Finger Rock Wash
Letter of Map Revision
Technical Data Notebook

Sections 3, 10, 15 & 22, T13S, R14E
G&SRB&M, Pima County, Arizona

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Expires 12/31/2012

CMG Project No. 27028
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SECTION 1: INTRODUCTION

1.1 Purpose

This Technical Data Notebook has been prepared in support of a Letter of Map Revision (LOMR) submittal to amend the 100-year floodplain, or Special Flood Hazard Area (SFHA) associated with Finger Rock Wash in Pima County, Arizona. The purpose of this LOMR application is to revise the effective Flood Insurance Rate Map (FIRM) SFHA boundaries based on updated and more detailed information. No new hydraulic structures are present within the study limits.

1.2 Authority for Study

The National Flood Insurance Act of 1968 created the National Flood Insurance Program (NFIP) to improve basic knowledge about flood hazards and reduce future flood damages through State and local community floodplain management regulations (Reference #1). The Federal Emergency Management Agency (FEMA) is charged with administration of the NFIP. In addition to providing flood insurance and floodplain management regulations, the NFIP identifies and maps the nation's floodplains. The floodplains are depicted on Flood Insurance Rate Maps, or FIRMs, for each local community. FEMA recognizes that changes to the maps may be necessary over time due to improvements in the techniques used in assessing flood risks, changes in physical conditions in the floodplains or watersheds, or the availability of new scientific or technical data. The NFIP regulations allow FEMA to revise and amend maps, as warranted, and require that each NFIP community inform FEMA of any new studies that present information that more accurately reflects existing flood risks and affects Base Flood Elevations (BFEs) in the community. This LOMR application has been undertaken by the Pima County Regional Flood Control District (PCRFCD) to fulfill this NFIP requirement for updated flood hazard mapping on Finger Rock Wash.

1.3 Location of Study

The study reach of Finger Rock Wash is located within portions of Sections 3, 10, 15 and 22, Township 13 South, Range 14 East, G&SRB&M, in northeastern Pima County, Arizona. A location and vicinity map for the study area are shown on Figure 1, Appendix F.

1.4 Hydrologic and Hydraulic Methodology

Hydrologic analyses were performed to update the 1% annual chance flood regulatory discharge rates at various concentration points along the Finger Rock Wash based on improved methodology and more recent topographic mapping in the watersheds downstream of the Coronado National Forest. The hydrologic modeling was performed using the U.S. Army Corps of Engineers' HEC-1 flood hydrograph computer program. The methodology is consistent with Arizona Department of Water Resources (ADWR) State Standard for Hydrologic Modeling Guidelines (SS10-07) (Reference #2) and model parameters were provided by the PCRFCD in accordance with District guidelines and policies.

The U.S. Army Corps of Engineers' river system modeling software, HEC-RAS version 4.0.0, March 2008, was used to model the water surface elevations and determine floodplain limits for the 1% annual chance flood profile. The hydraulic model is based on updated topographic information collected along the study reaches.

1.5 Acknowledgments

Guidance and review was provided throughout the development of this study by PCRFCD staff including Lynn Orchard, CFM, Project Manager; Bill Zimmerman, Planning & Development Division Manager; Terry Hendricks, CFM; & Evan Canfield, PhD, PE, CFM.

1.6 Study Results

The enclosed information has been developed to support this LOMR application. The application has been reviewed and accepted by PCRFCD, the local agency with jurisdiction over the affected watercourses. The study results provide a more accurate and detailed floodplain delineation for Finger Rock Wash than was previously reported.

SECTION 2: FEMA FORMS

2.1 Study Documentation Abstract for FEMA Submittals

2.1.1 Date Study Accepted

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2.1.2 Study Contractor

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2.1.3 FEMA Technical Review Contractor

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2.1.4 FEMA Regional Reviewer

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2.1.5 State Technical Reviewer

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2.1.6 Local Technical Reviewer

Lynn Orchard, CFM Chief Hydrologist
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2.1.7 Reach Description

The downstream limit of this study is the confluence of Finger Rock Wash with Rillito Creek. The study extends approximately 4.80 miles upstream on the main Finger Rock Wash main channel to the Coronado National Forest boundary. The study also includes a short tributary reach on Pontatoc Canyon Wash that joins Finger Rock Wash approximately 0.16 miles downstream of the Coronado National Forest boundary (the upstream study limit). Lastly, the study area includes a split reach that diverges east from Finger Rock Wash near River Mile 4.477, at the Coronado Drive at-grade crossing, and extends downstream approximately 0.85 miles before rejoining the main Finger Rock Wash channel near River Mile 3.748.

The study reaches are currently designated as SFHA Zone A on the following DFIRM Panels that have an effective date of February 8, 1999 (relevant LOMR updates are also noted):

- 04019C1635K, revised to reflect LOMRs dated October 12, 2000 and April 29, 2004;
- 04019C1643K, revised to reflect LOMR dated April 22, 2004;
- 04019C1644K, revised to reflect LOMR dated April 22, 2004;
- 04019C1645K;

2.1.8 USGS Quadrangle Sheets

The watersheds for the study area are shown on Tucson North, Oro Valley and Sabino Canyon USGS 7.5-Minute, 1:24,000 Quadrangle Maps for Arizona. The floodplain mapping study area is contained on the Tucson North Quadrangle Map.

2.1.9 Unique Conditions and Problems

There were no remarkable unique conditions or problems encountered during the course of this study.

2.1.10 Coordination of Peak Discharges

Suitable stream flow data is not available for Finger Rock Wash. The PCRFCD does have an Alert Flood Warning gage at the Skyline Road culvert crossing, however the data produced by this gage is not considered applicable for detailed stage-discharge measurement analysis or comparisons. A HEC-1 flood hydrograph model was developed for the Finger Rock Wash watershed based on a hypothetical storm event for the 1-percent annual chance recurrence interval. The HEC-1 model was set up using methodology prescribed by the PCRFCD at the time this study was initiated. The resulting discharge rates were reviewed and approved by the PCRFCD technical reviewer on or about February 18, 2008, prior to the initiation of floodplain hydraulic mapping.

2.2 FEMA Forms

FEMA MT-2 Forms are included in Appendix A including:

- MT-2 Form 1, Overview and Concurrence Form, plus Attachment 1-1: Part C. Review Fee – Exemption explanation
- MT-2 Form 2, Riverine Hydrology & Hydraulics Form
- MT-2 Form 3, Riverine Structures Form, plus Attachment 3-1: Part A. General – Description of Structure continuation

SECTION 3: SURVEY AND MAPPING INFORMATION

3.1 Field Survey Information

As-built elevations for the existing culverts and select ground points located throughout the study reach were field surveyed by OPW Engineering, LLC in January 2008, as a part of this project. As-built plans for the culverts that were available and certified field survey information are provided in Appendix C. The survey information is also provided graphically on the certified Hydraulic Work Maps found in Appendix F.

3.2 Mapping

Topographic mapping and aerial photography used in the preparation of this LOMR application were acquired from the Pima Association of Governments (PAG) GIS Regional Data Clearinghouse. The topographic mapping was generated in 1998, with contours being provided on a 2-foot interval. The aerial photography was generated in 2005 by PAG. The topography and all field survey elevations are based on the following:

- Horizontal Datum: NAD83-92(HARN)
- Projection: Arizona State Plane, Central Zone
- Units: International Feet
- Vertical Datum: NAVD88

A vertical datum conversion from NAVD88 to NGVD29 was performed in accordance with the conversion protocol from *Guidelines & Specifications for Mapping Partners, FEMA, April 2003, Appendix B, Guidance for Converting to NAVD88* (Reference #3). The average NGS Vertcon datum shift for the Finger Rock Wash study reach is: NAVD88 – 2.29 ft = NGVD29. The conversion computations have been included in Appendix C.

The electronic DFIRM files in AutoCAD and ArcView formats (horizontal datum, projection & units as noted above) were acquired from the PCRFCD for use in creating mapping exhibits for this LOMR. Hydraulic Work Maps and Annotated FIRMs have been provided at a horizontal scale of 1 inch = 100 feet. The effective FIRM mapping for Finger Rock Wash was completed either as part of the original Flood Insurance Study (FIS) for Pima County in 1979, or as an update in the mid-1980s. The original mapping, outside the LOMR areas noted above, was based on approximate methods and a hydraulic model was not available for this study.

SECTION 4: HYDROLOGY

4.1 Method Description

As noted in Section 1.4 above, the U.S. Army Corps of Engineers' HEC-1, computer program, version 4.1, June 1998 (Reference #4), was used to develop peak flow rates and hydrographs from the 1% annual chance storm occurring over the entire Finger Rock Wash watershed. Peak discharges from the HEC-1 model were input into the floodplain hydraulic model (HEC-RAS) at key locations along the watercourse to simulate flood flows moving through the study reach.

4.2 Parameter Estimation

4.2.1 Drainage Area Boundaries

The limits of the study watershed extend from the geologic floodplain of the Rillito Creek on the downstream end (near the boundary line between T13S, R14E, Section 22/27), upstream (northward) to the upstream limits near Mt. Kimball (in T12S, R14E, Section 23) in the Santa Catalina Mountains, north of Tucson. The watershed varies in elevation from approximately 2426 feet at the downstream end to approximately 7245 feet near the peak of Mt. Kimball. Watercourse slopes in the overall watershed vary from 0.028 feet per feet in the lower watershed, to approximately 0.405 feet per feet in the upper watershed.

4.2.2 Watershed Work Maps

A watershed work map was developed for the project using PAG aerial photography and topographic GIS data for the areas south (downstream) of the Coronado National Forest boundary (boundary line between T13S, R14E, Sections 34/3 & Sections 35/2) and USGS Quadrangle Maps for the areas upstream of the Forest boundary. This map was generated at a horizontal scale of 1 inch = 800 feet. The topography is provided with a contour interval of 10 feet in the PAG data areas, and a contour interval of 40 feet on the USGS Quadrangles. The watershed map, which is provided as Figure F-2 in Appendix F, illustrates the following information:

- Subbasin boundaries and flow concentration points;
- Point rainfall locations and data;
- Time of concentration (T_c) flow paths;
- Hydrograph routing flow paths;
- Tabular hydrologic data for each subbasin.

4.2.3 Gage Data

As noted in Section 2.1.10 above, there is a PCRFCD Alert Flood Warning gage at the Skyline Road culvert crossing; however the data produced by this gage is not applicable for detailed stage-discharge measurement analysis or comparisons. Consequently, stream flow gage data was not available for this study.

4.2.4 Statistical Parameters

Rainfall data records and information were acquired from NOAA Atlas 14, *Precipitation-Frequency Atlas of the United States, Volume 1 Version 4.0: Semiarid Southwest (Arizona, Southeast California, Nevada, New Mexico, Utah)*, 2004, Revised 2006 (Reference #5). Excerpts from this document that provide a discussion on the length of records and methods of analyses are provided in Appendix D.1.

4.2.5 Precipitation

As noted in the previous section, rainfall data for this study was acquired from NOAA Atlas 14 records for the Finger Rock Wash watershed. Per requirements contained in PCRFCD Technical Policy TECH-010 *Rainfall Input for Hydrologic Modeling* (Reference #6), values that correspond to the upper bound of the 90% confidence interval were used.

Seven point rainfall locations were chosen within the watershed to provide representative rainfall amounts for the hydrologic model. Rainfall depths increased as elevations in the watershed increased. Rainfall data is summarized in Table 1, NOAA 14 data sheets are included in Appendix D.1, and point rainfall locations are shown on Figure F-2 in Appendix F.

Table 1: NOAA 14 Precipitation Table – 3-hr Storm Duration

Point Rainfall ID	T-R-S	Latitude / Longitude	Approx Elev.	Corresponding HEC-1 Subbasin	100-yr Rainfall Depth (inches)	100-yr Rainfall Depth with 0.84 Aerial Reduction (inches)
A	12-14-23	32.3726/-110.8809	6768	FR-11, -12	4.00	3.36
B	12-14-26	32.3613/-110.8801	5833	FR-93, -94	3.96	3.33
C	12-14-35N	32.3522/-110.8906	4917	FR-10, -921, -922	3.83	3.22
D	12-14-35S	32.3412/-110.8922	3782	FR-9, -91, -92	3.70	3.11
E	13-14-03	32.3305/-110.8998	2910	FR-62, -7, -8, -81, -82	3.55	2.98
F	13-14-10	32.3164/-110.9011	2749	FR-4, -5, -6, -61	3.39	2.85
G	13-14-15	32.2999/-110.9061	2598	FR-1, -2, -3	3.29	2.76

The HEC-1 model produced a total time to peak (T_p) for the Finger Rock Wash watershed of 1.33 hours. From USDA Natural Resources Conservation Service (NRCS) (formerly SCS) NEH-4, *Hydrology, Chapter 16 - Hydrographs* (Reference #7) Equations 16.7 and 16.12, a T_p of 1.33 hours equates to an approximate T_c = 2 hours. A 3-hour design storm was chosen in accordance with PCRFCD Technical Policy 18 (TECH-018) *Acceptable Model Parameterization for Determining Peak Discharge* (Reference #8), in which a 3-hour storm distribution is stipulated as the local storm for watersheds with times of concentration equal to, or less than 3 hours.

The 3-hour hypothetical storm corresponds to relatively small convective thunderstorms that often occur during the months of July through September in the Tucson area. These storms are usually limited in aerial extent with maximum rainfall amounts and intensities confined to less than a two-square-mile central core of rainfall. An aerial reduction factor of 0.84 that is consistent with the 6.35 square mile Finger Rock Wash watershed area was applied to the NOAA 14 point rainfall data for input into the HEC-1 model. The aerial reduction factor was derived from NOAA Technical Memorandum NWS HYDRO-40 data that support the premise that average rainfall depths decrease as the areal extent of storms increase. Aerial reduction factors for Arizona are presented in ADWR State Standard SS10-07 (Reference #2).

Rainfall temporal distribution was based on that presented in the City of Tucson Stormwater Management Study (TSMS), *Existing-Conditions Hydrologic Modeling for the TSMS Phase II* (Reference #9) and a TSMS Technical Memorandum 7.2.6, *Temporal Distribution for a 3-hour Thunderstorm* (Reference #10). These documents describe how the TSMS 3-hour temporal distribution was adapted from a 1-hour rainfall distribution developed from data collected from the nearby US Agricultural Research Service Walnut Gulch Experimental Watershed. The data collection and research are documented in a technical paper *Storm-Cell Properties Influencing Runoff From Small Watersheds* (Osborn, 1983) (Reference #10) for 3-hour, early-occurring, maximum rainfall intensities. The TSMS Temporal Distribution of a Design 3-Hour Thunderstorm and TSMS Technical Memorandum 7.2.6 are included in Appendix D.1.

4.2.6 Physical Parameters

The Finger Rock Wash watershed was subdivided into 22 subbasins, varying in size from 0.055 to 0.592 square miles. Subwatershed physical characteristics are summarized in

Table 2. A schematic diagram of the HEC-1 stream network can be found on pages 9 through 11 of the HEC-1 input/output printout in Appendix D.5.

Rainfall loss and runoff transformation methods and parameters were determined based on PCRFCD TECH-018 guidelines and Pima County Hydrology Procedures documented in the PCRFCD *PC-Hydro User Guide*, March 2007 (Reference #11).

Table 2: Subbasin Physical Parameters

Subbasin ID	Subbasin Area (sq mi)	Hydrologic Soils Groups			Vegetation Cover (%)	SCS Curve No.	Impervious Surface (%)	T_c Flow Path Length (ft)	Mean Slope (ft/ft)	T_c (hrs)	Lag (hrs)
		B (%)	C (%)	D (%)							
FR-1	0.083	90	10	0	30	77	10	3097	0.027	0.325	0.195
FR-2	0.175	85	15	0	30	77	15	4970	0.033	0.420	0.252
FR-3	0.317	88	12	0	30	77	25	6080	0.029	0.390	0.234
FR-4	0.055	92	8	0	30	77	25	2110	0.041	0.167	0.100
FR-5	0.155	90	10	0	25	77	10	3880	0.035	0.333	0.200
FR-6	0.133	15	30	45	30	77	20	5122	0.034	0.370	0.222
FR-7	0.173	84	6	10	30	78	20	4695	0.040	0.372	0.223
FR-8	0.592	40	0	60	30	85	20	7005	0.189	0.318	0.191
FR-9	0.151	0	0	100	40	86	5	5720	0.226	0.297	0.178
FR-10	0.561	0	0	100	40	86	2	8770	0.287	0.330	0.198
FR-11	0.480	0	0	100	40	86	10	7260	0.382	0.290	0.174
FR-12	0.434	0	0	100	40	86	15	6834	0.299	0.288	0.173
FR-61	0.166	60	20	20	30	81	35	6064	0.036	0.478	0.287
FR-62	0.503	75	0	25	30	80	20	8880	0.120	0.249	0.199
FR-81	0.313	40	0	60	30	85	20	9495	0.241	0.388	0.233
FR-82	0.330	40	0	60	30	85	15	6745	0.336	0.277	0.166
FR-91	0.113	0	0	100	40	86	10	3680	0.186	0.277	0.166
FR-92	0.222	0	0	100	40	86	5	5440	0.224	0.268	0.161
FR-93	0.381	0	0	100	40	86	5	6520	0.373	0.295	0.177
FR-94	0.464	0	0	100	40	86	10	6660	0.295	0.278	0.167
FR-921	0.211	0	0	100	40	86	2	6140	0.238	0.267	0.160
FR-922	0.341	0	0	100	40	86	10	7300	0.405	0.302	0.181

Rainfall losses were estimated by the SCS Curve Number (CN) method. This method estimates infiltration losses based on hydrologic soils types and vegetation type and cover density. Hydrologic soils types for each subbasin were determined from the Soil Survey of Pima County, Arizona as provided in GIS format by the PCRFCD. Hydrologic soil type percentages were estimated by overlaying the GIS soils drawings onto the CAD watershed map for each subbasin. Vegetation cover types and densities were estimated by examination of aerial photographs and guidance found in Section 2.4.3 of the PCRFCD PC-Hydro User Guide (Reference #11).

For portions of the Finger Rock Wash watershed south of the Coronado National Forest boundary, the percent impervious surface listed in Table 2 reflects the existing land use as determined by zoning/development records and aerial photographs. North of this boundary, impervious surfaces varying from 2% to 10% per subwatershed, were estimated from aerial photographs to account for hydraulically-connected rock outcrops.

Runoff transformation was modeled using the SCS Unit Hydrograph function within HEC-1. This method requires that subbasin Lag times be input on the HEC-1 UD records. Lag times were computed as L = 0.6 T_c per Equation 15.3 from NRCS NEH-4, *Hydrology, Chapter 15 – Travel Time, Time of Concentration and Lag* (Reference #7). For the T_c computations, the subbasin watershed boundaries and T_c hydraulic flow paths were delineated on the Finger Rock Wash Watershed Map, Figure F-2. Per methods outlined in NRCS Technical Release No. 55 (TR-55) (Reference #12), sheet flow, shallow concentrated flow and channel flow segments were identified along the T_c hydraulic flow paths. Velocities in the channel portions of the T_c flow paths were estimated by a Manning's normal depth analysis for a representative channel cross section within each channel segment.

The Manning's n values were determined based on review of aerial photographs and methods prescribed in Arizona State Standard for Floodplain Hydraulic Modeling (SS 09-02) (Reference #13) and USGS Scientific Investigations Report 2006-5108 (Reference #14). Attention was paid to the resulting Froude numbers generated by the application of the estimated Manning's n values to confirm that appropriate hydraulic conditions, i.e. sub-critical flow were being produced for each channel segment. This is in accordance with USGS and USDA Forest Service studies (References #15 and #16, respectively), which found that high gradient and mobile bed natural channels, such as those found within the Finger Rock Wash drainage system, will not consistently flow under super-critical conditions except for short isolated reaches and for short time periods. T_c and Lag time parameters are summarized in Table 2, and detailed computation sheets are included in Appendix D.2.

Hydrograph routing between subbasins was performed using the normal depth storage routing method option within HEC-1. Representative eight-point cross sections were developed for each routing reach based on field investigations and review of PAG 2005 color aerial photographs and 1998 topography. Manning's n values for each routing reach were estimated using similar methods described above for the T_c channel segment velocity computations, i.e. channel roughness was computed based on the assumption that flow in steep gradient, mobile bed channels is seldom supercritical (References #15 and #16).

From ADWR SS 10-07 (Reference #2), “the amount of hydrograph attenuation is related to the number of subreaches needed to simulate the movement of the flood wave through the reach.” For this study, guidance from the HEC-1 User Manual (Reference #4) was used to estimate the appropriate number of subreaches for each routing reach per the following relationship. The number of subreaches should be equal to the flood wave travel time through the routing reach divided by the HEC-1 model computational time interval (NMIN). A ratio of flood wave velocity to average channel velocity of 1.5 for natural watercourses was used to compute the routing reach flood wave travel times.

To account for potential flood storage upstream of the five culvert crossings within the study reach, flood storage (reservoir) routing was performed at each culvert crossing using the Modified Puls reservoir routing option within HEC-1. Culvert and roadway input data were determined from as-built plans, field surveys, site visits and inspection of aerial photographs and topography. Upstream area-elevation information was determined from the project topographic mapping by CAD methods and input into the HEC-1 model on the SA and SE records. Separate stage-discharge relationships for each culvert were developed by use of the Federal Highways Administration (FHWA) HY-8 Culvert Hydraulic computer program. This program is based on and automated the design methods described in FHWA Hydraulic Design Series No. 5 (HDS-5) Hydraulic Design of Highway Culverts (Reference #17). Stage-discharge information was input into the HEC-1 model on the SQ and SE records. A summary of the channel routing information is shown in Table 3, and the hydrograph routing and reservoir routing data are included in Appendices D.3 and D.4 respectively.

Table 3: Subbasin Channel Routing Summary

Routing Reach ID	Left Overbank Manning's n	Channel Manning's n	Right Overbank Manning's n	Reach Length (ft)	Channel Slope (ft/ft)	Flood-wave Velocity (ft/sec)	Reach travel time (min)	Number of sub-reaches*
FR-2 to FR-1	0.050	0.040	0.050	2300	0.018	11.2	3.4	2
FR-3 to FR-2	0.055	0.045	0.055	2465	0.016	10.7	3.8	2
FR-4 to FR-3	0.060	0.045	0.060	5940	0.017	12.5	7.9	4
FR-5 to FR-4	0.060	0.050	0.060	1270	0.019	10.6	2.0	1
FR-6 to FR-5	0.060	0.045	0.060	3140	0.018	13.6	3.8	2
FR-7 to FR-6	0.060	0.045	0.060	3136	0.024	14.5	3.6	2
FR-8 to FR-7	0.060	0.045	0.060	1350	0.018	15.3	1.5	1
FR-9 to FR-8	0.065	0.065	0.065	4615	0.045	19.0	4.0	2
FR-10 to FR-9	0.095	0.095	0.095	4300	0.093	16.5	4.3	2
FR-11 to FR-10	0.125	0.125	0.125	4720	0.159	18.1	4.3	2
FR-12 to FR-11	0.160	0.160	0.160	4000	0.268	15.7	4.2	2
FR-62 to FR-61	0.050	0.050	0.050	4270	0.032	10.9	6.5	3
FR-82 to FR-81	0.085	0.085	0.085	4475	0.049	11.4	6.5	3
FR-92 to FR-91	0.095	0.095	0.095	1520	0.092	18.0	1.4	1
FR-93 to FR-92	0.105	0.105	0.105	4220	0.121	16.1	4.3	2
FR-94 to FR-93	0.160	0.160	0.160	3600	0.286	14.3	4.2	2
FR-922 to FR-921	0.115	0.115	0.115	5100	0.135	12.8	6.6	3

* Equals Flood Wave Velocity divided by HEC-1 computation interval (NMIN) of 2 min.

4.3 Problems encountered during the Study

4.3.1 Special Problems and Solutions

There were no special problems or unique situations encountered during the hydrologic modeling for this study.

4.3.2 Modeling Warnings and Error Messages

There were no errors encountered during the HEC-1 modeling. Warning messages were encountered during channel routing operations for HEC-1 Stations [12 to 11], [RES-9], [92 to

91], [RES-91], [RES-7], [7 to 6], [RES-5], [RES-4], [3 to 2] and [2 to 1]. The following is an example of the warning message displayed in the HEC-1 output.

```
*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR
OUTFLOWS BETWEEN 0. TO 4272.  THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR
OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.  THIS CAN BE CORRECTED
BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)
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Examination of the routed hydrographs found that no outflows were greater than peak inflows. For Stations [12 to 11], [92 to 91], [RES-7], [7 to 6], [3 to 2] and [2 to 1], the numerically unstable outflow ranges were outside the outflow ranges of the Finger Rock Wash model. For Stations [RES-9] and [RES-91], the Finger Rock Wash model outflows were within the numerically unstable outflow ranges, but no oscillations were noted in the hydrographs and the results appeared reasonable. For Stations [RES-5] and [RES-4], single minor oscillations occurred near the beginning of these reservoir routing hydrographs. The remainder of the hydrograph was normal and the oscillation did not appear to impact the modeling results. Therefore, no corrective steps were taken.

4.4 Calibration

No calibration was conducted in this study.

4.5 Final Results

4.5.1 Hydrologic Analysis Results

The results of the HEC-1 modeling for Finger Rock Wash are summarized by subbasin in Table 4. See Appendix D.5 for the Finger Rock Wash HEC-1 input/output and Appendix G for the electronic input file.

Table 4: Peak Discharge Summary by Subbasin

Subbasin ID	Area (sq. mi)	Subbasin Discharge (cfs)	Cumulative Discharge (cfs)	Time of Peak (hrs)
FR-1	0.083	61	5589	1.33
FR-2	0.175	131	5653	1.27
FR-3	0.317	301	5756	1.20
FR-4	0.055	72	6046	1.00
FR-5	0.155	120	6213	0.93
FR-6	0.133	123	6657	0.77
FR-7	0.173	180	6121	0.70
FR-8	0.592	887	6055	0.63
FR-9	0.151	224	4798	0.60
FR-10	0.561	822	2235	0.53
FR-11	0.480	854	1563	0.47
FR-12	0.434	811	811	0.40
FR-61	0.166	202	770	0.57
FR-62	0.503	595	595	0.47
FR-81	0.313	430	852	0.53
FR-82	0.330	495	495	0.40
FR-91	0.113	181	2503	0.57
FR-92	0.222	343	2377	0.53
FR-921	0.211	337	777	0.53
FR-922	0.341	559	559	0.43
FR-93	0.381	635	1388	0.47
FR-94	0.464	830	830	0.40
Totals	6.353	N/A	N/A	N/A

4.5.2 Verification of Results

The Finger Rock Wash LOMR hydrologic results were compared with other similar-sized Santa Catalina Mountain foothills watershed's effective discharges for the 100-year storm event. An additional comparison was made using the southern Arizona regional regression equations published by the USGS. Table 5 summarizes the results of these comparisons. The Finger Rock Wash LOMR peak discharge was similar to the peak discharge from the 1986 effective Pima County regulatory study by Simons, Li & Associates (Reference #18), which utilized the Pima County Hydrology Method established in 1979. The Finger Rock Wash LOMR HEC-1 unit discharge was somewhat larger than the unit discharge computed from the USGS Regional Regression Equation 13 for southern Arizona (Reference #19); probably due in part to the urbanized characteristics of the downstream half of the watershed. Overall, the Finger Rock Wash LOMR HEC-1 model predicts a unit discharge within one standard error (68-percent confidence interval) of the regression estimate for Finger Rock Wash. Therefore, the flood discharge estimates used for this LOMR are considered reasonable per guidelines in Appendix C of FEMA's *Guidelines & Specifications for Flood Hazard Mapping Partners* (Reference #20).

Table 5: Comparison to Similar Watersheds – 100-year Recurrence Interval Storm

Data Source	Basin Area (sq. mi.)	100-Year Runoff (cfs)	Unit Runoff (cfs/sq. mi)
Finger Rock Wash Model from This Study	**6.353**	**5589**	**880**
Finger Rock Wash per USGS Regional Regression Equation 13	6.353	3815	601
Finger Rock Wash from Flecha Caida Study (SLA 1986) and Pima Co Effective Regulatory Discharge	6.444	5779	897
Esperero Canyon Wash at Confluence with Ventana Canyon – Pima Co Effective FIS	6.2	8440	1361
Ventana Canyon at Sunrise Drive – Pima Co Effective FIS	7.0	10,770	1539
Pima Wash Above Confluence with Geronimo Wash - Pima Co Effective FIS	6.3	4250	675
Sabino Creek Above Confluence with Bear Creek – Pima Co Effective FIS	36.8	12,500	340
Sabino Canyon Gauged Data (1993)	35.5	11,300	318

SECTION 5: HYDRAULICS

5.1 Method Description

Finger Rock Wash, from its confluence with Rillito Creek on the downstream end, extending approximately 4.80 miles upstream on the main channel to the Coronado National Forest boundary is the primary subject of this LOMR application. The study also includes a short tributary reach on Pontatoc Canyon Wash that joins Finger Rock Wash approximately 0.16 miles downstream of the Coronado National Forest boundary (the upstream study limit). Lastly, the study area includes a split reach that diverges north and east from Finger Rock Wash near River Mile 4.477, at the Coronado Drive at-grade crossing, and extends downstream approximately 0.85 miles before rejoining the main Finger Rock Wash channel near River Mile 3.748.

Finger Rock Wash is a major tributary to Rillito Creek that emanates from the Santa Catalina Mountains, north of the City of Tucson, Arizona. Flow is generally in a north to south direction and the floodplain mapping study reach is situated primarily in mountain foothills terrain. Finger Rock Wash consists primarily of a sand/cobble bed channel varying in depth up to approximately four feet in places. The channel is well entrenched and the floodplain changes from narrow steep-sided canyons in the upper reaches, to broader, flatter floodplains in the lower reaches. The overbanks of the wash are moderately to heavily vegetated. The upstream portions of the study area are of a relatively natural character, with an active channel, and narrow floodplains with abundant desert vegetation. Human activity and floodplain encroachment increase in the downstream direction. Development is generally limited to low-density residential development. Activities that impact the channel and floodplain include road crossings and residential development encroachment.

HEC-RAS, Version 4.0.0 (March 2008, U.S. Army Corps of Engineers) was used to determine the water surface elevations for the 100-year discharge. The downstream boundary condition for the model was determined by the normal depth method within HEC-RAS (slope equal to 0.015 feet per foot).

5.2 Work Study Maps

Hydraulic work maps were developed for the project using PAG aerial photography and topographic GIS data for the floodplain mapping areas south (downstream) of the Coronado National Forest boundary (boundary line between T13S, R14E, Sections 34/3 & Sections

35/2). These maps were generated at a horizontal scale of 1 inch = 100 feet. Streets and property line base information have been imported from Pima County effective DFIRM panels 0419C1635K, 0419C1643K, 0419C1644K and 0419C1645K that were provided by PCRFCD. The topography is provided with a contour interval of 2 feet, and the contours and all ground elevation data are based on NAVD88 vertical datum. Due to Pima County's impending conversion from NGVD29 to NAVD88 vertical datum, water surface elevations have been provided on both datum with a VERTCON of NAVD88 Elev. minus 2.29 feet = NGVD29 Elev. A vertical datum conversion computation sheet is provided in Appendix C.1.

In addition to the information mentioned above, the Hydraulic Work Maps, which are provided as Figure F-4 (Sheets 1 through 6) in Appendix F, illustrate the following:

- Survey Township, Range & Section information;
- Stream channel center lines / profile base lines;
- River & reach identifiers that correspond to the HEC-RAS model;
- HEC-RAS hydraulic cross-section lines with graphic representation of the 1% annual chance flood water surface elevations on NGVD29 & NAVD88 vertical datum;
- 1% annual chance flood water surface elevations on NGVD29 & NAVD88 vertical datum in tabular format;
- Lateral weir crest boundary line;
- Existing culvert type, size & elevation information;
- Effective 1% annual chance flood Zone A SFHA boundaries;
- Proposed 1% annual chance flood Zone AE SFHA boundaries.

5.3 Parameter Estimation

5.3.1 Roughness Coefficients

Manning's roughness coefficients were established for the hydraulic modeling phase of this project. A field reconnaissance study was conducted, and the results are summarized in the report entitled *Finger Rock Wash LOMR Study – Field Reconnaissance Report*, prepared by CMG Drainage Engineering, Inc, and dated September 9, 2010. This study is provided in Appendix E.1 of this report and Table 6 provides a summary of the selected coefficients organized by river reach.

Table 6: Summary of Manning's "n" Roughness Coefficients

River Station	Left Overbank	Channel	Right Overbank
Pontatoc Canyon Tributary Reach			
RS 0.000 to 0.154	0.086	0.066	0.086
Finger Rock Wash Main Channel Reach 1			
RS 4.643 to 4.800	0.086	0.066	0.086
Finger Rock Wash Main Channel Reach 2			
RS 4.492	0.083	0.050	0.083
RS 4.509 to 4.596	0.083	0.061	0.083
Finger Rock Wash Main Channel Reach 3			
RS 3.748 to 4.477	0.083	0.061	0.083
Finger Rock Wash Main Channel Reach 4			
RS 0.000 to 1.939	0.066	0.045	0.066
RS 1.997 to 2.019	0.025	0.025	0.025
RS 2.047 to 2.164	0.066	0.045	0.066
RS 2.233 to 2.268	0.045	0.045	0.045
RS 2.305 to 3.440	0.075	0.050	0.075
RS 3.466 to 3.494	0.020	0.020	0.020
RS 3.521 to 3.656	0.083	0.061	0.083
Coronado Split Reach			
RS 0.000 to 0.186	0.083	0.061	0.083
RS 0.221	0.083	0.030	0.083
RS 0.271	0.083	0.070	0.083
RS 0.319	0.083	0.065	0.083
RS 0.352 to0.382	0.083	0.060	0.083
RS 0.399 to 0.482	0.083	0.070	0.083
RS 0.527	0.083	0.061	0.083
RS 0.561	0.030	0.083	0.061
RS 0.581 to 0.847	0.083	0.030	0.083
RS 0.854	0.083	0.030	0.061

5.3.2 Expansion and Contraction Coefficients

Expansion and contraction coefficients used in the HEC-RAS model are based on guidance provided in the HEC-RAS User's Guide and Hydraulic Reference Manual (Reference #21). An expansion coefficient of 0.1 and contraction coefficient of 0.3 were used at all cross sections, except at culvert inlets and outlets where they were set respectively, at 0.3 and 0.5.

5.4 Cross Section Description

The revision area includes the entire length of Finger Rock Wash south (downstream) of the Coronado National Forest, which presently includes only a Zone A SFHA. This LOMR proposes to upgrade the floodplain mapping and SFHA zone designation to Zone AE for all reaches of the watercourse with current SFHAs. A HEC-RAS model consisting of 141 cross-sections has been prepared for Finger Rock Wash. The cross-section channel reach lengths range from approximately 23 feet to approximately 822 feet with an average reach length of just under 220 feet. All cross-sections are based on existing conditions 2-foot contour interval topography, produced in 1998, which was provided by Pima County for this project. Ground surveys and other Pima County GIS ground point data were also used to supplement the 1998 topography in areas where more detail was required. All topography and ground elevation data are based on NAVD88 vertical datum.

Cross section locations were chosen based on guidance provided in the HEC-RAS User's Guide, Hydraulic Reference Manual, and Arizona State Standard for Floodplain Hydraulic Modeling (SS 09-02) (Reference #13). The cross sections were located considering changes in channel geometry, discharge, slope, roughness, and distance between cross sections for computational stability. Since the effective FIS mapping for Finger Rock Wash is Zone A, no FIS cross sections exist on the effective FIRM panels. This precluded the need to duplicate effective cross section locations in the current model. Ground points for each cross section were initially obtained by CAD methods, with points being added or modified manually to select cross sections, where needed, to make the model more representative of actual ground conditions. The cross sections were oriented to be perpendicular to estimated flow paths of the 100-year flood event.

Between Finger Rock Wash main channel cross sections 3.748 and 4.477, a flow split reach, which begins at the Coronado Drive at-grade crossing, was modeled as described in Section 2.1.7 above. Cross sections in the split reach numbered from river mile 0.000 (coincident with main channel RS 3.748) to 0.854 (coincident with main channel RS 4.477). Split reach cross sections 0.000, 0.079, 0.114 and 0.186 shared alignments with main channel cross sections 3.748, 3.815, 3.855 and 3.891, respectively. Split reach cross sections between and inclusive of 0.221 to 0.482 were drawn separately from the main channel cross sections. Split reach cross sections between and inclusive of 0.527 to 0.854 again shared alignments with main channel cross sections 4.169 to 4.477, respectively. Additional discussion about the modeling of the Coronado Drive flow split modeling can be found later in Section 5.5.4 of this report.

The location of the channel center line/profile base line and cross-sections are shown on the work maps provided in Appendix F.

5.5 Modeling Consideration

5.5.1 Hydraulic Jump and Drop Analysis

Except at roadway culvert crossings, there were no locations where significant hydraulic jumps or drops where noted. Culvert hydraulics are discussed in the next section, 5.5.2.

5.5.2 Bridges and Culverts

Five existing culverts were modeled within the study reach, from upstream to downstream they included, 1) a single cell 31'-0" x 10'-1" corrugated metal arch culvert on the Pontatoc Canyon tributary at Playa de Coronado, RS 0.078; 2) a single cell 28'-1" x 9'-6" corrugated metal arch culvert on the Finger Rock Wash main channel at Playa de Coronado, RS 4.771; 3) a single 48" diameter corrugated metal pipe culvert at Skyline Drive, main channel RS 3.479; 4) a 9-cell 10' x 8' reinforced concrete box culvert at Sunrise Drive, main channel RS 2.251; and, 5) a 7-cell 84" diameter corrugated metal pipe culvert at Pontatoc Canyon Drive, main channel RS 2.008. The culvert modeling procedures within HEC-RAS were used to analyze the hydraulics of the culverts. Geometric input data for the culverts were obtained from as-built plans and/or field surveys. Current as-built plans for the two Playa de Coronado culverts were available and have been included in Appendix C.2. Archive construction plans for the Skyline Drive and Sunrise Drive culverts were acquired from the Pima County Department of Transportation GIS records and have also been included in Appendix C.2. A summary of the culvert information is provided in Table 7.

Table 7: Culvert Summary Table

Culvert ID Number	Location			Culvert Type	Modeling Method	Culvert Geometric Data Source
	River	Reach	River Sta. / Roadway			
1	Pontatoc Canyon	Pontatoc Canyon	0.078 / Playa Coronado	31'-0" x 10'-1" Corrugated Metal Arch	HEC-RAS: FHWA HDS-5	As-built plans from LOMR #04-09-038P
2	Finger Rock Wash	Main Reach 1	4.771 / Playa Coronado	28'-0" x 9'-6" Corrugated Metal Arch	HEC-RAS: FHWA HDS-5	As-built plans from LOMR #04-09-038P
3	Finger Rock Wash	Main Reach 4	3.479 / Skyline Drive	Single 48" dia. Corrugated Metal Pipe	HEC-RAS: FHWA HDS-5	Pima Co DOT const. plans & OPW field survey
4	Finger Rock Wash	Main Reach 4	2.251 / Sunrise Drive	9-cell 10' x 8' Reinforced Concrete Box Culvert	HEC-RAS: FHWA HDS-5	Pima Co DOT const. plans & OPW field survey
5	Finger Rock Wash	Main Reach 4	2.008 / Pontatoc Canyon Dr	7-cell 84" dia. Corrugated Metal Pipe	HEC-RAS: FHWA HDS-5	OPW field survey

Results of the hydraulic analysis for the Skyline Drive culvert indicated that a substantial amount of flow would overtop the roadway during the base flood. Because of this overtopping scenario and the potential for the roadway embankment to be washed out during the base flood, separate HEC-RAS models were run to simulate conditions with and without the roadway and culvert in place. This was done to establish the conditions that produced the highest base flood elevations (BFEs) upstream and downstream of the roadway. The higher BFEs from one, or a combination, of the models were then used as the basis for floodplain mapping through the reach that is influenced by the Skyline Drive crossing.

The hydraulic influence of the Skyline Drive culvert crossing was examined from RS 3.386 downstream of the crossing, to RS 3.855 upstream of the crossing. The HEC-RAS results showed that the model with the Skyline Drive embankment in place produced the highest base flood elevations upstream of the crossing, and that there was no difference in the models downstream. The single 48-inch culvert beneath Skyline Drive has a relatively low capacity of approximately 232 cfs during the 100-year flood, compared to the design discharge of 6162 cfs at Skyline Drive. This results in the available storage upstream being filled up rapidly and only a small amount of flow attenuation occurring at the culvert. The modeling indicates that the channel and floodplain downstream of the roadway have a combined large conveyance capacity, which results in no difference in downstream BFEs with, or without the culvert and roadway embankment in place. Table 8 provides a summary of the HEC-RAS model results in the Skyline Drive area, as modeled with, and without the culvert and roadway embankment in place.

Table 8: HEC-RAS Model Results for "With" & "Without" Skyline Drive Culvert

Location			Base Flood Elevation (NAVD88)	
River	Reach	River Station	"With Skyline Dr. Culvert"	"Without Skyline Dr. Culvert"
Finger Rock Wash	Main Reach 3	3.855	2821.67	2821.67
Finger Rock Wash	Main Reach 3	3.813	2813.82	2813.82
Finger Rock Wash	Main Reach 3	3.748	2803.28	2803.71
Finger Rock Wash	Main Reach 4	3.656	2792.41	2789.97
Finger Rock Wash	Main Reach 4	3.565	2789.10	2780.60
Finger Rock Wash	Main Reach 4	3.521	2787.47	2775.39
Finger Rock Wash	Main Reach 4	3.494	2787.48	2773.26
Finger Rock Wash	Main Reach 4	3.479	Culvert	Section Removed
Finger Rock Wash	Main Reach 4	3.466	2767.22	Section Removed
Finger Rock Wash	Main Reach 4	3.440	2762.90	2762.90
Finger Rock Wash	Main Reach 4	3.403	2757.16	2757.16
Finger Rock Wash	Main Reach 4	3.386	2754.90	2754.90

The culvert modeling results also indicated that Pontatoc Canyon Drive would be overtopped during the base flood. However, this crossing was designed as a combination crossing with an armored embankment and therefore was not modeled in a breached scenario. A complete printout of the culvert modeling results for the HEC-RAS model with the Skyline Drive culvert and embankment can be found in Appendix E.4. Since the “No Skyline Dr Culvert” HEC-RAS model only contained changes in the few cross sections in the immediate vicinity of Skyline Drive, a full printout of the HEC-RAS modeling results has not been included. Instead, only the culvert and cross section summary output tables for this model have been provided in Appendix E.4. The complete electronic model files for both HEC-RAS models have been provided in Appendix G on compact disk.

5.5.3 Levees and Dikes

This section is not applicable.

5.5.4 Islands and Flow Splits

As noted in previous Sections 2.1.7 and 5.4, a flow split was determined to exist at the Coronado Drive at-grade crossing at Finger Rock Wash main channel RS 4.477. At this location, flows break out to the east and drain down Coronado Drive. The Coronado split reach extends downstream approximately 0.85 miles before rejoining the main Finger Rock Wash channel near RS 3.748. A separate water surface profile was established for the Coronado split reach with independent river stations extending from 0.000 on the downstream end to 0.854 on the upstream end at the Coronado Drive at-grade crossing flow split location.

Using the junction and split flow optimization features in HEC-RAS, discharges at the flow split were determined to be 3362 cfs in the main channel and 1922 cfs in the Coronado split reach. As flow progresses east and south down the Coronado split reach, topographic differences between the split reach and main channel cause some of the split flow to progressively return to the main channel. Lateral weirs, based on existing topography and obstructions, e.g. buildings, etc., were placed in the model along the drainage divide to simulate this return of flows to the main channel and estimate new discharge quantities at each cross section. The lateral weir crest line was extended along the drainage divide boundary between the main channel reach and Coronado split reach (drainage divide defined as the corresponding left and right bank stations respectively) from cross section 4.189/0.561 (main channel reach/split reach) to 4.477/0.854. Ineffective flow boundaries were set in the model at the drainage divide line to segregate the main channel flows from the Coronado split reach and to generate independent water surface profiles for each reach.

Between cross sections 4.289/0.677 and 4.315/0.691, the HEC-RAS model indicated that no additional flows were being shared between the split reach and main channel, so the lateral weirs were terminated and the remainder of the downstream split reach was modeled as an independent profile in HEC-RAS. Based on the modeling results described above, an island of high ground was mapped between the two profiles between cross sections 3.891/0.186 and 4.315/0.691. This mapping concept is consistent with the effective floodplain mapping in this area, albeit more detailed.

The base flood discharges and water surface elevations for the Coronado split reach and adjacent main channel reach are summarized in Table 9. Table 10 provides a summary of the locations, discharges and other hydraulic characteristics of the lateral weirs.

Table 9: Summary of Discharges and Water Surface Elevations: Coronado Split Reach vs. Corresponding Main Channel Reach 3 Cross Sections

River Station (Main Channel / Split Reach)	Base Flood Discharge (cfs)		Water Surface Elevation (per NAVD88 vertical datum)	
	Main Channel Reach 3	Coronado Split Reach	Main Channel Reach 3	Coronado Split Reach
4.477 / 0.854	3361.56	1922.44	2974.74	2974.65
4.470 / 0.847	3523.65	1760.35	2972.88	2972.70
4.447 / 0.830	3523.65	1476.49	2963.63	2966.41
4.426 / 0.813	4089.64	1194.36	2959.41	2961.67
4.409 / 0.794	4089.64	711.84	2953.59	2956.03
4.392 / 0.774	4640.72	643.28	2948.05	2950.78
4.371 / 0.749	4640.72	291.81	2943.66	2946.03
4.353 / 0.727	4992.19	229.97	2937.02	2941.29
4.333 / 0.708	5073.97	210.03	2931.34	2936.43
4.315 / 0.691	5073.97	165.05	2924.84	2932.21
4.289 / 0.677	5118.95	165.05	2919.18	2926.99
4.262 / 0.662	5118.95	165.05	2912.57	2921.27
4.243 / 0.642	5118.95	165.05	2906.58	2916.67
4.225 / 0.608	5118.95	165.05	2902.61	2908.95
4.205 / 0.581	5163.18	120.82	2897.10	2902.38
4.189 / 0.561	5163.18	120.82	2892.27	2895.54
4.169 / 0.527	5163.18	120.82	2885.81	2887.79
Main Channel RS 3.944 to 4.151 & Coronado Split RS 0.221 to 0.482 are independent profiles with separate cross section alignments				
3.891 / 0.186	5163.18	120.82	2827.24	2827.24*
3.855 / 0.114	5163.18	120.82	2821.67	2821.67*
3.813 / 0.079	5163.18	120.82	2813.82	2813.82*
3.748 / 0.000	5163.18	120.82	2803.28	2803.28*

*Water surface elevations controlled by Finger Rock Wash Main Channel Profile

Note that main channel reach 3 versus Coronado split reach water surface profiles were compared for cross sections 3.748 / 0.000 to 3.891 / 0.186 and the highest water surface elevations (from the main channel profile) were used to establish base flood elevations and delineate floodplain boundaries.

Table 10: Lateral Weir Summary Table

Reach	River Station	Lateral Weir Characteristics					
		Q Leaving (cfs)	Weir Top Width (ft)	Weir Avg Depth (ft)	Min Elev Weir Flow (NAVD88)	Water Surface Elev Upstream (NAVD88)	Water Surface Elev Downstream (NAVD88)
Coronado Split Reach	0.851	162.50	34.00	4.08	2970.10	2974.65	2972.70
Coronado Split Reach	0.839	283.89	76.07	1.44	2964.40	2972.70	2966.41
Coronado Split Reach	0.822	282.14	45.02	2.13	2963.00	2966.41	2961.67
Coronado Split Reach	0.804	482.56	89.92	1.93	2955.00	2961.67	2956.03
Coronado Split Reach	0.784	68.52	33.00	1.00	2954.50	2956.03	2950.78
Coronado Split Reach	0.762	350.85	57.37	2.09	2945.00	2950.78	2946.03
Coronado Split Reach	0.738	61.48	36.91	0.88	2941.00	2946.03	2941.29
Coronado Split Reach	0.718	19.90	24.24	0.55	2940.00	2941.29	2936.43
Coronado Split Reach	0.700	44.77	53.91	0.54	2932.70	2936.43	2932.21
Coronado Split Reach	0.684	0.00	0.00	0.00	2940.00	2932.21	2926.99
Coronado Split Reach	0.670	0.00	0.00	0.00	2925.00	2926.99	2921.27
Coronado Split Reach	0.652	0.00	0.00	0.00	2921.80	2921.27	2916.67
Coronado Split Reach	0.625	0.00	0.00	0.00	2917.00	2916.67	2908.95
Coronado Split Reach	0.595	43.70	45.00	0.59	2904.00	2908.95	2902.38
Coronado Split Reach	0.571	0.00	0.00	0.00	2912.00	2902.38	2895.54
Coronado Split Reach	0.544	0.00	0.00	0.00	2895.80	2895.54	2887.79

At lateral weir RS 0.595, 43.7 cfs was shown to flow from the Coronado split reach to main channel, but it was determined that the flow was primarily contained within Columbus Blvd, so the island between the main channel and split reach profiles was left continuous in this area on the hydraulic work maps and annotated FIRMs. Please note however that the floodplain boundaries in this area were delineated such that the residential structures adjacent to lateral weir RS 0.595 and Coronado split reach cross section RS 0.581 lay within the revised SFHA.

5.5.5 Ineffective Flow Areas

Ineffective flows were modeled in the following situations:

- Floodplain areas where flows were not hydraulically connected, e.g. adjacent main channel or split flow areas within the Coronado split flow reach where cross section alignments were shared between the two profiles;
- Cross sections immediately upstream and downstream of culverts to account for expansion and contraction of flows. 3:1 expansion and 1:1 contraction ratios were used.

5.5.6 Supercritical Flow

Per FEMA requirements for floodplain modeling, the HEC-RAS analyses were performed using subcritical flow regimes. Therefore, this section is not applicable.

5.6 Floodway Modeling

Although this LOMR proposes to change the effective Zone A SFHA to a Zone AE with base flood elevations determined, a floodway is not being proposed for Finger Rock Wash. The PCRFCD has established development criteria that are more restrictive than the NFIP minimum regulations. These development criteria, which serve as justification for this proposal, are outlined in the following sections:

5.6.1 Establishing the primary channel as floodway

The District's ordinance establishes that, at a minimum, the primary channel of a watercourse shall be considered a floodway. Applicable sections from the District's Ordinance (Reference #22), updated in May 2010, are included in Appendix E.3.

5.6.2 Regulation of erosion hazard areas

In addition to potential damage due to flood water, development along watercourses in Southern Arizona may be at risk for damage from erosion; that is the lateral migration of the low flow channel. The District's ordinance established safe erosion hazard setbacks from the primary banks of a watercourse and requires that development be outside of these setbacks to mitigate for the potential the channel would migrate. The primary channel and the erosion hazard setbacks increase that portion of the floodplain that is preserved and have the potential to equal or exceed a floodway that is developed using the FEMA criteria (Sections 16.28.020 and 16.28.030 of the floodplain ordinance).

5.6.3 Encroachment limits are stricter than FEMA guidelines

The Pima County Floodplain Ordinance requires that the cumulative encroachment on a property not create more that a 0.1 foot rise in water surface elevations for the Base Flood event or more than a 10% increase in velocities as measured at property lines (Section 16.26.020 of the floodplain ordinance).

5.6.4 Expanding the definition of primary channel in confined flow areas

As a result of a technical appeal associated with proposed development along the Campbell Wash, the Pima County Flood Control Board directed the District staff to develop more restrictive development criteria for watercourses that are confined by geologic features. Basically, when the floodplain is confined, the District will evaluate the watercourse to determine which part of the valley of the watercourse should be considered the “active” channel, which is an expansion of the primary channel. The active channel would be considered the administrative floodway (Section 16.08.350 of the floodplain ordinance). This includes “no-rise” criteria for encroachments. The confined flow area is characterized by:

- Major watercourses coming from steeper slopes with a confined floodplain within an incised geologic floodplain. A watercourse is considered confined when the ratios of the wetted top widths of the floodplain associated with the base flood and the 25-year flood (4% annual chance flood) is 1.25 or less **and** the height of the geologic features are at least 1.5 times the hydraulic depth of the base flood.
- The Base Flood discharge is greater than 2,000 cfs.

The definition of active channel is:

- The area necessary to convey the base flood without increasing the base flood elevation by more than 0.1 foot under normal flow conditions.
- The portion of the valley bottom subject to more frequent inundation as defined by the 25-year floodplain.
- The portion of the floodplain that have excessive flood depths and velocities, product of the depth (in feet) times the square of the velocity (in feet per second) is greater than 18 ($DV^2=18$).
- The portion of valley bottom that is underlain by sand and gravel (unconsolidated alluvium related to fluvial processes), or in an area subject to historical channel changes, especially by avulsion.

5.7 Problems encountered during the Study

5.7.1 Special Problems and Solutions

There were no special problems encountered during this study.

5.7.2 Model Warnings and Error Messages

The HEC-RAS modeling produced no error messages. The model warnings were reviewed according to procedures outlined in the HEC-RAS User's Manual and a quality control check was performed on the model results per Arizona State Standard for Floodplain Hydraulic Modeling (SS 09-02) (Reference #13) guidelines. The hydraulic results were reviewed at locations where warnings were issued and all results were found to be reasonable. The primary warning message involved the model defaulting to critical depth due to the lack of a valid subcritical answer. Given that Finger Rock Wash is a fairly steep gradient stream and the HEC-RAS modeling was performed as a subcritical flow regime to meet FEMA floodplain modeling requirements, these warnings are not unexpected. A summary of the HEC-RAS Errors, Warnings and Notes has been included with the modeling input/output in Appendix E.4.

5.8 Calibration

No model calibration was performed in this study.

5.9 Final Results

5.9.1 Hydraulic Analysis Results

The HEC-RAS hydraulic analysis for the “with Skyline Drive culvert” conditions is the governing analysis for this study. The HEC-RAS model (Filename: FRW88.prj) results are summarized in HEC-RAS summary output tables provided in Appendix E.4. Summary tables have been included for normal stream results, culvert results and lateral structure results. All elevations listed in the results are based on NAVD88 vertical datum. A complete printout of the Finger Rock Wash HEC-RAS input/output report has also been provided in Appendix E.4.

A summary output table for the HEC-RAS model “No Skyline Drive Culvert” (Filename: FRW88_NoSkylineCulv.prj) that shows the normal stream results for Finger Rock Wash Reach 4, where the Skyline Drive crossing is located, has also been included in Appendix E.5.; however, since only a short section of Reach 4 is needed for comparison, a complete report printout has not been provided.

Complete electronic model files on compact disk for both HEC-RAS models, “with” and “without” the Skyline Drive culvert, can be found in Appendix G.

5.9.2 Verification of Results

The limits of the Finger Rock Wash 1-percent annual chance floodplain determined in this study are super-imposed on the current effective floodplain limits on the Annotated FIRM exhibits provided in Appendix F. A comparison of the proposed floodplain limits to the effective floodplain limits shows that they are generally consistent in location and shape. The proposed floodplain limits do deviate where the more detailed topography used in this study has allowed more accurate floodplain delineation than currently shown on the FIRMs.

SECTION 6: EROSION AND SEDIMENT TRANSPORT

The study reach is a relatively stable natural watercourse with no historical indications that sediment transport can be expected to greatly affect base flood elevations. Development within the watershed has been substantially “built-out” per existing zoning classifications for a number of years contributing to the ongoing stability of the watercourse. Consequently, sediment transport was not included in the scope of this LOMR study.

SECTION 7: DRAFT FIS REPORT DATA

7.1 Summary of Discharges

The current effective FIS for Pima County (Reference #23) does not provide a base flood discharge for Finger Rock Wash. Table 11 contains the following steady flow data for the 1-percent annual chance flood that were utilized in the HEC-RAS hydraulic modeling.

Table 11: HEC-RAS Steady Flow Data Summary

Flow Change Location					100-yr Discharge (cfs)
	River	Reach	River Station (mi.)	Description	
1	Coronado Split Flow	Cor Split Reach	0.854	Downstream of flow split at Coronado Drive at-grade crossing	1922
2	Finger Rock Wash	Main Reach 1	4.800	At Coronado National Forest Boundary (upstream study limit)	2324
3	Finger Rock Wash	Main Reach 2	4.596	Downstream of Pontatoc Canyon tributary confluence	5284
4	Finger Rock Wash	Main Reach 3	4.477	Downstream of flow split at Coronado Drive at-grade crossing	3362
5	Finger Rock Wash	Main Reach 4	3.656	Downstream of Coronado Split Reach return to main channel	6162
6	Finger Rock Wash	Main Reach 4	3.403	Downstream of Skyline Drive crossing	6060
7	Finger Rock Wash	Main Reach 4	2.876	Downstream of un-named east tributary confluence	6368
8	Finger Rock Wash	Main Reach 4	2.125	Downstream of Sunrise Drive crossing	6114
9	Finger Rock Wash	Main Reach 4	1.884	Downstream of Pontatoc Canyon Drive crossing	5756
10	Finger Rock Wash	Main Reach 4	0.898	Upstream of La Espalda at-grade crossing	5653
11	Finger Rock Wash	Main Reach 4	0.421	At Camino de la Bajada at-grade crossing	5589
12	Pontatoc Canyon	Pontatoc Cnyn	0.154	At Coronado National Forest Boundary (upstream study limit)	2503

7.2 Floodway Data

As described in Section 5.6 above, a floodway analysis has not been included in this study.

7.3 Annotated Flood Insurance Rate Maps

Annotated FIRMs were developed for the project using PAG aerial photography and panel boundaries, streets, property line and effective SFHA boundary information imported from Pima County effective DFIRM panels 0419C1635K, 0419C1643K, 0419C1644K and 0419C1645K, which were provided by PCRFCD. These maps were generated at a horizontal scale of 1 inch = 100 feet. Due to Pima County's impending conversion from NGVD29 to NAVD88 vertical datum, water surface elevations on the annotated FIRMs have been provided on both NGVD29 and NAVD88 datum with a VERTCON of NAVD88 Elev. minus 2.29 feet = NGVD29 Elev. A vertical datum conversion computation sheet is provided in Appendix C.1.

In addition to the information mentioned above, the Annotated FIRMs, which are provided on Figure F-5 (Sheets 1 through 6) in Appendix F, illustrate the following:

- Survey Township, Range & Section information;
- Stream channel center lines / profile base lines;
- HEC-RAS hydraulic cross-section lines with graphic representation of the 1% annual chance flood water surface elevations on NGVD29 & NAVD88 vertical datum;
- 1% annual chance flood water surface elevations on NGVD29 & NAVD88 vertical datum in tabular format;
- Lateral weir crest boundary line in the Coronado Split Reach;
- Effective 1% annual chance flood Zone A SFHA boundaries;
- Proposed 1% annual chance flood Zone AE SFHA boundaries.

7.4 Flood Profiles

Preliminary flood profile print outs, based on NGVD29 vertical datum, have been provided in Appendix F.

APPENDIX A

FEMA FORMS

MT-2 FORM 1 – OVERVIEW & CONCURRENCE FORM
MT-2 FORM 2 – RIVERINE HYDROLOGY & HYDRAULICS FORM
MT-2 FORM 3 – RIVERINE STRUCTURES FORM

U.S. DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY **OVERVIEW & CONCURRENCE FORM**	*O.M.B No. 1660-0016* *Expires: 12/31/2010*

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, U.S. Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (1660-0016). 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 DHS-FEMA

This request is for a (check one):

☐ CLOMR: A letter from DHS-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 DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72)

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are): [also Panels 1644K & 1645K, Eff. Date 02/08/99]

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
040073	Pima County Unincorporated Areas	AZ	04019C	1635K	02/08/99
040073	Pima County Unincorporated Areas	AZ	04019C	1643K	02/08/99

2. a. Flooding Source: Finger Rock Wash

   b. Types of Flooding: ☑ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH) ☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

3. Project Name/Identifier: Finger Rock Wash Updated Existing Conditions LOMR

4. FEMA zone designations affected: A (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 ☐ Base Map Changes

   ☐ Coastal Analysis ☑ Hydraulic Analysis ☑ Hydrologic Analysis ☐ Corrections

   ☐ Weir-Dam Changes ☐ Levee Certification ☐ Alluvial Fan Analysis ☐ Natural Changes

   ☑ New Topographic Data ☐ 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 structures (check all that apply)

   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 DHS-FEMA Web site at http://www.fema.gov/plan/prevent/fhm/frm_fees.shtm **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: Jerald L. Curless, PE	Company: CMG Drainage Engineering, Inc.	
Mailing Address: 3555 N Mountain Ave, Tucson, AZ 85719	Daytime Telephone No.:520-882-4244	Fax No.:520-888-1421
	E-Mail Address: jcurless@cmgdrainage.com	
Signature of Requester (required): Jerald L. Curless	Date: 10/15/2010	

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: Suzanne Shields, PE, Chief Engineer	Community Name: Pima County RFCD	
Mailing Address: 97 E Congress St, 3rd Flr, Tucson, AZ 85701	Daytime Telephone No.:520-243-1800	Fax No.:520-243-1821
	E-Mail Address: suzanne.shields@rfcd.pima.gov	
Community Official's Signature (required):	Date:	

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 data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. 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: Jerald L. Curless, PE	License No.: 32139, AZ	Expiration Date: 12/31/2012
Company Name: CMG Drainage Engineering, Inc.	Telephone No.: 520-882-4244	Fax No.: 520-888-1421
Signature: Jerald L. Curless		Date: 10/15/2010

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.
32139
JERALD L.
CURLESS
Date Signed 10/15/10
ARIZONA
Jerald L. Curless
Seal (Optional)
Expires 12/31/2012

Print Form

MT-2 FORM 1, OVERVIEW & CONCURRENCE FORM ATTACHMENT 1-1

PART C. REVIEW FEE – (Explanation Why No Fee Included)

This Map Change Request qualifies for a fee exemption, because it is based on updated and more detailed data and incorporates no manmade modifications within the SFHA.

U.S. DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDROLOGY & HYDRAULICS FORM**	*O.M.B No. 1660-0016* *Expires: 12/31/2010*

Flooding Source: Finger Rock 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 B) ☐ 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.)	Effective/FIS (cfs)	Revised (cfs)
DS of Cor NF Bndy-CP FR-9	3.36	N/A	4798
Sunrise Dr	5.72	N/A	6213
Rillito Crk Confluence	6.35	N/A	5589

3. Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1
☐ 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.

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	Rillito Crk FP, 550' US of Alvernon Way	RM 0.000	N/A	2429.66 NGVD29
Upstream Limit	Coronado Nat'l Forest Bndry	RM 4.800	N/A	3076.72 NGVD29

2. Hydraulic Method/Model Used

HEC RAS V 4.0.0

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

DHS-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 may help 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/plan/prevent/fhm/frm_soft.shtm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. Review of your submittal and resolution of valid modeling discrepancies may result in reduced review time.

4. Models Submitted

Models Submitted	Natural Run		Floodway Run		Datum
	File Name	Plan Name	File Name	Plan Name	
Duplicate Effective Model*	NA	NA	NA	NA	NA
Corrected Effective Model*					
Existing or Pre-Project Conditions Model	FRW88.prj	FRW88	NA	NA	NAVD88
Revised or Post-Project Conditions Model					
Other - (attach description)					

* For details, refer to the corresponding section of the instructions.

☒ Digital Models Submitted? (Required)

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.).

☒ Digital Mapping (GIS/CADD) Data Submitted

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.

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☒ No

   a. 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 or without BFEs established and would result in increases above 1.00 foot.

   b. 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.

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/CLOMR requests, does this request have the potential to impact an endangered species? ☐ Yes ☒ No

   If Yes, please submit documentation to the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA). Section 9 of the ESA prohibits anyone from "taking" or harming an endangered species. If an action might harm an endangered species, a permit is required from U.S. Fish and Wildlife Service or National Marine Fisheries Service under Section 10 of the ESA.

   For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

U.S. DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

O.M.B No. 1660-0016
Expires: 12/31/2010

Flooding Source: Finger Rock 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/Basin .... complete Section D
Levee/Floodwall .... complete Section E
Sediment Transport........ complete Section F (if required)

Description Of Structure

1. **Name of Structure:** FRW Culvert #1 - Playa de Coronado (east crossing)

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

   Location of Structure: River Mile 0.078 Pontatoc Canyon Reach

   Downstream Limit/Cross Section: RM 0.059

   Upstream Limit/Cross Section: RM 0.087

2. **Name of Structure:** FRW Culvert #2 - Playa de Coronado (west crossing)

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

   Location of Structure: RM 4.771 Main Channel Reach 1

   Downstream Limit/Cross Section: RM 4.756

   Upstream Limit/Cross Section: RM 4.783

3. **Name of Structure:** FRW Culvert #3 - Skyline Dr.

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

   Location of Structure: RM 3.479 Main Channel Reach 4

   Downstream Limit/Cross Section: RM 3.440

   Upstream Limit/Cross Section: RM 3.521

NOTE: For more structures, attach additional pages as needed. (see Attachment 1 for additional structures)

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 [Attach Section D (Dam/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: Finger Rock Wash

Name of Structure: FRW Culverts #1 - 5

1. This revision reflects (check one):

- ☑ Bridge/culvert not modeled in the FIS (FRW Culverts #3, 4 &5)
- ☐ Modified bridge/culvert previously modeled in the FIS
- ☑ Revised analysis of bridge/culvert previously modeled in the FIS (FRW Culverts #1 &2)

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8):
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. HEC-RAS culvert routine

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

- ☑ Dimensions (height, width, span, radius, length)
- ☑ Shape (culverts only)
- ☑ Material
- ☑ Beveling or Rounding
- ☑ Wing Wall Angle
- ☑ Skew Angle
- ☑ Distances Between Cross Sections
- ☑ Erosion Protection
- ☑ Low Chord Elevations – Upstream and Downstream
- ☑ Top of Road Elevations – Upstream and Downstream
- ☑ Structure Invert Elevations – Upstream and Downstream
- ☑ Stream Invert Elevations – Upstream and Downstream
- ☑ Cross-Section Locations

4. Sediment Transport Considerations

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

D. DAM/BASIN

Flooding Source:

Name of Structure:

1. This request is for (check one): ☐ Existing dam ☐ New dam ☐ Modification of existing dam

2. The dam was designed by (check one): ☐ Federal agency ☐ State agency ☐ Local government agency ☐ Private organization

   Name of the agency or organization:

3. The Dam was permitted as (check one):

   a. ☐ Federal Dam ☐ State Dam

      Provide the permit or identification number (ID) for the dam and the appropriate permitting agency or organization

      Permit or ID number Permitting Agency or Organization

   b. ☐ Local Government Dam ☐ Private Dam

      Provided related drawings, specification and supporting design information.

4. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

   Was the dam/basin designed using critical duration storm?

   ☐ Yes, provide supporting documentation with your completed Form 2.

   ☐ No, provide a written explanation and justification for not using the critical duration storm.

5. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If yes, then fill out Section F (Sediment Transport).
   If No, then attach your explanation for why debris/sediment analysis was not considered.

6. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

   Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

7. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. <u>System Elements</u>

a. This Levee/Floodwall analysis is based on (check one):

☐ upgrading of an existing levee/floodwall system
☐ a newly constructed levee/floodwall system
☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc.	Station	to
☐ structural floodwall	Station	to
☐ Other (describe):	Station	to

c. Structural Type (check one):

☐ monolithic cast-in place reinforced concrete
☐ reinforced concrete masonry block
☐ sheet piling
☐ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures.	Sheet Numbers:
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system.	Sheet Numbers:
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure.	Sheet Numbers:
4. A layout detail for the embankment protection measures.	Sheet Numbers:
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations.	Sheet Numbers:

2. <u>Freeboard</u>

a. The minimum freeboard provided above the BFE is:

<u>Riverine</u>

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

<u>Coastal</u>

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

E. LEVEE/FLOODWALL (CONTINUED)

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

c. The range of velocities along the levee during the base flood is: (min.) to (max.)

d. Embankment material is protected by (describe what kind):

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach	Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
					D_{100}	D_{50}	Thickness	
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								

(Extend table on an added sheet as needed and reference each entry)

4. Embankment Protection (continued)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results:

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. Stability analysis submitted provides for:

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ P_A = psf; P_p = psf

☐ Surcharge-Slope @ , ☐ surface psf

☐ Wind @ P_w = psf

☐ Seepage (Uplift); ☐ Earthquake @ P_{eq} = %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: Extend table on an added sheet as needed and reference)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is ft. to ft.

c. Settlement of the levee crest is determined to be primarily from :

☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: acres
Draining to ponding area: acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No

If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is cfs

h. The length of levee system used to drive this seepage rate in item g: ft.

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem
Hydrocompaction ☐ is ☐ is not a problem
Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

d. Sediment Transport Considerations:

Was sediment transport considered? ☐ Yes ☐ No If Yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations? ☐ Yes ☐ No

c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations? ☐ Yes ☐ No

If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
If No, please attach supporting documentation.

12. Operations and Maintenance Plan

Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

MT-2 FORM 3, RIVERINE STRUCTURES FORM ATTACHMENT 3-1

PART A. GENERAL

Description Of Structure (continued)

4. **Name of Structure:** FRW Culvert #4 – Sunrise Dr.

   Type: Bridge/Culvert

   Location of Structure: RM 2.251 Main Channel Reach 4

   Downstream Limit/Cross Section: RM 2.164

   Upstream Limit/Cross Section: RM 2.305

5. **Name of Structure:** FRW Culvert #5 – Pontatoc Canyon Dr.

   Type: Bridge/Culvert

   Location of Structure: RM 2.008 Main Channel Reach 4

   Downstream Limit/Cross Section: RM 1.939

   Upstream Limit/Cross Section: RM 2.047

APPENDIX B

REFERENCES

REFERENCES

1. National Flood Insurance Program-Program Description Report, FEMA, August 1, 2002;
2. Arizona Department of Water Resources, *State Standard for Hydrologic Modeling Guidelines (SS 10-07, draft),* August 2007;
3. FEMA, *Guidelines & Specifications for Mapping Partners, Appendix B, Guidance for Converting to NAVD88*, April 2003;
4. U.S. Army Corps of Engineers, Hydrologic Engineering Center, *HEC-1 Flood Hydrograph Package User Manual,* Version 4.1, June 1998;
5. National Oceanic and Atmospheric Administration (NOAA) *Atlas 14, Precipitation Frequency Atlas for the United States: Volume 1 – Version 4.0 The Semiarid Southwest. National Weather Service, Hydrometeorological Design Studies Center,* 2006;
6. Pima County Regional Flood Control District *Technical Policy TECH-010, Rainfall Input for Hydrologic Modeling,* May 15, 2007;
7. NRCS, *National Engineering Handbook, Section 4 – Hydrology (NEH-4), Chapter 15. Travel Time, Time of Concentration and Lag, and Chapter 16. Hydrographs*, August 1972;
8. Pima County Regional Flood Control District *Technical Policy TECH-018, Acceptable Model Parameterization for Determining Peak Discharge,* Draft 2009;
9. City of Tucson, Arizona, *Existing Conditions Hydrologic Modeling for the Tucson Stormwater Management Study (TSMS), Phase II, Stormwater Master Plan (Task 7, Subtask 7A.3)*, December 17, 1993, Revised November 1995, by Simons, Li & Associates;
10. City of Tucson, Arizona, *TSMS Technical Memorandum 7.2.6, Temporal Distribution for a 3-hour Thunderstorm,* Simons, Li & Associates, October 6, 193;
11. Pima County Regional Flood Control District, PC-HYDRO, *User Guide – Pima County Hydrology Procedures,* Version 5.4.2, October 2009;
12. USDA Natural Resource Conservation Service (NRCS), *Technical Release TR-55, Urban Hydrology for Small Watersheds,* June 1986;
13. Arizona Department of Water Resources, *State Standard for Floodplain Hydraulic Modeling,* State Standard (SS 09-02), July 2002;
14. United States Geological Survey (USGS), Scientific Investigations Report 2006-5108, *Selection of Manning's Roughness Coefficient for Natural and Constructed Vegetated and Non-Vegetated Channels, and Vegetation Maintenance Plan Guidelines for Vegetated Channels in Central Arizona*, 2007;
15. USGS, *American Society of Civil Engineers Journal of Hydraulic Engineering, Volume 10, No. 1 – Hydraulics of High-Gradient Streams*, November, 1984;
16. USDA Forest Service, *Critical Flow Constrains Flow Hydraulics in Mobile-Bed Streams: A New Hypothesis,* Water Resources Research, Vol. 33, No. 2, pp. 349-358, February 1997;
17. Federal Highway Administration HDS No. 5, *Hydraulic Design of Highway Culverts*, September 2001, Revised May 2005;

18. Pima County Regional Flood Control District, *Flecha Caida Flood Improvement Study, Phase I 100-year Peak Discharge Magnitudes & Floodplain Mapping,* Simons, Li & Associates, January 28, 1986;

19. USGS, Open File Report 93-419, *Methods for Estimating Magnitude and Frequency of Floods in the Southwestern United States,* pg. 59, 1994;

20. U.S. Army Corps of Engineers *HEC-RAS River Analysis System User Manual*, Version 4.0.0, March 2008;

21. Pima County Regional Flood Control District, *Pima County Floodplain and Erosion Hazard Management Ordinance, Title 16 of the Pima County Code,* Ordinance 2010 FC-5, revised May 2010;

22. FEMA, Flood Insurance Study (FIS) for Pima County, Arizona and Incorporated Areas, February 8, 1999;

APPENDIX C

SURVEY FIELD NOTES & AS-BUILT PLANS

C.1 – SURVEY FIELD NOTES

OPW SURVEYING, LLC

Serving Southern Arizona

7135 N. Skyway Drive
Tucson, Arizona 85718
Phone: 520.990.1568

OPW Surveying Job No. 2010028
Date: May 4, 2010

re: Finger Wash Survey

In January of 2008, OPW Engineering, LLC surveyed a variety of wash crossings along Finger Wash. Included in the data collected were roadway elevations, curb locations, box culvert and pipe inverts, flowline grades, tops and toes of slopes and a number of spot elevations. The survey locations were provided by CMG Drainage Engineering in support of a new floodplain mapping study for the watercourse.

The survey data was tied horizontally and vertically to Pima County DOT - City of Tucson DOT Geodetic Control Points BA13, BE13, BJ13, BR13 and BL11, Township 13 South, Range 14 East, using published coordinate and elevation data from the Pima County GIS website. These points correspond to points 3, 4, 5, 6 and 7 on the attached data sheet.

The datum used is State Plane Coordinates, Arizona Central Zone, international feet, 1983 datum for horizontal control datum and NAVD 88 datum for vertical control.

Thank you.

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
26928
CHRIS E.
MORRISON
Date Signed 05/04/10
ARIZONA

Chris E. Morrison

Chris E. Morrison, R.L.S.

FINGER WASH DATA - 4 SHEETS

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REGISTERED LAND SURVEYOR CERTIFICATE NO. 26928 CHRIS E. MORRISON Date Signed 05/04/10 ARIZONA

CHRIS E. MORRISON
EXPIRES 03/31/2011

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1007,474757.19,1008871.58,2592.91,

CMG # 27028
June 26, 2009

Finger Rock Wash NAVD88 to NGVD29
Vertical Datum Conversion Computations

Conversion protocol from *Guidelines & Specifications for Mapping Partners, FEMA, April 2003, Appendix B, Guidance for Converting to NAVD88.*

<u>B.4.1.2 Multiple Conversion Factors (Stream by stream basis)</u> –

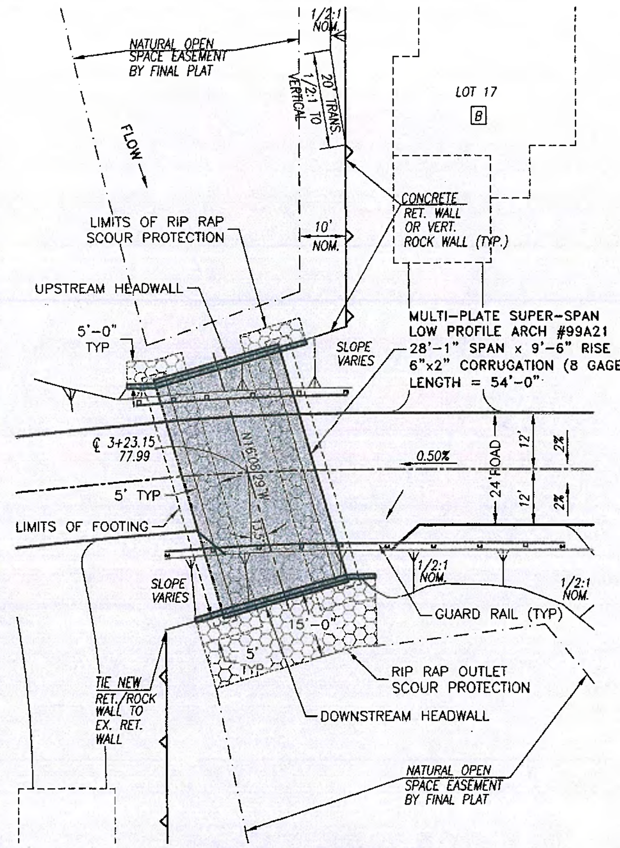
Upstream end of study reach – Approximate River Sta. 4.8 mi.
Lat = 32.337216, Lon = -110.907924
From NGS Vertcon website, datum shift = 0.723 m = 2.37 ft
» NAVD88 - 2.37 ft = NGVD29

Intermediate point in study reach – Approximate River Sta. 2.4 mi.
Lat = 32.310680, Lon = -110.904676
From NGS Vertcon website, datum shift = 0.697 m = 2.29 ft
» NAVD88 - 2.29 ft = NGVD29

Downstream end of study reach – Approximate River Sta. 0.0 mi.
Lat = 32.279587, Lon = -110.907874
From NGS Vertcon website, datum shift = 0.676 m = 2.22 ft
» NAVD88 - 2.22 ft = NGVD29

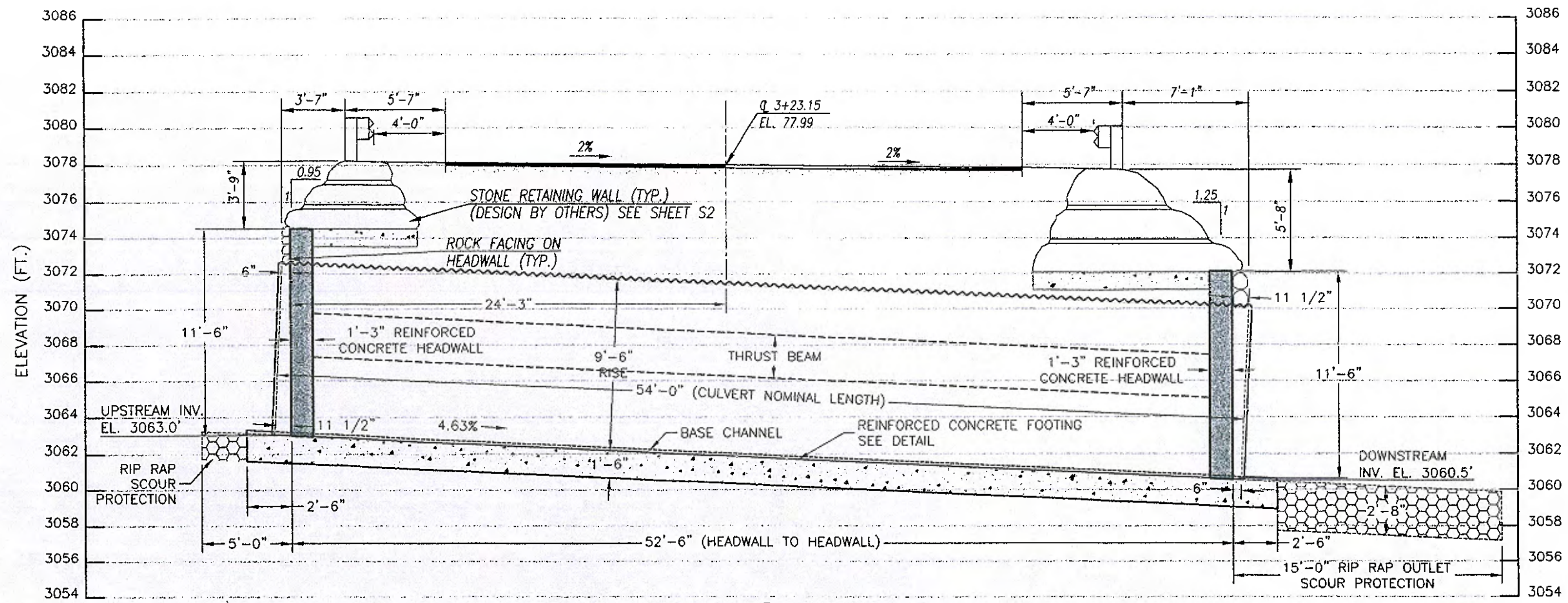
Average datum shift for Finger Rock Wash study reach: **NAVD88 - 2.29 ft = NGVD29**

C.2 – CULVERT AS-BUILT PLANS



PLAN VIEW

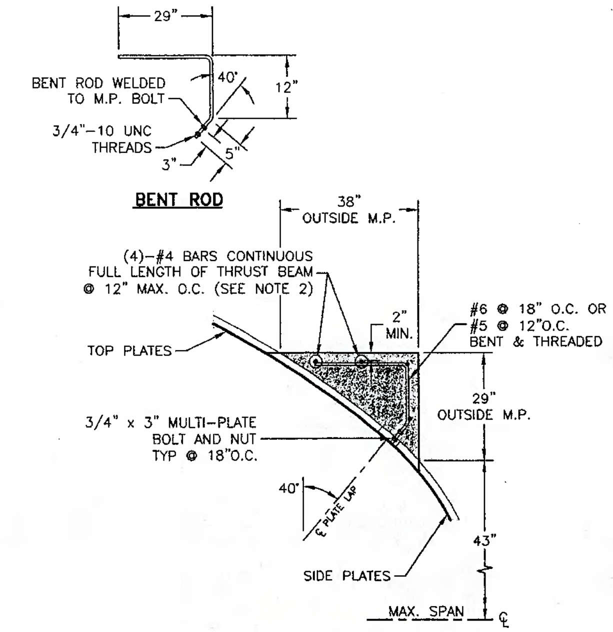
GRAPHIC SCALE



PROFILE @ ℄ OF STRUCTURE

(LOOKING UP STATION)

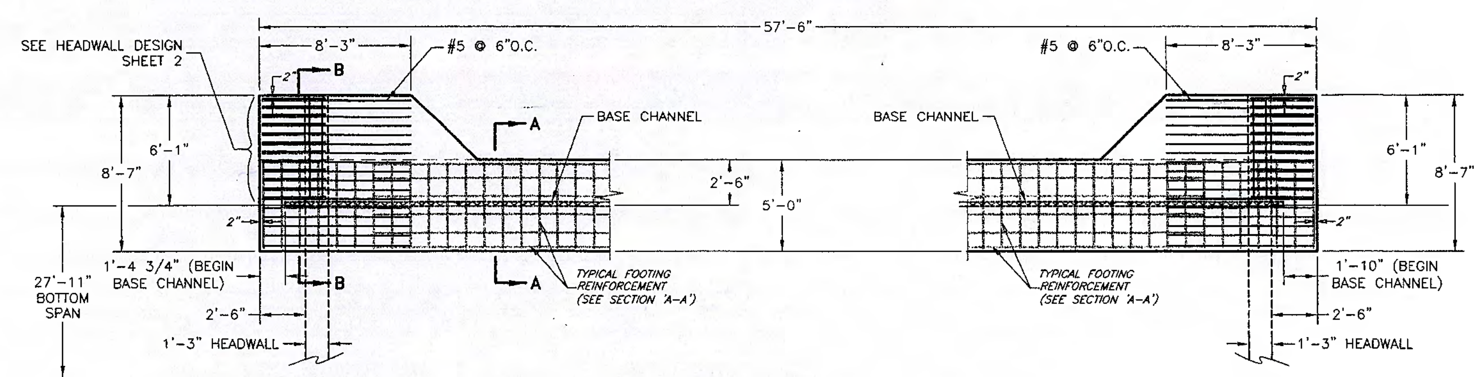
GRAPHIC SCALE



DETAIL OF THRUST BEAM

GRAPHIC SCALE

NOTES FOR THRUST BEAM:
1.) REINFORCED CONCRETE THRUST BEAMS TO BE POURED IN A MANNER TO MAINTAIN A BALANCED LOADING ON EACH SIDE OF THE STRUCTURE.
2.) LONGITUDINAL REINFORCING BARS MAY BE PLACED ON EITHER SIDE OF BENT ROD.
3.) CONCRETE SHALL BE f'c = 3,000 psi.(MIN.)
4.) REINFORCEMENT SHALL BE ASTM A-615 GRADE 60.

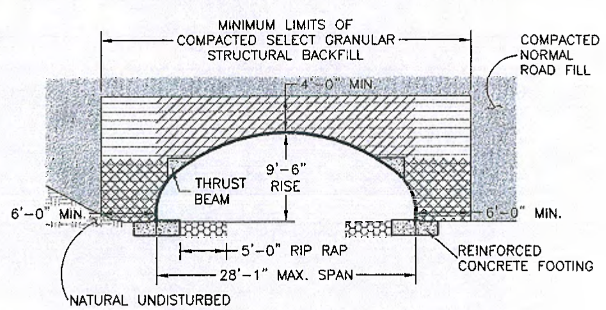


PLAN VIEW

DESIGN OF FOOTINGS

GRAPHIC SCALE

NOTE: LEFT FOOTING (LOOKING UPSTREAM) IS SHOWN. RIGHT FOOTING IS SYMMETRICAL.

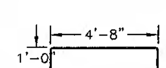


TYPICAL MINIMUM BACKFILL REQUIREMENTS

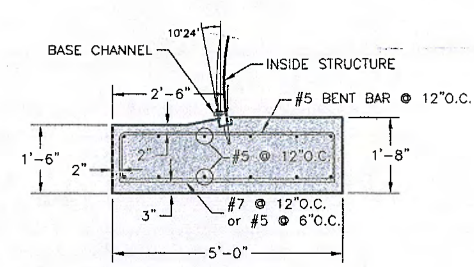
GRAPHIC SCALE

LEGEND:
- CRITICAL BACKFILL ZONE, PRESSURE ON SOIL GREATEST HERE.
- INITIAL LIFTS OVER CROWN OF STRUCTURE AS INDICATED BY SHADED AREA TO BE COMPACTED TO REQUIRED DENSITY WITH HAND OPERATED EQUIPMENT OR WITH SMALL TRACTOR (D-4 OR SMALLER) DRAWN EQUIPMENT.

NOTES FOR BACKFILL REQUIREMENTS:
1.) ALL SELECT GRANULAR FILL TO BE COMPACTED TO 95% PER AASHTO T-180.
2.) COMPLETE AND REGULAR MONITORING OF THE SUPER-SPAN SHAPE IS NECESSARY DURING ALL BACKFILLING OF THE STRUCTURE.
3.) DO NOT OPERATE HEAVY OR MEDIUM COMPACTORS ON BACKFILL (USE WALK BEHIND EQUIPMENT) CLOSER THAN 2 FEET FROM THE SIDE PLATES.
4.) PREVENT EXCESSIVE DISTORTION OF SHAPE AS NECESSARY VARYING COMPACTION METHODS AND EQUIPMENT, USING THINNER LIFTS, LIGHTER EQUIPMENT AND KEEPING HEAVIER EQUIPMENT BACK FROM PLATE. ANY CHANGES IN THIS METHOD WILL BE IN ACCORDANCE WITH PIMA COUNTY STANDARDS.

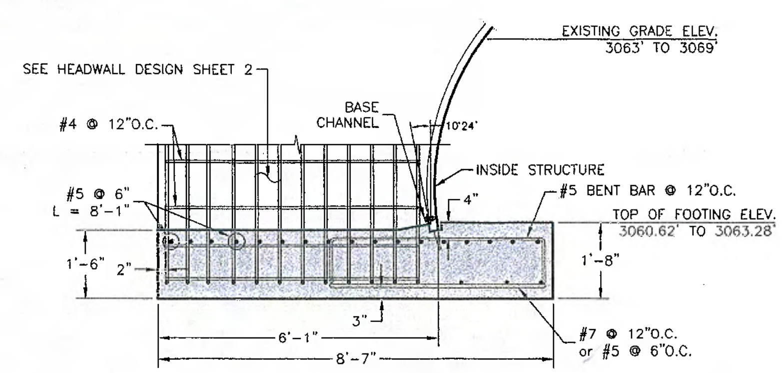


#5 BENT BAR
NTS



SECTION 'A-A'

GRAPHIC SCALE



SECTION 'B-B'

GRAPHIC SCALE

NOTES:
1.) CONCRETE SHALL BE f'c = 3,500 PSI, CLASS 'S'.
2.) ALL REINFORCEMENT SHALL BE ASTM A-615 GRADE 60.
3.) IF CONTRACTOR CHOOSES TO PURSUE ALTERNATE MATERIALS FOR THE BRIDGE CULVERT CROSSINGS, THE CONTRACTOR SHALL FURNISH A DESIGN DONE IN ACCORDANCE WITH SECTION 12 OF THE AASHTO BRIDGE MANUAL, AND STAMPED BY A LICENSED ENGINEER IN THE STATE OF ARIZONA. THE DESIGN SHALL BE SUBMITTED FOR PRE-APPROVAL TO THE PROJECT ENGINEER 10 DAYS PRIOR TO THE BID DATE.
4.) CONSTRUCTION SHALL CONFORM TO PIMA COUNTY/CITY OF TUCSON STD. SPECIFICATIONS FOR PUBLIC IMPROVEMENTS, 1994, REVISED TO DATE.

3/02/00	DJH	REVISION #2
1/20/00	BKB	MAKE CHANGES REQUESTED BY CLIENT

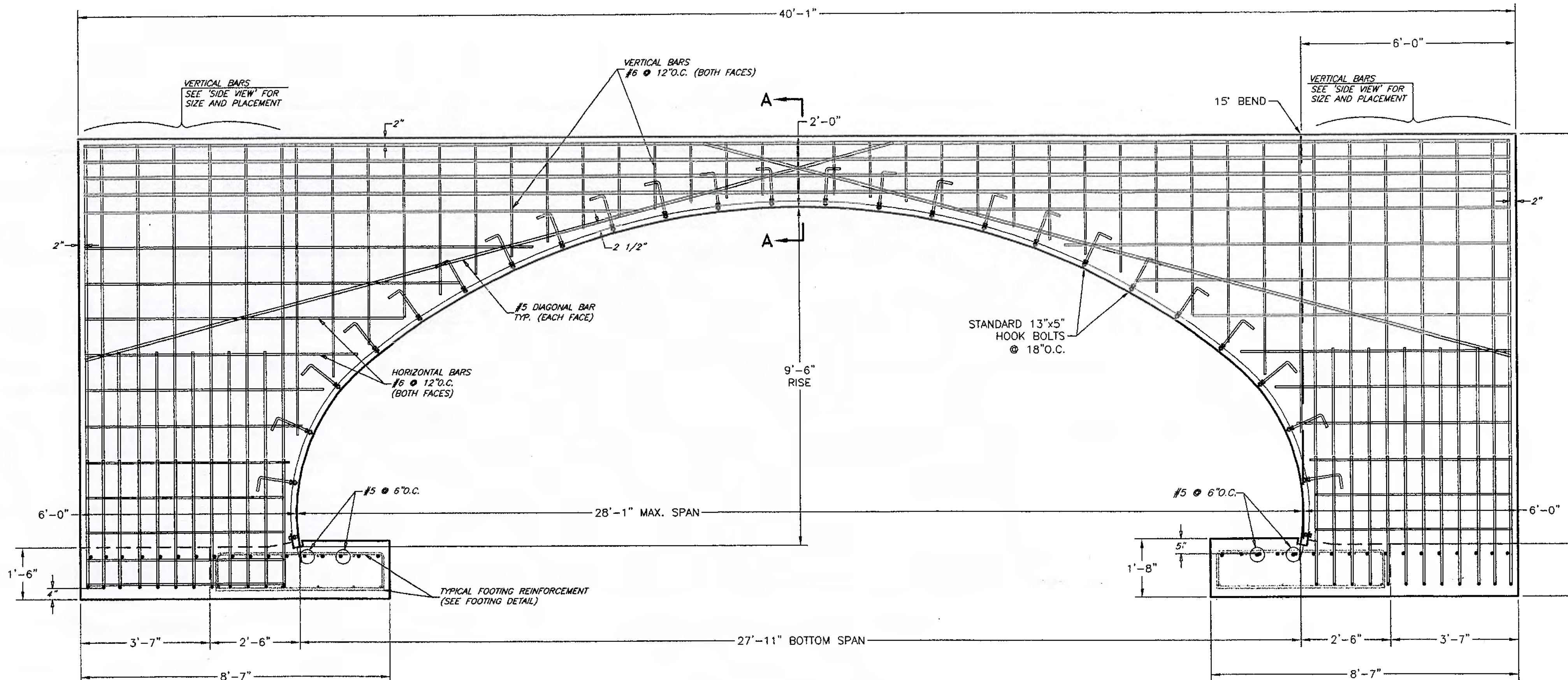
CBC Engineers and Associates
DAYTON, OHIO

DESIGN OF STRUCTURE #1

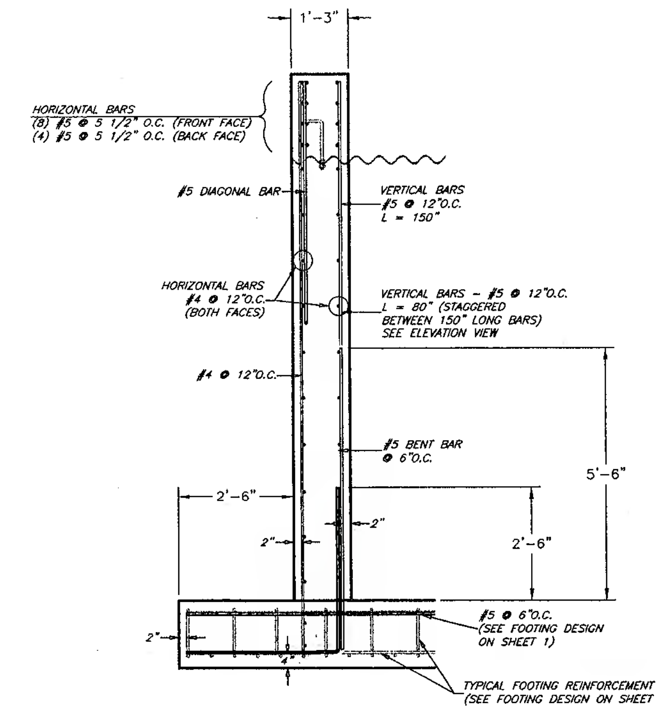
DRAWN BY DJH	DATE 9/21/99	CONTECH CONSTRUCTION PRODUCTS INC. DESIGN OF TWO(2) LOW PROFILE ARCH SUPER-SPAN STRUCTURES FOR SUMMIT AT FINGER ROCK PROJECT PIMA COUNTY, ARIZONA
APPROVED BY	DATE	
SCALE GRAPHIC	SHEET 1 OF 4	PROJECT NO CBC-2079

Registered Professional Engineer CERTIFICATE NO. 33361 DAVID C. COWHERD ARIZONA U.S.A.

DESIGN OF STRUCTURE #1, MULTI-PLATE SUPER-SPAN LOW PROFILE ARCH #99A21 @ STATION 3+23.15'



ELEVATION VIEW

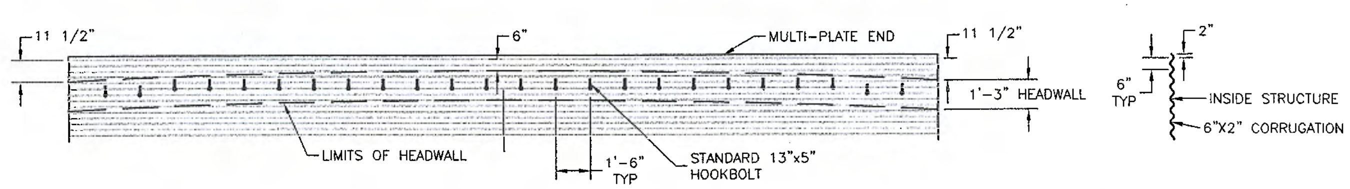


SIDE VIEW

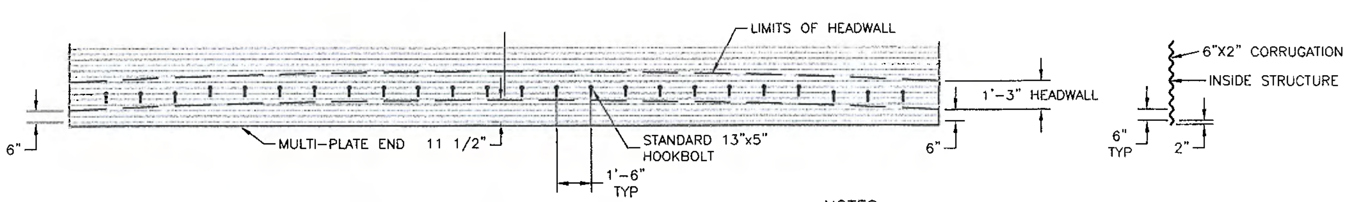
NOTE:
BOTH UPSTREAM AND DOWNSTREAM HEADWALLS ARE IDENTICAL WITH THE EXCEPTION OF THE VERTICAL ANGLE IN WHICH THE SUPER-SPAN ENTERS THE HEADWALL. (SEE PROFILE ON SHEET 1)

HEADWALL DESIGN

GRAPHIC SCALE



UPSTREAM END PLATES

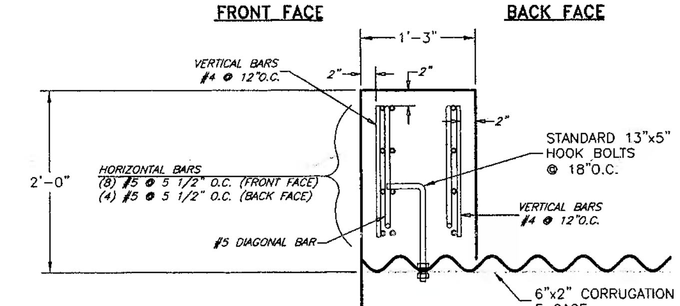


DOWNSTREAM END PLATES

HOOKBOLT PLACEMENT DETAIL

GRAPHIC SCALE

NOTES:
1.) MULTI-PLATE IS PROJECTED FLAT FOR CLARITY OF HOOKBOLT PLACEMENT
2.) THE HOLES ARE LOCATED IN THE CREST OR VALLEY THAT'S NEAREST TO THE ℄ OF HEADWALL AT EACH END OF STRUCTURE.



SECTION 'A–A'

GRAPHIC SCALE

NOTES:
1.) CONCRETE SHALL BE f'c = 3,500 PSI, CLASS 'S'.
2.) ALL REINFORCEMENT SHALL BE ASTM A-615 GRADE 60.
3.) IF CONTRACTOR CHOOSES TO PURSUE ALTERNATE MATERIALS FOR THE BRIDGE CULVERT CROSSINGS, THE CONTRACTOR SHALL FURNISH A DESIGN DONE IN ACCORDANCE WITH SECTION 12 OF THE AASHTO BRIDGE MANUAL, AND STAMPED BY A LICENSED ENGINEER IN THE STATE OF ARIZONA. THE DESIGN SHALL BE SUBMITTED FOR PRE-APPROVAL TO THE PROJECT ENGINEER 10 DAYS PRIOR TO THE BID DATE.
4.) CONSTRUCTION SHALL CONFORM TO PIMA COUNTY/CITY OF TUCSON STD. SPECIFICATIONS FOR PUBLIC IMPROVEMENTS, 1994, REVISED TO DATE.

3/02/00	DJH	REVISION #2
1/20/00	BKB	MAKE CHANGES REQUESTED BY CLIENT

CBC Engineers and Associates
DAYTON, OHIO

HEADWALL DESIGN FOR STRUCTURE #1

DRAWN BY DJH	DATE 9/21/99	CONTECH CONSTRUCTION PRODUCTS INC. DESIGN OF TWO(2) LOW PROFILE ARCH SUPER-SPAN STRUCTURES FOR SUMMIT AT FINGER ROCK PROJECT PIMA COUNTY, ARIZONA
APPROVED BY	DATE	
SCALE GRAPHIC	SHEET 2 OF 4	PROJECT NO CBC-2079

CONTECH
CONSTRUCTION PRODUCTS INC.

August 28, 2000

Brent E. Flom, P.E.
Regional Engineer

To: Bing Sherwood; Finger Rock Development Corporation

From: B. E. Flom

Subject: Summit at Finger Rock, Station 3+23; Super-Span Low Profile Arch

I am pleased to distribute the final inspection report reviewing the performance of the SUPER SPAN structure during the backfilling operation.

After assembly the structure was within substantial conformance of the design dimensions. During the backfilling operation the movement of the structure went as predicted; the structure increased in rise as fill was placed along the sides and then settled slightly as fill was placed over the top. The final rise of the structure averaged 9.57 ft., versus the design rise of 9.50 ft. The final span averaged 28.09 ft., compared to the design dimension of 28.08 ft. None of the individual measurements along the length of the structure exceeded their established tolerance with the exception of the rise dimension at station 4, and the structure exhibits good symmetry. All of the density records indicate the required densities were achieved with exception of the few measurements taken on the first lift over the top of the structure (this is to be expected).

Our Shape Control Technician monitored the backfilling operation until there was 3 ft. of fill over the top of the structure. This was determined to be the minimum cover for highway loading. **It is important to insure that the minimum cover is maintained. Additional fill may be required to facilitate heavy construction equipment; that is, construction equipment which exerts live load pressures in excess of standard highway wheel loads. This is especially important if this road will not be paved.** If rutting occurs the ruts should be filled in (rather than graded down) in order to maintain minimum cover.

Finally, we recommend the riprap be placed around the footings on both Super-Spans immediately to provide for scour protection in accordance with our engineers directions.

Congratulations on another successful SUPER-SPAN installation. We appreciate this opportunity to have furnished CONTECH products for your project and look forward to working with you in the future.

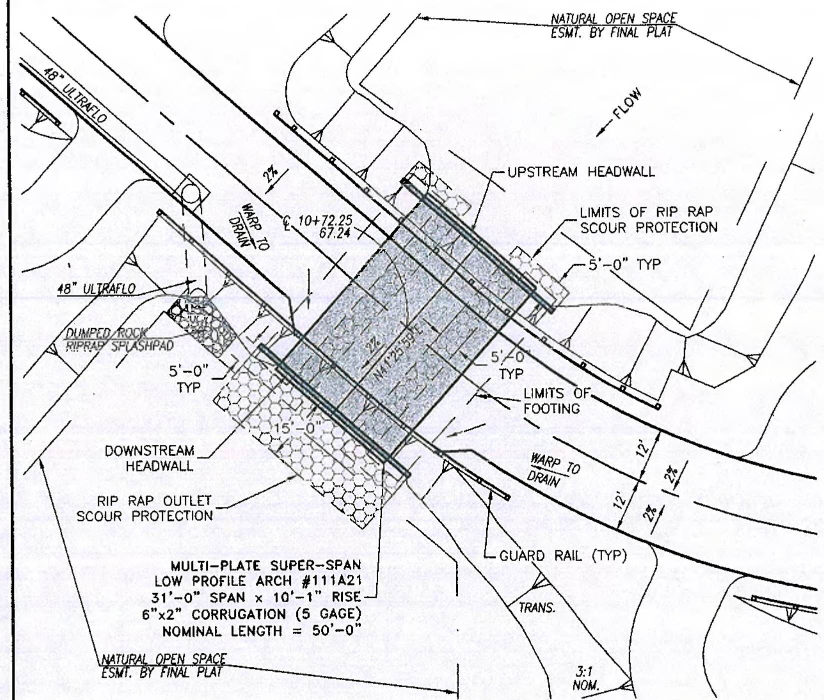
Sincerely,

Brent E. Flom

Brent E. Flom
Regional Engineer

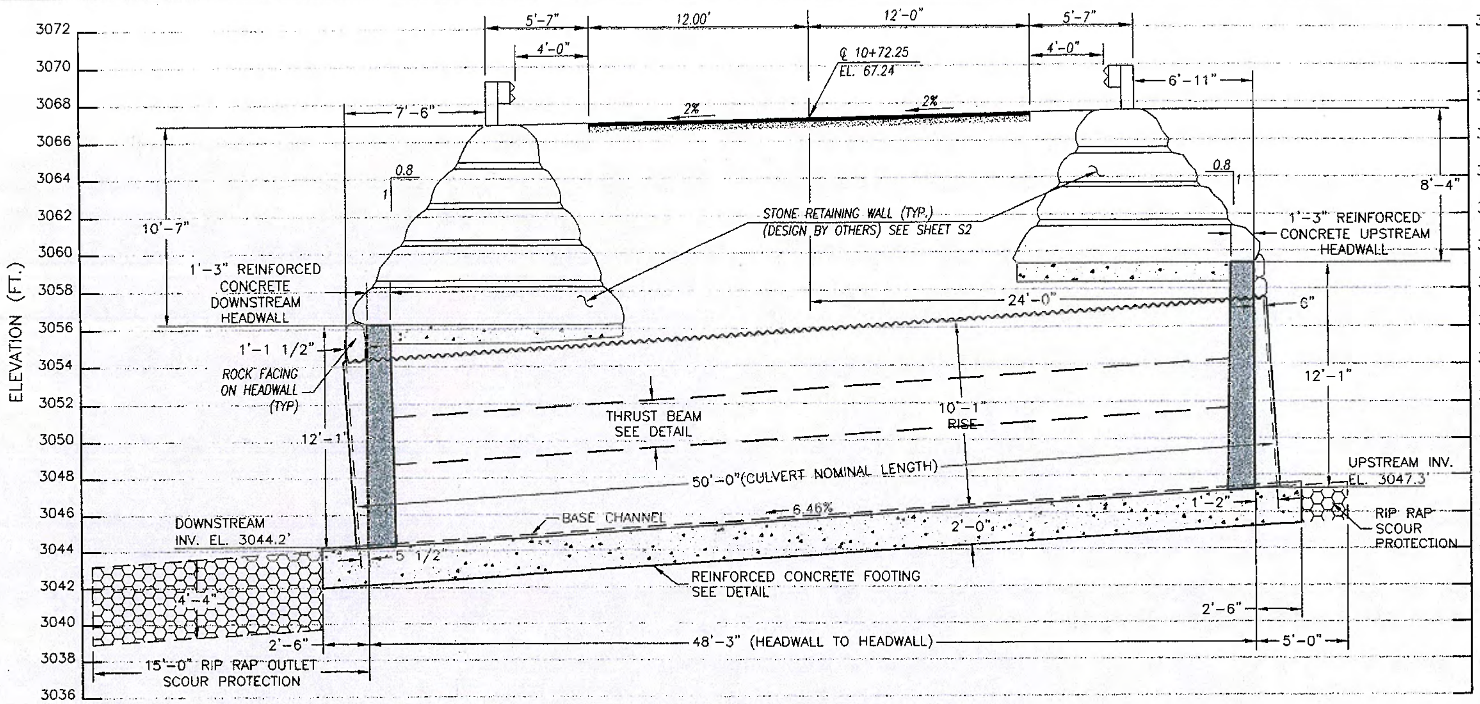
cc:R.C. Adams, J.R. Noll, E.J. Prahl, J.S. Schluter, M.A. Taylor; CONTECH
Bill Baker; Walbert Baker

4891 Independence St., #195 • Wheat Ridge, Colorado 80033 • (303) 431-8999 • FAX (303) 431-9839 • e-mail BFlom@contech-cpi.com



PLAN VIEW

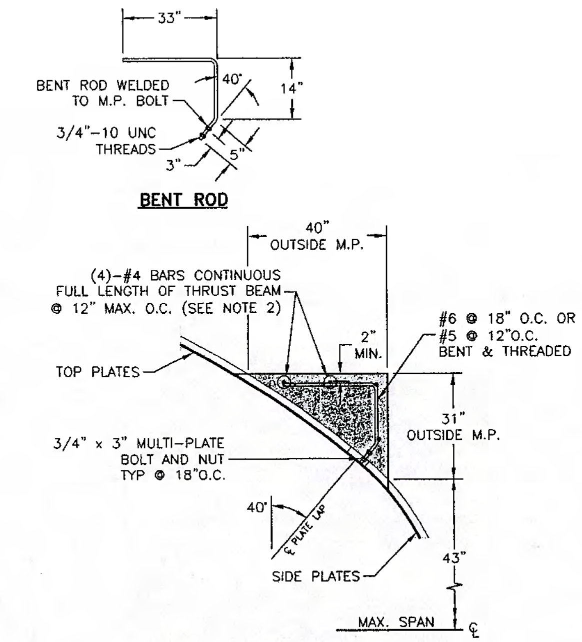
GRAPHIC SCALE
20' 10' 0 20' 40'



PROFILE @ ℄ OF STRUCTURE

(LOOKING DOWN STATION)

GRAPHIC SCALE
5' 2.5' 0 5' 10'

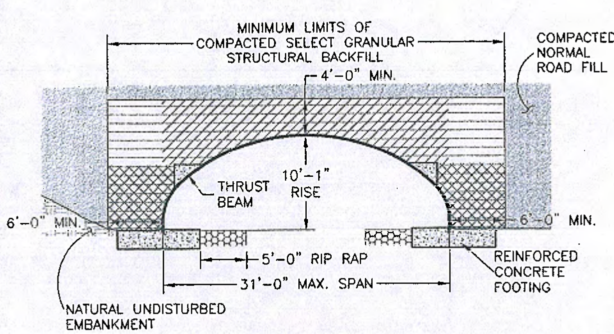


DESIGN OF THRUST BEAM

NOT TO SCALE

NOTES FOR THRUST BEAM:

1.) REINFORCED CONCRETE THRUST BEAMS TO BE POURED IN A MANNER TO MAINTAIN A BALANCED LOADING ON EACH SIDE OF THE STRUCTURE.
2.) LONGITUDINAL REINFORCING BARS MAY BE PLACED ON EITHER SIDE OF BENT ROD.
3.) CONCRETE SHALL BE f'c = 3,000 psi.(MIN.)
4.) REINFORCEMENT SHALL BE ASTM A-615 GRADE 60.



TYPICAL MINIMUM BACKFILL REQUIREMENTS

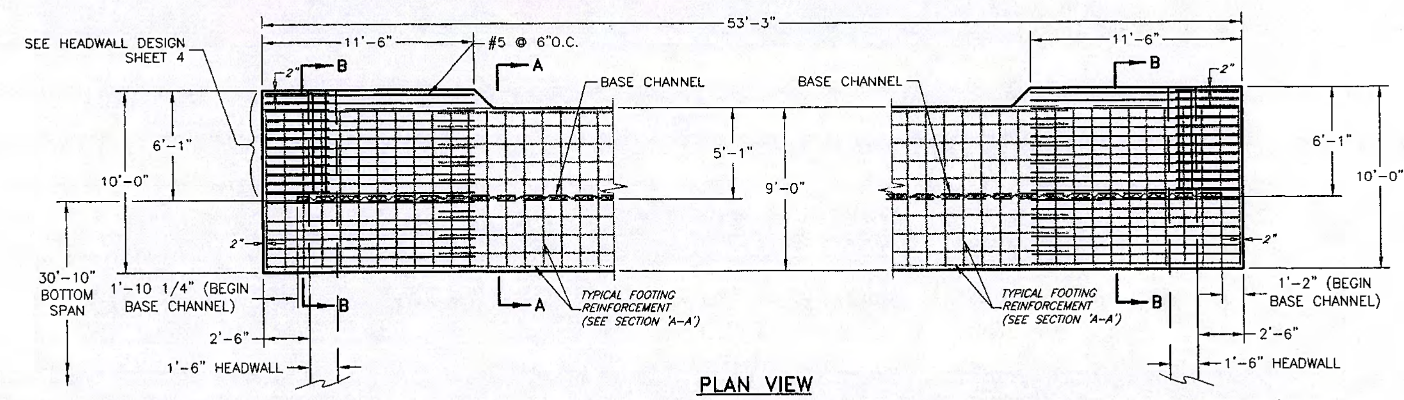
GRAPHIC SCALE
10' 5' 0 10' 20'

LEGEND:

- CRITICAL BACKFILL ZONE, PRESSURE ON SOIL GREATEST HERE.
- INITIAL LIFTS OVER CROWN OF STRUCTURE AS INDICATED BY SHADED AREA TO BE COMPACTED TO REQUIRED DENSITY WITH HAND OPERATED EQUIPMENT OR WITH SMALL TRACTOR (D-4 OR SMALLER) DRAWN EQUIPMENT.

NOTES FOR BACKFILL REQUIREMENTS:

1.) ALL SELECT GRANULAR FILL TO BE COMPACTED TO 95% PER AASHTO T-180.
2.) COMPLETE AND REGULAR MONITORING OF THE SUPER-SPAN SHAPE IS NECESSARY DURING ALL BACKFILLING OF THE STRUCTURE.
3.) DO NOT OPERATE HEAVY OR MEDIUM COMPACTORS ON BACKFILL (USE WALK BEHIND EQUIPMENT) CLOSER THAN 2 FEET FROM THE SIDE PLATES.
4.) PREVENT EXCESSIVE DISTORTION OF SHAPE AS NECESSARY VARYING COMPACTION METHODS AND EQUIPMENT, USING THINNER LIFTS, LIGHTER EQUIPMENT AND KEEPING HEAVIER EQUIPMENT BACK FROM PLATE. ANY CHANGES IN THIS METHOD WILL BE IN ACCORDANCE WITH PIMA COUNTY STANDARDS.

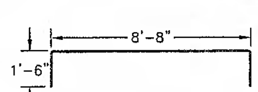


PLAN VIEW

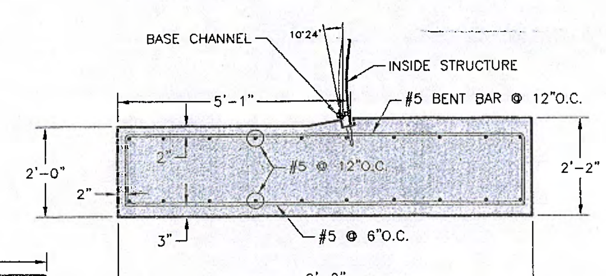
NOTE: LEFT FOOTING (LOOKING UPSTREAM) IS SHOWN. RIGHT FOOTING IS SYMMETRICAL.

DESIGN OF FOOTINGS

GRAPHIC SCALE
5' 2.5' 0 5' 10'

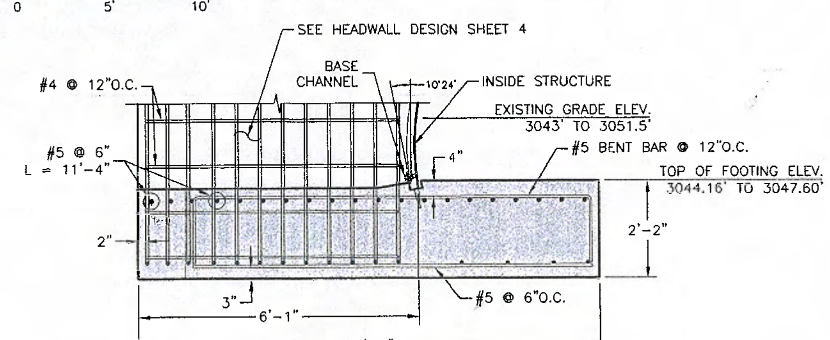


#5 BENT BAR
NTS



SECTION 'A-A'

GRAPHIC SCALE
2' 1' 0 2' 4'



SECTION 'B-B'

GRAPHIC SCALE
2' 1' 0 2' 4'

NOTES:

1.) CONCRETE SHALL BE f'c = 3,500 PSI, CLASS 'S'.
2.) ALL REINFORCEMENT SHALL BE ASTM A-615 GRADE 60.
3.) IF CONTRACTOR CHOOSES TO PURSUE ALTERNATE MATERIALS FOR THE BRIDGE CULVERT CROSSINGS, THE CONTRACTOR SHALL FURNISH A DESIGN DONE IN ACCORDANCE WITH SECTION 12 OF THE AASHTO BRIDGE MANUAL, AND STAMPED BY A LICENSED ENGINEER IN THE STATE OF ARIZONA. THE DESIGN SHALL BE SUBMITTED FOR PRE-APPROVAL TO THE PROJECT ENGINEER 10 DAYS PRIOR TO THE BID DATE.
4.) CONSTRUCTION SHALL CONFORM TO PIMA COUNTY/CITY OF TUCSON STD. SPECIFICATIONS FOR PUBLIC IMPROVEMENTS, 1994, REVISED TO DATE.

3/02/00	DJH	REVISION #2
1/20/00	BKB	MAKE CHANGES REQUESTED BY CLIENT

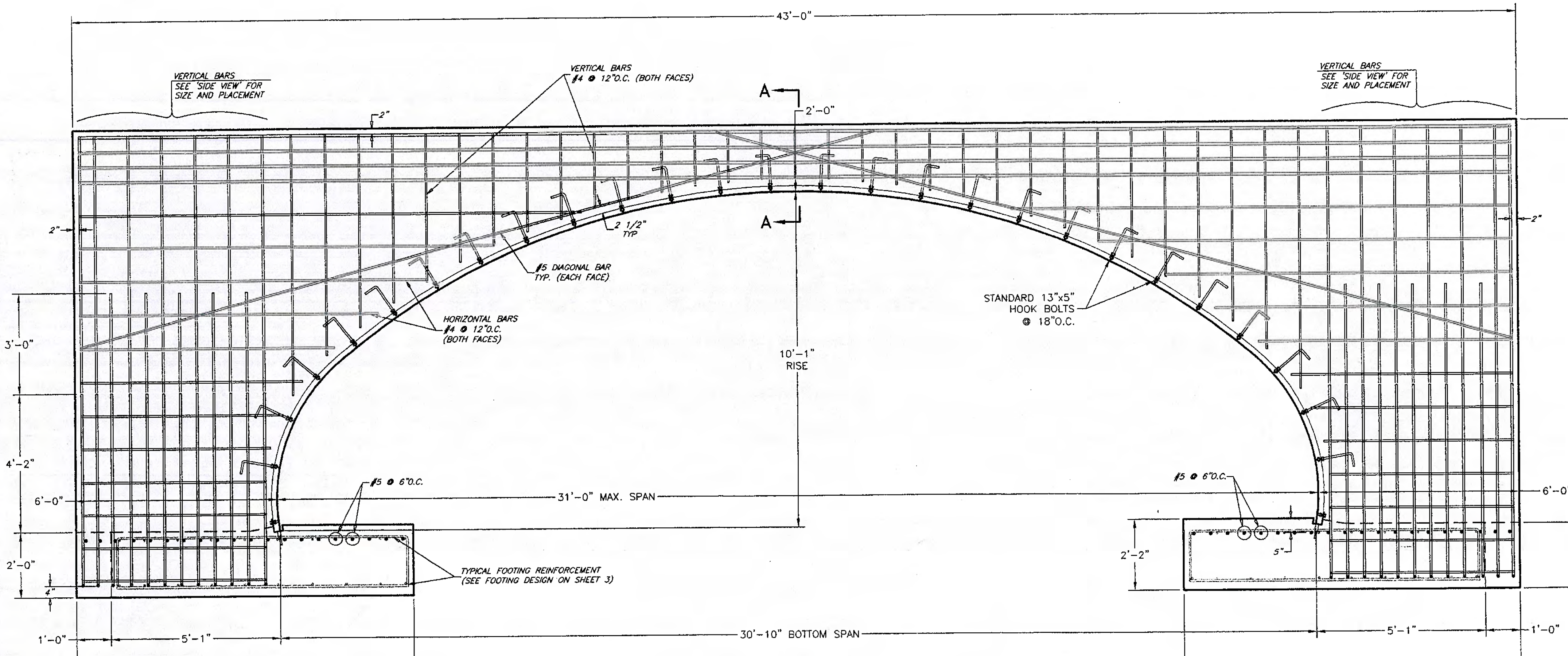
CBC Engineers and Associates
DAYTON, OHIO

DESIGN OF STRUCTURE #2

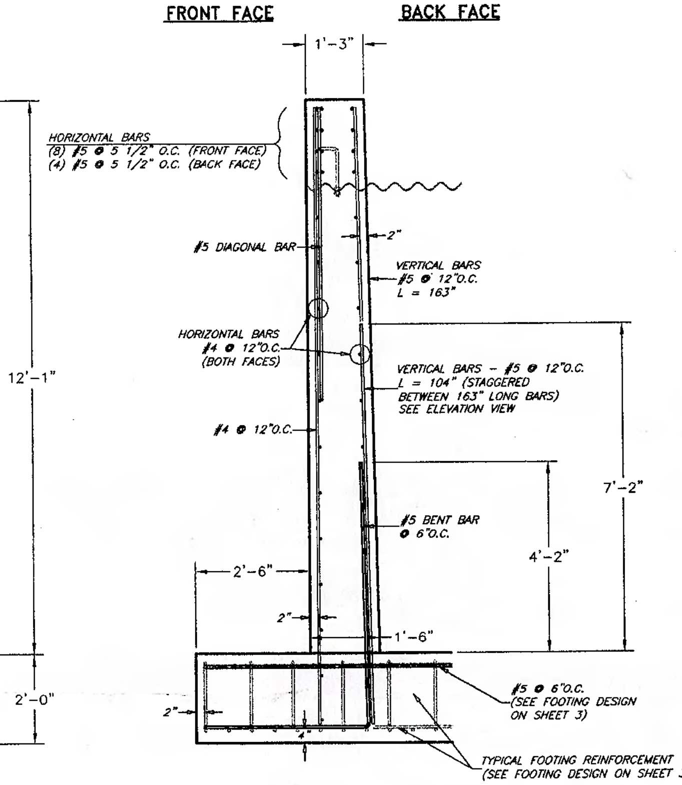
DRAWN BY	DATE	
DJH	9/21/99	CONTECH CONSTRUCTION PRODUCTS INC. DESIGN OF TWO(2) LOW PROFILE ARCH SUPER-SPAN STRUCTURES FOR SUMMIT AT FINGER ROCK PROJECT PIMA COUNTY, ARIZONA
APPROVED BY	DATE	

SCALE	SHEET	PROJECT NO
GRAPHIC	3 OF 4	CBC-2079

DESIGN OF STRUCTURE #2, MULTI-PLATE SUPER-SPAN LOW PROFILE ARCH #111A21 @ STATION 10+72.25'



ELEVATION VIEW

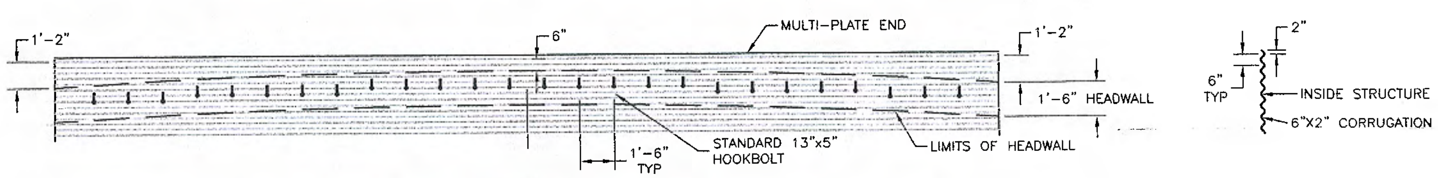


SIDE VIEW

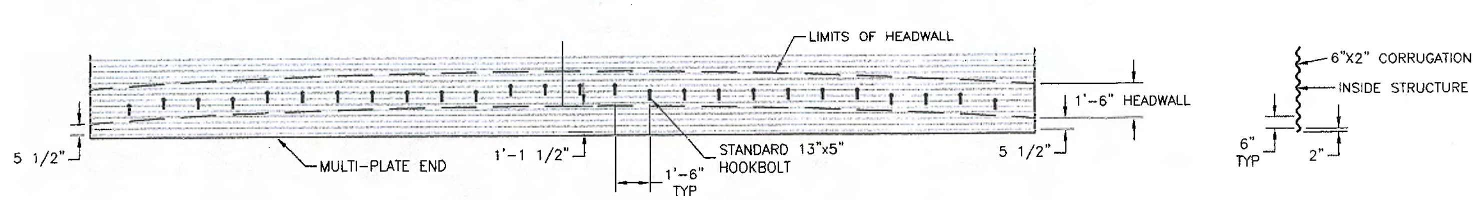
NOTE:
BOTH UPSTREAM AND DOWNSTREAM HEADWALLS ARE IDENTICAL WITH THE EXCEPTION OF THE VERTICAL ANGLE IN WHICH THE SUPER-SPAN ENTERS THE HEADWALL. (SEE PROFILE ON SHEET 3)

HEADWALL DESIGN

GRAPHIC SCALE
2' 1' 0 2' 4'



UPSTREAM END PLATES

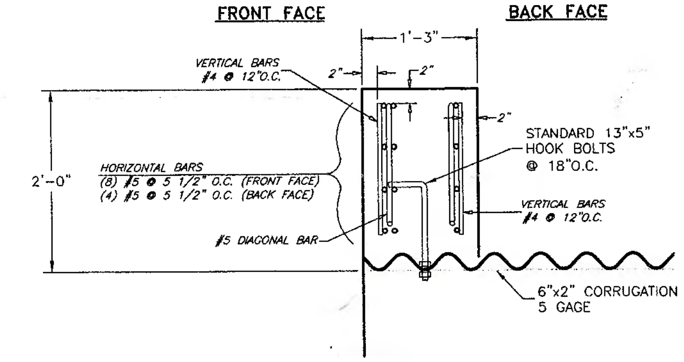


DOWNSTREAM END PLATES

HOOKBOLT PLACEMENT DETAIL

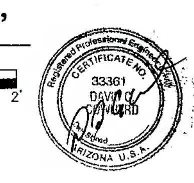
GRAPHIC SCALE
4' 2' 0 4' 8'

NOTES:
1.) MULTI-PLATE IS PROJECTED FLAT FOR CLARITY OF HOOKBOLT PLACEMENT
2.) THE HOLES ARE LOCATED IN THE CREST OR VALLEY THAT'S NEAREST TO THE ℄ OF HEADWALL AT EACH END OF STRUCTURE.



SECTION 'A-A'

GRAPHIC SCALE
1' 0.5' 0 1' 2'



NOTES:
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3/02/00	DJH	REVISION #2
1/20/00	BKB	MAKE CHANGES REQUESTED BY CLIENT

CBC Engineers and Associates
DAYTON, OHIO

HEADWALL DESIGN FOR STRUCTURE #2

DRAWN BY DJH	DATE 9/21/99	CONTECH CONSTRUCTION PRODUCTS INC. DESIGN OF TWO(2) LOW PROFILE ARCH SUPER-SPAN STRUCTURES FOR SUMMIT AT FINGER ROCK PROJECT PIMA COUNTY, ARIZONA
APPROVED BY	DATE	
SCALE GRAPHIC	SHEET 4 OF 4	PROJECT NO CBC-2079

CONTECH CONSTRUCTION PRODUCTS INC.

July 13, 2000

Brent E. Flom, P.E.
Regional Engineer

To: Bing Sherwood; Finger Rock Development Corporation

From: B. E. Flom

Subject: Summit at Finger Rock, Station 10 + 72; Super-Span Low Profile Arch

I am pleased to distribute the final inspection report reviewing the performance of the SUPER SPAN structure during the backfilling operation.

After assembly the structure was within tolerance of the design dimensions. During the backfilling operation the movement of the structure went exactly as predicted; the structure increased in rise as fill was placed along the sides and then settled slightly as fill was placed over the top. The final rise of the structure averaged 10.17 ft., versus the design rise of 10.08 ft. The final span averaged 31.04 ft., compared to the design dimension of 31.00 ft. None of the individual measurements along the length of the structure exceeded their established tolerance, and the structure exhibits good symmetry. All of the density records indicate the required densities were achieved with exception of the few measurements taken on the first lift over the top of the structure (this is to be expected).

Our Shape Control Technician monitored the backfilling operation until there was 4 ft. of fill over the top of the structure. This was determined to be the minimum cover for highway loading. **It is important to insure that the minimum cover is maintained. Additional fill may be required to facilitate heavy construction equipment; that is, construction equipment which exerts live load pressures in excess of standard highway wheel loads. This is especially important if this road will not be paved.** If rutting occurs the ruts should be filled in (rather than graded down) in order to maintain minimum cover.

Congratulations on another successful SUPER-SPAN installation. We appreciate this opportunity to have furnished CONTECH products for your project and look forward to working with you in the future.

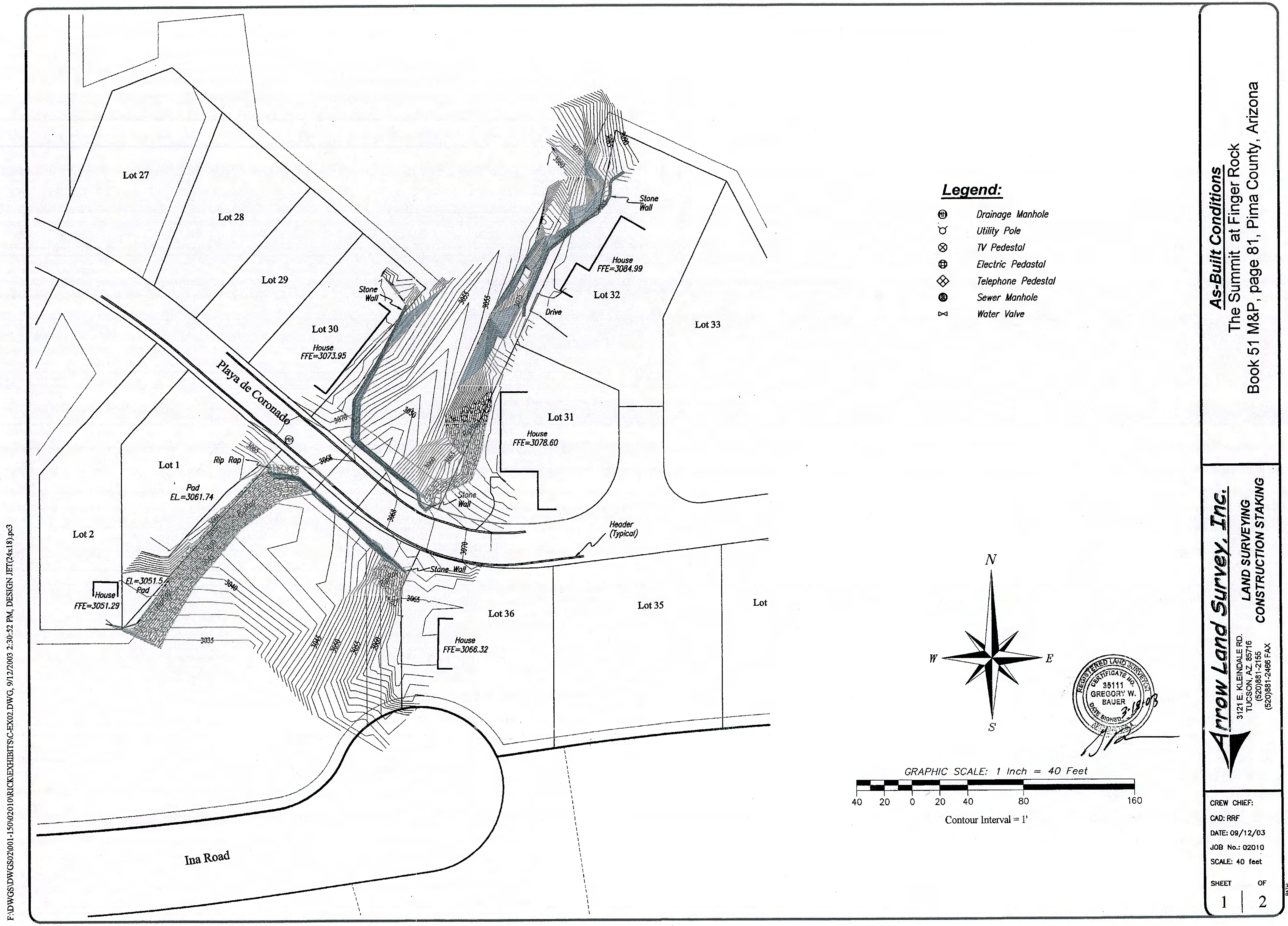
Sincerely,

Brent E. Flom

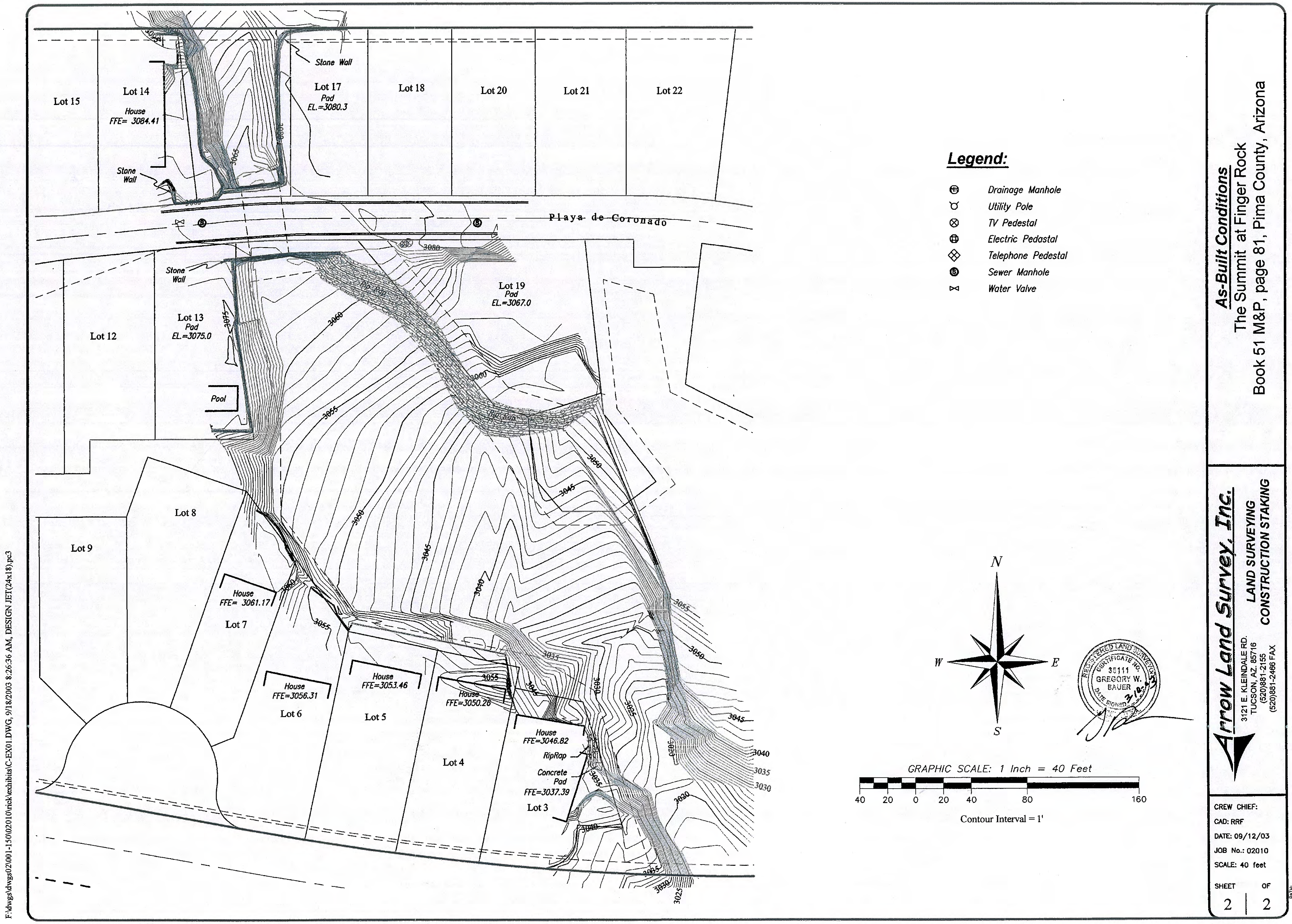
Brent E. Flom
Regional Engineer

cc:R.C. Adams, J.R. Noll, E.J. Prahl; J.S. Schluter, M.A. Taylor; CONTECH
Bill Baker; Walbert Baker
Cecil Baldwin; Baldwin Construction

4891 Independence St., #195 • Wheat Ridge, Colorado 80033 • (303) 431-8999 • FAX (303) 431-9839 • e-mail BFlom@contech-cpi.com



Lot 27
Lot 28
Lot 29
Lot 30
House FFE=3073.95
Stone Wall
Lot 32
House FFE=3084.99
Drive
Lot 33
Lot 31
House FFE=3078.60
Playa de Coronado
Lot 1
Rip Rap
Pad EL.=3061.74
Lot 2
House FFE=3051.29
EL=3051.5 Pad
Header (Typical)
Lot 36
House FFE=3066.32
Lot 35
Lot
Ina Road
Legend:
Drainage Manhole
Utility Pole
TV Pedestal
Electric Pedastal
Telephone Pedestal
Sewer Manhole
Water Valve
N
W
E
S
GRAPHIC SCALE: 1 Inch = 40 Feet
40 20 0 20 40 80 160
Contour Interval = 1'
REGISTERED LAND SURVEYOR
CERTIFICATE NO. 35111
GREGORY W. BAUER
DATE SIGNED 3-18-03
As-Built Conditions
The Summit at Finger Rock
Book 51 M&P, page 81, Pima County, Arizona
Arrow Land Survey, Inc.
LAND SURVEYING
CONSTRUCTION STAKING
3121 E. KLEINDALE RD.
TUCSON, AZ. 85716
(520)881-2155
(520)881-2466 FAX
CREW CHIEF:
CAD: RRF
DATE: 09/12/03
JOB No.: 02010
SCALE: 40 feet
SHEET 1 OF 2
F:\DWGS\DWGS02\001-150\02010\RICK\EXHIBITS\C-EX02.DWG, 9/12/2003 2:30:52 PM, DESIGN JET(24x18).pc3



Lot 15
Lot 14
House FFE= 3084.41
Stone Wall
Lot 17
Pad EL.=3080.3
Lot 18
Lot 20
Lot 21
Lot 22
Playa de Coronado
Stone Wall
Lot 12
Lot 13
Pad EL.=3075.0
Pool
Lot 19
Pad EL.=3067.0
Rip Rap
Lot 8
Lot 9
House FFE= 3061.17
Lot 7
House FFE=3056.31
Lot 6
House FFE=3053.46
Lot 5
House FFE=3050.26
Lot 4
House FFE=3046.82
RipRap
Concrete Pad FFE=3037.39
Lot 3
Legend:
Drainage Manhole
Utility Pole
TV Pedestal
Electric Pedastal
Telephone Pedestal
Sewer Manhole
Water Valve
N
W
E
S
GRAPHIC SCALE: 1 Inch = 40 Feet
40 20 0 20 40 80 160
Contour Interval = 1'
REGISTERED LAND SURVEYOR
CERTIFICATE NO. 35111
GREGORY W. BAUER
DATE SIGNED
As-Built Conditions
The Summit at Finger Rock
Book 51 M&P, page 81, Pima County, Arizona
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3121 E. KLEINDALE RD.
TUCSON, AZ. 85716
(520)881-2155
(520)881-2466 FAX
CREW CHIEF:
CAD: RRF
DATE: 09/12/03
JOB No.: 02010
SCALE: 40 feet
SHEET 2 OF 2
F:\dwgs\dwgs02001-150\02010\rick\exhibits\C-EX01.DWG, 9/18/2003 8:26:36 AM, DESIGN JET(24x18).pc3

PIMA COUNTY HIGHWAY DEPARTMENT

J. R. JONES, P.E. DIRECTOR

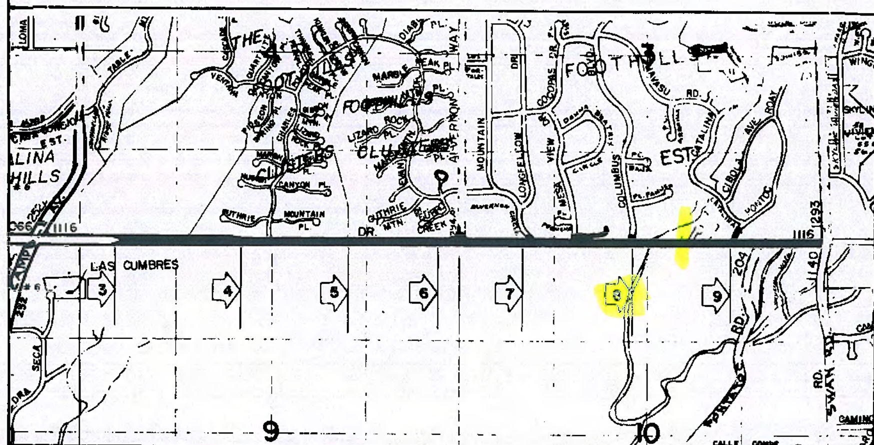
SKYLINE DRIVE

FROM

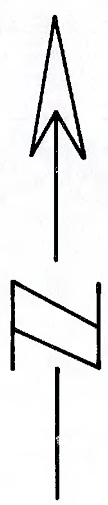
CAMPBELL AVENUE TO SWAN ROAD

PHASE II

CAH 14 Feb 78

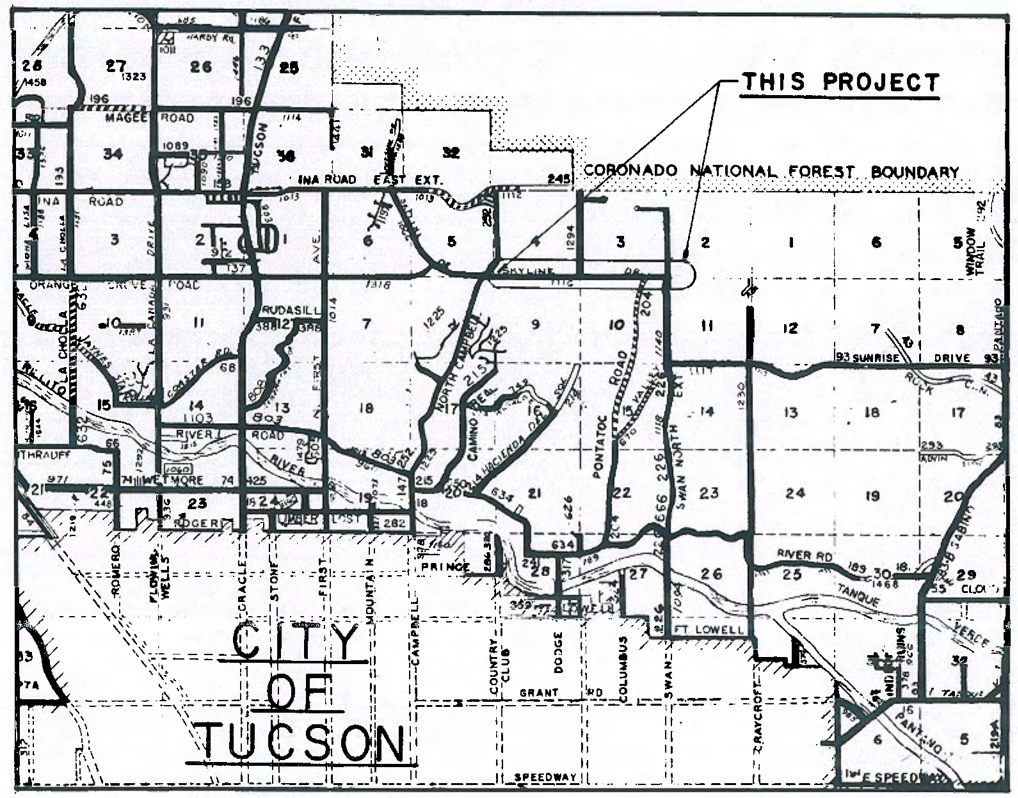


SHEET INDEX



T.-13-S. R.-14-E.

SEC. 2,3,4,9,10 & 11



LOCATION PLAN

SCALE: 1" = 1 MILE

GENERAL NOTES:

UTILITIES:

CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES WITH THE APPROPRIATE ORGANIZATIONS PRIOR TO START OF CONSTRUCTION. THE LOCATION OF UTILITIES SHOWN ON THE PLANS IS APPROXIMATE.

SPECIFICATIONS:

CONSTRUCTION SHALL CONFORM TO THE ARIZONA HIGHWAY DEPARTMENT SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, EDITION OF 1969 AS MODIFIED BY THE CONTRACT DOCUMENTS.

TRAFFIC CONTROL:

CONTRACTOR SHALL CONFORM TO THE ARIZONA HIGHWAY DEPARTMENT TRAFFIC CONTROL MANUAL FOR HIGHWAY CONSTRUCTION AND MAINTENANCE, AND THOSE WHICH ARE SPECIFIED ON THE PLANS AND IN THE SPECIAL PROVISIONS.

PLANT REMOVAL:

"THE PIMA COUNTY HIGHWAY DEPARTMENT MAY REMOVE CACTUS FROM THE RIGHT-OF-WAY PRIOR TO THE START OF CONSTRUCTION. ANY CACTUS NOT REMOVED BY THE HIGHWAY DEPARTMENT, WHICH MUST BE REMOVED DURING CONSTRUCTION, SHALL BE THE RESPONSIBLILITY OF THE CONTRACTOR."

INDEX

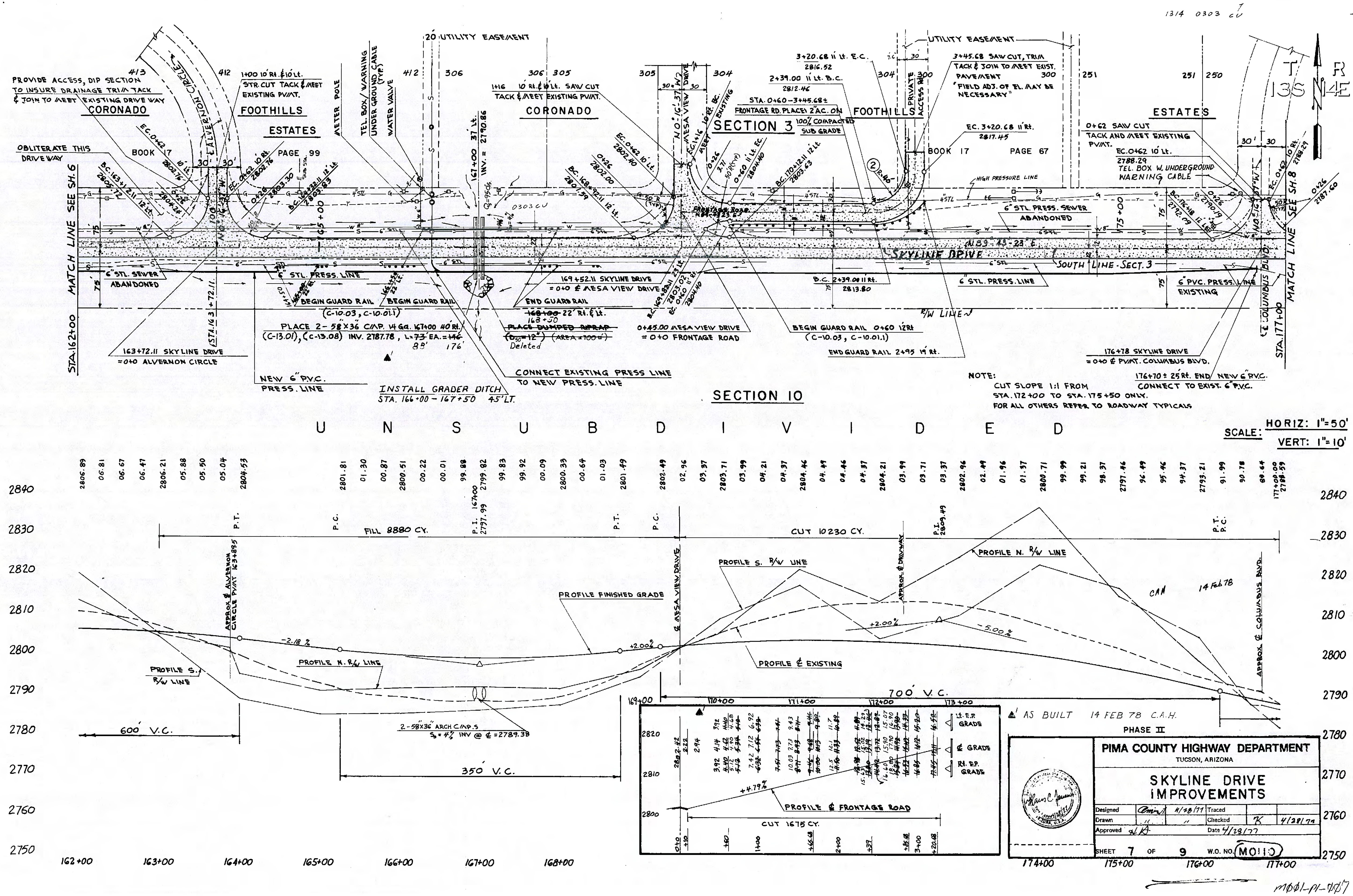
NO	DATE	MADE BY	DESCRIPTION OF REVISIONS
1			
2			
3			
4			

BLUE PRINT RECORD: NO | FOR | DATE | NO | FOR | DATE

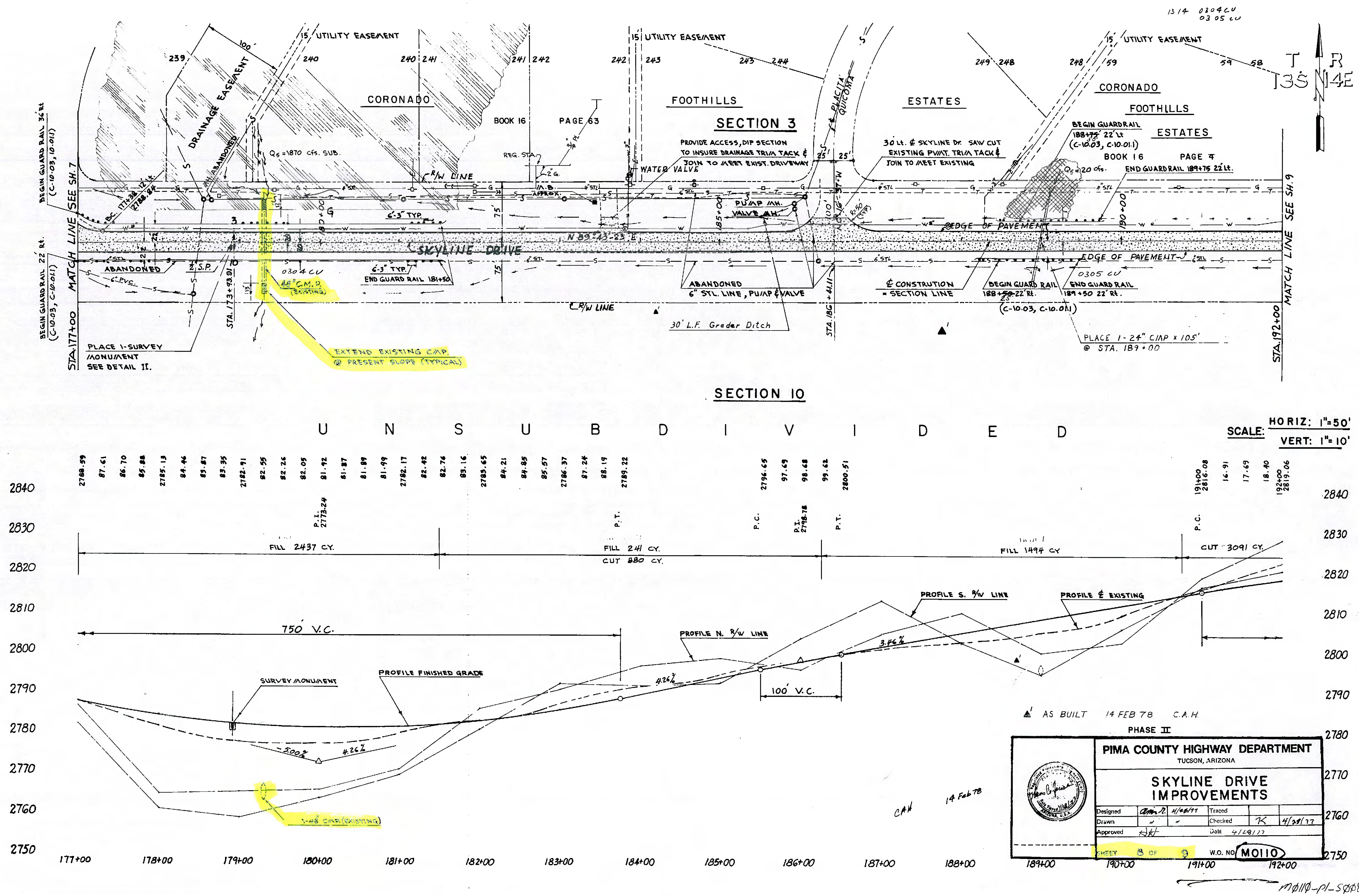
W.O. NO. M-0110 SHEET 1 OF 9

M-0110 MØ110-P1-5ØØ1

BOX LT 6 FOLDER 3 DR # 1



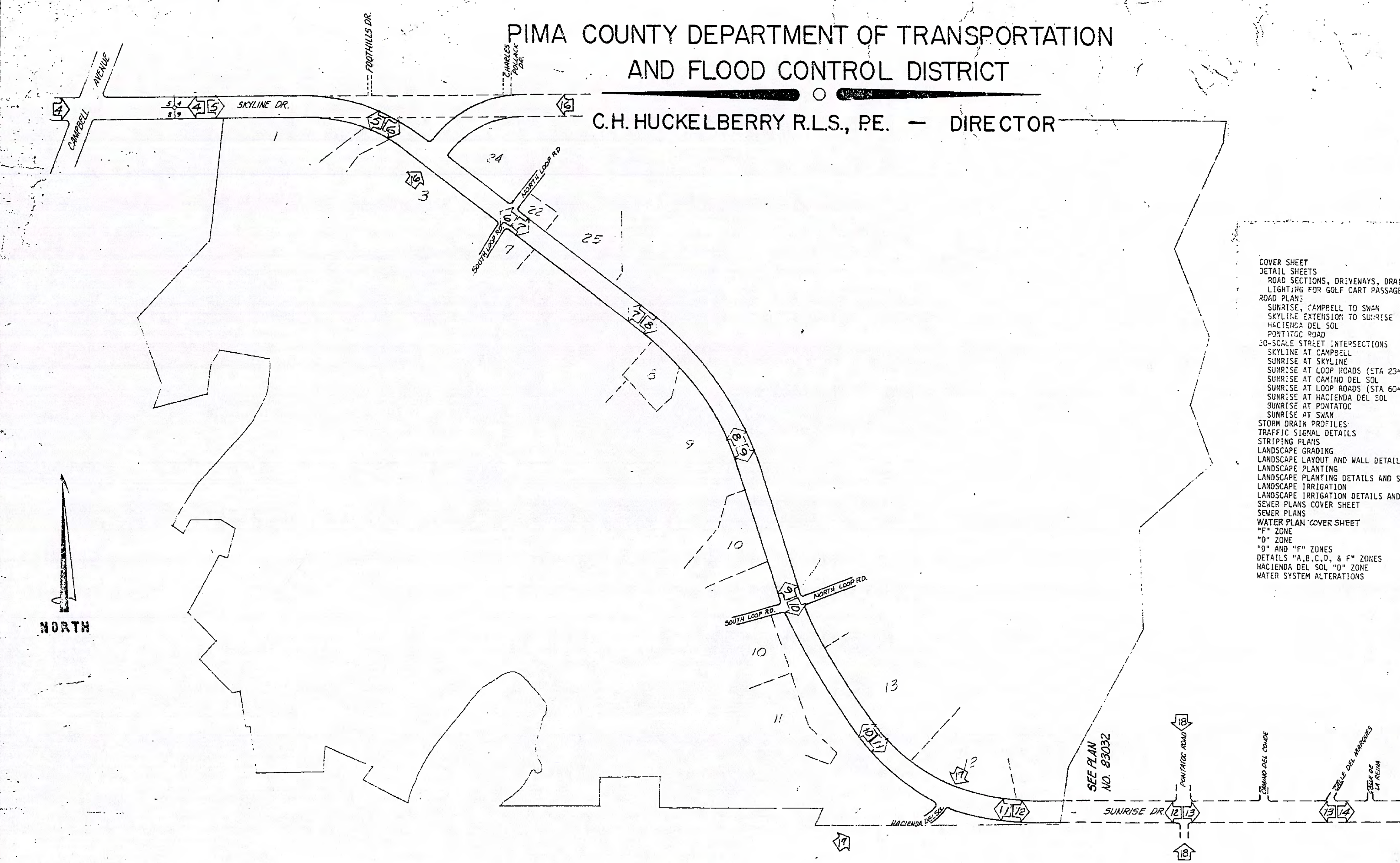
1314 0303 cv
PROVIDE ACCESS, DIP SECTION TO INSURE DRAINAGE TRIM TACK & JOIN TO MEET EXISTING DRIVE WAY
CORONADO
FOOTHILLS
ESTATES
BOOK 17
PAGE 99
OBLITERATE THIS DRIVEWAY
ALVERNON CIRCLE
METER POLE
TEL. BOX/WARNING UNDER GROUND CABLE (TYP)
WATER VALVE
20' UTILITY EASEMENT
CORONADO
SECTION 3
FOOTHILLS
PRIVATE ACCESS RD.
UTILITY EASEMENT
ESTATES
BOOK 17
PAGE 67
T 13S
R 14E
N
MATCH LINE SEE SH. 6
MATCH LINE SEE SH. 8
SKYLINE DRIVE
N 89°49'23" E
SOUTH LINE - SECT. 3
6" STL. SEWER ABANDONED
6" STL. PRESS. LINE
BEGIN GUARD RAIL
END GUARD RAIL
6" STL. PRESS. SEWER ABANDONED
HIGH PRESSURE LINE
6" PVC. PRESS. LINE EXISTING
R/W LINE
STA. 162+00
STA. 177+00
163+72.11 SKY LINE DRIVE =0+0 ALVERNON CIRCLE
NEW 6" P.V.C. PRESS. LINE
PLACE 2 - 58"X36" C/MP. 14 Ga. 167+00 40' Rt. (C-13.01), (C-13.08) INV. 2787.78, L=73' EA.=146' 88' 176'
INSTALL GRADER DITCH STA. 166+00 - 167+50 45' LT.
CONNECT EXISTING PRESS LINE TO NEW PRESS. LINE
169+52.11 SKYLINE DRIVE = 0+0 ¢ MESA VIEW DRIVE
0+45.00 MESA VIEW DRIVE = 0+0 FRONTAGE ROAD
BEGIN GUARD RAIL 0+60 12' Rt (C-10.03, C-10.01.1)
END GUARD RAIL 2+95 19' Rt.
176+78 SKYLINE DRIVE = 0+0 ¢ PVMT. COLUMBUS BLVD.
176+70± 25' Rt. END NEW 6" PVC. CONNECT TO EXIST. 6" P.V.C.
NOTE: CUT SLOPE 1:1 FROM STA. 172+00 TO STA. 175+50 ONLY. FOR ALL OTHERS REFER TO ROADWAY TYPICALS
SECTION 10
U N S U B D I V I D E D
SCALE: HORIZ: 1"=50' VERT: 1"=10'
FILL 8880 CY.
CUT 10230 CY.
PROFILE FINISHED GRADE
PROFILE S. R/W LINE
PROFILE N. R/W LINE
PROFILE ¢ EXISTING
600' V.C.
350' V.C.
700' V.C.
2-58"X36" ARCH C/MP.S S_o=4% INV @ ¢ =2789.38
PROFILE ¢ FRONTAGE ROAD
CUT 1675 CY.
AS BUILT 14 FEB 78 C.A.H.
PHASE II
PIMA COUNTY HIGHWAY DEPARTMENT
TUCSON, ARIZONA
SKYLINE DRIVE IMPROVEMENTS
Designed
Drawn
Approved
Traced
Checked
Date 4/28/77
SHEET 7 OF 9 W.O. NO. M0110
M001-P1-007

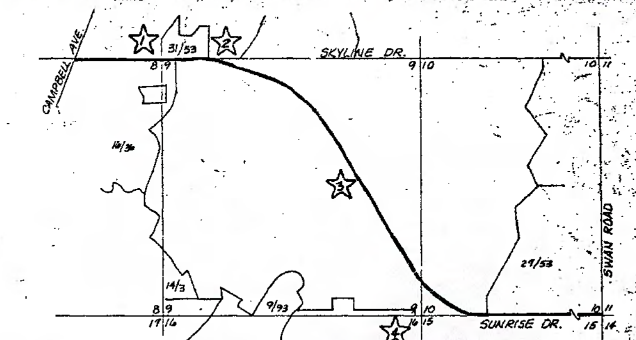


1314 0304CU 0305CU
T13S R14E
15' UTILITY EASEMENT
CORONADO
FOOTHILLS
SECTION 3
ESTATES
CORONADO FOOTHILLS ESTATES
BOOK 16 PAGE 63
BOOK 16 PAGE 4
DRAINAGE EASEMENT
PLACITA QUICOMA
PROVIDE ACCESS, DIP SECTION TO INSURE DRAINAGE TRIM, TACK & JOIN TO MEET EXIST. DRIVEWAY
30' Lt. ℄ SKYLINE Dr. SAW CUT EXISTING PVMT. TRIM, TACK & JOIN TO MEET EXISTING
BEGIN GUARD RAIL 188+75 22' Lt (C-10.03, C-10.01.1)
END GUARD RAIL 189+75 22' Lt.
Qs=1870 cfs. SUB.
Qs=20 cfs.
R/W LINE
WATER VALVE
PUMP MH. VALVE MH.
EDGE OF PAVEMENT
SKYLINE DRIVE
N 89°-43'-23" E
6-3" TYP.
END GUARD RAIL 181+50
ABANDONED
0304 CU
48" C.M.P. (EXISTING)
ABANDONED 6" STL. LINE, PUMP & VALVE
℄ CONSTRUCTION = SECTION LINE
BEGIN GUARD RAIL 188+50 22' Rt.
END GUARD RAIL 189+50 22' Rt.
0305 CU
(C-10.03, C-10.01.1)
30' L.F. Grader Ditch
PLACE 1-24" CMP x 105' @ STA. 189+00
PLACE 1-SURVEY MONUMENT SEE DETAIL II.
EXTEND EXISTING C.M.P. @ PRESENT SLOPE (TYPICAL)
BEGIN GUARD RAIL 36' Rt. (C-10.03, 10.01.1)
BEGIN GUARD RAIL 22' Rt. (C-10.03, C-10.01.1)
MATCH LINE SEE SH. 7
MATCH LINE SEE SH. 9
STA. 177+00
STA. 173+93.91
STA. 186+41.11
STA. 192+00
SECTION 10
U N S U B D I V I D E D
SCALE: HORIZ: 1"=50' VERT: 1"=10'
FILL 2437 CY.
FILL 241 CY. CUT 880 CY.
FILL 1494 CY
CUT 3091 CY.
750' V.C.
100' V.C.
PROFILE FINISHED GRADE
SURVEY MONUMENT
PROFILE N. R/W LINE
PROFILE S. R/W LINE
PROFILE ℄ EXISTING
-5.00%
4.26%
3.46%
1-48" CMP (EXISTING)
AS BUILT 14 FEB 78 C.A.H.
CAH 14 Feb 78
2840 2830 2820 2810 2800 2790 2780 2770 2760 2750
177+00 178+00 179+00 180+00 181+00 182+00 183+00 184+00 185+00 186+00 187+00 188+00 189+00 190+00 191+00 192+00
PHASE II
PIMA COUNTY HIGHWAY DEPARTMENT
TUCSON, ARIZONA
SKYLINE DRIVE IMPROVEMENTS
Designed 4/28/77
Checked 4/28/77
Approved
Date 4/28/77
SHEET 8 OF 9
W.O. NO. M0110
M0110-PI-S008

PIMA COUNTY DEPARTMENT OF TRANSPORTATION AND FLOOD CONTROL DISTRICT

C.H. HUCKELBERRY R.L.S., P.E. — DIRECTOR





LOCATION PLAN
SECTION 9 & SECTION 10
T-13-S R-14-E G&SRB&M
PIMA COUNTY, ARIZONA
SCALE: 3" = 1 MILE

BENCH MARK NOTES

1. FND. 2" BC SEC. COR $\frac{5}{8}\big|\frac{4}{9}$ SKYLINE RD. ELEV. = 2722.14
2. FND. NAIL IN PVMT. 1/4 COR. SEC. 9 SKYLINE RD. ELEV. = 2752.45
3. SET 5/8" PIN - PANEL POINT NO. 77-A WEST OF SUNRISE RD. EXTEN. ELEV: 2754.61 CORRD. N 12344.88 E 8868.31
4. FND. 5/8" I.P. SEC. COR. $\frac{9}{16}\big|\frac{10}{15}$ SOUTH ℄ OF PROPERTY ELEV = 2662.38

PIMA COUNTY DATUM

GENERAL NOTES

1. RIGHT OF WAY ENCROACHMENTS SHALL BE REMOVED ONLY BY ORDER OF THE COUNTY. ALL CONSTRUCTION ACTIVITY MUST REMAIN WITHIN RIGHT OF WAY EASEMENTS.
2. CONSTRUCTION SHALL CONFORM TO THE ARIZONA HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, EDITION 1982.
3. ALL TEST METHODS SHALL CONFORM TO THE REQUIREMENTS OF THE ARIZONA HIGHWAY DEPARTMENT MATERIAL TESTING MANUAL AND REVISIONS TO DATE.
4. SELECT MATERIAL SHALL CONFORM TO ARIZONA HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS, EDITION OF 1969 EXCEPT AS FOLLOWS:

GRADATION		PLASTICITY INDEX
SIEVE SIZE	PERCENT PASSING	MAXIMUM
3" (square)	100	5
#200	0 - 12	

IN NO CASE, HOWEVER, IS THE MAXIMUM AGGREGATE SIZE TO EXCEED THE THICKNESS OF SELECT REQUIRED.

5. THE MAXIMUM PAVEMENT THICKNESS WHICH MAY BE PLACED ON A SINGLE LIFT WILL BE DETERMINED BY THE PIMA COUNTY ENGINEER.
6. THE PIMA COUNTY ENGINEER RESERVES THE RIGHT TO CHECK PAVEMENT THICKNESS DESIGN REQUIREMENTS BY SAMPLING AND TESTING SUBGRADE PRIOR TO THE PLACING OF THE BASE COURSE.
7. PAVING CONTRACTOR SHALL ADJUST WATER VALVE, MANHOLE AND CLEANOUT RINGS AND COVERS TO GRADE.
8. IF, AT THE TIME OF CONSTRUCTION, ANY DIP SECTION OR DRAINAGE STRUCTURE SHOWN ON THESE PLANS IS FOUND TO BE UNDERCUTTING A WASH, REVISED PLANS WILL BE SUBMITTED TO THE PIMA COUNTY DEPARTMENT OF TRANSPORTATION AND FLOOD CONTROL DISTRICT FOR REVIEW AND APPROVAL PRIOR TO FURTHER CONSTRUCTION OF THAT PARTICULAR DIP SECTION OR STRUCTURE.
9. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES WITH THE APPROPRIATE ORGANIZATIONS PRIOR TO START OF CONSTRUCTION. THE LOCATION OF UTILITIES AS SHOWN ON PLANS IS APPROXIMATE. CALL BLUESTAKE 792-2211.
10. CONTRACTOR SHALL COMPLY WITH THE FHWA "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS", 1978, AND THOSE REQUIREMENTS WHICH ARE SPECIFIED ON PLANS AND IN SPECIAL PROVISIONS.
11. SOILS INFORMATION CONTAINED HEREIN IS MADE AVAILABLE TO PROSPECTIVE BIDDERS FOR INFORMATION PURPOSES ONLY, AND IS NOT TO BE CONSIDERED A PART OF THE CONTRACT DOCUMENTS. THE INFORMATION IS DEVELOPED AS ACCURATELY AS POSSIBLE BY THE METHODS UTILIZED; HOWEVER, THE COUNTY ACCEPTS NO RESPONSIBILITY FOR ANY CONDITIONS ENCOUNTERED WHICH MAY BE AT VARIANCE WITH INFORMATION CONTAINED HEREIN.
12. THE PIMA COUNTY DEPARTMENT OF TRANSPORTATION AND FLOOD CONTROL DISTRICT MAY REMOVE CACTI FROM THE RIGHT OF WAY PRIOR TO THE START OF CONSTRUCTION ANY CACTI NOT REMOVED BY THE DEPARTMENT OF TRANSPORTATION AND FLOOD CONTROL DISTRICT, WHICH MUST BE REMOVED DURING CONSTRUCTION, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. ALL CACTI AND NATIVE PLANT REMOVAL MUST BE IN ACCORDANCE WITH THE PROVISIONS OF THE "ARIZONA NATIVE PLANT LAW", A.R.S. CHAPTER 7.
13. SURVEY MONUMENTS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. BASIS OF BEARING FOR THE PROJECT IS RECORD BEARING OF THE NORTH LINE OF SECTION 10 RECORDED AS NORTH 89° 43' 23" EAST IN THE PLAT OF CORONADO FOOTHILLS ESTATES (BOOK 16, Page 4, BOOK 16, PAGE 63, BOOK 17, PAGE 67, BOOK 17, PAGE 99).
14. A CONSTRUCTION CENTER LINE AND CURVE WILL BE USED FOR DESIGN AND CONSTRUCTION OF THIS PROJECT WHICH PERIODICALLY DOES NOT MATCH EXISTING R/W BEARINGS AND DISTANCES.
15. CONTRACTOR SHALL OBTAIN ALL PERMITS REQUIRED BY GOVERNMENTAL AGENCIES.
16. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE OCCUPATION SAFETY AND HEALTH ADMINISTRATION REGULATIONS.
17. FOR BENCHING OF CUT SLOPES, SEE LANDSCAPE PLAN SHEET NOS. G-3 THRU G-19.
18. ADD TWO (2) ADDITIONAL FEET OF HEADWALL TO TOP OF ALL PIPES AND BOX CULVERT HEADWALLS THAT ARE FIVE FEET OR MORE BELOW TOP OF PARKWAY GRADE. SEE PROFILE SHEETS 29 THRU 30.

R-776

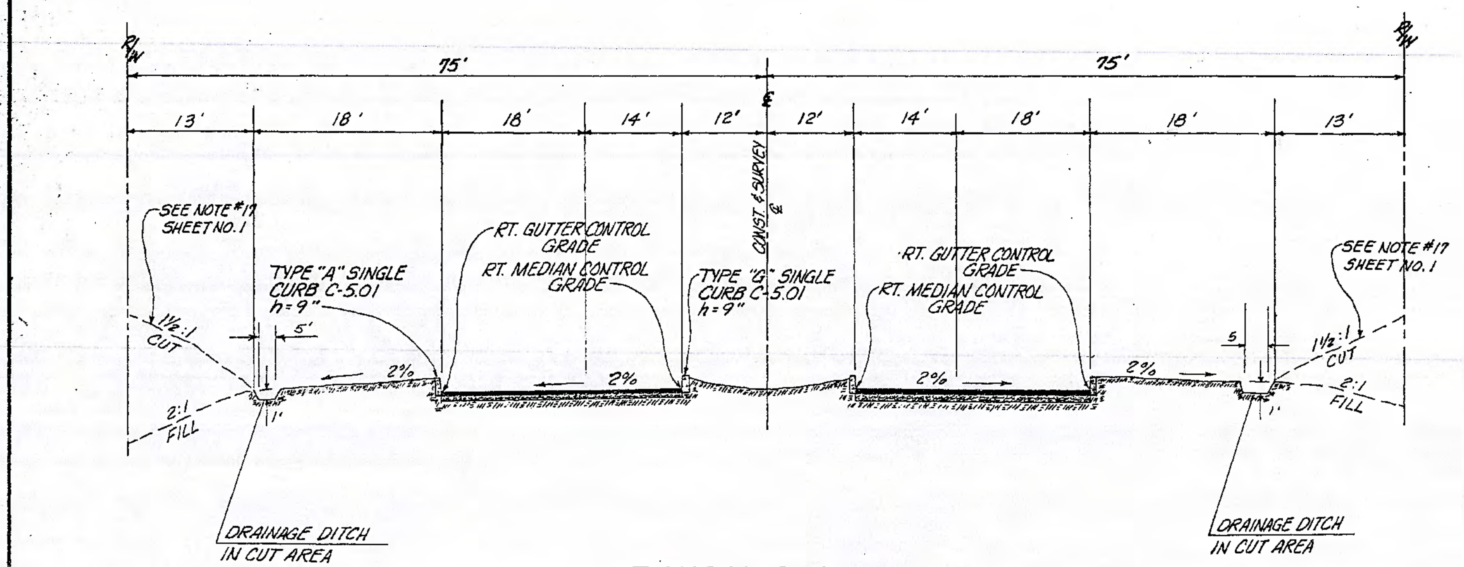
Rev. 9-7-83

PIMA COUNTY
SUNRISE DRIVE
COVER SHEET

OSBORN, PETTERSON, WALBERT & ASSOCIATES
Engineering, Surveying & Planning, Inc.

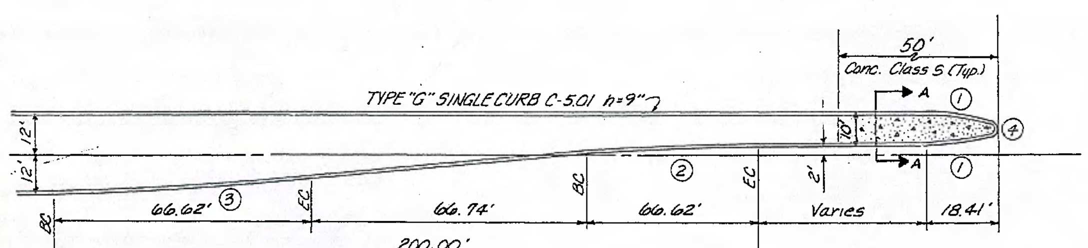
Design	WE
Engineered by	PO
Drawn	BC
Scale, Horizontal	1" = 400'
Date	4/5/83
Sheet	1 OF 116
Job No.	8113-107

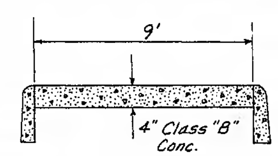
4/7/83



TYPICAL SECTION
NOT TO SCALE

(A)



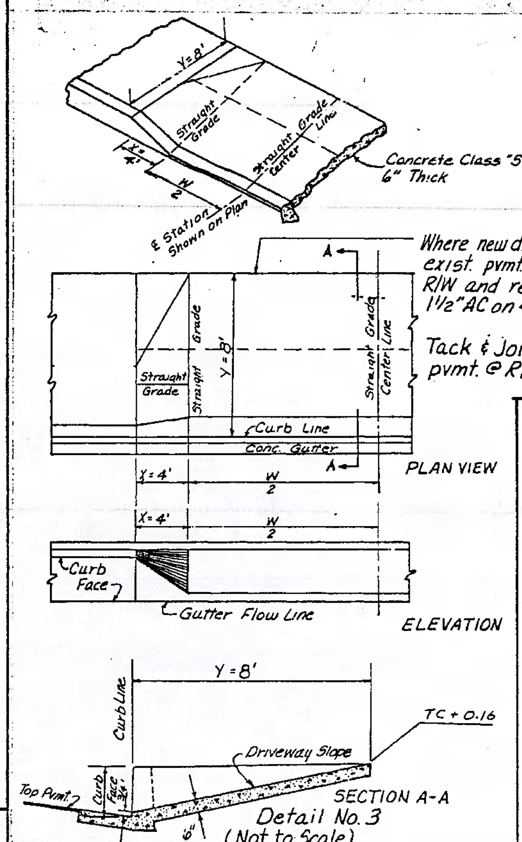


Section A-A

MEDIAN CURVE DATA				
NO.	R	Δ	T	L
1	60'	18°30'	9.78'	19.38'
2	637.30'	6°00'	33.40'	66.74'
3	637.30'	6°00'	33.40'	66.74'
4	2'	143°00'	5.97'	4.99'

TYPICAL MEDIAN DETAIL
SCALE 1":20'

(B)



Where new driveways have exist. pvmt., remove to exist. R/W and replace with new 1½"AC on 4"ABC

Trim, Tack & Join. Meet exist. pvmt. @ R/W.

SECTION A-A
Detail No. 3
(Not to Scale)

NOTE:

1. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST STANDARD SPECIFICATIONS.
2. PLASTIC CONTROL WEAKENED PLANE JOINTS SHALL BE INSTALLED AT BOTH SIDES OF A DRIVEWAY AND AT APPROXIMATELY TEN-FOOT INTERVALS WITHIN THE DRIVEWAY. WHERE THE DISTANCE BETWEEN THE SIDES OF THE DRIVEWAY DOES NOT EXCEED 15 FEET, AN INTERMEDIATE WEAKENED PLANE JOINT WILL NOT BE REQUIRED.
3. THE AREA INCLUDED WITHIN THE "X" AND "Y" SLOPES (INCLUDING TOP OF CURB) WITHIN DRIVEWAY SHALL BE FINISHED WITH A WOOD FLOAT. THE BALANCE OF THE DRIVEWAY SHALL BE FINISHED IN ACCORDANCE WITH THE LATEST SPECIFICATIONS FOR SIDEWALKS.
4. CURB FACE FOR DRIVEWAY DEPRESSION SHALL BE 3/4 INCH.

NEW DRIVEWAYS and DEPRESSED CURBS DETAIL

(C)

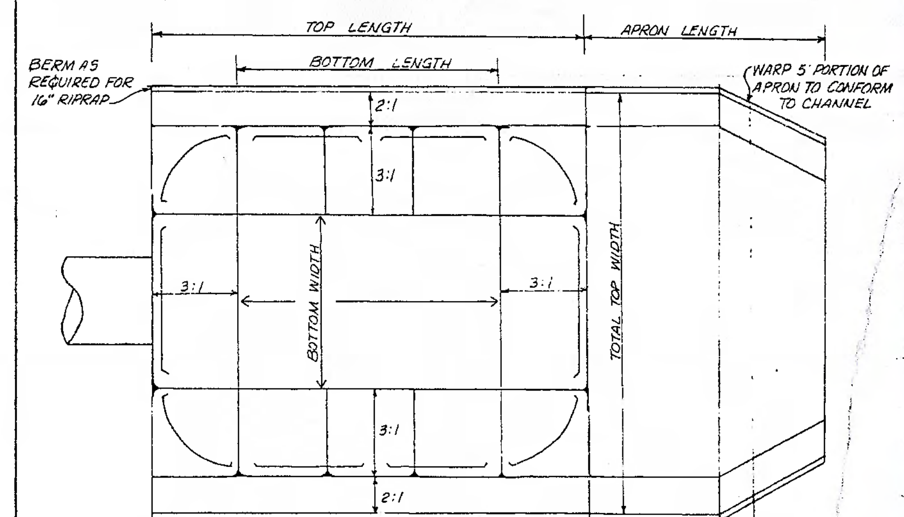
ADOT Structural Std. Drawing (1983), Construction Std. Drawings (1983)

1976		1983
C-5.01	Curb and Driveway Detail	C-5.10 & C-5.20
C-10.01	Guard Rail, Single Face Detail	C-10.01
C-10.07	Guard Rail Installation	C-10.04
C-13.02	Pipe Culvert Placement	C-13.15
C-13.03	Pipe, Reinf. Conc. Fill Height	------
C-14.01	Headwall, Pipe Straight and "L" Type	C-14.10
C-14.02	Headwall, Normal to Pipe 42"-84" Pipe	C-14.20
	Catch Basin, No. 1 Pima County Std. Dtl.	
B-3.01	Equipment Pass	B-03.10
CW2-1	Inlet Wings Detail	CW2-1
CW2-2	Inlet Wings Detail	CW2-2
CW2-3	Outlet Wings Detail	CW2-3
CW2-4	Outlet Wings Detail	CW2-4
CB-2	Double Barrel Box Culvert	CB-2
CB-3	Triple Barrel Box Culvert	CB-3
CB-5	Five Barrel Box Culvert	CB-5
CB-9	Nine Barrel Box Culvert	CB-9

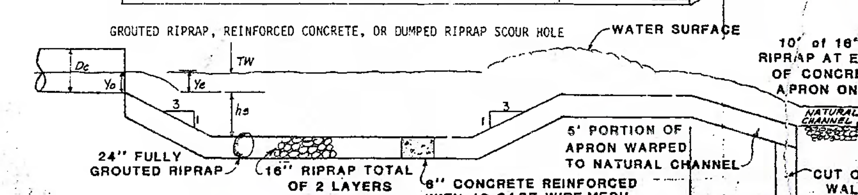
Station	Q100 (cfs)	Culvert Size (ft)	Vo	Bottom Length (ft)	Top Length (ft)	Bottom Width (ft)	3:1 Top Width (ft)	2:1 Top Width (ft)	Apron Length (ft)	Material for Bottom Hole/Apron	Depth hs	Cutoff Wall Depth
3+40	306	4	1.71	2.00	20	17.66	29.66	45	10	24" Fully Grouted	2.00	4
[illegible]+35	380	4	1.45	6.50	26.3	28.22	38	47.6	15	24" Fully Grouted	[illegible]	4
[illegible]+25	159	3	1.83	7.82	20	15.30	27.5	52	10	24" Fully Grouted	[illegible]	4
[illegible]+74	346	5	1.06	10.0	25	32.60	47.5	56.6	10	16" Riprap	[illegible]	4
[illegible]+25	51	3.5	1.06	[illegible]	10	10.30	[illegible]	[illegible]	10	16" Riprap	[illegible]	4
[illegible]+25	388	5	1.81	10.4	26	15.90	[illegible]	[illegible]	10	24" Fully Grouted	[illegible]	4
[illegible]+05	63	2	1.93	[illegible]	16.7	10.30	15.60	[illegible]	[illegible]	24" Fully Grouted	[illegible]	4
[illegible]+17	228	3.4	1.78	4.56	11.4	21.16	28.0	[illegible]	[illegible]	24" Fully Grouted	[illegible]	4
11+10	225	4	[illegible]	7.1	12.7	21.38	32	38.64	10	24" Fully Grouted	[illegible]	4
[illegible]+90	1,408	6	1.96	8.56	28.9	57.60	75	84.3	14	24" Fully Grouted	[illegible]	4
[illegible]+93	87	3.5	1.38	5.23	13.1	20.14	28	33.68	7	24" Fully Grouted	[illegible]	4
4+90	206	3	1.48	1.00	10	48.00	57	63.4	10	24" Fully Grouted	[illegible]	4
[illegible]+20	47	3	[illegible]	6.32	15.8	5.52	15	20.6	10	24" Fully Grouted	[illegible]	4
[illegible]+25	7,329	10x8	2.15	14.70	27	107.80	130	143.8	18	Reinf. Concrete	[illegible]	4
[illegible]+74	611	5	1.87	[illegible]	21.6	34.50	47.5	56.6	10.2	24" Fully Grouted	[illegible]	4
[illegible]+87	77	3.5	1.60	5.00	12.5	10.67	18.17	24.49	10	Reinf. Concrete	[illegible]	4
[illegible]+79	1,440	10x5	1.05	12.0	30	38.60	56.5	67.20	15	16" Riprap	[illegible]	4
[illegible]+76	2,200	10x5	1.09	10.36	22	86.60	98.25	111	11	16" Riprap	[illegible]	4

Located at Hacienda Del Sol Road

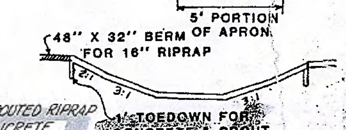
NOTE: All scour holes were constructed of reinforced concrete. △2



GROUTED RIPRAP, REINFORCED CONCRETE, OR DUMPED RIPRAP SCOUR HOLE

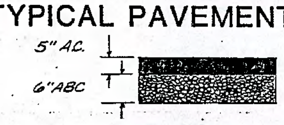


LEGEND
Dc = CULVERT DEPTH
Yo = BRINK DEPTH
Ye = EQUIVALENT BRINK DEPTH
TW = TAIL WATER
hs = DEPTH OF SCOUR HOLE
2dso = TOTAL DEPTH OF RIPRAP OR GROUTED RIPRAP OR 10" OF REINFORCED CONCRETE



(E)

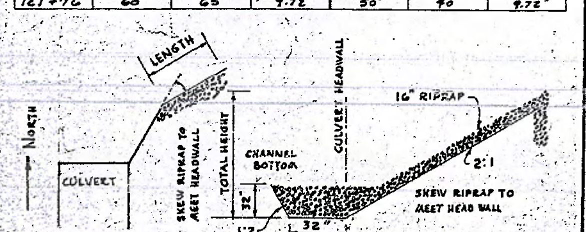
TYPICAL PAVEMENT SECTION



NOTE: Between Sta. 78+50± and Sta. 96+00±, 15" of ABC was placed due to unsuitable subgrade. △2

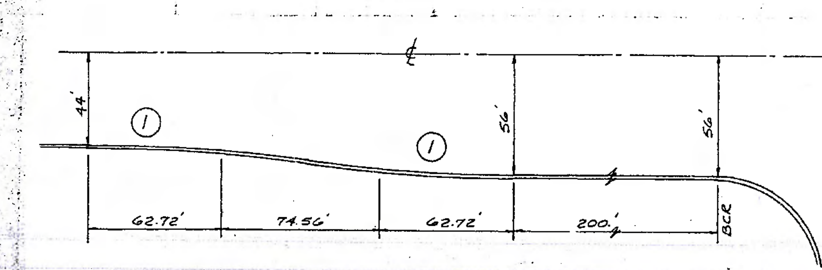
BERM RIPRAP

STATION	RIGHT		TOTAL	LEFT		TOTAL
	LENGTH	ANGLE	HEIGHT	LENGTH	ANGLE	HEIGHT
18+25	17'	75°	6.17'	21'	50°	6.17'
32+25				7'	40°	7.77'
44+40	30'	50°	7.59'			
105+90	20'	30°	10.42'	25'	30°	10.42'
121+76	60'	65°	9.72'	50'	40°	9.72'



MEDIAN DATA TABLE

BULLNOSE STA.	HOLDING BAY LENGTH
(-9+39.15)	200'
3+30	150'
3+90	150'
13+32.17	155'
14+12.17	155'
22+76.17	150'
23+56.17	150'
30+20	150'
30+80	150'
41+10	150'
53+70	150'
54+30	150'
60+00.74	150'
60+80.74	150'
66+45	150'
67+05	150'
72+70	150'
73+30	150'
78+68.94	150'
79+48.94	150'
85+20	150'
85+80	150'
96+61.11	150'
97+41.11	150'
102+64.43	150'
103+44.43	150'
115+79	150'
116+39	150'
126+72.80	150'



CURVE DATA				
CURVE NO.	R	Δ	T	L
1	719.63'	5°00'	31.42'	62.80'

RIGHT TURN LANE DETAIL

(D)

△2 As-Staked 7-12-85
Rev. 9-7-83

6/17/83

PIMA COUNTY
SUNRISE DRIVE
DETAIL SHEET

OSBORN, PETTERSON, WALBERT & ASSOCIATES
Engineering, Surveying & Planning, Inc.
6501 East Grant Road
Tucson, Arizona 85715
Phone: (602) 296-8544

Designed by	WE
Checked by	PO
Drawn by	BC
Scale	NONE
Date	4/5/83
Sheet	2 OF 116
Job Number	8113-107

Trim,
loin, Meet exist.
R/W.

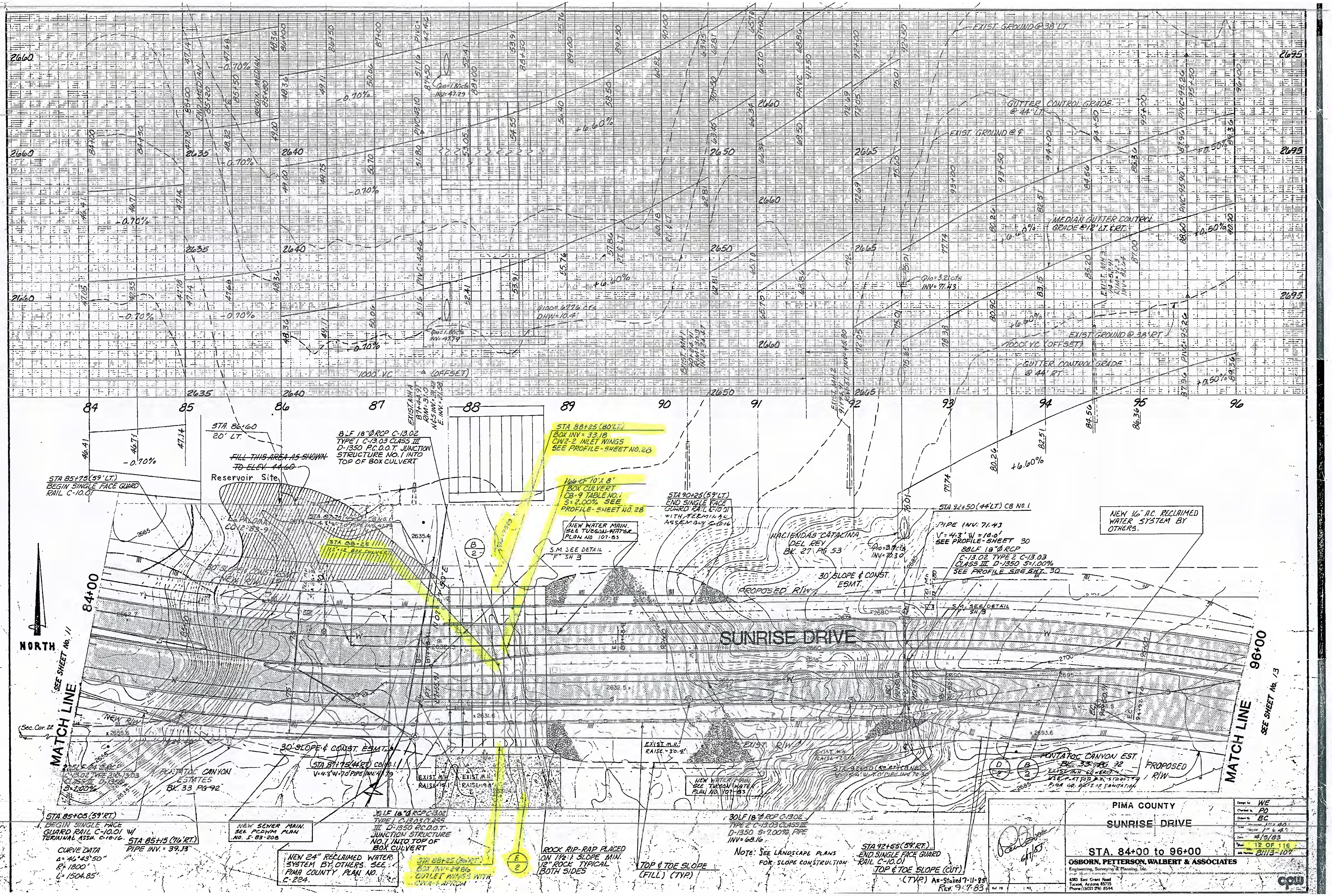
CB-3	Triple Barrel Box Culvert	CB-3
CB-5	Five Barrel Box Culvert	CB-5
CB-9	Nine Barrel Box Culvert	CB-9

Station	Q100 (cfs)	Culvert Size (ft)	Vo Vm	Bottom Length (ft)	Top Length (ft)	Bottom Width (ft)	3:1 Top Width (ft)	2:1 Top Width (ft)	Apron Length (ft)	Material for Building Hole/Apron	Depth hs (ft)	Cutoff Wall Depth
5+40	306	4	1.71	8.00	20	17.66	29.66	45	10	24" Fully Grouted	2.00	4
7+95	380	4	1.45	6.50	16.3	28.22	38	47.6	15	24" Fully Grouted	1.6[illegible]	4
8+25	159	3	1.83	7.82	20	15.30	27.5	28	10	24" Fully Grouted	[illegible]	4
11+74	996	5	1.06	10.0	25	32.50	47.5	56.6	12	16" Riprap	[illegible]	4
13+25	51	2.5	1.09	4	10	10.30	16.3	20.3	10	16" Riprap	[illegible]	4
[illegible]+25	388	5	1.89	10.4	26	16.90	32.5	33.8	13	24" Fully Grouted	[illegible]	4
3+05	53	2	1.99	9.5	16.7	10.90	15.06	20.7	9.5	24" Fully Grouted	1.[illegible]	4
32+15	228	3.5	1.78	4.56	11.4	21.16	28.0	35.1	10.5	24" Fully Grouted	1.14	4
44+40	225	4	1.55	7.1	17.7	21.38	32	38.64	10	24" Fully Grouted	1.77	4
47+90	1,308	6	1.36	8.56	28.9	57.60	75	84.3	14	24" Fully Grouted	2.49	4
[illegible]+93	87	3.5	1.38	5.25	13.1	20.14	28	33.68	7	24" Fully Grouted	1.31	4
74+90	286	5	1.48	1.00	10	48.00	57	63.4	10	24" Fully Grouted	1.50	4
80+20	47	3	1.30	6.32	15.8	5.52	15	20.6	10	24" Fully Grouted	1.[illegible]	4
88+25	7,529	10x8	2.10	14.80	37	107.80	130	143.8	18	Reinf. Concrete	3.7[illegible]	6
98+74	611	5	1.67	9.64	21.6	34.50	47.5	56.6	10.8	24" Fully Grouted	2.16	4
101+87	77	3.5	3.50	5.00	12.5	10.67	18.17	24.49	10	Reinf. Concrete	1.2[illegible]	4
105+79	1,440	10x5	1.05	12.0	30	38.60	56.5	67.20	15	16" Riprap	3.00	4
121+76	2,200	10x5	1.09	10.36	22	86.60	98.25	111	11	16" Riprap	1.94	4

Located at Hacienda Del Sol Road

NOTE: *All* scour holes were constructed of reinforced concrete. 2

TOP LENGTH | APRON LENGTH



PIMA COUNTY

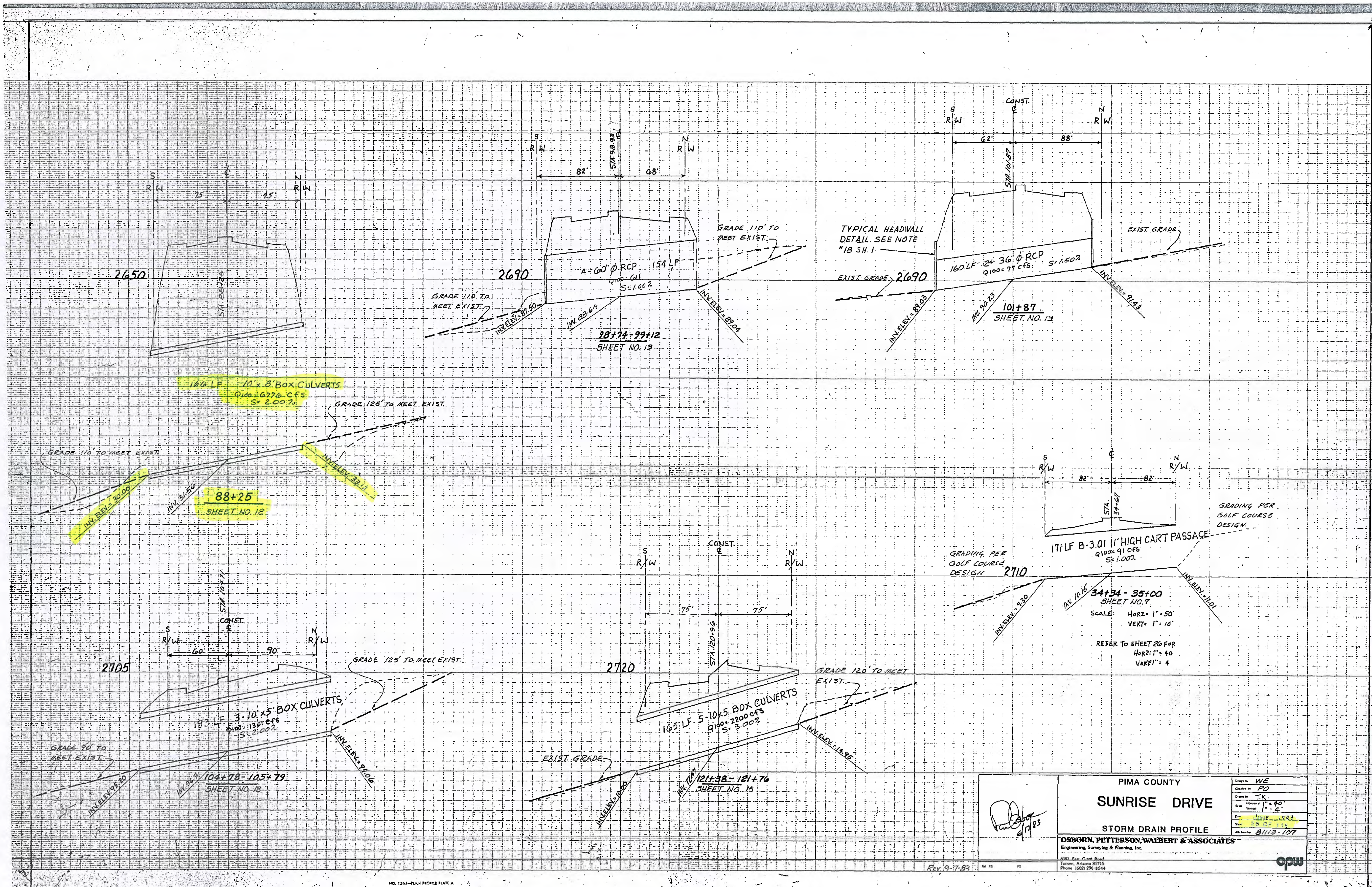
SUNRISE DRIVE

STA. 84+00 to 96+00

OSBORN, PETTERSON, WALBERT & ASSOCIATES
Engineering, Surveying & Planning, Inc.
6383 East Grant Road
Tucson, Arizona 85715
Phone (602) 296-8544

Design by	WE
Checked by	PO
Drawn by	BC
Scale Horizontal	1" = 40'
Scale Vertical	1" = 4'
Date	4/5/83
Sheet	12 OF 116
Job Number	8113-107

6/7/83



PIMA COUNTY

SUNRISE DRIVE

STORM DRAIN PROFILE

OSBORN, PETTERSON, WALBERT & ASSOCIATES
Engineering, Surveying & Planning, Inc.
6383 East Grant Road
Tucson, Arizona 85715
Phone (602) 296-8544

Designed by WE
Checked by PO
Drawn by T.K.
Scale Horizontal 1" = 40'
Vertical 1" = 4'
Date JUNE 1983
Sheet 28 OF 116
Job Number 81113-107

6/7/83

APPENDIX D

HYDROLOGIC ANALYSIS SUPPORTING DOCUMENTATION

D.1 – PRECIPITATION DATA

NOAA Atlas 14

Precipitation-Frequency Atlas of the United States

Volume 1 Version 4.0: Semiarid Southwest (Arizona, Southeast California, Nevada, New Mexico, Utah)

Geoffrey M. Bonnin, Deborah Martin, Bingzhang Lin, Tye Parzybok, Michael Yekta, David Riley

U.S. Department of Commerce

National Oceanic and Atmospheric Administration

National Weather Service

Silver Spring, Maryland, 2004 revised 2006

Table of Contents

1. Abstract

NOAA Atlas 14 contains precipitation frequency estimates with associated confidence limits for the United States and is accompanied by additional information such as temporal distributions and seasonality. The Atlas is divided into volumes based on geographic sections of the country. The Atlas is intended as the official documentation of precipitation frequency estimates and associated information for the United States. It includes discussion of the development methodology and intermediate results. The Precipitation Frequency Data Server (PFDS) was developed and published in tandem with this Atlas to allow delivery of the results and supporting information in multiple forms via the Internet.

2. Preface to Volume 1

NOAA Atlas 14 Volume 1 contains precipitation frequency estimates for Arizona, Nevada, New Mexico, Utah, and southeastern California (Imperial, Inyo, Eastern Kern, Eastern Los Angeles, Riverside, San Bernardino and Eastern San Diego counties). These areas were addressed together in a single project focused on the semiarid southwestern United States. The Atlas supercedes precipitation frequency estimates contained in Technical Paper No. 49 "Two- to ten-day precipitation for return periods of 2 to 100 years in the contiguous United States" (Miller et al., 1964), NOAA Atlas 2 "Precipitation-Frequency Atlas of the Western United States" (Miller et al., 1973), "Short Duration Rainfall Frequency Relations for California" (Frederick and Miller, 1979) and "Short Duration Rainfall Relations for the Western United States" (Arkell and Richards, 1986). The updates are based on more recent and extended data sets, currently accepted statistical approaches, and improved spatial interpolation and mapping techniques.

The work was performed by the Hydrometeorological Design Studies Center within the Office of Hydrologic Development of the National Oceanic and Atmospheric Administration's National Weather Service. Funding for the work was provided by the National Weather Service, U.S. Army Corps of Engineers, Natural Resources Conservation Service, Bureau of Reclamation, Arizona Department of Transportation, and Riverside County, California. Any use of trade names in this publication is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Citation and Version History. This documentation and associated artifacts such as maps, grids, and point-and-click results from the PFDS, are part of a whole with a single version number and can be referenced as: "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4.0, G. M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley, NOAA, National Weather Service, Silver Spring, Maryland, 2006.

The version number has the format P.S where:

P is an integer representing successive releases of primary information. Primary information is essentially the data – the values of precipitation frequencies (in ASCII grids of the precipitation frequency estimates and output from the PFDS), shapefiles, cartographic maps, temporal distributions, and seasonality.

S is an integer representing successive releases of secondary information. S reverts to zero (or nothing; i.e., Version 2 and Version 2.0 are equivalent) when P is incremented. Secondary information includes documentation and metadata.

When new information is completed and added, such as draft documentation, *without changing any prior information*, the version number is not incremented.

The primary version number is stamped on the artifact or is included as part of the filename where the format does not allow for a version stamp (for example, the grids). An examination of any of the artifacts available through the Precipitation Frequency Data Server (PFDS) provides an immediate indication of the primary version number associated with all artifacts. All output from the PFDS is stamped with the version number and date of download.

Several versions of the project have been released. Table 2.1 lists the version history associated with the NOAA Atlas 14 Volume 1, the semiarid southwestern United States precipitation frequency project and indicates the nature of changes made. If major discrepancies are observed or identified by users, a new release may be warranted.

Table 2.1. Version History of the NOAA Atlas 14 Volume 1.

Version no.	**Date**	**Notes**
Version 1	October 30, 2002	Draft data used in peer review
Version 2	July 14, 2003	Final released data
Version 3	January 7, 2004	Updated final data
Version 3.0	October 22, 2004	Draft documentation released
Version 3.1	December 3, 2004	Final documentation released
Version 3.2	June 2, 2005	Edited final documentation released
Version 4	June 19, 2006	Updated final data (includes 1-year ARI)
Version 4.0	October 4, 2006	Updated final documentation released

3. Introduction

3.1. Objective

NOAA Atlas 14 Volume 1 provides precipitation frequency estimates for the semiarid southwestern United States which includes Arizona, Nevada, New Mexico, Utah, and southeastern California (Imperial, Inyo, Eastern Kern, Eastern Los Angeles, Riverside, San Bernardino and Eastern San Diego counties). Figures 4.1.1 and 4.1.2 show the project core area where estimates are available (enclosed in the bold line) and also include all stations used in the analysis, even those outside the core area. The Atlas provides precipitation frequency estimates for 5-minute through 60-day durations at average recurrence intervals of 1-year through 1,000-year. The estimates are based on the analysis of annual maximum series and then converted to partial duration series results. The information in NOAA Atlas 14 Volume 1 supercedes precipitation frequency estimates contained in Technical Paper No. 49 "Two- to ten-day precipitation for return periods of 2 to 100 years in the contiguous United States" (Miller, 1964), NOAA Atlas 2 "Precipitation-Frequency Atlas of the Western United States" (Miller et al., 1973), "Short Duration Rainfall Frequency Relations for California" (Frederick and Miller, 1979) and "Short Duration Rainfall Relations for the Western United States" (Arkell and Richards, 1986). The results are provided at high spatial resolution and include confidence limits for the estimates. The Atlas includes temporal distributions designed for use with the precipitation frequency estimates (Appendix A.1) and seasonal information for heavy precipitation (Appendix A.2). In addition, the potential effects of climate change were examined (Appendix A.3).

The new estimates are based on improvements in three primary areas: denser data networks with a greater period of record, the application of regional frequency analysis using L-moments for selecting and parameterizing probability distributions and new techniques for spatial interpolation and mapping. The new techniques for spatial interpolation and mapping account for topography and have allowed significant improvements in areas of complex terrain.

NOAA Atlas 14 Volume 1 precipitation frequency estimates for the semiarid southwestern United States are available via the Precipitation Frequency Data Server at http://hdsc.nws.noaa.gov/hdsc/pfds which provides the additional ability to download digital files. The types of results and information found there include:

- point estimates (via a point-and-click interface)
- ArcInfo© ASCII grids
- ESRI shapefiles
- color cartographic maps for each state
- associated Federal Geographic Data Committee-compliant metadata
- data series used in the analyses: annual maximum series and partial duration series
- temporal distributions of heavy precipitation (6-hour, 12-hour, 24-hour and 96-hour)
- seasonal exceedance graphs: counts of events that exceed the 1 in 2, 5, 10, 25, 50 and 100 annual exceedance probabilities for the 60-minute, 24-hour, 48-hour, and 10-day durations.

As discussed in Sections 4.8.4 and 4.8.5, the color cartographic maps and ESRI shapefiles were created to serve as visual aids and, unlike NOAA Atlas 2, are not recommended for interpolating final point or area precipitation frequency estimates. Users are urged to take advantage of the Precipitation Frequency Data Server or the underlying ArcInfo© ASCII grids for accessing estimates.

3.2. Terminology; Partial Duration and Annual Maximum Series

This publication adopts the terminology "average recurrence interval" (ARI) and "annual exceedance probability" (AEP) presented in Australian Rainfall and Runoff (Institute of Engineers, Australia, 1987) which in turn is based on Laurenson (1987). NOAA Atlas 14 is based on the analysis of annual maximum series data with the results converted to represent estimates based on partial duration series. The results for these two types of series differ at shorter average recurrence intervals and have different meanings. Factors for converting between these results are provided in Section 4.6.4.

An annual maximum series is constructed by taking the highest accumulated precipitation for a particular duration in each successive year of record, whether the year is defined as a calendar year or using some other arbitrary boundary such as a water year. Calendar years are used in this Atlas. An annual maximum series inherently excludes other extreme cases that occur in the same year as a more extreme case. In other words, the second highest case on record at an observing station may occur in the same year as the highest case on record but will not be included in the annual maximum series. A partial duration series is constructed by taking all of the highest cases above a threshold regardless of the year in which the case occurred. In this Atlas, partial duration series consist of the N largest cases in the period of record, where N is the number of years in the period of record at the particular observing station.

Analysis of annual maximum series produces estimates of the average period between *years when a particular value is exceeded*. On the other hand, analysis of partial duration series gives the average period between *cases of a particular magnitude*. The two results are numerically similar at rarer average recurrence intervals but differ at shorter average recurrence intervals (below about 20 years). The difference can be important depending on the application.

Typically, the use of AEP and ARI reflects the analysis of the different series. However, in some cases, average recurrence interval is used as a general term for ease of reference.

3.3. Approach

The approach used in this project largely follows the regional frequency analysis using the method of L-moments described in Hosking and Wallis (1997). This section provides an overview of the approach. Greater detail on the approach is provided in Section 4.2.

This Atlas introduces a change from past NWS publications by its use of regional frequency analysis using L-moments for selecting and parameterizing probability distributions. Both annual maximum series and partial duration series were extracted at each observing station from quality controlled data sets. Because of the greater reliability of the analysis of annual maximum series, an average ratio of partial duration series to annual maximum series precipitation frequency estimates (quantiles) was computed and then applied to the annual maximum series quantiles to obtain the final equivalent partial duration series quantiles.

Quality control was performed on the initial observed data sets (see Section 4.3) and it continued throughout the process as an inherent result of the performance parameters of intermediate steps.

To support the regional approach, potential regions were initially determined based on climatology. They were then tested statistically for homogeneity. Individual stations in each region were also tested statistically for discordancy. Adjustments were made in the definition of regions based on underlying climatology in cases where homogeneity and discordancy criteria were not met.

A variety of probability distributions were examined and the most appropriate distribution for each region and duration was selected using several different performance measures. The final determination of the appropriate distributions for each region and duration was made based on sensitivity tests and a desire for a relatively smooth transition between distributions from region to region. Probability distributions selected for annual maximum series were not necessarily the same as those selected for partial duration series.

Quantiles at each station were determined based on the mean of the data series at the station and the regionally determined higher order moments of the selected probability distribution. There were a number of stations where the regional approach did not provide the most effective choice of probability distribution. In these cases the most appropriate probability distribution was chosen and parameterized based solely on data at that station. Quantiles for durations below 60-minutes (n-minute durations) were computed using an average ratio between the n-minute and 60-minute quantiles due to the small number of stations recording data at less than 60-minute intervals.

For the first time, the National Weather Service is providing confidence limits for the precipitation frequency estimates in the area covered by NOAA Atlas 14. Monte Carlo Simulation was used to produce upper and lower bounds at the 90% confidence level.

In the regional approach, the second and higher order moments are constant for each region resulting in a potential for discontinuities in the quantiles at regional boundaries. In order to avoid potential discontinuities and to achieve an effective spatial interpolation of quantiles between observing stations, the data series means at each station for each duration were spatially interpolated using PRISM technology by the Spatial Climate Analysis Service (SCAS) at Oregon State University (Appendix A.4). Because the mean was derived directly at each observing station from the data series and independently of the regional computations, it was not subject to the same discontinuities. The grid of quantiles for each successive average recurrence interval was then derived in an iterative process using a strong linear relationship between a particular duration and average recurrence interval and the next rarer average recurrence interval of the same duration (see Section 4.8.2). The resulting set of grids were tested and adjusted in cases where inconsistencies occurred between durations and frequencies. Computations were made over a geographic domain that was larger than the published domain to ensure continuity at the edges of the published domain.

Both the spatial interpolation and the point estimates were subject to external peer reviews (see Section 6 and Appendices A.5 and A.6). Based on the results of the peer review, adjustments were made where necessary by the addition of new observations or removal of questionable ones. Adjustments were also made in the definition of regions.

Temporal precipitation patterns were extracted for use with the precipitation frequency estimates presented in the Atlas (Appendix A.1). The temporal patterns are presented in probabilistic terms and can be used in Monte Carlo development of ensembles of possible scenarios. They were specifically designed to be consistent with the definition of duration used for the precipitation frequency estimates.

The seasonality of heavy precipitation is represented in seasonal exceedance graphs that are available through the Precipitation Frequency Data Server. The graphs were developed for each region by tabulating the number of events exceeding the precipitation frequency estimate at each station for a given annual exceedance probability (Appendix A.2).

The 1-day annual maximum series were analyzed for linear trends in mean and variance and shifts in mean to determine whether climate change during the period of record was an issue in the production of this Atlas (Appendix A.3). The results showed little observable or geographically consistent impact of climate change on the annual maximum series during the period of record and so the entire period of record was used. The estimates presented in this Atlas make the necessary assumption that there is no effect of climate change in future years on precipitation frequency estimates. The estimates will need to be modified if that assumption proves quantifiably incorrect.

4. Method

4.1. Data

4.1.1. Properties

Sources. Daily, hourly, and n-minute (defined below) measurements of precipitation from various sources were used for this project (Table 4.1.1). Figure 4.1.1 shows the locations of daily stations, including SNOTEL (defined below), in the project area. Figure 4.1.2 shows the hourly and n-minute stations.

The National Weather Service (NWS) Cooperative Observer Program's (COOP) daily and hourly stations were the primary source of precipitation gauge records. The following data sets of COOP data were obtained from National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center (NCDC):

- Hourly data set: TD3240
- Daily data set: TD3200 and TD3206
- N-minute data set: TD9649 and an additional dataset covering 1973-1979

Other sources were NRCS (USDA) and local datasets, which included data from:

- San Bernardino County Flood Control District, CA
- Riverside County Flood Control and Water Conservation District, CA
- NWS's California-Nevada River Forecast Center at Sacramento, CA
- California Department of Water Resources (CDWR) Automated Local Evaluation in Real Time (ALERT) precipitation gauges
- ALERT hourly data from Maricopa County Flood Control District, AZ
- U.S. Geological Survey (USGS) dense precipitation gauge network from the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA).

Various supplementary stations provided information where no or limited data were previously available – in high elevations and south of the United States border. SNOTEL (SNOpack TELemetry) provided information in high elevations of the project area. The SNOTEL network of stations at high elevations (6000 - 11,000 feet) is operated by the United State's Department of Agriculture's (USDA) National Resources Conservation Service (NRCS). Additional daily data south of the United States border were obtained through the cooperation of Mr. Jorge Sanchez-Sesma, Instituto Mexicano de Technologia del Agua, Mexico City, Mexico.

Table 4.1.1. Number of stations in each state in the project area.

State	Daily	SNOTEL	Hourly	N-min
Arizona	270	13	68	5
Southeastern California	129	1	75	7
Nevada	114	26	39	5
New Mexico	239	11	76	3
Utah	212	67	42	4
Border states*	477	64	181	3
Baja, Mexico	31	n/a	n/a	n/a
Chihuahua, Mexico	10	n/a	n/a	n/a
Sonora, Mexico	22	n/a	n/a	n/a
Total	**1504**	**182**	**481**	**27**

*Border states include parts of California, Colorado, Idaho, Oklahoma, Oregon, Texas and Wyoming that are directly adjacent to the project core area.

Figure 4.1.1. Map of daily and SNOTEL stations for NOAA Atlas 14 Volume 1.

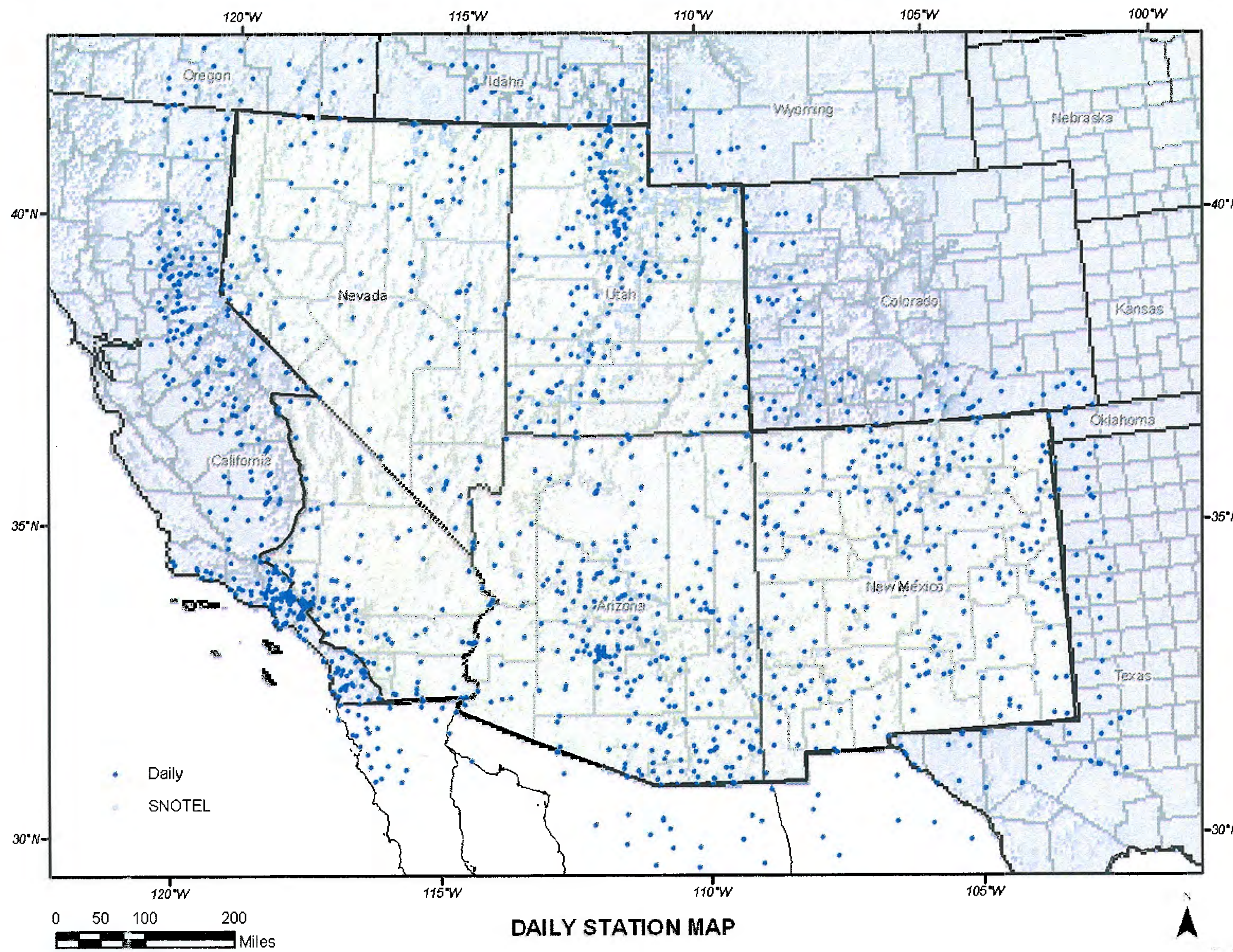
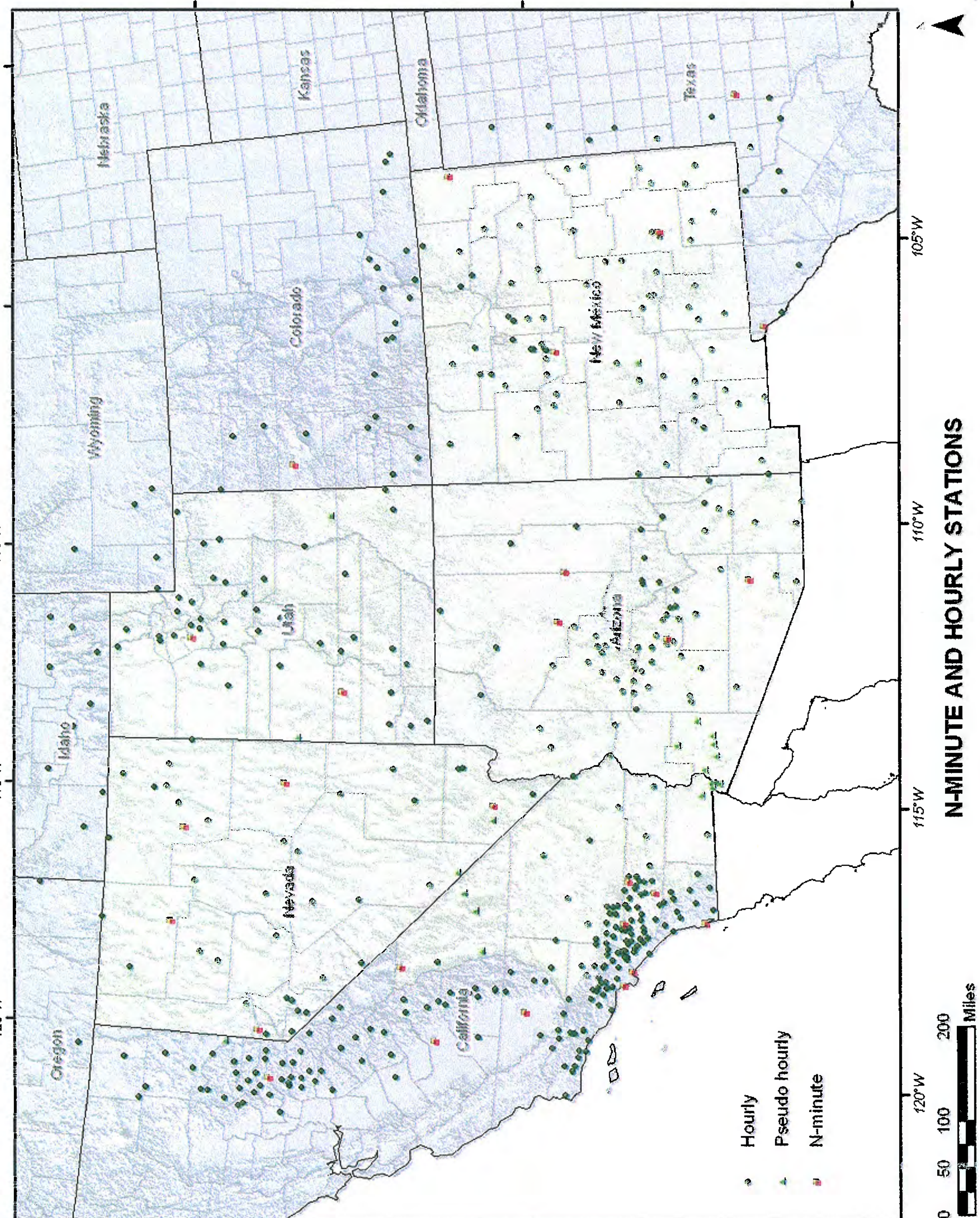


Figure 4.1.2. Map of hourly and n-minute stations for NOAA Atlas 14 Volume 1.



Record length. Record length may be characterized by the entire period of record or by the number of years of useable data within the total period of record (data years). For this project, only daily stations with 20 or more data years and hourly stations with 15 or more data years were used in the analysis. (Although, Mexico data were limited, so a threshold of 13 data years was used.) The records of these stations extend through December 2000 and average 54 data years in length for daily stations and 37 data years for hourly (Table 4.1.2). Figures 4.1.3 and 4.1.4 show the number of data years by percent of stations for the daily and hourly data. N-minute records used in the analysis had 14 to nearly 100 years of data with records extending through May 1997. At the time of this project the n-minute data at NCDC had not been updated beyond 1997. Eight n-minute stations had more than 80 years of data. (See Appendix A.7 for a complete list of stations or http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_data.html for downloadable comma-delimited station lists.)

Table 4.1.2. Information for daily and hourly datasets through 12/2000 and n-minute datasets through 5/1997.

	Daily	Hourly	N-minute
No. of stations	1441 (+182 SNOTEL) (+63 Mexico)	481	27
Longest record length (data yrs) (Station ID)	108 (29-8535)	62 (04-4211)	88 (02-6481)
Average record length (data yrs)	54*	37	36

*not including SNOTEL or Mexico stations

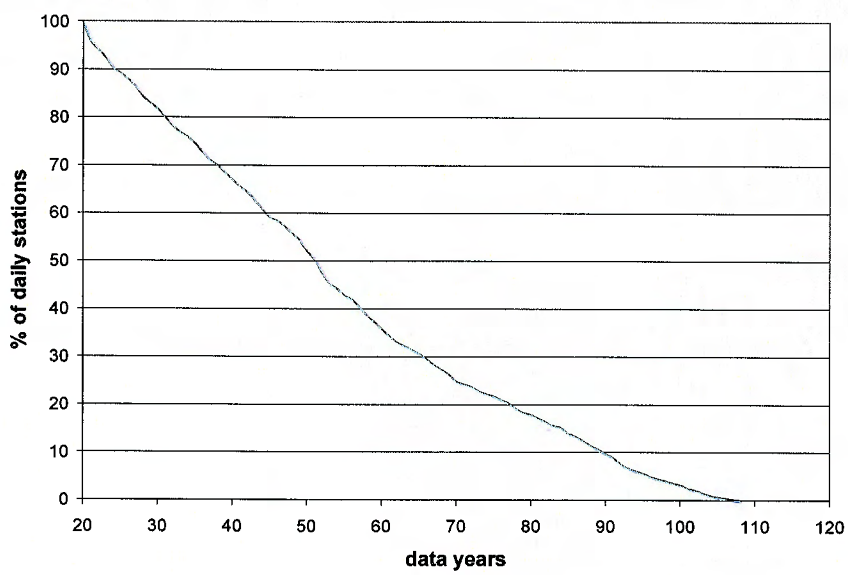


Figure 4.1.3. Plot of percentage of total number of daily stations used in NOAA Atlas 14 Volume 1 versus data years.

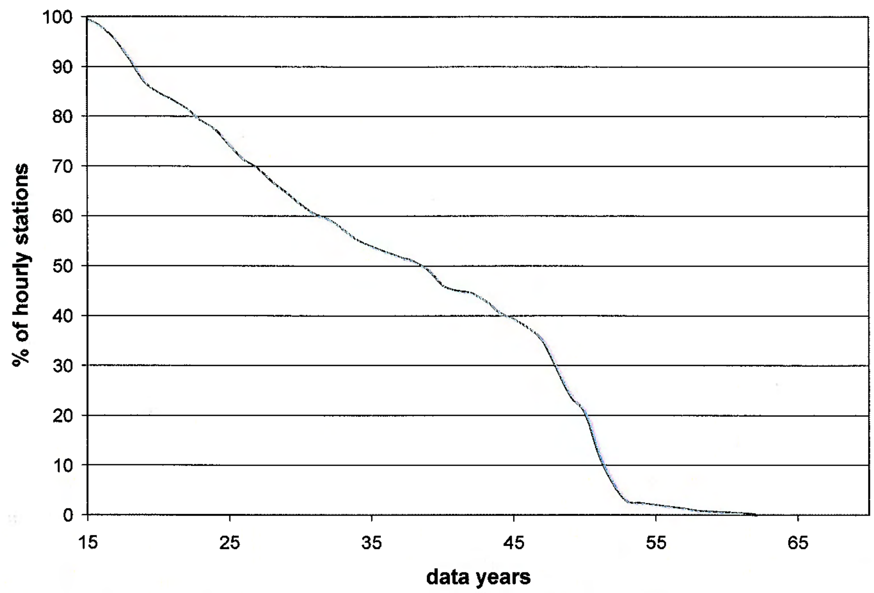


Figure 4.1.4. Plot of percentage of hourly stations used in NOAA Atlas 14 Volume 1 versus data years.

N-minute data. N-minute data are precipitation data measured at a temporal resolution of 5-minutes that can be summed to various "n-minute" durations (10-minute, 15-minute, 30-minute, and 60-minute). Because of the small number of n-minute data available, n-minute precipitation frequencies were estimated by applying a linear scaling to 60-minute data. The linear scaling factors were developed using ratios of n-minute quantiles to 60-minute quantiles from 27 co-located n-minute and hourly stations divided into 6 regions (Figure 4.1.5). The ratios were calculated and averaged for each region. Since they were found to be essentially the same regardless of region and frequency, the ratios for each duration were averaged over the 6 regions and all annual exceedance probabilities and then applied to the entire project area.

The ratios are consistent with other studies. Table 4.1.3 shows the n-minute ratios (n-min/60-min) computed for NOAA Atlas 14 Volume 1 and those reported in NOAA Atlas 2 (Miller et al., 1973) (herein after referred to as NOAA Atlas 2) for 5, 10, 15, and 30 minutes. Also shown in Table 4.1.3 are the ratios used by Arkell and Richards (1986), who computed values for a comparable geographic area, but did not include California.

Figure 4.1.5. Regional groupings for n-minute data for NOAA Atlas 14 Volume 1.

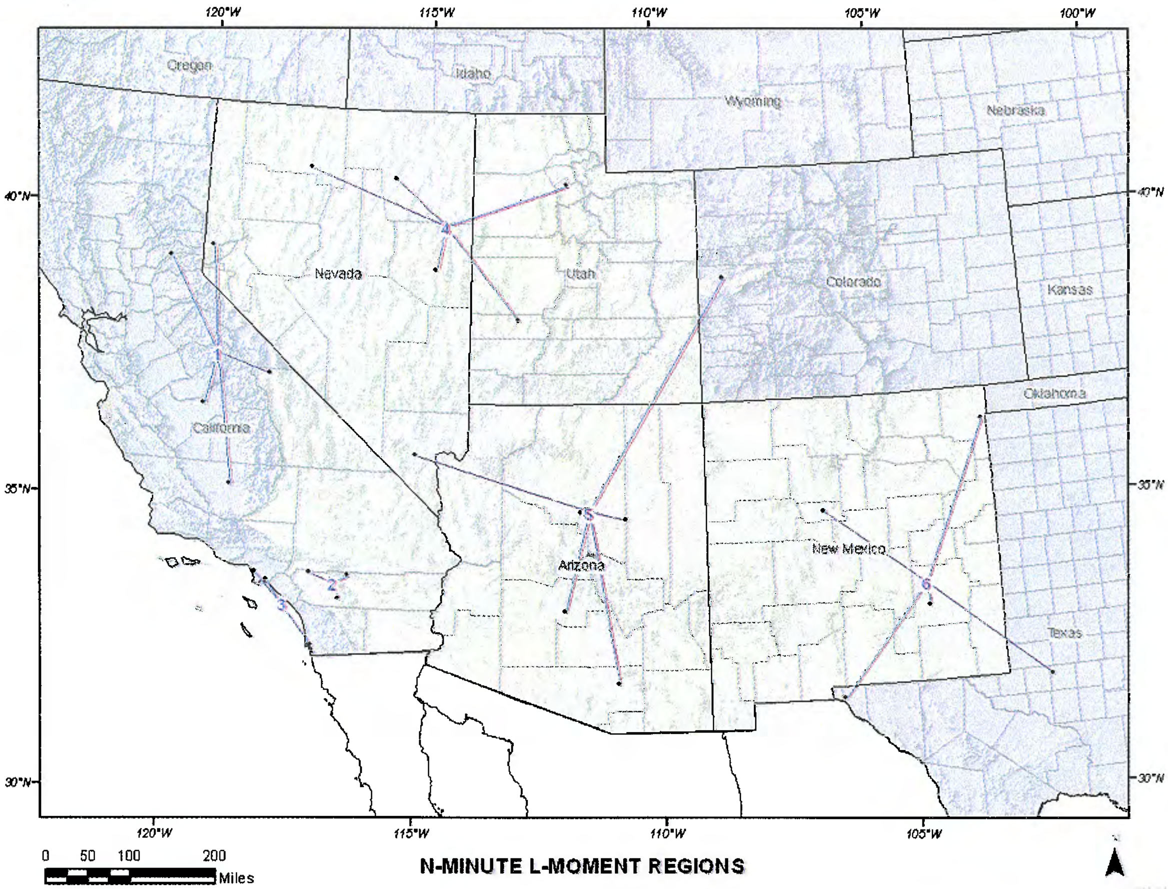


Table 4.1.3. N-minute ratios: 5-, 10-, 15- and 30-Minute to 60-Minute.

	5-min	**10-min**	**15-min**	**30-min**
NOAA Atlas 14 Volume 1	**0.318**	**0.484**	**0.600**	**0.808**
NOAA Atlas 2	*0.29*	*0.45*	*0.57*	*0.79*
Arkell and Richards, 1986	*0.34*	*0.52*	*0.62*	*0.82*

SNOTEL data. SNOTEL stations provide precipitation data in the higher elevations where in NOAA Atlas 2 there was no information. The number and quality of the data were insufficient for computing higher order statistical moments directly and so the data were not used in the calculation of regional parameters. Rather, mean annual maxima for the 24-hour through 60-day durations at each location were computed for use in analysis and spatial interpolation processes. Precipitation frequency estimates for SNOTEL stations were calculated using the regional growth factors (RGFs), a dimensionless regional frequency distribution parameter derived from the regions in which they resided (Section 4.6.1), combined with the mean of their annual maximum series at the SNOTEL station. The estimates were then used to anchor the spatial distribution of precipitation frequency residuals that were the basis of the precipitation frequency grids (Section 4.8) to provide better accuracy at higher elevations.

Mexico data. Mexico data were included to provide spatial continuity across the southern border of the project area. The maximum record length of these daily data was 15 years. Annual maximum series were extracted from the data using 13 years as the minimum years of record so that a reasonable number of stations could be included. The data were not directly used in L-moment computations for the project area. The mean annual precipitation and mean annual maxima for the 24-hour through 60-day durations were computed and used in the spatial interpolation of the mean annual maxima values, but not the precipitation frequency estimates.

Multi-day/hour durations. Maxima for durations greater than 24-hour were generated by accumulating daily data. The multi-day maxima, 2-day through 60-day, were extracted in an iterative process where 1-day observations were summed and compared with the value of the previous summation shifted by 1 day. Multi-hour durations, 2-hour through 48-hour, were generated by accumulating hourly data. (See Section 4.1.3 for additional details on the annual maximum series and partial duration series extraction process.)

NOAA Atlas 2 data comparison. NOAA Atlas 14 Volume 1 used a total of 2,194 stations, which includes substantially more stations, 76% more, than were available to NOAA Atlas 2 (southeastern California could not be directly compared). Table 4.1.4 shows a comparison between the total number of stations used in each Atlas for the 4 complete core states, Arizona, Nevada, New Mexico, and Utah. Many new stations also provided information in critical areas, where no data were available to NOAA Atlas 2, including 182 SNOTEL stations and 63 stations in Mexico. NOAA Atlas 2 used data through 1970, whereas NOAA Atlas 14 Volume 1 used data through 2000, vastly increasing the amount of data available. Some stations available for NOAA Atlas 14 Volume 1 had up to 30 more years of record than those used in NOAA Atlas 2. This allowed for the exclusion of shorter, less reliable data records. NOAA Atlas 2 used a minimum of 15 data years, whereas for NOAA Atlas 14 Volume 1 the minimum was increased to 20 data years. Figure 4.1.6 shows the number of years of record for daily stations used in each Atlas for the 4 core states, Arizona, Nevada, New Mexico, and Utah, (southeastern California could not be directly compared).

Table 4.1.4. Comparison of the total number of stations in Arizona, Nevada, New Mexico, and Utah (southeastern California could not be directly compared) that were used in NOAA Atlas 2 and NOAA Atlas 14 Volume 1.

Data type	NOAA Atlas 2	NOAA Atlas 14 Volume 1	Increase	% increase
Hourly	180	225	45	25%
Daily	563	835	272	48%
SNOTEL	0	182	182	
Mexico	0	63	63	
Total	**743**	**1305**	**562**	**76%**

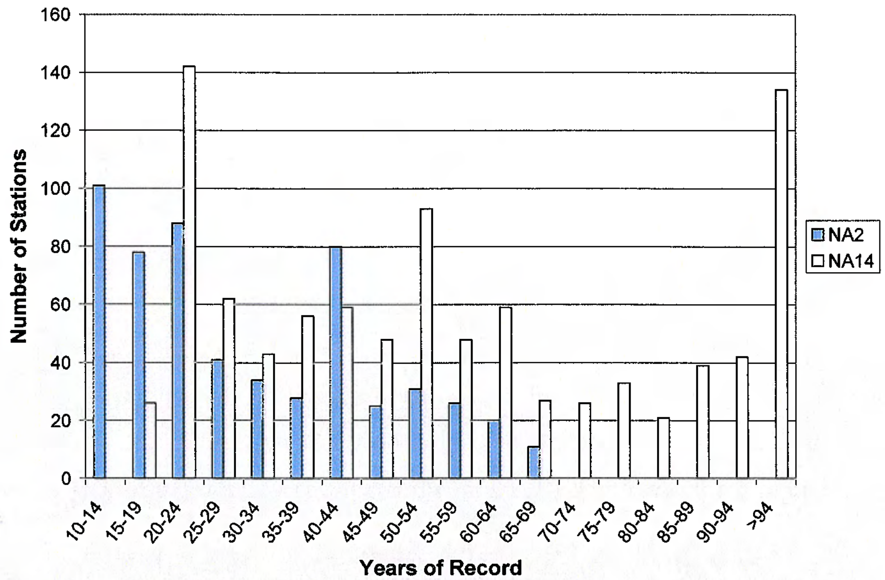


Figure 4.1.6. Comparison of the years of record at stations used in Arizona, Nevada, New Mexico, and Utah (southeastern California could not be directly compared) in NOAA Atlas 2 (NA2) and NOAA Atlas 14 Volume 1 (NA14) [Note: Mexico and SNOTEL stations are not included in chart.]

4.1.2. Conversions of data

Daily. Daily data have varying observation times. Maximum 24-hour amounts seldom fall within a single daily observation period. In order to make the daily and hourly data comparable, a conversion was necessary from 'observation day' (constrained observation) to 24 hours (unconstrained observation). Both NOAA Atlas 2 and Technical Paper 40 (Hershfield, 1961) used the empirically derived value of 1.13 to convert daily data to 24-hour data. Conversion factors for this project were computed using ratios of the 2-year quantiles computed from annual maxima series at 32 stations with concurrent hourly and daily data in the project area (note: at least 10 of these were first order stations). Time series for concurrent time periods were generated for 24-hour precipitation values summed from hourly observations and co-located daily precipitation observations. The series were analyzed separately using L-moments. Ratios of 2-year 24-hour to 2-year 1-day quantiles were then generated and averaged. The resulting conversion factor was comparable to results from a regression of daily-hourly annual maxima that occurred on the same day. The regression was not directly used since there were not enough data to produce a reliable result. The conversion factor used in this project was 1.14, which is in close agreement with the conversion factor used in NOAA Atlas 2 and Technical Paper 40 (see Table 4.1.5). Similarly, a 2-day to 48-hour conversion factor of 1.03 was generated for NOAA Atlas 14 Volume 1. This factor had not been previously calculated in the other studies. All daily and 2-day data, including SNOTEL data, were converted to equivalent 24-hour and 48-hour unconstrained values, respectively.

Hourly. In order to make hourly and 60-minute data comparable, a conversion was necessary from the constrained 'clock hour' to unconstrained 60-minute and from 2 hours to 120-minute. Conversion factors were computed using ratios of the 2-year quantiles computed from annual maxima series at 12 stations with co-located hourly and n-minute stations in the project area. Time series from concurrent time periods were generated for 60-minute precipitation values summed from n-minute observations and co-located hourly precipitation observations. The series were analyzed separately using L-moments. Ratios of 2-year 60-minute to 2-year 1-hour quantiles were generated and averaged. The

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POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

Arizona 32.3726 N 110.8809 W 6768 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006
Extracted: Mon May 10 2010

Confidence Limits | Seasonality | Location Maps | Other Info. | GIS data | Maps | Docs | Return to State Map

Precipitation Frequency Estimates (inches)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.32	0.49	0.60	0.81	1.01	1.13	1.22	1.44	1.69	1.82	2.08	2.40	2.88	3.28	4.53	5.68	7.08	8.21
2	0.41	0.63	0.78	1.05	1.30	1.45	1.54	1.80	2.12	2.28	2.61	3.02	3.63	4.13	5.70	7.13	8.89	10.31
5	0.54	0.83	1.03	1.38	1.71	1.87	1.97	2.25	2.64	2.86	3.31	3.88	4.69	5.30	7.28	8.97	11.07	12.86
10	0.64	0.97	1.21	1.62	2.01	2.20	2.31	2.63	3.06	3.34	3.89	4.62	5.61	6.30	8.59	10.48	12.78	14.84
25	0.77	1.17	1.44	1.94	2.41	2.65	2.79	3.15	3.66	4.01	4.69	5.69	6.98	7.78	10.47	12.58	15.09	17.48
50	0.86	1.30	1.62	2.18	2.70	3.00	3.16	3.57	4.12	4.54	5.34	6.57	8.13	9.01	12.01	14.25	16.87	19.51
100	0.95	1.45	1.79	2.42	2.99	3.35	3.56	4.01	4.61	5.09	6.03	7.54	9.40	10.37	13.66	16.01	18.71	21.59
200	1.04	1.59	1.97	2.65	3.28	3.70	3.96	4.46	5.11	5.67	6.74	8.58	10.80	11.86	15.43	17.85	20.58	23.71
500	1.16	1.77	2.19	2.95	3.65	4.18	4.51	5.07	5.79	6.47	7.74	10.09	12.86	14.02	17.96	20.40	23.14	26.56
1000	1.26	1.91	2.37	3.19	3.95	4.55	4.95	5.56	6.32	7.11	8.54	11.34	14.60	15.84	20.04	22.44	25.18	28.81

* These precipitation frequency estimates are based on a partial duration series. **ARI** is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting forces estimates near zero to appear as zero.

*** Upper bound of the 90% confidence interval**
Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.36	0.56	0.69	0.93	1.15	1.27	1.37	1.62	1.90	2.01	2.30	2.67	3.21	3.65	5.01	6.23	7.73	8.98
2	0.47	0.72	0.89	1.20	1.48	1.63	1.73	2.03	2.37	2.52	2.89	3.35	4.05	4.59	6.31	7.83	9.73	11.31
5	0.62	0.94	1.16	1.56	1.94	2.11	2.22	2.54	2.95	3.17	3.66	4.31	5.23	5.90	8.07	9.86	12.12	14.12
10	0.72	1.10	1.36	1.83	2.27	2.48	2.60	2.96	3.42	3.70	4.30	5.12	6.26	7.02	9.54	11.53	14.03	16.32
25	0.86	1.31	1.62	2.19	2.71	2.97	3.13	3.54	4.08	4.45	5.20	6.32	7.81	8.68	11.65	13.87	16.61	19.31
50	0.97	1.47	1.83	2.46	3.04	3.36	3.55	4.01	4.61	5.04	5.95	7.33	9.14	10.10	13.40	15.77	18.63	21.63
100	1.08	1.64	2.03	2.74	3.39	3.76	4.00	4.51	5.17	5.69	6.75	8.46	10.65	11.69	15.34	17.82	20.79	24.05
200	1.19	1.80	2.24	3.01	3.73	4.17	4.47	5.04	5.78	6.38	7.61	9.70	12.35	13.48	17.47	19.99	23.03	26.55
500	1.33	2.03	2.52	3.39	4.20	4.75	5.14	5.76	6.60	7.36	8.85	11.56	14.90	16.16	20.60	23.14	26.16	30.10
1000	1.46	2.22	2.75	3.70	4.58	5.22	5.70	6.37	7.27	8.15	9.88	13.16	17.15	18.48	23.26	25.72	28.73	32.97

* The **upper** bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are **greater** than.
** These precipitation frequency estimates are based on a partial duration series. **ARI** is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

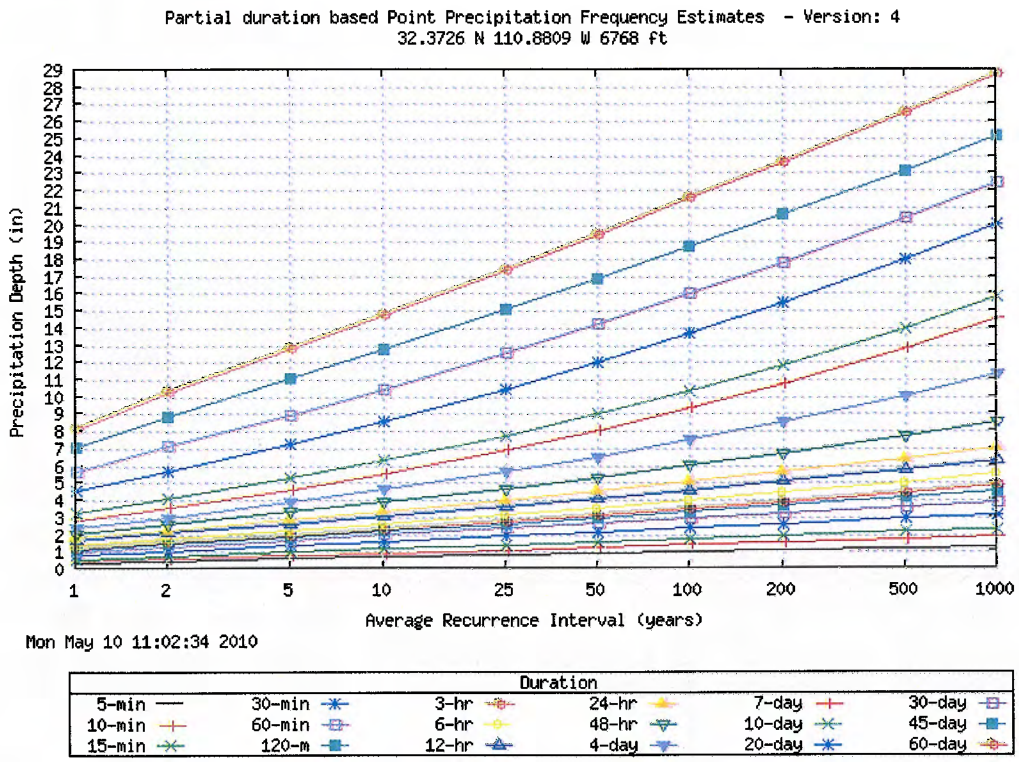
*** Lower bound of the 90% confidence interval**
Precipitation Frequency Estimates (inches)

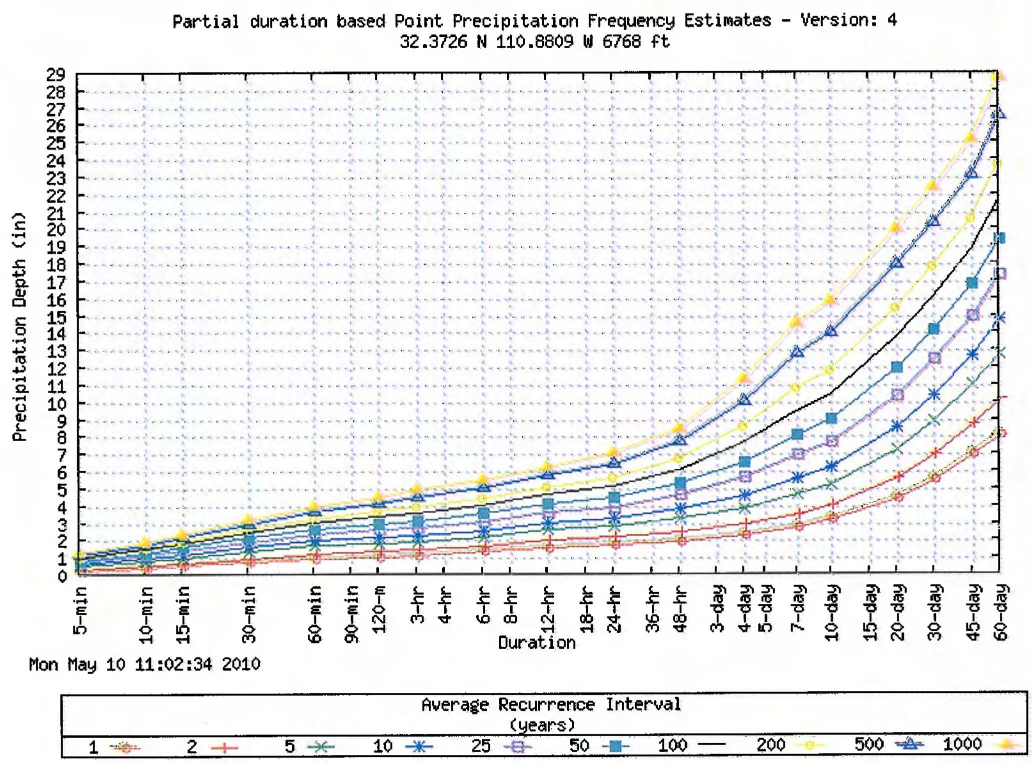
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.28	0.43	0.54	0.72	0.89	1.01	1.09	1.28	1.52	1.66	1.89	2.18	2.60	2.98	4.12	5.19	6.49	7.50
2	0.37	0.56	0.69	0.93	1.16	1.29	1.38	1.61	1.90	2.08	2.38	2.74	3.28	3.74	5.18	6.51	8.14	9.43
5	0.48	0.73	0.90	1.21	1.50	1.66	1.75	2.00	2.35	2.59	3.01	3.50	4.22	4.77	6.58	8.15	10.10	11.73
10	0.56	0.85	1.05	1.42	1.76	1.94	2.04	2.33	2.72	3.02	3.52	4.15	5.02	5.65	7.74	9.49	11.63	13.48
25	0.66	1.01	1.25	1.68	2.08	2.31	2.44	2.76	3.21	3.59	4.21	5.05	6.16	6.88	9.33	11.30	13.63	15.79
50	0.73	1.12	1.39	1.87	2.31	2.59	2.73	3.09	3.59	4.03	4.74	5.76	7.09	7.89	10.58	12.68	15.13	17.52
100	0.81	1.23	1.52	2.05	2.53	2.86	3.02	3.41	3.95	4.48	5.29	6.52	8.09	8.96	11.88	14.10	16.63	19.24
200	0.87	1.33	1.65	2.21	2.74	3.11	3.31	3.73	4.32	4.92	5.83	7.29	9.13	10.06	13.23	15.55	18.10	20.92
500	0.95	1.45	1.80	2.42	2.99	3.43	3.67	4.14	4.78	5.52	6.57	8.35	10.61	11.59	15.05	17.43	20.05	23.10
1000	1.01	1.54	1.91	2.56	3.17	3.67	3.94	4.45	5.13	5.97	7.12	9.20	11.79	12.82	16.45	18.86	21.52	24.72

* The **lower** bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are **less** than.
** These precipitation frequency estimates are based on a partial duration maxima series. **ARI** is the Average Recurrence Interval.

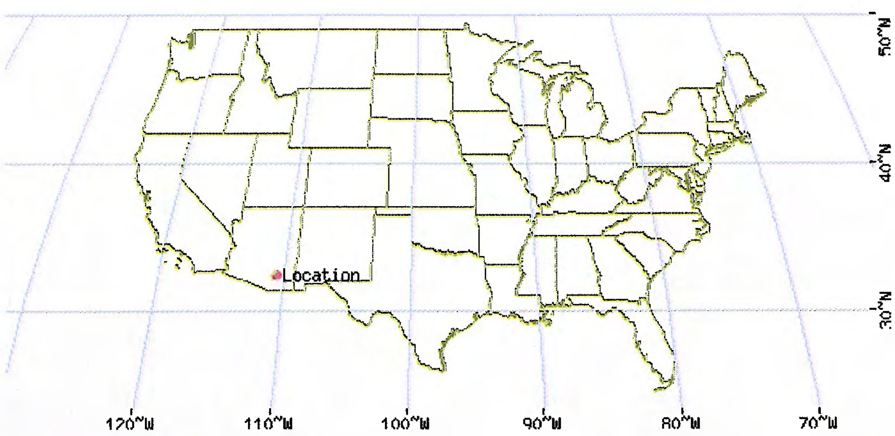
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

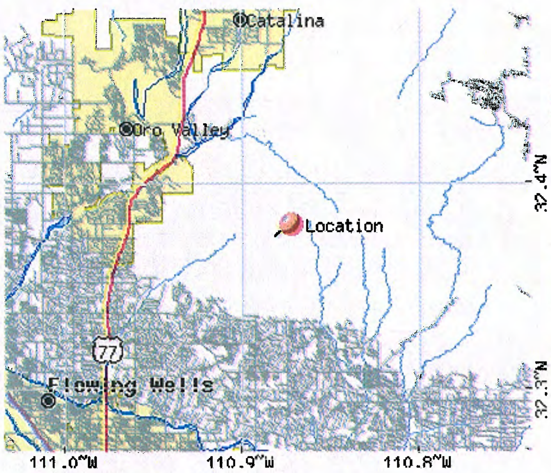
Text version of tables





Maps -





These maps were produced using a direct map request from the [U.S. Census Bureau Mapping and Cartographic Resources Tiger Map Server.]

Please read disclaimer for more information.

LEGEND

State, County, Indian Resv, Lake/Pond/Ocean, Street, Expressway, Highway, Connector, Stream, Military Area, National Park, Other Park, City, County

Scale 1:228583
*average--true scale depends on monitor resolution

0 2 4 6 8 mi
0 2 4 6 8 10 km

Other Maps/Photographs -

View USGS digital orthophoto quadrangle (DOQ) covering this location from TerraServer; **USGS Aerial Photograph** may also be available from this site. A DOQ is a computer-generated image of an aerial photograph in which image displacement caused by terrain relief and camera tilts has been removed. It combines the image characteristics of a photograph with the geometric qualities of a map. Visit the USGS for more information.

Watershed/Stream Flow Information -

Find the Watershed for this location using the U.S. Environmental Protection Agency's site.

Climate Data Sources -

Precipitation frequency results are based on data from a variety of sources, but largely NCDC. The following links provide general information about observing sites in the area, regardless of if their data was used in this study. For detailed information about the stations used in this study, please refer to NOAA Atlas 14 Document.

Using the **National Climatic Data Center's (NCDC)** station search engine, locate other climate stations within:

+/-30 minutes ...OR... +/-1 degree of this location (32.3726/-110.8809). Digital ASCII data can be obtained directly from **NCDC**.

Find Natural Resources Conservation Service (NRCS) SNOTEL (SNOwpack TELemetry) stations by visiting the **Western Regional Climate Center's state-specific SNOTEL station maps**.

Hydrometeorological Design Studies Center
DOC/NOAA/National Weather Service
1325 East-West Highway
Silver Spring, MD 20910
(301) 713-1669
Questions?: HDSC.Questions@noaa.gov

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POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

Arizona 32.3613 N 110.8801 W 5833 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006

Extracted: Mon May 10 2010

Confidence Limits | Seasonality | Location Maps | Other Info. | GIS data | Maps | Docs | Return to State Map

Precipitation Frequency Estimates (inches)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.32	0.48	0.60	0.81	1.00	1.12	1.21	1.42	1.67	1.79	2.04	2.35	2.82	3.22	4.43	5.55	6.92	8.01
2	0.41	0.63	0.78	1.05	1.29	1.43	1.52	1.78	2.09	2.24	2.57	2.97	3.56	4.05	5.58	6.97	8.68	10.05
5	0.54	0.82	1.02	1.37	1.70	1.86	1.95	2.23	2.60	2.82	3.25	3.81	4.60	5.19	7.11	8.75	10.80	12.52
10	0.64	0.97	1.20	1.61	2.00	2.19	2.29	2.60	3.02	3.29	3.82	4.53	5.49	6.17	8.39	10.22	12.47	14.45
25	0.76	1.16	1.44	1.93	2.39	2.63	2.76	3.12	3.60	3.94	4.61	5.57	6.83	7.61	10.23	12.26	14.71	17.02
50	0.85	1.30	1.61	2.17	2.68	2.97	3.13	3.53	4.06	4.47	5.25	6.44	7.95	8.82	11.72	13.89	16.44	18.99
100	0.95	1.44	1.78	2.40	2.97	3.32	3.52	3.96	4.54	5.01	5.91	7.38	9.19	10.14	13.34	15.60	18.22	21.01
200	1.04	1.58	1.96	2.64	3.26	3.67	3.92	4.41	5.03	5.58	6.62	8.40	10.56	11.59	15.07	17.39	20.04	23.05
500	1.16	1.76	2.18	2.94	3.64	4.15	4.47	5.00	5.70	6.37	7.59	9.88	12.56	13.71	17.53	19.86	22.51	25.82
1000	1.25	1.91	2.36	3.18	3.94	4.52	4.90	5.49	6.22	7.00	8.37	11.10	14.26	15.48	19.55	21.84	24.48	28.00

* These precipitation frequency estimates are based on a partial duration series. **ARI** is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting forces estimates near zero to appear as zero.

*** Upper bound of the 90% confidence interval**
Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.36	0.55	0.69	0.92	1.14	1.26	1.36	1.60	1.87	1.98	2.26	2.62	3.14	3.57	4.90	6.09	7.55	8.75
2	0.47	0.71	0.88	1.19	1.47	1.62	1.72	2.00	2.34	2.48	2.84	3.29	3.96	4.49	6.16	7.64	9.49	11.02
5	0.61	0.93	1.16	1.55	1.93	2.09	2.20	2.50	2.91	3.12	3.60	4.22	5.12	5.77	7.89	9.63	11.83	13.75
10	0.72	1.09	1.35	1.82	2.26	2.46	2.58	2.92	3.37	3.64	4.22	5.02	6.12	6.87	9.31	11.25	13.67	15.89
25	0.86	1.30	1.62	2.18	2.69	2.95	3.10	3.49	4.02	4.38	5.11	6.19	7.63	8.48	11.38	13.53	16.19	18.80
50	0.96	1.47	1.82	2.45	3.03	3.33	3.52	3.95	4.54	4.96	5.84	7.18	8.93	9.87	13.08	15.37	18.15	21.05
100	1.07	1.63	2.02	2.72	3.37	3.73	3.96	4.45	5.09	5.60	6.62	8.28	10.41	11.43	14.96	17.37	20.24	23.39
200	1.18	1.80	2.23	3.00	3.71	4.14	4.43	4.96	5.68	6.27	7.46	9.49	12.06	13.18	17.05	19.48	22.42	25.82
500	1.33	2.02	2.51	3.37	4.18	4.71	5.09	5.68	6.49	7.24	8.68	11.30	14.55	15.78	20.10	22.54	25.45	29.26
1000	1.45	2.21	2.74	3.69	4.56	5.18	5.65	6.29	7.14	8.02	9.69	12.87	16.75	18.05	22.69	25.05	27.93	32.04

* The **upper** bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are **greater** than.
** These precipitation frequency estimates are based on a partial duration series. **ARI** is the Average Recurrence Interval.

Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

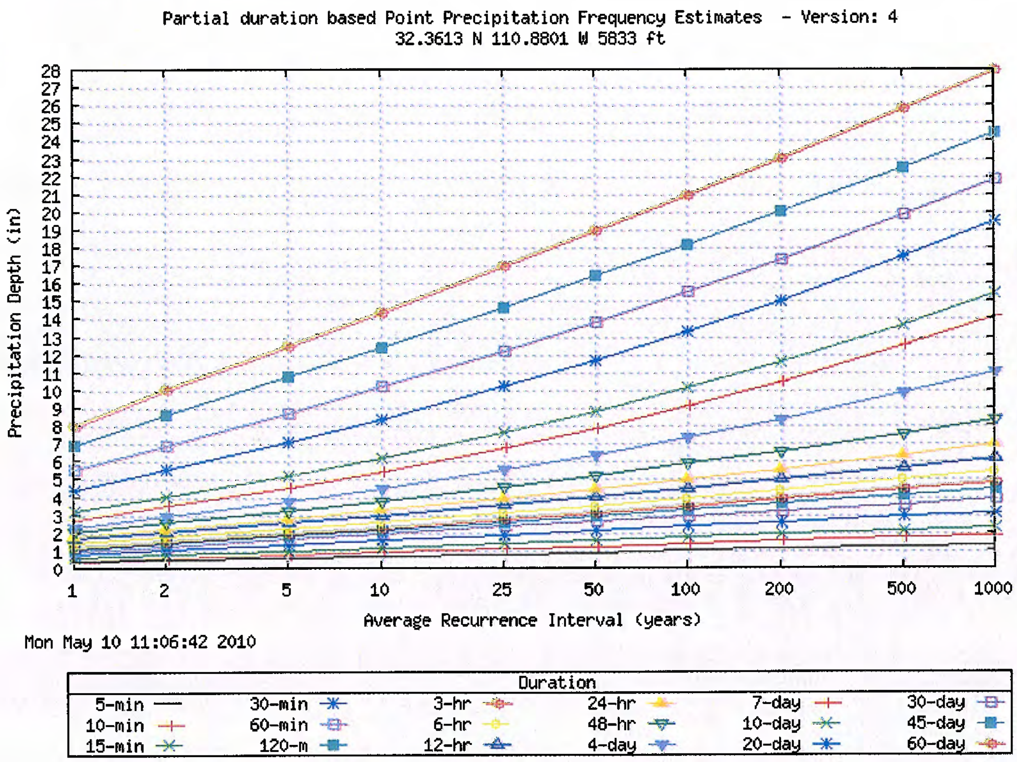
*** Lower bound of the 90% confidence interval**
Precipitation Frequency Estimates (inches)

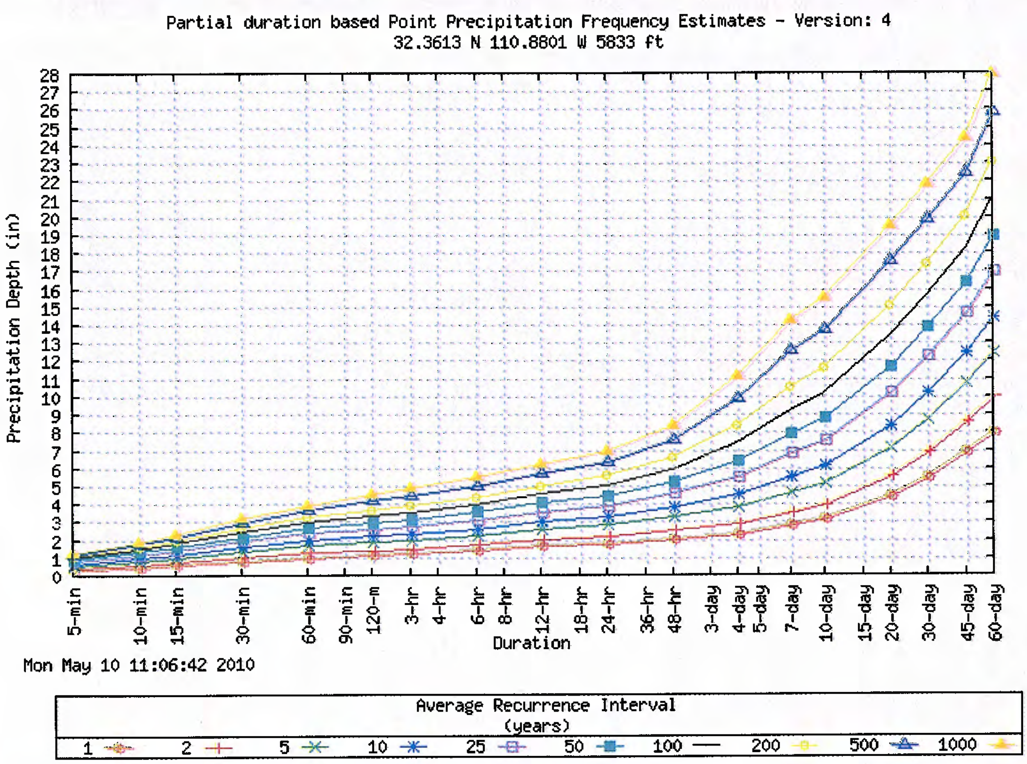
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.28	0.43	0.53	0.72	0.89	1.00	1.08	1.27	1.50	1.63	1.86	2.15	2.56	2.92	4.03	5.07	6.33	7.32
2	0.36	0.56	0.69	0.93	1.15	1.28	1.36	1.59	1.88	2.05	2.34	2.69	3.22	3.66	5.07	6.36	7.95	9.19
5	0.48	0.72	0.90	1.21	1.50	1.65	1.74	1.98	2.32	2.56	2.96	3.44	4.14	4.67	6.44	7.96	9.86	11.44
10	0.56	0.85	1.05	1.42	1.75	1.92	2.02	2.30	2.68	2.97	3.46	4.07	4.92	5.53	7.56	9.27	11.35	13.14
25	0.66	1.00	1.24	1.68	2.07	2.30	2.42	2.73	3.16	3.54	4.14	4.96	6.03	6.74	9.11	11.02	13.29	15.39
50	0.73	1.11	1.38	1.86	2.30	2.57	2.71	3.05	3.53	3.97	4.66	5.66	6.95	7.72	10.33	12.38	14.75	17.07
100	0.80	1.22	1.51	2.04	2.52	2.83	3.00	3.37	3.89	4.41	5.19	6.40	7.92	8.76	11.61	13.76	16.21	18.74
200	0.87	1.32	1.64	2.21	2.73	3.08	3.28	3.69	4.25	4.85	5.73	7.16	8.94	9.84	12.93	15.16	17.64	20.37
500	0.95	1.44	1.79	2.41	2.98	3.40	3.63	4.08	4.70	5.44	6.45	8.19	10.38	11.33	14.69	16.99	19.53	22.47
1000	1.01	1.53	1.90	2.56	3.16	3.64	3.90	4.39	5.04	5.89	6.99	9.02	11.53	12.53	16.05	18.37	20.95	24.04

* The **lower** bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are **less** than.
** These precipitation frequency estimates are based on a partial duration maxima series. **ARI** is the Average Recurrence Interval.

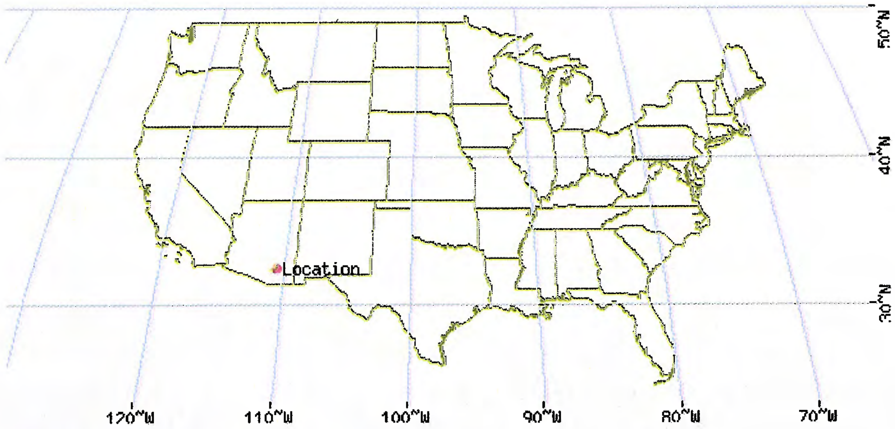
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

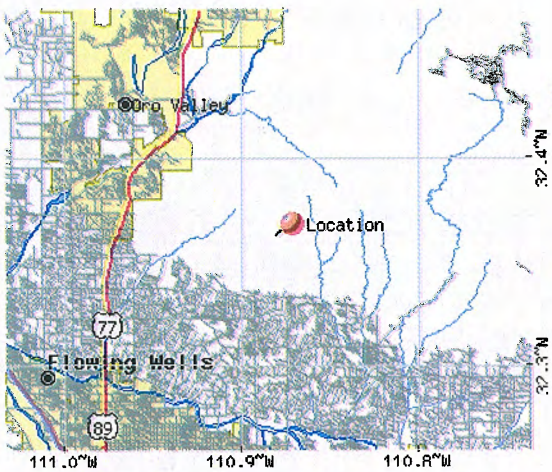
Text version of tables





Maps -





These maps were produced using a direct map request from the [U.S. Census Bureau Mapping and Cartographic Resources Tiger Map Server.]

Please read disclaimer for more information.

LEGEND

State	Connector
County	Stream
Indian Resv	Military Area
Lake/Pond/Ocean	National Park
Street	Other Park
Expressway	City
Highway	County

Scale 1:228583 0 2 4 6 8 mi; 0 2 4 6 8 10 km
*average--true scale depends on monitor resolution

Other Maps/Photographs -

View USGS digital orthophoto quadrangle (DOQ) covering this location from TerraServer; **USGS Aerial Photograph** may also be available from this site. A DOQ is a computer-generated image of an aerial photograph in which image displacement caused by terrain relief and camera tilts has been removed. It combines the image characteristics of a photograph with the geometric qualities of a map. Visit the USGS for more information.

Watershed/Stream Flow Information -

Find the Watershed for this location using the U.S. Environmental Protection Agency's site.

Climate Data Sources -

Precipitation frequency results are based on data from a variety of sources, but largely NCDC. The following links provide general information about observing sites in the area, regardless of if their data was used in this study. For detailed information about the stations used in this study, please refer to NOAA Atlas 14 Document.

Using the **National Climatic Data Center's (NCDC)** station search engine, locate other climate stations within:

+/-30 minutes ...OR... +/-1 degree of this location (32.3613/-110.8801). Digital ASCII data can be obtained directly from **NCDC**.

Find Natural Resources Conservation Service (NRCS) SNOTEL (SNOwpack TELemetry) stations by visiting the **Western Regional Climate Center's state-specific SNOTEL station maps.**

Hydrometeorological Design Studies Center
DOC/NOAA/National Weather Service
1325 East-West Highway
Silver Spring, MD 20910
(301) 713-1669
Questions?: HDSC.Questions@noaa.gov

Disclaimer

C

POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

Arizona 32.3522 N 110.8906 W 4917 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006

Extracted: Mon May 10 2010

Confidence Limits | Seasonality | Location Maps | Other Info. | GIS data | Maps | Docs | Return to State Map

Precipitation Frequency Estimates (inches)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.30	0.46	0.57	0.77	0.96	1.08	1.16	1.36	1.59	1.72	1.96	2.24	2.67	3.04	4.16	5.18	6.44	7.42
2	0.39	0.60	0.74	1.00	1.24	1.39	1.47	1.71	1.99	2.15	2.46	2.83	3.37	3.83	5.23	6.50	8.07	9.32
5	0.52	0.79	0.97	1.31	1.62	1.80	1.88	2.14	2.48	2.71	3.11	3.62	4.34	4.89	6.66	8.16	10.04	11.59
10	0.61	0.93	1.15	1.54	1.91	2.11	2.21	2.50	2.88	3.16	3.65	4.30	5.18	5.81	7.85	9.52	11.57	13.37
25	0.73	1.11	1.38	1.85	2.29	2.54	2.67	2.99	3.44	3.78	4.40	5.28	6.43	7.15	9.56	11.40	13.63	15.73
50	0.82	1.25	1.55	2.08	2.58	2.88	3.03	3.39	3.87	4.28	5.00	6.10	7.48	8.28	10.94	12.90	15.21	17.53
100	0.91	1.39	1.72	2.31	2.86	3.22	3.40	3.81	4.33	4.80	5.63	6.99	8.64	9.52	12.44	14.48	16.84	19.37
200	1.00	1.52	1.89	2.54	3.15	3.56	3.79	4.24	4.80	5.35	6.29	7.94	9.91	10.87	14.04	16.12	18.49	21.23
500	1.12	1.70	2.11	2.84	3.52	4.03	4.32	4.82	5.43	6.10	7.21	9.33	11.78	12.83	16.32	18.40	20.72	23.74
1000	1.21	1.84	2.29	3.08	3.81	4.39	4.75	5.29	5.93	6.69	7.94	10.48	13.36	14.48	18.18	20.21	22.49	25.70

* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting forces estimates near zero to appear as zero.

* Upper bound of the 90% confidence interval Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.35	0.53	0.65	0.88	1.09	1.22	1.31	1.53	1.78	1.90	2.16	2.49	2.97	3.37	4.59	5.68	7.02	8.11
2	0.45	0.68	0.84	1.14	1.41	1.56	1.65	1.92	2.23	2.38	2.71	3.13	3.75	4.24	5.77	7.13	8.83	10.21
5	0.58	0.89	1.10	1.49	1.84	2.02	2.12	2.40	2.77	2.99	3.43	4.01	4.83	5.43	7.37	8.96	10.98	12.71
10	0.69	1.05	1.30	1.75	2.16	2.38	2.48	2.80	3.21	3.49	4.03	4.75	5.76	6.46	8.70	10.46	12.68	14.67
25	0.82	1.25	1.55	2.09	2.58	2.85	2.99	3.35	3.83	4.19	4.86	5.86	7.17	7.96	10.62	12.56	14.99	17.34
50	0.93	1.41	1.75	2.35	2.91	3.22	3.39	3.80	4.33	4.75	5.55	6.79	8.39	9.25	12.20	14.26	16.78	19.39
100	1.03	1.57	1.95	2.62	3.24	3.61	3.83	4.28	4.85	5.36	6.29	7.82	9.77	10.71	13.94	16.10	18.69	21.53
200	1.14	1.73	2.15	2.89	3.58	4.01	4.29	4.78	5.41	6.00	7.09	8.96	11.31	12.34	15.87	18.04	20.67	23.73
500	1.28	1.95	2.42	3.26	4.04	4.57	4.93	5.47	6.19	6.92	8.23	10.66	13.62	14.76	18.70	20.86	23.41	26.85
1000	1.40	2.13	2.65	3.56	4.41	5.03	5.47	6.06	6.81	7.67	9.17	12.12	15.67	16.87	21.09	23.16	25.64	29.35

* The **upper** bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are **greater** than.
** These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

* Lower bound of the 90% confidence interval Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.27	0.41	0.51	0.69	0.85	0.97	1.04	1.22	1.43	1.57	1.78	2.05	2.43	2.76	3.78	4.74	5.91	6.80
2	0.35	0.53	0.66	0.89	1.10	1.24	1.31	1.52	1.79	1.97	2.24	2.57	3.05	3.46	4.75	5.94	7.41	8.53
5	0.46	0.69	0.86	1.16	1.43	1.59	1.68	1.90	2.21	2.45	2.83	3.28	3.91	4.41	6.03	7.43	9.17	10.60
10	0.53	0.81	1.01	1.35	1.68	1.86	1.95	2.21	2.56	2.85	3.30	3.87	4.64	5.22	7.08	8.64	10.55	12.17
25	0.63	0.96	1.19	1.61	1.99	2.22	2.33	2.62	3.02	3.40	3.95	4.71	5.69	6.34	8.53	10.26	12.35	14.24
50	0.70	1.07	1.33	1.79	2.21	2.49	2.61	2.93	3.37	3.81	4.44	5.37	6.54	7.26	9.66	11.51	13.69	15.78
100	0.77	1.17	1.46	1.96	2.42	2.75	2.89	3.24	3.71	4.23	4.95	6.07	7.45	8.23	10.84	12.78	15.03	17.31
200	0.84	1.27	1.58	2.12	2.63	2.99	3.17	3.55	4.05	4.65	5.45	6.78	8.41	9.24	12.07	14.08	16.33	18.80
500	0.91	1.39	1.73	2.32	2.88	3.30	3.51	3.93	4.48	5.21	6.13	7.75	9.75	10.63	13.70	15.76	18.04	20.71
1000	0.97	1.48	1.83	2.47	3.05	3.53	3.77	4.23	4.80	5.64	6.64	8.53	10.82	11.74	14.96	17.02	19.32	22.13

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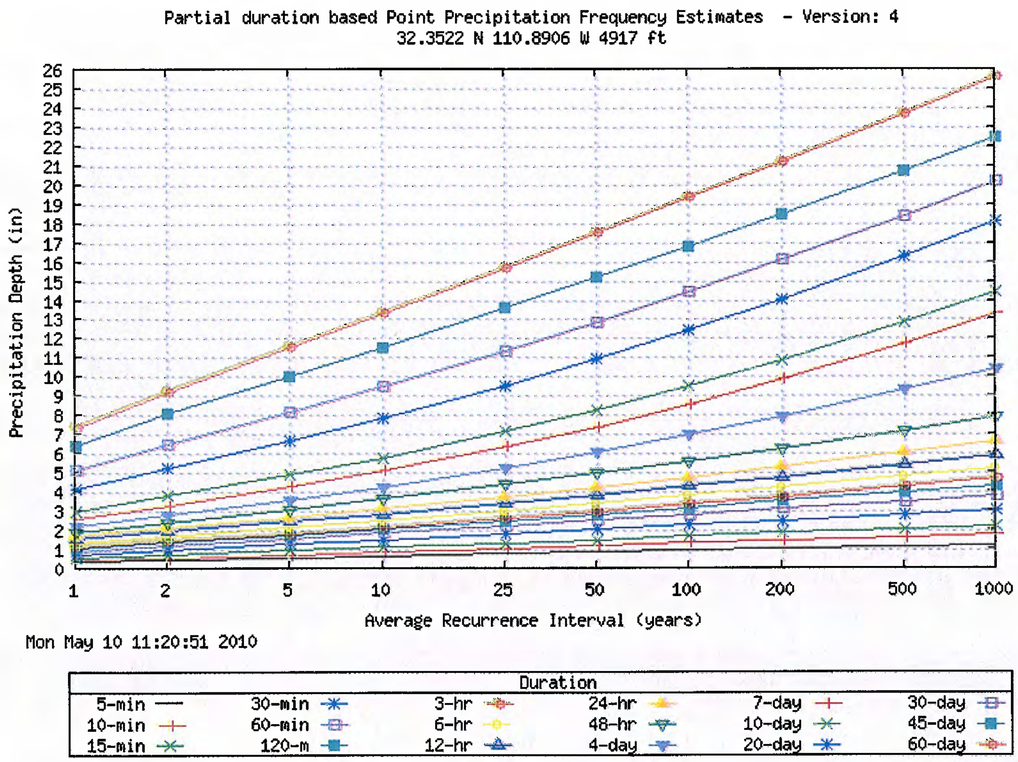
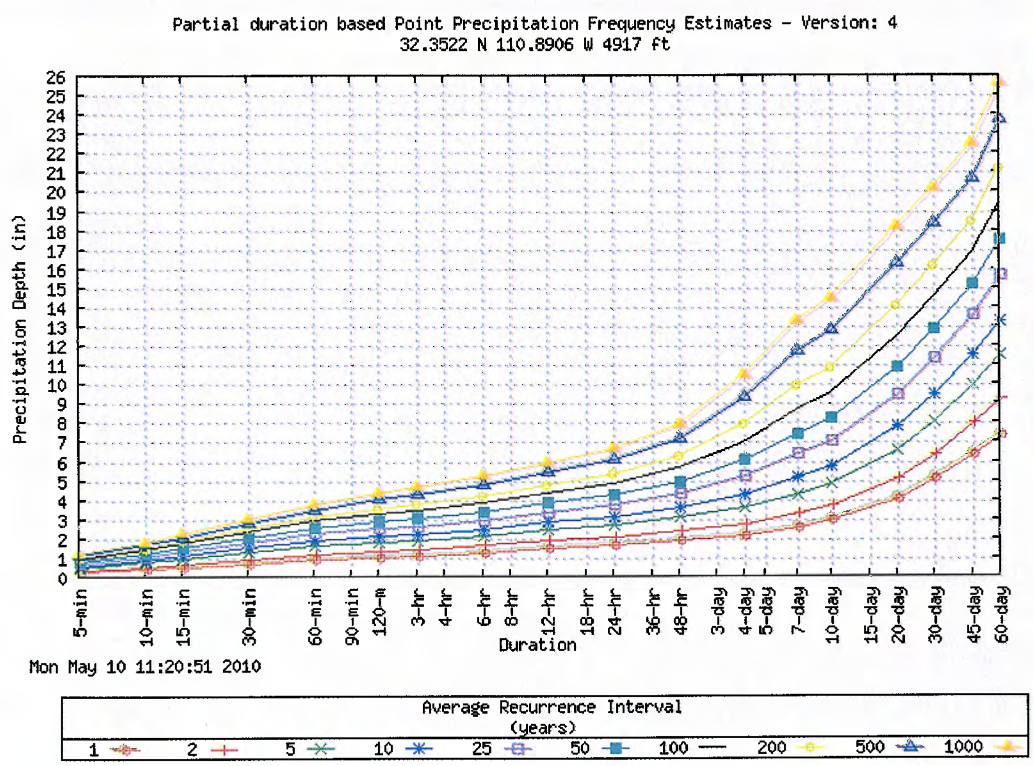
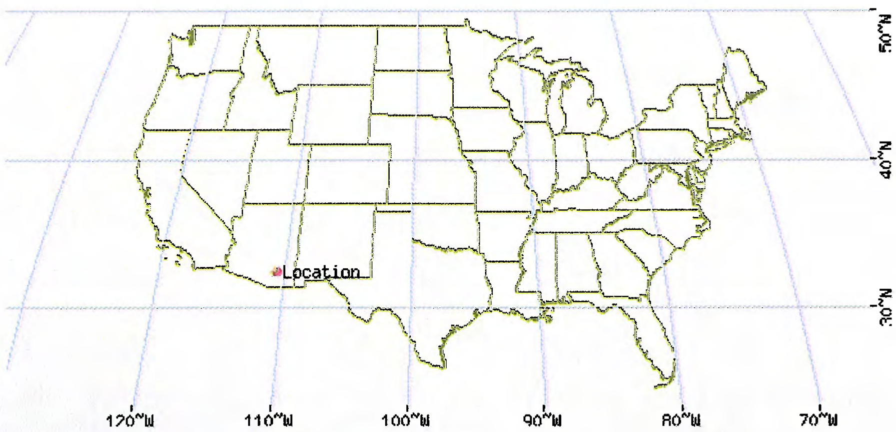
Text version of tables





Maps -



These maps were produced using a direct map request from the U.S. Census Bureau Mapping and Cartographic Resources Tiger Map Server.

Please read disclaimer for more information.

LEGEND

State	Connector
County	Stream
Indian Resv	Military Area
Lake/Pond/Ocean	National Park
Street	Other Park
Expressway	City
Highway	County

Scale 1:228583 (0 2 4 6 8 mi; 0 2 4 6 8 10 km)
*average--true scale depends on monitor resolution

Other Maps/Photographs -

View USGS digital orthophoto quadrangle (DOQ) covering this location from TerraServer; **USGS Aerial Photograph** may also be available from this site. A DOQ is a computer-generated image of an aerial photograph in which image displacement caused by terrain relief and camera tilts has been removed. It combines the image characteristics of a photograph with the geometric qualities of a map. Visit the USGS for more information.

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+/-30 minutes ...OR... +/-1 degree of this location (32.3522/-110.8906). Digital ASCII data can be obtained directly from NCDC.

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(301) 713-1669
Questions?: HDSC.Questions@noaa.gov

Disclaimer

POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

Arizona 32.3412 N 110.8922 W 3782 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006
Extracted: Mon May 10 2010

Confidence Limits | Seasonality | Location Maps | Other Info. | GIS data | Maps | Docs | Return to State Map

Precipitation Frequency Estimates (inches)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.29	0.44	0.55	0.73	0.91	1.05	1.12	1.31	1.52	1.65	1.87	2.13	2.53	2.87	3.89	4.82	5.98	6.86
2	0.37	0.57	0.70	0.95	1.17	1.34	1.41	1.63	1.90	2.06	2.34	2.69	3.18	3.60	4.88	6.05	7.49	8.60
5	0.49	0.75	0.93	1.25	1.54	1.73	1.81	2.05	2.36	2.59	2.96	3.43	4.09	4.59	6.21	7.58	9.30	10.68
10	0.58	0.88	1.09	1.47	1.82	2.04	2.13	2.40	2.75	3.02	3.47	4.07	4.87	5.45	7.31	8.83	10.71	12.30
25	0.70	1.06	1.31	1.77	2.19	2.46	2.57	2.88	3.28	3.62	4.18	4.99	6.03	6.70	8.89	10.56	12.59	14.46
50	0.78	1.19	1.48	1.99	2.46	2.79	2.92	3.26	3.69	4.09	4.75	5.75	7.01	7.75	10.17	11.94	14.03	16.10
100	0.87	1.33	1.65	2.22	2.74	3.12	3.28	3.66	4.13	4.59	5.34	6.59	8.09	8.89	11.55	13.38	15.50	17.76
200	0.96	1.46	1.81	2.44	3.02	3.45	3.66	4.08	4.58	5.11	5.96	7.48	9.26	10.14	13.03	14.89	16.99	19.44
500	1.08	1.64	2.03	2.73	3.38	3.90	4.18	4.64	5.18	5.82	6.82	8.77	11.00	11.96	15.13	16.97	18.99	21.69
1000	1.17	1.78	2.20	2.96	3.67	4.26	4.60	5.10	5.66	6.39	7.51	9.85	12.46	13.48	16.84	18.62	20.56	23.43

* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting forces estimates near zero to appear as zero.

*** Upper bound of the 90% confidence interval
Precipitation Frequency Estimates (inches)**

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.33	0.50	0.62	0.84	1.04	1.18	1.26	1.47	1.70	1.82	2.06	2.37	2.81	3.18	4.29	5.28	6.52	7.49
2	0.42	0.65	0.80	1.08	1.34	1.51	1.59	1.84	2.12	2.28	2.59	2.97	3.53	3.98	5.38	6.62	8.19	9.41
5	0.56	0.85	1.05	1.41	1.75	1.95	2.04	2.31	2.64	2.86	3.27	3.79	4.54	5.09	6.87	8.31	10.16	11.69
10	0.65	1.00	1.24	1.66	2.06	2.29	2.40	2.69	3.07	3.33	3.83	4.49	5.41	6.05	8.09	9.69	11.72	13.47
25	0.79	1.19	1.48	1.99	2.47	2.76	2.89	3.22	3.65	4.00	4.61	5.52	6.71	7.44	9.86	11.62	13.82	15.90
50	0.89	1.35	1.67	2.25	2.78	3.12	3.27	3.65	4.12	4.54	5.26	6.39	7.84	8.64	11.32	13.17	15.45	17.76
100	0.99	1.50	1.87	2.51	3.11	3.50	3.70	4.11	4.62	5.12	5.96	7.36	9.12	9.99	12.93	14.85	17.18	19.69
200	1.09	1.66	2.06	2.78	3.44	3.89	4.14	4.60	5.16	5.72	6.70	8.42	10.55	11.50	14.71	16.62	18.96	21.68
500	1.24	1.88	2.33	3.14	3.89	4.43	4.77	5.27	5.90	6.60	7.77	10.01	12.69	13.74	17.31	19.19	21.41	24.47
1000	1.35	2.06	2.55	3.43	4.25	4.88	5.30	5.84	6.50	7.31	8.65	11.38	14.58	15.69	19.51	21.29	23.40	26.70

* The **upper** bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are **greater** than.
** These precipitation frequency estimates are based on a partial duration series. **ARI** is the Average Recurrence Interval.

Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

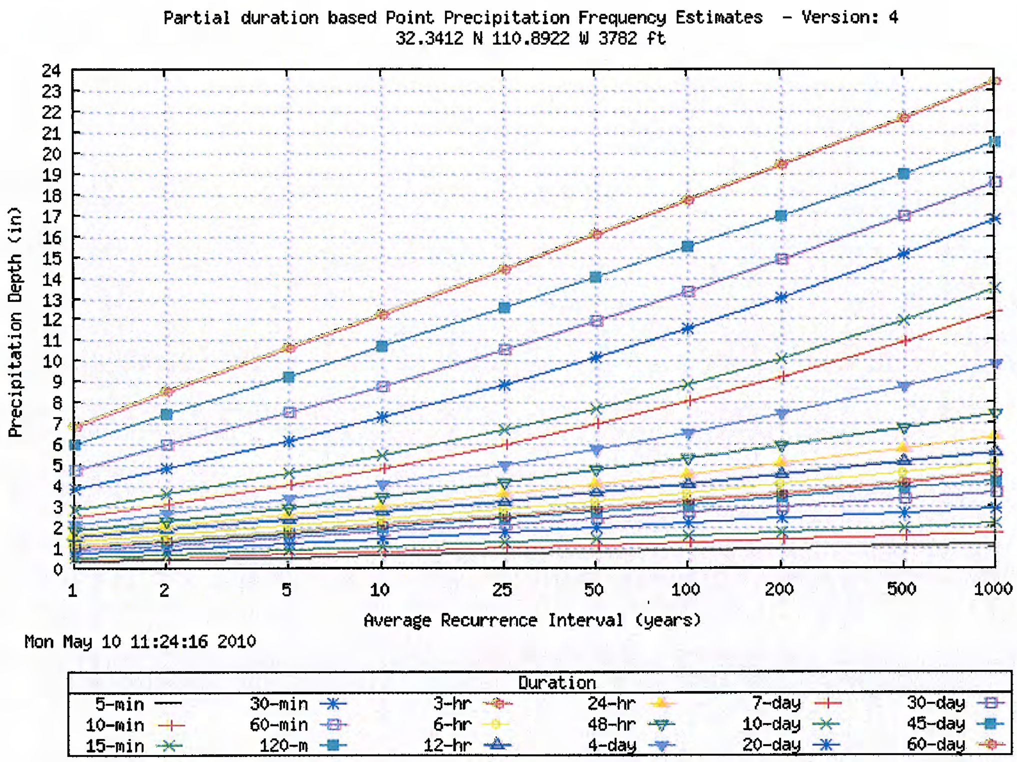
*** Lower bound of the 90% confidence interval
Precipitation Frequency Estimates (inches)**

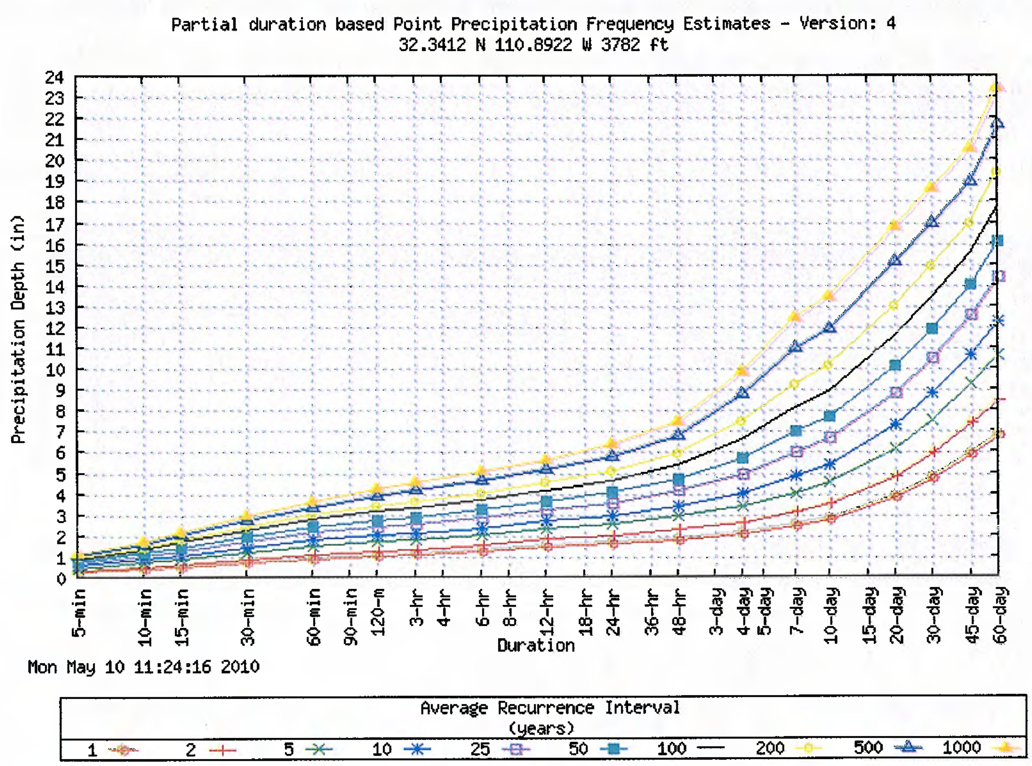
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.26	0.39	0.48	0.65	0.81	0.93	1.00	1.17	1.36	1.50	1.71	1.95	2.30	2.61	3.54	4.42	5.49	6.29
2	0.33	0.50	0.62	0.84	1.04	1.19	1.26	1.46	1.71	1.89	2.14	2.44	2.88	3.26	4.44	5.53	6.88	7.88
5	0.43	0.66	0.82	1.10	1.36	1.54	1.61	1.83	2.11	2.35	2.70	3.11	3.69	4.15	5.63	6.91	8.51	9.78
10	0.51	0.77	0.96	1.29	1.59	1.80	1.88	2.12	2.44	2.73	3.15	3.67	4.38	4.90	6.61	8.03	9.78	11.22
25	0.60	0.92	1.14	1.53	1.90	2.15	2.25	2.52	2.88	3.25	3.76	4.46	5.35	5.95	7.95	9.52	11.43	13.11
50	0.67	1.02	1.27	1.71	2.11	2.40	2.52	2.82	3.21	3.64	4.22	5.08	6.14	6.81	8.99	10.67	12.65	14.51
100	0.74	1.12	1.39	1.88	2.32	2.66	2.79	3.11	3.54	4.04	4.70	5.73	6.99	7.70	10.09	11.84	13.87	15.90
200	0.80	1.22	1.51	2.04	2.52	2.89	3.05	3.41	3.86	4.45	5.17	6.39	7.88	8.64	11.22	13.02	15.05	17.25
500	0.88	1.34	1.66	2.23	2.76	3.20	3.39	3.78	4.28	4.97	5.81	7.30	9.12	9.92	12.72	14.55	16.59	18.97
1000	0.93	1.42	1.76	2.37	2.93	3.42	3.64	4.07	4.58	5.38	6.29	8.03	10.11	10.95	13.88	15.70	17.73	20.24

* The **lower** bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are **less** than.
** These precipitation frequency estimates are based on a partial duration maxima series. **ARI** is the Average Recurrence Interval.

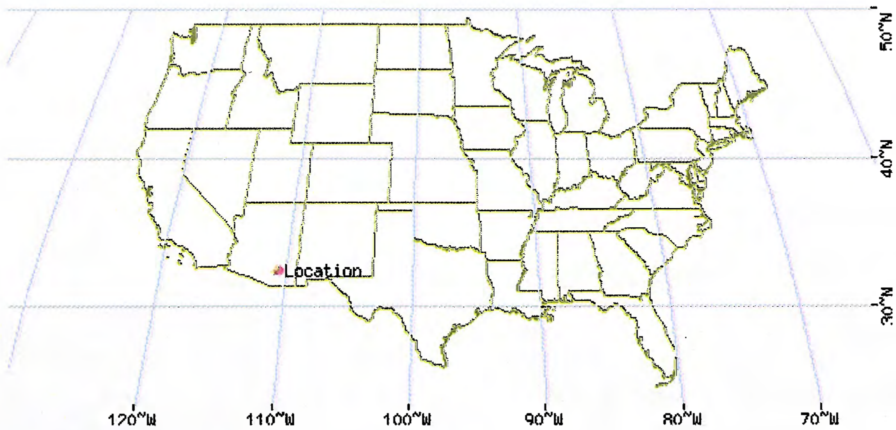
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

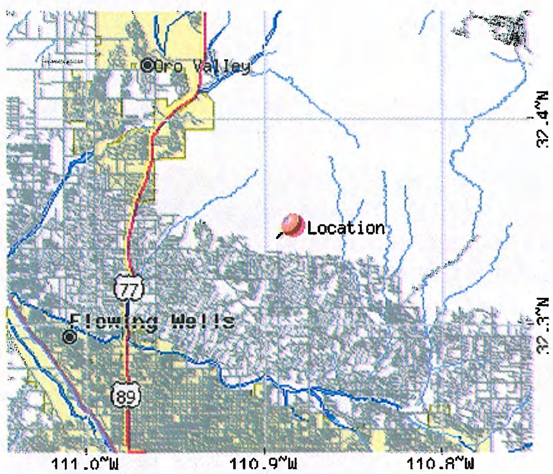
Text version of tables





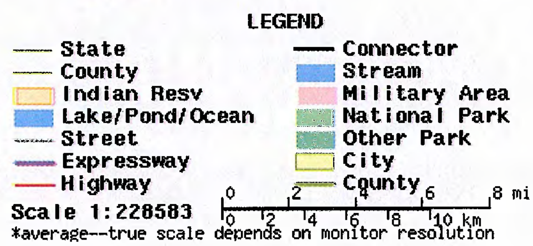
Maps -





These maps were produced using a direct map request from the [U.S. Census Bureau Mapping and Cartographic Resources Tiger Map Server.]

Please read [disclaimer] for more information.



Other Maps/Photographs -

View USGS digital orthophoto quadrangle (DOQ) covering this location from TerraServer; **USGS Aerial Photograph** may also be available from this site. A DOQ is a computer-generated image of an aerial photograph in which image displacement caused by terrain relief and camera tilts has been removed. It combines the image characteristics of a photograph with the geometric qualities of a map. Visit the USGS for more information.

Watershed/Stream Flow Information -

Find the Watershed for this location using the U.S. Environmental Protection Agency's site.

Climate Data Sources -

Precipitation frequency results are based on data from a variety of sources, but largely NCDC. The following links provide general information about observing sites in the area, regardless of if their data was used in this study. For detailed information about the stations used in this study, please refer to NOAA Atlas 14 Document.

Using the **National Climatic Data Center's (NCDC)** station search engine, locate other climate stations within:

+/-30 minutes ...OR... +/-1 degree of this location (32.3412/-110.8922). Digital ASCII data can be obtained directly from **NCDC**.

Find Natural Resources Conservation Service (NRCS) SNOTEL (SNOwpack TELemetry) stations by visiting the **Western Regional Climate Center's state-specific SNOTEL station maps.**

Hydrometeorological Design Studies Center
DOC/NOAA/National Weather Service
1325 East-West Highway
Silver Spring, MD 20910
(301) 713-1669
Questions?: HDSC.Questions@noaa.gov

Disclaimer

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POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

Arizona 32.3305 N 110.8998 W 2910 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006
Extracted: Mon May 10 2010

Precipitation Frequency Estimates (inches)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.27	0.42	0.52	0.70	0.86	1.00	1.07	1.24	1.43	1.57	1.77	2.02	2.36	2.67	3.59	4.42	5.47	6.23
2	0.35	0.54	0.67	0.90	1.11	1.28	1.35	1.55	1.79	1.97	2.22	2.53	2.97	3.35	4.50	5.54	6.84	7.80
5	0.47	0.71	0.88	1.19	1.47	1.66	1.73	1.95	2.23	2.46	2.80	3.23	3.81	4.27	5.71	6.93	8.47	9.67
10	0.55	0.84	1.04	1.40	1.73	1.96	2.04	2.28	2.59	2.87	3.28	3.81	4.53	5.05	6.72	8.06	9.73	11.12
25	0.66	1.01	1.25	1.69	2.09	2.36	2.46	2.74	3.10	3.44	3.94	4.67	5.60	6.20	8.16	9.63	11.42	13.04
50	0.75	1.14	1.41	1.90	2.35	2.68	2.80	3.11	3.49	3.89	4.47	5.38	6.49	7.16	9.32	10.87	12.71	14.51
100	0.83	1.27	1.58	2.12	2.63	3.00	3.15	3.49	3.90	4.36	5.02	6.15	7.48	8.21	10.58	12.16	14.01	15.98
200	0.92	1.40	1.74	2.34	2.90	3.33	3.52	3.89	4.32	4.84	5.60	6.97	8.55	9.35	11.91	13.51	15.32	17.45
500	1.03	1.58	1.95	2.63	3.26	3.77	4.02	4.44	4.89	5.52	6.39	8.17	10.13	11.01	13.81	15.37	17.07	19.42
1000	1.12	1.71	2.12	2.86	3.54	4.11	4.42	4.88	5.34	6.05	7.03	9.16	11.46	12.39	15.35	16.84	18.43	20.93

* These precipitation frequency estimates are based on a partial duration series. **ARI** is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting forces estimates near zero to appear as zero.

*** Upper bound of the 90% confidence interval**
Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.31	0.48	0.59	0.79	0.98	1.13	1.20	1.40	1.60	1.73	1.95	2.23	2.62	2.96	3.95	4.84	5.95	6.79
2	0.40	0.61	0.76	1.02	1.27	1.45	1.52	1.75	2.01	2.17	2.45	2.79	3.29	3.71	4.95	6.05	7.46	8.52
5	0.53	0.80	1.00	1.34	1.66	1.87	1.95	2.20	2.50	2.72	3.08	3.56	4.21	4.72	6.30	7.58	9.24	10.56
10	0.62	0.95	1.18	1.58	1.96	2.20	2.29	2.56	2.90	3.17	3.60	4.20	5.01	5.60	7.42	8.82	10.63	12.15
25	0.75	1.14	1.41	1.90	2.35	2.65	2.76	3.07	3.45	3.80	4.34	5.16	6.21	6.88	9.03	10.56	12.51	14.30
50	0.85	1.29	1.60	2.15	2.66	3.00	3.14	3.48	3.89	4.30	4.94	5.96	7.24	7.97	10.36	11.96	13.96	15.96
100	0.95	1.44	1.79	2.41	2.98	3.37	3.55	3.92	4.36	4.85	5.58	6.85	8.41	9.21	11.81	13.46	15.48	17.66
200	1.05	1.60	1.98	2.67	3.30	3.75	3.98	4.38	4.87	5.43	6.28	7.84	9.71	10.58	13.42	15.05	17.04	19.41
500	1.19	1.81	2.25	3.02	3.74	4.28	4.59	5.04	5.57	6.26	7.26	9.30	11.66	12.63	15.77	17.35	19.18	21.84
1000	1.30	1.98	2.46	3.31	4.09	4.71	5.10	5.59	6.14	6.92	8.07	10.56	13.39	14.40	17.76	19.21	20.89	23.77

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*** Lower bound of the 90% confidence interval**
Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.24	0.37	0.46	0.62	0.77	0.90	0.95	1.11	1.29	1.43	1.62	1.84	2.15	2.44	3.27	4.06	5.02	5.72
2	0.31	0.48	0.59	0.80	0.99	1.14	1.21	1.39	1.61	1.80	2.03	2.31	2.70	3.05	4.10	5.08	6.29	7.16
5	0.41	0.62	0.78	1.04	1.29	1.48	1.54	1.74	2.00	2.24	2.56	2.93	3.45	3.86	5.19	6.33	7.77	8.87
10	0.48	0.73	0.91	1.23	1.52	1.73	1.80	2.02	2.31	2.60	2.98	3.45	4.08	4.55	6.08	7.34	8.92	10.16
25	0.57	0.88	1.08	1.46	1.81	2.06	2.16	2.40	2.72	3.09	3.55	4.18	4.98	5.52	7.31	8.69	10.40	11.85
50	0.64	0.98	1.21	1.63	2.02	2.31	2.42	2.68	3.04	3.46	3.98	4.76	5.70	6.30	8.26	9.73	11.49	13.11
100	0.70	1.07	1.33	1.79	2.22	2.56	2.67	2.96	3.34	3.85	4.43	5.36	6.48	7.13	9.26	10.78	12.58	14.34
200	0.77	1.17	1.45	1.95	2.41	2.79	2.93	3.25	3.64	4.22	4.87	5.97	7.29	7.98	10.28	11.85	13.62	15.53
500	0.84	1.28	1.59	2.14	2.65	3.08	3.25	3.60	4.03	4.72	5.45	6.81	8.42	9.15	11.64	13.22	14.97	17.04
1000	0.90	1.36	1.69	2.28	2.82	3.30	3.50	3.88	4.33	5.11	5.90	7.48	9.32	10.09	12.69	14.25	15.97	18.14

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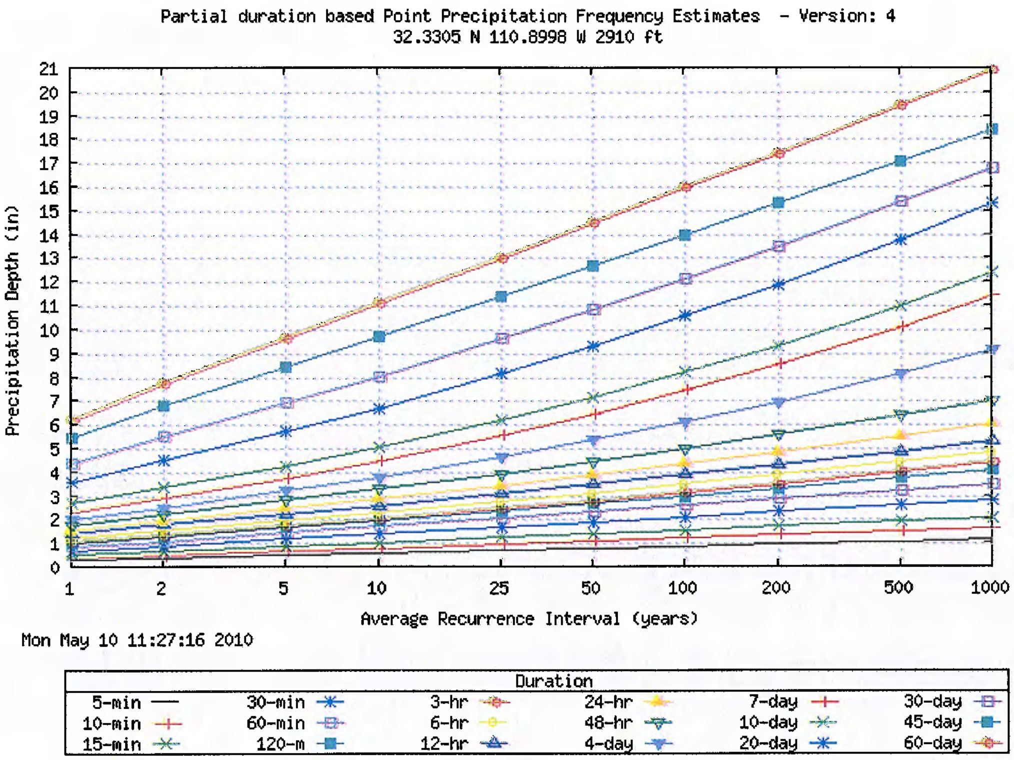
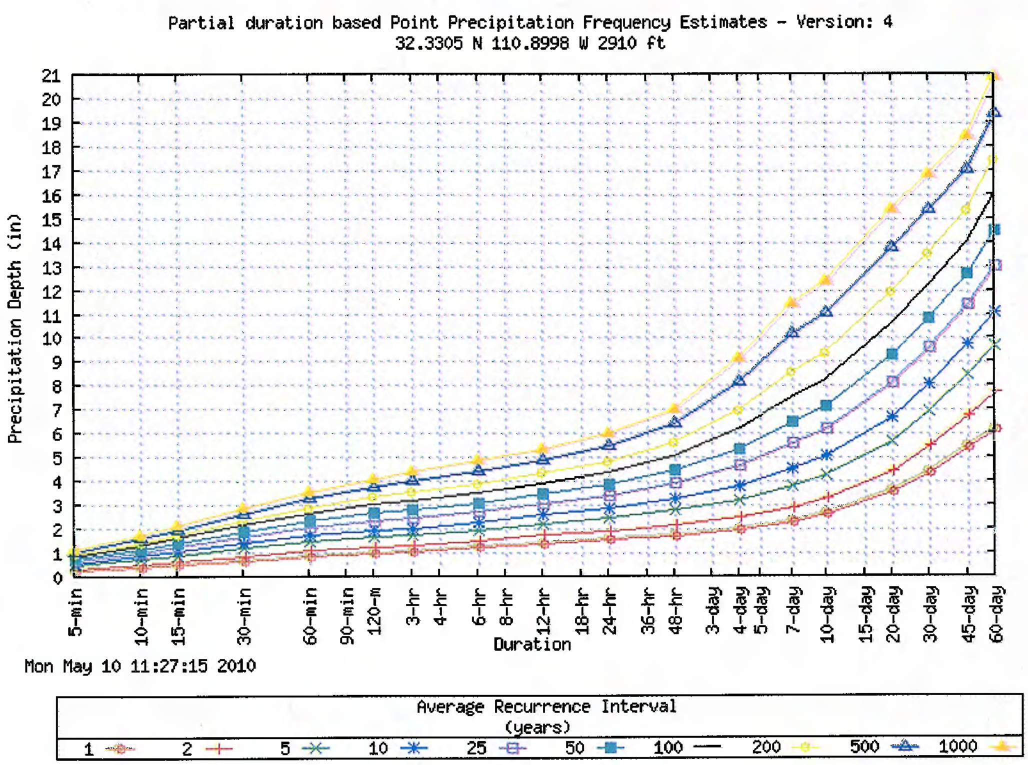
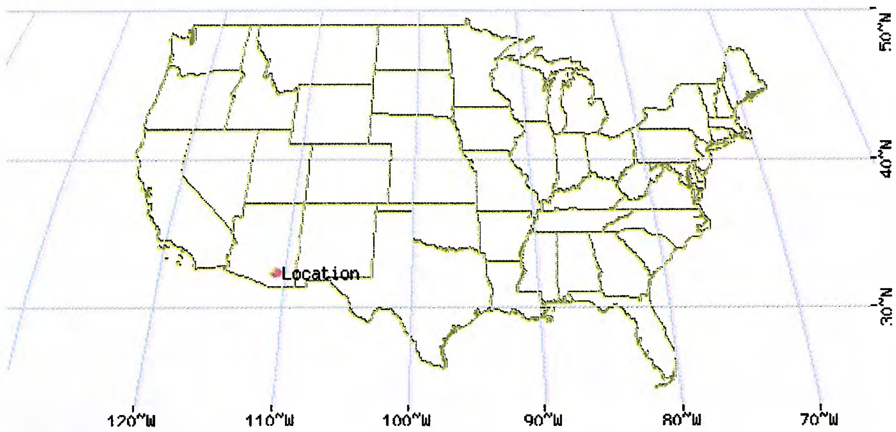
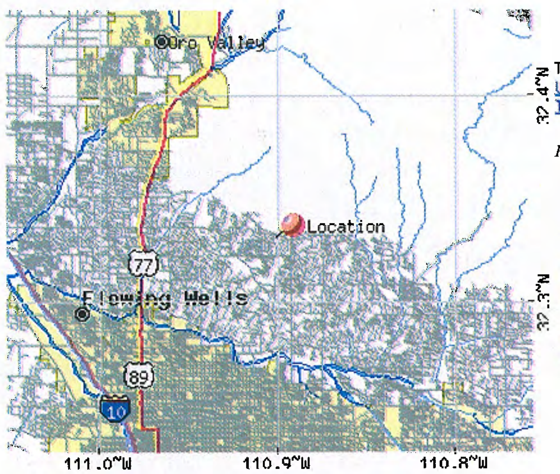
Text version of tables





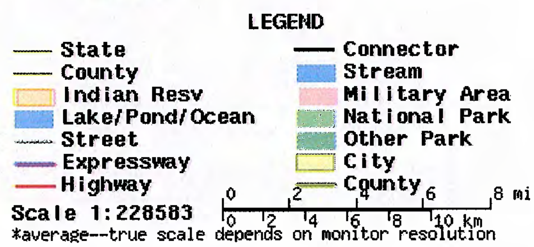
Maps -





These maps were produced using a direct map request from the U.S. Census Bureau Mapping and Cartographic Resources Tiger Map Server.

Please read disclaimer for more information.



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Questions?: HDSC.Questions@noaa.gov

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POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

Arizona 32.3164 N 110.9011 W 2749 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006

Extracted: Mon May 10 2010

Confidence Limits | Seasonality | Location Maps | Other Info. | GIS data | Maps | Docs | Return to State Map

Precipitation Frequency Estimates (inches)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.26	0.40	0.50	0.67	0.83	0.96	1.02	1.17	1.34	1.48	1.66	1.88	2.19	2.46	3.25	3.98	4.90	5.54
2	0.34	0.52	0.64	0.86	1.07	1.22	1.28	1.47	1.68	1.85	2.08	2.36	2.74	3.08	4.08	4.98	6.12	6.92
5	0.45	0.68	0.85	1.14	1.41	1.59	1.65	1.85	2.10	2.32	2.62	2.99	3.50	3.91	5.16	6.21	7.56	8.55
10	0.53	0.81	1.00	1.35	1.67	1.87	1.94	2.16	2.43	2.71	3.06	3.53	4.15	4.62	6.06	7.21	8.67	9.81
25	0.64	0.98	1.21	1.63	2.02	2.26	2.35	2.60	2.90	3.23	3.67	4.32	5.11	5.65	7.35	8.59	10.14	11.48
50	0.72	1.10	1.37	1.84	2.28	2.56	2.67	2.94	3.27	3.66	4.16	4.96	5.91	6.51	8.39	9.68	11.25	12.74
100	0.81	1.23	1.53	2.06	2.54	2.87	3.01	3.31	3.65	4.10	4.66	5.66	6.80	7.45	9.50	10.82	12.37	14.00
200	0.89	1.36	1.69	2.27	2.81	3.19	3.36	3.69	4.04	4.55	5.19	6.41	7.76	8.47	10.68	11.99	13.48	15.26
500	1.01	1.53	1.90	2.56	3.17	3.62	3.85	4.22	4.58	5.18	5.91	7.49	9.17	9.95	12.36	13.61	14.95	16.90
1000	1.09	1.67	2.06	2.78	3.44	3.96	4.24	4.64	5.01	5.67	6.48	8.38	10.35	11.18	13.71	14.88	16.07	18.15

* These precipitation frequency estimates are based on a partial duration series. **ARI** is the Average Recurrence Interval.
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* Upper bound of the 90% confidence interval Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.30	0.46	0.57	0.76	0.94	1.08	1.15	1.32	1.50	1.63	1.82	2.07	2.41	2.71	3.58	4.35	5.32	6.02
2	0.39	0.59	0.73	0.98	1.22	1.38	1.45	1.65	1.88	2.04	2.29	2.59	3.02	3.39	4.48	5.43	6.66	7.55
5	0.51	0.78	0.96	1.29	1.60	1.79	1.86	2.08	2.34	2.56	2.88	3.29	3.85	4.31	5.69	6.78	8.22	9.32
10	0.60	0.91	1.13	1.53	1.89	2.10	2.19	2.43	2.71	2.98	3.36	3.88	4.57	5.09	6.68	7.87	9.44	10.70
25	0.72	1.10	1.36	1.84	2.27	2.53	2.64	2.91	3.23	3.57	4.03	4.75	5.65	6.24	8.11	9.40	11.07	12.56
50	0.82	1.25	1.54	2.08	2.57	2.87	2.99	3.30	3.65	4.04	4.58	5.48	6.57	7.22	9.29	10.62	12.31	13.98
100	0.92	1.40	1.73	2.33	2.89	3.23	3.39	3.71	4.09	4.55	5.17	6.29	7.62	8.32	10.58	11.94	13.62	15.43
200	1.02	1.55	1.92	2.59	3.20	3.59	3.80	4.16	4.56	5.09	5.80	7.18	8.78	9.55	12.00	13.32	14.94	16.91
500	1.16	1.76	2.18	2.94	3.64	4.11	4.40	4.79	5.22	5.86	6.70	8.50	10.53	11.38	14.08	15.32	16.72	18.96
1000	1.27	1.93	2.39	3.22	3.98	4.53	4.89	5.32	5.75	6.48	7.43	9.65	12.06	12.96	15.83	16.93	18.14	20.56

* The **upper** bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are **greater** than.
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Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

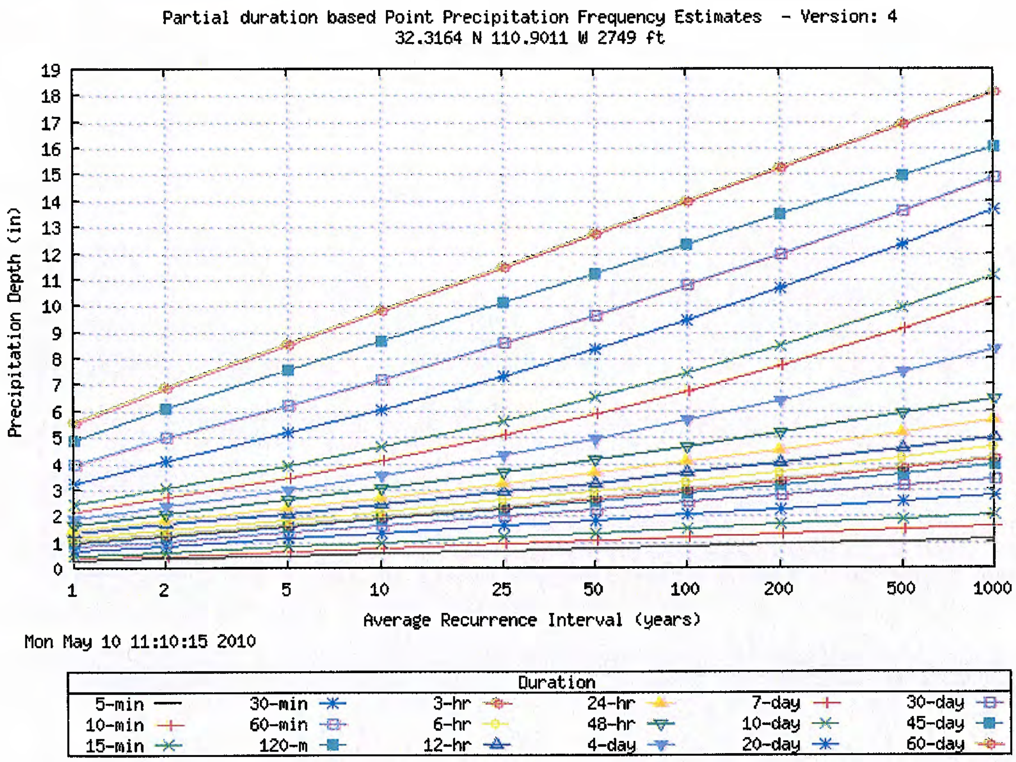
* Lower bound of the 90% confidence interval Precipitation Frequency Estimates (inches)

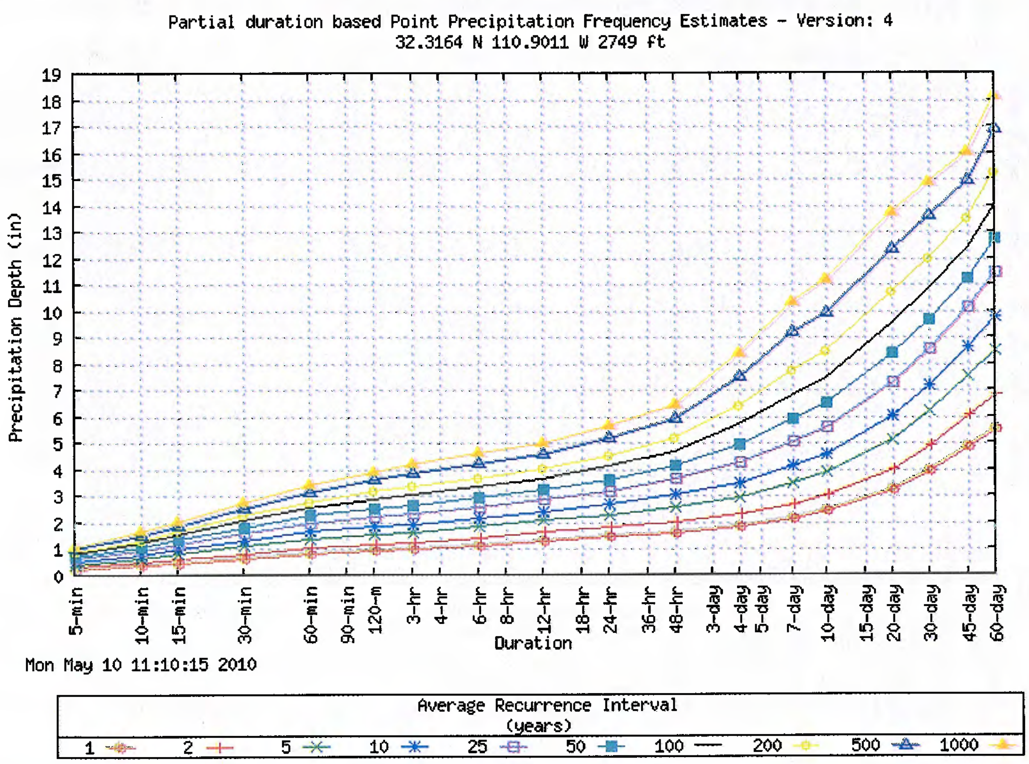
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.23	0.36	0.44	0.59	0.74	0.85	0.91	1.05	1.21	1.35	1.52	1.72	2.00	2.25	2.97	3.66	4.51	5.10
2	0.30	0.46	0.57	0.77	0.95	1.09	1.15	1.31	1.51	1.70	1.91	2.15	2.50	2.80	3.72	4.57	5.64	6.37
5	0.40	0.60	0.75	1.01	1.25	1.41	1.47	1.65	1.87	2.12	2.40	2.73	3.18	3.54	4.70	5.68	6.95	7.87
10	0.47	0.71	0.88	1.18	1.46	1.65	1.72	1.91	2.16	2.46	2.79	3.21	3.75	4.17	5.50	6.58	7.96	9.00
25	0.56	0.84	1.05	1.41	1.75	1.98	2.06	2.27	2.56	2.92	3.32	3.87	4.57	5.04	6.60	7.78	9.26	10.47
50	0.62	0.94	1.17	1.57	1.95	2.21	2.31	2.54	2.85	3.27	3.72	4.40	5.22	5.75	7.45	8.70	10.21	11.56
100	0.68	1.04	1.29	1.74	2.15	2.45	2.55	2.81	3.13	3.62	4.12	4.95	5.92	6.49	8.34	9.62	11.15	12.63
200	0.74	1.13	1.40	1.89	2.34	2.67	2.80	3.08	3.42	3.98	4.53	5.51	6.65	7.26	9.25	10.55	12.04	13.65
500	0.82	1.24	1.54	2.08	2.57	2.95	3.12	3.42	3.78	4.44	5.06	6.27	7.66	8.30	10.45	11.74	13.19	14.92
1000	0.87	1.32	1.64	2.21	2.74	3.16	3.35	3.69	4.05	4.80	5.46	6.87	8.46	9.13	11.37	12.63	14.02	15.84

* The **lower** bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are **less** than.
** These precipitation frequency estimates are based on a partial duration maxima series. **ARI** is the Average Recurrence Interval.

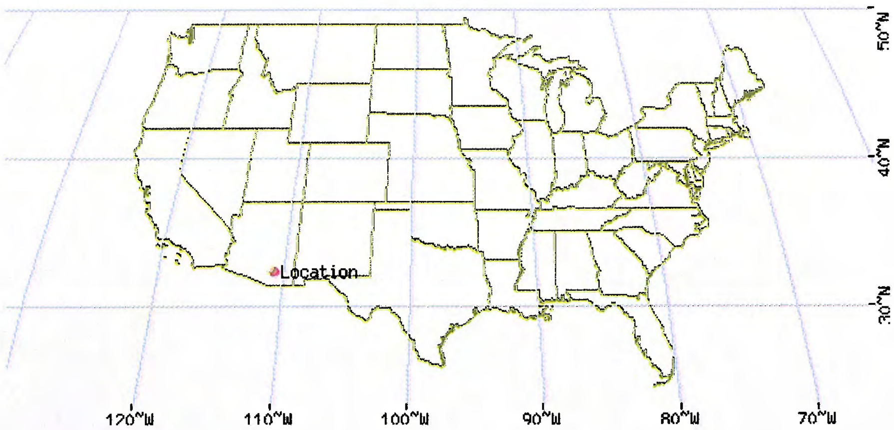
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

Text version of tables



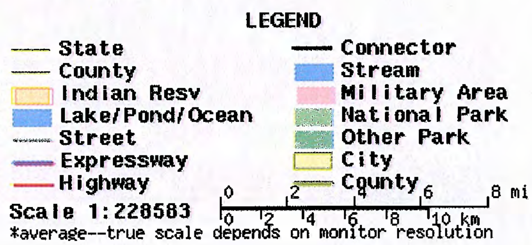


Maps -



These maps were produced using a direct map request from the [U.S. Census Bureau Mapping and Cartographic Resources Tiger Map Server.]

Please read disclaimer for more information.



Other Maps/Photographs -

View USGS digital orthophoto quadrangle (DOQ) covering this location from TerraServer; **USGS Aerial Photograph** may also be available from this site. A DOQ is a computer-generated image of an aerial photograph in which image displacement caused by terrain relief and camera tilts has been removed. It combines the image characteristics of a photograph with the geometric qualities of a map. Visit the USGS for more information.

Watershed/Stream Flow Information -

Find the Watershed for this location using the U.S. Environmental Protection Agency's site.

Climate Data Sources -

Precipitation frequency results are based on data from a variety of sources, but largely NCDC. The following links provide general information about observing sites in the area, regardless of if their data was used in this study. For detailed information about the stations used in this study, please refer to NOAA Atlas 14 Document.

Using the **National Climatic Data Center's (NCDC)** station search engine, locate other climate stations within:

+/-30 minutes ...OR... +/-1 degree of this location (32.3164/-110.9011). Digital ASCII data can be obtained directly from **NCDC**.

Find Natural Resources Conservation Service (NRCS) SNOTEL (SNOwpack TELemetry) stations by visiting the **Western Regional Climate Center's state-specific SNOTEL station maps.**

Hydrometeorological Design Studies Center
DOC/NOAA/National Weather Service
1325 East-West Highway
Silver Spring, MD 20910
(301) 713-1669
Questions?: HDSC.Questions@noaa.gov

Disclaimer

6

POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

Arizona 32.2999 N 110.9061 W 2598 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006

Extracted: Mon May 10 2010

Precipitation Frequency Estimates (inches)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.26	0.39	0.48	0.65	0.81	0.93	0.98	1.13	1.29	1.43	1.59	1.80	2.08	2.34	3.06	3.72	4.56	5.13
2	0.33	0.50	0.62	0.84	1.04	1.19	1.25	1.42	1.61	1.79	2.00	2.26	2.60	2.92	3.83	4.65	5.69	6.41
5	0.44	0.66	0.82	1.11	1.37	1.54	1.60	1.78	2.01	2.24	2.51	2.86	3.31	3.70	4.84	5.78	7.01	7.90
10	0.52	0.79	0.97	1.31	1.62	1.82	1.88	2.09	2.33	2.61	2.93	3.37	3.92	4.37	5.68	6.71	8.03	9.05
25	0.62	0.95	1.18	1.59	1.96	2.20	2.28	2.51	2.78	3.12	3.51	4.11	4.82	5.33	6.87	7.97	9.37	10.57
50	0.71	1.07	1.33	1.79	2.22	2.50	2.59	2.84	3.13	3.53	3.97	4.71	5.57	6.14	7.83	8.97	10.38	11.71
100	0.79	1.20	1.49	2.01	2.48	2.80	2.92	3.20	3.50	3.95	4.45	5.37	6.40	7.01	8.86	10.01	11.38	12.85
200	0.87	1.33	1.65	2.22	2.75	3.11	3.27	3.56	3.88	4.38	4.95	6.08	7.29	7.96	9.95	11.08	12.38	13.97
500	0.99	1.50	1.86	2.51	3.10	3.53	3.75	4.08	4.39	4.99	5.63	7.09	8.60	9.34	11.49	12.55	13.67	15.44
1000	1.07	1.63	2.02	2.73	3.37	3.86	4.13	4.49	4.80	5.46	6.17	7.93	9.70	10.48	12.74	13.70	14.65	16.53

* These precipitation frequency estimates are based on a partial duration series. **ARI** is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting forces estimates near zero to appear as zero.

*** Upper bound of the 90% confidence interval Precipitation Frequency Estimates (inches)**

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.29	0.44	0.55	0.74	0.92	1.05	1.11	1.28	1.44	1.57	1.75	1.98	2.29	2.57	3.35	4.05	4.94	5.57
2	0.38	0.57	0.71	0.96	1.18	1.34	1.41	1.60	1.80	1.97	2.19	2.47	2.87	3.21	4.20	5.06	6.18	6.97
5	0.49	0.75	0.93	1.26	1.55	1.74	1.80	2.01	2.25	2.46	2.75	3.13	3.64	4.07	5.33	6.30	7.61	8.59
10	0.58	0.89	1.10	1.48	1.83	2.04	2.12	2.34	2.60	2.87	3.21	3.69	4.31	4.81	6.25	7.30	8.71	9.85
25	0.70	1.07	1.33	1.79	2.21	2.46	2.56	2.81	3.10	3.44	3.84	4.51	5.32	5.88	7.57	8.70	10.20	11.54
50	0.80	1.21	1.50	2.03	2.51	2.79	2.91	3.18	3.50	3.88	4.37	5.20	6.18	6.79	8.66	9.81	11.31	12.82
100	0.90	1.36	1.69	2.28	2.82	3.14	3.29	3.59	3.92	4.37	4.92	5.96	7.15	7.82	9.86	11.01	12.48	14.13
200	1.00	1.51	1.88	2.53	3.13	3.50	3.69	4.01	4.37	4.89	5.52	6.80	8.23	8.96	11.16	12.27	13.66	15.46
500	1.13	1.72	2.14	2.88	3.56	4.00	4.28	4.62	4.99	5.63	6.36	8.04	9.85	10.65	13.08	14.09	15.23	17.27
1000	1.24	1.89	2.34	3.15	3.90	4.42	4.76	5.14	5.51	6.22	7.05	9.12	11.27	12.12	14.69	15.54	16.46	18.68

* The **upper** bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are **greater** than.
** These precipitation frequency estimates are based on a partial duration series. **ARI** is the Average Recurrence Interval.

Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

*** Lower bound of the 90% confidence interval Precipitation Frequency Estimates (inches)**

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.23	0.35	0.43	0.58	0.72	0.83	0.88	1.01	1.16	1.31	1.46	1.65	1.90	2.13	2.80	3.42	4.20	4.73
2	0.29	0.45	0.55	0.75	0.92	1.06	1.12	1.27	1.45	1.64	1.83	2.07	2.38	2.67	3.50	4.27	5.24	5.90
5	0.39	0.59	0.73	0.98	1.21	1.37	1.43	1.59	1.80	2.05	2.30	2.61	3.02	3.37	4.41	5.30	6.45	7.28
10	0.45	0.69	0.85	1.15	1.42	1.60	1.67	1.85	2.08	2.38	2.67	3.07	3.56	3.96	5.16	6.13	7.38	8.32
25	0.54	0.82	1.02	1.37	1.70	1.92	2.00	2.19	2.45	2.82	3.18	3.70	4.33	4.78	6.18	7.24	8.57	9.67
50	0.60	0.92	1.14	1.53	1.90	2.15	2.24	2.45	2.73	3.16	3.56	4.20	4.94	5.44	6.97	8.08	9.43	10.66
100	0.67	1.01	1.26	1.69	2.10	2.38	2.48	2.71	3.00	3.50	3.95	4.72	5.60	6.13	7.79	8.92	10.28	11.63
200	0.73	1.10	1.37	1.84	2.28	2.60	2.72	2.97	3.27	3.84	4.33	5.25	6.28	6.85	8.63	9.77	11.08	12.55
500	0.80	1.22	1.51	2.03	2.51	2.88	3.03	3.31	3.62	4.29	4.83	5.96	7.22	7.82	9.74	10.86	12.09	13.69
1000	0.85	1.30	1.61	2.16	2.68	3.08	3.25	3.57	3.88	4.63	5.21	6.54	7.96	8.59	10.59	11.66	12.82	14.50

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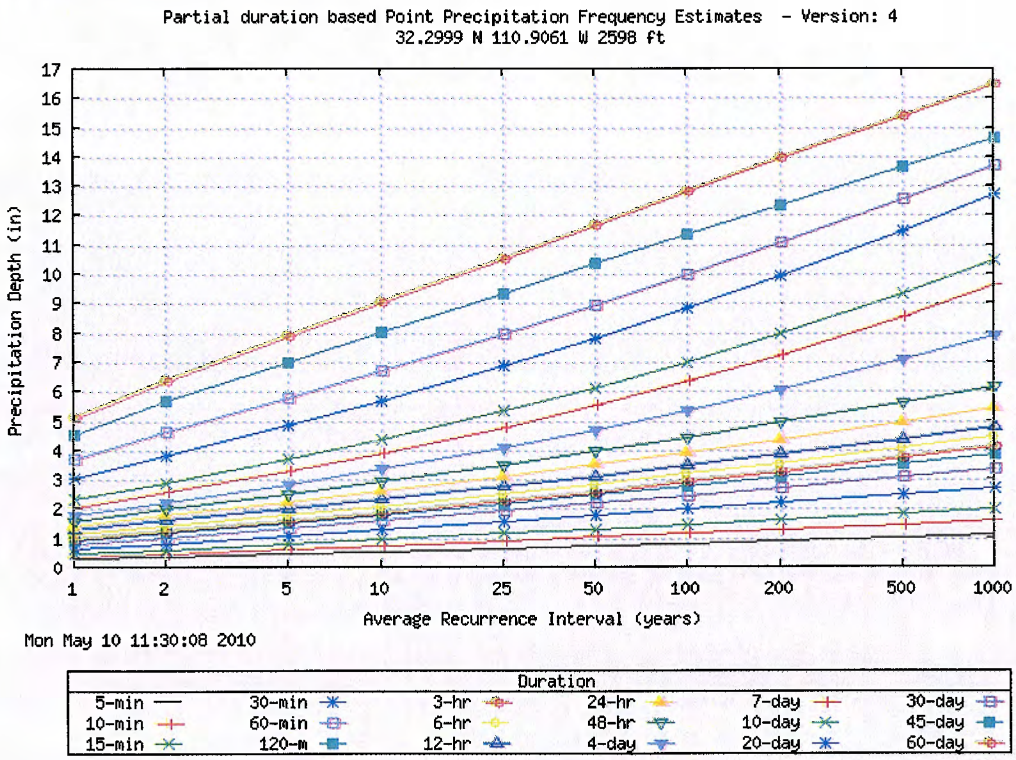
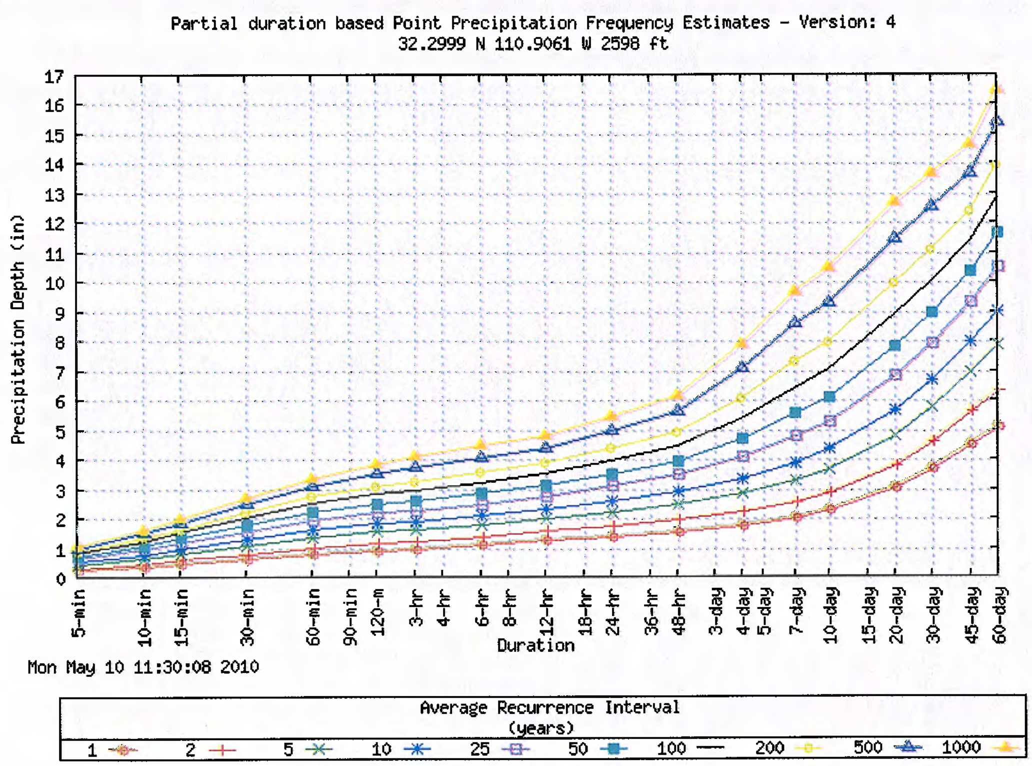
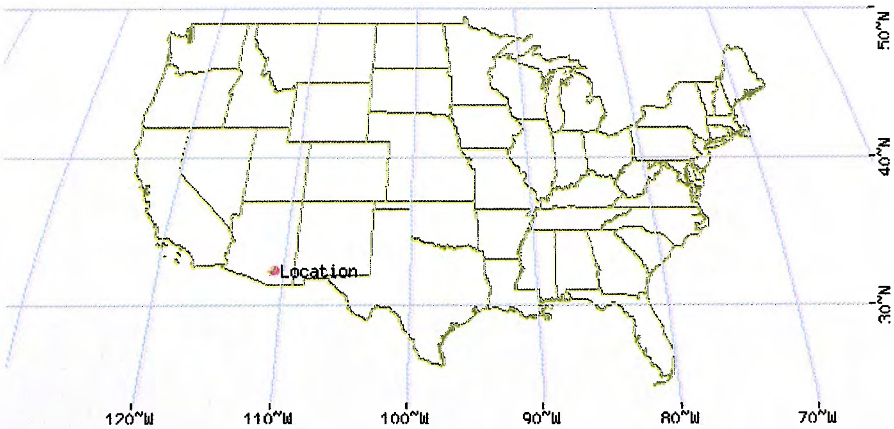
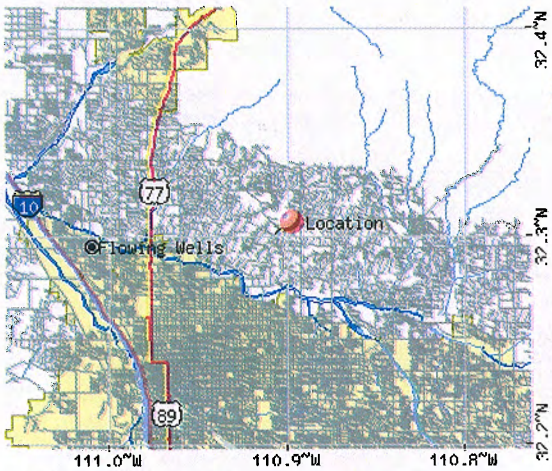
Text version of tables





Maps -





These maps were produced using a direct map request from the [U.S. Census Bureau Mapping and Cartographic Resources Tiger Map Server.]

Please read [disclaimer] for more information.

LEGEND

State	Connector
County	Stream
Indian Resv	Military Area
Lake/Pond/Ocean	National Park
Street	Other Park
Expressway	City
Highway	County

Scale 1:228583 0 2 4 6 8 mi / 0 2 4 6 8 10 km

*average--true scale depends on monitor resolution

Other Maps/Photographs -

View USGS digital orthophoto quadrangle (DOQ) covering this location from TerraServer; **USGS Aerial Photograph** may also be available from this site. A DOQ is a computer-generated image of an aerial photograph in which image displacement caused by terrain relief and camera tilts has been removed. It combines the image characteristics of a photograph with the geometric qualities of a map. Visit the USGS for more information.

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Hydrometeorological Design Studies Center
DOC/NOAA/National Weather Service
1325 East-West Highway
Silver Spring, MD 20910
(301) 713-1669
Questions?: HDSC.Questions@noaa.gov

Disclaimer

EXISTING-CONDITIONS HYDROLOGIC MODELING FOR THE TUCSON STORMWATER MANAGEMENT STUDY, PHASE II, STORMWATER MASTER PLAN
(Task 7, Subtask 7A.3)

Prepared for:

CITY OF TUCSON
Department of Transportation
County/City Public Works Building
201 North Stone Avenue
Tucson, Arizona 85701

Prepared By:

SIMONS, LI & ASSOCIATES, INC.
P.O. Box 2712
Tucson, Arizona 85702

In Association With:

Camp Dresser & McKee
Lewis & Roca
Rillito Consulting Group
SWCA, Inc.

Registered Professional Engineer (Civil)
CERTIFICATE NO.
25331
LARRY K. ROBERTS
Date Signed 11-20-95
ARIZONA U.S.A.
Larry K. Roberts

December 17, 1993
(Revised November, 1995)

Registered Professional Engineer (Civil)
CERTIFICATE NO.
12481
MICHAEL E. ZELLER
Date Signed 11-20-95
ARIZONA U.S.A.
Michael E. Zeller

TABLE 2.4
TEMPORAL DISTRIBUTION OF A DESIGN 3-HOUR THUNDERSTORM

Minutes	Factor*	Minutes	Factor*	Minutes	Factor*	Minutes	Factor*	Minutes	Factor*	Minutes	Factor*
1	0.01897	31	0.01046	61	0.00412	91	0.00218	121	0.00135	151	0.00092
2	0.02116	32	0.01006	62	0.00401	92	0.00215	122	0.00133	152	0.00091
3	0.02377	33	0.00968	63	0.00392	93	0.00211	123	0.00131	153	0.00090
4	0.02688	34	0.00932	64	0.00382	94	0.00207	124	0.00130	154	0.00089
5	0.03065	35	0.00898	65	0.00373	95	0.00203	125	0.00128	155	0.00088
6	0.03527	36	0.00866	66	0.00365	96	0.00200	126	0.00126	156	0.00087
7	0.04103	37	0.00835	67	0.00356	97	0.00196	127	0.00124	157	0.00086
8	0.04831	38	0.00807	68	0.00348	98	0.00193	128	0.00123	158	0.00085
9	0.05772	39	0.00779	69	0.00340	99	0.00190	129	0.00121	159	0.00084
10	0.06349	40	0.00753	70	0.00333	100	0.00187	130	0.00119	160	0.00083
11	0.05270	41	0.00729	71	0.00326	101	0.00184	131	0.00118	161	0.00082
12	0.04444	42	0.00705	72	0.00319	102	0.00181	132	0.00116	162	0.00081
13	0.03799	43	0.00683	73	0.00312	103	0.00178	133	0.00115	163	0.00080
14	0.03284	44	0.00661	74	0.00305	104	0.00175	134	0.00113	164	0.00079
15	0.02867	45	0.00641	75	0.00299	105	0.00172	135	0.00112	165	0.00078
16	0.02525	46	0.00622	76	0.00292	106	0.00169	136	0.00110	166	0.00077
17	0.02241	47	0.00603	77	0.00286	107	0.00167	137	0.00109	167	0.00077
18	0.02002	48	0.00585	78	0.00281	108	0.00164	138	0.00108	168	0.00076
19	0.01799	49	0.00568	79	0.00275	109	0.00161	139	0.00106	169	0.00075
20	0.01709	50	0.00552	80	0.00269	110	0.00159	140	0.00105	170	0.00074
21	0.01626	51	0.00537	81	0.00264	111	0.00157	141	0.00104	171	0.00073
22	0.01549	52	0.00522	82	0.00259	112	0.00154	142	0.00102	172	0.00073
23	0.01477	53	0.00507	83	0.00254	113	0.00152	143	0.00101	173	0.00072
24	0.01409	54	0.00494	84	0.00249	114	0.00150	144	0.00100	174	0.00071
25	0.01347	55	0.00480	85	0.00244	115	0.00147	145	0.00099	175	0.00070
26	0.01288	56	0.00468	86	0.00240	116	0.00145	146	0.00097	176	0.00070
27	0.01233	57	0.00456	87	0.00235	117	0.00143	147	0.00096	177	0.00069
28	0.01182	58	0.00444	88	0.00231	118	0.00141	148	0.00095	178	0.00068
29	0.01134	59	0.00433	89	0.00227	119	0.00139	149	0.00094	179	0.00068
30	0.01088	60	0.00422	90	0.00222	120	0.00137	150	0.00093	180	0.00067

*Note: To determine incremental amount, multiply factor by the *one-hour* rainfall depth.

October 6, 1993

TSMS, PHASE II, STORMWATER MASTER PLAN
TECHNICAL MEMORANDUM (TM) 7.2.6

Registered Professional Engineer (Civil)
Certificate No. 12481
MICHAEL E. ZELLER
10-6-93
Date Signed
ARIZONA U.S.A.

Michael E. Zeller

TO: SLA Working File, Task 7 (File No. COT-37.7.4)

FROM: Michael E. Zeller, P.E., P.H. Z

REVIEWED BY: Larry K. Roberts, P.E. LKR

RE: TEMPORAL DISTRIBUTION FOR A 3-HOUR THUNDERSTORM

An assessment was conducted to ascertain the most appropriate temporal distribution for use in conjunction with the application of a 3-hour thunderstorm on the small urban watersheds (i.e., generally less than 10 square miles in size) located within the TSMS, Phase II, Stormwater Master Plan Study Area; since these are the watersheds which have their maximum peak discharges occur as the result of short-duration, convective thunderstorms.

The "Rainfall Intensity Relationship" found in the City of Tucson *Drainage Standards Manual* (1989) was used to first define, on a per-minute basis, the incremental change in rainfall depth for each Return Interval (RI) design thunderstorm event. This relationship is:

$$i_{RI} = \frac{4P_{1,RI}}{1+0.05T_{c,RI}} \qquad (1)$$

Where,

i_{RI} = Return-Interval rainfall intensity, in inches per hour;
$P_{1,RI}$ = One-Hour Return-Interval rainfall depth, in inches; and,
$T_{c,RI}$ = Return-Interval time of concentration, in minutes.

Recalling that $60(P_{t,RI}) = i_{t,RI}(t)$, algebraic manipulation yields:

$$P_{t,RI} = \frac{P_{1,RI}(t)}{15 + 0.75(t)} \qquad (2)$$

Where,

$P_{t,RI}$ = Return-Interval accumulative rainfall depth at time t, in inches; and,
t = Time, in minutes (generic substitute for T_c).

The per-minute incremental change in rainfall depth is then determined by merely subtracting $P_{t,RI}$ from $P_{t+1,RI}$ (Note: $P_{t+1,RI}$ = rainfall depth at the next incremental minute).

Once the per-minute incremental change in the rainfall is determined, the storm pattern of these one-minute increments can be assigned according to an appropriate temporal distribution for the TSMS, Phase II, Study Area. SLA has developed a temporal distribution for 3-hour thunderstorms which is adapted from a 1-hour temporal distribution developed from the extensive data collected from the nearby Walnut Gulch Experimental Watershed, which was established and is monitored by the Agricultural Research Service. A technical paper by Herbert B. Osborn, titled "Storm-Cell Properties Influencing Runoff from Small Watersheds" (1984), provides the following temporal distribution for a 1-hour thunderstorm event:

Time (minutes)	Rainfall (rank order)
from 0 to 6	2
from 6 to 12	1
from 12 to 18	2
from 18 to 24	3
from 24 to 30	4
from 30 to 36	5
from 36 to 42	6
from 42 to 48	6
from 48 to 54	7
from 54 to 60	7

The preceding temporal distribution was then adapted for use as a 3-hour thunderstorm by adding on a 2-hour "tail" in accordance with the per-minute incremental change in rainfall depth computed using Equation (1) above.

DIMENSIONLESS FACTORS FOR ONE-MINUTE INCREMENTS OF 3-HOUR THUNDERSTORM

Time	Factor	Time	Factor	Time	Factor	Time	Factor	Time	Factor	Time	Factor
1	0.01897	31	0.01046	61	0.00412	91	0.00218	121	0.00135	151	0.00092
2	0.02116	32	0.01006	62	0.00401	92	0.00215	122	0.00133	152	0.00091
3	0.02377	33	0.00968	63	0.00392	93	0.00211	123	0.00131	153	0.00090
4	0.02688	34	0.00932	64	0.00382	94	0.00207	124	0.00130	154	0.00089
5	0.03065	35	0.00898	65	0.00373	95	0.00203	125	0.00128	155	0.00088
6	0.03527	36	0.00866	66	0.00365	96	0.00200	126	0.00126	156	0.00087
7	0.04103	37	0.00835	67	0.00356	97	0.00196	127	0.00124	157	0.00086
8	0.04831	38	0.00807	68	0.00348	98	0.00193	128	0.00123	158	0.00085
9	0.05772	39	0.00779	69	0.00340	99	0.00190	129	0.00121	159	0.00084
10	0.06349	40	0.00753	70	0.00333	100	0.00187	130	0.00119	160	0.00083
11	0.05270	41	0.00729	71	0.00326	101	0.00184	131	0.00118	161	0.00082
12	0.04444	42	0.00705	72	0.00319	102	0.00181	132	0.00116	162	0.00081
13	0.03799	43	0.00683	73	0.00312	103	0.00178	133	0.00115	163	0.00080
14	0.03284	44	0.00661	74	0.00305	104	0.00175	134	0.00113	164	0.00079
15	0.02867	45	0.00641	75	0.00299	105	0.00172	135	0.00112	165	0.00078
16	0.02525	46	0.00622	76	0.00292	106	0.00169	136	0.00110	166	0.00077
17	0.02241	47	0.00603	77	0.00286	107	0.00167	137	0.00109	167	0.00077
18	0.02002	48	0.00585	78	0.00281	108	0.00164	138	0.00108	168	0.00076
19	0.01799	49	0.00568	79	0.00275	109	0.00161	139	0.00106	169	0.00075
20	0.01709	50	0.00552	80	0.00269	110	0.00159	140	0.00105	170	0.00074
21	0.01626	51	0.00537	81	0.00264	111	0.00157	141	0.00104	171	0.00073
22	0.01549	52	0.00522	82	0.00259	112	0.00154	142	0.00102	172	0.00073
23	0.01477	53	0.00507	83	0.00254	113	0.00152	143	0.00101	173	0.00072
24	0.01409	54	0.00494	84	0.00249	114	0.00150	144	0.00100	174	0.00071
25	0.01347	55	0.00480	85	0.00244	115	0.00147	145	0.00099	175	0.00070
26	0.01288	56	0.00468	86	0.00240	116	0.00145	146	0.00097	176	0.00070
27	0.01233	57	0.00456	87	0.00235	117	0.00143	147	0.00096	177	0.00069
28	0.01182	58	0.00444	88	0.00231	118	0.00141	148	0.00095	178	0.00068
29	0.01134	59	0.00433	89	0.00227	119	0.00139	149	0.00094	179	0.00068
30	0.01088	60	0.00422	90	0.00222	120	0.00137	150	0.00093	180	0.00067

C:\WPWIN60\AZCOT.37\TASK.7\TM7-2-6.ATT

MEZ: 10/6/93

February 10, 1993

To: Mike Zeller, Principal
Simon, Li Associates

Re: Background information for temporal rainfall distribution described by Dr. H. B. Osborn in a 1993 professional paper.

The 30-min and 60-min point temporal rainfall distributions for thunderstorms in the Southwest shown in Table 1 of paper entitled "Storm-cell properties influencing runoff from small watersheds" (Osborn, 1983) were based on 25 years of records from a dense network of weighing-type recording raingages located on the 58-sq-mile USDA, ARS Walnut Gulch Experimental Watershed in southeastern Arizona. The "front-loaded" distribution is the most common measured on the Walnut Gulch Experimmental watershed in southeastern Arizona. I, and other professionals in our office, use this distribution for estimating flood peaks and volumes for recurrence intervals up to 100 years for small watersheds (up to 30 square miles) in the southwest.

Because of limitations in recording very high intensities with weighing-type raingages, and because of extreme rainfall variability within relatively small areas (less than the approximate one-mile spacing of the network on Walnut Gulch), 3 minutes is about the minimum duration for estimating thunderstorm rainfall intensities for runoff models. For models which assume durations shorter than 3 minutes, values can be interpolated from the "Osborn" model with 3-min durations, making sure that the maximum intensities and total volume are maintained.

Both the 30-min and 60-min models were developed for varying recurrence intervals for point rainfall up to 100 years (Table 1). On the Walnut Gulch Watershed high intensity rains of small areal extent lasting about 30 minutes occur quite commonly at some point on the watershed, so the assumption that a 30-min, 100 year rain at a point within a small watershed will produce a 100-year runoff event is quite good. The actual event may last for say 25 minutes, or 35 minutes, but the peaks and volumes will compare favorably with the output from the model storm.

Osborn, H. B. Storm-cell properties influencing runoff from small watersheds. In, Proc. Transportation Research Board 922, NAS, Wash., D.C., pp 24-32, 1983.

Sincerely,

Hubert B. Osborn

Herbert B. Osborn, PE, PhD

Registered Professional Engineer (Civil) 5712 HERBERT BRADLEY OSBORN State of Arizona U.S.A. 2/15/93

Herbert B. Osborn

Transportation Research Record 922
Transportation Res. Board
National Research Council
NAS, wash. DC, 1984,
pp 24-32.

Storm-Cell Properties Influencing Runoff from ıall Watersheds

HERBERT B. OSBORN

In much of the western United States, runoff from small watersheds is dominated by occasional short-duration, extremely variable, high-intensity thunderstorm rainfall. These runoff-producing events are important in highway-culvert and small-bridge design, erosion and sedimentation studies, evaluations of range management and renovation programs, and studies on urbanizing watersheds. A kinematic-cascade model (KINEROS) was adapted in this study for use on a small rangeland watershed to determine the influences of thunderstorm rainfall variability in time and space on peak discharge and runoff volume. Model parameters were developed with existing rainfall and runoff data, and the hydrographs were generated from simulated rainfall distributions. The study showed that for small rangeland watersheds (less than 1 mile^2), spatial and temporal rainfall distributions exert approximately equal influences on peak discharge and the influences tend to be additive. Further studies on the interrelationship between rainfall variability and watershed size are indicated, because where the storm is centered becomes increasingly important with increasing watershed size.

In much of the western United States, and particularly in the Southwest, runoff from small watersheds is dominated by occasional short-duration, extremely variable, high-intensity thunderstorm rains (1,2). These runoff-producing events are important in highway-culvert and small-bridge design, erosion and sedimentation studies, evaluations of range management and renovation programs, and studies on urbanizing watersheds, but expected peak discharges and runoff volumes for such events are difficult to estimate accurately. In this paper, a kinematic-cascade model (KINEROS) was adapted for use on a small (560-acre) rangeland subwatershed to investigate the influence of thunderstorm rainfall variability in time and space on peak discharge and runoff volume. The model parameters were developed with existing rainfall and runoff data, and hydrographs were generated from simulated rainfall distributions. The influence of temporal and spatial variability was examined through comparison of the generated peak discharges and runoff volumes.

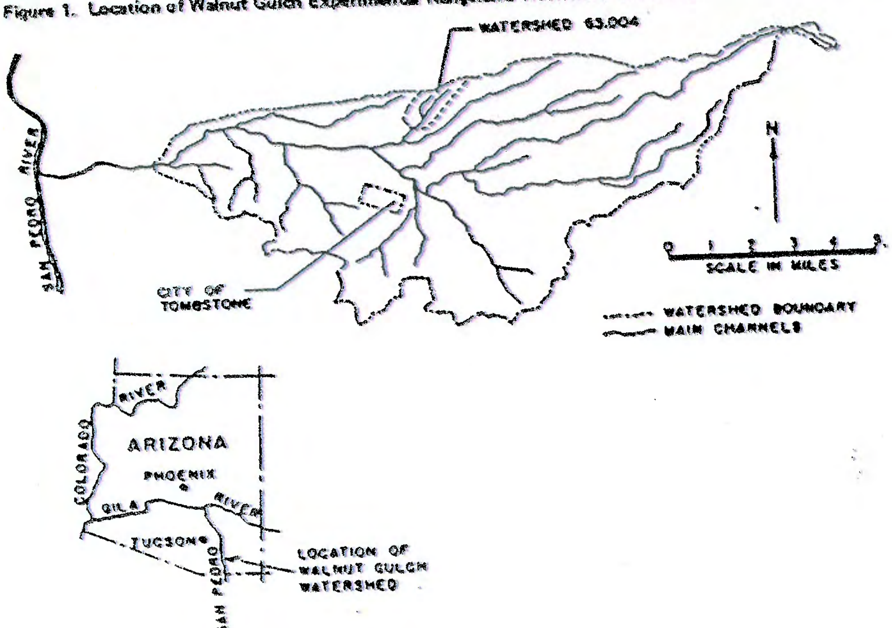
WATERSHED DESCRIPTION

The Walnut Gulch Experimental Rangeland Watershed, operated by the Agricultural Research Service (ARS) of the U.S. Department of Agriculture (USDA), is located near Tombstone in southeastern Arizona (Figure 1). The lower two-thirds of the 58-mile^2 watershed is primarily brush covered (whitethorn, creosote bush, tar bush, and burroweed); the upper one-third is primarily grass covered (grama grasses). Tombstone is centrally located on the watershed. The 560-acre study subwatershed (63.004) lies north of Tombstone on the Walnut Gulch watershed boundary (Figure 1). Slopes of the study subwatershed vary up to 14 percent; the average is 9 percent. The subwatershed is drained by well-defined sand-bottomed channels in the lower portion and broad swales with poorly defined shallow meandering channels in the upper portion. Headcuts separate the sand-bottomed channels and swales on the two major branches of the drainage system. The subwatershed is brush covered, and the soils are primarily gravelly and silty loams.

RAINFALL-RUNOFF MODELING

Many different mathematical models have been used to estimate drainage runoff peaks or volumes or both for small watersheds (3,4), but few models are sensitive enough to separate the influences on runoff of rainfall variability and critical watershed characteristics. In some cases, such definition is not needed, and the model can be quite simple (the ra-

Figure 1. Location of Walnut Gulch Experimental Rangeland Watershed and study subwatershed 63.004.



tional formula, for example). Nevertheless, to identify the significant thunderstorm-cell rainfall properties that influence runoff, critical watershed haracteristics must be modeled so that their effect n be eliminated when rainfall is varied. It must : possible to isolate the watershed influences on runoff so that variations in runoff can be attributed directly to the rainfall input to the system. In the past, efforts to model the influences of rainfall variability on watershed runoff have been handicapped by the lack of a sensitive (and uncomplicated) rainfall-runoff model.

Several rainfall-runoff models were suggested for this study, and from these a kinematic-cascade model (KINEROS) (5-8) was chosen because it was versatile and sensitive to both rainfall and watershed characteristics.

Model Description

KINEROS is a well-tested nonlinear, deterministic, distributed-parameter model (6). Inputs are (a) the hyetograph of actual or simulated rainfall, (b) the watershed surface geometry and topography, (c) parameters for surface roughness, (d) infiltration parameters, and (e) the channel networks, including slope, cross-sectional area, cross-sectional shape, and hydraulic roughness. The model also includes a subroutine for erosion, which was not used in this study. A more detailed description of the model is given elsewhere (8). For this study, a subroutine was added to account for channel abstractions.

The watershed was segmented into a series of 21 representative rectangular planes and 9 trapezoidal channel segments (Figures 2 and 3). Because all planes of the watershed were pervious, with relatively homogeneous soils and cover, the same infiltration and roughness characteristics were used throughout. Surface geometries were determined separately for each plane and channel reach (Figure 3). The numbers indicate the order in which each plane was entered into the program. Runoff from the uppermost plane along a slope can be calculated independently of that for all other planes. Because the runoff from the upper plane provides the upper boundary condition for lower planes, sequential calculation is required for complex slopes such as planes 27 and 28 in Figure 3. Flows were routed through each channel segment by using the kinematic approximation to the equations of unsteady, gradually varied flow.

Variables such as infiltration and surface roughness were adjusted based on comparisons of hydrograph simulations and actual runoff hydrographs. Particular attention was paid to surface rock cover (erosion pavement) and roughness, the initial water-holding capacity of the soils, and initial and final infiltration rates. Once the model had been adjusted, it was used to generate a series of hydrographs from simulated rainfall inputs.

Rainfall Input

The storm-cell properties that would be expected to influence runoff are the rainfall amount and duration and the rainfall variability in time and space. These properties were examined through a series of selected inputs.

Several investigators (2,9) reported strong correlations for small watersheds between peak discharge and maximum rainfall for 30 min. On the other hand, 60-min rainfall is a more common unit used in modeling of rainfall and runoff, so both 30- and 60-min rainfall durations were used in the simulations. Also, commonly used 2-, 5-, 10-, and 100-yr expected rainfall amounts (0.9, 1.2, 1.5, and 2.3 in. for 30-min durations, and 1.2, 1.5, 1.9, and 2.9 in. for 60-min durations) were selected (1).

Temporal and spatial rainfall variabilities were considered next. Maximum intensities were concentrated early and late in the event given for each of the expected 30- and 60-min amounts (Table 1). Early events are characterized by concentration of two-thirds of the rainfall in the first one-third of the storm; in late events, two-thirds of the rainfall was concentrated in the last one-third of the

these values would be appropriate for Tucson Walnut Gulch are higher.
HBO

Figure 2. Detailed map of subwatershed 63.004, Walnut Gulch.

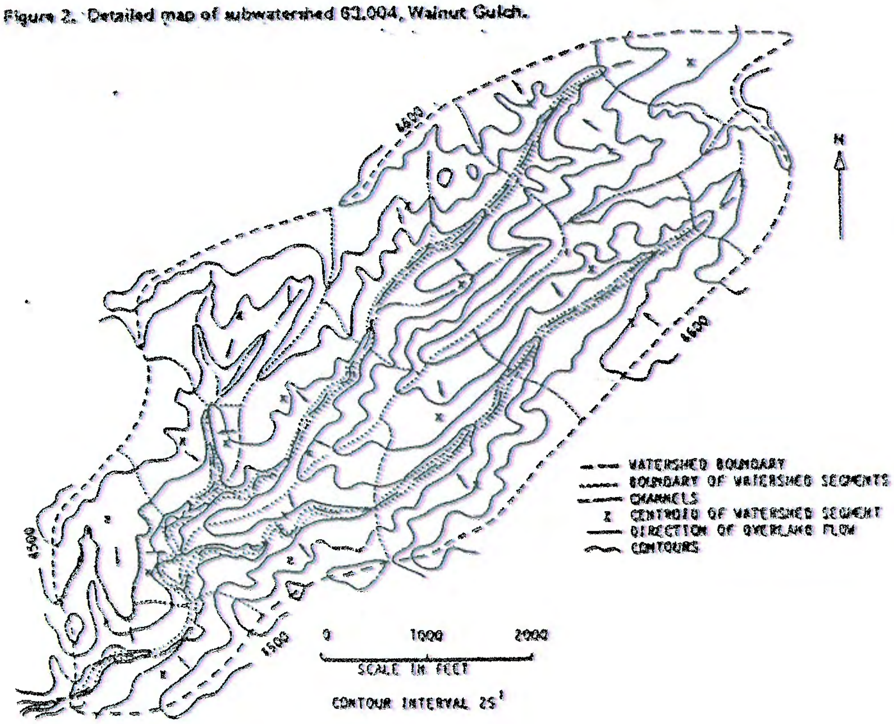


Figure 3. Schematic representation of planes and channels of subwatershed 63.004 for KINEROS.

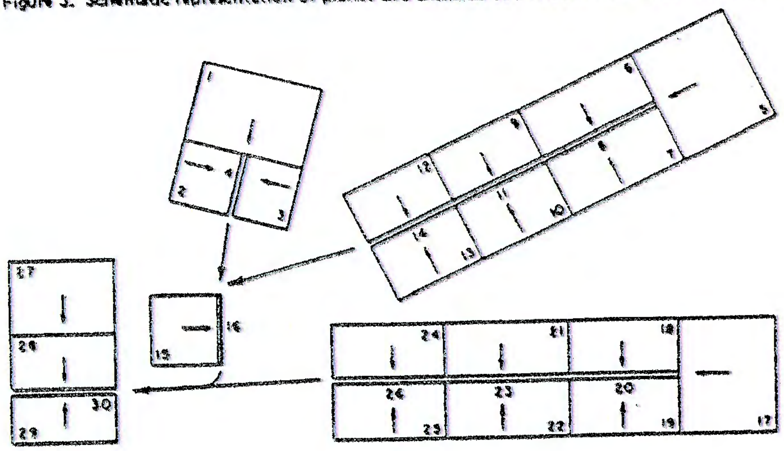
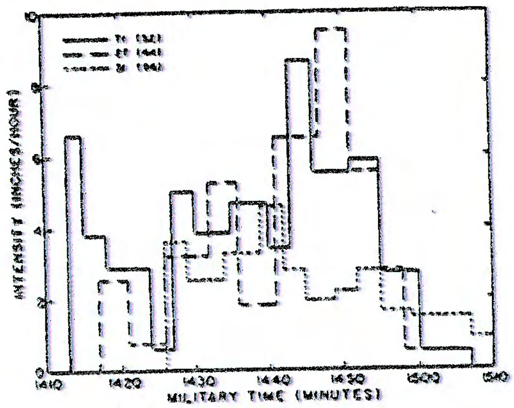


Table 1. Simulated early maximum rainfall intensities for selected frequencies for rainfall and runoff modeling, subwatershed 63.004, Walnut Gulch.

Duration of Storm	Portion of Storm (min)	Rainfall (in./hr) by Frequency (yr) 2	5	10	100
30 min	0-3	2.5	3.0	4.0	6.0
	3-6	3.1	4.2	5.2	8.0
	6-9	3.1	4.2	5.2	8.0
	9-12	2.3	3.0	4.0	6.0
	12-15	2.3	3.0	4.0	6.0
	15-18	2.0	2.6	3.2	5.0
	18-21	1.7	2.0	2.6	4.0
	21-24	0.8	1.0	1.3	2.0
	24-27	0.5	0.6	0.8	1.2
	27-30	0.2	0.3	0.4	0.6
60 min	0-6	2.5	3.0	4.0	6.0
	6-12	3.3	4.2	5.2	8.0
	12-18	2.5	3.0	4.0	6.0
	18-24	1.7	2.0	2.6	4.0
	24-30	0.8	1.0	1.3	2.0
	30-36	0.5	0.6	0.8	1.2
	36-42	0.2	0.3	0.4	0.6
	42-48	0.2	0.3	0.4	0.6
	48-54	0.1	0.2	0.2	0.3
	54-60	0.1	0.2	0.2	0.3

Note: Late storms are mirror images of early storms.

Figure 4. Maximum recorded 60-min point rainfall on Walnut Gulch (1956-1982) for adjacent gages superimposed on subwatershed 63.004.



storm. Spatial variability was modeled by centering each of the simulated events at three locations on the subwatershed—near the outlet, in the middle, and at the head of the subwatershed. Point-to-point reductions in rainfall amounts were based on earlier evaluations of Walnut Gulch rainfall data (10), and rainfall volume varied with storm location.

Finally, as a test of the effect of spatial variability on runoff, the event with the maximum observed rainfall in 25 yr of record on Walnut Gulch was centered on the study subwatershed at three different locations (Figure 4 and Table 2).

Model Output

Hydrographs were generated from spatially varied rainfall for all 30- and 60-min simulated events. Peaks and volumes were compared (Tables 3 and 4). Storms that were spatially centered on the subwatershed produced significantly greater peaks than those centered near the outlet or at the head of the subwatershed (Figure 5). For events of all frequencies, rainfall centered near the subwatershed outlet produced slightly greater peaks than that centered at the head of the subwatershed (Figure 6). All 30- and 60-min events were similar in that peak discharges were greater when rainfall was centered on the subwatershed rather than centered either near the outlet or at the head of the subwatershed. All 30- and 60-min simulations in which maximum rainfall was concentrated late in the event produced greater peak discharges than those with rainfall concentrated early in the event (Figure 7), primarily because the maximum intensities were recorded on a saturated subwatershed.

Runoff volumes were significantly higher for those events centered on the subwatershed, whereas runoff volume from the late events was only slightly greater than that from the early events (Figures 8 and 9).

The maximum recorded peak discharge from the subwatershed has been 1,250 ft³/sec. Although there were insufficient data from the subwatershed to plot a peak-discharge frequency curve, the estimated Q_{100} based on the 25-yr record at other Walnut Gulch stations would be 1,660 ft³/sec (11). The simulated 60-min, 100-yr event with maximum rainfall centered on the subwatershed, and occurring late in the event, produced a peak discharge of 1,900 ft³/sec—400 ft³/sec higher than a similar simulated event with maximum rainfall concentrated early in the event (Figure 5 and Table 3). Interestingly, the record Walnut Gulch storm when superimposed in time near the outlet, in the center, and at the head of the subwatershed, was so oriented in time and space that it produced peak discharges varying from only 1,814 to 1,871 ft³/sec (Figure 10). Peak

Table 2. Maximum-rainfall event superimposed on subwatershed 63.004 with maximum point rainfall centered at rain gages 27, 71, and 31.

Military Time	Rainfall (in.) by Rain Gage (RG)								
	Centered at RG 27			Centered at RG 71			Centered at RG 31[a]		
	27	71	31	27	71	31	27	71	31
1413	0	0	0	0	0	0	0	0	0
1415	0.22	0	0	0	0.22	0	0	0	0.22
1416	-	0	0	0	-	0	0	0	-
1417	-	0	-	0	-	0	-	0	-
1418	0.41	-	0.08	-	0.41	0	0.08	-	0.41
1421	-	0.17	-	0.17	-	0	-	0.17	-
1423	-	-	0.15	-	-	0	0.15	-	-
1424	0.70	-	-	-	0.70	0	-	-	0.70
1426	-	0.23	0.19	0.23	-	0	0.19	0.23	-
1427	0.73	-	-	-	0.73	-	-	-	0.73
1429	-	-	-	-	-	0.18	-	-	-
1430	0.98	-	-	-	0.98	-	-	-	0.98
1431	-	-	0.23	-	-	-	0.23	-	-
1432	-	0.55	-	0.55	-	-	-	0.55	-
1434	-	-	-	-	-	0.39	-	-	-
1435	1.30	-	0.25	-	1.30	-	0.25	-	1.30
1436	-	0.90	-	0.90	-	-	-	0.90	-
1439	-	-	-	-	-	0.66	-	-	-
1440	1.69	-	0.58	-	1.69	-	0.58	-	1.69
1441	-	1.05	-	1.05	-	-	-	1.05	-
1442	-	-	-	-	-	0.89	-	-	-
1443	1.86	-	-	-	1.86	-	-	-	1.36
1445	-	-	1.01	-	-	1.03	1.01	-	-
1446	2.29	-	-	-	2.29	-	-	-	2.29
1447	-	1.70	-	1.70	-	-	-	1.70	-
1449	-	-	-	-	-	1.16	-	-	-
1450	-	-	1.29	-	-	-	1.29	-	-
1451	2.73	2.33	-	2.33	2.73	-	-	2.33	2.73
1452	-	-	-	-	-	1.27	-	-	-
1455	3.12	2.70	1.47	2.70	3.12	1.41	1.47	2.70	3.12
1458	-	2.84	1.51	2.84	-	-	1.51	2.84	-
1459	-	-	-	-	-	1.52	-	-	-
1500	3.35	-	-	-	3.35	-	-	-	3.35
1501	-	-	1.54	-	-	-	1.54	-	-
1504	-	2.89	1.57	2.89	-	-	1.57	2.89	-
1507	3.41		-		3.41	1.72	-		3.41
1511			-			1.78	-		
1512			1.60			-	1.60		
1515						1.86			

[a]The same as storm centered on RG 27, but amounts at RG 27 and RG 31 are reversed.

Table 3. Peak discharge from simulated rainfall on subwatershed 63.004, Walnut Gulch.

Type of Storm	Location of Event on Subwatershed	Peak Discharge (ft^3/sec) by Frequency (yr)			
		2	5	10	100
30-min					
Early	Outlet	2	125	201	692
	Middle	1	147	261	1,021
	Head	0	90	169	743
Late	Outlet	16	159	243	858
	Middle	16	174	304	1,185
	Head	3	114	207	883
60-min					
Early	Outlet	70	237	361	1,188
	Middle	78	304	499	1,492
	Head	37	207	355	1,248
Late	Outlet	137	339	544	1,536
	Middle	154	445	703	1,896
	Head	92	315	526	1,591

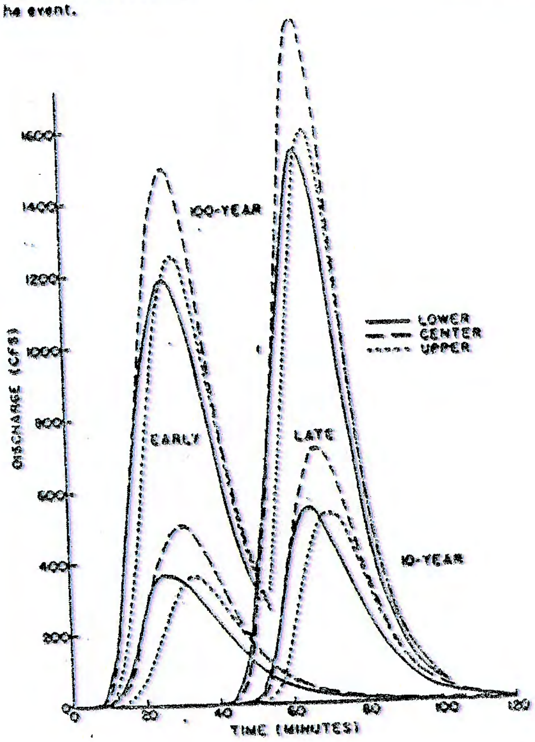
Table 4. Runoff volume from simulated rainfall on subwatershed 63.004, Walnut Gulch.

Type of Storm	Location of Event on Subwatershed	Runoff Volume (in.) by Frequency (yr)			
		2	5	10	100
30-min					
Early	Outlet	<0.01	0.08	0.15	0.57
	Middle	<0.01	0.13	0.22	0.79
	Head	0.00	0.07	0.14	0.54
Late	Outlet	0.02	0.10	0.16	0.60
	Middle	0.01	0.14	0.24	0.79
	Head	<0.01	0.09	0.15	0.57
60-min					
Early	Outlet	0.04	0.18	0.30	0.99
	Middle	0.07	0.25	0.40	1.19
	Head	0.03	0.17	0.28	0.97
Late	Outlet	0.08	0.25	0.39	1.06
	Middle	0.13	0.33	0.50	1.26
	Head	0.07	0.24	0.38	1.04

discharges of 1,800 to 1,900 ft^3/sec from centered 60-min, 100-yr late-occurring simulated rainfall and from the maximum observed Walnut Gulch rainfall seemed reasonable.

To investigate the effect of spatial variability of rainfall on runoff, average rainfall depths were ssumed over the subwatershed for each storm dura- ion and frequency; temporal variability was re- tained. Hydrographs were generated from the full range of 30- and 60-min simulated rainfall amounts and compared with similar peaks based on spatially and temporally varied rainfall (Tables 3 and 5). The differences were meaningful for the 10-yr events but relatively small for the 100-yr events (generally about 10 percent smaller). Runoff volumes were also less for the spatially uniform rainfall (Tables 4 and 6).

To determine the influence of a constant rainfall rate versus a variable one, hydrographs were gen- erated from simulated spatially varied, constantrate, 30- and 60-min events (Tables 7 and 8). When peak discharges for the 30-min events were compared, igure 5. Hydrographs from simulated 60-min, 10- and 100-yr storms entered at three locations with rainfall intensities occurring early and late in he event.



e 6. Peak discharge from simulated storms that were centered versus that were not centered on the subwatershed.

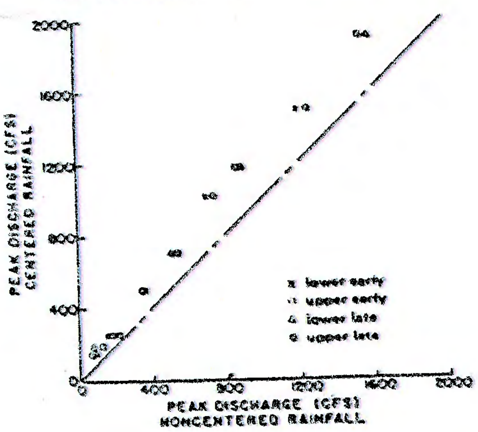


Figure 7. Peak discharge from simulated storms with maximum intensities concentrated early and late in the event.

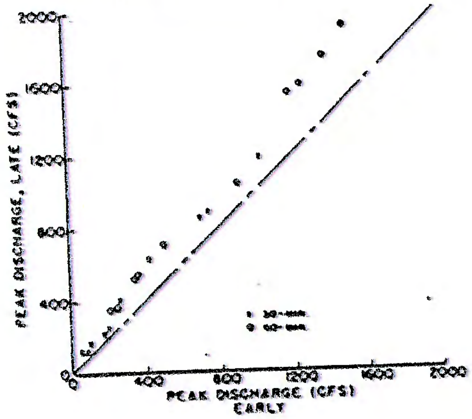


Figure 8. Runoff volume from simulated storms that were centered versus those that were not centered on the subwatershed.

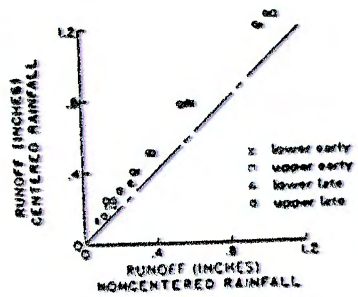
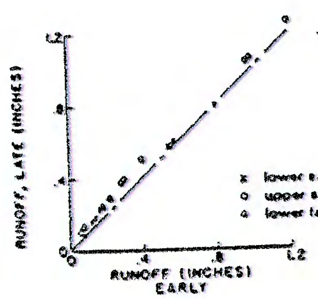


Figure 9. Runoff volume from simulated storms with intensities concentrated early and late in the event.



those generated from constant inputs were considerably lower than those generated from time-variable inputs (Tables 5 and 7). When rainfall was spread uniformly over a 60-min period, the differences between constant and varied time inputs were much more striking (Tables 5 and 7). Simulated peaks were reduced by more than 50 percent for events of all frequencies with 60-min constant rainfall rates.

EVALUATION

ntitative differences in hydrograph peaks and olumes generated from spatially and temporally varied rainfall patterns were apparent when runoff peaks and volumes were compared. There was a strong linear relationship between storms centered on the subwatershed and those centered near the outlet or at the head of the subwatershed for peak discharges up to 800 ft³/sec and runoff volumes up to 0.6 in. (Figures 6 and 8). Peak discharges and volumes were 35 to 40 percent higher for events centered on the subwatershed. Rainfall volumes were 10 to 15 percent greater for the events centered on the subwatershed, so higher peaks and volumes were not due entirely to more rainfall. Above 800 ft³/sec and 0.6 in., events centered on the subwatershed produced constant increases in peak discharge of 300 ft³/sec and runoff volume of 0.22 in. The relationships were as follows:

$$Q_{p_c} = 1.375 Q_{p_{nc}} \; (0 < Q_{p_{nc}} < 800) \tag{1}$$

$$Q_{p_c} = Q_{p_{nc}} + 300 \; (Q_{p_{nc}} > 800) \tag{2}$$

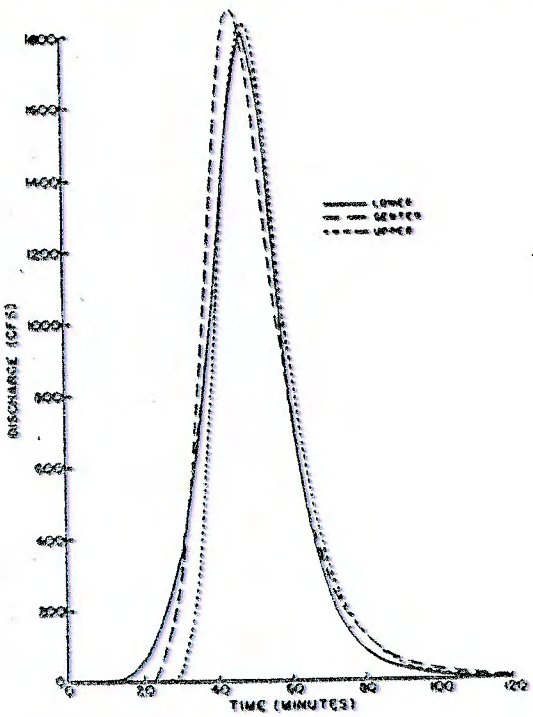
$$Q_c = 1.375 Q_{nc} \; (0 < Q_{nc} < 0.6) \tag{3}$$

$$Q_c = Q_{nc} + 0.22 \; (Q_c > 0.6) \tag{4}$$

where

Q_{Pc} = peak discharge from simulated rainfall centered on subwatershed,
Q_{Pnc} = peak discharge from simulated rainfall not centered on subwatershed,
Q_c = runoff volume from simulated rainfall centered on subwatershed, and
Q_{nc} = runoff volume from simulated rainfall not centered on subwatershed.

Figure 10. Hydrographs from the maximum observed Walnut Gulch storm superimposed at three locations on subwatershed 63.004.



There were also good linear correlations for both peak discharge and runoff volume for the full range of values given by

$$Q_{Pc} = 1.25Q_{Pnc} \tag{5}$$

$$Q_c = 1.25\ Q_{nc} \tag{6}$$

Either Equations 1 and 2 together or Equation 5 alone would give an acceptable estimate of peak discharge for this small watershed, but the suggestion of a limit to the linear relationship could become important with increasing watershed size. Extrapolation of Equation 5 could possibly lead to costly overestimates for peak discharges from larger watersheds.

There was also a strong linear relationship between peak discharges when maximum rainfall intensities occurred early or late in the event (Figure 8). The relationship was as follows:

$$Q_{Pl} = 1.25Q_{Pe} \tag{7}$$

where Q_{Pl} is the peak discharge from maximum intensities occurring late in the event, and Q_{Pe} is the peak discharge from maximum intensities occurring early in the event. Again, however, there was a suggestion that there may be a limit on the linear relationship, which could lead to overestimates for larger watersheds. Because rainfall amounts were the same for each selected storm event, runoff volumes were only slightly greater for the late-occurring events (Figure 9).

The influences of temporal and spatial rainfall variability on peak discharge tended to be additive. The 60-min, 100-yr, late-occurring, centered peak discharge was 60 percent higher than the 60-min, 100-yr, early-occurring, noncentered peak discharge. The maximum peak discharges for the lower-frequency events were up to 100 percent higher than the minimums for storm units of the same frequency. Obviously, both storm location and temporal variability of rainfall can significantly affect peak discharge.

Assuming spatially uniform rainfall on the 560-

Table 5. Peak discharge for selected frequencies and durations of spatially uniform rainfall on subwatershed 63.004, Walnut Gulch.

Type of Storm	Peak Discharge (ft^3/sec) by Frequency (yr)			
	2	5	10	100
30-min				
Early	0	119	195	908
Late	2	146	293[a]	1,040
60-min				
Early	24	257	422	1,380
Late	78	363	626	1,745

Table 6. Runoff volume for selected frequencies and durations of spatially uniform rainfall on subwatershed 63.004, Walnut Gulch.

Type of Storm	Runoff Volume (in.) by Frequency (yr)			
	2	5	10	100
30-min				
Early	0	0.11	0.16	0.71
Late	<0.01	0.13	0.21	0.72
60-min				
Early	0.02	0.22	0.35	1.12
Late	0.07	0.29	0.46	1.19

Table 7. Peak discharge for selected frequencies and durations of constant rainfall rates on subwatershed 63.004, Walnut Gulch.

Type of Storm	Location of Event on Subwatershed	Peak Discharge (ft^3/sec) by Frequency (yr)			
		2	5	10	100
30-min	Outlet	0	20	153	677
	Middle	0	20	200	980
	Head	0	3	123	714
60-min	Outlet	0	3	108	622
	Middle	0	0	163	795
	Head	0	0	90	640

Table 8. Runoff volume for selected frequencies and durations of constant rainfall rates on subwatershed 63.004, Walnut Gulch.

Type of Storm	Location of Event on Subwatershed	Runoff Volume (in.) by Frequency (yr)			
		2	5	10	100
30-min	Outlet	0	0.01	0.10	0.52
	Middle	0	0.02	0.16	0.72
	Head	0	<0.01	0.09	0.50
60-min	Outlet	0	<0.01	0.08	0.66
	Middle	0	0	0.14	0.86
	Head	0	0	0.07	0.63

acre subwatershed reduces peak discharges by only about 10 percent. For larger watersheds and therefore decreasing rainfall averages, however, assuming ...ally uniform rainfall could lead to significant ...stimates of peak discharge, especially when ...-producing rainfall does not cover the entire watershed.

As long as assumed rainfall durations are kept relatively short, assuming a constant rainfall rate does not greatly decrease generated peak discharges. However, for durations longer than about 30 min, assuming a constant rainfall rate can lead to greatly underestimating peak discharge. For example, for a duration of 60 min, assuming a constant rainfall rate would reduce the simulated peak discharge by more than 50 percent.

Rainfall versus runoff relationships for simulated storms that were centered and not centered and maximum intensities concentrated early and late in the event are shown in Tables 9-11. Both linear regression and exponential curves were fitted for the four sets of events (Figures 11-14). The exponential curves were only a slight improvement over linear regression. Nevertheless, the differences could be significant at runoff thresholds or for large events. The expressions for combined data were as follows:

$$Q = -0.622 + 0.654P \quad (SEE = 0.070) \tag{8}$$

$$Q = 0.236P^{1.83} - 0.180 \quad (SEE = 0.047) \tag{9}$$

where Q is the storm runoff in inches and P is the storm rainfall in inches. There was slightly more runoff from equal amounts of rainfall for centered events as opposed to those that were not centered. ... differences were not significant. There was an ...age increase of 0.07 in. in runoff volumes from ...l amounts of late-occurring, maximum-rainfall intensities as opposed to early concentrations of rainfall. In many situations, the increase would be important.

Relationships between frequency and peak discharge for each classification tend to plot as straight lines on log-normal paper for 5- to 100-yr expected rainfall amounts (Figures 15 and 16). Because the 5-, 10-, and 100-yr events plotted as straight lines, it was assumed that storms for any frequency greater than 5 yr would plot on the same lines. The influence of within-storm variations is clearly evident and well defined for 5- to 100-yr

Table 9. Rainfall and runoff for simulated early and late 2-, 5-, 10-, and 100-yr storms by location on subwatershed 63.004, Walnut Gulch.

Frequency and Type of Storm	Location of Event on Subwatershed	Duration of Storm: 30 min P (in.)	30 min Q (in.)	60 min P (in.)	60 min Q (in.)
2 yr, early	Outlet	0.77	<0.01	1.10	0.04
	Middle	0.84	<0.01	1.19	0.07
	Head	0.77	0	1.09	0.03
2 yr, late	Outlet	0.77	0.02	1.10	0.08
	Middle	0.84	0.01	1.19	0.13
	Head	0.77	<0.01	1.09	0.07
5 yr, early	Outlet	1.03	0.08	1.36	0.18
	Middle	1.12	0.13	1.49	0.25
	Head	1.02	0.07	1.35	0.17
5 yr, late	Outlet	1.03	0.10	1.36	0.25
	Middle	1.12	0.14	1.49	0.33
	Head	1.02	0.09	1.35	0.24
10 yr, early	Outlet	1.25	0.15	1.60	0.30
	Middle	1.36	0.22	1.75	0.40
	Head	1.24	0.14	1.59	0.28
10 yr, late	Outlet	1.25	0.16	1.60	0.39
	Middle	1.36	0.24	1.75	0.50
	Head	1.24	0.16	1.59	0.38
100 yr, early	Outlet	1.80	0.57	2.46	0.97
	Middle	2.05	0.78	2.69	1.19
	Head	1.79	0.54	2.43	0.97
...r, late	Outlet	1.80	0.60	2.46	1.06
	Middle	2.05	0.79	2.69	1.26
	Head	1.78	0.57	2.43	1.04

Note: P = storm rainfall; Q = storm runoff.

Table 10. Rainfall and runoff for simulated early and late 2-, 5-, 10-, and 100-yr storms with spatially uniform rainfall.

Frequency and Type of Storm	30-min Storm P (in.)	30-min Storm Q (in.)	60-min Storm P (in.)	60-min Storm Q (in.)
2 yr				
Early	0.78	0	1.09	0.02
Late	0.78	<0.01	1.09	0.07
5 yr				
Early	1.09	0.11	1.42	0.22
Late	1.09	0.13	1.42	0.29
10 yr				
Early	1.28	0.16	1.70	0.35
Late	1.28	0.21	1.70	0.46
100 yr				
Early	1.95	0.71	2.62	1.12
Late	1.95	0.72	2.59	1.19

Note: P = storm rainfall; Q = storm runoff.

Table 11. Rainfall and runoff for simulated early and late 2-, 5-, 10-, and 100-yr storms with constant rainfall.

Frequency of Storm	Location of Event on Subwatershed	30-min Storm P (in.)	30-min Storm Q (in.)	60-min Storm P (in.)	60-min Storm Q (in.)
2 yr	Outlet	0.70	0	1.00	0
	Middle	0.80	0	1.10	0
	Head	0.70	0	1.00	0
5 yr	Outlet	1.00	0.01	1.23	<0.01
	Middle	1.10	0.02	1.35	0
	Head	1.00	<0.01	1.22	0
10 yr	Outlet	1.26	0.10	1.61	0.08
	Middle	1.37	0.16	1.75	0.14
	Head	1.24	0.09	1.59	0.07
100 yr	Outlet	1.81	0.52	2.41	0.66
	Middle	2.05	0.72	2.64	0.86
	Head	1.79	0.50	2.38	0.63

Note: P = storm rainfall; Q = storm runoff.

Figure 11. Rainfall versus runoff for simulated centered 2-, 5-, 10-, and 100-yr storms.

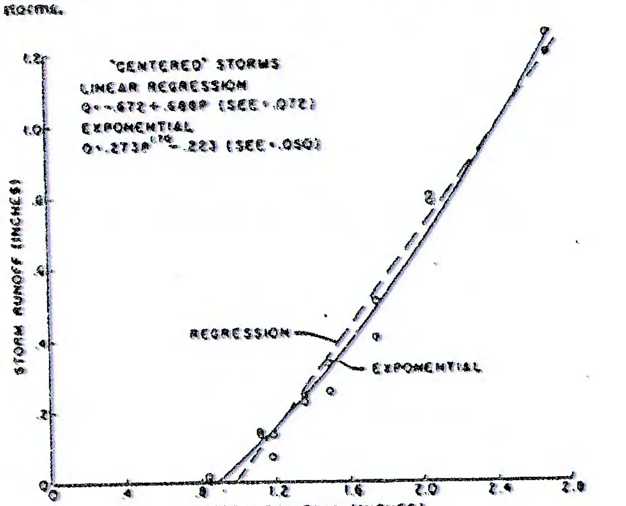


Figure 12. Rainfall versus runoff for simulated 2-, 5-, 10-, and 100-yr storms that were not centered.

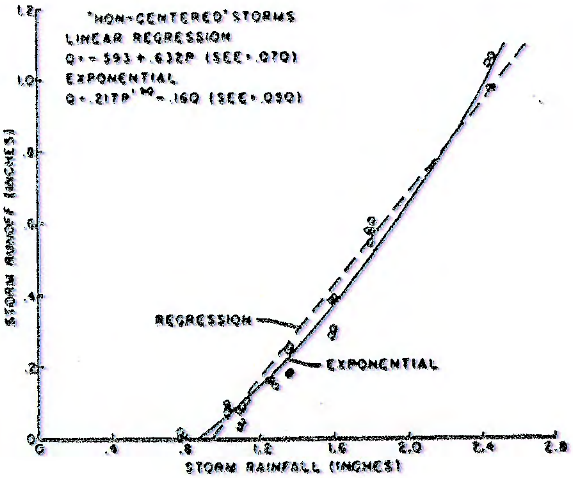


Figure 13. Rainfall versus runoff for simulated early 2-, 5-, 10-, and 100-yr storms.

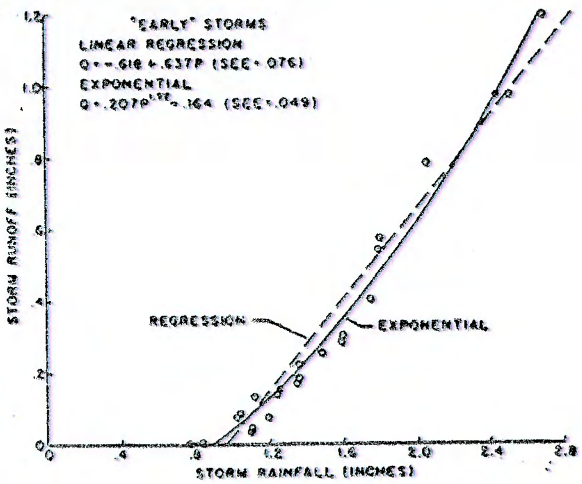


Figure 14. Rainfall versus runoff for simulated late 2-, 5-, 10-, and 100-yr storms.

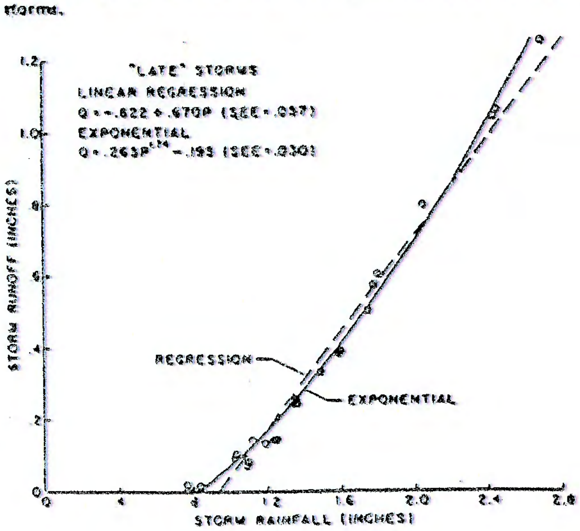


Figure 15. Peak discharge for rainfall frequencies of 2, 5, 10, and 100 yr for selected durations and storm patterns.

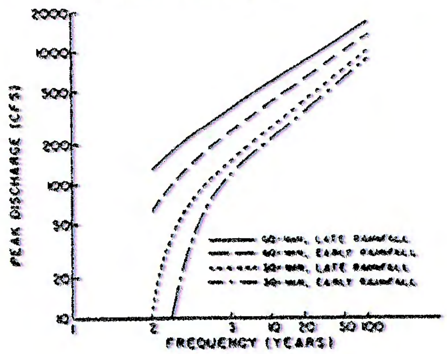
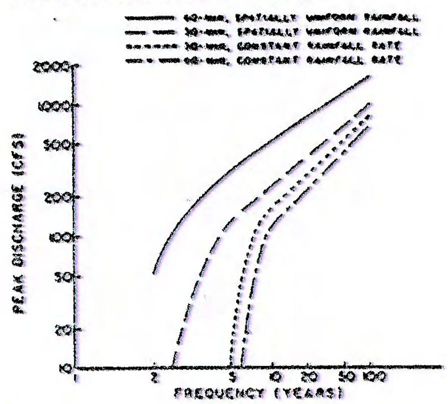


Figure 16. Peak discharge for rainfall frequencies of 2, 5, 10, and 100 yr for selected durations and constraints.



storms. Even for spatially uniform rainfall, the relationships are clearly defined. For more frequent events, however, peak discharges fall off rapidly. For constant rainfall rates, there was no runoff for 5-yr events with 60-min duration and no runoff for 2-yr events with 30-min duration. The curve for peak discharge versus frequency for a 560-acre subwatershed, based on Walnut Gulch data, would plot near the upper curve in Figure 13.

RECOMMENDATIONS

The results of this study indicated that for a small semiarid rangeland watershed (560 acres), the spatial and temporal distributions of thunderstorm rainfall exert an approximately equal influence on peak discharge from the watershed and that the influences tend to be additive. There are, however, two areas where further research is needed.

First, storm-runoff frequencies as opposed to rainfall frequencies need to be established. In this study, the 30- and 60-min, 2-, 5-, 10-, and 100-yr point rainfall amounts were used to generate peak discharge (Figures 13 and 14). However, these expected rainfall amounts were determined independently from the thunderstorm-cell properties, and a wide range of peak discharges was generated from only eight point-rainfall depths. Furthermore, the relationships between peak discharge and spatial and temporal variability may not be linear.

Second, and equally as important, the relative importance of storm-cell properties with increasing watershed size must be established. The runoff-producing areal extent of thunderstorm cells is limited, and runoff-producing rainfall will cover a smaller fraction of the watershed as the size of the rshed increases. Therefore, where the storm is red should become increasingly important with asing watershed size.

On the other hand, the influence of varying the occurrence of maximum intensity within the storm duration is more or less a function of watershed size and becomes relatively less important with increasing watershed size.

Quantitative analysis of the relationships between thunderstorm rainfall and runoff illustrated here is extremely difficult for several reasons. One reason is that rainfall is not uniform in time or space, and rainfall input can only be estimated from rainfall measurements within certain limits of accuracy and precision. Also, channel abstractions may account for much, or all, of on-site runoff. For example, annual runoff from the 58-mile² Walnut Gulch watershed is only about 5 percent of summer rainfall (2).

The next step, therefore, would be to model a larger watershed (several square miles) by using KINEROS and simulated rainfall input. In a step-by-step process, by increasing watershed size and complexity, it should be possible to define the interrelationships between storm-cell properties and watershed characteristics. The test of these interrelationships, in each case, would be the comparison of simulated peak discharges and runoff volumes.

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D.2 – PHYSICAL PARAMETER CALCULATIONS

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc/bjk Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-1
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)	Segment ID		A	EL 2516
1. Surface description (table 3-1)			Sht Grass	
2. Manning's roughness coeff, n (table 3-1)			0.15	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	1.97	NOAA 14
5. Land slope, s		ft/ft	0.03	
6. $T_t = 0.007\ (nL)^{0.8} / (P_2^{0.5})\ (s^{0.4})$	Compute T_t	hr	0.177	2513
Shallow Concentrated Flow	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	180	
9. Watercourse Slope, s		ft/ft	0.083	
10. Average Velocity, V (figure 3-1)		ft/s	4.7	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.011	2498
Channel Flow	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.025	
16. Manning's roughness coeff, n			0.043	
17. $V = (1.49\ r^{0.666}\ s^{0.5)}) / n$		ft/s	5.72	
18. Flow Length, L		ft	2817	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.137	2428
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.324	
		min	19	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.195	
		min	12	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/05/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :bjk

Project Description
FR-1 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude #<= 1 for steep mtn stream
Adjust Manning's n to calibrate

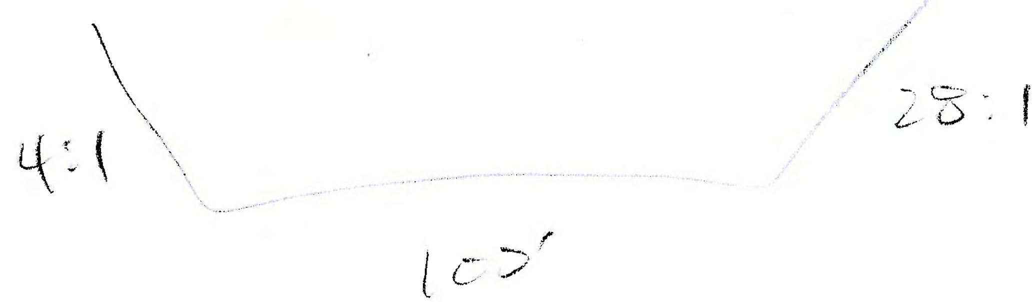
INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.0250
2.	Channel Bottom Width (ft)	15.00
3.	Left Side Slope (Horizontal to 1)	5.00
4.	Right Side Slope (Horizontal to 1)	5.00
5.	Manning's Coefficient	0.042
6.	Discharge (cfs)	168.00
7.	Depth of Flow (ft)	1.35

OUTPUT RESULTS

Cross Section Area (Sqft)	29.36
Average Velocity (ft/sec)	5.72
Top Width (ft)	28.50
Hydraulic Radius (ft)	1.02
Froude Number	0.99

HEC-1 Rting



1/22/08 JLC

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc/bjk Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-2
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)		Unit	Value	
	Segment ID		A	EL 2637
1. Surface description (table 3-1)			Sht Grass	
2. Manning's roughness coeff, n (table 3-1)			0.15	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	1.97	NOAA 14
5. Land slope, s		ft/ft	0.14	
6. $T_t = 0.007\ (nL)^{0.8} / (P_2^{0.5})\ (s^{0.4})$	Compute T_t	hr	0.096	
				2623

Shallow Concentrated Flow		Unit	Value	
	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	2714	
9. Watercourse Slope, s		ft/ft	0.039	
10. Average Velocity, V (figure 3-1)		ft/s	3.2	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.236	
				2527

Channel Flow		Unit	Value	
	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.027	
16. Manning's roughness coeff, n			0.046	
17. $V = (1.49\ r^{0.666}\ s^{0.5)} / n$		ft/s	6.79	
18. Flow Length, L		ft	2156	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.088	
				2469

		Unit	Value
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.419
		min	25
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.252
		min	15

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/05/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :bjk

Project Description
FR-2 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude #<= 1 for steep mtn stream
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.0270
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	5.00
4.	Right Side Slope (Horizontal to 1)	5.00
5.	Manning's Coefficient	0.047
6.	Discharge (cfs)	336.00
7.	Depth of Flow (ft)	2.30

OUTPUT RESULTS

Cross Section Area (Sqft)	49.45
Average Velocity (ft/sec)	6.79
Top Width (ft)	33.00
Hydraulic Radius (ft)	1.48
Froude Number	0.98

HEC-1 Rting

1/22/08
JLC

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc/bjk Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-3
Circle One: Tc or Tt computation

EL 2691

Sheet Flow (Applicable to Tc only)		Segment ID	A
1. Surface description (table 3-1)			Sht Grass
2. Manning's roughness coeff, n (table 3-1)			0.15
3. Flow Length, L (total L ≤ 300 ft)		ft	100
4. Two-yr 24-hr rainfall, P_2		in	1.97
5. Land slope, s		ft/ft	0.04
6. $T_t = 0.007\,(nL)^{0.8} / (P_2^{0.5})\,(s^{0.4})$	Compute T_t	hr	0.158

NOAA 14

2687

Shallow Concentrated Flow		Segment ID	B
7. Surface description (paved or unpaved)			U
8. Flow Length, L		ft	300
9. Watercourse Slope, s		ft/ft	0.057
10. Average Velocity, V (figure 3-1)		ft/s	3.8
11. $T_t = L / (3600\,V)$	Compute T_t	hr	0.022

2670

Channel Flow		Segment ID	C
12. Cross Sectional Flow Area, a		ft^2	
13. Wetted Perimeter, P_w		ft	
14. Hydraulic radius, $r = a/P_w$		ft	
15. Channel Slope, s		ft/ft	0.028
16. Manning's roughness coeff, n			0.05
17. $V = (1.49\, r^{0.666}\, s^{0.5)} / n$		ft/s	7.5
18. Flow Length, L		ft	5680
19. $T_t = L / (3600\,V)$	Compute T_t	hr	0.210

2509

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.390
		min	23
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.234
		min	14

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/09/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :bjk/jlc

Project Description
FR-3 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep gradient streams
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.0280
2.	Channel Bottom Width (ft)	15.00
3.	Left Side Slope (Horizontal to 1)	5.00
4.	Right Side Slope (Horizontal to 1)	5.00
5.	Manning's Coefficient	0.050
6.	Discharge (cfs)	600.00
7.	Depth of Flow (ft)	2.77

OUTPUT RESULTS

Cross Section Area (Sqft)	79.91
Average Velocity (ft/sec)	7.51
Top Width (ft)	42.70
Hydraulic Radius (ft)	1.85
Froude Number	0.97

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-4
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only) — Segment ID		A	EL
1. Surface description (table 3-1)		Smooth	2699
2. Manning's roughness coeff, n (table 3-1)		0.011	
3. Flow Length, L (total L ≤ 300 ft)	ft	300	
4. Two-yr 24-hr rainfall, P_2	in	2.04	NOAA 14
5. Land slope, s	ft/ft	0.02	
6. $T_t = 0.007\,(nL)^{0.8} / (P_2^{0.5})\,(s^{0.4})$ — Compute T_t	hr	0.061	
			2693
Shallow Concentrated Flow — Segment ID		B	
7. Surface description (paved or unpaved)		U	
8. Flow Length, L	ft	400	
9. Watercourse Slope, s	ft/ft	0.058	
10. Average Velocity, V (figure 3-1)	ft/s	3.9	
11. $T_t = L / (3600\,V)$ — Compute T_t	hr	0.028	
			2670
Channel Flow — Segment ID		C	
12. Cross Sectional Flow Area, a	ft^2		
13. Wetted Perimeter, P_w	ft		
14. Hydraulic radius, $r = a/P_w$	ft		
15. Channel Slope, s	ft/ft	0.041	
16. Manning's roughness coeff, n		0.055	
17. $V = (1.49\, r^{0.666}\, s^{0.5}) / n$	ft/s	5.1	
18. Flow Length, L	ft	1410	
19. $T_t = L / (3600\,V)$ — Compute T_t	hr	0.077	
			2612
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)	hr	0.166	
	min	10	
21. Lag Time = 0.6 T_c — Compute Lag Time	hr	0.100	
	min	6	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/05/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :jlc

Project Description
FR-4 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep gradient stream
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.0410
2.	Channel Bottom Width (ft)	15.00
3.	Left Side Slope (Horizontal to 1)	10.00
4.	Right Side Slope (Horizontal to 1)	10.00
5.	Manning's Coefficient	0.055
6.	Discharge (cfs)	185.00
7.	Depth of Flow (ft)	1.30

OUTPUT RESULTS

Cross Section Area (Sqft)	36.40
Average Velocity (ft/sec)	5.08
Top Width (ft)	41.00
Hydraulic Radius (ft)	0.89
Froude Number	0.95

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-5
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)	Segment ID		A	EL
1. Surface description (table 3-1)			Sht Grass	2774
2. Manning's roughness coeff, n (table 3-1)			0.15	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.04	NOAA14
5. Land slope, s		ft/ft	0.05	
6. $T_t = 0.007 (nL)^{0.8} / (P_2^{0.5}) (s^{0.4})$	Compute T_t	hr	0.142	
				2769
Shallow Concentrated Flow	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	640	
9. Watercourse Slope, s		ft/ft	0.045	
10. Average Velocity, V (figure 3-1)		ft/s	3.4	
11. $T_t = L / (3600 V)$	Compute T_t	hr	0.052	
				2740
Channel Flow	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.033	
16. Manning's roughness coeff, n			0.052	
17. $V = (1.49 r^{0.666} s^{0.5}) / n$		ft/s	6.3	
18. Flow Length, L		ft	3140	
19. $T_t = L / (3600 V)$	Compute T_t	hr	0.138	
				2636
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.333	
		min	20	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.200	
		min	12	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/05/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :jlc

Project Description
FR-5 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep gradient stream
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.0330
2.	Channel Bottom Width (ft)	15.00
3.	Left Side Slope (Horizontal to 1)	5.00
4.	Right Side Slope (Horizontal to 1)	5.00
5.	Manning's Coefficient	0.052
6.	Discharge (cfs)	280.00
7.	Depth of Flow (ft)	1.84

OUTPUT RESULTS

Cross Section Area (Sqft)	44.53
Average Velocity (ft/sec)	6.29
Top Width (ft)	33.40
Hydraulic Radius (ft)	1.32
Froude Number	0.96

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc/bjk Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-6
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)	Segment ID		A	EL
1. Surface description (table 3-1)			Sht Grass	2886
2. Manning's roughness coeff, n (table 3-1)			0.15	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.04	NOAA 14
5. Land slope, s		ft/ft	0.16	
6. $T_t = 0.007\,(nL)^{0.8} / (P_2^{0.5})\,(s^{0.4})$	Compute T_t	hr	0.089	2870
Shallow Concentrated Flow	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	1366	
9. Watercourse Slope, s		ft/ft	0.054	
10. Average Velocity, V (figure 3-1)		ft/s	3.7	
11. $T_t = L / (3600\,V)$	Compute T_t	hr	0.103	2796
Channel Flow	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.0279	
16. Manning's roughness coeff, n			0.045	
17. $V = (1.49\, r^{0.666}\, s^{0.5)} / n$		ft/s	5.7	
18. Flow Length, L		ft	3656	
19. $T_t = L / (3600\,V)$	Compute T_t	hr	0.178	2694
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.370	
		min	22	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.222	
		min	13	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/05/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :bjk

Project Description
FR-6 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude #<= 1 for steep mtn stream
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.0279
2.	Channel Bottom Width (ft)	15.00
3.	Left Side Slope (Horizontal to 1)	10.00
4.	Right Side Slope (Horizontal to 1)	10.00
5.	Manning's Coefficient	0.045
6.	Discharge (cfs)	275.00
7.	Depth of Flow (ft)	1.57

OUTPUT RESULTS

Cross Section Area (Sqft)	48.20
Average Velocity (ft/sec)	5.71
Top Width (ft)	46.40
Hydraulic Radius (ft)	1.04
Froude Number	0.99

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-7
Circle One: Tc or Tt computation

<u>Sheet Flow</u> (Applicable to Tc only)	Segment ID		A	EL
1. Surface description (table 3-1)			Sht Grass	2956
2. Manning's roughness coeff, n (table 3-1)			0.15	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.17	NOAA 14
5. Land slope, s		ft/ft	0.08	
6. $T_t = 0.007\ (nL)^{0.8} / (P_2^{0.5})\ (s^{0.4})$	Compute T_t	hr	0.114	
				2948
<u>Shallow Concentrated Flow</u>	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	1860	
9. Watercourse Slope, s		ft/ft	0.042	
10. Average Velocity, V (figure 3-1)		ft/s	3.4	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.152	
				2870
<u>Channel Flow</u>	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.037	
16. Manning's roughness coeff, n			0.06	
17. $V = (1.49\ r^{0.666}\ s^{0.5)} / n$		ft/s	7.2	
18. Flow Length, L		ft	2735	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.106	
				2770
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.371	
		min	22	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.223	
		min	13	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/04/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :jlc

Project Description
FR-7 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep mtn stream
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.0365
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	3.00
4.	Right Side Slope (Horizontal to 1)	3.00
5.	Manning's Coefficient	0.060
6.	Discharge (cfs)	400.00
7.	Depth of Flow (ft)	2.91

OUTPUT RESULTS

Cross Section Area (Sqft)	54.50
Average Velocity (ft/sec)	7.34
Top Width (ft)	27.46
Hydraulic Radius (ft)	1.92
Froude Number	0.92

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-8
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)	Segment ID		A	EL
1. Surface description (table 3-1)			Woods	4120
2. Manning's roughness coeff, n (table 3-1)			0.4	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.17	NOAA 14
5. Land slope, s		ft/ft	0.8	
6. $T_t = 0.007\ (nL)^{0.8} / (P_2^{0.5})\ (s^{0.4})$	Compute T_t	hr	0.099	
				4040
Shallow Concentrated Flow	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	4320	
9. Watercourse Slope, s		ft/ft	0.27	
10. Average Velocity, V (figure 3-1)		ft/s	8.3	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.145	
				2892
Channel Flow	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.0379	
16. Manning's roughness coeff, n			0.065	
17. $V = (1.49\ r^{0.666}\ s^{0.5}) / n$		ft/s	9.6	
18. Flow Length, L		ft	2585	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.075	
				2794
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.319	
		min	19	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.191	
		min	11	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/04/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :jlc

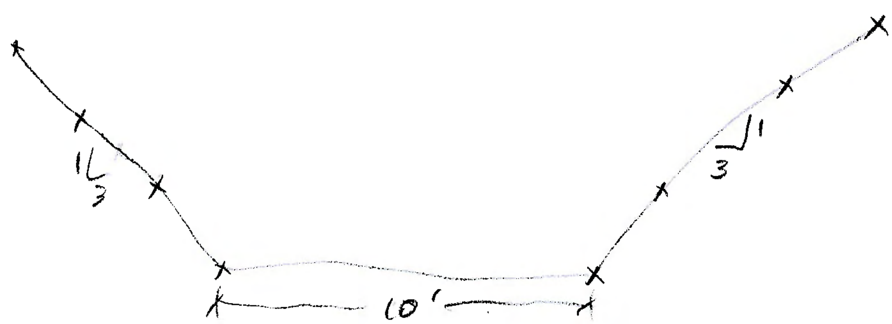
Project Description
FR-8 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep mtn stream
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.0379
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	3.00
4.	Right Side Slope (Horizontal to 1)	3.00
5.	Manning's Coefficient	0.065
6.	Discharge (cfs)	1300.00
7.	Depth of Flow (ft)	5.27

OUTPUT RESULTS

Cross Section Area (Sqft)	136.02
Average Velocity (ft/sec)	9.56
Top Width (ft)	41.62
Hydraulic Radius (ft)	3.14
Froude Number	0.93



TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-9
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)	Segment ID		A	EL 4290
1. Surface description (table 3-1)			Woods	
2. Manning's roughness coeff, n (table 3-1)			0.4	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.28	NOAA 14
5. Land slope, s		ft/ft	0.5	
6. $T_t = 0.007\ (nL)^{0.8} / (P_2^{0.5})\ (s^{0.4})$	Compute T_t	hr	0.117	
				4240
Shallow Concentrated Flow	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	1520	
9. Watercourse Slope, s		ft/ft	0.5	
10. Average Velocity, V (figure 3-1)		ft/s	11.3	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.037	
				3600
Channel Flow	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.093	
16. Manning's roughness coeff, n			0.095	
17. $V = (1.49\ r^{0.666}\ s^{0.5)} / n$		ft/s	8	
18. Flow Length, L		ft	4100	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.142	
				3050
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.297	
		min	18	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.178	
		min	11	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/03/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :jlc

Project Description
FR-09 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep mtn streams
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.0930
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	3.00
4.	Right Side Slope (Horizontal to 1)	3.00
5.	Manning's Coefficient	0.095
6.	Discharge (cfs)	488.00
7.	Depth of Flow (ft)	3.20

OUTPUT RESULTS

Cross Section Area (Sqft)	62.72
Average Velocity (ft/sec)	7.78
Top Width (ft)	29.20
Hydraulic Radius (ft)	2.07
Froude Number	0.94

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-10
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)		Segment ID	A	EL
1. Surface description (table 3-1)			Woods	5920
2. Manning's roughness coeff, n (table 3-1)			0.4	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.38	NOAA 14
5. Land slope, s		ft/ft	0.4	
6. $T_t = 0.007\,(nL)^{0.8} / (P_2^{0.5})\,(s^{0.4})$	Compute T_t	hr	0.125	5880

Shallow Concentrated Flow		Segment ID	B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	3950	
9. Watercourse Slope, s		ft/ft	0.44	
10. Average Velocity, V (figure 3-1)		ft/s	10.8	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.102	4150

Channel Flow		Segment ID	C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.159	
16. Manning's roughness coeff, n			0.125	
17. $V = (1.49\ r^{0.666}\ s^{0.5)} / n$		ft/s	12.7	
18. Flow Length, L		ft	4720	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.103	3400

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.330
		min	20
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.198
		min	12

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/02/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :jlc

Project Description
FR-10 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep mtn stream
Adjust Manning's n accordingly

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.1590
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	1.00
4.	Right Side Slope (Horizontal to 1)	1.00
5.	Manning's Coefficient	0.125
6.	Discharge (cfs)	1800.00
7.	Depth of Flow (ft)	7.91

OUTPUT RESULTS

Cross Section Area (Sqft)	141.67
Average Velocity (ft/sec)	12.71
Top Width (ft)	25.82
Hydraulic Radius (ft)	4.38
Froude Number	0.96

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-11
Circle One: Tc or Tt computation

EL
6920

Sheet Flow (Applicable to Tc only)			
	Segment ID		A
1. Surface description (table 3-1)			Woods
2. Manning's roughness coeff, n (table 3-1)			0.4
3. Flow Length, L (total L ≤ 300 ft)		ft	100
4. Two-yr 24-hr rainfall, P_2		in	2.52
5. Land slope, s		ft/ft	0.4
6. $T_t = 0.007 (nL)^{0.8} / (P_2^{0.5}) (s^{0.4})$	Compute T_t	hr	0.122

NOAA 14

6880

Shallow Concentrated Flow			
	Segment ID		B
7. Surface description (paved or unpaved)			U
8. Flow Length, L		ft	3160
9. Watercourse Slope, s		ft/ft	0.54
10. Average Velocity, V (figure 3-1)		ft/s	10.8
11. $T_t = L / (3600 V)$	Compute T_t	hr	0.081

5160

Channel Flow			
	Segment ID		C
12. Cross Sectional Flow Area, a		ft^2	
13. Wetted Perimeter, P_w		ft	
14. Hydraulic radius, $r = a/P_w$		ft	
15. Channel Slope, s		ft/ft	0.26
16. Manning's roughness coeff, n			0.16
17. $V = (1.49\ r^{0.666}\ s^{0.5)}) / n$		ft/s	12.8
18. Flow Length, L		ft	4000
19. $T_t = L / (3600 V)$	Compute T_t	hr	0.087

4150

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.290
		min	17
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.174
		min	10

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/02/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :jlc

Project Description
FR-11 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep mtn stream
Adjust Manning's n accordingly

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.2680
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	1.00
4.	Right Side Slope (Horizontal to 1)	1.00
5.	Manning's Coefficient	0.160
6.	Discharge (cfs)	1760.00
7.	Depth of Flow (ft)	7.76

OUTPUT RESULTS

Cross Section Area (Sqft)	137.82
Average Velocity (ft/sec)	12.77
Top Width (ft)	25.52
Hydraulic Radius (ft)	4.31
Froude Number	0.97

TR-55 Time of Concentration (Tc) or Travel Time (Tt) Worksheet

Project No: 27028 By: jlc Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-12
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)	Segment ID		A	
1. Surface description (table 3-1)			Woods	El 7240
2. Manning's roughness coeff, n (table 3-1)			0.4	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.52	NOAA14
5. Land slope, s		ft/ft	0.4	
6. $T_t = 0.007\ (nL)^{0.8} / (P_2^{0.5})\ (s^{0.4})$	Compute T_t	hr	0.122	7200
Shallow Concentrated Flow	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	1640	
9. Watercourse Slope, s		ft/ft	0.27	
10. Average Velocity, V (figure 3-1)		ft/s	8.5	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.054	6760
Channel Flow	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.3	
16. Manning's roughness coeff, n			0.17	
17. $V = (1.49\ r^{0.666}\ s^{0.5)} / n$		ft/s	12.6	
18. Flow Length, L		ft	5094	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.112	5200
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.288	
		min	17	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.173	.184
		min	10	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/02/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :jlc

Project Description
FR-12 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep mtn stream
Adjust Manning's n accordingly

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.3000
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	1.00
4.	Right Side Slope (Horizontal to 1)	1.00
5.	Manning's Coefficient	0.170
6.	Discharge (cfs)	1700.00
7.	Depth of Flow (ft)	7.64

OUTPUT RESULTS

Cross Section Area (Sqft)	134.77
Average Velocity (ft/sec)	12.61
Top Width (ft)	25.28
Hydraulic Radius (ft)	4.26
Froude Number	0.96

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc/bjk Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-61
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)	Segment ID		A	EL
1. Surface description (table 3-1)			Sht Grass	2910
2. Manning's roughness coeff, n (table 3-1)			0.15	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.04	NOAA 14
5. Land slope, s		ft/ft	0.06	
6. $T_t = 0.007\ (nL)^{0.8} / (P_2^{0.5})\ (s^{0.4})$	Compute T_t	hr	0.132	2904
Shallow Concentrated Flow	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	2260	
9. Watercourse Slope, s		ft/ft	0.042	
10. Average Velocity, V (figure 3-1)		ft/s	3.3	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.190	2810
Channel Flow	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.031	
16. Manning's roughness coeff, n			0.05	
17. $V = (1.49\ r^{0.666}\ s^{0.5)} / n$		ft/s	6.6	
18. Flow Length, L		ft	3704	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.156	2694
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.478	
		min	29	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.287	
		min	17	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/05/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :bjk

Project Description
FR-61 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude #<= 1 for steep mtn stream
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.0310
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	5.00
4.	Right Side Slope (Horizontal to 1)	5.00
5.	Manning's Coefficient	0.050
6.	Discharge (cfs)	295.00
7.	Depth of Flow (ft)	2.16

OUTPUT RESULTS

Cross Section Area (Sqft)	44.93
Average Velocity (ft/sec)	6.57
Top Width (ft)	31.60
Hydraulic Radius (ft)	1.40
Froude Number	0.97

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc/bjk Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-62
Circle One: Tc or Tt computation

<u>Sheet Flow</u> (Applicable to Tc only)	Segment ID		A	EL 3900
1. Surface description (table 3-1)			Sht Grass	
2. Manning's roughness coeff, n (table 3-1)			0.15	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.17	NOAA 14
5. Land slope, s		ft/ft	0.5	
6. $T_t = 0.007\ (nL)^{0.8} / (P_2^{0.5})\ (s^{0.4})$	Compute T_t	hr	0.055	3850
<u>Shallow Concentrated Flow</u>	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	2527	
9. Watercourse Slope, s		ft/ft	0.28	
10. Average Velocity, V (figure 3-1)		ft/s	8.6	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.082	3140
<u>Channel Flow</u>	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.049	
16. Manning's roughness coeff, n			0.068	
17. $V = (1.49\ r^{0.666}\ s^{0.5)} / n$		ft/s	8.86	
18. Flow Length, L		ft	6253	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.196	2831
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.332	
		min	20	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.199	
		min	12	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/05/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :bjk

Project Description
FR-62 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude #<= 1 for steep mtn stream
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.0490
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	5.00
4.	Right Side Slope (Horizontal to 1)	5.00
5.	Manning's Coefficient	0.068
6.	Discharge (cfs)	1153.00
7.	Depth of Flow (ft)	4.20

OUTPUT RESULTS

Cross Section Area (Sqft)	130.20
Average Velocity (ft/sec)	8.86
Top Width (ft)	52.00
Hydraulic Radius (ft)	2.46
Froude Number	0.99

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-81
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)	Segment ID		A	EL
1. Surface description (table 3-1)			Woods	5080
2. Manning's roughness coeff, n (table 3-1)			0.4	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.17	NOAA 14
5. Land slope, s		ft/ft	0.6	
6. $T_t = 0.007\ (nL)^{0.8} / (P_2^{0.5})\ (s^{0.4})$	Compute T_t	hr	0.111	
				5020
Shallow Concentrated Flow	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	3520	
9. Watercourse Slope, s		ft/ft	0.5	
10. Average Velocity, V (figure 3-1)		ft/s	11.3	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.087	
				3230
Channel Flow	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.074	
16. Manning's roughness coeff, n			0.085	
17. $V = (1.49\ r^{0.666}\ s^{0.5)} / n$		ft/s	8.6	
18. Flow Length, L		ft	5875	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.190	
				2794
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.388	
		min	23	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.233	
		min	14	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/04/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :jlc

Project Description
FR-81 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep mtn stream
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.0740
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	3.00
4.	Right Side Slope (Horizontal to 1)	3.00
5.	Manning's Coefficient	0.085
6.	Discharge (cfs)	720.00
7.	Depth of Flow (ft)	3.87

OUTPUT RESULTS

Cross Section Area (Sqft)	83.63
Average Velocity (ft/sec)	8.61
Top Width (ft)	33.22
Hydraulic Radius (ft)	2.43
Froude Number	0.96

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-82
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)	Segment ID		A	EC
1. Surface description (table 3-1)			Woods	5280
2. Manning's roughness coeff, n (table 3-1)			0.4	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.28	NOAA 14
5. Land slope, s		ft/ft	0.8	
6. $T_t = 0.007\ (nL)^{0.8} / (P_2^{0.5})\ (s^{0.4})$	Compute T_t	hr	0.097	
				5200
Shallow Concentrated Flow	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	4600	
9. Watercourse Slope, s		ft/ft	0.42	
10. Average Velocity, V (figure 3-1)		ft/s	10.5	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.122	
				3280
Channel Flow	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.131	
16. Manning's roughness coeff, n			0.115	
17. $V = (1.49\ r^{0.666}\ s^{0.5)} / n$		ft/s	9.8	
18. Flow Length, L		ft	2045	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.058	
				3012
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.277	
		min	17	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.166	
		min	10	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/04/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :jlc

Project Description
FR-82 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep mtn stream
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.1310
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	2.00
4.	Right Side Slope (Horizontal to 1)	2.00
5.	Manning's Coefficient	0.115
6.	Discharge (cfs)	930.00
7.	Depth of Flow (ft)	4.84

OUTPUT RESULTS

Cross Section Area (Sqft)	95.25
Average Velocity (ft/sec)	9.76
Top Width (ft)	29.36
Hydraulic Radius (ft)	3.01
Froude Number	0.96

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-91
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)	Segment ID		A	EL
1. Surface description (table 3-1)			Short Gr	3685
2. Manning's roughness coeff, n (table 3-1)			0.24	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.28	NOAA 14
5. Land slope, s		ft/ft	0.1	
6. $T_t = 0.007\ (nL)^{0.8} / (P_2^{0.5})\ (s^{0.4})$	Compute T_t	hr	0.148	
				3675
Shallow Concentrated Flow	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	2460	
9. Watercourse Slope, s		ft/ft	0.219	
10. Average Velocity, V (figure 3-1)		ft/s	7.6	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.090	
				3115
Channel Flow	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.103	
16. Manning's roughness coeff, n			0.095	
17. $V = (1.49\ r^{0.666}\ s^{0.5)} / n$		ft/s	8.1	
18. Flow Length, L		ft	1120	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.038	
				3056
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.276	
		min	17	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.166	
		min	10	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/03/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :jlc

Project Description
FR-91 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep mtn streams
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.1030
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	2.00
4.	Right Side Slope (Horizontal to 1)	2.00
5.	Manning's Coefficient	0.095
6.	Discharge (cfs)	380.00
7.	Depth of Flow (ft)	2.96

OUTPUT RESULTS

Cross Section Area (Sqft)	47.12
Average Velocity (ft/sec)	8.06
Top Width (ft)	21.84
Hydraulic Radius (ft)	2.03
Froude Number	0.97

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-92
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)	Segment ID		A	EL
1. Surface description (table 3-1)			Woods	4360
2. Manning's roughness coeff, n (table 3-1)			0.4	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.28	NOAA 14
5. Land slope, s		ft/ft	0.5	
6. $T_t = 0.007\ (nL)^{0.8} / (P_2^{0.5})\ (s^{0.4})$	Compute T_t	hr	0.117	4310
Shallow Concentrated Flow	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	1440	
9. Watercourse Slope, s		ft/ft	0.48	
10. Average Velocity, V (figure 3-1)		ft/s	11.3	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.035	3590
Channel Flow	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.115	
16. Manning's roughness coeff, n			0.105	
17. $V = (1.49\ r^{0.666}\ s^{0.5)} / n$		ft/s	9.4	
18. Flow Length, L		ft	3900	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.115	3140
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.268	
		min	16	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.161	
		min	10	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/03/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :jlc

Project Description
FR-92 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep mtn streams
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.1150
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	2.00
4.	Right Side Slope (Horizontal to 1)	2.00
5.	Manning's Coefficient	0.105
6.	Discharge (cfs)	750.00
7.	Depth of Flow (ft)	4.29

OUTPUT RESULTS

Cross Section Area (Sqft)	79.71
Average Velocity (ft/sec)	9.41
Top Width (ft)	27.16
Hydraulic Radius (ft)	2.73
Froude Number	0.97

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-93
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)	Segment ID		A	EL 6080
1. Surface description (table 3-1)			Woods	
2. Manning's roughness coeff, n (table 3-1)			0.4	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.48	NOAA 14
5. Land slope, s		ft/ft	0.4	
6. $T_t = 0.007\,(nL)^{0.8} / (P_2^{0.5})\,(s^{0.4})$	Compute T_t	hr	0.123	6040
Shallow Concentrated Flow	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	4800	
9. Watercourse Slope, s		ft/ft	0.42	
10. Average Velocity, V (figure 3-1)		ft/s	10.3	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.129	4040
Channel Flow	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.24	
16. Manning's roughness coeff, n			0.16	
17. $V = (1.49\ r^{0.666}\ s^{0.5}) / n$		ft/s	10.6	
18. Flow Length, L		ft	1620	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.042	3650
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.295	
		min	18	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.177	
		min	11	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/03/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :jlc

Project Description
FR-93 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep mtn streams
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.2400
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	2.00
4.	Right Side Slope (Horizontal to 1)	2.00
5.	Manning's Coefficient	0.160
6.	Discharge (cfs)	1380.00
7.	Depth of Flow (ft)	5.94

OUTPUT RESULTS

Cross Section Area (Sqft)	129.97
Average Velocity (ft/sec)	10.62
Top Width (ft)	33.76
Hydraulic Radius (ft)	3.55
Froude Number	0.95

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-94
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)	Segment ID		A	EL 6645
1. Surface description (table 3-1)			Woods	
2. Manning's roughness coeff, n (table 3-1)			0.4	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.48	NOAA 14
5. Land slope, s		ft/ft	0.45	
6. $T_t = 0.007\ (nL)^{0.8} / (P_2^{0.5})\ (s^{0.4})$	Compute T_t	hr	0.117	
				6600
Shallow Concentrated Flow	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	450	
9. Watercourse Slope, s		ft/ft	0.49	
10. Average Velocity, V (figure 3-1)		ft/s	11	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.011	
				6380
Channel Flow	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.278	
16. Manning's roughness coeff, n			0.17	
17. $V = (1.49\ r^{0.666}\ s^{0.5)} / n$		ft/s	11.3	
18. Flow Length, L		ft	6110	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.150	
				4680
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.279	
		min	17	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.167	
		min	10	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/03/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :jlc

Project Description
FR-94 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep mtn streams
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.2780
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	2.00
4.	Right Side Slope (Horizontal to 1)	2.00
5.	Manning's Coefficient	0.170
6.	Discharge (cfs)	1700.00
7.	Depth of Flow (ft)	6.52

OUTPUT RESULTS

Cross Section Area (Sqft)	150.22
Average Velocity (ft/sec)	11.32
Top Width (ft)	36.08
Hydraulic Radius (ft)	3.84
Froude Number	0.98

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-921
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)	Segment ID		A	EL 4600
1. Surface description (table 3-1)			Woods	
2. Manning's roughness coeff, n (table 3-1)			0.4	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.38	NOAA 14
5. Land slope, s		ft/ft	0.8	
6. $T_t = 0.007 (nL)^{0.8} / (P_2^{0.5}) (s^{0.4})$	Compute T_t	hr	0.095	4520
Shallow Concentrated Flow	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	1240	
9. Watercourse Slope, s		ft/ft	0.5	
10. Average Velocity, V (figure 3-1)		ft/s	11.3	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.030	3790
Channel Flow	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.135	
16. Manning's roughness coeff, n			0.11	
17. $V = (1.49\ r^{0.666}\ s^{0.5}) / n$		ft/s	9.4	
18. Flow Length, L		ft	4800	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.142	3140
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.267	
		min	16	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.160	
		min	10	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/03/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :jlc

Project Description
FR-921 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep mtn streams
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.1350
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	2.00
4.	Right Side Slope (Horizontal to 1)	2.00
5.	Manning's Coefficient	0.115
6.	Discharge (cfs)	770.00
7.	Depth of Flow (ft)	4.37

OUTPUT RESULTS

Cross Section Area (Sqft)	81.89
Average Velocity (ft/sec)	9.40
Top Width (ft)	27.48
Hydraulic Radius (ft)	2.77
Froude Number	0.96

TR-55 Time of Concentration (Tc), Travel Time (Tt) and Lag Time Worksheet

Project No: 27028 By: jlc Date: 10/25/2007
Project Name: Finger Rock Wash LOMR

Watershed Subarea ID: FR-922
Circle One: Tc or Tt computation

Sheet Flow (Applicable to Tc only)	Segment ID		A	EL 6805
1. Surface description (table 3-1)			Woods	
2. Manning's roughness coeff, n (table 3-1)			0.4	
3. Flow Length, L (total L ≤ 300 ft)		ft	100	
4. Two-yr 24-hr rainfall, P_2		in	2.38	NOAA 14
5. Land slope, s		ft/ft	0.5	
6. $T_t = 0.007\ (nL)^{0.8} / (P_2^{0.5})\ (s^{0.4})$	Compute T_t	hr	0.115	6750
Shallow Concentrated Flow	Segment ID		B	
7. Surface description (paved or unpaved)			U	
8. Flow Length, L		ft	1580	
9. Watercourse Slope, s		ft/ft	0.481	
10. Average Velocity, V (figure 3-1)		ft/s	11.3	
11. $T_t = L / (3600\ V)$	Compute T_t	hr	0.039	5960
Channel Flow	Segment ID		C	
12. Cross Sectional Flow Area, a		ft^2		
13. Wetted Perimeter, P_w		ft		
14. Hydraulic radius, $r = a/P_w$		ft		
15. Channel Slope, s		ft/ft	0.377	
16. Manning's roughness coeff, n			0.19	
17. $V = (1.49\ r^{0.666}\ s^{0.5)} / n$		ft/s	10.5	
18. Flow Length, L		ft	5620	
19. $T_t = L / (3600\ V)$	Compute T_t	hr	0.149	3840
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)		hr	0.302	
		min	18	
21. Lag Time = 0.6 T_c	Compute Lag Time	hr	0.181	
		min	11	

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 10/03/2007

Project No. :27028
Project Name.:Finger Rock Wash
Computed by :jlc

Project Description
FR-922 Tc Calc Using TR-55 - Channel Flow Segment
Assume Froude # <= 1 for steep mtn streams
Adjust Manning's n to calibrate

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.3770
2.	Channel Bottom Width (ft)	10.00
3.	Left Side Slope (Horizontal to 1)	2.00
4.	Right Side Slope (Horizontal to 1)	2.00
5.	Manning's Coefficient	0.190
6.	Discharge (cfs)	1140.00
7.	Depth of Flow (ft)	5.28

OUTPUT RESULTS

Cross Section Area (Sqft)	108.56
Average Velocity (ft/sec)	10.50
Top Width (ft)	31.12
Hydraulic Radius (ft)	3.23
Froude Number	0.99

D.3 – HYDROGRAPH ROUTING DATA

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-12 TO FR-11 1-29-08

STA:	.00	10.00	20.00	30.00	40.00	50.00	60.00
ELEV:	30.00	20.00	10.00	.00	.00	10.00	20.00

STA:	70.00
ELEV:	30.00

DISCHARGE = 770. WSEL = 4.92 SLOPE = .2680

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1	
DISCHARGE (CFS) =	770.32	770.32	
VELOCITY (FT/S) =	10.49	10.49	x 1.5 = 15.7 fps
AREA (SQUARE FT) =	73.45	73.45	
TOPWIDTH (FT) =	19.84	19.84	
DEPTH (FT) =	4.92	4.92	
HYD. DEPTH (FT) =	3.70	3.70	
WET. PERIM. (FT) =	23.92	23.92	
HYD. RADIUS (FT) =	3.07	3.07	
FROUDE NUMBER =	.96	.96	
MANNINGS N VALUE =	.1550	.1550	

SUBSECTION 1 = STATION .00 TO STATION 70.00

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-11 TO FR-10 1-29-08

STA:	.00	10.00	20.00	30.00	40.00	50.00	60.00
ELEV:	30.00	20.00	10.00	.00	.00	10.00	20.00

STA:	70.00
ELEV:	30.00

DISCHARGE = 1480. WSEL = 7.15 SLOPE = .1590

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1	
DISCHARGE (CFS) =	1480.01	1480.01	
VELOCITY (FT/S) =	12.07	12.07	× 1.5 = 18.1 fps
AREA (SQUARE FT) =	122.66	122.66	
TOPWIDTH (FT) =	24.30	24.30	
DEPTH (FT) =	7.15	7.15	
HYD. DEPTH (FT) =	5.05	5.05	
WET. PERIM. (FT) =	30.23	30.23	
HYD. RADIUS (FT) =	4.06	4.06	
FROUDE NUMBER =	.95	.95	
MANNINGS N VALUE =	.1250	.1250	

SUBSECTION 1 = STATION .00 TO STATION 70.00

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-10 TO FR-9 1-29-08

STA:	.00	10.00	20.00	30.00	40.00	50.00	60.00
ELEV:	10.00	6.60	3.30	.00	.00	3.30	6.60

STA:	70.00
ELEV:	10.00

DISCHARGE = 2150. WSEL = 6.55 SLOPE = .0930

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1	
DISCHARGE (CFS) =	2150.17	2150.17	
VELOCITY (FT/S) =	10.99	10.99	X 1.5 = 16.5 fps
AREA (SQUARE FT) =	195.61	195.61	
TOPWIDTH (FT) =	49.71	49.71	
DEPTH (FT) =	6.55	6.55	
HYD. DEPTH (FT) =	3.94	3.94	
WET. PERIM. (FT) =	51.82	51.82	
HYD. RADIUS (FT) =	3.78	3.78	
FROUDE NUMBER =	.98	.98	
MANNINGS N VALUE =	.1000	.1000	

SUBSECTION 1 = STATION .00 TO STATION 70.00

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-94 TO FR-93 1-29-08

STA:	.00	10.00	20.00	30.00	40.00	50.00	60.00
ELEV:	15.00	10.00	5.00	.00	.00	5.00	10.00

STA:	70.00
ELEV:	15.00

DISCHARGE = 785. WSEL = 4.39 SLOPE = .2860

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	785.15	785.15
VELOCITY (FT/S) =	9.53	9.53 × 1.5 = 14.3 fps
AREA (SQUARE FT) =	82.40	82.40
TOPWIDTH (FT) =	27.55	27.55
DEPTH (FT) =	4.39	4.39
HYD. DEPTH (FT) =	2.99	2.99
WET. PERIM. (FT) =	29.63	29.63
HYD. RADIUS (FT) =	2.78	2.78
FROUDE NUMBER =	.97	.97
MANNINGS N VALUE =	.1650	.1650

SUBSECTION 1 = STATION .00 TO STATION 70.00

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-93 TO FR-92 1-29-08

STA:	.00	10.00	20.00	30.00	40.00	50.00	60.00
ELEV:	15.00	10.00	5.00	.00	.00	5.00	10.00

STA:	70.00
ELEV:	15.00

DISCHARGE = 1325. WSEL = 5.74 SLOPE = .1210

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1	
DISCHARGE (CFS) =	1325.01	1325.01	
VELOCITY (FT/S) =	10.75	10.75	× 1.5 = 16.1 fps
AREA (SQUARE FT) =	123.29	123.29	
TOPWIDTH (FT) =	32.96	32.96	
DEPTH (FT) =	5.74	5.74	
HYD. DEPTH (FT) =	3.74	3.74	
WET. PERIM. (FT) =	35.67	35.67	
HYD. RADIUS (FT) =	3.46	3.46	
FROUDE NUMBER =	.98	.98	
MANNINGS N VALUE =	.1100	.1100	

SUBSECTION 1 = STATION .00 TO STATION 70.00

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-922 TO FR-921 1-29-08

STA:	.00	10.00	20.00	30.00	40.00	50.00	60.00
ELEV:	15.00	10.00	5.00	.00	.00	5.00	10.00

STA:	70.00
ELEV:	15.00

DISCHARGE = 535. WSEL = 3.64 SLOPE = .1350

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1	
DISCHARGE (CFS) =	535.00	535.00	
VELOCITY (FT/S) =	8.50	8.50	x 1.5 = 12.8 fps
AREA (SQUARE FT) =	62.94	62.94	
TOPWIDTH (FT) =	24.57	24.57	
DEPTH (FT) =	3.64	3.64	
HYD. DEPTH (FT) =	2.56	2.56	
WET. PERIM. (FT) =	26.29	26.29	
HYD. RADIUS (FT) =	2.39	2.39	
FROUDE NUMBER =	.94	.94	
MANNINGS N VALUE =	.1150	.1150	

SUBSECTION 1 = STATION .00 TO STATION 70.00

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-92 TO FR-91 1-29-08

STA:	.00	10.00	20.00	30.00	40.00	50.00	60.00
ELEV:	15.00	10.00	5.00	.00	.00	5.00	10.00

STA:	70.00
ELEV:	15.00

DISCHARGE = 2275. WSEL = 7.56 SLOPE = .0920

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	2275.07	2275.07
VELOCITY (FT/S) =	11.99	11.99 x 1.5 = 18.0 fps
AREA (SQUARE FT) =	189.80	189.80
TOPWIDTH (FT) =	40.23	40.23
DEPTH (FT) =	7.56	7.56
HYD. DEPTH (FT) =	4.72	4.72
WET. PERIM. (FT) =	43.80	43.80
HYD. RADIUS (FT) =	4.33	4.33
FROUDE NUMBER =	.97	.97
MANNINGS N VALUE =	.1000	.1000

SUBSECTION 1 = STATION .00 TO STATION 70.00

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-9 TO FR-8 1-29-08

STA:	.00	10.00	20.00	30.00	40.00	50.00	60.00
ELEV:	10.00	6.60	3.30	.00	.00	3.30	6.60

STA:	70.00
ELEV:	10.00

DISCHARGE = 4615. WSEL = 9.45 SLOPE = .0450

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1	
DISCHARGE (CFS) =	4615.01	4615.01	
VELOCITY (FT/S) =	12.66	12.66	x 1.5 = 19.0 fps
AREA (SQUARE FT) =	364.67	364.67	
TOPWIDTH (FT) =	66.79	66.79	
DEPTH (FT) =	9.45	9.45	
HYD. DEPTH (FT) =	5.46	5.46	
WET. PERIM. (FT) =	69.86	69.86	
HYD. RADIUS (FT) =	5.22	5.22	
FROUDE NUMBER =	.95	.95	
MANNINGS N VALUE =	.0750	.0750	

SUBSECTION 1 = STATION .00 TO STATION 70.00

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-82 TO FR-81 1-29-08

STA:	.00	10.00	20.00	30.00	40.00	50.00	60.00
ELEV:	10.00	6.60	3.30	.00	.00	3.30	6.60

STA:	70.00
ELEV:	10.00

DISCHARGE = 465. WSEL = 3.15 SLOPE = .0490

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	465.04	465.04
VELOCITY (FT/S) =	7.57	7.57 x 1.5 = 11.4 fps
AREA (SQUARE FT) =	61.45	61.45
TOPWIDTH (FT) =	29.07	29.07
DEPTH (FT) =	3.15	3.15
HYD. DEPTH (FT) =	2.11	2.11
WET. PERIM. (FT) =	30.08	30.08
HYD. RADIUS (FT) =	2.04	2.04
FROUDE NUMBER =	.92	.92
MANNINGS N VALUE =	.0700	.0700

SUBSECTION 1 = STATION .00 TO STATION 70.00

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-8 TO FR-7 1-29-08

STA:	.00	19.00	37.00	52.00	85.00	112.00	167.00
ELEV:	84.00	80.00	78.00	76.00	75.00	76.00	78.00

STA:	200.00
ELEV:	84.00

DISCHARGE = 5770. WSEL = 80.36 SLOPE = .0180

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1	
DISCHARGE (CFS) =	5770.34	5770.34	
VELOCITY (FT/S) =	10.17	10.17	x 1.5 = 15.3 fps
AREA (SQUARE FT) =	567.45	567.45	
TOPWIDTH (FT) =	162.72	162.72	
DEPTH (FT) =	5.36	5.36	
HYD. DEPTH (FT) =	3.49	3.49	
WET. PERIM. (FT) =	163.29	163.29	
HYD. RADIUS (FT) =	3.48	3.48	
FROUDE NUMBER =	.96	.96	
MANNINGS N VALUE =	.0450	.0450	

SUBSECTION 1 = STATION .00 TO STATION 200.00

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-7 TO FR-6 1-29-08

STA:	.00	15.00	57.00	164.00	172.00	219.00	237.00
ELEV:	24.00	20.00	18.00	13.30	14.00	18.00	20.00

STA:	250.00
ELEV:	24.00

DISCHARGE = 5840. WSEL = 19.25 SLOPE = .0240

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1
DISCHARGE (CFS) =	5840.12	5840.12
VELOCITY (FT/S) =	9.65	9.65 × 1.5 = 14.5
AREA (SQUARE FT) =	605.48	605.48
TOPWIDTH (FT) =	199.39	199.39
DEPTH (FT) =	5.95	5.95
HYD. DEPTH (FT) =	3.04	3.04
WET. PERIM. (FT) =	199.80	199.80
HYD. RADIUS (FT) =	3.03	3.03
FROUDE NUMBER =	.98	.98
MANNINGS N VALUE =	.0500	.0500

SUBSECTION 1 = STATION .00 TO STATION 250.00

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-62 TO FR-61 1-29-08

STA:	.00	10.00	20.00	30.00	40.00	50.00	60.00
ELEV:	6.00	4.00	2.00	.00	.00	2.00	4.00

STA:	70.00
ELEV:	6.00

DISCHARGE = 550. WSEL = 3.01 SLOPE = .0320

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1	
DISCHARGE (CFS) =	550.01	550.01	
VELOCITY (FT/S) =	7.29	7.29	× 1.5 = 10.9 fps
AREA (SQUARE FT) =	75.42	75.42	
TOPWIDTH (FT) =	40.10	40.10	
DEPTH (FT) =	3.01	3.01	
HYD. DEPTH (FT) =	1.88	1.88	
WET. PERIM. (FT) =	40.70	40.70	
HYD. RADIUS (FT) =	1.85	1.85	
FROUDE NUMBER =	.94	.94	
MANNINGS N VALUE =	.0550	.0550	

SUBSECTION 1 = STATION .00 TO STATION 70.00

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-6 TO FR-5 1-29-08

STA:	.00	66.00	202.00	225.00	237.00	255.00	287.00
ELEV:	90.00	82.00	80.00	76.60	78.00	80.00	82.00

STA:	320.00
ELEV:	90.00

DISCHARGE = 6410. WSEL = 83.48 SLOPE = .0180

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1	
DISCHARGE (CFS) =	6410.24	6410.24	
VELOCITY (FT/S) =	9.09	9.09	× 1.5 = 13.6 fps
AREA (SQUARE FT) =	705.29	705.29	
TOPWIDTH (FT) =	239.37	239.37	
DEPTH (FT) =	6.88	6.88	
HYD. DEPTH (FT) =	2.95	2.95	
WET. PERIM. (FT) =	240.16	240.16	
HYD. RADIUS (FT) =	2.94	2.94	
FROUDE NUMBER =	.93	.93	
MANNINGS N VALUE =	.0450	.0450	

SUBSECTION 1 = STATION .00 TO STATION 320.00

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-5 TO FR-4 1-29-08

STA:	.00	50.00	373.00	415.00	425.00	442.00	543.00
ELEV:	30.00	24.00	22.00	18.00	20.00	22.00	26.00

STA:	593.00
ELEV:	30.00

DISCHARGE = 5650. WSEL = 24.34 SLOPE = .0190

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1	
DISCHARGE (CFS) =	5650.01	5650.01	
VELOCITY (FT/S) =	7.09	7.09	x 1.5 = 10.6 fps
AREA (SQUARE FT) =	796.82	796.82	
TOPWIDTH (FT) =	454.06	454.06	
DEPTH (FT) =	6.34	6.34	
HYD. DEPTH (FT) =	1.75	1.75	
WET. PERIM. (FT) =	454.64	454.64	
HYD. RADIUS (FT) =	1.75	1.75	
FROUDE NUMBER =	.94	.94	
MANNINGS N VALUE =	.0420	.0420	

SUBSECTION 1 = STATION .00 TO STATION 593.00

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-4 TO FR-3 1-29-08

STA:	.00	50.00	140.00	164.00	172.00	197.00	270.00
ELEV:	80.00	67.50	71.00	68.00	68.00	71.00	68.00

STA:	333.00
ELEV:	80.00

DISCHARGE = 5490. WSEL = 71.96 SLOPE = .0170

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1	
DISCHARGE (CFS) =	5490.00	5490.00	
VELOCITY (FT/S) =	8.36	8.36	× 1.5 = 12.5 fps
AREA (SQUARE FT) =	656.79	656.79	
TOPWIDTH (FT) =	258.63	258.63	
DEPTH (FT) =	4.46	4.46	
HYD. DEPTH (FT) =	2.54	2.54	
WET. PERIM. (FT) =	260.05	260.05	
HYD. RADIUS (FT) =	2.53	2.53	
FROUDE NUMBER =	.92	.92	
MANNINGS N VALUE =	.0430	.0430	

SUBSECTION 1 = STATION .00 TO STATION 333.00

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-3 TO FR-2 1-29-08

STA:	.00	38.00	85.00	131.00	142.00	208.00	415.00
ELEV:	90.00	80.00	78.00	77.50	78.00	79.00	80.00

STA:	438.00
ELEV:	90.00

DISCHARGE = 5130. WSEL = 80.90 SLOPE = .0160

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1	
DISCHARGE (CFS) =	5130.12	5130.12	
VELOCITY (FT/S) =	7.15	7.15	x 1.5 = 10.7 fps
AREA (SQUARE FT) =	717.82	717.82	
TOPWIDTH (FT) =	382.46	382.46	
DEPTH (FT) =	3.40	3.40	
HYD. DEPTH (FT) =	1.88	1.88	
WET. PERIM. (FT) =	382.83	382.83	
HYD. RADIUS (FT) =	1.88	1.88	
FROUDE NUMBER =	.92	.92	
MANNINGS N VALUE =	.0400	.0400	

SUBSECTION 1 = STATION .00 TO STATION 438.00

27028 FINGER ROCK WASH HEC-1 ROUTING
CROSS-SECTION - FR-2 TO FR-1 1-29-08

STA:	.00	20.00	150.00	365.00	377.00	390.00	403.00
ELEV:	52.00	46.00	43.00	42.00	42.00	46.00	49.00

STA:	412.00
ELEV:	52.00

DISCHARGE = 4890. WSEL = 44.94 SLOPE = .0180

SECTION AND SUBSECTION HYDRAULIC DATA

	TOTAL SECTION	SUBSECTION #: 1	
DISCHARGE (CFS) =	4890.06	4890.06	
VELOCITY (FT/S) =	7.46	7.46	x 1.5 = 11.2 fps
AREA (SQUARE FT) =	655.32	655.32	
TOPWIDTH (FT) =	320.60	320.60	
DEPTH (FT) =	2.94	2.94	
HYD. DEPTH (FT) =	2.04	2.04	
WET. PERIM. (FT) =	321.07	321.07	
HYD. RADIUS (FT) =	2.04	2.04	
FROUDE NUMBER =	.92	.92	
MANNINGS N VALUE =	.0430	.0430	

SUBSECTION 1 = STATION .00 TO STATION 412.00

D.4 – RESERVOIR ROUTING DATA

Finger Rock Wash		
Reservoir Elev -Area		
Project #:	**27028**	
BASIN FR4	Pontatoc Canyon Dr.	
Elevation		
(ft)		
2624.0	(ft^2)	AC
2622.0	336139.25	7.72
2620.0	278771	6.40
2618.0	217485	5.00
2616.0	158507	3.64
2614.0	92068	2.11
2612.0	32730	0.75
	1177	0.03
		25.650
BASIN FR5		
Elevation	Sunrise Dr.	
(ft)		
2750.0	(ft^2)	AC
2748.0	289561.09	6.65
2746.0	242575	5.57
2744.0	195322	4.48
2742.0	149998	3.44
2740.0	106764	2.45
2738.0	61879	1.42
2736.0	20052	0.46
	2974	0.69
		25.160
BASIN FR7	SkyLine Dr.	
(ft)		
2790.00	(ft^2)	AC
2788.00	338020.20	7.76
2786.0	293656.40	6.74
2784.0	267424	6.140
2782.0	236469	5.430
2780.0	203249	4.700
2778.0	178971	4.110
2776.0	151893	3.500
2774.0	120047	2.800
2772.0	88075	2.020
2770.0	51342.3	1.200
	7804.84	0.200
		44.601

BASIN FR9	Play De Coronado W					
Elevation						
(ft)						
3080.0	(ft^2)	AC				
3078.0	13648.60	0.31				
3076.0	10556.42	0.24				
3075.0	8844.98	0.20				
3074.0	7815.90	0.18				
3072.0	5733.41	0.13				
3070.0	4671.52	0.11				
3068.0	3737.13	0.10				
3066.0	2275.28	0.05				
3065.00	1236.46	0.03				
3064.00	326.50	0.0070				
	65.05	0.0010				
		1.358				
BASIN FR91	Play De Coronado E					
Elevation						
(ft)						
3070.0	(ft^2)	AC				
3065.0	22851.79	0.52				
3060.0	15670.35	0.36				
3055.0	10843.36	0.25				
3050.0	5626.77	0.13				
3048.0	470.42	0.01				
	172.85	0.0040				
		0.389				

2-18-08

HY-8 Culvert Analysis Report

27028 Finger Rock LOMR

Pontatoc Canyon Dr. Crossing

HEC-1 Conc. Pt FR-4

Based on OPW As Built Survey Data (1-31-08)

Table 1 - Summary of Culvert Flows at Crossing: 27028 FR-4 Pontatoc Cnyn

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2610.40	0.00	0.00	0.00	1
2614.92	1000.00	1000.00	0.00	1
2617.42	2000.00	2000.00	0.00	1
2618.65	3000.00	2398.33	600.78	5
2619.36	4000.00	2601.31	1398.56	4
2619.93	5000.00	2751.76	2247.97	4
2620.42	6000.00	2876.41	3123.18	4
2620.84	7000.00	2979.50	4020.29	4
2621.23	8000.00	3070.46	4929.35	4
2621.59	9000.00	3152.63	5847.13	4
2621.94	10000.00	3227.92	6771.75	4

Table 2 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	2610.40	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
1000.00	1000.00	2614.92	4.522	0.772	1-S2n	2.759	3.075	2.765	1.172	10.100	5.298
2000.00	2000.00	2617.42	7.023	1.246	5-S2n	4.141	4.429	4.148	1.646	12.031	6.395
3000.00	2398.33	2618.65	8.247	1.596	5-S2n	4.693	4.875	4.695	1.996	12.500	7.113
4000.00	2601.31	2619.36	8.957	1.852	5-S2n	4.989	5.066	4.995	2.252	12.662	7.870
5000.00	2751.76	2619.93	9.522	9.528	2-M2c	5.235	5.204	5.204	2.479	12.841	8.515
6000.00	2876.41	2620.42	10.017	9.776	2-M2c	5.440	5.319	5.319	2.687	13.126	9.079
7000.00	2979.50	2620.84	10.444	9.980	2-M2c	5.614	5.413	5.413	2.879	13.353	9.582
8000.00	3070.46	2621.23	10.833	10.195	2-M2c	5.851	5.497	5.497	3.058	13.546	10.038
9000.00	3152.63	2621.59	11.195	10.385	2-M2c	6.065	5.572	5.572	3.228	13.715	10.456
10000.00	3227.92	2621.94	11.535	10.560	2-M2c	6.261	5.629	5.629	3.388	13.898	10.843

****

Inlet Elevation (invert): 2610.40 ft, Outlet Elevation (invert): 2609.30 ft

Culvert Length: 70.01 ft, Culvert Slope: 0.0157

****

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 2610.40 ft

Outlet Station: 70.00 ft

Outlet Elevation: 2609.30 ft

Number of Barrels: 7

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 7.00 ft

Barrel Material: Corrugated Steel

Barrel Manning's n: 0.0240

Inlet Type: Conventional

Inlet Edge Condition: Mitered to Conform to Slope

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: 27028 FR-4 Pontatoc Cnyn)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	2610.00	0.00	0.00	0.00	0.00
1000.00	2611.17	1.17	5.30	3.88	1.04
2000.00	2611.65	1.65	6.40	5.44	1.09
3000.00	2612.00	2.00	7.11	6.60	1.11
4000.00	2612.25	2.25	7.87	7.45	1.14
5000.00	2612.48	2.48	8.52	8.20	1.16
6000.00	2612.69	2.69	9.08	8.89	1.18
7000.00	2612.88	2.88	9.58	9.52	1.20
8000.00	2613.06	3.06	10.04	10.11	1.21
9000.00	2613.23	3.23	10.46	10.67	1.22
10000.00	2613.39	3.39	10.84	11.21	1.24

Tailwater Channel Data - 27028 FR-4 Pontatoc Cnyn

Tailwater Channel Option: Irregular Channel

Channel Slope: 0.0530

User Defined Channel Cross-Section:

Coord No.	Station (ft)	Elevation (ft)	Manning's n
1	0.00	2628.00	0.0600
2	6.46	2626.00	0.0600
3	13.02	2624.00	0.0600
4	19.58	2622.00	0.0600
5	26.15	2620.00	0.0600
6	46.22	2618.00	0.0600
7	81.67	2616.00	0.0600
8	98.77	2614.00	0.0600
9	115.98	2612.00	0.0600
10	258.20	2610.00	0.0600
11	306.74	2610.00	0.0600
12	347.83	2610.00	0.0600
13	449.40	2612.00	0.0600
14	507.45	2614.00	0.0600
15	534.63	2616.00	0.0600
16	545.92	2618.00	0.0600
17	556.46	2620.00	0.0600
18	564.36	2622.00	0.0600

19	569.87	2624.00	0.0600
20	574.49	2626.00	0.0600
21	579.38	2628.00	0.0600
22	585.00	2630.00	0.0600
23	590.62	2632.00	0.0600
24	596.25	2634.00	0.0600
25	601.87	2636.00	0.0000

Roadway Data for Crossing: 27028 FR-4 Pontatoc Cnyn

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
1	0.00	2636.41
2	52.00	2632.21
3	102.00	2627.26
4	151.00	2623.09
5	201.00	2620.24
6	250.00	2618.26
7	301.00	2617.44
8	343.00	2617.46
9	398.00	2617.46
10	449.00	2618.30
11	503.00	2620.50
12	554.00	2623.93
13	605.00	2628.32
14	657.00	2634.26
15	707.00	2641.04

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

2-07-08
HY-8 Culvert Analysis Report
27028 Finger Rock LOMR

Sunrise Dr. Crossing
HEC-1 Conc. Pt. FR-5
Based on OPW As Built Survey Data (1-31-08)

Table 1 - Summary of Culvert Flows at Crossing: 27058FR5

Headwater Elevation (ft)	Total Discharge (cfs)	27058FR5(1) Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2635.61	0.00	0.00	0.00	1
2637.90	1000.00	1000.00	0.00	1
2639.25	2000.00	2000.00	0.00	1
2640.45	3000.00	3000.00	0.00	1
2641.57	4000.00	4000.00	0.00	1
2642.62	5000.00	5000.00	0.00	1
2643.66	6000.00	6000.00	0.00	1
2644.08	6407.00	6407.00	0.00	1
2645.79	8000.00	8000.00	0.00	1
2646.94	9000.00	9000.00	0.00	1
2648.17	10000.00	10000.00	0.00	1

Table 2 - Culvert Summary Table: 27058FR5(1)

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	2635.61	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
1000.00	1000.00	2637.90	2.294	2.294	1-S2n	0.796	1.568	0.800	1.755	13.893	5.300
2000.00	2000.00	2639.25	3.642	3.642	1-S2n	1.214	2.490	1.376	2.477	16.152	6.627
3000.00	3000.00	2640.45	4.841	4.841	1-S2n	1.624	3.263	1.880	3.014	17.734	7.511
4000.00	4000.00	2641.57	5.958	5.958	1-S2n	1.956	3.952	2.350	3.463	18.910	8.170
5000.00	5000.00	2642.62	7.014	7.014	1-S2n	2.289	4.586	2.801	3.854	19.832	8.700
6000.00	6000.00	2643.66	8.050	8.050	5-S2n	2.597	5.179	3.229	4.193	20.646	9.070
6407.00	6407.00	2644.08	8.473	8.473	5-S2n	2.717	5.411	3.401	4.317	20.934	9.188
8000.00	8000.00	2645.79	10.183	10.183	5-S2n	3.187	6.274	4.054	4.756	21.926	9.600
9000.00	9000.00	2646.94	11.332	11.332	5-S2n	3.462	6.786	4.446	5.001	22.490	9.826
10000.00	10000.00	2648.17	12.561	12.561	5-S2n	3.735	7.280	4.830	5.229	23.003	10.033

****

Inlet Elevation (invert): 2635.61 ft, Outlet Elevation (invert): 2632.16 ft

Culvert Length: 166.04 ft, Culvert Slope: 0.0208

****

Site Data - 27058FR5(1)

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 2635.61 ft

Outlet Station: 166.00 ft

Outlet Elevation: 2632.16 ft

Number of Barrels: 9

Culvert Data Summary - 27058FR5(1)

Barrel Shape: Concrete Box

Barrel Span: 10.00 ft

Barrel Rise: 8.00 ft

Barrel Material: Concrete

Barrel Manning's n: 0.0120

Inlet Type: Conventional

Inlet Edge Condition: 1:1 Bevel (45° flare) Wingwall

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: 27058FR5)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	2632.00	0.00	0.00	0.00	0.00
1000.00	2633.75	1.75	5.30	3.07	0.81
2000.00	2634.48	2.48	6.63	4.33	0.88
3000.00	2635.01	3.01	7.51	5.27	0.92
4000.00	2635.46	3.46	8.17	6.05	0.94
5000.00	2635.85	3.85	8.70	6.73	0.96
6000.00	2636.19	4.19	9.07	7.33	1.05
6407.00	2636.32	4.32	9.19	7.54	1.05
8000.00	2636.76	4.76	9.60	8.31	1.06
9000.00	2637.00	5.00	9.83	8.74	1.06
10000.00	2637.23	5.23	10.03	9.14	1.07

Tailwater Channel Data - 27058FR5

Tailwater Channel Option: Irregular Channel

Channel Slope: 0.0280

User Defined Channel Cross-Section:

Coord No.	Station (ft)	Elevation (ft)	Manning's n
1	0.00	2670.00	0.0600
2	4.80	2668.00	0.0600
3	11.42	2666.00	0.0600
4	17.83	2664.00	0.0600
5	23.41	2662.00	0.0600
6	33.21	2660.00	0.0600
7	39.16	2658.00	0.0600
8	45.00	2656.00	0.0600
9	50.36	2654.00	0.0600
10	55.21	2652.00	0.0600
11	60.05	2650.00	0.0600
12	67.55	2648.00	0.0600
13	78.72	2646.00	0.0600
14	83.26	2644.00	0.0600
15	87.45	2642.00	0.0600
16	91.24	2640.00	0.0600
17	109.46	2638.00	0.0600

18	142.75	2636.00	0.0600
19	181.01	2636.00	0.0600
20	218.84	2638.00	0.0600
21	234.65	2638.00	0.0600
22	257.00	2636.00	0.0600
23	274.37	2634.00	0.0600
24	303.75	2632.00	0.0600
25	368.68	2632.00	0.0600
26	402.54	2634.00	0.0600
27	412.50	2636.00	0.0600
28	421.66	2638.00	0.0600
29	432.28	2640.00	0.0600
30	443.19	2642.00	0.0600
31	461.79	2642.00	0.0600
32	500.62	2640.00	0.0600
33	545.20	2638.00	0.0600
34	591.32	2636.00	0.0600
35	639.36	2634.00	0.0600
36	648.77	2632.00	0.0600
37	656.51	2632.00	0.0600
38	663.31	2634.00	0.0600
39	666.95	2636.00	0.0600
40	670.60	2638.00	0.0600
41	674.24	2640.00	0.0600
42	678.13	2642.00	0.0600
43	684.79	2644.00	0.0600
44	692.54	2646.00	0.0600
45	700.80	2648.00	0.0600
46	707.52	2650.00	0.0600
47	714.46	2652.00	0.0600
48	722.13	2654.00	0.0600
49	729.37	2656.00	0.0000

Roadway Data for Crossing: 27058FR5

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
1	89.00	2660.37
2	153.00	2657.78
3	203.00	2656.24
4	261.00	2654.44
5	306.00	2653.54
6	357.00	2652.00
7	410.00	2651.74
8	458.00	2651.19
9	510.00	2650.70
10	561.00	2650.20
11	612.00	2649.75
12	667.00	2649.38
13	715.00	2649.33
14	764.00	2649.48
15	819.00	2651.54

Roadway Surface: Paved

Roadway Top Width: 127.00 ft

HY-8 Culvert Hydraulic Report
Skyline Drive Culvert Crossing at Finger Rock Wash
Stage-Discharge Analysis

Part of the Finger Rock Wash LOMR Project
(@ HEC-1 Concentration Point FR-7)

Combined flow analysis including low-flow and roadway overtopping
Culvert site data based on 1-31-08 OPW as-built survey

Prepared for:
Pima County Regional Flood Control District
97 E Congress St
Tucson, Arizona 85701

Prepared by:
CMG Drainage Engineering, Inc.
3555 N Mountain Ave.
Tucson, Arizona 85719
520-882-4244

Registered Professional Engineer (Civil)
CERTIFICATE NO.
32139
JERALD L.
CURLESS
Date Signed 2/20/08
ARIZONA, U.S.A.
Jerald L. Curless

Expires 12-31-2009

CMG Project No. 27028

February 19, 2008

Table 1 - Summary of Combined Culvert & Roadway Overtopping Flows at Crossing: 27028 FR-7 Skyline

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2767.28	0.00	0.00	0.00	1
2769.14	20.00	20.00	0.00	1
2770.09	40.00	40.00	0.00	1
2770.99	60.00	60.00	0.00	1
2771.97	80.00	80.00	0.00	1
2773.15	100.00	100.00	0.00	1
2774.60	120.00	120.00	0.00	1
2776.38	140.00	140.00	0.00	1
2778.50	160.00	160.00	0.00	1
2780.95	180.00	180.00	0.00	1
2783.69	200.00	200.00	0.00	1
2784.74	500.00	207.20	292.68	22
2785.27	1000.00	210.67	789.27	20
2785.93	2000.00	215.01	1784.39	4
2786.42	3000.00	218.18	2780.77	4
2786.84	4000.00	220.78	3778.16	4
2787.19	5000.00	223.02	4776.11	4
2787.51	6000.00	225.01	5774.12	4
2787.81	7000.00	226.81	6772.36	4
2788.08	8000.00	228.46	7767.67	3
2788.33	9000.00	230.00	8769.15	3
2788.57	10000.00	231.44	9768.53	3

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 2767.28 ft

Outlet Station: 115.00 ft

Outlet Elevation: 2760.73 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 4.00 ft

Barrel Material: Corrugated Steel

Barrel Manning's n: 0.0240

Inlet Type: Conventional

Inlet Edge Condition: Thin Edge Projecting

Inlet Depression: None

Table 2 - Culvert Summary Table: Low Flows (0 to 200 cfs)

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	2767.28	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
20.00	20.00	2769.14	1.861	0.000	1-S2n	0.874	1.305	0.875	0.822	9.760	2.819
40.00	40.00	2770.09	2.812	0.000	1-S2n	1.254	1.879	1.258	1.054	11.789	3.428
60.00	60.00	2770.99	3.709	0.000	1-S2n	1.559	2.329	1.568	1.202	13.125	3.915
80.00	80.00	2771.97	4.691	0.000	5-S2n	1.828	2.703	1.836	1.326	14.207	4.244
100.00	100.00	2773.15	5.870	0.000	5-S2n	2.087	3.018	2.092	1.433	15.041	4.494
120.00	120.00	2774.60	7.323	0.000	5-S2n	2.337	3.281	2.340	1.528	15.719	4.697
140.00	140.00	2776.38	9.099	0.000	5-S2n	2.595	3.490	2.602	1.614	16.200	4.870
160.00	160.00	2778.50	11.218	0.000	5-S2n	2.865	3.698	2.867	1.692	16.620	5.020
180.00	180.00	2780.95	13.669	0.000	5-S2n	3.171	3.907	3.176	1.765	16.834	5.154
200.00	200.00	2783.69	16.406	12.491	5-S2n	4.000	4.000	4.000	1.834	15.915	5.275

****

Inlet Elevation (invert): 2767.28 ft, Outlet Elevation (invert): 2760.73 ft

Culvert Length: 115.19 ft, Culvert Slope: 0.0570

****

Table 3 - Culvert Summary Table: High Flows (0 to 10,000 cfs)

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	2767.28	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
500.00	207.20	2784.74	17.462	13.593	5-S2n	4.000	4.000	4.000	2.559	16.488	6.420
1000.00	210.67	2785.27	17.984	14.139	5-S2n	4.000	4.000	4.000	3.270	16.765	7.605
2000.00	215.01	2785.93	18.649	14.833	5-S2n	4.000	4.000	4.000	4.174	17.110	9.131
3000.00	218.18	2786.42	19.144	15.350	5-S2n	4.000	4.000	4.000	4.852	17.362	10.048
4000.00	220.78	2786.84	19.555	15.779	5-S2n	4.000	4.000	4.000	5.388	17.569	10.522
5000.00	223.02	2787.19	19.913	16.246	5-S2n	4.000	4.000	4.000	5.834	17.747	10.849
6000.00	225.01	2787.51	20.234	16.970	5-S2n	4.000	4.000	4.000	6.223	17.906	11.127
7000.00	226.81	2787.81	20.527	17.625	5-S2n	4.000	4.000	4.000	6.572	18.049	11.370
8000.00	228.46	2788.08	20.798	18.226	5-S2n	4.000	4.000	4.000	6.889	18.181	11.588
9000.00	230.00	2788.33	21.051	18.777	5-S2n	4.000	4.000	4.000	7.176	18.303	11.821
10000.00	231.44	2788.57	21.292	19.293	5-S2n	4.000	4.000	4.000	7.441	18.418	12.078

****

Inlet Elevation (invert): 2767.28 ft, Outlet Elevation (invert): 2760.73 ft

Culvert Length: 115.19 ft, Culvert Slope: 0.0570

****

Table 4 - Downstream Channel Rating Curve (Crossing: 27028 FR-7 Skyline)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	2759.00	0.00	0.00	0.00	0.00
20.00	2759.82	0.82	2.82	1.23	0.77
40.00	2760.05	1.05	3.43	1.58	0.84
60.00	2760.20	1.20	3.91	1.80	0.91
80.00	2760.33	1.33	4.24	1.99	0.95
100.00	2760.43	1.43	4.49	2.15	0.97
120.00	2760.53	1.53	4.70	2.29	0.98
140.00	2760.61	1.61	4.87	2.42	0.99
160.00	2760.69	1.69	5.02	2.53	1.00
180.00	2760.77	1.77	5.15	2.64	1.01
200.00	2760.83	1.83	5.28	2.75	1.01
500.00	2761.56	2.56	6.42	3.83	1.04
1000.00	2762.27	3.27	7.61	4.90	1.08
2000.00	2763.17	4.17	9.13	6.25	1.13
3000.00	2763.85	4.85	10.05	7.27	1.15
4000.00	2764.39	5.39	10.52	8.07	1.24
5000.00	2764.83	5.83	10.85	8.74	1.23
6000.00	2765.22	6.22	11.13	9.32	1.23
7000.00	2765.57	6.57	11.37	9.84	1.22
8000.00	2765.89	6.89	11.59	10.32	1.21
9000.00	2766.18	7.18	11.82	10.75	1.19
10000.00	2766.44	7.44	12.08	11.14	1.18

Tailwater Channel Data - 27028 FR-7 Skyline

Tailwater Channel Option: Irregular Channel

Channel Slope: 0.0240

User Defined Channel Cross-Section:

Coord No.	Station (ft)	Elevation (ft)	Manning's n
1	0.00	2770.00	0.0600
2	37.00	2768.00	0.0600
3	50.00	2766.00	0.0600
4	138.00	2764.00	0.0600
5	160.00	2764.00	0.0600
6	192.00	2762.00	0.0600
7	202.00	2760.00	0.0450
8	216.00	2759.00	0.0450
9	223.00	2760.00	0.0450
10	270.00	2762.00	0.0600
11	290.00	2764.00	0.0600
12	298.00	2766.00	0.0600
13	306.00	2768.00	0.0600
14	314.00	2770.00	0.0000

Roadway Data for Crossing: 27028 FR-7 Skyline

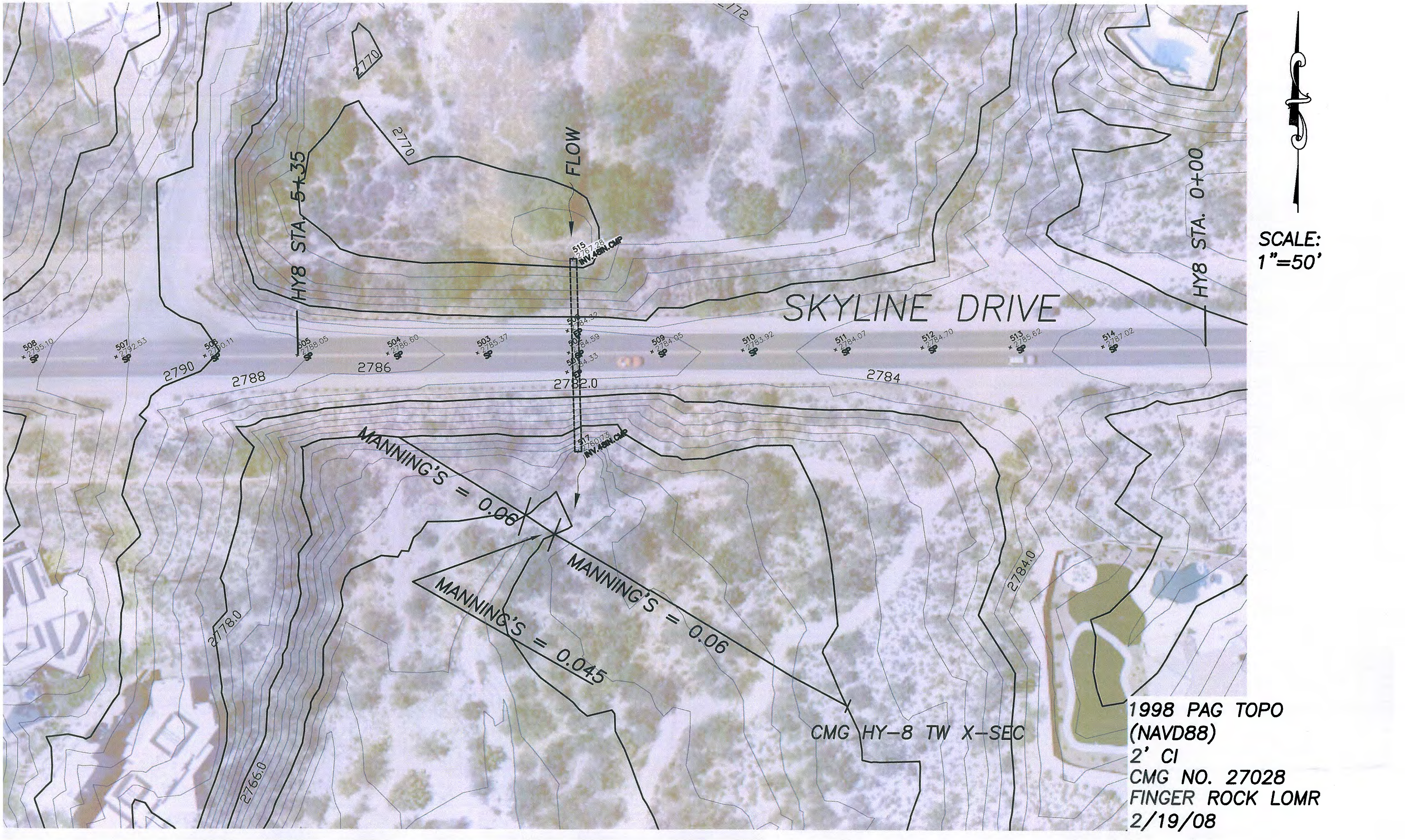
Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
1	0.00	2788.00
2	50.00	2787.02
3	105.00	2785.62
4	160.00	2784.70
5	210.00	2784.07
6	266.00	2783.92
7	321.00	2784.05
8	370.00	2784.59
9	425.00	2785.37
10	480.00	2786.60
11	535.00	2788.05

Roadway Surface: Paved

Roadway Top Width: 42.00 ft


SKYLINE DRIVE
FLOW
HY8 STA. 5+35
HY8 STA. 0+00
SCALE:
1"=50'
MANNING'S = 0.06
MANNING'S = 0.06
MANNING'S = 0.045
CMG HY-8 TW X-SEC
2770
2772
2790
2788
2786
2782.0
2784
2784.0
2778.0
2766.0
1998 PAG TOPO
(NAVD88)
2' CI
CMG NO. 27028
FINGER ROCK LOMR
2/19/08

1-22-08

HY-8 Culvert Analysis Report
27028 Finger Rock LOMR

Playa de Coronado West Crossing (Sta. 3+23)
HEC-1 Conc. Pt. FR-9
Based on As-built plans from Summit at Finger Rock
LOMR Case No. 04-09-0380P

Table 1 - Summary of Culvert Flows at Crossing: 27028 FR-9 Summit at FR-West

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
3063.00	0.00	0.00	0.00	1
3066.59	500.00	500.00	0.00	1
3068.69	1000.00	1000.00	0.00	1
3070.55	1500.00	1500.00	0.00	1
3072.28	2000.00	2000.00	0.00	1
3074.48	2500.00	2500.00	0.00	1
3076.85	3000.00	3000.00	0.00	1
3077.53	3140.00	3140.00	0.00	1
3079.44	4000.00	3476.74	523.14	4
3080.09	4500.00	3582.50	916.89	3
3080.67	5000.00	3676.29	1323.15	3

Table 2 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	3063.00	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
500.00	500.00	3066.59	3.587	0.000	1-S2n	1.512	2.161	1.551	0.904	11.778	10.681
1000.00	1000.00	3068.69	5.686	0.000	1-S2n	2.375	3.410	2.479	1.367	14.661	13.873
1500.00	1500.00	3070.55	7.553	0.000	1-S2n	3.108	4.445	3.289	1.739	16.603	16.133
2000.00	2000.00	3072.28	9.281	0.000	1-S2n	3.782	5.329	4.043	2.062	18.106	17.923
2500.00	2500.00	3074.48	11.482	0.000	5-S2n	4.437	6.117	4.760	2.352	19.385	19.428
3000.00	3000.00	3076.85	13.853	0.119	5-S2n	5.117	6.830	5.495	2.619	20.468	20.739
3140.00	3140.00	3077.53	14.530	0.190	5-S2n	5.316	6.997	5.681	2.690	20.792	21.076
4000.00	3476.74	3079.44	16.438	0.602	5-S2n	5.803	7.399	6.197	3.102	21.441	22.940
4500.00	3582.50	3080.09	17.090	0.824	5-S2n	5.978	7.525	6.355	3.324	21.645	23.900
5000.00	3676.29	3080.67	17.668	1.035	5-S2n	6.134	7.637	6.496	3.535	21.817	24.785

****

Inlet Elevation (invert): 3063.00 ft, Outlet Elevation (invert): 3060.50 ft

Culvert Length: 52.56 ft, Culvert Slope: 0.0476

****

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 3063.00 ft

Outlet Station: 52.50 ft

Outlet Elevation: 3060.50 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Low-Profile Arch

Barrel Span: 28.08 ft

Barrel Rise: 9.58 ft

Barrel Material: Corrugated Steel

Barrel Manning's n: 0.0350 (top and sides)

Manning's n: 1.4lf (bottom)

Inlet Type: Conventional

Inlet Edge Condition: Square Edge with Headwall

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: 27028 FR-9 Summit at FR-West)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	3060.50	0.00	0.00	0.00	0.00
500.00	3061.40	0.90	10.68	5.64	2.01
1000.00	3061.87	1.37	13.87	8.53	2.14
1500.00	3062.24	1.74	16.13	10.85	2.23
2000.00	3062.56	2.06	17.92	12.87	2.28
2500.00	3062.85	2.35	19.43	14.68	2.33
3000.00	3063.12	2.62	20.74	16.34	2.36
3140.00	3063.19	2.69	21.08	16.79	2.37
4000.00	3063.60	3.10	22.94	19.36	2.42
4500.00	3063.82	3.32	23.90	20.74	2.44
5000.00	3064.03	3.53	24.78	22.06	2.46

Tailwater Channel Data - 27028 FR-9 Summit at FR-West

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 50.00 ft

Side Slope (H:V): 2.00 (_:1)

Channel Slope: 0.1000

Channel Manning's n: 0.0400

Channel Invert Elevation: 3060.50 ft

Roadway Data for Crossing: 27028 FR-9 Summit at FR-West

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 3078.00 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

1-22-08
HY-8 Culvert Analysis Report
27028 Finger Rock LOMR

Playa de Coronado East Crossing (Sta. 10+72)
HEC-1 Conc. Pt. FR-91
Based on As-built plans from Summit at Finger Rock
LOMR Case No. 04-09-0380P

Table 1 - Summary of Culvert Flows at Crossing: 27028 FR-91 Summit at FR-East

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
3047.30	0.00	0.00	0.00	1
3050.67	500.00	500.00	0.00	1
3052.64	1000.00	1000.00	0.00	1
3054.40	1500.00	1500.00	0.00	1
3055.92	2000.00	2000.00	0.00	1
3057.59	2500.00	2500.00	0.00	1
3059.55	3000.00	3000.00	0.00	1
3060.76	3290.00	3290.00	0.00	1
3063.97	4000.00	4000.00	0.00	1
3066.71	4500.00	4500.00	0.00	1
3068.11	5000.00	4736.22	263.50	5

Table 2 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	3047.30	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
500.00	500.00	3050.67	3.366	3.366	1-S2n	1.283	2.037	1.327	1.690	12.455	6.820
1000.00	1000.00	3052.64	5.337	5.337	1-S2n	2.032	3.199	2.127	2.541	15.459	8.730
1500.00	1500.00	3054.40	7.099	7.099	1-S2n	2.606	4.175	2.825	3.219	17.447	10.034
2000.00	2000.00	3055.92	8.623	8.623	1-S2n	3.161	5.033	3.481	3.803	18.931	11.048
2500.00	2500.00	3057.59	10.289	10.289	5-S2n	3.667	5.769	4.094	4.323	20.203	11.887
3000.00	3000.00	3059.55	12.246	12.246	5-S2n	4.170	6.461	4.698	4.799	21.304	12.605
3290.00	3290.00	3060.76	13.458	13.458	5-S2n	4.457	6.846	5.025	5.056	21.920	12.984
4000.00	4000.00	3063.97	16.674	16.674	5-S2n	5.171	7.636	5.856	5.647	23.294	13.810
4500.00	4500.00	3066.71	19.414	19.414	5-S2n	5.717	8.132	6.442	6.034	24.220	14.323
5000.00	4736.22	3068.11	20.811	20.811	5-S2n	5.975	8.302	6.710	6.399	24.668	14.798

****

Inlet Elevation (invert): 3047.30 ft, Outlet Elevation (invert): 3044.20 ft

Culvert Length: 48.10 ft, Culvert Slope: 0.0646

****

Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 3047.30 ft

Outlet Station: 48.00 ft

Outlet Elevation: 3044.20 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Low-Profile Arch

Barrel Span: 31.00 ft

Barrel Rise: 10.08 ft

Barrel Material: Corrugated Steel

Barrel Manning's n: 0.0350 (top and sides)

Manning's n: 1.4lf (bottom)

Inlet Type: Conventional

Inlet Edge Condition: Square Edge with Headwall

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: 27028 FR-91 Summit at FR-East)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	3044.20	0.00	0.00	0.00	0.00
500.00	3045.89	1.69	6.82	5.27	0.96
1000.00	3046.74	2.54	8.73	7.93	1.02
1500.00	3047.42	3.22	10.03	10.04	1.05
2000.00	3048.00	3.80	11.05	11.86	1.08
2500.00	3048.52	4.32	11.89	13.49	1.09
3000.00	3049.00	4.80	12.60	14.97	1.11
3290.00	3049.26	5.06	12.98	15.78	1.12
4000.00	3049.85	5.65	13.81	17.62	1.13
4500.00	3050.23	6.03	14.32	18.83	1.14
5000.00	3050.60	6.40	14.80	19.97	1.15

Tailwater Channel Data - 27028 FR-91 Summit at FR-East

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 40.00 ft

Side Slope (H:V): 2.00 (_:1)

Channel Slope: 0.0500

Channel Manning's n: 0.0650

Channel Invert Elevation: 3044.20 ft

Roadway Data for Crossing: 27028 FR-91 Summit at FR-East

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 3067.20 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

D.5 – HEC-1 MODEL INPUT/OUTPUT

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1***************************************                                          ***************************************
 *                                     *                                          *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                                          *   U.S. ARMY CORPS OF ENGINEERERS    *
 *            JUN   1998               *                                          *   HYDROLOGIC ENGINEERING CENTER     *
 *          VERSION 4.1                *                                          *         609 SECOND STREET           *
 *                                     *                                          *      DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   18FEB08  TIME  17:35:03 *                                          *          (916) 756-1104             *
 *                                     *                                          *                                     *
***************************************                                          ***************************************


                          X     X  XXXXXXX   XXXXX          X
                          X     X  X        X     X        XX
                          X     X  X        X               X
                          XXXXXXX  XXXX     X       XXXXX   X
                          X     X  X        X               X
                          X     X  X        X     X         X
                          X     X  XXXXXXX   XXXXX         XXX


THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                                HEC-1 INPUT                                                  PAGE  1

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

   1            ID   FINGER ROCK WASH
   2            ID   100-YEAR RUNOFF ANALYSIS
   3            ID   WATERSHED UPSTREAM OF RILLITO CRK FLOODPLAIN
   4            ID   CMG DRAINAGE ENGINEERING---JLC
   5            ID   NOAA 14 UPPER 90% RAINFALL---3-HOUR STORM---TSMS DISTRIBUTION
   6            ID   AERIAL REDUCTION = 0.84 FOR 6.3 SQ MI WATERSHED PER ADWR ST STD SS10-07
   7            ID   SCS RUNOFF METHOD---MODIFIED PULS ROUTING
   8            ID   RESERVOIR ROUTING @ PONTATOC CNYN (FR-4), SUNRISE (FR-5), SKYLINE (FR-7),
   9            ID   SUMMIT AT FINGER ROCK EAST (FR-91) & WEST (FR-9) CULVERTS PER AS-BUILTS
  10            ID   FILENAME: 27028-FR100yrHEC-1_2008.02.18.dat
  11            ID   REVISED 2/18/08
                *DIAGRAM
  12            IT       2                     300
  13            IN       5
  14            IO       2       0
                *

  15            KK  FR-12
  16            KM   HEADWATERS OF FINGER ROCK WASH (MAIN CHANNEL)
  17            KM   BASIN FR-12
  18            BA   0.434
  19            PB    3.36
  20            PC  .00000  .10119  .30604  .46991  .55554  .61728  .66665  .70707  .74073  .76923
  21            PC  .79364  .81481  .83333  .84967  .86418  .87719  .88888  .89947  .90909  .91788
  22            PC  .92593  .93334  .94018  .94651  .95238  .95786  .96297  .96775  .97223  .97645
  23            PC  .98041  .98416  .98770  .99103  .99419  .99718 1.00000
  24            LS       0      86      15
  25            UD   0.173
                *

  26            KK  12TO11
  27            KM   MODIFIED PULS CHANNEL ROUTING
  28            KM   FROM NODE FR-12 TO FR-11
  29            RS       2    FLOW      -1
  30            RC    0.16    0.16    0.16    4000   0.268
  31            RX       0      10      20      30      40      50      60      70
  32            RY      30      20      10       0       0      10      20      30
                *

  33            KK  FR-11
  34            KM   LOCAL RUNOFF TO FR-11
  35            KM   BASIN FR-11
  36            BA   0.480
```

```
 37          LS       0      86      10
 38          UD   0.174
             *

 39          KK  CO-11
 40          KM   COMBINE HYDROGRAPHS
 41          KM   AT NODE FR-11
 42          HC       2
             *
1                                         HEC-1 INPUT                                             PAGE  2

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


 43          KK  11TO10
 44          KM   MODIFIED PULS CHANNEL ROUTING
 45          KM   FROM NODE FR-11 TO FR-10
 46          RS       2    FLOW      -1
 47          RC   0.125   0.125   0.125    4720   0.159
 48          RX       0      10      20      30      40      50      60      70
 49          RY      30      20      10       0       0      10      20      30
             *

 50          KK  FR-10
 51          KM   LOCAL RUNOFF TO FR-10
 52          KM   BASIN FR-10
 53          BA    .561
 54          PB    3.22
 55          LS       0      86       2
 56          UD    .198
             *

 57          KK  CO-10
 58          KM   COMBINE HYDROGRAPHS
 59          KM   AT NODE FR-10
 60          HC       2
             *

 61          KK  10TO9
 62          KM   MODIFIED PULS CHANNEL ROUTING
 63          KM   FROM NODE FR-10 TO FR-9
 64          RS       2    FLOW      -1
 65          RC   0.095   0.095   0.095    4300   0.093
 66          RX       0      10      20      30      40      50      60      70
 67          RY      10     6.6     3.3       0       0     3.3     6.6      10
             *

 68          KK  FR-9
 69          KM   LOCAL RUNOFF TO FR-9
 70          KM   BASIN FR-9
 71          BA   0.151
 72          PB    3.11
 73          LS       0      86       5
 74          UD    .178
             *

 75          KK  CO-9
 76          KM   COMBINE HYDROGRAPHS
 77          KM   AT NODE FR-9 (MAIN CHANNEL)
 78          HC       2
             *

 79          KK  RES-9
 80          KM   MODIFIED PULS RESERVOIR ROUTING
 81          KM   AT NODE FR-9
 82          KM   SUMMIT AT FINGER ROCK WEST CULVERT CROSSING (MAIN CHANNEL)
 83          RS       1    ELEV  3063.0
 84          SA       0    0.01    0.03    0.05    0.10    0.11    0.13    0.18    0.20    0.24
1                                         HEC-1 INPUT                                             PAGE  3

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

 85          SA    0.31
 86          SE  3063.0    3065    3066    3068    3070    3072    3074    3075    3076    3078
 87          SE    3080
 88          SQ       0     500    1000    1500    2000    2500    3000    3140    4000
 89          SE  3063.0  3066.6  3068.7  3070.6  3072.3  3074.5  3076.9  3077.5  3079.4
             *

 90          KK  FR-94
 91          KM   HEADWATERS OF PONTATOC CANYON WASH
```

```
 92           KM   BASIN FR-94
 93           BA   0.464
 94           PB    3.33
 95           LS      0      86      10
 96           UD    .167
              *

 97           KK  94TO93
 98           KM   MODIFIED PULS CHANNEL ROUTING
 99           KM   FROM NODE FR-94 TO FR-93
100           RS      2    FLOW      -1
101           RC   0.16    0.16    0.16    3600   0.286
102           RX      0      10      20      30      40      50      60      70
103           RY     15      10       5       0       0       5      10      15
              *

104           KK  FR-93
105           KM   LOCAL RUNOFF TO FR-93
106           KM   BASIN FR-93
107           BA   0.381
108           PB    3.33
109           LS      0      86       5
110           UD    .177
              *

111           KK  CO-93
112           KM   COMBINE HYDROGRAPHS
113           KM   AT NODE FR-93
114           HC      2
              *

115           KK  93TO92
116           KM   MODIFIED PULS CHANNEL ROUTING
117           KM   FROM NODE FR-93 TO FR-92
118           RS      2    FLOW      -1
119           RC  0.105   0.105   0.105    4220   0.121
120           RX      0      10      20      30      40      50      60      70
121           RY     15      10       5       0       0       5      10      15
              *

122           KK  FR-92
123           KM   LOCAL RUNOFF TO FR-92
124           KM   BASIN FR-92
125           BA   0.222
126           PB    3.11
127           LS      0      86       5
```



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

128           UD    .161
              *

129           KK  CO-92
130           KM   COMBINE HYDROGRAPHS
131           KM   AT NODE FR-92 (MAIN CHANNEL PONTATOC CANYON)
132           HC      2
              *

133           KK  FR-922
134           KM   HEADWATERS OF TRIBUTARY TO
135           KM   PONTATOC CANYON WASH
136           KM   BASIN FR-922
137           BA   0.341
138           PB    3.22
139           LS      0      86      10
140           UD    .181
              *

141           KK  922921
142           KM   MODIFIED PULS CHANNEL ROUTING
143           KM   FROM NODE FR-922 TO FR-921
144           RS      3    FLOW      -1
145           RC  0.115   0.115   0.115    5100   0.135
146           RX      0      10      20      30      40      50      60      70
147           RY     15      10       5       0       0       5      10      15
              *

148           KK  FR-921
149           KM   LOCAL RUNOFF TO FR-921
150           KM   BASIN FR-921
```

```
 151          BA   0.211
 152          PB    3.22
 153          LS       0      86       2
 154          UD    .160
              *

 155          KK  CO-921
 156          KM   COMBINE HYDROGRAPHS
 157          KM   AT NODE FR-921
 158          HC       2
              *

 159          KK  CO-92A
 160          KM   COMBINE HYDROGRAPHS
 161          KM   AT NODE FR-92
 162          KM   PONTATOC CANYON WASH AND TRIBUTARY
 163          HC       2
              *
1                                  HEC-1 INPUT                                                PAGE  5

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


 164          KK  92TO91
 165          KM   MODIFIED PULS CHANNEL ROUTING
 166          KM   FROM NODE FR-92 TO FR-91 (MAIN CHANNEL PONTATOC CANYON)
 167          RS       1    FLOW      -1
 168          RC   0.095   0.095   0.095    1520   0.092
 169          RX       0      10      20      30      40      50      60      70
 170          RY      15      10       5       0       0       5      10      15
              *

 171          KK  FR-91
 172          KM   LOCAL RUNOFF TO FR-91
 173          KM   BASIN FR-91
 174          BA   0.113
 175          PB    3.11
 176          LS       0      86      10
 177          UD    .166
              *

 178          KK  CO-91
 179          KM   COMBINE HYDROGRAPHS
 180          KM   AT NODE FR-91
 181          HC       2
              *

 182          KK  RES-91
 183          KM   MODIFIED PULS RESERVOIR ROUTING
 184          KM   AT NODE FR-91
 185          KM   SUMMIT AT FINGER ROCK EAST CULVERT CROSSING (PONTATOC CANYON)
 186          RS       1    ELEV  3047.3
 187          SA       0   0.004    0.01    0.13    0.25    0.36    0.52
 188          SE  3047.3    3048    3050    3055    3060    3065    3070
 189          SQ       0     500    1000    1500    2000    2500    3000    3290    4000
 190          SE  3047.3  3050.7  3052.6  3054.4  3055.9  3057.6  3059.6  3060.8  3064.0
              *

 191          KK  CO-9A
 192          KM   COMBINE HYDROGRAPHS
 193          KM   AT NODE FR-9
 194          KM   FINGER ROCK WASH AND PONTATOC CANYON WASH
 195          HC       2
              *

 196          KK  9TO8
 197          KM   MODIFIED PULS CHANNEL ROUTING
 198          KM   FROM NODE FR-9 TO FR-8 (MAIN CHANNEL)
 199          RS       2    FLOW      -1
 200          RC   0.065   0.065   0.065    4615   0.045
 201          RX       0      10      20      30      40      50      60      70
 202          RY      10     6.6     3.3       0       0     3.3     6.6      10
              *
1                                  HEC-1 INPUT                                                PAGE  6

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


 203          KK  FR-8
 204          KM   LOCAL RUNOFF TO FR-8
 205          KM   BASIN FR-8
```

```
 206            BA   0.592
 207            PB    2.98
 208            LS       0       85       20
 209            UD    .191
                *

 210            KK  CO-8
 211            KM   COMBINE HYDROGRAPHS
 212            KM   AT NODE FR-8 (MAIN CHANNEL)
 213            HC       2
                *

 214            KK  FR-82
 215            KM   HEADWATERS TO TRIBUTARY TO
 216            KM   FINGER ROCK WASH
 217            KM   BASIN FR-82
 218            BA   0.330
 219            PB    2.98
 220            LS       0       85       15
 221            UD    .166
                *

 222            KK  82TO81
 223            KM   MODIFIED PULS CHANNEL ROUTING
 224            KM   FROM NODE FR-82 TO FR-81
 225            RS       3     FLOW       -1
 226            RC   0.085    0.085    0.085     4475    0.049
 227            RX       0       10       20       30       40       50       60       70
 228            RY      10      6.6      3.3        0        0      3.3      6.6       10
                *

 229            KK  FR-81
 230            KM   LOCAL RUNOFF TO FR-81
 231            KM   BASIN FR-81
 232            BA   0.313
 233            PB    2.98
 234            LS       0       85       20
 235            UD    .233
                *

 236            KK  CO-81
 237            KM   COMBINE HYDROGRAPHS
 238            KM   AT NODE FR-81
 239            HC       2
                *
1                                  HEC-1 INPUT                                              PAGE  7

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


 240            KK  CO-8A
 241            KM   COMBINE HYDROGRAPHS
 242            KM   AT NODE FR-8 (MAIN CHANNEL)
 243            KM   FINGER ROCK WASH AND TRIBUTARY CANYON WASH
 244            HC       2
                *

 245            KK  8TO7
 246            KM   MODIFIED PULS CHANNEL ROUTING
 247            KM   FROM NODE FR-8 TO FR-7 (MAIN CHANNEL)
 248            RS       1     FLOW       -1
 249            RC    0.06    0.045     0.06     1350    0.018
 250            RX       0       19       37       52       85      112      167      200
 251            RY      84       80       78       76       75       76       78       84
                *

 252            KK  FR-7
 253            KM   LOCAL RUNOFF TO FR-7
 254            KM   BASIN FR-7
 255            BA   0.173
 256            PB    2.98
 257            LS       0       78       20
 258            UD    .223
                *

 259            KK  CO-7
 260            KM   COMBINE HYDROGRAPHS
 261            KM   AT NODE FR-7 (MAIN CHANNEL)
 262            KM   UPSTREAM OF CULVERT AT SKYLINE ROAD
 263            HC       2
                *
```

```
 264           KK  RES-7
 265           KM   MODIFIED PULS RESERVOIR ROUTING
 266           KM   AT NODE FR-7
 267           KM   SKYLINE DR CULVERT CROSSING
 268           RS       1     ELEV  2767.3
 269           SA       0      0.2    1.20    2.02    2.80    3.50    4.11    4.70    5.43    6.14
 270           SA    6.74     7.76
 271           SE  2767.3     2770    2772    2774    2776    2778    2780    2782    2784    2786
 272           SE    2788     2790
 273           SQ       0       20      40      60      80     100     120     140     160     180
 274           SQ     200      500    1000    2000    3000    4000    5000    6000    7000    8000
 275           SE  2767.3   2769.1  2770.1  2771.0  2772.0  2773.2  2774.6  2776.4  2778.5  2781.0
 276           SE  2783.7   2784.6  2785.1  2785.7  2786.2  2786.5  2786.9  2787.2  2787.5  2787.7
               *

 277           KK  7TO6
 278           KM   MODIFIED PULS CHANNEL ROUTING
 279           KM   FROM NODE FR-7 TO FR-6 (MAIN CHANNEL)
 280           RS       2     FLOW      -1
 281           RC    0.06    0.045    0.06    3136   0.024
 282           RX       0       15      57     164     172     219     237     250
 283           RY      24       20      18    13.3      14      18      20      24
               *
1                                        HEC-1 INPUT                                          PAGE  8

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


 284           KK  FR-6
 285           KM   LOCAL RUNOFF TO FR-6
 286           KM   BASIN FR-6
 287           BA   0.133
 288           PB    2.85
 289           LS       0       77      20
 290           UD    .222
               *

 291           KK  CO-6
 292           KM   COMBINE HYDROGRAPHS
 293           KM   AT NODE FR-6 (MAIN CHANNEL)
 294           HC       2
               *

 295           KK  FR-62
 296           KM   HEADWATERS TO TRIBUTARY TO
 297           KM   FINGER ROCK WASH
 298           KM   BASIN FR-62
 299           BA   0.503
 300           PB    2.98
 301           LS       0       80      20
 302           UD    .199
               *

 303           KK  62TO61
 304           KM   MODIFIED PULS CHANNEL ROUTING
 305           KM   FROM NODE FR-62 TO FR-61
 306           RS       3     FLOW      -1
 307           RC    0.05     0.05    0.05    4270   0.032
 308           RX       0       10      20      30      40      50      60      70
 309           RY       6        4       2       0       0       2       4       6
               *

 310           KK  FR-61
 311           KM   LOCAL RUNOFF TO FR-61
 312           KM   BASIN FR-61
 313           BA   0.166
 314           PB    2.85
 315           LS       0       81      35
 316           UD    .287
               *

 317           KK  CO-61
 318           KM   COMBINE HYDROGRAPHS
 319           KM   AT NODE FR-61
 320           HC       2
               *
1                                        HEC-1 INPUT                                          PAGE  9

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

```
321          KK  CO-6A
322          KM   COMBINE HYDROGRAPHS
323          KM   AT NODE FR-6 (MAIN CHANNEL)
324          KM   FINGER ROCK WASH AND TRIBUTARY WASH
325          HC       2
             *

326          KK  6TO5
327          KM   MODIFIED PULS CHANNEL ROUTING
328          KM   FROM NODE FR-6 TO FR-5 (MAIN CHANNEL)
329          RS       2    FLOW       -1
330          RC    0.06   0.045    0.06    3140   0.018
331          RX       0      66     202     225     237     255     287     320
332          RY      90      82      80    76.6      78      80      82      90
             *

333          KK  FR-5
334          KM   LOCAL RUNOFF TO FR-5
335          KM   BASIN FR-5
336          BA  0.155
337          PB   2.85
338          LS       0      77      10
339          UD    .200
             *

340          KK  CO-5
341          KM   COMBINE HYDROGRAPHS
342          KM   AT NODE FR-5 (MAIN CHANNEL)
343          KM   UPSTREAM OF CULVERT AT SUNRISE DRIVE
344          HC       2
             *

345          KK  RES-5
346          KM   MODIFIED PULS RESERVOIR ROUTING
347          KM   AT NODE FR-5
348          KM   SUNRISE DR CULVERT CROSSING
349          RS       1    ELEV  2635.6
350          SA    0.69    0.46    1.42    2.45    3.44    4.48    5.57    6.65
351          SE    2636    2638    2640    2642    2644    2646    2648    2650
352          SQ       0    1000    2000    3000    4000    5000    6000    7000    8000    9000
353          SQ   10000
354          SE  2635.6  2637.9  2639.3  2640.5  2641.6  2642.6  2643.7  2644.7  2645.8  2646.9
355          SE  2648.2
             *

356          KK  5TO4
357          KM   MODIFIED PULS CHANNEL ROUTING
358          KM   FROM NODE FR-5 TO FR-4 (MAIN CHANNEL)
359          RS       1    FLOW       -1
360          RC    0.06    0.05    0.06    1270   0.019
361          RX       0      50     373     415     425     442     543     593
362          RY      30      24      22      18      20      22      26      30
             *
```



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


363          KK  FR-4
364          KM   LOCAL RUNOFF TO FR-4
365          KM   BASIN FR-4
366          BA  0.055
367          PB   2.85
368          LS       0      77      25
369          UD    .100
             *

370          KK  CO-4
371          KM   COMBINE HYDROGRAPHS
372          KM   AT NODE FR-4 (MAIN CHANNEL)
373          HC       2
             *

374          KK  RES-4
375          KM   MODIFIED PULS RESERVOIR ROUTING
376          KM   AT NODE FR-4
377          KM   PONTATOC CANYON DR CULVERT CROSSING
378          RS       1    ELEV  2610.4
379          SA       0    0.03    0.75    2.11    3.64    5.00    6.40    7.72
380          SE    2611    2612    2614    2616    2618    2620    2622    2624
```

```
381          SQ       0    1000    2000    3000    4000    5000    6000    7000    8000    9000
382          SQ   10000
383          SE  2610.4  2614.9  2617.4  2618.7  2619.4  2619.9  2620.4  2620.8  2621.2  2621.6
384          SE  2621.9
             *

385          KK  4TO3
386          KM   MODIFIED PULS CHANNEL ROUTING
387          KM   FROM NODE FR-4 TO FR-3 (MAIN CHANNEL)
388          RS       4    FLOW      -1
389          RC    0.06   0.045    0.06    5940   0.017
390          RX       0      50     140     164     172     197     270     333
391          RY      80    67.5      71      68      68      71      68      80
             *

392          KK  FR-3
393          KM   LOCAL RUNOFF TO FR-3
394          KM   BASIN FR-3
395          BA   0.317
396          PB    2.76
397          LS       0      77      25
398          UD    .234
             *

399          KK  CO-3
400          KM   COMBINE HYDROGRAPHS
401          KM   AT NODE FR-2 (MAIN CHANNEL)
402          HC       2
             *
1                                    HEC-1 INPUT                                                  PAGE 11

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

403          KK  3TO2
404          KM   MODIFIED PULS CHANNEL ROUTING
405          KM   FROM NODE FR-3 TO FR-2 (MAIN CHANNEL)
406          RS       2    FLOW      -1
407          RC   0.055   0.045   0.055    2465   0.016
408          RX       0      38      85     131     142     208     415     438
409          RY      90      80      78    77.5      78      79      80      90
             *

410          KK  FR-2
411          KM   LOCAL RUNOFF TO FR-2
412          KM   BASIN FR-2
413          BA   0.175
414          PB    2.76
415          LS       0      77      15
416          UD    .252
             *

417          KK  CO-2
418          KM   COMBINE HYDROGRAPHS
419          KM   AT NODE FR-2 (MAIN CHANNEL)
420          HC       2
             *

421          KK  2TO1
422          KM   MODIFIED PULS CHANNEL ROUTING
423          KM   FROM NODE FR-2 TO FR-1 (MAIN CHANNEL)
424          RS       2    FLOW      -1
425          RC    0.05    0.04    0.05    2300   0.018
426          RX       0      20     150     365     377     390     403     412
427          RY      52      46      43      42      42      46      49      52
             *

428          KK  FR-1
429          KM   LOCAL RUNOFF TO FR-1
430          KM   BASIN FR-1
431          BA   0.083
432          PB    2.76
433          LS       0      77      10
434          UD    .195
             *

435          KK  CO-1
436          KM   COMBINE HYDROGRAPHS
437          KM   AT NODE FR-1 (MAIN CHANNEL)
438          KM   AT ALVERNON ROAD
439          HC       2
440          ZZ
```

```
1
                 SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    15      FR-12
                 V
                 V
    26      12TO11
                 .
                 .
    33           .      FR-11
                 .           .
                 .           .
    39      CO-11 ............
                 V
                 V
    43      11TO10
                 .
                 .
    50           .      FR-10
                 .           .
                 .           .
    57      CO-10 ............
                 V
                 V
    61      10TO9
                 .
                 .
    68           .      FR-9
                 .           .
                 .           .
    75      CO-9  ............
                 V
                 V
    79      RES-9
                 .
                 .
    90           .      FR-94
                 .           V
                 .           V
    97           .      94TO93
                 .           .
                 .           .
   104           .           .      FR-93
                 .           .           .
                 .           .           .
   111           .      CO-93 ............
                 .           V
                 .           V
   115           .      93TO92
                 .           .
                 .           .
   122           .           .      FR-92
                 .           .           .
                 .           .           .
   129           .      CO-92 ............
                 .           .
                 .           .
   133           .           .      FR-922
                 .           .           V
                 .           .           V
   141           .           .      922921
                 .           .           .
                 .           .           .
   148           .           .           .      FR-921
                 .           .           .           .
                 .           .           .           .
   155           .           .      CO-921............
                 .           .           .
                 .           .           .
   159           .      CO-92A............
                 .           V
                 .           V
   164           .      92TO91
                 .           .
                 .           .
   171           .           .      FR-91
                 .           .           .
```

```
              .            .           .
178           .      CO-91 ............
              .            V
              .            V
182           .      RES-91
              .            .
              .            .
191      CO-9A ............
              V
              V
196      9TO8
              .
              .
203           .      FR-8
              .            .
              .            .
210      CO-8  ............
              .
              .
214           .      FR-82
              .            V
              .            V
222           .      82TO81
              .            .
              .            .
229           .            .      FR-81
              .            .           .
              .            .           .
236           .      CO-81 ............
              .            .
              .            .
240      CO-8A ............
              V
              V
245      8TO7
              .
              .
252           .      FR-7
              .            .
              .            .
259      CO-7  ............
              V
              V
264      RES-7
              V
              V
277      7TO6
              .
              .
284           .      FR-6
              .            .
              .            .
291      CO-6  ............
              .
              .
295           .      FR-62
              .            V
              .            V
303           .      62TO61
              .            .
              .            .
310           .            .      FR-61
              .            .           .
              .            .           .
317           .      CO-61 ............
              .            .
              .            .
321      CO-6A ............
              V
              V
326      6TO5
              .
              .
333           .      FR-5
              .            .
              .            .
340      CO-5  ............
              V
              V
345      RES-5
              V
```

```
              V
 356      5TO4
              .
              .
 363          .       FR-4
              .           .
              .           .
 370      CO-4 ...........
              V
              V
 374      RES-4
              V
              V
 385      4TO3
              .
              .
 392          .       FR-3
              .           .
              .           .
 399      CO-3 ...........
              V
              V
 403      3TO2
              .
              .
 410          .       FR-2
              .           .
              .           .
 417      CO-2 ...........
              V
              V
 421      2TO1
              .
              .
 428          .       FR-1
              .           .
              .           .
 435      CO-1 ...........
(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *              JUN   1998               *
 *           VERSION 4.1                 *
 *                                       *
 *  RUN DATE   18FEB08  TIME  17:35:03   *
 *                                       *
 *****************************************

 ***************************************
 *                                     *
 *    U.S. ARMY CORPS OF ENGINEERS     *
 *    HYDROLOGIC ENGINEERING CENTER    *
 *          609 SECOND STREET          *
 *       DAVIS, CALIFORNIA 95616       *
 *           (916) 756-1104            *
 *                                     *
 ***************************************
```

```
                    FINGER ROCK WASH
                    100-YEAR RUNOFF ANALYSIS
                    WATERSHED UPSTREAM OF RILLITO CRK FLOODPLAIN
                    CMG DRAINAGE ENGINEERING---JLC
                    NOAA 14 UPPER 90% RAINFALL---3-HOUR STORM---TSMS DISTRIBUTION
                    AERIAL REDUCTION = 0.84 FOR 6.3 SQ MI WATERSHED PER ADWR ST STD SS10-07
                    SCS RUNOFF METHOD---MODIFIED PULS ROUTING
                    RESERVOIR ROUTING @ PONTATOC CNYN (FR-4), SUNRISE (FR-5), SKYLINE (FR-7),
                    SUMMIT AT FINGER ROCK EAST (FR-91) & WEST (FR-9) CULVERTS PER AS-BUILTS
                    FILENAME: 27028-FR100yrHEC-1_2008.02.18.dat
                    REVISED 2/18/08

 14 IO         OUTPUT CONTROL VARIABLES
                     IPRNT          2  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT         HYDROGRAPH TIME DATA
                      NMIN          2  MINUTES IN COMPUTATION INTERVAL
                     IDATE     1    0  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     1    0  ENDING DATE
                    NDTIME       0958  ENDING TIME
                     ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL     .03 HOURS
```

```
               TOTAL TIME BASE    9.97 HOURS

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

*** ***

```
           **************
           *            *
 15 KK     *   FR-12    *
           *            *
           **************
                 HEADWATERS OF FINGER ROCK WASH (MAIN CHANNEL)
                 BASIN FR-12

 13 IN        TIME DATA FOR INPUT TIME SERIES
                   JXMIN            5  TIME INTERVAL IN MINUTES
                  JXDATE      1     0  STARTING DATE
                  JXTIME            0  STARTING TIME

             SUBBASIN RUNOFF DATA

 18 BA        SUBBASIN CHARACTERISTICS
                   TAREA          .43  SUBBASIN AREA

              PRECIPITATION DATA

 19 PB             STORM         3.36  BASIN TOTAL PRECIPITATION

 20 PI          INCREMENTAL PRECIPITATION PATTERN
                    .04       .04       .06       .08       .08       .07       .07       .05       .03       .03
                    .02       .02       .02       .02       .02       .02       .02       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .01       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

 24 LS        SCS LOSS RATE
                  STRTL           .33  INITIAL ABSTRACTION
                 CRVNBR         86.00  CURVE NUMBER
                  RTIMP         15.00  PERCENT IMPERVIOUS AREA

 25 UD        SCS DIMENSIONLESS UNITGRAPH
                   TLAG           .17  LAG

                                                         ***

                                                   UNIT HYDROGRAPH
                                             28 END-OF-PERIOD ORDINATES
            92.      278.      577.      910.     1080.     1099.     1004.      855.      643.      464.
           346.      265.      201.      149.      112.       84.       62.       47.       36.       27.
            20.       15.       12.        9.        7.        5.        3.        1.
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HYDROGRAPH AT STATION FR-12

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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	*	1		0500	151	.00	.00	.00	0.
1		0002	2	.14	.12	.02	2.	*	1		0502	152	.00	.00	.00	0.
1		0004	3	.14	.12	.02	8.	*	1		0504	153	.00	.00	.00	0.
1		0006	4	.21	.16	.04	21.	*	1		0506	154	.00	.00	.00	0.
1		0008	5	.28	.17	.11	52.	*	1		0508	155	.00	.00	.00	0.
1		0010	6	.28	.13	.15	108.	*	1		0510	156	.00	.00	.00	0.
1		0012	7	.22	.08	.14	197.	*	1		0512	157	.00	.00	.00	0.
1		0014	8	.22	.07	.15	320.	*	1		0514	158	.00	.00	.00	0.

1	0016	9	.17	.05	.12	463.	*	1	0516	159	.00	.00	.00	0.
1	0018	10	.12	.03	.09	599.	*	1	0518	160	.00	.00	.00	0.
1	0020	11	.12	.03	.09	711.	*	1	0520	161	.00	.00	.00	0.
1	0022	12	.08	.02	.06	783.	*	1	0522	162	.00	.00	.00	0.
1	0024	13	.08	.02	.07	811.	*	1	0524	163	.00	.00	.00	0.
1	0026	14	.07	.01	.06	802.	*	1	0526	164	.00	.00	.00	0.
1	0028	15	.07	.01	.05	769.	*	1	0528	165	.00	.00	.00	0.
1	0030	16	.07	.01	.05	724.	*	1	0530	166	.00	.00	.00	0.
1	0032	17	.05	.01	.04	674.	*	1	0532	167	.00	.00	.00	0.
1	0034	18	.05	.01	.05	627.	*	1	0534	168	.00	.00	.00	0.
1	0036	19	.05	.01	.04	582.	*	1	0536	169	.00	.00	.00	0.
1	0038	20	.05	.01	.04	540.	*	1	0538	170	.00	.00	.00	0.
1	0040	21	.05	.01	.04	502.	*	1	0540	171	.00	.00	.00	0.
1	0042	22	.04	.01	.03	466.	*	1	0542	172	.00	.00	.00	0.
1	0044	23	.04	.01	.03	434.	*	1	0544	173	.00	.00	.00	0.
1	0046	24	.04	.01	.03	404.	*	1	0546	174	.00	.00	.00	0.
1	0048	25	.03	.00	.03	377.	*	1	0548	175	.00	.00	.00	0.
1	0050	26	.03	.00	.03	352.	*	1	0550	176	.00	.00	.00	0.
1	0052	27	.03	.00	.02	330.	*	1	0552	177	.00	.00	.00	0.
1	0054	28	.03	.00	.02	309.	*	1	0554	178	.00	.00	.00	0.
1	0056	29	.03	.00	.02	290.	*	1	0556	179	.00	.00	.00	0.
1	0058	30	.02	.00	.02	273.	*	1	0558	180	.00	.00	.00	0.
1	0100	31	.02	.00	.02	257.	*	1	0600	181	.00	.00	.00	0.
1	0102	32	.02	.00	.02	242.	*	1	0602	182	.00	.00	.00	0.
1	0104	33	.02	.00	.02	228.	*	1	0604	183	.00	.00	.00	0.
1	0106	34	.02	.00	.02	215.	*	1	0606	184	.00	.00	.00	0.
1	0108	35	.02	.00	.02	204.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.00	.02	193.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.02	.00	.02	183.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.02	.00	.02	174.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.02	.00	.01	166.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.02	.00	.01	158.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.02	.00	.01	151.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	144.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	138.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	132.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	126.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	121.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	116.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	112.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	107.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	103.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	100.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	96.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	92.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	89.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	86.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	83.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.01	80.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.01	78.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.01	75.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.01	73.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.01	71.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.01	68.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.01	66.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.01	64.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.01	62.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.01	61.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.01	59.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.01	57.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.01	56.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.01	.00	.01	54.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.01	.00	.01	53.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.01	.00	.01	51.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.01	.00	.01	50.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.01	.00	.00	49.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.01	.00	.00	47.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.01	.00	.00	46.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.01	.00	.00	45.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.01	.00	.00	44.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	43.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	42.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	41.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	40.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	39.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	38.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	37.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	36.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	36.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	35.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	34.	*	1	0756	239	.00	.00	.00	0.

1	0258	90	.00	.00	.00	33.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	33.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	31.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	30.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	27.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	24.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	20.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	16.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	12.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	9.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	7.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	5.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	4.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	3.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	2.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	2.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	1.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	1.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	1.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	0.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	0.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	0.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.
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   TOTAL RAINFALL =     3.36, TOTAL LOSS =     1.18, TOTAL EXCESS =     2.18

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR        72-HR        9.97-HR
+   (CFS)        (HR)
                           (CFS)
+     811.        .40                   102.         61.          61.          61.
                         (INCHES)      2.183       2.183        2.183        2.183
                          (AC-FT)        51.         51.          51.          51.

                        CUMULATIVE AREA =     .43 SQ MI


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          **************
          *            *
 26 KK    *   12T011   *
          *            *
          **************
                      MODIFIED PULS CHANNEL ROUTING
                      FROM NODE FR-12 TO FR-11

             HYDROGRAPH ROUTING DATA

 29 RS         STORAGE ROUTING
                     NSTPS           2  NUMBER OF SUBREACHES
                      ITYP        FLOW  TYPE OF INITIAL CONDITION
                    RSVRIC       -1.00  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT

 30 RC         NORMAL DEPTH CHANNEL
                       ANL        .160  LEFT OVERBANK N-VALUE
                      ANCH        .160  MAIN CHANNEL N-VALUE
                       ANR        .160  RIGHT OVERBANK N-VALUE
                     RLNTH       4000.  REACH LENGTH
                       SEL       .2680  ENERGY SLOPE
                     ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                         CROSS-SECTION DATA
                      --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 32 RY       ELEVATION    30.00     20.00     10.00       .00       .00     10.00     20.00     30.00
 31 RX       DISTANCE       .00     10.00     20.00     30.00     40.00     50.00     60.00     70.00

                                                                 ***

                                             COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE          .00      1.68      3.82      6.41      9.46     12.97     16.94     21.37     26.25     31.59
          OUTFLOW          .00    103.03    338.31    697.44   1188.05   1820.42   2605.44   3709.16   5086.07   6675.65
        ELEVATION          .00      1.58      3.16      4.74      6.32      7.89      9.47     11.05     12.63     14.21

          STORAGE        37.39     43.65     50.37     57.54     65.17     73.26     81.81     90.81    100.27    110.19
          OUTFLOW      8488.51  10534.34  12822.46  15361.92  18161.59  21230.19  24576.30  28208.41  32134.87  36363.94
        ELEVATION        15.79     17.37     18.95     20.53     22.11     23.68     25.26     26.84     28.42     30.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN    15362. TO     36364.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                                                   HYDROGRAPH AT STATION    12T011

*******************************************************************************************************************************
                                           *                                          *
 DA MON HRMN ORD   OUTFLOW  STORAGE    STAGE * DA MON HRMN ORD   OUTFLOW  STORAGE    STAGE * DA MON HRMN ORD   OUTFLOW  STORAGE    STAGE
                                           *                                          *
  1     0000   1       0.       .0       .0 *  1     0320 101      21.       .2       .3 *  1     0640 201       0.       .0       .0
  1     0002   2       0.       .0       .0 *  1     0322 102      18.       .1       .3 *  1     0642 202       0.       .0       .0
  1     0004   3       0.       .0       .0 *  1     0324 103      15.       .1       .2 *  1     0644 203       0.       .0       .0
  1     0006   4       1.       .0       .0 *  1     0326 104      13.       .1       .2 *  1     0646 204       0.       .0       .0
  1     0008   5       4.       .0       .1 *  1     0328 105      11.       .1       .2 *  1     0648 205       0.       .0       .0
  1     0010   6       9.       .1       .1 *  1     0330 106       9.       .1       .1 *  1     0650 206       0.       .0       .0
  1     0012   7      21.       .2       .3 *  1     0332 107       8.       .1       .1 *  1     0652 207       0.       .0       .0
  1     0014   8      44.       .4       .7 *  1     0334 108       6.       .1       .1 *  1     0654 208       0.       .0       .0
  1     0016   9      88.       .7      1.3 *  1     0336 109       5.       .0       .1 *  1     0656 209       0.       .0       .0
  1     0018  10     188.      1.2      2.1 *  1     0338 110       4.       .0       .1 *  1     0658 210       0.       .0       .0
  1     0020  11     317.      1.8      3.0 *  1     0340 111       3.       .0       .1 *  1     0700 211       0.       .0       .0
  1     0022  12     466.      2.4      3.7 *  1     0342 112       3.       .0       .0 *  1     0702 212       0.       .0       .0
  1     0024  13     592.      2.8      4.3 *  1     0344 113       2.       .0       .0 *  1     0704 213       0.       .0       .0
  1     0026  14     684.      3.2      4.7 *  1     0346 114       2.       .0       .0 *  1     0706 214       0.       .0       .0
  1     0028  15     742.      3.3      4.9 *  1     0348 115       1.       .0       .0 *  1     0708 215       0.       .0       .0
  1     0030  16     761.      3.4      4.9 *  1     0350 116       1.       .0       .0 *  1     0710 216       0.       .0       .0
  1     0032  17     749.      3.4      4.9 *  1     0352 117       1.       .0       .0 *  1     0712 217       0.       .0       .0
  1     0034  18     720.      3.3      4.8 *  1     0354 118       1.       .0       .0 *  1     0714 218       0.       .0       .0
  1     0036  19     684.      3.2      4.7 *  1     0356 119       0.       .0       .0 *  1     0716 219       0.       .0       .0
  1     0038  20     647.      3.0      4.5 *  1     0358 120       0.       .0       .0 *  1     0718 220       0.       .0       .0
  1     0040  21     607.      2.9      4.3 *  1     0400 121       0.       .0       .0 *  1     0720 221       0.       .0       .0
  1     0042  22     568.      2.7      4.2 *  1     0402 122       0.       .0       .0 *  1     0722 222       0.       .0       .0
  1     0044  23     529.      2.6      4.0 *  1     0404 123       0.       .0       .0 *  1     0724 223       0.       .0       .0
  1     0046  24     492.      2.5      3.8 *  1     0406 124       0.       .0       .0 *  1     0726 224       0.       .0       .0
  1     0048  25     458.      2.3      3.7 *  1     0408 125       0.       .0       .0 *  1     0728 225       0.       .0       .0
  1     0050  26     427.      2.2      3.5 *  1     0410 126       0.       .0       .0 *  1     0730 226       0.       .0       .0
```

1	0052	27	398.	2.1	3.4	*	1	0412	127	0.	.0	.0	*	1	0732	227	0.	.0	.0	
1	0054	28	372.	2.0	3.3	*	1	0414	128	0.	.0	.0	*	1	0734	228	0.	.0	.0	
1	0056	29	348.	1.9	3.2	*	1	0416	129	0.	.0	.0	*	1	0736	229	0.	.0	.0	
1	0058	30	329.	1.9	3.1	*	1	0418	130	0.	.0	.0	*	1	0738	230	0.	.0	.0	
1	0100	31	313.	1.8	3.0	*	1	0420	131	0.	.0	.0	*	1	0740	231	0.	.0	.0	
1	0102	32	296.	1.7	2.9	*	1	0422	132	0.	.0	.0	*	1	0742	232	0.	.0	.0	
1	0104	33	279.	1.6	2.8	*	1	0424	133	0.	.0	.0	*	1	0744	233	0.	.0	.0	
1	0106	34	263.	1.6	2.7	*	1	0426	134	0.	.0	.0	*	1	0746	234	0.	.0	.0	
1	0108	35	249.	1.5	2.6	*	1	0428	135	0.	.0	.0	*	1	0748	235	0.	.0	.0	
1	0110	36	235.	1.4	2.5	*	1	0430	136	0.	.0	.0	*	1	0750	236	0.	.0	.0	
1	0112	37	222.	1.4	2.4	*	1	0432	137	0.	.0	.0	*	1	0752	237	0.	.0	.0	
1	0114	38	210.	1.3	2.3	*	1	0434	138	0.	.0	.0	*	1	0754	238	0.	.0	.0	
1	0116	39	199.	1.3	2.2	*	1	0436	139	0.	.0	.0	*	1	0756	239	0.	.0	.0	
1	0118	40	188.	1.2	2.2	*	1	0438	140	0.	.0	.0	*	1	0758	240	0.	.0	.0	
1	0120	41	179.	1.2	2.1	*	1	0440	141	0.	.0	.0	*	1	0800	241	0.	.0	.0	
1	0122	42	170.	1.1	2.0	*	1	0442	142	0.	.0	.0	*	1	0802	242	0.	.0	.0	
1	0124	43	162.	1.1	2.0	*	1	0444	143	0.	.0	.0	*	1	0804	243	0.	.0	.0	
1	0126	44	154.	1.1	1.9	*	1	0446	144	0.	.0	.0	*	1	0806	244	0.	.0	.0	
1	0128	45	147.	1.0	1.9	*	1	0448	145	0.	.0	.0	*	1	0808	245	0.	.0	.0	
1	0130	46	141.	1.0	1.8	*	1	0450	146	0.	.0	.0	*	1	0810	246	0.	.0	.0	
1	0132	47	135.	1.0	1.8	*	1	0452	147	0.	.0	.0	*	1	0812	247	0.	.0	.0	
1	0134	48	129.	1.0	1.8	*	1	0454	148	0.	.0	.0	*	1	0814	248	0.	.0	.0	
1	0136	49	124.	.9	1.7	*	1	0456	149	0.	.0	.0	*	1	0816	249	0.	.0	.0	
1	0138	50	119.	.9	1.7	*	1	0458	150	0.	.0	.0	*	1	0818	250	0.	.0	.0	
1	0140	51	114.	.9	1.7	*	1	0500	151	0.	.0	.0	*	1	0820	251	0.	.0	.0	
1	0142	52	110.	.9	1.6	*	1	0502	152	0.	.0	.0	*	1	0822	252	0.	.0	.0	
1	0144	53	106.	.9	1.6	*	1	0504	153	0.	.0	.0	*	1	0824	253	0.	.0	.0	
1	0146	54	103.	.8	1.6	*	1	0506	154	0.	.0	.0	*	1	0826	254	0.	.0	.0	
1	0148	55	101.	.8	1.5	*	1	0508	155	0.	.0	.0	*	1	0828	255	0.	.0	.0	
1	0150	56	99.	.8	1.5	*	1	0510	156	0.	.0	.0	*	1	0830	256	0.	.0	.0	
1	0152	57	96.	.8	1.5	*	1	0512	157	0.	.0	.0	*	1	0832	257	0.	.0	.0	
1	0154	58	94.	.8	1.4	*	1	0514	158	0.	.0	.0	*	1	0834	258	0.	.0	.0	
1	0156	59	91.	.7	1.4	*	1	0516	159	0.	.0	.0	*	1	0836	259	0.	.0	.0	
1	0158	60	88.	.7	1.4	*	1	0518	160	0.	.0	.0	*	1	0838	260	0.	.0	.0	
1	0200	61	86.	.7	1.3	*	1	0520	161	0.	.0	.0	*	1	0840	261	0.	.0	.0	
1	0202	62	83.	.7	1.3	*	1	0522	162	0.	.0	.0	*	1	0842	262	0.	.0	.0	
1	0204	63	81.	.7	1.2	*	1	0524	163	0.	.0	.0	*	1	0844	263	0.	.0	.0	
1	0206	64	78.	.6	1.2	*	1	0526	164	0.	.0	.0	*	1	0846	264	0.	.0	.0	
1	0208	65	76.	.6	1.2	*	1	0528	165	0.	.0	.0	*	1	0848	265	0.	.0	.0	
1	0210	66	73.	.6	1.1	*	1	0530	166	0.	.0	.0	*	1	0850	266	0.	.0	.0	
1	0212	67	71.	.6	1.1	*	1	0532	167	0.	.0	.0	*	1	0852	267	0.	.0	.0	
1	0214	68	69.	.6	1.1	*	1	0534	168	0.	.0	.0	*	1	0854	268	0.	.0	.0	
1	0216	69	67.	.5	1.0	*	1	0536	169	0.	.0	.0	*	1	0856	269	0.	.0	.0	
1	0218	70	65.	.5	1.0	*	1	0538	170	0.	.0	.0	*	1	0858	270	0.	.0	.0	
1	0220	71	63.	.5	1.0	*	1	0540	171	0.	.0	.0	*	1	0900	271	0.	.0	.0	
1	0222	72	61.	.5	.9	*	1	0542	172	0.	.0	.0	*	1	0902	272	0.	.0	.0	
1	0224	73	59.	.5	.9	*	1	0544	173	0.	.0	.0	*	1	0904	273	0.	.0	.0	
1	0226	74	58.	.5	.9	*	1	0546	174	0.	.0	.0	*	1	0906	274	0.	.0	.0	
1	0228	75	56.	.5	.9	*	1	0548	175	0.	.0	.0	*	1	0908	275	0.	.0	.0	
1	0230	76	55.	.4	.8	*	1	0550	176	0.	.0	.0	*	1	0910	276	0.	.0	.0	
1	0232	77	53.	.4	.8	*	1	0552	177	0.	.0	.0	*	1	0912	277	0.	.0	.0	
1	0234	78	52.	.4	.8	*	1	0554	178	0.	.0	.0	*	1	0914	278	0.	.0	.0	
1	0236	79	50.	.4	.8	*	1	0556	179	0.	.0	.0	*	1	0916	279	0.	.0	.0	
1	0238	80	49.	.4	.8	*	1	0558	180	0.	.0	.0	*	1	0918	280	0.	.0	.0	
1	0240	81	48.	.4	.7	*	1	0600	181	0.	.0	.0	*	1	0920	281	0.	.0	.0	
1	0242	82	47.	.4	.7	*	1	0602	182	0.	.0	.0	*	1	0922	282	0.	.0	.0	
1	0244	83	45.	.4	.7	*	1	0604	183	0.	.0	.0	*	1	0924	283	0.	.0	.0	
1	0246	84	44.	.4	.7	*	1	0606	184	0.	.0	.0	*	1	0926	284	0.	.0	.0	
1	0248	85	43.	.4	.7	*	1	0608	185	0.	.0	.0	*	1	0928	285	0.	.0	.0	
1	0250	86	42.	.3	.6	*	1	0610	186	0.	.0	.0	*	1	0930	286	0.	.0	.0	
1	0252	87	41.	.3	.6	*	1	0612	187	0.	.0	.0	*	1	0932	287	0.	.0	.0	
1	0254	88	40.	.3	.6	*	1	0614	188	0.	.0	.0	*	1	0934	288	0.	.0	.0	
1	0256	89	39.	.3	.6	*	1	0616	189	0.	.0	.0	*	1	0936	289	0.	.0	.0	
1	0258	90	38.	.3	.6	*	1	0618	190	0.	.0	.0	*	1	0938	290	0.	.0	.0	
1	0300	91	37.	.3	.6	*	1	0620	191	0.	.0	.0	*	1	0940	291	0.	.0	.0	
1	0302	92	37.	.3	.6	*	1	0622	192	0.	.0	.0	*	1	0942	292	0.	.0	.0	
1	0304	93	36.	.3	.5	*	1	0624	193	0.	.0	.0	*	1	0944	293	0.	.0	.0	
1	0306	94	35.	.3	.5	*	1	0626	194	0.	.0	.0	*	1	0946	294	0.	.0	.0	
1	0308	95	34.	.3	.5	*	1	0628	195	0.	.0	.0	*	1	0948	295	0.	.0	.0	
1	0310	96	32.	.3	.5	*	1	0630	196	0.	.0	.0	*	1	0950	296	0.	.0	.0	
1	0312	97	30.	.2	.5	*	1	0632	197	0.	.0	.0	*	1	0952	297	0.	.0	.0	
1	0314	98	28.	.2	.4	*	1	0634	198	0.	.0	.0	*	1	0954	298	0.	.0	.0	
1	0316	99	26.	.2	.4	*	1	0636	199	0.	.0	.0	*	1	0956	299	0.	.0	.0	
1	0318	100	23.	.2	.4	*	1	0638	200	0.	.0	.0	*	1	0958	300	0.	.0	.0	
						*							*							

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 PEAK FLOW     TIME                           MAXIMUM AVERAGE FLOW
                                       6-HR        24-HR        72-HR        9.97-HR
+   (CFS)       (HR)
                          (CFS)
```

```
+      761.         .50                   102.           61.          61.            61.
                             (INCHES)    2.183         2.183        2.183          2.183
                             (AC-FT)       51.           51.          51.            51.

 PEAK STORAGE    TIME                              MAXIMUM AVERAGE STORAGE
                                          6-HR         24-HR        72-HR        9.97-HR
+  (AC-FT)       (HR)
        3.        .50                       1.            0.           0.             0.

  PEAK STAGE     TIME                               MAXIMUM AVERAGE STAGE
                                          6-HR         24-HR        72-HR        9.97-HR
+   (FEET)       (HR)
      4.94        .50                      .99           .60          .60            .60

                          CUMULATIVE AREA =       .43 SQ MI


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


            **************
            *            *
  33 KK     *    FR-11   *
            *            *
            **************
                           LOCAL RUNOFF TO FR-11
                           BASIN FR-11

               SUBBASIN RUNOFF DATA

  36 BA          SUBBASIN CHARACTERISTICS
                       TAREA          .48  SUBBASIN AREA

                 PRECIPITATION DATA

  19 PB                STORM         3.36  BASIN TOTAL PRECIPITATION

  20 PI            INCREMENTAL PRECIPITATION PATTERN
                      .04         .04         .06         .08         .08         .07         .07         .05         .03         .03
                      .02         .02         .02         .02         .02         .02         .02         .01         .01         .01
                      .01         .01         .01         .01         .01         .01         .01         .01         .01         .01
                      .01         .01         .01         .01         .01         .01         .01         .00         .00         .00
                      .00         .00         .00         .00         .00         .00         .00         .00         .00         .00
                      .00         .00         .00         .00         .00         .00         .00         .00         .00         .00
                      .00         .00         .00         .00         .00         .00         .00         .00         .00         .00
                      .00         .00         .00         .00         .00         .00         .00         .00         .00         .00
                      .00         .00         .00         .00         .00         .00         .00         .00         .00         .00

  37 LS          SCS LOSS RATE
                       STRTL          .33  INITIAL ABSTRACTION
                      CRVNBR        86.00  CURVE NUMBER
                       RTIMP        10.00  PERCENT IMPERVIOUS AREA

  38 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG          .17  LAG

                                                                   ***

                                                             UNIT HYDROGRAPH
                                                        28 END-OF-PERIOD ORDINATES
               100.        303.        628.        996.       1185.       1210.       1110.        950.        720.        518.
               387.        297.        225.        167.        126.         94.         71.         53.         40.         31.
                23.         17.         13.         11.          8.          6.          3.          1.

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

                                                    HYDROGRAPH AT STATION    FR-11

*****************************************************************************************************************************
                                                                   *
      DA MON HRMN   ORD     RAIN     LOSS   EXCESS      COMP Q     *      DA MON HRMN   ORD     RAIN     LOSS   EXCESS      COMP Q
                                                                   *
       1    0000     1      .00      .00      .00          0.      *       1    0500   151      .00      .00      .00          0.
       1    0002     2      .14      .12      .01          1.      *       1    0502   152      .00      .00      .00          0.
       1    0004     3      .14      .12      .01          5.      *       1    0504   153      .00      .00      .00          0.
       1    0006     4      .21      .17      .03         16.      *       1    0506   154      .00      .00      .00          0.
       1    0008     5      .28      .18      .10         41.      *       1    0508   155      .00      .00      .00          0.
       1    0010     6      .28      .14      .14         93.      *       1    0510   156      .00      .00      .00          0.
       1    0012     7      .22      .09      .13        180.      *       1    0512   157      .00      .00      .00          0.
```

1	0014	8	.22	.07	.15	307.	*	1	0514	158	.00	.00	.00	0.
1	0016	9	.17	.05	.12	457.	*	1	0516	159	.00	.00	.00	0.
1	0018	10	.12	.03	.08	606.	*	1	0518	160	.00	.00	.00	0.
1	0020	11	.12	.03	.09	731.	*	1	0520	161	.00	.00	.00	0.
1	0022	12	.08	.02	.06	816.	*	1	0522	162	.00	.00	.00	0.
1	0024	13	.08	.02	.06	854.	*	1	0524	163	.00	.00	.00	0.
1	0026	14	.07	.02	.06	851.	*	1	0526	164	.00	.00	.00	0.
1	0028	15	.07	.01	.05	821.	*	1	0528	165	.00	.00	.00	0.
1	0030	16	.07	.01	.05	776.	*	1	0530	166	.00	.00	.00	0.
1	0032	17	.05	.01	.04	726.	*	1	0532	167	.00	.00	.00	0.
1	0034	18	.05	.01	.04	677.	*	1	0534	168	.00	.00	.00	0.
1	0036	19	.05	.01	.04	630.	*	1	0536	169	.00	.00	.00	0.
1	0038	20	.05	.01	.04	586.	*	1	0538	170	.00	.00	.00	0.
1	0040	21	.05	.01	.04	546.	*	1	0540	171	.00	.00	.00	0.
1	0042	22	.04	.01	.03	508.	*	1	0542	172	.00	.00	.00	0.
1	0044	23	.04	.01	.03	473.	*	1	0544	173	.00	.00	.00	0.
1	0046	24	.04	.01	.03	441.	*	1	0546	174	.00	.00	.00	0.
1	0048	25	.03	.01	.03	412.	*	1	0548	175	.00	.00	.00	0.
1	0050	26	.03	.01	.03	385.	*	1	0550	176	.00	.00	.00	0.
1	0052	27	.03	.00	.02	361.	*	1	0552	177	.00	.00	.00	0.
1	0054	28	.03	.00	.02	338.	*	1	0554	178	.00	.00	.00	0.
1	0056	29	.03	.00	.02	318.	*	1	0556	179	.00	.00	.00	0.
1	0058	30	.02	.00	.02	299.	*	1	0558	180	.00	.00	.00	0.
1	0100	31	.02	.00	.02	281.	*	1	0600	181	.00	.00	.00	0.
1	0102	32	.02	.00	.02	265.	*	1	0602	182	.00	.00	.00	0.
1	0104	33	.02	.00	.02	250.	*	1	0604	183	.00	.00	.00	0.
1	0106	34	.02	.00	.02	236.	*	1	0606	184	.00	.00	.00	0.
1	0108	35	.02	.00	.02	224.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.00	.02	212.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.02	.00	.02	201.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.02	.00	.02	191.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.02	.00	.01	182.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.02	.00	.01	174.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.02	.00	.01	166.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	158.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	151.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	145.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	139.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	133.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	128.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	123.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	118.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	114.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	109.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	105.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	102.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	98.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	95.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	91.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.01	88.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.01	85.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.01	83.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.01	80.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.01	78.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.01	75.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.01	73.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.01	71.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.01	69.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.01	67.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.01	65.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.01	63.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.01	61.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.01	.00	.01	60.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.01	.00	.01	58.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.01	.00	.01	56.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.01	.00	.01	55.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.01	.00	.00	53.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.01	.00	.00	52.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.01	.00	.00	51.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.01	.00	.00	50.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.01	.00	.00	48.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	47.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	46.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	45.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	44.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	43.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	42.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	41.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	40.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	39.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	38.	*	1	0754	238	.00	.00	.00	0.

1	0256	89	.00	.00	.00	37.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	37.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	36.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	35.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	33.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	30.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	26.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	22.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	17.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	13.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	10.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	7.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	6.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	4.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	3.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	2.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	2.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	1.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	1.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	1.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	1.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	0.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	0.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.
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   TOTAL RAINFALL =     3.36, TOTAL LOSS =     1.25, TOTAL EXCESS =     2.11

 PEAK FLOW      TIME                               MAXIMUM AVERAGE FLOW
                                         6-HR         24-HR         72-HR        9.97-HR
+   (CFS)       (HR)
                           (CFS)
+     854.       .40                     109.           66.           66.           66.
                         (INCHES)       2.113         2.113         2.113         2.113
                          (AC-FT)         54.           54.           54.           54.

                         CUMULATIVE AREA =      .48 SQ MI


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              **************
              *            *
 39 KK        *   CO-11    *
              *            *
              **************
                              COMBINE HYDROGRAPHS
                              AT NODE FR-11

 42 HC          HYDROGRAPH COMBINATION
                      ICOMP            2  NUMBER OF HYDROGRAPHS TO COMBINE

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                                                    HYDROGRAPH AT STATION   CO-11
                                                         SUM OF  2 HYDROGRAPHS

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0230	76	105.	*	1		0500	151	0.	*	1		0730	226	0.
1		0002	2	1.	*	1		0232	77	103.	*	1		0502	152	0.	*	1		0732	227	0.
1		0004	3	6.	*	1		0234	78	100.	*	1		0504	153	0.	*	1		0734	228	0.
1		0006	4	17.	*	1		0236	79	97.	*	1		0506	154	0.	*	1		0736	229	0.
1		0008	5	45.	*	1		0238	80	95.	*	1		0508	155	0.	*	1		0738	230	0.
1		0010	6	102.	*	1		0240	81	93.	*	1		0510	156	0.	*	1		0740	231	0.
1		0012	7	201.	*	1		0242	82	90.	*	1		0512	157	0.	*	1		0742	232	0.
1		0014	8	351.	*	1		0244	83	88.	*	1		0514	158	0.	*	1		0744	233	0.
1		0016	9	545.	*	1		0246	84	86.	*	1		0516	159	0.	*	1		0746	234	0.
1		0018	10	794.	*	1		0248	85	84.	*	1		0518	160	0.	*	1		0748	235	0.
1		0020	11	1048.	*	1		0250	86	82.	*	1		0520	161	0.	*	1		0750	236	0.
1		0022	12	1282.	*	1		0252	87	80.	*	1		0522	162	0.	*	1		0752	237	0.
1		0024	13	1447.	*	1		0254	88	78.	*	1		0524	163	0.	*	1		0754	238	0.
1		0026	14	1535.	*	1		0256	89	77.	*	1		0526	164	0.	*	1		0756	239	0.
1		0028	15	1563.	*	1		0258	90	75.	*	1		0528	165	0.	*	1		0758	240	0.
1		0030	16	1537.	*	1		0300	91	73.	*	1		0530	166	0.	*	1		0800	241	0.
1		0032	17	1475.	*	1		0302	92	71.	*	1		0532	167	0.	*	1		0802	242	0.
1		0034	18	1397.	*	1		0304	93	69.	*	1		0534	168	0.	*	1		0804	243	0.
1		0036	19	1315.	*	1		0306	94	65.	*	1		0536	169	0.	*	1		0806	244	0.
1		0038	20	1233.	*	1		0308	95	60.	*	1		0538	170	0.	*	1		0808	245	0.
1		0040	21	1153.	*	1		0310	96	54.	*	1		0540	171	0.	*	1		0810	246	0.
1		0042	22	1075.	*	1		0312	97	48.	*	1		0542	172	0.	*	1		0812	247	0.
1		0044	23	1002.	*	1		0314	98	42.	*	1		0544	173	0.	*	1		0814	248	0.
1		0046	24	934.	*	1		0316	99	36.	*	1		0546	174	0.	*	1		0816	249	0.
1		0048	25	870.	*	1		0318	100	31.	*	1		0548	175	0.	*	1		0818	250	0.
1		0050	26	812.	*	1		0320	101	26.	*	1		0550	176	0.	*	1		0820	251	0.
1		0052	27	759.	*	1		0322	102	22.	*	1		0552	177	0.	*	1		0822	252	0.
1		0054	28	710.	*	1		0324	103	19.	*	1		0554	178	0.	*	1		0824	253	0.
1		0056	29	666.	*	1		0326	104	15.	*	1		0556	179	0.	*	1		0826	254	0.
1		0058	30	628.	*	1		0328	105	13.	*	1		0558	180	0.	*	1		0828	255	0.
1		0100	31	594.	*	1		0330	106	10.	*	1		0600	181	0.	*	1		0830	256	0.
1		0102	32	561.	*	1		0332	107	9.	*	1		0602	182	0.	*	1		0832	257	0.
1		0104	33	529.	*	1		0334	108	7.	*	1		0604	183	0.	*	1		0834	258	0.
1		0106	34	500.	*	1		0336	109	6.	*	1		0606	184	0.	*	1		0836	259	0.
1		0108	35	472.	*	1		0338	110	4.	*	1		0608	185	0.	*	1		0838	260	0.
1		0110	36	447.	*	1		0340	111	4.	*	1		0610	186	0.	*	1		0840	261	0.
1		0112	37	423.	*	1		0342	112	3.	*	1		0612	187	0.	*	1		0842	262	0.
1		0114	38	401.	*	1		0344	113	2.	*	1		0614	188	0.	*	1		0844	263	0.
1		0116	39	381.	*	1		0346	114	2.	*	1		0616	189	0.	*	1		0846	264	0.
1		0118	40	362.	*	1		0348	115	1.	*	1		0618	190	0.	*	1		0848	265	0.
1		0120	41	345.	*	1		0350	116	1.	*	1		0620	191	0.	*	1		0850	266	0.
1		0122	42	328.	*	1		0352	117	1.	*	1		0622	192	0.	*	1		0852	267	0.
1		0124	43	313.	*	1		0354	118	1.	*	1		0624	193	0.	*	1		0854	268	0.
1		0126	44	299.	*	1		0356	119	0.	*	1		0626	194	0.	*	1		0856	269	0.
1		0128	45	286.	*	1		0358	120	0.	*	1		0628	195	0.	*	1		0858	270	0.
1		0130	46	274.	*	1		0400	121	0.	*	1		0630	196	0.	*	1		0900	271	0.
1		0132	47	263.	*	1		0402	122	0.	*	1		0632	197	0.	*	1		0902	272	0.
1		0134	48	252.	*	1		0404	123	0.	*	1		0634	198	0.	*	1		0904	273	0.
1		0136	49	242.	*	1		0406	124	0.	*	1		0636	199	0.	*	1		0906	274	0.
1		0138	50	232.	*	1		0408	125	0.	*	1		0638	200	0.	*	1		0908	275	0.
1		0140	51	223.	*	1		0410	126	0.	*	1		0640	201	0.	*	1		0910	276	0.
1		0142	52	215.	*	1		0412	127	0.	*	1		0642	202	0.	*	1		0912	277	0.
1		0144	53	207.	*	1		0414	128	0.	*	1		0644	203	0.	*	1		0914	278	0.
1		0146	54	201.	*	1		0416	129	0.	*	1		0646	204	0.	*	1		0916	279	0.
1		0148	55	195.	*	1		0418	130	0.	*	1		0648	205	0.	*	1		0918	280	0.
1		0150	56	190.	*	1		0420	131	0.	*	1		0650	206	0.	*	1		0920	281	0.
1		0152	57	185.	*	1		0422	132	0.	*	1		0652	207	0.	*	1		0922	282	0.

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  1    0154   58      179.   *   1    0424  133      0.   *   1    0654  208      0.   *   1    0924  283      0.
  1    0156   59      174.   *   1    0426  134      0.   *   1    0656  209      0.   *   1    0926  284      0.
  1    0158   60      169.   *   1    0428  135      0.   *   1    0658  210      0.   *   1    0928  285      0.
  1    0200   61      163.   *   1    0430  136      0.   *   1    0700  211      0.   *   1    0930  286      0.
  1    0202   62      158.   *   1    0432  137      0.   *   1    0702  212      0.   *   1    0932  287      0.
  1    0204   63      154.   *   1    0434  138      0.   *   1    0704  213      0.   *   1    0934  288      0.
  1    0206   64      149.   *   1    0436  139      0.   *   1    0706  214      0.   *   1    0936  289      0.
  1    0208   65      144.   *   1    0438  140      0.   *   1    0708  215      0.   *   1    0938  290      0.
  1    0210   66      140.   *   1    0440  141      0.   *   1    0710  216      0.   *   1    0940  291      0.
  1    0212   67      136.   *   1    0442  142      0.   *   1    0712  217      0.   *   1    0942  292      0.
  1    0214   68      132.   *   1    0444  143      0.   *   1    0714  218      0.   *   1    0944  293      0.
  1    0216   69      128.   *   1    0446  144      0.   *   1    0716  219      0.   *   1    0946  294      0.
  1    0218   70      124.   *   1    0448  145      0.   *   1    0718  220      0.   *   1    0948  295      0.
  1    0220   71      121.   *   1    0450  146      0.   *   1    0720  221      0.   *   1    0950  296      0.
  1    0222   72      118.   *   1    0452  147      0.   *   1    0722  222      0.   *   1    0952  297      0.
  1    0224   73      114.   *   1    0454  148      0.   *   1    0724  223      0.   *   1    0954  298      0.
  1    0226   74      111.   *   1    0456  149      0.   *   1    0726  224      0.   *   1    0956  299      0.
  1    0228   75      108.   *   1    0458  150      0.   *   1    0728  225      0.   *   1    0958  300      0.
                             *                              *                              *
*******************************************************************************************************************

 PEAK FLOW     TIME                         MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR       72-HR       9.97-HR
+   (CFS)      (HR)
                          (CFS)
+    1563.      .47                   211.         127.        127.         127.
                       (INCHES)      2.146        2.146       2.146        2.146
                        (AC-FT)       105.         105.        105.         105.

                      CUMULATIVE AREA =      .91 SQ MI



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             **************
             *            *
   43 KK     *    11TO10  *
             *            *
             **************
                         MODIFIED PULS CHANNEL ROUTING
                         FROM NODE FR-11 TO FR-10

              HYDROGRAPH ROUTING DATA

   46 RS        STORAGE ROUTING
                      NSTPS           2  NUMBER OF SUBREACHES
                       ITYP        FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC       -1.00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

   47 RC        NORMAL DEPTH CHANNEL
                        ANL        .125  LEFT OVERBANK N-VALUE
                       ANCH        .125  MAIN CHANNEL N-VALUE
                        ANR        .125  RIGHT OVERBANK N-VALUE
                      RLNTH       4720.  REACH LENGTH
                        SEL       .1590  ENERGY SLOPE
                      ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                             CROSS-SECTION DATA
                           --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
   49 RY        ELEVATION   30.00     20.00      10.00       .00        .00      10.00      20.00      30.00
   48 RX        DISTANCE      .00     10.00      20.00     30.00      40.00      50.00      60.00      70.00
                                                               ***

                                              COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

           STORAGE        .00      1.98      4.50      7.56     11.17     15.31     19.99     25.21     30.98     37.28
           OUTFLOW        .00    101.58    333.54    687.62   1171.32   1794.78   2568.75   3656.93   5014.45   6581.65
         ELEVATION        .00      1.58      3.16      4.74      6.32      7.89      9.47     11.05     12.63     14.21

           STORAGE      44.12     51.51     59.43     67.90     76.90     86.44     96.53    107.16    118.32    130.03
           OUTFLOW    8368.98  10386.00  12641.90  15145.60  17905.85  20931.23  24230.23  27811.20  31682.37  35851.88
         ELEVATION      15.79     17.37     18.95     20.53     22.11     23.68     25.26     26.84     28.42     30.00

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HYDROGRAPH AT STATION 11TO10

DA MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	0000	1	0.	.0	.0	*	1	0320	101	59.	.6	.9	*	1	0640	201	0.	.0	.0
1	0002	2	0.	.0	.0	*	1	0322	102	55.	.5	.8	*	1	0642	202	0.	.0	.0
1	0004	3	0.	.0	.0	*	1	0324	103	50.	.5	.8	*	1	0644	203	0.	.0	.0
1	0006	4	1.	.0	.0	*	1	0326	104	46.	.4	.7	*	1	0646	204	0.	.0	.0
1	0008	5	2.	.0	.0	*	1	0328	105	41.	.4	.6	*	1	0648	205	0.	.0	.0
1	0010	6	6.	.1	.1	*	1	0330	106	37.	.4	.6	*	1	0650	206	0.	.0	.0
1	0012	7	15.	.1	.2	*	1	0332	107	33.	.3	.5	*	1	0652	207	0.	.0	.0
1	0014	8	33.	.3	.5	*	1	0334	108	29.	.3	.5	*	1	0654	208	0.	.0	.0
1	0016	9	70.	.7	1.1	*	1	0336	109	26.	.3	.4	*	1	0656	209	0.	.0	.0
1	0018	10	161.	1.3	2.0	*	1	0338	110	23.	.2	.4	*	1	0658	210	0.	.0	.0
1	0020	11	320.	2.2	3.1	*	1	0340	111	20.	.2	.3	*	1	0700	211	0.	.0	.0
1	0022	12	551.	3.2	4.1	*	1	0342	112	17.	.2	.3	*	1	0702	212	0.	.0	.0
1	0024	13	805.	4.2	5.1	*	1	0344	113	15.	.1	.2	*	1	0704	213	0.	.0	.0
1	0026	14	1052.	5.1	5.9	*	1	0346	114	13.	.1	.2	*	1	0706	214	0.	.0	.0
1	0028	15	1254.	5.9	6.5	*	1	0348	115	11.	.1	.2	*	1	0708	215	0.	.0	.0
1	0030	16	1394.	6.3	6.9	*	1	0350	116	9.	.1	.1	*	1	0710	216	0.	.0	.0
1	0032	17	1464.	6.6	7.1	*	1	0352	117	8.	.1	.1	*	1	0712	217	0.	.0	.0
1	0034	18	1479.	6.6	7.1	*	1	0354	118	6.	.1	.1	*	1	0714	218	0.	.0	.0
1	0036	19	1453.	6.5	7.0	*	1	0356	119	5.	.1	.1	*	1	0716	219	0.	.0	.0
1	0038	20	1401.	6.3	6.9	*	1	0358	120	5.	.0	.1	*	1	0718	220	0.	.0	.0
1	0040	21	1335.	6.1	6.7	*	1	0400	121	4.	.0	.1	*	1	0720	221	0.	.0	.0
1	0042	22	1261.	5.9	6.5	*	1	0402	122	3.	.0	.0	*	1	0722	222	0.	.0	.0
1	0044	23	1187.	5.6	6.4	*	1	0404	123	3.	.0	.0	*	1	0724	223	0.	.0	.0
1	0046	24	1119.	5.4	6.1	*	1	0406	124	2.	.0	.0	*	1	0726	224	0.	.0	.0
1	0048	25	1052.	5.1	5.9	*	1	0408	125	2.	.0	.0	*	1	0728	225	0.	.0	.0
1	0050	26	985.	4.9	5.7	*	1	0410	126	1.	.0	.0	*	1	0730	226	0.	.0	.0
1	0052	27	921.	4.7	5.5	*	1	0412	127	1.	.0	.0	*	1	0732	227	0.	.0	.0
1	0054	28	860.	4.4	5.3	*	1	0414	128	1.	.0	.0	*	1	0734	228	0.	.0	.0
1	0056	29	804.	4.2	5.1	*	1	0416	129	1.	.0	.0	*	1	0736	229	0.	.0	.0
1	0058	30	752.	4.0	4.9	*	1	0418	130	1.	.0	.0	*	1	0738	230	0.	.0	.0
1	0100	31	707.	3.9	4.8	*	1	0420	131	1.	.0	.0	*	1	0740	231	0.	.0	.0
1	0102	32	669.	3.7	4.7	*	1	0422	132	0.	.0	.0	*	1	0742	232	0.	.0	.0
1	0104	33	635.	3.6	4.5	*	1	0424	133	0.	.0	.0	*	1	0744	233	0.	.0	.0
1	0106	34	601.	3.4	4.4	*	1	0426	134	0.	.0	.0	*	1	0746	234	0.	.0	.0
1	0108	35	568.	3.3	4.2	*	1	0428	135	0.	.0	.0	*	1	0748	235	0.	.0	.0
1	0110	36	537.	3.1	4.1	*	1	0430	136	0.	.0	.0	*	1	0750	236	0.	.0	.0
1	0112	37	508.	3.0	3.9	*	1	0432	137	0.	.0	.0	*	1	0752	237	0.	.0	.0
1	0114	38	480.	2.9	3.8	*	1	0434	138	0.	.0	.0	*	1	0754	238	0.	.0	.0
1	0116	39	455.	2.8	3.7	*	1	0436	139	0.	.0	.0	*	1	0756	239	0.	.0	.0
1	0118	40	431.	2.7	3.6	*	1	0438	140	0.	.0	.0	*	1	0758	240	0.	.0	.0
1	0120	41	408.	2.6	3.5	*	1	0440	141	0.	.0	.0	*	1	0800	241	0.	.0	.0
1	0122	42	387.	2.5	3.4	*	1	0442	142	0.	.0	.0	*	1	0802	242	0.	.0	.0
1	0124	43	368.	2.4	3.3	*	1	0444	143	0.	.0	.0	*	1	0804	243	0.	.0	.0
1	0126	44	351.	2.3	3.2	*	1	0446	144	0.	.0	.0	*	1	0806	244	0.	.0	.0
1	0128	45	335.	2.3	3.2	*	1	0448	145	0.	.0	.0	*	1	0808	245	0.	.0	.0
1	0130	46	323.	2.2	3.1	*	1	0450	146	0.	.0	.0	*	1	0810	246	0.	.0	.0
1	0132	47	311.	2.1	3.0	*	1	0452	147	0.	.0	.0	*	1	0812	247	0.	.0	.0
1	0134	48	299.	2.1	2.9	*	1	0454	148	0.	.0	.0	*	1	0814	248	0.	.0	.0
1	0136	49	287.	2.0	2.8	*	1	0456	149	0.	.0	.0	*	1	0816	249	0.	.0	.0
1	0138	50	275.	1.9	2.8	*	1	0458	150	0.	.0	.0	*	1	0818	250	0.	.0	.0
1	0140	51	264.	1.9	2.7	*	1	0500	151	0.	.0	.0	*	1	0820	251	0.	.0	.0
1	0142	52	253.	1.8	2.6	*	1	0502	152	0.	.0	.0	*	1	0822	252	0.	.0	.0
1	0144	53	243.	1.8	2.5	*	1	0504	153	0.	.0	.0	*	1	0824	253	0.	.0	.0
1	0146	54	234.	1.7	2.5	*	1	0506	154	0.	.0	.0	*	1	0826	254	0.	.0	.0
1	0148	55	225.	1.7	2.4	*	1	0508	155	0.	.0	.0	*	1	0828	255	0.	.0	.0
1	0150	56	217.	1.6	2.4	*	1	0510	156	0.	.0	.0	*	1	0830	256	0.	.0	.0
1	0152	57	210.	1.6	2.3	*	1	0512	157	0.	.0	.0	*	1	0832	257	0.	.0	.0
1	0154	58	203.	1.5	2.3	*	1	0514	158	0.	.0	.0	*	1	0834	258	0.	.0	.0
1	0156	59	197.	1.5	2.2	*	1	0516	159	0.	.0	.0	*	1	0836	259	0.	.0	.0
1	0158	60	191.	1.5	2.2	*	1	0518	160	0.	.0	.0	*	1	0838	260	0.	.0	.0
1	0200	61	185.	1.4	2.1	*	1	0520	161	0.	.0	.0	*	1	0840	261	0.	.0	.0
1	0202	62	180.	1.4	2.1	*	1	0522	162	0.	.0	.0	*	1	0842	262	0.	.0	.0
1	0204	63	174.	1.4	2.1	*	1	0524	163	0.	.0	.0	*	1	0844	263	0.	.0	.0
1	0206	64	169.	1.4	2.0	*	1	0526	164	0.	.0	.0	*	1	0846	264	0.	.0	.0
1	0208	65	164.	1.3	2.0	*	1	0528	165	0.	.0	.0	*	1	0848	265	0.	.0	.0
1	0210	66	159.	1.3	2.0	*	1	0530	166	0.	.0	.0	*	1	0850	266	0.	.0	.0
1	0212	67	154.	1.3	1.9	*	1	0532	167	0.	.0	.0	*	1	0852	267	0.	.0	.0
1	0214	68	149.	1.2	1.9	*	1	0534	168	0.	.0	.0	*	1	0854	268	0.	.0	.0
1	0216	69	145.	1.2	1.9	*	1	0536	169	0.	.0	.0	*	1	0856	269	0.	.0	.0
1	0218	70	140.	1.2	1.8	*	1	0538	170	0.	.0	.0	*	1	0858	270	0.	.0	.0
1	0220	71	136.	1.2	1.8	*	1	0540	171	0.	.0	.0	*	1	0900	271	0.	.0	.0
1	0222	72	132.	1.2	1.8	*	1	0542	172	0.	.0	.0	*	1	0902	272	0.	.0	.0
1	0224	73	129.	1.1	1.8	*	1	0544	173	0.	.0	.0	*	1	0904	273	0.	.0	.0
1	0226	74	125.	1.1	1.7	*	1	0546	174	0.	.0	.0	*	1	0906	274	0.	.0	.0
1	0228	75	121.	1.1	1.7	*	1	0548	175	0.	.0	.0	*	1	0908	275	0.	.0	.0

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  1     0230  76      118.       1.1      1.7 *  1     0550 176      0.       .0       .0 *  1     0910 276      0.       .0       .0
  1     0232  77      115.       1.1      1.7 *  1     0552 177      0.       .0       .0 *  1     0912 277      0.       .0       .0
  1     0234  78      112.       1.0      1.6 *  1     0554 178      0.       .0       .0 *  1     0914 278      0.       .0       .0
  1     0236  79      109.       1.0      1.6 *  1     0556 179      0.       .0       .0 *  1     0916 279      0.       .0       .0
  1     0238  80      106.       1.0      1.6 *  1     0558 180      0.       .0       .0 *  1     0918 280      0.       .0       .0
  1     0240  81      103.       1.0      1.6 *  1     0600 181      0.       .0       .0 *  1     0920 281      0.       .0       .0
  1     0242  82      101.       1.0      1.6 *  1     0602 182      0.       .0       .0 *  1     0922 282      0.       .0       .0
  1     0244  83      100.       1.0      1.6 *  1     0604 183      0.       .0       .0 *  1     0924 283      0.       .0       .0
  1     0246  84       99.       1.0      1.5 *  1     0606 184      0.       .0       .0 *  1     0926 284      0.       .0       .0
  1     0248  85       97.        .9      1.5 *  1     0608 185      0.       .0       .0 *  1     0928 285      0.       .0       .0
  1     0250  86       95.        .9      1.5 *  1     0610 186      0.       .0       .0 *  1     0930 286      0.       .0       .0
  1     0252  87       94.        .9      1.5 *  1     0612 187      0.       .0       .0 *  1     0932 287      0.       .0       .0
  1     0254  88       92.        .9      1.4 *  1     0614 188      0.       .0       .0 *  1     0934 288      0.       .0       .0
  1     0256  89       90.        .9      1.4 *  1     0616 189      0.       .0       .0 *  1     0936 289      0.       .0       .0
  1     0258  90       88.        .9      1.4 *  1     0618 190      0.       .0       .0 *  1     0938 290      0.       .0       .0
  1     0300  91       86.        .8      1.3 *  1     0620 191      0.       .0       .0 *  1     0940 291      0.       .0       .0
  1     0302  92       84.        .8      1.3 *  1     0622 192      0.       .0       .0 *  1     0942 292      0.       .0       .0
  1     0304  93       82.        .8      1.3 *  1     0624 193      0.       .0       .0 *  1     0944 293      0.       .0       .0
  1     0306  94       81.        .8      1.3 *  1     0626 194      0.       .0       .0 *  1     0946 294      0.       .0       .0
  1     0308  95       78.        .8      1.2 *  1     0628 195      0.       .0       .0 *  1     0948 295      0.       .0       .0
  1     0310  96       76.        .7      1.2 *  1     0630 196      0.       .0       .0 *  1     0950 296      0.       .0       .0
  1     0312  97       73.        .7      1.1 *  1     0632 197      0.       .0       .0 *  1     0952 297      0.       .0       .0
  1     0314  98       70.        .7      1.1 *  1     0634 198      0.       .0       .0 *  1     0954 298      0.       .0       .0
  1     0316  99       67.        .7      1.0 *  1     0636 199      0.       .0       .0 *  1     0956 299      0.       .0       .0
  1     0318 100       63.        .6      1.0 *  1     0638 200      0.       .0       .0 *  1     0958 300      0.       .0       .0
                                              *                                           *
*****************************************************************************************************************************************

  PEAK FLOW     TIME                             MAXIMUM AVERAGE FLOW
                                        6-HR         24-HR        72-HR        9.97-HR
+    (CFS)      (HR)
                             (CFS)
+     1479.       .57                   211.          127.         127.          127.
                          (INCHES)     2.146         2.146        2.146         2.146
                           (AC-FT)      105.          105.         105.          105.

 PEAK STORAGE   TIME                            MAXIMUM AVERAGE STORAGE
                                        6-HR         24-HR        72-HR        9.97-HR
+   (AC-FT)     (HR)
          7.      .57                     1.            1.           1.            1.

  PEAK STAGE    TIME                             MAXIMUM AVERAGE STAGE
                                        6-HR         24-HR        72-HR        9.97-HR
+    (FEET)     (HR)
        7.09      .57                   1.62           .97          .97           .97

                          CUMULATIVE AREA =      .91 SQ MI


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


              **************
              *            *
   50 KK      *    FR-10   *
              *            *
              **************
                             LOCAL RUNOFF TO FR-10
                             BASIN FR-10

                 SUBBASIN RUNOFF DATA

   53 BA           SUBBASIN CHARACTERISTICS
                         TAREA           .56  SUBBASIN AREA

                   PRECIPITATION DATA

   54 PB                 STORM         3.22  BASIN TOTAL PRECIPITATION

   20 PI             INCREMENTAL PRECIPITATION PATTERN
                         .04       .04       .06       .08       .08       .07       .07       .05       .03       .03
                         .02       .02       .02       .02       .02       .02       .02       .01       .01       .01
                         .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                         .01       .01       .01       .01       .01       .01       .01       .00       .00       .00
                         .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                         .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                         .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                         .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                         .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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55 LS SCS LOSS RATE

STRTL	.33	INITIAL ABSTRACTION
CRVNBR	86.00	CURVE NUMBER
RTIMP	2.00	PERCENT IMPERVIOUS AREA

56 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.20	LAG

***

UNIT HYDROGRAPH
32 END-OF-PERIOD ORDINATES

87.	256.	524.	876.	1141.	1254.	1251.	1137.	987.	778.
574.	444.	345.	273.	212.	164.	128.	98.	76.	59.
46.	36.	28.	22.	17.	13.	11.	9.	6.	4.
2.	0.								

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HYDROGRAPH AT STATION FR-10

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DA MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	0000	1	.00	.00	.00	0.	*	1	0500	151	.00	.00	.00	0.
1	0002	2	.13	.13	.00	0.	*	1	0502	152	.00	.00	.00	0.
1	0004	3	.13	.13	.00	1.	*	1	0504	153	.00	.00	.00	0.
1	0006	4	.20	.18	.01	3.	*	1	0506	154	.00	.00	.00	0.
1	0008	5	.26	.19	.07	13.	*	1	0508	155	.00	.00	.00	0.
1	0010	6	.26	.15	.12	41.	*	1	0510	156	.00	.00	.00	0.
1	0012	7	.21	.10	.12	95.	*	1	0512	157	.00	.00	.00	0.
1	0014	8	.21	.08	.13	186.	*	1	0514	158	.00	.00	.00	0.
1	0016	9	.16	.05	.11	309.	*	1	0516	159	.00	.00	.00	0.
1	0018	10	.11	.03	.08	448.	*	1	0518	160	.00	.00	.00	0.
1	0020	11	.11	.03	.08	583.	*	1	0520	161	.00	.00	.00	0.
1	0022	12	.08	.02	.06	696.	*	1	0522	162	.00	.00	.00	0.
1	0024	13	.08	.02	.06	774.	*	1	0524	163	.00	.00	.00	0.
1	0026	14	.07	.02	.05	816.	*	1	0526	164	.00	.00	.00	0.
1	0028	15	.06	.01	.05	822.	*	1	0528	165	.00	.00	.00	0.
1	0030	16	.06	.01	.05	804.	*	1	0530	166	.00	.00	.00	0.
1	0032	17	.05	.01	.04	771.	*	1	0532	167	.00	.00	.00	0.
1	0034	18	.05	.01	.04	731.	*	1	0534	168	.00	.00	.00	0.
1	0036	19	.05	.01	.04	690.	*	1	0536	169	.00	.00	.00	0.
1	0038	20	.04	.01	.03	649.	*	1	0538	170	.00	.00	.00	0.
1	0040	21	.04	.01	.03	610.	*	1	0540	171	.00	.00	.00	0.
1	0042	22	.04	.01	.03	573.	*	1	0542	172	.00	.00	.00	0.
1	0044	23	.04	.01	.03	537.	*	1	0544	173	.00	.00	.00	0.
1	0046	24	.03	.01	.03	504.	*	1	0546	174	.00	.00	.00	0.
1	0048	25	.03	.01	.03	472.	*	1	0548	175	.00	.00	.00	0.
1	0050	26	.03	.01	.03	443.	*	1	0550	176	.00	.00	.00	0.
1	0052	27	.03	.00	.02	416.	*	1	0552	177	.00	.00	.00	0.
1	0054	28	.03	.00	.02	390.	*	1	0554	178	.00	.00	.00	0.
1	0056	29	.03	.00	.02	367.	*	1	0556	179	.00	.00	.00	0.
1	0058	30	.02	.00	.02	345.	*	1	0558	180	.00	.00	.00	0.
1	0100	31	.02	.00	.02	326.	*	1	0600	181	.00	.00	.00	0.
1	0102	32	.02	.00	.02	307.	*	1	0602	182	.00	.00	.00	0.
1	0104	33	.02	.00	.02	290.	*	1	0604	183	.00	.00	.00	0.
1	0106	34	.02	.00	.02	274.	*	1	0606	184	.00	.00	.00	0.
1	0108	35	.02	.00	.02	260.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.00	.02	246.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.02	.00	.01	233.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.02	.00	.01	221.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.02	.00	.01	210.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.02	.00	.01	200.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.02	.00	.01	191.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	182.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	174.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	166.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	159.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	152.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	146.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	140.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	135.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	130.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	125.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	120.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	116.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	112.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	108.	*	1	0648	205	.00	.00	.00	0.

1	0150	56	.01	.00	.01	104.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.01	100.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.01	97.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.01	94.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.01	91.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.01	88.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.01	85.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.01	82.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.01	80.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.01	78.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.01	75.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.01	73.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.01	71.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.01	69.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.01	.00	.01	67.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.01	.00	.01	65.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.01	.00	.00	64.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.01	.00	.00	62.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.01	.00	.00	60.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.01	.00	.00	59.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.01	.00	.00	57.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.00	.00	.00	56.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	54.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	53.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	52.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	51.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	49.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	48.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	47.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	46.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	45.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	44.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	43.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	42.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	41.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	40.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	39.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	37.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	35.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	31.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	27.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	23.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	19.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	15.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	11.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	9.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	7.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	5.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	4.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	3.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	2.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	2.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	1.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	1.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	1.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	1.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.

1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.
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    TOTAL RAINFALL =     3.22, TOTAL LOSS =     1.34, TOTAL EXCESS =     1.88

  PEAK FLOW       TIME                           MAXIMUM AVERAGE FLOW
                                         6-HR         24-HR         72-HR         9.97-HR
+    (CFS)        (HR)
                             (CFS)
+      822.        .47                    113.           68.           68.            68.
                           (INCHES)      1.880         1.880         1.880          1.880
                            (AC-FT)        56.           56.           56.            56.

                          CUMULATIVE AREA =      .56 SQ MI


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              **************
              *            *
   57 KK      *    CO-10   *
              *            *
              **************
                             COMBINE HYDROGRAPHS
                             AT NODE FR-10

   60 HC           HYDROGRAPH COMBINATION
                         ICOMP             2   NUMBER OF HYDROGRAPHS TO COMBINE

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                                                   HYDROGRAPH AT STATION    CO-10
                                                        SUM OF  2 HYDROGRAPHS

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0230	76	175.	*	1		0500	151	0.	*	1		0730	226	0.
1		0002	2	0.	*	1		0232	77	170.	*	1		0502	152	0.	*	1		0732	227	0.
1		0004	3	1.	*	1		0234	78	166.	*	1		0504	153	0.	*	1		0734	228	0.
1		0006	4	4.	*	1		0236	79	162.	*	1		0506	154	0.	*	1		0736	229	0.
1		0008	5	16.	*	1		0238	80	158.	*	1		0508	155	0.	*	1		0738	230	0.
1		0010	6	47.	*	1		0240	81	154.	*	1		0510	156	0.	*	1		0740	231	0.
1		0012	7	110.	*	1		0242	82	151.	*	1		0512	157	0.	*	1		0742	232	0.
1		0014	8	219.	*	1		0244	83	148.	*	1		0514	158	0.	*	1		0744	233	0.
1		0016	9	380.	*	1		0246	84	146.	*	1		0516	159	0.	*	1		0746	234	0.
1		0018	10	609.	*	1		0248	85	143.	*	1		0518	160	0.	*	1		0748	235	0.
1		0020	11	903.	*	1		0250	86	140.	*	1		0520	161	0.	*	1		0750	236	0.
1		0022	12	1247.	*	1		0252	87	138.	*	1		0522	162	0.	*	1		0752	237	0.
1		0024	13	1579.	*	1		0254	88	135.	*	1		0524	163	0.	*	1		0754	238	0.
1		0026	14	1868.	*	1		0256	89	132.	*	1		0526	164	0.	*	1		0756	239	0.
1		0028	15	2075.	*	1		0258	90	129.	*	1		0528	165	0.	*	1		0758	240	0.
1		0030	16	2198.	*	1		0300	91	126.	*	1		0530	166	0.	*	1		0800	241	0.
1		0032	17	2235.	*	1		0302	92	123.	*	1		0532	167	0.	*	1		0802	242	0.
1		0034	18	2209.	*	1		0304	93	120.	*	1		0534	168	0.	*	1		0804	243	0.
1		0036	19	2143.	*	1		0306	94	115.	*	1		0536	169	0.	*	1		0806	244	0.
1		0038	20	2050.	*	1		0308	95	110.	*	1		0538	170	0.	*	1		0808	245	0.
1		0040	21	1945.	*	1		0310	96	103.	*	1		0540	171	0.	*	1		0810	246	0.
1		0042	22	1834.	*	1		0312	97	96.	*	1		0542	172	0.	*	1		0812	247	0.
1		0044	23	1724.	*	1		0314	98	89.	*	1		0544	173	0.	*	1		0814	248	0.
1		0046	24	1623.	*	1		0316	99	82.	*	1		0546	174	0.	*	1		0816	249	0.

1	0048	25	1524.	*	1	0318	100	74.	*	1	0548	175	0.	*	1	0818	250	0.
1	0050	26	1428.	*	1	0320	101	68.	*	1	0550	176	0.	*	1	0820	251	0.
1	0052	27	1336.	*	1	0322	102	61.	*	1	0552	177	0.	*	1	0822	252	0.
1	0054	28	1251.	*	1	0324	103	55.	*	1	0554	178	0.	*	1	0824	253	0.
1	0056	29	1171.	*	1	0326	104	50.	*	1	0556	179	0.	*	1	0826	254	0.
1	0058	30	1098.	*	1	0328	105	44.	*	1	0558	180	0.	*	1	0828	255	0.
1	0100	31	1032.	*	1	0330	106	40.	*	1	0600	181	0.	*	1	0830	256	0.
1	0102	32	976.	*	1	0332	107	35.	*	1	0602	182	0.	*	1	0832	257	0.
1	0104	33	925.	*	1	0334	108	31.	*	1	0604	183	0.	*	1	0834	258	0.
1	0106	34	875.	*	1	0336	109	27.	*	1	0606	184	0.	*	1	0836	259	0.
1	0108	35	828.	*	1	0338	110	23.	*	1	0608	185	0.	*	1	0838	260	0.
1	0110	36	783.	*	1	0340	111	20.	*	1	0610	186	0.	*	1	0840	261	0.
1	0112	37	741.	*	1	0342	112	18.	*	1	0612	187	0.	*	1	0842	262	0.
1	0114	38	701.	*	1	0344	113	15.	*	1	0614	188	0.	*	1	0844	263	0.
1	0116	39	665.	*	1	0346	114	13.	*	1	0616	189	0.	*	1	0846	264	0.
1	0118	40	630.	*	1	0348	115	11.	*	1	0618	190	0.	*	1	0848	265	0.
1	0120	41	599.	*	1	0350	116	9.	*	1	0620	191	0.	*	1	0850	266	0.
1	0122	42	569.	*	1	0352	117	8.	*	1	0622	192	0.	*	1	0852	267	0.
1	0124	43	542.	*	1	0354	118	7.	*	1	0624	193	0.	*	1	0854	268	0.
1	0126	44	517.	*	1	0356	119	5.	*	1	0626	194	0.	*	1	0856	269	0.
1	0128	45	494.	*	1	0358	120	5.	*	1	0628	195	0.	*	1	0858	270	0.
1	0130	46	475.	*	1	0400	121	4.	*	1	0630	196	0.	*	1	0900	271	0.
1	0132	47	457.	*	1	0402	122	3.	*	1	0632	197	0.	*	1	0902	272	0.
1	0134	48	439.	*	1	0404	123	3.	*	1	0634	198	0.	*	1	0904	273	0.
1	0136	49	421.	*	1	0406	124	2.	*	1	0636	199	0.	*	1	0906	274	0.
1	0138	50	405.	*	1	0408	125	2.	*	1	0638	200	0.	*	1	0908	275	0.
1	0140	51	389.	*	1	0410	126	1.	*	1	0640	201	0.	*	1	0910	276	0.
1	0142	52	374.	*	1	0412	127	1.	*	1	0642	202	0.	*	1	0912	277	0.
1	0144	53	359.	*	1	0414	128	1.	*	1	0644	203	0.	*	1	0914	278	0.
1	0146	54	346.	*	1	0416	129	1.	*	1	0646	204	0.	*	1	0916	279	0.
1	0148	55	333.	*	1	0418	130	1.	*	1	0648	205	0.	*	1	0918	280	0.
1	0150	56	321.	*	1	0420	131	1.	*	1	0650	206	0.	*	1	0920	281	0.
1	0152	57	310.	*	1	0422	132	0.	*	1	0652	207	0.	*	1	0922	282	0.
1	0154	58	300.	*	1	0424	133	0.	*	1	0654	208	0.	*	1	0924	283	0.
1	0156	59	291.	*	1	0426	134	0.	*	1	0656	209	0.	*	1	0926	284	0.
1	0158	60	282.	*	1	0428	135	0.	*	1	0658	210	0.	*	1	0928	285	0.
1	0200	61	273.	*	1	0430	136	0.	*	1	0700	211	0.	*	1	0930	286	0.
1	0202	62	265.	*	1	0432	137	0.	*	1	0702	212	0.	*	1	0932	287	0.
1	0204	63	257.	*	1	0434	138	0.	*	1	0704	213	0.	*	1	0934	288	0.
1	0206	64	249.	*	1	0436	139	0.	*	1	0706	214	0.	*	1	0936	289	0.
1	0208	65	241.	*	1	0438	140	0.	*	1	0708	215	0.	*	1	0938	290	0.
1	0210	66	234.	*	1	0440	141	0.	*	1	0710	216	0.	*	1	0940	291	0.
1	0212	67	227.	*	1	0442	142	0.	*	1	0712	217	0.	*	1	0942	292	0.
1	0214	68	220.	*	1	0444	143	0.	*	1	0714	218	0.	*	1	0944	293	0.
1	0216	69	214.	*	1	0446	144	0.	*	1	0716	219	0.	*	1	0946	294	0.
1	0218	70	208.	*	1	0448	145	0.	*	1	0718	220	0.	*	1	0948	295	0.
1	0220	71	202.	*	1	0450	146	0.	*	1	0720	221	0.	*	1	0950	296	0.
1	0222	72	196.	*	1	0452	147	0.	*	1	0722	222	0.	*	1	0952	297	0.
1	0224	73	190.	*	1	0454	148	0.	*	1	0724	223	0.	*	1	0954	298	0.
1	0226	74	185.	*	1	0456	149	0.	*	1	0726	224	0.	*	1	0956	299	0.
1	0228	75	180.	*	1	0458	150	0.	*	1	0728	225	0.	*	1	0958	300	0.
				*					*					*				

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

  PEAK FLOW      TIME                              MAXIMUM AVERAGE FLOW
                                          6-HR         24-HR        72-HR        9.97-HR
+    (CFS)        (HR)
                                (CFS)
+    2235.         .53                    324.          195.         195.          195.
                             (INCHES)    2.045         2.045        2.045         2.045
                              (AC-FT)     161.          161.         161.          161.

                            CUMULATIVE AREA =     1.47 SQ MI

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

               **************
               *            *
   61 KK       *    10TO9   *
               *            *
               **************
                              MODIFIED PULS CHANNEL ROUTING
                              FROM NODE FR-10 TO FR-9

                  HYDROGRAPH ROUTING DATA

   64 RS            STORAGE ROUTING
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NSTPS	2	NUMBER OF SUBREACHES
ITYP	FLOW	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

65 RC NORMAL DEPTH CHANNEL

ANL	.095	LEFT OVERBANK N-VALUE
ANCH	.095	MAIN CHANNEL N-VALUE
ANR	.095	RIGHT OVERBANK N-VALUE
RLNTH	4300.	REACH LENGTH
SEL	.0930	ENERGY SLOPE
ELMAX	.0	MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

		--- LEFT OVERBANK ---		+ ------ MAIN CHANNEL		------- +	--- RIGHT OVERBANK ---		
67 RY	ELEVATION	10.00	6.60	3.30	.00	.00	3.30	6.60	10.00
66 RX	DISTANCE	.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00

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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.60	1.37	2.30	3.40	4.67	6.10	7.70	9.46	11.39
OUTFLOW	.00	17.31	58.67	123.46	213.37	330.46	476.91	682.99	936.17	1229.07
ELEVATION	.00	.53	1.05	1.58	2.11	2.63	3.16	3.68	4.21	4.74
STORAGE	13.48	15.74	18.17	20.76	23.51	26.42	29.50	32.73	36.13	39.68
OUTFLOW	1563.85	1942.48	2366.84	2838.99	3360.57	3932.86	4557.47	5236.02	5970.07	6761.19
ELEVATION	5.26	5.79	6.32	6.84	7.37	7.89	8.42	8.95	9.47	10.00

HYDROGRAPH AT STATION 10TO9

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	.0	*	1		0320	101	101.	1.0	1.4	*	1		0640	201	0.	.0	.0
1		0002	2	0.	.0	.0	*	1		0322	102	95.	.9	1.3	*	1		0642	202	0.	.0	.0
1		0004	3	0.	.0	.0	*	1		0324	103	88.	.9	1.3	*	1		0644	203	0.	.0	.0
1		0006	4	0.	.0	.0	*	1		0326	104	82.	.9	1.2	*	1		0646	204	0.	.0	.0
1		0008	5	0.	.0	.0	*	1		0328	105	76.	.8	1.2	*	1		0648	205	0.	.0	.0
1		0010	6	1.	.0	.0	*	1		0330	106	70.	.8	1.1	*	1		0650	206	0.	.0	.0
1		0012	7	2.	.0	.1	*	1		0332	107	64.	.7	1.1	*	1		0652	207	0.	.0	.0
1		0014	8	7.	.1	.2	*	1		0334	108	59.	.7	1.1	*	1		0654	208	0.	.0	.0
1		0016	9	22.	.3	.6	*	1		0336	109	55.	.7	1.0	*	1		0656	209	0.	.0	.0
1		0018	10	71.	.8	1.2	*	1		0338	110	51.	.6	1.0	*	1		0658	210	0.	.0	.0
1		0020	11	176.	1.5	1.9	*	1		0340	111	47.	.6	.9	*	1		0700	211	0.	.0	.0
1		0022	12	363.	2.5	2.7	*	1		0342	112	43.	.5	.9	*	1		0702	212	0.	.0	.0
1		0024	13	664.	3.8	3.6	*	1		0344	113	39.	.5	.8	*	1		0704	213	0.	.0	.0
1		0026	14	1044.	5.1	4.4	*	1		0346	114	35.	.5	.8	*	1		0706	214	0.	.0	.0
1		0028	15	1407.	6.2	5.0	*	1		0348	115	32.	.4	.7	*	1		0708	215	0.	.0	.0
1		0030	16	1716.	7.2	5.5	*	1		0350	116	28.	.4	.7	*	1		0710	216	0.	.0	.0
1		0032	17	1945.	7.9	5.8	*	1		0352	117	25.	.4	.6	*	1		0712	217	0.	.0	.0
1		0034	18	2092.	8.3	6.0	*	1		0354	118	23.	.4	.6	*	1		0714	218	0.	.0	.0
1		0036	19	2155.	8.5	6.1	*	1		0356	119	21.	.3	.6	*	1		0716	219	0.	.0	.0
1		0038	20	2155.	8.5	6.1	*	1		0358	120	19.	.3	.5	*	1		0718	220	0.	.0	.0
1		0040	21	2109.	8.3	6.0	*	1		0400	121	17.	.3	.5	*	1		0720	221	0.	.0	.0
1		0042	22	2033.	8.1	5.9	*	1		0402	122	16.	.3	.5	*	1		0722	222	0.	.0	.0
1		0044	23	1941.	7.9	5.8	*	1		0404	123	15.	.3	.5	*	1		0724	223	0.	.0	.0
1		0046	24	1844.	7.6	5.7	*	1		0406	124	14.	.2	.4	*	1		0726	224	0.	.0	.0
1		0048	25	1742.	7.3	5.5	*	1		0408	125	13.	.2	.4	*	1		0728	225	0.	.0	.0
1		0050	26	1642.	7.0	5.4	*	1		0410	126	12.	.2	.4	*	1		0730	226	0.	.0	.0
1		0052	27	1545.	6.7	5.2	*	1		0412	127	11.	.2	.3	*	1		0732	227	0.	.0	.0
1		0054	28	1454.	6.4	5.1	*	1		0414	128	10.	.2	.3	*	1		0734	228	0.	.0	.0
1		0056	29	1365.	6.1	5.0	*	1		0416	129	10.	.2	.3	*	1		0736	229	0.	.0	.0
1		0058	30	1280.	5.9	4.8	*	1		0418	130	9.	.2	.3	*	1		0738	230	0.	.0	.0
1		0100	31	1202.	5.6	4.7	*	1		0420	131	8.	.1	.2	*	1		0740	231	0.	.0	.0
1		0102	32	1131.	5.4	4.6	*	1		0422	132	7.	.1	.2	*	1		0742	232	0.	.0	.0
1		0104	33	1066.	5.2	4.4	*	1		0424	133	7.	.1	.2	*	1		0744	233	0.	.0	.0
1		0106	34	1006.	5.0	4.3	*	1		0426	134	6.	.1	.2	*	1		0746	234	0.	.0	.0
1		0108	35	951.	4.8	4.2	*	1		0428	135	5.	.1	.2	*	1		0748	235	0.	.0	.0
1		0110	36	902.	4.6	4.1	*	1		0430	136	5.	.1	.1	*	1		0750	236	0.	.0	.0
1		0112	37	855.	4.4	4.0	*	1		0432	137	4.	.1	.1	*	1		0752	237	0.	.0	.0
1		0114	38	810.	4.3	3.9	*	1		0434	138	4.	.1	.1	*	1		0754	238	0.	.0	.0
1		0116	39	767.	4.1	3.9	*	1		0436	139	4.	.1	.1	*	1		0756	239	0.	.0	.0
1		0118	40	726.	4.0	3.8	*	1		0438	140	3.	.1	.1	*	1		0758	240	0.	.0	.0
1		0120	41	689.	3.9	3.7	*	1		0440	141	3.	.0	.1	*	1		0800	241	0.	.0	.0
1		0122	42	657.	3.7	3.6	*	1		0442	142	3.	.0	.1	*	1		0802	242	0.	.0	.0

1	0124	43	626.	3.6	3.5	*	1	0444	143	2.	.0	.1	*	1	0804	243	0.	.0	.0
1	0126	44	596.	3.5	3.5	*	1	0446	144	2.	.0	.1	*	1	0806	244	0.	.0	.0
1	0128	45	567.	3.4	3.4	*	1	0448	145	2.	.0	.1	*	1	0808	245	0.	.0	.0
1	0130	46	541.	3.3	3.3	*	1	0450	146	2.	.0	.0	*	1	0810	246	0.	.0	.0
1	0132	47	517.	3.2	3.3	*	1	0452	147	1.	.0	.0	*	1	0812	247	0.	.0	.0
1	0134	48	496.	3.1	3.2	*	1	0454	148	1.	.0	.0	*	1	0814	248	0.	.0	.0
1	0136	49	477.	3.0	3.2	*	1	0456	149	1.	.0	.0	*	1	0816	249	0.	.0	.0
1	0138	50	462.	3.0	3.1	*	1	0458	150	1.	.0	.0	*	1	0818	250	0.	.0	.0
1	0140	51	446.	2.9	3.0	*	1	0500	151	1.	.0	.0	*	1	0820	251	0.	.0	.0
1	0142	52	430.	2.8	3.0	*	1	0502	152	1.	.0	.0	*	1	0822	252	0.	.0	.0
1	0144	53	414.	2.7	2.9	*	1	0504	153	1.	.0	.0	*	1	0824	253	0.	.0	.0
1	0146	54	399.	2.7	2.9	*	1	0506	154	1.	.0	.0	*	1	0826	254	0.	.0	.0
1	0148	55	383.	2.6	2.8	*	1	0508	155	1.	.0	.0	*	1	0828	255	0.	.0	.0
1	0150	56	369.	2.5	2.8	*	1	0510	156	0.	.0	.0	*	1	0830	256	0.	.0	.0
1	0152	57	355.	2.5	2.7	*	1	0512	157	0.	.0	.0	*	1	0832	257	0.	.0	.0
1	0154	58	342.	2.4	2.7	*	1	0514	158	0.	.0	.0	*	1	0834	258	0.	.0	.0
1	0156	59	331.	2.3	2.6	*	1	0516	159	0.	.0	.0	*	1	0836	259	0.	.0	.0
1	0158	60	320.	2.3	2.6	*	1	0518	160	0.	.0	.0	*	1	0838	260	0.	.0	.0
1	0200	61	310.	2.2	2.5	*	1	0520	161	0.	.0	.0	*	1	0840	261	0.	.0	.0
1	0202	62	301.	2.2	2.5	*	1	0522	162	0.	.0	.0	*	1	0842	262	0.	.0	.0
1	0204	63	291.	2.1	2.5	*	1	0524	163	0.	.0	.0	*	1	0844	263	0.	.0	.0
1	0206	64	282.	2.1	2.4	*	1	0526	164	0.	.0	.0	*	1	0846	264	0.	.0	.0
1	0208	65	274.	2.0	2.4	*	1	0528	165	0.	.0	.0	*	1	0848	265	0.	.0	.0
1	0210	66	265.	2.0	2.3	*	1	0530	166	0.	.0	.0	*	1	0850	266	0.	.0	.0
1	0212	67	257.	1.9	2.3	*	1	0532	167	0.	.0	.0	*	1	0852	267	0.	.0	.0
1	0214	68	249.	1.9	2.3	*	1	0534	168	0.	.0	.0	*	1	0854	268	0.	.0	.0
1	0216	69	242.	1.9	2.2	*	1	0536	169	0.	.0	.0	*	1	0856	269	0.	.0	.0
1	0218	70	235.	1.8	2.2	*	1	0538	170	0.	.0	.0	*	1	0858	270	0.	.0	.0
1	0220	71	228.	1.8	2.2	*	1	0540	171	0.	.0	.0	*	1	0900	271	0.	.0	.0
1	0222	72	221.	1.7	2.1	*	1	0542	172	0.	.0	.0	*	1	0902	272	0.	.0	.0
1	0224	73	215.	1.7	2.1	*	1	0544	173	0.	.0	.0	*	1	0904	273	0.	.0	.0
1	0226	74	209.	1.7	2.1	*	1	0546	174	0.	.0	.0	*	1	0906	274	0.	.0	.0
1	0228	75	204.	1.6	2.0	*	1	0548	175	0.	.0	.0	*	1	0908	275	0.	.0	.0
1	0230	76	198.	1.6	2.0	*	1	0550	176	0.	.0	.0	*	1	0910	276	0.	.0	.0
1	0232	77	193.	1.6	2.0	*	1	0552	177	0.	.0	.0	*	1	0912	277	0.	.0	.0
1	0234	78	188.	1.5	2.0	*	1	0554	178	0.	.0	.0	*	1	0914	278	0.	.0	.0
1	0236	79	183.	1.5	1.9	*	1	0556	179	0.	.0	.0	*	1	0916	279	0.	.0	.0
1	0238	80	178.	1.5	1.9	*	1	0558	180	0.	.0	.0	*	1	0918	280	0.	.0	.0
1	0240	81	173.	1.5	1.9	*	1	0600	181	0.	.0	.0	*	1	0920	281	0.	.0	.0
1	0242	82	169.	1.4	1.8	*	1	0602	182	0.	.0	.0	*	1	0922	282	0.	.0	.0
1	0244	83	165.	1.4	1.8	*	1	0604	183	0.	.0	.0	*	1	0924	283	0.	.0	.0
1	0246	84	161.	1.4	1.8	*	1	0606	184	0.	.0	.0	*	1	0926	284	0.	.0	.0
1	0248	85	157.	1.4	1.8	*	1	0608	185	0.	.0	.0	*	1	0928	285	0.	.0	.0
1	0250	86	154.	1.3	1.8	*	1	0610	186	0.	.0	.0	*	1	0930	286	0.	.0	.0
1	0252	87	151.	1.3	1.7	*	1	0612	187	0.	.0	.0	*	1	0932	287	0.	.0	.0
1	0254	88	148.	1.3	1.7	*	1	0614	188	0.	.0	.0	*	1	0934	288	0.	.0	.0
1	0256	89	145.	1.3	1.7	*	1	0616	189	0.	.0	.0	*	1	0936	289	0.	.0	.0
1	0258	90	142.	1.3	1.7	*	1	0618	190	0.	.0	.0	*	1	0938	290	0.	.0	.0
1	0300	91	139.	1.2	1.7	*	1	0620	191	0.	.0	.0	*	1	0940	291	0.	.0	.0
1	0302	92	136.	1.2	1.7	*	1	0622	192	0.	.0	.0	*	1	0942	292	0.	.0	.0
1	0304	93	133.	1.2	1.6	*	1	0624	193	0.	.0	.0	*	1	0944	293	0.	.0	.0
1	0306	94	130.	1.2	1.6	*	1	0626	194	0.	.0	.0	*	1	0946	294	0.	.0	.0
1	0308	95	127.	1.2	1.6	*	1	0628	195	0.	.0	.0	*	1	0948	295	0.	.0	.0
1	0310	96	124.	1.2	1.6	*	1	0630	196	0.	.0	.0	*	1	0950	296	0.	.0	.0
1	0312	97	120.	1.1	1.6	*	1	0632	197	0.	.0	.0	*	1	0952	297	0.	.0	.0
1	0314	98	116.	1.1	1.5	*	1	0634	198	0.	.0	.0	*	1	0954	298	0.	.0	.0
1	0316	99	112.	1.1	1.5	*	1	0636	199	0.	.0	.0	*	1	0956	299	0.	.0	.0
1	0318	100	106.	1.0	1.4	*	1	0638	200	0.	.0	.0	*	1	0958	300	0.	.0	.0
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2155.	.60		324.	195.	195.	195.
		(INCHES)	2.045	2.045	2.045	2.045
		(AC-FT)	161.	161.	161.	161.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	9.97-HR
+ (AC-FT)	(HR)				
8.	.60	2.	1.	1.	1.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	9.97-HR
+ (FEET)	(HR)				
6.05	.60	1.72	1.04	1.04	1.04

CUMULATIVE AREA = 1.47 SQ MI

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

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              *            *
 68 KK        *    FR-9    *
              *            *
              **************
                             LOCAL RUNOFF TO FR-9
                             BASIN FR-9

                 SUBBASIN RUNOFF DATA

 71 BA             SUBBASIN CHARACTERISTICS
                         TAREA          .15   SUBBASIN AREA

                   PRECIPITATION DATA

 72 PB                   STORM         3.11   BASIN TOTAL PRECIPITATION

 20 PI               INCREMENTAL PRECIPITATION PATTERN
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.04	.04	.06	.08	.08	.07	.07	.05	.03	.03
.02	.02	.02	.02	.02	.02	.02	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

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 73 LS             SCS LOSS RATE
                        STRTL          .33   INITIAL ABSTRACTION
                       CRVNBR        86.00   CURVE NUMBER
                        RTIMP         5.00   PERCENT IMPERVIOUS AREA

 74 UD             SCS DIMENSIONLESS UNITGRAPH
                         TLAG          .18   LAG

                                                                  ***

                                                            UNIT HYDROGRAPH
                                                       29 END-OF-PERIOD ORDINATES
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30.	90.	186.	299.	361.	374.	349.	302.	237.	169.
127.	98.	75.	55.	42.	32.	24.	18.	14.	11.
8.	6.	5.	4.	3.	2.	1.	1.	0.	

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                                                  HYDROGRAPH AT STATION   FR-9

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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	*	1		0500	151	.00	.00	.00	0.
1		0002	2	.13	.12	.01	0.	*	1		0502	152	.00	.00	.00	0.
1		0004	3	.13	.12	.01	1.	*	1		0504	153	.00	.00	.00	0.
1		0006	4	.19	.17	.02	2.	*	1		0506	154	.00	.00	.00	0.
1		0008	5	.25	.18	.07	7.	*	1		0508	155	.00	.00	.00	0.
1		0010	6	.25	.14	.11	17.	*	1		0510	156	.00	.00	.00	0.
1		0012	7	.20	.09	.11	36.	*	1		0512	157	.00	.00	.00	0.
1		0014	8	.20	.08	.13	67.	*	1		0514	158	.00	.00	.00	0.
1		0016	9	.16	.05	.10	105.	*	1		0516	159	.00	.00	.00	0.
1		0018	10	.11	.03	.07	145.	*	1		0518	160	.00	.00	.00	0.
1		0020	11	.11	.03	.08	180.	*	1		0520	161	.00	.00	.00	0.
1		0022	12	.08	.02	.06	207.	*	1		0522	162	.00	.00	.00	0.
1		0024	13	.08	.02	.06	221.	*	1		0524	163	.00	.00	.00	0.
1		0026	14	.07	.02	.05	224.	*	1		0526	164	.00	.00	.00	0.
1		0028	15	.06	.01	.05	219.	*	1		0528	165	.00	.00	.00	0.
1		0030	16	.06	.01	.05	210.	*	1		0530	166	.00	.00	.00	0.
1		0032	17	.05	.01	.04	198.	*	1		0532	167	.00	.00	.00	0.
1		0034	18	.05	.01	.04	186.	*	1		0534	168	.00	.00	.00	0.
1		0036	19	.05	.01	.04	174.	*	1		0536	169	.00	.00	.00	0.
1		0038	20	.04	.01	.03	163.	*	1		0538	170	.00	.00	.00	0.
1		0040	21	.04	.01	.03	152.	*	1		0540	171	.00	.00	.00	0.
1		0042	22	.04	.01	.03	142.	*	1		0542	172	.00	.00	.00	0.
1		0044	23	.04	.01	.03	133.	*	1		0544	173	.00	.00	.00	0.

1	0046	24	.03	.01	.03	124.	*	1	0546	174	.00	.00	.00	0.
1	0048	25	.03	.01	.02	116.	*	1	0548	175	.00	.00	.00	0.
1	0050	26	.03	.01	.02	109.	*	1	0550	176	.00	.00	.00	0.
1	0052	27	.03	.00	.02	102.	*	1	0552	177	.00	.00	.00	0.
1	0054	28	.03	.00	.02	96.	*	1	0554	178	.00	.00	.00	0.
1	0056	29	.02	.00	.02	90.	*	1	0556	179	.00	.00	.00	0.
1	0058	30	.02	.00	.02	85.	*	1	0558	180	.00	.00	.00	0.
1	0100	31	.02	.00	.02	80.	*	1	0600	181	.00	.00	.00	0.
1	0102	32	.02	.00	.02	76.	*	1	0602	182	.00	.00	.00	0.
1	0104	33	.02	.00	.02	71.	*	1	0604	183	.00	.00	.00	0.
1	0106	34	.02	.00	.02	67.	*	1	0606	184	.00	.00	.00	0.
1	0108	35	.02	.00	.02	64.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.00	.02	60.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.02	.00	.01	57.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.02	.00	.01	55.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.02	.00	.01	52.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.01	.00	.01	50.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.01	.00	.01	47.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	45.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	43.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	41.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	40.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	38.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	37.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	35.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	34.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	32.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	31.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	30.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	29.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	28.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	27.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	26.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.01	25.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.01	24.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.01	24.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.01	23.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.01	22.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.01	21.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.01	21.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.01	20.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.01	20.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.01	19.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.01	18.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.01	18.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.00	17.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.01	.00	.00	17.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.01	.00	.00	17.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.01	.00	.00	16.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.01	.00	.00	16.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.01	.00	.00	15.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.00	.00	.00	15.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.00	.00	.00	15.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.00	.00	.00	14.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	14.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	13.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	13.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	13.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	13.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	12.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	12.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	12.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	11.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	11.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	11.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	11.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	10.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	10.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	10.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	9.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	9.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	8.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	6.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	5.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	4.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	3.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	2.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	2.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	1.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	1.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	1.	*	1	0826	254	.00	.00	.00	0.

1	0328	105	.00	.00	.00	1.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	0.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	0.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	0.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	0.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	0.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	0.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.
							*							

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TOTAL RAINFALL = 3.11, TOTAL LOSS = 1.29, TOTAL EXCESS = 1.82

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 224.	.43		30.	18.	18.	18.
		(INCHES)	1.825	1.825	1.825	1.825
		(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .15 SQ MI

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          *            *
 75 KK    *    CO-9    *
          *            *
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                        COMBINE HYDROGRAPHS
                        AT NODE FR-9 (MAIN CHANNEL)

 78 HC        HYDROGRAPH COMBINATION
                    ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
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HYDROGRAPH AT STATION CO-9
SUM OF 2 HYDROGRAPHS

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0230	76	213.	*	1		0500	151	1.	*	1		0730	226	0.
1		0002	2	0.	*	1		0232	77	207.	*	1		0502	152	1.	*	1		0732	227	0.
1		0004	3	1.	*	1		0234	78	202.	*	1		0504	153	1.	*	1		0734	228	0.
1		0006	4	2.	*	1		0236	79	196.	*	1		0506	154	1.	*	1		0736	229	0.
1		0008	5	7.	*	1		0238	80	191.	*	1		0508	155	1.	*	1		0738	230	0.
1		0010	6	18.	*	1		0240	81	186.	*	1		0510	156	0.	*	1		0740	231	0.
1		0012	7	39.	*	1		0242	82	181.	*	1		0512	157	0.	*	1		0742	232	0.
1		0014	8	74.	*	1		0244	83	177.	*	1		0514	158	0.	*	1		0744	233	0.
1		0016	9	127.	*	1		0246	84	173.	*	1		0516	159	0.	*	1		0746	234	0.
1		0018	10	216.	*	1		0248	85	169.	*	1		0518	160	0.	*	1		0748	235	0.
1		0020	11	356.	*	1		0250	86	165.	*	1		0520	161	0.	*	1		0750	236	0.
1		0022	12	570.	*	1		0252	87	162.	*	1		0522	162	0.	*	1		0752	237	0.
1		0024	13	885.	*	1		0254	88	159.	*	1		0524	163	0.	*	1		0754	238	0.
1		0026	14	1268.	*	1		0256	89	155.	*	1		0526	164	0.	*	1		0756	239	0.
1		0028	15	1626.	*	1		0258	90	152.	*	1		0528	165	0.	*	1		0758	240	0.
1		0030	16	1926.	*	1		0300	91	149.	*	1		0530	166	0.	*	1		0800	241	0.
1		0032	17	2143.	*	1		0302	92	146.	*	1		0532	167	0.	*	1		0802	242	0.
1		0034	18	2278.	*	1		0304	93	143.	*	1		0534	168	0.	*	1		0804	243	0.
1		0036	19	2329.	*	1		0306	94	139.	*	1		0536	169	0.	*	1		0806	244	0.
1		0038	20	2317.	*	1		0308	95	135.	*	1		0538	170	0.	*	1		0808	245	0.
1		0040	21	2261.	*	1		0310	96	130.	*	1		0540	171	0.	*	1		0810	246	0.
1		0042	22	2176.	*	1		0312	97	125.	*	1		0542	172	0.	*	1		0812	247	0.
1		0044	23	2074.	*	1		0314	98	120.	*	1		0544	173	0.	*	1		0814	248	0.
1		0046	24	1968.	*	1		0316	99	115.	*	1		0546	174	0.	*	1		0816	249	0.
1		0048	25	1859.	*	1		0318	100	109.	*	1		0548	175	0.	*	1		0818	250	0.
1		0050	26	1751.	*	1		0320	101	102.	*	1		0550	176	0.	*	1		0820	251	0.
1		0052	27	1647.	*	1		0322	102	96.	*	1		0552	177	0.	*	1		0822	252	0.
1		0054	28	1550.	*	1		0324	103	89.	*	1		0554	178	0.	*	1		0824	253	0.
1		0056	29	1455.	*	1		0326	104	83.	*	1		0556	179	0.	*	1		0826	254	0.
1		0058	30	1365.	*	1		0328	105	76.	*	1		0558	180	0.	*	1		0828	255	0.
1		0100	31	1282.	*	1		0330	106	70.	*	1		0600	181	0.	*	1		0830	256	0.
1		0102	32	1207.	*	1		0332	107	65.	*	1		0602	182	0.	*	1		0832	257	0.
1		0104	33	1137.	*	1		0334	108	59.	*	1		0604	183	0.	*	1		0834	258	0.
1		0106	34	1073.	*	1		0336	109	55.	*	1		0606	184	0.	*	1		0836	259	0.
1		0108	35	1015.	*	1		0338	110	51.	*	1		0608	185	0.	*	1		0838	260	0.
1		0110	36	962.	*	1		0340	111	47.	*	1		0610	186	0.	*	1		0840	261	0.
1		0112	37	912.	*	1		0342	112	43.	*	1		0612	187	0.	*	1		0842	262	0.
1		0114	38	864.	*	1		0344	113	39.	*	1		0614	188	0.	*	1		0844	263	0.
1		0116	39	819.	*	1		0346	114	35.	*	1		0616	189	0.	*	1		0846	264	0.
1		0118	40	776.	*	1		0348	115	32.	*	1		0618	190	0.	*	1		0848	265	0.
1		0120	41	736.	*	1		0350	116	28.	*	1		0620	191	0.	*	1		0850	266	0.
1		0122	42	702.	*	1		0352	117	25.	*	1		0622	192	0.	*	1		0852	267	0.
1		0124	43	669.	*	1		0354	118	23.	*	1		0624	193	0.	*	1		0854	268	0.
1		0126	44	637.	*	1		0356	119	21.	*	1		0626	194	0.	*	1		0856	269	0.
1		0128	45	607.	*	1		0358	120	19.	*	1		0628	195	0.	*	1		0858	270	0.
1		0130	46	579.	*	1		0400	121	17.	*	1		0630	196	0.	*	1		0900	271	0.
1		0132	47	554.	*	1		0402	122	16.	*	1		0632	197	0.	*	1		0902	272	0.
1		0134	48	531.	*	1		0404	123	15.	*	1		0634	198	0.	*	1		0904	273	0.
1		0136	49	510.	*	1		0406	124	14.	*	1		0636	199	0.	*	1		0906	274	0.
1		0138	50	494.	*	1		0408	125	13.	*	1		0638	200	0.	*	1		0908	275	0.
1		0140	51	477.	*	1		0410	126	12.	*	1		0640	201	0.	*	1		0910	276	0.
1		0142	52	460.	*	1		0412	127	11.	*	1		0642	202	0.	*	1		0912	277	0.
1		0144	53	443.	*	1		0414	128	10.	*	1		0644	203	0.	*	1		0914	278	0.
1		0146	54	427.	*	1		0416	129	10.	*	1		0646	204	0.	*	1		0916	279	0.
1		0148	55	410.	*	1		0418	130	9.	*	1		0648	205	0.	*	1		0918	280	0.
1		0150	56	395.	*	1		0420	131	8.	*	1		0650	206	0.	*	1		0920	281	0.
1		0152	57	380.	*	1		0422	132	7.	*	1		0652	207	0.	*	1		0922	282	0.
1		0154	58	367.	*	1		0424	133	7.	*	1		0654	208	0.	*	1		0924	283	0.
1		0156	59	354.	*	1		0426	134	6.	*	1		0656	209	0.	*	1		0926	284	0.
1		0158	60	343.	*	1		0428	135	5.	*	1		0658	210	0.	*	1		0928	285	0.
1		0200	61	333.	*	1		0430	136	5.	*	1		0700	211	0.	*	1		0930	286	0.
1		0202	62	322.	*	1		0432	137	4.	*	1		0702	212	0.	*	1		0932	287	0.
1		0204	63	312.	*	1		0434	138	4.	*	1		0704	213	0.	*	1		0934	288	0.
1		0206	64	303.	*	1		0436	139	4.	*	1		0706	214	0.	*	1		0936	289	0.
1		0208	65	293.	*	1		0438	140	3.	*	1		0708	215	0.	*	1		0938	290	0.
1		0210	66	284.	*	1		0440	141	3.	*	1		0710	216	0.	*	1		0940	291	0.
1		0212	67	276.	*	1		0442	142	3.	*	1		0712	217	0.	*	1		0942	292	0.
1		0214	68	267.	*	1		0444	143	2.	*	1		0714	218	0.	*	1		0944	293	0.
1		0216	69	259.	*	1		0446	144	2.	*	1		0716	219	0.	*	1		0946	294	0.
1		0218	70	252.	*	1		0448	145	2.	*	1		0718	220	0.	*	1		0948	295	0.
1		0220	71	244.	*	1		0450	146	2.	*	1		0720	221	0.	*	1		0950	296	0.
1		0222	72	237.	*	1		0452	147	1.	*	1		0722	222	0.	*	1		0952	297	0.
1		0224	73	230.	*	1		0454	148	1.	*	1		0724	223	0.	*	1		0954	298	0.

```
    1     0226   74      224.   *    1     0456  149         1.   *    1      0726  224        0.   *    1      0956  299         0.
    1     0228   75      219.   *    1     0458  150         1.   *    1      0728  225        0.   *    1      0958  300         0.
                                *                                 *                                 *
*********************************************************************************************************************************

  PEAK FLOW       TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR         24-HR        72-HR        9.97-HR
+    (CFS)         (HR)
                            (CFS)
+     2329.          .60               354.          213.         213.          213.
                         (INCHES)     2.025         2.025        2.025         2.025
                         (AC-FT)       176.          176.         176.          176.

                         CUMULATIVE AREA =     1.63 SQ MI



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


             **************
             *            *
   79 KK     *    RES-9   *
             *            *
             **************
                          MODIFIED PULS RESERVOIR ROUTING
                          AT NODE FR-9
                          SUMMIT AT FINGER ROCK WEST CULVERT CROSSING (MAIN CHANNEL)

                HYDROGRAPH ROUTING DATA

   83 RS          STORAGE ROUTING
                       NSTPS            1  NUMBER OF SUBREACHES
                        ITYP         ELEV  TYPE OF INITIAL CONDITION
                      RSVRIC      3063.00  INITIAL CONDITION
                           X          .00 WORKING R AND D COEFFICIENT

   84 SA                 AREA          .0          .0          .0          .1          .1          .1          .1          .2          .2          .2
                                       .3

   86 SE             ELEVATION    3063.00     3065.00     3066.00     3068.00     3070.00     3072.00     3074.00     3075.00     3076.00     3078.00
                                  3080.00

   88 SQ             DISCHARGE         0.        500.       1000.       1500.       2000.       2500.       3000.       3140.       4000.

   89 SE             ELEVATION    3063.00     3066.60     3068.70     3070.60     3072.30     3074.50     3076.90     3077.50     3079.40
                                                                     ***

                                                       COMPUTED STORAGE-ELEVATION DATA

            STORAGE          .00         .01         .03         .10         .25         .46         .70         .86        1.05        1.49
          ELEVATION      3063.00     3065.00     3066.00     3068.00     3070.00     3072.00     3074.00     3075.00     3076.00     3078.00

            STORAGE         2.03
          ELEVATION      3080.00

                                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

            STORAGE          .00         .01         .03         .05         .10         .15         .25         .31         .46         .50
            OUTFLOW          .00      277.77      416.66      500.00      833.33     1000.00     1342.09     1500.00     1911.75     2000.00
          ELEVATION      3063.00     3065.00     3066.00     3066.60     3068.00     3068.70     3070.00     3070.60     3072.00     3072.30

            STORAGE          .70         .77         .86        1.05        1.23        1.37        1.49        1.85        2.03
            OUTFLOW      2386.36     2500.00     2604.17     2812.51     3000.00     3140.00     3366.33     4000.00     4271.64
          ELEVATION      3074.00     3074.50     3075.00     3076.00     3076.90     3077.50     3078.00     3079.40     3080.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO     4272.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                                                        HYDROGRAPH AT STATION    RES-9

*********************************************************************************************************************************
                                               *                                            *
  DA MON HRMN ORD   OUTFLOW   STORAGE     STAGE * DA MON HRMN ORD   OUTFLOW   STORAGE     STAGE * DA MON HRMN ORD   OUTFLOW   STORAGE     STAGE
                                               *                                            *
   1      0000   1        0.        .0  3063.0 *  1      0320 101      102.        .0  3063.7 *  1      0640 201        0.        .0  3063.0
```

1	0002	2	0.	.0	3063.0	*	1	0322	102	96.	.0	3063.7	*	1	0642 202	0.	.0 3063.0
1	0004	3	1.	.0	3063.0	*	1	0324	103	90.	.0	3063.6	*	1	0644 203	0.	.0 3063.0
1	0006	4	2.	.0	3063.0	*	1	0326	104	83.	.0	3063.6	*	1	0646 204	0.	.0 3063.0
1	0008	5	7.	.0	3063.0	*	1	0328	105	77.	.0	3063.6	*	1	0648 205	0.	.0 3063.0
1	0010	6	18.	.0	3063.1	*	1	0330	106	70.	.0	3063.5	*	1	0650 206	0.	.0 3063.0
1	0012	7	38.	.0	3063.3	*	1	0332	107	65.	.0	3063.5	*	1	0652 207	0.	.0 3063.0
1	0014	8	73.	.0	3063.5	*	1	0334	108	59.	.0	3063.4	*	1	0654 208	0.	.0 3063.0
1	0016	9	126.	.0	3063.9	*	1	0336	109	55.	.0	3063.4	*	1	0656 209	0.	.0 3063.0
1	0018	10	215.	.0	3064.5	*	1	0338	110	51.	.0	3063.4	*	1	0658 210	0.	.0 3063.0
1	0020	11	349.	.0	3065.5	*	1	0340	111	47.	.0	3063.3	*	1	0700 211	0.	.0 3063.0
1	0022	12	549.	.1	3066.8	*	1	0342	112	43.	.0	3063.3	*	1	0702 212	0.	.0 3063.0
1	0024	13	863.	.1	3068.1	*	1	0344	113	39.	.0	3063.3	*	1	0704 213	0.	.0 3063.0
1	0026	14	1217.	.2	3069.5	*	1	0346	114	35.	.0	3063.3	*	1	0706 214	0.	.0 3063.0
1	0028	15	1583.	.3	3070.9	*	1	0348	115	32.	.0	3063.2	*	1	0708 215	0.	.0 3063.0
1	0030	16	1889.	.5	3071.9	*	1	0350	116	28.	.0	3063.2	*	1	0710 216	0.	.0 3063.0
1	0032	17	2108.	.6	3072.8	*	1	0352	117	25.	.0	3063.2	*	1	0712 217	0.	.0 3063.0
1	0034	18	2256.	.6	3073.4	*	1	0354	118	23.	.0	3063.2	*	1	0714 218	0.	.0 3063.0
1	0036	19	2324.	.7	3073.7	*	1	0356	119	21.	.0	3063.1	*	1	0716 219	0.	.0 3063.0
1	0038	20	2323.	.7	3073.7	*	1	0358	120	19.	.0	3063.1	*	1	0718 220	0.	.0 3063.0
1	0040	21	2275.	.6	3073.5	*	1	0400	121	17.	.0	3063.1	*	1	0720 221	0.	.0 3063.0
1	0042	22	2194.	.6	3073.2	*	1	0402	122	16.	.0	3063.1	*	1	0722 222	0.	.0 3063.0
1	0044	23	2094.	.5	3072.7	*	1	0404	123	15.	.0	3063.1	*	1	0724 223	0.	.0 3063.0
1	0046	24	1987.	.5	3072.3	*	1	0406	124	14.	.0	3063.1	*	1	0726 224	0.	.0 3063.0
1	0048	25	1871.	.4	3071.9	*	1	0408	125	13.	.0	3063.1	*	1	0728 225	0.	.0 3063.0
1	0050	26	1766.	.4	3071.5	*	1	0410	126	12.	.0	3063.1	*	1	0730 226	0.	.0 3063.0
1	0052	27	1660.	.4	3071.1	*	1	0412	127	11.	.0	3063.1	*	1	0732 227	0.	.0 3063.0
1	0054	28	1563.	.3	3070.8	*	1	0414	128	10.	.0	3063.1	*	1	0734 228	0.	.0 3063.0
1	0056	29	1468.	.3	3070.5	*	1	0416	129	10.	.0	3063.1	*	1	0736 229	0.	.0 3063.0
1	0058	30	1377.	.3	3070.1	*	1	0418	130	9.	.0	3063.1	*	1	0738 230	0.	.0 3063.0
1	0100	31	1291.	.2	3069.8	*	1	0420	131	8.	.0	3063.1	*	1	0740 231	0.	.0 3063.0
1	0102	32	1215.	.2	3069.5	*	1	0422	132	7.	.0	3063.1	*	1	0742 232	0.	.0 3063.0
1	0104	33	1145.	.2	3069.3	*	1	0424	133	7.	.0	3063.0	*	1	0744 233	0.	.0 3063.0
1	0106	34	1080.	.2	3069.0	*	1	0426	134	6.	.0	3063.0	*	1	0746 234	0.	.0 3063.0
1	0108	35	1021.	.2	3068.8	*	1	0428	135	5.	.0	3063.0	*	1	0748 235	0.	.0 3063.0
1	0110	36	967.	.1	3068.6	*	1	0430	136	5.	.0	3063.0	*	1	0750 236	0.	.0 3063.0
1	0112	37	917.	.1	3068.4	*	1	0432	137	4.	.0	3063.0	*	1	0752 237	0.	.0 3063.0
1	0114	38	868.	.1	3068.1	*	1	0434	138	4.	.0	3063.0	*	1	0754 238	0.	.0 3063.0
1	0116	39	822.	.1	3068.0	*	1	0436	139	4.	.0	3063.0	*	1	0756 239	0.	.0 3063.0
1	0118	40	778.	.1	3067.8	*	1	0438	140	3.	.0	3063.0	*	1	0758 240	0.	.0 3063.0
1	0120	41	739.	.1	3067.6	*	1	0440	141	3.	.0	3063.0	*	1	0800 241	0.	.0 3063.0
1	0122	42	704.	.1	3067.5	*	1	0442	142	2.	.0	3063.0	*	1	0802 242	0.	.0 3063.0
1	0124	43	671.	.1	3067.3	*	1	0444	143	2.	.0	3063.0	*	1	0804 243	0.	.0 3063.0
1	0126	44	639.	.1	3067.2	*	1	0446	144	2.	.0	3063.0	*	1	0806 244	0.	.0 3063.0
1	0128	45	609.	.1	3067.1	*	1	0448	145	2.	.0	3063.0	*	1	0808 245	0.	.0 3063.0
1	0130	46	581.	.1	3066.9	*	1	0450	146	2.	.0	3063.0	*	1	0810 246	0.	.0 3063.0
1	0132	47	555.	.1	3066.8	*	1	0452	147	1.	.0	3063.0	*	1	0812 247	0.	.0 3063.0
1	0134	48	532.	.1	3066.7	*	1	0454	148	1.	.0	3063.0	*	1	0814 248	0.	.0 3063.0
1	0136	49	512.	.0	3066.6	*	1	0456	149	1.	.0	3063.0	*	1	0816 249	0.	.0 3063.0
1	0138	50	495.	.0	3066.6	*	1	0458	150	1.	.0	3063.0	*	1	0818 250	0.	.0 3063.0
1	0140	51	479.	.0	3066.4	*	1	0500	151	1.	.0	3063.0	*	1	0820 251	0.	.0 3063.0
1	0142	52	461.	.0	3066.3	*	1	0502	152	1.	.0	3063.0	*	1	0822 252	0.	.0 3063.0
1	0144	53	445.	.0	3066.2	*	1	0504	153	1.	.0	3063.0	*	1	0824 253	0.	.0 3063.0
1	0146	54	428.	.0	3066.1	*	1	0506	154	1.	.0	3063.0	*	1	0826 254	0.	.0 3063.0
1	0148	55	412.	.0	3066.0	*	1	0508	155	1.	.0	3063.0	*	1	0828 255	0.	.0 3063.0
1	0150	56	396.	.0	3065.8	*	1	0510	156	0.	.0	3063.0	*	1	0830 256	0.	.0 3063.0
1	0152	57	381.	.0	3065.7	*	1	0512	157	0.	.0	3063.0	*	1	0832 257	0.	.0 3063.0
1	0154	58	367.	.0	3065.6	*	1	0514	158	0.	.0	3063.0	*	1	0834 258	0.	.0 3063.0
1	0156	59	355.	.0	3065.6	*	1	0516	159	0.	.0	3063.0	*	1	0836 259	0.	.0 3063.0
1	0158	60	344.	.0	3065.5	*	1	0518	160	0.	.0	3063.0	*	1	0838 260	0.	.0 3063.0
1	0200	61	333.	.0	3065.4	*	1	0520	161	0.	.0	3063.0	*	1	0840 261	0.	.0 3063.0
1	0202	62	323.	.0	3065.3	*	1	0522	162	0.	.0	3063.0	*	1	0842 262	0.	.0 3063.0
1	0204	63	313.	.0	3065.3	*	1	0524	163	0.	.0	3063.0	*	1	0844 263	0.	.0 3063.0
1	0206	64	303.	.0	3065.2	*	1	0526	164	0.	.0	3063.0	*	1	0846 264	0.	.0 3063.0
1	0208	65	294.	.0	3065.1	*	1	0528	165	0.	.0	3063.0	*	1	0848 265	0.	.0 3063.0
1	0210	66	285.	.0	3065.0	*	1	0530	166	0.	.0	3063.0	*	1	0850 266	0.	.0 3063.0
1	0212	67	276.	.0	3065.0	*	1	0532	167	0.	.0	3063.0	*	1	0852 267	0.	.0 3063.0
1	0214	68	267.	.0	3064.9	*	1	0534	168	0.	.0	3063.0	*	1	0854 268	0.	.0 3063.0
1	0216	69	260.	.0	3064.9	*	1	0536	169	0.	.0	3063.0	*	1	0856 269	0.	.0 3063.0
1	0218	70	251.	.0	3064.8	*	1	0538	170	0.	.0	3063.0	*	1	0858 270	0.	.0 3063.0
1	0220	71	244.	.0	3064.8	*	1	0540	171	0.	.0	3063.0	*	1	0900 271	0.	.0 3063.0
1	0222	72	237.	.0	3064.7	*	1	0542	172	0.	.0	3063.0	*	1	0902 272	0.	.0 3063.0
1	0224	73	231.	.0	3064.7	*	1	0544	173	0.	.0	3063.0	*	1	0904 273	0.	.0 3063.0
1	0226	74	224.	.0	3064.6	*	1	0546	174	0.	.0	3063.0	*	1	0906 274	0.	.0 3063.0
1	0228	75	219.	.0	3064.6	*	1	0548	175	0.	.0	3063.0	*	1	0908 275	0.	.0 3063.0
1	0230	76	213.	.0	3064.5	*	1	0550	176	0.	.0	3063.0	*	1	0910 276	0.	.0 3063.0
1	0232	77	208.	.0	3064.5	*	1	0552	177	0.	.0	3063.0	*	1	0912 277	0.	.0 3063.0
1	0234	78	202.	.0	3064.5	*	1	0554	178	0.	.0	3063.0	*	1	0914 278	0.	.0 3063.0
1	0236	79	197.	.0	3064.4	*	1	0556	179	0.	.0	3063.0	*	1	0916 279	0.	.0 3063.0
1	0238	80	191.	.0	3064.4	*	1	0558	180	0.	.0	3063.0	*	1	0918 280	0.	.0 3063.0
1	0240	81	186.	.0	3064.3	*	1	0600	181	0.	.0	3063.0	*	1	0920 281	0.	.0 3063.0
1	0242	82	181.	.0	3064.3	*	1	0602	182	0.	.0	3063.0	*	1	0922 282	0.	.0 3063.0

```
 1     0244  83      177.        .0  3064.3 *  1     0604 183        0.        .0  3063.0 *  1      0924 283        0.        .0  3063.0
 1     0246  84      173.        .0  3064.2 *  1     0606 184        0.        .0  3063.0 *  1      0926 284        0.        .0  3063.0
 1     0248  85      169.        .0  3064.2 *  1     0608 185        0.        .0  3063.0 *  1      0928 285        0.        .0  3063.0
 1     0250  86      165.        .0  3064.2 *  1     0610 186        0.        .0  3063.0 *  1      0930 286        0.        .0  3063.0
 1     0252  87      162.        .0  3064.2 *  1     0612 187        0.        .0  3063.0 *  1      0932 287        0.        .0  3063.0
 1     0254  88      158.        .0  3064.1 *  1     0614 188        0.        .0  3063.0 *  1      0934 288        0.        .0  3063.0
 1     0256  89      155.        .0  3064.1 *  1     0616 189        0.        .0  3063.0 *  1      0936 289        0.        .0  3063.0
 1     0258  90      152.        .0  3064.1 *  1     0618 190        0.        .0  3063.0 *  1      0938 290        0.        .0  3063.0
 1     0300  91      149.        .0  3064.1 *  1     0620 191        0.        .0  3063.0 *  1      0940 291        0.        .0  3063.0
 1     0302  92      146.        .0  3064.0 *  1     0622 192        0.        .0  3063.0 *  1      0942 292        0.        .0  3063.0
 1     0304  93      143.        .0  3064.0 *  1     0624 193        0.        .0  3063.0 *  1      0944 293        0.        .0  3063.0
 1     0306  94      139.        .0  3064.0 *  1     0626 194        0.        .0  3063.0 *  1      0946 294        0.        .0  3063.0
 1     0308  95      135.        .0  3064.0 *  1     0628 195        0.        .0  3063.0 *  1      0948 295        0.        .0  3063.0
 1     0310  96      130.        .0  3063.9 *  1     0630 196        0.        .0  3063.0 *  1      0950 296        0.        .0  3063.0
 1     0312  97      126.        .0  3063.9 *  1     0632 197        0.        .0  3063.0 *  1      0952 297        0.        .0  3063.0
 1     0314  98      120.        .0  3063.9 *  1     0634 198        0.        .0  3063.0 *  1      0954 298        0.        .0  3063.0
 1     0316  99      115.        .0  3063.8 *  1     0636 199        0.        .0  3063.0 *  1      0956 299        0.        .0  3063.0
 1     0318 100      109.        .0  3063.8 *  1     0638 200        0.        .0  3063.0 *  1      0958 300        0.        .0  3063.0
                                          *                                            *
*******************************************************************************************************************************************

  PEAK FLOW      TIME                              MAXIMUM AVERAGE FLOW
                                        6-HR         24-HR         72-HR       9.97-HR
+    (CFS)       (HR)
                              (CFS)
+    2324.        .60                   354.          213.          213.          213.
                           (INCHES)    2.025         2.025         2.025         2.025
                            (AC-FT)     176.          176.          176.          176.

 PEAK STORAGE    TIME                            MAXIMUM AVERAGE STORAGE
                                        6-HR         24-HR         72-HR       9.97-HR
+  (AC-FT)       (HR)
        1.        .60                     0.            0.            0.            0.

  PEAK STAGE     TIME                              MAXIMUM AVERAGE STAGE
                                        6-HR         24-HR         72-HR       9.97-HR
+    (FEET)      (HR)
   3073.73        .60                3065.01       3064.21       3064.21       3064.21

                          CUMULATIVE AREA =     1.63 SQ MI


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


              **************
              *            *
   90 KK      *    FR-94   *
              *            *
              **************
                            HEADWATERS OF PONTATOC CANYON WASH
                            BASIN FR-94

                 SUBBASIN RUNOFF DATA

   93 BA           SUBBASIN CHARACTERISTICS
                         TAREA           .46   SUBBASIN AREA

                   PRECIPITATION DATA

   94 PB                 STORM          3.33   BASIN TOTAL PRECIPITATION

   20 PI             INCREMENTAL PRECIPITATION PATTERN
                        .04        .04        .06        .08        .08        .07        .07        .05        .03        .03
                        .02        .02        .02        .02        .02        .02        .02        .01        .01        .01
                        .01        .01        .01        .01        .01        .01        .01        .01        .01        .01
                        .01        .01        .01        .01        .01        .01        .01        .00        .00        .00
                        .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                        .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                        .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                        .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                        .00        .00        .00        .00        .00        .00        .00        .00        .00        .00

   95 LS           SCS LOSS RATE
                         STRTL           .33   INITIAL ABSTRACTION
                        CRVNBR         86.00   CURVE NUMBER
                         RTIMP         10.00   PERCENT IMPERVIOUS AREA

   96 UD           SCS DIMENSIONLESS UNITGRAPH
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TLAG .17 LAG

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UNIT HYDROGRAPH
27 END-OF-PERIOD ORDINATES

106.	324.	676.	1035.	1208.	1209.	1074.	888.	642.	465.
344.	262.	194.	145.	108.	80.	59.	44.	33.	25.
18.	14.	11.	8.	6.	3.	1.			

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HYDROGRAPH AT STATION FR-94

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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	*	1		0500	151	.00	.00	.00	0.
1		0002	2	.13	.12	.01	1.	*	1		0502	152	.00	.00	.00	0.
1		0004	3	.13	.12	.01	6.	*	1		0504	153	.00	.00	.00	0.
1		0006	4	.20	.17	.03	17.	*	1		0506	154	.00	.00	.00	0.
1		0008	5	.27	.18	.09	43.	*	1		0508	155	.00	.00	.00	0.
1		0010	6	.27	.14	.14	96.	*	1		0510	156	.00	.00	.00	0.
1		0012	7	.22	.09	.13	187.	*	1		0512	157	.00	.00	.00	0.
1		0014	8	.22	.07	.14	315.	*	1		0514	158	.00	.00	.00	0.
1		0016	9	.17	.05	.12	466.	*	1		0516	159	.00	.00	.00	0.
1		0018	10	.11	.03	.08	611.	*	1		0518	160	.00	.00	.00	0.
1		0020	11	.11	.03	.09	729.	*	1		0520	161	.00	.00	.00	0.
1		0022	12	.08	.02	.06	804.	*	1		0522	162	.00	.00	.00	0.
1		0024	13	.08	.02	.06	830.	*	1		0524	163	.00	.00	.00	0.
1		0026	14	.07	.02	.06	818.	*	1		0526	164	.00	.00	.00	0.
1		0028	15	.07	.01	.05	783.	*	1		0528	165	.00	.00	.00	0.
1		0030	16	.07	.01	.05	735.	*	1		0530	166	.00	.00	.00	0.
1		0032	17	.05	.01	.04	685.	*	1		0532	167	.00	.00	.00	0.
1		0034	18	.05	.01	.04	637.	*	1		0534	168	.00	.00	.00	0.
1		0036	19	.05	.01	.04	592.	*	1		0536	169	.00	.00	.00	0.
1		0038	20	.04	.01	.04	550.	*	1		0538	170	.00	.00	.00	0.
1		0040	21	.04	.01	.04	511.	*	1		0540	171	.00	.00	.00	0.
1		0042	22	.04	.01	.03	476.	*	1		0542	172	.00	.00	.00	0.
1		0044	23	.04	.01	.03	443.	*	1		0544	173	.00	.00	.00	0.
1		0046	24	.04	.01	.03	413.	*	1		0546	174	.00	.00	.00	0.
1		0048	25	.03	.01	.03	386.	*	1		0548	175	.00	.00	.00	0.
1		0050	26	.03	.01	.03	361.	*	1		0550	176	.00	.00	.00	0.
1		0052	27	.03	.00	.02	338.	*	1		0552	177	.00	.00	.00	0.
1		0054	28	.03	.00	.02	317.	*	1		0554	178	.00	.00	.00	0.
1		0056	29	.03	.00	.02	298.	*	1		0556	179	.00	.00	.00	0.
1		0058	30	.02	.00	.02	280.	*	1		0558	180	.00	.00	.00	0.
1		0100	31	.02	.00	.02	264.	*	1		0600	181	.00	.00	.00	0.
1		0102	32	.02	.00	.02	248.	*	1		0602	182	.00	.00	.00	0.
1		0104	33	.02	.00	.02	234.	*	1		0604	183	.00	.00	.00	0.
1		0106	34	.02	.00	.02	222.	*	1		0606	184	.00	.00	.00	0.
1		0108	35	.02	.00	.02	210.	*	1		0608	185	.00	.00	.00	0.
1		0110	36	.02	.00	.02	199.	*	1		0610	186	.00	.00	.00	0.
1		0112	37	.02	.00	.01	189.	*	1		0612	187	.00	.00	.00	0.
1		0114	38	.02	.00	.01	180.	*	1		0614	188	.00	.00	.00	0.
1		0116	39	.02	.00	.01	171.	*	1		0616	189	.00	.00	.00	0.
1		0118	40	.02	.00	.01	164.	*	1		0618	190	.00	.00	.00	0.
1		0120	41	.02	.00	.01	156.	*	1		0620	191	.00	.00	.00	0.
1		0122	42	.01	.00	.01	149.	*	1		0622	192	.00	.00	.00	0.
1		0124	43	.01	.00	.01	143.	*	1		0624	193	.00	.00	.00	0.
1		0126	44	.01	.00	.01	137.	*	1		0626	194	.00	.00	.00	0.
1		0128	45	.01	.00	.01	131.	*	1		0628	195	.00	.00	.00	0.
1		0130	46	.01	.00	.01	126.	*	1		0630	196	.00	.00	.00	0.
1		0132	47	.01	.00	.01	121.	*	1		0632	197	.00	.00	.00	0.
1		0134	48	.01	.00	.01	116.	*	1		0634	198	.00	.00	.00	0.
1		0136	49	.01	.00	.01	112.	*	1		0636	199	.00	.00	.00	0.
1		0138	50	.01	.00	.01	107.	*	1		0638	200	.00	.00	.00	0.
1		0140	51	.01	.00	.01	103.	*	1		0640	201	.00	.00	.00	0.
1		0142	52	.01	.00	.01	100.	*	1		0642	202	.00	.00	.00	0.
1		0144	53	.01	.00	.01	96.	*	1		0644	203	.00	.00	.00	0.
1		0146	54	.01	.00	.01	93.	*	1		0646	204	.00	.00	.00	0.
1		0148	55	.01	.00	.01	90.	*	1		0648	205	.00	.00	.00	0.
1		0150	56	.01	.00	.01	87.	*	1		0650	206	.00	.00	.00	0.
1		0152	57	.01	.00	.01	84.	*	1		0652	207	.00	.00	.00	0.
1		0154	58	.01	.00	.01	81.	*	1		0654	208	.00	.00	.00	0.
1		0156	59	.01	.00	.01	78.	*	1		0656	209	.00	.00	.00	0.
1		0158	60	.01	.00	.01	76.	*	1		0658	210	.00	.00	.00	0.
1		0200	61	.01	.00	.01	73.	*	1		0700	211	.00	.00	.00	0.
1		0202	62	.01	.00	.01	71.	*	1		0702	212	.00	.00	.00	0.
1		0204	63	.01	.00	.01	69.	*	1		0704	213	.00	.00	.00	0.

1	0206	64	.01	.00	.01	67.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.01	65.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.01	63.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.01	61.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.01	60.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.01	58.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.01	.00	.01	56.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.01	.00	.01	55.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.01	.00	.00	53.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.01	.00	.00	52.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.01	.00	.00	51.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.01	.00	.00	49.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.01	.00	.00	48.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.00	.00	.00	47.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	46.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	45.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	44.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	43.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	42.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	41.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	40.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	39.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	38.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	37.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	36.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	36.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	35.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	34.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	33.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	31.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	28.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	24.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	20.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	16.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	12.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	9.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	6.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	5.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	4.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	3.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	2.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	1.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	1.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	1.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	1.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	0.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	0.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	0.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.

```
         1     0448  145     .00     .00     .00         0.      *      1     0948  295     .00     .00     .00          0.
         1     0450  146     .00     .00     .00         0.      *      1     0950  296     .00     .00     .00          0.
         1     0452  147     .00     .00     .00         0.      *      1     0952  297     .00     .00     .00          0.
         1     0454  148     .00     .00     .00         0.      *      1     0954  298     .00     .00     .00          0.
         1     0456  149     .00     .00     .00         0.      *      1     0956  299     .00     .00     .00          0.
         1     0458  150     .00     .00     .00         0.      *      1     0958  300     .00     .00     .00          0.
                                                                 *
*****************************************************************************************************************************************

     TOTAL RAINFALL =     3.33, TOTAL LOSS =     1.24, TOTAL EXCESS =     2.09

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR         24-HR        72-HR       9.97-HR
+    (CFS)       (HR)
                            (CFS)
+      830.       .40                  104.           63.          63.           63.
                         (INCHES)     2.087        2.087        2.087         2.087
                          (AC-FT)       52.          52.          52.           52.

                         CUMULATIVE AREA =      .46 SQ MI


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

             **************
             *            *
   97 KK     *    94TO93  *
             *            *
             **************
                          MODIFIED PULS CHANNEL ROUTING
                          FROM NODE FR-94 TO FR-93

               HYDROGRAPH ROUTING DATA

  100 RS         STORAGE ROUTING
                       NSTPS           2  NUMBER OF SUBREACHES
                        ITYP        FLOW  TYPE OF INITIAL CONDITION
                      RSVRIC       -1.00  INITIAL CONDITION
                           X         .00 WORKING R AND D COEFFICIENT

  101 RC         NORMAL DEPTH CHANNEL
                         ANL        .160  LEFT OVERBANK N-VALUE
                        ANCH        .160  MAIN CHANNEL N-VALUE
                         ANR        .160  RIGHT OVERBANK N-VALUE
                       RLNTH       3600.  REACH LENGTH
                         SEL       .2860  ENERGY SLOPE
                       ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                                CROSS-SECTION DATA
                             --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  103 RY       ELEVATION     15.00      10.00       5.00        .00        .00       5.00      10.00      15.00
  102 RX       DISTANCE        .00      10.00      20.00      30.00      40.00      50.00      60.00      70.00

                                                                 ***

                                             COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

            STORAGE          .00        .76       1.72       2.88       4.26       5.84       7.62       9.62      11.81      14.22
            OUTFLOW          .00      35.05     117.99     247.11     425.58     657.37     946.66    1350.07    1851.71    2431.60
          ELEVATION          .00        .79       1.58       2.37       3.16       3.95       4.74       5.53       6.32       7.11

            STORAGE        16.83      19.64      22.66      25.89      29.33      32.97      36.81      40.86      45.12      49.59
            OUTFLOW      3093.90    3842.43    4680.82    5612.60    6641.22    7770.06    9002.44   10341.64   11790.90   13353.38
          ELEVATION         7.89       8.68       9.47      10.26      11.05      11.84      12.63      13.42      14.21      15.00

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                                                 HYDROGRAPH AT STATION     94TO93

*****************************************************************************************************************************************
                                          *                                           *
  DA MON HRMN ORD   OUTFLOW   STORAGE     STAGE * DA MON HRMN ORD   OUTFLOW   STORAGE     STAGE * DA MON HRMN ORD   OUTFLOW   STORAGE    STAGE
                                          *                                           *
   1     0000   1        0.        .0        .0 *  1     0320 101       24.        .3        .5 *  1     0640 201        0.        .0       .0
   1     0002   2        0.        .0        .0 *  1     0322 102       22.        .2        .5 *  1     0642 202        0.        .0       .0
   1     0004   3        0.        .0        .0 *  1     0324 103       20.        .2        .4 *  1     0644 203        0.        .0       .0
   1     0006   4        1.        .0        .0 *  1     0326 104       17.        .2        .4 *  1     0646 204        0.        .0       .0
```

1	0008	5	2.	.0	.0 *	1	0328	105	15.	.2	.3 *	1	0648	205	0.	.0	.0
1	0010	6	5.	.1	.1 *	1	0330	106	13.	.1	.3 *	1	0650	206	0.	.0	.0
1	0012	7	13.	.1	.3 *	1	0332	107	11.	.1	.3 *	1	0652	207	0.	.0	.0
1	0014	8	33.	.4	.7 *	1	0334	108	10.	.1	.2 *	1	0654	208	0.	.0	.0
1	0016	9	94.	.7	1.4 *	1	0336	109	8.	.1	.2 *	1	0656	209	0.	.0	.0
1	0018	10	199.	1.2	2.1 *	1	0338	110	7.	.1	.2 *	1	0658	210	0.	.0	.0
1	0020	11	341.	1.8	2.8 *	1	0340	111	6.	.1	.1 *	1	0700	211	0.	.0	.0
1	0022	12	492.	2.4	3.4 *	1	0342	112	5.	.1	.1 *	1	0702	212	0.	.0	.0
1	0024	13	624.	2.8	3.8 *	1	0344	113	4.	.0	.1 *	1	0704	213	0.	.0	.0
1	0026	14	720.	3.1	4.1 *	1	0346	114	3.	.0	.1 *	1	0706	214	0.	.0	.0
1	0028	15	770.	3.3	4.3 *	1	0348	115	3.	.0	.1 *	1	0708	215	0.	.0	.0
1	0030	16	781.	3.3	4.3 *	1	0350	116	2.	.0	.1 *	1	0710	216	0.	.0	.0
1	0032	17	765.	3.3	4.2 *	1	0352	117	2.	.0	.0 *	1	0712	217	0.	.0	.0
1	0034	18	732.	3.2	4.2 *	1	0354	118	2.	.0	.0 *	1	0714	218	0.	.0	.0
1	0036	19	692.	3.0	4.0 *	1	0356	119	1.	.0	.0 *	1	0716	219	0.	.0	.0
1	0038	20	650.	2.9	3.9 *	1	0358	120	1.	.0	.0 *	1	0718	220	0.	.0	.0
1	0040	21	611.	2.8	3.8 *	1	0400	121	1.	.0	.0 *	1	0720	221	0.	.0	.0
1	0042	22	571.	2.6	3.7 *	1	0402	122	1.	.0	.0 *	1	0722	222	0.	.0	.0
1	0044	23	532.	2.5	3.5 *	1	0404	123	1.	.0	.0 *	1	0724	223	0.	.0	.0
1	0046	24	496.	2.4	3.4 *	1	0406	124	0.	.0	.0 *	1	0726	224	0.	.0	.0
1	0048	25	462.	2.3	3.3 *	1	0408	125	0.	.0	.0 *	1	0728	225	0.	.0	.0
1	0050	26	432.	2.2	3.2 *	1	0410	126	0.	.0	.0 *	1	0730	226	0.	.0	.0
1	0052	27	406.	2.1	3.1 *	1	0412	127	0.	.0	.0 *	1	0732	227	0.	.0	.0
1	0054	28	382.	2.0	3.0 *	1	0414	128	0.	.0	.0 *	1	0734	228	0.	.0	.0
1	0056	29	358.	1.9	2.9 *	1	0416	129	0.	.0	.0 *	1	0736	229	0.	.0	.0
1	0058	30	336.	1.8	2.8 *	1	0418	130	0.	.0	.0 *	1	0738	230	0.	.0	.0
1	0100	31	316.	1.7	2.7 *	1	0420	131	0.	.0	.0 *	1	0740	231	0.	.0	.0
1	0102	32	297.	1.6	2.6 *	1	0422	132	0.	.0	.0 *	1	0742	232	0.	.0	.0
1	0104	33	279.	1.6	2.5 *	1	0424	133	0.	.0	.0 *	1	0744	233	0.	.0	.0
1	0106	34	263.	1.5	2.4 *	1	0426	134	0.	.0	.0 *	1	0746	234	0.	.0	.0
1	0108	35	249.	1.4	2.4 *	1	0428	135	0.	.0	.0 *	1	0748	235	0.	.0	.0
1	0110	36	237.	1.4	2.3 *	1	0430	136	0.	.0	.0 *	1	0750	236	0.	.0	.0
1	0112	37	225.	1.3	2.2 *	1	0432	137	0.	.0	.0 *	1	0752	237	0.	.0	.0
1	0114	38	214.	1.3	2.2 *	1	0434	138	0.	.0	.0 *	1	0754	238	0.	.0	.0
1	0116	39	204.	1.2	2.1 *	1	0436	139	0.	.0	.0 *	1	0756	239	0.	.0	.0
1	0118	40	194.	1.2	2.0 *	1	0438	140	0.	.0	.0 *	1	0758	240	0.	.0	.0
1	0120	41	184.	1.2	2.0 *	1	0440	141	0.	.0	.0 *	1	0800	241	0.	.0	.0
1	0122	42	175.	1.1	1.9 *	1	0442	142	0.	.0	.0 *	1	0802	242	0.	.0	.0
1	0124	43	167.	1.1	1.9 *	1	0444	143	0.	.0	.0 *	1	0804	243	0.	.0	.0
1	0126	44	160.	1.0	1.8 *	1	0446	144	0.	.0	.0 *	1	0806	244	0.	.0	.0
1	0128	45	152.	1.0	1.8 *	1	0448	145	0.	.0	.0 *	1	0808	245	0.	.0	.0
1	0130	46	146.	1.0	1.7 *	1	0450	146	0.	.0	.0 *	1	0810	246	0.	.0	.0
1	0132	47	140.	1.0	1.7 *	1	0452	147	0.	.0	.0 *	1	0812	247	0.	.0	.0
1	0134	48	134.	.9	1.7 *	1	0454	148	0.	.0	.0 *	1	0814	248	0.	.0	.0
1	0136	49	128.	.9	1.6 *	1	0456	149	0.	.0	.0 *	1	0816	249	0.	.0	.0
1	0138	50	123.	.9	1.6 *	1	0458	150	0.	.0	.0 *	1	0818	250	0.	.0	.0
1	0140	51	119.	.9	1.6 *	1	0500	151	0.	.0	.0 *	1	0820	251	0.	.0	.0
1	0142	52	115.	.8	1.6 *	1	0502	152	0.	.0	.0 *	1	0822	252	0.	.0	.0
1	0144	53	111.	.8	1.5 *	1	0504	153	0.	.0	.0 *	1	0824	253	0.	.0	.0
1	0146	54	108.	.8	1.5 *	1	0506	154	0.	.0	.0 *	1	0826	254	0.	.0	.0
1	0148	55	104.	.8	1.4 *	1	0508	155	0.	.0	.0 *	1	0828	255	0.	.0	.0
1	0150	56	101.	.8	1.4 *	1	0510	156	0.	.0	.0 *	1	0830	256	0.	.0	.0
1	0152	57	97.	.7	1.4 *	1	0512	157	0.	.0	.0 *	1	0832	257	0.	.0	.0
1	0154	58	94.	.7	1.4 *	1	0514	158	0.	.0	.0 *	1	0834	258	0.	.0	.0
1	0156	59	91.	.7	1.3 *	1	0516	159	0.	.0	.0 *	1	0836	259	0.	.0	.0
1	0158	60	88.	.7	1.3 *	1	0518	160	0.	.0	.0 *	1	0838	260	0.	.0	.0
1	0200	61	85.	.7	1.3 *	1	0520	161	0.	.0	.0 *	1	0840	261	0.	.0	.0
1	0202	62	82.	.7	1.2 *	1	0522	162	0.	.0	.0 *	1	0842	262	0.	.0	.0
1	0204	63	79.	.6	1.2 *	1	0524	163	0.	.0	.0 *	1	0844	263	0.	.0	.0
1	0206	64	77.	.6	1.2 *	1	0526	164	0.	.0	.0 *	1	0846	264	0.	.0	.0
1	0208	65	74.	.6	1.2 *	1	0528	165	0.	.0	.0 *	1	0848	265	0.	.0	.0
1	0210	66	72.	.6	1.1 *	1	0530	166	0.	.0	.0 *	1	0850	266	0.	.0	.0
1	0212	67	70.	.6	1.1 *	1	0532	167	0.	.0	.0 *	1	0852	267	0.	.0	.0
1	0214	68	68.	.6	1.1 *	1	0534	168	0.	.0	.0 *	1	0854	268	0.	.0	.0
1	0216	69	66.	.6	1.1 *	1	0536	169	0.	.0	.0 *	1	0856	269	0.	.0	.0
1	0218	70	64.	.5	1.1 *	1	0538	170	0.	.0	.0 *	1	0858	270	0.	.0	.0
1	0220	71	62.	.5	1.0 *	1	0540	171	0.	.0	.0 *	1	0900	271	0.	.0	.0
1	0222	72	60.	.5	1.0 *	1	0542	172	0.	.0	.0 *	1	0902	272	0.	.0	.0
1	0224	73	59.	.5	1.0 *	1	0544	173	0.	.0	.0 *	1	0904	273	0.	.0	.0
1	0226	74	57.	.5	1.0 *	1	0546	174	0.	.0	.0 *	1	0906	274	0.	.0	.0
1	0228	75	56.	.5	1.0 *	1	0548	175	0.	.0	.0 *	1	0908	275	0.	.0	.0
1	0230	76	54.	.5	1.0 *	1	0550	176	0.	.0	.0 *	1	0910	276	0.	.0	.0
1	0232	77	53.	.5	1.0 *	1	0552	177	0.	.0	.0 *	1	0912	277	0.	.0	.0
1	0234	78	51.	.5	.9 *	1	0554	178	0.	.0	.0 *	1	0914	278	0.	.0	.0
1	0236	79	50.	.5	.9 *	1	0556	179	0.	.0	.0 *	1	0916	279	0.	.0	.0
1	0238	80	49.	.5	.9 *	1	0558	180	0.	.0	.0 *	1	0918	280	0.	.0	.0
1	0240	81	47.	.4	.9 *	1	0600	181	0.	.0	.0 *	1	0920	281	0.	.0	.0
1	0242	82	46.	.4	.9 *	1	0602	182	0.	.0	.0 *	1	0922	282	0.	.0	.0
1	0244	83	45.	.4	.9 *	1	0604	183	0.	.0	.0 *	1	0924	283	0.	.0	.0
1	0246	84	44.	.4	.9 *	1	0606	184	0.	.0	.0 *	1	0926	284	0.	.0	.0
1	0248	85	43.	.4	.9 *	1	0608	185	0.	.0	.0 *	1	0928	285	0.	.0	.0

```
 1    0250  86     42.      .4     .9 *  1    0610 186     0.      .0     .0 *  1    0930 286     0.      .0     .0
 1    0252  87     41.      .4     .8 *  1    0612 187     0.      .0     .0 *  1    0932 287     0.      .0     .0
 1    0254  88     40.      .4     .8 *  1    0614 188     0.      .0     .0 *  1    0934 288     0.      .0     .0
 1    0256  89     39.      .4     .8 *  1    0616 189     0.      .0     .0 *  1    0936 289     0.      .0     .0
 1    0258  90     38.      .4     .8 *  1    0618 190     0.      .0     .0 *  1    0938 290     0.      .0     .0
 1    0300  91     37.      .4     .8 *  1    0620 191     0.      .0     .0 *  1    0940 291     0.      .0     .0
 1    0302  92     37.      .4     .8 *  1    0622 192     0.      .0     .0 *  1    0942 292     0.      .0     .0
 1    0304  93     36.      .4     .8 *  1    0624 193     0.      .0     .0 *  1    0944 293     0.      .0     .0
 1    0306  94     35.      .4     .8 *  1    0626 194     0.      .0     .0 *  1    0946 294     0.      .0     .0
 1    0308  95     34.      .4     .8 *  1    0628 195     0.      .0     .0 *  1    0948 295     0.      .0     .0
 1    0310  96     34.      .4     .8 *  1    0630 196     0.      .0     .0 *  1    0950 296     0.      .0     .0
 1    0312  97     32.      .3     .7 *  1    0632 197     0.      .0     .0 *  1    0952 297     0.      .0     .0
 1    0314  98     31.      .3     .7 *  1    0634 198     0.      .0     .0 *  1    0954 298     0.      .0     .0
 1    0316  99     29.      .3     .6 *  1    0636 199     0.      .0     .0 *  1    0956 299     0.      .0     .0
 1    0318 100     27.      .3     .6 *  1    0638 200     0.      .0     .0 *  1    0958 300     0.      .0     .0
                                      *                                     *
***************************************************************************************************************************

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                       6-HR          24-HR         72-HR        9.97-HR
+    (CFS)      (HR)
                          (CFS)
+      781.       .50                  104.            63.           63.            63.
                       (INCHES)       2.087          2.087         2.087          2.087
                        (AC-FT)         52.            52.           52.            52.

 PEAK STORAGE   TIME                             MAXIMUM AVERAGE STORAGE
                                       6-HR          24-HR         72-HR        9.97-HR
+  (AC-FT)      (HR)
         3.       .50                    1.             0.            0.             0.

  PEAK STAGE    TIME                              MAXIMUM AVERAGE STAGE
                                       6-HR          24-HR         72-HR        9.97-HR
+    (FEET)     (HR)
       4.28       .50                   .96            .58           .58            .58

                         CUMULATIVE AREA =      .46 SQ MI


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


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             *            *
  104 KK     *    FR-93   *
             *            *
             **************
                           LOCAL RUNOFF TO FR-93
                           BASIN FR-93

                SUBBASIN RUNOFF DATA

  107 BA          SUBBASIN CHARACTERISTICS
                        TAREA          .38  SUBBASIN AREA

                  PRECIPITATION DATA

  108 PB                STORM         3.33  BASIN TOTAL PRECIPITATION

   20 PI            INCREMENTAL PRECIPITATION PATTERN
                        .04        .04        .06        .08        .08        .07        .07        .05        .03        .03
                        .02        .02        .02        .02        .02        .02        .02        .01        .01        .01
                        .01        .01        .01        .01        .01        .01        .01        .01        .01        .01
                        .01        .01        .01        .01        .01        .01        .01        .00        .00        .00
                        .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                        .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                        .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                        .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                        .00        .00        .00        .00        .00        .00        .00        .00        .00        .00

  109 LS          SCS LOSS RATE
                        STRTL          .33  INITIAL ABSTRACTION
                       CRVNBR        86.00  CURVE NUMBER
                        RTIMP         5.00  PERCENT IMPERVIOUS AREA

  110 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG          .18  LAG

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UNIT HYDROGRAPH
29 END-OF-PERIOD ORDINATES

77.	231.	477.	762.	919.	948.	881.	759.	591.	423.
318.	244.	186.	138.	105.	80.	60.	45.	34.	26.
20.	15.	11.	9.	7.	5.	3.	2.	0.	

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HYDROGRAPH AT STATION FR-93

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DA MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	0000	1	.00	.00	.00	0.	*	1	0500	151	.00	.00	.00	0.
1	0002	2	.13	.13	.01	1.	*	1	0502	152	.00	.00	.00	0.
1	0004	3	.13	.13	.01	2.	*	1	0504	153	.00	.00	.00	0.
1	0006	4	.20	.18	.02	6.	*	1	0506	154	.00	.00	.00	0.
1	0008	5	.27	.19	.08	20.	*	1	0508	155	.00	.00	.00	0.
1	0010	6	.27	.14	.13	51.	*	1	0510	156	.00	.00	.00	0.
1	0012	7	.22	.09	.13	109.	*	1	0512	157	.00	.00	.00	0.
1	0014	8	.22	.08	.14	197.	*	1	0514	158	.00	.00	.00	0.
1	0016	9	.17	.05	.11	308.	*	1	0516	159	.00	.00	.00	0.
1	0018	10	.11	.03	.08	421.	*	1	0518	160	.00	.00	.00	0.
1	0020	11	.11	.03	.08	521.	*	1	0520	161	.00	.00	.00	0.
1	0022	12	.08	.02	.06	592.	*	1	0522	162	.00	.00	.00	0.
1	0024	13	.08	.02	.06	630.	*	1	0524	163	.00	.00	.00	0.
1	0026	14	.07	.02	.06	635.	*	1	0526	164	.00	.00	.00	0.
1	0028	15	.07	.01	.05	619.	*	1	0528	165	.00	.00	.00	0.
1	0030	16	.07	.01	.05	589.	*	1	0530	166	.00	.00	.00	0.
1	0032	17	.05	.01	.04	554.	*	1	0532	167	.00	.00	.00	0.
1	0034	18	.05	.01	.04	519.	*	1	0534	168	.00	.00	.00	0.
1	0036	19	.05	.01	.04	485.	*	1	0536	169	.00	.00	.00	0.
1	0038	20	.04	.01	.04	452.	*	1	0538	170	.00	.00	.00	0.
1	0040	21	.04	.01	.04	422.	*	1	0540	171	.00	.00	.00	0.
1	0042	22	.04	.01	.03	394.	*	1	0542	172	.00	.00	.00	0.
1	0044	23	.04	.01	.03	368.	*	1	0544	173	.00	.00	.00	0.
1	0046	24	.04	.01	.03	343.	*	1	0546	174	.00	.00	.00	0.
1	0048	25	.03	.01	.03	321.	*	1	0548	175	.00	.00	.00	0.
1	0050	26	.03	.01	.03	300.	*	1	0550	176	.00	.00	.00	0.
1	0052	27	.03	.00	.02	282.	*	1	0552	177	.00	.00	.00	0.
1	0054	28	.03	.00	.02	264.	*	1	0554	178	.00	.00	.00	0.
1	0056	29	.03	.00	.02	248.	*	1	0556	179	.00	.00	.00	0.
1	0058	30	.02	.00	.02	234.	*	1	0558	180	.00	.00	.00	0.
1	0100	31	.02	.00	.02	220.	*	1	0600	181	.00	.00	.00	0.
1	0102	32	.02	.00	.02	208.	*	1	0602	182	.00	.00	.00	0.
1	0104	33	.02	.00	.02	196.	*	1	0604	183	.00	.00	.00	0.
1	0106	34	.02	.00	.02	185.	*	1	0606	184	.00	.00	.00	0.
1	0108	35	.02	.00	.02	175.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.00	.02	166.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.02	.00	.01	158.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.02	.00	.01	150.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.02	.00	.01	143.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.02	.00	.01	136.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.02	.00	.01	130.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	124.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	119.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	113.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	109.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	104.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	100.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	96.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	92.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	89.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	86.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	82.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	80.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	77.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	74.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	72.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.01	69.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.01	67.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.01	65.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.01	63.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.01	61.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.01	59.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.01	57.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.01	55.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.01	54.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.01	52.	*	1	0710	216	.00	.00	.00	0.

1	0212	67	.01	.00	.01	51.	*
1	0214	68	.01	.00	.01	49.	*
1	0216	69	.01	.00	.01	48.	*
1	0218	70	.01	.00	.01	47.	*
1	0220	71	.01	.00	.01	45.	*
1	0222	72	.01	.00	.00	44.	*
1	0224	73	.01	.00	.00	43.	*
1	0226	74	.01	.00	.00	42.	*
1	0228	75	.01	.00	.00	41.	*
1	0230	76	.01	.00	.00	40.	*
1	0232	77	.00	.00	.00	39.	*
1	0234	78	.00	.00	.00	38.	*
1	0236	79	.00	.00	.00	37.	*
1	0238	80	.00	.00	.00	36.	*
1	0240	81	.00	.00	.00	35.	*
1	0242	82	.00	.00	.00	34.	*
1	0244	83	.00	.00	.00	34.	*
1	0246	84	.00	.00	.00	33.	*
1	0248	85	.00	.00	.00	32.	*
1	0250	86	.00	.00	.00	31.	*
1	0252	87	.00	.00	.00	31.	*
1	0254	88	.00	.00	.00	30.	*
1	0256	89	.00	.00	.00	29.	*
1	0258	90	.00	.00	.00	29.	*
1	0300	91	.00	.00	.00	28.	*
1	0302	92	.00	.00	.00	27.	*
1	0304	93	.00	.00	.00	26.	*
1	0306	94	.00	.00	.00	24.	*
1	0308	95	.00	.00	.00	21.	*
1	0310	96	.00	.00	.00	17.	*
1	0312	97	.00	.00	.00	14.	*
1	0314	98	.00	.00	.00	11.	*
1	0316	99	.00	.00	.00	8.	*
1	0318	100	.00	.00	.00	6.	*
1	0320	101	.00	.00	.00	5.	*
1	0322	102	.00	.00	.00	3.	*
1	0324	103	.00	.00	.00	3.	*
1	0326	104	.00	.00	.00	2.	*
1	0328	105	.00	.00	.00	1.	*
1	0330	106	.00	.00	.00	1.	*
1	0332	107	.00	.00	.00	1.	*
1	0334	108	.00	.00	.00	1.	*
1	0336	109	.00	.00	.00	0.	*
1	0338	110	.00	.00	.00	0.	*
1	0340	111	.00	.00	.00	0.	*
1	0342	112	.00	.00	.00	0.	*
1	0344	113	.00	.00	.00	0.	*
1	0346	114	.00	.00	.00	0.	*
1	0348	115	.00	.00	.00	0.	*
1	0350	116	.00	.00	.00	0.	*
1	0352	117	.00	.00	.00	0.	*
1	0354	118	.00	.00	.00	0.	*
1	0356	119	.00	.00	.00	0.	*
1	0358	120	.00	.00	.00	0.	*
1	0400	121	.00	.00	.00	0.	*
1	0402	122	.00	.00	.00	0.	*
1	0404	123	.00	.00	.00	0.	*
1	0406	124	.00	.00	.00	0.	*
1	0408	125	.00	.00	.00	0.	*
1	0410	126	.00	.00	.00	0.	*
1	0412	127	.00	.00	.00	0.	*
1	0414	128	.00	.00	.00	0.	*
1	0416	129	.00	.00	.00	0.	*
1	0418	130	.00	.00	.00	0.	*
1	0420	131	.00	.00	.00	0.	*
1	0422	132	.00	.00	.00	0.	*
1	0424	133	.00	.00	.00	0.	*
1	0426	134	.00	.00	.00	0.	*
1	0428	135	.00	.00	.00	0.	*
1	0430	136	.00	.00	.00	0.	*
1	0432	137	.00	.00	.00	0.	*
1	0434	138	.00	.00	.00	0.	*
1	0436	139	.00	.00	.00	0.	*
1	0438	140	.00	.00	.00	0.	*
1	0440	141	.00	.00	.00	0.	*
1	0442	142	.00	.00	.00	0.	*
1	0444	143	.00	.00	.00	0.	*
1	0446	144	.00	.00	.00	0.	*
1	0448	145	.00	.00	.00	0.	*
1	0450	146	.00	.00	.00	0.	*
1	0452	147	.00	.00	.00	0.	*

1	0712	217	.00	.00	.00	0.
1	0714	218	.00	.00	.00	0.
1	0716	219	.00	.00	.00	0.
1	0718	220	.00	.00	.00	0.
1	0720	221	.00	.00	.00	0.
1	0722	222	.00	.00	.00	0.
1	0724	223	.00	.00	.00	0.
1	0726	224	.00	.00	.00	0.
1	0728	225	.00	.00	.00	0.
1	0730	226	.00	.00	.00	0.
1	0732	227	.00	.00	.00	0.
1	0734	228	.00	.00	.00	0.
1	0736	229	.00	.00	.00	0.
1	0738	230	.00	.00	.00	0.
1	0740	231	.00	.00	.00	0.
1	0742	232	.00	.00	.00	0.
1	0744	233	.00	.00	.00	0.
1	0746	234	.00	.00	.00	0.
1	0748	235	.00	.00	.00	0.
1	0750	236	.00	.00	.00	0.
1	0752	237	.00	.00	.00	0.
1	0754	238	.00	.00	.00	0.
1	0756	239	.00	.00	.00	0.
1	0758	240	.00	.00	.00	0.
1	0800	241	.00	.00	.00	0.
1	0802	242	.00	.00	.00	0.
1	0804	243	.00	.00	.00	0.
1	0806	244	.00	.00	.00	0.
1	0808	245	.00	.00	.00	0.
1	0810	246	.00	.00	.00	0.
1	0812	247	.00	.00	.00	0.
1	0814	248	.00	.00	.00	0.
1	0816	249	.00	.00	.00	0.
1	0818	250	.00	.00	.00	0.
1	0820	251	.00	.00	.00	0.
1	0822	252	.00	.00	.00	0.
1	0824	253	.00	.00	.00	0.
1	0826	254	.00	.00	.00	0.
1	0828	255	.00	.00	.00	0.
1	0830	256	.00	.00	.00	0.
1	0832	257	.00	.00	.00	0.
1	0834	258	.00	.00	.00	0.
1	0836	259	.00	.00	.00	0.
1	0838	260	.00	.00	.00	0.
1	0840	261	.00	.00	.00	0.
1	0842	262	.00	.00	.00	0.
1	0844	263	.00	.00	.00	0.
1	0846	264	.00	.00	.00	0.
1	0848	265	.00	.00	.00	0.
1	0850	266	.00	.00	.00	0.
1	0852	267	.00	.00	.00	0.
1	0854	268	.00	.00	.00	0.
1	0856	269	.00	.00	.00	0.
1	0858	270	.00	.00	.00	0.
1	0900	271	.00	.00	.00	0.
1	0902	272	.00	.00	.00	0.
1	0904	273	.00	.00	.00	0.
1	0906	274	.00	.00	.00	0.
1	0908	275	.00	.00	.00	0.
1	0910	276	.00	.00	.00	0.
1	0912	277	.00	.00	.00	0.
1	0914	278	.00	.00	.00	0.
1	0916	279	.00	.00	.00	0.
1	0918	280	.00	.00	.00	0.
1	0920	281	.00	.00	.00	0.
1	0922	282	.00	.00	.00	0.
1	0924	283	.00	.00	.00	0.
1	0926	284	.00	.00	.00	0.
1	0928	285	.00	.00	.00	0.
1	0930	286	.00	.00	.00	0.
1	0932	287	.00	.00	.00	0.
1	0934	288	.00	.00	.00	0.
1	0936	289	.00	.00	.00	0.
1	0938	290	.00	.00	.00	0.
1	0940	291	.00	.00	.00	0.
1	0942	292	.00	.00	.00	0.
1	0944	293	.00	.00	.00	0.
1	0946	294	.00	.00	.00	0.
1	0948	295	.00	.00	.00	0.
1	0950	296	.00	.00	.00	0.
1	0952	297	.00	.00	.00	0.

							*							
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.

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TOTAL RAINFALL = 3.33, TOTAL LOSS = 1.31, TOTAL EXCESS = 2.02

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	9.97-HR
+	(CFS)	(HR)					
			(CFS)				
+	635.	.43		83.	50.	50.	50.
			(INCHES)	2.018	2.018	2.018	2.018
			(AC-FT)	41.	41.	41.	41.

CUMULATIVE AREA = .38 SQ MI

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           *            *
111 KK     *   CO-93    *
           *            *
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                          COMBINE HYDROGRAPHS
                          AT NODE FR-93

114 HC          HYDROGRAPH COMBINATION
                      ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
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HYDROGRAPH AT STATION CO-93
SUM OF 2 HYDROGRAPHS

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DA MON	HRMN	ORD	FLOW	*	DA MON	HRMN	ORD	FLOW	*	DA MON	HRMN	ORD	FLOW	*	DA MON	HRMN	ORD	FLOW
1	0000	1	0.	*	1	0230	76	94.	*	1	0500	151	0.	*	1	0730	226	0.
1	0002	2	1.	*	1	0232	77	91.	*	1	0502	152	0.	*	1	0732	227	0.
1	0004	3	2.	*	1	0234	78	89.	*	1	0504	153	0.	*	1	0734	228	0.
1	0006	4	7.	*	1	0236	79	87.	*	1	0506	154	0.	*	1	0736	229	0.
1	0008	5	22.	*	1	0238	80	85.	*	1	0508	155	0.	*	1	0738	230	0.
1	0010	6	56.	*	1	0240	81	83.	*	1	0510	156	0.	*	1	0740	231	0.
1	0012	7	122.	*	1	0242	82	81.	*	1	0512	157	0.	*	1	0742	232	0.
1	0014	8	230.	*	1	0244	83	79.	*	1	0514	158	0.	*	1	0744	233	0.
1	0016	9	402.	*	1	0246	84	77.	*	1	0516	159	0.	*	1	0746	234	0.
1	0018	10	620.	*	1	0248	85	75.	*	1	0518	160	0.	*	1	0748	235	0.
1	0020	11	862.	*	1	0250	86	73.	*	1	0520	161	0.	*	1	0750	236	0.
1	0022	12	1085.	*	1	0252	87	72.	*	1	0522	162	0.	*	1	0752	237	0.
1	0024	13	1254.	*	1	0254	88	70.	*	1	0524	163	0.	*	1	0754	238	0.
1	0026	14	1355.	*	1	0256	89	68.	*	1	0526	164	0.	*	1	0756	239	0.
1	0028	15	1388.	*	1	0258	90	67.	*	1	0528	165	0.	*	1	0758	240	0.
1	0030	16	1370.	*	1	0300	91	65.	*	1	0530	166	0.	*	1	0800	241	0.
1	0032	17	1319.	*	1	0302	92	64.	*	1	0532	167	0.	*	1	0802	242	0.
1	0034	18	1251.	*	1	0304	93	62.	*	1	0534	168	0.	*	1	0804	243	0.
1	0036	19	1177.	*	1	0306	94	59.	*	1	0536	169	0.	*	1	0806	244	0.
1	0038	20	1102.	*	1	0308	95	55.	*	1	0538	170	0.	*	1	0808	245	0.
1	0040	21	1033.	*	1	0310	96	51.	*	1	0540	171	0.	*	1	0810	246	0.
1	0042	22	965.	*	1	0312	97	46.	*	1	0542	172	0.	*	1	0812	247	0.
1	0044	23	900.	*	1	0314	98	42.	*	1	0544	173	0.	*	1	0814	248	0.
1	0046	24	840.	*	1	0316	99	37.	*	1	0546	174	0.	*	1	0816	249	0.
1	0048	25	783.	*	1	0318	100	33.	*	1	0548	175	0.	*	1	0818	250	0.
1	0050	26	732.	*	1	0320	101	29.	*	1	0550	176	0.	*	1	0820	251	0.
1	0052	27	688.	*	1	0322	102	25.	*	1	0552	177	0.	*	1	0822	252	0.
1	0054	28	646.	*	1	0324	103	22.	*	1	0554	178	0.	*	1	0824	253	0.
1	0056	29	607.	*	1	0326	104	19.	*	1	0556	179	0.	*	1	0826	254	0.
1	0058	30	570.	*	1	0328	105	17.	*	1	0558	180	0.	*	1	0828	255	0.
1	0100	31	536.	*	1	0330	106	14.	*	1	0600	181	0.	*	1	0830	256	0.
1	0102	32	504.	*	1	0332	107	12.	*	1	0602	182	0.	*	1	0832	257	0.
1	0104	33	475.	*	1	0334	108	10.	*	1	0604	183	0.	*	1	0834	258	0.
1	0106	34	448.	*	1	0336	109	9.	*	1	0606	184	0.	*	1	0836	259	0.
1	0108	35	424.	*	1	0338	110	7.	*	1	0608	185	0.	*	1	0838	260	0.

1	0110	36	403.	*	1	0340	111	6.	*	1	0610	186	0.	*	1	0840	261	0.
1	0112	37	383.	*	1	0342	112	5.	*	1	0612	187	0.	*	1	0842	262	0.
1	0114	38	364.	*	1	0344	113	4.	*	1	0614	188	0.	*	1	0844	263	0.
1	0116	39	346.	*	1	0346	114	4.	*	1	0616	189	0.	*	1	0846	264	0.
1	0118	40	330.	*	1	0348	115	3.	*	1	0618	190	0.	*	1	0848	265	0.
1	0120	41	314.	*	1	0350	116	2.	*	1	0620	191	0.	*	1	0850	266	0.
1	0122	42	299.	*	1	0352	117	2.	*	1	0622	192	0.	*	1	0852	267	0.
1	0124	43	286.	*	1	0354	118	2.	*	1	0624	193	0.	*	1	0854	268	0.
1	0126	44	273.	*	1	0356	119	1.	*	1	0626	194	0.	*	1	0856	269	0.
1	0128	45	261.	*	1	0358	120	1.	*	1	0628	195	0.	*	1	0858	270	0.
1	0130	46	250.	*	1	0400	121	1.	*	1	0630	196	0.	*	1	0900	271	0.
1	0132	47	240.	*	1	0402	122	1.	*	1	0632	197	0.	*	1	0902	272	0.
1	0134	48	230.	*	1	0404	123	1.	*	1	0634	198	0.	*	1	0904	273	0.
1	0136	49	221.	*	1	0406	124	0.	*	1	0636	199	0.	*	1	0906	274	0.
1	0138	50	212.	*	1	0408	125	0.	*	1	0638	200	0.	*	1	0908	275	0.
1	0140	51	204.	*	1	0410	126	0.	*	1	0640	201	0.	*	1	0910	276	0.
1	0142	52	198.	*	1	0412	127	0.	*	1	0642	202	0.	*	1	0912	277	0.
1	0144	53	191.	*	1	0414	128	0.	*	1	0644	203	0.	*	1	0914	278	0.
1	0146	54	185.	*	1	0416	129	0.	*	1	0646	204	0.	*	1	0916	279	0.
1	0148	55	178.	*	1	0418	130	0.	*	1	0648	205	0.	*	1	0918	280	0.
1	0150	56	172.	*	1	0420	131	0.	*	1	0650	206	0.	*	1	0920	281	0.
1	0152	57	166.	*	1	0422	132	0.	*	1	0652	207	0.	*	1	0922	282	0.
1	0154	58	161.	*	1	0424	133	0.	*	1	0654	208	0.	*	1	0924	283	0.
1	0156	59	156.	*	1	0426	134	0.	*	1	0656	209	0.	*	1	0926	284	0.
1	0158	60	150.	*	1	0428	135	0.	*	1	0658	210	0.	*	1	0928	285	0.
1	0200	61	146.	*	1	0430	136	0.	*	1	0700	211	0.	*	1	0930	286	0.
1	0202	62	141.	*	1	0432	137	0.	*	1	0702	212	0.	*	1	0932	287	0.
1	0204	63	136.	*	1	0434	138	0.	*	1	0704	213	0.	*	1	0934	288	0.
1	0206	64	132.	*	1	0436	139	0.	*	1	0706	214	0.	*	1	0936	289	0.
1	0208	65	128.	*	1	0438	140	0.	*	1	0708	215	0.	*	1	0938	290	0.
1	0210	66	124.	*	1	0440	141	0.	*	1	0710	216	0.	*	1	0940	291	0.
1	0212	67	121.	*	1	0442	142	0.	*	1	0712	217	0.	*	1	0942	292	0.
1	0214	68	117.	*	1	0444	143	0.	*	1	0714	218	0.	*	1	0944	293	0.
1	0216	69	114.	*	1	0446	144	0.	*	1	0716	219	0.	*	1	0946	294	0.
1	0218	70	111.	*	1	0448	145	0.	*	1	0718	220	0.	*	1	0948	295	0.
1	0220	71	107.	*	1	0450	146	0.	*	1	0720	221	0.	*	1	0950	296	0.
1	0222	72	104.	*	1	0452	147	0.	*	1	0722	222	0.	*	1	0952	297	0.
1	0224	73	102.	*	1	0454	148	0.	*	1	0724	223	0.	*	1	0954	298	0.
1	0226	74	99.	*	1	0456	149	0.	*	1	0726	224	0.	*	1	0956	299	0.
1	0228	75	96.	*	1	0458	150	0.	*	1	0728	225	0.	*	1	0958	300	0.

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

 PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR         24-HR         72-HR        9.97-HR
+   (CFS)       (HR)
                               (CFS)
+    1388.       .47                    187.          112.          112.          112.
                            (INCHES)   2.056         2.056         2.056         2.056
                             (AC-FT)     93.           93.           93.           93.

                            CUMULATIVE AREA =     .85 SQ MI


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


             **************
             *            *
 115 KK      *   93T092   *
             *            *
             **************
                             MODIFIED PULS CHANNEL ROUTING
                             FROM NODE FR-93 TO FR-92

                HYDROGRAPH ROUTING DATA

 118 RS           STORAGE ROUTING
                        NSTPS             2  NUMBER OF SUBREACHES
                         ITYP          FLOW  TYPE OF INITIAL CONDITION
                       RSVRIC         -1.00  INITIAL CONDITION
                            X           .00 WORKING R AND D COEFFICIENT

 119 RC           NORMAL DEPTH CHANNEL
                          ANL          .105  LEFT OVERBANK N-VALUE
                         ANCH          .105  MAIN CHANNEL N-VALUE
                          ANR          .105  RIGHT OVERBANK N-VALUE
                        RLNTH         4220.  REACH LENGTH
                          SEL         .1210  ENERGY SLOPE
```

ELMAX .0 MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

		--- LEFT OVERBANK ---		+ ------ MAIN CHANNEL -------			+ --- RIGHT OVERBANK ---		
121 RY	ELEVATION	15.00	10.00	5.00	.00	.00	5.00	10.00	15.00
120 RX	DISTANCE	.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.89	2.01	3.38	4.99	6.84	8.94	11.27	13.85	16.67
OUTFLOW	.00	34.74	116.94	244.92	421.81	651.55	938.28	1338.13	1835.33	2410.08
ELEVATION	.00	.79	1.58	2.37	3.16	3.95	4.74	5.53	6.32	7.11
STORAGE	19.72	23.03	26.57	30.35	34.38	38.64	43.15	47.90	52.89	58.13
OUTFLOW	3066.53	3808.43	4639.40	5562.94	6582.46	7701.31	8922.79	10250.14	11686.57	13235.24
ELEVATION	7.89	8.68	9.47	10.26	11.05	11.84	12.63	13.42	14.21	15.00

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HYDROGRAPH AT STATION 93T092

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	.0	*	1		0320	101	49.	.5	.9	*	1		0640	201	0.	.0	.0
1		0002	2	0.	.0	.0	*	1		0322	102	45.	.5	.9	*	1		0642	202	0.	.0	.0
1		0004	3	0.	.0	.0	*	1		0324	103	41.	.5	.9	*	1		0644	203	0.	.0	.0
1		0006	4	0.	.0	.0	*	1		0326	104	38.	.5	.8	*	1		0646	204	0.	.0	.0
1		0008	5	1.	.0	.0	*	1		0328	105	35.	.4	.8	*	1		0648	205	0.	.0	.0
1		0010	6	2.	.0	.0	*	1		0330	106	33.	.4	.8	*	1		0650	206	0.	.0	.0
1		0012	7	5.	.1	.1	*	1		0332	107	32.	.4	.7	*	1		0652	207	0.	.0	.0
1		0014	8	13.	.2	.3	*	1		0334	108	30.	.4	.7	*	1		0654	208	0.	.0	.0
1		0016	9	33.	.4	.8	*	1		0336	109	28.	.4	.6	*	1		0656	209	0.	.0	.0
1		0018	10	100.	.9	1.4	*	1		0338	110	26.	.3	.6	*	1		0658	210	0.	.0	.0
1		0020	11	225.	1.6	2.2	*	1		0340	111	24.	.3	.5	*	1		0700	211	0.	.0	.0
1		0022	12	415.	2.5	3.1	*	1		0342	112	22.	.3	.5	*	1		0702	212	0.	.0	.0
1		0024	13	649.	3.4	3.9	*	1		0344	113	20.	.3	.5	*	1		0704	213	0.	.0	.0
1		0026	14	891.	4.3	4.6	*	1		0346	114	18.	.2	.4	*	1		0706	214	0.	.0	.0
1		0028	15	1113.	5.0	5.1	*	1		0348	115	16.	.2	.4	*	1		0708	215	0.	.0	.0
1		0030	16	1253.	5.4	5.4	*	1		0350	116	15.	.2	.3	*	1		0710	216	0.	.0	.0
1		0032	17	1316.	5.6	5.5	*	1		0352	117	13.	.2	.3	*	1		0712	217	0.	.0	.0
1		0034	18	1323.	5.6	5.5	*	1		0354	118	12.	.2	.3	*	1		0714	218	0.	.0	.0
1		0036	19	1294.	5.5	5.4	*	1		0356	119	10.	.1	.2	*	1		0716	219	0.	.0	.0
1		0038	20	1242.	5.4	5.3	*	1		0358	120	9.	.1	.2	*	1		0718	220	0.	.0	.0
1		0040	21	1178.	5.2	5.2	*	1		0400	121	8.	.1	.2	*	1		0720	221	0.	.0	.0
1		0042	22	1110.	5.0	5.1	*	1		0402	122	7.	.1	.2	*	1		0722	222	0.	.0	.0
1		0044	23	1042.	4.8	4.9	*	1		0404	123	6.	.1	.1	*	1		0724	223	0.	.0	.0
1		0046	24	977.	4.6	4.8	*	1		0406	124	6.	.1	.1	*	1		0726	224	0.	.0	.0
1		0048	25	920.	4.4	4.7	*	1		0408	125	5.	.1	.1	*	1		0728	225	0.	.0	.0
1		0050	26	870.	4.2	4.5	*	1		0410	126	4.	.1	.1	*	1		0730	226	0.	.0	.0
1		0052	27	819.	4.0	4.4	*	1		0412	127	4.	.0	.1	*	1		0732	227	0.	.0	.0
1		0054	28	769.	3.9	4.3	*	1		0414	128	3.	.0	.1	*	1		0734	228	0.	.0	.0
1		0056	29	722.	3.7	4.1	*	1		0416	129	3.	.0	.1	*	1		0736	229	0.	.0	.0
1		0058	30	679.	3.5	4.0	*	1		0418	130	2.	.0	.1	*	1		0738	230	0.	.0	.0
1		0100	31	640.	3.4	3.9	*	1		0420	131	2.	.0	.0	*	1		0740	231	0.	.0	.0
1		0102	32	604.	3.2	3.8	*	1		0422	132	2.	.0	.0	*	1		0742	232	0.	.0	.0
1		0104	33	570.	3.1	3.7	*	1		0424	133	1.	.0	.0	*	1		0744	233	0.	.0	.0
1		0106	34	537.	3.0	3.6	*	1		0426	134	1.	.0	.0	*	1		0746	234	0.	.0	.0
1		0108	35	506.	2.8	3.4	*	1		0428	135	1.	.0	.0	*	1		0748	235	0.	.0	.0
1		0110	36	478.	2.7	3.4	*	1		0430	136	1.	.0	.0	*	1		0750	236	0.	.0	.0
1		0112	37	452.	2.6	3.3	*	1		0432	137	1.	.0	.0	*	1		0752	237	0.	.0	.0
1		0114	38	428.	2.5	3.2	*	1		0434	138	1.	.0	.0	*	1		0754	238	0.	.0	.0
1		0116	39	408.	2.4	3.1	*	1		0436	139	1.	.0	.0	*	1		0756	239	0.	.0	.0
1		0118	40	390.	2.3	3.0	*	1		0438	140	0.	.0	.0	*	1		0758	240	0.	.0	.0
1		0120	41	371.	2.3	2.9	*	1		0440	141	0.	.0	.0	*	1		0800	241	0.	.0	.0
1		0122	42	354.	2.2	2.9	*	1		0442	142	0.	.0	.0	*	1		0802	242	0.	.0	.0
1		0124	43	337.	2.1	2.8	*	1		0444	143	0.	.0	.0	*	1		0804	243	0.	.0	.0
1		0126	44	321.	2.0	2.7	*	1		0446	144	0.	.0	.0	*	1		0806	244	0.	.0	.0
1		0128	45	306.	2.0	2.6	*	1		0448	145	0.	.0	.0	*	1		0808	245	0.	.0	.0
1		0130	46	292.	1.9	2.6	*	1		0450	146	0.	.0	.0	*	1		0810	246	0.	.0	.0
1		0132	47	279.	1.8	2.5	*	1		0452	147	0.	.0	.0	*	1		0812	247	0.	.0	.0
1		0134	48	267.	1.8	2.5	*	1		0454	148	0.	.0	.0	*	1		0814	248	0.	.0	.0
1		0136	49	256.	1.7	2.4	*	1		0456	149	0.	.0	.0	*	1		0816	249	0.	.0	.0
1		0138	50	245.	1.7	2.4	*	1		0458	150	0.	.0	.0	*	1		0818	250	0.	.0	.0
1		0140	51	237.	1.6	2.3	*	1		0500	151	0.	.0	.0	*	1		0820	251	0.	.0	.0
1		0142	52	229.	1.6	2.3	*	1		0502	152	0.	.0	.0	*	1		0822	252	0.	.0	.0
1		0144	53	220.	1.6	2.2	*	1		0504	153	0.	.0	.0	*	1		0824	253	0.	.0	.0

1	0146	54	213.	1.5	2.2	*	1	0506	154	0.	.0	.0	*	1	0826	254	0.	.0	.0
1	0148	55	205.	1.5	2.1	*	1	0508	155	0.	.0	.0	*	1	0828	255	0.	.0	.0
1	0150	56	198.	1.4	2.1	*	1	0510	156	0.	.0	.0	*	1	0830	256	0.	.0	.0
1	0152	57	191.	1.4	2.0	*	1	0512	157	0.	.0	.0	*	1	0832	257	0.	.0	.0
1	0154	58	185.	1.4	2.0	*	1	0514	158	0.	.0	.0	*	1	0834	258	0.	.0	.0
1	0156	59	179.	1.3	2.0	*	1	0516	159	0.	.0	.0	*	1	0836	259	0.	.0	.0
1	0158	60	173.	1.3	1.9	*	1	0518	160	0.	.0	.0	*	1	0838	260	0.	.0	.0
1	0200	61	167.	1.3	1.9	*	1	0520	161	0.	.0	.0	*	1	0840	261	0.	.0	.0
1	0202	62	161.	1.2	1.9	*	1	0522	162	0.	.0	.0	*	1	0842	262	0.	.0	.0
1	0204	63	156.	1.2	1.8	*	1	0524	163	0.	.0	.0	*	1	0844	263	0.	.0	.0
1	0206	64	151.	1.2	1.8	*	1	0526	164	0.	.0	.0	*	1	0846	264	0.	.0	.0
1	0208	65	146.	1.2	1.8	*	1	0528	165	0.	.0	.0	*	1	0848	265	0.	.0	.0
1	0210	66	141.	1.1	1.7	*	1	0530	166	0.	.0	.0	*	1	0850	266	0.	.0	.0
1	0212	67	137.	1.1	1.7	*	1	0532	167	0.	.0	.0	*	1	0852	267	0.	.0	.0
1	0214	68	133.	1.1	1.7	*	1	0534	168	0.	.0	.0	*	1	0854	268	0.	.0	.0
1	0216	69	128.	1.1	1.6	*	1	0536	169	0.	.0	.0	*	1	0856	269	0.	.0	.0
1	0218	70	125.	1.0	1.6	*	1	0538	170	0.	.0	.0	*	1	0858	270	0.	.0	.0
1	0220	71	121.	1.0	1.6	*	1	0540	171	0.	.0	.0	*	1	0900	271	0.	.0	.0
1	0222	72	118.	1.0	1.6	*	1	0542	172	0.	.0	.0	*	1	0902	272	0.	.0	.0
1	0224	73	115.	1.0	1.6	*	1	0544	173	0.	.0	.0	*	1	0904	273	0.	.0	.0
1	0226	74	112.	1.0	1.5	*	1	0546	174	0.	.0	.0	*	1	0906	274	0.	.0	.0
1	0228	75	110.	1.0	1.5	*	1	0548	175	0.	.0	.0	*	1	0908	275	0.	.0	.0
1	0230	76	107.	.9	1.5	*	1	0550	176	0.	.0	.0	*	1	0910	276	0.	.0	.0
1	0232	77	104.	.9	1.5	*	1	0552	177	0.	.0	.0	*	1	0912	277	0.	.0	.0
1	0234	78	102.	.9	1.4	*	1	0554	178	0.	.0	.0	*	1	0914	278	0.	.0	.0
1	0236	79	99.	.9	1.4	*	1	0556	179	0.	.0	.0	*	1	0916	279	0.	.0	.0
1	0238	80	97.	.9	1.4	*	1	0558	180	0.	.0	.0	*	1	0918	280	0.	.0	.0
1	0240	81	94.	.9	1.4	*	1	0600	181	0.	.0	.0	*	1	0920	281	0.	.0	.0
1	0242	82	92.	.8	1.3	*	1	0602	182	0.	.0	.0	*	1	0922	282	0.	.0	.0
1	0244	83	90.	.8	1.3	*	1	0604	183	0.	.0	.0	*	1	0924	283	0.	.0	.0
1	0246	84	87.	.8	1.3	*	1	0606	184	0.	.0	.0	*	1	0926	284	0.	.0	.0
1	0248	85	85.	.8	1.3	*	1	0608	185	0.	.0	.0	*	1	0928	285	0.	.0	.0
1	0250	86	83.	.8	1.3	*	1	0610	186	0.	.0	.0	*	1	0930	286	0.	.0	.0
1	0252	87	81.	.8	1.2	*	1	0612	187	0.	.0	.0	*	1	0932	287	0.	.0	.0
1	0254	88	79.	.7	1.2	*	1	0614	188	0.	.0	.0	*	1	0934	288	0.	.0	.0
1	0256	89	77.	.7	1.2	*	1	0616	189	0.	.0	.0	*	1	0936	289	0.	.0	.0
1	0258	90	75.	.7	1.2	*	1	0618	190	0.	.0	.0	*	1	0938	290	0.	.0	.0
1	0300	91	74.	.7	1.2	*	1	0620	191	0.	.0	.0	*	1	0940	291	0.	.0	.0
1	0302	92	72.	.7	1.1	*	1	0622	192	0.	.0	.0	*	1	0942	292	0.	.0	.0
1	0304	93	70.	.7	1.1	*	1	0624	193	0.	.0	.0	*	1	0944	293	0.	.0	.0
1	0306	94	69.	.7	1.1	*	1	0626	194	0.	.0	.0	*	1	0946	294	0.	.0	.0
1	0308	95	67.	.7	1.1	*	1	0628	195	0.	.0	.0	*	1	0948	295	0.	.0	.0
1	0310	96	64.	.6	1.1	*	1	0630	196	0.	.0	.0	*	1	0950	296	0.	.0	.0
1	0312	97	62.	.6	1.1	*	1	0632	197	0.	.0	.0	*	1	0952	297	0.	.0	.0
1	0314	98	59.	.6	1.0	*	1	0634	198	0.	.0	.0	*	1	0954	298	0.	.0	.0
1	0316	99	56.	.6	1.0	*	1	0636	199	0.	.0	.0	*	1	0956	299	0.	.0	.0
1	0318	100	52.	.6	1.0	*	1	0638	200	0.	.0	.0	*	1	0958	300	0.	.0	.0
						*							*						

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 PEAK FLOW     TIME                            MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR       9.97-HR
+   (CFS)      (HR)
                          (CFS)
+    1323.      .57                  187.         112.         112.         112.
                        (INCHES)    2.056        2.056        2.056        2.056
                         (AC-FT)      93.          93.          93.          93.

PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR        24-HR        72-HR       9.97-HR
+  (AC-FT)     (HR)
        6.      .57                    1.           1.           1.           1.

 PEAK STAGE    TIME                            MAXIMUM AVERAGE STAGE
                                     6-HR        24-HR        72-HR       9.97-HR
+   (FEET)     (HR)
     5.50       .57                  1.36          .82          .82          .82

                         CUMULATIVE AREA =    .85 SQ MI


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


              **************
              *            *
 122 KK       *    FR-92   *
              *            *
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LOCAL RUNOFF TO FR-92
BASIN FR-92

SUBBASIN RUNOFF DATA

125 BA SUBBASIN CHARACTERISTICS
TAREA .22 SUBBASIN AREA

PRECIPITATION DATA

126 PB STORM 3.11 BASIN TOTAL PRECIPITATION

20 PI INCREMENTAL PRECIPITATION PATTERN

.04	.04	.06	.08	.08	.07	.07	.05	.03	.03
.02	.02	.02	.02	.02	.02	.02	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

127 LS SCS LOSS RATE
STRTL .33 INITIAL ABSTRACTION
CRVNBR 86.00 CURVE NUMBER
RTIMP 5.00 PERCENT IMPERVIOUS AREA

128 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .16 LAG

***

UNIT HYDROGRAPH
26 END-OF-PERIOD ORDINATES

55.	169.	356.	529.	600.	588.	513.	410.	285.	208.
155.	116.	84.	62.	46.	33.	25.	18.	14.	10.
7.	6.	4.	3.	2.	1.				

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HYDROGRAPH AT STATION FR-92

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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	*	1		0500	151	.00	.00	.00	0.
1		0002	2	.13	.12	.01	0.	*	1		0502	152	.00	.00	.00	0.
1		0004	3	.13	.12	.01	1.	*	1		0504	153	.00	.00	.00	0.
1		0006	4	.19	.17	.02	4.	*	1		0506	154	.00	.00	.00	0.
1		0008	5	.25	.18	.07	12.	*	1		0508	155	.00	.00	.00	0.
1		0010	6	.25	.14	.11	31.	*	1		0510	156	.00	.00	.00	0.
1		0012	7	.20	.09	.11	67.	*	1		0512	157	.00	.00	.00	0.
1		0014	8	.20	.08	.13	120.	*	1		0514	158	.00	.00	.00	0.
1		0016	9	.16	.05	.10	184.	*	1		0516	159	.00	.00	.00	0.
1		0018	10	.11	.03	.07	247.	*	1		0518	160	.00	.00	.00	0.
1		0020	11	.11	.03	.08	299.	*	1		0520	161	.00	.00	.00	0.
1		0022	12	.08	.02	.06	331.	*	1		0522	162	.00	.00	.00	0.
1		0024	13	.08	.02	.06	343.	*	1		0524	163	.00	.00	.00	0.
1		0026	14	.07	.02	.05	339.	*	1		0526	164	.00	.00	.00	0.
1		0028	15	.06	.01	.05	324.	*	1		0528	165	.00	.00	.00	0.
1		0030	16	.06	.01	.05	305.	*	1		0530	166	.00	.00	.00	0.
1		0032	17	.05	.01	.04	285.	*	1		0532	167	.00	.00	.00	0.
1		0034	18	.05	.01	.04	266.	*	1		0534	168	.00	.00	.00	0.
1		0036	19	.05	.01	.04	247.	*	1		0536	169	.00	.00	.00	0.
1		0038	20	.04	.01	.03	230.	*	1		0538	170	.00	.00	.00	0.
1		0040	21	.04	.01	.03	215.	*	1		0540	171	.00	.00	.00	0.
1		0042	22	.04	.01	.03	200.	*	1		0542	172	.00	.00	.00	0.
1		0044	23	.04	.01	.03	187.	*	1		0544	173	.00	.00	.00	0.
1		0046	24	.03	.01	.03	174.	*	1		0546	174	.00	.00	.00	0.
1		0048	25	.03	.01	.02	163.	*	1		0548	175	.00	.00	.00	0.
1		0050	26	.03	.01	.02	153.	*	1		0550	176	.00	.00	.00	0.
1		0052	27	.03	.00	.02	143.	*	1		0552	177	.00	.00	.00	0.
1		0054	28	.03	.00	.02	135.	*	1		0554	178	.00	.00	.00	0.
1		0056	29	.02	.00	.02	127.	*	1		0556	179	.00	.00	.00	0.
1		0058	30	.02	.00	.02	119.	*	1		0558	180	.00	.00	.00	0.
1		0100	31	.02	.00	.02	112.	*	1		0600	181	.00	.00	.00	0.
1		0102	32	.02	.00	.02	106.	*	1		0602	182	.00	.00	.00	0.
1		0104	33	.02	.00	.02	100.	*	1		0604	183	.00	.00	.00	0.
1		0106	34	.02	.00	.02	95.	*	1		0606	184	.00	.00	.00	0.

1	0108	35	.02	.00	.02	90.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.00	.02	85.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.02	.00	.01	81.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.02	.00	.01	77.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.02	.00	.01	74.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.01	.00	.01	70.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.01	.00	.01	67.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	64.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	61.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	59.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	56.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	54.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	52.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	50.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	48.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	46.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	45.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	43.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	42.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	40.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	39.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	37.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.01	36.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.01	35.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.01	34.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.01	33.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.01	32.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.01	31.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.01	30.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.01	29.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.01	28.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.01	27.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.01	27.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.01	26.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.00	25.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.01	.00	.00	25.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.01	.00	.00	24.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.01	.00	.00	23.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.01	.00	.00	23.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.01	.00	.00	22.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.00	.00	.00	21.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.00	.00	.00	21.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.00	.00	.00	20.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	20.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	19.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	19.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	19.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	18.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	18.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	17.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	17.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	17.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	16.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	16.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	15.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	15.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	15.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	14.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	13.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	12.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	10.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	8.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	6.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	5.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	3.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	3.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	2.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	1.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	1.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	1.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	1.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	0.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	0.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	0.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	0.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	0.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	0.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.

1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.
							*							

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

   TOTAL RAINFALL =    3.11, TOTAL LOSS =    1.29, TOTAL EXCESS =    1.82

 PEAK FLOW       TIME                           MAXIMUM AVERAGE FLOW
                                       6-HR          24-HR         72-HR        9.97-HR
+   (CFS)        (HR)
                             (CFS)
+     343.        .40                    44.            26.           26.            26.
                           (INCHES)     1.825          1.825         1.825          1.825
                            (AC-FT)       22.            22.           22.            22.

                          CUMULATIVE AREA =      .22 SQ MI


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


              **************
              *            *
 129 KK       *    CO-92   *
              *            *
              **************
                             COMBINE HYDROGRAPHS
                             AT NODE FR-92 (MAIN CHANNEL PONTATOC CANYON)

 132 HC           HYDROGRAPH COMBINATION
                        ICOMP            2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

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                                                   HYDROGRAPH AT STATION    CO-92
                                                        SUM OF   2 HYDROGRAPHS

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0230	76	128.	*	1		0500	151	0.	*	1		0730	226	0.
1		0002	2	0.	*	1		0232	77	125.	*	1		0502	152	0.	*	1		0732	227	0.
1		0004	3	1.	*	1		0234	78	122.	*	1		0504	153	0.	*	1		0734	228	0.

1	0006	4	4.	*	1	0236	79	119.	*	1	0506	154	0.	*	1	0736	229	0.
1	0008	5	13.	*	1	0238	80	116.	*	1	0508	155	0.	*	1	0738	230	0.
1	0010	6	33.	*	1	0240	81	113.	*	1	0510	156	0.	*	1	0740	231	0.
1	0012	7	72.	*	1	0242	82	110.	*	1	0512	157	0.	*	1	0742	232	0.
1	0014	8	134.	*	1	0244	83	107.	*	1	0514	158	0.	*	1	0744	233	0.
1	0016	9	217.	*	1	0246	84	105.	*	1	0516	159	0.	*	1	0746	234	0.
1	0018	10	347.	*	1	0248	85	102.	*	1	0518	160	0.	*	1	0748	235	0.
1	0020	11	524.	*	1	0250	86	100.	*	1	0520	161	0.	*	1	0750	236	0.
1	0022	12	746.	*	1	0252	87	97.	*	1	0522	162	0.	*	1	0752	237	0.
1	0024	13	992.	*	1	0254	88	95.	*	1	0524	163	0.	*	1	0754	238	0.
1	0026	14	1230.	*	1	0256	89	93.	*	1	0526	164	0.	*	1	0756	239	0.
1	0028	15	1437.	*	1	0258	90	91.	*	1	0528	165	0.	*	1	0758	240	0.
1	0030	16	1558.	*	1	0300	91	88.	*	1	0530	166	0.	*	1	0800	241	0.
1	0032	17	1601.	*	1	0302	92	86.	*	1	0532	167	0.	*	1	0802	242	0.
1	0034	18	1589.	*	1	0304	93	84.	*	1	0534	168	0.	*	1	0804	243	0.
1	0036	19	1541.	*	1	0306	94	81.	*	1	0536	169	0.	*	1	0806	244	0.
1	0038	20	1472.	*	1	0308	95	77.	*	1	0538	170	0.	*	1	0808	245	0.
1	0040	21	1393.	*	1	0310	96	73.	*	1	0540	171	0.	*	1	0810	246	0.
1	0042	22	1310.	*	1	0312	97	68.	*	1	0542	172	0.	*	1	0812	247	0.
1	0044	23	1229.	*	1	0314	98	64.	*	1	0544	173	0.	*	1	0814	248	0.
1	0046	24	1151.	*	1	0316	99	59.	*	1	0546	174	0.	*	1	0816	249	0.
1	0048	25	1083.	*	1	0318	100	55.	*	1	0548	175	0.	*	1	0818	250	0.
1	0050	26	1023.	*	1	0320	101	50.	*	1	0550	176	0.	*	1	0820	251	0.
1	0052	27	962.	*	1	0322	102	46.	*	1	0552	177	0.	*	1	0822	252	0.
1	0054	28	904.	*	1	0324	103	42.	*	1	0554	178	0.	*	1	0824	253	0.
1	0056	29	849.	*	1	0326	104	39.	*	1	0556	179	0.	*	1	0826	254	0.
1	0058	30	798.	*	1	0328	105	36.	*	1	0558	180	0.	*	1	0828	255	0.
1	0100	31	752.	*	1	0330	106	34.	*	1	0600	181	0.	*	1	0830	256	0.
1	0102	32	710.	*	1	0332	107	32.	*	1	0602	182	0.	*	1	0832	257	0.
1	0104	33	670.	*	1	0334	108	30.	*	1	0604	183	0.	*	1	0834	258	0.
1	0106	34	632.	*	1	0336	109	28.	*	1	0606	184	0.	*	1	0836	259	0.
1	0108	35	596.	*	1	0338	110	26.	*	1	0608	185	0.	*	1	0838	260	0.
1	0110	36	563.	*	1	0340	111	24.	*	1	0610	186	0.	*	1	0840	261	0.
1	0112	37	533.	*	1	0342	112	22.	*	1	0612	187	0.	*	1	0842	262	0.
1	0114	38	505.	*	1	0344	113	20.	*	1	0614	188	0.	*	1	0844	263	0.
1	0116	39	482.	*	1	0346	114	18.	*	1	0616	189	0.	*	1	0846	264	0.
1	0118	40	460.	*	1	0348	115	16.	*	1	0618	190	0.	*	1	0848	265	0.
1	0120	41	438.	*	1	0350	116	15.	*	1	0620	191	0.	*	1	0850	266	0.
1	0122	42	418.	*	1	0352	117	13.	*	1	0622	192	0.	*	1	0852	267	0.
1	0124	43	398.	*	1	0354	118	12.	*	1	0624	193	0.	*	1	0854	268	0.
1	0126	44	380.	*	1	0356	119	10.	*	1	0626	194	0.	*	1	0856	269	0.
1	0128	45	363.	*	1	0358	120	9.	*	1	0628	195	0.	*	1	0858	270	0.
1	0130	46	347.	*	1	0400	121	8.	*	1	0630	196	0.	*	1	0900	271	0.
1	0132	47	331.	*	1	0402	122	7.	*	1	0632	197	0.	*	1	0902	272	0.
1	0134	48	317.	*	1	0404	123	6.	*	1	0634	198	0.	*	1	0904	273	0.
1	0136	49	304.	*	1	0406	124	6.	*	1	0636	199	0.	*	1	0906	274	0.
1	0138	50	292.	*	1	0408	125	5.	*	1	0638	200	0.	*	1	0908	275	0.
1	0140	51	282.	*	1	0410	126	4.	*	1	0640	201	0.	*	1	0910	276	0.
1	0142	52	272.	*	1	0412	127	4.	*	1	0642	202	0.	*	1	0912	277	0.
1	0144	53	262.	*	1	0414	128	3.	*	1	0644	203	0.	*	1	0914	278	0.
1	0146	54	253.	*	1	0416	129	3.	*	1	0646	204	0.	*	1	0916	279	0.
1	0148	55	244.	*	1	0418	130	2.	*	1	0648	205	0.	*	1	0918	280	0.
1	0150	56	236.	*	1	0420	131	2.	*	1	0650	206	0.	*	1	0920	281	0.
1	0152	57	228.	*	1	0422	132	2.	*	1	0652	207	0.	*	1	0922	282	0.
1	0154	58	220.	*	1	0424	133	1.	*	1	0654	208	0.	*	1	0924	283	0.
1	0156	59	212.	*	1	0426	134	1.	*	1	0656	209	0.	*	1	0926	284	0.
1	0158	60	205.	*	1	0428	135	1.	*	1	0658	210	0.	*	1	0928	285	0.
1	0200	61	199.	*	1	0430	136	1.	*	1	0700	211	0.	*	1	0930	286	0.
1	0202	62	192.	*	1	0432	137	1.	*	1	0702	212	0.	*	1	0932	287	0.
1	0204	63	186.	*	1	0434	138	1.	*	1	0704	213	0.	*	1	0934	288	0.
1	0206	64	180.	*	1	0436	139	1.	*	1	0706	214	0.	*	1	0936	289	0.
1	0208	65	174.	*	1	0438	140	0.	*	1	0708	215	0.	*	1	0938	290	0.
1	0210	66	169.	*	1	0440	141	0.	*	1	0710	216	0.	*	1	0940	291	0.
1	0212	67	163.	*	1	0442	142	0.	*	1	0712	217	0.	*	1	0942	292	0.
1	0214	68	158.	*	1	0444	143	0.	*	1	0714	218	0.	*	1	0944	293	0.
1	0216	69	154.	*	1	0446	144	0.	*	1	0716	219	0.	*	1	0946	294	0.
1	0218	70	149.	*	1	0448	145	0.	*	1	0718	220	0.	*	1	0948	295	0.
1	0220	71	145.	*	1	0450	146	0.	*	1	0720	221	0.	*	1	0950	296	0.
1	0222	72	141.	*	1	0452	147	0.	*	1	0722	222	0.	*	1	0952	297	0.
1	0224	73	138.	*	1	0454	148	0.	*	1	0724	223	0.	*	1	0954	298	0.
1	0226	74	134.	*	1	0456	149	0.	*	1	0726	224	0.	*	1	0956	299	0.
1	0228	75	131.	*	1	0458	150	0.	*	1	0728	225	0.	*	1	0958	300	0.
				*					*					*				

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	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	9.97-HR
+	(CFS)	(HR)					
			(CFS)				
+	1601.	.53		230.	139.	139.	139.
			(INCHES)	2.008	2.008	2.008	2.008

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          (AC-FT)      114.         114.         114.          114.

          CUMULATIVE AREA =     1.07 SQ MI
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            **************
            *            *
133 KK      *    FR-922  *
            *            *
            **************
                           HEADWATERS OF TRIBUTARY TO
                           PONTATOC CANYON WASH
                           BASIN FR-922

               SUBBASIN RUNOFF DATA

137 BA           SUBBASIN CHARACTERISTICS
                      TAREA          .34  SUBBASIN AREA

                 PRECIPITATION DATA

138 PB                STORM        3.22  BASIN TOTAL PRECIPITATION

 20 PI             INCREMENTAL PRECIPITATION PATTERN
                        .04       .04       .06       .08       .08       .07       .07       .05       .03       .03
                        .02       .02       .02       .02       .02       .02       .02       .01       .01       .01
                        .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                        .01       .01       .01       .01       .01       .01       .01       .00       .00       .00
                        .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                        .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                        .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                        .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                        .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

139 LS           SCS LOSS RATE
                      STRTL          .33  INITIAL ABSTRACTION
                     CRVNBR        86.00  CURVE NUMBER
                      RTIMP        10.00  PERCENT IMPERVIOUS AREA

140 UD           SCS DIMENSIONLESS UNITGRAPH
                       TLAG          .18  LAG

                                                           ***

                                                     UNIT HYDROGRAPH
                                                29 END-OF-PERIOD ORDINATES
                65.      196.      401.      650.      797.      833.      786.      685.      550.      395.
               298.      226.      175.      132.      101.       77.       58.       44.       33.       25.
                19.       15.       11.        9.        7.        5.        4.        2.        1.
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HYDROGRAPH AT STATION FR-922

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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	*	1		0500	151	.00	.00	.00	0.
1		0002	2	.13	.12	.01	1.	*	1		0502	152	.00	.00	.00	0.
1		0004	3	.13	.12	.01	3.	*	1		0504	153	.00	.00	.00	0.
1		0006	4	.20	.17	.03	10.	*	1		0506	154	.00	.00	.00	0.
1		0008	5	.26	.18	.09	25.	*	1		0508	155	.00	.00	.00	0.
1		0010	6	.26	.14	.13	56.	*	1		0510	156	.00	.00	.00	0.
1		0012	7	.21	.09	.12	108.	*	1		0512	157	.00	.00	.00	0.
1		0014	8	.21	.07	.14	185.	*	1		0514	158	.00	.00	.00	0.
1		0016	9	.16	.05	.11	279.	*	1		0516	159	.00	.00	.00	0.
1		0018	10	.11	.03	.08	375.	*	1		0518	160	.00	.00	.00	0.
1		0020	11	.11	.03	.08	460.	*	1		0520	161	.00	.00	.00	0.
1		0022	12	.08	.02	.06	521.	*	1		0522	162	.00	.00	.00	0.
1		0024	13	.08	.02	.06	553.	*	1		0524	163	.00	.00	.00	0.
1		0026	14	.07	.02	.06	559.	*	1		0526	164	.00	.00	.00	0.
1		0028	15	.06	.01	.05	545.	*	1		0528	165	.00	.00	.00	0.
1		0030	16	.06	.01	.05	520.	*	1		0530	166	.00	.00	.00	0.
1		0032	17	.05	.01	.04	489.	*	1		0532	167	.00	.00	.00	0.
1		0034	18	.05	.01	.04	457.	*	1		0534	168	.00	.00	.00	0.

1	0036	19	.05	.01	.04	427.	*	1	0536	169	.00	.00	.00	0.
1	0038	20	.04	.01	.04	399.	*	1	0538	170	.00	.00	.00	0.
1	0040	21	.04	.01	.04	372.	*	1	0540	171	.00	.00	.00	0.
1	0042	22	.04	.01	.03	347.	*	1	0542	172	.00	.00	.00	0.
1	0044	23	.04	.01	.03	324.	*	1	0544	173	.00	.00	.00	0.
1	0046	24	.03	.01	.03	302.	*	1	0546	174	.00	.00	.00	0.
1	0048	25	.03	.01	.03	282.	*	1	0548	175	.00	.00	.00	0.
1	0050	26	.03	.01	.03	264.	*	1	0550	176	.00	.00	.00	0.
1	0052	27	.03	.00	.02	247.	*	1	0552	177	.00	.00	.00	0.
1	0054	28	.03	.00	.02	232.	*	1	0554	178	.00	.00	.00	0.
1	0056	29	.03	.00	.02	218.	*	1	0556	179	.00	.00	.00	0.
1	0058	30	.02	.00	.02	205.	*	1	0558	180	.00	.00	.00	0.
1	0100	31	.02	.00	.02	193.	*	1	0600	181	.00	.00	.00	0.
1	0102	32	.02	.00	.02	182.	*	1	0602	182	.00	.00	.00	0.
1	0104	33	.02	.00	.02	172.	*	1	0604	183	.00	.00	.00	0.
1	0106	34	.02	.00	.02	162.	*	1	0606	184	.00	.00	.00	0.
1	0108	35	.02	.00	.02	153.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.00	.02	145.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.02	.00	.01	138.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.02	.00	.01	131.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.02	.00	.01	125.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.02	.00	.01	119.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.02	.00	.01	113.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	108.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	104.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	99.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	95.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	91.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	87.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	84.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	81.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	78.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	75.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	72.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	69.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	67.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	65.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	62.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.01	60.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.01	58.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.01	56.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.01	55.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.01	53.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.01	51.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.01	50.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.01	48.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.01	47.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.01	45.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.01	44.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.01	43.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.01	42.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.01	.00	.01	41.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.01	.00	.01	39.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.01	.00	.00	38.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.01	.00	.00	37.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.01	.00	.00	36.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.01	.00	.00	35.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.01	.00	.00	35.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.00	.00	.00	34.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	33.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	32.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	31.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	31.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	30.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	29.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	28.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	28.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	27.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	27.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	26.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	25.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	25.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	24.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	24.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	22.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	21.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	18.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	15.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	12.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	10.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	7.	*	1	0816	249	.00	.00	.00	0.

1	0318	100	.00	.00	.00	6.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	4.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	3.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	2.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	2.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	1.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	1.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	1.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	1.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	0.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	0.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	0.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.
							*							

TOTAL RAINFALL = 3.22, TOTAL LOSS = 1.23, TOTAL EXCESS = 1.99

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 559.	.43		73.	44.	44.	44.
		(INCHES)	1.989	1.989	1.989	1.989
		(AC-FT)	36.	36.	36.	36.

CUMULATIVE AREA = .34 SQ MI

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              **************
              *            *
141 KK        *   922921   *
              *            *
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MODIFIED PULS CHANNEL ROUTING
FROM NODE FR-922 TO FR-921

HYDROGRAPH ROUTING DATA

144 RS STORAGE ROUTING

NSTPS	3	NUMBER OF SUBREACHES
ITYP	FLOW	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

145 RC NORMAL DEPTH CHANNEL

ANL	.115	LEFT OVERBANK N-VALUE
ANCH	.115	MAIN CHANNEL N-VALUE
ANR	.115	RIGHT OVERBANK N-VALUE
RLNTH	5100.	REACH LENGTH
SEL	.1350	ENERGY SLOPE
ELMAX	.0	MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

		--- LEFT OVERBANK ---		+ ------ MAIN CHANNEL		------- +	--- RIGHT OVERBANK ---		
147 RY	ELEVATION	15.00	10.00	5.00	.00	.00	5.00	10.00	15.00
146 RX	DISTANCE	.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00

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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.07	2.43	4.09	6.03	8.27	10.80	13.62	16.73	20.14
OUTFLOW	.00	33.51	112.78	236.21	406.80	628.37	904.89	1290.52	1770.03	2324.33
ELEVATION	.00	.79	1.58	2.37	3.16	3.95	4.74	5.53	6.32	7.11
STORAGE	23.84	27.83	32.11	36.68	41.55	46.70	52.15	57.89	63.92	70.25
OUTFLOW	2957.42	3672.92	4474.33	5365.00	6348.25	7427.29	8605.31	9885.43	11270.75	12764.31
ELEVATION	7.89	8.68	9.47	10.26	11.05	11.84	12.63	13.42	14.21	15.00

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HYDROGRAPH AT STATION 922921

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DA MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	0000	1	0.	.0	.0	*	1	0320	101	23.	.2	.5	*	1	0640	201	0.	.0	.0
1	0002	2	0.	.0	.0	*	1	0322	102	22.	.2	.5	*	1	0642	202	0.	.0	.0
1	0004	3	0.	.0	.0	*	1	0324	103	21.	.2	.5	*	1	0644	203	0.	.0	.0
1	0006	4	0.	.0	.0	*	1	0326	104	19.	.2	.4	*	1	0646	204	0.	.0	.0
1	0008	5	0.	.0	.0	*	1	0328	105	18.	.2	.4	*	1	0648	205	0.	.0	.0
1	0010	6	1.	.0	.0	*	1	0330	106	16.	.2	.4	*	1	0650	206	0.	.0	.0
1	0012	7	2.	.0	.0	*	1	0332	107	15.	.2	.3	*	1	0652	207	0.	.0	.0
1	0014	8	4.	.0	.1	*	1	0334	108	13.	.1	.3	*	1	0654	208	0.	.0	.0
1	0016	9	10.	.1	.2	*	1	0336	109	12.	.1	.3	*	1	0656	209	0.	.0	.0
1	0018	10	23.	.2	.5	*	1	0338	110	10.	.1	.2	*	1	0658	210	0.	.0	.0
1	0020	11	60.	.5	1.0	*	1	0340	111	9.	.1	.2	*	1	0700	211	0.	.0	.0
1	0022	12	126.	.9	1.7	*	1	0342	112	8.	.1	.2	*	1	0702	212	0.	.0	.0
1	0024	13	217.	1.3	2.2	*	1	0344	113	7.	.1	.2	*	1	0704	213	0.	.0	.0
1	0026	14	315.	1.7	2.7	*	1	0346	114	6.	.1	.1	*	1	0706	214	0.	.0	.0
1	0028	15	398.	2.0	3.1	*	1	0348	115	5.	.1	.1	*	1	0708	215	0.	.0	.0
1	0030	16	461.	2.2	3.4	*	1	0350	116	5.	.0	.1	*	1	0710	216	0.	.0	.0
1	0032	17	497.	2.3	3.5	*	1	0352	117	4.	.0	.1	*	1	0712	217	0.	.0	.0
1	0034	18	510.	2.4	3.5	*	1	0354	118	3.	.0	.1	*	1	0714	218	0.	.0	.0
1	0036	19	506.	2.3	3.5	*	1	0356	119	3.	.0	.1	*	1	0716	219	0.	.0	.0
1	0038	20	491.	2.3	3.5	*	1	0358	120	2.	.0	.1	*	1	0718	220	0.	.0	.0
1	0040	21	469.	2.2	3.4	*	1	0400	121	2.	.0	.0	*	1	0720	221	0.	.0	.0
1	0042	22	444.	2.1	3.3	*	1	0402	122	2.	.0	.0	*	1	0722	222	0.	.0	.0
1	0044	23	419.	2.1	3.2	*	1	0404	123	1.	.0	.0	*	1	0724	223	0.	.0	.0
1	0046	24	396.	2.0	3.1	*	1	0406	124	1.	.0	.0	*	1	0726	224	0.	.0	.0
1	0048	25	374.	1.9	3.0	*	1	0408	125	1.	.0	.0	*	1	0728	225	0.	.0	.0
1	0050	26	351.	1.8	2.9	*	1	0410	126	1.	.0	.0	*	1	0730	226	0.	.0	.0
1	0052	27	329.	1.7	2.8	*	1	0412	127	1.	.0	.0	*	1	0732	227	0.	.0	.0
1	0054	28	309.	1.6	2.7	*	1	0414	128	1.	.0	.0	*	1	0734	228	0.	.0	.0
1	0056	29	289.	1.6	2.6	*	1	0416	129	0.	.0	.0	*	1	0736	229	0.	.0	.0
1	0058	30	271.	1.5	2.5	*	1	0418	130	0.	.0	.0	*	1	0738	230	0.	.0	.0
1	0100	31	254.	1.4	2.5	*	1	0420	131	0.	.0	.0	*	1	0740	231	0.	.0	.0
1	0102	32	240.	1.4	2.4	*	1	0422	132	0.	.0	.0	*	1	0742	232	0.	.0	.0
1	0104	33	227.	1.3	2.3	*	1	0424	133	0.	.0	.0	*	1	0744	233	0.	.0	.0
1	0106	34	216.	1.3	2.2	*	1	0426	134	0.	.0	.0	*	1	0746	234	0.	.0	.0
1	0108	35	205.	1.2	2.2	*	1	0428	135	0.	.0	.0	*	1	0748	235	0.	.0	.0
1	0110	36	194.	1.2	2.1	*	1	0430	136	0.	.0	.0	*	1	0750	236	0.	.0	.0
1	0112	37	183.	1.1	2.0	*	1	0432	137	0.	.0	.0	*	1	0752	237	0.	.0	.0
1	0114	38	173.	1.1	2.0	*	1	0434	138	0.	.0	.0	*	1	0754	238	0.	.0	.0
1	0116	39	164.	1.0	1.9	*	1	0436	139	0.	.0	.0	*	1	0756	239	0.	.0	.0
1	0118	40	155.	1.0	1.8	*	1	0438	140	0.	.0	.0	*	1	0758	240	0.	.0	.0

1	0120	41	147.	1.0	1.8	*	1	0440	141	0.	.0	.0	*	1	0800	241	0.	.0	.0
1	0122	42	139.	.9	1.7	*	1	0442	142	0.	.0	.0	*	1	0802	242	0.	.0	.0
1	0124	43	132.	.9	1.7	*	1	0444	143	0.	.0	.0	*	1	0804	243	0.	.0	.0
1	0126	44	126.	.9	1.7	*	1	0446	144	0.	.0	.0	*	1	0806	244	0.	.0	.0
1	0128	45	120.	.8	1.6	*	1	0448	145	0.	.0	.0	*	1	0808	245	0.	.0	.0
1	0130	46	115.	.8	1.6	*	1	0450	146	0.	.0	.0	*	1	0810	246	0.	.0	.0
1	0132	47	111.	.8	1.6	*	1	0452	147	0.	.0	.0	*	1	0812	247	0.	.0	.0
1	0134	48	107.	.8	1.5	*	1	0454	148	0.	.0	.0	*	1	0814	248	0.	.0	.0
1	0136	49	104.	.8	1.5	*	1	0456	149	0.	.0	.0	*	1	0816	249	0.	.0	.0
1	0138	50	100.	.7	1.5	*	1	0458	150	0.	.0	.0	*	1	0818	250	0.	.0	.0
1	0140	51	96.	.7	1.4	*	1	0500	151	0.	.0	.0	*	1	0820	251	0.	.0	.0
1	0142	52	93.	.7	1.4	*	1	0502	152	0.	.0	.0	*	1	0822	252	0.	.0	.0
1	0144	53	89.	.7	1.3	*	1	0504	153	0.	.0	.0	*	1	0824	253	0.	.0	.0
1	0146	54	86.	.7	1.3	*	1	0506	154	0.	.0	.0	*	1	0826	254	0.	.0	.0
1	0148	55	82.	.6	1.3	*	1	0508	155	0.	.0	.0	*	1	0828	255	0.	.0	.0
1	0150	56	79.	.6	1.2	*	1	0510	156	0.	.0	.0	*	1	0830	256	0.	.0	.0
1	0152	57	76.	.6	1.2	*	1	0512	157	0.	.0	.0	*	1	0832	257	0.	.0	.0
1	0154	58	74.	.6	1.2	*	1	0514	158	0.	.0	.0	*	1	0834	258	0.	.0	.0
1	0156	59	71.	.6	1.2	*	1	0516	159	0.	.0	.0	*	1	0836	259	0.	.0	.0
1	0158	60	68.	.6	1.1	*	1	0518	160	0.	.0	.0	*	1	0838	260	0.	.0	.0
1	0200	61	66.	.5	1.1	*	1	0520	161	0.	.0	.0	*	1	0840	261	0.	.0	.0
1	0202	62	64.	.5	1.1	*	1	0522	162	0.	.0	.0	*	1	0842	262	0.	.0	.0
1	0204	63	62.	.5	1.1	*	1	0524	163	0.	.0	.0	*	1	0844	263	0.	.0	.0
1	0206	64	59.	.5	1.0	*	1	0526	164	0.	.0	.0	*	1	0846	264	0.	.0	.0
1	0208	65	58.	.5	1.0	*	1	0528	165	0.	.0	.0	*	1	0848	265	0.	.0	.0
1	0210	66	56.	.5	1.0	*	1	0530	166	0.	.0	.0	*	1	0850	266	0.	.0	.0
1	0212	67	54.	.5	1.0	*	1	0532	167	0.	.0	.0	*	1	0852	267	0.	.0	.0
1	0214	68	52.	.5	1.0	*	1	0534	168	0.	.0	.0	*	1	0854	268	0.	.0	.0
1	0216	69	51.	.5	1.0	*	1	0536	169	0.	.0	.0	*	1	0856	269	0.	.0	.0
1	0218	70	49.	.4	.9	*	1	0538	170	0.	.0	.0	*	1	0858	270	0.	.0	.0
1	0220	71	48.	.4	.9	*	1	0540	171	0.	.0	.0	*	1	0900	271	0.	.0	.0
1	0222	72	46.	.4	.9	*	1	0542	172	0.	.0	.0	*	1	0902	272	0.	.0	.0
1	0224	73	45.	.4	.9	*	1	0544	173	0.	.0	.0	*	1	0904	273	0.	.0	.0
1	0226	74	44.	.4	.9	*	1	0546	174	0.	.0	.0	*	1	0906	274	0.	.0	.0
1	0228	75	42.	.4	.9	*	1	0548	175	0.	.0	.0	*	1	0908	275	0.	.0	.0
1	0230	76	41.	.4	.9	*	1	0550	176	0.	.0	.0	*	1	0910	276	0.	.0	.0
1	0232	77	40.	.4	.9	*	1	0552	177	0.	.0	.0	*	1	0912	277	0.	.0	.0
1	0234	78	39.	.4	.8	*	1	0554	178	0.	.0	.0	*	1	0914	278	0.	.0	.0
1	0236	79	38.	.4	.8	*	1	0556	179	0.	.0	.0	*	1	0916	279	0.	.0	.0
1	0238	80	37.	.4	.8	*	1	0558	180	0.	.0	.0	*	1	0918	280	0.	.0	.0
1	0240	81	36.	.4	.8	*	1	0600	181	0.	.0	.0	*	1	0920	281	0.	.0	.0
1	0242	82	35.	.4	.8	*	1	0602	182	0.	.0	.0	*	1	0922	282	0.	.0	.0
1	0244	83	34.	.4	.8	*	1	0604	183	0.	.0	.0	*	1	0924	283	0.	.0	.0
1	0246	84	34.	.4	.8	*	1	0606	184	0.	.0	.0	*	1	0926	284	0.	.0	.0
1	0248	85	33.	.4	.8	*	1	0608	185	0.	.0	.0	*	1	0928	285	0.	.0	.0
1	0250	86	33.	.4	.8	*	1	0610	186	0.	.0	.0	*	1	0930	286	0.	.0	.0
1	0252	87	33.	.3	.8	*	1	0612	187	0.	.0	.0	*	1	0932	287	0.	.0	.0
1	0254	88	32.	.3	.8	*	1	0614	188	0.	.0	.0	*	1	0934	288	0.	.0	.0
1	0256	89	32.	.3	.7	*	1	0616	189	0.	.0	.0	*	1	0936	289	0.	.0	.0
1	0258	90	31.	.3	.7	*	1	0618	190	0.	.0	.0	*	1	0938	290	0.	.0	.0
1	0300	91	31.	.3	.7	*	1	0620	191	0.	.0	.0	*	1	0940	291	0.	.0	.0
1	0302	92	30.	.3	.7	*	1	0622	192	0.	.0	.0	*	1	0942	292	0.	.0	.0
1	0304	93	30.	.3	.7	*	1	0624	193	0.	.0	.0	*	1	0944	293	0.	.0	.0
1	0306	94	29.	.3	.7	*	1	0626	194	0.	.0	.0	*	1	0946	294	0.	.0	.0
1	0308	95	29.	.3	.7	*	1	0628	195	0.	.0	.0	*	1	0948	295	0.	.0	.0
1	0310	96	28.	.3	.7	*	1	0630	196	0.	.0	.0	*	1	0950	296	0.	.0	.0
1	0312	97	27.	.3	.6	*	1	0632	197	0.	.0	.0	*	1	0952	297	0.	.0	.0
1	0314	98	26.	.3	.6	*	1	0634	198	0.	.0	.0	*	1	0954	298	0.	.0	.0
1	0316	99	26.	.3	.6	*	1	0636	199	0.	.0	.0	*	1	0956	299	0.	.0	.0
1	0318	100	24.	.3	.6	*	1	0638	200	0.	.0	.0	*	1	0958	300	0.	.0	.0
						*							*						

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	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	9.97-HR
+	(CFS)	(HR)					
			(CFS)				
+	510.	.57		73.	44.	44.	44.
			(INCHES)	1.989	1.989	1.989	1.989
			(AC-FT)	36.	36.	36.	36.

	PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	9.97-HR
+	(AC-FT)	(HR)				
	2.	.57	0.	0.	0.	0.

	PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	9.97-HR
+	(FEET)	(HR)				
	3.52	.57	.82	.49	.49	.49

CUMULATIVE AREA = .34 SQ MI

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          *            *
148 KK    *   FR-921   *
          *            *
          **************
                 LOCAL RUNOFF TO FR-921
                 BASIN FR-921

            SUBBASIN RUNOFF DATA

151 BA        SUBBASIN CHARACTERISTICS
                    TAREA          .21  SUBBASIN AREA

              PRECIPITATION DATA

152 PB              STORM         3.22  BASIN TOTAL PRECIPITATION

 20 PI          INCREMENTAL PRECIPITATION PATTERN
                    .04       .04       .06       .08       .08       .07       .07       .05       .03       .03
                    .02       .02       .02       .02       .02       .02       .02       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .01       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

153 LS        SCS LOSS RATE
                    STRTL          .33  INITIAL ABSTRACTION
                   CRVNBR        86.00  CURVE NUMBER
                    RTIMP         2.00  PERCENT IMPERVIOUS AREA

154 UD        SCS DIMENSIONLESS UNITGRAPH
                     TLAG          .16  LAG

                                                   ***

                                              UNIT HYDROGRAPH
                                         26 END-OF-PERIOD ORDINATES
          53.       163.       344.       508.       574.       561.       487.       386.       267.       195.
         146.       108.        79.        58.        43.        31.        23.        17.        12.         9.
           7.         5.         4.         3.         2.         1.
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HYDROGRAPH AT STATION FR-921

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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	*	1		0500	151	.00	.00	.00	0.
1		0002	2	.13	.13	.00	0.	*	1		0502	152	.00	.00	.00	0.
1		0004	3	.13	.13	.00	1.	*	1		0504	153	.00	.00	.00	0.
1		0006	4	.20	.18	.01	2.	*	1		0506	154	.00	.00	.00	0.
1		0008	5	.26	.19	.07	8.	*	1		0508	155	.00	.00	.00	0.
1		0010	6	.26	.15	.12	25.	*	1		0510	156	.00	.00	.00	0.
1		0012	7	.21	.10	.12	60.	*	1		0512	157	.00	.00	.00	0.
1		0014	8	.21	.08	.13	112.	*	1		0514	158	.00	.00	.00	0.
1		0016	9	.16	.05	.11	176.	*	1		0516	159	.00	.00	.00	0.
1		0018	10	.11	.03	.08	240.	*	1		0518	160	.00	.00	.00	0.
1		0020	11	.11	.03	.08	292.	*	1		0520	161	.00	.00	.00	0.
1		0022	12	.08	.02	.06	325.	*	1		0522	162	.00	.00	.00	0.
1		0024	13	.08	.02	.06	337.	*	1		0524	163	.00	.00	.00	0.
1		0026	14	.07	.02	.05	332.	*	1		0526	164	.00	.00	.00	0.
1		0028	15	.06	.01	.05	318.	*	1		0528	165	.00	.00	.00	0.
1		0030	16	.06	.01	.05	299.	*	1		0530	166	.00	.00	.00	0.
1		0032	17	.05	.01	.04	280.	*	1		0532	167	.00	.00	.00	0.
1		0034	18	.05	.01	.04	261.	*	1		0534	168	.00	.00	.00	0.
1		0036	19	.05	.01	.04	243.	*	1		0536	169	.00	.00	.00	0.
1		0038	20	.04	.01	.03	227.	*	1		0538	170	.00	.00	.00	0.
1		0040	21	.04	.01	.03	211.	*	1		0540	171	.00	.00	.00	0.

1	0042	22	.04	.01	.03	197.	*	1	0542	172	.00	.00	.00	0.
1	0044	23	.04	.01	.03	184.	*	1	0544	173	.00	.00	.00	0.
1	0046	24	.03	.01	.03	172.	*	1	0546	174	.00	.00	.00	0.
1	0048	25	.03	.01	.03	160.	*	1	0548	175	.00	.00	.00	0.
1	0050	26	.03	.01	.03	150.	*	1	0550	176	.00	.00	.00	0.
1	0052	27	.03	.00	.02	141.	*	1	0552	177	.00	.00	.00	0.
1	0054	28	.03	.00	.02	132.	*	1	0554	178	.00	.00	.00	0.
1	0056	29	.03	.00	.02	125.	*	1	0556	179	.00	.00	.00	0.
1	0058	30	.02	.00	.02	117.	*	1	0558	180	.00	.00	.00	0.
1	0100	31	.02	.00	.02	111.	*	1	0600	181	.00	.00	.00	0.
1	0102	32	.02	.00	.02	104.	*	1	0602	182	.00	.00	.00	0.
1	0104	33	.02	.00	.02	99.	*	1	0604	183	.00	.00	.00	0.
1	0106	34	.02	.00	.02	93.	*	1	0606	184	.00	.00	.00	0.
1	0108	35	.02	.00	.02	88.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.00	.02	84.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.02	.00	.01	80.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.02	.00	.01	76.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.02	.00	.01	73.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.02	.00	.01	69.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.02	.00	.01	66.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	63.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	61.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	58.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	56.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	53.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	51.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	49.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	47.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	46.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	44.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	42.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	41.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	40.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	38.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	37.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.01	36.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.01	35.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.01	33.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.01	32.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.01	31.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.01	30.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.01	30.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.01	29.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.01	28.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.01	27.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.01	26.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.01	26.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.01	25.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.01	.00	.01	24.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.01	.00	.01	24.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.01	.00	.00	23.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.01	.00	.00	22.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.01	.00	.00	22.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.01	.00	.00	21.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.01	.00	.00	21.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.00	.00	.00	20.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	20.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	19.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	19.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	18.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	18.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	17.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	17.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	17.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	16.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	16.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	16.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	15.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	15.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	15.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	14.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	13.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	12.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	10.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	8.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	6.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	5.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	3.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	2.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	2.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	1.	*	1	0822	252	.00	.00	.00	0.

1	0324	103	.00	.00	.00	1.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	1.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	1.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	0.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	0.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	0.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	0.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	0.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	0.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.
							*							

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TOTAL RAINFALL = 3.22, TOTAL LOSS = 1.34, TOTAL EXCESS = 1.88

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 337.	.40		43.	26.	26.	26.
		(INCHES)	1.880	1.880	1.880	1.880
		(AC-FT)	21.	21.	21.	21.

CUMULATIVE AREA = .21 SQ MI

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           *            *
155 KK     *   CO-921   *
           *            *
           **************
                         COMBINE HYDROGRAPHS
                         AT NODE FR-921

158 HC          HYDROGRAPH COMBINATION
                     ICOMP            2  NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION CO-921
SUM OF 2 HYDROGRAPHS

DA MON	HRMN	ORD	FLOW	DA MON	HRMN	ORD	FLOW	DA MON	HRMN	ORD	FLOW	DA MON	HRMN	ORD	FLOW
1	0000	1	0.	1	0230	76	62.	1	0500	151	0.	1	0730	226	0.
1	0002	2	0.	1	0232	77	60.	1	0502	152	0.	1	0732	227	0.
1	0004	3	1.	1	0234	78	59.	1	0504	153	0.	1	0734	228	0.
1	0006	4	2.	1	0236	79	57.	1	0506	154	0.	1	0736	229	0.
1	0008	5	8.	1	0238	80	56.	1	0508	155	0.	1	0738	230	0.
1	0010	6	26.	1	0240	81	54.	1	0510	156	0.	1	0740	231	0.
1	0012	7	61.	1	0242	82	53.	1	0512	157	0.	1	0742	232	0.
1	0014	8	117.	1	0244	83	52.	1	0514	158	0.	1	0744	233	0.
1	0016	9	186.	1	0246	84	51.	1	0516	159	0.	1	0746	234	0.
1	0018	10	263.	1	0248	85	50.	1	0518	160	0.	1	0748	235	0.
1	0020	11	352.	1	0250	86	49.	1	0520	161	0.	1	0750	236	0.
1	0022	12	451.	1	0252	87	49.	1	0522	162	0.	1	0752	237	0.
1	0024	13	554.	1	0254	88	48.	1	0524	163	0.	1	0754	238	0.
1	0026	14	647.	1	0256	89	47.	1	0526	164	0.	1	0756	239	0.
1	0028	15	716.	1	0258	90	46.	1	0528	165	0.	1	0758	240	0.
1	0030	16	761.	1	0300	91	45.	1	0530	166	0.	1	0800	241	0.
1	0032	17	777.	1	0302	92	44.	1	0532	167	0.	1	0802	242	0.
1	0034	18	771.	1	0304	93	43.	1	0534	168	0.	1	0804	243	0.
1	0036	19	749.	1	0306	94	41.	1	0536	169	0.	1	0806	244	0.
1	0038	20	717.	1	0308	95	39.	1	0538	170	0.	1	0808	245	0.
1	0040	21	680.	1	0310	96	36.	1	0540	171	0.	1	0810	246	0.
1	0042	22	641.	1	0312	97	34.	1	0542	172	0.	1	0812	247	0.
1	0044	23	603.	1	0314	98	31.	1	0544	173	0.	1	0814	248	0.
1	0046	24	567.	1	0316	99	29.	1	0546	174	0.	1	0816	249	0.
1	0048	25	534.	1	0318	100	27.	1	0548	175	0.	1	0818	250	0.
1	0050	26	502.	1	0320	101	25.	1	0550	176	0.	1	0820	251	0.
1	0052	27	470.	1	0322	102	23.	1	0552	177	0.	1	0822	252	0.
1	0054	28	441.	1	0324	103	22.	1	0554	178	0.	1	0824	253	0.
1	0056	29	414.	1	0326	104	20.	1	0556	179	0.	1	0826	254	0.
1	0058	30	388.	1	0328	105	18.	1	0558	180	0.	1	0828	255	0.
1	0100	31	365.	1	0330	106	16.	1	0600	181	0.	1	0830	256	0.
1	0102	32	344.	1	0332	107	15.	1	0602	182	0.	1	0832	257	0.
1	0104	33	326.	1	0334	108	13.	1	0604	183	0.	1	0834	258	0.
1	0106	34	309.	1	0336	109	12.	1	0606	184	0.	1	0836	259	0.
1	0108	35	293.	1	0338	110	10.	1	0608	185	0.	1	0838	260	0.
1	0110	36	278.	1	0340	111	9.	1	0610	186	0.	1	0840	261	0.
1	0112	37	263.	1	0342	112	8.	1	0612	187	0.	1	0842	262	0.
1	0114	38	249.	1	0344	113	7.	1	0614	188	0.	1	0844	263	0.
1	0116	39	236.	1	0346	114	6.	1	0616	189	0.	1	0846	264	0.
1	0118	40	224.	1	0348	115	5.	1	0618	190	0.	1	0848	265	0.
1	0120	41	213.	1	0350	116	5.	1	0620	191	0.	1	0850	266	0.
1	0122	42	203.	1	0352	117	4.	1	0622	192	0.	1	0852	267	0.
1	0124	43	193.	1	0354	118	3.	1	0624	193	0.	1	0854	268	0.
1	0126	44	184.	1	0356	119	3.	1	0626	194	0.	1	0856	269	0.
1	0128	45	176.	1	0358	120	2.	1	0628	195	0.	1	0858	270	0.
1	0130	46	169.	1	0400	121	2.	1	0630	196	0.	1	0900	271	0.
1	0132	47	162.	1	0402	122	2.	1	0632	197	0.	1	0902	272	0.
1	0134	48	157.	1	0404	123	1.	1	0634	198	0.	1	0904	273	0.
1	0136	49	151.	1	0406	124	1.	1	0636	199	0.	1	0906	274	0.
1	0138	50	146.	1	0408	125	1.	1	0638	200	0.	1	0908	275	0.
1	0140	51	140.	1	0410	126	1.	1	0640	201	0.	1	0910	276	0.
1	0142	52	135.	1	0412	127	1.	1	0642	202	0.	1	0912	277	0.
1	0144	53	130.	1	0414	128	1.	1	0644	203	0.	1	0914	278	0.
1	0146	54	125.	1	0416	129	0.	1	0646	204	0.	1	0916	279	0.
1	0148	55	121.	1	0418	130	0.	1	0648	205	0.	1	0918	280	0.
1	0150	56	116.	1	0420	131	0.	1	0650	206	0.	1	0920	281	0.
1	0152	57	112.	1	0422	132	0.	1	0652	207	0.	1	0922	282	0.
1	0154	58	108.	1	0424	133	0.	1	0654	208	0.	1	0924	283	0.
1	0156	59	104.	1	0426	134	0.	1	0656	209	0.	1	0926	284	0.
1	0158	60	101.	1	0428	135	0.	1	0658	210	0.	1	0928	285	0.
1	0200	61	97.	1	0430	136	0.	1	0700	211	0.	1	0930	286	0.
1	0202	62	94.	1	0432	137	0.	1	0702	212	0.	1	0932	287	0.
1	0204	63	91.	1	0434	138	0.	1	0704	213	0.	1	0934	288	0.
1	0206	64	88.	1	0436	139	0.	1	0706	214	0.	1	0936	289	0.
1	0208	65	85.	1	0438	140	0.	1	0708	215	0.	1	0938	290	0.
1	0210	66	83.	1	0440	141	0.	1	0710	216	0.	1	0940	291	0.
1	0212	67	80.	1	0442	142	0.	1	0712	217	0.	1	0942	292	0.
1	0214	68	78.	1	0444	143	0.	1	0714	218	0.	1	0944	293	0.
1	0216	69	75.	1	0446	144	0.	1	0716	219	0.	1	0946	294	0.
1	0218	70	73.	1	0448	145	0.	1	0718	220	0.	1	0948	295	0.
1	0220	71	71.	1	0450	146	0.	1	0720	221	0.	1	0950	296	0.

1	0222	72	69.	*	1	0452	147	0.	*	1	0722	222	0.	*	1	0952	297	0.
1	0224	73	67.	*	1	0454	148	0.	*	1	0724	223	0.	*	1	0954	298	0.
1	0226	74	65.	*	1	0456	149	0.	*	1	0726	224	0.	*	1	0956	299	0.
1	0228	75	63.	*	1	0458	150	0.	*	1	0728	225	0.	*	1	0958	300	0.

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 777.	.53		116.	70.	70.	70.
		(INCHES)	1.947	1.947	1.947	1.947
		(AC-FT)	57.	57.	57.	57.

CUMULATIVE AREA = .55 SQ MI

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              *            *
 159 KK       *   CO-92A   *
              *            *
              **************
                         COMBINE HYDROGRAPHS
                         AT NODE FR-92
                         PONTATOC CANYON WASH AND TRIBUTARY

 163 HC          HYDROGRAPH COMBINATION
                       ICOMP            2  NUMBER OF HYDROGRAPHS TO COMBINE
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HYDROGRAPH AT STATION CO-92A
SUM OF 2 HYDROGRAPHS

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0230	76	190.	*	1		0500	151	0.	*	1		0730	226	0.
1		0002	2	0.	*	1		0232	77	185.	*	1		0502	152	0.	*	1		0732	227	0.
1		0004	3	2.	*	1		0234	78	180.	*	1		0504	153	0.	*	1		0734	228	0.
1		0006	4	7.	*	1		0236	79	176.	*	1		0506	154	0.	*	1		0736	229	0.
1		0008	5	21.	*	1		0238	80	171.	*	1		0508	155	0.	*	1		0738	230	0.
1		0010	6	59.	*	1		0240	81	167.	*	1		0510	156	0.	*	1		0740	231	0.
1		0012	7	133.	*	1		0242	82	163.	*	1		0512	157	0.	*	1		0742	232	0.
1		0014	8	250.	*	1		0244	83	159.	*	1		0514	158	0.	*	1		0744	233	0.
1		0016	9	404.	*	1		0246	84	155.	*	1		0516	159	0.	*	1		0746	234	0.
1		0018	10	610.	*	1		0248	85	152.	*	1		0518	160	0.	*	1		0748	235	0.
1		0020	11	876.	*	1		0250	86	149.	*	1		0520	161	0.	*	1		0750	236	0.
1		0022	12	1197.	*	1		0252	87	146.	*	1		0522	162	0.	*	1		0752	237	0.
1		0024	13	1546.	*	1		0254	88	143.	*	1		0524	163	0.	*	1		0754	238	0.
1		0026	14	1877.	*	1		0256	89	140.	*	1		0526	164	0.	*	1		0756	239	0.
1		0028	15	2153.	*	1		0258	90	137.	*	1		0528	165	0.	*	1		0758	240	0.
1		0030	16	2318.	*	1		0300	91	134.	*	1		0530	166	0.	*	1		0800	241	0.
1		0032	17	2377.	*	1		0302	92	131.	*	1		0532	167	0.	*	1		0802	242	0.
1		0034	18	2360.	*	1		0304	93	127.	*	1		0534	168	0.	*	1		0804	243	0.
1		0036	19	2290.	*	1		0306	94	122.	*	1		0536	169	0.	*	1		0806	244	0.
1		0038	20	2189.	*	1		0308	95	116.	*	1		0538	170	0.	*	1		0808	245	0.
1		0040	21	2073.	*	1		0310	96	109.	*	1		0540	171	0.	*	1		0810	246	0.
1		0042	22	1951.	*	1		0312	97	102.	*	1		0542	172	0.	*	1		0812	247	0.
1		0044	23	1831.	*	1		0314	98	95.	*	1		0544	173	0.	*	1		0814	248	0.
1		0046	24	1718.	*	1		0316	99	88.	*	1		0546	174	0.	*	1		0816	249	0.
1		0048	25	1617.	*	1		0318	100	82.	*	1		0548	175	0.	*	1		0818	250	0.
1		0050	26	1525.	*	1		0320	101	76.	*	1		0550	176	0.	*	1		0820	251	0.
1		0052	27	1433.	*	1		0322	102	69.	*	1		0552	177	0.	*	1		0822	252	0.
1		0054	28	1345.	*	1		0324	103	64.	*	1		0554	178	0.	*	1		0824	253	0.
1		0056	29	1263.	*	1		0326	104	58.	*	1		0556	179	0.	*	1		0826	254	0.
1		0058	30	1186.	*	1		0328	105	54.	*	1		0558	180	0.	*	1		0828	255	0.
1		0100	31	1117.	*	1		0330	106	50.	*	1		0600	181	0.	*	1		0830	256	0.
1		0102	32	1054.	*	1		0332	107	47.	*	1		0602	182	0.	*	1		0832	257	0.
1		0104	33	996.	*	1		0334	108	43.	*	1		0604	183	0.	*	1		0834	258	0.
1		0106	34	941.	*	1		0336	109	40.	*	1		0606	184	0.	*	1		0836	259	0.
1		0108	35	889.	*	1		0338	110	36.	*	1		0608	185	0.	*	1		0838	260	0.

1	0110	36	841.	*	1	0340	111	33.	*	1	0610	186	0.	*	1	0840	261	0.
1	0112	37	796.	*	1	0342	112	30.	*	1	0612	187	0.	*	1	0842	262	0.
1	0114	38	755.	*	1	0344	113	27.	*	1	0614	188	0.	*	1	0844	263	0.
1	0116	39	718.	*	1	0346	114	24.	*	1	0616	189	0.	*	1	0846	264	0.
1	0118	40	684.	*	1	0348	115	22.	*	1	0618	190	0.	*	1	0848	265	0.
1	0120	41	651.	*	1	0350	116	19.	*	1	0620	191	0.	*	1	0850	266	0.
1	0122	42	621.	*	1	0352	117	17.	*	1	0622	192	0.	*	1	0852	267	0.
1	0124	43	591.	*	1	0354	118	15.	*	1	0624	193	0.	*	1	0854	268	0.
1	0126	44	564.	*	1	0356	119	13.	*	1	0626	194	0.	*	1	0856	269	0.
1	0128	45	539.	*	1	0358	120	12.	*	1	0628	195	0.	*	1	0858	270	0.
1	0130	46	515.	*	1	0400	121	10.	*	1	0630	196	0.	*	1	0900	271	0.
1	0132	47	494.	*	1	0402	122	9.	*	1	0632	197	0.	*	1	0902	272	0.
1	0134	48	474.	*	1	0404	123	8.	*	1	0634	198	0.	*	1	0904	273	0.
1	0136	49	455.	*	1	0406	124	7.	*	1	0636	199	0.	*	1	0906	274	0.
1	0138	50	437.	*	1	0408	125	6.	*	1	0638	200	0.	*	1	0908	275	0.
1	0140	51	422.	*	1	0410	126	5.	*	1	0640	201	0.	*	1	0910	276	0.
1	0142	52	407.	*	1	0412	127	4.	*	1	0642	202	0.	*	1	0912	277	0.
1	0144	53	392.	*	1	0414	128	4.	*	1	0644	203	0.	*	1	0914	278	0.
1	0146	54	378.	*	1	0416	129	3.	*	1	0646	204	0.	*	1	0916	279	0.
1	0148	55	365.	*	1	0418	130	3.	*	1	0648	205	0.	*	1	0918	280	0.
1	0150	56	352.	*	1	0420	131	2.	*	1	0650	206	0.	*	1	0920	281	0.
1	0152	57	340.	*	1	0422	132	2.	*	1	0652	207	0.	*	1	0922	282	0.
1	0154	58	328.	*	1	0424	133	2.	*	1	0654	208	0.	*	1	0924	283	0.
1	0156	59	317.	*	1	0426	134	1.	*	1	0656	209	0.	*	1	0926	284	0.
1	0158	60	306.	*	1	0428	135	1.	*	1	0658	210	0.	*	1	0928	285	0.
1	0200	61	296.	*	1	0430	136	1.	*	1	0700	211	0.	*	1	0930	286	0.
1	0202	62	286.	*	1	0432	137	1.	*	1	0702	212	0.	*	1	0932	287	0.
1	0204	63	277.	*	1	0434	138	1.	*	1	0704	213	0.	*	1	0934	288	0.
1	0206	64	268.	*	1	0436	139	1.	*	1	0706	214	0.	*	1	0936	289	0.
1	0208	65	259.	*	1	0438	140	1.	*	1	0708	215	0.	*	1	0938	290	0.
1	0210	66	251.	*	1	0440	141	0.	*	1	0710	216	0.	*	1	0940	291	0.
1	0212	67	244.	*	1	0442	142	0.	*	1	0712	217	0.	*	1	0942	292	0.
1	0214	68	236.	*	1	0444	143	0.	*	1	0714	218	0.	*	1	0944	293	0.
1	0216	69	229.	*	1	0446	144	0.	*	1	0716	219	0.	*	1	0946	294	0.
1	0218	70	222.	*	1	0448	145	0.	*	1	0718	220	0.	*	1	0948	295	0.
1	0220	71	216.	*	1	0450	146	0.	*	1	0720	221	0.	*	1	0950	296	0.
1	0222	72	210.	*	1	0452	147	0.	*	1	0722	222	0.	*	1	0952	297	0.
1	0224	73	205.	*	1	0454	148	0.	*	1	0724	223	0.	*	1	0954	298	0.
1	0226	74	200.	*	1	0456	149	0.	*	1	0726	224	0.	*	1	0956	299	0.
1	0228	75	195.	*	1	0458	150	0.	*	1	0728	225	0.	*	1	0958	300	0.
				*					*					*				

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

 PEAK FLOW      TIME                        MAXIMUM AVERAGE FLOW
                                       6-HR         24-HR        72-HR        9.97-HR
+   (CFS)       (HR)
                          (CFS)
+    2377.       .53                   346.          208.         208.          208.
                       (INCHES)       1.987         1.987        1.987         1.987
                        (AC-FT)        172.          172.         172.          172.

                      CUMULATIVE AREA =     1.62 SQ MI


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


             **************
             *            *
 164 KK      *    92TO91  *
             *            *
             **************
                         MODIFIED PULS CHANNEL ROUTING
                         FROM NODE FR-92 TO FR-91 (MAIN CHANNEL PONTATOC CANYON)

               HYDROGRAPH ROUTING DATA

 167 RS          STORAGE ROUTING
                      NSTPS            1  NUMBER OF SUBREACHES
                       ITYP         FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC        -1.00  INITIAL CONDITION
                          X          .00 WORKING R AND D COEFFICIENT

 168 RC          NORMAL DEPTH CHANNEL
                        ANL         .095  LEFT OVERBANK N-VALUE
                       ANCH         .095  MAIN CHANNEL N-VALUE
                        ANR         .095  RIGHT OVERBANK N-VALUE
                      RLNTH        1520.  REACH LENGTH
                        SEL        .0920  ENERGY SLOPE
```

ELMAX .0 MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

		--- LEFT OVERBANK ---		+ ------ MAIN CHANNEL	-------		+ --- RIGHT OVERBANK ---		
170 RY	ELEVATION	15.00	10.00	5.00	.00	.00	5.00	10.00	15.00
169 RX	DISTANCE	.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.32	.72	1.22	1.80	2.46	3.22	4.06	4.99	6.00
OUTFLOW	.00	33.48	112.70	236.05	406.52	627.94	904.27	1289.63	1768.81	2322.73
ELEVATION	.00	.79	1.58	2.37	3.16	3.95	4.74	5.53	6.32	7.11
STORAGE	7.10	8.29	9.57	10.93	12.38	13.92	15.54	17.25	19.05	20.94
OUTFLOW	2955.38	3670.40	4471.25	5361.32	6343.88	7422.18	8599.39	9878.63	11263.00	12755.53
ELEVATION	7.89	8.68	9.47	10.26	11.05	11.84	12.63	13.42	14.21	15.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 8599. TO 12756.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

****

HYDROGRAPH AT STATION 92TO91

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	.0	*	1		0320	101	87.	.6	1.3	*	1		0640	201	0.	.0	.0
1		0002	2	0.	.0	.0	*	1		0322	102	81.	.6	1.3	*	1		0642	202	0.	.0	.0
1		0004	3	0.	.0	.0	*	1		0324	103	75.	.5	1.2	*	1		0644	203	0.	.0	.0
1		0006	4	1.	.0	.0	*	1		0326	104	69.	.5	1.1	*	1		0646	204	0.	.0	.0
1		0008	5	5.	.0	.1	*	1		0328	105	64.	.5	1.1	*	1		0648	205	0.	.0	.0
1		0010	6	14.	.1	.3	*	1		0330	106	59.	.4	1.0	*	1		0650	206	0.	.0	.0
1		0012	7	35.	.3	.8	*	1		0332	107	54.	.4	1.0	*	1		0652	207	0.	.0	.0
1		0014	8	101.	.7	1.5	*	1		0334	108	50.	.4	1.0	*	1		0654	208	0.	.0	.0
1		0016	9	215.	1.1	2.2	*	1		0336	109	47.	.4	.9	*	1		0656	209	0.	.0	.0
1		0018	10	380.	1.7	3.0	*	1		0338	110	43.	.4	.9	*	1		0658	210	0.	.0	.0
1		0020	11	606.	2.4	3.9	*	1		0340	111	39.	.3	.8	*	1		0700	211	0.	.0	.0
1		0022	12	893.	3.2	4.7	*	1		0342	112	36.	.3	.8	*	1		0702	212	0.	.0	.0
1		0024	13	1262.	4.0	5.5	*	1		0344	113	33.	.3	.8	*	1		0704	213	0.	.0	.0
1		0026	14	1633.	4.7	6.1	*	1		0346	114	31.	.3	.7	*	1		0706	214	0.	.0	.0
1		0028	15	1956.	5.3	6.6	*	1		0348	115	29.	.3	.7	*	1		0708	215	0.	.0	.0
1		0030	16	2196.	5.8	6.9	*	1		0350	116	27.	.3	.6	*	1		0710	216	0.	.0	.0
1		0032	17	2326.	6.0	7.1	*	1		0352	117	25.	.2	.6	*	1		0712	217	0.	.0	.0
1		0034	18	2364.	6.1	7.2	*	1		0354	118	23.	.2	.5	*	1		0714	218	0.	.0	.0
1		0036	19	2329.	6.0	7.1	*	1		0356	119	20.	.2	.5	*	1		0716	219	0.	.0	.0
1		0038	20	2252.	5.9	7.0	*	1		0358	120	18.	.2	.4	*	1		0718	220	0.	.0	.0
1		0040	21	2148.	5.7	6.9	*	1		0400	121	17.	.2	.4	*	1		0720	221	0.	.0	.0
1		0042	22	2031.	5.5	6.7	*	1		0402	122	15.	.1	.3	*	1		0722	222	0.	.0	.0
1		0044	23	1911.	5.2	6.5	*	1		0404	123	13.	.1	.3	*	1		0724	223	0.	.0	.0
1		0046	24	1794.	5.0	6.4	*	1		0406	124	12.	.1	.3	*	1		0726	224	0.	.0	.0
1		0048	25	1688.	4.8	6.2	*	1		0408	125	10.	.1	.2	*	1		0728	225	0.	.0	.0
1		0050	26	1591.	4.6	6.0	*	1		0410	126	9.	.1	.2	*	1		0730	226	0.	.0	.0
1		0052	27	1498.	4.5	5.9	*	1		0412	127	8.	.1	.2	*	1		0732	227	0.	.0	.0
1		0054	28	1407.	4.3	5.7	*	1		0414	128	7.	.1	.2	*	1		0734	228	0.	.0	.0
1		0056	29	1321.	4.1	5.6	*	1		0416	129	6.	.1	.1	*	1		0736	229	0.	.0	.0
1		0058	30	1244.	4.0	5.4	*	1		0418	130	5.	.1	.1	*	1		0738	230	0.	.0	.0
1		0100	31	1172.	3.8	5.3	*	1		0420	131	5.	.0	.1	*	1		0740	231	0.	.0	.0
1		0102	32	1105.	3.7	5.1	*	1		0422	132	4.	.0	.1	*	1		0742	232	0.	.0	.0
1		0104	33	1043.	3.5	5.0	*	1		0424	133	3.	.0	.1	*	1		0744	233	0.	.0	.0
1		0106	34	986.	3.4	4.9	*	1		0426	134	3.	.0	.1	*	1		0746	234	0.	.0	.0
1		0108	35	931.	3.3	4.8	*	1		0428	135	3.	.0	.1	*	1		0748	235	0.	.0	.0
1		0110	36	883.	3.2	4.7	*	1		0430	136	2.	.0	.1	*	1		0750	236	0.	.0	.0
1		0112	37	840.	3.0	4.6	*	1		0432	137	2.	.0	.0	*	1		0752	237	0.	.0	.0
1		0114	38	796.	2.9	4.4	*	1		0434	138	2.	.0	.0	*	1		0754	238	0.	.0	.0
1		0116	39	756.	2.8	4.3	*	1		0436	139	1.	.0	.0	*	1		0756	239	0.	.0	.0
1		0118	40	719.	2.7	4.2	*	1		0438	140	1.	.0	.0	*	1		0758	240	0.	.0	.0
1		0120	41	685.	2.6	4.1	*	1		0440	141	1.	.0	.0	*	1		0800	241	0.	.0	.0
1		0122	42	652.	2.5	4.0	*	1		0442	142	1.	.0	.0	*	1		0802	242	0.	.0	.0
1		0124	43	622.	2.4	3.9	*	1		0444	143	1.	.0	.0	*	1		0804	243	0.	.0	.0
1		0126	44	594.	2.4	3.8	*	1		0446	144	1.	.0	.0	*	1		0806	244	0.	.0	.0
1		0128	45	567.	2.3	3.7	*	1		0448	145	1.	.0	.0	*	1		0808	245	0.	.0	.0
1		0130	46	542.	2.2	3.6	*	1		0450	146	0.	.0	.0	*	1		0810	246	0.	.0	.0
1		0132	47	518.	2.1	3.6	*	1		0452	147	0.	.0	.0	*	1		0812	247	0.	.0	.0
1		0134	48	497.	2.1	3.5	*	1		0454	148	0.	.0	.0	*	1		0814	248	0.	.0	.0
1		0136	49	476.	2.0	3.4	*	1		0456	149	0.	.0	.0	*	1		0816	249	0.	.0	.0

1	0138	50	457.	2.0	3.3	*	1	0458	150	0.	.0	.0	*	1	0818	250	0.	.0	.0
1	0140	51	440.	1.9	3.3	*	1	0500	151	0.	.0	.0	*	1	0820	251	0.	.0	.0
1	0142	52	424.	1.9	3.2	*	1	0502	152	0.	.0	.0	*	1	0822	252	0.	.0	.0
1	0144	53	408.	1.8	3.2	*	1	0504	153	0.	.0	.0	*	1	0824	253	0.	.0	.0
1	0146	54	395.	1.8	3.1	*	1	0506	154	0.	.0	.0	*	1	0826	254	0.	.0	.0
1	0148	55	381.	1.7	3.0	*	1	0508	155	0.	.0	.0	*	1	0828	255	0.	.0	.0
1	0150	56	368.	1.7	3.0	*	1	0510	156	0.	.0	.0	*	1	0830	256	0.	.0	.0
1	0152	57	355.	1.6	2.9	*	1	0512	157	0.	.0	.0	*	1	0832	257	0.	.0	.0
1	0154	58	343.	1.6	2.9	*	1	0514	158	0.	.0	.0	*	1	0834	258	0.	.0	.0
1	0156	59	331.	1.5	2.8	*	1	0516	159	0.	.0	.0	*	1	0836	259	0.	.0	.0
1	0158	60	320.	1.5	2.8	*	1	0518	160	0.	.0	.0	*	1	0838	260	0.	.0	.0
1	0200	61	309.	1.5	2.7	*	1	0520	161	0.	.0	.0	*	1	0840	261	0.	.0	.0
1	0202	62	299.	1.4	2.7	*	1	0522	162	0.	.0	.0	*	1	0842	262	0.	.0	.0
1	0204	63	289.	1.4	2.6	*	1	0524	163	0.	.0	.0	*	1	0844	263	0.	.0	.0
1	0206	64	279.	1.4	2.6	*	1	0526	164	0.	.0	.0	*	1	0846	264	0.	.0	.0
1	0208	65	270.	1.3	2.5	*	1	0528	165	0.	.0	.0	*	1	0848	265	0.	.0	.0
1	0210	66	262.	1.3	2.5	*	1	0530	166	0.	.0	.0	*	1	0850	266	0.	.0	.0
1	0212	67	253.	1.3	2.4	*	1	0532	167	0.	.0	.0	*	1	0852	267	0.	.0	.0
1	0214	68	246.	1.3	2.4	*	1	0534	168	0.	.0	.0	*	1	0854	268	0.	.0	.0
1	0216	69	238.	1.2	2.4	*	1	0536	169	0.	.0	.0	*	1	0856	269	0.	.0	.0
1	0218	70	231.	1.2	2.3	*	1	0538	170	0.	.0	.0	*	1	0858	270	0.	.0	.0
1	0220	71	225.	1.2	2.3	*	1	0540	171	0.	.0	.0	*	1	0900	271	0.	.0	.0
1	0222	72	219.	1.1	2.3	*	1	0542	172	0.	.0	.0	*	1	0902	272	0.	.0	.0
1	0224	73	213.	1.1	2.2	*	1	0544	173	0.	.0	.0	*	1	0904	273	0.	.0	.0
1	0226	74	207.	1.1	2.2	*	1	0546	174	0.	.0	.0	*	1	0906	274	0.	.0	.0
1	0228	75	202.	1.1	2.2	*	1	0548	175	0.	.0	.0	*	1	0908	275	0.	.0	.0
1	0230	76	197.	1.1	2.1	*	1	0550	176	0.	.0	.0	*	1	0910	276	0.	.0	.0
1	0232	77	192.	1.0	2.1	*	1	0552	177	0.	.0	.0	*	1	0912	277	0.	.0	.0
1	0234	78	187.	1.0	2.1	*	1	0554	178	0.	.0	.0	*	1	0914	278	0.	.0	.0
1	0236	79	183.	1.0	2.0	*	1	0556	179	0.	.0	.0	*	1	0916	279	0.	.0	.0
1	0238	80	178.	1.0	2.0	*	1	0558	180	0.	.0	.0	*	1	0918	280	0.	.0	.0
1	0240	81	173.	1.0	2.0	*	1	0600	181	0.	.0	.0	*	1	0920	281	0.	.0	.0
1	0242	82	169.	1.0	1.9	*	1	0602	182	0.	.0	.0	*	1	0922	282	0.	.0	.0
1	0244	83	165.	.9	1.9	*	1	0604	183	0.	.0	.0	*	1	0924	283	0.	.0	.0
1	0246	84	161.	.9	1.9	*	1	0606	184	0.	.0	.0	*	1	0926	284	0.	.0	.0
1	0248	85	157.	.9	1.9	*	1	0608	185	0.	.0	.0	*	1	0928	285	0.	.0	.0
1	0250	86	154.	.9	1.8	*	1	0610	186	0.	.0	.0	*	1	0930	286	0.	.0	.0
1	0252	87	151.	.9	1.8	*	1	0612	187	0.	.0	.0	*	1	0932	287	0.	.0	.0
1	0254	88	147.	.9	1.8	*	1	0614	188	0.	.0	.0	*	1	0934	288	0.	.0	.0
1	0256	89	144.	.9	1.8	*	1	0616	189	0.	.0	.0	*	1	0936	289	0.	.0	.0
1	0258	90	141.	.8	1.8	*	1	0618	190	0.	.0	.0	*	1	0938	290	0.	.0	.0
1	0300	91	138.	.8	1.7	*	1	0620	191	0.	.0	.0	*	1	0940	291	0.	.0	.0
1	0302	92	135.	.8	1.7	*	1	0622	192	0.	.0	.0	*	1	0942	292	0.	.0	.0
1	0304	93	132.	.8	1.7	*	1	0624	193	0.	.0	.0	*	1	0944	293	0.	.0	.0
1	0306	94	128.	.8	1.7	*	1	0626	194	0.	.0	.0	*	1	0946	294	0.	.0	.0
1	0308	95	123.	.8	1.6	*	1	0628	195	0.	.0	.0	*	1	0948	295	0.	.0	.0
1	0310	96	118.	.7	1.6	*	1	0630	196	0.	.0	.0	*	1	0950	296	0.	.0	.0
1	0312	97	112.	.7	1.6	*	1	0632	197	0.	.0	.0	*	1	0952	297	0.	.0	.0
1	0314	98	106.	.7	1.5	*	1	0634	198	0.	.0	.0	*	1	0954	298	0.	.0	.0
1	0316	99	100.	.7	1.5	*	1	0636	199	0.	.0	.0	*	1	0956	299	0.	.0	.0
1	0318	100	94.	.6	1.4	*	1	0638	200	0.	.0	.0	*	1	0958	300	0.	.0	.0
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 PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR         24-HR        72-HR       9.97-HR
+    (CFS)      (HR)
                            (CFS)
+    2364.       .57                    346.         208.         208.         208.
                         (INCHES)      1.987        1.987        1.987        1.987
                          (AC-FT)       172.         172.         172.         172.

 PEAK STORAGE   TIME                        MAXIMUM AVERAGE STORAGE
                                        6-HR         24-HR        72-HR       9.97-HR
+   (AC-FT)     (HR)
         6.      .57                      1.           1.           1.           1.

 PEAK STAGE     TIME                         MAXIMUM AVERAGE STAGE
                                        6-HR         24-HR        72-HR       9.97-HR
+    (FEET)     (HR)
       7.16      .57                    1.93         1.16         1.16         1.16

                        CUMULATIVE AREA =    1.62 SQ MI


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                  *              *
171 KK            *     FR-91    *
                  *              *
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                                 LOCAL RUNOFF TO FR-91
                                 BASIN FR-91

                    SUBBASIN RUNOFF DATA

174 BA                SUBBASIN CHARACTERISTICS
                            TAREA          .11  SUBBASIN AREA

                      PRECIPITATION DATA

175 PB                      STORM         3.11  BASIN TOTAL PRECIPITATION

 20 PI                  INCREMENTAL PRECIPITATION PATTERN
                              .04        .04        .06        .08        .08        .07        .07        .05        .03        .03
                              .02        .02        .02        .02        .02        .02        .02        .01        .01        .01
                              .01        .01        .01        .01        .01        .01        .01        .01        .01        .01
                              .01        .01        .01        .01        .01        .01        .01        .00        .00        .00
                              .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                              .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                              .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                              .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                              .00        .00        .00        .00        .00        .00        .00        .00        .00        .00

176 LS                SCS LOSS RATE
                            STRTL          .33  INITIAL ABSTRACTION
                           CRVNBR        86.00  CURVE NUMBER
                            RTIMP        10.00  PERCENT IMPERVIOUS AREA

177 UD                SCS DIMENSIONLESS UNITGRAPH
                             TLAG          .17  LAG

                                                                      ***

                                                               UNIT HYDROGRAPH
                                                         27 END-OF-PERIOD ORDINATES
                   26.        80.       167.       255.       296.       296.       262.       215.       155.       112.
                   83.        63.        46.        35.        26.        19.        14.        11.         8.         6.
                    4.         3.         3.         2.         1.         1.         0.

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                                                      HYDROGRAPH AT STATION    FR-91

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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	*	1		0500	151	.00	.00	.00	0.
1		0002	2	.13	.11	.01	0.	*	1		0502	152	.00	.00	.00	0.
1		0004	3	.13	.11	.01	1.	*	1		0504	153	.00	.00	.00	0.
1		0006	4	.19	.16	.03	4.	*	1		0506	154	.00	.00	.00	0.
1		0008	5	.25	.17	.08	10.	*	1		0508	155	.00	.00	.00	0.
1		0010	6	.25	.13	.12	21.	*	1		0510	156	.00	.00	.00	0.
1		0012	7	.20	.09	.12	40.	*	1		0512	157	.00	.00	.00	0.
1		0014	8	.20	.07	.13	68.	*	1		0514	158	.00	.00	.00	0.
1		0016	9	.16	.05	.11	101.	*	1		0516	159	.00	.00	.00	0.
1		0018	10	.11	.03	.08	133.	*	1		0518	160	.00	.00	.00	0.
1		0020	11	.11	.03	.08	159.	*	1		0520	161	.00	.00	.00	0.
1		0022	12	.08	.02	.06	175.	*	1		0522	162	.00	.00	.00	0.
1		0024	13	.08	.02	.06	181.	*	1		0524	163	.00	.00	.00	0.
1		0026	14	.07	.02	.05	179.	*	1		0526	164	.00	.00	.00	0.
1		0028	15	.06	.01	.05	172.	*	1		0528	165	.00	.00	.00	0.
1		0030	16	.06	.01	.05	161.	*	1		0530	166	.00	.00	.00	0.
1		0032	17	.05	.01	.04	151.	*	1		0532	167	.00	.00	.00	0.
1		0034	18	.05	.01	.04	140.	*	1		0534	168	.00	.00	.00	0.
1		0036	19	.05	.01	.04	131.	*	1		0536	169	.00	.00	.00	0.
1		0038	20	.04	.01	.03	121.	*	1		0538	170	.00	.00	.00	0.
1		0040	21	.04	.01	.03	113.	*	1		0540	171	.00	.00	.00	0.
1		0042	22	.04	.01	.03	105.	*	1		0542	172	.00	.00	.00	0.
1		0044	23	.04	.01	.03	98.	*	1		0544	173	.00	.00	.00	0.
1		0046	24	.03	.01	.03	92.	*	1		0546	174	.00	.00	.00	0.
1		0048	25	.03	.01	.03	86.	*	1		0548	175	.00	.00	.00	0.
1		0050	26	.03	.01	.03	80.	*	1		0550	176	.00	.00	.00	0.
1		0052	27	.03	.00	.02	75.	*	1		0552	177	.00	.00	.00	0.
1		0054	28	.03	.00	.02	70.	*	1		0554	178	.00	.00	.00	0.
1		0056	29	.02	.00	.02	66.	*	1		0556	179	.00	.00	.00	0.
1		0058	30	.02	.00	.02	62.	*	1		0558	180	.00	.00	.00	0.

1	0100	31	.02	.00	.02	59.	*	1	0600	181	.00	.00	.00	0.
1	0102	32	.02	.00	.02	55.	*	1	0602	182	.00	.00	.00	0.
1	0104	33	.02	.00	.02	52.	*	1	0604	183	.00	.00	.00	0.
1	0106	34	.02	.00	.02	49.	*	1	0606	184	.00	.00	.00	0.
1	0108	35	.02	.00	.02	47.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.00	.02	44.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.02	.00	.01	42.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.02	.00	.01	40.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.02	.00	.01	38.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.01	.00	.01	37.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.01	.00	.01	35.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	33.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	32.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	31.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	29.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	28.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	27.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	26.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	25.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	24.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	23.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	22.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	22.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	21.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	20.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	19.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.01	19.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.01	18.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.01	18.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.01	17.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.01	16.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.01	16.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.01	15.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.01	15.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.01	15.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.01	14.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.01	14.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.01	13.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.01	13.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.01	.00	.00	13.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.01	.00	.00	12.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.01	.00	.00	12.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.01	.00	.00	12.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.01	.00	.00	11.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.00	.00	.00	11.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.00	.00	.00	11.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.00	.00	.00	11.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	10.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	10.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	10.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	10.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	9.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	9.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	9.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	9.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	9.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	8.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	8.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	8.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	8.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	8.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	7.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	7.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	6.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	5.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	4.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	3.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	3.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	2.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	1.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	1.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	1.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	1.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	0.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	0.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	0.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	0.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	0.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	0.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	0.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	0.	*	1	0840	261	.00	.00	.00	0.

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     1    0342  112     .00      .00      .00          0.       *       1    0842  262     .00      .00      .00          0.
     1    0344  113     .00      .00      .00          0.       *       1    0844  263     .00      .00      .00          0.
     1    0346  114     .00      .00      .00          0.       *       1    0846  264     .00      .00      .00          0.
     1    0348  115     .00      .00      .00          0.       *       1    0848  265     .00      .00      .00          0.
     1    0350  116     .00      .00      .00          0.       *       1    0850  266     .00      .00      .00          0.
     1    0352  117     .00      .00      .00          0.       *       1    0852  267     .00      .00      .00          0.
     1    0354  118     .00      .00      .00          0.       *       1    0854  268     .00      .00      .00          0.
     1    0356  119     .00      .00      .00          0.       *       1    0856  269     .00      .00      .00          0.
     1    0358  120     .00      .00      .00          0.       *       1    0858  270     .00      .00      .00          0.
     1    0400  121     .00      .00      .00          0.       *       1    0900  271     .00      .00      .00          0.
     1    0402  122     .00      .00      .00          0.       *       1    0902  272     .00      .00      .00          0.
     1    0404  123     .00      .00      .00          0.       *       1    0904  273     .00      .00      .00          0.
     1    0406  124     .00      .00      .00          0.       *       1    0906  274     .00      .00      .00          0.
     1    0408  125     .00      .00      .00          0.       *       1    0908  275     .00      .00      .00          0.
     1    0410  126     .00      .00      .00          0.       *       1    0910  276     .00      .00      .00          0.
     1    0412  127     .00      .00      .00          0.       *       1    0912  277     .00      .00      .00          0.
     1    0414  128     .00      .00      .00          0.       *       1    0914  278     .00      .00      .00          0.
     1    0416  129     .00      .00      .00          0.       *       1    0916  279     .00      .00      .00          0.
     1    0418  130     .00      .00      .00          0.       *       1    0918  280     .00      .00      .00          0.
     1    0420  131     .00      .00      .00          0.       *       1    0920  281     .00      .00      .00          0.
     1    0422  132     .00      .00      .00          0.       *       1    0922  282     .00      .00      .00          0.
     1    0424  133     .00      .00      .00          0.       *       1    0924  283     .00      .00      .00          0.
     1    0426  134     .00      .00      .00          0.       *       1    0926  284     .00      .00      .00          0.
     1    0428  135     .00      .00      .00          0.       *       1    0928  285     .00      .00      .00          0.
     1    0430  136     .00      .00      .00          0.       *       1    0930  286     .00      .00      .00          0.
     1    0432  137     .00      .00      .00          0.       *       1    0932  287     .00      .00      .00          0.
     1    0434  138     .00      .00      .00          0.       *       1    0934  288     .00      .00      .00          0.
     1    0436  139     .00      .00      .00          0.       *       1    0936  289     .00      .00      .00          0.
     1    0438  140     .00      .00      .00          0.       *       1    0938  290     .00      .00      .00          0.
     1    0440  141     .00      .00      .00          0.       *       1    0940  291     .00      .00      .00          0.
     1    0442  142     .00      .00      .00          0.       *       1    0942  292     .00      .00      .00          0.
     1    0444  143     .00      .00      .00          0.       *       1    0944  293     .00      .00      .00          0.
     1    0446  144     .00      .00      .00          0.       *       1    0946  294     .00      .00      .00          0.
     1    0448  145     .00      .00      .00          0.       *       1    0948  295     .00      .00      .00          0.
     1    0450  146     .00      .00      .00          0.       *       1    0950  296     .00      .00      .00          0.
     1    0452  147     .00      .00      .00          0.       *       1    0952  297     .00      .00      .00          0.
     1    0454  148     .00      .00      .00          0.       *       1    0954  298     .00      .00      .00          0.
     1    0456  149     .00      .00      .00          0.       *       1    0956  299     .00      .00      .00          0.
     1    0458  150     .00      .00      .00          0.       *       1    0958  300     .00      .00      .00          0.
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***************************************************************************************************************************

   TOTAL RAINFALL =     3.11, TOTAL LOSS =     1.22, TOTAL EXCESS =     1.89

 PEAK FLOW      TIME                         MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR       9.97-HR
+   (CFS)         (HR)
                          (CFS)
+     181.          .40                23.          14.          14.          14.
                        (INCHES)     1.892        1.892        1.892        1.892
                         (AC-FT)       11.          11.          11.          11.

                        CUMULATIVE AREA =      .11 SQ MI


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


             **************
             *            *
 178 KK      *    CO-91   *
             *            *
             **************
                           COMBINE HYDROGRAPHS
                           AT NODE FR-91

 181 HC          HYDROGRAPH COMBINATION
                       ICOMP           2   NUMBER OF HYDROGRAPHS TO COMBINE

                                                                ***

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                                                   HYDROGRAPH AT STATION    CO-91
                                                        SUM OF  2 HYDROGRAPHS

***************************************************************************************************************************
                                  *                             *                             *
   DA MON HRMN  ORD       FLOW    *   DA MON HRMN  ORD       FLOW    *   DA MON HRMN  ORD       FLOW    *   DA MON HRMN  ORD       FLOW
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1	0000	1	0.	*	1	0230	76	208.	*	1	0500	151	0.	*	1	0730	226	0.
1	0002	2	0.	*	1	0232	77	203.	*	1	0502	152	0.	*	1	0732	227	0.
1	0004	3	2.	*	1	0234	78	198.	*	1	0504	153	0.	*	1	0734	228	0.
1	0006	4	5.	*	1	0236	79	193.	*	1	0506	154	0.	*	1	0736	229	0.
1	0008	5	14.	*	1	0238	80	188.	*	1	0508	155	0.	*	1	0738	230	0.
1	0010	6	34.	*	1	0240	81	183.	*	1	0510	156	0.	*	1	0740	231	0.
1	0012	7	75.	*	1	0242	82	178.	*	1	0512	157	0.	*	1	0742	232	0.
1	0014	8	169.	*	1	0244	83	174.	*	1	0514	158	0.	*	1	0744	233	0.
1	0016	9	315.	*	1	0246	84	170.	*	1	0516	159	0.	*	1	0746	234	0.
1	0018	10	513.	*	1	0248	85	166.	*	1	0518	160	0.	*	1	0748	235	0.
1	0020	11	764.	*	1	0250	86	162.	*	1	0520	161	0.	*	1	0750	236	0.
1	0022	12	1068.	*	1	0252	87	159.	*	1	0522	162	0.	*	1	0752	237	0.
1	0024	13	1443.	*	1	0254	88	155.	*	1	0524	163	0.	*	1	0754	238	0.
1	0026	14	1812.	*	1	0256	89	152.	*	1	0526	164	0.	*	1	0756	239	0.
1	0028	15	2128.	*	1	0258	90	149.	*	1	0528	165	0.	*	1	0758	240	0.
1	0030	16	2357.	*	1	0300	91	146.	*	1	0530	166	0.	*	1	0800	241	0.
1	0032	17	2477.	*	1	0302	92	142.	*	1	0532	167	0.	*	1	0802	242	0.
1	0034	18	2504.	*	1	0304	93	139.	*	1	0534	168	0.	*	1	0804	243	0.
1	0036	19	2460.	*	1	0306	94	134.	*	1	0536	169	0.	*	1	0806	244	0.
1	0038	20	2373.	*	1	0308	95	129.	*	1	0538	170	0.	*	1	0808	245	0.
1	0040	21	2261.	*	1	0310	96	122.	*	1	0540	171	0.	*	1	0810	246	0.
1	0042	22	2136.	*	1	0312	97	115.	*	1	0542	172	0.	*	1	0812	247	0.
1	0044	23	2009.	*	1	0314	98	109.	*	1	0544	173	0.	*	1	0814	248	0.
1	0046	24	1886.	*	1	0316	99	102.	*	1	0546	174	0.	*	1	0816	249	0.
1	0048	25	1774.	*	1	0318	100	95.	*	1	0548	175	0.	*	1	0818	250	0.
1	0050	26	1671.	*	1	0320	101	88.	*	1	0550	176	0.	*	1	0820	251	0.
1	0052	27	1573.	*	1	0322	102	82.	*	1	0552	177	0.	*	1	0822	252	0.
1	0054	28	1478.	*	1	0324	103	76.	*	1	0554	178	0.	*	1	0824	253	0.
1	0056	29	1388.	*	1	0326	104	69.	*	1	0556	179	0.	*	1	0826	254	0.
1	0058	30	1306.	*	1	0328	105	64.	*	1	0558	180	0.	*	1	0828	255	0.
1	0100	31	1231.	*	1	0330	106	59.	*	1	0600	181	0.	*	1	0830	256	0.
1	0102	32	1160.	*	1	0332	107	54.	*	1	0602	182	0.	*	1	0832	257	0.
1	0104	33	1096.	*	1	0334	108	50.	*	1	0604	183	0.	*	1	0834	258	0.
1	0106	34	1035.	*	1	0336	109	47.	*	1	0606	184	0.	*	1	0836	259	0.
1	0108	35	978.	*	1	0338	110	43.	*	1	0608	185	0.	*	1	0838	260	0.
1	0110	36	928.	*	1	0340	111	39.	*	1	0610	186	0.	*	1	0840	261	0.
1	0112	37	882.	*	1	0342	112	36.	*	1	0612	187	0.	*	1	0842	262	0.
1	0114	38	837.	*	1	0344	113	33.	*	1	0614	188	0.	*	1	0844	263	0.
1	0116	39	794.	*	1	0346	114	31.	*	1	0616	189	0.	*	1	0846	264	0.
1	0118	40	756.	*	1	0348	115	29.	*	1	0618	190	0.	*	1	0848	265	0.
1	0120	41	720.	*	1	0350	116	27.	*	1	0620	191	0.	*	1	0850	266	0.
1	0122	42	685.	*	1	0352	117	25.	*	1	0622	192	0.	*	1	0852	267	0.
1	0124	43	653.	*	1	0354	118	23.	*	1	0624	193	0.	*	1	0854	268	0.
1	0126	44	625.	*	1	0356	119	20.	*	1	0626	194	0.	*	1	0856	269	0.
1	0128	45	597.	*	1	0358	120	18.	*	1	0628	195	0.	*	1	0858	270	0.
1	0130	46	570.	*	1	0400	121	17.	*	1	0630	196	0.	*	1	0900	271	0.
1	0132	47	545.	*	1	0402	122	15.	*	1	0632	197	0.	*	1	0902	272	0.
1	0134	48	523.	*	1	0404	123	13.	*	1	0634	198	0.	*	1	0904	273	0.
1	0136	49	501.	*	1	0406	124	12.	*	1	0636	199	0.	*	1	0906	274	0.
1	0138	50	482.	*	1	0408	125	10.	*	1	0638	200	0.	*	1	0908	275	0.
1	0140	51	463.	*	1	0410	126	9.	*	1	0640	201	0.	*	1	0910	276	0.
1	0142	52	446.	*	1	0412	127	8.	*	1	0642	202	0.	*	1	0912	277	0.
1	0144	53	430.	*	1	0414	128	7.	*	1	0644	203	0.	*	1	0914	278	0.
1	0146	54	416.	*	1	0416	129	6.	*	1	0646	204	0.	*	1	0916	279	0.
1	0148	55	401.	*	1	0418	130	5.	*	1	0648	205	0.	*	1	0918	280	0.
1	0150	56	387.	*	1	0420	131	5.	*	1	0650	206	0.	*	1	0920	281	0.
1	0152	57	374.	*	1	0422	132	4.	*	1	0652	207	0.	*	1	0922	282	0.
1	0154	58	361.	*	1	0424	133	3.	*	1	0654	208	0.	*	1	0924	283	0.
1	0156	59	349.	*	1	0426	134	3.	*	1	0656	209	0.	*	1	0926	284	0.
1	0158	60	337.	*	1	0428	135	3.	*	1	0658	210	0.	*	1	0928	285	0.
1	0200	61	325.	*	1	0430	136	2.	*	1	0700	211	0.	*	1	0930	286	0.
1	0202	62	315.	*	1	0432	137	2.	*	1	0702	212	0.	*	1	0932	287	0.
1	0204	63	304.	*	1	0434	138	2.	*	1	0704	213	0.	*	1	0934	288	0.
1	0206	64	294.	*	1	0436	139	1.	*	1	0706	214	0.	*	1	0936	289	0.
1	0208	65	285.	*	1	0438	140	1.	*	1	0708	215	0.	*	1	0938	290	0.
1	0210	66	276.	*	1	0440	141	1.	*	1	0710	216	0.	*	1	0940	291	0.
1	0212	67	267.	*	1	0442	142	1.	*	1	0712	217	0.	*	1	0942	292	0.
1	0214	68	259.	*	1	0444	143	1.	*	1	0714	218	0.	*	1	0944	293	0.
1	0216	69	251.	*	1	0446	144	1.	*	1	0716	219	0.	*	1	0946	294	0.
1	0218	70	244.	*	1	0448	145	1.	*	1	0718	220	0.	*	1	0948	295	0.
1	0220	71	237.	*	1	0450	146	0.	*	1	0720	221	0.	*	1	0950	296	0.
1	0222	72	231.	*	1	0452	147	0.	*	1	0722	222	0.	*	1	0952	297	0.
1	0224	73	225.	*	1	0454	148	0.	*	1	0724	223	0.	*	1	0954	298	0.
1	0226	74	219.	*	1	0456	149	0.	*	1	0726	224	0.	*	1	0956	299	0.
1	0228	75	213.	*	1	0458	150	0.	*	1	0728	225	0.	*	1	0958	300	0.

PEAK FLOW TIME MAXIMUM AVERAGE FLOW

6-HR 24-HR 72-HR 9.97-HR

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+    (CFS)        (HR)
                                (CFS)
+     2504.        .57                       369.          222.          222.          222.
                             (INCHES)       1.981         1.981         1.981         1.981
                              (AC-FT)        183.          183.          183.          183.

                              CUMULATIVE AREA =     1.73 SQ MI


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

               **************
               *            *
 182 KK        *   RES-91   *
               *            *
               **************
                               MODIFIED PULS RESERVOIR ROUTING
                               AT NODE FR-91
                               SUMMIT AT FINGER ROCK EAST CULVERT CROSSING (PONTATOC CANYON)

                  HYDROGRAPH ROUTING DATA

 186 RS             STORAGE ROUTING
                          NSTPS              1  NUMBER OF SUBREACHES
                           ITYP           ELEV  TYPE OF INITIAL CONDITION
                         RSVRIC        3047.30  INITIAL CONDITION
                              X            .00 WORKING R AND D COEFFICIENT

 187 SA                   AREA          .0         .0         .0         .1         .3         .4         .5

 188 SE             ELEVATION     3047.30    3048.00    3050.00    3055.00    3060.00    3065.00    3070.00

 189 SQ             DISCHARGE          0.       500.      1000.      1500.      2000.      2500.      3000.      3290.      4000.

 190 SE             ELEVATION     3047.30    3050.70    3052.60    3054.40    3055.90    3057.60    3059.60    3060.80    3064.00

                                                                     ***

                                                     COMPUTED STORAGE-ELEVATION DATA

             STORAGE          .00        .00        .01        .31       1.24       2.76       4.95
           ELEVATION      3047.30    3048.00    3050.00    3055.00    3060.00    3065.00    3070.00

                                                 COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

             STORAGE          .00        .00        .01        .02        .09        .24        .31        .43        .72       1.14
             OUTFLOW          .00     102.94     397.06     500.00    1000.00    1500.00    1700.03    2000.00    2500.00    3000.00
           ELEVATION      3047.30    3048.00    3050.00    3050.70    3052.60    3054.40    3055.00    3055.90    3057.60    3059.60

             STORAGE         1.24       1.45       2.41       2.76       4.95
             OUTFLOW      3096.65    3290.00    4000.00    4221.88    5331.27
           ELEVATION      3060.00    3060.80    3064.00    3065.00    3070.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO     4000.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                                                      HYDROGRAPH AT STATION    RES-91

*********************************************************************************************************************************
                                            *                                           *
 DA MON HRMN ORD   OUTFLOW  STORAGE    STAGE * DA MON HRMN ORD   OUTFLOW  STORAGE    STAGE * DA MON HRMN ORD   OUTFLOW  STORAGE    STAGE
                                            *                                           *
  1     0000   1        0.       .0  3047.3 *  1     0320 101       89.       .0  3047.9 *  1     0640 201        0.       .0  3047.3
  1     0002   2       -0.       .0  3047.3 *  1     0322 102       82.       .0  3047.9 *  1     0642 202        0.       .0  3047.3
  1     0004   3        2.       .0  3047.3 *  1     0324 103       76.       .0  3047.8 *  1     0644 203        0.       .0  3047.3
  1     0006   4        5.       .0  3047.3 *  1     0326 104       69.       .0  3047.8 *  1     0646 204        0.       .0  3047.3
  1     0008   5       14.       .0  3047.4 *  1     0328 105       64.       .0  3047.7 *  1     0648 205        0.       .0  3047.3
  1     0010   6       34.       .0  3047.5 *  1     0330 106       59.       .0  3047.7 *  1     0650 206        0.       .0  3047.3
  1     0012   7       75.       .0  3047.8 *  1     0332 107       55.       .0  3047.7 *  1     0652 207        0.       .0  3047.3
  1     0014   8      167.       .0  3048.4 *  1     0334 108       50.       .0  3047.6 *  1     0654 208        0.       .0  3047.3
  1     0016   9      313.       .0  3049.4 *  1     0336 109       47.       .0  3047.6 *  1     0656 209        0.       .0  3047.3
  1     0018  10      505.       .0  3050.7 *  1     0338 110       43.       .0  3047.6 *  1     0658 210        0.       .0  3047.3
  1     0020  11      748.       .1  3051.6 *  1     0340 111       40.       .0  3047.6 *  1     0700 211        0.       .0  3047.3
  1     0022  12     1049.       .1  3052.8 *  1     0342 112       36.       .0  3047.5 *  1     0702 212        0.       .0  3047.3
  1     0024  13     1390.       .2  3054.0 *  1     0344 113       33.       .0  3047.5 *  1     0704 213        0.       .0  3047.3
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1	0026	14	1769.	.3	3055.2	*	1	0346	114	31.	.0	3047.5	*	1	0706	214	0.	.0	3047.3
1	0028	15	2072.	.5	3056.1	*	1	0348	115	29.	.0	3047.5	*	1	0708	215	0.	.0	3047.3
1	0030	16	2313.	.6	3057.0	*	1	0350	116	27.	.0	3047.5	*	1	0710	216	0.	.0	3047.3
1	0032	17	2460.	.7	3057.5	*	1	0352	117	25.	.0	3047.5	*	1	0712	217	0.	.0	3047.3
1	0034	18	2503.	.7	3057.6	*	1	0354	118	22.	.0	3047.5	*	1	0714	218	0.	.0	3047.3
1	0036	19	2473.	.7	3057.5	*	1	0356	119	21.	.0	3047.4	*	1	0716	219	0.	.0	3047.3
1	0038	20	2393.	.7	3057.2	*	1	0358	120	18.	.0	3047.4	*	1	0718	220	0.	.0	3047.3
1	0040	21	2286.	.6	3056.9	*	1	0400	121	17.	.0	3047.4	*	1	0720	221	0.	.0	3047.3
1	0042	22	2163.	.5	3056.5	*	1	0402	122	15.	.0	3047.4	*	1	0722	222	0.	.0	3047.3
1	0044	23	2036.	.5	3056.0	*	1	0404	123	13.	.0	3047.4	*	1	0724	223	0.	.0	3047.3
1	0046	24	1903.	.4	3055.6	*	1	0406	124	12.	.0	3047.4	*	1	0726	224	0.	.0	3047.3
1	0048	25	1790.	.3	3055.3	*	1	0408	125	10.	.0	3047.4	*	1	0728	225	0.	.0	3047.3
1	0050	26	1685.	.3	3055.0	*	1	0410	126	9.	.0	3047.4	*	1	0730	226	0.	.0	3047.3
1	0052	27	1584.	.3	3054.7	*	1	0412	127	8.	.0	3047.4	*	1	0732	227	0.	.0	3047.3
1	0054	28	1490.	.2	3054.4	*	1	0414	128	7.	.0	3047.3	*	1	0734	228	0.	.0	3047.3
1	0056	29	1395.	.2	3054.0	*	1	0416	129	6.	.0	3047.3	*	1	0736	229	0.	.0	3047.3
1	0058	30	1315.	.2	3053.7	*	1	0418	130	5.	.0	3047.3	*	1	0738	230	0.	.0	3047.3
1	0100	31	1238.	.2	3053.5	*	1	0420	131	5.	.0	3047.3	*	1	0740	231	0.	.0	3047.3
1	0102	32	1168.	.1	3053.2	*	1	0422	132	4.	.0	3047.3	*	1	0742	232	0.	.0	3047.3
1	0104	33	1102.	.1	3053.0	*	1	0424	133	4.	.0	3047.3	*	1	0744	233	0.	.0	3047.3
1	0106	34	1041.	.1	3052.7	*	1	0426	134	3.	.0	3047.3	*	1	0746	234	0.	.0	3047.3
1	0108	35	982.	.1	3052.5	*	1	0428	135	3.	.0	3047.3	*	1	0748	235	0.	.0	3047.3
1	0110	36	929.	.1	3052.3	*	1	0430	136	2.	.0	3047.3	*	1	0750	236	0.	.0	3047.3
1	0112	37	885.	.1	3052.2	*	1	0432	137	2.	.0	3047.3	*	1	0752	237	0.	.0	3047.3
1	0114	38	838.	.1	3052.0	*	1	0434	138	2.	.0	3047.3	*	1	0754	238	0.	.0	3047.3
1	0116	39	797.	.1	3051.8	*	1	0436	139	1.	.0	3047.3	*	1	0756	239	0.	.0	3047.3
1	0118	40	757.	.1	3051.7	*	1	0438	140	1.	.0	3047.3	*	1	0758	240	0.	.0	3047.3
1	0120	41	722.	.1	3051.5	*	1	0440	141	1.	.0	3047.3	*	1	0800	241	0.	.0	3047.3
1	0122	42	687.	.0	3051.4	*	1	0442	142	1.	.0	3047.3	*	1	0802	242	0.	.0	3047.3
1	0124	43	655.	.0	3051.3	*	1	0444	143	1.	.0	3047.3	*	1	0804	243	0.	.0	3047.3
1	0126	44	626.	.0	3051.2	*	1	0446	144	1.	.0	3047.3	*	1	0806	244	0.	.0	3047.3
1	0128	45	598.	.0	3051.1	*	1	0448	145	1.	.0	3047.3	*	1	0808	245	0.	.0	3047.3
1	0130	46	571.	.0	3051.0	*	1	0450	146	0.	.0	3047.3	*	1	0810	246	0.	.0	3047.3
1	0132	47	547.	.0	3050.9	*	1	0452	147	0.	.0	3047.3	*	1	0812	247	0.	.0	3047.3
1	0134	48	524.	.0	3050.8	*	1	0454	148	0.	.0	3047.3	*	1	0814	248	0.	.0	3047.3
1	0136	49	503.	.0	3050.7	*	1	0456	149	0.	.0	3047.3	*	1	0816	249	0.	.0	3047.3
1	0138	50	482.	.0	3050.6	*	1	0458	150	0.	.0	3047.3	*	1	0818	250	0.	.0	3047.3
1	0140	51	464.	.0	3050.5	*	1	0500	151	0.	.0	3047.3	*	1	0820	251	0.	.0	3047.3
1	0142	52	447.	.0	3050.3	*	1	0502	152	0.	.0	3047.3	*	1	0822	252	0.	.0	3047.3
1	0144	53	431.	.0	3050.2	*	1	0504	153	0.	.0	3047.3	*	1	0824	253	0.	.0	3047.3
1	0146	54	416.	.0	3050.1	*	1	0506	154	0.	.0	3047.3	*	1	0826	254	0.	.0	3047.3
1	0148	55	402.	.0	3050.0	*	1	0508	155	0.	.0	3047.3	*	1	0828	255	0.	.0	3047.3
1	0150	56	387.	.0	3049.9	*	1	0510	156	0.	.0	3047.3	*	1	0830	256	0.	.0	3047.3
1	0152	57	374.	.0	3049.8	*	1	0512	157	0.	.0	3047.3	*	1	0832	257	0.	.0	3047.3
1	0154	58	361.	.0	3049.8	*	1	0514	158	0.	.0	3047.3	*	1	0834	258	0.	.0	3047.3
1	0156	59	349.	.0	3049.7	*	1	0516	159	0.	.0	3047.3	*	1	0836	259	0.	.0	3047.3
1	0158	60	337.	.0	3049.6	*	1	0518	160	0.	.0	3047.3	*	1	0838	260	0.	.0	3047.3
1	0200	61	326.	.0	3049.5	*	1	0520	161	0.	.0	3047.3	*	1	0840	261	0.	.0	3047.3
1	0202	62	315.	.0	3049.4	*	1	0522	162	0.	.0	3047.3	*	1	0842	262	0.	.0	3047.3
1	0204	63	305.	.0	3049.4	*	1	0524	163	0.	.0	3047.3	*	1	0844	263	0.	.0	3047.3
1	0206	64	294.	.0	3049.3	*	1	0526	164	0.	.0	3047.3	*	1	0846	264	0.	.0	3047.3
1	0208	65	285.	.0	3049.2	*	1	0528	165	0.	.0	3047.3	*	1	0848	265	0.	.0	3047.3
1	0210	66	276.	.0	3049.2	*	1	0530	166	0.	.0	3047.3	*	1	0850	266	0.	.0	3047.3
1	0212	67	267.	.0	3049.1	*	1	0532	167	0.	.0	3047.3	*	1	0852	267	0.	.0	3047.3
1	0214	68	259.	.0	3049.1	*	1	0534	168	0.	.0	3047.3	*	1	0854	268	0.	.0	3047.3
1	0216	69	251.	.0	3049.0	*	1	0536	169	0.	.0	3047.3	*	1	0856	269	0.	.0	3047.3
1	0218	70	244.	.0	3049.0	*	1	0538	170	0.	.0	3047.3	*	1	0858	270	0.	.0	3047.3
1	0220	71	238.	.0	3048.9	*	1	0540	171	0.	.0	3047.3	*	1	0900	271	0.	.0	3047.3
1	0222	72	231.	.0	3048.9	*	1	0542	172	0.	.0	3047.3	*	1	0902	272	0.	.0	3047.3
1	0224	73	225.	.0	3048.8	*	1	0544	173	0.	.0	3047.3	*	1	0904	273	0.	.0	3047.3
1	0226	74	219.	.0	3048.8	*	1	0546	174	0.	.0	3047.3	*	1	0906	274	0.	.0	3047.3
1	0228	75	213.	.0	3048.8	*	1	0548	175	0.	.0	3047.3	*	1	0908	275	0.	.0	3047.3
1	0230	76	208.	.0	3048.7	*	1	0550	176	0.	.0	3047.3	*	1	0910	276	0.	.0	3047.3
1	0232	77	203.	.0	3048.7	*	1	0552	177	0.	.0	3047.3	*	1	0912	277	0.	.0	3047.3
1	0234	78	198.	.0	3048.6	*	1	0554	178	0.	.0	3047.3	*	1	0914	278	0.	.0	3047.3
1	0236	79	193.	.0	3048.6	*	1	0556	179	0.	.0	3047.3	*	1	0916	279	0.	.0	3047.3
1	0238	80	188.	.0	3048.6	*	1	0558	180	0.	.0	3047.3	*	1	0918	280	0.	.0	3047.3
1	0240	81	183.	.0	3048.5	*	1	0600	181	0.	.0	3047.3	*	1	0920	281	0.	.0	3047.3
1	0242	82	178.	.0	3048.5	*	1	0602	182	0.	.0	3047.3	*	1	0922	282	0.	.0	3047.3
1	0244	83	174.	.0	3048.5	*	1	0604	183	0.	.0	3047.3	*	1	0924	283	0.	.0	3047.3
1	0246	84	170.	.0	3048.5	*	1	0606	184	0.	.0	3047.3	*	1	0926	284	0.	.0	3047.3
1	0248	85	166.	.0	3048.4	*	1	0608	185	0.	.0	3047.3	*	1	0928	285	0.	.0	3047.3
1	0250	86	162.	.0	3048.4	*	1	0610	186	0.	.0	3047.3	*	1	0930	286	0.	.0	3047.3
1	0252	87	159.	.0	3048.4	*	1	0612	187	0.	.0	3047.3	*	1	0932	287	0.	.0	3047.3
1	0254	88	155.	.0	3048.4	*	1	0614	188	0.	.0	3047.3	*	1	0934	288	0.	.0	3047.3
1	0256	89	152.	.0	3048.3	*	1	0616	189	0.	.0	3047.3	*	1	0936	289	0.	.0	3047.3
1	0258	90	149.	.0	3048.3	*	1	0618	190	0.	.0	3047.3	*	1	0938	290	0.	.0	3047.3
1	0300	91	146.	.0	3048.3	*	1	0620	191	0.	.0	3047.3	*	1	0940	291	0.	.0	3047.3
1	0302	92	143.	.0	3048.3	*	1	0622	192	0.	.0	3047.3	*	1	0942	292	0.	.0	3047.3
1	0304	93	139.	.0	3048.2	*	1	0624	193	0.	.0	3047.3	*	1	0944	293	0.	.0	3047.3
1	0306	94	134.	.0	3048.2	*	1	0626	194	0.	.0	3047.3	*	1	0946	294	0.	.0	3047.3

1	0308	95	129.	.0	3048.2	*	1	0628	195	0.	.0	3047.3	*	1	0948	295	0.	.0	3047.3
1	0310	96	122.	.0	3048.1	*	1	0630	196	0.	.0	3047.3	*	1	0950	296	0.	.0	3047.3
1	0312	97	115.	.0	3048.1	*	1	0632	197	0.	.0	3047.3	*	1	0952	297	0.	.0	3047.3
1	0314	98	109.	.0	3048.0	*	1	0634	198	0.	.0	3047.3	*	1	0954	298	0.	.0	3047.3
1	0316	99	102.	.0	3048.0	*	1	0636	199	0.	.0	3047.3	*	1	0956	299	0.	.0	3047.3
1	0318	100	95.	.0	3047.9	*	1	0638	200	0.	.0	3047.3	*	1	0958	300	0.	.0	3047.3

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PEAK FLOW	TIME			MAXIMUM AVERAGE FLOW		
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2503.	.57		369.	222.	222.	222.
		(INCHES)	1.981	1.981	1.981	1.981
		(AC-FT)	183.	183.	183.	183.

PEAK STORAGE	TIME			MAXIMUM AVERAGE STORAGE		
			6-HR	24-HR	72-HR	9.97-HR
+ (AC-FT)	(HR)					
1.	.57		0.	0.	0.	0.

PEAK STAGE	TIME			MAXIMUM AVERAGE STAGE		
			6-HR	24-HR	72-HR	9.97-HR
+ (FEET)	(HR)					
3057.61	.57		3049.23	3048.47	3048.47	3048.47

CUMULATIVE AREA = 1.73 SQ MI

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          *            *
191 KK    *   CO-9A    *
          *            *
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COMBINE HYDROGRAPHS
AT NODE FR-9
FINGER ROCK WASH AND PONTATOC CANYON WASH

195 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION CO-9A
SUM OF 2 HYDROGRAPHS

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0230	76	421.	*	1		0500	151	1.	*	1		0730	226	0.
1		0002	2	1.	*	1		0232	77	410.	*	1		0502	152	1.	*	1		0732	227	0.
1		0004	3	2.	*	1		0234	78	399.	*	1		0504	153	1.	*	1		0734	228	0.
1		0006	4	7.	*	1		0236	79	389.	*	1		0506	154	1.	*	1		0736	229	0.
1		0008	5	21.	*	1		0238	80	379.	*	1		0508	155	1.	*	1		0738	230	0.
1		0010	6	52.	*	1		0240	81	369.	*	1		0510	156	0.	*	1		0740	231	0.
1		0012	7	114.	*	1		0242	82	360.	*	1		0512	157	1.	*	1		0742	232	0.
1		0014	8	241.	*	1		0244	83	351.	*	1		0514	158	0.	*	1		0744	233	0.
1		0016	9	439.	*	1		0246	84	343.	*	1		0516	159	0.	*	1		0746	234	0.
1		0018	10	720.	*	1		0248	85	335.	*	1		0518	160	0.	*	1		0748	235	0.
1		0020	11	1097.	*	1		0250	86	327.	*	1		0520	161	0.	*	1		0750	236	0.
1		0022	12	1599.	*	1		0252	87	321.	*	1		0522	162	0.	*	1		0752	237	0.
1		0024	13	2254.	*	1		0254	88	314.	*	1		0524	163	0.	*	1		0754	238	0.
1		0026	14	2986.	*	1		0256	89	308.	*	1		0526	164	0.	*	1		0756	239	0.
1		0028	15	3654.	*	1		0258	90	301.	*	1		0528	165	0.	*	1		0758	240	0.
1		0030	16	4202.	*	1		0300	91	295.	*	1		0530	166	0.	*	1		0800	241	0.
1		0032	17	4568.	*	1		0302	92	288.	*	1		0532	167	0.	*	1		0802	242	0.
1		0034	18	4758.	*	1		0304	93	282.	*	1		0534	168	0.	*	1		0804	243	0.
1		0036	19	4798.	*	1		0306	94	273.	*	1		0536	169	0.	*	1		0806	244	0.
1		0038	20	4716.	*	1		0308	95	264.	*	1		0538	170	0.	*	1		0808	245	0.
1		0040	21	4560.	*	1		0310	96	252.	*	1		0540	171	0.	*	1		0810	246	0.
1		0042	22	4356.	*	1		0312	97	241.	*	1		0542	172	0.	*	1		0812	247	0.
1		0044	23	4130.	*	1		0314	98	229.	*	1		0544	173	0.	*	1		0814	248	0.

1	0046	24	3891.	*	1	0316	99	217.	*	1	0546	174	0.	*	1	0816	249	0.
1	0048	25	3661.	*	1	0318	100	204.	*	1	0548	175	0.	*	1	0818	250	0.
1	0050	26	3452.	*	1	0320	101	191.	*	1	0550	176	0.	*	1	0820	251	0.
1	0052	27	3244.	*	1	0322	102	178.	*	1	0552	177	0.	*	1	0822	252	0.
1	0054	28	3053.	*	1	0324	103	165.	*	1	0554	178	0.	*	1	0824	253	0.
1	0056	29	2863.	*	1	0326	104	152.	*	1	0556	179	0.	*	1	0826	254	0.
1	0058	30	2693.	*	1	0328	105	141.	*	1	0558	180	0.	*	1	0828	255	0.
1	0100	31	2529.	*	1	0330	106	129.	*	1	0600	181	0.	*	1	0830	256	0.
1	0102	32	2383.	*	1	0332	107	119.	*	1	0602	182	0.	*	1	0832	257	0.
1	0104	33	2247.	*	1	0334	108	110.	*	1	0604	183	0.	*	1	0834	258	0.
1	0106	34	2122.	*	1	0336	109	102.	*	1	0606	184	0.	*	1	0836	259	0.
1	0108	35	2003.	*	1	0338	110	94.	*	1	0608	185	0.	*	1	0838	260	0.
1	0110	36	1895.	*	1	0340	111	87.	*	1	0610	186	0.	*	1	0840	261	0.
1	0112	37	1802.	*	1	0342	112	79.	*	1	0612	187	0.	*	1	0842	262	0.
1	0114	38	1706.	*	1	0344	113	72.	*	1	0614	188	0.	*	1	0844	263	0.
1	0116	39	1619.	*	1	0346	114	66.	*	1	0616	189	0.	*	1	0846	264	0.
1	0118	40	1535.	*	1	0348	115	61.	*	1	0618	190	0.	*	1	0848	265	0.
1	0120	41	1461.	*	1	0350	116	55.	*	1	0620	191	0.	*	1	0850	266	0.
1	0122	42	1390.	*	1	0352	117	50.	*	1	0622	192	0.	*	1	0852	267	0.
1	0124	43	1327.	*	1	0354	118	45.	*	1	0624	193	0.	*	1	0854	268	0.
1	0126	44	1265.	*	1	0356	119	41.	*	1	0626	194	0.	*	1	0856	269	0.
1	0128	45	1207.	*	1	0358	120	37.	*	1	0628	195	0.	*	1	0858	270	0.
1	0130	46	1152.	*	1	0400	121	34.	*	1	0630	196	0.	*	1	0900	271	0.
1	0132	47	1102.	*	1	0402	122	31.	*	1	0632	197	0.	*	1	0902	272	0.
1	0134	48	1056.	*	1	0404	123	28.	*	1	0634	198	0.	*	1	0904	273	0.
1	0136	49	1014.	*	1	0406	124	26.	*	1	0636	199	0.	*	1	0906	274	0.
1	0138	50	977.	*	1	0408	125	24.	*	1	0638	200	0.	*	1	0908	275	0.
1	0140	51	943.	*	1	0410	126	21.	*	1	0640	201	0.	*	1	0910	276	0.
1	0142	52	908.	*	1	0412	127	19.	*	1	0642	202	0.	*	1	0912	277	0.
1	0144	53	875.	*	1	0414	128	17.	*	1	0644	203	0.	*	1	0914	278	0.
1	0146	54	844.	*	1	0416	129	16.	*	1	0646	204	0.	*	1	0916	279	0.
1	0148	55	814.	*	1	0418	130	14.	*	1	0648	205	0.	*	1	0918	280	0.
1	0150	56	783.	*	1	0420	131	13.	*	1	0650	206	0.	*	1	0920	281	0.
1	0152	57	756.	*	1	0422	132	11.	*	1	0652	207	0.	*	1	0922	282	0.
1	0154	58	728.	*	1	0424	133	10.	*	1	0654	208	0.	*	1	0924	283	0.
1	0156	59	704.	*	1	0426	134	9.	*	1	0656	209	0.	*	1	0926	284	0.
1	0158	60	681.	*	1	0428	135	8.	*	1	0658	210	0.	*	1	0928	285	0.
1	0200	61	659.	*	1	0430	136	7.	*	1	0700	211	0.	*	1	0930	286	0.
1	0202	62	637.	*	1	0432	137	6.	*	1	0702	212	0.	*	1	0932	287	0.
1	0204	63	617.	*	1	0434	138	5.	*	1	0704	213	0.	*	1	0934	288	0.
1	0206	64	597.	*	1	0436	139	5.	*	1	0706	214	0.	*	1	0936	289	0.
1	0208	65	579.	*	1	0438	140	4.	*	1	0708	215	0.	*	1	0938	290	0.
1	0210	66	561.	*	1	0440	141	4.	*	1	0710	216	0.	*	1	0940	291	0.
1	0212	67	543.	*	1	0442	142	3.	*	1	0712	217	0.	*	1	0942	292	0.
1	0214	68	526.	*	1	0444	143	3.	*	1	0714	218	0.	*	1	0944	293	0.
1	0216	69	511.	*	1	0446	144	3.	*	1	0716	219	0.	*	1	0946	294	0.
1	0218	70	496.	*	1	0448	145	2.	*	1	0718	220	0.	*	1	0948	295	0.
1	0220	71	482.	*	1	0450	146	2.	*	1	0720	221	0.	*	1	0950	296	0.
1	0222	72	468.	*	1	0452	147	2.	*	1	0722	222	0.	*	1	0952	297	0.
1	0224	73	455.	*	1	0454	148	1.	*	1	0724	223	0.	*	1	0954	298	0.
1	0226	74	443.	*	1	0456	149	1.	*	1	0726	224	0.	*	1	0956	299	0.
1	0228	75	432.	*	1	0458	150	1.	*	1	0728	225	0.	*	1	0958	300	0.
				*					*					*				

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 PEAK FLOW      TIME                               MAXIMUM AVERAGE FLOW
                                         6-HR          24-HR          72-HR          9.97-HR
+   (CFS)       (HR)
                              (CFS)
+    4798.       .60                      723.           435.           435.           435.
                           (INCHES)      2.002          2.002          2.002          2.002
                            (AC-FT)       359.           359.           359.           359.

                            CUMULATIVE AREA =     3.36 SQ MI


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              **************
              *            *
 196 KK       *    9TO8    *
              *            *
              **************
                              MODIFIED PULS CHANNEL ROUTING
                              FROM NODE FR-9 TO FR-8 (MAIN CHANNEL)

                 HYDROGRAPH ROUTING DATA
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199 RS STORAGE ROUTING

NSTPS	2	NUMBER OF SUBREACHES
ITYP	FLOW	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

200 RC NORMAL DEPTH CHANNEL

ANL	.065	LEFT OVERBANK N-VALUE
ANCH	.065	MAIN CHANNEL N-VALUE
ANR	.065	RIGHT OVERBANK N-VALUE
RLNTH	4615.	REACH LENGTH
SEL	.0450	ENERGY SLOPE
ELMAX	.0	MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

--- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---

202 RY	ELEVATION	10.00	6.60	3.30	.00	.00	3.30	6.60	10.00
201 RX	DISTANCE	.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00

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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.65	1.47	2.47	3.65	5.01	6.55	8.26	10.15	12.22
OUTFLOW	.00	17.60	59.65	125.52	216.92	335.97	484.85	694.37	951.76	1249.55
ELEVATION	.00	.53	1.05	1.58	2.11	2.63	3.16	3.68	4.21	4.74
STORAGE	14.47	16.89	19.50	22.28	25.23	28.36	31.66	35.13	38.77	42.59
OUTFLOW	1589.90	1974.84	2406.26	2886.29	3416.55	3998.37	4633.39	5323.24	6069.52	6873.82
ELEVATION	5.26	5.79	6.32	6.84	7.37	7.89	8.42	8.95	9.47	10.00

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HYDROGRAPH AT STATION 9TO8

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	.0	*	1		0320	101	240.	2.0	2.2	*	1		0640	201	0.	.0	.0
1		0002	2	0.	.0	.0	*	1		0322	102	228.	1.9	2.2	*	1		0642	202	0.	.0	.0
1		0004	3	0.	.0	.0	*	1		0324	103	217.	1.8	2.1	*	1		0644	203	0.	.0	.0
1		0006	4	0.	.0	.0	*	1		0326	104	207.	1.8	2.0	*	1		0646	204	0.	.0	.0
1		0008	5	0.	.0	.0	*	1		0328	105	195.	1.7	2.0	*	1		0648	205	0.	.0	.0
1		0010	6	1.	.0	.0	*	1		0330	106	184.	1.6	1.9	*	1		0650	206	0.	.0	.0
1		0012	7	3.	.0	.1	*	1		0332	107	172.	1.5	1.8	*	1		0652	207	0.	.0	.0
1		0014	8	8.	.1	.2	*	1		0334	108	161.	1.5	1.8	*	1		0654	208	0.	.0	.0
1		0016	9	23.	.4	.6	*	1		0336	109	150.	1.4	1.7	*	1		0656	209	0.	.0	.0
1		0018	10	77.	.9	1.2	*	1		0338	110	140.	1.3	1.7	*	1		0658	210	0.	.0	.0
1		0020	11	197.	1.7	2.0	*	1		0340	111	130.	1.3	1.6	*	1		0700	211	0.	.0	.0
1		0022	12	429.	3.0	3.0	*	1		0342	112	122.	1.2	1.5	*	1		0702	212	0.	.0	.0
1		0024	13	847.	4.7	4.0	*	1		0344	113	114.	1.1	1.5	*	1		0704	213	0.	.0	.0
1		0026	14	1427.	6.7	5.0	*	1		0346	114	106.	1.1	1.4	*	1		0706	214	0.	.0	.0
1		0028	15	2113.	8.9	6.0	*	1		0348	115	99.	1.0	1.4	*	1		0708	215	0.	.0	.0
1		0030	16	2840.	11.0	6.8	*	1		0350	116	92.	1.0	1.3	*	1		0710	216	0.	.0	.0
1		0032	17	3517.	12.9	7.5	*	1		0352	117	85.	.9	1.3	*	1		0712	217	0.	.0	.0
1		0034	18	4060.	14.3	7.9	*	1		0354	118	79.	.9	1.2	*	1		0714	218	0.	.0	.0
1		0036	19	4432.	15.3	8.3	*	1		0356	119	72.	.8	1.2	*	1		0716	219	0.	.0	.0
1		0038	20	4629.	15.8	8.4	*	1		0358	120	67.	.8	1.1	*	1		0718	220	0.	.0	.0
1		0040	21	4681.	15.9	8.5	*	1		0400	121	62.	.8	1.1	*	1		0720	221	0.	.0	.0
1		0042	22	4620.	15.8	8.4	*	1		0402	122	57.	.7	1.0	*	1		0722	222	0.	.0	.0
1		0044	23	4485.	15.4	8.3	*	1		0404	123	54.	.7	1.0	*	1		0724	223	0.	.0	.0
1		0046	24	4300.	15.0	8.1	*	1		0406	124	50.	.6	.9	*	1		0726	224	0.	.0	.0
1		0048	25	4088.	14.4	8.0	*	1		0408	125	46.	.6	.9	*	1		0728	225	0.	.0	.0
1		0050	26	3871.	13.8	7.8	*	1		0410	126	43.	.6	.8	*	1		0730	226	0.	.0	.0
1		0052	27	3657.	13.3	7.6	*	1		0412	127	40.	.5	.8	*	1		0732	227	0.	.0	.0
1		0054	28	3448.	12.7	7.4	*	1		0414	128	37.	.5	.8	*	1		0734	228	0.	.0	.0
1		0056	29	3252.	12.2	7.2	*	1		0416	129	34.	.5	.7	*	1		0736	229	0.	.0	.0
1		0058	30	3062.	11.6	7.0	*	1		0418	130	31.	.5	.7	*	1		0738	230	0.	.0	.0
1		0100	31	2881.	11.1	6.8	*	1		0420	131	28.	.4	.7	*	1		0740	231	0.	.0	.0
1		0102	32	2715.	10.6	6.7	*	1		0422	132	26.	.4	.6	*	1		0742	232	0.	.0	.0
1		0104	33	2557.	10.2	6.5	*	1		0424	133	24.	.4	.6	*	1		0744	233	0.	.0	.0
1		0106	34	2411.	9.8	6.3	*	1		0426	134	22.	.4	.6	*	1		0746	234	0.	.0	.0
1		0108	35	2279.	9.4	6.2	*	1		0428	135	20.	.3	.6	*	1		0748	235	0.	.0	.0
1		0110	36	2153.	9.0	6.0	*	1		0430	136	19.	.3	.5	*	1		0750	236	0.	.0	.0
1		0112	37	2036.	8.6	5.9	*	1		0432	137	17.	.3	.5	*	1		0752	237	0.	.0	.0
1		0114	38	1931.	8.3	5.7	*	1		0434	138	17.	.3	.5	*	1		0754	238	0.	.0	.0
1		0116	39	1833.	8.0	5.6	*	1		0436	139	16.	.3	.5	*	1		0756	239	0.	.0	.0
1		0118	40	1739.	7.7	5.5	*	1		0438	140	15.	.3	.5	*	1		0758	240	0.	.0	.0
1		0120	41	1650.	7.4	5.3	*	1		0440	141	14.	.3	.4	*	1		0800	241	0.	.0	.0

1	0122	42	1569.	7.2	5.2	*	1	0442	142	14.	.3	.4	*	1	0802	242	0.	.0	.0
1	0124	43	1494.	6.9	5.1	*	1	0444	143	13.	.2	.4	*	1	0804	243	0.	.0	.0
1	0126	44	1424.	6.7	5.0	*	1	0446	144	12.	.2	.4	*	1	0806	244	0.	.0	.0
1	0128	45	1357.	6.5	4.9	*	1	0448	145	11.	.2	.3	*	1	0808	245	0.	.0	.0
1	0130	46	1294.	6.3	4.8	*	1	0450	146	11.	.2	.3	*	1	0810	246	0.	.0	.0
1	0132	47	1236.	6.1	4.7	*	1	0452	147	10.	.2	.3	*	1	0812	247	0.	.0	.0
1	0134	48	1183.	5.9	4.6	*	1	0454	148	9.	.2	.3	*	1	0814	248	0.	.0	.0
1	0136	49	1133.	5.7	4.5	*	1	0456	149	9.	.2	.3	*	1	0816	249	0.	.0	.0
1	0138	50	1085.	5.5	4.4	*	1	0458	150	8.	.1	.2	*	1	0818	250	0.	.0	.0
1	0140	51	1042.	5.4	4.4	*	1	0500	151	7.	.1	.2	*	1	0820	251	0.	.0	.0
1	0142	52	1002.	5.2	4.3	*	1	0502	152	7.	.1	.2	*	1	0822	252	0.	.0	.0
1	0144	53	965.	5.1	4.2	*	1	0504	153	6.	.1	.2	*	1	0824	253	0.	.0	.0
1	0146	54	931.	5.0	4.2	*	1	0506	154	6.	.1	.2	*	1	0826	254	0.	.0	.0
1	0148	55	898.	4.9	4.1	*	1	0508	155	5.	.1	.2	*	1	0828	255	0.	.0	.0
1	0150	56	866.	4.8	4.0	*	1	0510	156	5.	.1	.1	*	1	0830	256	0.	.0	.0
1	0152	57	835.	4.6	4.0	*	1	0512	157	4.	.1	.1	*	1	0832	257	0.	.0	.0
1	0154	58	805.	4.5	3.9	*	1	0514	158	4.	.1	.1	*	1	0834	258	0.	.0	.0
1	0156	59	776.	4.4	3.9	*	1	0516	159	4.	.1	.1	*	1	0836	259	0.	.0	.0
1	0158	60	749.	4.3	3.8	*	1	0518	160	3.	.1	.1	*	1	0838	260	0.	.0	.0
1	0200	61	723.	4.2	3.7	*	1	0520	161	3.	.1	.1	*	1	0840	261	0.	.0	.0
1	0202	62	699.	4.1	3.7	*	1	0522	162	3.	.1	.1	*	1	0842	262	0.	.0	.0
1	0204	63	678.	4.1	3.6	*	1	0524	163	3.	.0	.1	*	1	0844	263	0.	.0	.0
1	0206	64	658.	4.0	3.6	*	1	0526	164	2.	.0	.1	*	1	0846	264	0.	.0	.0
1	0208	65	638.	3.9	3.5	*	1	0528	165	2.	.0	.1	*	1	0848	265	0.	.0	.0
1	0210	66	618.	3.8	3.5	*	1	0530	166	2.	.0	.1	*	1	0850	266	0.	.0	.0
1	0212	67	598.	3.7	3.4	*	1	0532	167	2.	.0	.1	*	1	0852	267	0.	.0	.0
1	0214	68	580.	3.7	3.4	*	1	0534	168	2.	.0	.0	*	1	0854	268	0.	.0	.0
1	0216	69	562.	3.6	3.4	*	1	0536	169	1.	.0	.0	*	1	0856	269	0.	.0	.0
1	0218	70	544.	3.5	3.3	*	1	0538	170	1.	.0	.0	*	1	0858	270	0.	.0	.0
1	0220	71	528.	3.4	3.3	*	1	0540	171	1.	.0	.0	*	1	0900	271	0.	.0	.0
1	0222	72	512.	3.4	3.2	*	1	0542	172	1.	.0	.0	*	1	0902	272	0.	.0	.0
1	0224	73	497.	3.3	3.2	*	1	0544	173	1.	.0	.0	*	1	0904	273	0.	.0	.0
1	0226	74	484.	3.3	3.2	*	1	0546	174	1.	.0	.0	*	1	0906	274	0.	.0	.0
1	0228	75	474.	3.2	3.1	*	1	0548	175	1.	.0	.0	*	1	0908	275	0.	.0	.0
1	0230	76	463.	3.2	3.1	*	1	0550	176	1.	.0	.0	*	1	0910	276	0.	.0	.0
1	0232	77	452.	3.1	3.0	*	1	0552	177	1.	.0	.0	*	1	0912	277	0.	.0	.0
1	0234	78	441.	3.0	3.0	*	1	0554	178	1.	.0	.0	*	1	0914	278	0.	.0	.0
1	0236	79	430.	3.0	3.0	*	1	0556	179	0.	.0	.0	*	1	0916	279	0.	.0	.0
1	0238	80	419.	2.9	2.9	*	1	0558	180	0.	.0	.0	*	1	0918	280	0.	.0	.0
1	0240	81	408.	2.9	2.9	*	1	0600	181	0.	.0	.0	*	1	0920	281	0.	.0	.0
1	0242	82	398.	2.8	2.8	*	1	0602	182	0.	.0	.0	*	1	0922	282	0.	.0	.0
1	0244	83	387.	2.8	2.8	*	1	0604	183	0.	.0	.0	*	1	0924	283	0.	.0	.0
1	0246	84	378.	2.7	2.8	*	1	0606	184	0.	.0	.0	*	1	0926	284	0.	.0	.0
1	0248	85	368.	2.7	2.7	*	1	0608	185	0.	.0	.0	*	1	0928	285	0.	.0	.0
1	0250	86	359.	2.6	2.7	*	1	0610	186	0.	.0	.0	*	1	0930	286	0.	.0	.0
1	0252	87	351.	2.6	2.7	*	1	0612	187	0.	.0	.0	*	1	0932	287	0.	.0	.0
1	0254	88	343.	2.5	2.7	*	1	0614	188	0.	.0	.0	*	1	0934	288	0.	.0	.0
1	0256	89	335.	2.5	2.6	*	1	0616	189	0.	.0	.0	*	1	0936	289	0.	.0	.0
1	0258	90	328.	2.5	2.6	*	1	0618	190	0.	.0	.0	*	1	0938	290	0.	.0	.0
1	0300	91	322.	2.4	2.6	*	1	0620	191	0.	.0	.0	*	1	0940	291	0.	.0	.0
1	0302	92	315.	2.4	2.5	*	1	0622	192	0.	.0	.0	*	1	0942	292	0.	.0	.0
1	0304	93	309.	2.4	2.5	*	1	0624	193	0.	.0	.0	*	1	0944	293	0.	.0	.0
1	0306	94	302.	2.3	2.5	*	1	0626	194	0.	.0	.0	*	1	0946	294	0.	.0	.0
1	0308	95	295.	2.3	2.5	*	1	0628	195	0.	.0	.0	*	1	0948	295	0.	.0	.0
1	0310	96	288.	2.2	2.4	*	1	0630	196	0.	.0	.0	*	1	0950	296	0.	.0	.0
1	0312	97	280.	2.2	2.4	*	1	0632	197	0.	.0	.0	*	1	0952	297	0.	.0	.0
1	0314	98	271.	2.1	2.3	*	1	0634	198	0.	.0	.0	*	1	0954	298	0.	.0	.0
1	0316	99	261.	2.1	2.3	*	1	0636	199	0.	.0	.0	*	1	0956	299	0.	.0	.0
1	0318	100	251.	2.0	2.3	*	1	0638	200	0.	.0	.0	*	1	0958	300	0.	.0	.0
						*							*						

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	PEAK FLOW	TIME			MAXIMUM AVERAGE FLOW		
				6-HR	24-HR	72-HR	9.97-HR
+	(CFS)	(HR)					
			(CFS)				
+	4681.	.67		723.	435.	435.	435.
			(INCHES)	2.002	2.002	2.002	2.002
			(AC-FT)	359.	359.	359.	359.

	PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE		
			6-HR	24-HR	72-HR	9.97-HR
+	(AC-FT)	(HR)				
	16.	.67	3.	2.	2.	2.

	PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE		
			6-HR	24-HR	72-HR	9.97-HR
+	(FEET)	(HR)				
	8.46	.67	2.56	1.54	1.54	1.54

CUMULATIVE AREA = 3.36 SQ MI

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

            **************
            *            *
 203 KK     *    FR-8    *
            *            *
            **************
                      LOCAL RUNOFF TO FR-8
                      BASIN FR-8

              SUBBASIN RUNOFF DATA

 206 BA         SUBBASIN CHARACTERISTICS
                      TAREA          .59  SUBBASIN AREA

                PRECIPITATION DATA

 207 PB               STORM         2.98  BASIN TOTAL PRECIPITATION

  20 PI           INCREMENTAL PRECIPITATION PATTERN
                      .04       .04       .06       .08       .08       .07       .07       .05       .03       .03
                      .02       .02       .02       .02       .02       .02       .02       .01       .01       .01
                      .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                      .01       .01       .01       .01       .01       .01       .01       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

 208 LS         SCS LOSS RATE
                      STRTL          .35  INITIAL ABSTRACTION
                     CRVNBR        85.00  CURVE NUMBER
                      RTIMP        20.00  PERCENT IMPERVIOUS AREA

 209 UD         SCS DIMENSIONLESS UNITGRAPH
                       TLAG          .19  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                     31 END-OF-PERIOD ORDINATES
              100.      296.      607.     1002.     1283.     1372.     1344.     1200.     1013.      764.
              570.      437.      342.      266.      200.      156.      121.       93.       71.       54.
               42.       33.       25.       19.       15.       12.       10.        7.        5.        3.
                0.

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                                                  HYDROGRAPH AT STATION    FR-8

*********************************************************************************************************************************
                                                                 *
      DA MON HRMN  ORD    RAIN    LOSS  EXCESS    COMP Q         *     DA MON HRMN  ORD    RAIN    LOSS  EXCESS    COMP Q
                                                                 *
       1    0000     1     .00     .00     .00        0.         *      1    0500  151     .00     .00     .00        0.
       1    0002     2     .12     .10     .02        2.         *      1    0502  152     .00     .00     .00        0.
       1    0004     3     .12     .10     .02       10.         *      1    0504  153     .00     .00     .00        0.
       1    0006     4     .18     .14     .04       26.         *      1    0506  154     .00     .00     .00        0.
       1    0008     5     .24     .16     .08       59.         *      1    0508  155     .00     .00     .00        0.
       1    0010     6     .24     .13     .12      116.         *      1    0510  156     .00     .00     .00        0.
       1    0012     7     .20     .08     .11      200.         *      1    0512  157     .00     .00     .00        0.
       1    0014     8     .20     .07     .12      317.         *      1    0514  158     .00     .00     .00        0.
       1    0016     9     .15     .05     .10      457.         *      1    0516  159     .00     .00     .00        0.
       1    0018    10     .10     .03     .07      598.         *      1    0518  160     .00     .00     .00        0.
       1    0020    11     .10     .03     .07      724.         *      1    0520  161     .00     .00     .00        0.
       1    0022    12     .07     .02     .05      818.         *      1    0522  162     .00     .00     .00        0.
       1    0024    13     .07     .02     .06      871.         *      1    0524  163     .00     .00     .00        0.
       1    0026    14     .07     .02     .05      887.         *      1    0526  164     .00     .00     .00        0.
       1    0028    15     .06     .01     .05      871.         *      1    0528  165     .00     .00     .00        0.
       1    0030    16     .06     .01     .05      835.         *      1    0530  166     .00     .00     .00        0.
       1    0032    17     .05     .01     .04      789.         *      1    0532  167     .00     .00     .00        0.
       1    0034    18     .05     .01     .04      739.         *      1    0534  168     .00     .00     .00        0.
       1    0036    19     .04     .01     .04      692.         *      1    0536  169     .00     .00     .00        0.
       1    0038    20     .04     .01     .03      646.         *      1    0538  170     .00     .00     .00        0.
       1    0040    21     .04     .01     .03      603.         *      1    0540  171     .00     .00     .00        0.
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1	0042	22	.03	.01	.03	563.	*
1	0044	23	.03	.01	.03	525.	*
1	0046	24	.03	.01	.03	491.	*
1	0048	25	.03	.01	.02	459.	*
1	0050	26	.03	.01	.02	429.	*
1	0052	27	.03	.00	.02	402.	*
1	0054	28	.03	.00	.02	377.	*
1	0056	29	.02	.00	.02	354.	*
1	0058	30	.02	.00	.02	333.	*
1	0100	31	.02	.00	.02	313.	*
1	0102	32	.02	.00	.02	295.	*
1	0104	33	.02	.00	.02	279.	*
1	0106	34	.02	.00	.02	263.	*
1	0108	35	.02	.00	.01	249.	*
1	0110	36	.02	.00	.01	236.	*
1	0112	37	.02	.00	.01	223.	*
1	0114	38	.02	.00	.01	212.	*
1	0116	39	.01	.00	.01	202.	*
1	0118	40	.01	.00	.01	192.	*
1	0120	41	.01	.00	.01	183.	*
1	0122	42	.01	.00	.01	175.	*
1	0124	43	.01	.00	.01	167.	*
1	0126	44	.01	.00	.01	160.	*
1	0128	45	.01	.00	.01	153.	*
1	0130	46	.01	.00	.01	147.	*
1	0132	47	.01	.00	.01	141.	*
1	0134	48	.01	.00	.01	135.	*
1	0136	49	.01	.00	.01	130.	*
1	0138	50	.01	.00	.01	125.	*
1	0140	51	.01	.00	.01	120.	*
1	0142	52	.01	.00	.01	116.	*
1	0144	53	.01	.00	.01	111.	*
1	0146	54	.01	.00	.01	108.	*
1	0148	55	.01	.00	.01	104.	*
1	0150	56	.01	.00	.01	100.	*
1	0152	57	.01	.00	.01	97.	*
1	0154	58	.01	.00	.01	94.	*
1	0156	59	.01	.00	.01	91.	*
1	0158	60	.01	.00	.01	88.	*
1	0200	61	.01	.00	.01	85.	*
1	0202	62	.01	.00	.01	82.	*
1	0204	63	.01	.00	.01	80.	*
1	0206	64	.01	.00	.01	77.	*
1	0208	65	.01	.00	.01	75.	*
1	0210	66	.01	.00	.01	73.	*
1	0212	67	.01	.00	.00	71.	*
1	0214	68	.01	.00	.00	69.	*
1	0216	69	.01	.00	.00	67.	*
1	0218	70	.01	.00	.00	65.	*
1	0220	71	.01	.00	.00	63.	*
1	0222	72	.01	.00	.00	61.	*
1	0224	73	.01	.00	.00	60.	*
1	0226	74	.00	.00	.00	58.	*
1	0228	75	.00	.00	.00	57.	*
1	0230	76	.00	.00	.00	55.	*
1	0232	77	.00	.00	.00	54.	*
1	0234	78	.00	.00	.00	53.	*
1	0236	79	.00	.00	.00	51.	*
1	0238	80	.00	.00	.00	50.	*
1	0240	81	.00	.00	.00	49.	*
1	0242	82	.00	.00	.00	48.	*
1	0244	83	.00	.00	.00	47.	*
1	0246	84	.00	.00	.00	46.	*
1	0248	85	.00	.00	.00	44.	*
1	0250	86	.00	.00	.00	43.	*
1	0252	87	.00	.00	.00	42.	*
1	0254	88	.00	.00	.00	42.	*
1	0256	89	.00	.00	.00	41.	*
1	0258	90	.00	.00	.00	40.	*
1	0300	91	.00	.00	.00	39.	*
1	0302	92	.00	.00	.00	38.	*
1	0304	93	.00	.00	.00	36.	*
1	0306	94	.00	.00	.00	34.	*
1	0308	95	.00	.00	.00	30.	*
1	0310	96	.00	.00	.00	26.	*
1	0312	97	.00	.00	.00	21.	*
1	0314	98	.00	.00	.00	17.	*
1	0316	99	.00	.00	.00	13.	*
1	0318	100	.00	.00	.00	10.	*
1	0320	101	.00	.00	.00	8.	*
1	0322	102	.00	.00	.00	6.	*

1	0542	172	.00	.00	.00	0.
1	0544	173	.00	.00	.00	0.
1	0546	174	.00	.00	.00	0.
1	0548	175	.00	.00	.00	0.
1	0550	176	.00	.00	.00	0.
1	0552	177	.00	.00	.00	0.
1	0554	178	.00	.00	.00	0.
1	0556	179	.00	.00	.00	0.
1	0558	180	.00	.00	.00	0.
1	0600	181	.00	.00	.00	0.
1	0602	182	.00	.00	.00	0.
1	0604	183	.00	.00	.00	0.
1	0606	184	.00	.00	.00	0.
1	0608	185	.00	.00	.00	0.
1	0610	186	.00	.00	.00	0.
1	0612	187	.00	.00	.00	0.
1	0614	188	.00	.00	.00	0.
1	0616	189	.00	.00	.00	0.
1	0618	190	.00	.00	.00	0.
1	0620	191	.00	.00	.00	0.
1	0622	192	.00	.00	.00	0.
1	0624	193	.00	.00	.00	0.
1	0626	194	.00	.00	.00	0.
1	0628	195	.00	.00	.00	0.
1	0630	196	.00	.00	.00	0.
1	0632	197	.00	.00	.00	0.
1	0634	198	.00	.00	.00	0.
1	0636	199	.00	.00	.00	0.
1	0638	200	.00	.00	.00	0.
1	0640	201	.00	.00	.00	0.
1	0642	202	.00	.00	.00	0.
1	0644	203	.00	.00	.00	0.
1	0646	204	.00	.00	.00	0.
1	0648	205	.00	.00	.00	0.
1	0650	206	.00	.00	.00	0.
1	0652	207	.00	.00	.00	0.
1	0654	208	.00	.00	.00	0.
1	0656	209	.00	.00	.00	0.
1	0658	210	.00	.00	.00	0.
1	0700	211	.00	.00	.00	0.
1	0702	212	.00	.00	.00	0.
1	0704	213	.00	.00	.00	0.
1	0706	214	.00	.00	.00	0.
1	0708	215	.00	.00	.00	0.
1	0710	216	.00	.00	.00	0.
1	0712	217	.00	.00	.00	0.
1	0714	218	.00	.00	.00	0.
1	0716	219	.00	.00	.00	0.
1	0718	220	.00	.00	.00	0.
1	0720	221	.00	.00	.00	0.
1	0722	222	.00	.00	.00	0.
1	0724	223	.00	.00	.00	0.
1	0726	224	.00	.00	.00	0.
1	0728	225	.00	.00	.00	0.
1	0730	226	.00	.00	.00	0.
1	0732	227	.00	.00	.00	0.
1	0734	228	.00	.00	.00	0.
1	0736	229	.00	.00	.00	0.
1	0738	230	.00	.00	.00	0.
1	0740	231	.00	.00	.00	0.
1	0742	232	.00	.00	.00	0.
1	0744	233	.00	.00	.00	0.
1	0746	234	.00	.00	.00	0.
1	0748	235	.00	.00	.00	0.
1	0750	236	.00	.00	.00	0.
1	0752	237	.00	.00	.00	0.
1	0754	238	.00	.00	.00	0.
1	0756	239	.00	.00	.00	0.
1	0758	240	.00	.00	.00	0.
1	0800	241	.00	.00	.00	0.
1	0802	242	.00	.00	.00	0.
1	0804	243	.00	.00	.00	0.
1	0806	244	.00	.00	.00	0.
1	0808	245	.00	.00	.00	0.
1	0810	246	.00	.00	.00	0.
1	0812	247	.00	.00	.00	0.
1	0814	248	.00	.00	.00	0.
1	0816	249	.00	.00	.00	0.
1	0818	250	.00	.00	.00	0.
1	0820	251	.00	.00	.00	0.
1	0822	252	.00	.00	.00	0.

1	0324	103	.00	.00	.00	5.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	4.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	3.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	2.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	2.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	1.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	1.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	1.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	1.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.
							*							

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TOTAL RAINFALL = 2.98, TOTAL LOSS = 1.13, TOTAL EXCESS = 1.85

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 887.	.43		118.	71.	71.	71.
		(INCHES)	1.853	1.853	1.853	1.853
		(AC-FT)	59.	59.	59.	59.

CUMULATIVE AREA = .59 SQ MI

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              **************
              *            *
 210 KK       *    CO-8    *
              *            *
              **************
                              COMBINE HYDROGRAPHS
                              AT NODE FR-8 (MAIN CHANNEL)

 213 HC             HYDROGRAPH COMBINATION
                         ICOMP              2   NUMBER OF HYDROGRAPHS TO COMBINE
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HYDROGRAPH AT STATION CO-8
SUM OF 2 HYDROGRAPHS

DA MON	HRMN	ORD	FLOW	DA MON	HRMN	ORD	FLOW	DA MON	HRMN	ORD	FLOW	DA MON	HRMN	ORD	FLOW
1	0000	1	0.	1	0230	76	518.	1	0500	151	7.	1	0730	226	0.
1	0002	2	2.	1	0232	77	506.	1	0502	152	7.	1	0732	227	0.
1	0004	3	10.	1	0234	78	493.	1	0504	153	6.	1	0734	228	0.
1	0006	4	26.	1	0236	79	481.	1	0506	154	6.	1	0736	229	0.
1	0008	5	59.	1	0238	80	469.	1	0508	155	5.	1	0738	230	0.
1	0010	6	117.	1	0240	81	457.	1	0510	156	5.	1	0740	231	0.
1	0012	7	203.	1	0242	82	445.	1	0512	157	4.	1	0742	232	0.
1	0014	8	325.	1	0244	83	434.	1	0514	158	4.	1	0744	233	0.
1	0016	9	480.	1	0246	84	423.	1	0516	159	4.	1	0746	234	0.
1	0018	10	675.	1	0248	85	413.	1	0518	160	3.	1	0748	235	0.
1	0020	11	921.	1	0250	86	403.	1	0520	161	3.	1	0750	236	0.
1	0022	12	1246.	1	0252	87	393.	1	0522	162	3.	1	0752	237	0.
1	0024	13	1719.	1	0254	88	384.	1	0524	163	3.	1	0754	238	0.
1	0026	14	2314.	1	0256	89	376.	1	0526	164	2.	1	0756	239	0.
1	0028	15	2984.	1	0258	90	368.	1	0528	165	2.	1	0758	240	0.
1	0030	16	3674.	1	0300	91	361.	1	0530	166	2.	1	0800	241	0.
1	0032	17	4305.	1	0302	92	353.	1	0532	167	2.	1	0802	242	0.
1	0034	18	4799.	1	0304	93	345.	1	0534	168	2.	1	0804	243	0.
1	0036	19	5124.	1	0306	94	336.	1	0536	169	1.	1	0806	244	0.
1	0038	20	5275.	1	0308	95	325.	1	0538	170	1.	1	0808	245	0.
1	0040	21	5284.	1	0310	96	314.	1	0540	171	1.	1	0810	246	0.
1	0042	22	5183.	1	0312	97	301.	1	0542	172	1.	1	0812	247	0.
1	0044	23	5010.	1	0314	98	288.	1	0544	173	1.	1	0814	248	0.
1	0046	24	4791.	1	0316	99	274.	1	0546	174	1.	1	0816	249	0.
1	0048	25	4547.	1	0318	100	261.	1	0548	175	1.	1	0818	250	0.
1	0050	26	4300.	1	0320	101	247.	1	0550	176	1.	1	0820	251	0.
1	0052	27	4059.	1	0322	102	234.	1	0552	177	1.	1	0822	252	0.
1	0054	28	3825.	1	0324	103	222.	1	0554	178	1.	1	0824	253	0.
1	0056	29	3606.	1	0326	104	210.	1	0556	179	0.	1	0826	254	0.
1	0058	30	3395.	1	0328	105	198.	1	0558	180	0.	1	0828	255	0.
1	0100	31	3194.	1	0330	106	186.	1	0600	181	0.	1	0830	256	0.
1	0102	32	3011.	1	0332	107	174.	1	0602	182	0.	1	0832	257	0.
1	0104	33	2836.	1	0334	108	162.	1	0604	183	0.	1	0834	258	0.
1	0106	34	2674.	1	0336	109	151.	1	0606	184	0.	1	0836	259	0.
1	0108	35	2528.	1	0338	110	140.	1	0608	185	0.	1	0838	260	0.
1	0110	36	2389.	1	0340	111	131.	1	0610	186	0.	1	0840	261	0.
1	0112	37	2260.	1	0342	112	122.	1	0612	187	0.	1	0842	262	0.
1	0114	38	2143.	1	0344	113	114.	1	0614	188	0.	1	0844	263	0.
1	0116	39	2035.	1	0346	114	107.	1	0616	189	0.	1	0846	264	0.
1	0118	40	1931.	1	0348	115	99.	1	0618	190	0.	1	0848	265	0.
1	0120	41	1833.	1	0350	116	92.	1	0620	191	0.	1	0850	266	0.
1	0122	42	1744.	1	0352	117	85.	1	0622	192	0.	1	0852	267	0.
1	0124	43	1661.	1	0354	118	79.	1	0624	193	0.	1	0854	268	0.
1	0126	44	1584.	1	0356	119	72.	1	0626	194	0.	1	0856	269	0.
1	0128	45	1510.	1	0358	120	67.	1	0628	195	0.	1	0858	270	0.
1	0130	46	1441.	1	0400	121	62.	1	0630	196	0.	1	0900	271	0.
1	0132	47	1377.	1	0402	122	57.	1	0632	197	0.	1	0902	272	0.
1	0134	48	1318.	1	0404	123	54.	1	0634	198	0.	1	0904	273	0.
1	0136	49	1262.	1	0406	124	50.	1	0636	199	0.	1	0906	274	0.
1	0138	50	1210.	1	0408	125	46.	1	0638	200	0.	1	0908	275	0.
1	0140	51	1162.	1	0410	126	43.	1	0640	201	0.	1	0910	276	0.
1	0142	52	1117.	1	0412	127	40.	1	0642	202	0.	1	0912	277	0.
1	0144	53	1076.	1	0414	128	37.	1	0644	203	0.	1	0914	278	0.
1	0146	54	1038.	1	0416	129	34.	1	0646	204	0.	1	0916	279	0.
1	0148	55	1002.	1	0418	130	31.	1	0648	205	0.	1	0918	280	0.
1	0150	56	966.	1	0420	131	28.	1	0650	206	0.	1	0920	281	0.
1	0152	57	932.	1	0422	132	26.	1	0652	207	0.	1	0922	282	0.
1	0154	58	899.	1	0424	133	24.	1	0654	208	0.	1	0924	283	0.
1	0156	59	867.	1	0426	134	22.	1	0656	209	0.	1	0926	284	0.
1	0158	60	837.	1	0428	135	20.	1	0658	210	0.	1	0928	285	0.
1	0200	61	808.	1	0430	136	19.	1	0700	211	0.	1	0930	286	0.
1	0202	62	782.	1	0432	137	17.	1	0702	212	0.	1	0932	287	0.
1	0204	63	758.	1	0434	138	17.	1	0704	213	0.	1	0934	288	0.
1	0206	64	735.	1	0436	139	16.	1	0706	214	0.	1	0936	289	0.
1	0208	65	713.	1	0438	140	15.	1	0708	215	0.	1	0938	290	0.
1	0210	66	690.	1	0440	141	14.	1	0710	216	0.	1	0940	291	0.
1	0212	67	669.	1	0442	142	14.	1	0712	217	0.	1	0942	292	0.
1	0214	68	648.	1	0444	143	13.	1	0714	218	0.	1	0944	293	0.
1	0216	69	628.	1	0446	144	12.	1	0716	219	0.	1	0946	294	0.
1	0218	70	609.	1	0448	145	11.	1	0718	220	0.	1	0948	295	0.
1	0220	71	591.	1	0450	146	11.	1	0720	221	0.	1	0950	296	0.

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  1    0222   72      573.   *    1    0452  147       10.   *    1     0722  222        0.   *    1     0952  297        0.
  1    0224   73      557.   *    1    0454  148        9.   *    1     0724  223        0.   *    1     0954  298        0.
  1    0226   74      543.   *    1    0456  149        9.   *    1     0726  224        0.   *    1     0956  299        0.
  1    0228   75      531.   *    1    0458  150        8.   *    1     0728  225        0.   *    1     0958  300        0.
                             *                               *                                *
*********************************************************************************************************************************

  PEAK FLOW      TIME                         MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR        9.97-HR
+   (CFS)        (HR)
                              (CFS)
+    5284.        .67                    841.          506.         506.          506.
                           (INCHES)     1.980         1.980        1.980         1.980
                            (AC-FT)      417.          417.         417.          417.

                          CUMULATIVE AREA =    3.95 SQ MI



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


             **************
             *            *
  214 KK     *    FR-82   *
             *            *
             **************
                           HEADWATERS TO TRIBUTARY TO
                           FINGER ROCK WASH
                           BASIN FR-82

                SUBBASIN RUNOFF DATA

  218 BA          SUBBASIN CHARACTERISTICS
                        TAREA          .33  SUBBASIN AREA

                  PRECIPITATION DATA

  219 PB                STORM         2.98  BASIN TOTAL PRECIPITATION

   20 PI            INCREMENTAL PRECIPITATION PATTERN
                       .04       .04       .06       .08       .08       .07       .07       .05       .03       .03
                       .02       .02       .02       .02       .02       .02       .02       .01       .01       .01
                       .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                       .01       .01       .01       .01       .01       .01       .01       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

  220 LS          SCS LOSS RATE
                        STRTL          .35  INITIAL ABSTRACTION
                       CRVNBR        85.00  CURVE NUMBER
                        RTIMP        15.00  PERCENT IMPERVIOUS AREA

  221 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG          .17  LAG

                                                                 ***

                                                           UNIT HYDROGRAPH
                                                      27 END-OF-PERIOD ORDINATES
                 77.       234.       489.       744.       865.       864.       764.       628.       451.       327.
                242.       184.       135.       101.        75.        56.        41.        31.        23.        17.
                 13.         9.         8.         6.         4.         2.         1.
*********************************************************************************************************************************

                                                HYDROGRAPH AT STATION    FR-82

*********************************************************************************************************************************
                                                                 *
       DA MON HRMN  ORD     RAIN     LOSS  EXCESS      COMP Q    *       DA MON HRMN  ORD     RAIN     LOSS  EXCESS      COMP Q
                                                                 *
        1    0000    1       .00      .00     .00         0.     *        1    0500  151       .00      .00     .00         0.
        1    0002    2       .12      .10     .02         1.     *        1    0502  152       .00      .00     .00         0.
        1    0004    3       .12      .10     .02         6.     *        1    0504  153       .00      .00     .00         0.
        1    0006    4       .18      .15     .03        15.     *        1    0506  154       .00      .00     .00         0.
        1    0008    5       .24      .17     .07        35.     *        1    0508  155       .00      .00     .00         0.
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1	0010	6	.24	.13	.11	70.	*	1	0510	156	.00	.00	.00	0.
1	0012	7	.20	.09	.11	124.	*	1	0512	157	.00	.00	.00	0.
1	0014	8	.20	.08	.12	199.	*	1	0514	158	.00	.00	.00	0.
1	0016	9	.15	.05	.10	285.	*	1	0516	159	.00	.00	.00	0.
1	0018	10	.10	.03	.07	369.	*	1	0518	160	.00	.00	.00	0.
1	0020	11	.10	.03	.07	437.	*	1	0520	161	.00	.00	.00	0.
1	0022	12	.07	.02	.05	479.	*	1	0522	162	.00	.00	.00	0.
1	0024	13	.07	.02	.05	495.	*	1	0524	163	.00	.00	.00	0.
1	0026	14	.07	.02	.05	488.	*	1	0526	164	.00	.00	.00	0.
1	0028	15	.06	.01	.04	467.	*	1	0528	165	.00	.00	.00	0.
1	0030	16	.06	.01	.05	439.	*	1	0530	166	.00	.00	.00	0.
1	0032	17	.05	.01	.04	410.	*	1	0532	167	.00	.00	.00	0.
1	0034	18	.05	.01	.04	382.	*	1	0534	168	.00	.00	.00	0.
1	0036	19	.04	.01	.03	355.	*	1	0536	169	.00	.00	.00	0.
1	0038	20	.04	.01	.03	331.	*	1	0538	170	.00	.00	.00	0.
1	0040	21	.04	.01	.03	308.	*	1	0540	171	.00	.00	.00	0.
1	0042	22	.03	.01	.03	287.	*	1	0542	172	.00	.00	.00	0.
1	0044	23	.03	.01	.03	268.	*	1	0544	173	.00	.00	.00	0.
1	0046	24	.03	.01	.03	250.	*	1	0546	174	.00	.00	.00	0.
1	0048	25	.03	.01	.02	234.	*	1	0548	175	.00	.00	.00	0.
1	0050	26	.03	.01	.02	219.	*	1	0550	176	.00	.00	.00	0.
1	0052	27	.03	.00	.02	205.	*	1	0552	177	.00	.00	.00	0.
1	0054	28	.03	.00	.02	193.	*	1	0554	178	.00	.00	.00	0.
1	0056	29	.02	.00	.02	181.	*	1	0556	179	.00	.00	.00	0.
1	0058	30	.02	.00	.02	170.	*	1	0558	180	.00	.00	.00	0.
1	0100	31	.02	.00	.02	160.	*	1	0600	181	.00	.00	.00	0.
1	0102	32	.02	.00	.02	151.	*	1	0602	182	.00	.00	.00	0.
1	0104	33	.02	.00	.02	143.	*	1	0604	183	.00	.00	.00	0.
1	0106	34	.02	.00	.02	135.	*	1	0606	184	.00	.00	.00	0.
1	0108	35	.02	.00	.01	128.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.00	.01	122.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.02	.00	.01	116.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.02	.00	.01	110.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.01	.00	.01	105.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.01	.00	.01	100.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.01	.00	.01	96.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	91.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	88.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	84.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	80.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	77.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	74.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	71.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	69.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	66.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	64.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	61.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	59.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	57.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	55.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	53.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.01	51.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.01	50.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.01	48.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.01	47.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.01	45.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.01	44.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.01	43.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.01	41.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.01	40.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.01	39.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.00	38.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.00	37.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.00	36.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.01	.00	.00	35.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.01	.00	.00	34.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.01	.00	.00	33.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.01	.00	.00	32.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.00	.00	.00	31.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.00	.00	.00	30.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.00	.00	.00	30.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.00	.00	.00	29.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	28.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	28.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	27.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	26.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	26.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	25.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	25.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	24.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	23.	*	1	0750	236	.00	.00	.00	0.

1	0252	87	.00	.00	.00	23.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	22.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	22.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	21.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	21.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	20.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	19.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	17.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	15.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	12.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	10.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	7.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	5.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	4.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	3.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	2.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	2.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	1.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	1.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	1.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	0.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	0.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	0.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	0.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	0.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.
							*							

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TOTAL RAINFALL = 2.98, TOTAL LOSS = 1.20, TOTAL EXCESS = 1.78

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 495.	.40		63.	38.	38.	38.
		(INCHES)	1.783	1.783	1.783	1.783
		(AC-FT)	31.	31.	31.	31.

CUMULATIVE AREA = .33 SQ MI

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           *            *
222 KK     *   82T081   *
           *            *
           **************
                      MODIFIED PULS CHANNEL ROUTING
                      FROM NODE FR-82 TO FR-81

             HYDROGRAPH ROUTING DATA

225 RS         STORAGE ROUTING
                    NSTPS           3  NUMBER OF SUBREACHES
                     ITYP        FLOW  TYPE OF INITIAL CONDITION
                   RSVRIC       -1.00  INITIAL CONDITION
                        X         .00 WORKING R AND D COEFFICIENT

226 RC         NORMAL DEPTH CHANNEL
                      ANL        .085  LEFT OVERBANK N-VALUE
                     ANCH        .085  MAIN CHANNEL N-VALUE
                      ANR        .085  RIGHT OVERBANK N-VALUE
                    RLNTH       4475.  REACH LENGTH
                      SEL       .0490  ENERGY SLOPE
                    ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                         CROSS-SECTION DATA
                         --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
228 RY       ELEVATION   10.00      6.60      3.30       .00       .00      3.30      6.60     10.00
227 RX       DISTANCE      .00     10.00     20.00     30.00     40.00     50.00     60.00     70.00

                                                        ***

                                       COMPUTED STORAGE-OUTFLOW-ELEVATION DATA
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STORAGE	.00	.63	1.43	2.40	3.54	4.86	6.35	8.01	9.84	11.85
OUTFLOW	.00	14.05	47.60	100.16	173.10	268.09	386.90	554.08	759.48	997.10
ELEVATION	.00	.53	1.05	1.58	2.11	2.63	3.16	3.68	4.21	4.74
STORAGE	14.03	16.38	18.91	21.60	24.47	27.50	30.70	34.06	37.60	41.30
OUTFLOW	1268.70	1575.86	1920.12	2303.17	2726.30	3190.58	3697.31	4247.78	4843.29	5485.10
ELEVATION	5.26	5.79	6.32	6.84	7.37	7.89	8.42	8.95	9.47	10.00

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                                        HYDROGRAPH AT STATION    82T081

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	.0	*	1		0320	101	17.	.2	.6	*	1		0640	201	0.	.0	.0
1		0002	2	0.	.0	.0	*	1		0322	102	16.	.2	.6	*	1		0642	202	0.	.0	.0
1		0004	3	0.	.0	.0	*	1		0324	103	15.	.2	.5	*	1		0644	203	0.	.0	.0
1		0006	4	0.	.0	.0	*	1		0326	104	14.	.2	.5	*	1		0646	204	0.	.0	.0
1		0008	5	0.	.0	.0	*	1		0328	105	14.	.2	.5	*	1		0648	205	0.	.0	.0
1		0010	6	0.	.0	.0	*	1		0330	106	13.	.2	.5	*	1		0650	206	0.	.0	.0
1		0012	7	1.	.0	.0	*	1		0332	107	12.	.2	.5	*	1		0652	207	0.	.0	.0
1		0014	8	3.	.0	.1	*	1		0334	108	12.	.2	.4	*	1		0654	208	0.	.0	.0
1		0016	9	8.	.1	.3	*	1		0336	109	11.	.2	.4	*	1		0656	209	0.	.0	.0
1		0018	10	22.	.3	.6	*	1		0338	110	10.	.2	.4	*	1		0658	210	0.	.0	.0
1		0020	11	56.	.5	1.1	*	1		0340	111	9.	.1	.4	*	1		0700	211	0.	.0	.0
1		0022	12	113.	.9	1.7	*	1		0342	112	9.	.1	.3	*	1		0702	212	0.	.0	.0
1		0024	13	188.	1.2	2.2	*	1		0344	113	8.	.1	.3	*	1		0704	213	0.	.0	.0
1		0026	14	268.	1.6	2.6	*	1		0346	114	7.	.1	.3	*	1		0706	214	0.	.0	.0
1		0028	15	342.	1.9	3.0	*	1		0348	115	7.	.1	.3	*	1		0708	215	0.	.0	.0
1		0030	16	396.	2.1	3.2	*	1		0350	116	6.	.1	.2	*	1		0710	216	0.	.0	.0
1		0032	17	431.	2.3	3.3	*	1		0352	117	6.	.1	.2	*	1		0712	217	0.	.0	.0
1		0034	18	440.	2.3	3.3	*	1		0354	118	5.	.1	.2	*	1		0714	218	0.	.0	.0
1		0036	19	432.	2.3	3.3	*	1		0356	119	5.	.1	.2	*	1		0716	219	0.	.0	.0
1		0038	20	416.	2.2	3.2	*	1		0358	120	4.	.1	.2	*	1		0718	220	0.	.0	.0
1		0040	21	396.	2.1	3.2	*	1		0400	121	4.	.1	.1	*	1		0720	221	0.	.0	.0
1		0042	22	378.	2.1	3.1	*	1		0402	122	3.	.0	.1	*	1		0722	222	0.	.0	.0
1		0044	23	360.	2.0	3.0	*	1		0404	123	3.	.0	.1	*	1		0724	223	0.	.0	.0
1		0046	24	340.	1.9	3.0	*	1		0406	124	3.	.0	.1	*	1		0726	224	0.	.0	.0
1		0048	25	320.	1.8	2.9	*	1		0408	125	2.	.0	.1	*	1		0728	225	0.	.0	.0
1		0050	26	301.	1.8	2.8	*	1		0410	126	2.	.0	.1	*	1		0730	226	0.	.0	.0
1		0052	27	283.	1.7	2.7	*	1		0412	127	2.	.0	.1	*	1		0732	227	0.	.0	.0

1	0054	28	266.	1.6	2.6	*	1	0414	128	2.	.0	.1	*	1	0734	228	0.	.0	.0
1	0056	29	251.	1.5	2.5	*	1	0416	129	1.	.0	.1	*	1	0736	229	0.	.0	.0
1	0058	30	236.	1.5	2.5	*	1	0418	130	1.	.0	.0	*	1	0738	230	0.	.0	.0
1	0100	31	222.	1.4	2.4	*	1	0420	131	1.	.0	.0	*	1	0740	231	0.	.0	.0
1	0102	32	209.	1.3	2.3	*	1	0422	132	1.	.0	.0	*	1	0742	232	0.	.0	.0
1	0104	33	197.	1.3	2.2	*	1	0424	133	1.	.0	.0	*	1	0744	233	0.	.0	.0
1	0106	34	186.	1.2	2.2	*	1	0426	134	1.	.0	.0	*	1	0746	234	0.	.0	.0
1	0108	35	175.	1.2	2.1	*	1	0428	135	1.	.0	.0	*	1	0748	235	0.	.0	.0
1	0110	36	167.	1.1	2.1	*	1	0430	136	1.	.0	.0	*	1	0750	236	0.	.0	.0
1	0112	37	158.	1.1	2.0	*	1	0432	137	0.	.0	.0	*	1	0752	237	0.	.0	.0
1	0114	38	150.	1.1	1.9	*	1	0434	138	0.	.0	.0	*	1	0754	238	0.	.0	.0
1	0116	39	143.	1.0	1.9	*	1	0436	139	0.	.0	.0	*	1	0756	239	0.	.0	.0
1	0118	40	136.	1.0	1.8	*	1	0438	140	0.	.0	.0	*	1	0758	240	0.	.0	.0
1	0120	41	129.	.9	1.8	*	1	0440	141	0.	.0	.0	*	1	0800	241	0.	.0	.0
1	0122	42	122.	.9	1.7	*	1	0442	142	0.	.0	.0	*	1	0802	242	0.	.0	.0
1	0124	43	116.	.9	1.7	*	1	0444	143	0.	.0	.0	*	1	0804	243	0.	.0	.0
1	0126	44	111.	.9	1.7	*	1	0446	144	0.	.0	.0	*	1	0806	244	0.	.0	.0
1	0128	45	106.	.8	1.6	*	1	0448	145	0.	.0	.0	*	1	0808	245	0.	.0	.0
1	0130	46	101.	.8	1.6	*	1	0450	146	0.	.0	.0	*	1	0810	246	0.	.0	.0
1	0132	47	98.	.8	1.6	*	1	0452	147	0.	.0	.0	*	1	0812	247	0.	.0	.0
1	0134	48	94.	.8	1.5	*	1	0454	148	0.	.0	.0	*	1	0814	248	0.	.0	.0
1	0136	49	91.	.7	1.5	*	1	0456	149	0.	.0	.0	*	1	0816	249	0.	.0	.0
1	0138	50	87.	.7	1.4	*	1	0458	150	0.	.0	.0	*	1	0818	250	0.	.0	.0
1	0140	51	84.	.7	1.4	*	1	0500	151	0.	.0	.0	*	1	0820	251	0.	.0	.0
1	0142	52	80.	.7	1.4	*	1	0502	152	0.	.0	.0	*	1	0822	252	0.	.0	.0
1	0144	53	77.	.7	1.4	*	1	0504	153	0.	.0	.0	*	1	0824	253	0.	.0	.0
1	0146	54	74.	.6	1.3	*	1	0506	154	0.	.0	.0	*	1	0826	254	0.	.0	.0
1	0148	55	72.	.6	1.3	*	1	0508	155	0.	.0	.0	*	1	0828	255	0.	.0	.0
1	0150	56	69.	.6	1.3	*	1	0510	156	0.	.0	.0	*	1	0830	256	0.	.0	.0
1	0152	57	66.	.6	1.2	*	1	0512	157	0.	.0	.0	*	1	0832	257	0.	.0	.0
1	0154	58	64.	.6	1.2	*	1	0514	158	0.	.0	.0	*	1	0834	258	0.	.0	.0
1	0156	59	62.	.6	1.2	*	1	0516	159	0.	.0	.0	*	1	0836	259	0.	.0	.0
1	0158	60	59.	.5	1.2	*	1	0518	160	0.	.0	.0	*	1	0838	260	0.	.0	.0
1	0200	61	57.	.5	1.1	*	1	0520	161	0.	.0	.0	*	1	0840	261	0.	.0	.0
1	0202	62	55.	.5	1.1	*	1	0522	162	0.	.0	.0	*	1	0842	262	0.	.0	.0
1	0204	63	53.	.5	1.1	*	1	0524	163	0.	.0	.0	*	1	0844	263	0.	.0	.0
1	0206	64	52.	.5	1.1	*	1	0526	164	0.	.0	.0	*	1	0846	264	0.	.0	.0
1	0208	65	50.	.5	1.1	*	1	0528	165	0.	.0	.0	*	1	0848	265	0.	.0	.0
1	0210	66	49.	.5	1.1	*	1	0530	166	0.	.0	.0	*	1	0850	266	0.	.0	.0
1	0212	67	47.	.5	1.1	*	1	0532	167	0.	.0	.0	*	1	0852	267	0.	.0	.0
1	0214	68	46.	.5	1.0	*	1	0534	168	0.	.0	.0	*	1	0854	268	0.	.0	.0
1	0216	69	45.	.5	1.0	*	1	0536	169	0.	.0	.0	*	1	0856	269	0.	.0	.0
1	0218	70	44.	.4	1.0	*	1	0538	170	0.	.0	.0	*	1	0858	270	0.	.0	.0
1	0220	71	43.	.4	1.0	*	1	0540	171	0.	.0	.0	*	1	0900	271	0.	.0	.0
1	0222	72	42.	.4	1.0	*	1	0542	172	0.	.0	.0	*	1	0902	272	0.	.0	.0
1	0224	73	41.	.4	.9	*	1	0544	173	0.	.0	.0	*	1	0904	273	0.	.0	.0
1	0226	74	40.	.4	.9	*	1	0546	174	0.	.0	.0	*	1	0906	274	0.	.0	.0
1	0228	75	39.	.4	.9	*	1	0548	175	0.	.0	.0	*	1	0908	275	0.	.0	.0
1	0230	76	38.	.4	.9	*	1	0550	176	0.	.0	.0	*	1	0910	276	0.	.0	.0
1	0232	77	37.	.4	.9	*	1	0552	177	0.	.0	.0	*	1	0912	277	0.	.0	.0
1	0234	78	36.	.4	.9	*	1	0554	178	0.	.0	.0	*	1	0914	278	0.	.0	.0
1	0236	79	35.	.4	.9	*	1	0556	179	0.	.0	.0	*	1	0916	279	0.	.0	.0
1	0238	80	34.	.4	.8	*	1	0558	180	0.	.0	.0	*	1	0918	280	0.	.0	.0
1	0240	81	33.	.4	.8	*	1	0600	181	0.	.0	.0	*	1	0920	281	0.	.0	.0
1	0242	82	32.	.4	.8	*	1	0602	182	0.	.0	.0	*	1	0922	282	0.	.0	.0
1	0244	83	31.	.3	.8	*	1	0604	183	0.	.0	.0	*	1	0924	283	0.	.0	.0
1	0246	84	31.	.3	.8	*	1	0606	184	0.	.0	.0	*	1	0926	284	0.	.0	.0
1	0248	85	30.	.3	.8	*	1	0608	185	0.	.0	.0	*	1	0928	285	0.	.0	.0
1	0250	86	29.	.3	.8	*	1	0610	186	0.	.0	.0	*	1	0930	286	0.	.0	.0
1	0252	87	28.	.3	.8	*	1	0612	187	0.	.0	.0	*	1	0932	287	0.	.0	.0
1	0254	88	28.	.3	.7	*	1	0614	188	0.	.0	.0	*	1	0934	288	0.	.0	.0
1	0256	89	27.	.3	.7	*	1	0616	189	0.	.0	.0	*	1	0936	289	0.	.0	.0
1	0258	90	26.	.3	.7	*	1	0618	190	0.	.0	.0	*	1	0938	290	0.	.0	.0
1	0300	91	26.	.3	.7	*	1	0620	191	0.	.0	.0	*	1	0940	291	0.	.0	.0
1	0302	92	25.	.3	.7	*	1	0622	192	0.	.0	.0	*	1	0942	292	0.	.0	.0
1	0304	93	25.	.3	.7	*	1	0624	193	0.	.0	.0	*	1	0944	293	0.	.0	.0
1	0306	94	24.	.3	.7	*	1	0626	194	0.	.0	.0	*	1	0946	294	0.	.0	.0
1	0308	95	23.	.3	.7	*	1	0628	195	0.	.0	.0	*	1	0948	295	0.	.0	.0
1	0310	96	23.	.3	.7	*	1	0630	196	0.	.0	.0	*	1	0950	296	0.	.0	.0
1	0312	97	22.	.3	.6	*	1	0632	197	0.	.0	.0	*	1	0952	297	0.	.0	.0
1	0314	98	21.	.3	.6	*	1	0634	198	0.	.0	.0	*	1	0954	298	0.	.0	.0
1	0316	99	20.	.3	.6	*	1	0636	199	0.	.0	.0	*	1	0956	299	0.	.0	.0
1	0318	100	19.	.2	.6	*	1	0638	200	0.	.0	.0	*	1	0958	300	0.	.0	.0
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 440.	.57		63.	38.	38.	38.

```
                    (INCHES)      1.783        1.783        1.783         1.783
                     (AC-FT)        31.          31.          31.           31.

 PEAK STORAGE    TIME                         MAXIMUM AVERAGE STORAGE
                                       6-HR        24-HR        72-HR       9.97-HR
+   (AC-FT)      (HR)
        2.        .57                    0.           0.           0.            0.

  PEAK STAGE     TIME                          MAXIMUM AVERAGE STAGE
                                       6-HR        24-HR        72-HR       9.97-HR
+    (FEET)      (HR)
      3.32        .57                   .83          .50          .50           .50

                     CUMULATIVE AREA =      .33 SQ MI


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

           **************
           *            *
 229 KK    *   FR-81    *
           *            *
           **************
                       LOCAL RUNOFF TO FR-81
                       BASIN FR-81

             SUBBASIN RUNOFF DATA

 232 BA        SUBBASIN CHARACTERISTICS
                     TAREA          .31  SUBBASIN AREA

               PRECIPITATION DATA

 233 PB              STORM         2.98  BASIN TOTAL PRECIPITATION

  20 PI          INCREMENTAL PRECIPITATION PATTERN
                      .04       .04       .06       .08       .08       .07       .07       .05       .03       .03
                      .02       .02       .02       .02       .02       .02       .02       .01       .01       .01
                      .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                      .01       .01       .01       .01       .01       .01       .01       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

 234 LS        SCS LOSS RATE
                     STRTL          .35  INITIAL ABSTRACTION
                    CRVNBR        85.00  CURVE NUMBER
                     RTIMP        20.00  PERCENT IMPERVIOUS AREA

 235 UD        SCS DIMENSIONLESS UNITGRAPH
                      TLAG          .23  LAG

                                                    ***

                                                     UNIT HYDROGRAPH
                                                37 END-OF-PERIOD ORDINATES
              32.       97.      188.      324.      466.      564.      602.      602.      563.      504.
             431.      338.      264.      211.      169.      140.      113.       89.       73.       58.
              46.       38.       30.       24.       20.       16.       13.       10.        8.        7.
               6.        5.        4.        3.        2.        1.        0.

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                                              HYDROGRAPH AT STATION    FR-81

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                                                      *
     DA MON HRMN  ORD     RAIN    LOSS  EXCESS     COMP Q     *      DA MON HRMN  ORD     RAIN    LOSS  EXCESS     COMP Q
                                                      *
      1     0000    1      .00     .00     .00         0.     *       1     0500  151      .00     .00     .00         0.
      1     0002    2      .12     .10     .02         1.     *       1     0502  152      .00     .00     .00         0.
      1     0004    3      .12     .10     .02         3.     *       1     0504  153      .00     .00     .00         0.
      1     0006    4      .18     .14     .04         8.     *       1     0506  154      .00     .00     .00         0.
      1     0008    5      .24     .16     .08        19.     *       1     0508  155      .00     .00     .00         0.
      1     0010    6      .24     .13     .12        38.     *       1     0510  156      .00     .00     .00         0.
      1     0012    7      .20     .08     .11        68.     *       1     0512  157      .00     .00     .00         0.
```

1	0014	8	.20	.07	.12	111.	*	1	0514	158	.00	.00	.00	0.
1	0016	9	.15	.05	.10	165.	*	1	0516	159	.00	.00	.00	0.
1	0018	10	.10	.03	.07	226.	*	1	0518	160	.00	.00	.00	0.
1	0020	11	.10	.03	.07	288.	*	1	0520	161	.00	.00	.00	0.
1	0022	12	.07	.02	.05	343.	*	1	0522	162	.00	.00	.00	0.
1	0024	13	.07	.02	.06	386.	*	1	0524	163	.00	.00	.00	0.
1	0026	14	.07	.02	.05	415.	*	1	0526	164	.00	.00	.00	0.
1	0028	15	.06	.01	.05	429.	*	1	0528	165	.00	.00	.00	0.
1	0030	16	.06	.01	.05	430.	*	1	0530	166	.00	.00	.00	0.
1	0032	17	.05	.01	.04	421.	*	1	0532	167	.00	.00	.00	0.
1	0034	18	.05	.01	.04	405.	*	1	0534	168	.00	.00	.00	0.
1	0036	19	.04	.01	.04	386.	*	1	0536	169	.00	.00	.00	0.
1	0038	20	.04	.01	.03	365.	*	1	0538	170	.00	.00	.00	0.
1	0040	21	.04	.01	.03	344.	*	1	0540	171	.00	.00	.00	0.
1	0042	22	.03	.01	.03	324.	*	1	0542	172	.00	.00	.00	0.
1	0044	23	.03	.01	.03	305.	*	1	0544	173	.00	.00	.00	0.
1	0046	24	.03	.01	.03	287.	*	1	0546	174	.00	.00	.00	0.
1	0048	25	.03	.01	.02	269.	*	1	0548	175	.00	.00	.00	0.
1	0050	26	.03	.01	.02	253.	*	1	0550	176	.00	.00	.00	0.
1	0052	27	.03	.00	.02	237.	*	1	0552	177	.00	.00	.00	0.
1	0054	28	.03	.00	.02	223.	*	1	0554	178	.00	.00	.00	0.
1	0056	29	.02	.00	.02	209.	*	1	0556	179	.00	.00	.00	0.
1	0058	30	.02	.00	.02	197.	*	1	0558	180	.00	.00	.00	0.
1	0100	31	.02	.00	.02	185.	*	1	0600	181	.00	.00	.00	0.
1	0102	32	.02	.00	.02	175.	*	1	0602	182	.00	.00	.00	0.
1	0104	33	.02	.00	.02	165.	*	1	0604	183	.00	.00	.00	0.
1	0106	34	.02	.00	.02	156.	*	1	0606	184	.00	.00	.00	0.
1	0108	35	.02	.00	.01	147.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.00	.01	139.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.02	.00	.01	132.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.02	.00	.01	125.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.01	.00	.01	119.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.01	.00	.01	113.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.01	.00	.01	107.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	102.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	97.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	92.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	88.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	84.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	81.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	77.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	74.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	71.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	68.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	66.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	63.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	61.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	59.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	57.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.01	55.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.01	53.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.01	51.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.01	49.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.01	48.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.01	46.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.01	45.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.01	43.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.01	42.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.01	41.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.00	39.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.00	38.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.00	37.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.01	.00	.00	36.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.01	.00	.00	35.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.01	.00	.00	34.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.01	.00	.00	33.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.00	.00	.00	32.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.00	.00	.00	31.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.00	.00	.00	31.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.00	.00	.00	30.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	29.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	28.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	28.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	27.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	26.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	26.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	25.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	25.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	24.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	23.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	23.	*	1	0754	238	.00	.00	.00	0.

1	0256	89	.00	.00	.00	22.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	22.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	21.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	21.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	20.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	19.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	18.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	16.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	14.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	12.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	10.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	8.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	7.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	5.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	4.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	3.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	3.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	2.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	2.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	1.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	1.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	1.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	1.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	1.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.
							*							

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TOTAL RAINFALL = 2.98, TOTAL LOSS = 1.13, TOTAL EXCESS = 1.85

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 430.	.50		62.	38.	38.	38.
		(INCHES)	1.853	1.853	1.853	1.853
		(AC-FT)	31.	31.	31.	31.

CUMULATIVE AREA = .31 SQ MI

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              *            *
236 KK        *   CO-81    *
              *            *
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                             COMBINE HYDROGRAPHS
                             AT NODE FR-81

239 HC         HYDROGRAPH COMBINATION
                     ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION CO-81
SUM OF 2 HYDROGRAPHS

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DA MON	HRMN	ORD	FLOW	DA MON	HRMN	ORD	FLOW	DA MON	HRMN	ORD	FLOW	DA MON	HRMN	ORD	FLOW
1	0000	1	0.	1	0230	76	68.	1	0500	151	0.	1	0730	226	0.
1	0002	2	1.	1	0232	77	67.	1	0502	152	0.	1	0732	227	0.
1	0004	3	3.	1	0234	78	65.	1	0504	153	0.	1	0734	228	0.
1	0006	4	8.	1	0236	79	63.	1	0506	154	0.	1	0736	229	0.
1	0008	5	19.	1	0238	80	62.	1	0508	155	0.	1	0738	230	0.
1	0010	6	39.	1	0240	81	60.	1	0510	156	0.	1	0740	231	0.
1	0012	7	70.	1	0242	82	59.	1	0512	157	0.	1	0742	232	0.
1	0014	8	114.	1	0244	83	57.	1	0514	158	0.	1	0744	233	0.
1	0016	9	173.	1	0246	84	56.	1	0516	159	0.	1	0746	234	0.
1	0018	10	248.	1	0248	85	54.	1	0518	160	0.	1	0748	235	0.
1	0020	11	343.	1	0250	86	53.	1	0520	161	0.	1	0750	236	0.
1	0022	12	456.	1	0252	87	52.	1	0522	162	0.	1	0752	237	0.
1	0024	13	574.	1	0254	88	51.	1	0524	163	0.	1	0754	238	0.
1	0026	14	682.	1	0256	89	49.	1	0526	164	0.	1	0756	239	0.
1	0028	15	771.	1	0258	90	48.	1	0528	165	0.	1	0758	240	0.
1	0030	16	827.	1	0300	91	47.	1	0530	166	0.	1	0800	241	0.
1	0032	17	852.	1	0302	92	46.	1	0532	167	0.	1	0802	242	0.
1	0034	18	845.	1	0304	93	45.	1	0534	168	0.	1	0804	243	0.
1	0036	19	818.	1	0306	94	43.	1	0536	169	0.	1	0806	244	0.
1	0038	20	780.	1	0308	95	41.	1	0538	170	0.	1	0808	245	0.
1	0040	21	740.	1	0310	96	39.	1	0540	171	0.	1	0810	246	0.
1	0042	22	702.	1	0312	97	36.	1	0542	172	0.	1	0812	247	0.
1	0044	23	665.	1	0314	98	33.	1	0544	173	0.	1	0814	248	0.
1	0046	24	627.	1	0316	99	30.	1	0546	174	0.	1	0816	249	0.
1	0048	25	590.	1	0318	100	27.	1	0548	175	0.	1	0818	250	0.
1	0050	26	554.	1	0320	101	24.	1	0550	176	0.	1	0820	251	0.
1	0052	27	520.	1	0322	102	22.	1	0552	177	0.	1	0822	252	0.
1	0054	28	488.	1	0324	103	19.	1	0554	178	0.	1	0824	253	0.
1	0056	29	460.	1	0326	104	18.	1	0556	179	0.	1	0826	254	0.
1	0058	30	433.	1	0328	105	16.	1	0558	180	0.	1	0828	255	0.
1	0100	31	408.	1	0330	106	15.	1	0600	181	0.	1	0830	256	0.
1	0102	32	384.	1	0332	107	14.	1	0602	182	0.	1	0832	257	0.
1	0104	33	362.	1	0334	108	13.	1	0604	183	0.	1	0834	258	0.
1	0106	34	341.	1	0336	109	12.	1	0606	184	0.	1	0836	259	0.
1	0108	35	322.	1	0338	110	11.	1	0608	185	0.	1	0838	260	0.
1	0110	36	306.	1	0340	111	10.	1	0610	186	0.	1	0840	261	0.
1	0112	37	290.	1	0342	112	9.	1	0612	187	0.	1	0842	262	0.
1	0114	38	275.	1	0344	113	9.	1	0614	188	0.	1	0844	263	0.
1	0116	39	261.	1	0346	114	8.	1	0616	189	0.	1	0846	264	0.
1	0118	40	248.	1	0348	115	7.	1	0618	190	0.	1	0848	265	0.
1	0120	41	236.	1	0350	116	6.	1	0620	191	0.	1	0850	266	0.
1	0122	42	224.	1	0352	117	6.	1	0622	192	0.	1	0852	267	0.
1	0124	43	213.	1	0354	118	5.	1	0624	193	0.	1	0854	268	0.
1	0126	44	203.	1	0356	119	5.	1	0626	194	0.	1	0856	269	0.
1	0128	45	194.	1	0358	120	4.	1	0628	195	0.	1	0858	270	0.
1	0130	46	186.	1	0400	121	4.	1	0630	196	0.	1	0900	271	0.
1	0132	47	178.	1	0402	122	3.	1	0632	197	0.	1	0902	272	0.
1	0134	48	171.	1	0404	123	3.	1	0634	198	0.	1	0904	273	0.
1	0136	49	165.	1	0406	124	3.	1	0636	199	0.	1	0906	274	0.
1	0138	50	158.	1	0408	125	2.	1	0638	200	0.	1	0908	275	0.
1	0140	51	152.	1	0410	126	2.	1	0640	201	0.	1	0910	276	0.
1	0142	52	146.	1	0412	127	2.	1	0642	202	0.	1	0912	277	0.
1	0144	53	141.	1	0414	128	2.	1	0644	203	0.	1	0914	278	0.
1	0146	54	135.	1	0416	129	1.	1	0646	204	0.	1	0916	279	0.
1	0148	55	130.	1	0418	130	1.	1	0648	205	0.	1	0918	280	0.
1	0150	56	125.	1	0420	131	1.	1	0650	206	0.	1	0920	281	0.
1	0152	57	121.	1	0422	132	1.	1	0652	207	0.	1	0922	282	0.

1	0154	58	117.	*	1	0424	133	1.	*	1	0654	208	0.	*	1	0924	283	0.
1	0156	59	113.	*	1	0426	134	1.	*	1	0656	209	0.	*	1	0926	284	0.
1	0158	60	109.	*	1	0428	135	1.	*	1	0658	210	0.	*	1	0928	285	0.
1	0200	61	105.	*	1	0430	136	1.	*	1	0700	211	0.	*	1	0930	286	0.
1	0202	62	101.	*	1	0432	137	0.	*	1	0702	212	0.	*	1	0932	287	0.
1	0204	63	98.	*	1	0434	138	0.	*	1	0704	213	0.	*	1	0934	288	0.
1	0206	64	95.	*	1	0436	139	0.	*	1	0706	214	0.	*	1	0936	289	0.
1	0208	65	92.	*	1	0438	140	0.	*	1	0708	215	0.	*	1	0938	290	0.
1	0210	66	89.	*	1	0440	141	0.	*	1	0710	216	0.	*	1	0940	291	0.
1	0212	67	87.	*	1	0442	142	0.	*	1	0712	217	0.	*	1	0942	292	0.
1	0214	68	85.	*	1	0444	143	0.	*	1	0714	218	0.	*	1	0944	293	0.
1	0216	69	83.	*	1	0446	144	0.	*	1	0716	219	0.	*	1	0946	294	0.
1	0218	70	80.	*	1	0448	145	0.	*	1	0718	220	0.	*	1	0948	295	0.
1	0220	71	78.	*	1	0450	146	0.	*	1	0720	221	0.	*	1	0950	296	0.
1	0222	72	76.	*	1	0452	147	0.	*	1	0722	222	0.	*	1	0952	297	0.
1	0224	73	74.	*	1	0454	148	0.	*	1	0724	223	0.	*	1	0954	298	0.
1	0226	74	72.	*	1	0456	149	0.	*	1	0726	224	0.	*	1	0956	299	0.
1	0228	75	70.	*	1	0458	150	0.	*	1	0728	225	0.	*	1	0958	300	0.

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 852.	.53		126.	76.	76.	76.
		(INCHES)	1.817	1.817	1.817	1.817
		(AC-FT)	62.	62.	62.	62.

CUMULATIVE AREA = .64 SQ MI

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          *            *
240 KK    *   CO-8A    *
          *            *
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COMBINE HYDROGRAPHS
AT NODE FR-8 (MAIN CHANNEL)
FINGER ROCK WASH AND TRIBUTARY CANYON WASH

244 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION CO-8A
SUM OF 2 HYDROGRAPHS

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DA MON	HRMN	ORD	FLOW	*	DA MON	HRMN	ORD	FLOW	*	DA MON	HRMN	ORD	FLOW	*	DA MON	HRMN	ORD	FLOW
1	0000	1	0.	*	1	0230	76	587.	*	1	0500	151	7.	*	1	0730	226	0.
1	0002	2	3.	*	1	0232	77	572.	*	1	0502	152	7.	*	1	0732	227	0.
1	0004	3	13.	*	1	0234	78	558.	*	1	0504	153	6.	*	1	0734	228	0.
1	0006	4	34.	*	1	0236	79	544.	*	1	0506	154	6.	*	1	0736	229	0.
1	0008	5	78.	*	1	0238	80	530.	*	1	0508	155	5.	*	1	0738	230	0.
1	0010	6	155.	*	1	0240	81	517.	*	1	0510	156	5.	*	1	0740	231	0.
1	0012	7	273.	*	1	0242	82	504.	*	1	0512	157	4.	*	1	0742	232	0.
1	0014	8	439.	*	1	0244	83	491.	*	1	0514	158	4.	*	1	0744	233	0.
1	0016	9	653.	*	1	0246	84	479.	*	1	0516	159	4.	*	1	0746	234	0.
1	0018	10	923.	*	1	0248	85	467.	*	1	0518	160	3.	*	1	0748	235	0.
1	0020	11	1264.	*	1	0250	86	456.	*	1	0520	161	3.	*	1	0750	236	0.
1	0022	12	1702.	*	1	0252	87	445.	*	1	0522	162	3.	*	1	0752	237	0.
1	0024	13	2293.	*	1	0254	88	435.	*	1	0524	163	3.	*	1	0754	238	0.
1	0026	14	2996.	*	1	0256	89	425.	*	1	0526	164	2.	*	1	0756	239	0.
1	0028	15	3755.	*	1	0258	90	416.	*	1	0528	165	2.	*	1	0758	240	0.
1	0030	16	4501.	*	1	0300	91	408.	*	1	0530	166	2.	*	1	0800	241	0.
1	0032	17	5157.	*	1	0302	92	399.	*	1	0532	167	2.	*	1	0802	242	0.
1	0034	18	5644.	*	1	0304	93	389.	*	1	0534	168	2.	*	1	0804	243	0.
1	0036	19	5942.	*	1	0306	94	379.	*	1	0536	169	1.	*	1	0806	244	0.
1	0038	20	6055.	*	1	0308	95	366.	*	1	0538	170	1.	*	1	0808	245	0.
1	0040	21	6025.	*	1	0310	96	352.	*	1	0540	171	1.	*	1	0810	246	0.

1	0042	22	5885.	*	1	0312	97	337.	*	1	0542	172	1.	*	1	0812	247	0.
1	0044	23	5675.	*	1	0314	98	321.	*	1	0544	173	1.	*	1	0814	248	0.
1	0046	24	5418.	*	1	0316	99	304.	*	1	0546	174	1.	*	1	0816	249	0.
1	0048	25	5136.	*	1	0318	100	288.	*	1	0548	175	1.	*	1	0818	250	0.
1	0050	26	4854.	*	1	0320	101	272.	*	1	0550	176	1.	*	1	0820	251	0.
1	0052	27	4578.	*	1	0322	102	256.	*	1	0552	177	1.	*	1	0822	252	0.
1	0054	28	4314.	*	1	0324	103	241.	*	1	0554	178	1.	*	1	0824	253	0.
1	0056	29	4066.	*	1	0326	104	228.	*	1	0556	179	0.	*	1	0826	254	0.
1	0058	30	3828.	*	1	0328	105	214.	*	1	0558	180	0.	*	1	0828	255	0.
1	0100	31	3602.	*	1	0330	106	201.	*	1	0600	181	0.	*	1	0830	256	0.
1	0102	32	3395.	*	1	0332	107	188.	*	1	0602	182	0.	*	1	0832	257	0.
1	0104	33	3198.	*	1	0334	108	175.	*	1	0604	183	0.	*	1	0834	258	0.
1	0106	34	3015.	*	1	0336	109	163.	*	1	0606	184	0.	*	1	0836	259	0.
1	0108	35	2850.	*	1	0338	110	151.	*	1	0608	185	0.	*	1	0838	260	0.
1	0110	36	2695.	*	1	0340	111	141.	*	1	0610	186	0.	*	1	0840	261	0.
1	0112	37	2550.	*	1	0342	112	131.	*	1	0612	187	0.	*	1	0842	262	0.
1	0114	38	2418.	*	1	0344	113	123.	*	1	0614	188	0.	*	1	0844	263	0.
1	0116	39	2296.	*	1	0346	114	114.	*	1	0616	189	0.	*	1	0846	264	0.
1	0118	40	2179.	*	1	0348	115	106.	*	1	0618	190	0.	*	1	0848	265	0.
1	0120	41	2069.	*	1	0350	116	98.	*	1	0620	191	0.	*	1	0850	266	0.
1	0122	42	1968.	*	1	0352	117	91.	*	1	0622	192	0.	*	1	0852	267	0.
1	0124	43	1875.	*	1	0354	118	84.	*	1	0624	193	0.	*	1	0854	268	0.
1	0126	44	1787.	*	1	0356	119	77.	*	1	0626	194	0.	*	1	0856	269	0.
1	0128	45	1704.	*	1	0358	120	71.	*	1	0628	195	0.	*	1	0858	270	0.
1	0130	46	1627.	*	1	0400	121	65.	*	1	0630	196	0.	*	1	0900	271	0.
1	0132	47	1555.	*	1	0402	122	61.	*	1	0632	197	0.	*	1	0902	272	0.
1	0134	48	1490.	*	1	0404	123	57.	*	1	0634	198	0.	*	1	0904	273	0.
1	0136	49	1427.	*	1	0406	124	53.	*	1	0636	199	0.	*	1	0906	274	0.
1	0138	50	1368.	*	1	0408	125	49.	*	1	0638	200	0.	*	1	0908	275	0.
1	0140	51	1314.	*	1	0410	126	45.	*	1	0640	201	0.	*	1	0910	276	0.
1	0142	52	1264.	*	1	0412	127	42.	*	1	0642	202	0.	*	1	0912	277	0.
1	0144	53	1217.	*	1	0414	128	38.	*	1	0644	203	0.	*	1	0914	278	0.
1	0146	54	1173.	*	1	0416	129	35.	*	1	0646	204	0.	*	1	0916	279	0.
1	0148	55	1132.	*	1	0418	130	32.	*	1	0648	205	0.	*	1	0918	280	0.
1	0150	56	1092.	*	1	0420	131	30.	*	1	0650	206	0.	*	1	0920	281	0.
1	0152	57	1053.	*	1	0422	132	27.	*	1	0652	207	0.	*	1	0922	282	0.
1	0154	58	1015.	*	1	0424	133	25.	*	1	0654	208	0.	*	1	0924	283	0.
1	0156	59	979.	*	1	0426	134	23.	*	1	0656	209	0.	*	1	0926	284	0.
1	0158	60	945.	*	1	0428	135	21.	*	1	0658	210	0.	*	1	0928	285	0.
1	0200	61	913.	*	1	0430	136	19.	*	1	0700	211	0.	*	1	0930	286	0.
1	0202	62	883.	*	1	0432	137	18.	*	1	0702	212	0.	*	1	0932	287	0.
1	0204	63	856.	*	1	0434	138	17.	*	1	0704	213	0.	*	1	0934	288	0.
1	0206	64	830.	*	1	0436	139	16.	*	1	0706	214	0.	*	1	0936	289	0.
1	0208	65	805.	*	1	0438	140	16.	*	1	0708	215	0.	*	1	0938	290	0.
1	0210	66	780.	*	1	0440	141	15.	*	1	0710	216	0.	*	1	0940	291	0.
1	0212	67	756.	*	1	0442	142	14.	*	1	0712	217	0.	*	1	0942	292	0.
1	0214	68	733.	*	1	0444	143	13.	*	1	0714	218	0.	*	1	0944	293	0.
1	0216	69	711.	*	1	0446	144	12.	*	1	0716	219	0.	*	1	0946	294	0.
1	0218	70	690.	*	1	0448	145	11.	*	1	0718	220	0.	*	1	0948	295	0.
1	0220	71	669.	*	1	0450	146	11.	*	1	0720	221	0.	*	1	0950	296	0.
1	0222	72	650.	*	1	0452	147	10.	*	1	0722	222	0.	*	1	0952	297	0.
1	0224	73	631.	*	1	0454	148	9.	*	1	0724	223	0.	*	1	0954	298	0.
1	0226	74	615.	*	1	0456	149	9.	*	1	0726	224	0.	*	1	0956	299	0.
1	0228	75	601.	*	1	0458	150	8.	*	1	0728	225	0.	*	1	0958	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 6055.	.63		967.	582.	582.	582.
		(INCHES)	1.957	1.957	1.957	1.957
		(AC-FT)	479.	479.	479.	479.

CUMULATIVE AREA = 4.59 SQ MI

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          **************
          *            *
245 KK    *    8TO7    *
          *            *
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MODIFIED PULS CHANNEL ROUTING
FROM NODE FR-8 TO FR-7 (MAIN CHANNEL)

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              HYDROGRAPH ROUTING DATA

248 RS          STORAGE ROUTING
                      NSTPS          1  NUMBER OF SUBREACHES
                       ITYP       FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC      -1.00  INITIAL CONDITION
                          X        .00 WORKING R AND D COEFFICIENT

249 RC          NORMAL DEPTH CHANNEL
                        ANL       .060  LEFT OVERBANK N-VALUE
                       ANCH       .045  MAIN CHANNEL N-VALUE
                        ANR       .060  RIGHT OVERBANK N-VALUE
                      RLNTH      1350.  REACH LENGTH
                        SEL      .0180  ENERGY SLOPE
                      ELMAX         .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                           CROSS-SECTION DATA
                              --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
251 RY        ELEVATION     84.00      80.00      78.00      76.00      75.00      76.00      78.00      84.00
250 RX        DISTANCE        .00      19.00      37.00      52.00      85.00     112.00     167.00     200.00

                                                              ***

                                             COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

             STORAGE          .00        .21        .83       1.81       3.03       4.49       6.20       8.11      10.14      12.27
             OUTFLOW          .00      11.44      72.66     231.83     479.58     818.15    1253.50    1833.79    2541.22    3353.30
           ELEVATION        75.00      75.47      75.95      76.42      76.89      77.37      77.84      78.32      78.79      79.26

             STORAGE        14.49      16.82      19.22      21.69      24.24      26.85      29.54      32.30      35.13      38.03
             OUTFLOW      4268.95    5289.58    6414.08    7638.59    8962.32   10384.84   11905.99   13525.79   15244.43   17062.21
           ELEVATION        79.74      80.21      80.68      81.16      81.63      82.11      82.58      83.05      83.53      84.00

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                                                  HYDROGRAPH AT STATION    8TO7

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                                          *                                            *
DA MON HRMN ORD   OUTFLOW  STORAGE    STAGE * DA MON HRMN ORD   OUTFLOW  STORAGE    STAGE * DA MON HRMN ORD   OUTFLOW  STORAGE    STAGE
                                          *                                            *
 1     0000   1       0.       .0     75.0 *  1     0320 101      300.      2.1     76.6 *  1     0640 201        0.       .0     75.0
 1     0002   2       0.       .0     75.0 *  1     0322 102      284.      2.1     76.5 *  1     0642 202        0.       .0     75.0
 1     0004   3       1.       .0     75.1 *  1     0324 103      269.      2.0     76.5 *  1     0644 203        0.       .0     75.0
 1     0006   4       4.       .1     75.2 *  1     0326 104      254.      1.9     76.5 *  1     0646 204        0.       .0     75.0
 1     0008   5      12.       .2     75.5 *  1     0328 105      239.      1.8     76.4 *  1     0648 205        0.       .0     75.0
 1     0010   6      37.       .5     75.7 *  1     0330 106      227.      1.8     76.4 *  1     0650 206        0.       .0     75.0
 1     0012   7      82.       .9     76.0 *  1     0332 107      215.      1.7     76.4 *  1     0652 207        0.       .0     75.0
 1     0014   8     183.      1.5     76.3 *  1     0334 108      203.      1.6     76.3 *  1     0654 208        0.       .0     75.0
 1     0016   9     332.      2.3     76.6 *  1     0336 109      190.      1.6     76.3 *  1     0656 209        0.       .0     75.0
 1     0018  10     537.      3.3     77.0 *  1     0338 110      178.      1.5     76.3 *  1     0658 210        0.       .0     75.0
 1     0020  11     806.      4.4     77.4 *  1     0340 111      166.      1.4     76.2 *  1     0700 211        0.       .0     75.0
 1     0022  12    1158.      5.8     77.7 *  1     0342 112      155.      1.3     76.2 *  1     0702 212        0.       .0     75.0
 1     0024  13    1639.      7.5     78.2 *  1     0344 113      145.      1.3     76.2 *  1     0704 213        0.       .0     75.0
 1     0026  14    2272.      9.4     78.6 *  1     0346 114      135.      1.2     76.1 *  1     0706 214        0.       .0     75.0
 1     0028  15    3016.     11.4     79.1 *  1     0348 115      126.      1.2     76.1 *  1     0708 215        0.       .0     75.0
 1     0030  16    3803.     13.4     79.5 *  1     0350 116      117.      1.1     76.1 *  1     0710 216        0.       .0     75.0
 1     0032  17    4557.     15.1     79.9 *  1     0352 117      109.      1.1     76.1 *  1     0712 217        0.       .0     75.0
 1     0034  18    5193.     16.6     80.2 *  1     0354 118      101.      1.0     76.0 *  1     0714 218        0.       .0     75.0
 1     0036  19    5659.     17.6     80.4 *  1     0356 119       93.      1.0     76.0 *  1     0716 219        0.       .0     75.0
 1     0038  20    5925.     18.2     80.5 *  1     0358 120       86.       .9     76.0 *  1     0718 220        0.       .0     75.0
 1     0040  21    6015.     18.4     80.5 *  1     0400 121       80.       .9     76.0 *  1     0720 221        0.       .0     75.0
 1     0042  22    5968.     18.3     80.5 *  1     0402 122       74.       .8     76.0 *  1     0722 222        0.       .0     75.0
 1     0044  23    5821.     18.0     80.4 *  1     0404 123       70.       .8     75.9 *  1     0724 223        0.       .0     75.0
 1     0046  24    5606.     17.5     80.3 *  1     0406 124       66.       .8     75.9 *  1     0726 224        0.       .0     75.0
 1     0048  25    5348.     16.9     80.2 *  1     0408 125       62.       .7     75.9 *  1     0728 225        0.       .0     75.0
 1     0050  26    5080.     16.3     80.1 *  1     0410 126       59.       .7     75.8 *  1     0730 226        0.       .0     75.0
 1     0052  27    4806.     15.7     80.0 *  1     0412 127       55.       .7     75.8 *  1     0732 227        0.       .0     75.0
 1     0054  28    4535.     15.1     79.9 *  1     0414 128       52.       .6     75.8 *  1     0734 228        0.       .0     75.0
 1     0056  29    4275.     14.5     79.7 *  1     0416 129       48.       .6     75.8 *  1     0736 229        0.       .0     75.0
 1     0058  30    4038.     13.9     79.6 *  1     0418 130       45.       .5     75.7 *  1     0738 230        0.       .0     75.0
 1     0100  31    3804.     13.4     79.5 *  1     0420 131       41.       .5     75.7 *  1     0740 231        0.       .0     75.0
 1     0102  32    3583.     12.8     79.4 *  1     0422 132       38.       .5     75.7 *  1     0742 232        0.       .0     75.0
 1     0104  33    3376.     12.3     79.3 *  1     0424 133       35.       .5     75.7 *  1     0744 233        0.       .0     75.0
 1     0106  34    3189.     11.8     79.2 *  1     0426 134       33.       .4     75.6 *  1     0746 234        0.       .0     75.0
 1     0108  35    3013.     11.4     79.1 *  1     0428 135       30.       .4     75.6 *  1     0748 235        0.       .0     75.0
 1     0110  36    2847.     10.9     79.0 *  1     0430 136       28.       .4     75.6 *  1     0750 236        0.       .0     75.0
 1     0112  37    2692.     10.5     78.9 *  1     0432 137       25.       .4     75.6 *  1     0752 237        0.       .0     75.0
 1     0114  38    2549.     10.2     78.8 *  1     0434 138       24.       .3     75.6 *  1     0754 238        0.       .0     75.0
 1     0116  39    2424.      9.8     78.7 *  1     0436 139       22.       .3     75.6 *  1     0756 239        0.       .0     75.0
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1	0118	40	2303.	9.5	78.6	*	1	0438	140	21.	.3	75.5	*	1	0758	240	0.	.0	75.0
1	0120	41	2187.	9.1	78.6	*	1	0440	141	19.	.3	75.5	*	1	0800	241	0.	.0	75.0
1	0122	42	2078.	8.8	78.5	*	1	0442	142	18.	.3	75.5	*	1	0802	242	0.	.0	75.0
1	0124	43	1976.	8.5	78.4	*	1	0444	143	17.	.3	75.5	*	1	0804	243	0.	.0	75.0
1	0126	44	1882.	8.3	78.3	*	1	0446	144	16.	.3	75.5	*	1	0806	244	0.	.0	75.0
1	0128	45	1797.	8.0	78.3	*	1	0448	145	15.	.2	75.5	*	1	0808	245	0.	.0	75.0
1	0130	46	1720.	7.7	78.2	*	1	0450	146	14.	.2	75.5	*	1	0810	246	0.	.0	75.0
1	0132	47	1644.	7.5	78.2	*	1	0452	147	13.	.2	75.5	*	1	0812	247	0.	.0	75.0
1	0134	48	1573.	7.2	78.1	*	1	0454	148	12.	.2	75.5	*	1	0814	248	0.	.0	75.0
1	0136	49	1505.	7.0	78.0	*	1	0456	149	12.	.2	75.5	*	1	0816	249	0.	.0	75.0
1	0138	50	1442.	6.8	78.0	*	1	0458	150	11.	.2	75.5	*	1	0818	250	0.	.0	75.0
1	0140	51	1383.	6.6	77.9	*	1	0500	151	11.	.2	75.4	*	1	0820	251	0.	.0	75.0
1	0142	52	1327.	6.4	77.9	*	1	0502	152	10.	.2	75.4	*	1	0822	252	0.	.0	75.0
1	0144	53	1276.	6.3	77.9	*	1	0504	153	10.	.2	75.4	*	1	0824	253	0.	.0	75.0
1	0146	54	1231.	6.1	77.8	*	1	0506	154	9.	.2	75.4	*	1	0826	254	0.	.0	75.0
1	0148	55	1190.	5.9	77.8	*	1	0508	155	9.	.2	75.4	*	1	0828	255	0.	.0	75.0
1	0150	56	1150.	5.8	77.7	*	1	0510	156	8.	.1	75.3	*	1	0830	256	0.	.0	75.0
1	0152	57	1109.	5.6	77.7	*	1	0512	157	8.	.1	75.3	*	1	0832	257	0.	.0	75.0
1	0154	58	1070.	5.5	77.6	*	1	0514	158	7.	.1	75.3	*	1	0834	258	0.	.0	75.0
1	0156	59	1032.	5.3	77.6	*	1	0516	159	7.	.1	75.3	*	1	0836	259	0.	.0	75.0
1	0158	60	996.	5.2	77.6	*	1	0518	160	6.	.1	75.3	*	1	0838	260	0.	.0	75.0
1	0200	61	961.	5.0	77.5	*	1	0520	161	6.	.1	75.2	*	1	0840	261	0.	.0	75.0
1	0202	62	928.	4.9	77.5	*	1	0522	162	5.	.1	75.2	*	1	0842	262	0.	.0	75.0
1	0204	63	898.	4.8	77.5	*	1	0524	163	5.	.1	75.2	*	1	0844	263	0.	.0	75.0
1	0206	64	869.	4.7	77.4	*	1	0526	164	5.	.1	75.2	*	1	0846	264	0.	.0	75.0
1	0208	65	842.	4.6	77.4	*	1	0528	165	4.	.1	75.2	*	1	0848	265	0.	.0	75.0
1	0210	66	816.	4.5	77.4	*	1	0530	166	4.	.1	75.2	*	1	0850	266	0.	.0	75.0
1	0212	67	793.	4.4	77.3	*	1	0532	167	4.	.1	75.2	*	1	0852	267	0.	.0	75.0
1	0214	68	769.	4.3	77.3	*	1	0534	168	3.	.1	75.1	*	1	0854	268	0.	.0	75.0
1	0216	69	746.	4.2	77.3	*	1	0536	169	3.	.1	75.1	*	1	0856	269	0.	.0	75.0
1	0218	70	724.	4.1	77.2	*	1	0538	170	3.	.1	75.1	*	1	0858	270	0.	.0	75.0
1	0220	71	702.	4.0	77.2	*	1	0540	171	3.	.0	75.1	*	1	0900	271	0.	.0	75.0
1	0222	72	682.	3.9	77.2	*	1	0542	172	2.	.0	75.1	*	1	0902	272	0.	.0	75.0
1	0224	73	662.	3.8	77.1	*	1	0544	173	2.	.0	75.1	*	1	0904	273	0.	.0	75.0
1	0226	74	643.	3.7	77.1	*	1	0546	174	2.	.0	75.1	*	1	0906	274	0.	.0	75.0
1	0228	75	626.	3.7	77.1	*	1	0548	175	2.	.0	75.1	*	1	0908	275	0.	.0	75.0
1	0230	76	610.	3.6	77.1	*	1	0550	176	2.	.0	75.1	*	1	0910	276	0.	.0	75.0
1	0232	77	595.	3.5	77.1	*	1	0552	177	2.	.0	75.1	*	1	0912	277	0.	.0	75.0
1	0234	78	581.	3.5	77.0	*	1	0554	178	1.	.0	75.1	*	1	0914	278	0.	.0	75.0
1	0236	79	567.	3.4	77.0	*	1	0556	179	1.	.0	75.1	*	1	0916	279	0.	.0	75.0
1	0238	80	552.	3.3	77.0	*	1	0558	180	1.	.0	75.0	*	1	0918	280	0.	.0	75.0
1	0240	81	539.	3.3	77.0	*	1	0600	181	1.	.0	75.0	*	1	0920	281	0.	.0	75.0
1	0242	82	525.	3.2	77.0	*	1	0602	182	1.	.0	75.0	*	1	0922	282	0.	.0	75.0
1	0244	83	512.	3.2	76.9	*	1	0604	183	1.	.0	75.0	*	1	0924	283	0.	.0	75.0
1	0246	84	499.	3.1	76.9	*	1	0606	184	1.	.0	75.0	*	1	0926	284	0.	.0	75.0
1	0248	85	486.	3.1	76.9	*	1	0608	185	1.	.0	75.0	*	1	0928	285	0.	.0	75.0
1	0250	86	475.	3.0	76.9	*	1	0610	186	1.	.0	75.0	*	1	0930	286	0.	.0	75.0
1	0252	87	464.	3.0	76.9	*	1	0612	187	1.	.0	75.0	*	1	0932	287	0.	.0	75.0
1	0254	88	453.	2.9	76.8	*	1	0614	188	1.	.0	75.0	*	1	0934	288	0.	.0	75.0
1	0256	89	443.	2.8	76.8	*	1	0616	189	0.	.0	75.0	*	1	0936	289	0.	.0	75.0
1	0258	90	433.	2.8	76.8	*	1	0618	190	0.	.0	75.0	*	1	0938	290	0.	.0	75.0
1	0300	91	424.	2.8	76.8	*	1	0620	191	0.	.0	75.0	*	1	0940	291	0.	.0	75.0
1	0302	92	415.	2.7	76.8	*	1	0622	192	0.	.0	75.0	*	1	0942	292	0.	.0	75.0
1	0304	93	406.	2.7	76.8	*	1	0624	193	0.	.0	75.0	*	1	0944	293	0.	.0	75.0
1	0306	94	396.	2.6	76.7	*	1	0626	194	0.	.0	75.0	*	1	0946	294	0.	.0	75.0
1	0308	95	386.	2.6	76.7	*	1	0628	195	0.	.0	75.0	*	1	0948	295	0.	.0	75.0
1	0310	96	374.	2.5	76.7	*	1	0630	196	0.	.0	75.0	*	1	0950	296	0.	.0	75.0
1	0312	97	361.	2.4	76.7	*	1	0632	197	0.	.0	75.0	*	1	0952	297	0.	.0	75.0
1	0314	98	347.	2.4	76.6	*	1	0634	198	0.	.0	75.0	*	1	0954	298	0.	.0	75.0
1	0316	99	332.	2.3	76.6	*	1	0636	199	0.	.0	75.0	*	1	0956	299	0.	.0	75.0
1	0318	100	316.	2.2	76.6	*	1	0638	200	0.	.0	75.0	*	1	0958	300	0.	.0	75.0
						*							*						

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PEAK FLOW	TIME			MAXIMUM AVERAGE FLOW		
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 6015.	.67		967.	582.	582.	582.
		(INCHES)	1.957	1.957	1.957	1.957
		(AC-FT)	479.	479.	479.	479.

PEAK STORAGE	TIME			MAXIMUM AVERAGE STORAGE		
			6-HR	24-HR	72-HR	9.97-HR
+ (AC-FT)	(HR)					
18.	.67		4.	2.	2.	2.

PEAK STAGE	TIME			MAXIMUM AVERAGE STAGE		
			6-HR	24-HR	72-HR	9.97-HR
+ (FEET)	(HR)					
80.52	.67		76.84	76.11	76.11	76.11

CUMULATIVE AREA = 4.59 SQ MI

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           *            *
252 KK     *    FR-7    *
           *            *
           **************
                       LOCAL RUNOFF TO FR-7
                       BASIN FR-7

             SUBBASIN RUNOFF DATA

255 BA         SUBBASIN CHARACTERISTICS
                    TAREA         .17  SUBBASIN AREA

               PRECIPITATION DATA

256 PB              STORM        2.98  BASIN TOTAL PRECIPITATION

 20 PI           INCREMENTAL PRECIPITATION PATTERN
                      .04       .04       .06       .08       .08       .07       .07       .05       .03       .03
                      .02       .02       .02       .02       .02       .02       .02       .01       .01       .01
                      .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                      .01       .01       .01       .01       .01       .01       .01       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

257 LS         SCS LOSS RATE
                    STRTL         .56  INITIAL ABSTRACTION
                   CRVNBR       78.00  CURVE NUMBER
                    RTIMP       20.00  PERCENT IMPERVIOUS AREA

258 UD         SCS DIMENSIONLESS UNITGRAPH
                     TLAG         .22  LAG

                                                   ***

                                              UNIT HYDROGRAPH
                                          35 END-OF-PERIOD ORDINATES
              20.       59.      118.      201.      283.      331.      348.      342.      312.      274.
             225.      171.      134.      107.       87.       70.       55.       44.       35.       28.
              22.       18.       14.       11.        9.        7.        6.        5.        4.        3.
               3.        2.        1.        1.        0.
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HYDROGRAPH AT STATION FR-7

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DA	MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	0000	1	.00	.00	.00	0.	*	1	0500	151	.00	.00	.00	0.
1	0002	2	.12	.10	.02	0.	*	1	0502	152	.00	.00	.00	0.
1	0004	3	.12	.10	.02	2.	*	1	0504	153	.00	.00	.00	0.
1	0006	4	.18	.15	.04	5.	*	1	0506	154	.00	.00	.00	0.
1	0008	5	.24	.19	.05	11.	*	1	0508	155	.00	.00	.00	0.
1	0010	6	.24	.17	.08	21.	*	1	0510	156	.00	.00	.00	0.
1	0012	7	.20	.12	.08	34.	*	1	0512	157	.00	.00	.00	0.
1	0014	8	.20	.10	.09	53.	*	1	0514	158	.00	.00	.00	0.
1	0016	9	.15	.07	.08	75.	*	1	0516	159	.00	.00	.00	0.
1	0018	10	.10	.05	.06	100.	*	1	0518	160	.00	.00	.00	0.
1	0020	11	.10	.04	.06	124.	*	1	0520	161	.00	.00	.00	0.
1	0022	12	.07	.03	.04	146.	*	1	0522	162	.00	.00	.00	0.
1	0024	13	.07	.03	.04	163.	*	1	0524	163	.00	.00	.00	0.
1	0026	14	.07	.03	.04	174.	*	1	0526	164	.00	.00	.00	0.
1	0028	15	.06	.02	.04	180.	*	1	0528	165	.00	.00	.00	0.
1	0030	16	.06	.02	.04	180.	*	1	0530	166	.00	.00	.00	0.
1	0032	17	.05	.02	.03	177.	*	1	0532	167	.00	.00	.00	0.
1	0034	18	.05	.02	.03	171.	*	1	0534	168	.00	.00	.00	0.
1	0036	19	.04	.01	.03	163.	*	1	0536	169	.00	.00	.00	0.

1	0038	20	.04	.01	.03	155.	*	1	0538	170	.00	.00	.00	0.
1	0040	21	.04	.01	.03	147.	*	1	0540	171	.00	.00	.00	0.
1	0042	22	.03	.01	.02	139.	*	1	0542	172	.00	.00	.00	0.
1	0044	23	.03	.01	.02	132.	*	1	0544	173	.00	.00	.00	0.
1	0046	24	.03	.01	.02	124.	*	1	0546	174	.00	.00	.00	0.
1	0048	25	.03	.01	.02	117.	*	1	0548	175	.00	.00	.00	0.
1	0050	26	.03	.01	.02	111.	*	1	0550	176	.00	.00	.00	0.
1	0052	27	.03	.01	.02	104.	*	1	0552	177	.00	.00	.00	0.
1	0054	28	.03	.01	.02	99.	*	1	0554	178	.00	.00	.00	0.
1	0056	29	.02	.01	.02	93.	*	1	0556	179	.00	.00	.00	0.
1	0058	30	.02	.01	.02	88.	*	1	0558	180	.00	.00	.00	0.
1	0100	31	.02	.01	.02	83.	*	1	0600	181	.00	.00	.00	0.
1	0102	32	.02	.01	.01	79.	*	1	0602	182	.00	.00	.00	0.
1	0104	33	.02	.01	.01	74.	*	1	0604	183	.00	.00	.00	0.
1	0106	34	.02	.01	.01	70.	*	1	0606	184	.00	.00	.00	0.
1	0108	35	.02	.00	.01	67.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.00	.01	63.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.02	.00	.01	60.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.02	.00	.01	57.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.01	.00	.01	54.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.01	.00	.01	52.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.01	.00	.01	49.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	47.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	45.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	43.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	41.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	39.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	38.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	36.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	35.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	33.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	32.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	31.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	30.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	29.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	28.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	27.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.01	26.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.01	25.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.01	24.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.01	23.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.01	23.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.00	22.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.00	21.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.00	21.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.00	20.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.00	19.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.00	19.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.00	18.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.00	18.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.01	.00	.00	17.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.01	.00	.00	17.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.01	.00	.00	16.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.01	.00	.00	16.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.00	.00	.00	15.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.00	.00	.00	15.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.00	.00	.00	15.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.00	.00	.00	14.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	14.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	14.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	13.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	13.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	13.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	12.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	12.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	12.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	12.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	11.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	11.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	11.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	11.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	10.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	10.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	10.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	9.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	8.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	8.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	7.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	6.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	5.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	4.	*	1	0818	250	.00	.00	.00	0.

1	0320	101	.00	.00	.00	3.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	2.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	2.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	1.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	1.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	1.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	1.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	1.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	0.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	0.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	0.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.
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   TOTAL RAINFALL =     2.98, TOTAL LOSS =     1.49, TOTAL EXCESS =     1.49

 PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR         24-HR        72-HR        9.97-HR
+   (CFS)       (HR)
                           (CFS)
+     180.       .50                   28.           17.          17.           17.
                        (INCHES)      1.488         1.488        1.488         1.488
                         (AC-FT)        14.           14.          14.           14.

                        CUMULATIVE AREA =      .17 SQ MI


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            **************
            *            *
 259 KK     *    CO-7    *
            *            *
            **************
                         COMBINE HYDROGRAPHS
                         AT NODE FR-7 (MAIN CHANNEL)
                         UPSTREAM OF CULVERT AT SKYLINE ROAD

 263 HC          HYDROGRAPH COMBINATION
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ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION CO-7
SUM OF 2 HYDROGRAPHS

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0230	76	625.	1		0500	151	11.	1		0730	226	0.
1		0002	2	1.	1		0232	77	610.	1		0502	152	10.	1		0732	227	0.
1		0004	3	3.	1		0234	78	595.	1		0504	153	10.	1		0734	228	0.
1		0006	4	9.	1		0236	79	580.	1		0506	154	9.	1		0736	229	0.
1		0008	5	23.	1		0238	80	566.	1		0508	155	9.	1		0738	230	0.
1		0010	6	57.	1		0240	81	552.	1		0510	156	8.	1		0740	231	0.
1		0012	7	117.	1		0242	82	538.	1		0512	157	8.	1		0742	232	0.
1		0014	8	235.	1		0244	83	524.	1		0514	158	7.	1		0744	233	0.
1		0016	9	407.	1		0246	84	511.	1		0516	159	7.	1		0746	234	0.
1		0018	10	636.	1		0248	85	498.	1		0518	160	6.	1		0748	235	0.
1		0020	11	930.	1		0250	86	486.	1		0520	161	6.	1		0750	236	0.
1		0022	12	1304.	1		0252	87	475.	1		0522	162	5.	1		0752	237	0.
1		0024	13	1802.	1		0254	88	464.	1		0524	163	5.	1		0754	238	0.
1		0026	14	2446.	1		0256	89	454.	1		0526	164	5.	1		0756	239	0.
1		0028	15	3196.	1		0258	90	444.	1		0528	165	4.	1		0758	240	0.
1		0030	16	3983.	1		0300	91	434.	1		0530	166	4.	1		0800	241	0.
1		0032	17	4733.	1		0302	92	425.	1		0532	167	4.	1		0802	242	0.
1		0034	18	5363.	1		0304	93	416.	1		0534	168	3.	1		0804	243	0.
1		0036	19	5822.	1		0306	94	405.	1		0536	169	3.	1		0806	244	0.
1		0038	20	6080.	1		0308	95	394.	1		0538	170	3.	1		0808	245	0.
1		0040	21	6162.	1		0310	96	382.	1		0540	171	3.	1		0810	246	0.
1		0042	22	6107.	1		0312	97	368.	1		0542	172	2.	1		0812	247	0.
1		0044	23	5952.	1		0314	98	353.	1		0544	173	2.	1		0814	248	0.
1		0046	24	5730.	1		0316	99	337.	1		0546	174	2.	1		0816	249	0.
1		0048	25	5465.	1		0318	100	320.	1		0548	175	2.	1		0818	250	0.
1		0050	26	5190.	1		0320	101	303.	1		0550	176	2.	1		0820	251	0.
1		0052	27	4910.	1		0322	102	287.	1		0552	177	2.	1		0822	252	0.
1		0054	28	4633.	1		0324	103	271.	1		0554	178	1.	1		0824	253	0.
1		0056	29	4368.	1		0326	104	255.	1		0556	179	1.	1		0826	254	0.
1		0058	30	4126.	1		0328	105	241.	1		0558	180	1.	1		0828	255	0.
1		0100	31	3887.	1		0330	106	228.	1		0600	181	1.	1		0830	256	0.
1		0102	32	3662.	1		0332	107	216.	1		0602	182	1.	1		0832	257	0.
1		0104	33	3450.	1		0334	108	203.	1		0604	183	1.	1		0834	258	0.
1		0106	34	3260.	1		0336	109	191.	1		0606	184	1.	1		0836	259	0.
1		0108	35	3079.	1		0338	110	179.	1		0608	185	1.	1		0838	260	0.
1		0110	36	2910.	1		0340	111	167.	1		0610	186	1.	1		0840	261	0.
1		0112	37	2752.	1		0342	112	155.	1		0612	187	1.	1		0842	262	0.
1		0114	38	2606.	1		0344	113	145.	1		0614	188	1.	1		0844	263	0.
1		0116	39	2478.	1		0346	114	135.	1		0616	189	0.	1		0846	264	0.
1		0118	40	2355.	1		0348	115	126.	1		0618	190	0.	1		0848	265	0.
1		0120	41	2236.	1		0350	116	117.	1		0620	191	0.	1		0850	266	0.
1		0122	42	2125.	1		0352	117	109.	1		0622	192	0.	1		0852	267	0.
1		0124	43	2021.	1		0354	118	101.	1		0624	193	0.	1		0854	268	0.
1		0126	44	1925.	1		0356	119	94.	1		0626	194	0.	1		0856	269	0.
1		0128	45	1838.	1		0358	120	86.	1		0628	195	0.	1		0858	270	0.
1		0130	46	1759.	1		0400	121	80.	1		0630	196	0.	1		0900	271	0.
1		0132	47	1682.	1		0402	122	74.	1		0632	197	0.	1		0902	272	0.
1		0134	48	1609.	1		0404	123	70.	1		0634	198	0.	1		0904	273	0.
1		0136	49	1540.	1		0406	124	66.	1		0636	199	0.	1		0906	274	0.
1		0138	50	1475.	1		0408	125	62.	1		0638	200	0.	1		0908	275	0.
1		0140	51	1415.	1		0410	126	59.	1		0640	201	0.	1		0910	276	0.
1		0142	52	1358.	1		0412	127	55.	1		0642	202	0.	1		0912	277	0.
1		0144	53	1306.	1		0414	128	52.	1		0644	203	0.	1		0914	278	0.
1		0146	54	1260.	1		0416	129	48.	1		0646	204	0.	1		0916	279	0.
1		0148	55	1218.	1		0418	130	45.	1		0648	205	0.	1		0918	280	0.
1		0150	56	1176.	1		0420	131	41.	1		0650	206	0.	1		0920	281	0.
1		0152	57	1135.	1		0422	132	38.	1		0652	207	0.	1		0922	282	0.
1		0154	58	1095.	1		0424	133	35.	1		0654	208	0.	1		0924	283	0.
1		0156	59	1056.	1		0426	134	33.	1		0656	209	0.	1		0926	284	0.
1		0158	60	1019.	1		0428	135	30.	1		0658	210	0.	1		0928	285	0.
1		0200	61	984.	1		0430	136	28.	1		0700	211	0.	1		0930	286	0.
1		0202	62	950.	1		0432	137	25.	1		0702	212	0.	1		0932	287	0.
1		0204	63	919.	1		0434	138	24.	1		0704	213	0.	1		0934	288	0.
1		0206	64	890.	1		0436	139	22.	1		0706	214	0.	1		0936	289	0.
1		0208	65	862.	1		0438	140	21.	1		0708	215	0.	1		0938	290	0.
1		0210	66	836.	1		0440	141	19.	1		0710	216	0.	1		0940	291	0.
1		0212	67	812.	1		0442	142	18.	1		0712	217	0.	1		0942	292	0.
1		0214	68	788.	1		0444	143	17.	1		0714	218	0.	1		0944	293	0.

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      1    0216   69       764.  *  1   0446  144       16.  *  1   0716  219       0.  *  1   0946  294        0.
      1    0218   70       741.  *  1   0448  145       15.  *  1   0718  220       0.  *  1   0948  295        0.
      1    0220   71       719.  *  1   0450  146       14.  *  1   0720  221       0.  *  1   0950  296        0.
      1    0222   72       698.  *  1   0452  147       13.  *  1   0722  222       0.  *  1   0952  297        0.
      1    0224   73       678.  *  1   0454  148       12.  *  1   0724  223       0.  *  1   0954  298        0.
      1    0226   74       658.  *  1   0456  149       12.  *  1   0726  224       0.  *  1   0956  299        0.
      1    0228   75       641.  *  1   0458  150       11.  *  1   0728  225       0.  *  1   0958  300        0.
                                 *                           *                          *
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   PEAK FLOW      TIME                      MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR       72-HR      9.97-HR
 +   (CFS)        (HR)
                             (CFS)
 +    6162.        .67               994.         599.        599.        599.
                          (INCHES)  1.940        1.940       1.940       1.940
                           (AC-FT)   493.         493.        493.        493.

                         CUMULATIVE AREA =     4.77 SQ MI


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

            **************
            *            *
   264 KK   *   RES-7    *
            *            *
            **************
                          MODIFIED PULS RESERVOIR ROUTING
                          AT NODE FR-7
                          SKYLINE DR CULVERT CROSSING

               HYDROGRAPH ROUTING DATA

   268 RS        STORAGE ROUTING
                      NSTPS            1  NUMBER OF SUBREACHES
                       ITYP         ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC      2767.30  INITIAL CONDITION
                          X          .00 WORKING R AND D COEFFICIENT

   269 SA             AREA          .0         .2        1.2        2.0        2.8        3.5        4.1        4.7        5.4        6.1
                                   6.7        7.8

   271 SE        ELEVATION     2767.30    2770.00    2772.00    2774.00    2776.00    2778.00    2780.00    2782.00    2784.00    2786.00
                               2788.00    2790.00

   273 SQ        DISCHARGE          0.        20.        40.        60.        80.       100.       120.       140.       160.       180.
                                  200.       500.      1000.      2000.      3000.      4000.      5000.      6000.      7000.      8000.

   275 SE        ELEVATION     2767.30    2769.10    2770.10    2771.00    2772.00    2773.20    2774.60    2776.40    2778.50    2781.00
                               2783.70    2784.60    2785.10    2785.70    2786.20    2786.50    2786.90    2787.20    2787.50    2787.70

                                                            ***

                                             COMPUTED STORAGE-ELEVATION DATA

          STORAGE       .00        .18       1.44       4.62       9.42      15.71      23.31      32.12      42.24      53.80
        ELEVATION   2767.30    2770.00    2772.00    2774.00    2776.00    2778.00    2780.00    2782.00    2784.00    2786.00

          STORAGE     66.67      81.16
        ELEVATION   2788.00    2790.00

                                         COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       .00        .05        .18        .20        .56       1.44       3.15       4.62       5.90       9.42
          OUTFLOW       .00      20.00      38.00      40.00      60.00      80.00     100.00     111.43     120.00     135.56
        ELEVATION   2767.30    2769.10    2770.00    2770.10    2771.00    2772.00    2773.20    2774.00    2774.60    2776.00

          STORAGE     10.57      15.71      17.50      23.31      27.57      32.12      40.62      42.24      45.56      48.42
          OUTFLOW    140.00     155.24     160.00     172.00     180.00     187.41     200.00     300.00     500.00    1000.00
        ELEVATION   2776.40    2778.00    2778.50    2780.00    2781.00    2782.00    2783.70    2784.00    2784.60    2785.10

          STORAGE     51.97      53.80      55.03      56.91      59.44      61.38      63.34      64.67      66.67      81.16
          OUTFLOW   2000.00    2600.10    3000.00    4000.00    5000.00    6000.00    7000.00    8000.00    9500.61   19503.05
        ELEVATION   2785.70    2786.00    2786.20    2786.50    2786.90    2787.20    2787.50    2787.70    2788.00    2790.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN     7000. TO     9501.
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THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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HYDROGRAPH AT STATION RES-7

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	2767.3	*	1		0320	101	381.	43.6	2784.2	*	1		0640	201	119.	5.7	2774.5
1		0002	2	0.	.0	2767.3	*	1		0322	102	368.	43.4	2784.2	*	1		0642	202	116.	5.4	2774.3
1		0004	3	1.	.0	2767.4	*	1		0324	103	354.	43.1	2784.2	*	1		0644	203	114.	5.0	2774.2
1		0006	4	5.	.0	2767.7	*	1		0326	104	340.	42.9	2784.1	*	1		0646	204	112.	4.7	2774.1
1		0008	5	12.	.0	2768.4	*	1		0328	105	326.	42.7	2784.1	*	1		0648	205	110.	4.4	2773.9
1		0010	6	25.	.1	2769.4	*	1		0330	106	312.	42.4	2784.0	*	1		0650	206	108.	4.1	2773.7
1		0012	7	42.	.2	2770.2	*	1		0332	107	298.	42.2	2784.0	*	1		0652	207	105.	3.8	2773.6
1		0014	8	60.	.6	2771.0	*	1		0334	108	284.	42.0	2784.0	*	1		0654	208	103.	3.5	2773.4
1		0016	9	76.	1.3	2771.8	*	1		0336	109	271.	41.8	2783.9	*	1		0656	209	101.	3.3	2773.3
1		0018	10	92.	2.5	2772.7	*	1		0338	110	257.	41.5	2783.9	*	1		0658	210	98.	3.0	2773.1
1		0020	11	109.	4.4	2773.9	*	1		0340	111	244.	41.3	2783.8	*	1		0700	211	95.	2.7	2772.9
1		0022	12	125.	7.1	2775.1	*	1		0342	112	231.	41.1	2783.8	*	1		0702	212	92.	2.5	2772.7
1		0024	13	141.	11.0	2776.5	*	1		0344	113	218.	40.9	2783.8	*	1		0704	213	89.	2.2	2772.5
1		0026	14	157.	16.5	2778.2	*	1		0346	114	206.	40.7	2783.7	*	1		0706	214	86.	2.0	2772.4
1		0028	15	173.	23.8	2780.1	*	1		0348	115	200.	40.5	2783.7	*	1		0708	215	84.	1.7	2772.2
1		0030	16	189.	33.2	2782.2	*	1		0350	116	200.	40.3	2783.6	*	1		0710	216	81.	1.5	2772.1
1		0032	17	426.	44.3	2784.4	*	1		0352	117	199.	40.1	2783.6	*	1		0712	217	77.	1.3	2771.8
1		0034	18	2661.	54.0	2786.0	*	1		0354	118	199.	39.8	2783.5	*	1		0714	218	72.	1.1	2771.6
1		0036	19	4846.	59.1	2786.8	*	1		0356	119	198.	39.5	2783.5	*	1		0716	219	68.	.9	2771.4
1		0038	20	5737.	60.9	2787.1	*	1		0358	120	198.	39.2	2783.4	*	1		0718	220	64.	.7	2771.2
1		0040	21	6056.	61.5	2787.2	*	1		0400	121	197.	38.9	2783.4	*	1		0720	221	60.	.6	2771.0
1		0042	22	6121.	61.6	2787.2	*	1		0402	122	197.	38.6	2783.3	*	1		0722	222	51.	.4	2770.6
1		0044	23	6046.	61.5	2787.2	*	1		0404	123	196.	38.2	2783.2	*	1		0724	223	44.	.3	2770.3
1		0046	24	5876.	61.1	2787.2	*	1		0406	124	196.	37.9	2783.2	*	1		0726	224	35.	.2	2769.9
1		0048	25	5645.	60.7	2787.1	*	1		0408	125	195.	37.5	2783.1	*	1		0728	225	24.	.1	2769.3
1		0050	26	5381.	60.2	2787.0	*	1		0410	126	195.	37.2	2783.0	*	1		0730	226	12.	.0	2768.3
1		0052	27	5106.	59.6	2786.9	*	1		0412	127	194.	36.8	2782.9	*	1		0732	227	4.	.0	2767.6
1		0054	28	4855.	59.1	2786.8	*	1		0414	128	194.	36.4	2782.9	*	1		0734	228	1.	.0	2767.4
1		0056	29	4606.	58.4	2786.7	*	1		0416	129	193.	36.0	2782.8	*	1		0736	229	0.	.0	2767.3
1		0058	30	4353.	57.8	2786.6	*	1		0418	130	193.	35.6	2782.7	*	1		0738	230	0.	.0	2767.3
1		0100	31	4109.	57.2	2786.5	*	1		0420	131	192.	35.2	2782.6	*	1		0740	231	0.	.0	2767.3
1		0102	32	3848.	56.6	2786.5	*	1		0422	132	191.	34.8	2782.5	*	1		0742	232	0.	.0	2767.3
1		0104	33	3600.	56.2	2786.4	*	1		0424	133	191.	34.3	2782.4	*	1		0744	233	0.	.0	2767.3
1		0106	34	3392.	55.8	2786.3	*	1		0426	134	190.	33.9	2782.4	*	1		0746	234	0.	.0	2767.3
1		0108	35	3203.	55.4	2786.3	*	1		0428	135	189.	33.5	2782.3	*	1		0748	235	0.	.0	2767.3
1		0110	36	3027.	55.1	2786.2	*	1		0430	136	189.	33.0	2782.2	*	1		0750	236	0.	.0	2767.3
1		0112	37	2899.	54.7	2786.1	*	1		0432	137	188.	32.6	2782.1	*	1		0752	237	0.	.0	2767.3
1		0114	38	2763.	54.3	2786.1	*	1		0434	138	187.	32.1	2782.0	*	1		0754	238	0.	.0	2767.3
1		0116	39	2627.	53.9	2786.0	*	1		0436	139	187.	31.7	2781.9	*	1		0756	239	0.	.0	2767.3
1		0118	40	2496.	53.5	2785.9	*	1		0438	140	186.	31.2	2781.8	*	1		0758	240	0.	.0	2767.3
1		0120	41	2371.	53.1	2785.9	*	1		0440	141	185.	30.8	2781.7	*	1		0800	241	0.	.0	2767.3
1		0122	42	2252.	52.7	2785.8	*	1		0442	142	184.	30.3	2781.6	*	1		0802	242	0.	.0	2767.3
1		0124	43	2140.	52.4	2785.8	*	1		0444	143	184.	29.8	2781.5	*	1		0804	243	0.	.0	2767.3
1		0126	44	2036.	52.1	2785.7	*	1		0446	144	183.	29.4	2781.4	*	1		0806	244	0.	.0	2767.3
1		0128	45	1946.	51.8	2785.7	*	1		0448	145	182.	28.9	2781.3	*	1		0808	245	0.	.0	2767.3
1		0130	46	1864.	51.5	2785.6	*	1		0450	146	181.	28.5	2781.2	*	1		0810	246	0.	.0	2767.3
1		0132	47	1784.	51.2	2785.6	*	1		0452	147	181.	28.0	2781.1	*	1		0812	247	0.	.0	2767.3
1		0134	48	1706.	50.9	2785.5	*	1		0454	148	180.	27.5	2781.0	*	1		0814	248	0.	.0	2767.3
1		0136	49	1633.	50.7	2785.5	*	1		0456	149	179.	27.1	2780.9	*	1		0816	249	0.	.0	2767.3
1		0138	50	1563.	50.4	2785.4	*	1		0458	150	178.	26.6	2780.8	*	1		0818	250	0.	.0	2767.3
1		0140	51	1497.	50.2	2785.4	*	1		0500	151	177.	26.2	2780.7	*	1		0820	251	0.	.0	2767.3
1		0142	52	1435.	50.0	2785.4	*	1		0502	152	176.	25.7	2780.6	*	1		0822	252	0.	.0	2767.3
1		0144	53	1378.	49.8	2785.3	*	1		0504	153	176.	25.2	2780.5	*	1		0824	253	0.	.0	2767.3
1		0146	54	1325.	49.6	2785.3	*	1		0506	154	175.	24.8	2780.3	*	1		0826	254	0.	.0	2767.3
1		0148	55	1277.	49.4	2785.3	*	1		0508	155	174.	24.3	2780.2	*	1		0828	255	0.	.0	2767.3
1		0150	56	1232.	49.2	2785.2	*	1		0510	156	173.	23.9	2780.1	*	1		0830	256	0.	.0	2767.3
1		0152	57	1190.	49.1	2785.2	*	1		0512	157	172.	23.4	2780.0	*	1		0832	257	0.	.0	2767.3
1		0154	58	1148.	48.9	2785.2	*	1		0514	158	171.	23.0	2779.9	*	1		0834	258	0.	.0	2767.3
1		0156	59	1108.	48.8	2785.2	*	1		0516	159	170.	22.5	2779.8	*	1		0836	259	0.	.0	2767.3
1		0158	60	1069.	48.7	2785.1	*	1		0518	160	169.	22.1	2779.7	*	1		0838	260	0.	.0	2767.3
1		0200	61	1031.	48.5	2785.1	*	1		0520	161	169.	21.6	2779.6	*	1		0840	261	0.	.0	2767.3
1		0202	62	997.	48.4	2785.1	*	1		0522	162	168.	21.2	2779.4	*	1		0842	262	0.	.0	2767.3
1		0204	63	973.	48.3	2785.1	*	1		0524	163	167.	20.7	2779.3	*	1		0844	263	0.	.0	2767.3
1		0206	64	946.	48.1	2785.0	*	1		0526	164	166.	20.3	2779.2	*	1		0846	264	0.	.0	2767.3
1		0208	65	919.	48.0	2785.0	*	1		0528	165	165.	19.8	2779.1	*	1		0848	265	0.	.0	2767.3
1		0210	66	892.	47.8	2785.0	*	1		0530	166	164.	19.4	2779.0	*	1		0850	266	0.	.0	2767.3
1		0212	67	865.	47.7	2785.0	*	1		0532	167	163.	19.0	2778.9	*	1		0852	267	0.	.0	2767.3
1		0214	68	840.	47.5	2784.9	*	1		0534	168	162.	18.5	2778.8	*	1		0854	268	0.	.0	2767.3
1		0216	69	815.	47.4	2784.9	*	1		0536	169	161.	18.1	2778.7	*	1		0856	269	0.	.0	2767.3
1		0218	70	791.	47.2	2784.9	*	1		0538	170	160.	17.6	2778.5	*	1		0858	270	0.	.0	2767.3

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   1      0220  71       767.       47.1  2784.9 *  1       0540 171       159.       17.2  2778.4 *  1       0900 271         0.         .0  2767.3
   1      0222  72       745.       47.0  2784.8 *  1       0542 172       158.       16.8  2778.3 *  1       0902 272         0.         .0  2767.3
   1      0224  73       723.       46.8  2784.8 *  1       0544 173       157.       16.4  2778.2 *  1       0904 273         0.         .0  2767.3
   1      0226  74       701.       46.7  2784.8 *  1       0546 174       156.       15.9  2778.1 *  1       0906 274         0.         .0  2767.3
   1      0228  75       681.       46.6  2784.8 *  1       0548 175       155.       15.5  2777.9 *  1       0908 275         0.         .0  2767.3
   1      0230  76       663.       46.5  2784.8 *  1       0550 176       153.       15.1  2777.8 *  1       0910 276         0.         .0  2767.3
   1      0232  77       645.       46.4  2784.7 *  1       0552 177       152.       14.7  2777.7 *  1       0912 277         0.         .0  2767.3
   1      0234  78       629.       46.3  2784.7 *  1       0554 178       151.       14.3  2777.5 *  1       0914 278         0.         .0  2767.3
   1      0236  79       613.       46.2  2784.7 *  1       0556 179       150.       13.8  2777.4 *  1       0916 279         0.         .0  2767.3
   1      0238  80       597.       46.1  2784.7 *  1       0558 180       149.       13.4  2777.3 *  1       0918 280         0.         .0  2767.3
   1      0240  81       582.       46.0  2784.7 *  1       0600 181       147.       13.0  2777.2 *  1       0920 281         0.         .0  2767.3
   1      0242  82       568.       45.9  2784.7 *  1       0602 182       146.       12.6  2777.0 *  1       0922 282         0.         .0  2767.3
   1      0244  83       553.       45.9  2784.7 *  1       0604 183       145.       12.2  2776.9 *  1       0924 283         0.         .0  2767.3
   1      0246  84       539.       45.8  2784.6 *  1       0606 184       144.       11.8  2776.8 *  1       0926 284         0.         .0  2767.3
   1      0248  85       526.       45.7  2784.6 *  1       0608 185       143.       11.5  2776.7 *  1       0928 285         0.         .0  2767.3
   1      0250  86       513.       45.6  2784.6 *  1       0610 186       141.       11.1  2776.6 *  1       0930 286         0.         .0  2767.3
   1      0252  87       500.       45.6  2784.6 *  1       0612 187       140.       10.7  2776.4 *  1       0932 287         0.         .0  2767.3
   1      0254  88       495.       45.5  2784.6 *  1       0614 188       139.       10.3  2776.3 *  1       0934 288         0.         .0  2767.3
   1      0256  89       490.       45.4  2784.6 *  1       0616 189       137.        9.9  2776.2 *  1       0936 289         0.         .0  2767.3
   1      0258  90       484.       45.3  2784.6 *  1       0618 190       136.        9.5  2776.0 *  1       0938 290         0.         .0  2767.3
   1      0300  91       477.       45.2  2784.5 *  1       0620 191       134.        9.2  2775.9 *  1       0940 291         0.         .0  2767.3
   1      0302  92       470.       45.1  2784.5 *  1       0622 192       133.        8.8  2775.8 *  1       0942 292         0.         .0  2767.3
   1      0304  93       462.       44.9  2784.5 *  1       0624 193       131.        8.4  2775.6 *  1       0944 293         0.         .0  2767.3
   1      0306  94       454.       44.8  2784.5 *  1       0626 194       130.        8.1  2775.5 *  1       0946 294         0.         .0  2767.3
   1      0308  95       446.       44.7  2784.4 *  1       0628 195       128.        7.7  2775.3 *  1       0948 295         0.         .0  2767.3
   1      0310  96       437.       44.5  2784.4 *  1       0630 196       126.        7.4  2775.2 *  1       0950 296         0.         .0  2767.3
   1      0312  97       427.       44.4  2784.4 *  1       0632 197       125.        7.0  2775.0 *  1       0952 297         0.         .0  2767.3
   1      0314  98       417.       44.2  2784.4 *  1       0634 198       123.        6.7  2774.9 *  1       0954 298         0.         .0  2767.3
   1      0316  99       406.       44.0  2784.3 *  1       0636 199       122.        6.3  2774.8 *  1       0956 299         0.         .0  2767.3
   1      0318 100       394.       43.8  2784.3 *  1       0638 200       120.        6.0  2774.6 *  1       0958 300         0.         .0  2767.3
                                                *                                                    *
*******************************************************************************************************************************************

   PEAK FLOW       TIME                              MAXIMUM AVERAGE FLOW
                                            6-HR         24-HR         72-HR        9.97-HR
+    (CFS)         (HR)
                             (CFS)
+     6121.         .70                     974.          599.          599.          599.
                          (INCHES)         1.900         1.940         1.940         1.940
                           (AC-FT)          483.          493.          493.          493.

  PEAK STORAGE     TIME                              MAXIMUM AVERAGE STORAGE
                                            6-HR         24-HR         72-HR        9.97-HR
+   (AC-FT)        (HR)
         62.        .70                      38.           23.           23.           23.

   PEAK STAGE      TIME                              MAXIMUM AVERAGE STAGE
                                            6-HR         24-HR         72-HR        9.97-HR
+    (FEET)        (HR)
    2787.24         .70                  2782.90       2777.45       2777.45       2777.45

                            CUMULATIVE AREA =     4.77 SQ MI


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


              **************
              *            *
   277 KK     *    7TO6    *
              *            *
              **************
                            MODIFIED PULS CHANNEL ROUTING
                            FROM NODE FR-7 TO FR-6 (MAIN CHANNEL)

                 HYDROGRAPH ROUTING DATA

   280 RS          STORAGE ROUTING
                         NSTPS              2  NUMBER OF SUBREACHES
                          ITYP           FLOW  TYPE OF INITIAL CONDITION
                        RSVRIC          -1.00  INITIAL CONDITION
                             X            .00 WORKING R AND D COEFFICIENT

   281 RC          NORMAL DEPTH CHANNEL
                           ANL           .060  LEFT OVERBANK N-VALUE
                          ANCH           .045  MAIN CHANNEL N-VALUE
                           ANR           .060  RIGHT OVERBANK N-VALUE
                         RLNTH          3136.  REACH LENGTH
                           SEL          .0240  ENERGY SLOPE
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ELMAX .0 MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

		--- LEFT OVERBANK ---		+ ------ MAIN CHANNEL			------- +	--- RIGHT OVERBANK ---	
283 RY	ELEVATION	24.00	20.00	18.00	13.30	14.00	18.00	20.00	24.00
282 RX	DISTANCE	.00	15.00	57.00	164.00	172.00	219.00	237.00	250.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.39	1.56	3.52	6.27	9.81	14.14	19.25	25.15	31.82
OUTFLOW	.00	11.93	75.77	223.80	482.66	876.00	1425.52	2151.51	3073.12	4389.59
ELEVATION	13.30	13.86	14.43	14.99	15.55	16.12	16.68	17.24	17.81	18.37
STORAGE	39.18	47.22	55.95	65.04	74.30	83.72	93.29	103.03	112.93	122.98
OUTFLOW	6035.93	7927.80	10076.59	12508.60	15183.09	18091.47	21227.49	24586.37	28164.32	31958.33
ELEVATION	18.93	19.49	20.06	20.62	21.18	21.75	22.31	22.87	23.44	24.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 28164. TO 31958.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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HYDROGRAPH AT STATION 7TO6

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	13.3	*	1		0320	101	423.	2.8	15.4	*	1		0640	201	126.	1.1	14.6
1		0002	2	0.	.0	13.3	*	1		0322	102	413.	2.8	15.4	*	1		0642	202	125.	1.1	14.6
1		0004	3	0.	.0	13.3	*	1		0324	103	402.	2.7	15.4	*	1		0644	203	123.	1.1	14.6
1		0006	4	0.	.0	13.3	*	1		0326	104	390.	2.6	15.4	*	1		0646	204	121.	1.1	14.6
1		0008	5	0.	.0	13.3	*	1		0328	105	377.	2.6	15.3	*	1		0648	205	119.	1.1	14.6
1		0010	6	1.	.0	13.3	*	1		0330	106	364.	2.5	15.3	*	1		0650	206	117.	1.1	14.6
1		0012	7	2.	.0	13.4	*	1		0332	107	351.	2.4	15.3	*	1		0652	207	115.	1.0	14.6
1		0014	8	3.	.1	13.5	*	1		0334	108	337.	2.4	15.2	*	1		0654	208	113.	1.0	14.6
1		0016	9	7.	.1	13.6	*	1		0336	109	324.	2.3	15.2	*	1		0656	209	111.	1.0	14.6
1		0018	10	12.	.2	13.8	*	1		0338	110	310.	2.2	15.2	*	1		0658	210	109.	1.0	14.6
1		0020	11	22.	.3	14.0	*	1		0340	111	296.	2.1	15.1	*	1		0700	211	107.	1.0	14.5
1		0022	12	34.	.4	14.1	*	1		0342	112	283.	2.1	15.1	*	1		0702	212	105.	1.0	14.5
1		0024	13	47.	.5	14.2	*	1		0344	113	269.	2.0	15.1	*	1		0704	213	102.	1.0	14.5
1		0026	14	62.	.7	14.3	*	1		0346	114	256.	1.9	15.1	*	1		0706	214	99.	.9	14.5
1		0028	15	78.	.8	14.4	*	1		0348	115	243.	1.9	15.0	*	1		0708	215	97.	.9	14.5
1		0030	16	99.	.9	14.5	*	1		0350	116	232.	1.8	15.0	*	1		0710	216	94.	.9	14.5
1		0032	17	126.	1.1	14.6	*	1		0352	117	223.	1.8	15.0	*	1		0712	217	91.	.9	14.5
1		0034	18	259.	1.9	15.1	*	1		0354	118	218.	1.7	15.0	*	1		0714	218	88.	.9	14.5
1		0036	19	856.	4.8	16.1	*	1		0356	119	213.	1.7	14.9	*	1		0716	219	85.	.8	14.5
1		0038	20	2223.	9.9	17.3	*	1		0358	120	209.	1.7	14.9	*	1		0718	220	82.	.8	14.4
1		0040	21	3979.	14.9	18.2	*	1		0400	121	206.	1.6	14.9	*	1		0720	221	79.	.8	14.4
1		0042	22	5285.	17.9	18.7	*	1		0402	122	204.	1.6	14.9	*	1		0722	222	75.	.8	14.4
1		0044	23	5833.	19.1	18.9	*	1		0404	123	202.	1.6	14.9	*	1		0724	223	72.	.8	14.4
1		0046	24	5974.	19.4	18.9	*	1		0406	124	201.	1.6	14.9	*	1		0726	224	69.	.7	14.4
1		0048	25	5916.	19.3	18.9	*	1		0408	125	199.	1.6	14.9	*	1		0728	225	65.	.7	14.3
1		0050	26	5750.	18.9	18.8	*	1		0410	126	198.	1.6	14.9	*	1		0730	226	59.	.6	14.3
1		0052	27	5525.	18.4	18.8	*	1		0412	127	198.	1.6	14.9	*	1		0732	227	53.	.6	14.2
1		0054	28	5272.	17.9	18.7	*	1		0414	128	197.	1.6	14.9	*	1		0734	228	47.	.5	14.2
1		0056	29	5015.	17.3	18.6	*	1		0416	129	196.	1.6	14.9	*	1		0736	229	40.	.5	14.1
1		0058	30	4762.	16.7	18.5	*	1		0418	130	196.	1.6	14.9	*	1		0738	230	34.	.4	14.1
1		0100	31	4514.	16.2	18.4	*	1		0420	131	195.	1.6	14.9	*	1		0740	231	28.	.3	14.0
1		0102	32	4281.	15.6	18.3	*	1		0422	132	194.	1.6	14.9	*	1		0742	232	23.	.3	14.0
1		0104	33	4050.	15.0	18.2	*	1		0424	133	194.	1.6	14.9	*	1		0744	233	20.	.3	13.9
1		0106	34	3812.	14.4	18.1	*	1		0426	134	193.	1.6	14.9	*	1		0746	234	16.	.2	13.9
1		0108	35	3585.	13.9	18.0	*	1		0428	135	192.	1.6	14.9	*	1		0748	235	14.	.2	13.9
1		0110	36	3377.	13.3	17.9	*	1		0430	136	192.	1.6	14.9	*	1		0750	236	12.	.2	13.8
1		0112	37	3193.	12.9	17.9	*	1		0432	137	191.	1.5	14.9	*	1		0752	237	10.	.2	13.8
1		0114	38	3045.	12.5	17.8	*	1		0434	138	191.	1.5	14.9	*	1		0754	238	9.	.2	13.7
1		0116	39	2926.	12.1	17.7	*	1		0436	139	190.	1.5	14.9	*	1		0756	239	8.	.1	13.7
1		0118	40	2799.	11.7	17.6	*	1		0438	140	189.	1.5	14.9	*	1		0758	240	8.	.1	13.7
1		0120	41	2670.	11.3	17.6	*	1		0440	141	189.	1.5	14.9	*	1		0800	241	7.	.1	13.6
1		0122	42	2542.	10.9	17.5	*	1		0442	142	188.	1.5	14.9	*	1		0802	242	6.	.1	13.6
1		0124	43	2417.	10.5	17.4	*	1		0444	143	187.	1.5	14.9	*	1		0804	243	5.	.1	13.5
1		0126	44	2298.	10.1	17.3	*	1		0446	144	186.	1.5	14.8	*	1		0806	244	5.	.1	13.5
1		0128	45	2187.	9.7	17.3	*	1		0448	145	186.	1.5	14.8	*	1		0808	245	4.	.1	13.5
1		0130	46	2091.	9.4	17.2	*	1		0450	146	185.	1.5	14.8	*	1		0810	246	4.	.1	13.5
1		0132	47	2002.	9.1	17.1	*	1		0452	147	184.	1.5	14.8	*	1		0812	247	3.	.1	13.4
1		0134	48	1916.	8.8	17.1	*	1		0454	148	184.	1.5	14.8	*	1		0814	248	3.	.0	13.4
1		0136	49	1834.	8.5	17.0	*	1		0456	149	183.	1.5	14.8	*	1		0816	249	2.	.0	13.4

1	0138	50	1754.	8.2	16.9	*	1	0458	150	182.	1.5	14.8	*	1	0818	250	2.	.0	13.4
1	0140	51	1679.	8.0	16.9	*	1	0500	151	181.	1.5	14.8	*	1	0820	251	2.	.0	13.4
1	0142	52	1607.	7.7	16.8	*	1	0502	152	180.	1.5	14.8	*	1	0822	252	2.	.0	13.4
1	0144	53	1540.	7.5	16.8	*	1	0504	153	180.	1.5	14.8	*	1	0824	253	1.	.0	13.4
1	0146	54	1476.	7.2	16.7	*	1	0506	154	179.	1.5	14.8	*	1	0826	254	1.	.0	13.4
1	0148	55	1419.	7.0	16.7	*	1	0508	155	178.	1.5	14.8	*	1	0828	255	1.	.0	13.4
1	0150	56	1370.	6.8	16.6	*	1	0510	156	177.	1.5	14.8	*	1	0830	256	1.	.0	13.3
1	0152	57	1321.	6.7	16.6	*	1	0512	157	176.	1.4	14.8	*	1	0832	257	1.	.0	13.3
1	0154	58	1275.	6.5	16.5	*	1	0514	158	175.	1.4	14.8	*	1	0834	258	1.	.0	13.3
1	0156	59	1230.	6.3	16.5	*	1	0516	159	175.	1.4	14.8	*	1	0836	259	1.	.0	13.3
1	0158	60	1187.	6.1	16.4	*	1	0518	160	174.	1.4	14.8	*	1	0838	260	1.	.0	13.3
1	0200	61	1145.	6.0	16.4	*	1	0520	161	173.	1.4	14.8	*	1	0840	261	0.	.0	13.3
1	0202	62	1105.	5.8	16.4	*	1	0522	162	172.	1.4	14.8	*	1	0842	262	0.	.0	13.3
1	0204	63	1067.	5.7	16.3	*	1	0524	163	171.	1.4	14.8	*	1	0844	263	0.	.0	13.3
1	0206	64	1033.	5.5	16.3	*	1	0526	164	170.	1.4	14.8	*	1	0846	264	0.	.0	13.3
1	0208	65	1002.	5.4	16.2	*	1	0528	165	169.	1.4	14.8	*	1	0848	265	0.	.0	13.3
1	0210	66	972.	5.3	16.2	*	1	0530	166	168.	1.4	14.8	*	1	0850	266	0.	.0	13.3
1	0212	67	944.	5.2	16.2	*	1	0532	167	167.	1.4	14.8	*	1	0852	267	0.	.0	13.3
1	0214	68	916.	5.1	16.2	*	1	0534	168	166.	1.4	14.8	*	1	0854	268	0.	.0	13.3
1	0216	69	890.	5.0	16.1	*	1	0536	169	166.	1.4	14.8	*	1	0856	269	0.	.0	13.3
1	0218	70	866.	4.9	16.1	*	1	0538	170	165.	1.4	14.8	*	1	0858	270	0.	.0	13.3
1	0220	71	844.	4.8	16.1	*	1	0540	171	164.	1.4	14.8	*	1	0900	271	0.	.0	13.3
1	0222	72	821.	4.7	16.0	*	1	0542	172	163.	1.4	14.8	*	1	0902	272	0.	.0	13.3
1	0224	73	797.	4.6	16.0	*	1	0544	173	162.	1.4	14.8	*	1	0904	273	0.	.0	13.3
1	0226	74	774.	4.4	16.0	*	1	0546	174	161.	1.3	14.8	*	1	0906	274	0.	.0	13.3
1	0228	75	752.	4.3	15.9	*	1	0548	175	160.	1.3	14.7	*	1	0908	275	0.	.0	13.3
1	0230	76	730.	4.2	15.9	*	1	0550	176	159.	1.3	14.7	*	1	0910	276	0.	.0	13.3
1	0232	77	709.	4.2	15.9	*	1	0552	177	158.	1.3	14.7	*	1	0912	277	0.	.0	13.3
1	0234	78	689.	4.1	15.8	*	1	0554	178	157.	1.3	14.7	*	1	0914	278	0.	.0	13.3
1	0236	79	670.	4.0	15.8	*	1	0556	179	155.	1.3	14.7	*	1	0916	279	0.	.0	13.3
1	0238	80	652.	3.9	15.8	*	1	0558	180	154.	1.3	14.7	*	1	0918	280	0.	.0	13.3
1	0240	81	635.	3.8	15.8	*	1	0600	181	153.	1.3	14.7	*	1	0920	281	0.	.0	13.3
1	0242	82	619.	3.7	15.7	*	1	0602	182	152.	1.3	14.7	*	1	0922	282	0.	.0	13.3
1	0244	83	603.	3.7	15.7	*	1	0604	183	151.	1.3	14.7	*	1	0924	283	0.	.0	13.3
1	0246	84	588.	3.6	15.7	*	1	0606	184	149.	1.3	14.7	*	1	0926	284	0.	.0	13.3
1	0248	85	573.	3.5	15.7	*	1	0608	185	148.	1.3	14.7	*	1	0928	285	0.	.0	13.3
1	0250	86	558.	3.5	15.7	*	1	0610	186	147.	1.3	14.7	*	1	0930	286	0.	.0	13.3
1	0252	87	544.	3.4	15.6	*	1	0612	187	146.	1.2	14.7	*	1	0932	287	0.	.0	13.3
1	0254	88	531.	3.4	15.6	*	1	0614	188	145.	1.2	14.7	*	1	0934	288	0.	.0	13.3
1	0256	89	519.	3.3	15.6	*	1	0616	189	144.	1.2	14.7	*	1	0936	289	0.	.0	13.3
1	0258	90	510.	3.3	15.6	*	1	0618	190	142.	1.2	14.7	*	1	0938	290	0.	.0	13.3
1	0300	91	501.	3.2	15.6	*	1	0620	191	141.	1.2	14.7	*	1	0940	291	0.	.0	13.3
1	0302	92	493.	3.2	15.6	*	1	0622	192	140.	1.2	14.7	*	1	0942	292	0.	.0	13.3
1	0304	93	486.	3.2	15.6	*	1	0624	193	138.	1.2	14.7	*	1	0944	293	0.	.0	13.3
1	0306	94	480.	3.1	15.5	*	1	0626	194	137.	1.2	14.7	*	1	0946	294	0.	.0	13.3
1	0308	95	473.	3.1	15.5	*	1	0628	195	135.	1.2	14.7	*	1	0948	295	0.	.0	13.3
1	0310	96	466.	3.1	15.5	*	1	0630	196	134.	1.2	14.6	*	1	0950	296	0.	.0	13.3
1	0312	97	459.	3.0	15.5	*	1	0632	197	132.	1.2	14.6	*	1	0952	297	0.	.0	13.3
1	0314	98	451.	3.0	15.5	*	1	0634	198	131.	1.1	14.6	*	1	0954	298	0.	.0	13.3
1	0316	99	443.	2.9	15.5	*	1	0636	199	129.	1.1	14.6	*	1	0956	299	0.	.0	13.3
1	0318	100	433.	2.9	15.4	*	1	0638	200	128.	1.1	14.6	*	1	0958	300	0.	.0	13.3
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 5974.	.77		973.	599.	599.	599.
		(INCHES)	1.899	1.940	1.940	1.940
		(AC-FT)	483.	493.	493.	493.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	9.97-HR
+ (AC-FT)	(HR)				
19.	.77	5.	3.	3.	3.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	9.97-HR
+ (FEET)	(HR)				
18.91	.77	15.72	14.94	14.94	14.94

CUMULATIVE AREA = 4.77 SQ MI

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              *           *
284 KK        *   FR-6    *
              *           *
              *************
                             LOCAL RUNOFF TO FR-6
                             BASIN FR-6

                SUBBASIN RUNOFF DATA

287 BA            SUBBASIN CHARACTERISTICS
                        TAREA          .13  SUBBASIN AREA

                  PRECIPITATION DATA

288 PB                  STORM         2.85  BASIN TOTAL PRECIPITATION

 20 PI              INCREMENTAL PRECIPITATION PATTERN
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.04	.04	.06	.08	.08	.07	.07	.05	.03	.03
.02	.02	.02	.02	.02	.02	.02	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

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289 LS            SCS LOSS RATE
                        STRTL          .60  INITIAL ABSTRACTION
                       CRVNBR        77.00  CURVE NUMBER
                        RTIMP        20.00  PERCENT IMPERVIOUS AREA

290 UD            SCS DIMENSIONLESS UNITGRAPH
                         TLAG          .22  LAG

                                                                   ***

                                                             UNIT HYDROGRAPH
                                                       35 END-OF-PERIOD ORDINATES
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16.	46.	92.	156.	220.	256.	268.	264.	240.	211.
171.	130.	102.	81.	66.	53.	42.	33.	27.	21.
17.	13.	11.	9.	7.	5.	4.	3.	3.	2.
2.	1.	1.	1.	0.					

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HYDROGRAPH AT STATION FR-6

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DA MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	0000	1	.00	.00	.00	0.	*	1	0500	151	.00	.00	.00	0.
1	0002	2	.12	.09	.02	0.	*	1	0502	152	.00	.00	.00	0.
1	0004	3	.12	.09	.02	1.	*	1	0504	153	.00	.00	.00	0.
1	0006	4	.17	.14	.03	4.	*	1	0506	154	.00	.00	.00	0.
1	0008	5	.23	.19	.05	8.	*	1	0508	155	.00	.00	.00	0.
1	0010	6	.23	.17	.06	15.	*	1	0510	156	.00	.00	.00	0.
1	0012	7	.19	.12	.07	25.	*	1	0512	157	.00	.00	.00	0.
1	0014	8	.19	.11	.08	37.	*	1	0514	158	.00	.00	.00	0.
1	0016	9	.14	.07	.07	53.	*	1	0516	159	.00	.00	.00	0.
1	0018	10	.10	.05	.05	69.	*	1	0518	160	.00	.00	.00	0.
1	0020	11	.10	.05	.05	86.	*	1	0520	161	.00	.00	.00	0.
1	0022	12	.07	.03	.04	100.	*	1	0522	162	.00	.00	.00	0.
1	0024	13	.07	.03	.04	112.	*	1	0524	163	.00	.00	.00	0.
1	0026	14	.06	.03	.04	119.	*	1	0526	164	.00	.00	.00	0.
1	0028	15	.06	.02	.03	123.	*	1	0528	165	.00	.00	.00	0.
1	0030	16	.06	.02	.03	123.	*	1	0530	166	.00	.00	.00	0.
1	0032	17	.05	.02	.03	121.	*	1	0532	167	.00	.00	.00	0.
1	0034	18	.05	.02	.03	117.	*	1	0534	168	.00	.00	.00	0.
1	0036	19	.04	.02	.03	112.	*	1	0536	169	.00	.00	.00	0.
1	0038	20	.04	.01	.02	107.	*	1	0538	170	.00	.00	.00	0.
1	0040	21	.04	.01	.02	101.	*	1	0540	171	.00	.00	.00	0.
1	0042	22	.03	.01	.02	96.	*	1	0542	172	.00	.00	.00	0.
1	0044	23	.03	.01	.02	91.	*	1	0544	173	.00	.00	.00	0.
1	0046	24	.03	.01	.02	86.	*	1	0546	174	.00	.00	.00	0.
1	0048	25	.03	.01	.02	81.	*	1	0548	175	.00	.00	.00	0.
1	0050	26	.03	.01	.02	77.	*	1	0550	176	.00	.00	.00	0.
1	0052	27	.02	.01	.02	72.	*	1	0552	177	.00	.00	.00	0.
1	0054	28	.02	.01	.02	68.	*	1	0554	178	.00	.00	.00	0.
1	0056	29	.02	.01	.02	65.	*	1	0556	179	.00	.00	.00	0.

1	0058	30	.02	.01	.01	61.	*	1	0558	180	.00	.00	.00	0.
1	0100	31	.02	.01	.01	58.	*	1	0600	181	.00	.00	.00	0.
1	0102	32	.02	.01	.01	55.	*	1	0602	182	.00	.00	.00	0.
1	0104	33	.02	.01	.01	52.	*	1	0604	183	.00	.00	.00	0.
1	0106	34	.02	.01	.01	49.	*	1	0606	184	.00	.00	.00	0.
1	0108	35	.02	.01	.01	47.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.01	.01	44.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.01	.00	.01	42.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.01	.00	.01	40.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.01	.00	.01	38.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.01	.00	.01	36.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.01	.00	.01	35.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	33.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	32.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	30.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	29.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	28.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	27.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	25.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	24.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	24.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	23.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	22.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	21.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	20.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	20.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	19.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.01	18.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.01	18.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.01	17.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.00	16.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.00	16.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.00	15.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.00	15.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.00	15.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.00	14.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.00	14.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.00	13.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.00	13.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.00	13.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.01	.00	.00	12.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.01	.00	.00	12.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.00	.00	.00	12.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.00	.00	.00	11.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.00	.00	.00	11.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.00	.00	.00	11.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.00	.00	.00	10.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.00	.00	.00	10.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	10.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	10.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	9.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	9.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	9.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	9.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	9.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	8.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	8.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	8.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	8.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	8.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	7.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	7.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	7.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	7.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	6.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	6.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	5.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	5.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	4.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	3.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	3.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	2.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	2.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	1.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	1.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	1.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	1.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	1.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	0.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	0.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	0.	*	1	0838	260	.00	.00	.00	0.

1	0340	111	.00	.00	.00	0.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.

*

TOTAL RAINFALL = 2.85, TOTAL LOSS = 1.51, TOTAL EXCESS = 1.34

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 123.	.50		19.	12.	12.	12.
		(INCHES)	1.345	1.345	1.345	1.345
		(AC-FT)	10.	10.	10.	10.

CUMULATIVE AREA = .13 SQ MI

*** ***

****
*   *
291 KK   *   CO-6   *
*   *
****

COMBINE HYDROGRAPHS
AT NODE FR-6 (MAIN CHANNEL)

294 HC   HYDROGRAPH COMBINATION
ICOMP   2 NUMBER OF HYDROGRAPHS TO COMBINE

***

HYDROGRAPH AT STATION CO-6
SUM OF 2 HYDROGRAPHS

*   *   *

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0230	76	741.	*	1		0500	151	181.	*	1		0730	226	59.
1		0002	2	0.	*	1		0232	77	719.	*	1		0502	152	180.	*	1		0732	227	53.
1		0004	3	1.	*	1		0234	78	699.	*	1		0504	153	180.	*	1		0734	228	47.
1		0006	4	4.	*	1		0236	79	680.	*	1		0506	154	179.	*	1		0736	229	40.
1		0008	5	8.	*	1		0238	80	662.	*	1		0508	155	178.	*	1		0738	230	34.
1		0010	6	16.	*	1		0240	81	644.	*	1		0510	156	177.	*	1		0740	231	28.
1		0012	7	26.	*	1		0242	82	628.	*	1		0512	157	176.	*	1		0742	232	23.
1		0014	8	41.	*	1		0244	83	612.	*	1		0514	158	175.	*	1		0744	233	20.
1		0016	9	60.	*	1		0246	84	596.	*	1		0516	159	175.	*	1		0746	234	16.
1		0018	10	81.	*	1		0248	85	581.	*	1		0518	160	174.	*	1		0748	235	14.
1		0020	11	108.	*	1		0250	86	566.	*	1		0520	161	173.	*	1		0750	236	12.
1		0022	12	134.	*	1		0252	87	552.	*	1		0522	162	172.	*	1		0752	237	10.
1		0024	13	159.	*	1		0254	88	539.	*	1		0524	163	171.	*	1		0754	238	9.
1		0026	14	181.	*	1		0256	89	527.	*	1		0526	164	170.	*	1		0756	239	8.
1		0028	15	201.	*	1		0258	90	517.	*	1		0528	165	169.	*	1		0758	240	8.
1		0030	16	222.	*	1		0300	91	508.	*	1		0530	166	168.	*	1		0800	241	7.
1		0032	17	247.	*	1		0302	92	500.	*	1		0532	167	167.	*	1		0802	242	6.
1		0034	18	376.	*	1		0304	93	493.	*	1		0534	168	166.	*	1		0804	243	5.
1		0036	19	968.	*	1		0306	94	486.	*	1		0536	169	166.	*	1		0806	244	5.
1		0038	20	2329.	*	1		0308	95	479.	*	1		0538	170	165.	*	1		0808	245	4.
1		0040	21	4081.	*	1		0310	96	472.	*	1		0540	171	164.	*	1		0810	246	4.
1		0042	22	5381.	*	1		0312	97	464.	*	1		0542	172	163.	*	1		0812	247	3.
1		0044	23	5924.	*	1		0314	98	455.	*	1		0544	173	162.	*	1		0814	248	3.
1		0046	24	6060.	*	1		0316	99	446.	*	1		0546	174	161.	*	1		0816	249	2.
1		0048	25	5997.	*	1		0318	100	436.	*	1		0548	175	160.	*	1		0818	250	2.
1		0050	26	5827.	*	1		0320	101	426.	*	1		0550	176	159.	*	1		0820	251	2.
1		0052	27	5597.	*	1		0322	102	415.	*	1		0552	177	158.	*	1		0822	252	2.
1		0054	28	5340.	*	1		0324	103	403.	*	1		0554	178	157.	*	1		0824	253	1.
1		0056	29	5080.	*	1		0326	104	391.	*	1		0556	179	155.	*	1		0826	254	1.
1		0058	30	4823.	*	1		0328	105	378.	*	1		0558	180	154.	*	1		0828	255	1.
1		0100	31	4571.	*	1		0330	106	365.	*	1		0600	181	153.	*	1		0830	256	1.
1		0102	32	4335.	*	1		0332	107	351.	*	1		0602	182	152.	*	1		0832	257	1.
1		0104	33	4102.	*	1		0334	108	338.	*	1		0604	183	151.	*	1		0834	258	1.
1		0106	34	3861.	*	1		0336	109	324.	*	1		0606	184	149.	*	1		0836	259	1.
1		0108	35	3632.	*	1		0338	110	310.	*	1		0608	185	148.	*	1		0838	260	1.
1		0110	36	3422.	*	1		0340	111	296.	*	1		0610	186	147.	*	1		0840	261	0.
1		0112	37	3235.	*	1		0342	112	283.	*	1		0612	187	146.	*	1		0842	262	0.
1		0114	38	3085.	*	1		0344	113	269.	*	1		0614	188	145.	*	1		0844	263	0.
1		0116	39	2964.	*	1		0346	114	256.	*	1		0616	189	144.	*	1		0846	264	0.
1		0118	40	2836.	*	1		0348	115	243.	*	1		0618	190	142.	*	1		0848	265	0.
1		0120	41	2705.	*	1		0350	116	232.	*	1		0620	191	141.	*	1		0850	266	0.
1		0122	42	2575.	*	1		0352	117	223.	*	1		0622	192	140.	*	1		0852	267	0.
1		0124	43	2449.	*	1		0354	118	218.	*	1		0624	193	138.	*	1		0854	268	0.
1		0126	44	2328.	*	1		0356	119	213.	*	1		0626	194	137.	*	1		0856	269	0.
1		0128	45	2216.	*	1		0358	120	209.	*	1		0628	195	135.	*	1		0858	270	0.
1		0130	46	2119.	*	1		0400	121	206.	*	1		0630	196	134.	*	1		0900	271	0.
1		0132	47	2028.	*	1		0402	122	204.	*	1		0632	197	132.	*	1		0902	272	0.
1		0134	48	1941.	*	1		0404	123	202.	*	1		0634	198	131.	*	1		0904	273	0.
1		0136	49	1858.	*	1		0406	124	201.	*	1		0636	199	129.	*	1		0906	274	0.
1		0138	50	1778.	*	1		0408	125	199.	*	1		0638	200	128.	*	1		0908	275	0.
1		0140	51	1702.	*	1		0410	126	198.	*	1		0640	201	126.	*	1		0910	276	0.
1		0142	52	1629.	*	1		0412	127	198.	*	1		0642	202	125.	*	1		0912	277	0.
1		0144	53	1561.	*	1		0414	128	197.	*	1		0644	203	123.	*	1		0914	278	0.
1		0146	54	1497.	*	1		0416	129	196.	*	1		0646	204	121.	*	1		0916	279	0.
1		0148	55	1439.	*	1		0418	130	196.	*	1		0648	205	119.	*	1		0918	280	0.
1		0150	56	1389.	*	1		0420	131	195.	*	1		0650	206	117.	*	1		0920	281	0.
1		0152	57	1340.	*	1		0422	132	194.	*	1		0652	207	115.	*	1		0922	282	0.
1		0154	58	1293.	*	1		0424	133	194.	*	1		0654	208	113.	*	1		0924	283	0.
1		0156	59	1247.	*	1		0426	134	193.	*	1		0656	209	111.	*	1		0926	284	0.
1		0158	60	1203.	*	1		0428	135	192.	*	1		0658	210	109.	*	1		0928	285	0.
1		0200	61	1161.	*	1		0430	136	192.	*	1		0700	211	107.	*	1		0930	286	0.
1		0202	62	1121.	*	1		0432	137	191.	*	1		0702	212	105.	*	1		0932	287	0.
1		0204	63	1082.	*	1		0434	138	191.	*	1		0704	213	102.	*	1		0934	288	0.
1		0206	64	1047.	*	1		0436	139	190.	*	1		0706	214	99.	*	1		0936	289	0.
1		0208	65	1016.	*	1		0438	140	189.	*	1		0708	215	97.	*	1		0938	290	0.
1		0210	66	986.	*	1		0440	141	189.	*	1		0710	216	94.	*	1		0940	291	0.
1		0212	67	957.	*	1		0442	142	188.	*	1		0712	217	91.	*	1		0942	292	0.
1		0214	68	929.	*	1		0444	143	187.	*	1		0714	218	88.	*	1		0944	293	0.
1		0216	69	902.	*	1		0446	144	186.	*	1		0716	219	85.	*	1		0946	294	0.
1		0218	70	878.	*	1		0448	145	186.	*	1		0718	220	82.	*	1		0948	295	0.
1		0220	71	855.	*	1		0450	146	185.	*	1		0720	221	79.	*	1		0950	296	0.
1		0222	72	832.	*	1		0452	147	184.	*	1		0722	222	75.	*	1		0952	297	0.
1		0224	73	809.	*	1		0454	148	184.	*	1		0724	223	72.	*	1		0954	298	0.
1		0226	74	785.	*	1		0456	149	183.	*	1		0726	224	69.	*	1		0956	299	0.
1		0228	75	763.	*	1		0458	150	182.	*	1		0728	225	65.	*	1		0958	300	0.

PEAK FLOW TIME MAXIMUM AVERAGE FLOW

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                                         6-HR         24-HR        72-HR       9.97-HR
+    (CFS)        (HR)
                             (CFS)
+    6060.         .77                  989.          610.         610.          610.
                          (INCHES)     1.877         1.924        1.924         1.924
                           (AC-FT)      490.          503.         503.          503.

                          CUMULATIVE AREA =    4.90 SQ MI


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


              **************
              *            *
 295 KK       *   FR-62    *
              *            *
              **************
                             HEADWATERS TO TRIBUTARY TO
                             FINGER ROCK WASH
                             BASIN FR-62

                 SUBBASIN RUNOFF DATA

 299 BA            SUBBASIN CHARACTERISTICS
                         TAREA          .50  SUBBASIN AREA

                   PRECIPITATION DATA

 300 PB                  STORM         2.98  BASIN TOTAL PRECIPITATION

  20 PI              INCREMENTAL PRECIPITATION PATTERN
                         .04        .04        .06        .08        .08        .07        .07        .05        .03        .03
                         .02        .02        .02        .02        .02        .02        .02        .01        .01        .01
                         .01        .01        .01        .01        .01        .01        .01        .01        .01        .01
                         .01        .01        .01        .01        .01        .01        .01        .00        .00        .00
                         .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                         .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                         .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                         .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                         .00        .00        .00        .00        .00        .00        .00        .00        .00        .00

 301 LS            SCS LOSS RATE
                         STRTL          .50  INITIAL ABSTRACTION
                        CRVNBR        80.00  CURVE NUMBER
                         RTIMP        20.00  PERCENT IMPERVIOUS AREA

 302 UD            SCS DIMENSIONLESS UNITGRAPH
                          TLAG          .20  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                     32 END-OF-PERIOD ORDINATES
                 77.        226.       464.       777.      1014.      1119.      1118.      1019.       887.       705.
                518.        403.       312.       248.       193.       149.       116.        90.        70.        54.
                 42.         33.        26.        20.        15.        12.        10.         8.         6.         4.
                  2.          1.

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

                                                     HYDROGRAPH AT STATION    FR-62

*************************************************************************************************************************************
                                                                  *
        DA MON HRMN  ORD     RAIN    LOSS  EXCESS     COMP Q      *       DA MON HRMN  ORD     RAIN    LOSS  EXCESS     COMP Q
                                                                  *
         1     0000    1      .00     .00     .00         0.      *        1     0500  151      .00     .00     .00         0.
         1     0002    2      .12     .10     .02         2.      *        1     0502  152      .00     .00     .00         0.
         1     0004    3      .12     .10     .02         7.      *        1     0504  153      .00     .00     .00         0.
         1     0006    4      .18     .15     .04        19.      *        1     0506  154      .00     .00     .00         0.
         1     0008    5      .24     .19     .06        43.      *        1     0508  155      .00     .00     .00         0.
         1     0010    6      .24     .16     .09        80.      *        1     0510  156      .00     .00     .00         0.
         1     0012    7      .20     .11     .09       133.      *        1     0512  157      .00     .00     .00         0.
         1     0014    8      .20     .10     .10       203.      *        1     0514  158      .00     .00     .00         0.
         1     0016    9      .15     .07     .08       288.      *        1     0516  159      .00     .00     .00         0.
         1     0018   10      .10     .04     .06       377.      *        1     0518  160      .00     .00     .00         0.
         1     0020   11      .10     .04     .06       461.      *        1     0520  161      .00     .00     .00         0.
         1     0022   12      .07     .03     .05       528.      *        1     0522  162      .00     .00     .00         0.
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1	0024	13	.07	.03	.05	572.	*	1	0524	163	.00	.00	.00	0.
1	0026	14	.07	.02	.04	594.	*	1	0526	164	.00	.00	.00	0.
1	0028	15	.06	.02	.04	595.	*	1	0528	165	.00	.00	.00	0.
1	0030	16	.06	.02	.04	580.	*	1	0530	166	.00	.00	.00	0.
1	0032	17	.05	.01	.03	556.	*	1	0532	167	.00	.00	.00	0.
1	0034	18	.05	.01	.03	527.	*	1	0534	168	.00	.00	.00	0.
1	0036	19	.04	.01	.03	498.	*	1	0536	169	.00	.00	.00	0.
1	0038	20	.04	.01	.03	470.	*	1	0538	170	.00	.00	.00	0.
1	0040	21	.04	.01	.03	442.	*	1	0540	171	.00	.00	.00	0.
1	0042	22	.03	.01	.02	416.	*	1	0542	172	.00	.00	.00	0.
1	0044	23	.03	.01	.02	390.	*	1	0544	173	.00	.00	.00	0.
1	0046	24	.03	.01	.02	367.	*	1	0546	174	.00	.00	.00	0.
1	0048	25	.03	.01	.02	345.	*	1	0548	175	.00	.00	.00	0.
1	0050	26	.03	.01	.02	324.	*	1	0550	176	.00	.00	.00	0.
1	0052	27	.03	.01	.02	305.	*	1	0552	177	.00	.00	.00	0.
1	0054	28	.03	.01	.02	287.	*	1	0554	178	.00	.00	.00	0.
1	0056	29	.02	.01	.02	270.	*	1	0556	179	.00	.00	.00	0.
1	0058	30	.02	.01	.02	255.	*	1	0558	180	.00	.00	.00	0.
1	0100	31	.02	.01	.02	240.	*	1	0600	181	.00	.00	.00	0.
1	0102	32	.02	.00	.01	227.	*	1	0602	182	.00	.00	.00	0.
1	0104	33	.02	.00	.01	215.	*	1	0604	183	.00	.00	.00	0.
1	0106	34	.02	.00	.01	203.	*	1	0606	184	.00	.00	.00	0.
1	0108	35	.02	.00	.01	193.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.00	.01	183.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.02	.00	.01	173.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.02	.00	.01	165.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.01	.00	.01	157.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.01	.00	.01	149.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.01	.00	.01	142.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	136.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	130.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	124.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	119.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	114.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	110.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	105.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	101.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	97.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	94.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	90.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	87.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	84.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	81.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	78.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.01	76.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.01	73.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.01	71.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.01	68.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.01	66.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.01	64.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.01	62.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.00	60.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.00	59.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.00	57.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.00	55.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.00	54.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.00	52.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.01	.00	.00	51.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.01	.00	.00	49.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.01	.00	.00	48.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.01	.00	.00	47.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.00	.00	.00	46.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.00	.00	.00	44.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.00	.00	.00	43.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.00	.00	.00	42.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	41.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	40.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	39.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	38.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	37.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	37.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	36.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	35.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	34.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	33.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	33.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	32.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	31.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	30.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	30.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	28.	*	1	0804	243	.00	.00	.00	0.

1	0306	94	.00	.00	.00	27.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	24.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	21.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	17.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	14.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	11.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	9.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	7.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	5.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	4.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	3.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	2.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	2.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	1.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	1.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	1.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	1.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	1.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.
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   TOTAL RAINFALL =     2.98, TOTAL LOSS =     1.40, TOTAL EXCESS =     1.58

  PEAK FLOW       TIME                       MAXIMUM AVERAGE FLOW
                                      6-HR         24-HR         72-HR        9.97-HR
+    (CFS)        (HR)
                             (CFS)
+      595.        .47                  86.           52.           52.           52.
                           (INCHES)   1.584         1.584         1.584         1.584
                            (AC-FT)     42.           42.           42.           42.

                         CUMULATIVE AREA =      .50 SQ MI


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


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               *            *
  303 KK       *    62T061  *
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MODIFIED PULS CHANNEL ROUTING
FROM NODE FR-62 TO FR-61

HYDROGRAPH ROUTING DATA

306 RS STORAGE ROUTING

NSTPS	3	NUMBER OF SUBREACHES
ITYP	FLOW	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

307 RC NORMAL DEPTH CHANNEL

ANL	.050	LEFT OVERBANK N-VALUE
ANCH	.050	MAIN CHANNEL N-VALUE
ANR	.050	RIGHT OVERBANK N-VALUE
RLNTH	4270.	REACH LENGTH
SEL	.0320	ENERGY SLOPE
ELMAX	.0	MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

		--- LEFT OVERBANK ---		+ ------ MAIN CHANNEL		------- +	--- RIGHT OVERBANK ---		
309 RY	ELEVATION	6.00	4.00	2.00	.00	.00	2.00	4.00	6.00
308 RX	DISTANCE	.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00

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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.36	.81	1.37	2.02	2.77	3.62	4.56	5.60	6.75
OUTFLOW	.00	8.27	28.11	59.24	102.46	158.79	229.25	327.19	448.82	589.50
ELEVATION	.00	.32	.63	.95	1.26	1.58	1.89	2.21	2.53	2.84
STORAGE	7.98	9.32	10.75	12.28	13.91	15.64	17.47	19.39	21.41	23.53
OUTFLOW	750.28	932.11	1135.91	1362.55	1612.89	1887.77	2188.03	2514.47	2867.91	3249.12
ELEVATION	3.16	3.47	3.79	4.11	4.42	4.74	5.05	5.37	5.68	6.00

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HYDROGRAPH AT STATION 62TO61

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DA MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	0000	1	0.	.0	.0	*	1	0320	101	25.	.2	.6	*	1	0640	201	0.	.0	.0
1	0002	2	0.	.0	.0	*	1	0322	102	23.	.2	.5	*	1	0642	202	0.	.0	.0
1	0004	3	0.	.0	.0	*	1	0324	103	21.	.2	.5	*	1	0644	203	0.	.0	.0
1	0006	4	0.	.0	.0	*	1	0326	104	19.	.2	.5	*	1	0646	204	0.	.0	.0
1	0008	5	0.	.0	.0	*	1	0328	105	17.	.2	.5	*	1	0648	205	0.	.0	.0
1	0010	6	1.	.0	.0	*	1	0330	106	15.	.2	.4	*	1	0650	206	0.	.0	.0
1	0012	7	2.	.0	.1	*	1	0332	107	13.	.2	.4	*	1	0652	207	0.	.0	.0
1	0014	8	5.	.1	.2	*	1	0334	108	12.	.1	.4	*	1	0654	208	0.	.0	.0
1	0016	9	18.	.2	.5	*	1	0336	109	11.	.1	.4	*	1	0656	209	0.	.0	.0
1	0018	10	48.	.4	.8	*	1	0338	110	9.	.1	.3	*	1	0658	210	0.	.0	.0
1	0020	11	103.	.7	1.3	*	1	0340	111	8.	.1	.3	*	1	0700	211	0.	.0	.0
1	0022	12	187.	1.0	1.7	*	1	0342	112	8.	.1	.3	*	1	0702	212	0.	.0	.0
1	0024	13	295.	1.4	2.1	*	1	0344	113	7.	.1	.3	*	1	0704	213	0.	.0	.0
1	0026	14	403.	1.7	2.4	*	1	0346	114	7.	.1	.3	*	1	0706	214	0.	.0	.0
1	0028	15	484.	2.0	2.6	*	1	0348	115	6.	.1	.2	*	1	0708	215	0.	.0	.0
1	0030	16	536.	2.1	2.7	*	1	0350	116	6.	.1	.2	*	1	0710	216	0.	.0	.0
1	0032	17	563.	2.2	2.8	*	1	0352	117	6.	.1	.2	*	1	0712	217	0.	.0	.0
1	0034	18	570.	2.2	2.8	*	1	0354	118	5.	.1	.2	*	1	0714	218	0.	.0	.0
1	0036	19	562.	2.2	2.8	*	1	0356	119	5.	.1	.2	*	1	0716	219	0.	.0	.0
1	0038	20	544.	2.1	2.7	*	1	0358	120	4.	.1	.2	*	1	0718	220	0.	.0	.0
1	0040	21	521.	2.1	2.7	*	1	0400	121	4.	.1	.1	*	1	0720	221	0.	.0	.0
1	0042	22	495.	2.0	2.6	*	1	0402	122	3.	.0	.1	*	1	0722	222	0.	.0	.0
1	0044	23	469.	1.9	2.6	*	1	0404	123	3.	.0	.1	*	1	0724	223	0.	.0	.0
1	0046	24	443.	1.9	2.5	*	1	0406	124	3.	.0	.1	*	1	0726	224	0.	.0	.0
1	0048	25	419.	1.8	2.4	*	1	0408	125	2.	.0	.1	*	1	0728	225	0.	.0	.0
1	0050	26	395.	1.7	2.4	*	1	0410	126	2.	.0	.1	*	1	0730	226	0.	.0	.0
1	0052	27	371.	1.6	2.3	*	1	0412	127	2.	.0	.1	*	1	0732	227	0.	.0	.0
1	0054	28	349.	1.6	2.3	*	1	0414	128	2.	.0	.1	*	1	0734	228	0.	.0	.0
1	0056	29	330.	1.5	2.2	*	1	0416	129	2.	.0	.1	*	1	0736	229	0.	.0	.0
1	0058	30	313.	1.5	2.2	*	1	0418	130	1.	.0	.1	*	1	0738	230	0.	.0	.0
1	0100	31	296.	1.4	2.1	*	1	0420	131	1.	.0	.0	*	1	0740	231	0.	.0	.0
1	0102	32	280.	1.4	2.1	*	1	0422	132	1.	.0	.0	*	1	0742	232	0.	.0	.0
1	0104	33	264.	1.3	2.0	*	1	0424	133	1.	.0	.0	*	1	0744	233	0.	.0	.0
1	0106	34	250.	1.3	2.0	*	1	0426	134	1.	.0	.0	*	1	0746	234	0.	.0	.0

1	0108	35	237.	1.2	1.9	*	1	0428	135	1.	.0	.0	*	1	0748	235	0.	.0	.0
1	0110	36	226.	1.2	1.9	*	1	0430	136	1.	.0	.0	*	1	0750	236	0.	.0	.0
1	0112	37	216.	1.2	1.8	*	1	0432	137	1.	.0	.0	*	1	0752	237	0.	.0	.0
1	0114	38	207.	1.1	1.8	*	1	0434	138	0.	.0	.0	*	1	0754	238	0.	.0	.0
1	0116	39	197.	1.1	1.7	*	1	0436	139	0.	.0	.0	*	1	0756	239	0.	.0	.0
1	0118	40	187.	1.0	1.7	*	1	0438	140	0.	.0	.0	*	1	0758	240	0.	.0	.0
1	0120	41	178.	1.0	1.7	*	1	0440	141	0.	.0	.0	*	1	0800	241	0.	.0	.0
1	0122	42	170.	1.0	1.6	*	1	0442	142	0.	.0	.0	*	1	0802	242	0.	.0	.0
1	0124	43	162.	.9	1.6	*	1	0444	143	0.	.0	.0	*	1	0804	243	0.	.0	.0
1	0126	44	155.	.9	1.6	*	1	0446	144	0.	.0	.0	*	1	0806	244	0.	.0	.0
1	0128	45	148.	.9	1.5	*	1	0448	145	0.	.0	.0	*	1	0808	245	0.	.0	.0
1	0130	46	142.	.8	1.5	*	1	0450	146	0.	.0	.0	*	1	0810	246	0.	.0	.0
1	0132	47	136.	.8	1.5	*	1	0452	147	0.	.0	.0	*	1	0812	247	0.	.0	.0
1	0134	48	130.	.8	1.4	*	1	0454	148	0.	.0	.0	*	1	0814	248	0.	.0	.0
1	0136	49	125.	.8	1.4	*	1	0456	149	0.	.0	.0	*	1	0816	249	0.	.0	.0
1	0138	50	120.	.7	1.4	*	1	0458	150	0.	.0	.0	*	1	0818	250	0.	.0	.0
1	0140	51	115.	.7	1.3	*	1	0500	151	0.	.0	.0	*	1	0820	251	0.	.0	.0
1	0142	52	110.	.7	1.3	*	1	0502	152	0.	.0	.0	*	1	0822	252	0.	.0	.0
1	0144	53	106.	.7	1.3	*	1	0504	153	0.	.0	.0	*	1	0824	253	0.	.0	.0
1	0146	54	102.	.7	1.3	*	1	0506	154	0.	.0	.0	*	1	0826	254	0.	.0	.0
1	0148	55	99.	.7	1.2	*	1	0508	155	0.	.0	.0	*	1	0828	255	0.	.0	.0
1	0150	56	95.	.6	1.2	*	1	0510	156	0.	.0	.0	*	1	0830	256	0.	.0	.0
1	0152	57	92.	.6	1.2	*	1	0512	157	0.	.0	.0	*	1	0832	257	0.	.0	.0
1	0154	58	89.	.6	1.2	*	1	0514	158	0.	.0	.0	*	1	0834	258	0.	.0	.0
1	0156	59	86.	.6	1.1	*	1	0516	159	0.	.0	.0	*	1	0836	259	0.	.0	.0
1	0158	60	83.	.6	1.1	*	1	0518	160	0.	.0	.0	*	1	0838	260	0.	.0	.0
1	0200	61	80.	.6	1.1	*	1	0520	161	0.	.0	.0	*	1	0840	261	0.	.0	.0
1	0202	62	77.	.5	1.1	*	1	0522	162	0.	.0	.0	*	1	0842	262	0.	.0	.0
1	0204	63	75.	.5	1.1	*	1	0524	163	0.	.0	.0	*	1	0844	263	0.	.0	.0
1	0206	64	72.	.5	1.0	*	1	0526	164	0.	.0	.0	*	1	0846	264	0.	.0	.0
1	0208	65	70.	.5	1.0	*	1	0528	165	0.	.0	.0	*	1	0848	265	0.	.0	.0
1	0210	66	68.	.5	1.0	*	1	0530	166	0.	.0	.0	*	1	0850	266	0.	.0	.0
1	0212	67	66.	.5	1.0	*	1	0532	167	0.	.0	.0	*	1	0852	267	0.	.0	.0
1	0214	68	64.	.5	1.0	*	1	0534	168	0.	.0	.0	*	1	0854	268	0.	.0	.0
1	0216	69	62.	.5	1.0	*	1	0536	169	0.	.0	.0	*	1	0856	269	0.	.0	.0
1	0218	70	60.	.5	1.0	*	1	0538	170	0.	.0	.0	*	1	0858	270	0.	.0	.0
1	0220	71	59.	.5	.9	*	1	0540	171	0.	.0	.0	*	1	0900	271	0.	.0	.0
1	0222	72	57.	.4	.9	*	1	0542	172	0.	.0	.0	*	1	0902	272	0.	.0	.0
1	0224	73	56.	.4	.9	*	1	0544	173	0.	.0	.0	*	1	0904	273	0.	.0	.0
1	0226	74	54.	.4	.9	*	1	0546	174	0.	.0	.0	*	1	0906	274	0.	.0	.0
1	0228	75	53.	.4	.9	*	1	0548	175	0.	.0	.0	*	1	0908	275	0.	.0	.0
1	0230	76	52.	.4	.9	*	1	0550	176	0.	.0	.0	*	1	0910	276	0.	.0	.0
1	0232	77	50.	.4	.9	*	1	0552	177	0.	.0	.0	*	1	0912	277	0.	.0	.0
1	0234	78	49.	.4	.8	*	1	0554	178	0.	.0	.0	*	1	0914	278	0.	.0	.0
1	0236	79	48.	.4	.8	*	1	0556	179	0.	.0	.0	*	1	0916	279	0.	.0	.0
1	0238	80	46.	.4	.8	*	1	0558	180	0.	.0	.0	*	1	0918	280	0.	.0	.0
1	0240	81	45.	.4	.8	*	1	0600	181	0.	.0	.0	*	1	0920	281	0.	.0	.0
1	0242	82	44.	.4	.8	*	1	0602	182	0.	.0	.0	*	1	0922	282	0.	.0	.0
1	0244	83	43.	.4	.8	*	1	0604	183	0.	.0	.0	*	1	0924	283	0.	.0	.0
1	0246	84	42.	.4	.8	*	1	0606	184	0.	.0	.0	*	1	0926	284	0.	.0	.0
1	0248	85	41.	.3	.8	*	1	0608	185	0.	.0	.0	*	1	0928	285	0.	.0	.0
1	0250	86	40.	.3	.8	*	1	0610	186	0.	.0	.0	*	1	0930	286	0.	.0	.0
1	0252	87	39.	.3	.7	*	1	0612	187	0.	.0	.0	*	1	0932	287	0.	.0	.0
1	0254	88	38.	.3	.7	*	1	0614	188	0.	.0	.0	*	1	0934	288	0.	.0	.0
1	0256	89	37.	.3	.7	*	1	0616	189	0.	.0	.0	*	1	0936	289	0.	.0	.0
1	0258	90	36.	.3	.7	*	1	0618	190	0.	.0	.0	*	1	0938	290	0.	.0	.0
1	0300	91	35.	.3	.7	*	1	0620	191	0.	.0	.0	*	1	0940	291	0.	.0	.0
1	0302	92	35.	.3	.7	*	1	0622	192	0.	.0	.0	*	1	0942	292	0.	.0	.0
1	0304	93	34.	.3	.7	*	1	0624	193	0.	.0	.0	*	1	0944	293	0.	.0	.0
1	0306	94	33.	.3	.7	*	1	0626	194	0.	.0	.0	*	1	0946	294	0.	.0	.0
1	0308	95	32.	.3	.7	*	1	0628	195	0.	.0	.0	*	1	0948	295	0.	.0	.0
1	0310	96	31.	.3	.7	*	1	0630	196	0.	.0	.0	*	1	0950	296	0.	.0	.0
1	0312	97	30.	.3	.7	*	1	0632	197	0.	.0	.0	*	1	0952	297	0.	.0	.0
1	0314	98	29.	.3	.6	*	1	0634	198	0.	.0	.0	*	1	0954	298	0.	.0	.0
1	0316	99	28.	.3	.6	*	1	0636	199	0.	.0	.0	*	1	0956	299	0.	.0	.0
1	0318	100	26.	.3	.6	*	1	0638	200	0.	.0	.0	*	1	0958	300	0.	.0	.0
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 570.	.57		86.	52.	52.	52.
		(INCHES)	1.584	1.584	1.584	1.584
		(AC-FT)	42.	42.	42.	42.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	9.97-HR
+ (AC-FT)	(HR)					
2.	.57		0.	0.	0.	0.

```
 PEAK STAGE     TIME                         MAXIMUM AVERAGE STAGE
                                     6-HR        24-HR        72-HR       9.97-HR
+   (FEET)      (HR)
     2.80        .57                  .76          .46          .46           .46

                       CUMULATIVE AREA =      .50 SQ MI


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

            **************
            *            *
 310 KK     *    FR-61   *
            *            *
            **************
                          LOCAL RUNOFF TO FR-61
                          BASIN FR-61

               SUBBASIN RUNOFF DATA

 313 BA          SUBBASIN CHARACTERISTICS
                       TAREA          .17   SUBBASIN AREA

                 PRECIPITATION DATA

 314 PB                STORM        2.85   BASIN TOTAL PRECIPITATION

  20 PI            INCREMENTAL PRECIPITATION PATTERN
                       .04        .04        .06        .08        .08        .07        .07        .05        .03        .03
                       .02        .02        .02        .02        .02        .02        .02        .01        .01        .01
                       .01        .01        .01        .01        .01        .01        .01        .01        .01        .01
                       .01        .01        .01        .01        .01        .01        .01        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00

 315 LS          SCS LOSS RATE
                       STRTL          .47   INITIAL ABSTRACTION
                      CRVNBR        81.00   CURVE NUMBER
                       RTIMP        35.00   PERCENT IMPERVIOUS AREA

 316 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG          .29   LAG

                                                                  ***

                                                            UNIT HYDROGRAPH
                                                       45 END-OF-PERIOD ORDINATES
                 10.        31.        59.        98.       149.       199.       236.       258.       264.       261.
                244.       223.       199.       168.       136.       111.        93.        77.        66.        55.
                 46.        38.        32.        27.        23.        19.        16.        13.        11.         9.
                  8.         6.         5.         4.         4.         3.         3.         2.         2.         2.
                  1.         1.         1.         0.         0.

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

                                                   HYDROGRAPH AT STATION    FR-61

***********************************************************************************************************************************
                                                                  *
       DA MON HRMN  ORD     RAIN    LOSS  EXCESS     COMP Q       *       DA MON HRMN  ORD     RAIN    LOSS  EXCESS     COMP Q
                                                                  *
        1    0000    1      .00     .00     .00          0.       *        1    0500  151      .00     .00     .00          0.
        1    0002    2      .12     .07     .04          0.       *        1    0502  152      .00     .00     .00          0.
        1    0004    3      .12     .07     .04          2.       *        1    0504  153      .00     .00     .00          0.
        1    0006    4      .17     .11     .06          4.       *        1    0506  154      .00     .00     .00          0.
        1    0008    5      .23     .14     .09          9.       *        1    0508  155      .00     .00     .00          0.
        1    0010    6      .23     .12     .11         17.       *        1    0510  156      .00     .00     .00          0.
        1    0012    7      .19     .08     .10         30.       *        1    0512  157      .00     .00     .00          0.
        1    0014    8      .19     .07     .11         46.       *        1    0514  158      .00     .00     .00          0.
        1    0016    9      .14     .05     .09         67.       *        1    0516  159      .00     .00     .00          0.
        1    0018   10      .10     .03     .07         90.       *        1    0518  160      .00     .00     .00          0.
        1    0020   11      .10     .03     .07        115.       *        1    0520  161      .00     .00     .00          0.
        1    0022   12      .07     .02     .05        139.       *        1    0522  162      .00     .00     .00          0.
        1    0024   13      .07     .02     .05        161.       *        1    0524  163      .00     .00     .00          0.
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1	0026	14	.06	.02	.05	179.	*	1	0526	164	.00	.00	.00	0.
1	0028	15	.06	.01	.04	191.	*	1	0528	165	.00	.00	.00	0.
1	0030	16	.06	.01	.04	199.	*	1	0530	166	.00	.00	.00	0.
1	0032	17	.05	.01	.03	202.	*	1	0532	167	.00	.00	.00	0.
1	0034	18	.05	.01	.03	201.	*	1	0534	168	.00	.00	.00	0.
1	0036	19	.04	.01	.03	196.	*	1	0536	169	.00	.00	.00	0.
1	0038	20	.04	.01	.03	189.	*	1	0538	170	.00	.00	.00	0.
1	0040	21	.04	.01	.03	181.	*	1	0540	171	.00	.00	.00	0.
1	0042	22	.03	.01	.03	172.	*	1	0542	172	.00	.00	.00	0.
1	0044	23	.03	.01	.03	164.	*	1	0544	173	.00	.00	.00	0.
1	0046	24	.03	.01	.02	155.	*	1	0546	174	.00	.00	.00	0.
1	0048	25	.03	.01	.02	146.	*	1	0548	175	.00	.00	.00	0.
1	0050	26	.03	.01	.02	138.	*	1	0550	176	.00	.00	.00	0.
1	0052	27	.02	.01	.02	131.	*	1	0552	177	.00	.00	.00	0.
1	0054	28	.02	.00	.02	123.	*	1	0554	178	.00	.00	.00	0.
1	0056	29	.02	.00	.02	116.	*	1	0556	179	.00	.00	.00	0.
1	0058	30	.02	.00	.02	110.	*	1	0558	180	.00	.00	.00	0.
1	0100	31	.02	.00	.02	103.	*	1	0600	181	.00	.00	.00	0.
1	0102	32	.02	.00	.01	98.	*	1	0602	182	.00	.00	.00	0.
1	0104	33	.02	.00	.01	92.	*	1	0604	183	.00	.00	.00	0.
1	0106	34	.02	.00	.01	87.	*	1	0606	184	.00	.00	.00	0.
1	0108	35	.02	.00	.01	82.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.00	.01	78.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.01	.00	.01	74.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.01	.00	.01	70.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.01	.00	.01	66.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.01	.00	.01	63.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.01	.00	.01	60.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	57.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	54.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	51.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	49.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	47.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	45.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	43.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	41.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	39.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	37.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	36.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	34.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	33.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	32.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	30.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.01	29.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.01	28.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.01	27.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.01	26.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.01	25.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.01	24.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.01	24.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.01	23.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.00	22.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.00	21.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.00	21.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.00	20.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.00	20.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.01	.00	.00	19.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.01	.00	.00	18.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.00	.00	.00	18.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.00	.00	.00	17.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.00	.00	.00	17.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.00	.00	.00	16.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.00	.00	.00	16.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.00	.00	.00	16.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	15.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	15.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	14.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	14.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	14.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	13.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	13.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	13.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	12.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	12.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	12.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	12.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	11.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	11.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	11.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	10.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	10.	*	1	0806	244	.00	.00	.00	0.

1	0308	95	.00	.00	.00	10.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	9.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	8.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	7.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	7.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	6.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	5.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	4.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	4.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	3.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	2.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	2.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	2.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	1.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	1.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	1.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	1.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	1.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	1.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.
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   TOTAL RAINFALL =    2.85, TOTAL LOSS =    1.07, TOTAL EXCESS =    1.78

 PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR       9.97-HR
+   (CFS)       (HR)
                          (CFS)
+     202.       .53                   32.          19.          19.          19.
                         (INCHES)    1.777        1.777        1.777        1.777
                          (AC-FT)      16.          16.          16.          16.

                         CUMULATIVE AREA =      .17 SQ MI


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


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              *            *
 317 KK       *   CO-61    *
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COMBINE HYDROGRAPHS
AT NODE FR-61

320 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION CO-61
SUM OF 2 HYDROGRAPHS

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0230	76	68.	*	1		0500	151	0.	*	1		0730	226	0.
1		0002	2	0.	*	1		0232	77	66.	*	1		0502	152	0.	*	1		0732	227	0.
1		0004	3	2.	*	1		0234	78	64.	*	1		0504	153	0.	*	1		0734	228	0.
1		0006	4	4.	*	1		0236	79	62.	*	1		0506	154	0.	*	1		0736	229	0.
1		0008	5	9.	*	1		0238	80	61.	*	1		0508	155	0.	*	1		0738	230	0.
1		0010	6	18.	*	1		0240	81	59.	*	1		0510	156	0.	*	1		0740	231	0.
1		0012	7	32.	*	1		0242	82	58.	*	1		0512	157	0.	*	1		0742	232	0.
1		0014	8	52.	*	1		0244	83	56.	*	1		0514	158	0.	*	1		0744	233	0.
1		0016	9	85.	*	1		0246	84	55.	*	1		0516	159	0.	*	1		0746	234	0.
1		0018	10	139.	*	1		0248	85	54.	*	1		0518	160	0.	*	1		0748	235	0.
1		0020	11	219.	*	1		0250	86	52.	*	1		0520	161	0.	*	1		0750	236	0.
1		0022	12	327.	*	1		0252	87	51.	*	1		0522	162	0.	*	1		0752	237	0.
1		0024	13	455.	*	1		0254	88	50.	*	1		0524	163	0.	*	1		0754	238	0.
1		0026	14	581.	*	1		0256	89	49.	*	1		0526	164	0.	*	1		0756	239	0.
1		0028	15	675.	*	1		0258	90	48.	*	1		0528	165	0.	*	1		0758	240	0.
1		0030	16	735.	*	1		0300	91	46.	*	1		0530	166	0.	*	1		0800	241	0.
1		0032	17	765.	*	1		0302	92	45.	*	1		0532	167	0.	*	1		0802	242	0.
1		0034	18	770.	*	1		0304	93	44.	*	1		0534	168	0.	*	1		0804	243	0.
1		0036	19	758.	*	1		0306	94	43.	*	1		0536	169	0.	*	1		0806	244	0.
1		0038	20	734.	*	1		0308	95	42.	*	1		0538	170	0.	*	1		0808	245	0.
1		0040	21	702.	*	1		0310	96	40.	*	1		0540	171	0.	*	1		0810	246	0.
1		0042	22	668.	*	1		0312	97	38.	*	1		0542	172	0.	*	1		0812	247	0.
1		0044	23	632.	*	1		0314	98	36.	*	1		0544	173	0.	*	1		0814	248	0.
1		0046	24	598.	*	1		0316	99	34.	*	1		0546	174	0.	*	1		0816	249	0.
1		0048	25	565.	*	1		0318	100	32.	*	1		0548	175	0.	*	1		0818	250	0.
1		0050	26	533.	*	1		0320	101	30.	*	1		0550	176	0.	*	1		0820	251	0.
1		0052	27	502.	*	1		0322	102	27.	*	1		0552	177	0.	*	1		0822	252	0.
1		0054	28	473.	*	1		0324	103	25.	*	1		0554	178	0.	*	1		0824	253	0.
1		0056	29	446.	*	1		0326	104	22.	*	1		0556	179	0.	*	1		0826	254	0.
1		0058	30	422.	*	1		0328	105	19.	*	1		0558	180	0.	*	1		0828	255	0.
1		0100	31	399.	*	1		0330	106	17.	*	1		0600	181	0.	*	1		0830	256	0.
1		0102	32	377.	*	1		0332	107	15.	*	1		0602	182	0.	*	1		0832	257	0.
1		0104	33	356.	*	1		0334	108	13.	*	1		0604	183	0.	*	1		0834	258	0.
1		0106	34	337.	*	1		0336	109	12.	*	1		0606	184	0.	*	1		0836	259	0.
1		0108	35	319.	*	1		0338	110	10.	*	1		0608	185	0.	*	1		0838	260	0.
1		0110	36	304.	*	1		0340	111	9.	*	1		0610	186	0.	*	1		0840	261	0.
1		0112	37	290.	*	1		0342	112	9.	*	1		0612	187	0.	*	1		0842	262	0.
1		0114	38	276.	*	1		0344	113	8.	*	1		0614	188	0.	*	1		0844	263	0.
1		0116	39	263.	*	1		0346	114	7.	*	1		0616	189	0.	*	1		0846	264	0.
1		0118	40	250.	*	1		0348	115	7.	*	1		0618	190	0.	*	1		0848	265	0.
1		0120	41	238.	*	1		0350	116	6.	*	1		0620	191	0.	*	1		0850	266	0.
1		0122	42	226.	*	1		0352	117	6.	*	1		0622	192	0.	*	1		0852	267	0.
1		0124	43	216.	*	1		0354	118	5.	*	1		0624	193	0.	*	1		0854	268	0.
1		0126	44	206.	*	1		0356	119	5.	*	1		0626	194	0.	*	1		0856	269	0.
1		0128	45	197.	*	1		0358	120	4.	*	1		0628	195	0.	*	1		0858	270	0.
1		0130	46	189.	*	1		0400	121	4.	*	1		0630	196	0.	*	1		0900	271	0.
1		0132	47	181.	*	1		0402	122	4.	*	1		0632	197	0.	*	1		0902	272	0.
1		0134	48	173.	*	1		0404	123	3.	*	1		0634	198	0.	*	1		0904	273	0.
1		0136	49	165.	*	1		0406	124	3.	*	1		0636	199	0.	*	1		0906	274	0.
1		0138	50	158.	*	1		0408	125	3.	*	1		0638	200	0.	*	1		0908	275	0.
1		0140	51	152.	*	1		0410	126	2.	*	1		0640	201	0.	*	1		0910	276	0.
1		0142	52	146.	*	1		0412	127	2.	*	1		0642	202	0.	*	1		0912	277	0.
1		0144	53	140.	*	1		0414	128	2.	*	1		0644	203	0.	*	1		0914	278	0.
1		0146	54	135.	*	1		0416	129	2.	*	1		0646	204	0.	*	1		0916	279	0.
1		0148	55	130.	*	1		0418	130	1.	*	1		0648	205	0.	*	1		0918	280	0.
1		0150	56	126.	*	1		0420	131	1.	*	1		0650	206	0.	*	1		0920	281	0.
1		0152	57	121.	*	1		0422	132	1.	*	1		0652	207	0.	*	1		0922	282	0.
1		0154	58	117.	*	1		0424	133	1.	*	1		0654	208	0.	*	1		0924	283	0.
1		0156	59	113.	*	1		0426	134	1.	*	1		0656	209	0.	*	1		0926	284	0.
1		0158	60	109.	*	1		0428	135	1.	*	1		0658	210	0.	*	1		0928	285	0.
1		0200	61	106.	*	1		0430	136	1.	*	1		0700	211	0.	*	1		0930	286	0.
1		0202	62	102.	*	1		0432	137	1.	*	1		0702	212	0.	*	1		0932	287	0.
1		0204	63	99.	*	1		0434	138	0.	*	1		0704	213	0.	*	1		0934	288	0.

1		0206	64	95.	*	1		0436	139	0.	*	1		0706	214	0.	*	1		0936	289	0.
1		0208	65	92.	*	1		0438	140	0.	*	1		0708	215	0.	*	1		0938	290	0.
1		0210	66	89.	*	1		0440	141	0.	*	1		0710	216	0.	*	1		0940	291	0.
1		0212	67	86.	*	1		0442	142	0.	*	1		0712	217	0.	*	1		0942	292	0.
1		0214	68	84.	*	1		0444	143	0.	*	1		0714	218	0.	*	1		0944	293	0.
1		0216	69	81.	*	1		0446	144	0.	*	1		0716	219	0.	*	1		0946	294	0.
1		0218	70	79.	*	1		0448	145	0.	*	1		0718	220	0.	*	1		0948	295	0.
1		0220	71	77.	*	1		0450	146	0.	*	1		0720	221	0.	*	1		0950	296	0.
1		0222	72	75.	*	1		0452	147	0.	*	1		0722	222	0.	*	1		0952	297	0.
1		0224	73	73.	*	1		0454	148	0.	*	1		0724	223	0.	*	1		0954	298	0.
1		0226	74	71.	*	1		0456	149	0.	*	1		0726	224	0.	*	1		0956	299	0.
1		0228	75	69.	*	1		0458	150	0.	*	1		0728	225	0.	*	1		0958	300	0.
					*						*						*					

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	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	9.97-HR
+	(CFS)	(HR)					
			(CFS)				
+	770.	.57		117.	71.	71.	71.
			(INCHES)	1.632	1.632	1.632	1.632
			(AC-FT)	58.	58.	58.	58.

CUMULATIVE AREA = .67 SQ MI

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          *            *
321 KK    *   CO-6A    *
          *            *
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COMBINE HYDROGRAPHS
AT NODE FR-6 (MAIN CHANNEL)
FINGER ROCK WASH AND TRIBUTARY WASH

325 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION CO-6A
SUM OF 2 HYDROGRAPHS

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0230	76	808.	*	1		0500	151	181.	*	1		0730	226	59.
1		0002	2	1.	*	1		0232	77	785.	*	1		0502	152	181.	*	1		0732	227	53.
1		0004	3	3.	*	1		0234	78	763.	*	1		0504	153	180.	*	1		0734	228	47.
1		0006	4	8.	*	1		0236	79	742.	*	1		0506	154	179.	*	1		0736	229	40.
1		0008	5	18.	*	1		0238	80	723.	*	1		0508	155	178.	*	1		0738	230	34.
1		0010	6	34.	*	1		0240	81	704.	*	1		0510	156	177.	*	1		0740	231	28.
1		0012	7	58.	*	1		0242	82	685.	*	1		0512	157	176.	*	1		0742	232	23.
1		0014	8	93.	*	1		0244	83	668.	*	1		0514	158	175.	*	1		0744	233	20.
1		0016	9	144.	*	1		0246	84	651.	*	1		0516	159	175.	*	1		0746	234	16.
1		0018	10	220.	*	1		0248	85	635.	*	1		0518	160	174.	*	1		0748	235	14.
1		0020	11	327.	*	1		0250	86	619.	*	1		0520	161	173.	*	1		0750	236	12.
1		0022	12	461.	*	1		0252	87	603.	*	1		0522	162	172.	*	1		0752	237	10.
1		0024	13	614.	*	1		0254	88	589.	*	1		0524	163	171.	*	1		0754	238	9.
1		0026	14	762.	*	1		0256	89	576.	*	1		0526	164	170.	*	1		0756	239	8.
1		0028	15	876.	*	1		0258	90	565.	*	1		0528	165	169.	*	1		0758	240	8.
1		0030	16	957.	*	1		0300	91	555.	*	1		0530	166	168.	*	1		0800	241	7.
1		0032	17	1011.	*	1		0302	92	546.	*	1		0532	167	167.	*	1		0802	242	6.
1		0034	18	1146.	*	1		0304	93	537.	*	1		0534	168	166.	*	1		0804	243	5.
1		0036	19	1726.	*	1		0306	94	529.	*	1		0536	169	166.	*	1		0806	244	5.
1		0038	20	3063.	*	1		0308	95	521.	*	1		0538	170	165.	*	1		0808	245	4.
1		0040	21	4783.	*	1		0310	96	512.	*	1		0540	171	164.	*	1		0810	246	4.
1		0042	22	6049.	*	1		0312	97	502.	*	1		0542	172	163.	*	1		0812	247	3.
1		0044	23	6556.	*	1		0314	98	491.	*	1		0544	173	162.	*	1		0814	248	3.
1		0046	24	6657.	*	1		0316	99	480.	*	1		0546	174	161.	*	1		0816	249	2.
1		0048	25	6562.	*	1		0318	100	468.	*	1		0548	175	160.	*	1		0818	250	2.
1		0050	26	6360.	*	1		0320	101	455.	*	1		0550	176	159.	*	1		0820	251	2.
1		0052	27	6099.	*	1		0322	102	442.	*	1		0552	177	158.	*	1		0822	252	2.

1	0054	28	5813.	*	1	0324	103	427.	*	1	0554	178	157.	*	1	0824	253	1.
1	0056	29	5526.	*	1	0326	104	413.	*	1	0556	179	155.	*	1	0826	254	1.
1	0058	30	5246.	*	1	0328	105	397.	*	1	0558	180	154.	*	1	0828	255	1.
1	0100	31	4971.	*	1	0330	106	382.	*	1	0600	181	153.	*	1	0830	256	1.
1	0102	32	4713.	*	1	0332	107	367.	*	1	0602	182	152.	*	1	0832	257	1.
1	0104	33	4458.	*	1	0334	108	351.	*	1	0604	183	151.	*	1	0834	258	1.
1	0106	34	4197.	*	1	0336	109	336.	*	1	0606	184	149.	*	1	0836	259	1.
1	0108	35	3950.	*	1	0338	110	321.	*	1	0608	185	148.	*	1	0838	260	1.
1	0110	36	3725.	*	1	0340	111	306.	*	1	0610	186	147.	*	1	0840	261	0.
1	0112	37	3526.	*	1	0342	112	291.	*	1	0612	187	146.	*	1	0842	262	0.
1	0114	38	3361.	*	1	0344	113	277.	*	1	0614	188	145.	*	1	0844	263	0.
1	0116	39	3227.	*	1	0346	114	263.	*	1	0616	189	144.	*	1	0846	264	0.
1	0118	40	3086.	*	1	0348	115	250.	*	1	0618	190	142.	*	1	0848	265	0.
1	0120	41	2942.	*	1	0350	116	238.	*	1	0620	191	141.	*	1	0850	266	0.
1	0122	42	2801.	*	1	0352	117	229.	*	1	0622	192	140.	*	1	0852	267	0.
1	0124	43	2664.	*	1	0354	118	223.	*	1	0624	193	138.	*	1	0854	268	0.
1	0126	44	2534.	*	1	0356	119	218.	*	1	0626	194	137.	*	1	0856	269	0.
1	0128	45	2413.	*	1	0358	120	214.	*	1	0628	195	135.	*	1	0858	270	0.
1	0130	46	2307.	*	1	0400	121	210.	*	1	0630	196	134.	*	1	0900	271	0.
1	0132	47	2209.	*	1	0402	122	207.	*	1	0632	197	132.	*	1	0902	272	0.
1	0134	48	2114.	*	1	0404	123	205.	*	1	0634	198	131.	*	1	0904	273	0.
1	0136	49	2023.	*	1	0406	124	204.	*	1	0636	199	129.	*	1	0906	274	0.
1	0138	50	1936.	*	1	0408	125	202.	*	1	0638	200	128.	*	1	0908	275	0.
1	0140	51	1854.	*	1	0410	126	201.	*	1	0640	201	126.	*	1	0910	276	0.
1	0142	52	1775.	*	1	0412	127	200.	*	1	0642	202	125.	*	1	0912	277	0.
1	0144	53	1701.	*	1	0414	128	199.	*	1	0644	203	123.	*	1	0914	278	0.
1	0146	54	1632.	*	1	0416	129	198.	*	1	0646	204	121.	*	1	0916	279	0.
1	0148	55	1569.	*	1	0418	130	197.	*	1	0648	205	119.	*	1	0918	280	0.
1	0150	56	1514.	*	1	0420	131	196.	*	1	0650	206	117.	*	1	0920	281	0.
1	0152	57	1461.	*	1	0422	132	195.	*	1	0652	207	115.	*	1	0922	282	0.
1	0154	58	1410.	*	1	0424	133	195.	*	1	0654	208	113.	*	1	0924	283	0.
1	0156	59	1360.	*	1	0426	134	194.	*	1	0656	209	111.	*	1	0926	284	0.
1	0158	60	1313.	*	1	0428	135	193.	*	1	0658	210	109.	*	1	0928	285	0.
1	0200	61	1267.	*	1	0430	136	192.	*	1	0700	211	107.	*	1	0930	286	0.
1	0202	62	1222.	*	1	0432	137	192.	*	1	0702	212	105.	*	1	0932	287	0.
1	0204	63	1181.	*	1	0434	138	191.	*	1	0704	213	102.	*	1	0934	288	0.
1	0206	64	1143.	*	1	0436	139	190.	*	1	0706	214	99.	*	1	0936	289	0.
1	0208	65	1108.	*	1	0438	140	190.	*	1	0708	215	97.	*	1	0938	290	0.
1	0210	66	1075.	*	1	0440	141	189.	*	1	0710	216	94.	*	1	0940	291	0.
1	0212	67	1044.	*	1	0442	142	188.	*	1	0712	217	91.	*	1	0942	292	0.
1	0214	68	1013.	*	1	0444	143	187.	*	1	0714	218	88.	*	1	0944	293	0.
1	0216	69	984.	*	1	0446	144	187.	*	1	0716	219	85.	*	1	0946	294	0.
1	0218	70	957.	*	1	0448	145	186.	*	1	0718	220	82.	*	1	0948	295	0.
1	0220	71	932.	*	1	0450	146	185.	*	1	0720	221	79.	*	1	0950	296	0.
1	0222	72	907.	*	1	0452	147	184.	*	1	0722	222	75.	*	1	0952	297	0.
1	0224	73	882.	*	1	0454	148	184.	*	1	0724	223	72.	*	1	0954	298	0.
1	0226	74	857.	*	1	0456	149	183.	*	1	0726	224	69.	*	1	0956	299	0.
1	0228	75	832.	*	1	0458	150	182.	*	1	0728	225	65.	*	1	0958	300	0.
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  PEAK FLOW      TIME                        MAXIMUM AVERAGE FLOW
                                      6-HR         24-HR        72-HR        9.97-HR
+   (CFS)        (HR)
                           (CFS)
+    6657.        .77                 1105.          681.         681.          681.
                         (INCHES)     1.844         1.889        1.889         1.889
                          (AC-FT)      548.          561.         561.          561.

                         CUMULATIVE AREA =     5.57 SQ MI


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


              **************
              *            *
  326 KK      *    6TO5    *
              *            *
              **************
                             MODIFIED PULS CHANNEL ROUTING
                             FROM NODE FR-6 TO FR-5 (MAIN CHANNEL)

                 HYDROGRAPH ROUTING DATA

  329 RS           STORAGE ROUTING
                        NSTPS          2  NUMBER OF SUBREACHES
                         ITYP        LOW  TYPE OF INITIAL CONDITION
                       RSVRIC     -10.00  INITIAL CONDITION
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X .00 WORKING R AND D COEFFICIENT

330 RC NORMAL DEPTH CHANNEL

ANL	.060	LEFT OVERBANK N-VALUE
ANCH	.045	MAIN CHANNEL N-VALUE
ANR	.060	RIGHT OVERBANK N-VALUE
RLNTH	3140.	REACH LENGTH
SEL	.0180	ENERGY SLOPE
ELMAX	.0	MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

		--- LEFT OVERBANK ---		+ ------ MAIN CHANNEL		------- +	--- RIGHT OVERBANK ---		
332 RY	ELEVATION	90.00	82.00	80.00	76.60	78.00	80.00	82.00	90.00
331 RX	DISTANCE	.00	66.00	202.00	225.00	237.00	255.00	287.00	320.00

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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.27	1.10	2.48	4.43	6.98	11.72	19.47	30.09	41.69
OUTFLOW	.00	8.41	53.39	157.28	339.90	632.67	1146.72	1925.89	3088.21	4688.08
ELEVATION	76.60	77.31	78.01	78.72	79.42	80.13	80.83	81.54	82.24	82.95
STORAGE	53.75	66.24	79.19	92.57	106.40	120.67	135.38	150.54	166.15	182.19
OUTFLOW	6622.95	8875.12	11434.10	14293.47	17449.36	20899.62	24643.32	28680.46	33011.71	37638.27
ELEVATION	83.65	84.36	85.06	85.77	86.47	87.18	87.88	88.59	89.29	90.00

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HYDROGRAPH AT STATION 6TO5

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	76.6	*	1		0320	101	492.	2.9	79.8	*	1		0640	201	133.	1.1	78.6
1		0002	2	0.	.0	76.6	*	1		0322	102	480.	2.8	79.8	*	1		0642	202	132.	1.1	78.5
1		0004	3	0.	.0	76.6	*	1		0324	103	468.	2.8	79.7	*	1		0644	203	130.	1.1	78.5
1		0006	4	0.	.0	76.6	*	1		0326	104	456.	2.7	79.7	*	1		0646	204	129.	1.1	78.5
1		0008	5	0.	.0	76.6	*	1		0328	105	442.	2.7	79.7	*	1		0648	205	127.	1.0	78.5
1		0010	6	1.	.0	76.7	*	1		0330	106	428.	2.6	79.6	*	1		0650	206	126.	1.0	78.5
1		0012	7	3.	.0	76.8	*	1		0332	107	414.	2.5	79.6	*	1		0652	207	124.	1.0	78.5
1		0014	8	6.	.1	77.1	*	1		0334	108	399.	2.5	79.6	*	1		0654	208	122.	1.0	78.5
1		0016	9	14.	.2	77.4	*	1		0336	109	384.	2.4	79.5	*	1		0656	209	121.	1.0	78.5
1		0018	10	30.	.3	77.6	*	1		0338	110	369.	2.3	79.5	*	1		0658	210	119.	1.0	78.5
1		0020	11	56.	.6	78.0	*	1		0340	111	354.	2.3	79.5	*	1		0700	211	117.	1.0	78.4
1		0022	12	108.	.9	78.4	*	1		0342	112	340.	2.2	79.4	*	1		0702	212	115.	1.0	78.4
1		0024	13	183.	1.4	78.8	*	1		0344	113	328.	2.2	79.4	*	1		0704	213	113.	.9	78.4
1		0026	14	293.	2.0	79.2	*	1		0346	114	315.	2.1	79.3	*	1		0706	214	111.	.9	78.4
1		0028	15	431.	2.6	79.6	*	1		0348	115	302.	2.0	79.3	*	1		0708	215	108.	.9	78.4
1		0030	16	571.	3.2	80.0	*	1		0350	116	289.	1.9	79.2	*	1		0710	216	106.	.9	78.4
1		0032	17	692.	3.8	80.2	*	1		0352	117	276.	1.9	79.2	*	1		0712	217	104.	.9	78.4
1		0034	18	797.	4.3	80.4	*	1		0354	118	264.	1.8	79.1	*	1		0714	218	101.	.9	78.3
1		0036	19	925.	4.8	80.5	*	1		0356	119	252.	1.7	79.1	*	1		0716	219	99.	.9	78.3
1		0038	20	1163.	5.9	80.8	*	1		0358	120	243.	1.7	79.0	*	1		0718	220	96.	.8	78.3
1		0040	21	1619.	8.2	81.3	*	1		0400	121	235.	1.7	79.0	*	1		0720	221	93.	.8	78.3
1		0042	22	2436.	12.1	81.8	*	1		0402	122	228.	1.6	79.0	*	1		0722	222	90.	.8	78.3
1		0044	23	3597.	16.9	82.5	*	1		0404	123	222.	1.6	79.0	*	1		0724	223	87.	.8	78.2
1		0046	24	4805.	21.2	83.0	*	1		0406	124	217.	1.6	78.9	*	1		0726	224	84.	.8	78.2
1		0048	25	5712.	24.0	83.3	*	1		0408	125	213.	1.5	78.9	*	1		0728	225	81.	.7	78.2
1		0050	26	6157.	25.4	83.5	*	1		0410	126	210.	1.5	78.9	*	1		0730	226	78.	.7	78.2
1		0052	27	6295.	25.9	83.5	*	1		0412	127	207.	1.5	78.9	*	1		0732	227	74.	.7	78.2
1		0054	28	6239.	25.7	83.5	*	1		0414	128	205.	1.5	78.9	*	1		0734	228	70.	.7	78.1
1		0056	29	6071.	25.2	83.5	*	1		0416	129	203.	1.5	78.9	*	1		0736	229	66.	.6	78.1
1		0058	30	5841.	24.4	83.4	*	1		0418	130	202.	1.5	78.9	*	1		0738	230	61.	.6	78.1
1		0100	31	5583.	23.6	83.3	*	1		0420	131	200.	1.5	78.9	*	1		0740	231	56.	.6	78.0
1		0102	32	5316.	22.8	83.2	*	1		0422	132	199.	1.5	78.9	*	1		0742	232	52.	.5	78.0
1		0104	33	5049.	22.0	83.1	*	1		0424	133	198.	1.5	78.9	*	1		0744	233	48.	.5	77.9
1		0106	34	4793.	21.2	83.0	*	1		0426	134	197.	1.5	78.9	*	1		0746	234	44.	.5	77.9
1		0108	35	4561.	20.4	82.9	*	1		0428	135	196.	1.4	78.9	*	1		0748	235	40.	.4	77.8
1		0110	36	4336.	19.6	82.8	*	1		0430	136	195.	1.4	78.9	*	1		0750	236	36.	.4	77.7
1		0112	37	4107.	18.7	82.7	*	1		0432	137	195.	1.4	78.9	*	1		0752	237	32.	.4	77.7
1		0114	38	3887.	17.9	82.6	*	1		0434	138	194.	1.4	78.9	*	1		0754	238	29.	.3	77.6
1		0116	39	3686.	17.2	82.5	*	1		0436	139	193.	1.4	78.9	*	1		0756	239	25.	.3	77.6
1		0118	40	3506.	16.6	82.4	*	1		0438	140	192.	1.4	78.9	*	1		0758	240	22.	.3	77.5
1		0120	41	3342.	16.0	82.4	*	1		0440	141	192.	1.4	78.8	*	1		0800	241	20.	.2	77.5
1		0122	42	3192.	15.4	82.3	*	1		0442	142	191.	1.4	78.8	*	1		0802	242	17.	.2	77.4
1		0124	43	3060.	14.9	82.2	*	1		0444	143	190.	1.4	78.8	*	1		0804	243	15.	.2	77.4
1		0126	44	2946.	14.4	82.2	*	1		0446	144	189.	1.4	78.8	*	1		0806	244	14.	.2	77.4
1		0128	45	2825.	13.8	82.1	*	1		0448	145	189.	1.4	78.8	*	1		0808	245	12.	.2	77.4

1	0130	46	2703.	13.3	82.0	*	1	0450	146	188.	1.4	78.8	*	1	0810	246	11.	.2	77.3
1	0132	47	2583.	12.7	81.9	*	1	0452	147	187.	1.4	78.8	*	1	0812	247	10.	.1	77.3
1	0134	48	2468.	12.2	81.9	*	1	0454	148	187.	1.4	78.8	*	1	0814	248	9.	.1	77.3
1	0136	49	2359.	11.7	81.8	*	1	0456	149	186.	1.4	78.8	*	1	0816	249	8.	.1	77.3
1	0138	50	2256.	11.2	81.7	*	1	0458	150	185.	1.4	78.8	*	1	0818	250	8.	.1	77.2
1	0140	51	2158.	10.8	81.7	*	1	0500	151	184.	1.4	78.8	*	1	0820	251	7.	.1	77.2
1	0142	52	2065.	10.4	81.6	*	1	0502	152	184.	1.4	78.8	*	1	0822	252	7.	.1	77.2
1	0144	53	1977.	10.0	81.6	*	1	0504	153	183.	1.4	78.8	*	1	0824	253	6.	.1	77.1
1	0146	54	1897.	9.6	81.5	*	1	0506	154	182.	1.4	78.8	*	1	0826	254	6.	.1	77.1
1	0148	55	1824.	9.2	81.4	*	1	0508	155	181.	1.4	78.8	*	1	0828	255	5.	.1	77.1
1	0150	56	1753.	8.9	81.4	*	1	0510	156	180.	1.4	78.8	*	1	0830	256	5.	.1	77.0
1	0152	57	1685.	8.5	81.3	*	1	0512	157	180.	1.4	78.8	*	1	0832	257	5.	.1	77.0
1	0154	58	1621.	8.2	81.3	*	1	0514	158	179.	1.4	78.8	*	1	0834	258	4.	.1	77.0
1	0156	59	1561.	7.9	81.2	*	1	0516	159	178.	1.4	78.8	*	1	0836	259	4.	.1	76.9
1	0158	60	1504.	7.6	81.2	*	1	0518	160	177.	1.3	78.8	*	1	0838	260	4.	.1	76.9
1	0200	61	1450.	7.4	81.1	*	1	0520	161	176.	1.3	78.8	*	1	0840	261	3.	.1	76.9
1	0202	62	1398.	7.1	81.1	*	1	0522	162	175.	1.3	78.8	*	1	0842	262	3.	.0	76.9
1	0204	63	1349.	6.9	81.0	*	1	0524	163	174.	1.3	78.8	*	1	0844	263	3.	.0	76.8
1	0206	64	1301.	6.6	81.0	*	1	0526	164	174.	1.3	78.8	*	1	0846	264	2.	.0	76.8
1	0208	65	1257.	6.4	80.9	*	1	0528	165	173.	1.3	78.8	*	1	0848	265	2.	.0	76.8
1	0210	66	1214.	6.2	80.9	*	1	0530	166	172.	1.3	78.8	*	1	0850	266	2.	.0	76.8
1	0212	67	1174.	6.0	80.9	*	1	0532	167	171.	1.3	78.8	*	1	0852	267	2.	.0	76.8
1	0214	68	1135.	5.8	80.8	*	1	0534	168	170.	1.3	78.8	*	1	0854	268	2.	.0	76.7
1	0216	69	1097.	5.6	80.8	*	1	0536	169	169.	1.3	78.8	*	1	0856	269	1.	.0	76.7
1	0218	70	1062.	5.5	80.7	*	1	0538	170	168.	1.3	78.8	*	1	0858	270	1.	.0	76.7
1	0220	71	1030.	5.3	80.7	*	1	0540	171	167.	1.3	78.8	*	1	0900	271	1.	.0	76.7
1	0222	72	1000.	5.2	80.6	*	1	0542	172	166.	1.3	78.8	*	1	0902	272	1.	.0	76.7
1	0224	73	971.	5.1	80.6	*	1	0544	173	165.	1.3	78.7	*	1	0904	273	1.	.0	76.7
1	0226	74	944.	4.9	80.6	*	1	0546	174	165.	1.3	78.7	*	1	0906	274	1.	.0	76.7
1	0228	75	918.	4.8	80.5	*	1	0548	175	164.	1.3	78.7	*	1	0908	275	1.	.0	76.7
1	0230	76	892.	4.7	80.5	*	1	0550	176	163.	1.3	78.7	*	1	0910	276	1.	.0	76.7
1	0232	77	867.	4.6	80.4	*	1	0552	177	162.	1.3	78.7	*	1	0912	277	1.	.0	76.7
1	0234	78	842.	4.5	80.4	*	1	0554	178	161.	1.3	78.7	*	1	0914	278	1.	.0	76.6
1	0236	79	818.	4.3	80.4	*	1	0556	179	160.	1.3	78.7	*	1	0916	279	0.	.0	76.6
1	0238	80	795.	4.2	80.3	*	1	0558	180	159.	1.2	78.7	*	1	0918	280	0.	.0	76.6
1	0240	81	773.	4.1	80.3	*	1	0600	181	158.	1.2	78.7	*	1	0920	281	0.	.0	76.6
1	0242	82	752.	4.0	80.3	*	1	0602	182	157.	1.2	78.7	*	1	0922	282	0.	.0	76.6
1	0244	83	732.	3.9	80.3	*	1	0604	183	156.	1.2	78.7	*	1	0924	283	0.	.0	76.6
1	0246	84	712.	3.9	80.2	*	1	0606	184	155.	1.2	78.7	*	1	0926	284	0.	.0	76.6
1	0248	85	694.	3.8	80.2	*	1	0608	185	154.	1.2	78.7	*	1	0928	285	0.	.0	76.6
1	0250	86	676.	3.7	80.2	*	1	0610	186	153.	1.2	78.7	*	1	0930	286	0.	.0	76.6
1	0252	87	659.	3.6	80.2	*	1	0612	187	151.	1.2	78.7	*	1	0932	287	0.	.0	76.6
1	0254	88	642.	3.5	80.1	*	1	0614	188	150.	1.2	78.7	*	1	0934	288	0.	.0	76.6
1	0256	89	625.	3.5	80.1	*	1	0616	189	149.	1.2	78.7	*	1	0936	289	0.	.0	76.6
1	0258	90	609.	3.4	80.1	*	1	0618	190	148.	1.2	78.7	*	1	0938	290	0.	.0	76.6
1	0300	91	594.	3.3	80.0	*	1	0620	191	147.	1.2	78.6	*	1	0940	291	0.	.0	76.6
1	0302	92	581.	3.3	80.0	*	1	0622	192	146.	1.2	78.6	*	1	0942	292	0.	.0	76.6
1	0304	93	570.	3.2	80.0	*	1	0624	193	144.	1.2	78.6	*	1	0944	293	0.	.0	76.6
1	0306	94	559.	3.2	79.9	*	1	0626	194	143.	1.1	78.6	*	1	0946	294	0.	.0	76.6
1	0308	95	549.	3.1	79.9	*	1	0628	195	142.	1.1	78.6	*	1	0948	295	0.	.0	76.6
1	0310	96	540.	3.1	79.9	*	1	0630	196	141.	1.1	78.6	*	1	0950	296	0.	.0	76.6
1	0312	97	531.	3.0	79.9	*	1	0632	197	139.	1.1	78.6	*	1	0952	297	0.	.0	76.6
1	0314	98	522.	3.0	79.9	*	1	0634	198	138.	1.1	78.6	*	1	0954	298	0.	.0	76.6
1	0316	99	512.	3.0	79.8	*	1	0636	199	136.	1.1	78.6	*	1	0956	299	0.	.0	76.6
1	0318	100	502.	2.9	79.8	*	1	0638	200	135.	1.1	78.6	*	1	0958	300	0.	.0	76.6
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 6295.	.87		1103.	681.	681.	681.
		(INCHES)	1.842	1.889	1.889	1.889
		(AC-FT)	547.	561.	561.	561.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	9.97-HR
+ (AC-FT)	(HR)				
26.	.87	5.	3.	3.	3.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	9.97-HR
+ (FEET)	(HR)				
83.53	.87	80.05	79.02	79.02	79.02

CUMULATIVE AREA = 5.57 SQ MI

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              *            *
333 KK        *    FR-5    *
              *            *
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LOCAL RUNOFF TO FR-5
BASIN FR-5

SUBBASIN RUNOFF DATA

336 BA SUBBASIN CHARACTERISTICS
TAREA .16 SUBBASIN AREA

PRECIPITATION DATA

337 PB STORM 2.85 BASIN TOTAL PRECIPITATION

20 PI INCREMENTAL PRECIPITATION PATTERN

.04	.04	.06	.08	.08	.07	.07	.05	.03	.03
.02	.02	.02	.02	.02	.02	.02	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

338 LS SCS LOSS RATE
STRTL .60 INITIAL ABSTRACTION
CRVNBR 77.00 CURVE NUMBER
RTIMP 10.00 PERCENT IMPERVIOUS AREA

339 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .20 LAG

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UNIT HYDROGRAPH
32 END-OF-PERIOD ORDINATES

23.	69.	141.	237.	310.	343.	343.	314.	274.	219.
162.	125.	97.	77.	60.	47.	36.	28.	22.	17.
13.	10.	8.	6.	5.	4.	3.	3.	2.	1.
1.	0.								

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HYDROGRAPH AT STATION FR-5

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DA MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	0000	1	.00	.00	.00	0.	*	1	0500	151	.00	.00	.00	0.
1	0002	2	.12	.10	.01	0.	*	1	0502	152	.00	.00	.00	0.
1	0004	3	.12	.10	.01	1.	*	1	0504	153	.00	.00	.00	0.
1	0006	4	.17	.16	.02	3.	*	1	0506	154	.00	.00	.00	0.
1	0008	5	.23	.21	.02	6.	*	1	0508	155	.00	.00	.00	0.
1	0010	6	.23	.19	.04	11.	*	1	0510	156	.00	.00	.00	0.
1	0012	7	.19	.13	.05	19.	*	1	0512	157	.00	.00	.00	0.
1	0014	8	.19	.12	.07	30.	*	1	0514	158	.00	.00	.00	0.
1	0016	9	.14	.08	.06	45.	*	1	0516	159	.00	.00	.00	0.
1	0018	10	.10	.05	.04	62.	*	1	0518	160	.00	.00	.00	0.
1	0020	11	.10	.05	.05	79.	*	1	0520	161	.00	.00	.00	0.
1	0022	12	.07	.04	.04	95.	*	1	0522	162	.00	.00	.00	0.
1	0024	13	.07	.03	.04	107.	*	1	0524	163	.00	.00	.00	0.
1	0026	14	.06	.03	.03	116.	*	1	0526	164	.00	.00	.00	0.
1	0028	15	.06	.03	.03	120.	*	1	0528	165	.00	.00	.00	0.
1	0030	16	.06	.02	.03	120.	*	1	0530	166	.00	.00	.00	0.
1	0032	17	.05	.02	.03	118.	*	1	0532	167	.00	.00	.00	0.
1	0034	18	.05	.02	.03	114.	*	1	0534	168	.00	.00	.00	0.
1	0036	19	.04	.02	.02	110.	*	1	0536	169	.00	.00	.00	0.
1	0038	20	.04	.02	.02	105.	*	1	0538	170	.00	.00	.00	0.
1	0040	21	.04	.02	.02	101.	*	1	0540	171	.00	.00	.00	0.
1	0042	22	.03	.01	.02	96.	*	1	0542	172	.00	.00	.00	0.
1	0044	23	.03	.01	.02	91.	*	1	0544	173	.00	.00	.00	0.
1	0046	24	.03	.01	.02	86.	*	1	0546	174	.00	.00	.00	0.
1	0048	25	.03	.01	.02	82.	*	1	0548	175	.00	.00	.00	0.

1	0050	26	.03	.01	.02	78.	*	1	0550	176	.00	.00	.00	0.
1	0052	27	.02	.01	.02	73.	*	1	0552	177	.00	.00	.00	0.
1	0054	28	.02	.01	.02	70.	*	1	0554	178	.00	.00	.00	0.
1	0056	29	.02	.01	.01	66.	*	1	0556	179	.00	.00	.00	0.
1	0058	30	.02	.01	.01	62.	*	1	0558	180	.00	.00	.00	0.
1	0100	31	.02	.01	.01	59.	*	1	0600	181	.00	.00	.00	0.
1	0102	32	.02	.01	.01	56.	*	1	0602	182	.00	.00	.00	0.
1	0104	33	.02	.01	.01	53.	*	1	0604	183	.00	.00	.00	0.
1	0106	34	.02	.01	.01	51.	*	1	0606	184	.00	.00	.00	0.
1	0108	35	.02	.01	.01	48.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.01	.01	46.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.01	.01	.01	44.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.01	.01	.01	42.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.01	.00	.01	40.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.01	.00	.01	38.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.01	.00	.01	36.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	35.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	33.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	32.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	30.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	29.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	28.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	27.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	26.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	25.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	24.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	23.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	22.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	22.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	21.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	20.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.00	20.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.00	19.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.00	18.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.00	18.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.00	17.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.00	17.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.00	16.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.00	16.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.00	15.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.00	15.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.00	14.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.00	14.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.00	14.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.01	.00	.00	13.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.01	.00	.00	13.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.00	.00	.00	12.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.00	.00	.00	12.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.00	.00	.00	12.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.00	.00	.00	12.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.00	.00	.00	11.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.00	.00	.00	11.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	11.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	10.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	10.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	10.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	10.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	10.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	9.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	9.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	9.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	9.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	8.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	8.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	8.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	8.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	8.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	7.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	7.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	6.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	5.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	5.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	4.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	3.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	2.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	2.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	1.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	1.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	1.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	1.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	0.	*	1	0830	256	.00	.00	.00	0.

1	0332	107	.00	.00	.00	0.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	0.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	0.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	0.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	0.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.
							*							

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    TOTAL RAINFALL =     2.85, TOTAL LOSS =     1.69, TOTAL EXCESS =     1.16

 PEAK FLOW     TIME                           MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR       9.97-HR
+   (CFS)      (HR)
                           (CFS)
+     120.       .50                    19.         12.         12.          12.
                         (INCHES)    1.157       1.157       1.157        1.157
                          (AC-FT)      10.         10.         10.          10.

                         CUMULATIVE AREA =     .16 SQ MI



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


            **************
            *            *
  340 KK    *    CO-5    *
            *            *
            **************
                          COMBINE HYDROGRAPHS
                          AT NODE FR-5 (MAIN CHANNEL)
                          UPSTREAM OF CULVERT AT SUNRISE DRIVE

  344 HC        HYDROGRAPH COMBINATION
                     ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                            ***

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HYDROGRAPH AT STATION CO-5
SUM OF 2 HYDROGRAPHS

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0230	76	903.	1		0500	151	184.	1		0730	226	78.
1		0002	2	0.	1		0232	77	878.	1		0502	152	184.	1		0732	227	74.
1		0004	3	1.	1		0234	78	853.	1		0504	153	183.	1		0734	228	70.
1		0006	4	3.	1		0236	79	829.	1		0506	154	182.	1		0736	229	66.
1		0008	5	7.	1		0238	80	806.	1		0508	155	181.	1		0738	230	61.
1		0010	6	13.	1		0240	81	783.	1		0510	156	180.	1		0740	231	56.
1		0012	7	22.	1		0242	82	762.	1		0512	157	180.	1		0742	232	52.
1		0014	8	36.	1		0244	83	741.	1		0514	158	179.	1		0744	233	48.
1		0016	9	59.	1		0246	84	722.	1		0516	159	178.	1		0746	234	44.
1		0018	10	92.	1		0248	85	703.	1		0518	160	177.	1		0748	235	40.
1		0020	11	136.	1		0250	86	685.	1		0520	161	176.	1		0750	236	36.
1		0022	12	203.	1		0252	87	667.	1		0522	162	175.	1		0752	237	32.
1		0024	13	291.	1		0254	88	650.	1		0524	163	174.	1		0754	238	29.
1		0026	14	409.	1		0256	89	633.	1		0526	164	174.	1		0756	239	25.
1		0028	15	550.	1		0258	90	617.	1		0528	165	173.	1		0758	240	22.
1		0030	16	691.	1		0300	91	602.	1		0530	166	172.	1		0800	241	20.
1		0032	17	810.	1		0302	92	589.	1		0532	167	171.	1		0802	242	17.
1		0034	18	912.	1		0304	93	577.	1		0534	168	170.	1		0804	243	15.
1		0036	19	1035.	1		0306	94	566.	1		0536	169	169.	1		0806	244	14.
1		0038	20	1269.	1		0308	95	556.	1		0538	170	168.	1		0808	245	12.
1		0040	21	1719.	1		0310	96	546.	1		0540	171	167.	1		0810	246	11.
1		0042	22	2532.	1		0312	97	536.	1		0542	172	166.	1		0812	247	10.
1		0044	23	3688.	1		0314	98	526.	1		0544	173	165.	1		0814	248	9.
1		0046	24	4892.	1		0316	99	515.	1		0546	174	165.	1		0816	249	8.
1		0048	25	5794.	1		0318	100	505.	1		0548	175	164.	1		0818	250	8.
1		0050	26	6235.	1		0320	101	493.	1		0550	176	163.	1		0820	251	7.
1		0052	27	6368.	1		0322	102	482.	1		0552	177	162.	1		0822	252	7.
1		0054	28	6309.	1		0324	103	469.	1		0554	178	161.	1		0824	253	6.
1		0056	29	6137.	1		0326	104	456.	1		0556	179	160.	1		0826	254	6.
1		0058	30	5904.	1		0328	105	443.	1		0558	180	159.	1		0828	255	5.
1		0100	31	5643.	1		0330	106	429.	1		0600	181	158.	1		0830	256	5.
1		0102	32	5372.	1		0332	107	414.	1		0602	182	157.	1		0832	257	5.
1		0104	33	5103.	1		0334	108	399.	1		0604	183	156.	1		0834	258	4.
1		0106	34	4844.	1		0336	109	384.	1		0606	184	155.	1		0836	259	4.
1		0108	35	4609.	1		0338	110	369.	1		0608	185	154.	1		0838	260	4.
1		0110	36	4381.	1		0340	111	354.	1		0610	186	153.	1		0840	261	3.
1		0112	37	4151.	1		0342	112	340.	1		0612	187	151.	1		0842	262	3.
1		0114	38	3929.	1		0344	113	328.	1		0614	188	150.	1		0844	263	3.
1		0116	39	3726.	1		0346	114	315.	1		0616	189	149.	1		0846	264	2.
1		0118	40	3544.	1		0348	115	302.	1		0618	190	148.	1		0848	265	2.
1		0120	41	3378.	1		0350	116	289.	1		0620	191	147.	1		0850	266	2.
1		0122	42	3227.	1		0352	117	276.	1		0622	192	146.	1		0852	267	2.
1		0124	43	3093.	1		0354	118	264.	1		0624	193	144.	1		0854	268	2.
1		0126	44	2978.	1		0356	119	253.	1		0626	194	143.	1		0856	269	1.
1		0128	45	2856.	1		0358	120	243.	1		0628	195	142.	1		0858	270	1.
1		0130	46	2732.	1		0400	121	235.	1		0630	196	141.	1		0900	271	1.
1		0132	47	2611.	1		0402	122	228.	1		0632	197	139.	1		0902	272	1.
1		0134	48	2495.	1		0404	123	222.	1		0634	198	138.	1		0904	273	1.
1		0136	49	2385.	1		0406	124	217.	1		0636	199	136.	1		0906	274	1.
1		0138	50	2281.	1		0408	125	213.	1		0638	200	135.	1		0908	275	1.
1		0140	51	2182.	1		0410	126	210.	1		0640	201	133.	1		0910	276	1.
1		0142	52	2088.	1		0412	127	207.	1		0642	202	132.	1		0912	277	1.
1		0144	53	2000.	1		0414	128	205.	1		0644	203	130.	1		0914	278	1.
1		0146	54	1919.	1		0416	129	203.	1		0646	204	129.	1		0916	279	0.
1		0148	55	1845.	1		0418	130	202.	1		0648	205	127.	1		0918	280	0.
1		0150	56	1773.	1		0420	131	200.	1		0650	206	126.	1		0920	281	0.
1		0152	57	1705.	1		0422	132	199.	1		0652	207	124.	1		0922	282	0.
1		0154	58	1640.	1		0424	133	198.	1		0654	208	122.	1		0924	283	0.
1		0156	59	1580.	1		0426	134	197.	1		0656	209	121.	1		0926	284	0.
1		0158	60	1522.	1		0428	135	196.	1		0658	210	119.	1		0928	285	0.
1		0200	61	1467.	1		0430	136	195.	1		0700	211	117.	1		0930	286	0.
1		0202	62	1415.	1		0432	137	195.	1		0702	212	115.	1		0932	287	0.
1		0204	63	1365.	1		0434	138	194.	1		0704	213	113.	1		0934	288	0.
1		0206	64	1317.	1		0436	139	193.	1		0706	214	111.	1		0936	289	0.
1		0208	65	1272.	1		0438	140	192.	1		0708	215	108.	1		0938	290	0.
1		0210	66	1229.	1		0440	141	192.	1		0710	216	106.	1		0940	291	0.
1		0212	67	1188.	1		0442	142	191.	1		0712	217	104.	1		0942	292	0.
1		0214	68	1149.	1		0444	143	190.	1		0714	218	101.	1		0944	293	0.
1		0216	69	1111.	1		0446	144	189.	1		0716	219	99.	1		0946	294	0.
1		0218	70	1075.	1		0448	145	189.	1		0718	220	96.	1		0948	295	0.
1		0220	71	1043.	1		0450	146	188.	1		0720	221	93.	1		0950	296	0.
1		0222	72	1012.	1		0452	147	187.	1		0722	222	90.	1		0952	297	0.
1		0224	73	984.	1		0454	148	187.	1		0724	223	87.	1		0954	298	0.
1		0226	74	956.	1		0456	149	186.	1		0726	224	84.	1		0956	299	0.

```
   1     0228   75       929.   *    1      0458  150       185.   *    1      0728  225       81.   *    1      0958  300          0.
                                *                                   *                                  *
*****************************************************************************************************************************************

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR         24-HR        72-HR       9.97-HR
+    (CFS)        (HR)
                             (CFS)
+    6368.        .87                1121.          693.          693.         693.
                          (INCHES)   1.821         1.869         1.869        1.869
                           (AC-FT)    556.          570.          570.         570.

                        CUMULATIVE AREA =     5.72 SQ MI



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


            **************
            *            *
 345 KK     *    RES-5   *
            *            *
            **************
                             MODIFIED PULS RESERVOIR ROUTING
                             AT NODE FR-5
                             SUNRISE DR CULVERT CROSSING

               HYDROGRAPH ROUTING DATA

 349 RS          STORAGE ROUTING
                       NSTPS           1  NUMBER OF SUBREACHES
                        ITYP        ELEV  TYPE OF INITIAL CONDITION
                      RSVRIC     2635.60  INITIAL CONDITION
                           X         .00  WORKING R AND D COEFFICIENT

 350 SA              AREA            .7          .5         1.4         2.5         3.4         4.5         5.6         6.7

 351 SE          ELEVATION      2636.00     2638.00     2640.00     2642.00     2644.00     2646.00     2648.00     2650.00

 352 SQ          DISCHARGE           0.       1000.       2000.       3000.       4000.       5000.       6000.       7000.       8000.       9000.
                               10000.

 354 SE          ELEVATION      2635.60     2637.90     2639.30     2640.50     2641.60     2642.60     2643.70     2644.70     2645.80     2646.90
                               2648.20

                                                                  ***

                                                  COMPUTED STORAGE-ELEVATION DATA

            STORAGE          .00        1.14        2.93        6.76       12.62       20.52       30.55       42.75
          ELEVATION      2636.00     2638.00     2640.00     2642.00     2644.00     2646.00     2648.00     2650.00

                                              COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

            STORAGE          .00         .00        1.10        1.14        2.08        2.93        3.70        5.82        6.76        8.31
            OUTFLOW          .00      173.89     1000.00     1071.49     2000.00     2583.32     3000.00     4000.00     4399.90     5000.00
          ELEVATION      2635.60     2636.00     2637.90     2638.00     2639.30     2640.00     2640.50     2641.60     2642.00     2642.60

            STORAGE        11.61       12.62       15.15       19.63       20.52       24.76       30.55       31.67       42.75
            OUTFLOW      6000.00     6300.05     7000.00     8000.00     8181.80     9000.00     9846.20    10000.00    11384.60
          ELEVATION      2643.70     2644.00     2644.70     2645.80     2646.00     2646.90     2648.00     2648.20     2650.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN       174. TO       2000.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                                                   HYDROGRAPH AT STATION    RES-5

*****************************************************************************************************************************************
                                           *                                            *
 DA MON HRMN ORD   OUTFLOW   STORAGE     STAGE * DA MON HRMN ORD   OUTFLOW   STORAGE     STAGE * DA MON HRMN ORD   OUTFLOW   STORAGE     STAGE
                                           *                                            *
  1     0000   1        0.        .2  2636.0 *  1      0320 101      499.        .4  2636.7 *  1      0640 201      133.        .0  2635.9
  1     0002   2      174.        .0  2636.0 *  1      0322 102      487.        .4  2636.7 *  1      0642 202      132.        .0  2635.9
  1     0004   3        1.        .0  2635.6 *  1      0324 103      475.        .4  2636.7 *  1      0644 203      130.        .0  2635.9
  1     0006   4        3.        .0  2635.6 *  1      0326 104      463.        .4  2636.7 *  1      0646 204      129.        .0  2635.9
  1     0008   5        7.        .0  2635.6 *  1      0328 105      449.        .4  2636.6 *  1      0648 205      127.        .0  2635.9
```

1	0010	6	13.	.0	2635.6	*	1	0330	106	436.	.3	2636.6	*	1	0650	206	126.	.0	2635.9
1	0012	7	22.	.0	2635.6	*	1	0332	107	421.	.3	2636.6	*	1	0652	207	124.	.0	2635.9
1	0014	8	36.	.0	2635.7	*	1	0334	108	407.	.3	2636.5	*	1	0654	208	122.	.0	2635.9
1	0016	9	59.	.0	2635.7	*	1	0336	109	391.	.3	2636.5	*	1	0656	209	121.	.0	2635.9
1	0018	10	92.	.0	2635.8	*	1	0338	110	376.	.3	2636.5	*	1	0658	210	119.	.0	2635.9
1	0020	11	136.	.0	2635.9	*	1	0340	111	361.	.2	2636.4	*	1	0700	211	117.	.0	2635.9
1	0022	12	188.	.0	2636.0	*	1	0342	112	347.	.2	2636.4	*	1	0702	212	115.	.0	2635.9
1	0024	13	248.	.1	2636.2	*	1	0344	113	334.	.2	2636.4	*	1	0704	213	113.	.0	2635.9
1	0026	14	352.	.2	2636.4	*	1	0346	114	321.	.2	2636.3	*	1	0706	214	111.	.0	2635.9
1	0028	15	482.	.4	2636.7	*	1	0348	115	308.	.2	2636.3	*	1	0708	215	108.	.0	2635.8
1	0030	16	623.	.6	2637.0	*	1	0350	116	295.	.2	2636.3	*	1	0710	216	106.	.0	2635.8
1	0032	17	753.	.8	2637.3	*	1	0352	117	282.	.1	2636.2	*	1	0712	217	104.	.0	2635.8
1	0034	18	863.	.9	2637.6	*	1	0354	118	269.	.1	2636.2	*	1	0714	218	101.	.0	2635.8
1	0036	19	976.	1.1	2637.8	*	1	0356	119	258.	.1	2636.2	*	1	0716	219	99.	.0	2635.8
1	0038	20	1186.	1.3	2638.2	*	1	0358	120	247.	.1	2636.2	*	1	0718	220	96.	.0	2635.8
1	0040	21	1541.	1.6	2638.7	*	1	0400	121	239.	.1	2636.1	*	1	0720	221	93.	.0	2635.8
1	0042	22	2181.	2.3	2639.5	*	1	0402	122	231.	.1	2636.1	*	1	0722	222	90.	.0	2635.8
1	0044	23	3022.	3.7	2640.5	*	1	0404	123	225.	.1	2636.1	*	1	0724	223	87.	.0	2635.8
1	0046	24	4019.	5.9	2641.6	*	1	0406	124	219.	.1	2636.1	*	1	0726	224	84.	.0	2635.8
1	0048	25	4963.	8.2	2642.6	*	1	0408	125	215.	.1	2636.1	*	1	0728	225	81.	.0	2635.8
1	0050	26	5588.	10.3	2643.2	*	1	0410	126	211.	.0	2636.1	*	1	0730	226	78.	.0	2635.8
1	0052	27	6008.	11.6	2643.7	*	1	0412	127	208.	.0	2636.1	*	1	0732	227	74.	.0	2635.8
1	0054	28	6200.	12.3	2643.9	*	1	0414	128	206.	.0	2636.1	*	1	0734	228	70.	.0	2635.8
1	0056	29	6213.	12.3	2643.9	*	1	0416	129	204.	.0	2636.1	*	1	0736	229	66.	.0	2635.8
1	0058	30	6101.	12.0	2643.8	*	1	0418	130	202.	.0	2636.1	*	1	0738	230	61.	.0	2635.7
1	0100	31	5909.	11.3	2643.6	*	1	0420	131	201.	.0	2636.1	*	1	0740	231	56.	.0	2635.7
1	0102	32	5673.	10.5	2643.3	*	1	0422	132	200.	.0	2636.1	*	1	0742	232	52.	.0	2635.7
1	0104	33	5416.	9.7	2643.1	*	1	0424	133	199.	.0	2636.1	*	1	0744	233	48.	.0	2635.7
1	0106	34	5155.	8.8	2642.8	*	1	0426	134	198.	.0	2636.1	*	1	0746	234	44.	.0	2635.7
1	0108	35	4885.	8.0	2642.5	*	1	0428	135	197.	.0	2636.1	*	1	0748	235	40.	.0	2635.7
1	0110	36	4614.	7.3	2642.2	*	1	0430	136	196.	.0	2636.1	*	1	0750	236	36.	.0	2635.7
1	0112	37	4371.	6.7	2642.0	*	1	0432	137	195.	.0	2636.0	*	1	0752	237	32.	.0	2635.7
1	0114	38	4125.	6.1	2641.7	*	1	0434	138	194.	.0	2636.0	*	1	0754	238	29.	.0	2635.7
1	0116	39	3898.	5.6	2641.5	*	1	0436	139	193.	.0	2636.0	*	1	0756	239	25.	.0	2635.7
1	0118	40	3691.	5.2	2641.3	*	1	0438	140	193.	.0	2636.0	*	1	0758	240	22.	.0	2635.7
1	0120	41	3510.	4.8	2641.1	*	1	0440	141	192.	.0	2636.0	*	1	0800	241	20.	.0	2635.6
1	0122	42	3347.	4.4	2640.9	*	1	0442	142	191.	.0	2636.0	*	1	0802	242	17.	.0	2635.6
1	0124	43	3200.	4.1	2640.7	*	1	0444	143	191.	.0	2636.0	*	1	0804	243	15.	.0	2635.6
1	0126	44	3070.	3.9	2640.6	*	1	0446	144	190.	.0	2636.0	*	1	0806	244	14.	.0	2635.6
1	0128	45	2945.	3.6	2640.4	*	1	0448	145	189.	.0	2636.0	*	1	0808	245	12.	.0	2635.6
1	0130	46	2816.	3.4	2640.3	*	1	0450	146	188.	.0	2636.0	*	1	0810	246	11.	.0	2635.6
1	0132	47	2692.	3.1	2640.1	*	1	0452	147	188.	.0	2636.0	*	1	0812	247	10.	.0	2635.6
1	0134	48	2572.	2.9	2640.0	*	1	0454	148	187.	.0	2636.0	*	1	0814	248	9.	.0	2635.6
1	0136	49	2444.	2.7	2639.8	*	1	0456	149	186.	.0	2636.0	*	1	0816	249	8.	.0	2635.6
1	0138	50	2336.	2.6	2639.7	*	1	0458	150	185.	.0	2636.0	*	1	0818	250	8.	.0	2635.6
1	0140	51	2235.	2.4	2639.6	*	1	0500	151	185.	.0	2636.0	*	1	0820	251	7.	.0	2635.6
1	0142	52	2138.	2.3	2639.5	*	1	0502	152	184.	.0	2636.0	*	1	0822	252	7.	.0	2635.6
1	0144	53	2046.	2.2	2639.4	*	1	0504	153	183.	.0	2636.0	*	1	0824	253	6.	.0	2635.6
1	0146	54	1955.	2.0	2639.2	*	1	0506	154	182.	.0	2636.0	*	1	0826	254	6.	.0	2635.6
1	0148	55	1871.	2.0	2639.1	*	1	0508	155	182.	.0	2636.0	*	1	0828	255	5.	.0	2635.6
1	0150	56	1799.	1.9	2639.0	*	1	0510	156	181.	.0	2636.0	*	1	0830	256	5.	.0	2635.6
1	0152	57	1729.	1.8	2638.9	*	1	0512	157	180.	.0	2636.0	*	1	0832	257	5.	.0	2635.6
1	0154	58	1664.	1.7	2638.8	*	1	0514	158	179.	.0	2636.0	*	1	0834	258	4.	.0	2635.6
1	0156	59	1602.	1.7	2638.7	*	1	0516	159	178.	.0	2636.0	*	1	0836	259	4.	.0	2635.6
1	0158	60	1543.	1.6	2638.7	*	1	0518	160	177.	.0	2636.0	*	1	0838	260	4.	.0	2635.6
1	0200	61	1487.	1.6	2638.6	*	1	0520	161	177.	.0	2636.0	*	1	0840	261	3.	.0	2635.6
1	0202	62	1434.	1.5	2638.5	*	1	0522	162	176.	.0	2636.0	*	1	0842	262	3.	.0	2635.6
1	0204	63	1383.	1.5	2638.4	*	1	0524	163	175.	.0	2636.0	*	1	0844	263	3.	.0	2635.6
1	0206	64	1334.	1.4	2638.4	*	1	0526	164	174.	.0	2636.0	*	1	0846	264	2.	.0	2635.6
1	0208	65	1288.	1.4	2638.3	*	1	0528	165	173.	.0	2636.0	*	1	0848	265	2.	.0	2635.6
1	0210	66	1245.	1.3	2638.2	*	1	0530	166	172.	.0	2636.0	*	1	0850	266	2.	.0	2635.6
1	0212	67	1203.	1.3	2638.2	*	1	0532	167	171.	.0	2636.0	*	1	0852	267	2.	.0	2635.6
1	0214	68	1163.	1.2	2638.1	*	1	0534	168	170.	.0	2636.0	*	1	0854	268	2.	.0	2635.6
1	0216	69	1125.	1.2	2638.1	*	1	0536	169	169.	.0	2636.0	*	1	0856	269	1.	.0	2635.6
1	0218	70	1088.	1.2	2638.0	*	1	0538	170	168.	.0	2636.0	*	1	0858	270	1.	.0	2635.6
1	0220	71	1052.	1.1	2638.0	*	1	0540	171	167.	.0	2636.0	*	1	0900	271	1.	.0	2635.6
1	0222	72	1019.	1.1	2637.9	*	1	0542	172	166.	.0	2636.0	*	1	0902	272	1.	.0	2635.6
1	0224	73	993.	1.1	2637.9	*	1	0544	173	165.	.0	2636.0	*	1	0904	273	1.	.0	2635.6
1	0226	74	969.	1.1	2637.8	*	1	0546	174	165.	.0	2636.0	*	1	0906	274	1.	.0	2635.6
1	0228	75	942.	1.0	2637.8	*	1	0548	175	164.	.0	2636.0	*	1	0908	275	1.	.0	2635.6
1	0230	76	916.	1.0	2637.7	*	1	0550	176	163.	.0	2636.0	*	1	0910	276	1.	.0	2635.6
1	0232	77	890.	.9	2637.6	*	1	0552	177	162.	.0	2636.0	*	1	0912	277	1.	.0	2635.6
1	0234	78	865.	.9	2637.6	*	1	0554	178	161.	.0	2636.0	*	1	0914	278	1.	.0	2635.6
1	0236	79	840.	.9	2637.5	*	1	0556	179	160.	.0	2636.0	*	1	0916	279	0.	.0	2635.6
1	0238	80	817.	.9	2637.5	*	1	0558	180	159.	.0	2636.0	*	1	0918	280	0.	.0	2635.6
1	0240	81	794.	.8	2637.4	*	1	0600	181	158.	.0	2636.0	*	1	0920	281	0.	.0	2635.6
1	0242	82	772.	.8	2637.4	*	1	0602	182	157.	.0	2636.0	*	1	0922	282	0.	.0	2635.6
1	0244	83	751.	.8	2637.3	*	1	0604	183	156.	.0	2636.0	*	1	0924	283	0.	.0	2635.6
1	0246	84	731.	.7	2637.3	*	1	0606	184	155.	.0	2636.0	*	1	0926	284	0.	.0	2635.6
1	0248	85	712.	.7	2637.2	*	1	0608	185	154.	.0	2636.0	*	1	0928	285	0.	.0	2635.6
1	0250	86	693.	.7	2637.2	*	1	0610	186	153.	.0	2636.0	*	1	0930	286	0.	.0	2635.6

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 1     0252  87      676.        .7  2637.2 *  1     0612 187      151.       .0  2635.9 *  1     0932 287       0.         .0  2635.6
 1     0254  88      658.        .6  2637.1 *  1     0614 188      150.       .0  2635.9 *  1     0934 288       0.         .0  2635.6
 1     0256  89      641.        .6  2637.1 *  1     0616 189      149.       .0  2635.9 *  1     0936 289       0.         .0  2635.6
 1     0258  90      625.        .6  2637.0 *  1     0618 190      148.       .0  2635.9 *  1     0938 290       0.         .0  2635.6
 1     0300  91      609.        .6  2637.0 *  1     0620 191      147.       .0  2635.9 *  1     0940 291       0.         .0  2635.6
 1     0302  92      596.        .6  2637.0 *  1     0622 192      146.       .0  2635.9 *  1     0942 292       0.         .0  2635.6
 1     0304  93      583.        .5  2636.9 *  1     0624 193      144.       .0  2635.9 *  1     0944 293       0.         .0  2635.6
 1     0306  94      571.        .5  2636.9 *  1     0626 194      143.       .0  2635.9 *  1     0946 294       0.         .0  2635.6
 1     0308  95      561.        .5  2636.9 *  1     0628 195      142.       .0  2635.9 *  1     0948 295       0.         .0  2635.6
 1     0310  96      550.        .5  2636.9 *  1     0630 196      141.       .0  2635.9 *  1     0950 296       0.         .0  2635.6
 1     0312  97      540.        .5  2636.8 *  1     0632 197      139.       .0  2635.9 *  1     0952 297       0.         .0  2635.6
 1     0314  98      530.        .5  2636.8 *  1     0634 198      138.       .0  2635.9 *  1     0954 298       0.         .0  2635.6
 1     0316  99      520.        .5  2636.8 *  1     0636 199      136.       .0  2635.9 *  1     0956 299       0.         .0  2635.6
 1     0318 100      510.        .4  2636.8 *  1     0638 200      135.       .0  2635.9 *  1     0958 300       0.         .0  2635.6
                                            *                                            *
*****************************************************************************************************************************************

 PEAK FLOW     TIME                               MAXIMUM AVERAGE FLOW
                                       6-HR        24-HR        72-HR        9.97-HR
+   (CFS)      (HR)
                           (CFS)
+    6213.      .93                    1121.        693.         693.          693.
                        (INCHES)       1.821        1.870        1.870         1.870
                         (AC-FT)        556.         571.         571.          571.

PEAK STORAGE   TIME                             MAXIMUM AVERAGE STORAGE
                                       6-HR        24-HR        72-HR        9.97-HR
+  (AC-FT)     (HR)
       12.      .93                       1.           1.           1.            1.

 PEAK STAGE    TIME                               MAXIMUM AVERAGE STAGE
                                       6-HR        24-HR        72-HR        9.97-HR
+   (FEET)     (HR)
   2643.91      .93                  2637.56      2636.83      2636.83       2636.83

                          CUMULATIVE AREA =     5.72 SQ MI


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


              **************
              *            *
 356 KK       *    5TO4    *
              *            *
              **************
                             MODIFIED PULS CHANNEL ROUTING
                             FROM NODE FR-5 TO FR-4 (MAIN CHANNEL)

                 HYDROGRAPH ROUTING DATA

 359 RS            STORAGE ROUTING
                         NSTPS            1  NUMBER OF SUBREACHES
                          ITYP         FLOW  TYPE OF INITIAL CONDITION
                        RSVRIC        -1.00  INITIAL CONDITION
                             X          .00 WORKING R AND D COEFFICIENT

 360 RC            NORMAL DEPTH CHANNEL
                           ANL         .060  LEFT OVERBANK N-VALUE
                          ANCH         .050  MAIN CHANNEL N-VALUE
                           ANR         .060  RIGHT OVERBANK N-VALUE
                         RLNTH        1270.  REACH LENGTH
                           SEL        .0190  ENERGY SLOPE
                         ELMAX           .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                             CROSS-SECTION DATA
                              --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 362 RY          ELEVATION     30.00      24.00      22.00      18.00      20.00      22.00      26.00      30.00
 361 RX          DISTANCE        .00      50.00     373.00     415.00     425.00     442.00     543.00     593.00

                                                                  ***

                                             COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

              STORAGE          .00        .09        .36        .81       1.46       2.32       3.41       5.15       8.95      14.93
              OUTFLOW          .00       5.85      37.16     109.55     232.70     426.86     706.59    1166.49    1943.44    3174.48
            ELEVATION        18.00      18.63      19.26      19.89      20.53      21.16      21.79      22.42      23.05      23.68

              STORAGE        22.86      31.39      40.32      49.63      59.22      69.05      79.12      89.44      99.99     110.79
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OUTFLOW	5096.90	7736.26	10945.45	14722.78	19066.41	23919.72	29270.95	35111.74	41436.11	48239.90
ELEVATION	24.32	24.95	25.58	26.21	26.84	27.47	28.11	28.74	29.37	30.00

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HYDROGRAPH AT STATION 5T04

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	18.0	*	1		0320	101	514.	2.7	21.4	*	1		0640	201	136.	1.0	20.0
1		0002	2	20.	.2	18.9	*	1		0322	102	503.	2.6	21.3	*	1		0642	202	135.	.9	20.0
1		0004	3	39.	.4	19.3	*	1		0324	103	492.	2.6	21.3	*	1		0644	203	133.	.9	20.0
1		0006	4	28.	.3	19.1	*	1		0326	104	480.	2.5	21.3	*	1		0646	204	132.	.9	20.0
1		0008	5	22.	.2	19.0	*	1		0328	105	467.	2.5	21.2	*	1		0648	205	130.	.9	20.0
1		0010	6	19.	.2	18.9	*	1		0330	106	454.	2.4	21.2	*	1		0650	206	129.	.9	20.0
1		0012	7	18.	.2	18.9	*	1		0332	107	441.	2.4	21.2	*	1		0652	207	127.	.9	20.0
1		0014	8	21.	.2	18.9	*	1		0334	108	427.	2.3	21.2	*	1		0654	208	126.	.9	20.0
1		0016	9	28.	.3	19.1	*	1		0336	109	414.	2.3	21.1	*	1		0656	209	124.	.9	20.0
1		0018	10	43.	.4	19.3	*	1		0338	110	400.	2.2	21.1	*	1		0658	210	122.	.9	20.0
1		0020	11	68.	.6	19.5	*	1		0340	111	385.	2.1	21.0	*	1		0700	211	120.	.9	19.9
1		0022	12	102.	.8	19.8	*	1		0342	112	370.	2.1	21.0	*	1		0702	212	118.	.9	19.9
1		0024	13	149.	1.0	20.1	*	1		0344	113	356.	2.0	20.9	*	1		0704	213	116.	.8	19.9
1		0026	14	212.	1.3	20.4	*	1		0346	114	343.	1.9	20.9	*	1		0706	214	114.	.8	19.9
1		0028	15	306.	1.8	20.8	*	1		0348	115	330.	1.9	20.8	*	1		0708	215	112.	.8	19.9
1		0030	16	423.	2.3	21.1	*	1		0350	116	316.	1.8	20.8	*	1		0710	216	110.	.8	19.9
1		0032	17	561.	2.8	21.5	*	1		0352	117	303.	1.8	20.8	*	1		0712	217	108.	.8	19.9
1		0034	18	690.	3.3	21.8	*	1		0354	118	290.	1.7	20.7	*	1		0714	218	106.	.8	19.9
1		0036	19	812.	3.8	21.9	*	1		0356	119	278.	1.7	20.7	*	1		0716	219	104.	.8	19.8
1		0038	20	956.	4.4	22.1	*	1		0358	120	266.	1.6	20.6	*	1		0718	220	101.	.8	19.8
1		0040	21	1172.	5.2	22.4	*	1		0400	121	255.	1.6	20.6	*	1		0720	221	99.	.7	19.8
1		0042	22	1475.	6.7	22.7	*	1		0402	122	245.	1.5	20.6	*	1		0722	222	96.	.7	19.8
1		0044	23	1969.	9.1	23.1	*	1		0404	123	237.	1.5	20.5	*	1		0724	223	93.	.7	19.8
1		0046	24	2655.	12.4	23.4	*	1		0406	124	230.	1.4	20.5	*	1		0726	224	91.	.7	19.7
1		0048	25	3505.	16.3	23.8	*	1		0408	125	225.	1.4	20.5	*	1		0728	225	88.	.7	19.7
1		0050	26	4392.	19.9	24.1	*	1		0410	126	220.	1.4	20.5	*	1		0730	226	85.	.7	19.7
1		0052	27	5096.	22.9	24.3	*	1		0412	127	216.	1.4	20.4	*	1		0732	227	81.	.6	19.6
1		0054	28	5698.	24.8	24.5	*	1		0414	128	212.	1.3	20.4	*	1		0734	228	78.	.6	19.6
1		0056	29	6002.	25.8	24.5	*	1		0416	129	209.	1.3	20.4	*	1		0736	229	74.	.6	19.6
1		0058	30	6095.	26.1	24.6	*	1		0418	130	207.	1.3	20.4	*	1		0738	230	70.	.6	19.6
1		0100	31	6041.	25.9	24.5	*	1		0420	131	205.	1.3	20.4	*	1		0740	231	66.	.5	19.5
1		0102	32	5892.	25.4	24.5	*	1		0422	132	203.	1.3	20.4	*	1		0742	232	62.	.5	19.5
1		0104	33	5684.	24.8	24.5	*	1		0424	133	201.	1.3	20.4	*	1		0744	233	57.	.5	19.4
1		0106	34	5446.	24.0	24.4	*	1		0426	134	200.	1.3	20.4	*	1		0746	234	53.	.5	19.4
1		0108	35	5192.	23.2	24.3	*	1		0428	135	199.	1.3	20.4	*	1		0748	235	49.	.4	19.4
1		0110	36	4955.	22.3	24.3	*	1		0430	136	198.	1.3	20.3	*	1		0750	236	45.	.4	19.3
1		0112	37	4723.	21.3	24.2	*	1		0432	137	197.	1.3	20.3	*	1		0752	237	41.	.4	19.3
1		0114	38	4485.	20.3	24.1	*	1		0434	138	196.	1.3	20.3	*	1		0754	238	37.	.4	19.3
1		0116	39	4248.	19.4	24.0	*	1		0436	139	195.	1.3	20.3	*	1		0756	239	34.	.3	19.2
1		0118	40	4021.	18.4	24.0	*	1		0438	140	194.	1.3	20.3	*	1		0758	240	32.	.3	19.1
1		0120	41	3810.	17.6	23.9	*	1		0440	141	193.	1.3	20.3	*	1		0800	241	29.	.3	19.1
1		0122	42	3619.	16.8	23.8	*	1		0442	142	193.	1.2	20.3	*	1		0802	242	26.	.3	19.0
1		0124	43	3446.	16.0	23.8	*	1		0444	143	192.	1.2	20.3	*	1		0804	243	23.	.2	19.0
1		0126	44	3290.	15.4	23.7	*	1		0446	144	191.	1.2	20.3	*	1		0806	244	21.	.2	18.9
1		0128	45	3152.	14.8	23.7	*	1		0448	145	190.	1.2	20.3	*	1		0808	245	19.	.2	18.9
1		0130	46	3032.	14.2	23.6	*	1		0450	146	190.	1.2	20.3	*	1		0810	246	17.	.2	18.9
1		0132	47	2909.	13.6	23.5	*	1		0452	147	189.	1.2	20.3	*	1		0812	247	15.	.2	18.8
1		0134	48	2787.	13.0	23.5	*	1		0454	148	188.	1.2	20.3	*	1		0814	248	13.	.2	18.8
1		0136	49	2663.	12.4	23.4	*	1		0456	149	188.	1.2	20.3	*	1		0816	249	12.	.1	18.8
1		0138	50	2543.	11.9	23.4	*	1		0458	150	187.	1.2	20.3	*	1		0818	250	11.	.1	18.7
1		0140	51	2429.	11.3	23.3	*	1		0500	151	186.	1.2	20.3	*	1		0820	251	10.	.1	18.7
1		0142	52	2322.	10.8	23.2	*	1		0502	152	185.	1.2	20.3	*	1		0822	252	9.	.1	18.7
1		0144	53	2220.	10.3	23.2	*	1		0504	153	185.	1.2	20.3	*	1		0824	253	8.	.1	18.7
1		0146	54	2123.	9.8	23.1	*	1		0506	154	184.	1.2	20.3	*	1		0826	254	8.	.1	18.7
1		0148	55	2030.	9.4	23.1	*	1		0508	155	183.	1.2	20.3	*	1		0828	255	7.	.1	18.7
1		0150	56	1944.	9.0	23.1	*	1		0510	156	182.	1.2	20.3	*	1		0830	256	7.	.1	18.6
1		0152	57	1865.	8.6	23.0	*	1		0512	157	181.	1.2	20.3	*	1		0832	257	6.	.1	18.6
1		0154	58	1791.	8.2	22.9	*	1		0514	158	181.	1.2	20.3	*	1		0834	258	6.	.1	18.6
1		0156	59	1722.	7.9	22.9	*	1		0516	159	180.	1.2	20.3	*	1		0836	259	5.	.1	18.6
1		0158	60	1656.	7.5	22.8	*	1		0518	160	179.	1.2	20.3	*	1		0838	260	5.	.1	18.6
1		0200	61	1594.	7.2	22.8	*	1		0520	161	178.	1.2	20.2	*	1		0840	261	5.	.1	18.5
1		0202	62	1535.	7.0	22.7	*	1		0522	162	177.	1.2	20.2	*	1		0842	262	5.	.1	18.5
1		0204	63	1480.	6.7	22.7	*	1		0524	163	177.	1.2	20.2	*	1		0844	263	4.	.1	18.5
1		0206	64	1427.	6.4	22.6	*	1		0526	164	176.	1.2	20.2	*	1		0846	264	4.	.1	18.4
1		0208	65	1376.	6.2	22.6	*	1		0528	165	175.	1.2	20.2	*	1		0848	265	4.	.1	18.4
1		0210	66	1328.	5.9	22.6	*	1		0530	166	174.	1.1	20.2	*	1		0850	266	3.	.1	18.4
1		0212	67	1282.	5.7	22.5	*	1		0532	167	173.	1.1	20.2	*	1		0852	267	3.	.0	18.3
1		0214	68	1239.	5.5	22.5	*	1		0534	168	172.	1.1	20.2	*	1		0854	268	3.	.0	18.3
1		0216	69	1197.	5.3	22.4	*	1		0536	169	171.	1.1	20.2	*	1		0856	269	3.	.0	18.3

1	0218	70	1155.	5.1	22.4	*	1	0538	170	170.	1.1	20.2	*	1	0858	270	3.	.0	18.3
1	0220	71	1110.	4.9	22.3	*	1	0540	171	169.	1.1	20.2	*	1	0900	271	2.	.0	18.3
1	0222	72	1070.	4.8	22.3	*	1	0542	172	168.	1.1	20.2	*	1	0902	272	2.	.0	18.2
1	0224	73	1036.	4.7	22.2	*	1	0544	173	167.	1.1	20.2	*	1	0904	273	2.	.0	18.2
1	0226	74	1007.	4.5	22.2	*	1	0546	174	166.	1.1	20.2	*	1	0906	274	2.	.0	18.2
1	0228	75	979.	4.4	22.2	*	1	0548	175	165.	1.1	20.2	*	1	0908	275	2.	.0	18.2
1	0230	76	953.	4.3	22.1	*	1	0550	176	164.	1.1	20.2	*	1	0910	276	1.	.0	18.2
1	0232	77	926.	4.2	22.1	*	1	0552	177	163.	1.1	20.2	*	1	0912	277	1.	.0	18.1
1	0234	78	900.	4.1	22.1	*	1	0554	178	163.	1.1	20.2	*	1	0914	278	1.	.0	18.1
1	0236	79	875.	4.0	22.0	*	1	0556	179	162.	1.1	20.2	*	1	0916	279	1.	.0	18.1
1	0238	80	850.	4.0	22.0	*	1	0558	180	161.	1.1	20.2	*	1	0918	280	1.	.0	18.1
1	0240	81	826.	3.9	22.0	*	1	0600	181	159.	1.1	20.2	*	1	0920	281	1.	.0	18.1
1	0242	82	803.	3.8	21.9	*	1	0602	182	158.	1.1	20.1	*	1	0922	282	1.	.0	18.1
1	0244	83	781.	3.7	21.9	*	1	0604	183	158.	1.1	20.1	*	1	0924	283	1.	.0	18.1
1	0246	84	760.	3.6	21.9	*	1	0606	184	157.	1.1	20.1	*	1	0926	284	1.	.0	18.1
1	0248	85	739.	3.5	21.8	*	1	0608	185	156.	1.1	20.1	*	1	0928	285	1.	.0	18.1
1	0250	86	720.	3.5	21.8	*	1	0610	186	155.	1.0	20.1	*	1	0930	286	1.	.0	18.1
1	0252	87	701.	3.4	21.8	*	1	0612	187	154.	1.0	20.1	*	1	0932	287	0.	.0	18.1
1	0254	88	683.	3.3	21.7	*	1	0614	188	152.	1.0	20.1	*	1	0934	288	0.	.0	18.0
1	0256	89	666.	3.2	21.7	*	1	0616	189	151.	1.0	20.1	*	1	0936	289	0.	.0	18.0
1	0258	90	649.	3.2	21.7	*	1	0618	190	150.	1.0	20.1	*	1	0938	290	0.	.0	18.0
1	0300	91	632.	3.1	21.6	*	1	0620	191	149.	1.0	20.1	*	1	0940	291	0.	.0	18.0
1	0302	92	617.	3.1	21.6	*	1	0622	192	148.	1.0	20.1	*	1	0942	292	0.	.0	18.0
1	0304	93	602.	3.0	21.6	*	1	0624	193	147.	1.0	20.1	*	1	0944	293	0.	.0	18.0
1	0306	94	589.	3.0	21.5	*	1	0626	194	146.	1.0	20.1	*	1	0946	294	0.	.0	18.0
1	0308	95	577.	2.9	21.5	*	1	0628	195	144.	1.0	20.1	*	1	0948	295	0.	.0	18.0
1	0310	96	566.	2.9	21.5	*	1	0630	196	143.	1.0	20.1	*	1	0950	296	0.	.0	18.0
1	0312	97	555.	2.8	21.4	*	1	0632	197	142.	1.0	20.1	*	1	0952	297	0.	.0	18.0
1	0314	98	545.	2.8	21.4	*	1	0634	198	140.	1.0	20.1	*	1	0954	298	0.	.0	18.0
1	0316	99	535.	2.7	21.4	*	1	0636	199	139.	1.0	20.0	*	1	0956	299	0.	.0	18.0
1	0318	100	524.	2.7	21.4	*	1	0638	200	138.	1.0	20.0	*	1	0958	300	0.	.0	18.0

```
                                                 *                                                  *
*****************************************************************************************************************************

  PEAK FLOW      TIME                            MAXIMUM AVERAGE FLOW
                                         6-HR        24-HR        72-HR       9.97-HR
+   (CFS)         (HR)
                             (CFS)
+    6095.         .97                   1120.        693.         693.          693.
                           (INCHES)      1.820        1.870        1.870         1.870
                            (AC-FT)       555.         571.         571.          571.

 PEAK STORAGE    TIME                           MAXIMUM AVERAGE STORAGE
                                         6-HR        24-HR        72-HR       9.97-HR
+  (AC-FT)        (HR)
       26.         .97                     5.           3.           3.            3.

  PEAK STAGE     TIME                            MAXIMUM AVERAGE STAGE
                                         6-HR        24-HR        72-HR       9.97-HR
+   (FEET)        (HR)
     24.55         .97                   21.54        20.53        20.53         20.53

                          CUMULATIVE AREA =     5.72 SQ MI


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


              **************
              *            *
  363 KK      *    FR-4    *
              *            *
              **************
                             LOCAL RUNOFF TO FR-4
                             BASIN FR-4

                 SUBBASIN RUNOFF DATA

  366 BA           SUBBASIN CHARACTERISTICS
                         TAREA         .05   SUBBASIN AREA

                   PRECIPITATION DATA

  367 PB                 STORM        2.85   BASIN TOTAL PRECIPITATION

   20 PI             INCREMENTAL PRECIPITATION PATTERN
                         .04        .04        .06        .08        .08        .07        .07        .05        .03        .03
                         .02        .02        .02        .02        .02        .02        .02        .01        .01        .01
                         .01        .01        .01        .01        .01        .01        .01        .01        .01        .01
```

.01	.01	.01	.01	.01	.01	.01	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

368 LS SCS LOSS RATE

STRTL	.60	INITIAL ABSTRACTION
CRVNBR	77.00	CURVE NUMBER
RTIMP	25.00	PERCENT IMPERVIOUS AREA

369 UD SCS DIMENSIONLESS UNITGRAPH

TLAG .10 LAG

***

UNIT HYDROGRAPH
17 END-OF-PERIOD ORDINATES

40.	138.	220.	220.	171.	103.	64.	41.	26.	16.
10.	6.	4.	3.	2.	1.	0.			

****

HYDROGRAPH AT STATION FR-4

****

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	*	1		0500	151	.00	.00	.00	0.
1		0002	2	.12	.09	.03	1.	*	1		0502	152	.00	.00	.00	0.
1		0004	3	.12	.09	.03	5.	*	1		0504	153	.00	.00	.00	0.
1		0006	4	.17	.13	.04	12.	*	1		0506	154	.00	.00	.00	0.
1		0008	5	.23	.17	.06	21.	*	1		0508	155	.00	.00	.00	0.
1		0010	6	.23	.16	.08	32.	*	1		0510	156	.00	.00	.00	0.
1		0012	7	.19	.11	.08	44.	*	1		0512	157	.00	.00	.00	0.
1		0014	8	.19	.10	.09	56.	*	1		0514	158	.00	.00	.00	0.
1		0016	9	.14	.07	.07	66.	*	1		0516	159	.00	.00	.00	0.
1		0018	10	.10	.04	.05	72.	*	1		0518	160	.00	.00	.00	0.
1		0020	11	.10	.04	.06	72.	*	1		0520	161	.00	.00	.00	0.
1		0022	12	.07	.03	.04	69.	*	1		0522	162	.00	.00	.00	0.
1		0024	13	.07	.03	.04	63.	*	1		0524	163	.00	.00	.00	0.
1		0026	14	.06	.02	.04	57.	*	1		0526	164	.00	.00	.00	0.
1		0028	15	.06	.02	.03	52.	*	1		0528	165	.00	.00	.00	0.
1		0030	16	.06	.02	.04	48.	*	1		0530	166	.00	.00	.00	0.
1		0032	17	.05	.02	.03	44.	*	1		0532	167	.00	.00	.00	0.
1		0034	18	.05	.02	.03	41.	*	1		0534	168	.00	.00	.00	0.
1		0036	19	.04	.01	.03	38.	*	1		0536	169	.00	.00	.00	0.
1		0038	20	.04	.01	.03	35.	*	1		0538	170	.00	.00	.00	0.
1		0040	21	.04	.01	.03	33.	*	1		0540	171	.00	.00	.00	0.
1		0042	22	.03	.01	.02	31.	*	1		0542	172	.00	.00	.00	0.
1		0044	23	.03	.01	.02	29.	*	1		0544	173	.00	.00	.00	0.
1		0046	24	.03	.01	.02	27.	*	1		0546	174	.00	.00	.00	0.
1		0048	25	.03	.01	.02	26.	*	1		0548	175	.00	.00	.00	0.
1		0050	26	.03	.01	.02	24.	*	1		0550	176	.00	.00	.00	0.
1		0052	27	.02	.01	.02	23.	*	1		0552	177	.00	.00	.00	0.
1		0054	28	.02	.01	.02	22.	*	1		0554	178	.00	.00	.00	0.
1		0056	29	.02	.01	.02	20.	*	1		0556	179	.00	.00	.00	0.
1		0058	30	.02	.01	.01	19.	*	1		0558	180	.00	.00	.00	0.
1		0100	31	.02	.01	.01	18.	*	1		0600	181	.00	.00	.00	0.
1		0102	32	.02	.01	.01	17.	*	1		0602	182	.00	.00	.00	0.
1		0104	33	.02	.01	.01	17.	*	1		0604	183	.00	.00	.00	0.
1		0106	34	.02	.01	.01	16.	*	1		0606	184	.00	.00	.00	0.
1		0108	35	.02	.00	.01	15.	*	1		0608	185	.00	.00	.00	0.
1		0110	36	.02	.00	.01	14.	*	1		0610	186	.00	.00	.00	0.
1		0112	37	.01	.00	.01	14.	*	1		0612	187	.00	.00	.00	0.
1		0114	38	.01	.00	.01	13.	*	1		0614	188	.00	.00	.00	0.
1		0116	39	.01	.00	.01	13.	*	1		0616	189	.00	.00	.00	0.
1		0118	40	.01	.00	.01	12.	*	1		0618	190	.00	.00	.00	0.
1		0120	41	.01	.00	.01	12.	*	1		0620	191	.00	.00	.00	0.
1		0122	42	.01	.00	.01	11.	*	1		0622	192	.00	.00	.00	0.
1		0124	43	.01	.00	.01	11.	*	1		0624	193	.00	.00	.00	0.
1		0126	44	.01	.00	.01	10.	*	1		0626	194	.00	.00	.00	0.
1		0128	45	.01	.00	.01	10.	*	1		0628	195	.00	.00	.00	0.
1		0130	46	.01	.00	.01	9.	*	1		0630	196	.00	.00	.00	0.
1		0132	47	.01	.00	.01	9.	*	1		0632	197	.00	.00	.00	0.
1		0134	48	.01	.00	.01	9.	*	1		0634	198	.00	.00	.00	0.
1		0136	49	.01	.00	.01	8.	*	1		0636	199	.00	.00	.00	0.
1		0138	50	.01	.00	.01	8.	*	1		0638	200	.00	.00	.00	0.
1		0140	51	.01	.00	.01	8.	*	1		0640	201	.00	.00	.00	0.

1	0142	52	.01	.00	.01	8.	*
1	0144	53	.01	.00	.01	7.	*
1	0146	54	.01	.00	.01	7.	*
1	0148	55	.01	.00	.01	7.	*
1	0150	56	.01	.00	.01	7.	*
1	0152	57	.01	.00	.01	7.	*
1	0154	58	.01	.00	.01	6.	*
1	0156	59	.01	.00	.01	6.	*
1	0158	60	.01	.00	.00	6.	*
1	0200	61	.01	.00	.00	6.	*
1	0202	62	.01	.00	.00	6.	*
1	0204	63	.01	.00	.00	5.	*
1	0206	64	.01	.00	.00	5.	*
1	0208	65	.01	.00	.00	5.	*
1	0210	66	.01	.00	.00	5.	*
1	0212	67	.01	.00	.00	5.	*
1	0214	68	.01	.00	.00	5.	*
1	0216	69	.01	.00	.00	5.	*
1	0218	70	.01	.00	.00	4.	*
1	0220	71	.01	.00	.00	4.	*
1	0222	72	.00	.00	.00	4.	*
1	0224	73	.00	.00	.00	4.	*
1	0226	74	.00	.00	.00	4.	*
1	0228	75	.00	.00	.00	4.	*
1	0230	76	.00	.00	.00	4.	*
1	0232	77	.00	.00	.00	4.	*
1	0234	78	.00	.00	.00	4.	*
1	0236	79	.00	.00	.00	4.	*
1	0238	80	.00	.00	.00	4.	*
1	0240	81	.00	.00	.00	3.	*
1	0242	82	.00	.00	.00	3.	*
1	0244	83	.00	.00	.00	3.	*
1	0246	84	.00	.00	.00	3.	*
1	0248	85	.00	.00	.00	3.	*
1	0250	86	.00	.00	.00	3.	*
1	0252	87	.00	.00	.00	3.	*
1	0254	88	.00	.00	.00	3.	*
1	0256	89	.00	.00	.00	3.	*
1	0258	90	.00	.00	.00	3.	*
1	0300	91	.00	.00	.00	3.	*
1	0302	92	.00	.00	.00	3.	*
1	0304	93	.00	.00	.00	2.	*
1	0306	94	.00	.00	.00	2.	*
1	0308	95	.00	.00	.00	1.	*
1	0310	96	.00	.00	.00	1.	*
1	0312	97	.00	.00	.00	0.	*
1	0314	98	.00	.00	.00	0.	*
1	0316	99	.00	.00	.00	0.	*
1	0318	100	.00	.00	.00	0.	*
1	0320	101	.00	.00	.00	0.	*
1	0322	102	.00	.00	.00	0.	*
1	0324	103	.00	.00	.00	0.	*
1	0326	104	.00	.00	.00	0.	*
1	0328	105	.00	.00	.00	0.	*
1	0330	106	.00	.00	.00	0.	*
1	0332	107	.00	.00	.00	0.	*
1	0334	108	.00	.00	.00	0.	*
1	0336	109	.00	.00	.00	0.	*
1	0338	110	.00	.00	.00	0.	*
1	0340	111	.00	.00	.00	0.	*
1	0342	112	.00	.00	.00	0.	*
1	0344	113	.00	.00	.00	0.	*
1	0346	114	.00	.00	.00	0.	*
1	0348	115	.00	.00	.00	0.	*
1	0350	116	.00	.00	.00	0.	*
1	0352	117	.00	.00	.00	0.	*
1	0354	118	.00	.00	.00	0.	*
1	0356	119	.00	.00	.00	0.	*
1	0358	120	.00	.00	.00	0.	*
1	0400	121	.00	.00	.00	0.	*
1	0402	122	.00	.00	.00	0.	*
1	0404	123	.00	.00	.00	0.	*
1	0406	124	.00	.00	.00	0.	*
1	0408	125	.00	.00	.00	0.	*
1	0410	126	.00	.00	.00	0.	*
1	0412	127	.00	.00	.00	0.	*
1	0414	128	.00	.00	.00	0.	*
1	0416	129	.00	.00	.00	0.	*
1	0418	130	.00	.00	.00	0.	*
1	0420	131	.00	.00	.00	0.	*
1	0422	132	.00	.00	.00	0.	*

1	0642	202	.00	.00	.00	0.
1	0644	203	.00	.00	.00	0.
1	0646	204	.00	.00	.00	0.
1	0648	205	.00	.00	.00	0.
1	0650	206	.00	.00	.00	0.
1	0652	207	.00	.00	.00	0.
1	0654	208	.00	.00	.00	0.
1	0656	209	.00	.00	.00	0.
1	0658	210	.00	.00	.00	0.
1	0700	211	.00	.00	.00	0.
1	0702	212	.00	.00	.00	0.
1	0704	213	.00	.00	.00	0.
1	0706	214	.00	.00	.00	0.
1	0708	215	.00	.00	.00	0.
1	0710	216	.00	.00	.00	0.
1	0712	217	.00	.00	.00	0.
1	0714	218	.00	.00	.00	0.
1	0716	219	.00	.00	.00	0.
1	0718	220	.00	.00	.00	0.
1	0720	221	.00	.00	.00	0.
1	0722	222	.00	.00	.00	0.
1	0724	223	.00	.00	.00	0.
1	0726	224	.00	.00	.00	0.
1	0728	225	.00	.00	.00	0.
1	0730	226	.00	.00	.00	0.
1	0732	227	.00	.00	.00	0.
1	0734	228	.00	.00	.00	0.
1	0736	229	.00	.00	.00	0.
1	0738	230	.00	.00	.00	0.
1	0740	231	.00	.00	.00	0.
1	0742	232	.00	.00	.00	0.
1	0744	233	.00	.00	.00	0.
1	0746	234	.00	.00	.00	0.
1	0748	235	.00	.00	.00	0.
1	0750	236	.00	.00	.00	0.
1	0752	237	.00	.00	.00	0.
1	0754	238	.00	.00	.00	0.
1	0756	239	.00	.00	.00	0.
1	0758	240	.00	.00	.00	0.
1	0800	241	.00	.00	.00	0.
1	0802	242	.00	.00	.00	0.
1	0804	243	.00	.00	.00	0.
1	0806	244	.00	.00	.00	0.
1	0808	245	.00	.00	.00	0.
1	0810	246	.00	.00	.00	0.
1	0812	247	.00	.00	.00	0.
1	0814	248	.00	.00	.00	0.
1	0816	249	.00	.00	.00	0.
1	0818	250	.00	.00	.00	0.
1	0820	251	.00	.00	.00	0.
1	0822	252	.00	.00	.00	0.
1	0824	253	.00	.00	.00	0.
1	0826	254	.00	.00	.00	0.
1	0828	255	.00	.00	.00	0.
1	0830	256	.00	.00	.00	0.
1	0832	257	.00	.00	.00	0.
1	0834	258	.00	.00	.00	0.
1	0836	259	.00	.00	.00	0.
1	0838	260	.00	.00	.00	0.
1	0840	261	.00	.00	.00	0.
1	0842	262	.00	.00	.00	0.
1	0844	263	.00	.00	.00	0.
1	0846	264	.00	.00	.00	0.
1	0848	265	.00	.00	.00	0.
1	0850	266	.00	.00	.00	0.
1	0852	267	.00	.00	.00	0.
1	0854	268	.00	.00	.00	0.
1	0856	269	.00	.00	.00	0.
1	0858	270	.00	.00	.00	0.
1	0900	271	.00	.00	.00	0.
1	0902	272	.00	.00	.00	0.
1	0904	273	.00	.00	.00	0.
1	0906	274	.00	.00	.00	0.
1	0908	275	.00	.00	.00	0.
1	0910	276	.00	.00	.00	0.
1	0912	277	.00	.00	.00	0.
1	0914	278	.00	.00	.00	0.
1	0916	279	.00	.00	.00	0.
1	0918	280	.00	.00	.00	0.
1	0920	281	.00	.00	.00	0.
1	0922	282	.00	.00	.00	0.

```
    1     0424  133     .00      .00      .00          0.       *      1     0924  283      .00      .00      .00          0.
    1     0426  134     .00      .00      .00          0.       *      1     0926  284      .00      .00      .00          0.
    1     0428  135     .00      .00      .00          0.       *      1     0928  285      .00      .00      .00          0.
    1     0430  136     .00      .00      .00          0.       *      1     0930  286      .00      .00      .00          0.
    1     0432  137     .00      .00      .00          0.       *      1     0932  287      .00      .00      .00          0.
    1     0434  138     .00      .00      .00          0.       *      1     0934  288      .00      .00      .00          0.
    1     0436  139     .00      .00      .00          0.       *      1     0936  289      .00      .00      .00          0.
    1     0438  140     .00      .00      .00          0.       *      1     0938  290      .00      .00      .00          0.
    1     0440  141     .00      .00      .00          0.       *      1     0940  291      .00      .00      .00          0.
    1     0442  142     .00      .00      .00          0.       *      1     0942  292      .00      .00      .00          0.
    1     0444  143     .00      .00      .00          0.       *      1     0944  293      .00      .00      .00          0.
    1     0446  144     .00      .00      .00          0.       *      1     0946  294      .00      .00      .00          0.
    1     0448  145     .00      .00      .00          0.       *      1     0948  295      .00      .00      .00          0.
    1     0450  146     .00      .00      .00          0.       *      1     0950  296      .00      .00      .00          0.
    1     0452  147     .00      .00      .00          0.       *      1     0952  297      .00      .00      .00          0.
    1     0454  148     .00      .00      .00          0.       *      1     0954  298      .00      .00      .00          0.
    1     0456  149     .00      .00      .00          0.       *      1     0956  299      .00      .00      .00          0.
    1     0458  150     .00      .00      .00          0.       *      1     0958  300      .00      .00      .00          0.
                                                                *
*******************************************************************************************************************************

    TOTAL RAINFALL =    2.85, TOTAL LOSS =    1.41, TOTAL EXCESS =    1.44

  PEAK FLOW      TIME                              MAXIMUM AVERAGE FLOW
                                        6-HR          24-HR          72-HR        9.97-HR
+    (CFS)        (HR)
                           (CFS)
+       72.        .33                     9.             5.             5.             5.
                         (INCHES)       1.439          1.439          1.439          1.439
                          (AC-FT)          4.             4.             4.             4.

                         CUMULATIVE AREA =      .05 SQ MI


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

             **************
             *            *
 370 KK      *    CO-4    *
             *            *
             **************
                            COMBINE HYDROGRAPHS
                            AT NODE FR-4 (MAIN CHANNEL)

 373 HC          HYDROGRAPH COMBINATION
                       ICOMP            2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                ***

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

                                                  HYDROGRAPH AT STATION    CO-4
                                                       SUM OF  2 HYDROGRAPHS

*******************************************************************************************************************************
                                 *                                *                                *
   DA MON HRMN  ORD        FLOW  *   DA MON HRMN  ORD        FLOW *   DA MON HRMN  ORD        FLOW *   DA MON HRMN  ORD        FLOW
                                 *                                *                                *
    1     0000    1          0.  *    1    0230   76        956.  *    1    0500  151        186.  *    1    0730  226         85.
    1     0002    2         21.  *    1    0232   77        930.  *    1    0502  152        185.  *    1    0732  227         81.
    1     0004    3         44.  *    1    0234   78        904.  *    1    0504  153        185.  *    1    0734  228         78.
    1     0006    4         40.  *    1    0236   79        878.  *    1    0506  154        184.  *    1    0736  229         74.
    1     0008    5         43.  *    1    0238   80        854.  *    1    0508  155        183.  *    1    0738  230         70.
    1     0010    6         51.  *    1    0240   81        830.  *    1    0510  156        182.  *    1    0740  231         66.
    1     0012    7         62.  *    1    0242   82        807.  *    1    0512  157        181.  *    1    0742  232         62.
    1     0014    8         77.  *    1    0244   83        784.  *    1    0514  158        181.  *    1    0744  233         57.
    1     0016    9         94.  *    1    0246   84        763.  *    1    0516  159        180.  *    1    0746  234         53.
    1     0018   10        114.  *    1    0248   85        743.  *    1    0518  160        179.  *    1    0748  235         49.
    1     0020   11        141.  *    1    0250   86        723.  *    1    0520  161        178.  *    1    0750  236         45.
    1     0022   12        171.  *    1    0252   87        704.  *    1    0522  162        177.  *    1    0752  237         41.
    1     0024   13        213.  *    1    0254   88        686.  *    1    0524  163        177.  *    1    0754  238         37.
    1     0026   14        269.  *    1    0256   89        669.  *    1    0526  164        176.  *    1    0756  239         34.
    1     0028   15        358.  *    1    0258   90        651.  *    1    0528  165        175.  *    1    0758  240         32.
    1     0030   16        471.  *    1    0300   91        635.  *    1    0530  166        174.  *    1    0800  241         29.
    1     0032   17        606.  *    1    0302   92        619.  *    1    0532  167        173.  *    1    0802  242         26.
    1     0034   18        732.  *    1    0304   93        605.  *    1    0534  168        172.  *    1    0804  243         23.
    1     0036   19        850.  *    1    0306   94        591.  *    1    0536  169        171.  *    1    0806  244         21.
    1     0038   20        991.  *    1    0308   95        578.  *    1    0538  170        170.  *    1    0808  245         19.
```

1	0040	21	1205.	*	1	0310	96	566.	*	1	0540	171	169.	*	1	0810	246	17.
1	0042	22	1506.	*	1	0312	97	556.	*	1	0542	172	168.	*	1	0812	247	15.
1	0044	23	1999.	*	1	0314	98	545.	*	1	0544	173	167.	*	1	0814	248	13.
1	0046	24	2682.	*	1	0316	99	535.	*	1	0546	174	166.	*	1	0816	249	12.
1	0048	25	3531.	*	1	0318	100	524.	*	1	0548	175	165.	*	1	0818	250	11.
1	0050	26	4416.	*	1	0320	101	514.	*	1	0550	176	164.	*	1	0820	251	10.
1	0052	27	5119.	*	1	0322	102	503.	*	1	0552	177	163.	*	1	0822	252	9.
1	0054	28	5720.	*	1	0324	103	492.	*	1	0554	178	163.	*	1	0824	253	8.
1	0056	29	6022.	*	1	0326	104	480.	*	1	0556	179	162.	*	1	0826	254	8.
1	0058	30	6114.	*	1	0328	105	467.	*	1	0558	180	161.	*	1	0828	255	7.
1	0100	31	6059.	*	1	0330	106	454.	*	1	0600	181	159.	*	1	0830	256	7.
1	0102	32	5909.	*	1	0332	107	441.	*	1	0602	182	158.	*	1	0832	257	6.
1	0104	33	5701.	*	1	0334	108	427.	*	1	0604	183	158.	*	1	0834	258	6.
1	0106	34	5462.	*	1	0336	109	414.	*	1	0606	184	157.	*	1	0836	259	5.
1	0108	35	5207.	*	1	0338	110	400.	*	1	0608	185	156.	*	1	0838	260	5.
1	0110	36	4970.	*	1	0340	111	385.	*	1	0610	186	155.	*	1	0840	261	5.
1	0112	37	4737.	*	1	0342	112	370.	*	1	0612	187	154.	*	1	0842	262	5.
1	0114	38	4498.	*	1	0344	113	356.	*	1	0614	188	152.	*	1	0844	263	4.
1	0116	39	4261.	*	1	0346	114	343.	*	1	0616	189	151.	*	1	0846	264	4.
1	0118	40	4033.	*	1	0348	115	330.	*	1	0618	190	150.	*	1	0848	265	4.
1	0120	41	3822.	*	1	0350	116	316.	*	1	0620	191	149.	*	1	0850	266	3.
1	0122	42	3630.	*	1	0352	117	303.	*	1	0622	192	148.	*	1	0852	267	3.
1	0124	43	3456.	*	1	0354	118	290.	*	1	0624	193	147.	*	1	0854	268	3.
1	0126	44	3300.	*	1	0356	119	278.	*	1	0626	194	146.	*	1	0856	269	3.
1	0128	45	3162.	*	1	0358	120	266.	*	1	0628	195	144.	*	1	0858	270	3.
1	0130	46	3041.	*	1	0400	121	255.	*	1	0630	196	143.	*	1	0900	271	2.
1	0132	47	2918.	*	1	0402	122	245.	*	1	0632	197	142.	*	1	0902	272	2.
1	0134	48	2795.	*	1	0404	123	237.	*	1	0634	198	140.	*	1	0904	273	2.
1	0136	49	2672.	*	1	0406	124	230.	*	1	0636	199	139.	*	1	0906	274	2.
1	0138	50	2551.	*	1	0408	125	225.	*	1	0638	200	138.	*	1	0908	275	2.
1	0140	51	2437.	*	1	0410	126	220.	*	1	0640	201	136.	*	1	0910	276	1.
1	0142	52	2329.	*	1	0412	127	216.	*	1	0642	202	135.	*	1	0912	277	1.
1	0144	53	2228.	*	1	0414	128	212.	*	1	0644	203	133.	*	1	0914	278	1.
1	0146	54	2130.	*	1	0416	129	209.	*	1	0646	204	132.	*	1	0916	279	1.
1	0148	55	2037.	*	1	0418	130	207.	*	1	0648	205	130.	*	1	0918	280	1.
1	0150	56	1951.	*	1	0420	131	205.	*	1	0650	206	129.	*	1	0920	281	1.
1	0152	57	1872.	*	1	0422	132	203.	*	1	0652	207	127.	*	1	0922	282	1.
1	0154	58	1797.	*	1	0424	133	201.	*	1	0654	208	126.	*	1	0924	283	1.
1	0156	59	1728.	*	1	0426	134	200.	*	1	0656	209	124.	*	1	0926	284	1.
1	0158	60	1662.	*	1	0428	135	199.	*	1	0658	210	122.	*	1	0928	285	1.
1	0200	61	1600.	*	1	0430	136	198.	*	1	0700	211	120.	*	1	0930	286	1.
1	0202	62	1541.	*	1	0432	137	197.	*	1	0702	212	118.	*	1	0932	287	0.
1	0204	63	1485.	*	1	0434	138	196.	*	1	0704	213	116.	*	1	0934	288	0.
1	0206	64	1432.	*	1	0436	139	195.	*	1	0706	214	114.	*	1	0936	289	0.
1	0208	65	1381.	*	1	0438	140	194.	*	1	0708	215	112.	*	1	0938	290	0.
1	0210	66	1333.	*	1	0440	141	193.	*	1	0710	216	110.	*	1	0940	291	0.
1	0212	67	1287.	*	1	0442	142	193.	*	1	0712	217	108.	*	1	0942	292	0.
1	0214	68	1243.	*	1	0444	143	192.	*	1	0714	218	106.	*	1	0944	293	0.
1	0216	69	1202.	*	1	0446	144	191.	*	1	0716	219	104.	*	1	0946	294	0.
1	0218	70	1160.	*	1	0448	145	190.	*	1	0718	220	101.	*	1	0948	295	0.
1	0220	71	1114.	*	1	0450	146	190.	*	1	0720	221	99.	*	1	0950	296	0.
1	0222	72	1074.	*	1	0452	147	189.	*	1	0722	222	96.	*	1	0952	297	0.
1	0224	73	1040.	*	1	0454	148	188.	*	1	0724	223	93.	*	1	0954	298	0.
1	0226	74	1011.	*	1	0456	149	188.	*	1	0726	224	91.	*	1	0956	299	0.
1	0228	75	983.	*	1	0458	150	187.	*	1	0728	225	88.	*	1	0958	300	0.
				*					*					*				

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 6114.	.97		1126.	698.	698.	698.
		(INCHES)	1.812	1.866	1.866	1.866
		(AC-FT)	558.	575.	575.	575.

CUMULATIVE AREA = 5.78 SQ MI

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              **************
              *            *
 374 KK       *    RES-4   *
              *            *
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MODIFIED PULS RESERVOIR ROUTING
AT NODE FR-4

PONTATOC CANYON DR CULVERT CROSSING

HYDROGRAPH ROUTING DATA

378 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	ELEV	TYPE OF INITIAL CONDITION
RSVRIC	2610.40	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

379 SA	AREA	.0	.0	.8	2.1	3.6	5.0	6.4	7.7		
380 SE	ELEVATION	2611.00	2612.00	2614.00	2616.00	2618.00	2620.00	2622.00	2624.00		
381 SQ	DISCHARGE	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	8000.	9000.
		10000.									
383 SE	ELEVATION	2610.40	2614.90	2617.40	2618.70	2619.40	2619.90	2620.40	2620.80	2621.20	2621.60
		2621.90									

***

COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	.01	.63	3.38	9.06	17.66	29.03	43.13
ELEVATION	2611.00	2612.00	2614.00	2616.00	2618.00	2620.00	2622.00	2624.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.00	.01	.63	1.53	3.38	7.02	9.06	11.76	14.79
OUTFLOW	.00	133.36	355.58	800.02	1000.00	1440.04	2000.00	2461.60	3000.00	4000.00
ELEVATION	2610.40	2611.00	2612.00	2614.00	2614.90	2616.00	2617.40	2618.00	2618.70	2619.40
STORAGE	17.16	17.66	19.71	21.87	24.15	26.53	28.39	29.03	43.13	
OUTFLOW	5000.00	5200.20	6000.00	7000.00	8000.00	9000.00	10000.00	10333.88	17004.88	
ELEVATION	2619.90	2620.00	2620.40	2620.80	2621.20	2621.60	2621.90	2622.00	2624.00	

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 133. TO 356.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

HYDROGRAPH AT STATION RES-4

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.2	2611.0	*	1		0320	101	519.	.2	2612.7	*	1		0640	201	136.	.0	2611.0
1		0002	2	154.	.0	2611.1	*	1		0322	102	508.	.2	2612.7	*	1		0642	202	135.	.0	2611.0
1		0004	3	44.	-.1	2610.4	*	1		0324	103	497.	.2	2612.6	*	1		0644	203	133.	.0	2611.0
1		0006	4	40.	-.1	2610.4	*	1		0326	104	486.	.2	2612.6	*	1		0646	204	132.	.0	2611.0
1		0008	5	43.	-.1	2610.4	*	1		0328	105	474.	.2	2612.5	*	1		0648	205	130.	.0	2611.0
1		0010	6	51.	-.1	2610.4	*	1		0330	106	461.	.2	2612.5	*	1		0650	206	129.	.0	2611.0
1		0012	7	62.	-.1	2610.5	*	1		0332	107	448.	.1	2612.4	*	1		0652	207	127.	.0	2611.0
1		0014	8	77.	-.1	2610.6	*	1		0334	108	434.	.1	2612.4	*	1		0654	208	126.	.0	2611.0
1		0016	9	94.	-.1	2610.6	*	1		0336	109	420.	.1	2612.3	*	1		0656	209	124.	.0	2611.0
1		0018	10	114.	-.1	2610.7	*	1		0338	110	407.	.1	2612.2	*	1		0658	210	122.	.0	2610.9
1		0020	11	141.	-.1	2610.9	*	1		0340	111	392.	.1	2612.2	*	1		0700	211	120.	.0	2610.9
1		0022	12	171.	-.1	2611.0	*	1		0342	112	378.	.0	2612.1	*	1		0702	212	118.	.0	2610.9
1		0024	13	171.	.0	2611.2	*	1		0344	113	363.	.0	2612.0	*	1		0704	213	116.	.0	2610.9
1		0026	14	307.	.0	2611.8	*	1		0346	114	344.	.0	2611.9	*	1		0706	214	114.	.0	2610.9
1		0028	15	321.	.0	2611.8	*	1		0348	115	329.	.0	2611.9	*	1		0708	215	112.	.0	2610.9
1		0030	16	431.	.1	2612.3	*	1		0350	116	317.	.0	2611.8	*	1		0710	216	110.	.0	2610.9
1		0032	17	537.	.3	2612.8	*	1		0352	117	303.	.0	2611.8	*	1		0712	217	108.	.0	2610.9
1		0034	18	668.	.4	2613.4	*	1		0354	118	291.	.0	2611.7	*	1		0714	218	106.	.0	2610.9
1		0036	19	790.	.6	2614.0	*	1		0356	119	277.	.0	2611.6	*	1		0716	219	104.	.0	2610.9
1		0038	20	856.	.9	2614.3	*	1		0358	120	267.	.0	2611.6	*	1		0718	220	101.	.0	2610.9
1		0040	21	970.	1.4	2614.8	*	1		0400	121	255.	.0	2611.5	*	1		0720	221	99.	.0	2610.8
1		0042	22	1159.	2.2	2615.3	*	1		0402	122	246.	.0	2611.5	*	1		0722	222	96.	.0	2610.8
1		0044	23	1449.	3.4	2616.0	*	1		0404	123	237.	.0	2611.5	*	1		0724	223	93.	.0	2610.8
1		0046	24	1760.	5.5	2616.8	*	1		0406	124	231.	.0	2611.4	*	1		0726	224	91.	.0	2610.8
1		0048	25	2314.	8.4	2617.8	*	1		0408	125	224.	.0	2611.4	*	1		0728	225	88.	.0	2610.8
1		0050	26	3062.	11.9	2618.7	*	1		0410	126	220.	.0	2611.4	*	1		0730	226	85.	.0	2610.8
1		0052	27	4150.	15.1	2619.5	*	1		0412	127	216.	.0	2611.4	*	1		0732	227	81.	.0	2610.8
1		0054	28	5080.	17.4	2619.9	*	1		0414	128	213.	.0	2611.4	*	1		0734	228	78.	.0	2610.8
1		0056	29	5635.	18.8	2620.2	*	1		0416	129	209.	.0	2611.3	*	1		0736	229	74.	.0	2610.7
1		0058	30	5938.	19.6	2620.4	*	1		0418	130	207.	.0	2611.3	*	1		0738	230	70.	.0	2610.7
1		0100	31	6046.	19.8	2620.4	*	1		0420	131	204.	.0	2611.3	*	1		0740	231	66.	.0	2610.7
1		0102	32	5998.	19.7	2620.4	*	1		0422	132	203.	.0	2611.3	*	1		0742	232	62.	.0	2610.7

1	0104	33	5863.	19.4	2620.3	*	1	0424	133	201.	.0	2611.3	*	1	0744	233	57.	.0	2610.7
1	0106	34	5666.	18.9	2620.2	*	1	0426	134	200.	.0	2611.3	*	1	0746	234	53.	.0	2610.6
1	0108	35	5435.	18.3	2620.1	*	1	0428	135	199.	.0	2611.3	*	1	0748	235	49.	.0	2610.6
1	0110	36	5192.	17.6	2620.0	*	1	0430	136	198.	.0	2611.3	*	1	0750	236	45.	.0	2610.6
1	0112	37	4949.	17.0	2619.9	*	1	0432	137	197.	.0	2611.3	*	1	0752	237	41.	.0	2610.6
1	0114	38	4706.	16.5	2619.8	*	1	0434	138	196.	.0	2611.3	*	1	0754	238	37.	.0	2610.6
1	0116	39	4466.	15.9	2619.6	*	1	0436	139	195.	.0	2611.3	*	1	0756	239	34.	.0	2610.6
1	0118	40	4232.	15.3	2619.5	*	1	0438	140	194.	.0	2611.3	*	1	0758	240	32.	.0	2610.5
1	0120	41	4008.	14.8	2619.4	*	1	0440	141	193.	.0	2611.3	*	1	0800	241	29.	.0	2610.5
1	0122	42	3830.	14.3	2619.3	*	1	0442	142	193.	.0	2611.3	*	1	0802	242	26.	.0	2610.5
1	0124	43	3651.	13.7	2619.2	*	1	0444	143	192.	.0	2611.3	*	1	0804	243	23.	.0	2610.5
1	0126	44	3481.	13.2	2619.0	*	1	0446	144	191.	.0	2611.3	*	1	0806	244	21.	.0	2610.5
1	0128	45	3324.	12.7	2618.9	*	1	0448	145	190.	.0	2611.3	*	1	0808	245	19.	.0	2610.5
1	0130	46	3185.	12.3	2618.8	*	1	0450	146	190.	.0	2611.3	*	1	0810	246	17.	.0	2610.5
1	0132	47	3057.	11.9	2618.7	*	1	0452	147	189.	.0	2611.3	*	1	0812	247	15.	.0	2610.5
1	0134	48	2953.	11.5	2618.6	*	1	0454	148	188.	.0	2611.2	*	1	0814	248	13.	.0	2610.5
1	0136	49	2859.	11.1	2618.5	*	1	0456	149	188.	.0	2611.2	*	1	0816	249	12.	.0	2610.5
1	0138	50	2752.	10.5	2618.4	*	1	0458	150	187.	.0	2611.2	*	1	0818	250	11.	.0	2610.4
1	0140	51	2641.	10.0	2618.2	*	1	0500	151	186.	.0	2611.2	*	1	0820	251	10.	.0	2610.4
1	0142	52	2530.	9.4	2618.1	*	1	0502	152	185.	.0	2611.2	*	1	0822	252	9.	.0	2610.4
1	0144	53	2417.	8.9	2617.9	*	1	0504	153	185.	.0	2611.2	*	1	0824	253	8.	.0	2610.4
1	0146	54	2304.	8.4	2617.8	*	1	0506	154	184.	.0	2611.2	*	1	0826	254	8.	.0	2610.4
1	0148	55	2199.	7.9	2617.7	*	1	0508	155	183.	.0	2611.2	*	1	0828	255	7.	.0	2610.4
1	0150	56	2101.	7.5	2617.5	*	1	0510	156	182.	.0	2611.2	*	1	0830	256	7.	.0	2610.4
1	0152	57	2010.	7.1	2617.4	*	1	0512	157	181.	.0	2611.2	*	1	0832	257	6.	.0	2610.4
1	0154	58	1946.	6.7	2617.3	*	1	0514	158	181.	.0	2611.2	*	1	0834	258	6.	.0	2610.4
1	0156	59	1882.	6.3	2617.1	*	1	0516	159	180.	.0	2611.2	*	1	0836	259	5.	.0	2610.4
1	0158	60	1817.	5.8	2616.9	*	1	0518	160	179.	.0	2611.2	*	1	0838	260	5.	.0	2610.4
1	0200	61	1752.	5.4	2616.8	*	1	0520	161	178.	.0	2611.2	*	1	0840	261	5.	.0	2610.4
1	0202	62	1689.	5.0	2616.6	*	1	0522	162	177.	.0	2611.2	*	1	0842	262	5.	.0	2610.4
1	0204	63	1627.	4.6	2616.5	*	1	0524	163	176.	.0	2611.2	*	1	0844	263	4.	.0	2610.4
1	0206	64	1568.	4.2	2616.3	*	1	0526	164	176.	.0	2611.2	*	1	0846	264	4.	.0	2610.4
1	0208	65	1512.	3.8	2616.2	*	1	0528	165	175.	.0	2611.2	*	1	0848	265	4.	.0	2610.4
1	0210	66	1458.	3.5	2616.0	*	1	0530	166	174.	.0	2611.2	*	1	0850	266	3.	.0	2610.4
1	0212	67	1392.	3.2	2615.9	*	1	0532	167	173.	.0	2611.2	*	1	0852	267	3.	.0	2610.4
1	0214	68	1329.	2.9	2615.7	*	1	0534	168	172.	.0	2611.2	*	1	0854	268	3.	.0	2610.4
1	0216	69	1277.	2.7	2615.6	*	1	0536	169	171.	.0	2611.2	*	1	0856	269	3.	.0	2610.4
1	0218	70	1229.	2.5	2615.5	*	1	0538	170	170.	.0	2611.2	*	1	0858	270	3.	.0	2610.4
1	0220	71	1184.	2.3	2615.4	*	1	0540	171	169.	.0	2611.2	*	1	0900	271	2.	.0	2610.4
1	0222	72	1139.	2.1	2615.2	*	1	0542	172	168.	.0	2611.2	*	1	0902	272	2.	.0	2610.4
1	0224	73	1099.	1.9	2615.1	*	1	0544	173	167.	.0	2611.2	*	1	0904	273	2.	.0	2610.4
1	0226	74	1062.	1.8	2615.1	*	1	0546	174	166.	.0	2611.1	*	1	0906	274	2.	.0	2610.4
1	0228	75	1030.	1.7	2615.0	*	1	0548	175	165.	.0	2611.1	*	1	0908	275	2.	.0	2610.4
1	0230	76	1000.	1.5	2614.9	*	1	0550	176	164.	.0	2611.1	*	1	0910	276	1.	.0	2610.4
1	0232	77	973.	1.4	2614.8	*	1	0552	177	163.	.0	2611.1	*	1	0912	277	1.	.0	2610.4
1	0234	78	947.	1.3	2614.7	*	1	0554	178	163.	.0	2611.1	*	1	0914	278	1.	.0	2610.4
1	0236	79	921.	1.2	2614.5	*	1	0556	179	162.	.0	2611.1	*	1	0916	279	1.	.0	2610.4
1	0238	80	895.	1.1	2614.4	*	1	0558	180	161.	.0	2611.1	*	1	0918	280	1.	.0	2610.4
1	0240	81	870.	.9	2614.3	*	1	0600	181	159.	.0	2611.1	*	1	0920	281	1.	.0	2610.4
1	0242	82	846.	.8	2614.2	*	1	0602	182	159.	.0	2611.1	*	1	0922	282	1.	.0	2610.4
1	0244	83	822.	.7	2614.1	*	1	0604	183	158.	.0	2611.1	*	1	0924	283	1.	.0	2610.4
1	0246	84	799.	.6	2614.0	*	1	0606	184	157.	.0	2611.1	*	1	0926	284	1.	.0	2610.4
1	0248	85	753.	.6	2613.8	*	1	0608	185	156.	.0	2611.1	*	1	0928	285	1.	.0	2610.4
1	0250	86	733.	.5	2613.7	*	1	0610	186	155.	.0	2611.1	*	1	0930	286	1.	.0	2610.4
1	0252	87	714.	.5	2613.6	*	1	0612	187	154.	.0	2611.1	*	1	0932	287	0.	.0	2610.4
1	0254	88	695.	.5	2613.5	*	1	0614	188	152.	.0	2611.1	*	1	0934	288	0.	.0	2610.4
1	0256	89	678.	.5	2613.4	*	1	0616	189	151.	.0	2611.1	*	1	0936	289	0.	.0	2610.4
1	0258	90	660.	.4	2613.4	*	1	0618	190	150.	.0	2611.1	*	1	0938	290	0.	.0	2610.4
1	0300	91	643.	.4	2613.3	*	1	0620	191	149.	.0	2611.1	*	1	0940	291	0.	.0	2610.4
1	0302	92	627.	.4	2613.2	*	1	0622	192	148.	.0	2611.1	*	1	0942	292	0.	.0	2610.4
1	0304	93	612.	.4	2613.2	*	1	0624	193	147.	.0	2611.1	*	1	0944	293	0.	.0	2610.4
1	0306	94	598.	.3	2613.1	*	1	0626	194	146.	.0	2611.1	*	1	0946	294	0.	.0	2610.4
1	0308	95	585.	.3	2613.0	*	1	0628	195	144.	.0	2611.0	*	1	0948	295	0.	.0	2610.4
1	0310	96	572.	.3	2613.0	*	1	0630	196	143.	.0	2611.0	*	1	0950	296	0.	.0	2610.4
1	0312	97	561.	.3	2612.9	*	1	0632	197	142.	.0	2611.0	*	1	0952	297	0.	.0	2610.4
1	0314	98	550.	.3	2612.9	*	1	0634	198	140.	.0	2611.0	*	1	0954	298	0.	.0	2610.4
1	0316	99	540.	.3	2612.8	*	1	0636	199	139.	.0	2611.0	*	1	0956	299	0.	.0	2610.4
1	0318	100	530.	.3	2612.8	*	1	0638	200	138.	.0	2611.0	*	1	0958	300	0.	.0	2610.4
						*							*						

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 PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR        24-HR        72-HR        9.97-HR
+   (CFS)       (HR)
                             (CFS)
+    6046.      1.00                   1126.        699.         699.          699.
                          (INCHES)     1.812        1.867        1.867         1.867
                           (AC-FT)      558.         575.         575.          575.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                       6-HR        24-HR        72-HR        9.97-HR
```

```
+  (AC-FT)        (HR)
       20.        1.00                     3.            2.            2.            2.

   PEAK STAGE     TIME                              MAXIMUM AVERAGE STAGE
                                        6-HR         24-HR         72-HR       9.97-HR
+    (FEET)       (HR)
    2620.42       1.00               2613.76       2612.51       2612.51       2612.51

                          CUMULATIVE AREA =     5.78 SQ MI



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


             **************
             *            *
  385 KK     *    4TO3    *
             *            *
             **************
                          MODIFIED PULS CHANNEL ROUTING
                          FROM NODE FR-4 TO FR-3 (MAIN CHANNEL)

                HYDROGRAPH ROUTING DATA

  388 RS          STORAGE ROUTING
                        NSTPS            4  NUMBER OF SUBREACHES
                         ITYP         FLOW  TYPE OF INITIAL CONDITION
                       RSVRIC        -1.00  INITIAL CONDITION
                            X          .00 WORKING R AND D COEFFICIENT

  389 RC          NORMAL DEPTH CHANNEL
                          ANL         .060  LEFT OVERBANK N-VALUE
                         ANCH         .045  MAIN CHANNEL N-VALUE
                          ANR         .060  RIGHT OVERBANK N-VALUE
                        RLNTH        5940.  REACH LENGTH
                          SEL        .0170  ENERGY SLOPE
                        ELMAX           .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                           CROSS-SECTION DATA
                            --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  391 RY        ELEVATION      80.00      67.50      71.00      68.00      68.00      71.00      68.00      80.00
  390 RX        DISTANCE         .00      50.00     140.00     164.00     172.00     197.00     270.00     333.00
                                                                  ***

                                             COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

            STORAGE         .00       1.13       6.48      16.30      30.58      49.33      71.63      94.68     118.28     142.42
            OUTFLOW         .00      11.80     115.30     389.97     897.60    1692.60    2978.29    4662.49    6647.86    8919.53
          ELEVATION       67.50      68.16      68.82      69.47      70.13      70.79      71.45      72.11      72.76      73.42

            STORAGE      167.11     192.34     218.12     244.45     271.32     298.74     326.70     355.21     384.26     413.87
            OUTFLOW    11466.92   14282.24   17359.66   20694.76   24284.21   28125.48   32216.71   36556.57   41144.16   45978.99
          ELEVATION       74.08      74.74      75.39      76.05      76.71      77.37      78.03      78.68      79.34      80.00

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                                                  HYDROGRAPH AT STATION    4TO3

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                                              *                                           *
 DA MON HRMN ORD  OUTFLOW  STORAGE    STAGE   * DA MON HRMN ORD  OUTFLOW  STORAGE   STAGE * DA MON HRMN ORD  OUTFLOW  STORAGE    STAGE
                                              *                                           *
  1     0000   1       0.       .0     67.5   *  1     0320 101     658.      6.0    69.8  *  1     0640 201     152.      1.9     68.9
  1     0002   2       0.       .0     67.5   *  1     0322 102     642.      5.8    69.8  *  1     0642 202     151.      1.9     68.9
  1     0004   3       0.       .0     67.5   *  1     0324 103     627.      5.7    69.8  *  1     0644 203     150.      1.9     68.9
  1     0006   4       0.       .0     67.5   *  1     0326 104     612.      5.6    69.8  *  1     0646 204     149.      1.9     68.9
  1     0008   5       0.       .0     67.5   *  1     0328 105     598.      5.5    69.7  *  1     0648 205     147.      1.9     68.9
  1     0010   6       0.       .0     67.5   *  1     0330 106     585.      5.4    69.7  *  1     0650 206     146.      1.9     68.9
  1     0012   7       1.       .0     67.5   *  1     0332 107     572.      5.4    69.7  *  1     0652 207     145.      1.9     68.9
  1     0014   8       1.       .0     67.5   *  1     0334 108     559.      5.3    69.7  *  1     0654 208     144.      1.9     68.9
  1     0016   9       1.       .0     67.6   *  1     0336 109     547.      5.2    69.7  *  1     0656 209     142.      1.9     68.9
  1     0018  10       2.       .0     67.6   *  1     0338 110     535.      5.1    69.7  *  1     0658 210     141.      1.9     68.9
  1     0020  11       3.       .1     67.7   *  1     0340 111     522.      5.0    69.6  *  1     0700 211     140.      1.8     68.9
  1     0022  12       4.       .1     67.7   *  1     0342 112     510.      4.9    69.6  *  1     0702 212     138.      1.8     68.9
  1     0024  13       6.       .1     67.8   *  1     0344 113     498.      4.8    69.6  *  1     0704 213     137.      1.8     68.9
  1     0026  14       8.       .2     68.0   *  1     0346 114     485.      4.7    69.6  *  1     0706 214     136.      1.8     68.9
  1     0028  15      11.       .3     68.1   *  1     0348 115     473.      4.7    69.6  *  1     0708 215     134.      1.8     68.9
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1	0030	16	17.	.4	68.2	*	1	0350	116	460.	4.6	69.6	*	1	0710	216	133.	1.8	68.9
1	0032	17	25.	.5	68.2	*	1	0352	117	447.	4.5	69.5	*	1	0712	217	131.	1.8	68.9
1	0034	18	35.	.6	68.3	*	1	0354	118	434.	4.4	69.5	*	1	0714	218	130.	1.7	68.8
1	0036	19	48.	.8	68.4	*	1	0356	119	422.	4.3	69.5	*	1	0716	219	128.	1.7	68.8
1	0038	20	66.	1.0	68.5	*	1	0358	120	409.	4.2	69.5	*	1	0718	220	126.	1.7	68.8
1	0040	21	91.	1.3	68.7	*	1	0400	121	398.	4.1	69.5	*	1	0720	221	125.	1.7	68.8
1	0042	22	126.	1.7	68.8	*	1	0402	122	387.	4.1	69.5	*	1	0722	222	123.	1.7	68.8
1	0044	23	182.	2.2	69.0	*	1	0404	123	378.	4.0	69.4	*	1	0724	223	121.	1.7	68.8
1	0046	24	249.	2.8	69.1	*	1	0406	124	368.	3.9	69.4	*	1	0726	224	120.	1.7	68.8
1	0048	25	332.	3.6	69.3	*	1	0408	125	358.	3.8	69.4	*	1	0728	225	118.	1.6	68.8
1	0050	26	444.	4.5	69.5	*	1	0410	126	348.	3.7	69.4	*	1	0730	226	117.	1.6	68.8
1	0052	27	603.	5.6	69.7	*	1	0412	127	337.	3.6	69.3	*	1	0732	227	116.	1.6	68.8
1	0054	28	818.	7.1	70.0	*	1	0414	128	326.	3.5	69.3	*	1	0734	228	114.	1.6	68.8
1	0056	29	1172.	9.3	70.4	*	1	0416	129	316.	3.4	69.3	*	1	0736	229	113.	1.6	68.8
1	0058	30	1690.	12.3	70.8	*	1	0418	130	305.	3.3	69.3	*	1	0738	230	112.	1.6	68.8
1	0100	31	2547.	16.0	71.2	*	1	0420	131	295.	3.2	69.2	*	1	0740	231	111.	1.6	68.8
1	0102	32	3509.	19.7	71.7	*	1	0422	132	286.	3.1	69.2	*	1	0742	232	109.	1.5	68.8
1	0104	33	4397.	22.8	72.0	*	1	0424	133	277.	3.1	69.2	*	1	0744	233	108.	1.5	68.8
1	0106	34	5068.	24.9	72.2	*	1	0426	134	268.	3.0	69.2	*	1	0746	234	106.	1.5	68.8
1	0108	35	5470.	26.1	72.4	*	1	0428	135	261.	2.9	69.2	*	1	0748	235	104.	1.5	68.7
1	0110	36	5640.	26.6	72.4	*	1	0430	136	253.	2.9	69.1	*	1	0750	236	102.	1.4	68.7
1	0112	37	5654.	26.6	72.4	*	1	0432	137	247.	2.8	69.1	*	1	0752	237	100.	1.4	68.7
1	0114	38	5565.	26.4	72.4	*	1	0434	138	240.	2.7	69.1	*	1	0754	238	97.	1.4	68.7
1	0116	39	5411.	25.9	72.4	*	1	0436	139	235.	2.7	69.1	*	1	0756	239	95.	1.4	68.7
1	0118	40	5218.	25.3	72.3	*	1	0438	140	230.	2.6	69.1	*	1	0758	240	92.	1.3	68.7
1	0120	41	5005.	24.7	72.2	*	1	0440	141	225.	2.6	69.1	*	1	0800	241	90.	1.3	68.7
1	0122	42	4792.	24.1	72.1	*	1	0442	142	221.	2.6	69.1	*	1	0802	242	87.	1.3	68.6
1	0124	43	4595.	23.4	72.1	*	1	0444	143	218.	2.5	69.1	*	1	0804	243	84.	1.2	68.6
1	0126	44	4412.	22.8	72.0	*	1	0446	144	214.	2.5	69.1	*	1	0806	244	81.	1.2	68.6
1	0128	45	4222.	22.2	71.9	*	1	0448	145	211.	2.5	69.0	*	1	0808	245	78.	1.1	68.6
1	0130	46	4034.	21.5	71.9	*	1	0450	146	209.	2.5	69.0	*	1	0810	246	75.	1.1	68.6
1	0132	47	3851.	20.9	71.8	*	1	0452	147	206.	2.4	69.0	*	1	0812	247	72.	1.1	68.5
1	0134	48	3676.	20.3	71.7	*	1	0454	148	204.	2.4	69.0	*	1	0814	248	69.	1.0	68.5
1	0136	49	3513.	19.7	71.7	*	1	0456	149	202.	2.4	69.0	*	1	0816	249	65.	1.0	68.5
1	0138	50	3362.	19.2	71.6	*	1	0458	150	201.	2.4	69.0	*	1	0818	250	62.	.9	68.5
1	0140	51	3226.	18.8	71.5	*	1	0500	151	199.	2.4	69.0	*	1	0820	251	59.	.9	68.5
1	0142	52	3106.	18.3	71.5	*	1	0502	152	198.	2.4	69.0	*	1	0822	252	56.	.9	68.4
1	0144	53	3003.	18.0	71.5	*	1	0504	153	197.	2.3	69.0	*	1	0824	253	53.	.8	68.4
1	0146	54	2920.	17.7	71.4	*	1	0506	154	195.	2.3	69.0	*	1	0826	254	50.	.8	68.4
1	0148	55	2836.	17.3	71.4	*	1	0508	155	194.	2.3	69.0	*	1	0828	255	47.	.7	68.4
1	0150	56	2744.	16.9	71.3	*	1	0510	156	193.	2.3	69.0	*	1	0830	256	44.	.7	68.4
1	0152	57	2647.	16.5	71.3	*	1	0512	157	192.	2.3	69.0	*	1	0832	257	41.	.7	68.3
1	0154	58	2547.	16.0	71.2	*	1	0514	158	191.	2.3	69.0	*	1	0834	258	38.	.6	68.3
1	0156	59	2446.	15.6	71.2	*	1	0516	159	190.	2.3	69.0	*	1	0836	259	36.	.6	68.3
1	0158	60	2347.	15.2	71.1	*	1	0518	160	190.	2.3	69.0	*	1	0838	260	33.	.6	68.3
1	0200	61	2252.	14.8	71.1	*	1	0520	161	189.	2.3	69.0	*	1	0840	261	31.	.5	68.3
1	0202	62	2162.	14.4	71.0	*	1	0522	162	188.	2.3	69.0	*	1	0842	262	29.	.5	68.3
1	0204	63	2078.	14.0	71.0	*	1	0524	163	187.	2.3	69.0	*	1	0844	263	27.	.5	68.3
1	0206	64	1999.	13.7	70.9	*	1	0526	164	186.	2.3	69.0	*	1	0846	264	25.	.5	68.2
1	0208	65	1924.	13.3	70.9	*	1	0528	165	185.	2.2	69.0	*	1	0848	265	23.	.4	68.2
1	0210	66	1855.	13.0	70.9	*	1	0530	166	185.	2.2	69.0	*	1	0850	266	22.	.4	68.2
1	0212	67	1792.	12.8	70.8	*	1	0532	167	184.	2.2	69.0	*	1	0852	267	20.	.4	68.2
1	0214	68	1736.	12.5	70.8	*	1	0534	168	183.	2.2	69.0	*	1	0854	268	19.	.4	68.2
1	0216	69	1688.	12.3	70.8	*	1	0536	169	182.	2.2	69.0	*	1	0856	269	18.	.4	68.2
1	0218	70	1651.	12.1	70.8	*	1	0538	170	181.	2.2	69.0	*	1	0858	270	17.	.3	68.2
1	0220	71	1609.	11.8	70.7	*	1	0540	171	180.	2.2	69.0	*	1	0900	271	16.	.3	68.2
1	0222	72	1564.	11.6	70.7	*	1	0542	172	180.	2.2	69.0	*	1	0902	272	15.	.3	68.2
1	0224	73	1516.	11.3	70.6	*	1	0544	173	179.	2.2	69.0	*	1	0904	273	14.	.3	68.2
1	0226	74	1467.	11.0	70.6	*	1	0546	174	178.	2.2	69.0	*	1	0906	274	13.	.3	68.2
1	0228	75	1418.	10.7	70.6	*	1	0548	175	177.	2.2	69.0	*	1	0908	275	13.	.3	68.2
1	0230	76	1368.	10.4	70.5	*	1	0550	176	176.	2.2	69.0	*	1	0910	276	12.	.3	68.2
1	0232	77	1320.	10.1	70.5	*	1	0552	177	175.	2.2	69.0	*	1	0912	277	12.	.3	68.2
1	0234	78	1274.	9.9	70.4	*	1	0554	178	174.	2.1	69.0	*	1	0914	278	11.	.3	68.1
1	0236	79	1229.	9.6	70.4	*	1	0556	179	174.	2.1	69.0	*	1	0916	279	11.	.3	68.1
1	0238	80	1187.	9.3	70.4	*	1	0558	180	173.	2.1	69.0	*	1	0918	280	11.	.3	68.1
1	0240	81	1146.	9.1	70.3	*	1	0600	181	172.	2.1	69.0	*	1	0920	281	11.	.3	68.1
1	0242	82	1109.	8.9	70.3	*	1	0602	182	171.	2.1	68.9	*	1	0922	282	10.	.2	68.1
1	0244	83	1073.	8.7	70.3	*	1	0604	183	170.	2.1	68.9	*	1	0924	283	10.	.2	68.1
1	0246	84	1039.	8.5	70.2	*	1	0606	184	169.	2.1	68.9	*	1	0926	284	10.	.2	68.0
1	0248	85	1008.	8.3	70.2	*	1	0608	185	168.	2.1	68.9	*	1	0928	285	9.	.2	68.0
1	0250	86	978.	8.1	70.2	*	1	0610	186	167.	2.1	68.9	*	1	0930	286	9.	.2	68.0
1	0252	87	950.	8.0	70.2	*	1	0612	187	166.	2.1	68.9	*	1	0932	287	9.	.2	68.0
1	0254	88	924.	7.8	70.2	*	1	0614	188	165.	2.1	68.9	*	1	0934	288	8.	.2	68.0
1	0256	89	900.	7.7	70.1	*	1	0616	189	164.	2.1	68.9	*	1	0936	289	8.	.2	68.0
1	0258	90	879.	7.5	70.1	*	1	0618	190	163.	2.0	68.9	*	1	0938	290	8.	.2	67.9
1	0300	91	858.	7.4	70.1	*	1	0620	191	162.	2.0	68.9	*	1	0940	291	8.	.2	67.9
1	0302	92	836.	7.2	70.1	*	1	0622	192	161.	2.0	68.9	*	1	0942	292	7.	.2	67.9
1	0304	93	815.	7.1	70.0	*	1	0624	193	160.	2.0	68.9	*	1	0944	293	7.	.2	67.9
1	0306	94	793.	6.9	70.0	*	1	0626	194	159.	2.0	68.9	*	1	0946	294	7.	.2	67.9
1	0308	95	772.	6.8	70.0	*	1	0628	195	158.	2.0	68.9	*	1	0948	295	6.	.2	67.9
1	0310	96	751.	6.6	69.9	*	1	0630	196	157.	2.0	68.9	*	1	0950	296	6.	.1	67.8

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 1      0312  97      731.        6.5      69.9 *  1      0632 197       156.        2.0      68.9 *  1      0952 297        6.        .1     67.8
 1      0314  98      712.        6.3      69.9 *  1      0634 198       155.        2.0      68.9 *  1      0954 298        6.        .1     67.8
 1      0316  99      693.        6.2      69.9 *  1      0636 199       154.        2.0      68.9 *  1      0956 299        5.        .1     67.8
 1      0318 100      675.        6.1      69.8 *  1      0638 200       153.        2.0      68.9 *  1      0958 300        5.        .1     67.8
                                                *                                              *
*****************************************************************************************************************************************

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR         24-HR        72-HR       9.97-HR
+   (CFS)        (HR)
                            (CFS)
+    5654.       1.20                1122.          698.         698.         698.
                         (INCHES)    1.805         1.867        1.867        1.867
                          (AC-FT)     556.          575.         575.         575.

 PEAK STORAGE    TIME                         MAXIMUM AVERAGE STORAGE
                                      6-HR         24-HR        72-HR       9.97-HR
+  (AC-FT)       (HR)
        27.      1.20                   8.            5.           5.           5.

  PEAK STAGE     TIME                          MAXIMUM AVERAGE STAGE
                                      6-HR         24-HR        72-HR       9.97-HR
+   (FEET)       (HR)
     72.43       1.20                69.90         69.28        69.28        69.28

                         CUMULATIVE AREA =     5.78 SQ MI



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


             **************
             *            *
  392 KK     *    FR-3    *
             *            *
             **************
                          LOCAL RUNOFF TO FR-3
                          BASIN FR-3

                SUBBASIN RUNOFF DATA

  395 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .32   SUBBASIN AREA

                  PRECIPITATION DATA

  396 PB                STORM        2.76   BASIN TOTAL PRECIPITATION

   20 PI            INCREMENTAL PRECIPITATION PATTERN
                       .04        .04        .06        .08        .08        .07        .07        .05        .03        .03
                       .02        .02        .02        .02        .02        .02        .02        .01        .01        .01
                       .01        .01        .01        .01        .01        .01        .01        .01        .01        .01
                       .01        .01        .01        .01        .01        .01        .01        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                       .00        .00        .00        .00        .00        .00        .00        .00        .00        .00

  397 LS          SCS LOSS RATE
                        STRTL         .60   INITIAL ABSTRACTION
                       CRVNBR       77.00   CURVE NUMBER
                        RTIMP       25.00   PERCENT IMPERVIOUS AREA

  398 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .23   LAG

                                                                   ***

                                                             UNIT HYDROGRAPH
                                                        37 END-OF-PERIOD ORDINATES
                 32.        97.       189.       324.       467.       567.       607.       607.       570.       511.
                439.       345.       269.       216.       173.       143.       115.        91.        74.        60.
                 48.        39.        31.        25.        20.        16.        13.        11.         8.         7.
                  6.         5.         4.         3.         2.         1.         0.

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                                                    HYDROGRAPH AT STATION    FR-3
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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.
1		0002	2	.11	.08	.03	1.
1		0004	3	.11	.08	.03	4.
1		0006	4	.17	.13	.04	9.
1		0008	5	.23	.17	.06	20.
1		0010	6	.23	.16	.07	38.
1		0012	7	.18	.11	.07	62.
1		0014	8	.18	.10	.08	94.
1		0016	9	.14	.07	.07	131.
1		0018	10	.09	.04	.05	171.
1		0020	11	.09	.04	.05	210.
1		0022	12	.07	.03	.04	245.
1		0024	13	.07	.03	.04	272.
1		0026	14	.06	.02	.04	290.
1		0028	15	.05	.02	.03	300.
1		0030	16	.05	.02	.03	301.
1		0032	17	.04	.02	.03	296.
1		0034	18	.04	.02	.03	287.
1		0036	19	.04	.01	.03	275.
1		0038	20	.04	.01	.02	261.
1		0040	21	.04	.01	.02	248.
1		0042	22	.03	.01	.02	235.
1		0044	23	.03	.01	.02	223.
1		0046	24	.03	.01	.02	210.
1		0048	25	.03	.01	.02	199.
1		0050	26	.03	.01	.02	187.
1		0052	27	.02	.01	.02	177.
1		0054	28	.02	.01	.02	167.
1		0056	29	.02	.01	.02	158.
1		0058	30	.02	.01	.01	149.
1		0100	31	.02	.01	.01	141.
1		0102	32	.02	.01	.01	133.
1		0104	33	.02	.01	.01	126.
1		0106	34	.02	.01	.01	119.
1		0108	35	.02	.00	.01	113.
1		0110	36	.02	.00	.01	107.
1		0112	37	.01	.00	.01	102.
1		0114	38	.01	.00	.01	97.
1		0116	39	.01	.00	.01	92.
1		0118	40	.01	.00	.01	88.
1		0120	41	.01	.00	.01	83.
1		0122	42	.01	.00	.01	79.
1		0124	43	.01	.00	.01	76.
1		0126	44	.01	.00	.01	72.
1		0128	45	.01	.00	.01	69.
1		0130	46	.01	.00	.01	66.
1		0132	47	.01	.00	.01	64.
1		0134	48	.01	.00	.01	61.
1		0136	49	.01	.00	.01	59.
1		0138	50	.01	.00	.01	56.
1		0140	51	.01	.00	.01	54.
1		0142	52	.01	.00	.01	52.
1		0144	53	.01	.00	.01	50.
1		0146	54	.01	.00	.01	48.
1		0148	55	.01	.00	.01	47.
1		0150	56	.01	.00	.01	45.
1		0152	57	.01	.00	.01	43.
1		0154	58	.01	.00	.01	42.
1		0156	59	.01	.00	.00	41.
1		0158	60	.01	.00	.00	39.
1		0200	61	.01	.00	.00	38.
1		0202	62	.01	.00	.00	37.
1		0204	63	.01	.00	.00	36.
1		0206	64	.01	.00	.00	34.
1		0208	65	.01	.00	.00	33.
1		0210	66	.01	.00	.00	32.
1		0212	67	.01	.00	.00	31.
1		0214	68	.01	.00	.00	31.
1		0216	69	.01	.00	.00	30.
1		0218	70	.00	.00	.00	29.
1		0220	71	.00	.00	.00	28.
1		0222	72	.00	.00	.00	27.
1		0224	73	.00	.00	.00	27.
1		0226	74	.00	.00	.00	26.
1		0228	75	.00	.00	.00	25.
1		0230	76	.00	.00	.00	25.

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0500	151	.00	.00	.00	0.
1		0502	152	.00	.00	.00	0.
1		0504	153	.00	.00	.00	0.
1		0506	154	.00	.00	.00	0.
1		0508	155	.00	.00	.00	0.
1		0510	156	.00	.00	.00	0.
1		0512	157	.00	.00	.00	0.
1		0514	158	.00	.00	.00	0.
1		0516	159	.00	.00	.00	0.
1		0518	160	.00	.00	.00	0.
1		0520	161	.00	.00	.00	0.
1		0522	162	.00	.00	.00	0.
1		0524	163	.00	.00	.00	0.
1		0526	164	.00	.00	.00	0.
1		0528	165	.00	.00	.00	0.
1		0530	166	.00	.00	.00	0.
1		0532	167	.00	.00	.00	0.
1		0534	168	.00	.00	.00	0.
1		0536	169	.00	.00	.00	0.
1		0538	170	.00	.00	.00	0.
1		0540	171	.00	.00	.00	0.
1		0542	172	.00	.00	.00	0.
1		0544	173	.00	.00	.00	0.
1		0546	174	.00	.00	.00	0.
1		0548	175	.00	.00	.00	0.
1		0550	176	.00	.00	.00	0.
1		0552	177	.00	.00	.00	0.
1		0554	178	.00	.00	.00	0.
1		0556	179	.00	.00	.00	0.
1		0558	180	.00	.00	.00	0.
1		0600	181	.00	.00	.00	0.
1		0602	182	.00	.00	.00	0.
1		0604	183	.00	.00	.00	0.
1		0606	184	.00	.00	.00	0.
1		0608	185	.00	.00	.00	0.
1		0610	186	.00	.00	.00	0.
1		0612	187	.00	.00	.00	0.
1		0614	188	.00	.00	.00	0.
1		0616	189	.00	.00	.00	0.
1		0618	190	.00	.00	.00	0.
1		0620	191	.00	.00	.00	0.
1		0622	192	.00	.00	.00	0.
1		0624	193	.00	.00	.00	0.
1		0626	194	.00	.00	.00	0.
1		0628	195	.00	.00	.00	0.
1		0630	196	.00	.00	.00	0.
1		0632	197	.00	.00	.00	0.
1		0634	198	.00	.00	.00	0.
1		0636	199	.00	.00	.00	0.
1		0638	200	.00	.00	.00	0.
1		0640	201	.00	.00	.00	0.
1		0642	202	.00	.00	.00	0.
1		0644	203	.00	.00	.00	0.
1		0646	204	.00	.00	.00	0.
1		0648	205	.00	.00	.00	0.
1		0650	206	.00	.00	.00	0.
1		0652	207	.00	.00	.00	0.
1		0654	208	.00	.00	.00	0.
1		0656	209	.00	.00	.00	0.
1		0658	210	.00	.00	.00	0.
1		0700	211	.00	.00	.00	0.
1		0702	212	.00	.00	.00	0.
1		0704	213	.00	.00	.00	0.
1		0706	214	.00	.00	.00	0.
1		0708	215	.00	.00	.00	0.
1		0710	216	.00	.00	.00	0.
1		0712	217	.00	.00	.00	0.
1		0714	218	.00	.00	.00	0.
1		0716	219	.00	.00	.00	0.
1		0718	220	.00	.00	.00	0.
1		0720	221	.00	.00	.00	0.
1		0722	222	.00	.00	.00	0.
1		0724	223	.00	.00	.00	0.
1		0726	224	.00	.00	.00	0.
1		0728	225	.00	.00	.00	0.
1		0730	226	.00	.00	.00	0.

1	0232	77	.00	.00	.00	24.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	23.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	23.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	22.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	22.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	21.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	21.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	20.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	20.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	19.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	19.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	18.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	18.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	18.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	17.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	17.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	16.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	15.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	14.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	13.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	11.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	10.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	8.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	7.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	5.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	4.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	3.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	3.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	2.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	2.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	1.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	1.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	1.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	1.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	1.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.

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TOTAL RAINFALL = 2.76, TOTAL LOSS = 1.39, TOTAL EXCESS = 1.37

PEAK FLOW TIME MAXIMUM AVERAGE FLOW

6-HR 24-HR 72-HR 9.97-HR

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+   (CFS)        (HR)
                          (CFS)
+     301.        .50                   47.         28.         28.          28.
                      (INCHES)      1.371       1.371       1.371        1.371
                       (AC-FT)         23.         23.         23.          23.

                     CUMULATIVE AREA =      .32 SQ MI
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             **************
             *            *
 399 KK      *    CO-3    *
             *            *
             **************
                          COMBINE HYDROGRAPHS
                          AT NODE FR-2 (MAIN CHANNEL)

 402 HC          HYDROGRAPH COMBINATION
                      ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
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HYDROGRAPH AT STATION CO-3
SUM OF 2 HYDROGRAPHS

DA MON	HRMN	ORD	FLOW	DA MON	HRMN	ORD	FLOW	DA MON	HRMN	ORD	FLOW	DA MON	HRMN	ORD	FLOW
1	0000	1	0.	1	0230	76	1393.	1	0500	151	199.	1	0730	226	117.
1	0002	2	1.	1	0232	77	1344.	1	0502	152	198.	1	0732	227	116.
1	0004	3	4.	1	0234	78	1297.	1	0504	153	197.	1	0734	228	114.
1	0006	4	9.	1	0236	79	1252.	1	0506	154	195.	1	0736	229	113.
1	0008	5	20.	1	0238	80	1209.	1	0508	155	194.	1	0738	230	112.
1	0010	6	38.	1	0240	81	1168.	1	0510	156	193.	1	0740	231	111.
1	0012	7	63.	1	0242	82	1130.	1	0512	157	192.	1	0742	232	109.
1	0014	8	95.	1	0244	83	1094.	1	0514	158	191.	1	0744	233	108.
1	0016	9	132.	1	0246	84	1059.	1	0516	159	190.	1	0746	234	106.
1	0018	10	173.	1	0248	85	1027.	1	0518	160	190.	1	0748	235	104.
1	0020	11	213.	1	0250	86	997.	1	0520	161	189.	1	0750	236	102.
1	0022	12	249.	1	0252	87	969.	1	0522	162	188.	1	0752	237	100.
1	0024	13	278.	1	0254	88	942.	1	0524	163	187.	1	0754	238	97.
1	0026	14	298.	1	0256	89	918.	1	0526	164	186.	1	0756	239	95.
1	0028	15	311.	1	0258	90	896.	1	0528	165	185.	1	0758	240	92.
1	0030	16	318.	1	0300	91	875.	1	0530	166	185.	1	0800	241	90.
1	0032	17	321.	1	0302	92	853.	1	0532	167	184.	1	0802	242	87.
1	0034	18	322.	1	0304	93	831.	1	0534	168	183.	1	0804	243	84.
1	0036	19	323.	1	0306	94	808.	1	0536	169	182.	1	0806	244	81.
1	0038	20	327.	1	0308	95	786.	1	0538	170	181.	1	0808	245	78.
1	0040	21	339.	1	0310	96	764.	1	0540	171	180.	1	0810	246	75.
1	0042	22	361.	1	0312	97	742.	1	0542	172	180.	1	0812	247	72.
1	0044	23	405.	1	0314	98	721.	1	0544	173	179.	1	0814	248	69.
1	0046	24	460.	1	0316	99	701.	1	0546	174	178.	1	0816	249	65.
1	0048	25	530.	1	0318	100	682.	1	0548	175	177.	1	0818	250	62.
1	0050	26	631.	1	0320	101	664.	1	0550	176	176.	1	0820	251	59.
1	0052	27	780.	1	0322	102	646.	1	0552	177	175.	1	0822	252	56.
1	0054	28	984.	1	0324	103	630.	1	0554	178	174.	1	0824	253	53.
1	0056	29	1330.	1	0326	104	615.	1	0556	179	174.	1	0826	254	50.
1	0058	30	1839.	1	0328	105	600.	1	0558	180	173.	1	0828	255	47.
1	0100	31	2687.	1	0330	106	587.	1	0600	181	172.	1	0830	256	44.
1	0102	32	3642.	1	0332	107	573.	1	0602	182	171.	1	0832	257	41.
1	0104	33	4523.	1	0334	108	560.	1	0604	183	170.	1	0834	258	38.
1	0106	34	5187.	1	0336	109	548.	1	0606	184	169.	1	0836	259	36.
1	0108	35	5583.	1	0338	110	535.	1	0608	185	168.	1	0838	260	33.
1	0110	36	5747.	1	0340	111	523.	1	0610	186	167.	1	0840	261	31.
1	0112	37	5756.	1	0342	112	511.	1	0612	187	166.	1	0842	262	29.
1	0114	38	5662.	1	0344	113	498.	1	0614	188	165.	1	0844	263	27.
1	0116	39	5503.	1	0346	114	486.	1	0616	189	164.	1	0846	264	25.
1	0118	40	5305.	1	0348	115	473.	1	0618	190	163.	1	0848	265	23.
1	0120	41	5089.	1	0350	116	460.	1	0620	191	162.	1	0850	266	22.
1	0122	42	4872.	1	0352	117	447.	1	0622	192	161.	1	0852	267	20.
1	0124	43	4671.	1	0354	118	434.	1	0624	193	160.	1	0854	268	19.
1	0126	44	4484.	1	0356	119	422.	1	0626	194	159.	1	0856	269	18.
1	0128	45	4292.	1	0358	120	410.	1	0628	195	158.	1	0858	270	17.

1	0130	46	4100.	*	1	0400	121	398.	*	1	0630	196	157.	*	1	0900	271	16.
1	0132	47	3914.	*	1	0402	122	387.	*	1	0632	197	156.	*	1	0902	272	15.
1	0134	48	3737.	*	1	0404	123	378.	*	1	0634	198	155.	*	1	0904	273	14.
1	0136	49	3571.	*	1	0406	124	368.	*	1	0636	199	154.	*	1	0906	274	13.
1	0138	50	3418.	*	1	0408	125	358.	*	1	0638	200	153.	*	1	0908	275	13.
1	0140	51	3280.	*	1	0410	126	348.	*	1	0640	201	152.	*	1	0910	276	12.
1	0142	52	3158.	*	1	0412	127	337.	*	1	0642	202	151.	*	1	0912	277	12.
1	0144	53	3053.	*	1	0414	128	326.	*	1	0644	203	150.	*	1	0914	278	11.
1	0146	54	2968.	*	1	0416	129	316.	*	1	0646	204	149.	*	1	0916	279	11.
1	0148	55	2882.	*	1	0418	130	305.	*	1	0648	205	147.	*	1	0918	280	11.
1	0150	56	2789.	*	1	0420	131	295.	*	1	0650	206	146.	*	1	0920	281	11.
1	0152	57	2690.	*	1	0422	132	286.	*	1	0652	207	145.	*	1	0922	282	10.
1	0154	58	2589.	*	1	0424	133	277.	*	1	0654	208	144.	*	1	0924	283	10.
1	0156	59	2486.	*	1	0426	134	268.	*	1	0656	209	142.	*	1	0926	284	10.
1	0158	60	2386.	*	1	0428	135	261.	*	1	0658	210	141.	*	1	0928	285	9.
1	0200	61	2290.	*	1	0430	136	253.	*	1	0700	211	140.	*	1	0930	286	9.
1	0202	62	2199.	*	1	0432	137	247.	*	1	0702	212	138.	*	1	0932	287	9.
1	0204	63	2113.	*	1	0434	138	240.	*	1	0704	213	137.	*	1	0934	288	8.
1	0206	64	2033.	*	1	0436	139	235.	*	1	0706	214	136.	*	1	0936	289	8.
1	0208	65	1958.	*	1	0438	140	230.	*	1	0708	215	134.	*	1	0938	290	8.
1	0210	66	1887.	*	1	0440	141	225.	*	1	0710	216	133.	*	1	0940	291	8.
1	0212	67	1823.	*	1	0442	142	221.	*	1	0712	217	131.	*	1	0942	292	7.
1	0214	68	1767.	*	1	0444	143	218.	*	1	0714	218	130.	*	1	0944	293	7.
1	0216	69	1718.	*	1	0446	144	214.	*	1	0716	219	128.	*	1	0946	294	7.
1	0218	70	1680.	*	1	0448	145	211.	*	1	0718	220	126.	*	1	0948	295	6.
1	0220	71	1637.	*	1	0450	146	209.	*	1	0720	221	125.	*	1	0950	296	6.
1	0222	72	1591.	*	1	0452	147	206.	*	1	0722	222	123.	*	1	0952	297	6.
1	0224	73	1543.	*	1	0454	148	204.	*	1	0724	223	121.	*	1	0954	298	6.
1	0226	74	1493.	*	1	0456	149	202.	*	1	0726	224	120.	*	1	0956	299	5.
1	0228	75	1443.	*	1	0458	150	201.	*	1	0728	225	118.	*	1	0958	300	5.
				*					*					*				

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	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	9.97-HR
+	(CFS)	(HR)					
			(CFS)				
+	5756.	1.20		1158.	726.	726.	726.
			(INCHES)	1.766	1.841	1.841	1.841
			(AC-FT)	574.	598.	598.	598.

CUMULATIVE AREA = 6.09 SQ MI

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              *            *
403 KK        *   3TO2     *
              *            *
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MODIFIED PULS CHANNEL ROUTING
FROM NODE FR-3 TO FR-2 (MAIN CHANNEL)

HYDROGRAPH ROUTING DATA

406 RS STORAGE ROUTING

NSTPS	2	NUMBER OF SUBREACHES
ITYP	FLOW	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

407 RC NORMAL DEPTH CHANNEL

ANL	.055	LEFT OVERBANK N-VALUE
ANCH	.045	MAIN CHANNEL N-VALUE
ANR	.055	RIGHT OVERBANK N-VALUE
RLNTH	2465.	REACH LENGTH
SEL	.0160	ENERGY SLOPE
ELMAX	.0	MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

		--- LEFT OVERBANK --- +		------ MAIN CHANNEL ------- +			--- RIGHT OVERBANK ---	
409 RY	ELEVATION	90.00	80.00	78.00	77.50	78.00	79.00	80.00	90.00
408 RX	DISTANCE	.00	38.00	85.00	131.00	142.00	208.00	415.00	438.00

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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.38	5.12	11.95	24.19	38.33	52.62	67.06	81.64	96.38
OUTFLOW	.00	50.92	299.70	921.23	2133.10	4090.75	6610.34	9633.89	13124.55	17056.03
ELEVATION	77.50	78.16	78.82	79.47	80.13	80.79	81.45	82.11	82.76	83.42
STORAGE	111.27	126.31	141.49	156.83	172.31	187.95	203.73	219.66	235.74	251.98
OUTFLOW	21408.37	26165.77	31315.37	36846.49	42750.14	49018.63	55645.29	62624.36	69950.80	77620.18
ELEVATION	84.08	84.74	85.39	86.05	86.71	87.37	88.03	88.68	89.34	90.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 36846. TO 77620.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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HYDROGRAPH AT STATION 3TO2

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	77.5	*	1		0320	101	744.	5.0	79.3	*	1		0640	201	158.	1.5	78.4
1		0002	2	0.	.0	77.5	*	1		0322	102	724.	4.9	79.3	*	1		0642	202	157.	1.5	78.4
1		0004	3	0.	.0	77.5	*	1		0324	103	704.	4.8	79.2	*	1		0644	203	156.	1.5	78.4
1		0006	4	0.	.0	77.5	*	1		0326	104	685.	4.7	79.2	*	1		0646	204	155.	1.5	78.4
1		0008	5	1.	.0	77.5	*	1		0328	105	667.	4.6	79.2	*	1		0648	205	154.	1.5	78.4
1		0010	6	2.	.0	77.5	*	1		0330	106	650.	4.5	79.2	*	1		0650	206	152.	1.5	78.4
1		0012	7	4.	.1	77.5	*	1		0332	107	634.	4.4	79.2	*	1		0652	207	151.	1.4	78.4
1		0014	8	7.	.1	77.6	*	1		0334	108	618.	4.3	79.2	*	1		0654	208	150.	1.4	78.4
1		0016	9	12.	.2	77.7	*	1		0336	109	603.	4.2	79.1	*	1		0656	209	149.	1.4	78.4
1		0018	10	21.	.3	77.8	*	1		0338	110	589.	4.2	79.1	*	1		0658	210	148.	1.4	78.4
1		0020	11	34.	.5	77.9	*	1		0340	111	575.	4.1	79.1	*	1		0700	211	147.	1.4	78.4
1		0022	12	52.	.7	78.2	*	1		0342	112	562.	4.0	79.1	*	1		0702	212	145.	1.4	78.4
1		0024	13	87.	1.0	78.3	*	1		0344	113	549.	3.9	79.1	*	1		0704	213	144.	1.4	78.4
1		0026	14	122.	1.2	78.3	*	1		0346	114	536.	3.9	79.1	*	1		0706	214	143.	1.4	78.4
1		0028	15	155.	1.5	78.4	*	1		0348	115	523.	3.8	79.1	*	1		0708	215	142.	1.4	78.4
1		0030	16	186.	1.7	78.5	*	1		0350	116	511.	3.7	79.0	*	1		0710	216	140.	1.4	78.4
1		0032	17	213.	1.9	78.6	*	1		0352	117	498.	3.7	79.0	*	1		0712	217	139.	1.4	78.4
1		0034	18	236.	2.1	78.6	*	1		0354	118	485.	3.6	79.0	*	1		0714	218	137.	1.3	78.4
1		0036	19	256.	2.2	78.7	*	1		0356	119	473.	3.5	79.0	*	1		0716	219	136.	1.3	78.4
1		0038	20	272.	2.4	78.7	*	1		0358	120	460.	3.4	79.0	*	1		0718	220	135.	1.3	78.4
1		0040	21	286.	2.5	78.8	*	1		0400	121	447.	3.4	79.0	*	1		0720	221	133.	1.3	78.4
1		0042	22	298.	2.6	78.8	*	1		0402	122	435.	3.3	79.0	*	1		0722	222	132.	1.3	78.4
1		0044	23	316.	2.6	78.8	*	1		0404	123	423.	3.2	78.9	*	1		0724	223	130.	1.3	78.4
1		0046	24	337.	2.8	78.9	*	1		0406	124	411.	3.2	78.9	*	1		0726	224	128.	1.3	78.4
1		0048	25	365.	2.9	78.9	*	1		0408	125	400.	3.1	78.9	*	1		0728	225	127.	1.3	78.4
1		0050	26	403.	3.1	78.9	*	1		0410	126	390.	3.1	78.9	*	1		0730	226	125.	1.2	78.4
1		0052	27	455.	3.4	79.0	*	1		0412	127	379.	3.0	78.9	*	1		0732	227	124.	1.2	78.4
1		0054	28	528.	3.8	79.1	*	1		0414	128	368.	2.9	78.9	*	1		0734	228	122.	1.2	78.3
1		0056	29	633.	4.4	79.2	*	1		0416	129	358.	2.9	78.9	*	1		0736	229	121.	1.2	78.3
1		0058	30	793.	5.3	79.3	*	1		0418	130	347.	2.8	78.9	*	1		0738	230	119.	1.2	78.3
1		0100	31	1050.	6.6	79.5	*	1		0420	131	337.	2.8	78.9	*	1		0740	231	118.	1.2	78.3
1		0102	32	1455.	8.7	79.8	*	1		0422	132	326.	2.7	78.8	*	1		0742	232	117.	1.2	78.3
1		0104	33	2042.	11.6	80.1	*	1		0424	133	316.	2.7	78.8	*	1		0744	233	115.	1.2	78.3
1		0106	34	2953.	15.1	80.4	*	1		0426	134	307.	2.6	78.8	*	1		0746	234	114.	1.2	78.3
1		0108	35	3845.	18.3	80.7	*	1		0428	135	299.	2.6	78.8	*	1		0748	235	112.	1.2	78.3
1		0110	36	4682.	20.8	80.9	*	1		0430	136	292.	2.5	78.8	*	1		0750	236	111.	1.1	78.3
1		0112	37	5237.	22.4	81.1	*	1		0432	137	285.	2.5	78.8	*	1		0752	237	109.	1.1	78.3
1		0114	38	5514.	23.2	81.2	*	1		0434	138	279.	2.4	78.8	*	1		0754	238	108.	1.1	78.3
1		0116	39	5604.	23.5	81.2	*	1		0436	139	272.	2.3	78.7	*	1		0756	239	106.	1.1	78.3
1		0118	40	5567.	23.4	81.2	*	1		0438	140	265.	2.3	78.7	*	1		0758	240	104.	1.1	78.3
1		0120	41	5449.	23.0	81.1	*	1		0440	141	258.	2.2	78.7	*	1		0800	241	102.	1.1	78.3
1		0122	42	5281.	22.5	81.1	*	1		0442	142	252.	2.2	78.7	*	1		0802	242	100.	1.1	78.3
1		0124	43	5087.	22.0	81.0	*	1		0444	143	246.	2.2	78.7	*	1		0804	243	98.	1.0	78.3
1		0126	44	4888.	21.4	81.0	*	1		0446	144	240.	2.1	78.7	*	1		0806	244	95.	1.0	78.3
1		0128	45	4691.	20.9	80.9	*	1		0448	145	235.	2.1	78.6	*	1		0808	245	93.	1.0	78.3
1		0130	46	4497.	20.3	80.9	*	1		0450	146	231.	2.0	78.6	*	1		0810	246	90.	1.0	78.3
1		0132	47	4304.	19.8	80.8	*	1		0452	147	226.	2.0	78.6	*	1		0812	247	87.	1.0	78.3
1		0134	48	4124.	19.3	80.8	*	1		0454	148	222.	2.0	78.6	*	1		0814	248	85.	.9	78.2
1		0136	49	3977.	18.8	80.8	*	1		0456	149	219.	2.0	78.6	*	1		0816	249	82.	.9	78.2
1		0138	50	3827.	18.2	80.7	*	1		0458	150	215.	1.9	78.6	*	1		0818	250	79.	.9	78.2
1		0140	51	3674.	17.7	80.6	*	1		0500	151	212.	1.9	78.6	*	1		0820	251	76.	.9	78.2
1		0142	52	3524.	17.1	80.6	*	1		0502	152	210.	1.9	78.6	*	1		0822	252	73.	.9	78.2
1		0144	53	3384.	16.6	80.6	*	1		0504	153	207.	1.9	78.6	*	1		0824	253	70.	.8	78.2
1		0146	54	3256.	16.2	80.5	*	1		0506	154	205.	1.9	78.6	*	1		0826	254	67.	.8	78.2
1		0148	55	3143.	15.7	80.5	*	1		0508	155	203.	1.8	78.6	*	1		0828	255	64.	.8	78.2
1		0150	56	3040.	15.4	80.4	*	1		0510	156	201.	1.8	78.6	*	1		0830	256	60.	.8	78.2
1		0152	57	2943.	15.0	80.4	*	1		0512	157	200.	1.8	78.6	*	1		0832	257	58.	.7	78.2
1		0154	58	2846.	14.7	80.4	*	1		0514	158	198.	1.8	78.5	*	1		0834	258	55.	.7	78.2
1		0156	59	2748.	14.3	80.3	*	1		0516	159	197.	1.8	78.5	*	1		0836	259	52.	.7	78.2

1	0158	60	2649.	14.0	80.3	*	1	0518	160	196.	1.8	78.5	*	1	0838	260	50.	.7	78.2
1	0200	61	2549.	13.6	80.3	*	1	0520	161	194.	1.8	78.5	*	1	0840	261	49.	.7	78.1
1	0202	62	2450.	13.2	80.2	*	1	0522	162	193.	1.8	78.5	*	1	0842	262	47.	.6	78.1
1	0204	63	2354.	12.9	80.2	*	1	0524	163	192.	1.8	78.5	*	1	0844	263	46.	.6	78.1
1	0206	64	2262.	12.6	80.2	*	1	0526	164	191.	1.7	78.5	*	1	0846	264	44.	.6	78.1
1	0208	65	2178.	12.3	80.1	*	1	0528	165	190.	1.7	78.5	*	1	0848	265	42.	.6	78.0
1	0210	66	2111.	12.0	80.1	*	1	0530	166	189.	1.7	78.5	*	1	0850	266	40.	.5	78.0
1	0212	67	2054.	11.7	80.1	*	1	0532	167	188.	1.7	78.5	*	1	0852	267	39.	.5	78.0
1	0214	68	1993.	11.4	80.1	*	1	0534	168	188.	1.7	78.5	*	1	0854	268	37.	.5	78.0
1	0216	69	1932.	11.1	80.0	*	1	0536	169	187.	1.7	78.5	*	1	0856	269	35.	.5	78.0
1	0218	70	1873.	10.8	80.0	*	1	0538	170	186.	1.7	78.5	*	1	0858	270	33.	.4	77.9
1	0220	71	1818.	10.5	80.0	*	1	0540	171	185.	1.7	78.5	*	1	0900	271	31.	.4	77.9
1	0222	72	1767.	10.2	79.9	*	1	0542	172	184.	1.7	78.5	*	1	0902	272	30.	.4	77.9
1	0224	73	1718.	10.0	79.9	*	1	0544	173	183.	1.7	78.5	*	1	0904	273	28.	.4	77.9
1	0226	74	1669.	9.8	79.9	*	1	0546	174	183.	1.7	78.5	*	1	0906	274	26.	.4	77.8
1	0228	75	1621.	9.5	79.9	*	1	0548	175	182.	1.7	78.5	*	1	0908	275	25.	.3	77.8
1	0230	76	1573.	9.3	79.8	*	1	0550	176	181.	1.7	78.5	*	1	0910	276	24.	.3	77.8
1	0232	77	1524.	9.0	79.8	*	1	0552	177	180.	1.7	78.5	*	1	0912	277	22.	.3	77.8
1	0234	78	1475.	8.8	79.8	*	1	0554	178	179.	1.7	78.5	*	1	0914	278	21.	.3	77.8
1	0236	79	1426.	8.5	79.7	*	1	0556	179	178.	1.6	78.5	*	1	0916	279	20.	.3	77.8
1	0238	80	1379.	8.3	79.7	*	1	0558	180	177.	1.6	78.5	*	1	0918	280	19.	.3	77.7
1	0240	81	1332.	8.0	79.7	*	1	0600	181	177.	1.6	78.5	*	1	0920	281	18.	.2	77.7
1	0242	82	1287.	7.8	79.7	*	1	0602	182	176.	1.6	78.5	*	1	0922	282	17.	.2	77.7
1	0244	83	1243.	7.6	79.6	*	1	0604	183	175.	1.6	78.5	*	1	0924	283	16.	.2	77.7
1	0246	84	1201.	7.4	79.6	*	1	0606	184	174.	1.6	78.5	*	1	0926	284	15.	.2	77.7
1	0248	85	1162.	7.2	79.6	*	1	0608	185	173.	1.6	78.5	*	1	0928	285	15.	.2	77.7
1	0250	86	1124.	7.0	79.6	*	1	0610	186	172.	1.6	78.5	*	1	0930	286	14.	.2	77.7
1	0252	87	1089.	6.8	79.6	*	1	0612	187	171.	1.6	78.5	*	1	0932	287	13.	.2	77.7
1	0254	88	1055.	6.7	79.5	*	1	0614	188	170.	1.6	78.5	*	1	0934	288	13.	.2	77.7
1	0256	89	1024.	6.5	79.5	*	1	0616	189	169.	1.6	78.5	*	1	0936	289	12.	.2	77.7
1	0258	90	994.	6.3	79.5	*	1	0618	190	168.	1.6	78.5	*	1	0938	290	12.	.2	77.7
1	0300	91	966.	6.2	79.5	*	1	0620	191	167.	1.6	78.5	*	1	0940	291	11.	.2	77.6
1	0302	92	941.	6.1	79.5	*	1	0622	192	167.	1.6	78.5	*	1	0942	292	11.	.1	77.6
1	0304	93	917.	6.0	79.5	*	1	0624	193	166.	1.6	78.5	*	1	0944	293	11.	.1	77.6
1	0306	94	896.	5.8	79.4	*	1	0626	194	165.	1.5	78.5	*	1	0946	294	10.	.1	77.6
1	0308	95	874.	5.7	79.4	*	1	0628	195	164.	1.5	78.5	*	1	0948	295	10.	.1	77.6
1	0310	96	852.	5.6	79.4	*	1	0630	196	163.	1.5	78.5	*	1	0950	296	9.	.1	77.6
1	0312	97	830.	5.5	79.4	*	1	0632	197	162.	1.5	78.5	*	1	0952	297	9.	.1	77.6
1	0314	98	808.	5.4	79.4	*	1	0634	198	161.	1.5	78.4	*	1	0954	298	9.	.1	77.6
1	0316	99	786.	5.2	79.3	*	1	0636	199	160.	1.5	78.4	*	1	0956	299	8.	.1	77.6
1	0318	100	765.	5.1	79.3	*	1	0638	200	159.	1.5	78.4	*	1	0958	300	8.	.1	77.6
						*							*						

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PEAK FLOW	TIME			MAXIMUM AVERAGE FLOW		
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 5604.	1.27		1156.	726.	726.	726.
		(INCHES)	1.763	1.840	1.840	1.840
		(AC-FT)	573.	598.	598.	598.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE		
		6-HR	24-HR	72-HR	9.97-HR
+ (AC-FT)	(HR)				
23.	1.27	6.	4.	4.	4.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE		
		6-HR	24-HR	72-HR	9.97-HR
+ (FEET)	(HR)				
81.18	1.27	79.29	78.81	78.81	78.81

CUMULATIVE AREA = 6.09 SQ MI

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410 KK * FR-2 *
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LOCAL RUNOFF TO FR-2
BASIN FR-2

SUBBASIN RUNOFF DATA

413 BA SUBBASIN CHARACTERISTICS

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                  TAREA          .17  SUBBASIN AREA

             PRECIPITATION DATA

414 PB            STORM         2.76  BASIN TOTAL PRECIPITATION

 20 PI         INCREMENTAL PRECIPITATION PATTERN
                   .04       .04       .06       .08       .08       .07       .07       .05       .03       .03
                   .02       .02       .02       .02       .02       .02       .02       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .01       .01       .01       .01       .01       .01       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

415 LS       SCS LOSS RATE
                  STRTL          .60  INITIAL ABSTRACTION
                 CRVNBR        77.00  CURVE NUMBER
                  RTIMP        15.00  PERCENT IMPERVIOUS AREA

416 UD       SCS DIMENSIONLESS UNITGRAPH
                   TLAG          .25  LAG

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                                                      UNIT HYDROGRAPH
                                                 40 END-OF-PERIOD ORDINATES
            15.       45.       87.      146.      218.      274.      306.      315.      308.      284.
           254.      218.      172.      137.      111.       90.       76.       62.       50.       41.
            33.       28.       22.       18.       15.       12.       10.        8.        7.        5.
             4.        4.        3.        3.        2.        2.        1.        1.        1.        0.

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                                                 HYDROGRAPH AT STATION     FR-2

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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1 0000	1	.00	.00	.00	0.	*	1 0500	151	.00	.00	.00	0.
1 0002	2	.11	.09	.02	0.	*	1 0502	152	.00	.00	.00	0.
1 0004	3	.11	.09	.02	1.	*	1 0504	153	.00	.00	.00	0.
1 0006	4	.17	.14	.03	3.	*	1 0506	154	.00	.00	.00	0.
1 0008	5	.23	.19	.03	6.	*	1 0508	155	.00	.00	.00	0.
1 0010	6	.23	.18	.05	11.	*	1 0510	156	.00	.00	.00	0.
1 0012	7	.18	.12	.06	18.	*	1 0512	157	.00	.00	.00	0.
1 0014	8	.18	.11	.07	28.	*	1 0514	158	.00	.00	.00	0.
1 0016	9	.14	.08	.06	41.	*	1 0516	159	.00	.00	.00	0.
1 0018	10	.09	.05	.04	56.	*	1 0518	160	.00	.00	.00	0.
1 0020	11	.09	.05	.05	72.	*	1 0520	161	.00	.00	.00	0.
1 0022	12	.07	.03	.04	89.	*	1 0522	162	.00	.00	.00	0.
1 0024	13	.07	.03	.04	103.	*	1 0524	163	.00	.00	.00	0.
1 0026	14	.06	.03	.03	115.	*	1 0526	164	.00	.00	.00	0.
1 0028	15	.05	.02	.03	124.	*	1 0528	165	.00	.00	.00	0.
1 0030	16	.05	.02	.03	129.	*	1 0530	166	.00	.00	.00	0.
1 0032	17	.04	.02	.03	131.	*	1 0532	167	.00	.00	.00	0.
1 0034	18	.04	.02	.03	131.	*	1 0534	168	.00	.00	.00	0.
1 0036	19	.04	.02	.02	129.	*	1 0536	169	.00	.00	.00	0.
1 0038	20	.04	.01	.02	125.	*	1 0538	170	.00	.00	.00	0.
1 0040	21	.04	.01	.02	120.	*	1 0540	171	.00	.00	.00	0.
1 0042	22	.03	.01	.02	116.	*	1 0542	172	.00	.00	.00	0.
1 0044	23	.03	.01	.02	111.	*	1 0544	173	.00	.00	.00	0.
1 0046	24	.03	.01	.02	106.	*	1 0546	174	.00	.00	.00	0.
1 0048	25	.03	.01	.02	101.	*	1 0548	175	.00	.00	.00	0.
1 0050	26	.03	.01	.02	96.	*	1 0550	176	.00	.00	.00	0.
1 0052	27	.02	.01	.01	91.	*	1 0552	177	.00	.00	.00	0.
1 0054	28	.02	.01	.02	87.	*	1 0554	178	.00	.00	.00	0.
1 0056	29	.02	.01	.01	82.	*	1 0556	179	.00	.00	.00	0.
1 0058	30	.02	.01	.01	78.	*	1 0558	180	.00	.00	.00	0.
1 0100	31	.02	.01	.01	74.	*	1 0600	181	.00	.00	.00	0.
1 0102	32	.02	.01	.01	70.	*	1 0602	182	.00	.00	.00	0.
1 0104	33	.02	.01	.01	67.	*	1 0604	183	.00	.00	.00	0.
1 0106	34	.02	.01	.01	63.	*	1 0606	184	.00	.00	.00	0.
1 0108	35	.02	.01	.01	60.	*	1 0608	185	.00	.00	.00	0.
1 0110	36	.02	.01	.01	57.	*	1 0610	186	.00	.00	.00	0.
1 0112	37	.01	.00	.01	55.	*	1 0612	187	.00	.00	.00	0.
1 0114	38	.01	.00	.01	52.	*	1 0614	188	.00	.00	.00	0.
1 0116	39	.01	.00	.01	49.	*	1 0616	189	.00	.00	.00	0.

1	0118	40	.01	.00	.01	47.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.01	.00	.01	45.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	43.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	41.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	39.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	37.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	36.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	34.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	33.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	32.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	30.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	29.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	28.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	27.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	26.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	25.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	24.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.00	23.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.00	23.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.00	22.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.00	21.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.00	20.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.00	20.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.00	19.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.00	19.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.00	18.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.00	17.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.00	17.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.00	16.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.00	16.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.00	.00	.00	16.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.00	.00	.00	15.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.00	.00	.00	15.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.00	.00	.00	14.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.00	.00	.00	14.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.00	.00	.00	14.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.00	.00	.00	13.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.00	.00	.00	13.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	13.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	12.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	12.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	12.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	11.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	11.	*	1	0744	233	.00	.00	.00	0.
1	0246	84	.00	.00	.00	11.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	11.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	10.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	10.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	10.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	10.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	9.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	9.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	9.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	9.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	8.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	8.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	7.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	6.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	6.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	5.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	4.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	3.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	3.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	2.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	2.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	1.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	1.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	1.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	1.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	1.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	1.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	0.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.

1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.

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TOTAL RAINFALL = 2.76, TOTAL LOSS = 1.57, TOTAL EXCESS = 1.19

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	9.97-HR
+ (CFS)	(HR)					
		(CFS)				
+ 131.	.53		22.	13.	13.	13.
		(INCHES)	1.186	1.186	1.186	1.186
		(AC-FT)	11.	11.	11.	11.

CUMULATIVE AREA = .17 SQ MI

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          *            *
 417 KK   *    CO-2    *
          *            *
          **************
                         COMBINE HYDROGRAPHS
                         AT NODE FR-2 (MAIN CHANNEL)

 420 HC        HYDROGRAPH COMBINATION
                   ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
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HYDROGRAPH AT STATION CO-2
SUM OF 2 HYDROGRAPHS

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0230	76	1586.	*	1		0500	151	212.	*	1		0730	226	125.
1		0002	2	0.	*	1		0232	77	1537.	*	1		0502	152	210.	*	1		0732	227	124.
1		0004	3	1.	*	1		0234	78	1487.	*	1		0504	153	207.	*	1		0734	228	122.
1		0006	4	3.	*	1		0236	79	1439.	*	1		0506	154	205.	*	1		0736	229	121.
1		0008	5	6.	*	1		0238	80	1390.	*	1		0508	155	203.	*	1		0738	230	119.
1		0010	6	12.	*	1		0240	81	1343.	*	1		0510	156	201.	*	1		0740	231	118.
1		0012	7	22.	*	1		0242	82	1298.	*	1		0512	157	200.	*	1		0742	232	117.
1		0014	8	35.	*	1		0244	83	1254.	*	1		0514	158	198.	*	1		0744	233	115.

1	0016	9	53.	*	1	0246	84	1212.	*	1	0516	159	197.	*	1	0746	234	114.
1	0018	10	77.	*	1	0248	85	1172.	*	1	0518	160	196.	*	1	0748	235	112.
1	0020	11	106.	*	1	0250	86	1135.	*	1	0520	161	194.	*	1	0750	236	111.
1	0022	12	140.	*	1	0252	87	1099.	*	1	0522	162	193.	*	1	0752	237	109.
1	0024	13	190.	*	1	0254	88	1065.	*	1	0524	163	192.	*	1	0754	238	108.
1	0026	14	237.	*	1	0256	89	1033.	*	1	0526	164	191.	*	1	0756	239	106.
1	0028	15	279.	*	1	0258	90	1003.	*	1	0528	165	190.	*	1	0758	240	104.
1	0030	16	315.	*	1	0300	91	976.	*	1	0530	166	189.	*	1	0800	241	102.
1	0032	17	344.	*	1	0302	92	950.	*	1	0532	167	188.	*	1	0802	242	100.
1	0034	18	367.	*	1	0304	93	926.	*	1	0534	168	188.	*	1	0804	243	98.
1	0036	19	384.	*	1	0306	94	904.	*	1	0536	169	187.	*	1	0806	244	95.
1	0038	20	397.	*	1	0308	95	882.	*	1	0538	170	186.	*	1	0808	245	93.
1	0040	21	406.	*	1	0310	96	859.	*	1	0540	171	185.	*	1	0810	246	90.
1	0042	22	414.	*	1	0312	97	836.	*	1	0542	172	184.	*	1	0812	247	87.
1	0044	23	426.	*	1	0314	98	814.	*	1	0544	173	183.	*	1	0814	248	85.
1	0046	24	443.	*	1	0316	99	791.	*	1	0546	174	183.	*	1	0816	249	82.
1	0048	25	466.	*	1	0318	100	769.	*	1	0548	175	182.	*	1	0818	250	79.
1	0050	26	499.	*	1	0320	101	747.	*	1	0550	176	181.	*	1	0820	251	76.
1	0052	27	546.	*	1	0322	102	726.	*	1	0552	177	180.	*	1	0822	252	73.
1	0054	28	615.	*	1	0324	103	706.	*	1	0554	178	179.	*	1	0824	253	70.
1	0056	29	716.	*	1	0326	104	687.	*	1	0556	179	178.	*	1	0826	254	67.
1	0058	30	871.	*	1	0328	105	669.	*	1	0558	180	177.	*	1	0828	255	64.
1	0100	31	1124.	*	1	0330	106	651.	*	1	0600	181	177.	*	1	0830	256	60.
1	0102	32	1525.	*	1	0332	107	635.	*	1	0602	182	176.	*	1	0832	257	58.
1	0104	33	2109.	*	1	0334	108	619.	*	1	0604	183	175.	*	1	0834	258	55.
1	0106	34	3016.	*	1	0336	109	604.	*	1	0606	184	174.	*	1	0836	259	52.
1	0108	35	3906.	*	1	0338	110	590.	*	1	0608	185	173.	*	1	0838	260	50.
1	0110	36	4739.	*	1	0340	111	576.	*	1	0610	186	172.	*	1	0840	261	49.
1	0112	37	5291.	*	1	0342	112	562.	*	1	0612	187	171.	*	1	0842	262	47.
1	0114	38	5566.	*	1	0344	113	549.	*	1	0614	188	170.	*	1	0844	263	46.
1	0116	39	5653.	*	1	0346	114	536.	*	1	0616	189	169.	*	1	0846	264	44.
1	0118	40	5614.	*	1	0348	115	524.	*	1	0618	190	168.	*	1	0848	265	42.
1	0120	41	5494.	*	1	0350	116	511.	*	1	0620	191	167.	*	1	0850	266	40.
1	0122	42	5324.	*	1	0352	117	498.	*	1	0622	192	167.	*	1	0852	267	39.
1	0124	43	5128.	*	1	0354	118	485.	*	1	0624	193	166.	*	1	0854	268	37.
1	0126	44	4927.	*	1	0356	119	473.	*	1	0626	194	165.	*	1	0856	269	35.
1	0128	45	4728.	*	1	0358	120	460.	*	1	0628	195	164.	*	1	0858	270	33.
1	0130	46	4532.	*	1	0400	121	447.	*	1	0630	196	163.	*	1	0900	271	31.
1	0132	47	4339.	*	1	0402	122	435.	*	1	0632	197	162.	*	1	0902	272	30.
1	0134	48	4157.	*	1	0404	123	423.	*	1	0634	198	161.	*	1	0904	273	28.
1	0136	49	4009.	*	1	0406	124	411.	*	1	0636	199	160.	*	1	0906	274	26.
1	0138	50	3858.	*	1	0408	125	400.	*	1	0638	200	159.	*	1	0908	275	25.
1	0140	51	3703.	*	1	0410	126	390.	*	1	0640	201	158.	*	1	0910	276	24.
1	0142	52	3552.	*	1	0412	127	379.	*	1	0642	202	157.	*	1	0912	277	22.
1	0144	53	3411.	*	1	0414	128	368.	*	1	0644	203	156.	*	1	0914	278	21.
1	0146	54	3282.	*	1	0416	129	358.	*	1	0646	204	155.	*	1	0916	279	20.
1	0148	55	3168.	*	1	0418	130	347.	*	1	0648	205	154.	*	1	0918	280	19.
1	0150	56	3064.	*	1	0420	131	337.	*	1	0650	206	152.	*	1	0920	281	18.
1	0152	57	2966.	*	1	0422	132	326.	*	1	0652	207	151.	*	1	0922	282	17.
1	0154	58	2868.	*	1	0424	133	316.	*	1	0654	208	150.	*	1	0924	283	16.
1	0156	59	2770.	*	1	0426	134	307.	*	1	0656	209	149.	*	1	0926	284	15.
1	0158	60	2670.	*	1	0428	135	299.	*	1	0658	210	148.	*	1	0928	285	15.
1	0200	61	2569.	*	1	0430	136	292.	*	1	0700	211	147.	*	1	0930	286	14.
1	0202	62	2470.	*	1	0432	137	285.	*	1	0702	212	145.	*	1	0932	287	13.
1	0204	63	2373.	*	1	0434	138	279.	*	1	0704	213	144.	*	1	0934	288	13.
1	0206	64	2281.	*	1	0436	139	272.	*	1	0706	214	143.	*	1	0936	289	12.
1	0208	65	2196.	*	1	0438	140	265.	*	1	0708	215	142.	*	1	0938	290	12.
1	0210	66	2128.	*	1	0440	141	258.	*	1	0710	216	140.	*	1	0940	291	11.
1	0212	67	2071.	*	1	0442	142	252.	*	1	0712	217	139.	*	1	0942	292	11.
1	0214	68	2010.	*	1	0444	143	246.	*	1	0714	218	137.	*	1	0944	293	11.
1	0216	69	1948.	*	1	0446	144	240.	*	1	0716	219	136.	*	1	0946	294	10.
1	0218	70	1889.	*	1	0448	145	235.	*	1	0718	220	135.	*	1	0948	295	10.
1	0220	71	1833.	*	1	0450	146	231.	*	1	0720	221	133.	*	1	0950	296	9.
1	0222	72	1782.	*	1	0452	147	226.	*	1	0722	222	132.	*	1	0952	297	9.
1	0224	73	1732.	*	1	0454	148	222.	*	1	0724	223	130.	*	1	0954	298	9.
1	0226	74	1683.	*	1	0456	149	219.	*	1	0726	224	128.	*	1	0956	299	8.
1	0228	75	1635.	*	1	0458	150	215.	*	1	0728	225	127.	*	1	0958	300	8.
				*					*					*				

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	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	9.97-HR
+	(CFS)	(HR)					
			(CFS)				
+	5653.	1.27		1176.	740.	740.	740.
			(INCHES)	1.744	1.822	1.822	1.822
			(AC-FT)	583.	609.	609.	609.

CUMULATIVE AREA = 6.27 SQ MI

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          *            *
421 KK    *    2TO1    *
          *            *
          **************
                       MODIFIED PULS CHANNEL ROUTING
                       FROM NODE FR-2 TO FR-1 (MAIN CHANNEL)

             HYDROGRAPH ROUTING DATA

424 RS          STORAGE ROUTING
                     NSTPS           2  NUMBER OF SUBREACHES
                      ITYP        FLOW  TYPE OF INITIAL CONDITION
                    RSVRIC       -1.00  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT

425 RC          NORMAL DEPTH CHANNEL
                       ANL        .050  LEFT OVERBANK N-VALUE
                      ANCH        .040  MAIN CHANNEL N-VALUE
                       ANR        .050  RIGHT OVERBANK N-VALUE
                     RLNTH       2300.  REACH LENGTH
                       SEL       .0180  ENERGY SLOPE
                     ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                        CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
427 RY        ELEVATION    52.00     46.00     43.00     42.00     42.00     46.00     49.00     52.00
426 RX        DISTANCE       .00     20.00    150.00    365.00    377.00    390.00    403.00    412.00

                                                   ***

                                          COMPUTED STORAGE-OUTFLOW-ELEVATION DATA
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STORAGE	.00	1.93	7.04	13.85	21.34	29.51	38.36	47.89	58.06	68.44
OUTFLOW	.00	79.62	462.03	1368.31	2666.25	4339.30	6382.67	8797.05	11648.70	14966.09
ELEVATION	42.00	42.53	43.05	43.58	44.11	44.63	45.16	45.68	46.21	46.74
STORAGE	78.94	89.54	100.26	111.10	122.03	133.07	144.19	155.41	166.72	178.12
OUTFLOW	18639.50	22655.23	27002.28	31671.57	36657.63	41951.47	47545.69	53434.86	59614.14	66079.34
ELEVATION	47.26	47.79	48.32	48.84	49.37	49.89	50.42	50.95	51.47	52.00

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*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN    18639. TO     66079.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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                                             HYDROGRAPH AT STATION    2TO1

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	42.0	*	1		0320	101	808.	4.8	43.3	*	1		0640	201	163.	1.5	42.6
1		0002	2	0.	.0	42.0	*	1		0322	102	786.	4.7	43.2	*	1		0642	202	162.	1.5	42.6
1		0004	3	0.	.0	42.0	*	1		0324	103	764.	4.7	43.2	*	1		0644	203	161.	1.5	42.6
1		0006	4	0.	.0	42.0	*	1		0326	104	743.	4.6	43.2	*	1		0646	204	160.	1.5	42.6
1		0008	5	0.	.0	42.0	*	1		0328	105	722.	4.5	43.2	*	1		0648	205	159.	1.5	42.6
1		0010	6	1.	.0	42.0	*	1		0330	106	702.	4.4	43.2	*	1		0650	206	158.	1.5	42.6
1		0012	7	1.	.0	42.0	*	1		0332	107	683.	4.4	43.2	*	1		0652	207	156.	1.5	42.6
1		0014	8	3.	.0	42.0	*	1		0334	108	665.	4.3	43.2	*	1		0654	208	155.	1.5	42.6
1		0016	9	5.	.1	42.0	*	1		0336	109	648.	4.2	43.2	*	1		0656	209	154.	1.5	42.6
1		0018	10	9.	.1	42.1	*	1		0338	110	632.	4.2	43.2	*	1		0658	210	153.	1.5	42.6
1		0020	11	14.	.2	42.1	*	1		0340	111	616.	4.1	43.1	*	1		0700	211	152.	1.4	42.6
1		0022	12	21.	.3	42.1	*	1		0342	112	601.	4.0	43.1	*	1		0702	212	151.	1.4	42.6
1		0024	13	31.	.4	42.2	*	1		0344	113	587.	4.0	43.1	*	1		0704	213	150.	1.4	42.6
1		0026	14	45.	.5	42.3	*	1		0346	114	573.	3.9	43.1	*	1		0706	214	149.	1.4	42.6
1		0028	15	66.	.8	42.4	*	1		0348	115	559.	3.9	43.1	*	1		0708	215	148.	1.4	42.6
1		0030	16	100.	1.1	42.6	*	1		0350	116	546.	3.8	43.1	*	1		0710	216	146.	1.4	42.6
1		0032	17	146.	1.4	42.6	*	1		0352	117	533.	3.8	43.1	*	1		0712	217	145.	1.4	42.6
1		0034	18	188.	1.7	42.7	*	1		0354	118	520.	3.7	43.1	*	1		0714	218	144.	1.4	42.6
1		0036	19	228.	2.0	42.7	*	1		0356	119	508.	3.7	43.1	*	1		0716	219	143.	1.4	42.6
1		0038	20	263.	2.2	42.8	*	1		0358	120	495.	3.6	43.1	*	1		0718	220	141.	1.4	42.6
1		0040	21	294.	2.4	42.8	*	1		0400	121	482.	3.6	43.1	*	1		0720	221	140.	1.4	42.6
1		0042	22	320.	2.6	42.9	*	1		0402	122	470.	3.6	43.1	*	1		0722	222	138.	1.4	42.6

1	0044	23	343.	2.7	42.9	*	1	0404	123	461.	3.5	43.1	*	1	0724	223	137.	1.3	42.6
1	0046	24	362.	2.9	42.9	*	1	0406	124	454.	3.5	43.0	*	1	0726	224	136.	1.3	42.6
1	0048	25	380.	3.0	42.9	*	1	0408	125	446.	3.4	43.0	*	1	0728	225	134.	1.3	42.6
1	0050	26	399.	3.1	43.0	*	1	0410	126	438.	3.4	43.0	*	1	0730	226	133.	1.3	42.6
1	0052	27	419.	3.2	43.0	*	1	0412	127	428.	3.3	43.0	*	1	0732	227	131.	1.3	42.6
1	0054	28	448.	3.4	43.0	*	1	0414	128	418.	3.2	43.0	*	1	0734	228	130.	1.3	42.6
1	0056	29	504.	3.7	43.1	*	1	0416	129	408.	3.2	43.0	*	1	0736	229	128.	1.3	42.6
1	0058	30	585.	4.0	43.1	*	1	0418	130	398.	3.1	43.0	*	1	0738	230	127.	1.3	42.6
1	0100	31	692.	4.4	43.2	*	1	0420	131	388.	3.0	43.0	*	1	0740	231	125.	1.3	42.6
1	0102	32	850.	5.0	43.3	*	1	0422	132	377.	3.0	42.9	*	1	0742	232	124.	1.3	42.6
1	0104	33	1098.	5.9	43.4	*	1	0424	133	367.	2.9	42.9	*	1	0744	233	122.	1.2	42.6
1	0106	34	1531.	7.4	43.6	*	1	0426	134	356.	2.8	42.9	*	1	0746	234	121.	1.2	42.6
1	0108	35	2236.	9.4	43.9	*	1	0428	135	346.	2.7	42.9	*	1	0748	235	119.	1.2	42.6
1	0110	36	3105.	11.7	44.2	*	1	0430	136	336.	2.7	42.9	*	1	0750	236	118.	1.2	42.6
1	0112	37	4011.	14.0	44.5	*	1	0432	137	327.	2.6	42.9	*	1	0752	237	116.	1.2	42.6
1	0114	38	4767.	15.7	44.7	*	1	0434	138	318.	2.6	42.9	*	1	0754	238	115.	1.2	42.6
1	0116	39	5265.	16.8	44.9	*	1	0436	139	309.	2.5	42.8	*	1	0756	239	114.	1.2	42.6
1	0118	40	5505.	17.3	44.9	*	1	0438	140	301.	2.4	42.8	*	1	0758	240	112.	1.2	42.6
1	0120	41	5571.	17.4	44.9	*	1	0440	141	294.	2.4	42.8	*	1	0800	241	110.	1.2	42.6
1	0122	42	5520.	17.3	44.9	*	1	0442	142	286.	2.3	42.8	*	1	0802	242	109.	1.2	42.6
1	0124	43	5395.	17.0	44.9	*	1	0444	143	279.	2.3	42.8	*	1	0804	243	107.	1.1	42.6
1	0126	44	5227.	16.7	44.9	*	1	0446	144	272.	2.2	42.8	*	1	0806	244	105.	1.1	42.6
1	0128	45	5038.	16.3	44.8	*	1	0448	145	265.	2.2	42.8	*	1	0808	245	103.	1.1	42.6
1	0130	46	4842.	15.8	44.8	*	1	0450	146	259.	2.2	42.8	*	1	0810	246	101.	1.1	42.6
1	0132	47	4645.	15.4	44.7	*	1	0452	147	253.	2.1	42.8	*	1	0812	247	99.	1.1	42.6
1	0134	48	4453.	15.0	44.7	*	1	0454	148	247.	2.1	42.8	*	1	0814	248	97.	1.1	42.5
1	0136	49	4280.	14.6	44.6	*	1	0456	149	242.	2.0	42.7	*	1	0816	249	94.	1.1	42.5
1	0138	50	4127.	14.2	44.6	*	1	0458	150	237.	2.0	42.7	*	1	0818	250	92.	1.0	42.5
1	0140	51	3975.	13.9	44.5	*	1	0500	151	232.	2.0	42.7	*	1	0820	251	89.	1.0	42.5
1	0142	52	3822.	13.5	44.5	*	1	0502	152	228.	2.0	42.7	*	1	0822	252	86.	1.0	42.5
1	0144	53	3671.	13.1	44.4	*	1	0504	153	224.	1.9	42.7	*	1	0824	253	84.	1.0	42.5
1	0146	54	3526.	12.8	44.4	*	1	0506	154	220.	1.9	42.7	*	1	0826	254	82.	1.0	42.5
1	0148	55	3390.	12.4	44.3	*	1	0508	155	217.	1.9	42.7	*	1	0828	255	79.	1.0	42.5
1	0150	56	3265.	12.1	44.3	*	1	0510	156	214.	1.9	42.7	*	1	0830	256	78.	.9	42.5
1	0152	57	3152.	11.9	44.3	*	1	0512	157	211.	1.8	42.7	*	1	0832	257	76.	.9	42.5
1	0154	58	3046.	11.6	44.2	*	1	0514	158	209.	1.8	42.7	*	1	0834	258	75.	.9	42.5
1	0156	59	2945.	11.3	44.2	*	1	0516	159	206.	1.8	42.7	*	1	0836	259	73.	.9	42.5
1	0158	60	2846.	11.1	44.2	*	1	0518	160	204.	1.8	42.7	*	1	0838	260	71.	.9	42.5
1	0200	61	2747.	10.9	44.1	*	1	0520	161	202.	1.8	42.7	*	1	0840	261	68.	.8	42.5
1	0202	62	2653.	10.6	44.1	*	1	0522	162	201.	1.8	42.7	*	1	0842	262	66.	.8	42.4
1	0204	63	2568.	10.4	44.1	*	1	0524	163	199.	1.8	42.7	*	1	0844	263	64.	.8	42.4
1	0206	64	2476.	10.1	44.0	*	1	0526	164	197.	1.8	42.7	*	1	0846	264	62.	.8	42.4
1	0208	65	2384.	9.9	44.0	*	1	0528	165	196.	1.7	42.7	*	1	0848	265	60.	.7	42.4
1	0210	66	2296.	9.6	44.0	*	1	0530	166	195.	1.7	42.7	*	1	0850	266	58.	.7	42.4
1	0212	67	2216.	9.4	43.9	*	1	0532	167	194.	1.7	42.7	*	1	0852	267	56.	.7	42.4
1	0214	68	2145.	9.2	43.9	*	1	0534	168	193.	1.7	42.7	*	1	0854	268	54.	.7	42.4
1	0216	69	2079.	9.0	43.9	*	1	0536	169	191.	1.7	42.7	*	1	0856	269	52.	.6	42.3
1	0218	70	2017.	8.8	43.8	*	1	0538	170	190.	1.7	42.7	*	1	0858	270	50.	.6	42.3
1	0220	71	1956.	8.6	43.8	*	1	0540	171	189.	1.7	42.7	*	1	0900	271	48.	.6	42.3
1	0222	72	1897.	8.4	43.8	*	1	0542	172	189.	1.7	42.7	*	1	0902	272	46.	.6	42.3
1	0224	73	1842.	8.3	43.8	*	1	0544	173	188.	1.7	42.7	*	1	0904	273	44.	.5	42.3
1	0226	74	1789.	8.1	43.7	*	1	0546	174	187.	1.7	42.7	*	1	0906	274	42.	.5	42.3
1	0228	75	1738.	8.0	43.7	*	1	0548	175	186.	1.7	42.7	*	1	0908	275	40.	.5	42.3
1	0230	76	1689.	7.8	43.7	*	1	0550	176	185.	1.7	42.7	*	1	0910	276	39.	.5	42.3
1	0232	77	1639.	7.7	43.7	*	1	0552	177	184.	1.7	42.7	*	1	0912	277	37.	.4	42.2
1	0234	78	1590.	7.6	43.7	*	1	0554	178	183.	1.7	42.7	*	1	0914	278	35.	.4	42.2
1	0236	79	1541.	7.4	43.6	*	1	0556	179	182.	1.7	42.7	*	1	0916	279	33.	.4	42.2
1	0238	80	1492.	7.3	43.6	*	1	0558	180	182.	1.6	42.7	*	1	0918	280	32.	.4	42.2
1	0240	81	1444.	7.1	43.6	*	1	0600	181	181.	1.6	42.7	*	1	0920	281	30.	.4	42.2
1	0242	82	1397.	7.0	43.6	*	1	0602	182	180.	1.6	42.7	*	1	0922	282	29.	.3	42.2
1	0244	83	1356.	6.9	43.6	*	1	0604	183	179.	1.6	42.7	*	1	0924	283	27.	.3	42.2
1	0246	84	1321.	6.7	43.6	*	1	0606	184	178.	1.6	42.7	*	1	0926	284	26.	.3	42.2
1	0248	85	1282.	6.6	43.5	*	1	0608	185	177.	1.6	42.7	*	1	0928	285	25.	.3	42.2
1	0250	86	1242.	6.4	43.5	*	1	0610	186	176.	1.6	42.7	*	1	0930	286	23.	.3	42.2
1	0252	87	1203.	6.3	43.5	*	1	0612	187	176.	1.6	42.7	*	1	0932	287	22.	.3	42.1
1	0254	88	1165.	6.2	43.5	*	1	0614	188	175.	1.6	42.7	*	1	0934	288	21.	.3	42.1
1	0256	89	1128.	6.0	43.4	*	1	0616	189	174.	1.6	42.7	*	1	0936	289	20.	.2	42.1
1	0258	90	1093.	5.9	43.4	*	1	0618	190	173.	1.6	42.7	*	1	0938	290	19.	.2	42.1
1	0300	91	1060.	5.8	43.4	*	1	0620	191	172.	1.6	42.7	*	1	0940	291	18.	.2	42.1
1	0302	92	1029.	5.6	43.4	*	1	0622	192	171.	1.6	42.7	*	1	0942	292	17.	.2	42.1
1	0304	93	999.	5.5	43.4	*	1	0624	193	170.	1.6	42.7	*	1	0944	293	16.	.2	42.1
1	0306	94	972.	5.4	43.3	*	1	0626	194	169.	1.6	42.6	*	1	0946	294	16.	.2	42.1
1	0308	95	947.	5.3	43.3	*	1	0628	195	168.	1.6	42.6	*	1	0948	295	15.	.2	42.1
1	0310	96	922.	5.2	43.3	*	1	0630	196	167.	1.6	42.6	*	1	0950	296	14.	.2	42.1
1	0312	97	899.	5.2	43.3	*	1	0632	197	166.	1.5	42.6	*	1	0952	297	14.	.2	42.1
1	0314	98	876.	5.1	43.3	*	1	0634	198	165.	1.5	42.6	*	1	0954	298	13.	.2	42.1
1	0316	99	853.	5.0	43.3	*	1	0636	199	164.	1.5	42.6	*	1	0956	299	12.	.2	42.1
1	0318	100	830.	4.9	43.3	*	1	0638	200	164.	1.5	42.6	*	1	0958	300	12.	.1	42.1
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  PEAK FLOW      TIME                             MAXIMUM AVERAGE FLOW
                                          6-HR         24-HR        72-HR        9.97-HR
+    (CFS)       (HR)
                            (CFS)
+     5571.      1.33                    1174.          739.         739.          739.
                         (INCHES)        1.741         1.821        1.821         1.821
                          (AC-FT)         582.          609.         609.          609.

 PEAK STORAGE    TIME                           MAXIMUM AVERAGE STORAGE
                                          6-HR         24-HR        72-HR        9.97-HR
+   (AC-FT)      (HR)
        17.      1.33                       5.            4.           4.            4.

  PEAK STAGE     TIME                             MAXIMUM AVERAGE STAGE
                                          6-HR         24-HR        72-HR        9.97-HR
+     (FEET)     (HR)
      44.95      1.33                    43.28         42.93        42.93         42.93

                          CUMULATIVE AREA =     6.27 SQ MI


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              *            *
  428 KK      *    FR-1    *
              *            *
              **************
                            LOCAL RUNOFF TO FR-1
                            BASIN FR-1

                 SUBBASIN RUNOFF DATA

  431 BA           SUBBASIN CHARACTERISTICS
                         TAREA           .08   SUBBASIN AREA

                   PRECIPITATION DATA

  432 PB                 STORM          2.76   BASIN TOTAL PRECIPITATION

   20 PI             INCREMENTAL PRECIPITATION PATTERN
                         .04        .04        .06        .08        .08        .07        .07        .05        .03        .03
                         .02        .02        .02        .02        .02        .02        .02        .01        .01        .01
                         .01        .01        .01        .01        .01        .01        .01        .01        .01        .01
                         .01        .01        .01        .01        .01        .01        .01        .00        .00        .00
                         .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                         .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                         .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                         .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                         .00        .00        .00        .00        .00        .00        .00        .00        .00        .00

  433 LS           SCS LOSS RATE
                         STRTL           .60   INITIAL ABSTRACTION
                        CRVNBR         77.00   CURVE NUMBER
                         RTIMP         10.00   PERCENT IMPERVIOUS AREA

  434 UD           SCS DIMENSIONLESS UNITGRAPH
                          TLAG           .19   LAG

                                                                ***

                                                         UNIT HYDROGRAPH
                                                    31 END-OF-PERIOD ORDINATES
                 13.        39.        81.       134.       174.       188.       187.       168.       144.       112.
                 83.        64.        50.        39.        30.        23.        18.        14.        11.         8.
                  6.         5.         4.         3.         2.         2.         2.         1.         1.         1.
                  0.

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

                                                  HYDROGRAPH AT STATION     FR-1

*****************************************************************************************************************************************
                                                                  *
        DA MON HRMN  ORD     RAIN     LOSS  EXCESS     COMP Q     *      DA MON HRMN  ORD     RAIN     LOSS  EXCESS     COMP Q
                                                                  *
         1     0000    1      .00      .00     .00         0.     *       1     0500  151      .00      .00     .00         0.
         1     0002    2      .11      .10     .01         0.     *       1     0502  152      .00      .00     .00         0.
```

1	0004	3	.11	.10	.01	1.	*	1	0504	153	.00	.00	.00	0.
1	0006	4	.17	.15	.02	2.	*	1	0506	154	.00	.00	.00	0.
1	0008	5	.23	.20	.02	3.	*	1	0508	155	.00	.00	.00	0.
1	0010	6	.23	.19	.04	6.	*	1	0510	156	.00	.00	.00	0.
1	0012	7	.18	.13	.05	10.	*	1	0512	157	.00	.00	.00	0.
1	0014	8	.18	.12	.06	16.	*	1	0514	158	.00	.00	.00	0.
1	0016	9	.14	.08	.06	24.	*	1	0516	159	.00	.00	.00	0.
1	0018	10	.09	.05	.04	32.	*	1	0518	160	.00	.00	.00	0.
1	0020	11	.09	.05	.04	41.	*	1	0520	161	.00	.00	.00	0.
1	0022	12	.07	.03	.03	49.	*	1	0522	162	.00	.00	.00	0.
1	0024	13	.07	.03	.03	55.	*	1	0524	163	.00	.00	.00	0.
1	0026	14	.06	.03	.03	59.	*	1	0526	164	.00	.00	.00	0.
1	0028	15	.05	.03	.03	61.	*	1	0528	165	.00	.00	.00	0.
1	0030	16	.05	.02	.03	61.	*	1	0530	166	.00	.00	.00	0.
1	0032	17	.04	.02	.02	60.	*	1	0532	167	.00	.00	.00	0.
1	0034	18	.04	.02	.03	58.	*	1	0534	168	.00	.00	.00	0.
1	0036	19	.04	.02	.02	55.	*	1	0536	169	.00	.00	.00	0.
1	0038	20	.04	.02	.02	53.	*	1	0538	170	.00	.00	.00	0.
1	0040	21	.04	.02	.02	51.	*	1	0540	171	.00	.00	.00	0.
1	0042	22	.03	.01	.02	48.	*	1	0542	172	.00	.00	.00	0.
1	0044	23	.03	.01	.02	46.	*	1	0544	173	.00	.00	.00	0.
1	0046	24	.03	.01	.02	43.	*	1	0546	174	.00	.00	.00	0.
1	0048	25	.03	.01	.02	41.	*	1	0548	175	.00	.00	.00	0.
1	0050	26	.03	.01	.02	39.	*	1	0550	176	.00	.00	.00	0.
1	0052	27	.02	.01	.01	37.	*	1	0552	177	.00	.00	.00	0.
1	0054	28	.02	.01	.01	35.	*	1	0554	178	.00	.00	.00	0.
1	0056	29	.02	.01	.01	33.	*	1	0556	179	.00	.00	.00	0.
1	0058	30	.02	.01	.01	31.	*	1	0558	180	.00	.00	.00	0.
1	0100	31	.02	.01	.01	30.	*	1	0600	181	.00	.00	.00	0.
1	0102	32	.02	.01	.01	28.	*	1	0602	182	.00	.00	.00	0.
1	0104	33	.02	.01	.01	27.	*	1	0604	183	.00	.00	.00	0.
1	0106	34	.02	.01	.01	26.	*	1	0606	184	.00	.00	.00	0.
1	0108	35	.02	.01	.01	24.	*	1	0608	185	.00	.00	.00	0.
1	0110	36	.02	.01	.01	23.	*	1	0610	186	.00	.00	.00	0.
1	0112	37	.01	.01	.01	22.	*	1	0612	187	.00	.00	.00	0.
1	0114	38	.01	.01	.01	21.	*	1	0614	188	.00	.00	.00	0.
1	0116	39	.01	.00	.01	20.	*	1	0616	189	.00	.00	.00	0.
1	0118	40	.01	.00	.01	19.	*	1	0618	190	.00	.00	.00	0.
1	0120	41	.01	.00	.01	18.	*	1	0620	191	.00	.00	.00	0.
1	0122	42	.01	.00	.01	17.	*	1	0622	192	.00	.00	.00	0.
1	0124	43	.01	.00	.01	17.	*	1	0624	193	.00	.00	.00	0.
1	0126	44	.01	.00	.01	16.	*	1	0626	194	.00	.00	.00	0.
1	0128	45	.01	.00	.01	15.	*	1	0628	195	.00	.00	.00	0.
1	0130	46	.01	.00	.01	15.	*	1	0630	196	.00	.00	.00	0.
1	0132	47	.01	.00	.01	14.	*	1	0632	197	.00	.00	.00	0.
1	0134	48	.01	.00	.01	14.	*	1	0634	198	.00	.00	.00	0.
1	0136	49	.01	.00	.01	13.	*	1	0636	199	.00	.00	.00	0.
1	0138	50	.01	.00	.01	13.	*	1	0638	200	.00	.00	.00	0.
1	0140	51	.01	.00	.01	12.	*	1	0640	201	.00	.00	.00	0.
1	0142	52	.01	.00	.01	12.	*	1	0642	202	.00	.00	.00	0.
1	0144	53	.01	.00	.01	11.	*	1	0644	203	.00	.00	.00	0.
1	0146	54	.01	.00	.01	11.	*	1	0646	204	.00	.00	.00	0.
1	0148	55	.01	.00	.01	11.	*	1	0648	205	.00	.00	.00	0.
1	0150	56	.01	.00	.01	10.	*	1	0650	206	.00	.00	.00	0.
1	0152	57	.01	.00	.00	10.	*	1	0652	207	.00	.00	.00	0.
1	0154	58	.01	.00	.00	10.	*	1	0654	208	.00	.00	.00	0.
1	0156	59	.01	.00	.00	9.	*	1	0656	209	.00	.00	.00	0.
1	0158	60	.01	.00	.00	9.	*	1	0658	210	.00	.00	.00	0.
1	0200	61	.01	.00	.00	9.	*	1	0700	211	.00	.00	.00	0.
1	0202	62	.01	.00	.00	8.	*	1	0702	212	.00	.00	.00	0.
1	0204	63	.01	.00	.00	8.	*	1	0704	213	.00	.00	.00	0.
1	0206	64	.01	.00	.00	8.	*	1	0706	214	.00	.00	.00	0.
1	0208	65	.01	.00	.00	8.	*	1	0708	215	.00	.00	.00	0.
1	0210	66	.01	.00	.00	7.	*	1	0710	216	.00	.00	.00	0.
1	0212	67	.01	.00	.00	7.	*	1	0712	217	.00	.00	.00	0.
1	0214	68	.01	.00	.00	7.	*	1	0714	218	.00	.00	.00	0.
1	0216	69	.01	.00	.00	7.	*	1	0716	219	.00	.00	.00	0.
1	0218	70	.00	.00	.00	7.	*	1	0718	220	.00	.00	.00	0.
1	0220	71	.00	.00	.00	7.	*	1	0720	221	.00	.00	.00	0.
1	0222	72	.00	.00	.00	6.	*	1	0722	222	.00	.00	.00	0.
1	0224	73	.00	.00	.00	6.	*	1	0724	223	.00	.00	.00	0.
1	0226	74	.00	.00	.00	6.	*	1	0726	224	.00	.00	.00	0.
1	0228	75	.00	.00	.00	6.	*	1	0728	225	.00	.00	.00	0.
1	0230	76	.00	.00	.00	6.	*	1	0730	226	.00	.00	.00	0.
1	0232	77	.00	.00	.00	6.	*	1	0732	227	.00	.00	.00	0.
1	0234	78	.00	.00	.00	5.	*	1	0734	228	.00	.00	.00	0.
1	0236	79	.00	.00	.00	5.	*	1	0736	229	.00	.00	.00	0.
1	0238	80	.00	.00	.00	5.	*	1	0738	230	.00	.00	.00	0.
1	0240	81	.00	.00	.00	5.	*	1	0740	231	.00	.00	.00	0.
1	0242	82	.00	.00	.00	5.	*	1	0742	232	.00	.00	.00	0.
1	0244	83	.00	.00	.00	5.	*	1	0744	233	.00	.00	.00	0.

1	0246	84	.00	.00	.00	5.	*	1	0746	234	.00	.00	.00	0.
1	0248	85	.00	.00	.00	5.	*	1	0748	235	.00	.00	.00	0.
1	0250	86	.00	.00	.00	5.	*	1	0750	236	.00	.00	.00	0.
1	0252	87	.00	.00	.00	4.	*	1	0752	237	.00	.00	.00	0.
1	0254	88	.00	.00	.00	4.	*	1	0754	238	.00	.00	.00	0.
1	0256	89	.00	.00	.00	4.	*	1	0756	239	.00	.00	.00	0.
1	0258	90	.00	.00	.00	4.	*	1	0758	240	.00	.00	.00	0.
1	0300	91	.00	.00	.00	4.	*	1	0800	241	.00	.00	.00	0.
1	0302	92	.00	.00	.00	4.	*	1	0802	242	.00	.00	.00	0.
1	0304	93	.00	.00	.00	4.	*	1	0804	243	.00	.00	.00	0.
1	0306	94	.00	.00	.00	4.	*	1	0806	244	.00	.00	.00	0.
1	0308	95	.00	.00	.00	3.	*	1	0808	245	.00	.00	.00	0.
1	0310	96	.00	.00	.00	3.	*	1	0810	246	.00	.00	.00	0.
1	0312	97	.00	.00	.00	2.	*	1	0812	247	.00	.00	.00	0.
1	0314	98	.00	.00	.00	2.	*	1	0814	248	.00	.00	.00	0.
1	0316	99	.00	.00	.00	1.	*	1	0816	249	.00	.00	.00	0.
1	0318	100	.00	.00	.00	1.	*	1	0818	250	.00	.00	.00	0.
1	0320	101	.00	.00	.00	1.	*	1	0820	251	.00	.00	.00	0.
1	0322	102	.00	.00	.00	1.	*	1	0822	252	.00	.00	.00	0.
1	0324	103	.00	.00	.00	1.	*	1	0824	253	.00	.00	.00	0.
1	0326	104	.00	.00	.00	0.	*	1	0826	254	.00	.00	.00	0.
1	0328	105	.00	.00	.00	0.	*	1	0828	255	.00	.00	.00	0.
1	0330	106	.00	.00	.00	0.	*	1	0830	256	.00	.00	.00	0.
1	0332	107	.00	.00	.00	0.	*	1	0832	257	.00	.00	.00	0.
1	0334	108	.00	.00	.00	0.	*	1	0834	258	.00	.00	.00	0.
1	0336	109	.00	.00	.00	0.	*	1	0836	259	.00	.00	.00	0.
1	0338	110	.00	.00	.00	0.	*	1	0838	260	.00	.00	.00	0.
1	0340	111	.00	.00	.00	0.	*	1	0840	261	.00	.00	.00	0.
1	0342	112	.00	.00	.00	0.	*	1	0842	262	.00	.00	.00	0.
1	0344	113	.00	.00	.00	0.	*	1	0844	263	.00	.00	.00	0.
1	0346	114	.00	.00	.00	0.	*	1	0846	264	.00	.00	.00	0.
1	0348	115	.00	.00	.00	0.	*	1	0848	265	.00	.00	.00	0.
1	0350	116	.00	.00	.00	0.	*	1	0850	266	.00	.00	.00	0.
1	0352	117	.00	.00	.00	0.	*	1	0852	267	.00	.00	.00	0.
1	0354	118	.00	.00	.00	0.	*	1	0854	268	.00	.00	.00	0.
1	0356	119	.00	.00	.00	0.	*	1	0856	269	.00	.00	.00	0.
1	0358	120	.00	.00	.00	0.	*	1	0858	270	.00	.00	.00	0.
1	0400	121	.00	.00	.00	0.	*	1	0900	271	.00	.00	.00	0.
1	0402	122	.00	.00	.00	0.	*	1	0902	272	.00	.00	.00	0.
1	0404	123	.00	.00	.00	0.	*	1	0904	273	.00	.00	.00	0.
1	0406	124	.00	.00	.00	0.	*	1	0906	274	.00	.00	.00	0.
1	0408	125	.00	.00	.00	0.	*	1	0908	275	.00	.00	.00	0.
1	0410	126	.00	.00	.00	0.	*	1	0910	276	.00	.00	.00	0.
1	0412	127	.00	.00	.00	0.	*	1	0912	277	.00	.00	.00	0.
1	0414	128	.00	.00	.00	0.	*	1	0914	278	.00	.00	.00	0.
1	0416	129	.00	.00	.00	0.	*	1	0916	279	.00	.00	.00	0.
1	0418	130	.00	.00	.00	0.	*	1	0918	280	.00	.00	.00	0.
1	0420	131	.00	.00	.00	0.	*	1	0920	281	.00	.00	.00	0.
1	0422	132	.00	.00	.00	0.	*	1	0922	282	.00	.00	.00	0.
1	0424	133	.00	.00	.00	0.	*	1	0924	283	.00	.00	.00	0.
1	0426	134	.00	.00	.00	0.	*	1	0926	284	.00	.00	.00	0.
1	0428	135	.00	.00	.00	0.	*	1	0928	285	.00	.00	.00	0.
1	0430	136	.00	.00	.00	0.	*	1	0930	286	.00	.00	.00	0.
1	0432	137	.00	.00	.00	0.	*	1	0932	287	.00	.00	.00	0.
1	0434	138	.00	.00	.00	0.	*	1	0934	288	.00	.00	.00	0.
1	0436	139	.00	.00	.00	0.	*	1	0936	289	.00	.00	.00	0.
1	0438	140	.00	.00	.00	0.	*	1	0938	290	.00	.00	.00	0.
1	0440	141	.00	.00	.00	0.	*	1	0940	291	.00	.00	.00	0.
1	0442	142	.00	.00	.00	0.	*	1	0942	292	.00	.00	.00	0.
1	0444	143	.00	.00	.00	0.	*	1	0944	293	.00	.00	.00	0.
1	0446	144	.00	.00	.00	0.	*	1	0946	294	.00	.00	.00	0.
1	0448	145	.00	.00	.00	0.	*	1	0948	295	.00	.00	.00	0.
1	0450	146	.00	.00	.00	0.	*	1	0950	296	.00	.00	.00	0.
1	0452	147	.00	.00	.00	0.	*	1	0952	297	.00	.00	.00	0.
1	0454	148	.00	.00	.00	0.	*	1	0954	298	.00	.00	.00	0.
1	0456	149	.00	.00	.00	0.	*	1	0956	299	.00	.00	.00	0.
1	0458	150	.00	.00	.00	0.	*	1	0958	300	.00	.00	.00	0.
							*							

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TOTAL RAINFALL = 2.76, TOTAL LOSS = 1.67, TOTAL EXCESS = 1.09

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	9.97-HR
+	(CFS)	(HR)					
			(CFS)				
+	61.	.50		10.	6.	6.	6.
			(INCHES)	1.093	1.093	1.093	1.093
			(AC-FT)	5.	5.	5.	5.

CUMULATIVE AREA = .08 SQ MI

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              **************
              *            *
 435 KK       *    CO-1    *
              *            *
              **************
                           COMBINE HYDROGRAPHS
                           AT NODE FR-1 (MAIN CHANNEL)
                           AT ALVERNON ROAD

 439 HC          HYDROGRAPH COMBINATION
                       ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
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HYDROGRAPH AT STATION CO-1
SUM OF 2 HYDROGRAPHS

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DA MON	HRMN	ORD	FLOW	DA MON	HRMN	ORD	FLOW	DA MON	HRMN	ORD	FLOW	DA MON	HRMN	ORD	FLOW
1	0000	1	0.	1	0230	76	1694.	1	0500	151	232.	1	0730	226	133.
1	0002	2	0.	1	0232	77	1645.	1	0502	152	228.	1	0732	227	131.
1	0004	3	1.	1	0234	78	1596.	1	0504	153	224.	1	0734	228	130.
1	0006	4	2.	1	0236	79	1547.	1	0506	154	220.	1	0736	229	128.
1	0008	5	4.	1	0238	80	1497.	1	0508	155	217.	1	0738	230	127.
1	0010	6	7.	1	0240	81	1449.	1	0510	156	214.	1	0740	231	125.
1	0012	7	12.	1	0242	82	1402.	1	0512	157	211.	1	0742	232	124.
1	0014	8	19.	1	0244	83	1361.	1	0514	158	209.	1	0744	233	122.
1	0016	9	29.	1	0246	84	1325.	1	0516	159	206.	1	0746	234	121.
1	0018	10	41.	1	0248	85	1286.	1	0518	160	204.	1	0748	235	119.
1	0020	11	55.	1	0250	86	1247.	1	0520	161	202.	1	0750	236	118.
1	0022	12	70.	1	0252	87	1207.	1	0522	162	201.	1	0752	237	116.
1	0024	13	86.	1	0254	88	1169.	1	0524	163	199.	1	0754	238	115.
1	0026	14	104.	1	0256	89	1132.	1	0526	164	197.	1	0756	239	114.
1	0028	15	127.	1	0258	90	1097.	1	0528	165	196.	1	0758	240	112.
1	0030	16	161.	1	0300	91	1064.	1	0530	166	195.	1	0800	241	110.
1	0032	17	205.	1	0302	92	1032.	1	0532	167	194.	1	0802	242	109.
1	0034	18	246.	1	0304	93	1003.	1	0534	168	193.	1	0804	243	107.
1	0036	19	283.	1	0306	94	976.	1	0536	169	191.	1	0806	244	105.
1	0038	20	316.	1	0308	95	950.	1	0538	170	190.	1	0808	245	103.
1	0040	21	344.	1	0310	96	925.	1	0540	171	189.	1	0810	246	101.
1	0042	22	368.	1	0312	97	901.	1	0542	172	189.	1	0812	247	99.
1	0044	23	388.	1	0314	98	878.	1	0544	173	188.	1	0814	248	97.
1	0046	24	406.	1	0316	99	855.	1	0546	174	187.	1	0816	249	94.
1	0048	25	421.	1	0318	100	831.	1	0548	175	186.	1	0818	250	92.
1	0050	26	437.	1	0320	101	809.	1	0550	176	185.	1	0820	251	89.
1	0052	27	456.	1	0322	102	786.	1	0552	177	184.	1	0822	252	86.
1	0054	28	483.	1	0324	103	764.	1	0554	178	183.	1	0824	253	84.
1	0056	29	537.	1	0326	104	743.	1	0556	179	182.	1	0826	254	82.
1	0058	30	616.	1	0328	105	722.	1	0558	180	182.	1	0828	255	79.
1	0100	31	721.	1	0330	106	703.	1	0600	181	181.	1	0830	256	78.
1	0102	32	878.	1	0332	107	684.	1	0602	182	180.	1	0832	257	76.
1	0104	33	1125.	1	0334	108	665.	1	0604	183	179.	1	0834	258	75.
1	0106	34	1556.	1	0336	109	648.	1	0606	184	178.	1	0836	259	73.
1	0108	35	2260.	1	0338	110	632.	1	0608	185	177.	1	0838	260	71.
1	0110	36	3128.	1	0340	111	616.	1	0610	186	176.	1	0840	261	68.
1	0112	37	4033.	1	0342	112	601.	1	0612	187	176.	1	0842	262	66.
1	0114	38	4788.	1	0344	113	587.	1	0614	188	175.	1	0844	263	64.
1	0116	39	5285.	1	0346	114	573.	1	0616	189	174.	1	0846	264	62.
1	0118	40	5524.	1	0348	115	559.	1	0618	190	173.	1	0848	265	60.
1	0120	41	5589.	1	0350	116	546.	1	0620	191	172.	1	0850	266	58.
1	0122	42	5537.	1	0352	117	533.	1	0622	192	171.	1	0852	267	56.
1	0124	43	5412.	1	0354	118	520.	1	0624	193	170.	1	0854	268	54.
1	0126	44	5243.	1	0356	119	508.	1	0626	194	169.	1	0856	269	52.
1	0128	45	5053.	1	0358	120	495.	1	0628	195	168.	1	0858	270	50.
1	0130	46	4856.	1	0400	121	482.	1	0630	196	167.	1	0900	271	48.
1	0132	47	4660.	1	0402	122	470.	1	0632	197	166.	1	0902	272	46.
1	0134	48	4467.	1	0404	123	461.	1	0634	198	165.	1	0904	273	44.
1	0136	49	4293.	1	0406	124	454.	1	0636	199	164.	1	0906	274	42.
1	0138	50	4140.	1	0408	125	446.	1	0638	200	164.	1	0908	275	40.
1	0140	51	3987.	1	0410	126	438.	1	0640	201	163.	1	0910	276	39.

1	0142	52	3834.	*	1	0412	127	428.	*	1	0642	202	162.	*	1	0912	277	37.
1	0144	53	3682.	*	1	0414	128	418.	*	1	0644	203	161.	*	1	0914	278	35.
1	0146	54	3537.	*	1	0416	129	408.	*	1	0646	204	160.	*	1	0916	279	33.
1	0148	55	3400.	*	1	0418	130	398.	*	1	0648	205	159.	*	1	0918	280	32.
1	0150	56	3275.	*	1	0420	131	388.	*	1	0650	206	158.	*	1	0920	281	30.
1	0152	57	3162.	*	1	0422	132	377.	*	1	0652	207	156.	*	1	0922	282	29.
1	0154	58	3056.	*	1	0424	133	367.	*	1	0654	208	155.	*	1	0924	283	27.
1	0156	59	2955.	*	1	0426	134	356.	*	1	0656	209	154.	*	1	0926	284	26.
1	0158	60	2855.	*	1	0428	135	346.	*	1	0658	210	153.	*	1	0928	285	25.
1	0200	61	2756.	*	1	0430	136	336.	*	1	0700	211	152.	*	1	0930	286	23.
1	0202	62	2661.	*	1	0432	137	327.	*	1	0702	212	151.	*	1	0932	287	22.
1	0204	63	2576.	*	1	0434	138	318.	*	1	0704	213	150.	*	1	0934	288	21.
1	0206	64	2484.	*	1	0436	139	309.	*	1	0706	214	149.	*	1	0936	289	20.
1	0208	65	2392.	*	1	0438	140	301.	*	1	0708	215	148.	*	1	0938	290	19.
1	0210	66	2303.	*	1	0440	141	294.	*	1	0710	216	146.	*	1	0940	291	18.
1	0212	67	2223.	*	1	0442	142	286.	*	1	0712	217	145.	*	1	0942	292	17.
1	0214	68	2152.	*	1	0444	143	279.	*	1	0714	218	144.	*	1	0944	293	16.
1	0216	69	2086.	*	1	0446	144	272.	*	1	0716	219	143.	*	1	0946	294	16.
1	0218	70	2023.	*	1	0448	145	265.	*	1	0718	220	141.	*	1	0948	295	15.
1	0220	71	1962.	*	1	0450	146	259.	*	1	0720	221	140.	*	1	0950	296	14.
1	0222	72	1904.	*	1	0452	147	253.	*	1	0722	222	138.	*	1	0952	297	14.
1	0224	73	1848.	*	1	0454	148	247.	*	1	0724	223	137.	*	1	0954	298	13.
1	0226	74	1795.	*	1	0456	149	242.	*	1	0726	224	136.	*	1	0956	299	12.
1	0228	75	1744.	*	1	0458	150	237.	*	1	0728	225	134.	*	1	0958	300	12.
				*					*					*				

****

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	9.97-HR
+	(CFS)	(HR)					
			(CFS)				
+	5589.	1.33		1182.	745.	745.	745.
			(INCHES)	1.729	1.812	1.812	1.812
			(AC-FT)	586.	614.	614.	614.

CUMULATIVE AREA = 6.35 SQ MI

1

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+					6-HOUR	24-HOUR	72-HOUR			
	HYDROGRAPH AT									
+		FR-12	811.	.40	102.	61.	61.	.43		
	ROUTED TO									
+		12TO11	761.	.50	102.	61.	61.	.43		
+									4.94	.50
	HYDROGRAPH AT									
+		FR-11	854.	.40	109.	66.	66.	.48		
	2 COMBINED AT									
+		CO-11	1563.	.47	211.	127.	127.	.91		
	ROUTED TO									
+		11TO10	1479.	.57	211.	127.	127.	.91		
+									7.09	.57
	HYDROGRAPH AT									
+		FR-10	822.	.47	113.	68.	68.	.56		
	2 COMBINED AT									
+		CO-10	2235.	.53	324.	195.	195.	1.47		
	ROUTED TO									
+		10TO9	2155.	.60	324.	195.	195.	1.47		
+									6.05	.60
	HYDROGRAPH AT									
+		FR-9	224.	.43	30.	18.	18.	.15		
	2 COMBINED AT									
+		CO-9	2329.	.60	354.	213.	213.	1.63		
	ROUTED TO									
+		RES-9	2324.	.60	354.	213.	213.	1.63		

								3073.73	.60
HYDROGRAPH AT	FR-94	830.	.40	104.	63.	63.	.46		
ROUTED TO	94TO93	781.	.50	104.	63.	63.	.46	4.28	.50
HYDROGRAPH AT	FR-93	635.	.43	83.	50.	50.	.38		
2 COMBINED AT	CO-93	1388.	.47	187.	112.	112.	.85		
ROUTED TO	93TO92	1323.	.57	187.	112.	112.	.85	5.50	.57
HYDROGRAPH AT	FR-92	343.	.40	44.	26.	26.	.22		
2 COMBINED AT	CO-92	1601.	.53	230.	139.	139.	1.07		
HYDROGRAPH AT	FR-922	559.	.43	73.	44.	44.	.34		
ROUTED TO	922921	510.	.57	73.	44.	44.	.34	3.52	.57
HYDROGRAPH AT	FR-921	337.	.40	43.	26.	26.	.21		
2 COMBINED AT	CO-921	777.	.53	116.	70.	70.	.55		
2 COMBINED AT	CO-92A	2377.	.53	346.	208.	208.	1.62		
ROUTED TO	92TO91	2364.	.57	346.	208.	208.	1.62	7.16	.57
HYDROGRAPH AT	FR-91	181.	.40	23.	14.	14.	.11		
2 COMBINED AT	CO-91	2504.	.57	369.	222.	222.	1.73		
ROUTED TO	RES-91	2503.	.57	369.	222.	222.	1.73	3057.61	.57
2 COMBINED AT	CO-9A	4798.	.60	723.	435.	435.	3.36		
ROUTED TO	9TO8	4681.	.67	723.	435.	435.	3.36	8.46	.67
HYDROGRAPH AT	FR-8	887.	.43	118.	71.	71.	.59		
2 COMBINED AT	CO-8	5284.	.67	841.	506.	506.	3.95		
HYDROGRAPH AT	FR-82	495.	.40	63.	38.	38.	.33		
ROUTED TO	82TO81	440.	.57	63.	38.	38.	.33	3.32	.57
HYDROGRAPH AT	FR-81	430.	.50	62.	38.	38.	.31		
2 COMBINED AT	CO-81	852.	.53	126.	76.	76.	.64		

+	2 COMBINED AT	CO-8A	6055.	.63	967.	582.	582.	4.59		
+ +	ROUTED TO	8TO7	6015.	.67	967.	582.	582.	4.59	80.52	.67
+	HYDROGRAPH AT	FR-7	180.	.50	28.	17.	17.	.17		
+	2 COMBINED AT	CO-7	6162.	.67	994.	599.	599.	4.77		
+ +	ROUTED TO	RES-7	6121.	.70	974.	599.	599.	4.77	2787.24	.70
+ +	ROUTED TO	7TO6	5974.	.77	973.	599.	599.	4.77	18.91	.77
+	HYDROGRAPH AT	FR-6	123.	.50	19.	12.	12.	.13		
+	2 COMBINED AT	CO-6	6060.	.77	989.	610.	610.	4.90		
+	HYDROGRAPH AT	FR-62	595.	.47	86.	52.	52.	.50		
+ +	ROUTED TO	62TO61	570.	.57	86.	52.	52.	.50	2.80	.57
+	HYDROGRAPH AT	FR-61	202.	.53	32.	19.	19.	.17		
+	2 COMBINED AT	CO-61	770.	.57	117.	71.	71.	.67		
+	2 COMBINED AT	CO-6A	6657.	.77	1105.	681.	681.	5.57		
+ +	ROUTED TO	6TO5	6295.	.87	1103.	681.	681.	5.57	83.53	.87
+	HYDROGRAPH AT	FR-5	120.	.50	19.	12.	12.	.16		
+	2 COMBINED AT	CO-5	6368.	.87	1121.	693.	693.	5.72		
+ +	ROUTED TO	RES-5	6213.	.93	1121.	693.	693.	5.72	2643.91	.93
+ +	ROUTED TO	5TO4	6095.	.97	1120.	693.	693.	5.72	24.55	.97
+	HYDROGRAPH AT	FR-4	72.	.33	9.	5.	5.	.05		
+	2 COMBINED AT	CO-4	6114.	.97	1126.	698.	698.	5.78		
+ +	ROUTED TO	RES-4	6046.	1.00	1126.	699.	699.	5.78	2620.42	1.00
+ +	ROUTED TO	4TO3	5654.	1.20	1122.	698.	698.	5.78	72.43	1.20
+	HYDROGRAPH AT	FR-3	301.	.50	47.	28.	28.	.32		
+	2 COMBINED AT	CO-3	5756.	1.20	1158.	726.	726.	6.09		

	ROUTED TO									
+		3TO2	5604.	1.27	1156.	726.	726.	6.09		
+									81.18	1.27
	HYDROGRAPH AT									
+		FR-2	131.	.53	22.	13.	13.	.17		
	2 COMBINED AT									
+		CO-2	5653.	1.27	1176.	740.	740.	6.27		
	ROUTED TO									
+		2TO1	5571.	1.33	1174.	739.	739.	6.27		
+									44.95	1.33
	HYDROGRAPH AT									
+		FR-1	61.	.50	10.	6.	6.	.08		
	2 COMBINED AT									
+		CO-1	5589.	1.33	1182.	745.	745.	6.35		

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

APPENDIX E

HYDRAULIC ANALYSIS SUPPORTING DOCUMENTATION

E.1 – ROUGHNESS COEFFICIENT ESTIMATION

Finger Rock Wash LOMR Study

Field Reconnaissance Report

Prepared For:

Pima County Regional Flood Control District
97 East Congress Street, 3rd Floor
Tucson, Arizona 85701

Prepared By:

CMG Drainage Engineering, Inc.
3555 N. Mountain Ave.
Tucson, Arizona 85719

Job #27028

April 23, 2010

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1.0 Introduction

This report was prepared to document the results of field reconnaissance performed as part of the Finger Rock Wash LOMR. The project area is shown on Figure F-1 in Appendix F. CMG Drainage Engineering, Inc. conducted field reconnaissance of the project area between 2008 and 2010. The purpose of the field reconnaissance was to observe channel and floodplain conditions, to estimate Manning's "n" values, document those conditions using photographs, observe tributary inflow areas as well as possible channel overbank flow areas, and observe culvert dimensions and configurations. Additional culvert and roadway elevation information was obtained through review of as-built plans and field survey as needed. The results of the field reconnaissance documented herein were used for subsequent floodplain hydraulic modeling of Finger Rock Wash.

2.0 Manning's "n" Values

Manning's "n" values were determined using the methodology in the report titled "Guide to Selecting Manning's Roughness Coefficients For Natural Channel Flood Plains", U.S. Geological Survey Water Supply Paper 2339 report, 1989, and supplemented by information from the report titled "Estimating Manning's Roughness Coefficients for Stream Channel and Flood Plains in Maricopa County, Arizona", USGS, 1991. Engineering judgment and experience were applied as needed to determine the variables used in the above referenced procedures and to arrive at reasonable roughness element estimates. In addition to information from field reconnaissance, aerial photographs were also reviewed to verify conditions along the various study reaches.

Finger Rock Wash, a tributary to Rillito Creek emanates from the Santa Catalina Mountain Foothills in Pima County, Arizona. Finger Rock Wash consists primarily of a sand/cobble bed channel varying in depth up to approximately four feet in places. The overbanks of the creek are heavily vegetated.

The main factor in the development of the Manning’s roughness coefficients for the Finger Rock Wash is the variation in vegetation, for which the manning's vegetation component varies from 0 to 0.02. Other factors in defining the main channel “n” values, such as channel materials, degree of irregularity, effects of obstructions and variations in channel cross-sections, also played a role.

The main factors in the development of the roughness coefficients for the overbank areas were vegetation and obstructions. The vegetation component varies from 0.015 to 0.035. The obstruction component varies from 0.005 to 0.01. Both components increase moving upstream.

3.0 Photographs and Roughness Coefficient Tables

The following pages contain aerial and ground photographs and tabulations of selected roughness coefficients for the various reaches covered by the study. For the purposes of field reconnaissance and roughness coefficient determination, the study area was broken into a series of reaches usually defined by major roadway crossings. The photographs and Manning’s “n” value tables which follow are organized by those reach definitions.

TABLE 1: DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS

Project: Finger Rock Wash LOMR
Stream: Finger Rock Wash
Location: River Station 0.000 to River Station 2.233 (Alvernon to Sunrise)

Channel Conditions		Manning's Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Concrete	n	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.012-.035			
	Gravel		.028-.035			
	Cobble		.030-.050	.045	.045	.045
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n,	0			
	Minor		.001-.005	.001	.005	.001
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n,	.000-.004	.005	.005	.005
	Minor		.010-.025			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n,	.002-.010		0	
	Medium		.010-.025	.015		.015
	Large		.025-.050			
	Very Large		.50-.100			
Variations in Channel Cross-section	Gradual	n,	0	0	0	0
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
n = (n+n+n+n+n)m				0.066	0.045	0.066

Finger Rock Wash – reach between Alvernon Way and La Espalda

Google Maps Aerial View – Typical of Reach - RS 0.421 to 0.710

Finger Rock Wash – reach between Alvernon Way and La Espalda
River Station 0.898 (La Espalda) Facing Downstream

Overbank 'n' = 0.066 Channel 'n' = 0.045

Finger Rock Wash – reach between La Espalda and Sunrise Drive

Google Maps Aerial View – Typical of Reach - RS 1.585 to RS 1.997

Finger Rock Wash – reach between La Espalda and Sunrise Drive
River Station 2.233 (Sunrise Drive) Facing Downstream

Overbank 'n' = 0.066 Channel 'n' = 0.045

TABLE 2: DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS

Project: Finger Rock Wash LOMR
Stream: Finger Rock Wash
Location: River Station 2.233 to River Station 3.466 (Sunrise Drive to Skyline Drive)

Channel Conditions		Manning's Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Concrete	n	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.012-.035			
	Gravel		.028-.035			
	Cobble		.030-.050	0.045	0.035	0.045
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n,	0			
	Minor		.001-.005		0.005	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n,	.000-.004	0.005	0.005	0.005
	Minor		.010-.025			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n,	.002-.010		0.005	
	Medium		.010-.025	0.025		0.025
	Large		.025-.050			
	Very Large		.50-.100			
Variations in Channel Cross-section	Gradual	n,	0	0	0	0
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
n = (n+n+n+n+n)m				0.075	0.050	0.075

Finger Rock Wash – reach between Sunrise Drive and Skyline Drive

Google Maps Aerial View – Typical of Reach - RS 3.031 to RS 3.291

Finger Rock Wash – reach between Sunrise Drive and Skyline Drive
River Station 2.268 (Sunrise Drive) Facing Upstream

Overbank 'n' = 0.075 Channel 'n' = 0.050

Finger Rock Wash – reach between Sunrise Drive and Skyline Drive
River Station 3.466 (Skyline Drive) Facing Downstream

Overbank 'n' = 0.075 Channel 'n' = 0.050

TABLE 3: DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS

Project: Finger Rock Wash LOMR
Stream: Finger Rock Wash
Location: River Station 3.466 to River Station 4.643 (Skyline Drive to Ina Road)

Channel Conditions		Manning's Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Concrete	n	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.012-.035			
	Gravel		.028-.035			
	Cobble		.030-.050	0.045	0.035	0.045
	Boulder		.040-.070			
Degree of Irregularity	Smooth	n,	0			
	Minor		.001-.005		0.005	
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n,	.000-.004	0.005	0.005	0.005
	Minor		.010-.025			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n,	.002-.010		0.01	
	Medium		.010-.025	0.025		0.025
	Large		.025-.050			
	Very Large		.50-.100			
Variations in Channel Cross-section	Gradual	n,	0	0	0	0
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1			
	Appreciable		1.15	1.1	1.1	1.1
	Severe		1.3			
n = (n+n+n+n+n)m				0.083	0.061	0.083

Finger Rock Wash – reach between Skyline Drive and Ina Road

Google Maps Aerial View – Typical of Reach – RS 3.466 to RS 4.643

Finger Rock Wash – reach between Skyline Drive and Ina Road
River Station 3.466 (Skyline Drive) Facing Upstream

Overbank 'n' = 0.083 Channel 'n' = 0.061

TABLE 4: DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS

Project: Finger Rock Wash LOMR
Stream: Finger Rock Wash
Location: River Station 4.643 to River Station 4.800 (Ina Road to Coronado NF Boundary)

Channel Conditions		Manning's Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Concrete	n	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.012-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070	0.04	0.04	0.04
Degree of Irregularity	Smooth	n,	0			
	Minor		.001-.005	0.001	0.001	0.001
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n,	.000-.004	0.01	0.005	0.01
	Minor		.010-.025			
	Appreciable		.020-.030			
	Severe		.040-.060			
Vegetation	Small	n,	.002-.010			
	Medium		.010-.025		0.02	
	Large		.025-.050	0.035		0.035
	Very Large		.50-.100			
Variations in Channel Cross-section	Gradual	n,	0	0	0	
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
n = (n+n+n+n+n)m				0.086	0.066	0.086

Finger Rock Wash – reach between Ina Road and Coronado NF Boundary

Google Maps Aerial View – Typical of Reach – RS 4.643 to RS 4.800

Finger Rock Wash – reach between Ina Road and Coronado NF Boundary
River Station 4.787 (Playa de Coronado West Crossing) Facing Downstream

Overbank 'n' = 0.086 Channel 'n' = 0.066

TABLE 5: DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS

Project: Finger Rock Wash LOMR
Stream: Finger Rock Wash – Pontatoc Canyon Tributary
Location: River Station 0.000 to River Station 0.154 (Ina Road to Coronado NF Boundary)

Channel Conditions		Manning's Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Concrete	n	.012-.018			
	Firm Soil		.025-.032			
	Coarse Sand		.012-.035			
	Gravel		.028-.035			
	Cobble		.030-.050			
	Boulder		.040-.070	0.040	0.040	0.040
Degree of Irregularity	Smooth	n,	0			
	Minor		.001-.005	0.001	0.002	0.001
	Moderate		.006-.010			
	Severe		.011-.020			
Effects of Obstruction	Negligible	n,	.000-.004			
	Minor		.010-.025	0.010		0.010
	Appreciable		.020-.030		0.020	
	Severe		.040-.060			
Vegetation	Small	n,	.002-.010			
	Medium		.010-.025	0.025		0.025
	Large		.025-.050		0.035	
	Very Large		.50-.100			
Variations in Channel Cross-section	Gradual	n,	0	0	0	0
	Occ. Alt.		.001-.005			
	Freq. Alt.		.010-.015			
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
n = (n+n+n+n+n)m				0.076	0.097	0.076

Pontatoc Canyon Tributary – reach between Ina Road and Coronado NF Boundary

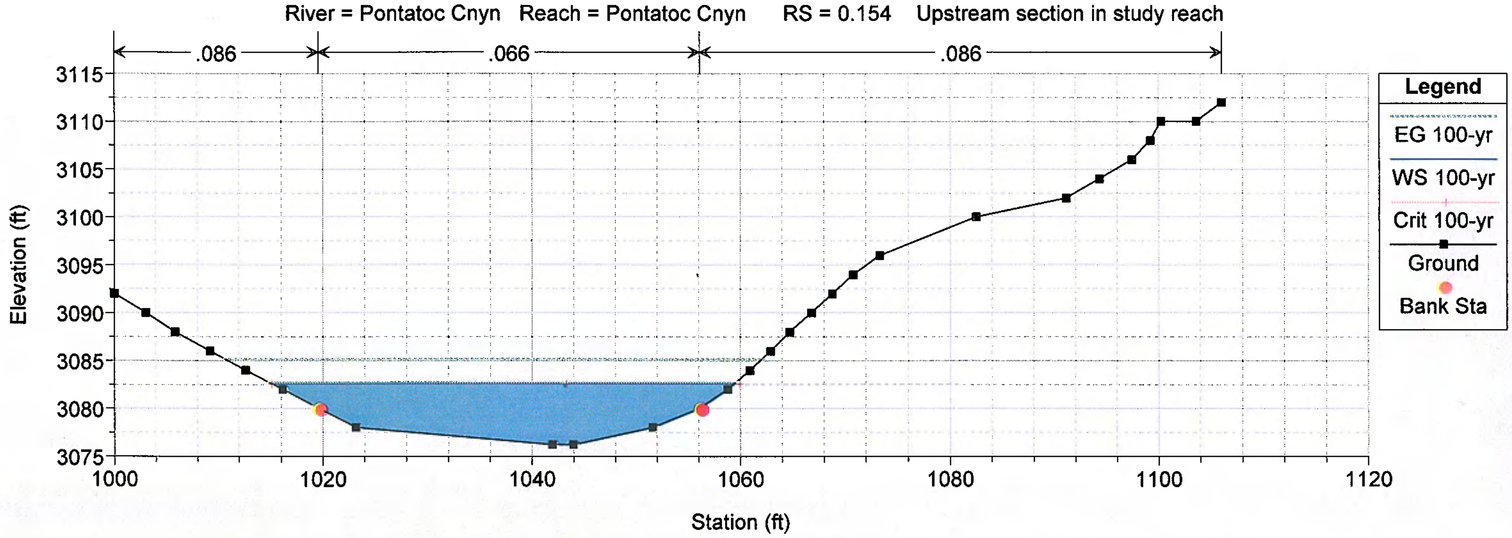
Google Maps Aerial View – Typical of Reach – RS 0.000 to RS 0.154

Pontatoc Canyon Tributary – reach between Ina Road and Coronado NF Boundary
River Station 0.070 (Playa de Coronado East Crossing) Downstream

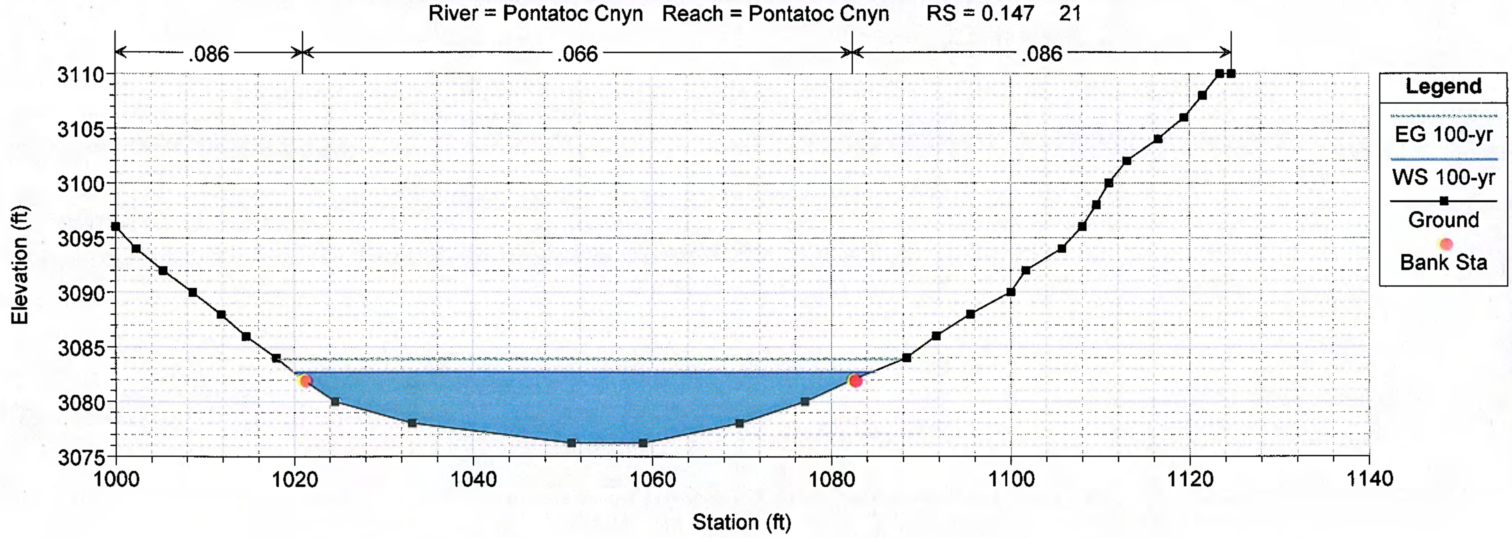
Overbank 'n' = 0.076 Channel 'n' = 0.097

E.2 – CROSS SECTION PLOTS

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.154 Upstream section in study reach



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.147 21



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
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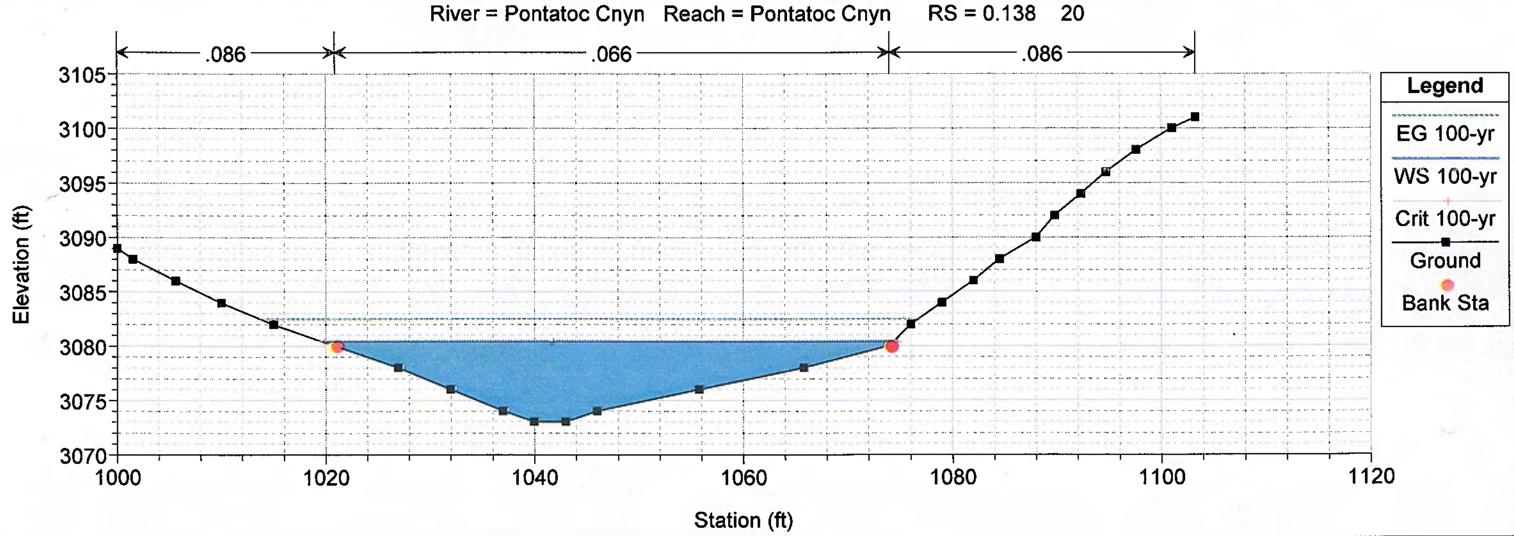

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
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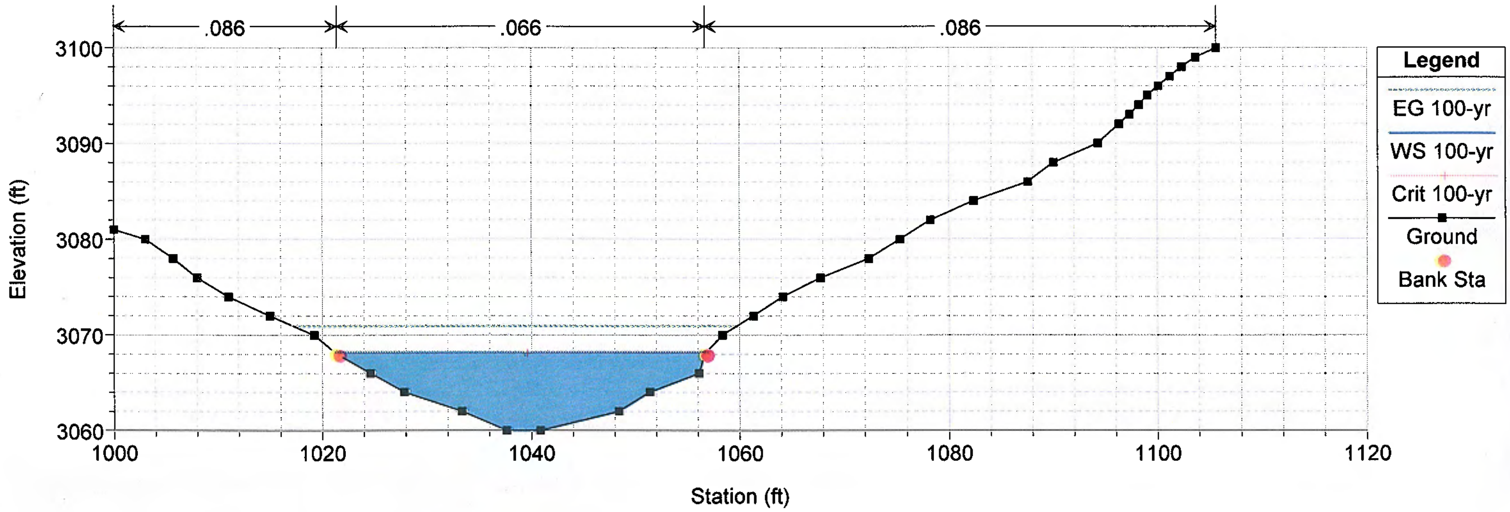

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
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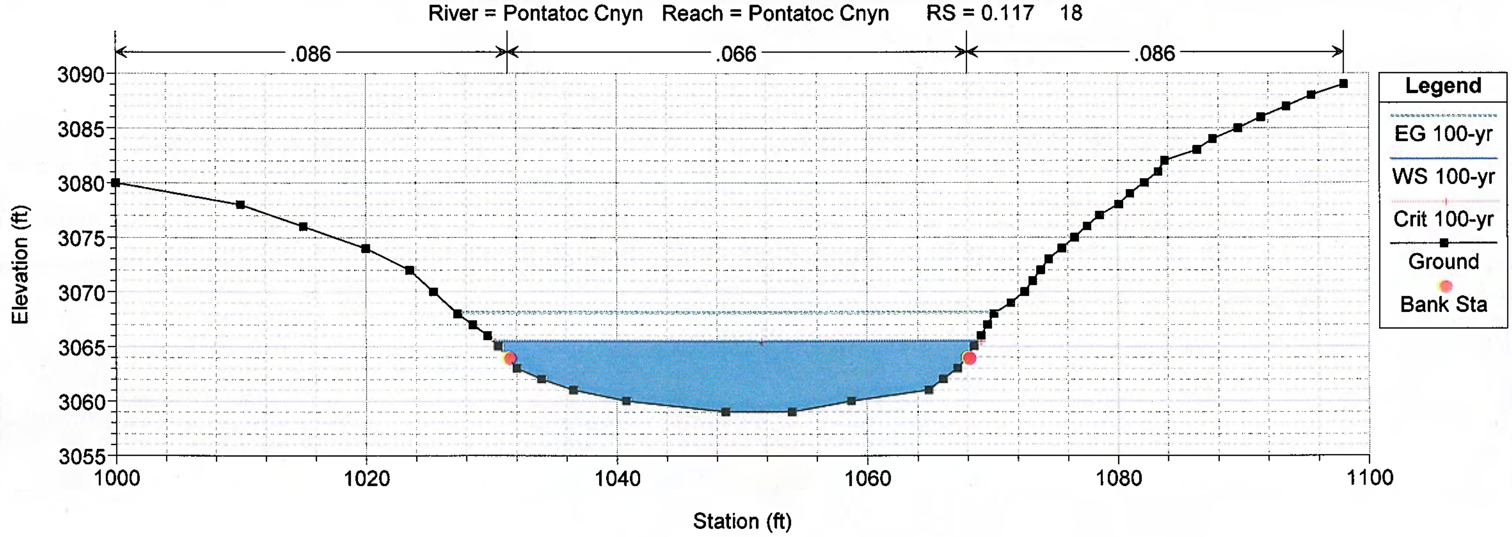
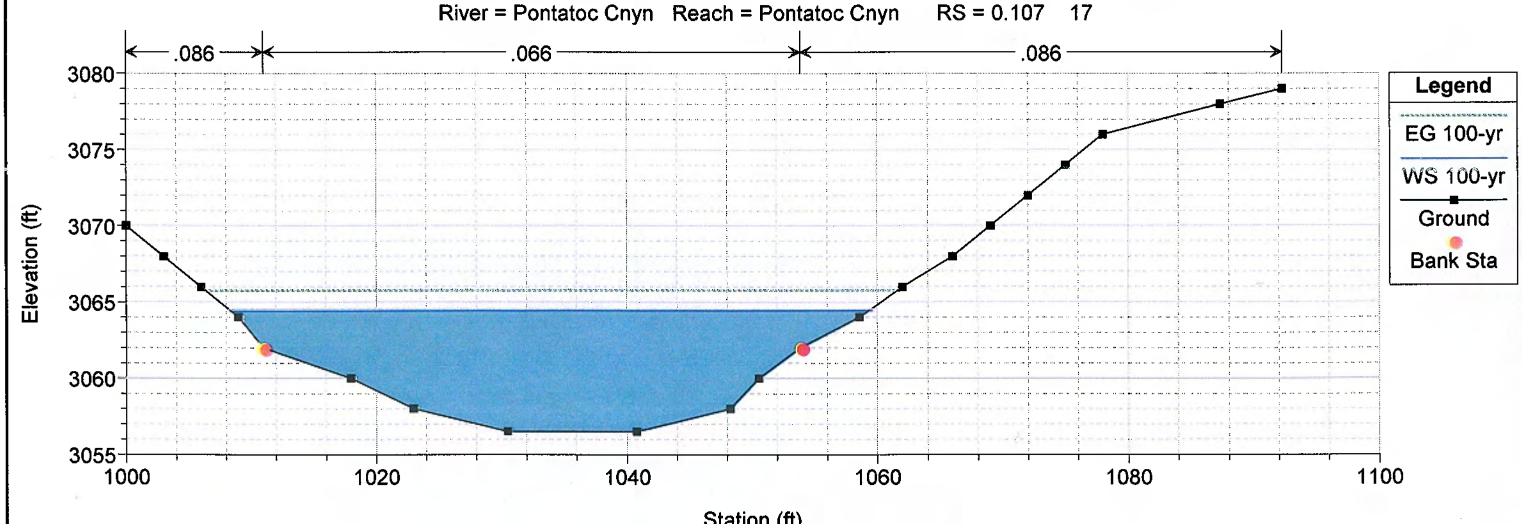
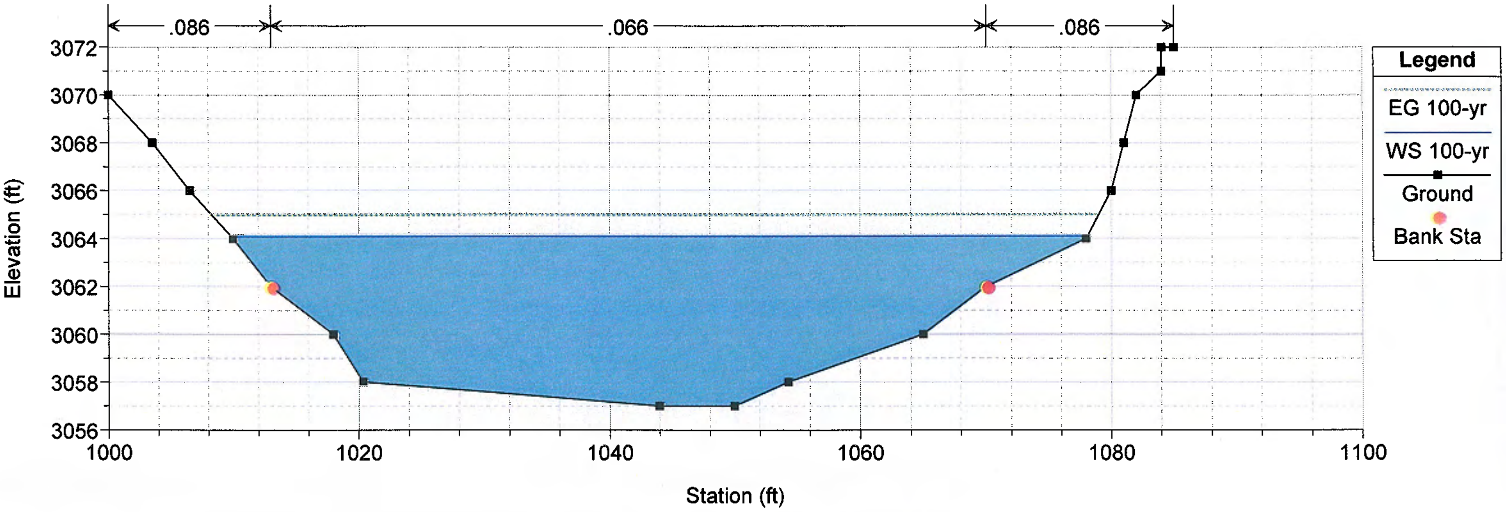


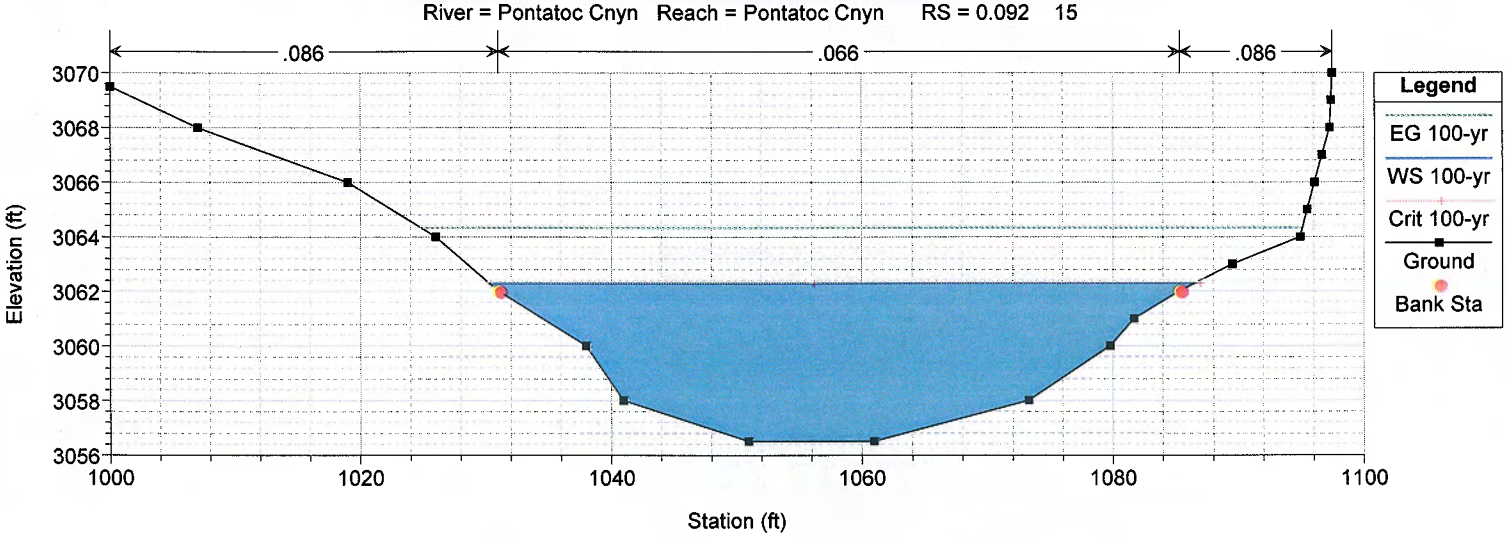
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.107 17



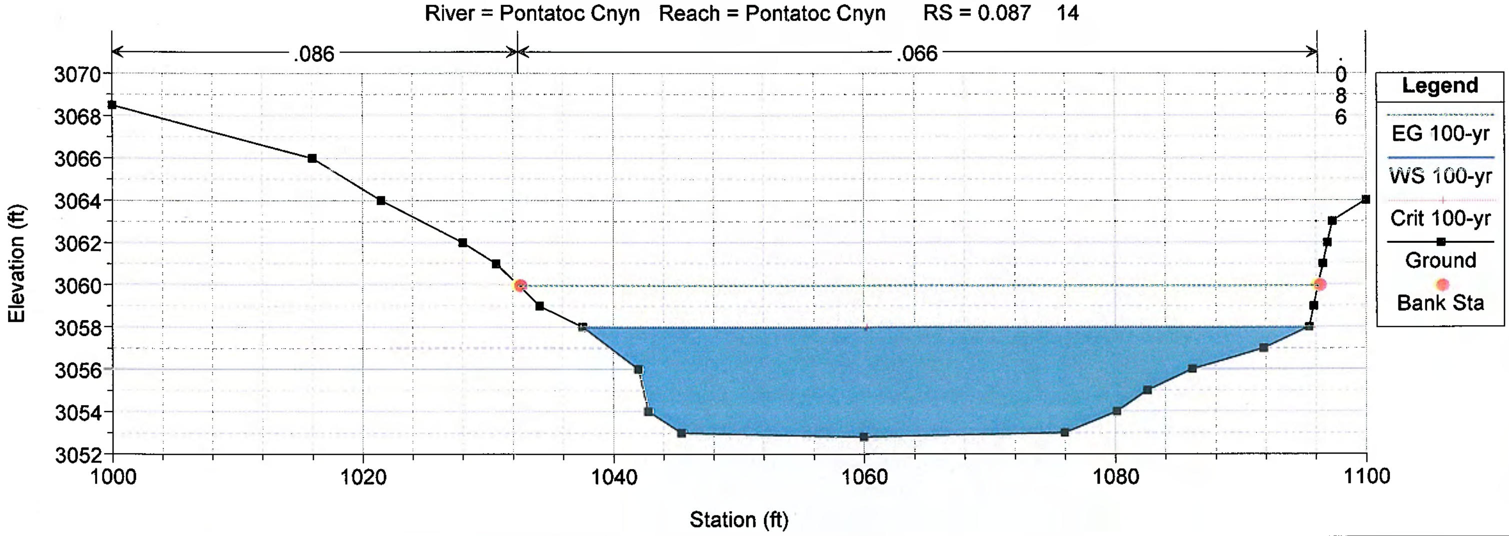
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.097 16

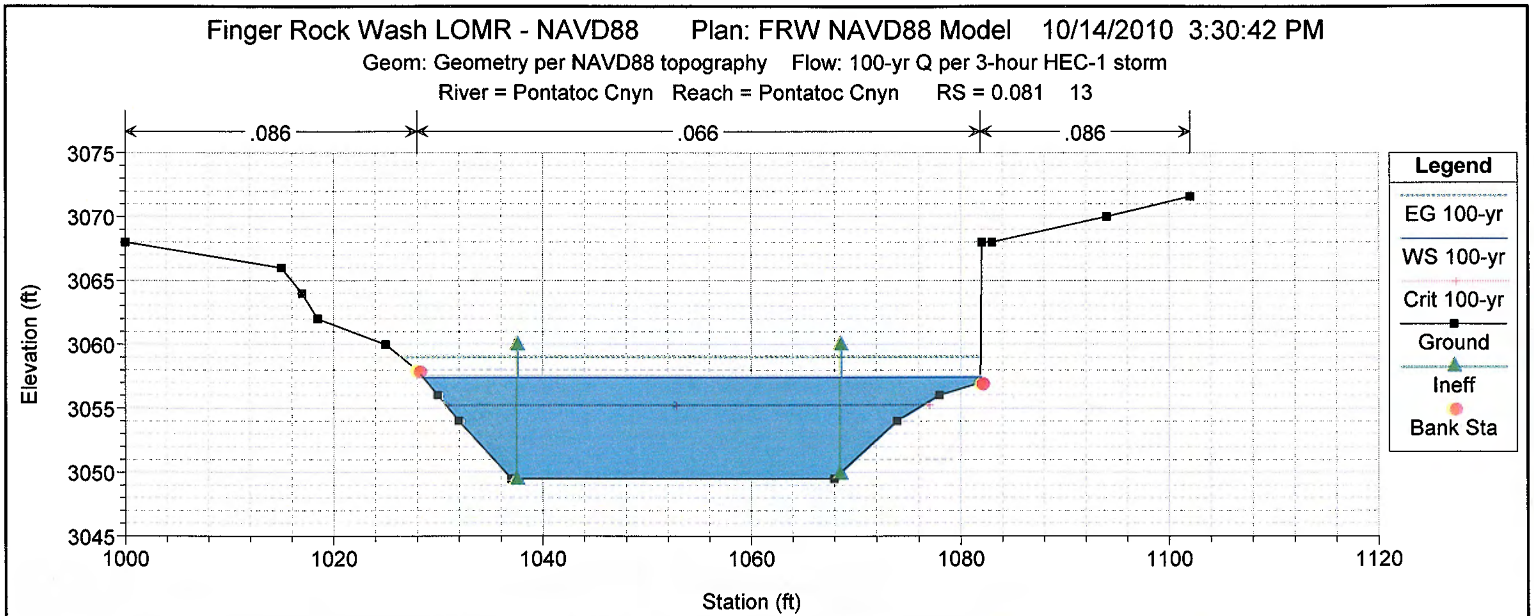


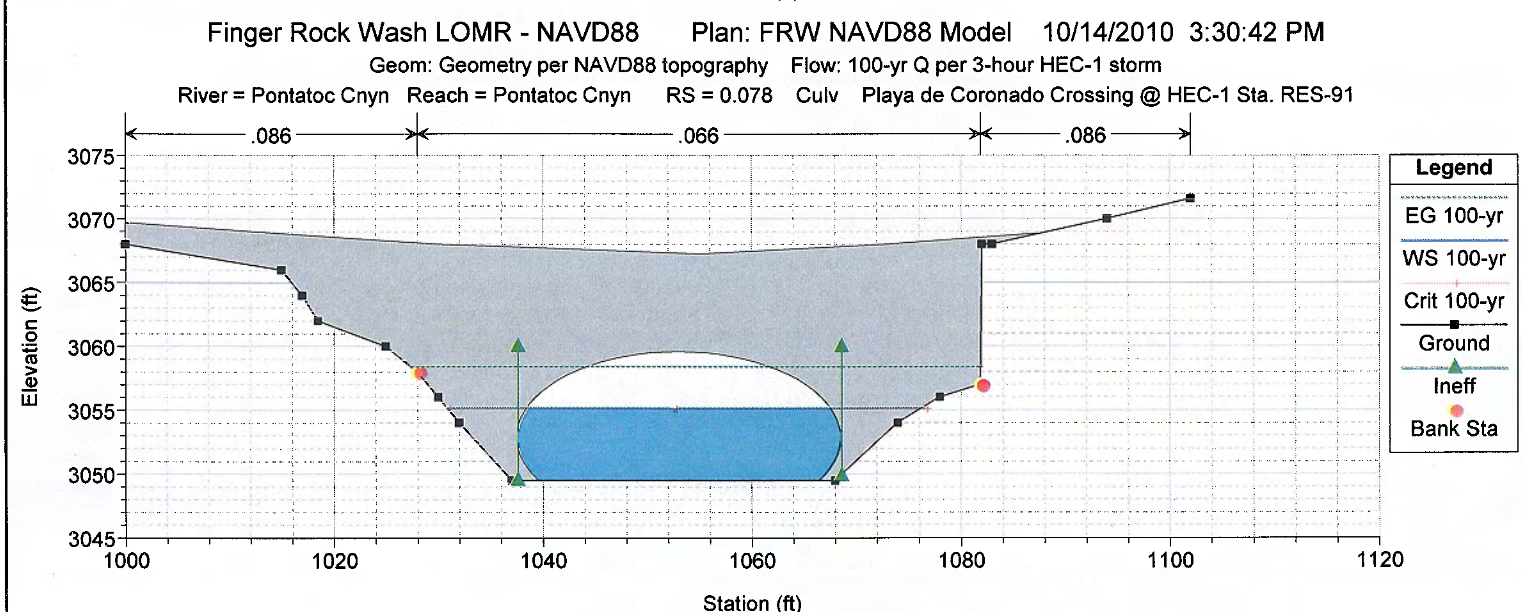
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.092 15

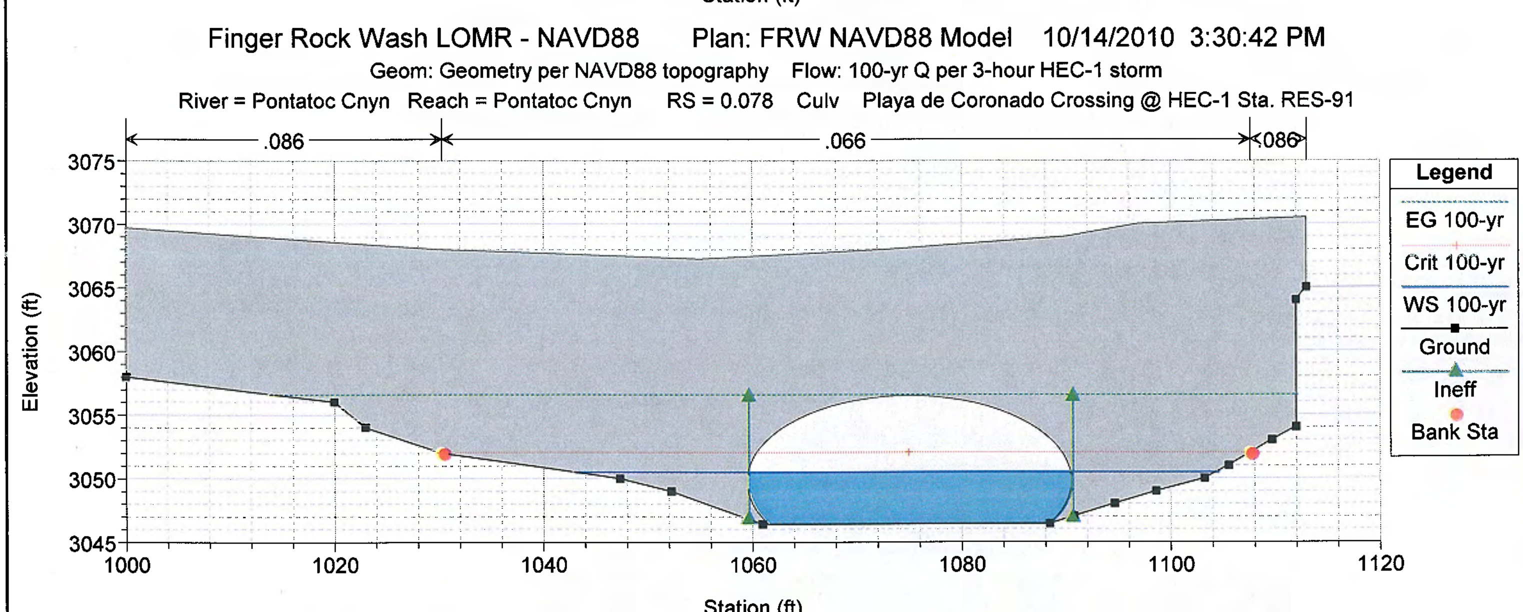


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.087 14




Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.081 13
.086
.066
.086
Elevation (ft)
3075
3070
3065
3060
3055
3050
3045
1000
1020
1040
1060
1080
1100
1120
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

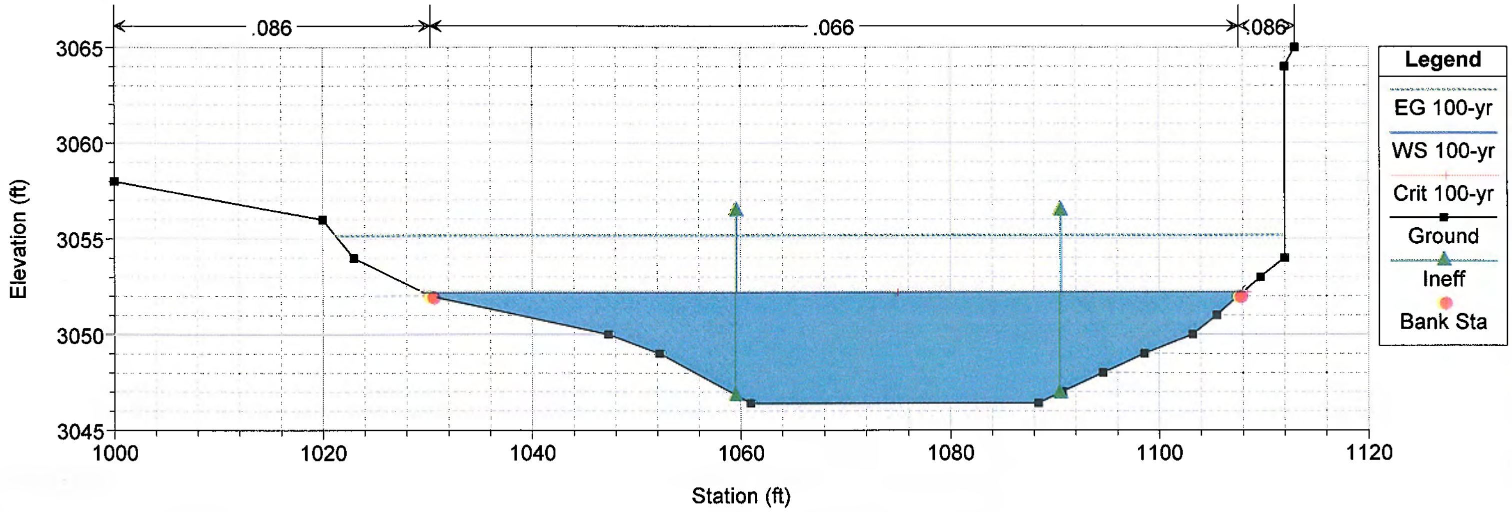

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.078 Culv Playa de Coronado Crossing @ HEC-1 Sta. RES-91
.086
.066
.086
Elevation (ft)
3075
3070
3065
3060
3055
3050
3045
1000
1020
1040
1060
1080
1100
1120
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.078 Culv Playa de Coronado Crossing @ HEC-1 Sta. RES-91
.086
.066
.086
Elevation (ft)
3075
3070
3065
3060
3055
3050
3045
1000
1020
1040
1060
1080
1100
1120
Station (ft)
Legend
EG 100-yr
Crit 100-yr
WS 100-yr
Ground
Ineff
Bank Sta

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM

Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm

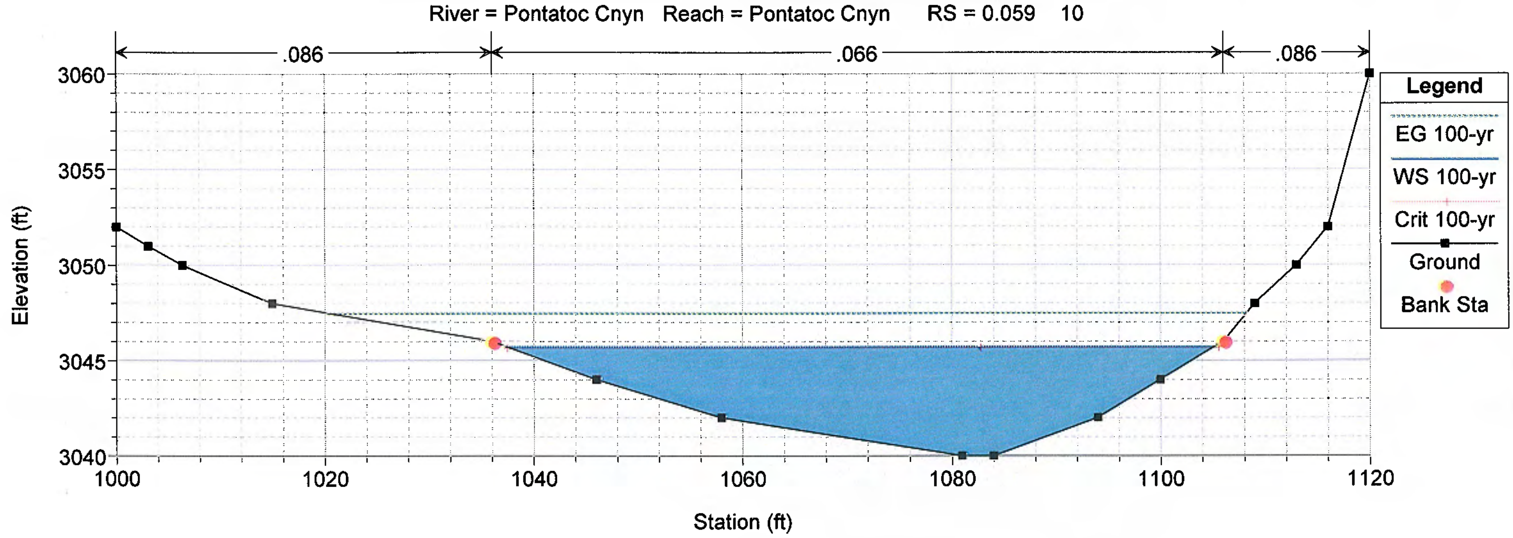
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.07 12



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM

Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm

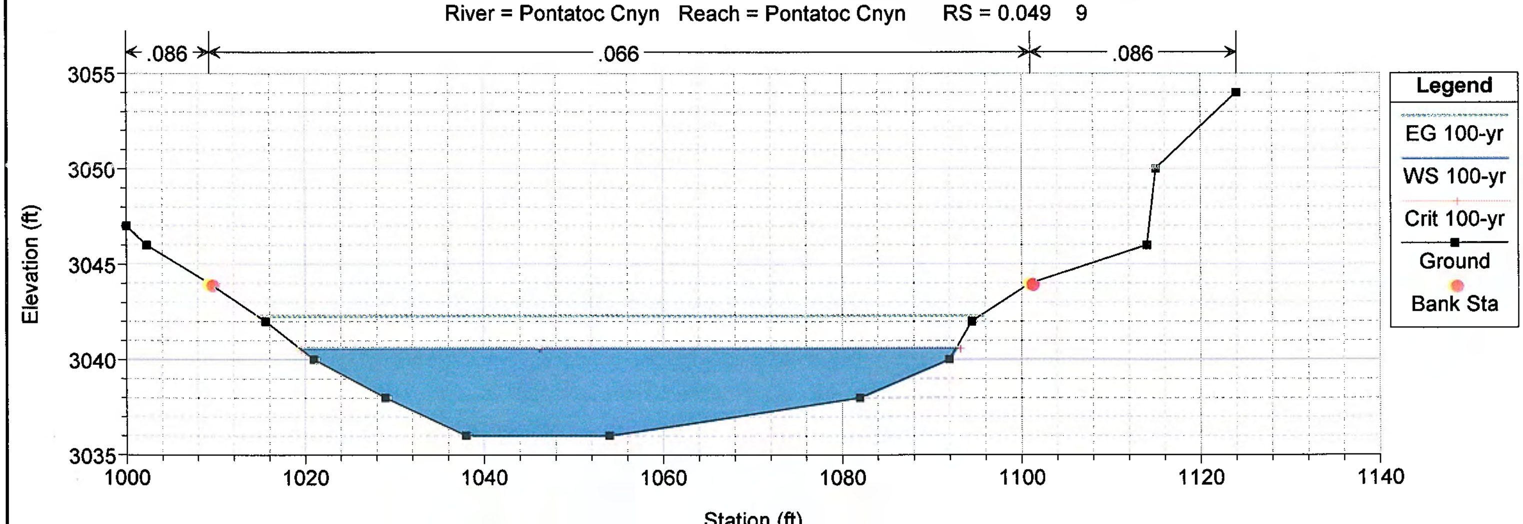
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.059 10

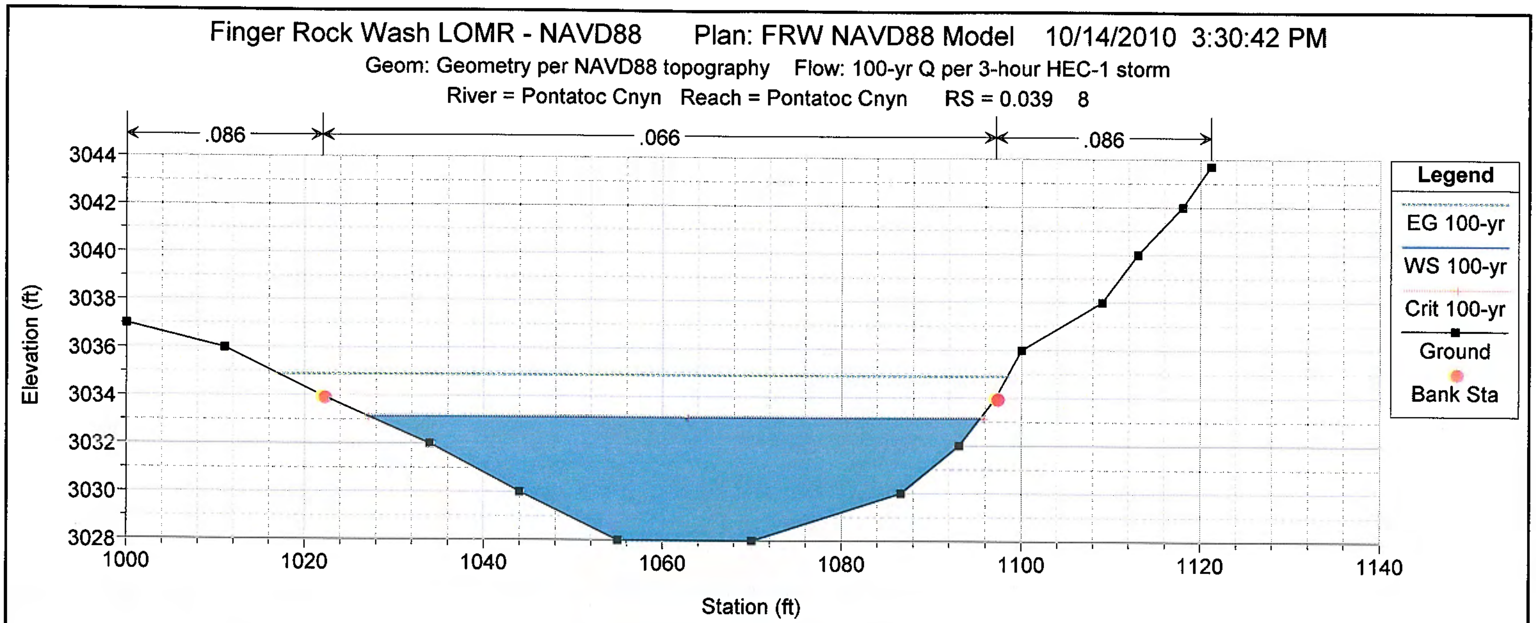


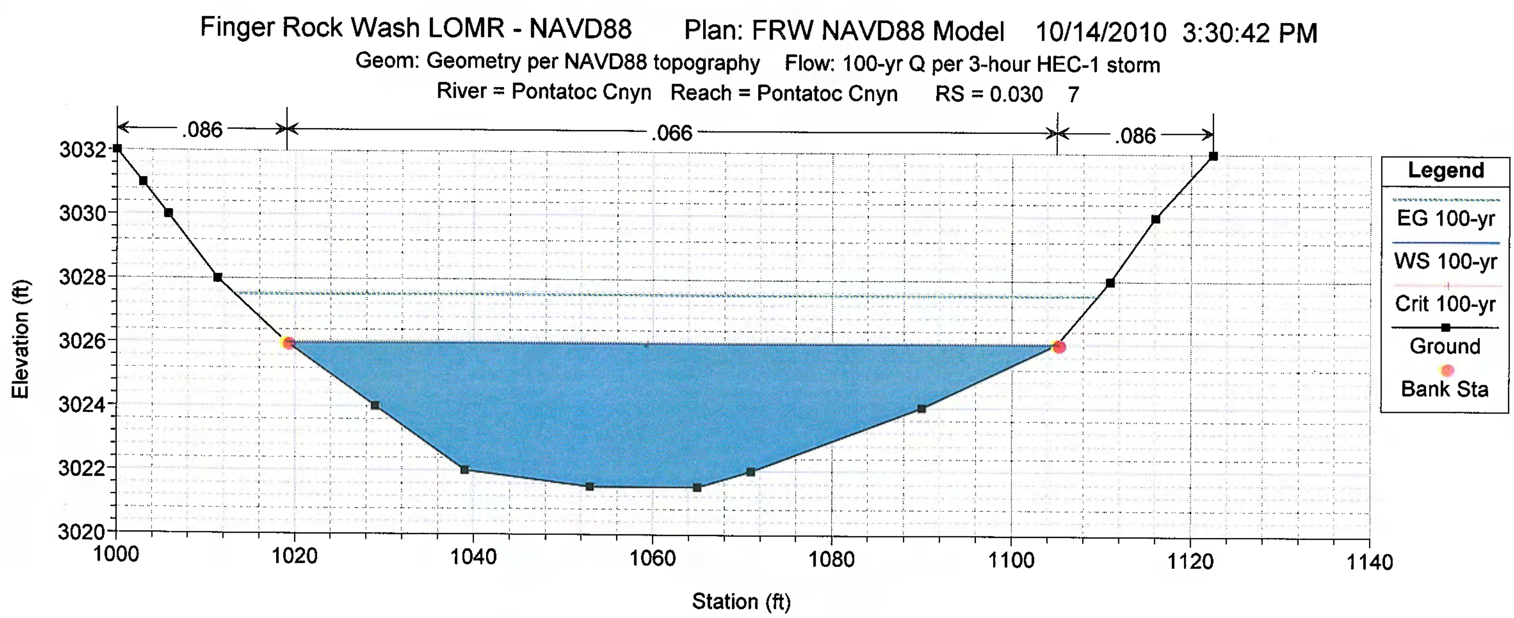
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM

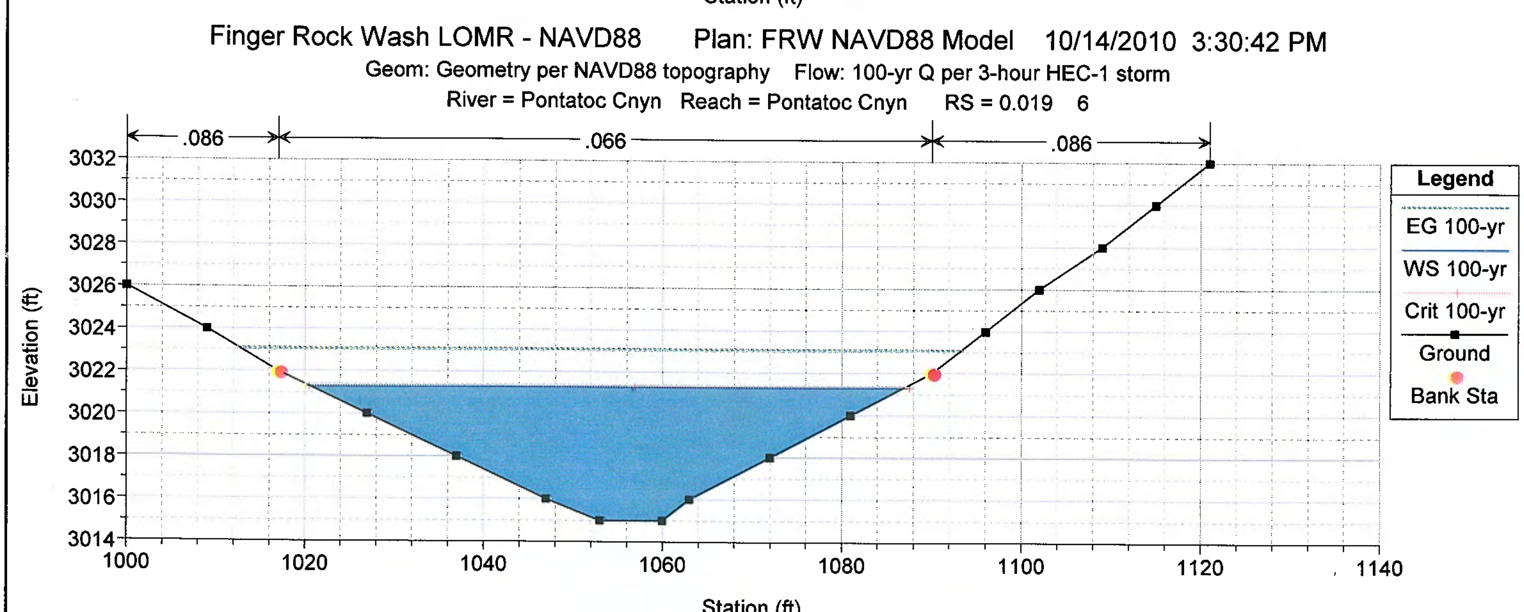
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm

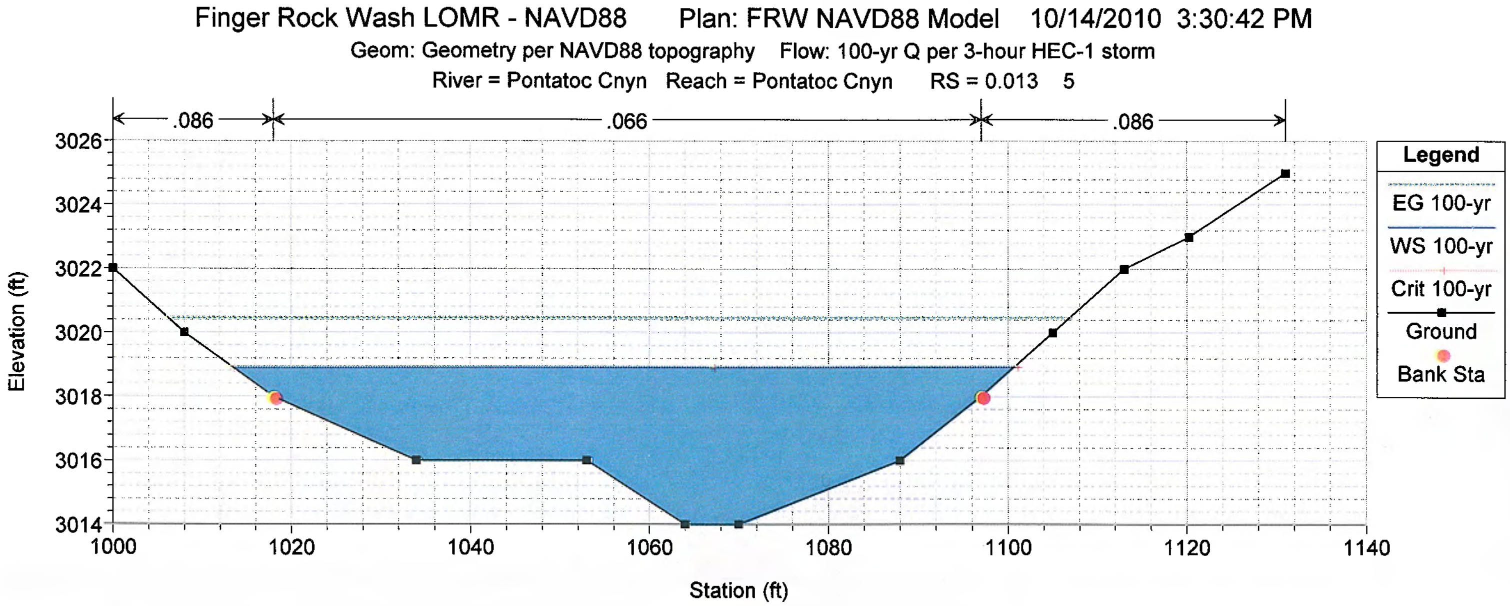
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.049 9



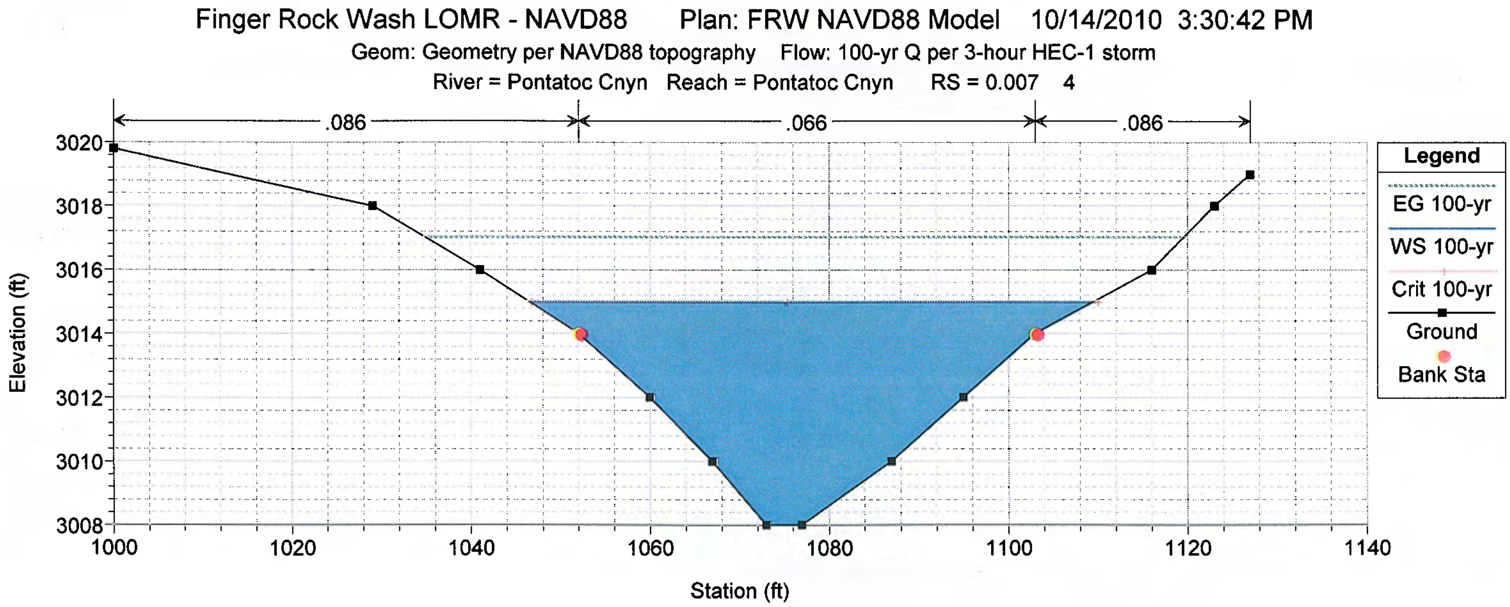

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.039 8
.086
.066
.086
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
3044
3042
3040
3038
3036
3034
3032
3030
3028
1000
1020
1040
1060
1080
1100
1120
1140


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.030 7
.086
.066
.086
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
3032
3030
3028
3026
3024
3022
3020
1000
1020
1040
1060
1080
1100
1120
1140

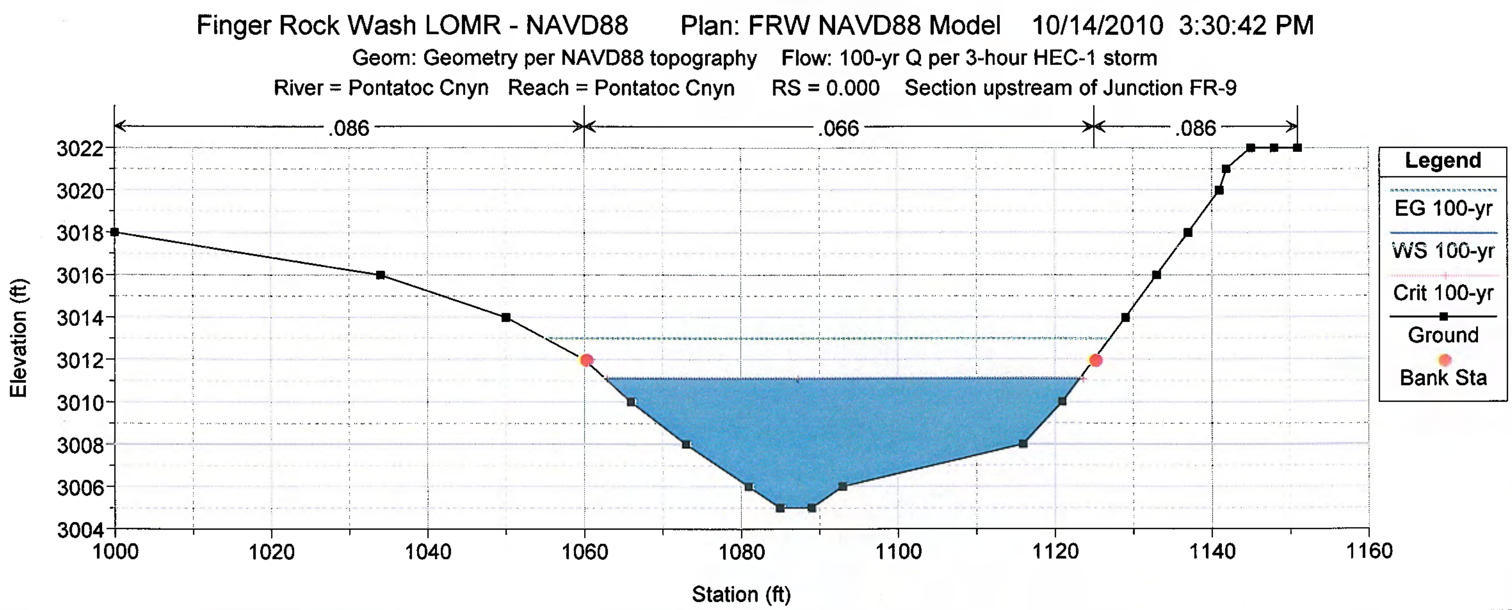

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.019 6
.086
.066
.086
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
3032
3030
3028
3026
3024
3022
3020
3018
3016
3014
1000
1020
1040
1060
1080
1100
1120
1140



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.013 5
.086
.066
.086
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

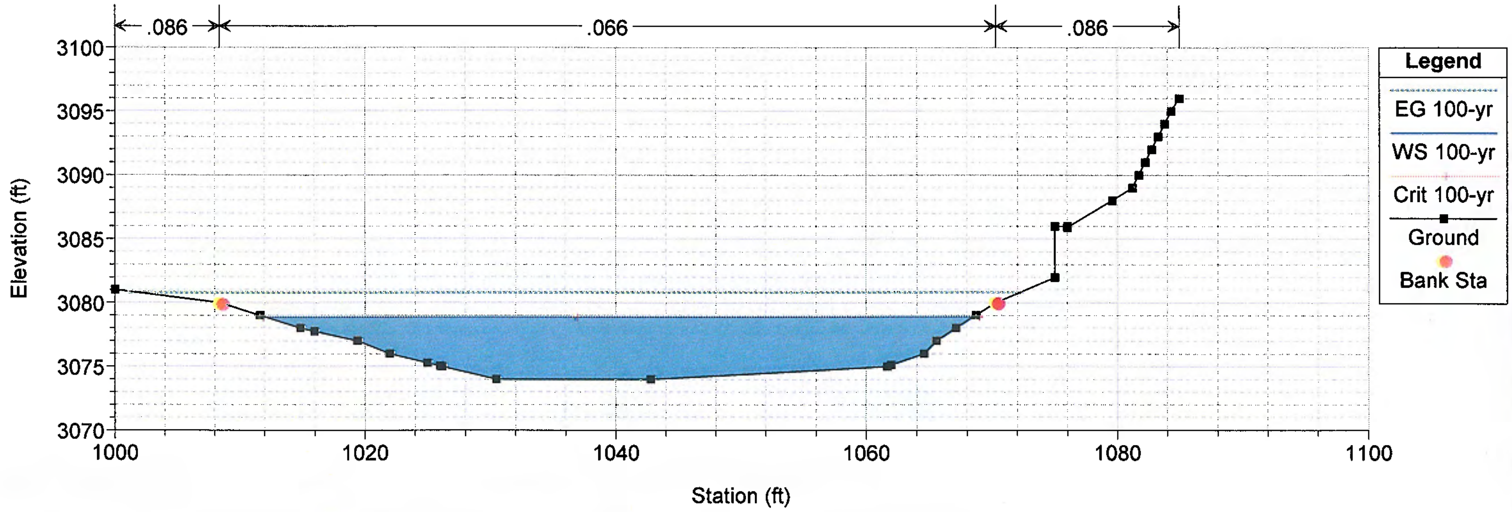


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.007 4
.086
.066
.086
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

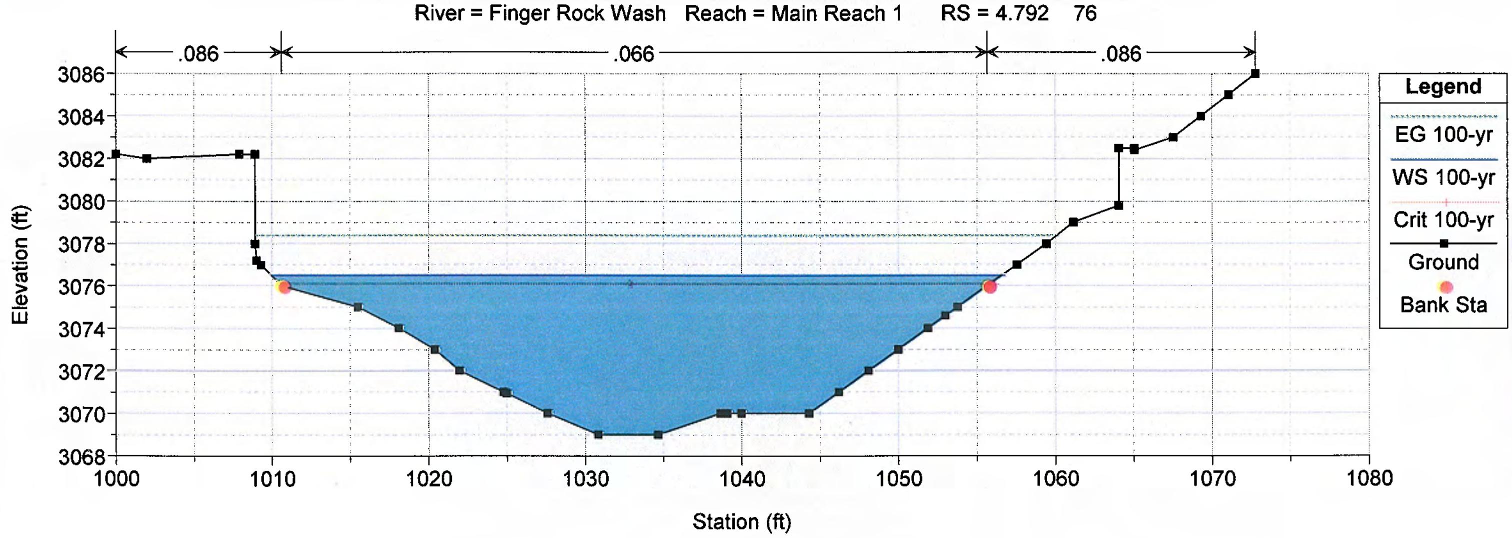


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Pontatoc Cnyn Reach = Pontatoc Cnyn RS = 0.000 Section upstream of Junction FR-9
.086
.066
.086
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

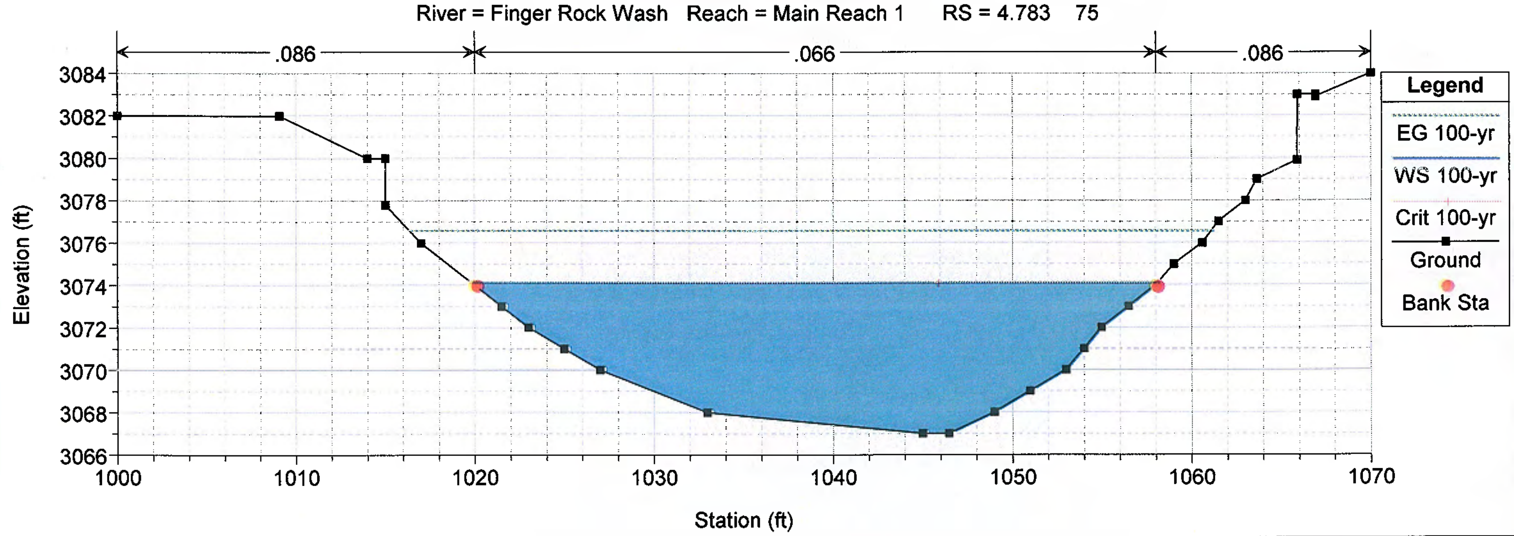
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 1 RS = 4.800 Upstream section in study reach

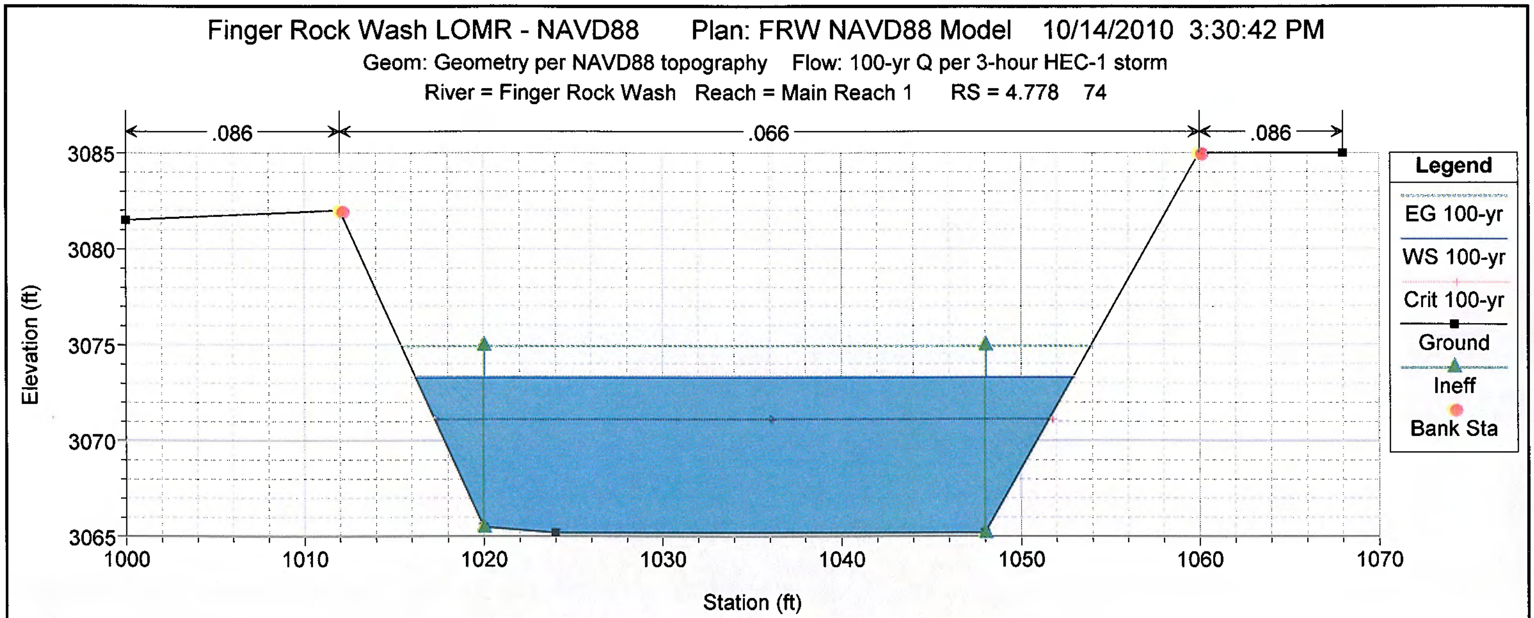


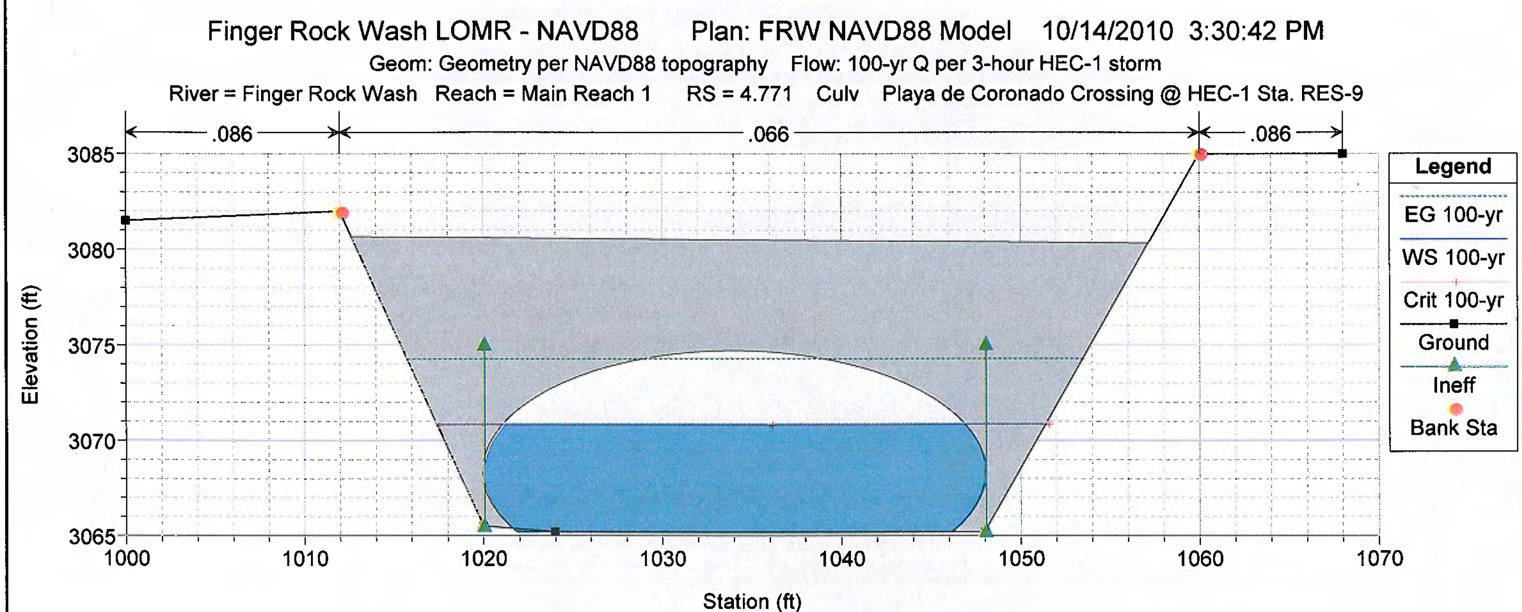
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 1 RS = 4.792 76

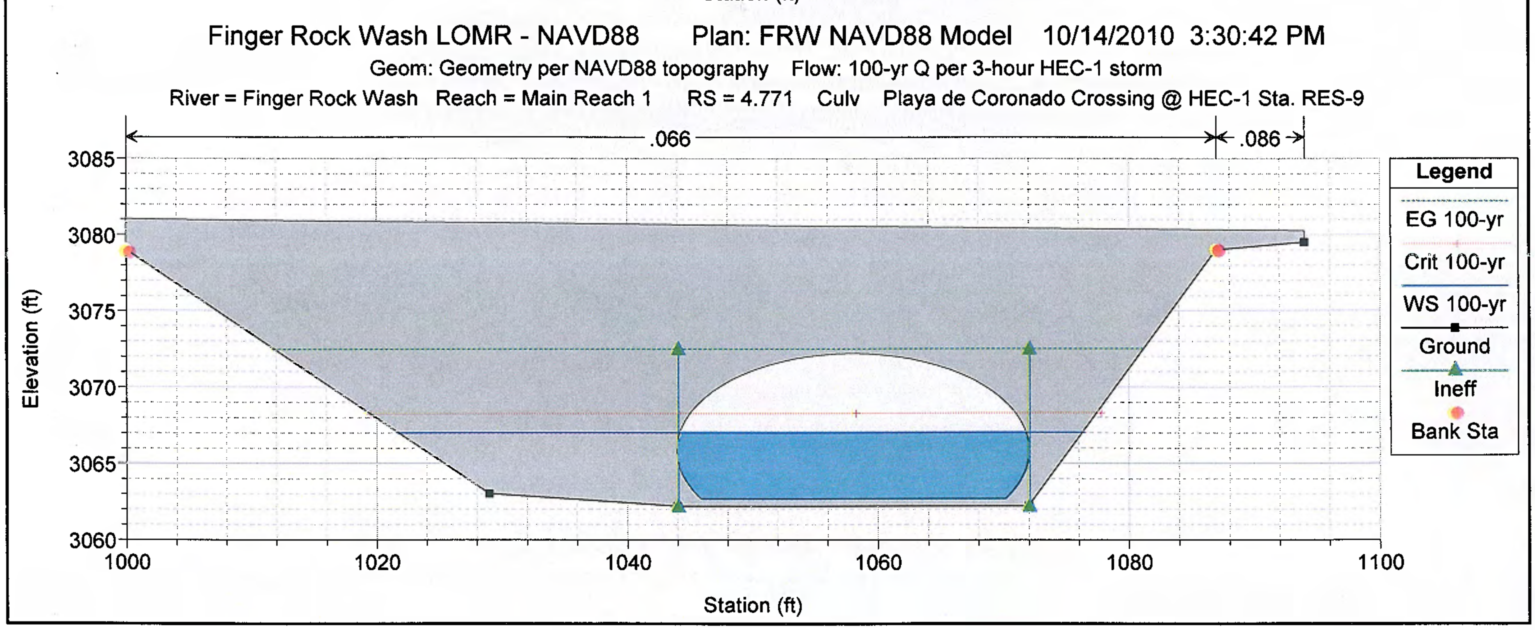


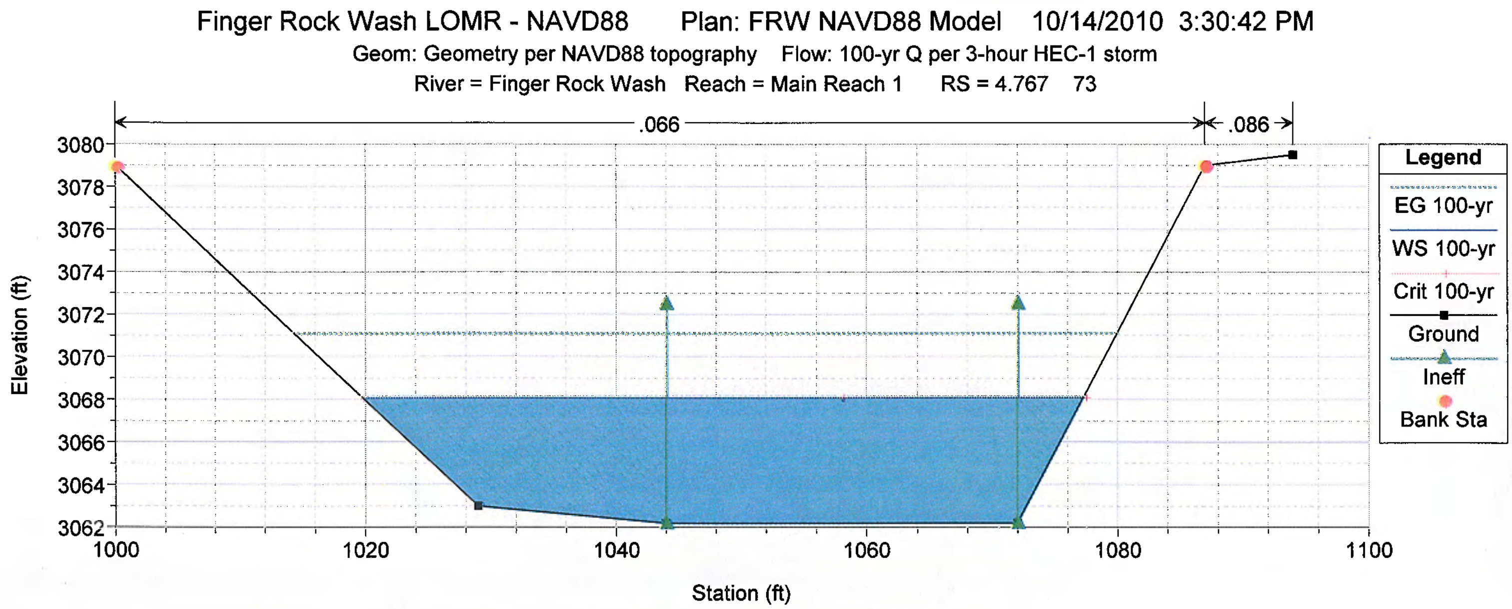
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 1 RS = 4.783 75

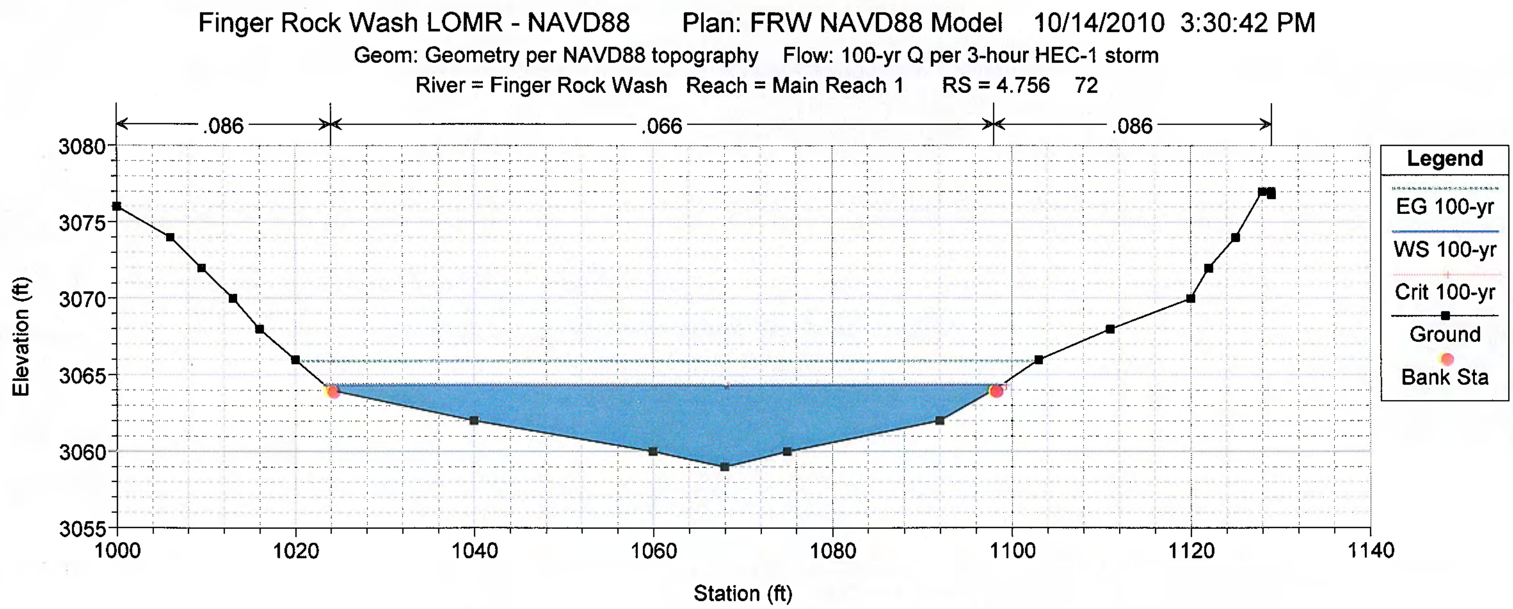


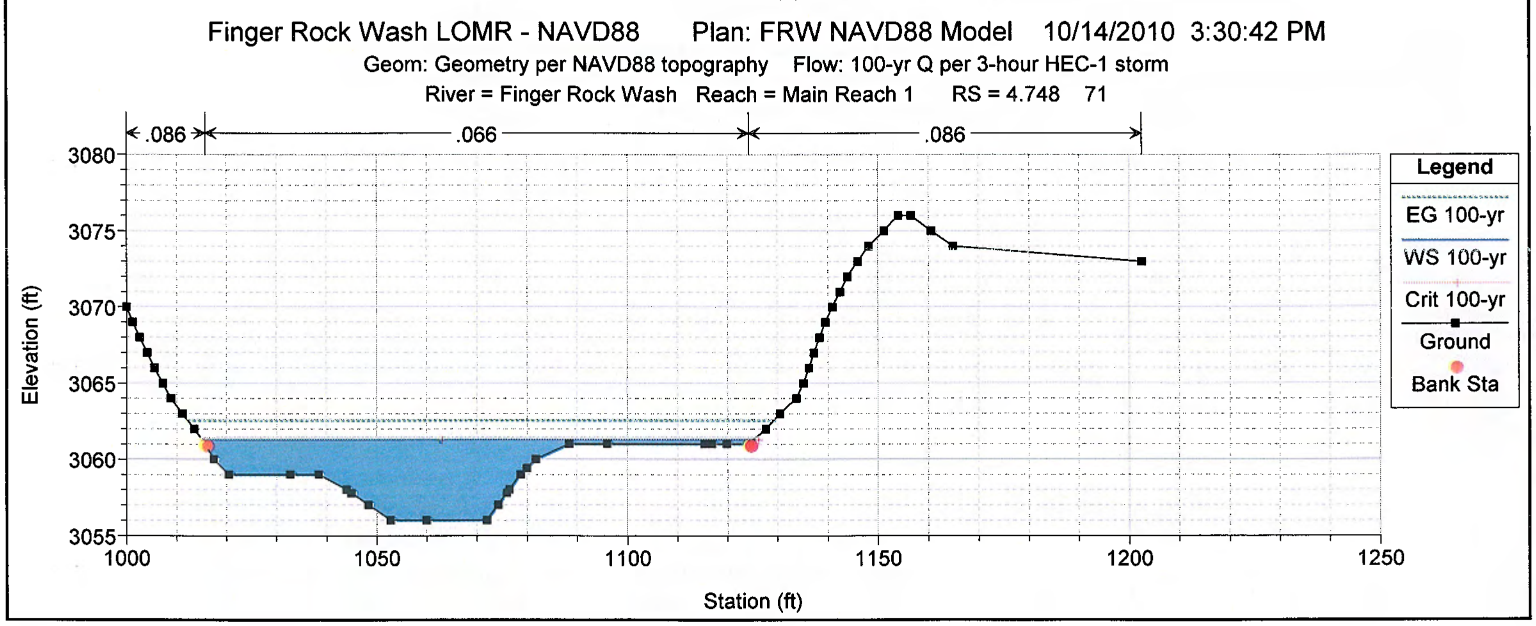

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 1 RS = 4.778 74
.086
.066
.086
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
3085
3080
3075
3070
3065
1000
1010
1020
1030
1040
1050
1060
1070
Station (ft)

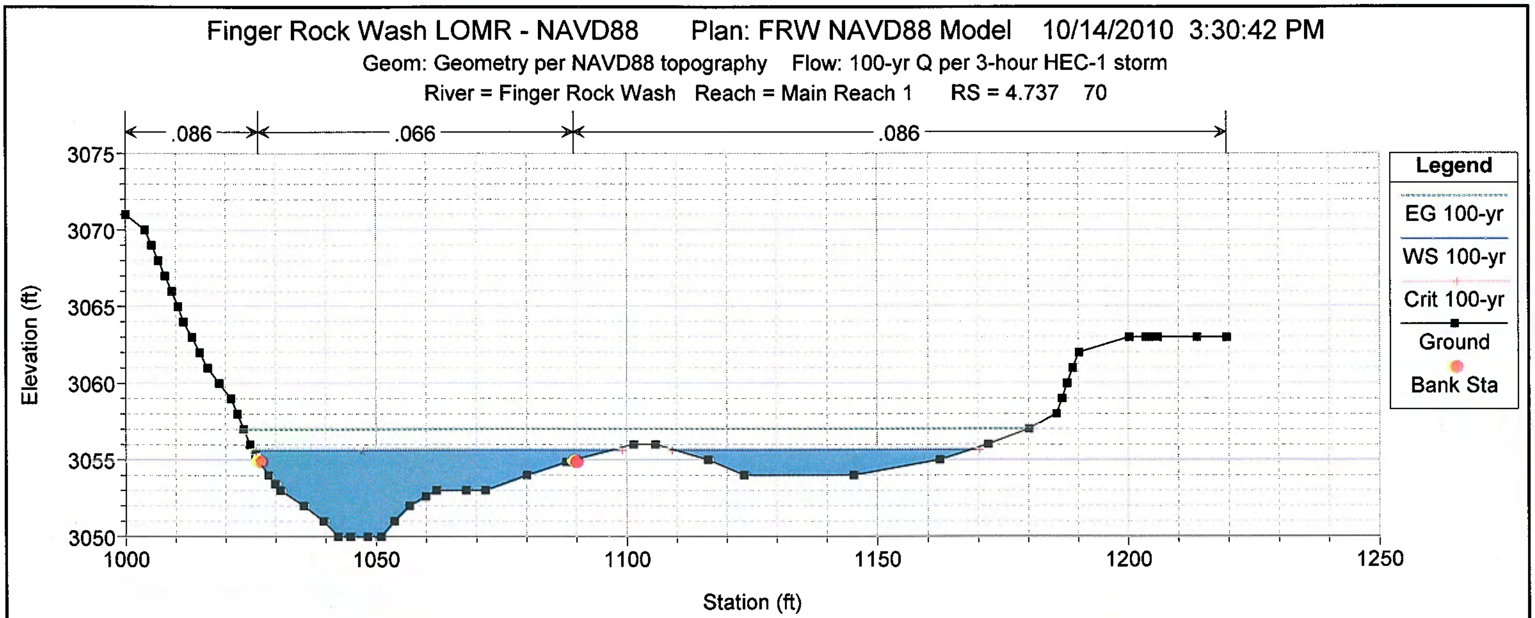

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 1 RS = 4.771 Culv Playa de Coronado Crossing @ HEC-1 Sta. RES-9
.086
.066
.086
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
3085
3080
3075
3070
3065
1000
1010
1020
1030
1040
1050
1060
1070
Station (ft)

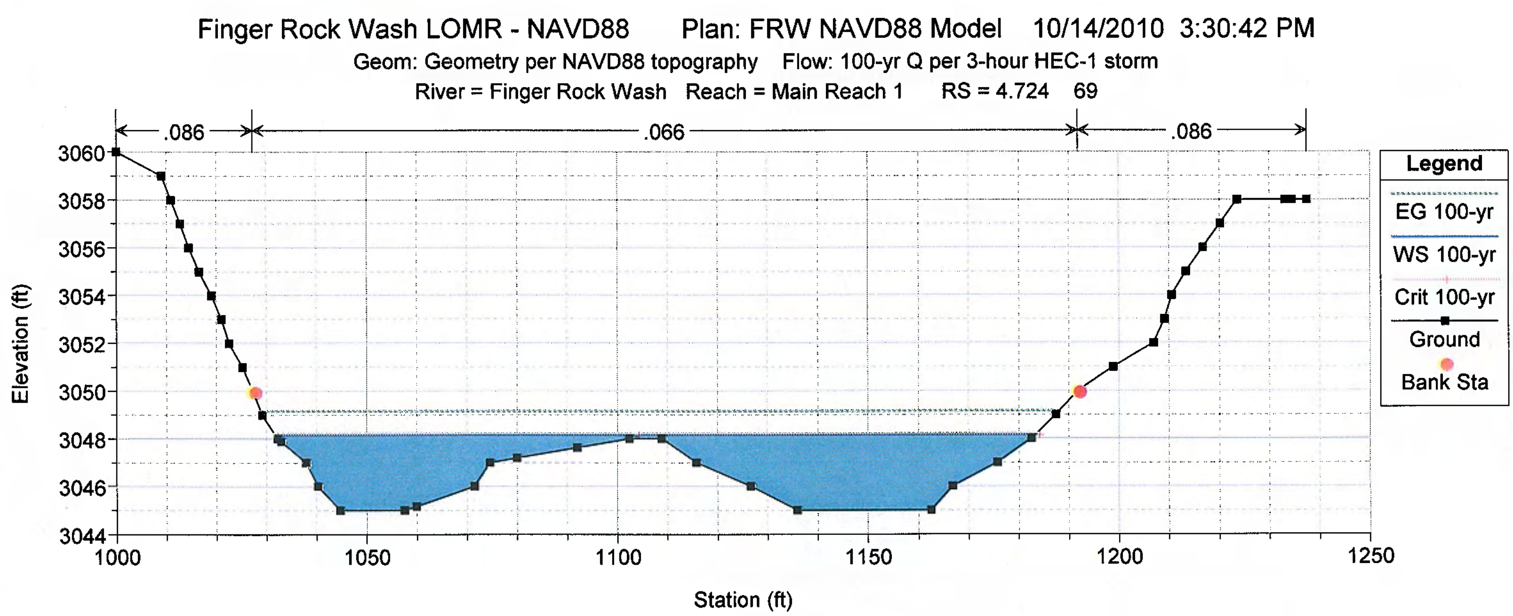

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 1 RS = 4.771 Culv Playa de Coronado Crossing @ HEC-1 Sta. RES-9
.066
.086
Legend
EG 100-yr
Crit 100-yr
WS 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
3085
3080
3075
3070
3065
3060
1000
1020
1040
1060
1080
1100
Station (ft)

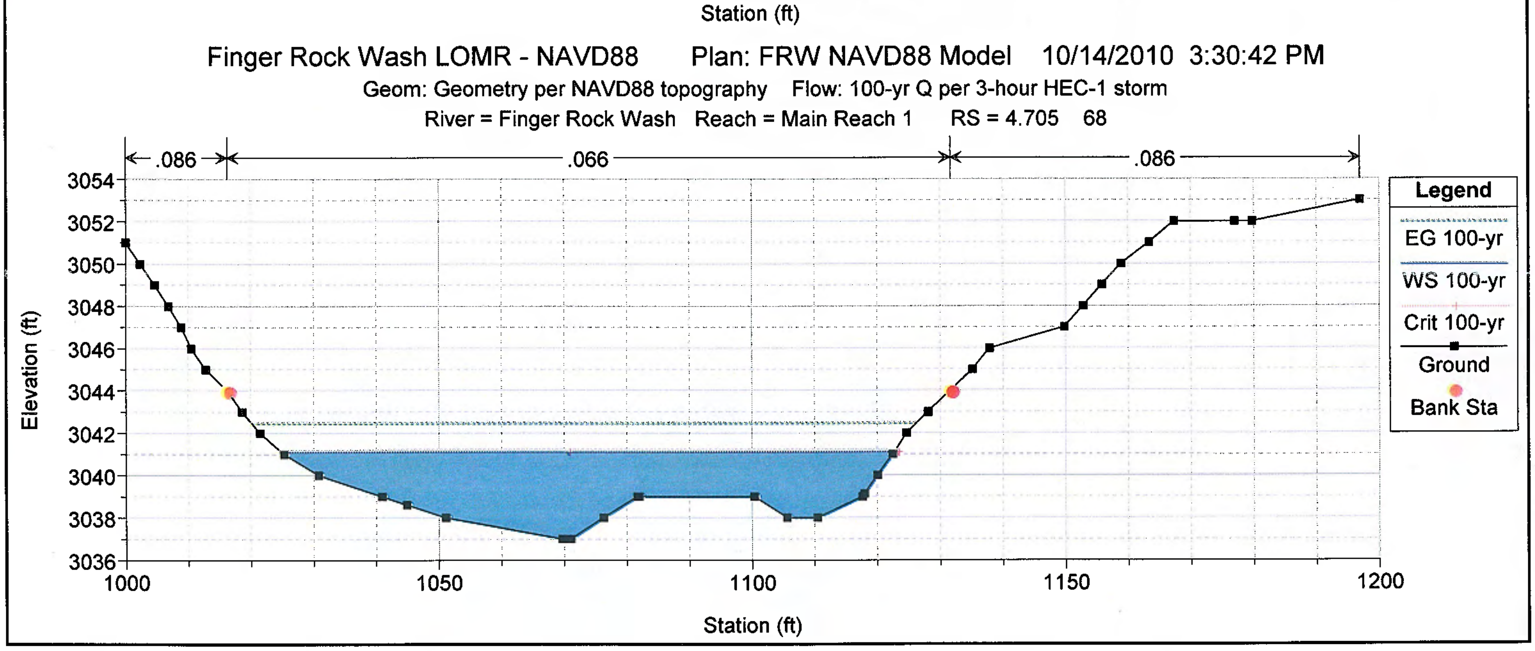

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 1 RS = 4.767 73
.066
.086
Elevation (ft)
3080
3078
3076
3074
3072
3070
3068
3066
3064
3062
Station (ft)
1000
1020
1040
1060
1080
1100
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

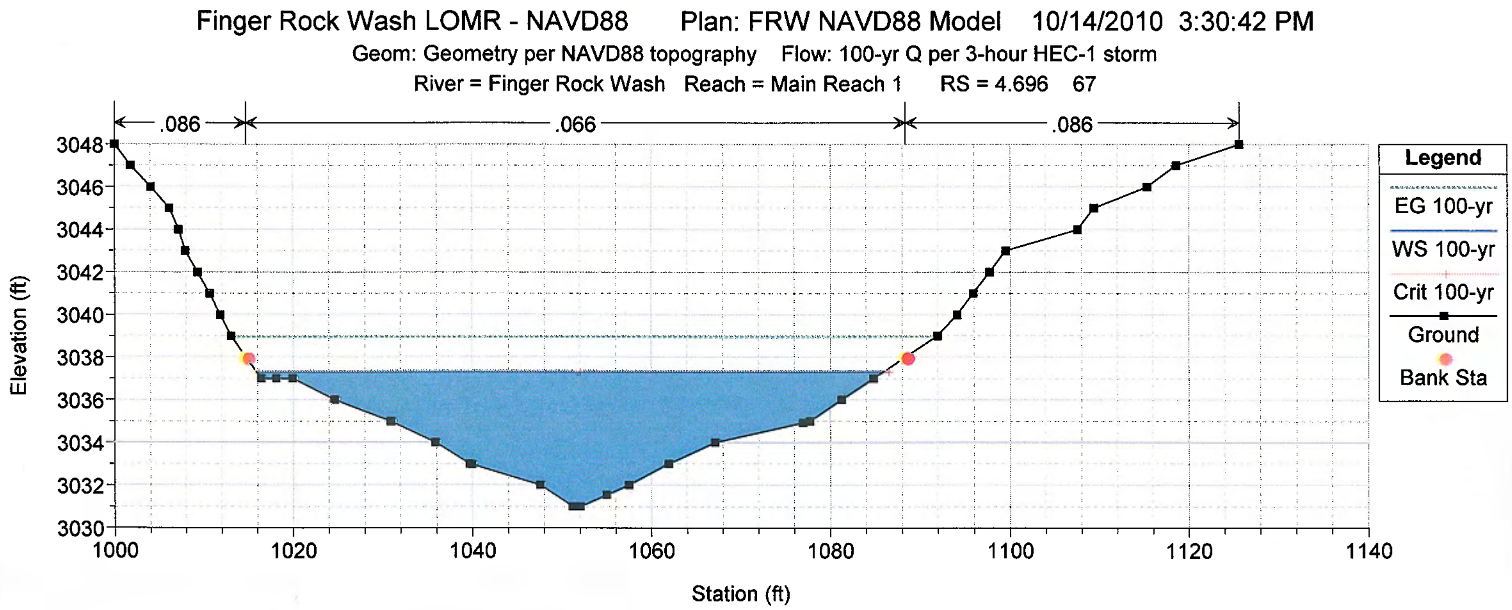

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 1 RS = 4.756 72
.086
.066
.086
Elevation (ft)
3080
3075
3070
3065
3060
3055
Station (ft)
1000
1020
1040
1060
1080
1100
1120
1140
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 1 RS = 4.748 71
.086
.066
.086
Elevation (ft)
3080
3075
3070
3065
3060
3055
Station (ft)
1000
1050
1100
1150
1200
1250
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

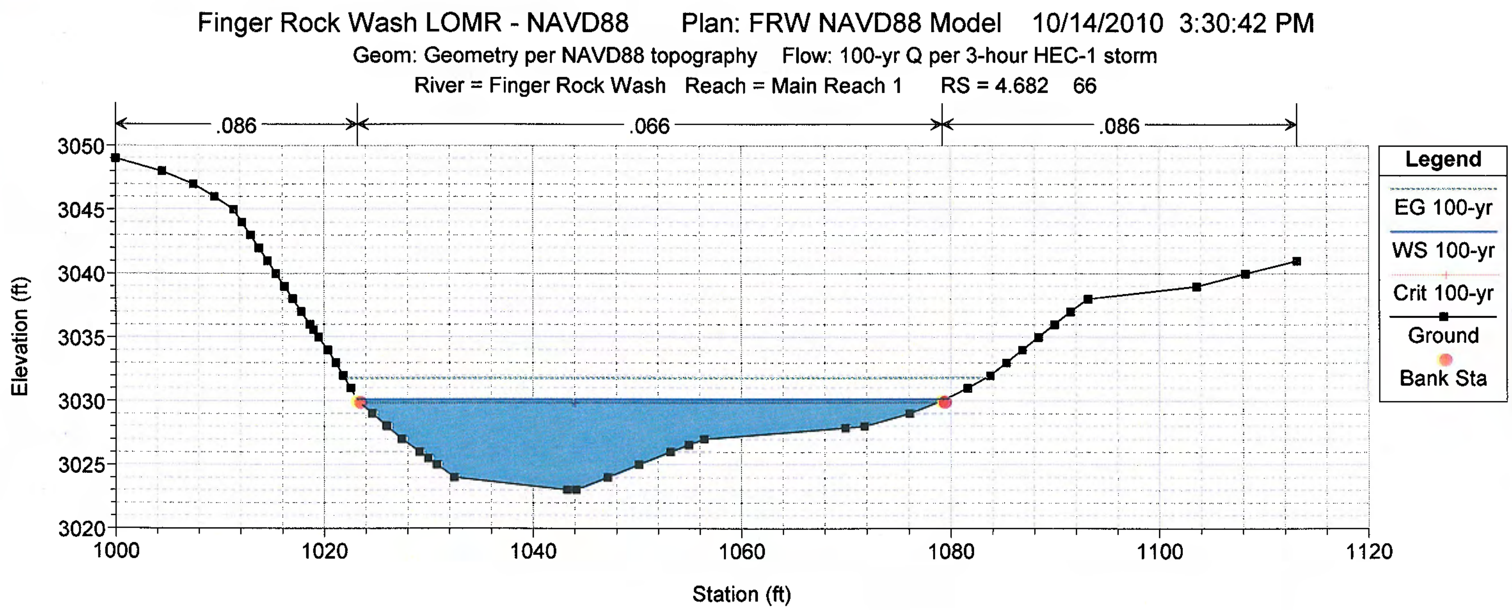

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 1 RS = 4.737 70
.086
.066
.086
Elevation (ft)
3075
3070
3065
3060
3055
3050
1000
1050
1100
1150
1200
1250
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 1 RS = 4.724 69
.086
.066
.086
Elevation (ft)
3060
3058
3056
3054
3052
3050
3048
3046
3044
1000
1050
1100
1150
1200
1250
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

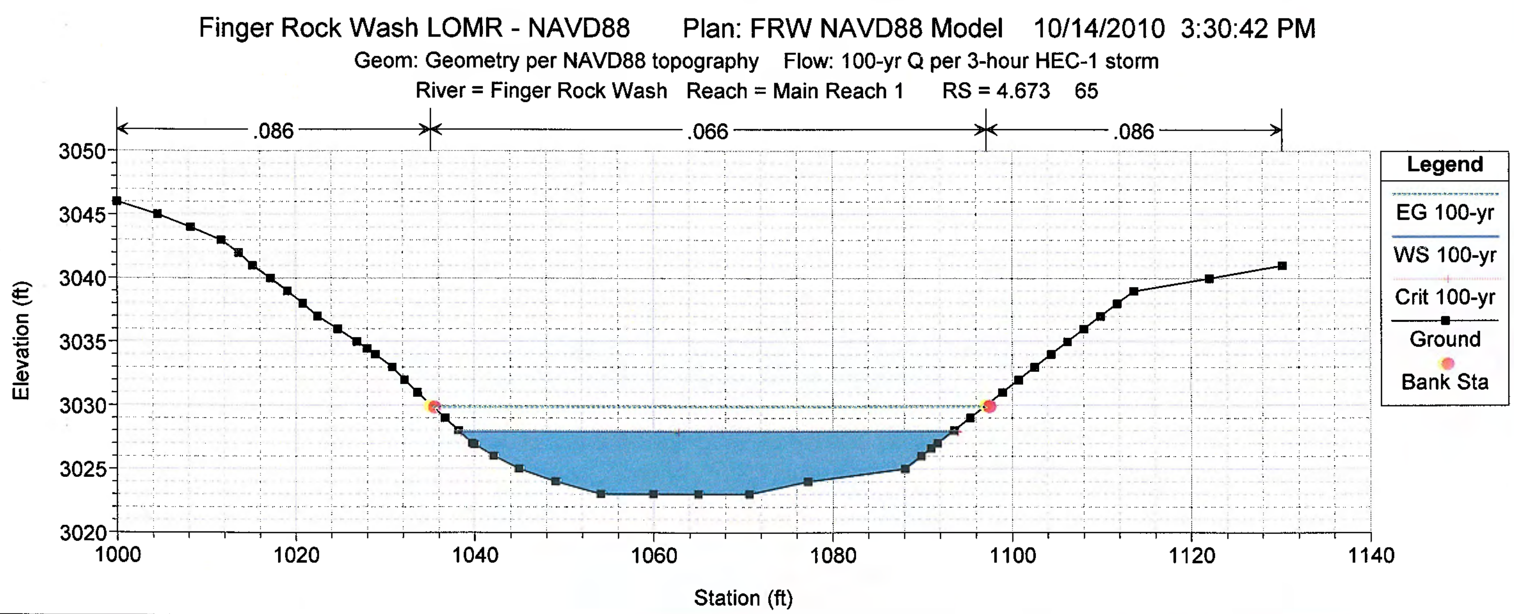

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 1 RS = 4.705 68
.086
.066
.086
Elevation (ft)
3054
3052
3050
3048
3046
3044
3042
3040
3038
3036
1000
1050
1100
1150
1200
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta



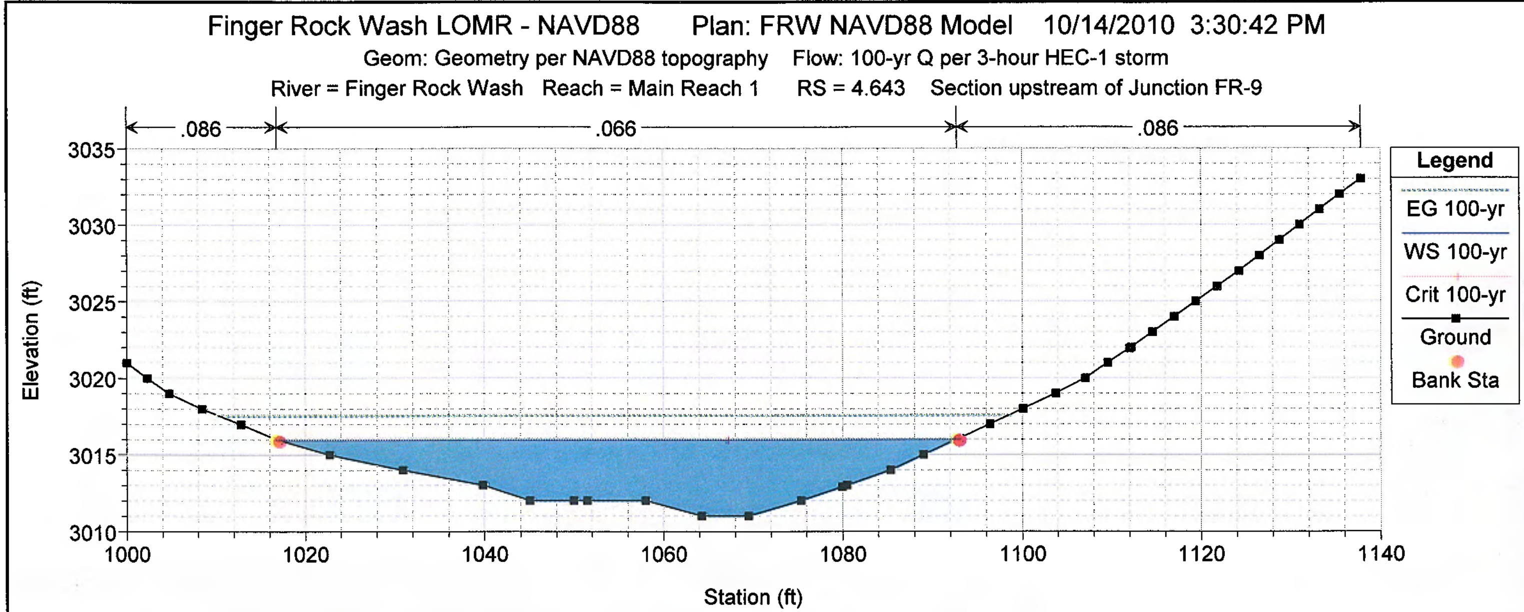
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 1 RS = 4.696 67
.086
.066
.086
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta



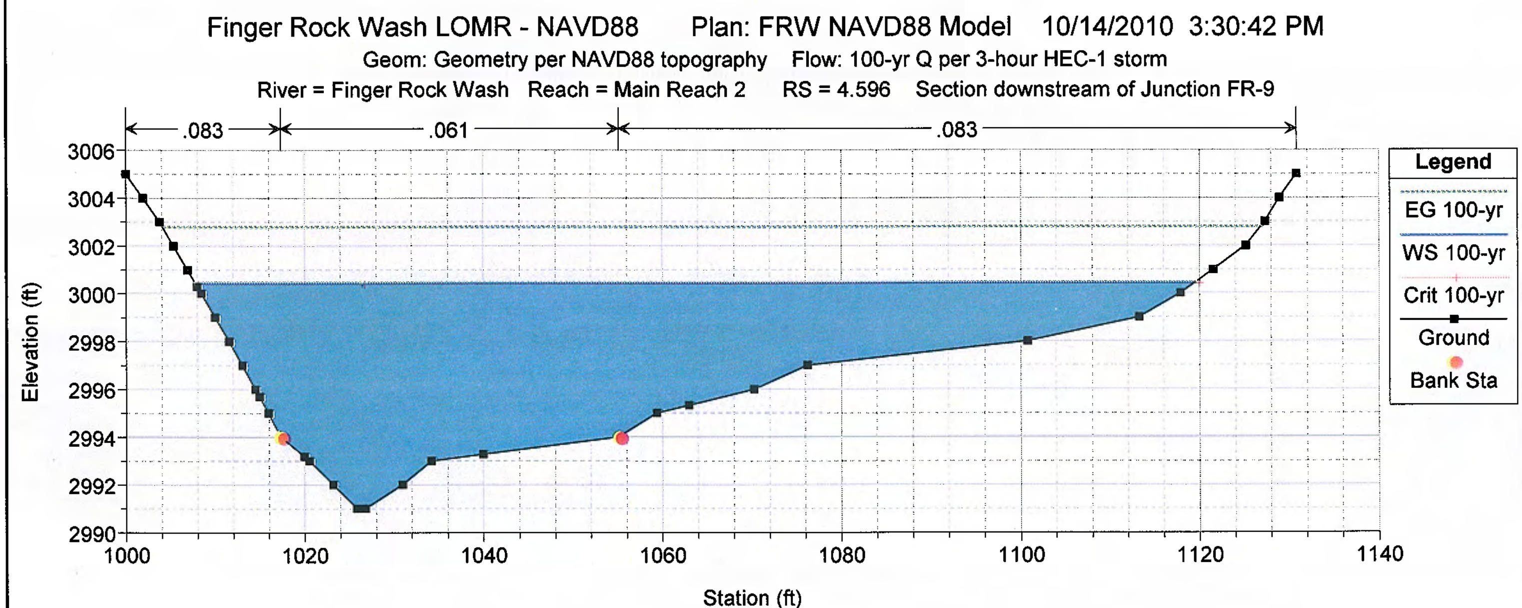
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 1 RS = 4.682 66
.086
.066
.086
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta



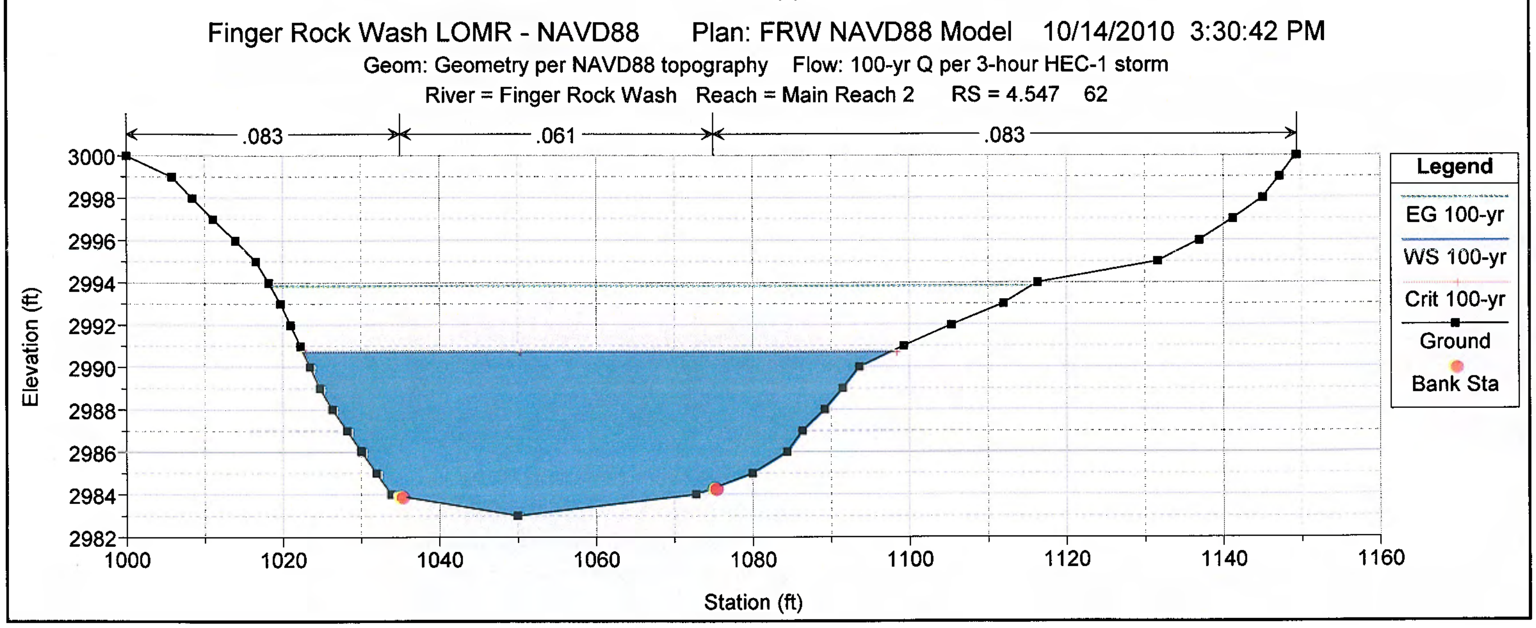
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 1 RS = 4.673 65
.086
.066
.086
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta



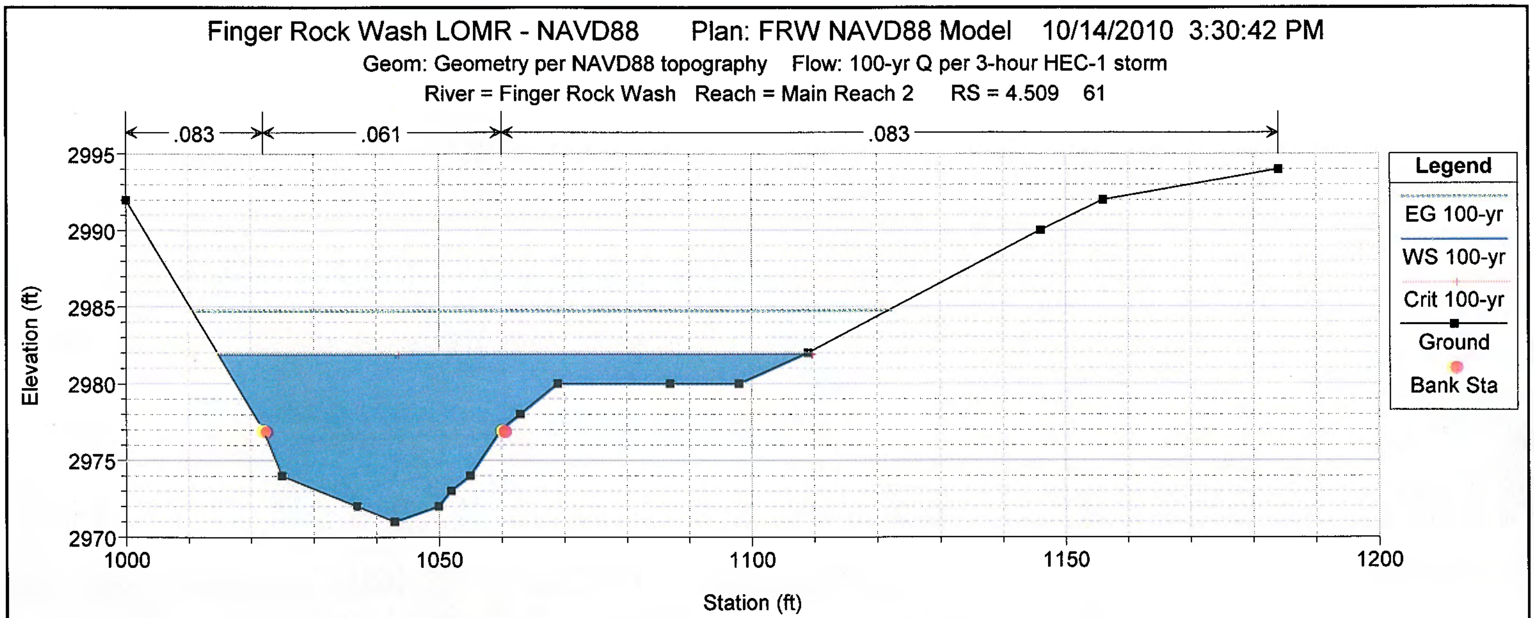
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 1 RS = 4.643 Section upstream of Junction FR-9
.086
.066
.086
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

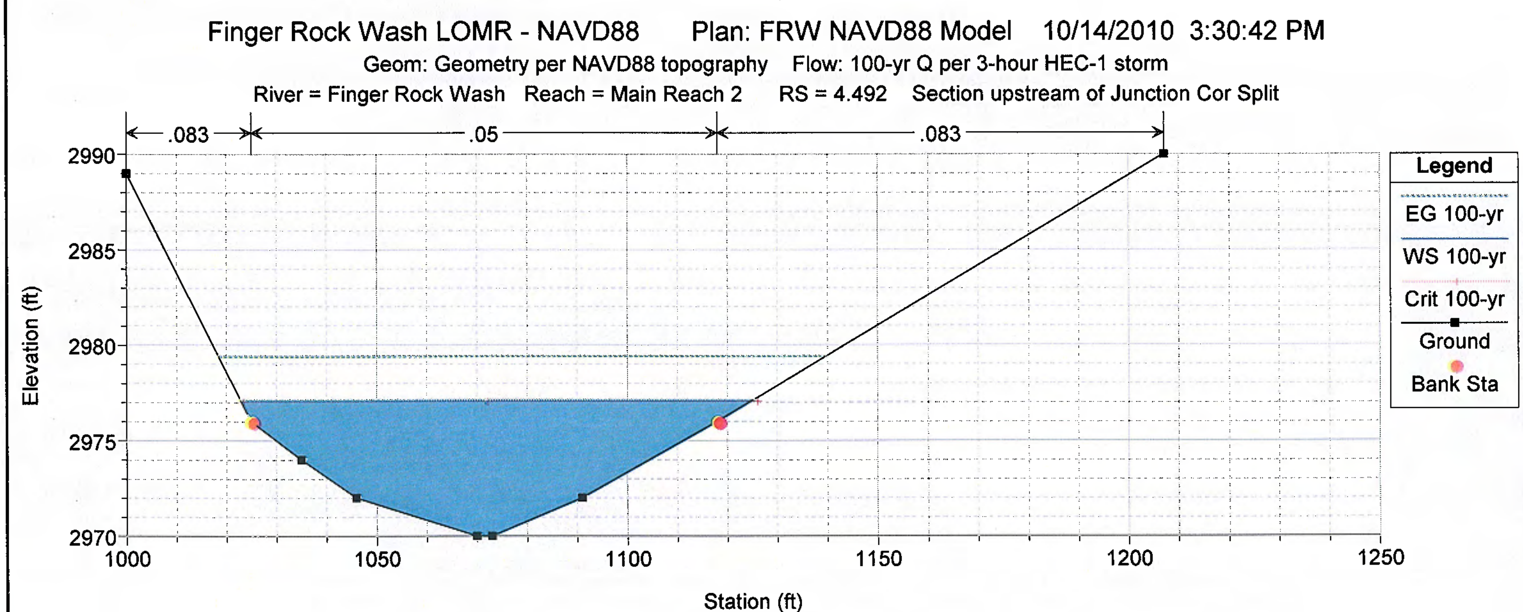


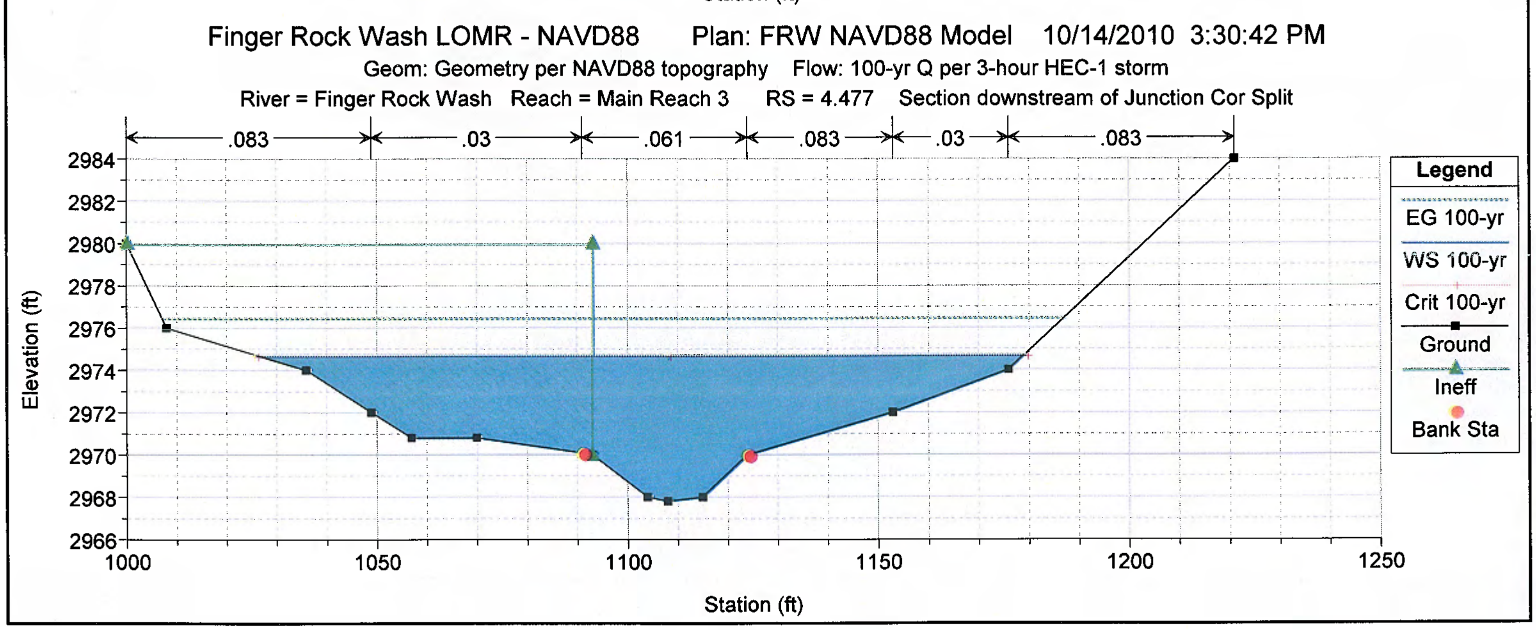
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 2 RS = 4.596 Section downstream of Junction FR-9
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 2 RS = 4.547 62
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 2 RS = 4.509 61
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

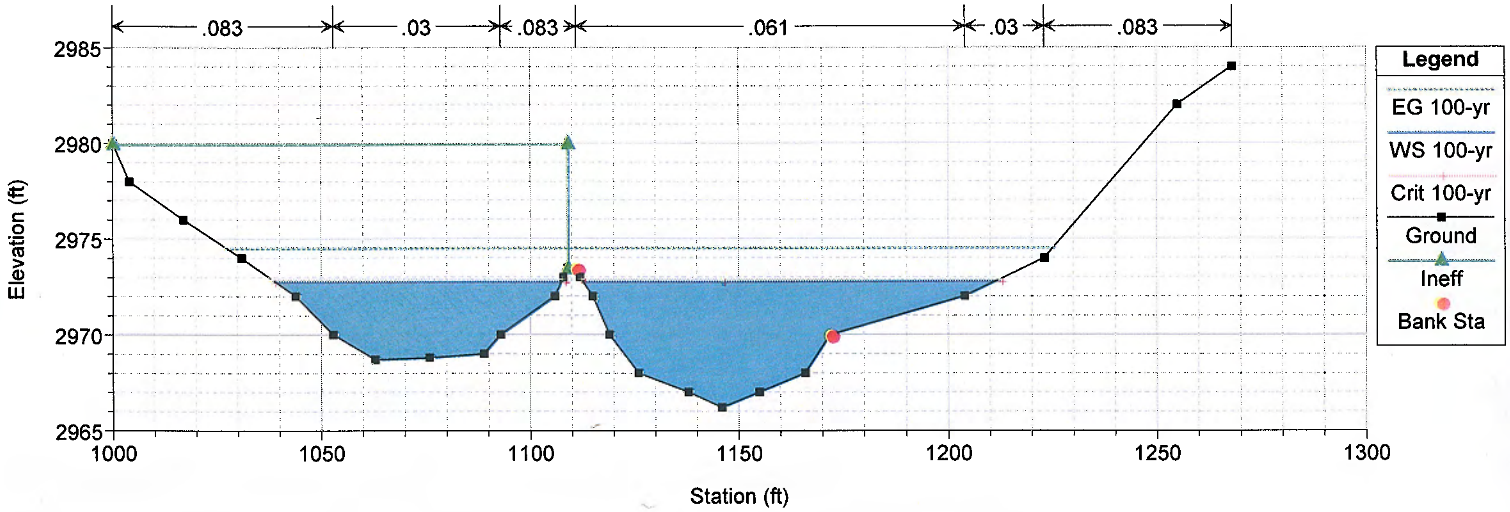

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 2 RS = 4.492 Section upstream of Junction Cor Split
.083
.05
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.477 Section downstream of Junction Cor Split
.083
.03
.061
.083
.03
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM

Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm

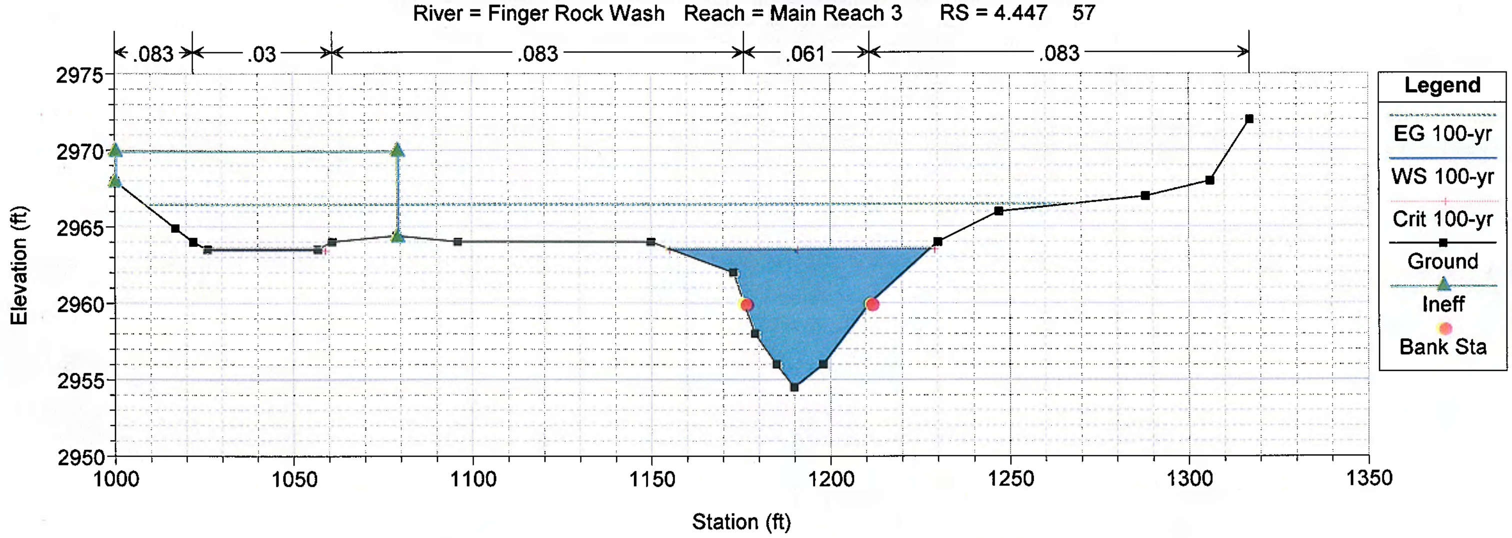
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.47 58



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM

Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm

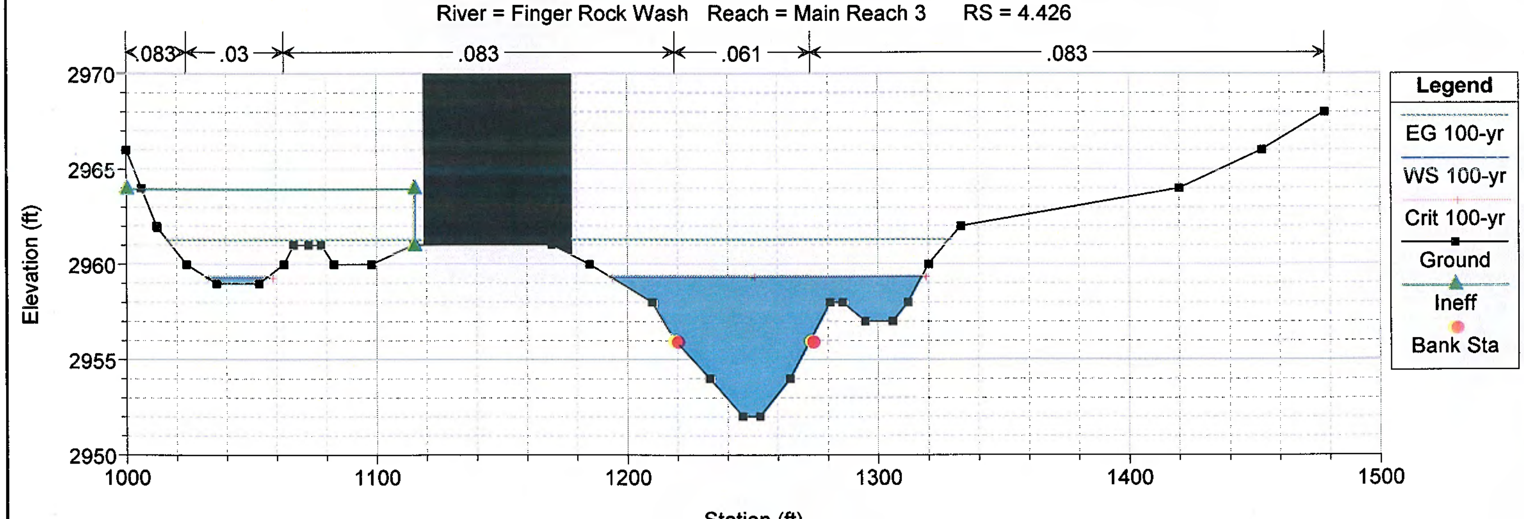
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.447 57

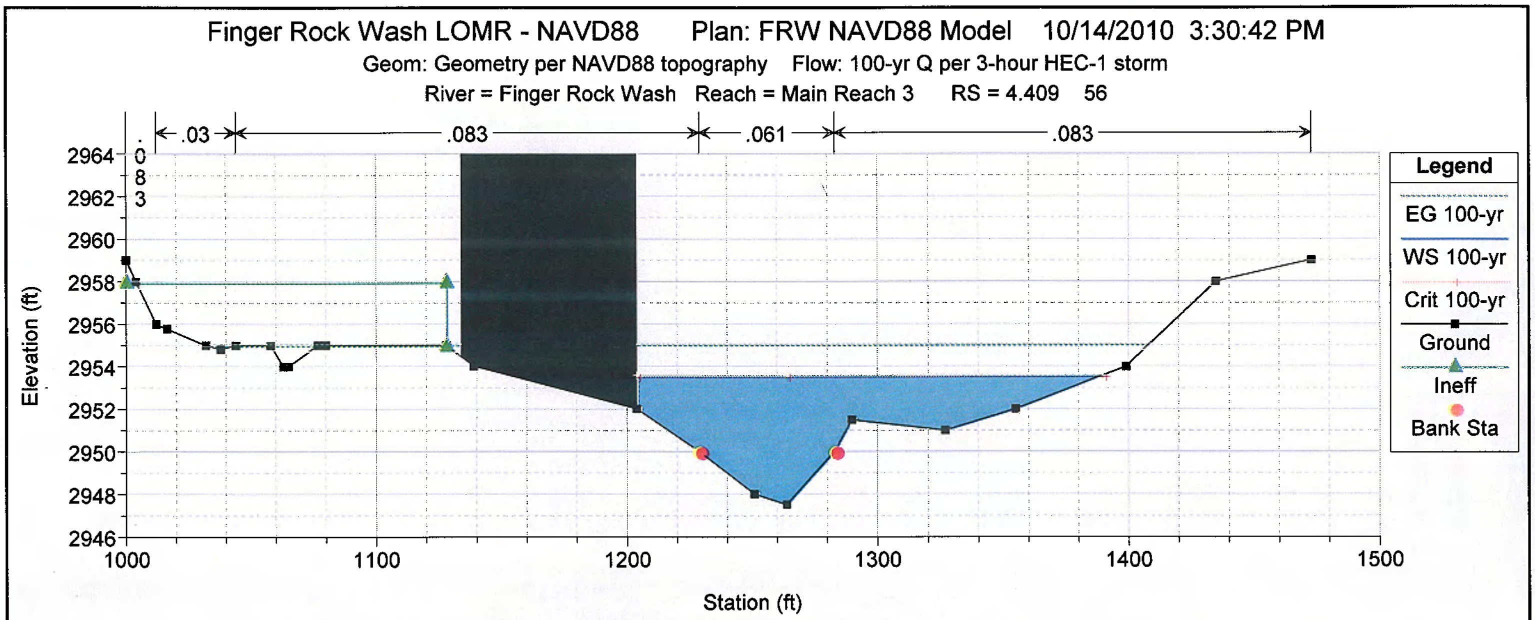


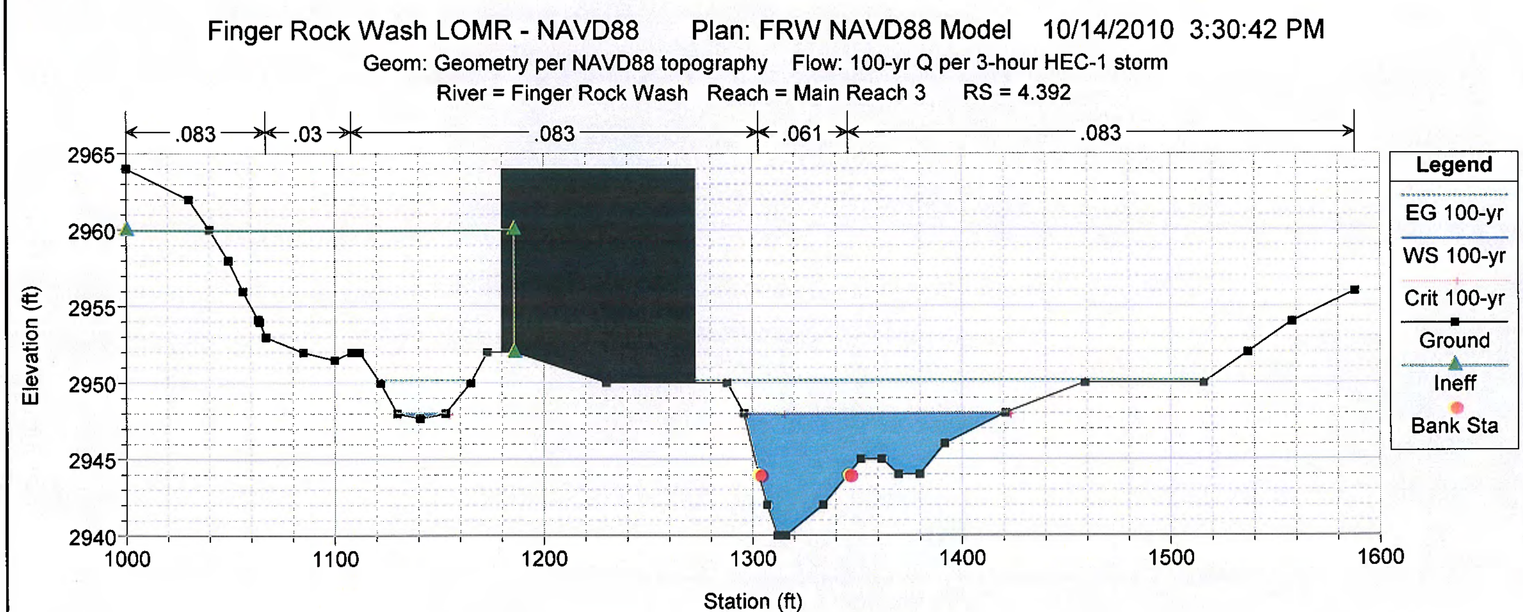
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM

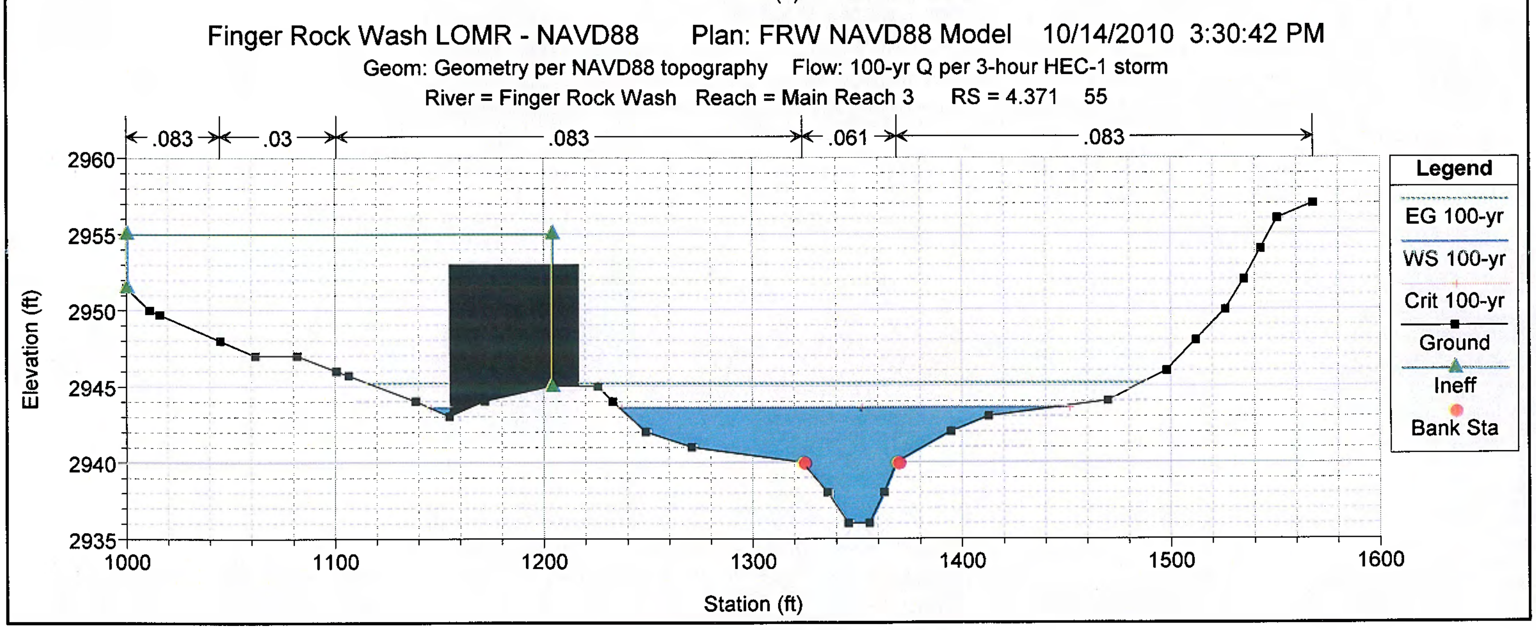
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm

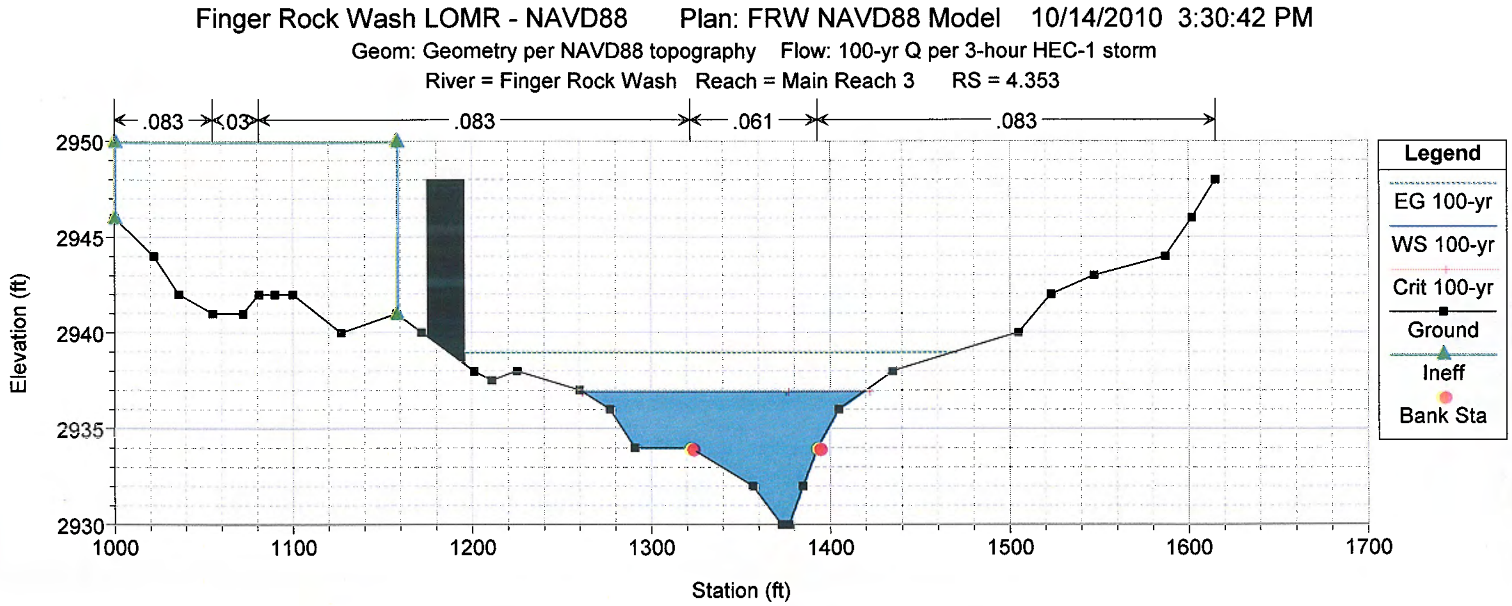
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.426

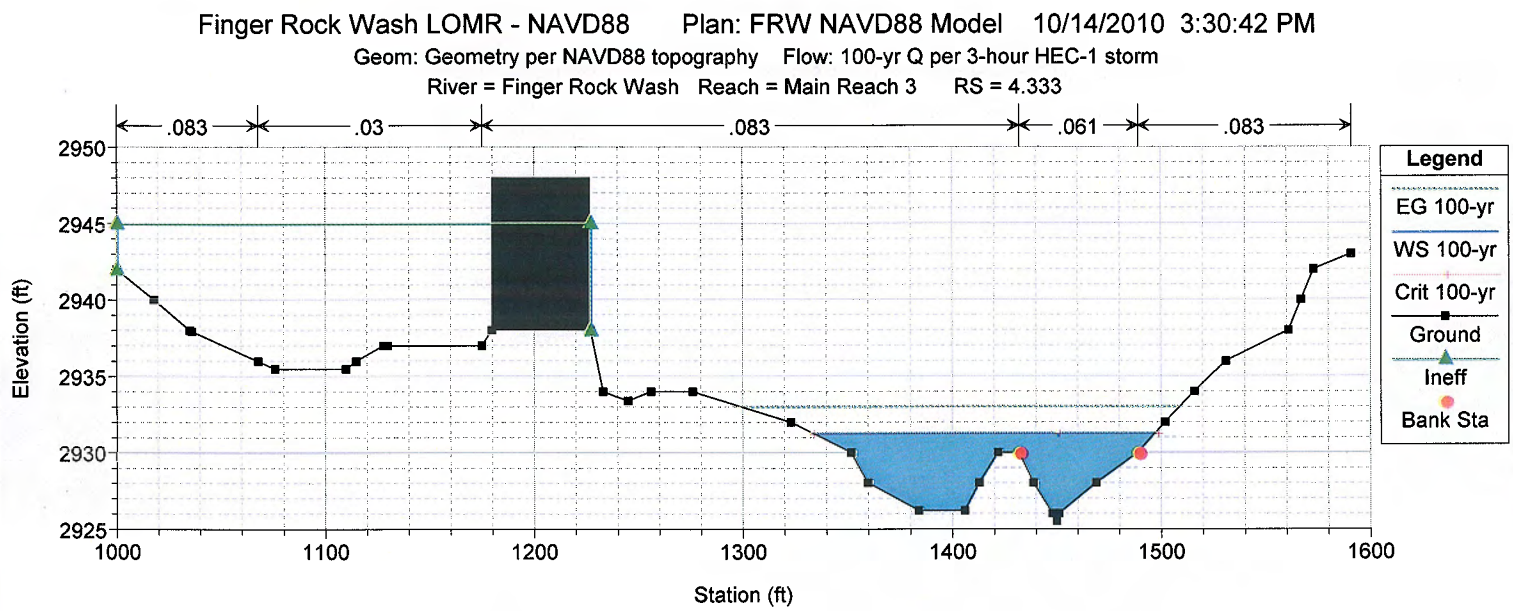


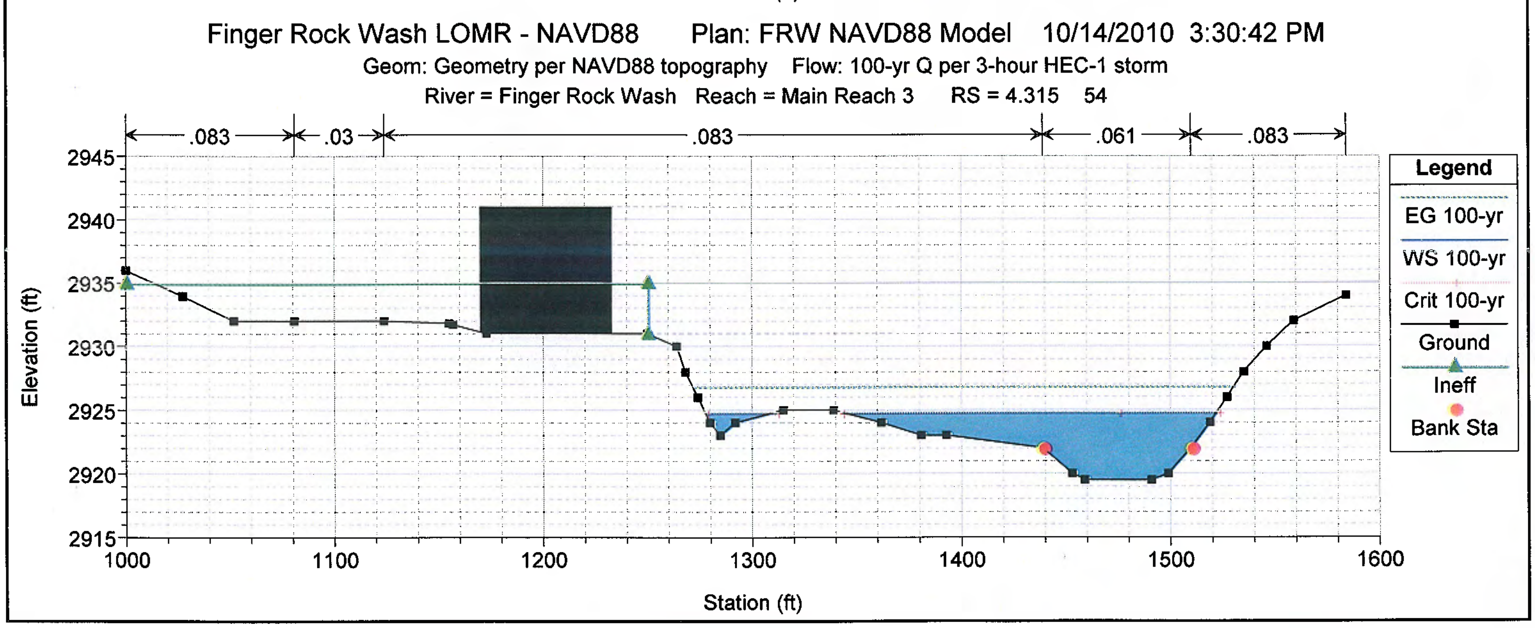

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.409 56
.03
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

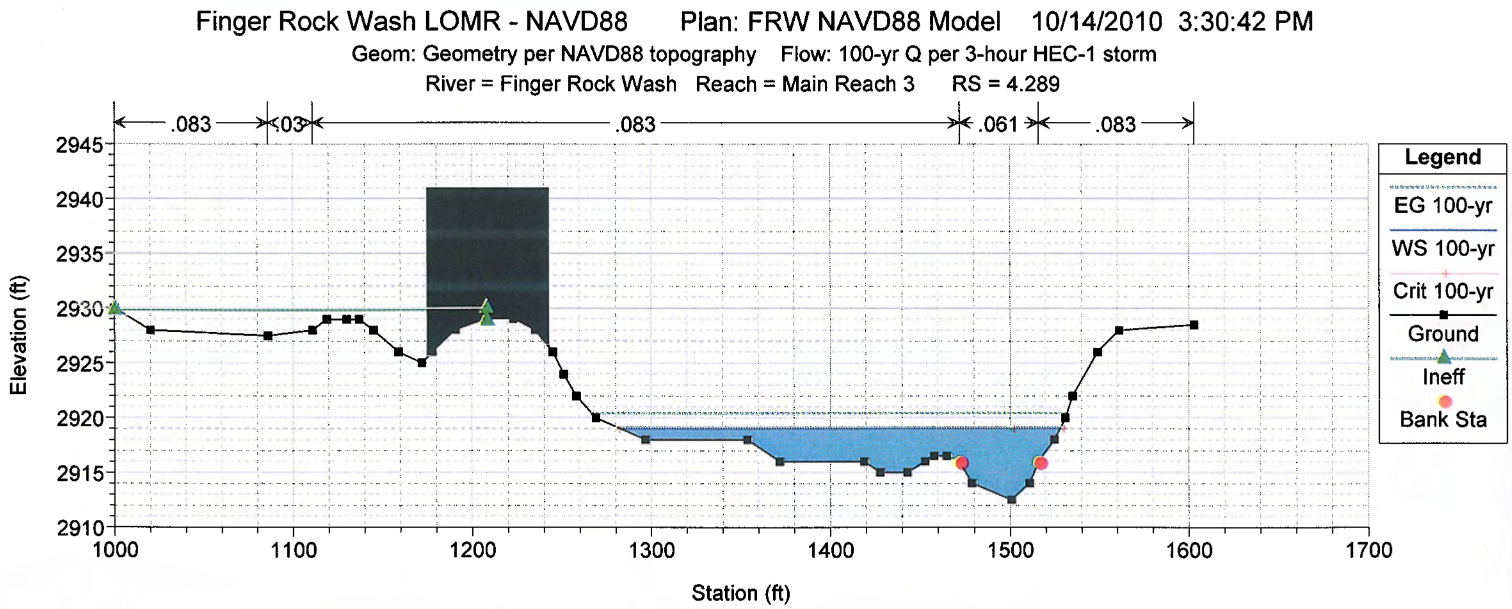

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.392
.083
.03
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

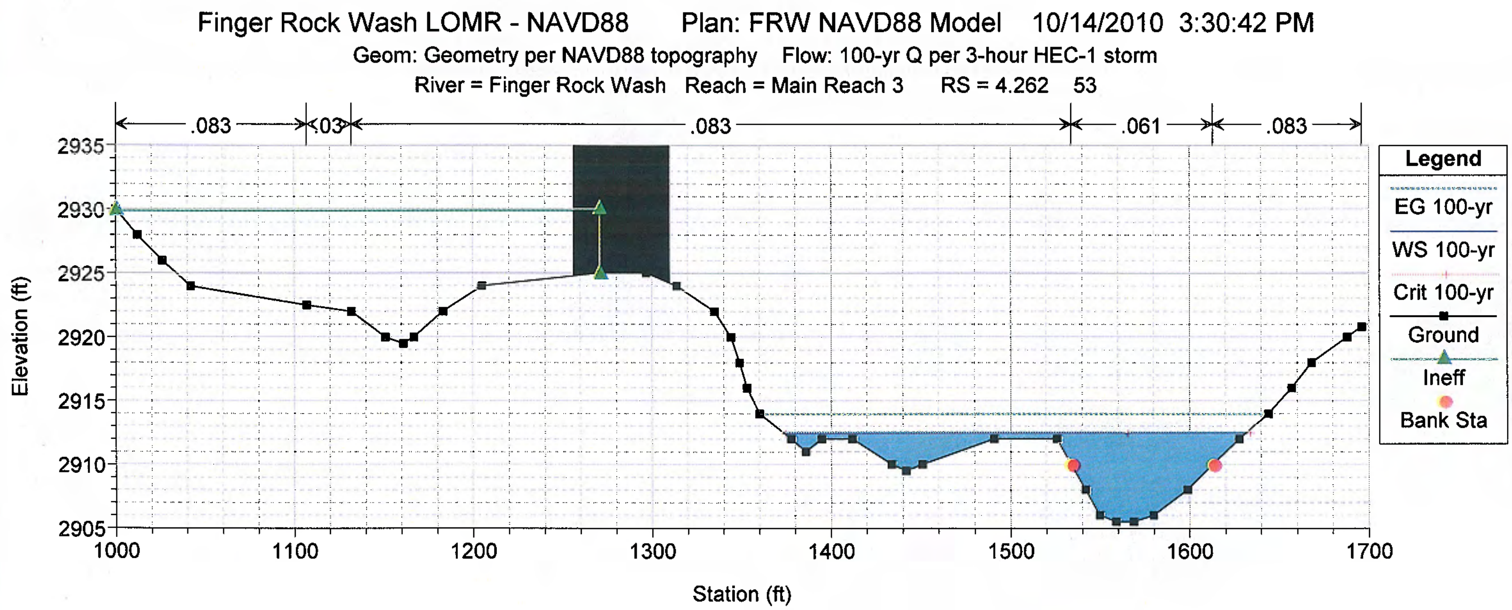

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.371 55
.083
.03
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

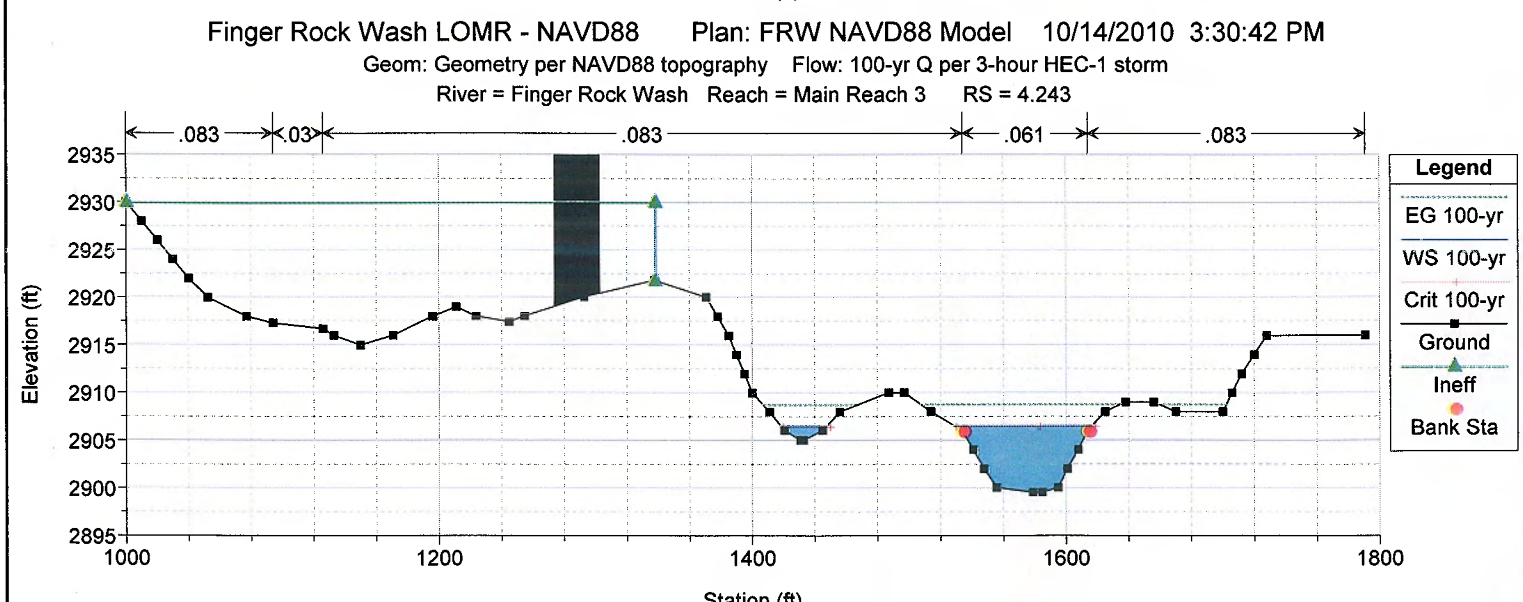

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.353
.083 .03 .083 .061 .083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.333
.083 .03 .083 .061 .083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

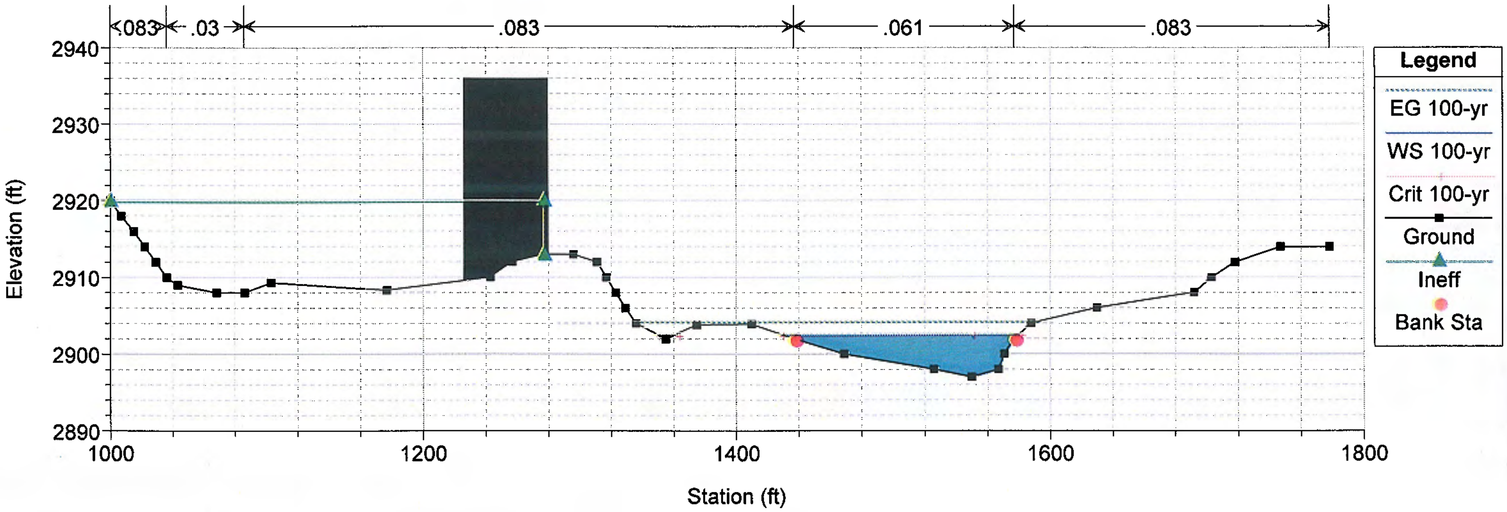

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.315 54
.083 .03 .083 .061 .083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.289
.083 .03 .083 .061 .083
Elevation (ft)
2945
2940
2935
2930
2925
2920
2915
2910
1000 1100 1200 1300 1400 1500 1600 1700
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

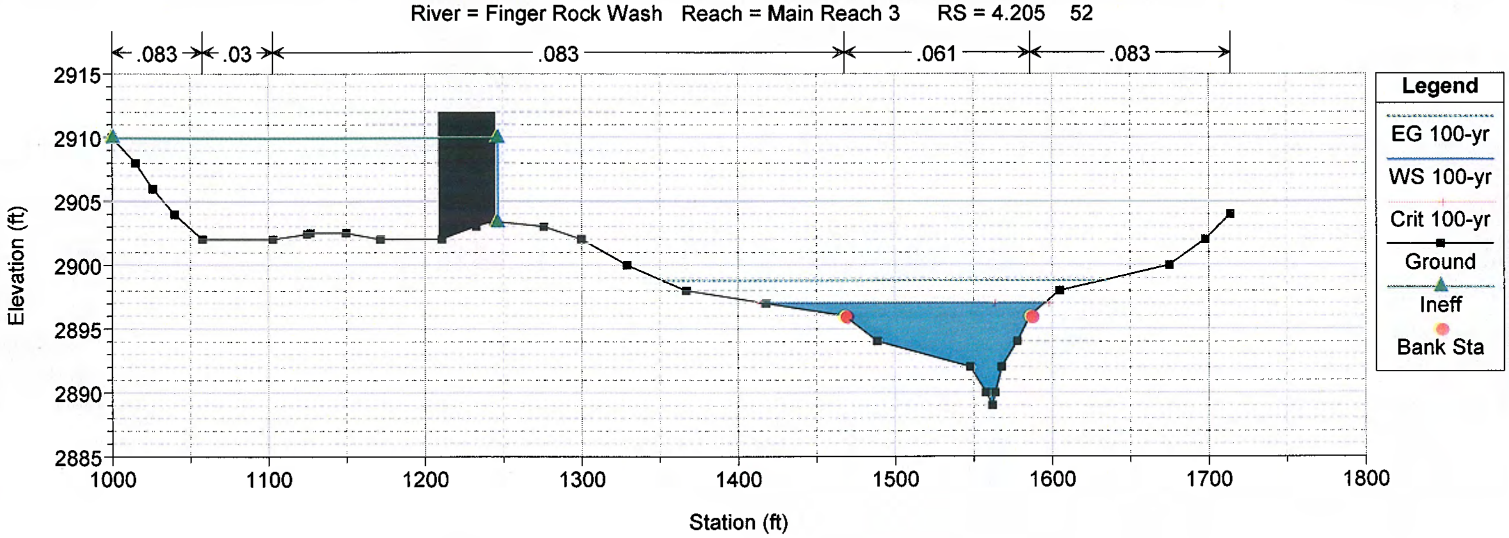

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.262 53
.083 .03 .083 .061 .083
Elevation (ft)
2935
2930
2925
2920
2915
2910
2905
1000 1100 1200 1300 1400 1500 1600 1700
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.243
.083 .03 .083 .061 .083
Elevation (ft)
2935
2930
2925
2920
2915
2910
2905
2900
2895
1000 1200 1400 1600 1800
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

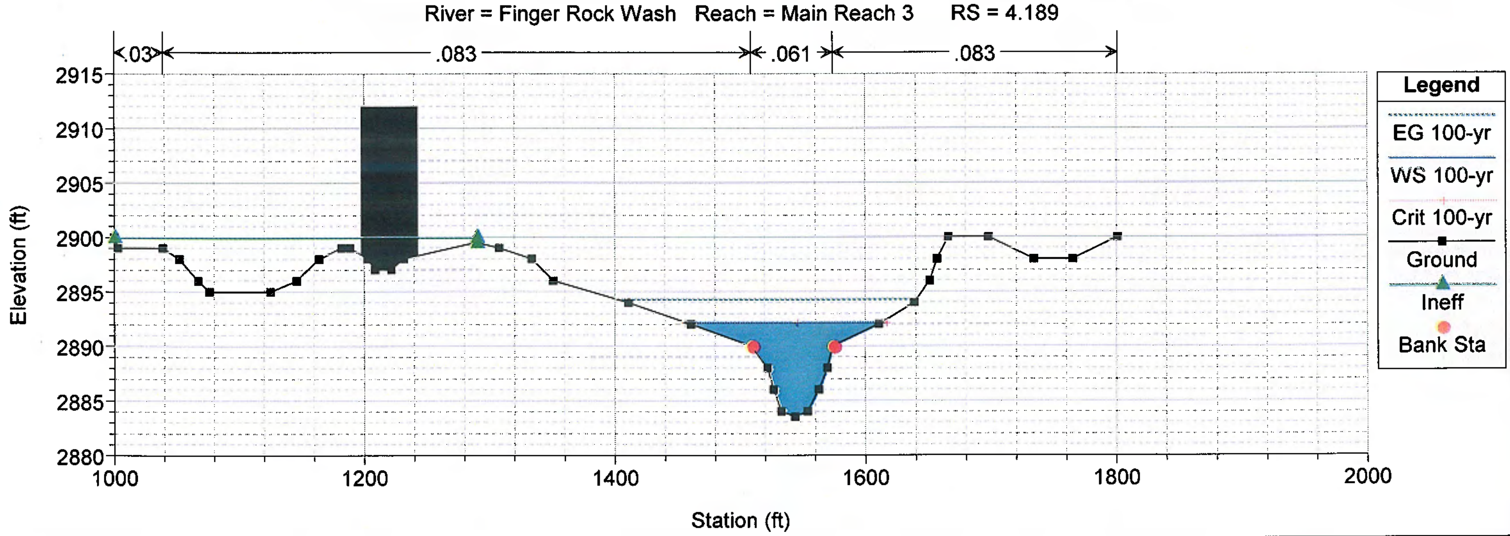
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.225

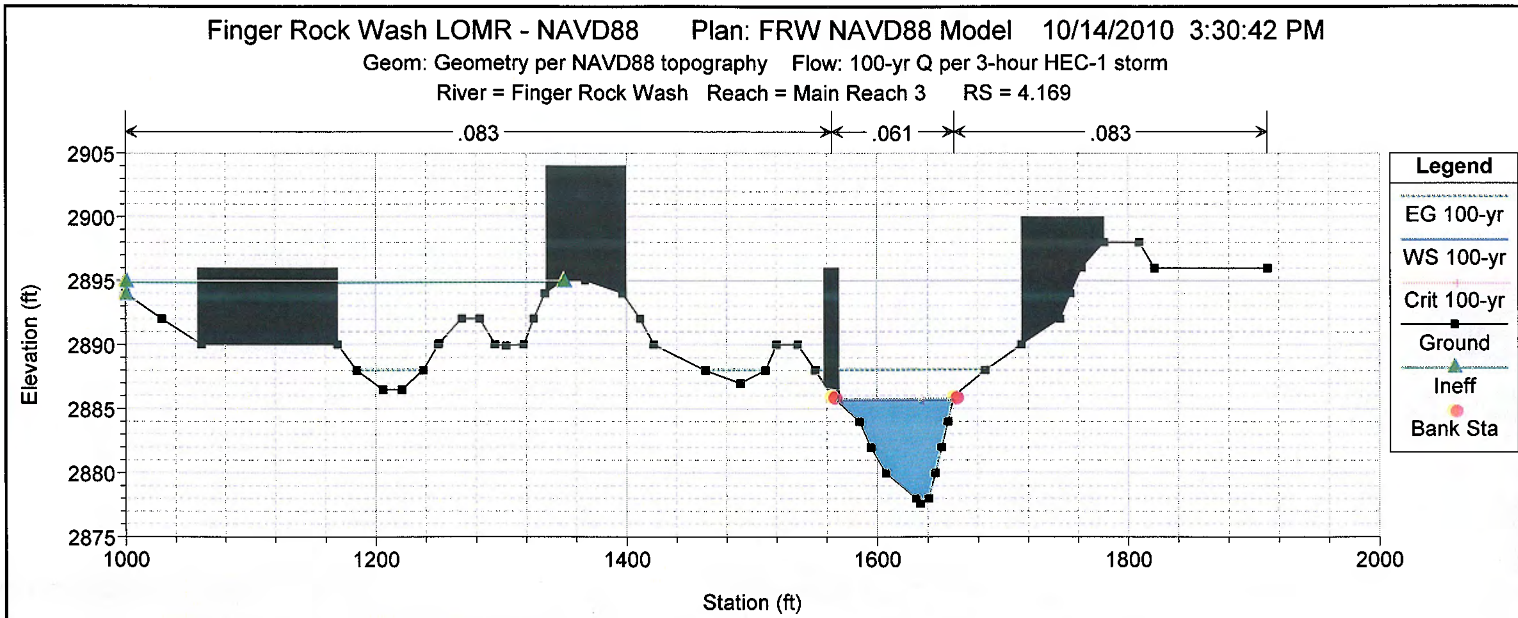


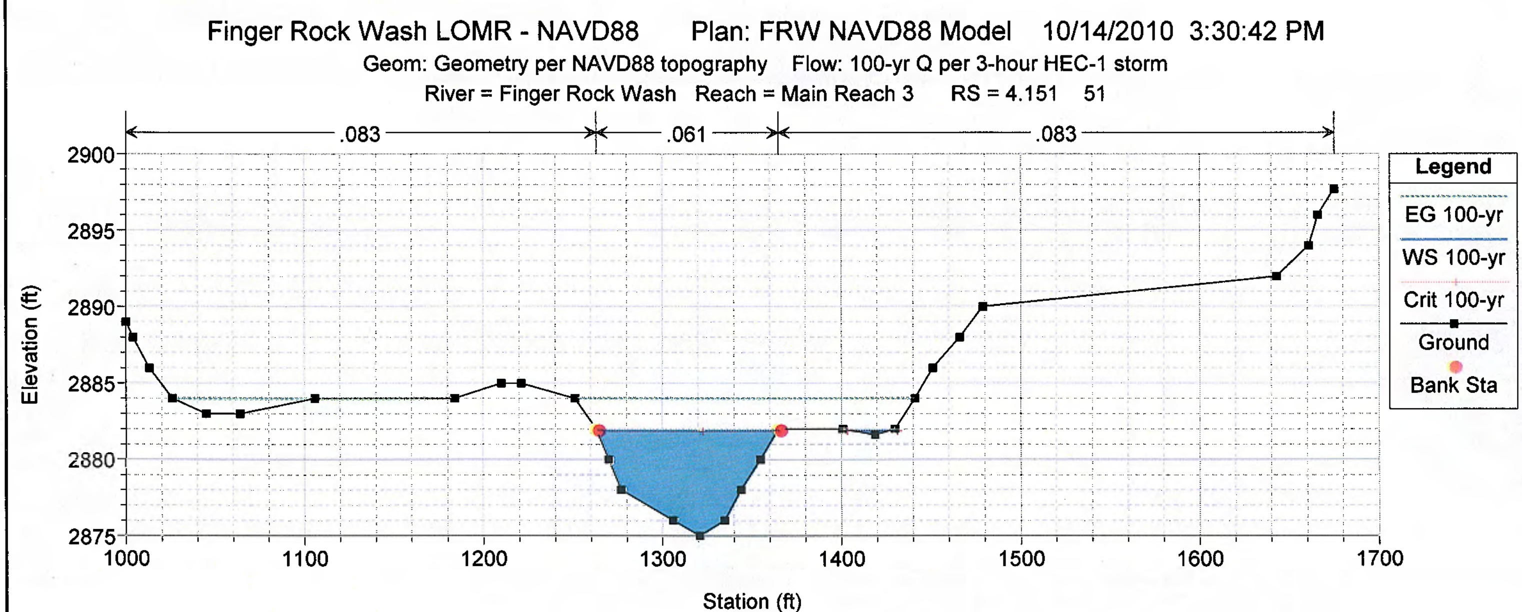
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.205 52

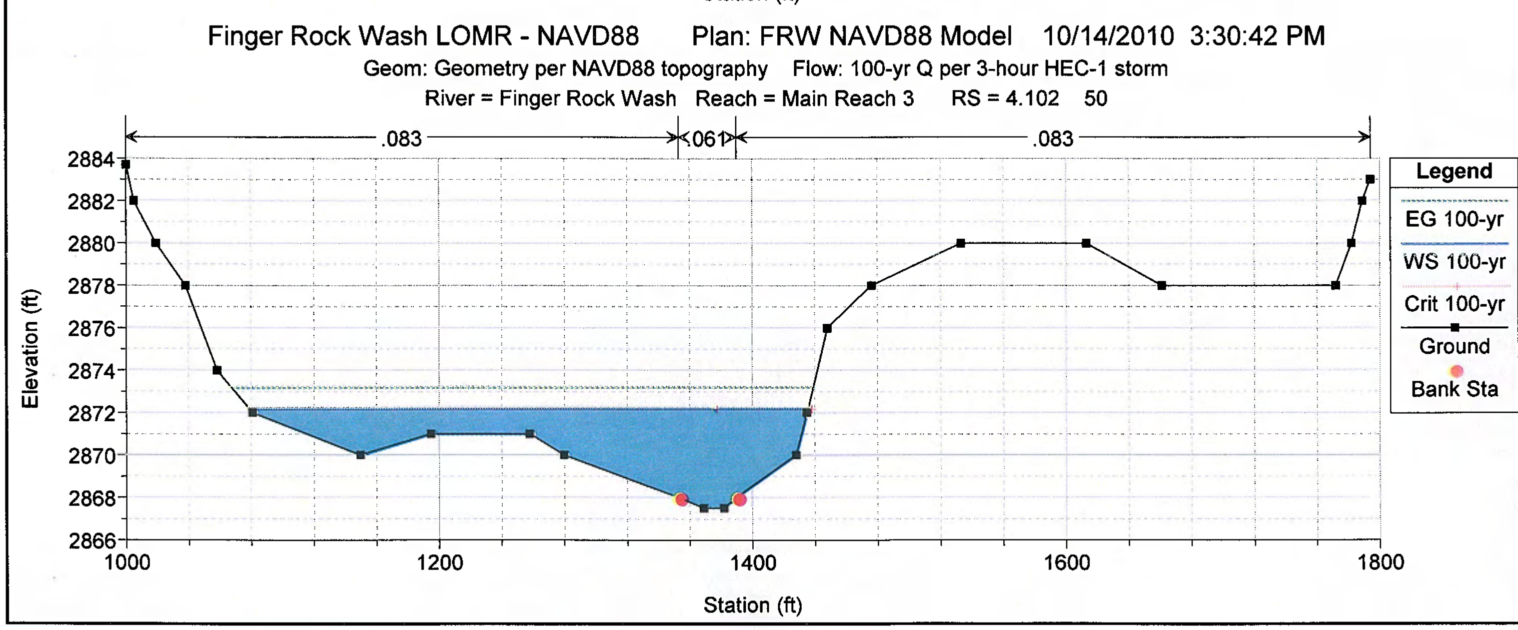


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.189

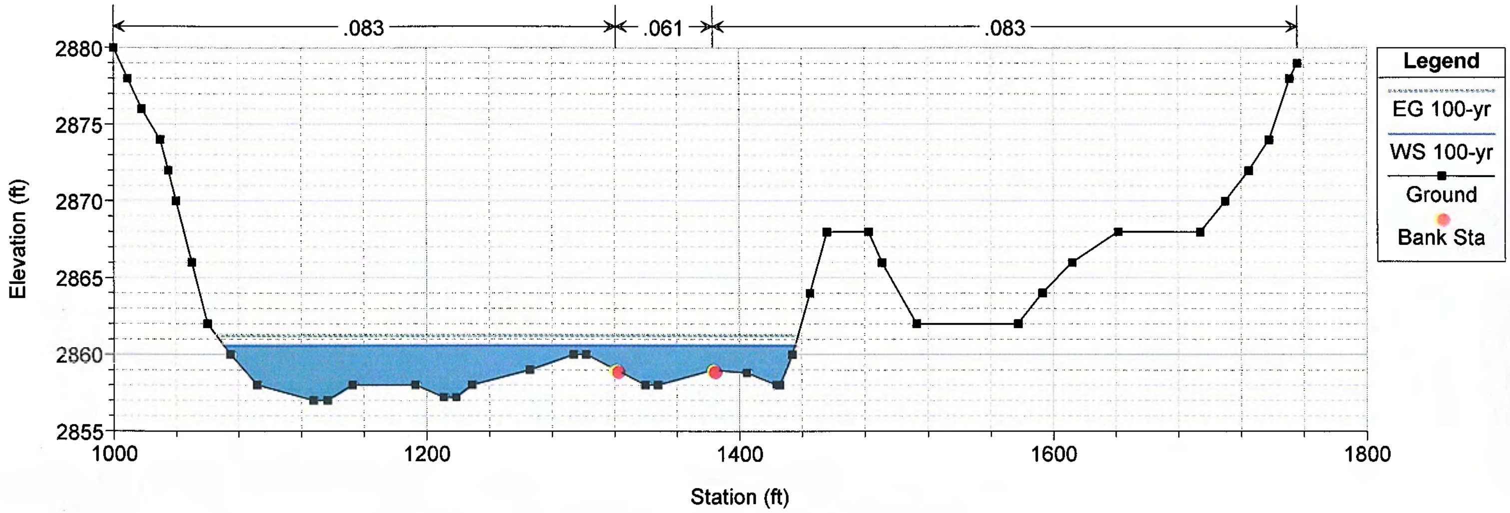



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.169
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

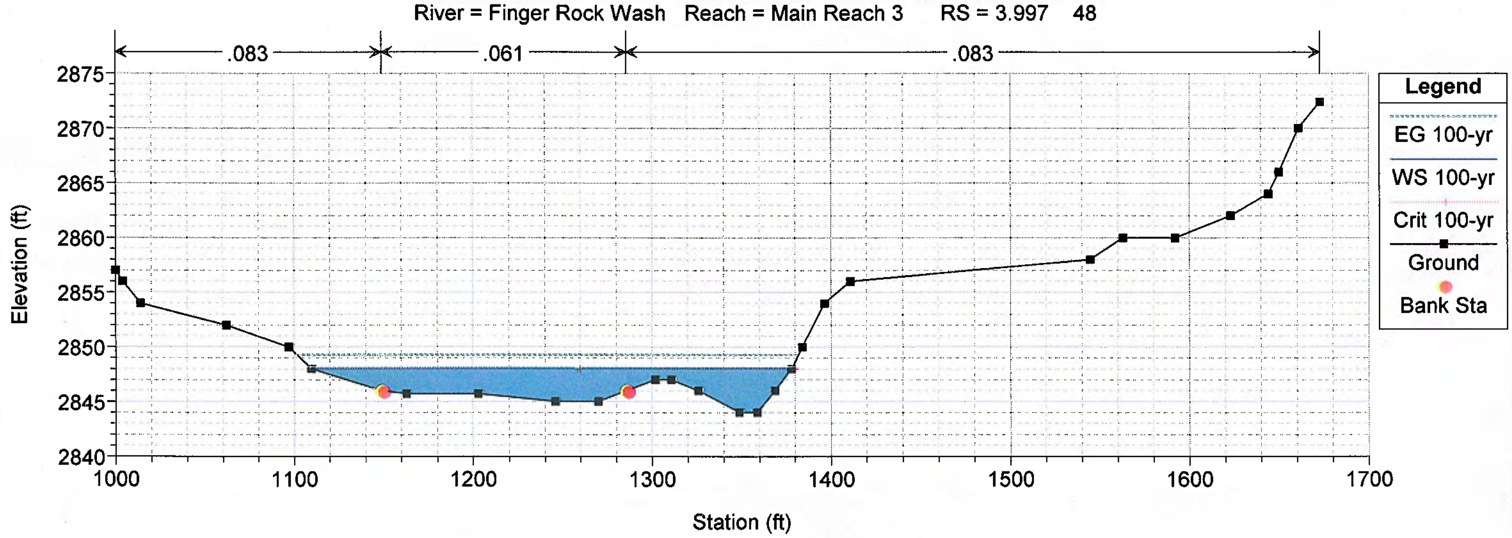

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.151 51
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.102 50
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

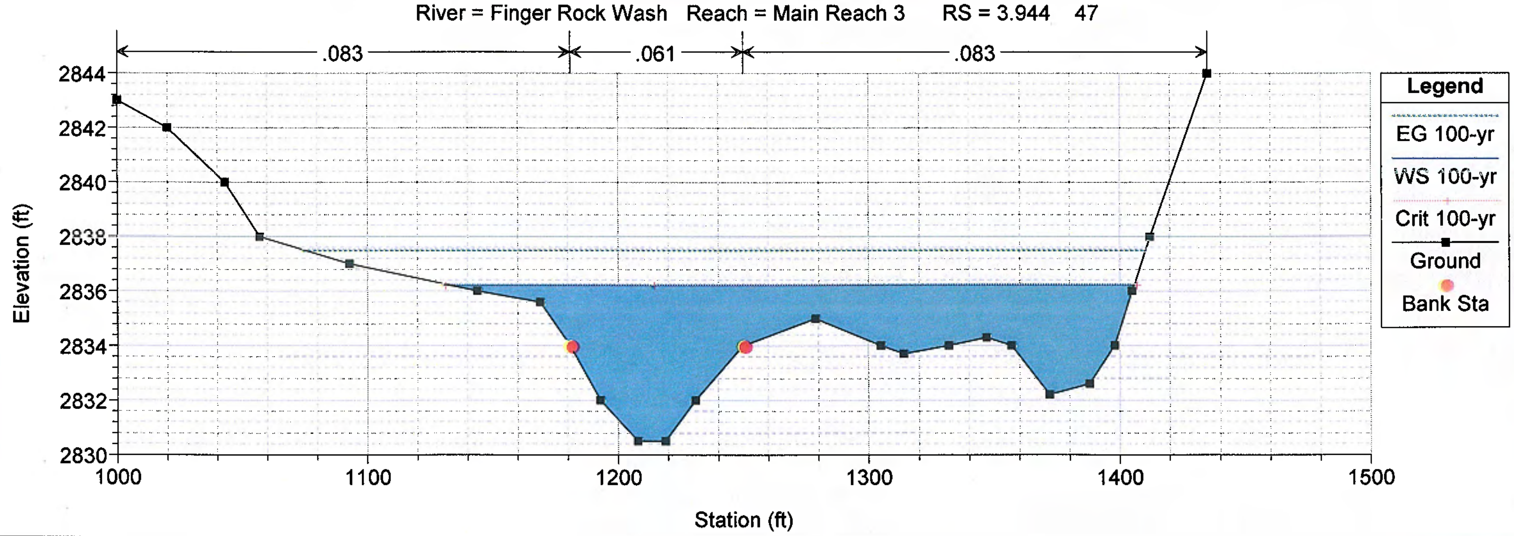
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 4.055 49

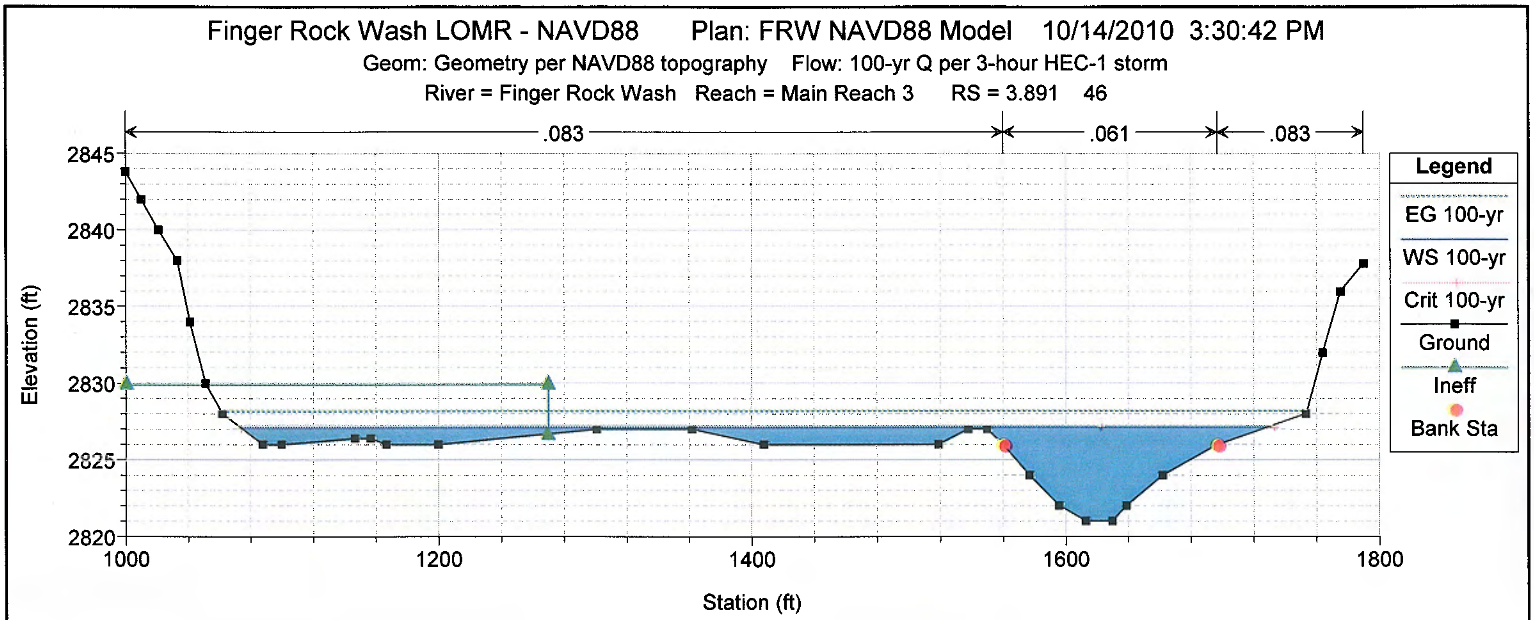


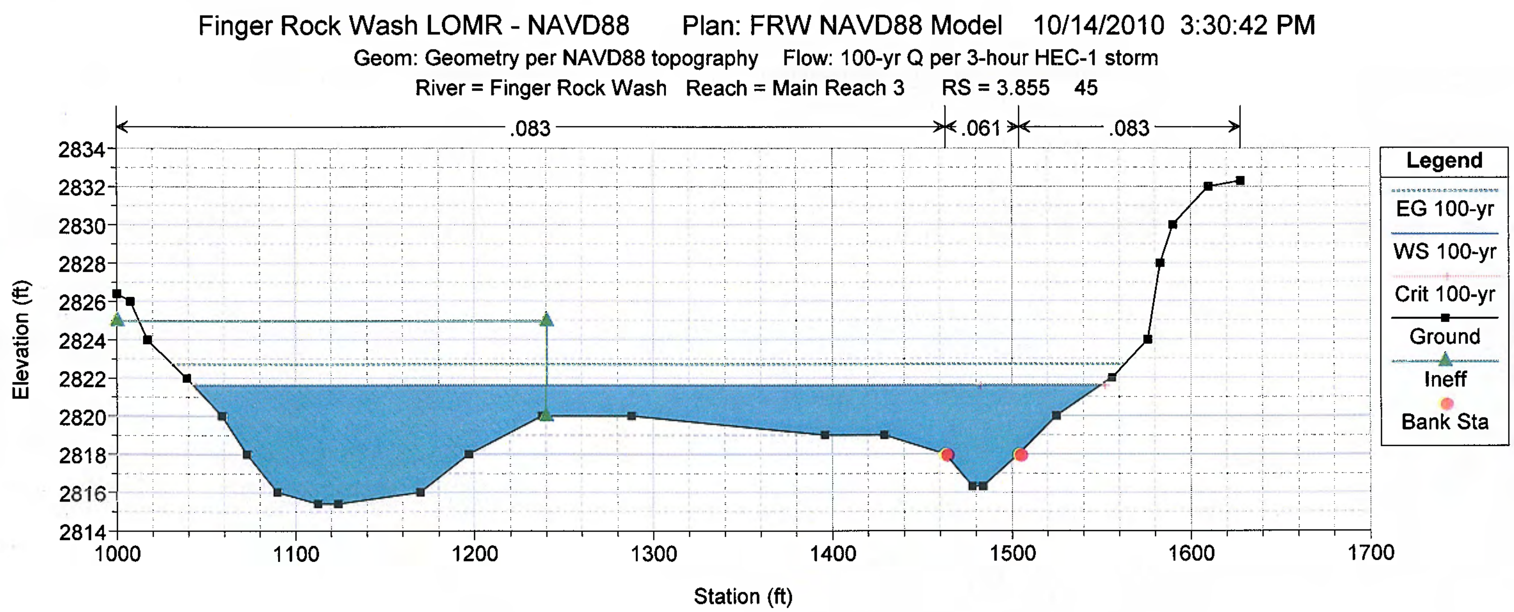
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 3.997 48

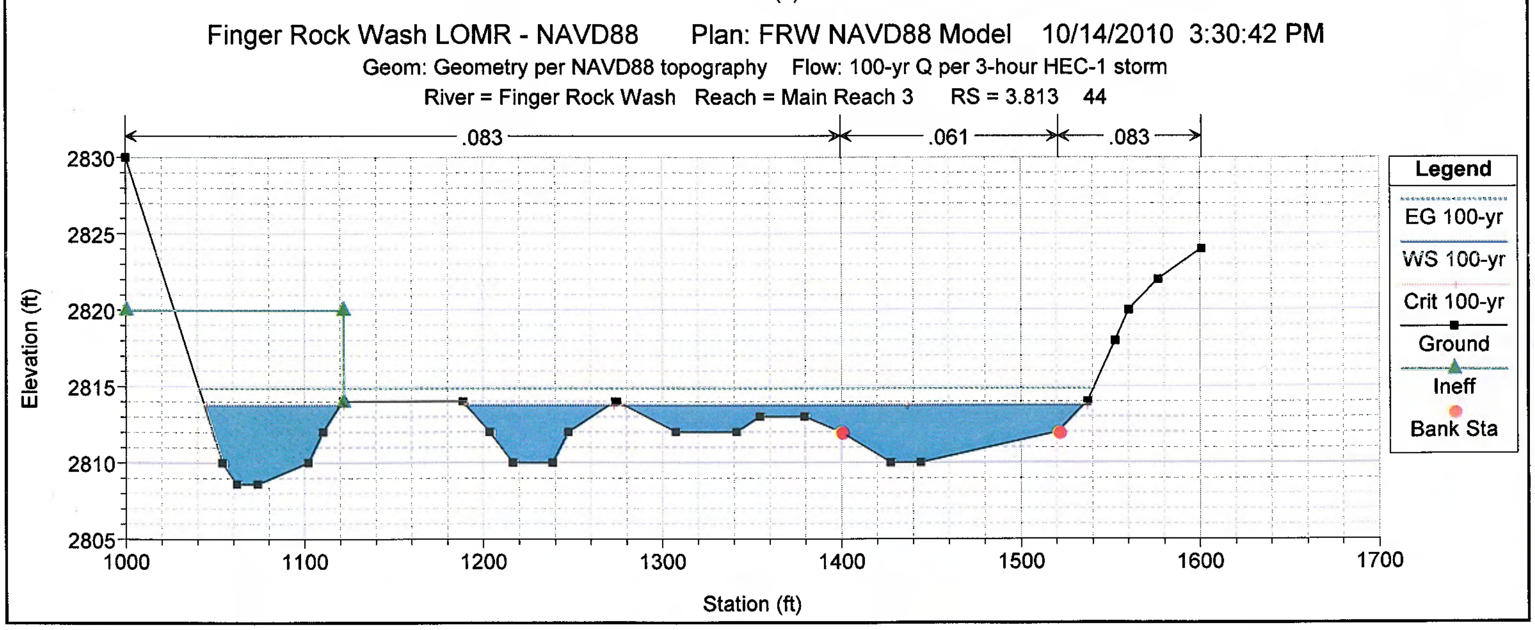


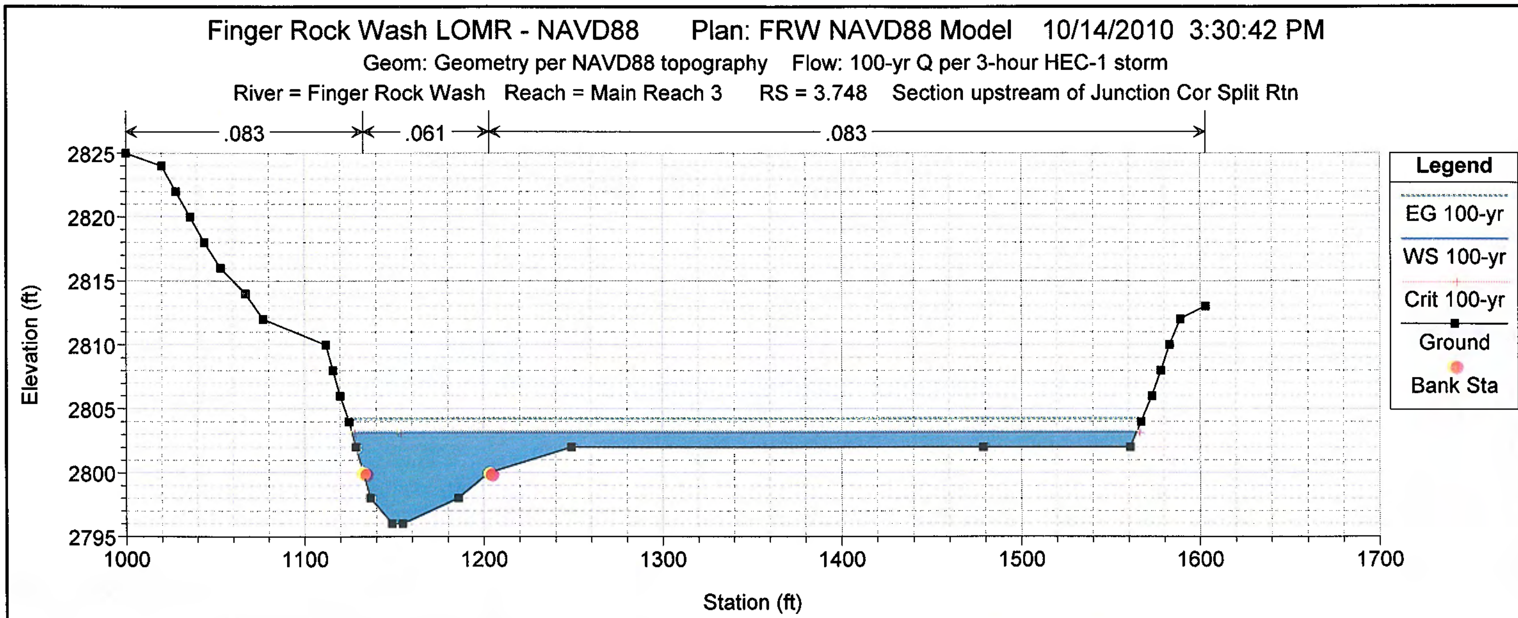
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 3.944 47



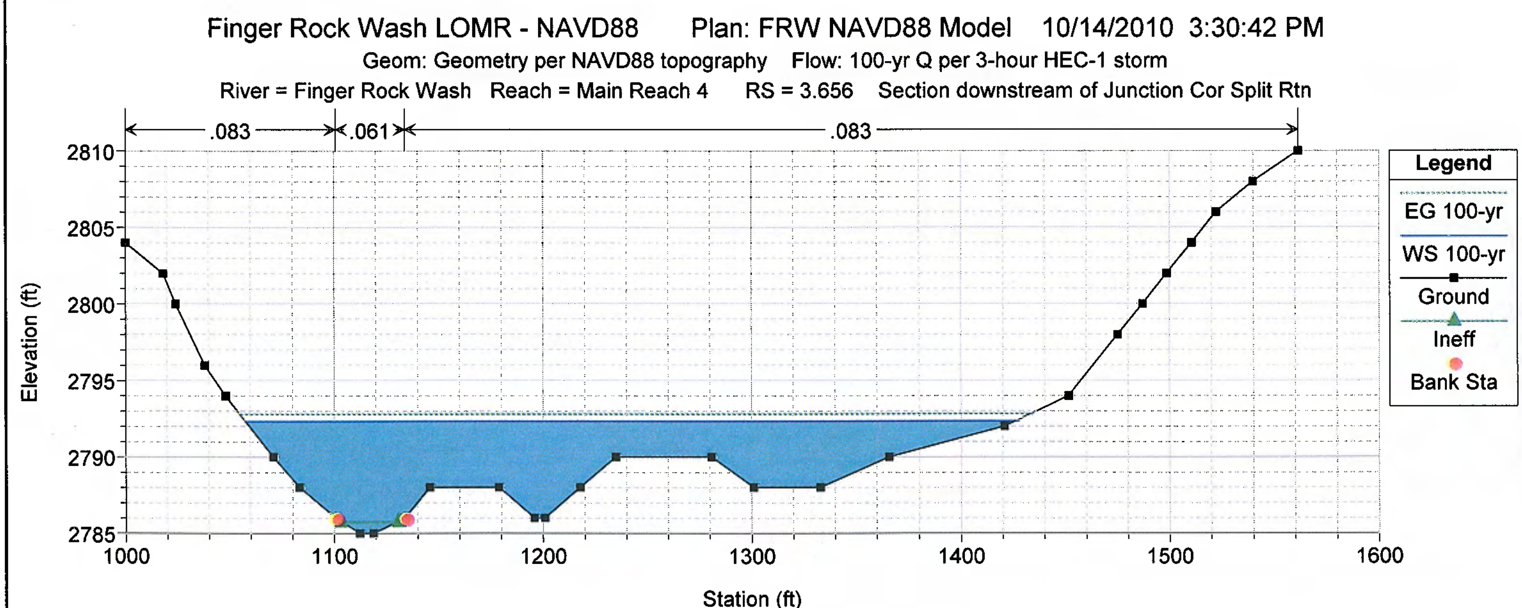

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 3.891 46
.083
.061
.083
Elevation (ft)
2845
2840
2835
2830
2825
2820
1000
1200
1400
1600
1800
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 3.855 45
.083
.061
.083
Elevation (ft)
2834
2832
2830
2828
2826
2824
2822
2820
2818
2816
2814
1000
1100
1200
1300
1400
1500
1600
1700
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

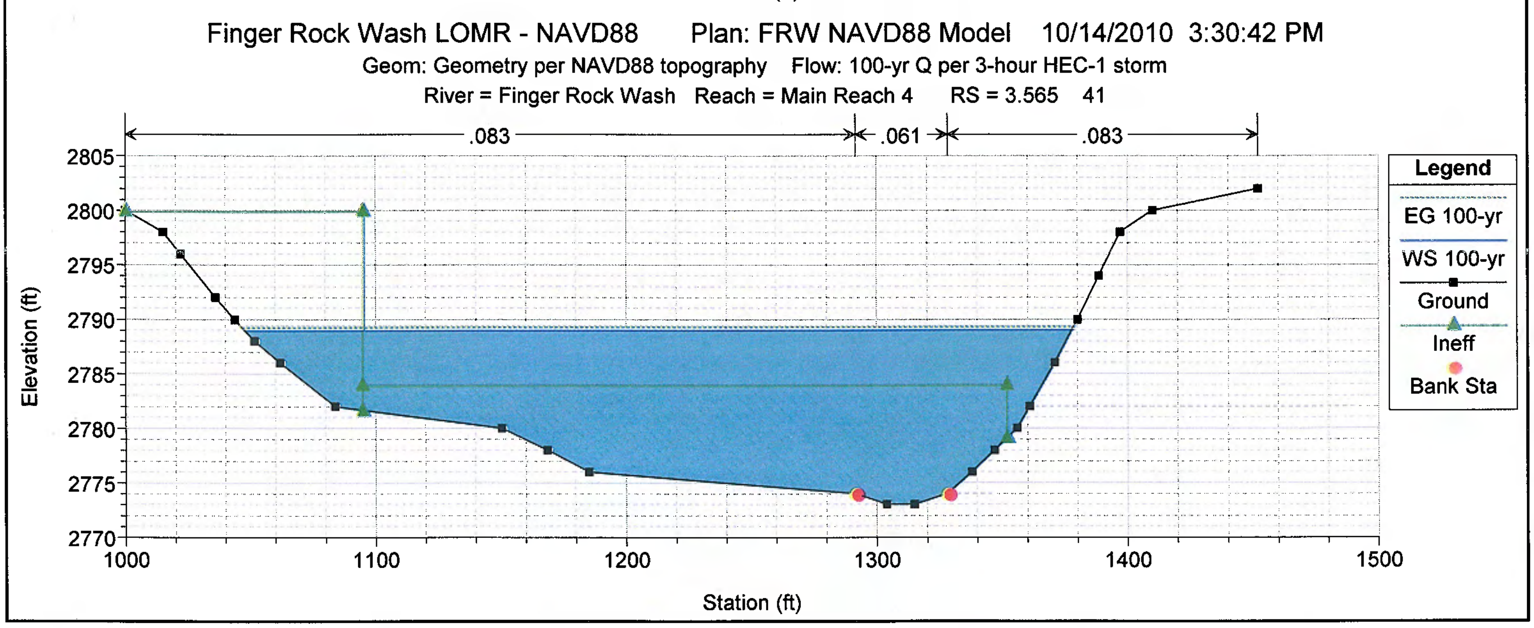

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 3.813 44
.083
.061
.083
Elevation (ft)
2830
2825
2820
2815
2810
2805
1000
1100
1200
1300
1400
1500
1600
1700
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta



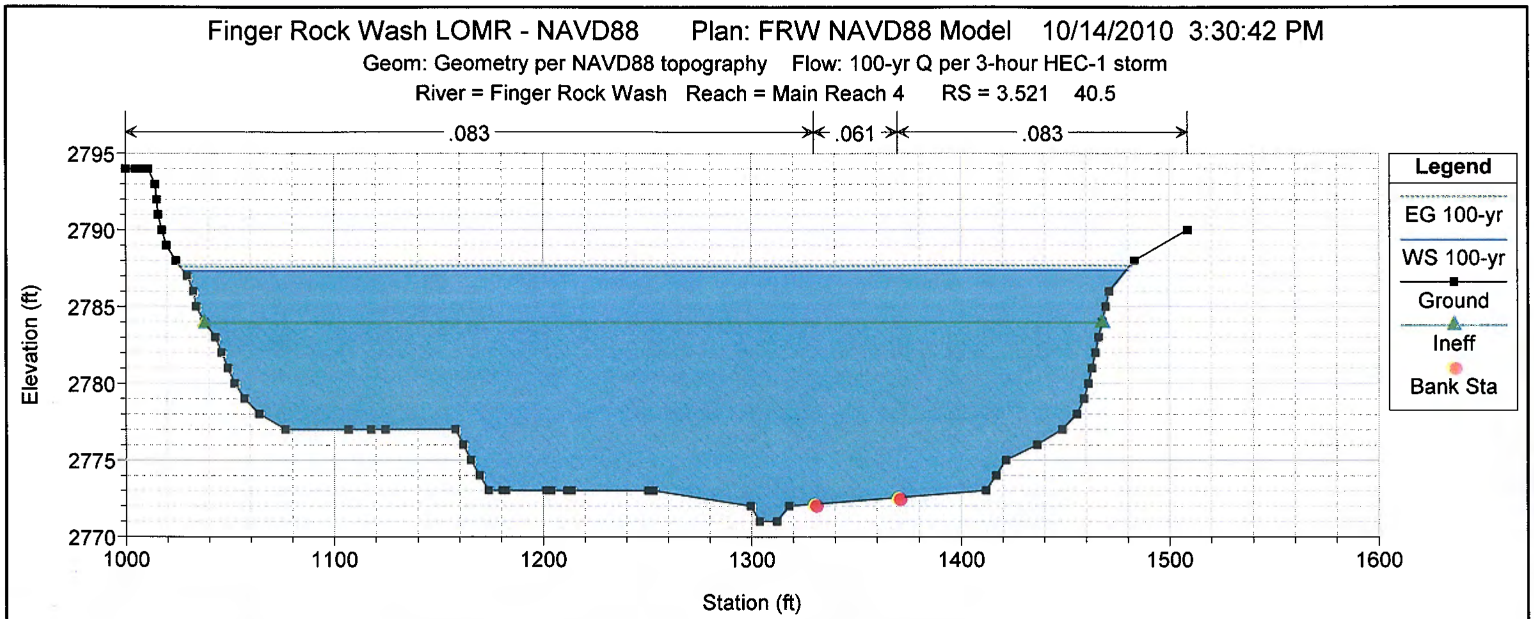
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 3 RS = 3.748 Section upstream of Junction Cor Split Rtn
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

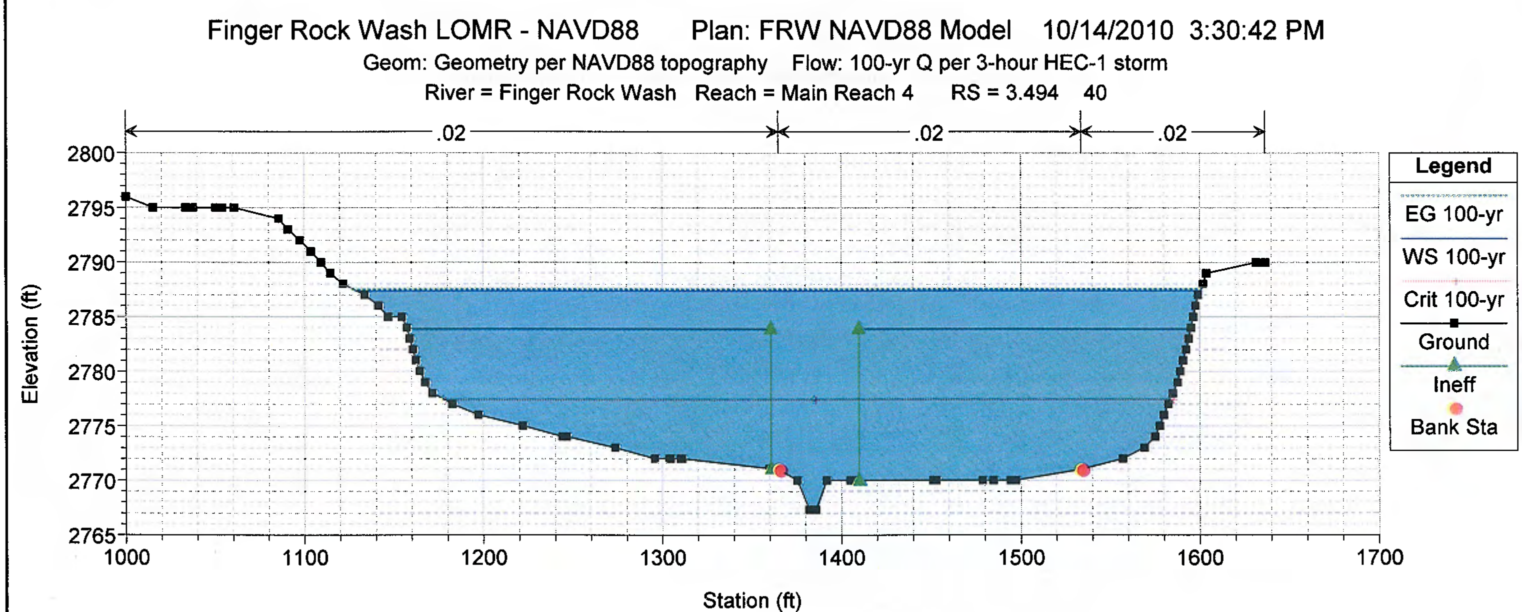


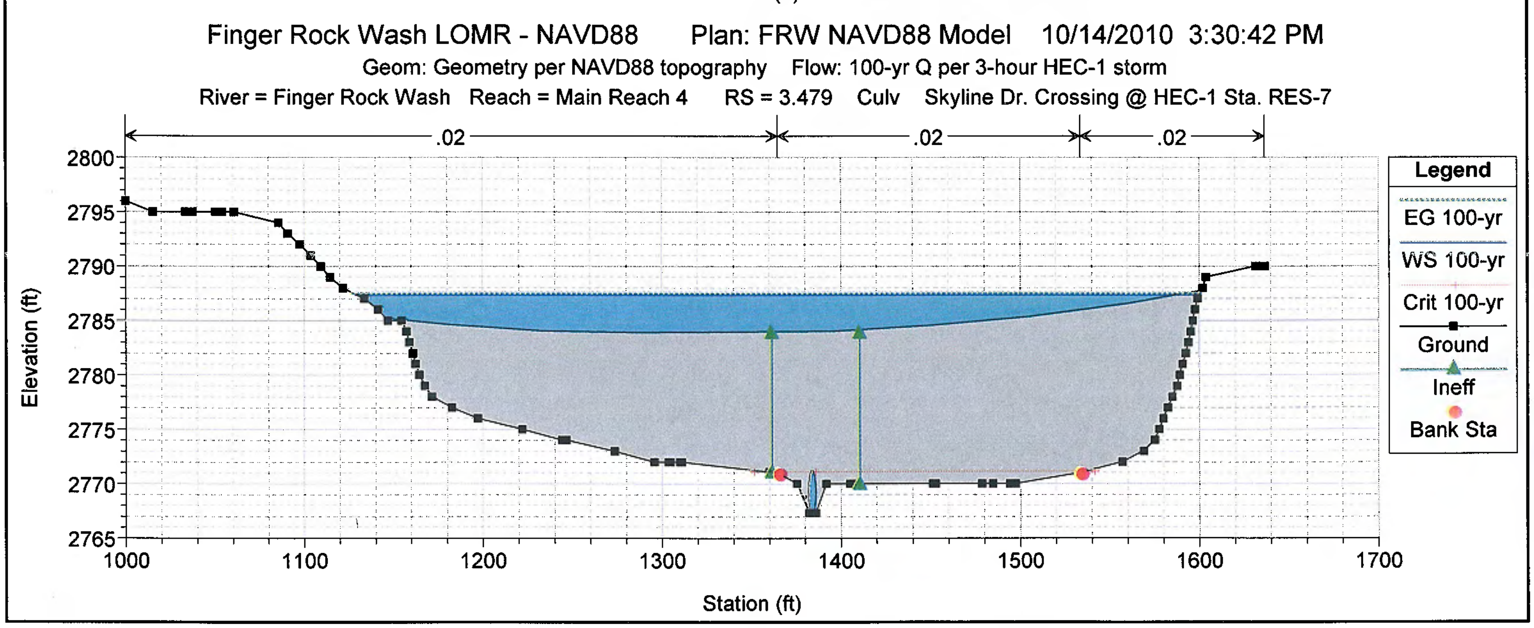
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 3.656 Section downstream of Junction Cor Split Rtn
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Ground
Ineff
Bank Sta



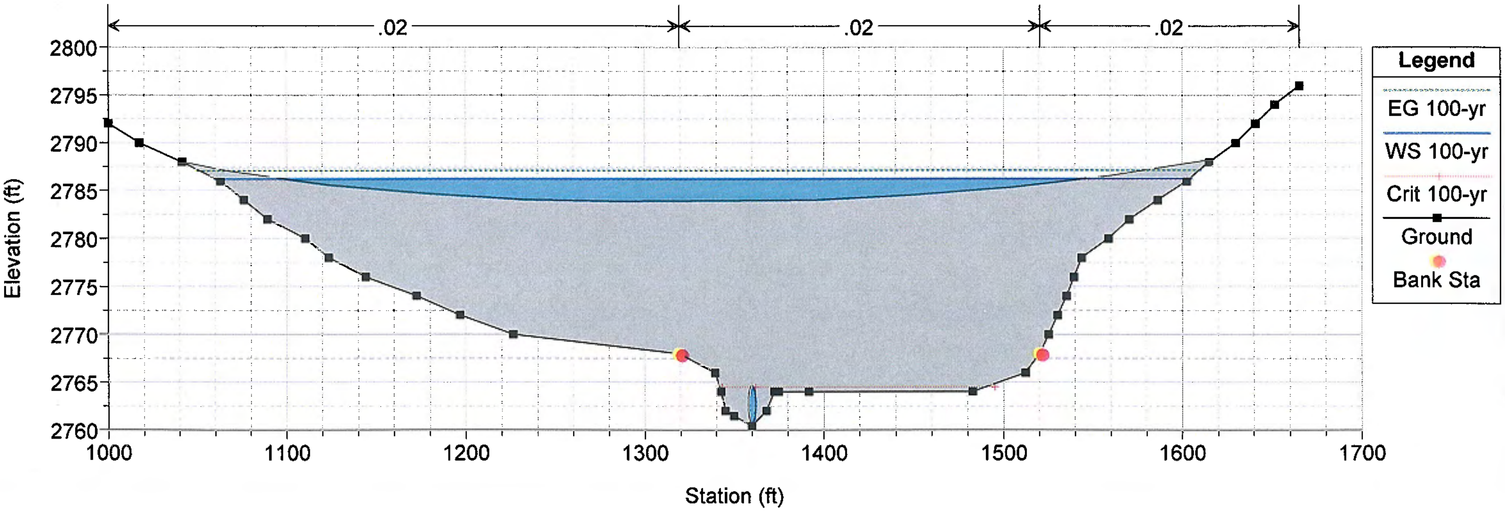
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 3.565 41
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Ground
Ineff
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 3.521 40.5
.083
.061
.083
Legend
EG 100-yr
WS 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

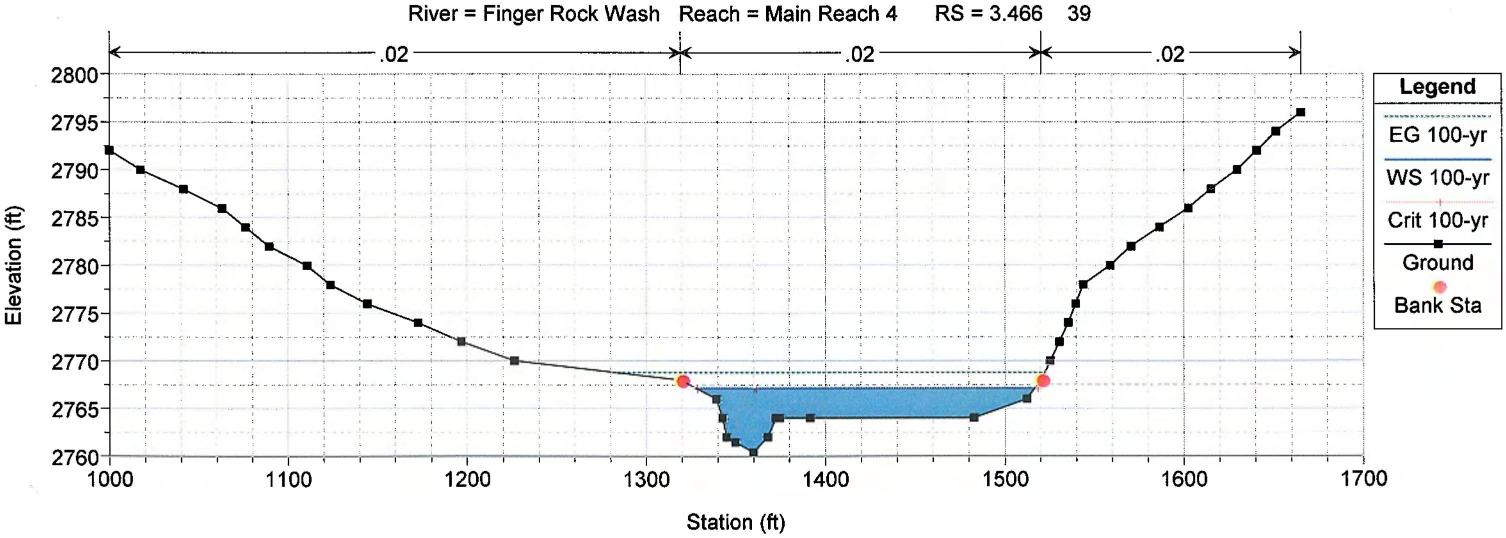

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 3.494 40
.02
.02
.02
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 3.479 Culv Skyline Dr. Crossing @ HEC-1 Sta. RES-7
.02
.02
.02
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

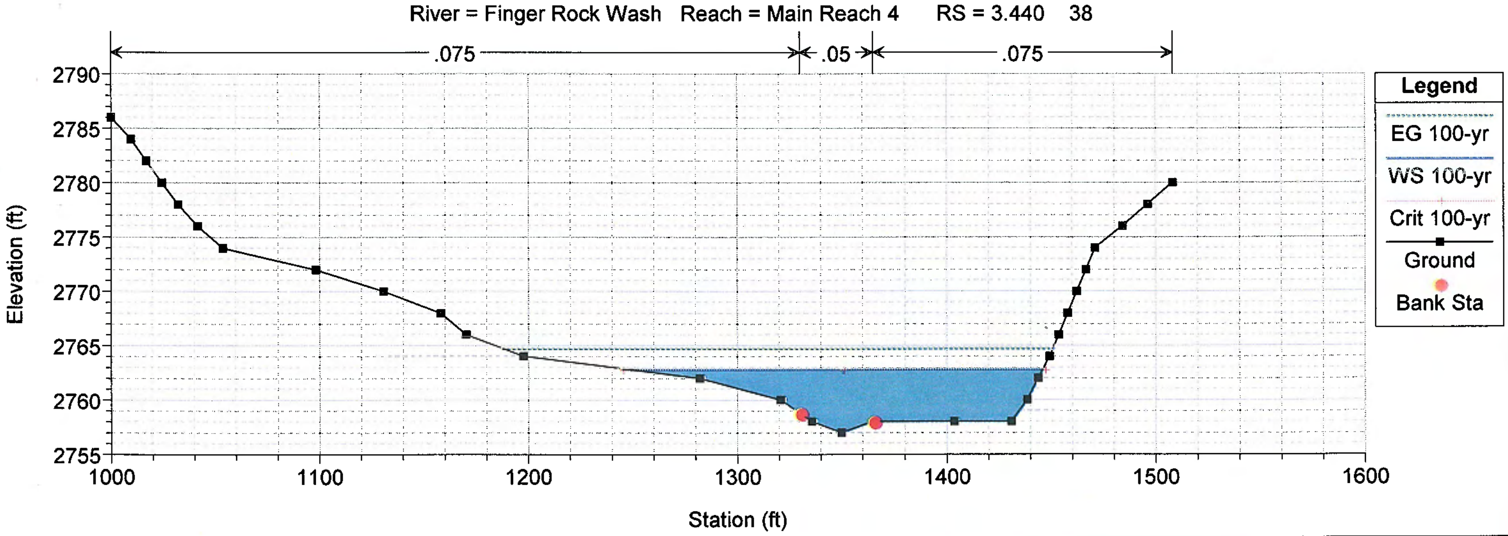
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 3.479 Culv Skyline Dr. Crossing @ HEC-1 Sta. RES-7

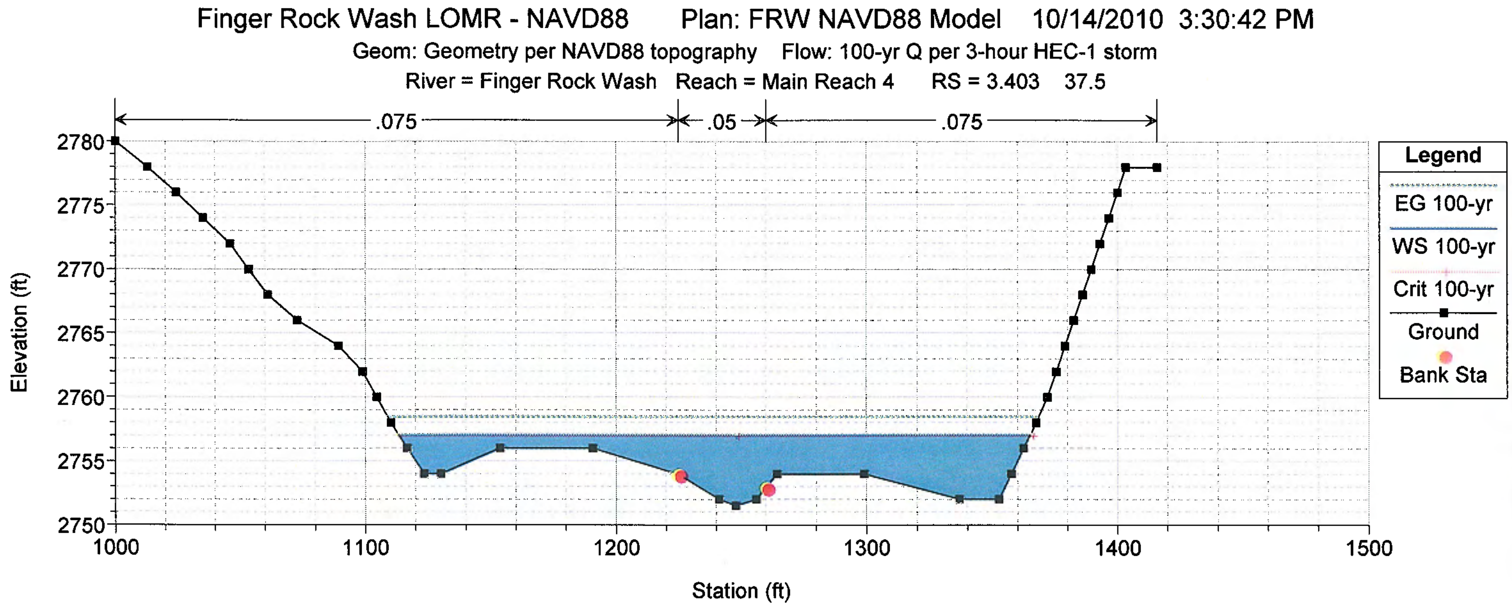


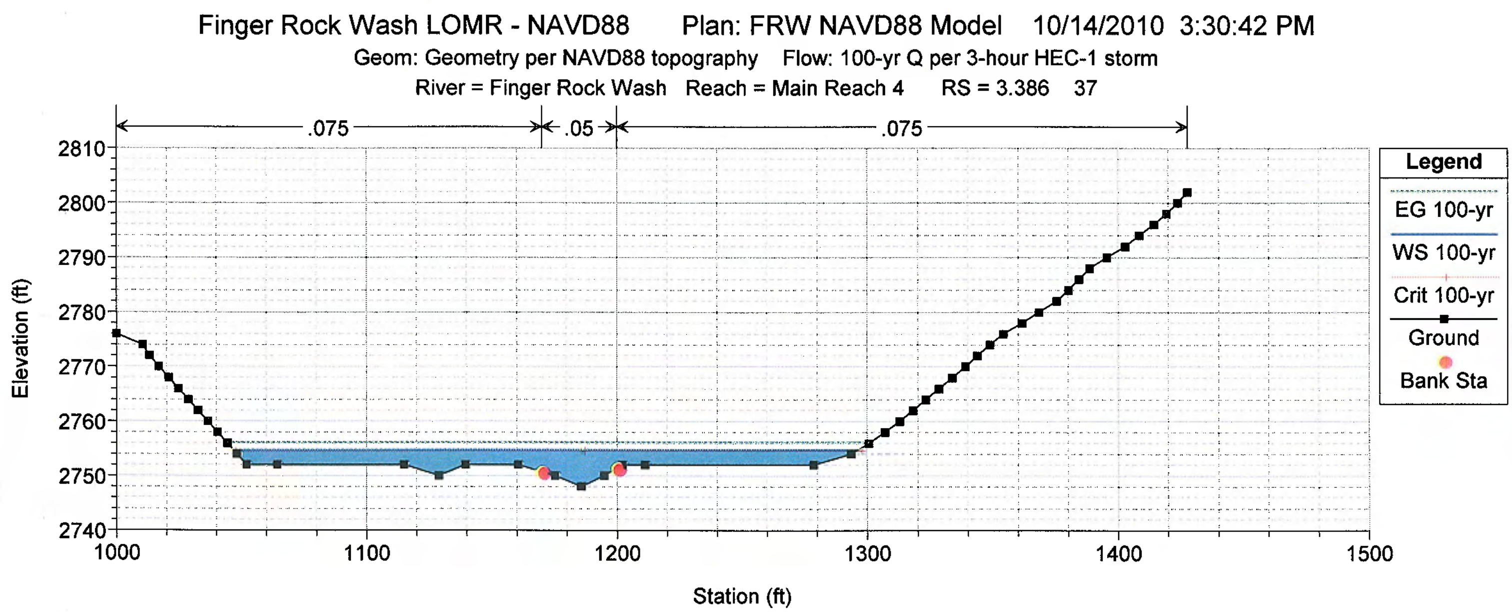
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 3.466 39

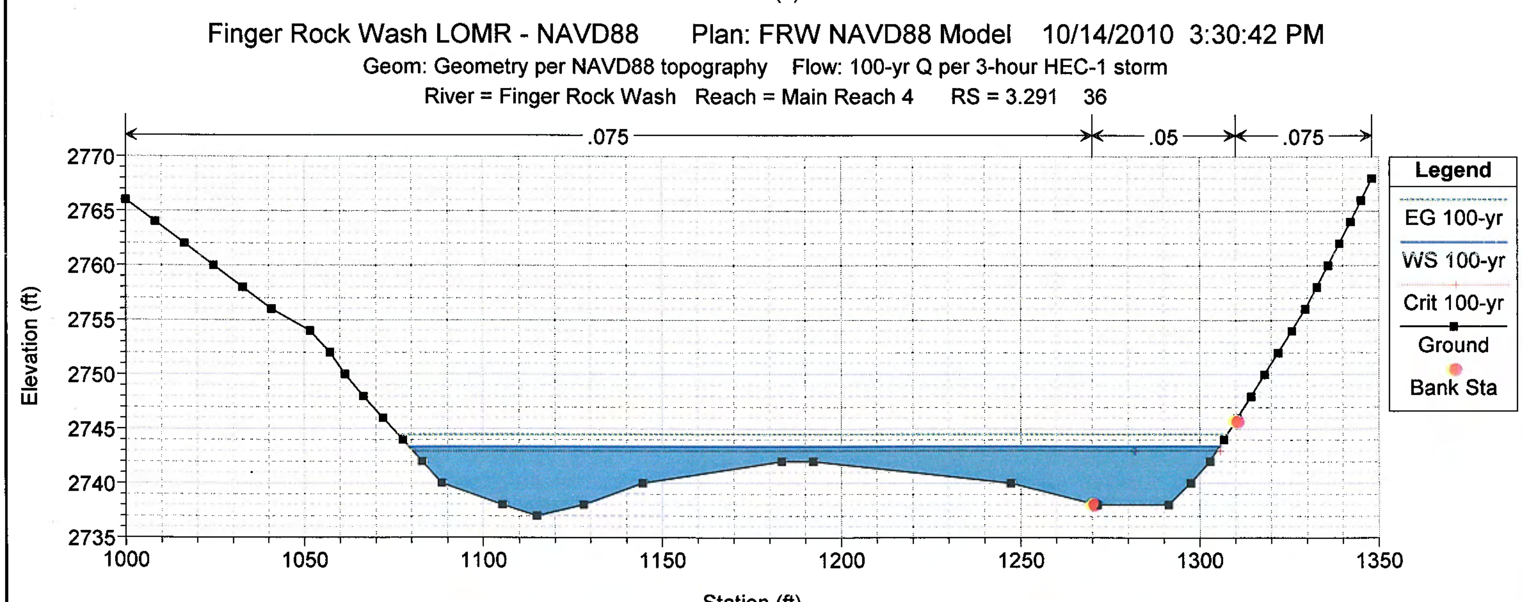


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 3.440 38




Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 3.403 37.5
.075
.05
.075
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

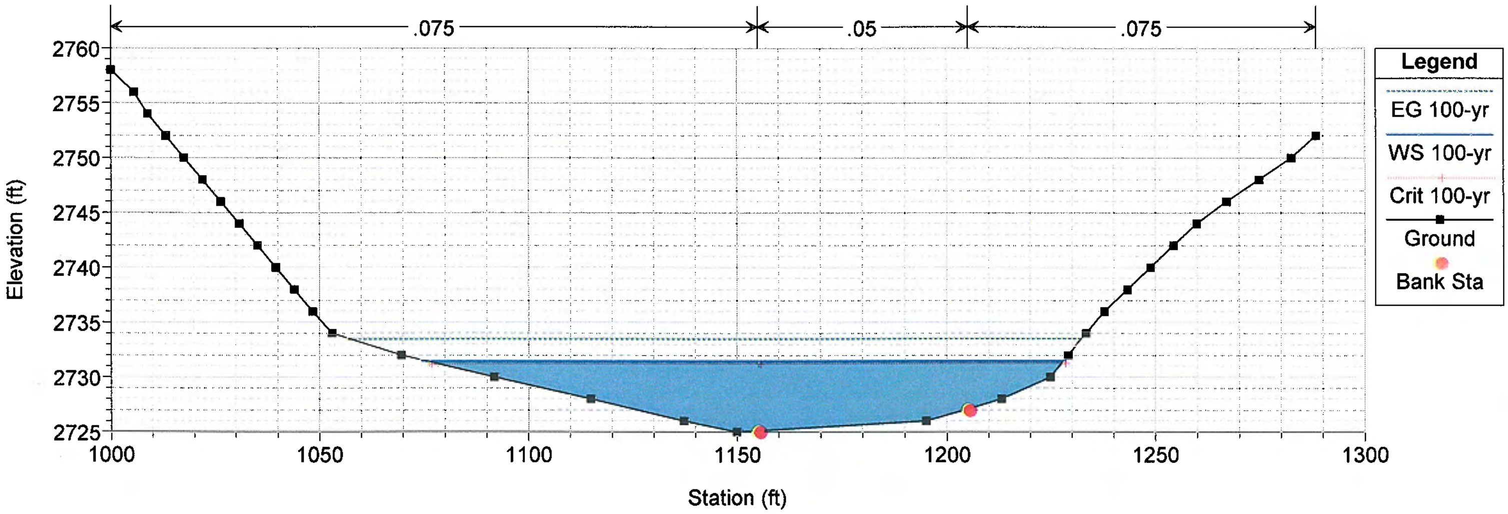

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 3.386 37
.075
.05
.075
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 3.291 36
.075
.05
.075
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM

Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm

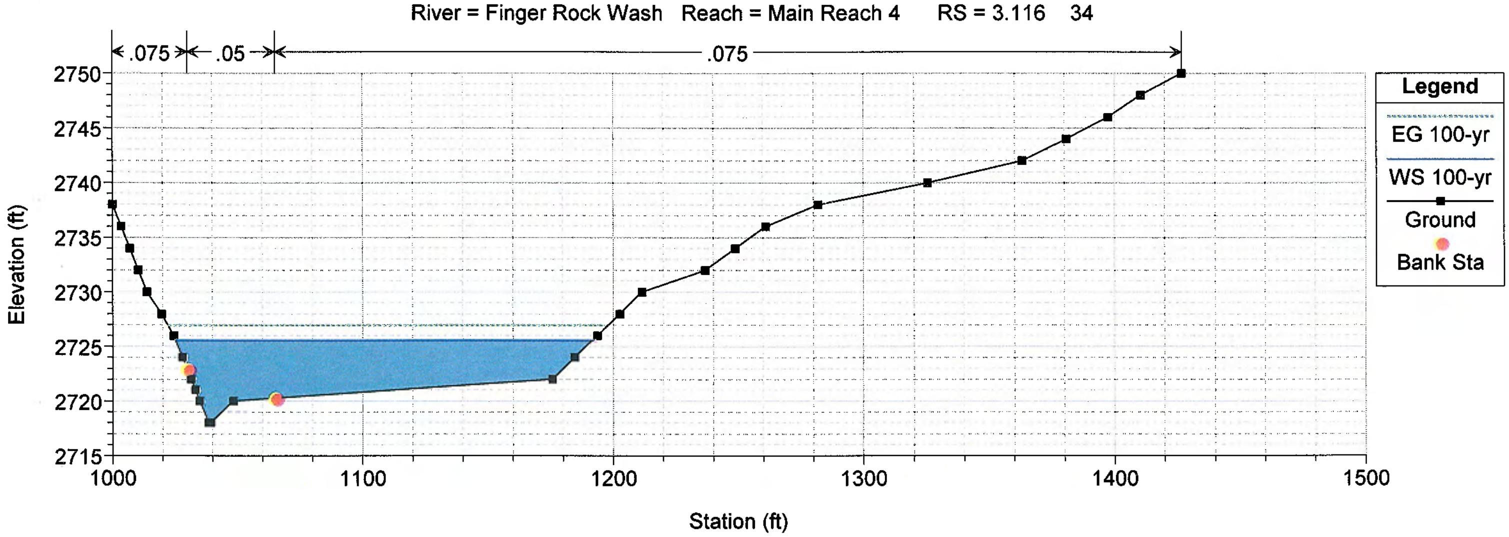
River = Finger Rock Wash Reach = Main Reach 4 RS = 3.185 35



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM

Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm

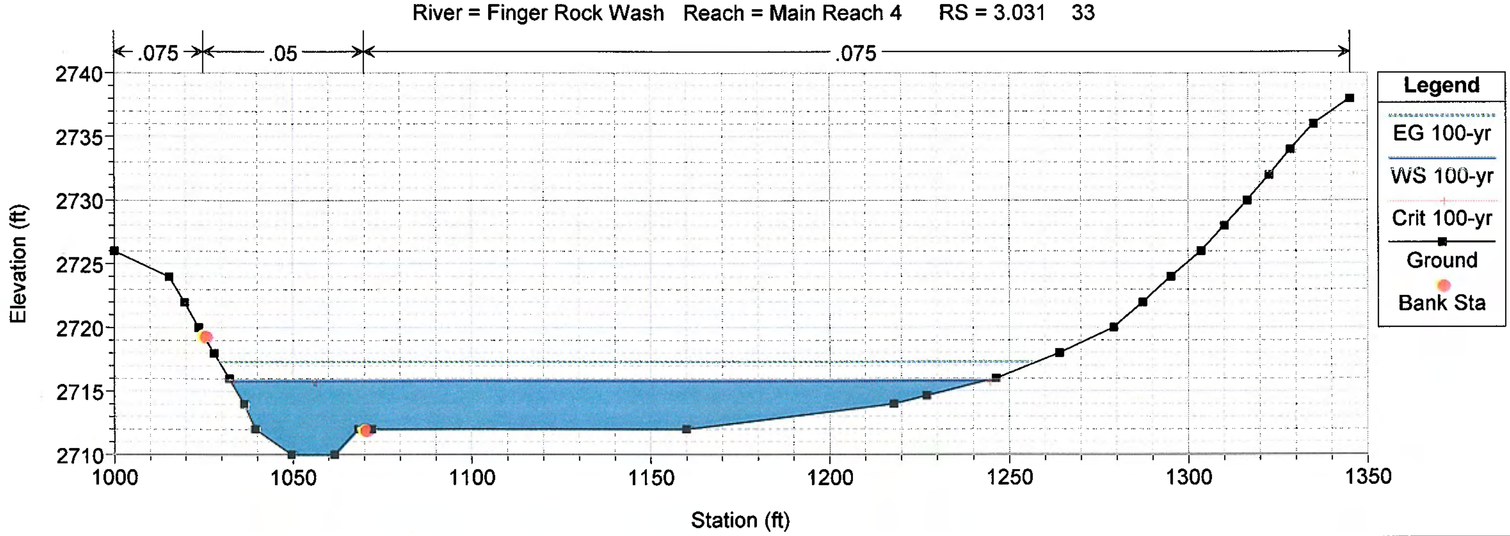
River = Finger Rock Wash Reach = Main Reach 4 RS = 3.116 34

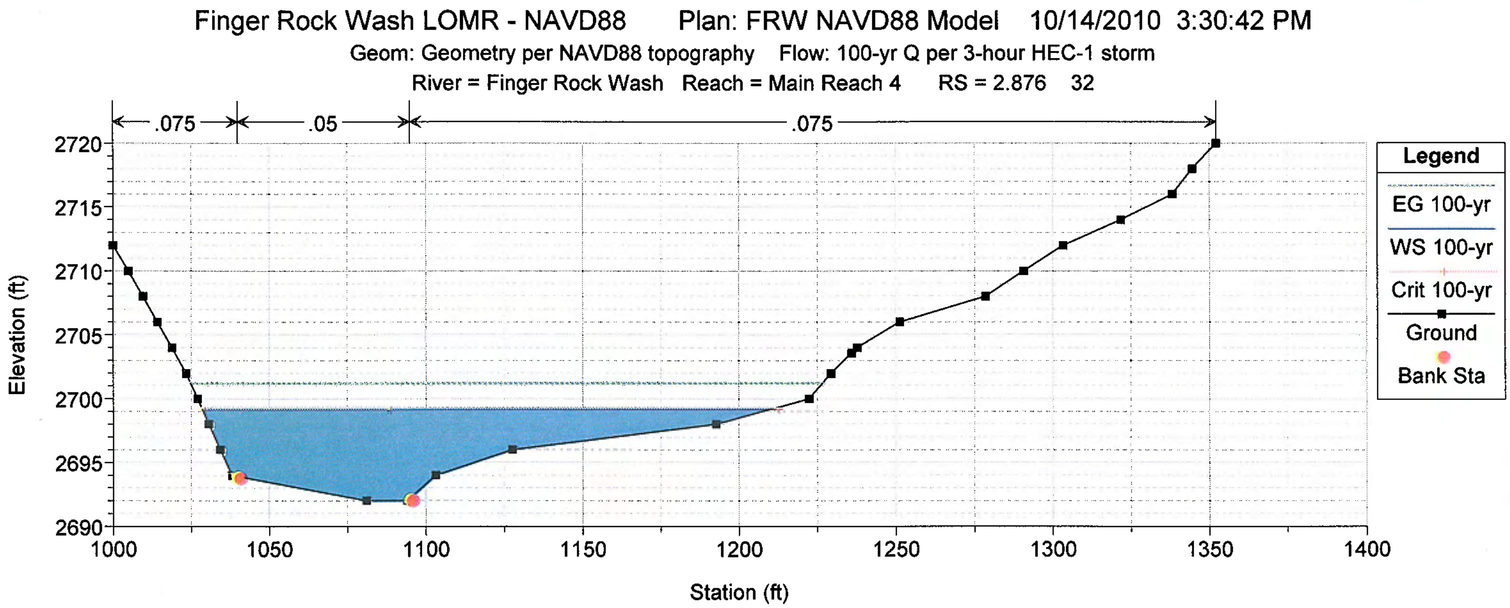


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM

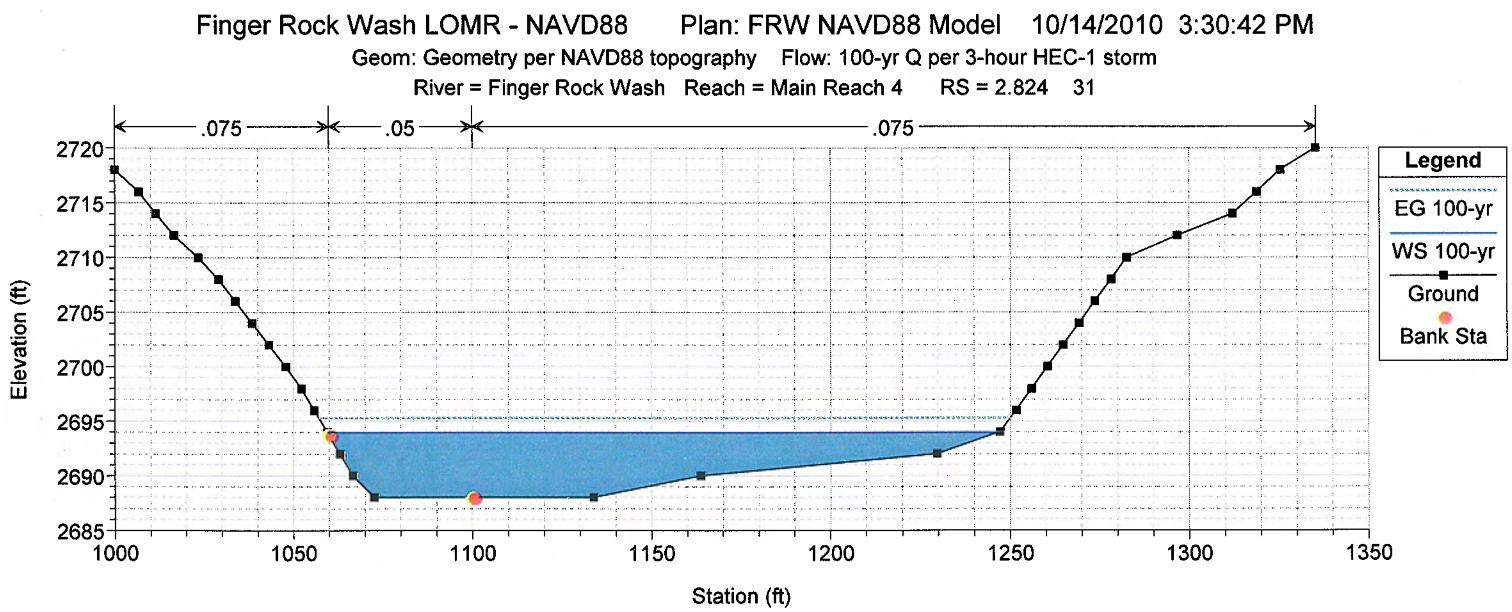
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm

River = Finger Rock Wash Reach = Main Reach 4 RS = 3.031 33

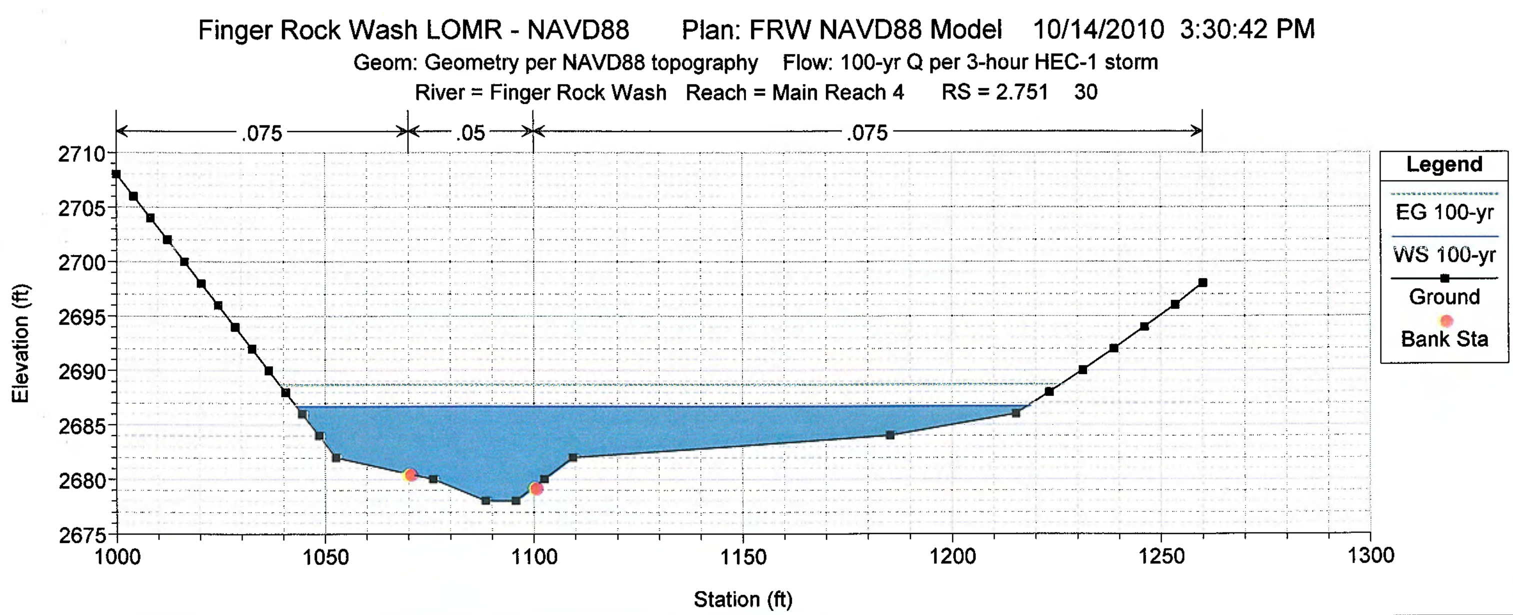




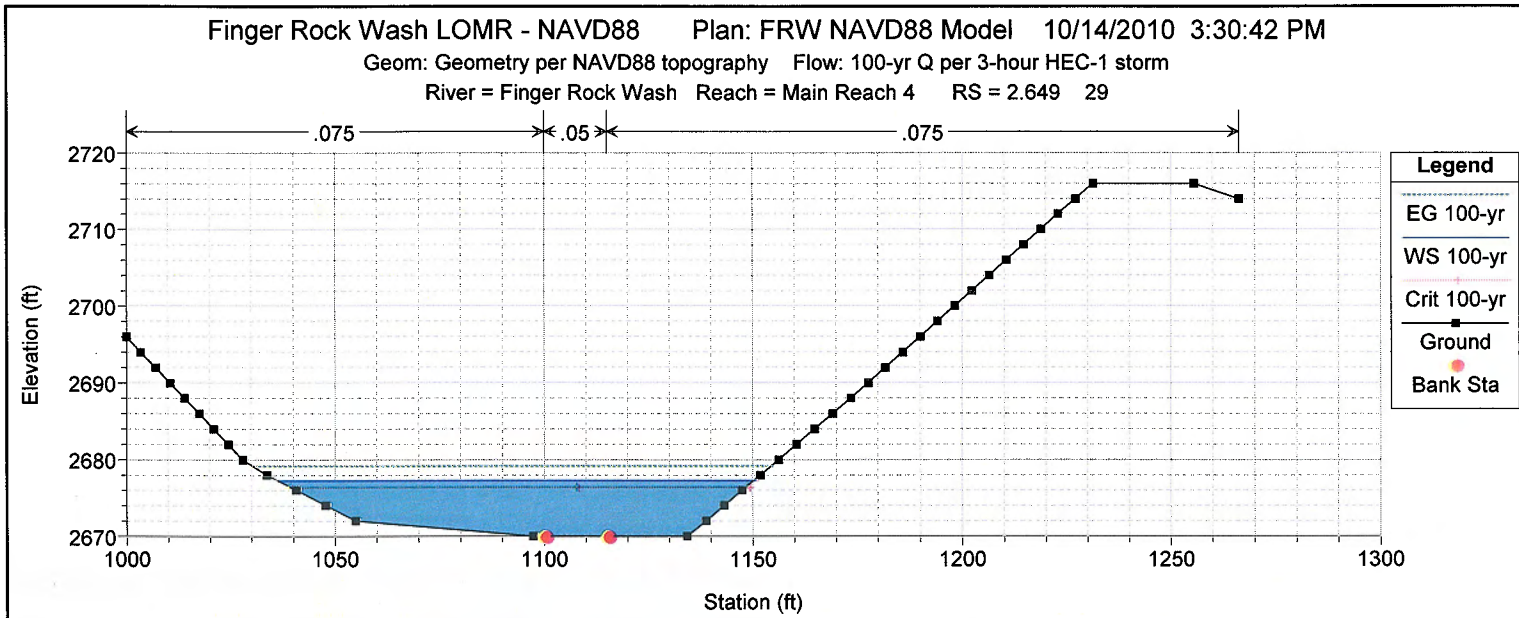
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.876 32
.075
.05
.075
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

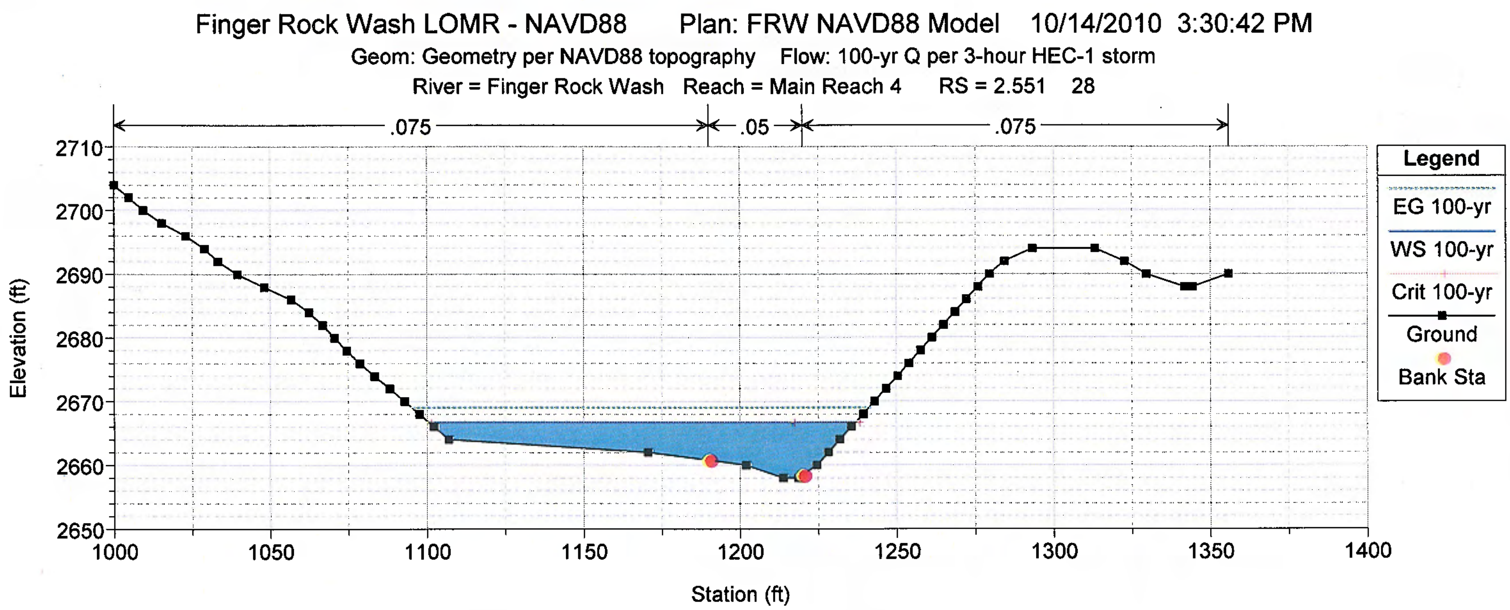


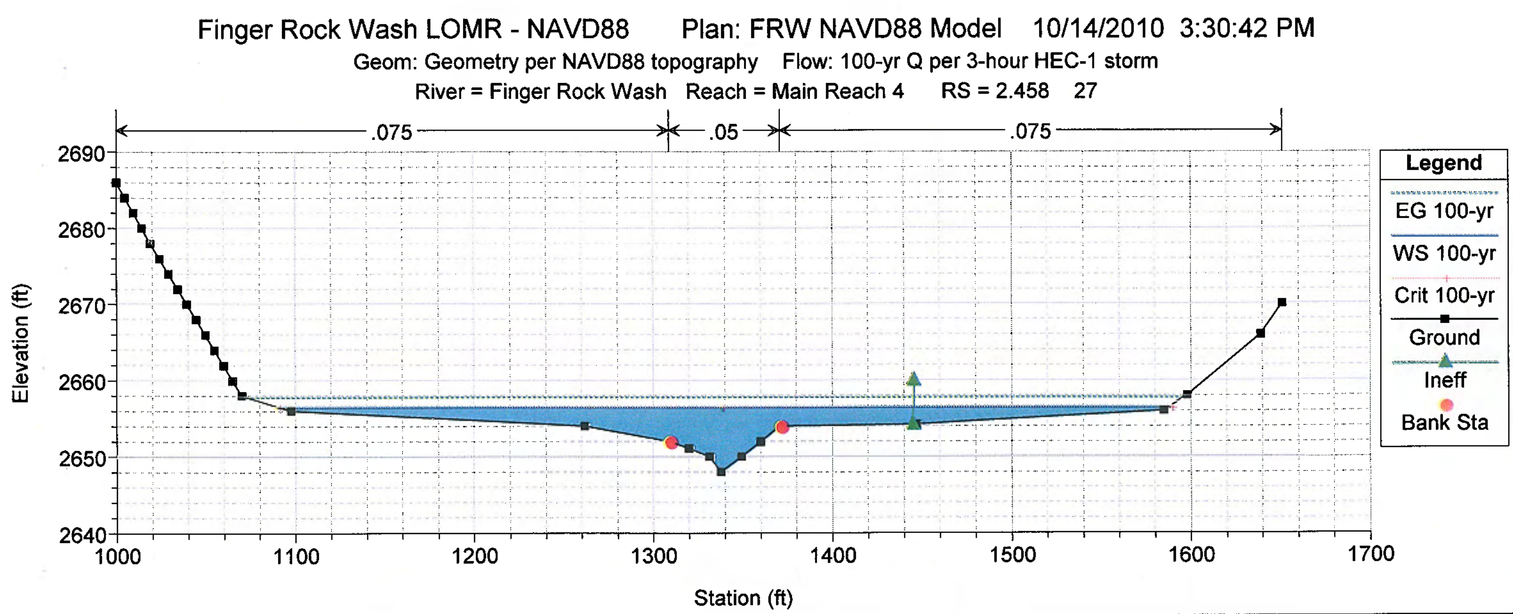
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.824 31
.075
.05
.075
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Ground
Bank Sta



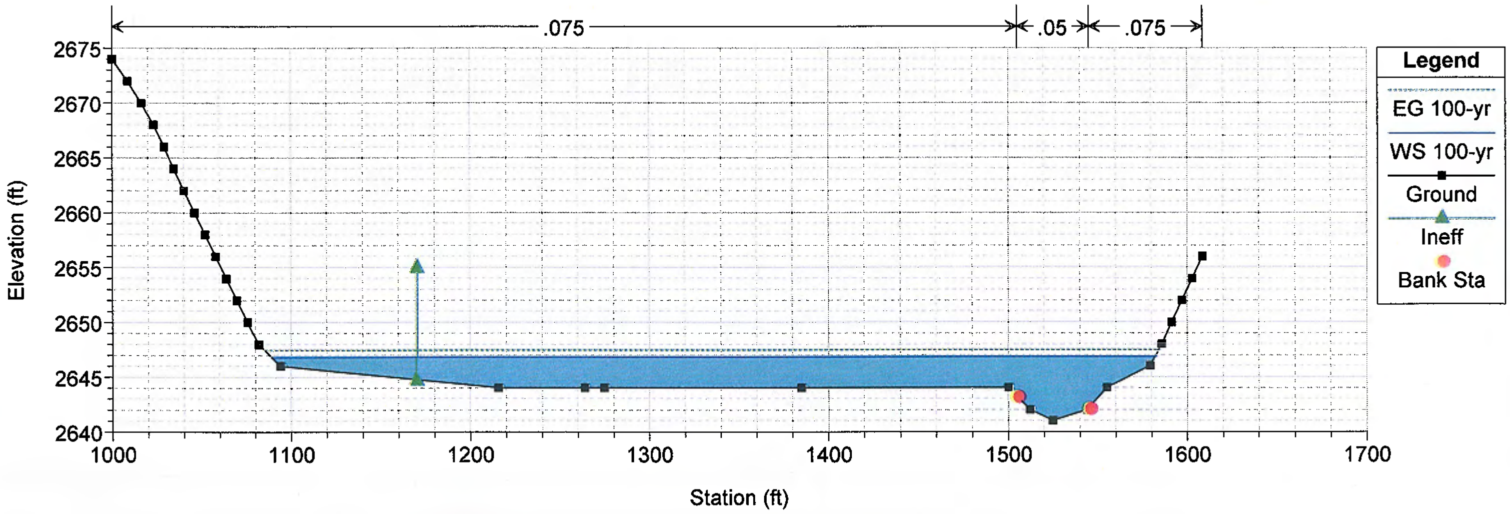
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.751 30
.075
.05
.075
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Ground
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.649 29
.075
.05
.075
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta
Elevation (ft)
2720
2710
2700
2690
2680
2670
1000
1050
1100
1150
1200
1250
1300
Station (ft)

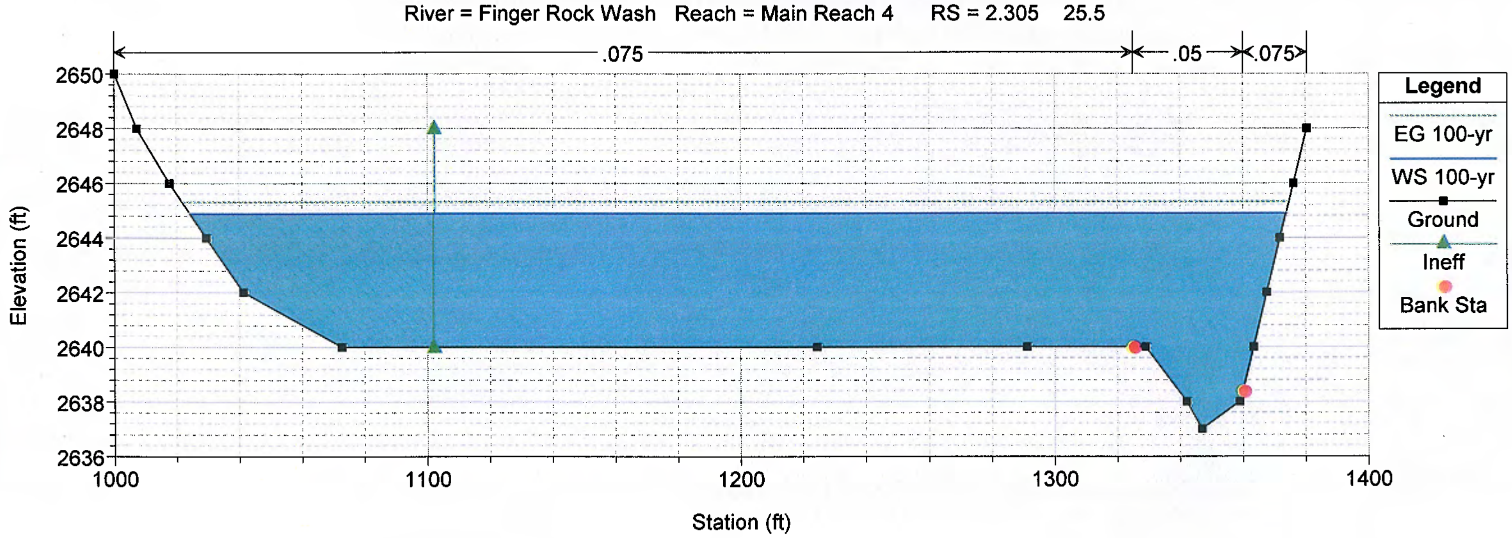

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.551 28
.075
.05
.075
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta
Elevation (ft)
2710
2700
2690
2680
2670
2660
2650
1000
1050
1100
1150
1200
1250
1300
1350
1400
Station (ft)


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.458 27
.075
.05
.075
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
2690
2680
2670
2660
2650
2640
1000
1100
1200
1300
1400
1500
1600
1700
Station (ft)

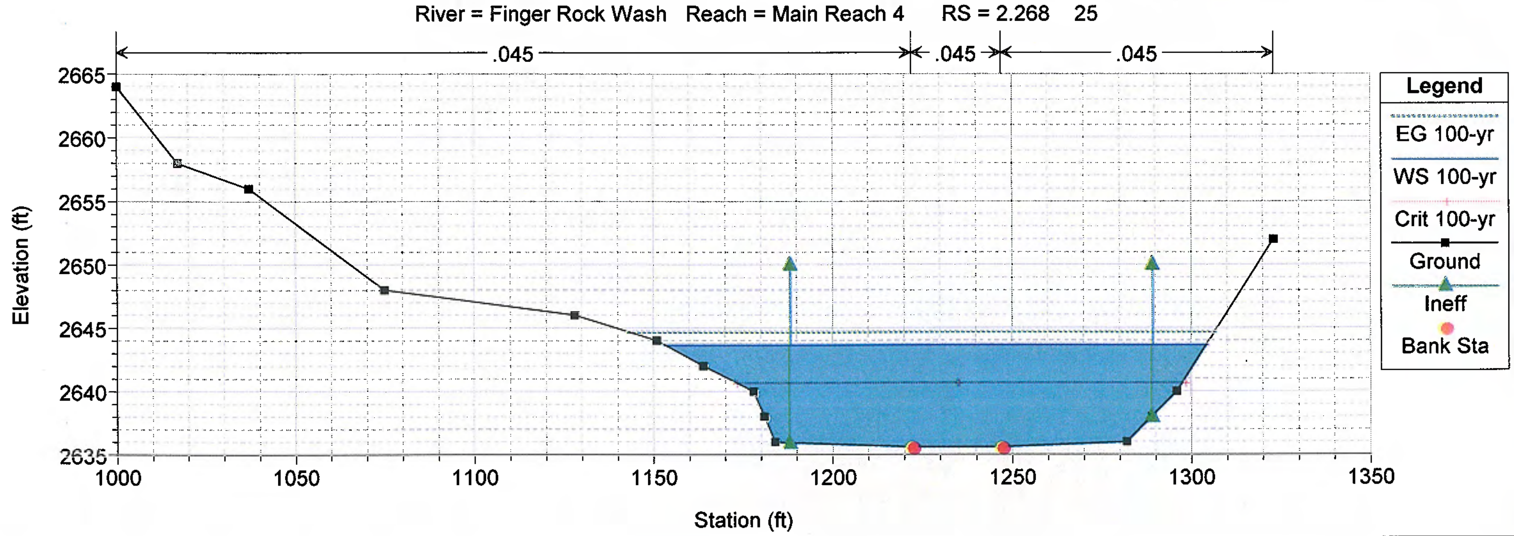
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.362 26

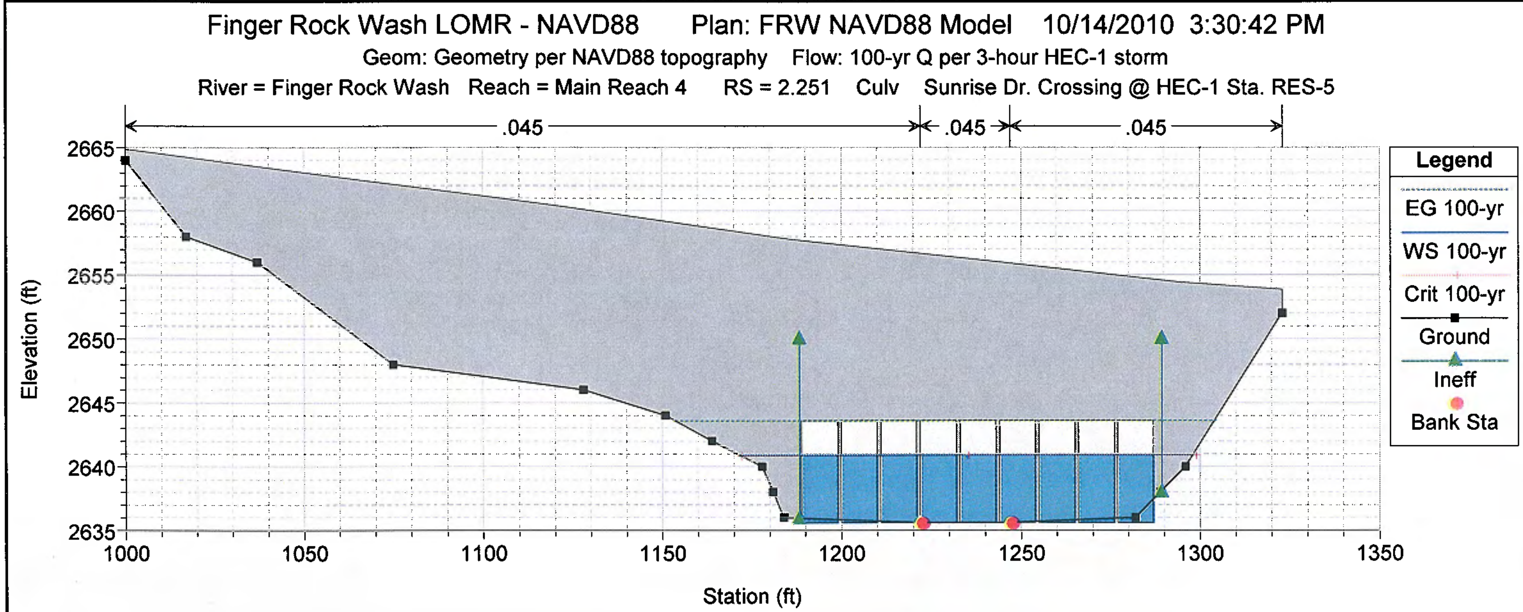


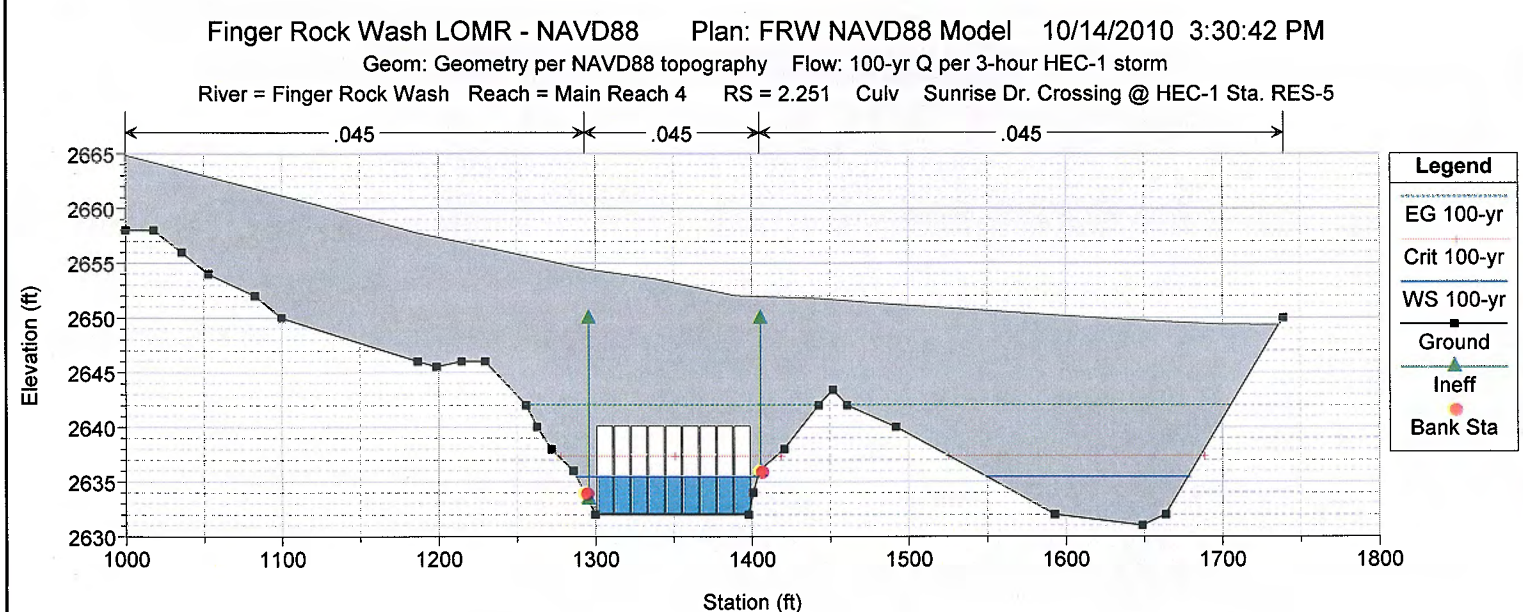
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.305 25.5

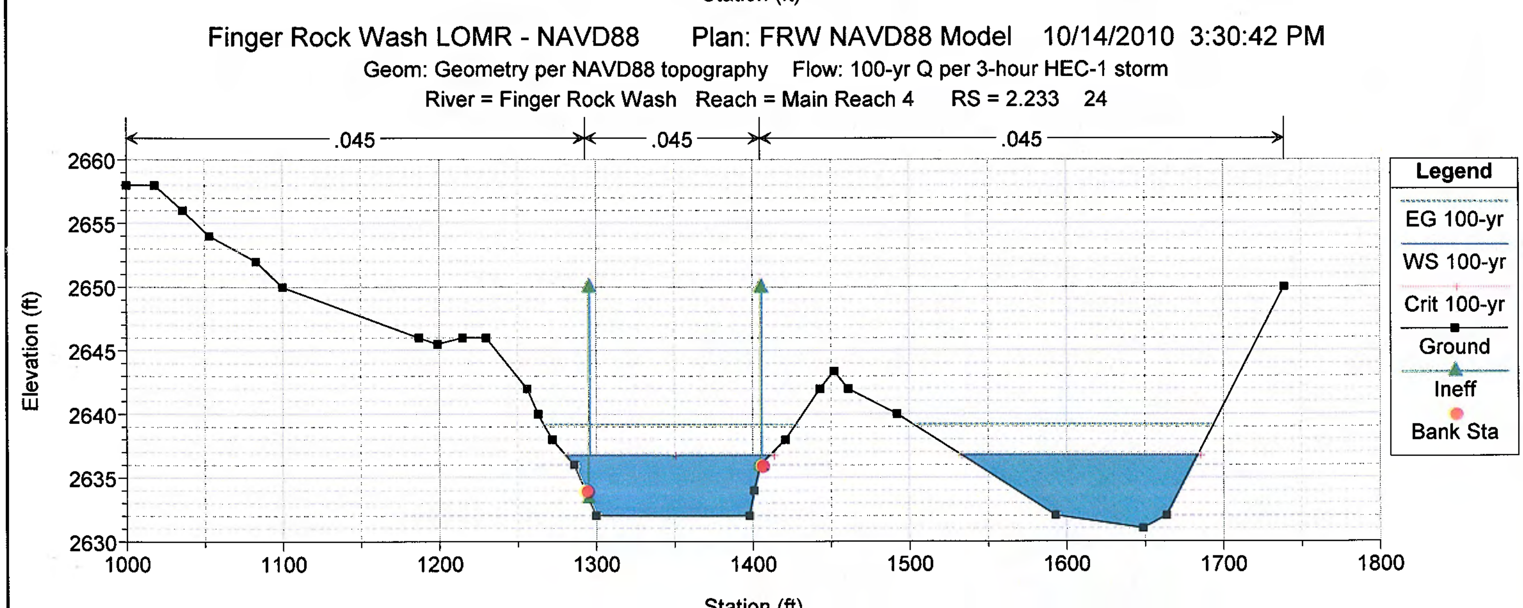


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.268 25

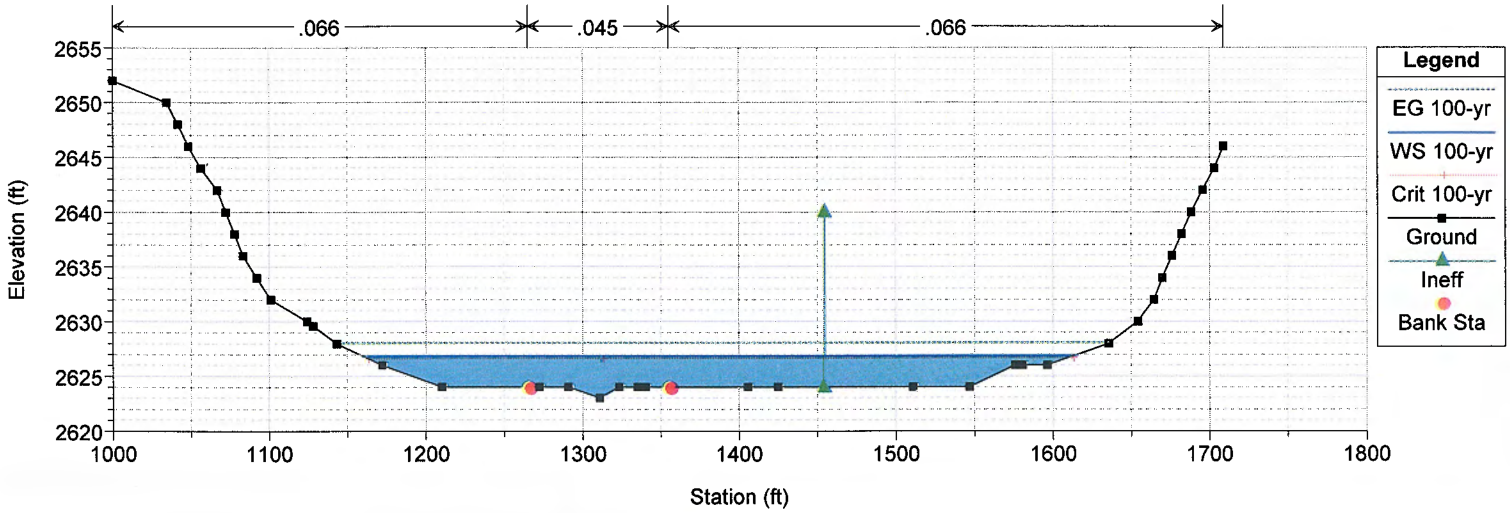



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.251 Culv Sunrise Dr. Crossing @ HEC-1 Sta. RES-5
.045
.045
.045
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

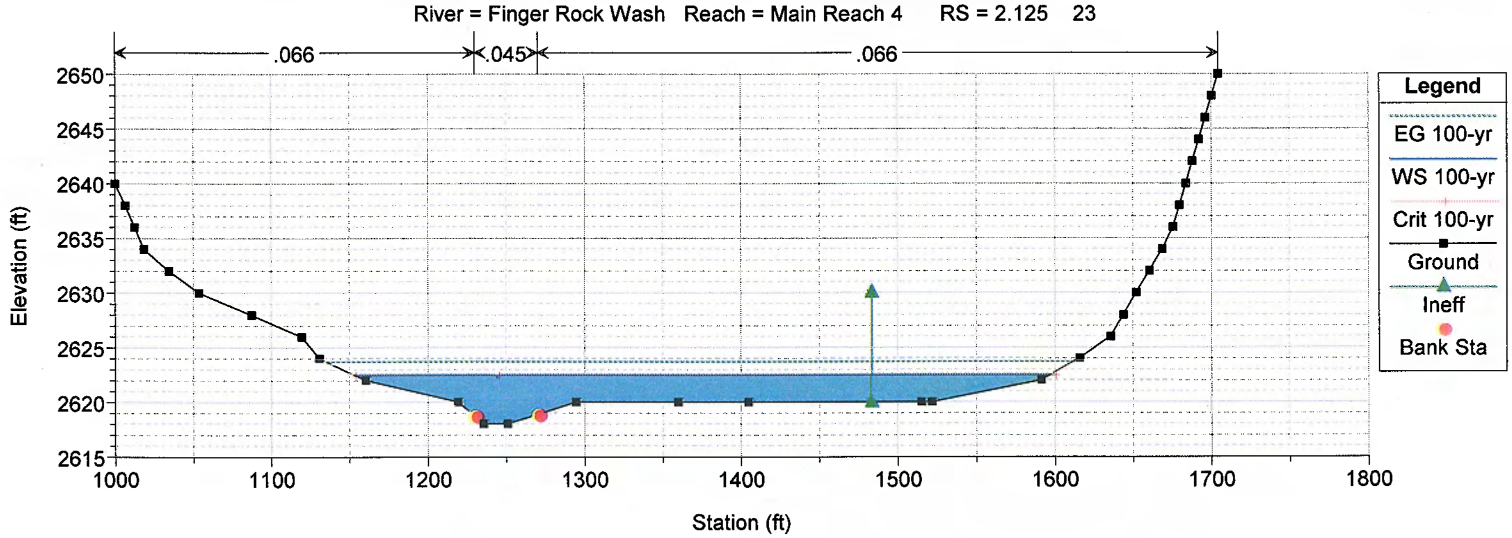

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.251 Culv Sunrise Dr. Crossing @ HEC-1 Sta. RES-5
.045
.045
.045
Elevation (ft)
Station (ft)
Legend
EG 100-yr
Crit 100-yr
WS 100-yr
Ground
Ineff
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.233 24
.045
.045
.045
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

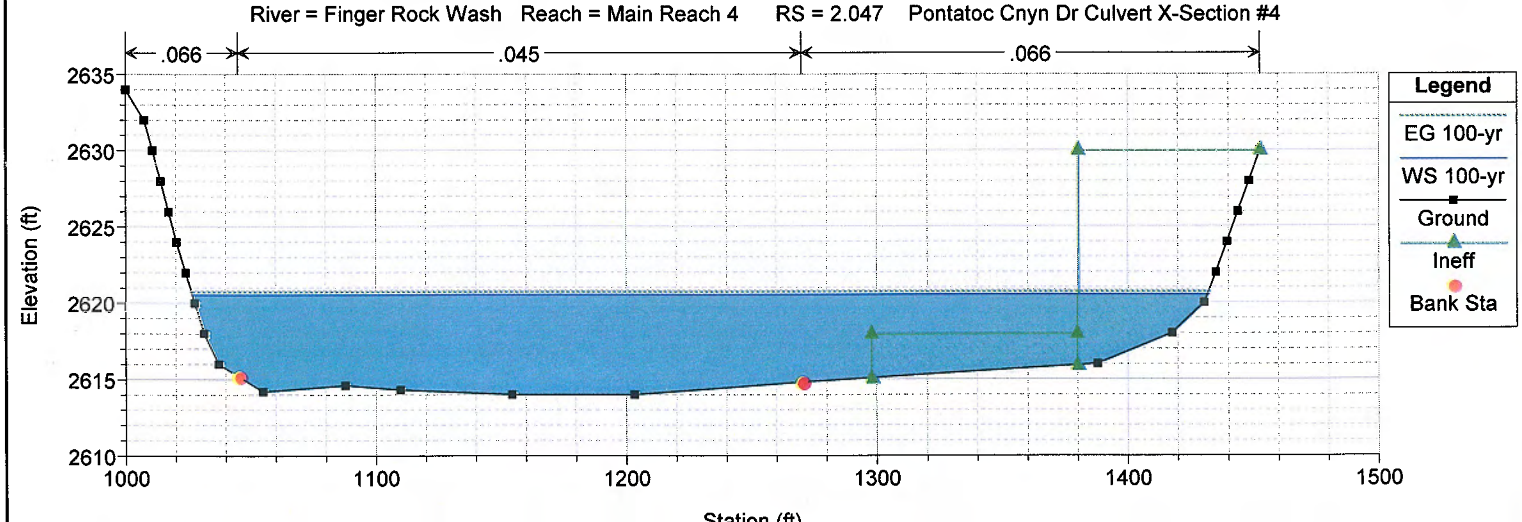
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.164 23.5



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.125 23



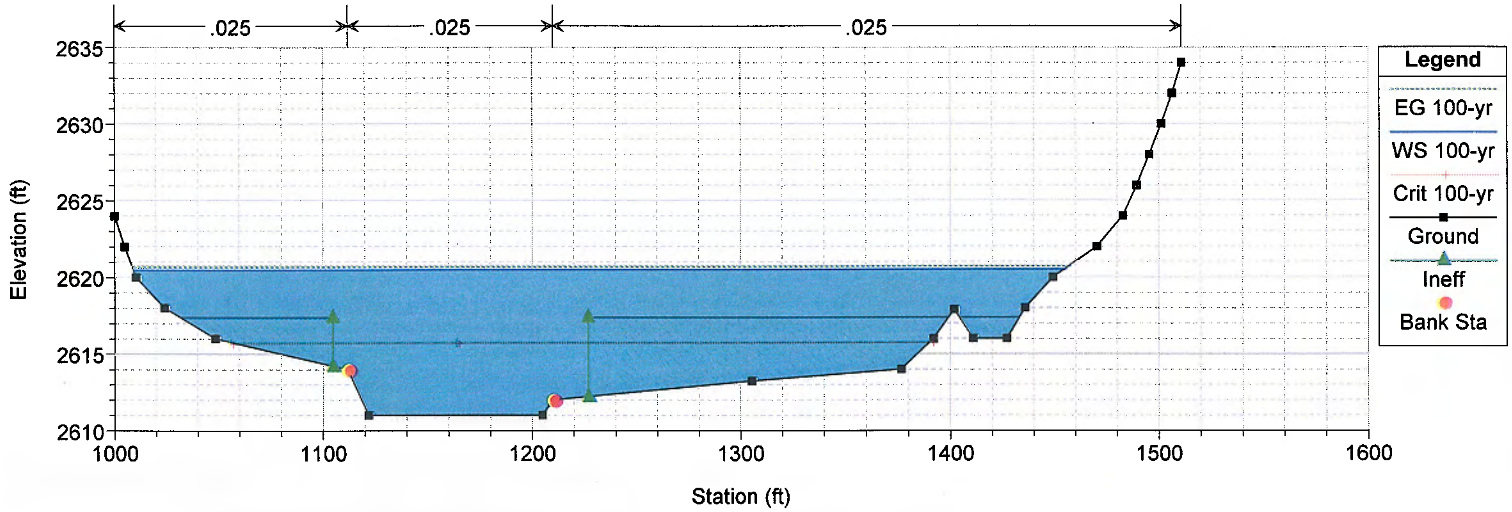
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.047 Pontatoc Cnyn Dr Culvert X-Section #4



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM

Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm

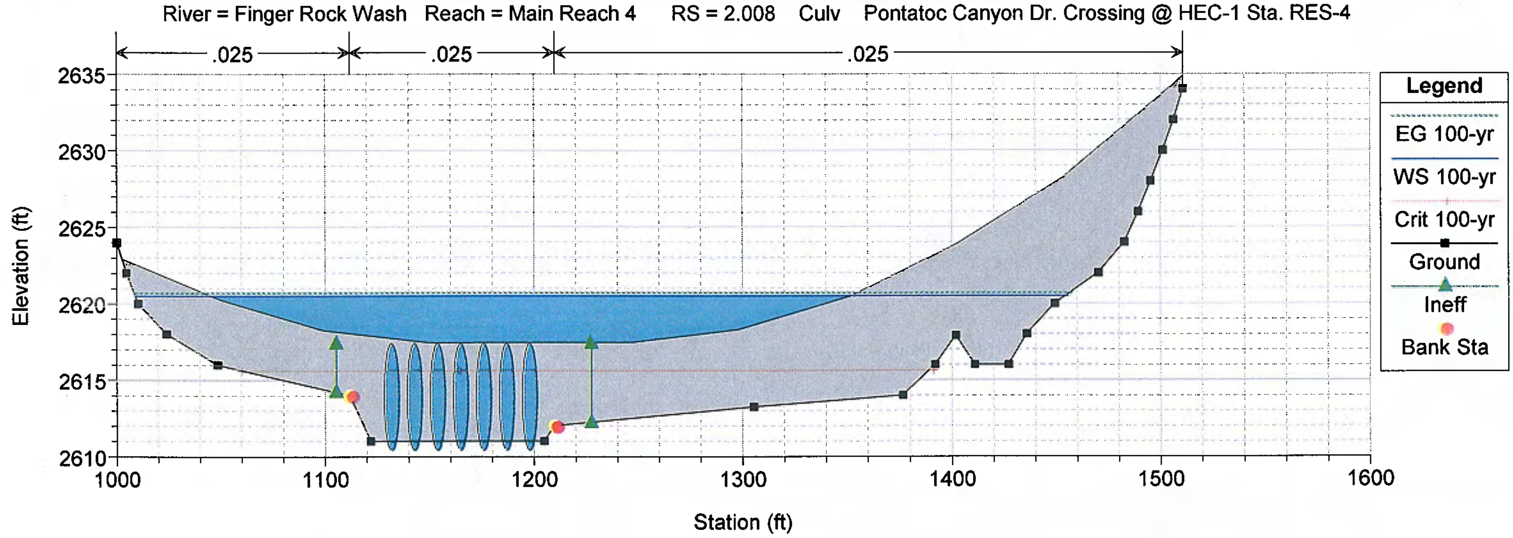
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.019 Pontatoc Cnyn Dr Culvert X-Section #3



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM

Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm

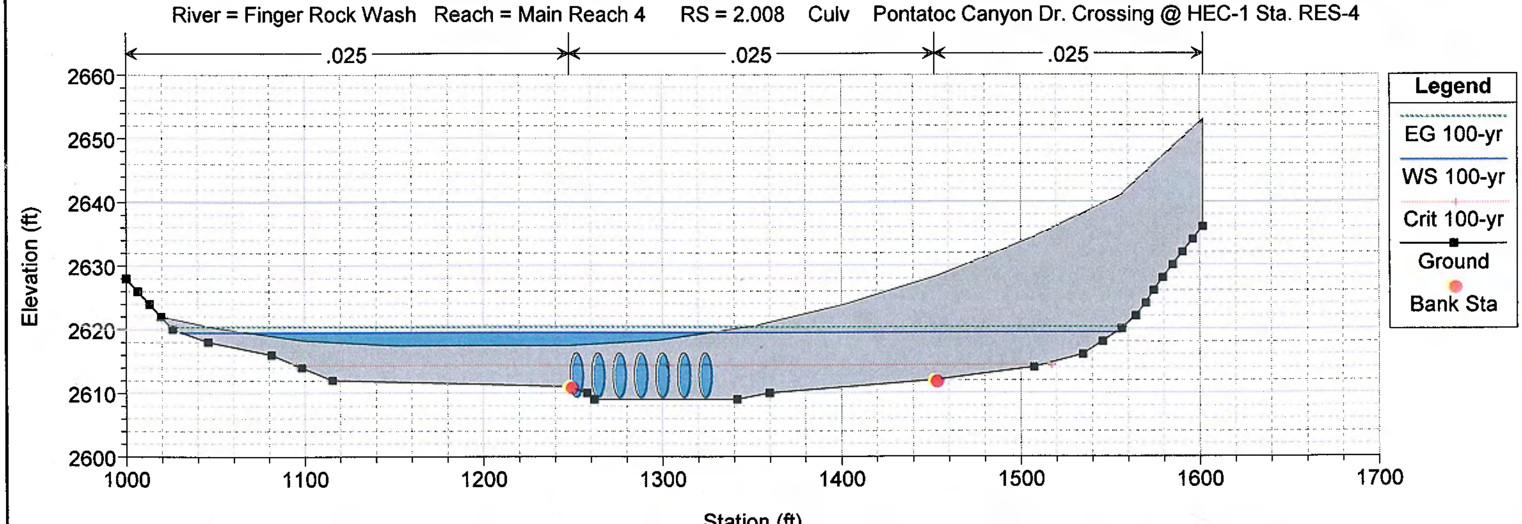
River = Finger Rock Wash Reach = Main Reach 4 RS = 2.008 Culv Pontatoc Canyon Dr. Crossing @ HEC-1 Sta. RES-4

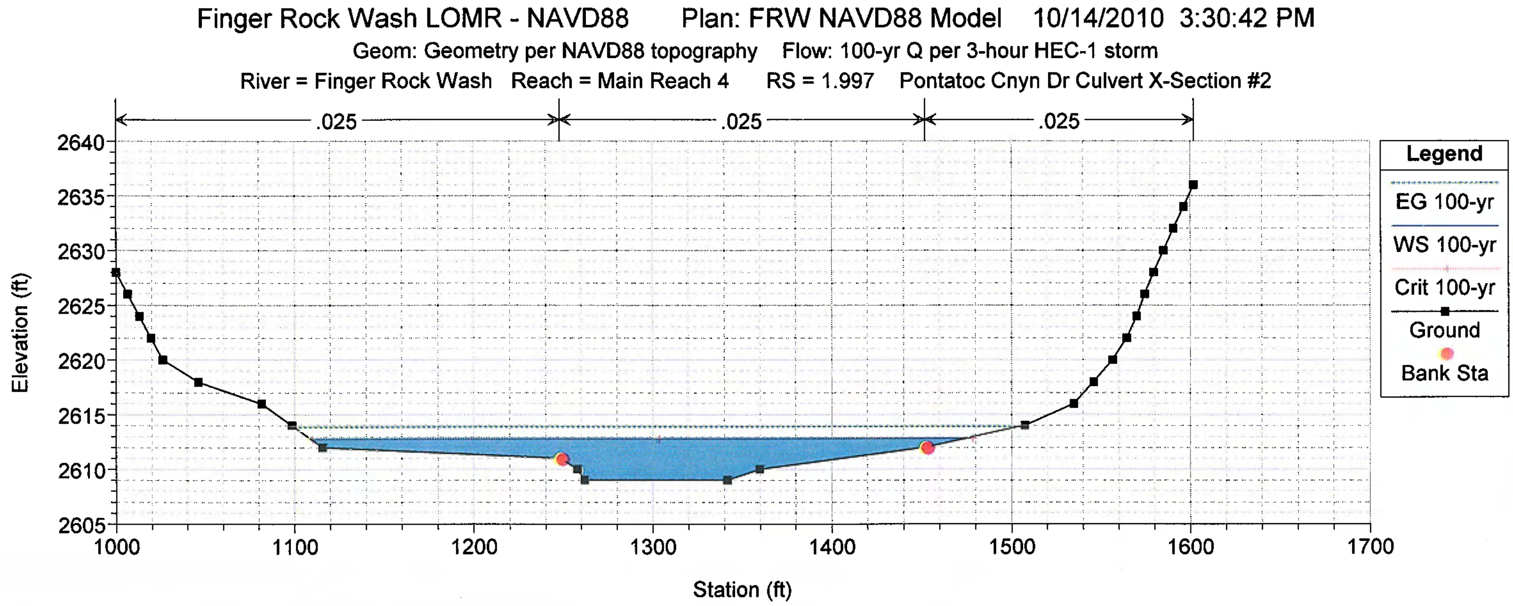


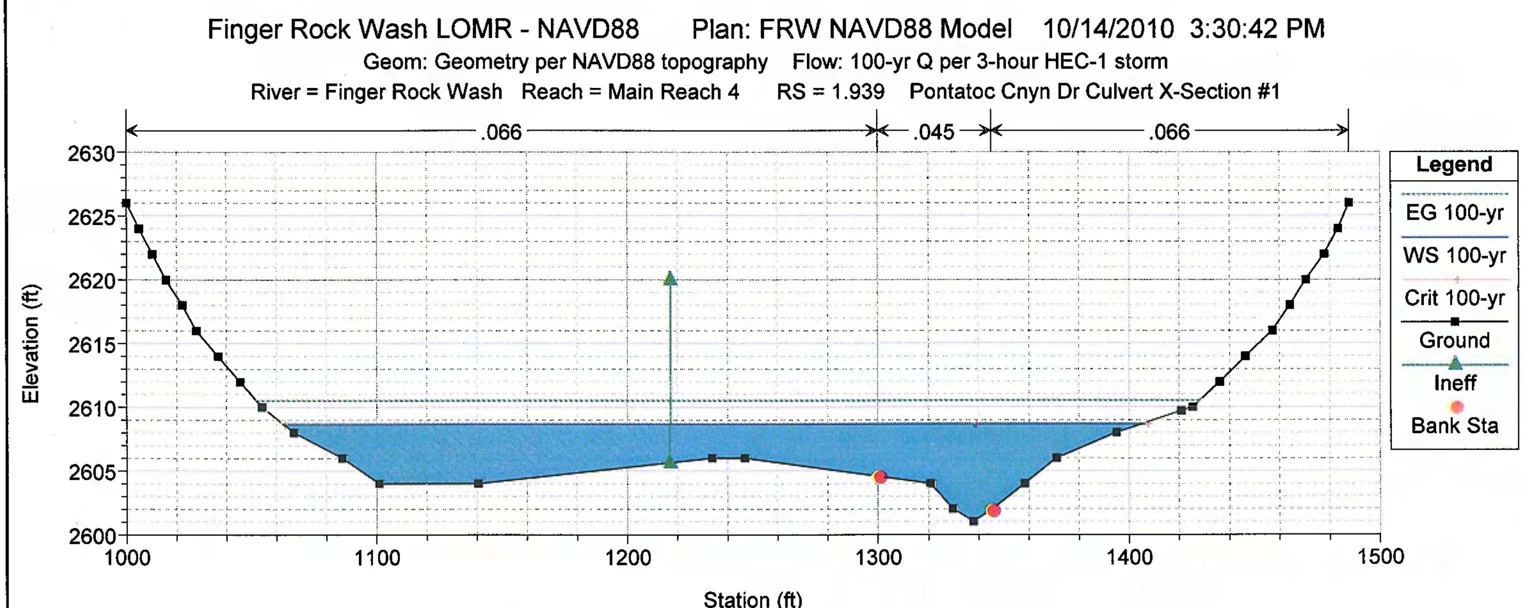
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM

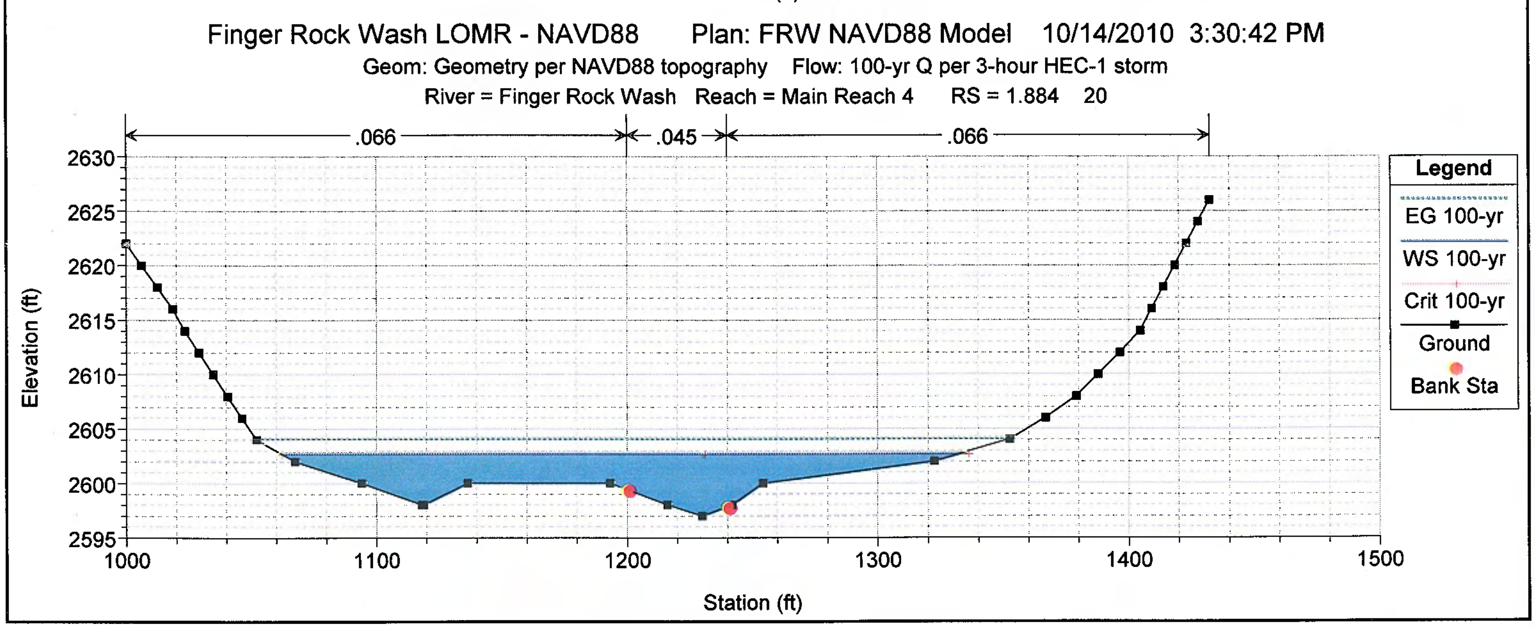
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm

River = Finger Rock Wash Reach = Main Reach 4 RS = 2.008 Culv Pontatoc Canyon Dr. Crossing @ HEC-1 Sta. RES-4

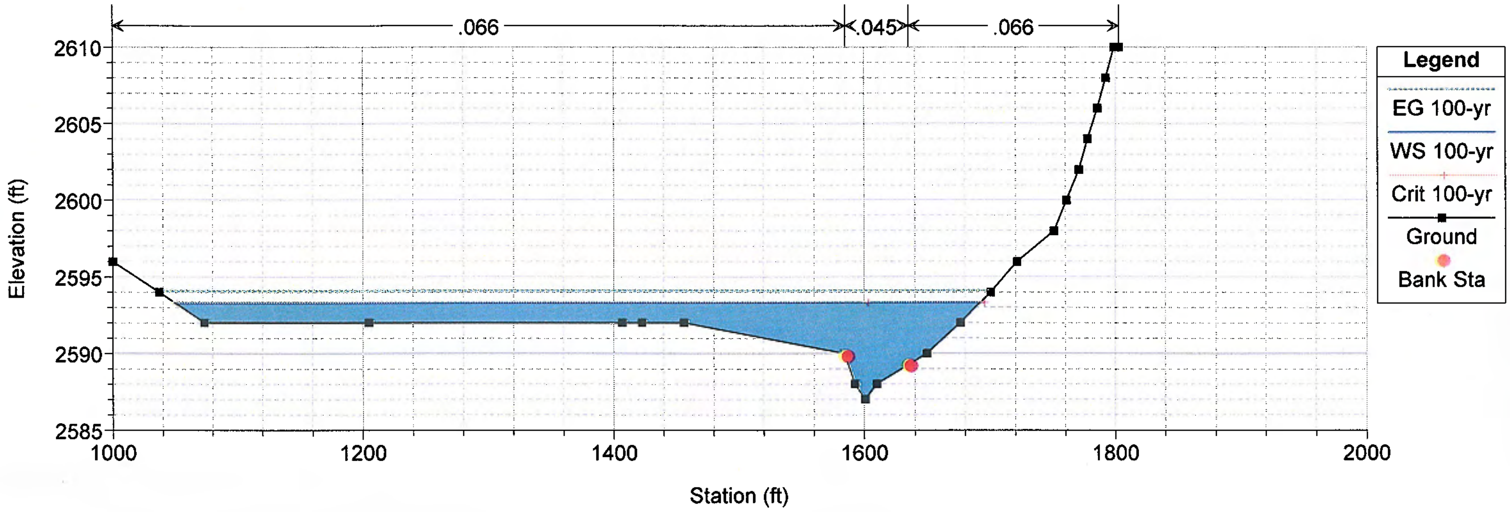



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 1.997 Pontatoc Cnyn Dr Culvert X-Section #2
.025
.025
.025
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

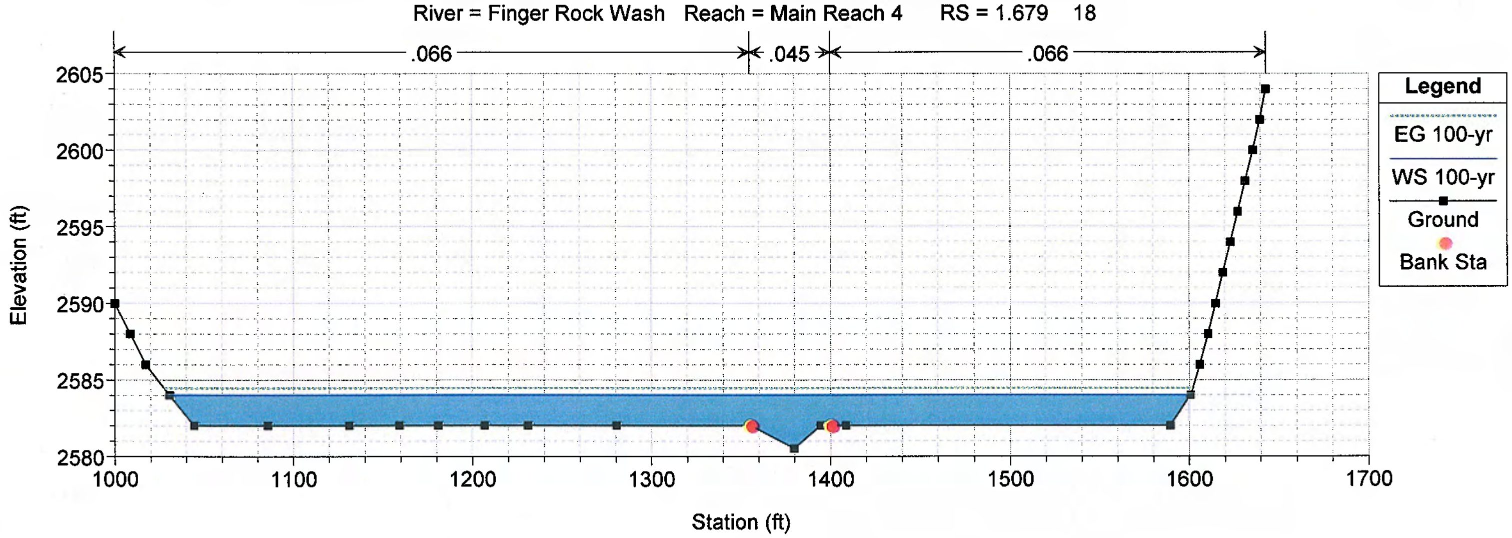

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 1.939 Pontatoc Cnyn Dr Culvert X-Section #1
.066
.045
.066
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 1.884 20
.066
.045
.066
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 1.774 19



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 1.679 18



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
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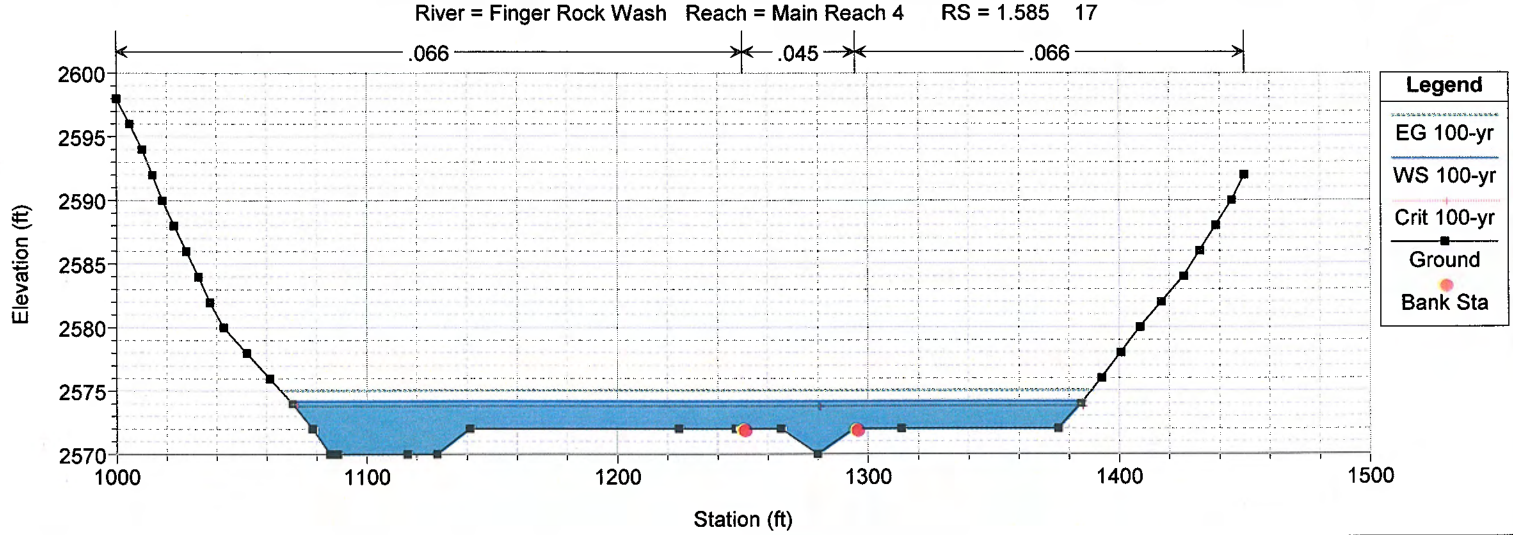
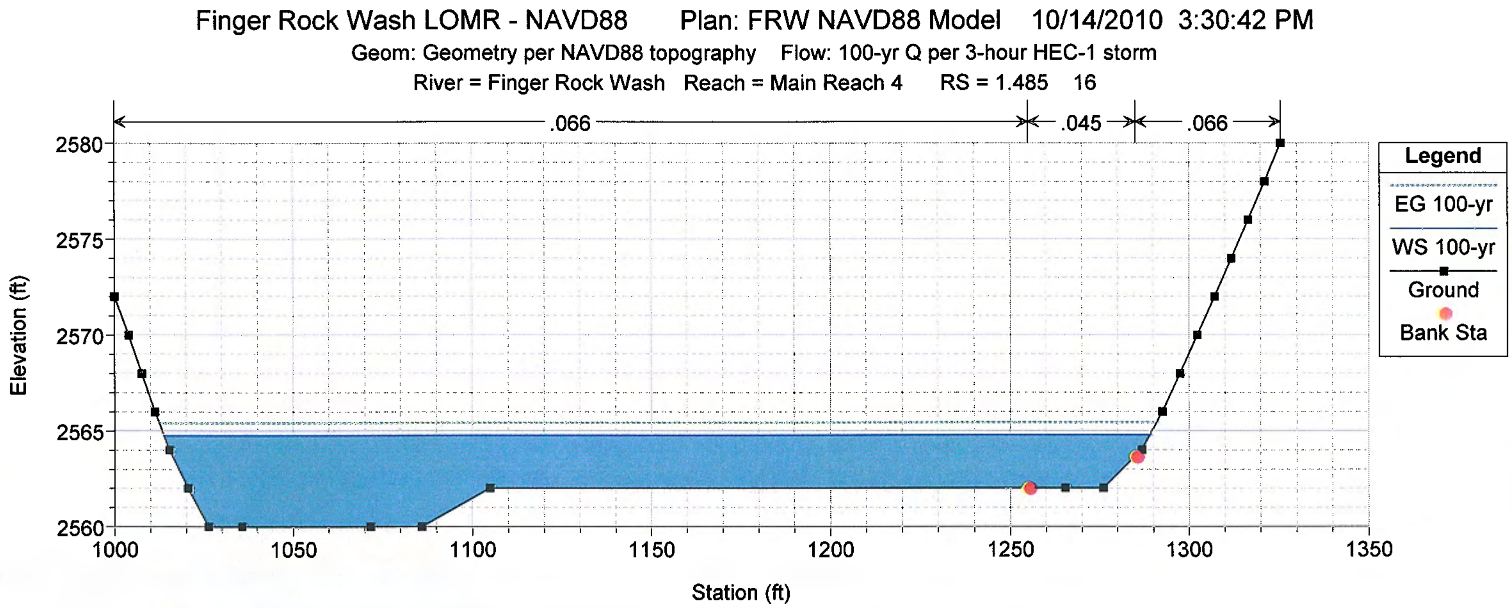
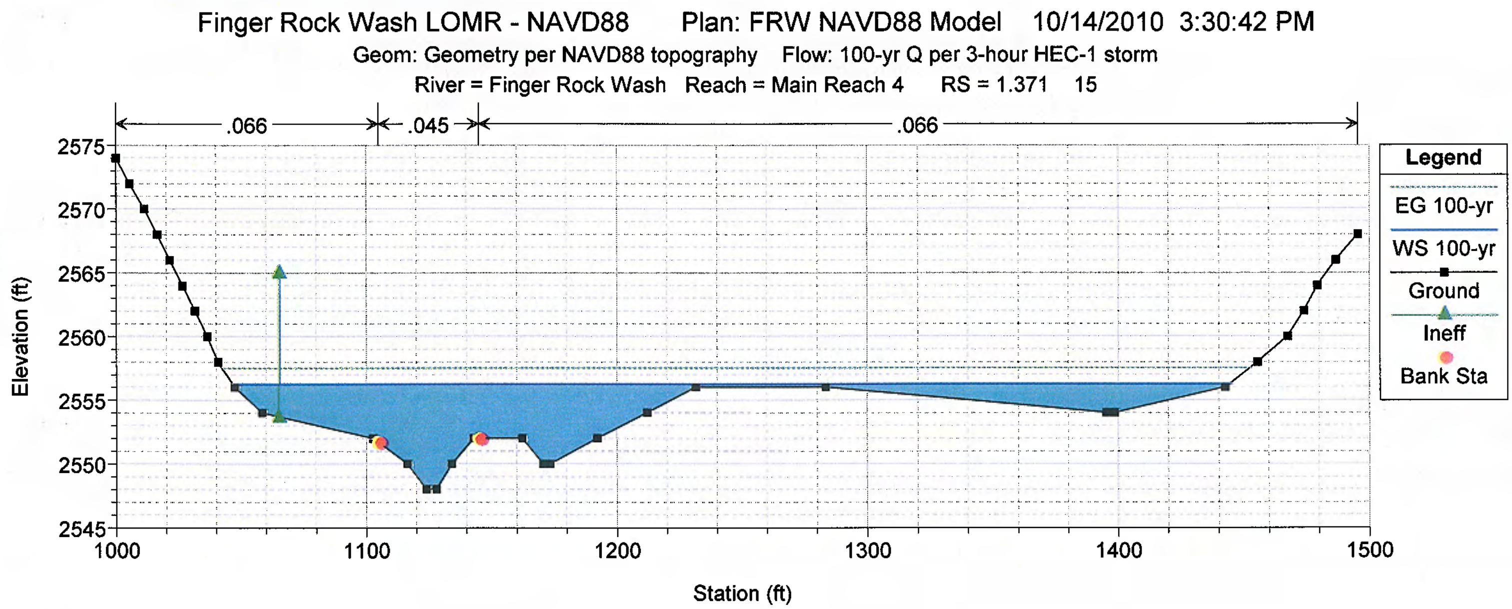
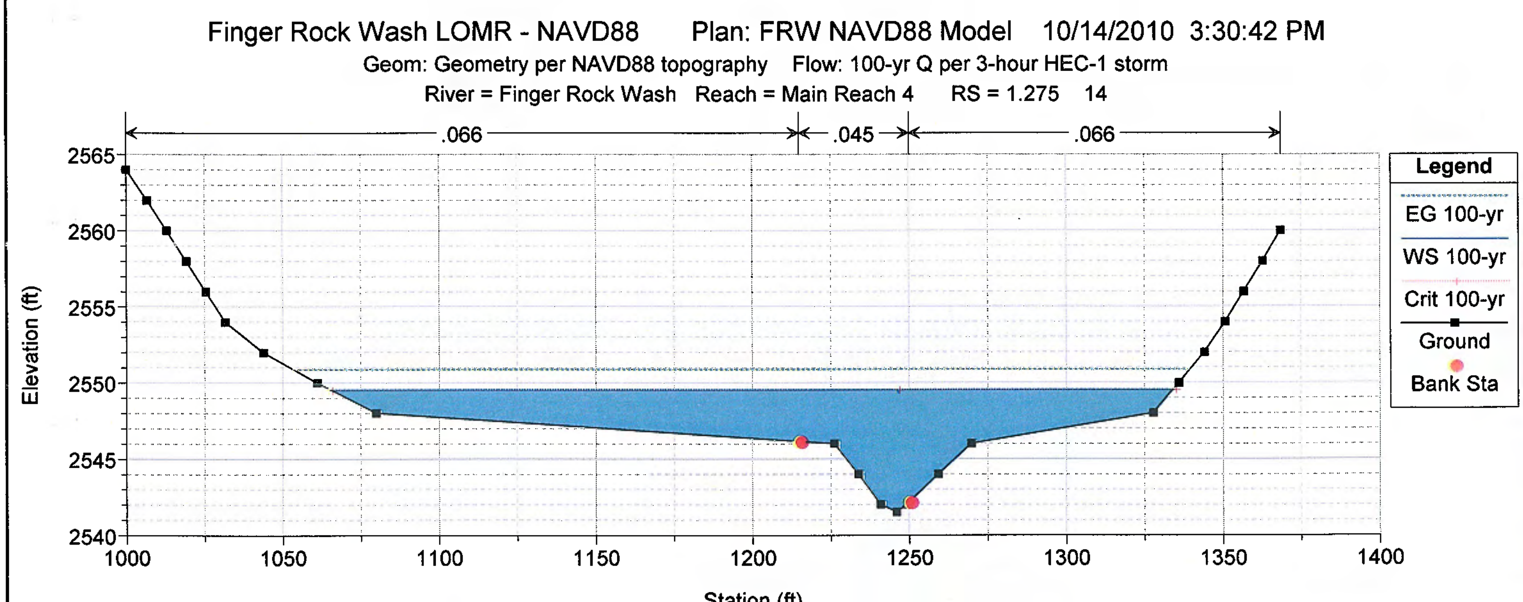



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 1.485 16
.066
.045
.066
Legend
EG 100-yr
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 1.371 15
.066
.045
.066
Legend
EG 100-yr
WS 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 1.275 14
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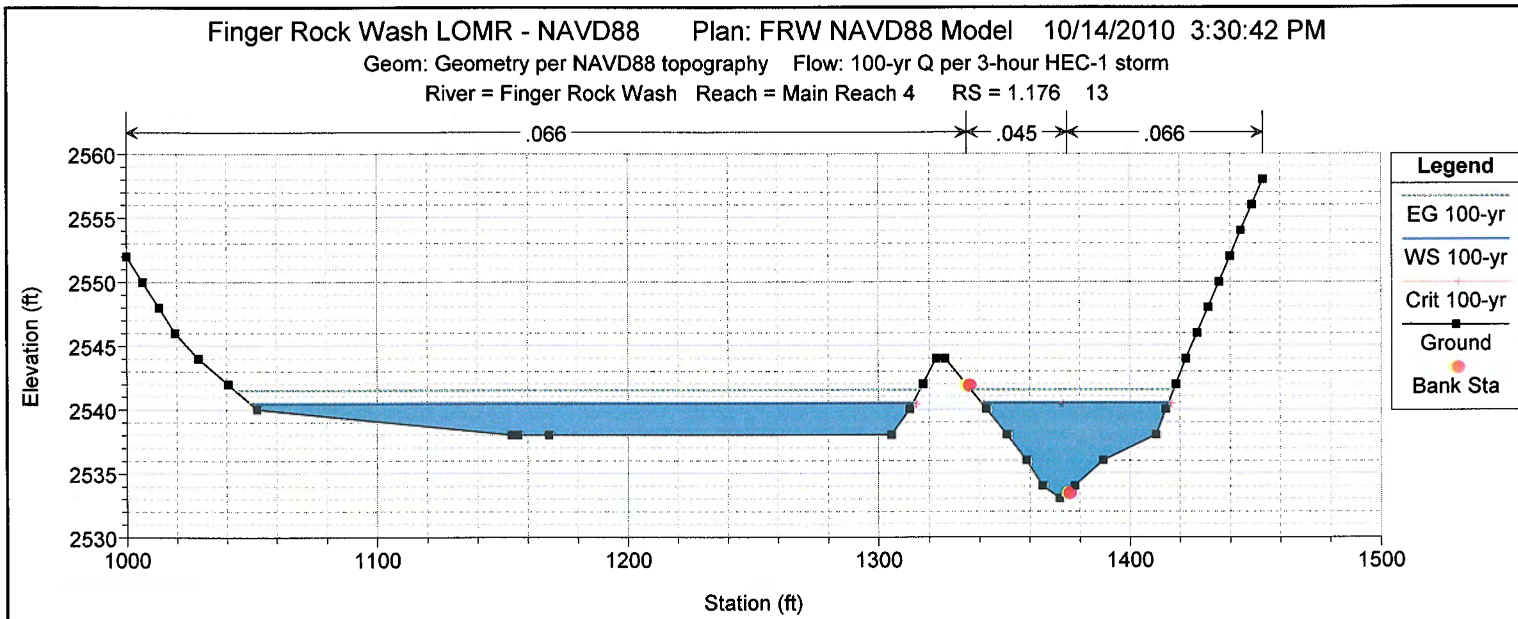
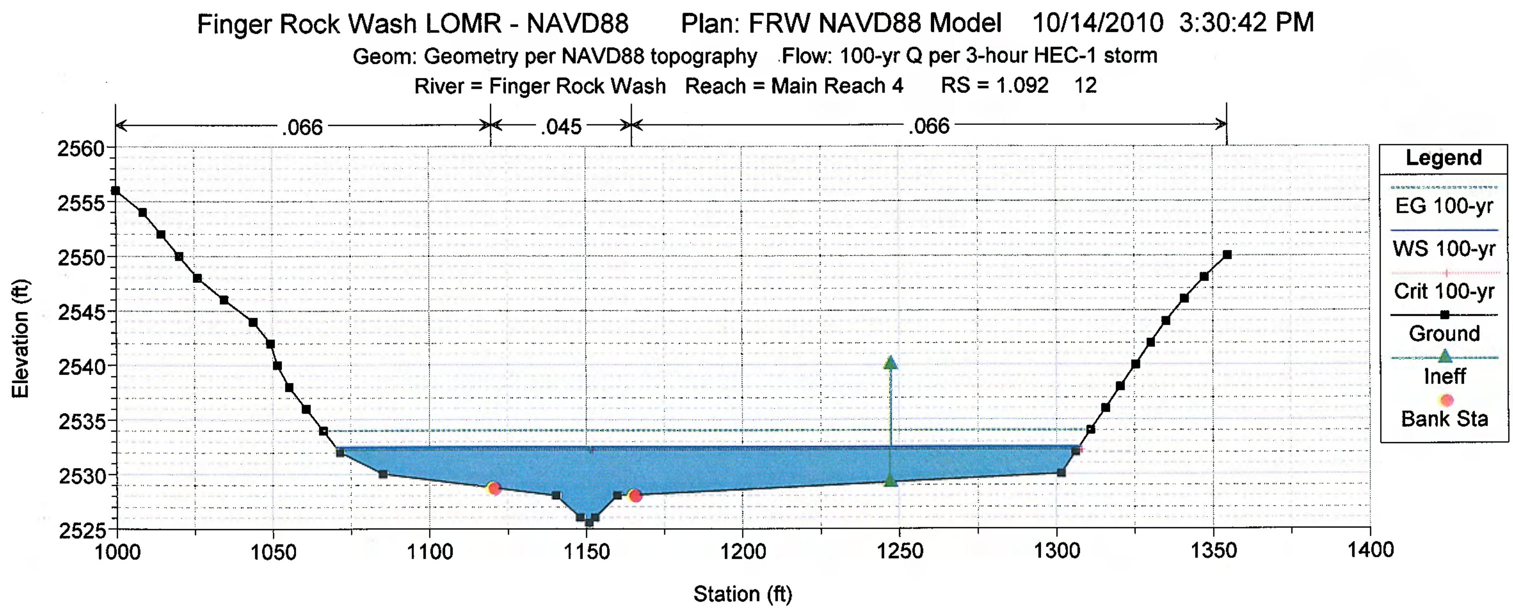
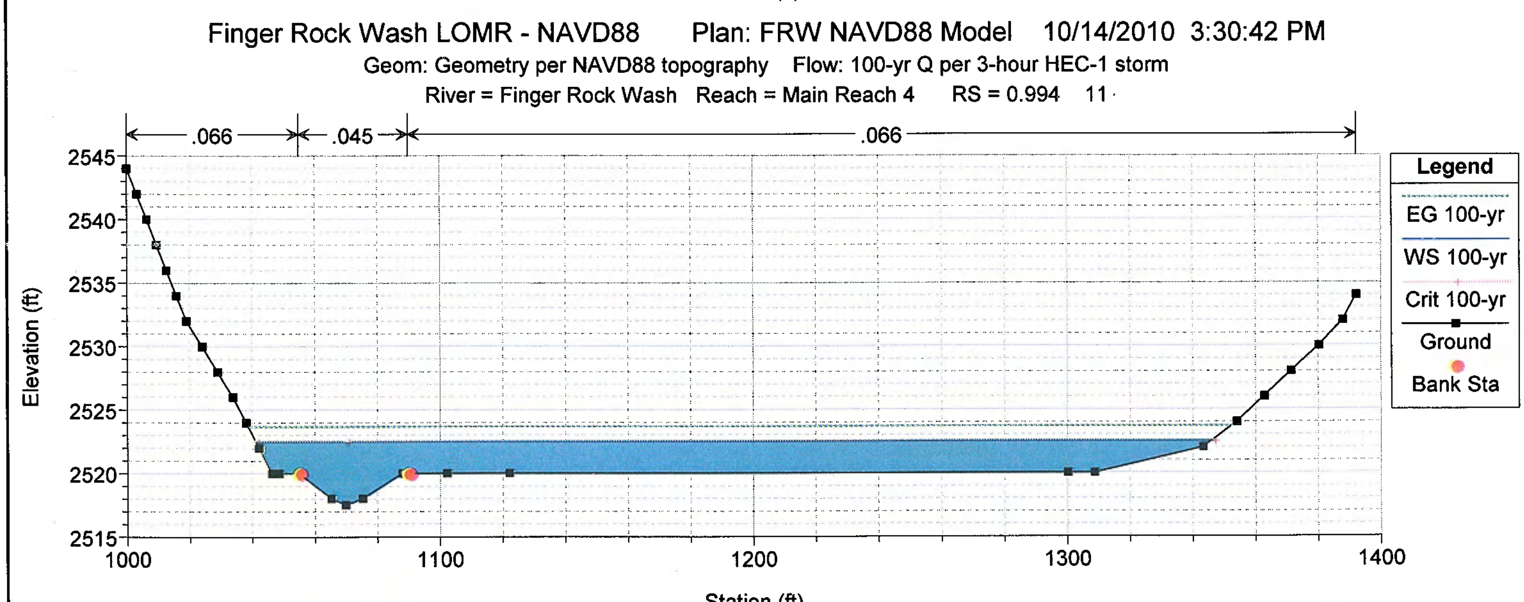
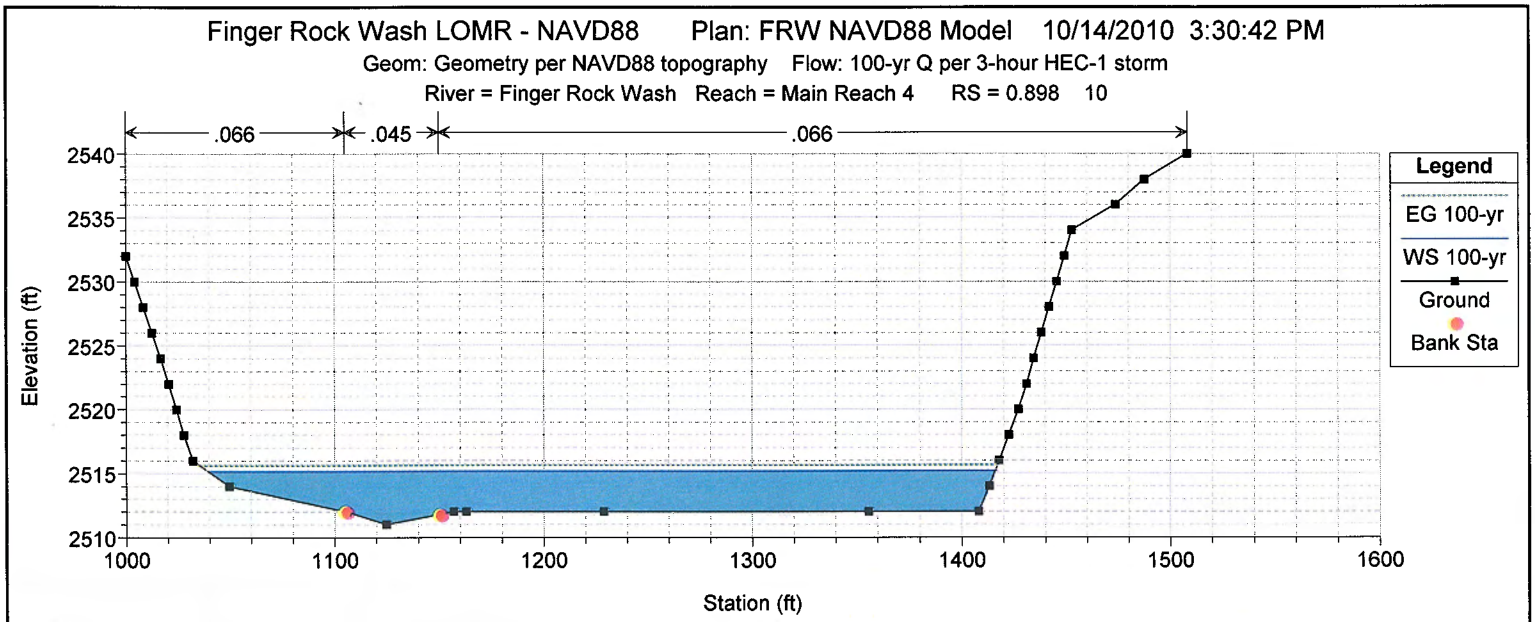
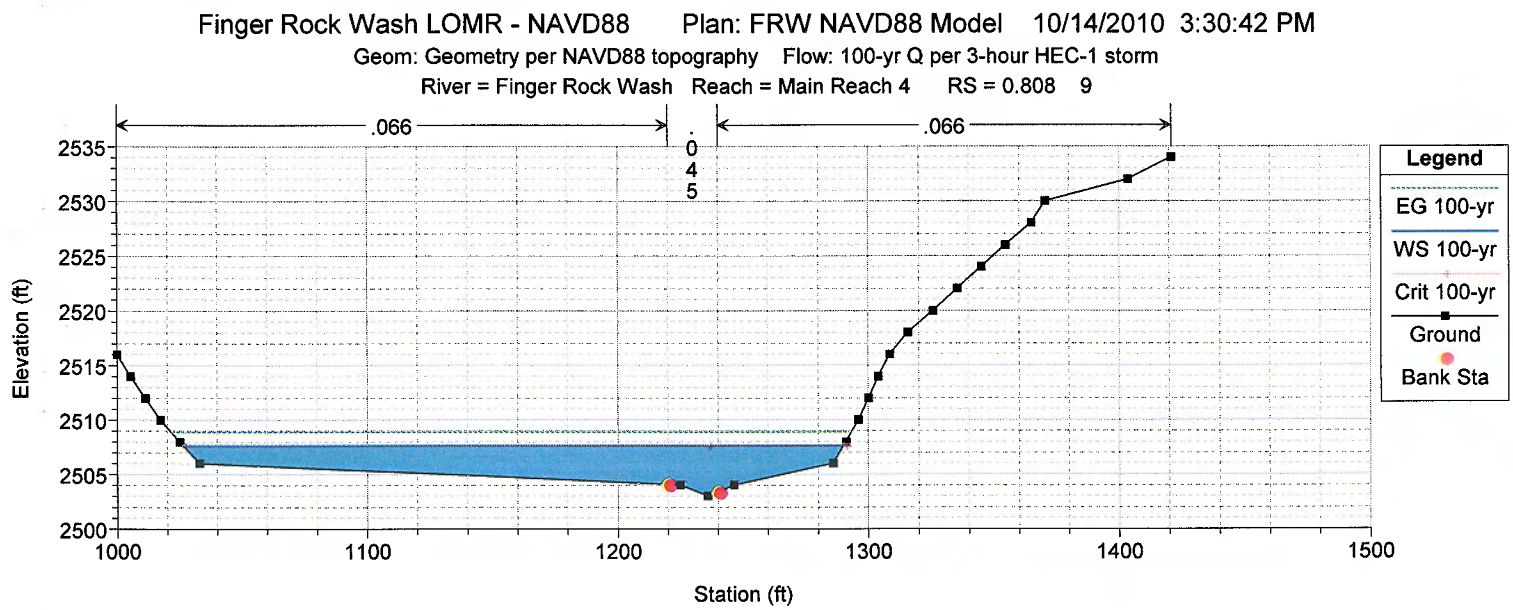
.045
.066
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

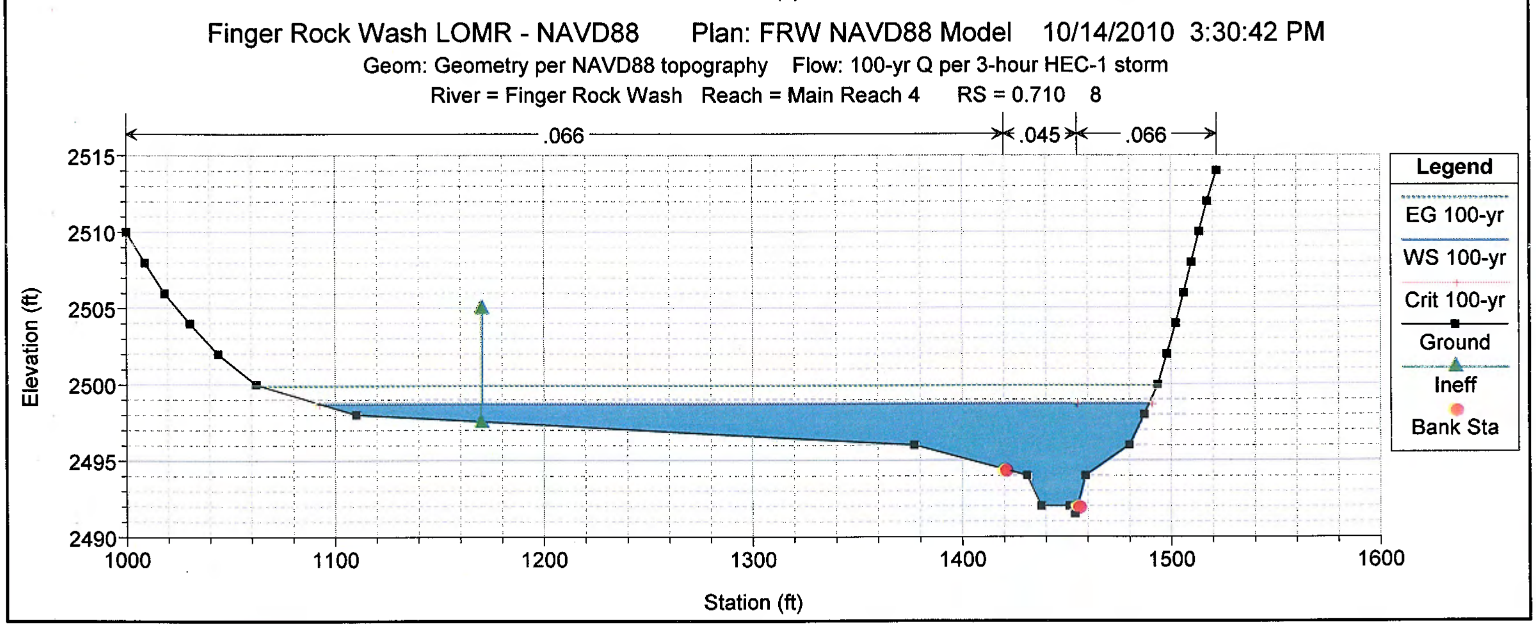

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 1.176 13
.066
.045
.066
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

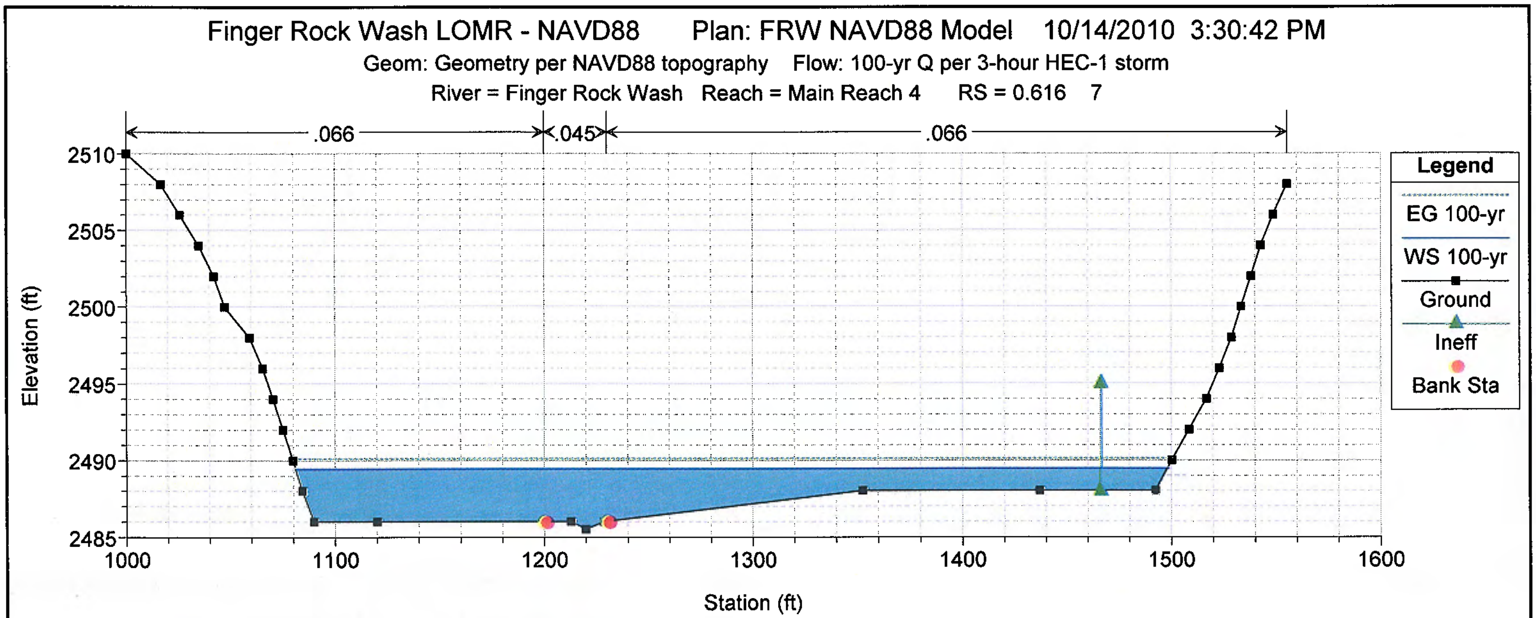

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 1.092 12
.066
.045
.066
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 0.994 11
.066
.045
.066
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

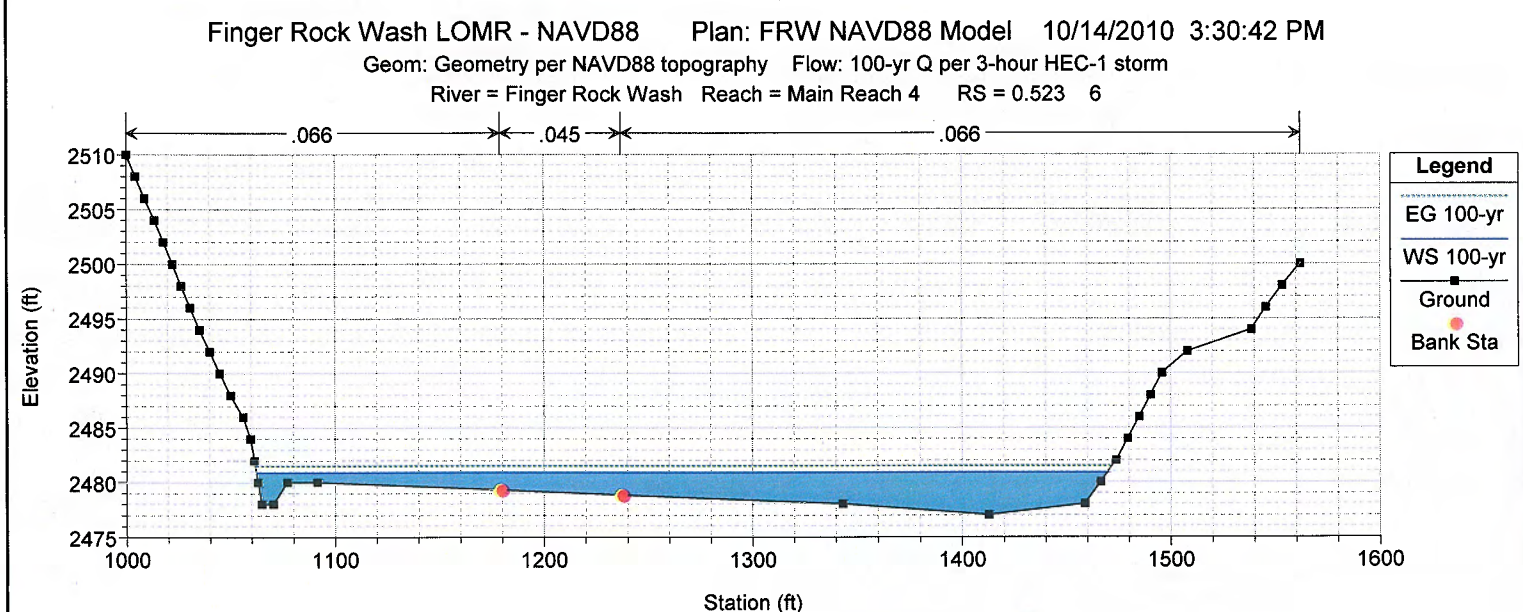

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 0.898 10
.066
.045
.066
Legend
EG 100-yr
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 0.808 9
.066
.045
.066
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

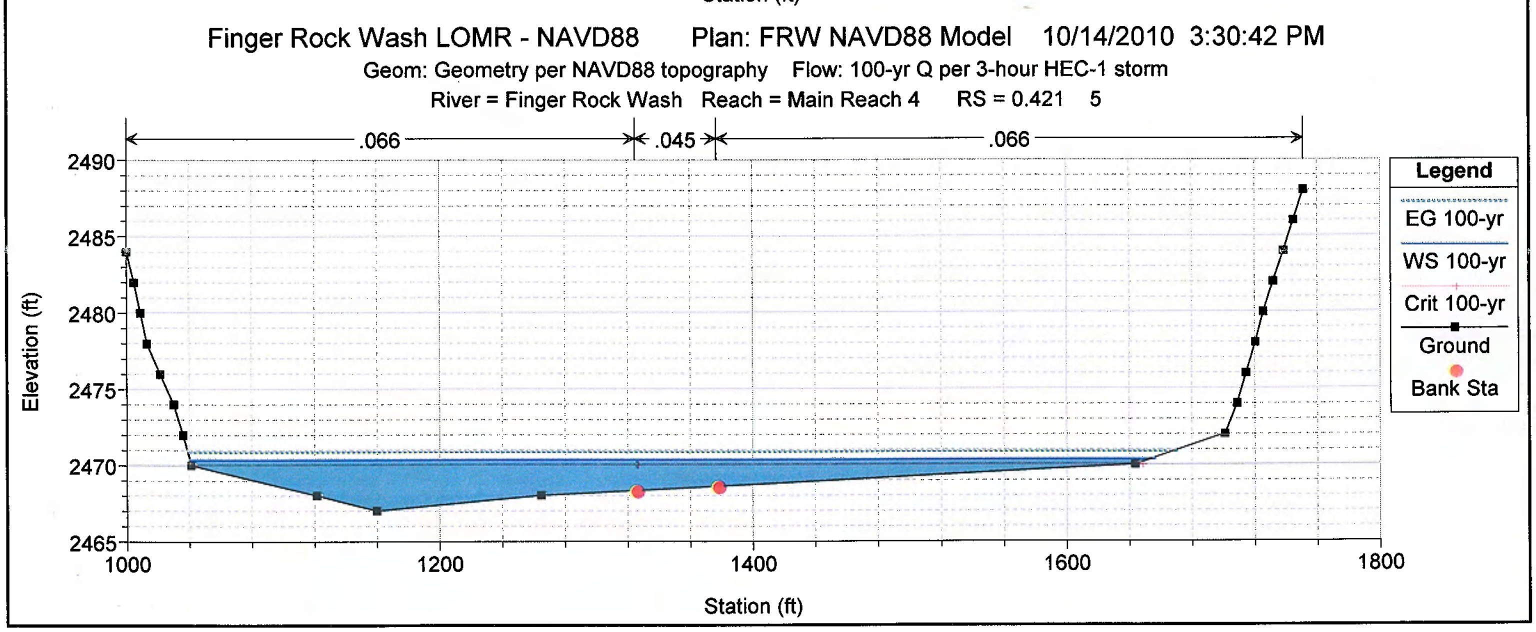

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 0.710 8
.066
.045
.066
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)



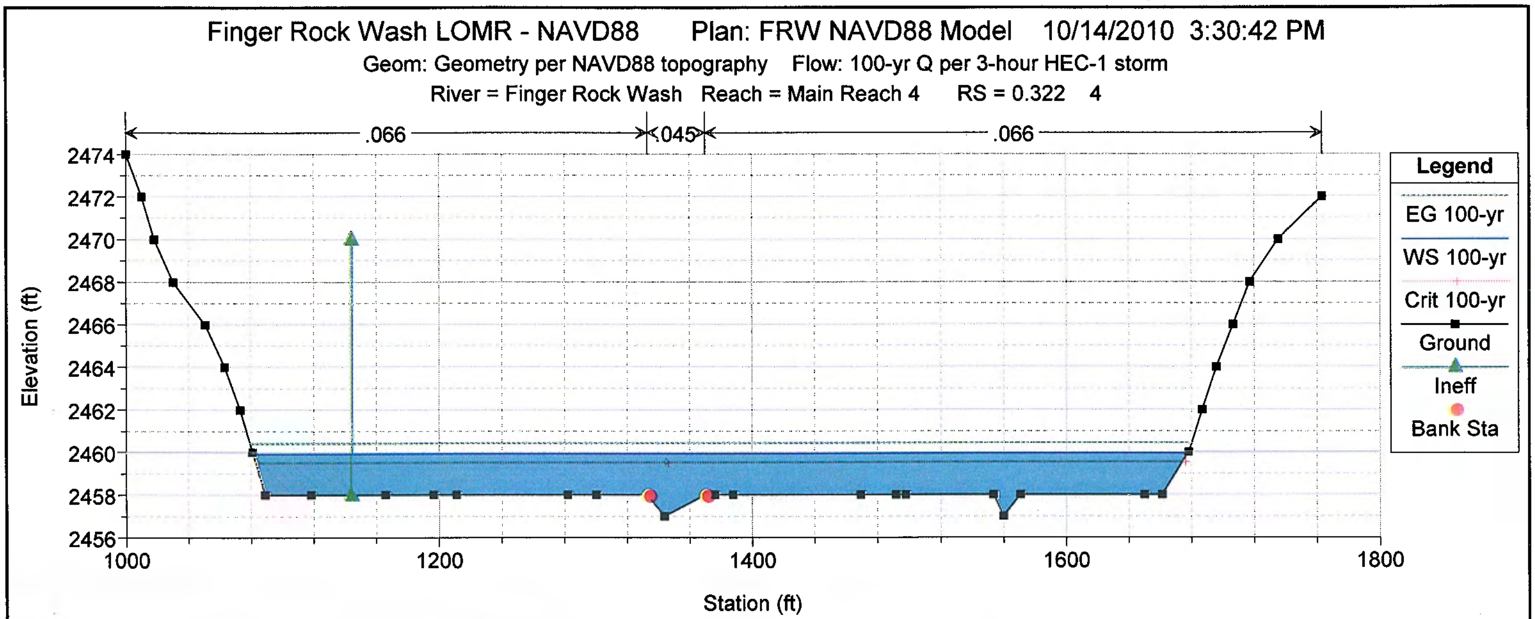
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 0.616 7
.066
.045
.066
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Ground
Ineff
Bank Sta

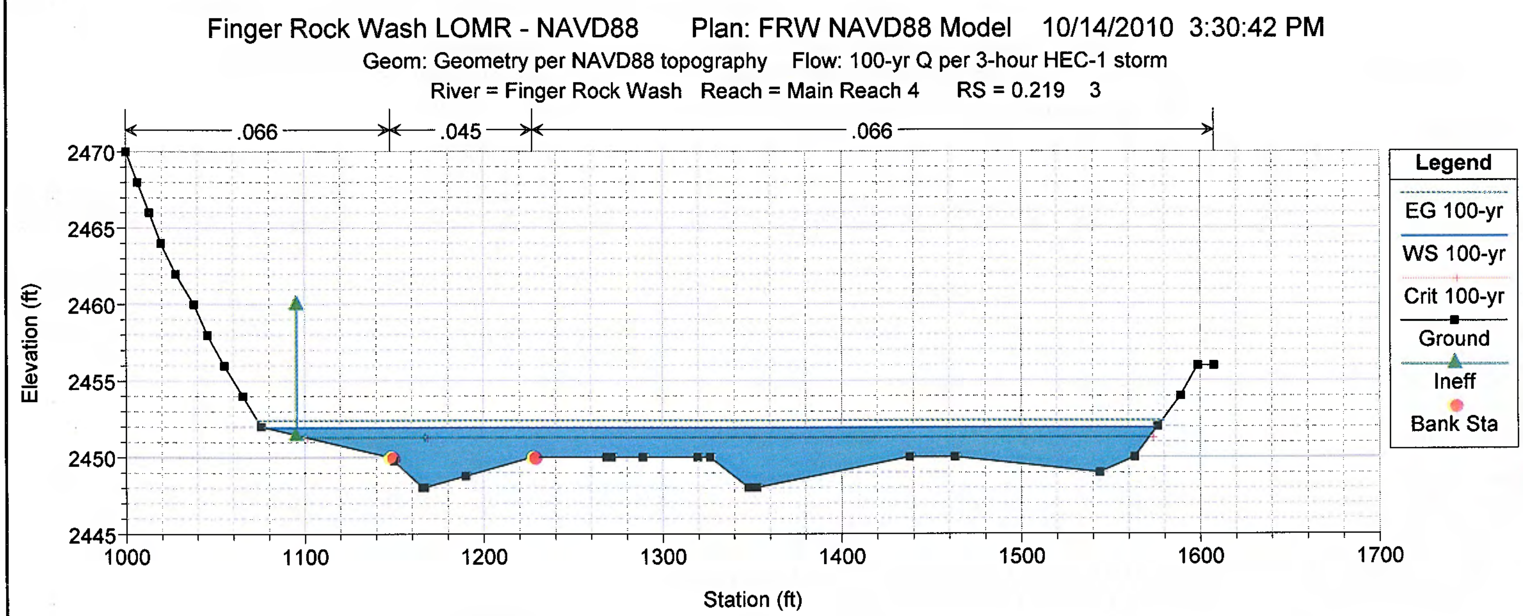


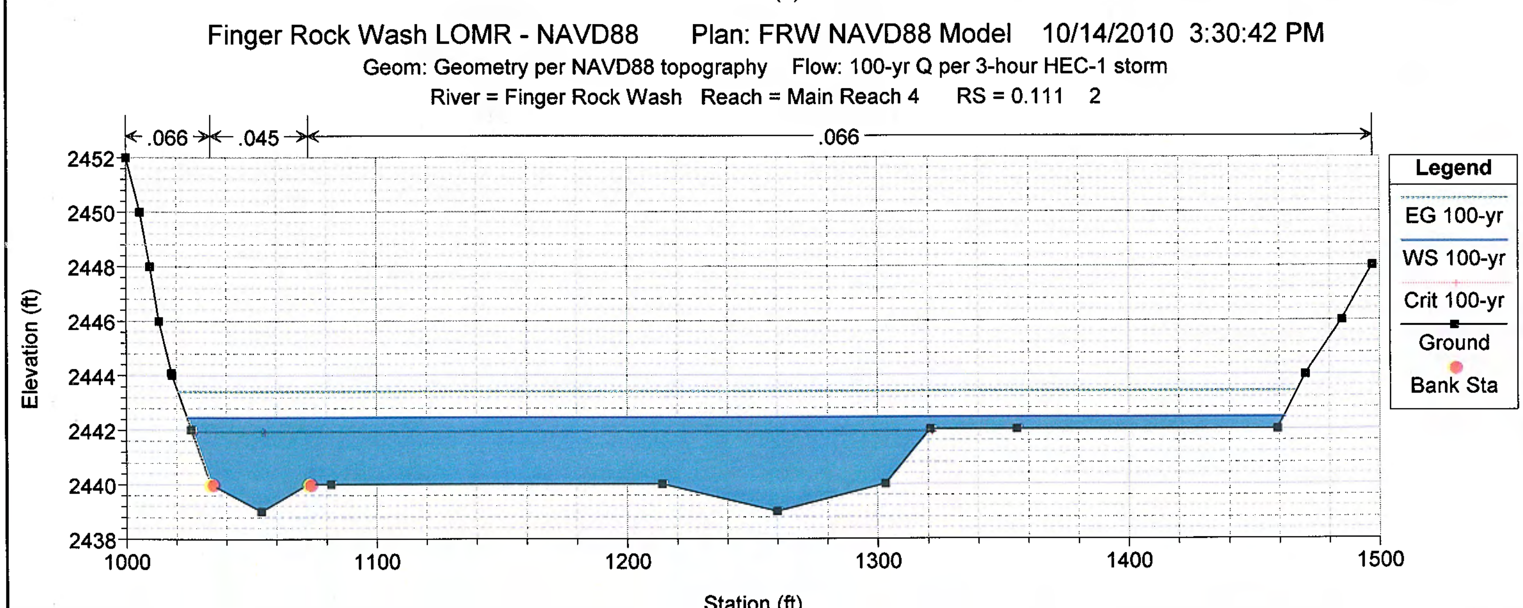
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 0.523 6
.066
.045
.066
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Ground
Bank Sta

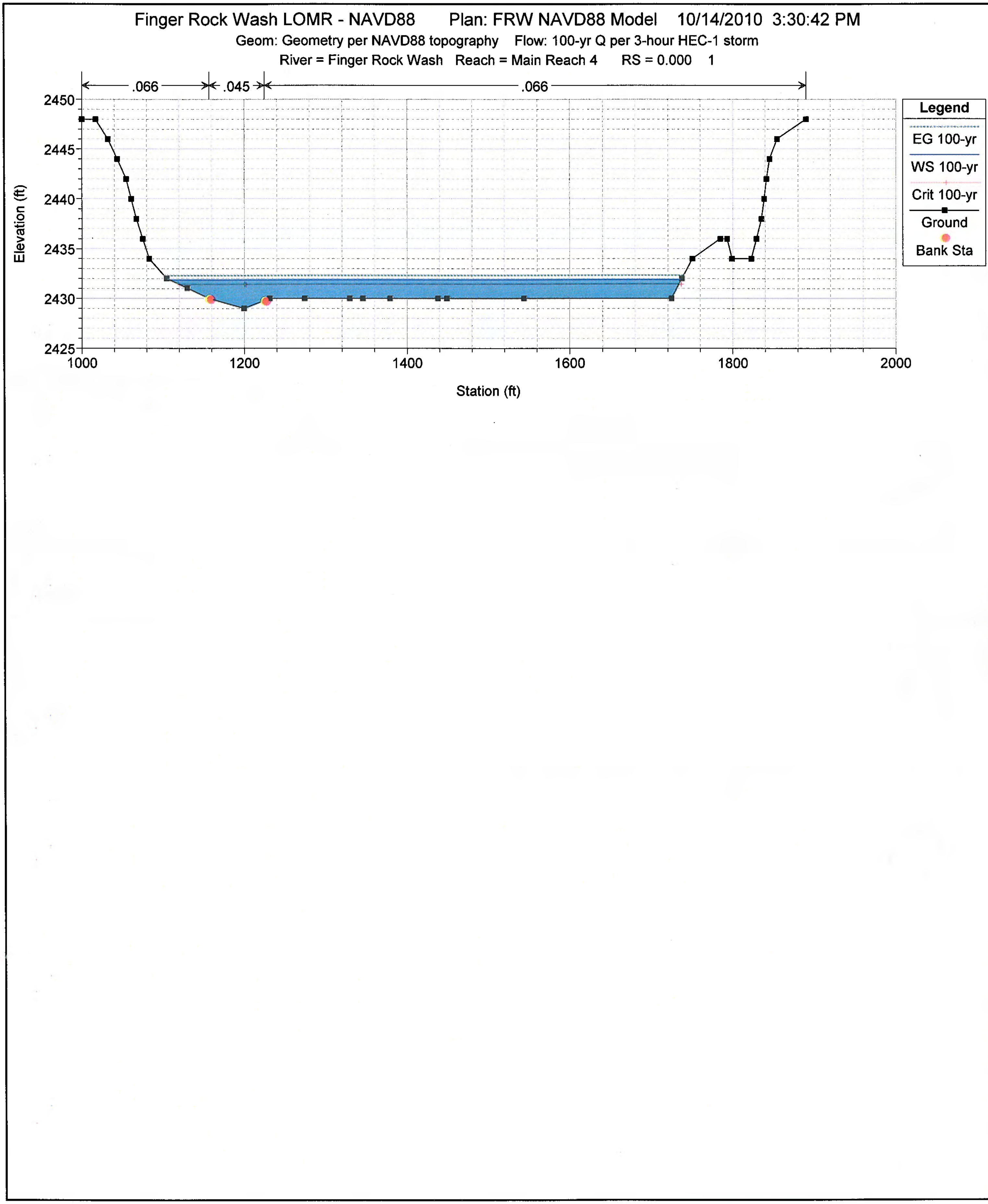


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 0.421 5
.066
.045
.066
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 0.322 4
.066
.045
.066
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 0.219 3
.066
.045
.066
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 0.111 2
.066
.045
.066
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

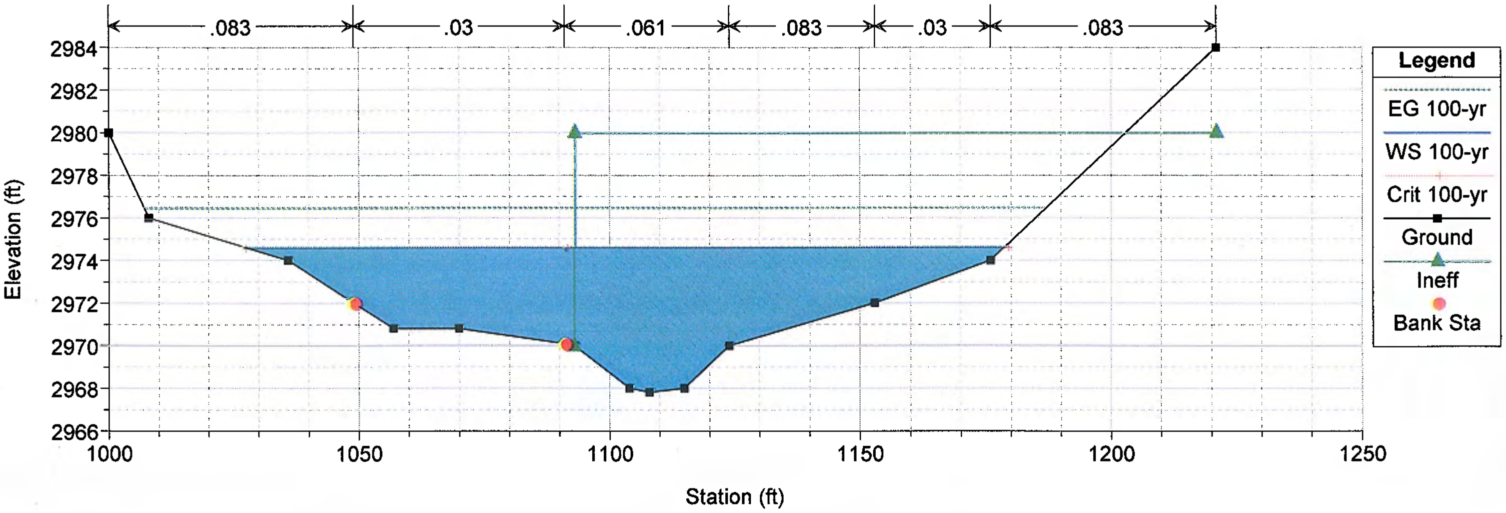


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Finger Rock Wash Reach = Main Reach 4 RS = 0.000 1
.066
.045
.066
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta
Elevation (ft)
2450
2445
2440
2435
2430
2425
1000
1200
1400
1600
1800
2000
Station (ft)

Finger Rock Wash LOMR - NAVD88   Plan: FRW NAVD88 Model   10/14/2010 3:30:42 PM

Geom: Geometry per NAVD88 topography   Flow: 100-yr Q per 3-hour HEC-1 storm

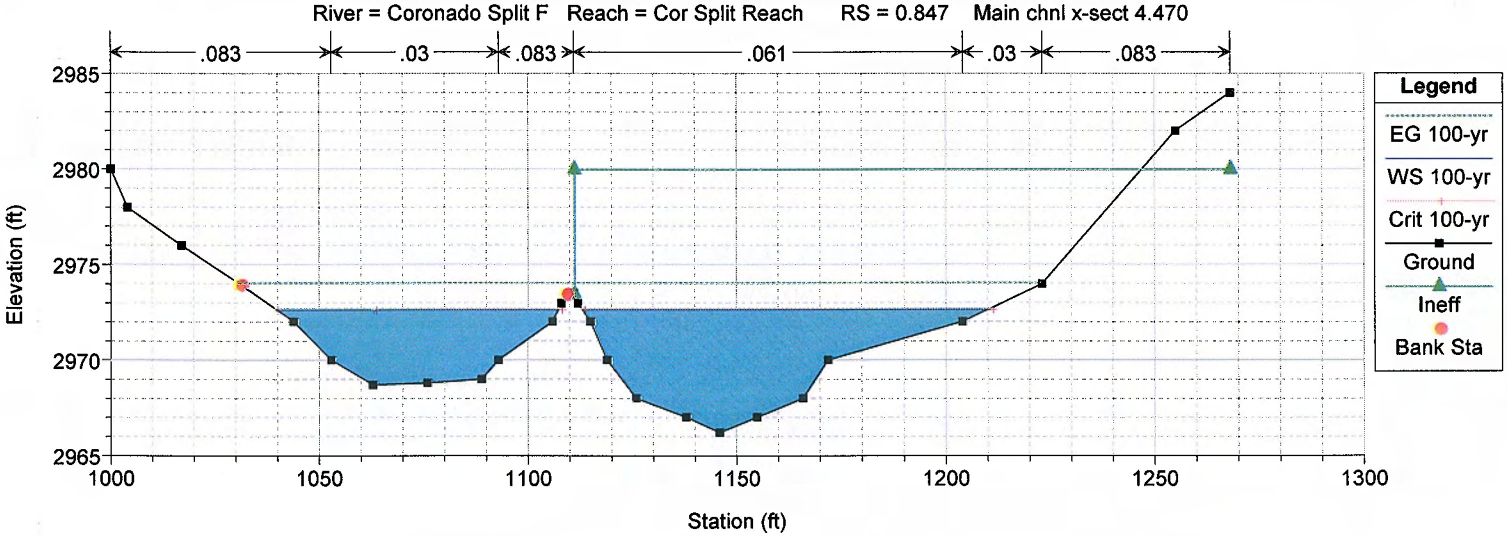
River = Coronado Split F   Reach = Cor Split Reach   RS = 0.854   Main chnl x-sect 4.477, Sect downstream of Jct Cor Split



Finger Rock Wash LOMR - NAVD88   Plan: FRW NAVD88 Model   10/14/2010 3:30:42 PM

Geom: Geometry per NAVD88 topography   Flow: 100-yr Q per 3-hour HEC-1 storm

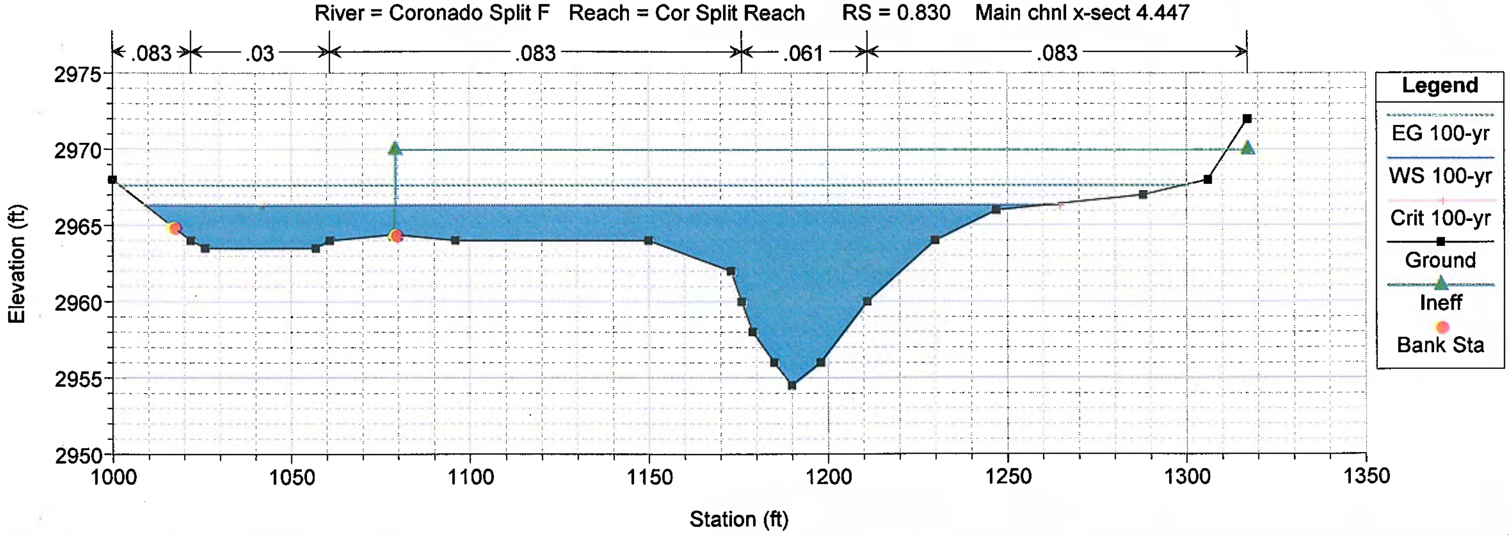
River = Coronado Split F   Reach = Cor Split Reach   RS = 0.847   Main chnl x-sect 4.470

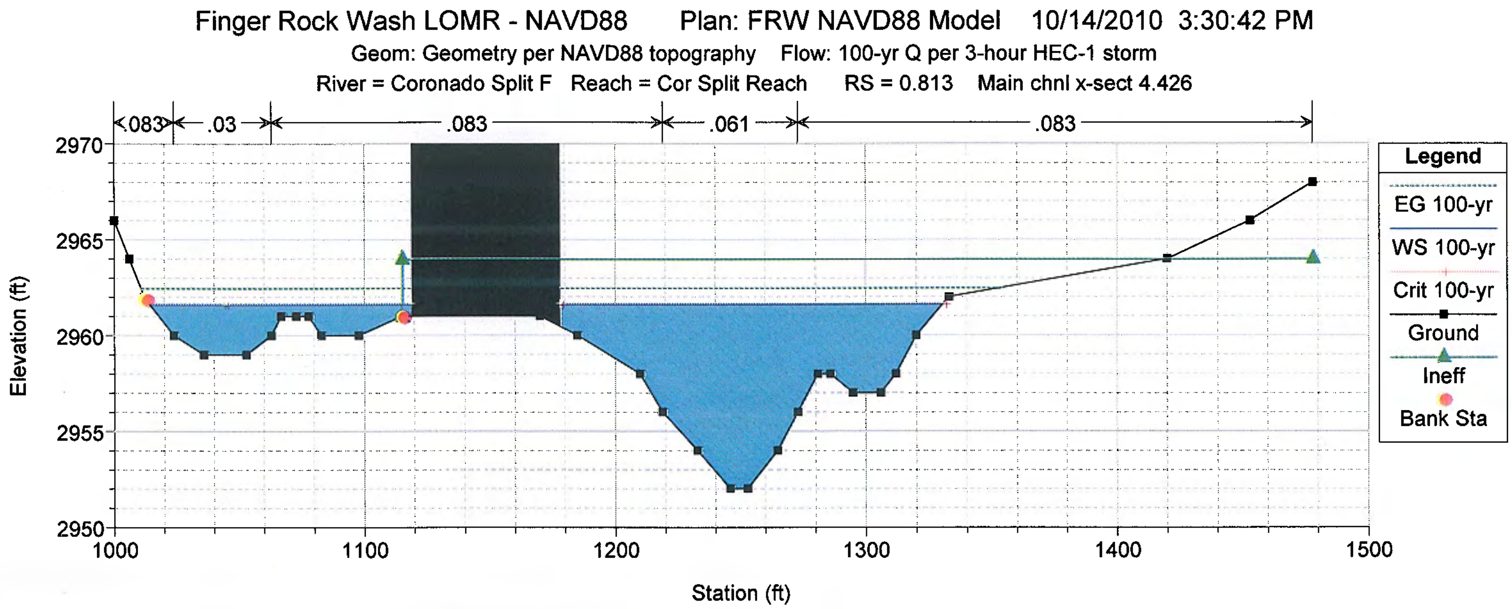


Finger Rock Wash LOMR - NAVD88   Plan: FRW NAVD88 Model   10/14/2010 3:30:42 PM

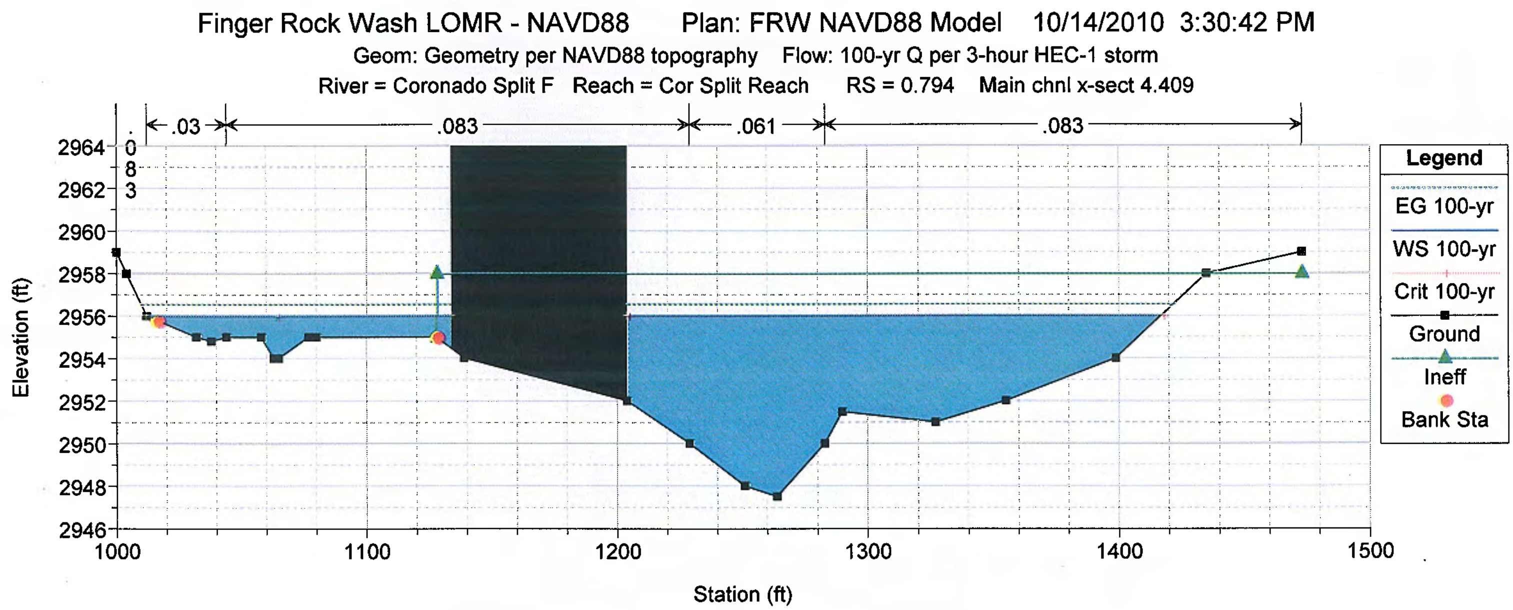
Geom: Geometry per NAVD88 topography   Flow: 100-yr Q per 3-hour HEC-1 storm

River = Coronado Split F   Reach = Cor Split Reach   RS = 0.830   Main chnl x-sect 4.447

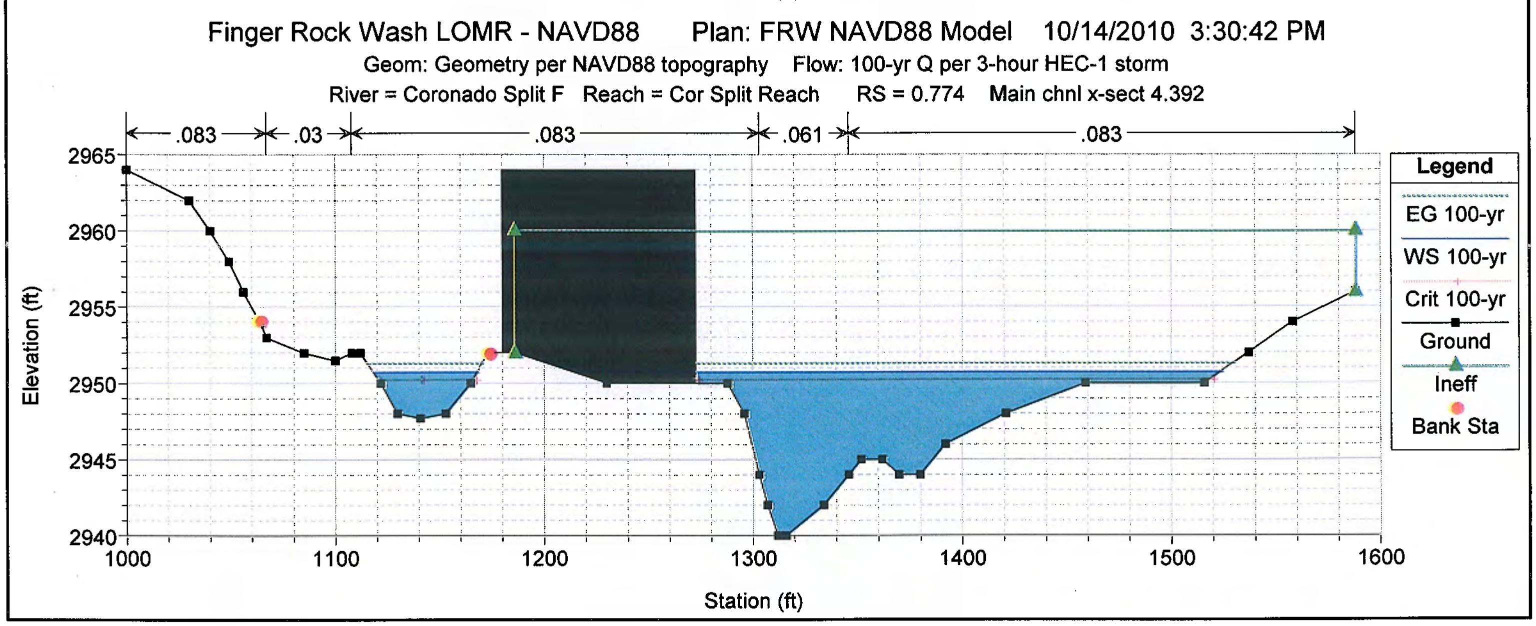




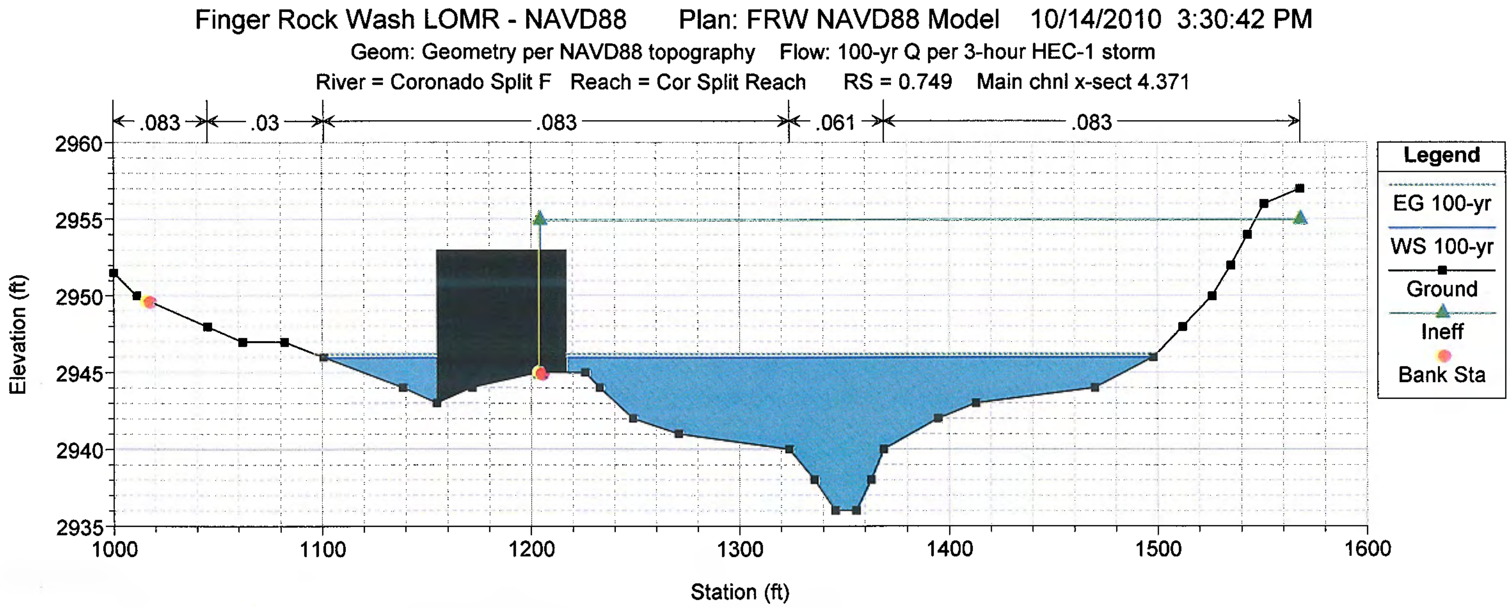
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.813 Main chnl x-sect 4.426
.083
.03
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

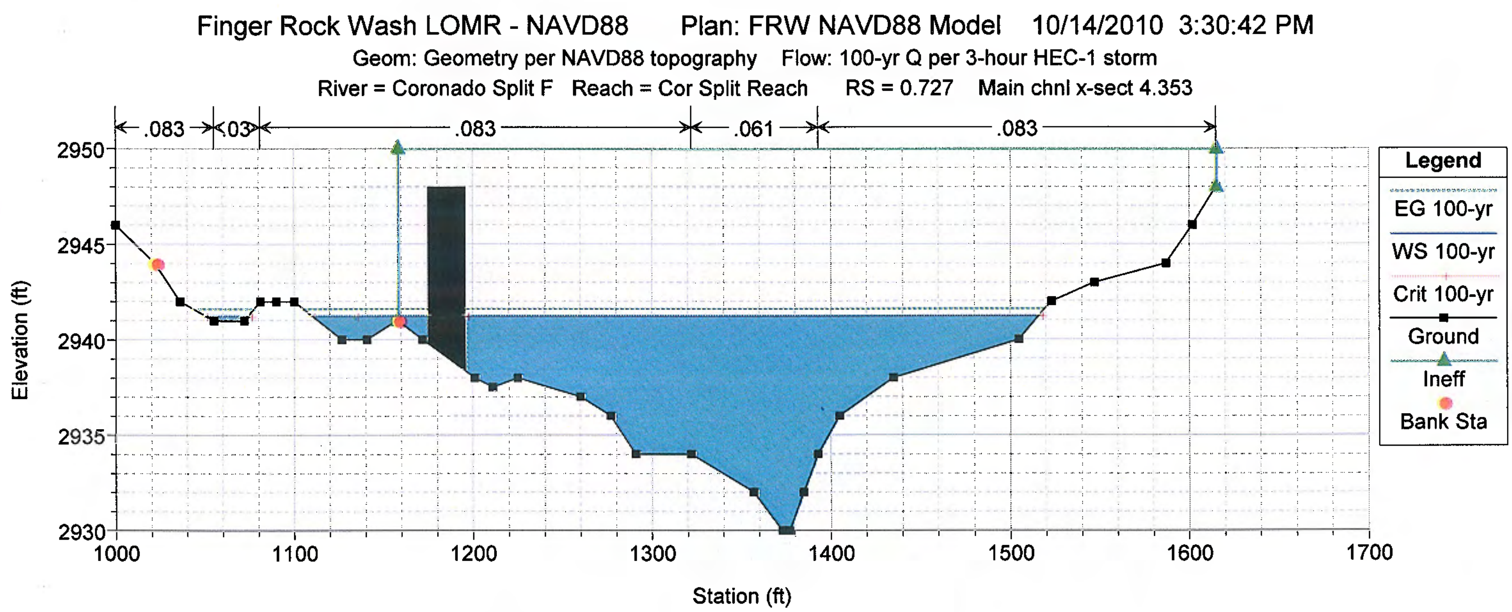


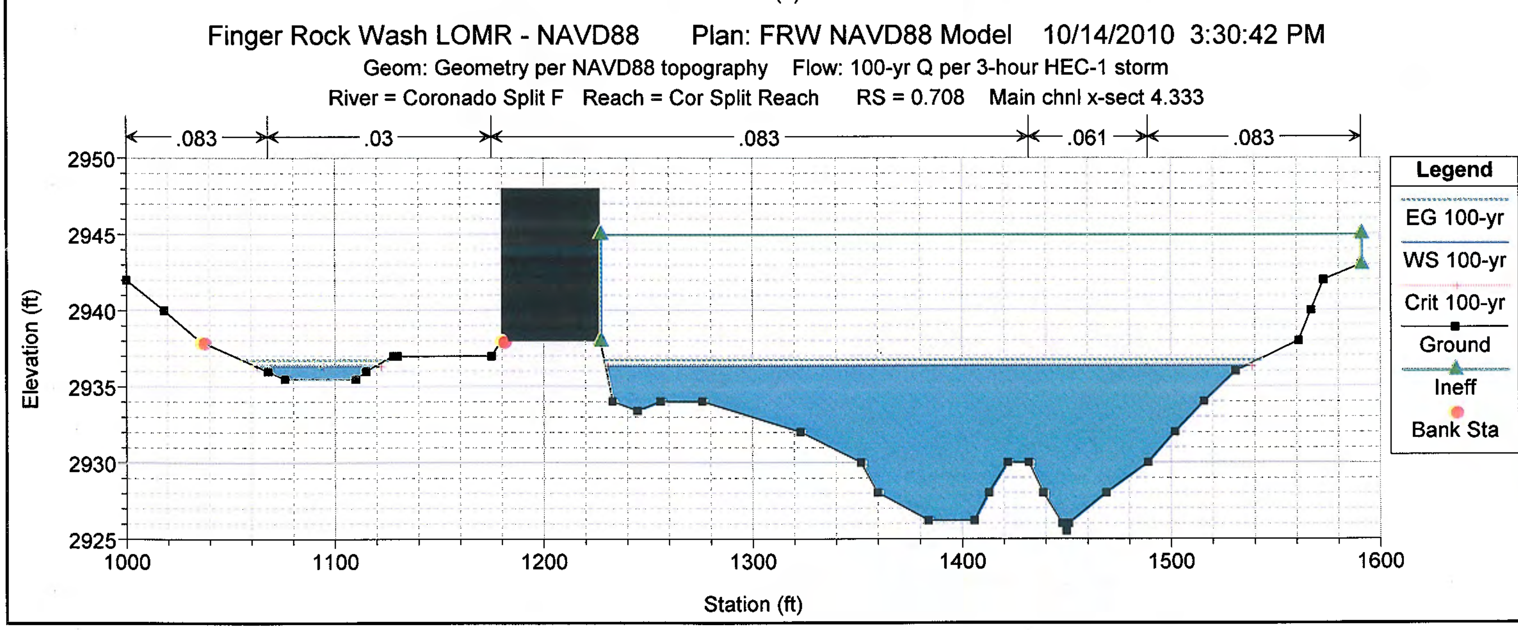
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.794 Main chnl x-sect 4.409
.083
.03
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

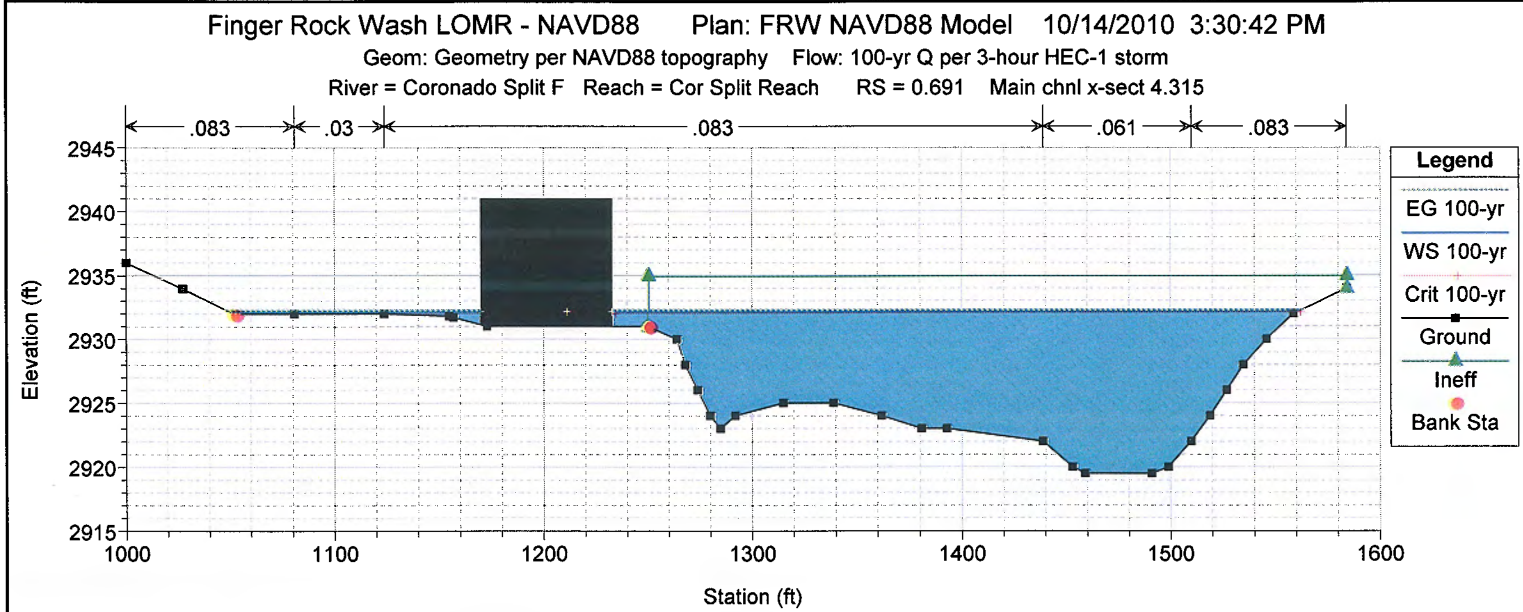


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.774 Main chnl x-sect 4.392
.083
.03
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

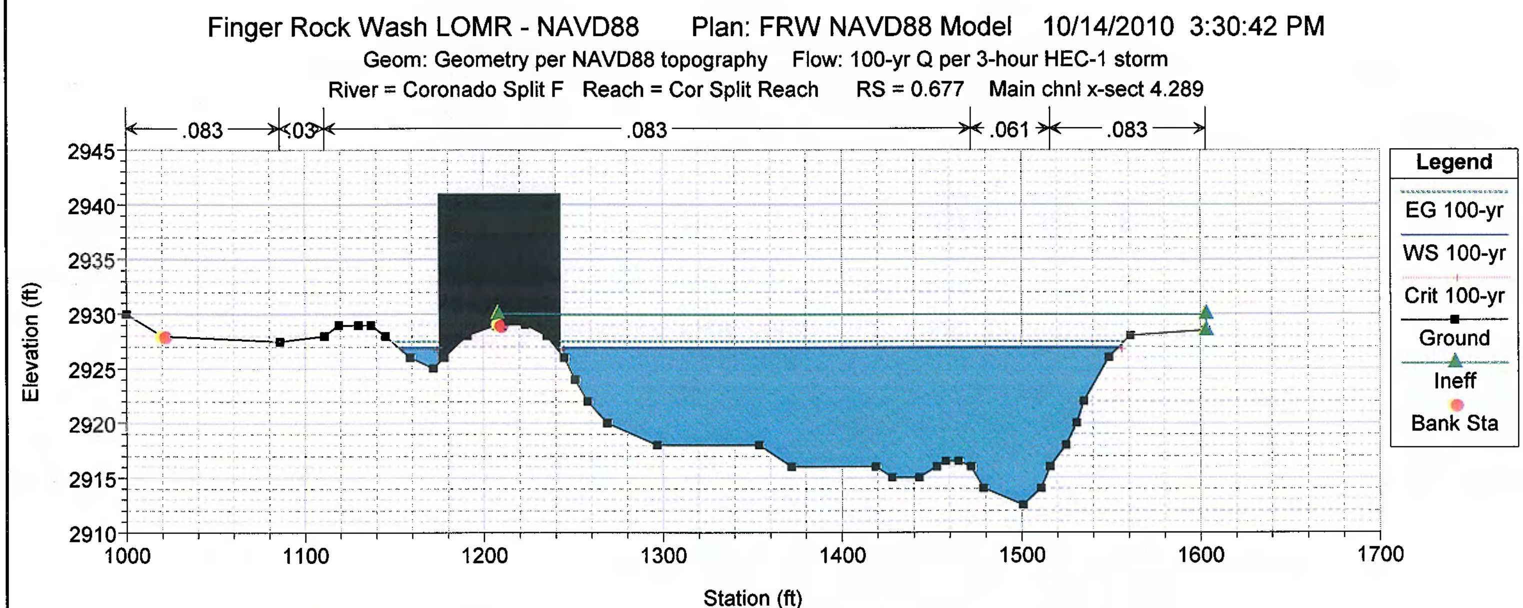

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.749 Main chnl x-sect 4.371
.083
.03
.083
.061
.083
Legend
EG 100-yr
WS 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
2960
2955
2950
2945
2940
2935
1000
1100
1200
1300
1400
1500
1600


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.727 Main chnl x-sect 4.353
.083
.03
.083
.061
.083
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
2950
2945
2940
2935
2930
1000
1100
1200
1300
1400
1500
1600
1700

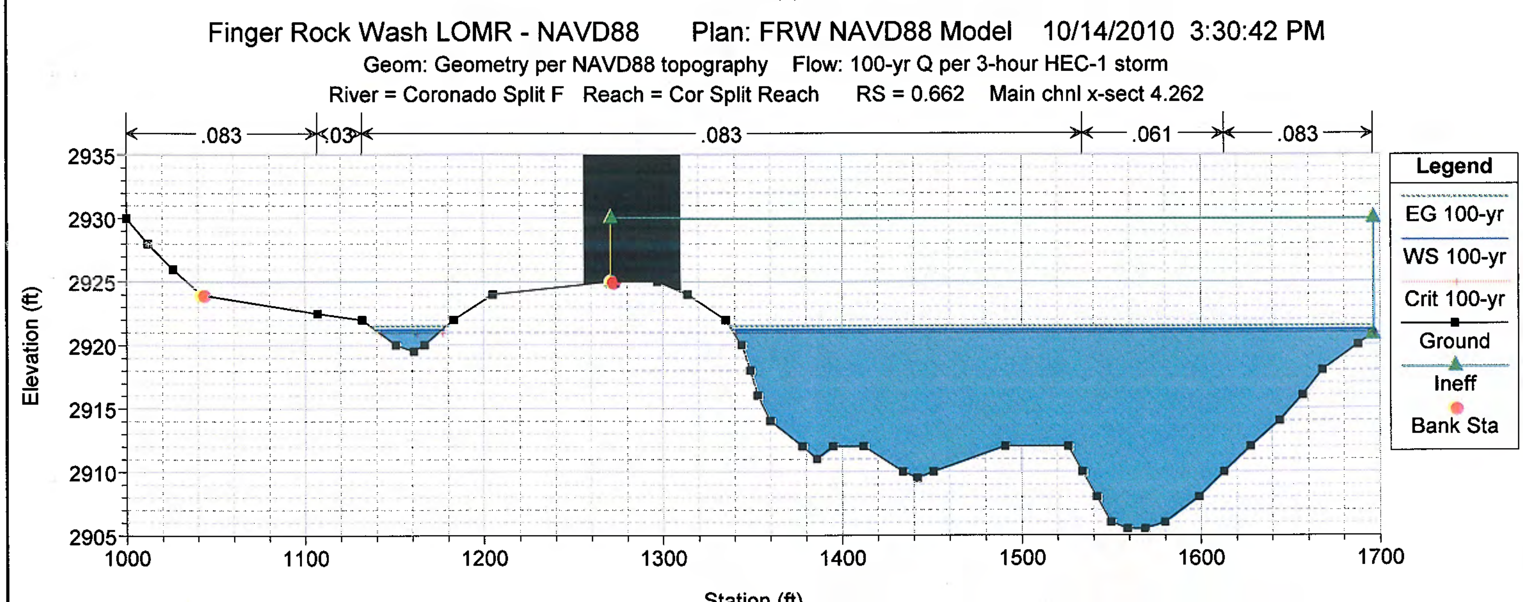

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.708 Main chnl x-sect 4.333
.083
.03
.083
.061
.083
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
2950
2945
2940
2935
2930
2925
1000
1100
1200
1300
1400
1500
1600



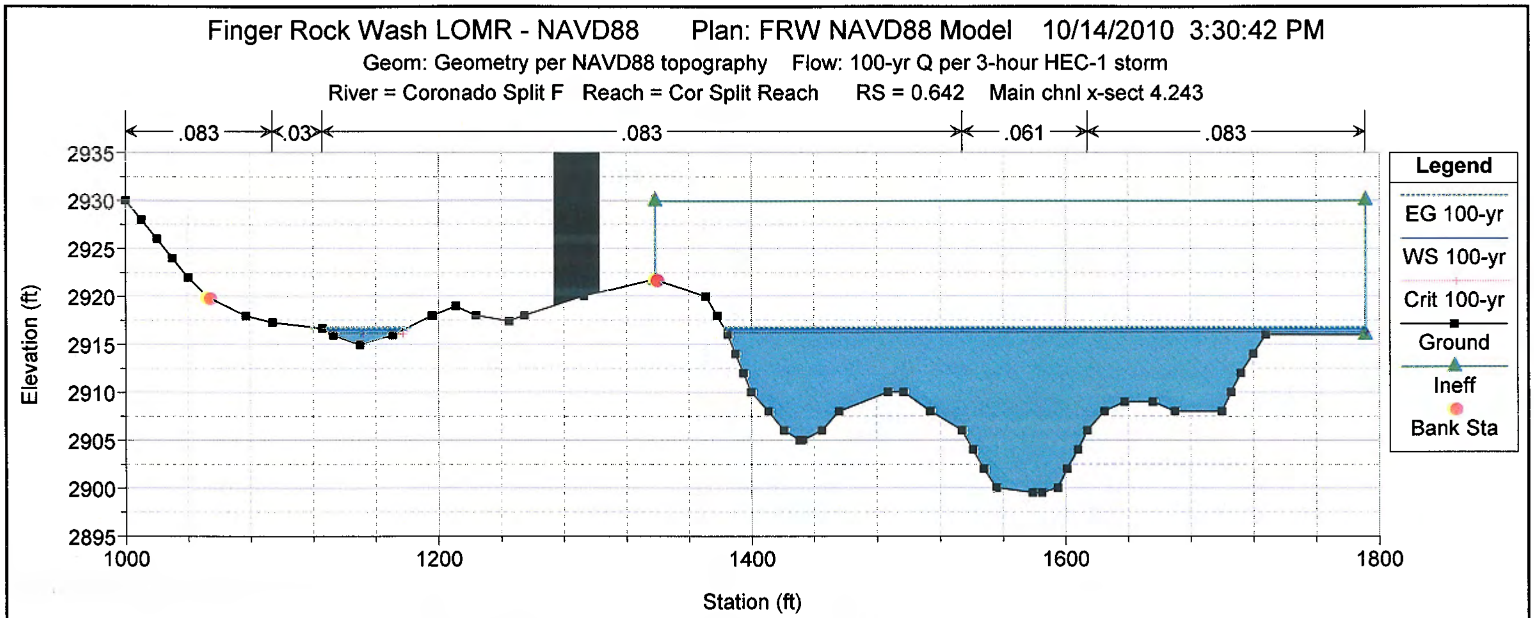
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.691 Main chnl x-sect 4.315
.083
.03
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta



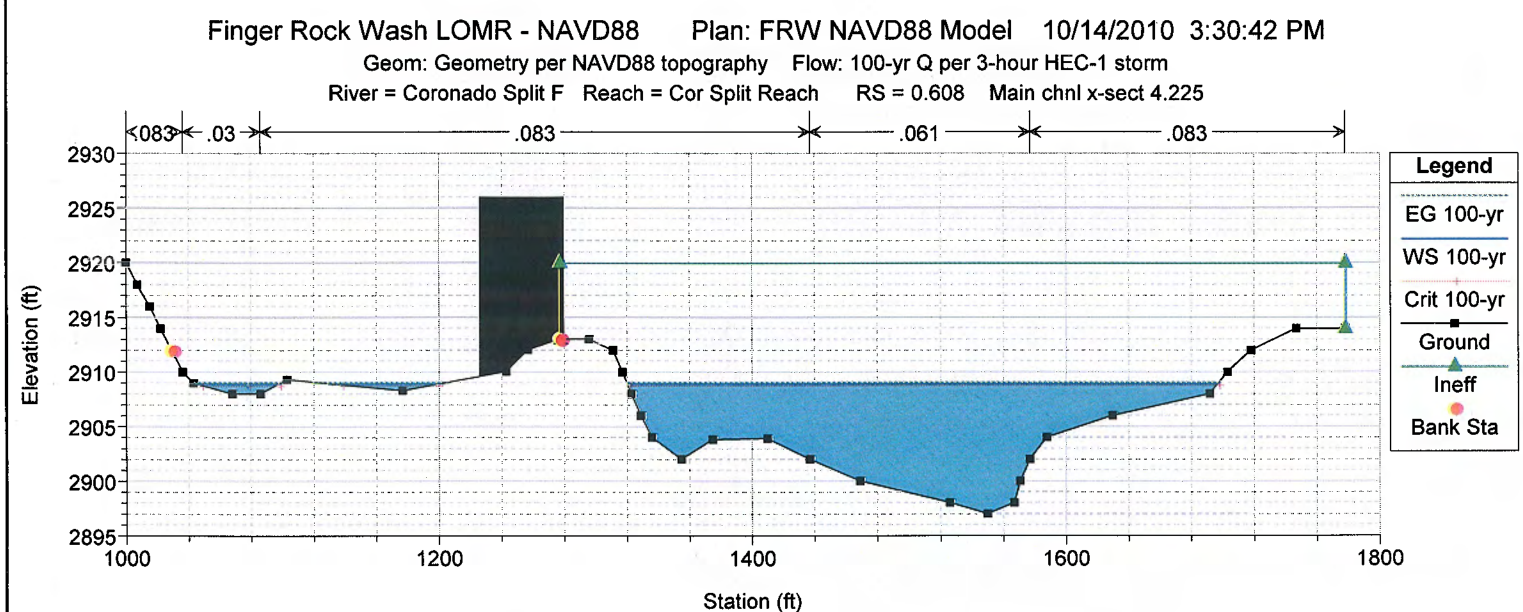
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.677 Main chnl x-sect 4.289
.083
.03
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta



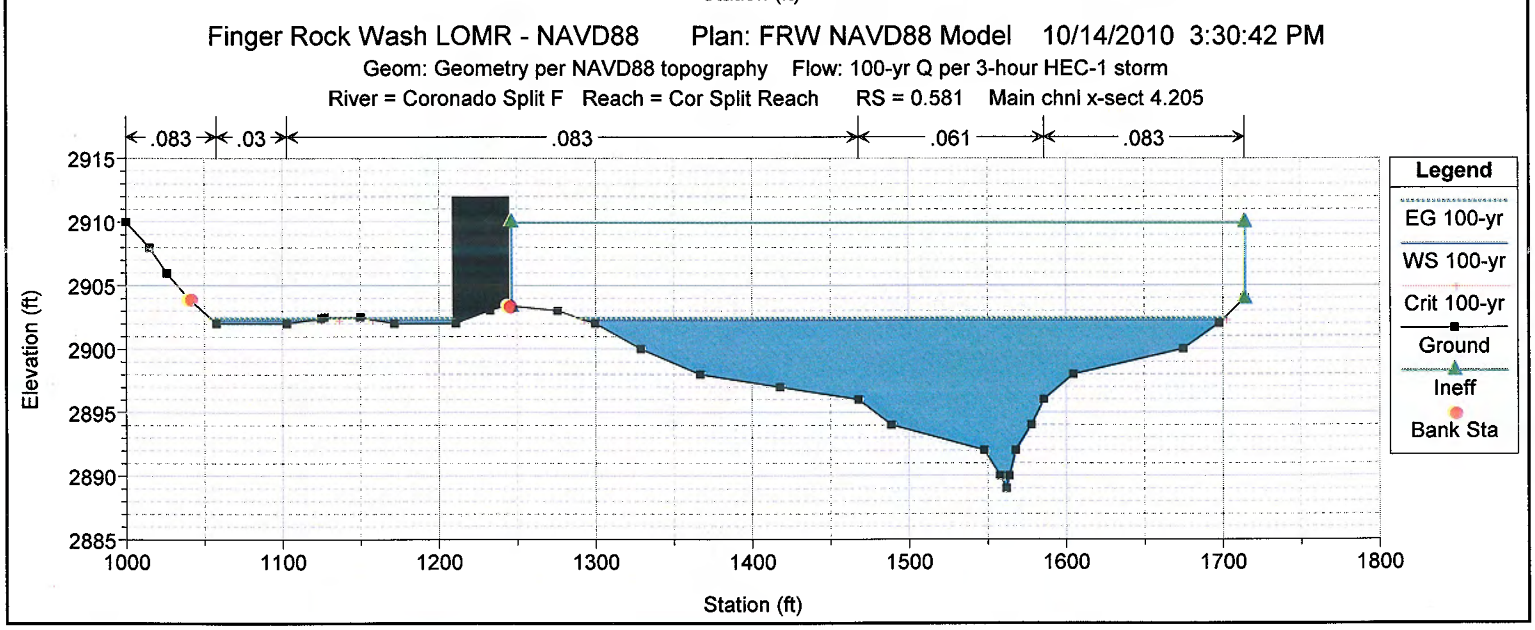
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.662 Main chnl x-sect 4.262
.083
.03
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta



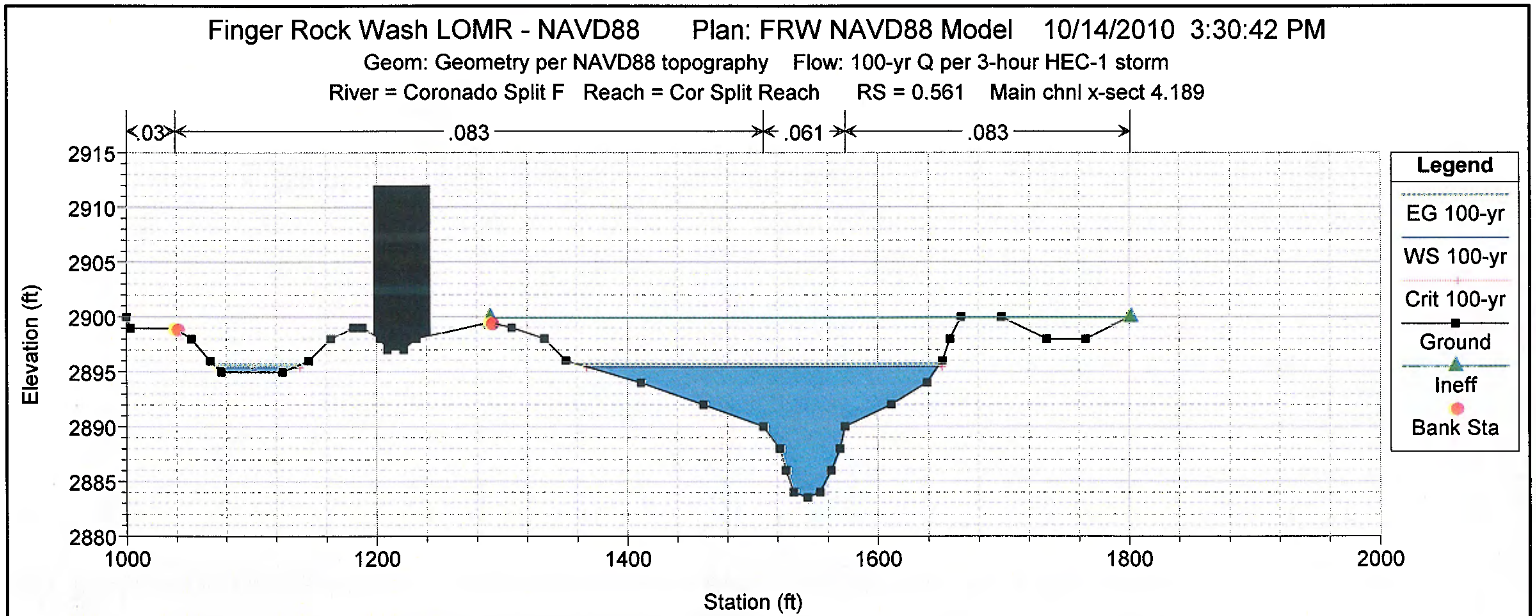
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.642 Main chnl x-sect 4.243
.083
.03
.083
.061
.083
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

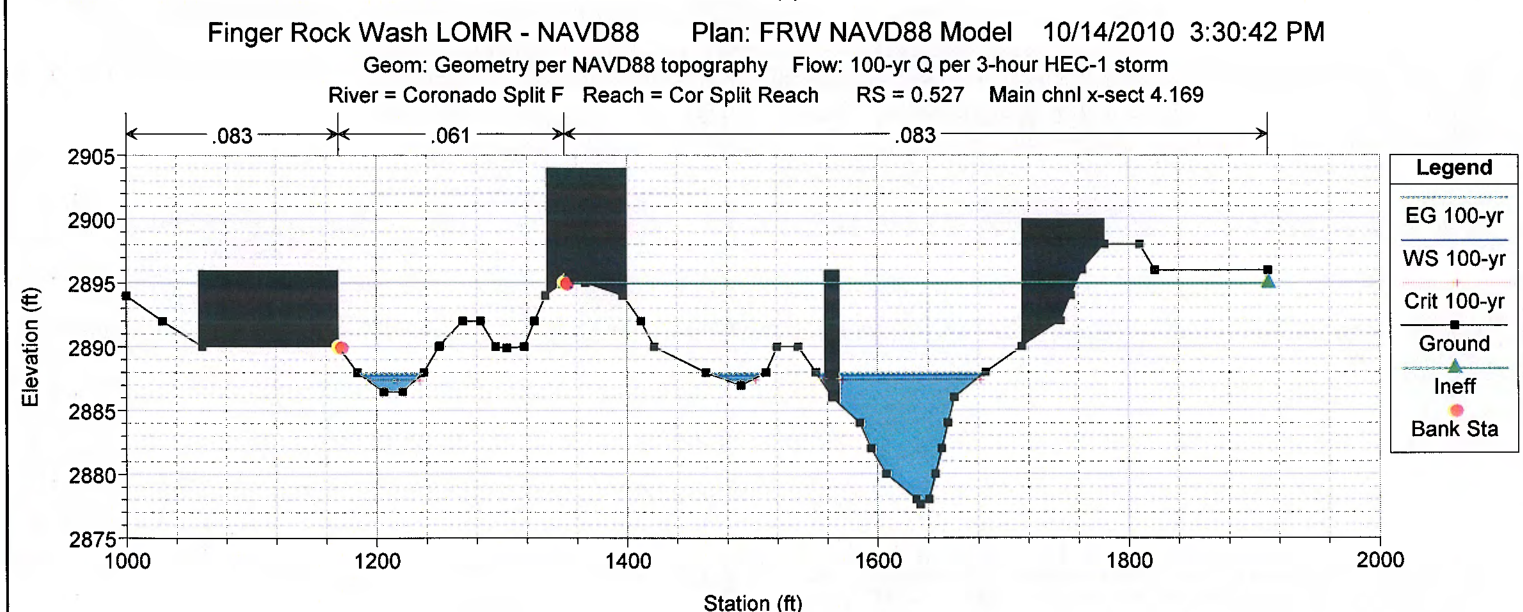


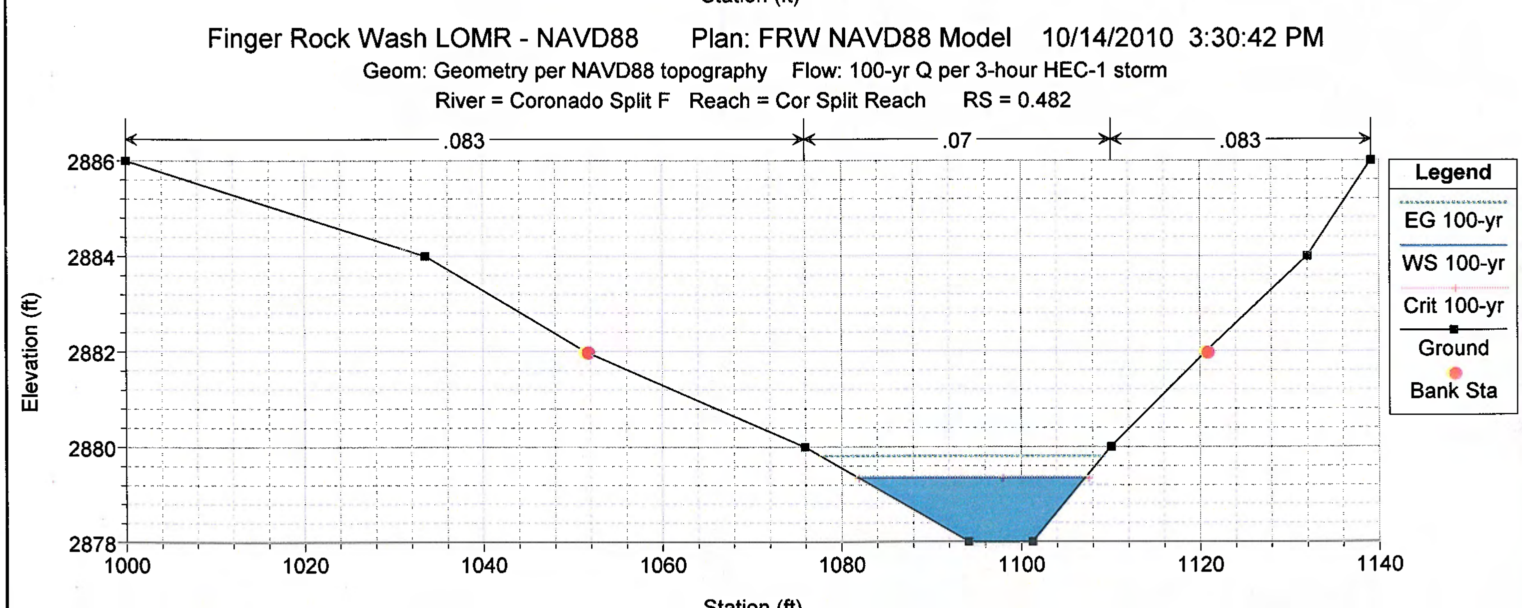
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.608 Main chnl x-sect 4.225
.083
.03
.083
.061
.083
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)



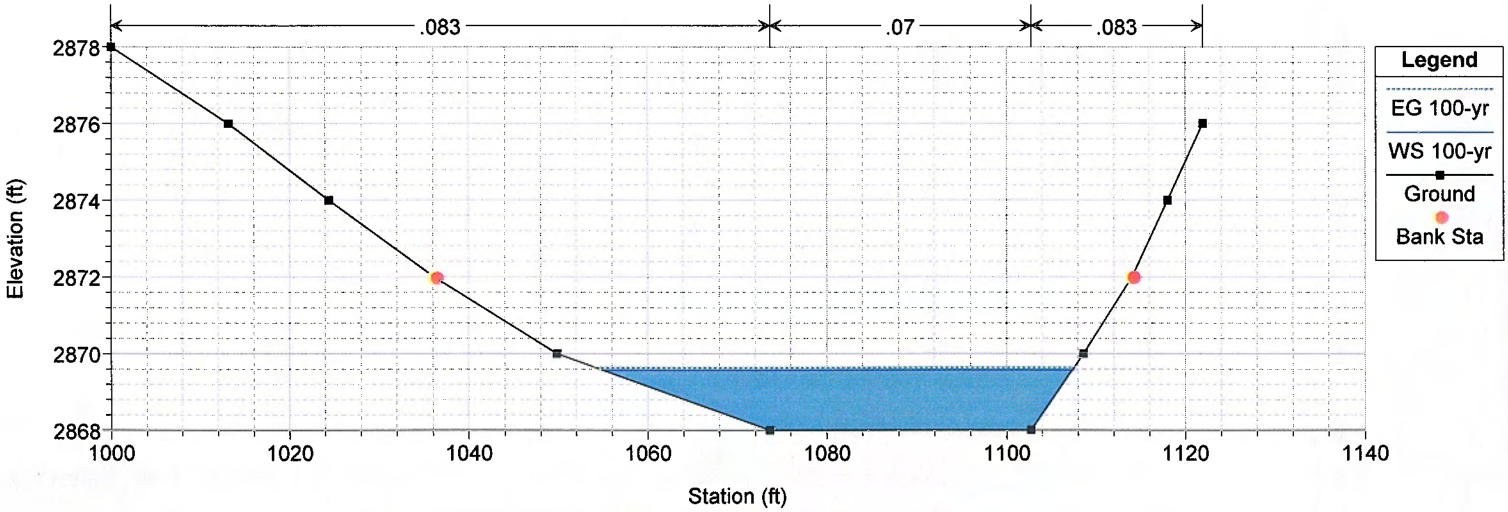
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.581 Main chnl x-sect 4.205
.083
.03
.083
.061
.083
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.561 Main chnl x-sect 4.189
.03
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta

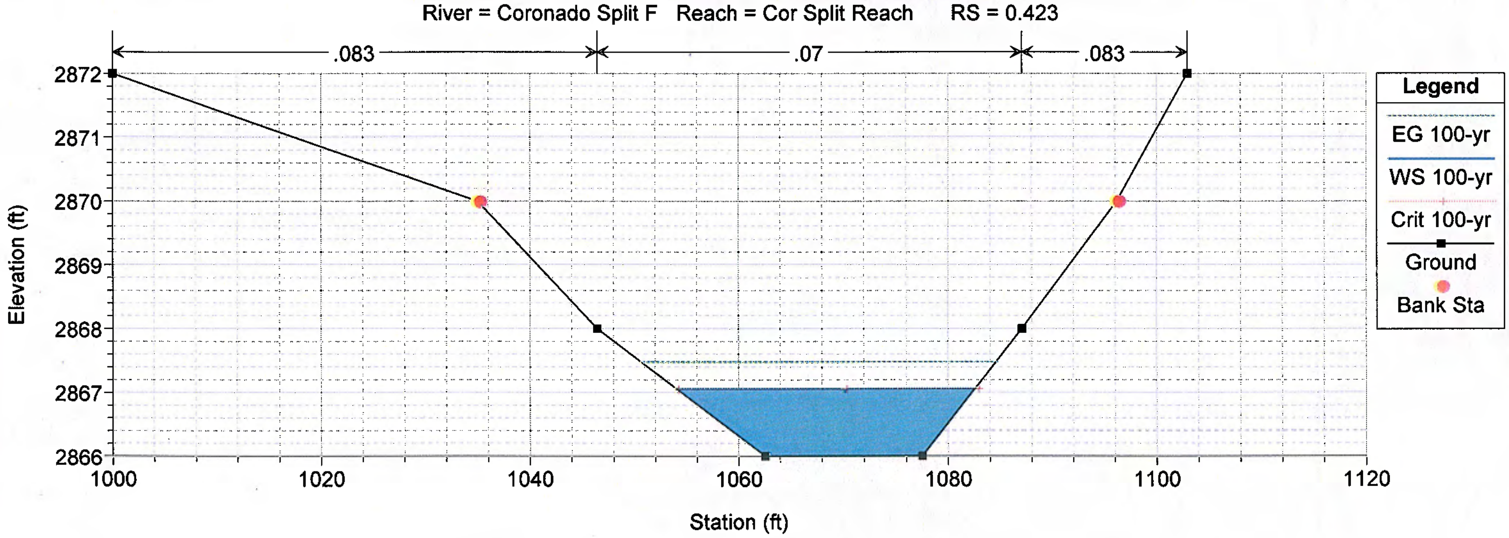

Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.527 Main chnl x-sect 4.169
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.482
.083
.07
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

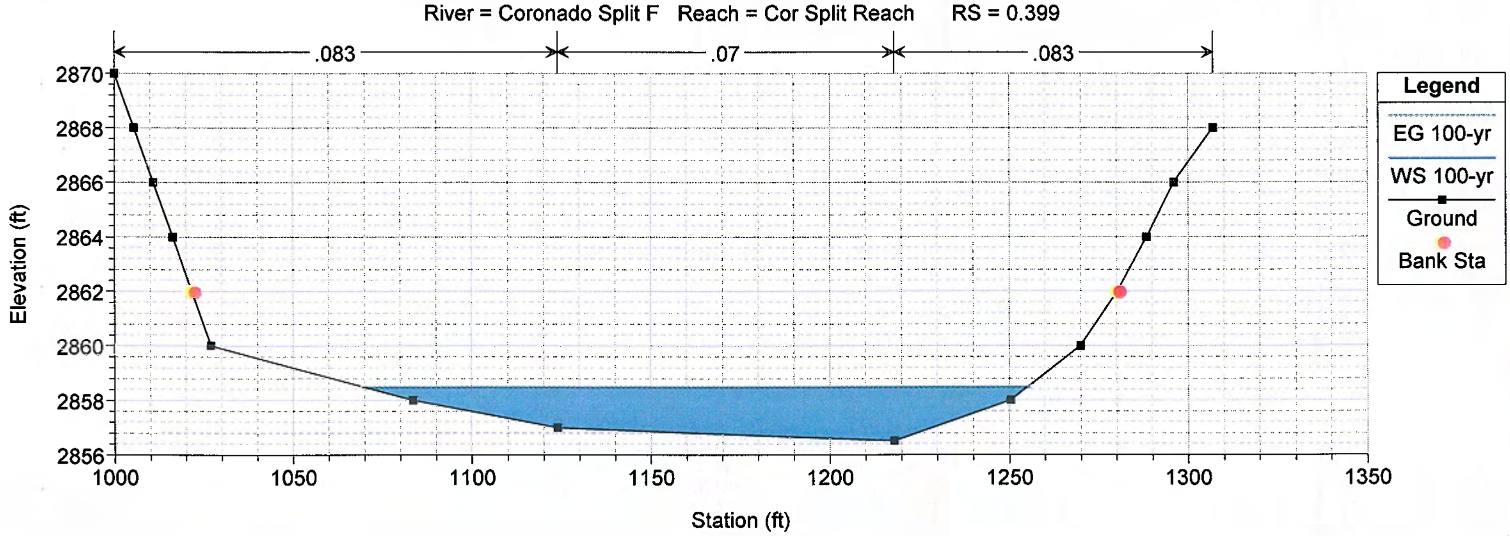
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.448

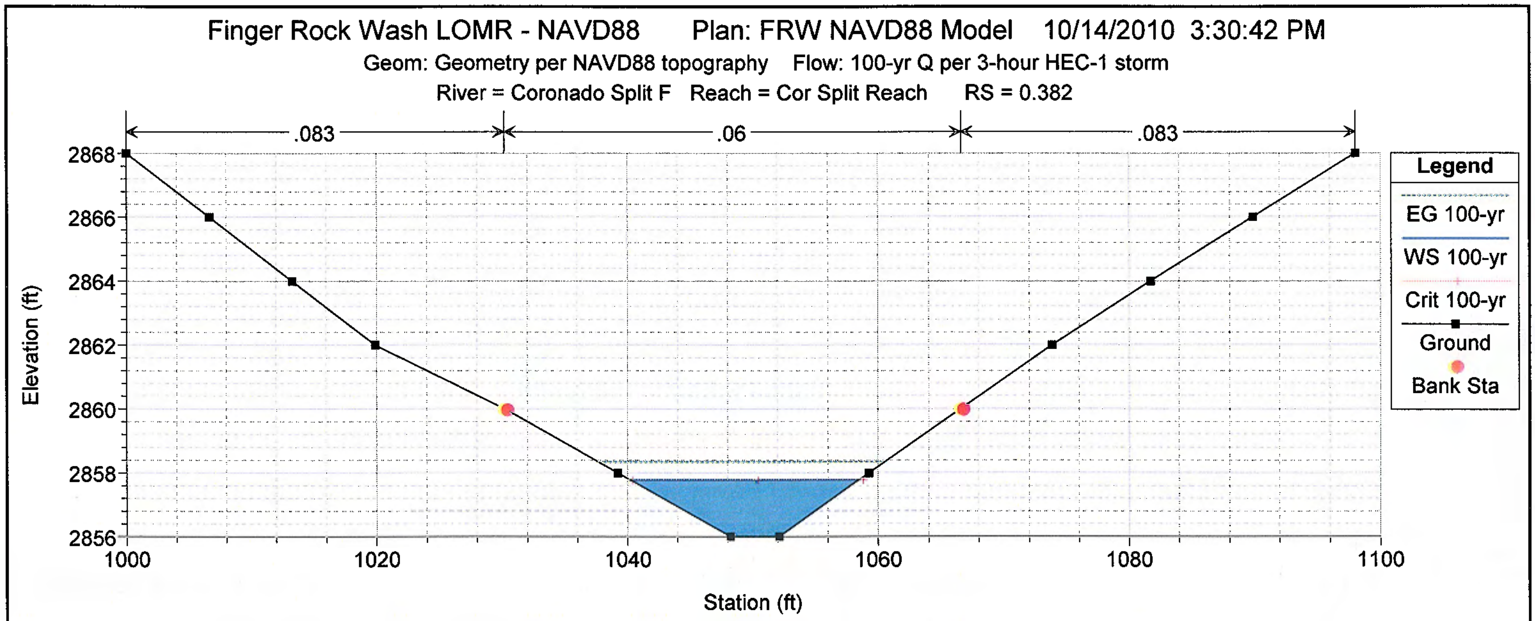


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.423

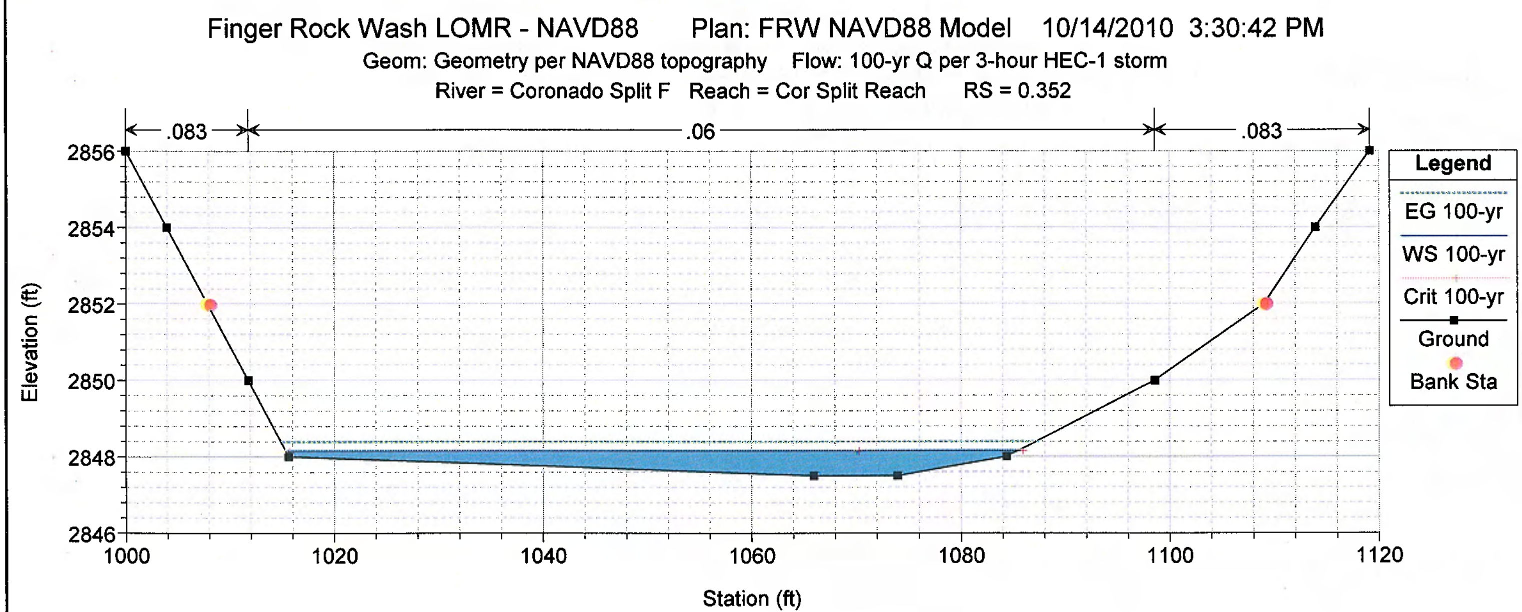


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.399

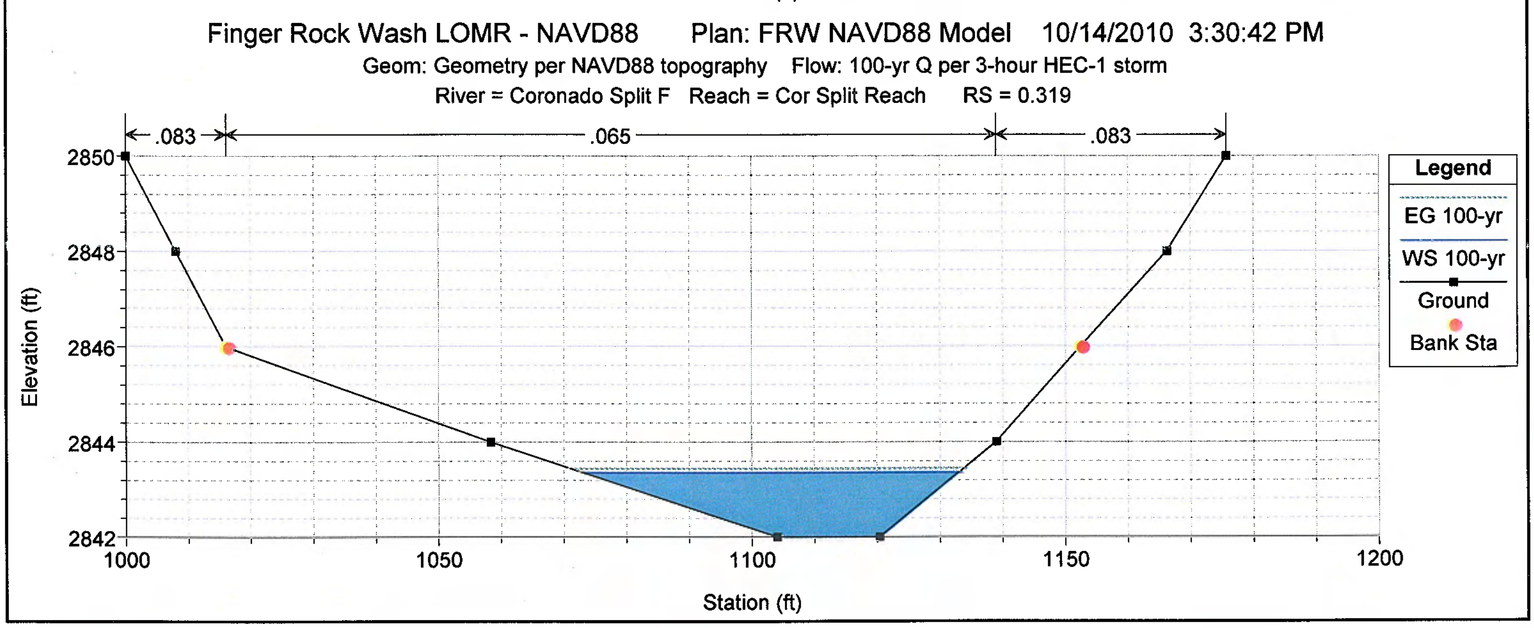




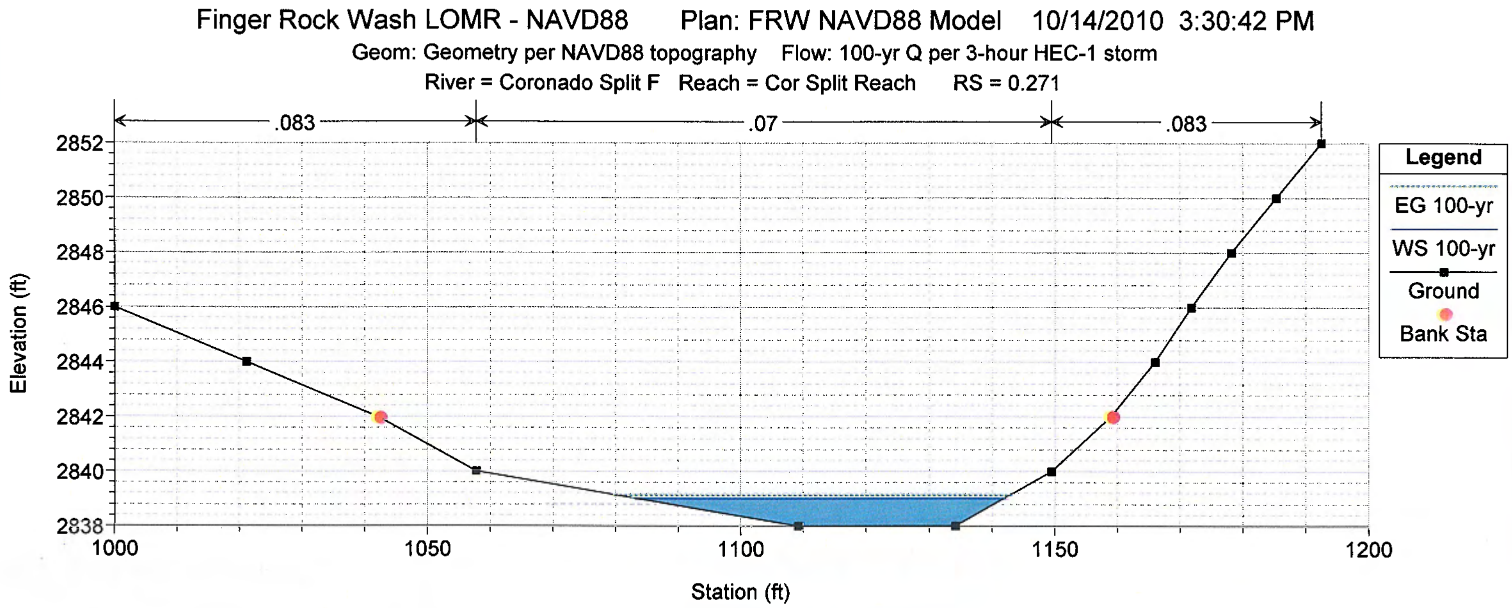
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.382
.083
.06
.083
Elevation (ft)
2868
2866
2864
2862
2860
2858
2856
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta



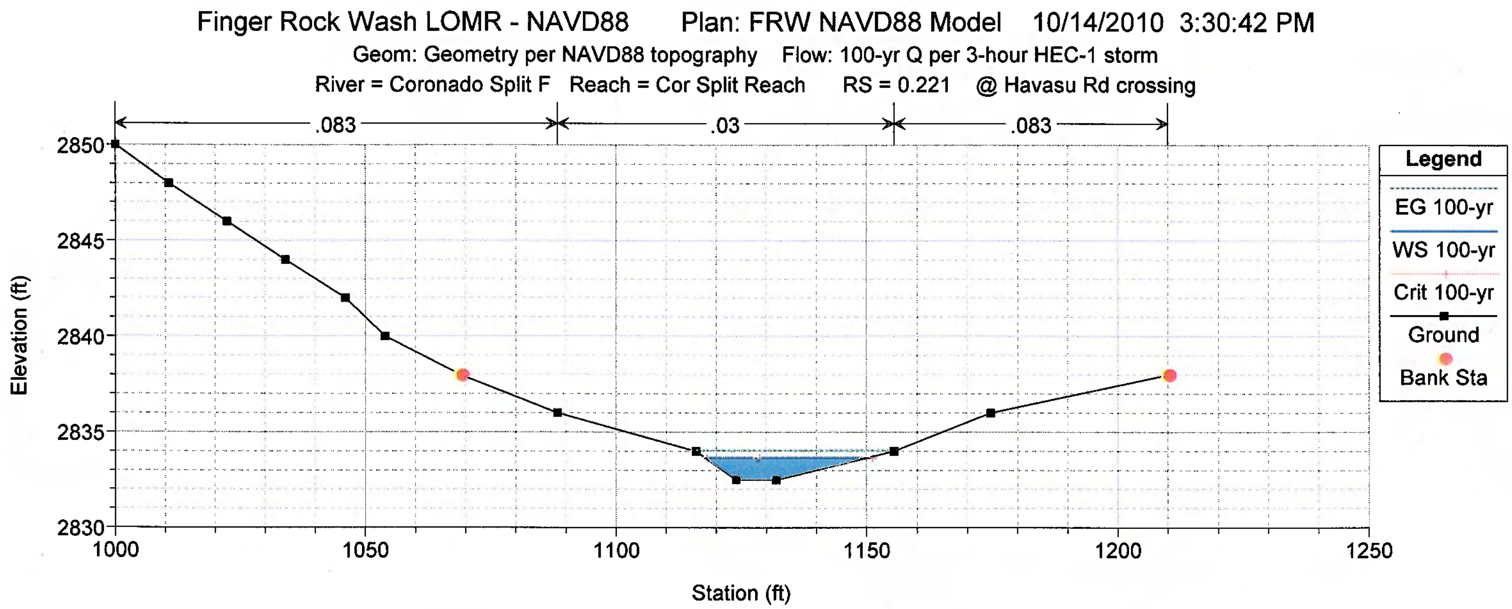
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.352
.083
.06
.083
Elevation (ft)
2856
2854
2852
2850
2848
2846
1000
1020
1040
1060
1080
1100
1120
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta



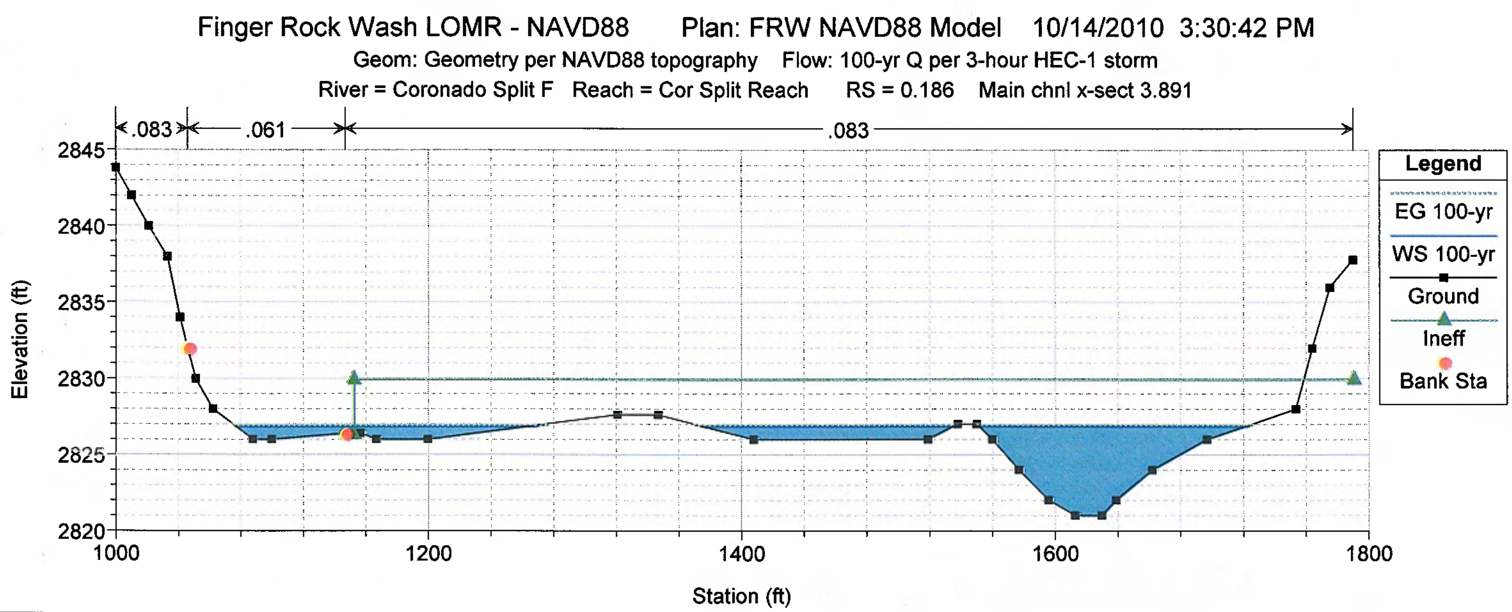
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.319
.083
.065
.083
Elevation (ft)
2850
2848
2846
2844
2842
1000
1050
1100
1150
1200
Station (ft)
Legend
EG 100-yr
WS 100-yr
Ground
Bank Sta



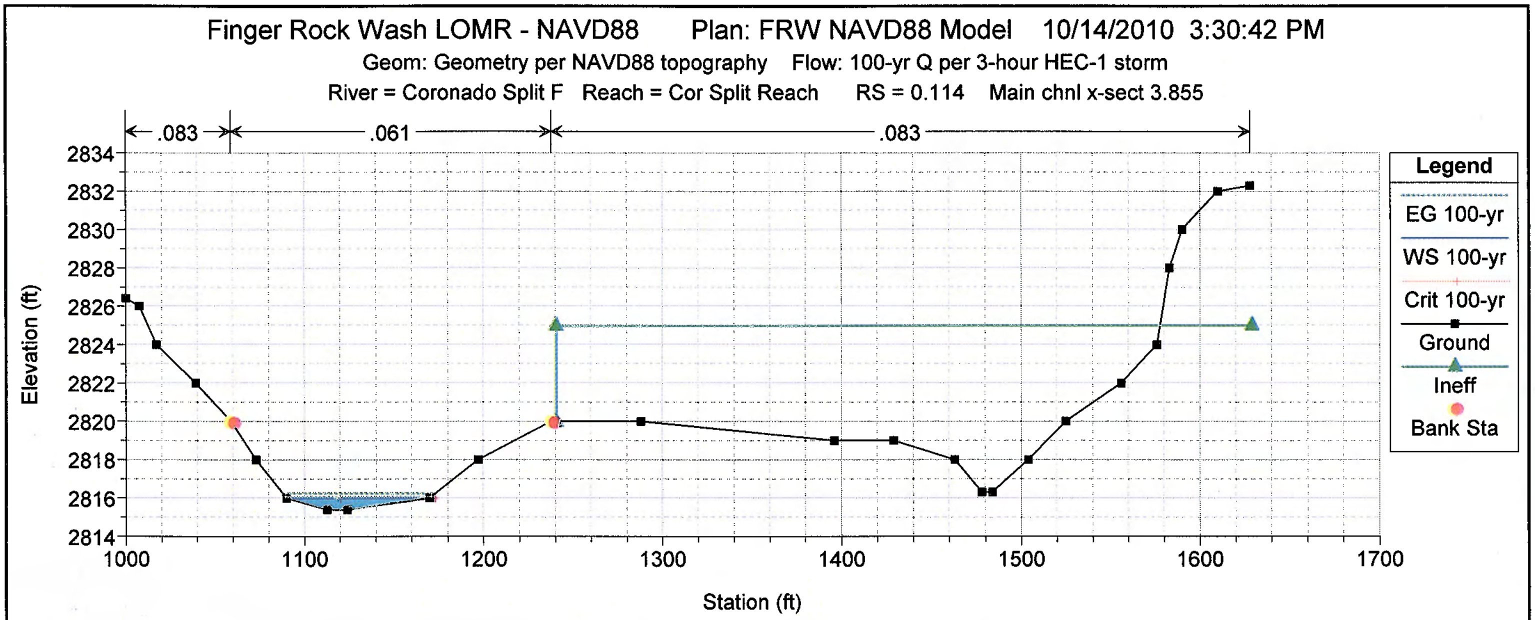
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.271
.083
.07
.083
Legend
EG 100-yr
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

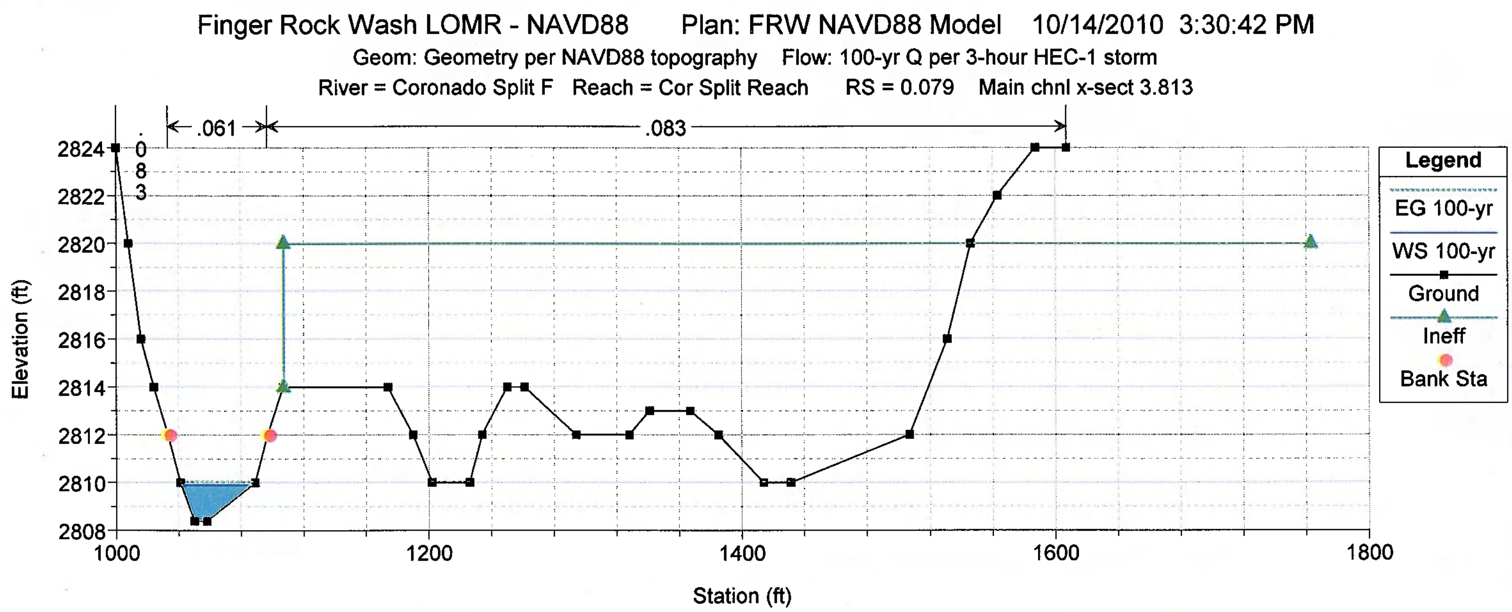


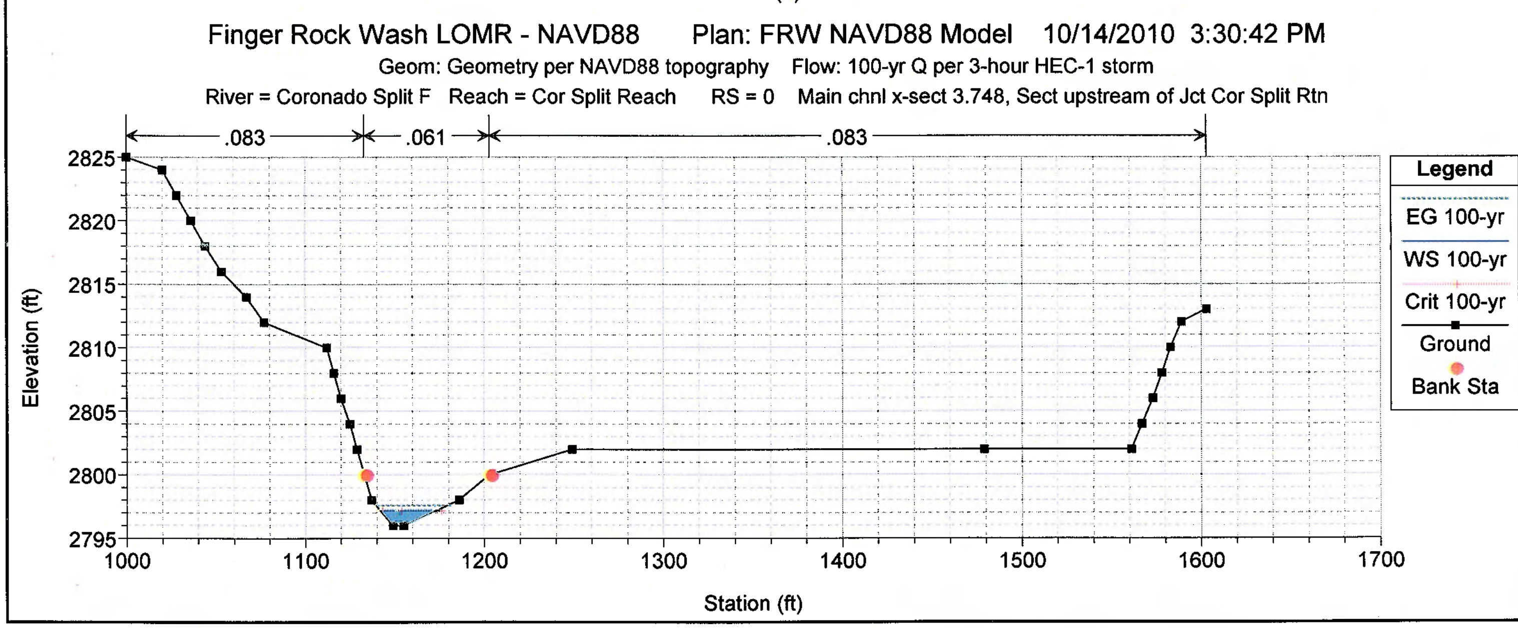
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.221 @ Havasu Rd crossing
.083
.03
.083
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.186 Main chnl x-sect 3.891
.083
.061
.083
Legend
EG 100-yr
WS 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.114 Main chnl x-sect 3.855
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Ineff
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0.079 Main chnl x-sect 3.813
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Ground
Ineff
Bank Sta


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
River = Coronado Split F Reach = Cor Split Reach RS = 0 Main chnl x-sect 3.748, Sect upstream of Jct Cor Split Rtn
.083
.061
.083
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

E.3 – PIMA COUNTY REGIONAL FLOOD CONTROL DISTRICT FLOODPLAIN ORDINANCE 2010-FC5 (APPLICABLE SECTIONS)

F. ANN RODRIGUEZ, RECORDER
RECORDED BY: LLW
DEPUTY RECORDER
1956 PE-1
P0230
PIMA CO CLERK OF THE BOARD
PICKUP

DOCKET: 13810
PAGE: 3313
NO. OF PAGES: 61
SEQUENCE: 20100940799
05/17/2010
ORDIN 18:00

PICKUP
AMOUNT PAID $ 0.00

ORDINANCE NO. 2010-FC 5

AN ORDINANCE OF THE BOARD OF DIRECTORS OF THE PIMA COUNTY FLOOD CONTROL DISTRICT RELATING TO FLOODPLAIN MANAGEMENT; REVISING THE PIMA COUNTY FLOODPLAIN AND EROSION HAZARD MANAGEMENT ORDINANCE, TITLE 16 OF THE PIMA COUNTY CODE.

WHEREAS, on December 16, 1974, the Pima County Board of Supervisors adopted Ordinance No. 1974-86, called the Pima County Floodplain and Erosion Hazard Management Ordinance (the "Floodplain Ordinance"), and

WHEREAS, on July 12, 1983, and on July 24, 1984, the Pima County Board of Supervisors adopted Ordinance Nos. 1983-FC1 and 1984-FC1 replacing Ordinance No. 1974-86,and

WHEREAS, the Arizona Legislature authorized the boards of directors of county flood control districts to adopt floodplain management regulations designed to promote the public health, safety and general welfare pursuant to Arizona Revised Statutes, Title 48, Section 48-3603, and

WHEREAS, on May 7, 1985, the Board of Supervisors, acting as the Board of Directors of the Pima County Flood Control District, adopted Ordinance No. 1985-FC1 replacing Ordinance No. 1983-FC1, as amended by Ordinance No. 1984-FC1, and

WHEREAS, on April 12, 1988, the Board of Supervisors, acting as the Board of Directors of the Pima County Flood Control District, adopted Ordinance No. 1988-FC1 replacing Ordinance No. 1984-FC1, and

WHEREAS, on December 6, 1988, the Board of Supervisors, acting as the Board of Directors of the Pima County Flood Control District, adopted Ordinance No. 1988-FC2 replacing Ordinance No. 1988-FC1, and

WHEREAS, Ordinance No. 1988-FC2 was amended by Ordinance Nos. 1994-FC2 as adopted on July 19, 1994, 1995-FC1 as adopted August 1, 1995, and 1998-FC1 as adopted July 14, 1998, and

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WHEREAS, the Pima County Board of Supervisors, acting as the Board of Directors of the Flood Control District, officially amended Title 16 of the Pima County Code on September 6, 2005 by Ordinance No. 2005-FC2, and

WHEREAS, the Pima County Flood Control District Board of Directors has determined it to be in the best interests of the residents of Pima County that the current Floodplain Ordinance, as codified in Title 16 of the Pima County Code, be amended to establish the most current floodplain erosion and riparian habitat regulations,

NOW THEREFORE, IT IS ORDAINED BY THE BOARD OF DIRECTORS OF THE FLOOD CONTROL DISTRICT OF PIMA COUNTY,

SECTION 1. Title 16 of the Pima County Code shall hereby read as follows:

TITLE 16
Chapters:

Chapter 16.08

DEFINITIONS
Sections:

16.08.010
Application of definitions and general usage.
The following definitions and general usage shall apply to words and phrases used in Title 16 of this code.

A. When parts of the Arizona Revised Statutes are adopted by reference or referred to in this title, the abbreviation A.R.S. will be used.
B. When parts of the Arizona Administrative Code are adopted by reference or referred to in this title, the abbreviation A.A.C. will be used.
C. References to the U.S. Code of Federal Regulations refer sequentially to the title of the Code of Federal Regulations (CFR), part, section and paragraph, e.g., 44 CFR 62.01(a), means Title 44, Code of Federal Regulations, Part 62 Section .01, Paragraph (a)).
D. When parts of the National Federal Flood Insurance Program are adopted or referenced, the following terms shall be used:
   1. "NFIP" means National Flood Insurance Program.
   2. "FEMA" means the Federal Emergency Management Agency under the U.S. Department of Homeland Security.
   3. "FIRM" means Flood Insurance Rate Map as adopted by FEMA that delineates special flood hazards and risk premium zones.
   4. "FBFM" means Flood Boundary and Floodway Map as adopted by FEMA to delineate areas of special flood hazards including floodways.
   5. "FHBM" means Flood Hazard Boundary Map as adopted by FEMA for areas of flood hazards.
   6. "Community" is the term used by FEMA for all political bodies that administer floodplain regulations whether those are towns, cities, counties, districts, parishes, etc.
   7. "Jurisdiction" is a term used by FEMA and ADWR that includes communities, states, tribal nations and other federal land owners like the Bureau of Land Management and the National Forest Service.
   8. "Reasonably safe from flooding" is a term used to indicate that conditions of the National Flood Insurance Program are met for the base flood.
E. "State Standard" means a document defining standards for floodplain management as adopted by the Arizona Department of Water Resources pursuant to A.R.S. Section § 48-3605(A). An abbreviation for a specific standard of SS3-96 means State Standard Number 3 as adopted in 1996.
F. All units of measure contained in this title, whether expressed or implied, are intended to be in the English system of units. The following units of measures and abbreviations will be used:
   1. When referring to the volume of flow, "cubic feet per second" will be abbreviated as cfs.
   2. When referring to the velocity of the flow, "feet per second" will be abbreviated as fps.
G. When referring to timeframes for action, and unless otherwise noted, “days” shall mean business days. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.020
Appeal

"Appeal" means a written request for a technical review of the Chief Engineer's written finding, as defined in 16.08.770, concerning the denial of a floodplain use permit, or a boundary determination of a regulatory floodplain, floodway, erosion hazard area, or riparian habitat. The appeal of a final decision and order of the Chief Engineer regarding a floodplain violation shall be pursuant to 16.64.070. (Ord. 2010 FC-1)

16.08.030

Arizona Department of Water Resources.

"Arizona Department of Water Resources," known from this point forward as ADWR, is the state agency assigned with oversight of flood control as provided for in Title 48 Chapter 21 of the A.R.S. (Ord. 2005 FC-2 § 2 (part), 2005).

16.08.040

Balanced drainage basin.

"Balanced drainage basin" means a drainage basin or watershed which contains flood water channels, natural or manmade, and/or flood control structures that are adequate to contain existing runoff from the base flood produced by the basin or watershed, but in which additional runoff may not be safely contained by said channels or structures. All drainage basins shall be considered to be balanced basins unless a basin has been designated as a critical drainage basin. (Ord. 2010 FC-1; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.050

Base flood.

"Base flood" means a flood with a one-percent probability of being equaled or exceeded in any given year. Commonly referred to as the 100-year flood, this flood shall be determined from an analysis of floods on a particular watercourse and other watercourses in the same general region in accordance with the criteria established by the director of the ADWR, or the Flood Control District Board, which criterion is hereby incorporated by reference and made a part of this title. (Ord. 2010-FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.060

Base flood elevation.

"Base flood elevation" means the calculated water-surface elevation of the base flood. (Ord. 1999-FC-1 §§ 1 (part) 1999; Ord. 1988-FC2 Art. 4 (part), 1988)

16.08.070

Basement.

"Basement" means any area of a building having its floor sub-grade (below ground level) on all sides. (Ord. 2005-FC2 § 2 (part), 2005)

16.08.080

Board.

"Board" means the Board of Supervisors of Pima County sitting as the Board of Directors for the Flood Control District, known from this point forward as the Board, as the governing body for codes, ordinances and other regulations relating to floodplain management within Pima County, but excluding Indian and military reservations and incorporated communities that elected to assume separate floodplain management duties and powers, as set forth in the A.R.S., Title 48, Chapter 21 Districts. (Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.090

Board of Supervisors.

"Board of Supervisors," means the governing body of Pima County as defined in Title 11, Chapter 2, of the A.R.S. (Ord. 2005-FC2 § 2 (part), 2005)

16.08.100

Chief Engineer.

"Chief Engineer" means an official of Pima County or authorized representative of the Flood Control District whose duties are as set forth in A.R.S. Section 48-3603, and who is an Arizona registered civil engineer in the state of Arizona. For the Flood Control District, the Chief Engineer is also the director of the Pima County Flood Control District. The Chief Engineer, or an authorized designee, is in charge of enforcement of this title, and is responsible for administrating appeals and waivers to engineering standards specified in this title. (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.110

County Engineer.

"County Engineer" means an official of Pima County whose duties are set forth in A.R.S. Section 11-562 and 48-3603. The County Engineer is also the director of the Pima County Department of Transportation. (Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.120

Critical drainage basin.

"Critical drainage basin" means a drainage basin or watershed that contains flood water channels, natural or manmade, and/or flood control structures that cannot convey existing runoff during a base flood produced by the basin or watershed, and which has a documented history of severe hazards. (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.130

Critical or balanced drainage basin management plan.

"Critical or balanced drainage basin management plan" means a site-specific plan for a balanced or critical basin or watershed which has been prepared for and approved by Pima County, and provides a conceptual plan for orderly development of flood control, floodplain management, and associated erosion hazard-control measures that may be necessary as a result of urbanization within the basin or watershed. (Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.140

Cumulative substantial damage.

"Cumulative substantial damage" means the total cost of all repairs to a structure that has incurred repetitive loss or damage in order to determine the applicability of the substantial improvement provisions of this Title. When the total cost of all repairs to the repetitive loss structure equals or exceeds the 50% substantial improvement threshold, the structure must be brought into compliance. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005)

16.08.150

Cumulative substantial improvement.
"Cumulative substantial improvement" means the total cost of all improvements, modifications, additions, reconstruction, or repairs to a structure in order to determine the applicability of the substantial improvement provisions of this Title. When the total cost of all improvements, modifications, additions, reconstruction or repairs equals or exceeds the 50% substantial improvement threshold, the structure must be brought into compliance. The cumulative substantial improvement provision does not apply to tenant improvements of commercial structures or to the subsequent remodeling of any residential facility (e.g. kitchen or bathroom) that have been remodeled previously and accounted for under this provision. (Ord. 2010 FC-1; Ord. 2005-FC2 § 2 (part), 2005)

16.08.160
Detention system.
"Detention system" means a type of flood control system that delays the downstream progress of flood waters in a controlled manner, generally through the combined use of a temporary storage area and a metered outlet device, which causes a lengthening of the duration of flow and thereby reduces downstream flood peaks. (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.170
Development.
"Development" means any manmade change to improved or unimproved real estate, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, fencing, excavating or drilling or storage of equipment or materials. (Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.180
District.
"District" means the County Flood Control District, as established by Title 48, Chapter 21 of the A.R.S., which is named in Pima County as the Pima County Flood Control District and known from this point forward as the District. (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.190
Drainage area.
"Drainage area" means the upstream contributing watershed area measured at a single point of drainage concentration and is expressed in units of area. Other terms for this are catchment area, watershed, and river basin. (Ord. 2010 FC-1; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.200
Dry well.
"Dry well" means a deep hole covered and designed in such a manner so as to hold storm water runoff until it infiltrates into the ground. (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.210

Dwelling unit.
"Dwelling unit" means a place of residence that may be located in a single or multiple dwelling building or a manufactured home. (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.220
Encroachment.
"Encroachment" means the placement of uses, materials, fill, or structures into the regulatory floodplain in a manner that impedes or adversely modifies the flow conveyance capacity of the channel and/or regulatory floodplain of a watercourse.

A. An equal degree of encroachment is the standard applied to the evaluation of the effect of an encroachment within the regulatory floodplain with respect to the degree in which flood water heights or flow velocities may be changed as a result of the encroachment and assumes that all property owners on both sides of the watercourse are provided with an equal right to encroach to the same degree within that reach of the watercourse and modify the flow capacity within the floodplain including increasing the flood height or flow velocity.
B. Since the factors affecting hydraulic efficiency are usually not uniform within a reach, this standard may not result in equally measured distances between floodway limit lines and the regulatory floodplain boundaries of a watercourse. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.230
Erosion
"Erosion" means the physical process where flowing flood water removes sediment and earthen material causing the banks and beds of stream channels to wear away and degrade over time. (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.240
Erosion hazard area.
"Erosion hazard area" means the lands adjoining a watercourse regulated by this title that are deemed by the Chief Engineer to be subject to flood-related erosion losses. (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.250
Exemption.
"Exemption" to this title means that a federal, state and/or local law has identified a land use, construction activity, and/or other action as allowed and immune to local regulations. Exempted uses shall not be affected or prohibited by the provisions of this title including those exempted land uses as provided for in A.R.S. Section 11-830 and 48-3609 as identified in Section 16.12 of this title. (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.260
Flood Control District Advisory Committee.
"Flood Control District Advisory Committee" means the technical committee established by resolution of the Board, to act as an advisory committee to the Board on technical floodplain management and District issues. (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.270
Flood Insurance Study.
"Flood Insurance Study" means an engineering study conducted through FEMA to identify certain flood hazard areas in an engineering study. For Pima County, the flood insurance study is a report entitled, "The Flood Insurance Study for the Unincorporated Areas of Pima County, Arizona," dated February 15, 1983, with accompanying FIRMs and flood boundary and floodway maps. This flood insurance study includes its accompanying maps along with all subsequent amendments by the federal government to the flood insurance study. (Ord. 2005-FC2 § 2 (part), 2005)

16.08.280
Flood or floodwater.
"Flood" or "floodwater" means a temporary rise in water level including groundwater or overflow of water onto lands not normally covered by water. (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.290
Floodplain.
"Floodplain" means any areas within a watercourse which have been or may be covered partially or wholly by flood waters from the base flood including land that have been, or may be, subject to flooding from storm water runoff, overflow of flood waters from a watercourse, alluvial fans, sheet flood zones, or other property subject to flooding. The floodplain includes the stream channel, the floodway, and the floodway fringe area. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005)

16.08.300
Floodplain Administrator.
"Floodplain Administrator" means the Chief Engineer or authorized representative of the District appointed by the Chief Engineer, who is also a registered civil engineer in the state of Arizona, whose duty is to oversee administration and enforcement of the floodplain management regulations contained within this ordinance as required by the NFIP. (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.310
Floodplain management.
"Floodplain management" means the operation of an integrated natural resource management program, encompassing corrective and preventive measures for reducing flood and erosion damage. Floodplain management includes, but is not limited to, emergency preparedness planning, flood control works and floodplain management regulations. (Ord. 1999 FC-1 § 1 (part) 999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.320
Floodplain management regulations.
"Floodplain management regulations" means the codes, ordinances and other regulations relating to the use of land and construction within the regulatory floodplain, including zoning ordinances,

subdivision regulations, building codes, housing codes, setback requirements, open area regulations and similar methods of control affecting the use and development of these areas. (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.330
Floodplain use permit.
"Floodplain use permit" means an official document that authorizes specific activity within a regulatory floodplain, riparian habitat, or erosion hazard area. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.340
Flood proofing.
"Flood proofing" means provisions, changes or adjustments primarily for the purpose of reducing or eliminating flood damages to property and improvements subject to flooding. (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.350
Floodway area.
"Floodway area" means that portion of the floodplain which must be preserved in order to maintain the flood carrying capacity of the base flood. Floodway areas regulated by this title include:

A. Federal floodway areas as delineated by FEMA;
B. Administrative floodways for major watercourses with a base flood peak discharge of 2,000 cfs or more as determined through engineering analyses using ADWR standards or other applicable engineering method.
    1. Administrative floodway areas include the primary channel of the watercourse and any adjacent land areas that are necessary to convey the base flood without cumulatively increasing the water-surface elevation more than 1 foot above the base flood elevation under normal flow conditions;
    2. In addition, when geologic features confine the flow of a watercourse the following additional areas shall be considered floodway areas:
        a. Areas necessary to convey the base flood without increasing the water surface elevation more than a tenth (0.1) of a foot above the base flood elevation under normal flow conditions,
        b. Areas of frequent inundation as defined by the 4% annual chance (25-year) flood,
        c. Areas with excessive flow depths and velocities (dv^2), as defined in 16.26.050.G, and
        d. Active flow paths and channels based on the presence of unconsolidated alluvium related to fluvial processes and the potential for the flow paths to meander over time.
    3. A watercourse can be considered confined when the ratio of the wetted top-widths of the floodplains associated with the base flood and the 25-year flood is 1.25 or less and the height of the geologic features are at least 1.5 times the hydraulic depth of the base flood. The watercourse shall be considered confined through all reaches where this criteria is present both upstream and downstream of the subject area.
C. The primary channel of all regulatory minor watercourses with a base flood peak discharge of less than 2,000 cfs; (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1998 FC-1 Section 1, 1998; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.360
Floodway fringe area.
"Floodway fringe area" is a term used by FEMA to designate the floodplain area lying outside the floodway, but within the regulatory floodplain. For the purposes of this title, the floodway fringe area is also the regulatory floodplain wherever a floodway has not been defined for a regulatory watercourse. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.370
Geologic floodplain.
"Geologic floodplain" means those lands adjacent to a watercourse that have been subject to fluvial processes during the Holocene epoch (i.e., approximately the past 10,000 years). The geologic floodplain may be different from the regulatory floodplain. (Ord. 2010 FC-1; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.380
Habitat mitigation.
"Habitat mitigation" for purposes of Chapter 16.30 of the Pima County Code means providing a new riparian habitat of similar quality to that which was removed as a result of physical improvements or development to a piece of property located within floodplain, an erosion hazard area, or riparian habitat regulated by this ordinance. (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.390
Hardship.
Hardship means, for the purposes of approving variances of regulation under the NFIP, the exceptional hardship which would result from a failure to grant the requested variance. The governing body requires that the variance be exceptional, unusual and peculiar to the property involved. Mere economic or financial hardship alone is not exceptional. Inconvenience, aesthetic considerations, physical disabilities, personal preferences or the disapproval of one's neighbors likewise cannot, as a rule, qualify as an exceptional hardship. All of these problems can be resolved through other means without granting a variance, even if the alternative is more expensive, or requires the property owner to build elsewhere or put the parcel to a different use than originally intended. (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.400
Highest adjacent grade.
"Highest adjacent grade" means the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure. (Ord. 2005-FC2 § 2 (part), 2005)

16.08.410
Historic structure.
"Historic structure" means a building:

A. Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior (Secretary) as meeting the requirements for individual listing on the National Register;

B. Certified or preliminarily determined by the Secretary as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
C. Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary; or
D. Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either by an approved state program as determined by the Secretary; or directly by the Secretary in states without approved programs. (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.420
Hydroriparian.
"Hydroriparian" for purposes of this title, means riparian habitat designated as hydroriparian on maps adopted by the Board. These riparian habitats are generally associated with perennial watercourses and/or springs. Plant communities are dominated by obligate or preferential wetland plant species such as willow and cottonwood. (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.430
Important Riparian Area.
"Important Riparian Area," for purposes of this title, means riparian areas designated as Important Riparian Areas on maps adopted by the Board for their hydrologic, geomorphic, and biological values. These areas provide a critical function for landscape linkage and connectivity with other habitats and provide biological corridors. Important Riparian Areas include hydroriparian, mesoriparian, and xeroriparian class A, B, C, and D habitat areas. (Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1994 FC-2 (part), 1994: Ord. 1988 FC-2 Art. 10 (B), 1988)

16.08.440
Levee.
"Levee" means a manmade structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices for the purpose of controlling, or diverting the flow of water so as to provide protection from temporary flooding. (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.450
Lowest floor.
"Lowest floor" means the floor of the lowest enclosed area of any structure. This includes any part of the structure having a basement, a floor sub-grade below ground level and crawl spaces under manufactured housing, which are considered to be the lowest finished floor if they are not vented and constructed of flood resistant materials to the regulatory flood elevation. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.460
Manufactured home.

"Manufactured home" means a structure transportable in one or more sections, which is built on a permanent chassis and designed to be used with or without a permanent foundation when connected to the required utilities. Manufactured home construction, installment standards, and placement within floodplains are regulated under A.R.S. in Title 41, Chapter 21, Article 2, Office of Manufactured Housing. For floodplain management purposes, the term manufactured home also includes mobile homes, park trailers, travel trailers, recreational vehicles, and other similar vehicles placed on a site for more than 180 consecutive days. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.470
Manufactured home park or subdivision.
"Manufactured home park or subdivision" means a parcel or contiguous parcels of land divided into four or more manufactured home lots for sale or rent. (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988FC-2 Art. 4 (part), 1988)

16.08.480
Market value.
"Market value" means the determination of the estimated cost to replace the structure in new condition and adjusting that cost figure by the amount of depreciation that has accrued since the structure was constructed. The cost of replacement of the structure shall be based on a square foot cost factor determined by reference to a building cost estimating guide recognized by the building construction industry. The amount of depreciation shall be determined by taking into account the age and physical deterioration of the structure and functional obsolescence as approved by the floodplain administrator, but shall not include economic or other forms of external obsolescence. Use of replacement costs or accrued depreciation factors different from those contained in recognized building cost estimating guides may be considered only if such factors are included in a report prepared by an independent professional appraiser and supported by a written explanation of the differences. (Ord. 2005-FC2 § 2 (part), 2005)

16.08.490
Mean sea level.
"Mean sea level," for purposes of the NFIP, means the National Geodetic Vertical Datum (NGVD) of 1929 or other datum to which base flood elevations are referenced, as shown on a community's FIRM. (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.500
Mesoriparian.
"Mesoriparian" for purposes of this title, means riparian habitat designated as mesoriparian on maps adopted by the Board. These riparian habitats generally are associated with perennial or intermittent watercourses or shallow groundwater. Plant communities may be dominated by species that are also found in drier habitats (e.g., mesquite), but contain some preferential riparian plant species such as ash or netleaf hackberry. (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.510
Mining reclamation plan.

"Mining reclamation plan" means a plan for sand and gravel operations that defines hydrologic and hydraulic constraints; outlines methods of extraction, operation and site development; and provides procedures for final site reclamation pursuant to the Arizona Aggregate Mined Land Reclamation Act in Title 27 of the Arizona Revised Statutes (A.R.S. §27-1201, et seq.). (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.520
New construction.
"New construction" means structures and any subsequent improvements to such structures for which the "start of construction" commenced on or after the effective date of adoption of:
A. An initial FIRM or after December 31, 1974, whichever is later, within federally regulated flood hazard zones.
B. This title for floodplain management regulations including regulation of erosion and riparian habitat as provided herein. (Ord. 2010 FC-1)

16.08.530
Nonconforming use.
“Nonconforming use” means an existing legal use that does not comply with this Title and was either:
A. Constructed prior to December 16, 1974, which predates the requirement for written authorization for development within a floodplain, or
B. Constructed on or after December 16, 1974, in compliance with the terms and conditions of the written authorization in effect at the time of construction. (Ord. 2010 FC-1)

16.08.540
Obstruction.
"Obstruction" means any physical alteration within, to, along, across or projecting into any watercourse that may impede, retard, or change the direction of the flow of water, either in itself or by catching or collecting debris carried by such water, or that is placed where a flow of water might carry the same downstream. Examples include, but are not limited to, the following: Any dam, wall, embankment, levee, dike, pile, abutment, projection, excavation, channel rectification, bridge, conduit, culvert, building, wire, fence, rock, gravel, refuse, fill, structure or vegetation. (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.550
Person.
"Person" means any individual, the individual's agent, a firm, partnership, association, or corporation or an agent of the aforementioned groups, this state or its political subdivision thereof. (Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.560
Pima County.
"Pima County" means the political subdivision established by Title 11, Chapter 1 of the A.R.S. and from this point forward is referred to as the County. (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.570
Reach.
"Reach" is a hydraulic engineering term used to describe longitudinal segments of a stream or watercourse. In an urban area, an example of a reach would be the segment of a watercourse located between two consecutive bridge crossings. (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)
16.08.580

Reasonable repair.
"Reasonable repair" means those activities necessary in order to facilitate continuation or improvement of an existing legal use. Reasonable repair is considered to occur when the first alteration commences for any wall, ceiling, floor or other structural part of the building whether or not that alteration affects the exterior dimensions of the structure. (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.590
Regulatory flood elevation.
"Regulatory flood elevation" means the elevation that is 1 foot above the calculated water-surface elevation of the base flood. (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.600
Regulatory floodplain or floodprone area.
"Regulatory floodplain or floodprone area" means that portion of the geologic floodplain associated with a watercourse, including its channel, or any other floodplain or floodprone area that would be inundated by the base flood, including all base floods where the base flood peak discharge is 100 cfs or greater, those areas that are subject to sheet flooding except when the maximum potential contributing watershed area is less than 20 acres, those areas identified on subdivision plats or development plans, those areas designated by FEMA, including areas designated as Shaded Zone X as well as those areas that the Chief Engineer, using the best available data, has determined is subject to a flood hazard during the base flood. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.610
Retention system.
"Retention system" means a type of flood control system that stops the downstream progress of flood waters by employing methods of total containment. (Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC2 Art. 4 (part), 1988)

16.08.620
Riparian habitat.
"Riparian habitat," for purposes of this title, means riparian habitat designated as riparian on maps adopted by the Board. These habitats are generally characterized by vegetation that is different in plant species composition or an increase in the size and/or density of vegetation as compared to upland areas occurring in association with any regulatory floodplain and stream

channel where waters flow at least periodically in a channel or as dispersed flow, or other features associated with a floodplain such as a spring, cienega, lake, watercourse, river, stream, creek, wash, arroyo, or other surface body of water. (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.630
Setback.
"Setback" means the minimum horizontal distance between a structure and a watercourse. On each side of a watercourse, the setback is measured from the top edge of the channel bank, the top edge of the closest channel or braid when multiple channels or braids exist, or the edge of the regulatory floodway, whichever is most representative of the erosion hazard. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.640
Sheet flooding area.
"Sheet flooding area" means the area which may be subject to flooding with depths of one foot or less during the base flood even though a clearly defined channel does not exist and the path of the flooding is often unpredictable and indeterminate. Sheet flooding areas include:

A. FEMA designated Shaded Zone X when the designation refers to areas subject to a depth of flow of 1 foot or less during the base flood; and
B. Areas that the Chief Engineer, using the best available data, has determined are subject to sheet flooding during the base flood. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.650
Special Flood Hazard Area.
"Special Flood Hazard Area" means an area designated by FEMA as having a special flood hazard, and that is land subject to a 1 percent or greater chance of flooding in any given year, and from this point forward abbreviated as SFHA. An SFHA may be designated as a Zone A, AO, AH, AE, A 1-30, A99.

A. Zone A, no base flood elevation has been determined;
B. Zone AE, the base flood elevation has been determined;
C. Zone AH, flood depths of 1 to 3 feet in areas that are usually areas of ponding with the base flood elevations determined;
D. Zone AO, flood depths of 1 to 3 feet in areas usually subject to sheet flow with the average depths determined. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005)

16.08.660
Start of construction.
"Start of construction" means the date the building permit was issued, for purposes of determining exemptions to Title 16 under Section 16.12.010, provided the actual commencement of physical construction activities occurs within 180 calendar days of the permit date. This applies to building permits for a new building or the substantial improvement of an existing building, including the actual commencement of construction, repair, reconstruction, rehabilitation, addition, placement or other improvement. The actual start means the first placement of permanent construction of a structure on a site, such as the pouring of slab or

footings, the installation of piles, the construction of columns or any work beyond the stage of excavation including those improvements intended for the placement of a manufactured home. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor or other structural part of a building, whether or not that alteration affects the external dimensions of the building. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005)

16.08.670
Structure.
"Structure" means any walled and roofed building that is principally above ground; this includes a gas or liquid storage tank or a manufactured home. Habitable structures are those structures intended for human occupation, whether utilized on a full or part-time basis, as defined under County Code, Title 15, Building Codes. For purposes of this title, a private drainage improvement is considered a structure. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.680
Substantial damage.
"Substantial damage" means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. This term also applies to structures which have incurred repetitive loss or damage where the cumulative total of the loss or damage equals or exceeds 50 percent of the structure’s market value regardless of the actual repair work performed. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005)

16.08.690
Substantial improvement.
"Substantial improvement" means any reconstruction, rehabilitation, addition or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement as determined by:

A. The latest assessment rolls of the County Assessor before the improvement or repair is started, or
B. The market value as determined by estimating the cost to replace the structure in new condition and adjusting that cost figure by the amount of depreciation that has accrued since the structure was constructed. The cost of replacement of the structure shall be based on a square foot cost factor determined by reference to a building cost estimating guide recognized by the building construction industry. The amount of depreciation shall be determined by taking into account the age and physical deterioration of the structure and functional obsolescence as approved by the floodplain administrator, but shall not include economic or other forms of external obsolescence. Use of replacement costs or accrued depreciation factors different from those contained in recognized building cost estimating guides may be considered only if such factors are included in a report prepared by an independent professional appraiser and supported by a written explanation of the differences.
C. This term includes structures which have incurred Substantial damage regardless of the actual repair work performed.
D. The term does not, however, include either:

1. Any project for improvement of a structure to correct existing violations of state or local health, sanitary or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions; or,
2. Any alteration of a "historic structure," provided that the alteration would not preclude the structure's continued designation as a "historic structure." (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005)

16.08.700
Technical Review Committee.
"Technical Review Committee" means the Flood Control District Advisory Committee that, when requested by the Board, provides review of technical matters concerning interpretation and enforcement of this title. (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.710
Variance.
"Variance" means to have the Board grant relief from the requirements of this title that would allow construction in a manner that would otherwise be prohibited by this title including:

A. Variances of adopted Special Flood Hazard Areas as designated by FEMA. Such variances shall conform to the variance requirements of the National Flood Insurance Program as provided for within 44 CFR 66 and A.R.S. 48-3609 and as provided for in Chapter 16.56 of this Title.
B. Variances to adopted District regulations as provided by this title. Such variances shall conform to the variance requirements provided in Chapter 16.56 of this title. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.720
Violation.
"Violation" means the failure of a structure or other development to be fully compliant with the District's floodplain management regulations. A structure or other development without the elevation certificate, other certifications or other evidence of compliance required in this ordinance is presumed to be in violation until such time as that documentation is provided. (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.730
Waiver by the Chief Engineer.
"Waiver by the Chief Engineer" means to modify or substitute one technical requirements or standard for another where provisions in this title allow the Chief Engineer to exercise technical judgment in establishing permit requirements, for example, waiving erosion setback requirements based on geotechnical evidence. (Ord. 2005-FC2 § 2 (part), 2005)

16.08.740
Watercourse.
"Watercourse" means any lake, river, stream, creek, wash, arroyo, or other body of water or channel having banks and a bed through which waters flow at least periodically. The watercourse

includes the streambed, channel banks, floodway and floodway fringe areas, and areas subject to sheet flooding. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005); Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 4 (part), 1988)

16.08.750

Watercourse master plan.

"Watercourse master plan" means a master plan adopted by the District Board that provides uniform but separate rules for watercourses where a higher level of protection is warranted for public safety or to preserve the integrity of the watercourse as provided for in A. R. S. Section 48-3609-01. (Ord. 2005 FC-2 § 2 (part), 2005)

16.08.760

Watershed.

"Watershed" means the contributing drainage area located upstream of a specific point along a watercourse. (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art.4 (part), 1988)

16.08.770

Written Finding by the Chief Engineer.

“Written Finding by the Chief Engineer” means a written determination issued by the Chief Engineer after consideration of technical facts and the provisions of this Title concerning the conditions or denial of a floodplain use permit or a boundary determination of a regulatory floodplain, floodway, erosion hazard area or riparian habitat. (Ord. 2010 FC-1)

16.08.780

Xeroriparian.

"Xeroriparian" for purposes of this title, means riparian habitat designated as xeroriparian on maps adopted by the Board. These riparian habitats are generally associated with an ephemeral water supply. These communities typically contain plant species also found in upland habitats; however, these plants are typically larger and/or occur at higher densities than adjacent uplands. (Ord. 2005 FC-2 § 2 (part), 2005)

Chapter 16.26

FLOODWAY FRINGE AREA REQUIREMENTS

Sections:

16.26.010
Uses allowed.
Any use, to the extent not prohibited by this title or any other title or law, is allowed within the floodway fringe area, (Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 9 (A), 1988)

16.26.020
Conditions applicable to all uses.

A. The following general conditions, as set out in Sections 16.26.030 through 16.26.070, shall apply to all uses within the floodway fringe area and, for purposes of this chapter, other regulatory floodplain areas where a floodway has not been defined or delineated including but not limited to A, AO, AE, AH, A1-30 and Shaded X Zones as provided on adopted FIRMs, or those regulatory floodplain areas defined by this title.
B. No development, storage of materials or equipment, or other uses shall be permitted which, acting alone or in combination with existing or future uses, create a danger or hazard to life or property.
C. No encroachment may increase the base flood level more than one tenth (0.1) of a foot or increase flood velocities more than 10% or 1 fps, whichever is less, at any property line, except when it can be demonstrated that the post-development velocity is not an erosive velocity. The velocity subject to this standard may be the overbank velocity, the channel velocity, or both, as appropriate based on the type of development and its location within the floodplain.
D. Consideration of the effects of a proposed use or development shall be based on the assumption that there will be an equal degree of encroachment extending for a significant reach on both sides of the watercourse. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 9 (B) (part), 1988)

16.26.030
Elevation and flood proofing.

A. New construction and substantial improvement of any habitable structure, either residential or nonresidential, shall have the lowest floor, including the basement, or in the case of manufactured housing the lowest structural member, elevated at or above the regulatory flood elevation, which is one foot above the base flood elevation. Certification of elevation shall be required pursuant to Section 16.20.070.
B. New construction and substantial improvement of any habitable structure, either residential or nonresidential, in a numbered AO Zone (AO1, AO2, AO3, etc.) shall have the lowest floor, including basement, or in the case of manufactured housing the lowest structural member, elevated above highest adjacent natural grade at least one foot higher than the depth designated by the numbered zone on the FIRM, or at least two feet above highest adjacent natural grade if no depth number is specified. Certification of elevation shall be required pursuant to 16.20.070.
C. In sheet flooding or ponding areas, such as Zones AO and AH, require drainage paths around structures on slopes to guide water away from structures.
D. Non-residential, non-habitable structures shall either be elevated in conformance with subsections A. and B., or together with attendant utility and sanitary facilities:
   1. Be flood proofed so that below the regulatory flood elevation the structure is watertight with walls substantially impermeable to the passage of water;
   2. Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and
   3. Be certified by an Arizona registered engineer or architect that the standards of this subsection are satisfied. Such certifications shall be provided to the Floodplain Administrator on a form approved by the District.
E. All new construction and substantial improvements with fully enclosed areas below the regulatory flood elevation that are useable solely for parking of vehicles, building access or limited storage in an area other than a basement and which are subject to flooding shall be constructed of flood resistant materials to the regulatory flood elevation, have all service facilities elevated at or above the regulatory flood elevation, and be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of flood waters. Designs for meeting this requirement must either be certified by an Arizona registered civil engineer or architect or meet or exceed the following minimum criteria:
   1. A minimum of two openings on different sides of each enclosed area that have a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided;
   2. The bottom of all openings shall be no higher than one foot above grade; and
   3. Openings may be equipped with screens, louvers, valves or other coverings or devices provided that they permit the automatic entry and exit of flood waters.
F. Manufactured homes shall meet the above standards and also the standards in 16.34. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005)

16.26.040
Fill and fill materials.

A. Any fill proposed to be deposited in the floodway fringe area must be shown to have some beneficial purpose, and the amount thereof shall not be greater than is needed to achieve that purpose, as demonstrated by a plan submitted by the owner showing the uses to which the filled land will be put and the final dimensions of the proposed fill or other materials.

B. Such fill or other materials shall be protected against erosion by a method approved by the District including riprap, vegetative cover, bulk-heading, or other approved methods, unless a study, prepared by an Arizona registered civil engineer, demonstrates that erosion protection is not required.

C. If the permittee proposes to remove a structure or a portion of the property from a FEMA floodplain through the LOMR-F process, the permittee shall provide evidence the fill was adequately compacted by submitting the results of compaction testing certified by an Arizona registered engineer. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 9 (B) (1), 1988)

16.26.050

Structures - Construction restrictions.

A. Structures, residential and nonresidential, shall be constructed so as to offer the minimum obstruction to the flow of flood waters. Wherever possible, structures shall be constructed with the same alignment as the direction of flood flow; and so far as practicable, shall be placed approximately on the same alignment as those of adjoining structures.

B. All structures, residential and nonresidential, shall be firmly anchored to prevent flotation, collapse or lateral movement which might otherwise result in damage to other structures or restriction of bridge openings and other narrow sections of the watercourse. Anchoring for manufactured housing will be in conformance with state standards as established by the Office of Manufactured Housing under A. R. S. Title 41, Chapter 16, Article 2.

C. Service facilities such as electrical and heating equipment shall be constructed at or above the regulatory flood elevation for the particular area, or, in the case of nonresidential structures, be adequately flood proofed.

D. Any structure designed or utilized for human habitation, whether residential or nonresidential, that is used on a full-time or part-time basis shall have the lowest floor elevated at or above the regulatory flood elevation. Certification of elevation is required pursuant to Section 16.20.070.

E. Non-habitable, enclosed areas within the regulatory floodplain and below the regulatory flood elevation shall be designed in accordance with 16.26.030.E.

F. If fill is used to elevate any structure, the minimum elevation of the fill shall be at or above the base flood elevation, shall extend at such elevation for a distance of at least 10 feet beyond the outside limit of the structure, and shall be adequately protected from erosion pursuant to Section 16.26.040.B unless a study or analysis prepared by an Arizona registered civil engineer demonstrates that a lesser distance or the absence of erosion protection is acceptable.

G. Structures, residential or nonresidential, designed or utilized for human habitation, whether on a full-time or part-time basis, and which will be completely surrounded by floodwaters during the base flood shall only be permitted when:

   1. The product of the flow depth (d), in feet, times the square of the flow velocity (v), in feet per second, of the flood waters of the base flood does not exceed the numerical value of 18 for a period in excess of 30 minutes at any point adjacent to the structure and associated improvements, including fill, and
   2. The flood waters of the base flood do not exceed 3 feet in depth at any point adjacent to the structure and associated improvements, including fill.

3. For purposes of this section, depth and velocity shall be post development values and shall be calculated as follows:
   a. When flow distribution information is available, it shall be used to provide the most representative values for flood depth and velocity.
   b. When approximate information is available, average depths and velocities may be used. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; 1998 FC-1 Section 2, 1998; Ord.1988 FC-2 Art. 9 (B) (2), 1988)

16.26.055
Critical facilities.

A. Critical facility means any of the following:
   1. A structure or facility that produces, uses or stores highly volatile, flammable, explosive, toxic, and/or water reactive materials;
   2. Hospitals, emergency medical facilities, nursing homes and/or housing facilities likely to have occupants who may not be sufficiently mobile to avoid injury or death during a flood;
   3. Essential emergency response facilities, such as police stations, fire stations, emergency shelters and/or operation centers that are needed for public safety and/or flood response activities before, during and after a flood; and
   4. Public and private utility facilities, such as, but not limited to power, water and wastewater treatment, and/or communications, that are vital to maintaining or restoring normal services to flooded areas before, during and after a flood.
B. Applicability. The critical facility requirements shall only apply along watercourses which have FEMA designated floodplains. Where the 0.2 percent chance floodplain has not been established, the Chief Engineer may require that this floodplain be delineated by the applicant.
C. Critical facilities shall be located outside of the 0.2 percent annual chance (500-year) floodplain, if possible. If a critical facility must be located in a 0.2 percent annual chance (500-year) floodplain, it must be demonstrated that there is either a critical need to locate it within the floodplain, or that there is not a suitable alternative site, as justified by an Arizona registered civil engineer. Any critical facility located within a 0.2 percent annual chance (500-year) floodplain shall be protected from that event. Protection includes, but is not limited to, elevating the lowest floor and all utilities and mechanical services to a minimum of one foot above the base flood or to the 0.2 percent annual chance (500-year) floodplain water surface elevation, whichever is greater, providing elevated access ramps, if appropriate, adequately protecting the facility from both lateral and vertical erosion associated with the 0.2 percent annual chance (500-year) floodplain, providing all weather access during the base flood and developing an emergency response plan.
D. Existing critical facilities within the 0.2 percent annual chance (500-year) floodplain that propose substantial improvements and/or repairs shall be protected from the 0.2 percent annual chance (500-year) flood event. Protection includes, but is not limited to, elevating or flood proofing the lowest floor and all utilities and mechanical services to a minimum of one foot above the base flood or to the 0.2 percent annual chance (500-year) floodplain water surface elevation, whichever is greater, providing elevated access ramps, if appropriate, adequately protecting the facility from both lateral and vertical erosion associated with the

0.2 percent annual chance (500-year) floodplain, providing all weather access to the base flood and developing an emergency response plan.

16.26.060

Storage of materials and equipment.

A. The storage and/or processing of materials that are buoyant, flammable, explosive, hazardous, or that could be injurious to human, animal, or plant life in times of flooding is prohibited.

B. Storage of other material or equipment may be allowed if it is not subject to major damage by floods and is firmly anchored to prevent flotation or is readily removable from the area within the limited time available after flood warning. (Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999-FC-1 §§ 1 (part) 1999; Ord. 1988-FC2 Art. 9 (B) (3), 1988)

16.26.070

Utilities and sanitary facilities.

A. Water supply, water treatment, and sewage collection and disposal systems built in a regulatory floodplain or erosion hazard area shall be designed to prevent or minimize infiltration of flood waters into these systems and to prevent the discharge of materials from these systems into flood waters.

B. On-site sanitary waste disposal systems shall be located or designed to avoid impairment to them or contamination from them during flooding.

C. Other utilities, such as gas pipelines, fuel pipelines, and non-potable waterlines shall be designed and constructed to ensure they are not impaired during the base flood, including the potential for long term scour. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 9 (B) (4), 1988)

16.26.080

Public right-of-way.

Any proposed development, disturbance, or grading within public right-of-way that is located in a floodway fringe shall require a floodplain use permit pursuant to this title. All provisions of this title shall apply to such activities. No uses shall be permitted which the Chief Engineer determines would adversely affect the function of the public right-of-way, floodplain, or riparian habitat. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005)

16.26.090

Floodway fringe appeals and variances.

A. Appeals. Any applicant requesting an appeal of a written finding of the Chief Engineer regarding the conditions of or denial of a permit or to delineate a floodplain may appeal to the Board as provided for in Chapter 16.56 of this title.

B. Variance. Any property owner requesting a variance shall request a variance of the Board through the Chief Engineer as provided for in Chapter 16.56 of this title. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005)

Chapter 16.28

EROSION HAZARD AREAS AND BUILDING SETBACKS

Sections:

16.28.010
Building setback requirements.

In erosion hazard areas where watercourses are subject to flow-related erosion hazards, building setbacks are required from the primary channel or channels as set forth in Sections 16.28.020 and 16.28.030. (Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 12 (part), 1988)

16.28.020
Setbacks near major watercourses.

For major watercourses with base flood peak discharges of 2,000 cfs or greater, the following building setbacks shall be required where approved bank protection is not provided:

A. Along the following major natural watercourses, where no unusual conditions exist, a minimum (default) building setback shall be provided at the time of the development, unless an alternative setback is determined by an engineering analysis, prepared by an Arizona registered civil engineer, based on ADWR standards or other applicable engineering methods, which establishes acceptable safe limits for the development and is approved by the Chief Engineer.

B. Along natural channels where no unusual conditions exist (such as a pronounced channel curvature), the default building setback for erosion hazard protection shall be:

1. A distance of 500 feet along the Santa Cruz River, Rillito Creek, Pantano Wash, Tanque Verde Creek, San Pedro River, and the Canada del Oro Wash;
2. A distance of 250 feet along major watercourses with base flood peak discharges greater than 10,000 cfs;
3. A distance of 100 feet along all major watercourses with base flood peak discharges of 10,000 cfs or less, but more than 5,000 cfs; and
4. A distance of 75 feet along all other major watercourses with base flood peak discharges of 5,000 cfs or less, but more than or equal to 2,000 cfs.

C. Along major natural watercourses where unusual conditions do exist that may increase or decrease the required erosion hazard setback, building setbacks shall be established on a case-by-case basis by the Chief Engineer using the standard adopted by the ADWR or other applicable engineering methods which establish safe limits for the development. Unusual conditions include but are not limited to historical meandering of the watercourse, large excavation pits, poorly defined or poorly consolidated banks, natural channel armoring, proximity to stabilized structures such as bridges or rock outcrops, and changes in the direction, amount and velocity of the flow of waters within the watercourse.

D. When determining building setback requirements, the Chief Engineer shall consider the danger to life and property due to existing flood heights or velocities and historical channel meandering.

E. For constructed channels, structural bank protection to prevent erosion is required for major watercourses with base flood peak discharges of more than 2,000 cfs unless a written waiver of the requirement is granted by the Chief Engineer. A waiver of the requirement for structural bank protection may be granted based on an acceptable engineering study, which has been prepared and sealed by an Arizona registered civil engineer, demonstrating an appropriate building setback for an earthen channel, based on soil and natural flow conditions. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999 FC-1 § 1 (part), 1999; Ord. 1988 FC-2 Art. 12 (A), 1988).

16.28.030
Setbacks from minor washes.

A. For minor natural washes with a base flood peak discharge of less than 2,000 cfs, the following building setbacks shall be required:
   1. A distance of 50 feet for watercourses with base flood peak discharges of less than 2,000 cfs, but more than 500 cfs;
   2. A distance of 25 feet for watercourses with base flood peak discharges of 500 cfs to 100 cfs;
   3. Alternative safe limits for erosion setbacks approved in writing by the Chief Engineer based on an acceptable engineering study prepared and sealed by an Arizona registered civil engineer. However, at no time shall a setback of less than 25 feet from the top of channel bank be permitted in order to provide for reasonable access and stability of nearby structure foundations, except as allowed pursuant to subpart B of this provision.

B. Along minor natural washes where unusual conditions exist, building setbacks shall be established on a case-by-case basis by the Chief Engineer, using ADWR standards or other applicable engineering methods or an acceptable engineering study is prepared and sealed by an Arizona registered civil engineer and approved by the Chief Engineer. When determining building setback requirements, the Chief Engineer shall consider danger to life and property due to existing flood heights or velocities and historical channel meandering. Unusual conditions include but are not limited to historical meandering of the watercourse, large excavation pits, poorly defined or poorly consolidated banks, natural channel armoring, proximity to stabilized structures such as bridges or rock outcrops, and changes in the direction, amount, and velocity of flow of the waters in the watercourse.

C. For constructed channels, channel banks are required to be stabilized to prevent erosion along minor watercourses with base flood peak discharges of less than 2,000 cfs, but greater than 500 cfs. Stabilization is required unless a waiver to the requirement is granted by the Chief Engineer based on an engineering study prepared and sealed by an Arizona registered civil engineer which demonstrates an appropriate building setback for an earthen channel, based on soil and natural flow conditions. For constructed channels with a base flood peak discharge of less than 500 cfs, channel stabilization may be required based on engineering analysis and assessment of soil conditions and flow velocities. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005; Ord. 1999-FC-1 §§ 1 (part) 1999; Ord. 1988-FC2 Art. 12 (B), 1988)

16.28.040
Appeals and variances.

A. Appeals. Any applicant disputing a written finding of the Chief Engineer denying a permit or delineating an erosion hazard setback may appeal to the Board as provided in Chapter 16.56 of this title.
B. Variances. Any property owner requesting a variance from the requirements of this Title shall submit a request for a variance to the Board through the Chief Engineer as provided in Chapter 16.56 of this title. (Ord. 2010 FC-1; Ord. 2005 FC-2 § 2 (part), 2005)

SECTION 2. The various Pima County Flood Control District officers and employees are hereby authorized and directed to perform all acts necessary or desirable to give effect to this ordinance.

PASSED AND ADOPTED this 4th day of May, 2010 by the Pima County Flood Control District Board of Directors, Pima County, Arizona.

ATTEST:

Lori Godoshian
Clerk of the Board

BOARD OF DIRECTORS OF THE PIMA COUNTY FLOOD CONTROL DISTRICT

Ramon Valadez, Chairman

RECOMMENDED TO THE BOARD:

Suzanne Shields, Director
Pima County Flood Control District

APPROVED AS TO FORM:

Deputy County Attorney for the District

E.4 – HEC-RAS MODEL (WITH SKYLINE DRIVE CULVERT) INPUT/OUTPUT

```
                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California

            X     X  XXXXXX    XXXX        XXXX       XX      XXXX
            X     X  X        X    X       X   X     X  X    X
            X     X  X        X            X   X    X    X   X
            XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
            X     X  X        X            X  X     X    X        X
            X     X  X        X    X       X   X    X    X        X
            X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

****

PROJECT DATA
Project Title: Finger Rock Wash LOMR - NAVD88
Project File : FRW88.prj
Run Date and Time: 10/14/2010 3:30:42 PM

Project in English units

Project Description:
Finger Rock Wash Floodplain Re-mapping & LOMR

****

PLAN DATA

Plan Title: FRW NAVD88 Model
Plan File : Z:\PROJECTS\27000\27028-PCRFCD-Finger Rock Wash\HecRas\FRW88.P01

```
           Geometry Title: Geometry per NAVD88 topography
           Geometry File : Z:\PROJECTS\27000\27028-PCRFCD-Finger Rock Wash\HecRas\FRW88.G01

           Flow Title    : 100-yr Q per 3-hour HEC-1 storm
           Flow File     : Z:\PROJECTS\27000\27028-PCRFCD-Finger Rock Wash\HecRas\FRW88.F01

Plan Summary Information:
Number of:  Cross Sections =  141    Multiple Openings  =    0
            Culverts       =    5    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =   16

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow
```

****

FLOW DATA

Flow Title: 100-yr Q per 3-hour HEC-1 storm
Flow File : Z:\PROJECTS\27000\27028-PCRFCD-Finger Rock Wash\HecRas\FRW88.F01

Flow Data (cfs)

River	Reach	RS	100-yr
Coronado Split F	Cor Split Reach	0.854	1922
Finger Rock Wash	Main Reach 1	4.800	2324
Finger Rock Wash	Main Reach 2	4.596	5284
Finger Rock Wash	Main Reach 3	4.477	3362
Finger Rock Wash	Main Reach 4	3.656	6162
Finger Rock Wash	Main Reach 4	3.403	6060
Finger Rock Wash	Main Reach 4	2.876	6368
Finger Rock Wash	Main Reach 4	2.125	6114
Finger Rock Wash	Main Reach 4	1.884	5756
Finger Rock Wash	Main Reach 4	0.898	5653

River	Reach			
Finger Rock Wash	Main Reach 4	0.421		5589
Pontatoc Cnyn	Pontatoc Cnyn	0.154		2503

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Finger Rock Wash	Main Reach 4	100-yr		Normal S = 0.015

GEOMETRY DATA

Geometry Title: Geometry per NAVD88 topography
Geometry File : Z:\PROJECTS\27000\27028-PCRFCD-Finger Rock Wash\HecRas\FRW88.G01

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
Coronado Split F	Cor Split Reach	Cor Split	Cor Splt Rtn
Finger Rock Wash	Main Reach 1		FR-9
Finger Rock Wash	Main Reach 2	FR-9	Cor Split
Finger Rock Wash	Main Reach 3	Cor Split	Cor Splt Rtn
Finger Rock Wash	Main Reach 4	Cor Splt Rtn	
Pontatoc Cnyn	Pontatoc Cnyn		FR-9

JUNCTION INFORMATION

Name: FR-9
Description: Pontatoc Cnyn Confluence
Energy computation Method

Length across Junction / Tributary

River	Reach		River	Reach	Length	Angle
Pontatoc Cnyn	Pontatoc Cnyn	to	Finger Rock Wash	Main Reach 2	168	
Finger Rock Wash	Main Reach 1	to	Finger Rock Wash	Main Reach 2	252	

Name: Cor Split
Description: Flow split in Lft overbank at Coronado Dr
Energy computation Method

Length across Junction / Tributary

River	Reach		River	Reach	Length	Angle
Finger Rock Wash	Main Reach 2	to	Finger Rock Wash	Main Reach 3	78	
Finger Rock Wash	Main Reach 2	to	Coronado Split F	Cor Split Reach	75	

Name: Cor Splt Rtn
Description: Return of Coronado Split Flow
Energy computation Method

Length across Junction / Tributary

River	Reach		River	Reach	Length	Angle
Finger Rock Wash	Main Reach 3	to	Finger Rock Wash	Main Reach 4	480	
Coronado Split F	Cor Split Reach	to	Finger Rock Wash	Main Reach 4	480	

CROSS SECTION

RIVER: Coronado Split F
REACH: Cor Split Reach   RS: 0.854

INPUT
Description: Main chnl x-sect 4.477, Sect downstream of Jct Cor Split
Station Elevation Data   num=   15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2980	1008	2976	1036	2974	1049	2972	1057	2970.8
1070	2970.8	1091	2970.1	1093	2970	1104	2968	1108	2967.8
1115	2968	1124	2970	1153	2972	1176	2974	1221	2984

Manning's n Values   num=   6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1000	.083	1049	.03	1091	.061	1124	.083	1153	.03
1176	.083								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1049	1091	34	34	36	.1	.3

```
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1093    1221    2980       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2976.49  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.84  * Wt. n-Val.            *   0.083  *   0.030  *   0.061  *
* W.S. Elev (ft)         * 2974.65  * Reach Len. (ft)       *   34.00  *   34.00  *   36.00  *
* Crit W.S. (ft)         * 2974.65  * Flow Area (sq ft)     *   24.39  *  164.21  *    9.20  *
* E.G. Slope (ft/ft)     *0.008195  * Area (sq ft)          *   24.39  *  164.21  *  341.13  *
* Q Total (cfs)          * 1922.44  * Flow (cfs)            *   42.00  * 1824.39  *   56.05  *
* Top Width (ft)         *  152.01  * Top Width (ft)        *   22.09  *   42.00  *   87.92  *
* Vel Total (ft/s)       *    9.72  * Avg. Vel. (ft/s)      *    1.72  *   11.11  *    6.09  *
* Max Chl Dpth (ft)      *    6.85  * Hydr. Depth (ft)      *    1.10  *    3.91  *    4.60  *
* Conv. Total (cfs)      * 21236.9  * Conv. (cfs)           *   464.0  * 20153.8  *   619.1  *
* Length Wtd. (ft)       *   34.03  * Wetted Per. (ft)      *   22.26  *   42.10  *    2.00  *
* Min Ch El (ft)         * 2970.10  * Shear (lb/sq ft)      *    0.56  *    2.00  *    2.35  *
* Alpha                  *    1.25  * Stream Power (lb/ft s) *   0.97  *   22.17  *   14.32  *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)  *    0.87  *    7.26  *   77.23  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)        *    0.04  *    6.61  *   13.03  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The 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.

LATERAL STRUCTURE


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.851

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =       5
Weir Coefficient          =       2
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =       3
     Sta    Elev     Sta    Elev     Sta    Elev
***********************************************
       0  2970.1      25    2972      34  2973.5

Weir crest shape                            = Broad Crested


LATERAL STRUCTURE OUTPUT  Profile #100-yr  Lat Struct
*******************************************************************************
* E.G. US. (ft)             * 2976.49  * Weir Sta US (ft)          *    0.00  *
* W.S. US. (ft)             * 2974.65  * Weir Sta DS (ft)          *   34.00  *
* E.G. DS (ft)              * 2974.08  * Min El Weir Flow (ft)     * 2970.10  *
* W.S. DS (ft)              * 2972.70  * Wr Top Wdth (ft)          *   34.00  *
* Q US (cfs)                * 1922.44  * Weir Max Depth (ft)       *    6.39  *
* Q Leaving Total (cfs)     *  162.50  * Weir Avg Depth (ft)       *    4.08  *
* Q DS (cfs)                * 1760.35  * Weir Flow Area (sq ft)    *  138.87  *
* Perc Q Leaving            *    8.43  * Weir Coef                 *   2.000  *
* Q Weir (cfs)              *  162.50  * Weir Submerg              *    0.89  *
* Q Gates (cfs)             *          * Q Gate Group (cfs)        *          *
* Q Culv (cfs)              *    0.00  * Gate Open Ht (ft)         *          *
* Q Lat RC (cfs)            *          * Gate #Open                *          *
*                           *          * Gate Area (sq ft)         *          *
* Q Breach (cfs)            *          * Gate Submerg              *          *
* Breach Avg Velocity (ft/s) *         * Gate Invert (ft)          *          *
* Breach Flow Area (sq ft)  *          * Gate Weir Coef            *          *
*******************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION
```

```
RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.847

INPUT
Description: Main chnl x-sect 4.470
Station Elevation Data    num=      27
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2980    1004    2978    1017    2976    1031    2974    1044    2972
    1053    2970    1063  2968.7    1076  2968.8    1089    2969    1093    2970
    1106    2972    1108    2973    1109  2973.5    1111  2973.5    1112    2973
    1115    2972    1119    2970    1126    2968    1138    2967    1146  2966.2
    1155    2967    1166    2968    1172    2970    1204    2972    1223    2974
    1255    2982    1268    2984

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1053     .03    1093    .083    1111    .061    1204     .03
    1223    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1031    1109               87      90     140             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1111    1268    2980       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2974.08  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.39  * Wt. n-Val.             *          *   0.055  *          *
* W.S. Elev (ft)         * 2972.70  * Reach Len. (ft)        *   87.00  *   90.00  *  140.00  *
* Crit W.S. (ft)         * 2972.70  * Flow Area (sq ft)      *          *  186.31  *          *
* E.G. Slope (ft/ft)     *0.032563  * Area (sq ft)           *          *  186.31  *  335.35  *
* Q Total (cfs)          * 1760.35  * Flow (cfs)             *          * 1760.35  *          *
* Top Width (ft)         *  165.63  * Top Width (ft)         *          *   67.92  *   97.71  *
* Vel Total (ft/s)       *    9.45  * Avg. Vel. (ft/s)       *          *    9.45  *          *
* Max Chl Dpth (ft)      *    6.50  * Hydr. Depth (ft)       *          *    2.74  *          *
* Conv. Total (cfs)      *  9755.2  * Conv. (cfs)            *          *  9755.2  *          *
* Length Wtd. (ft)       *   89.99  * Wetted Per. (ft)       *          *   68.72  *          *
* Min Ch El (ft)         * 2968.70  * Shear (lb/sq ft)       *          *    5.51  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   52.07  *          *
* Frctn Loss (ft)        *    1.87  * Cum Volume (acre-ft)   *    0.86  *    7.12  *   76.95  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    0.03  *    6.57  *   12.95  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.
Note:    Manning's n values were composited to a single value in the main channel.

LATERAL STRUCTURE


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.839

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =       5
Weir Coefficient          =       2
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
       0  2973.5      10    2974      15    2974      21    2972      41    2970
      59    2968      86    2966      90  2964.4

Weir crest shape                           = Broad Crested


LATERAL STRUCTURE OUTPUT  Profile #100-yr  Lat Struct
*********************************************************************************
* E.G. US. (ft)             * 2974.08  * Weir Sta US (ft)          *    0.00  *
* W.S. US. (ft)             * 2972.70  * Weir Sta DS (ft)          *   90.00  *
```

```
* E.G. DS (ft)              * 2967.69  * Min El Weir Flow (ft)      * 2964.40  *
* W.S. DS (ft)              * 2966.41  * Wr Top Wdth (ft)           *   76.07  *
* Q US (cfs)                * 1760.35  * Weir Max Depth (ft)        *    3.29  *
* Q Leaving Total (cfs)     *  283.89  * Weir Avg Depth (ft)        *    1.44  *
* Q DS (cfs)                * 1476.49  * Weir Flow Area (sq ft)     *  109.87  *
* Perc Q Leaving            *   16.13  * Weir Coef                  *   2.000  *
* Q Weir (cfs)              *  283.89  * Weir Submerg               *    0.00  *
* Q Gates (cfs)             *          * Q Gate Group (cfs)         *          *
* Q Culv (cfs)              *    0.00  * Gate Open Ht (ft)          *          *
* Q Lat RC (cfs)            *          * Gate #Open                 *          *
*                           *          * Gate Area (sq ft)          *          *
* Q Breach (cfs)            *          * Gate Submerg               *          *
* Breach Avg Velocity (ft/s) *         * Gate Invert (ft)           *          *
* Breach Flow Area (sq ft)  *          * Gate Weir Coef             *          *
*********************************************************************************
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Coronado Split F
REACH: Cor Split Reach   RS: 0.830

INPUT
Description: Main chnl x-sect 4.447

```
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2968 1016.982964.913    1022    2964    1026  2963.5    1057  2963.5
    1061    2964    1079  2964.4    1096    2964    1150    2964    1173    2962
    1176    2960    1179    2958    1185    2956    1190  2954.5    1198    2956
    1211    2960    1230    2964    1247    2966    1288    2967    1306    2968
    1317    2972

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1022     .03    1061    .083    1176    .061    1211    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1016.98    1079               90      90     103             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1079    1317    2970       T
```

CROSS SECTION OUTPUT Profile #100-yr

```
***********************************************************************************************
* E.G. Elev (ft)         * 2967.69  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.28  * Wt. n-Val.              *   0.083  *   0.036  *          *
* W.S. Elev (ft)         * 2966.41  * Reach Len. (ft)         *   90.00  *   90.00  *  103.00  *
* Crit W.S. (ft)         * 2966.41  * Flow Area (sq ft)       *    6.18  *  161.22  *          *
* E.G. Slope (ft/ft)     *0.013518  * Area (sq ft)            *    6.18  *  161.22  *  707.11  *
* Q Total (cfs)          * 1476.49  * Flow (cfs)              *   10.50  * 1465.98  *          *
* Top Width (ft)         *  255.17  * Top Width (ft)          *    8.25  *   62.02  *  184.91  *
* Vel Total (ft/s)       *    8.82  * Avg. Vel. (ft/s)        *    1.70  *    9.09  *          *
* Max Chl Dpth (ft)      *   11.91  * Hydr. Depth (ft)        *    0.75  *    2.60  *          *
* Conv. Total (cfs)      * 12699.1  * Conv. (cfs)             *    90.3  * 12608.7  *          *
* Length Wtd. (ft)       *   90.00  * Wetted Per. (ft)        *    8.38  *   62.17  *          *
* Min Ch El (ft)         * 2963.50  * Shear (lb/sq ft)        *    0.62  *    2.19  *          *
* Alpha                  *    1.06  * Stream Power (lb/ft s)  *    1.06  *   19.90  *          *
* Frctn Loss (ft)        *    1.29  * Cum Volume (acre-ft)    *    0.86  *    6.76  *   75.28  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)          *    0.02  *    6.43  *   12.49  *
***********************************************************************************************
```

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

LATERAL STRUCTURE

RIVER: Coronado Split F
REACH: Cor Split Reach   RS: 0.822

```
INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =       5
Weir Coefficient          =       2
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =        5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
       0    2965      34    2964      45    2963    45.1    2972      90    2972

Weir crest shape                             = Broad Crested


LATERAL STRUCTURE OUTPUT  Profile #100-yr  Lat Struct
*********************************************************************************
* E.G. US. (ft)             * 2967.69  * Weir Sta US (ft)          *    0.00  *
* W.S. US. (ft)             * 2966.41  * Weir Sta DS (ft)          *   45.10  *
* E.G. DS (ft)              * 2962.49  * Min El Weir Flow (ft)     * 2963.00  *
* W.S. DS (ft)              * 2961.67  * Wr Top Wdth (ft)          *   45.02  *
* Q US (cfs)                * 1476.49  * Weir Max Depth (ft)       *    2.69  *
* Q Leaving Total (cfs)     *  282.14  * Weir Avg Depth (ft)       *    2.13  *
* Q DS (cfs)                * 1194.36  * Weir Flow Area (sq ft)    *   95.99  *
* Perc Q Leaving            *   19.11  * Weir Coef                 *   2.000  *
* Q Weir (cfs)              *  282.14  * Weir Submerg              *    0.05  *
* Q Gates (cfs)             *          * Q Gate Group (cfs)        *          *
* Q Culv (cfs)              *    0.00  * Gate Open Ht (ft)         *          *
* Q Lat RC (cfs)            *          * Gate #Open                *          *
*                           *          * Gate Area (sq ft)         *          *
* Q Breach (cfs)            *          * Gate Submerg              *          *
* Breach Avg Velocity (ft/s) *         * Gate Invert (ft)          *          *
* Breach Flow Area (sq ft)   *         * Gate Weir Coef            *          *
*********************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.813

INPUT
Description: Main chnl x-sect 4.426
Station Elevation Data    num=      33
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2966    1006    2964    1012    2962 1012.432961.928    1024    2960
    1036    2959    1053    2959    1063    2960    1067    2961    1073    2961
    1078    2961    1083    2960    1098    2960    1115    2961    1170    2961
    1185    2960    1210    2958    1219    2956    1233    2954    1246    2952
    1253    2952    1265    2954    1273    2956    1281    2958    1286    2958
    1295    2957    1306    2957    1312    2958    1320    2960    1333    2962
    1420    2964    1453    2966    1478    2968

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1024     .03    1063    .083    1219    .061    1273    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1012.43    1115             102     100     100             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1115    1478    2964       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1119    1178    2970

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         * 2962.49  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.            *          *   0.038  *          *
* W.S. Elev (ft)         * 2961.67  * Reach Len. (ft)       *  102.00  *  100.00  *  100.00  *
* Crit W.S. (ft)         * 2961.67  * Flow Area (sq ft)     *          *  164.06  *          *
* E.G. Slope (ft/ft)     *0.015444  * Area (sq ft)          *          *  164.06  *  752.32  *
* Q Total (cfs)          * 1194.36  * Flow (cfs)            *          * 1194.36  *          *
```

```
* Top Width (ft)         *  257.84  * Top Width (ft)        *          *  101.01  *  156.84  *
* Vel Total (ft/s)       *    7.28  * Avg. Vel. (ft/s)      *          *    7.28  *          *
* Max Chl Dpth (ft)      *    9.67  * Hydr. Depth (ft)      *          *    1.62  *          *
* Conv. Total (cfs)      *  9610.8  * Conv. (cfs)           *          *  9610.8  *          *
* Length Wtd. (ft)       *  100.00  * Wetted Per. (ft)      *          *  101.49  *          *
* Min Ch El (ft)         * 2959.00  * Shear (lb/sq ft)      *          *    1.56  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *   11.35  *          *
* Frctn Loss (ft)        *    2.29  * Cum Volume (acre-ft)  *    0.85  *    6.43  *   73.55  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)        *    0.02  *    6.26  *   12.09  *
**********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

LATERAL STRUCTURE


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.804

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =       5
Weir Coefficient          =       2
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
       0    2972      10    2972    10.1  2959.6      46    2958      75    2956
     100    2955

Weir crest shape                           = Broad Crested


LATERAL STRUCTURE OUTPUT  Profile #100-yr  Lat Struct
*********************************************************************************
* E.G. US. (ft)              * 2962.49  * Weir Sta US (ft)          *   10.00  *
* W.S. US. (ft)              * 2961.67  * Weir Sta DS (ft)          *  100.00  *
* E.G. DS (ft)               * 2956.57  * Min El Weir Flow (ft)     * 2955.00  *
* W.S. DS (ft)               * 2956.03  * Wr Top Wdth (ft)          *   89.92  *
* Q US (cfs)                 * 1194.36  * Weir Max Depth (ft)       *    2.29  *
* Q Leaving Total (cfs)      *  482.56  * Weir Avg Depth (ft)       *    1.93  *
* Q DS (cfs)                 *  711.84  * Weir Flow Area (sq ft)    *  173.34  *
* Perc Q Leaving             *   40.40  * Weir Coef                 *   2.000  *
* Q Weir (cfs)               *  482.56  * Weir Submerg              *    0.00  *
* Q Gates (cfs)              *          * Q Gate Group (cfs)        *          *
* Q Culv (cfs)               *    0.00  * Gate Open Ht (ft)         *          *
* Q Lat RC (cfs)             *          * Gate #Open                *          *
*                            *          * Gate Area (sq ft)         *          *
* Q Breach (cfs)             *          * Gate Submerg              *          *
* Breach Avg Velocity (ft/s) *          * Gate Invert (ft)          *          *
* Breach Flow Area (sq ft)   *          * Gate Weir Coef            *          *
*********************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.794

INPUT
Description: Main chnl x-sect 4.409
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2959    1004    2958    1012    2956 1016.412955.779    1032    2955
    1038  2954.8    1044    2955    1058    2955    1063    2954    1065    2954
```

```
    1077    2955    1080    2955    1128    2955    1139    2954    1204    2952
    1229    2950    1251    2948    1264  2947.5    1283    2950    1290  2951.5
    1327    2951    1355    2952    1399    2954    1435    2958    1473    2959

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1012     .03    1044    .083    1229    .061    1283    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1016.41    1128              105     105     100             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1128    1473    2958       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1134    1204    2964

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2956.57  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.030  *   0.064  *          *
* W.S. Elev (ft)         * 2956.03  * Reach Len. (ft)        * 105.00  *  105.00  *  100.00  *
* Crit W.S. (ft)         * 2956.03  * Flow Area (sq ft)      *    0.64  *  121.03  *          *
* E.G. Slope (ft/ft)     *0.056782  * Area (sq ft)           *    0.64  *  121.03  * 1027.63  *
* Q Total (cfs)          *  711.84  * Flow (cfs)             *    2.07  *  709.76  *          *
* Top Width (ft)         *  335.44  * Top Width (ft)         *    4.55  *  111.59  *  219.31  *
* Vel Total (ft/s)       *    5.85  * Avg. Vel. (ft/s)       *    3.24  *    5.86  *          *
* Max Chl Dpth (ft)      *    8.53  * Hydr. Depth (ft)       *    0.14  *    1.08  *          *
* Conv. Total (cfs)      *  2987.3  * Conv. (cfs)            *     8.7  *  2978.6  *          *
* Length Wtd. (ft)       *  105.00  * Wetted Per. (ft)       *    4.56  *  111.76  *          *
* Min Ch El (ft)         * 2954.00  * Shear (lb/sq ft)       *    0.50  *    3.84  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    1.61  *   22.51  *          *
* Frctn Loss (ft)        *    5.22  * Cum Volume (acre-ft)   *    0.85  *    6.10  *   71.51  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.01  *    6.02  *   11.66  *
***********************************************************************************************

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.

LATERAL STRUCTURE


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.784

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =       5
Weir Coefficient          =       2
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
****************************************************************
       0    2955      33  2954.5    33.1    2965     105    2965

Weir crest shape                          = Broad Crested


LATERAL STRUCTURE OUTPUT  Profile #100-yr  Lat Struct
*********************************************************************************
* E.G. US. (ft)              * 2956.57  * Weir Sta US (ft)           *    0.00  *
* W.S. US. (ft)              * 2956.03  * Weir Sta DS (ft)           *   33.10  *
* E.G. DS (ft)               * 2951.36  * Min El Weir Flow (ft)      * 2954.50  *
* W.S. DS (ft)               * 2950.78  * Wr Top Wdth (ft)           *   33.00  *
* Q US (cfs)                 *  711.84  * Weir Max Depth (ft)        *    1.57  *
* Q Leaving Total (cfs)      *   68.52  * Weir Avg Depth (ft)        *    1.00  *
* Q DS (cfs)                 *  643.28  * Weir Flow Area (sq ft)     *   32.94  *
* Perc Q Leaving             *    9.63  * Weir Coef                  *   2.000  *
* Q Weir (cfs)               *   68.52  * Weir Submerg               *    0.00  *
* Q Gates (cfs)              *          * Q Gate Group (cfs)         *          *
* Q Culv (cfs)               *    0.00  * Gate Open Ht (ft)          *          *
* Q Lat RC (cfs)             *          * Gate #Open                 *          *
*                            *          * Gate Area (sq ft)          *          *
* Q Breach (cfs)             *          * Gate Submerg               *          *
* Breach Avg Velocity (ft/s) *          * Gate Invert (ft)           *          *
* Breach Flow Area (sq ft)   *          * Gate Weir Coef             *          *
*********************************************************************************
```

```
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.774

INPUT
Description: Main chnl x-sect 4.392
Station Elevation Data    num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2964    1030    2962    1040    2960    1049    2958    1056    2956
 1063.392954.153    1064    2954    1067    2953    1085    2952    1100  2951.5
    1108    2952    1110    2952    1112    2952    1122    2950    1130    2948
    1141  2947.7    1153    2948    1165    2950    1173    2952    1186    2952
    1230    2950    1288    2950    1296    2948    1303    2944    1307    2942
    1312    2940    1316    2940    1334    2942    1346    2944    1352    2945
    1362    2945    1370    2944    1380    2944    1392    2946    1421    2948
    1459    2950    1516    2950    1537    2952    1558    2954    1588    2956

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1067     .03    1108    .083    1303    .061    1346    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1063.39    1173              139     136      95             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1186    1588    2960       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1180    1273    2964

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2951.36  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.              *          *   0.083  *          *
* W.S. Elev (ft)         * 2950.78  * Reach Len. (ft)         *  139.00  *  136.00  *   95.00  *
* Crit W.S. (ft)         * 2950.31  * Flow Area (sq ft)       *          *  105.73  *          *
* E.G. Slope (ft/ft)     *0.043251  * Area (sq ft)            *          *  105.73  *  959.74  *
* Q Total (cfs)          *  643.28  * Flow (cfs)              *          *  643.28  *          *
* Top Width (ft)         *  301.21  * Top Width (ft)          *          *   50.02  *  251.19  *
* Vel Total (ft/s)       *    6.08  * Avg. Vel. (ft/s)        *          *    6.08  *          *
* Max Chl Dpth (ft)      *   10.78  * Hydr. Depth (ft)        *          *    2.11  *          *
* Conv. Total (cfs)      *  3093.2  * Conv. (cfs)             *          *  3093.2  *          *
* Length Wtd. (ft)       *  136.00  * Wetted Per. (ft)        *          *   50.61  *          *
* Min Ch El (ft)         * 2947.70  * Shear (lb/sq ft)        *          *    5.64  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *   34.32  *          *
* Frctn Loss (ft)        *    5.01  * Cum Volume (acre-ft)    *    0.85  *    5.83  *   69.23  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)          *    0.00  *    5.82  *   11.12  *
*********************************************************************************************

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: The composite Mannings n value for the channel was larger than the largest entered n value or
         smaller than the smallest entered n value.
Note:    Manning's n values were composited to a single value in the main channel.

LATERAL STRUCTURE


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.762

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =       5
Weir Coefficient          =       2
Weir Flow Reference       = Energy Grade
```

```
 Weir Embankment Coordinates    num =        7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
       0  2964.5      47  2964.5    47.1  2954.5      58    2947     112    2945
   112.1    2953     136    2953

Weir crest shape                           = Broad Crested


LATERAL STRUCTURE OUTPUT  Profile #100-yr  Lat Struct
*********************************************************************************
* E.G. US. (ft)             * 2951.36  * Weir Sta US (ft)           *   47.10  *
* W.S. US. (ft)             * 2950.78  * Weir Sta DS (ft)           *  112.10  *
* E.G. DS (ft)              * 2946.24  * Min El Weir Flow (ft)      * 2945.00  *
* W.S. DS (ft)              * 2946.03  * Wr Top Wdth (ft)           *   57.37  *
* Q US (cfs)                *  643.28  * Weir Max Depth (ft)        *    2.17  *
* Q Leaving Total (cfs)     *  350.85  * Weir Avg Depth (ft)        *    2.09  *
* Q DS (cfs)                *  291.81  * Weir Flow Area (sq ft)     *  120.16  *
* Perc Q Leaving            *   54.64  * Weir Coef                  *   2.000  *
* Q Weir (cfs)              *  350.85  * Weir Submerg               *    0.00  *
* Q Gates (cfs)             *          * Q Gate Group (cfs)         *          *
* Q Culv (cfs)              *    0.00  * Gate Open Ht (ft)          *          *
* Q Lat RC (cfs)            *          * Gate #Open                 *          *
*                           *          * Gate Area (sq ft)          *          *
* Q Breach (cfs)            *          * Gate Submerg               *          *
* Breach Avg Velocity (ft/s) *         * Gate Invert (ft)           *          *
* Breach Flow Area (sq ft)   *         * Gate Weir Coef             *          *
*********************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.749

INPUT
Description: Main chnl x-sect 4.371
Station Elevation Data    num=      31
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000  2951.5    1011    2950 1015.962949.708    1045    2948    1062    2947
    1082    2947    1101    2946    1139    2944    1155    2943    1172    2944
    1204    2945    1226    2945    1233    2944    1249    2942    1271    2941
    1324    2940    1336    2938    1346    2936    1356    2936    1363    2938
    1369    2940    1395    2942    1413    2943    1470    2944    1498    2946
    1512    2948    1526    2950    1535    2952    1543    2954    1551    2956
    1568    2957

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1045     .03    1101    .083    1324    .061    1369    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1015.96    1204             114     114     114             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1204    1568    2955       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1155    1217    2953

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2946.24  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.21  * Wt. n-Val.              *          *   0.083  *          *
* W.S. Elev (ft)         * 2946.03  * Reach Len. (ft)         *  114.00  *  114.00  *  114.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *          *   79.67  *          *
* E.G. Slope (ft/ft)     *0.026866  * Area (sq ft)            *          *   79.67  * 1209.15  *
* Q Total (cfs)          *  291.81  * Flow (cfs)              *          *  291.81  *          *
* Top Width (ft)         *  335.80  * Top Width (ft)          *          *   54.58  *  281.22  *
* Vel Total (ft/s)       *    3.66  * Avg. Vel. (ft/s)        *          *    3.66  *          *
* Max Chl Dpth (ft)      *   10.03  * Hydr. Depth (ft)        *          *    1.46  *          *
* Conv. Total (cfs)      *  1780.3  * Conv. (cfs)             *          *  1780.3  *          *
* Length Wtd. (ft)       *  114.00  * Wetted Per. (ft)        *          *   57.70  *          *
* Min Ch El (ft)         * 2943.00  * Shear (lb/sq ft)        *          *    2.32  *          *
```

```
* Alpha                 *    1.00  * Stream Power (lb/ft s) *          *    8.48  *          *
* Frctn Loss (ft)       *    4.60  * Cum Volume (acre-ft)   *    0.85  *    5.54  *   66.86  *
* C & E Loss (ft)       *    0.01  * Cum SA (acres)         *    0.00  *    5.66  *   10.54  *
*********************************************************************************************

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.

LATERAL STRUCTURE


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.738

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =       5
Weir Coefficient          =       2
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =        4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
****************************************************************
       0    2953      77    2953    77.1    2942     114    2941

Weir crest shape                           = Broad Crested


LATERAL STRUCTURE OUTPUT  Profile #100-yr  Lat Struct
*********************************************************************************
* E.G. US. (ft)             * 2946.24  * Weir Sta US (ft)           *   77.00  *
* W.S. US. (ft)             * 2946.03  * Weir Sta DS (ft)           *  114.00  *
* E.G. DS (ft)              * 2941.63  * Min El Weir Flow (ft)      * 2941.00  *
* W.S. DS (ft)              * 2941.29  * Wr Top Wdth (ft)           *   36.91  *
* Q US (cfs)                *  291.81  * Weir Max Depth (ft)        *    1.13  *
* Q Leaving Total (cfs)     *   61.48  * Weir Avg Depth (ft)        *    0.88  *
* Q DS (cfs)                *  229.97  * Weir Flow Area (sq ft)     *   32.46  *
* Perc Q Leaving            *   21.19  * Weir Coef                  *   2.000  *
* Q Weir (cfs)              *   61.48  * Weir Submerg               *    0.00  *
* Q Gates (cfs)             *          * Q Gate Group (cfs)         *          *
* Q Culv (cfs)              *    0.00  * Gate Open Ht (ft)          *          *
* Q Lat RC (cfs)            *          * Gate #Open                 *          *
*                           *          * Gate Area (sq ft)          *          *
* Q Breach (cfs)            *          * Gate Submerg               *          *
* Breach Avg Velocity (ft/s) *         * Gate Invert (ft)           *          *
* Breach Flow Area (sq ft)  *          * Gate Weir Coef             *          *
*********************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.727

INPUT
Description: Main chnl x-sect 4.353
Station Elevation Data    num=      33
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2946 1021.972944.003    1022    2944    1036    2942    1055    2941
    1072    2941    1081    2942    1090    2942    1100    2942    1127    2940
    1141    2940    1158    2941    1172    2940    1201    2938    1211  2937.5
    1225    2938    1260    2937    1277    2936    1291    2934    1322    2934
    1357    2932    1373    2930    1377    2930    1385    2932    1393    2934
    1405    2936    1435    2938    1505    2940    1523    2942    1547    2943
    1587    2944    1602    2946    1615    2948

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1055     .03    1081    .083    1322    .061    1393    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
```

```
      1021.97    1158               73     100     101             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1158    1615    2950       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1175    1196    2948

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2941.63  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.34  * Wt. n-Val.              *          *   0.076  *          *
* W.S. Elev (ft)         * 2941.29  * Reach Len. (ft)         *   73.00  *  100.00  *  101.00  *
* Crit W.S. (ft)         * 2941.29  * Flow Area (sq ft)       *          *   48.85  *          *
* E.G. Slope (ft/ft)     *0.079162  * Area (sq ft)            *          *   48.85  * 1664.57  *
* Q Total (cfs)          *  229.97  * Flow (cfs)              *          *  229.97  *          *
* Top Width (ft)         *  411.16  * Top Width (ft)          *          *   73.55  *  337.61  *
* Vel Total (ft/s)       *    4.71  * Avg. Vel. (ft/s)        *          *    4.71  *          *
* Max Chl Dpth (ft)      *   11.29  * Hydr. Depth (ft)        *          *    0.66  *          *
* Conv. Total (cfs)      *   817.4  * Conv. (cfs)             *          *   817.4  *          *
* Length Wtd. (ft)       *  100.00  * Wetted Per. (ft)        *          *   73.65  *          *
* Min Ch El (ft)         * 2940.00  * Shear (lb/sq ft)        *          *    3.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   15.43  *          *
* Frctn Loss (ft)        *    2.89  * Cum Volume (acre-ft)    *    0.85  *    5.37  *   63.10  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    0.00  *    5.49  *    9.73  *
***********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

LATERAL STRUCTURE


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.718

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =       5
Weir Coefficient          =       2
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
****************************************************************
       0    2941      24    2940    28.1    2948     100    2948

Weir crest shape                           = Broad Crested


LATERAL STRUCTURE OUTPUT  Profile #100-yr  Lat Struct
*********************************************************************************
* E.G. US. (ft)              * 2941.63  * Weir Sta US (ft)           *    0.00  *
* W.S. US. (ft)              * 2941.29  * Weir Sta DS (ft)           *   28.10  *
* E.G. DS (ft)               * 2936.80  * Min El Weir Flow (ft)      * 2940.00  *
* W.S. DS (ft)               * 2936.43  * Wr Top Wdth (ft)           *   24.24  *
* Q US (cfs)                 *  229.97  * Weir Max Depth (ft)        *    0.63  *
* Q Leaving Total (cfs)      *   19.90  * Weir Avg Depth (ft)        *    0.55  *
* Q DS (cfs)                 *  210.03  * Weir Flow Area (sq ft)     *   13.35  *
* Perc Q Leaving             *    8.67  * Weir Coef                  *   2.000  *
* Q Weir (cfs)               *   19.90  * Weir Submerg               *    0.00  *
* Q Gates (cfs)              *          * Q Gate Group (cfs)         *          *
* Q Culv (cfs)               *    0.00  * Gate Open Ht (ft)          *          *
* Q Lat RC (cfs)             *          * Gate #Open                 *          *
*                            *          * Gate Area (sq ft)          *          *
* Q Breach (cfs)             *          * Gate Submerg               *          *
* Breach Avg Velocity (ft/s) *          * Gate Invert (ft)           *          *
* Breach Flow Area (sq ft)   *          * Gate Weir Coef             *          *
*********************************************************************************

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

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

CROSS SECTION


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.708

INPUT
Description: Main chnl x-sect 4.333
Station Elevation Data    num=      38
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    1000    2942    1018    2940    1035    2938 1036.142937.931    1068    2936
    1076  2935.5    1110  2935.5    1115    2936    1128    2937    1130    2937
    1175    2937    1180    2938    1227    2938    1233    2934    1245  2933.4
    1256    2934    1276    2934    1323    2932    1352    2930    1360    2928
    1384  2926.2    1406  2926.2    1413    2928    1422    2930    1432    2930
    1439    2928    1448    2926    1450  2925.5    1451    2926    1469    2928
    1489    2930    1502    2932    1516    2934    1531    2936    1561    2938
    1567    2940    1573    2942    1591    2943

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
    1000    .083    1068     .03    1175    .083    1432    .061    1489    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1036.14    1180              90      90      95             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1227    1591    2945       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1180    1227    2948

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2936.80  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.37  * Wt. n-Val.            *          *   0.030  *          *
* W.S. Elev (ft)         * 2936.43  * Reach Len. (ft)       *   90.00  *   90.00  *   95.00  *
* Crit W.S. (ft)         * 2936.43  * Flow Area (sq ft)     *          *   43.11  *          *
* E.G. Slope (ft/ft)     *0.014068  * Area (sq ft)          *          *   43.11  * 1767.71  *
* Q Total (cfs)          *  210.03  * Flow (cfs)            *          *  210.03  *          *
* Top Width (ft)         *  367.72  * Top Width (ft)        *          *   59.65  *  308.07  *
* Vel Total (ft/s)       *    4.87  * Avg. Vel. (ft/s)      *          *    4.87  *          *
* Max Chl Dpth (ft)      *   10.93  * Hydr. Depth (ft)      *          *    0.72  *          *
* Conv. Total (cfs)      *  1770.8  * Conv. (cfs)           *          *  1770.8  *          *
* Length Wtd. (ft)       *   90.00  * Wetted Per. (ft)      *          *   59.72  *          *
* Min Ch El (ft)         * 2935.50  * Shear (lb/sq ft)      *          *    0.63  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *    3.09  *          *
* Frctn Loss (ft)        *    2.01  * Cum Volume (acre-ft)  *    0.85  *    5.26  *   59.12  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)        *    0.00  *    5.34  *    8.98  *
**********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

LATERAL STRUCTURE


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.700

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =       5
Weir Coefficient          =       2
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =       7
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
       0    2948      12    2948    12.1    2936      39  2934.3      66  2932.7
    66.1    2940      90    2940

Weir crest shape                            = Broad Crested


LATERAL STRUCTURE OUTPUT  Profile #100-yr  Lat Struct
*********************************************************************************
* E.G. US. (ft)             * 2936.80  * Weir Sta US (ft)           *   12.00  *
* W.S. US. (ft)             * 2936.43  * Weir Sta DS (ft)           *   66.10  *
* E.G. DS (ft)              * 2932.34  * Min El Weir Flow (ft)      * 2932.70  *
* W.S. DS (ft)              * 2932.21  * Wr Top Wdth (ft)           *   53.91  *
* Q US (cfs)                *  210.03  * Weir Max Depth (ft)        *    0.83  *
* Q Leaving Total (cfs)     *   44.77  * Weir Avg Depth (ft)        *    0.54  *
* Q DS (cfs)                *  165.05  * Weir Flow Area (sq ft)     *   29.15  *
* Perc Q Leaving            *   21.42  * Weir Coef                  *   2.000  *
* Q Weir (cfs)              *   44.77  * Weir Submerg               *    0.00  *
* Q Gates (cfs)             *          * Q Gate Group (cfs)         *          *
* Q Culv (cfs)              *    0.00  * Gate Open Ht (ft)          *          *
* Q Lat RC (cfs)            *          * Gate #Open                 *          *
*                           *          * Gate Area (sq ft)          *          *
* Q Breach (cfs)            *          * Gate Submerg               *          *
* Breach Avg Velocity (ft/s) *         * Gate Invert (ft)           *          *
* Breach Flow Area (sq ft)  *          * Gate Weir Coef             *          *
*********************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.691

INPUT
Description: Main chnl x-sect 4.315
Station Elevation Data    num=      33
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2936    1027    2934 1027.42933.968    1052    2932    1081    2932
    1124    2932    1155  2931.8    11572931.711    1173    2931    1250    2931
    1264    2930    1268    2928    1274    2926    1280    2924    1285    2923
    1292    2924    1315    2925    1339    2925    1362    2924    1381    2923
    1393    2923    1439    2922    1453    2920    1459  2919.5    1491  2919.5
    1499    2920    1510    2922    1519    2924    1527    2926    1535    2928
    1546    2930    1559    2932    1584    2934

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1081     .03    1124    .083    1439    .061    1510    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1052    1250                 63      73     140             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1250    1584    2935       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
***********************
    1170    1233    2941

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2932.34  * Element                  *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.13  * Wt. n-Val.               *   0.083  *   0.072  *          *
* W.S. Elev (ft)         * 2932.21  * Reach Len. (ft)          *   63.00  *   73.00  *  140.00  *
* Crit W.S. (ft)         * 2932.15  * Flow Area (sq ft)        *    0.27  *   56.38  *          *
* E.G. Slope (ft/ft)     *0.049540  * Area (sq ft)             *    0.27  *   56.38  * 2561.00  *
* Q Total (cfs)          *  165.05  * Flow (cfs)               *    0.24  *  164.80  *          *
* Top Width (ft)         *  449.24  * Top Width (ft)           *    2.62  *  135.00  *  311.62  *
* Vel Total (ft/s)       *    2.91  * Avg. Vel. (ft/s)         *    0.88  *    2.92  *          *
* Max Chl Dpth (ft)      *   12.71  * Hydr. Depth (ft)         *    0.10  *    0.42  *          *
* Conv. Total (cfs)      *   741.5  * Conv. (cfs)              *     1.1  *   740.4  *          *
* Length Wtd. (ft)       *   72.99  * Wetted Per. (ft)         *    2.63  *  137.30  *          *
* Min Ch El (ft)         * 2931.00  * Shear (lb/sq ft)         *    0.32  *    1.27  *          *
* Alpha                  *    1.01  * Stream Power (lb/ft s)   *    0.29  *    3.71  *          *
```

Frctn Loss (ft)	4.77	Cum Volume (acre-ft)	0.85	5.16	54.40
C & E Loss (ft)	0.04	Cum SA (acres)	0.00	5.14	8.30

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.

LATERAL STRUCTURE

RIVER: Coronado Split F
REACH: Cor Split Reach   RS: 0.684

INPUT
Description:
Lateral structure position   = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width   =   5
Weir Coefficient   =   2
Weir Flow Reference   = Energy Grade
Weir Embankment Coordinates   num =   2

Sta	Elev	Sta	Elev
0	2940	73	2940

Weir crest shape   = Broad Crested

LATERAL STRUCTURE OUTPUT Profile #100-yr Lat Struct

E.G. US. (ft)	2932.34	Weir Sta US (ft)	
W.S. US. (ft)	2932.21	Weir Sta DS (ft)	
E.G. DS (ft)	2927.53	Min El Weir Flow (ft)	2940.00
W.S. DS (ft)	2926.99	Wr Top Wdth (ft)	
Q US (cfs)	165.05	Weir Max Depth (ft)	
Q Leaving Total (cfs)	0.00	Weir Avg Depth (ft)	
Q DS (cfs)	165.05	Weir Flow Area (sq ft)	
Perc Q Leaving	0.00	Weir Coef	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Gate Group (cfs)	
Q Culv (cfs)	0.00	Gate Open Ht (ft)	
Q Lat RC (cfs)		Gate #Open	
		Gate Area (sq ft)	
Q Breach (cfs)		Gate Submerg	
Breach Avg Velocity (ft/s)		Gate Invert (ft)	
Breach Flow Area (sq ft)		Gate Weir Coef	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Coronado Split F
REACH: Cor Split Reach   RS: 0.677

INPUT
Description: Main chnl x-sect 4.289
Station Elevation Data   num=   39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2930	1020	2928	1086	2927.5	1111	2928	1119	2929
1130	2929	1137	2929	1145	2928	1159	2926	1172	2925
1178	2926	1191	2928	1208	2929	1223	2929	1235	2928
1245	2926	1251	2924	1258	2922	1269	2920	1297	2918
1354	2918	1372	2916	1419	2916	1428	2915	1443	2915
1453	2916	1458	2916.5	1465	2916.5	1472	2916	1479	2914
1501	2912.5	1511	2914	1516	2916	1525	2918	1531	2920
1535	2922	1549	2926	1561	2928	1603	2928.5		

Manning's n Values   num=   5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1000	.083	1086	.03	1111	.083	1472	.061	1516	.083

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1020	1208	78	83	155	.1	.3

Ineffective Flow   num=   1

```
   Sta L   Sta R    Elev  Permanent
    1208    1603    2930       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1175    1243    2941
```

```
CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2927.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.54  * Wt. n-Val.             *          *   0.083  *          *
* W.S. Elev (ft)         * 2926.99  * Reach Len. (ft)        *   78.00  *   83.00  *  155.00  *
* Crit W.S. (ft)         * 2926.92  * Flow Area (sq ft)      *          *   28.09  *          *
* E.G. Slope (ft/ft)     *0.090198  * Area (sq ft)           *          *   28.09  * 2931.47  *
* Q Total (cfs)          *  165.05  * Flow (cfs)             *          *  165.05  *          *
* Top Width (ft)         *  334.91  * Top Width (ft)         *          *   22.95  *  311.96  *
* Vel Total (ft/s)       *    5.87  * Avg. Vel. (ft/s)       *          *    5.87  *          *
* Max Chl Dpth (ft)      *   14.49  * Hydr. Depth (ft)       *          *    1.22  *          *
* Conv. Total (cfs)      *   549.5  * Conv. (cfs)            *          *  549.5   *          *
* Length Wtd. (ft)       *   83.00  * Wetted Per. (ft)       *          *   24.60  *          *
* Min Ch El (ft)         * 2925.00  * Shear (lb/sq ft)       *          *    6.43  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   37.79  *          *
* Frctn Loss (ft)        *    5.90  * Cum Volume (acre-ft)   *    0.85  *    5.09  *   45.58  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *          *    5.01  *    7.30  *
*********************************************************************************************
```

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.

LATERAL STRUCTURE

RIVER: Coronado Split F
REACH: Cor Split Reach   RS: 0.670

INPUT

```
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =       5
Weir Coefficient          =       2
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
       0    2940       3    2940     3.1    2929      28    2928      63    2926
      73    2925    73.1    2934      83    2934

Weir crest shape                          = Broad Crested
```

```
LATERAL STRUCTURE OUTPUT  Profile #100-yr  Lat Struct
*********************************************************************************
* E.G. US. (ft)             * 2927.53  * Weir Sta US (ft)           *          *
* W.S. US. (ft)             * 2926.99  * Weir Sta DS (ft)           *          *
* E.G. DS (ft)              * 2921.56  * Min El Weir Flow (ft)      * 2925.00  *
* W.S. DS (ft)              * 2921.27  * Wr Top Wdth (ft)           *          *
* Q US (cfs)                *  165.05  * Weir Max Depth (ft)        *          *
* Q Leaving Total (cfs)     *    0.00  * Weir Avg Depth (ft)        *          *
* Q DS (cfs)                *  165.05  * Weir Flow Area (sq ft)     *          *
* Perc Q Leaving            *    0.00  * Weir Coef                  *   2.000  *
* Q Weir (cfs)              *    0.00  * Weir Submerg               *          *
* Q Gates (cfs)             *          * Q Gate Group (cfs)         *          *
* Q Culv (cfs)              *    0.00  * Gate Open Ht (ft)          *          *
* Q Lat RC (cfs)            *          * Gate #Open                 *          *
*                           *          * Gate Area (sq ft)          *          *
* Q Breach (cfs)            *          * Gate Submerg               *          *
* Breach Avg Velocity (ft/s) *         * Gate Invert (ft)           *          *
* Breach Flow Area (sq ft)  *          * Gate Weir Coef             *          *
*********************************************************************************
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Coronado Split F
REACH: Cor Split Reach   RS: 0.662

```
INPUT
Description: Main chnl x-sect 4.262
Station Elevation Data    num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2930    1012    2928    1026    2926    1042    2924    1107  2922.5
    1132    2922    1151    2920    1161  2919.5    1167    2920    1183    2922
    1205    2924    1271    2925    1297    2925    1314    2924    1335    2922
    1344    2920    1349    2918    1353    2916    1360    2914    1378    2912
    1386    2911    1395    2912    1412    2912    1434    2910    1442  2909.5
    1451    2910    1491    2912    1526    2912    1534    2910    1542    2908
    1550    2906    1559  2905.5    1569  2905.5    1580    2906    1599    2908
    1613    2910    1628    2912    1644    2914    1657    2916    1668    2918
    1688    2920    1696  2920.8

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1107     .03    1132    .083    1534    .061    1613    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1042    1271               95     101     101             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1271    1696    2930       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1256    1310    2935

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)          * 2921.56  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.29  * Wt. n-Val.              *          *   0.083  *          *
* W.S. Elev (ft)          * 2921.27  * Reach Len. (ft)         *   95.00  *  101.00  *  101.00  *
* Crit W.S. (ft)          * 2921.05  * Flow Area (sq ft)       *          *   38.42  *          *
* E.G. Slope (ft/ft)      *0.057517  * Area (sq ft)            *          *   38.42  * 3378.14  *
* Q Total (cfs)           *  165.05  * Flow (cfs)              *          *  165.05  *          *
* Top Width (ft)          *  395.94  * Top Width (ft)          *          *   38.22  *  357.71  *
* Vel Total (ft/s)        *    4.30  * Avg. Vel. (ft/s)        *          *    4.30  *          *
* Max Chl Dpth (ft)       *   15.77  * Hydr. Depth (ft)        *          *    1.01  *          *
* Conv. Total (cfs)       *   688.2  * Conv. (cfs)             *          *   688.2  *          *
* Length Wtd. (ft)        *  101.00  * Wetted Per. (ft)        *          *   38.40  *          *
* Min Ch El (ft)          * 2919.50  * Shear (lb/sq ft)        *          *    3.59  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s)  *          *   15.43  *          *
* Frctn Loss (ft)         *    4.68  * Cum Volume (acre-ft)    *    0.85  *    5.03  *   34.35  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)          *          *    4.95  *    6.11  *
***********************************************************************************************

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.

LATERAL STRUCTURE


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.652

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =       5
Weir Coefficient          =       2
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
****************************************************************
       0    2934      90    2934    90.1    2922     101  2921.8

Weir crest shape                           = Broad Crested


LATERAL STRUCTURE OUTPUT  Profile #100-yr  Lat Struct
*********************************************************************************
* E.G. US. (ft)              * 2921.56  * Weir Sta US (ft)          *          *
* W.S. US. (ft)              * 2921.27  * Weir Sta DS (ft)          *          *
* E.G. DS (ft)               * 2916.84  * Min El Weir Flow (ft)     * 2921.80  *
* W.S. DS (ft)               * 2916.67  * Wr Top Wdth (ft)          *          *
```

```
* Q US (cfs)                 *  165.05  * Weir Max Depth (ft)        *          *
* Q Leaving Total (cfs)      *    0.00  * Weir Avg Depth (ft)        *          *
* Q DS (cfs)                 *  165.05  * Weir Flow Area (sq ft)     *          *
* Perc Q Leaving             *    0.00  * Weir Coef                  *   2.000  *
* Q Weir (cfs)               *    0.00  * Weir Submerg               *          *
* Q Gates (cfs)              *          * Q Gate Group (cfs)         *          *
* Q Culv (cfs)               *    0.00  * Gate Open Ht (ft)          *          *
* Q Lat RC (cfs)             *          * Gate #Open                 *          *
*                            *          * Gate Area (sq ft)          *          *
* Q Breach (cfs)             *          * Gate Submerg               *          *
* Breach Avg Velocity (ft/s) *          * Gate Invert (ft)           *          *
* Breach Flow Area (sq ft)   *          * Gate Weir Coef             *          *
*********************************************************************************
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Coronado Split F
REACH: Cor Split Reach   RS: 0.642

INPUT
Description: Main chnl x-sect 4.243

```
Station Elevation Data    num=      56
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2930    1010    2928    1020    2926    1030    2924    1040    2922
    1052    2920 1052.322919.974    1077    2918    1094  2917.3    1126  2916.7
    1133    2916    1150    2915    1171    2916    1196    2918 1196.342918.023
    1211    2919    1224    2918    1245  2917.4    1255    2918    1293    2920
    1338  2921.8    1371    2920    1378    2918    1385    2916    1390    2914
    1395    2912    1400    2910    1411    2908    1421    2906    1431    2905
    1433    2905    1445    2906    1456    2908    1487    2910    1497    2910
    1514    2908    1534    2906    1541    2904    1548    2902    1556    2900
    1579  2899.5    1585  2899.5    1595    2900    1601    2902    1608    2904
    1614    2906    1625    2908    1638    2909    1656    2909    1670    2908
    1700    2908    1706    2910    1712    2912    1720    2914    1728    2916
    1791    2916

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1094     .03    1126    .083    1534    .061    1614    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1052.32    1338              185     180      82             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1338    1791    2930       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1274    1303    2935
```

CROSS SECTION OUTPUT Profile #100-yr

```
**********************************************************************************************
* E.G. Elev (ft)         * 2916.84  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.17  * Wt. n-Val.              *          *   0.083  *          *
* W.S. Elev (ft)         * 2916.67  * Reach Len. (ft)         *  185.00  *  180.00  *   82.00  *
* Crit W.S. (ft)         * 2916.35  * Flow Area (sq ft)       *          *   49.51  *          *
* E.G. Slope (ft/ft)     *0.038158  * Area (sq ft)            *          *   49.51  * 3354.52  *
* Q Total (cfs)          *  165.05  * Flow (cfs)              *          *  165.05  *          *
* Top Width (ft)         *  461.42  * Top Width (ft)          *          *   53.07  *  408.34  *
* Vel Total (ft/s)       *    3.33  * Avg. Vel. (ft/s)        *          *    3.33  *          *
* Max Chl Dpth (ft)      *   17.17  * Hydr. Depth (ft)        *          *    0.93  *          *
* Conv. Total (cfs)      *   844.9  * Conv. (cfs)             *          *   844.9  *          *
* Length Wtd. (ft)       *  180.00  * Wetted Per. (ft)        *          *   53.19  *          *
* Min Ch El (ft)         * 2915.00  * Shear (lb/sq ft)        *          *    2.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    7.39  *          *
* Frctn Loss (ft)        *    7.75  * Cum Volume (acre-ft)    *    0.85  *    4.92  *   26.55  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *          *    4.84  *    5.22  *
**********************************************************************************************
```

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.

```
LATERAL STRUCTURE


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.625

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =       5
Weir Coefficient          =       2
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =        4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
****************************************************************
       0  2921.8      55    2917    55.1    2926     180    2926

Weir crest shape                           = Broad Crested


LATERAL STRUCTURE OUTPUT  Profile #100-yr  Lat Struct
*********************************************************************************
* E.G. US. (ft)             * 2916.84  * Weir Sta US (ft)          *          *
* W.S. US. (ft)             * 2916.67  * Weir Sta DS (ft)          *          *
* E.G. DS (ft)              * 2909.07  * Min El Weir Flow (ft)     * 2917.00  *
* W.S. DS (ft)              * 2908.95  * Wr Top Wdth (ft)          *          *
* Q US (cfs)                *  165.05  * Weir Max Depth (ft)       *          *
* Q Leaving Total (cfs)     *    0.00  * Weir Avg Depth (ft)       *          *
* Q DS (cfs)                *  165.05  * Weir Flow Area (sq ft)    *          *
* Perc Q Leaving            *    0.00  * Weir Coef                 *   2.000  *
* Q Weir (cfs)              *    0.00  * Weir Submerg              *          *
* Q Gates (cfs)             *          * Q Gate Group (cfs)        *          *
* Q Culv (cfs)              *    0.00  * Gate Open Ht (ft)         *          *
* Q Lat RC (cfs)            *          * Gate #Open                *          *
*                           *          * Gate Area (sq ft)         *          *
* Q Breach (cfs)            *          * Gate Submerg              *          *
* Breach Avg Velocity (ft/s) *         * Gate Invert (ft)          *          *
* Breach Flow Area (sq ft)  *          * Gate Weir Coef            *          *
*********************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.608

INPUT
Description: Main chnl x-sect 4.225
Station Elevation Data    num=      38
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2920    1007    2918    1015    2916    1022    2914    1029    2912
    1036    2910    1043    2909    1068    2908    1086    2908    1103  2909.3
    1177  2908.3    1243    2910 1243.092910.013    1257    2912    1277    2913
    1296    2913    1311    2912    1317    2910    1323    2908    1329    2906
    1336    2904    1355    2902    1375  2903.8    1410  2903.9    1437    2902
    1469    2900    1526    2898    1550    2897    1567    2898    1571    2900
    1577    2902    1588    2904    1630    2906    1692    2908    1703    2910
    1718    2912    1747    2914    1778    2914

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1036     .03    1086    .083    1437    .061    1577    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1029    1277              147     147     105             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1277    1778    2920       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1226    1280    2926

CROSS SECTION OUTPUT  Profile #100-yr
```

```
*******************************************************************************************
* E.G. Elev (ft)         * 2909.07  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.13  * Wt. n-Val.              *          *   0.068  *          *
* W.S. Elev (ft)         * 2908.95  * Reach Len. (ft)         *  147.00  *  147.00  *  105.00  *
* Crit W.S. (ft)         * 2908.84  * Flow Area (sq ft)       *          *   57.83  *          *
* E.G. Slope (ft/ft)     *0.048982  * Area (sq ft)            *          *   57.83  * 2347.64  *
* Q Total (cfs)          *  165.05  * Flow (cfs)              *          *  165.05  *          *
* Top Width (ft)         *  504.22  * Top Width (ft)          *          *  127.17  *  377.06  *
* Vel Total (ft/s)       *    2.85  * Avg. Vel. (ft/s)        *          *    2.85  *          *
* Max Chl Dpth (ft)      *   11.95  * Hydr. Depth (ft)        *          *    0.45  *          *
* Conv. Total (cfs)      *   745.7  * Conv. (cfs)             *          *   745.7  *          *
* Length Wtd. (ft)       *  147.00  * Wetted Per. (ft)        *          *  127.23  *          *
* Min Ch El (ft)         * 2908.00  * Shear (lb/sq ft)        *          *    1.39  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    3.97  *          *
* Frctn Loss (ft)        *    6.54  * Cum Volume (acre-ft)    *    0.85  *    4.70  *   21.18  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *          *    4.47  *    4.48  *
*******************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.

LATERAL STRUCTURE


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.595

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =       5
Weir Coefficient          =       2
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =       10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
       0    2926      10    2926    10.1    2912      31    2910      69    2906
      73    2905      98    2904     124    2904   124.1    2912     147    2912

Weir crest shape                           = Broad Crested


LATERAL STRUCTURE OUTPUT  Profile #100-yr  Lat Struct
*********************************************************************************
* E.G. US. (ft)             * 2909.07  * Weir Sta US (ft)          *   31.00  *
* W.S. US. (ft)             * 2908.95  * Weir Sta DS (ft)          *  124.00  *
* E.G. DS (ft)              * 2902.53  * Min El Weir Flow (ft)     * 2904.00  *
* W.S. DS (ft)              * 2902.38  * Wr Top Wdth (ft)          *   45.00  *
* Q US (cfs)                *  165.05  * Weir Max Depth (ft)       *    0.82  *
* Q Leaving Total (cfs)     *   43.70  * Weir Avg Depth (ft)       *    0.59  *
* Q DS (cfs)                *  120.82  * Weir Flow Area (sq ft)    *   26.51  *
* Perc Q Leaving            *   26.80  * Weir Coef                 *   2.000  *
* Q Weir (cfs)              *   43.70  * Weir Submerg              *    0.00  *
* Q Gates (cfs)             *          * Q Gate Group (cfs)        *          *
* Q Culv (cfs)              *    0.00  * Gate Open Ht (ft)         *          *
* Q Lat RC (cfs)            *          * Gate #Open                *          *
*                           *          * Gate Area (sq ft)         *          *
* Q Breach (cfs)            *          * Gate Submerg              *          *
* Breach Avg Velocity (ft/s) *         * Gate Invert (ft)          *          *
* Breach Flow Area (sq ft)   *         * Gate Weir Coef            *          *
*********************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.581

INPUT
Description: Main chnl x-sect 4.205
Station Elevation Data    num=      31
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2910    1015    2908    1026    2906    1040    2904    1058    2902
```

```
    1103    2902    1125  2902.4    1127  2902.5    1150  2902.5    1172    2902
    1211    2902    1233    2903    1244  2903.4    1276    2903    1300    2902
    1329    2900    1367    2898    1418    2897    1468    2896    1489    2894
    1548    2892    1558    2890    1562    2889    1564    2890    1568    2892
    1578    2894    1586    2896    1605    2898    1675    2900    1698    2902
    1714    2904

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1058     .03    1103    .083    1468    .061    1586    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1040    1244             103     103      70             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1246    1714    2910       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1209    1245    2912

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************
* E.G. Elev (ft)         * 2902.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.15  * Wt. n-Val.             *          *   0.044  *          *
* W.S. Elev (ft)         * 2902.38  * Reach Len. (ft)        *  103.00  *  103.00  *   70.00  *
* Crit W.S. (ft)         * 2902.37  * Flow Area (sq ft)      *          *   38.88  *          *
* E.G. Slope (ft/ft)     *0.039222  * Area (sq ft)           *          *   38.88  * 2181.80  *
* Q Total (cfs)          *  120.82  * Flow (cfs)             *          *  120.82  *          *
* Top Width (ft)         *  533.12  * Top Width (ft)         *          *  122.98  *  410.14  *
* Vel Total (ft/s)       *    3.11  * Avg. Vel. (ft/s)       *          *    3.11  *          *
* Max Chl Dpth (ft)      *   13.38  * Hydr. Depth (ft)       *          *    0.32  *          *
* Conv. Total (cfs)      *   610.1  * Conv. (cfs)            *          *   610.1  *          *
* Length Wtd. (ft)       *  103.00  * Wetted Per. (ft)       *          *  123.39  *          *
* Min Ch El (ft)         * 2902.00  * Shear (lb/sq ft)       *          *    0.77  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    2.40  *          *
* Frctn Loss (ft)        *    6.75  * Cum Volume (acre-ft)   *    0.85  *    4.54  *   15.72  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *          *    4.05  *    3.53  *
*****************************************************************************************

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.

LATERAL STRUCTURE


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.571

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =       5
Weir Coefficient          =       2
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =       2
     Sta    Elev     Sta    Elev
********************************
       0    2912     103    2912

Weir crest shape                           = Broad Crested


LATERAL STRUCTURE OUTPUT  Profile #100-yr  Lat Struct
*******************************************************************************
* E.G. US. (ft)              * 2902.53  * Weir Sta US (ft)           *          *
* W.S. US. (ft)              * 2902.38  * Weir Sta DS (ft)           *          *
* E.G. DS (ft)               * 2895.78  * Min El Weir Flow (ft)      * 2912.00  *
* W.S. DS (ft)               * 2895.54  * Wr Top Wdth (ft)           *          *
* Q US (cfs)                 *  120.82  * Weir Max Depth (ft)        *          *
* Q Leaving Total (cfs)      *    0.00  * Weir Avg Depth (ft)        *          *
* Q DS (cfs)                 *  120.82  * Weir Flow Area (sq ft)     *          *
* Perc Q Leaving             *    0.00  * Weir Coef                  *   2.000  *
* Q Weir (cfs)               *    0.00  * Weir Submerg               *          *
* Q Gates (cfs)              *          * Q Gate Group (cfs)         *          *
* Q Culv (cfs)               *    0.00  * Gate Open Ht (ft)          *          *
* Q Lat RC (cfs)             *          * Gate #Open                 *          *
```

```
*                            *          * Gate Area (sq ft)         *          *
* Q Breach (cfs)             *          * Gate Submerg              *          *
* Breach Avg Velocity (ft/s) *          * Gate Invert (ft)          *          *
* Breach Flow Area (sq ft)   *          * Gate Weir Coef            *          *
*********************************************************************************
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Coronado Split F
REACH: Cor Split Reach   RS: 0.561

INPUT
Description: Main chnl x-sect 4.189

```
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2900    1003    2899    1039    2899    1052    2898    1067    2896
    1076    2895    1125    2895    1146    2896    1164    2898    1182    2899
    1189    2899    1203    2898    1209    2897    1222    2897    1232    2898
    1290  2899.5    1308    2899    1334    2898    1351    2896    1411    2894
    1461    2892    1509    2890    1522    2888    1527    2886    1533    2884
    1544  2883.5    1554    2884    1563    2886    1570    2888    1574    2890
    1611    2892    1639    2894    1651    2896    1657    2898    1666    2900
    1698    2900    1734    2898    1765    2898    1801    2900

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
****************************************************************
    1000     .03    1039    .083    1509    .061    1574    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1039    1290             178     178     150             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1290    1801    2900       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1198    1243    2912

CROSS SECTION OUTPUT  Profile #100-yr
*****************************************************************************************************
* E.G. Elev (ft)         * 2895.78  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.              *          *   0.083  *          *
* W.S. Elev (ft)         * 2895.54  * Reach Len. (ft)         *  178.00  *  178.00  *  150.00  *
* Crit W.S. (ft)         * 2895.54  * Flow Area (sq ft)       *          *   30.79  *          *
* E.G. Slope (ft/ft)     *0.130710  * Area (sq ft)            *          *   30.79  * 1245.86  *
* Q Total (cfs)          *  120.82  * Flow (cfs)              *          *  120.82  *          *
* Top Width (ft)         *  348.59  * Top Width (ft)          *          *   65.18  *  283.42  *
* Vel Total (ft/s)       *    3.92  * Avg. Vel. (ft/s)        *          *    3.92  *          *
* Max Chl Dpth (ft)      *   12.04  * Hydr. Depth (ft)        *          *    0.47  *          *
* Conv. Total (cfs)      *   334.2  * Conv. (cfs)             *          *   334.2  *          *
* Length Wtd. (ft)       *  178.00  * Wetted Per. (ft)        *          *   65.22  *          *
* Min Ch El (ft)         * 2895.00  * Shear (lb/sq ft)        *          *    3.85  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *   15.12  *          *
* Frctn Loss (ft)        *    7.10  * Cum Volume (acre-ft)    *    0.85  *    4.46  *   12.97  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *          *    3.83  *    2.98  *
*****************************************************************************************************
```

Warning: The energy equation could not be balanced within the specified number of iterations. The
         program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth. This indicates that there
         is not a valid subcritical answer. The program defaulted to critical depth.

LATERAL STRUCTURE

RIVER: Coronado Split F
REACH: Cor Split Reach   RS: 0.544

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 5
Weir Coefficient = 2
Weir Flow Reference = Energy Grade
Weir Embankment Coordinates num = 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2912	.1	2899.5	70	2898	124	2896	126	2895.8
126.1	2904	178	2904						

Weir crest shape = Broad Crested

LATERAL STRUCTURE OUTPUT Profile #100-yr Lat Struct

E.G. US. (ft)	2895.78	Weir Sta US (ft)	
W.S. US. (ft)	2895.54	Weir Sta DS (ft)	
E.G. DS (ft)	2887.93	Min El Weir Flow (ft)	2895.80
W.S. DS (ft)	2887.79	Wr Top Wdth (ft)	
Q US (cfs)	120.82	Weir Max Depth (ft)	
Q Leaving Total (cfs)	0.00	Weir Avg Depth (ft)	
Q DS (cfs)	120.82	Weir Flow Area (sq ft)	
Perc Q Leaving	0.00	Weir Coef	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Gate Group (cfs)	
Q Culv (cfs)	0.00	Gate Open Ht (ft)	
Q Lat RC (cfs)		Gate #Open	
		Gate Area (sq ft)	
Q Breach (cfs)		Gate Submerg	
Breach Avg Velocity (ft/s)		Gate Invert (ft)	
Breach Flow Area (sq ft)		Gate Weir Coef	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Coronado Split F
REACH: Cor Split Reach RS: 0.527

INPUT
Description: Main chnl x-sect 4.169
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2894	1029	2892	1061	2890	1170	2890	1185	2888
1206	2886.5	1221	2886.5	1238	2888	1250	2890	1250.86	2890.091
1269	2892	1283	2892	1295	2890	1304	2889.9	1318	2890
1326	2892	1335	2894	1350	2895	1367	2895	1397	2894
1411	2892	1422	2890	1463	2888	1491	2887	1511	2888
1520	2890	1537	2890	1551	2888	1564	2886	1586	2884
1595	2882	1607	2880	1631	2878	1634	2877.6	1641	2878
1646	2880	1651	2882	1656	2884	1661	2886	1686	2888
1715	2890	1746	2892	1754	2894	1763	2896	1781	2898
1809	2898	1821	2896	1911	2896				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.083	1170	.061	1350	.083

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1170	1350	240	238	165	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1350	1911	2895	T

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
1058	1170	2896	1336	1400	2904	1558	1570	2896
1715	1781	2900						

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	2887.93	Element	Left OB	Channel	Right OB

```
* Vel Head (ft)          *    0.14  * Wt. n-Val.             *          *  0.061  *          *
* W.S. Elev (ft)         * 2887.79  * Reach Len. (ft)        *  240.00  * 238.00  *  165.00  *
* Crit W.S. (ft)         * 2887.46  * Flow Area (sq ft)      *          *  40.24  *          *
* E.G. Slope (ft/ft)     *0.019044  * Area (sq ft)           *          *  40.24  *  637.09  *
* Q Total (cfs)          *  120.82  * Flow (cfs)             *          * 120.82  *          *
* Top Width (ft)         *  204.25  * Top Width (ft)         *          *  47.58  *  156.67  *
* Vel Total (ft/s)       *    3.00  * Avg. Vel. (ft/s)       *          *   3.00  *          *
* Max Chl Dpth (ft)      *   10.19  * Hydr. Depth (ft)       *          *   0.85  *          *
* Conv. Total (cfs)      *   875.5  * Conv. (cfs)            *          *  875.5  *          *
* Length Wtd. (ft)       *  238.00  * Wetted Per. (ft)       *          *  47.68  *          *
* Min Ch El (ft)         * 2886.50  * Shear (lb/sq ft)       *          *   1.00  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   3.01  *          *
* Frctn Loss (ft)        *    8.08  * Cum Volume (acre-ft)   *    0.85  *   4.31  *    9.72  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *          *   3.60  *    2.22  *
**********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.482

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
******************************************************************************
    1000    2886 1033.54    2884 1051.43    2882  1075.9    2880 1094.16    2878
 1101.31    2878 1110.05    2880  1120.7    2882 1132.04    2884 1139.15    2886

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083  1075.9     .07 1110.05    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1051.43  1120.7              220     181     160             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2879.82  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.             *          *  0.070  *          *
* W.S. Elev (ft)         * 2879.37  * Reach Len. (ft)        *  220.00  * 181.00  *  160.00  *
* Crit W.S. (ft)         * 2879.37  * Flow Area (sq ft)      *          *  22.54  *          *
* E.G. Slope (ft/ft)     *0.076830  * Area (sq ft)           *          *  22.54  *          *
* Q Total (cfs)          *  120.82  * Flow (cfs)             *          * 120.82  *          *
* Top Width (ft)         *   25.68  * Top Width (ft)         *          *  25.68  *          *
* Vel Total (ft/s)       *    5.36  * Avg. Vel. (ft/s)       *          *   5.36  *          *
* Max Chl Dpth (ft)      *    1.37  * Hydr. Depth (ft)       *          *   0.88  *          *
* Conv. Total (cfs)      *   435.9  * Conv. (cfs)            *          *  435.9  *          *
* Length Wtd. (ft)       *  181.00  * Wetted Per. (ft)       *          *  25.91  *          *
* Min Ch El (ft)         * 2878.00  * Shear (lb/sq ft)       *          *   4.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  22.36  *          *
* Frctn Loss (ft)        *    2.95  * Cum Volume (acre-ft)   *    0.85  *   4.14  *    8.52  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *          *   3.40  *    1.92  *
**********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The 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: Coronado Split F
REACH: Cor Split Reach    RS: 0.448

INPUT
Description:
Station Elevation Data    num=      11
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    1000    2878 1013.15    2876 1024.41    2874 1036.15    2872 1049.85    2870
 1073.71    2868 1102.78    2868 1108.61    2870 1114.04    2872 1118.01    2874
 1121.98    2876

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083 1073.71     .07 1102.78    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1036.15 1114.04              160     130     120             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2869.65  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.05  * Wt. n-Val.            *          *   0.076  *          *
* W.S. Elev (ft)         * 2869.59  * Reach Len. (ft)       *  160.00  *  130.00  *  120.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     *          *   65.08  *          *
* E.G. Slope (ft/ft)     *0.006864  * Area (sq ft)          *          *   65.08  *          *
* Q Total (cfs)          *  120.82  * Flow (cfs)            *          *  120.82  *          *
* Top Width (ft)         *   52.70  * Top Width (ft)        *          *   52.70  *          *
* Vel Total (ft/s)       *    1.86  * Avg. Vel. (ft/s)      *          *    1.86  *          *
* Max Chl Dpth (ft)      *    1.59  * Hydr. Depth (ft)      *          *    1.23  *          *
* Conv. Total (cfs)      *  1458.3  * Conv. (cfs)           *          *  1458.3  *          *
* Length Wtd. (ft)       *  130.00  * Wetted Per. (ft)      *          *   53.03  *          *
* Min Ch El (ft)         * 2868.00  * Shear (lb/sq ft)      *          *    0.53  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *    0.98  *          *
* Frctn Loss (ft)        *    2.12  * Cum Volume (acre-ft)  *    0.85  *    3.96  *    8.52  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)        *          *    3.23  *    1.92  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.423

INPUT
Description:
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    1000    2872 1034.99    2870 1046.44    2868 1062.54    2866 1077.58    2866
 1087.07    2868 1096.19    2870 1102.95    2872

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083 1046.44     .07 1087.07    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1034.99 1096.19              152     129     125             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2867.48  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.            *          *   0.070  *          *
* W.S. Elev (ft)         * 2867.07  * Reach Len. (ft)       *  152.00  *  129.00  *  125.00  *
* Crit W.S. (ft)         * 2867.07  * Flow Area (sq ft)     *          *   23.42  *          *
* E.G. Slope (ft/ft)     *0.078212  * Area (sq ft)          *          *   23.42  *          *
* Q Total (cfs)          *  120.82  * Flow (cfs)            *          *  120.82  *          *
* Top Width (ft)         *   28.73  * Top Width (ft)        *          *   28.73  *          *
* Vel Total (ft/s)       *    5.16  * Avg. Vel. (ft/s)      *          *    5.16  *          *
* Max Chl Dpth (ft)      *    1.07  * Hydr. Depth (ft)      *          *    0.82  *          *
* Conv. Total (cfs)      *   432.0  * Conv. (cfs)           *          *   432.0  *          *
* Length Wtd. (ft)       *  129.00  * Wetted Per. (ft)      *          *   28.91  *          *
* Min Ch El (ft)         * 2866.00  * Shear (lb/sq ft)      *          *    3.96  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *   20.41  *          *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)  *    0.85  *    3.83  *    8.52  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)        *          *    3.11  *    1.92  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
```

```
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.399

INPUT
Description:
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2870 1005.43    2868 1010.86    2866 1016.29    2864 1021.65    2862
 1026.98    2860 1083.64    2858    1124    2857    1218  2856.5  1250.5    2858
 1269.94    2860 1280.25    2862  1288.4    2864    1296    2866    1307    2868

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083    1124     .07    1218    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1021.65 1280.25             119      86      82             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2858.51  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *         *   0.073  *          *
* W.S. Elev (ft)         * 2858.51  * Reach Len. (ft)        *  119.00 *   86.00  *   82.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *         *  251.83  *          *
* E.G. Slope (ft/ft)     *0.000333  * Area (sq ft)           *         *  251.83  *          *
* Q Total (cfs)          *  120.82  * Flow (cfs)             *         *  120.82  *          *
* Top Width (ft)         *  186.21  * Top Width (ft)         *         *  186.21  *          *
* Vel Total (ft/s)       *    0.48  * Avg. Vel. (ft/s)       *         *    0.48  *          *
* Max Chl Dpth (ft)      *    2.01  * Hydr. Depth (ft)       *         *    1.35  *          *
* Conv. Total (cfs)      *  6618.3  * Conv. (cfs)            *         *  6618.3  *          *
* Length Wtd. (ft)       *   86.00  * Wetted Per. (ft)       *         *  186.29  *          *
* Min Ch El (ft)         * 2856.50  * Shear (lb/sq ft)       *         *    0.03  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *    0.01  *          *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *    0.85 *    3.42  *    8.52  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *         *    2.79  *    1.92  *
*********************************************************************************************

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.

CROSS SECTION


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.382

INPUT
Description:
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2868 1006.63    2866 1013.26    2864 1019.89    2862 1030.18    2860
 1039.22    2858 1048.25    2856 1052.16    2856 1059.28    2858 1066.56    2860
 1073.85    2862 1081.71    2864 1089.87    2866 1098.03    2868

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083 1030.18     .06 1066.56    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1030.18 1066.56             155     161     150             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2858.36  * Element                * Left OB *  Channel * Right OB *
```

```
* Vel Head (ft)          *    0.56  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         * 2857.80  * Reach Len. (ft)        *  155.00  *  161.00  *  150.00  *
* Crit W.S. (ft)         * 2857.80  * Flow Area (sq ft)      *          *   20.18  *          *
* E.G. Slope (ft/ft)     *0.053593  * Area (sq ft)           *          *   20.18  *          *
* Q Total (cfs)          *  120.82  * Flow (cfs)             *          *  120.82  *          *
* Top Width (ft)         *   18.47  * Top Width (ft)         *          *   18.47  *          *
* Vel Total (ft/s)       *    5.99  * Avg. Vel. (ft/s)       *          *    5.99  *          *
* Max Chl Dpth (ft)      *    1.80  * Hydr. Depth (ft)       *          *    1.09  *          *
* Conv. Total (cfs)      *   521.9  * Conv. (cfs)            *          *   521.9  *          *
* Length Wtd. (ft)       *  161.00  * Wetted Per. (ft)       *          *   18.92  *          *
* Min Ch El (ft)         * 2856.00  * Shear (lb/sq ft)       *          *    3.57  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   21.37  *          *
* Frctn Loss (ft)        *    9.75  * Cum Volume (acre-ft)   *    0.85  *    3.15  *    8.52  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *          *    2.59  *    1.92  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.352

INPUT
Description:
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2856 1003.92    2854 1007.85    2852 1011.77    2850 1015.69    2848
    1066  2847.5    1074  2847.5  1084.4    2848 1098.57    2850 1109.05    2852
 1113.96    2854 1119.14    2856

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083 1011.77     .06 1098.57    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1007.85 1109.05              157     177     184             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2848.41  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.23  * Wt. n-Val.             *          *   0.060  *          *
* W.S. Elev (ft)         * 2848.18  * Reach Len. (ft)        *  157.00  *  177.00  *  184.00  *
* Crit W.S. (ft)         * 2848.18  * Flow Area (sq ft)      *          *   31.65  *          *
* E.G. Slope (ft/ft)     *0.068970  * Area (sq ft)           *          *   31.65  *          *
* Q Total (cfs)          *  120.82  * Flow (cfs)             *          *  120.82  *          *
* Top Width (ft)         *   70.33  * Top Width (ft)         *          *   70.33  *          *
* Vel Total (ft/s)       *    3.82  * Avg. Vel. (ft/s)       *          *    3.82  *          *
* Max Chl Dpth (ft)      *    0.68  * Hydr. Depth (ft)       *          *    0.45  *          *
* Conv. Total (cfs)      *   460.0  * Conv. (cfs)            *          *   460.0  *          *
* Length Wtd. (ft)       *  177.00  * Wetted Per. (ft)       *          *   70.40  *          *
* Min Ch El (ft)         * 2847.50  * Shear (lb/sq ft)       *          *    1.94  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    7.39  *          *
* Frctn Loss (ft)        *    4.21  * Cum Volume (acre-ft)   *    0.85  *    3.05  *    8.52  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *          *    2.43  *    1.92  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.
Note:    Manning's n values were composited to a single value in the main channel.

CROSS SECTION


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.319
```

```
INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2850 1008.01    2848 1016.02    2846 1058.34    2844 1104.08    2842
 1120.46    2842 1139.01    2844 1152.46    2846 1166.23    2848  1175.7    2850

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083 1016.02    .065 1139.01    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1016.02 1152.46              252     253     253             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2843.46  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.08  * Wt. n-Val.             *         *   0.065  *          *
* W.S. Elev (ft)         * 2843.38  * Reach Len. (ft)        *  252.00  *  253.00  *  253.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *         *   52.98  *          *
* E.G. Slope (ft/ft)     *0.011933  * Area (sq ft)           *         *   52.98  *          *
* Q Total (cfs)          *  120.82  * Flow (cfs)             *         *  120.82  *          *
* Top Width (ft)         *   60.62  * Top Width (ft)         *         *   60.62  *          *
* Vel Total (ft/s)       *    2.28  * Avg. Vel. (ft/s)       *         *    2.28  *          *
* Max Chl Dpth (ft)      *    1.38  * Hydr. Depth (ft)       *         *    0.87  *          *
* Conv. Total (cfs)      *  1106.0  * Conv. (cfs)            *         *  1106.0  *          *
* Length Wtd. (ft)       *  253.00  * Wetted Per. (ft)       *         *   60.72  *          *
* Min Ch El (ft)         * 2842.00  * Shear (lb/sq ft)       *         *    0.65  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *    1.48  *          *
* Frctn Loss (ft)        *    4.30  * Cum Volume (acre-ft)   *    0.85  *    2.88  *    8.52  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *         *    2.16  *    1.92  *
***********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Coronado Split F
REACH: Cor Split Reach    RS: 0.271

INPUT
Description:
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2846 1021.15    2844 1042.13    2842 1057.81    2840 1109.27    2838
  1134.2    2838 1149.47    2840 1158.94    2842 1166.01    2844 1171.84    2846
 1178.19    2848 1185.36    2850 1192.53    2852

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083 1057.81     .07 1149.47    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1042.13 1158.94              155     262     299             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2839.15  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.12  * Wt. n-Val.             *         *   0.070  *          *
* W.S. Elev (ft)         * 2839.03  * Reach Len. (ft)        *  155.00  *  262.00  *  299.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *         *   43.42  *          *
* E.G. Slope (ft/ft)     *0.026097  * Area (sq ft)           *         *   43.42  *          *
* Q Total (cfs)          *  120.82  * Flow (cfs)             *         *  120.82  *          *
* Top Width (ft)         *   59.32  * Top Width (ft)         *         *   59.32  *          *
* Vel Total (ft/s)       *    2.78  * Avg. Vel. (ft/s)       *         *    2.78  *          *
* Max Chl Dpth (ft)      *    1.03  * Hydr. Depth (ft)       *         *    0.73  *          *
* Conv. Total (cfs)      *   747.9  * Conv. (cfs)            *         *   747.9  *          *
* Length Wtd. (ft)       *  262.00  * Wetted Per. (ft)       *         *   59.41  *          *
* Min Ch El (ft)         * 2838.00  * Shear (lb/sq ft)       *         *    1.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *    3.31  *          *
* Frctn Loss (ft)        *    5.06  * Cum Volume (acre-ft)   *    0.85  *    2.60  *    8.52  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *         *    1.81  *    1.92  *
***********************************************************************************************
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION

RIVER: Coronado Split F
REACH: Cor Split Reach   RS: 0.221

INPUT
Description: @ Havasu Rd crossing
Station Elevation Data   num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2850	1010.68	2848	1022.32	2846	1034.08	2844	1046.07	2842
1054	2840	1068.91	2838	1088.29	2836	1115.96	2834	1124	2832.5
1132	2832.5	1155.41	2834	1174.63	2836	1209.98	2838		

Manning's n Values   num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.083	1088.29	.03	1155.41	.083

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1068.91	1209.98	219	185	166	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2834.07	Wt. n-Val.		0.030	
Vel Head (ft)	0.38	Reach Len. (ft)	219.00	185.00	166.00
W.S. Elev (ft)	2833.69	Flow Area (sq ft)		24.50	
Crit W.S. (ft)	2833.69	Area (sq ft)		24.50	
E.G. Slope (ft/ft)	0.014854	Flow (cfs)		120.82	
Q Total (cfs)	120.82	Top Width (ft)		33.04	
Top Width (ft)	33.04	Avg. Vel. (ft/s)		4.93	
Vel Total (ft/s)	4.93	Hydr. Depth (ft)		0.74	
Max Chl Dpth (ft)	1.19	Conv. (cfs)		991.3	
Conv. Total (cfs)	991.3	Wetted Per. (ft)		33.18	
Length Wtd. (ft)	184.72	Shear (lb/sq ft)		0.68	
Min Ch El (ft)	2832.50	Stream Power (lb/ft s)		3.38	
Alpha	1.00	Cum Volume (acre-ft)	0.85	2.40	8.52
Frctn Loss (ft)	2.73	Cum SA (acres)		1.54	1.92
C & E Loss (ft)	0.09				

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

CROSS SECTION

RIVER: Coronado Split F
REACH: Cor Split Reach   RS: 0.186

INPUT
Description: Main chnl x-sect 3.891
Station Elevation Data   num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2843.8	1010	2842	1021	2840	1033	2838	1041	2834
1046	2832	1051	2830	1062	2828	1088	2826	1100	2826
1147	2826.4	1157	2826.4	1167	2826	1200	2826	1321	2827.6
1347	2827.6	1408	2826	1519	2826	1538	2827	1550	2827
1560	2826	1577	2824	1596	2822	1613	2821	1630	2821
1639	2822	1662	2824	1697	2826	1753.5	2828	1764	2832
1775.3	2836	1790	2837.8						

Manning's n Values   num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.083	1046	.061	1147	.083

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1046	1147	383	383	200	.1	.3

Ineffective Flow   num= 1

```
   Sta L   Sta R    Elev  Permanent
    1152 1790.38    2830       T

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2827.00  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.08  * Wt. n-Val.            *          *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2826.92  * Reach Len. (ft)       *  383.00  *  383.00  *  200.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     *          *   50.10  *    2.58  *
* E.G. Slope (ft/ft)     *0.014669  * Area (sq ft)          *          *   50.10  *  721.46  *
* Q Total (cfs)          *  120.82  * Flow (cfs)            *          *  117.22  *    3.60  *
* Top Width (ft)         *  528.54  * Top Width (ft)        *          *   70.91  *  457.63  *
* Vel Total (ft/s)       *    2.29  * Avg. Vel. (ft/s)      *          *    2.34  *    1.40  *
* Max Chl Dpth (ft)      *    5.92  * Hydr. Depth (ft)      *          *    0.71  *    0.52  *
* Conv. Total (cfs)      *   997.6  * Conv. (cfs)           *          *   967.8  *    29.7  *
* Length Wtd. (ft)       *  380.27  * Wetted Per. (ft)      *          *   70.95  *    5.00  *
* Min Ch El (ft)         * 2826.00  * Shear (lb/sq ft)      *          *    0.65  *    0.47  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *         *    1.51  *    0.66  *
* Frctn Loss (ft)        *   10.72  * Cum Volume (acre-ft)  *    0.85  *    2.24  *    7.14  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)        *          *    1.31  *    1.05  *
**********************************************************************************************

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: Coronado Split F
REACH: Cor Split Reach    RS: 0.114

INPUT
Description: Main chnl x-sect 3.855
Station Elevation Data    num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    1000  2826.4  1007.5    2826    1017    2824    1039    2822    1059    2820
    1073    2818    1090    2816  1112.7  2815.4    1124  2815.4    1170    2816
    1197    2818    1238    2820    1288    2820    1396    2819    1429    2819
    1463    2818    1478  2816.3    1484  2816.3    1504    2818    1525    2820
    1556    2822    1576    2824    1583    2828    1590    2830    1610    2832
    1628  2832.3

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083    1059    .061    1238    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1059    1238              165     184     215             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1240 1628.74    2825       T

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2816.28  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.21  * Wt. n-Val.            *          *   0.061  *          *
* W.S. Elev (ft)         * 2816.07  * Reach Len. (ft)       *  165.00  *  184.00  *  215.00  *
* Crit W.S. (ft)         * 2816.07  * Flow Area (sq ft)     *          *   33.09  *          *
* E.G. Slope (ft/ft)     *0.074787  * Area (sq ft)          *          *   33.09  *          *
* Q Total (cfs)          *  120.82  * Flow (cfs)            *          *  120.82  *          *
* Top Width (ft)         *   81.55  * Top Width (ft)        *          *   81.55  *          *
* Vel Total (ft/s)       *    3.65  * Avg. Vel. (ft/s)      *          *    3.65  *          *
* Max Chl Dpth (ft)      *    0.67  * Hydr. Depth (ft)      *          *    0.41  *          *
* Conv. Total (cfs)      *   441.8  * Conv. (cfs)           *          *   441.8  *          *
* Length Wtd. (ft)       *  184.00  * Wetted Per. (ft)      *          *   81.57  *          *
* Min Ch El (ft)         * 2815.40  * Shear (lb/sq ft)      *          *    1.89  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *    6.92  *          *
* Frctn Loss (ft)        *    5.87  * Cum Volume (acre-ft)  *    0.85  *    1.87  *    5.49  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)        *          *    0.64  *          *
**********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
```

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Coronado Split F
REACH: Cor Split Reach RS: 0.079

INPUT
Description: Main chnl x-sect 3.813
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2824	1007.7	2820	1015.8	2816	1024	2814	1033	2812
1041	2810	1050	2808.4	1058	2808.4	1089	2810	1097	2812
1107	2814	1174	2814	1190	2812	1202	2810	1226	2810
1234	2812	1250	2814	1261	2814	1294	2812	1328	2812
1341	2813	1367	2813	1385	2812	1414	2810	1431.4	2810
1507	2812	1531	2816	1546	2820	1563	2822	1587	2824
1607	2824								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.083	1033	.061	1097	.083

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1033	1097	415	415	250	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1107	1762.93	2820	T

CROSS SECTION OUTPUT Profile #100-yr

			Left OB	Channel	Right OB
E.G. Elev (ft)	2810.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.061	
W.S. Elev (ft)	2809.91	Reach Len. (ft)	415.00	415.00	250.00
Crit W.S. (ft)		Flow Area (sq ft)		40.59	
E.G. Slope (ft/ft)	0.017603	Area (sq ft)		40.59	
Q Total (cfs)	120.82	Flow (cfs)		120.82	
Top Width (ft)	45.75	Top Width (ft)		45.75	
Vel Total (ft/s)	2.98	Avg. Vel. (ft/s)		2.98	
Max Chl Dpth (ft)	1.51	Hydr. Depth (ft)		0.89	
Conv. Total (cfs)	910.6	Conv. (cfs)		910.6	
Length Wtd. (ft)	415.00	Wetted Per. (ft)		45.93	
Min Ch El (ft)	2808.40	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)		2.89	
Frctn Loss (ft)	12.39	Cum Volume (acre-ft)	0.85	1.72	5.49
C & E Loss (ft)	0.02	Cum SA (acres)		0.38	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was 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: Coronado Split F
REACH: Cor Split Reach RS: 0

INPUT
Description: Main chnl x-sect 3.748, Sect upstream of Jct Cor Split Rtn
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2825	1020	2824	1028	2822	1036	2820	1044	2818
1053	2816	1067	2814	1077	2812	1112	2810	1116	2808
1120	2806	1125	2804	1129	2802	1133	2800	1137	2798
1149	2796	1155	2796	1186	2798	1203	2800	1249	2802
1479	2802	1561	2802	1567	2804	1573	2806	1578	2808
1583	2810	1589	2812	1603	2813				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.083	1133	.061	1203	.083

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

```
         1133    1203                0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2797.63  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.            *          *   0.061  *          *
* W.S. Elev (ft)         * 2797.26  * Reach Len. (ft)       *  480.00  *  480.00  *  480.00  *
* Crit W.S. (ft)         * 2797.26  * Flow Area (sq ft)     *          *   24.50  *          *
* E.G. Slope (ft/ft)     *0.061351  * Area (sq ft)          *          *   24.50  *          *
* Q Total (cfs)          *  120.82  * Flow (cfs)            *          *  120.82  *          *
* Top Width (ft)         *   33.01  * Top Width (ft)        *          *   33.01  *          *
* Vel Total (ft/s)       *    4.93  * Avg. Vel. (ft/s)      *          *    4.93  *          *
* Max Chl Dpth (ft)      *    1.26  * Hydr. Depth (ft)      *          *    0.74  *          *
* Conv. Total (cfs)      *   487.8  * Conv. (cfs)           *          *   487.8  *          *
* Length Wtd. (ft)       *  480.00  * Wetted Per. (ft)      *          *   33.15  *          *
* Min Ch El (ft)         * 2796.00  * Shear (lb/sq ft)      *          *    2.83  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *   13.96  *          *
* Frctn Loss (ft)        *    4.40  * Cum Volume (acre-ft)  *    0.85  *    1.41  *    5.49  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)        *          *          *          *
*********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 1       RS: 4.800

INPUT
Description: Upstream section in study reach
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    1000    3081 1008.39    3080 1011.63    3079 1014.87    3078    10163077.753
 1019.45    3077    1022    3076    10253075.279    10263075.039 1026.16    3075
 1030.48    3074 1042.84    3074 1061.67    3075    10623075.113 1064.59    3076
  1065.6    3077 1067.14    3078 1068.71    3079 1070.29    3080    1075    3082
 1075.01    3086    1076    3086 1076.01  3085.9 1079.58    3088 1081.19    3089
 1081.71    3090 1082.23    3091 1082.74    3092 1083.26    3093 1083.78    3094
  1084.3    3095 1084.95    3096

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    1000    .086 1008.39    .066 1070.29    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1008.39 1070.29               50      46      39             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 3080.88  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.87  * Wt. n-Val.            *          *   0.066  *          *
* W.S. Elev (ft)         * 3079.01  * Reach Len. (ft)       *   50.00  *   46.00  *   39.00  *
* Crit W.S. (ft)         * 3079.01  * Flow Area (sq ft)     *          *  211.62  *          *
* E.G. Slope (ft/ft)     *0.043326  * Area (sq ft)          *          *  211.62  *          *
* Q Total (cfs)          * 2324.00  * Flow (cfs)            *          * 2324.00  *          *
* Top Width (ft)         *   57.11  * Top Width (ft)        *          *   57.11  *          *
* Vel Total (ft/s)       *   10.98  * Avg. Vel. (ft/s)      *          *   10.98  *          *
* Max Chl Dpth (ft)      *    5.01  * Hydr. Depth (ft)      *          *    3.71  *          *
* Conv. Total (cfs)      * 11165.1  * Conv. (cfs)           *          * 11165.1  *          *
* Length Wtd. (ft)       *   46.00  * Wetted Per. (ft)      *          *   58.99  *          *
* Min Ch El (ft)         * 3074.00  * Shear (lb/sq ft)      *          *    9.70  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *  106.57  *          *
* Frctn Loss (ft)        *    1.72  * Cum Volume (acre-ft)  *    0.00  *    0.75  *    0.00  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)        *    0.01  *    1.43  *    0.11  *
*********************************************************************************************

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

```
CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 1       RS: 4.792

INPUT
Description: 76
Station Elevation Data    num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000  3082.2 1001.98    3082 1007.91  3082.2 1008.91  3082.2 1008.92    3078
    10093077.204 1009.28    3077 1010.64    3076 1015.52    3075 1018.11    3074
  1020.4    3073 1021.99    3072  1024.8    3071    10253070.929 1027.61    3070
 1030.83    3069 1034.68    3069 1038.66    3070 1039.07    3070    1040    3070
 1044.33    3070 1046.22    3071 1048.11    3072 1049.99    3073    10503073.005
 1051.88    3074    10533074.593 1053.77    3075 1055.66    3076 1057.55    3077
 1059.43    3078 1061.14    3079 1064.05  3079.8 1064.06  3082.5 1065.05  3082.5
 1065.06  3082.4 1067.55    3083  1069.3    3084 1071.06    3085 1072.79    3086

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086 1010.64    .066 1055.66    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1010.64 1055.66               43      47      50             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
********************************************************************************************
* E.G. Elev (ft)         * 3078.41  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.86  * Wt. n-Val.            *   0.086  *   0.066  *   0.086  *
* W.S. Elev (ft)         * 3076.55  * Reach Len. (ft)       *   43.00  *   47.00  *   50.00  *
* Crit W.S. (ft)         * 3076.16  * Flow Area (sq ft)     *    0.20  *  212.07  *    0.28  *
* E.G. Slope (ft/ft)     *0.032590  * Area (sq ft)          *    0.20  *  212.07  *    0.28  *
* Q Total (cfs)          * 2324.00  * Flow (cfs)            *    0.23  * 2323.43  *    0.34  *
* Top Width (ft)         *   46.80  * Top Width (ft)        *    0.74  *   45.02  *    1.03  *
* Vel Total (ft/s)       *   10.93  * Avg. Vel. (ft/s)      *    1.14  *   10.96  *    1.21  *
* Max Chl Dpth (ft)      *    7.55  * Hydr. Depth (ft)      *    0.27  *    4.71  *    0.27  *
* Conv. Total (cfs)      * 12873.5  * Conv. (cfs)           *     1.3  * 12870.3  *     1.9  *
* Length Wtd. (ft)       *   47.00  * Wetted Per. (ft)      *    0.92  *   47.92  *    1.17  *
* Min Ch El (ft)         * 3069.00  * Shear (lb/sq ft)      *    0.45  *    9.00  *    0.49  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *   0.51  *   98.66  *    0.59  *
* Frctn Loss (ft)        *    1.74  * Cum Volume (acre-ft)  *    0.00  *    0.53  *    0.00  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)        *    0.00  *    1.37  *    0.11  *
********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 1       RS: 4.783

INPUT
Description: 75
Station Elevation Data    num=      31
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3082 1009.09    3082    1014    3080    1015    3080 1015.01  3077.8
    1017    3076    1020    3074  1021.5    3073    1023    3072    1025    3071
    1027    3070    1033    3068    1045    3067 1046.47    3067    1049    3068
    1051    3069    1053    3070    1054    3071    1055    3072  1056.5    3073
    1058    3074    1059    3075  1060.6    3076  1061.5    3077    1063    3078
 1063.65    3079  1065.9  3079.9 1065.91    3083 1066.91    3083 1066.92  3082.9
    1070    3084

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086    1020    .066    1058    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1020    1058               23      24      24             .3       .5

CROSS SECTION OUTPUT  Profile #100-yr
********************************************************************************************
```

```
* E.G. Elev (ft)         * 3076.62  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.44  * Wt. n-Val.              *   0.086  *   0.066  *   0.086  *
* W.S. Elev (ft)         * 3074.17  * Reach Len. (ft)         *   23.00  *   24.00  *   24.00  *
* Crit W.S. (ft)         * 3074.17  * Flow Area (sq ft)       *    0.02  *  185.30  *    0.01  *
* E.G. Slope (ft/ft)     *0.042258  * Area (sq ft)            *    0.02  *  185.30  *    0.01  *
* Q Total (cfs)          * 2324.00  * Flow (cfs)              *    0.01  * 2323.98  *    0.01  *
* Top Width (ft)         *   38.43  * Top Width (ft)          *    0.26  *   38.00  *    0.17  *
* Vel Total (ft/s)       *   12.54  * Avg. Vel. (ft/s)        *    0.61  *   12.54  *    0.55  *
* Max Chl Dpth (ft)      *    7.17  * Hydr. Depth (ft)        *    0.09  *    4.88  *    0.09  *
* Conv. Total (cfs)      * 11305.3  * Conv. (cfs)             *     0.1  * 11305.1  *     0.0  *
* Length Wtd. (ft)       *   24.00  * Wetted Per. (ft)        *    0.31  *   41.54  *    0.24  *
* Min Ch El (ft)         * 3067.00  * Shear (lb/sq ft)        *    0.19  *   11.77  *    0.16  *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *    0.12  *  147.59  *    0.09  *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)    *    0.00  *    0.31  *    0.00  *
* C & E Loss (ft)        *    0.42  * Cum SA (acres)          *    0.00  *    1.33  *    0.11  *
**********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 1       RS: 4.778

INPUT
Description: 74
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000  3081.5    1012    3082    1020  3065.5    1024  3065.2    1048  3065.2
    1060    3085    1068    3085

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086    1012    .066    1060    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1012    1060               60      60      60             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000    1020    3075       T
    1048    1068    3075       T

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 3074.98  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.61  * Wt. n-Val.              *          *   0.066  *          *
* W.S. Elev (ft)         * 3073.37  * Reach Len. (ft)         *   60.00  *   60.00  *   60.00  *
* Crit W.S. (ft)         * 3071.19  * Flow Area (sq ft)       *          *  228.08  *          *
* E.G. Slope (ft/ft)     *0.012505  * Area (sq ft)            *          *  263.29  *          *
* Q Total (cfs)          * 2324.00  * Flow (cfs)              *          * 2324.00  *          *
* Top Width (ft)         *   36.76  * Top Width (ft)          *          *   36.76  *          *
* Vel Total (ft/s)       *   10.19  * Avg. Vel. (ft/s)        *          *   10.19  *          *
* Max Chl Dpth (ft)      *    8.17  * Hydr. Depth (ft)        *          *    8.15  *          *
* Conv. Total (cfs)      * 20782.4  * Conv. (cfs)             *          * 20782.4  *          *
* Length Wtd. (ft)       *   60.00  * Wetted Per. (ft)        *          *   28.01  *          *
* Min Ch El (ft)         * 3065.20  * Shear (lb/sq ft)        *          *    6.36  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *   64.77  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *          *    0.19  *          *
* C & E Loss (ft)        *          * Cum SA (acres)          *    0.00  *    1.31  *    0.11  *
**********************************************************************************************

CULVERT


RIVER: Finger Rock Wash
REACH: Main Reach 1       RS: 4.771

INPUT
Description: Playa de Coronado Crossing @ HEC-1 Sta. RES-9
```

```
Distance from Upstream XS =     6.5
Deck/Roadway Width        =      35
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
************************************************************************
     920    3082             965    3081            1100    3080

Upstream Bridge Cross Section Data
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000  3081.5    1012    3082    1020  3065.5    1024  3065.2    1048  3065.2
    1060    3085    1068    3085

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086    1012    .066    1060    .086

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1012    1060             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000    1020    3075       T
    1048    1068    3075       T

Downstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
************************************************************************
     950    3082            1001    3081            1125    3080

Downstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3079    1029    3063    1044  3062.2    1072  3062.2    1087    3079
    1094  3079.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086    1000    .066    1087    .086

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1000    1087             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000    1044  3072.5       T
    1072    1094  3072.5       T

Upstream Embankment side slope              =      .5 horiz. to 1.0 vertical
Downstream Embankment side slope            =      .5 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
PlCoronadoMC    Low Arch     9.5   28.08
FHWA Chart # 52- Low and high corrugated metal arch
FHWA Scale # 4 - Beveled edges; 90 Degree headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  3    52.5     .024     .035        0                   .2                1
Upstream   Elevation =  3065.2
           Centerline Station =  1034
Downstream Elevation =  3062.7
           Centerline Station =  1058

CULVERT OUTPUT  Profile #100-yr  Culv Group:  PlCoronadoMC
*************************************************************************
* Q Culv Group (cfs)     * 2324.00  * Culv Full Len (ft)     *          *
* # Barrels              *       1  * Culv Vel US (ft/s)     *   14.80  *
* Q Barrel (cfs)         * 2324.00  * Culv Vel DS (ft/s)     *   18.78  *
* E.G. US. (ft)          * 3074.99  * Culv Inv El Up (ft)    * 3065.20  *
* W.S. US. (ft)          * 3073.37  * Culv Inv El Dn (ft)    * 3062.70  *
```

```
* E.G. DS (ft)           * 3071.17  * Culv Frctn Ls (ft)     *    1.72  *
* W.S. DS (ft)           * 3068.17  * Culv Exit Loss (ft)    *    1.42  *
* Delta EG (ft)          *    3.82  * Culv Entr Loss (ft)    *    0.68  *
* Delta WS (ft)          *    5.20  * Q Weir (cfs)           *          *
* E.G. IC (ft)           * 3074.97  * Weir Sta Lft (ft)      *          *
* E.G. OC (ft)           * 3074.99  * Weir Sta Rgt (ft)      *          *
* Culvert Control        *  Outlet  * Weir Submerg           *          *
* Culv WS Inlet (ft)     * 3070.91  * Weir Max Depth (ft)    *          *
* Culv WS Outlet (ft)    * 3067.11  * Weir Avg Depth (ft)    *          *
* Culv Nml Depth (ft)    *    4.15  * Weir Flow Area (sq ft) *          *
* Culv Crt Depth (ft)    *    5.71  * Min El Weir Flow (ft)  * 3080.33  *
*************************************************************************

Warning: Since the culvert has supercritical flow, the program should be run in mixed flow in order to
         check if the cross section downstream of the culvert has supercritical flow.
Note:    The flow in the culvert is entirely supercritical.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 1       RS: 4.767

INPUT
Description: 73
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3079    1029    3063    1044  3062.2    1072  3062.2    1087    3079
    1094  3079.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086    1000    .066    1087    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1000    1087               35      60      63             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000    1044  3072.5       T
    1072    1094  3072.5       T

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 3071.17  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.01  * Wt. n-Val.             *          *   0.066  *          *
* W.S. Elev (ft)         * 3068.17  * Reach Len. (ft)        *   35.00  *   60.00  *   63.00  *
* Crit W.S. (ft)         * 3068.17  * Flow Area (sq ft)      *          *  167.01  *          *
* E.G. Slope (ft/ft)     *0.035317  * Area (sq ft)           *          *  290.53  *          *
* Q Total (cfs)          * 2324.00  * Flow (cfs)             *          * 2324.00  *          *
* Top Width (ft)         *   57.69  * Top Width (ft)         *          *   57.69  *          *
* Vel Total (ft/s)       *   13.92  * Avg. Vel. (ft/s)       *          *   13.92  *          *
* Max Chl Dpth (ft)      *    5.96  * Hydr. Depth (ft)       *          *    5.96  *          *
* Conv. Total (cfs)      * 12366.4  * Conv. (cfs)            *          * 12366.4  *          *
* Length Wtd. (ft)       *   60.00  * Wetted Per. (ft)       *          *   28.00  *          *
* Min Ch El (ft)         * 3062.20  * Shear (lb/sq ft)       *          *   13.15  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  183.00  *          *
* Frctn Loss (ft)        *    2.36  * Cum Volume (acre-ft)   *    0.09  *    5.10  *    0.71  *
* C & E Loss (ft)        *    0.72  * Cum SA (acres)         *    0.00  *    1.24  *    0.11  *
***********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 1       RS: 4.756

INPUT
Description: 72
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
******************************************************************************
    1000    3076    1006    3074  1009.5    3072    1013    3070    1016    3068
    1020    3066    1024    3064    1040    3062    1060    3060    1068    3059
    1075    3060    1092    3062    1098    3064    1103    3066    1111    3068
    1120    3070    1122    3072    1125    3074    1128    3077    1129    3077
 1129.01  3076.8

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086    1024    .066    1098    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1024    1098              35      39      40             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 3065.98  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.56  * Wt. n-Val.             *   0.086  *   0.066  *   0.086  *
* W.S. Elev (ft)         * 3064.42  * Reach Len. (ft)        *   35.00  *   39.00  *   40.00  *
* Crit W.S. (ft)         * 3064.42  * Flow Area (sq ft)      *    0.18  *  231.74  *    0.22  *
* E.G. Slope (ft/ft)     *0.043914  * Area (sq ft)           *    0.18  *  231.74  *    0.22  *
* Q Total (cfs)          * 2324.00  * Flow (cfs)             *    0.21  * 2323.52  *    0.27  *
* Top Width (ft)         *   75.90  * Top Width (ft)         *    0.84  *   74.00  *    1.06  *
* Vel Total (ft/s)       *   10.01  * Avg. Vel. (ft/s)       *    1.19  *   10.03  *    1.22  *
* Max Chl Dpth (ft)      *    5.42  * Hydr. Depth (ft)       *    0.21  *    3.13  *    0.21  *
* Conv. Total (cfs)      * 11090.1  * Conv. (cfs)            *     1.0  * 11087.8  *     1.3  *
* Length Wtd. (ft)       *   39.00  * Wetted Per. (ft)       *    0.94  *   74.80  *    1.14  *
* Min Ch El (ft)         * 3059.00  * Shear (lb/sq ft)       *    0.52  *    8.49  *    0.54  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.62  *   85.16  *    0.66  *
* Frctn Loss (ft)        *    1.80  * Cum Volume (acre-ft)   *    0.09  *    4.74  *    0.71  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *    0.00  *    1.15  *    0.11  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 1       RS: 4.748

INPUT
Description: 71
Station Elevation Data    num=      51
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
******************************************************************************
    1000    3070 1001.21    3069 1002.65    3068 1004.11    3067 1005.57    3066
 1007.21    3065 1008.84    3064 1011.16    3063 1013.54    3062 1015.76    3061
 1017.47    3060  1020.5    3059 1032.76    3059 1038.48    3059 1044.06    3058
    10453057.785 1048.43    3057  1052.8    3056    1060    3056 1072.03    3056
 1074.27    3057    10763057.772 1076.51    3058 1078.76    3059    10803059.408
  1081.8    3060 1088.46    3061    1096    3061 1115.44    3061 1116.95    3061
 1119.88    3061 1124.22    3061  1127.6    3062 1130.45    3063 1133.68    3064
 1135.12    3065 1136.18    3066 1137.24    3067  1138.3    3068 1139.49    3069
 1140.91    3070  1142.4    3071 1143.86    3072 1145.93    3073 1148.11    3074
 1151.16    3075 1154.01    3076 1156.51    3076 1160.55    3075 1164.91    3074
 1202.48    3073

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086 1015.76    .066 1124.22    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1015.76 1124.22              59      62      63             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 3062.63  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.21  * Wt. n-Val.             *   0.086  *   0.066  *   0.086  *
* W.S. Elev (ft)         * 3061.42  * Reach Len. (ft)        *   59.00  *   62.00  *   63.00  *
* Crit W.S. (ft)         * 3061.42  * Flow Area (sq ft)      *    0.19  *  262.84  *    0.29  *
* E.G. Slope (ft/ft)     *0.048301  * Area (sq ft)           *    0.19  *  262.84  *    0.29  *
* Q Total (cfs)          * 2324.00  * Flow (cfs)             *    0.24  * 2323.39  *    0.38  *
* Top Width (ft)         *  110.78  * Top Width (ft)         *    0.92  *  108.46  *    1.40  *
```

```
* Vel Total (ft/s)       *    8.83  * Avg. Vel. (ft/s)       *    1.25  *    8.84  *    1.29  *
* Max Chl Dpth (ft)      *    5.41  * Hydr. Depth (ft)       *    0.21  *    2.42  *    0.21  *
* Conv. Total (cfs)      * 10574.5  * Conv. (cfs)            *     1.1  * 10571.7  *     1.7  *
* Length Wtd. (ft)       *   62.06  * Wetted Per. (ft)       *    1.01  *  110.08  *    1.46  *
* Min Ch El (ft)         * 3056.00  * Shear (lb/sq ft)       *    0.57  *    7.20  *    0.60  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.71  *   63.64  *    0.78  *
* Frctn Loss (ft)        *    2.74  * Cum Volume (acre-ft)   *    0.09  *    4.52  *    0.71  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.00  *    1.07  *    0.10  *
**********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 1       RS: 4.737

INPUT
Description: 70
Station Elevation Data    num=      56
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
****************************************************************************
    1000    3071 1003.82    3070 1005.17    3069 1006.51    3068 1007.86    3067
 1009.21    3066 1010.41    3065 1011.55    3064 1013.28    3063  1014.8    3062
 1016.39    3061 1018.69    3060 1021.04    3059 1022.36    3058 1023.62    3057
 1024.87    3056    10263055.347  1026.6    3055 1028.61    3054    10303053.421
 1031.01    3053  1035.7    3052 1039.67    3051 1042.51    3050 1044.86    3050
    1045    3050 1048.43    3050 1051.09    3050 1053.73    3051 1056.75    3052
    10603052.607  1062.1    3053 1068.01    3053 1071.87    3053 1080.12    3054
    1088 3054.85 1089.39    3055 1101.44    3056 1105.78    3056 1116.37    3055
 1123.54    3054 1145.38    3054 1162.47    3055 1172.08    3056 1180.18    3057
 1185.64    3058 1186.71    3059 1187.78    3060 1188.85    3061 1190.11    3062
 1200.16    3063 1203.51    3063 1204.89    3063 1205.89    3063 1213.66    3063
 1219.56    3063

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086  1026.6    .066 1089.39    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        1026.6 1089.39               69      66      64             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 3057.09  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.34  * Wt. n-Val.             *   0.086  *   0.066  *   0.086  *
* W.S. Elev (ft)         * 3055.75  * Reach Len. (ft)        *   69.00  *   66.00  *   64.00  *
* Crit W.S. (ft)         * 3055.75  * Flow Area (sq ft)      *    0.49  *  205.40  *   77.65  *
* E.G. Slope (ft/ft)     *0.040601  * Area (sq ft)           *    0.49  *  205.40  *   77.65  *
* Q Total (cfs)          * 2324.00  * Flow (cfs)             *    0.80  * 2023.72  *  299.48  *
* Top Width (ft)         *  134.39  * Top Width (ft)         *    1.30  *   62.79  *   70.30  *
* Vel Total (ft/s)       *    8.20  * Avg. Vel. (ft/s)       *    1.65  *    9.85  *    3.86  *
* Max Chl Dpth (ft)      *    5.75  * Hydr. Depth (ft)       *    0.38  *    3.27  *    1.10  *
* Conv. Total (cfs)      * 11533.7  * Conv. (cfs)            *     4.0  * 10043.5  *  1486.3  *
* Length Wtd. (ft)       *   65.87  * Wetted Per. (ft)       *    1.50  *   64.18  *   70.51  *
* Min Ch El (ft)         * 3050.00  * Shear (lb/sq ft)       *    0.82  *    8.11  *    2.79  *
* Alpha                  *    1.29  * Stream Power (lb/ft s) *    1.35  *   79.93  *   10.77  *
* Frctn Loss (ft)        *    3.01  * Cum Volume (acre-ft)   *    0.09  *    4.18  *    0.66  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *    0.00  *    0.95  *    0.05  *
**********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
```

```
REACH: Main Reach 1       RS: 4.724

INPUT
Description: 69
Station Elevation Data    num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3060 1009.01    3059  1010.9    3058 1012.73    3057  1014.5    3056
 1016.51    3055 1019.01    3054 1020.98    3053 1022.54    3052 1025.21    3051
 1027.27    3050 1029.14    3049  1032.3    3048    10333047.876 1037.95    3047
 1040.36    3046 1044.75    3045 1057.63    3045    1060 3045.17 1071.56    3046
 1074.58    3047    10803047.194    10923047.625 1102.43    3048  1108.9    3048
 1115.87    3047 1126.66    3046 1135.97    3045 1162.62    3045 1166.91    3046
 1175.79    3047 1182.57    3048 1187.34    3049 1191.79    3050 1198.82    3051
 1206.89    3052 1209.09    3053 1210.55    3054 1213.35    3055 1216.77    3056
  1220.2    3057 1223.62    3058 1233.18    3058 1234.51    3058 1237.45    3058

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086 1027.27    .066 1191.79    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1027.27 1191.79              118     102     100             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 3049.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.97  * Wt. n-Val.             *          *   0.066  *          *
* W.S. Elev (ft)         * 3048.23  * Reach Len. (ft)        *  118.00  *  102.00  *  100.00  *
* Crit W.S. (ft)         * 3048.23  * Flow Area (sq ft)      *          *  294.00  *          *
* E.G. Slope (ft/ft)     *0.051673  * Area (sq ft)           *          *  294.00  *          *
* Q Total (cfs)          * 2324.00  * Flow (cfs)             *          * 2324.00  *          *
* Top Width (ft)         *  152.07  * Top Width (ft)         *          *  152.07  *          *
* Vel Total (ft/s)       *    7.90  * Avg. Vel. (ft/s)       *          *    7.90  *          *
* Max Chl Dpth (ft)      *    3.23  * Hydr. Depth (ft)       *          *    1.93  *          *
* Conv. Total (cfs)      * 10223.6  * Conv. (cfs)            *          * 10223.6  *          *
* Length Wtd. (ft)       *  102.00  * Wetted Per. (ft)       *          *  153.16  *          *
* Min Ch El (ft)         * 3045.00  * Shear (lb/sq ft)       *          *    6.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   48.95  *          *
* Frctn Loss (ft)        *    5.07  * Cum Volume (acre-ft)   *    0.09  *    3.80  *    0.60  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    0.00  *    0.79  *    0.00  *
***********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 1       RS: 4.705

INPUT
Description: 68
Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3051  1002.3    3050  1004.6    3049 1006.79    3048 1008.84    3047
 1010.43    3046 1012.76    3045 1016.23    3044 1018.62    3043 1021.45    3042
 1025.38    3041 1030.91    3040 1041.04    3039    1045 3038.61 1051.19    3038
 1069.75    3037    1070    3037  1071.1    3037 1076.34    3038 1081.78    3039
    1082    3039 1100.42    3039 1105.65    3038  1110.5    3038 1117.67    3039
    11183039.136 1120.09    3040  1122.5    3041 1124.63    3042    11283042.977
 1128.08    3043 1131.67    3044 1135.12    3045 1137.85    3046 1149.79    3047
  1152.8    3048  1155.8    3049 1158.85    3050  1163.3    3051 1167.32    3052
 1176.94    3052 1179.76    3052 1196.91    3053

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086 1016.23    .066 1131.67    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1016.23 1131.67               45      48      50             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
```

```
*********************************************************************************************
* E.G. Elev (ft)        * 3042.51  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *    1.31  * Wt. n-Val.            *          *   0.066  *          *
* W.S. Elev (ft)        * 3041.20  * Reach Len. (ft)       *   45.00  *   48.00  *   50.00  *
* Crit W.S. (ft)        * 3041.20  * Flow Area (sq ft)     *          *  252.94  *          *
* E.G. Slope (ft/ft)    *0.047923  * Area (sq ft)          *          *  252.94  *          *
* Q Total (cfs)         * 2324.00  * Flow (cfs)            *          * 2324.00  *          *
* Top Width (ft)        *   98.34  * Top Width (ft)        *          *   98.34  *          *
* Vel Total (ft/s)      *    9.19  * Avg. Vel. (ft/s)      *          *    9.19  *          *
* Max Chl Dpth (ft)     *    4.20  * Hydr. Depth (ft)      *          *    2.57  *          *
* Conv. Total (cfs)     * 10616.1  * Conv. (cfs)           *          * 10616.1  *          *
* Length Wtd. (ft)      *   48.00  * Wetted Per. (ft)      *          *   99.37  *          *
* Min Ch El (ft)        * 3037.00  * Shear (lb/sq ft)      *          *    7.62  *          *
* Alpha                 *    1.00  * Stream Power (lb/ft s) *         *   69.97  *          *
* Frctn Loss (ft)       *    2.22  * Cum Volume (acre-ft)  *    0.09  *    3.16  *    0.60  *
* C & E Loss (ft)       *    0.03  * Cum SA (acres)        *    0.00  *    0.49  *    0.00  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 1       RS: 4.696

INPUT
Description: 67
Station Elevation Data    num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3048 1001.79    3047 1004.06    3046 1006.14    3045 1007.16    3044
 1007.94    3043 1009.29    3042 1010.64    3041 1011.84    3040 1013.07    3039
 1014.71    3038 1016.46    3037 1018.15    3037 1019.98    3037 1024.69    3036
 1030.91    3035    10313034.982 1035.89    3034 1039.71    3033    10403032.963
 1047.58    3032 1051.22    3031 1052.03    3031    10553031.542 1057.51    3032
 1061.98    3033 1067.16    3034    10773034.927 1077.77    3035  1081.3    3036
 1084.83    3037 1088.37    3038  1091.9    3039 1094.09    3040  1095.9    3041
 1097.72    3042 1099.53    3043 1107.55    3044 1109.39    3045 1115.33    3046
 1118.59    3047 1125.62    3048

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086 1014.71    .066 1088.37    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1014.71 1088.37               74      72      68             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)        * 3039.02  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *    1.63  * Wt. n-Val.            *          *   0.066  *          *
* W.S. Elev (ft)        * 3037.39  * Reach Len. (ft)       *   74.00  *   72.00  *   68.00  *
* Crit W.S. (ft)        * 3037.39  * Flow Area (sq ft)     *          *  226.64  *          *
* E.G. Slope (ft/ft)    *0.044804  * Area (sq ft)          *          *  226.64  *          *
* Q Total (cfs)         * 2324.00  * Flow (cfs)            *          * 2324.00  *          *
* Top Width (ft)        *   70.42  * Top Width (ft)        *          *   70.42  *          *
* Vel Total (ft/s)      *   10.25  * Avg. Vel. (ft/s)      *          *   10.25  *          *
* Max Chl Dpth (ft)     *    6.39  * Hydr. Depth (ft)      *          *    3.22  *          *
* Conv. Total (cfs)     * 10979.4  * Conv. (cfs)           *          * 10979.4  *          *
* Length Wtd. (ft)      *   72.00  * Wetted Per. (ft)      *          *   71.81  *          *
* Min Ch El (ft)        * 3031.00  * Shear (lb/sq ft)      *          *    8.83  *          *
* Alpha                 *    1.00  * Stream Power (lb/ft s) *         *   90.53  *          *
* Frctn Loss (ft)       *    2.84  * Cum Volume (acre-ft)  *    0.09  *    2.90  *    0.60  *
* C & E Loss (ft)       *    0.00  * Cum SA (acres)        *    0.00  *    0.40  *    0.00  *
*********************************************************************************************

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

```
CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 1       RS: 4.682

INPUT
Description: 66
Station Elevation Data    num=      51
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3049 1004.45    3048 1007.47    3047 1009.51    3046 1011.33    3045
 1012.15    3044 1012.96    3043 1013.78    3042 1014.59    3041  1015.4    3040
 1016.22    3039 1017.03    3038 1017.84    3037 1018.66    3036    10193035.585
 1019.48    3035 1020.38    3034 1021.14    3033 1021.84    3032 1022.55    3031
 1023.25    3030 1024.64    3029    10263028.055 1026.08    3028 1027.48    3027
 1029.16    3026    10303025.494 1030.82    3025 1032.49    3024 1043.31    3023
 1044.16    3023 1047.17    3024 1050.19    3025  1053.2    3026    10553026.549
 1056.48    3027    10703027.883 1071.79    3028 1076.12    3029 1079.21    3030
 1081.61    3031  1083.8    3032 1085.34    3033 1086.87    3034 1088.41    3035
 1089.95    3036 1091.49    3037 1093.17    3038 1103.56    3039 1108.23    3040
 1113.14    3041

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086 1023.25    .066 1079.21    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1023.25 1079.21               47      49      53             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 3031.88  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.66  * Wt. n-Val.             *  0.086  *   0.066  *   0.086  *
* W.S. Elev (ft)         * 3030.22  * Reach Len. (ft)        *  47.00  *   49.00  *   53.00  *
* Crit W.S. (ft)         * 3029.95  * Flow Area (sq ft)      *   0.02  *  225.04  *    0.06  *
* E.G. Slope (ft/ft)     *0.035091  * Area (sq ft)           *   0.02  *  225.04  *    0.06  *
* Q Total (cfs)          * 2324.00  * Flow (cfs)             *   0.01  * 2323.95  *    0.04  *
* Top Width (ft)         *   56.64  * Top Width (ft)         *   0.15  *   55.96  *    0.53  *
* Vel Total (ft/s)       *   10.32  * Avg. Vel. (ft/s)       *   0.51  *   10.33  *    0.71  *
* Max Chl Dpth (ft)      *    7.22  * Hydr. Depth (ft)       *   0.11  *    4.02  *    0.11  *
* Conv. Total (cfs)      * 12406.3  * Conv. (cfs)            *    0.0  * 12406.0  *     0.2  *
* Length Wtd. (ft)       *   49.00  * Wetted Per. (ft)       *   0.27  *   58.73  *    0.57  *
* Min Ch El (ft)         * 3023.00  * Shear (lb/sq ft)       *   0.14  *    8.39  *    0.22  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *   0.07  *   86.69  *    0.16  *
* Frctn Loss (ft)        *    1.90  * Cum Volume (acre-ft)   *   0.09  *    2.53  *    0.60  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   0.00  *    0.30  *    0.00  *
***********************************************************************************************

Warning: The energy loss was 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: Finger Rock Wash
REACH: Main Reach 1       RS: 4.673

INPUT
Description: 65
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3046 1004.55    3045 1008.24    3044 1011.66    3043 1013.63    3042
 1015.18    3041 1017.18    3040 1019.09    3039 1020.79    3038 1022.46    3037
 1024.71    3036 1026.86    3035    10283034.441  1028.9    3034  1030.8    3033
 1032.15    3032  1033.6    3031 1035.13    3030 1036.67    3029  1038.2    3028
 1039.73    3027    10403026.887 1042.12    3026 1044.97    3025 1049.05    3024
 1054.13    3023    1060    3023    1065    3023 1070.73    3023 1077.27    3024
 1088.11    3025 1089.91    3026    10913026.602 1091.72    3027 1093.52    3028
 1095.32    3029 1097.13    3030 1098.93    3031 1100.73    3032 1102.54    3033
 1104.34    3034 1106.18    3035 1108.03    3036 1109.89    3037 1111.74    3038
 1113.59    3039 1122.04    3040 1130.16    3041

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086 1035.13    .066 1097.13    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1035.13 1097.13              173     155     129             .1       .3
```

```
CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 3029.95  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.91  * Wt. n-Val.             *         *   0.066  *          *
* W.S. Elev (ft)         * 3028.05  * Reach Len. (ft)        *  173.00 *  155.00  *  129.00  *
* Crit W.S. (ft)         * 3028.05  * Flow Area (sq ft)      *         *  209.66  *          *
* E.G. Slope (ft/ft)     *0.042979  * Area (sq ft)           *         *  209.66  *          *
* Q Total (cfs)          * 2324.00  * Flow (cfs)             *         * 2324.00  *          *
* Top Width (ft)         *   55.47  * Top Width (ft)         *         *   55.47  *          *
* Vel Total (ft/s)       *   11.08  * Avg. Vel. (ft/s)       *         *   11.08  *          *
* Max Chl Dpth (ft)      *    5.05  * Hydr. Depth (ft)       *         *    3.78  *          *
* Conv. Total (cfs)      * 11210.0  * Conv. (cfs)            *         * 11210.0  *          *
* Length Wtd. (ft)       *  155.00  * Wetted Per. (ft)       *         *   57.28  *          *
* Min Ch El (ft)         * 3023.00  * Shear (lb/sq ft)       *         *    9.82  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *  108.86  *          *
* Frctn Loss (ft)        *    6.85  * Cum Volume (acre-ft)   *    0.09 *    2.28  *    0.60  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *    0.00 *    0.23  *    0.00  *
*********************************************************************************************
```

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

CROSS SECTION

RIVER: Finger Rock Wash
REACH: Main Reach 1   RS: 4.643

INPUT
Description: Section upstream of Junction FR-9

```
Station Elevation Data    num=      41
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    1000    3021 1002.28    3020 1004.74    3019 1008.43    3018 1012.79    3017
 1016.83    3016    10173015.971 1022.78    3015 1030.93    3014 1039.85    3013
 1045.08    3012    1050    3012  1051.5    3012 1058.03    3012 1064.29    3011
 1069.52    3011  1075.4    3012    10803012.897 1080.53    3013 1085.37    3014
 1089.05    3015 1092.74    3016    10933016.071 1096.41    3017 1100.08    3018
 1103.74    3019 1107.04    3020 1109.55    3021    11123021.932 1112.18    3022
 1114.59    3023    1117    3024 1119.41    3025 1121.83    3026 1124.24    3027
 1126.53    3028 1128.77    3029    1131    3030 1133.24    3031 1135.47    3032
 1137.83    3033

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
    1000    .086 1016.83    .066 1092.74    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1016.83 1092.74                 0       0       0             .1       .3
```

```
CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 3017.64  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.56  * Wt. n-Val.             *   0.086 *   0.066  *   0.086  *
* W.S. Elev (ft)         * 3016.08  * Reach Len. (ft)        *  252.00 *  252.00  *  252.00  *
* Crit W.S. (ft)         * 3016.08  * Flow Area (sq ft)      *    0.01 *  231.85  *    0.01  *
* E.G. Slope (ft/ft)     *0.045460  * Area (sq ft)           *    0.01 *  231.85  *    0.01  *
* Q Total (cfs)          * 2324.00  * Flow (cfs)             *    0.01 * 2323.99  *    0.00  *
* Top Width (ft)         *   76.52  * Top Width (ft)         *    0.32 *   75.91  *    0.29  *
* Vel Total (ft/s)       *   10.02  * Avg. Vel. (ft/s)       *    0.42 *   10.02  *    0.42  *
* Max Chl Dpth (ft)      *    5.08  * Hydr. Depth (ft)       *    0.04 *    3.05  *    0.04  *
* Conv. Total (cfs)      * 10899.8  * Conv. (cfs)            *     0.0 * 10899.8  *     0.0  *
* Length Wtd. (ft)       *  252.00  * Wetted Per. (ft)       *    0.33 *   76.83  *    0.30  *
* Min Ch El (ft)         * 3011.00  * Shear (lb/sq ft)       *    0.11 *    8.56  *    0.11  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.05 *   85.84  *    0.05  *
* Frctn Loss (ft)        *    6.77  * Cum Volume (acre-ft)   *    0.09 *    1.50  *    0.60  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *         *          *          *
*********************************************************************************************
```

Warning: The energy equation could not be balanced within the specified number of iterations. The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section. This may indicate the need for additional cross sections.

```
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 2       RS: 4.596

INPUT
Description: Section downstream of Junction FR-9
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3005  1001.9    3004 1003.75    3003 1005.32    3002 1006.89    3001
    10083000.293 1008.46    3000 1010.02    2999 1011.57    2998 1013.05    2997
 1014.53    2996    10152995.682 1016.01    2995 1017.36    2994    1020 2993.18
 1020.58    2993 1023.23    2992 1025.88    2991 1026.84    2991    1031    2992
  1034.2    2993    10402993.278  1055.1    2994 1059.43    2995    10632995.329
 1070.27    2996 1076.26    2997 1100.79    2998 1113.29    2999 1117.92    3000
 1121.54    3001 1125.17    3002  1127.3    3003 1128.93    3004 1130.83    3005

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083 1017.36    .061  1055.1    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1017.36  1055.1             258     256     261             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 3002.81  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.32  * Wt. n-Val.             *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 3000.49  * Reach Len. (ft)        *  258.00  *  256.00  *  261.00  *
* Crit W.S. (ft)         * 3000.49  * Flow Area (sq ft)      *   30.61  *  285.62  *  207.09  *
* E.G. Slope (ft/ft)     *0.022146  * Area (sq ft)           *   30.61  *  285.62  *  207.09  *
* Q Total (cfs)          * 5284.00  * Flow (cfs)             *  155.30  * 3934.92  * 1193.78  *
* Top Width (ft)         *  112.00  * Top Width (ft)         *    9.67  *   37.74  *   64.59  *
* Vel Total (ft/s)       *   10.10  * Avg. Vel. (ft/s)       *    5.07  *   13.78  *    5.76  *
* Max Chl Dpth (ft)      *    9.49  * Hydr. Depth (ft)       *    3.17  *    7.57  *    3.21  *
* Conv. Total (cfs)      * 35507.0  * Conv. (cfs)            *  1043.6  * 26441.5  *  8021.9  *
* Length Wtd. (ft)       *  256.92  * Wetted Per. (ft)       *   11.65  *   38.55  *   65.07  *
* Min Ch El (ft)         * 2991.00  * Shear (lb/sq ft)       *    3.63  *   10.24  *    4.40  *
* Alpha                  *    1.47  * Stream Power (lb/ft s) *   18.44  *  141.12  *   25.37  *
* Frctn Loss (ft)        *    6.35  * Cum Volume (acre-ft)   *    0.51  *    4.51  *    1.59  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *    0.12  *    0.55  *    0.47  *
***********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 2       RS: 4.547

INPUT
Description: 62
Station Elevation Data    num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3000 1005.81    2999 1008.43    2998 1011.08    2997 1013.93    2996
 1016.54    2995 1018.19    2994 1019.73    2993    1021    2992 1022.27    2991
 1023.54    2990 1024.81    2989 1026.39    2988 1028.26    2987    10302986.064
 1030.12    2986 1031.99    2985 1033.89    2984    10352983.931    1050    2983
 1072.77    2984    10752984.308    10802984.999 1080.01    2985 1084.43    2986
  1086.4    2987 1089.24    2988 1091.53    2989 1093.63    2990 1099.25    2991
 1105.34    2992 1111.97    2993 1116.31    2994 1131.63    2995 1136.95    2996
 1141.21    2997 1145.05    2998  1147.2    2999 1149.28    3000 1149.37    3000

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
```

```
***********************************************
    1000    .083    1035    .061    1075    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1035    1075              202     203     209             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2993.88  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.10  * Wt. n-Val.             *  0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2990.78  * Reach Len. (ft)        * 202.00  *  203.00  *  209.00  *
* Crit W.S. (ft)         * 2990.78  * Flow Area (sq ft)      *  49.04  *  290.13  *   81.32  *
* E.G. Slope (ft/ft)     *0.027749  * Area (sq ft)           *  49.04  *  290.13  *   81.32  *
* Q Total (cfs)          * 5284.00  * Flow (cfs)             * 331.75  * 4406.19  *  546.07  *
* Top Width (ft)         *   75.44  * Top Width (ft)         *  12.45  *   40.00  *   23.00  *
* Vel Total (ft/s)       *   12.57  * Avg. Vel. (ft/s)       *   6.76  *   15.19  *    6.71  *
* Max Chl Dpth (ft)      *    7.78  * Hydr. Depth (ft)       *   3.94  *    7.25  *    3.54  *
* Conv. Total (cfs)      * 31720.2  * Conv. (cfs)            * 1991.5  * 26450.6  *  3278.1  *
* Length Wtd. (ft)       *  203.50  * Wetted Per. (ft)       *  14.35  *   40.07  *   24.07  *
* Min Ch El (ft)         * 2983.00  * Shear (lb/sq ft)       *   5.92  *   12.54  *    5.85  *
* Alpha                  *    1.27  * Stream Power (lb/ft s) *  40.04  *  190.49  *   39.30  *
* Frctn Loss (ft)        *    4.69  * Cum Volume (acre-ft)   *   0.28  *    2.82  *    0.73  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *   0.06  *    0.32  *    0.21  *
**********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 2       RS: 4.509

INPUT
Description: 61
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2992    1022    2977    1025    2974    1037    2972    1043    2971
    1050    2972    1052    2973    1055    2974    1060    2977    1063    2978
    1069    2980    1087    2980    1098    2980    1109    2982    1146    2990
    1156    2992    1184    2994

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    1000    .083    1022    .061    1060    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1022    1060               95      90      60             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2984.83  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.80  * Wt. n-Val.             *  0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2982.03  * Reach Len. (ft)        *  95.00  *   90.00  *   60.00  *
* Crit W.S. (ft)         * 2982.03  * Flow Area (sq ft)      *  18.55  *  342.14  *  101.97  *
* E.G. Slope (ft/ft)     *0.019448  * Area (sq ft)           *  18.55  *  342.14  *  101.97  *
* Q Total (cfs)          * 5284.00  * Flow (cfs)             *  75.43  * 4798.09  *  410.48  *
* Top Width (ft)         *   94.52  * Top Width (ft)         *   7.38  *   38.00  *   49.14  *
* Vel Total (ft/s)       *   11.42  * Avg. Vel. (ft/s)       *   4.07  *   14.02  *    4.03  *
* Max Chl Dpth (ft)      *   11.03  * Hydr. Depth (ft)       *   2.52  *    9.00  *    2.08  *
* Conv. Total (cfs)      * 37890.0  * Conv. (cfs)            *  540.9  * 34405.6  *  2943.4  *
* Length Wtd. (ft)       *   88.85  * Wetted Per. (ft)       *   8.93  *   40.79  *   49.81  *
* Min Ch El (ft)         * 2971.00  * Shear (lb/sq ft)       *   2.52  *   10.18  *    2.49  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *  10.26  *  142.81  *   10.01  *
* Frctn Loss (ft)        *    1.82  * Cum Volume (acre-ft)   *   0.12  *    1.34  *    0.29  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *   0.01  *    0.14  *    0.04  *
**********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
```

```
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 2       RS: 4.492

INPUT
Description: Section upstream of Junction Cor Split
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2989    1025    2976    1035    2974    1046    2972    1070    2970
    1073    2970    1091    2972    1118    2976    1207    2990

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083    1025     .05    1118    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1025    1118                0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
************************************************************************************************
* E.G. Elev (ft)         * 2979.46  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.28  * Wt. n-Val.             *   0.083  *   0.050  *   0.083  *
* W.S. Elev (ft)         * 2977.18  * Reach Len. (ft)        *          *          *          *
* Crit W.S. (ft)         * 2977.18  * Flow Area (sq ft)      *    1.33  *  434.42  *    4.40  *
* E.G. Slope (ft/ft)     *0.021636  * Area (sq ft)           *    1.33  *  434.42  *    4.40  *
* Q Total (cfs)          * 5284.00  * Flow (cfs)             *    2.27  * 5273.66  *    8.07  *
* Top Width (ft)         *  102.74  * Top Width (ft)         *    2.26  *   93.00  *    7.48  *
* Vel Total (ft/s)       *   12.01  * Avg. Vel. (ft/s)       *    1.71  *   12.14  *    1.83  *
* Max Chl Dpth (ft)      *    7.18  * Hydr. Depth (ft)       *    0.59  *    4.67  *    0.59  *
* Conv. Total (cfs)      * 35923.3  * Conv. (cfs)            *    15.4  * 35853.0  *    54.9  *
* Length Wtd. (ft)       *          * Wetted Per. (ft)       *    2.55  *   93.87  *    7.57  *
* Min Ch El (ft)         * 2970.00  * Shear (lb/sq ft)       *    0.70  *    6.25  *    0.78  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    1.20  *   75.89  *    1.44  *
* Frctn Loss (ft)        *    1.69  * Cum Volume (acre-ft)   *    0.10  *    0.54  *    0.22  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *          *          *          *
************************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: A flow split was encountered.  The program first calculated the momentum of both channels
         below the junction.  An energy balance was performed across the junction from the stream with
         the highest momentum downstream to the section upstream.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3       RS: 4.477

INPUT
Description: Section downstream of Junction Cor Split
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2980    1008    2976    1036    2974    1049    2972    1057  2970.8
    1070  2970.8    1091  2970.1    1093    2970    1104    2968    1108  2967.8
    1115    2968    1124    2970    1153    2972    1176    2974    1221    2984

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1049     .03    1091    .061    1124    .083    1153     .03
    1176    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1091    1124               33      35      36             .1       .3
Ineffective Flow     num=       1
```

```
   Sta L   Sta R    Elev  Permanent
    1000    1093    2980       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2976.49  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.75  * Wt. n-Val.            *          *   0.061  *   0.063  *
* W.S. Elev (ft)         * 2974.74  * Reach Len. (ft)       *   33.00  *   35.00  *   36.00  *
* Crit W.S. (ft)         * 2974.74  * Flow Area (sq ft)     *          *  189.95  *  149.55  *
* E.G. Slope (ft/ft)     *0.021572  * Area (sq ft)          *  194.29  *  199.32  *  149.55  *
* Q Total (cfs)          * 3361.56  * Flow (cfs)            *          * 2255.85  * 1105.71  *
* Top Width (ft)         *  153.64  * Top Width (ft)        *   65.32  *   33.00  *   55.32  *
* Vel Total (ft/s)       *    9.90  * Avg. Vel. (ft/s)      *          *   11.88  *    7.39  *
* Max Chl Dpth (ft)      *    6.94  * Hydr. Depth (ft)      *          *    6.13  *    2.70  *
* Conv. Total (cfs)      * 22887.5  * Conv. (cfs)           *          * 15359.2  *  7528.3  *
* Length Wtd. (ft)       *   35.21  * Wetted Per. (ft)      *          *   31.41  *   55.55  *
* Min Ch El (ft)         * 2967.80  * Shear (lb/sq ft)      *          *    8.14  *    3.63  *
* Alpha                  *    1.15  * Stream Power (lb/ft s) *         *   96.73  *   26.80  *
* Frctn Loss (ft)        *    0.82  * Cum Volume (acre-ft)  *   25.28  *   32.25  *   17.79  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)        *   12.94  *    6.99  *    5.33  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3       RS: 4.47

INPUT
Description: 58
Station Elevation Data    num=      27
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    1000    2980    1004    2978    1017    2976    1031    2974    1044    2972
    1053    2970    1063  2968.7    1076  2968.8    1089    2969    1093    2970
    1106    2972    1108    2973    1109  2973.5    1111  2973.5    1112    2973
    1115    2972    1119    2970    1126    2968    1138    2967    1146  2966.2
    1155    2967    1166    2968    1172    2970    1204    2972    1223    2974
    1255    2982    1268    2984

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
    1000    .083    1053     .03    1093    .083    1111    .061    1204     .03
    1223    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1111    1172               90     122     140             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1109    2980       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2974.58  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.71  * Wt. n-Val.            *          *   0.061  *   0.060  *
* W.S. Elev (ft)         * 2972.88  * Reach Len. (ft)       *   90.00  *  122.00  *  140.00  *
* Crit W.S. (ft)         * 2972.88  * Flow Area (sq ft)     *          *  289.43  *   63.71  *
* E.G. Slope (ft/ft)     *0.025122  * Area (sq ft)          *  198.67  *  289.43  *   63.71  *
* Q Total (cfs)          * 3523.65  * Flow (cfs)            *          * 3154.85  *  368.80  *
* Top Width (ft)         *  169.41  * Top Width (ft)        *   69.45  *   59.63  *   40.33  *
* Vel Total (ft/s)       *    9.98  * Avg. Vel. (ft/s)      *          *   10.90  *    5.79  *
* Max Chl Dpth (ft)      *    6.68  * Hydr. Depth (ft)      *          *    4.85  *    1.58  *
* Conv. Total (cfs)      * 22231.4  * Conv. (cfs)           *          * 19904.6  *  2326.8  *
* Length Wtd. (ft)       *  122.97  * Wetted Per. (ft)      *          *   61.01  *   40.44  *
* Min Ch El (ft)         * 2966.20  * Shear (lb/sq ft)      *          *    7.44  *    2.47  *
* Alpha                  *    1.10  * Stream Power (lb/ft s) *         *   81.10  *   14.30  *
* Frctn Loss (ft)        *    3.26  * Cum Volume (acre-ft)  *   25.13  *   32.05  *   17.70  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)        *   12.89  *    6.95  *    5.29  *
*********************************************************************************************

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the 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: Finger Rock Wash
REACH: Main Reach 3 RS: 4.447

INPUT
Description: 57
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2968	1016.98	2964.913	1022	2964	1026	2963.5	1057	2963.5
1061	2964	1079	2964.4	1096	2964	1150	2964	1173	2962
1176	2960	1179	2958	1185	2956	1190	2954.5	1198	2956
1211	2960	1230	2964	1247	2966	1288	2967	1306	2968
1317	2972								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1000	.083	1022	.03	1061	.083	1176	.061	1211	.083

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1176	1211	90	112	103	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	1079	2970	T

CROSS SECTION OUTPUT Profile #100-yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2966.53	Wt. n-Val.	0.083	0.061	0.083
Vel Head (ft)	2.90	Reach Len. (ft)	90.00	112.00	103.00
W.S. Elev (ft)	2963.63	Flow Area (sq ft)	23.21	235.86	31.33
Crit W.S. (ft)	2963.63	Area (sq ft)	27.43	235.86	31.33
E.G. Slope (ft/ft)	0.028049	Flow (cfs)	71.15	3314.70	137.80
Q Total (cfs)	3523.65	Top Width (ft)	54.88	35.00	17.25
Top Width (ft)	107.13	Avg. Vel. (ft/s)	3.07	14.05	4.40
Vel Total (ft/s)	12.13	Hydr. Depth (ft)	1.07	6.74	1.82
Max Chl Dpth (ft)	9.13	Conv. (cfs)	424.9	19791.9	822.8
Conv. Total (cfs)	21039.5	Wetted Per. (ft)	22.44	36.89	17.63
Length Wtd. (ft)	110.90	Shear (lb/sq ft)	1.81	11.20	3.11
Min Ch El (ft)	2954.50	Stream Power (lb/ft s)	5.55	157.34	13.69
Alpha	1.27	Cum Volume (acre-ft)	24.89	31.32	17.55
Frctn Loss (ft)	2.79	Cum SA (acres)	12.76	6.82	5.20
C & E Loss (ft)	0.29				

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the 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: Finger Rock Wash
REACH: Main Reach 3 RS: 4.426

INPUT
Description:
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2966	1006	2964	1012	2962	1012.43	2961.928	1024	2960
1036	2959	1053	2959	1063	2960	1067	2961	1073	2961
1078	2961	1083	2960	1098	2960	1115	2961	1170	2961
1185	2960	1210	2958	1219	2956	1233	2954	1246	2952
1253	2952	1265	2954	1273	2956	1281	2958	1286	2958

```
    1295    2957    1306    2957    1312    2958    1320    2960    1333    2962
    1420    2964    1453    2966    1478    2968

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1024     .03    1063    .083    1219    .061    1273    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1219    1273              102      90     100             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1115    2964       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1119    1178    2970

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2961.33  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.92  * Wt. n-Val.             *  0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2959.41  * Reach Len. (ft)        * 102.00  *   90.00  *  100.00  *
* Crit W.S. (ft)         * 2959.41  * Flow Area (sq ft)      *  34.13  *  309.17  *   85.49  *
* E.G. Slope (ft/ft)     *0.023024  * Area (sq ft)           *  42.97  *  309.17  *   85.49  *
* Q Total (cfs)          * 4089.64  * Flow (cfs)             * 108.65  * 3625.79  *  355.21  *
* Top Width (ft)         *  151.31  * Top Width (ft)         *  52.67  *   54.00  *   44.64  *
* Vel Total (ft/s)       *    9.54  * Avg. Vel. (ft/s)       *   3.18  *   11.73  *    4.15  *
* Max Chl Dpth (ft)      *    7.41  * Hydr. Depth (ft)       *   1.28  *    5.73  *    1.92  *
* Conv. Total (cfs)      * 26952.2  * Conv. (cfs)            *  716.0  * 23895.2  *  2340.9  *
* Length Wtd. (ft)       *   92.05  * Wetted Per. (ft)       *  26.91  *   54.71  *   45.20  *
* Min Ch El (ft)         * 2952.00  * Shear (lb/sq ft)       *   1.82  *    8.12  *    2.72  *
* Alpha                  *    1.36  * Stream Power (lb/ft s) *   5.80  *   95.27  *   11.30  *
* Frctn Loss (ft)        *    2.17  * Cum Volume (acre-ft)   *  24.82  *   30.61  *   17.41  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *  12.65  *    6.70  *    5.12  *
***********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3       RS: 4.409

INPUT
Description: 56
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2959    1004    2958    1012    2956 1016.412955.779    1032    2955
    1038  2954.8    1044    2955    1058    2955    1063    2954    1065    2954
    1077    2955    1080    2955    1128    2955    1139    2954    1204    2952
    1229    2950    1251    2948    1264  2947.5    1283    2950    1290  2951.5
    1327    2951    1355    2952    1399    2954    1435    2958    1473    2959

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1012     .03    1044    .083    1229    .061    1283    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1229    1283               98      90      75             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1128    2958       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1134    1204    2964

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2955.05  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.45  * Wt. n-Val.             *  0.083  *   0.061  *   0.083  *
```

```
* W.S. Elev (ft)         * 2953.59  * Reach Len. (ft)        *   98.00  *   90.00  *   75.00  *
* Crit W.S. (ft)         * 2953.59  * Flow Area (sq ft)      *   64.81  *  269.00  *  193.06  *
* E.G. Slope (ft/ft)     *0.024250  * Area (sq ft)           *   64.81  *  269.00  *  193.06  *
* Q Total (cfs)          * 4089.64  * Flow (cfs)             *  326.59  * 2966.60  *  796.45  *
* Top Width (ft)         *  186.04  * Top Width (ft)         *   25.00  *   54.00  *  107.04  *
* Vel Total (ft/s)       *    7.76  * Avg. Vel. (ft/s)       *    5.04  *   11.03  *    4.13  *
* Max Chl Dpth (ft)      *    6.09  * Hydr. Depth (ft)       *    2.59  *    4.98  *    1.80  *
* Conv. Total (cfs)      * 26262.0  * Conv. (cfs)            *  2097.2  * 19050.3  *  5114.5  *
* Length Wtd. (ft)       *   87.31  * Wetted Per. (ft)       *   26.67  *   54.26  *  107.25  *
* Min Ch El (ft)         * 2947.50  * Shear (lb/sq ft)       *    3.68  *    7.50  *    2.73  *
* Alpha                  *    1.55  * Stream Power (lb/ft s) *   18.54  *   82.77  *   11.24  *
* Frctn Loss (ft)        *    2.16  * Cum Volume (acre-ft)   *   24.69  *   30.02  *   17.09  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   12.56  *    6.59  *    4.95  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3       RS: 4.392

INPUT
Description:
Station Elevation Data    num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
******************************************************************************
    1000    2964    1030    2962    1040    2960    1049    2958    1056    2956
 1063.392954.153    1064    2954    1067    2953    1085    2952    1100  2951.5
    1108    2952    1110    2952    1112    2952    1122    2950    1130    2948
    1141  2947.7    1153    2948    1165    2950    1173    2952    1186    2952
    1230    2950    1288    2950    1296    2948    1303    2944    1307    2942
    1312    2940    1316    2940    1334    2942    1346    2944    1352    2945
    1362    2945    1370    2944    1380    2944    1392    2946    1421    2948
    1459    2950    1516    2950    1537    2952    1558    2954    1588    2956

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
******************************************************************************
    1000    .083    1067     .03    1108    .083    1303    .061    1346    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1303    1346              125     107      95              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1186    2960       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1180    1273    2964

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2950.22  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.17  * Wt. n-Val.             *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2948.05  * Reach Len. (ft)        *  125.00  *  107.00  *   95.00  *
* Crit W.S. (ft)         * 2948.05  * Flow Area (sq ft)      *   14.34  *  275.07  *  187.63  *
* E.G. Slope (ft/ft)     *0.025287  * Area (sq ft)           *   18.91  *  275.07  *  187.63  *
* Q Total (cfs)          * 4640.72  * Flow (cfs)             *   58.98  * 3608.54  *  973.20  *
* Top Width (ft)         *  149.59  * Top Width (ft)         *   30.67  *   43.00  *   75.91  *
* Vel Total (ft/s)       *    9.73  * Avg. Vel. (ft/s)       *    4.11  *   13.12  *    5.19  *
* Max Chl Dpth (ft)      *    8.05  * Hydr. Depth (ft)       *    1.99  *    6.40  *    2.47  *
* Conv. Total (cfs)      * 29183.6  * Conv. (cfs)            *   370.9  * 22692.7  *  6120.1  *
* Length Wtd. (ft)       *  107.60  * Wetted Per. (ft)       *    8.26  *   44.13  *   76.29  *
* Min Ch El (ft)         * 2940.00  * Shear (lb/sq ft)       *    2.74  *    9.84  *    3.88  *
* Alpha                  *    1.48  * Stream Power (lb/ft s) *   11.27  *  129.08  *   20.14  *
* Frctn Loss (ft)        *    2.51  * Cum Volume (acre-ft)   *   24.60  *   29.46  *   16.76  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *   12.50  *    6.49  *    4.79  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
```

```
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3       RS: 4.371

INPUT
Description: 55
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000  2951.5    1011    2950 1015.962949.708    1045    2948    1062    2947
    1082    2947    1101    2946 1106.822945.694    1139    2944    1155    2943
    1172    2944    1204    2945    1226    2945    1233    2944    1249    2942
    1271    2941    1324    2940    1336    2938    1346    2936    1356    2936
    1363    2938    1369    2940    1395    2942    1413    2943    1470    2944
    1498    2946    1512    2948    1526    2950    1535    2952    1543    2954
    1551    2956    1568    2957

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1045     .03    1101    .083    1324    .061    1369    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1324    1369              108      98     108             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1204    2955       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1155    1217    2953

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2945.25  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.59  * Wt. n-Val.             *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2943.66  * Reach Len. (ft)        *  108.00  *   98.00  *  108.00  *
* Crit W.S. (ft)         * 2943.66  * Flow Area (sq ft)      *  225.65  *  273.51  *  102.11  *
* E.G. Slope (ft/ft)     *0.021639  * Area (sq ft)           *  229.09  *  273.51  *  102.11  *
* Q Total (cfs)          * 4640.72  * Flow (cfs)             * 1110.07  * 3218.10  *  312.55  *
* Top Width (ft)         *  225.12  * Top Width (ft)         *   98.74  *   45.00  *   81.38  *
* Vel Total (ft/s)       *    7.72  * Avg. Vel. (ft/s)       *    4.92  *   11.77  *    3.06  *
* Max Chl Dpth (ft)      *    7.66  * Hydr. Depth (ft)       *    2.56  *    6.08  *    1.25  *
* Conv. Total (cfs)      * 31547.5  * Conv. (cfs)            *  7546.2  * 21876.6  *  2124.7  *
* Length Wtd. (ft)       *  100.29  * Wetted Per. (ft)       *   88.38  *   45.97  *   81.49  *
* Min Ch El (ft)         * 2936.00  * Shear (lb/sq ft)       *    3.45  *    8.04  *    1.69  *
* Alpha                  *    1.72  * Stream Power (lb/ft s) *   16.97  *   94.57  *    5.18  *
* Frctn Loss (ft)        *    2.59  * Cum Volume (acre-ft)   *   24.24  *   28.78  *   16.45  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   12.31  *    6.38  *    4.62  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3       RS: 4.353

INPUT
Description:
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2946 1021.972944.003    1022    2944    1036    2942    1055    2941
```

1072	2941	1081	2942	1090	2942	1100	2942	1127	2940
1158	2941	1172	2940	1201	2938	1211	2937.5	1225	2938
1260	2937	1277	2936	1291	2934	1322	2934	1357	2932
1373	2930	1377	2930	1385	2932	1393	2934	1405	2936
1435	2938	1505	2940	1523	2942	1547	2943	1587	2944
1602	2946	1615	2948						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1000	.083	1055	.03	1081	.083	1322	.061	1393	.083

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1322	1393	85	105	101	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	1158	2950	T

Blocked Obstructions num= 1

Sta L	Sta R	Elev
1175	1196	2948

CROSS SECTION OUTPUT Profile #100-yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2939.03	Wt. n-Val.	0.083	0.061	0.083
Vel Head (ft)	2.01	Reach Len. (ft)	85.00	105.00	101.00
W.S. Elev (ft)	2937.02	Flow Area (sq ft)	130.72	345.39	32.03
Crit W.S. (ft)	2937.02	Area (sq ft)	130.72	345.39	32.03
E.G. Slope (ft/ft)	0.030789	Flow (cfs)	669.03	4211.76	111.40
Q Total (cfs)	4992.19	Top Width (ft)	62.68	71.00	27.29
Top Width (ft)	160.98	Avg. Vel. (ft/s)	5.12	12.19	3.48
Vel Total (ft/s)	9.82	Hydr. Depth (ft)	2.09	4.86	1.17
Max Chl Dpth (ft)	7.02	Conv. (cfs)	3812.8	24003.1	634.9
Conv. Total (cfs)	28450.8	Wetted Per. (ft)	62.86	71.67	27.49
Length Wtd. (ft)	98.38	Shear (lb/sq ft)	4.00	9.26	2.24
Min Ch El (ft)	2930.00	Stream Power (lb/ft s)	20.46	112.95	7.79
Alpha	1.34	Cum Volume (acre-ft)	23.80	28.09	16.28
Frctn Loss (ft)	3.80	Cum SA (acres)	12.11	6.25	4.49
C & E Loss (ft)	0.09				

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

CROSS SECTION

RIVER: Finger Rock Wash
REACH: Main Reach 3 RS: 4.333

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2942	1018	2940	1035	2938	1036.14	2937.931	1068	2936
1076	2935.5	1110	2935.5	1115	2936	1128	2937	1130	2937
1175	2937	1180	2938	1227	2938	1233	2934	1245	2933.4
1256	2934	1276	2934	1323	2932	1352	2930	1360	2928
1384	2926.2	1406	2926.2	1413	2928	1422	2930	1432	2930
1439	2928	1448	2926	1450	2925.5	1451	2926	1469	2928
1489	2930	1502	2932	1516	2934	1531	2936	1561	2938
1567	2940	1573	2942	1591	2943				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1000	.083	1068	.03	1175	.083	1432	.061	1489	.083

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1432	1489	88	96	95	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	1227	2945	T

Blocked Obstructions num= 1

Sta L	Sta R	Elev

```
    1180    1227    2948

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2933.04  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.70  * Wt. n-Val.             *  0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2931.34  * Reach Len. (ft)        *  88.00  *   96.00  *   95.00  *
* Crit W.S. (ft)         * 2931.34  * Flow Area (sq ft)      * 310.70  *  197.12  *    5.83  *
* E.G. Slope (ft/ft)     *0.049643  * Area (sq ft)           * 310.70  *  197.12  *    5.83  *
* Q Total (cfs)          * 5073.97  * Flow (cfs)             * 2634.80 * 2421.49  *   17.68  *
* Top Width (ft)         *  165.14  * Top Width (ft)         *  99.43  *   57.00  *    8.71  *
* Vel Total (ft/s)       *    9.88  * Avg. Vel. (ft/s)       *   8.48  *   12.28  *    3.03  *
* Max Chl Dpth (ft)      *    5.84  * Hydr. Depth (ft)       *   3.12  *    3.46  *    0.67  *
* Conv. Total (cfs)      * 22772.9  * Conv. (cfs)            * 11825.4 * 10868.1  *    79.3  *
* Length Wtd. (ft)       *   93.27  * Wetted Per. (ft)       * 100.23  *   57.89  *    8.81  *
* Min Ch El (ft)         * 2925.50  * Shear (lb/sq ft)       *   9.61  *   10.55  *    2.05  *
* Alpha                  *    1.12  * Stream Power (lb/ft s) *  81.47  *  129.64  *    6.22  *
* Frctn Loss (ft)        *    3.70  * Cum Volume (acre-ft)   *  23.37  *   27.43  *   16.24  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *  11.95  *    6.10  *    4.44  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the 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: Finger Rock Wash
REACH: Main Reach 3       RS: 4.315

INPUT
Description: 54
Station Elevation Data    num=      33
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2936    1027    2934  1027.42933.968    1052    2932    1081    2932
    1124    2932    1155  2931.8    11572931.711    1173    2931    1250    2931
    1264    2930    1268    2928    1274    2926    1280    2924    1285    2923
    1292    2924    1315    2925    1339    2925    1362    2924    1381    2923
    1393    2923    1439    2922    1453    2920    1459  2919.5    1491  2919.5
    1499    2920    1510    2922    1519    2924    1527    2926    1535    2928
    1546    2930    1559    2932    1584    2934

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1081     .03    1124    .083    1439    .061    1510    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1439    1510               93     135     140             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1250    2935       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1170    1233    2941

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2926.85  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.01  * Wt. n-Val.             *  0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2924.84  * Reach Len. (ft)        *  93.00  *  135.00  *  140.00  *
* Crit W.S. (ft)         * 2924.84  * Flow Area (sq ft)      * 188.88  *  338.32  *   18.00  *
* E.G. Slope (ft/ft)     *0.032374  * Area (sq ft)           * 188.88  *  338.32  *   18.00  *
* Q Total (cfs)          * 5073.97  * Flow (cfs)             * 815.93  * 4184.84  *   73.20  *
* Top Width (ft)         *  213.65  * Top Width (ft)         * 130.28  *   71.00  *   12.37  *
* Vel Total (ft/s)       *    9.31  * Avg. Vel. (ft/s)       *   4.32  *   12.37  *    4.07  *
* Max Chl Dpth (ft)      *    5.34  * Hydr. Depth (ft)       *   1.45  *    4.77  *    1.46  *
* Conv. Total (cfs)      * 28199.9  * Conv. (cfs)            * 4534.7  * 23258.3  *   406.8  *
* Length Wtd. (ft)       *  122.48  * Wetted Per. (ft)       * 130.66  *   71.36  *   12.69  *
* Min Ch El (ft)         * 2919.50  * Shear (lb/sq ft)       *   2.92  *    9.58  *    2.87  *
* Alpha                  *    1.49  * Stream Power (lb/ft s) *  12.62  *  118.53  *   11.66  *
* Frctn Loss (ft)        *    3.42  * Cum Volume (acre-ft)   *  22.86  *   26.84  *   16.21  *
* C & E Loss (ft)        *    0.21  * Cum SA (acres)         *  11.72  *    5.96  *    4.42  *
*********************************************************************************************
```

```
Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3       RS: 4.289

INPUT
Description:
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2930    1020    2928    1086  2927.5    1111    2928    1119    2929
    1130    2929    1137    2929    1145    2928    1159    2926    1172    2925
    1178    2926    1191    2928    1208    2929    1223    2929    1235    2928
    1245    2926    1251    2924    1258    2922    1269    2920    1297    2918
    1354    2918    1372    2916    1419    2916    1428    2915    1443    2915
    1453    2916    1458  2916.5    1465  2916.5    1472    2916    1479    2914
    1501  2912.5    1511    2914    1516    2916    1525    2918    1531    2920
    1535    2922    1549    2926    1561    2928    1603  2928.5

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1086     .03    1111    .083    1472    .061    1516    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1472    1516              107     143     155             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1208    2930       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1175    1243    2941

CROSS SECTION OUTPUT  Profile #100-yr
****************************************************************************************************
* E.G. Elev (ft)         * 2920.50  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.31  * Wt. n-Val.             *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2919.18  * Reach Len. (ft)        *  107.00  *  143.00  *  155.00  *
* Crit W.S. (ft)         * 2919.18  * Flow Area (sq ft)      *  453.03  *  240.10  *   21.76  *
* E.G. Slope (ft/ft)     *0.024305  * Area (sq ft)           *  453.03  *  240.10  *   21.76  *
* Q Total (cfs)          * 5118.95  * Flow (cfs)             * 2241.94  * 2791.24  *   85.78  *
* Top Width (ft)         *  248.13  * Top Width (ft)         *  191.58  *   44.00  *   12.55  *
* Vel Total (ft/s)       *    7.16  * Avg. Vel. (ft/s)       *    4.95  *   11.63  *    3.94  *
* Max Chl Dpth (ft)      *    6.68  * Hydr. Depth (ft)       *    2.36  *    5.46  *    1.73  *
* Conv. Total (cfs)      * 32834.8  * Conv. (cfs)            * 14380.6  * 17904.0  *   550.2  *
* Length Wtd. (ft)       *  133.22  * Wetted Per. (ft)       *  191.88  *   44.83  *   12.96  *
* Min Ch El (ft)         * 2912.50  * Shear (lb/sq ft)       *    3.58  *    8.13  *    2.55  *
* Alpha                  *    1.65  * Stream Power (lb/ft s) *   17.73  *   94.48  *   10.04  *
* Frctn Loss (ft)        *    2.79  * Cum Volume (acre-ft)   *   22.18  *   25.95  *   16.15  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   11.38  *    5.78  *    4.38  *
****************************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3       RS: 4.262

INPUT
Description: 53
Station Elevation Data    num=      42
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2930    1012    2928    1026    2926    1042    2924    1107  2922.5
    1132    2922    1151    2920    1161  2919.5    1167    2920    1183    2922
    1205    2924    1271    2925    1297    2925    1314    2924    1335    2922
    1344    2920    1349    2918    1353    2916    1360    2914    1378    2912
    1386    2911    1395    2912    1412    2912    1434    2910    1442  2909.5
    1451    2910    1491    2912    1526    2912    1534    2910    1542    2908
    1550    2906    1559  2905.5    1569  2905.5    1580    2906    1599    2908
    1613    2910    1628    2912    1644    2914    1657    2916    1668    2918
    1688    2920    1696  2920.8

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1107     .03    1132    .083    1534    .061    1613    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1534    1613              100     102     100             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1271    2930       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1256    1310    2935

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2914.00  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.43  * Wt. n-Val.             *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2912.57  * Reach Len. (ft)        *  100.00  *  102.00  *  100.00  *
* Crit W.S. (ft)         * 2912.57  * Flow Area (sq ft)      *  207.46  *  436.19  *   24.89  *
* E.G. Slope (ft/ft)     *0.018257  * Area (sq ft)           *  207.46  *  436.19  *   24.89  *
* Q Total (cfs)          * 5118.95  * Flow (cfs)             *  592.49  * 4456.21  *   70.26  *
* Top Width (ft)         *  259.72  * Top Width (ft)         *  161.15  *   79.00  *   19.58  *
* Vel Total (ft/s)       *    7.66  * Avg. Vel. (ft/s)       *    2.86  *   10.22  *    2.82  *
* Max Chl Dpth (ft)      *    7.07  * Hydr. Depth (ft)       *    1.29  *    5.52  *    1.27  *
* Conv. Total (cfs)      * 37884.9  * Conv. (cfs)            *  4385.0  * 32980.0  *   520.0  *
* Length Wtd. (ft)       *  101.85  * Wetted Per. (ft)       *  161.71  *   79.76  *   19.74  *
* Min Ch El (ft)         * 2905.50  * Shear (lb/sq ft)       *    1.46  *    6.23  *    1.44  *
* Alpha                  *    1.57  * Stream Power (lb/ft s) *    4.18  *   63.68  *    4.06  *
* Frctn Loss (ft)        *    2.28  * Cum Volume (acre-ft)   *   21.37  *   24.83  *   16.06  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *   10.94  *    5.58  *    4.32  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3        RS: 4.243

INPUT
Description:
Station Elevation Data    num=      56
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2930    1010    2928    1020    2926    1030    2924    1040    2922
    1052    2920 1052.322919.974    1077    2918    1094  2917.3    1126  2916.7
    1133    2916    1150    2915    1171    2916    1196    2918 1196.342918.023
    1211    2919    1224    2918    1245  2917.4    1255    2918    1293    2920
    1338  2921.8    1371    2920    1378    2918    1385    2916    1390    2914
    1395    2912    1400    2910    1411    2908    1421    2906    1431    2905
    1433    2905    1445    2906    1456    2908    1487    2910    1497    2910
    1514    2908    1534    2906    1541    2904    1548    2902    1556    2900
    1579  2899.5    1585  2899.5    1595    2900    1601    2902    1608    2904
    1614    2906    1625    2908    1638    2909    1656    2909    1670    2908
    1700    2908    1706    2910    1712    2912    1720    2914    1728    2916
    1791    2916

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
```

```
******************************************************************************
    1000    .083    1094     .03    1126    .083    1534    .061    1614    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1534    1614             128      97      82             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1338    2930       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1274    1303    2935

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2908.81  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.23  * Wt. n-Val.            *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2906.58  * Reach Len. (ft)       *  128.00  *   97.00  *   82.00  *
* Crit W.S. (ft)         * 2906.58  * Flow Area (sq ft)     *   30.39  *  416.70  *    0.93  *
* E.G. Slope (ft/ft)     *0.028024  * Area (sq ft)          *   30.39  *  416.70  *    0.93  *
* Q Total (cfs)          * 5118.95  * Flow (cfs)            *   85.18  * 5032.57  *    1.20  *
* Top Width (ft)         *  119.09  * Top Width (ft)        *   35.90  *   80.00  *    3.19  *
* Vel Total (ft/s)       *   11.43  * Avg. Vel. (ft/s)      *    2.80  *   12.08  *    1.30  *
* Max Chl Dpth (ft)      *    7.08  * Hydr. Depth (ft)      *    0.85  *    5.21  *    0.29  *
* Conv. Total (cfs)      * 30578.6  * Conv. (cfs)           *   508.9  * 30062.5  *     7.2  *
* Length Wtd. (ft)       *   97.28  * Wetted Per. (ft)      *   36.13  *   81.75  *    3.25  *
* Min Ch El (ft)         * 2899.50  * Shear (lb/sq ft)      *    1.47  *    8.92  *    0.50  *
* Alpha                  *    1.10  * Stream Power (lb/ft s) *   4.12  *  107.70  *    0.65  *
* Frctn Loss (ft)        *    3.02  * Cum Volume (acre-ft)  *   21.09  *   23.84  *   16.03  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)        *   10.72  *    5.39  *    4.30  *
**********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3       RS: 4.225

INPUT
Description:
Station Elevation Data    num=      38
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
******************************************************************************
    1000    2920    1007    2918    1015    2916    1022    2914    1029    2912
    1036    2910    1043    2909    1068    2908    1086    2908    1103  2909.3
    1177  2908.3    1243    2910 1243.092910.013    1257    2912    1277    2913
    1296    2913    1311    2912    1317    2910    1323    2908    1329    2906
    1336    2904    1355    2902    1375  2903.8    1410  2903.9    1437    2902
    1469    2900    1526    2898    1550    2897    1567    2898    1571    2900
    1577    2902    1588    2904    1630    2906    1692    2908    1703    2910
    1718    2912    1747    2914    1778    2914

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
******************************************************************************
    1000    .083    1036     .03    1086    .083    1437    .061    1577    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1437    1577             121     105     105             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1277    2920       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1226    1280    2936

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2904.29  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.68  * Wt. n-Val.            *   0.083  *   0.061  *   0.083  *
```

```
* W.S. Elev (ft)         * 2902.61  * Reach Len. (ft)        *  121.00  *  105.00  *  105.00  *
* Crit W.S. (ft)         * 2902.61  * Flow Area (sq ft)      *    6.42  *  490.54  *    1.01  *
* E.G. Slope (ft/ft)     *0.034643  * Area (sq ft)           *    6.42  *  490.54  *    1.01  *
* Q Total (cfs)          * 5118.95  * Flow (cfs)             *    9.65  * 5107.80  *    1.51  *
* Top Width (ft)         *  164.49  * Top Width (ft)         *   21.15  *  140.00  *    3.34  *
* Vel Total (ft/s)       *   10.28  * Avg. Vel. (ft/s)       *    1.50  *   10.41  *    1.49  *
* Max Chl Dpth (ft)      *    5.61  * Hydr. Depth (ft)       *    0.30  *    3.50  *    0.30  *
* Conv. Total (cfs)      * 27502.4  * Conv. (cfs)            *    51.8  * 27442.4  *     8.1  *
* Length Wtd. (ft)       *  105.12  * Wetted Per. (ft)       *   21.23  *  140.94  *    3.40  *
* Min Ch El (ft)         * 2897.00  * Shear (lb/sq ft)       *    0.65  *    7.53  *    0.65  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    0.98  *   78.38  *    0.96  *
* Frctn Loss (ft)        *    3.42  * Cum Volume (acre-ft)   *   21.04  *   22.83  *   16.03  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   10.63  *    5.15  *    4.29  *
**********************************************************************************************

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the 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: Finger Rock Wash
REACH: Main Reach 3       RS: 4.205

INPUT
Description: 52
Station Elevation Data    num=      31
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2910    1015    2908    1026    2906    1040    2904    1058    2902
    1103    2902    1125  2902.4    1127  2902.5    1150  2902.5    1172    2902
    1211    2902    1233    2903    1244  2903.4    1276    2903    1300    2902
    1329    2900    1367    2898    1418    2897    1468    2896    1489    2894
    1548    2892    1558    2890    1562    2889    1564    2890    1568    2892
    1578    2894    1586    2896    1605    2898    1675    2900    1698    2902
    1714    2904

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
    1000    .083    1058     .03    1103    .083    1468    .061    1586    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1468    1586               75      83      70             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1246    2910       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1209    1245    2912

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2898.86  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.75  * Wt. n-Val.             *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2897.10  * Reach Len. (ft)        *   75.00  *   83.00  *   70.00  *
* Crit W.S. (ft)         * 2897.10  * Flow Area (sq ft)      *   30.49  *  475.30  *    5.79  *
* E.G. Slope (ft/ft)     *0.030665  * Area (sq ft)           *   30.49  *  475.30  *    5.79  *
* Q Total (cfs)          * 5163.18  * Flow (cfs)             *   64.25  * 5086.76  *   12.18  *
* Top Width (ft)         *  183.81  * Top Width (ft)         *   55.32  *  118.00  *   10.49  *
* Vel Total (ft/s)       *   10.09  * Avg. Vel. (ft/s)       *    2.11  *   10.70  *    2.10  *
* Max Chl Dpth (ft)      *    8.10  * Hydr. Depth (ft)       *    0.55  *    4.03  *    0.55  *
* Conv. Total (cfs)      * 29484.7  * Conv. (cfs)            *   366.9  * 29048.3  *    69.5  *
* Length Wtd. (ft)       *   82.62  * Wetted Per. (ft)       *   55.33  *  119.60  *   10.55  *
* Min Ch El (ft)         * 2889.00  * Shear (lb/sq ft)       *    1.05  *    7.61  *    1.05  *
* Alpha                  *    1.11  * Stream Power (lb/ft s) *    2.22  *   81.42  *    2.21  *
* Frctn Loss (ft)        *    2.11  * Cum Volume (acre-ft)   *   20.99  *   21.66  *   16.02  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   10.53  *    4.83  *    4.28  *
**********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
```

```
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3       RS: 4.189

INPUT
Description:
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2900    1003    2899    1039    2899    1052    2898    1067    2896
    1076    2895    1125    2895    1146    2896    1164    2898    1182    2899
    1189    2899    1203    2898    1209    2897    1222    2897    1232    2898
    1290  2899.5    1308    2899    1334    2898    1351    2896    1411    2894
    1461    2892    1509    2890    1522    2888    1527    2886    1533    2884
    1544  2883.5    1554    2884    1563    2886    1570    2888    1574    2890
    1611    2892    1639    2894    1651    2896    1657    2898    1666    2900
    1698    2900    1734    2898    1765    2898    1801    2900

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
****************************************************************
    1000     .03    1039    .083    1509    .061    1574    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1509    1574             125     109      95             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1290    2900       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
    1198    1243    2912

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2894.35  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.08  * Wt. n-Val.              *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2892.27  * Reach Len. (ft)         *  125.00  *  109.00  *   95.00  *
* Crit W.S. (ft)         * 2892.27  * Flow Area (sq ft)       *   61.86  *  406.79  *   47.49  *
* E.G. Slope (ft/ft)     *0.021558  * Area (sq ft)            *   61.86  *  406.79  *   47.49  *
* Q Total (cfs)          * 5163.18  * Flow (cfs)              *  176.30  * 4848.84  *  138.04  *
* Top Width (ft)         *  160.52  * Top Width (ft)          *   54.74  *   65.00  *   40.78  *
* Vel Total (ft/s)       *   10.00  * Avg. Vel. (ft/s)        *    2.85  *   11.92  *    2.91  *
* Max Chl Dpth (ft)      *    8.77  * Hydr. Depth (ft)        *    1.13  *    6.26  *    1.16  *
* Conv. Total (cfs)      * 35165.5  * Conv. (cfs)             *  1200.7  * 33024.6  *   940.2  *
* Length Wtd. (ft)       *  109.09  * Wetted Per. (ft)        *   54.79  *   66.86  *   40.84  *
* Min Ch El (ft)         * 2883.50  * Shear (lb/sq ft)        *    1.52  *    8.19  *    1.57  *
* Alpha                  *    1.34  * Stream Power (lb/ft s) *    4.33  *   97.61  *    4.55  *
* Frctn Loss (ft)        *    2.92  * Cum Volume (acre-ft)   *   20.91  *   20.82  *   15.98  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *   10.43  *    4.66  *    4.23  *
**********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3       RS: 4.169

INPUT
Description:
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2894    1029    2892    1061    2890    1170    2890    1185    2888
    1206  2886.5    1221  2886.5    1238    2888    1250    2890 1250.862890.091
    1269    2892    1283    2892    1295    2890    1304  2889.9    1318    2890
    1326    2892    1335    2894    1350    2895    1367    2895    1397    2894
    1411    2892    1422    2890    1463    2888    1491    2887    1511    2888
    1520    2890    1537    2890    1551    2888    1564    2886    1586    2884
```

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    1595    2882    1607    2880    1631    2878    1634  2877.6    1641    2878
    1646    2880    1651    2882    1656    2884    1661    2886    1686    2888
    1715    2890    1746    2892    1754    2894    1763    2896    1781    2898
    1809    2898    1821    2896    1911    2896

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083    1564    .061    1661    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1564    1661              105      92     100             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1350    2895       T
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************************************
    1058    1170    2896    1336    1400    2904    1558    1570    2896
    1715    1781    2900

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2888.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.34  * Wt. n-Val.             *          *   0.061  *          *
* W.S. Elev (ft)         * 2885.81  * Reach Len. (ft)        *  105.00  *   92.00  *  100.00  *
* Crit W.S. (ft)         * 2885.81  * Flow Area (sq ft)      *          *  420.21  *          *
* E.G. Slope (ft/ft)     *0.034041  * Area (sq ft)           *          *  420.21  *          *
* Q Total (cfs)          * 5163.18  * Flow (cfs)             *          * 5163.18  *          *
* Top Width (ft)         *   90.53  * Top Width (ft)         *          *   90.53  *          *
* Vel Total (ft/s)       *   12.29  * Avg. Vel. (ft/s)       *          *   12.29  *          *
* Max Chl Dpth (ft)      *    8.21  * Hydr. Depth (ft)       *          *    4.64  *          *
* Conv. Total (cfs)      * 27984.2  * Conv. (cfs)            *          * 27984.2  *          *
* Length Wtd. (ft)       *   92.00  * Wetted Per. (ft)       *          *   92.96  *          *
* Min Ch El (ft)         * 2877.60  * Shear (lb/sq ft)       *          *    9.61  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  118.04  *          *
* Frctn Loss (ft)        *    3.01  * Cum Volume (acre-ft)   *   20.82  *   19.79  *   15.93  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *   10.35  *    4.47  *    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: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the 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: Finger Rock Wash
REACH: Main Reach 3       RS: 4.151

INPUT
Description: 51
Station Elevation Data    num=      31
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2889    1004    2888    1013    2886    1026    2884    1045    2883
    1064    2883    1106    2884    1184    2884    1210    2885    1221    2885
    1251    2884    1263    2882    1270    2880    1277    2878    1306    2876
    1321    2875    1335    2876    1344    2878    1355    2880    1365    2882
    1401    2882    1419  2881.6    1430    2882    1441    2884    1451    2886
    1466    2888    1479    2890    1643    2892    1661    2894    1666    2896
    1675  2897.7

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083    1263    .061    1365    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1263    1365              255     261     246             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2884.04  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.06  * Wt. n-Val.             *          *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2881.99  * Reach Len. (ft)        *  255.00  *  261.00  *  246.00  *
* Crit W.S. (ft)         * 2881.99  * Flow Area (sq ft)      *          *  448.06  *    5.40  *
* E.G. Slope (ft/ft)     *0.031515  * Area (sq ft)           *          *  448.06  *    5.40  *
```

```
* Q Total (cfs)          * 5163.18  * Flow (cfs)            *          * 5157.46  *    5.72  *
* Top Width (ft)         *  129.85  * Top Width (ft)        *          *  101.88  *   27.97  *
* Vel Total (ft/s)       *   11.39  * Avg. Vel. (ft/s)      *          *   11.51  *    1.06  *
* Max Chl Dpth (ft)      *    6.99  * Hydr. Depth (ft)      *          *    4.40  *    0.19  *
* Conv. Total (cfs)      * 29084.4  * Conv. (cfs)           *          * 29052.1  *    32.2  *
* Length Wtd. (ft)       *  258.40  * Wetted Per. (ft)      *          *  103.17  *   27.98  *
* Min Ch El (ft)         * 2875.00  * Shear (lb/sq ft)      *          *    8.54  *    0.38  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *         *   98.35  *    0.40  *
* Frctn Loss (ft)        *    7.67  * Cum Volume (acre-ft)  *   20.82  *   18.87  *   15.92  *
* C & E Loss (ft)        *    0.32  * Cum SA (acres)        *   10.35  *    4.26  *    4.16  *
**********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3       RS: 4.102

INPUT
Description: 50
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    1000  2883.7    1005    2882    1019    2880    1038    2878    1058    2874
    1081    2872    1150    2870    1195    2871    1258    2871    1280    2870
    1353    2868    1369  2867.5    1382  2867.5    1390    2868    1428    2870
    1435    2872    1448    2876    1476    2878    1533    2880    1613    2880
    1661    2878    1772    2878    1782    2880    1789    2882    1794    2883

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083    1353    .061    1390    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1353    1390             244     248     236              .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2873.26  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.98  * Wt. n-Val.            *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2872.27  * Reach Len. (ft)       *  244.00  *  248.00  *  236.00  *
* Crit W.S. (ft)         * 2872.27  * Flow Area (sq ft)     *  526.30  *  170.62  *  133.43  *
* E.G. Slope (ft/ft)     *0.027984  * Area (sq ft)          *  526.30  *  170.62  *  133.43  *
* Q Total (cfs)          * 5163.18  * Flow (cfs)            * 2428.21  * 1925.34  *  809.63  *
* Top Width (ft)         *  358.03  * Top Width (ft)        *  275.14  *   37.00  *   45.89  *
* Vel Total (ft/s)       *    6.22  * Avg. Vel. (ft/s)      *    4.61  *   11.28  *    6.07  *
* Max Chl Dpth (ft)      *    4.77  * Hydr. Depth (ft)      *    1.91  *    4.61  *    2.91  *
* Conv. Total (cfs)      * 30864.7  * Conv. (cfs)           * 14515.5  * 11509.4  *  4839.9  *
* Length Wtd. (ft)       *  244.13  * Wetted Per. (ft)      *  275.25  *   37.02  *   46.26  *
* Min Ch El (ft)         * 2867.50  * Shear (lb/sq ft)      *    3.34  *    8.05  *    5.04  *
* Alpha                  *    1.64  * Stream Power (lb/ft s) *   15.41  *   90.85  *   30.57  *
* Frctn Loss (ft)        *    7.76  * Cum Volume (acre-ft)  *   19.28  *   17.02  *   15.53  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)        *    9.55  *    3.85  *    3.95  *
**********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3       RS: 4.055

INPUT
```

```
Description: 49
Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2880    1009    2878    1018    2876    1030    2874    1035    2872
    1040    2870    1050    2866    1060    2862    1075    2860    1092    2858
    1128    2857    1137    2857    1153    2858    1193    2858    1211  2857.2
    1219  2857.2    1229    2858    1266    2859    1294    2860    1302    2860
    1321    2859    1340    2858    1348    2858    1383    2859    1405  2858.8
    1424    2858    1426    2858    1434    2860    1445    2864    1456    2868
  1482.3    2868  1490.9    2866    1513    2862  1577.5    2862    1593    2864
    1612    2866  1641.7    2868    1694    2868    1710    2870    1725    2872
    1738    2874    1751    2878    1756    2879

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083    1321    .061    1383    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1321    1383             304     306     306             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
************************************************************************************************
* E.G. Elev (ft)         * 2861.30  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.64  * Wt. n-Val.              *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2860.67  * Reach Len. (ft)         *  304.00  *  306.00  *  306.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *  587.92  *  138.25  *  101.14  *
* E.G. Slope (ft/ft)     *0.036373  * Area (sq ft)            *  587.92  *  138.25  *  101.14  *
* Q Total (cfs)          * 5163.18  * Flow (cfs)              * 3537.60  * 1095.73  *  529.86  *
* Top Width (ft)         *  365.82  * Top Width (ft)          *  250.99  *   62.00  *   52.83  *
* Vel Total (ft/s)       *    6.24  * Avg. Vel. (ft/s)        *    6.02  *    7.93  *    5.24  *
* Max Chl Dpth (ft)      *    3.67  * Hydr. Depth (ft)        *    2.34  *    2.23  *    1.91  *
* Conv. Total (cfs)      * 27072.3  * Conv. (cfs)             * 18548.8  *  5745.3  *  2778.2  *
* Length Wtd. (ft)       *  305.28  * Wetted Per. (ft)        *  251.30  *   62.04  *   53.21  *
* Min Ch El (ft)         * 2858.00  * Shear (lb/sq ft)        *    5.31  *    5.06  *    4.32  *
* Alpha                  *    1.05  * Stream Power (lb/ft s)  *   31.97  *   40.11  *   22.61  *
* Frctn Loss (ft)        *   11.89  * Cum Volume (acre-ft)    *   16.16  *   16.14  *   14.90  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)          *    8.07  *    3.56  *    3.68  *
************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3       RS: 3.997

INPUT
Description: 48
Station Elevation Data    num=      30
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2857    1004    2856    1014    2854    1062    2852    1097    2850
    1110    2848    1149    2846    1163  2845.7    1203  2845.7    1246    2845
    1270    2845  1285.6    2846    1302    2847    1311    2847    1326    2846
    1349    2844    1359    2844    1369    2846    1378    2848    1384    2850
  1396.4    2854    1411    2856  1544.7    2858    1563    2860    1592    2860
    1623    2862    1644    2864    1650    2866    1661    2870    1673  2872.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083    1149    .061  1285.6    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1149  1285.6             267     279     276             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
************************************************************************************************
* E.G. Elev (ft)         * 2849.35  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.19  * Wt. n-Val.              *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2848.16  * Reach Len. (ft)         *  267.00  *  279.00  *  276.00  *
* Crit W.S. (ft)         * 2848.16  * Flow Area (sq ft)       *   45.40  *  369.16  *  219.10  *
* E.G. Slope (ft/ft)     *0.041822  * Area (sq ft)            *   45.40  *  369.16  *  219.10  *
* Q Total (cfs)          * 5163.18  * Flow (cfs)              *  180.50  * 3567.34  * 1415.34  *
* Top Width (ft)         *  269.54  * Top Width (ft)          *   40.05  *  136.60  *   92.89  *
* Vel Total (ft/s)       *    8.15  * Avg. Vel. (ft/s)        *    3.98  *    9.66  *    6.46  *
```

Max Chl Dpth (ft)	4.16	Hydr. Depth (ft)	1.13	2.70	2.36
Conv. Total (cfs)	25247.4	Conv. (cfs)	882.6	17443.9	6920.9
Length Wtd. (ft)	277.75	Wetted Per. (ft)	40.12	136.64	93.48
Min Ch El (ft)	2845.00	Shear (lb/sq ft)	2.95	7.05	6.12
Alpha	1.15	Stream Power (lb/ft s)	11.75	68.16	39.53
Frctn Loss (ft)	9.26	Cum Volume (acre-ft)	13.95	14.36	13.77
C & E Loss (ft)	0.01	Cum SA (acres)	7.06	2.87	3.17

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

CROSS SECTION

RIVER: Finger Rock Wash
REACH: Main Reach 3 RS: 3.944

INPUT
Description: 47
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2843	1020	2842	1043	2840	1057	2838	1093	2837
1144	2836	1169	2835.6	1181	2834	1193	2832	1208	2830.5
1219	2830.5	1231	2832	1250	2834	1279	2835	1305	2834
1314	2833.7	1332	2834	1347	2834.3	1357	2834	1372	2832.2
1388	2832.6	1398	2834	1405	2836	1412	2838	1435	2844

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.083	1181	.061	1250	.083

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1181	1250	302	278	263	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

			Left OB	Channel	Right OB
E.G. Elev (ft)	2837.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.25	Wt. n-Val.	0.083	0.061	0.083
W.S. Elev (ft)	2836.27	Reach Len. (ft)	302.00	278.00	263.00
Crit W.S. (ft)	2836.27	Flow Area (sq ft)	31.36	300.53	364.22
E.G. Slope (ft/ft)	0.027214	Area (sq ft)	31.36	300.53	364.22
Q Total (cfs)	5163.18	Flow (cfs)	66.98	3207.38	1888.83
Top Width (ft)	275.84	Top Width (ft)	50.88	69.00	155.95
Vel Total (ft/s)	7.42	Avg. Vel. (ft/s)	2.14	10.67	5.19
Max Chl Dpth (ft)	5.77	Hydr. Depth (ft)	0.62	4.36	2.34
Conv. Total (cfs)	31298.1	Conv. (cfs)	406.0	19442.5	11449.7
Length Wtd. (ft)	276.43	Wetted Per. (ft)	51.00	69.44	156.53
Min Ch El (ft)	2830.50	Shear (lb/sq ft)	1.04	7.35	3.95
Alpha	1.47	Stream Power (lb/ft s)	2.23	78.48	20.50
Frctn Loss (ft)	6.25	Cum Volume (acre-ft)	13.71	12.21	11.92
C & E Loss (ft)	0.07	Cum SA (acres)	6.78	2.21	2.38

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

CROSS SECTION

RIVER: Finger Rock Wash
REACH: Main Reach 3 RS: 3.891

INPUT
Description: 46
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2843.8	1010	2842	1021	2840	1033	2838	1041	2834
1051	2830	1062	2828	1088	2826	1100	2826	1147	2826.4

```
    1157  2826.4    1167    2826    1200    2826    1301    2827    1362    2827
    1408    2826    1519    2826    1538    2827    1550    2827    1560    2826
    1577    2824    1596    2822    1613    2821    1630    2821    1639    2822
    1662    2824    1697    2826  1753.5    2828    1764    2832  1775.3    2836
    1790  2837.8

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083    1560    .061    1697    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1560    1697              203     191     183             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000 1269.45    2830       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)          * 2828.25  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.02  * Wt. n-Val.              *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)          * 2827.24  * Reach Len. (ft)         *  203.00  *  191.00  *  183.00  *
* Crit W.S. (ft)          * 2827.24  * Flow Area (sq ft)       *  222.66  *  549.64  *   21.66  *
* E.G. Slope (ft/ft)      *0.019109  * Area (sq ft)            *  418.03  *  549.64  *   21.66  *
* Q Total (cfs)           * 5163.18  * Flow (cfs)              *  461.35  * 4662.91  *   38.92  *
* Top Width (ft)          *  660.08  * Top Width (ft)          *  488.10  *  137.00  *   34.98  *
* Vel Total (ft/s)        *    6.50  * Avg. Vel. (ft/s)        *    2.07  *    8.48  *    1.80  *
* Max Chl Dpth (ft)       *    6.24  * Hydr. Depth (ft)        *    0.77  *    4.01  *    0.62  *
* Conv. Total (cfs)       * 37350.6  * Conv. (cfs)             *  3337.4  * 33731.6  *   281.6  *
* Length Wtd. (ft)        *  194.35  * Wetted Per. (ft)        *  290.64  *  137.45  *   35.00  *
* Min Ch El (ft)          * 2821.00  * Shear (lb/sq ft)        *    0.91  *    4.77  *    0.74  *
* Alpha                   *    1.55  * Stream Power (lb/ft s)  *    1.89  *   40.47  *    1.33  *
* Frctn Loss (ft)         *    4.49  * Cum Volume (acre-ft)    *   12.16  *    9.50  *   10.76  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *    4.91  *    1.55  *    1.81  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3       RS: 3.855

INPUT
Description: 45
Station Elevation Data    num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000  2826.4  1007.5    2826    1017    2824    1039    2822    1059    2820
    1073    2818    1090    2816  1112.7  2815.4    1124  2815.4    1170    2816
    1197    2818    1238    2820    1288    2820    1396    2819    1429    2819
    1463    2818    1478  2816.3    1484  2816.3    1504    2818    1525    2820
    1556    2822    1576    2824    1583    2828    1590    2830    1610    2832
    1628  2832.3

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083    1463    .061    1504    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1463    1504              203     219     224             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1240    2825       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)          * 2822.75  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.09  * Wt. n-Val.              *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)          * 2821.67  * Reach Len. (ft)         *  203.00  *  219.00  *  224.00  *
* Crit W.S. (ft)          * 2821.67  * Flow Area (sq ft)       *  509.30  *  190.22  *   77.45  *
* E.G. Slope (ft/ft)      *0.028468  * Area (sq ft)            * 1358.93  *  190.22  *   77.45  *
* Q Total (cfs)           * 5163.18  * Flow (cfs)              * 2667.84  * 2168.75  *  326.60  *
* Top Width (ft)          *  508.46  * Top Width (ft)          *  420.65  *   41.00  *   46.81  *
```

```
* Vel Total (ft/s)       *    6.65  * Avg. Vel. (ft/s)       *    5.24  *   11.40  *    4.22  *
* Max Chl Dpth (ft)      *    6.27  * Hydr. Depth (ft)       *    2.28  *    4.64  *    1.65  *
* Conv. Total (cfs)      * 30601.4  * Conv. (cfs)            * 15811.9  * 12853.9  *  1935.7  *
* Length Wtd. (ft)       *  212.47  * Wetted Per. (ft)       *  223.02  *   41.17  *   46.96  *
* Min Ch El (ft)         * 2816.30  * Shear (lb/sq ft)       *    4.06  *    8.21  *    2.93  *
* Alpha                  *    1.58  * Stream Power (lb/ft s) *   21.26  *   93.63  *   12.36  *
* Frctn Loss (ft)        *    6.87  * Cum Volume (acre-ft)   *    8.02  *    7.88  *   10.55  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.79  *    1.16  *    1.63  *
**********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 3       RS: 3.813

INPUT
Description: 44
Station Elevation Data    num=      27
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2830  1054.2    2810  1062.2  2808.6  1073.9  2808.6  1102.4    2810
  1110.6    2812  1121.6    2814  1188.6    2814  1203.6    2812  1216.6    2810
  1238.8    2810  1247.6    2812  1273.6    2814  1274.6    2814  1307.6    2812
  1341.6    2812  1354.6    2813  1379.6    2813  1399.6    2812  1427.6    2810
  1444.3    2810  1520.8    2812  1537.2    2814  1552.6    2818  1560.1    2820
  1576.6    2822  1600.8    2824

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083  1399.6    .061  1520.8    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        1399.6  1520.8             353     343     341             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000  1121.6    2820       T

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2814.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.09  * Wt. n-Val.             *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2813.82  * Reach Len. (ft)        *  353.00  *  343.00  *  341.00  *
* Crit W.S. (ft)         * 2813.82  * Flow Area (sq ft)      *  333.02  *  358.20  *   13.55  *
* E.G. Slope (ft/ft)     *0.037057  * Area (sq ft)           *  610.89  *  358.20  *   13.55  *
* Q Total (cfs)          * 5163.18  * Flow (cfs)             * 1662.29  * 3457.30  *   43.58  *
* Top Width (ft)         *  416.10  * Top Width (ft)         *  279.99  *  121.20  *   14.90  *
* Vel Total (ft/s)       *    7.33  * Avg. Vel. (ft/s)       *    4.99  *    9.65  *    3.22  *
* Max Chl Dpth (ft)      *    5.22  * Hydr. Depth (ft)       *    1.64  *    2.96  *    0.91  *
* Conv. Total (cfs)      * 26821.3  * Conv. (cfs)            *  8635.2  * 17959.7  *   226.4  *
* Length Wtd. (ft)       *  344.37  * Wetted Per. (ft)       *  203.94  *  121.30  *   15.01  *
* Min Ch El (ft)         * 2810.00  * Shear (lb/sq ft)       *    3.78  *    6.83  *    2.09  *
* Alpha                  *    1.31  * Stream Power (lb/ft s) *   18.86  *   65.94  *    6.72  *
* Frctn Loss (ft)        *    7.54  * Cum Volume (acre-ft)   *    3.43  *    6.50  *   10.32  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    1.16  *    0.75  *    1.47  *
**********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: 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: Finger Rock Wash
REACH: Main Reach 3       RS: 3.748
```

```
INPUT
Description: Section upstream of Junction Cor Split Rtn
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2825    1020    2824    1028    2822    1036    2820    1044    2818
    1053    2816    1067    2814    1077    2812    1112    2810    1116    2808
    1120    2806    1125    2804    1129    2802    1133    2800    1137    2798
    1149    2796    1155    2796    1186    2798    1203    2800    1249    2802
    1479    2802    1561    2802    1567    2804    1573    2806    1578    2808
    1583    2810    1589    2812    1603    2813

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083    1133    .061    1203    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1133    1203                0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
************************************************************************************************
* E.G. Elev (ft)         * 2804.30  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.02  * Wt. n-Val.             *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2803.28  * Reach Len. (ft)        *  480.00  *  480.00  *  480.00  *
* Crit W.S. (ft)         * 2803.28  * Flow Area (sq ft)      *   10.76  *  403.64  *  506.88  *
* E.G. Slope (ft/ft)     *0.014433  * Area (sq ft)           *   10.76  *  403.64  *  506.88  *
* Q Total (cfs)          * 5163.18  * Flow (cfs)             *   29.89  * 3769.03  * 1364.27  *
* Top Width (ft)         *  438.40  * Top Width (ft)         *    6.56  *   70.00  *  361.84  *
* Vel Total (ft/s)       *    5.60  * Avg. Vel. (ft/s)       *    2.78  *    9.34  *    2.69  *
* Max Chl Dpth (ft)      *    7.28  * Hydr. Depth (ft)       *    1.64  *    5.77  *    1.40  *
* Conv. Total (cfs)      * 42977.0  * Conv. (cfs)            *   248.8  * 31372.4  * 11355.8  *
* Length Wtd. (ft)       *  480.00  * Wetted Per. (ft)       *    7.34  *   70.82  *  362.09  *
* Min Ch El (ft)         * 2796.00  * Shear (lb/sq ft)       *    1.32  *    5.14  *    1.26  *
* Alpha                  *    2.09  * Stream Power (lb/ft s) *    3.67  *   47.95  *    3.39  *
* Frctn Loss (ft)        *    5.27  * Cum Volume (acre-ft)   *    0.91  *    3.50  *    8.28  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *          *          *          *
************************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 3.656

INPUT
Description: Section downstream of Junction Cor Split Rtn
Station Elevation Data    num=      30
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2804    1018    2802    1024    2800    1038    2796    1048    2794
    1071    2790  1083.6    2788    1101    2786  1112.5    2785  1118.9    2785
    1134    2786    1146    2788    1179    2788    1196    2786    1201    2786
    1218    2788    1235    2790    1281    2790    1301    2788    1333    2788
    1366    2790    1421    2792  1451.6    2794  1475.1    2798    1487    2800
  1498.6    2802  1510.5    2804  1522.3    2806  1539.9    2808  1561.6    2810

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083    1101    .061    1134    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1101    1134              461     482     488             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 1103.14  1130.8  2785.8       T

CROSS SECTION OUTPUT  Profile #100-yr
************************************************************************************************
* E.G. Elev (ft)         * 2792.86  * Element                *  Left OB *  Channel * Right OB *
```

```
* Vel Head (ft)          *    0.45  * Wt. n-Val.            *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2792.41  * Reach Len. (ft)       *  461.00  *  482.00  *  488.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     *  153.75  *  217.56  *  995.64  *
* E.G. Slope (ft/ft)     *0.008957  * Area (sq ft)          *  153.75  *  231.19  *  995.64  *
* Q Total (cfs)          * 6162.00  * Flow (cfs)            *  596.87  * 1760.76  * 3804.37  *
* Top Width (ft)         *  370.11  * Top Width (ft)        *   43.85  *   33.00  *  293.26  *
* Vel Total (ft/s)       *    4.51  * Avg. Vel. (ft/s)      *    3.88  *    8.09  *    3.82  *
* Max Chl Dpth (ft)      *    7.41  * Hydr. Depth (ft)      *    3.51  *    6.59  *    3.40  *
* Conv. Total (cfs)      * 65110.0  * Conv. (cfs)           *  6306.8  * 18604.9  * 40198.3  *
* Length Wtd. (ft)       *  476.40  * Wetted Per. (ft)      *   44.33  *   33.08  *  293.98  *
* Min Ch El (ft)         * 2785.00  * Shear (lb/sq ft)      *    1.94  *    3.68  *    1.89  *
* Alpha                  *    1.44  * Stream Power (lb/ft s) *   7.53  *   29.77  *    7.24  *
* Frctn Loss (ft)        *    3.42  * Cum Volume (acre-ft)  *   39.99  *   21.02  *   16.32  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)        *   62.80  *   21.89  *   64.91  *
**********************************************************************************************

Warning: The energy loss was 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: Finger Rock Wash
REACH: Main Reach 4       RS: 3.565

INPUT
Description: 41
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
******************************************************************************
    1000    2800    1015    2798    1022    2796    1036    2792  1043.7    2790
  1051.7    2788    1062    2786    1084    2782  1150.5    2780  1168.7    2778
  1185.2    2776  1291.6    2774    1304    2773    1315    2773  1328.3    2774
    1338    2776    1347    2778    1356    2780    1361    2782    1371    2786
    1380    2790  1388.4    2794    1397    2798    1410    2800    1452    2802

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083  1291.6    .061  1328.3    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        1291.6  1328.3              218     230     238             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000    1095    2800       T
    1095 1352.11    2784       T

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2789.40  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.            *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2789.10  * Reach Len. (ft)       *  218.00  *  230.00  *  238.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     * 1003.35  *  187.30  *  261.00  *
* E.G. Slope (ft/ft)     *0.005878  * Area (sq ft)          * 2559.47  *  578.15  *  439.06  *
* Q Total (cfs)          * 6162.00  * Flow (cfs)            * 4078.35  * 1035.40  * 1048.26  *
* Top Width (ft)         *  330.70  * Top Width (ft)        *  244.31  *   36.70  *   49.68  *
* Vel Total (ft/s)       *    4.24  * Avg. Vel. (ft/s)      *    4.06  *    5.53  *    4.02  *
* Max Chl Dpth (ft)      *   16.10  * Hydr. Depth (ft)      *    5.10  *    5.10  *    5.25  *
* Conv. Total (cfs)      * 80374.2  * Conv. (cfs)           * 53196.0  * 13505.2  * 13673.0  *
* Length Wtd. (ft)       *  223.61  * Wetted Per. (ft)      *  196.87  *   36.78  *   52.14  *
* Min Ch El (ft)         * 2773.00  * Shear (lb/sq ft)      *    1.87  *    1.87  *    1.84  *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *   7.60  *   10.33  *    7.38  *
* Frctn Loss (ft)        *    1.65  * Cum Volume (acre-ft)  *   25.64  *   16.54  *    8.29  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)        *   61.27  *   21.50  *   62.99  *
**********************************************************************************************

Warning: The energy loss was 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: Finger Rock Wash
REACH: Main Reach 4       RS: 3.521

INPUT
Description: 40.5
Station Elevation Data    num=      60
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
******************************************************************************
    1000    2794 1004.56    2794 1008.73    2794 1010.71    2794 1014.21    2793
```

```
 1014.89    2792 1015.56    2791 1017.42    2790 1019.46    2789  1024.2    2788
 1029.64    2787 1032.54    2786  1033.9    2785 1037.84    2784 1043.12    2783
 1046.09    2782 1049.13    2781 1052.37    2780 1057.13    2779 1064.31    2778
 1076.86    2777 1107.11    2777 1107.17    2777 1117.88    2777 1124.73    2777
 1158.18    2777 1161.87    2776 1165.58    2775 1169.74    2774  1173.9    2773
 1180.53    2773 1182.18    2773 1201.47    2773 1203.91    2773 1211.61    2773
 1213.64    2773 1250.57    2773 1252.91    2773  1299.7    2772 1303.94    2771
  1312.3    2771 1318.06    2772    13302772.127    13702772.553 1411.99    2773
 1416.95    2774  1421.6    2775 1436.57    2776 1448.61    2777 1455.61    2778
 1459.03    2779 1461.26    2780 1462.91    2781 1464.56    2782 1466.21    2783
 1467.86    2784 1469.51    2785 1471.21    2786 1483.21    2788 1508.67    2790

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .083    1330    .061    1370    .083

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1330    1370              133     144     158             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 1037.84 1467.86    2784       T

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2787.74  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.083  *   0.061  *   0.083  *
* W.S. Elev (ft)         * 2787.47  * Reach Len. (ft)        *  133.00  *  144.00  *  158.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 1032.84  *  138.96  *  354.76  *
* E.G. Slope (ft/ft)     *0.009535  * Area (sq ft)           * 3696.41  *  605.37  * 1227.38  *
* Q Total (cfs)          * 6162.00  * Flow (cfs)             * 4070.66  *  758.18  * 1333.16  *
* Top Width (ft)         *  452.99  * Top Width (ft)         *  302.94  *   40.00  *  110.05  *
* Vel Total (ft/s)       *    4.04  * Avg. Vel. (ft/s)       *    3.94  *    5.46  *    3.76  *
* Max Chl Dpth (ft)      *   16.47  * Hydr. Depth (ft)       *    3.41  *    3.47  *    3.22  *
* Conv. Total (cfs)      * 63105.2  * Conv. (cfs)            * 41687.8  *  7764.6  * 13652.9  *
* Length Wtd. (ft)       *  140.88  * Wetted Per. (ft)       *  305.10  *   40.00  *  112.56  *
* Min Ch El (ft)         * 2772.13  * Shear (lb/sq ft)       *    2.02  *    2.07  *    1.88  *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *    7.94  *   11.28  *    7.05  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *    9.98  *   13.41  *    3.73  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   59.90  *   21.30  *   62.55  *
***********************************************************************************************

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: Finger Rock Wash
REACH: Main Reach 4       RS: 3.494

INPUT
Description: 40
Station Elevation Data    num=      75
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2796 1015.22    2795 1033.46    2795 1034.61    2795 1037.72    2795
 1050.31    2795 1054.01    2795 1060.83    2795 1085.69    2794 1090.93    2793
 1097.61    2792 1103.77    2791 1109.34    2790 1114.54    2789 1121.79    2788
 1133.93    2787 1141.67    2786 1147.09    2785 1154.76    2785 1154.82    2785
 1157.37    2784 1159.06    2783 1160.75    2782 1162.43    2781 1164.66    2780
 1167.61    2779 1171.65    2778 1182.72    2777 1197.26    2776 1221.93    2775
 1244.29    2774 1244.54    2774 1246.59    2774 1273.66    2773 1295.88    2772
 1303.83    2772  1304.6    2772 1310.36    2772 1311.04    2772    13602771.092
 1364.96    2771 1375.66    2770 1382.32  2767.3    1386  2767.3    1392    2770
 1405.27    2770 1407.62    2770 1451.24    2770 1452.85    2770 1478.67    2770
 1484.79    2770 1494.29    2770 1497.46    2770 1533.64    2771 1557.13    2772
 1569.03    2773 1575.23    2774 1577.71    2775 1579.96    2776 1582.48    2777
 1585.09    2778 1587.84    2779 1589.26    2780 1590.85    2781 1592.65    2782
 1594.05    2783 1595.32    2784 1596.59    2785 1597.86    2786 1599.22    2787
 1601.99    2788 1603.63    2789 1631.28    2790 1632.35    2790 1636.54    2790

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000     .02 1364.96     .02 1533.64     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1364.96 1533.64              145     145     145             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000    1361  2783.9       T
```

```
    1410 1636.54  2783.9       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2787.61  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.13  * Wt. n-Val.            *   0.020  *   0.020  *   0.020  *
* W.S. Elev (ft)         * 2787.48  * Reach Len. (ft)       *  145.00  *  145.00  *  145.00  *
* Crit W.S. (ft)         * 2777.52  * Flow Area (sq ft)     *  841.01  * 1251.91  *  228.88  *
* E.G. Slope (ft/ft)     *0.000133  * Area (sq ft)          * 2841.98  * 2952.40  *  831.15  *
* Q Total (cfs)          * 6162.00  * Flow (cfs)            * 1668.77  * 4063.75  *  429.47  *
* Top Width (ft)         *  472.47  * Top Width (ft)        *  236.88  *  168.68  *   66.91  *
* Vel Total (ft/s)       *    2.65  * Avg. Vel. (ft/s)      *    1.98  *    3.25  *    1.88  *
* Max Chl Dpth (ft)      *   20.18  * Hydr. Depth (ft)      *    3.55  *    7.42  *    3.42  *
* Conv. Total (cfs)      *534163.2  * Conv. (cfs)           *144660.5  *352273.3  * 37229.5  *
* Length Wtd. (ft)       *  145.00  * Wetted Per. (ft)      *  238.74  *  169.85  *   70.65  *
* Min Ch El (ft)         * 2767.30  * Shear (lb/sq ft)      *    0.03  *    0.06  *    0.03  *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *   0.06  *    0.20  *    0.05  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)  *          *    7.53  *          *
* C & E Loss (ft)        *          * Cum SA (acres)        *   59.08  *   20.95  *   62.23  *
*********************************************************************************************

CULVERT


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 3.479

INPUT
Description: Skyline Dr. Crossing @ HEC-1 Sta. RES-7
Distance from Upstream XS =      65
Deck/Roadway Width        =      34
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      12
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
************************************************************************
    1068 2787.02            1123 2785.62            1178  2784.7
    1233 2784.07            1285 2783.92            1395 2784.05
    1450 2784.59            1505 2785.37            1560  2786.6
    1610 2788.05            1660 2790.11            1710 2792.53

Upstream Bridge Cross Section Data
Station Elevation Data    num=      75
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2796 1015.22    2795 1033.46    2795 1034.61    2795 1037.72    2795
 1050.31    2795 1054.01    2795 1060.83    2795 1085.69    2794 1090.93    2793
 1097.61    2792 1103.77    2791 1109.34    2790 1114.54    2789 1121.79    2788
 1133.93    2787 1141.67    2786 1147.09    2785 1154.76    2785 1154.82    2785
 1157.37    2784 1159.06    2783 1160.75    2782 1162.43    2781 1164.66    2780
 1167.61    2779 1171.65    2778 1182.72    2777 1197.26    2776 1221.93    2775
 1244.29    2774 1244.54    2774 1246.59    2774 1273.66    2773 1295.88    2772
 1303.83    2772  1304.6    2772 1310.36    2772 1311.04    2772    13602771.092
 1364.96    2771 1375.66    2770 1382.32  2767.3    1386  2767.3    1392    2770
 1405.27    2770 1407.62    2770 1451.24    2770 1452.85    2770 1478.67    2770
 1484.79    2770 1494.29    2770 1497.46    2770 1533.64    2771 1557.13    2772
 1569.03    2773 1575.23    2774 1577.71    2775 1579.96    2776 1582.48    2777
 1585.09    2778 1587.84    2779 1589.26    2780 1590.85    2781 1592.65    2782
 1594.05    2783 1595.32    2784 1596.59    2785 1597.86    2786 1599.22    2787
 1601.99    2788 1603.63    2789 1631.28    2790 1632.35    2790 1636.54    2790

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000     .02 1364.96     .02 1533.64     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1364.96 1533.64             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000    1361  2783.9       T
    1410 1636.54  2783.9       T

Downstream  Deck/Roadway Coordinates
    num=      13
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
************************************************************************
    1041    2788            1068 2787.02            1123 2785.62
    1178  2784.7            1233 2784.07            1285 2783.92
    1395 2784.05            1450 2784.59            1505 2785.37
    1560  2786.6            1610 2788.05            1660 2790.11
    1710 2792.53
```

```
Downstream Bridge Cross Section Data
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2792 1017.32    2790 1041.37    2788 1063.03    2786 1076.23    2784
 1089.49    2782 1110.66    2780 1123.78    2778 1144.31    2776 1172.66    2774
 1196.83    2772 1226.45    2770 1319.27    2768 1339.39    2766 1342.88    2764
 1345.17    2762    13502761.479    1360  2760.4 1368.09    2762 1372.62    2764
    1375    2764 1391.85    2764 1482.93    2764 1512.38    2766 1520.26    2768
 1525.32    2770 1530.38    2772 1535.31    2774 1539.54    2776 1543.77    2778
  1558.8    2780 1570.56    2782 1586.51    2784 1602.59    2786 1615.11    2788
 1629.91    2790 1640.85    2792 1651.52    2794 1665.43    2796

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000     .02 1319.27     .02 1520.26     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1319.27 1520.26             .3       .5

Upstream Embankment side slope             =       3 horiz. to 1.0 vertical
Downstream Embankment side slope           =     2.1 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
Skyline Dr      Circular      4
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 3 - Pipe projecting from fill
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 22     117     .024     .024       0                  .9                1
Upstream   Elevation =  2767.28
           Centerline Station =  1384
Downstream Elevation =  2760.73
           Centerline Station =  1360

CULVERT OUTPUT  Profile #100-yr  Culv Group:  Skyline Dr
*************************************************************************
* Q Culv Group (cfs)     *  231.61  * Culv Full Len (ft)     *  117.00  *
* # Barrels              *       1  * Culv Vel US (ft/s)     *   18.43  *
* Q Barrel (cfs)         *  231.61  * Culv Vel DS (ft/s)     *   18.43  *
* E.G. US. (ft)          * 2787.61  * Culv Inv El Up (ft)    * 2767.28  *
* W.S. US. (ft)          * 2787.48  * Culv Inv El Dn (ft)    * 2760.73  *
* E.G. DS (ft)           * 2768.83  * Culv Frctn Ls (ft)     *   10.37  *
* W.S. DS (ft)           * 2767.22  * Culv Exit Loss (ft)    *    3.67  *
* Delta EG (ft)          *   18.79  * Culv Entr Loss (ft)    *    4.75  *
* Delta WS (ft)          *   20.26  * Q Weir (cfs)           * 5930.39  *
* E.G. IC (ft)           * 2787.61  * Weir Sta Lft (ft)      * 1126.56  *
* E.G. OC (ft)           * 2787.61  * Weir Sta Rgt (ft)      * 1594.72  *
* Culvert Control        *  Outlet  * Weir Submerg           *    0.00  *
* Culv WS Inlet (ft)     * 2771.28  * Weir Max Depth (ft)    *    3.69  *
* Culv WS Outlet (ft)    * 2764.73  * Weir Avg Depth (ft)    *    2.78  *
* Culv Nml Depth (ft)    *    4.00  * Weir Flow Area (sq ft) * 1299.31  *
* Culv Crt Depth (ft)    *    4.00  * Min El Weir Flow (ft)  * 2783.93  *
*************************************************************************

Note:    The normal depth exceeds the height of the culvert.  The program assumes that the normal
         depth is equal to the height of the culvert.
Note:    Culvert critical depth exceeds the height of the culvert.
Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note:    The culvert inlet is submerged and the culvert flows full over part or all of its length.  Therefore,
         the culvert inlet equations are not valid and the supercritical result has been discarded.  The
         outlet answer will be used.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 3.466

INPUT
Description: 39
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
******************************************************************************
    1000    2792 1017.32    2790 1041.37    2788 1063.03    2786 1076.23    2784
 1089.49    2782 1110.66    2780 1123.78    2778 1144.31    2776 1172.66    2774
 1196.83    2772 1226.45    2770 1319.27    2768 1339.39    2766 1342.88    2764
 1345.17    2762    13502761.479    1360  2760.4 1368.09    2762 1372.62    2764
    1375    2764 1391.85    2764 1482.93    2764 1512.38    2766 1520.26    2768
 1525.32    2770 1530.38    2772 1535.31    2774 1539.54    2776 1543.77    2778
  1558.8    2780 1570.56    2782 1586.51    2784 1602.59    2786 1615.11    2788
 1629.91    2790 1640.85    2792 1651.52    2794 1665.43    2796

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000     .02 1319.27     .02 1520.26     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1319.27 1520.26             125     138     130             .3       .5

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2768.83  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.61  * Wt. n-Val.            *          *   0.020  *          *
* W.S. Elev (ft)         * 2767.22  * Reach Len. (ft)       *  125.00  *  138.00  *  130.00  *
* Crit W.S. (ft)         * 2767.22  * Flow Area (sq ft)     *          *  606.05  *          *
* E.G. Slope (ft/ft)     *0.004054  * Area (sq ft)          *          *  606.05  *          *
* Q Total (cfs)          * 6162.00  * Flow (cfs)            *          * 6162.00  *          *
* Top Width (ft)         *  190.11  * Top Width (ft)        *          *  190.11  *          *
* Vel Total (ft/s)       *   10.17  * Avg. Vel. (ft/s)      *          *   10.17  *          *
* Max Chl Dpth (ft)      *    6.82  * Hydr. Depth (ft)      *          *    3.19  *          *
* Conv. Total (cfs)      * 96776.9  * Conv. (cfs)           *          * 96776.9  *          *
* Length Wtd. (ft)       *  135.49  * Wetted Per. (ft)      *          *  192.34  *          *
* Min Ch El (ft)         * 2760.40  * Shear (lb/sq ft)      *          *    0.80  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *    8.11  *          *
* Frctn Loss (ft)        *    1.12  * Cum Volume (acre-ft)  *   43.68  *   33.45  *   39.49  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)        *   58.69  *   20.36  *   62.12  *
***********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 3.440

INPUT
Description: 38
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
******************************************************************************
    1000    2786 1009.54    2784 1016.77    2782 1024.28    2780 1032.09    2778
  1041.5    2776 1053.61    2774  1098.4    2772 1130.78    2770 1158.16    2768
 1170.24    2766 1197.87    2764 1282.18    2762 1320.85    2760    13302758.775
 1335.79    2758    1350    2757 1364.55    2758    1365    2758 1403.79    2758
 1431.15    2758 1438.59    2760 1443.83    2762 1449.08    2764 1453.57    2766
 1457.89    2768  1462.2    2770 1466.56    2772 1470.92    2774 1484.06    2776
 1496.09    2778 1508.13    2780

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .075    1330     .05    1365    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1330    1365             205     197     174             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2764.78  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.88  * Wt. n-Val.            *   0.075  *   0.050  *   0.075  *
* W.S. Elev (ft)         * 2762.90  * Reach Len. (ft)       *  205.00  *  197.00  *  174.00  *
* Crit W.S. (ft)         * 2762.90  * Flow Area (sq ft)     *  122.64  *  183.62  *  364.12  *
* E.G. Slope (ft/ft)     *0.024952  * Area (sq ft)          *  122.64  *  183.62  *  364.12  *
* Q Total (cfs)          * 6162.00  * Flow (cfs)            *  486.69  * 2596.45  * 3078.86  *
```

```
* Top Width (ft)         *  201.93  * Top Width (ft)        *   85.73  *   35.00  *   81.19  *
* Vel Total (ft/s)       *    9.19  * Avg. Vel. (ft/s)      *    3.97  *   14.14  *    8.46  *
* Max Chl Dpth (ft)      *    5.90  * Hydr. Depth (ft)      *    1.43  *    5.25  *    4.48  *
* Conv. Total (cfs)      * 39009.7  * Conv. (cfs)           *  3081.1  * 16437.3  * 19491.3  *
* Length Wtd. (ft)       *  186.60  * Wetted Per. (ft)      *   85.88  *   35.12  *   81.99  *
* Min Ch El (ft)         * 2757.00  * Shear (lb/sq ft)      *    2.22  *    8.14  *    6.92  *
* Alpha                  *    1.43  * Stream Power (lb/ft s) *    8.83  *  115.16  *   58.50  *
* Frctn Loss (ft)        *    4.59  * Cum Volume (acre-ft)  *   43.51  *   32.20  *   38.95  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)        *   58.56  *   20.00  *   62.00  *
*********************************************************************************************
```

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

CROSS SECTION

RIVER: Finger Rock Wash
REACH: Main Reach 4   RS: 3.403

INPUT
Description: 37.5

```
Station Elevation Data    num=      41
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    1000    2780 1012.75    2778 1024.39    2776  1035.1    2774 1045.94    2772
 1053.37    2770 1061.08    2768 1072.92    2766 1089.37    2764 1098.97    2762
 1104.64    2760 1110.31    2758 1116.85    2756  1123.6    2754 1130.21    2754
 1153.87    2756 1190.86    2756 1224.65    2754    12252753.958 1241.35    2752
    1248  2751.5 1256.11    2752    12602752.934 1264.44    2754 1299.24    2754
 1336.92    2752 1352.69    2752 1357.72    2754  1362.6    2756  1367.4    2758
 1371.96    2760 1375.46    2762 1378.97    2764 1382.47    2766 1385.97    2768
 1389.47    2770 1392.98    2772 1396.48    2774 1399.98    2776 1403.34    2778
  1415.8    2778

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .075    1225     .05    1260    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1225    1260               91      89     102             .1       .3
```

CROSS SECTION OUTPUT Profile #100-yr

```
*********************************************************************************************
* E.G. Elev (ft)         * 2758.57  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.41  * Wt. n-Val.            *   0.075  *   0.050  *   0.075  *
* W.S. Elev (ft)         * 2757.16  * Reach Len. (ft)       *   91.00  *   89.00  *  102.00  *
* Crit W.S. (ft)         * 2757.16  * Flow Area (sq ft)     *  205.74  *  166.45  *  397.53  *
* E.G. Slope (ft/ft)     *0.024196  * Area (sq ft)          *  205.74  *  166.45  *  397.53  *
* Q Total (cfs)          * 6060.00  * Flow (cfs)            *  947.96  * 2165.35  * 2946.70  *
* Top Width (ft)         *  252.33  * Top Width (ft)        *  111.94  *   35.00  *  105.38  *
* Vel Total (ft/s)       *    7.87  * Avg. Vel. (ft/s)      *    4.61  *   13.01  *    7.41  *
* Max Chl Dpth (ft)      *    5.66  * Hydr. Depth (ft)      *    1.84  *    4.76  *    3.77  *
* Conv. Total (cfs)      * 38958.0  * Conv. (cfs)           *  6094.1  * 13920.4  * 18943.5  *
* Length Wtd. (ft)       *          * Wetted Per. (ft)      *  112.55  *   35.26  *  106.57  *
* Min Ch El (ft)         * 2751.50  * Shear (lb/sq ft)      *    2.76  *    7.13  *    5.63  *
* Alpha                  *    1.46  * Stream Power (lb/ft s) *   12.72  *   92.76  *   41.77  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)  *   42.74  *   31.41  *   37.43  *
* C & E Loss (ft)        *          * Cum SA (acres)        *   58.10  *   19.84  *   61.63  *
*********************************************************************************************
```

Warning: The energy equation could not be balanced within the specified number of iterations. The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Finger Rock Wash
REACH: Main Reach 4   RS: 3.386

INPUT
Description: 37

```
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
******************************************************************************
    1000    2776 1010.47    2774 1013.17    2772 1016.96    2770 1020.87    2768
 1024.77    2766 1028.68    2764 1032.59    2762  1036.5    2760  1040.4    2758
 1044.36    2756 1048.22    2754 1052.12    2752 1064.47    2752 1115.17    2752
    1129    2750  1139.6    2752 1160.59    2752    11702750.728 1175.39    2750
 1185.69    2748 1185.97    2748 1194.93    2750    12002751.381 1202.27    2752
 1211.35    2752 1278.74    2752 1293.65    2754 1300.54    2756 1306.95    2758
  1312.9    2760  1318.1    2762  1323.3    2764  1328.5    2766  1333.7    2768
 1339.02    2770  1343.7    2772 1348.72    2774 1354.18    2776 1361.55    2778
  1368.4    2780 1375.35    2782 1380.15    2784 1384.34    2786 1388.54    2788
 1395.51    2790 1402.74    2792 1408.43    2794 1414.34    2796 1419.34    2798
 1423.77    2800  1427.7    2802

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .075    1170     .05    1200    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1170    1200              480     501     476             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2756.30  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.39  * Wt. n-Val.             *   0.075  *   0.050  *   0.075  *
* W.S. Elev (ft)         * 2754.90  * Reach Len. (ft)        *  480.00  *  501.00  *  476.00  *
* Crit W.S. (ft)         * 2754.90  * Flow Area (sq ft)      *  380.72  *  161.42  *  258.98  *
* E.G. Slope (ft/ft)     *0.022646  * Area (sq ft)           *  380.72  *  161.42  *  258.98  *
* Q Total (cfs)          * 6060.00  * Flow (cfs)             * 2389.64  * 2185.41  * 1484.95  *
* Top Width (ft)         *  250.28  * Top Width (ft)         *  123.52  *   30.00  *   96.76  *
* Vel Total (ft/s)       *    7.56  * Avg. Vel. (ft/s)       *    6.28  *   13.54  *    5.73  *
* Max Chl Dpth (ft)      *    6.90  * Hydr. Depth (ft)       *    3.08  *    5.38  *    2.68  *
* Conv. Total (cfs)      * 40269.2  * Conv. (cfs)            * 15879.4  * 14522.2  *  9867.6  *
* Length Wtd. (ft)       *  486.51  * Wetted Per. (ft)       *  124.64  *   30.65  *   97.10  *
* Min Ch El (ft)         * 2748.00  * Shear (lb/sq ft)       *    4.32  *    7.45  *    3.77  *
* Alpha                  *    1.57  * Stream Power (lb/ft s) *   27.11  *  100.82  *   21.62  *
* Frctn Loss (ft)        *   10.81  * Cum Volume (acre-ft)   *   42.12  *   31.07  *   36.66  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *   57.85  *   19.78  *   61.39  *
**********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 3.291

INPUT
Description: 36
Station Elevation Data    num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
******************************************************************************
    1000    2766 1008.23    2764 1016.39    2762 1024.54    2760  1032.7    2758
 1040.83    2756 1051.63    2754 1057.22    2752 1061.39    2750 1066.53    2748
 1072.02    2746 1077.52    2744 1083.02    2742 1088.52    2740 1105.44    2738
    1115    2737 1128.12    2738 1144.61    2740 1183.51    2742 1192.27    2742
 1247.31    2740    12702738.121 1271.46    2738 1291.35    2738 1297.55    2740
 1302.93    2742 1306.72    2744    13102745.735  1310.5    2746 1314.28    2748
 1318.06    2750 1321.86    2752 1325.66    2754 1329.46    2756 1332.69    2758
 1335.84    2760 1338.99    2762 1342.13    2764  1345.1    2766 1348.06    2768

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .075    1270     .05    1310    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1270    1310              507     563     585             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2744.56  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.11  * Wt. n-Val.             *   0.075  *   0.050  *          *
* W.S. Elev (ft)         * 2743.45  * Reach Len. (ft)        *  507.00  *  563.00  *  585.00  *
* Crit W.S. (ft)         * 2743.08  * Flow Area (sq ft)      *  642.48  *  159.04  *          *
```

```
* E.G. Slope (ft/ft)     *0.021815  * Area (sq ft)           *  642.48  *  159.04  *           *
* Q Total (cfs)          * 6060.00  * Flow (cfs)             * 4205.02  * 1854.98  *           *
* Top Width (ft)         *  226.65  * Top Width (ft)         *  190.97  *   35.68  *           *
* Vel Total (ft/s)       *    7.56  * Avg. Vel. (ft/s)       *    6.55  *   11.66  *           *
* Max Chl Dpth (ft)      *    6.45  * Hydr. Depth (ft)       *    3.36  *    4.46  *           *
* Conv. Total (cfs)      * 41029.1  * Conv. (cfs)            * 28470.0  * 12559.1  *           *
* Length Wtd. (ft)       *  535.81  * Wetted Per. (ft)       *  192.07  *   36.72  *           *
* Min Ch El (ft)         * 2738.00  * Shear (lb/sq ft)       *    4.56  *    5.90  *           *
* Alpha                  *    1.25  * Stream Power (lb/ft s) *   29.82  *   68.81  *           *
* Frctn Loss (ft)        *   10.91  * Cum Volume (acre-ft)   *   36.49  *   29.23  *   35.24  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *   56.12  *   19.40  *   60.86  *
************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 3.185

INPUT
Description: 35
Station Elevation Data    num=      34
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2758 1005.55    2756 1008.85    2754 1013.14    2752 1017.55    2750
 1021.96    2748 1026.37    2746  1030.8    2744 1035.19    2742  1039.6    2740
 1044.02    2738 1048.43    2736 1053.12    2734  1069.7    2732 1091.84    2730
 1114.94    2728  1137.3    2726    1150    2725    11552725.111  1195.2    2726
    1205 2727.09 1213.19    2728 1224.88    2730 1229.11    2732 1233.34    2734
 1237.78    2736  1243.3    2738 1248.82    2740 1254.33    2742 1259.85    2744
 1267.05    2746 1274.76    2748 1282.47    2750 1288.43    2752

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .075    1155     .05    1205    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1155    1205             398     360     315             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
************************************************************************************************
* E.G. Elev (ft)         * 2733.57  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.97  * Wt. n-Val.             *   0.075  *   0.050  *   0.075  *
* W.S. Elev (ft)         * 2731.59  * Reach Len. (ft)        *  398.00  *  360.00  *  315.00  *
* Crit W.S. (ft)         * 2731.42  * Flow Area (sq ft)      *  286.60  *  292.10  *   66.11  *
* E.G. Slope (ft/ft)     *0.019059  * Area (sq ft)           *  286.60  *  292.10  *   66.11  *
* Q Total (cfs)          * 6060.00  * Flow (cfs)             * 1819.16  * 3883.73  *  357.12  *
* Top Width (ft)         *  154.02  * Top Width (ft)         *   80.78  *   50.00  *   23.25  *
* Vel Total (ft/s)       *    9.40  * Avg. Vel. (ft/s)       *    6.35  *   13.30  *    5.40  *
* Max Chl Dpth (ft)      *    6.59  * Hydr. Depth (ft)       *    3.55  *    5.84  *    2.84  *
* Conv. Total (cfs)      * 43895.9  * Conv. (cfs)            * 13177.1  * 28131.9  *  2586.8  *
* Length Wtd. (ft)       *  351.22  * Wetted Per. (ft)       *   81.07  *   50.07  *   23.82  *
* Min Ch El (ft)         * 2725.11  * Shear (lb/sq ft)       *    4.21  *    6.94  *    3.30  *
* Alpha                  *    1.44  * Stream Power (lb/ft s) *   26.70  *   92.29  *   17.84  *
* Frctn Loss (ft)        *    6.38  * Cum Volume (acre-ft)   *   31.08  *   26.31  *   34.80  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         *   54.54  *   18.84  *   60.71  *
************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 3.116

INPUT
Description: 34
Station Elevation Data    num=      31
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2738 1003.43    2736 1006.86    2734 1010.29    2732 1013.72    2730
 1019.56    2728 1024.41    2726 1028.06    2724    10302722.888 1031.55    2722
```

```
  1033.2 2721.03 1034.95    2720 1038.49    2718 1039.45    2718 1048.46    2720
    1065 2720.26 1175.89    2722 1184.74    2724  1193.7    2726 1202.66    2728
 1211.62    2730 1236.82    2732  1248.9    2734 1260.99    2736 1281.87    2738
 1325.49    2740 1363.09    2742 1380.73    2744  1397.4    2746 1410.51    2748
 1426.79    2750

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .075    1030     .05    1065    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1030    1065              448     450     453             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2727.00  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.37  * Wt. n-Val.             *  0.075  *   0.050  *   0.075  *
* W.S. Elev (ft)         * 2725.63  * Reach Len. (ft)        *  448.00  *  450.00  *  453.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    6.69  *  202.33  *  528.77  *
* E.G. Slope (ft/ft)     *0.017342  * Area (sq ft)           *    6.69  *  202.33  *  528.77  *
* Q Total (cfs)          * 6060.00  * Flow (cfs)             *   19.55  * 2478.88  * 3561.57  *
* Top Width (ft)         *  166.98  * Top Width (ft)         *    4.92  *   35.00  *  127.06  *
* Vel Total (ft/s)       *    8.21  * Avg. Vel. (ft/s)       *    2.92  *   12.25  *    6.74  *
* Max Chl Dpth (ft)      *    7.63  * Hydr. Depth (ft)       *    1.36  *    5.78  *    4.16  *
* Conv. Total (cfs)      * 46017.7  * Conv. (cfs)            *   148.4  * 18823.8  * 27045.4  *
* Length Wtd. (ft)       *  451.82  * Wetted Per. (ft)       *    5.64  *   36.53  *  127.48  *
* Min Ch El (ft)         * 2718.00  * Shear (lb/sq ft)       *    1.28  *    6.00  *    4.49  *
* Alpha                  *    1.31  * Stream Power (lb/ft s) *    3.75  *   73.47  *   30.25  *
* Frctn Loss (ft)        *    9.61  * Cum Volume (acre-ft)   *   29.74  *   24.27  *   32.65  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   54.15  *   18.49  *   60.16  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 3.031

INPUT
Description: 33
Station Elevation Data    num=      29
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
******************************************************************************
    1000    2726 1015.37    2724 1019.59    2722  1023.6    2720    10252719.347
 1027.89    2718 1032.18    2716 1036.43    2714 1039.54    2712 1049.69    2710
 1061.79    2710 1068.39    2712    1070    2712 1072.16    2712 1160.02    2712
 1217.91    2714 1227.07 2714.64 1246.38    2716 1264.01    2718 1279.14    2720
 1287.34    2722 1295.12    2724 1303.58    2726 1310.11    2728 1316.49    2730
  1322.7    2732 1328.54    2734 1335.03    2736 1345.17    2738

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .075    1025     .05    1070    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1025    1070              791     822     791             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2717.38  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.46  * Wt. n-Val.             *         *   0.050  *   0.075  *
* W.S. Elev (ft)         * 2715.92  * Reach Len. (ft)        *  791.00  *  822.00  *  791.00  *
* Crit W.S. (ft)         * 2715.84  * Flow Area (sq ft)      *          *  173.25  *  547.72  *
* E.G. Slope (ft/ft)     *0.026725  * Area (sq ft)           *          *  173.25  *  547.72  *
* Q Total (cfs)          * 6060.00  * Flow (cfs)             *          * 2268.62  * 3791.38  *
* Top Width (ft)         *  212.85  * Top Width (ft)         *          *   37.64  *  175.21  *
* Vel Total (ft/s)       *    8.41  * Avg. Vel. (ft/s)       *          *   13.09  *    6.92  *
* Max Chl Dpth (ft)      *    5.92  * Hydr. Depth (ft)       *          *    4.60  *    3.13  *
* Conv. Total (cfs)      * 37069.0  * Conv. (cfs)            *          * 13877.2  * 23191.8  *
* Length Wtd. (ft)       *  808.33  * Wetted Per. (ft)       *          *   39.15  *  175.31  *
* Min Ch El (ft)         * 2710.00  * Shear (lb/sq ft)       *          *    7.38  *    5.21  *
* Alpha                  *    1.33  * Stream Power (lb/ft s) *          *   96.68  *   36.08  *
* Frctn Loss (ft)        *   16.03  * Cum Volume (acre-ft)   *   29.70  *   22.33  *   27.05  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   54.12  *   18.12  *   58.59  *
*********************************************************************************************

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

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

CROSS SECTION

RIVER: Finger Rock Wash
REACH: Main Reach 4 RS: 2.876

INPUT
Description: 32
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2712	1004.89	2710	1009.53	2708	1014.18	2706	1018.83	2704
1023.39	2702	1027.06	2700	1030.74	2698	1034.41	2696	1038.07	2694
1040	2693.911	1081.27	2692	1094.26	2692	1095	2692.165	1103.24	2694
1127.63	2696	1192.85	2698	1222.42	2700	1229.43	2702	1235.95	2703.58
1237.69	2704	1251.24	2706	1278.53	2708	1290.72	2710	1303.28	2712
1321.77	2714	1338.22	2716	1344.6	2718	1352.15	2720		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.075	1040	.05	1095	.075

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1040	1095	290	273	243	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	2701.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.01	Wt. n-Val.	0.075	0.050	0.075
W.S. Elev (ft)	2699.28	Reach Len. (ft)	290.00	273.00	243.00
Crit W.S. (ft)	2699.28	Flow Area (sq ft)	35.86	361.12	316.73
E.G. Slope (ft/ft)	0.015483	Area (sq ft)	35.86	361.12	316.73
Q Total (cfs)	6368.00	Flow (cfs)	174.15	4678.86	1514.99
Top Width (ft)	183.46	Top Width (ft)	11.62	55.00	116.83
Vel Total (ft/s)	8.92	Avg. Vel. (ft/s)	4.86	12.96	4.78
Max Chl Dpth (ft)	7.28	Hydr. Depth (ft)	3.09	6.57	2.71
Conv. Total (cfs)	51177.5	Conv. (cfs)	1399.6	37602.4	12175.5
Length Wtd. (ft)	260.61	Wetted Per. (ft)	12.97	55.06	117.19
Min Ch El (ft)	2692.00	Shear (lb/sq ft)	2.67	6.34	2.61
Alpha	1.63	Stream Power (lb/ft s)	12.98	82.13	12.50
Frctn Loss (ft)	4.48	Cum Volume (acre-ft)	29.38	17.29	19.20
C & E Loss (ft)	0.20	Cum SA (acres)	54.01	17.24	55.94

Warning: The energy equation could not be balanced within the specified number of iterations. The
program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
depth, the calculated water surface came back below critical depth. This indicates that there
is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Finger Rock Wash
REACH: Main Reach 4 RS: 2.824

INPUT
Description: 31
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2718	1006.71	2716	1011.48	2714	1016.58	2712	1023.28	2710
1029.06	2708	1033.75	2706	1038.44	2704	1043.14	2702	1047.83	2700
1052.25	2698	1055.88	2696	1059.49	2694	1060	2693.717	1063.1	2692
1066.72	2690	1072.71	2688	1100	2688	1133.85	2688	1163.87	2690
1229.69	2692	1247.21	2694	1251.62	2696	1256.04	2698	1260.46	2700
1264.87	2702	1269.29	2704	1273.72	2706	1278.25	2708	1282.61	2710
1296.75	2712	1312.16	2714	1318.91	2716	1325.47	2718	1335.28	2720

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.075	1060	.05	1100	.075

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1060    1100              410     386     366             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)        * 2695.34  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *    1.33  * Wt. n-Val.              *   0.075  *   0.050  *   0.075  *
* W.S. Elev (ft)        * 2694.01  * Reach Len. (ft)         *  410.00  *  386.00  *  366.00  *
* Crit W.S. (ft)        *          * Flow Area (sq ft)       *    0.08  *  208.34  *  569.11  *
* E.G. Slope (ft/ft)    *0.019195  * Area (sq ft)            *    0.08  *  208.34  *  569.11  *
* Q Total (cfs)         * 6368.00  * Flow (cfs)              *    0.05  * 2523.84  * 3844.11  *
* Top Width (ft)        *  187.75  * Top Width (ft)          *    0.52  *   40.00  *  147.22  *
* Vel Total (ft/s)      *    8.19  * Avg. Vel. (ft/s)        *    0.69  *   12.11  *    6.75  *
* Max Chl Dpth (ft)     *    6.01  * Hydr. Depth (ft)        *    0.14  *    5.21  *    3.87  *
* Conv. Total (cfs)     * 45962.6  * Conv. (cfs)             *     0.4  * 18216.4  * 27745.8  *
* Length Wtd. (ft)      *  377.93  * Wetted Per. (ft)        *    0.60  *   41.28  *  147.44  *
* Min Ch El (ft)        * 2688.00  * Shear (lb/sq ft)        *    0.15  *    6.05  *    4.63  *
* Alpha                 *    1.28  * Stream Power (lb/ft s)  *    0.10  *   73.26  *   31.25  *
* Frctn Loss (ft)       *    6.51  * Cum Volume (acre-ft)    *   29.26  *   15.50  *   16.73  *
* C & E Loss (ft)       *    0.07  * Cum SA (acres)          *   53.97  *   16.95  *   55.20  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 2.751

INPUT
Description: 30
Station Elevation Data    num=      29
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2708 1004.11    2706 1008.16    2704 1012.21    2702 1016.27    2700
 1020.32    2698 1024.37    2696 1028.43    2694 1032.48    2692 1036.53    2690
 1040.59    2688 1044.64    2686 1048.69    2684 1052.69    2682    10702680.516
 1076.02    2680  1088.5    2678 1095.78    2678    11002679.243 1102.57    2680
 1109.43    2682 1185.35    2684 1215.36    2686 1223.33    2688 1231.31    2690
 1238.74    2692 1246.08    2694 1253.42    2696 1260.03    2698

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .075    1070     .05    1100    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1070    1100              454     536     623             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)        * 2688.75  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *    1.98  * Wt. n-Val.              *   0.075  *   0.050  *   0.075  *
* W.S. Elev (ft)        * 2686.77  * Reach Len. (ft)         *  454.00  *  536.00  *  623.00  *
* Crit W.S. (ft)        *          * Flow Area (sq ft)       *  118.35  *  234.51  *  398.88  *
* E.G. Slope (ft/ft)    *0.015564  * Area (sq ft)            *  118.35  *  234.51  *  398.88  *
* Q Total (cfs)         * 6368.00  * Flow (cfs)              *  762.78  * 3397.36  * 2207.86  *
* Top Width (ft)        *  175.37  * Top Width (ft)          *   26.93  *   30.00  *  118.44  *
* Vel Total (ft/s)      *    8.47  * Avg. Vel. (ft/s)        *    6.44  *   14.49  *    5.54  *
* Max Chl Dpth (ft)     *    8.77  * Hydr. Depth (ft)        *    4.40  *    7.82  *    3.37  *
* Conv. Total (cfs)     * 51043.4  * Conv. (cfs)             *  6114.1  * 27231.9  * 17697.4  *
* Length Wtd. (ft)      *  539.71  * Wetted Per. (ft)        *   28.11  *   30.36  *  119.03  *
* Min Ch El (ft)        * 2678.00  * Shear (lb/sq ft)        *    4.09  *    7.51  *    3.26  *
* Alpha                 *    1.78  * Stream Power (lb/ft s)  *   26.37  *  108.73  *   18.02  *
* Frctn Loss (ft)       *    9.49  * Cum Volume (acre-ft)    *   28.70  *   13.54  *   12.67  *
* C & E Loss (ft)       *    0.02  * Cum SA (acres)          *   53.84  *   16.64  *   54.09  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 2.649
```

```
INPUT
Description: 29
Station Elevation Data    num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2696 1003.41    2694    1007    2692 1010.44    2690 1013.93    2688
 1017.42    2686 1020.92    2684 1024.41    2682  1027.9    2680 1033.75    2678
 1040.83    2676 1047.91    2674    1055    2672 1097.45    2670    1100    2670
    1115    2670  1134.3    2670 1138.91    2672 1143.23    2674 1147.55    2676
 1151.88    2678  1156.2    2680 1160.53    2682 1164.85    2684 1169.18    2686
  1173.5    2688 1177.63    2690 1181.75    2692 1185.87    2694    1190    2696
 1194.12    2698 1198.27    2700 1202.36    2702 1206.48    2704 1210.59    2706
 1214.71    2708 1218.82    2710 1222.95    2712 1227.15    2714 1231.35    2716
 1255.54    2716 1266.29    2714

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .075    1100     .05    1115    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1100    1115              566     517     474             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2679.25  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.90  * Wt. n-Val.            *   0.075  *   0.050  *   0.075  *
* W.S. Elev (ft)         * 2677.35  * Reach Len. (ft)       *  566.00  *  517.00  *  474.00  *
* Crit W.S. (ft)         * 2676.51  * Flow Area (sq ft)     *  338.86  *  110.21  *  201.96  *
* E.G. Slope (ft/ft)     *0.020015  * Area (sq ft)          *  338.86  *  110.21  *  201.96  *
* Q Total (cfs)          * 6368.00  * Flow (cfs)            * 2863.58  * 1751.37  * 1753.05  *
* Top Width (ft)         *  114.41  * Top Width (ft)        *   63.94  *   15.00  *   35.47  *
* Vel Total (ft/s)       *    9.78  * Avg. Vel. (ft/s)      *    8.45  *   15.89  *    8.68  *
* Max Chl Dpth (ft)      *    7.35  * Hydr. Depth (ft)      *    5.30  *    7.35  *    5.69  *
* Conv. Total (cfs)      * 45011.4  * Conv. (cfs)           * 20240.9  * 12379.4  * 12391.2  *
* Length Wtd. (ft)       *  529.55  * Wetted Per. (ft)      *   64.73  *   15.00  *   37.06  *
* Min Ch El (ft)         * 2670.00  * Shear (lb/sq ft)      *    6.54  *    9.18  *    6.81  *
* Alpha                  *    1.28  * Stream Power (lb/ft s) *   55.28  *  145.90  *   59.11  *
* Frctn Loss (ft)        *   10.11  * Cum Volume (acre-ft)  *   26.32  *   11.42  *    8.37  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)        *   53.37  *   16.36  *   52.99  *
***********************************************************************************************

Warning: The energy loss was 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: Finger Rock Wash
REACH: Main Reach 4       RS: 2.551

INPUT
Description: 28
Station Elevation Data    num=      51
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2704 1004.68    2702 1009.36    2700 1015.24    2698 1022.93    2696
 1028.96    2694 1033.35    2692 1039.56    2690 1048.14    2688 1056.73    2686
 1062.53    2684 1066.78    2682 1070.55    2680 1074.47    2678 1078.73    2676
 1083.45    2674 1088.18    2672  1092.9    2670 1097.63    2668 1102.35    2666
 1107.08    2664 1170.69    2662    11902660.769 1202.05    2660 1213.98    2658
  1218.8    2658    12202658.406 1224.71    2660 1228.36    2662 1232.01    2664
 1235.66    2666 1239.31    2668 1242.96    2670 1246.61    2672 1250.26    2674
 1253.91    2676 1257.56    2678 1261.21    2680 1264.86    2682 1268.51    2684
 1272.16    2686 1275.81    2688 1279.46    2690 1284.29    2692 1293.19    2694
 1313.25    2694 1322.62    2692 1329.62    2690 1341.94    2688 1344.32    2688
 1355.89    2690

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .075    1190     .05    1220    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1190    1220              513     494     492             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2669.10  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.27  * Wt. n-Val.            *   0.075  *   0.050  *   0.075  *
* W.S. Elev (ft)         * 2666.84  * Reach Len. (ft)       *  513.00  *  494.00  *  492.00  *
* Crit W.S. (ft)         * 2666.84  * Flow Area (sq ft)     *  359.00  *  224.24  *   78.63  *
```

```
* E.G. Slope (ft/ft)     *0.018223  * Area (sq ft)           *  359.00  *  224.24  *   78.63  *
* Q Total (cfs)          * 6368.00  * Flow (cfs)             * 2410.04  * 3419.67  *  538.29  *
* Top Width (ft)         *  136.82  * Top Width (ft)         *   89.63  *   30.00  *   17.19  *
* Vel Total (ft/s)       *    9.62  * Avg. Vel. (ft/s)       *    6.71  *   15.25  *    6.85  *
* Max Chl Dpth (ft)      *    8.84  * Hydr. Depth (ft)       *    4.01  *    7.47  *    4.57  *
* Conv. Total (cfs)      * 47172.5  * Conv. (cfs)            * 17853.0  * 25332.0  *  3987.5  *
* Length Wtd. (ft)       *  499.72  * Wetted Per. (ft)       *   90.27  *   30.26  *   19.20  *
* Min Ch El (ft)         * 2658.00  * Shear (lb/sq ft)       *    4.52  *    8.43  *    4.66  *
* Alpha                  *    1.58  * Stream Power (lb/ft s) *   30.37  *  128.58  *   31.89  *
* Frctn Loss (ft)        *    7.88  * Cum Volume (acre-ft)   *   21.79  *    9.43  *    6.84  *
* C & E Loss (ft)        *    0.29  * Cum SA (acres)         *   52.37  *   16.09  *   52.70  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 2.458

INPUT
Description: 27
Station Elevation Data    num=      30
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2686 1004.72    2684 1009.44    2682 1014.16    2680 1018.91    2678
 1024.01    2676 1029.12    2674 1034.22    2672 1039.34    2670 1044.46    2668
 1049.59    2666 1054.71    2664 1059.83    2662 1064.95    2660 1070.05    2658
 1097.85    2656 1261.87    2654    1309    2652    13202651.059 1331.49    2650
    1338    2648 1349.39    2650    13602651.929 1360.39    2652    1371    2654
    1447  2654.2    1585    2656    1598    2658    1639    2666    1651    2670

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .075    1309     .05    1371    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1309    1371              518     504     500             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1445    1651    2660       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2657.89  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.31  * Wt. n-Val.             *   0.075  *   0.050  *   0.075  *
* W.S. Elev (ft)         * 2656.58  * Reach Len. (ft)        *  518.00  *  504.00  *  500.00  *
* Crit W.S. (ft)         * 2656.58  * Flow Area (sq ft)      *  429.80  *  360.01  *  183.58  *
* E.G. Slope (ft/ft)     *0.013792  * Area (sq ft)           *  429.80  *  360.01  *  393.41  *
* Q Total (cfs)          * 6368.00  * Flow (cfs)             * 1566.34  * 4018.89  *  782.77  *
* Top Width (ft)         *  498.94  * Top Width (ft)         *  219.19  *   62.00  *  217.76  *
* Vel Total (ft/s)       *    6.54  * Avg. Vel. (ft/s)       *    3.64  *   11.16  *    4.26  *
* Max Chl Dpth (ft)      *    8.58  * Hydr. Depth (ft)       *    1.96  *    5.81  *    2.48  *
* Conv. Total (cfs)      * 54224.4  * Conv. (cfs)            * 13337.6  * 34221.5  *  6665.4  *
* Length Wtd. (ft)       *  509.86  * Wetted Per. (ft)       *  219.26  *   62.93  *   74.00  *
* Min Ch El (ft)         * 2648.00  * Shear (lb/sq ft)       *    1.69  *    4.93  *    2.14  *
* Alpha                  *    1.97  * Stream Power (lb/ft s) *    6.15  *   54.99  *    9.11  *
* Frctn Loss (ft)        *    6.36  * Cum Volume (acre-ft)   *   17.14  *    6.12  *    4.18  *
* C & E Loss (ft)        *    0.21  * Cum SA (acres)         *   50.56  *   15.57  *   51.37  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION
```

```
RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 2.362

INPUT
Description: 26
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2674 1008.55    2672 1016.26    2670 1023.11    2668 1029.05    2666
 1034.51    2664 1040.09    2662 1046.02    2660 1051.96    2658  1057.9    2656
 1063.84    2654 1069.78    2652 1075.74    2650 1081.94    2648 1094.36    2646
 1215.73    2644 1263.86    2644 1274.92    2644 1385.11    2644 1500.22    2644
    15052643.205 1512.25    2642    1525    2641 1544.32    2642    15452642.125
 1555.23    2644 1579.46    2646 1585.71    2648 1591.39    2650 1597.11    2652
 1602.82    2654 1608.47    2656

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .075    1505     .05    1545    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1505    1545              281     305     311             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1170    2655       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2647.53  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.62  * Wt. n-Val.             *   0.075  *   0.050  *   0.075  *
* W.S. Elev (ft)         * 2646.91  * Reach Len. (ft)        *  281.00  *  305.00  *  311.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  959.41  *  208.01  *   86.92  *
* E.G. Slope (ft/ft)     *0.011327  * Area (sq ft)           * 1077.92  *  208.01  *   86.92  *
* Q Total (cfs)          * 6368.00  * Flow (cfs)             * 4079.12  * 1969.00  *  319.88  *
* Top Width (ft)         *  493.59  * Top Width (ft)         *  416.29  *   40.00  *   37.30  *
* Vel Total (ft/s)       *    5.08  * Avg. Vel. (ft/s)       *    4.25  *    9.47  *    3.68  *
* Max Chl Dpth (ft)      *    5.91  * Hydr. Depth (ft)       *    2.86  *    5.20  *    2.33  *
* Conv. Total (cfs)      * 59834.1  * Conv. (cfs)            * 38327.7  * 18500.8  *  3005.6  *
* Length Wtd. (ft)       *  288.99  * Wetted Per. (ft)       *  335.07  *   40.18  *   37.70  *
* Min Ch El (ft)         * 2641.00  * Shear (lb/sq ft)       *    2.02  *    3.66  *    1.63  *
* Alpha                  *    1.55  * Stream Power (lb/ft s) *    8.61  *   34.66  *    6.00  *
* Frctn Loss (ft)        *    2.14  * Cum Volume (acre-ft)   *    8.18  *    2.84  *    1.42  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   46.78  *   14.98  *   49.91  *
*********************************************************************************************

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: Finger Rock Wash
REACH: Main Reach 4       RS: 2.305

INPUT
Description: 25.5
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2650  1007.2    2648 1017.67    2646 1029.52    2644 1041.36    2642
 1072.84    2640 1224.51    2640 1291.24    2640    1325    2640 1329.14    2640
  1342.2    2638    1347    2637 1359.15    2638    13602638.388 1363.53    2640
 1367.75    2642 1371.96    2644  1376.2    2646 1380.48    2648

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .075    1325     .05    1360    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1325    1360               11     195     196             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1102    2648       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
```

```
* E.G. Elev (ft)         * 2645.34  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.              *   0.075  *   0.050  *   0.075  *
* W.S. Elev (ft)         * 2644.91  * Reach Len. (ft)         *   11.00  *  195.00  *  196.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       * 1095.84  *  228.96  *   45.65  *
* E.G. Slope (ft/ft)     *0.005206  * Area (sq ft)            * 1387.48  *  228.96  *   45.65  *
* Q Total (cfs)          * 6368.00  * Flow (cfs)              * 4528.05  * 1705.00  *  134.95  *
* Top Width (ft)         *  349.79  * Top Width (ft)          *  300.90  *   35.00  *   13.90  *
* Vel Total (ft/s)       *    4.65  * Avg. Vel. (ft/s)        *    4.13  *    7.45  *    2.96  *
* Max Chl Dpth (ft)      *    7.91  * Hydr. Depth (ft)        *    4.91  *    6.54  *    3.28  *
* Conv. Total (cfs)      * 88253.5  * Conv. (cfs)             * 62753.8  * 23629.5  *  1870.3  *
* Length Wtd. (ft)       *   98.46  * Wetted Per. (ft)        *  223.00  *   35.38  *   15.35  *
* Min Ch El (ft)         * 2637.00  * Shear (lb/sq ft)        *    1.60  *    2.10  *    0.97  *
* Alpha                  *    1.26  * Stream Power (lb/ft s) *    6.60  *   15.66  *    2.86  *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)    *    0.22  *    1.31  *    0.95  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)          *   44.46  *   14.72  *   49.73  *
**********************************************************************************************
```

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

CROSS SECTION

RIVER: Finger Rock Wash
REACH: Main Reach 4   RS: 2.268

INPUT
Description: 25

```
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2664    1017    2658    1037    2656    1075    2648    1128    2646
    1151    2644    1164    2642    1178    2640    1181    2638    1184    2636
    1222  2635.6    1247  2635.6    1282    2636    1289    2638    1296    2640
    1323    2652

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .045    1222    .045    1247    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1222    1247              184     184     184             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000    1188    2650       T
    1289    1323    2650       T
```

CROSS SECTION OUTPUT Profile #100-yr

```
**********************************************************************************************
* E.G. Elev (ft)         * 2644.74  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.98  * Wt. n-Val.              *   0.045  *   0.045  *   0.045  *
* W.S. Elev (ft)         * 2643.76  * Reach Len. (ft)         *  184.00  *  184.00  *  184.00  *
* Crit W.S. (ft)         * 2640.80  * Flow Area (sq ft)       *  271.29  *  203.96  *  325.85  *
* E.G. Slope (ft/ft)     *0.003675  * Area (sq ft)            *  385.63  *  203.96  *  375.05  *
* Q Total (cfs)          * 6368.00  * Flow (cfs)              * 2168.49  * 1654.59  * 2544.92  *
* Top Width (ft)         *  151.89  * Top Width (ft)          *   69.43  *   25.00  *   57.46  *
* Vel Total (ft/s)       *    7.95  * Avg. Vel. (ft/s)        *    7.99  *    8.11  *    7.81  *
* Max Chl Dpth (ft)      *    8.16  * Hydr. Depth (ft)        *    7.98  *    8.16  *    7.76  *
* Conv. Total (cfs)      *105041.5  * Conv. (cfs)             * 35769.7  * 27292.7  * 41979.0  *
* Length Wtd. (ft)       *  184.00  * Wetted Per. (ft)        *   34.00  *   25.00  *   42.28  *
* Min Ch El (ft)         * 2635.60  * Shear (lb/sq ft)        *    1.83  *    1.87  *    1.77  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *   14.63  *   15.19  *   13.81  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *          *    0.34  *          *
* C & E Loss (ft)        *          * Cum SA (acres)          *   44.42  *   14.58  *   49.57  *
**********************************************************************************************
```

CULVERT

RIVER: Finger Rock Wash
REACH: Main Reach 4   RS: 2.251

INPUT
Description: Sunrise Dr. Crossing @ HEC-1 Sta. RES-5

```
Distance from Upstream XS =      45
Deck/Roadway Width        =     120
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      16
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
************************************************************************
```

```
    1000 2664.86            1122 2660.37            1186 2657.78
    1236 2656.24            1294 2654.44            1339 2653.54
    1390    2652            1443 2651.74            1491 2651.19
    1543  2650.7            1594  2650.2            1645 2649.75
    1700 2649.38            1748 2649.33            1797 2649.48
    1852 2651.54

Upstream Bridge Cross Section Data
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2664    1017    2658    1037    2656    1075    2648    1128    2646
    1151    2644    1164    2642    1178    2640    1181    2638    1184    2636
    1222  2635.6    1247  2635.6    1282    2636    1289    2638    1296    2640
    1323    2652

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .045    1222    .045    1247    .045

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1222    1247             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000    1188    2650       T
    1289    1323    2650       T

Downstream  Deck/Roadway Coordinates
    num=      16
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
************************************************************************
    1000 2664.86            1122 2660.37            1186 2657.78
    1236 2656.24            1294 2654.44            1339 2653.54
    1390    2652            1443 2651.74            1491 2651.19
    1543  2650.7            1594  2650.2            1645 2649.75
    1700 2649.38            1748 2649.33            1797 2649.48
    1852 2651.54

Downstream Bridge Cross Section Data
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2658    1018    2658    1036    2656    1053    2654    1083    2652
    1100    2650    1187    2646    1199  2645.5    1215    2646    1230    2646
    1256    2642    1263    2640    1272    2638    1286    2636    1293    2634
    1300    2632    1398    2632    1401    2634    1405    2636    1421    2638
    1443    2642    1452  2643.4    1461    2642    1492    2640    1593    2632
    1649    2631    1664    2632    1739    2650

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .045    1293    .045    1405    .045

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1293    1405             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000    1295    2650       T
    1405    1739    2650       T

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
Sunrise Dr           Box       8      10
FHWA Chart # 13- Offset flared wingwalls; Beveled edge at top of inlet
FHWA Scale # 1 - Wingwalls flared 45 deg. (1:1); inlet top edge bevel=0.042D
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  8     167     .013     .013        0                   .4                1
Number of Barrels =  9
Upstream   Elevation =  2635.6
Centerline Stations
```

```
    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.
    1194    1205    1216    1227    1238    1249    1260    1271    1282
Downstream Elevation =  2632.1
Centerline Stations
    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.
    1306    1317    1328    1339    1350    1361    1372    1383    1394

CULVERT OUTPUT  Profile #100-yr  Culv Group:  Sunrise Dr
*************************************************************************
* Q Culv Group (cfs)     * 6368.00  * Culv Full Len (ft)     *          *
* # Barrels              *       9  * Culv Vel US (ft/s)     *   13.16  *
* Q Barrel (cfs)         *  707.56  * Culv Vel DS (ft/s)     *   20.59  *
* E.G. US. (ft)          * 2644.74  * Culv Inv El Up (ft)    * 2635.60  *
* W.S. US. (ft)          * 2643.76  * Culv Inv El Dn (ft)    * 2632.10  *
* E.G. DS (ft)           * 2639.23  * Culv Frctn Ls (ft)     *    1.55  *
* W.S. DS (ft)           * 2636.86  * Culv Exit Loss (ft)    *    2.89  *
* Delta EG (ft)          *    5.52  * Culv Entr Loss (ft)    *    1.08  *
* Delta WS (ft)          *    6.90  * Q Weir (cfs)           *          *
* E.G. IC (ft)           * 2644.11  * Weir Sta Lft (ft)      *          *
* E.G. OC (ft)           * 2644.74  * Weir Sta Rgt (ft)      *          *
* Culvert Control        *  Outlet  * Weir Submerg           *          *
* Culv WS Inlet (ft)     * 2640.98  * Weir Max Depth (ft)    *          *
* Culv WS Outlet (ft)    * 2635.54  * Weir Avg Depth (ft)    *          *
* Culv Nml Depth (ft)    *    2.87  * Weir Flow Area (sq ft) *          *
* Culv Crt Depth (ft)    *    5.38  * Min El Weir Flow (ft)  * 2653.87  *
*************************************************************************

Note:    The flow in the culvert is entirely supercritical.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 2.233

INPUT
Description: 24
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2658    1018    2658    1036    2656    1053    2654    1083    2652
    1100    2650    1187    2646    1199  2645.5    1215    2646    1230    2646
    1256    2642    1263    2640    1272    2638    1286    2636    1293    2634
    1300    2632    1398    2632    1401    2634    1405    2636    1421    2638
    1443    2642    1452  2643.4    1461    2642    1492    2640    1593    2632
    1649    2631    1664    2632    1739    2650

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .045    1293    .045    1405    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1293    1405              420     364     182             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000    1295    2650       T
    1405    1739    2650       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2639.23  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.37  * Wt. n-Val.              *          *   0.045  *          *
* W.S. Elev (ft)         * 2636.86  * Reach Len. (ft)         *  420.00  *  364.00  *  182.00  *
* Crit W.S. (ft)         * 2636.86  * Flow Area (sq ft)       *          *  515.91  *          *
* E.G. Slope (ft/ft)     *0.018075  * Area (sq ft)            *   15.59  *  522.20  *  581.65  *
* Q Total (cfs)          * 6368.00  * Flow (cfs)              *          * 6368.00  *          *
* Top Width (ft)         *  284.47  * Top Width (ft)          *   13.01  *  112.00  *  159.46  *
* Vel Total (ft/s)       *   12.34  * Avg. Vel. (ft/s)        *          *   12.34  *          *
* Max Chl Dpth (ft)      *    5.86  * Hydr. Depth (ft)        *          *    4.69  *          *
* Conv. Total (cfs)      * 47365.5  * Conv. (cfs)             *          * 47365.5  *          *
* Length Wtd. (ft)       *  341.40  * Wetted Per. (ft)        *          *  111.28  *          *
* Min Ch El (ft)         * 2632.00  * Shear (lb/sq ft)        *          *    5.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *   64.58  *          *
* Frctn Loss (ft)        *    6.82  * Cum Volume (acre-ft)    *    3.88  *   18.47  *   17.08  *
* C & E Loss (ft)        *    0.61  * Cum SA (acres)          *   44.24  *   14.29  *   49.11  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
```

```
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 2.164

INPUT
Description: 23.5
Station Elevation Data    num=      41
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2652 1034.34    2650  1041.6    2648 1048.32    2646 1056.35    2644
 1066.77    2642 1072.32    2640 1077.86    2638 1083.41    2636 1092.24    2634
 1101.19    2632 1124.39    2630 1128.25 2629.59 1143.41    2628 1172.49    2626
 1210.48    2624    1265    2624 1272.47    2624 1291.03    2624    1311    2623
 1323.66    2624 1335.45    2624 1340.57    2624    1355    2624 1405.98    2624
 1425.12    2624 1511.07    2624 1546.83    2624 1575.95    2626 1580.73    2626
 1596.56    2626 1635.69    2628 1654.32    2630  1664.5    2632 1669.93    2634
    1676    2636 1682.14    2638 1688.28    2640  1695.7    2642 1703.14    2644
 1708.85    2646

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1265    .045    1355    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1265    1355              207     208     209             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1454 1708.85    2640       T

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2628.09  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.14  * Wt. n-Val.              *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2626.95  * Reach Len. (ft)         *  207.00  *  208.00  *  209.00  *
* Crit W.S. (ft)         * 2626.76  * Flow Area (sq ft)       *  241.26  *  281.63  *  291.85  *
* E.G. Slope (ft/ft)     *0.022166  * Area (sq ft)            *  241.26  *  281.63  *  650.57  *
* Q Total (cfs)          * 6368.00  * Flow (cfs)              * 1395.97  * 2960.74  * 2011.29  *
* Top Width (ft)         *  456.40  * Top Width (ft)          *  106.29  *   90.00  *  260.11  *
* Vel Total (ft/s)       *    7.82  * Avg. Vel. (ft/s)        *    5.79  *   10.51  *    6.89  *
* Max Chl Dpth (ft)      *    3.95  * Hydr. Depth (ft)        *    2.27  *    3.13  *    2.95  *
* Conv. Total (cfs)      * 42772.0  * Conv. (cfs)             *  9376.3  * 19886.5  * 13509.3  *
* Length Wtd. (ft)       *  208.28  * Wetted Per. (ft)        *  106.38  *   90.06  *   99.00  *
* Min Ch El (ft)         * 2623.00  * Shear (lb/sq ft)        *    3.14  *    4.33  *    4.08  *
* Alpha                  *    1.21  * Stream Power (lb/ft s)  *   18.16  *   45.49  *   28.11  *
* Frctn Loss (ft)        *    4.35  * Cum Volume (acre-ft)    *    2.65  *   15.11  *   14.50  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *   43.67  *   13.45  *   48.23  *
***********************************************************************************************

Warning: The energy loss was 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: Finger Rock Wash
REACH: Main Reach 4       RS: 2.125

INPUT
Description: 23
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2640 1006.54    2638 1012.51    2636 1018.48    2634 1034.34    2632
 1053.61    2630 1087.45    2628 1119.45    2626 1130.99    2624 1160.66    2622
 1219.44    2620    12302618.705 1235.75    2618 1250.99    2618    1270 2618.87
 1294.71    2620 1360.04    2620 1404.82    2620 1515.19    2620 1521.93    2620
 1591.65    2622 1615.97    2624 1635.58    2626 1643.86    2628 1652.13    2630
  1660.4    2632 1668.69    2634 1675.68    2636  1679.7    2638 1683.79    2640
 1687.88    2642 1691.96    2644 1696.05    2646 1700.14    2648 1704.22    2650

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
```

```
***********************************************
    1000    .066    1230    .045    1270    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1230    1270              409     412     415             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1483 1704.22    2630       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2623.75  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.16  * Wt. n-Val.             *  0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2622.59  * Reach Len. (ft)        * 409.00  *  412.00  *  415.00  *
* Crit W.S. (ft)         * 2622.59  * Flow Area (sq ft)      * 129.89  *  173.13  *  564.71  *
* E.G. Slope (ft/ft)     *0.019644  * Area (sq ft)           * 129.89  *  173.13  *  778.01  *
* Q Total (cfs)          * 6114.00  * Flow (cfs)             * 575.06  * 2125.79  * 3413.14  *
* Top Width (ft)         *  446.80  * Top Width (ft)         *  78.03  *   40.00  *  328.77  *
* Vel Total (ft/s)       *    7.05  * Avg. Vel. (ft/s)       *   4.43  *   12.28  *    6.04  *
* Max Chl Dpth (ft)      *    4.59  * Hydr. Depth (ft)       *   1.66  *    4.33  *    2.65  *
* Conv. Total (cfs)      * 43622.7  * Conv. (cfs)            * 4103.0  * 15167.3  * 24352.4  *
* Length Wtd. (ft)       *  412.82  * Wetted Per. (ft)       *  78.16  *   40.06  *  213.03  *
* Min Ch El (ft)         * 2618.00  * Shear (lb/sq ft)       *   2.04  *    5.30  *    3.25  *
* Alpha                  *    1.50  * Stream Power (lb/ft s) *   9.02  *   65.07  *   19.65  *
* Frctn Loss (ft)        *    1.20  * Cum Volume (acre-ft)   *   1.76  *   14.02  *   11.07  *
* C & E Loss (ft)        *    0.29  * Cum SA (acres)         *  43.23  *   13.14  *   46.82  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 2.047

INPUT
Description: Pontatoc Cnyn Dr Culvert X-Section #4
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    1000    2634 1007.43    2632 1010.73    2630 1014.02    2628 1017.14    2626
 1020.26    2624 1023.95    2622 1027.64    2620 1031.33    2618 1037.28    2616
    1045  2615.2    1055  2614.2    1088  2614.6    1110  2614.3 1154.48    2614
 1203.35    2614    1270  2614.8 1388.09    2616 1417.75    2618 1430.61    2620
 1435.06    2622 1439.51    2624 1443.96    2626 1448.34    2628 1452.73    2630

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    1000    .066    1045    .045    1270    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1045    1270              139     145     146             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1298    1380    2618       T
    1380 1452.73    2630       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2620.82  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.20  * Wt. n-Val.             *  0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2620.62  * Reach Len. (ft)        * 139.00  *  145.00  *  146.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  66.60  * 1425.71  *  373.64  *
* E.G. Slope (ft/ft)     *0.001109  * Area (sq ft)           *  66.60  * 1425.71  *  744.81  *
* Q Total (cfs)          * 6114.00  * Flow (cfs)             * 113.11  * 5367.84  *  633.04  *
* Top Width (ft)         *  405.49  * Top Width (ft)         *  18.50  *  225.00  *  161.99  *
* Vel Total (ft/s)       *    3.28  * Avg. Vel. (ft/s)       *   1.70  *    3.77  *    1.69  *
* Max Chl Dpth (ft)      *    6.62  * Hydr. Depth (ft)       *   3.60  *    6.34  *    3.40  *
* Conv. Total (cfs)      *183580.0  * Conv. (cfs)            * 3396.4  *161175.8  * 19007.9  *
* Length Wtd. (ft)       *  144.83  * Wetted Per. (ft)       *  19.53  *  225.06  *  110.01  *
```

```
* Min Ch El (ft)         * 2614.00  * Shear (lb/sq ft)       *    0.24  *    0.44  *    0.24  *
* Alpha                  *    1.19  * Stream Power (lb/ft s) *    0.40  *    1.65  *    0.40  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *    0.84  *    6.46  *    3.82  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   42.78  *   11.89  *   44.48  *
**********************************************************************************************

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: Finger Rock Wash
REACH: Main Reach 4       RS: 2.019

INPUT
Description: Pontatoc Cnyn Dr Culvert X-Section #3
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2624 1004.72    2622 1010.45    2620 1024.09    2618 1048.62    2616
    1112    2614    1122    2611    1205    2611    1210    2612 1305.54 2613.23
 1376.84    2614 1392.22    2616    1402  2617.9 1411.12    2616 1427.23    2616
 1436.09    2618 1449.33    2620 1470.25    2622  1482.7    2624 1489.34    2626
 1495.38    2628 1501.11    2630 1506.45    2632 1510.82    2634

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .025    1112    .025    1210    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1112    1210             116     116     116             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000    1105  2617.4       T
    1227 1510.82  2617.4       T

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2620.75  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.             *   0.025  *   0.025  *   0.025  *
* W.S. Elev (ft)         * 2620.56  * Reach Len. (ft)        *  116.00  *  116.00  *  116.00  *
* Crit W.S. (ft)         * 2615.79  * Flow Area (sq ft)      *  320.20  *  919.24  *  820.83  *
* E.G. Slope (ft/ft)     *0.000244  * Area (sq ft)           *  461.30  *  919.24  * 1534.95  *
* Q Total (cfs)          * 6114.00  * Flow (cfs)             *  631.13  * 3781.73  * 1701.14  *
* Top Width (ft)         *  446.32  * Top Width (ft)         *  103.15  *   98.00  *  245.17  *
* Vel Total (ft/s)       *    2.97  * Avg. Vel. (ft/s)       *    1.97  *    4.11  *    2.07  *
* Max Chl Dpth (ft)      *    9.56  * Hydr. Depth (ft)       *    3.10  *    9.38  *    3.35  *
* Conv. Total (cfs)      *391441.4  * Conv. (cfs)            * 40407.6  *242120.7  *108913.1  *
* Length Wtd. (ft)       *  116.00  * Wetted Per. (ft)       *  103.50  *   98.54  *  246.09  *
* Min Ch El (ft)         * 2611.00  * Shear (lb/sq ft)       *    0.05  *    0.14  *    0.05  *
* Alpha                  *    1.37  * Stream Power (lb/ft s) *    0.09  *    0.58  *    0.11  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          *    2.56  *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *   42.58  *   11.35  *   43.80  *
**********************************************************************************************

CULVERT


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 2.008

INPUT
Description: Pontatoc Canyon Dr. Crossing @ HEC-1 Sta. RES-4
Distance from Upstream XS =      36
Deck/Roadway Width        =      46
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      12
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
************************************************************************
    1000 2623.09            1050 2620.24            1099 2618.26
    1150 2617.44            1192 2617.46            1247 2617.46
    1298  2618.3            1352  2620.5            1403 2623.93
    1454 2628.32            1506 2634.26            1556 2641.04

Upstream Bridge Cross Section Data
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2624 1004.72    2622 1010.45    2620 1024.09    2618 1048.62    2616
```

```
    1112    2614    1122    2611    1205    2611    1210    2612 1305.54 2613.23
 1376.84    2614 1392.22    2616    1402  2617.9 1411.12    2616 1427.23    2616
 1436.09    2618 1449.33    2620 1470.25    2622  1482.7    2624 1489.34    2626
 1495.38    2628 1501.11    2630 1506.45    2632 1510.82    2634

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .025    1112    .025    1210    .025

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1112    1210             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000    1105  2617.4       T
    1227 1510.82  2617.4       T

Downstream  Deck/Roadway Coordinates
    num=      13
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
************************************************************************
    1000 2623.09            1050 2620.24            1099 2618.26
    1150 2617.44            1192 2617.46            1247 2617.46
    1298  2618.3            1352  2620.5            1403 2623.93
    1454 2628.32            1506 2634.26            1556 2641.04
 1601.92    2653

Downstream Bridge Cross Section Data
Station Elevation Data    num=      27
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2628 1006.45    2626 1013.01    2624 1019.57    2622 1026.13    2620
 1046.14    2618 1081.64    2616  1098.7    2614 1115.83    2612    1248    2611
    1258    2610    1262    2609    1342    2609 1359.99    2610    1452    2612
 1507.62    2614 1534.92    2616 1545.95    2618 1556.49    2620 1564.44    2622
 1569.95    2624 1574.56    2626 1579.43    2628 1585.05    2630 1590.67    2632
  1596.3    2634 1601.92    2636

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .025    1248    .025    1452    .025

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1248    1452             .3       .5

Upstream Embankment side slope             =       0 horiz. to 1.0 vertical
Downstream Embankment side slope           =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins        =
Energy head used in spillway design        =
Spillway height used in design             =
Weir crest shape                           = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Pontatoc Cyn    Circular       7
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 2 - Mitered to conform to slope
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 15      70     .024     .024        0                    .7                 1
Number of Barrels =  7
Upstream   Elevation =  2610.4
Centerline Stations
    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.
    1132    1143    1154    1165    1176    1187    1198
Downstream Elevation =  2609.3
Centerline Stations
    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.
    1252    1264    1276    1288    1300    1312    1324

CULVERT OUTPUT  Profile #100-yr  Culv Group:  Pontatoc Cyn
*************************************************************************
* Q Culv Group (cfs)     * 2831.00  * Culv Full Len (ft)     *          *
* # Barrels              *       7  * Culv Vel US (ft/s)     *   12.81  *
* Q Barrel (cfs)         *  404.43  * Culv Vel DS (ft/s)     *   12.94  *
* E.G. US. (ft)          * 2620.75  * Culv Inv El Up (ft)    * 2610.40  *
* W.S. US. (ft)          * 2620.56  * Culv Inv El Dn (ft)    * 2609.30  *
* E.G. DS (ft)           * 2613.95  * Culv Frctn Ls (ft)     *    1.10  *
* W.S. DS (ft)           * 2612.89  * Culv Exit Loss (ft)    *    3.25  *
```

```
* Delta EG (ft)          *    6.80  * Culv Entr Loss (ft)    *    2.45  *
* Delta WS (ft)          *    7.67  * Q Weir (cfs)           * 3283.00  *
* E.G. IC (ft)           * 2620.75  * Weir Sta Lft (ft)      * 1040.89  *
* E.G. OC (ft)           * 2620.61  * Weir Sta Rgt (ft)      * 1355.86  *
* Culvert Control        *   Inlet  * Weir Submerg           *    0.00  *
* Culv WS Inlet (ft)     * 2615.75  * Weir Max Depth (ft)    *    3.32  *
* Culv WS Outlet (ft)    * 2614.60  * Weir Avg Depth (ft)    *    2.43  *
* Culv Nml Depth (ft)    *    5.35  * Weir Flow Area (sq ft) *  765.97  *
* Culv Crt Depth (ft)    *    5.30  * Min El Weir Flow (ft)  * 2617.45  *
*************************************************************************
```

Note: During subcritical analysis, the culvert direct step method, the solution went to normal depth.

CROSS SECTION

RIVER: Finger Rock Wash
REACH: Main Reach 4   RS: 1.997

INPUT
Description: Pontatoc Cnyn Dr Culvert X-Section #2

```
Station Elevation Data    num=      27
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2628 1006.45    2626 1013.01    2624 1019.57    2622 1026.13    2620
 1046.14    2618 1081.64    2616  1098.7    2614 1115.83    2612    1248    2611
    1258    2610    1262    2609    1342    2609 1359.99    2610    1452    2612
 1507.62    2614 1534.92    2616 1545.95    2618 1556.49    2620 1564.44    2622
 1569.95    2624 1574.56    2626 1579.43    2628 1585.05    2630 1590.67    2632
  1596.3    2634 1601.92    2636

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .025    1248    .025    1452    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1248    1452              293     308     327             .3       .5
```

```
CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2613.95  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.06  * Wt. n-Val.              *   0.025  *   0.025  *   0.025  *
* W.S. Elev (ft)         * 2612.89  * Reach Len. (ft)         *  293.00  *  308.00  *  327.00  *
* Crit W.S. (ft)         * 2612.89  * Flow Area (sq ft)       *  186.68  *  582.93  *   10.94  *
* E.G. Slope (ft/ft)     *0.005355  * Area (sq ft)            *  186.68  *  582.93  *   10.94  *
* Q Total (cfs)          * 6114.00  * Flow (cfs)              *  984.54  * 5101.81  *   27.66  *
* Top Width (ft)         *  368.43  * Top Width (ft)          *  139.77  *  204.00  *   24.67  *
* Vel Total (ft/s)       *    7.83  * Avg. Vel. (ft/s)        *    5.27  *    8.75  *    2.53  *
* Max Chl Dpth (ft)      *    3.89  * Hydr. Depth (ft)        *    1.34  *    2.86  *    0.44  *
* Conv. Total (cfs)      * 83549.3  * Conv. (cfs)             * 13453.9  * 69717.4  *   377.9  *
* Length Wtd. (ft)       *  306.27  * Wetted Per. (ft)        *  139.82  *  204.22  *   24.68  *
* Min Ch El (ft)         * 2609.00  * Shear (lb/sq ft)        *    0.45  *    0.95  *    0.15  *
* Alpha                  *    1.12  * Stream Power (lb/ft s)  *    2.35  *    8.35  *    0.37  *
* Frctn Loss (ft)        *    2.65  * Cum Volume (acre-ft)    *   94.77  *   39.89  *   96.73  *
* C & E Loss (ft)        *    0.22  * Cum SA (acres)          *   42.26  *   10.95  *   43.44  *
***********************************************************************************************
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The 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: Finger Rock Wash
REACH: Main Reach 4   RS: 1.939

INPUT
Description: Pontatoc Cnyn Dr Culvert X-Section #1

```
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2626 1005.05    2624  1010.4    2622 1015.74    2620 1022.25    2618
```

```
 1027.86    2616 1036.65    2614 1045.44    2612 1054.24    2610 1067.07    2608
 1086.51    2606 1101.14    2604 1140.64    2604 1234.05    2606 1247.08    2606
    13002604.567 1320.92    2604  1329.8    2602    1338    2601    13452601.902
 1345.76    2602 1345.79    2602 1358.49    2604 1371.22    2606 1395.07    2608
 1421.04 2609.71 1425.44    2610 1436.16    2612 1446.48    2614 1457.26    2616
 1464.11    2618 1470.59    2620  1477.9    2622 1483.33    2624 1487.71    2626

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1300    .045    1345    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1300    1345              269     291     287             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1217    2620       T

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2610.57  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.81  * Wt. n-Val.              *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2608.77  * Reach Len. (ft)         *  269.00  *  291.00  *  287.00  *
* Crit W.S. (ft)         * 2608.77  * Flow Area (sq ft)       *  270.52  *  255.71  *  173.06  *
* E.G. Slope (ft/ft)     *0.016326  * Area (sq ft)            *  851.42  *  255.71  *  173.06  *
* Q Total (cfs)          * 6114.00  * Flow (cfs)              * 1710.34  * 3417.95  *  985.71  *
* Top Width (ft)         *  344.52  * Top Width (ft)          *  237.84  *   45.00  *   61.69  *
* Vel Total (ft/s)       *    8.74  * Avg. Vel. (ft/s)        *    6.32  *   13.37  *    5.70  *
* Max Chl Dpth (ft)      *    7.76  * Hydr. Depth (ft)        *    3.26  *    5.68  *    2.81  *
* Conv. Total (cfs)      * 47850.5  * Conv. (cfs)             * 13385.8  * 26750.2  *  7714.5  *
* Length Wtd. (ft)       *  282.75  * Wetted Per. (ft)        *   83.02  *   45.35  *   62.11  *
* Min Ch El (ft)         * 2601.00  * Shear (lb/sq ft)        *    3.32  *    5.75  *    2.84  *
* Alpha                  *    1.52  * Stream Power (lb/ft s)  *   21.00  *   76.82  *   16.17  *
* Frctn Loss (ft)        *    4.80  * Cum Volume (acre-ft)    *   91.27  *   36.93  *   96.04  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)          *   40.99  *   10.07  *   43.12  *
***********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 1.884

INPUT
Description: 20
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2622 1006.18    2620 1012.37    2618 1018.56    2616 1023.46    2614
 1029.05    2612 1034.75    2610 1040.45    2608 1046.22    2606 1052.07    2604
 1067.57    2602 1094.31    2600 1118.38    2598 1118.98    2598 1136.48    2600
 1193.32    2600    12002599.415 1216.17    2598    1230    2597    12402597.833
 1242.01    2598 1254.41    2600 1322.59    2602 1352.59    2604 1366.86    2606
 1379.05    2608 1387.75    2610 1396.46    2612 1404.57    2614 1409.14    2616
 1413.77    2618 1418.39    2620 1423.02    2622 1427.65    2624 1432.27    2626

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1200    .045    1240    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1200    1240              563     578     547             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2604.20  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.35  * Wt. n-Val.              *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2602.85  * Reach Len. (ft)         *  563.00  *  578.00  *  547.00  *
* Crit W.S. (ft)         * 2602.85  * Flow Area (sq ft)       *  397.82  *  195.20  *  188.94  *
* E.G. Slope (ft/ft)     *0.017729  * Area (sq ft)            *  397.82  *  195.20  *  188.94  *
* Q Total (cfs)          * 5756.00  * Flow (cfs)              * 2399.91  * 2463.63  *  892.46  *
* Top Width (ft)         *  274.29  * Top Width (ft)          *  139.00  *   40.00  *   95.30  *
* Vel Total (ft/s)       *    7.36  * Avg. Vel. (ft/s)        *    6.03  *   12.62  *    4.72  *
```

```
* Max Chl Dpth (ft)      *    5.85  * Hydr. Depth (ft)       *    2.86  *    4.88  *    1.98  *
* Conv. Total (cfs)      * 43229.6  * Conv. (cfs)            * 18024.2  * 18502.8  *  6702.7  *
* Length Wtd. (ft)       *  567.58  * Wetted Per. (ft)       *  139.35  *   40.13  *   95.52  *
* Min Ch El (ft)         * 2597.00  * Shear (lb/sq ft)       *    3.16  *    5.38  *    2.19  *
* Alpha                  *    1.60  * Stream Power (lb/ft s) *   19.06  *   67.94  *   10.34  *
* Frctn Loss (ft)        *    7.69  * Cum Volume (acre-ft)   *   87.42  *   35.42  *   94.85  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *   39.83  *    9.78  *   42.60  *
**********************************************************************************************
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Finger Rock Wash
REACH: Main Reach 4   RS: 1.774

INPUT
Description: 19

```
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2596  1037.1    2594 1073.39    2592 1205.17    2592 1406.95    2592
 1422.83    2592 1456.47    2592 1584.39    2590    15852589.853 1592.67    2588
    1601    2587  1610.1    2588    16352589.253 1649.83    2590 1676.49    2592
 1700.22    2594 1721.22    2596 1750.74    2598  1760.8    2600 1770.87    2602
 1777.73    2604 1785.73    2606 1792.27    2608 1798.81    2610 1802.81    2610

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1585    .045    1635    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1585    1635             492     501     513             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2594.16  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.             *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2593.37  * Reach Len. (ft)        *  492.00  *  501.00  *  513.00  *
* Crit W.S. (ft)         * 2593.37  * Flow Area (sq ft)      *  848.36  *  254.63  *  129.97  *
* E.G. Slope (ft/ft)     *0.010678  * Area (sq ft)           *  848.36  *  254.63  *  129.97  *
* Q Total (cfs)          * 5756.00  * Flow (cfs)             * 2678.59  * 2559.18  *  518.23  *
* Top Width (ft)         *  644.28  * Top Width (ft)         *  536.51  *   50.00  *   57.77  *
* Vel Total (ft/s)       *    4.67  * Avg. Vel. (ft/s)       *    3.16  *   10.05  *    3.99  *
* Max Chl Dpth (ft)      *    6.37  * Hydr. Depth (ft)       *    1.58  *    5.09  *    2.25  *
* Conv. Total (cfs)      * 55702.7  * Conv. (cfs)            * 25921.6  * 24766.0  *  5015.1  *
* Length Wtd. (ft)       *  499.02  * Wetted Per. (ft)       *  536.58  *   50.37  *   57.92  *
* Min Ch El (ft)         * 2587.00  * Shear (lb/sq ft)       *    1.05  *    3.37  *    1.50  *
* Alpha                  *    2.34  * Stream Power (lb/ft s) *    3.33  *   33.87  *    5.96  *
* Frctn Loss (ft)        *    6.45  * Cum Volume (acre-ft)   *   79.36  *   32.44  *   92.85  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *   35.46  *    9.19  *   41.64  *
**********************************************************************************************
```

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

CROSS SECTION

RIVER: Finger Rock Wash
REACH: Main Reach 4   RS: 1.679

INPUT
Description: 18

```
Station Elevation Data    num=      30
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
```

```
    1000    2590 1008.64    2588 1017.28    2586 1030.71    2584 1044.52    2582
 1085.91    2582 1131.51    2582 1159.49    2582 1181.17    2582 1206.92    2582
  1231.1    2582 1280.58    2582    1355    2582 1355.62    2582    1380  2580.5
 1394.73    2582    1400    2582 1408.76    2582 1589.61    2582 1600.91    2584
 1605.84    2586 1610.51    2588 1614.68    2590 1618.86    2592 1623.03    2594
 1627.21    2596 1631.39    2598 1635.56    2600 1639.58    2602 1642.84    2604

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1355    .045    1400    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1355    1400              519     500     467             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2584.49  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.44  * Wt. n-Val.             *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2584.06  * Reach Len. (ft)        *  519.00  *  500.00  *  467.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  652.75  *  121.83  *  401.66  *
* E.G. Slope (ft/ft)     *0.015976  * Area (sq ft)           *  652.75  *  121.83  *  401.66  *
* Q Total (cfs)          * 5756.00  * Flow (cfs)             * 2958.13  *  985.89  * 1811.97  *
* Top Width (ft)         *  570.71  * Top Width (ft)         *  324.66  *   45.00  *  201.05  *
* Vel Total (ft/s)       *    4.89  * Avg. Vel. (ft/s)       *    4.53  *    8.09  *    4.51  *
* Max Chl Dpth (ft)      *    3.56  * Hydr. Depth (ft)       *    2.01  *    2.71  *    2.00  *
* Conv. Total (cfs)      * 45538.8  * Conv. (cfs)            * 23403.4  *  7799.9  * 14335.5  *
* Length Wtd. (ft)       *  502.10  * Wetted Per. (ft)       *  324.81  *   45.12  *  201.23  *
* Min Ch El (ft)         * 2580.50  * Shear (lb/sq ft)       *    2.00  *    2.69  *    1.99  *
* Alpha                  *    1.18  * Stream Power (lb/ft s) *    9.08  *   21.79  *    8.98  *
* Frctn Loss (ft)        *    9.33  * Cum Volume (acre-ft)   *   70.89  *   30.27  *   89.71  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   30.60  *    8.64  *   40.11  *
***********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 1.585

INPUT
Description: 17
Station Elevation Data    num=      38
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2598 1005.21    2596 1010.24    2594 1014.31    2592 1018.37    2590
  1022.9    2588 1027.75    2586  1032.6    2584 1037.29    2582 1042.84    2580
 1052.05    2578 1061.26    2576 1070.42    2574 1078.48    2572 1085.58    2570
 1088.49    2570 1116.41    2570 1128.18    2570 1141.32    2572 1224.64    2572
 1247.31    2572    1250    2572 1265.39    2572    1280    2570 1294.53    2572
    1295    2572 1313.34    2572 1375.76    2572 1384.84    2574 1392.94    2576
 1400.59    2578 1408.24    2580  1416.9    2582 1425.68    2584 1432.12    2586
 1438.49    2588 1444.99    2590 1449.88    2592

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1250    .045    1295    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1250    1295              524     527     479             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2575.12  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.84  * Wt. n-Val.             *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2574.28  * Reach Len. (ft)        *  524.00  *  527.00  *  479.00  *
* Crit W.S. (ft)         * 2573.91  * Flow Area (sq ft)      *  507.49  *  131.86  *  196.16  *
* E.G. Slope (ft/ft)     *0.021886  * Area (sq ft)           *  507.49  *  131.86  *  196.16  *
* Q Total (cfs)          * 5756.00  * Flow (cfs)             * 3353.88  * 1313.74  * 1088.38  *
* Top Width (ft)         *  316.86  * Top Width (ft)         *  180.87  *   45.00  *   90.98  *
* Vel Total (ft/s)       *    6.89  * Avg. Vel. (ft/s)       *    6.61  *    9.96  *    5.55  *
* Max Chl Dpth (ft)      *    4.28  * Hydr. Depth (ft)       *    2.81  *    2.93  *    2.16  *
* Conv. Total (cfs)      * 38907.5  * Conv. (cfs)            * 22670.5  *  8880.2  *  7356.8  *
* Length Wtd. (ft)       *  520.22  * Wetted Per. (ft)       *  181.58  *   45.27  *   91.24  *
* Min Ch El (ft)         * 2570.00  * Shear (lb/sq ft)       *    3.82  *    3.98  *    2.94  *
* Alpha                  *    1.14  * Stream Power (lb/ft s) *   25.24  *   39.65  *   16.30  *
* Frctn Loss (ft)        *    9.60  * Cum Volume (acre-ft)   *   63.97  *   28.82  *   86.51  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   27.59  *    8.12  *   38.55  *
```

```
************************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 1.485

INPUT
Description: 16
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
************************************************************************
    1000    2572 1003.94    2570 1007.62    2568  1011.3    2566 1015.39    2564
 1020.63    2562 1026.34    2560 1035.75    2560 1071.72    2560 1085.98    2560
    1105    2562    1255    2562 1265.42    2562 1276.15    2562    12852563.642
 1286.93    2564 1292.57    2566 1297.43    2568 1302.28    2570 1307.13    2572
 1311.82    2574 1316.48    2576 1321.13    2578 1325.51    2580

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1255    .045    1285    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1255    1285              572     599     632             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
************************************************************************************************
* E.G. Elev (ft)         * 2565.47  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.              *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2564.81  * Reach Len. (ft)         *  572.00  *  599.00  *  632.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *  812.88  *   77.05  *    2.84  *
* E.G. Slope (ft/ft)     *0.015781  * Area (sq ft)            *  812.88  *   77.05  *    2.84  *
* Q Total (cfs)          * 5756.00  * Flow (cfs)              * 5152.60  *  597.41  *    6.00  *
* Top Width (ft)         *  275.48  * Top Width (ft)          *  241.27  *   30.00  *    4.22  *
* Vel Total (ft/s)       *    6.45  * Avg. Vel. (ft/s)        *    6.34  *    7.75  *    2.11  *
* Max Chl Dpth (ft)      *    4.81  * Hydr. Depth (ft)        *    3.37  *    2.57  *    0.67  *
* Conv. Total (cfs)      * 45820.0  * Conv. (cfs)             * 41016.7  *  4755.6  *    47.7  *
* Length Wtd. (ft)       *  590.88  * Wetted Per. (ft)        *  242.27  *   30.15  *    4.39  *
* Min Ch El (ft)         * 2562.00  * Shear (lb/sq ft)        *    3.31  *    2.52  *    0.64  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *   20.95  *   19.52  *    1.35  *
* Frctn Loss (ft)        *    7.84  * Cum Volume (acre-ft)    *   56.03  *   27.55  *   85.42  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)          *   25.05  *    7.67  *   38.02  *
************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 1.371

INPUT
Description: 15
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
************************************************************************
    1000    2574 1005.44    2572 1011.27    2570 1016.35    2568 1021.42    2566
  1026.5    2564 1031.57    2562 1036.35    2560 1040.79    2558 1047.56    2556
 1058.52    2554  1102.9    2552    11052551.692 1116.55    2550 1124.14    2548
 1128.07    2548 1134.28    2550 1142.98    2552    1145    2552 1162.28    2552
 1170.77    2550 1173.37    2550 1192.24    2552 1212.22    2554  1231.7    2556
 1283.54    2556 1395.36    2554 1398.67    2554 1442.78    2556 1455.53    2558
 1467.52    2560 1474.05    2562 1479.43    2564 1486.67    2566 1495.56    2568

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1105    .045    1145    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1105    1145              530     508     480             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
```

```
    1000    1065    2565       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2557.56  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.25  * Wt. n-Val.             *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2556.31  * Reach Len. (ft)        *  530.00  *  508.00  *  480.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  140.46  *  251.65  *  556.86  *
* E.G. Slope (ft/ft)     *0.011317  * Area (sq ft)           *  170.94  *  251.65  *  556.86  *
* Q Total (cfs)          * 5756.00  * Flow (cfs)             *  776.37  * 2967.04  * 2012.58  *
* Top Width (ft)         *  398.27  * Top Width (ft)         *   58.50  *   40.00  *  299.77  *
* Vel Total (ft/s)       *    6.07  * Avg. Vel. (ft/s)       *    5.53  *   11.79  *    3.61  *
* Max Chl Dpth (ft)      *    8.31  * Hydr. Depth (ft)       *    3.51  *    6.29  *    1.86  *
* Conv. Total (cfs)      * 54107.6  * Conv. (cfs)            *  7298.1  * 27890.8  * 18918.7  *
* Length Wtd. (ft)       *  504.06  * Wetted Per. (ft)       *   40.06  *   40.92  *  300.40  *
* Min Ch El (ft)         * 2548.00  * Shear (lb/sq ft)       *    2.48  *    4.34  *    1.31  *
* Alpha                  *    2.18  * Stream Power (lb/ft s) *   13.69  *   51.22  *    4.73  *
* Frctn Loss (ft)        *    6.63  * Cum Volume (acre-ft)   *   49.57  *   25.29  *   81.36  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   23.08  *    7.19  *   35.82  *
*********************************************************************************************

Warning: The energy loss was 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: Finger Rock Wash
REACH: Main Reach 4       RS: 1.275

INPUT
Description: 14
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    1000    2564 1006.67    2562 1012.86    2560 1019.12    2558 1025.39    2556
 1031.66    2554 1043.86    2552 1061.19    2550    1080    2548    12152546.154
 1226.28    2546 1233.93    2544 1240.95    2542    1246  2541.5 1249.26    2542
    12502542.147 1259.35    2544 1269.84    2546 1327.82    2548 1335.93    2550
 1344.09    2552  1350.7    2554  1356.7    2556 1362.69    2558 1368.43    2560

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1215    .045    1250    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1215    1250             430     526     581             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2550.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.31  * Wt. n-Val.             *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2549.60  * Reach Len. (ft)        *  430.00  *  526.00  *  581.00  *
* Crit W.S. (ft)         * 2549.60  * Flow Area (sq ft)      *  352.25  *  191.97  *  265.00  *
* E.G. Slope (ft/ft)     *0.015499  * Area (sq ft)           *  352.25  *  191.97  *  265.00  *
* Q Total (cfs)          * 5756.00  * Flow (cfs)             * 1743.42  * 2426.17  * 1586.41  *
* Top Width (ft)         *  269.32  * Top Width (ft)         *  150.02  *   35.00  *   84.30  *
* Vel Total (ft/s)       *    7.11  * Avg. Vel. (ft/s)       *    4.95  *   12.64  *    5.99  *
* Max Chl Dpth (ft)      *    8.10  * Hydr. Depth (ft)       *    2.35  *    5.48  *    3.14  *
* Conv. Total (cfs)      * 46234.3  * Conv. (cfs)            * 14003.8  * 19487.9  * 12742.6  *
* Length Wtd. (ft)       *  501.73  * Wetted Per. (ft)       *  150.12  *   35.61  *   84.90  *
* Min Ch El (ft)         * 2541.50  * Shear (lb/sq ft)       *    2.27  *    5.22  *    3.02  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *   11.24  *   65.92  *   18.08  *
* Frctn Loss (ft)        *    8.40  * Cum Volume (acre-ft)   *   46.39  *   22.71  *   76.83  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *   21.81  *    6.75  *   33.70  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 1.176
```

```
INPUT
Description: 13
Station Elevation Data    num=      36
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2552 1006.45    2550  1012.9    2548 1019.35    2546 1028.66    2544
 1040.56    2542 1052.29    2540 1153.74    2538 1156.16    2538 1168.57    2538
 1305.17    2538 1312.44    2540 1317.66    2542 1322.89    2544 1326.45    2544
 1334.64    2542    13352541.912 1342.82    2540 1351.01    2538 1358.91    2536
 1365.28    2534    1372    2533    13752533.491 1378.11    2534 1389.47    2536
 1410.56    2538 1414.48    2540 1418.39    2542 1422.35    2544 1426.87    2546
 1431.39    2548 1435.72    2550 1440.03    2552 1444.34    2554 1448.79    2556
 1453.08    2558

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1335    .045    1375    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1335    1375              460     441     395             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2541.55  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.98  * Wt. n-Val.            *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2540.57  * Reach Len. (ft)       *  460.00  *  441.00  *  395.00  *
* Crit W.S. (ft)         * 2540.52  * Flow Area (sq ft)     *  561.13  *  146.68  *  166.25  *
* E.G. Slope (ft/ft)     *0.018154  * Area (sq ft)          *  561.13  *  146.68  *  166.25  *
* Q Total (cfs)          * 5756.00  * Flow (cfs)            * 2803.83  * 1680.63  * 1271.54  *
* Top Width (ft)         *  340.08  * Top Width (ft)        *  264.98  *   34.51  *   40.59  *
* Vel Total (ft/s)       *    6.59  * Avg. Vel. (ft/s)      *    5.00  *   11.46  *    7.65  *
* Max Chl Dpth (ft)      *    7.57  * Hydr. Depth (ft)      *    2.12  *    4.25  *    4.10  *
* Conv. Total (cfs)      * 42720.7  * Conv. (cfs)           * 20809.8  * 12473.5  *  9437.3  *
* Length Wtd. (ft)       *  432.55  * Wetted Per. (ft)      *  265.42  *   35.49  *   41.52  *
* Min Ch El (ft)         * 2533.00  * Shear (lb/sq ft)      *    2.40  *    4.68  *    4.54  *
* Alpha                  *    1.46  * Stream Power (lb/ft s) *   11.97  *   53.67  *   34.71  *
* Frctn Loss (ft)        *    7.47  * Cum Volume (acre-ft)  *   41.88  *   20.66  *   73.95  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)        *   19.76  *    6.33  *   32.87  *
*********************************************************************************************

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: Finger Rock Wash
REACH: Main Reach 4       RS: 1.092

INPUT
Description: 12
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2556 1008.65    2554 1014.42    2552  1020.2    2550 1025.98    2548
  1034.5    2546 1043.85    2544 1049.42    2542 1051.51    2540 1055.32    2538
 1060.76    2536  1066.2    2534 1071.64    2532 1085.39    2530    11202528.742
 1140.43    2528 1148.13    2526    1151  2525.5  1152.9    2526 1160.07    2528
    1165 2528.07 1301.59    2530  1306.3    2532 1311.01    2534 1315.73    2536
  1320.5    2538 1325.37    2540 1330.23    2542  1335.1    2544 1341.02    2546
 1347.37    2548 1354.85    2550

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1120    .045    1165    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1120    1165              452     519     530             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1247 1354.85    2540       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2534.04  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.47  * Wt. n-Val.            *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2532.56  * Reach Len. (ft)       *  452.00  *  519.00  *  530.00  *
* Crit W.S. (ft)         * 2532.31  * Flow Area (sq ft)     *  132.40  *  223.19  *  320.91  *
* E.G. Slope (ft/ft)     *0.016461  * Area (sq ft)          *  132.40  *  223.19  *  489.61  *
```

```
* Q Total (cfs)         * 5756.00  * Flow (cfs)            *  730.43  * 2723.66  * 2301.91  *
* Top Width (ft)        *  237.52  * Top Width (ft)        *   49.89  *   45.00  *  142.63  *
* Vel Total (ft/s)      *    8.51  * Avg. Vel. (ft/s)      *    5.52  *   12.20  *    7.17  *
* Max Chl Dpth (ft)     *    7.06  * Hydr. Depth (ft)      *    2.65  *    4.96  *    3.91  *
* Conv. Total (cfs)     * 44863.4  * Conv. (cfs)           *  5693.2  * 21228.7  * 17941.5  *
* Length Wtd. (ft)      *  519.73  * Wetted Per. (ft)      *   50.16  *   45.65  *   82.01  *
* Min Ch El (ft)        * 2525.50  * Shear (lb/sq ft)      *    2.71  *    5.02  *    4.02  *
* Alpha                 *    1.31  * Stream Power (lb/ft s) *  14.97  *   61.31  *   28.85  *
* Frctn Loss (ft)       *   10.21  * Cum Volume (acre-ft)  *   38.22  *   18.79  *   70.98  *
* C & E Loss (ft)       *    0.10  * Cum SA (acres)        *   18.10  *    5.93  *   32.04  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 0.994

INPUT
Description: 11
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
****************************************************************************
    1000    2544 1003.16    2542 1006.31    2540 1009.47    2538 1012.63    2536
 1015.78    2534 1018.97    2532    1024    2530 1028.92    2528 1033.82    2526
 1038.02    2524 1042.21    2522  1046.4    2520 1048.64    2520    1055    2520
 1055.02    2520 1065.37    2518    1070  2517.5 1075.44    2518 1088.08    2520
    1090    2520 1102.37    2520 1122.23    2520 1300.27    2520 1308.79    2520
 1343.43    2522  1354.1    2524 1362.93    2526 1371.37    2528 1380.37    2530
 1387.95    2532 1392.26    2534

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1055    .045    1090    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1055    1090              496     507     511             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)        * 2523.73  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *    1.14  * Wt. n-Val.            *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)        * 2522.58  * Reach Len. (ft)       *  496.00  *  507.00  *  511.00  *
* Crit W.S. (ft)        * 2522.58  * Flow Area (sq ft)     *   29.21  *  136.08  *  621.07  *
* E.G. Slope (ft/ft)    *0.023847  * Area (sq ft)          *   29.21  *  136.08  *  621.07  *
* Q Total (cfs)         * 5756.00  * Flow (cfs)            *  161.29  * 1702.78  * 3891.93  *
* Top Width (ft)        *  305.56  * Top Width (ft)        *   14.01  *   35.00  *  256.54  *
* Vel Total (ft/s)      *    7.32  * Avg. Vel. (ft/s)      *    5.52  *   12.51  *    6.27  *
* Max Chl Dpth (ft)     *    5.08  * Hydr. Depth (ft)      *    2.08  *    3.89  *    2.42  *
* Conv. Total (cfs)     * 37273.7  * Conv. (cfs)           *  1044.4  * 11026.6  * 25202.7  *
* Length Wtd. (ft)      *  509.17  * Wetted Per. (ft)      *   14.60  *   35.40  *  256.66  *
* Min Ch El (ft)        * 2517.50  * Shear (lb/sq ft)      *    2.98  *    5.72  *    3.60  *
* Alpha                 *    1.38  * Stream Power (lb/ft s) *  16.45  *   71.61  *   22.58  *
* Frctn Loss (ft)       *    7.00  * Cum Volume (acre-ft)  *   37.38  *   16.65  *   64.22  *
* C & E Loss (ft)       *    0.21  * Cum SA (acres)        *   17.77  *    5.45  *   29.61  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 0.898

INPUT
Description: 10
Station Elevation Data    num=      33
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2532 1004.14    2530 1008.28    2528 1012.42    2526 1016.56    2524
 1020.41    2522 1024.07    2520 1027.73    2518 1032.03    2516 1049.66    2514
    11052512.039 1106.11    2512    1125    2511     11502511.779 1157.11    2512
 1163.13    2512 1228.82    2512 1355.73    2512 1408.19    2512 1413.31    2514
 1417.92    2516 1422.52    2518 1427.13    2520 1431.03    2522 1434.42    2524
 1438.12    2526 1441.82    2528 1445.52    2530 1449.22    2532 1452.79    2534
 1473.86    2536 1487.63    2538 1508.23    2540

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1105    .045    1150    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1105    1150              423     476     497             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2515.70  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.45  * Wt. n-Val.              *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2515.25  * Reach Len. (ft)         *  423.00  *  476.00  *  497.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *  130.29  *  170.91  *  853.09  *
* E.G. Slope (ft/ft)     *0.008874  * Area (sq ft)            *  130.29  *  170.91  *  853.09  *
* Q Total (cfs)          * 5653.00  * Flow (cfs)              *  432.84  * 1293.46  * 3926.70  *
* Top Width (ft)         *  377.54  * Top Width (ft)          *   66.35  *   45.00  *  266.19  *
* Vel Total (ft/s)       *    4.90  * Avg. Vel. (ft/s)        *    3.32  *    7.57  *    4.60  *
* Max Chl Dpth (ft)      *    4.25  * Hydr. Depth (ft)        *    1.96  *    3.80  *    3.20  *
* Conv. Total (cfs)      * 60007.8  * Conv. (cfs)             *  4594.7  * 13730.3  * 41682.8  *
* Length Wtd. (ft)       *  466.54  * Wetted Per. (ft)        *   66.46  *   45.04  *  266.83  *
* Min Ch El (ft)         * 2511.00  * Shear (lb/sq ft)        *    1.09  *    2.10  *    1.77  *
* Alpha                  *    1.20  * Stream Power (lb/ft s)  *    3.61  *   15.91  *    8.15  *
* Frctn Loss (ft)        *    6.70  * Cum Volume (acre-ft)    *   36.47  *   14.86  *   55.57  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)          *   17.31  *    4.99  *   26.54  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The 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: Finger Rock Wash
REACH: Main Reach 4       RS: 0.808

INPUT
Description: 9
Station Elevation Data    num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2516 1005.38    2514 1011.32    2512 1017.26    2510 1025.03    2508
  1033.1    2506    12202504.054 1225.21    2504    1236    2503    1240 2503.38
 1246.53    2504 1286.18    2506 1291.07    2508 1295.96    2510 1300.03    2512
 1303.88    2514 1308.56    2516 1315.68    2518 1325.79    2520 1335.43    2522
 1345.06    2524  1354.7    2526 1365.01    2528 1370.55    2530  1403.6    2532
 1420.79    2534

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1220    .045    1240    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1220    1240              481     516     560             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2508.92  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.23  * Wt. n-Val.              *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2507.69  * Reach Len. (ft)         *  481.00  *  516.00  *  560.00  *
* Crit W.S. (ft)         * 2507.68  * Flow Area (sq ft)       *  503.61  *   82.31  *  136.30  *
* E.G. Slope (ft/ft)     *0.027136  * Area (sq ft)            *  503.61  *   82.31  *  136.30  *
* Q Total (cfs)          * 5653.00  * Flow (cfs)              * 3528.65  * 1147.29  *  977.06  *
* Top Width (ft)         *  264.04  * Top Width (ft)          *  193.72  *   20.00  *   50.31  *
* Vel Total (ft/s)       *    7.83  * Avg. Vel. (ft/s)        *    7.01  *   13.94  *    7.17  *
* Max Chl Dpth (ft)      *    4.69  * Hydr. Depth (ft)        *    2.60  *    4.12  *    2.71  *
* Conv. Total (cfs)      * 34316.7  * Conv. (cfs)             * 21420.8  *  6964.7  *  5931.3  *
```

```
* Length Wtd. (ft)       *  503.64  * Wetted Per. (ft)       *  193.94  *   20.06  *   50.73  *
* Min Ch El (ft)         * 2503.00  * Shear (lb/sq ft)       *    4.40  *    6.95  *    4.55  *
* Alpha                  *    1.29  * Stream Power (lb/ft s) *   30.82  *   96.87  *   32.63  *
* Frctn Loss (ft)        *    8.92  * Cum Volume (acre-ft)   *   33.40  *   13.48  *   49.93  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   16.05  *    4.63  *   24.74  *
**********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 0.710

INPUT
Description: 8
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2510 1008.95    2508 1018.27    2506 1030.42    2504 1043.94    2502
 1062.25    2500 1110.41    2498 1377.31    2496    14202494.414 1431.13    2494
 1437.84    2492 1451.46    2492    1454  2491.5    1455    2492    1459    2494
  1480.1    2496 1487.18    2498 1493.62    2500 1497.99    2502 1502.19    2504
  1506.1    2506 1509.82    2508 1513.55    2510 1517.27    2512 1521.89    2514

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1420    .045    1455    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1420    1455             600     497     415             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1170    2505       T

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2499.97  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.17  * Wt. n-Val.             *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2498.81  * Reach Len. (ft)        *  600.00  *  497.00  *  415.00  *
* Crit W.S. (ft)         * 2498.81  * Flow Area (sq ft)      *  574.30  *  207.82  *  117.36  *
* E.G. Slope (ft/ft)     *0.012457  * Area (sq ft)           *  643.45  *  207.82  *  117.36  *
* Q Total (cfs)          * 5653.00  * Flow (cfs)             * 2512.21  * 2489.31  *  651.49  *
* Top Width (ft)         *  398.77  * Top Width (ft)         *  329.00  *   35.00  *   34.78  *
* Vel Total (ft/s)       *    6.28  * Avg. Vel. (ft/s)       *    4.37  *   11.98  *    5.55  *
* Max Chl Dpth (ft)      *    7.31  * Hydr. Depth (ft)       *    2.30  *    5.94  *    3.37  *
* Conv. Total (cfs)      * 50649.8  * Conv. (cfs)            * 22508.9  * 22303.7  *  5837.2  *
* Length Wtd. (ft)       *  522.62  * Wetted Per. (ft)       *  250.04  *   35.47  *   35.74  *
* Min Ch El (ft)         * 2491.50  * Shear (lb/sq ft)       *    1.79  *    4.56  *    2.55  *
* Alpha                  *    1.90  * Stream Power (lb/ft s) *    7.81  *   54.58  *   14.18  *
* Frctn Loss (ft)        *    7.17  * Cum Volume (acre-ft)   *   27.06  *   11.76  *   48.30  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *   13.16  *    4.30  *   24.19  *
**********************************************************************************************

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: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 0.616

INPUT
Description: 7
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2510 1016.53    2508  1025.6    2506 1034.66    2504 1041.91    2502
 1047.15    2500 1059.23    2498 1065.51    2496 1070.38    2494 1075.21    2492
```

```
 1079.96    2490 1084.59    2488 1090.02    2486 1120.36    2486    1200    2486
 1212.79    2486    1220  2485.5  1228.7    2486    12302486.021 1352.78    2488
 1437.09    2488 1492.57    2488 1500.28    2490 1508.56    2492 1516.85    2494
 1522.97    2496 1528.86    2498 1533.52    2500 1538.17    2502 1542.83    2504
 1548.75    2506 1555.49    2508

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1200    .045    1230    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1200    1230              490     487     525             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1466 1555.49    2495       T

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2490.15  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.              *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2489.50  * Reach Len. (ft)         *  490.00  *  487.00  *  525.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *  401.25  *  109.00  *  475.78  *
* E.G. Slope (ft/ft)     *0.015205  * Area (sq ft)            *  401.25  *  109.00  *  520.01  *
* Q Total (cfs)          * 5653.00  * Flow (cfs)              * 2497.08  * 1048.16  * 2107.75  *
* Top Width (ft)         *  417.24  * Top Width (ft)          *  118.89  *   30.00  *  268.36  *
* Vel Total (ft/s)       *    5.73  * Avg. Vel. (ft/s)        *    6.22  *    9.62  *    4.43  *
* Max Chl Dpth (ft)      *    4.00  * Hydr. Depth (ft)        *    3.38  *    3.63  *    2.02  *
* Conv. Total (cfs)      * 45845.0  * Conv. (cfs)             * 20251.0  *  8500.4  * 17093.6  *
* Length Wtd. (ft)       *  509.39  * Wetted Per. (ft)        *  119.55  *   30.03  *  236.02  *
* Min Ch El (ft)         * 2485.50  * Shear (lb/sq ft)        *    3.19  *    3.45  *    1.91  *
* Alpha                  *    1.26  * Stream Power (lb/ft s)  *   19.83  *   33.13  *    8.48  *
* Frctn Loss (ft)        *    8.60  * Cum Volume (acre-ft)    *   19.87  *    9.95  *   45.26  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *   10.08  *    3.93  *   22.75  *
**********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 0.523

INPUT
Description: 6
Station Elevation Data    num=      36
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2510 1004.36    2508 1008.71    2506 1013.49    2504 1017.88    2502
  1022.1    2500 1026.32    2498 1030.54    2496 1035.03    2494 1039.91    2492
 1044.79    2490    1050    2488 1055.99    2486 1059.47    2484 1061.27    2482
 1063.14    2480 1065.01    2478 1070.57    2478 1077.32    2480 1091.78    2480
    11792479.307    12372478.845 1343.37    2478    1413    2477 1458.97    2478
 1466.58    2480 1473.76    2482 1479.34    2484 1484.85    2486 1490.36    2488
 1495.87    2490 1508.14    2492 1538.64    2494  1545.6    2496 1553.41    2498
 1561.98    2500

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066    1179    .045    1237    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1179    1237              560     540     525             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 2481.53  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.59  * Wt. n-Val.              *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2480.94  * Reach Len. (ft)         *  560.00  *  540.00  *  525.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *  159.28  *  108.11  *  681.79  *
* E.G. Slope (ft/ft)     *0.018873  * Area (sq ft)            *  159.28  *  108.11  *  681.79  *
* Q Total (cfs)          * 5653.00  * Flow (cfs)              *  600.67  *  742.79  * 4309.54  *
* Top Width (ft)         *  407.69  * Top Width (ft)          *  116.74  *   58.00  *  232.95  *
* Vel Total (ft/s)       *    5.96  * Avg. Vel. (ft/s)        *    3.77  *    6.87  *    6.32  *
* Max Chl Dpth (ft)      *    3.94  * Hydr. Depth (ft)        *    1.36  *    1.86  *    2.93  *
* Conv. Total (cfs)      * 41149.1  * Conv. (cfs)             *  4372.4  *  5406.9  * 31369.8  *
* Length Wtd. (ft)       *  540.70  * Wetted Per. (ft)        *  118.31  *   58.00  *  233.36  *
* Min Ch El (ft)         * 2478.85  * Shear (lb/sq ft)        *    1.59  *    2.20  *    3.44  *
* Alpha                  *    1.08  * Stream Power (lb/ft s)  *    5.98  *   15.09  *   21.76  *
```

```
* Frctn Loss (ft)        *   10.59  * Cum Volume (acre-ft)   *   16.72  *    8.74  *   38.02  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    8.75  *    3.44  *   19.73  *
*********************************************************************************************
```

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

CROSS SECTION

RIVER: Finger Rock Wash
REACH: Main Reach 4   RS: 0.421

INPUT
Description: 5

```
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    1000    2484 1004.72    2482 1008.78    2480 1012.83    2478 1021.29    2476
 1029.97    2474 1035.85    2472 1041.09    2470 1121.64    2468    1160    2467
 1264.97    2468    13252468.317    13772468.591  1643.9    2470 1701.06    2472
 1708.76    2474 1714.65    2476 1720.54    2478 1725.66    2480 1732.03    2482
 1738.48    2484 1744.93    2486 1751.21    2488

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    1000    .066    1325    .045    1377    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1325    1377              520     523     530             .1       .3
```

CROSS SECTION OUTPUT Profile #100-yr

```
*********************************************************************************************
* E.G. Elev (ft)         * 2470.91  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.             *   0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2470.42  * Reach Len. (ft)        *  520.00  *  523.00  *  530.00  *
* Crit W.S. (ft)         * 2470.12  * Flow Area (sq ft)      *  669.85  *  102.41  *  303.57  *
* E.G. Slope (ft/ft)     *0.020335  * Area (sq ft)           *  669.85  *  102.41  *  303.57  *
* Q Total (cfs)          * 5589.00  * Flow (cfs)             * 3800.38  *  757.61  * 1031.01  *
* Top Width (ft)         *  616.02  * Top Width (ft)         *  285.02  *   52.00  *  279.00  *
* Vel Total (ft/s)       *    5.20  * Avg. Vel. (ft/s)       *    5.67  *    7.40  *    3.40  *
* Max Chl Dpth (ft)      *    3.42  * Hydr. Depth (ft)       *    2.35  *    1.97  *    1.09  *
* Conv. Total (cfs)      * 39193.4  * Conv. (cfs)            * 26650.6  *  5312.8  *  7230.1  *
* Length Wtd. (ft)       *  523.98  * Wetted Per. (ft)       *  285.14  *   52.00  *  279.01  *
* Min Ch El (ft)         * 2468.32  * Shear (lb/sq ft)       *    2.98  *    2.50  *    1.38  *
* Alpha                  *    1.16  * Stream Power (lb/ft s) *   16.92  *   18.50  *    4.69  *
* Frctn Loss (ft)        *   10.45  * Cum Volume (acre-ft)   *   11.39  *    7.43  *   32.08  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    6.17  *    2.76  *   16.64  *
*********************************************************************************************
```

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

CROSS SECTION

RIVER: Finger Rock Wash
REACH: Main Reach 4   RS: 0.322

INPUT
Description: 4

```
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    1000    2474 1010.01    2472 1018.08    2470 1030.18    2468 1050.54    2466
 1063.06    2464 1072.88    2462 1081.02    2460 1089.17    2458 1118.62    2458
 1166.19    2458 1196.74    2458 1211.37    2458 1282.07    2458 1300.51    2458
    1333    2458    1344    2457 1370.12    2458 1376.45    2458    1388    2458
  1469.4    2458 1491.75    2458    1498    2458 1553.69    2458    1560    2457
 1570.99    2458 1650.23    2458 1661.41    2458 1678.18    2460 1686.95    2462
 1695.93    2464 1706.53    2466 1717.31    2468 1735.37    2470 1763.23    2472

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    1000    .066    1333    .045 1370.12    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1333 1370.12              547     545     530             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
```

```
    1000    1144    2470       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2460.46  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.48  * Wt. n-Val.             *  0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2459.98  * Reach Len. (ft)        *  547.00 *   545.00 *  530.00  *
* Crit W.S. (ft)         * 2459.56  * Flow Area (sq ft)      *  373.94 *    92.00 *  601.38  *
* E.G. Slope (ft/ft)     *0.019551  * Area (sq ft)           *  490.40 *    92.00 *  601.38  *
* Q Total (cfs)          * 5589.00  * Flow (cfs)             * 1855.23 *   777.07 * 2956.70  *
* Top Width (ft)         *  596.89  * Top Width (ft)         *  251.89 *    37.12 *  307.88  *
* Vel Total (ft/s)       *    5.24  * Avg. Vel. (ft/s)       *    4.96 *     8.45 *    4.92  *
* Max Chl Dpth (ft)      *    2.98  * Hydr. Depth (ft)       *    1.98 *     2.48 *    1.95  *
* Conv. Total (cfs)      * 39971.4  * Conv. (cfs)            * 13268.2 *   5557.4 * 21145.7  *
* Length Wtd. (ft)       *  536.48  * Wetted Per. (ft)       *  189.00 *    37.18 *  308.12  *
* Min Ch El (ft)         * 2457.00  * Shear (lb/sq ft)       *    2.41 *     3.02 *    2.38  *
* Alpha                  *    1.13  * Stream Power (lb/ft s) *   11.98 *    25.51 *   11.71  *
* Frctn Loss (ft)        *    8.04  * Cum Volume (acre-ft)   *    4.46 *     6.27 *   26.58  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.96 *     2.23 *   13.07  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Finger Rock Wash
REACH: Main Reach 4       RS: 0.219

INPUT
Description: 3
Station Elevation Data    num=      31
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2470 1006.52    2468 1013.06    2466  1019.6    2464 1027.84    2462
  1038.1    2460 1045.47    2458 1055.11    2456  1065.5    2454 1075.89    2452
 1147.84    2450    11502449.761 1165.95    2448 1167.06    2448    11902448.762
 1227.24    2450 1268.54    2450 1271.49    2450 1289.02    2450 1319.77    2450
 1326.65    2450 1348.05    2448  1352.7    2448 1438.11    2450 1463.11    2450
    1544    2449  1563.6    2450 1576.39    2452 1589.14    2454 1598.65    2456
 1607.64    2456

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066 1147.84    .045 1227.24    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1147.84 1227.24              578     569     461             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000    1095    2460       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 2452.42  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *  0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2451.95  * Reach Len. (ft)        *  578.00 *   569.00 *  461.00  *
* Crit W.S. (ft)         * 2451.34  * Flow Area (sq ft)      *   64.37 *   235.57 *  835.34  *
* E.G. Slope (ft/ft)     *0.011853  * Area (sq ft)           *   68.58 *   235.57 *  835.34  *
* Q Total (cfs)          * 5589.00  * Flow (cfs)             *  179.94 * 1746.42  * 3662.64  *
* Top Width (ft)         *  498.49  * Top Width (ft)         *   70.25 *    79.40 *  348.85  *
* Vel Total (ft/s)       *    4.92  * Avg. Vel. (ft/s)       *    2.80 *     7.41 *    4.38  *
* Max Chl Dpth (ft)      *    3.95  * Hydr. Depth (ft)       *    1.22 *     2.97 *    2.39  *
* Conv. Total (cfs)      * 51335.7  * Conv. (cfs)            *  1652.7 * 16041.1  * 33641.9  *
* Length Wtd. (ft)       *  493.78  * Wetted Per. (ft)       *   52.86 *    79.54 *  349.15  *
* Min Ch El (ft)         * 2448.00  * Shear (lb/sq ft)       *    0.90 *     2.19 *    1.77  *
* Alpha                  *    1.24  * Stream Power (lb/ft s) *    2.52 *    16.25 *    7.76  *
* Frctn Loss (ft)        *    8.94  * Cum Volume (acre-ft)   *    0.95 *     4.22 *   17.84  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *    0.94 *     1.50 *    9.08  *
*********************************************************************************************

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: Finger Rock Wash
```

```
REACH: Main Reach 4       RS: 0.111

INPUT
Description: 2
Station Elevation Data    num=      20
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2452 1005.55    2450 1009.47    2448 1013.04    2446    1018  2444.1
 1018.26    2444 1025.99    2442 1033.74    2440    1054    2439 1072.93    2440
    1082    2440 1214.19    2440    1260    2439 1303.17    2440 1321.06    2442
 1355.55    2442 1459.43    2442  1470.4    2444 1485.06    2446 1497.17    2448

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066 1033.74    .045 1072.93    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1033.74 1072.93             592     587     500             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2443.43  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.96  * Wt. n-Val.             *  0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2442.47  * Reach Len. (ft)        * 592.00  *  587.00  *  500.00  *
* Crit W.S. (ft)         * 2441.95  * Flow Area (sq ft)      *  11.78  *  116.25  *  703.68  *
* E.G. Slope (ft/ft)     *0.031031  * Area (sq ft)           *  11.78  *  116.25  *  703.68  *
* Q Total (cfs)          * 5589.00  * Flow (cfs)             *  52.61  * 1394.77  * 4141.61  *
* Top Width (ft)         *  437.80  * Top Width (ft)         *   9.55  *   39.19  *  389.06  *
* Vel Total (ft/s)       *    6.72  * Avg. Vel. (ft/s)       *   4.46  *   12.00  *    5.89  *
* Max Chl Dpth (ft)      *    3.47  * Hydr. Depth (ft)       *   1.23  *    2.97  *    1.81  *
* Conv. Total (cfs)      * 31727.7  * Conv. (cfs)            *  298.7  *  7917.9  * 23511.2  *
* Length Wtd. (ft)       *  522.14  * Wetted Per. (ft)       *   9.87  *   39.24  *  389.23  *
* Min Ch El (ft)         * 2439.00  * Shear (lb/sq ft)       *   2.31  *    5.74  *    3.50  *
* Alpha                  *    1.37  * Stream Power (lb/ft s) *  10.33  *   68.86  *   20.61  *
* Frctn Loss (ft)        *   10.90  * Cum Volume (acre-ft)   *   0.42  *    1.92  *    9.69  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *   0.41  *    0.72  *    5.17  *
***********************************************************************************************

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: Finger Rock Wash
REACH: Main Reach 4       RS: 0.000

INPUT
Description: 1
Station Elevation Data    num=      36
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    2448    1017    2448 1031.96    2446 1043.64    2444 1054.64    2442
 1060.58    2440 1067.09    2438 1075.08    2436 1083.07    2434 1104.65    2432
    11302431.033 1157.07    2430    1200    2429    1225 2429.79 1231.64    2430
 1274.26    2430 1329.74    2430 1345.91    2430 1379.01    2430 1438.26    2430
 1449.36    2430 1544.02    2430 1724.79    2430 1737.41    2432 1750.16    2434
 1784.64    2436 1793.08    2436 1799.05    2434 1822.76    2434 1829.04    2436
 1835.32    2438 1838.75    2440 1841.57    2442 1845.37    2444 1854.52    2446
 1890.07    2448

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .066 1157.07    .045    1225    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1157.07    1225               0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 2432.35  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *  0.066  *   0.045  *   0.066  *
* W.S. Elev (ft)         * 2431.95  * Reach Len. (ft)        *         *          *          *
* Crit W.S. (ft)         * 2431.50  * Flow Area (sq ft)      *  49.64  *  168.80  *  985.38  *
* E.G. Slope (ft/ft)     *0.014999  * Area (sq ft)           *  49.64  *  168.80  *  985.38  *
* Q Total (cfs)          * 5589.00  * Flow (cfs)             * 134.33  * 1252.07  * 4202.59  *
```

```
* Top Width (ft)         *  631.01  * Top Width (ft)        *   51.01  *   67.93  *  512.07  *
* Vel Total (ft/s)       *    4.64  * Avg. Vel. (ft/s)      *    2.71  *    7.42  *    4.26  *
* Max Chl Dpth (ft)      *    2.95  * Hydr. Depth (ft)      *    0.97  *    2.48  *    1.92  *
* Conv. Total (cfs)      * 45635.4  * Conv. (cfs)           *  1096.9  * 10223.4  * 34315.1  *
* Length Wtd. (ft)       *          * Wetted Per. (ft)      *   51.05  *   67.95  *  512.23  *
* Min Ch El (ft)         * 2429.00  * Shear (lb/sq ft)      *    0.91  *    2.33  *    1.80  *
* Alpha                  *    1.21  * Stream Power (lb/ft s) *   2.46  *   17.25  *    7.68  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)  *          *          *          *
* C & E Loss (ft)        *          * Cum SA (acres)        *          *          *          *
*********************************************************************************************

CROSS SECTION


RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.154

INPUT
Description: Upstream section in study reach
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    1000    3092    1003    3090  1005.8    3088  1009.2    3086  1012.6    3084
  1016.2    3082  1019.6    3080  1023.2    3078    1042  3076.2    1044  3076.2
  1051.6    3078  1056.1    3080  1058.8    3082  1060.9    3084  1062.9    3086
  1064.7    3088  1066.8    3090  1068.8    3092  1070.8    3094  1073.3    3096
  1082.5    3100  1091.1    3102  1094.3    3104  1097.4    3106  1099.2    3108
  1100.2    3110  1103.6    3110    1106    3112

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086  1019.6    .066  1056.1    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        1019.6  1056.1               39      37      33             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 3085.25  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.44  * Wt. n-Val.            *   0.086  *   0.066  *   0.086  *
* W.S. Elev (ft)         * 3082.80  * Reach Len. (ft)       *   39.00  *   37.00  *   33.00  *
* Crit W.S. (ft)         * 3082.79  * Flow Area (sq ft)     *    6.71  *  194.55  *    5.20  *
* E.G. Slope (ft/ft)     *0.035414  * Area (sq ft)          *    6.71  *  194.55  *    5.20  *
* Q Total (cfs)          * 2503.00  * Flow (cfs)            *   24.61  * 2459.81  *   18.58  *
* Top Width (ft)         *   44.89  * Top Width (ft)        *    4.84  *   36.50  *    3.54  *
* Vel Total (ft/s)       *   12.12  * Avg. Vel. (ft/s)      *    3.67  *   12.64  *    3.57  *
* Max Chl Dpth (ft)      *    6.60  * Hydr. Depth (ft)      *    1.38  *    5.33  *    1.47  *
* Conv. Total (cfs)      * 13300.7  * Conv. (cfs)           *   130.8  * 13071.2  *    98.7  *
* Length Wtd. (ft)       *   36.99  * Wetted Per. (ft)      *    5.60  *   37.74  *    4.52  *
* Min Ch El (ft)         * 3076.20  * Shear (lb/sq ft)      *    2.65  *   11.40  *    2.54  *
* Alpha                  *    1.07  * Stream Power (lb/ft s) *   9.72  *  144.10  *    9.08  *
* Frctn Loss (ft)        *    0.95  * Cum Volume (acre-ft)  *    0.01  *    2.31  *    0.02  *
* C & E Loss (ft)        *    0.39  * Cum SA (acres)        *    0.02  *    1.11  *    0.03  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.147

INPUT
Description: 21
Station Elevation Data    num=      30
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    1000    3096  1002.3    3094  1005.3    3092  1008.6    3090  1011.8    3088
  1014.6    3086    1018    3084    1021    3082  1024.6    3080  1033.2    3078
    1051  3076.2    1059  3076.2  1069.8    3078  1077.1    3080  1082.4    3082
  1088.4    3084  1091.7    3086  1095.5    3088    1100    3090  1101.7    3092
  1105.7    3094    1108    3096  1109.6    3098    1111    3100    1113    3102
  1116.5    3104  1119.4    3106  1121.5    3108  1123.4    3110 1124.67    3110

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
```

```
    1000    .086    1021    .066  1082.4    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1021  1082.4               45      48      50             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 3083.91  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.16  * Wt. n-Val.             *  0.086  *   0.066  *   0.086  *
* W.S. Elev (ft)         * 3082.75  * Reach Len. (ft)        *  45.00  *   48.00  *   50.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   0.43  *  289.39  *    0.85  *
* E.G. Slope (ft/ft)     *0.019315  * Area (sq ft)           *   0.43  *  289.39  *    0.85  *
* Q Total (cfs)          * 2503.00  * Flow (cfs)             *   0.47  * 2501.50  *    1.03  *
* Top Width (ft)         *   64.79  * Top Width (ft)         *   1.13  *   61.40  *    2.26  *
* Vel Total (ft/s)       *    8.61  * Avg. Vel. (ft/s)       *   1.11  *    8.64  *    1.21  *
* Max Chl Dpth (ft)      *    6.55  * Hydr. Depth (ft)       *   0.38  *    4.71  *    0.38  *
* Conv. Total (cfs)      * 18010.1  * Conv. (cfs)            *    3.4  * 17999.3  *     7.4  *
* Length Wtd. (ft)       *   48.00  * Wetted Per. (ft)       *   1.36  *   63.02  *    2.38  *
* Min Ch El (ft)         * 3076.20  * Shear (lb/sq ft)       *   0.38  *    5.54  *    0.43  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *   0.42  *   47.86  *    0.52  *
* Frctn Loss (ft)        *    1.31  * Cum Volume (acre-ft)   *   0.01  *    2.11  *    0.02  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *   0.02  *    1.07  *    0.03  *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The 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: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.138

INPUT
Description: 20
Station Elevation Data    num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3089  1001.5    3088  1005.6    3086    1010    3084    1015    3082
  1020.9    3080    1027    3078    1032    3076    1037    3074    1040    3073
    1043    3073    1046    3074  1055.8    3076  1065.8    3078    1074    3080
    1076    3082    1079    3084    1082    3086  1084.5    3088    1088    3090
  1089.8    3092  1092.3    3094  1094.7    3096  1097.6    3098    1101    3100
 1103.25    3101

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086  1020.9    .066    1074    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        1020.9    1074               46      51      53             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 3082.51  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.05  * Wt. n-Val.             *  0.086  *   0.066  *   0.086  *
* W.S. Elev (ft)         * 3080.46  * Reach Len. (ft)        *  46.00  *   51.00  *   53.00  *
* Crit W.S. (ft)         * 3080.46  * Flow Area (sq ft)      *   0.32  *  217.84  *    0.11  *
* E.G. Slope (ft/ft)     *0.041702  * Area (sq ft)           *   0.32  *  217.84  *    0.11  *
* Q Total (cfs)          * 2503.00  * Flow (cfs)             *   0.40  * 2502.48  *    0.11  *
* Top Width (ft)         *   54.93  * Top Width (ft)         *   1.36  *   53.10  *    0.46  *
* Vel Total (ft/s)       *   11.47  * Avg. Vel. (ft/s)       *   1.28  *   11.49  *    1.05  *
* Max Chl Dpth (ft)      *    7.46  * Hydr. Depth (ft)       *   0.23  *    4.10  *    0.23  *
* Conv. Total (cfs)      * 12257.0  * Conv. (cfs)            *    2.0  * 12254.5  *     0.6  *
* Length Wtd. (ft)       *   51.00  * Wetted Per. (ft)       *   1.44  *   55.15  *    0.65  *
* Min Ch El (ft)         * 3073.00  * Shear (lb/sq ft)       *   0.57  *   10.28  *    0.43  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *   0.73  *  118.12  *    0.45  *
* Frctn Loss (ft)        *    2.16  * Cum Volume (acre-ft)   *   0.01  *    1.83  *    0.02  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   0.02  *    1.00  *    0.03  *
*********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
```

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn   RS: 0.128

INPUT
Description: 19
Station Elevation Data   num=   37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	3081	1003	3080	1005.7	3078	1008	3076	1011	3074
1015	3072	1019.24	3070	1021.42	3068	1024.65	3066	1027.88	3064
1033.39	3062	1037.66	3060	1040.88	3060	1048.41	3062	1051.38	3064
1056.12	3066	1056.65	3068	1058.33	3070	1061.32	3072	1064.15	3074
1067.74	3076	1072.35	3078	1075.33	3080	1078.22	3082	1082.35	3084
1087.55	3086	1090.01	3088	1094.28	3090	1096.31	3092	1097.31	3093
1098.2	3094	1099.04	3095	1100.07	3096	1101.2	3097	1102.34	3098
1103.66	3099	1105.62	3100						

Manning's n Values   num=   3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.086	1021.42	.066	1056.65	.086

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1021.42	1056.65	67	61	43	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	3071.02	Wt. n-Val.	0.086	0.066	0.086
Vel Head (ft)	2.70	Reach Len. (ft)	67.00	61.00	43.00
W.S. Elev (ft)	3068.32	Flow Area (sq ft)	0.06	189.85	0.04
Crit W.S. (ft)	3068.32	Area (sq ft)	0.06	189.85	0.04
E.G. Slope (ft/ft)	0.042960	Flow (cfs)	0.05	2502.92	0.04
Q Total (cfs)	2503.00	Top Width (ft)	0.35	35.23	0.27
Top Width (ft)	35.86	Avg. Vel. (ft/s)	0.87	13.18	0.79
Vel Total (ft/s)	13.18	Hydr. Depth (ft)	0.16	5.39	0.16
Max Chl Dpth (ft)	8.32	Conv. (cfs)	0.2	12075.7	0.2
Conv. Total (cfs)	12076.1	Wetted Per. (ft)	0.48	39.98	0.42
Length Wtd. (ft)	61.00	Shear (lb/sq ft)	0.32	12.74	0.28
Min Ch El (ft)	3060.00	Stream Power (lb/ft s)	0.28	167.90	0.22
Alpha	1.00	Cum Volume (acre-ft)	0.01	1.59	0.02
Frctn Loss (ft)	2.51	Cum SA (acres)	0.02	0.95	0.03
C & E Loss (ft)	0.03				

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

CROSS SECTION

RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn   RS: 0.117

INPUT
Description: 18
Station Elevation Data   num=   47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	3080	1010	3078	1015	3076	1020	3074	1023.49	3072
1025.38	3070	1027.31	3068	1028.51	3067	1029.7	3066	1030.57	3065
1031.31	3064	1032.04	3063	1034.02	3062	1036.56	3061	1040.77	3060
1048.73	3059	1054.03	3059	1058.76	3060	1064.92	3061	1066.07	3062
1067.22	3063	1067.95	3064	1068.51	3065	1069.07	3066	1069.57	3067
1070.07	3068	1071.44	3069	1072.54	3070	1073.18	3071	1073.83	3072
1074.47	3073	1075.52	3074	1076.53	3075	1077.53	3076	1078.53	3077
1080.08	3078	1080.98	3079	1082.11	3080	1083.23	3081	1083.73	3082
1086.31	3083	1087.58	3084	1089.61	3085	1091.43	3086	1093.43	3087
1095.45	3088	1098.04	3089						

Manning's n Values   num=   3

```
     Sta   n Val      Sta   n Val      Sta   n Val
************************************************
    1000    .086 1031.31    .066 1067.95    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1031.31 1067.95               51      51      51             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 3068.20  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.60  * Wt. n-Val.             *   0.086  *   0.066  *   0.086  *
* W.S. Elev (ft)         * 3065.59  * Reach Len. (ft)        *   51.00  *   51.00  *   51.00  *
* Crit W.S. (ft)         * 3065.59  * Flow Area (sq ft)      *    0.96  *  192.93  *    0.71  *
* E.G. Slope (ft/ft)     *0.039558  * Area (sq ft)           *    0.96  *  192.93  *    0.71  *
* Q Total (cfs)          * 2503.00  * Flow (cfs)             *    2.01  * 2499.69  *    1.30  *
* Top Width (ft)         *   38.79  * Top Width (ft)         *    1.26  *   36.64  *    0.89  *
* Vel Total (ft/s)       *   12.86  * Avg. Vel. (ft/s)       *    2.09  *   12.96  *    1.83  *
* Max Chl Dpth (ft)      *    6.59  * Hydr. Depth (ft)       *    0.77  *    5.27  *    0.80  *
* Conv. Total (cfs)      * 12584.8  * Conv. (cfs)            *    10.1  * 12568.1  *     6.5  *
* Length Wtd. (ft)       *   51.00  * Wetted Per. (ft)       *    2.03  *   39.20  *    1.83  *
* Min Ch El (ft)         * 3059.00  * Shear (lb/sq ft)       *    1.17  *   12.16  *    0.96  *
* Alpha                  *    1.01  * Stream Power (lb/ft s) *    2.44  *  157.49  *    1.76  *
* Frctn Loss (ft)        *    1.20  * Cum Volume (acre-ft)   *    0.01  *    1.32  *    0.02  *
* C & E Loss (ft)        *    0.39  * Cum SA (acres)         *    0.02  *    0.90  *    0.03  *
***********************************************************************************************

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

CROSS SECTION


RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.107

INPUT
Description: 17
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
******************************************************************************
    1000    3070    1003    3068    1006    3066    1009    3064    1011    3062
    1018    3060    1023    3058  1030.5  3056.5  1040.8  3056.5 1048.29    3058
 1050.56    3060  1053.9    3062  1058.6    3064    1062    3066    1066    3068
    1069    3070    1072    3072    1075    3074    1078    3076 1087.35    3078
  1092.3    3079

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
************************************************
    1000    .086    1011    .066  1053.9    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1011  1053.9               48      51      52             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 3065.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.31  * Wt. n-Val.             *   0.086  *   0.066  *   0.086  *
* W.S. Elev (ft)         * 3064.54  * Reach Len. (ft)        *   48.00  *   51.00  *   52.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    3.29  *  268.79  *    7.46  *
* E.G. Slope (ft/ft)     *0.015553  * Area (sq ft)           *    3.29  *  268.79  *    7.46  *
* Q Total (cfs)          * 2503.00  * Flow (cfs)             *    6.44  * 2478.30  *   18.27  *
* Top Width (ft)         *   51.31  * Top Width (ft)         *    2.80  *   42.90  *    5.61  *
* Vel Total (ft/s)       *    8.95  * Avg. Vel. (ft/s)       *    1.96  *    9.22  *    2.45  *
* Max Chl Dpth (ft)      *    8.04  * Hydr. Depth (ft)       *    1.17  *    6.27  *    1.33  *
* Conv. Total (cfs)      * 20070.0  * Conv. (cfs)            *    51.6  * 19871.9  *   146.5  *
* Length Wtd. (ft)       *   51.00  * Wetted Per. (ft)       *    3.79  *   45.17  *    6.16  *
* Min Ch El (ft)         * 3056.50  * Shear (lb/sq ft)       *    0.84  *    5.78  *    1.18  *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *    1.65  *   53.27  *    2.88  *
* Frctn Loss (ft)        *    0.67  * Cum Volume (acre-ft)   *    0.01  *    1.05  *    0.01  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *    0.01  *    0.86  *    0.02  *
***********************************************************************************************
```

```
CROSS SECTION


RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.097

INPUT
Description: 16
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3070  1003.5    3068  1006.5    3066    1010    3064    1013    3062
    1018    3060 1020.38    3058    1044    3057    1050    3057 1054.31    3058
    1065    3060    1070    3062    1078    3064    1080    3066    1081    3068
    1082    3070    1084    3071 1084.01    3072    1085    3072

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086    1013    .066    1070    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1013    1070               31      29      28             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 3065.04  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.88  * Wt. n-Val.             *   0.086  *   0.066  *   0.086  *
* W.S. Elev (ft)         * 3064.16  * Reach Len. (ft)        *   31.00  *   29.00  *   28.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    3.51  *  328.08  *    9.30  *
* E.G. Slope (ft/ft)     *0.011385  * Area (sq ft)           *    3.51  *  328.08  *    9.30  *
* Q Total (cfs)          * 2503.00  * Flow (cfs)             *    5.99  * 2478.76  *   18.25  *
* Top Width (ft)         *   68.44  * Top Width (ft)         *    3.28  *   57.00  *    8.16  *
* Vel Total (ft/s)       *    7.34  * Avg. Vel. (ft/s)       *    1.71  *    7.56  *    1.96  *
* Max Chl Dpth (ft)      *    7.16  * Hydr. Depth (ft)       *    1.07  *    5.76  *    1.14  *
* Conv. Total (cfs)      * 23458.0  * Conv. (cfs)            *    56.1  * 23230.9  *   171.0  *
* Length Wtd. (ft)       *   29.00  * Wetted Per. (ft)       *    3.93  *   58.82  *    8.47  *
* Min Ch El (ft)         * 3057.00  * Shear (lb/sq ft)       *    0.63  *    3.96  *    0.78  *
* Alpha                  *    1.05  * Stream Power (lb/ft s) *    1.08  *   29.95  *    1.53  *
* Frctn Loss (ft)        *    0.57  * Cum Volume (acre-ft)   *    0.00  *    0.70  *    0.00  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *    0.01  *    0.80  *    0.01  *
*********************************************************************************************

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.

CROSS SECTION


RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.092

INPUT
Description: 15
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000  3069.5    1007    3068    1019    3066    1026    3064    1031    3062
    1038    3060    1041    3058    1051  3056.5    1061  3056.5 1073.32    3058
 1079.82    3060  1081.7    3061 1085.36    3062 1089.53    3063 1094.93    3064
  1095.5    3065 1096.07    3066 1096.67    3067 1097.28    3068  1097.4    3069
  1097.5    3070

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086    1031    .066 1085.36    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1031 1085.36               25      22      20             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 3064.36  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.02  * Wt. n-Val.             *   0.086  *   0.066  *   0.086  *
* W.S. Elev (ft)         * 3062.34  * Reach Len. (ft)        *   25.00  *   22.00  *   20.00  *
* Crit W.S. (ft)         * 3062.34  * Flow Area (sq ft)      *    0.14  *  219.56  *    0.24  *
* E.G. Slope (ft/ft)     *0.041588  * Area (sq ft)           *    0.14  *  219.56  *    0.24  *
* Q Total (cfs)          * 2503.00  * Flow (cfs)             *    0.15  * 2502.60  *    0.25  *
* Top Width (ft)         *   56.62  * Top Width (ft)         *    0.85  *   54.36  *    1.41  *
```

```
* Vel Total (ft/s)       *   11.38  * Avg. Vel. (ft/s)       *    1.03  *   11.40  *    1.06  *
* Max Chl Dpth (ft)      *    5.84  * Hydr. Depth (ft)       *    0.17  *    4.04  *    0.17  *
* Conv. Total (cfs)      * 12273.8  * Conv. (cfs)            *     0.7  * 12271.8  *     1.2  *
* Length Wtd. (ft)       *   22.00  * Wetted Per. (ft)       *    0.91  *   56.13  *    1.45  *
* Min Ch El (ft)         * 3056.50  * Shear (lb/sq ft)       *    0.41  *   10.16  *    0.43  *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *    0.42  *  115.75  *    0.45  *
* Frctn Loss (ft)        *    0.94  * Cum Volume (acre-ft)   *    0.00  *    0.52  *    0.00  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    0.01  *    0.76  *    0.01  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.087

INPUT
Description: 14
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    1000  3068.5    1016    3066  1021.5    3064    1028    3062 1030.67    3061
 1032.39    3060 1034.11    3059 1037.55    3058    1042    3056 1042.79    3054
 1045.44    3053    1060  3052.8 1075.97    3053 1080.16    3054 1082.59    3055
 1086.18    3056 1091.86    3057 1095.46    3058 1095.82    3059 1096.19    3060
 1096.56    3061 1096.93    3062  1097.3    3063    1100    3064

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086 1032.39    .066 1096.19    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1032.39 1096.19               35      32      27             .3       .5

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 3059.99  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.95  * Wt. n-Val.             *          *   0.066  *          *
* W.S. Elev (ft)         * 3058.04  * Reach Len. (ft)        *   35.00  *   32.00  *   27.00  *
* Crit W.S. (ft)         * 3058.04  * Flow Area (sq ft)      *          *  223.37  *          *
* E.G. Slope (ft/ft)     *0.043645  * Area (sq ft)           *          *  223.37  *          *
* Q Total (cfs)          * 2503.00  * Flow (cfs)             *          * 2503.00  *          *
* Top Width (ft)         *   58.06  * Top Width (ft)         *          *   58.06  *          *
* Vel Total (ft/s)       *   11.21  * Avg. Vel. (ft/s)       *          *   11.21  *          *
* Max Chl Dpth (ft)      *    5.24  * Hydr. Depth (ft)       *          *    3.85  *          *
* Conv. Total (cfs)      * 11981.0  * Conv. (cfs)            *          * 11981.0  *          *
* Length Wtd. (ft)       *   32.00  * Wetted Per. (ft)       *          *   60.74  *          *
* Min Ch El (ft)         * 3052.80  * Shear (lb/sq ft)       *          *   10.02  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  112.28  *          *
* Frctn Loss (ft)        *    0.68  * Cum Volume (acre-ft)   *          *    0.41  *    0.00  *
* C & E Loss (ft)        *    0.19  * Cum SA (acres)         *    0.01  *    0.73  *    0.01  *
*********************************************************************************************

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: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the 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: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.081

INPUT
Description: 13
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    1000    3068    1015    3066    1017    3064  1018.5    3062    1025    3060
```

```
    1028    3058    1030    3056    1032    3054    1037  3049.5    1068  3049.5
    1074    3054    1078    3056  1081.9    3057    1082    3068    1083    3068
    1094    3070    1102  3071.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086    1028    .066  1081.9    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1028  1081.9               59      59      59             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000  1037.5    3060       T
  1068.5    1102    3060       T

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 3059.10  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.57  * Wt. n-Val.             *          *   0.066  *          *
* W.S. Elev (ft)         * 3057.52  * Reach Len. (ft)        *   59.00  *   59.00  *   59.00  *
* Crit W.S. (ft)         * 3055.36  * Flow Area (sq ft)      *          *  248.66  *          *
* E.G. Slope (ft/ft)     *0.012516  * Area (sq ft)           *          *  332.58  *    0.00  *
* Q Total (cfs)          * 2503.00  * Flow (cfs)             *          * 2503.00  *          *
* Top Width (ft)         *   53.43  * Top Width (ft)         *          *   53.42  *          *
* Vel Total (ft/s)       *   10.07  * Avg. Vel. (ft/s)       *          *   10.07  *          *
* Max Chl Dpth (ft)      *    8.02  * Hydr. Depth (ft)       *          *    8.02  *          *
* Conv. Total (cfs)      * 22373.3  * Conv. (cfs)            *          * 22373.3  *          *
* Length Wtd. (ft)       *   59.00  * Wetted Per. (ft)       *          *   31.13  *          *
* Min Ch El (ft)         * 3049.50  * Shear (lb/sq ft)       *          *    6.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   62.84  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          *    0.20  *          *
* C & E Loss (ft)        *          * Cum SA (acres)         *    0.01  *    0.69  *    0.01  *
*********************************************************************************************

CULVERT


RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.078

INPUT
Description: Playa de Coronado Crossing @ HEC-1 Sta. RES-91
Distance from Upstream XS =      13
Deck/Roadway Width        =      30
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
************************************************************************
     995    3070            1030    3068            1055 3067.24
    1073    3068            1090    3069         1100.76    3070

Upstream Bridge Cross Section Data
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3068    1015    3066    1017    3064  1018.5    3062    1025    3060
    1028    3058    1030    3056    1032    3054    1037  3049.5    1068  3049.5
    1074    3054    1078    3056  1081.9    3057    1082    3068    1083    3068
    1094    3070    1102  3071.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086    1028    .066  1081.9    .086

Bank Sta: Left   Right    Coeff Contr.   Expan.
          1028  1081.9             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000  1037.5    3060       T
  1068.5    1102    3060       T

Downstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
************************************************************************
     995    3070            1030    3068            1055 3067.24
    1073    3068            1090    3069         1096.93    3070
 1128.48    3071
```

```
Downstream Bridge Cross Section Data
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3058    1020    3056    1023    3054 1030.32    3052 1047.35    3050
 1052.25    3049 1060.98  3046.4 1088.42  3046.4 1090.74    3047 1094.65    3048
  1098.6    3049 1103.25    3050 1105.54    3051 1107.62    3052  1109.7    3053
    1112    3054 1112.01    3064    1113    3065

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086 1030.32    .066 1107.62    .086

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1030.32 1107.62             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000  1059.5  3056.5       T
  1090.5    1113  3056.5       T

Upstream Embankment side slope             =      .5 horiz. to 1.0 vertical
Downstream Embankment side slope           =      .5 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
PlCoronadoPC    Low Arch   10.08      31
FHWA Chart # 52- Low and high corrugated metal arch
FHWA Scale # 4 - Beveled edges; 90 Degree headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  4      50     .024     .035        0                  .2                1
Upstream   Elevation =  3049.5
           Centerline Station =  1053
Downstream Elevation =  3046.4
           Centerline Station =  1075

CULVERT OUTPUT  Profile #100-yr  Culv Group:  PlCoronadoPC
*************************************************************************
* Q Culv Group (cfs)     * 2503.00  * Culv Full Len (ft)     *           *
* # Barrels              *       1  * Culv Vel US (ft/s)     *   14.41  *
* Q Barrel (cfs)         * 2503.00  * Culv Vel DS (ft/s)     *   19.82  *
* E.G. US. (ft)          * 3059.11  * Culv Inv El Up (ft)    * 3049.50  *
* W.S. US. (ft)          * 3057.52  * Culv Inv El Dn (ft)    * 3046.40  *
* E.G. DS (ft)           * 3055.24  * Culv Frctn Ls (ft)     *    1.82  *
* W.S. DS (ft)           * 3052.28  * Culv Exit Loss (ft)    *    1.40  *
* Delta EG (ft)          *    3.87  * Culv Entr Loss (ft)    *    0.64  *
* Delta WS (ft)          *    5.24  * Q Weir (cfs)           *          *
* E.G. IC (ft)           * 3058.89  * Weir Sta Lft (ft)      *          *
* E.G. OC (ft)           * 3059.11  * Weir Sta Rgt (ft)      *          *
* Culvert Control        *  Outlet  * Weir Submerg           *          *
* Culv WS Inlet (ft)     * 3055.24  * Weir Max Depth (ft)    *          *
* Culv WS Outlet (ft)    * 3050.54  * Weir Avg Depth (ft)    *          *
* Culv Nml Depth (ft)    *    3.78  * Weir Flow Area (sq ft) *          *
* Culv Crt Depth (ft)    *    5.74  * Min El Weir Flow (ft)  * 3067.25  *
*************************************************************************

Warning: Since the culvert has supercritical flow, the program should be run in mixed flow in order to
         check if the cross section downstream of the culvert has supercritical flow.
Note:    The flow in the culvert is entirely supercritical.

CROSS SECTION


RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.07

INPUT
Description: 12
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3058    1020    3056    1023    3054 1030.32    3052 1047.35    3050
 1052.25    3049 1060.98  3046.4 1088.42  3046.4 1090.74    3047 1094.65    3048
  1098.6    3049 1103.25    3050 1105.54    3051 1107.62    3052  1109.7    3053
    1112    3054 1112.01    3064    1113    3065
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086 1030.32    .066 1107.62    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1030.32 1107.62               50      58      60             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000  1059.5  3056.5       T
  1090.5    1113  3056.5       T

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 3055.24  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.96  * Wt. n-Val.             *          *   0.066  *          *
* W.S. Elev (ft)         * 3052.28  * Reach Len. (ft)        *   50.00  *   58.00  *   60.00  *
* Crit W.S. (ft)         * 3052.28  * Flow Area (sq ft)      *          *  181.44  *          *
* E.G. Slope (ft/ft)     *0.035801  * Area (sq ft)           *    0.14  *  302.04  *    0.08  *
* Q Total (cfs)          * 2503.00  * Flow (cfs)             *          * 2503.00  *          *
* Top Width (ft)         *   78.91  * Top Width (ft)         *    1.03  *   77.30  *    0.58  *
* Vel Total (ft/s)       *   13.80  * Avg. Vel. (ft/s)       *          *   13.80  *          *
* Max Chl Dpth (ft)      *    5.88  * Hydr. Depth (ft)       *          *    5.85  *          *
* Conv. Total (cfs)      * 13228.6  * Conv. (cfs)            *          * 13228.6  *          *
* Length Wtd. (ft)       *   58.00  * Wetted Per. (ft)       *          *   31.13  *          *
* Min Ch El (ft)         * 3046.40  * Shear (lb/sq ft)       *          *   13.03  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  179.69  *          *
* Frctn Loss (ft)        *    2.27  * Cum Volume (acre-ft)   *    0.06  *    3.05  *    0.40  *
* C & E Loss (ft)        *    0.61  * Cum SA (acres)         *    0.01  *    0.60  *    0.01  *
***********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
         is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.059

INPUT
Description: 10
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3052 1003.05    3051 1006.32    3050    1015    3048    1036    3046
    1046    3044    1058    3042    1081    3040    1084    3040    1094    3042
    1100    3044    1106    3046    1109    3048    1113    3050    1116    3052
    1120    3060

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086    1036    .066    1106    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1036    1106               51      51      51             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
***********************************************************************************************
* E.G. Elev (ft)         * 3047.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.74  * Wt. n-Val.             *          *   0.066  *          *
* W.S. Elev (ft)         * 3045.77  * Reach Len. (ft)        *   51.00  *   51.00  *   51.00  *
* Crit W.S. (ft)         * 3045.77  * Flow Area (sq ft)      *          *  236.75  *          *
* E.G. Slope (ft/ft)     *0.042904  * Area (sq ft)           *          *  236.75  *          *
* Q Total (cfs)          * 2503.00  * Flow (cfs)             *          * 2503.00  *          *
* Top Width (ft)         *   68.12  * Top Width (ft)         *          *   68.12  *          *
* Vel Total (ft/s)       *   10.57  * Avg. Vel. (ft/s)       *          *   10.57  *          *
* Max Chl Dpth (ft)      *    5.76  * Hydr. Depth (ft)       *          *    3.48  *          *
* Conv. Total (cfs)      * 12084.1  * Conv. (cfs)            *          * 12084.1  *          *
* Length Wtd. (ft)       *   51.00  * Wetted Per. (ft)       *          *   69.35  *          *
* Min Ch El (ft)         * 3040.00  * Shear (lb/sq ft)       *          *    9.14  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   96.67  *          *
* Frctn Loss (ft)        *    2.23  * Cum Volume (acre-ft)   *    0.06  *    2.70  *    0.40  *
```

```
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    0.01  *    0.51  *    0.01  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.049

INPUT
Description: 9
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    1000    3047 1002.27    3046 1009.29    3044 1015.56    3042    1021    3040
    1029    3038    1038    3036    1054    3036    1082    3038    1092    3040
 1094.46    3042    1101    3044    1114    3046    1115    3050    1124    3054

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    1000    .086 1009.29    .066    1101    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1009.29    1101              54      54      54             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 3042.34  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.67  * Wt. n-Val.             *          *   0.066  *          *
* W.S. Elev (ft)         * 3040.67  * Reach Len. (ft)        *   54.00  *   54.00  *   54.00  *
* Crit W.S. (ft)         * 3040.67  * Flow Area (sq ft)      *          *  241.47  *          *
* E.G. Slope (ft/ft)     *0.044383  * Area (sq ft)           *          *  241.47  *          *
* Q Total (cfs)          * 2503.00  * Flow (cfs)             *          * 2503.00  *          *
* Top Width (ft)         *   73.65  * Top Width (ft)         *          *   73.65  *          *
* Vel Total (ft/s)       *   10.37  * Avg. Vel. (ft/s)       *          *   10.37  *          *
* Max Chl Dpth (ft)      *    4.67  * Hydr. Depth (ft)       *          *    3.28  *          *
* Conv. Total (cfs)      * 11881.0  * Conv. (cfs)            *          * 11881.0  *          *
* Length Wtd. (ft)       *   54.00  * Wetted Per. (ft)       *          *   74.74  *          *
* Min Ch El (ft)         * 3036.00  * Shear (lb/sq ft)       *          *    8.95  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   92.79  *          *
* Frctn Loss (ft)        *    2.38  * Cum Volume (acre-ft)   *    0.06  *    2.42  *    0.40  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.01  *    0.42  *    0.01  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.039

INPUT
Description: 8
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    1000    3037    1011    3036    1022    3034    1034    3032    1044    3030
    1055    3028    1070    3028 1086.65    3030  1093.1    3032  1097.1    3034
    1100    3036    1109    3038    1113    3040    1118    3042 1121.17  3043.7

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    1000    .086    1022    .066  1097.1    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
```

```
          1022  1097.1               48      50      52             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 3034.95  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.74  * Wt. n-Val.            *          *   0.066  *          *
* W.S. Elev (ft)         * 3033.20  * Reach Len. (ft)       *   48.00  *   50.00  *   52.00  *
* Crit W.S. (ft)         * 3033.20  * Flow Area (sq ft)     *          *  236.18  *          *
* E.G. Slope (ft/ft)     *0.043701  * Area (sq ft)          *          *  236.18  *          *
* Q Total (cfs)          * 2503.00  * Flow (cfs)            *          * 2503.00  *          *
* Top Width (ft)         *   68.71  * Top Width (ft)        *          *   68.71  *          *
* Vel Total (ft/s)       *   10.60  * Avg. Vel. (ft/s)      *          *   10.60  *          *
* Max Chl Dpth (ft)      *    5.20  * Hydr. Depth (ft)      *          *    3.44  *          *
* Conv. Total (cfs)      * 11973.4  * Conv. (cfs)           *          * 11973.4  *          *
* Length Wtd. (ft)       *   50.00  * Wetted Per. (ft)      *          *   69.90  *          *
* Min Ch El (ft)         * 3028.00  * Shear (lb/sq ft)      *          *    9.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *   97.70  *          *
* Frctn Loss (ft)        *    2.23  * Cum Volume (acre-ft)  *    0.06  *    2.12  *    0.40  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)        *    0.01  *    0.33  *    0.01  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.030

INPUT
Description: 7
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
****************************************************************************
    1000    3032 1002.92    3031 1005.72    3030  1011.3    3028    1019    3026
    1029    3024    1039    3022    1053  3021.5    1065  3021.5    1071    3022
    1090    3024    1105    3026    1111    3028    1116    3030 1122.42    3032

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086    1019    .066    1105    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1019    1105               45      55      55             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 3027.54  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.50  * Wt. n-Val.            *   0.000  *   0.066  *   0.000  *
* W.S. Elev (ft)         * 3026.04  * Reach Len. (ft)       *   45.00  *   55.00  *   55.00  *
* Crit W.S. (ft)         * 3026.04  * Flow Area (sq ft)     *    0.00  *  254.55  *    0.00  *
* E.G. Slope (ft/ft)     *0.045349  * Area (sq ft)          *    0.00  *  254.55  *    0.00  *
* Q Total (cfs)          * 2503.00  * Flow (cfs)            *    0.00  * 2503.00  *    0.00  *
* Top Width (ft)         *   86.28  * Top Width (ft)        *    0.16  *   86.00  *    0.12  *
* Vel Total (ft/s)       *    9.83  * Avg. Vel. (ft/s)      *    0.27  *    9.83  *    0.27  *
* Max Chl Dpth (ft)      *    4.54  * Hydr. Depth (ft)      *    0.02  *    2.96  *    0.02  *
* Conv. Total (cfs)      * 11753.8  * Conv. (cfs)           *     0.0  * 11753.8  *     0.0  *
* Length Wtd. (ft)       *   55.00  * Wetted Per. (ft)      *    0.16  *   86.66  *    0.13  *
* Min Ch El (ft)         * 3021.50  * Shear (lb/sq ft)      *          *    8.32  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *   81.77  *          *
* Frctn Loss (ft)        *    2.44  * Cum Volume (acre-ft)  *    0.06  *    1.84  *    0.40  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)        *    0.01  *    0.25  *    0.01  *
*********************************************************************************************

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

CROSS SECTION
```

```
RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.019

INPUT
Description: 6
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3026    1009    3024    1017    3022    1027    3020    1037    3018
    1047    3016    1053    3015    1060    3015    1063    3016    1072    3018
    1081    3020    1090    3022    1096    3024    1102    3026    1109    3028
    1115    3030    1121    3032

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086    1017    .066    1090    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1017    1090               16      30      40             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 3023.14  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.76  * Wt. n-Val.             *          *   0.066  *          *
* W.S. Elev (ft)         * 3021.38  * Reach Len. (ft)        *   16.00  *   30.00  *   40.00  *
* Crit W.S. (ft)         * 3021.38  * Flow Area (sq ft)      *          *  234.96  *          *
* E.G. Slope (ft/ft)     *0.043250  * Area (sq ft)           *          *  234.96  *          *
* Q Total (cfs)          * 2503.00  * Flow (cfs)             *          * 2503.00  *          *
* Top Width (ft)         *   67.09  * Top Width (ft)         *          *   67.09  *          *
* Vel Total (ft/s)       *   10.65  * Avg. Vel. (ft/s)       *          *   10.65  *          *
* Max Chl Dpth (ft)      *    6.38  * Hydr. Depth (ft)       *          *    3.50  *          *
* Conv. Total (cfs)      * 12035.7  * Conv. (cfs)            *          * 12035.7  *          *
* Length Wtd. (ft)       *   29.99  * Wetted Per. (ft)       *          *   68.46  *          *
* Min Ch El (ft)         * 3015.00  * Shear (lb/sq ft)       *          *    9.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   98.71  *          *
* Frctn Loss (ft)        *    1.29  * Cum Volume (acre-ft)   *    0.06  *    1.53  *    0.40  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *    0.01  *    0.15  *    0.01  *
**********************************************************************************************

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

CROSS SECTION


RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.013

INPUT
Description: 5
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3022    1008    3020    1018    3018    1034    3016    1053    3016
    1064    3014    1070    3014    1088    3016    1097    3018    1105    3020
    1113    3022 1120.24    3023    1131    3025

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086    1018    .066    1097    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1018    1097               33      37      38             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
**********************************************************************************************
* E.G. Elev (ft)         * 3020.50  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.54  * Wt. n-Val.             *   0.086  *   0.066  *   0.086  *
* W.S. Elev (ft)         * 3018.96  * Reach Len. (ft)        *   33.00  *   37.00  *   38.00  *
* Crit W.S. (ft)         * 3018.96  * Flow Area (sq ft)      *    2.31  *  250.01  *    1.85  *
* E.G. Slope (ft/ft)     *0.042708  * Area (sq ft)           *    2.31  *  250.01  *    1.85  *
* Q Total (cfs)          * 2503.00  * Flow (cfs)             *    5.01  * 2494.01  *    3.98  *
* Top Width (ft)         *   87.66  * Top Width (ft)         *    4.81  *   79.00  *    3.85  *
* Vel Total (ft/s)       *    9.85  * Avg. Vel. (ft/s)       *    2.16  *    9.98  *    2.15  *
* Max Chl Dpth (ft)      *    4.96  * Hydr. Depth (ft)       *    0.48  *    3.16  *    0.48  *
```

```
* Conv. Total (cfs)      * 12111.8  * Conv. (cfs)           *    24.2  * 12068.3  *    19.2  *
* Length Wtd. (ft)       *   36.99  * Wetted Per. (ft)      *    4.91  *   79.64  *    3.97  *
* Min Ch El (ft)         * 3014.00  * Shear (lb/sq ft)      *    1.26  *    8.37  *    1.24  *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *   2.72  *   83.50  *    2.67  *
* Frctn Loss (ft)        *    1.51  * Cum Volume (acre-ft)  *    0.06  *    1.36  *    0.40  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)        *    0.01  *    0.10  *    0.01  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.007

INPUT
Description: 4
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000  3019.8    1029    3018    1041    3016    1052    3014    1060    3012
    1067    3010    1073    3008    1077    3008    1087    3010    1095    3012
    1103    3014    1116    3016    1123    3018    1127    3019

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086    1052    .066    1103    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1052    1103               30      34      38             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr
*********************************************************************************************
* E.G. Elev (ft)         * 3017.05  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.02  * Wt. n-Val.            *   0.086  *   0.066  *   0.086  *
* W.S. Elev (ft)         * 3015.03  * Reach Len. (ft)       *   30.00  *   34.00  *   38.00  *
* Crit W.S. (ft)         * 3015.03  * Flow Area (sq ft)     *    2.92  *  217.54  *    3.45  *
* E.G. Slope (ft/ft)     *0.038850  * Area (sq ft)          *    2.92  *  217.54  *    3.45  *
* Q Total (cfs)          * 2503.00  * Flow (cfs)            *    6.32  * 2489.19  *    7.49  *
* Top Width (ft)         *   63.36  * Top Width (ft)        *    5.67  *   51.00  *    6.70  *
* Vel Total (ft/s)       *   11.18  * Avg. Vel. (ft/s)      *    2.16  *   11.44  *    2.17  *
* Max Chl Dpth (ft)      *    7.03  * Hydr. Depth (ft)      *    0.52  *    4.27  *    0.52  *
* Conv. Total (cfs)      * 12698.9  * Conv. (cfs)           *    32.1  * 12628.8  *    38.0  *
* Length Wtd. (ft)       *   34.00  * Wetted Per. (ft)      *    5.76  *   52.54  *    6.78  *
* Min Ch El (ft)         * 3008.00  * Shear (lb/sq ft)      *    1.23  *   10.04  *    1.23  *
* Alpha                  *    1.04  * Stream Power (lb/ft s) *   2.66  *  114.91  *    2.68  *
* Frctn Loss (ft)        *    1.38  * Cum Volume (acre-ft)  *    0.06  *    1.16  *    0.40  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)        *    0.00  *    0.04  *    0.00  *
*********************************************************************************************

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

CROSS SECTION


RIVER: Pontatoc Cnyn
REACH: Pontatoc Cnyn      RS: 0.000

INPUT
Description: Section upstream of Junction FR-9
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
    1000    3018    1034    3016    1050    3014    1060    3012    1066    3010
    1073    3008    1081    3006    1085    3005    1089    3005    1093    3006
    1116    3008    1121    3010    1125    3012    1129    3014    1133    3016
    1137    3018    1141    3020  1141.9    3021    1145    3022    1148    3022
    1151    3022
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
    1000    .086    1060    .066    1125    .086

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1060    1125                0       0       0             .1       .3
```

CROSS SECTION OUTPUT Profile #100-yr

			Left OB	Channel	Right OB
E.G. Elev (ft)	3013.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.88	Wt. n-Val.		0.066	
W.S. Elev (ft)	3011.15	Reach Len. (ft)	168.00	168.00	168.00
Crit W.S. (ft)	3011.15	Flow Area (sq ft)		227.77	
E.G. Slope (ft/ft)	0.042455	Area (sq ft)		227.77	
Q Total (cfs)	2503.00	Flow (cfs)		2503.00	
Top Width (ft)	60.77	Top Width (ft)		60.77	
Vel Total (ft/s)	10.99	Avg. Vel. (ft/s)		10.99	
Max Chl Dpth (ft)	6.15	Hydr. Depth (ft)		3.75	
Conv. Total (cfs)	12147.8	Conv. (cfs)		12147.8	
Length Wtd. (ft)	168.00	Wetted Per. (ft)		62.47	
Min Ch El (ft)	3005.00	Shear (lb/sq ft)		9.66	
Alpha	1.00	Stream Power (lb/ft s)		106.19	
Frctn Loss (ft)	4.49	Cum Volume (acre-ft)	0.06	0.99	0.40
C & E Loss (ft)	0.04	Cum SA (acres)			

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

****

SUMMARY OF MANNING'S N VALUES

River:Coronado Split F

Reach	River Sta.	n1	n2	n3	n4	n5	n6
Cor Split Reach	0.854	.083	.03	.061	.083	.03	.083
Cor Split Reach	0.851	Lat Struct					
Cor Split Reach	0.847	.083	.03	.083	.061	.03	.083
Cor Split Reach	0.839	Lat Struct					
Cor Split Reach	0.830	.083	.03	.083	.061	.083	
Cor Split Reach	0.822	Lat Struct					
Cor Split Reach	0.813	.083	.03	.083	.061	.083	
Cor Split Reach	0.804	Lat Struct					
Cor Split Reach	0.794	.083	.03	.083	.061	.083	
Cor Split Reach	0.784	Lat Struct					
Cor Split Reach	0.774	.083	.03	.083	.061	.083	
Cor Split Reach	0.762	Lat Struct					
Cor Split Reach	0.749	.083	.03	.083	.061	.083	
Cor Split Reach	0.738	Lat Struct					
Cor Split Reach	0.727	.083	.03	.083	.061	.083	
Cor Split Reach	0.718	Lat Struct					
Cor Split Reach	0.708	.083	.03	.083	.061	.083	
Cor Split Reach	0.700	Lat Struct					
Cor Split Reach	0.691	.083	.03	.083	.061	.083	
Cor Split Reach	0.684	Lat Struct					
Cor Split Reach	0.677	.083	.03	.083	.061	.083	
Cor Split Reach	0.670	Lat Struct					
Cor Split Reach	0.662	.083	.03	.083	.061	.083	
Cor Split Reach	0.652	Lat Struct					
Cor Split Reach	0.642	.083	.03	.083	.061	.083	
Cor Split Reach	0.625	Lat Struct					
Cor Split Reach	0.608	.083	.03	.083	.061	.083	
Cor Split Reach	0.595	Lat Struct					
Cor Split Reach	0.581	.083	.03	.083	.061	.083	
Cor Split Reach	0.571	Lat Struct					
Cor Split Reach	0.561	.03	.083	.061	.083		
Cor Split Reach	0.544	Lat Struct					
Cor Split Reach	0.527	.083	.061	.083			
Cor Split Reach	0.482	.083	.07	.083			
Cor Split Reach	0.448	.083	.07	.083			
Cor Split Reach	0.423	.083	.07	.083			
Cor Split Reach	0.399	.083	.07	.083			
Cor Split Reach	0.382	.083	.06	.083			

Cor Split Reach	0.352	.083	.06	.083			
Cor Split Reach	0.319	.083	.065	.083			
Cor Split Reach	0.271	.083	.07	.083			
Cor Split Reach	0.221	.083	.03	.083			
Cor Split Reach	0.186	.083	.061	.083			
Cor Split Reach	0.114	.083	.061	.083			
Cor Split Reach	0.079	.083	.061	.083			
Cor Split Reach	0	.083	.061	.083			

River:Finger Rock Wash

Reach	River Sta.	n1	n2	n3	n4	n5	n6
Main Reach 1	4.800	.086	.066	.086			
Main Reach 1	4.792	.086	.066	.086			
Main Reach 1	4.783	.086	.066	.086			
Main Reach 1	4.778	.086	.066	.086			
Main Reach 1	4.771	Culvert					
Main Reach 1	4.767	.086	.066	.086			
Main Reach 1	4.756	.086	.066	.086			
Main Reach 1	4.748	.086	.066	.086			
Main Reach 1	4.737	.086	.066	.086			
Main Reach 1	4.724	.086	.066	.086			
Main Reach 1	4.705	.086	.066	.086			
Main Reach 1	4.696	.086	.066	.086			
Main Reach 1	4.682	.086	.066	.086			
Main Reach 1	4.673	.086	.066	.086			
Main Reach 1	4.643	.086	.066	.086			
Main Reach 2	4.596	.083	.061	.083			
Main Reach 2	4.547	.083	.061	.083			
Main Reach 2	4.509	.083	.061	.083			
Main Reach 2	4.492	.083	.05	.083			
Main Reach 3	4.477	.083	.03	.061	.083	.03	.083
Main Reach 3	4.47	.083	.03	.083	.061	.03	.083
Main Reach 3	4.447	.083	.03	.083	.061	.083	
Main Reach 3	4.426	.083	.03	.083	.061	.083	
Main Reach 3	4.409	.083	.03	.083	.061	.083	
Main Reach 3	4.392	.083	.03	.083	.061	.083	
Main Reach 3	4.371	.083	.03	.083	.061	.083	
Main Reach 3	4.353	.083	.03	.083	.061	.083	
Main Reach 3	4.333	.083	.03	.083	.061	.083	
Main Reach 3	4.315	.083	.03	.083	.061	.083	
Main Reach 3	4.289	.083	.03	.083	.061	.083	
Main Reach 3	4.262	.083	.03	.083	.061	.083	
Main Reach 3	4.243	.083	.03	.083	.061	.083	
Main Reach 3	4.225	.083	.03	.083	.061	.083	
Main Reach 3	4.205	.083	.03	.083	.061	.083	
Main Reach 3	4.189	.03	.083	.061	.083		
Main Reach 3	4.169	.083	.061	.083			
Main Reach 3	4.151	.083	.061	.083			
Main Reach 3	4.102	.083	.061	.083			
Main Reach 3	4.055	.083	.061	.083			
Main Reach 3	3.997	.083	.061	.083			
Main Reach 3	3.944	.083	.061	.083			
Main Reach 3	3.891	.083	.061	.083			
Main Reach 3	3.855	.083	.061	.083			
Main Reach 3	3.813	.083	.061	.083			
Main Reach 3	3.748	.083	.061	.083			
Main Reach 4	3.656	.083	.061	.083			
Main Reach 4	3.565	.083	.061	.083			
Main Reach 4	3.521	.083	.061	.083			
Main Reach 4	3.494	.02	.02	.02			
Main Reach 4	3.479	Culvert					
Main Reach 4	3.466	.02	.02	.02			
Main Reach 4	3.440	.075	.05	.075			
Main Reach 4	3.403	.075	.05	.075			
Main Reach 4	3.386	.075	.05	.075			
Main Reach 4	3.291	.075	.05	.075			
Main Reach 4	3.185	.075	.05	.075			
Main Reach 4	3.116	.075	.05	.075			
Main Reach 4	3.031	.075	.05	.075			
Main Reach 4	2.876	.075	.05	.075			
Main Reach 4	2.824	.075	.05	.075			
Main Reach 4	2.751	.075	.05	.075			
Main Reach 4	2.649	.075	.05	.075			
Main Reach 4	2.551	.075	.05	.075			
Main Reach 4	2.458	.075	.05	.075			
Main Reach 4	2.362	.075	.05	.075			
Main Reach 4	2.305	.075	.05	.075			
Main Reach 4	2.268	.045	.045	.045			
Main Reach 4	2.251	Culvert					

Main Reach 4	2.233	.045	.045	.045
Main Reach 4	2.164	.066	.045	.066
Main Reach 4	2.125	.066	.045	.066
Main Reach 4	2.047	.066	.045	.066
Main Reach 4	2.019	.025	.025	.025
Main Reach 4	2.008	Culvert		
Main Reach 4	1.997	.025	.025	.025
Main Reach 4	1.939	.066	.045	.066
Main Reach 4	1.884	.066	.045	.066
Main Reach 4	1.774	.066	.045	.066
Main Reach 4	1.679	.066	.045	.066
Main Reach 4	1.585	.066	.045	.066
Main Reach 4	1.485	.066	.045	.066
Main Reach 4	1.371	.066	.045	.066
Main Reach 4	1.275	.066	.045	.066
Main Reach 4	1.176	.066	.045	.066
Main Reach 4	1.092	.066	.045	.066
Main Reach 4	0.994	.066	.045	.066
Main Reach 4	0.898	.066	.045	.066
Main Reach 4	0.808	.066	.045	.066
Main Reach 4	0.710	.066	.045	.066
Main Reach 4	0.616	.066	.045	.066
Main Reach 4	0.523	.066	.045	.066
Main Reach 4	0.421	.066	.045	.066
Main Reach 4	0.322	.066	.045	.066
Main Reach 4	0.219	.066	.045	.066
Main Reach 4	0.111	.066	.045	.066
Main Reach 4	0.000	.066	.045	.066

River:Pontatoc Cnyn

Reach	River Sta.	n1	n2	n3
Pontatoc Cnyn	0.154	.086	.066	.086
Pontatoc Cnyn	0.147	.086	.066	.086
Pontatoc Cnyn	0.138	.086	.066	.086
Pontatoc Cnyn	0.128	.086	.066	.086
Pontatoc Cnyn	0.117	.086	.066	.086
Pontatoc Cnyn	0.107	.086	.066	.086
Pontatoc Cnyn	0.097	.086	.066	.086
Pontatoc Cnyn	0.092	.086	.066	.086
Pontatoc Cnyn	0.087	.086	.066	.086
Pontatoc Cnyn	0.081	.086	.066	.086
Pontatoc Cnyn	0.078	Culvert		
Pontatoc Cnyn	0.07	.086	.066	.086
Pontatoc Cnyn	0.059	.086	.066	.086
Pontatoc Cnyn	0.049	.086	.066	.086
Pontatoc Cnyn	0.039	.086	.066	.086
Pontatoc Cnyn	0.030	.086	.066	.086
Pontatoc Cnyn	0.019	.086	.066	.086
Pontatoc Cnyn	0.013	.086	.066	.086
Pontatoc Cnyn	0.007	.086	.066	.086
Pontatoc Cnyn	0.000	.086	.066	.086

SUMMARY OF REACH LENGTHS

River: Coronado Split F

Reach	River Sta.	Left	Channel	Right
Cor Split Reach	0.854	34	34	36
Cor Split Reach	0.851	Lat Struct		
Cor Split Reach	0.847	87	90	140
Cor Split Reach	0.839	Lat Struct		
Cor Split Reach	0.830	90	90	103
Cor Split Reach	0.822	Lat Struct		
Cor Split Reach	0.813	102	100	100
Cor Split Reach	0.804	Lat Struct		
Cor Split Reach	0.794	105	105	100
Cor Split Reach	0.784	Lat Struct		
Cor Split Reach	0.774	139	136	95
Cor Split Reach	0.762	Lat Struct		
Cor Split Reach	0.749	114	114	114
Cor Split Reach	0.738	Lat Struct		
Cor Split Reach	0.727	73	100	101
Cor Split Reach	0.718	Lat Struct		
Cor Split Reach	0.708	90	90	95
Cor Split Reach	0.700	Lat Struct		

Cor Split Reach	0.691	63	73	140
Cor Split Reach	0.684	Lat Struct		
Cor Split Reach	0.677	78	83	155
Cor Split Reach	0.670	Lat Struct		
Cor Split Reach	0.662	95	101	101
Cor Split Reach	0.652	Lat Struct		
Cor Split Reach	0.642	185	180	82
Cor Split Reach	0.625	Lat Struct		
Cor Split Reach	0.608	147	147	105
Cor Split Reach	0.595	Lat Struct		
Cor Split Reach	0.581	103	103	70
Cor Split Reach	0.571	Lat Struct		
Cor Split Reach	0.561	178	178	150
Cor Split Reach	0.544	Lat Struct		
Cor Split Reach	0.527	240	238	165
Cor Split Reach	0.482	220	181	160
Cor Split Reach	0.448	160	130	120
Cor Split Reach	0.423	152	129	125
Cor Split Reach	0.399	119	86	82
Cor Split Reach	0.382	155	161	150
Cor Split Reach	0.352	157	177	184
Cor Split Reach	0.319	252	253	253
Cor Split Reach	0.271	155	262	299
Cor Split Reach	0.221	219	185	166
Cor Split Reach	0.186	383	383	200
Cor Split Reach	0.114	165	184	215
Cor Split Reach	0.079	415	415	250
Cor Split Reach	0	0	0	0

River: Finger Rock Wash

Reach	River Sta.	Left	Channel	Right
Main Reach 1	4.800	50	46	39
Main Reach 1	4.792	43	47	50
Main Reach 1	4.783	23	24	24
Main Reach 1	4.778	60	60	60
Main Reach 1	4.771	Culvert		
Main Reach 1	4.767	35	60	63
Main Reach 1	4.756	35	39	40
Main Reach 1	4.748	59	62	63
Main Reach 1	4.737	69	66	64
Main Reach 1	4.724	118	102	100
Main Reach 1	4.705	45	48	50
Main Reach 1	4.696	74	72	68
Main Reach 1	4.682	47	49	53
Main Reach 1	4.673	173	155	129
Main Reach 1	4.643	0	0	0
Main Reach 2	4.596	258	256	261
Main Reach 2	4.547	202	203	209
Main Reach 2	4.509	95	90	60
Main Reach 2	4.492	0	0	0
Main Reach 3	4.477	33	35	36
Main Reach 3	4.47	90	122	140
Main Reach 3	4.447	90	112	103
Main Reach 3	4.426	102	90	100
Main Reach 3	4.409	98	90	75
Main Reach 3	4.392	125	107	95
Main Reach 3	4.371	108	98	108
Main Reach 3	4.353	85	105	101
Main Reach 3	4.333	88	96	95
Main Reach 3	4.315	93	135	140
Main Reach 3	4.289	107	143	155
Main Reach 3	4.262	100	102	100
Main Reach 3	4.243	128	97	82
Main Reach 3	4.225	121	105	105
Main Reach 3	4.205	75	83	70
Main Reach 3	4.189	125	109	95
Main Reach 3	4.169	105	92	100
Main Reach 3	4.151	255	261	246
Main Reach 3	4.102	244	248	236
Main Reach 3	4.055	304	306	306
Main Reach 3	3.997	267	279	276
Main Reach 3	3.944	302	278	263
Main Reach 3	3.891	203	191	183
Main Reach 3	3.855	203	219	224
Main Reach 3	3.813	353	343	341
Main Reach 3	3.748	0	0	0
Main Reach 4	3.656	461	482	488
Main Reach 4	3.565	218	230	238
Main Reach 4	3.521	133	144	158

Reach	River Sta.	Left	Channel	Right
Main Reach 4	3.494	145	145	145
Main Reach 4	3.479	Culvert		
Main Reach 4	3.466	125	138	130
Main Reach 4	3.440	205	197	174
Main Reach 4	3.403	91	89	102
Main Reach 4	3.386	480	501	476
Main Reach 4	3.291	507	563	585
Main Reach 4	3.185	398	360	315
Main Reach 4	3.116	448	450	453
Main Reach 4	3.031	791	822	791
Main Reach 4	2.876	290	273	243
Main Reach 4	2.824	410	386	366
Main Reach 4	2.751	454	536	623
Main Reach 4	2.649	566	517	474
Main Reach 4	2.551	513	494	492
Main Reach 4	2.458	518	504	500
Main Reach 4	2.362	281	305	311
Main Reach 4	2.305	11	195	196
Main Reach 4	2.268	184	184	184
Main Reach 4	2.251	Culvert		
Main Reach 4	2.233	420	364	182
Main Reach 4	2.164	207	208	209
Main Reach 4	2.125	409	412	415
Main Reach 4	2.047	139	145	146
Main Reach 4	2.019	116	116	116
Main Reach 4	2.008	Culvert		
Main Reach 4	1.997	293	308	327
Main Reach 4	1.939	269	291	287
Main Reach 4	1.884	563	578	547
Main Reach 4	1.774	492	501	513
Main Reach 4	1.679	519	500	467
Main Reach 4	1.585	524	527	479
Main Reach 4	1.485	572	599	632
Main Reach 4	1.371	530	508	480
Main Reach 4	1.275	430	526	581
Main Reach 4	1.176	460	441	395
Main Reach 4	1.092	452	519	530
Main Reach 4	0.994	496	507	511
Main Reach 4	0.898	423	476	497
Main Reach 4	0.808	481	516	560
Main Reach 4	0.710	600	497	415
Main Reach 4	0.616	490	487	525
Main Reach 4	0.523	560	540	525
Main Reach 4	0.421	520	523	530
Main Reach 4	0.322	547	545	530
Main Reach 4	0.219	578	569	461
Main Reach 4	0.111	592	587	500
Main Reach 4	0.000	0	0	0

River: Pontatoc Cnyn

Reach	River Sta.	Left	Channel	Right
Pontatoc Cnyn	0.154	39	37	33
Pontatoc Cnyn	0.147	45	48	50
Pontatoc Cnyn	0.138	46	51	53
Pontatoc Cnyn	0.128	67	61	43
Pontatoc Cnyn	0.117	51	51	51
Pontatoc Cnyn	0.107	48	51	52
Pontatoc Cnyn	0.097	31	29	28
Pontatoc Cnyn	0.092	25	22	20
Pontatoc Cnyn	0.087	35	32	27
Pontatoc Cnyn	0.081	59	59	59
Pontatoc Cnyn	0.078	Culvert		
Pontatoc Cnyn	0.07	50	58	60
Pontatoc Cnyn	0.059	51	51	51
Pontatoc Cnyn	0.049	54	54	54
Pontatoc Cnyn	0.039	48	50	52
Pontatoc Cnyn	0.030	45	55	55
Pontatoc Cnyn	0.019	16	30	40
Pontatoc Cnyn	0.013	33	37	38
Pontatoc Cnyn	0.007	30	34	38
Pontatoc Cnyn	0.000	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Coronado Split F

```
*     Reach      *   River Sta.   * Contr.  * Expan.  *
*******************************************************
*Cor Split Reach *    0.854   *       .1*       .3*
*Cor Split Reach *    0.851   *Lat Struct*        *
*Cor Split Reach *    0.847   *       .1*       .3*
*Cor Split Reach *    0.839   *Lat Struct*        *
*Cor Split Reach *    0.830   *       .1*       .3*
*Cor Split Reach *    0.822   *Lat Struct*        *
*Cor Split Reach *    0.813   *       .1*       .3*
*Cor Split Reach *    0.804   *Lat Struct*        *
*Cor Split Reach *    0.794   *       .1*       .3*
*Cor Split Reach *    0.784   *Lat Struct*        *
*Cor Split Reach *    0.774   *       .1*       .3*
*Cor Split Reach *    0.762   *Lat Struct*        *
*Cor Split Reach *    0.749   *       .1*       .3*
*Cor Split Reach *    0.738   *Lat Struct*        *
*Cor Split Reach *    0.727   *       .1*       .3*
*Cor Split Reach *    0.718   *Lat Struct*        *
*Cor Split Reach *    0.708   *       .1*       .3*
*Cor Split Reach *    0.700   *Lat Struct*        *
*Cor Split Reach *    0.691   *       .1*       .3*
*Cor Split Reach *    0.684   *Lat Struct*        *
*Cor Split Reach *    0.677   *       .1*       .3*
*Cor Split Reach *    0.670   *Lat Struct*        *
*Cor Split Reach *    0.662   *       .1*       .3*
*Cor Split Reach *    0.652   *Lat Struct*        *
*Cor Split Reach *    0.642   *       .1*       .3*
*Cor Split Reach *    0.625   *Lat Struct*        *
*Cor Split Reach *    0.608   *       .1*       .3*
*Cor Split Reach *    0.595   *Lat Struct*        *
*Cor Split Reach *    0.581   *       .1*       .3*
*Cor Split Reach *    0.571   *Lat Struct*        *
*Cor Split Reach *    0.561   *       .1*       .3*
*Cor Split Reach *    0.544   *Lat Struct*        *
*Cor Split Reach *    0.527   *       .1*       .3*
*Cor Split Reach *    0.482   *       .1*       .3*
*Cor Split Reach *    0.448   *       .1*       .3*
*Cor Split Reach *    0.423   *       .1*       .3*
*Cor Split Reach *    0.399   *       .1*       .3*
*Cor Split Reach *    0.382   *       .1*       .3*
*Cor Split Reach *    0.352   *       .1*       .3*
*Cor Split Reach *    0.319   *       .1*       .3*
*Cor Split Reach *    0.271   *       .1*       .3*
*Cor Split Reach *    0.221   *       .1*       .3*
*Cor Split Reach *    0.186   *       .1*       .3*
*Cor Split Reach *    0.114   *       .1*       .3*
*Cor Split Reach *    0.079   *       .1*       .3*
*Cor Split Reach *    0       *       .1*       .3*
*******************************************************
River: Finger Rock Wash

*******************************************************
*     Reach      *   River Sta.   * Contr.  * Expan.  *
*******************************************************
*Main Reach 1    *    4.800   *       .1*       .3*
*Main Reach 1    *    4.792   *       .1*       .3*
*Main Reach 1    *    4.783   *       .3*       .5*
*Main Reach 1    *    4.778   *       .3*       .5*
*Main Reach 1    *    4.771   *Culvert  *         *
*Main Reach 1    *    4.767   *       .3*       .5*
*Main Reach 1    *    4.756   *       .1*       .3*
*Main Reach 1    *    4.748   *       .1*       .3*
*Main Reach 1    *    4.737   *       .1*       .3*
*Main Reach 1    *    4.724   *       .1*       .3*
*Main Reach 1    *    4.705   *       .1*       .3*
*Main Reach 1    *    4.696   *       .1*       .3*
*Main Reach 1    *    4.682   *       .1*       .3*
*Main Reach 1    *    4.673   *       .1*       .3*
*Main Reach 1    *    4.643   *       .1*       .3*
*Main Reach 2    *    4.596   *       .1*       .3*
*Main Reach 2    *    4.547   *       .1*       .3*
*Main Reach 2    *    4.509   *       .1*       .3*
*Main Reach 2    *    4.492   *       .1*       .3*
*Main Reach 3    *    4.477   *       .1*       .3*
*Main Reach 3    *    4.47    *       .1*       .3*
*Main Reach 3    *    4.447   *       .1*       .3*
*Main Reach 3    *    4.426   *       .1*       .3*
*Main Reach 3    *    4.409   *       .1*       .3*
*Main Reach 3    *    4.392   *       .1*       .3*
*Main Reach 3    *    4.371   *       .1*       .3*
*Main Reach 3    *    4.353   *       .1*       .3*
*Main Reach 3    *    4.333   *       .1*       .3*
```

Main Reach 3	4.315	.1	.3
Main Reach 3	4.289	.1	.3
Main Reach 3	4.262	.1	.3
Main Reach 3	4.243	.1	.3
Main Reach 3	4.225	.1	.3
Main Reach 3	4.205	.1	.3
Main Reach 3	4.189	.1	.3
Main Reach 3	4.169	.1	.3
Main Reach 3	4.151	.1	.3
Main Reach 3	4.102	.1	.3
Main Reach 3	4.055	.1	.3
Main Reach 3	3.997	.1	.3
Main Reach 3	3.944	.1	.3
Main Reach 3	3.891	.1	.3
Main Reach 3	3.855	.1	.3
Main Reach 3	3.813	.1	.3
Main Reach 3	3.748	.1	.3
Main Reach 4	3.656	.1	.3
Main Reach 4	3.565	.1	.3
Main Reach 4	3.521	.3	.5
Main Reach 4	3.494	.3	.5
Main Reach 4	3.479	Culvert	
Main Reach 4	3.466	.3	.5
Main Reach 4	3.440	.1	.3
Main Reach 4	3.403	.1	.3
Main Reach 4	3.386	.1	.3
Main Reach 4	3.291	.1	.3
Main Reach 4	3.185	.1	.3
Main Reach 4	3.116	.1	.3
Main Reach 4	3.031	.1	.3
Main Reach 4	2.876	.1	.3
Main Reach 4	2.824	.1	.3
Main Reach 4	2.751	.1	.3
Main Reach 4	2.649	.1	.3
Main Reach 4	2.551	.1	.3
Main Reach 4	2.458	.1	.3
Main Reach 4	2.362	.1	.3
Main Reach 4	2.305	.3	.5
Main Reach 4	2.268	.3	.5
Main Reach 4	2.251	Culvert	
Main Reach 4	2.233	.3	.5
Main Reach 4	2.164	.1	.3
Main Reach 4	2.125	.1	.3
Main Reach 4	2.047	.3	.5
Main Reach 4	2.019	.3	.5
Main Reach 4	2.008	Culvert	
Main Reach 4	1.997	.3	.5
Main Reach 4	1.939	.1	.3
Main Reach 4	1.884	.1	.3
Main Reach 4	1.774	.1	.3
Main Reach 4	1.679	.1	.3
Main Reach 4	1.585	.1	.3
Main Reach 4	1.485	.1	.3
Main Reach 4	1.371	.1	.3
Main Reach 4	1.275	.1	.3
Main Reach 4	1.176	.1	.3
Main Reach 4	1.092	.1	.3
Main Reach 4	0.994	.1	.3
Main Reach 4	0.898	.1	.3
Main Reach 4	0.808	.1	.3
Main Reach 4	0.710	.1	.3
Main Reach 4	0.616	.1	.3
Main Reach 4	0.523	.1	.3
Main Reach 4	0.421	.1	.3
Main Reach 4	0.322	.1	.3
Main Reach 4	0.219	.1	.3
Main Reach 4	0.111	.1	.3
Main Reach 4	0.000	.1	.3

River: Pontatoc Cnyn

Reach	River Sta.	Contr.	Expan.
Pontatoc Cnyn	0.154	.1	.3
Pontatoc Cnyn	0.147	.1	.3
Pontatoc Cnyn	0.138	.1	.3
Pontatoc Cnyn	0.128	.1	.3
Pontatoc Cnyn	0.117	.1	.3
Pontatoc Cnyn	0.107	.1	.3
Pontatoc Cnyn	0.097	.1	.3
Pontatoc Cnyn	0.092	.1	.3

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*Pontatoc Cnyn   *    0.087   *       .3*       .5*
*Pontatoc Cnyn   *    0.081   *       .3*       .5*
*Pontatoc Cnyn   *    0.078   *Culvert  *         *
*Pontatoc Cnyn   *    0.07    *       .3*       .5*
*Pontatoc Cnyn   *    0.059   *       .1*       .3*
*Pontatoc Cnyn   *    0.049   *       .1*       .3*
*Pontatoc Cnyn   *    0.039   *       .1*       .3*
*Pontatoc Cnyn   *    0.030   *       .1*       .3*
*Pontatoc Cnyn   *    0.019   *       .1*       .3*
*Pontatoc Cnyn   *    0.013   *       .1*       .3*
*Pontatoc Cnyn   *    0.007   *       .1*       .3*
*Pontatoc Cnyn   *    0.000   *       .1*       .3*
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ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : FRW_NAVD88

River: Coronado Split F  Reach: Cor Split Reach     RS: 0.854     Profile: 100-yr
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.851     Profile: 100-yr
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.847     Profile: 100-yr
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:Divided flow computed for this cross-section.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
     Note:   Manning's n values were composited to a single value in the main channel.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.839     Profile: 100-yr
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.830     Profile: 100-yr
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.822     Profile: 100-yr
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.813     Profile: 100-yr
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.804     Profile: 100-yr
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.794     Profile: 100-yr
     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: Coronado Split F  Reach: Cor Split Reach     RS: 0.784     Profile: 100-yr
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
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River: Coronado Split F  Reach: Cor Split Reach     RS: 0.774     Profile: 100-yr
     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:The composite Mannings n value for the channel was larger than the largest entered n value or smaller than the
             smallest entered n value.
     Note:   Manning's n values were composited to a single value in the main channel.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.762     Profile: 100-yr
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.749     Profile: 100-yr
     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: Coronado Split F  Reach: Cor Split Reach     RS: 0.738     Profile: 100-yr
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.727     Profile: 100-yr
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.718     Profile: 100-yr
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.708     Profile: 100-yr
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.700     Profile: 100-yr
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.691     Profile: 100-yr
     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: Coronado Split F  Reach: Cor Split Reach     RS: 0.684     Profile: 100-yr
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.677     Profile: 100-yr
     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: Coronado Split F  Reach: Cor Split Reach     RS: 0.670     Profile: 100-yr
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.662     Profile: 100-yr
     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: Coronado Split F  Reach: Cor Split Reach     RS: 0.652     Profile: 100-yr
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: Coronado Split F  Reach: Cor Split Reach     RS: 0.642     Profile: 100-yr
     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
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the need for additional cross sections.
River: Coronado Split F Reach: Cor Split Reach   RS: 0.625   Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: Coronado Split F Reach: Cor Split Reach   RS: 0.608   Profile: 100-yr
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
River: Coronado Split F Reach: Cor Split Reach   RS: 0.595   Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: Coronado Split F Reach: Cor Split Reach   RS: 0.581   Profile: 100-yr
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: Coronado Split F Reach: Cor Split Reach   RS: 0.571   Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: Coronado Split F Reach: Cor Split Reach   RS: 0.561   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Coronado Split F Reach: Cor Split Reach   RS: 0.544   Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: Coronado Split F Reach: Cor Split Reach   RS: 0.527   Profile: 100-yr
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: Coronado Split F Reach: Cor Split Reach   RS: 0.482   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Coronado Split F Reach: Cor Split Reach   RS: 0.448   Profile: 100-yr
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
River: Coronado Split F Reach: Cor Split Reach   RS: 0.423   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.
River: Coronado Split F Reach: Cor Split Reach   RS: 0.399   Profile: 100-yr
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.
River: Coronado Split F Reach: Cor Split Reach   RS: 0.382   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Coronado Split F Reach: Cor Split Reach RS: 0.352 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.
River: Coronado Split F Reach: Cor Split Reach RS: 0.319 Profile: 100-yr
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: Coronado Split F Reach: Cor Split Reach RS: 0.271 Profile: 100-yr
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
River: Coronado Split F Reach: Cor Split Reach RS: 0.221 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Coronado Split F Reach: Cor Split Reach RS: 0.186 Profile: 100-yr
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: Coronado Split F Reach: Cor Split Reach RS: 0.114 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Coronado Split F Reach: Cor Split Reach RS: 0.079 Profile: 100-yr
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: Coronado Split F Reach: Cor Split Reach RS: 0 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 1 RS: 4.800 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 1 RS: 4.792 Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: Finger Rock Wash Reach: Main Reach 1 RS: 4.783 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 1   RS: 4.771   Profile: 100-yr   Culv: PlCoronadoMC
Warning:Since the culvert has supercritical flow, the program should be run in mixed flow in order to check if the cross section downstream of the culvert has supercritical flow.
Note: The flow in the culvert is entirely supercritical.

River: Finger Rock Wash Reach: Main Reach 1   RS: 4.767   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 1   RS: 4.756   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 1   RS: 4.748   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 1   RS: 4.737   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 1   RS: 4.724   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 1   RS: 4.705   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 1   RS: 4.696   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 1   RS: 4.682   Profile: 100-yr
Warning:The energy loss was 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: Finger Rock Wash Reach: Main Reach 1   RS: 4.673   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 1   RS: 4.643   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 2   RS: 4.596   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 2   RS: 4.547   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 2   RS: 4.509   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 2   RS: 4.492   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:A flow split was encountered. The program first calculated the momentum of both channels below the junction. An energy balance was performed across the junction from the stream with the highest momentum downstream to the section upstream.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 3   RS: 4.477   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 3   RS: 4.47   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 3   RS: 4.447   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 3   RS: 4.426   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 3   RS: 4.409   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 3   RS: 4.392   Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning:Divided flow computed for this cross-section.

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

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 3   RS: 4.371   Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning:Divided flow computed for this cross-section.

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 3   RS: 4.353   Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 3   RS: 4.333   Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 3   RS: 4.315   Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning:Divided flow computed for this cross-section.

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

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 3   RS: 4.289   Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 3   RS: 4.262   Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

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

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 3   RS: 4.243   Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning:Divided flow computed for this cross-section.

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

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 3   RS: 4.225   Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning:Divided flow computed for this cross-section.

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The

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           program defaulted to critical depth.
River: Finger Rock Wash  Reach: Main Reach 3     RS: 4.205     Profile: 100-yr
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
           for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
           water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
           program defaulted to critical depth.
River: Finger Rock Wash  Reach: Main Reach 3     RS: 4.189     Profile: 100-yr
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
           for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
           water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
           program defaulted to critical depth.
River: Finger Rock Wash  Reach: Main Reach 3     RS: 4.169     Profile: 100-yr
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
           for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
           water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
           program defaulted to critical depth.
River: Finger Rock Wash  Reach: Main Reach 3     RS: 4.151     Profile: 100-yr
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
           for the water surface and continued on with the calculations.
     Warning:Divided flow computed for this cross-section.
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
           water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
           program defaulted to critical depth.
River: Finger Rock Wash  Reach: Main Reach 3     RS: 4.102     Profile: 100-yr
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
           for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
           water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
           program defaulted to critical depth.
River: Finger Rock Wash  Reach: Main Reach 3     RS: 4.055     Profile: 100-yr
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
River: Finger Rock Wash  Reach: Main Reach 3     RS: 3.997     Profile: 100-yr
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
           for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
           water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
           program defaulted to critical depth.
River: Finger Rock Wash  Reach: Main Reach 3     RS: 3.944     Profile: 100-yr
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
           for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
           water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
           program defaulted to critical depth.
River: Finger Rock Wash  Reach: Main Reach 3     RS: 3.891     Profile: 100-yr
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
           for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
           water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
           program defaulted to critical depth.
River: Finger Rock Wash  Reach: Main Reach 3     RS: 3.855     Profile: 100-yr
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
           for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
           water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
           program defaulted to critical depth.
River: Finger Rock Wash  Reach: Main Reach 3     RS: 3.813     Profile: 100-yr
     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.
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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: Finger Rock Wash Reach: Main Reach 3 RS: 3.748 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 4 RS: 3.656 Profile: 100-yr
Warning:The energy loss was 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: Finger Rock Wash Reach: Main Reach 4 RS: 3.565 Profile: 100-yr
Warning:The energy loss was 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: Finger Rock Wash Reach: Main Reach 4 RS: 3.521 Profile: 100-yr
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: Finger Rock Wash Reach: Main Reach 4 RS: 3.479 Profile: 100-yr Culv: Skyline Dr
Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the height of the culvert.
Note: Culvert critical depth exceeds the height of the culvert.
Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note: The culvert inlet is submerged and the culvert flows full over part or all of its length. Therefore, the culvert inlet equations are not valid and the supercritical result has been discarded. The outlet answer will be used.

River: Finger Rock Wash Reach: Main Reach 4 RS: 3.466 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 4 RS: 3.440 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 4 RS: 3.403 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

River: Finger Rock Wash Reach: Main Reach 4 RS: 3.386 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Finger Rock Wash Reach: Main Reach 4 RS: 3.291 Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

River: Finger Rock Wash Reach: Main Reach 4 RS: 3.185 Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

River: Finger Rock Wash Reach: Main Reach 4 RS: 3.116 Profile: 100-yr
Warning:The energy loss was 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: Finger Rock Wash Reach: Main Reach 4 RS: 3.031 Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

River: Finger Rock Wash Reach: Main Reach 4 RS: 2.876 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 4   RS: 2.824   Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: Finger Rock Wash Reach: Main Reach 4   RS: 2.751   Profile: 100-yr
Warning:The energy loss was 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: Finger Rock Wash Reach: Main Reach 4   RS: 2.649   Profile: 100-yr
Warning:The energy loss was 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: Finger Rock Wash Reach: Main Reach 4   RS: 2.551   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 4   RS: 2.458   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 4   RS: 2.362   Profile: 100-yr
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: Finger Rock Wash Reach: Main Reach 4   RS: 2.305   Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: Finger Rock Wash Reach: Main Reach 4   RS: 2.251   Profile: 100-yr   Culv: Sunrise Dr
Note: The flow in the culvert is entirely supercritical.
River: Finger Rock Wash Reach: Main Reach 4   RS: 2.233   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 4   RS: 2.164   Profile: 100-yr
Warning:The energy loss was 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: Finger Rock Wash Reach: Main Reach 4   RS: 2.125   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 4   RS: 2.047   Profile: 100-yr
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: Finger Rock Wash Reach: Main Reach 4   RS: 2.008   Profile: 100-yr   Culv: Pontatoc Cyn
Note: During subcritical analysis, the culvert direct step method, the solution went to normal depth.
River: Finger Rock Wash Reach: Main Reach 4   RS: 1.997   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The

program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 4   RS: 1.939   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 4   RS: 1.884   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 4   RS: 1.774   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 4   RS: 1.679   Profile: 100-yr
Warning:The energy loss was 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: Finger Rock Wash Reach: Main Reach 4   RS: 1.585   Profile: 100-yr
Warning:The energy loss was 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: Finger Rock Wash Reach: Main Reach 4   RS: 1.485   Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: Finger Rock Wash Reach: Main Reach 4   RS: 1.371   Profile: 100-yr
Warning:The energy loss was 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: Finger Rock Wash Reach: Main Reach 4   RS: 1.275   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 4   RS: 1.176   Profile: 100-yr
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: Finger Rock Wash Reach: Main Reach 4   RS: 1.092   Profile: 100-yr
Warning:The energy loss was 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: Finger Rock Wash Reach: Main Reach 4   RS: 0.994   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 4   RS: 0.898   Profile: 100-yr
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: Finger Rock Wash Reach: Main Reach 4   RS: 0.808   Profile: 100-yr
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: Finger Rock Wash Reach: Main Reach 4   RS: 0.710   Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Finger Rock Wash Reach: Main Reach 4 RS: 0.616 Profile: 100-yr
Warning:The energy loss was 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: Finger Rock Wash Reach: Main Reach 4 RS: 0.523 Profile: 100-yr
Warning:The energy loss was 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: Finger Rock Wash Reach: Main Reach 4 RS: 0.421 Profile: 100-yr
Warning:The energy loss was 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: Finger Rock Wash Reach: Main Reach 4 RS: 0.322 Profile: 100-yr
Warning:The energy loss was 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: Finger Rock Wash Reach: Main Reach 4 RS: 0.219 Profile: 100-yr
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: Finger Rock Wash Reach: Main Reach 4 RS: 0.111 Profile: 100-yr
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: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.154 Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.147 Profile: 100-yr
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: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.138 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.128 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.117 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.097 Profile: 100-yr
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.
River: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.092 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.087 Profile: 100-yr
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:During the standard step iterations, when the assumed water surface was set equal to critical depth, the 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: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.078 Profile: 100-yr Culv: PlCoronadoPC

Warning:Since the culvert has supercritical flow, the program should be run in mixed flow in order to check if the cross section downstream of the culvert has supercritical flow.

Note: The flow in the culvert is entirely supercritical.

River: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.07 Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

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

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.059 Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.049 Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.039 Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.030 Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.019 Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.013 Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.007 Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Pontatoc Cnyn Reach: Pontatoc Cnyn RS: 0.000 Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

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

Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

PROFILE OUTPUT TABLE – STD TABLE 1

10/14/10 RUN DATE

FILENAME: FRW88.prj

HEC-RAS Plan: FRW_NAVD88 Profile: 100-yr

River	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)	
Pontatoc Cnyn	Pontatoc Cnyn	0.154	2503.00	3076.20	3082.80	3082.79	3085.25	0.035414	12.64	206.46	44.89	0.97
Pontatoc Cnyn	Pontatoc Cnyn	0.147	2503.00	3076.20	3082.75		3083.91	0.019315	8.64	290.66	64.79	0.70
Pontatoc Cnyn	Pontatoc Cnyn	0.138	2503.00	3073.00	3080.46	3080.46	3082.51	0.041702	11.49	218.26	54.93	1.00
Pontatoc Cnyn	Pontatoc Cnyn	0.128	2503.00	3060.00	3068.32	3068.32	3071.02	0.042960	13.18	189.95	35.86	1.00
Pontatoc Cnyn	Pontatoc Cnyn	0.117	2503.00	3059.00	3065.59	3065.59	3068.20	0.039558	12.96	194.60	38.79	1.00
Pontatoc Cnyn	Pontatoc Cnyn	0.107	2503.00	3056.50	3064.54		3065.84	0.015553	9.22	279.54	51.31	0.65
Pontatoc Cnyn	Pontatoc Cnyn	0.097	2503.00	3057.00	3064.16		3065.04	0.011385	7.56	340.89	68.44	0.55
Pontatoc Cnyn	Pontatoc Cnyn	0.092	2503.00	3056.50	3062.34	3062.34	3064.36	0.041588	11.40	219.95	56.62	1.00
Pontatoc Cnyn	Pontatoc Cnyn	0.087	2503.00	3052.80	3058.04	3058.04	3059.99	0.043645	11.21	223.37	58.06	1.01
Pontatoc Cnyn	Pontatoc Cnyn	0.081	2503.00	3049.50	3057.52	3055.36	3059.10	0.012516	10.07	248.66	53.43	0.63
Pontatoc Cnyn	Pontatoc Cnyn	0.078	Culvert									
Pontatoc Cnyn	Pontatoc Cnyn	0.07	2503.00	3046.40	3052.28	3052.28	3055.24	0.035801	13.80	181.44	78.91	1.00
Pontatoc Cnyn	Pontatoc Cnyn	0.059	2503.00	3040.00	3045.77	3045.77	3047.50	0.042904	10.57	236.75	68.12	1.00
Pontatoc Cnyn	Pontatoc Cnyn	0.049	2503.00	3036.00	3040.67	3040.67	3042.34	0.044383	10.37	241.47	73.65	1.01
Pontatoc Cnyn	Pontatoc Cnyn	0.039	2503.00	3028.00	3033.20	3033.20	3034.95	0.043701	10.60	236.18	68.71	1.01
Pontatoc Cnyn	Pontatoc Cnyn	0.030	2503.00	3021.50	3026.04	3026.04	3027.54	0.045349	9.83	254.55	86.28	1.01
Pontatoc Cnyn	Pontatoc Cnyn	0.019	2503.00	3015.00	3021.38	3021.38	3023.14	0.043250	10.65	234.96	67.09	1.00
Pontatoc Cnyn	Pontatoc Cnyn	0.013	2503.00	3014.00	3018.96	3018.96	3020.50	0.042708	9.98	254.18	87.66	0.99
Pontatoc Cnyn	Pontatoc Cnyn	0.007	2503.00	3008.00	3015.03	3015.03	3017.05	0.038850	11.44	223.91	63.36	0.98
Pontatoc Cnyn	Pontatoc Cnyn	0.000	2503.00	3005.00	3011.15	3011.15	3013.03	0.042455	10.99	227.77	60.77	1.00
Finger Rock Wash	Main Reach 1	4.800	2324.00	3074.00	3079.01	3079.01	3080.88	0.043326	10.98	211.62	57.11	1.01
Finger Rock Wash	Main Reach 1	4.792	2324.00	3069.00	3076.55	3076.16	3078.41	0.032590	10.96	212.55	46.80	0.89
Finger Rock Wash	Main Reach 1	4.783	2324.00	3067.00	3074.17	3074.17	3076.62	0.042258	12.54	185.34	38.43	1.00
Finger Rock Wash	Main Reach 1	4.778	2324.00	3065.20	3073.37	3071.19	3074.98	0.012505	10.19	228.08	36.76	0.63
Finger Rock Wash	Main Reach 1	4.771	Culvert									
Finger Rock Wash	Main Reach 1	4.767	2324.00	3062.20	3068.17	3068.17	3071.17	0.035317	13.92	167.01	57.69	1.00
Finger Rock Wash	Main Reach 1	4.756	2324.00	3059.00	3064.42	3064.42	3065.98	0.043914	10.03	232.14	75.90	1.00
Finger Rock Wash	Main Reach 1	4.748	2324.00	3056.00	3061.42	3061.42	3062.63	0.048301	8.84	263.33	110.78	1.00
Finger Rock Wash	Main Reach 1	4.737	2324.00	3050.00	3055.75	3055.75	3057.09	0.040601	9.85	283.54	134.39	0.96
Finger Rock Wash	Main Reach 1	4.724	2324.00	3045.00	3048.23	3048.23	3049.20	0.051673	7.90	294.00	152.07	1.00
Finger Rock Wash	Main Reach 1	4.705	2324.00	3037.00	3041.20	3041.20	3042.51	0.047923	9.19	252.94	98.34	1.01
Finger Rock Wash	Main Reach 1	4.696	2324.00	3031.00	3037.39	3037.39	3039.02	0.044804	10.25	226.64	70.42	1.01
Finger Rock Wash	Main Reach 1	4.682	2324.00	3023.00	3030.22	3029.95	3031.88	0.035091	10.33	225.11	56.64	0.91
Finger Rock Wash	Main Reach 1	4.673	2324.00	3023.00	3028.05	3028.05	3029.95	0.042979	11.08	209.66	55.47	1.00
Finger Rock Wash	Main Reach 1	4.643	2324.00	3011.00	3016.08	3016.08	3017.64	0.045460	10.02	231.87	76.52	1.01
Finger Rock Wash	Main Reach 2	4.596	5284.00	2991.00	3000.49	3000.49	3002.81	0.022146	13.78	523.32	112.00	0.88
Finger Rock Wash	Main Reach 2	4.547	5284.00	2983.00	2990.78	2990.78	2993.88	0.027749	15.19	420.49	75.44	0.99
Finger Rock Wash	Main Reach 2	4.509	5284.00	2971.00	2982.03	2982.03	2984.83	0.019448	14.02	462.67	94.52	0.82
Finger Rock Wash	Main Reach 2	4.492	5284.00	2970.00	2977.18	2977.18	2979.46	0.021636	12.14	440.15	102.74	0.99
Finger Rock Wash	Main Reach 3	4.477	3361.56	2967.80	2974.74	2974.74	2976.49	0.021572	11.88	339.50	153.64	0.85
Finger Rock Wash	Main Reach 3	4.47	3523.65	2966.20	2972.88	2972.88	2974.58	0.025122	10.90	353.13	169.41	0.87
Finger Rock Wash	Main Reach 3	4.447	3523.65	2954.50	2963.63	2963.63	2966.53	0.028049	14.05	290.40	107.13	0.95
Finger Rock Wash	Main Reach 3	4.426	4089.64	2952.00	2959.41	2959.41	2961.33	0.023024	11.73	428.80	151.31	0.86
Finger Rock Wash	Main Reach 3	4.409	4089.64	2947.50	2953.59	2953.59	2955.05	0.024250	11.03	526.87	186.04	0.87
Finger Rock Wash	Main Reach 3	4.392	4640.72	2940.00	2948.05	2948.05	2950.22	0.025287	13.12	477.04	149.59	0.91
Finger Rock Wash	Main Reach 3	4.371	4640.72	2936.00	2943.66	2943.66	2945.25	0.021639	11.77	601.27	225.12	0.84
Finger Rock Wash	Main Reach 3	4.353	4992.19	2930.00	2937.02	2937.02	2939.03	0.030789	12.19	508.13	160.98	0.97
Finger Rock Wash	Main Reach 3	4.333	5073.97	2925.50	2931.34	2931.34	2933.04	0.049643	12.28	513.66	165.14	1.16
Finger Rock Wash	Main Reach 3	4.315	5073.97	2919.50	2924.84	2924.84	2926.85	0.032374	12.37	545.20	213.65	1.00
Finger Rock Wash	Main Reach 3	4.289	5118.95	2912.50	2919.18	2919.18	2920.50	0.024305	11.63	714.89	248.13	0.88
Finger Rock Wash	Main Reach 3	4.262	5118.95	2905.50	2912.57	2912.57	2914.00	0.018257	10.22	668.54	259.72	0.77
Finger Rock Wash	Main Reach 3	4.243	5118.95	2899.50	2906.58	2906.58	2908.81	0.028024	12.08	448.01	119.09	0.93
Finger Rock Wash	Main Reach 3	4.225	5118.95	2897.00	2902.61	2902.61	2904.29	0.034643	10.41	497.98	164.49	0.98
Finger Rock Wash	Main Reach 3	4.205	5163.18	2889.00	2897.10	2897.10	2898.86	0.030665	10.70	511.58	183.81	0.94
Finger Rock Wash	Main Reach 3	4.189	5163.18	2883.50	2892.27	2892.27	2894.35	0.021558	11.92	516.14	160.52	0.84
Finger Rock Wash	Main Reach 3	4.169	5163.18	2877.60	2885.81	2885.81	2888.16	0.034041	12.29	420.21	90.53	1.01
Finger Rock Wash	Main Reach 3	4.151	5163.18	2875.00	2881.99	2881.99	2884.04	0.031515	11.51	453.45	129.85	0.97
Finger Rock Wash	Main Reach 3	4.102	5163.18	2867.50	2872.27	2872.27	2873.26	0.027984	11.28	830.35	358.03	0.93
Finger Rock Wash	Main Reach 3	4.055	5163.18	2858.00	2860.67		2861.30	0.036373	7.93	827.31	365.82	0.94
Finger Rock Wash	Main Reach 3	3.997	5163.18	2845.00	2848.16	2848.16	2849.35	0.041822	9.66	633.66	269.54	1.04
Finger Rock Wash	Main Reach 3	3.944	5163.18	2830.50	2836.27	2836.27	2837.53	0.027214	10.67	696.12	275.84	0.90
Finger Rock Wash	Main Reach 3	3.891	5163.18	2821.00	2827.24	2827.24	2828.25	0.019109	8.48	793.96	660.08	0.75
Finger Rock Wash	Main Reach 3	3.855	5163.18	2816.30	2821.67	2821.67	2822.75	0.028468	11.40	776.97	508.46	0.93
Finger Rock Wash	Main Reach 3	3.813	5163.18	2810.00	2813.82	2813.82	2814.91	0.037057	9.65	704.76	416.10	0.99
Finger Rock Wash	Main Reach 3	3.748	5163.18	2796.00	2803.28	2803.28	2804.30	0.014433	9.34	921.28	438.40	0.69
Finger Rock Wash	Main Reach 4	3.656	6162.00	2785.00	2792.41		2792.86	0.008957	8.09	1366.96	370.11	0.56
Finger Rock Wash	Main Reach 4	3.565	6162.00	2773.00	2789.10		2789.40	0.005878	5.53	1451.65	330.70	0.43
Finger Rock Wash	Main Reach 4	3.521	6162.00	2772.13	2787.47		2787.74	0.009535	5.46	1526.56	452.99	0.52
Finger Rock Wash	Main Reach 4	3.494	6162.00	2767.30	2787.48	2777.52	2787.61	0.000133	3.25	2321.79	472.47	0.21
Finger Rock Wash	Main Reach 4	3.479	Culvert									
Finger Rock Wash	Main Reach 4	3.466	6162.00	2760.40	2767.22	2767.22	2768.83	0.004054	10.17	606.05	190.11	1.00

HEC-RAS Plan: FRW_NAVD88 Profile: 100-yr (Continued)

River	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)	
Finger Rock Wash	Main Reach 4	3.440	6162.00	2757.00	2762.90	2762.90	2764.78	0.024952	14.14	670.37	201.93	1.09
Finger Rock Wash	Main Reach 4	3.403	6060.00	2751.50	2757.16	2757.16	2758.57	0.024196	13.01	769.73	252.33	1.05
Finger Rock Wash	Main Reach 4	3.386	6060.00	2748.00	2754.90	2754.90	2756.30	0.022646	13.54	801.11	250.28	1.03
Finger Rock Wash	Main Reach 4	3.291	6060.00	2738.00	2743.45	2743.08	2744.56	0.021815	11.66	801.51	226.65	0.97
Finger Rock Wash	Main Reach 4	3.185	6060.00	2725.11	2731.59	2731.42	2733.57	0.019059	13.30	644.81	154.02	0.97
Finger Rock Wash	Main Reach 4	3.116	6060.00	2718.00	2725.63		2727.00	0.017342	12.25	737.79	166.98	0.90
Finger Rock Wash	Main Reach 4	3.031	6060.00	2710.00	2715.92	2715.84	2717.38	0.026725	13.09	720.97	212.85	1.08
Finger Rock Wash	Main Reach 4	2.876	6368.00	2692.00	2699.28	2699.28	2701.29	0.015483	12.96	713.72	183.46	0.89
Finger Rock Wash	Main Reach 4	2.824	6368.00	2688.00	2694.01		2695.34	0.019195	12.11	777.53	187.75	0.94
Finger Rock Wash	Main Reach 4	2.751	6368.00	2678.00	2686.77		2688.75	0.015564	14.49	751.74	175.37	0.91
Finger Rock Wash	Main Reach 4	2.649	6368.00	2670.00	2677.35	2676.51	2679.25	0.020015	15.89	651.03	114.41	1.03
Finger Rock Wash	Main Reach 4	2.551	6368.00	2658.00	2666.84	2666.84	2669.10	0.018223	15.25	661.88	136.82	0.98
Finger Rock Wash	Main Reach 4	2.458	6368.00	2648.00	2656.58	2656.58	2657.89	0.013792	11.16	973.39	498.94	0.82
Finger Rock Wash	Main Reach 4	2.362	6368.00	2641.00	2646.91		2647.53	0.011327	9.47	1254.34	493.59	0.73
Finger Rock Wash	Main Reach 4	2.305	6368.00	2637.00	2644.91		2645.34	0.005206	7.45	1370.45	349.79	0.51
Finger Rock Wash	Main Reach 4	2.268	6368.00	2635.60	2643.76	2640.80	2644.74	0.003675	8.11	801.10	151.89	0.50
Finger Rock Wash	Main Reach 4	2.251	Culvert									
Finger Rock Wash	Main Reach 4	2.233	6368.00	2632.00	2636.86	2636.86	2639.23	0.018075	12.34	515.91	284.47	1.00
Finger Rock Wash	Main Reach 4	2.164	6368.00	2623.00	2626.95	2626.76	2628.09	0.022166	10.51	814.75	456.40	1.05
Finger Rock Wash	Main Reach 4	2.125	6114.00	2618.00	2622.59	2622.59	2623.75	0.019644	12.28	867.74	446.80	1.04
Finger Rock Wash	Main Reach 4	2.047	6114.00	2614.00	2620.62		2620.82	0.001109	3.77	1865.94	405.49	0.26
Finger Rock Wash	Main Reach 4	2.019	6114.00	2611.00	2620.56	2615.79	2620.75	0.000244	4.11	2060.28	446.32	0.24
Finger Rock Wash	Main Reach 4	2.008	Culvert									
Finger Rock Wash	Main Reach 4	1.997	6114.00	2609.00	2612.89	2612.89	2613.95	0.005355	8.75	780.55	368.43	0.91
Finger Rock Wash	Main Reach 4	1.939	6114.00	2601.00	2608.77	2608.77	2610.57	0.016326	13.37	699.29	344.52	0.99
Finger Rock Wash	Main Reach 4	1.884	5756.00	2597.00	2602.85	2602.85	2604.20	0.017729	12.62	781.95	274.29	1.01
Finger Rock Wash	Main Reach 4	1.774	5756.00	2587.00	2593.37	2593.37	2594.16	0.010678	10.05	1232.96	644.28	0.78
Finger Rock Wash	Main Reach 4	1.679	5756.00	2580.50	2584.06		2584.49	0.015976	8.09	1176.24	570.71	0.87
Finger Rock Wash	Main Reach 4	1.585	5756.00	2570.00	2574.28	2573.91	2575.12	0.021886	9.96	835.52	316.86	1.03
Finger Rock Wash	Main Reach 4	1.485	5756.00	2562.00	2564.81		2565.47	0.015781	7.75	892.76	275.48	0.85
Finger Rock Wash	Main Reach 4	1.371	5756.00	2548.00	2556.31		2557.56	0.011317	11.79	948.96	398.27	0.83
Finger Rock Wash	Main Reach 4	1.275	5756.00	2541.50	2549.60	2549.60	2550.91	0.015499	12.64	809.22	269.32	0.95
Finger Rock Wash	Main Reach 4	1.176	5756.00	2533.00	2540.57	2540.52	2541.55	0.018154	11.46	874.05	340.08	0.98
Finger Rock Wash	Main Reach 4	1.092	5756.00	2525.50	2532.56	2532.31	2534.04	0.016461	12.20	676.50	237.52	0.97
Finger Rock Wash	Main Reach 4	0.994	5756.00	2517.50	2522.58	2522.58	2523.73	0.023847	12.51	786.36	305.56	1.12
Finger Rock Wash	Main Reach 4	0.898	5653.00	2511.00	2515.25		2515.70	0.008874	7.57	1154.30	377.54	0.68
Finger Rock Wash	Main Reach 4	0.808	5653.00	2503.00	2507.69	2507.68	2508.92	0.027136	13.94	722.22	264.04	1.21
Finger Rock Wash	Main Reach 4	0.710	5653.00	2491.50	2498.81	2498.81	2499.97	0.012457	11.98	899.48	398.77	0.87
Finger Rock Wash	Main Reach 4	0.616	5653.00	2485.50	2489.50		2490.15	0.015205	9.62	986.03	417.24	0.89
Finger Rock Wash	Main Reach 4	0.523	5653.00	2478.85	2480.94		2481.53	0.018873	6.87	949.18	407.69	0.89
Finger Rock Wash	Main Reach 4	0.421	5589.00	2468.32	2470.42	2470.12	2470.91	0.020335	7.40	1075.83	616.02	0.93
Finger Rock Wash	Main Reach 4	0.322	5589.00	2457.00	2459.98	2459.56	2460.46	0.019551	8.45	1067.33	596.89	0.95
Finger Rock Wash	Main Reach 4	0.219	5589.00	2448.00	2451.95	2451.34	2452.42	0.011853	7.41	1135.27	498.49	0.76
Finger Rock Wash	Main Reach 4	0.111	5589.00	2439.00	2442.47	2441.95	2443.43	0.031031	12.00	831.72	437.80	1.23
Finger Rock Wash	Main Reach 4	0.000	5589.00	2429.00	2431.95	2431.50	2432.35	0.014999	7.42	1203.82	631.01	0.83
Coronado Split F	Cor Split Reach	0.854	1922.44	2970.10	2974.65	2974.65	2976.49	0.008195	11.11	197.80	152.01	0.99
Coronado Split F	Cor Split Reach	0.851	Lat Struct									
Coronado Split F	Cor Split Reach	0.847	1760.35	2968.70	2972.70	2972.70	2974.08	0.032563	9.45	186.31	165.63	1.01
Coronado Split F	Cor Split Reach	0.839	Lat Struct									
Coronado Split F	Cor Split Reach	0.830	1476.49	2963.50	2966.41	2966.41	2967.69	0.013518	9.09	167.41	255.17	0.99
Coronado Split F	Cor Split Reach	0.822	Lat Struct									
Coronado Split F	Cor Split Reach	0.813	1194.36	2959.00	2961.67	2961.67	2962.49	0.015444	7.28	164.06	257.84	1.01
Coronado Split F	Cor Split Reach	0.804	Lat Struct									
Coronado Split F	Cor Split Reach	0.794	711.84	2954.00	2956.03	2956.03	2956.57	0.056782	5.86	121.67	335.44	0.99
Coronado Split F	Cor Split Reach	0.784	Lat Struct									
Coronado Split F	Cor Split Reach	0.774	643.28	2947.70	2950.78	2950.31	2951.36	0.043251	6.08	105.73	301.21	0.74
Coronado Split F	Cor Split Reach	0.762	Lat Struct									
Coronado Split F	Cor Split Reach	0.749	291.81	2943.00	2946.03		2946.24	0.026866	3.66	79.67	335.80	0.53
Coronado Split F	Cor Split Reach	0.738	Lat Struct									
Coronado Split F	Cor Split Reach	0.727	229.97	2940.00	2941.29	2941.29	2941.63	0.079162	4.71	48.85	411.16	1.02
Coronado Split F	Cor Split Reach	0.718	Lat Struct									
Coronado Split F	Cor Split Reach	0.708	210.03	2935.50	2936.43	2936.43	2936.80	0.014068	4.87	43.11	367.72	1.01
Coronado Split F	Cor Split Reach	0.700	Lat Struct									
Coronado Split F	Cor Split Reach	0.691	165.05	2931.00	2932.21	2932.15	2932.34	0.049540	2.92	56.65	449.24	0.80
Coronado Split F	Cor Split Reach	0.684	Lat Struct									
Coronado Split F	Cor Split Reach	0.677	165.05	2925.00	2926.99	2926.92	2927.53	0.090198	5.87	28.09	334.91	0.94
Coronado Split F	Cor Split Reach	0.670	Lat Struct									
Coronado Split F	Cor Split Reach	0.662	165.05	2919.50	2921.27	2921.05	2921.56	0.057517	4.30	38.42	395.94	0.75
Coronado Split F	Cor Split Reach	0.652	Lat Struct									
Coronado Split F	Cor Split Reach	0.642	165.05	2915.00	2916.67	2916.35	2916.84	0.038158	3.33	49.51	461.42	0.61
Coronado Split F	Cor Split Reach	0.625	Lat Struct									

HEC-RAS Plan: FRW_NAVD88 Profile: 100-yr (Continued)

River	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)	
Coronado Split F	Cor Split Reach	0.608	165.05	2908.00	2908.95	2908.84	2909.07	0.048982	2.85	57.83	504.22	0.75
Coronado Split F	Cor Split Reach	0.595	Lat Struct									
Coronado Split F	Cor Split Reach	0.581	120.82	2902.00	2902.38	2902.37	2902.53	0.039222	3.11	38.88	533.12	0.97
Coronado Split F	Cor Split Reach	0.571	Lat Struct									
Coronado Split F	Cor Split Reach	0.561	120.82	2895.00	2895.54	2895.54	2895.78	0.130710	3.92	30.79	348.59	1.01
Coronado Split F	Cor Split Reach	0.544	Lat Struct									
Coronado Split F	Cor Split Reach	0.527	120.82	2886.50	2887.79	2887.46	2887.93	0.019044	3.00	40.24	204.25	0.58
Coronado Split F	Cor Split Reach	0.482	120.82	2878.00	2879.37	2879.37	2879.82	0.076830	5.36	22.54	25.68	1.01
Coronado Split F	Cor Split Reach	0.448	120.82	2868.00	2869.59		2869.65	0.006864	1.86	65.08	52.70	0.29
Coronado Split F	Cor Split Reach	0.423	120.82	2866.00	2867.07	2867.07	2867.48	0.078212	5.16	23.42	28.73	1.01
Coronado Split F	Cor Split Reach	0.399	120.82	2856.50	2858.51		2858.51	0.000333	0.48	251.83	186.21	0.07
Coronado Split F	Cor Split Reach	0.382	120.82	2856.00	2857.80	2857.80	2858.36	0.053593	5.99	20.18	18.47	1.01
Coronado Split F	Cor Split Reach	0.352	120.82	2847.50	2848.18	2848.18	2848.41	0.068970	3.82	31.65	70.33	1.00
Coronado Split F	Cor Split Reach	0.319	120.82	2842.00	2843.38		2843.46	0.011933	2.28	52.98	60.62	0.43
Coronado Split F	Cor Split Reach	0.271	120.82	2838.00	2839.03		2839.15	0.026097	2.78	43.42	59.32	0.57
Coronado Split F	Cor Split Reach	0.221	120.82	2832.50	2833.69	2833.69	2834.07	0.014854	4.93	24.50	33.04	1.01
Coronado Split F	Cor Split Reach	0.186	120.82	2826.00	2826.92		2827.00	0.014669	2.34	52.68	528.54	0.49
Coronado Split F	Cor Split Reach	0.114	120.82	2815.40	2816.07	2816.07	2816.28	0.074787	3.65	33.09	81.55	1.01
Coronado Split F	Cor Split Reach	0.079	120.82	2808.40	2809.91		2810.05	0.017603	2.98	40.59	45.75	0.56
Coronado Split F	Cor Split Reach	0	120.82	2796.00	2797.26	2797.26	2797.63	0.061351	4.93	24.50	33.01	1.01

PROFILE OUTPUT TABLE CULVERT ONLY

1 OF 1

10/14/10 RUN DATE

FILENAME: FRW88.prj

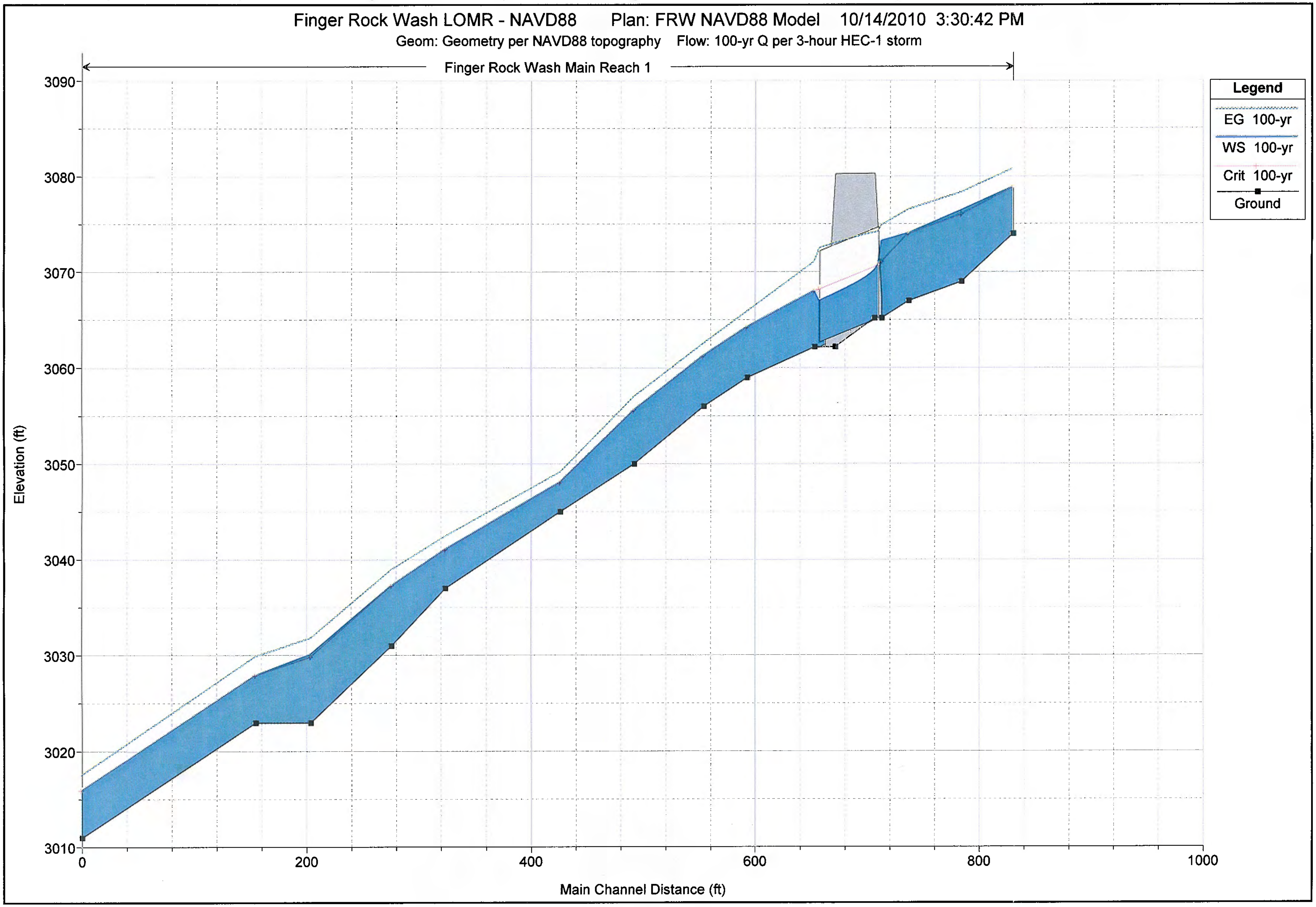
HEC-RAS Plan: FRW_NAVD88 Profile: 100-yr

River	Reach	River Sta	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Pontatoc Cnyn	Pontatoc Cnyn	0.078 PlCoronadoPC	3059.11	3057.52	3058.89	3059.11	3067.25	2503.00		5.24	14.41	19.82
Finger Rock Wash	Main Reach 1	4.771 PlCoronadoMC	3074.99	3073.37	3074.97	3074.99	3080.33	2324.00		5.20	14.80	18.78
Finger Rock Wash	Main Reach 4	3.479 Skyline Dr	2787.61	2787.48	2787.61	2787.61	2783.93	231.61	5930.39	20.26	18.43	18.43
Finger Rock Wash	Main Reach 4	2.251 Sunrise Dr	2644.74	2643.76	2644.11	2644.74	2653.87	6368.00		6.90	13.16	20.59
Finger Rock Wash	Main Reach 4	2.008 Pontatoc Cyn	2620.75	2620.56	2620.75	2620.61	2617.45	2831.00	3283.00	7.67	12.81	12.94

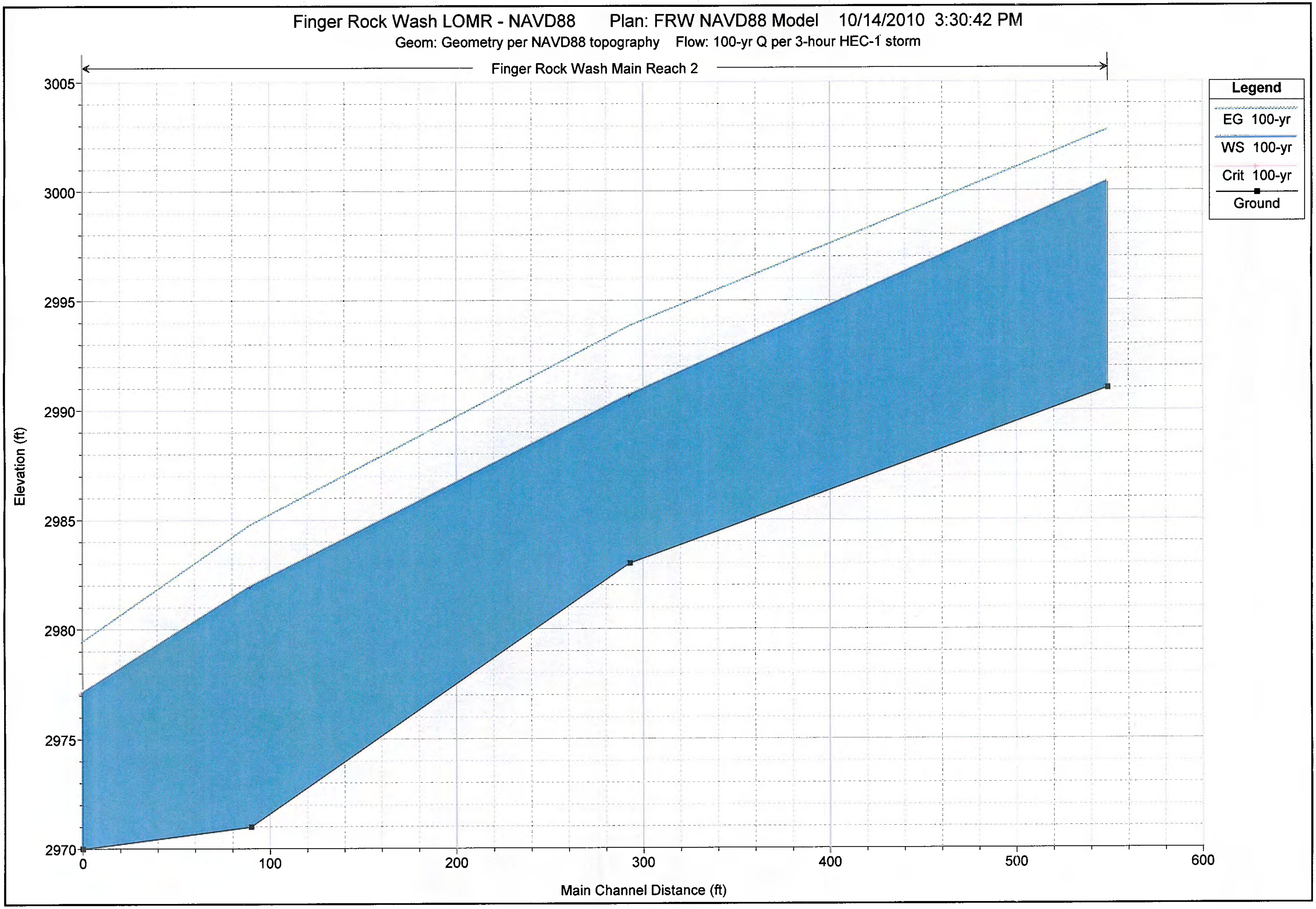
PROFILE OUTPUT TABLE – LATERAL STRUCTURES
10/14/10 RUN DATE
FILENAME: FRW88.prj

HEC-RAS Plan: FRW_NAVD88 Profile: 100-yr

River	Reach	River Sta	Q US	Q Leaving Total	Q DS	Q Weir	Q Gates	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)
Coronado Split F	Cor Split Reach	0.851	1922.44	162.50	1760.35	162.50		34.00	6.39	4.08	2970.10	2976.49	2974.65	2974.08	2972.70
Coronado Split F	Cor Split Reach	0.839	1760.35	283.89	1476.49	283.89		76.07	3.29	1.44	2964.40	2974.08	2972.70	2967.69	2966.41
Coronado Split F	Cor Split Reach	0.822	1476.49	282.14	1194.36	282.14		45.02	2.69	2.13	2963.00	2967.69	2966.41	2962.49	2961.67
Coronado Split F	Cor Split Reach	0.804	1194.36	482.56	711.84	482.56		89.92	2.29	1.93	2955.00	2962.49	2961.67	2956.57	2956.03
Coronado Split F	Cor Split Reach	0.784	711.84	68.52	643.28	68.52		33.00	1.57	1.00	2954.50	2956.57	2956.03	2951.36	2950.78
Coronado Split F	Cor Split Reach	0.762	643.28	350.85	291.81	350.85		57.37	2.17	2.09	2945.00	2951.36	2950.78	2946.24	2946.03
Coronado Split F	Cor Split Reach	0.738	291.81	61.48	229.97	61.48		36.91	1.13	0.88	2941.00	2946.24	2946.03	2941.63	2941.29
Coronado Split F	Cor Split Reach	0.718	229.97	19.90	210.03	19.90		24.24	0.63	0.55	2940.00	2941.63	2941.29	2936.80	2936.43
Coronado Split F	Cor Split Reach	0.700	210.03	44.77	165.05	44.77		53.91	0.83	0.54	2932.70	2936.80	2936.43	2932.34	2932.21
Coronado Split F	Cor Split Reach	0.684	165.05	0.00	165.05	0.00					2940.00	2932.34	2932.21	2927.53	2926.99
Coronado Split F	Cor Split Reach	0.670	165.05	0.00	165.05	0.00					2925.00	2927.53	2926.99	2921.56	2921.27
Coronado Split F	Cor Split Reach	0.652	165.05	0.00	165.05	0.00					2921.80	2921.56	2921.27	2916.84	2916.67
Coronado Split F	Cor Split Reach	0.625	165.05	0.00	165.05	0.00					2917.00	2916.84	2916.67	2909.07	2908.95
Coronado Split F	Cor Split Reach	0.595	165.05	43.70	120.82	43.70		45.00	0.82	0.59	2904.00	2909.07	2908.95	2902.53	2902.38
Coronado Split F	Cor Split Reach	0.571	120.82	0.00	120.82	0.00					2912.00	2902.53	2902.38	2895.78	2895.54
Coronado Split F	Cor Split Reach	0.544	120.82	0.00	120.82	0.00					2895.80	2895.78	2895.54	2887.93	2887.79

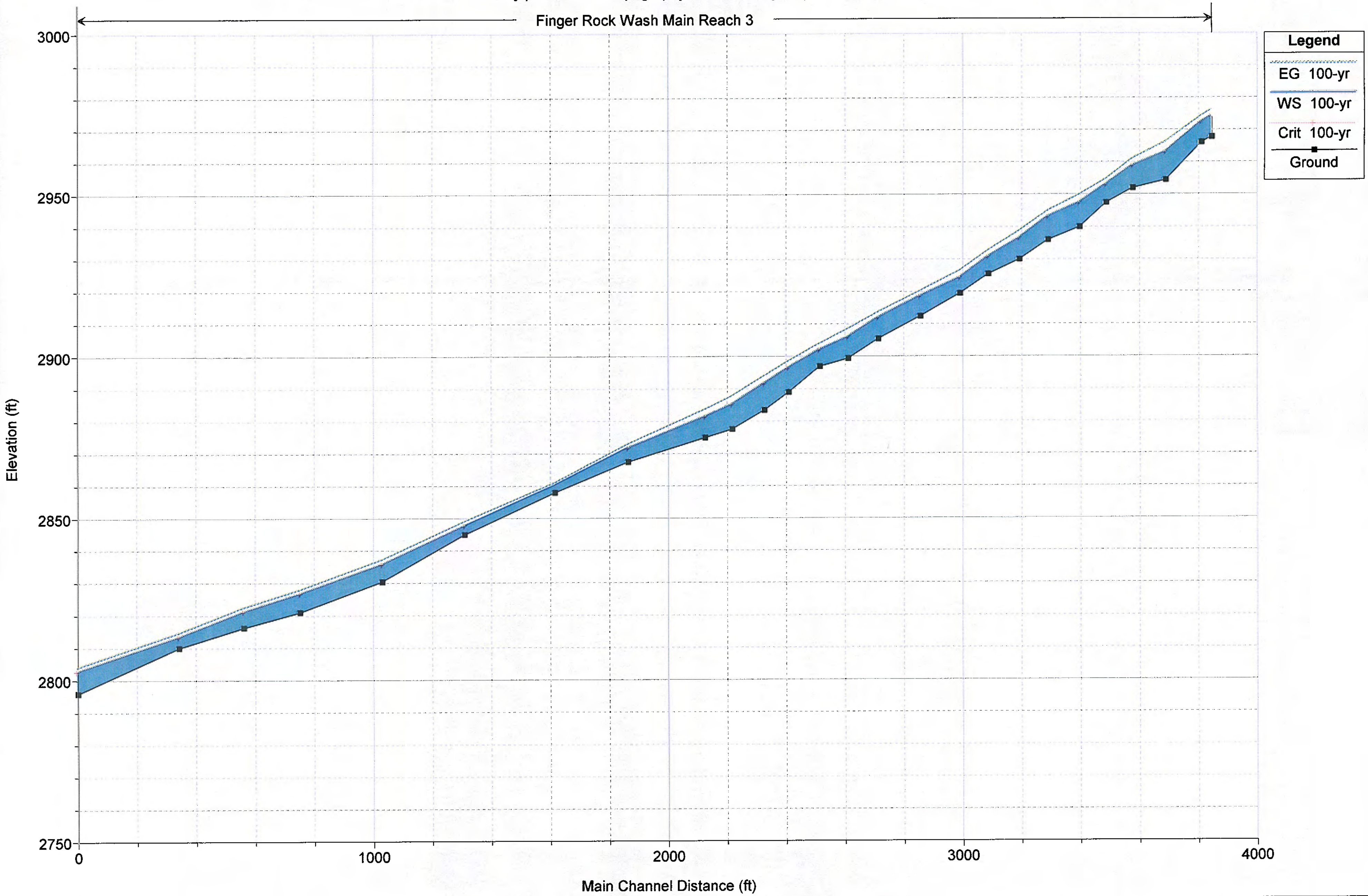


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
Finger Rock Wash Main Reach 1
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Elevation (ft)
3010
3020
3030
3040
3050
3060
3070
3080
3090
Main Channel Distance (ft)
0
200
400
600
800
1000


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
Finger Rock Wash Main Reach 2
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Elevation (ft)
3005
3000
2995
2990
2985
2980
2975
2970
0
100
200
300
400
500
600
Main Channel Distance (ft)

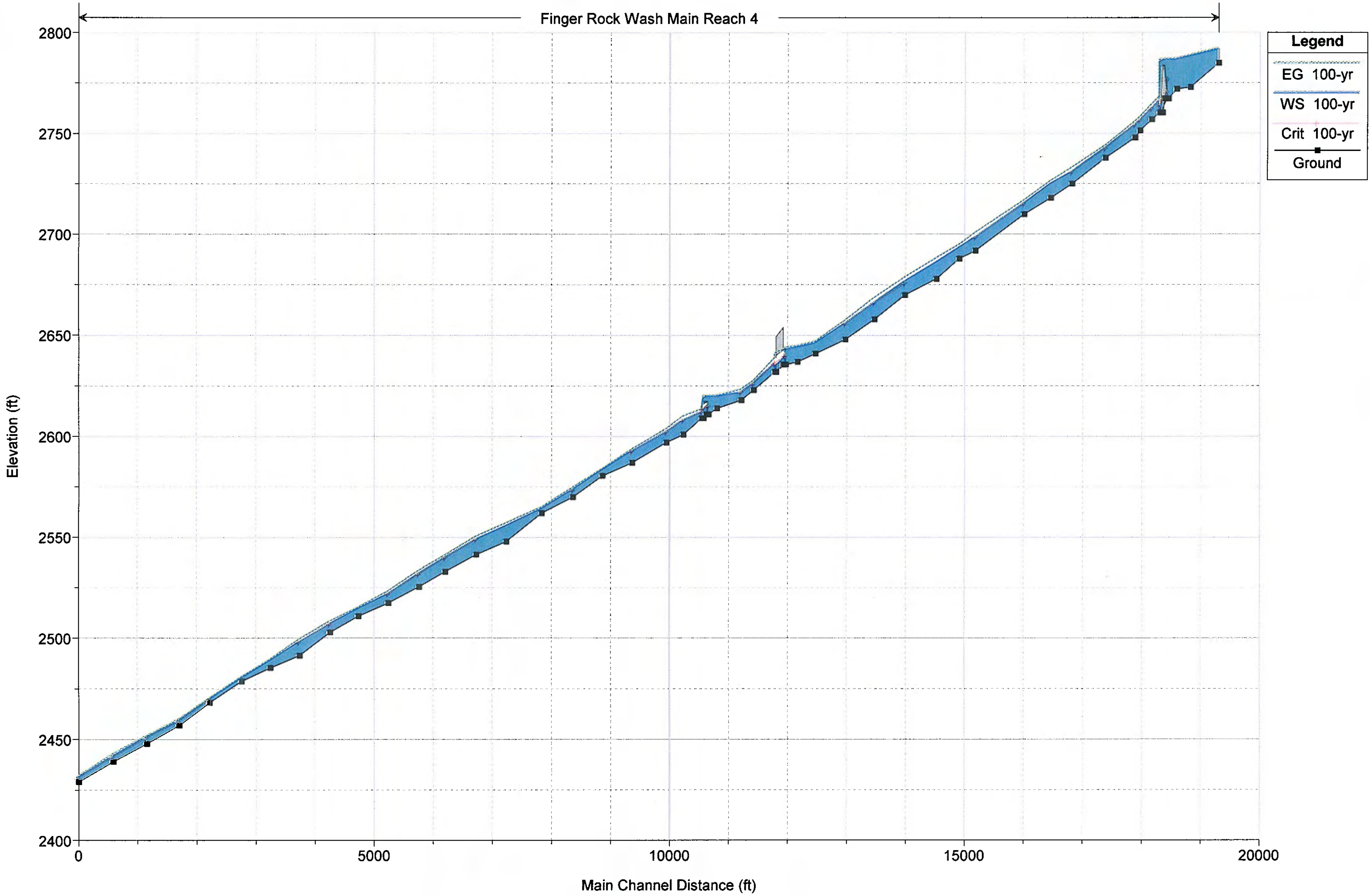
Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM

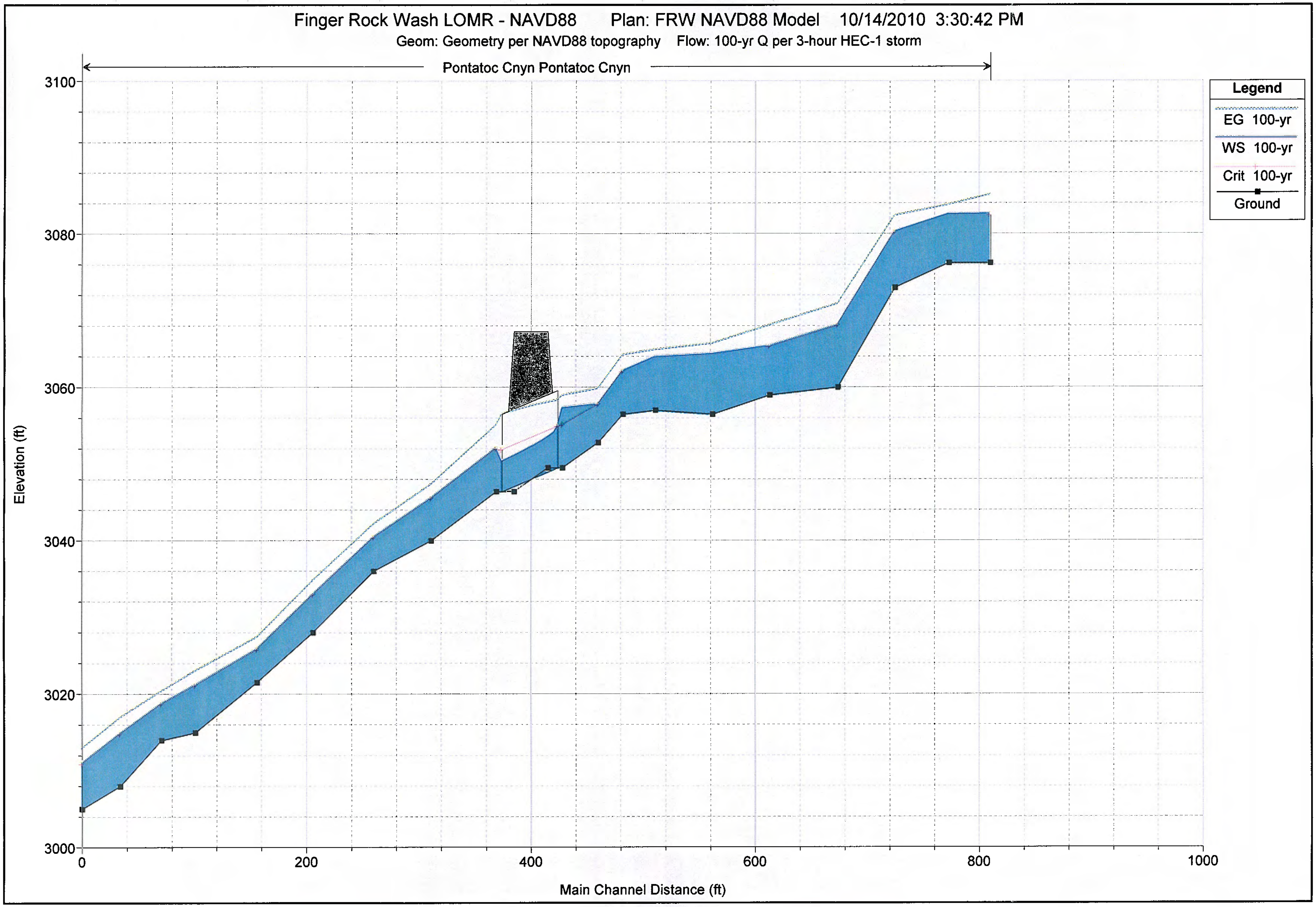
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm

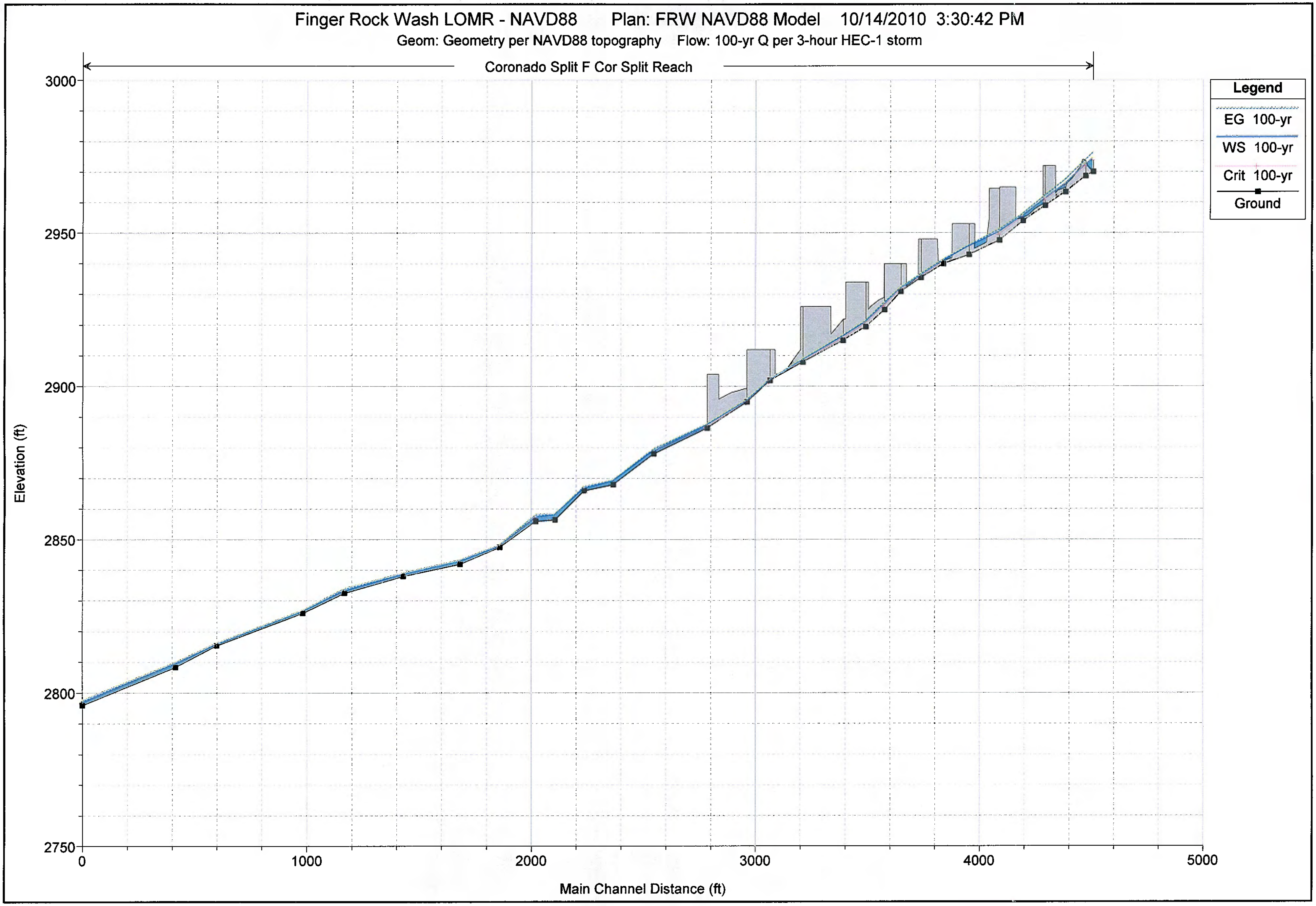


Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM

Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm




Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
Pontatoc Cnyn Pontatoc Cnyn
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Elevation (ft)
3100
3080
3060
3040
3020
3000
0
200
400
600
800
1000
Main Channel Distance (ft)



Finger Rock Wash LOMR - NAVD88 Plan: FRW NAVD88 Model 10/14/2010 3:30:42 PM
Geom: Geometry per NAVD88 topography Flow: 100-yr Q per 3-hour HEC-1 storm
Coronado Split F Cor Split Reach
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Elevation (ft)
3000
2950
2900
2850
2800
2750
0
1000
2000
3000
4000
5000
Main Channel Distance (ft)

E.5 – HEC-RAS MODEL (WITHOUT SKYLINE DRIVE CULVERT) OUTPUT SUMMARY TABLES

FILENAME: FRW88_NoSkylineCulv.prj

PROFILE OUTPUT TABLE - STD TABLE 1

RUN DATE: 10/14/10

HEC-RAS Plan: NoSkylineDr River: Finger Rock Wash Reach: Main Reach 4 Profile: 100 yr

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)	
Main Reach 4	3.656	6162.00	2785.00	2789.97	2789.97	2792.94	0.089624	18.82	554.14	247.88	1.63
Main Reach 4	3.565	6162.00	2773.00	2780.60	2778.75	2781.33	0.010226	9.21	1058.12	226.97	0.60
Main Reach 4	3.521	6162.00	2772.13	2775.39	2775.39	2776.74	0.057329	12.28	698.62	263.38	1.24
Main Reach 4	3.494	6162.00	2767.30	2773.26	2773.26	2774.49	0.003318	9.41	736.18	304.05	0.92
Main Reach 4	3.440	6162.00	2757.00	2762.90	2762.90	2764.78	0.024952	14.14	670.37	201.93	1.09
Main Reach 4	3.403	6060.00	2751.50	2757.16	2757.16	2758.57	0.024196	13.01	769.73	252.33	1.05
Main Reach 4	3.386	6060.00	2748.00	2754.90	2754.90	2756.30	0.022646	13.54	801.11	250.28	1.03
Main Reach 4	3.291	6060.00	2738.00	2743.45	2743.08	2744.56	0.021815	11.66	801.51	226.65	0.97
Main Reach 4	3.185	6060.00	2725.11	2731.59	2731.42	2733.57	0.019059	13.30	644.81	154.02	0.97
Main Reach 4	3.116	6060.00	2718.00	2725.63		2727.00	0.017342	12.25	737.79	166.98	0.90
Main Reach 4	3.031	6060.00	2710.00	2715.92	2715.84	2717.38	0.026725	13.09	720.97	212.85	1.08
Main Reach 4	2.876	6368.00	2692.00	2699.28	2699.28	2701.29	0.015483	12.96	713.72	183.46	0.89
Main Reach 4	2.824	6368.00	2688.00	2694.01		2695.34	0.019195	12.11	777.53	187.75	0.94
Main Reach 4	2.751	6368.00	2678.00	2686.77		2688.75	0.015564	14.49	751.74	175.37	0.91
Main Reach 4	2.649	6368.00	2670.00	2677.35	2676.51	2679.25	0.020015	15.89	651.03	114.41	1.03
Main Reach 4	2.551	6368.00	2658.00	2666.84	2666.84	2669.10	0.018223	15.25	661.88	136.82	0.98
Main Reach 4	2.458	6368.00	2648.00	2656.58	2656.58	2657.89	0.013792	11.16	973.39	498.94	0.82
Main Reach 4	2.362	6368.00	2641.00	2646.91		2647.53	0.011327	9.47	1254.34	493.59	0.73
Main Reach 4	2.305	6368.00	2637.00	2644.91		2645.34	0.005206	7.45	1370.45	349.79	0.51
Main Reach 4	2.268	6368.00	2635.60	2643.76	2640.80	2644.74	0.003675	8.11	801.10	151.89	0.50
Main Reach 4	2.251	Culvert									
Main Reach 4	2.233	6368.00	2632.00	2636.86	2636.86	2639.23	0.018075	12.34	515.91	284.47	1.00
Main Reach 4	2.164	6368.00	2623.00	2626.95	2626.76	2628.09	0.022166	10.51	814.75	456.40	1.05
Main Reach 4	2.125	6114.00	2618.00	2622.59	2622.59	2623.75	0.019644	12.28	867.74	446.80	1.04
Main Reach 4	2.047	6114.00	2614.00	2620.62		2620.82	0.001109	3.77	1865.94	405.49	0.26
Main Reach 4	2.019	6114.00	2611.00	2620.56	2615.79	2620.75	0.000244	4.11	2060.28	446.32	0.24
Main Reach 4	2.008	Culvert									
Main Reach 4	1.997	6114.00	2609.00	2612.89	2612.89	2613.95	0.005355	8.75	780.55	368.43	0.91
Main Reach 4	1.939	6114.00	2601.00	2608.77	2608.77	2610.57	0.016326	13.37	699.29	344.52	0.99
Main Reach 4	1.884	5756.00	2597.00	2602.85	2602.85	2604.20	0.017729	12.62	781.95	274.29	1.01
Main Reach 4	1.774	5756.00	2587.00	2593.37	2593.37	2594.16	0.010678	10.05	1232.96	644.28	0.78
Main Reach 4	1.679	5756.00	2580.50	2584.06		2584.49	0.015976	8.09	1176.24	570.71	0.87
Main Reach 4	1.585	5756.00	2570.00	2574.28	2573.91	2575.12	0.021886	9.96	835.52	316.86	1.03
Main Reach 4	1.485	5756.00	2562.00	2564.81		2565.47	0.015781	7.75	892.76	275.48	0.85
Main Reach 4	1.371	5756.00	2548.00	2556.31		2557.56	0.011317	11.79	948.96	398.27	0.83
Main Reach 4	1.275	5756.00	2541.50	2549.60	2549.60	2550.91	0.015499	12.64	809.22	269.32	0.95
Main Reach 4	1.176	5756.00	2533.00	2540.57	2540.52	2541.55	0.018154	11.46	874.05	340.08	0.98
Main Reach 4	1.092	5756.00	2525.50	2532.56	2532.31	2534.04	0.016461	12.20	676.50	237.52	0.97
Main Reach 4	0.994	5756.00	2517.50	2522.58	2522.58	2523.73	0.023847	12.51	786.36	305.56	1.12
Main Reach 4	0.898	5653.00	2511.00	2515.25		2515.70	0.008874	7.57	1154.30	377.54	0.68
Main Reach 4	0.808	5653.00	2503.00	2507.69	2507.68	2508.92	0.027136	13.94	722.22	264.04	1.21
Main Reach 4	0.710	5653.00	2491.50	2498.81	2498.81	2499.97	0.012457	11.98	899.48	398.77	0.87
Main Reach 4	0.616	5653.00	2485.50	2489.50		2490.15	0.015205	9.62	986.03	417.24	0.89
Main Reach 4	0.523	5653.00	2478.85	2480.94		2481.53	0.018873	6.87	949.18	407.69	0.89
Main Reach 4	0.421	5589.00	2468.32	2470.42	2470.12	2470.91	0.020335	7.40	1075.83	616.02	0.93
Main Reach 4	0.322	5589.00	2457.00	2459.98	2459.56	2460.46	0.019551	8.45	1067.33	596.89	0.95
Main Reach 4	0.219	5589.00	2448.00	2451.95	2451.34	2452.42	0.011853	7.41	1135.27	498.49	0.76
Main Reach 4	0.111	5589.00	2439.00	2442.47	2441.95	2443.43	0.031031	12.00	831.72	437.80	1.23
Main Reach 4	0.000	5589.00	2429.00	2431.95	2431.50	2432.35	0.014999	7.42	1203.82	631.01	0.83

APPENDIX F

EXHIBIT MAPS

APPENDIX G

ELECTRONIC FILES ON DVD

HEC-1 Model –
- **Filename: 27028-FR100yrHEC-1_2008.02.18.dat**

HEC-RAS Model (with Skyline Dr culvert) –
- **Filenames:**
  - **FRW88.F01**
  - **FRW88.G01**
  - **FRW88.O01**
  - **FRW88.P01**
  - **FRW88.prj**

HEC-RAS Model (without Skyline Dr culvert) –
- **Filenames:**
  - **FRW88_NoSkylineCulv.F01**
  - **FRW88_NoSkylineCulv.G01**
  - **FRW88_NoSkylineCulv.O01**
  - **FRW88_NoSkylineCulv.P01**
  - **FRW88_NoSkylineCulv.prj**

TDN Report text plus Appendices A – E (pdf format)

Appendix F Exhibit Maps (pdf format)
- **Figure 1 – Location Map**
- **Figure 2 – Watershed Map**
- **Figure 3 – Hydrologic Soils Group Map**
- **Figure 4 – Hydraulic Work Maps**
- **Figure 5 – Annotated Flood Insurance Rate Maps (FIRMs)**
- **Preliminary Flood Profiles from RAS-PLOT (on NGVD29 datum)**

Shapefiles of Proposed Floodplain Mapping Revisions (ArcView shapefile format)