SALT RIVER HYDROLOGIC HYDRAULIC, AND SEDIMENT TRANSPORT ANALYSES

RED MOUNTAIN FREEWAY (PHASE II)

RED MOUNTAIN TRAFFIC INTERCHANGE TO McKELLIPS ROAD CONNECTION

Prepared for:

ARIZONA DEPARTMENT OF TRANSPORTATION

January, 1996

Prepared by:

WOOD, PATEL & ASSOCIATES, INC.

WPA #93080

Registered Professional Engineer
CERTIFICATE NO.
23170
JEFFREY J.
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(Civil)
Date Signed 1/22/96
ARIZONA, U.S.A.

January 21, 1998

CHANNEL DESIGN CRITERIA FOR MAJOR WATERCOURSES*

1. All geotechnical test results shall be provided for District review. Gradation data shall be obtained that is representative of the full depth of the moveable bed. The District's rule of thumb for bore hole/test pit intervals is a minimum of one per 500 feet. If an armoring analysis is to be presented for review, gradation test results for the channel bed samples shall include the percentages of the 3-inch plus material encountered.

2. The geotechnical exploration shall determine if landfill or hazardous material deposits are present within the channel alignment, and if so, their impacts on channel design and costs.

3. If existing gravel pits are to be filled, gradation specs shall be required for the material that is to be placed in the moveable bed zone.

4. Levees shall be designed to conform to FEMA freeboard criteria, 100-year frequency peak flow with three (3) feet of freeboard plus one (1) additional feet at bridges. In non-levee conditions a minimum of one (1) feet of freeboard shall be provided.

5. HEC-II or HEC-RAS shall be used to perform water surface profile calculations, unless the District agrees to another method. A hard copy and floppy disk with input and output files shall be submitted for District review.

6. The location of cross sections used in the water surface profile calculations shall be provided on a scaled map.

7. The final plans shall include profiles showing the top of levee protection, HGL, invert, and the low chords for all bridges.

8. Tributary (side) drainage to the channel shall be addressed such that the more severe of the following conditions govern: 1) 100-year frequency peak in the main channel with 10-year frequency peak tributary drainage or 2) 10-year frequency peak in the main channel with the 100-year frequency peak tributary drainage.

9. Consideration shall be given to the upstream and downstream river and floodplain conditions and how those conditions may impact the proposed channel. Existing and potential material extraction and landfill operations shall be addressed in this context. Overbank flooding upstream of the channelization shall be analyzed to ensure that those flows enter and are contained within the improved channel. The design and analysis shall address the potential impacts of known future modifications that may be proposed by others.

10. Maintenance access and channel invert access ramps shall be incorporated into the design.

11. The scour analysis shall be performed using an analytical approach based on the velocity associated with the 100-year frequency peak flow, the depth of the thalweg, and the soil gradation of the channel bed materials.

12. Degradation and aggradation analyses shall include factors for dunes and antidunes.

13. The depth of scour, measured from the low-flow thalweg invert elevation, shall be used to determine the toe-down elevations for bank protection based on the 100-year frequency peak flow.

14. Local scour calculations shall be provided for review. These calculations are to be tabulated at all critical design locations and presented with a map showing the locations.

15. Levee slope stability and embankment settlement analyses shall be submitted for District review. The analyses shall consider pore pressure caused by rapid draw down. The loading conditions for stability analysis and their appropriate safety factors shall be those in US Army Corps of Engineers EM-1110-2-1913, Table 6.1. Seepage analysis shall be performed for levees without soil cement lining in which the uplift pressure at the toe of the embankment at the land side shall be determined, and seepage exit gradients checked for piping potential"

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* Design Criteria to be used for Flood Control District of Maricopa County designed, funded or maintained projects.

16. Provide calculations to show that the type of bank protection (riprap, gabions, etc...) is suitably sized to resist hydraulic forces at the design frequency peak flow.

17. All hydraulics and structural calculations performed to substantiate the design of slope or channel stabilization shall be provided for District review.

18. A person at least as competent as the designer shall independently check all calculations before submitting them to the District. Both the designer and checker shall initial and date each page of calculations that is submitted.

19. Minimum factors of safety for scour and forces on structures shall be 1.5 based on the 100-year frequency peak flow.

20. Permissible velocity method of natural channel design will only be used for preliminary design purposes. Tractive shear stress approach shall be used in a more detailed design to confirm the stability of the unlined channel.

ANALYTICAL APPROACH FOR DETERMINING REQUIRED TOE DEPTHS FOR BANK PROTECTION

The following analytical approach shall be utilized for determining required toe depths for bank protection:

1. Contraction Scour (includes General Scour), in the vicinity of bridge crossings and river sections that have been constricted due to landfill or any other type of encroachment shall be computed by methods described in Federal Highway Administration, FHWA, Hydraulic Engineering Circular Nos. 18 and 20, and other publications deemed appropriate for the 100-year frequency flow. General scour for unconstricted reaches is to be quantified by computer models for flows representing a hydrological history, as described in Item 3 below, and shall be supplemented with hand calculations.

2. Bed-form scour, due to the passage of dunes or antidunes, shall be computed from analytical relationships developed by investigators such as Yalin and Kennedy, as described in textbooks on sediment transport technology. The maximum hydraulic parameters associated with the passage of a 100-year frequency peak shall be used to establish the quantitative values for this scour component.

3. Long-term Aggradation/Degradation shall be computed by using the concept of equilibrium slope or the concept of streambed armoring, depending on which approach controls the long-term channel profile. The equilibrium slope concept shall utilize a sediment transport relationship, which incorporates the D_{50} and gradation of the streambed sediment. The streambed-armoring concept shall utilize the critical tractive shear stress approach and the representative (armor) particle size. A series of flood frequency hydrographs from 10 to 100-year shall be used to represent the hydrologic history that the structure may experience in its life as a basis for determining these long-term trends. The "dominant" discharge shall generally be assumed to be the 10-year frequency discharge.

   If a sediment analysis is required, the analysis shall consider the sediment load entering the study reach. If computer software is used to analyze the sediment transport a hard copy and floppy disk with input and output files shall be submitted for District review.

4. The scour due to river bend shall be considered and added to the required bank toe depth calculation.

5. The scour due to any local obstruction (bridge pier, etc.) shall be considered and added to the required bank toe depth calculation.

SALT RIVER BANK PROTECTION
Pima Freeway to Alma School Road
SRPMIC PROJECT NO. 97E060

CEMENT STABILIZED ALLUVIUM EMBANKMENT DESIGN

KICK-OFF MEETING
AGENDA

I. INTRODUCTIONS

II. DATA NEEDS:
- Topographic Mapping in AutoCadd format ✓
- Existing Reports ✓
- Temporary earth levee plans/as-builts ✓
- FCDMC Channel Design Criteria for Major Watercourses ✓

III. SCOPE OF WORK:
- Field Surveys ✓
- Geotechnical Investigation
- Embankment Design/Hydraulic Analysis ✓ Establish TOB, TOE Profiles & F.G. Elev.
- Design Concept Report ✓
- Construction Plans & Specifications ✓ Scale 40 or 50

IV. SCHEDULE:

Notice to Proceed	February 2, 1998
Design Concept Report	April 3, 1998
40% Plans	May 29, 1998
90% Plans	July 24, 1998
Final Plans & Specs	August 21, 1998

* Temporary levees -> 60K cfs assume to fail at higher Q's.
Modeling will assume their non-existence
* HEC-2 & HEC-6 will modify the S. Bank models. Use the one that Kim-Horn developed with the ultimate design invert incorporated
* Levee Height - Use Pre Roosevelt? S. Bank is based on Pre-Roosevelt 100 yr. (220,000 cfs).

TABLE OF CONTENTS

1.0 GENERAL DISCUSSION 1

2.0. HYDROLOGY 1

3.0. HYDRAULICS 3
- 3.1 Data Collection 3
  - 3.1.1 Topography 3
  - 3.1.2 Bridge/Drop Structure As-Built Data 3
  - 3.1.3 HEC-2 Data 8
  - 3.1.4 Geotechnical Data 8
- 3.2 Hydraulic Modeling Parameters & Criteria 9
  - 3.2.1 Assumptions 9
  - 3.2.2 Effective Flow Areas 10
  - 3.2.3 Flow Continuity 11
  - 3.2.4 MCDOT Drop Structures 12
  - 3.2.5 Split Flow Analysis 12
  - 3.2.6 SLA Design & HEC-2 modeling of Channelization 14
- 3.3 Existing and Design Condition HEC-2 Models 14
  - 3.3.1 "Existing Condition" HEC-2 Model 14
  - 3.3.2 SLA/WPA Design Condition 1 HEC-2 Model 15
  - 3.3.3 SLA/WPA Design Condition 2 HEC-2 Model 15
  - 3.3.4 Comparison of Existing and Design WSEL's 15
  - 3.3.5 Recent Changes in Hardbank Alignment 16
- 3.4 FEMA Letter of Map Revision (LOMR) for Salt River 18

4.0 SEDIMENT TRANSPORT 19
- 4.1 Sediment Transport Analysis 19
- 4.2 Design Criteria 20
- 4.3 South Bank Protection Geometry 21
- 4.4 Recommended Design Dimensions 21

5.0 COORDINATION WITH LOCAL AGENCIES 30

6.0 COMPUTER FILE DESCRIPTIONS 32

7.0 REFERENCES 34

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Figures

Figure 1 - Vicinity Map 2
Figure 2 - MCDOT Drop Structure @ Alma School Road 13
Figure 3 - Bank Protection Geometry 24

Tables

Table 1 - Comparison of Existing and Design WSEL's 17
Table 2 - Recommended Toe-Down Elevations 23
Table 3 - Red Mountain Bank Protection Offsets 25-29

Plates

Plates 1-4 (MBE Plates 37-40) 4-7
HEC-2 Cross Section Locations

Appendices

Appendix A - Sediment Transport Analysis
Appendix B - HEC-2/HEC-6 Analysis
Appendix C - Bank Protection Design Criteria - Documentation

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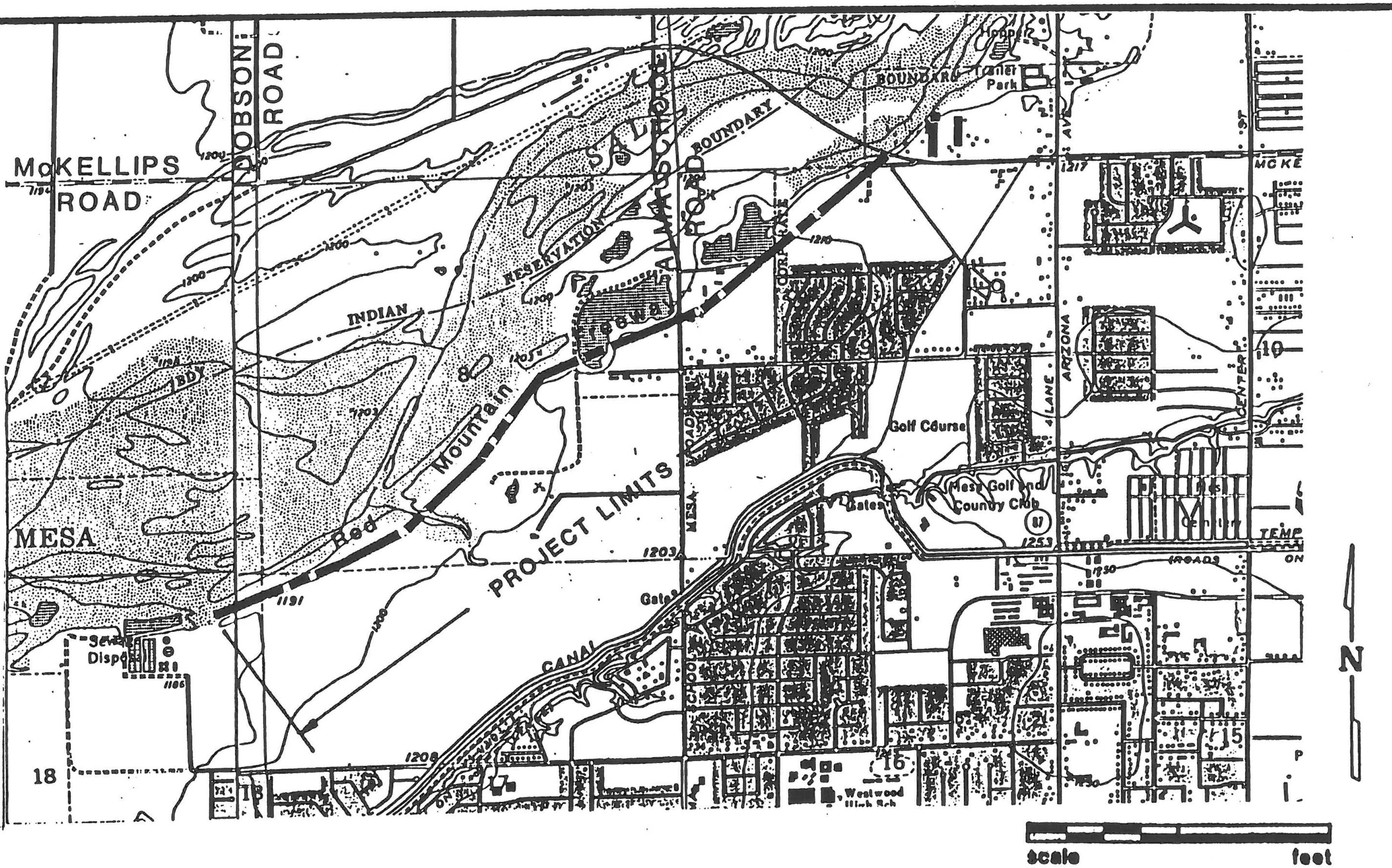
1.0 GENERAL DISCUSSION

The purpose of this report is to document the engineering assumptions and methodologies utilized in the hydrologic, hydraulic and sediment transport analyses of the Salt River. The results of these analyses were used to design the geometric layout and toe-down depths of the bank protection along the south bank of the Salt River. In addition, the analyses were used to evaluate the impact of the Red Mountain Freeway and it's associated bank protection on the 100-year water surface elevation of the Salt River. Both existing and design condition HEC-2 hydraulic models were prepared for the subject reach of the Salt River using the pre-Roosevelt 100-year flow (220,000 cfs) as the design discharge. A location map showing the project limits is included as Figure 1.

2.0. HYDROLOGY

The hydrologic data for this analysis was obtained from the Flood Control District of Maricopa County (FCDMC) (the original sources were FEMA and the Army Corps of Engineers). The existing condition (pre-Roosevelt) 100-year design flow obtained from the FEMA analysis of the Salt River (Flood Insurance Study - Maricopa County and Incorporated Areas, Revised December 3, 1993) was 220,000 cfs. The renovation of Roosevelt Dam is expected to significantly reduce the expected 100-year peak flow in the Salt River. The Army Corps of Engineers is currently performing a reservoir analysis of the entire Salt/Verde River system to determine the future condition (post-Roosevelt) 100-year design flow. The preliminary post-Roosevelt 100-year peak discharge value for the project area is 160,000 cfs. Because the CoE analyses was not finalized prior to the notice to proceed of the Red Mountain Freeway; the pre-Roosevelt flow of 220,000 cfs was used for the analysis.



WOOD/PATEL ASSOCIATES Civil Engineers Hydrologists Land Surveyors (602) 234-1344	Scale NTS Date 9/21/95 Job # 93080	Design RH Drawn JB Chk. JH	RED MOUNTAIN FREEWAY LOCATION MAP	FIGURE 1

3.0. HYDRAULICS

3.1 Data Collection

3.1.1 Topography

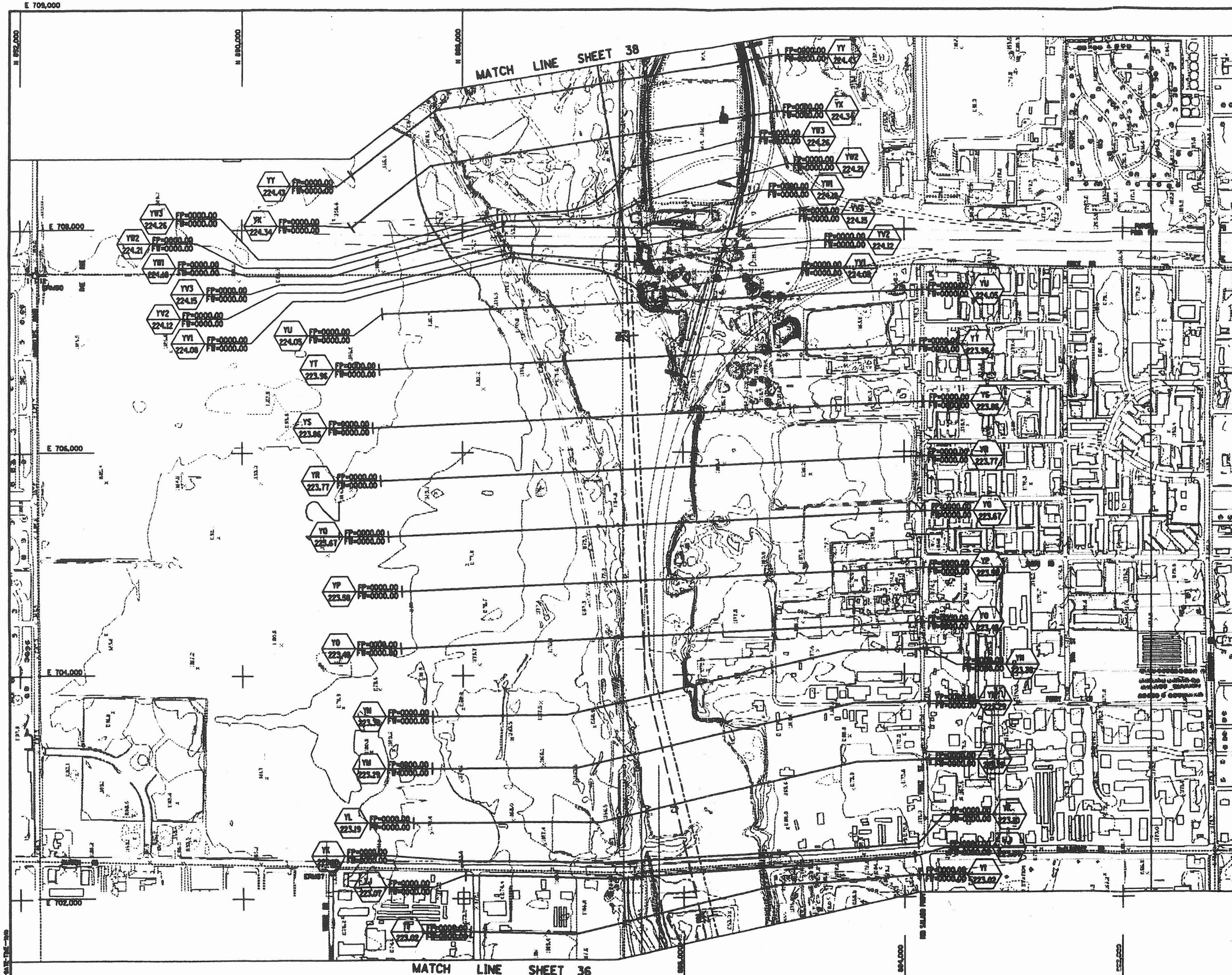
The topographic information used in this analysis was provided by Michael Baker Jr. Engineers, Inc. (MBE) and the FCDMC. The mapping was prepared at a scale of 1" = 400' with 4' contour intervals. The topographic mapping for this model was based on aerial photographs and survey data collected by McClain, Harbors Co., Inc.; Baker Engineers; Jaykim Engineers; and Greiner Engineers. The flight dates for the aerial photographs are December 13, 1991, January 13, 1992, January 23, 1992, and February 2, 1993, respectively.

The topography does not appear to reflect any changes in the channel (i.e. degradation, head cutting, etc.) which may have occurred due to the January/February 1993 flooding. In addition, flows in the river may have prevented accurate mapping of the invert. Specifically, the average daily flow recorded on February 2, 1993 was approximately 11,000 cfs.

The MBE mapping and cross section locations for the subject reach are included as Plates 1 thru 4 (MBE sheets 37 thru 40). These plates also depict the Red Mountain freeway alignment and hardbank locations.

3.1.2 Bridge/Drop Structure As-Built Data

The Maricopa County Department of Transportation recently constructed drop structures at both the north and south Alma School Road bridges. Due to their recent construction, these drop structures were not included in the MBE HEC-2 hydraulic model. To accurately model the hydraulics of the Salt River through this reach it was necessary to include the drop structures in the analyses. Geometric data for the Alma School Road Bridges was obtained from the City of Mesa. Drop structure as-builts were obtained from the Maricopa Department of Transportation (MCDOT).



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF SALT - GILA RIVERS

F.C.D. CONTRACT NO. 90-59 & 92-01

LEGEND

- 100-YR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE WITH RIVER MILE — RM 12.0, RM 13.0
- STATION 200+00
- CROSS SECTION
- ELEVATION REFERENCE MARK — ERM3 X
- BASE FLOOD ELEVATIONS — 1221
- ZONE DESIGNATIONS — ZONE AE
- CORPORATE LIMITS — Corporate Limits
- BENCH MARK LOCATION — BM 144
- APPROXIMATE SECTION CORNER — 20 21 29 28
- MAIN CHANNEL LIMITS

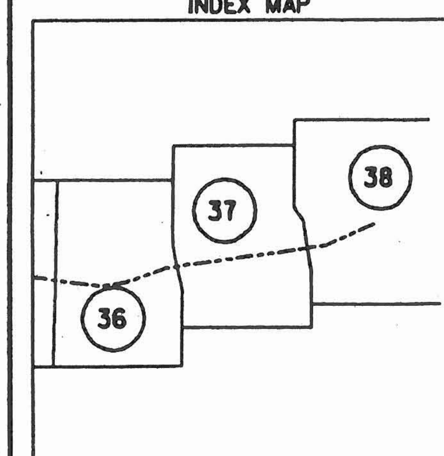
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1983

I.D. #	ELEV (FT)	DESCRIPTION/LOCATION
87	1180.62	A BC in a HH in the intersection of Hayden Rd. and Weber Rd. This point is the E quarter corner of Sec. 11, T 1 N, R 4 E of the G&SRB&M, Maricopa County, Arizona.
90	1190.35	A BC in a HH in the intersection of McKellips Rd. and Pima Rd. This point is the SW corner of Sec. 6, T 1 N, R 5 E of the G&SRB&M, Maricopa County, Arizona.

PRELIMINARY FOR INTERNAL USE ONLY

INDEX MAP



SCALE: 1" = 400'
CONTOUR INTERVAL = 4 FEET

MICHAEL BAKER JR INC.

	BY	DATE
DESIGN	RLB	-
DESIGN CHK.	TEK	-
PLANS	SSO	-
PLANS CHK.	RLB/TEK	-

SUBMITTED BY: DATE

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 37 OF 46

REV. DEC. 18, 1995

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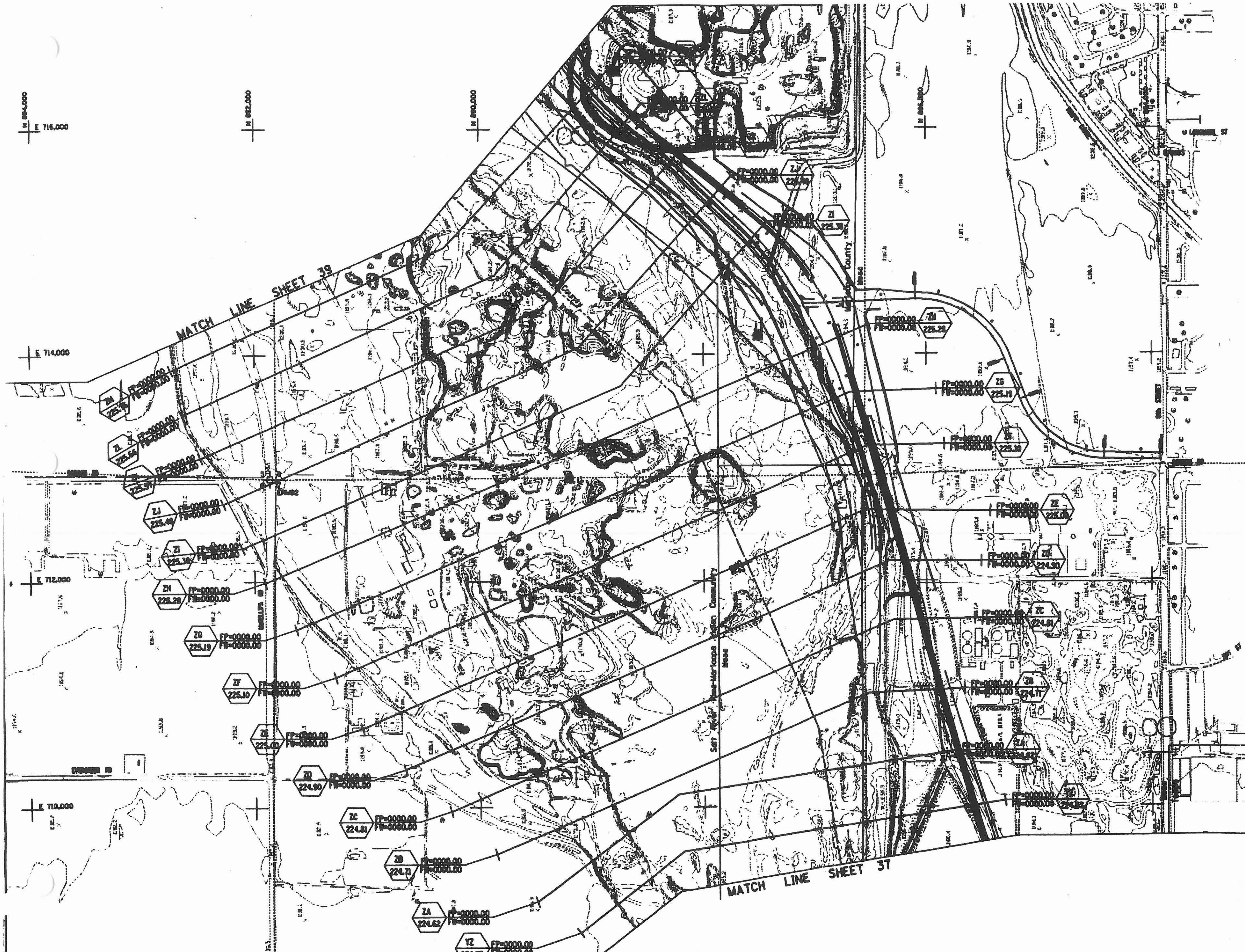

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	RM 12.0 RM 13.0
STATION 200+00	
CROSS SECTION	
ELEVATION REFERENCE MARK	ERM3 X
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
BENCH MARK LOCATION	BM 144 ▲
APPROXIMATE SECTION CORNER	20 21 29 28
MAIN CHANNEL LIMITS	

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1983

I.D. #	ELEV (FT)	DESCRIPTION/LOCATION
92	1196.26	A BC in a HH in the intersection of McKellips Rd. and Gobson Rd. This point is the NE corner of Sec. 7, T 1 N, R 5 E of the G&SRB&M, Maricopa County, Arizona.
93	1214.57	A BC in a HH at the centerline intersection of 8th St. and Longmore St. This point is approximately 100 feet E of the center of Sec. 17, T 1 N, R 5 E of the G&SRB&M, Maricopa County, Arizona.

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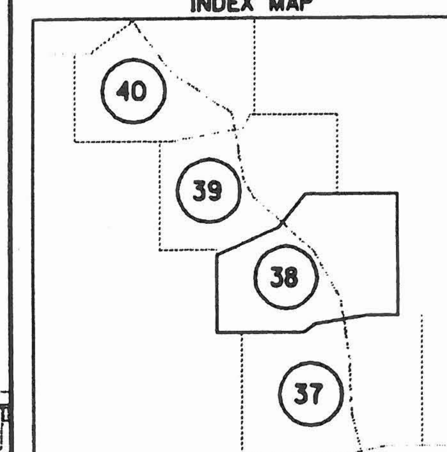

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SCALE: 1"= 400'

CONTOUR INTERVAL = 4 FEET

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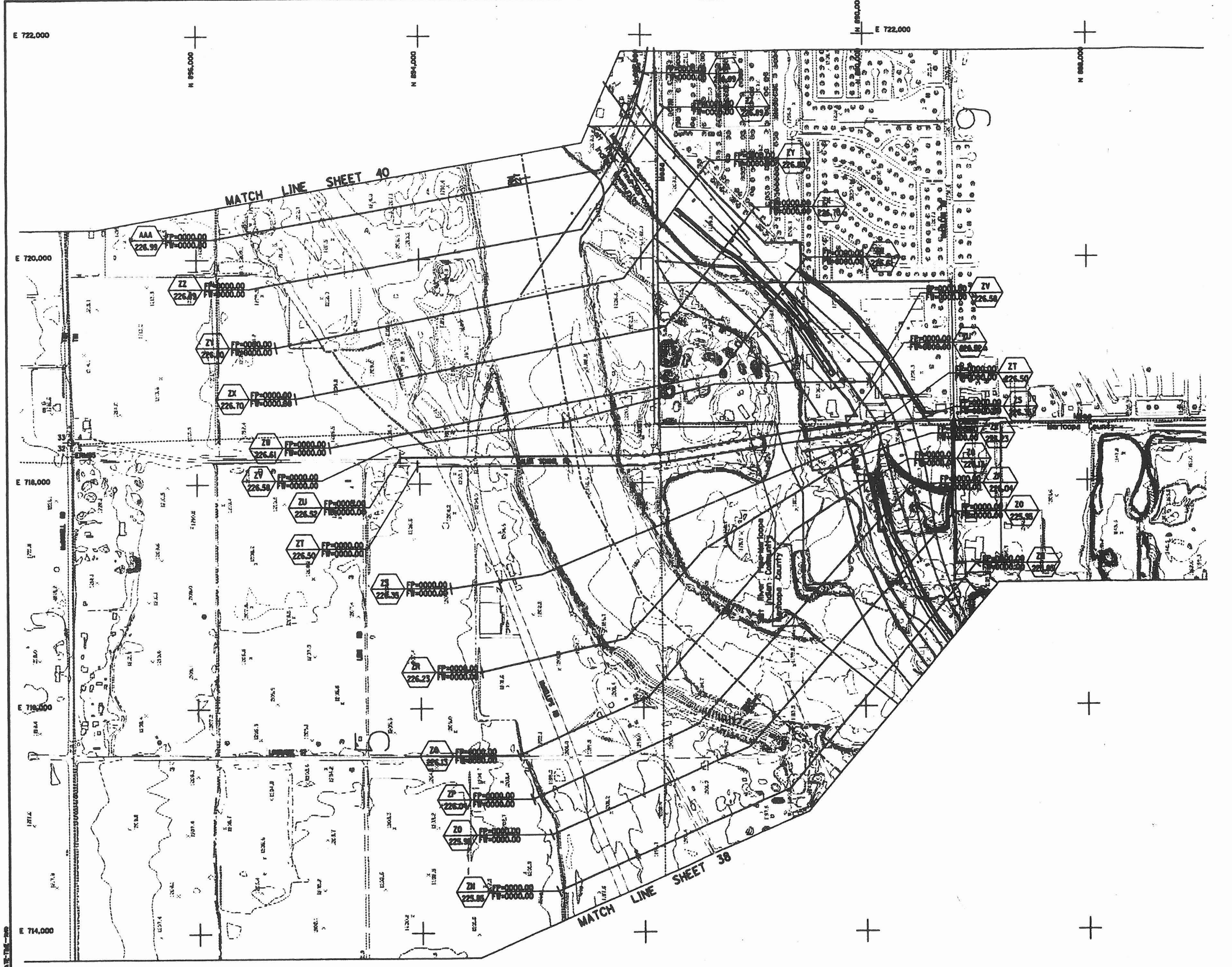

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I.D. #	ELEV (FT)	DESCRIPTION/LOCATION
94	1204.35	A BC in a HH in the intersection of McLellan Rd. and Alma School Rd. This point is the one quarter corner between Sec. 8 and 9 of T 1 N, R 5 E of the G&SRB&M Maricopa County, Arizona.
95	1218.72	A BC in a HH in the intersection of Alma School Rd. and McDowell Rd. This point is the SE corner of Sec. 32, T 2 N, R 5 E of the G&SRB&M, Maricopa County, Arizona.

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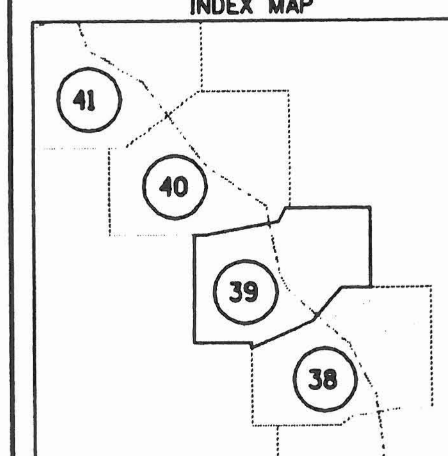

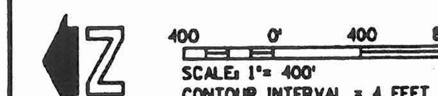

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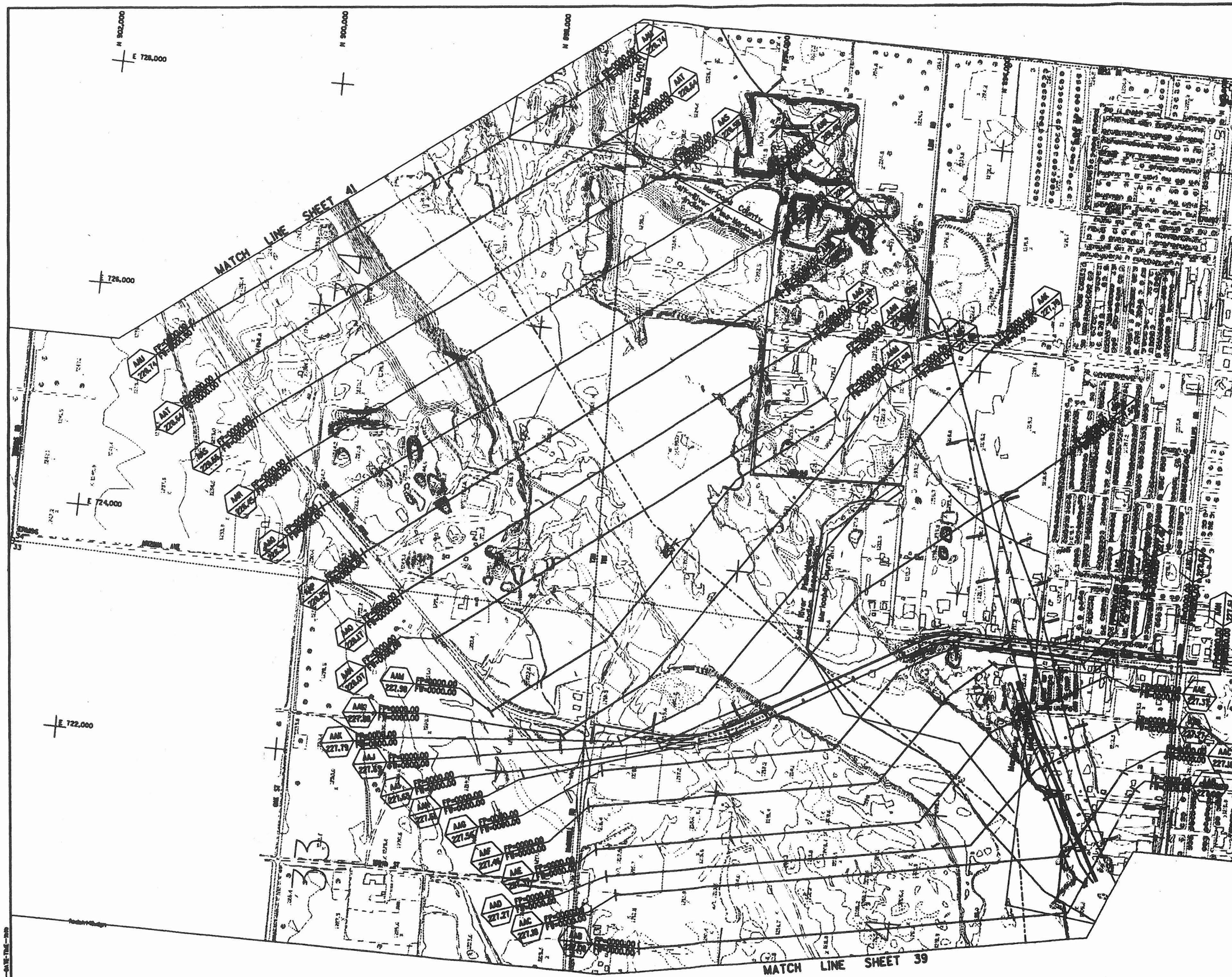

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF SALT - GILA RIVERS

F.C.D. CONTRACT NO. 90-59 & 92-01

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	RM 12.0 — RM 13.0
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ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1983

I.D. #	ELEV (FT)	DESCRIPTION/LOCATION
96	1244.20	A BC in a HH in the intersection of Thomas Rd. and Arizona Ave. This point is the NE corner of Sec. 33, T 2 N, R 5 E of the G&SRB&M, Maricopa County, Arizona.
97	1219.19	A BC in a HH in the intersection of Center St. and McKellips Rd. This point is the N quarter corner of Sec. 10, T 1 N, R 5 E of the G&SRB&M, Maricopa County, Arizona.
98	1224.71	A BC in a HH in the intersection of Mesa Dr. and McKellips Rd. This point is the NE corner of Sec. 10, T 1 N, R 5 E of the G&SRB&M, Maricopa County, Arizona.

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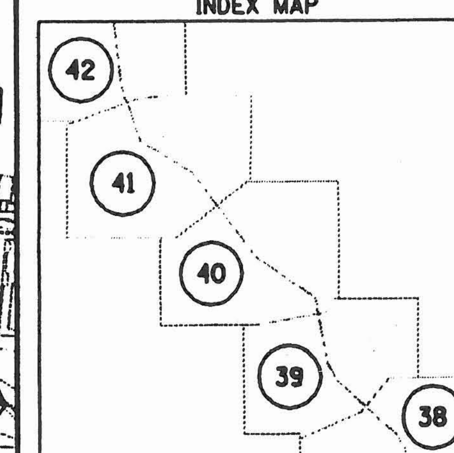

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SCALE: 1" = 400'

CONTOUR INTERVAL = 4 FEET

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AERIAL MAPPING COMPANY, MCLAUGHLIN CO. INC. BAKER ENGINEERS, SURVEYING COMPANY, JAYCOR ENGINEERS & GREINER ENGINEERS. FLIGHT DATES 13 DEC. 1991 ; 13 JAN. 1992 ; 23 JAN. 1992

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3.1.3 HEC-2 Data

The FCDMC retained MBE to update the floodplain/floodway delineations for the Salt River from Gillespie Dam to Roosevelt Dam. The FCDMC has indicated that the project has been suspended until the U.S. Army Corps of Engineers' hydrologic analyses of the Salt/Verde River system (Roosevelt renovation) has been finalized. Approved HEC-2 models were not available for the analyses. However, the FCDMC and MBE provided the project team with topographic mapping and a preliminary HEC-2 computer model for the project area. The preliminary HEC-2 model had been reviewed by FCDMC personnel on at least one occasion. This was used as the base model for both the existing and design condition models developed by Wood/Patel (WPA) and Simons, Li (SLA).

Wood/Patel reviewed the HEC-2 model and found some discrepancies in the channel geometry near Alma School Road between the 2/2/93 topographic mapping from MBE and the April/May 1994 topographic mapping from ADOT. This may be the result of a headcut from a gravel pit located west (downstream) of the Alma School Road north bridge. Also, MCDOT constructed drop structures under both the north and south Alma School Road bridges to mitigate future lowering of the channel invert. The HEC-2 model was revised to account for the impact of these drop structures (hardpoints). Modifications were made to the effective flow areas, bank stations, and cross section alignments. The majority of these changes were due to the increase between the post-Roosevelt and pre-Roosevelt 100-year discharges (160,000 cfs to 220,000 cfs). The MBE model assumed a post-Roosevelt discharge and the ADOT facilities were designed for the pre-Roosevelt discharge. A comparison of the existing condition and design condition water surface elevations in the HEC-2 models is required to ensure that the 100-year Salt River WSEL is not increased by more than one foot due to the construction of the Red Mountain Freeway.

The original HEC-2 model, as received from the FCDMC and Michael Baker Engineers, is included in Appendix B and on 3½" floppy disk along with the Wood/Patel modified HEC-2 models.

3.1.4 Geotechnical Data

Geotechnical data for the sediment transport analyses were obtained from SLA's report entitled "Hydraulic and Sediment Transport Analysis Report, Salt River Bank Protection Design, South Bank Upstream of Pima Freeway Bank Sta. 33+00 to 73+00". A characteristic sediment size distribution was developed from 25 samples collected within the Salt River. The available data indicate that the median grain size (D_{50}) of the local bed material is about 15 mm (medium gravel), and approximately 25% of the material is of cobble classification (D>64mm). The D_{90} of the characteristic size distribution is approximately 165 mm.

AGRA Earth and Environmental prepared a report entitled "Geotechnical Investigation Report Southbank Protection, Red Mountain Freeway - Phase II, Dobson Road to McKellips Road " for use in the sediment transport analyses. Unfortunately, the report was not completed in time for use in this study. Results of AGRA's geotechnical report will be reviewed to determine if modifications to the HEC-6 models are required. A preliminary review of the data indicates that the AGRA sediment size distribution is similar to the SLA sediment size distribution, and that modifications to the HEC-6 models will not be required.

3.2 Hydraulic Modeling Parameters & Criteria

3.2.1 Assumptions

The following assumptions were utilized in the hydraulic modeling;

a) The existing and design condition HEC-2 models were merged with the downstream SLA design condition model to insure uniform starting conditions.

b) The "Existing Condition" and "Design Condition 1" models did not include channelization improvements for the north bank of the Salt River through the Indian Reservation. These improvements were modeled in the "Design Condition 2" model;

c) Both the existing and design condition models utilized FCDMC/MBE topographic mapping with modifications made by SLA to the channel invert elevations;

d) Horizontal and vertical effective flow boundaries were determined by site visits and review of available mapping (area heavily mined);

e) The existing 100-year discharge of 220,000 was used. The Corps of Engineers have not completed their analysis of the improvements to Roosevelt Dam so the predicted future 100-year discharge of 160,000 cfs was not used.

f) MBE/FCDMC did not account for flow which was in the Salt River at the time the aerial photography was taken.

During the photography taken on February 2, 1993, and subsequently used to develop portions of the topography, the USGS recorded an average flow in the Salt River at the Alma School Road north bridge of 11,000 cfs. For the days preceding and following the flight date, the USGS recorded approximately the same flow at this location. Therefore, the results obtained from hydraulic analysis may yield slightly higher, and thus more conservative, water surface elevations.

g) Manning's "n" values from both the SLA modified HEC-2 analysis (Downstream of Alma School Road) and the MBE/FCDMC HEC-2 analysis (upstream of Alma School Road) were used in the analyses.

h) The Alma School Road drop structures (under both the north and south bridge structures) were not included in the MBE topography and were not modeled in the HEC-2 files received from MBE/FCDMC.

3.2.2 Effective Flow Areas

Depending upon site specific conditions, not all of the area of a river cross-section may effectively carry water. The contraction and expansion of flow through bridge and other natural floodplain constrictions must be recognized in order to eliminate non-effective flow areas from the river cross-sections.

Based on engineering judgement and HEC-2 modeling guidelines which recommend a 1:1 contraction and 4:1 expansion ratio, effective flow boundaries were sketched onto the topographic maps of the study area. In addition to the allowable effective flow pattern associated with contacting and expanding flow, these boundaries were also used to eliminate non-effective flow areas on the inside of sharp channel bends.

Since the subject reach of the Salt River has been subjected to significant sand and gravel mining, vertical encroachments were required at some locations to eliminate pits and other localized depressions from the effective flow area of the model. These encroachments were either "hard coded" (requiring modification of the cross-section (GR) data or an artificial sediment deposition elevation can be added to the model.

3.2.3 Flow Continuity

One-dimensional models such as HEC-2 have no capability to ensure flow continuity within the subdivisions of adjacent river cross-sections, e.g., the model will simply fill the cross-section on the basis of available calculated conveyance. This limitation often leads to significant transfers of water between the overbanks and channel of adjacent cross-sections. Quite often, there is no physical basis for justifying these transfers. In such cases it is prudent to manipulate the model parameters to "force" more realistic flow continuity from one cross-section to the next.

A review of the HEC-2 output data for both the existing and design condition reveals flow discontinuities of varying magnitude. The majority of these discontinuities can be largely attributed to differences in channel and overbank widths between adjacent cross-sections. Some of the water transfers can be further justified by visualizing the flow pattern that might occur between the channel and overbank of adjacent cross-sections, e.g., a channel bend might easily cause more water to appear in the outer overbank area of a downstream cross-section.

For those locations where flow discontinuities seemed excessive, adjustments were made in the model to force a more reasonable transfer of flow through the system. These adjustments were primarily in the form of "n" value modifications to force more water to or from an overbank or channel.

The adjustment of model parameters to achieve more realistic flow continuity is certainly subjective and dependent upon engineering judgement. Although such adjustments may improve flow continuity, it is difficult to determine their impact on the accuracy of the water surface profile.

3.2.4 MCDOT Drop Structures

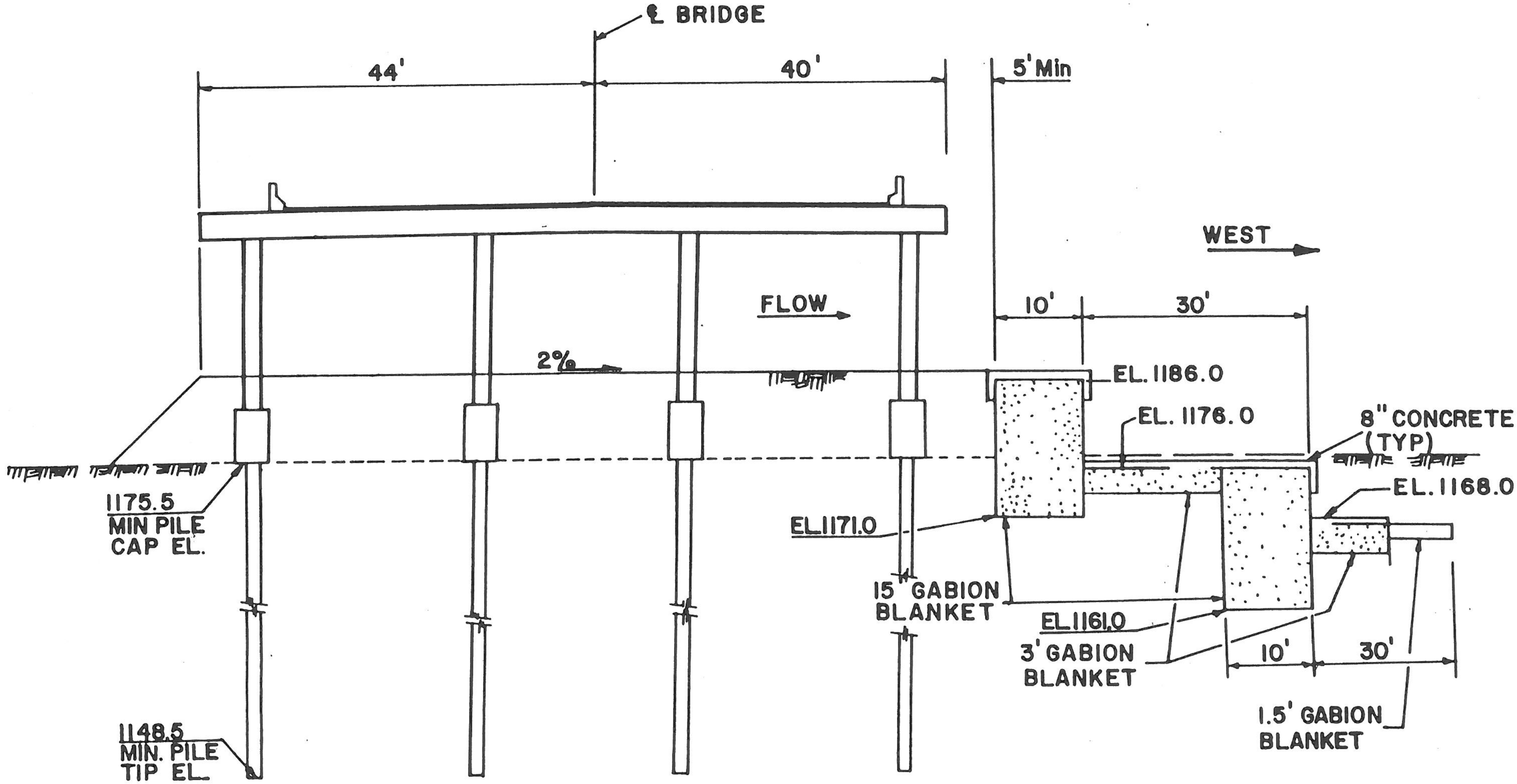
MCDOT has constructed drop structures under both the north and south Alma School Road bridges to limit the propagation of downstream headcuts. The HEC-2 model was revised to account for the impact of these drop structures (hardpoints). Figure 2 is a cross-section of the drop structure at the north bridge showing its proximity to the Alma School bridge piers.

Maricopa County Department of Transportation (MCDOT) designed and constructed a double tiered "check dam" structure immediately downstream of each of the Alma School Road bridges. These structures do not show up on the FCDMC topography (the flight dates are prior to the construction of the structures) or on the cross section data (HEC-2 GR cards). To account for their presence in the model, the GR-card data was modified to reflect both the structure and the resulting sediment deposition upstream of the structure.

The inclusion of these drop structures in the MBE HEC-2 hydraulic model resulted in a significant increase in the water surface elevation immediately upstream of the Alma School Road bridges. The construction of the drop structures also reduced the capacity of the south Alma School bridge to a greater degree than the north bridge. This forced a greater percentage of the peak flow into the north channel in the 100-year split flow analyses split flow analysis.

3.2.5 Split Flow Analysis

Due to the presence of an "island" in the vicinity of Alma School Road, the runoff splits before it reaches the roadway and must pass through two bridges. A detailed split-flow analysis was performed to determine the distribution of flow between the north and the south channel. The south branch of the split has siltation ponds in the channel bottom for a significant portion of the channel reach. It was assumed for the purposes of this analysis that the siltation ponds will wash out prior to the peak flow and thus, should have no impact on the WSEL. Therefore, the presence of these siltation ponds is not reflected in the HEC-2 model. The results of the split flow analysis indicate that of the 220,000 cfs flowing into the reach, approximately 147,500 cfs flows in the north branch and approximately 72,500 cfs flows in the south branch.



TYPICAL SECTION
NORTH BRIDGE

WOOD/PATEL ASSOCIATES Civil Engineers Hydrologists Land Surveyors (602) 234-1344	Scale NTS	Design RH	ALMA SCHOOL BRIDGE MCDOT DROP-STRUCTURE	FIGURE 2
	Date	Drawn JB		
	Job # 93080.03	Chk. JLH		

3.2.6 SLA Design & HEC-2 modeling of Channelization

Simons, Li & Associates (SLA) has designed a channelized section for the reach of the Salt River downstream of the Price Road Interchange. This channelized section overlaps the beginning of Phase I of the Red Mountain Freeway Design. In both the existing condition and design condition WPA/MBE/SLA HEC-2 models, the downstream SLA model was joined to the upstream WPA/MBE model. This insures that the water surface elevations for the existing and design models will have comparable initial conditions.

3.3 Existing and Design Condition HEC-2 Models

3.3.1 "Existing Condition" HEC-2 Model

The existing condition HEC-2 model was developed utilizing the procedures and assumptions listed previously. This model serves as the baseline for determination of the impact of the Red Mountain Phase II improvements to the Salt River. MBE provided Wood/Patel with a preliminary HEC-2 model for the Salt River from the Price Road Traffic Interchange to Country Club Road.

Several modifications to the MBE model were required to define the bank stations and effective flow boundaries in the river. The subject reach of the Salt River has been subjected to significant sand and gravel mining. Numerous pits and stockpiles exist in and adjacent to the river. Both vertical (adjustments to the cross-section GR data) and horizontal (addition of both X3 and ET cards) controls were used to identify the effective flow boundaries. Also, bank stations were relocated to provide a uniform main channel width, minimize conveyance errors, and to allow the use of encroachments to model areas of ineffective flow which occur within the limits of the original (MBE) channel banks.

Proper modeling technique using the Army Corps of Engineers HEC-2 Hydraulic analysis program requires that each cross section be aligned perpendicular to the flow direction of the river. In some cases (i.e. sudden changes in channel width, channel meanders, flow splits, etc.) this may require that a cross section alignment have one or more breaks along its length in order to maintain perpendicularity to the flow direction.

3.3.2 SLA/WPA Design Condition 1 HEC-2 Model

The "existing condition" model and the "design condition 1" model differ mainly in that the south hardbank for the Red Mountain Freeway results in an additional encroachment along the south bank of the Salt River. The encroachment resulting from this hardbank was modeled by adding ET cards to the existing condition HEC-2 model. The hardbank encroachment causes no appreciable increase in the 100-year WSEL from HEC-2 section 224.34 through section 225.85 and from section 226.99 through section 227.63. The maximum WSEL increase due to the hardbank was 0.36 feet and occurred at cross-section 226.35 in the south channel at Alma School Road.

3.3.3 SLA/WPA Design Condition 2 HEC-2 Model

SLA created a HEC-2 model, using the FCDMD/MBE/WPA model as a base, which included the north SRPMIC hardbank and channelization between the hardbanks up to station 225.38. The location of the north hardbank, as in the "Design Condition 1" model for the south hardbank only, was modeled by inserting encroachments (through the use of ET cards) into the HEC-2 model. As a result of the additional constriction due to the north hardbank, the WSEL increases in this model were greater than in the "Design Condition 1" HEC-2 model. From HEC-2 section 224.34 to section 224.71 and from section 226.99 to section 227.63, the WSEL increases were negligible. The maximum WSEL increase of 1.20 feet occurred at section 225.19. Upstream of Alma School Road the WSEL's generated by the "Design Condition 1" and Design Condition 2" models are virtually identical.

3.3.4 Comparison of Existing and Design WSEL's

A direct comparison of the water surface elevations for both the "existing" and "design" conditions can be made to identify any problem areas associated with the construction of Phase II of the Red Mountain Freeway. Table I presents a summary of both the "existing" and "design" conditions. Two water surface profiles are listed for the existing and both design conditions. This is necessary due to the split flow which occurs around the Alma School Road "island".

A comparison of the "existing" and "design" condition water surface elevations showed a maximum 0.36 foot increase in the 100-year WSEL in the south split in the "design condition 1" HEC-

2 model. The addition of the North hardbank, however, resulted in a 1.2 foot increase in the 100-year WSEL between Price Road and Alma School Road. Upstream of Alma School Road the effect of the hardbank was negligible. It appears that relatively minor downstream increases in the 100-year WSEL do not propagate past the drop structures under the Alma School Road bridges.

3.3.5 Recent Changes in Hardbank Alignment

Recent modifications to the freeway alignment have resulted in a small (< 10') horizontal shift in the hardbank alignment. Due to the extreme width of the floodplain/floodway relative to the small amount of hardbank alignment shift, this shift will have a negligable impact on the hydraulic model (HEC-2). Therefore, the 60% submittal hydraulic model was not revised.

TABLE I

21-Sep-95

SALT RIVER

01:36 PM

Comparison of Existing & Design WSEL's

Mainline Station	HEC-2 X-Section	Existing WSEL	Existing South Split	Design 1 WSEL	Design 1 Diff.	South 1 Split WSEL	South 1 Split Diff.	Design 2B WSEL	Design 2B Diff.	South 2B Split WSEL	South 2B Split Diff.	Maximum WSEL
	224.34	1181.07		1181.07	0.00			1180.92	-0.15			1181.07
	224.43	1181.24		1181.24	0.00			1181.04	-0.20			1181.24
	224.53	1181.54		1181.54	0.00			1181.27	-0.27			1181.54
	224.62	1181.57		1181.57	0.00			1181.34	-0.23			1181.57
	224.71	1181.86		1181.86	0.00			1181.82	-0.04			1181.86
	224.81	1181.95		1181.95	0.00			1182.24	0.29			1182.24
398+00	224.90	1181.64		1181.64	0.00			1182.58	0.94			1182.58
403+00	225.00	1182.57		1182.57	0.00			1182.79	0.22			1182.79
408+00	225.10	1182.09		1182.09	0.00			1182.87	0.78			1182.87
414+00	225.19	1181.98		1181.98	0.00			1183.18	1.20			1183.18
418+50	225.28	1182.92		1182.92	0.00			1183.91	0.99			1183.91
432+00	225.38	1183.88		1183.88	0.00			1184.93	1.05			1184.93
436+00	225.48	1185.64		1185.64	0.00			1184.15	-1.49			1185.64
441+00	225.57	1187.28		1187.28	0.00			1186.21	-1.07			1187.28
446+00	225.66	1187.76		1187.76	0.00			1186.79	-0.97			1187.76
450+50	225.76	1188.12		1188.14	0.02			1187.24	-0.88			1188.14
456+00	225.85	1189.75		1189.31	-0.44			1188.59	-1.16			1189.31
460+35	225.95	1189.85	1189.85	1190.02	0.17	1190.02	0.17	1189.38	-0.47	1189.38	-0.47	1190.02
465+70	226.04	1189.46	1190.62	1189.63	0.17	1190.76	0.14	1188.93	-0.53	1190.19	-0.43	1190.76
469+00	226.13	1189.60	1190.82	1189.75	0.15	1190.95	0.13	1189.16	-0.44	1190.40	-0.42	1190.95
471+00	226.23	1190.55	1188.69	1190.64	0.09	1188.71	0.02	1190.44	-0.11	1187.95	-0.74	1190.64
472+00	226.35	1194.14	1189.44	1194.07	-0.07	1189.80	0.36	1194.21	0.07	1190.01	0.57	1194.21
	226.48	1196.84	1192.04	1196.86	0.02	1191.98	-0.06	1196.86	0.02	1191.98	-0.06	1196.86
	226.49	1196.67	1198.12	1196.67	0.00	1198.09	-0.03	1196.67	0.00	1198.09	-0.03	1198.09
473+00	226.50	1197.71	1199.29	1197.70	-0.01	1199.27	-0.02	1197.71	0.00	1199.28	-0.01	1199.28
	226.51	1197.54	1199.15	1197.54	0.00	1198.98	-0.17	1197.54	0.00	1198.98	-0.17	1198.98
	226.52	1198.99	1200.84	1198.99	0.00	1200.82	-0.02	1198.99	0.00	1200.82	-0.02	1200.82
474+00	226.53	1199.71	1201.43	1199.71	0.00	1201.53	0.10	1199.71	0.00	1201.53	0.10	1201.53
478+00	226.58		1202.00			1202.07	0.07			1202.07	0.07	1202.07
488+35	226.61	1200.88	1204.40	1200.88	0.00	1203.80	-0.60	1200.88	0.00	1203.80	-0.60	1203.80
495+00	226.70	1202.16	1205.65	1202.16	0.00	1206.00	0.35	1202.16	0.00	1206.00	0.35	1206.00
501+00	226.80	1201.55	1206.24	1201.55	0.00	1206.53	0.29	1201.55	0.00	1206.53	0.29	1206.53
	226.89	1205.16	1206.46	1205.16	0.00	1206.76	0.30	1205.16	0.00	1206.76	0.30	1206.76
	226.99	1205.67		1205.67	0.00			1205.67	0.00			1205.67
	227.08	1207.78		1207.78	0.00			1207.78	0.00			1207.78
	227.18	1211.83		1211.83	0.00			1211.83	0.00			1211.83
	227.27	1214.03		1214.03	0.00			1214.03	0.00			1214.03
	227.37	1215.68		1215.57	-0.11			1215.57	-0.11			1215.57
	227.46	1215.91		1215.75	-0.16			1215.75	-0.16			1215.75
	227.56	1217.04		1216.58	-0.46			1216.58	-0.46			1216.58
	227.61	1217.10		1217.13	0.03			1217.13	0.03			1217.13
	227.62	1216.92		1216.78	-0.14			1216.78	-0.14			1216.78
	227.63	1216.99		1216.86	-0.13			1216.86	-0.13			1216.86
	227.64	1217.26		1217.48	0.22			1217.48	0.22			1217.48
	227.69	1217.34		1217.57	0.23			1217.57	0.23			1217.57
	227.79	1217.72		1218.11	0.39			1218.11	0.39			1218.11

3.4 FEMA Letter of Map Revision (LOMR) for Salt River

The regulatory floodplain and floodway delineation for the Salt River adjacent to the project was published by the Federal Emergency Management Agency on the *Flood Insurance Rate Maps* (FIRMs) for Maricopa County, Arizona and Incorporated Areas. The reach of the Salt River that affects the project is shown on panels 2160 (effective date April 15, 1988), 2170 (revised September 4, 1991), 2180 (revised September 4, 1991), and 2190 (revised December 3, 1993) of the FIRM series. Supporting documentation was published in the accompanying document *Flood Insurance Study, Maricopa County, Arizona and Incorporated Areas*, revised December 3, 1993.

Although the above revision dates are fairly recent, the actual hydraulic analysis of the Salt River in the reach of interest was performed in the late 1970's by the U.S. Army Corps of Engineers (COE). The topographic mapping upon which that analysis was based no longer represents actual conditions in the Salt River channel. New topographic mapping prepared by the Flood Control District of Maricopa County (FCDMC) as part of a temporarily suspended restudy of the Salt River indicates a decrease of as much as 20 feet in some areas of the Salt River channel bed. Changes such as this have occurred as a result of gravel mining operations and natural sediment transport processes during large flows in recent years.

Because of these significant changes in the channel geometry, it was necessary to prepare an updated hydraulic model of the reach of the Salt River adjacent to the project. Adoption of the revised model by local agencies and FEMA required the submittal of a Letter of Map Revision (LOMR) request to FEMA. The request package included FEMA forms, hydraulic analyses, summary tables and water surface profile plots documenting the revised hydraulic analysis. Upon approval of the LOMR request, FEMA will update the FIRMs and Flood Insurance Study report.

The results of the revised floodplain and floodway analyses were subsequently used by the design team to select a freeway alignment outside of the new floodway delineation.

4.0 SEDIMENT TRANSPORT

4.1 Sediment Transport Analysis

A detailed sediment transport analysis (HEC-6) has been performed for the design reach of the Salt River. The results of this analysis are presented in the accompanying section of this report entitled "Sediment Transport Analysis, Salt River, Red Mountain Freeway, McKellips Road to Dobson Road".

The scour depth was determined by the summation of the following parameters; long-term degradation, local scour, general scour, bend scour, low-flow channel incisement, and bed form troughs. A safety factor of 1.5 was then added to the theoretical scour depth.

The invert of the Salt River between the CSA hardbank and the SRPMIC boundary and/or the "Waters of the U.S." was excavated to provide borrow for the Red Mountain Freeway. The limits of this excavation were controlled by several factors.

- The downstream invert elevation was set to match SLA design elevation.
- The excavation could not encroach beyond the SRPMIC boundary.
- The excavation could not encroach into the Corps of Engineer's jurisdictional boundary.
- The area adjacent to the CSA hardbank was required to have a positive drainage outfall.
- The volume of excavation from the area was to be maximized to reduce the borrow requirements for the Red Mountain Freeway project.

At the request of the FCDMC (per their comments at the 60% submittal) an additional HEC-6 analysis was performed assuming that the sediment inflow was double the inflow assumed in the previous analysis. The HEC-6 input and output data files are included on the enclosed 3½" floppy disk along with the original HEC-6 analyses.

4.2 Design Criteria

The design criteria used for the CSA bank protection will be the same as that used on the adjacent downstream section of the Salt River. The criteria is described in the following documents: 1) "Letter of Intent for the Salt River South Bank Stabilization", including Exhibits A and B, as well as Attachment A, as conveyed by the February 18, 1992 letter from the FCDMC to ADOT; and 2) the "Bank Protection Toe-Down Depths in the vicinity of Sand and Gravel Mining Pits", as conveyed by the July 29, 1992 letter from SLA to DMJM. Copies of these documents are included in Appendix C.

The proposed bank protection will be constructed by ADOT, maintained by the FCDMC, and will fall under the administrative jurisdiction (FEMA) of the City of Mesa. The FCDMC requested that the bank protection be designed for the Pre-Roosevelt 100-year discharge of 220,000 cfs with a minimum freeboard allowance of 3 feet. The toe-down elevations are to be set according to the total scour which accounts for components of long term degradation, local scour, general scour (including contraction scour and bend scour), lowflow channel incisement, and bed form troughs. The effects of any in-stream sand and gravel mining within 300 feet of the bank protection toe are to be incorporated into the design.

Hardbank toe down elevations were determined by one of two methods. The method that produced the lowest toe-down elevation (worst case) was used for the design of the hardbank at each section. The first method was to set the hardbank toe-down elevation below the low-flow channel invert elevation by an amount equal to the total scour depth predicted in the sediment transport analysis or ten (10) feet whichever was greater.

The second procedure was used only in the vicinity of the settling ponds (part of the sand and gravel operation located east of Alma School Road) where available right-of-way is extremely limited. A 10' foot vertical mining easement (measured from the existing ground elevation shown on the Red Mountain Freeway topographic mapping) was granted to the sand and gravel operator in this area. Both the theoretical scour depth predicted in the sediment transport analysis and the 10-foot vertical mining easement were then subtracted from the low-flow channel invert elevation to determine the final recommended toe down elevation. AGRA performed a structural analysis on the proposed hardbank geometry and recommended that an additional 10 feet of depth be incorporated into the design for stability.

4.3 South Bank Protection Geometry

In order to protect the future roadway prism of the Red Mountain Freeway, a Cement Stabilized Alluvium (CSA) hardbank system was designed to tie into the hardbank at the downstream end of the subject reach. The hardbank consists of an 8 foot thick section of CSA at a 1:1 slope from the toe-down elevation to a point 3 feet (minimum) above the 100-year water surface elevation. A 16 foot wide access road is provided along the top of the hardbank and the roadway embankment above the hardbank slopes upward at 2½:1 to the Red Mountain freeway. The design invert adjacent to the hardbank was established to provide positive drainage and to maximize borrow for the roadway embankment.

The harbank typical section in the area adjacent to the settling ponds is composed of a vertical cutoff wall and a sloped (1H:1V) CSA bank. Geotechnical and structural analyses indicated that an additional 10 feet of toe down (below the computed scour elevation) was required for stability. This 10-foot dimension was included in the determination of the design toe elevation.

The hardbank begins at approximately mainline station 399+50 where it ties into the SLA hardbank design (SLA station 73+00) and continues to station 469+00 immediately west of Alma School Road. The bank protection begins again on the east side of Alma School Road at station 480+00 and continues to station 503+00. The bank protection was terminated at these locations because the freeway alignment was several hundred feet from the natural river bank. In addition, McDOT is evaluating the feasibility of constructing a bridge across the Salt River at McKellips Road. As part of the future McKellips Road bridge construction project bank protection can be built to tie into the south bank protection system to form a continuous bank protection system along the south bank of the Salt River.

4.4 Recommended Design Dimensions

Table 2 lists the recommended design for the proposed protection at specific bank stations. The recommended design dimensions were developed based on the requirements discussed above. Some smoothing between cross-section will be applied after agency review for constructability. The proposed bank protection has been designed to match the top of bank and toe down elevations of the CSA section immediately downstream. River inverts from cross-section 224.90 to 225.28 were based on data provided by SLA. River inverts from cross-section 225.28 to the end of the project were obtained from MBE data. The lack of correlation between various portions of existing topographic mapping was an issue throughout the project which may have resulted in conservative toe down elevations in the proposed hardbank.

It was recently decided that the side slope of the CSA protection immediately downstream would be modified from 1:1 (H:V) to 1.5:1 (H:V). Therefore, a transition section was required between CSA design sections.

TABLE 2

Summary of Recommended Elevations for CSA Bank-Lining Design
Red Mountain Freeway
Dobson Road to McKellips Road
Salt River, 100-Year Event

CSA Control Line Station	Applicable HEC-2/HEC-6 XSEC	Top-of-Bank Design: Maximum 100-Yr Water Surface (ft, MSL)	Top-of-Bank Design: Data Source	Top-of-Bank Design: Freeboard (ft)	Top-of-Bank Design: Recommended Design Elevation (ft, MSL)	Toe-Down Design: Data Source	Toe-Down Design: Recommended Design Elevation (ft, MSL)
-	224.90	1182.77	HEC-6 Model T2A	3.00	1185.77	* HEC-6 Model T2B	1141.24
0+00	-	-	-	-	-	-	-
3+57.7	225.00	1183.32	HEC-6 Model T2APF	3.00	1186.32	* HEC-6 Model T2B	1142.16
8+58.0	225.10	1183.60	HEC-6 Model T2APF	3.00	1186.60	* HEC-6 Model T2B	1142.67
14+67.1	225.19	1183.86	HEC-6 Model T2APF	3.00	1186.86	* HEC-6 Model T2B	1143.95
19+00.0	225.28	1184.30	HEC-6 Model T2APF	3.00	1187.30	HEC-6 Model T2B	1149.94
31+30.4	225.38	1185.35	HEC-6 Model T2APF	3.00	1188.35	HEC-6 Model T2B	1149.89
35+30.3	225.48	1185.47	HEC-6 Model T2APF	3.00	1188.47	HEC-6 Model T2A	1147.91
40+32.5	225.57	1186.56	HEC-6 Model T2A	3.00	1189.56	HEC-6 Model T2A	1145.22
45+39.4	225.66	1187.04	HEC-6 Model T2APF	3.00	1190.04	HEC-6 Model T2A	1145.97
50+00.0	225.76	1188.37	HEC-6 Model T2APF	3.00	1191.37	HEC-6 Model T2A	1154.30
55+83.9	225.85	1189.84	HEC-6 Model T2APF	3.00	1192.84	HEC-6 Model T2A	1156.80
60+61.08	225.95	1190.81	HEC-2 Model SPTBDGN2	3.00	1193.81	HEC-6 Model T2A	1157.90
66+00.0	226.04	1191.48	HEC-2 Model SPTBDGN2	3.00	1194.48	Gravel Pit Analysis	1155.20
69+47.1	226.13	1191.64	HEC-2 Model SPTBDGN2	3.00	1194.64	Gravel Pit Analysis	1155.20
-	226.23	1189.97	HEC-2 Model SPTBDGN2	3.00	1192.97	Gravel Pit Analysis	1155.20
-	226.35	1190.37	HEC-2 Model SPTBDGN2	3.00	1193.37	Gravel Pit Analysis	1155.20
-	226.48	1191.98	HEC-2 Model SPTBDGN2	3.00	1194.98	Gravel Pit Analysis	1155.20
-	226.49	1198.09	HEC-2 Model SPTBDGN2	3.00	1201.09	Alma School Road Grade-Control	
-	226.53	1201.53	HEC-2 Model SPTBDGN2	3.00	1204.53	Alma School Road Grade-Control	
-	226.58	1202.07	HEC-2 Model SPTBDGN2	3.00	1205.07	HEC-6 Model SOUTH1	1169.00
108+46.16	226.61	1203.80	HEC-2 Model SPTBDGN2	3.00	1206.80	HEC-6 Model SOUTH1	1170.00
115+05.9	226.70	1206.00	HEC-2 Model SPTBDGN2	3.00	1209.00	HEC-6 Model SOUTH1	1172.00
-	226.80	1206.53	HEC-2 Model SPTBDGN2	3.00	1209.53	HEC-6 Model SOUTH1	1178.00

Description of HEC-2 & HEC-6 models:

HEC-6 Model T2A - Main channel model from Evergreen Road to Country Club Road.

HEC-6 Model T2B - Main channel model from Evergreen Road to XSEC 226.38, with zero sediment supply from gravel pit at XSEC 225.38.

HEC-6 Model T2APF - Model T2A with hard-bed adjusted to post-flood bed profile & single, steady-state Q100 discharge.

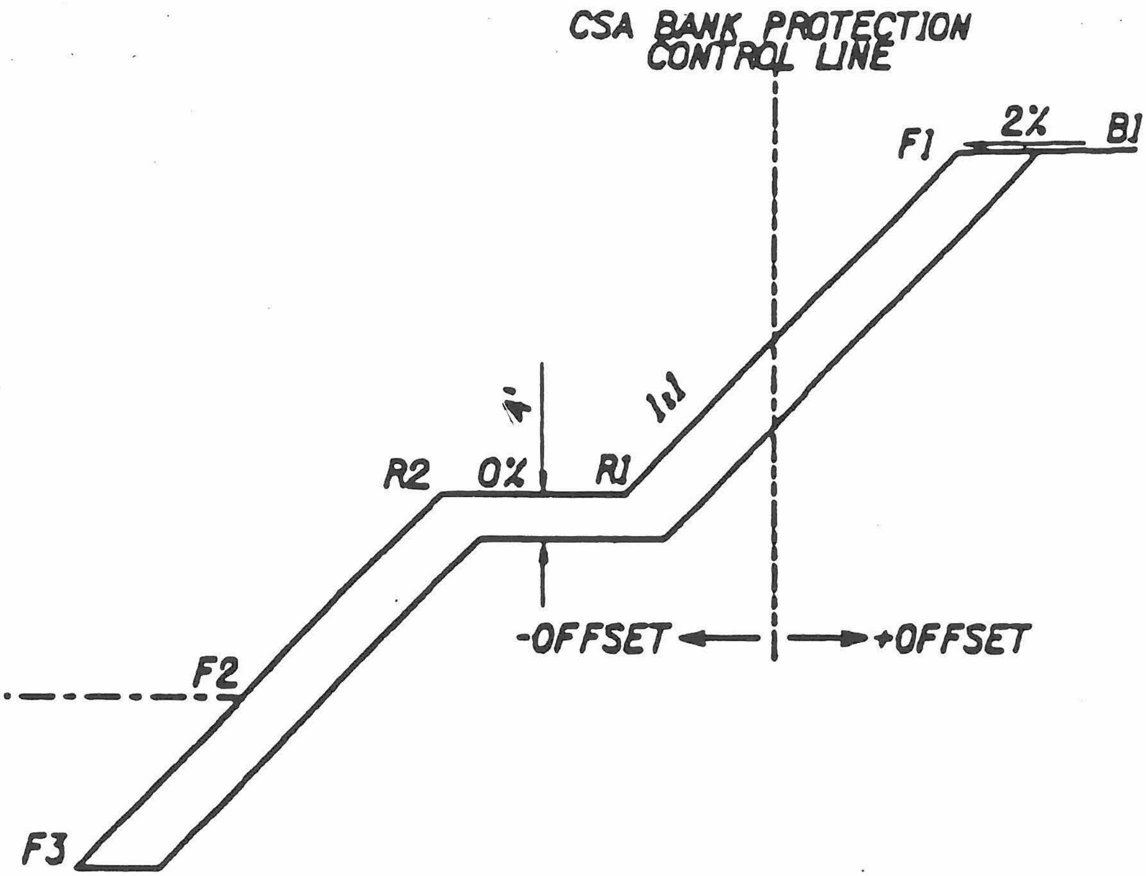
HEC-6 Model SOUTH1 - South channel model from Alma School Road to McKellips Road; zero sediment inflow from main channel; natural bed thalweg.

HEC-2 Model SPTBDGN2 - South channel model prepared by Wood-Patel from XSECs 225.95 to 226.89.

* Recommended toe-down elevations for XSECs 224.90 through 225.19 are referenced to artificial thalweg elevations published in the 1994 SLA report.

Cross-reference between CSA Control Line Stations & HEC-2/HEC-6 XSEC numbers was provided by Wood-Patel.

File: RMREC1.WK4



Scale	Design	Drawn
NTS		
Date 9/20/95	Job # 93080	Chk.

WOOD/PATEL
ASSOCIATES
Civil Engineers
Hydrologists
Land Surveyors
(602) 234-1344

BANK PROTECTION
GEOMETRY

FIGURE 3

Thi le reflects revised control for 95% plans

Table 4

Red Mountain Bank Protection Offsets

ADOT Contract: 94-29

WPA Job # 93080.03
Date 16-Jan-96
03:16 PM

SR202L Median Station	HEC - 2 Cross Section	CSA Control Line Station	Offset from SR202L Median to CSA Control	100-year WSEL	Offset to F1 (ft)	F1 Elevation	Offset to Backfill	Backfill Elevation	Offset to Toe (ft)	Toe of CSA Elevation				Offset to Acc Road	Acc Road Elevation	Offset to In Ramp	In Ramp Elevation	Offset to Out Ramp	Out Ramp Elevation
										(F2-10')	Scour	Min.	Design						
					F 1		F 2		F 3					B 1		R 1		R 2	
399.4893		0+00.0 PC	184.4	1182.9	0	1186.2	-44.9	1156.3	-69.3	1146.3	1140.0	1140.0	1140.0	16	1186.5				
400		0+52.9	170.6	1183.0	0	1186.2	-44.8	1156.3	-69.3	1146.3	1140.0	1140.0	1140.0	16	1186.5				
		0+92.4		1183.0	0	1186.2	-44.8	1156.4	-69.4	1146.4	1140.0	1140.0	1140.0	16	1186.6				
		1+00.0	159.4	1183.0	0	1186.3	-44.2	1156.4	-68.5	1146.4	1140.2	1140.2	1140.1	16	1186.6				
401		1+55.5	147.8	1183.1	0	1186.3	-40.2	1156.4	-61.8	1146.4	1141.1	1141.1	1140.5	16	1186.6				
		2+00.0	139.6	1183.1	0	1186.3	-37.0	1156.4	-56.5	1146.4	1141.8	1141.8	1140.9	16	1186.6				
402		2+57.0	130.6	1183.2	0	1186.3	-32.9	1156.5	-49.7	1146.5	1142.0	1142.0	1141.4	16	1186.7				
		3+00.0	124.9	1183.2	0	1186.4	-29.9	1156.5	-44.6	1146.5	1142.0	1142.0	1141.7	16	1186.7				
403	225.00	3+57.7	118.7	1183.3	0	1186.4	-29.8	1156.5	-44.6	1146.5	1142.2	1142.2	1141.8	16	1186.7				
		4+00.0	115.4	1183.3	0	1186.4	-29.8	1156.6	-44.5	1146.6	1142.2	1142.2	1141.9	16	1186.7				
404		4+57.9	112.2	1183.4	0	1186.4	-29.8	1156.6	-44.4	1146.6	1142.3	1142.3	1142.0	16	1186.8				
		5+00.0	111.1	1183.4	0	1186.5	-29.8	1156.6	-44.4	1146.6	1142.3	1142.3	1142.1	16	1186.8				
405		5+57.9	111.0	1183.4	0	1186.5	-29.8	1156.7	-44.3	1146.7	1142.4	1142.4	1142.2	16	1186.8				
		5+70.19 PT	111.2	1183.4	0	1186.5	-29.8	1156.7	-44.3	1146.7	1142.4	1142.4	1142.2	16	1186.8				
		6+00.0	111.8	1183.4	0	1186.5	-29.8	1156.7	-44.3	1146.7	1142.4	1142.4	1142.3	16	1186.8				
406		6+57.9	112.9	1183.5	0	1186.5	-29.8	1156.7	-44.2	1146.7	1142.5	1142.5	1142.3	16	1186.9				
		7+00.0	113.8	1183.5	0	1186.6	-29.8	1156.8	-44.1	1146.8	1142.5	1142.5	1142.4	16	1186.9				
407		7+58.0	114.9	1183.5	0	1186.6	-29.8	1156.8	-44.1	1146.8	1142.6	1142.6	1142.5	16	1186.9				
		8+00.0	115.8	1183.6	0	1186.6	-29.8	1156.8	-44.0	1146.8	1142.6	1142.6	1142.6	16	1186.9				
408	225.10	8+58.0	116.9	1183.6	0	1186.7	-29.8	1156.9	-44.0	1146.9	1142.7	1142.7	1142.7	16	1187.0				
		9+00.0	117.8	1183.6	0	1186.7	-29.8	1156.9	-43.9	1146.9	1142.8	1142.8	1142.8	16	1187.0				
		9+16.42 PC	118.1	1183.6	0	1186.7	-29.8	1156.9	-43.9	1146.9	1142.8	1142.8	1142.8	16	1187.0				
409		9+58.1	120.1	1183.6	0	1186.7	-29.8	1156.9	-43.8	1146.9	1142.9	1142.9	1142.9	16	1187.0				
		10+00.0	124.6	1183.7	0	1186.7	-29.8	1157.0	-43.8	1147.0	1143.0	1143.0	1142.9	16	1187.0				
410		10+59.3	135.1	1183.7	0	1186.8	-29.7	1157.0	-43.7	1147.0	1143.1	1143.1	1143.0	16	1187.1				
		11+00.0	145.1	1183.7	0	1186.8	-29.7	1157.0	-43.7	1147.0	1143.2	1143.2	1143.1	16	1187.1				
		11+39.12 PRC	156.8	1183.7	0	1186.8	-29.7	1157.1	-43.6	1147.1	1143.3	1143.3	1143.2	16	1187.1				
411		11+63.5	164.4	1183.7	0	1186.8	-29.7	1157.1	-43.6	1147.1	1143.3	1143.3	1143.2	16	1187.1				
		12+00.0	174.3	1183.7	0	1186.8	-29.7	1157.1	-43.6	1147.1	1143.4	1143.4	1143.3	16	1187.2				
412		12+66.3	188.0	1183.8	0	1186.9	-29.7	1157.2	-43.5	1147.2	1143.5	1143.5	1143.4	16	1187.2				
		13+00.0	192.7	1183.8	0	1186.9	-29.7	1157.2	-43.4	1147.2	1143.6	1143.6	1143.4	16	1187.2				
413		13+66.88 PRC	197.9	1183.8	0	1186.9	-29.7	1157.2	-43.4	1147.2	1143.7	1143.7	1143.6	16	1187.2				
		14+00.0	199.2	1183.8	0	1186.9	-29.7	1157.2	-43.3	1147.2	1143.8	1143.8	1143.6	16	1187.3				
		14+50.0		1183.9	0	1187.0	-29.7	1157.3	-43.3	1147.3	1143.9	1143.9	1143.7	16	1187.3				
414	225.19	14+67.1	203.8	1183.9	0	1187.0	-29.7	1157.3	-43.1	1147.3	1144.0	1144.0	1143.9	16	1187.3				
		15+00.0	206.9	1183.9	0	1187.0	-29.7	1157.3	-42.7	1147.3	1144.4	1144.4	1144.3	16	1187.3				
		15+47.86 PT	212.4	1183.9	0	1187.0	-29.7	1157.3	-42.1	1147.3	1145.1	1145.1	1144.9	16	1187.4				
415		15+67.7	214.9	1184.0	0	1187.1	-29.7	1157.4	-41.9	1147.4	1145.3	1145.3	1145.2	16	1187.4				
		15+72.0		1184.0	0	1187.1	-29.7	1157.4	-41.8	1147.4	1145.4	1145.4	1145.2	16	1187.4				
		16+00.0	219.0	1184.0	0	1187.1	-29.7	1157.4	-41.5	1147.4	1145.8	1145.8	1145.6	16	1187.4	-40.6	1146.5	-40.6	1146.5
416		16+68.5	227.7	1184.1	9.8	1187.1	-19.9	1157.4	-41.1	1147.4	1146.7	1146.7	1146.1	25.8	1187.5	-24.1	1153.2	-33.9	1153.2
		17+00.0	231.7	1184.1	14.3	1187.2	-15.4	1157.4	-40.9	1147.4	1147.2	1147.2	1146.3	30.3	1187.5	-16.6	1156.3	-30.9	1156.3
		17+12.0		1184.1	16	1187.2	-13.7	1157.5	-40.8	1147.5	1147.3	1147.3	1146.3	32	1187.5	-13.7	1157.5	-29.7	1157.5
417		17+67.1	239.9	1184.2	16	1187.2	-29.7	1157.5	-40.5	1147.5	1148.1	1147.5	1146.7	32	1187.5	-8.1	1163.1	-24.1	1163.1
		18+00.0	243.7	1184.2	16	1187.2	-29.7	1157.5	-40.3	1147.5	1148.6	1147.5	1146.9	32	1187.5	-4.6	1166.6	-20.6	1166.6
418		18+61.8	250.1	1184.3	16	1187.3	-29.7	1157.6	-39.9	1147.6	1149.4	1147.6	1147.3	32	1187.6	1.8	1173.0	-14.2	1173.0
	225.28	19+00.0	253.5	1184.3	16	1187.3	-29.7	1157.6	-39.7	1147.6	1149.9	1147.6	1147.6	32	1187.6	5.7	1177.0	-10.3	1177.0
419		19+52.7	257.2	1184.3	16	1187.3	-29.7	1157.6	-39.7	1147.6	1149.9	1147.6	1147.6	32	1187.7	11.1	1182.5	-4.9	1182.5
		20+00.0	259.4	1184.3	16	1187.4	-29.7	1157.6	-39.7	1147.6	1149.9	1147.6	1147.7	32	1187.7	16	1187.4	0	1187.4
420		20+41.4	260.4	1184.3	16	1187.4	-29.7	1157.7	-39.7	1147.7	1149.9	1147.7	1147.7	32	1187.7	16	1187.4	0	1187.4
		20+50.0		1184.4	16	1187.4	-29.7	1157.7	-39.7	1147.7	1149.9	1147.7	1147.7	32	1187.7	16	1187.4	0	1187.4
		20+79.99 PC	260.5	1184.4	0	1187.4	-29.7	1157.7	-39.7	1147.7	1149.9	1147.7	1147.7	16	1187.8				
		21+00.0	260.5	1184.4	0	1187.5	-29.7	1157.7	-39.7	1147.7	1149.9	1147.7	1147.7	16	1187.8				
421		21+30.0	260.8	1184.4	0	1187.5	-29.7	1157.7	-39.7	1147.7	1149.9	1147.7	1147.7	16	1187.8				

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able 4

(continued)

Red Mountain Bank Protection Offsets

ADOT Contract: 94-29

WPA Job # 93080.03
Date 16-Jan-96
03:16 PM

SR202L Median Station	HEC - 2 Cross Section	CSA Control Line Station	Offset from SR202L Median to CSA Control	100-year WSEL	Offset to F1 (ft)	F1 Elevation	Offset to Backfill	Backfill Elevation	Offset to Toe (ft)	Toe of CSA Elevation (F2-10')	Toe of CSA Elevation Scour	Toe of CSA Elevation Min.	Toe of CSA Elevation Design	Offset to Acc Road	Acc Road Elevation	Offset to In Ramp	In Ramp Elevation	Offset to Out Ramp	Out Ramp Elevation
					F 1		F 2		F 3					B 1		R 1		R 2	
		22+00.0	262.7	1184.5	0	1187.5	-29.8	1157.8	-39.8	1147.8	1149.9	1147.8	1147.8	16	1187.9				
422		22+18.7	263.5	1184.5	0	1187.6	-29.8	1157.8	-39.8	1147.8	1149.9	1147.8	1147.8	16	1187.9				
		22+54.12 PT	265.4	1184.5	0	1187.6	-29.8	1157.8	-39.8	1147.8	1149.9	1147.8	1147.8	16	1187.9				
		23+00.0	267.7	1184.6	0	1187.6	-29.8	1157.9	-39.8	1147.9	1149.9	1147.9	1147.8	16	1187.9				
423		23+07.2	268.0	1184.6	0	1187.6	-29.8	1157.9	-39.8	1147.9	1149.9	1147.9	1147.8	16	1188.0				
		23+56.24 PC	269.1	1184.6	0	1187.7	-29.8	1157.9	-39.8	1147.9	1149.9	1147.9	1147.9	16	1188.0				
424		23+95.5	268.0	1184.7	0	1187.7	-29.8	1157.9	-39.8	1147.9	1149.9	1147.9	1147.9	16	1188.0				
		24+00.0	267.7	1184.7	0	1187.7	-29.8	1157.9	-39.8	1147.9	1149.9	1147.9	1147.9	16	1188.0				
		24+32.77 PRC	264.4	1184.7	0	1187.7	-29.8	1157.9	-39.8	1147.9	1149.9	1147.9	1147.9	16	1188.1				
425		24+84.6	257.6	1184.8	0	1187.8	-29.8	1158.0	-39.8	1148.0	1149.9	1148.0	1148.0	16	1188.1				
		25+00.0	255.7	1184.8	0	1187.8	-29.8	1158.0	-39.8	1148.0	1149.9	1148.0	1148.0	16	1188.1				
426		25+74.3	246.7	1184.8	0	1187.9	-29.8	1158.0	-39.9	1148.0	1149.9	1148.0	1148.0	16	1188.2				
		26+00.0	243.8	1184.9	0	1187.9	-29.8	1158.1	-39.9	1148.1	1149.9	1148.1	1148.0	16	1188.2				
		26+50.0		1184.9	0	1187.9	-29.8	1158.1	-44.9	1148.1	1149.9	1148.1	1143.1	16	1188.3				
427		26+64.3	236.8	1184.9	0	1187.9	-29.8	1158.1	-44.8	1148.1	1149.9	1148.1	1143.1	16	1188.3				
		27+00.0	233.1	1185.0	0	1188.0	-29.9	1158.1	-44.9	1148.1	1149.9	1148.1	1143.1	16	1188.3				
		27+50.0		1185.0	0	1188.0	-29.9	1158.2	-44.9	1148.2	1149.9	1148.2	1143.1	16	1188.3				
428		27+54.6	227.8	1185.0	0	1188.0	-29.9	1158.2	-44.4	1148.2	1149.9	1148.2	1143.6	16	1188.3				
		28+00.0	223.7	1185.0	0	1188.1	-29.9	1158.2	-39.9	1148.2	1149.9	1148.2	1148.1	16	1188.4				
429		28+45.2	219.9	1185.1	0	1188.1	-29.9	1158.2	-39.9	1148.2	1149.9	1148.2	1148.2	16	1188.4				
		29+00.0	215.6	1185.1	0	1188.1	-29.9	1158.3	-39.9	1148.3	1149.9	1148.3	1148.2	16	1188.5				
430		29+36.0	213.0	1185.2	0	1188.2	-29.9	1158.3	-39.9	1148.3	1149.9	1148.3	1148.2	16	1188.5				
		29+48.08 PT	212.1	1185.2	0	1188.2	-29.9	1158.3	-40.0	1148.3	1149.9	1148.3	1148.2	16	1188.5				
		30+00.0	208.0	1185.2	0	1188.2	-29.9	1158.3	-40.0	1148.3	1149.9	1148.3	1148.3	16	1188.6				
431		30+28.6	205.3	1185.3	0	1188.3	-29.9	1158.3	-40.0	1148.3	1149.9	1148.3	1148.3	16	1188.6				
		31+00.0	197.4	1185.3	0	1188.3	-29.9	1158.4	-40.0	1148.4	1149.9	1148.4	1148.3	16	1188.6				
432	225.38	31+24.4	194.4	1185.4	0	1188.3	-29.9	1158.4	-40.0	1148.4	1149.9	1148.4	1148.4	16	1188.7				
		32+00.0	184.7	1185.4	0	1188.4	-30.0	1158.5	-40.0	1148.5	1149.5	1148.5	1148.4	16	1188.8				
433		32+23.5	181.6	1185.4	0	1188.5	-30.0	1158.5	-40.1	1148.5	1149.4	1148.5	1148.3	16	1188.8				
		33+00.0	171.5	1185.5	0	1188.6	-30.0	1158.5	-40.4	1148.5	1149.0	1148.5	1148.2	16	1188.9				
434		33+24.4	168.3	1185.5	0	1188.6	-30.0	1158.5	-40.5	1148.5	1148.9	1148.5	1148.1	16	1188.9				
		34+00.0	158.3	1185.6	0	1188.7	-30.1	1158.6	-40.7	1148.6	1148.5	1148.5	1148.0	16	1189.0				
435		34+25.3	155.0	1185.6	0	1188.7	-30.1	1158.6	-40.8	1148.6	1148.4	1148.4	1147.9	16	1189.0				
		35+00.0	145.1	1185.7	0	1188.8	-30.1	1158.7	-41.1	1148.7	1148.0	1148.0	1147.7	16	1189.1				
436	225.48	35+28.2	141.6	1185.7	0	1188.8	-30.1	1158.7	-41.1	1148.7	1147.9	1147.9	1147.7	16	1189.1				
		35+45.73 PC	139.0	1185.7	0	1188.9	-30.1	1158.7	-41.2	1148.7	1147.8	1147.8	1147.6	16	1189.2				
		36+00.0	132.3	1185.9	0	1189.0	-30.2	1158.7	-41.4	1148.7	1147.5	1147.5	1147.5	16	1189.2				
437		36+26.9	129.3	1186.0	0	1189.0	-30.2	1158.7	-41.6	1148.7	1147.4	1147.4	1147.4	16	1189.3				
		37+00.0	122.2	1186.2	0	1189.2	-30.4	1158.8	-42.3	1148.8	1147.0	1147.0	1147.0	16	1189.6				
438		37+27.4	120.0	1186.3	0	1189.3	-30.5	1158.8	-42.5	1148.8	1146.8	1146.8	1146.8	16	1189.6				
		38+00.0	115.2	1186.5	0	1189.6	-30.7	1158.9	-43.1	1148.9	1146.4	1146.4	1146.5	16	1189.9				
439		38+27.6	113.8	1186.6	0	1189.7	-30.8	1158.9	-43.3	1148.9	1146.3	1146.3	1146.3	16	1190.0				
		39+00.0	111.2	1186.9	0	1189.9	-31.0	1158.9	-44.0	1148.9	1145.9	1145.9	1145.9	16	1190.2				
440		39+27.6	110.7	1187.0	0	1190.0	-31.0	1159.0	-44.2	1149.0	1145.8	1145.8	1145.8	16	1190.3				
		40+00.0	110.3	1187.2	0	1190.2	-31.2	1159.0	-44.8	1149.0	1145.4	1145.4	1145.4	16	1190.6				
441	225.57	40+27.6	110.6	1187.3	0	1190.3	-31.2	1159.1	-45.0	1149.1	1145.2	1145.2	1145.3	16	1190.6				
		40+50.0		1187.3	0	1190.4	-31.2	1159.2	-45.2	1149.2	1145.3	1145.3	1145.2	16	1190.7				
		41+00.0	112.4	1187.3	0	1190.5	-31.1	1159.4	-45.6	1149.4	1145.3	1145.3	1144.9	16	1190.8				

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Table 4

(continued)

Red Mountain Bank Protection Offsets

ADOT Contract: 94-29

WPA Job # 93080.03
Date 16-Jan-96
03:16 PM

SR202L Median Station	HEC - 2 Cross Section	CSA Control Line Station	Offset from SR202L Median to CSA Control	100-year WSEL	Offset to F1 (ft)	F1 Elevation	Offset to Backfill	Backfill Elevation	Offset to Toe (ft)	Toe of CSA Elevation (F2-10')	Toe of CSA Elevation Scour	Toe of CSA Elevation Min.	Toe of CSA Elevation Design	Offset to Acc Road	Acc Road Elevation	Offset to In Ramp	In Ramp Elevation	Offset to Out Ramp	Out Ramp Elevation
					F 1		F 2		F 3					B 1		R 1		R 2	
442		41+27.7	113.6	1187.4	0	1190.5	-31.0	1159.5	-45.5	1149.5	1145.4	1145.4	1144.9	16	1190.8				
		41+98.88 PT	117.6	1187.4	0	1190.6	-30.8	1159.7	-45.5	1149.7	1145.5	1145.5	1145.0	16	1190.9				
		42+00.0	117.6	1187.4	0	1190.6	-30.8	1159.8	-45.5	1149.8	1145.5	1145.5	1145.0	16	1190.9				
443		42+27.9	119.4	1187.5	0	1190.6	-30.7	1159.9	-45.5	1149.9	1145.5	1145.5	1145.1	16	1190.9				
		43+00.0	123.0	1187.5	0	1190.7	-30.5	1160.1	-45.5	1150.1	1145.6	1145.6	1145.2	16	1191.0				
444		43+29.3	124.2	1187.6	0	1190.7	-30.5	1160.2	-45.5	1150.2	1145.7	1145.7	1145.2	16	1191.0				
		44+00.0	126.6	1187.6	0	1190.8	-30.3	1160.5	-45.5	1150.5	1145.8	1145.8	1145.3	16	1191.1				
445		44+32.1	127.6	1187.7	0	1190.8	-30.2	1160.6	-45.5	1150.6	1145.8	1145.8	1145.3	16	1191.1				
		45+00.0	129.4	1187.7	0	1190.9	-30.0	1160.9	-45.5	1150.9	1145.9	1145.9	1145.4	16	1191.2				
446	225.66	45+36.4	130.5	1187.8	0	1190.9	-29.9	1161.0	-44.9	1151.0	1146.0	1146.0	1146.0	16	1191.2				
		46+00.0	132.4	1187.8	0	1191.0	-29.7	1161.3	-43.8	1151.3	1147.1	1147.1	1147.1	16	1191.3				
447		46+41.1	133.8	1187.9	0	1191.0	-29.6	1161.4	-43.2	1151.4	1147.9	1147.9	1147.9	16	1191.3				
		47+00.0	135.7	1188.0	0	1191.1	-29.5	1161.6	-42.2	1151.6	1148.9	1148.9	1148.9	16	1191.4				
448		47+45.9	137.3	1188.0	0	1191.1	-29.3	1161.8	-41.5	1151.8	1149.7	1149.7	1149.7	16	1191.5				
		48+00.0	139.3	1188.1	0	1191.2	-29.2	1162.0	-40.6	1152.0	1150.7	1150.7	1150.6	16	1191.5				
449		48+50.8	141.2	1188.2	0	1191.2	-29.1	1162.2	-39.7	1152.2	1151.6	1151.6	1151.5	16	1191.6				
		49+00.0	143.1	1188.2	0	1191.3	-28.9	1162.4	-39.4	1152.4	1152.5	1152.4	1151.9	16	1191.6				
450		49+55.9	145.3	1188.3	0	1191.4	-28.8	1162.6	-39.0	1152.6	1153.5	1152.6	1152.3	16	1191.7				
	225.76	50+00.0	147.2	1188.4	0	1191.4	-28.6	1162.8	-38.7	1152.8	1154.3	1152.8	1152.7	16	1191.7				
451		50+61.1	149.8	1188.5	0	1191.6	-28.6	1163.0	-38.6	1153.0	1154.6	1153.0	1152.9	16	1191.9				
		51+00.0	151.5	1188.6	0	1191.7	-28.5	1163.1	-38.6	1153.1	1154.7	1153.1	1153.1	16	1192.0				
		51+40.08 PC	153.4	1188.7	0	1191.8	-28.5	1163.3	-38.5	1153.3	1154.9	1153.3	1153.2	16	1192.1				
452		51+66.6	155.1	1188.8	0	1191.8	-28.4	1163.4	-38.5	1153.4	1155.0	1153.4	1153.3	16	1192.1				
		52+00.0	159.0	1188.9	0	1191.9	-28.4	1163.5	-38.4	1153.5	1155.1	1153.5	1153.5	16	1192.2				
		52+23.65 PT	162.9	1188.9	0	1192.0	-28.4	1163.6	-38.4	1153.6	1155.2	1153.6	1153.5	16	1192.3				
453		52+73.4	170.7	1189.0	0	1192.1	-28.3	1163.8	-38.3	1153.8	1155.5	1153.8	1153.7	16	1192.4				
		53+00.0	173.9	1189.1	0	1192.2	-28.3	1163.9	-38.3	1153.9	1155.6	1153.9	1153.8	16	1192.5				
		53+15.0		1189.2	0	1192.2	-28.3	1163.9	-38.3	1153.9	1155.6	1153.9	1153.9	16	1192.5	-38.0	1154.3	-38.0	1154.3
454		53+79.9	179.4	1189.3	10.4	1192.3	-17.8	1164.2	-38.2	1154.2	1155.9	1154.2	1154.1	26.39	1192.7	-21.3	1160.7	-31.6	1160.7
		53+87.39 PT	179.6	1189.3	11.6	1192.4	-16.6	1164.2	-38.2	1154.2	1155.9	1154.2	1154.2	27.6	1192.7	-19.2	1161.5	-30.8	1161.6
		54+00.0	179.9	1189.4	13.6	1192.4	-14.5	1164.3	-38.2	1154.3	1156.0	1154.3	1154.2	29.6	1192.7	-16.0	1162.8	-29.6	1162.8
		54+15.0		1189.4	16	1192.4	-12.1	1164.3	-38.2	1154.3	1156.1	1154.3	1154.3	32	1192.8	-12.1	1164.3	-28.1	1164.4
455		54+86.3	181.9	1189.6	16	1192.6	-12.0	1164.6	-38.1	1154.6	1156.4	1154.6	1154.5	32	1192.9	-5.1	1171.5	-21.1	1171.5
		55+00.0	182.2	1189.6	16	1192.7	-28.0	1164.6	-38.1	1154.6	1156.4	1154.6	1154.6	32	1193.0	-3.7	1172.9	-19.7	1173.0
456	225.85	55+92.7	184.6	1189.8	16	1192.9	-27.9	1165.0	-37.9	1155.0	1156.8	1155.0	1155.0	32	1193.2	5.4	1182.3	-10.6	1182.3
		56+00.0	184.8	1189.9	16	1192.9	-27.9	1165.0	-37.9	1155.0	1156.8	1155.0	1155.0	32	1193.2	6.1	1183.0	-9.9	1183.0
457		56+99.3	187.5	1190.0	16	1193.1	-27.7	1165.4	-37.7	1155.4	1157.0	1155.4	1155.4	32	1193.4	15.9	1193.0	-0.1	1193.0
		57+00.0	187.6	1190.0	16	1193.1	-27.7	1165.4	-37.7	1155.4	1157.0	1155.4	1155.4	32	1193.4	16.0	1193.1	0.0	1193.1
		57+50.0		1190.1	16	1193.2	-27.6	1165.6	-37.7	1155.6	1157.1	1155.6	1155.6	32	1193.5	16.0	1193.2	0.0	1193.2
		58+00.0	190.6	1190.2	0	1193.3	-27.5	1165.8	-37.6	1155.8	1157.2	1155.8	1155.7	16	1193.6				
458		58+05.91 PC	190.7	1190.2	0	1193.3	-27.5	1165.8	-37.5	1155.8	1157.3	1155.8	1155.8	16	1193.6				
		59+00.0	195.1	1190.4	0	1193.5	-27.4	1166.1	-37.4	1156.1	1157.5	1156.1	1156.1	16	1193.8				
459		59+12.8	196.0	1190.4	0	1193.5	-27.4	1166.2	-37.4	1156.2	1157.5	1156.2	1156.2	16	1193.8				
		60+00.0	203.0	1190.6	0	1193.7	-27.2	1166.5	-37.2	1156.5	1157.7	1156.5	1156.5	16	1194.0				
460		60+20.1	204.9	1190.6	0	1193.7	-27.2	1166.6	-37.1	1156.6	1157.7	1156.6	1156.6	16	1194.1				
	225.95	60+99.44 PT	213.9	1190.8	0	1193.8	-27.0	1166.9	-37.0	1156.9	1157.9	1156.9	1156.9	16	1194.2				
		61+00.0	214.0	1190.8	0	1193.9	-27.0	1166.9	-37.0	1156.9	1157.9	1156.9	1156.9	16	1194.2				
461		61+28.2	217.5	1190.8	0	1193.9	-26.9	1167.0	-37.1	1157.0	1157.7	1157.0	1156.8	16	1194.2				
		62+00.0	225.6	1190.9	0	1194.0	-26.7	1167.3	-37.4	1157.3	1157.4	1157.3	1156.6	16	1194.3				

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(continued)

Sheet 4 of

Red Mountain Bank Protection Offsets

ADOT Contract: 94-29

WPA Job # 93080.0
Date 22-Jan-9
02:56 P

SR202L Median Station	HEC - 2 Cross Section	CSA Control Line Station	Offset from SR202L Median to CSA Control	100-year WSEL	Offset to F1 (ft)	F1 Elevation	Offset to Backfill	Backfill Elevation	Offset to Toe (ft)	Toe of CSA Elevation (F2-10')	Toe of CSA Elevation Scour	Toe of CSA Elevation Min.	Toe of CSA Elevation Design	Offset to Acc Road	Acc Road Elevation	Offset to In Ramp	In Ramp Elevation	Offset to Out Ramp	Out Ramp Elevation	Toe of Cutoff Wall
					F 1		F 2			F 3				B 1		R 1		R 2		F4
462		62+36.7	229.4	1190.9	0	1194.1	-26.7	1167.4	-37.6	1157.4	1157.2	1157.2	1156.4	16	1194.4					
		63+00.0	235.3	1191.0	0	1194.2	-26.5	1167.6	-37.9	1157.6	1156.8	1156.8	1156.2	16	1194.5					
463		63+45.3	239.0	1191.1	0	1194.2	-26.4	1167.8	-38.1	1157.8	1156.6	1156.6	1156.1	16	1194.5					
		64+00.0	242.9	1191.2	0	1194.2	-26.2	1168.0	-38.4	1158.0	1156.3	1156.3	1155.9	16	1194.6					
		64+50.04 PC	245.8	1191.2	0	1194.3	-26.1	1168.2	-38.6	1158.2	1156.0	1156.0	1155.7	16	1194.6					
464		64+52.7	246.0	1191.2	0	1194.3	-26.1	1168.2	-38.6	1158.2	1156.0	1156.0	1155.7	16	1194.6					
		64+75.0		1191.3	0	1194.3	-26.0	1168.3	-38.7	1158.3	1155.9	1155.9	1155.6	16	1194.6					
		65+00.0	248.7	1191.3	0	1194.3	-26.0	1168.4	-38.8	1158.4	1155.7	1155.7	1155.5	16	1194.7					
465		65+57.6	252.5	1191.4	0	1194.4	-25.8	1168.6	-39.1	1158.6	1155.4	1155.4	1155.3	16	1194.7					
	226.04	66+00.0	255.6	1191.5	0	1194.4	-25.7	1168.8	-39.2	1158.8	1155.2	1155.2	1155.2	16	1194.8					
466		66+59.7	260.2	1191.5	0	1194.5	-25.5	1169.0	-39.3	1159.0	1155.2	1155.2	1155.2	16	1194.8					
		67+00.0	263.3	1191.5	0	1194.5	-25.4	1169.1	-39.3	1159.1	1155.2	1155.2	1155.2	16	1194.9					
467		67+60.1	268.0	1191.6	0	1194.6	-25.3	1169.4	-39.4	1159.4	1155.2	1155.2	1155.2	16	1194.9					
		68+00.0	271.1	1191.6	0	1194.6	-25.1	1169.5	-39.4	1159.5	1155.2	1155.2	1155.2	16	1195.0					
468		68+58.9	275.6	1191.6	0	1194.7	-25.0	1169.7	-39.5	1159.7	1155.2	1155.2	1155.2	16	1195.0					
		69+00.0	278.5	1191.7	0	1194.7	-24.9	1169.9	-39.5	1159.9	1155.2	1155.2	1155.2	16	1195.1					
469	226.13	69+54.0	281.8	1191.7	0	1194.8	-24.7	1170.1	-39.6	1160.1	1155.2	1155.2	1155.2	16	1195.1					
		69+59.36		1191.7	0	1194.8	-24.7	1170.1	-39.6	1160.1	1155.2	1155.2	1155.2	16	1195.1					
		70+00.0	284.0	1191.7	N/A	N/A	N/A	N/A	-39.6	1160.7	1155.2	1155.2	1155.2	N/A	N/A					
470		70+45.0	285.5	1191.7	N/A	N/A	N/A	N/A	-39.7	1160.7	1155.2	1155.2	1155.2	N/A	N/A					
		71+17.76	285.7	1191.7	N/A	N/A	N/A	N/A	-39.8	1160.7	1155.2	1155.2	1155.2	N/A	N/A					
471	226.23																			
472	226.35																			
473	226.50																			
474	226.53																			
475																				
476																				
477																				
478	226.58																			
		99+04.82		1202.3	N/A	N/A	N/A	N/A	-36.0	1193.0	1169.1	1169.1	1169.1	N/A	N/A					
479		99+08.9	227.5	1202.3	N/A	N/A	N/A	N/A	-36.0	1193.0	1169.1	1169.1	1169.1	N/A	N/A					
		100+00.0	213.5	1202.3	0	N/A	N/A	N/A	-36.1	1193.0	1169.2	1169.2	1169.2	N/A	N/A					
480		100+02.2	213.1	1202.3	0	1205.3	-2.3	1203.0	-36.1	1193.0	1169.2	1169.2	1169.2	N/A	N/A					
		100+50.0		1202.5	0	1205.4	-2.1	1203.3	-36.1	1193.3	1169.2	1169.2	1169.2	16	1205.7					
481		100+99.4	195.3	1202.5	0	1205.5	-1.8	1203.7	-36.2	1193.7	1169.3	1169.3	1169.3	16	1205.8					
		101+00.0	195.2	1202.5	0	1205.5	-1.8	1203.7	-36.2	1193.7	1169.3	1169.3	1169.3	16	1205.8					
482		101+99.8	175.5	1202.7	0	1205.7	-1.4	1204.3	-41.5	1194.3	1169.4	1169.4	1164.2	16	1206.0					
		102+00.0	175.4	1202.7	0	1205.7	-1.4	1204.3	-41.5	1194.3	1169.4	1169.4	1164.2	16	1206.0					1164.2
		102+43.94 PC	166.6	1202.7	0	1205.8	-1.2	1204.6	-32.1	1194.6	1169.4	1169.4	1173.7	16	1206.1					1162.4
		103+00.0	155.9	1202.8	0	1205.9	-0.9	1205.0	-20.0	1195.0	1169.5	1169.5	1185.9	16	1206.2					1160.2
483		103+01.7	155.6	1202.8	0	1205.9	-0.9	1205.0	-20.0	1195.0	1169.5	1169.5	1185.9	16	1206.2					1160.2
		104+00.0	139.5	1203.0	0	1206.1	-1.1	1205.0	-20.0	1195.0	1169.5	1169.5	1186.1	16	1206.4					1160.8
484		104+03.1	139.0	1203.0	0	1206.1	-1.1	1205.0	-20.0	1195.0	1169.6	1169.6	1186.1	16	1206.4					1160.8
		105+00.0	126.5	1203.2	0	1206.3	-1.3	1205.0	-20.0	1195.0	1169.6	1169.6	1186.3	16	1206.6					1161.4
485		105+04.0	126.0	1203.2	0	1206.3	-1.3	1205.0	-20.0	1195.0	1169.6	1169.6	1186.3	16	1206.6					1161.7
		106+00.0	117.0	1203.4	0	1206.5	-1.5	1205.0	-20.0	1195.0	1169.7	1169.7	1186.5	16	1206.8					1169.4
486		106+04.4	116.6	1203.4	0	1206.5	-1.5	1205.0	-20.0	1195.0	1169.7	1169.7	1186.5	16	1206.8					1169.4
		107+00.0	110.9	1203.5	0	1206.7	-1.7	1205.0	-20.0	1195.0	1169.8	1169.8	1186.7	16	1207.0					1169.4
487		107+04.6	110.7	1203.5	0	1206.7	-1.7	1205.0	-20.0	1195.0	1169.8	1169.8	1186.7	16	1207.0					1169.4
		108+00.0	108.4	1203.7	0	1206.9	-1.9	1205.0	-20.0	1195.0	1169.9	1169.9	1186.9	16	1207.2					1169.4

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(continued)

Red Mountain Bank Protection Offsets

ADOT Contract: 94-29

WPA Job # 93080.0

Date 22-Jan-9

02:56 PI

SR202L Median Station	HEC - 2 Cross Section	CSA Control Line Station	Offset from SR202L Median to CSA Control	100-year WSEL	Offset to F1 (ft)	F1 Elevation	Offset to Backfill	Backfill Elevation	Offset to Toe (ft)	Toe of CSA Elevation (F2-10')	Scour	Min.	Design	Offset to Acc Road	Acc Road Elevation	Offset to In Ramp	In Ramp Elevation	Offset to Out Ramp	Out Ramp Elevation	Toe of Cutoff Wal
					F 1		F 2		F 3					B 1		R 1		R 2		F4
488		108+04.6	108.4	1203.7	0	1206.9	-2.0	1204.9	-20.0	1194.9	1169.9	1169.9	1186.9	16	1207.2					1169.4
	226.61	108+96.45 PT	109.3	1203.8	0	1207.1	-4.0	1203.1	-20.0	1193.1	1170.0	1170.0	1187.1	16	1207.4					1169.4
		109+00.0	109.3	1203.8	0	1207.1	-4.1	1203.0	-20.0	1193.0	1170.0	1170.0	1187.1	16	1207.4					1169.4
489		109+04.6	109.5	1203.8	0	1207.1	-4.2	1202.9	-20.0	1192.9	1170.0	1170.0	1187.1	16	1207.4					1169.4
		110+00.0	111.9	1204.1	0	1207.3	-6.3	1201.0	-20.0	1191.0	1170.3	1170.3	1187.3	16	1207.6					1169.4
490		110+04.7	112.0	1204.1	0	1207.3	-6.3	1201.0	-20.0	1191.0	1170.4	1170.4	1187.3	16	1207.6					1169.4
		111+00.0	114.5	1204.5	0	1207.6	-6.4	1201.2	-20.0	1191.2	1170.7	1170.7	1187.6	16	1208.0					1169.4
491		111+04.7	114.6	1204.5	0	1207.6	-6.4	1201.2	-20.0	1191.2	1170.7	1170.7	1187.6	16	1208.0					1169.4
		112+00.0	117.0	1204.8	0	1208.0	-6.5	1201.5	-20.0	1191.5	1171.0	1171.0	1188.0	16	1208.3					1169.4
492		112+04.7	117.2	1204.9	0	1208.0	-6.5	1201.5	-20.0	1191.5	1171.0	1171.0	1188.0	16	1208.3					1169.4
		112+70.64 PC	118.9	1205.1	0	1208.2	-6.6	1201.6	-20.0	1191.6	1171.2	1171.2	1188.2	16	1208.5					1169.8
		113+00.0	120.2	1205.2	0	1208.3	-6.6	1201.7	-20.0	1191.7	1171.3	1171.3	1188.3	16	1208.6					1169.9
493		113+04.8	120.5	1205.2	0	1208.3	-6.6	1201.7	-20.0	1191.7	1171.3	1171.3	1188.3	16	1208.6					1169.9
		114+00.0	133.8	1205.6	0	1208.6	-6.7	1201.9	-20.0	1191.9	1171.6	1171.6	1188.6	16	1209.0					1170.4
494		114+05.9	135.0	1205.6	0	1208.7	-6.7	1201.9	-21.0	1191.9	1171.7	1171.7	1187.6	16	1209.0					1170.5
		114+52.12 PRC	146.3	1205.7	0	1208.8	-6.8	1202.0	-28.9	1192.0	1171.8	1171.8	1179.9	16	1209.1					1171.2
		115+00.0	158.1	1205.9	0	1209.0	-6.8	1202.2	-37.1	1192.2	1172.0	1172.0	1171.9	16	1209.3					1171.9
495	226.70	115+09.0	159.9	1206.0	0	1209.0	-6.8	1202.2	-37.0	1192.2	1172.0	1172.0	1172.0	16	1209.3					
		115+87.56 PT	171.9	1206.1	0	1209.3	-6.9	1202.4	-36.5	1192.4	1172.8	1172.8	1172.8	16	1209.6					
		116+00.0	173.2	1206.1	0	1209.3	-6.9	1202.4	-36.4	1192.4	1172.9	1172.9	1172.9	16	1209.6					
496		116+10.1	174.2	1206.1	0	1209.3	-6.9	1202.4	-36.3	1192.4	1173.0	1173.0	1173.0	16	1209.6					
		117+00.0	183.4	1206.1	0	1209.3	-6.7	1202.6	-35.5	1192.6	1173.9	1173.9	1173.9	16	1209.6					
497		117+10.58	184.4	1206.2	0	1209.3	-6.7	1202.6	-35.4	1192.6	1174.0	1174.0	1174.0	16	1209.6					
		118+00.0	193.5	1206.2	0	1209.3	-6.5	1202.8	-34.5	1192.8	1174.9	1174.9	1174.8	16	1209.7					
498		118+11.1	194.6	1206.3	0	1209.3	-6.5	1202.9	-34.4	1192.9	1175.0	1175.0	1175.0	16	1209.7					
		119+00.0	203.7	1206.3	0	1209.4	-6.3	1203.1	-33.5	1193.1	1175.9	1175.9	1175.8	16	1209.7					
499		119+11.6	204.5	1206.3	0	1209.4	-6.3	1203.1	-33.4	1193.1	1176.0	1176.0	1175.9	16	1209.7					
		120+00.0	214.0	1206.3	0	1209.4	-6.1	1203.3	-32.6	1193.3	1176.8	1176.8	1176.8	16	1209.7					
500		120+13.9	215.5	1206.4	0	1209.4	-6.1	1203.3	-32.5	1193.3	1177.0	1177.0	1176.9	16	1209.7					
		120+60.0		1206.4	0	1209.4	-6.0	1203.4	-32.0	1193.4	1177.4	1177.4	1177.4	16	1209.7					
		121+00.0	225.4	1206.5	N/A	N/A	N/A	N/A	-31.5	1193.5	1177.8	1177.8	1177.9	N/A	N/A					
501	226.80	121+17.5	227.5	1206.5	N/A	N/A	N/A	N/A	-31.5	1193.5	1178.0	1178.0	1177.9	N/A	N/A					
501.657		121+83.21	236.2	1206.6	N/A	N/A	N/A	N/A	-30.8	1193.7	1178.6	1178.6	1178.6	N/A	N/A					

q:\redmntn\hardbank\sunmatin\toedwn95.wq2

5.0 COORDINATION WITH LOCAL AGENCIES

Due to the project's proximity to the Salt River, the Indian reservation, and the City of Mesa, this design/analysis required coordination with many federal, state, county, city, and local agencies.

- Army Corps of Engineers

  The boundary for the Waters of the U.S. was established by the Corps. The hardbank was designed to minimize the impact to the boundary in the area east of the Alma School Drain. If the hardbank construction encroaches into the Waters of the U.S. a 404 permit may be required.

- Federal Emergency Management Agency (FEMA) (City of Mesa)

  The City of Mesa is the FEMA flood insurance administrator for the subject reach of the Salt River. Since the proposed hardbank encroaches into the existing 100-year floodway, a LOMR (Letter of Map Revision) will be required for the project. The LOMR will be coordinated with the CoM, FCDMC, and FEMA.

- Salt River Pima Maricopa Indian Community

  The alignment of the freeway is along the border of the Indian Reservation. Coordination between ADOT and the Tribe regarding the purchase of construction easements, etc. will be required throughout the project. In addition, coordination between the design of the north and south bank channelization of the Salt River must be addressed.

- Maricopa County Flood Control District (MCFCD)

  MCFCD will be in responsible for maintenance of the hardbank. Due to their involvement in the ongoing analysis of the Salt River (including the subject reach), significant coordination with MCFCD will be required.

  The Maricopa County Department of Transportation (MCDOT) is planning the future construction of a bridge structure across the Salt River along the current McKellips Road alignment. Based on coordination with MCDOT, the Red Mountain freeway bank protection may be incorporated into the future design of this bridge structure. Therefore, the hardbank may be continuous along the south bank of the Salt River. The proposed design for this bridge involves closing off the south channel at Alma School Road and forcing the entire flow through the north channel. This scenario will most likely result in a significant increase in the water surface elevations in the vicinity of Alma School Road unless significant channelization is done upstream of the Alma School Road MCDOT drop structures.

- Local Sand & Gravel Mining Operations

There are several sand & gravel operations in the subject reach of the Salt River and coordination will be necessary to minimize impacts between the Red Mountain freeway and the mining operations. Sunward Materials will require a bridge crossing under the freeway to maintain access between their mining and process operations. The access road will cross the hardbank west of Alma School Road.

The process settling ponds located east of Alma School Road effectively block the south branch of the Salt River during small flood events. However, during large flood events, these settling ponds will wash out and south channel will convey floodwater. The hardbank has been designed to remain outside of the settling ponds and should not impact their continued operation.

6.0 COMPUTER FILE DESCRIPTIONS

Note: All HEC-2 and HEC-6 files are based on preliminary files developed by Michael Baker Jr. and received from the Flood Control District of Maricopa County (FCDMC).

HEC-2 Hydraulic Analysis Files

EXSTING.DAT This is the existing condition model for the 220,000 cfs flow in the Salt River. The SLA design condition forms the downstream portion of the model.

EXSTSS.DAT This file models the existing condition flow in the south split at the Alma School Road bridges.

DESIGN1.DAT This file was originally entitled BASE.DAT and was modified both by Wood/Patel and Simons, Li & Associates, Inc. (SLA) from the original Michael Baker Jr. file received from the FCDMC. This file models the design condition with the south hardbank in place. The invert elevations were modified by SLA (based on field investigation) from the original MBE data.

DSGN1SS.DAT This file models the design condition flow in the south split at Alma School with the south hardbank in place.

DESIGN2B.DAT This file was originally entitled BSI-SM.DAT and was modified both by Wood/Patel and SLA from the original files received from the FCDMC. This file models the design condition with both the north and south hardbank in place. A "bump" in the channel bed profile in the SLA model at sections 225.28 and 225.38 was removed for our analysis.

DSGN2BSS.DAT This file models the design condition flow in the south split at Alma School with both the north and south hardbank in place.

Sediment Transport Analysis HEC-2 Files

BSI-SMET.DAT This file is the approved main channel HEC-2 file provided to Robert Ward as a basis for creating the HEC-6 models for the main channel. Only the input file is enclosed.

SPTBDGN2.DAT This file is the approved south split file provided to Robert L. Ward as a basis for creating the HEC-6 models for the south split. Only the input file is enclosed.

M2.IN This is file BSI-SMET.DAT with modifications to remove the "bump" in the main channel at XSEC's 225.28 and 225.38. Revised encroachment stations have been added to reflect a 4:1 expansion downstream of Country Club Drive bridge. This model provided the hydraulic data for use in the manual scour calculations in Table 4.1 of the attached sediment transport analysis report.

S1H2.IN This model reflects revisions made by Robert L. Ward to the SPTBDGN2.DAT model for the south split. These revisions reflect removal of the sediment elevations upstream of Alma School Road and the removal of some effective flow area along the south bank of XSEC 226.89 (STENCL = 19,040). This model provided hydraulic data for the scour calculations for the first scenario in Table 4.2 of the attached sediment transport analysis report.

S2H2.IN Same as S1H2.IN except the sediment elevations have been left on the X3 records. This model provided hydraulic data for the scour calculations for the second scenario in Table 4.2 of the attached sediment transport analysis report.

Sediment Transport Analysis HEC-6 Files

T2A This is the HEC-6 model for the main channel. It is based on the GR data from the HEC-2 file M2.IN, but all of the bridge records have been removed. Local inflow and diversion points have been added to reflect the Alma School Road "island". XSEC 226.47 has been added near the downstream side of Alma School Road.

T2A1 This is the HEC-6 model for the main channel. It is identical to the T2A model except that the sediment inflow has been doubled per a 60% comment from the FCDMC.

T2B This is the portion of file T2A that lies below the gravel pit near XSEC 225.57. The starting sediment supply is zero in order to reflect a 100% trap efficiency from the pit.

T2APF.IN This is model T2A configured for a fixed bed condition to reflect the post-flood bed profile. This model is run for a single time step for the peak 100-year discharge. GR records have been adjusted to reflect the cumulative vertical bed movement that occurred at time step #34 from model T2A.

SOUTH1.IN Natural invert model for the south channel from Alma School Road to McKellips Road. Zero sediment inflow from the main channel.

SOUTH2.IN Raised invert model for the south channel from Alma School Road to McKellips Road. Zero sediment inflow from the main channel.

S2APF.IN Fixed-bed model to reflect the post-flood bed profile for the south channel. This model is run for a single time step for the peak 100-year discharge. GR records have been adjusted to reflect the cumulative vertical bed movement that occurred at time step #34 from model SOUTH2A, which has the raised invert profile and 32.9% sediment diversion from the main channel.

7.0 REFERENCES

1. U.S. Army Corps of Engineers, Hydrologic Engineering Center, "HEC-2 Water Surface Profiles", Users Manual, September 1990.

2. U.S. Army Corps of Engineers, Hydrologic Engineering Center, "HEC-6 Scour and Deposition in Rivers and Reservoirs",Users Manual, August 1993.

3. Simons and Sentruk, Sediment Transport Technology, Water Resources Publications, Ft. Collins, Colorado, 1077

4. Simons, Li & Associates, Inc., "Design Manual for Engineering analysis of Fluvial Systems", Prepared for the Arizona Department of Water Resources, Tucson, Arizona, March, 1985.

5. U.S. Department of the Interior, Bureau of Reclamation, Computing Degradation and Local Scour, Technical Guideline, Denver, Colorado, January 1994.

6. Federal Highway Administration, "Highways in the River Environment", Publication No. FHWA-H1-90-016, February 1990.

7. U.S. Army Corps of Engineers, Los Angeles District, "Salt River Flood Insurance Study, Aqua Fria River to Country Club Drive", Performed for the Federal Emergency Management Agency, 1983-84.

8. CRSS Civil Engineers, Inc., "Salt River Hydraulic Design Grade Control No. 4 to McClintock Drive Bridge" Prepared for the City of Tempe Department of Public Works, Phoenix, Arizona, August 1991.

9. Simons, Li & Associates, Inc. "Effects of In-Stream Mining on Channel Stability", Report No. FHWA-AZ88-250, Prepared for the Arizona Department of Transportation, Arizona Transportation Research Center, June 1989.

10. Flood Control District of Maricopa County, "Letter of Intent for Salt River South Bank Stabilization, Attachment A - Analytical approach for Determining Required Toe Depths for Bank Protection along Salt River Upstream of McClintock Drive", February 18, 1992.

11. Letter Dennis Richards (SLA) to Tom Monchak (DMJM), "Bank Protection Toe Down Depths in the Vicinity of Sand and Gravel Mining Pits", July 29, 1992.

Appendix A

Sediment Transport Analysis

Appendix B

Existing Condition HEC-2 Models
Design Condition 1 HEC-2 Models
Design Condition 2 HEC-2 Models
HEC-6 Main Channel Analysis

HEC-2

Existing Condition Model
Main Channel

Summary Printout (SUMPO)
& Complete Printout

Filename = EXISTING.DAT

HEC-2

Existing Condition Model
South Split at Alma School

Summary Printout (SUMPO)
& Complete Printout

Filename = EXSTSS.DAT

HEC-2

Design Condition 1 Model
South Hardbank in Place
Main Channel

Summary Printout (SUMPO)
& Complete Printout

Filename = DESIGN1.DAT

HEC-2

Design Condition 1 Model
South Hardbank in Place
South Split at Alma School

Summary Printout (SUMPO)
& Complete Printout

Filename = DSGN1SS.DAT

HEC-2

Design Condition 2 Model
South Hardbank in Place and
North SRPMIC Hardbank in Place
Main Channel

Summary Printout (SUMPO)
& Complete Printout

Filename = DESIGN2.DAT

HEC-2

Design Condition 2 Model
South Hardbank in Place and
North SRPMIC Hardbank in Place
South Split at Alma School

Summary Printout (SUMPO)
& Complete Printout

Filename = DSGN2SS.DAT

HEC-6

Sediment Transport Model
Main Channel Analysis

Filename = T2A

Appendix C

Bank Protection Design Criteria Documentation

Appendix A

Sediment Transport Analysis

SEDIMENT TRANSPORT ANALYSIS
SALT RIVER
RED MOUNTAIN FREEWAY
McKELLIPS ROAD to DOBSON ROAD

prepared for:

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September 15, 1995

Table of Contents

1 INTRODUCTION 1

2 HYDRAULIC MODELS (HEC-2) 3

2.1 HEC-2 Files 3

2.2 Topographic Mapping 4

3 SEDIMENT TRANSPORT & SCOUR ANALYSIS 5

3.1 Scour Analysis (Non-Gravel Pit Environment) 5

3.1.1 Long-Term Degradation 6

3.1.2 Local Scour 7

3.1.3 General Scour 7

3.1.4 Bend Scour 8

3.1.5 Low-Flow Incisement 8

3.1.6 Bed-Form Troughs 9

3.2 Sediment Routing Model (HEC-6) 10

3.2.1 Flood Hydrograph 11

3.2.2 Cross-Section Data 13

3.2.2.1 Main Channel 13

3.2.2.2 South Channel 14

3.2.3 Bed-Material Gradation 15

Table of Contents

3.2.4 Sediment Supply 17

3.2.5 Special Considerations Near Alma School Road 19

3.2.5.1 Split-Flow Analysis 20

3.2.5.2 Main Channel Headcut 20

3.3 Gravel Pit Analysis 21

4 CALCULATION SUMMARY & RECOMMENDATIONS 25

4.1 Results of HEC-6 Modeling 25

4.2 Total Scour Summary 29

4.3 Water Surface Profile Summary 33

4.4 Recommended Elevations For Freeway Embankment Design 36

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Table of Tables

Table 3.1 - Sediment Gradation for HEC-6 Modeling 15

Table 4.1 - Summary of Scour Analysis Calculations - Main Channel 30

Table 4.2 - Summary of Scour Analysis Calculations - South Channel 31

Table 4.3 - Summary of Recommended Elevations for CSA Bank-Lining Design 37

Table of Figures

Figure 1.1 - Location Map 2

Figure 3.1 - 100-Year Discretized Hydrographs, Salt River 12

Figure 3.2 - Sediment Gradation for Salt River Bed-Material 16

Figure 3.3 - Sediment Load Curve, Salt River 18

Figure 3.4 - Scour Geometry for Gravel Pit Near XSEC 226.04 24

Figure 4.1 - Salt River Bed Profile From HEC-6 Analysis for Main Channel 26

Figure 4.2 - Salt River Bed Profile From HEC-6 Analysis for South Channel 27

Figure 4.3 - Salt River Bed Profile From HEC-6 Analysis for Main Channel,With Zero Sediment Inflow at XSEC 225.38 28

Figure 4.4 - Salt River Water Surface Profile Analysis for Main Channel 34

Figure 4.5 - Salt River Water Surface Profile Analysis for South Channel 35

Figure 4.6 - Recommended Design Profiles for CSA Bank-Lining, Alma School Road to Dobson Road 38

Figure 4.7 - Recommended Design Profiles for CSA Bank-Lining, Alma School Road to McKellips Road 39

List of Appendices

Appendix A - Summary of HEC-6 Analysis for Main Channel Bed Profile, Model T2A

Appendix B - Summary of HEC-6 Analysis for South Channel Bed Profile, Models SOUTH1 & SOUTH2

Appendix C - Summary of HEC-6 Analysis for Main Channel Bed Profile, With Zero Sediment Inflow Downstream of XSEC 225.38, Model T2B

Appendix D - Summary of HEC-6 Water Surface Profiles for Main Channel, Model T2A

Appendix E - Summary of HEC-6 Water Surface Profiles for South Channel, Models SOUTH1A & SOUTH2A

Appendix F - Sample Calculation for Scour Analysis

List of Plates

Plate 1 - Topographic Map (1" = 400') With HEC-2/HEC-6 XSEC Locations

Plate 2 - Topographic Map (1" = 400') With HEC-2/HEC-6 XSEC Locations

Plate 3 - Topographic Map (1" = 400') With HEC-2/HEC-6 XSEC Locations

1 INTRODUCTION

The purpose of this report is to present the results of a sediment transport and scour analysis that was performed to provide data for the design of a bank protection system for that section of the Red Mountain Freeway that abuts the south bank of the Salt River, between McKellips Road and just west of Dobson Road. The bank protection addressed in this report extends from SR 202L Median Station 399+48.93 to approximately Station 500+50. Based on a separate median offset stationing system for the bank protection design (STA 0+00 to 120+60), the total length of the embankment protection is 12,060 feet (2.28 miles). The study reach is shown in Figure 1.1.

At the present time, the proposed freeway embankment protection system is to be constructed of cement-stabilized alluvium (CSA). This bank-lining material is required to prevent an erosion failure of the freeway embankment, as a result of flow in the Salt River.

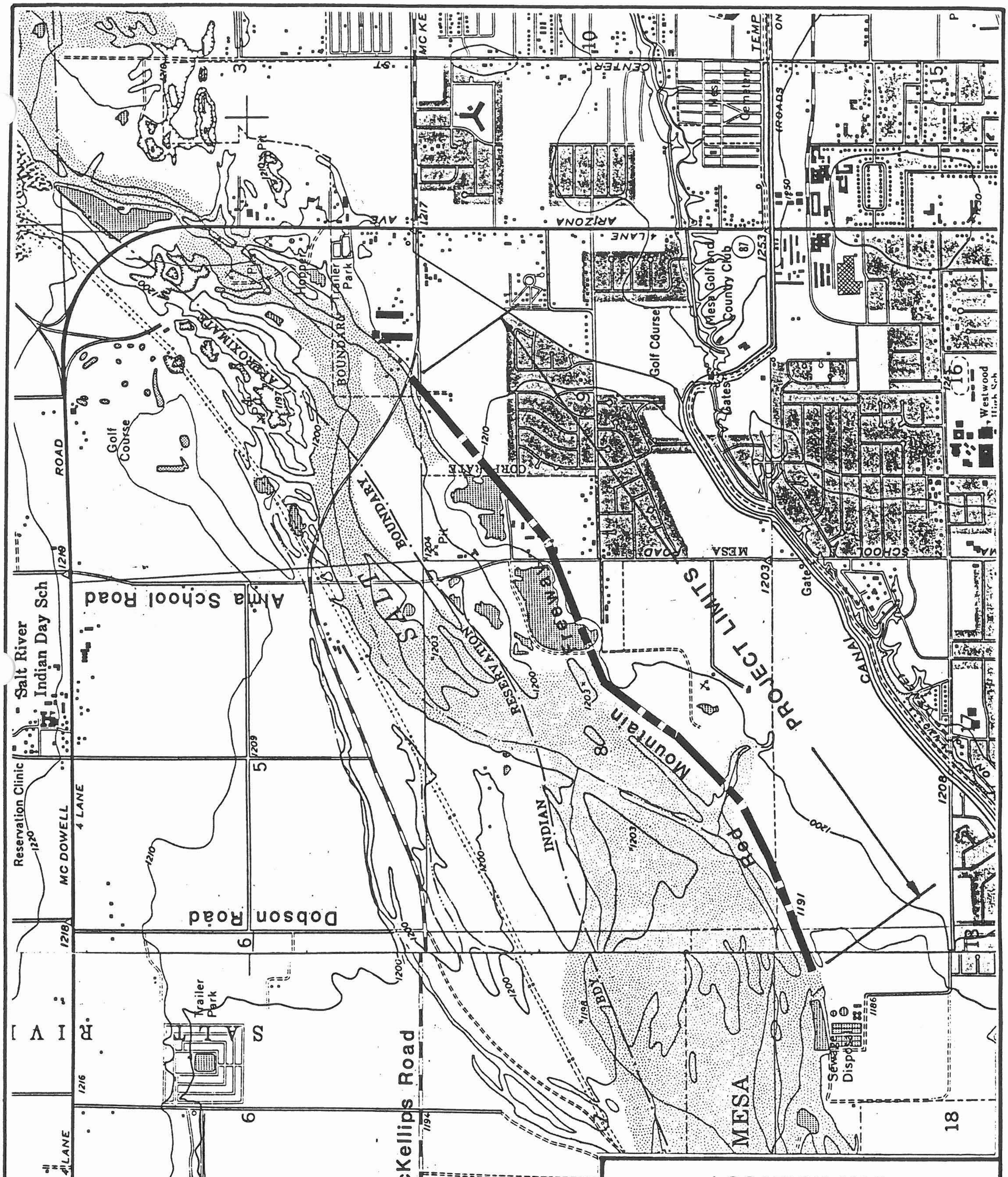
Specific objectives of this study are to:

1. provide recommended toe-down elevations for the CSA bank protection system.

2. provide recommended top-of-bank elevations that will prevent the CSA system from being overtopped during the 100-year, 10-day flow event in the Salt River.

To be consistent with the previously approved sediment transport and scour analysis that was prepared by Simons, Li & Associates, Inc. (SLA) for the adjacent downstream section of the Red Mountain Freeway, the same general procedures and technical approach have been adopted for this upstream study. The SLA study is published as **Hydraulic And Sediment Transport Analysis Report, Salt River Bank Protection Design, South Bank Upstream Of Pima Freeway, Bank STA 33+00 To 73+00**, April 1994.

The following sections of this report present a technical discussion of the engineering assumptions and methodologies that were used in the sediment transport and scour analysis. Section 4 presents calculation summaries and design recommendations.



LOCATION MAP

RED MOUNTAIN FREEWAY

September 1995 | Figure 1.1

2 HYDRAULIC MODELS (HEC-2)

The HEC-2 models that formed the basis for initiating this study, were provided to the author of this report by *Wood, Patel & Associates, Inc.* (WPA). The original HEC-2 modeling was performed by *Michael Baker, Jr., Inc.* (MBJ). Certain revisions were made to the MBJ files by WPA. WPA indicated that these revised files have been approved by the Arizona Department of Transportation (ADOT) and by the Flood Control District of Maricopa County (FCDMC) for use in this sediment transport and scour analysis. The following sections present a discussion of the HEC-2 files that were used in the sediment transport and scour analysis.

2.1 HEC-2 Files

The HEC-2 files that were provided for use in this study are identified as follows:

1. WPA File: *BSI-SMET.DAT* - This model covers the main channel of the river and has encroachments in-place for the north hard-bank. This model also includes a split-flow analysis for the island that exists near Alma School Road.

   As used in this current study, changes made by R. Ward to the WPA model include the elimination of cross-sections downstream of XSEC 224.62 and upstream of XSEC 227.56 (areas upstream and downstream of these locations were well beyond the current study limits). A minor revision was also made to the south effective flow boundaries of three cross-sections to simulate a 4:1 expansion ratio downstream from the Country Club Drive bridge. Wood-Patel also provided supplementary GR data to R. Ward to eliminate an approximate 8-foot high "bump" in the thalweg profile between XSECs 225.28 and 225.38. This revised HEC-2 file is referenced as Model M2.IN in subsequent sections of this report.

   As will be discussed in the following sections, other formatting changes were made to this model to convert it to a HEC-6 format. This HEC-2 model provided the basic geometric data for creating the HEC-6 model for the main channel of the river.

2. WPA File: *SPTBDGN2.DAT* - This model was created for the HEC-2 split-flow analysis around the south side of the island near Alma School Road. The starting water surface elevation for this model reflects the existence of the north hard-bank on the main channel of the river.

   WPA has inserted X3 records in this model to fill-in depressions in that part of the south channel that lies upstream of the Alma School Road bridge.

   Due to the existence of a large gravel pit downstream from the Alma School Road bridge, only that part of this model located between Alma School Road and

McKellips Road was used for the HEC-6 analysis of the south channel. Areas downstream of the south channel bridge will be analyzed as a function of in-stream gravel mining behavior.

2.2 Topographic Mapping

The following information was provided by Wood-Patel regarding the source of topographic mapping used for the HEC-2 models.

"The topographic information used in this analysis was provided by Michael Baker, Jr., Inc. and the Flood Control District of Maricopa County. The mapping was prepared at a scale of 1" = 400' with a 4-ft contour interval. The topography for this model was based on aerial photographs and survey data collected by McLain, Harbors Co., Inc.; Baker Engineers; Jaykim Engineers; and Greiner Engineers. The flight dates for the aerial photographs are December 13, 1991, January 13, 1992, January 23, 1992, and February 2, 1993, respectively.

The topography does not appear to reflect any changes in the channel (i.e., degradation, head cutting, etc.) which may have occurred due to the January/February 1993 flooding. In addition, flows in the river may have prevented accurate mapping of the invert. Specifically, the average daily flow recorded on February 2, 1993 was approximately 11,000 cfs."

The 11,000 cfs flow in the river during the February 1993 mapping, creates concern about the accuracy of any scour analysis performed with this data. Without having access to more current and accurate topographic mapping of the true riverbed geometry, the analysis presented in this report will not necessarily represent scour conditions that would occur along the Red Mountain Freeway alignment as of August 1995. The existence of in-stream gravel pits, which may have been camouflaged by the 11,000 cfs flow, or, which may have been excavated since the mapping was prepared, contributes to this concern.

ADOT has also provided topographic strip maps for a limited width along the freeway construction centerline; they do not cover the entire river-bed. These maps, which were based on an April-May 1994 flight date, are being used for the freeway design.

The author of this report, and a representative from Wood-Patel, conducted a field inspection of the study reach on August 31, 1995. This inspection was made to compare field observations and June 1995 aerial photographs to the 1991-1993 topographic maps. This inspection provided information that was used to estimate bank-lining toe-down requirements as a function of current in-stream gravel mining activities (see Section 3.3).

Topographic maps showing the WPA/MBJ cross-section locations referenced in this report are included as Plates 1, 2, and 3. These Plates are based on the 1991-1993 mapping.

3 SEDIMENT TRANSPORT & SCOUR ANALYSIS

A sediment transport analysis was conducted for the freeway embankment in order to examine the potential for sediment deposition impacts to the design water surface profile and for potential undercutting of the bank-lining by scour processes. The following sections address the mechanics of both short-term, single-event bed scour and long-term bed-slope adjustments. Section 3.3 discusses scour impacts due to the location of gravel pits adjacent to the freeway, while water surface profile fluctuations, associated with moveable-bed geometry, are addressed in Section 4.3.

3.1 Scour Analysis (Non-Gravel Pit Environment)

The design of an erosion resistant bank protection system must consider the potential for scour of the channel bed, if the bed is to be left in a natural condition. Failure to do so could lead to the toe of the bank protection material being undercut by scour processes that will be induced by flowing water. Should this situation occur, the bank-lining material may collapse into the scour hole, thus exposing the bank to erosive velocities and possible lateral movement.

Vertical incisement of the channel bed can occur in response to the following six processes:

$$Z_{tot} = Z_{deg} + Z_{ls} + Z_{gs} + Z_{bs} + Z_{i} + Z_{bf} \quad \text{............... (Equation 3.1)}$$

where Z_{tot} = total vertical adjustment in bed elevation

Z_{deg} = vertical change due to long-term degradation
Z_{ls} = vertical change due to local scour
Z_{gs} = vertical change due to general scour
Z_{bs} = vertical change due to bend scour
Z_{i} = vertical change due to low-flow incisement
Z_{bf} = vertical change due to bed-form troughs

A brief discussion of each of these phenomena, and its applicability to this project, is presented in the following sub-sections.

3.1.1 Long-Term Degradation

Sediment transport analyses need to distinguish between short-term and long-term changes. Short-term changes are event-specific and occur to some extent during each flood hydrograph. Referring to Equation 3.1, examples of short-term changes would be local scour, general scour, bend scour, bedform troughs, and to some extent, low-flow incisement. With the exception of low-flow incisement, any visible signs of these processes may be difficult to detect after the flow has subsided.

Long-term degradation occurs over a long period of time in response to an imbalance between the sediment transport capacity of the channel and the dominant sediment supply to the channel. When such imbalances occur, the channel will naturally adjust its slope to restore equilibrium between the transport capacity and incoming supply of sediment. If the transport capacity of the channel exceeds the sediment supply, the channel will flatten its slope (degrade). However, should the sediment supply exceed the transport capacity of the channel, the channel slope will increase (aggrade) in order to generate higher velocities that are capable of moving the sediment inflows.

Long-term degradation is very difficult to quantify because of the many complex variables that drive this process. Accordingly, numerous assumptions have to be made on the basis of engineering judgment.

Long-term degradation (and/or aggradation) are normally evaluated with an equilibrium slope analysis. Such an analysis requires that a known or assumed scenario of river or watershed changes will occur and be in existence for an adequate time frame for the river system to re-establish equilibrium with such changes.

Since this reach of the Salt River is undergoing active gravel mining, there is no way that a constant set of river system changes can be assumed for conducting an equilibrium slope analysis, i.e., the equilibrium target is changing on a daily basis, and will probably continue to do so for many years to come. Accordingly, an equilibrium slope analysis is not considered practical for this reach of the Salt River.

As a matter of technical interest, the 1994 SLA report did conduct an equilibrium slope and armoring analysis for that reach of the Salt River between McClintock Drive and Alma School Road. This reach includes the majority of the Red Mountain Freeway alignment being addressed in this current study.

The SLA study published an equilibrium slope of 0.00047 ft/ft, which was pivoted about Grade Control #5, which is located just downstream of McClintock Drive. The SLA report also listed a computed armoring size of 24-mm (0.94"), and an associated armoring depth of 0.3-feet, for the 10-year peak discharge of 95,800 cfs. SLA compared this armoring depth to the theoretical equilibrium slope depth and used the lesser of these two depths to determine the long-term degradation component in Equation 3.1.

For the purpose of continuity with the approved SLA report, the published equilibrium slope of 0.00047 ft/ft, and the Q_{10} armoring depth of 0.3-feet, will also be compared in this report for a prediction of long-term degradation through the current study reach. Since there are no other riverbed "hard-points" between McClintock Drive and Alma School Road, Grade Control #5 will be used as the pivot point for projecting the equilibrium slope to Alma School Road. The Alma School Road grade-control structure will be used as the pivot point for areas upstream of this location.

3.1.2 Local Scour

Local scour will occur in response to objects being placed in the path of flowing water. The most common form of local scour is that occurring at bridge piers and protruding bridge abutments or spur dikes. This process would be applicable to bridge piers at the Alma School Road crossing of the Salt River. However, since the Red Mountain Freeway is over 500-feet south of these piers, the freeway will not be in the pier scour envelope. Accordingly, local scour calculations were not required for this study.

3.1.3 General Scour

This scour process occurs in response to changes in river geometry and/or bed-slope from one reach of a river to the next. As the river cross-section contracts and expands, its flow velocity (and thus sediment transport capacity) will change. General scour will occur when a channel contracts (in the downstream direction) and causes an increase in velocity through the contracted section. The increase in sediment transport capacity through the contracted reach will begin to remove more sediment from the bed of the contracted reach than is being delivered to the contraction by the wider, upstream reach. The result is a lowering (general scour) of the channel bed through the contracted reach. When the channel geometry expands in the downstream direction, the opposite effect can occur, i.e., sediment deposition will take place in the wider channel section. However, sediment deposition can also take place if an artificially constricted channel is subjected to larger sediment inflows than it can transport.

General scour, and/or sediment deposition, is usually quantified with a mobile-boundary sediment routing model, such as HEC-6. Such models are capable of predicting scour and deposition patterns as a function of bed-material size, channel geometry, bed-slope, and changes in discharge that occur during passage of a specific flood hydrograph. Section 3.2 of this report provides a detailed discussion on the sediment routing model that was created to quantify the general scour contribution to the total scour depth for the bank-lining design.

3.1.4 Bend Scour

As the name implies, this process only occurs in the vicinity of channel curvature. For this study, the magnitude of bend scour was completed with the following equation (ADWR, 1985):

$$Z_{bs} = \frac{0.0685 Y V^{0.8}}{Y_h^{0.4} S_e^{0.3}} \left[2.1 \left(\frac{\sin^2 \frac{\alpha}{2}}{\cos \alpha} \right)^{0.2} - 1 \right] \text{.............. (Equation 3.2)}$$

where Z_{bs} = depth of bend scour (ft)

V = mean velocity of upstream flow (fps)

Y = maximum depth of upstream flow (ft)

Y_h = hydraulic depth of upstream flow (ft)

S_e = upstream energy slope (ft/ft)

alpha = angle formed by the projection of the channel centerline from the point of curvature to a point which meets a line tangent to the outer bank of the channel (degrees)

Depth and velocity data for the bend scour calculations were taken from HEC-2 File M2.IN, which reflects the revisions discussed in Section 2.1 to WPA HEC-2 File BSI-SMET.DAT. Curvature angles were measured from the MBJ topographic mapping.

The approximate downstream limit of the bend scour component was computed with Equation 3.3 (ADWR, 1985):

$$X = 2.3 \left(\frac{C}{\sqrt{g}} \right) Y \text{............ (Equation 3.3)}$$

where X = distance from the end of channel curvature (point of tangency) to the downstream point at which secondary currents have dissipated (ft)

C = Chezy coefficient

Y = maximum depth of flow within the bend (ft)

g = 32.2 feet/second^2

3.1.5 Low-Flow Incisement

Man-made channels with large width to depth ratios are very vulnerable to the formation of low-flow channels. When trapezoidal channels, designed to carry large events such as the 100-year flood, are exposed to smaller, more frequent flows (2- to 5-year floods), the wide channel bottomwidths may cause a shallow sheetflow condition to exist. Rather than transporting small flows in this manner, nature will incise a low-flow section (similar to manmade pilot channels in wide trapezoidal sections) that provides a more hydraulically efficient conveyance for small discharges.

Low-flow channels will meander across the bottom of the larger, parent channel, thus randomly coming into contact with the channel banks. Accordingly, it is important to acknowledge low-flow incisement when computing the total scour depth for bank-lining design.

Since this reach of the Salt River is a natural watercourse, low-flow incisement will already have occurred. Accordingly, for natural sections of the river, low-flow incisement will be accounted for by referencing the total computed scour depth to the minimum channel elevation at each river cross-section.

HEC-2 Model BSI-SMET.DAT includes notes that state the channel invert will be "smoothed" to a manmade elevation from SLA XSEC 42.1 through XSEC 225.38. The natural channel invert elevation for these same sections was identified from the original MBJ HEC-2 Models R4A.DAT and R5A.DAT. These natural inverts were compared to the "smoothed" invert elevations. The lower of the natural versus "smoothed" invert elevations was used as a reference point for the total computed scour depth in this report. Through this area of mixed natural and manmade inverts, 1-foot of low-flow incisement was used in the scour calculations.

For the artificially raised invert profile through that portion of the south channel located upstream of Alma School Road, 2-feet of low-flow incisement was used in the scour calculations. No low-flow incisement was added to the scour calculations when analyzing the natural invert profile through this same reach

3.1.6 Bed-Form Troughs

Sand and gravel-bed channels are prone to the development of transitory bedforms, such as dunes and antidunes. Such bedforms create troughs, or depressions, below the natural bed of the channel during the flow event. In order to account for the possibility of these troughs forming adjacent to the toe of the bank, it is prudent to include bedform troughs in the estimate of total scour. Although this reach of the Salt River has a very cobbly bottom, which may tend to inhibit the full development of bed-forms, calculations were performed in order to include this scour component in the toe-down design for the freeway embankment.

Based on laboratory flume studies, the maximum depth of antidune troughs (below the existing channel bed) is approximately equal to $\underline{0.0135V^2}$ or one-half the depth of flow, whichever value is less (ADWR 1985).

For lower regime flow, dune heights can be estimated from the following relationship (Simons & Senturk, 1977):

$$\log d = 0.8271 \log A + 0.8901 \quad \text{(Equation 3.4)}$$

where d = mean flow depth (meters)
A = dune height, from trough to crest (meters)

Tables 4.1 and 4.2 (in Section 4 of this report) present a quantitative summary of the preceding scour processes and recommended scour depths that should be applied to the bank-lining toe-down design. It should be noted that the total scour depths include a safety factor of 1.5. A minimum scour depth criteria of 10-feet is also applied to all locations.

3.2 Sediment Routing Model (HEC-6)

As discussed in Section 3.1.3, the general scour and sediment deposition process is an event-specific analysis that is most accurately performed with a mobile-boundary sediment routing model. Accordingly, the Corps of Engineers HEC-6 Program, Version 4.1.00, October 1993, was used to analyze the sediment transport performance of this reach of the Salt River.

Due to the split-flow condition in the vicinity of Alma School Road, separate HEC-6 models were created for the main channel and the smaller channel that flows around the south side of the island between McKellips Road and Alma School Road.

In addition to cross-sectional geometry, required input data for HEC-6 consists of a flood hydrograph, a sediment supply rating curve, bed-material gradation, and the selection of a sediment transport equation. HEC-6 uses this information to compute hydraulic data and sediment transport rates for discrete intervals of time throughout the inflow hydrograph. The incoming sediment load is also computed for each hydrograph interval and introduced to the model at the most upstream cross-section.

The difference in sediment inflow and sediment transport is computed for the upstream control section and any imbalance between the two quantities is converted to a sediment volume and distributed within a *"control reach length"* that is a function of adjacent cross-section spacing. If the sediment inflow exceeds the channel transport rate, then sediment deposition occurs and the channel bed is adjusted upward to reflect the excess volume of material. If the reverse condition occurs, then scour will result in a lowering of the bed elevation.

The difference between actual sediment transport rate and incoming sediment load at the first control section becomes the sediment supply to the next downstream control section. This process is repeated until the downstream end of the model is reached. The next interval of the hydrograph is then introduced and the entire calculation sequence is repeated.

The Meyer-Peter and Muller (MPM, 1948) sediment transport equation was used for this study. This equation is recommended for streams with relatively coarse bed-material and very little suspended bed-material load. The cobbly bottom of the Salt River and the sediment trap efficiency of upstream SRP dams would seem to support these assumptions for the study reach addressed in this report. The MPM equation was also used in the sediment routing model prepared by SLA for the adjacent downstream reach of the Salt River, although it was integrated with Einstein's procedure for suspended bed-material load. Einstein's procedure is not an available option in HEC-6.

The following sub-sections discuss specific elements of the input data developed for the HEC-6 models presented in this report.

3.2.1 Flood Hydrograph

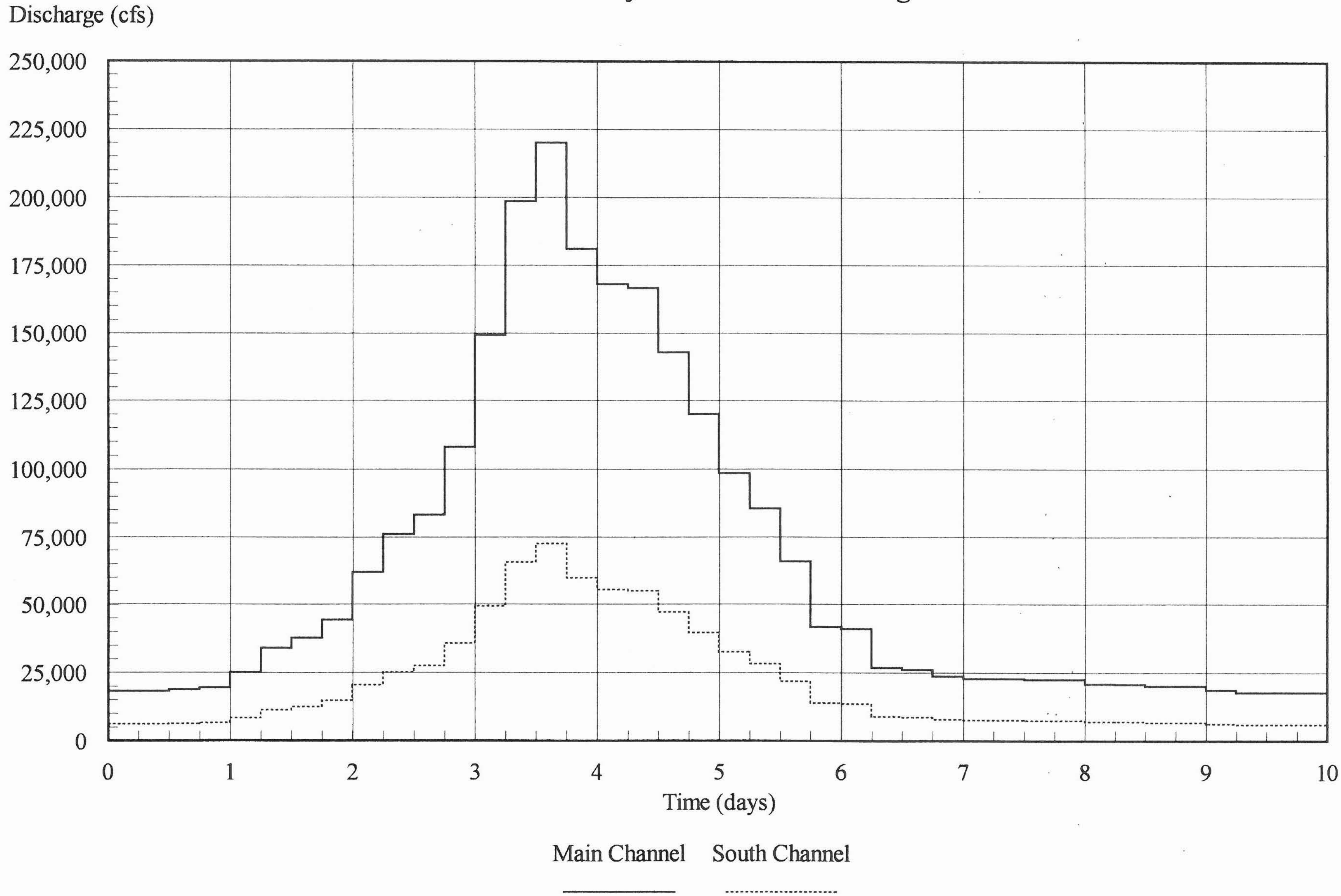
The hydrograph used for the sediment routing model was identical to that used in the previously referenced 1994 SLA report. The hydrograph coordinates, which were provided to Wood-Patel by SLA, reflect a 100-year, 10-day flood with a peak discharge of 220,000 cfs for the main channel of the Salt River.

The split-flow hydrograph for the south channel (around the Alma School Road island), was created by reducing all the main channel hydrograph ordinates by a ratio of 0.3295. This reduction constant is based on the ratio of the peak south channel discharge to the peak main channel discharge, i.e., 72,500/220,000. The peak south channel discharge was identified from a split-flow analysis performed by Wood-Patel.

Figure 3.1 presents a plot of the main channel and south channel hydrographs that were used with the HEC-6 model.

The main channel starting water surface elevations for each interval of the discretized hydrograph were taken from the previously referenced HEC-2 File BSI-SMET.DAT, with all ET encroachment stations transferred to an X3 record to facilitate a multiple profile run. This model was run for discharges from 17,000 to 237,000 cfs, at 20,000 cfs intervals. The resulting water surface elevations were used to input an elevation/discharge relationship to HEC-6. The data for this relationship was based on

Figure 3.1
100-Year Discretized Hydrograph
Salt River - Country Club Drive to Evergreen Road



HYD1.PRE

the computed CWSEL from HEC-2 Model M2.IN at XSEC 224.62, which is the downstream end of the HEC-6 model prepared for this study.

The starting water surface elevations for the south channel were based on a conservative, pro-scour assumption of critical depth at the Alma School Road grade-control structure. HEC-2 File SPTBDGN2.DAT was used to model a range of flows from 5,000 to 75,000 cfs, at 10,000 cfs intervals. The starting cross-section for this analysis was XSEC 226.53, i.e., all cross-sections downstream of Alma School Road were stripped from the model. This information was used to develop an elevation/discharge curve for the HEC-6 model for the south channel.

3.2.2 Cross-Section Data

The HEC-2 files previously referenced in Section 2.1 of this report were used to provide the initial river geometry for the HEC-6 model. The GR data and encroachment stations from these models were visually reviewed with the PLOT2 subroutine in HEC-2 in order to verify that overbank gravel pit areas were not being used in the hydraulic calculations.

The following subsections discuss the cross-section data for both the main channel and the south channel at Alma School Road.

3.2.2.1 Main Channel

As stated previously, some minor adjustments were made to certain south encroachment stations to reflect a 4:1 expansion ratio downstream from the Country Club Drive bridge. After the initial run of the HEC-6 model, adjustments were also make to the left encroachment stations at XSECs 225.95 and 225.85.

Adjustments were made at these latter two cross-sections to decrease the effective flow width in the region where the south channel merges with the main channel. The large effective flow width at this location (in the Wood-Patel model) was causing a significant velocity reduction, which was in-turn triggering unreasonably large sediment depositions through this area.

In addition to specifying effective flow boundaries for hydraulic calculations, HEC-6 also provides the capability to specify the horizontal limits of the moveable-bed geometry. This is an important feature which allows the user to exclude overbank areas which would not reasonably be expected to contribute to the scour or deposition process in a river.

For this study, moveable-bed limits were based on a visual review of PLOT2 cross-sections. Using this visual illustration of the river geometry, the moveable-bed width was generally set to coincide with the toe of the slope of the main channel bank-lines. Again, engineering judgment was used to set the active bed width through the confluence area of XSECs 225.95 and 225.85.

The allowable depth of scour within the moveable-bed width was set at 10-feet, except at grade control structures, which were modeled with a hard bottom.

In addition to cross-sectional geometry, cross-section spacing is also an important parameter in sediment routing calculations. The length of the control volume that HEC-6 uses for sediment transport calculations is defined as the distance between a point located halfway between the current cross-section and the adjacent upstream cross-section and the adjacent downstream cross-section. Irregular cross-section spacing will cause this control section length to vary along the length of the river. Such irregular spacing will result in errors in the bed-level changes that HEC-6 computes for each hydrograph interval. For example, bed-material may be scoured from a control section that is 800-feet long and transported to an adjacent control section that is only 200-feet long. Assuming equal bed-widths and hydraulic parameters within each section, the transported material from the 800-foot section will have a much smaller downstream surface area available for the distribution of any excess sediment. This would result in a larger depth of sediment deposition than would occur if the downstream control section were also 800-feet long.

The cross-section spacing in the HEC-2 models provided by Wood-Patel was found to be fairly uniform in the 500- to 600-foot range. Although there was some irregularity in the cross-section spacing, it was not considered severe enough to cause any major calculation errors. However, it should be noted that the bridge cross-sections at Alma School Road were eliminated from the HEC-6 model. These sections were eliminated because of the short cross-section spacing and because HEC-6 cannot accept bridge routines used in HEC-2. XSEC 226.47 was added at the Alma School bridge location (north channel only) in order to promote uniform cross-section spacing between XSECs 226.61 and 226.35.

3.2.2.2 South Channel

Due to the existing gravel pit on the downstream side of Alma School Road, the HEC-6 model for the south channel only extended from Alma School Road to McKellips Road. (XSECs 226.53 through 226.89). Based on the topography used for this study, the invert of the south channel (upstream from Alma School Road) reflects a depression that is approximately 6-feet below the invert at the bridge crossing.

For HEC-2 modeling purposes, Wood-Patel assumed this depression would fill-in with sediment and establish a positive gradient upstream to McKellips Road. Accordingly, the WPA model used X3 records to simulate this sediment deposition at each cross-section.

In order to examine both invert conditions, the HEC-6 model was run with a natural invert elevation and with the artificial invert elevation specified in the WPA model. This comparison indicated that the natural invert scenario will produce a more severe scour profile through the south channel.

3.2.3 Bed-Material Gradation

The bed-material gradation used for the HEC-6 model was the same as that used by SLA for the sediment routing model through the adjacent downstream reach of the Salt River. No additional sampling information was available which was considered to be anymore reliable than that used in the 1994 SLA report.

Although *AGRA Earth & Environmental, Inc.* did perform bed-material sampling at four locations within the study reach, the sampling was limited to the existing surface armor layer and was not representative of material below the armor layer. Accordingly, this information was not considered suitable for use in the HEC-6 model.

Table 3.1 summarizes the sediment gradation data taken from the 1994 SLA report. The data in Table 3.1 is plotted in Figure 3.2.

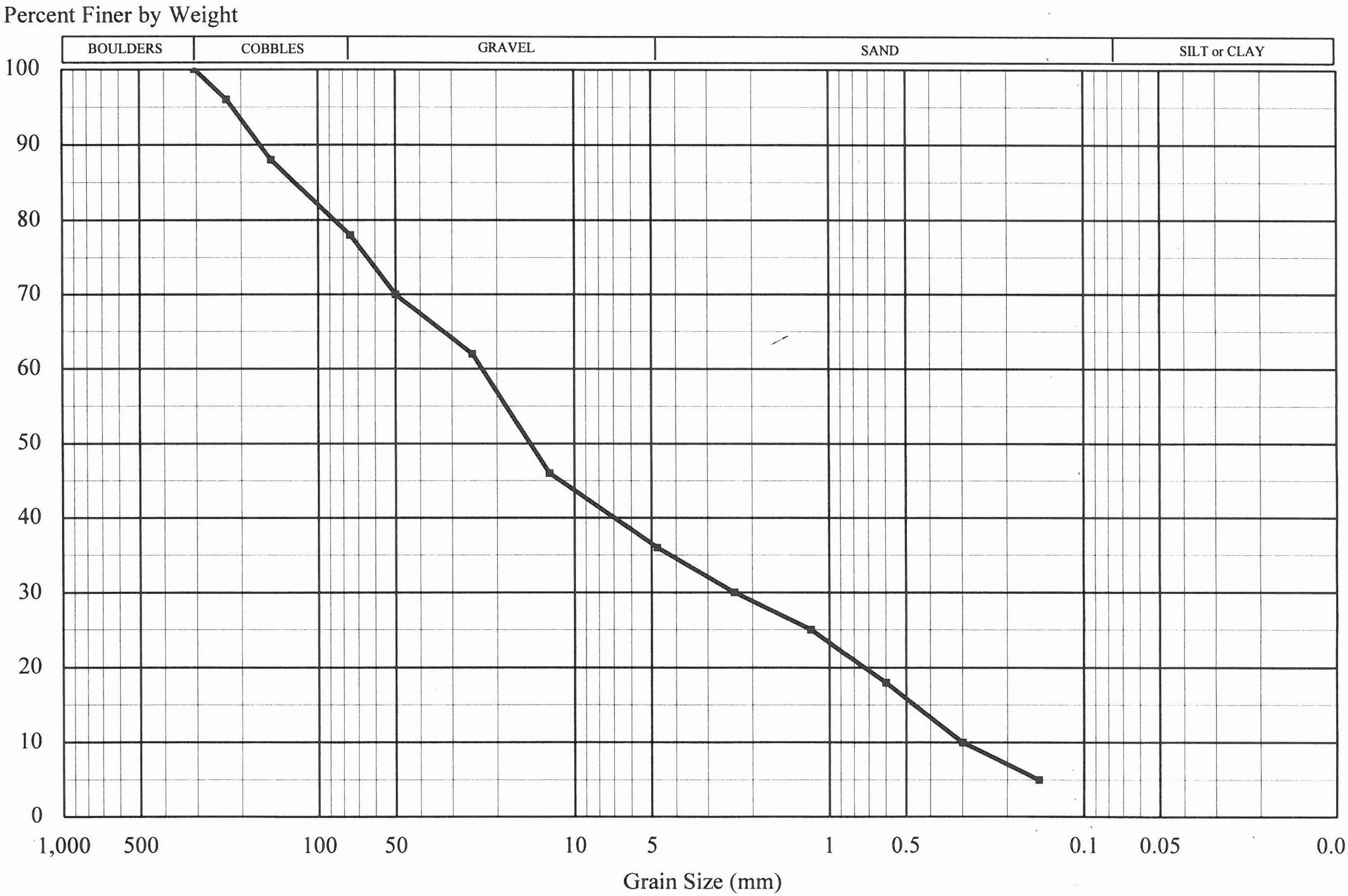
Table 3.1
Sediment Gradation For HEC-6 Modeling
Country Club Drive to Evergreen Road
Salt River

Particle Size (mm)	Cumulative Percent Passing (%)
0.15	5.00
0.30	10.00
0.60	18.00
1.18	25.00
2.36	30.00
4.75	36.00
12.50	46.00
25.00	62.00
50.00	70.00
75.00	78.00
152.40	88.00
228.60	96.00
304.80	100.00

Figure 3.2

Sediment Gradation For Salt River Bed-Material

Red Mountain Freeway - McKellips Road to Dobson Road



GRAD1.PRE

3.2.4 Sediment Supply

A required input parameter for a sediment routing model is an estimate of the sediment load being supplied to the upstream end of the model.

The sediment load table for the main channel was developed through an iteration process that assumes a cross-section at the upstream end of the model is being supplied sediment at a rate that is in equilibrium with the theoretical transport rate of the cross-section. Using an initial guess of the inflowing sediment load for a specific water discharge, HEC-6 will compute the sediment load, in tons/day, for each size fraction in the given bed-material gradation. This information is then used to compute an updated sediment transport potential for each size fraction. This updated size fraction data is entered on the LF record and the model is re-run. This iteration process is continued until the computed fraction of the total sediment load for each grain size matches that which is input to the model.

This first step identifies the fraction (or percentage) of each grain size contributing to the total sediment load for a given discharge, e.g., for Q = 25,000 cfs, 2.8% of the total sediment load might be composed of fine gravel (4-8mm), 4.5% of coarse gravel (16-32mm), etc.

In order to estimate the total sediment load curve (tons/day), different sediment loads were input to the model until a load rate was found which produced very little vertical bed movement (at the upstream end of the model) over a 10-day flow period. The load rate that produced this minimal bed movement was assumed to be in equilibrium with the transport rate at the upstream end of the model. This process was repeated for each water discharge used to define the sediment load curve.

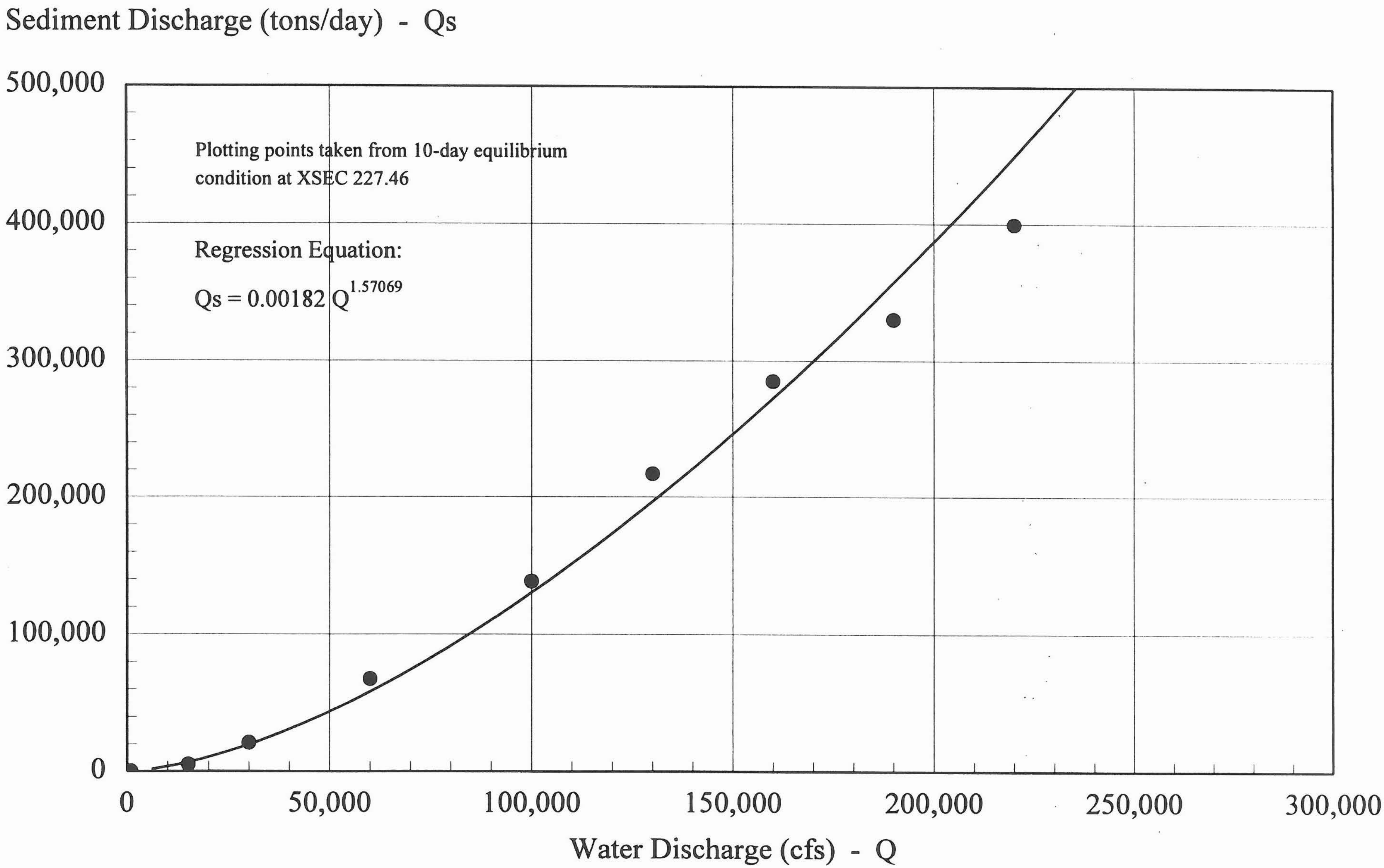
Figure 3.3 illustrates the sediment load relationship that was developed using this procedure. This figure also shows a power regression curve that was fit to the actual data points in an effort to provide a more uniform sediment load relationship at the upper end of the flood hydrograph. Experimental runs with the HEC-6 model indicated that there was very little difference in bed level changes when changing the sediment load table from the actual data points to the regression curve values. Accordingly, the actual computed sediment load data points were used for the final HEC-6 runs, rather than the predicted regression curve values.

Any errors in the upstream sediment load curve are "washed out" within a few cross-sections, as the model becomes controlled by the actual sediment transport rates and sediment movement through the downstream control sections. The HEC-6 model

Figure 3.3

Salt River Hydraulic Analysis - Red Mountain Freeway

Upstream Sediment Load Curve



File: QQS1.PRE

was initiated at the downstream side of the Country Club Drive bridge location in order to allow the model to dampen any sediment load errors prior to reaching McKellips Road.

As stated previously, a separate HEC-6 model was created to evaluate that portion of the south channel located between Alma School Road and McKellips Road. It is difficult to identify with any certainty how much of the main channel sediment load would be diverted into the south channel. Accordingly, two scenarios were created in order to examine a probable sediment load envelope for this split-flow location.

As a worst-case condition, the first scenario assumed none of the main channel sediment would enter the south channel. This would create a "clear-water" inflow condition which would be expected to induce the maximum scour profile through the south channel.

The second condition assumed that the sediment <u>concentration</u> in the south channel would be the same as that in the main channel. Under this scenario, the sediment size fractions for the south channel are assumed to be transported in the same <u>ratios</u> (for a given water discharge) as used in the main channel. However, the inflowing sediment <u>load</u> (tons/day) from the main channel to the south channel was reduced by the ratio of the peak discharge in the south channel to that in the main channel, i.e., 72,500/220,000 = 0.3295.

Comparisons of the HEC-6 bed profiles for these two sediment load scenarios revealed a maximum difference of 0.63-feet at the upstream end of the model for the artificial invert condition (see Section 3.2.2.2) and only 0.28-feet for the natural invert condition. The final HEC-6 runs for the south channel used the "clear-water" sediment inflow assumption, since it produced a slightly more severe scour profile for the majority of the cross-sections.

For a more in-depth discussion of how sediment diversions were handled around the Alma School Road "island", the reader is referred to Section 3.2.5 of this report.

3.2.5 Special Considerations Near Alma School Road

The sediment routing analysis in the vicinity of the Alma School Road bridge is complicated by the following factors:

1. A large gravel pit is located immediately downstream of the Alma School Road bridge over the south channel.

2. A split-flow condition occurs around an island at Alma School Road.

3. Concrete grade control structures have been built at both the north and south bridge crossings on Alma School Road to halt headcutting that has occurred in response to downstream gravel mining operations.

Some engineering judgment was required in order to configure the HEC-6 model to address these features without causing unreasonable fluctuations in the hydraulic calculations. These modeling techniques are discussed in the following sub-sections.

3.2.5.1 Split-Flow Analysis

No attempt was made to apply HEC-6 to the large gravel pit that captures the outflow from the south channel. However, the existence of this pit was used to justify an assumption that no sediment flows will enter the main channel from the south channel. This gravel pit is assumed to provide 100-percent trap efficiency for any sediments transported into the pit by flows diverted through the south channel.

This split-flow condition is simulated in the HEC-6 model for the main channel by adding a local inflow point at XSEC 225.95 and a local diversion point at XSEC 226.89. For the main channel model, the water flow between these two cross-sections is reduced by the amount of water flowing through the south channel. The sediment flow diverted from the main channel at McKellips Road is computed by HEC-6 on the basis of the diverted water discharge and on an assumption of equal sediment concentrations existing in the main channel flow and diverted flow. This diverted sediment load is not allowed to re-enter the model at XSEC 225.95, i.e., it is trapped in the gravel pit. However, the diverted water discharge is returned to the model at XSEC 225.95.

The assumed sediment inflow condition for the south channel HEC-6 model was previously discussed in Section 3.2.4. Both clear-water and sediment inflow scenarios were evaluated for the south channel. For conservatism, the final scour calculations used a "clear-water" inflow with no sediment diversion from the main channel.

3.2.5.2 Main Channel Headcut

As a result of in-stream gravel mining that was initiated downstream of Alma School Road in the mid-1980s, a large headcut has moved up the river-bed and lowered the main channel-bed through the Alma School Road bridge. A concrete grade-control structure has been built at the bridge to prevent any further channel degradation that might jeopardize the stability of the bridge piers.

This grade-control structure creates an abrupt vertical drop in the riverbed profile at the downstream side of the bridge. In accordance with instructions from ADOT, this grade-control structure was assumed to remain intact during the 100-year, 10-day flow event being analyzed in this report.

Since HEC-6 does not have a bridge analysis routine, the Alma School Road HEC-2 bridge coding was not included in the HEC-6 model. An additional cross-section (XSEC 226.47) was inserted in the HEC-6 model, just downstream of the grade control structure, to promote uniform cross-section spacing through the bridge. In order to simulate the effect of the concrete grade control structure on the upstream channel bed-profile, XSEC 226.61 was coded as a "hard bottom" so that no scour could occur at this location. All sections upstream of XSEC 226.61 were left with soft bottoms. A plot of the vertical profile for this simulation is presented in Section 4 of this report.

It is interesting to note that the HEC-6 simulation shows 3.60-feet of sediment deposition occurring during the 15th time interval (Q = 121,378 cfs) at XSEC 226.61, which is the hard bottom location being used to simulate the upstream side of the grade-control structure. A check of the velocities immediately upstream and downstream of XSEC 226.61 did not provide any insight as to why this occurred. Since this location is not adjacent to the freeway alignment, this anomaly has no impact on the freeway design.

3.3 Gravel Pit Analysis

Design criteria for evaluating in-stream gravel pits was taken from a July 29, 1992 letter from Simons, Li & Associates, Inc. (SLA) to Daniel, Mann, Johnson & Mendenhall (DMJM). The criteria in this letter was approved by the Flood Control District of Maricopa County (FCDMC) via letter dated August 11, 1992 from Donald J. Rerick, to Thomas M. Monchak, DMJM. Both of these letters were included in Appendix IV to the previously referenced 1994 SLA report.

The 1992 letter indicated that scour dimensions associated with in-stream mining would be estimated from relationships published in **"Investigation of Gravel Mining Effects, Salt River Channelization Project At Sky Harbor International Airport"**, Colorado State University (CSU), December 1980.

The three design conditions outlined in the 1992 letter are summarized as follows:

1. If gravel pits are located within 150-feet of the bank, fill will be required and the total scour depth will be the sum of the normal scour depth plus a lateral migration depth component. The toe-down depth will be extend at least 3-feet below the point where the fill meets the existing channel invert.

2. If gravel pits are located between 150 and 300-feet of the bank, no fill will be required and the total scour depth will be the sum of the normal scour depth plus a lateral migration component.

3. If gravel pits are located beyond 300-feet from the bank, the total scour depth will be computed as the normal scour depth. This scenario assumes the bank is not within the scour envelope associated with the gravel pit.

That reach of the Salt River from Dobson Road to McKellips Road includes intensive gravel mining operations, most of which are currently located in the overbank areas, rather than the main channel.

As discussed in Section 2.2, the outdated 1991 through 1993 topographic mapping of this reach of the river is not considered reliable for conducting an assessment of in-stream gravel mining impacts to the Red Mountain Freeway. In an attempt to analyze gravel mining impacts associated with present-day conditions, a June 1995 aerial photograph (1" = 400') was obtained from Kenny Aerial Mapping. This photo was used during an August 31, 1995 field inspection of the river to locate and measure any existing gravel pits within the study reach. This inspection revealed a shallow, two-tiered pit that lies in the main channel between XSECs 225.19 and 225.66. The total pit length is about 2500-feet, while the average width is about 500-feet.

The downstream tier of this pit is about 9-feet deep, while the upstream tier is about 4.5 feet deep. This pit is located a minimum of 300-feet from the edge of the CSA bank protection for the Red Mountain Freeway. Accordingly, it is not considered a threat to cause undercutting of the bank-lining.

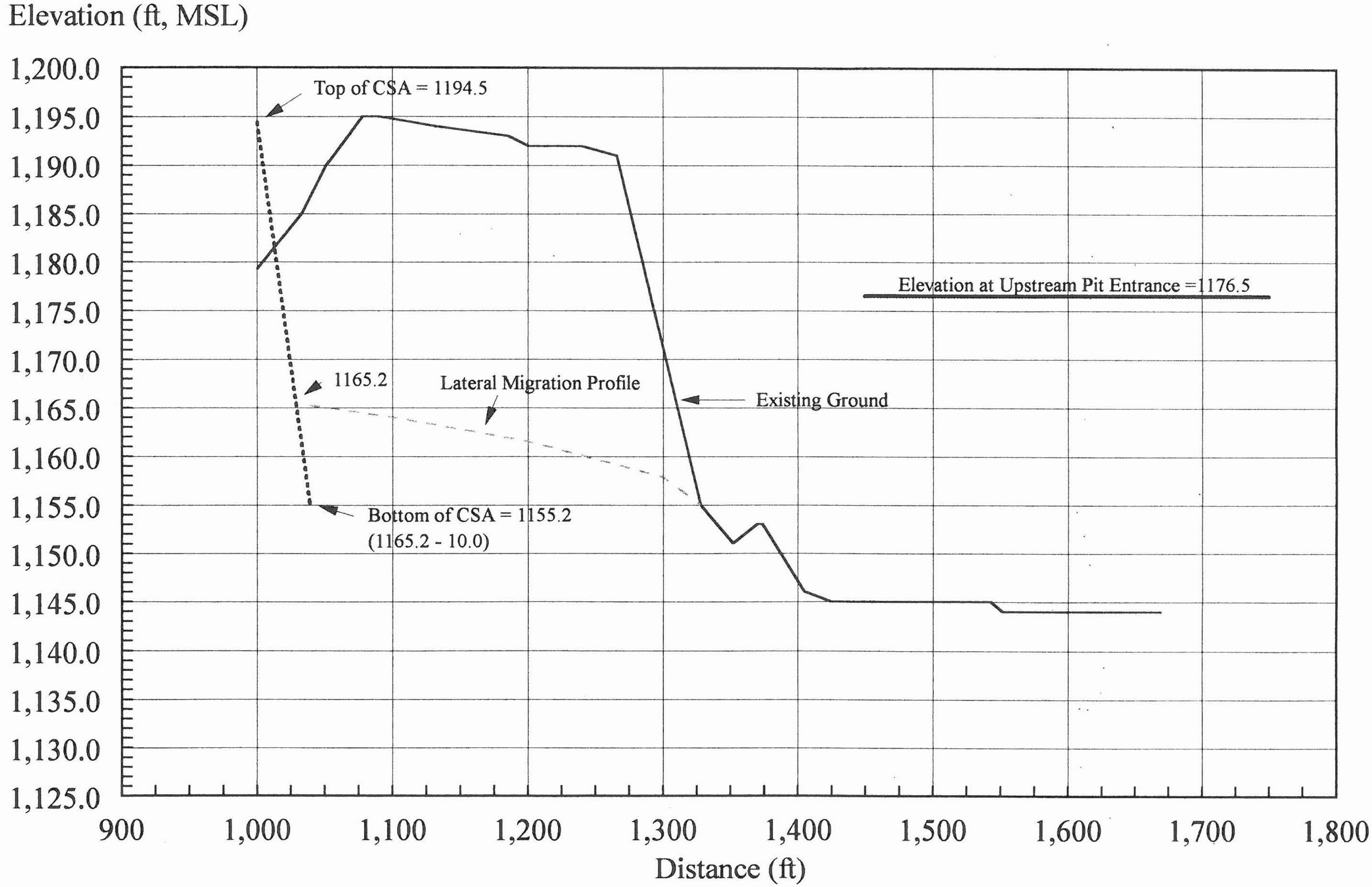
Two large gravel pits are presently in-place in the south channel, immediately downstream of the Alma School Road bridge. These pits have been in existence for a number of years and are clearly visible on the topographic mapping used for this project. A portion of the southernmost of these two pits lies within 300-feet of the freeway bank protection system. Accordingly, it warrants discussion relative to the recommended scour depths for the bank protection system.

Based on the 1994 ADOT strip-map topography that is being used for the freeway design, the depth of this southern pit is about 34-feet. This depth is referenced to an 1176.5-foot elevation near the upstream entrance to the pit. Using the 1980 CSU physical model study curves, the maximum lateral migration depth and length for this pit is 11.3-feet and 260-feet, respectively. These are conservative dimensions since the model study results are based on flow over the entire pit area., including the sides. The south side of this pit is several feet above the 100-year water surface elevation. Accordingly, lateral migration will probably never occur as predicted by the CSU curves. However, for conservatism, it will be assumed that the pit will be completely inundated and that the CSU relationships will be applicable.

This south pit lies within a region that was not analyzed with the conventional scour procedures that were discussed in Section 3.1. This area consists entirely of gravel mining operations, which makes an open channel hydraulic analysis impractical. Accordingly, the minimum 10-foot "normal scour" depth was applied to this area.

Based on the second of the three listed in-stream gravel mining design criteria, a theoretical bank-lining toe-down elevation was established as the sum of the lateral migration depth plus 10-feet, i.e., (11.3 + 10.0 = 21.3-feet). This scour depth was referenced to the pit inlet elevation of 1176.5-feet MSL, resulting in a toe-down elevation of 1176.5-21.3 = 1155.2-feet MSL. Figure 3.4 illustrates the bank geometry (based on the 1994 ADOT mapping) adjacent to this pit and the location of the recommended toe-down elevation. This constant toe-down elevation was applied to XSECs 226.04 through 226.48, which has an upstream terminus at the downstream side of the Alma School Road bridge.

Figure 3.4
Scour Geometry for Gravel Pit Near XSEC 226.04
Red Mountain Freeway



File: X22604.PRE

4 CALCULATION SUMMARY & RECOMMENDATIONS

The preceding sections of this report present discussions of the technical procedures and assumptions that were used to perform the scour analysis for that section of the Red Mountain Freeway extending from McKellips Road to about 700-feet west of Dobson Road. This final section of the report presents both tabular and graphical summaries of the calculation results and recommendations for the bank-lining toe-down and top of CSA embankment elevations for the freeway design.

4.1 Results of HEC-6 Modeling

The HEC-6 output generates a summary of bed-profile and water surface profile changes for each time step at each cross-section. For the 34 time steps and 27 cross-sections used in the main channel model, 918 data sets were produced which had to be examined to find maximum and minimum bed profile and water surface profile fluctuations. An additional 408 data sets were produced for the south channel. This examination process was expedited by editing the HEC-6 output files and then exporting the files to a LOTUS 1-2-3 spreadsheet, where electronic data scans were performed to find maximum and minimum data points.

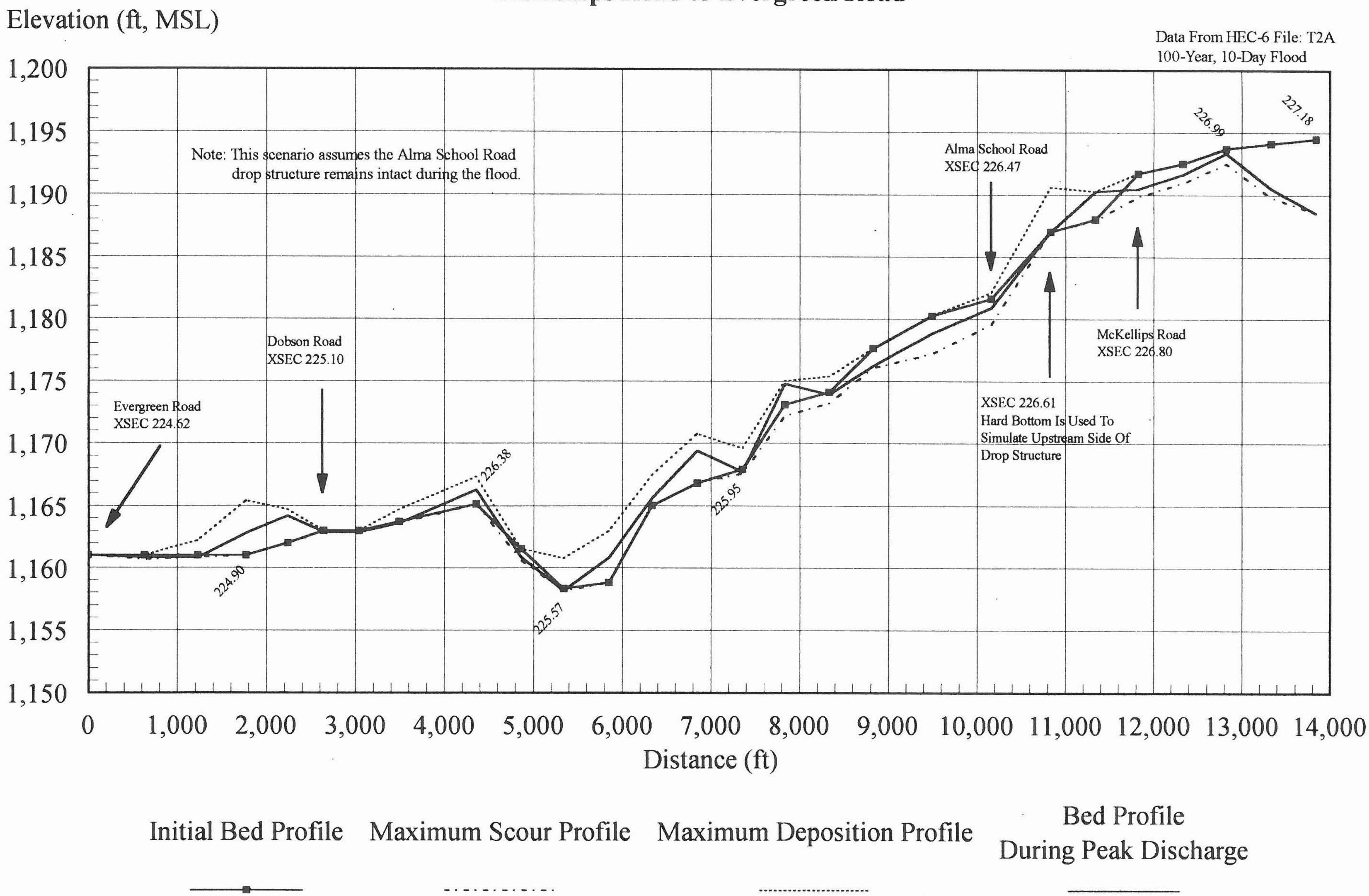
Appendices A and B present these spreadsheets for the main channel and south channel models, respectively. Each of these tables is composed of two data sets which show the scour or deposition dimension (feet) at each time step, as well as the adjusted bed profile elevation (feet MSL) for each step. Summary columns are provided at the end of each data set to summarize the maximum and minimum conditions that occurred at each cross-section during the 10-day flow event.

Figures 4.1 and 4.2 graphically summarize the data in Appendices A and B, respectively. A review of Figure 4.1 reveals a substantial depression (probably a gravel pit) in the vicinity of XSEC 225.57. The maximum deposition profile in Figure 4.1 indicates that this depression is not completely filled-in during the 10-day flow event.

In order to address the downstream impact that might occur if this pit were to trap 100-percent of the inflowing sediment, a separate HEC-6 model was created for that portion of the study reach located downstream of this pit (XSECs 224.62 TO 225.38). The trap efficiency of the pit was simulated by inputting a zero sediment load to the model at XSEC 225.38. Appendix C presents the bed elevation changes that result from this simulation, while Figure 4.3 presents the profile plots.

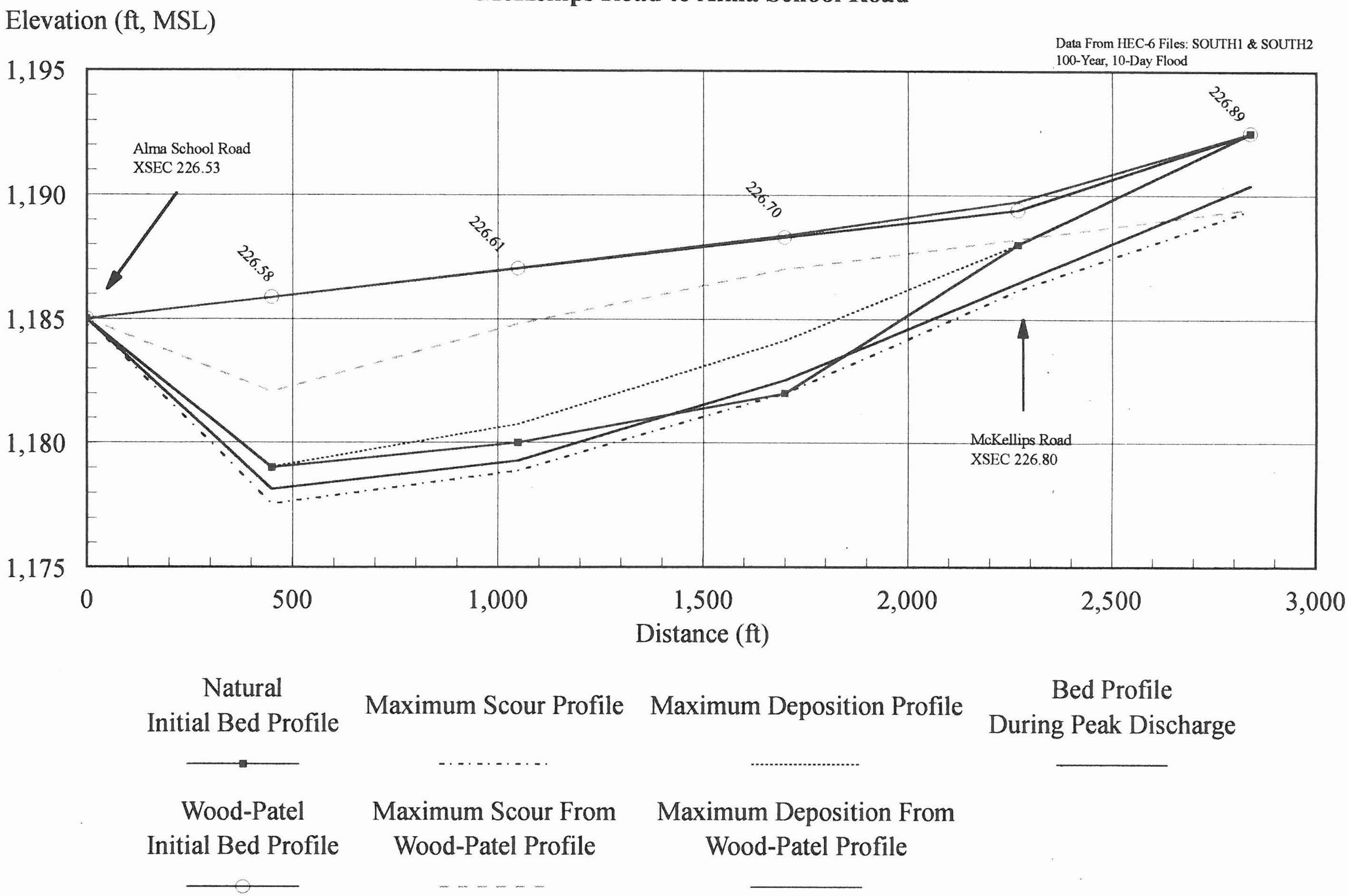
A review of Figure 4.3 indicates that this simulation produces a more severe scour profile than the model that allows sediment to be transported out of the gravel pit area. Since the sediment trap efficiency of the gravel pit should create a downstream sediment deficit, thus

Figure 4.1
Salt River Bed Profile From HEC-6 Analysis For Main Channel
McKellips Road to Evergreen Road



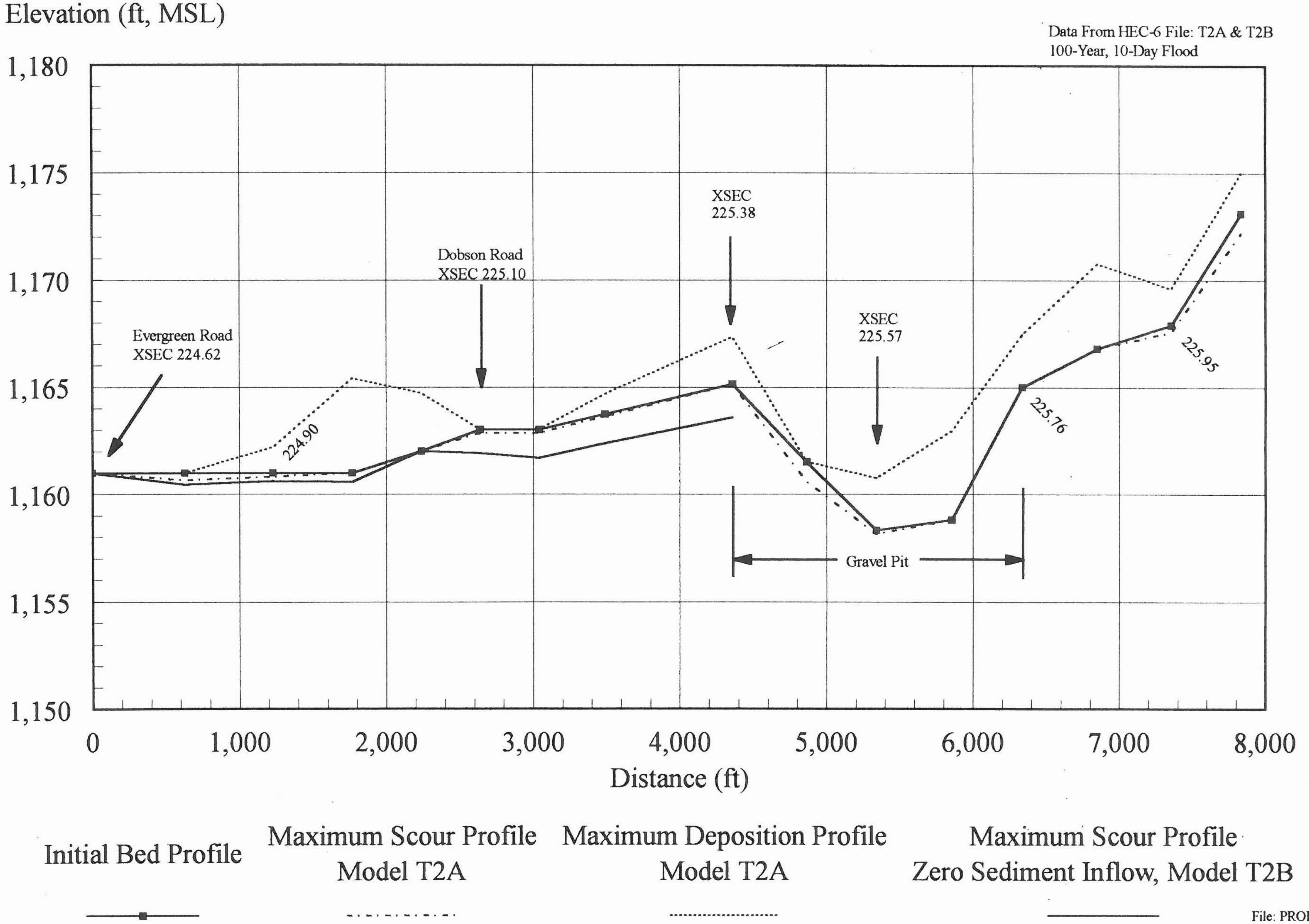
File: PROF1A..PRE

Figure 4.2
Salt River Bed Profile From HEC-6 Analysis For South Channel
McKellips Road to Alma School Road



File: PROF2.PRE

Figure 4.3
Salt River Bed Profile From HEC-6 Analysis For Main Channel With Gravel Pit Upstream of XSEC 225.38



causing downstream scour, the zero sediment inflow scour profile will be used in this report for areas downstream of XSEC 225.38.

It should be emphasized that the HEC-6 bed-profiles shown in Figures 4.1 through 4.3 only reflect the general scour/depostion component in Equation 3.1. The remaining scour components in Equation 3.1 must be added to these profiles in order to arrive at the total scour depth.

4.2 Total Scour Summary

Table 4.1 provides a quantitative summary of all applicable scour components for that section of the main channel of the Salt River that passes through the freeway project limits addressed in this report. Table 4.2 lists similar information for that portion of the south channel that lies between Alma School Road and McKellips Road. As discussed in Section 3.3, that portion of the south channel located between XSEC 226.04 and the downstream side of the Alma School Road bridge was assigned a constant toe-down elevation of 1155.2-feet MSL. This elevation, which was a function of gravel pit behavior, is not shown in either Table 4.1 or 4.2

All elevation data listed in Tables 4.1 and 4.2 are referenced to the 1991 through 1993 topographic mapping that was used for the HEC-2 models originally developed by MBJ and subsequently modified by WPA. The 1155.2 elevation used for the south channel, downstream of Alma School Road, is referenced to the April - May 1994 ADOT strip maps that are being used for the freeway design.

The following comments are provided to assist the reader in following the calculation sequence in these tables. A sample calculation sequence is provided in Appendix F.

1. **Table 4.1** - Two thalweg elevations are listed in the 2nd and 3rd columns in order to reflect the difference between the artificial "smoothed invert" used in the WPA model versus the natural invert reflected in the MBJ models. The only differences between these two thalweg elevations occur between XSECs 224.90 through 225.38. The lower of these two inverts was used for the scour depth reference point. As discussed in Section 3.1.5, 1-foot of low-flow incisement was included for these six cross-sections as a compromise between a mix of natural and man-made inverts.

   All hydraulic data required for calculation of certain scour components was taken from HEC-2 Model M2.IN (see Section 2.1).

   The long-term degradation component was based on the smaller of the equilibrium slope depth or the Q_{10} armoring depth. This is consistent with the 1994 SLA report.

Table 4.1
Summary of Scour Analysis Calculations - Main Channel
Red Mountain Freeway
South Levee Analysis - Salt River
McKellips Road to Dobson Road

Q100 = 220,000 cfs

XSEC	Minimum Thalweg From Wood-Patel Model (ft, MSL)	Minimum Thalweg From Baker Models (ft, MSL)	Maximum Flow Depth (ft)	Channel Velocity (fps)	Topwidth Between Effective Flow Boundaries (ft)	Wetted Area (sf)	Hydraulic Depth (ft)	Energy Slope ft/ft)	Angle of Curvature (alpha) (degrees)	Long-Term Degradation: Based On Equil. Slope (ft)	Long-Term Degradation: Based On Q10 Armor Depth (ft)	Maximum General Scour (ft)	Bend Scour (ft)	Dune Troughs (ft)	Anti-dune Troughs (ft)	Low-Flow Incisement (ft)	Total Computed Scour Depth (ft)	Factor of Safety	Maximum Scour Depth With Safety Factor (ft)	Minimum Allowable Scour Depth (ft)	Recommended Toe-Down Elevation (ft, MSL)
224.90	1154.00	1162.60	21.58	7.83	1323.37	28,096	21.23	0.000589	30	2.34	0.3	0.42	5.44	1.34	0.83	1.00	8.50	1.50	12.76	10.00	1141.24
225.00	1154.00	1161.80	20.79	8.38	1282.84	26,238	20.45	0.000710	30	2.12	0.3	0.00	5.31	1.28	0.95	1.00	7.90	1.50	11.84	10.00	1142.16
225.10	1156.00	1162.30	19.87	9.69	1162.29	22,693	19.52	0.001010	30	3.93	0.3	1.09	5.23	1.22	1.27	1.00	8.88	1.50	13.33	10.00	1142.67
225.19	1158.00	1162.60	20.18	10.17	1092.37	21,641	19.81	0.001091	30	5.75	0.3	1.31	5.36	1.24	1.40	1.00	9.37	1.50	14.05	10.00	1143.95
225.28	1163.73	1164.30	20.08	9.69	1144.93	22,701	19.83	0.000994	30	11.26	0.3	1.35	5.27	1.23	1.27	1.00	9.19	1.50	13.79	10.00	1149.94
225.38	1165.13	1162.50	19.72	9.00	1255.63	24,447	19.47	0.000875	28	12.25	0.3	1.55	4.35	1.20	1.09	1.00	8.41	1.50	12.61	10.00	1149.89
225.48	1161.50	1161.50	23.01	13.18	984.47	16,694	16.96	0.002238	28	8.39	0.3	0.92	5.50	1.45	2.35	0.00	9.06	1.50	13.59	10.00	1147.91
225.57	1158.30	1158.30	28.16	10.19	1166.13	21,600	18.52	0.001198	28	4.96	0.3	0.19	6.37	1.85	1.40	0.00	8.72	1.50	13.08	10.00	1145.22
225.66	1158.80	1158.80	28.22	10.33	1045.99	21,298	20.36	0.001090	28	5.22	0.3	0.00	6.40	1.86	1.44	0.00	8.56	1.50	12.83	10.00	1145.97
225.76	1165.00	1165.00	22.45	11.08	1106.45	19,852	17.94	0.001468	28	11.20	0.3	0.00	5.18	1.41	1.66	0.00	7.14	1.50	10.70	10.00	1154.30
225.85	1166.80	1166.80	22.41	6.45	1715.12	34,089	19.88	0.000433	0	12.76	0.3	0.00	0.00	1.41	0.56	0.00	1.71	1.50	2.56	10.00	1156.80
225.95	1167.90	1167.90	21.38	7.91	1762.87	27,816	15.78	0.000883	0	13.62	0.3	0.35	0.00	1.33	0.84	0.00	1.98	1.50	2.97	10.00	1157.90
226.04	1173.10	1173.10	15.74	12.54	1017.91	12,059	11.85	0.001829	0	18.59	0.3	0.94	0.00	0.92	2.12	0.00	3.36	1.50	5.04	10.00	1163.10
226.13	1174.10	1174.10	14.98	15.68	876.01	9,490	10.83	0.003439	0	19.36	0.3	0.91	0.00	0.86	3.32	0.00	4.53	1.50	6.79	10.00	1164.10
226.23	1177.60	1177.60	12.83	17.86	919.10	8,793	9.57	0.004310	0	22.62	0.3	1.59	0.00	0.72	4.31	0.00	6.20	1.50	9.29	10.00	1167.60
226.35	1180.20	1180.20	14.02	15.22	913.77	9,743	10.66	0.003423	0	24.91	0.3	3.05	0.00	0.80	3.13	0.00	6.48	1.50	9.72	10.00	1170.20
226.48	1181.80	1181.80	15.06	15.30	908.32	9,642	10.62	0.003588	0	26.15	0.3	n/a									n/a
226.49	1186.00	1186.00	10.67	17.45	907.31	8,454	9.32	0.005547	0	30.35	0.3	Alma									Alma
226.50	1186.00	1186.00	11.71	15.70	912.73	9,393	10.29	0.003938	0	30.35	0.3	School									School
226.51	1186.00	1186.00	11.54	16.21	862.63	9,099	10.55	0.006252	0	30.35	0.3	Road									Road
226.52	1186.00	1186.00	12.99	14.26	862.65	10,345	11.99	0.004286	0	30.31	0.3	Bridge									Bridge
226.53	1186.00	1186.00	13.71	12.70	924.40	11,613	12.56	0.001978	0	30.31	0.3	n/a									n/a
226.61	1187.00	1187.00	13.88	11.99	962.58	12,408	12.89	0.001626	0	0.00	0.3	0.00	0.00	0.79	1.94	0.00	1.94	1.50	2.91	10.00	1177.00
226.70	1188.00	1188.00	14.16	10.57	1121.92	14,098	12.57	0.001301	0	0.76	0.3	0.09	0.00	0.81	1.51	0.00	1.90	1.50	2.85	10.00	1178.00
226.80	1191.70	1191.70	9.85	17.24	960.68	8,636	8.99	0.005462	0	4.47	0.3	1.90	0.00	0.52	4.01	0.00	6.21	1.50	9.32	10.00	1181.70
226.89	1192.50	1192.50	12.66	13.98	948.73	10,695	11.27	0.002585	37	5.26	0.3	1.58	6.29	0.70	2.64	0.00	10.81	1.50	16.21	10.00	1176.29
226.99	1193.70	1193.70	11.97	17.20	1144.43	12,872	11.25	0.004004	37	6.47	0.3	1.25	6.16	0.66	3.99	0.00	11.71	1.50	17.56	10.00	1176.14
227.08	1194.10	1194.10	13.68	19.92	962.61	11,410	11.85	0.004665	37	6.86	0.3	4.31	7.41	0.77	5.36	0.00	17.37	1.50	26.06	10.00	1168.04
227.18	1194.50	1194.50	17.33	15.45	985.01	14,366	14.58	0.002279	37	7.26	0.3	5.97	8.74	1.03	3.22	0.00	18.23	1.50	27.35	10.00	1167.15

Note: All hydraulic data taken from HEC-2 File: M2.IN (modified BSI-SMET.DAT).

Equilibrium slope of 0.00047 ft/ft & Q10 armor depth of 0.3-ft taken from 1994 SLA report.

General Scour depths taken from HEC-6 File: T2B for XSECS 224.90 - 225.38 & from HEC-6 File: T2A for XSECs 225.48 - 227.18

Equilibrium pivot points are Grade-Control #5 (XSEC 223.02), invert elevation =1147.00-ft, MSL, & Alma School Road (XSEC 226.61), invert elevation = 1187.00 ft MSL

The total scour depth is measured from the lower of the Wood-Patel or Baker thalweg elevations.
For XSECs 224.90 through 225.19, the Wood-Patel thalweg reflects "Existing Invert Elev" from Table 4 & HEC-2 Model BASE.DAT in the 1994 SLA report.
The SLA elevations are used for these 4 sections to promote a smooth transition from this report to the SLA report.

Data from XSECs 226.04 through 226.80 apply to the north channel and are not used for the Freeway embankment design..

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Table 4.2
Summary of Scour Analysis Calculations - South Channel
Red Mountain Freeway
South Levee Analysis - Salt River
McKellips Road to Alma School Road

Q100 = 72,500 cfs

XSEC	Existing Invert Elevation (ft, MSL)	Maximum Flow Depth (ft)	Channel Velocity (fps)	Topwidth Between Effective Flow Boundaries (ft)	Wetted Area (sf)	Hydraulic Depth (ft)	Energy Slope ft/ft)	Angle of Curvature (alpha) (degrees)	Long-Term Degradation: Based On Equil. Slope (ft)	Long-Term Degradation: Based On Q10 Armor Depth (ft)	Maximum General Scour (ft)	Bend Scour (ft)	Dune Troughs (ft)	Anti-dune Troughs (ft)	Low-Flow Incisement (ft)	Total Computed Scour Depth (ft)	Factor of Safety	Maximum Scour Depth With Safety Factor (ft)	Minimum Allowable Scour Depth (ft)	Recommended Toe-Down Elevation (ft, MSL)
	Natural Channel Invert - Hydraulics From HEC-2 File: S1H2.IN; General Scour From HEC-6 File: SOUTH1.IN																			
226.53	1185.00	16.53	13.03	405.67	5,565	13.72	0.001884	0	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00	1185.00
226.58	1179.00	24.04	10.90	730.15	7,447	10.20	0.000781	0	n/a	0.3	1.44	0.00	1.53	1.60	0.00	3.04	1.50	4.57	10.00	1169.00
226.61	1180.00	23.51	10.66	439.21	6,841	15.58	0.000883	0	n/a	0.3	1.12	0.00	1.49	1.53	0.00	2.65	1.50	3.98	10.00	1170.00
226.70	1182.00	22.77	8.27	562.59	8,769	15.59	0.000631	0	n/a	0.3	0.00	0.00	1.43	0.92	0.00	1.43	1.50	2.15	10.00	1172.00
226.80	1188.00	16.98	9.45	607.77	7,669	12.62	0.000953	0	1.93	0.3	1.85	0.00	1.01	1.21	0.00	3.36	1.50	5.03	10.00	1178.00
226.89	1192.50	12.76	11.41	560.00	6,356	11.35	0.001826	0	6.17	0.3	3.08	0.00	0.71	1.76	0.00	5.14	1.50	7.71	10.00	1182.50
	Wood-Patel Raised Channel Invert - Hydraulics From HEC-2 File: S2H2.IN; General Scour From HEC-6 File: SOUTH2.IN																			
226.53	1185.00	16.53	13.03	405.67	5,565	13.72	0.001884	0	0.00	0.3	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00	1185.00
226.58	1185.87	16.20	14.68	618.51	5,490	8.88	0.002105	0	0.66	0.3	3.81	0.00	0.95	2.91	2.00	9.02	1.50	13.53	10.00	1172.34
226.61	1187.03	16.77	12.86	446.93	5,697	12.75	0.001622	0	1.54	0.3	2.23	0.00	0.99	2.23	2.00	6.76	1.50	10.14	10.00	1176.89
226.7	1188.29	17.71	8.84	570.80	8,204	14.37	0.000802	0	2.49	0.3	1.29	0.00	1.06	1.05	2.00	4.65	1.50	6.97	10.00	1178.29
226.8	1189.39	17.14	8.51	756.72	8,668	11.45	0.000709	0	3.32	0.3	1.18	0.00	1.02	0.98	2.00	4.50	1.50	6.75	10.00	1179.39
226.89	1192.50	14.23	10.11	560.00	7,175	12.81	0.001224	0	6.17	0.3	3.05	0.00	0.81	1.38	2.00	6.73	1.50	10.09	10.00	1182.41

Notes: Equilibrium slope of 0.00047 ft/ft & Q10 armor depth of 0.3-ft taken from 1994 SLA report.

Pivot point for equilibrium slope analysis is the Alma School Road grade-control structure; invert elevation = 1185.0 ft MSL at XSEC 226.53.

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The general scour dimensions were taken from HEC-6 Models T2A and T2B, as described in the footnotes to this table.

The "Total Computed Scour Depth" is based on Equation 3.1. Local scour is not included because the freeway is not within a scour envelope of bridge piers or spur dikes.

A safety factor of 1.50 is applied to the total scour depth to arrive at the "Maximum Scour Depth". This safety factor is based on FCDMC requirements. To provide consistency with the 1994 SLA report, a minimum scour depth of 10-feet is used at all cross-sections.

The "Recommended Toe-Down Elevation" is computed by subtracting the larger of the "Maximum Scour Depth", or 10-feet, from the lower of the two thalweg elevations.

2. **Table 4.2** - This table presents scour summaries for the south channel with both a natural invert and the artificially raised invert used in the WPA HEC-2 model.

   The invert elevation of 1185.00 at XSEC 226.53 reflects the top of the grade control structure at Alma School Road. This elevation is maintained as a non-erodible point in both scenarios.

   Some of the cross-sections for the natural invert scenario include an "n/a" for the equilibrium slope calculation. This occurs because the natural channel bottom is lower than the Alma School Road grade-control for some distance upstream of this structure. Accordingly, when the equilibrium slope is projected upstream from this structure, it actually lies above the natural invert elevations until reaching XSEC 226.80.

   No "Low-Flow Incisement" is included for the natural invert simulation, since this phenomenon should already be reflected in the existing thalweg profile. The Alma School Road grade-control would also prevent any upstream incisement through this depressed channel.

   The Wood-Patel raised invert scenario does include 2-feet of low-flow incisement for all locations upstream of the grade-control structure.

   The remainder of the scour components in Table 4.2 are computed as previously discussed for Table 4.1.

4.3 Water Surface Profile Summary

In addition to the scour analysis, the HEC-6 models were also used to examine fluctuations in the water surface profile that would occur during the 100-year, 10-day flow event. Appendix D presents a summary of the water surface elevation changes that occur in the main channel during this event. These water surface profile changes reflect both discharge variations and bed-profile movements that are occurring during the flood.

Appendix E presents the HEC-6 water surface profile summary for the south channel.

In order to find the maximum water surface profile for the top of the bank-lining design, the maximum HEC-6 profile was compared to the HEC-2 profile, as well as to the profile obtained from routing the 100-year peak discharge through a fixed-bed HEC-6 model, adjusted to the post-flood bed-profile. This latter condition, which was analyzed in order to be consistent with the 1994 SLA study, was simulated by applying a vertical elevation adjustment to the GR records. This elevation adjustment was taken as the cumulative, vertical bed-change dimension from the last hydrograph time step (#34) in the moveable-bed HEC-6 model.

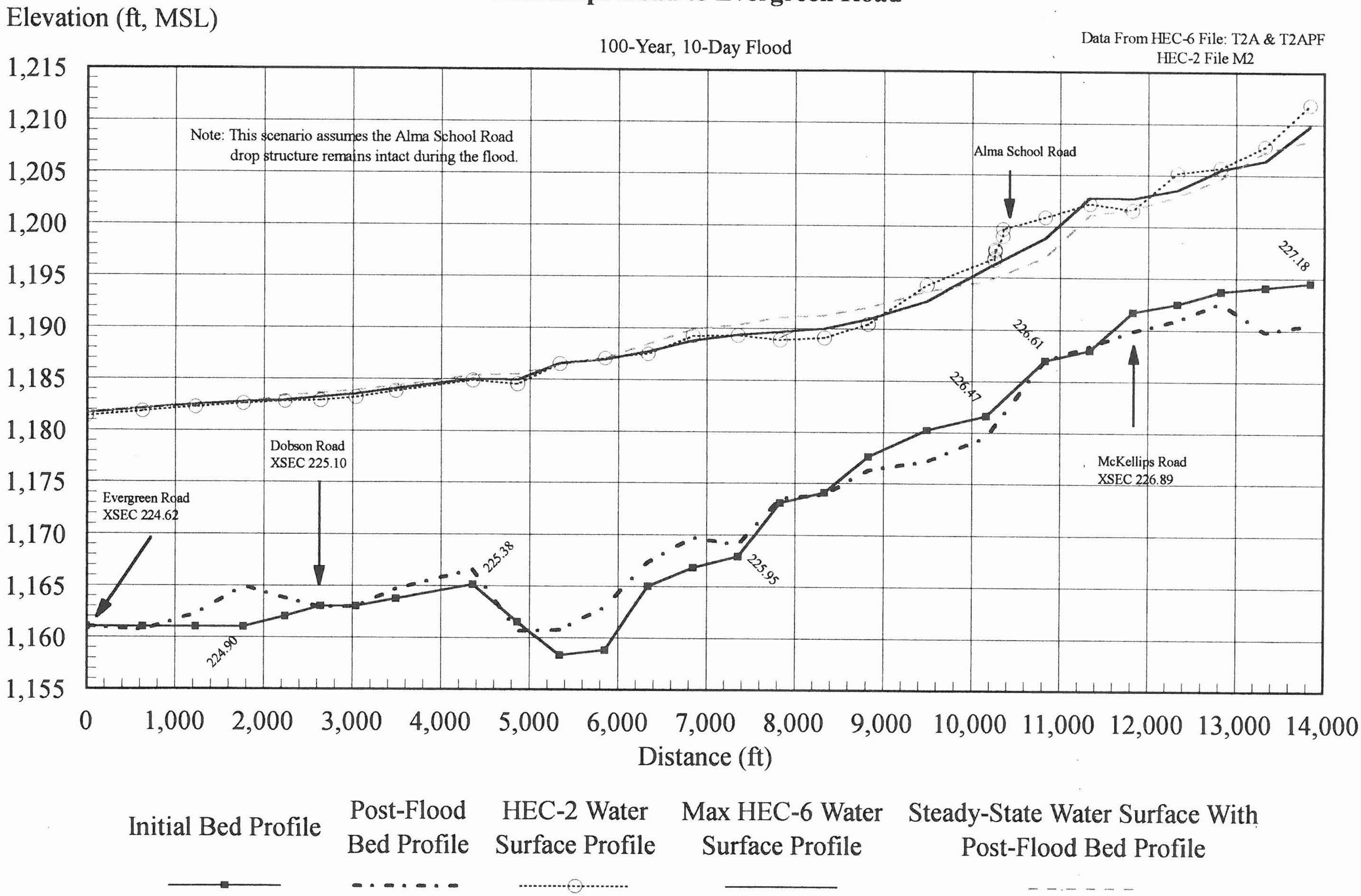
Figure 4.4 graphically compares the water surface profiles for the main channel, while Figure 4.5 presents the same information for the south channel. Notes on each of these figures identify the model file names that are being plotted.

A review of Figure 4.4 indicates the post-flood bed-profile model, with a few minor exceptions, generally creates a slightly higher water surface profile for that portion of the freeway embankment that is in direct contact with the main channel of the river, downstream from the south channel confluence at XSEC 225.95.

A review of Figure 4.5 indicates that the original WPA HEC-2 profile consistently provides a higher water surface profile than the other two conditions that were analyzed for the south channel. Accordingly, for that portion of the freeway embankment that is adjacent to the south channel, the HEC-2 profile should be used to set the top of freeway embankment elevation.

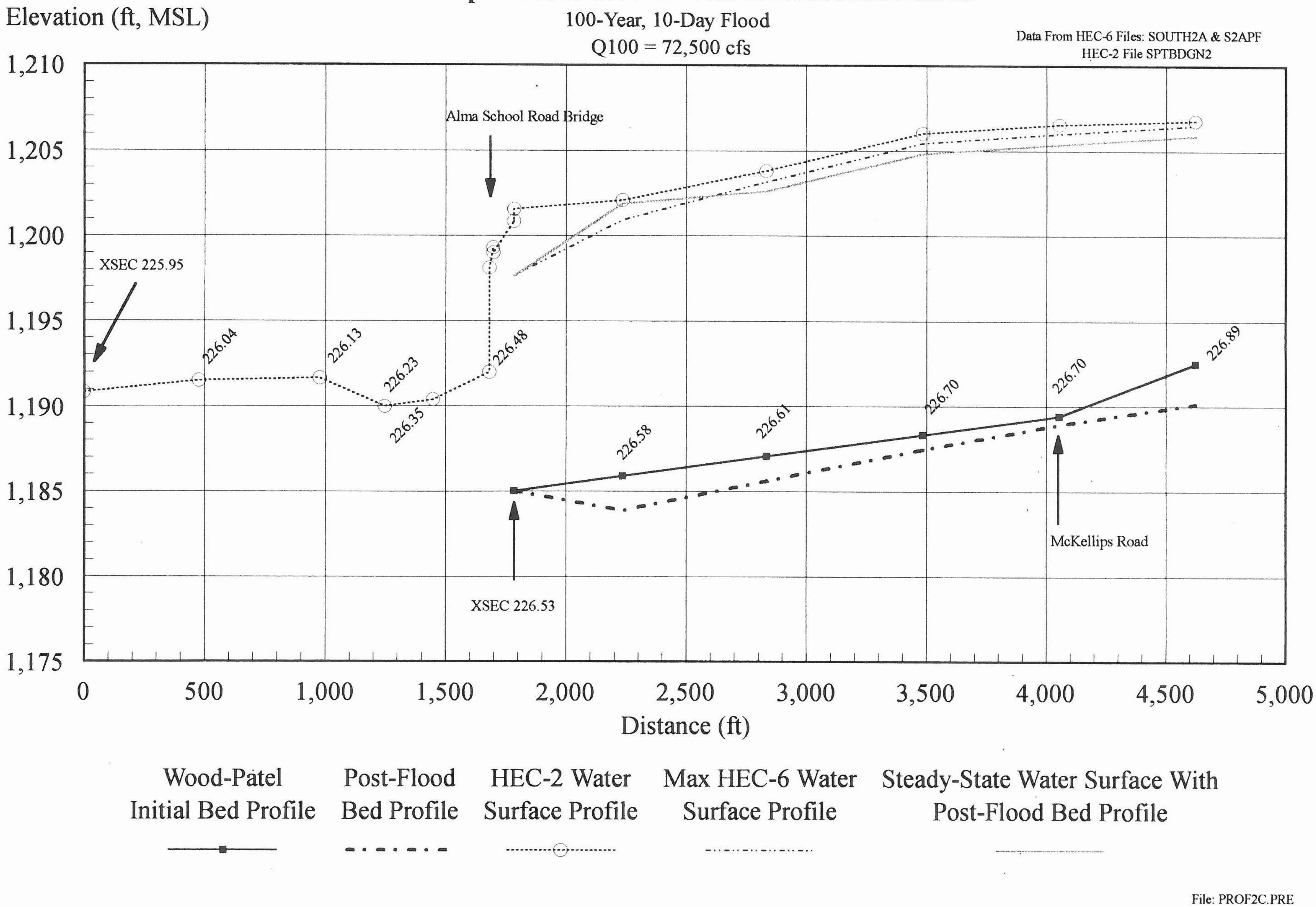
The maximum water surface elevation that occurred at each XSEC along the freeway was used for the design recommendations presented in the following section. A freeboard elevation of 3.0-feet was added to the maximum water surface profile in order to establish the recommended top-of-bank elevations.

Figure 4.4
Salt River Water Surface Profile Analysis For Main Channel
McKellips Road to Evergreen Road



File: PROF2A..PRE

Figure 4.5
Salt River Water Surface Profile Analysis For South Channel
McKellips Road to 1100-Ft West of Alma School Road



4.4 Recommended Elevations For Freeway Embankment Design

The scour and water surface profile data presented in Sections 4.2 and 4.3 have been condensed into a single summary table for listing design recommendations for the CSA bank-lining. Table 4.3 summarizes these recommendations.

Design elevations are referenced to HEC-2 cross-section numbers, as well as to the CSA control line stationing. This correlation between HEC-2 sections and control line stationing was prepared by Wood, Patel & Associates.

The scour and water surface profiles from Table 4.3 are plotted in Figures 4.6 and 4.7 for areas downstream and upstream of Alma School Road, respectively. These figures show the actual 100-year water surface profile without freeboard.

The information in Table 4.3 is being provided to Wood, Patel & Associates for use in designing the CSA bank-lining. For ease of construction, Wood-Patel will probably "smooth" some of the undulations in the theoretical design profiles. Such smoothing should be done in a manner that will not decrease the scour depths and freeboard dimensions presented in this report.

Wood-Patel also indicated that some material may be excavated along the toe of the proposed bank-lining in order to satisfy the need for freeway fill. This excavation will probably be done in a manner that will create a small channel adjacent to the bank-lining. Wood-Patel stated that the bank-lining toe-down will be extended 10-feet below this channel invert, or to the theoretical scour elevation from Table 4.3, whichever is deeper.

For documentation purposes, it should be noted that the minimum Wood-Patel thalweg elevations for XSECs 224.90, 225.00, 225.10, and 225.19 (Table 4.1) are referenced to the thalweg elevations published in the 1994 SLA report under Table 4 and in HEC-2 Model BASE.DAT. This approach provides continuity for the CSA design through the SLA/Wood-Patel transition zone. Justification for the thalweg elevations at these four locations is available from SLA.

In concluding, it should be re-emphasized that the 1991-1993 topographic data upon which this scour analysis is based may or may not be representative of present-day river geometry through the study reach (see Section 2.2). In preparing this study, it has been assumed that the general river characteristics have not changed in a way (since 1991-1993) that would cause any significant alteration to the recommended water surface and scour profiles presented in this report. This should be a reasonable assumption. However, continuation of un-regulated in-stream gravel mining could induce changes to the river system equilibrium that would void the recommendations presented in this report. Acquisition of a right-of-way buffer zone adjacent to the CSA bank protection would provide an added measure of protection against possible undercutting caused by future in-stream mining.

Table 4.3
Summary of Recommended Elevations for CSA Bank-Lining Design
Red Mountain Freeway
Dobson Road to McKellips Road
Salt River, 100-Year Event

		Top-of-Bank Design				Toe-Down Design	
CSA Control Line Station	Applicable HEC-2/HEC-6 XSEC	Maximum 100-Yr Water Surface (ft, MSL)	Data Source	Freeboard (ft)	Recommended Design Elevation (ft, MSL)	Data Source	Recommended Design Elevation (ft, MSL)
-	224.90	1182.77	HEC-6 Model T2A	3.00	1185.77	* HEC-6 Model T2B	1141.24
0+00	-	-	-	-	-	-	-
3+57.7	225.00	1183.32	HEC-6 Model T2APF	3.00	1186.32	* HEC-6 Model T2B	1142.16
8+58.0	225.10	1183.60	HEC-6 Model T2APF	3.00	1186.60	* HEC-6 Model T2B	1142.67
14+67.1	225.19	1183.86	HEC-6 Model T2APF	3.00	1186.86	* HEC-6 Model T2B	1143.95
19+00.0	225.28	1184.30	HEC-6 Model T2APF	3.00	1187.30	HEC-6 Model T2B	1149.94
31+30.4	225.38	1185.35	HEC-6 Model T2APF	3.00	1188.35	HEC-6 Model T2B	1149.89
35+30.3	225.48	1185.47	HEC-6 Model T2APF	3.00	1188.47	HEC-6 Model T2A	1147.91
40+32.5	225.57	1186.56	HEC-6 Model T2A	3.00	1189.56	HEC-6 Model T2A	1145.22
45+39.4	225.66	1187.04	HEC-6 Model T2APF	3.00	1190.04	HEC-6 Model T2A	1145.97
50+00.0	225.76	1188.37	HEC-6 Model T2APF	3.00	1191.37	HEC-6 Model T2A	1154.30
55+83.9	225.85	1189.84	HEC-6 Model T2APF	3.00	1192.84	HEC-6 Model T2A	1156.80
60+61.08	225.95	1190.81	HEC-2 Model SPTBDGN2	3.00	1193.81	HEC-6 Model T2A	1157.90
66+00.0	226.04	1191.48	HEC-2 Model SPTBDGN2	3.00	1194.48	Gravel Pit Analysis	1155.20
69+47.1	226.13	1191.64	HEC-2 Model SPTBDGN2	3.00	1194.64	Gravel Pit Analysis	1155.20
-	226.23	1189.97	HEC-2 Model SPTBDGN2	3.00	1192.97	Gravel Pit Analysis	1155.20
-	226.35	1190.37	HEC-2 Model SPTBDGN2	3.00	1193.37	Gravel Pit Analysis	1155.20
-	226.48	1191.98	HEC-2 Model SPTBDGN2	3.00	1194.98	Gravel Pit Analysis	1155.20
-	226.49	1198.09	HEC-2 Model SPTBDGN2	3.00	1201.09	Alma School Road Grade-Control	
-	226.53	1201.53	HEC-2 Model SPTBDGN2	3.00	1204.53	Alma School Road Grade-Control	
-	226.58	1202.07	HEC-2 Model SPTBDGN2	3.00	1205.07	HEC-6 Model SOUTH1	1169.00
108+46.16	226.61	1203.80	HEC-2 Model SPTBDGN2	3.00	1206.80	HEC-6 Model SOUTH1	1170.00
115+05.9	226.70	1206.00	HEC-2 Model SPTBDGN2	3.00	1209.00	HEC-6 Model SOUTH1	1172.00
-	226.80	1206.53	HEC-2 Model SPTBDGN2	3.00	1209.53	HEC-6 Model SOUTH1	1178.00

Description of HEC-2 & HEC-6 models:

HEC-6 Model T2A - Main channel model from Evergreen Road to Country Club Road.

HEC-6 Model T2B - Main channel model from Evergreen Road to XSEC 226.38, with zero sediment supply from gravel pit at XSEC 225.38.

HEC-6 Model T2APF - Model T2A with hard-bed adjusted to post-flood bed profile & single, steady-state Q100 discharge.

HEC-6 Model SOUTH1 - South channel model from Alma School Road to McKellips Road; zero sediment inflow from main channel; natural bed thalweg.

HEC-2 Model SPTBDGN2 - South channel model prepared by Wood-Patel from XSECs 225.95 to 226.89.

* Recommended toe-down elevations for XSECs 224.90 through 225.19 are referenced to artificial thalweg elevations published in the 1994 SLA report.

Cross-reference between CSA Control Line Stations & HEC-2/HEC-6 XSEC numbers was provided by Wood-Patel.

File: RMREC1.WK4

Figure 4.6
Recommended Design Profiles For CSA Bank-Lining
Red Mountain Freeway, Alma School Road To Dobson Road

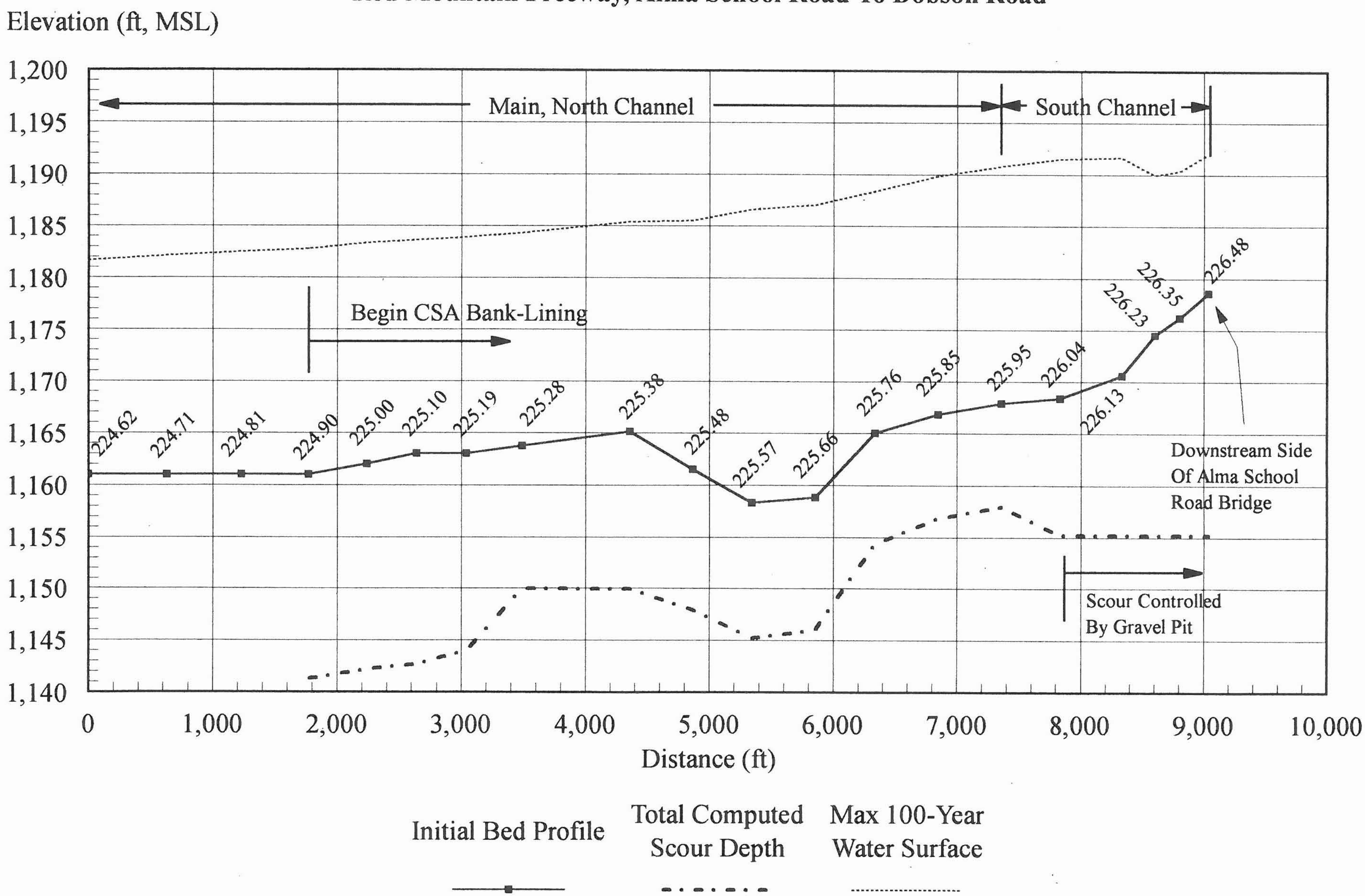
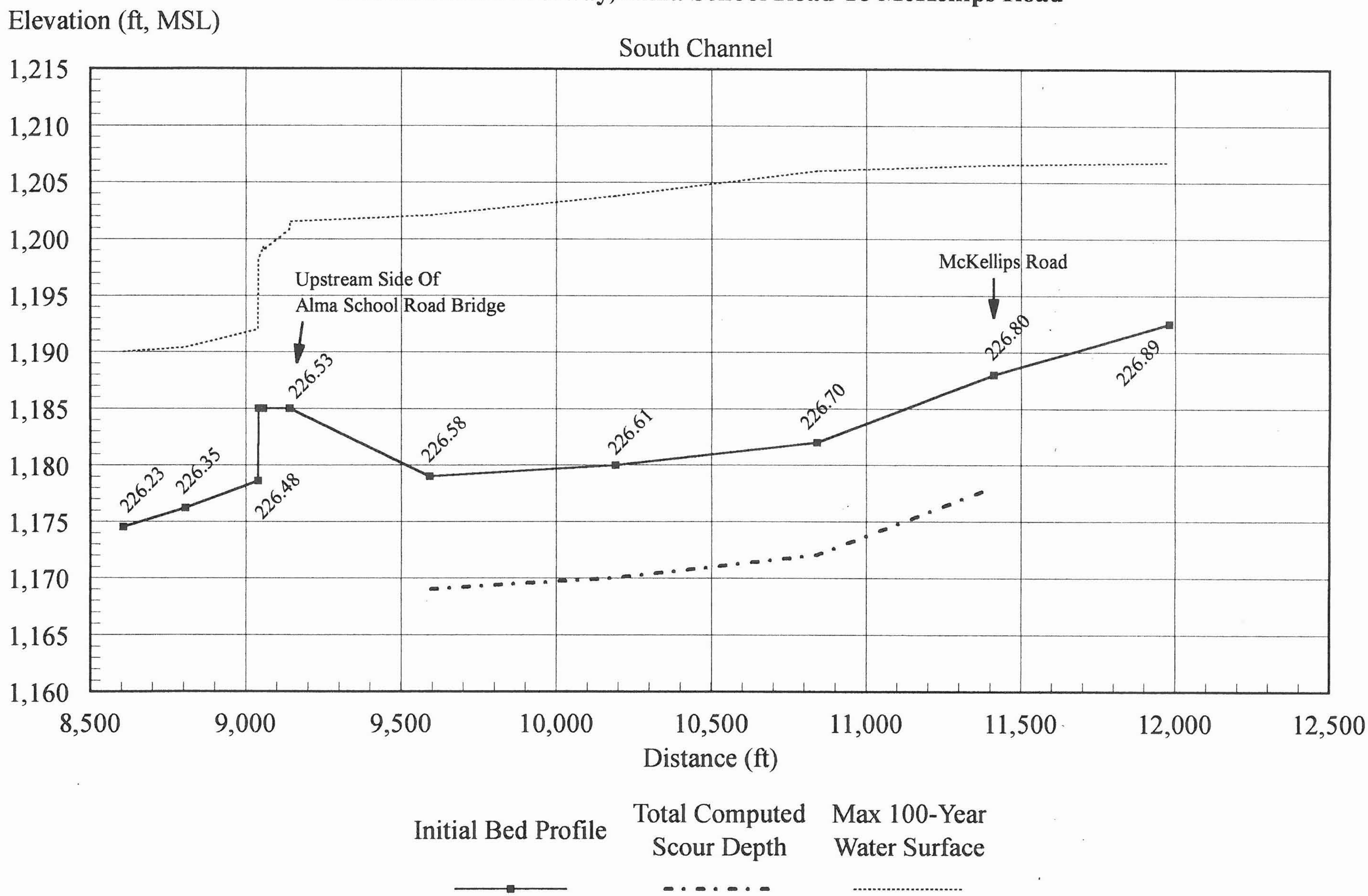


Figure 4.7
Recommended Design Profiles For CSA Bank-Lining
Red Mountain Freeway, Alma School Road To McKellips Road



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Simons, D.B., & Senturk, F., 1977, *Sediment Transport Technology*

APPENDIX A

Red Mountain Freeway
Summary of HEC-6 Analysis
Main Channel Bed Profile

Model: T2A

Table A1
Summary of HEC-6 Analysis
Model T2A - With Alma School Drop
Red Mountain Freeway
Country Club Drive to Evergreen Road
Salt River - Main Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
224.62	0	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00
224.71	630	1161.00	1160.95	1160.94	1160.93	1160.91	1160.90	1160.89	1160.86	1160.83	1160.81	1160.79	1160.78	1160.78	1160.79	1160.80	1160.80	1160.80	1160.81	1160.81
224.81	1,230	1161.00	1161.01	1161.00	1160.99	1160.98	1160.96	1160.95	1160.94	1160.92	1160.89	1160.86	1160.84	1160.83	1160.82	1160.82	1160.82	1160.82	1160.82	1160.83
224.90	1,770	1161.00	1161.12	1161.16	1161.19	1161.22	1161.25	1161.27	1161.31	1161.41	1161.54	1161.70	1161.89	1162.13	1162.43	1162.79	1163.19	1163.59	1164.00	1164.42
225.00	2,240	1162.00	1162.09	1162.13	1162.15	1162.21	1162.30	1162.40	1162.47	1162.57	1162.70	1162.83	1163.03	1163.37	1163.77	1164.17	1164.40	1164.55	1164.68	1164.70
225.10	2,640	1163.00	1162.93	1162.92	1162.92	1162.92	1162.90	1162.85	1162.84	1162.84	1162.84	1162.84	1162.85	1162.87	1162.88	1162.89	1162.89	1162.89	1162.90	1162.91
225.19	3,040	1163.00	1162.98	1162.97	1162.96	1162.94	1162.92	1162.90	1162.89	1162.88	1162.87	1162.87	1162.85	1162.84	1162.84	1162.84	1162.84	1162.84	1162.84	1162.85
225.28	3,490	1163.73	1163.72	1163.71	1163.69	1163.67	1163.65	1163.64	1163.63	1163.63	1163.62	1163.62	1163.62	1163.62	1163.61	1163.61	1163.61	1163.61	1163.62	1163.64
225.38	4,360	1165.13	1165.13	1165.13	1165.13	1165.12	1165.13	1165.14	1165.17	1165.20	1165.23	1165.28	1165.39	1165.62	1165.98	1166.28	1166.51	1166.73	1166.99	1167.21
225.48	4,867	1161.50	1161.28	1161.22	1161.20	1161.17	1161.14	1161.10	1161.06	1161.02	1160.99	1160.96	1160.95	1160.92	1160.86	1160.83	1160.79	1160.76	1160.73	1160.72
225.57	5,342	1158.30	1158.32	1158.29	1158.27	1158.26	1158.25	1158.25	1158.23	1158.21	1158.20	1158.19	1158.17	1158.15	1158.14	1158.13	1158.12	1158.11	1158.12	1158.15
225.66	5,855	1158.80	1159.35	1159.54	1159.72	1159.88	1160.04	1160.21	1160.39	1160.55	1160.74	1160.86	1160.96	1160.92	1160.79	1160.81	1160.96	1161.24	1161.59	1161.91
225.76	6,338	1165.00	1165.16	1165.19	1165.28	1165.41	1165.52	1165.62	1165.67	1165.68	1165.66	1165.70	1165.69	1165.71	1165.72	1165.61	1165.77	1166.26	1166.43	1166.95
225.85	6,848	1166.80	1167.60	1167.98	1168.07	1168.19	1168.33	1168.38	1168.48	1168.69	1168.84	1168.91	1169.02	1169.19	1169.04	1169.42	1170.17	1170.00	1170.50	1170.75
225.95	7,358	1167.90	1167.55	1167.71	1167.73	1167.83	1167.88	1167.91	1167.85	1167.75	1167.60	1167.61	1167.67	1167.66	1167.62	1167.70	1168.30	1168.36	1169.58	1168.96
226.04	7,834	1173.10	1172.81	1172.16	1172.25	1172.30	1172.24	1172.21	1172.36	1172.56	1172.64	1172.73	1172.89	1173.15	1173.19	1174.76	1172.92	1174.99	1174.70	1174.68
226.13	8,336	1174.10	1174.28	1174.47	1174.13	1173.71	1173.48	1173.51	1173.38	1173.31	1173.26	1173.22	1173.19	1173.37	1173.44	1173.91	1173.62	1175.34	1173.72	1174.11
226.23	8,829	1177.60	1177.02	1177.14	1177.13	1177.02	1176.98	1176.84	1176.77	1176.72	1176.67	1176.62	1176.58	1176.35	1176.17	1176.19	1176.11	1176.23	1176.29	1176.10
226.35	9,495	1180.20	1179.90	1179.43	1179.34	1179.32	1179.31	1179.30	1179.27	1179.19	1179.10	1179.06	1179.04	1179.02	1178.92	1178.79	1178.62	1178.61	1178.52	1178.45
226.47	10,166	1181.60	1181.88	1181.98	1182.04	1182.07	1182.05	1181.96	1181.89	1181.65	1181.49	1181.40	1181.24	1181.14	1180.99	1180.87	1180.74	1180.70	1180.60	1180.51
226.61	10,836	1187.00	1187.00	1187.00	1187.00	1187.00	1187.00	1187.00	1187.00	1187.00	1187.00	1187.00	1187.00	1187.00	1188.07	1187.00	1190.56	1187.03	1187.04	1187.03
226.70	11,340	1188.00	1188.64	1188.71	1188.71	1188.61	1188.53	1188.49	1188.48	1188.42	1188.53	1188.49	1188.48	1188.58	1188.92	1190.24	1187.91	1188.18	1188.35	1188.24
226.80	11,828	1191.70	1190.45	1190.62	1190.52	1190.51	1190.48	1190.45	1190.42	1190.40	1190.33	1190.31	1190.17	1190.13	1190.21	1190.45	1190.35	1190.61	1190.19	1190.18
226.89	12,338	1192.50	1192.42	1192.01	1192.01	1191.96	1191.90	1191.87	1191.83	1191.79	1191.71	1191.64	1191.58	1191.53	1191.66	1191.63	1191.60	1191.64	1191.47	1191.39
226.99	12,830	1193.70	1193.72	1193.69	1193.56	1193.53	1193.50	1193.41	1193.31	1193.31	1193.28	1193.16	1193.02	1192.84	1192.45	1193.32	1192.96	1193.01	1192.85	1192.82
227.08	13,335	1194.10	1193.84	1193.82	1193.79	1193.72	1193.67	1193.63	1193.58	1193.47	1193.42	1193.36	1193.29	1192.81	1190.90	1190.50	1190.31	1190.16	1190.02	1189.92
227.18	13,844	1194.50	1194.27	1194.24	1194.20	1194.17	1194.10	1194.06	1194.01	1193.97	1193.93	1193.89	1193.81	1193.75	1193.69	1188.53	1188.61	1188.59	1188.55	1188.64

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Table A1
Summary of HEC-6 Analysis
Model T2A - With Alma School Drop
Red Mountain Freeway
Country Club Drive to Evergreen Road
Salt River - Main Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step 19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	Maximum Aggradation Elevation (ft, MSL)	Maximum Scour Elevation (ft, MSL)
224.62	0	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00
224.71	630	1161.00	1160.81	1160.80	1160.77	1160.73	1160.70	1160.69	1160.68	1160.67	1160.67	1160.66	1160.66	1160.66	1160.66	1160.65	1160.65	1160.65	1161.00	1160.65
224.81	1,230	1161.00	1160.85	1160.90	1161.01	1161.21	1161.43	1161.61	1161.72	1161.81	1161.88	1162.00	1162.08	1162.10	1162.13	1162.15	1162.17	1162.19	1162.19	1160.82
224.90	1,770	1161.00	1164.83	1165.14	1165.34	1165.40	1165.37	1165.33	1165.30	1165.26	1165.23	1165.16	1165.10	1165.07	1165.05	1165.01	1164.99	1164.94	1165.40	1161.00
225.00	2,240	1162.00	1164.63	1164.48	1164.33	1164.19	1164.08	1164.02	1163.97	1163.92	1163.89	1163.83	1163.79	1163.78	1163.77	1163.76	1163.76	1163.76	1164.70	1162.00
225.10	2,640	1163.00	1162.92	1162.93	1162.92	1162.91	1162.91	1162.91	1162.91	1162.90	1162.90	1162.89	1162.88	1162.88	1162.89	1162.89	1162.90	1162.91	1163.00	1162.84
225.19	3,040	1163.00	1162.87	1162.91	1162.92	1162.93	1162.97	1162.98	1163.00	1162.96	1162.94	1162.92	1162.90	1162.91	1162.91	1162.92	1162.93	1162.95	1163.00	1162.84
225.28	3,490	1163.73	1163.67	1163.71	1163.74	1163.79	1163.86	1163.93	1164.00	1164.11	1164.20	1164.35	1164.45	1164.50	1164.53	1164.58	1164.61	1164.67	1164.67	1163.61
225.38	4,360	1165.13	1167.33	1167.09	1166.95	1166.88	1166.81	1166.77	1166.71	1166.66	1166.62	1166.57	1166.56	1166.55	1166.56	1166.57	1166.56	1166.56	1167.33	1165.12
225.48	4,867	1161.50	1160.70	1160.66	1160.63	1160.61	1160.60	1160.58	1160.58	1160.58	1160.58	1160.58	1160.58	1160.59	1160.60	1160.60	1160.61	1160.62	1161.50	1160.58
225.57	5,342	1158.30	1158.29	1159.09	1159.74	1160.11	1160.27	1160.41	1160.47	1160.53	1160.58	1160.65	1160.71	1160.73	1160.73	1160.76	1160.76	1160.75	1160.76	1158.11
225.66	5,855	1158.80	1162.33	1162.50	1162.53	1162.56	1162.62	1162.69	1162.73	1162.77	1162.81	1162.88	1162.92	1162.93	1162.94	1162.94	1162.94	1162.94	1162.94	1158.80
225.76	6,338	1165.00	1167.10	1167.04	1167.07	1167.14	1167.26	1167.28	1167.36	1167.40	1167.43	1167.45	1167.42	1167.42	1167.42	1167.38	1167.37	1167.33	1167.45	1165.00
225.85	6,848	1166.80	1170.50	1170.51	1170.39	1170.27	1170.16	1170.12	1170.05	1170.02	1169.99	1169.94	1169.91	1169.87	1169.84	1169.79	1169.77	1169.70	1170.75	1166.80
225.95	7,358	1167.90	1169.21	1169.07	1169.08	1169.06	1169.14	1169.10	1169.17	1169.16	1169.16	1169.16	1169.10	1169.07	1169.07	1169.05	1169.04	1169.02	1169.58	1167.55
226.04	7,834	1173.10	1174.30	1174.21	1174.02	1173.99	1173.83	1173.87	1173.75	1173.78	1173.77	1173.68	1173.60	1173.60	1173.59	1173.54	1173.54	1173.50	1174.99	1172.16
226.13	8,336	1174.10	1174.02	1173.97	1173.96	1173.96	1174.02	1174.00	1174.06	1174.05	1174.03	1173.96	1173.89	1173.91	1173.91	1173.87	1173.88	1173.87	1175.34	1173.19
226.23	8,829	1177.60	1176.06	1176.03	1176.01	1176.05	1176.07	1176.08	1176.12	1176.17	1176.20	1176.20	1176.19	1176.23	1176.22	1176.22	1176.24	1176.24	1177.60	1176.01
226.35	9,495	1180.20	1178.38	1178.31	1178.25	1177.99	1177.88	1177.77	1177.62	1177.54	1177.40	1177.37	1177.34	1177.26	1177.24	1177.20	1177.18	1177.15	1180.20	1177.15
226.47	10,166	1181.60	1180.43	1180.36	1180.30	1180.26	1180.16	1180.06	1180.03	1179.91	1179.88	1179.75	1179.72	1179.69	1179.66	1179.63	1179.60	1179.52	1182.07	1179.52
226.61	10,836	1187.00	1187.02	1187.02	1187.02	1187.01	1187.01	1187.01	1187.00	1187.00	1187.00	1187.00	1187.00	1187.00	1187.00	1187.00	1187.00	1187.00	1190.56	1187.00
226.70	11,340	1188.00	1188.26	1188.27	1188.26	1188.26	1188.28	1188.29	1188.28	1188.28	1188.29	1188.29	1188.29	1188.31	1188.32	1188.32	1188.35	1188.35	1190.24	1187.91
226.80	11,828	1191.70	1190.16	1190.14	1190.11	1190.08	1190.05	1190.03	1190.01	1189.99	1189.96	1189.94	1189.92	1189.89	1189.87	1189.85	1189.83	1189.80	1191.70	1189.80
226.89	12,338	1192.50	1191.33	1191.29	1191.25	1191.23	1191.21	1191.19	1191.16	1191.14	1191.12	1191.09	1191.07	1191.04	1191.01	1190.98	1190.96	1190.92	1192.50	1190.92
226.99	12,830	1193.70	1192.79	1192.78	1192.76	1192.74	1192.77	1192.73	1192.69	1192.68	1192.68	1192.66	1192.65	1192.65	1192.64	1192.63	1192.62	1192.61	1193.72	1192.45
227.08	13,335	1194.10	1189.88	1189.86	1189.84	1189.82	1189.86	1189.82	1189.81	1189.81	1189.81	1189.81	1189.80	1189.80	1189.80	1189.79	1189.79	1189.79	1194.10	1189.79
227.18	13,844	1194.50	1188.67	1188.74	1188.76	1188.81	1189.83	1190.21	1190.46	1190.49	1190.51	1190.49	1190.47	1190.49	1190.52	1190.52	1190.55	1190.55	1194.50	1188.53

File: T2A.WK4

Table A1
Summary of HEC-6 Analysis
Model T2A - With Alma School Drop
Red Mountain Freeway
Country Club Drive to Evergreen Road
Salt River - Main Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
224.62	0	1161.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
224.71	630	1161.00	-0.05	-0.06	-0.07	-0.09	-0.10	-0.11	-0.14	-0.17	-0.19	-0.21	-0.22	-0.22	-0.21	-0.20	-0.20	-0.20	-0.19	-0.19
224.81	1,230	1161.00	0.01	0.00	-0.01	-0.02	-0.04	-0.05	-0.06	-0.08	-0.11	-0.14	-0.16	-0.17	-0.18	-0.18	-0.18	-0.18	-0.18	-0.17
224.90	1,770	1161.00	0.12	0.16	0.19	0.22	0.25	0.27	0.31	0.41	0.54	0.70	0.89	1.13	1.43	1.79	2.19	2.59	3.00	3.42
225.00	2,240	1162.00	0.09	0.13	0.15	0.21	0.30	0.40	0.47	0.57	0.70	0.83	1.03	1.37	1.77	2.17	2.40	2.55	2.68	2.70
225.10	2,640	1163.00	-0.07	-0.08	-0.08	-0.08	-0.10	-0.15	-0.16	-0.16	-0.16	-0.16	-0.15	-0.13	-0.12	-0.11	-0.11	-0.11	-0.10	-0.09
225.19	3,040	1163.00	-0.02	-0.03	-0.04	-0.06	-0.08	-0.10	-0.11	-0.12	-0.13	-0.13	-0.15	-0.16	-0.16	-0.16	-0.16	-0.16	-0.16	-0.15
225.28	3,490	1163.73	-0.01	-0.02	-0.04	-0.06	-0.08	-0.09	-0.10	-0.10	-0.11	-0.11	-0.11	-0.11	-0.12	-0.12	-0.12	-0.12	-0.11	-0.09
225.38	4,360	1165.13	0.00	0.00	0.00	-0.01	0.00	0.01	0.04	0.07	0.10	0.15	0.26	0.49	0.85	1.15	1.38	1.60	1.86	2.08
225.48	4,867	1161.50	-0.22	-0.28	-0.30	-0.33	-0.36	-0.40	-0.44	-0.48	-0.51	-0.54	-0.55	-0.58	-0.64	-0.67	-0.71	-0.74	-0.77	-0.78
225.57	5,342	1158.30	0.02	-0.01	-0.03	-0.04	-0.05	-0.05	-0.07	-0.09	-0.10	-0.11	-0.13	-0.15	-0.16	-0.17	-0.18	-0.19	-0.18	-0.15
225.66	5,855	1158.80	0.55	0.74	0.92	1.08	1.24	1.41	1.59	1.75	1.94	2.06	2.16	2.12	1.99	2.01	2.16	2.44	2.79	3.11
225.76	6,338	1165.00	0.16	0.19	0.28	0.41	0.52	0.62	0.67	0.68	0.66	0.70	0.69	0.71	0.72	0.61	0.77	1.26	1.43	1.95
225.85	6,848	1166.80	0.8[illegible]	1.18	1.27	1.39	1.53	1.58	1.68	1.89	2.04	2.11	2.22	2.39	2.24	2.62	3.37	3.20	3.70	3.95
225.95	7,358	1167.90	-0.35	-0.19	-0.17	-0.07	-0.02	0.01	-0.05	-0.15	-0.30	-0.29	-0.23	-0.24	-0.28	-0.20	0.40	0.46	1.68	1.06
226.04	7,834	1173.10	-0.29	-0.94	-0.85	-0.80	-0.86	-0.89	-0.74	-0.54	-0.46	-0.37	-0.21	0.05	0.09	1.66	-0.18	1.89	1.60	1.58
226.13	8,336	1174.10	0.18	0.37	0.03	-0.39	-0.62	-0.59	-0.72	-0.79	-0.84	-0.88	-0.91	-0.73	-0.66	-0.19	-0.48	1.24	-0.38	0.01
226.23	8,829	1177.60	-0.58	-0.46	-0.47	-0.58	-0.62	-0.76	-0.83	-0.88	-0.93	-0.98	-1.02	-1.25	-1.43	-1.41	-1.49	-1.37	-1.31	-1.50
226.35	9,495	1180.20	-0.30	-0.77	-0.86	-0.88	-0.89	-0.90	-0.93	-1.01	-1.10	-1.14	-1.16	-1.18	-1.28	-1.41	-1.58	-1.59	-1.68	-1.75
226.47	10,166	1181.60	0.28	0.38	0.44	0.47	0.45	0.36	0.29	0.05	-0.11	-0.20	-0.36	-0.46	-0.61	-0.73	-0.86	-0.90	-1.00	-1.09
226.61	10,836	1187.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.07	0.00	3.56	0.03	0.04	0.03
226.70	11,340	1188.00	0.64	0.71	0.71	0.61	0.53	0.49	0.48	0.42	0.53	0.49	0.48	0.58	0.92	2.24	-0.09	0.18	0.35	0.24
226.80	11,828	1191.70	-1.25	-1.08	-1.18	-1.19	-1.22	-1.25	-1.28	-1.30	-1.37	-1.39	-1.53	-1.57	-1.49	-1.25	-1.35	-1.09	-1.51	-1.52
226.89	12,338	1192.50	-0.08	-0.49	-0.49	-0.54	-0.60	-0.63	-0.67	-0.71	-0.79	-0.86	-0.92	-0.97	-0.84	-0.87	-0.90	-0.86	-1.03	-1.11
226.99	12,830	1193.70	0.02	-0.01	-0.14	-0.17	-0.20	-0.29	-0.39	-0.39	-0.42	-0.54	-0.68	-0.86	-1.25	-0.38	-0.74	-0.69	-0.85	-0.88
227.08	13,335	1194.10	-0.26	-0.28	-0.31	-0.38	-0.43	-0.47	-0.52	-0.63	-0.68	-0.74	-0.81	-1.29	-3.20	-3.60	-3.79	-3.94	-4.08	-4.18
227.18	13,844	1194.50	-0.23	-0.26	-0.30	-0.33	-0.40	-0.44	-0.49	-0.53	-0.57	-0.61	-0.69	-0.75	-0.81	-5.97	-5.89	-5.91	-5.95	-5.86

File: T2A.WK4

Table A1
Summary of HEC-6 Analysis
Model T2A - With Alma School Drop
Red Mountain Freeway
Country Club Drive to Evergreen Road
Salt River - Main Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step 19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	Maximum Aggradation (ft)	Maximum Scour (ft)
224.62	0	1161.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
224.71	630	1161.00	-0.19	-0.20	-0.23	-0.27	-0.30	-0.31	-0.32	-0.33	-0.33	-0.34	-0.34	-0.34	-0.34	-0.35	-0.35	-0.35	0.00	-0.35
224.81	1,230	1161.00	-0.15	-0.10	0.01	0.21	0.43	0.61	0.72	0.81	0.88	1.00	1.08	1.10	1.13	1.15	1.17	1.19	1.19	-0.18
224.90	1,770	1161.00	3.83	4.14	4.34	4.40	4.37	4.33	4.30	4.26	4.23	4.16	4.10	4.07	4.05	4.01	3.99	3.94	4.40	0.00
225.00	2,240	1162.00	2.63	2.48	2.33	2.19	2.08	2.02	1.97	1.92	1.89	1.83	1.79	1.78	1.77	1.76	1.76	1.76	2.70	0.00
225.10	2,640	1163.00	-0.08	-0.07	-0.08	-0.09	-0.09	-0.09	-0.09	-0.10	-0.10	-0.11	-0.12	-0.12	-0.11	-0.11	-0.10	-0.09	0.00	-0.16
225.19	3,040	1163.00	-0.13	-0.09	-0.08	-0.07	-0.03	-0.02	0.00	-0.04	-0.06	-0.08	-0.10	-0.09	-0.09	-0.08	-0.07	-0.05	0.00	-0.16
225.28	3,490	1163.73	-0.06	-0.02	0.01	0.06	0.13	0.20	0.27	0.38	0.47	0.62	0.72	0.77	0.80	0.85	0.88	0.94	0.94	-0.12
225.38	4,360	1165.13	2.20	1.96	1.82	1.75	1.68	1.64	1.58	1.53	1.49	1.44	1.43	1.42	1.43	1.44	1.43	1.43	2.20	-0.01
225.48	4,867	1161.50	-0.80	-0.84	-0.87	-0.89	-0.90	-0.92	-0.92	-0.92	-0.92	-0.92	-0.92	-0.91	-0.90	-0.90	-0.89	-0.88	0.00	-0.92
225.57	5,342	1158.30	-0.01	0.79	1.44	1.81	1.97	2.11	2.17	2.23	2.28	2.35	2.41	2.43	2.43	2.46	2.46	2.45	2.46	-0.19
225.66	5,855	1158.80	3.53	3.70	3.73	3.76	3.82	3.89	3.93	3.97	4.01	4.08	4.12	4.13	4.14	4.14	4.14	4.14	4.14	0.00
225.76	6,338	1165.00	2.10	2.04	2.07	2.14	2.26	2.28	2.36	2.40	2.43	2.45	2.42	2.42	2.42	2.38	2.37	2.33	2.45	0.00
225.85	6,848	1166.80	3.70	3.71	3.59	3.47	3.36	3.32	3.25	3.22	3.19	3.14	3.11	3.07	3.04	2.99	2.97	2.90	3.95	0.00
225.95	7,358	1167.90	1.31	1.17	1.18	1.16	1.24	1.20	1.27	1.26	1.26	1.26	1.20	1.17	1.17	1.15	1.14	1.12	1.68	-0.35
226.04	7,834	1173.10	1.20	1.11	0.92	0.89	0.73	0.77	0.65	0.68	0.67	0.58	0.50	0.50	0.49	0.44	0.44	0.40	1.89	-0.94
226.13	8,336	1174.10	-0.08	-0.13	-0.14	-0.14	-0.08	-0.10	-0.04	-0.05	-0.07	-0.14	-0.21	-0.19	-0.19	-0.23	-0.22	-0.23	1.24	-0.91
226.23	8,829	1177.60	-1.54	-1.57	-1.59	-1.55	-1.53	-1.52	-1.48	-1.43	-1.40	-1.40	-1.41	-1.37	-1.38	-1.38	-1.36	-1.36	0.00	-1.59
226.35	9,495	1180.20	-1.82	-1.89	-1.95	-2.21	-2.32	-2.43	-2.58	-2.66	-2.80	-2.83	-2.86	-2.94	-2.96	-3.00	-3.02	-3.05	0.00	-3.05
226.47	10,166	1181.60	-1.17	-1.24	-1.30	-1.34	-1.44	-1.54	-1.57	-1.69	-1.72	-1.85	-1.88	-1.91	-1.94	-1.97	-2.00	-2.08	0.47	-2.08
226.61	10,836	1187.00	0.02	0.02	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.56	0.00
226.70	11,340	1188.00	0.26	0.27	0.26	0.26	0.28	0.29	0.28	0.28	0.29	0.29	0.29	0.31	0.32	0.32	0.35	0.35	2.24	-0.09
226.80	11,828	1191.70	-1.54	-1.56	-1.59	-1.62	-1.65	-1.67	-1.69	-1.71	-1.74	-1.76	-1.78	-1.81	-1.83	-1.85	-1.87	-1.90	0.00	-1.90
226.89	12,338	1192.50	-1.17	-1.21	-1.25	-1.27	-1.29	-1.31	-1.34	-1.36	-1.38	-1.41	-1.43	-1.46	-1.49	-1.52	-1.54	-1.58	0.00	-1.58
226.99	12,830	1193.70	-0.91	-0.92	-0.94	-0.96	-0.93	-0.97	-1.01	-1.02	-1.02	-1.04	-1.05	-1.05	-1.06	-1.07	-1.08	-1.09	0.02	-1.25
227.08	13,335	1194.10	-4.22	-4.24	-4.26	-4.28	-4.24	-4.28	-4.29	-4.29	-4.29	-4.29	-4.30	-4.30	-4.30	-4.31	-4.31	-4.31	0.00	-4.31
227.18	13,844	1194.50	-5.83	-5.76	-5.74	-5.69	-4.67	-4.29	-4.04	-4.01	-3.99	-4.01	-4.03	-4.01	-3.98	-3.98	-3.95	-3.95	0.00	-5.97

File: T2A.WK4

APPENDIX B

Red Mountain Freeway
Summary of HEC-6 Analysis
South Channel Bed Profile

Models: SOUTH1 & SOUTH2

Table B1
Summary of HEC-6 Analysis
Model SOUTH1
Red Mountain Freeway
McKellips Road to Alma School Road
Salt River - South Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
226.53	0	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00
226.58	450	1179.00	1179.02	1179.02	1179.02	1179.01	1178.99	1178.97	1178.96	1178.91	1178.84	1178.82	1178.70	1178.49	1178.22	1178.14	1177.86	1177.76	1177.68	1177.61
226.61	1,050	1180.00	1180.24	1180.31	1180.38	1180.46	1180.56	1180.63	1180.70	1180.73	1180.70	1180.61	1180.45	1180.16	1179.84	1179.28	1179.12	1179.04	1178.96	1178.93
226.70	1,700	1182.00	1184.04	1184.11	1184.14	1184.09	1183.99	1183.90	1183.79	1183.64	1183.48	1183.34	1183.16	1182.93	1182.69	1182.54	1182.49	1182.47	1182.45	1182.44
226.80	2,270	1188.00	1186.51	1186.73	1186.66	1186.64	1186.64	1186.63	1186.63	1186.62	1186.61	1186.60	1186.59	1186.57	1186.53	1186.46	1186.42	1186.38	1186.34	1186.31
226.89	2,840	1192.50	1191.71	1191.08	1191.02	1190.96	1190.91	1190.85	1190.79	1190.74	1190.68	1190.63	1190.57	1190.52	1190.47	1190.41	1190.36	1190.30	1190.25	1190.20

Table B1
Summary of HEC-6 Analysis
Model SOUTH2
Red Mountain Freeway
McKellips Road to Alma School Road
Salt River - South Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
226.53	0	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00
226.58	450	1185.87	1185.84	1185.80	1185.76	1185.69	1185.55	1185.48	1185.34	1184.99	1184.76	1184.68	1184.42	1183.28	1182.98	1182.79	1182.38	1182.22	1182.13	1182.11
226.61	1,050	1187.03	1187.04	1187.01	1186.97	1186.93	1186.84	1186.75	1186.67	1186.58	1186.44	1186.28	1186.03	1185.79	1185.46	1185.05	1184.93	1184.91	1184.87	1184.85
226.70	1,700	1188.29	1188.37	1188.34	1188.29	1188.22	1188.15	1188.09	1188.02	1187.91	1187.82	1187.78	1187.75	1187.72	1187.46	1187.40	1187.37	1187.30	1187.25	1187.16
226.80	2,270	1189.39	1189.75	1189.69	1189.66	1189.64	1189.63	1189.62	1189.62	1189.61	1189.60	1189.58	1189.53	1189.44	1189.25	1188.97	1188.85	1188.74	1188.68	1188.64
226.89	2,840	1192.50	1191.01	1190.97	1190.94	1190.90	1190.86	1190.82	1190.77	1190.73	1190.69	1190.64	1190.59	1190.54	1190.46	1190.38	1190.30	1190.23	1190.16	1190.10

File: SOUTH1.WK4

Table B1
Summary of HEC-6 Analysis
Model SOUTH1
Red Mountain Freeway
McKellips Road to Alma School Road
Salt River - South Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step																Maximum Aggradation Elevation (ft, MSL)	Maximum Scour Elevation (ft, MSL)
			19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34		
226.53	0	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00
226.58	450	1179.00	1177.59	1177.58	1177.57	1177.56	1177.56	1177.56	1177.57	1177.57	1177.57	1177.58	1177.59	1177.59	1177.59	1177.60	1177.60	1177.61	1179.02	1177.56
226.61	1,050	1180.00	1178.90	1178.88	1178.88	1178.88	1178.89	1178.89	1178.90	1178.91	1178.92	1178.93	1178.94	1178.95	1178.96	1178.97	1178.97	1178.99	1180.73	1178.88
226.70	1,700	1182.00	1182.44	1182.45	1182.47	1182.49	1182.51	1182.53	1182.55	1182.57	1182.59	1182.60	1182.62	1182.64	1182.65	1182.66	1182.68	1182.69	1184.14	1182.00
226.80	2,270	1188.00	1186.28	1186.26	1186.24	1186.22	1186.21	1186.20	1186.20	1186.19	1186.19	1186.18	1186.17	1186.17	1186.17	1186.16	1186.16	1186.15	1188.00	1186.15
226.89	2,840	1192.50	1190.15	1190.09	1190.04	1189.99	1189.94	1189.89	1189.84	1189.79	1189.74	1189.69	1189.64	1189.60	1189.55	1189.51	1189.46	1189.42	1192.50	1189.42

Table B1
Summary of HEC-6 Analysis
Model SOUTH2
Red Mountain Freeway
McKellips Road to Alma School Road
Salt River - South Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step																Maximum Aggradation Elevation (ft, MSL)	Maximum Scour Elevation (ft, MSL)
			19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34		
226.53	0	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00	1185.00
226.58	450	1185.87	1182.08	1182.07	1182.06	1182.07	1182.08	1182.10	1182.11	1182.13	1182.15	1182.18	1182.19	1182.20	1182.21	1182.23	1182.24	1182.26	1185.87	1182.06
226.61	1,050	1187.03	1184.83	1184.81	1184.80	1184.80	1184.82	1184.83	1184.85	1184.86	1184.87	1184.88	1184.88	1184.89	1184.90	1184.90	1184.92	1184.92	1187.04	1184.80
226.70	1,700	1188.29	1187.13	1187.11	1187.09	1187.07	1187.06	1187.05	1187.05	1187.05	1187.05	1187.04	1187.03	1187.03	1187.03	1187.02	1187.02	1187.00	1188.37	1187.00
226.80	2,270	1189.39	1188.60	1188.56	1188.53	1188.49	1188.46	1188.44	1188.41	1188.39	1188.37	1188.34	1188.31	1188.29	1188.28	1188.25	1188.24	1188.21	1189.75	1188.21
226.89	2,840	1192.50	1190.05	1190.00	1189.95	1189.91	1189.87	1189.83	1189.80	1189.76	1189.72	1189.68	1189.64	1189.60	1189.57	1189.53	1189.50	1189.45	1192.50	1189.45

File: SOUTH1.WK4

Table B1
Summary of HEC-6 Analysis
Model SOUTH1
Red Mountain Freeway
McKellips Road to Alma School Road
Salt River - South Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
226.53	0	1185.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
226.58	450	1179.00	0.02	0.02	0.02	0.01	-0.01	-0.03	-0.04	-0.09	-0.16	-0.18	-0.30	-0.51	-0.78	-0.86	-1.14	-1.24	-1.32	-1.39
226.61	1,050	1180.00	0.24	0.31	0.38	0.46	0.56	0.63	0.70	0.73	0.70	0.61	0.45	0.16	-0.16	-0.72	-0.88	-0.96	-1.04	-1.07
226.70	1,700	1182.00	2.04	2.11	2.14	2.09	1.99	1.90	1.79	1.64	1.48	1.34	1.16	0.93	0.69	0.54	0.49	0.47	0.45	0.44
226.80	2,270	1188.00	-1.49	-1.27	-1.34	-1.36	-1.36	-1.37	-1.37	-1.38	-1.39	-1.40	-1.41	-1.43	-1.47	-1.54	-1.58	-1.62	-1.66	-1.69
226.89	2,840	1192.50	-0.79	-1.42	-1.48	-1.54	-1.59	-1.65	-1.71	-1.76	-1.82	-1.87	-1.93	-1.98	-2.03	-2.09	-2.14	-2.20	-2.25	-2.30

Table B1
Summary of HEC-6 Analysis
Model SOUTH2
Red Mountain Freeway
McKellips Road to Alma School Road
Salt River - South Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
226.53	0	1185.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
226.58	450	1185.87	-0.03	-0.07	-0.11	-0.18	-0.32	-0.39	-0.53	-0.88	-1.11	-1.19	-1.45	-2.59	-2.89	-3.08	-3.49	-3.65	-3.74	-3.76
226.61	1,050	1187.03	0.01	-0.02	-0.06	-0.10	-0.19	-0.28	-0.36	-0.45	-0.59	-0.75	-1.00	-1.24	-1.57	-1.98	-2.10	-2.12	-2.16	-2.18
226.70	1,700	1188.29	0.08	0.05	0.00	-0.07	-0.14	-0.20	-0.27	-0.38	-0.47	-0.51	-0.54	-0.57	-0.83	-0.89	-0.92	-0.99	-1.04	-1.13
226.80	2,270	1189.39	0.36	0.30	0.27	0.25	0.24	0.23	0.23	0.22	0.21	0.19	0.14	0.05	-0.14	-0.42	-0.54	-0.65	-0.71	-0.75
226.89	2,840	1192.50	-1.49	-1.53	-1.56	-1.60	-1.64	-1.68	-1.73	-1.77	-1.81	-1.86	-1.91	-1.96	-2.04	-2.12	-2.20	-2.27	-2.34	-2.40

File: SOUTH1.WK4

Table B1
Summary of HEC-6 Analysis
Model SOUTH1
Red Mountain Freeway
McKellips Road to Alma School Road
Salt River - South Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step																Maximum Aggradation (ft)	Maximum Scour (ft)
			19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34		
226.53	0	1185.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
226.58	450	1179.00	-1.41	-1.42	-1.43	-1.44	-1.44	-1.44	-1.43	-1.43	-1.43	-1.42	-1.41	-1.41	-1.41	-1.40	-1.40	-1.39	0.02	-1.44
226.61	1,050	1180.00	-1.10	-1.12	-1.12	-1.12	-1.11	-1.11	-1.10	-1.09	-1.08	-1.07	-1.06	-1.05	-1.04	-1.03	-1.03	-1.01	0.73	-1.12
226.70	1,700	1182.00	0.44	0.45	0.47	0.49	0.51	0.53	0.55	0.57	0.59	0.60	0.62	0.64	0.65	0.66	0.68	0.69	2.14	0.00
226.80	2,270	1188.00	-1.72	-1.74	-1.76	-1.78	-1.79	-1.80	-1.80	-1.81	-1.81	-1.82	-1.83	-1.83	-1.83	-1.84	-1.84	-1.85	0.00	-1.85
226.89	2,840	1192.50	-2.35	-2.41	-2.46	-2.51	-2.56	-2.61	-2.66	-2.71	-2.76	-2.81	-2.86	-2.90	-2.95	-2.99	-3.04	-3.08	0.00	-3.08

Table B1
Summary of HEC-6 Analysis
Model SOUTH2
Red Mountain Freeway
McKellips Road to Alma School Road
Salt River - South Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step																Maximum Aggradation (ft)	Maximum Scour (ft)
			19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34		
226.53	0	1185.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
226.58	450	1185.87	-3.79	-3.80	-3.81	-3.80	-3.79	-3.77	-3.76	-3.74	-3.72	-3.69	-3.68	-3.67	-3.66	-3.64	-3.63	-3.61	0.00	-3.81
226.61	1,050	1187.03	-2.20	-2.22	-2.23	-2.23	-2.21	-2.20	-2.18	-2.17	-2.16	-2.15	-2.15	-2.14	-2.13	-2.13	-2.11	-2.11	0.01	-2.23
226.70	1,700	1188.29	-1.16	-1.18	-1.20	-1.22	-1.23	-1.24	-1.24	-1.24	-1.24	-1.25	-1.26	-1.26	-1.26	-1.27	-1.27	-1.29	0.08	-1.29
226.80	2,270	1189.39	-0.79	-0.83	-0.86	-0.90	-0.93	-0.95	-0.98	-1.00	-1.02	-1.05	-1.08	-1.10	-1.11	-1.14	-1.15	-1.18	0.36	-1.18
226.89	2,840	1192.50	-2.45	-2.50	-2.55	-2.59	-2.63	-2.67	-2.70	-2.74	-2.78	-2.82	-2.86	-2.90	-2.93	-2.97	-3.00	-3.05	0.00	-3.05

File: SOUTH1.WK4

APPENDIX C

Red Mountain Freeway
Summary of HEC-6 Analysis
Main Channel Bed Profile
With Zero Sediment Inflow Downstream of XSEC 225.38

Model: T2B

Table C1
Summary of HEC-6 Analysis
Model T2B - With Zero Sediment Inflo
Red Mountain Freeway
XSEC 224.62 to XSEC 225.38
Salt River - Main Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
224.62	0	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00
224.71	630	1161.00	1160.95	1160.94	1160.93	1160.90	1160.89	1160.85	1160.83	1160.77	1160.76	1160.73	1160.74	1160.73	1160.74	1160.75	1160.74	1160.74	1160.73	1160.72
224.81	1,230	1161.00	1161.00	1160.99	1160.98	1160.98	1160.95	1160.93	1160.91	1160.89	1160.88	1160.87	1160.84	1160.83	1160.84	1160.84	1160.83	1160.82	1160.80	1160.74
224.90	1,770	1161.00	1161.10	1161.13	1161.15	1161.16	1161.16	1161.17	1161.18	1161.17	1161.11	1161.02	1160.90	1160.83	1160.79	1160.81	1160.79	1160.77	1160.73	1160.70
225.00	2,240	1162.00	1162.07	1162.09	1162.11	1162.12	1162.14	1162.18	1162.23	1162.29	1162.34	1162.45	1162.50	1162.52	1162.51	1162.45	1162.36	1162.36	1162.31	1162.31
225.10	2,640	1163.00	1162.90	1162.89	1162.85	1162.84	1162.82	1162.76	1162.70	1162.65	1162.62	1162.56	1162.55	1162.49	1162.42	1162.35	1162.31	1162.23	1162.19	1162.12
225.19	3,040	1163.00	1162.95	1162.91	1162.89	1162.88	1162.81	1162.75	1162.69	1162.65	1162.61	1162.54	1162.42	1162.26	1162.12	1162.04	1161.95	1161.89	1161.84	1161.78
225.28	3,490	1163.73	1163.66	1163.62	1163.60	1163.56	1163.53	1163.47	1163.44	1163.37	1163.29	1163.21	1163.09	1163.01	1162.90	1162.77	1162.72	1162.64	1162.60	1162.57
225.38	4,360	1165.13	1164.97	1164.94	1164.91	1164.88	1164.85	1164.81	1164.74	1164.63	1164.52	1164.40	1164.35	1164.30	1164.25	1164.20	1164.15	1164.11	1164.06	1164.02

File: T2B.WK4

Table C1
Summary of HEC-6 Analysis
Model T2B - With Zero Sediment Inflo
Red Mountain Freeway
XSEC 224.62 to XSEC 225.38
Salt River - Main Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
224.62	0	1161.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
224.71	630	1161.00	-0.05	-0.06	-0.07	-0.10	-0.11	-0.15	-0.17	-0.23	-0.24	-0.27	-0.26	-0.27	-0.26	-0.25	-0.26	-0.26	-0.27	-0.28
224.81	1,230	1161.00	0.00	-0.01	-0.02	-0.02	-0.05	-0.07	-0.09	-0.11	-0.12	-0.13	-0.16	-0.17	-0.16	-0.16	-0.17	-0.18	-0.20	-0.26
224.90	1,770	1161.00	0.10	0.13	0.15	0.16	0.16	0.17	0.18	0.17	0.11	0.02	-0.10	-0.17	-0.21	-0.19	-0.21	-0.23	-0.27	-0.30
225.00	2,240	1162.00	0.07	0.09	0.11	0.12	0.14	0.18	0.23	0.29	0.34	0.45	0.50	0.52	0.51	0.45	0.36	0.36	0.31	0.31
225.10	2,640	1163.00	-0.10	-0.11	-0.15	-0.16	-0.18	-0.24	-0.30	-0.35	-0.38	-0.44	-0.45	-0.51	-0.58	-0.65	-0.69	-0.77	-0.81	-0.88
225.19	3,040	1163.00	-0.05	-0.09	-0.11	-0.12	-0.19	-0.25	-0.31	-0.35	-0.39	-0.46	-0.58	-0.74	-0.88	-0.96	-1.05	-1.11	-1.16	-1.22
225.28	3,490	1163.73	-0.07	-0.11	-0.13	-0.17	-0.20	-0.26	-0.29	-0.36	-0.44	-0.52	-0.64	-0.72	-0.83	-0.96	-1.01	-1.09	-1.13	-1.16
225.38	4,360	1165.13	-0.16	-0.19	-0.22	-0.25	-0.28	-0.32	-0.39	-0.50	-0.61	-0.73	-0.78	-0.83	-0.88	-0.93	-0.98	-1.02	-1.07	-1.11

File: T2B.WK4

Table C1
Summary of HEC-6 Analysis
Model T2B - With Zero Sediment Inflo
Red Mountain Freeway
XSEC 224.62 to XSEC 225.38
Salt River - Main Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step 19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	Maximum Aggradation (ft)	Maximum Scour (ft)
224.62	0	1161.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
224.71	630	1161.00	-0.30	-0.36	-0.41	-0.43	-0.45	-0.46	-0.47	-0.48	-0.49	-0.50	-0.51	-0.51	-0.52	-0.53	-0.53	-0.54	0.00	-0.54
224.81	1,230	1161.00	-0.28	-0.33	-0.34	-0.36	-0.36	-0.37	-0.37	-0.37	-0.37	-0.38	-0.38	-0.38	-0.38	-0.38	-0.38	-0.39	0.00	-0.39
224.90	1,770	1161.00	-0.35	-0.37	-0.39	-0.40	-0.40	-0.41	-0.41	-0.41	-0.41	-0.41	-0.41	-0.41	-0.41	-0.41	-0.41	-0.42	0.18	-0.42
225.00	2,240	1162.00	0.29	0.29	0.29	0.30	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.32	0.32	0.32	0.32	0.32	0.52	0.00
225.10	2,640	1163.00	-0.91	-0.93	-0.95	-0.97	-0.99	-1.00	-1.01	-1.02	-1.03	-1.04	-1.05	-1.06	-1.06	-1.07	-1.08	-1.09	0.00	-1.09
225.19	3,040	1163.00	-1.24	-1.27	-1.28	-1.30	-1.30	-1.31	-1.31	-1.31	-1.31	-1.31	-1.31	-1.31	-1.31	-1.31	-1.31	-1.31	0.00	-1.31
225.28	3,490	1163.73	-1.20	-1.23	-1.25	-1.27	-1.28	-1.29	-1.30	-1.30	-1.31	-1.32	-1.33	-1.33	-1.33	-1.34	-1.34	-1.35	0.00	-1.35
225.38	4,360	1165.13	-1.16	-1.20	-1.24	-1.28	-1.31	-1.34	-1.36	-1.38	-1.40	-1.43	-1.45	-1.47	-1.49	-1.51	-1.53	-1.55	0.00	-1.55

File: T2B.WK4

Table C1
Summary of HEC-6 Analysis
Model T2B - With Zero Sediment Inflo
Red Mountain Freeway
XSEC 224.62 to XSEC 225.38
Salt River - Main Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step																Maximum Aggradation Elevation (ft, MSL)	Maximum Scour Elevation (ft, MSL)
			19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34		
224.62	0	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00	1161.00
224.71	630	1161.00	1160.70	1160.64	1160.59	1160.57	1160.55	1160.54	1160.53	1160.52	1160.51	1160.50	1160.49	1160.49	1160.48	1160.47	1160.47	1160.46	1161.00	1160.46
224.81	1,230	1161.00	1160.72	1160.67	1160.66	1160.64	1160.64	1160.63	1160.63	1160.63	1160.63	1160.62	1160.62	1160.62	1160.62	1160.62	1160.62	1160.61	1161.00	1160.61
224.90	1,770	1161.00	1160.65	1160.63	1160.61	1160.60	1160.60	1160.59	1160.59	1160.59	1160.59	1160.59	1160.59	1160.59	1160.59	1160.59	1160.59	1160.58	1161.18	1160.58
225.00	2,240	1162.00	1162.29	1162.29	1162.29	1162.30	1162.31	1162.31	1162.31	1162.31	1162.31	1162.31	1162.31	1162.32	1162.32	1162.32	1162.32	1162.32	1162.52	1162.00
225.10	2,640	1163.00	1162.09	1162.07	1162.05	1162.03	1162.01	1162.00	1161.99	1161.98	1161.97	1161.96	1161.95	1161.94	1161.94	1161.93	1161.92	1161.91	1163.00	1161.91
225.19	3,040	1163.00	1161.76	1161.73	1161.72	1161.70	1161.70	1161.69	1161.69	1161.69	1161.69	1161.69	1161.69	1161.69	1161.69	1161.69	1161.69	1161.69	1163.00	1161.69
225.28	3,490	1163.73	1162.53	1162.50	1162.48	1162.46	1162.45	1162.44	1162.43	1162.43	1162.42	1162.41	1162.40	1162.40	1162.40	1162.39	1162.39	1162.38	1163.73	1162.38
225.38	4,360	1165.13	1163.97	1163.93	1163.89	1163.85	1163.82	1163.79	1163.77	1163.75	1163.73	1163.70	1163.68	1163.66	1163.64	1163.62	1163.60	1163.58	1165.13	1163.58

File: T2B.WK4

APPENDIX D

Red Mountain Freeway
Summary of HEC-6 Analysis
Main Channel Water Surface Profile

Model: T2A

Table D1
HEC-6 Water Surface Profile
Model T2A - With Alma School Drop
Red Mountain Freeway
Country Club Drive to Evergreen Road
Salt River - Main Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
224.62	0	1161.00	1163.60	1163.65	1163.71	1164.12	1164.80	1165.10	1165.71	1167.39	1168.85	1169.58	1172.06	1175.85	1179.98	1181.64	1178.56	1177.48	1177.35	1175.30
224.71	630	1161.00	1165.11	1165.16	1165.24	1165.80	1166.60	1166.91	1167.45	1168.86	1170.06	1170.70	1172.92	1176.49	1180.48	1182.11	1179.10	1178.05	1177.93	1175.96
224.81	1,230	1161.00	1165.63	1165.68	1165.76	1166.38	1167.26	1167.59	1168.16	1169.60	1170.77	1171.38	1173.52	1176.98	1180.89	1182.49	1179.53	1178.51	1178.39	1176.47
224.90	1,770	1161.00	1165.97	1166.03	1166.13	1166.78	1167.71	1168.05	1168.65	1170.12	1171.29	1171.88	1173.96	1177.35	1181.20	1182.77	1179.84	1178.82	1178.69	1176.80
225.00	2,240	1162.00	1166.25	1166.34	1166.45	1167.12	1168.07	1168.43	1169.04	1170.52	1171.68	1172.27	1174.31	1177.61	1181.39	1182.93	1180.04	1179.05	1178.94	1177.13
225.10	2,640	1163.00	1166.70	1166.80	1166.91	1167.57	1168.54	1168.92	1169.54	1171.02	1172.16	1172.76	1174.74	1177.95	1181.67	1183.23	1180.49	1179.60	1179.54	1177.89
225.19	3,040	1163.00	1167.36	1167.42	1167.53	1168.19	1169.15	1169.53	1170.13	1171.61	1172.74	1173.31	1175.23	1178.36	1181.99	1183.52	1180.83	1179.96	1179.89	1178.27
225.28	3,490	1163.73	1167.93	1167.99	1168.10	1168.77	1169.77	1170.14	1170.77	1172.29	1173.43	1174.01	1175.92	1178.99	1182.57	1184.09	1181.43	1180.55	1180.48	1178.87
225.38	4,360	1165.13	1169.03	1169.11	1169.21	1169.89	1170.88	1171.27	1171.91	1173.46	1174.61	1175.17	1177.06	1180.05	1183.53	1184.98	1182.35	1181.49	1181.41	1179.83
225.48	4,867	1161.50	1169.72	1169.77	1169.87	1170.53	1171.50	1171.88	1172.51	1173.95	1175.01	1175.54	1177.31	1180.12	1183.44	1184.92	1182.48	1181.73	1181.71	1180.32
225.57	5,342	1158.30	1170.79	1170.78	1170.88	1171.65	1172.77	1173.19	1173.87	1175.41	1176.55	1177.11	1178.92	1181.80	1185.10	1186.56	1184.04	1183.24	1183.18	1181.70
225.66	5,855	1158.80	1171.19	1171.24	1171.36	1172.14	1173.28	1173.71	1174.40	1175.97	1177.10	1177.65	1179.43	1182.23	1185.47	1186.92	1184.44	1183.64	1183.54	1182.04
225.76	6,338	1165.00	1171.50	1171.69	1171.86	1172.68	1173.84	1174.32	1175.05	1176.67	1177.85	1178.46	1180.30	1183.13	1186.34	1187.69	1185.27	1184.48	1184.42	1183.04
225.85	6,848	1166.80	1172.58	1172.99	1173.22	1173.94	1175.04	1175.53	1176.26	1177.88	1179.06	1179.66	1181.52	1184.27	1187.40	1188.77	1186.28	1185.44	1185.57	1184.19
225.95	7,358	1167.90	1174.02	1174.60	1175.06	1175.65	1176.53	1176.96	1177.54	1178.95	1180.08	1180.66	1182.39	1185.07	1188.07	1189.34	1187.05	1186.49	1186.51	1185.32
226.04	7,834	1173.10	1176.78	1176.26	1176.03	1176.59	1177.40	1177.75	1178.31	1179.49	1180.44	1180.90	1182.57	1185.33	1188.37	1189.66	1186.81	1186.95	1186.38	1185.83
226.13	8,336	1174.10	1179.15	1179.31	1178.91	1179.23	1179.66	1179.75	1180.09	1181.14	1182.10	1182.54	1183.99	1186.35	1188.88	1190.00	1188.74	1187.49	1188.09	1187.52
226.23	8,829	1177.60	1181.07	1181.03	1181.55	1181.75	1182.05	1182.10	1182.67	1183.50	1184.22	1184.59	1185.71	1187.33	1189.82	1190.91	1189.85	1188.80	1190.91	1188.37
226.35	9,495	1180.20	1185.10	1184.37	1183.99	1184.68	1185.53	1185.89	1186.09	1187.15	1187.86	1188.17	1189.40	1191.21	1192.08	1192.70	1191.62	1190.92	1191.92	1190.32
226.47	10,166	1181.60	1187.67	1187.84	1187.81	1188.29	1188.95	1189.07	1189.50	1190.29	1190.87	1191.06	1191.93	1193.49	1195.27	1195.86	1194.44	1193.92	1193.74	1192.75
226.61	10,836	1187.00	1189.51	1189.75	1189.93	1190.38	1191.01	1191.25	1191.57	1192.46	1192.97	1193.16	1194.07	1195.43	1196.99	1197.99	1196.10	1198.86	1195.42	1194.55
226.70	11,340	1188.00	1191.71	1191.96	1192.01	1192.35	1192.90	1193.13	1193.52	1194.47	1195.18	1195.55	1196.64	1198.32	1200.12	1202.21	1199.11	1202.78	1199.27	1198.30
226.80	11,828	1191.70	1194.13	1193.51	1193.73	1194.06	1194.55	1194.68	1194.99	1195.82	1196.36	1196.74	1197.65	1199.12	1200.73	1202.53	1201.56	1202.70	1199.48	1198.93
226.89	12,338	1192.50	1196.44	1195.51	1195.47	1195.82	1196.39	1196.59	1196.96	1197.83	1198.45	1198.65	1199.59	1200.87	1202.43	1203.57	1202.66	1203.24	1202.12	1200.73
226.99	12,830	1193.70	1197.52	1197.58	1197.31	1197.77	1198.39	1198.59	1199.01	1199.95	1200.62	1200.90	1201.84	1203.22	1204.68	1205.51	1204.41	1204.40	1203.95	1202.93
227.08	13,335	1194.10	1198.31	1198.35	1198.31	1198.75	1199.43	1199.65	1200.07	1200.98	1201.66	1201.96	1202.83	1204.38	1205.97	1206.42	1206.29	1205.60	1205.53	1204.57
227.18	13,844	1194.50	1199.52	1199.40	1199.43	1200.11	1201.02	1201.38	1201.95	1203.25	1204.13	1204.57	1206.01	1208.15	1209.81	1208.10	1208.39	1207.60	1207.42	1206.21

File: T2AWS.WK4

Table D1
HEC-6 Water Surface Profile
Model T2A - With Alma School Drop
Red Mountain Freeway
Country Club Drive to Evergreen Road
Salt River - Main Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step 19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	Maximum Water Surface Elevation (ft, MSL)	Minimum Water Surface Elevation (ft, MSL)
224.62	0	1161.00	1173.20	1171.14	1169.81	1167.79	1165.48	1165.40	1164.27	1164.21	1164.03	1163.96	1163.93	1163.82	1163.80	1163.76	1163.63	1163.57	1181.64	1163.57
224.71	630	1161.00	1173.97	1172.08	1170.89	1169.18	1167.21	1167.14	1165.93	1165.84	1165.62	1165.51	1165.47	1165.32	1165.29	1165.23	1165.06	1164.96	1182.11	1164.96
224.81	1,230	1161.00	1174.53	1172.71	1171.57	1169.90	1167.90	1167.82	1166.56	1166.47	1166.24	1166.14	1166.10	1165.96	1165.92	1165.88	1165.70	1165.59	1182.49	1165.59
224.90	1,770	1161.00	1174.91	1173.13	1172.04	1170.46	1168.55	1168.54	1167.32	1167.26	1167.05	1166.97	1166.96	1166.84	1166.80	1166.76	1166.59	1166.50	1182.77	1165.97
225.00	2,240	1162.00	1175.36	1173.75	1172.80	1171.39	1169.59	1169.52	1168.30	1168.21	1167.97	1167.87	1167.81	1167.66	1167.62	1167.55	1167.37	1167.27	1182.93	1166.25
225.10	2,640	1163.00	1176.25	1174.72	1173.76	1172.32	1170.41	1170.29	1168.96	1168.85	1168.58	1168.46	1168.39	1168.21	1168.17	1168.10	1167.90	1167.80	1183.23	1166.70
225.19	3,040	1163.00	1176.66	1175.15	1174.19	1172.74	1170.77	1170.65	1169.27	1169.15	1168.87	1168.75	1168.68	1168.49	1168.44	1168.38	1168.17	1168.06	1183.52	1167.36
225.28	3,490	1163.73	1177.25	1175.72	1174.75	1173.25	1171.20	1171.09	1169.65	1169.53	1169.25	1169.12	1169.06	1168.86	1168.82	1168.76	1168.54	1168.44	1184.09	1167.93
225.38	4,360	1165.13	1178.27	1176.79	1175.84	1174.36	1172.32	1172.24	1170.83	1170.74	1170.50	1170.41	1170.42	1170.28	1170.23	1170.22	1170.04	1169.97	1184.98	1169.03
225.48	4,867	1161.50	1178.94	1177.62	1176.65	1175.22	1173.27	1173.15	1171.76	1171.66	1171.39	1171.25	1171.20	1171.05	1170.96	1170.94	1170.75	1170.67	1184.92	1169.72
225.57	5,342	1158.30	1180.21	1178.76	1177.69	1176.12	1174.04	1173.94	1172.48	1172.38	1172.09	1171.96	1171.92	1171.74	1171.68	1171.63	1171.41	1171.32	1186.56	1170.78
225.66	5,855	1158.80	1180.54	1179.10	1178.27	1176.97	1175.12	1175.09	1173.80	1173.75	1173.52	1173.45	1173.46	1173.35	1173.34	1173.26	1173.10	1173.01	1186.92	1171.19
225.76	6,338	1165.00	1181.62	1180.38	1179.60	1178.22	1176.31	1176.26	1174.95	1174.90	1174.66	1174.58	1174.59	1174.42	1174.40	1174.33	1174.12	1174.01	1187.69	1171.50
225.85	6,848	1166.80	1183.03	1181.82	1180.95	1179.51	1177.56	1177.54	1176.18	1176.12	1175.88	1175.79	1175.77	1175.57	1175.52	1175.46	1175.22	1175.10	1188.77	1172.58
225.95	7,358	1167.90	1184.31	1182.97	1182.16	1180.81	1178.99	1178.88	1177.66	1177.56	1177.34	1177.22	1177.14	1176.98	1176.91	1176.84	1176.62	1176.50	1189.34	1174.02
226.04	7,834	1173.10	1184.39	1183.26	1182.39	1181.16	1179.41	1179.40	1178.22	1178.20	1178.01	1177.90	1177.85	1177.68	1177.60	1177.55	1177.37	1177.25	1189.66	1176.03
226.13	8,336	1174.10	1186.51	1185.12	1184.37	1183.01	1181.58	1181.35	1180.39	1180.22	1180.02	1179.93	1179.81	1179.55	1179.57	1179.52	1179.28	1179.22	1190.00	1178.91
226.23	8,829	1177.60	1187.64	1186.42	1185.70	1184.47	1182.77	1182.68	1181.46	1181.43	1181.20	1181.08	1180.98	1180.74	1180.77	1180.70	1180.48	1180.42	1190.91	1180.42
226.35	9,495	1180.20	1189.26	1188.17	1187.49	1186.33	1184.73	1184.66	1183.45	1183.31	1183.10	1182.99	1182.94	1182.78	1182.76	1182.69	1182.48	1182.40	1192.70	1182.40
226.47	10,166	1181.60	1191.91	1190.99	1190.32	1189.38	1187.85	1187.69	1186.62	1186.43	1186.09	1185.87	1185.75	1185.60	1185.44	1185.40	1185.17	1185.08	1195.86	1185.08
226.61	10,836	1187.00	1193.89	1193.12	1192.64	1191.83	1190.75	1190.70	1189.96	1189.91	1189.75	1189.68	1189.67	1189.56	1189.58	1189.54	1189.42	1189.38	1198.86	1189.38
226.70	11,340	1188.00	1197.38	1196.46	1195.85	1194.90	1193.58	1193.53	1192.61	1192.55	1192.39	1192.32	1192.30	1192.17	1192.16	1192.11	1191.98	1191.91	1202.78	1191.71
226.80	11,828	1191.70	1198.07	1197.27	1196.74	1195.88	1194.65	1194.60	1193.76	1193.69	1193.52	1193.44	1193.43	1193.29	1193.30	1193.23	1193.09	1193.03	1202.70	1193.03
226.89	12,338	1192.50	1199.94	1199.10	1198.55	1197.66	1196.38	1196.30	1195.39	1195.30	1195.13	1195.01	1194.93	1194.82	1194.76	1194.70	1194.53	1194.45	1203.57	1194.45
226.99	12,830	1193.70	1202.05	1201.17	1200.57	1199.61	1198.20	1198.15	1197.09	1197.02	1196.82	1196.73	1196.67	1196.51	1196.47	1196.41	1196.19	1196.15	1205.51	1196.15
227.08	13,335	1194.10	1203.58	1202.61	1201.94	1200.84	1199.17	1199.14	1197.87	1197.80	1197.54	1197.45	1197.39	1197.20	1197.17	1197.11	1196.86	1196.80	1206.42	1196.80
227.18	13,844	1194.50	1204.94	1203.73	1202.92	1201.61	1199.66	1199.57	1198.17	1198.08	1197.80	1197.70	1197.64	1197.43	1197.40	1197.34	1197.08	1197.01	1209.81	1197.01

File: T2AWS.WK4

APPENDIX E

Red Mountain Freeway
Summary of HEC-6 Analysis
South Channel Water Surface Profile

Models: SOUTH1A & SOUTH2A

Table E.1
HEC-6 Water Surface Profiles
Model SOUTH1A
Red Mountain Freeway
McKellips Road to Alma School Road
Salt River - South Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
226.53	0	1185.00	1188.98	1189.03	1189.08	1189.48	1190.07	1190.27	1190.65	1191.59	1192.26	1192.57	1193.63	1195.21	1196.95	1197.62	1196.35	1195.90	1195.85	1194.98
226.58	450	1179.00	1190.29	1190.36	1190.46	1191.06	1191.94	1192.29	1192.84	1194.14	1195.07	1195.51	1196.89	1198.89	1201.05	1201.93	1200.31	1199.76	1199.70	1198.62
226.61	1,050	1180.00	1190.37	1190.44	1190.54	1191.18	1192.10	1192.46	1193.04	1194.42	1195.39	1195.86	1197.33	1199.47	1201.69	1202.63	1201.06	1200.46	1200.39	1199.27
226.70	1,700	1182.00	1190.53	1190.64	1190.76	1191.45	1192.44	1192.83	1193.46	1194.92	1195.98	1196.50	1198.12	1200.53	1203.03	1203.99	1202.09	1201.42	1201.33	1200.06
226.80	2,270	1188.00	1191.60	1191.42	1191.59	1192.26	1193.20	1193.55	1194.14	1195.57	1196.61	1197.09	1198.71	1201.08	1203.51	1204.49	1202.56	1201.89	1201.79	1200.52
226.89	2,840	1192.50	1195.45	1194.23	1193.74	1193.93	1194.24	1194.49	1194.95	1196.21	1197.16	1197.62	1199.18	1201.48	1203.90	1204.89	1202.97	1202.31	1202.21	1200.97

Table E.1
HEC-6 Water Surface Profiles
Model SOUTH2A
Red Mountain Freeway
McKellips Road to Alma School Road
Salt River - South Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
226.53	0	1185.00	1188.98	1189.03	1189.08	1189.48	1190.07	1190.27	1190.65	1191.59	1192.26	1192.57	1193.63	1195.21	1196.95	1197.62	1196.35	1195.90	1195.85	1194.98
226.58	450	1185.87	1190.97	1191.02	1191.11	1191.65	1192.42	1192.71	1193.18	1194.27	1195.04	1195.41	1196.53	1198.17	1200.03	1200.90	1199.50	1199.00	1198.97	1198.06
226.61	1,050	1187.03	1191.69	1191.74	1191.82	1192.46	1193.36	1193.68	1194.23	1195.55	1196.41	1196.87	1198.34	1200.35	1202.39	1203.14	1201.65	1201.11	1201.02	1199.93
226.70	1,700	1188.29	1192.52	1192.60	1192.68	1193.32	1194.26	1194.59	1195.17	1196.59	1197.58	1198.08	1199.71	1202.06	1204.54	1205.42	1203.48	1202.80	1202.67	1201.39
226.80	2,270	1189.39	1193.23	1193.40	1193.47	1194.04	1194.91	1195.23	1195.78	1197.18	1198.16	1198.65	1200.26	1202.57	1205.07	1205.99	1204.02	1203.33	1203.20	1201.94
226.89	2,840	1192.50	1195.09	1194.53	1194.57	1195.04	1195.78	1196.09	1196.57	1197.87	1198.81	1199.28	1200.84	1203.11	1205.59	1206.47	1204.54	1203.86	1203.73	1202.49

File: SOUTHWS.WK4

Table E.1
HEC-6 Water Surface Profiles
Model SOUTH1A
Red Mountain Freeway
McKellips Road to Alma School Road
Salt River - South Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step 19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	Maximum Water Surface Elevation (ft, MSL)	Minimum Water Surface Elevation (ft, MSL)
226.53	0	1185.00	1194.10	1193.23	1192.66	1191.75	1190.53	1190.48	1189.60	1189.55	1189.40	1189.34	1189.31	1189.17	1189.16	1189.12	1189.02	1188.95	1197.62	1188.95
226.58	450	1179.00	1197.52	1196.40	1195.65	1194.42	1192.61	1192.54	1191.23	1191.15	1190.91	1190.80	1190.76	1190.60	1190.57	1190.51	1190.31	1190.22	1201.93	1190.22
226.61	1,050	1180.00	1198.07	1196.84	1196.02	1194.70	1192.78	1192.71	1191.34	1191.25	1191.00	1190.88	1190.84	1190.68	1190.64	1190.59	1190.38	1190.28	1202.63	1190.28
226.70	1,700	1182.00	1198.73	1197.36	1196.47	1195.06	1193.05	1192.97	1191.54	1191.44	1191.18	1191.05	1191.01	1190.84	1190.80	1190.74	1190.52	1190.42	1203.99	1190.42
226.80	2,270	1188.00	1199.20	1197.80	1196.91	1195.50	1193.49	1193.41	1191.99	1191.90	1191.63	1191.51	1191.46	1191.29	1191.25	1191.20	1190.97	1190.87	1204.49	1190.87
226.89	2,840	1192.50	1199.69	1198.36	1197.51	1196.21	1194.49	1194.40	1193.36	1193.29	1193.08	1193.02	1192.95	1192.79	1192.76	1192.72	1192.52	1192.48	1204.89	1192.48

Table E.1
HEC-6 Water Surface Profiles
Model SOUTH2A
Red Mountain Freeway
McKellips Road to Alma School Road
Salt River - South Channel

River XSEC	Cumulative Distance (ft)	Initial Bed Profile (ft, MSL)	Time Step 19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	Maximum Water Surface Elevation (ft, MSL)	Minimum Water Surface Elevation (ft, MSL)
226.53	0	1185.00	1194.10	1193.23	1192.66	1191.75	1190.53	1190.48	1189.60	1189.55	1189.40	1189.34	1189.31	1189.17	1189.16	1189.12	1189.02	1188.95	1197.62	1188.95
226.58	450	1185.87	1197.15	1196.22	1195.57	1194.49	1192.84	1192.77	1191.54	1191.46	1191.23	1191.12	1191.08	1190.93	1190.90	1190.85	1190.64	1190.55	1200.90	1190.55
226.61	1,050	1187.03	1198.73	1197.47	1196.66	1195.36	1193.44	1193.37	1191.98	1191.89	1191.62	1191.51	1191.45	1191.29	1191.25	1191.20	1190.98	1190.88	1203.14	1190.88
226.70	1,700	1188.29	1200.02	1198.61	1197.65	1196.22	1194.15	1194.07	1192.60	1192.51	1192.24	1192.12	1192.07	1191.89	1191.84	1191.80	1191.56	1191.47	1205.42	1191.47
226.80	2,270	1189.39	1200.60	1199.25	1198.29	1196.87	1194.90	1194.80	1193.45	1193.35	1193.10	1192.99	1192.95	1192.77	1192.73	1192.67	1192.48	1192.39	1205.99	1192.39
226.89	2,840	1192.50	1201.18	1199.88	1198.97	1197.65	1195.89	1195.78	1194.66	1194.54	1194.33	1194.21	1194.14	1193.99	1193.93	1193.86	1193.71	1193.60	1206.47	1193.60

File: SOUTHWS.WK4

APPENDIX F

Red Mountain Freeway

Sample Calculations for Scour Analysis

ROBERT L. WARD, P.E. Consulting Engineer

Client: Wood-Patel — Page: 1/3

Project No.: WP-02 — Date: 9/15/95

Project Name: Red Mountain Freeway — Computed By: RLW

(Revised on 10/10/95 to reflect SLA thalweg elev.)

Sample Calculations For Scour Analysis

Use XSEC 225.19 from Table 4.1

1. Equilibrium Slope (.00047 ft/ft from SLA report)

Distance from Grade-Control #5 = 11,180.66′

Elevation of Grade-Control #5 = 1147.00 ft MSL

Project equilibrium slope elevation @ XSEC 225.19:

$$(11,180.66)(.00047) + 1147.00 = 1152.25$$

(SLA) Wood-Patel thalweg elevation = ~~1163.00~~ 1158.00

∴ Equilibrium slope is $(\cancel{1163.00}\ 1158.00 - 1152.25) = \cancel{10.75}\ 5.75$-ft below the existing thalweg.

Q_{10} armor depth = 0.3-ft from SLA report

Since 0.3 < ~~10.75~~ 5.75, use 0.3-ft as long-term degradation component.

2. Maximum General Scour

A value of −1.31′ is read from the 4th page of Table C1 under the "Maximum Scour" column. Table C1 is used instead of Table A1 because XSEC 225.19 is influenced by the gravel pit located immediately upstream of XSEC 225.38 (see Figure 4.3).

3. Bend Scour

$$Z_{bs} = \frac{0.0685\,Y V^{0.8}}{Y_h^{0.4}\, S_e^{0.3}} \left[2.1 \left(\frac{\sin^2 \frac{\alpha}{2}}{\cos \alpha}\right)^{0.2} - 1\right]$$

$Y = 20.18'$
$V = 10.17$ fps
$Y_h = 19.81'$
$S_e = 0.001091$ ft/ft
$\alpha = 30°$

$$Z_{bs} = \frac{(.0685)(20.18)(10.17)^{0.8}}{(19.81)^{0.4}(.001091)^{0.3}} \left[2.1 \left(\frac{\sin^2 \frac{30°}{2}}{\cos 30°}\right)^{0.2} - 1\right]$$

$$Z_{bs} = (20.7189)(0.258669)$$

$$Z_{bs} = \underline{5.36'}$$

4. Dune Troughs

$\log d = 0.8271 \log A + 0.8901$

$d =$ flow (meters) $= (20.18)(.305) = 6.1549$ meters

$\log(6.1549) = 0.8271 \log A + 0.8901$

$\log A = -0.121971126$

$A = 0.755\text{ m} = 2.4775$ ft.

Since "A" is the dune height from trough to crest, 1/2 of this value is the depth below the river-bed.

$\therefore\ \frac{1}{2} A = \frac{1}{2}(2.4775) = \underline{1.24'}$

5. Anti-dune Troughs

$$Z_{bf} = 0.0135\, V^2$$

$V = 10.17$ fps

$$\therefore\ Z_{bf} = (.0135)(10.17)^2$$

$Z_{bf} = \underline{1.40'}$, which is < ½ the flow depth.

The anti-dune trough depth is greater than the dune trough depth. Therefore, the anti-dune trough depth will be used in the total scour calculation.

6. Low-Flow Incisement

For this XSEC, 1.0' of low-flow incisement was judgementally selected.

7. Total Computed Scour Depth

0.3	Long-term degradation
0	Local Scour
1.31	General Scour
5.36	Bend Scour
1.40	Bed-Form Troughs
1.00	Low-Flow Incisement
Total: 9.37'	
x 1.5	Safety Factor
14.05'	Maximum Scour Depth

14.05 > 10.0 minimum criteria, ∴ use 14.05' of scour

Baker thalweg is lower than Wood-Patel thalweg, ∴ use Baker thalweg as reference elevation:

1162.60 − 14.05 = 1148.55-ft MSL as toe-down elevation.

Appendix B

Existing Condition HEC-2 Models
Design Condition 1 HEC-2 Models
Design Condition 2 HEC-2 Models
HEC-6 Main Channel Analysis

HEC-2

Existing Condition Model
Main Channel

Summary Printout (SUMPO)
& Complete Printout

Filename = EXISTING.DAT

HEC-2 Salt River Analysis

File=EXISTING.DAT Existing Condition Model - SLA downstream improvements in place

```
*-----------------------------------*
|             S U M P O             |
|                                   |
|   Interactive Summary Printout    |
|   for MS/PC-DOS micro computers   |
|             May 1991              |
*-----------------------------------*
```

NOTE - Asterisk (*) at left of profile number indicates message in summary of errors list

REPARED BY MICHAEL BAKER

Summary Printout

	SECNO	Q	CWSEL	EG	DEPTH	VCH
	20.50	215000.00	1166.59	1168.49	19.59	11.07
	22.00	215000.00	1166.70	1168.75	19.50	11.49
	22.65	215000.00	1166.81	1168.85	19.61	11.46
*	23.55	215000.00	1168.48	1170.17	21.18	10.45
	28.00	215000.00	1168.95	1170.59	21.25	10.27
	29.00	215000.00	1169.17	1171.16	21.07	11.32
	30.00	215000.00	1169.13	1172.12	20.73	13.87
	31.00	215000.00	1169.70	1173.20	20.90	15.02
	32.00	215000.00	1170.48	1174.37	21.28	15.84
	33.00	215000.00	1171.29	1175.64	21.69	16.74
	34.00	215000.00	1172.77	1176.83	22.77	16.17
	35.00	215000.00	1174.48	1177.85	24.08	14.74
	36.00	215000.00	1175.78	1178.66	24.98	13.61
	37.00	215000.00	1177.56	1179.28	26.36	10.51
	38.00	215000.00	1178.25	1179.71	26.55	9.68
	39.00	220000.00	1178.49	1180.13	26.29	10.28
	40.00	220000.00	1179.32	1180.51	26.62	8.77
	40.10	220000.00	1179.35	1180.55	26.55	8.79
	40.20	220000.00	1179.61	1180.77	26.81	8.64
	40.30	220000.00	1179.74	1180.84	26.84	8.42
	40.40	220000.00	1179.86	1180.91	26.86	8.22
	40.50	220000.00	1180.05	1181.06	26.95	8.04
	40.60	220000.00	1180.12	1181.09	27.02	7.92
	41.10	220000.00	1180.17	1181.13	26.97	7.84
	41.20	220000.00	1180.34	1181.27	27.14	7.75
	42.10	220000.00	1181.04	1181.56	31.04	5.82
	224.34	220000.00	1181.07	1181.61	31.07	5.90
	224.43	220000.00	1181.24	1181.76	29.24	5.77
	224.53	220000.00	1181.54	1181.90	29.54	4.76
	224.62	220000.00	1181.57	1182.07	28.57	5.69
	224.71	220000.00	1181.86	1182.20	27.86	4.70
	224.81	220000.00	1181.95	1182.29	27.95	4.66
*	224.90	220000.00	1181.64	1182.67	27.64	8.17

*	225.00	220000.00	1182.57	1182.92	28.57	4.74
*	225.10	220000.00	1182.09	1183.38	26.09	9.12
*	225.19	220000.00	1181.98	1184.30	23.98	12.24
	225.28	220000.00	1182.92	1185.41	19.92	13.72
	225.38	220000.00	1183.88	1186.84	21.48	13.80
	225.48	220000.00	1185.64	1188.00	25.34	12.33
	225.57	220000.00	1187.28	1188.76	29.38	9.75
	225.66	220000.00	1187.76	1189.30	28.96	9.97
	225.76	220000.00	1188.12	1189.91	23.12	10.79
*	225.85	220000.00	1189.75	1190.40	22.95	6.83
	225.95	220000.00	1189.85	1190.78	21.95	7.73
*	226.04	147500.00	1189.46	1191.62	16.36	11.93
	226.13	147500.00	1189.60	1193.06	19.10	14.98
	226.23	147500.00	1190.55	1195.13	18.25	17.63
	226.35	147500.00	1194.14	1197.77	20.73	15.32
	226.48	147500.00	1196.84	1200.50	15.04	15.34
*	226.49	147500.00	1196.67	1201.40	10.67	17.45
	226.50	147500.00	1197.71	1201.54	11.71	15.70
	226.51	147500.00	1197.54	1201.62	11.54	16.21
	226.52	147500.00	1198.99	1202.14	12.99	14.26
*	226.53	147500.00	1199.71	1202.21	13.71	12.70
	226.61	147500.00	1200.88	1203.10	13.88	11.99
	226.70	147500.00	1202.16	1203.88	14.16	10.57
*	226.80	147500.00	1201.55	1206.13	9.85	17.24
*	226.89	147500.00	1205.16	1208.14	12.66	13.98
	226.99	220000.00	1205.67	1210.25	11.97	17.20
*	227.08	220000.00	1207.78	1213.69	13.68	19.92
*	227.18	220000.00	1211.83	1215.52	17.33	15.45
	227.27	220000.00	1214.03	1216.49	20.33	12.58
	227.37	220000.00	1215.68	1217.10	21.68	10.04
	227.46	220000.00	1215.91	1217.55	21.81	10.75
	227.56	220000.00	1217.04	1217.87	22.44	7.93
	227.61	220000.00	1217.10	1218.00	22.20	7.84
	227.62	220000.00	1216.92	1218.09	22.02	8.84
	227.63	220000.00	1216.99	1218.14	22.09	8.80
	227.64	220000.00	1217.26	1218.18	22.36	7.91
	227.69	220000.00	1217.34	1218.43	22.34	8.74
	227.79	220000.00	1217.72	1218.78	21.62	8.74

```
**********************************************
*  HEC-2 WATER SURFACE PROFILES              *
*                                            *
*  Version   4.6.2;  May 1991                *
*                                            *
   N DATE    20SEP95    TIME    12:34:51     *
**********************************************
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**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*          (916) 756-1104            *
**************************************
```

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
```

THIS RUN EXECUTED 20SEP95 12:34:51

```
**************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
**************************************
```

```
T1      RED MOUNTAIN PHASE II EXISTING CONDITION MODEL
T2      BASED ON MCFCD PRELIMINARY SALT RIVER MODELS R4A.DAT & R5A.DAT
T3      PREPARED BY MICHAEL BAKER JR. ENGINEERS, INC.
T4      STARTING WSEL FROM SIMONS, LI & ASSOCIATES MODEL LEVEESB.DAT
T4      SALT RIVER, MCCLINTOCK DRIVE TO COUNTRY CLUB DRIVE
T4      REACH 5:  CROSS SECTIONS 224.34 TO 227.79
T4      REVISED BY WOOD, PATEL & ASSOCIATES, INC. 03-15-95
T4       The following analysis is for existing conditions only and does not
T4       reflect Phase II of the Red Mountain Freeway.  Certain revisions
T4       were made to the original file as received from Michael Baker Jr.
T4       Engineers. These included revisions to the encroachments, bank station
T4       locations, the Q used for analysis, the starting water surface elevation
T4       and the addition of the drop structures constructed by MCDOT under the
T4       north and south Alma School Road bridges.

        REVISED: 8/8/94 ADDED DOCUMENTATION, ADJ. LEVEE HEIGHTS TO CWSEL
                        PLUS 3 FEET FREEBOARD

        EVENT USING CAWCS HYDROLOGY (Q=220,000 cfs U/S PRICE RD.).

        X-SEC. 120.5 TO 240 USING TOPOGRAPHIC MAPPING
        DEVELOPED FOR AND SUPPLIED BY DMJM (5-9-94).

             100-YEAR FLOW = 220,000 CFS (PRE-ROOSEVELT DAM CONDITION)

             EXISTING CONDITION MODEL

             FILE EXISTING.DAT

        Downstream Portion of File from
        SIMONS, LI & ASSOCIATES, INC. (PAZ-PBDQ-02)
        RED MOUNTAIN FREEWAY SALT RIVER SOUTH LEVEE PROTECTION
        DROP #5 TO D/S OF ALMA ROAD SPLIT
```

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		2							1166.59	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1		-1							

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

38 42 1 43 26 51 4 8 10 53

	24	68	150							
J5	LPRNT	NUMSEC		********REQUESTED SECTION NUMBERS********						
	-10	-10								
QT	1	215000								
NC	0.035	0.035	0.035	0.1	0.3					
ET		7.1					368.02	1432.2		
X1	20.5	52	368.02	1432.2						
GR	1168	0	1164	17.95	1162	24.38	1162	36.95	1164	71.76
GR	1166	79.6	1168	87.26	1170	92.47	1170	100.79	1168	107.04
GR	1166	136.7	1164	170.55	1162	202.59	1162	204.03	1162	212.06
GR	1162	223.18	1162	256.79	1164	263.99	1166	271.92	1168	283.83
GR	1168	291.26	1168	333.54	1170	336.78	1172	341.62	1172	368.02
GR	1170	372.86	1168	379.02	1166	385.07	1164	391.96	1162	401.29
GR	1160	405.15	1147	417.51	1147	1383.8	1158.7	1396.8	1170.5	1432.2
GR	1164	1551.12	1166	1561.25	1168	1567.58	1170	1573	1172	1579.74
GR	1174	1587.59	1178	1595.63	1178	1606.62	1180	1659.93	1180	1677.36
GR	1180	1685.5	1180	1687.62	1170	1702.87	1168	1855.51	1168	1880.71
GR	1168	1915.94	1168	1966						
ET		7.1					371.86	1409.5		
X1	22	50	371.86	1409.5	155	150	150			
GR	1168	0	1168	20.19	1168	48.23	1170	61.53	1170	84.4
GR	1168	99.93	1166	110.69	1166	185.25	1166	203.64	1166	250.93
[illegible]	1168	294.27	1170	299.9	1172	350.11	1172	371.86	1170	379.7
	1168	385.29	1166	390.3	1164	395.63	1162	399.98	1160	403.29
GR	1158	407.35	1156	413.82	1154	422.34	1152	437.43	1147.2	450.69
GR	1147.2	1361.5	1159	1375	1170.5	1409.5	1158	1410.41	1160	1415.57
GR	1166	1509.56	1168	1519.96	1170	1527.06	1172	1531.57	1174	1536.19
GR	1178	1539.48	1178	1542.37	1178	1568.19	1176	1630.46	1174	1666.03
GR	1172	1673.42	1170	1679.79	1168	1691.14	1168	1700.35	1170	1704.62
GR	1172	1711.58	1174	1724.44	1174	1766.22	1172	1775.51	1170	1791.57
NC				0.3	0.5					
X1	22.65	27	188.7	1216.3	65	65	65			
X3	10									
GR	1172	0	1172	125.08	1170	188.7	1168	194.75	1166	201.16
GR	1164	205.95	1162	210.26	1160	216.37	1158	219.98	1156	227.72
GR	1154	232.41	1152	238.19	1147.2	264.91	1147.2	1169	1159.4	1183
GR	1170.5	1216.3	1168	1312.31	1170	1319.07	1172	1322.27	1174	1329.19
GR	1178	1333.2	1178	1338.91	1178	1378.93	1176	1435.77	1174	1496.03
GR	1172	1540.96	1170	1558.53						
SB	1.05	1.56	3	500	790	193	27088	6.5	1147.31	1147.2
X1	23.55	28	247.63	1335.6	120	120	120			
X2			1	1180.61	1181.8					
X3	10									
GR	1172	0	1172	247.63	1170	253.99	1168	273.55	1166	281.4
GR	1166	283.76	1166	310.92	1164	317.04	1162	322.63	1160	328.49
GR	1158	333.83	1156	339.53	1154	346.19	1152	354.31	1147.3	375.38

GR	1147.3	1288.2	1159.4	1302.3	1170.5	1335.6	1170	1419.47	1172	1429.2
	1174	1432.5	1176	1434.98	1178	1461.34	1178	1512.09	1176	1579.09
GR	1174	1678.33	1172	1755.73	1170	1861.49				
NC				0.1	0.3					
ET		7.1					90.9	1152.8		
X1	28	44	90.9	1152.8	420	300	360			
GR	1170	0	1172	6.43	1172	14.35	1172	22.93	1172	27.9
GR	1170	31.53	1168	39.25	1166	45.63	1164	50.41	1162	58.03
GR	1160	66.41	1158	76.71	1172	90.9	1147.7	111.9	1147.7	999
GR	1184	999.1	1184	1052.9	1147.7	1053	1147.7	1131.8	1172	1152.8
GR	1164	1153.31	1166	1206.5	1168	1211.92	1168	1223.69	1168	1264.35
GR	1170	1276.64	1172	1283.33	1174	1291.14	1176	1295.99	1178	1316.09
GR	1178	1326.38	1178	1333.75	1180	1337.72	1180	1344.25	1178	1347.49
GR	1176	1351.78	1174	1355.53	1172	1359.44	1170	1363.26	1168	1378.57
GR	1168	1398.94	1168	1429.84	1166	1529.46	1166	1620.11		
ET		7.1					330.6	1314.7		
X1	29	44	330.6	1314.7	440	330	380			
GR	1170	0	1160	21.56	1158	28.38	1158	53.44	1160	66.58
GR	1160	79.87	1158	116.07	1158	146.8	1158	153.74	1158	181.54
GR	1158	187.08	1158	202.48	1156	220.79	1154	247.95	1152	262.65
GR	1152	269.13	1152	301.61	1150	315.44	1172.2	330.6	1148.1	354.7
GR	1148.1	1060	1184	1060.1	1184	1113.9	1148.1	1114	1148.1	1288.9
GR	1173.5	1314.7	1172	1323.39	1174	1327.38	1176	1330.97	1178	1334.68
GR	1180	1337.95	1182	1343.55	1184	1364.4	1184	1386.7	1182	1391.21
GR	1180	1395.48	1178	1398.88	1176	1401.89	1174	1405.57	1172	1409.33
	1170	1415.5	1170	1520.41	1170	1537.44	1170	1644.45		
ET		7.1					481.5	1309.78		
X1	30	32	481.5	1309.78	350	430	390			
GR	1174	14.68	1172	34.2	1170	69.37	1168	74.89	1166	92.61
GR	1164	163.09	1162	258.68	1160	329.81	1158	342.99	1156	346.62
GR	1154	353.18	1152	370.82	1150	394	1150	405.61	1152	440
GR	1152	467.1	1172.1	481.5	1148.4	505.2	1148.4	1156	1181	1156.1
GR	1181	1209.9	1148.4	1210	1148.4	1286.1	1172.1	1309.78	1168	1321.25
GR	1170	1339.03	1172	1352.5	1172	1462.29	1172	1490.22	1174	1509.85
GR	1174	1535.71	1172	1542.61						
ET		7.1					160.5	919.6		
X1	31	22	160.5	919.6	360	460	400			
GR	1178	0	1176	141.91	1172.7	160.5	1148.8	184.4	1148.8	765
GR	1181.5	765.1	1181.5	818.9	1148.8	818.9	1148.8	907.7	1172.7	919.6
GR	1158	1051.56	1160	1069.76	1162	1080.98	1164	1093.09	1166	1105.46
GR	1168	1115.59	1170	1123.76	1172	1128.42	1174	1133.06	1174	1152.4
GR	1174	1275.9	1174	1320.61						
ET		7.1					315.3	1027.6		
X1	32	24	315.3	1027.6	400	410	400			
GR	1176	0	1176	39.97	1176	247.56	1173.5	315.3	1149.2	339.6
GR	1149.2	873	1182.5	873.1	1182.5	926.9	1149.2	927	1149.2	1015.5
GR	1173.5	1027.6	1152	1064.89	1154	1074.27	1156	1084.6	1158	1093.29
	1160	1106.57	1162	1113.87	1164	1118.12	1166	1121.69	1168	1131.52
GR	1170	1141.67	1172	1247.51	1172	1279.79	1172	1295.2		

		7.1					314.4	981.3		
X1	33	26	314.4	981.3	390	390	390			
GR	1176	0	1174	141.81	1172	247.49	1172	261.66	1174.3	314.4
GR	1149.6	339.1	1149.6	827	1182.5	827.1	1182.5	880.9	1149.6	881
GR	1149.6	969	1174.3	981.3	1154	984.4	1156	994.26	1158	1004.77
GR	1160	1015.49	1162	1023.59	1164	1032.43	1166	1038.61	1168	1046.29
GR	1168	1165.91	1168	1178.41	1170	1213.47	1170	1234.96	1168	1257.86
GR	1168	1265.33								
ET		7.1					351.3	1017.95		
X1	34	39	351.3	1017.95	435	370	405			
GR	1172	0	1172	55.13	1170	131.34	1170	133.81	1170	148.48
GR	1168	156.75	1168	159.9	1170	177.68	1170	264.01	1170	280.92
GR	1172	285.13	1174	287.34	1176	291.37	1178	293.5	1178	300.48
GR	1176	308.6	1174	313.89	1172	317.53	1170	320.96	1168	324.38
GR	1166	330.13	1164	334.17	1162	339.95	1160	348.17	1175.8	351.3
GR	1150	377.1	1150	863	1183	863.1	1183	916.9	1150	917
GR	1150	992.2	1175.8	1017.95	1160	1028.08	1162	1056.1	1164	1100.41
GR	1166	1117.08	1168	1148.31	1170	1244.36	1170	1260.5		
ET		7.1					323.7	1013.6		
X1	35	31	323.7	1013.6	400	405	400			
GR	1188	0	1188	5.95	1186	83.48	1184	109.91	1184	136.66
GR	1184	148.7	1182	181.29	1180	198.09	1180	208.53	1180	208.78
GR	1170	225.2	1160	240.93	1158	250.29	1156	268.18	1154	278.68
GP	1152	285.78	1177.5	323.7	1150.4	350.8	1150.4	859	1183	859.1
	1183	912.9	1150.4	913	1150.4	986.5	1177.5	1013.6	1166	1019.94
GR	1168	1036.82	1168	1047.05	1168	1118.89	1168	1129.18	1168	1142.62
GR	1170	1201.92								
ET		7.1					327.1	1044.5		
X1	36	29	327.1	1044.5	380	430	405			
GR	1186	0	1186	33.09	1186	88.98	1186	158.59	1186	165.74
GR	1184	175.14	1182	179.03	1180	182.87	1170	197.46	1160	209.76
GR	1158	212.84	1156	218.12	1154	222.17	1179	327.1	1150.8	355.3
GR	1150.8	890	1184	890.1	1184	943.9	1150.8	944	1150.8	1016.5
GR	1178.8	1044.5	1168	1058.28	1166	1062.4	1166	1086.32	1166	1092.55
GR	1168	1106.08	1170	1228.32	1172	1295.79	1172	1304.29		
ET		7.1					275.3	1137.7		
X1	37	27	275.3	1137.7	390	435	410			
GR	1188	0	1188	37.05	1186	162.09	1184	167.16	1182	170.9
GR	1180	173.01	1170	186.94	1160	203.56	1158	207.56	1156	209.33
GR	1154	215.62	1180.6	275.3	1151.2	304.7	1151.2	983	1184	983.1
GR	1184	1036.9	1151.2	1037	1151.2	1108.3	1180.6	1137.7	1166	1154.04
GR	1168	1163.43	1170	1182.53	1172	1319.78	1172	1366.54	1172	1385.84
GR	1172	1392.66	1172	1400.59						

		7.1					474.12	1344.58		
X1	38	41	474.12	1344.58	650	380	510			
GR	1178	0	1178	42.14	1180	60.75	1182	68.52	1184	76.58
GR	1186	86.57	1188	95.67	1190	150.75	1190	278.24	1188	296.12
GR	1186	364.44	1184	398.62	1182	403.49	1180	406.14	1170	421.07
GR	1164	430.09	1162	437.35	1160	440.69	1183.1	474.12	1151.7	505.5
GR	1151.7	1315	1181.3	1344.58	1160	1363.15	1162	1374.46	1170	1381.24
GR	1172	1383.52	1174	1385.56	1174	1389.66	1172	1397.64	1170	1409.81
GR	1170	1439.22	1170	1456.49	1170	1463.91	1170	1467.53	1170	1476.98
GR	1170	1482.89	1170	1508.53	1172	1563.28	1174	1601.93	1176	1654.88
GR	1176	1666.64								

QT	1	220000								
ET		7.1					489.54	1337.7		
X1	39	50	489.54	1337.7	500	450	480			
GR	1180	0	1180	60.86	1180	63.23	1180	73.46	1180	78.65
GR	1182	84.86	1184	87.46	1186	92.65	1188	95.53	1190	98.93
GR	1192	103.69	1194	105.79	1196	114.23	1198	170.87	1198	205.37
GR	1196	210.54	1194	216.61	1192	219.62	1190	226.22	1188	232.28
GR	1186	236.97	1184	244.01	1182	251.76	1180	257.61	1178	265.63
GR	1178	280.87	1178	286.25	1180	309.24	1180	384	1178	424.52
GR	1176	427.51	1174	430.65	1172	434	1170	436.74	1160	451.98
GR	1183.6	489.54	1152.2	520.94	1152.2	1308.4	1181.5	1337.7	1164	1340.92
GR	1166	1356.24	1168	1357.68	1170	1411.73	1172	1417.7	1172	1423.78
GR	1170	1427.2	1170	1461.02	1172	1519.9	1174	1610.18	1176	1629.91

.		7.1					455.69	1433.84		
X1	40	37	455.69	1433.84	470	550	500			
GR	1196	0	1198	18.94	1200	36.94	1202	54.89	1204	79.33
GR	1204	212.11	1202	252.1	1200	266.97	1198	275.7	1196	286.94
GR	1194	298.58	1192	308.25	1190	318.42	1188	333.62	1186	345.76
GR	1184	366.15	1184	390.9	1184	455.69	1152.7	487	1152.7	1402.54
GR	1184	1433.84	1158	1482.09	1160	1486.58	1162	1494.69	1164	1499.88
GR	1166	1506.5	1168	1511.89	1170	1516.8	1172	1520.97	1172	1535.67
GR	1172	1580.43	1172	1679.49	1172	1704.99	1174	1731.13	1174	1765.93
GR	1174	1769.16	1174	1819.84						

NC				0.3	0.5					
X1	40.1	4	5000	5979	58	37	57			
X3	10									
GR	1184.1	5000	1152.8	5031.3	1152.8	5947.7	1184.1	5979		

SB	1.05	1.56	2.6	500	923.4	106	33579	1	1152.8	1152.8
X1	40.2	4	5000	5986	32	32	32			
X2			1	1192	1206					
X3	10									
GR	1184.1	5000	1152.8	5031.3	1152.8	5954.7	1184.1	5986		

		7.1					5000	6009.2		
X1	40.3	4	5000	6009.2	106	106	106			
GR	1184.2	5000	1152.9	5031.3	1152.9	5977.9	1184.2	6009.2		
X1	40.4	4	5000	6032.4	106	106	106			
X3	10									
GR	1184.3	5000	1153	5031.3	1153	6001.1	1184.3	6032.4		
SB	1.05	1.56	2.6	500	988.4	104	28283	1	1153.1	1153.1
X1	40.5	4	5000	6051	85	85	85			
X2			1	1184	1199					
X3	10									
GR	1184.4	5000	1153.1	5031.3	1153.1	6019.7	1184.4	6051		
ET							5000	6063.7		
X1	40.6	4	5000	6063.7	58	58	58			
GR	1184.5	5000	1153.1	5031.4	1153.1	6032.4	1184.5	6063.7		
X1	41.1	4	5000	6076.7	59	59	59			
X3	10									
GR	1184.6	5000	1153.2	5031.4	1153.2	6045.2	1184.6	6076.7		
SB	1.05	1.5	2.6	500	1019.9	106	29097	1	1153.2	1153.2
X1	41.2	4	5000	6083	29	29	29			
X2			1	1184	1192					
X3	10									
	1185	5000	1153.2	5031.8	1153.2	6051.2	1185	6083		
ET		7.1					4910	6480		
X1	42.1	36	4910	6980	510	420	505			
GR	1184	4880	1184	4910	1180	4920	1160	4975	1160	5010
GR	1162	5105	1164	5125	1162	5325	1160	5450	1158	5555
GR	1152	5610	1150	5645	1150	5700	1152	5720	1160	5740
GR	1160	5755	1150	5790	1150	5825	1156	5855	1150	5890
GR	1150	6050	1152	6085	1152	6165	1158	6200	1150	6220
GR	1150	6250	1154	6260	1156	6435	1160	6450	1170	6470
GR	1172	6480	1174	6565	1176	6705	1176	6965	1180	6975
GR	1184	6980								
NC	0.05	0.05	0.035	0.1	0.3					

BEGIN BAKER TOPOGRAPHY

ET		7.1					19823	21402.1		
X1	224.34	95	19823	21835.3	105	200	140			
X4	1	1156.2	21402.1							
GR	1180	19680.3	1182	19684.1	1184	19688	1186	19691.8	1186	19710.8
GR	1184	19718.7	1182	19724.1	1180	19729.6	1178	19733.4	1176	19738.8
GR	1174	19746.8	1172	19749.4	1170	19757.7	1168	19762.1	1166	19767.2
GR	1164	19772.6	1162	19777.8	1184.1	19823	1162	19845.1	1162	19904.5
GR	1164	19911	1166	19918.5	1168	19925.1	1168	19925.6	1166	19929.5
GR	1164	19935.4	1164	20010.7	1164	20077.5	1162	20086.2	1162	20091.2
	1164	20097.9	1166	20104.5	1166	20151.2	1164	20157.5	1162	20164.2
GR	1162	20164.6	1164	20174.9	1162	20189.6	1160	20204	1160	20259.8

GR	1160	20325.1	1158	20330.7	1156	20374.1	1154	20397.4	1152	20443.1
GR	1150	20470.3	1150	20472.8	1152	20540	1154	20554.3	1156	20568.5
GR	1156	20618.8	1154	20629.9	1152	20645	1152	20795	1159.9	20805.4
GR	1160	20840	1162.6	20856	1162.2	20874.7	1161	20881	1160.4	20887.5
GR	1152	20910	1152	21065	1159.9	21100.9	1166.1	21133	1167.6	21149.1
GR	1163.2	21186.4	1159.3	21207	1152	21215	1152	21390	1160.4	21415
GR	1160.8	21417.5	1170.4	21442.1	1172.2	21446.3	1169.5	21451.1	1169.3	21476.5
GR	1173.7	21484.1	1175.1	21487.3	1168.8	21504.3	1170.5	21526.4	1173.7	21566.3
GR	1174	21576.9	1175.7	21615.4	1174.2	21653.5	1176.7	21671.8	1176.9	21734.9
GR	1177.3	21775.1	1176.7	21819.5	1176.7	21821.1	1184.9	21835.3	1184.7	21856.1
GR	1184.4	21903.1	1184.5	21928.7	1185	21979.5	1185	22034.5	1185.5	22129.6
ET		7.1					19822.7	21493.8		
X1	224.43	92	19822.7	22037.7	500	440	493.7			
X4	1	1152	21493.8							
GR	1182	19627	1184	19632.3	1186	19638.7	1186	19663.4	1180	19685.6
GR	1178	19691.4	1176	19698.1	1172	19719.9	1170	19759.9	1166	19777.3
GR	1164	19791.5	1162	19816.6	1184.6	19822.7	1162	19845.3	1162	19902.2
GR	1164	19920	1166	19924.5	1166	19929.1	1164	19935.4	1162	19940.7
GR	1162	19993.6	1164	19997.5	1168	20006.3	1170	20012.8	1170	20019.9
GR	1168	20033.8	1166	20046.8	1164	20055.9	1162	20069.4	1160	20079
GR	1158	20129.6	1158	20192.1	1160	20202.1	1164	20220.8	1164	20224.3
GR	1162	20257.2	1156	20278.5	1154	20285	1154	20349.9	1156	20371.6
GR	1158	20379.4	1162	20388.7	1164	20394	1164	20405.5	1160	20416.2
GR	1158	20422.2	1156	20561.7	1154	20569.5	1154	20619.2	1152	20635.7
GR	1152	20704.6	1154	20724.5	1156	20736.5	1160.8	20764.5	1162.6	20789.2
GR	1162.8	20828.1	1161.7	20847.8	1161	20912	1159.9	20962.7	1160.1	20969.4
GR	1152	21006.5	1152	21051.5	1160.5	21055	1160.5	21071.4	1161.4	21092.2
GR	1161.7	21124.3	1163	21134	1164.3	21181.4	1164.2	21208.7	1160.5	21225.5
GR	1161.4	21243	1160	21247.4	1152	21276.5	1152	21571.5	1161.8	21578.1
GR	1162.1	21597.7	1161.1	21604.9	1168.9	21634.9	1169.1	21650.2	1173.5	21660.8
GR	1171.7	21676.5	1169.4	21685.6	1169.4	21710.2	1171.4	21743	1170.5	21807.5
GR	1168.1	21842.8	1164.2	21871.5	1166.6	21919.1	1170.5	21966.9	1170.5	21967.8
GR	1184.6	21992.2	1186.2	22037.7						
ET		7.1					19664.6	21723		
X1	224.53	96	19664.6	22216.7	510	500	506.3			
GR	1184	19494.5	1186	19523.2	1186	19531.8	1184	19536.1	1182	19540.1
GR	1180	19544.1	1178	19548.2	1176	19552.2	1174	19556.1	1172	19560.4
GR	1170	19564.4	1168	19568.5	1166	19572.9	1164	19576.9	1162	19580.8
GR	1160	19586.2	1184.9	19664.6	1160	19689.5	1160	19704.3	1162	19731.8
GR	1164	19738.1	1166	19742.7	1168	19775.7	1170	19780.5	1172	19784.9
GR	1174	19789.4	1174	19795.1	1172	19799.3	1170	19803.6	1168	19809
GR	1166	19856.9	1164	19871.1	1162	19877.2	1162	19902.5	1162	19922.6
GR	1162	19989.7	1162	20020.8	1162	20045.2	1164	20055.7	1166	20065.4
GR	1166	20097.1	1164	20102.1	1162	20107	1160	20111.5	1158	20154.8
GR	1158	20171.1	1160	20177.3	1162	20183.1	1164	20189.1	1164	20198.7
GR	1162	20234.2	1160	20243	1158	20252.4	1156	20632.8	1154	20643
GR	1154	20693	1152	20713	1152	20773	1162.5	20785.4	1163.1	20967.5
GR	1164.5	21004.2	1167.1	21046.6	1165.3	21089.7	1164	21102.1	1162.8	21123.9
GR	1163	21130.1	1162.2	21133	1161.8	21183.5	1161.1	21282.7	1152	21293
GR	1152	21723	1162.2	21801.8	1162.3	21813	1163.6	21816.7	1169.5	21828.9

GR	1167	21850.3	1165.8	21852.1	1162.8	21863.2	1161.8	21889.2	1164.2	21940.4
GR	1165.1	21957.4	1170.8	22017.4	1169.5	22039.7	1170.4	22063.2	1170.6	22094.5
GR	1170.3	22184.8	1170.4	22193.7	1178.9	22203.9	1187	22216.7	1187	22280.3
GR	1186.9	22295.6	1186.8	22361	1187.5	22430	1187.6	22433.6	1187.7	22486.5
GR	1187.9	22533.1								
ET		7.1					19519	21400		
X1	224.62	96	19519	21946.9	505	505	504.9			
X4	1	1153	21400							
GR	1178	19298.4	1180	19303.8	1182	19309.7	1184	19352.1	1184	19367.7
GR	1182	19374.5	1180	19381	1178	19387.8	1176	19394	1174	19401.3
GR	1172	19409.5	1170	19418.3	1168	19425	1185.2	19519	1168	19536.2
GR	1168	19549.9	1168	19610.4	1168	19653.3	1170	19658.6	1172	19662.9
GR	1172	19669.8	1170	19674.2	1168	19678.2	1166	19682.5	1164	19687.2
GR	1164	19722.3	1166	19727.2	1168	19732.4	1170	19738	1172	19743.1
GR	1174	19747.6	1174	19760	1174	19838.1	1176	19843	1176	19847.4
GR	1174	19851.4	1172	19855.5	1170	19859.6	1168	19863.6	1166	19867.7
GR	1164	19871.8	1162	19875	1162	19926.2	1164	19931.7	1166	19939.3
GR	1166	19976.1	1164	19981.7	1164	20017.4	1166	20022.4	1168	20027.7
GR	1170	20035.5	1172	20047.5	1172	20053.8	1170	20057.5	1168	20062.1
GR	1166	20066.2	1164	20071.8	1162	20089.3	1160	20095	1158	20100.7
GR	1163.6	20123.1	1163.1	20178.9	1163	20218.9	1162.9	20519.9	1163.1	20543
GR	1162	20597.5	1158	20609	1153	20649	1153	21069	1163.7	21178
GR	1163.7	21183.5	1165.7	21200.9	1162.2	21219.8	1153	21264	1153	21824
GR	1163.9	21873	1166.6	21882	1163.5	21889.9	1162.6	21913.8	1179.6	21946.9
GR	1174.2	21979.4	1172.5	21995.9	1171.9	22051.4	1172.2	22122	1172.1	22142.6
GR	1172.4	22196	1174.6	22205	1174	22228.1	1173.7	22277.5	1171.6	22315.2
GR	1185.7	22340	1189.3	22347.1	1188.9	22378.4	1188.7	22440.6	1189.2	22475.7
GR	1189.2	22517.6								
ET		7.1					19326.4	21300		
X1	224.71	79	19326.4	21956.8	620	440	491.6			
X4	1	1154	21300							
GR	1184	19287.3	1186	19293.4	1188	19299.7	1190	19305.9	1190	19325.5
GR	1185.5	19326.4	1168	19343.9	1168	19372.8	1168	19449.2	1170	19453.6
GR	1172	19457.8	1174	19462.4	1176	19467.2	1178	19471.6	1180	19475.9
GR	1182	19480.4	1184	19484.4	1186	19491	1186	19491.8	1184	19498.9
GR	1182	19507.4	1182	19551.9	1184	19558.3	1186	19564.6	1188	19570.5
GR	1188	19572.2	1186	19575.8	1184	19579.2	1182	19582.7	1180	19586.3
GR	1178	19589.6	1176	19592	1174	19596.7	1172	19599	1170	19603.3
GR	1168	19606.7	1166	19609.3	1164	19613.6	1162	19617	1160	19620.3
GR	1158	19623.9	1156	19629.2	1156	19687.3	1156	19698.2	1156	20282.8
GR	1158	20318.3	1158	20333	1158	20390	1160	20398	1162	20405.3
GR	1162	20412.7	1160	20423.5	1158	20442.4	1154	20477	1154	21907
GR	1163.4	21924.8	1178	21956.8	1173.1	21970.8	1173.2	21979.2	1174.2	22038
GR	1173.8	22110.8	1173.8	22127.1	1171.8	22237.3	1173.9	22283.8	1176.9	22369.4
GR	1176.7	22377.1	1174.7	22397.1	1175	22425.2	1175.6	22433.8	1180.6	22446.6
GR	1184.2	22461.4	1185	22490.4	1179.8	22519.8	1181.5	22549.6	1182.1	22576
GR	1187.1	22626.1	1189.4	22649.6	1189.7	22706.1	1189.5	22767		

		7.1					19081.8	21140		
X1	224.81	79	19081.8	22081	560	490	509.8			
X4	1	1154	21140							
GR	1180	19051.5	1182	19057.6	1184	19064.9	1186	19070	1186	19077.5
GR	1185.8	19081.8	1184	19083.6	1184	19087.9	1182	19094.8	1180	19100.3
GR	1178	19134.5	1176	19260.9	1174	19339.4	1172	19346.8	1170	19354.7
GR	1168	19364	1166	19377.6	1164	19391.8	1162	19410.4	1160	19428.5
GR	1158	19449	1158	19453.5	1158	19478.1	1156	19534.9	1156	19558.9
GR	1158	19567.3	1160	19574.2	1162	19581.1	1164	19587.5	1164	19613.1
GR	1162	19640.3	1160	19677.6	1160	19812.7	1162	19846	1162	19945.9
GR	1160	19955	1158	19966.1	1156	19984.1	1154	20005.8	1154	21895
GR	1163.9	21917.7	1168.9	21934.9	1167.3	21963.3	1181.6	21996.9	1178.9	22037.5
GR	1177.7	22066	1186.3	22081	1186.3	22117.6	1177.8	22139.6	1178	22212.3
GR	1178.2	22264	1172.7	22282.7	1169.8	22295.3	1165.6	22319.6	1165.2	22336.4
GR	1175.7	22356.9	1180.4	22372.5	1181.7	22385.7	1185.5	22409.5	1183.6	22421.2
GR	1183.7	22443.6	1185.7	22449	1189.7	22466.9	1191.1	22470.1	1190.3	22494.1
GR	1189.7	22541.7	1192.1	22563	1189.7	22581.3	1189	22661	1187.9	22702.6
GR	1185	22747.3	1186.4	22818.2	1188.1	22933.2	1188.6	22961.3	1186.6	23045.3
GR	1185.9	23068.6	1191.4	23124.1	1190.8	23210.8	1191.3	23266.9		

ET		7.1					18902.6	20450		
X1	224.9	90	18902.6	21911.4	515	470	494.9			
X4	1	1167.7	20450							
GR	1184	18888.2	1186.1	18902.6	1180	18908.7	1180	18910.4	1178	18916.2
GR	1176	18922.2	1174	18926.1	1172	18953.9	1170	19033.8	1168	19058.2
	1168	19082.8	1168	19086.3	1166	19092.1	1164	19108.9	1162	19135.1
GR	1162	19202.2	1162	19214.8	1162	19217.7	1164	19271.8	1166	19329.9
GR	1168	19336.8	1168	19396.1	1166	19443	1164	19449.7	1162	19457.3
GR	1160	19465.4	1158	19505	1156	19562.5	1156	19640	1156	19651.2
GR	1154	19791.7	1154	20050	1163	20073.2	1163	20082.5	1167.6	20098.3
GR	1167.2	20117.7	1176.6	20151.6	1178.4	20213.9	1178.8	20313.5	1177	20332.2
GR	1175.2	20397	1168.3	20438.5	1166	20499.5	1162.9	20524.7	1163.5	20567.9
GR	1154	20600	1154	21190	1162.9	21224.5	1162.9	21230.3	1165.5	21242.4
GR	1163	21343.3	1163.1	21441.5	1164.2	21479.2	1162.6	21482	1154	21500
GR	1154	21835	1163.6	21855.3	1175.2	21886.6	1186.7	21911.4	1184.6	21916.6
GR	1179.5	21936.4	1178	22031.3	1188.1	22051.4	1187.7	22160.8	1186.5	22233.2
GR	1187.5	22354.9	1185.8	22404	1186.5	22462.5	1185.6	22489.2	1176.3	22509.2
GR	1178.4	22565.2	1176.7	22619	1179.4	22654.1	1182.6	22664.3	1182.6	22705.9
GR	1184.4	22815.8	1184.4	22914.2	1185.2	22959.9	1189.9	22975.3	1185.2	23004
GR	1188	23067.4	1189.3	23157.8	1189.9	23195.5	1188.6	23318.5	1187.9	23355.8
GR	1188.7	23394.2	1191.9	23425.2	1191.7	23468.4	1192.5	23494.2	1192	23534

ET		7.1					18731	20724.4		
X1	225	91	18731	21036.7	500	500	500			
GR	1182	18675.9	1186	18690.9	1186	18720	1186.4	18731	1166	18751.4
GR	1166	18769.6	1166	18867.9	1168	18888.8	1172	18899.5	1166	18921.2
GR	1164	18935.3	1164	18955.3	1168	18974.4	1172	19015.2	1174	19031.1
GR	1180	19050.1	1182	19057	1174	19075.3	1174	19167.4	1164	19192.2
GR	1158	19204.8	1156	19229.1	1154	19333.1	1154	19358.6	1154	19606.3
	1154	19648.3	1156	19708.6	1160	19766.7	1162	19807.5	1162.2	19819.8
GR	1164.5	19861.6	1170.9	19891.7	1169.8	19936.4	1168.5	19938.5	1164.6	19956.5

GR	1162.8	19969.1	1154	20022	1154	20707	1162.3	20775	1162.9	20792.1
	1165.2	20810.3	1164.5	20839.3	1173.7	20859.2	1179.5	20874.2	1176.5	20892.1
GR	1179.5	20994.7	1179.5	21005.2	1188.2	21036.7	1180.3	21075.9	1180.2	21185.9
GR	1171.4	21205.2	1162	21231	1162.2	21333.3	1162.2	21461.3	1165.8	21545.4
GR	1167.4	21558.4	1175.5	21583.5	1175.2	21605.7	1171.5	21623.4	1170.5	21724.4
GR	1170.7	21833.5	1175.4	21853	1177.7	21871.1	1171.6	21893.4	1171.8	21995
GR	1175.5	22095	1172.9	22103	1172.9	22133.9	1179.7	22154.5	1179.7	22175.4
GR	1182.9	22198.6	1176.5	22244.9	1175.4	22262	1185	22287.5	1186.8	22290.5
GR	1187.7	22397.9	1187.3	22502.6	1186.8	22557.3	1184.2	22616.4	1185.6	22730.2
GR	1186.6	22763.9	1187.2	22848.8	1189.3	22896.6	1188.3	22985	1189.6	23103.7
GR	1190.5	23216.6	1187.6	23244.2	1187.6	23369.7	1188.4	23393.3	1192.8	23431.4
GR	1193.3	23442								

ET		7.1					18968	20450		
X1	225.1	95	18968	21777.8	570	510	510			
X4	1	1190	20450							
GR	1192	18886.3	1192	18891.9	1192	18968	1190	19014.7	1188	19022.2
GR	1186	19029.8	1186	19039.7	1186	19061.4	1184	19080.5	1182	19088.2
GR	1180	19104.9	1178	19114.8	1176	19120.1	1174	19125.6	1172	19130.5
GR	1170	19142.1	1170	19228.9	1172	19238.6	1172	19248.7	1170	19254.7
GR	1168	19260.5	1168	19323.2	1170	19335.1	1172	19346.8	1172	19354.5
GR	1170	19380.1	1168	19398.3	1166	19416.8	1164	19434.7	1162	19452.1
GR	1160	19532.2	1158	19623.3	1156	19697	1156	20129.9	1158	20155.8
GR	1160	20182.4	1164.5	20183.3	1163	20214.5	1163.3	20235.7	1169.2	20250.7
GR	1175.4	20284	1190	20284	1190	20584	1166.2	20584	1170.4	20623.5
GR	170.7	20740.4	1164.2	20766.3	1168.2	20799.9	1167	20804.5	1162.8	20813.5
	1164.6	20829.6	1164	20889.9	1162.8	20949.9	1166.8	20982.9	1163.2	21043.4
GR	1156	21187	1156	21662	1163.3	21675.2	1169.3	21697.6	1172.6	21731.5
GR	1171.6	21738.6	1175.1	21751.5	1186	21777.8	1182	21813.9	1181.3	21904.9
GR	1195.1	21967.4	1206.3	22004.2	1202.7	22059.1	1203	22110.3	1205.5	22134.8
GR	1205.1	22183.7	1202.8	22191.5	1206.2	22218.8	1202.9	22227.6	1192.2	22266.2
GR	1183.6	22289.5	1184.9	22402.4	1201.4	22440	1202.1	22462	1209.2	22475.4
GR	1208.1	22486	1189.4	22525.8	1191.4	22631.5	1190.5	22780.3	1190.1	22789.5
GR	1176	22820.1	1178.3	22842.9	1188.6	22871.8	1190.2	23008.3	1189.1	23046.9
GR	1184.2	23057.5	1184.2	23074.6	1192.5	23094.6	1190.7	23188.9	1193.9	23202.5

ET		7.1					19212.7	20250		
X1	225.19	90	19212.7	21306.5	480	510	502.05			
X4	1	1159	20250							
GR	1192	18396	1194	19079.3	1194	19212.7	1184	19232.8	1168	19261.8
GR	1168	19297.7	1170	19361.9	1172	19445.1	1176	19454.6	1176	19476.9
GR	1174	19484	1174	19531.1	1176	19551.2	1176	19555.4	1172	19565.2
GR	1158	19596.7	1158	19700	1158	19951.2	1162.9	20049.4	1166	20103.5
GR	1166.1	20180.1	1158	20261	1158	20351	1162.8	20354	1190	20354
GR	1190	20654	1164.3	20654	1158	20701	1158	20756	1163.6	20789.5
GR	1170.8	20829.7	1173.6	20837.3	1177.4	20852.9	1181.6	20912.8	1180.3	20968.5
GR	1182.3	20988.9	1181.3	20993.5	1181.3	21034.2	1178.7	21058.5	1179.7	21072.8
GR	1179.7	21107.6	1176.7	21115.2	1176.4	21118.7	1179.3	21140.8	1178.1	21151.8
GR	1179.1	21157.7	1185.1	21173.5	1186.2	21182.1	1185.2	21195.5	1180.9	21210.1
GR	1183	21221.9	1185.5	21279	1193.9	21306.5	1192.1	21368.5	1190.1	21390.5
	188.3	21493.4	1188.6	21546.2	1187.5	21576.7	1186.8	21687.3	1187.2	21791.8
GR	1188.1	21831.1	1187	21905	1188.7	21928.7	1188.7	21961.1	1187.8	21968.4

GR	1187.3	22011.6	1193.7	22032.6	1186.6	22050.9	1185.3	22115.2	1187.1	22226.6
	1187.8	22313.1	1201.9	22337.8	1204.8	22350.4	1196.7	22377.8	1194.2	22402.3
GR	1190	22418.2	1191.3	22442.1	1193.1	22452.9	1192.3	22525.3	1193.2	22551.7
GR	1191.8	22554.2	1191.5	22655.4	1191.9	22760.6	1191.5	22865.8	1190.4	22948.5
GR	1184.2	22967.5	1184.2	23048.2	1192.6	23072.5	1194.5	23181.4	1196	23233

SALT/GILA FLOOD DELINEATION
100-YEAR FLOOD
REACH 5: SECTIONS 225.28 - 237.59

ET		7.1					19177.2	20249.9		
X1	225.28	95	19177.2	19850.4	490	430	487.64			
GR	1195.6	18148.3	1195.5	18250.6	1194.9	18363.5	1193	18455.9	1192.9	18546.4
GR	1191.7	18664.4	1174.5	18726.1	1171.7	18745.5	1172.3	18808.8	1175	18907
GR	1178.5	18937.6	1176.6	18994.7	1177.9	19012.5	1179.4	19072.4	1185.9	19096.3
GR	1177.8	19121.7	1179.8	19128.8	1179.8	19164.2	1184.3	19177.2	1176.8	19207.6
GR	1172.9	19262.8	1174.4	19312	1175.3	19324.5	1164.3	19352.6	1164.5	19773.2
GR	1164.5	19823.1	1175.8	19850.4	1164.3	19874.2	1164.5	19990.1	1164.2	20091.7
GR	1164.1	20161	1164.2	20249.9	1164.1	20256.2	1163.4	20362.5	1163	20406.3
GR	1163.8	20624.5	1163.4	20718.1	1163.1	20805.1	1170.9	20847.1	1170.4	20854.5
GR	1172.2	20860.1	1175.2	20889.8	1180.7	20905.5	1193.5	20947	1192.9	20957.3
GR	1189.7	20967.6	1181.6	20989.4	1181.3	21001.2	1183.4	21021.9	1184.8	21057.5
GR	1187.9	21102.3	1187	21132.3	1185.6	21136.3	1190.5	21158.5	1189.6	21189.2
GR	1190.2	21205.3	1188.5	21273.6	1190.6	21282.4	1193.4	21305	1190.5	21315.5
GR	1191.6	21330	1190.3	21338.5	1188.6	21389.6	1189.7	21504.4	1190.4	21565.5
GR	1202.7	21607.1	1190.4	21631.1	1190	21645.9	1196.6	21668.4	1197.5	21691.6
GR	1195.9	21731.7	1193.7	21750.5	1189.7	21762.1	1190.6	21852.1	1191.1	21932.8
	1191.9	22061	1192.1	22158	1192.1	22167.6	1196.2	22182.6	1195.9	22193.4
GR	1191.1	22210.6	1191.8	22295.4	1194.1	22357.2	1209.9	22384.9	1209.3	22387.6
GR	1202.5	22398.4	1195.3	22418.1	1194.4	22460.3	1198.1	22469.6	1195.5	22488.3
GR	1194.1	22493.1	1195	22520	1198.1	22531.5	1194.7	22548.1	1194.8	22639

ET		7.1					18817.8	19845.8		
X1	225.38	95	18817.8	19845.8	400	400	518.68			
GR	1193.9	18611.2	1182.7	18649.2	1186.5	18744.8	1189.3	18817.8	1188.3	18852.5
GR	1185.7	18871.2	1185.8	18884.5	1173.3	18914.7	1165.9	18935.8	1166.5	18941.8
GR	1165.6	19015.9	1165.1	19101.8	1164.9	19180.6	1164.4	19189	1172.7	19240.1
GR	1172.9	19304.8	1162.6	19351.1	1162.5	19402.2	1163.5	19402.3	1164.7	19412.4
GR	1164.9	19438.2	1163.3	19450.2	1163	19620.6	1162.6	19694.9	1171.8	19718.6
GR	1176.1	19732.6	1170.7	19775.5	1179.9	19829.3	1186.5	19845.8	1183.6	19859.7
GR	1183.8	19870	1174.5	19947.7	1170.6	19985.4	1169	20056.1	1166.3	20111.7
GR	1163	20149.2	1163.7	20213	1163.7	20262.4	1162.7	20632.3	1162.4	20737.3
GR	1162.9	20803.5	1164.4	20887.4	1164.5	20895.5	1169.4	20900.2	1172.6	20900.6
GR	1182.4	20936.8	1188.2	20948.6	1180.1	21005.8	1181.4	21045.7	1175.6	21060.8
GR	1177.6	21126.2	1177.6	21203.3	1177.7	21221.5	1176.6	21235.1	1181.9	21295.8
GR	1180.5	21379.2	1177.8	21426.3	1177.8	21471.7	1175.5	21520.7	1163.6	21543.6
GR	1163.8	21560.7	1163.4	21653.6	1162.7	21657.1	1163.4	21669.8	1167.3	21698.6
GR	1166.1	21707.4	1168.7	21742.6	1164.6	21761.2	1163.5	21762.8	1165.2	21805.9
GR	1169.1	21826.9	1172.4	21864.2	1181.5	21903.8	1185.2	21924.7	1182.3	21938.3
GR	1183	22013.7	1191.2	22080.5	1195.4	22096.7	1193.5	22110.8	1191.7	22152
GR	1190.3	22154.9	1190.7	22187.9	1192.8	22212.7	1194.1	22255.1	1193.9	22325
	1194	22406.1	1195.1	22471.6	1196.9	22573	1196.3	22638.1	1195.8	22701.9
GR	1196.2	22765.3	1195.5	22822.4	1195.8	22900.3	1196.4	22906.9	1200.4	22919.6

ET		7.1					18589.5	19774.3		
X1	225.48	96	18589.5	19774.3	505	460	507.13			
GR	1195.5	18401.8	1193.9	18532.5	1195	18589.5	1186.2	18634.4	1184.2	18717
GR	1165.5	18755.6	1166.5	18756.2	1166.6	18886.9	1167.5	19013.8	1171.1	19050.6
GR	1172.8	19102.6	1172	19109.8	1169.8	19212.5	1164.3	19297	1164.2	19414.2
GR	1164	19422.1	1163.1	19588.2	1161.5	19591.4	1162.9	19629.5	1186.4	19693.6
GR	1187.4	19703.9	1203.5	19762.5	1203.8	19774.3	1197.4	19803.8	1196.2	19812.5
GR	1204.2	19839.2	1203.4	19842.8	1201	19878.3	1192.9	19900.1	1191.7	19961.1
GR	1188.5	19992.3	1188	20016.5	1188.5	20040.9	1187.6	20153.7	1187.5	20178.1
GR	1189	20233.4	1192.8	20240.2	1196.8	20271.6	1174	20291.8	1165	20311.2
GR	1163	20362.4	1168.6	20389.3	1162.7	20411.4	1162	20599.5	1161.7	20603.5
GR	1163.1	20609.1	1182.9	20645.3	1187.2	20649	1168.8	20690.9	1162.7	20708.9
GR	1163.7	20755.9	1167.4	20769.5	1168.1	20775.5	1168.7	20814.9	1166.4	20821.3
GR	1165.7	20831.5	1163.3	20834.5	1164	20861.9	1163.5	20864.1	1163.5	20971.2
GR	1162.5	21079.5	1165.3	21184.7	1164.4	21200.1	1166.3	21213.4	1165.3	21221.9
GR	1164.3	21259.1	1167.4	21342.1	1162.7	21354.8	1163.8	21356.3	1164	21389.6
GR	1162.7	21480.5	1163.8	21585	1164.7	21615.9	1161	21634.1	1160.3	21642.5
GR	1173.1	21685.9	1179.8	21702.1	1186.4	21721.5	1186.1	21798.1	1191.7	21813
GR	1190.6	21835.9	1193.7	21927	1192.1	21991	1193.2	22057.7	1195.5	22096.2
GR	1194.6	22132.9	1196.9	22152.4	1195.5	22172.3	1197.2	22186.1	1196.4	22270.5
GR	1194.4	22324.4	1196.5	22395.3	1195.8	22430.4	1196.7	22504.7	1195.5	22515.5
GR	1197.2	22522								

ET		7.1					18700.7	19907.8		
	225.57	96	18700.7	19907.8	495	450	475.36			
GR	1199	18437.1	1193.8	18465.1	1197.2	18546.1	1185.6	18598.5	1184	18632.1
GR	1187.1	18665	1190.8	18678.1	1191.6	18700.7	1186.3	18719.4	1166.9	18751.5
GR	1167.9	18751.7	1167.1	18791.3	1167	18962.9	1167.8	18969.6	1168	19263.2
GR	1168.3	19336	1167.4	19353.3	1164	19354	1162.4	19354.7	1168.8	19396.7
GR	1167.6	19430.4	1168	19520.8	1160.3	19557.3	1159.6	19573.8	1158.3	19575.5
GR	1158.3	19690.1	1162.2	19721.7	1163.7	19751.5	1183.7	19789.6	1180.6	19812.1
GR	1181	19816.6	1185.2	19829.5	1187	19907.8	1186.6	19942.2	1181.2	19989.8
GR	1184.2	19999.4	1186.8	20072.2	1182	20080.7	1159.1	20114.3	1161.5	20116.9
GR	1157.9	20136.3	1158.7	20259.5	1158.8	20269.1	1162.3	20269.4	1172.4	20278.6
GR	1172.8	20283.2	1169.8	20311	1172.4	20327.3	1174.5	20333.5	1184.5	20352
GR	1185.5	20356.4	1173.8	20383.4	1171.5	20393.4	1172.2	20412.3	1164.9	20424.8
GR	1162.3	20434.4	1161.2	20434.8	1158	20447.3	1159.5	20492.2	1172.7	20516.9
GR	1188.1	20542.6	1188.4	20548.3	1202.8	20577.8	1210.5	20598.4	1206.4	20609.4
GR	1197.1	20676.4	1192.1	20734.1	1191.7	20779.9	1199.1	20814.8	1191.2	20844.6
GR	1189.9	20885.5	1194.4	20909.4	1189.5	20933.3	1190.7	20991	1186.9	21008.3
GR	1184	21143.8	1184.2	21212.2	1191.3	21232.9	1165.8	21282.3	1171.5	21294.3
GR	1184.3	21328.9	1184.7	21341.8	1195.4	21367.7	1190.6	21380.9	1190.6	21417.4
GR	1195.2	21433	1187.9	21460.1	1192	21471.6	1190.3	21541.7	1193.7	21586.5
GR	1194.4	21687.1	1193.2	21741.9	1197.9	21811.7	1197.3	21885.6	1196.1	21941.4
GR	1198.5	22042								

		9.1							18727.9	19790.8
X1	225.66	95	18727.9	19790.8	525	520	512.77			
GR	1202.6	18694.6	1190.2	18714.2	1194.7	18727.9	1186.7	18745.5	1181.8	18802.5
GR	1167	18825.6	1164.9	18827	1167.8	18829	1168	18879.7	1167.5	18912.6
GR	1164.2	19213.5	1165.9	19230.1	1166.9	19250.3	1168.7	19319.5	1169.3	19370.7
GR	1169.7	19410.1	1169.2	19423.8	1166.4	19432.8	1166.2	19439.6	1158.8	19467.2
GR	1160.5	19501.3	1160.5	19516.9	1159	19518.4	1159	19533.4	1160.2	19558.6
GR	1159	19562.5	1160.7	19584	1162.3	19596.7	1162.5	19639.1	1165.6	19671.6
GR	1161.6	19698.5	1161.9	19743.5	1163.5	19755.8	1165.9	19763.3	1185.1	19790.8
GR	1183.7	19805.1	1181.5	19854.7	1177	19869.3	1178.5	19886.7	1174.8	19948.3
GR	1174.8	19961.9	1181.1	19974.1	1197.6	20015.3	1195.4	20022.5	1188.4	20040
GR	1188.1	20076.1	1206.8	20113.6	1206.4	20154.6	1204.6	20211.4	1203.8	20276.3
GR	1202.5	20323.5	1200.2	20359.4	1192.9	20392.2	1192.4	20470.6	1192.3	20484
GR	1192.8	20540.9	1193.6	20599.2	1194.2	20661	1195.1	20677.3	1194.6	20717.6
GR	1199.5	20779.8	1203.3	20844.2	1203.1	20903.8	1204.9	20907.8	1207.7	20919.2
GR	1193	20945	1192.5	20952	1193.3	20982.2	1196	20992.9	1194.4	20995.7
GR	1194.7	21004.9	1195	21057.5	1196	21082.9	1197	21092.1	1199	21153.4
GR	1199.1	21186.7	1192.7	21219	1193.6	21274.2	1194.7	21336	1194.8	21392.1
GR	1195.7	21462.3	1193.7	21501.8	1198.8	21544.6	1198.6	21615.3	1197.8	21634.3
GR	1199.3	21706.1	1199.3	21711.8	1198.8	21769.9	1197.8	21810	1199.8	21887.6
GR	1199.8	21962.3	1199.5	22031.8	1198.8	22086.5	1198.3	22141.4	1200.7	22190

ET		9.1							18673.2	19822.4
X1	225.76	94	18720.5	19822.4	440	485	482.78			
GR	202.1	18599.4	1201.4	18607.5	1200.5	18649.4	1200.7	18673.2	1199.2	18675.4
	1165.5	18720.5	1165.6	18740.6	1166	18801.3	1166.2	18851.4	1165.3	18854.2
GR	1165.2	18881.2	1165.2	18915	1166.3	18924.9	1165	19164.4	1165.4	19166.6
GR	1167	19211.7	1168.3	19255.6	1170.7	19317.9	1171.4	19334.8	1171	19414.5
GR	1170.5	19445.1	1169.4	19500	1168.7	19535.3	1167.6	19557.8	1169.1	19593.6
GR	1170.7	19634.6	1170.9	19638.8	1177.8	19656.9	1178.1	19666.7	1180.5	19751.2
GR	1181.3	19780.3	1182.1	19782.4	1196.2	19822.4	1191.4	19834.5	1191.1	19865.6
GR	1190.9	19890	1190.7	19941.8	1190.8	19954	1191.7	20014.4	1190.8	20031
GR	1191.4	20067.7	1192.3	20095.6	1193.9	20141.3	1196.8	20201.8	1196.9	20206.2
GR	1195.9	20250.4	1194.3	20287.1	1195.6	20322.5	1198.2	20384.7	1198.7	20401
GR	1198.9	20438.6	1197.9	20454.7	1199.3	20484.2	1198.8	20509.1	1197.2	20517.6
GR	1198.6	20523.6	1214.7	20564.7	1224.3	20588.8	1227.4	20641.4	1229	20672.2
GR	1229.5	20697.7	1210.3	20730.5	1195.1	20756.4	1194.3	20792	1193.2	20813.3
GR	1194.4	20820.3	1193.3	20844	1193.8	20858.3	1194.7	20900.8	1195	20922.8
GR	1195.6	20955.7	1195.6	20980	1196.8	21012.4	1197.7	21028.5	1214.7	21064.4
GR	1216.5	21069	1216.8	21072.7	1217.1	21109.1	1216.8	21110	1197.5	21144.1
GR	1198.6	21184.6	1198.7	21223.2	1198.7	21255.2	1198.6	21293.7	1198.7	21335.9
GR	1198.7	21386.1	1199.4	21435.5	1199.3	21466.5	1199.1	21484.6	1199.1	21521.9
GR	1199.2	21551.1	1199.2	21586	1200.1	21622.7	1201.8	21674		

ET		9.1							18202.9	19950.6
X1	225.85	94	18644.0	19867.3	630	505	509.56			
GR	1200.8	17859.9	1200	17925.1	1199.9	17998.1	1199.9	18017.7	1199.3	18017.9
GR	1199.5	18021.9	1195.9	18066.5	1187.3	18086.8	1188.9	18091.7	1194.7	18128.4
GR	1192	18139.2	1190	18171.7	1190	18202.9	1187.8	18205.3	1175.3	18230.7
	167.6	18317.7	1166.8	18340.2	1166.9	18433.5	1167	18644	1167.3	18714.1
GR	1167.3	18730.3	1168	18923.1	1168.1	18951	1169.1	18998.3	1169	19113.9

GR	1168.9	19153.3	1168.7	19257	1168.6	19361.6	1169.4	19412.2	1168.7	19428.2
	1168.7	19474.2	1168.9	19549.8	1170.6	19636.8	1169.2	19637.4	1173	19703.5
GR	1173.6	19713.9	1172.3	19724.4	1171.1	19760.2	1168.4	19774.2	1168.8	19835.1
GR	1168.4	19851.4	1181.8	19867.3	1182.2	19884.5	1184.8	19907.6	1201.6	19950.6
GR	1202.4	19965.7	1198.5	19974.9	1193.1	19990.9	1194.5	20033.7	1189.9	20061.5
GR	1189.2	20111.3	1196.5	20135.6	1196.8	20186.5	1192.9	20196	1190.8	20209.4
GR	1190.8	20231	1192.3	20245.5	1195.4	20257.9	1195	20279	1190.9	20291.2
GR	1190.9	20371.8	1196.4	20396.8	1198.5	20440.3	1199.3	20444.2	1198.8	20519.4
GR	1198.5	20601.3	1199.1	20661.4	1201.2	20676.2	1201.3	20718.5	1200.5	20729.9
GR	1201.2	20754.7	1199.5	20792.3	1200.1	20830.8	1198.8	20892.9	1199.5	20954.2
GR	1200.5	21039.8	1203.7	21042.5	1206.2	21060.1	1205.4	21063.8	1200.5	21071.4
GR	1200.6	21118.5	1201.2	21197.6	1201.6	21234.8	1200.7	21260.1	1201.6	21334
GR	1201.1	21435.8	1201	21509.6	1197.7	21601	1196.8	21662.9	1197.6	21746.1
GR	1197.6	21762.1	1200.1	21799.7	1199	21871.1	1200.8	21924.6		

ET		9.1							18335.5	20237.2
X1	225.95	94	18335.5	20039.7	470	510	509.99			
GR	1203.7	17840.6	1202.4	17848.9	1193.6	17889.2	1193.7	17922.2	1194	17963.8
GR	1193.7	18003.5	1193.3	18049.4	1194.4	18075.7	1196.9	18116.2	1197	18196.1
GR	1196	18228.4	1194.6	18269	1193.2	18321.5	1192.9	18335.5	1190.1	18375.5
GR	1182.4	18405.1	1183	18428.5	1181.5	18445	1177.9	18462.5	1176.1	18485.6
GR	1176.8	18517.9	1176.6	18533.3	1175.3	18553.3	1176.3	18604.6	1178	18637.4
GR	1176	18671.4	1175.9	18692.9	1167.9	18708.4	1168.7	18708.7	1167.9	18717.5
GR	1167.9	18817.2	1168	18863.1	1168.6	18952	1168.8	19096.8	1168.8	19116.2
GR	1172.1	19129	1172.9	19130.4	1174.6	19160.5	1175.5	19215.6	1174.7	19255.3
GR	1175.1	19282.8	1173.9	19324	1172.5	19402.1	1173.3	19480.7	1173.4	19487.4
	1173.5	19546.6	1173.2	19561.6	1171.5	19597	1171.8	19766.1	1172	19774.5
GR	1172.2	19849.9	1172.6	19953.3	1173	20020.4	1173	20028.3	1183.6	20039.7
GR	1183.9	20085.7	1184.1	20114.6	1196.9	20181	1208.9	20237.2	1206.8	20284.1
GR	1208.4	20295.6	1203.3	20308.8	1195.4	20337	1194.8	20347.3	1194.6	20393
GR	1194.6	20446.4	1194.6	20457.2	1194.6	20542.6	1195.3	20585.5	1198.7	20639.1
GR	1198.6	20647.5	1200.8	20699.8	1201.6	20747.8	1201.5	20820.4	1201.6	20865.5
GR	1202.1	20977.3	1202.1	20982.5	1201.9	21042.6	1201.8	21084.5	1199.8	21122.5
GR	1199.8	21145.3	1200.5	21188.1	1200.5	21201.5	1198.1	21246.4	1196.8	21266.9
GR	1197.8	21298.1	1197.5	21304.9	1198.3	21344.9	1198.8	21373.7	1200.5	21418.9
GR	1199	21475.2	1199.6	21525.8	1200	21556.4	1202.2	21595		

Separate files were run from Sec. 225.95 to Sec. 226.89 to analyze
the split flow around the island under Alma School Bridge.
Qmc =150500 cfs (Split A) Qoverflow = 69500 cfs (Split B)

NH	4	0.028	19322.6	0.028	20431.8	0.028	20903.8	0.032	21292	
QT	1	147500								
ET		9.1							19322.6	20431.8
X1	226.04	61	19384.7	20261.8	484	480	476.46			
GR	1190.7	19322.6	1189.8	19330.3	1189.1	19348.5	1185	19384.7	1185	19388
GR	1184.7	19422.5	1184.8	19427	1184.1	19433.8	1183.1	19465.4	1180.9	19474.7
GR	1177.6	19481.8	1174.3	19487	1173.9	19516.1	1174.4	19546	1173.3	19554.1
GR	1177.3	19578.1	1176.4	19677.9	1176.1	19713.4	1175.5	19740.7	1174.3	19803.7
GR	1173.5	19852.7	1173.6	19865	1174.4	19915.2	1173.1	19968.4	1173.5	19986.1
	1174.1	20226.7	1174.6	20231.5	1186.4	20261.8	1182.7	20271.6	1182.7	20278.9
GR	1183.2	20323.1	1183.4	20350.9	1197.6	20397.2	1208.9	20431.8	1207.8	20455.3

GR	208.3	20494.1	1210.1	20512.3	1207.1	20520	1202.5	20536.8	1202.7	20559.4
	1202.7	20593.7	1203	20606.2	1202.5	20646.2	1202.3	20721.5	1202.4	20732.8
GR	1202	20792.8	1202.5	20851.4	1203.7	20901	1203.7	20903.8	1201.8	20944.3
GR	1199.6	20978.5	1197.3	21014.7	1197.4	21049.3	1197.4	21091.9	1199.9	21127.4
GR	1200.7	21138	1200.8	21147.2	1200.5	21186.3	1200.6	21206.2	1201.5	21261.6
GR	1201.7	21292								
NH	4	0.028	19593.2	0.028	20570.5	0.028	20626.6	0.032	21539.6	
ET		9.1							19593.2	20570.5
X1	226.13	60	19616.4	20439.1	510	500	502.01			
GR	1170.5	19437.3	1170.7	19485.6	1172.2	19504.1	1195.1	19553.4	1197.4	19593.2
GR	1185	19616.4	1175	19633	1175.1	19634.4	1174.6	19634.6	1174.2	19647
GR	1175	19647.9	1174.1	19649.3	1174.1	19651.3	1174.7	19652.3	1177.6	19671.2
GR	1177.4	19743.2	1177.3	19758.5	1177.3	19820.9	1176.9	19854.6	1175.8	19902.4
GR	1175.7	19926.4	1175.1	19957.4	1175.4	20107.7	1175.4	20182.2	1174.9	20223.3
GR	1175.4	20226.9	1176.7	20230.3	1182.3	20263.7	1183.8	20312.9	1183	20329.7
GR	1181.3	20345.9	1182	20382.2	1185.2	20439.1	1187	20474.8	1197.3	20524
GR	1207.3	20570.5	1207.3	20626.6	1200	20643.6	1194.2	20663.5	1193.7	20687.1
GR	1202.3	20743.5	1200.4	20811.7	1200.5	20871	1200.3	20920.2	1200.3	20939.3
GR	1200.5	20993.3	1201	21057	1200.2	21085.4	1200.7	21141.6	1200.8	21146.2
GR	1199.6	21208	1198.8	21227.7	1201.7	21263.7	1201.7	21319.4	1201.8	21376.1
GR	1201.6	21430.6	1201.1	21432.8	1201.2	21445.1	1201.8	21532.8	1202.2	21539.6
NH	2	0.028	19603.5	0.028	20608.2					
ET		9.1							19603.5	20608.2
X1	26.23	36	19656.4	20316.6	400	630	492.85			
	1172.3	19327.9	1172.5	19354.8	1172.5	19507.5	1172.5	19559.6	1172.8	19569.4
GR	1178.2	19577.6	1195.5	19603.5	1194.5	19620.9	1192.8	19643	1184.4	19656.4
GR	1183.6	19658	1178.5	19679.1	1178.6	19679.2	1178.6	19699.7	1178.6	19818.4
GR	1178.6	19842.2	1178.6	19887.8	1178.7	19921.7	1177.6	20113.2	1177.9	20135.2
GR	1178.7	20240.4	1179	20252.9	1178.7	20253.2	1181.4	20280.2	1184.7	20316.6
GR	1185.9	20328.3	1185.9	20344.6	1186	20373.1	1185.8	20381.7	1185.6	20439.4
GR	1186.1	20464.8	1186.5	20496.5	1186.2	20541.5	1186.1	20556.6	1191.5	20568.2
GR	1210.9	20608.2								
NH	3	0.028	19598.4	0.028	20580.5	0.032	21305.9			
ET		9.1							19598.4	20580.5
X1	226.35	46	19633.4	20520.9	470	770	666.57			
GR	1173.4	19477.2	1173.4	19478.6	1179.8	19487.8	1194.4	19507.4	1201.1	19533.2
GR	1201.9	19538.7	1202.2	19547.6	1202	19590.8	1204.3	19598.4	1199.6	19623
GR	1189.4	19633.4	1189	19635.3	1180.3	19702.2	1180.6	19722.8	1180.8	19974.1
GR	1180.2	19983.4	1182.9	20006.6	1184.5	20049.5	1184.8	20084.8	1183.2	20121.1
GR	1183.6	20122	1184.6	20188.7	1185.2	20414.8	1185.2	20456.4	1185.5	20504.6
GR	1185.7	20520.9	1207.3	20575.1	1209.5	20580.5	1204.6	20626.8	1203	20642
GR	1203	20647.6	1203	20714.5	1203	20738.2	1203.5	20817.4	1203.9	20885.1
GR	1203.7	20954.1	1203.4	21007.9	1203.1	21022.9	1204.1	21080.2	1203.7	21102.6
GR	1204	21105.1	1203	21151.8	1203.8	21197.6	1203.3	21239.4	1204.7	21284.3
GR	1205.1	21305.9								

	4	0.029	19319.7	0.028	19554.4	0.028	20592.3	0.032	21453.5	
ET		9.1							19554.4	20592.3
X1	226.48	51	19554.4	20592.3	550	994	763.51			
GR	1202.8	19057.9	1204.8	19157.6	1205.9	19268.4	1205.4	19298.9	1205.8	19319.7
GR	1206.2	19382.8	1206.1	19487.9	1205.8	19531.8	1204.6	19554.4	1203.8	19612.5
GR	1191.4	19639.4	1185.3	19650	1182.1	19671.1	1182.4	19681.3	1182.2	19793.3
GR	1181.8	19861.5	1182.8	19882.7	1183.6	19886.2	1183.2	19891.3	1183.7	19924.7
GR	1185.6	19949.7	1187.6	20029.1	1188.3	20086.5	1187.7	20119.4	1187.2	20120
GR	1187.8	20137.4	1187.5	20318.7	1188.5	20469.4	1188.7	20519.1	1196	20533.2
GR	1203.5	20556.3	1203.8	20592.3	1203.5	20663.4	1202.9	20689.2	1204.7	20698.9
GR	1204.6	20787.2	1203.2	20834.8	1203.5	20903.5	1203.6	20913.2	1204.3	20988.1
GR	1203.9	21060.7	1203.9	21128.6	1204.8	21172.6	1207.4	21256.2	1207.4	21258.9
GR	1202.4	21271	1207	21288.1	1206.8	21353	1206.8	21357.8	1207.6	21429.4
GR	1207.8	21453.5								

NH	4	0.029	19382.8	0.028	19554.4	0.028	20592.3	0.032	21453.5	
ET		9.1							19554.4	20592.3
X1	226.49	46	19554.4	20592.3	1	1	1			
GR	1206.2	19382.8	1206.1	19487.9	1205.8	19531.8	1204.6	19554.4	1203.8	19612.5
GR	1191.4	19639.4	1186.0	19650	1186.0	19671.1	1186.0	19681.3	1186.0	19793.3
GR	1186.0	19861.5	1186.0	19882.7	1186.0	19886.2	1186.0	19891.3	1186.0	19924.7
GR	1186.0	19949.7	1187.6	20029.1	1188.3	20086.5	1187.7	20119.4	1187.2	20120
G	187.8	20137.4	1187.5	20318.7	1188.5	20469.4	1188.7	20519.1	1196	20533.2
	1203.5	20556.3	1203.8	20592.3	1203.5	20663.4	1202.9	20689.2	1204.7	20698.9
GR	1204.6	20787.2	1203.2	20834.8	1203.5	20903.5	1203.6	20913.2	1204.3	20988.1
GR	1203.9	21060.7	1203.9	21128.6	1204.8	21172.6	1207.4	21256.2	1207.4	21258.9
GR	1202.4	21271	1207	21288.1	1206.8	21353	1206.8	21357.8	1207.6	21429.4
GR	1207.8	21453.5								

Downstream face of Alma School Rd Bridges

All data used to model this bridge was taken from survey notes and
from as-built plans dated 7-80

NH	4	0.029	19487.9	0.028	19554.4	0.028	20592.3	0.032	21453.5	
ET		9.1							19554.4	20592.3
X1	226.50	46	19554.4	20592.3	10	10	10			
GR	1206.2	19382.8	1206.1	19487.9	1205.8	19531.8	1204.6	19554.4	1203.8	19612.5
GR	1191.4	19639.4	1186.0	19650	1186.0	19671.1	1186.0	19681.3	1186.0	19793.3
GR	1186.0	19861.5	1186.0	19882.7	1186.0	19886.2	1186.0	19891.3	1186.0	19924.7
GR	1186.0	19949.7	1187.6	20029.1	1188.3	20086.5	1187.7	20119.4	1187.2	20120
GR	1187.8	20137.4	1187.5	20318.7	1188.5	20469.4	1188.7	20519.1	1196	20533.2
GR	1203.5	20556.3	1203.8	20592.3	1203.5	20663.4	1202.9	20689.2	1204.7	20698.9
GR	1204.6	20787.2	1203.2	20834.8	1203.5	20903.5	1203.6	20913.2	1204.3	20988.1
GR	1203.9	21060.7	1203.9	21128.6	1204.8	21172.6	1207.4	21256.2	1207.4	21258.9
	202.4	21271	1207	21288.1	1206.8	21353	1206.8	21357.8	1207.6	21429.4
GR	1207.8	21453.5								

12 degree skew angle (cosine 12 degrees = 0.9781)

NC	0.028	0.032	0.028							
ET		9.1							19615.6	20548.2
		Downstream Face of Alma School Road Bridge								
X1	226.51	77	19615.6	20548.2	2	2	2	0.9781		
X2									0.9781	
BT	-19	19030	1204	1204	19615.5	1206.13	1206.13	19615.5	1206.13	1202.48
BT		19670.8	1206.22	1202.57	19729.6	1206.26	1202.61	19788.4	1206.26	1202.61
BT		19847.6	1206.3	1202.65	19905.5	1206.31	1202.66	19963.3	1206.27	1202.62
BT		20022.4	1206.2	1202.55	20081.3	1206.15	1202.5	20139.1	1206.05	1202.4
BT		20197.8	1205.92	1202.27	20257.6	1205.8	1202.15	20315	1205.63	1201.98
BT		20372.7	1205.5	1201.85	20434	1205.38	1201.73	20489.6	1205.09	1201.44
BT		20548.1	1204.81	1201.16						
GR	1204	19030	1206.13	19615.5	1202.48	19615.6	1194.51	19615.7	1190.16	19629.5
GR	1187.9	19670.8	1202.57	19670.8	1202.57	19673.3	1187.89	19673.3	1186.93	19729.6
GR	1202.6	19729.6	1202.6	19732.1	1186.93	19732.1	1186.07	19757.1	1186.00	19788.4
GR	1202.6	19788.4	1202.61	19790.9	1186.00	19790.9	1186.00	19829.4	1186.00	19847.6
GR	1202.7	19847.6	1202.7	19850.1	1186.00	19850.1	1186.00	19863.9	1186.0	19905.5
GR	1202.7	19905.5	1202.7	19908	1186.0	19908	1186.0	19922.2	1186.0	19951.8
GR	1186.0	19963.3	1202.62	19963.3	1202.62	19965.8	1186.00	19965.8	1186.29	20022.4
GR	1202.6	20022.4	1202.6	20024.9	1186.29	20024.9	1187.03	20051.5	1187.08	20081.3
GR	1202.5	20081.3	1202.5	20083.8	1187.08	20083.8	1186.63	20139.1	1202.4	20139.1
GR	1202.4	20141.6	1186.63	20141.6	1187.14	20197.8	1202.27	20197.8	1202.27	20200.3
GR	1187.1	20200.3	1187.7	20257.6	1202.15	20257.6	1202.15	20260.1	1187.68	20260.1
GR	1186.8	20315	1202	20315	1202	20317.5	1186.83	20317.5	1187.56	20372.7
GR	1201.9	20372.7	1201.9	20375.2	1187.56	20375.2	1187	20434	1201.73	20434
GR	1201.7	20436.5	1187	20436.5	1187.64	20459.6	1186.2	20489.6	1201.44	20489.6
GR	1201.4	20492.1	1186.2	20492.1	1187.68	20520.2	1193.39	20548.1	1201.16	20548.2
GR	1204.8	20548.3	1204	20760						
ET		9.1							19615.6	20548.2
		Upstream Face of Alma School Road bridge								
X1	226.52	77	19615.6	20548.2	84	84	84	0.9781		
X2									0.9781	
BT	-19	19030	1204	1204	19615.5	1206.13	1206.13	19615.5	1206.13	1202.48
BT		19670.8	1206.22	1202.57	19729.6	1206.26	1202.61	19788.4	1206.26	1202.61
BT		19847.6	1206.3	1202.65	19905.5	1206.31	1202.66	19963.3	1206.27	1202.62
BT		20022.4	1206.2	1202.55	20081.3	1206.15	1202.5	20139.1	1206.05	1202.4
BT		20197.8	1205.92	1202.27	20257.6	1205.8	1202.15	20315	1205.63	1201.98
BT		20372.7	1205.5	1201.85	20434	1205.38	1201.73	20489.6	1205.09	1201.44
BT		20548.1	1204.81	1201.16						
GR	1204	19030	1206.13	19615.5	1202.48	19615.6	1194.51	19615.7	1190.16	19629.5
GR	1187.9	19670.8	1202.57	19670.8	1202.57	19673.3	1187.89	19673.3	1186.93	19729.6
GR	1202.6	19729.6	1202.6	19732.1	1186.93	19732.1	1186.07	19757.1	1186.00	19788.4
GR	1202.6	19788.4	1202.61	19790.9	1186.00	19790.9	1186.00	19829.4	1186.00	19847.6
GR	1202.7	19847.6	1202.7	19850.1	1186.00	19850.1	1186.00	19863.9	1186.00	19905.5
GR	1202.7	19905.5	1202.7	19908	1186.0	19908	1186.0	19922.2	1186.0	19951.8
GR	1186.0	19963.3	1202.62	19963.3	1202.62	19965.8	1186.00	19965.8	1186.29	20022.4
	1202.6	20022.4	1202.6	20024.9	1186.29	20024.9	1187.03	20051.5	1187.08	20081.3
GR	1202.5	20081.3	1202.5	20083.8	1187.08	20083.8	1186.63	20139.1	1202.4	20139.1

GR	1202.4	20141.6	1186.63	20141.6	1187.14	20197.8	1202.27	20197.8	1202.27	20200.3
	1187.1	20200.3	1187.7	20257.6	1202.15	20257.6	1202.15	20260.1	1187.68	20260.1
GR	1186.8	20315	1202	20315	1202	20317.5	1186.83	20317.5	1187.56	20372.7
GR	1201.9	20372.7	1201.9	20375.2	1187.56	20375.2	1187	20434	1201.73	20434
GR	1201.7	20436.5	1187	20436.5	1187.64	20459.6	1186.2	20489.6	1201.44	20489.6
GR	1201.4	20492.1	1186.2	20492.1	1187.68	20520.2	1193.39	20548.1	1201.16	20548.2
GR	1204.8	20548.3	1204	20760						

Upstream face of Alma School Rd Bridge

NH	3	0.029	19522.9	0.028	20594.3	0.032	20976.5			
ET		9.1							19522.9	20594.3
X1	226.53	40	19522.9	20594.3	2	2	2			
GR	1207.3	19400.7	1208.3	19413.5	1209.1	19437.4	1209.9	19470.5	1212	19522.9
GR	1211.8	19539.6	1206.3	19582.3	1203	19614.7	1188.3	19644.6	1186	19653.3
GR	1186.0	19685.6	1186.0	19697.2	1186.0	19724.9	1186.0	19901.4	1186.0	19903.5
GR	1186.0	19935.8	1186.0	19968.1	1186.0	19972.2	1187.9	20054.4	1188	20058.9
GR	1188.1	20107	1188.1	20107.1	1187.6	20144.4	1186.3	20145.7	1187.7	20508.1
GR	1187.9	20519	1194.9	20532.1	1202.8	20554.6	1204.2	20571.1	1204.5	20594.3
GR	1203.7	20692.8	1203.3	20729.5	1203.9	20736.7	1203.6	20756.4	1203.6	20799.1
GR	1204.8	20834	1203.2	20847.8	1203	20900.8	1203.5	20925.7	1203.9	20976.5

NH	3	0.028	19623.6	0.028	20581.5	0.032	21318.1			
ET		9.1							19549.9	20581.5
X1	226.61	40	19623.6	20542.5	560	360	478.1			
GR	1213.2	19483.8	1213.4	19549.9	1212.4	19581.4	1197.5	19610.7	1194.6	19619.8
GR	1190.6	19623.6	1188.3	19650.1	1188.2	19726.3	1187.0	19791.6	1187.0	19803.2
GR	1187.0	19883.3	1187.0	19964.1	1187.0	19991.7	1187.0	20038.5	1187.0	20063.8
GR	1187.0	20064.4	1187.0	20152.2	1187.0	20232.2	1188.2	20333.6	1188.5	20515.4
GR	1190	20542.5	1202.9	20571.1	1205.6	20581.5	1205.3	20676.4	1205.8	20765
GR	1207.4	20777	1204.5	20783.9	1200.5	20797.8	1201.5	20801.4	1203.3	20879.2
GR	1204.1	20903.5	1203.7	20927	1205.3	20950.3	1206.4	21025.9	1199.3	21086.6
GR	1200.4	21161	1201.8	21224.7	1206.9	21255.6	1208.6	21307	1208.4	21318.1

NH	3	0.031	19621.8	0.028	20724.5	0.032	21674.9			
ET		9.1							19491.0	20724.5
X1	226.70	55	19621.8	20687.5	490	510	503.99			
GR	1205.2	19345.1	1205.6	19395.9	1205.7	19443.8	1205.8	19491.0	1206.4	19531.6
GR	1204.9	19584.1	1204.4	19593	1191.8	19621.8	1190.4	19639.9	1189.5	19664.4
GR	1189.6	19702.3	1189.2	19759.1	1188.3	19767.6	1189.7	19797.4	1188	19861
GR	1188.0	19870.8	1188.0	19871.6	1188.0	20148.3	1190.4	20560.2	1189.9	20561.9
GR	1190.7	20591.4	1190.5	20594.8	1192.8	20675.2	1193.1	20687.5	1203.4	20724.5
GR	1196.6	20744.3	1196.5	20783.1	1197	20799.3	1202	20840.1	1198.3	20878.9
GR	1195.1	20903.1	1195.3	20915.8	1189.4	20948	1188.9	20971.4	1191.7	21016.3
GR	1194.3	21030.4	1195.1	21046.5	1204.8	21098.9	1206.7	21109.5	1207.4	21157.1
GR	1207.7	21170.9	1208.4	21212	1207.8	21239	1206.8	21246.3	1199.2	21270.6
GR	1197.8	21295.6	1197.9	21303.4	1198.9	21365.1	1199.6	21411.3	1208.8	21447.3
GR	1205.5	21474.7	1208.5	21506.6	1208.6	21515.6	1208.5	21579.6	1209.9	21674.9

.	5	0.028	19309.8	0.031	19441.4	0.031	19606.8	0.028	20598	0.032
NH	21791									
ET		9.1							19441.4	20598.0
X1	226.80	70	19621.0	20537.0	560	480	487.43			
GR	1204.9	19289.4	1205.2	19309.8	1205	19352.7	1205.2	19398	1205.2	19399.9
GR	1205	19436	1205.1	19441.4	1204.8	19484	1204.2	19500.3	1204.2	19526.5
GR	1204.5	19544.7	1204	19577.8	1203.3	19606.8	1194.2	19621	1193.6	19621.4
GR	1193.1	19628.3	1191.8	19665.2	1192.2	19666.9	1191.7	19698.9	1192.5	20222.1
GR	1192.9	20527.5	1192.8	20535.4	1193.2	20536.6	1192.7	20537	1205.7	20585.8
GR	1206.4	20589.8	1206.8	20598	1203.7	20641.3	1203.6	20649.8	1202.6	20711.9
GR	1202.2	20771.2	1201.9	20775.1	1200.3	20806.1	1195	20869.6	1195.1	20882.9
GR	1195.6	20935.9	1195.7	20944.5	1195.6	20972.8	1192.1	20992.5	1192	21007.1
GR	1192.3	21020.1	1192.8	21028.7	1201.5	21071.5	1204.1	21090.1	1206.1	21161
GR	1206.4	21170.5	1206.4	21184.9	1206.2	21271.6	1206.6	21311.6	1207.3	21334.3
GR	1207.3	21346.4	1206.7	21356.8	1202.6	21372.6	1200.1	21381	1199.5	21407.5
GR	1199.3	21410	1200.4	21434	1200.7	21436.3	1206.7	21465.8	1207.6	21517.2
GR	1207.8	21532.9	1208.5	21564.4	1210	21638.9	1210.5	21684.1	1210.3	21700.8
GR	1209.8	21714.6	1208.2	21730.5	1207.8	21748.7	1208.9	21772.5	1210.8	21791

NH	3	0.028	19026.7	0.028	20593.8	0.032	21751.8			
ET		9.1							19600.0	20593.8
X1	226.89	96	19600.1	20464.2	550	525	510.72			
GR	1210.8	18699.3	1210.7	18704	1210.4	18760	1210.2	18812.2	1210.6	18825.2
C	.09.3	18833.5	1210.5	18839.9	1210.1	18881.5	1210	18884.7	1210	18885.9
G.	1209.9	18900.2	1206.3	18960	1205.9	18965	1204.2	19008.2	1204.4	19026.7
GR	1202.5	19043.1	1197.3	19073.7	1195	19098.5	1193.6	19101.3	1193.6	19131
GR	1192.9	19351.9	1193.3	19352.3	1193.4	19357.5	1194.3	19389.5	1194.3	19392.7
GR	1194.3	19393.6	1194.3	19399.7	1193.7	19428	1193.2	19437.3	1192.5	19447.7
GR	1192.7	19448.7	1193.5	19456.5	1193.4	19486.1	1193.4	19491.2	1193.1	19600.1
GR	1192.8	19840.5	1192.9	19851.8	1193.6	20155.5	1193.7	20191	1193.7	20277.3
GR	1194.1	20461.8	1194.1	20464.2	1198.9	20506.8	1202.7	20534	1205.7	20552
GR	1205.8	20553.4	1207.2	20593.8	1205.3	20640.7	1204.4	20656.9	1204.5	20665.3
GR	1204	20691.7	1204.2	20701.6	1203.6	20722.5	1203.9	20741.1	1205.4	20776.1
GR	1205.8	20783	1205.8	20783.7	1205.8	20791.9	1205.8	20826.9	1206	20838.5
GR	1206.1	20855.5	1206.7	20894.8	1210.3	20924.6	1210.6	20926.4	1210.8	20929
GR	1210.9	20936	1211.4	21005.5	1211.2	21018.4	1211.1	21025.6	1209.9	21059.1
GR	1210.2	21081.5	1210.2	21113.8	1210.2	21155	1209.7	21178.6	1209.5	21235.1
GR	1209.2	21247.9	1209.2	21256.3	1209	21261.9	1209.6	21334.4	1209.5	21340.6
GR	1209.5	21345	1209.8	21399.5	1210.3	21437.5	1210.4	21455.1	1210.7	21460.8
GR	1210.5	21528.7	1209.6	21547.4	1208.9	21559	1209	21575.1	1209	21579.2
GR	1208.9	21584.7	1208.8	21613.8	1209.3	21642.8	1210.2	21683.1	1210.9	21714.4
GR	1211.1	21751.8								

Split flow starts at Sec. 226.89 for Alma School Bridge and ends at
Sec. 225.76 - Q upstream to Granite Reef Dam is 220000 cfs

	1	220000								
NH	3	0.031	19356.4	0.028	20574.1	0.032	21859.4			
ET		9.1							19356.4	20574.1
X1	226.99	96	19395.3	20492.4	170	490	492.08			
GR	1209.4	18363.1	1209	18395.6	1209	18401.2	1208.7	18434.8	1208.1	18452
GR	1207.9	18482.1	1208.1	18515.9	1208.5	18520.3	1209	18569.9	1209.4	18588.5
GR	1210	18595.7	1217.7	18683.9	1216	18695.7	1208.7	18708.4	1208.1	18722.1
GR	1208.2	18756.7	1208.4	18786.4	1208.2	18867.7	1207.6	18890.7	1206.9	18938.3
GR	1205.9	19001.2	1205.6	19002.6	1205.7	19004.4	1204.7	19037	1206.3	19054.8
GR	1209	19091.8	1208.7	19169.5	1208.5	19173.3	1203.7	19255.9	1200.2	19305.4
GR	1200.1	19306.1	1204.1	19326.7	1205.4	19337.4	1208.5	19351.6	1208.5	19356.4
GR	1207.5	19362.5	1206.5	19379.1	1200.5	19395.3	1194.3	19414.1	1194.6	19416.8
GR	1194.6	19453.4	1193.9	19524	1193.9	19529.1	1193.8	20095.1	1193.8	20212.5
GR	1193.8	20367.5	1193.7	20423	1195	20441	1195.5	20470.9	1199.6	20492.4
GR	1206.9	20532.5	1212.6	20574.1	1210.4	20583	1207.6	20592.4	1209.6	20613.5
GR	1212.7	20658.2	1214.4	20686.5	1217.2	20734.7	1217.9	20737.5	1217.1	20774.9
GR	1216.6	20786.2	1214.5	20827.4	1214.1	20840.4	1212.6	20857.8	1213.7	20893.9
GR	1213.9	20907.7	1213.4	20964	1213.1	21020.4	1208	21051.2	1209.5	21098.4
GR	1209.5	21112.5	1210	21120.2	1213.9	21185.1	1212.5	21194.8	1213.5	21209.7
GR	1212.1	21249.7	1211.8	21260.3	1213.4	21300.4	1214.2	21326.5	1214.1	21375.4
GR	1214.1	21394.8	1213.4	21430.3	1213	21466.9	1213.1	21495	1212.4	21529.4
GR	1210.4	21570.9	1209.3	21584.3	1209.5	21595.1	1209.7	21645.2	1209.8	21681.2
GR	1210.2	21698	1210.9	21729.2	1210.1	21763.2	1211	21792.1	1210.9	21833.7
GR	1212.1	21859.4								

F		9.1							19475	20579
[illegible]	3	0.03	19598.4	0.028	20588.8	0.032	21544.1			
X1	227.08	96	19699.1	20433.7	585	500	504.96			
GR	1212.5	18806.6	1212.3	18812.6	1210.7	18907.8	1210.1	18984.8	1209	19010.2
GR	1216.1	19028.4	1216.5	19030	1214.7	19070.7	1209	19077.5	1209.2	19091.4
GR	1209.2	19128.9	1208.8	19166.3	1209.8	19226.8	1210	19241	1218.9	19252.7
GR	1219.3	19254.9	1213.4	19301.3	1211.8	19312.2	1210.1	19319.1	1209.7	19337.5
GR	1209.8	19367.2	1209.6	19420.1	1209.6	19421	1209.9	19465.5	1209.9	19465.7
GR	1209.8	19527	1210	19531.3	1210.9	19574.1	1211.4	19598.4	1208.5	19602.9
GR	1194.1	19639	1194.1	19677.6	1194.3	19691.1	1195.3	19694.8	1195.6	19699.1
GR	1194.7	19700.2	1194.2	19704.7	1194.4	19726.1	1194.9	19921.6	1194.5	19935.8
GR	1194.5	19964	1194.2	20088.5	1194.2	20090	1196.1	20096.8	1195.7	20127.5
GR	1194.2	20146.2	1194.2	20165.4	1194.6	20173.5	1194.2	20203.2	1194.2	20240.9
GR	1194.4	20246	1195	20373	1194.7	20384.7	1198.4	20400.9	1200.2	20414.9
GR	1199.1	20420.6	1200.9	20433.7	1201.1	20447.4	1200.2	20489.6	1199.8	20518
GR	1199.9	20537.4	1208.9	20571.6	1215	20588.8	1212.3	20615.3	1212.4	20618
GR	1213.1	20663.3	1216.5	20713.5	1217.3	20735.3	1216.4	20762.4	1217.4	20772.9
GR	1215.7	20795.5	1214.3	20806.9	1214.5	20812.2	1212.8	20875.4	1212.9	20885
GR	1212	20902.2	1212.1	20912.2	1211.2	20951.7	1211.2	20957.4	1211.4	21013.1
GR	1211.2	21047.8	1209.7	21086.2	1211	21096	1212.2	21149	1213.7	21180.5
GR	1213.6	21210.4	1212.4	21229.4	1210.8	21266.5	1210	21309.1	1209.5	21350.5
GR	1208.8	21378.1	1209.3	21431.3	1208	21455	1212	21490.1	1212.5	21497.2
GR	1213	21544.1								

	3	0.03	19582.3	0.028	20583.2	0.032	22652.2			
ET		9.1							19582.3	20583.2
X1	227.18	96	19611.0	20546.1	500	505	509.22			
GR	1214.2	18653.9	1214.7	18735.4	1214.4	18808.3	1214.4	18866.3	1214.3	18881.6
GR	1213.7	19038.7	1212.4	19096.3	1212.4	19157.5	1212.2	19228.9	1212.2	19231.5
GR	1213.3	19351.8	1213.3	19354.9	1207.1	19372.8	1197.2	19405.9	1197.4	19406.7
GR	1195.1	19413.3	1194.6	19452	1195.8	19463.6	1195.9	19471.4	1200	19483.3
GR	1210.2	19507.1	1211	19512.5	1208	19547.4	1207.9	19572.9	1212.5	19582.3
GR	1211	19588.4	1201.8	19611	1194.6	19649.7	1194.7	19842.7	1194.5	19898.6
GR	1194.6	20015.1	1194.6	20178	1195.9	20197.8	1196.8	20233.3	1199.1	20298.1
GR	1200.4	20332.4	1200.5	20386.7	1201.8	20410	1201.5	20426.7	1205.2	20438.6
GR	1201.8	20447.1	1199.1	20452.3	1201.4	20510.7	1201.9	20546.1	1214.1	20575.5
GR	1216.5	20583.2	1215	20640.8	1218.1	20672.9	1217.5	20686	1219.3	20751.5
GR	1220.8	20808.6	1217.5	20845.6	1217.3	20863.7	1218.8	20895.4	1222	20919.6
GR	1221.3	20996.5	1219.9	21043.3	1220.1	21097.8	1221	21108.8	1220.4	21120.1
GR	1218.2	21133.6	1214.2	21152.1	1212.4	21188.4	1212.6	21238.3	1211.4	21271.1
GR	1212.3	21307.1	1210.7	21371.8	1211.8	21423.4	1213.7	21471.8	1212	21506.8
GR	1207.7	21556.2	1206.3	21557.8	1206.1	21563.9	1209	21609	1208.9	21634.6
GR	1207.8	21723.3	1211.5	21756	1212	21770.4	1213.5	21835.5	1213.6	21899.4
GR	1211.8	21956.1	1212.9	22002.8	1212.1	22054.9	1214.1	22094.3	1214.3	22151.4
GR	1213.4	22165.3	1212.5	22223.9	1213	22307.6	1213.8	22373.3	1213.7	22433
GR	1213.7	22475.3	1213.3	22547.6	1213.2	22605.9	1215.2	22634	1210.5	22645.3
GR	1210.5	22652.2								

N	3	0.028	19556.7	0.028	20636.5	0.032	22107.2			
.		9.1							19556.7	20636.5
X1	227.27	95	19556.7	20607.1	780	170	498.96			
GR	1217.3	19509.1	1217.4	19518.9	1217.7	19556.7	1212.9	19563	1194.1	19600.6
GR	1193.7	19601.1	1194.4	19781.3	1194.4	19890.4	1194.8	20100.6	1194.9	20107.6
GR	1194.9	20171.2	1194.9	20172.2	1194.4	20172.3	1197.2	20180.4	1198.2	20182.1
GR	1198.1	20190.6	1198.1	20221.7	1198.8	20291.1	1199.4	20363.2	1199.4	20378.1
GR	1199.5	20400.4	1201.3	20484	1201.8	20519.2	1201.6	20538.3	1201.3	20557.6
GR	1205.5	20572.4	1207.9	20583.2	1213.6	20607.1	1219.9	20636.5	1219.2	20652.9
GR	1219.8	20698.7	1219.9	20718.4	1219.4	20733.5	1217.7	20760.3	1216.7	20779.1
GR	1215.2	20799.6	1215.2	20840.2	1215	20853.4	1214.3	20862.6	1213.7	20872.8
GR	1216.1	20974.7	1216.5	20985	1216.5	20985.7	1217.5	21021.1	1217.7	21026.5
GR	1217.7	21038.6	1218.4	21073.4	1220.6	21108.5	1220.3	21116.8	1219.5	21137.8
GR	1219	21149.5	1216.3	21179.1	1213.5	21202.3	1213.1	21210.3	1212.1	21246.7
GR	1211.7	21275	1211.6	21282.8	1211	21319.7	1210.9	21331.9	1210.6	21342.4
GR	1209.8	21376.3	1209.7	21405.3	1209.5	21410.9	1209.4	21422.6	1209.7	21439.7
GR	1211	21486.9	1211.2	21494.9	1211.2	21495.9	1208.7	21528.8	1210.9	21561.1
GR	1211	21562.6	1210.6	21620	1210	21661.6	1208.3	21677.6	1211	21698.3
GR	1212	21705.4	1212.2	21714	1212.9	21744.9	1211.7	21800.1	1211.4	21805.4
GR	1209.9	21837.3	1209.8	21846	1211.3	21876.7	1212.9	21895.9	1213.1	21912.5
GR	1213.2	21917.5	1210	21949.4	1206.8	21981.8	1207.9	21999.1	1208.8	22015.7
GR	1209.1	22022.4	1210.9	22046.1	1211.1	22051.3	1211.4	22053.3	1215.5	22107.2

Remove vertical ineffective flow area below EL. 1200 between Sta 19125 and Sta 19400.7. This area is an inlet from the channel that would contribute to more coneyance in the left overbank than would truly exist

	3	0.03	19489.2	0.028	20492.2	0.032	22225.6			
ET		9.1							18950.0	20492.2
X1	227.37	95	19489.2	20492.2	590	425	509.52			
GR	1217.8	18504.3	1217.6	18527.7	1216.6	18573.4	1216.2	18591	1214.2	18623.6
GR	1213.7	18663.4	1212.6	18687.2	1212.5	18745.9	1212.5	18759.9	1211.3	18826.1
GR	1211.1	18867.1	1211	18896.7	1210.4	18955.8	1209.6	19006.2	1209.7	19047.6
GR	1208.1	19089.6	1207.9	19112.9	1200	19139.3	1200	19147.6	1200	19160.3
GR	1200	19220	1200	19258.9	1200	19282	1200	19321.2	1200	19331.9
GR	1200	19343.9	1200	19363	1200	19376.3	1200	19381.8	1200	19389.7
GR	1206.2	19416.5	1208.1	19439.9	1210.8	19451.1	1211.9	19489.2	1201.5	19503.7
GR	1194	19508.5	1194.1	19515.1	1194	19667.6	1194.1	19971.1	1195.5	20013.7
GR	1198.9	20051.9	1201.9	20105	1201.6	20167	1199.5	20211.9	1198.7	20252.3
GR	1199.1	20277.6	1198.3	20309.7	1198.7	20372.2	1210.3	20418	1215.7	20441
GR	1217.7	20492.2	1218.4	20508.3	1219.4	20562.5	1219.9	20586.1	1218.5	20645.6
GR	1218.2	20666.3	1217.5	20709.8	1214.7	20763.5	1214.1	20787.5	1212.6	20827.7
GR	1212.5	20849.9	1213.7	20865.9	1213.2	20885.8	1212.4	20929.8	1211.8	20942.5
GR	1211.9	20988.4	1212	21031.9	1212.4	21106.3	1212.4	21110.3	1211.3	21158.1
GR	1210.3	21183.8	1210.1	21227.6	1209.8	21277.9	1208.5	21326.3	1207.7	21379.1
GR	1208.6	21432.8	1209	21478.3	1208.4	21520.3	1208.6	21570.8	1210	21616.9
GR	1210.9	21644.1	1210	21695.4	1210.7	21708.1	1214	21754.1	1214.3	21783.3
GR	1214.2	21824.9	1215	21889.7	1215.5	21912.3	1214.4	21970.6	1214.4	22012.6
GR	1214.4	22059.9	1214.6	22065.6	1216.7	22147.8	1217.2	22161.9	1220.4	22225.6

NH	3	0.03	19537.7	0.028	20537.3	0.032	22146.6			
ET		9.1							18450.0	20537.3
	227.46	96	19537.7	20537.3	370	550	506.97			
GR	1214	17260	1212	17390	1212	17510	1212	17710	1212	18210
GR	1212	18400	1212	18850	1213.2	18982.2	1214	19044.7	1211.6	19081.4
GR	1211.6	19083.2	1214	19098.2	1211.9	19112.1	1211.7	19121.7	1215.7	19129.2
GR	1220.4	19141.4	1218.6	19152.6	1218.2	19159.4	1215.5	19170.1	1209.3	19188.4
GR	1208.9	19207.4	1209.7	19248.5	1209.2	19259.5	1209.2	19300.9	1209.2	19317.9
GR	1209.8	19331.2	1210	19360.3	1209.5	19383.5	1207.5	19422.8	1206	19439.2
GR	1206	19488.8	1207	19500.6	1206.2	19500.9	1207.6	19502.6	1210.5	19509.5
GR	1208.5	19521	1209.9	19537.7	1203.3	19545.6	1194.6	19578.4	1194.1	19581.3
GR	1194.1	19584.9	1194.2	19669.4	1194.3	19752.4	1194.3	19815	1194.8	20097.5
GR	1194.9	20109.3	1195	20261.3	1195.1	20282.9	1199.2	20315.6	1199.4	20323.2
GR	1199.4	20362.3	1199.4	20375.3	1199.2	20418.4	1209.7	20436.7	1210.6	20442.8
GR	1214.2	20475.7	1215.5	20492.4	1216.1	20537.3	1214	20584.8	1213.7	20613.1
GR	1213.6	20635.1	1214.4	20657.2	1216.8	20738.9	1216.8	20741.9	1216.9	20777.4
GR	1217.5	20844.5	1217	20867.3	1213.2	20942.9	1211.6	20976	1211.7	20990.5
GR	1212.5	21038.5	1212.3	21066.8	1211.7	21123.5	1211.2	21154.1	1210.7	21189.5
GR	1210.3	21257.5	1210.5	21278	1212.5	21361.7	1212.7	21382	1213.2	21414
GR	1213.3	21484.4	1213.8	21524.9	1214	21558.3	1214.2	21581	1214.6	21651.6
GR	1214.9	21679.8	1215.2	21710.9	1215.2	21738	1215.3	21780	1216	21887.3
GR	1216	21929.1	1216.3	21963	1216.6	22046.6	1216.7	22050.8	1217	22104.7
GR	1217.2	22146.6								

	3	0.032	19355.5	0.028	20597.9	0.032	21468.6			
ET		9.1							18100.0	20597.9
X1	227.56	96	19406.8	20480.0	90	385	490.8			
GR	1214	16930	1212	17360	1212	18510	1209	19017.6	1205.1	19024.3
GR	1203.6	19032.4	1198.8	19063.9	1198.9	19073.7	1198.9	19086.2	1203.6	19109.7
GR	1201.7	19121.9	1202.9	19130.3	1204.8	19159.6	1205.3	19186.9	1205.3	19187.9
GR	1204.8	19218	1204.5	19236.6	1203.9	19270.9	1203.9	19279.4	1204.4	19307
GR	1204.4	19313	1204.3	19316.2	1206.3	19347.7	1206.3	19355.5	1206.1	19380.9
GR	1204.5	19392.1	1205	19406.8	1204.4	19413.3	1202	19427.9	1200.4	19441.3
GR	1198.5	19457.7	1198.5	19459.9	1198.4	19462.9	1198.1	19477.6	1201.3	19501.7
GR	1201.4	19506.1	1201.8	19509.3	1200.8	19544.8	1199.5	19571.8	1199.4	19580.1
GR	1199.4	19591	1199	19598.4	1197.7	19621.9	1195.6	19669.2	1195.6	19670.4
GR	1195.7	19677.6	1194.6	19709.3	1194.7	19738.7	1195.9	19765.5	1196.6	19777.5
GR	1195.7	19811.8	1195.3	19817.7	1195	20011.2	1195.2	20373.3	1195.2	20414.3
GR	1195.6	20416.8	1196.1	20423.3	1198.9	20458.9	1206.5	20480	1209.1	20485.6
GR	1210.3	20500.3	1211.7	20521.4	1213	20540.4	1214.8	20568.7	1215.4	20597.9
GR	1214.4	20639	1214.1	20645.2	1214.4	20656.7	1214.2	20693.4	1215.9	20710
GR	1215.5	20727.3	1215.4	20754.3	1215.1	20766.2	1213.2	20780.5	1212.7	20799.9
GR	1212.5	20822.4	1212.7	20911.9	1212.8	20951.8	1213.2	20974.3	1213.4	20997.1
GR	1213.5	21018.2	1213.9	21028.8	1214.8	21045.3	1215.2	21071.6	1218.6	21136.3
GR	1217.3	21162.3	1216.2	21187.9	1215.9	21191.2	1216	21214.4	1216.4	21309.3
GR	1216.6	21325.6	1216.5	21335.5	1216.5	21341.6	1216	21414.7	1215.8	21441
GR	1216.2	21468.6								

NH	3	0.032	19359.8	0.028	20751.7	0.032	21124.5			
		9.1							17661.5	20751.8
X1	227.61	96	19359.8	20751.7	40	370	289.93			
GR	1217.9	17661.5	1215.9	17920.6	1211.1	18250.1	1213	18408.6	1212.1	18425.8
GR	1212.1	18464.7	1212.5	18503.3	1212.8	18523.7	1212.8	18539.4	1212.6	18550.4
GR	1212.4	18558	1214	18609.7	1214.3	18621.8	1214	18651.9	1213.9	18699.5
GR	1214.4	18764.3	1214.8	18785.9	1213.8	18850.6	1214.8	18871.9	1215.7	18890.9
GR	1216.1	18904.4	1217.2	18927.7	1217.7	18941.4	1218.4	18972.8	1218.1	18990.1
GR	1218.1	19016.9	1217.2	19053.3	1216	19063.9	1215.1	19072.7	1211.8	19130
GR	1211.6	19130.7	1210.6	19160.4	1209.9	19206.1	1209.7	19241.5	1210	19283.2
GR	1211.9	19308.7	1214.5	19329.6	1214.8	19351.3	1215.8	19359.8	1214.1	19367.5
GR	1210.6	19391.9	1210.6	19392	1210.6	19392.1	1210.6	19392.2	1198	19442
GR	1197.8	19484.7	1198.1	19499.2	1198.3	19519.3	1199.5	19575.8	1199.2	19605.7
GR	1199	19651.4	1200	19695.4	1200.3	19707.3	1200	19753.7	1199.2	19785.1
GR	1198.6	19845.4	1198.4	19850.1	1194.9	19899.7	1194.9	19931.8	1194.9	19933.8
GR	1194.9	19939.5	1194.9	20157.2	1195	20177	1195	20207.4	1195.1	20303.9
GR	1195.2	20407.2	1195.3	20485.1	1195.3	20514.6	1195.5	20605.9	1195.6	20621.3
GR	1195.6	20641.4	1197.1	20646.3	1197.3	20647.4	1214.1	20709.3	1214.2	20709.4
GR	1214.2	20709.5	1214.2	20709.6	1221.8	20745.2	1223.3	20751.7	1223.7	20805.2
GR	1223.7	20807.4	1223.7	20807.5	1224.2	20818.1	1225.9	20859.5	1226	20860.2
GR	1226	20860.5	1226	20861.1	1225.9	20861.8	1225.1	20991.8	1225.1	20993.8
GR	1225.1	20995.3	1224	21111.7	1224.1	21113	1224	21113.2	1224	21115.4
GR	1223.7	21124.5								

Downstream face of Country Club bridge

All data used to model this bridge was taken from survey notes and
from as-built plans dated 5-86

21 degree skew angle (cosine 21 degrees=0.9336)

Remove vertical ineffective areas below El.1194.9 (Scour hole)

NC	0.032	0.028	0.028							
		Downstream Face of Country Club Drive Bridge								
X1	227.62	80	19388	20725.5	18	18	18	0.9336		
X2									0.9336	
BT	-34	17300	1217.9	1217.9	17400	1216.6	1216.6	17500	1216.9	1216.9
BT		17600	1217	1217	17700	1217.7	1217.7	17800	1216.6	1216.6
BT		17900	1215.2	1215.2	18000	1213.8	1213.8	18100	1214.2	1214.2
BT		18200	1211.5	1211.5	18300	1211.9	1211.9	18400	1211.5	1211.5
BT		18500	1212.3	1212.3	18600	1213.6	1213.6	18700	1214.9	1214.9
BT		18800	1215.5	1215.5	18900	1219.1	1219.1	19000	1221	1221
BT		19100	1222	1222	19200	1224.3	1224.3	19300	1225.2	1225.2
BT		19387.9	1226.84	1226.84	19387.9	1226.84	1220.14	19513.7	1227.96	1221.2
BT		19650.3	1228.84	1222.1	19784.9	1229.57	1222.8	19919.5	1229.93	1223.2
BT		20053.9	1230.03	1223.3	20187.6	1229.87	1223.1	20323.2	1229.45	1222.7
BT		20457.4	1228.74	1222	20591.3	1227.89	1221.1	20725.4	1226.62	1219.9
BT		20725.4	1226.62	1226.6						
GR	1217.9	17300	1216.6	17400	1216.9	17500	1217	17600	1217.7	17700
GR	1216.6	17800	1215.2	17900	1213.8	18000	1214.2	18100	1211.5	18200
GR	1211.9	18300	1211.5	18400	1212.3	18500	1213.6	18600	1214.9	18700
GR	1215.5	18800	1219.1	18900	1221	19000	1222	19100	1224.3	19200
GR	1225.2	19300	1226.8	19387.9	1220.1	19388	1217.8	19388.1	1216.1	19398.2
	1204.3	19427.8	1197.4	19463.6	1197.2	19513.7	1221.2	19513.7	1221.2	19519.7
GR	1197.3	19519.7	1197.5	19589.2	1197.5	19650.3	1222.1	19650.3	1222.1	19656.3
GR	1197.5	19656.3	1198.3	19722.6	1196.6	19784.9	1222.8	19784.9	1222.8	19790.9
GR	1196.7	19790.9	1197	19853.3	1196.7	19886	1194.9	19904.6	1194.9	19919.5
GR	1223.2	19919.5	1223.2	19925.5	1194.9	19925.5	1194.9	20053.9	1223.3	20053.9
GR	1223.3	20059.9	1194.9	20059.9	1194.9	20111.6	1195.2	20124.9	1194.9	20187.6
GR	1223.1	20187.6	1223.2	20193.6	1194.9	20193.6	1194.9	20258.4	1195.1	20323.2
GR	1222.7	20323.2	1222.8	20329.2	1195.1	20329.2	1196.6	20389.7	1196.4	20457.4
GR	1222	20457.4	1222	20463.4	1196.4	20463.4	1194.9	20529.1	1194.9	20591.3
GR	1221.1	20591.3	1194.9	20597.3	1194.9	20637.5	1201.6	20683.5	1217.3	20725.4
GR	1219.9	20725.5	1226.6	20725.6	1224	20980	1220	21500	1220	21960

Upstream face of Country Club bridge

		Upstream Face of Country Club Drive Bridge								
X1	227.63	80	19388	20725.5	72	72	72	0.9336		
X2									0.9336	
BT	-34	17300	1217.9	1217.9	17400	1216.6	1216.6	17500	1216.9	1216.9
BT		17600	1217	1217	17700	1217.7	1217.7	17800	1216.6	1216.6
BT		17900	1215.2	1215.2	18000	1213.8	1213.8	18100	1214.2	1214.2
BT		18200	1211.5	1211.5	18300	1211.9	1211.9	18400	1211.5	1211.5
BT		18500	1212.3	1212.3	18600	1213.6	1213.6	18700	1214.9	1214.9
BT		18800	1215.5	1215.5	18900	1219.1	1219.1	19000	1221	1221
BT		19100	1222	1222	19200	1224.3	1224.3	19300	1225.2	1225.2
		19387.9	1226.84	1226.84	19387.9	1226.84	1220.14	19513.7	1227.96	1221.2
BT		19650.3	1228.84	1222.1	19784.9	1229.57	1222.8	19919.5	1229.93	1223.2

BT		20053.9	1230.03	1223.3	20187.6	1229.87	1223.1	20323.2	1229.45	1222.7
		20457.4	1228.74	1222	20591.3	1227.89	1221.1	20725.4	1226.62	1219.9
BT		20725.4	1226.62	1226.6						
GR	1217.9	17300	1216.6	17400	1216.9	17500	1217	17600	1217.7	17700
GR	1216.6	17800	1215.2	17900	1213.8	18000	1214.2	18100	1211.5	18200
GR	1211.9	18300	1211.5	18400	1212.3	18500	1213.6	18600	1214.9	18700
GR	1215.5	18800	1219.1	18900	1221	19000	1222	19100	1224.3	19200
GR	1225.2	19300	1226.8	19387.9	1220.1	19388	1217.8	19388.1	1216.1	19398.2
GR	1204.3	19427.8	1197.4	19463.6	1197.2	19513.7	1221.2	19513.7	1221.2	19519.7
GR	1197.3	19519.7	1197.5	19589.2	1197.5	19650.3	1222.1	19650.3	1222.1	19656.3
GR	1197.5	19656.3	1198.3	19722.6	1196.6	19784.9	1222.8	19784.9	1222.8	19790.9
GR	1196.7	19790.9	1197	19853.3	1196.7	19886	1194.9	19904.6	1194.9	19919.5
GR	1223.2	19919.5	1223.2	19925.5	1194.9	19925.5	1194.9	20053.9	1223.3	20053.9
GR	1223.3	20059.9	1194.9	20059.9	1194.9	20111.6	1195.2	20124.9	1194.9	20187.6
GR	1223.1	20187.6	1223.2	20193.6	1194.9	20193.6	1194.9	20258.4	1195.1	20323.2
GR	1222.7	20323.2	1222.8	20329.2	1195.1	20329.2	1196.6	20389.7	1196.4	20457.4
GR	1222	20457.4	1222	20463.4	1196.4	20463.4	1194.9	20529.1	1194.9	20591.3
GR	1221.1	20591.3	1194.9	20597.3	1194.9	20637.5	1201.6	20683.5	1217.3	20725.4
GR	1219.9	20725.5	1226.6	20725.6	1224	20980	1220	21500	1220	21960

NH	3	0.032	19259.5	0.028	20779.6	0.032	21096.2			
ET		9.1							17751.9	20779.7
X1	227.64	96	19259.5	20779.6	18	18	18			
GR	1216.4	17751.9	1213.3	18050.2	1210.8	18212.6	1210.7	18224.9	1211.8	18240.6
GR	1212.1	18259	1212	18285.6	1211	18303.8	1211	18311.6	1210.7	18337.6
GP	1211	18371	1211.2	18393	1211.6	18422.6	1211.6	18461.7	1210.9	18488.8
	1210.8	18495.8	1210.7	18510.3	1210.5	18524.3	1210.5	18524.9	1210.9	18536.9
GR	1212	18598.4	1213.4	18629.1	1213.2	18641.9	1213.2	18650.4	1213.4	18672.2
GR	1214.1	18697.2	1214.1	18716	1215	18747.9	1215.1	18782.8	1215.5	18810.3
GR	1213.3	18849.1	1213.2	18858.8	1211.6	18873.7	1211.8	18926.6	1211.9	18942.5
GR	1211.9	18948.5	1212	18957.3	1211.6	18985	1215.2	19003	1217.6	19020.8
GR	1225.4	19083.3	1225.3	19090.6	1225.3	19092.8	1225.4	19094.4	1225.9	19156.3
GR	1226	19162.1	1226	19248.1	1226.1	19250.8	1226.1	19259.5	1225.7	19352.6
GR	1223.6	19367.1	1220.7	19376.7	1198.7	19449.1	1198.7	19449.4	1197.5	19458.9
GR	1198.8	19474.2	1198.9	19488.9	1198.3	19511.8	1198.7	19545.4	1199.5	19589.3
GR	1199	19641.5	1199.7	19715.4	1199.7	19721.6	1199.7	19724.5	1198.7	19764.3
GR	1199.4	19832.7	1199.2	19850.5	1198.4	19885.2	1198.2	19903.3	1196.5	19927.6
GR	1194.9	19968.9	1194.9	20034.7	1194.9	20039.8	1194.9	20047.7	1195	20072.9
GR	1195.1	20266.3	1195.2	20315.5	1195.2	20394.4	1195.6	20635.8	1195.6	20637.5
GR	1195.6	20640.1	1197.7	20647.6	1201.9	20660.6	1219.3	20730	1222.6	20743.9
GR	1225.6	20777.7	1225.8	20779.6	1225.8	20779.9	1225.7	20783.8	1222.9	20929.3
GR	1222.9	20933.4	1223.1	20937	1223	20939	1223	20949.1	1223.1	21017.2
GR	1222.2	21096.2								

NH	3	0.032	19292.4	0.028	20687.1	0.032	21553.7			
ET		9.1							17692.3	20800.3
X1	227.69	96	19292.4	20687.1	1350	95	312.26			
GR	1218.4	17692.3	1218.3	17705.9	1215.8	17746.3	1215.9	17753.4	1215.1	17808.9
GR	1214.3	17846.8	1214.4	17903.4	1214.4	17970.6	1214.5	18009.3	1214.5	18026
GR	1214.9	18087.7	1214.7	18114.6	1214.2	18176.6	1213.7	18201.1	1211.7	18230.2
	1211	18246.1	1211	18279	1231	18302.1	1236.2	18309	1235.7	18346.1
GR	1235.1	18359.6	1230.5	18365.8	1211	18389.2	1211	18408.1	1211.3	18456.9

GR	1211.5	18478.3	1212.2	18514.3	1213.1	18633.4	1213.1	18650.5	1213.6	18764.1
GR	1213.3	18804.8	1213.3	18834.1	1213.3	18905.2	1213.4	18971.2	1213	19070.7
GR	1213	19132.1	1213.3	19157	1213.1	19198.2	1213.2	19265.1	1216	19292.4
GR	1211.9	19315.5	1208	19340.6	1203.1	19362	1201.6	19379.6	1203.6	19405.4
GR	1203.5	19418.4	1203.3	19473.3	1204.1	19498.6	1205.8	19539.6	1206.2	19577.4
GR	1206.1	19617.3	1206.2	19674.9	1206.3	19685.4	1206.2	19722.5	1206.2	19764.6
GR	1206.5	19819	1206.3	19831.4	1205.1	19888.9	1203.2	19912.6	1202.5	19917.5
GR	1200.2	19954.3	1197	19996.4	1195	20027.6	1195.4	20416	1195.5	20447.6
GR	1195.6	20569.5	1195.7	20618.4	1203	20642.7	1216.6	20687.1	1214.6	20699.7
GR	1214.2	20707.3	1214.8	20743.7	1214.3	20755.9	1211.4	20800.3	1210.8	20837.5
GR	1210.3	20850.5	1209.6	20888.3	1210.2	20916.2	1210.1	20941.9	1210.7	20989.1
GR	1210.3	20999.7	1214.3	21032.7	1214.4	21035.9	1215.4	21089.2	1215.6	21110.7
GR	1214.5	21149.1	1214.4	21177.7	1214.9	21203.9	1215.3	21263.8	1215	21295.6
GR	1214.9	21351.5	1215.1	21404.3	1216.4	21451.1	1216.6	21474.6	1217.6	21517.9
GR	1218.4	21553.7								
NH	3	0.032	19295.5	0.028	20696	0.032	21737			
ET		9.1							18323.4	21120.0
X1	227.79	96	19295.5	20696.0	800	450	493.17			
GR	1222.1	17036.6	1221.8	17080.5	1221.1	17190.4	1220.9	17331.6	1219.8	17459.9
GR	1219.5	17519.4	1219.3	17574	1219	17625	1218.2	17736	1217.6	17813.7
GR	1217.6	17843.8	1203.6	17866.2	1204.2	17891.6	1215.8	17934.6	1216.6	17990.3
GR	1205.9	18038.9	1208.3	18075.6	1209.9	18130.8	1210.4	18161.5	1206.5	18228
GR	1206.1	18231.9	1213.1	18287.7	1215.6	18299.3	1217.6	18323.4	1211.5	18341.7
GR	1212.8	18387.1	1212.3	18406.9	1215.6	18423.7	1216.7	18481	1213.7	18496.2
GR	1213.3	18512.8	1208.1	18549.4	1209.2	18555.7	1206.6	18584.4	1207.8	18636.9
GR	1212	18670.6	1207.5	18683.3	1206.2	18706.9	1212.2	18735.8	1212.7	18797.4
GR	1212.9	18843.1	1212.7	18894.6	1213.9	18938.7	1214.3	19000.4	1213.9	19080.3
GR	1213.7	19133.5	1214.9	19203.7	1215.2	19230	1213.4	19263.4	1212.3	19269.8
GR	1215.9	19295.5	1211.2	19342.3	1211.6	19382.4	1207	19407.6	1206.9	19480
GR	1207	19484.5	1200.5	19524.4	1204.3	19588.9	1207	19641.8	1206.1	19667.1
GR	1208	19754.9	1208.4	19812.4	1208.2	19827	1204.4	19893.4	1203.4	19904.7
GR	1199	19930.7	1198.6	20019.6	1198.5	20030.9	1197.8	20103.5	1196.8	20471.9
GR	1196.1	20637.4	1206.5	20670.7	1215	20688.5	1216.1	20696	1212.1	20723.1
GR	1213.7	20799.3	1213.2	20855	1211.6	20901.6	1211.4	20954.4	1211.2	20967.9
GR	1213.3	21022.3	1214.1	21052.9	1210.7	21109.4	1210.3	21114.4	1213.2	21151.6
GR	1214.6	21190.4	1215.2	21247.3	1215.8	21306.4	1214.5	21389.9	1213.9	21455
GR	1217.7	21491	1215.8	21523.5	1219	21596.2	1216.9	21651.5	1217.4	21704.4
GR	1219.6	21737								

THIS RUN EXECUTED 20SEP95 12:35:06

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991

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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

REPARED BY MICHAEL BAKER

SUMMARY PRINTOUT

SECNO	ELMIN	CWSEL	Q	VCH	DIFWSX	TOPWID	DEPTH	HV	SSTA	RBEL	FRCH
20.500	1147.00	1166.59	215000.00	11.07	.00	1037.18	19.59	1.90	383.29	100000.00	.45
22.000	1147.20	1166.70	215000.00	11.49	.11	1009.57	19.50	2.05	388.54	100000.00	.47
22.650	1147.20	1166.81	215000.00	11.46	.11	1006.63	19.61	2.04	198.58	1170.50	.47
* 3.550	1147.30	1168.48	215000.00	10.45	1.67	1060.68	21.18	1.69	268.86	1170.50	.42
28.000	1147.70	1168.95	215000.00	10.27	.47	1002.76	21.25	1.64	93.53	100000.00	.41
29.000	1148.10	1169.17	215000.00	11.32	.22	922.79	21.07	1.99	333.63	100000.00	.45
30.000	1148.40	1169.13	215000.00	13.87	-.04	768.48	20.73	2.99	484.47	100000.00	.56
31.000	1148.80	1169.70	215000.00	15.02	.57	700.77	20.90	3.50	163.50	100000.00	.61
32.000	1149.20	1170.48	215000.00	15.84	.78	653.90	21.28	3.90	318.32	100000.00	.64
33.000	1149.60	1171.29	215000.00	16.74	.82	608.52	21.69	4.35	317.41	100000.00	.67
34.000	1150.00	1172.77	215000.00	16.17	1.48	606.74	22.77	4.06	354.32	100000.00	.63
35.000	1150.40	1174.48	215000.00	14.74	1.70	630.01	24.08	3.37	326.72	100000.00	.56
36.000	1150.80	1175.78	215000.00	13.61	1.31	657.32	24.98	2.88	330.32	100000.00	.51
37.000	1151.20	1177.56	215000.00	10.51	1.78	802.49	26.36	1.71	278.34	100000.00	.38
38.000	1151.70	1178.25	215000.00	9.68	.69	862.57	26.55	1.46	478.96	100000.00	.34
39.000	1152.20	1178.49	220000.00	10.28	.23	840.03	26.29	1.64	494.65	100000.00	.36
0.000	1152.70	1179.32	220000.00	8.77	.83	968.78	26.62	1.19	460.37	100000.00	.30

SECNO	ELMIN	CWSEL	Q	VCH	DIFWSX	TOPWID	DEPTH	HV	SSTA	RBEL	FRCH
40.100	1152.80	1179.35	220000.00	8.79	.03	969.51	26.55	1.20	5004.75	1184.10	.30
40.200	1152.80	1179.61	220000.00	8.64	.26	977.02	26.81	1.16	5004.49	1184.10	.30
40.300	1152.90	1179.74	220000.00	8.42	.13	1000.28	26.84	1.10	5004.46	100000.00	.29
40.400	1153.00	1179.86	220000.00	8.22	.12	1023.52	26.86	1.05	5004.44	1184.30	.28
40.500	1153.10	1180.05	220000.00	8.04	.19	1042.31	26.95	1.00	5004.35	1184.40	.28
40.600	1153.10	1180.12	220000.00	7.92	.06	1054.95	27.02	.97	5004.38	1184.50	.27
41.100	1153.20	1180.17	220000.00	7.84	.05	1067.83	26.97	.95	5004.43	1184.60	.27
41.200	1153.20	1180.34	220000.00	7.75	.17	1073.68	27.14	.93	5004.66	1185.00	.27
42.100	1150.00	1181.04	220000.00	5.82	.70	1562.59	31.04	.53	4917.41	100000.00	.21
224.340	1150.00	1181.07	220000.00	5.90	.03	1576.06	31.07	.54	19826.03	100000.00	.21
224.430	1152.00	1181.24	220000.00	5.77	.17	1667.74	29.24	.52	19826.06	100000.00	.21
224.530	1152.00	1181.54	220000.00	4.76	.31	2055.04	29.54	.35	19667.96	100000.00	.18
4.620	1153.00	1181.57	220000.00	5.69	.02	1877.37	28.57	.50	19522.63	100000.00	.22
224.710	1154.00	1181.86	220000.00	4.70	.29	1867.08	27.86	.34	19330.04	100000.00	.17
224.810	1154.00	1181.95	220000.00	4.66	.10	2045.07	27.95	.34	19094.93	100000.00	.17
* 224.900	1154.00	1181.64	220000.00	8.17	-.32	1542.94	27.64	1.04	18907.06	100000.00	.34
* 225.000	1154.00	1182.57	220000.00	4.74	.93	1989.57	28.57	.35	18734.83	100000.00	.17
* 225.100	1156.00	1182.09	220000.00	9.12	-.48	1196.15	26.09	1.29	19087.85	100000.00	.36
* 225.190	1158.00	1181.98	220000.00	12.24	-.11	1013.53	23.98	2.33	19236.47	100000.00	.51
225.280	1163.00	1182.92	220000.00	13.72	.94	1067.11	19.92	2.49	19182.79	1175.80	.61
225.380	1162.40	1183.88	220000.00	13.80	.96	950.11	21.48	2.96	18889.14	100000.00	.59
225.480	1160.30	1185.64	220000.00	12.33	1.76	1034.23	25.34	2.36	18657.31	100000.00	.52
225.570	1157.90	1187.28	220000.00	9.75	1.64	1191.88	29.38	1.48	18715.92	100000.00	.39
225.660	1158.80	1187.76	220000.00	9.97	.48	1047.62	28.96	1.54	18743.18	100000.00	.38
225.760	1165.00	1188.12	220000.00	10.79	.36	1109.24	23.12	1.80	18690.23	100000.00	.44
25.850	1166.80	1189.75	220000.00	6.83	1.64	1717.11	22.95	.65	18203.17	1181.80	.26

	SECNO	ELMIN	CWSEL	Q	VCH	DIFWSX	TOPWID	DEPTH	HV	SSTA	RBEL	FRCH
	225.950	1167.90	1189.85	220000.00	7.73	.10	1768.01	21.95	.92	18376.44	1183.60	.33
*	226.040	1173.10	1189.46	147500.00	11.93	-.40	1031.62	16.36	2.16	19339.05	1186.40	.57
	226.130	1170.50	1189.60	147500.00	14.98	.14	879.43	19.10	3.47	19607.79	1185.20	.77
	226.230	1172.30	1190.55	147500.00	17.63	.95	919.57	18.25	4.58	19646.59	1184.70	.91
	226.350	1173.40	1194.14	147500.00	15.32	3.59	913.51	20.73	3.63	19628.57	1185.70	.82
	226.480	1181.80	1196.84	147500.00	15.34	2.70	908.15	15.04	3.66	19627.61	100000.00	.83
*	226.490	1186.00	1196.67	147500.00	17.45	-.17	907.31	10.67	4.73	19627.96	100000.00	1.01
	226.500	1186.00	1197.71	147500.00	15.70	1.03	912.73	11.71	3.83	19625.72	100000.00	.86
	226.510	1186.00	1197.54	147500.00	16.21	-.17	862.63	11.54	4.08	19615.60	1201.16	.90
	226.520	1186.00	1198.99	147500.00	14.26	1.45	862.65	12.99	3.16	19615.60	1201.16	.74
*	226.530	1186.00	1199.71	147500.00	12.70	.72	924.40	13.71	2.50	19621.39	100000.00	.63
	226.610	1187.00	1200.88	147500.00	11.99	1.17	962.58	13.88	2.22	19604.05	1190.00	.58
	6.700	1188.00	1202.16	147500.00	10.57	1.28	1121.92	14.16	1.72	19598.12	1193.10	.52
*	226.800	1191.70	1201.55	147500.00	17.24	-.61	960.68	9.85	4.58	19609.53	1192.70	1.00
*	226.890	1192.50	1205.16	147500.00	13.98	3.61	948.73	12.66	2.98	19600.00	1194.10	.72
	226.990	1193.70	1205.67	220000.00	17.20	.52	1144.43	11.97	4.58	19381.33	1199.60	.89
*	227.080	1194.10	1207.78	220000.00	19.92	2.10	962.61	13.68	5.91	19604.72	1200.90	.98
*	227.180	1194.50	1211.83	220000.00	15.45	4.06	985.01	17.33	3.69	19585.02	1201.90	.70
	227.270	1193.70	1214.03	220000.00	12.58	2.20	1047.65	20.33	2.46	19561.50	1213.60	.54
	227.370	1194.00	1215.68	220000.00	10.04	1.65	1490.94	21.68	1.42	18950.00	100000.00	.41
	227.460	1194.10	1215.91	220000.00	10.75	.23	2034.52	21.81	1.64	18450.00	100000.00	.44
*	227.560	1194.60	1217.04	220000.00	7.93	1.14	2497.90	22.44	.83	18100.00	1206.50	.31
	227.610	1194.90	1217.10	220000.00	7.84	.06	2829.38	22.20	.90	17765.19	1223.30	.31
	227.620	1194.90	1216.92	220000.00	8.84	-.17	2334.82	22.02	1.16	17370.04	1219.90	.36
	227.630	1194.90	1216.99	220000.00	8.80	.07	2409.09	22.09	1.15	17365.30	1219.90	.35
	27.640	1194.90	1217.26	220000.00	7.91	.27	2600.29	22.36	.91	17751.90	1225.80	.33

SECNO	ELMIN	CWSEL	Q	VCH	DIFWSX	TOPWID	DEPTH	HV	SSTA	RBEL	FRCH
227.690	1195.00	1217.34	220000.00	8.74	.07	2983.56	22.34	1.10	17721.46	1216.60	.38
227.790	1196.10	1217.72	220000.00	8.74	.38	2796.60	21.62	1.07	18323.40	1216.10	.39

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SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
20.500	.00	.00	.00	1147.00	215000.00	1166.59	.00	1168.49	13.87	11.07	19429.93	57733.27
22.000	150.00	.00	.00	1147.20	215000.00	1166.70	.00	1168.75	15.12	11.49	18707.49	55290.56
22.650	65.00	.00	.00	1147.20	215000.00	1166.81	.00	1168.85	14.93	11.46	18755.49	55639.61
* 23.550	120.00	1181.80	1180.61	1147.30	215000.00	1168.48	.00	1170.17	11.74	10.45	20580.07	62744.23
28.000	360.00	.00	.00	1147.70	215000.00	1168.95	.00	1170.59	11.04	10.27	20926.64	64718.88
29.000	380.00	.00	.00	1148.10	215000.00	1169.17	.00	1171.16	13.69	11.32	18995.56	58114.92
30.000	390.00	.00	.00	1148.40	215000.00	1169.13	.00	1172.12	21.42	13.87	15502.77	46452.00
31.000	400.00	.00	.00	1148.80	215000.00	1169.70	.00	1173.20	25.13	15.02	14317.17	42886.73
32.000	400.00	.00	.00	1149.20	215000.00	1170.48	.00	1174.37	27.66	15.84	13572.09	40881.82
33.000	390.00	.00	.00	1149.60	215000.00	1171.29	.00	1175.64	30.53	16.74	12846.28	38913.43
34.000	405.00	.00	.00	1150.00	215000.00	1172.77	.00	1176.83	27.03	16.17	13299.12	41355.56
35.000	400.00	.00	.00	1150.40	215000.00	1174.48	.00	1177.85	20.92	14.74	14588.62	47003.36
36.000	405.00	.00	.00	1150.80	215000.00	1175.78	.00	1178.66	16.97	13.61	15796.04	52186.17
37.000	410.00	.00	.00	1151.20	215000.00	1177.56	.00	1179.28	9.19	10.51	20460.22	70938.22
38.000	510.00	.00	.00	1151.70	215000.00	1178.25	.00	1179.71	7.08	9.68	22200.38	80805.23
39.000	480.00	.00	.00	1152.20	220000.00	1178.49	.00	1180.13	8.10	10.28	21391.35	77289.32
40.000	500.00	.00	.00	1152.70	220000.00	1179.32	.00	1180.51	5.74	8.77	25078.97	91800.82
40.100	57.00	.00	.00	1152.80	220000.00	1179.35	.00	1180.55	5.78	8.79	25038.34	91511.80
40.200	32.00	1206.00	1192.00	1152.80	220000.00	1179.61	.00	1180.77	5.51	8.64	25472.70	93687.29
40.300	106.00	.00	.00	1152.90	220000.00	1179.74	.00	1180.84	5.23	8.42	26126.23	96238.02
40.400	106.00	.00	.00	1153.00	220000.00	1179.86	.00	1180.91	4.96	8.22	26771.28	98738.73
40.500	85.00	1199.00	1184.00	1153.10	220000.00	1180.05	.00	1181.06	4.72	8.04	27367.97	101220.20
40.600	58.00	.00	.00	1153.10	220000.00	1180.12	.00	1181.09	4.57	7.92	27774.93	102922.90
41.100	59.00	.00	.00	1153.20	220000.00	1180.17	.00	1181.13	4.48	7.84	28073.44	103952.00

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	41.200	29.00	1192.00	1184.00	1153.20	220000.00	1180.34	.00	1181.27	4.34	7.75	28400.89	105593.10
	42.100	505.00	.00	.00	1150.00	220000.00	1181.04	.00	1181.56	2.74	5.82	37800.37	132928.20
	224.340	140.00	.00	.00	1150.00	220000.00	1181.07	.00	1181.61	2.95	5.90	37308.41	128031.20
	224.430	493.70	.00	.00	1152.00	220000.00	1181.24	.00	1181.76	2.97	5.77	38146.05	127724.00
	224.530	506.30	.00	.00	1152.00	220000.00	1181.54	.00	1181.90	2.04	4.76	46258.05	153933.60
	224.620	504.90	.00	.00	1153.00	220000.00	1181.57	.00	1182.07	3.29	5.69	38685.79	121293.20
	224.710	491.60	.00	.00	1154.00	220000.00	1181.86	.00	1182.20	1.72	4.70	46847.43	167823.40
	224.810	509.80	.00	.00	1154.00	220000.00	1181.95	.00	1182.29	1.88	4.66	47168.62	160631.80
*	224.900	494.90	.00	.00	1154.00	220000.00	1181.64	.00	1182.67	8.35	8.17	26917.62	76155.76
*	225.000	500.00	.00	.00	1154.00	220000.00	1182.57	.00	1182.92	1.93	4.74	46412.95	158527.00
*	225.100	510.00	.00	.00	1156.00	220000.00	1182.09	.00	1183.38	8.54	9.12	24132.75	75285.78
*	225.190	502.05	.00	.00	1158.00	220000.00	1181.98	.00	1184.30	18.72	12.24	17978.31	50852.11
	5.280	487.64	.00	.00	1163.00	220000.00	1182.92	.00	1185.41	26.74	13.72	17814.51	42544.44
	225.380	518.68	.00	.00	1162.40	220000.00	1183.88	.00	1186.84	24.98	13.80	15937.54	44019.50
	225.480	507.13	.00	.00	1160.30	220000.00	1185.64	.00	1188.00	19.15	12.33	17843.07	50269.62
	225.570	475.36	.00	.00	1157.90	220000.00	1187.28	.00	1188.76	10.67	9.75	22562.84	67356.80
	225.660	512.77	.00	.00	1158.80	220000.00	1187.76	.00	1189.30	9.70	9.97	22074.78	70627.05
	225.760	482.78	.00	.00	1165.00	220000.00	1188.12	.00	1189.91	12.98	10.79	20592.13	61054.46
*	225.850	509.56	.00	.00	1166.80	220000.00	1189.75	.00	1190.40	4.54	6.83	35026.59	103196.60
	225.950	509.99	.00	.00	1167.90	220000.00	1189.85	.00	1190.78	7.63	7.73	28821.91	79631.77
*	226.040	476.46	.00	.00	1173.10	147500.00	1189.46	.00	1191.62	15.57	11.93	12691.56	37382.94
	226.130	502.01	.00	.00	1170.50	147500.00	1189.60	.00	1193.06	29.60	14.98	9941.79	27110.54
	226.230	492.85	.00	.00	1172.30	147500.00	1190.55	1190.30	1195.13	41.41	17.63	8909.23	22921.80
	226.350	666.57	.00	.00	1173.40	147500.00	1194.14	.00	1197.77	35.01	15.32	9677.55	24929.53
	226.480	763.51	.00	.00	1181.80	147500.00	1196.84	.00	1200.50	36.24	15.34	9613.58	24502.47
	26.490	1.00	.00	.00	1186.00	147500.00	1196.67	1196.67	1201.40	55.47	17.45	8454.87	19805.32

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	226.500	10.00	.00	.00	1186.00	147500.00	1197.71	.00	1201.54	39.38	15.70	9393.44	23504.04
	226.510	2.00	1204.00	1202.66	1186.00	147500.00	1197.54	.00	1201.62	62.52	16.21	9099.29	18655.11
	226.520	84.00	1204.00	1202.66	1186.00	147500.00	1198.99	.00	1202.14	42.86	14.26	10345.96	22530.82
*	226.530	2.00	.00	.00	1186.00	147500.00	1199.71	.00	1202.21	19.78	12.70	11613.12	33164.21
	226.610	478.10	.00	.00	1187.00	147500.00	1200.88	.00	1203.10	16.26	11.99	12408.20	36582.31
	226.700	503.99	.00	.00	1188.00	147500.00	1202.16	.00	1203.88	13.01	10.57	14098.39	40895.38
*	226.800	487.43	.00	.00	1191.70	147500.00	1201.55	1201.55	1206.13	54.62	17.24	8636.25	19958.36
*	226.890	510.72	.00	.00	1192.50	147500.00	1205.16	.00	1208.14	25.85	13.98	10695.00	29013.08
	226.990	492.08	.00	.00	1193.70	220000.00	1205.67	.00	1210.25	40.04	17.20	12872.69	34768.92
*	227.080	504.96	.00	.00	1194.10	220000.00	1207.78	1207.78	1213.69	46.65	19.92	11410.21	32208.86
*	227.180	509.22	.00	.00	1194.50	220000.00	1211.83	.00	1215.52	22.79	15.45	14366.51	46079.87
	227.270	498.96	.00	.00	1193.70	220000.00	1214.03	.00	1216.49	13.25	12.58	17494.19	60443.29
	227.370	509.52	.00	.00	1194.00	220000.00	1215.68	.00	1217.10	7.49	10.04	23505.48	80388.79
	227.460	506.97	.00	.00	1194.10	220000.00	1215.91	.00	1217.55	8.37	10.75	23422.29	76031.65
*	227.560	490.80	.00	.00	1194.60	220000.00	1217.04	.00	1217.87	3.97	7.93	33113.47	110404.70
	227.610	289.93	.00	.00	1194.90	220000.00	1217.10	.00	1218.00	4.23	7.84	31697.72	106913.70
	227.620	18.00	1211.50	1226.60	1194.90	220000.00	1216.92	.00	1218.09	7.48	8.84	26989.13	80450.02
	227.630	72.00	1211.50	1226.60	1194.90	220000.00	1216.99	.00	1218.14	7.39	8.80	27145.77	80930.58
	227.640	18.00	.00	.00	1194.90	220000.00	1217.26	.00	1218.18	4.28	7.91	31389.83	106371.60
	227.690	312.26	.00	.00	1195.00	220000.00	1217.34	.00	1218.43	6.46	8.74	29160.95	86588.99
	227.790	493.17	.00	.00	1196.10	220000.00	1217.72	.00	1218.78	6.94	8.74	29088.68	83488.57

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SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	20.500	215000.00	1166.59	.00	.00	.00	1037.18	.00
	22.000	215000.00	1166.70	.00	.11	.00	1009.57	150.00
	22.650	215000.00	1166.81	.00	.11	.00	1006.63	65.00
*	23.550	215000.00	1168.48	.00	1.67	.00	1060.68	120.00
	28.000	215000.00	1168.95	.00	.47	.00	1002.76	360.00
	29.000	215000.00	1169.17	.00	.22	.00	922.79	380.00
	30.000	215000.00	1169.13	.00	-.04	.00	768.48	390.00
	31.000	215000.00	1169.70	.00	.57	.00	700.77	400.00
	32.000	215000.00	1170.48	.00	.78	.00	653.90	400.00
	33.000	215000.00	1171.29	.00	.82	.00	608.52	390.00
	34.000	215000.00	1172.77	.00	1.48	.00	606.74	405.00
	35.000	215000.00	1174.48	.00	1.70	.00	630.01	400.00
	36.000	215000.00	1175.78	.00	1.31	.00	657.32	405.00
	37.000	215000.00	1177.56	.00	1.78	.00	802.49	410.00
	38.000	215000.00	1178.25	.00	.69	.00	862.57	510.00
	39.000	220000.00	1178.49	.00	.23	.00	840.03	480.00
	40.000	220000.00	1179.32	.00	.83	.00	968.78	500.00
	40.100	220000.00	1179.35	.00	.03	.00	969.51	57.00
	40.200	220000.00	1179.61	.00	.26	.00	977.02	32.00
	40.300	220000.00	1179.74	.00	.13	.00	1000.28	106.00
	40.400	220000.00	1179.86	.00	.12	.00	1023.52	106.00
	40.500	220000.00	1180.05	.00	.19	.00	1042.31	85.00
	40.600	220000.00	1180.12	.00	.06	.00	1054.95	58.00
	41.100	220000.00	1180.17	.00	.05	.00	1067.83	59.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	41.200	220000.00	1180.34	.00	.17	.00	1073.68	29.00
	42.100	220000.00	1181.04	.00	.70	.00	1562.59	505.00
	224.340	220000.00	1181.07	.00	.03	.00	1576.06	140.00
	224.430	220000.00	1181.24	.00	.17	.00	1667.74	493.70
	224.530	220000.00	1181.54	.00	.31	.00	2055.04	506.30
	224.620	220000.00	1181.57	.00	.02	.00	1877.37	504.90
	224.710	220000.00	1181.86	.00	.29	.00	1867.08	491.60
	224.810	220000.00	1181.95	.00	.10	.00	2045.07	509.80
*	224.900	220000.00	1181.64	.00	-.32	.00	1542.94	494.90
*	225.000	220000.00	1182.57	.00	.93	.00	1989.57	500.00
*	225.100	220000.00	1182.09	.00	-.48	.00	1196.15	510.00
*	225.190	220000.00	1181.98	.00	-.11	.00	1013.53	502.05
	5.280	220000.00	1182.92	.00	.94	.00	1067.11	487.64
	225.380	220000.00	1183.88	.00	.96	.00	950.11	518.68
	225.480	220000.00	1185.64	.00	1.76	.00	1034.23	507.13
	225.570	220000.00	1187.28	.00	1.64	.00	1191.88	475.36
	225.660	220000.00	1187.76	.00	.48	.00	1047.62	512.77
	225.760	220000.00	1188.12	.00	.36	.00	1109.24	482.78
*	225.850	220000.00	1189.75	.00	1.64	.00	1717.11	509.56
	225.950	220000.00	1189.85	.00	.10	.00	1768.01	509.99
*	226.040	147500.00	1189.46	.00	-.40	.00	1031.62	476.46
	226.130	147500.00	1189.60	.00	.14	.00	879.43	502.01
	226.230	147500.00	1190.55	.00	.95	.00	919.57	492.85
	226.350	147500.00	1194.14	.00	3.59	.00	913.51	666.57
	226.480	147500.00	1196.84	.00	2.70	.00	908.15	763.51
	26.490	147500.00	1196.67	.00	-.17	.00	907.31	1.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	226.500	147500.00	1197.71	.00	1.03	.00	912.73	10.00
	226.510	147500.00	1197.54	.00	-.17	.00	862.63	2.00
	226.520	147500.00	1198.99	.00	1.45	.00	862.65	84.00
*	226.530	147500.00	1199.71	.00	.72	.00	924.40	2.00
	226.610	147500.00	1200.88	.00	1.17	.00	962.58	478.10
	226.700	147500.00	1202.16	.00	1.28	.00	1121.92	503.99
*	226.800	147500.00	1201.55	.00	-.61	.00	960.68	487.43
*	226.890	147500.00	1205.16	.00	3.61	.00	948.73	510.72
	226.990	220000.00	1205.67	.00	.52	.00	1144.43	492.08
*	227.080	220000.00	1207.78	.00	2.10	.00	962.61	504.96
*	227.180	220000.00	1211.83	.00	4.06	.00	985.01	509.22
	227.270	220000.00	1214.03	.00	2.20	.00	1047.65	498.96
	227.370	220000.00	1215.68	.00	1.65	.00	1490.94	509.52
	227.460	220000.00	1215.91	.00	.23	.00	2034.52	506.97
*	227.560	220000.00	1217.04	.00	1.14	.00	2497.90	490.80
	227.610	220000.00	1217.10	.00	.06	.00	2829.38	289.93
	227.620	220000.00	1216.92	.00	-.17	.00	2334.82	18.00
	227.630	220000.00	1216.99	.00	.07	.00	2409.09	72.00
	227.640	220000.00	1217.26	.00	.27	.00	2600.29	18.00
	227.690	220000.00	1217.34	.00	.07	.00	2983.56	312.26
	227.790	220000.00	1217.72	.00	.38	.00	2796.60	493.17

SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION SECNO=    23.550  PROFILE=  1  HYDRAULIC JUMP D.S.

WARNING SECNO=   224.900  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=   225.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=   225.100  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=   225.190  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=   225.850  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=   226.040  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=   226.490  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   226.490  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   226.490  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=   226.530  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=   226.800  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   226.800  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=   226.890  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=   227.080  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   227.080  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=   227.180  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=   227.560  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```

HEC-2

Existing Condition Model
South Split at Alma School

Summary Printout (SUMPO)
& Complete Printout

Filename = EXSTSS.DAT

HEC-2 Salt River Analysis

File=EXISTSS.DAT Existing Condition Model - SLA downstream improvements in place

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*-------------------------------------*
|              S U M P O              |
|                                     |
|    Interactive Summary Printout     |
|    for MS/PC-DOS micro computers    |
|              May 1991               |
*-------------------------------------*
```

NOTE - Asterisk (*) at left of profile number indicates message in summary of errors list

REACH 5: Split B X-sec

Summary Printout

	SECNO	Q	CWSEL	EG	DEPTH	VCH
	225.95	220000.00	1189.85	1190.77	21.95	7.75
*	226.04	72500.00	1190.62	1191.00	22.22	4.87
	226.13	72500.00	1190.82	1191.09	20.32	4.17
	226.23	72500.00	1188.69	1192.16	17.89	15.05
	226.35	72500.00	1189.44	1192.90	18.14	14.95
*	226.48	72500.00	1192.04	1197.43	13.44	18.70
*	226.49	72500.00	1198.12	1203.34	13.12	18.46
	226.50	72500.00	1199.29	1203.50	14.29	16.60
	226.51	72500.00	1199.15	1203.57	14.15	16.87
	226.52	72500.00	1200.84	1204.11	15.84	14.50
*	226.53	72500.00	1201.43	1204.16	16.43	13.42
	226.58	72500.00	1202.00	1205.19	16.13	14.78
	226.61	72500.00	1204.40	1206.28	17.37	11.31
	226.70	72500.00	1205.65	1206.95	17.36	9.19
	226.80	72500.00	1206.24	1207.41	16.85	8.71
	226.89	72500.00	1206.46	1208.10	13.96	10.44

```
*********************************************          **************************************
*  HEC-2 WATER SURFACE PROFILES             *          *  U.S. ARMY CORPS OF ENGINEERS      *
*                                           *          *  HYDROLOGIC ENGINEERING CENTER     *
*  Version   4.6.2;  May 1991               *          *  609 SECOND STREET, SUITE D        *
*                                           *          *  DAVIS, CALIFORNIA 95616-4687      *
*  RUN DATE    20SEP95    TIME   12:43:31   *          *          (916) 756-1104            *
*********************************************          **************************************
```

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X           XXXXX   XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
```

THIS RUN EXECUTED 20SEP95 12:43:31

```
**************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
**************************************


T1      SALT/GILA FLOOD DELINEATION
T2      100-YEAR FLOOD
T3      REACH 5: Split B   X-sec's  225.95 - 226.89
T4     RED MOUNTAIN PHASE II SALT RIVER EXISTING CONDITION MODEL
T4     BASED ON MCFCD PRELIMINARY SALT RIVER MODEL SPLITB.DAT
T4     PREPARED BY MICHAEL BAKER JR. ENGINEERS, INC.
T4     STARTING WSEL FROM EXISTING CONDITION MODEL EXIST220.DAT
T4     SALT RIVER, MCCLINTOCK DRIVE TO COUNTRY CLUB DRIVE
T4     REVISED BY WOOD, PATEL & ASSOCIATES, INC. 03-15-95
T4      The following analysis is for existing conditions only and does not
T4      reflect Phase II of the Red Mountain Freeway.  Certain revisions
T4      were made to the original file as received from Michael Baker Jr.
T4      Engineers. These included revisions to the encroachments, bank station
T4      locations, the Q used for analysis, the starting water surface elevation
T4      and the addition of the drop structures constructed by MCDOT under the
T4      north and south Alma School Road bridges.
        File=EXISTSS.DAT  Existing Conditions - South Split at Alma School
1

J1  ICHECK    INQ     NINV     IDIR     STRT    METRIC    HVINS     Q        WSEL      FQ

      0        2        0        0       0.0       0        0.0  220000.0  1189.85

J2  NPROF    IPLOT    PRFVS    XSECV    XSECH     FN      ALLDC     IBW     CHNIM     ITRACE

     1        0        -1      0.0      0.0      0.0     -1.0     -6.0      0.0       15


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    38       42        1       43       26        51        4         8        10        53
    54       13       15                150                 200

J5  LPRNT    NUMSEC              ********REQUESTED SECTION NUMBERS********

    -10      -10

NC      0.0       0.0       0.0      0.1       0.3
NH        5     0.032   18228.4    0.028   18335.5     0.028    20237.2     0.031    21188.1     0.032
NH  21595.
ET                7.1                                          18335.5   20237.2
```

```
X1   225.95      94   18428.5   20039.7       0.0       0.0       0.0       1.0       0.0
     1203.7  17840.6    1202.4   17848.9    1193.6   17889.2    1193.7   17922.2    1194.0   17963.8
GR   1193.7  18003.5    1193.3   18049.4    1194.4   18075.7    1196.9   18116.2    1197.0   18196.1
GR   1196.0  18228.4    1194.6   18269.0    1193.2   18321.5    1192.9   18335.5    1190.1   18375.5
GR   1182.4  18405.1    1183.0   18428.5    1181.5   18445.0    1177.9   18462.5    1176.1   18485.6
GR   1176.8  18517.9    1176.6   18533.3    1175.3   18553.3    1176.3   18604.6    1178.0   18637.4
GR   1176.0  18671.4    1175.9   18692.9    1167.9   18708.4    1168.7   18708.7    1167.9   18717.5
GR   1167.9  18817.2    1168.0   18863.1    1168.6   18952.0    1168.8   19096.8    1168.8   19116.2
GR   1172.1  19129.0    1172.9   19130.4    1174.6   19160.5    1175.5   19215.6    1174.7   19255.3
GR   1175.1  19282.8    1173.9   19324.0    1172.5   19402.1    1173.3   19480.7    1173.4   19487.4
GR   1173.5  19546.6    1173.2   19561.6    1171.5   19597.0    1171.8   19766.1    1172.0   19774.5
GR   1172.2  19849.9    1172.6   19953.3    1173.0   20020.4    1173.0   20028.3    1183.6   20039.7
GR   1183.9  20085.7    1184.1   20114.6    1196.9   20181.0    1208.9   20237.2    1206.8   20284.1
GR   1208.4  20295.6    1203.3   20308.8    1195.4   20337.0    1194.8   20347.3    1194.6   20393.0
GR   1194.6  20446.4    1194.6   20457.2    1194.6   20542.6    1195.3   20585.5    1198.7   20639.1
GR   1198.6  20647.5    1200.8   20699.8    1201.6   20747.8    1201.5   20820.4    1201.6   20865.5
GR   1202.1  20977.3    1202.1   20982.5    1201.9   21042.6    1201.8   21084.5    1199.8   21122.5
GR   1199.8  21145.3    1200.5   21188.1    1200.5   21201.5    1198.1   21246.4    1196.8   21266.9
GR   1197.8  21298.1    1197.5   21304.9    1198.3   21344.9    1198.8   21373.7    1200.5   21418.9
GR   1199.0  21475.2    1199.6   21525.8    1200.0   21556.4    1202.2   21595.0

NH        1    0.028   19322.6
QT        2  72500.0   72500.0
ET               7.1                                          18005.0   19322.6
X1   226.04       36   18304.5   18894.7     920.0     480.0    476.46       1.0       0.0
GR   1193.2  18218.0    1192.4   18233.8    1192.8   18247.6    1191.8   18287.0    1184.8   18304.5
      180.9  18318.6    1177.5   18347.5    1174.5   18388.8    1172.7   18426.1    1173.2   18435.0
     1172.8  18468.8    1171.2   18491.7    1171.7   18494.6    1171.7   18506.8    1171.7   18552.0
GR   1171.8  18561.4    1171.8   18594.4    1170.7   18804.6    1170.7   18825.8    1182.5   18862.3
GR   1183.7  18894.7    1199.3   18930.5    1194.4   18942.7    1194.9   18956.4    1189.5   18992.3
GR   1189.5  18993.7    1169.5   19060.0    1169.3   19074.1    1168.4   19207.2    1168.4   19211.5
GR   1169.4  19214.6    1181.4   19235.1    1188.9   19246.2    1189.7   19251.8    1190.6   19296.5
GR   1190.7  19322.6

NH        1    0.028   19593.2
ET               7.1                                          17850.0   19100.0
X1   226.13       40   18151.2   18774.9     510.0     500.0    502.01       1.0       0.0
GR   1190.7  18007.0    1190.0   18069.5    1190.0   18121.5    1189.5   18147.2    1188.4   18151.2
GR   1178.1  18168.9    1177.2   18204.8    1172.4   18213.2    1172.6   18256.4    1173.0   18340.7
GR   1172.2  18362.9    1173.0   18403.5    1173.0   18405.0    1173.0   18426.6    1173.0   18447.3
GR   1173.0  18499.7    1173.0   18538.4    1173.0   18572.4    1173.0   18661.7    1173.0   18668.6
GR   1173.0  18774.9    1173.0   18821.8    1173.0   18843.7    1173.0   18848.8    1171.5   18876.1
GR   1170.6  18876.4    1170.7   18925.4    1170.7   18929.6    1171.1   19032.6    1171.0   19140.5
GR   1171.6  19157.7    1171.2   19255.2    1170.7   19306.5    1171.3   19354.4    1171.8   19366.1
GR   1170.5  19437.3    1170.7   19485.6    1172.2   19504.1    1195.1   19553.4    1197.4   19593.2

NH        1    0.028   19603.5
ET               7.1                                          18060.0   18630.0
X1   226.23       67   18127.1   18658.7       270       270     270.0       1.0       0.0
GR   1204.2  17743.6    1191.9   17776.7    1190.6   17813.8    1190.1   17827.3    1188.8   17871.1
GR   1188.8  17877.4    1188.5   17916.5    1187.7   17942.6    1187.6   17969.4    1187.5   17973.1
GR   1189.3  17979.5    1190.1   17984.0    1188.6   17991.3    1187.8   17993.2    1187.9   18001.4
      188.4  18051.2    1191.5   18059.4    1184.3   18074.3    1184.4   18093.6    1186.4   18103.8
GR   1186.5  18106.5    1187.0   18127.1    1186.8   18142.8    1185.6   18208.7    1185.3   18223.2
```

GR	1181.8	18234.6	1181.2	18239.8	1180.1	18287.5	1180.0	18290.9	1179.02	18344.8
	1178.8	18359.2	1177.87	18408.1	1177.35	18437.0	1176.56	18480.3	1175.86	18519.3
GR	1175.2	18554.1	1174.80	18577.7	1174.5	18594.2	1174.7	18658.7	1174.7	18692.9
GR	1174.8	18734.4	1174.8	18749.9	1175.0	18796.6	1175.5	18799.4	1176.4	18835.0
GR	1176.9	18843.3	1177.0	18851.6	1178.9	18889.7	1179.6	18910.8	1179.6	18953.7
GR	1179.8	18975.1	1180.1	19006.5	1180.3	19029.6	1180.6	19046.8	1180.6	19075.0
GR	1181.0	19078.5	1170.8	19096.4	1171.5	19100.9	1171.8	19210.2	1172.0	19274.6
GR	1172.3	19327.9	1172.5	19354.8	1172.5	19507.5	1172.5	19559.6	1172.8	19569.4
GR	1178.2	19577.6	1195.5	19603.5						

NH	1	0.028	19598.4							
ET		7.1					18050	18572.1		
X1	226.35	59	18134.0	18572.1	150	240	200.0	1.0	0.0	
GR	1195.3	17801.4	1192.9	17812.7	1191.5	17823.9	1191.2	17859.1	1192.1	17899.8
GR	1190.9	17918.1	1189.1	17926.5	1189.0	17932.0	1188.8	17996.3	1188.5	18046.6
GR	1188.5	18068.6	1189.2	18086.1	1189.0	18091.9	1187.2	18134.0	1183.7	18147.0
GR	1182.2	18167.7	1179.4	18184.0	1179.3	18223.9	1178.6	18265.3	1178.4	18309.3
GR	1178.5	18326.0	1177.4	18344.3	1177.3	18388.0	1176.9	18431.1	1176.4	18469.8
GR	1176.3	18535.4	1176.2	18542.6	1178.1	18554.3	1180.5	18560.6	1183.6	18565.7
GR	1184.1	18572.1	1180.1	18591.0	1178.8	18592.7	1176.9	18597.0	1175.7	18643.3
GR	1175.5	18660.7	1172.0	18694.7	1171.3	18736.1	1172.5	18745.3	1172.5	18750.4
GR	1172.3	18881.4	1172.7	18909.7	1172.3	18942.1	1171.7	18947.4	1172.1	18981.1
GR	1171.6	19026.5	1171.8	19034.3	1172.5	19265.7	1172.5	19308.0	1172.9	19335.6
GR	1173.4	19477.2	1173.4	19478.6	1179.8	19487.8	1194.4	19507.4	1201.1	19533.2
GR	1201.9	19538.7	1202.2	19547.6	1202.0	19590.8	1204.3	19598.4		

NH	2	0.028	19319.7	0.028	19382.8					
ET		7.1					17912.9	18393.7		
X1	226.48	51	17940.6	18286.9	309.0	989.0	234.0	1.0	0.0	
GR	1204.1	17345.9	1204.8	17430.4	1202.5	17436.1	1202.4	17534.9	1202.4	17538.7
GR	1202.7	17599.2	1203.7	17611.9	1205.0	17613.0	1204.3	17625.1	1204.9	17654.1
GR	1204.8	17689.8	1203.3	17728.1	1202.9	17760.4	1203.5	17850.7	1203.9	17912.9
GR	1191.8	17933.5	1186.9	17940.6	1182.7	17957.6	1181.4	17960.0	1179.4	18021.5
GR	1179.4	18021.8	1178.6	18212.3	1179.3	18212.6	1186.1	18235.4	1186.2	18254.9
GR	1188.1	18259.6	1187.7	18268.8	1186.0	18283.7	1186.2	18286.9	1185.3	18290.3
GR	1200.0	18316.1	1202.9	18322.5	1204.3	18393.7	1202.2	18411.3	1202.9	18449.3
GR	1202.5	18483.7	1201.7	18561.0	1202.1	18632.7	1201.6	18694.6	1203.0	18739.3
GR	1202.7	18789.3	1201.8	18812.1	1202.2	18830.9	1202.0	18923.1	1202.1	18980.8
GR	1202.8	19057.9	1204.8	19157.6	1205.9	19268.4	1205.4	19298.9	1205.8	19319.7
GR	1206.2	19382.8								

NH	2	0.028	19319.7	0.028	19382.8					
ET		7.1					17912.9	18393.7		
X1	226.49	51	17933.5	18290.3	1	1	1	1.0	0.0	
GR	1204.1	17345.9	1204.8	17430.4	1202.5	17436.1	1202.4	17534.9	1202.4	17538.7
GR	1202.7	17599.2	1203.7	17611.9	1205.0	17613.0	1204.3	17625.1	1204.9	17654.1
GR	1204.8	17689.8	1203.3	17728.1	1202.9	17760.4	1203.5	17850.7	1203.9	17912.9
GR	1191.8	17933.5	1188.0	17940.6	1188.0	17957.6	1188.0	17960.0	1188.0	18056.0
GR	1185.0	18059.0	1185.0	18141.0	1188.0	18144.0	1188.0	18235.4	1188.0	18254.9
GR	1188.1	18259.6	1188.0	18268.8	1188.0	18283.7	1188.0	18286.9	1188.0	18290.3
GR	1200.0	18316.1	1202.9	18322.5	1204.3	18393.7	1202.2	18411.3	1202.9	18449.3
GR	1202.5	18483.7	1201.7	18561.0	1202.1	18632.7	1201.6	18694.6	1203.0	18739.3
	1202.7	18789.3	1201.8	18812.1	1202.2	18830.9	1202.0	18923.1	1202.1	18980.8
GR	1202.8	19057.9	1204.8	19157.6	1205.9	19268.4	1205.4	19298.9	1205.8	19319.7

```
GR   1206.2    19382.8

NH        2      0.028    19319.7      0.028    19382.8
 ALMA SCHOOL ROAD BRIDGE
ET                 7.1                                                 17912.8    18393.8
       ALMA SCHOOL ROAD BRIDGE
X1   226.50         51    17933.5    18290.3       15.0       15.0       15.0        1.0        0.0
X3      0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
GR   1204.1    17345.9     1204.8    17430.4     1202.5    17436.1     1202.4    17534.9     1202.4    17538.7
GR   1202.7    17599.2     1203.7    17611.9     1205.0    17613.0     1204.3    17625.1     1204.9    17654.1
GR   1204.8    17689.8     1203.3    17728.1     1202.9    17760.4     1203.5    17850.7     1203.9    17912.9
GR   1191.8    17933.5     1188.0    17940.6     1188.0    17957.6     1188.0    17960.0     1188.0    18056.0
GR   1185.0    18059.0     1185.0    18141.0     1188.0    18144.0     1188.0    18235.4     1188.0    18254.9
GR   1188.1    18259.6     1188.0    18268.8     1188.0    18283.7     1188.0    18286.9     1188.0    18290.3
GR   1200.0    18316.1     1202.9    18322.5     1204.3    18393.7     1202.2    18411.3     1202.9    18449.3
GR   1202.5    18483.7     1201.7    18561.0     1202.1    18632.7     1201.6    18694.6     1203.0    18739.3
GR   1202.7    18789.3     1201.8    18812.1     1202.2    18830.9     1202.0    18923.1     1202.1    18980.8
GR   1202.8    19057.9     1204.8    19157.6     1205.9    19268.4     1205.4    19298.9     1205.8    19319.7
GR   1206.2    19382.8

NC    0.028      0.028      0.028        0.0        0.0
ET                 7.1                                                 17915.5    18322.7
X1   226.51         40    17915.6    18322.6        1.0        1.0        1.0        1.0        0.0
X3      0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
BT      -12    17370.0     1204.0     1204.0    17590.0     1204.0     1204.0    17915.5    1205.74    1205.74
BT             17915.5    1205.74    1202.09    17971.2    1205.98    1202.33    18030.0    1206.19    1202.54
BT             18088.7     1206.3     1202.6    18147.2    1206.26    1202.61    18205.7    1206.18    1202.53
               18264.2    1205.97     1202.3    18322.5     1205.7    1202.05    18322.5     1205.7     1205.7
GR   1204.0    17370.0     1204.0    17590.0    1205.74    17915.5    1202.09    17915.6    1196.84    17915.7
GR   1188.0    17962.5    1188.00    17971.2    1202.33    17971.2    1202.33    17973.7    1188.00    17973.7
GR   1188.0    18030.0    1202.54    18030.0    1202.54    18032.5     1188.0    18032.5     1185.0    18058.5
GR   1185.0    18088.7    1202.62    18088.7    1202.62    18091.2     1185.0    18091.2     1185.0    18147.2
GR   1202.6    18147.2     1202.6    18149.7     1188.0    18149.7    1188.00    18188.7    1188.00    18205.7
GR   1202.5    18205.7     1202.5    18208.2    1188.00    18208.2    1188.00    18213.5    1188.00    18264.2
GR   1202.3    18264.2    1202.32    18266.7    1188.00    18266.7    1188.00    18297.5    1196.26    18311.5
GR   1198.7    18322.5     1202.1    18322.6     1205.7    18322.7     1204.0    18560.0     1204.0    19240.0

NC    0.028      0.028      0.028        0.0        0.0
ET                 7.1                                                 17915.6    18322.6
X1   226.52         40    17915.6    18322.6       84.0       84.0       84.0        1.0        0.0
X3                 0.0
BT      -12    17370.0     1204.0     1204.0    17590.0     1204.0     1204.0    17915.5    1205.74    1205.74
BT             17915.5    1205.74    1202.09    17971.2    1205.98    1202.33    18030.0    1206.19    1202.54
BT             18088.7     1206.3     1202.6    18147.2    1206.26    1202.61    18205.7    1206.18    1202.53
BT             18264.2    1205.97     1202.3    18322.5     1205.7    1202.05    18322.5     1205.7     1205.7
GR   1204.0    17370.0     1204.0    17590.0    1205.74    17915.5    1202.09    17915.6    1196.84    17915.7
GR   1188.0    17962.5    1188.00    17971.2    1202.33    17971.2    1202.33    17973.7    1188.00    17973.7
GR   1188.0    18030.0    1202.54    18030.0    1202.54    18032.5     1185.0    18032.5     1185.0    18058.5
GR   1185.0    18088.7    1202.62    18088.7    1202.62    18091.2     1185.0    18091.2     1185.0    18147.2
GR   1202.6    18147.2     1202.6    18149.7     1188.0    18149.7    1188.00    18188.7    1188.00    18205.7
GR   1202.5    18205.7     1202.5    18208.2    1188.00    18208.2    1188.00    18213.5    1188.00    18264.2
GR   1202.3    18264.2    1202.32    18266.7    1188.00    18266.7    1188.00    18297.5    1196.26    18311.5
      198.7    18322.5     1202.1    18322.6     1205.7    18322.7     1204.0    18560.0     1204.0    19240.0
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	1	0.028	19522.9							
E		7.1					17899.8	18325.5		
X1	226.53	60	17931.6	18288.5	1.0	1.0	1.0	1.0	0.0	
GR	1203.0	17546.3	1203.2	17577.3	1203.3	17661.8	1203.3	17689.5	1201.7	17704.7
GR	1201.8	17732.1	1203.0	17746.1	1202.7	17801.3	1203.8	17825.7	1204.5	17871.9
GR	1205.1	17899.8	1204.8	17905.5	1201.5	17910.5	1202.9	17911.1	1201.8	17913.9
GR	1189.3	17931.6	1188.00	17955.6	1188.0	17995.0	1188.0	18040.0	1185.0	18049.0
GR	1185.0	18107.8	1185.0	18176.3	1188.0	18185.7	1188.0	18218.8	1188.0	18258.6
GR	1188.7	18288.5	1188.0	18291.6	1194.4	18307.2	1203.1	18322.7	1204.0	18325.5
GR	1203.6	18377.0	1202.5	18509.4	1203.1	18521.2	1203.4	18585.4	1203.5	18606.5
GR	1203.4	18677.5	1203.4	18702.5	1203.0	18735.8	1203.0	18747.2	1203.6	18807.7
GR	1204.4	18828.8	1206.3	18926.4	1207.6	18983.2	1207.5	18996.9	1207.5	19141.4
GR	1207.5	19145.6	1207.5	19181.3	1206.7	19219.8	1204.6	19237.6	1202.8	19238.8
GR	1203.7	19284.4	1203.9	19306.3	1204.3	19339.1	1206.3	19346.9	1206.4	19377.7
GR	1207.3	19400.7	1208.3	19413.5	1209.1	19437.4	1209.9	19470.5	1212.0	19522.9
NH	1	0.028	19449.9							
ET		7.1					17800.0	18750.2		
X1	226.58	90	17885.1	18188.6	450.0	450.0	450.0	1.0	0.0	
X3		1185.87								
GR	1205.9	17263.7	1205.5	17287.8	1205.3	17314.2	1206.7	17356.2	1206.7	17370.8
GR	1204.9	17448.3	1204.3	17469.9	1204.2	17504.0	1202.9	17575.1	1202.1	17616.0
GR	1202.3	17674.1	1201.9	17684.3	1201.7	17708.4	1201.3	17729.6	1201.1	17799.9
GR	1200.7	17835.5	1200.0	17842.6	1199.5	17855.1	1200.1	17877.2	1200.4	17880.0
GR	1200.1	17885.1	1199.7	17885.4	1190.1	17904.6	1181.4	17925.1	1180.7	17928.5
GR	179.7	17930.2	1179.8	17942.1	1179.4	17943.9	1179.6	18030.2	1179.8	18093.5
	1179.0	18103.1	1179.9	18110.1	1181.4	18135.1	1188.3	18150.1	1189.0	18171.5
GR	1189.5	18174.4	1193.8	18188.6	1196.5	18199.7	1197.4	18202.3	1197.9	18251.8
GR	1197.6	18278.2	1197.1	18311.0	1196.4	18315.6	1199.4	18333.3	1200.5	18357.8
GR	1201.5	18402.8	1202.8	18438.4	1202.9	18459.0	1202.9	18490.5	1202.8	18515.6
GR	1202.9	18523.4	1203.7	18562.2	1203.7	18568.8	1203.2	18571.7	1204.6	18617.2
GR	1204.7	18626.8	1205.3	18654.2	1205.9	18675.4	1206.9	18706.9	1213.4	18727.2
GR	1214.1	18750.2	1211.9	18773.8	1211.0	18813.2	1211.0	18825.2	1210.7	18850.7
GR	1210.1	18882.4	1212.0	18899.2	1212.4	18910.9	1209.1	18923.2	1207.9	18950.7
GR	1207.8	18958.6	1207.0	18970.4	1207.3	18983.5	1206.7	19021.8	1206.5	19028.8
GR	1218.1	19045.4	1228.4	19062.3	1228.0	19069.0	1228.2	19083.1	1225.3	19097.8
GR	1220.5	19122.0	1203.4	19157.3	1203.6	19177.8	1203.8	19184.0	1203.6	19198.3
GR	1203.5	19227.4	1203.8	19258.4	1203.7	19267.3	1210.3	19300.5	1219.6	19353.4
NH	2	0.028	18230.1	0.031	19549.9					
ET		7.1					17550.0	18800.0		
X1	226.61	57	17930.8	18230.1	950.0	360.0	600.0	1.0	0.0	
X3		1187.03								
GR	1207.8	17550.0	1207.2	17647.2	1206.7	17717.6	1205.9	17790.0	1193.0	17816.8
GR	1189.5	17889.1	1188.0	17930.8	1187.7	17988.5	1185.3	17992.6	1182.0	17994.4
GR	1180.3	17994.5	1180.6	17996.8	1180.0	18092.3	1180.6	18093.8	1180.3	18168.1
GR	1180.5	18177.1	1203.0	18230.1	1203.6	18260.5	1213.4	18279.5	1212.0	18303.2
GR	1203.6	18312.8	1202.9	18317.4	1202.4	18356.0	1204.7	18368.5	1222.5	18397.5
GR	1205.1	18437.3	1204.5	18486.7	1206.5	18533.8	1218.4	18560.4	1214.7	18580.6
GR	1214.7	18583.8	1205.8	18608.2	1205.0	18622.9	1206.5	18698.6	1208.4	18723.1
GR	1207.9	18772.1	1209.5	18799.3	1208.6	18818.5	1208.0	18868.4	1209.6	18871.8
	208.7	18942.8	1209.3	18978.9	1207.1	19001.4	1206.6	19064.5	1204.5	19139.1
	1203.2	19175.2	1204.1	19252.7	1205.2	19260.4	1207.9	19270.6	1208.4	19291.1

GR	1209.8	19301.6	1211.1	19358.3	1211.0	19388.0	1211.9	19397.9	1213.6	19451.8
	1213.2	19483.8	1213.4	19549.9						
NH	2	0.028	18900.3	0.031	19491.0					
ET		7.1					18310.1	19000.0		
X1	226.70	44	18339.9	18859.2	640.0	495.0	650.0	1.0	0.0	
X3		1188.29								
GR	1208.4	18246.6	1207.0	18271.6	1206.0	18310.1	1193.0	18339.9	1191.4	18347.0
GR	1190.0	18355.8	1188.7	18371.3	1184.8	18419.6	1183.9	18442.8	1184.3	18443.8
GR	1182.6	18556.1	1182.0	18628.4	1182.9	18630.6	1183.7	18635.7	1190.6	18688.9
GR	1190.3	18724.7	1191.6	18757.0	1193.2	18764.0	1195.7	18779.2	1198.6	18793.6
GR	1198.0	18830.1	1200.8	18841.7	1203.1	18859.2	1203.7	18871.2	1208.7	18891.3
GR	1210.2	18900.3	1209.4	18919.0	1208.6	18923.3	1209.7	18928.4	1208.0	18962.6
GR	1207.0	19004.4	1207.1	19007.1	1210.8	19027.4	1210.5	19034.9	1210.8	19052.1
GR	1205.8	19062.7	1206.0	19080.4	1204.1	19152.9	1204.5	19218.6	1204.0	19277.2
GR	1205.2	19345.1	1205.6	19395.9	1205.7	19443.8	1205.8	19491.0		
NH	2	0.028	19227.0	0.031	19441.4					
ET		7.1					18684.9	19440.0		
X1	226.80	32	18684.9	19309.8	560.0	480.0	570.0	1.0	0.0	
X3		1189.39								
GR	1210.7	18517.6	1210.2	18590.0	1210.2	18591.2	1208.5	18678.9	1205.8	18684.9
GR	1188.2	18724.9	1188.9	18727.7	1189.0	18729.8	1188.6	18790.3	1188.1	18895.9
GR	1188.0	18897.7	1190.6	18911.8	1191.7	18940.6	1190.7	18977.1	1190.6	18980.7
GR	1190.4	19009.0	1190.7	19011.1	1190.5	19014.4	1191.0	19029.1	1190.3	19109.1
GR	1190.5	19182.7	1191.1	19188.4	1203.1	19225.3	1203.7	19227.0	1203.8	19232.2
GR	1204.9	19289.4	1205.2	19309.8	1205.0	19352.7	1205.2	19398.0	1205.2	19399.9
	1205.0	19436.0	1205.1	19441.4						
NH	3	0.028	19026.7	0.028	20553.4	0.032	21751.8			
ET		7.1					18699.3	19600.0		
X1	226.89	96	19101.3	19599.9	600.0	525.0	570.0	1.0	0.0	
GR	1210.8	18699.3	1210.7	18704.0	1210.4	18760.0	1210.2	18812.2	1210.6	18825.2
GR	1209.3	18833.5	1210.5	18839.9	1210.1	18881.5	1210.0	18884.7	1210.0	18885.9
GR	1209.9	18900.2	1206.3	18960.0	1205.9	18965.0	1204.2	19008.2	1204.4	19026.7
GR	1202.5	19043.1	1197.3	19073.7	1195.0	19098.5	1193.6	19101.3	1193.6	19131.0
GR	1192.9	19351.9	1193.3	19352.3	1193.4	19357.5	1194.3	19389.5	1194.3	19392.7
GR	1194.3	19393.6	1194.3	19399.7	1193.7	19428.0	1193.2	19437.3	1192.5	19447.7
GR	1192.7	19448.7	1193.5	19456.5	1193.4	19486.1	1193.4	19491.2	1193.1	19599.9
GR	1192.8	19840.5	1192.9	19851.8	1193.6	20155.5	1193.7	20191.0	1193.7	20277.3
GR	1194.1	20461.8	1194.1	20464.2	1198.9	20506.8	1202.7	20534.0	1205.7	20552.0
GR	1205.8	20553.4	1207.2	20593.8	1205.3	20640.7	1204.4	20656.9	1204.5	20665.3
GR	1204.0	20691.7	1204.2	20701.6	1203.6	20722.5	1203.9	20741.1	1205.4	20776.1
GR	1205.8	20783.0	1205.8	20783.7	1205.8	20791.9	1205.8	20826.9	1206.0	20838.5
GR	1206.1	20855.5	1206.7	20894.8	1210.3	20924.6	1210.6	20926.4	1210.8	20929.0
GR	1210.9	20936.0	1211.4	21005.5	1211.2	21018.4	1211.1	21025.6	1209.9	21059.1
GR	1210.2	21081.5	1210.2	21113.8	1210.2	21155.0	1209.7	21178.6	1209.5	21235.1
GR	1209.2	21247.9	1209.2	21256.3	1209.0	21261.9	1209.6	21334.4	1209.5	21340.6
GR	1209.5	21345.0	1209.8	21399.5	1210.3	21437.5	1210.4	21455.1	1210.7	21460.8
GR	1210.5	21528.7	1209.6	21547.4	1208.9	21559.0	1209.0	21575.1	1209.0	21579.2
GR	1208.9	21584.7	1208.8	21613.8	1209.3	21642.8	1210.2	21683.1	1210.9	21714.4
GR	1211.1	21751.8								

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 225.95 CWSEL= 1189.85

STA=	18376.	18429.	20040.	20144.
PER Q=	.5	98.7	.9	
AREA=	274.0	28003.7	535.4	
VEL=	3.7	7.8	3.6	
DEPTH=	5.3	17.4	5.1	

FLOW DISTRIBUTION FOR SECNO= 226.04 CWSEL= 1190.62

STA=	18290.	18305.	18895.	19060.	19207.	19235.	19302.
PER Q=	.1	67.5	3.8	25.4	3.1	.2	
AREA=	42.3	10047.2	798.0	3196.9	474.9	89.2	
VEL=	1.4	4.9	3.4	5.8	4.7	1.6	
DEPTH=	2.9	17.0	4.8	21.7	17.0	1.3	

FLOW DISTRIBUTION FOR SECNO= 226.13 CWSEL= 1190.82

STA=	18007.	18151.	18775.	18822.	18876.	18925.	19033.	19100.
PER Q=	.1	62.2	4.9	5.9	6.3	13.5	7.1	
AREA=	106.3	10811.6	835.6	987.8	994.1	2135.8	1330.9	
VEL=	.6	4.2	4.3	4.3	4.6	4.6	3.8	
DEPTH=	.7	17.3	17.8	18.2	20.2	19.9	19.7	

FLOW DISTRIBUTION FOR SECNO= 226.23 CWSEL= 1188.69

STA=	18065.	18127.	18630.
PER Q=	1.9	98.1	
AREA=	183.4	4724.7	
VEL=	7.5	15.1	
DEPTH=	3.0	9.4	

FLOW DISTRIBUTION FOR SECNO= 226.35 CWSEL= 1189.44

STA=	18050.	18134.	18572.
PER Q=	.4	99.6	
AREA=	86.5	4830.7	
VEL=	3.3	14.9	
DEPTH=	1.0	11.0	

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 226.48 CWSEL= 1192.04

STA=	17933.	17941.	18287.	18302.
PER Q=	.2	99.0	.8	
AREA=	19.1	3838.6	61.2	
VEL=	6.4	18.7	9.4	
DEPTH=	2.5	11.1	4.0	

FLOW DISTRIBUTION FOR SECNO= 226.49 CWSEL= 1198.12

STA=	17923.	17934.	18290.	18312.
PER Q=	.3	98.1	1.6	
AREA=	34.0	3850.3	110.0	
VEL=	7.4	18.5	10.5	
DEPTH=	3.2	10.8	5.1	

FLOW DISTRIBUTION FOR SECNO= 226.50 CWSEL= 1199.29

STA=	17921.	17934.	18290.	18315.
PER Q=	.5	97.7	1.8	
AREA=	47.7	4268.3	137.0	
VEL=	7.0	16.6	9.5	
DEPTH=	3.7	12.0	5.6	

FLOW DISTRIBUTION FOR SECNO= 226.51 CWSEL= 1199.15

STA=	17916.	18323.
PER Q=	100.0	
AREA=	4298.2	
VEL=	16.9	
DEPTH=	11.0	

FLOW DISTRIBUTION FOR SECNO= 226.52 CWSEL= 1200.84

STA=	17916.	18323.
PER Q=	100.0	
AREA=	4999.3	
VEL=	14.5	
DEPTH=	12.8	

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 226.53 CWSEL= 1201.43

STA=	17914.	17932.	18289.	18320.
PER Q=	.9	95.8	3.2	
AREA=	104.2	5176.8	244.2	
VEL=	6.6	13.4	9.5	
DEPTH=	6.1	14.5	7.8	

FLOW DISTRIBUTION FOR SECNO= 226.58 CWSEL= 1202.00

STA=	17800.	17885.	18189.	18278.	18417.
PER Q=	.7	92.6	4.0	2.7	
AREA=	141.5	4539.7	416.9	348.2	
VEL=	3.6	14.8	6.9	5.7	
DEPTH=	1.7	15.0	4.7	2.5	

FLOW DISTRIBUTION FOR SECNO= 226.61 CWSEL= 1204.40

STA=	17793.	17889.	17931.	18230.	18367.
PER Q=	14.0	10.0	75.7	.3	
AREA=	1085.9	652.7	4851.2	118.3	
VEL=	9.3	11.1	11.3	2.1	
DEPTH=	11.3	15.7	16.2	.9	

FLOW DISTRIBUTION FOR SECNO= 226.70 CWSEL= 1205.65

STA=	18311.	18340.	18859.	18879.
PER Q=	1.2	98.6	.1	
AREA=	183.5	7783.8	34.7	
VEL=	4.9	9.2	2.3	
DEPTH=	6.3	15.0	1.7	

FLOW DISTRIBUTION FOR SECNO= 226.80 CWSEL= 1206.24

STA=	18685.	19227.	19310.	19353.	19398.	19436.	19440.
PER Q=	99.3	.4	.1	.1	.1	.0	
AREA=	8151.7	145.0	48.7	51.5	43.0	4.8	
VEL=	8.8	1.9	1.4	1.4	1.4	1.3	
DEPTH=	15.0	1.8	1.1	1.1	1.1	1.2	

CNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 226.89 CWSEL= 1206.46

STA=	18957.	19099.	19101.	19600.	19600.
PER Q=	5.6	.4	94.0	.0	
AREA=	609.1	34.1	6523.5	1.3	
VEL=	6.7	9.2	10.4	.4	
DEPTH=	4.3	12.2	13.1	13.4	

THIS RUN EXECUTED 20SEP95 12:43:37

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

REACH 5: Split B X-sec

SUMMARY PRINTOUT

	SECNO	ELMIN	CWSEL	Q	VCH	DIFWSX	TOPWID	DEPTH	HV	SSTA	ENDST	QLOB	QROB
	225.950	1167.90	1189.85	220000.00	7.75	.00	1767.97	21.95	.92	18376.46	20144.43	1010.31	1920.56
*	226.040	1168.40	1190.62	72500.00	4.87	.77	937.70	22.22	.38	18289.95	19301.92	60.70	23470.71
	226.130	1170.50	1190.82	72500.00	4.17	.20	1093.00	20.32	.28	18007.00	19100.00	58.80	27359.84
*	226.230	1170.80	1188.69	72500.00	15.05	-2.13	564.79	17.89	3.47	18065.21	18630.00	1380.06	.00
	226.350	1171.30	1189.44	72500.00	14.95	.75	522.10	18.14	3.46	18050.00	18572.10	285.39	.00
*	226.480	1178.60	1192.04	72500.00	18.70	2.59	369.03	13.44	5.39	17933.10	18302.12	122.41	577.39
*	226.490	1185.00	1198.12	72500.00	18.46	6.08	389.30	13.12	5.22	17922.75	18312.05	252.01	1155.60
	226.500	1185.00	1199.29	72500.00	16.60	1.17	393.82	14.29	4.21	17920.75	18314.57	333.02	1299.30
	226.510	1185.00	1199.15	72500.00	16.87	-.14	391.86	14.15	4.42	17915.66	18322.51	.00	.00
	226.520	1185.00	1200.84	72500.00	14.50	1.69	391.94	15.84	3.27	17915.62	18322.56	.00	.00
*	226.530	1185.00	1201.43	72500.00	13.42	.59	405.30	16.43	2.73	17914.42	18319.72	684.53	2325.29
	226.580	1185.87	1202.00	72500.00	14.78	.57	616.55	16.13	3.18	17800.00	18416.55	512.02	4881.36
	226.610	1187.03	1204.40	72500.00	11.31	2.40	523.94	17.37	1.88	17793.11	18366.88	17396.34	242.61
	226.700	1188.29	1205.65	72500.00	9.19	1.25	568.16	17.36	1.30	18310.89	18879.06	897.38	81.62
	226.800	1189.39	1206.24	72500.00	8.71	.58	755.10	16.85	1.18	18684.90	19440.00	.00	211.55
	226.890	1192.50	1206.46	72500.00	10.44	.23	642.71	13.96	1.63	18957.29	19600.00	4366.21	.52

RF 5: Split B X-sec

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	225.950	.00	.00	.00	1167.90	220000.00	1189.85	1180.67	1190.77	4.77	7.75	28813.07	100737.30
*	226.040	476.46	.00	.00	1168.40	72500.00	1190.62	1178.67	1191.00	1.94	4.87	14648.57	52078.00
	226.130	502.01	.00	.00	1170.50	72500.00	1190.82	1178.39	1191.09	1.39	4.17	17202.03	61543.67
*	226.230	270.00	.00	.00	1170.80	72500.00	1188.69	1187.90	1192.16	42.16	15.05	4908.13	11165.12
	226.350	200.00	.00	.00	1171.30	72500.00	1189.44	1187.75	1192.90	33.08	14.95	4917.17	12605.92
*	226.480	234.00	.00	.00	1178.60	72500.00	1192.04	1192.04	1197.43	50.80	18.70	3918.91	10172.29
*	226.490	1.00	.00	.00	1185.00	72500.00	1198.12	1198.12	1203.34	51.40	18.46	3994.31	10112.18
	226.500	15.00	.00	.00	1185.00	72500.00	1199.29	1198.09	1203.50	36.23	16.60	4452.97	12045.18
	226.510	1.00	1204.00	1205.70	1185.00	72500.00	1199.15	1198.32	1203.57	63.70	16.87	4298.19	9084.05
	226.520	84.00	1204.00	1205.70	1185.00	72500.00	1200.84	1198.22	1204.11	41.03	14.50	4999.28	11319.14
	226.530	1.00	.00	.00	1185.00	72500.00	1201.43	1197.60	1204.16	18.15	13.42	5525.10	17017.84
	226.580	450.00	.00	.00	1185.87	72500.00	1202.00	1199.83	1205.19	21.47	14.78	5446.29	15647.04
	226.610	600.00	.00	.00	1187.03	72500.00	1204.40	1198.56	1206.28	11.24	11.31	6708.08	21628.34
	226.700	650.00	.00	.00	1188.29	72500.00	1205.65	1198.83	1206.95	8.14	9.19	8002.05	25403.79
	226.800	570.00	.00	.00	1189.39	72500.00	1206.24	1199.10	1207.41	7.58	8.71	8444.64	26340.32
	226.890	570.00	.00	.00	1192.50	72500.00	1206.46	1201.93	1208.10	12.57	10.44	7168.00	20449.31

REACH 5: Split B X-sec

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	225.950	220000.00	1189.85	.00	.00	.00	1767.97	.00
*	226.040	72500.00	1190.62	.00	.77	.00	937.70	476.46
	226.130	72500.00	1190.82	.00	.20	.00	1093.00	502.01
*	226.230	72500.00	1188.69	.00	-2.13	.00	564.79	270.00
	226.350	72500.00	1189.44	.00	.75	.00	522.10	200.00
*	226.480	72500.00	1192.04	.00	2.59	.00	369.03	234.00
*	226.490	72500.00	1198.12	.00	6.08	.00	389.30	1.00
	226.500	72500.00	1199.29	.00	1.17	.00	393.82	15.00
	226.510	72500.00	1199.15	.00	-.14	.00	391.86	1.00
	226.520	72500.00	1200.84	.00	1.69	.00	391.94	84.00
	226.530	72500.00	1201.43	.00	.59	.00	405.30	1.00
	226.580	72500.00	1202.00	.00	.57	.00	616.55	450.00
	226.610	72500.00	1204.40	.00	2.40	.00	523.94	600.00
	226.700	72500.00	1205.65	.00	1.25	.00	568.16	650.00
	226.800	72500.00	1206.24	.00	.58	.00	755.10	570.00
	226.890	72500.00	1206.46	.00	.23	.00	642.71	570.00

SUMMARY OF ERRORS AND SPECIAL NOTES

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WARNING SECNO=    226.040  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    226.230  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=    226.480  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    226.480  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=    226.490  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    226.490  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=    226.530  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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HEC-2

Design Condition 1 Model
South Hardbank in Place
Main Channel

Summary Printout (SUMPO)
& Complete Printout

Filename = DESIGN1.DAT

HEC-2 Salt River Analysis

File=DESIGN1.DAT Design Condition 1 - South Hardbank in Place

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*-----------------------------------*
|              S U M P O            |
|                                   |
|    Interactive Summary Printout   |
|    for MS/PC-DOS micro computers  |
|              May 1991             |
*-----------------------------------*
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NOTE - Asterisk (*) at left of profile number indicates message in summary of errors list

DROP #5 TO D/S OF ALMA R

Summary Printout

	SECNO	CWSEL	EG	DEPTH	VCH
	20.50	1166.59	1168.49	19.59	11.07
	22.00	1166.70	1168.75	19.50	11.49
	22.65	1166.81	1168.85	19.61	11.46
*	23.55	1168.48	1170.17	21.18	10.45
	28.00	1168.95	1170.59	21.25	10.27
	29.00	1169.17	1171.16	21.07	11.32
	30.00	1169.13	1172.12	20.73	13.87
	31.00	1169.70	1173.20	20.90	15.02
	32.00	1170.48	1174.37	21.28	15.84
	33.00	1171.29	1175.64	21.69	16.74
	34.00	1172.77	1176.83	22.77	16.17
	35.00	1174.48	1177.85	24.08	14.74
	36.00	1175.78	1178.66	24.98	13.61
	37.00	1177.56	1179.28	26.36	10.51
	38.00	1178.25	1179.71	26.55	9.68
	39.00	1178.49	1180.13	26.29	10.28
	40.00	1179.32	1180.51	26.62	8.77
	40.10	1179.35	1180.55	26.55	8.79
	40.20	1179.61	1180.77	26.81	8.64
	40.30	1179.74	1180.84	26.84	8.42
	40.40	1179.86	1180.91	26.86	8.22
	40.50	1180.05	1181.06	26.95	8.04
	40.60	1180.12	1181.09	27.02	7.92
	41.10	1180.17	1181.13	26.97	7.84
	41.20	1180.34	1181.27	27.14	7.75
	42.10	1181.04	1181.56	31.04	5.82
	224.34	1181.07	1181.61	31.07	5.90
	224.43	1181.24	1181.76	29.24	5.77
	224.53	1181.54	1181.90	29.54	4.76
	224.62	1181.57	1182.07	28.57	5.69
	224.71	1181.86	1182.20	27.86	4.70
	224.81	1181.95	1182.29	27.95	4.66
*	224.90	1181.64	1182.67	27.64	8.17
*	225.00	1182.57	1182.92	28.57	4.74

*	225.10	1182.09	1183.38	26.09	9.12	
*	225.19	1181.98	1184.30	23.98	12.24	
	225.28	1182.92	1185.41	19.92	13.72	Dobson Road
	225.38	1183.88	1186.84	21.48	13.80	
	225.48	1185.64	1188.00	25.34	12.33	
	225.57	1187.28	1188.76	29.38	9.75	
	225.66	1187.76	1189.30	28.96	9.97	
	225.76	1188.14	1189.91	23.14	10.67	
	225.85	1189.31	1190.48	22.31	8.70	
	225.95	1190.02	1190.91	22.12	7.56	
*	226.04	1189.63	1191.74	16.53	11.76	
	226.13	1189.75	1193.12	19.25	14.78	
	226.23	1190.64	1195.13	18.33	17.48	
	226.35	1194.07	1197.75	20.67	15.42	
	226.48	1196.86	1200.49	15.06	15.31	
*	226.49	1196.67	1201.40	10.67	17.44	
	226.50	1197.70	1201.54	11.70	15.71	
	226.51	1197.54	1201.62	11.54	16.21	
	226.52	1198.99	1202.14	12.99	14.26	
*	226.53	1199.71	1202.21	13.71	12.70	
	226.61	1200.88	1203.10	13.88	11.99	
	226.70	1202.16	1203.88	14.16	10.57	
*	226.80	1201.55	1206.13	9.85	17.24	
*	226.89	1205.16	1208.14	12.66	13.98	
	226.99	1205.67	1210.25	11.97	17.20	
*	227.08	1207.78	1213.69	13.68	19.92	
*	227.18	1211.83	1215.52	17.33	15.45	
	227.27	1214.03	1216.49	20.33	12.58	
	227.37	1215.57	1217.11	21.57	10.31	
	227.46	1215.75	1217.63	21.65	11.28	
	227.56	1216.58	1218.02	21.98	9.79	
	227.61	1217.13	1218.22	22.23	8.35	
	227.62	1216.78	1218.39	21.88	10.17	
	227.63	1216.86	1218.46	21.96	10.13	
*	227.64	1217.48	1218.52	22.58	8.27	
	227.69	1217.57	1218.75	22.57	8.92	
	227.79	1218.11	1219.10	22.01	8.45	

HEC-2 Salt River Analysis

File=DSGN1SS.DAT South Split @ Alma School - Design Condition 1
South Hardbank in Place

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*------------------------------------*
|              S U M P O             |
|                                    |
|    Interactive Summary Printout    |
|    for MS/PC-DOS micro computers   |
|              May 1991              |
*------------------------------------*
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NOTE - Asterisk (*) at left of profile number indicates message in summary of errors list

REPARED BY MICHAEL BAKER

Summary Printout

	SECNO	CWSEL	EG	DEPTH	VCH
	225.95	1190.02	1190.91	22.12	7.56
*	226.04	1190.76	1191.14	22.36	4.77
	226.13	1190.95	1191.23	20.45	4.14
*	226.23	1188.71	1192.33	17.91	15.53
	226.35	1189.80	1193.03	18.50	14.45
	226.48	1191.98	1197.35	13.38	18.60
*	226.49	1198.09	1203.23	13.09	18.21
	226.50	1199.27	1203.40	14.27	16.31
	226.51	1198.98	1203.54	13.98	17.13
	226.52	1200.82	1204.10	15.82	14.53
*	226.53	1201.53	1204.16	16.53	13.03
	226.58	1202.07	1205.21	16.20	14.69
	226.61	1203.80	1206.36	16.77	12.86
*	226.70	1206.00	1207.21	17.71	8.84
	226.80	1206.53	1207.65	17.14	8.51
	226.89	1206.76	1208.30	14.26	9.98

```
*******************************************                    ***************************************
*  HEC-2 WATER SURFACE PROFILES           *                    *  U.S. ARMY CORPS OF ENGINEERS       *
*                                         *                    *  HYDROLOGIC ENGINEERING CENTER      *
*  Version   4.6.2;  May 1991             *                    *  609 SECOND STREET, SUITE D         *
*                                         *                    *  DAVIS, CALIFORNIA 95616-4687       *
*  RUN DATE    29AUG95    TIME    13:44:54 *                   *          (916) 756-1104             *
*******************************************                    ***************************************
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```
X     X  XXXXXXX   XXXXX             XXXXX
X     X  X        X     X           X     X
X     X  X        X                       X
XXXXXXX  XXXX     X          XXXXX   XXXXX
X     X  X        X                 X
X     X  X        X     X           X
X     X  XXXXXXX   XXXXX            XXXXXXX
```

THIS RUN EXECUTED 29AUG95 13:44:54

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT 96

AC
AC DESIGN1.DAT -- WITH SOUTH BANK, CURRENT CONDITIONS
AC
AC DESIGN GRADE TO THE PIMA FREEWAY, ADJUSTED BAKER SECTIONS U/S
AC INCLUDES POPOSED SOUTH BANK BETWEEN PIMA FWY AND DOBSON
AC BAKER SECTIONS FROM 225.28 TO 225.95 (D/S OF ALMA SPLIT)
AC NH CARDS REMOVED, N=.035 IN CHANNEL, N=.050 IN OVERBANKS
AC X3 CARDS REMOVED, ET CARDS USED IN PLACE
AC
AC 100-YEAR FLOOD
AC
T1 SIMONS, LI & ASSOCIATES, INC. (PAZ-PBDQ-02)
T2 RED MOUNTAIN FREEWAY SALT RIVER SOUTH LEVEE PROTECTION
T3 DROP #5 TO D/S OF ALMA ROAD SPLIT

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		2							1166.59	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1		-1							

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

38	42	1	43	26	51	4	8	10	53
24	68	150							

J5 LPRNT NUMSEC ********REQUESTED SECTION NUMBERS********

-10 -10

QT	1	215000								
NC	0.035	0.035	0.035	0.1	0.3					
ET		7.1					368.02	1432.2		
X1	20.5	52	368.02	1432.2						
GR	1168	0	1164	17.95	1162	24.38	1162	36.95	1164	71.76
GR	1166	79.6	1168	87.26	1170	92.47	1170	100.79	1168	107.04
	1166	136.7	1164	170.55	1162	202.59	1162	204.03	1162	212.06
GR	1162	223.18	1162	256.79	1164	263.99	1166	271.92	1168	283.83
GR	1168	291.26	1168	333.54	1170	336.78	1172	341.62	1172	368.02

GR	1170	372.86	1168	379.02	1166	385.07	1164	391.96	1162	401.29
	1160	405.15	1147	417.51	1147	1383.8	1158.7	1396.8	1170.5	1432.2
GR	1164	1551.12	1166	1561.25	1168	1567.58	1170	1573	1172	1579.74
GR	1174	1587.59	1178	1595.63	1178	1606.62	1180	1659.93	1180	1677.36
GR	1180	1685.5	1180	1687.62	1170	1702.87	1168	1855.51	1168	1880.71
GR	1168	1915.94	1168	1966						
ET		7.1					371.86	1409.5		
X1	22	50	371.86	1409.5	155	150	150			
GR	1168	0	1168	20.19	1168	48.23	1170	61.53	1170	84.4
GR	1168	99.93	1166	110.69	1166	185.25	1166	203.64	1166	250.93
GR	1168	294.27	1170	299.9	1172	350.11	1172	371.86	1170	379.7
GR	1168	385.29	1166	390.3	1164	395.63	1162	399.98	1160	403.29
GR	1158	407.35	1156	413.82	1154	422.34	1152	437.43	1147.2	450.69
GR	1147.2	1361.5	1159	1375	1170.5	1409.5	1158	1410.41	1160	1415.57
GR	1166	1509.56	1168	1519.96	1170	1527.06	1172	1531.57	1174	1536.19
GR	1178	1539.48	1178	1542.37	1178	1568.19	1176	1630.46	1174	1666.03
GR	1172	1673.42	1170	1679.79	1168	1691.14	1168	1700.35	1170	1704.62
GR	1172	1711.58	1174	1724.44	1174	1766.22	1172	1775.51	1170	1791.57
NC				0.3	0.5					
X1	22.65	27	188.7	1216.3	65	65	65			
X3	10									
GR	1172	0	1172	125.08	1170	188.7	1168	194.75	1166	201.16
GR	1164	205.95	1162	210.26	1160	216.37	1158	219.98	1156	227.72
GR	1154	232.41	1152	238.19	1147.2	264.91	1147.2	1169	1159.4	1183
GR	170.5	1216.3	1168	1312.31	1170	1319.07	1172	1322.27	1174	1329.19
	1178	1333.2	1178	1338.91	1178	1378.93	1176	1435.77	1174	1496.03
GR	1172	1540.96	1170	1558.53						
SB	1.05	1.56	3	500	790	193	27088	6.5	1147.31	1147.2
X1	23.55	28	247.63	1335.6	120	120	120			
X2			1	1180.61	1181.8					
X3	10									
GR	1172	0	1172	247.63	1170	253.99	1168	273.55	1166	281.4
GR	1166	283.76	1166	310.92	1164	317.04	1162	322.63	1160	328.49
GR	1158	333.83	1156	339.53	1154	346.19	1152	354.31	1147.3	375.38
GR	1147.3	1288.2	1159.4	1302.3	1170.5	1335.6	1170	1419.47	1172	1429.2
GR	1174	1432.5	1176	1434.98	1178	1461.34	1178	1512.09	1176	1579.09
GR	1174	1678.33	1172	1755.73	1170	1861.49				
NC				0.1	0.3					
ET		7.1					90.9	1152.8		
X1	28	44	90.9	1152.8	420	300	360			
GR	1170	0	1172	6.43	1172	14.35	1172	22.93	1172	27.9
GR	1170	31.53	1168	39.25	1166	45.63	1164	50.41	1162	58.03
GR	1160	66.41	1158	76.71	1172	90.9	1147.7	111.9	1147.7	999
GR	1184	999.1	1184	1052.9	1147.7	1053	1147.7	1131.8	1172	1152.8
GR	1164	1153.31	1166	1206.5	1168	1211.92	1168	1223.69	1168	1264.35
GR	1170	1276.64	1172	1283.33	1174	1291.14	1176	1295.99	1178	1316.09
GR	1178	1326.38	1178	1333.75	1180	1337.72	1180	1344.25	1178	1347.49
GR	1176	1351.78	1174	1355.53	1172	1359.44	1170	1363.26	1168	1378.57
	1168	1398.94	1168	1429.84	1166	1529.46	1166	1620.11		

		7.1					330.6	1314.7		
X1	29	44	330.6	1314.7	440	330	380			
GR	1170	0	1160	21.56	1158	28.38	1158	53.44	1160	66.58
GR	1160	79.87	1158	116.07	1158	146.8	1158	153.74	1158	181.54
GR	1158	187.08	1158	202.48	1156	220.79	1154	247.95	1152	262.65
GR	1152	269.13	1152	301.61	1150	315.44	1172.2	330.6	1148.1	354.7
GR	1148.1	1060	1184	1060.1	1184	1113.9	1148.1	1114	1148.1	1288.9
GR	1173.5	1314.7	1172	1323.39	1174	1327.38	1176	1330.97	1178	1334.68
GR	1180	1337.95	1182	1343.55	1184	1364.4	1184	1386.7	1182	1391.21
GR	1180	1395.48	1178	1398.88	1176	1401.89	1174	1405.57	1172	1409.33
GR	1170	1415.5	1170	1520.41	1170	1537.44	1170	1644.45		
ET		7.1					481.5	1309.78		
X1	30	32	481.5	1309.78	350	430	390			
GR	1174	14.68	1172	34.2	1170	69.37	1168	74.89	1166	92.61
GR	1164	163.09	1162	258.68	1160	329.81	1158	342.99	1156	346.62
GR	1154	353.18	1152	370.82	1150	394	1150	405.61	1152	440
GR	1152	467.1	1172.1	481.5	1148.4	505.2	1148.4	1156	1181	1156.1
GR	1181	1209.9	1148.4	1210	1148.4	1286.1	1172.1	1309.78	1168	1321.25
GR	1170	1339.03	1172	1352.5	1172	1462.29	1172	1490.22	1174	1509.85
GR	1174	1535.71	1172	1542.61						
ET		7.1					160.5	919.6		
X1	31	22	160.5	919.6	360	460	400			
GR	1178	0	1176	141.91	1172.7	160.5	1148.8	184.4	1148.8	765
GR	181.5	765.1	1181.5	818.9	1148.8	818.9	1148.8	907.7	1172.7	919.6
	1158	1051.56	1160	1069.76	1162	1080.98	1164	1093.09	1166	1105.46
GR	1168	1115.59	1170	1123.76	1172	1128.42	1174	1133.06	1174	1152.4
GR	1174	1275.9	1174	1320.61						
ET		7.1					315.3	1027.6		
X1	32	24	315.3	1027.6	400	410	400			
GR	1176	0	1176	39.97	1176	247.56	1173.5	315.3	1149.2	339.6
GR	1149.2	873	1182.5	873.1	1182.5	926.9	1149.2	927	1149.2	1015.5
GR	1173.5	1027.6	1152	1064.89	1154	1074.27	1156	1084.6	1158	1093.29
GR	1160	1106.57	1162	1113.87	1164	1118.12	1166	1121.69	1168	1131.52
GR	1170	1141.67	1172	1247.51	1172	1279.79	1172	1295.2		
ET		7.1					314.4	981.3		
X1	33	26	314.4	981.3	390	390	390			
GR	1176	0	1174	141.81	1172	247.49	1172	261.66	1174.3	314.4
GR	1149.6	339.1	1149.6	827	1182.5	827.1	1182.5	880.9	1149.6	881
GR	1149.6	969	1174.3	981.3	1154	984.4	1156	994.26	1158	1004.77
GR	1160	1015.49	1162	1023.59	1164	1032.43	1166	1038.61	1168	1046.29
GR	1168	1165.91	1168	1178.41	1170	1213.47	1170	1234.96	1168	1257.86
GR	1168	1265.33								
ET		7.1					351.3	1017.95		
X1	34	39	351.3	1017.95	435	370	405			
GR	1172	0	1172	55.13	1170	131.34	1170	133.81	1170	148.48
GR	1168	156.75	1168	159.9	1170	177.68	1170	264.01	1170	280.92
	1172	285.13	1174	287.34	1176	291.37	1178	293.5	1178	300.48
GR	1176	308.6	1174	313.89	1172	317.53	1170	320.96	1168	324.38

G	1166	330.13	1164	334.17	1162	339.95	1160	348.17	1175.8	351.3
	1150	377.1	1150	863	1183	863.1	1183	916.9	1150	917
GR	1150	992.2	1175.8	1017.95	1160	1028.08	1162	1056.1	1164	1100.41
GR	1166	1117.08	1168	1148.31	1170	1244.36	1170	1260.5		
ET		7.1					323.7	1013.6		
X1	35	31	323.7	1013.6	400	405	400			
GR	1188	0	1188	5.95	1186	83.48	1184	109.91	1184	136.66
GR	1184	148.7	1182	181.29	1180	198.09	1180	208.53	1180	208.78
GR	1170	225.2	1160	240.93	1158	250.29	1156	268.18	1154	278.68
GR	1152	285.78	1177.5	323.7	1150.4	350.8	1150.4	859	1183	859.1
GR	1183	912.9	1150.4	913	1150.4	986.5	1177.5	1013.6	1166	1019.94
GR	1168	1036.82	1168	1047.05	1168	1118.89	1168	1129.18	1168	1142.62
GR	1170	1201.92								
ET		7.1					327.1	1044.5		
X1	36	29	327.1	1044.5	380	430	405			
GR	1186	0	1186	33.09	1186	88.98	1186	158.59	1186	165.74
GR	1184	175.14	1182	179.03	1180	182.87	1170	197.46	1160	209.76
GR	1158	212.84	1156	218.12	1154	222.17	1179	327.1	1150.8	355.3
GR	1150.8	890	1184	890.1	1184	943.9	1150.8	944	1150.8	1016.5
GR	1178.8	1044.5	1168	1058.28	1166	1062.4	1166	1086.32	1166	1092.55
GR	1168	1106.08	1170	1228.32	1172	1295.79	1172	1304.29		
ET		7.1					275.3	1137.7		
X1	37	27	275.3	1137.7	390	435	410			
C	1188	0	1188	37.05	1186	162.09	1184	167.16	1182	170.9
L	1180	173.01	1170	186.94	1160	203.56	1158	207.56	1156	209.33
GR	1154	215.62	1180.6	275.3	1151.2	304.7	1151.2	983	1184	983.1
GR	1184	1036.9	1151.2	1037	1151.2	1108.3	1180.6	1137.7	1166	1154.04
GR	1168	1163.43	1170	1182.53	1172	1319.78	1172	1366.54	1172	1385.84
GR	1172	1392.66	1172	1400.59						
ET		7.1					474.12	1344.58		
X1	38	41	474.12	1344.58	650	380	510			
GR	1178	0	1178	42.14	1180	60.75	1182	68.52	1184	76.58
GR	1186	86.57	1188	95.67	1190	150.75	1190	278.24	1188	296.12
GR	1186	364.44	1184	398.62	1182	403.49	1180	406.14	1170	421.07
GR	1164	430.09	1162	437.35	1160	440.69	1183.1	474.12	1151.7	505.5
GR	1151.7	1315	1181.3	1344.58	1160	1363.15	1162	1374.46	1170	1381.24
GR	1172	1383.52	1174	1385.56	1174	1389.66	1172	1397.64	1170	1409.81
GR	1170	1439.22	1170	1456.49	1170	1463.91	1170	1467.53	1170	1476.98
GR	1170	1482.89	1170	1508.53	1172	1563.28	1174	1601.93	1176	1654.88
GR	1176	1666.64								
QT	1	220000								
ET		7.1					489.54	1337.7		
X1	39	50	489.54	1337.7	500	450	480			
GR	1180	0	1180	60.86	1180	63.23	1180	73.46	1180	78.65
GR	1182	84.86	1184	87.46	1186	92.65	1188	95.53	1190	98.93
GR	1192	103.69	1194	105.79	1196	114.23	1198	170.87	1198	205.37
GR	1196	210.54	1194	216.61	1192	219.62	1190	226.22	1188	232.28
	1186	236.97	1184	244.01	1182	251.76	1180	257.61	1178	265.63
GR	1178	280.87	1178	286.25	1180	309.24	1180	384	1178	424.52

GR	1176	427.51	1174	430.65	1172	434	1170	436.74	1160	451.98
	1183.6	489.54	1152.2	520.94	1152.2	1308.4	1181.5	1337.7	1164	1340.92
GR	1166	1356.24	1168	1357.68	1170	1411.73	1172	1417.7	1172	1423.78
GR	1170	1427.2	1170	1461.02	1172	1519.9	1174	1610.18	1176	1629.91
ET		7.1					455.69	1433.84		
X1	40	37	455.69	1433.84	470	550	500			
GR	1196	0	1198	18.94	1200	36.94	1202	54.89	1204	79.33
GR	1204	212.11	1202	252.1	1200	266.97	1198	275.7	1196	286.94
GR	1194	298.58	1192	308.25	1190	318.42	1188	333.62	1186	345.76
GR	1184	366.15	1184	390.9	1184	455.69	1152.7	487	1152.7	1402.54
GR	1184	1433.84	1158	1482.09	1160	1486.58	1162	1494.69	1164	1499.88
GR	1166	1506.5	1168	1511.89	1170	1516.8	1172	1520.97	1172	1535.67
GR	1172	1580.43	1172	1679.49	1172	1704.99	1174	1731.13	1174	1765.93
GR	1174	1769.16	1174	1819.84						
NC				0.3	0.5					
X1	40.1	4	5000	5979	58	37	57			
X3	10									
GR	1184.1	5000	1152.8	5031.3	1152.8	5947.7	1184.1	5979		
SB	1.05	1.56	2.6	500	923.4	106	33579	1	1152.8	1152.8
X1	40.2	4	5000	5986	32	32	32			
X2			1	1192	1206					
X3	10									
GR	1184.1	5000	1152.8	5031.3	1152.8	5954.7	1184.1	5986		
		7.1					5000	6009.2		
X1	40.3	4	5000	6009.2	106	106	106			
GR	1184.2	5000	1152.9	5031.3	1152.9	5977.9	1184.2	6009.2		
X1	40.4	4	5000	6032.4	106	106	106			
X3	10									
GR	1184.3	5000	1153	5031.3	1153	6001.1	1184.3	6032.4		
SB	1.05	1.56	2.6	500	988.4	104	28283	1	1153.1	1153.1
X1	40.5	4	5000	6051	85	85	85			
X2			1	1184	1199					
X3	10									
GR	1184.4	5000	1153.1	5031.3	1153.1	6019.7	1184.4	6051		
ET							5000	6063.7		
X1	40.6	4	5000	6063.7	58	58	58			
GR	1184.5	5000	1153.1	5031.4	1153.1	6032.4	1184.5	6063.7		
X1	41.1	4	5000	6076.7	59	59	59			
X3	10									
GR	1184.6	5000	1153.2	5031.4	1153.2	6045.2	1184.6	6076.7		

.	1.05	1.5	2.6	500	1019.9	106	29097	1	1153.2	1153.2
X1	41.2	4	5000	6083	29	29	29			
X2			1	1184	1192					
X3	10									
GR	1185	5000	1153.2	5031.8	1153.2	6051.2	1185	6083		

ET		7.1					4910	6480		
X1	42.1	36	4910	6980	510	420	505			
GR	1184	4880	1184	4910	1180	4920	1160	4975	1160	5010
GR	1162	5105	1164	5125	1162	5325	1160	5450	1158	5555
GR	1152	5610	1150	5645	1150	5700	1152	5720	1160	5740
GR	1160	5755	1150	5790	1150	5825	1156	5855	1150	5890
GR	1150	6050	1152	6085	1152	6165	1158	6200	1150	6220
GR	1150	6250	1154	6260	1156	6435	1160	6450	1170	6470
GR	1172	6480	1174	6565	1176	6705	1176	6965	1180	6975
GR	1184	6980								

NC	0.05	0.05	0.035	0.1	0.3					

BEGIN BAKER TOPOGRAPHY

ET		7.1					19823	21402.1		
X1	224.34	95	19823	21835.3	105	200	140			
X4	1	1156.2	21402.1							
GR	1180	19680.3	1182	19684.1	1184	19688	1186	19691.8	1186	19710.8
GR	1184	19718.7	1182	19724.1	1180	19729.6	1178	19733.4	1176	19738.8
	1174	19746.8	1172	19749.4	1170	19757.7	1168	19762.1	1166	19767.2
G..	1164	19772.6	1162	19777.8	1184.1	19823	1162	19845.1	1162	19904.5
GR	1164	19911	1166	19918.5	1168	19925.1	1168	19925.6	1166	19929.5
GR	1164	19935.4	1164	20010.7	1164	20077.5	1162	20086.2	1162	20091.2
GR	1164	20097.9	1166	20104.5	1166	20151.2	1164	20157.5	1162	20164.2
GR	1162	20164.6	1164	20174.9	1162	20189.6	1160	20204	1160	20259.8
GR	1160	20325.1	1158	20330.7	1156	20374.1	1154	20397.4	1152	20443.1
GR	1150	20470.3	1150	20472.8	1152	20540	1154	20554.3	1156	20568.5
GR	1156	20618.8	1154	20629.9	1152	20645	1152	20795	1159.9	20805.4
GR	1160	20840	1162.6	20856	1162.2	20874.7	1161	20881	1160.4	20887.5
GR	1152	20910	1152	21065	1159.9	21100.9	1166.1	21133	1167.6	21149.1
GR	1163.2	21186.4	1159.3	21207	1152	21215	1152	21390	1160.4	21415
GR	1160.8	21417.5	1170.4	21442.1	1172.2	21446.3	1169.5	21451.1	1169.3	21476.5
GR	1173.7	21484.1	1175.1	21487.3	1168.8	21504.3	1170.5	21526.4	1173.7	21566.3
GR	1174	21576.9	1175.7	21615.4	1174.2	21653.5	1176.7	21671.8	1176.9	21734.9
GR	1177.3	21775.1	1176.7	21819.5	1176.7	21821.1	1184.9	21835.3	1184.7	21856.1
GR	1184.4	21903.1	1184.5	21928.7	1185	21979.5	1185	22034.5	1185.5	22129.6

ET		7.1					19822.7	21493.8		
X1	224.43	92	19822.7	22037.7	500	440	493.7			
X4	1	1152	21493.8							
GR	1182	19627	1184	19632.3	1186	19638.7	1186	19663.4	1180	19685.6
GR	1178	19691.4	1176	19698.1	1172	19719.9	1170	19759.9	1166	19777.3
GR	1164	19791.5	1162	19816.6	1184.6	19822.7	1162	19845.3	1162	19902.2
C-	1164	19920	1166	19924.5	1166	19929.1	1164	19935.4	1162	19940.7
	1162	19993.6	1164	19997.5	1168	20006.3	1170	20012.8	1170	20019.9
GR	1168	20033.8	1166	20046.8	1164	20055.9	1162	20069.4	1160	20079

	1158	20129.6	1158	20192.1	1160	20202.1	1164	20220.8	1164	20224.3
	1162	20257.2	1156	20278.5	1154	20285	1154	20349.9	1156	20371.6
GR	1158	20379.4	1162	20388.7	1164	20394	1164	20405.5	1160	20416.2
GR	1158	20422.2	1156	20561.7	1154	20569.5	1154	20619.2	1152	20635.7
GR	1152	20704.6	1154	20724.5	1156	20736.5	1160.8	20764.5	1162.6	20789.2
GR	1162.8	20828.1	1161.7	20847.8	1161	20912	1159.9	20962.7	1160.1	20969.4
GR	1152	21006.5	1152	21051.5	1160.5	21055	1160.5	21071.4	1161.4	21092.2
GR	1161.7	21124.3	1163	21134	1164.3	21181.4	1164.2	21208.7	1160.5	21225.5
GR	1161.4	21243	1160	21247.4	1152	21276.5	1152	21571.5	1161.8	21578.1
GR	1162.1	21597.7	1161.1	21604.9	1168.9	21634.9	1169.1	21650.2	1173.5	21660.8
GR	1171.7	21676.5	1169.4	21685.6	1169.4	21710.2	1171.4	21743	1170.5	21807.5
GR	1168.1	21842.8	1164.2	21871.5	1166.6	21919.1	1170.5	21966.9	1170.5	21967.8
GR	1184.6	21992.2	1186.2	22037.7						

ET		7.1					19664.6	21723		
X1	224.53	96	19664.6	22216.7	510	500	506.3			
GR	1184	19494.5	1186	19523.2	1186	19531.8	1184	19536.1	1182	19540.1
GR	1180	19544.1	1178	19548.2	1176	19552.2	1174	19556.1	1172	19560.4
GR	1170	19564.4	1168	19568.5	1166	19572.9	1164	19576.9	1162	19580.8
GR	1160	19586.2	1184.9	19664.6	1160	19689.5	1160	19704.3	1162	19731.8
GR	1164	19738.1	1166	19742.7	1168	19775.7	1170	19780.5	1172	19784.9
GR	1174	19789.4	1174	19795.1	1172	19799.3	1170	19803.6	1168	19809
GR	1166	19856.9	1164	19871.1	1162	19877.2	1162	19902.5	1162	19922.6
GR	1162	19989.7	1162	20020.8	1162	20045.2	1164	20055.7	1166	20065.4
GF	1166	20097.1	1164	20102.1	1162	20107	1160	20111.5	1158	20154.8
	1158	20171.1	1160	20177.3	1162	20183.1	1164	20189.1	1164	20198.7
G	1162	20234.2	1160	20243	1158	20252.4	1156	20632.8	1154	20643
GR	1154	20693	1152	20713	1152	20773	1162.5	20785.4	1163.1	20967.5
GR	1164.5	21004.2	1167.1	21046.6	1165.3	21089.7	1164	21102.1	1162.8	21123.9
GR	1163	21130.1	1162.2	21133	1161.8	21183.5	1161.1	21282.7	1152	21293
GR	1152	21723	1162.2	21801.8	1162.3	21813	1163.6	21816.7	1169.5	21828.9
GR	1167	21850.3	1165.8	21852.1	1162.8	21863.2	1161.8	21889.2	1164.2	21940.4
GR	1165.1	21957.4	1170.8	22017.4	1169.5	22039.7	1170.4	22063.2	1170.6	22094.5
GR	1170.3	22184.8	1170.4	22193.7	1178.9	22203.9	1187	22216.7	1187	22280.3
GR	1186.9	22295.6	1186.8	22361	1187.5	22430	1187.6	22433.6	1187.7	22486.5
GR	1187.9	22533.1								

ET		7.1					19519	21400		
X1	224.62	96	19519	21946.9	505	505	504.9			
X4	1	1153	21400							
GR	1178	19298.4	1180	19303.8	1182	19309.7	1184	19352.1	1184	19367.7
GR	1182	19374.5	1180	19381	1178	19387.8	1176	19394	1174	19401.3
GR	1172	19409.5	1170	19418.3	1168	19425	1185.2	19519	1168	19536.2
GR	1168	19549.9	1168	19610.4	1168	19653.3	1170	19658.6	1172	19662.9
GR	1172	19669.8	1170	19674.2	1168	19678.2	1166	19682.5	1164	19687.2
GR	1164	19722.3	1166	19727.2	1168	19732.4	1170	19738	1172	19743.1
GR	1174	19747.6	1174	19760	1174	19838.1	1176	19843	1176	19847.4
GR	1174	19851.4	1172	19855.5	1170	19859.6	1168	19863.6	1166	19867.7
GR	1164	19871.8	1162	19875	1162	19926.2	1164	19931.7	1166	19939.3
	1166	19976.1	1164	19981.7	1164	20017.4	1166	20022.4	1168	20027.7
	1170	20035.5	1172	20047.5	1172	20053.8	1170	20057.5	1168	20062.1
GR	1166	20066.2	1164	20071.8	1162	20089.3	1160	20095	1158	20100.7

GR	163.6	20123.1	1163.1	20178.9	1163	20218.9	1162.9	20519.9	1163.1	20543
GR	1162	20597.5	1158	20609	1153	20649	1153	21069	1163.7	21178
GR	1163.7	21183.5	1165.7	21200.9	1162.2	21219.8	1153	21264	1153	21824
GR	1163.9	21873	1166.6	21882	1163.5	21889.9	1162.6	21913.8	1179.6	21946.9
GR	1174.2	21979.4	1172.5	21995.9	1171.9	22051.4	1172.2	22122	1172.1	22142.6
GR	1172.4	22196	1174.6	22205	1174	22228.1	1173.7	22277.5	1171.6	22315.2
GR	1185.7	22340	1189.3	22347.1	1188.9	22378.4	1188.7	22440.6	1189.2	22475.7
GR	1189.2	22517.6								

ET		7.1					19326.4	21300		
X1	224.71	79	19326.4	21956.8	620	440	491.6			
X4	1	1154	21300							
GR	1184	19287.3	1186	19293.4	1188	19299.7	1190	19305.9	1190	19325.5
GR	1185.5	19326.4	1168	19343.9	1168	19372.8	1168	19449.2	1170	19453.6
GR	1172	19457.8	1174	19462.4	1176	19467.2	1178	19471.6	1180	19475.9
GR	1182	19480.4	1184	19484.4	1186	19491	1186	19491.8	1184	19498.9
GR	1182	19507.4	1182	19551.9	1184	19558.3	1186	19564.6	1188	19570.5
GR	1188	19572.2	1186	19575.8	1184	19579.2	1182	19582.7	1180	19586.3
GR	1178	19589.6	1176	19592	1174	19596.7	1172	19599	1170	19603.3
GR	1168	19606.7	1166	19609.3	1164	19613.6	1162	19617	1160	19620.3
GR	1158	19623.9	1156	19629.2	1156	19687.3	1156	19698.2	1156	20282.8
GR	1158	20318.3	1158	20333	1158	20390	1160	20398	1162	20405.3
GR	1162	20412.7	1160	20423.5	1158	20442.4	1154	20477	1154	21907
GR	1163.4	21924.8	1178	21956.8	1173.1	21970.8	1173.2	21979.2	1174.2	22038
GR	173.8	22110.8	1173.8	22127.1	1171.8	22237.3	1173.9	22283.8	1176.9	22369.4
GR	176.7	22377.1	1174.7	22397.1	1175	22425.2	1175.6	22433.8	1180.6	22446.6
GR	1184.2	22461.4	1185	22490.4	1179.8	22519.8	1181.5	22549.6	1182.1	22576
GR	1187.1	22626.1	1189.4	22649.6	1189.7	22706.1	1189.5	22767		

ET		7.1					19081.8	21140		
X1	224.81	79	19081.8	22081	560	490	509.8			
X4	1	1154	21140							
GR	1180	19051.5	1182	19057.6	1184	19064.9	1186	19070	1186	19077.5
GR	1185.8	19081.8	1184	19083.6	1184	19087.9	1182	19094.8	1180	19100.3
GR	1178	19134.5	1176	19260.9	1174	19339.4	1172	19346.8	1170	19354.7
GR	1168	19364	1166	19377.6	1164	19391.8	1162	19410.4	1160	19428.5
GR	1158	19449	1158	19453.5	1158	19478.1	1156	19534.9	1156	19558.9
GR	1158	19567.3	1160	19574.2	1162	19581.1	1164	19587.5	1164	19613.1
GR	1162	19640.3	1160	19677.6	1160	19812.7	1162	19846	1162	19945.9
GR	1160	19955	1158	19966.1	1156	19984.1	1154	20005.8	1154	21895
GR	1163.9	21917.7	1168.9	21934.9	1167.3	21963.3	1181.6	21996.9	1178.9	22037.5
GR	1177.7	22066	1186.3	22081	1186.3	22117.6	1177.8	22139.6	1178	22212.3
GR	1178.2	22264	1172.7	22282.7	1169.8	22295.3	1165.6	22319.6	1165.2	22336.4
GR	1175.7	22356.9	1180.4	22372.5	1181.7	22385.7	1185.5	22409.5	1183.6	22421.2
GR	1183.7	22443.6	1185.7	22449	1189.7	22466.9	1191.1	22470.1	1190.3	22494.1
GR	1189.7	22541.7	1192.1	22563	1189.7	22581.3	1189	22661	1187.9	22702.6
GR	1185	22747.3	1186.4	22818.2	1188.1	22933.2	1188.6	22961.3	1186.6	23045.3
GR	1185.9	23068.6	1191.4	23124.1	1190.8	23210.8	1191.3	23266.9		

		7.1					18902.6	20450		
X1	224.9	90	18902.6	21911.4	515	470	494.9			
X4	1	1167.7	20450							
GR	1184	18888.2	1186.1	18902.6	1180	18908.7	1180	18910.4	1178	18916.2
GR	1176	18922.2	1174	18926.1	1172	18953.9	1170	19033.8	1168	19058.2
GR	1168	19082.8	1168	19086.3	1166	19092.1	1164	19108.9	1162	19135.1
GR	1162	19202.2	1162	19214.8	1162	19217.7	1164	19271.8	1166	19329.9
GR	1168	19336.8	1168	19396.1	1166	19443	1164	19449.7	1162	19457.3
GR	1160	19465.4	1158	19505	1156	19562.5	1156	19640	1156	19651.2
GR	1154	19791.7	1154	20050	1163	20073.2	1163	20082.5	1167.6	20098.3
GR	1167.2	20117.7	1176.6	20151.6	1178.4	20213.9	1178.8	20313.5	1177	20332.2
GR	1175.2	20397	1168.3	20438.5	1166	20499.5	1162.9	20524.7	1163.5	20567.9
GR	1154	20600	1154	21190	1162.9	21224.5	1162.9	21230.3	1165.5	21242.4
GR	1163	21343.3	1163.1	21441.5	1164.2	21479.2	1162.6	21482	1154	21500
GR	1154	21835	1163.6	21855.3	1175.2	21886.6	1186.7	21911.4	1184.6	21916.6
GR	1179.5	21936.4	1178	22031.3	1188.1	22051.4	1187.7	22160.8	1186.5	22233.2
GR	1187.5	22354.9	1185.8	22404	1186.5	22462.5	1185.6	22489.2	1176.3	22509.2
GR	1178.4	22565.2	1176.7	22619	1179.4	22654.1	1182.6	22664.3	1182.6	22705.9
GR	1184.4	22815.8	1184.4	22914.2	1185.2	22959.9	1189.9	22975.3	1185.2	23004
GR	1188	23067.4	1189.3	23157.8	1189.9	23195.5	1188.6	23318.5	1187.9	23355.8
GR	1188.7	23394.2	1191.9	23425.2	1191.7	23468.4	1192.5	23494.2	1192	23534

ET		7.1					18731	20724.4		
X1	225	91	18731	21036.7	500	500	500			
	1182	18675.9	1186	18690.9	1186	18720	1186.4	18731	1166	18751.4
	1166	18769.6	1166	18867.9	1168	18888.8	1172	18899.5	1166	18921.2
GR	1164	18935.3	1164	18955.3	1168	18974.4	1172	19015.2	1174	19031.1
GR	1180	19050.1	1182	19057	1174	19075.3	1174	19167.4	1164	19192.2
GR	1158	19204.8	1156	19229.1	1154	19333.1	1154	19358.6	1154	19606.3
GR	1154	19648.3	1156	19708.6	1160	19766.7	1162	19807.5	1162.2	19819.8
GR	1164.5	19861.6	1170.9	19891.7	1169.8	19936.4	1168.5	19938.5	1164.6	19956.5
GR	1162.8	19969.1	1154	20022	1154	20707	1162.3	20775	1162.9	20792.1
GR	1165.2	20810.3	1164.5	20839.3	1173.7	20859.2	1179.5	20874.2	1176.5	20892.1
GR	1179.5	20994.7	1179.5	21005.2	1188.2	21036.7	1180.3	21075.9	1180.2	21185.9
GR	1171.4	21205.2	1162	21231	1162.2	21333.3	1162.2	21461.3	1165.8	21545.4
GR	1167.4	21558.4	1175.5	21583.5	1175.2	21605.7	1171.5	21623.4	1170.5	21724.4
GR	1170.7	21833.5	1175.4	21853	1177.7	21871.1	1171.6	21893.4	1171.8	21995
GR	1175.5	22095	1172.9	22103	1172.9	22133.9	1179.7	22154.5	1179.7	22175.4
GR	1182.9	22198.6	1176.5	22244.9	1175.4	22262	1185	22287.5	1186.8	22290.5
GR	1187.7	22397.9	1187.3	22502.6	1186.8	22557.3	1184.2	22616.4	1185.6	22730.2
GR	1186.6	22763.9	1187.2	22848.8	1189.3	22896.6	1188.3	22985	1189.6	23103.7
GR	1190.5	23216.6	1187.6	23244.2	1187.6	23369.7	1188.4	23393.3	1192.8	23431.4
GR	1193.3	23442								

ET		7.1					18968	20450		
X1	225.1	95	18968	21777.8	570	510	510			
X4	1	1190	20450							
GR	1192	18886.3	1192	18891.9	1192	18968	1190	19014.7	1188	19022.2
GR	1186	19029.8	1186	19039.7	1186	19061.4	1184	19080.5	1182	19088.2
	1180	19104.9	1178	19114.8	1176	19120.1	1174	19125.6	1172	19130.5
GR	1170	19142.1	1170	19228.9	1172	19238.6	1172	19248.7	1170	19254.7

	1168	19260.5	1168	19323.2	1170	19335.1	1172	19346.8	1172	19354.5
	1170	19380.1	1168	19398.3	1166	19416.8	1164	19434.7	1162	19452.1
GR	1160	19532.2	1158	19623.3	1156	19697	1156	20129.9	1158	20155.8
GR	1160	20182.4	1164.5	20183.3	1163	20214.5	1163.3	20235.7	1169.2	20250.7
GR	1175.4	20284	1190	20284	1190	20584	1166.2	20584	1170.4	20623.5
GR	1170.7	20740.4	1164.2	20766.3	1168.2	20799.9	1167	20804.5	1162.8	20813.5
GR	1164.6	20829.6	1164	20889.9	1162.8	20949.9	1166.8	20982.9	1163.2	21043.4
GR	1156	21187	1156	21662	1163.3	21675.2	1169.3	21697.6	1172.6	21731.5
GR	1171.6	21738.6	1175.1	21751.5	1186	21777.8	1182	21813.9	1181.3	21904.9
GR	1195.1	21967.4	1206.3	22004.2	1202.7	22059.1	1203	22110.3	1205.5	22134.8
GR	1205.1	22183.7	1202.8	22191.5	1206.2	22218.8	1202.9	22227.6	1192.2	22266.2
GR	1183.6	22289.5	1184.9	22402.4	1201.4	22440	1202.1	22462	1209.2	22475.4
GR	1208.1	22486	1189.4	22525.8	1191.4	22631.5	1190.5	22780.3	1190.1	22789.5
GR	1176	22820.1	1178.3	22842.9	1188.6	22871.8	1190.2	23008.3	1189.1	23046.9
GR	1184.2	23057.5	1184.2	23074.6	1192.5	23094.6	1190.7	23188.9	1193.9	23202.5

ET		7.1					19212.7	20250		
X1	225.19	90	19212.7	21306.5	480	510	502.05			
X4	1	1159	20250							
GR	1192	18396	1194	19079.3	1194	19212.7	1184	19232.8	1168	19261.8
GR	1168	19297.7	1170	19361.9	1172	19445.1	1176	19454.6	1176	19476.9
GR	1174	19484	1174	19531.1	1176	19551.2	1176	19555.4	1172	19565.2
GR	1158	19596.7	1158	19700	1158	19951.2	1162.9	20049.4	1166	20103.5
GR	1166.1	20180.1	1158	20261	1158	20351	1162.8	20354	1190	20354
GR	1190	20654	1164.3	20654	1158	20701	1158	20756	1163.6	20789.5
	1170.8	20829.7	1173.6	20837.3	1177.4	20852.9	1181.6	20912.8	1180.3	20968.5
GR	1182.3	20988.9	1181.3	20993.5	1181.3	21034.2	1178.7	21058.5	1179.7	21072.8
GR	1179.7	21107.6	1176.7	21115.2	1176.4	21118.7	1179.3	21140.8	1178.1	21151.8
GR	1179.1	21157.7	1185.1	21173.5	1186.2	21182.1	1185.2	21195.5	1180.9	21210.1
GR	1183	21221.9	1185.5	21279	1193.9	21306.5	1192.1	21368.5	1190.1	21390.5
GR	1188.3	21493.4	1188.6	21546.2	1187.5	21576.7	1186.8	21687.3	1187.2	21791.8
GR	1188.1	21831.1	1187	21905	1188.7	21928.7	1188.7	21961.1	1187.8	21968.4
GR	1187.3	22011.6	1193.7	22032.6	1186.6	22050.9	1185.3	22115.2	1187.1	22226.6
GR	1187.8	22313.1	1201.9	22337.8	1204.8	22350.4	1196.7	22377.8	1194.2	22402.3
GR	1190	22418.2	1191.3	22442.1	1193.1	22452.9	1192.3	22525.3	1193.2	22551.7
GR	1191.8	22554.2	1191.5	22655.4	1191.9	22760.6	1191.5	22865.8	1190.4	22948.5
GR	1184.2	22967.5	1184.2	23048.2	1192.6	23072.5	1194.5	23181.4	1196	23233

SALT/GILA FLOOD DELINEATION

100-YEAR FLOOD

REACH 5: SECTIONS 225.28 - 237.59

ET		7.1					19177.2	20249.9		
X1	225.28	95	19177.2	19850.4	490	430	487.64			
GR	1195.6	18148.3	1195.5	18250.6	1194.9	18363.5	1193	18455.9	1192.9	18546.4
GR	1191.7	18664.4	1174.5	18726.1	1171.7	18745.5	1172.3	18808.8	1175	18907
GR	1178.5	18937.6	1176.6	18994.7	1177.9	19012.5	1179.4	19072.4	1185.9	19096.3
GR	1177.8	19121.7	1179.8	19128.8	1179.8	19164.2	1184.3	19177.2	1176.8	19207.6
GR	1172.9	19262.8	1174.4	19312	1175.3	19324.5	1164.3	19352.6	1164.5	19773.2
GR	1164.5	19823.1	1175.8	19850.4	1164.3	19874.2	1164.5	19990.1	1164.2	20091.7
	1164.1	20161	1164.2	20249.9	1164.1	20256.2	1163.4	20362.5	1163	20406.3
	1163.8	20624.5	1163.4	20718.1	1163.1	20805.1	1170.9	20847.1	1170.4	20854.5
GR	1172.2	20860.1	1175.2	20889.8	1180.7	20905.5	1193.5	20947	1192.9	20957.3

	189.7	20967.6	1181.6	20989.4	1181.3	21001.2	1183.4	21021.9	1184.8	21057.5
	1187.9	21102.3	1187	21132.3	1185.6	21136.3	1190.5	21158.5	1189.6	21189.2
GR	1190.2	21205.3	1188.5	21273.6	1190.6	21282.4	1193.4	21305	1190.5	21315.5
GR	1191.6	21330	1190.3	21338.5	1188.6	21389.6	1189.7	21504.4	1190.4	21565.5
GR	1202.7	21607.1	1190.4	21631.1	1190	21645.9	1196.6	21668.4	1197.5	21691.6
GR	1195.9	21731.7	1193.7	21750.5	1189.7	21762.1	1190.6	21852.1	1191.1	21932.8
GR	1191.9	22061	1192.1	22158	1192.1	22167.6	1196.2	22182.6	1195.9	22193.4
GR	1191.1	22210.6	1191.8	22295.4	1194.1	22357.2	1209.9	22384.9	1209.3	22387.6
GR	1202.5	22398.4	1195.3	22418.1	1194.4	22460.3	1198.1	22469.6	1195.5	22488.3
GR	1194.1	22493.1	1195	22520	1198.1	22531.5	1194.7	22548.1	1194.8	22639
ET		7.1					18817.8	19845.8		
X1	225.38	95	18817.8	19845.8	400	400	518.68			
GR	1193.9	18611.2	1182.7	18649.2	1186.5	18744.8	1189.3	18817.8	1188.3	18852.5
GR	1185.7	18871.2	1185.8	18884.5	1173.3	18914.7	1165.9	18935.8	1166.5	18941.8
GR	1165.6	19015.9	1165.1	19101.8	1164.9	19180.6	1164.4	19189	1172.7	19240.1
GR	1172.9	19304.8	1162.6	19351.1	1162.5	19402.2	1163.5	19402.3	1164.7	19412.4
GR	1164.9	19438.2	1163.3	19450.2	1163	19620.6	1162.6	19694.9	1171.8	19718.6
GR	1176.1	19732.6	1170.7	19775.5	1179.9	19829.3	1186.5	19845.8	1183.6	19859.7
GR	1183.8	19870	1174.5	19947.7	1170.6	19985.4	1169	20056.1	1166.3	20111.7
GR	1163	20149.2	1163.7	20213	1163.7	20262.4	1162.7	20632.3	1162.4	20737.3
GR	1162.9	20803.5	1164.4	20887.4	1164.5	20895.5	1169.4	20900.2	1172.6	20900.6
GR	1182.4	20936.8	1188.2	20948.6	1180.1	21005.8	1181.4	21045.7	1175.6	21060.8
GR	1177.6	21126.2	1177.6	21203.3	1177.7	21221.5	1176.6	21235.1	1181.9	21295.8
GR	180.5	21379.2	1177.8	21426.3	1177.8	21471.7	1175.5	21520.7	1163.6	21543.6
	1163.8	21560.7	1163.4	21653.6	1162.7	21657.1	1163.4	21669.8	1167.3	21698.6
GR	1166.1	21707.4	1168.7	21742.6	1164.6	21761.2	1163.5	21762.8	1165.2	21805.9
GR	1169.1	21826.9	1172.4	21864.2	1181.5	21903.8	1185.2	21924.7	1182.3	21938.3
GR	1183	22013.7	1191.2	22080.5	1195.4	22096.7	1193.5	22110.8	1191.7	22152
GR	1190.3	22154.9	1190.7	22187.9	1192.8	22212.7	1194.1	22255.1	1193.9	22325
GR	1194	22406.1	1195.1	22471.6	1196.9	22573	1196.3	22638.1	1195.8	22701.9
GR	1196.2	22765.3	1195.5	22822.4	1195.8	22900.3	1196.4	22906.9	1200.4	22919.6
ET		7.1					18589.5	19774.3		
X1	225.48	96	18589.5	19774.3	505	460	507.13			
GR	1195.5	18401.8	1193.9	18532.5	1195	18589.5	1186.2	18634.4	1184.2	18717
GR	1165.5	18755.6	1166.5	18756.2	1166.6	18886.9	1167.5	19013.8	1171.1	19050.6
GR	1172.8	19102.6	1172	19109.8	1169.8	19212.5	1164.3	19297	1164.2	19414.2
GR	1164	19422.1	1163.1	19588.2	1161.5	19591.4	1162.9	19629.5	1186.4	19693.6
GR	1187.4	19703.9	1203.5	19762.5	1203.8	19774.3	1197.4	19803.8	1196.2	19812.5
GR	1204.2	19839.2	1203.4	19842.8	1201	19878.3	1192.9	19900.1	1191.7	19961.1
GR	1188.5	19992.3	1188	20016.5	1188.5	20040.9	1187.6	20153.7	1187.5	20178.1
GR	1189	20233.4	1192.8	20240.2	1196.8	20271.6	1174	20291.8	1165	20311.2
GR	1163	20362.4	1168.6	20389.3	1162.7	20411.4	1162	20599.5	1161.7	20603.5
GR	1163.1	20609.1	1182.9	20645.3	1187.2	20649	1168.8	20690.9	1162.7	20708.9
GR	1163.7	20755.9	1167.4	20769.5	1168.1	20775.5	1168.7	20814.9	1166.4	20821.3
GR	1165.7	20831.5	1163.3	20834.5	1164	20861.9	1163.5	20864.1	1163.5	20971.2
GR	1162.5	21079.5	1165.3	21184.7	1164.4	21200.1	1166.3	21213.4	1165.3	21221.9
GR	1164.3	21259.1	1167.4	21342.1	1162.7	21354.8	1163.8	21356.3	1164	21389.6
	162.7	21480.5	1163.8	21585	1164.7	21615.9	1161	21634.1	1160.3	21642.5
	1173.1	21685.9	1179.8	21702.1	1186.4	21721.5	1186.1	21798.1	1191.7	21813
GR	1190.6	21835.9	1193.7	21927	1192.1	21991	1193.2	22057.7	1195.5	22096.2

	1194.6	22132.9	1196.9	22152.4	1195.5	22172.3	1197.2	22186.1	1196.4	22270.5
GR	1194.4	22324.4	1196.5	22395.3	1195.8	22430.4	1196.7	22504.7	1195.5	22515.5
GR	1197.2	22522								
ET		7.1					18700.7	19907.8		
X1	225.57	96	18700.7	19907.8	495	450	475.36			
GR	1199	18437.1	1193.8	18465.1	1197.2	18546.1	1185.6	18598.5	1184	18632.1
GR	1187.1	18665	1190.8	18678.1	1191.6	18700.7	1186.3	18719.4	1166.9	18751.5
GR	1167.9	18751.7	1167.1	18791.3	1167	18962.9	1167.8	18969.6	1168	19263.2
GR	1168.3	19336	1167.4	19353.3	1164	19354	1162.4	19354.7	1168.8	19396.7
GR	1167.6	19430.4	1168	19520.8	1160.3	19557.3	1159.6	19573.8	1158.3	19575.5
GR	1158.3	19690.1	1162.2	19721.7	1163.7	19751.5	1183.7	19789.6	1180.6	19812.1
GR	1181	19816.6	1185.2	19829.5	1187	19907.8	1186.6	19942.2	1181.2	19989.8
GR	1184.2	19999.4	1186.8	20072.2	1182	20080.7	1159.1	20114.3	1161.5	20116.9
GR	1157.9	20136.3	1158.7	20259.5	1158.8	20269.1	1162.3	20269.4	1172.4	20278.6
GR	1172.8	20283.2	1169.8	20311	1172.4	20327.3	1174.5	20333.5	1184.5	20352
GR	1185.5	20356.4	1173.8	20383.4	1171.5	20393.4	1172.2	20412.3	1164.9	20424.8
GR	1162.3	20434.4	1161.2	20434.8	1158	20447.3	1159.5	20492.2	1172.7	20516.9
GR	1188.1	20542.6	1188.4	20548.3	1202.8	20577.8	1210.5	20598.4	1206.4	20609.4
GR	1197.1	20676.4	1192.1	20734.1	1191.7	20779.9	1199.1	20814.8	1191.2	20844.6
GR	1189.9	20885.5	1194.4	20909.4	1189.5	20933.3	1190.7	20991	1186.9	21008.3
GR	1184	21143.8	1184.2	21212.2	1191.3	21232.9	1165.8	21282.3	1171.5	21294.3
GR	1184.3	21328.9	1184.7	21341.8	1195.4	21367.7	1190.6	21380.9	1190.6	21417.4
GR	1195.2	21433	1187.9	21460.1	1192	21471.6	1190.3	21541.7	1193.7	21586.5
GR	1194.4	21687.1	1193.2	21741.9	1197.9	21811.7	1197.3	21885.6	1196.1	21941.4
	1198.5	22042								
ET		7.1					18727.9	19790.8		
X1	225.66	95	18727.9	19790.8	525	520	512.77			
GR	1202.6	18694.6	1190.2	18714.2	1194.7	18727.9	1186.7	18745.5	1181.8	18802.5
GR	1167	18825.6	1164.9	18827	1167.8	18829	1168	18879.7	1167.5	18912.6
GR	1164.2	19213.5	1165.9	19230.1	1166.9	19250.3	1168.7	19319.5	1169.3	19370.7
GR	1169.7	19410.1	1169.2	19423.8	1166.4	19432.8	1166.2	19439.6	1158.8	19467.2
GR	1160.5	19501.3	1160.5	19516.9	1159	19518.4	1159	19533.4	1160.2	19558.6
GR	1159	19562.5	1160.7	19584	1162.3	19596.7	1162.5	19639.1	1165.6	19671.6
GR	1161.6	19698.5	1161.9	19743.5	1163.5	19755.8	1165.9	19763.3	1185.1	19790.8
GR	1183.7	19805.1	1181.5	19854.7	1177	19869.3	1178.5	19886.7	1174.8	19948.3
GR	1174.8	19961.9	1181.1	19974.1	1197.6	20015.3	1195.4	20022.5	1188.4	20040
GR	1188.1	20076.1	1206.8	20113.6	1206.4	20154.6	1204.6	20211.4	1203.8	20276.3
GR	1202.5	20323.5	1200.2	20359.4	1192.9	20392.2	1192.4	20470.6	1192.3	20484
GR	1192.8	20540.9	1193.6	20599.2	1194.2	20661	1195.1	20677.3	1194.6	20717.6
GR	1199.5	20779.8	1203.3	20844.2	1203.1	20903.8	1204.9	20907.8	1207.7	20919.2
GR	1193	20945	1192.5	20952	1193.3	20982.2	1196	20992.9	1194.4	20995.7
GR	1194.7	21004.9	1195	21057.5	1196	21082.9	1197	21092.1	1199	21153.4
GR	1199.1	21186.7	1192.7	21219	1193.6	21274.2	1194.7	21336	1194.8	21392.1
GR	1195.7	21462.3	1193.7	21501.8	1198.8	21544.6	1198.6	21615.3	1197.8	21634.3
GR	1199.3	21706.1	1199.3	21711.8	1198.8	21769.9	1197.8	21810	1199.8	21887.6
GR	1199.8	21962.3	1199.5	22031.8	1198.8	22086.5	1198.3	22141.4	1200.7	22190

ET		7.1					18675.4	19822.4		
X1	225.76	94	18675.4	19822.4	440	485	482.78			
GR	1202.1	18599.4	1201.4	18607.5	1200.5	18649.4	1200.7	18673.2	1199.2	18675.4
GR	1165.5	18720.5	1165.6	18740.6	1166	18801.3	1166.2	18851.4	1165.3	18854.2
GR	1165.2	18881.2	1165.2	18915	1166.3	18924.9	1165	19164.4	1165.4	19166.6
GR	1167	19211.7	1168.3	19255.6	1170.7	19317.9	1171.4	19334.8	1171	19414.5
GR	1170.5	19445.1	1169.4	19500	1168.7	19535.3	1167.6	19557.8	1169.1	19593.6
GR	1170.7	19634.6	1170.9	19638.8	1177.8	19656.9	1178.1	19666.7	1180.5	19751.2
GR	1181.3	19780.3	1182.1	19782.4	1196.2	19822.4	1191.4	19834.5	1191.1	19865.6
GR	1190.9	19890	1190.7	19941.8	1190.8	19954	1191.7	20014.4	1190.8	20031
GR	1191.4	20067.7	1192.3	20095.6	1193.9	20141.3	1196.8	20201.8	1196.9	20206.2
GR	1195.9	20250.4	1194.3	20287.1	1195.6	20322.5	1198.2	20384.7	1198.7	20401
GR	1198.9	20438.6	1197.9	20454.7	1199.3	20484.2	1198.8	20509.1	1197.2	20517.6
GR	1198.6	20523.6	1214.7	20564.7	1224.3	20588.8	1227.4	20641.4	1229	20672.2
GR	1229.5	20697.7	1210.3	20730.5	1195.1	20756.4	1194.3	20792	1193.2	20813.3
GR	1194.4	20820.3	1193.3	20844	1193.8	20858.3	1194.7	20900.8	1195	20922.8
GR	1195.6	20955.7	1195.6	20980	1196.8	21012.4	1197.7	21028.5	1214.7	21064.4
GR	1216.5	21069	1216.8	21072.7	1217.1	21109.1	1216.8	21110	1197.5	21144.1
GR	1198.6	21184.6	1198.7	21223.2	1198.7	21255.2	1198.6	21293.7	1198.7	21335.9
GR	1198.7	21386.1	1199.4	21435.5	1199.3	21466.5	1199.1	21484.6	1199.1	21521.9
GR	1199.2	21551.1	1199.2	21586	1200.1	21622.7	1201.8	21674		

ET		7.1					18640.0	19965.7		
X1	225.85	94	18128.4	19965.7	630	505	509.56			
	10									
GR	1200.8	17859.9	1200	17925.1	1199.9	17998.1	1199.9	18017.7	1199.3	18017.9
GR	1199.5	18021.9	1195.9	18066.5	1187.3	18086.8	1188.9	18091.7	1194.7	18128.4
GR	1192	18139.2	1190	18171.7	1190	18202.9	1187.8	18205.3	1175.3	18230.7
GR	1167.6	18317.7	1166.8	18340.2	1166.9	18433.5	1167	18644	1167.3	18714.1
GR	1167.3	18730.3	1168	18923.1	1168.1	18951	1169.1	18998.3	1169	19113.9
GR	1168.9	19153.3	1168.7	19257	1168.6	19361.6	1169.4	19412.2	1168.7	19428.2
GR	1168.7	19474.2	1168.9	19549.8	1170.6	19636.8	1169.2	19637.4	1173	19703.5
GR	1173.6	19713.9	1172.3	19724.4	1171.1	19760.2	1168.4	19774.2	1168.8	19835.1
GR	1168.4	19851.4	1181.8	19867.3	1182.2	19884.5	1184.8	19907.6	1201.6	19950.6
GR	1202.4	19965.7	1198.5	19974.9	1193.1	19990.9	1194.5	20033.7	1189.9	20061.5
GR	1189.2	20111.3	1196.5	20135.6	1196.8	20186.5	1192.9	20196	1190.8	20209.4
GR	1190.8	20231	1192.3	20245.5	1195.4	20257.9	1195	20279	1190.9	20291.2
GR	1190.9	20371.8	1196.4	20396.8	1198.5	20440.3	1199.3	20444.2	1198.8	20519.4
GR	1198.5	20601.3	1199.1	20661.4	1201.2	20676.2	1201.3	20718.5	1200.5	20729.9
GR	1201.2	20754.7	1199.5	20792.3	1200.1	20830.8	1198.8	20892.9	1199.5	20954.2
GR	1200.5	21039.8	1203.7	21042.5	1206.2	21060.1	1205.4	21063.8	1200.5	21071.4
GR	1200.6	21118.5	1201.2	21197.6	1201.6	21234.8	1200.7	21260.1	1201.6	21334
GR	1201.1	21435.8	1201	21509.6	1197.7	21601	1196.8	21662.9	1197.6	21746.1
GR	1197.6	21762.1	1200.1	21799.7	1199	21871.1	1200.8	21924.6		

ET		7.1					18335.5	20237.2		
X1	225.95	94	18335.5	20237.2	470	510	509.99			
GR	1203.7	17840.6	1202.4	17848.9	1193.6	17889.2	1193.7	17922.2	1194	17963.8
	1193.7	18003.5	1193.3	18049.4	1194.4	18075.7	1196.9	18116.2	1197	18196.1
GR	1196	18228.4	1194.6	18269	1193.2	18321.5	1192.9	18335.5	1190.1	18375.5
GR	1182.4	18405.1	1183	18428.5	1181.5	18445	1177.9	18462.5	1176.1	18485.6

	1176.8	18517.9	1176.6	18533.3	1175.3	18553.3	1176.3	18604.6	1178	18637.4
GR	1176	18671.4	1175.9	18692.9	1167.9	18708.4	1168.7	18708.7	1167.9	18717.5
GR	1167.9	18817.2	1168	18863.1	1168.6	18952	1168.8	19096.8	1168.8	19116.2
GR	1172.1	19129	1172.9	19130.4	1174.6	19160.5	1175.5	19215.6	1174.7	19255.3
GR	1175.1	19282.8	1173.9	19324	1172.5	19402.1	1173.3	19480.7	1173.4	19487.4
GR	1173.5	19546.6	1173.2	19561.6	1171.5	19597	1171.8	19766.1	1172	19774.5
GR	1172.2	19849.9	1172.6	19953.3	1173	20020.4	1173	20028.3	1183.6	20039.7
GR	1183.9	20085.7	1184.1	20114.6	1196.9	20181	1208.9	20237.2	1206.8	20284.1
GR	1208.4	20295.6	1203.3	20308.8	1195.4	20337	1194.8	20347.3	1194.6	20393
GR	1194.6	20446.4	1194.6	20457.2	1194.6	20542.6	1195.3	20585.5	1198.7	20639.1
GR	1198.6	20647.5	1200.8	20699.8	1201.6	20747.8	1201.5	20820.4	1201.6	20865.5
GR	1202.1	20977.3	1202.1	20982.5	1201.9	21042.6	1201.8	21084.5	1199.8	21122.5
GR	1199.8	21145.3	1200.5	21188.1	1200.5	21201.5	1198.1	21246.4	1196.8	21266.9
GR	1197.8	21298.1	1197.5	21304.9	1198.3	21344.9	1198.8	21373.7	1200.5	21418.9
GR	1199	21475.2	1199.6	21525.8	1200	21556.4	1202.2	21595		

Separate files were run from Sec. 225.95 to Sec. 226.89 to analyze
the split flow around the island under Alma School Bridge.
Qmc =147500 cfs (Split A) Qoverflow = 72500 cfs (Split B)

NH	4	0.028	19322.6	0.028	20431.8	0.028	20903.8	0.032	21292	
QT	1	147500								
ET		7.1					19322.6	20431.8		
X1	226.04	61	19384.7	20261.8	484	480	476.46			
GR	190.7	19322.6	1189.8	19330.3	1189.1	19348.5	1185	19384.7	1185	19388
	1184.7	19422.5	1184.8	19427	1184.1	19433.8	1183.1	19465.4	1180.9	19474.7
GR	1177.6	19481.8	1174.3	19487	1173.9	19516.1	1174.4	19546	1173.3	19554.1
GR	1177.3	19578.1	1176.4	19677.9	1176.1	19713.4	1175.5	19740.7	1174.3	19803.7
GR	1173.5	19852.7	1173.6	19865	1174.4	19915.2	1173.1	19968.4	1173.5	19986.1
GR	1174.1	20226.7	1174.6	20231.5	1186.4	20261.8	1182.7	20271.6	1182.7	20278.9
GR	1183.2	20323.1	1183.4	20350.9	1197.6	20397.2	1208.9	20431.8	1207.8	20455.3
GR	1208.3	20494.1	1210.1	20512.3	1207.1	20520	1202.5	20536.8	1202.7	20559.4
GR	1202.7	20593.7	1203	20606.2	1202.5	20646.2	1202.3	20721.5	1202.4	20732.8
GR	1202	20792.8	1202.5	20851.4	1203.7	20901	1203.7	20903.8	1201.8	20944.3
GR	1199.6	20978.5	1197.3	21014.7	1197.4	21049.3	1197.4	21091.9	1199.9	21127.4
GR	1200.7	21138	1200.8	21147.2	1200.5	21186.3	1200.6	21206.2	1201.5	21261.6
GR	1201.7	21292								

NH	4	0.028	19593.2	0.028	20570.5	0.028	20626.6	0.032	21539.6	
ET		7.1					19593.2	20570.5		
X1	226.13	60	19616.4	20439.1	510	500	502.01			
GR	1170.5	19437.3	1170.7	19485.6	1172.2	19504.1	1195.1	19553.4	1197.4	19593.2
GR	1185	19616.4	1175	19633	1175.1	19634.4	1174.6	19634.6	1174.2	19647
GR	1175	19647.9	1174.1	19649.3	1174.1	19651.3	1174.7	19652.3	1177.6	19671.2
GR	1177.4	19743.2	1177.3	19758.5	1177.3	19820.9	1176.9	19854.6	1175.8	19902.4
GR	1175.7	19926.4	1175.1	19957.4	1175.4	20107.7	1175.4	20182.2	1174.9	20223.3
GR	1175.4	20226.9	1176.7	20230.3	1182.3	20263.7	1183.8	20312.9	1183	20329.7
GR	1181.3	20345.9	1182	20382.2	1185.2	20439.1	1187	20474.8	1197.3	20524
GR	1207.3	20570.5	1207.3	20626.6	1200	20643.6	1194.2	20663.5	1193.7	20687.1
	1202.3	20743.5	1200.4	20811.7	1200.5	20871	1200.3	20920.2	1200.3	20939.3
GR	1200.5	20993.3	1201	21057	1200.2	21085.4	1200.7	21141.6	1200.8	21146.2
GR	1199.6	21208	1198.8	21227.7	1201.7	21263.7	1201.7	21319.4	1201.8	21376.1

	1201.6	21430.6	1201.1	21432.8	1201.2	21445.1	1201.8	21532.8	1202.2	21539.6
NH	2	0.028	19603.5	0.028	20608.2					
ET		7.1					19603.5	20608.2		
X1	226.23	36	19656.4	20316.6	400	630	492.85			
GR	1172.3	19327.9	1172.5	19354.8	1172.5	19507.5	1172.5	19559.6	1172.8	19569.4
GR	1178.2	19577.6	1195.5	19603.5	1194.5	19620.9	1192.8	19643	1184.4	19656.4
GR	1183.6	19658	1178.5	19679.1	1178.6	19679.2	1178.6	19699.7	1178.6	19818.4
GR	1178.6	19842.2	1178.6	19887.8	1178.7	19921.7	1177.6	20113.2	1177.9	20135.2
GR	1178.7	20240.4	1179	20252.9	1178.7	20253.2	1181.4	20280.2	1184.7	20316.6
GR	1185.9	20328.3	1185.9	20344.6	1186	20373.1	1185.8	20381.7	1185.6	20439.4
GR	1186.1	20464.8	1186.5	20496.5	1186.2	20541.5	1186.1	20556.6	1191.5	20568.2
GR	1210.9	20608.2								
NH	3	0.028	19598.4	0.028	20580.5	0.032	21305.9			
ET		7.1					19598.4	20580.5		
X1	226.35	46	19633.4	20520.9	470	770	666.57			
GR	1173.4	19477.2	1173.4	19478.6	1179.8	19487.8	1194.4	19507.4	1201.1	19533.2
GR	1201.9	19538.7	1202.2	19547.6	1202	19590.8	1204.3	19598.4	1199.6	19623
GR	1189.4	19633.4	1189	19635.3	1180.3	19702.2	1180.6	19722.8	1180.8	19974.1
GR	1180.2	19983.4	1182.9	20006.6	1184.5	20049.5	1184.8	20084.8	1183.2	20121.1
GR	1183.6	20122	1184.6	20188.7	1185.2	20414.8	1185.2	20456.4	1185.5	20504.6
GR	1185.7	20520.9	1207.3	20575.1	1209.5	20580.5	1204.6	20626.8	1203	20642
GR	1203	20647.6	1203	20714.5	1203	20738.2	1203.5	20817.4	1203.9	20885.1
GR	1203.7	20954.1	1203.4	21007.9	1203.1	21022.9	1204.1	21080.2	1203.7	21102.6
	1204	21105.1	1203	21151.8	1203.8	21197.6	1203.3	21239.4	1204.7	21284.3
GR	1205.1	21305.9								
NH	4	0.029	19319.7	0.028	19554.4	0.028	20592.3	0.032	21453.5	
ET		7.1					19554.4	20592.3		
X1	226.48	51	19554.4	20592.3	550	994	763.51			
GR	1202.8	19057.9	1204.8	19157.6	1205.9	19268.4	1205.4	19298.9	1205.8	19319.7
GR	1206.2	19382.8	1206.1	19487.9	1205.8	19531.8	1204.6	19554.4	1203.8	19612.5
GR	1191.4	19639.4	1185.3	19650	1182.1	19671.1	1182.4	19681.3	1182.2	19793.3
GR	1181.8	19861.5	1182.8	19882.7	1183.6	19886.2	1183.2	19891.3	1183.7	19924.7
GR	1185.6	19949.7	1187.6	20029.1	1188.3	20086.5	1187.7	20119.4	1187.2	20120
GR	1187.8	20137.4	1187.5	20318.7	1188.5	20469.4	1188.7	20519.1	1196	20533.2
GR	1203.5	20556.3	1203.8	20592.3	1203.5	20663.4	1202.9	20689.2	1204.7	20698.9
GR	1204.6	20787.2	1203.2	20834.8	1203.5	20903.5	1203.6	20913.2	1204.3	20988.1
GR	1203.9	21060.7	1203.9	21128.6	1204.8	21172.6	1207.4	21256.2	1207.4	21258.9
GR	1202.4	21271	1207	21288.1	1206.8	21353	1206.8	21357.8	1207.6	21429.4
GR	1207.8	21453.5								
NH	4	0.029	19382.8	0.028	19554.4	0.028	20592.3	0.032	21453.5	
ET		7.1					19554.4	20592.3		

	226.49	46	19554.4	20592.3	1	1	1			
GR	1206.2	19382.8	1206.1	19487.9	1205.8	19531.8	1204.6	19554.4	1203.8	19612.5
GR	1191.4	19639.4	1186.0	19650	1186.0	19671.1	1186.0	19681.3	1186.0	19793.3
GR	1186.0	19861.5	1186.0	19882.7	1186.0	19886.2	1186.0	19891.3	1186.0	19924.7
GR	1186.0	19949.7	1187.6	20029.1	1188.3	20086.5	1187.7	20119.4	1187.2	20120
GR	1187.8	20137.4	1187.5	20318.7	1188.5	20469.4	1188.7	20519.1	1196	20533.2
GR	1203.5	20556.3	1203.8	20592.3	1203.5	20663.4	1202.9	20689.2	1204.7	20698.9
GR	1204.6	20787.2	1203.2	20834.8	1203.5	20903.5	1203.6	20913.2	1204.3	20988.1
GR	1203.9	21060.7	1203.9	21128.6	1204.8	21172.6	1207.4	21256.2	1207.4	21258.9
GR	1202.4	21271	1207	21288.1	1206.8	21353	1206.8	21357.8	1207.6	21429.4
GR	1207.8	21453.5								

Downstream face of Alma School Rd Bridges

All data used to model this bridge was taken from survey notes and
from as-built plans dated 7-80

NH	4	0.029	19487.9	0.028	19554.4	0.028	20592.3	0.032	21453.5	
ET		7.1					19554.4	20592.3		
X1	226.50	46	19554.4	20592.3	10	10	10			
GR	1206.2	19382.8	1206.1	19487.9	1205.8	19531.8	1204.6	19554.4	1203.8	19612.5
GR	1191.4	19639.4	1186.0	19650	1186.0	19671.1	1186.0	19681.3	1186.0	19793.3
GR	1186.0	19861.5	1186.0	19882.7	1186.0	19886.2	1186.0	19891.3	1186.0	19924.7
	1186.0	19949.7	1187.6	20029.1	1188.3	20086.5	1187.7	20119.4	1187.2	20120
GR	1187.8	20137.4	1187.5	20318.7	1188.5	20469.4	1188.7	20519.1	1196	20533.2
GR	1203.5	20556.3	1203.8	20592.3	1203.5	20663.4	1202.9	20689.2	1204.7	20698.9
GR	1204.6	20787.2	1203.2	20834.8	1203.5	20903.5	1203.6	20913.2	1204.3	20988.1
GR	1203.9	21060.7	1203.9	21128.6	1204.8	21172.6	1207.4	21256.2	1207.4	21258.9
GR	1202.4	21271	1207	21288.1	1206.8	21353	1206.8	21357.8	1207.6	21429.4
GR	1207.8	21453.5								

12 degree skew angle (cosine 12 degrees = 0.9781)

NC	0.028	0.032	0.028							
ET		7.1					19615.6	20548.2		
X1	226.51	77	19615.6	20548.2	2	2	2	0.9781		
X2									0.9781	
BT	-19	19030	1204	1204	19615.5	1206.13	1206.13	19615.5	1206.13	1202.48
BT		19670.8	1206.22	1202.57	19729.6	1206.26	1202.61	19788.4	1206.26	1202.61
BT		19847.6	1206.3	1202.65	19905.5	1206.31	1202.66	19963.3	1206.27	1202.62
BT		20022.4	1206.2	1202.55	20081.3	1206.15	1202.5	20139.1	1206.05	1202.4
BT		20197.8	1205.92	1202.27	20257.6	1205.8	1202.15	20315	1205.63	1201.98
BT		20372.7	1205.5	1201.85	20434	1205.38	1201.73	20489.6	1205.09	1201.44
BT		20548.1	1204.81	1201.16						
GR	1204	19030	1206.13	19615.5	1202.48	19615.6	1194.51	19615.7	1190.16	19629.5
GR	1187.9	19670.8	1202.57	19670.8	1202.57	19673.3	1187.89	19673.3	1186.93	19729.6
	1202.6	19729.6	1202.6	19732.1	1186.93	19732.1	1186.07	19757.1	1186.00	19788.4
GR	1202.6	19788.4	1202.61	19790.9	1186.00	19790.9	1186.00	19829.4	1186.00	19847.6
GR	1202.7	19847.6	1202.7	19850.1	1186.00	19850.1	1186.00	19863.9	1186.0	19905.5

	1202.7	19905.5	1202.7	19908	1186.0	19908	1186.0	19922.2	1186.0	19951.8
GR	1186.0	19963.3	1202.62	19963.3	1202.62	19965.8	1186.00	19965.8	1186.29	20022.4
GR	1202.6	20022.4	1202.6	20024.9	1186.29	20024.9	1187.03	20051.5	1187.08	20081.3
GR	1202.5	20081.3	1202.5	20083.8	1187.08	20083.8	1186.63	20139.1	1202.4	20139.1
GR	1202.4	20141.6	1186.63	20141.6	1187.14	20197.8	1202.27	20197.8	1202.27	20200.3
GR	1187.1	20200.3	1187.7	20257.6	1202.15	20257.6	1202.15	20260.1	1187.68	20260.1
GR	1186.8	20315	1202	20315	1202	20317.5	1186.83	20317.5	1187.56	20372.7
GR	1201.9	20372.7	1201.9	20375.2	1187.56	20375.2	1187	20434	1201.73	20434
GR	1201.7	20436.5	1187	20436.5	1187.64	20459.6	1186.2	20489.6	1201.44	20489.6
GR	1201.4	20492.1	1186.2	20492.1	1187.68	20520.2	1193.39	20548.1	1201.16	20548.2
GR	1204.8	20548.3	1204	20760						
ET		7.1					19615.6	20548.2		
X1	226.52	77	19615.6	20548.2	84	84	84	0.9781		
X2									0.9781	
BT	-19	19030	1204	1204	19615.5	1206.13	1206.13	19615.5	1206.13	1202.48
BT		19670.8	1206.22	1202.57	19729.6	1206.26	1202.61	19788.4	1206.26	1202.61
BT		19847.6	1206.3	1202.65	19905.5	1206.31	1202.66	19963.3	1206.27	1202.62
BT		20022.4	1206.2	1202.55	20081.3	1206.15	1202.5	20139.1	1206.05	1202.4
BT		20197.8	1205.92	1202.27	20257.6	1205.8	1202.15	20315	1205.63	1201.98
BT		20372.7	1205.5	1201.85	20434	1205.38	1201.73	20489.6	1205.09	1201.44
BT		20548.1	1204.81	1201.16						
GR	1204	19030	1206.13	19615.5	1202.48	19615.6	1194.51	19615.7	1190.16	19629.5
GR	1187.9	19670.8	1202.57	19670.8	1202.57	19673.3	1187.89	19673.3	1186.93	19729.6
GR	1202.6	19729.6	1202.6	19732.1	1186.93	19732.1	1186.07	19757.1	1186.00	19788.4
GR	1202.6	19788.4	1202.61	19790.9	1186.00	19790.9	1186.00	19829.4	1186.00	19847.6
	1202.7	19847.6	1202.7	19850.1	1186.00	19850.1	1186.00	19863.9	1186.00	19905.5
GR	1202.7	19905.5	1202.7	19908	1186.0	19908	1186.0	19922.2	1186.0	19951.8
GR	1186.0	19963.3	1202.62	19963.3	1202.62	19965.8	1186.00	19965.8	1186.29	20022.4
GR	1202.6	20022.4	1202.6	20024.9	1186.29	20024.9	1187.03	20051.5	1187.08	20081.3
GR	1202.5	20081.3	1202.5	20083.8	1187.08	20083.8	1186.63	20139.1	1202.4	20139.1
GR	1202.4	20141.6	1186.63	20141.6	1187.14	20197.8	1202.27	20197.8	1202.27	20200.3
GR	1187.1	20200.3	1187.7	20257.6	1202.15	20257.6	1202.15	20260.1	1187.68	20260.1
GR	1186.8	20315	1202	20315	1202	20317.5	1186.83	20317.5	1187.56	20372.7
GR	1201.9	20372.7	1201.9	20375.2	1187.56	20375.2	1187	20434	1201.73	20434
GR	1201.7	20436.5	1187	20436.5	1187.64	20459.6	1186.2	20489.6	1201.44	20489.6
GR	1201.4	20492.1	1186.2	20492.1	1187.68	20520.2	1193.39	20548.1	1201.16	20548.2
GR	1204.8	20548.3	1204	20760						

Upstream face of Alma School Rd Bridge

NH	3	0.029	19522.9	0.028	20594.3	0.032	20976.5			
ET		7.1					19522.9	20594.3		
X1	226.53	40	19522.9	20594.3	2	2	2			
GR	1207.3	19400.7	1208.3	19413.5	1209.1	19437.4	1209.9	19470.5	1212	19522.9
GR	1211.8	19539.6	1206.3	19582.3	1203	19614.7	1188.3	19644.6	1186	19653.3
GR	1186.0	19685.6	1186.0	19697.2	1186.0	19724.9	1186.0	19901.4	1186.0	19903.5
GR	1186.0	19935.8	1186.0	19968.1	1186.0	19972.2	1187.9	20054.4	1188	20058.9
GR	1188.1	20107	1188.1	20107.1	1187.6	20144.4	1186.3	20145.7	1187.7	20508.1
	1187.9	20519	1194.9	20532.1	1202.8	20554.6	1204.2	20571.1	1204.5	20594.3
GR	1203.7	20692.8	1203.3	20729.5	1203.9	20736.7	1203.6	20756.4	1203.6	20799.1
GR	1204.8	20834	1203.2	20847.8	1203	20900.8	1203.5	20925.7	1203.9	20976.5

NH	3	0.028	19623.6	0.028	20581.5	0.032	21318.1			
ET		7.1					19549.9	20581.5		
X1	226.61	40	19623.6	20542.5	560	360	478.1			
GR	1213.2	19483.8	1213.4	19549.9	1212.4	19581.4	1197.5	19610.7	1194.6	19619.8
GR	1190.6	19623.6	1188.3	19650.1	1188.2	19726.3	1187.0	19791.6	1187.0	19803.2
GR	1187.0	19883.3	1187.0	19964.1	1187.0	19991.7	1187.0	20038.5	1187.0	20063.8
GR	1187.0	20064.4	1187.0	20152.2	1187.0	20232.2	1188.2	20333.6	1188.5	20515.4
GR	1190	20542.5	1202.9	20571.1	1205.6	20581.5	1205.3	20676.4	1205.8	20765
GR	1207.4	20777	1204.5	20783.9	1200.5	20797.8	1201.5	20801.4	1203.3	20879.2
GR	1204.1	20903.5	1203.7	20927	1205.3	20950.3	1206.4	21025.9	1199.3	21086.6
GR	1200.4	21161	1201.8	21224.7	1206.9	21255.6	1208.6	21307	1208.4	21318.1
NH	3	0.031	19621.8	0.028	20724.5	0.032	21674.9			
ET		7.1					19491.0	20724.5		
X1	226.70	55	19621.8	20687.5	490	510	503.99			
GR	1205.2	19345.1	1205.6	19395.9	1205.7	19443.8	1205.8	19491.0	1206.4	19531.6
GR	1204.9	19584.1	1204.4	19593	1191.8	19621.8	1190.4	19639.9	1189.5	19664.4
GR	1189.6	19702.3	1189.2	19759.1	1188.3	19767.6	1189.7	19797.4	1188	19861
GR	1188.0	19870.8	1188.0	19871.6	1188.0	20148.3	1190.4	20560.2	1189.9	20561.9
GR	1190.7	20591.4	1190.5	20594.8	1192.8	20675.2	1193.1	20687.5	1203.4	20724.5
GR	1196.6	20744.3	1196.5	20783.1	1197	20799.3	1202	20840.1	1198.3	20878.9
GR	1195.1	20903.1	1195.3	20915.8	1189.4	20948	1188.9	20971.4	1191.7	21016.3
GR	1194.3	21030.4	1195.1	21046.5	1204.8	21098.9	1206.7	21109.5	1207.4	21157.1
	1207.7	21170.9	1208.4	21212	1207.8	21239	1206.8	21246.3	1199.2	21270.6
GR	1197.8	21295.6	1197.9	21303.4	1198.9	21365.1	1199.6	21411.3	1208.8	21447.3
GR	1205.5	21474.7	1208.5	21506.6	1208.6	21515.6	1208.5	21579.6	1209.9	21674.9
NH	5	0.028	19309.8	0.031	19441.4	0.031	19606.8	0.028	20598	0.032
NH	21791									
ET		7.1					19441.4	20598.0		
X1	226.80	70	19621.0	20537.0	560	480	487.43			
GR	1204.9	19289.4	1205.2	19309.8	1205	19352.7	1205.2	19398	1205.2	19399.9
GR	1205	19436	1205.1	19441.4	1204.8	19484	1204.2	19500.3	1204.2	19526.5
GR	1204.5	19544.7	1204	19577.8	1203.3	19606.8	1194.2	19621	1193.6	19621.4
GR	1193.1	19628.3	1191.8	19665.2	1192.2	19666.9	1191.7	19698.9	1192.5	20222.1
GR	1192.9	20527.5	1192.8	20535.4	1193.2	20536.6	1192.7	20537	1205.7	20585.8
GR	1206.4	20589.8	1206.8	20598	1203.7	20641.3	1203.6	20649.8	1202.6	20711.9
GR	1202.2	20771.2	1201.9	20775.1	1200.3	20806.1	1195	20869.6	1195.1	20882.9
GR	1195.6	20935.9	1195.7	20944.5	1195.6	20972.8	1192.1	20992.5	1192	21007.1
GR	1192.3	21020.1	1192.8	21028.7	1201.5	21071.5	1204.1	21090.1	1206.1	21161
GR	1206.4	21170.5	1206.4	21184.9	1206.2	21271.6	1206.6	21311.6	1207.3	21334.3
GR	1207.3	21346.4	1206.7	21356.8	1202.6	21372.6	1200.1	21381	1199.5	21407.5
GR	1199.3	21410	1200.4	21434	1200.7	21436.3	1206.7	21465.8	1207.6	21517.2
GR	1207.8	21532.9	1208.5	21564.4	1210	21638.9	1210.5	21684.1	1210.3	21700.8
GR	1209.8	21714.6	1208.2	21730.5	1207.8	21748.7	1208.9	21772.5	1210.8	21791

NH	3	0.028	19026.7	0.028	20593.8	0.032	21751.8			
ET		7.1					19600.0	20593.8		
X1	226.89	96	19600.1	20464.2	550	525	510.72			
GR	1210.8	18699.3	1210.7	18704	1210.4	18760	1210.2	18812.2	1210.6	18825.2
GR	1209.3	18833.5	1210.5	18839.9	1210.1	18881.5	1210	18884.7	1210	18885.9
GR	1209.9	18900.2	1206.3	18960	1205.9	18965	1204.2	19008.2	1204.4	19026.7
GR	1202.5	19043.1	1197.3	19073.7	1195	19098.5	1193.6	19101.3	1193.6	19131
GR	1192.9	19351.9	1193.3	19352.3	1193.4	19357.5	1194.3	19389.5	1194.3	19392.7
GR	1194.3	19393.6	1194.3	19399.7	1193.7	19428	1193.2	19437.3	1192.5	19447.7
GR	1192.7	19448.7	1193.5	19456.5	1193.4	19486.1	1193.4	19491.2	1193.1	19600.1
GR	1192.8	19840.5	1192.9	19851.8	1193.6	20155.5	1193.7	20191	1193.7	20277.3
GR	1194.1	20461.8	1194.1	20464.2	1198.9	20506.8	1202.7	20534	1205.7	20552
GR	1205.8	20553.4	1207.2	20593.8	1205.3	20640.7	1204.4	20656.9	1204.5	20665.3
GR	1204	20691.7	1204.2	20701.6	1203.6	20722.5	1203.9	20741.1	1205.4	20776.1
GR	1205.8	20783	1205.8	20783.7	1205.8	20791.9	1205.8	20826.9	1206	20838.5
GR	1206.1	20855.5	1206.7	20894.8	1210.3	20924.6	1210.6	20926.4	1210.8	20929
GR	1210.9	20936	1211.4	21005.5	1211.2	21018.4	1211.1	21025.6	1209.9	21059.1
GR	1210.2	21081.5	1210.2	21113.8	1210.2	21155	1209.7	21178.6	1209.5	21235.1
GR	1209.2	21247.9	1209.2	21256.3	1209	21261.9	1209.6	21334.4	1209.5	21340.6
GR	1209.5	21345	1209.8	21399.5	1210.3	21437.5	1210.4	21455.1	1210.7	21460.8
GR	1210.5	21528.7	1209.6	21547.4	1208.9	21559	1209	21575.1	1209	21579.2
GR	1208.9	21584.7	1208.8	21613.8	1209.3	21642.8	1210.2	21683.1	1210.9	21714.4
GR	1211.1	21751.8								

Split flow starts at Sec. 226.89 for Alma School Bridge and ends at
Sec. 225.76 - Q upstream to Granite Reef Dam is 220000 cfs

QT	1	220000								
NH	3	0.031	19356.4	0.028	20574.1	0.032	21859.4			
ET		7.1					19356.4	20574.1		
X1	226.99	96	19395.3	20492.4	170	490	492.08			
GR	1209.4	18363.1	1209	18395.6	1209	18401.2	1208.7	18434.8	1208.1	18452
GR	1207.9	18482.1	1208.1	18515.9	1208.5	18520.3	1209	18569.9	1209.4	18588.5
GR	1210	18595.7	1217.7	18683.9	1216	18695.7	1208.7	18708.4	1208.1	18722.1
GR	1208.2	18756.7	1208.4	18786.4	1208.2	18867.7	1207.6	18890.7	1206.9	18938.3
GR	1205.9	19001.2	1205.6	19002.6	1205.7	19004.4	1204.7	19037	1206.3	19054.8
GR	1209	19091.8	1208.7	19169.5	1208.5	19173.3	1203.7	19255.9	1200.2	19305.4
GR	1200.1	19306.1	1204.1	19326.7	1205.4	19337.4	1208.5	19351.6	1208.5	19356.4
GR	1207.5	19362.5	1206.5	19379.1	1200.5	19395.3	1194.3	19414.1	1194.6	19416.8
GR	1194.6	19453.4	1193.9	19524	1193.9	19529.1	1193.8	20095.1	1193.8	20212.5
GR	1193.8	20367.5	1193.7	20423	1195	20441	1195.5	20470.9	1199.6	20492.4
GR	1206.9	20532.5	1212.6	20574.1	1210.4	20583	1207.6	20592.4	1209.6	20613.5
GR	1212.7	20658.2	1214.4	20686.5	1217.2	20734.7	1217.9	20737.5	1217.1	20774.9
GR	1216.6	20786.2	1214.5	20827.4	1214.1	20840.4	1212.6	20857.8	1213.7	20893.9
GR	1213.9	20907.7	1213.4	20964	1213.1	21020.4	1208	21051.2	1209.5	21098.4
GR	1209.5	21112.5	1210	21120.2	1213.9	21185.1	1212.5	21194.8	1213.5	21209.7
GR	1212.1	21249.7	1211.8	21260.3	1213.4	21300.4	1214.2	21326.5	1214.1	21375.4
GR	1214.1	21394.8	1213.4	21430.3	1213	21466.9	1213.1	21495	1212.4	21529.4
GR	1210.4	21570.9	1209.3	21584.3	1209.5	21595.1	1209.7	21645.2	1209.8	21681.2
GR	1210.2	21698	1210.9	21729.2	1210.1	21763.2	1211	21792.1	1210.9	21833.7
GR	1212.1	21859.4								

ET		7.1					19475	20579		
NH	3	0.03	19598.4	0.028	20588.8	0.032	21544.1			
X1	227.08	96	19699.1	20433.7	585	500	504.96			
GR	1212.5	18806.6	1212.3	18812.6	1210.7	18907.8	1210.1	18984.8	1209	19010.2
GR	1216.1	19028.4	1216.5	19030	1214.7	19070.7	1209	19077.5	1209.2	19091.4
GR	1209.2	19128.9	1208.8	19166.3	1209.8	19226.8	1210	19241	1218.9	19252.7
GR	1219.3	19254.9	1213.4	19301.3	1211.8	19312.2	1210.1	19319.1	1209.7	19337.5
GR	1209.8	19367.2	1209.6	19420.1	1209.6	19421	1209.9	19465.5	1209.9	19465.7
GR	1209.8	19527	1210	19531.3	1210.9	19574.1	1211.4	19598.4	1208.5	19602.9
GR	1194.1	19639	1194.1	19677.6	1194.3	19691.1	1195.3	19694.8	1195.6	19699.1
GR	1194.7	19700.2	1194.2	19704.7	1194.4	19726.1	1194.9	19921.6	1194.5	19935.8
GR	1194.5	19964	1194.2	20088.5	1194.2	20090	1196.1	20096.8	1195.7	20127.5
GR	1194.2	20146.2	1194.2	20165.4	1194.6	20173.5	1194.2	20203.2	1194.2	20240.9
GR	1194.4	20246	1195	20373	1194.7	20384.7	1198.4	20400.9	1200.2	20414.9
GR	1199.1	20420.6	1200.9	20433.7	1201.1	20447.4	1200.2	20489.6	1199.8	20518
GR	1199.9	20537.4	1208.9	20571.6	1215	20588.8	1212.3	20615.3	1212.4	20618
GR	1213.1	20663.3	1216.5	20713.5	1217.3	20735.3	1216.4	20762.4	1217.4	20772.9
GR	1215.7	20795.5	1214.3	20806.9	1214.5	20812.2	1212.8	20875.4	1212.9	20885
GR	1212	20902.2	1212.1	20912.2	1211.2	20951.7	1211.2	20957.4	1211.4	21013.1
GR	1211.2	21047.8	1209.7	21086.2	1211	21096	1212.2	21149	1213.7	21180.5
GR	1213.6	21210.4	1212.4	21229.4	1210.8	21266.5	1210	21309.1	1209.5	21350.5
GR	1208.8	21378.1	1209.3	21431.3	1208	21455	1212	21490.1	1212.5	21497.2
GR	1213	21544.1								
NH	3	0.03	19582.3	0.028	20583.2	0.032	22652.2			
		7.1					19582.3	20583.2		
X1	227.18	96	19611.0	20546.1	500	505	509.22			
GR	1214.2	18653.9	1214.7	18735.4	1214.4	18808.3	1214.4	18866.3	1214.3	18881.6
GR	1213.7	19038.7	1212.4	19096.3	1212.4	19157.5	1212.2	19228.9	1212.2	19231.5
GR	1213.3	19351.8	1213.3	19354.9	1207.1	19372.8	1197.2	19405.9	1197.4	19406.7
GR	1195.1	19413.3	1194.6	19452	1195.8	19463.6	1195.9	19471.4	1200	19483.3
GR	1210.2	19507.1	1211	19512.5	1208	19547.4	1207.9	19572.9	1212.5	19582.3
GR	1211	19588.4	1201.8	19611	1194.6	19649.7	1194.7	19842.7	1194.5	19898.6
GR	1194.6	20015.1	1194.6	20178	1195.9	20197.8	1196.8	20233.3	1199.1	20298.1
GR	1200.4	20332.4	1200.5	20386.7	1201.8	20410	1201.5	20426.7	1205.2	20438.6
GR	1201.8	20447.1	1199.1	20452.3	1201.4	20510.7	1201.9	20546.1	1214.1	20575.5
GR	1216.5	20583.2	1215	20640.8	1218.1	20672.9	1217.5	20686	1219.3	20751.5
GR	1220.8	20808.6	1217.5	20845.6	1217.3	20863.7	1218.8	20895.4	1222	20919.6
GR	1221.3	20996.5	1219.9	21043.3	1220.1	21097.8	1221	21108.8	1220.4	21120.1
GR	1218.2	21133.6	1214.2	21152.1	1212.4	21188.4	1212.6	21238.3	1211.4	21271.1
GR	1212.3	21307.1	1210.7	21371.8	1211.8	21423.4	1213.7	21471.8	1212	21506.8
GR	1207.7	21556.2	1206.3	21557.8	1206.1	21563.9	1209	21609	1208.9	21634.6
GR	1207.8	21723.3	1211.5	21756	1212	21770.4	1213.5	21835.5	1213.6	21899.4
GR	1211.8	21956.1	1212.9	22002.8	1212.1	22054.9	1214.1	22094.3	1214.3	22151.4
GR	1213.4	22165.3	1212.5	22223.9	1213	22307.6	1213.8	22373.3	1213.7	22433
GR	1213.7	22475.3	1213.3	22547.6	1213.2	22605.9	1215.2	22634	1210.5	22645.3
GR	1210.5	22652.2								

NH	3	0.028	19556.7	0.028	20636.5	0.032	22107.2			
ET		7.1					19556.7	20636.5		
X1	227.27	95	19556.7	20607.1	780	170	498.96			
GR	1217.3	19509.1	1217.4	19518.9	1217.7	19556.7	1212.9	19563	1194.1	19600.6
GR	1193.7	19601.1	1194.4	19781.3	1194.4	19890.4	1194.8	20100.6	1194.9	20107.6
GR	1194.9	20171.2	1194.9	20172.2	1194.4	20172.3	1197.2	20180.4	1198.2	20182.1
GR	1198.1	20190.6	1198.1	20221.7	1198.8	20291.1	1199.4	20363.2	1199.4	20378.1
GR	1199.5	20400.4	1201.3	20484	1201.8	20519.2	1201.6	20538.3	1201.3	20557.6
GR	1205.5	20572.4	1207.9	20583.2	1213.6	20607.1	1219.9	20636.5	1219.2	20652.9
GR	1219.8	20698.7	1219.9	20718.4	1219.4	20733.5	1217.7	20760.3	1216.7	20779.1
GR	1215.2	20799.6	1215.2	20840.2	1215	20853.4	1214.3	20862.6	1213.7	20872.8
GR	1216.1	20974.7	1216.5	20985	1216.5	20985.7	1217.5	21021.1	1217.7	21026.5
GR	1217.7	21038.6	1218.4	21073.4	1220.6	21108.5	1220.3	21116.8	1219.5	21137.8
GR	1219	21149.5	1216.3	21179.1	1213.5	21202.3	1213.1	21210.3	1212.1	21246.7
GR	1211.7	21275	1211.6	21282.8	1211	21319.7	1210.9	21331.9	1210.6	21342.4
GR	1209.8	21376.3	1209.7	21405.3	1209.5	21410.9	1209.4	21422.6	1209.7	21439.7
GR	1211	21486.9	1211.2	21494.9	1211.2	21495.9	1208.7	21528.8	1210.9	21561.1
GR	1211	21562.6	1210.6	21620	1210	21661.6	1208.3	21677.6	1211	21698.3
GR	1212	21705.4	1212.2	21714	1212.9	21744.9	1211.7	21800.1	1211.4	21805.4
GR	1209.9	21837.3	1209.8	21846	1211.3	21876.7	1212.9	21895.9	1213.1	21912.5
GR	1213.2	21917.5	1210	21949.4	1206.8	21981.8	1207.9	21999.1	1208.8	22015.7
GR	1209.1	22022.4	1210.9	22046.1	1211.1	22051.3	1211.4	22053.3	1215.5	22107.2

Remove vertical ineffective flow area below EL. 1200 between Sta 19125 and Sta 19400.7. This area is an inlet from the channel that would contribute to more coneyance in the left overbank than would truly exist

NH	3	0.03	19489.2	0.028	20492.2	0.032	22225.6			
ET		7.1					19100.0	20492.2		
X1	227.37	95	19489.2	20492.2	590	425	509.52			
GR	1217.8	18504.3	1217.6	18527.7	1216.6	18573.4	1216.2	18591	1214.2	18623.6
GR	1213.7	18663.4	1212.6	18687.2	1212.5	18745.9	1212.5	18759.9	1211.3	18826.1
GR	1211.1	18867.1	1211	18896.7	1210.4	18955.8	1209.6	19006.2	1209.7	19047.6
GR	1208.1	19089.6	1207.9	19112.9	1200	19139.3	1200	19147.6	1200	19160.3
GR	1200	19220	1200	19258.9	1200	19282	1200	19321.2	1200	19331.9
GR	1200	19343.9	1200	19363	1200	19376.3	1200	19381.8	1200	19389.7
GR	1206.2	19416.5	1208.1	19439.9	1210.8	19451.1	1211.9	19489.2	1201.5	19503.7
GR	1194	19508.5	1194.1	19515.1	1194	19667.6	1194.1	19971.1	1195.5	20013.7
GR	1198.9	20051.9	1201.9	20105	1201.6	20167	1199.5	20211.9	1198.7	20252.3
GR	1199.1	20277.6	1198.3	20309.7	1198.7	20372.2	1210.3	20418	1215.7	20441
GR	1217.7	20492.2	1218.4	20508.3	1219.4	20562.5	1219.9	20586.1	1218.5	20645.6
GR	1218.2	20666.3	1217.5	20709.8	1214.7	20763.5	1214.1	20787.5	1212.6	20827.7
GR	1212.5	20849.9	1213.7	20865.9	1213.2	20885.8	1212.4	20929.8	1211.8	20942.5
GR	1211.9	20988.4	1212	21031.9	1212.4	21106.3	1212.4	21110.3	1211.3	21158.1
GR	1210.3	21183.8	1210.1	21227.6	1209.8	21277.9	1208.5	21326.3	1207.7	21379.1
GR	1208.6	21432.8	1209	21478.3	1208.4	21520.3	1208.6	21570.8	1210	21616.9
GR	1210.9	21644.1	1210	21695.4	1210.7	21708.1	1214	21754.1	1214.3	21783.3
GR	1214.2	21824.9	1215	21889.7	1215.5	21912.3	1214.4	21970.6	1214.4	22012.6
	1214.4	22059.9	1214.6	22065.6	1216.7	22147.8	1217.2	22161.9	1220.4	22225.6

NH	3	0.03	19537.7	0.028	20537.3	0.032	22146.6		
ET		7.1					19150.0	20537.3	
X1	227.46	96	19537.7	20537.3	370	550	506.97		
GR	1214	17260	1212	17390	1212	17510	1212	17710	1212	18210
GR	1212	18400	1212	18850	1213.2	18982.2	1214	19044.7	1211.6	19081.4
GR	1211.6	19083.2	1214	19098.2	1211.9	19112.1	1211.7	19121.7	1215.7	19129.2
GR	1220.4	19141.4	1218.6	19152.6	1218.2	19159.4	1215.5	19170.1	1209.3	19188.4
GR	1208.9	19207.4	1209.7	19248.5	1209.2	19259.5	1209.2	19300.9	1209.2	19317.9
GR	1209.8	19331.2	1210	19360.3	1209.5	19383.5	1207.5	19422.8	1206	19439.2
GR	1206	19488.8	1207	19500.6	1206.2	19500.9	1207.6	19502.6	1210.5	19509.5
GR	1208.5	19521	1209.9	19537.7	1203.3	19545.6	1194.6	19578.4	1194.1	19581.3
GR	1194.1	19584.9	1194.2	19669.4	1194.3	19752.4	1194.3	19815	1194.8	20097.5
GR	1194.9	20109.3	1195	20261.3	1195.1	20282.9	1199.2	20315.6	1199.4	20323.2
GR	1199.4	20362.3	1199.4	20375.3	1199.2	20418.4	1209.7	20436.7	1210.6	20442.8
GR	1214.2	20475.7	1215.5	20492.4	1216.1	20537.3	1214	20584.8	1213.7	20613.1
GR	1213.6	20635.1	1214.4	20657.2	1216.8	20738.9	1216.8	20741.9	1216.9	20777.4
GR	1217.5	20844.5	1217	20867.3	1213.2	20942.9	1211.6	20976	1211.7	20990.5
GR	1212.5	21038.5	1212.3	21066.8	1211.7	21123.5	1211.2	21154.1	1210.7	21189.5
GR	1210.3	21257.5	1210.5	21278	1212.5	21361.7	1212.7	21382	1213.2	21414
GR	1213.3	21484.4	1213.8	21524.9	1214	21558.3	1214.2	21581	1214.6	21651.6
GR	1214.9	21679.8	1215.2	21710.9	1215.2	21738	1215.3	21780	1216	21887.3
GR	1216	21929.1	1216.3	21963	1216.6	22046.6	1216.7	22050.8	1217	22104.7
GR	1217.2	22146.6								

.	3	0.032	19355.5	0.028	20597.9	0.032	21468.6			
ET		7.1					19300.0	20597.9		
X1	227.56	96	19406.8	20480.0	90	385	490.8			
GR	1214	16930	1212	17360	1212	18510	1209	19017.6	1205.1	19024.3
GR	1203.6	19032.4	1198.8	19063.9	1198.9	19073.7	1198.9	19086.2	1203.6	19109.7
GR	1201.7	19121.9	1202.9	19130.3	1204.8	19159.6	1205.3	19186.9	1205.3	19187.9
GR	1204.8	19218	1204.5	19236.6	1203.9	19270.9	1203.9	19279.4	1204.4	19307
GR	1204.4	19313	1204.3	19316.2	1206.3	19347.7	1206.3	19355.5	1206.1	19380.9
GR	1204.5	19392.1	1205	19406.8	1204.4	19413.3	1202	19427.9	1200.4	19441.3
GR	1198.5	19457.7	1198.5	19459.9	1198.4	19462.9	1198.1	19477.6	1201.3	19501.7
GR	1201.4	19506.1	1201.8	19509.3	1200.8	19544.8	1199.5	19571.8	1199.4	19580.1
GR	1199.4	19591	1199	19598.4	1197.7	19621.9	1195.6	19669.2	1195.6	19670.4
GR	1195.7	19677.6	1194.6	19709.3	1194.7	19738.7	1195.9	19765.5	1196.6	19777.5
GR	1195.7	19811.8	1195.3	19817.7	1195	20011.2	1195.2	20373.3	1195.2	20414.3
GR	1195.6	20416.8	1196.1	20423.3	1198.9	20458.9	1206.5	20480	1209.1	20485.6
GR	1210.3	20500.3	1211.7	20521.4	1213	20540.4	1214.8	20568.7	1215.4	20597.9
GR	1214.4	20639	1214.1	20645.2	1214.4	20656.7	1214.2	20693.4	1215.9	20710
GR	1215.5	20727.3	1215.4	20754.3	1215.1	20766.2	1213.2	20780.5	1212.7	20799.9
GR	1212.5	20822.4	1212.7	20911.9	1212.8	20951.8	1213.2	20974.3	1213.4	20997.1
GR	1213.5	21018.2	1213.9	21028.8	1214.8	21045.3	1215.2	21071.6	1218.6	21136.3
GR	1217.3	21162.3	1216.2	21187.9	1215.9	21191.2	1216	21214.4	1216.4	21309.3
GR	1216.6	21325.6	1216.5	21335.5	1216.5	21341.6	1216	21414.7	1215.8	21441
GR	1216.2	21468.6								

NH	3	0.032	19359.8	0.028	20751.7	0.032	21124.5			
ET		7.1					19350.0	20751.8		
X1	227.61	96	19359.8	20751.7	40	370	289.93			
GR	1217.9	17661.5	1215.9	17920.6	1211.1	18250.1	1213	18408.6	1212.1	18425.8
GR	1212.1	18464.7	1212.5	18503.3	1212.8	18523.7	1212.8	18539.4	1212.6	18550.4
GR	1212.4	18558	1214	18609.7	1214.3	18621.8	1214	18651.9	1213.9	18699.5
GR	1214.4	18764.3	1214.8	18785.9	1213.8	18850.6	1214.8	18871.9	1215.7	18890.9
GR	1216.1	18904.4	1217.2	18927.7	1217.7	18941.4	1218.4	18972.8	1218.1	18990.1
GR	1218.1	19016.9	1217.2	19053.3	1216	19063.9	1215.1	19072.7	1211.8	19130
GR	1211.6	19130.7	1210.6	19160.4	1209.9	19206.1	1209.7	19241.5	1210	19283.2
GR	1211.9	19308.7	1214.5	19329.6	1214.8	19351.3	1215.8	19359.8	1214.1	19367.5
GR	1210.6	19391.9	1210.6	19392	1210.6	19392.1	1210.6	19392.2	1198	19442
GR	1197.8	19484.7	1198.1	19499.2	1198.3	19519.3	1199.5	19575.8	1199.2	19605.7
GR	1199	19651.4	1200	19695.4	1200.3	19707.3	1200	19753.7	1199.2	19785.1
GR	1198.6	19845.4	1198.4	19850.1	1194.9	19899.7	1194.9	19931.8	1194.9	19933.8
GR	1194.9	19939.5	1194.9	20157.2	1195	20177	1195	20207.4	1195.1	20303.9
GR	1195.2	20407.2	1195.3	20485.1	1195.3	20514.6	1195.5	20605.9	1195.6	20621.3
GR	1195.6	20641.4	1197.1	20646.3	1197.3	20647.4	1214.1	20709.3	1214.2	20709.4
GR	1214.2	20709.5	1214.2	20709.6	1221.8	20745.2	1223.3	20751.7	1223.7	20805.2
GR	1223.7	20807.4	1223.7	20807.5	1224.2	20818.1	1225.9	20859.5	1226	20860.2
GR	1226	20860.5	1226	20861.1	1225.9	20861.8	1225.1	20991.8	1225.1	20993.8
GR	1225.1	20995.3	1224	21111.7	1224.1	21113	1224	21113.2	1224	21115.4
GR	1223.7	21124.5								

Downstream face of Country Club bridge

All data used to model this bridge was taken from survey notes and
from as-built plans dated 5-86

21 degree skew angle (cosine 21 degrees=0.9336)

Remove vertical ineffective areas below El.1194.9 (Scour hole)

NC	0.032	0.028	0.028							
ET		7.1					19388	20725		
X1	227.62	80	19388	20725.5	18	18	18	0.9336		
X2									0.9336	
BT	-34	17300	1217.9	1217.9	17400	1216.6	1216.6	17500	1216.9	1216.9
BT		17600	1217	1217	17700	1217.7	1217.7	17800	1216.6	1216.6
BT		17900	1215.2	1215.2	18000	1213.8	1213.8	18100	1214.2	1214.2
BT		18200	1211.5	1211.5	18300	1211.9	1211.9	18400	1211.5	1211.5
BT		18500	1212.3	1212.3	18600	1213.6	1213.6	18700	1214.9	1214.9
BT		18800	1215.5	1215.5	18900	1219.1	1219.1	19000	1221	1221
BT		19100	1222	1222	19200	1224.3	1224.3	19300	1225.2	1225.2
BT		19387.9	1226.84	1226.84	19387.9	1226.84	1220.14	19513.7	1227.96	1221.2
BT		19650.3	1228.84	1222.1	19784.9	1229.57	1222.8	19919.5	1229.93	1223.2
BT		20053.9	1230.03	1223.3	20187.6	1229.87	1223.1	20323.2	1229.45	1222.7
BT		20457.4	1228.74	1222	20591.3	1227.89	1221.1	20725.4	1226.62	1219.9
BT		20725.4	1226.62	1226.6						
	1217.9	17300	1216.6	17400	1216.9	17500	1217	17600	1217.7	17700
GR	1216.6	17800	1215.2	17900	1213.8	18000	1214.2	18100	1211.5	18200
GR	1211.9	18300	1211.5	18400	1212.3	18500	1213.6	18600	1214.9	18700

	1215.5	18800	1219.1	18900	1221	19000	1222	19100	1224.3	19200
GR	1225.2	19300	1226.8	19387.9	1220.1	19388	1217.8	19388.1	1216.1	19398.2
GR	1204.3	19427.8	1197.4	19463.6	1197.2	19513.7	1221.2	19513.7	1221.2	19519.7
GR	1197.3	19519.7	1197.5	19589.2	1197.5	19650.3	1222.1	19650.3	1222.1	19656.3
GR	1197.5	19656.3	1198.3	19722.6	1196.6	19784.9	1222.8	19784.9	1222.8	19790.9
GR	1196.7	19790.9	1197	19853.3	1196.7	19886	1194.9	19904.6	1194.9	19919.5
GR	1223.2	19919.5	1223.2	19925.5	1194.9	19925.5	1194.9	20053.9	1223.3	20053.9
GR	1223.3	20059.9	1194.9	20059.9	1194.9	20111.6	1195.2	20124.9	1194.9	20187.6
GR	1223.1	20187.6	1223.2	20193.6	1194.9	20193.6	1194.9	20258.4	1195.1	20323.2
GR	1222.7	20323.2	1222.8	20329.2	1195.1	20329.2	1196.6	20389.7	1196.4	20457.4
GR	1222	20457.4	1222	20463.4	1196.4	20463.4	1194.9	20529.1	1194.9	20591.3
GR	1221.1	20591.3	1194.9	20597.3	1194.9	20637.5	1201.6	20683.5	1217.3	20725.4
GR	1219.9	20725.5	1226.6	20725.6	1224	20980	1220	21500	1220	21960

Upstream face of Country Club bridge

ET		7.1					19388	20725		
X1	227.63	80	19388	20725.5	72	72	72	0.9336		
X2									0.9336	
BT	-34	17300	1217.9	1217.9	17400	1216.6	1216.6	17500	1216.9	1216.9
BT		17600	1217	1217	17700	1217.7	1217.7	17800	1216.6	1216.6
BT		17900	1215.2	1215.2	18000	1213.8	1213.8	18100	1214.2	1214.2
BT		18200	1211.5	1211.5	18300	1211.9	1211.9	18400	1211.5	1211.5
BT		18500	1212.3	1212.3	18600	1213.6	1213.6	18700	1214.9	1214.9
BT		18800	1215.5	1215.5	18900	1219.1	1219.1	19000	1221	1221
		19100	1222	1222	19200	1224.3	1224.3	19300	1225.2	1225.2
BT		19387.9	1226.84	1226.84	19387.9	1226.84	1220.14	19513.7	1227.96	1221.2
BT		19650.3	1228.84	1222.1	19784.9	1229.57	1222.8	19919.5	1229.93	1223.2
BT		20053.9	1230.03	1223.3	20187.6	1229.87	1223.1	20323.2	1229.45	1222.7
BT		20457.4	1228.74	1222	20591.3	1227.89	1221.1	20725.4	1226.62	1219.9
BT		20725.4	1226.62	1226.6						
GR	1217.9	17300	1216.6	17400	1216.9	17500	1217	17600	1217.7	17700
GR	1216.6	17800	1215.2	17900	1213.8	18000	1214.2	18100	1211.5	18200
GR	1211.9	18300	1211.5	18400	1212.3	18500	1213.6	18600	1214.9	18700
GR	1215.5	18800	1219.1	18900	1221	19000	1222	19100	1224.3	19200
GR	1225.2	19300	1226.8	19387.9	1220.1	19388	1217.8	19388.1	1216.1	19398.2
GR	1204.3	19427.8	1197.4	19463.6	1197.2	19513.7	1221.2	19513.7	1221.2	19519.7
GR	1197.3	19519.7	1197.5	19589.2	1197.5	19650.3	1222.1	19650.3	1222.1	19656.3
GR	1197.5	19656.3	1198.3	19722.6	1196.6	19784.9	1222.8	19784.9	1222.8	19790.9
GR	1196.7	19790.9	1197	19853.3	1196.7	19886	1194.9	19904.6	1194.9	19919.5
GR	1223.2	19919.5	1223.2	19925.5	1194.9	19925.5	1194.9	20053.9	1223.3	20053.9
GR	1223.3	20059.9	1194.9	20059.9	1194.9	20111.6	1195.2	20124.9	1194.9	20187.6
GR	1223.1	20187.6	1223.2	20193.6	1194.9	20193.6	1194.9	20258.4	1195.1	20323.2
GR	1222.7	20323.2	1222.8	20329.2	1195.1	20329.2	1196.6	20389.7	1196.4	20457.4
GR	1222	20457.4	1222	20463.4	1196.4	20463.4	1194.9	20529.1	1194.9	20591.3
GR	1221.1	20591.3	1194.9	20597.3	1194.9	20637.5	1201.6	20683.5	1217.3	20725.4
GR	1219.9	20725.5	1226.6	20725.6	1224	20980	1220	21500	1220	21960

NH	3	0.032	19259.5	0.028	20779.6	0.032	21096.2			
ET		7.1					18700.0	20779.7		
X1	227.64	96	19259.5	20779.6	18	18	18			
GR	1216.4	17751.9	1213.3	18050.2	1210.8	18212.6	1210.7	18224.9	1211.8	18240.6
GR	1212.1	18259	1212	18285.6	1211	18303.8	1211	18311.6	1210.7	18337.6
GR	1211	18371	1211.2	18393	1211.6	18422.6	1211.6	18461.7	1210.9	18488.8
GR	1210.8	18495.8	1210.7	18510.3	1210.5	18524.3	1210.5	18524.9	1210.9	18536.9
GR	1212	18598.4	1213.4	18629.1	1213.2	18641.9	1213.2	18650.4	1213.4	18672.2
GR	1214.1	18697.2	1214.1	18716	1215	18747.9	1215.1	18782.8	1215.5	18810.3
GR	1213.3	18849.1	1213.2	18858.8	1211.6	18873.7	1211.8	18926.6	1211.9	18942.5
GR	1211.9	18948.5	1212	18957.3	1211.6	18985	1215.2	19003	1217.6	19020.8
GR	1225.4	19083.3	1225.3	19090.6	1225.3	19092.8	1225.4	19094.4	1225.9	19156.3
GR	1226	19162.1	1226	19248.1	1226.1	19250.8	1226.1	19259.5	1225.7	19352.6
GR	1223.6	19367.1	1220.7	19376.7	1198.7	19449.1	1198.7	19449.4	1197.5	19458.9
GR	1198.8	19474.2	1198.9	19488.9	1198.3	19511.8	1198.7	19545.4	1199.5	19589.3
GR	1199	19641.5	1199.7	19715.4	1199.7	19721.6	1199.7	19724.5	1198.7	19764.3
GR	1199.4	19832.7	1199.2	19850.5	1198.4	19885.2	1198.2	19903.3	1196.5	19927.6
GR	1194.9	19968.9	1194.9	20034.7	1194.9	20039.8	1194.9	20047.7	1195	20072.9
GR	1195.1	20266.3	1195.2	20315.5	1195.2	20394.4	1195.6	20635.8	1195.6	20637.5
GR	1195.6	20640.1	1197.7	20647.6	1201.9	20660.6	1219.3	20730	1222.6	20743.9
GR	1225.6	20777.7	1225.8	20779.6	1225.8	20779.9	1225.7	20783.8	1222.9	20929.3
GR	1222.9	20933.4	1223.1	20937	1223	20939	1223	20949.1	1223.1	21017.2
GR	1222.2	21096.2								

NH	3	0.032	19292.4	0.028	20687.1	0.032	21553.7			
ET		7.1					18550.0	20800.3		
X1	227.69	96	19292.4	20687.1	1350	95	312.26			
GR	1218.4	17692.3	1218.3	17705.9	1215.8	17746.3	1215.9	17753.4	1215.1	17808.9
GR	1214.3	17846.8	1214.4	17903.4	1214.4	17970.6	1214.5	18009.3	1214.5	18026
GR	1214.9	18087.7	1214.7	18114.6	1214.2	18176.6	1213.7	18201.1	1211.7	18230.2
GR	1211	18246.1	1211	18279	1231	18302.1	1236.2	18309	1235.7	18346.1
GR	1235.1	18359.6	1230.5	18365.8	1211	18389.2	1211	18408.1	1211.3	18456.9
GR	1211.5	18478.3	1212.2	18514.3	1213.1	18633.4	1213.1	18650.5	1213.6	18764.1
GR	1213.3	18804.8	1213.3	18834.1	1213.3	18905.2	1213.4	18971.2	1213	19070.7
GR	1213	19132.1	1213.3	19157	1213.1	19198.2	1213.2	19265.1	1216	19292.4
GR	1211.9	19315.5	1208	19340.6	1203.1	19362	1201.6	19379.6	1203.6	19405.4
GR	1203.5	19418.4	1203.3	19473.3	1204.1	19498.6	1205.8	19539.6	1206.2	19577.4
GR	1206.1	19617.3	1206.2	19674.9	1206.3	19685.4	1206.2	19722.5	1206.2	19764.6
GR	1206.5	19819	1206.3	19831.4	1205.1	19888.9	1203.2	19912.6	1202.5	19917.5
GR	1200.2	19954.3	1197	19996.4	1195	20027.6	1195.4	20416	1195.5	20447.6
GR	1195.6	20569.5	1195.7	20618.4	1203	20642.7	1216.6	20687.1	1214.6	20699.7
GR	1214.2	20707.3	1214.8	20743.7	1214.3	20755.9	1211.4	20800.3	1210.8	20837.5
GR	1210.3	20850.5	1209.6	20888.3	1210.2	20916.2	1210.1	20941.9	1210.7	20989.1
GR	1210.3	20999.7	1214.3	21032.7	1214.4	21035.9	1215.4	21089.2	1215.6	21110.7
GR	1214.5	21149.1	1214.4	21177.7	1214.9	21203.9	1215.3	21263.8	1215	21295.6
GR	1214.9	21351.5	1215.1	21404.3	1216.4	21451.1	1216.6	21474.6	1217.6	21517.9
GR	1218.4	21553.7								

NH	3	0.032	19295.5	0.028	20696	0.032	21737			
ET		7.1					18323.4	21120.0		
X1	227.79	96	19295.5	20696.0	800	450	493.17			
GR	1222.1	17036.6	1221.8	17080.5	1221.1	17190.4	1220.9	17331.6	1219.8	17459.9
GR	1219.5	17519.4	1219.3	17574	1219	17625	1218.2	17736	1217.6	17813.7
GR	1217.6	17843.8	1203.6	17866.2	1204.2	17891.6	1215.8	17934.6	1216.6	17990.3
GR	1205.9	18038.9	1208.3	18075.6	1209.9	18130.8	1210.4	18161.5	1206.5	18228
GR	1206.1	18231.9	1213.1	18287.7	1215.6	18299.3	1217.6	18323.4	1211.5	18341.7
GR	1212.8	18387.1	1212.3	18406.9	1215.6	18423.7	1216.7	18481	1213.7	18496.2
GR	1213.3	18512.8	1208.1	18549.4	1209.2	18555.7	1206.6	18584.4	1207.8	18636.9
GR	1212	18670.6	1207.5	18683.3	1206.2	18706.9	1212.2	18735.8	1212.7	18797.4
GR	1212.9	18843.1	1212.7	18894.6	1213.9	18938.7	1214.3	19000.4	1213.9	19080.3
GR	1213.7	19133.5	1214.9	19203.7	1215.2	19230	1213.4	19263.4	1212.3	19269.8
GR	1215.9	19295.5	1211.2	19342.3	1211.6	19382.4	1207	19407.6	1206.9	19480
GR	1207	19484.5	1200.5	19524.4	1204.3	19588.9	1207	19641.8	1206.1	19667.1
GR	1208	19754.9	1208.4	19812.4	1208.2	19827	1204.4	19893.4	1203.4	19904.7
GR	1199	19930.7	1198.6	20019.6	1198.5	20030.9	1197.8	20103.5	1196.8	20471.9
GR	1196.1	20637.4	1206.5	20670.7	1215	20688.5	1216.1	20696	1212.1	20723.1
GR	1213.7	20799.3	1213.2	20855	1211.6	20901.6	1211.4	20954.4	1211.2	20967.9
GR	1213.3	21022.3	1214.1	21052.9	1210.7	21109.4	1210.3	21114.4	1213.2	21151.6
GR	1214.6	21190.4	1215.2	21247.3	1215.8	21306.4	1214.5	21389.9	1213.9	21455
GR	1217.7	21491	1215.8	21523.5	1219	21596.2	1216.9	21651.5	1217.4	21704.4
GR	1219.6	21737								

THIS RUN EXECUTED 29AUG95 13:45:23

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

DROP #5 TO D/S OF ALMA R

SUMMARY PRINTOUT

SECNO	ELMIN	CWSEL	Q	VCH	DIFWSX	TOPWID	DEPTH	HV	SSTA	RBEL	FRCH
20.500	1147.00	1166.59	215000.00	11.07	.00	1037.18	19.59	1.90	383.29	100000.00	.45
22.000	1147.20	1166.70	215000.00	11.49	.11	1009.57	19.50	2.05	388.54	100000.00	.47
22.650	1147.20	1166.81	215000.00	11.46	.11	1006.63	19.61	2.04	198.58	1170.50	.47
23.550	1147.30	1168.48	215000.00	10.45	1.67	1060.68	21.18	1.69	268.86	1170.50	.42
28.000	1147.70	1168.95	215000.00	10.27	.47	1002.76	21.25	1.64	93.53	100000.00	.41
29.000	1148.10	1169.17	215000.00	11.32	.22	922.79	21.07	1.99	333.63	100000.00	.45
30.000	1148.40	1169.13	215000.00	13.87	-.04	768.48	20.73	2.99	484.47	100000.00	.56
31.000	1148.80	1169.70	215000.00	15.02	.57	700.77	20.90	3.50	163.50	100000.00	.61
32.000	1149.20	1170.48	215000.00	15.84	.78	653.90	21.28	3.90	318.32	100000.00	.64
33.000	1149.60	1171.29	215000.00	16.74	.82	608.52	21.69	4.35	317.41	100000.00	.67
34.000	1150.00	1172.77	215000.00	16.17	1.48	606.74	22.77	4.06	354.32	100000.00	.63
35.000	1150.40	1174.48	215000.00	14.74	1.70	630.01	24.08	3.37	326.72	100000.00	.56
36.000	1150.80	1175.78	215000.00	13.61	1.31	657.32	24.98	2.88	330.32	100000.00	.51
37.000	1151.20	1177.56	215000.00	10.51	1.78	802.49	26.36	1.71	278.34	100000.00	.38
38.000	1151.70	1178.25	215000.00	9.68	.69	862.57	26.55	1.46	478.96	100000.00	.34
39.000	1152.20	1178.49	220000.00	10.28	.23	840.03	26.29	1.64	494.65	100000.00	.36
40.000	1152.70	1179.32	220000.00	8.77	.83	968.78	26.62	1.19	460.37	100000.00	.30

	SECNO	ELMIN	CWSEL	Q	VCH	DIFWSX	TOPWID	DEPTH	HV	SSTA	RBEL	FRCH
	40.100	1152.80	1179.35	220000.00	8.79	.03	969.51	26.55	1.20	5004.75	1184.10	.30
	40.200	1152.80	1179.61	220000.00	8.64	.26	977.02	26.81	1.16	5004.49	1184.10	.30
	40.300	1152.90	1179.74	220000.00	8.42	.13	1000.28	26.84	1.10	5004.46	100000.00	.29
	40.400	1153.00	1179.86	220000.00	8.22	.12	1023.52	26.86	1.05	5004.44	1184.30	.28
	40.500	1153.10	1180.05	220000.00	8.04	.19	1042.31	26.95	1.00	5004.35	1184.40	.28
	40.600	1153.10	1180.12	220000.00	7.92	.06	1054.95	27.02	.97	5004.38	1184.50	.27
	41.100	1153.20	1180.17	220000.00	7.84	.05	1067.83	26.97	.95	5004.43	1184.60	.27
	41.200	1153.20	1180.34	220000.00	7.75	.17	1073.68	27.14	.93	5004.66	1185.00	.27
	42.100	1150.00	1181.04	220000.00	5.82	.70	1562.59	31.04	.53	4917.41	100000.00	.21
	224.340	1150.00	1181.07	220000.00	5.90	.03	1576.06	31.07	.54	19826.03	100000.00	.21
	224.430	1152.00	1181.24	220000.00	5.77	.17	1667.74	29.24	.52	19826.06	100000.00	.21
	224.530	1152.00	1181.54	220000.00	4.76	.31	2055.04	29.54	.35	19667.96	100000.00	.18
	224.620	1153.00	1181.57	220000.00	5.69	.02	1877.37	28.57	.50	19522.63	100000.00	.22
	224.710	1154.00	1181.86	220000.00	4.70	.29	1867.08	27.86	.34	19330.04	100000.00	.17
	224.810	1154.00	1181.95	220000.00	4.66	.10	2045.07	27.95	.34	19094.93	100000.00	.17
*	224.900	1154.00	1181.64	220000.00	8.17	-.32	1542.94	27.64	1.04	18907.06	100000.00	.34
*	225.000	1154.00	1182.57	220000.00	4.74	.93	1989.57	28.57	.35	18734.83	100000.00	.17
*	225.100	1156.00	1182.09	220000.00	9.12	-.48	1196.15	26.09	1.29	19087.85	100000.00	.36
*	225.190	1158.00	1181.98	220000.00	12.24	-.11	1013.53	23.98	2.33	19236.47	100000.00	.51
	225.280	1163.00	1182.92	220000.00	13.72	.94	1067.11	19.92	2.49	19182.79	1175.80	.61
	225.380	1162.40	1183.88	220000.00	13.80	.96	950.11	21.48	2.96	18889.14	100000.00	.59
	225.480	1160.30	1185.64	220000.00	12.33	1.76	1034.23	25.34	2.36	18657.31	100000.00	.52
	225.570	1157.90	1187.28	220000.00	9.75	1.64	1191.88	29.38	1.48	18715.92	100000.00	.39
	225.660	1158.80	1187.76	220000.00	9.97	.48	1047.62	28.96	1.54	18743.18	100000.00	.38
	225.760	1165.00	1188.14	220000.00	10.67	.38	1109.32	23.14	1.77	18690.21	100000.00	.44
	225.850	1167.00	1189.31	220000.00	8.70	1.17	1279.13	22.31	1.17	18640.00	100000.00	.34

	SECNO	ELMIN	CWSEL	Q	VCH	DIFWSX	TOPWID	DEPTH	HV	SSTA	RBEL	FRCH
	225.950	1167.90	1190.02	220000.00	7.56	.72	1769.53	22.12	.89	18375.80	100000.00	.33
*	226.040	1173.10	1189.63	147500.00	11.76	-.39	1036.85	16.53	2.10	19334.40	1186.40	.56
	226.130	1170.50	1189.75	147500.00	14.78	.11	880.44	19.25	3.37	19607.51	1185.20	.75
	226.230	1172.30	1190.64	147500.00	17.48	.89	919.90	18.33	4.49	19646.45	1184.70	.90
	226.350	1173.40	1194.07	147500.00	15.42	3.44	913.28	20.67	3.68	19628.63	1185.70	.83
	226.480	1181.80	1196.86	147500.00	15.31	2.78	908.27	15.06	3.64	19627.56	100000.00	.83
*	226.490	1186.00	1196.67	147500.00	17.44	-.18	907.32	10.67	4.73	19627.96	100000.00	1.01
	226.500	1186.00	1197.70	147500.00	15.71	1.03	912.71	11.70	3.83	19625.73	100000.00	.86
	226.510	1186.00	1197.54	147500.00	16.21	-.17	862.63	11.54	4.08	19615.60	1201.16	.90
	226.520	1186.00	1198.99	147500.00	14.26	1.45	862.65	12.99	3.16	19615.60	1201.16	.74
*	226.530	1186.00	1199.71	147500.00	12.70	.72	924.40	13.71	2.51	19621.39	100000.00	.63
	226.610	1187.00	1200.88	147500.00	11.99	1.17	962.58	13.88	2.22	19604.05	1190.00	.58
	226.700	1188.00	1202.16	147500.00	10.57	1.28	1121.92	14.16	1.72	19598.12	1193.10	.52
*	226.800	1191.70	1201.55	147500.00	17.24	-.61	960.67	9.85	4.58	19609.54	1192.70	1.00
*	226.890	1192.50	1205.16	147500.00	13.98	3.61	948.73	12.66	2.98	19600.00	1194.10	.72
	226.990	1193.70	1205.67	220000.00	17.20	.52	1144.43	11.97	4.58	19381.33	1199.60	.89
*	227.080	1194.10	1207.78	220000.00	19.92	2.10	962.61	13.68	5.91	19604.72	1200.90	.98
*	227.180	1194.50	1211.83	220000.00	15.45	4.06	985.01	17.33	3.69	19585.02	1201.90	.70
	227.270	1193.70	1214.03	220000.00	12.58	2.20	1047.65	20.33	2.46	19561.50	1213.60	.54
	227.370	1194.00	1215.57	220000.00	10.31	1.54	1340.47	21.57	1.53	19100.00	100000.00	.43
	227.460	1194.10	1215.75	220000.00	11.28	.17	1341.90	21.65	1.88	19169.11	100000.00	.46
	227.560	1194.60	1216.58	220000.00	9.79	.83	1297.90	21.98	1.45	19300.00	1206.50	.38
	227.610	1194.90	1217.13	220000.00	8.35	.56	1373.35	22.23	1.08	19350.00	1223.30	.33
	227.620	1194.90	1216.78	220000.00	10.17	-.36	1068.52	21.88	1.61	19388.00	1219.90	.41
	227.630	1194.90	1216.86	220000.00	10.13	.08	1068.75	21.96	1.59	19388.00	1219.90	.40
*	227.640	1194.90	1217.48	220000.00	8.27	.61	1655.32	22.58	1.05	18700.00	1225.80	.34

SECNO	ELMIN	CWSEL	Q	VCH	DIFWSX	TOPWID	DEPTH	HV	SSTA	RBEL	FRCH
227.690	1195.00	1217.57	220000.00	8.92	.10	2250.30	22.57	1.18	18550.00	1216.60	.38
227.790	1196.10	1218.11	220000.00	8.45	.54	2796.60	22.01	.99	18323.40	1216.10	.37

D[illegible]5 TO D/S OF ALMA R

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	20.500	.00	.00	.00	1147.00	215000.00	1166.59	.00	1168.49	13.87	11.07	19429.93	57733.27
	22.000	150.00	.00	.00	1147.20	215000.00	1166.70	.00	1168.75	15.12	11.49	18707.49	55290.56
	22.650	65.00	.00	.00	1147.20	215000.00	1166.81	.00	1168.85	14.93	11.46	18755.49	55639.61
*	23.550	120.00	1181.80	1180.61	1147.30	215000.00	1168.48	.00	1170.17	11.74	10.45	20580.07	62744.23
	28.000	360.00	.00	.00	1147.70	215000.00	1168.95	.00	1170.59	11.04	10.27	20926.64	64718.88
	29.000	380.00	.00	.00	1148.10	215000.00	1169.17	.00	1171.16	13.69	11.32	18995.56	58114.92
	30.000	390.00	.00	.00	1148.40	215000.00	1169.13	.00	1172.12	21.42	13.87	15502.77	46452.00
	31.000	400.00	.00	.00	1148.80	215000.00	1169.70	.00	1173.20	25.13	15.02	14317.17	42886.73
	32.000	400.00	.00	.00	1149.20	215000.00	1170.48	.00	1174.37	27.66	15.84	13572.09	40881.82
	33.000	390.00	.00	.00	1149.60	215000.00	1171.29	.00	1175.64	30.53	16.74	12846.28	38913.43
	34.000	405.00	.00	.00	1150.00	215000.00	1172.77	.00	1176.83	27.03	16.17	13299.12	41355.56
	35.000	400.00	.00	.00	1150.40	215000.00	1174.48	.00	1177.85	20.92	14.74	14588.62	47003.36
	36.000	405.00	.00	.00	1150.80	215000.00	1175.78	.00	1178.66	16.97	13.61	15796.04	52186.17
	37.000	410.00	.00	.00	1151.20	215000.00	1177.56	.00	1179.28	9.19	10.51	20460.22	70938.22
	38.000	510.00	.00	.00	1151.70	215000.00	1178.25	.00	1179.71	7.08	9.68	22200.38	80805.23
	39.000	480.00	.00	.00	1152.20	220000.00	1178.49	.00	1180.13	8.10	10.28	21391.35	77289.32
	40.000	500.00	.00	.00	1152.70	220000.00	1179.32	.00	1180.51	5.74	8.77	25078.97	91800.82
	40.100	57.00	.00	.00	1152.80	220000.00	1179.35	.00	1180.55	5.78	8.79	25038.34	91511.80
	40.200	32.00	1206.00	1192.00	1152.80	220000.00	1179.61	.00	1180.77	5.51	8.64	25472.70	93687.29
	40.300	106.00	.00	.00	1152.90	220000.00	1179.74	.00	1180.84	5.23	8.42	26126.23	96238.02
	40.400	106.00	.00	.00	1153.00	220000.00	1179.86	.00	1180.91	4.96	8.22	26771.28	98738.73
	40.500	85.00	1199.00	1184.00	1153.10	220000.00	1180.05	.00	1181.06	4.72	8.04	27367.97	101220.20
	40.600	58.00	.00	.00	1153.10	220000.00	1180.12	.00	1181.09	4.57	7.92	27774.93	102922.90
	41.100	59.00	.00	.00	1153.20	220000.00	1180.17	.00	1181.13	4.48	7.84	28073.44	103952.00

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	41.200	29.00	1192.00	1184.00	1153.20	220000.00	1180.34	.00	1181.27	4.34	7.75	28400.89	105593.10
	42.100	505.00	.00	.00	1150.00	220000.00	1181.04	.00	1181.56	2.74	5.82	37800.37	132928.20
	224.340	140.00	.00	.00	1150.00	220000.00	1181.07	.00	1181.61	2.95	5.90	37308.41	128031.20
	224.430	493.70	.00	.00	1152.00	220000.00	1181.24	.00	1181.76	2.97	5.77	38146.05	127724.00
	224.530	506.30	.00	.00	1152.00	220000.00	1181.54	.00	1181.90	2.04	4.76	46258.05	153933.60
	224.620	504.90	.00	.00	1153.00	220000.00	1181.57	.00	1182.07	3.29	5.69	38685.79	121293.20
	224.710	491.60	.00	.00	1154.00	220000.00	1181.86	.00	1182.20	1.72	4.70	46847.43	167823.40
	224.810	509.80	.00	.00	1154.00	220000.00	1181.95	.00	1182.29	1.88	4.66	47168.62	160631.80
*	224.900	494.90	.00	.00	1154.00	220000.00	1181.64	.00	1182.67	8.35	8.17	26917.62	76155.76
*	225.000	500.00	.00	.00	1154.00	220000.00	1182.57	.00	1182.92	1.93	4.74	46412.95	158527.00
*	225.100	510.00	.00	.00	1156.00	220000.00	1182.09	.00	1183.38	8.54	9.12	24132.75	75285.78
*	225.190	502.05	.00	.00	1158.00	220000.00	1181.98	.00	1184.30	18.72	12.24	17978.31	50852.11
	225.280	487.64	.00	.00	1163.00	220000.00	1182.92	.00	1185.41	26.74	13.72	17814.51	42544.44
	225.380	518.68	.00	.00	1162.40	220000.00	1183.88	.00	1186.84	24.98	13.80	15937.54	44019.50
	225.480	507.13	.00	.00	1160.30	220000.00	1185.64	.00	1188.00	19.15	12.33	17843.07	50269.62
	225.570	475.36	.00	.00	1157.90	220000.00	1187.28	.00	1188.76	10.67	9.75	22562.84	67356.80
	225.660	512.77	.00	.00	1158.80	220000.00	1187.76	.00	1189.30	9.70	9.97	22074.78	70627.05
	225.760	482.78	.00	.00	1165.00	220000.00	1188.14	.00	1189.91	13.00	10.67	20613.40	61020.92
	225.850	509.56	.00	.00	1167.00	220000.00	1189.31	.00	1190.48	8.09	8.70	25296.68	77360.04
	225.950	509.99	.00	.00	1167.90	220000.00	1190.02	.00	1190.91	7.62	7.56	29118.36	79698.17
*	226.040	476.46	.00	.00	1173.10	147500.00	1189.63	.00	1191.74	14.88	11.76	12876.64	38241.57
	226.130	502.01	.00	.00	1170.50	147500.00	1189.75	.00	1193.12	28.35	14.78	10076.26	27704.48
	226.230	492.85	.00	.00	1172.30	147500.00	1190.64	.00	1195.13	40.29	17.48	8989.05	23237.32
	226.350	666.57	.00	.00	1173.40	147500.00	1194.07	.00	1197.75	35.73	15.42	9617.90	24677.11
	226.480	763.51	.00	.00	1181.80	147500.00	1196.86	.00	1200.49	35.98	15.31	9634.42	24588.78
	226.490	1.00	.00	.00	1186.00	147500.00	1196.67	1196.67	1201.40	55.45	17.44	8455.54	19807.84

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	226.500	10.00	.00	.00	1186.00	147500.00	1197.70	.00	1201.54	39.42	15.71	9390.55	23492.26
	226.510	2.00	1204.00	1202.66	1186.00	147500.00	1197.54	.00	1201.62	62.54	16.21	9097.92	18650.96
	226.520	84.00	1204.00	1202.66	1186.00	147500.00	1198.99	.00	1202.14	42.86	14.26	10345.43	22529.14
*	226.530	2.00	.00	.00	1186.00	147500.00	1199.71	.00	1202.21	19.78	12.70	11612.67	33162.12
	226.610	478.10	.00	.00	1187.00	147500.00	1200.88	.00	1203.10	16.26	11.99	12407.15	36577.23
	226.700	503.99	.00	.00	1188.00	147500.00	1202.16	.00	1203.88	13.01	10.57	14098.25	40894.74
*	226.800	487.43	.00	.00	1191.70	147500.00	1201.55	1201.55	1206.13	54.66	17.24	8634.37	19951.25
*	226.890	510.72	.00	.00	1192.50	147500.00	1205.16	.00	1208.14	25.84	13.98	10695.82	29016.66
	226.990	492.08	.00	.00	1193.70	220000.00	1205.67	.00	1210.25	40.03	17.20	12873.25	34771.38
*	227.080	504.96	.00	.00	1194.10	220000.00	1207.78	1207.78	1213.69	46.65	19.92	11410.32	32209.38
*	227.180	509.22	.00	.00	1194.50	220000.00	1211.83	.00	1215.52	22.79	15.45	14366.40	46079.24
	227.270	498.96	.00	.00	1193.70	220000.00	1214.03	.00	1216.49	13.25	12.58	17494.19	60443.29
	27.370	509.52	.00	.00	1194.00	220000.00	1215.57	.00	1217.11	7.96	10.31	22427.67	77983.63
	227.460	506.97	.00	.00	1194.10	220000.00	1215.75	.00	1217.63	9.18	11.28	20788.90	72618.05
	227.560	490.80	.00	.00	1194.60	220000.00	1216.58	.00	1218.02	6.25	9.79	23223.48	88014.22
	227.610	289.93	.00	.00	1194.90	220000.00	1217.13	.00	1218.22	4.79	8.35	26371.13	100496.00
	227.620	18.00	1211.50	1226.60	1194.90	220000.00	1216.78	.00	1218.39	9.77	10.17	21631.17	70374.31
	227.630	72.00	1211.50	1226.60	1194.90	220000.00	1216.86	.00	1218.46	9.65	10.13	21720.52	70804.93
*	227.640	18.00	.00	.00	1194.90	220000.00	1217.48	.00	1218.52	4.61	8.27	27453.70	102410.10
	227.690	312.26	.00	.00	1195.00	220000.00	1217.57	.00	1218.75	6.60	8.92	27029.60	85648.59
	227.790	493.17	.00	.00	1196.10	220000.00	1218.11	.00	1219.10	6.28	8.45	30185.20	87809.03

DR' '45 TO D/S OF ALMA R

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	20.500	215000.00	1166.59	.00	.00	.00	1037.18	.00
	22.000	215000.00	1166.70	.00	.11	.00	1009.57	150.00
	22.650	215000.00	1166.81	.00	.11	.00	1006.63	65.00
*	23.550	215000.00	1168.48	.00	1.67	.00	1060.68	120.00
	28.000	215000.00	1168.95	.00	.47	.00	1002.76	360.00
	29.000	215000.00	1169.17	.00	.22	.00	922.79	380.00
	30.000	215000.00	1169.13	.00	-.04	.00	768.48	390.00
	31.000	215000.00	1169.70	.00	.57	.00	700.77	400.00
	32.000	215000.00	1170.48	.00	.78	.00	653.90	400.00
	33.000	215000.00	1171.29	.00	.82	.00	608.52	390.00
	34.000	215000.00	1172.77	.00	1.48	.00	606.74	405.00
	35.000	215000.00	1174.48	.00	1.70	.00	630.01	400.00
	36.000	215000.00	1175.78	.00	1.31	.00	657.32	405.00
	37.000	215000.00	1177.56	.00	1.78	.00	802.49	410.00
	38.000	215000.00	1178.25	.00	.69	.00	862.57	510.00
	39.000	220000.00	1178.49	.00	.23	.00	840.03	480.00
	40.000	220000.00	1179.32	.00	.83	.00	968.78	500.00
	40.100	220000.00	1179.35	.00	.03	.00	969.51	57.00
	40.200	220000.00	1179.61	.00	.26	.00	977.02	32.00
	40.300	220000.00	1179.74	.00	.13	.00	1000.28	106.00
	40.400	220000.00	1179.86	.00	.12	.00	1023.52	106.00
	40.500	220000.00	1180.05	.00	.19	.00	1042.31	85.00
	40.600	220000.00	1180.12	.00	.06	.00	1054.95	58.00
	41.100	220000.00	1180.17	.00	.05	.00	1067.83	59.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	41.200	220000.00	1180.34	.00	.17	.00	1073.68	29.00
	42.100	220000.00	1181.04	.00	.70	.00	1562.59	505.00
	224.340	220000.00	1181.07	.00	.03	.00	1576.06	140.00
	224.430	220000.00	1181.24	.00	.17	.00	1667.74	493.70
	224.530	220000.00	1181.54	.00	.31	.00	2055.04	506.30
	224.620	220000.00	1181.57	.00	.02	.00	1877.37	504.90
	224.710	220000.00	1181.86	.00	.29	.00	1867.08	491.60
	224.810	220000.00	1181.95	.00	.10	.00	2045.07	509.80
*	224.900	220000.00	1181.64	.00	-.32	.00	1542.94	494.90
*	225.000	220000.00	1182.57	.00	.93	.00	1989.57	500.00
*	225.100	220000.00	1182.09	.00	-.48	.00	1196.15	510.00
*	225.190	220000.00	1181.98	.00	-.11	.00	1013.53	502.05
	225.280	220000.00	1182.92	.00	.94	.00	1067.11	487.64
	225.380	220000.00	1183.88	.00	.96	.00	950.11	518.68
	225.480	220000.00	1185.64	.00	1.76	.00	1034.23	507.13
	225.570	220000.00	1187.28	.00	1.64	.00	1191.88	475.36
	225.660	220000.00	1187.76	.00	.48	.00	1047.62	512.77
	225.760	220000.00	1188.14	.00	.38	.00	1109.32	482.78
	225.850	220000.00	1189.31	.00	1.17	.00	1279.13	509.56
	225.950	220000.00	1190.02	.00	.72	.00	1769.53	509.99
*	226.040	147500.00	1189.63	.00	-.39	.00	1036.85	476.46
	226.130	147500.00	1189.75	.00	.11	.00	880.44	502.01
	226.230	147500.00	1190.64	.00	.89	.00	919.90	492.85
	226.350	147500.00	1194.07	.00	3.44	.00	913.28	666.57
	226.480	147500.00	1196.86	.00	2.78	.00	908.27	763.51
	226.490	147500.00	1196.67	.00	-.18	.00	907.32	1.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	226.500	147500.00	1197.70	.00	1.03	.00	912.71	10.00
	226.510	147500.00	1197.54	.00	-.17	.00	862.63	2.00
	226.520	147500.00	1198.99	.00	1.45	.00	862.65	84.00
*	226.530	147500.00	1199.71	.00	.72	.00	924.40	2.00
	226.610	147500.00	1200.88	.00	1.17	.00	962.58	478.10
	226.700	147500.00	1202.16	.00	1.28	.00	1121.92	503.99
*	226.800	147500.00	1201.55	.00	-.61	.00	960.67	487.43
*	226.890	147500.00	1205.16	.00	3.61	.00	948.73	510.72
	226.990	220000.00	1205.67	.00	.52	.00	1144.43	492.08
*	227.080	220000.00	1207.78	.00	2.10	.00	962.61	504.96
*	227.180	220000.00	1211.83	.00	4.06	.00	985.01	509.22
	227.270	220000.00	1214.03	.00	2.20	.00	1047.65	498.96
	227.370	220000.00	1215.57	.00	1.54	.00	1340.47	509.52
	227.460	220000.00	1215.75	.00	.17	.00	1341.90	506.97
	227.560	220000.00	1216.58	.00	.83	.00	1297.90	490.80
	227.610	220000.00	1217.13	.00	.56	.00	1373.35	289.93
	227.620	220000.00	1216.78	.00	-.36	.00	1068.52	18.00
	227.630	220000.00	1216.86	.00	.08	.00	1068.75	72.00
*	227.640	220000.00	1217.48	.00	.61	.00	1655.32	18.00
	227.690	220000.00	1217.57	.00	.10	.00	2250.30	312.26
	227.790	220000.00	1218.11	.00	.54	.00	2796.60	493.17

SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION SECNO=     23.550  PROFILE=  1  HYDRAULIC JUMP D.S.

WARNING SECNO=    224.900  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    225.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    225.100  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    225.190  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    226.040  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=    226.490  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    226.490  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    226.490  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=    226.530  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=    226.800  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    226.800  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=    226.890  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=    227.080  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    227.080  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=    227.180  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    227.640  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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HEC-2

Design Condition 1 Model
South Hardbank in Place
South Split at Alma School

Summary Printout (SUMPO)
& Complete Printout

Filename = DSGN1SS.DAT

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*********************************************
*  HEC-2 WATER SURFACE PROFILES             *
*                                           *
*  Version   4.6.2;  May 1991               *
*                                           *
*  DATE    29AUG95    TIME    17:56:48      *
*********************************************
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**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*         (916) 756-1104             *
**************************************
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X     X  XXXXXXX   XXXXX               XXXXX
X     X  X        X     X             X     X
X     X  X        X                         X
XXXXXXX  XXXX     X          XXXXX     XXXXX
X     X  X        X                   X
X     X  X        X     X             X
X     X  XXXXXXX   XXXXX              XXXXXXX
```

THIS RUN EXECUTED 29AUG95 17:56:48

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**************************************
HEC-2 WATER SURFACE PROFILES

Version  4.6.2;  May 1991
**************************************
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T1 SALT/GILA FLOOD DELINEATION
T2 100-YEAR FLOOD
T3 REACH 5: Split B X-sec's 225.95 - 226.89
T1 RED MOUNTAIN PHASE II SALT RIVER EXISTING CONDITION MODEL
T2 BASED ON MCFCD PRELIMINARY SALT RIVER MODEL SPLITB.DAT
T3 PREPARED BY MICHAEL BAKER JR. ENGINEERS, INC.
T4 STARTING WSEL FROM DESIGN CONDITION MODEL DESGN220.DAT
T4 SALT RIVER, MCCLINTOCK DRIVE TO COUNTRY CLUB DRIVE
T4 REVISED BY WOOD, PATEL & ASSOCIATES, INC. 03-15-95
T4 The following analysis is for design conditions and reflects the roadway
T4 & hardbank for Phase II of the Red Mountain Freeway. Certain revisions
T4 were made to the original file as received from Michael Baker Jr.
T4 Engineers. These included revisions to the encroachments, bank station
T4 locations, the Q used for analysis, the starting water surface elevation
T4 and the addition of the drop structures constructed by MCDOT under the
T4 north and south Alma School Road bridges.
T4 File=DSGN1SS.DAT - Design Condition 1 - South Split at Alma School

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	2	0	0	0.0	0	0.0	220000.0	1190.02	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1	0	0.0	0.0	0.0	0.0	-1.0	-6.0	0.0	15

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

38	42	1	43	26	51	4	8	10	53
54	68		150						

J5 LPRNT NUMSEC ********REQUESTED SECTION NUMBERS********

-10 -10

NC	0.0	0.0	0.0	0.1	0.3					
NH	5	0.032	18228.4	0.028	18335.5	0.028	20237.2	0.031	21188.1	0.032
NH	21595.									
ET		7.1					18335.5	20237.2		

X1	225.95	94	18335.5	20237.2	0.0	0.0	0.0	1.0	0.0	
	1203.7	17840.6	1202.4	17848.9	1193.6	17889.2	1193.7	17922.2	1194.0	17963.8
GR	1193.7	18003.5	1193.3	18049.4	1194.4	18075.7	1196.9	18116.2	1197.0	18196.1
GR	1196.0	18228.4	1194.6	18269.0	1193.2	18321.5	1192.9	18335.5	1190.1	18375.5
GR	1182.4	18405.1	1183.0	18428.5	1181.5	18445.0	1177.9	18462.5	1176.1	18485.6
GR	1176.8	18517.9	1176.6	18533.3	1175.3	18553.3	1176.3	18604.6	1178.0	18637.4
GR	1176.0	18671.4	1175.9	18692.9	1167.9	18708.4	1168.7	18708.7	1167.9	18717.5
GR	1167.9	18817.2	1168.0	18863.1	1168.6	18952.0	1168.8	19096.8	1168.8	19116.2
GR	1172.1	19129.0	1172.9	19130.4	1174.6	19160.5	1175.5	19215.6	1174.7	19255.3
GR	1175.1	19282.8	1173.9	19324.0	1172.5	19402.1	1173.3	19480.7	1173.4	19487.4
GR	1173.5	19546.6	1173.2	19561.6	1171.5	19597.0	1171.8	19766.1	1172.0	19774.5
GR	1172.2	19849.9	1172.6	19953.3	1173.0	20020.4	1173.0	20028.3	1183.6	20039.7
GR	1183.9	20085.7	1184.1	20114.6	1196.9	20181.0	1208.9	20237.2	1206.8	20284.1
GR	1208.4	20295.6	1203.3	20308.8	1195.4	20337.0	1194.8	20347.3	1194.6	20393.0
GR	1194.6	20446.4	1194.6	20457.2	1194.6	20542.6	1195.3	20585.5	1198.7	20639.1
GR	1198.6	20647.5	1200.8	20699.8	1201.6	20747.8	1201.5	20820.4	1201.6	20865.5
GR	1202.1	20977.3	1202.1	20982.5	1201.9	21042.6	1201.8	21084.5	1199.8	21122.5
GR	1199.8	21145.3	1200.5	21188.1	1200.5	21201.5	1198.1	21246.4	1196.8	21266.9
GR	1197.8	21298.1	1197.5	21304.9	1198.3	21344.9	1198.8	21373.7	1200.5	21418.9
GR	1199.0	21475.2	1199.6	21525.8	1200.0	21556.4	1202.2	21595.0		
NH	1	0.028	19322.6							
QT	1	72500.0								
ET		7.1					18005.0	19322.6		
X1	226.04	36	18287.0	18930.5	920.0	480.0	476.46	1.0	0.0	
GR	1193.2	18218.0	1192.4	18233.8	1192.8	18247.6	1191.8	18287.0	1184.8	18304.5
GR	1180.9	18318.6	1177.5	18347.5	1174.5	18388.8	1172.7	18426.1	1173.2	18435.0
	1172.8	18468.8	1171.2	18491.7	1171.7	18494.6	1171.7	18506.8	1171.7	18552.0
GR	1171.8	18561.4	1171.8	18594.4	1170.7	18804.6	1170.7	18825.8	1182.5	18862.3
GR	1183.7	18894.7	1199.3	18930.5	1194.4	18942.7	1194.9	18956.4	1189.5	18992.3
GR	1189.5	18993.7	1169.5	19060.0	1169.3	19074.1	1168.4	19207.2	1168.4	19211.5
GR	1169.4	19214.6	1181.4	19235.1	1188.9	19246.2	1189.7	19251.8	1190.6	19296.5
GR	1190.7	19322.6								
NH	1	0.028	19593.2							
ET		7.1					17850.0	19100.0		
X1	226.13	40	18151.2	18774.9	510.0	500.0	502.01	1.0	0.0	
GR	1190.7	18007.0	1190.0	18069.5	1190.0	18121.5	1189.5	18147.2	1188.4	18151.2
GR	1178.1	18168.9	1177.2	18204.8	1172.4	18213.2	1172.6	18256.4	1173.0	18340.7
GR	1172.2	18362.9	1173.0	18403.5	1173.0	18405.0	1173.0	18426.6	1173.0	18447.3
GR	1173.0	18499.7	1173.0	18538.4	1173.0	18572.4	1173.0	18661.7	1173.0	18668.6
GR	1173.0	18774.9	1173.0	18821.8	1173.0	18843.7	1173.0	18848.8	1171.5	18876.1
GR	1170.6	18876.4	1170.7	18925.4	1170.7	18929.6	1171.1	19032.6	1171.0	19140.5
GR	1171.6	19157.7	1171.2	19255.2	1170.7	19306.5	1171.3	19354.4	1171.8	19366.1
GR	1170.5	19437.3	1170.7	19485.6	1172.2	19504.1	1195.1	19553.4	1197.4	19593.2
NH	1	0.028	19603.5							
ET		7.1					18060.0	18630.0		
X1	226.23	67	18223.2	19078.5	270	270	270.0	1.0	0.0	
GR	1204.2	17743.6	1191.9	17776.7	1190.6	17813.8	1190.1	17827.3	1188.8	17871.1
GR	1188.8	17877.4	1188.5	17916.5	1187.7	17942.6	1187.6	17969.4	1187.5	17973.1
GR	1189.3	17979.5	1190.1	17984.0	1188.6	17991.3	1187.8	17993.2	1187.9	18001.4
	1188.4	18051.2	1191.5	18059.4	1184.3	18074.3	1184.4	18093.6	1186.4	18103.8
GR	1186.5	18106.5	1187.0	18127.1	1186.8	18142.8	1185.6	18208.7	1185.3	18223.2

GR	1181.8	18234.6	1181.2	18239.8	1180.1	18287.5	1180.0	18290.9	1179.02	18344.8
	1178.8	18359.2	1177.87	18408.1	1177.35	18437.0	1176.56	18480.3	1175.86	18519.3
GR	1175.2	18554.1	1174.80	18577.7	1174.5	18594.2	1174.7	18658.7	1174.7	18692.9
GR	1174.8	18734.4	1174.8	18749.9	1175.0	18796.6	1175.5	18799.4	1176.4	18835.0
GR	1176.9	18843.3	1177.0	18851.6	1178.9	18889.7	1179.6	18910.8	1179.6	18953.7
GR	1179.8	18975.1	1180.1	19006.5	1180.3	19029.6	1180.6	19046.8	1180.6	19075.0
GR	1181.0	19078.5	1170.8	19096.4	1171.5	19100.9	1171.8	19210.2	1172.0	19274.6
GR	1172.3	19327.9	1172.5	19354.8	1172.5	19507.5	1172.5	19559.6	1172.8	19569.4
GR	1178.2	19577.6	1195.5	19603.5						
NH	1	0.028	19598.4							
ET		7.1					18050	18572.1		
X1	226.35	59	18134.0	18572.1	150	240	200.0	1.0	0.0	
GR	1195.3	17801.4	1192.9	17812.7	1191.5	17823.9	1191.2	17859.1	1192.1	17899.8
GR	1190.9	17918.1	1189.1	17926.5	1189.0	17932.0	1188.8	17996.3	1188.5	18046.6
GR	1188.5	18068.6	1189.2	18086.1	1189.0	18091.9	1187.2	18134.0	1183.7	18147.0
GR	1182.2	18167.7	1179.4	18184.0	1179.3	18223.9	1178.6	18265.3	1178.4	18309.3
GR	1178.5	18326.0	1177.4	18344.3	1177.3	18388.0	1176.9	18431.1	1176.4	18469.8
GR	1176.3	18535.4	1176.2	18542.6	1178.1	18554.3	1180.5	18560.6	1183.6	18565.7
GR	1184.1	18572.1	1180.1	18591.0	1178.8	18592.7	1176.9	18597.0	1175.7	18643.3
GR	1175.5	18660.7	1172.0	18694.7	1171.3	18736.1	1172.5	18745.3	1172.5	18750.4
GR	1172.3	18881.4	1172.7	18909.7	1172.3	18942.1	1171.7	18947.4	1172.1	18981.1
GR	1171.6	19026.5	1171.8	19034.3	1172.5	19265.7	1172.5	19308.0	1172.9	19335.6
GR	1173.4	19477.2	1173.4	19478.6	1179.8	19487.8	1194.4	19507.4	1201.1	19533.2
GR	1201.9	19538.7	1202.2	19547.6	1202.0	19590.8	1204.3	19598.4		
NH	2	0.028	19319.7	0.028	19382.8					
		7.1					17912.9	18393.7		
X1	226.48	51	17912.9	18393.7	309.0	989.0	234.0	1.0	0.0	
GR	1204.1	17345.9	1204.8	17430.4	1202.5	17436.1	1202.4	17534.9	1202.4	17538.7
GR	1202.7	17599.2	1203.7	17611.9	1205.0	17613.0	1204.3	17625.1	1204.9	17654.1
GR	1204.8	17689.8	1203.3	17728.1	1202.9	17760.4	1203.5	17850.7	1203.9	17912.9
GR	1191.8	17933.5	1186.9	17940.6	1182.7	17957.6	1181.4	17960.0	1179.4	18021.5
GR	1179.4	18021.8	1178.6	18212.3	1179.3	18212.6	1186.1	18235.4	1186.2	18254.9
GR	1188.1	18259.6	1187.7	18268.8	1186.0	18283.7	1186.2	18286.9	1185.3	18290.3
GR	1200.0	18316.1	1202.9	18322.5	1204.3	18393.7	1202.2	18411.3	1202.9	18449.3
GR	1202.5	18483.7	1201.7	18561.0	1202.1	18632.7	1201.6	18694.6	1203.0	18739.3
GR	1202.7	18789.3	1201.8	18812.1	1202.2	18830.9	1202.0	18923.1	1202.1	18980.8
GR	1202.8	19057.9	1204.8	19157.6	1205.9	19268.4	1205.4	19298.9	1205.8	19319.7
GR	1206.2	19382.8								
NH	2	0.028	19319.7	0.028	19382.8					
ET		7.1					17912.9	18393.7		
X1	226.49	51	17912.9	18393.7	1	1	1	1.0	0.0	
GR	1204.1	17345.9	1204.8	17430.4	1202.5	17436.1	1202.4	17534.9	1202.4	17538.7
GR	1202.7	17599.2	1203.7	17611.9	1205.0	17613.0	1204.3	17625.1	1204.9	17654.1
GR	1204.8	17689.8	1203.3	17728.1	1202.9	17760.4	1203.5	17850.7	1203.9	17912.9
GR	1191.8	17933.5	1188.0	17940.6	1188.0	17957.6	1188.0	17960.0	1188.0	18056.0
GR	1185.0	18059.0	1185.0	18141.0	1188.0	18144.0	1188.0	18235.4	1188.0	18254.9
GR	1188.1	18259.6	1188.0	18268.8	1188.0	18283.7	1188.0	18286.9	1188.0	18290.3
GR	1200.0	18316.1	1202.9	18322.5	1204.3	18393.7	1202.2	18411.3	1202.9	18449.3
GR	1202.5	18483.7	1201.7	18561.0	1202.1	18632.7	1201.6	18694.6	1203.0	18739.3
	1202.7	18789.3	1201.8	18812.1	1202.2	18830.9	1202.0	18923.1	1202.1	18980.8
GR	1202.8	19057.9	1204.8	19157.6	1205.9	19268.4	1205.4	19298.9	1205.8	19319.7

GR	1206.2	19382.8								
[illegible]	2	0.028	19319.7	0.028	19382.8					

ALMA SCHOOL ROAD BRIDGE

ET		7.1					17912.8	18393.8		

ALMA SCHOOL ROAD BRIDGE

X1	226.50	51	17912.9	18393.7	15.0	15.0	15.0	1.0	0.0	
X3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
GR	1204.1	17345.9	1204.8	17430.4	1202.5	17436.1	1202.4	17534.9	1202.4	17538.7
GR	1202.7	17599.2	1203.7	17611.9	1205.0	17613.0	1204.3	17625.1	1204.9	17654.1
GR	1204.8	17689.8	1203.3	17728.1	1202.9	17760.4	1203.5	17850.7	1203.9	17912.9
GR	1191.8	17933.5	1188.0	17940.6	1188.0	17957.6	1188.0	17960.0	1188.0	18056.0
GR	1185.0	18059.0	1185.0	18141.0	1188.0	18144.0	1188.0	18235.4	1188.0	18254.9
GR	1188.1	18259.6	1188.0	18268.8	1188.0	18283.7	1188.0	18286.9	1188.0	18290.3
GR	1200.0	18316.1	1202.9	18322.5	1204.3	18393.7	1202.2	18411.3	1202.9	18449.3
GR	1202.5	18483.7	1201.7	18561.0	1202.1	18632.7	1201.6	18694.6	1203.0	18739.3
GR	1202.7	18789.3	1201.8	18812.1	1202.2	18830.9	1202.0	18923.1	1202.1	18980.8
GR	1202.8	19057.9	1204.8	19157.6	1205.9	19268.4	1205.4	19298.9	1205.8	19319.7
GR	1206.2	19382.8								

NC	0.028	0.028	0.028	0.0	0.0					
ET		7.1					17915.5	18322.7		
X1	226.51	40	17915.6	18322.6	1.0	1.0	1.0	1.0	0.0	
X3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
BT	-12	17370.0	1204.0	1204.0	17590.0	1204.0	1204.0	17915.5	1205.74	1205.74
BT		17915.5	1205.74	1202.09	17971.2	1205.98	1202.33	18030.0	1206.19	1202.54
BT		18088.7	1206.3	1202.6	18147.2	1206.26	1202.61	18205.7	1206.18	1202.53
		18264.2	1205.97	1202.3	18322.5	1205.7	1202.05	18322.5	1205.7	1205.7
GR	1204.0	17370.0	1204.0	17590.0	1205.74	17915.5	1202.09	17915.6	1196.84	17915.7
GR	1188.0	17962.5	1188.00	17971.2	1202.33	17971.2	1202.33	17973.7	1188.00	17973.7
GR	1188.0	18030.0	1202.54	18030.0	1202.54	18032.5	1188.0	18032.5	1185.0	18058.5
GR	1185.0	18088.7	1202.62	18088.7	1202.62	18091.2	1185.0	18091.2	1185.0	18147.2
GR	1202.6	18147.2	1202.6	18149.7	1188.0	18149.7	1188.00	18188.7	1188.00	18205.7
GR	1202.5	18205.7	1202.5	18208.2	1188.00	18208.2	1188.00	18213.5	1188.00	18264.2
GR	1202.3	18264.2	1202.32	18266.7	1188.00	18266.7	1188.00	18297.5	1196.26	18311.5
GR	1198.7	18322.5	1202.1	18322.6	1205.7	18322.7	1204.0	18560.0	1204.0	19240.0

NC	0.028	0.028	0.028	0.0	0.0					
ET		7.1					17915.6	18322.6		
X1	226.52	40	17915.6	18322.6	84.0	84.0	84.0	1.0	0.0	
X3		0.0								
BT	-12	17370.0	1204.0	1204.0	17590.0	1204.0	1204.0	17915.5	1205.74	1205.74
BT		17915.5	1205.74	1202.09	17971.2	1205.98	1202.33	18030.0	1206.19	1202.54
BT		18088.7	1206.3	1202.6	18147.2	1206.26	1202.61	18205.7	1206.18	1202.53
BT		18264.2	1205.97	1202.3	18322.5	1205.7	1202.05	18322.5	1205.7	1205.7
GR	1204.0	17370.0	1204.0	17590.0	1205.74	17915.5	1202.09	17915.6	1196.84	17915.7
GR	1188.0	17962.5	1188.00	17971.2	1202.33	17971.2	1202.33	17973.7	1188.00	17973.7
GR	1188.0	18030.0	1202.54	18030.0	1202.54	18032.5	1185.0	18032.5	1185.0	18058.5
GR	1185.0	18088.7	1202.62	18088.7	1202.62	18091.2	1185.0	18091.2	1185.0	18147.2
GR	1202.6	18147.2	1202.6	18149.7	1188.0	18149.7	1188.00	18188.7	1188.00	18205.7
GR	1202.5	18205.7	1202.5	18208.2	1188.00	18208.2	1188.00	18213.5	1188.00	18264.2
GR	1202.3	18264.2	1202.32	18266.7	1188.00	18266.7	1188.00	18297.5	1196.26	18311.5
	1198.7	18322.5	1202.1	18322.6	1205.7	18322.7	1204.0	18560.0	1204.0	19240.0

	1	0.028	19522.9							
ET		7.1					17899.8	18325.5		
X1	226.53	60	17899.8	18325.5	1.0	1.0	1.0	1.0	0.0	
GR	1203.0	17546.3	1203.2	17577.3	1203.3	17661.8	1203.3	17689.5	1201.7	17704.7
GR	1201.8	17732.1	1203.0	17746.1	1202.7	17801.3	1203.8	17825.7	1204.5	17871.9
GR	1205.1	17899.8	1204.8	17905.5	1201.5	17910.5	1202.9	17911.1	1201.8	17913.9
GR	1189.3	17931.6	1188.00	17955.6	1188.0	17995.0	1188.0	18040.0	1185.0	18049.0
GR	1185.0	18107.8	1185.0	18176.3	1188.0	18185.7	1188.0	18218.8	1188.0	18258.6
GR	1188.7	18288.5	1188.0	18291.6	1194.4	18307.2	1203.1	18322.7	1204.0	18325.5
GR	1203.6	18377.0	1202.5	18509.4	1203.1	18521.2	1203.4	18585.4	1203.5	18606.5
GR	1203.4	18677.5	1203.4	18702.5	1203.0	18735.8	1203.0	18747.2	1203.6	18807.7
GR	1204.4	18828.8	1206.3	18926.4	1207.6	18983.2	1207.5	18996.9	1207.5	19141.4
GR	1207.5	19145.6	1207.5	19181.3	1206.7	19219.8	1204.6	19237.6	1202.8	19238.8
GR	1203.7	19284.4	1203.9	19306.3	1204.3	19339.1	1206.3	19346.9	1206.4	19377.7
GR	1207.3	19400.7	1208.3	19413.5	1209.1	19437.4	1209.9	19470.5	1212.0	19522.9
NH	1	0.028	19449.9							
ET		7.1					17800.0	18750.2		
X1	226.58	95	17885.1	18188.6	450.0	450.0	450.0	1.0	0.0	
X3		1185.87								
GR	1205.9	17263.7	1205.5	17287.8	1205.3	17314.2	1206.7	17356.2	1206.7	17370.8
GR	1204.9	17448.3	1204.3	17469.9	1204.2	17504.0	1202.9	17575.1	1202.1	17616.0
GR	1202.3	17674.1	1201.9	17684.3	1201.7	17708.4	1201.3	17729.6	1201.1	17799.9
GR	1200.7	17835.5	1200.0	17842.6	1199.5	17855.1	1200.1	17877.2	1200.4	17880.0
GR	1200.1	17885.1	1199.7	17885.4	1190.1	17904.6	1181.4	17925.1	1180.7	17928.5
	179.7	17930.2	1179.8	17942.1	1179.4	17943.9	1179.6	18030.2	1179.8	18093.5
	1179.0	18103.1	1179.9	18110.1	1181.4	18135.1	1188.3	18150.1	1189.0	18171.5
GR	1189.5	18174.4	1193.8	18188.6	1196.5	18199.7	1197.4	18202.3	1197.9	18251.8
GR	1197.6	18278.2	1197.1	18311.0	1196.4	18315.6	1199.4	18333.3	1200.5	18357.8
GR	1201.5	18402.8	1202.8	18438.4	1202.9	18459.0	1202.9	18490.5	1202.8	18515.6
GR	1202.9	18523.4	1203.7	18562.2	1203.7	18568.8	1203.2	18571.7	1204.6	18617.2
GR	1204.7	18626.8	1205.3	18654.2	1205.9	18675.4	1206.9	18706.9	1213.4	18727.2
GR	1214.1	18750.2	1211.9	18773.8	1211.0	18813.2	1211.0	18825.2	1210.7	18850.7
GR	1210.1	18882.4	1212.0	18899.2	1212.4	18910.9	1209.1	18923.2	1207.9	18950.7
GR	1207.8	18958.6	1207.0	18970.4	1207.3	18983.5	1206.7	19021.8	1206.5	19028.8
GR	1218.1	19045.4	1228.4	19062.3	1228.0	19069.0	1228.2	19083.1	1225.3	19097.8
GR	1220.5	19122.0	1203.4	19157.3	1203.6	19177.8	1203.8	19184.0	1203.6	19198.3
GR	1203.5	19227.4	1203.8	19258.4	1203.7	19267.3	1210.3	19300.5	1219.6	19353.4
GR	1219.7	19359.0	1219.7	19380.0	1219.6	19394.7	1220.0	19449.5	1220.0	19449.9
NH	2	0.028	18230.1	0.031	19549.9					
ET		7.1					17865.0	18800.0		
X1	226.61	57	17790.0	18230.1	950.0	360.0	600.0	1.0	0.0	
X3		1187.03								
GR	1207.8	17550.0	1207.2	17647.2	1206.7	17717.6	1205.9	17790.0	1193.0	17816.8
GR	1189.5	17889.1	1188.0	17930.8	1187.7	17988.5	1185.3	17992.6	1182.0	17994.4
GR	1180.3	17994.5	1180.6	17996.8	1180.0	18092.3	1180.6	18093.8	1180.3	18168.1
GR	1180.5	18177.1	1203.0	18230.1	1203.6	18260.5	1213.4	18279.5	1212.0	18303.2
GR	1203.6	18312.8	1202.9	18317.4	1202.4	18356.0	1204.7	18368.5	1222.5	18397.5
GR	1205.1	18437.3	1204.5	18486.7	1206.5	18533.8	1218.4	18560.4	1214.7	18580.6
GR	1214.7	18583.8	1205.8	18608.2	1205.0	18622.9	1206.5	18698.6	1208.4	18723.1
	1207.9	18772.1	1209.5	18799.3	1208.6	18818.5	1208.0	18868.4	1209.6	18871.8
GR	1208.7	18942.8	1209.3	18978.9	1207.1	19001.4	1206.6	19064.5	1204.5	19139.1

r	203.2	19175.2	1204.1	19252.7	1205.2	19260.4	1207.9	19270.6	1208.4	19291.1
\	1209.8	19301.6	1211.1	19358.3	1211.0	19388.0	1211.9	19397.9	1213.6	19451.8
GR	1213.2	19483.8	1213.4	19549.9						
NH	2	0.028	18900.3	0.031	19491.0					
ET		7.1					18246.6	19000.0		
X1	226.70	44	18246.6	18900.3	640.0	495.0	650.0	1.0	0.0	
X3		1188.29								
GR	1208.4	18246.6	1207.0	18271.6	1206.0	18310.1	1193.0	18339.9	1191.4	18347.0
GR	1190.0	18355.8	1188.7	18371.3	1184.8	18419.6	1183.9	18442.8	1184.3	18443.8
GR	1182.6	18556.1	1182.0	18628.4	1182.9	18630.6	1183.7	18635.7	1190.6	18688.9
GR	1190.3	18724.7	1191.6	18757.0	1193.2	18764.0	1195.7	18779.2	1198.6	18793.6
GR	1198.0	18830.1	1200.8	18841.7	1203.1	18859.2	1203.7	18871.2	1208.7	18891.3
GR	1210.2	18900.3	1209.4	18919.0	1208.6	18923.3	1209.7	18928.4	1208.0	18962.6
GR	1207.0	19004.4	1207.1	19007.1	1210.8	19027.4	1210.5	19034.9	1210.8	19052.1
GR	1205.8	19062.7	1206.0	19080.4	1204.1	19152.9	1204.5	19218.6	1204.0	19277.2
GR	1205.2	19345.1	1205.6	19395.9	1205.7	19443.8	1205.8	19491.0		
NH	2	0.028	19227.0	0.031	19441.4					
ET		7.1					18517.6	19440.0		
X1	226.80	32	18678.9	19309.8	560.0	480.0	570.0	1.0	0.0	
X3		1189.39								
GR	1210.7	18517.6	1210.2	18590.0	1210.2	18591.2	1208.5	18678.9	1205.8	18684.9
GR	1188.2	18724.9	1188.9	18727.7	1189.0	18729.8	1188.6	18790.3	1188.1	18895.9
GR	1188.0	18897.7	1190.6	18911.8	1191.7	18940.6	1190.7	18977.1	1190.6	18980.7
GR	1190.4	19009.0	1190.7	19011.1	1190.5	19014.4	1191.0	19029.1	1190.3	19109.1
'	190.5	19182.7	1191.1	19188.4	1203.1	19225.3	1203.7	19227.0	1203.8	19232.2
G..	1204.9	19289.4	1205.2	19309.8	1205.0	19352.7	1205.2	19398.0	1205.2	19399.9
GR	1205.0	19436.0	1205.1	19441.4						
NH	3	0.028	19026.7	0.028	20553.4	0.032	21751.8			
ET		7.1					18699.3	19600.0		
X1	226.89	96	19026.7	19599.9	600.0	525.0	570.0	1.0	0.0	
GR	1210.8	18699.3	1210.7	18704.0	1210.4	18760.0	1210.2	18812.2	1210.6	18825.2
GR	1209.3	18833.5	1210.5	18839.9	1210.1	18881.5	1210.0	18884.7	1210.0	18885.9
GR	1209.9	18900.2	1206.3	18960.0	1205.9	18965.0	1204.2	19008.2	1204.4	19026.7
GR	1202.5	19043.1	1197.3	19073.7	1195.0	19098.5	1193.6	19101.3	1193.6	19131.0
GR	1192.9	19351.9	1193.3	19352.3	1193.4	19357.5	1194.3	19389.5	1194.3	19392.7
GR	1194.3	19393.6	1194.3	19399.7	1193.7	19428.0	1193.2	19437.3	1192.5	19447.7
GR	1192.7	19448.7	1193.5	19456.5	1193.4	19486.1	1193.4	19491.2	1193.1	19599.9
GR	1192.8	19840.5	1192.9	19851.8	1193.6	20155.5	1193.7	20191.0	1193.7	20277.3
GR	1194.1	20461.8	1194.1	20464.2	1198.9	20506.8	1202.7	20534.0	1205.7	20552.0
GR	1205.8	20553.4	1207.2	20593.8	1205.3	20640.7	1204.4	20656.9	1204.5	20665.3
GR	1204.0	20691.7	1204.2	20701.6	1203.6	20722.5	1203.9	20741.1	1205.4	20776.1
GR	1205.8	20783.0	1205.8	20783.7	1205.8	20791.9	1205.8	20826.9	1206.0	20838.5
GR	1206.1	20855.5	1206.7	20894.8	1210.3	20924.6	1210.6	20926.4	1210.8	20929.0
GR	1210.9	20936.0	1211.4	21005.5	1211.2	21018.4	1211.1	21025.6	1209.9	21059.1
GR	1210.2	21081.5	1210.2	21113.8	1210.2	21155.0	1209.7	21178.6	1209.5	21235.1
GR	1209.2	21247.9	1209.2	21256.3	1209.0	21261.9	1209.6	21334.4	1209.5	21340.6
GR	1209.5	21345.0	1209.8	21399.5	1210.3	21437.5	1210.4	21455.1	1210.7	21460.8
GR	1210.5	21528.7	1209.6	21547.4	1208.9	21559.0	1209.0	21575.1	1209.0	21579.2
C-	1208.9	21584.7	1208.8	21613.8	1209.3	21642.8	1210.2	21683.1	1210.9	21714.4
	.211.1	21751.8								

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 225.95 CWSEL= 1190.02

STA=	18376.	20181.
PER Q=	100.0	
AREA=	29113.8	
VEL=	7.6	
DEPTH=	16.5	

FLOW DISTRIBUTION FOR SECNO= 226.04 CWSEL= 1190.76

STA=	18290.	18931.	19060.	19207.	19235.	19323.
PER Q=	67.3	3.7	25.7	3.1	.2	
AREA=	10231.1	753.6	3217.4	478.8	100.6	
VEL=	4.8	3.6	5.8	4.7	1.5	
DEPTH=	16.5	5.8	21.9	17.2	1.1	

FLOW DISTRIBUTION FOR SECNO= 226.13 CWSEL= 1190.95

STA=	18007.	18151.	18775.	18822.	18876.	18925.	19033.	19100.
PER Q=	.1	62.2	4.9	5.9	6.3	13.5	7.0	
AREA=	124.5	10890.2	841.5	994.7	1000.3	2149.3	1339.4	
VEL=	.6	4.1	4.2	4.3	4.6	4.6	3.8	
DEPTH=	.9	17.5	17.9	18.3	20.3	20.0	19.9	

FLOW DISTRIBUTION FOR SECNO= 226.23 CWSEL= 1188.71

STA=	18065.	18209.	18223.	18630.
PER Q=	3.3	.5	96.2	
AREA=	378.3	47.3	4492.6	
VEL=	6.4	7.0	15.5	
DEPTH=	2.6	3.3	11.0	

FLOW DISTRIBUTION FOR SECNO= 226.35 CWSEL= 1189.80

STA=	18050.	18134.	18572.
PER Q=	.6	99.4	
AREA=	116.8	4988.6	
VEL=	3.7	14.4	
DEPTH=	1.4	11.4	

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 226.48 CWSEL= 1191.98

STA= 17933. 18316.
PER Q= 100.0
AREA= 3897.2
VEL= 18.6
DEPTH= 10.6

FLOW DISTRIBUTION FOR SECNO= 226.49 CWSEL= 1198.09

STA= 17923. 18316.
PER Q= 100.0
AREA= 3982.4
VEL= 18.2
DEPTH= 10.2

FLOW DISTRIBUTION FOR SECNO= 226.50 CWSEL= 1199.27

STA= 17921. 18316.
PER Q= 100.0
AREA= 4446.4
VEL= 16.3
DEPTH= 11.3

FLOW DISTRIBUTION FOR SECNO= 226.51 CWSEL= 1198.98

STA= 17916. 18323.
PER Q= 100.0
AREA= 4232.3
VEL= 17.1
DEPTH= 10.8

FLOW DISTRIBUTION FOR SECNO= 226.52 CWSEL= 1200.82

STA= 17916. 18323.
PER Q= 100.0
AREA= 4989.4
VEL= 14.5
DEPTH= 12.7

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 226.53 CWSEL= 1201.53

STA=	17910.	18323.
PER Q=	100.0	
AREA=	5564.4	
VEL=	13.0	
DEPTH=	13.7	

FLOW DISTRIBUTION FOR SECNO= 226.58 CWSEL= 1202.07

STA=	17800.	17885.	18189.	18252.	18333.	18418.
PER Q=	.7	92.4	3.0	3.4	.5	
AREA=	147.5	4560.9	309.0	367.3	104.7	
VEL=	3.7	14.7	7.1	6.6	3.2	
DEPTH=	1.7	15.0	4.9	4.5	1.2	

FLOW DISTRIBUTION FOR SECNO= 226.61 CWSEL= 1203.80

STA=	17865.	18230.	18261.	18356.	18364.
PER Q=	99.8	.0	.1	.0	
AREA=	5629.6	15.2	47.0	5.3	
VEL=	12.9	1.2	2.1	1.5	
DEPTH=	15.4	.5	.5	.7	

FLOW DISTRIBUTION FOR SECNO= 226.70 CWSEL= 1206.00

STA=	18310.	18891.
PER Q=	100.0	
AREA=	8204.7	
VEL=	8.8	
DEPTH=	14.4	

FLOW DISTRIBUTION FOR SECNO= 226.80 CWSEL= 1206.53

STA=	18683.	19227.	19310.	19353.	19398.	19436.	19440.
PER Q=	99.1	.5	.1	.1	.1	.0	
AREA=	8312.4	169.5	61.4	64.8	54.2	6.0	
VEL=	8.6	2.1	1.6	1.6	1.6	1.4	
DEPTH=	15.3	2.0	1.4	1.4	1.4	1.5	

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 226.89 CWSEL= 1206.76

STA=	18952.	19027.	19600.	19600.
PER Q=		.5	99.5	.0
AREA=		124.2	7232.0	1.3
VEL=		2.8	10.0	.4
DEPTH=		1.7	12.6	13.7

PROFILE FOR STREAM REPARED BY MICHAEL BAKER

```
  ..ED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA

ELEVATION  1168.     1173.     1178.     1183.     1188.     1193.     1198.     1203.     1208.     1213.
    SECNO   CUMDIS

   225.95     0.  I         .         .     C   .         .   W E   L         .        M.         .         .         R
             50.  I         .         .    C    .         .   W E   L         .     M   .         .         .         R
            100.  I         .         .    C    .         .    WE   L         .   M     .         .         .         R
            150.  I         .         .   C     .         .    WE  L.         .M        .         .         .         R
            200.  I         .         .   C     .         .    WE  L.        M.         .         .         .         R
            250.  .I        .         .   C     .         .    WE  L.      M  .         .         .         .         R
            300.  .I        .         .  C      .         .    WE  L.   M     .         .         .         .         R
            350.  .I        .         .  C      .         .    WE L . M       .         .         .         .         R
            400.  .I        .         . C       .         .    WE LM.         .         .         .         .         R
            450.  .I        .         . C       .         .     EML .         .         .         .         .         R
   226.04   500.  .I        .         . C       .         .     E L .         .  R      .         .         .         .
            550.  .I        .         .C        .         .     EL  .       R .         .         .         .         .
            600.  . I       .         .C        .         .     WEM . R       .         .         .         .         .
            650.  . I       .         .C        .         .     WE  M         .         .         .         .         .
            700.  .  I      .         .C        .         . R  LWE  .M        .         .         .         .         .
            750.  .  I      .         .C        .      R  .   L WE  . M       .         .         .         .         .
            800.  .   I     .         .C        .R        .   L WE  .   M     .         .         .         .         .
            850.  .   I     .         .C    R   .         .  L  WE  .    M    .         .         .         .         .
            900.  .   I     .         .C        .         . L   WE  .     M   .         .         .         .         .
            950.  .    I    .     R   .C        .         . L   WE  .       M .         .         .         .         .
   226.13  1000.  .    I    R         .C        .         .L    WE  .        M.         .         .         .         .
           1050.  .    I    .         .    C    .         L    W E  .       M .         .         .         .         R
           1100.  .    I    .         .       C .        L.   W  E  .       M .         .         .         .         R
           1150.  .     I   .         .         . C     L .   W   E .      M  .         .         .         .         R
           1200.  .     I   .         .         .    CL   .  W    E .     M   .         .         .         .         R
   226.23  1250.  .     I   .         .         .    L    C W      E.    M    .         .         .         .         R
           1300.  .     I   .         .         .     L   C W      E.         M         .         .         .         R
           1350.  .     I   .         .         .      L  C  W      E         .   M     .         .         .         R
           1400.  .      I  .         .         .       L C  W      E         .       M .         .         .         R
   226.35  1450.  .      I  .         .         .        LC   W     E         .         .  M      .         .         R
           1500.  .         I         .         .         . C  WL   . E       .         .   M     .         .         R
           1550.  .         .  I      .         .         .  C  W   .  LE     .         .   M     .         .         R
           1600.  .         .     I   .         .         .    C W  .     E   L         .    M    .         .         R
           1650.  .         .        I.         .         .      CW .       E .      L  .     M   .         .         R
   226.48  1700.  .         .         .I        .         .       W .        E.         . L    M  .         .         R
   226.49  1750.  .         .         .         .   I     .         .         W         .EL    M  .         .         R
   226.50  1800.  .         .         .         .   I     .         .         C  W      .ELR   M  .         .         .
   226.51  1850.  .         .         .         .   I     .         .         .CW     L .EM       .         .         .
   226.52  1900.  .         .         .         .   I     .         .         .C    W L . E       .         .         R
   226.53  1950.  .         .         .         .   I     .         .        C.      W  .  EL     .       M .         R
           2000.  .         .         .         .   I     .         .         C      W  .  E      .         M         R
           2050.  .         .         .         .    I    .         .         C      W  . LE      .         . M       R
           2100.  .         .         .         .    I    .         .         .C      W .L E      .         .   M     R
           2150.  .         .         .         .    I    .         .         .C      W L  E      .         .    M    R
           2200.  .         .         .         .    I    .         .         . C     WL.   E     .         .      M  R
   226.58  2250.  .         .         .         .     I   .         . R       .   C   W .    E    .         .         M
           2300.  .         .         .         .     I   .         .  R      .   C    W.    E    .         .         L
           2350.  .         .         .         .     I   .         .    R    .   C    W.    E    .         .         L
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        2400.   .         .         .          .      I  .          .     R    .  C     W.     E    .         .         L
        2450.   .         .         .          .      I  .          .       R .  C     W.     E    .         .         L
        2500.   .         .         .          .      I  .          .        R.  C      W     E    .         .       ML
        2550.   .         .         .          .      I  .          .         .R C      W     E    .         .       M L
        2600.   .         .         .          .      I  .          .         .  C      W     E    .         .     M   L
        2650.   .         .         .          .      I  .          .         .  CR     .W    E    .         .    M    L
        2700.   .         .         .          .       I .          .         . C   R   .W    E    .         .   M     L
        2750.   .         .         .          .       I .          .         . C    R  .W     E   .         .  M      L
        2800.   .         .         .          .       I .          .         . C      R. W    E   .         . M       L
226.61  2850.   .         .         .          .       I .          .         . C       R W    E   .         .M        L
        2900.   .         .         .          .       I .          .         . C       .RW    E   .        M          L
        2950.   .         .         .          .        I.          .         . C       . W    E   .       M.          L
        3000.   .         .         .          .        I.          .         . C       .  WR  E   .    M  .           L
        3050.   .         .         .          .        I.          .         . C       .  W R E  .    M   .           L
        3100.   .         .         .          .        I.          .         . C       .   W R E .  M     .           L
        3150.   .         .         .          .        I.          .         . C       .   W  RE .  M     .           L
        3200.   .         .         .          .         I          .         . C       .   W   E . M      .           L
        3250.   .         .         .          .         I          .         . C       .    W  ER. M      .           L
        3300.   .         .         .          .         I          .         . C       .    W  E R        .           L
        3350.   .         .         .          .         I          .         . C       .    W  EM.R       .           L
        3400.   .         .         .          .         I          .         . C       .     W E . R      .           L
        3450.   .         .         .          .        .I          .         . C       .     WME . R      .           L
226.70  3500.   .         .         .          .        .I          .         . C       .     W  E.   R    .           L
        3550.   .         .         .          .        .I          .         . C       .     W  E.  R     .           L
        3600.   .         .         .          .        .I          .         . C       .     W  E. R      .           L
        3650.   .         .         .          .        .I          .         . C       .    MW  E. R      .           L
        3700.   .         .         .          .        . I         .         . C       .    M W E.R       .           L
        3750.   .         .         .          .        . I         .         . C       .    M W ER        .           L
        3800.   .         .         .          .        . I         .         . C       .    M W E.        .           L
        3850.   .         .         .          .        . I         .         . C       .    M WRE.        .           L
        3900.   .         .         .          .        . I         .         . C       .    M WRE.        .           L
        3950.   .         .         .          .        .  I        .         . C       .    M W E.        .           L
        4000.   .         .         .          .        .  I        .         . C       .    MRW E.        .      L    .
        4050.   .         .         .          .        .  I        .         . C       .   MR W E.    L   .           .
226.80  4100.   .         .         .          .        .  I        .         . C       .   MR W  EL       .           .
        4150.   .         .         .          .        .   I       .        .  C     . R  M W  E        .           .
        4200.   .         .         .          .        .   I       .        .  C     R      W  E        .           .
        4250.   .         .         .          .        .    I      .        .   C  R .      WMLE        .           .
        4300.   .         .         .          .        .    I      .        .   C R  .      WLME        .           .
        4350.   .         .         .          .        .     I     .        .   RC   .      WL E        .           .
        4400.   .         .         .          .        .     I     .        . R  C   .      LW EM       .           .
        4450.   .         .         .          .        .      I .          R    C .    L W E M        .           .
        4500.   .         .         .          .        .      I .      R .      C .   L  W E  M       .           .
        4550.   .         .         .          .        .       I .   R     .     C .   L  W .E  M      .           .
        4600.   .         .         .          .        .       I . R       .     C .  L   W .E   M     .           .
226.89  4650.   .         .         .          .        .        IR         .      C . L   W .E    M   .           .
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THIS RUN EXECUTED 29AUG95 17:56:53

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

REPARED BY MICHAEL BAKER

SUMMARY PRINTOUT

	SECNO	ELMIN	CWSEL	Q	VCH	DIFWSX	TOPWID	DEPTH	HV	SSTA	ENDST	FRCH
	225.950	1167.90	1190.02	220000.00	7.56	.00	1769.50	22.12	.89	18375.81	20145.31	.33
*	226.040	1168.40	1190.76	72500.00	4.77	.74	959.98	22.36	.38	18289.60	19322.60	.21
	226.130	1170.50	1190.95	72500.00	4.14	.19	1093.00	20.45	.27	18007.00	19100.00	.17
	26.230	1170.80	1188.71	72500.00	15.53	-2.24	564.82	17.91	3.63	18065.18	18630.00	.82
	226.350	1171.30	1189.80	72500.00	14.45	1.10	522.10	18.50	3.22	18050.00	18572.10	.75
*	226.480	1178.60	1191.98	72500.00	18.60	2.17	368.82	13.38	5.37	17933.20	18302.02	1.01
*	226.490	1185.00	1198.09	72500.00	18.21	6.11	389.19	13.09	5.15	17922.80	18311.98	1.00
	226.500	1185.00	1199.27	72500.00	16.31	1.19	393.75	14.27	4.13	17920.78	18314.53	.86
	226.510	1185.00	1198.98	72500.00	17.13	-.29	391.85	13.98	4.56	17915.66	18322.51	.94
	226.520	1185.00	1200.82	72500.00	14.53	1.84	391.94	15.82	3.28	17915.62	18322.56	.73
*	226.530	1185.00	1201.53	72500.00	13.03	.71	405.66	16.53	2.64	17910.46	18319.90	.62
	226.580	1185.87	1202.07	72500.00	14.69	.54	618.46	16.20	3.14	17800.00	18418.46	.67
	226.610	1187.03	1203.80	72500.00	12.86	1.73	446.93	16.77	2.56	17865.00	18363.61	.58
*	226.700	1188.29	1206.00	72500.00	8.84	2.20	570.79	17.71	1.21	18309.70	18880.49	.41
	226.800	1189.39	1206.53	72500.00	8.51	.53	756.72	17.14	1.12	18683.28	19440.00	.41
	226.890	1192.50	1206.76	72500.00	9.98	.23	647.59	14.26	1.54	18952.41	19600.00	.49

P[illegible] [illegible]D BY MICHAEL BAKER

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	225.950	.00	.00	.00	1167.90	220000.00	1190.02	1180.75	1190.91	4.88	7.56	29113.83	99597.69
*	226.040	476.46	.00	.00	1168.40	72500.00	1190.76	1178.67	1191.14	1.95	4.77	14781.47	51950.46
	226.130	502.01	.00	.00	1170.50	72500.00	1190.95	1178.39	1191.23	1.36	4.14	17339.85	62271.03
*	226.230	270.00	.00	.00	1170.80	72500.00	1188.71	1187.95	1192.33	36.49	15.53	4918.20	12002.37
	226.350	200.00	.00	.00	1171.30	72500.00	1189.80	1187.75	1193.03	29.63	14.45	5105.38	13320.03
*	226.480	234.00	.00	.00	1178.60	72500.00	1191.98	1191.98	1197.35	54.19	18.60	3897.15	9848.77
*	226.490	1.00	.00	.00	1185.00	72500.00	1198.09	1198.09	1203.23	54.30	18.21	3982.38	9838.33
	226.500	15.00	.00	.00	1185.00	72500.00	1199.27	1198.06	1203.40	38.26	16.31	4446.43	11721.11
	226.510	1.00	1204.00	1205.70	1185.00	72500.00	1198.98	1198.32	1203.54	66.67	17.13	4232.28	8878.85
	226.520	84.00	1204.00	1205.70	1185.00	72500.00	1200.82	1198.22	1204.10	41.26	14.53	4989.43	11286.65
	226.530	1.00	.00	.00	1185.00	72500.00	1201.53	1197.56	1204.16	18.84	13.03	5564.44	16701.64
	226.580	450.00	.00	.00	1185.87	72500.00	1202.07	1199.83	1205.21	21.06	14.69	5489.41	15797.55
	226.610	600.00	.00	.00	1187.03	72500.00	1203.80	1198.91	1206.36	16.22	12.86	5697.19	18000.22
*	226.700	650.00	.00	.00	1188.29	72500.00	1206.00	1198.82	1207.21	8.02	8.84	8204.70	25604.02
	226.800	570.00	.00	.00	1189.39	72500.00	1206.53	1199.09	1207.65	7.09	8.51	8668.30	27227.57
	226.890	570.00	.00	.00	1192.50	72500.00	1206.76	1201.89	1208.30	12.06	9.98	7357.56	20873.86

ED BY MICHAEL BAKER

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	225.950	220000.00	1190.02	.00	.00	.00	1769.50	.00
*	226.040	72500.00	1190.76	.00	.74	.00	959.98	476.46
	226.130	72500.00	1190.95	.00	.19	.00	1093.00	502.01
*	226.230	72500.00	1188.71	.00	-2.24	.00	564.82	270.00
	226.350	72500.00	1189.80	.00	1.10	.00	522.10	200.00
*	226.480	72500.00	1191.98	.00	2.17	.00	368.82	234.00
*	226.490	72500.00	1198.09	.00	6.11	.00	389.19	1.00
	226.500	72500.00	1199.27	.00	1.19	.00	393.75	15.00
	226.510	72500.00	1198.98	.00	-.29	.00	391.85	1.00
	226.520	72500.00	1200.82	.00	1.84	.00	391.94	84.00
	226.530	72500.00	1201.53	.00	.71	.00	405.66	1.00
	226.580	72500.00	1202.07	.00	.54	.00	618.46	450.00
	226.610	72500.00	1203.80	.00	1.73	.00	446.93	600.00
*	226.700	72500.00	1206.00	.00	2.20	.00	570.79	650.00
	226.800	72500.00	1206.53	.00	.53	.00	756.72	570.00
	226.890	72500.00	1206.76	.00	.23	.00	647.59	570.00

SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO=	226.040	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	226.230	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=	226.480	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	226.480	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	226.490	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	226.490	PROFILE=	1	MINIMUM SPECIFIC ENERGY
WARNING SECNO=	226.530	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	226.700	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

HEC-2

Design Condition 2 Model
South Hardbank in Place and
North SRPMIC Hardbank in Place
Main Channel

Summary Printout (SUMPO)
& Complete Printout

Filename = DESIGN2.DAT

HEC-2 Salt River Analysis

File=DESIGN2B.DAT Design Condition 2 - South Hardbank in Place
North Hardbank in Place
Channelization between north
and south hardbanks

Note: Data from this analysis supercedes the data included in the August 30, 1995 submittal.

S U M P O

Interactive Summary Printout
for MS/PC-DOS micro computers
May 1991

NOTE - Asterisk (*) at left of profile number indicates message in summary of errors list

PIMA FREEWAY TO DOBSON

Summary Printout

	SECNO	CWSEL	EG	DEPTH	VCH
	20.50	1166.59	1168.49	19.59	11.07
	22.00	1166.70	1168.75	19.50	11.49
	22.65	1166.81	1168.85	19.61	11.46
*	23.55	1168.48	1170.17	21.18	10.45
	28.00	1168.95	1170.59	21.25	10.27
	29.00	1169.17	1171.16	21.07	11.32
	30.00	1169.13	1172.12	20.73	13.87
	31.00	1169.70	1173.20	20.90	15.02
	32.00	1170.48	1174.37	21.28	15.84
	33.00	1171.29	1175.64	21.69	16.74
	34.00	1172.77	1176.83	22.77	16.17
	35.00	1174.48	1177.85	24.08	14.74
	36.00	1175.78	1178.66	24.98	13.61
	37.00	1177.56	1179.28	26.36	10.51
	38.00	1178.25	1179.71	26.55	9.68
	39.00	1178.49	1180.13	26.29	10.28
	40.00	1179.32	1180.51	26.62	8.77
	40.10	1179.35	1180.55	26.55	8.79
	40.20	1179.61	1180.77	26.81	8.64
	40.30	1179.74	1180.84	26.84	8.42
	40.40	1179.86	1180.91	26.86	8.22
	40.50	1180.05	1181.06	26.95	8.04
	40.60	1180.12	1181.09	27.02	7.92
	41.10	1180.17	1181.13	26.97	7.84
	41.20	1180.34	1181.27	27.14	7.75
	42.10	1180.91	1181.54	26.91	6.35
	224.34	1180.92	1181.60	25.92	6.59
	224.43	1181.04	1181.81	24.04	7.05
	224.53	1181.27	1182.03	22.27	7.00

	224.62	1181.34	1182.39	20.34	8.25	
	224.71	1181.82	1182.83	20.82	8.06	
	224.81	1182.24	1183.21	21.24	7.90	
	224.90	1182.58	1183.53	21.58	7.83	
	225.00	1182.79	1183.88	20.79	8.38	
	225.10	1182.87	1184.33	19.87	9.69	
	225.19	1183.18	1184.79	20.18	10.17	
	225.28	1183.91	1185.25	20.91	9.31	Dobson Road
	225.38	1184.93	1185.89	22.53	7.87	
*	225.48	1184.15	1186.96	23.85	13.45	
	225.57	1186.21	1187.87	28.31	10.33	
	225.66	1186.79	1188.48	27.99	10.44	
	225.76	1187.24	1189.19	22.24	11.21	
	225.85	1188.59	1189.85	21.79	9.02	
	225.95	1189.38	1190.34	21.48	7.86	
*	226.04	1188.93	1191.29	15.83	12.45	
	226.13	1189.16	1192.91	18.66	15.56	
*	226.23	1190.44	1195.13	18.14	17.84	
	226.35	1194.21	1197.80	20.81	15.23	
	226.48	1196.86	1200.49	15.06	15.30	
*	226.49	1196.67	1201.40	10.67	17.45	
	226.50	1197.71	1201.54	11.71	15.70	
	226.51	1197.54	1201.62	11.54	16.21	
	226.52	1198.99	1202.14	12.99	14.26	
*	226.53	1199.71	1202.21	13.71	12.70	
	226.61	1200.88	1203.10	13.88	11.99	
	226.70	1202.16	1203.88	14.16	10.57	
*	226.80	1201.55	1206.13	9.85	17.24	
*	226.89	1205.16	1208.14	12.66	13.98	
	226.99	1205.67	1210.25	11.97	17.20	
	227.08	1207.78	1213.69	13.68	19.92	
	227.18	1211.83	1215.52	17.33	15.45	
	227.27	1214.03	1216.49	20.33	12.58	
	227.37	1215.57	1217.11	21.57	10.31	
	227.46	1215.75	1217.63	21.65	11.28	
	227.56	1216.58	1218.02	21.98	9.79	
	227.61	1217.13	1218.22	22.23	8.35	
	227.62	1216.78	1218.39	21.88	10.17	
	227.63	1216.86	1218.46	21.96	10.13	
*	227.64	1217.48	1218.52	22.58	8.27	
	227.69	1217.57	1218.75	22.57	8.92	
	227.79	1218.11	1219.10	22.01	8.45	

```
***********************************************                    ****************************************
*  HEC-2 WATER SURFACE PROFILES               *                    *  U.S. ARMY CORPS OF ENGINEERS        *
*                                             *                    *  HYDROLOGIC ENGINEERING CENTER       *
*  Version   4.6.2;  May 1991                 *                    *  609 SECOND STREET, SUITE D          *
*                                             *                    *  DAVIS, CALIFORNIA 95616-4687        *
*  DATE    31AUG95     TIME    12:39:57       *                    *          (916) 756-1104              *
***********************************************                    ****************************************
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```
X     X XXXXXXX  XXXXX           XXXXX
X     X X       X     X         X     X
X     X X       X                     X
XXXXXXX XXXX    X          XXXXX XXXXX
X     X X       X               X
X     X X       X     X         X
X     X XXXXXXX  XXXXX          XXXXXXX
```

THIS RUN EXECUTED 31AUG95 12:39:57

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**************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
**************************************
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THIS IS AN ARCHIVAL RUN ALL DATA AND RESULTS ARE SAVED ON UNIT 96

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AC
AC     DESIGN2.DAT -- WITH SMOOTHED INVERT AND SRPMIC'S NORTH BANK
AC
AC  WITH BSI'S PROPOSED NORTH BANK BTWN PIMA FREEWAY AND DOBSON
AC  N-BANK ENCROACHMENT @ 42.1 MOVED SOUTH TO MAKE WIDTH COMPATIBLE WITH
AC        PROPOSED BSI BANK
AC  INVERT IS SMOOTHED TO ~AVG ELEV BETWEEN BANKS
AC  CROSS-SECTIONS ARE PERPENDICULAR TO BANKS, LENGTHS CHANGED ACCORDINGLY
AC
AC      100-YEAR FLOOD
AC
T1      SIMONS, LI & ASSOCIATES, INC. (PAZ-PBDQ-02)
T2      RED MOUNTAIN FREEWAY SALT RIVER SOUTH LEVEE PROTECTION
T       PIMA FREEWAY TO DOBSON
```

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		2						215000	1166.59	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1		-1							

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

38	42	1	43	26	51	4	8	10	53
54	68								

J5 LPRNT NUMSEC ********REQUESTED SECTION NUMBERS********

-10 -10

NC	0.035	0.035	0.035	0.1	0.3					
ET		7.1					368.02	1432.2		
X1	20.5	52	368.02	1432.2						
GR	1168	0	1164	17.95	1162	24.38	1162	36.95	1164	71.76
GR	1166	79.6	1168	87.26	1170	92.47	1170	100.79	1168	107.04
	1166	136.7	1164	170.55	1162	202.59	1162	204.03	1162	212.06
GR	1162	223.18	1162	256.79	1164	263.99	1166	271.92	1168	283.83
GR	1168	291.26	1168	333.54	1170	336.78	1172	341.62	1172	368.02

GR	1170	372.86	1168	379.02	1166	385.07	1164	391.96	1162	401.29
GR	1160	405.15	1147	417.51	1147	1383.8	1158.7	1396.8	1170.5	1432.2
GR	1164	1551.12	1166	1561.25	1168	1567.58	1170	1573	1172	1579.74
GR	1174	1587.59	1178	1595.63	1178	1606.62	1180	1659.93	1180	1677.36
GR	1180	1685.5	1180	1687.62	1170	1702.87	1168	1855.51	1168	1880.71
GR	1168	1915.94	1168	1966						
ET		7.1					371.86	1409.5		
X1	22	50	371.86	1409.5	155	150	150			
GR	1168	0	1168	20.19	1168	48.23	1170	61.53	1170	84.4
GR	1168	99.93	1166	110.69	1166	185.25	1166	203.64	1166	250.93
GR	1168	294.27	1170	299.9	1172	350.11	1172	371.86	1170	379.7
GR	1168	385.29	1166	390.3	1164	395.63	1162	399.98	1160	403.29
GR	1158	407.35	1156	413.82	1154	422.34	1152	437.43	1147.2	450.69
GR	1147.2	1361.5	1159	1375	1170.5	1409.5	1158	1410.41	1160	1415.57
GR	1166	1509.56	1168	1519.96	1170	1527.06	1172	1531.57	1174	1536.19
GR	1178	1539.48	1178	1542.37	1178	1568.19	1176	1630.46	1174	1666.03
GR	1172	1673.42	1170	1679.79	1168	1691.14	1168	1700.35	1170	1704.62
GR	1172	1711.58	1174	1724.44	1174	1766.22	1172	1775.51	1170	1791.57
NC				0.3	0.5					
X1	22.65	27	188.7	1216.3	65	65	65			
X3	10									
GR	1172	0	1172	125.08	1170	188.7	1168	194.75	1166	201.16
GR	1164	205.95	1162	210.26	1160	216.37	1158	219.98	1156	227.72
GR	1154	232.41	1152	238.19	1147.2	264.91	1147.2	1169	1159.4	1183
GR	1170.5	1216.3	1168	1312.31	1170	1319.07	1172	1322.27	1174	1329.19
GR	1178	1333.2	1178	1338.91	1178	1378.93	1176	1435.77	1174	1496.03
GR	1172	1540.96	1170	1558.53						
SB	1.05	1.56	3	500	790	193	27088	6.5	1147.31	1147.2
X1	23.55	28	247.63	1335.6	120	120	120			
X2			1	1180.61	1181.8					
X3	10									
GR	1172	0	1172	247.63	1170	253.99	1168	273.55	1166	281.4
GR	1166	283.76	1166	310.92	1164	317.04	1162	322.63	1160	328.49
GR	1158	333.83	1156	339.53	1154	346.19	1152	354.31	1147.3	375.38
GR	1147.3	1288.2	1159.4	1302.3	1170.5	1335.6	1170	1419.47	1172	1429.2
GR	1174	1432.5	1176	1434.98	1178	1461.34	1178	1512.09	1176	1579.09
GR	1174	1678.33	1172	1755.73	1170	1861.49				
NC				0.1	0.3					
ET		7.1					90.9	1152.8		
X1	28	44	90.9	1152.8	420	300	360			
GR	1170	0	1172	6.43	1172	14.35	1172	22.93	1172	27.9
GR	1170	31.53	1168	39.25	1166	45.63	1164	50.41	1162	58.03
GR	1160	66.41	1158	76.71	1172	90.9	1147.7	111.9	1147.7	999
GR	1184	999.1	1184	1052.9	1147.7	1053	1147.7	1131.8	1172	1152.8
GR	1164	1153.31	1166	1206.5	1168	1211.92	1168	1223.69	1168	1264.35
GR	1170	1276.64	1172	1283.33	1174	1291.14	1176	1295.99	1178	1316.09

GR	1178	1326.38	1178	1333.75	1180	1337.72	1180	1344.25	1178	1347.49
	1176	1351.78	1174	1355.53	1172	1359.44	1170	1363.26	1168	1378.57
GR	1168	1398.94	1168	1429.84	1166	1529.46	1166	1620.11		

ET		7.1					330.6	1314.7		
X1	29	44	330.6	1314.7	440	330	380			
X3	10									
GR	1170	0	1160	21.56	1158	28.38	1158	53.44	1160	66.58
GR	1160	79.87	1158	116.07	1158	146.8	1158	153.74	1158	181.54
GR	1158	187.08	1158	202.48	1156	220.79	1154	247.95	1152	262.65
GR	1152	269.13	1152	301.61	1150	315.44	1172.2	330.6	1148.1	354.7
GR	1148.1	1060	1184	1060.1	1184	1113.9	1148.1	1114	1148.1	1288.9
GR	1173.5	1314.7	1172	1323.39	1174	1327.38	1176	1330.97	1178	1334.68
GR	1180	1337.95	1182	1343.55	1184	1364.4	1184	1386.7	1182	1391.21
GR	1180	1395.48	1178	1398.88	1176	1401.89	1174	1405.57	1172	1409.33
GR	1170	1415.5	1170	1520.41	1170	1537.44	1170	1644.45		

ET		7.1					481.5	1309.78		
X1	30	32	481.5	1309.78	350	430	390			
GR	1174	14.68	1172	34.2	1170	69.37	1168	74.89	1166	92.61
GR	1164	163.09	1162	258.68	1160	329.81	1158	342.99	1156	346.62
GR	1154	353.18	1152	370.82	1150	394	1150	405.61	1152	440
GR	1152	467.1	1172.1	481.5	1148.4	505.2	1148.4	1156	1181	1156.1
GR	1181	1209.9	1148.4	1210	1148.4	1286.1	1172.1	1309.78	1168	1321.25
	1170	1339.03	1172	1352.5	1172	1462.29	1172	1490.22	1174	1509.85
G	1174	1535.71	1172	1542.61						

ET		7.1					160.5	919.6		
X1	31	22	160.5	919.6	360	460	400			
GR	1178	0	1176	141.91	1172.7	160.5	1148.8	184.4	1148.8	765
GR	1181.5	765.1	1181.5	818.9	1148.8	818.9	1148.8	907.7	1172.7	919.6
GR	1158	1051.56	1160	1069.76	1162	1080.98	1164	1093.09	1166	1105.46
GR	1168	1115.59	1170	1123.76	1172	1128.42	1174	1133.06	1174	1152.4
GR	1174	1275.9	1174	1320.61						

ET		7.1					315.3	1027.6		
X1	32	24	315.3	1027.6	400	410	400			
GR	1176	0	1176	39.97	1176	247.56	1173.5	315.3	1149.2	339.6
GR	1149.2	873	1182.5	873.1	1182.5	926.9	1149.2	927	1149.2	1015.5
GR	1173.5	1027.6	1152	1064.89	1154	1074.27	1156	1084.6	1158	1093.29
GR	1160	1106.57	1162	1113.87	1164	1118.12	1166	1121.69	1168	1131.52
GR	1170	1141.67	1172	1247.51	1172	1279.79	1172	1295.2		

ET		7.1					314.4	981.3		
X1	33	26	314.4	981.3	390	390	390			
GR	1176	0	1174	141.81	1172	247.49	1172	261.66	1174.3	314.4
GR	1149.6	339.1	1149.6	827	1182.5	827.1	1182.5	880.9	1149.6	881
	1149.6	969	1174.3	981.3	1154	984.4	1156	994.26	1158	1004.77
GR	1160	1015.49	1162	1023.59	1164	1032.43	1166	1038.61	1168	1046.29

GR	1168	1165.91	1168	1178.41	1170	1213.47	1170	1234.96	1168	1257.86
	1168	1265.33								

ET		7.1					351.3	1017.95		
X1	34	39	351.3	1017.95	435	370	405			
GR	1172	0	1172	55.13	1170	131.34	1170	133.81	1170	148.48
GR	1168	156.75	1168	159.9	1170	177.68	1170	264.01	1170	280.92
GR	1172	285.13	1174	287.34	1176	291.37	1178	293.5	1178	300.48
GR	1176	308.6	1174	313.89	1172	317.53	1170	320.96	1168	324.38
GR	1166	330.13	1164	334.17	1162	339.95	1160	348.17	1175.8	351.3
GR	1150	377.1	1150	863	1183	863.1	1183	916.9	1150	917
GR	1150	992.2	1175.8	1017.95	1160	1028.08	1162	1056.1	1164	1100.41
GR	1166	1117.08	1168	1148.31	1170	1244.36	1170	1260.5		

ET		7.1					323.7	1013.6		
X1	35	31	323.7	1013.6	400	405	400			
GR	1188	0	1188	5.95	1186	83.48	1184	109.91	1184	136.66
GR	1184	148.7	1182	181.29	1180	198.09	1180	208.53	1180	208.78
GR	1170	225.2	1160	240.93	1158	250.29	1156	268.18	1154	278.68
GR	1152	285.78	1177.5	323.7	1150.4	350.8	1150.4	859	1183	859.1
GR	1183	912.9	1150.4	913	1150.4	986.5	1177.5	1013.6	1166	1019.94
GR	1168	1036.82	1168	1047.05	1168	1118.89	1168	1129.18	1168	1142.62
GR	1170	1201.92								

ET		7.1					327.1	1044.5		
X1	36	29	327.1	1044.5	380	430	405			
GR	1186	0	1186	33.09	1186	88.98	1186	158.59	1186	165.74
GR	1184	175.14	1182	179.03	1180	182.87	1170	197.46	1160	209.76
GR	1158	212.84	1156	218.12	1154	222.17	1179	327.1	1150.8	355.3
GR	1150.8	890	1184	890.1	1184	943.9	1150.8	944	1150.8	1016.5
GR	1178.8	1044.5	1168	1058.28	1166	1062.4	1166	1086.32	1166	1092.55
GR	1168	1106.08	1170	1228.32	1172	1295.79	1172	1304.29		

ET		7.1					275.3	1137.7		
X1	37	27	275.3	1137.7	390	435	410			
GR	1188	0	1188	37.05	1186	162.09	1184	167.16	1182	170.9
GR	1180	173.01	1170	186.94	1160	203.56	1158	207.56	1156	209.33
GR	1154	215.62	1180.6	275.3	1151.2	304.7	1151.2	983	1184	983.1
GR	1184	1036.9	1151.2	1037	1151.2	1108.3	1180.6	1137.7	1166	1154.04
GR	1168	1163.43	1170	1182.53	1172	1319.78	1172	1366.54	1172	1385.84
GR	1172	1392.66	1172	1400.59						

ET		7.1					474.12	1344.58		
X1	38	41	474.12	1344.58	650	380	510			
GR	1178	0	1178	42.14	1180	60.75	1182	68.52	1184	76.58
GR	1186	86.57	1188	95.67	1190	150.75	1190	278.24	1188	296.12
GR	1186	364.44	1184	398.62	1182	403.49	1180	406.14	1170	421.07
	1164	430.09	1162	437.35	1160	440.69	1183.1	474.12	1151.7	505.5
GR	1151.7	1315	1181.3	1344.58	1160	1363.15	1162	1374.46	1170	1381.24

GR	1172	1383.52	1174	1385.56	1174	1389.66	1172	1397.64	1170	1409.81
	1170	1439.22	1170	1456.49	1170	1463.91	1170	1467.53	1170	1476.98
GR	1170	1482.89	1170	1508.53	1172	1563.28	1174	1601.93	1176	1654.88
GR	1176	1666.64								
QT	1	220000								
ET		7.1					489.5	1337.7		
X1	39	50	489.54	1337.7	500	450	480			
GR	1180	0	1180	60.86	1180	63.23	1180	73.46	1180	78.65
GR	1182	84.86	1184	87.46	1186	92.65	1188	95.53	1190	98.93
GR	1192	103.69	1194	105.79	1196	114.23	1198	170.87	1198	205.37
GR	1196	210.54	1194	216.61	1192	219.62	1190	226.22	1188	232.28
GR	1186	236.97	1184	244.01	1182	251.76	1180	257.61	1178	265.63
GR	1178	280.87	1178	286.25	1180	309.24	1180	384	1178	424.52
GR	1176	427.51	1174	430.65	1172	434	1170	436.74	1160	451.98
GR	1183.6	489.54	1152.2	520.94	1152.2	1308.4	1181.5	1337.7	1164	1340.92
GR	1166	1356.24	1168	1357.68	1170	1411.73	1172	1417.7	1172	1423.78
GR	1170	1427.2	1170	1461.02	1172	1519.9	1174	1610.18	1176	1629.91
ET		7.1					455.69	1433.84		
X1	40	37	455.69	1433.84	470	550	500			
GR	1196	0	1198	18.94	1200	36.94	1202	54.89	1204	79.33
GR	1204	212.11	1202	252.1	1200	266.97	1198	275.7	1196	286.94
GR	1194	298.58	1192	308.25	1190	318.42	1188	333.62	1186	345.76
G	1184	366.15	1184	390.9	1184	455.69	1152.7	487	1152.7	1402.54
G	1184	1433.84	1158	1482.09	1160	1486.58	1162	1494.69	1164	1499.88
GR	1166	1506.5	1168	1511.89	1170	1516.8	1172	1520.97	1172	1535.67
GR	1172	1580.43	1172	1679.49	1172	1704.99	1174	1731.13	1174	1765.93
GR	1174	1769.16	1174	1819.84						
NC				0.3	0.5					
X1	40.1	4	5000	5979	58	37	57			
X3	10									
GR	1184.1	5000	1152.8	5031.3	1152.8	5947.7	1184.1	5979		
SB	1.05	1.56	2.6	500	923.4	106	33579	1	1152.8	1152.8
X1	40.2	4	5000	5986	32	32	32			
X2			1	1192	1206					
X3	10									
GR	1184.1	5000	1152.8	5031.3	1152.8	5954.7	1184.1	5986		
ET		7.1					5000	6009.2		
X1	40.3	4	5000	6009.2	106	106	106			
GR	1184.2	5000	1152.9	5031.3	1152.9	5977.9	1184.2	6009.2		

	40.4	4	5000	6032.4	106	106	106			
X3	10									
GR	1184.3	5000	1153	5031.3	1153	6001.1	1184.3	6032.4		
SB	1.05	1.56	2.6	500	988.4	104	28283	1	1153.1	1153.1
X1	40.5	4	5000	6051	85	85	85			
X2			1	1184	1199					
X3	10									
GR	1184.4	5000	1153.1	5031.3	1153.1	6019.7	1184.4	6051		
ET		7.1					5000	6063.7		
X1	40.6	4	5000	6063.7	58	58	58			
GR	1184.5	5000	1153.1	5031.4	1153.1	6032.4	1184.5	6063.7		
X1	41.1	4	5000	6076.7	59	59	59			
X3	10									
GR	1184.6	5000	1153.2	5031.4	1153.2	6045.2	1184.6	6076.7		
SB	1.05	1.5	2.6	500	1019.9	106	29097	1	1153.2	1153.2
X1	41.2	4	5000	6083	29	29	29			
X2			1	1184	1192					
X3	10									
GR	1185	5000	1153.2	5031.8	1153.2	6051.2	1185	6083		

INVERT SMOOTHED TO ELEV 1154 BETWEEN BANKS

X1	42.1	4	4910	6230	510	420	505	
GR	1184	4910	1154	4940	1154	6200	1184	6230
NC	0.05	0.05	0.035	0.1	0.3			

INVERT SMOOTHED TO ELEV 1155 BETWEEN BANKS

X1	224.34	4	19823	21143	105	200	140	
GR	1184.1	19823	1155	19852.1	1155	21114	1184.1	21143

INVERT SMOOTHED TO ELEV 1157 BETWEEN BANKS

X1	224.43	4	19822.7	21152.7	500	440	500	
GR	1184.6	19822.7	1157	19850.3	1157	21125.1	1184.6	21152.7

INVERT SMOOTHED TO ELEV 1159 BETWEEN BANKS

	224.53	4	19664.6	21105	510	500	500	
GR	1184.9	19664.6	1159	19690.5	1159	21079.1	1184.9	21105

INVERT SMOOTHED TO ELEV 1161 BETWEEN BANKS

X1	224.62	4	19519	20859	505	505	500	
GR	1185.2	19519	1161	19543.2	1161	20834.8	1185.2	20859

INVERT SMOOTHED TO ELEV 1161 BETWEEN BANKS

X1	224.71	4	19326.4	20666	620	440	630	
GR	1185.5	19326.4	1161	19350.9	1161	20641.5	1185.5	20666

INVERT SMOOTHED TO ELEV 1161 BETWEEN BANKS

X1	224.81	4	19081.8	20422	560	490	600	
GR	1185.8	19081.8	1161	19106.6	1161	20397.2	1185.8	20422

INVERT SMOOTHED TO ELEV 1161 BETWEEN BANKS

X1	224.9	4	18902.6	20233	515	470	540	
GR	1186.1	18902.6	1161	18927.7	1161	20207.9	1186.1	20233

INVERT SMOOTHED TO ELEV 1162 BETWEEN BANKS

X1	225	4	18731	20021	500	500	470	
GR	1186.4	18731	1162	18755	1162	19996.6	1186.4	20021

INVERT SMOOTHED TO ELEV 1163 BETWEEN BANKS

X1	225.1	4	18770	19940	540	260	400	
GR	1186.7	18770	1163	18794	1163	19916.3	1186.7	19940

INVERT SMOOTHED TO ELEV 1163 BETWEEN BANKS

X1	225.19	4	18700	19800	470	340	400	
GR	1187	18700	1163	18724	1163	19776	1187	19800

INVERT SMOOTHED TO ELEV 1163 BETWEEN BANKS
The invert was originally at 1170 in the SLA model BSI-SM.dat but this resulted in an artificial hump in the channel bed profile. WPA felt that this hump should be removed.

	225.28	4	18660	19810	450	450	450			
GR	1187.3	18660	1163	18677	1163	19792.7	1187.3	19810		

INVERT SMOOTHED TO ELEV 1162.4 BETWEEN BANKS
The invert was originally at 1170 in the SLA model BSI-SM.dat but this resulted in an artificial hump in the channel bed profile. WPA felt that this hump should be removed.

X1	225.38	4	18530	19790	870	870	870			
GR	1187.6	18530	1162.4	18548	1162.4	19772.4	1187.6	19790		

BACK TO NON-CHANNELIZED SECTIONS

ET		7.1					18589.5	19774.3		
X1	225.48	96	18589.5	19774.3	505	460	507.13			
GR	1195.5	18401.8	1193.9	18532.5	1195	18589.5	1186.2	18634.4	1184.2	18717
GR	1165.5	18755.6	1166.5	18756.2	1166.6	18886.9	1167.5	19013.8	1171.1	19050.6
GR	1172.8	19102.6	1172	19109.8	1169.8	19212.5	1164.3	19297	1164.2	19414.2
GR	1164	19422.1	1163.1	19588.2	1161.5	19591.4	1162.9	19629.5	1186.4	19693.6
GR	1187.4	19703.9	1203.5	19762.5	1203.8	19774.3	1197.4	19803.8	1196.2	19812.5
GR	1204.2	19839.2	1203.4	19842.8	1201	19878.3	1192.9	19900.1	1191.7	19961.1
GR	1188.5	19992.3	1188	20016.5	1188.5	20040.9	1187.6	20153.7	1187.5	20178.1
GR	1189	20233.4	1192.8	20240.2	1196.8	20271.6	1174	20291.8	1165	20311.2
GR	1163	20362.4	1168.6	20389.3	1162.7	20411.4	1162	20599.5	1161.7	20603.5
	1163.1	20609.1	1182.9	20645.3	1187.2	20649	1168.8	20690.9	1162.7	20708.9
GR	1163.7	20755.9	1167.4	20769.5	1168.1	20775.5	1168.7	20814.9	1166.4	20821.3
GR	1165.7	20831.5	1163.3	20834.5	1164	20861.9	1163.5	20864.1	1163.5	20971.2
GR	1162.5	21079.5	1165.3	21184.7	1164.4	21200.1	1166.3	21213.4	1165.3	21221.9
GR	1164.3	21259.1	1167.4	21342.1	1162.7	21354.8	1163.8	21356.3	1164	21389.6
GR	1162.7	21480.5	1163.8	21585	1164.7	21615.9	1161	21634.1	1160.3	21642.5
GR	1173.1	21685.9	1179.8	21702.1	1186.4	21721.5	1186.1	21798.1	1191.7	21813
GR	1190.6	21835.9	1193.7	21927	1192.1	21991	1193.2	22057.7	1195.5	22096.2
GR	1194.6	22132.9	1196.9	22152.4	1195.5	22172.3	1197.2	22186.1	1196.4	22270.5
GR	1194.4	22324.4	1196.5	22395.3	1195.8	22430.4	1196.7	22504.7	1195.5	22515.5
GR	1197.2	22522								

ET		7.1					18700.7	19907.8		
X1	225.57	96	18700.7	19907.8	495	450	475.36			
GR	1199	18437.1	1193.8	18465.1	1197.2	18546.1	1185.6	18598.5	1184	18632.1
GR	1187.1	18665	1190.8	18678.1	1191.6	18700.7	1186.3	18719.4	1166.9	18751.5
GR	1167.9	18751.7	1167.1	18791.3	1167	18962.9	1167.8	18969.6	1168	19263.2
GR	1168.3	19336	1167.4	19353.3	1164	19354	1162.4	19354.7	1168.8	19396.7
GR	1167.6	19430.4	1168	19520.8	1160.3	19557.3	1159.6	19573.8	1158.3	19575.5
GR	1158.3	19690.1	1162.2	19721.7	1163.7	19751.5	1183.7	19789.6	1180.6	19812.1
GR	1181	19816.6	1185.2	19829.5	1187	19907.8	1186.6	19942.2	1181.2	19989.8
GR	1184.2	19999.4	1186.8	20072.2	1182	20080.7	1159.1	20114.3	1161.5	20116.9
GR	1157.9	20136.3	1158.7	20259.5	1158.8	20269.1	1162.3	20269.4	1172.4	20278.6
GR	1172.8	20283.2	1169.8	20311	1172.4	20327.3	1174.5	20333.5	1184.5	20352
	185.5	20356.4	1173.8	20383.4	1171.5	20393.4	1172.2	20412.3	1164.9	20424.8
GR	1162.3	20434.4	1161.2	20434.8	1158	20447.3	1159.5	20492.2	1172.7	20516.9

[illegible]	188.1	20542.6	1188.4	20548.3	1202.8	20577.8	1210.5	20598.4	1206.4	20609.4
	197.1	20676.4	1192.1	20734.1	1191.7	20779.9	1199.1	20814.8	1191.2	20844.6
GR	1189.9	20885.5	1194.4	20909.4	1189.5	20933.3	1190.7	20991	1186.9	21008.3
GR	1184	21143.8	1184.2	21212.2	1191.3	21232.9	1165.8	21282.3	1171.5	21294.3
GR	1184.3	21328.9	1184.7	21341.8	1195.4	21367.7	1190.6	21380.9	1190.6	21417.4
GR	1195.2	21433	1187.9	21460.1	1192	21471.6	1190.3	21541.7	1193.7	21586.5
GR	1194.4	21687.1	1193.2	21741.9	1197.9	21811.7	1197.3	21885.6	1196.1	21941.4
GR	1198.5	22042								

ET		7.1					18727.9	19790.8		
X1	225.66	95	18727.9	19790.8	525	520	512.77			
GR	1202.6	18694.6	1190.2	18714.2	1194.7	18727.9	1186.7	18745.5	1181.8	18802.5
GR	1167	18825.6	1164.9	18827	1167.8	18829	1168	18879.7	1167.5	18912.6
GR	1164.2	19213.5	1165.9	19230.1	1166.9	19250.3	1168.7	19319.5	1169.3	19370.7
GR	1169.7	19410.1	1169.2	19423.8	1166.4	19432.8	1166.2	19439.6	1158.8	19467.2
GR	1160.5	19501.3	1160.5	19516.9	1159	19518.4	1159	19533.4	1160.2	19558.6
GR	1159	19562.5	1160.7	19584	1162.3	19596.7	1162.5	19639.1	1165.6	19671.6
GR	1161.6	19698.5	1161.9	19743.5	1163.5	19755.8	1165.9	19763.3	1185.1	19790.8
GR	1183.7	19805.1	1181.5	19854.7	1177	19869.3	1178.5	19886.7	1174.8	19948.3
GR	1174.8	19961.9	1181.1	19974.1	1197.6	20015.3	1195.4	20022.5	1188.4	20040
GR	1188.1	20076.1	1206.8	20113.6	1206.4	20154.6	1204.6	20211.4	1203.8	20276.3
GR	1202.5	20323.5	1200.2	20359.4	1192.9	20392.2	1192.4	20470.6	1192.3	20484
GR	1192.8	20540.9	1193.6	20599.2	1194.2	20661	1195.1	20677.3	1194.6	20717.6
GR	1199.5	20779.8	1203.3	20844.2	1203.1	20903.8	1204.9	20907.8	1207.7	20919.2
GR	1193	20945	1192.5	20952	1193.3	20982.2	1196	20992.9	1194.4	20995.7
[illegible]	.94.7	21004.9	1195	21057.5	1196	21082.9	1197	21092.1	1199	21153.4
[illegible]	1199.1	21186.7	1192.7	21219	1193.6	21274.2	1194.7	21336	1194.8	21392.1
GR	1195.7	21462.3	1193.7	21501.8	1198.8	21544.6	1198.6	21615.3	1197.8	21634.3
GR	1199.3	21706.1	1199.3	21711.8	1198.8	21769.9	1197.8	21810	1199.8	21887.6
GR	1199.8	21962.3	1199.5	22031.8	1198.8	22086.5	1198.3	22141.4	1200.7	22190

ET		7.1					18675.4	19822.4		
X1	225.76	94	18675.4	19822.4	440	485	482.78			
GR	1202.1	18599.4	1201.4	18607.5	1200.5	18649.4	1200.7	18673.2	1199.2	18675.4
GR	1165.5	18720.5	1165.6	18740.6	1166	18801.3	1166.2	18851.4	1165.3	18854.2
GR	1165.2	18881.2	1165.2	18915	1166.3	18924.9	1165	19164.4	1165.4	19166.6
GR	1167	19211.7	1168.3	19255.6	1170.7	19317.9	1171.4	19334.8	1171	19414.5
GR	1170.5	19445.1	1169.4	19500	1168.7	19535.3	1167.6	19557.8	1169.1	19593.6
GR	1170.7	19634.6	1170.9	19638.8	1177.8	19656.9	1178.1	19666.7	1180.5	19751.2
GR	1181.3	19780.3	1182.1	19782.4	1196.2	19822.4	1191.4	19834.5	1191.1	19865.6
GR	1190.9	19890	1190.7	19941.8	1190.8	19954	1191.7	20014.4	1190.8	20031
GR	1191.4	20067.7	1192.3	20095.6	1193.9	20141.3	1196.8	20201.8	1196.9	20206.2
GR	1195.9	20250.4	1194.3	20287.1	1195.6	20322.5	1198.2	20384.7	1198.7	20401
GR	1198.9	20438.6	1197.9	20454.7	1199.3	20484.2	1198.8	20509.1	1197.2	20517.6
GR	1198.6	20523.6	1214.7	20564.7	1224.3	20588.8	1227.4	20641.4	1229	20672.2
GR	1229.5	20697.7	1210.3	20730.5	1195.1	20756.4	1194.3	20792	1193.2	20813.3
GR	1194.4	20820.3	1193.3	20844	1193.8	20858.3	1194.7	20900.8	1195	20922.8
GR	1195.6	20955.7	1195.6	20980	1196.8	21012.4	1197.7	21028.5	1214.7	21064.4
GR	1216.5	21069	1216.8	21072.7	1217.1	21109.1	1216.8	21110	1197.5	21144.1
GR	1198.6	21184.6	1198.7	21223.2	1198.7	21255.2	1198.6	21293.7	1198.7	21335.9
	198.7	21386.1	1199.4	21435.5	1199.3	21466.5	1199.1	21484.6	1199.1	21521.9
GR	1199.2	21551.1	1199.2	21586	1200.1	21622.7	1201.8	21674		

ET		7.1					18640.0	19965.7		
X1	225.85	94	18128.4	19965.7	630	505	509.56			
GR	1200.8	17859.9	1200	17925.1	1199.9	17998.1	1199.9	18017.7	1199.3	18017.9
GR	1199.5	18021.9	1195.9	18066.5	1187.3	18086.8	1188.9	18091.7	1194.7	18128.4
GR	1192	18139.2	1190	18171.7	1190	18202.9	1187.8	18205.3	1175.3	18230.7
GR	1167.6	18317.7	1166.8	18340.2	1166.9	18433.5	1167	18644	1167.3	18714.1
GR	1167.3	18730.3	1168	18923.1	1168.1	18951	1169.1	18998.3	1169	19113.9
GR	1168.9	19153.3	1168.7	19257	1168.6	19361.6	1169.4	19412.2	1168.7	19428.2
GR	1168.7	19474.2	1168.9	19549.8	1170.6	19636.8	1169.2	19637.4	1173	19703.5
GR	1173.6	19713.9	1172.3	19724.4	1171.1	19760.2	1168.4	19774.2	1168.8	19835.1
GR	1168.4	19851.4	1181.8	19867.3	1182.2	19884.5	1184.8	19907.6	1201.6	19950.6
GR	1202.4	19965.7	1198.5	19974.9	1193.1	19990.9	1194.5	20033.7	1189.9	20061.5
GR	1189.2	20111.3	1196.5	20135.6	1196.8	20186.5	1192.9	20196	1190.8	20209.4
GR	1190.8	20231	1192.3	20245.5	1195.4	20257.9	1195	20279	1190.9	20291.2
GR	1190.9	20371.8	1196.4	20396.8	1198.5	20440.3	1199.3	20444.2	1198.8	20519.4
GR	1198.5	20601.3	1199.1	20661.4	1201.2	20676.2	1201.3	20718.5	1200.5	20729.9
GR	1201.2	20754.7	1199.5	20792.3	1200.1	20830.8	1198.8	20892.9	1199.5	20954.2
GR	1200.5	21039.8	1203.7	21042.5	1206.2	21060.1	1205.4	21063.8	1200.5	21071.4
GR	1200.6	21118.5	1201.2	21197.6	1201.6	21234.8	1200.7	21260.1	1201.6	21334
GR	1201.1	21435.8	1201	21509.6	1197.7	21601	1196.8	21662.9	1197.6	21746.1
GR	1197.6	21762.1	1200.1	21799.7	1199	21871.1	1200.8	21924.6		

ET		7.1					18335.5	20237.2		
v	25.95	94	18335.5	20237.2	470	510	509.99			
	1203.7	17840.6	1202.4	17848.9	1193.6	17889.2	1193.7	17922.2	1194	17963.8
GR	1193.7	18003.5	1193.3	18049.4	1194.4	18075.7	1196.9	18116.2	1197	18196.1
GR	1196	18228.4	1194.6	18269	1193.2	18321.5	1192.9	18335.5	1190.1	18375.5
GR	1182.4	18405.1	1183	18428.5	1181.5	18445	1177.9	18462.5	1176.1	18485.6
GR	1176.8	18517.9	1176.6	18533.3	1175.3	18553.3	1176.3	18604.6	1178	18637.4
GR	1176	18671.4	1175.9	18692.9	1167.9	18708.4	1168.7	18708.7	1167.9	18717.5
GR	1167.9	18817.2	1168	18863.1	1168.6	18952	1168.8	19096.8	1168.8	19116.2
GR	1172.1	19129	1172.9	19130.4	1174.6	19160.5	1175.5	19215.6	1174.7	19255.3
GR	1175.1	19282.8	1173.9	19324	1172.5	19402.1	1173.3	19480.7	1173.4	19487.4
GR	1173.5	19546.6	1173.2	19561.6	1171.5	19597	1171.8	19766.1	1172	19774.5
GR	1172.2	19849.9	1172.6	19953.3	1173	20020.4	1173	20028.3	1183.6	20039.7
GR	1183.9	20085.7	1184.1	20114.6	1196.9	20181	1208.9	20237.2	1206.8	20284.1
GR	1208.4	20295.6	1203.3	20308.8	1195.4	20337	1194.8	20347.3	1194.6	20393
GR	1194.6	20446.4	1194.6	20457.2	1194.6	20542.6	1195.3	20585.5	1198.7	20639.1
GR	1198.6	20647.5	1200.8	20699.8	1201.6	20747.8	1201.5	20820.4	1201.6	20865.5
GR	1202.1	20977.3	1202.1	20982.5	1201.9	21042.6	1201.8	21084.5	1199.8	21122.5
GR	1199.8	21145.3	1200.5	21188.1	1200.5	21201.5	1198.1	21246.4	1196.8	21266.9
GR	1197.8	21298.1	1197.5	21304.9	1198.3	21344.9	1198.8	21373.7	1200.5	21418.9
GR	1199	21475.2	1199.6	21525.8	1200	21556.4	1202.2	21595		

Separate files were run from Sec. 225.95 to Sec. 226.89 to analyze
the split flow around the island under Alma School Bridge.
Qmc =147500 cfs (Split A) Qoverflow = 72500 cfs (Split B)

	4	0.028	19322.6	0.028	20431.8	0.028	20903.8	0.032	21292	
QT	1	147500								
ET		7.1					19322.6	20431.8		
X1	226.04	61	19384.7	20261.8	484	480	476.46			
GR	1190.7	19322.6	1189.8	19330.3	1189.1	19348.5	1185	19384.7	1185	19388
GR	1184.7	19422.5	1184.8	19427	1184.1	19433.8	1183.1	19465.4	1180.9	19474.7
GR	1177.6	19481.8	1174.3	19487	1173.9	19516.1	1174.4	19546	1173.3	19554.1
GR	1177.3	19578.1	1176.4	19677.9	1176.1	19713.4	1175.5	19740.7	1174.3	19803.7
GR	1173.5	19852.7	1173.6	19865	1174.4	19915.2	1173.1	19968.4	1173.5	19986.1
GR	1174.1	20226.7	1174.6	20231.5	1186.4	20261.8	1182.7	20271.6	1182.7	20278.9
GR	1183.2	20323.1	1183.4	20350.9	1197.6	20397.2	1208.9	20431.8	1207.8	20455.3
GR	1208.3	20494.1	1210.1	20512.3	1207.1	20520	1202.5	20536.8	1202.7	20559.4
GR	1202.7	20593.7	1203	20606.2	1202.5	20646.2	1202.3	20721.5	1202.4	20732.8
GR	1202	20792.8	1202.5	20851.4	1203.7	20901	1203.7	20903.8	1201.8	20944.3
GR	1199.6	20978.5	1197.3	21014.7	1197.4	21049.3	1197.4	21091.9	1199.9	21127.4
GR	1200.7	21138	1200.8	21147.2	1200.5	21186.3	1200.6	21206.2	1201.5	21261.6
GR	1201.7	21292								

NH	4	0.028	19593.2	0.028	20570.5	0.028	20626.6	0.032	21539.6	
ET		7.1					19593.2	20570.5		
X1	226.13	60	19616.4	20439.1	510	500	502.01			
GR	1170.5	19437.3	1170.7	19485.6	1172.2	19504.1	1195.1	19553.4	1197.4	19593.2
GR	1185	19616.4	1175	19633	1175.1	19634.4	1174.6	19634.6	1174.2	19647
GR	1175	19647.9	1174.1	19649.3	1174.1	19651.3	1174.7	19652.3	1177.6	19671.2
r	1177.4	19743.2	1177.3	19758.5	1177.3	19820.9	1176.9	19854.6	1175.8	19902.4
	1175.7	19926.4	1175.1	19957.4	1175.4	20107.7	1175.4	20182.2	1174.9	20223.3
GR	1175.4	20226.9	1176.7	20230.3	1182.3	20263.7	1183.8	20312.9	1183	20329.7
GR	1181.3	20345.9	1182	20382.2	1185.2	20439.1	1187	20474.8	1197.3	20524
GR	1207.3	20570.5	1207.3	20626.6	1200	20643.6	1194.2	20663.5	1193.7	20687.1
GR	1202.3	20743.5	1200.4	20811.7	1200.5	20871	1200.3	20920.2	1200.3	20939.3
GR	1200.5	20993.3	1201	21057	1200.2	21085.4	1200.7	21141.6	1200.8	21146.2
GR	1199.6	21208	1198.8	21227.7	1201.7	21263.7	1201.7	21319.4	1201.8	21376.1
GR	1201.6	21430.6	1201.1	21432.8	1201.2	21445.1	1201.8	21532.8	1202.2	21539.6

NH	2	0.028	19603.5	0.028	20608.2					
ET		7.1					19603.5	20608.2		
X1	226.23	36	19656.4	20316.6	400	630	492.85			
GR	1172.3	19327.9	1172.5	19354.8	1172.5	19507.5	1172.5	19559.6	1172.8	19569.4
GR	1178.2	19577.6	1195.5	19603.5	1194.5	19620.9	1192.8	19643	1184.4	19656.4
GR	1183.6	19658	1178.5	19679.1	1178.6	19679.2	1178.6	19699.7	1178.6	19818.4
GR	1178.6	19842.2	1178.6	19887.8	1178.7	19921.7	1177.6	20113.2	1177.9	20135.2
GR	1178.7	20240.4	1179	20252.9	1178.7	20253.2	1181.4	20280.2	1184.7	20316.6
GR	1185.9	20328.3	1185.9	20344.6	1186	20373.1	1185.8	20381.7	1185.6	20439.4
GR	1186.1	20464.8	1186.5	20496.5	1186.2	20541.5	1186.1	20556.6	1191.5	20568.2
GR	1210.9	20608.2								

NH	3	0.028	19598.4	0.028	20580.5	0.032	21305.9			
ET		7.1					19598.4	20580.5		

X1	226.35	46	19633.4	20520.9	470	770	666.57			
	1173.4	19477.2	1173.4	19478.6	1179.8	19487.8	1194.4	19507.4	1201.1	19533.2
GR	1201.9	19538.7	1202.2	19547.6	1202	19590.8	1204.3	19598.4	1199.6	19623
GR	1189.4	19633.4	1189	19635.3	1180.3	19702.2	1180.6	19722.8	1180.8	19974.1
GR	1180.2	19983.4	1182.9	20006.6	1184.5	20049.5	1184.8	20084.8	1183.2	20121.1
GR	1183.6	20122	1184.6	20188.7	1185.2	20414.8	1185.2	20456.4	1185.5	20504.6
GR	1185.7	20520.9	1207.3	20575.1	1209.5	20580.5	1204.6	20626.8	1203	20642
GR	1203	20647.6	1203	20714.5	1203	20738.2	1203.5	20817.4	1203.9	20885.1
GR	1203.7	20954.1	1203.4	21007.9	1203.1	21022.9	1204.1	21080.2	1203.7	21102.6
GR	1204	21105.1	1203	21151.8	1203.8	21197.6	1203.3	21239.4	1204.7	21284.3
GR	1205.1	21305.9								
NH	4	0.029	19319.7	0.028	19554.4	0.028	20592.3	0.032	21453.5	
ET		7.1					19554.4	20592.3		
X1	226.48	51	19554.4	20592.3	550	994	763.51			
GR	1202.8	19057.9	1204.8	19157.6	1205.9	19268.4	1205.4	19298.9	1205.8	19319.7
GR	1206.2	19382.8	1206.1	19487.9	1205.8	19531.8	1204.6	19554.4	1203.8	19612.5
GR	1191.4	19639.4	1185.3	19650	1182.1	19671.1	1182.4	19681.3	1182.2	19793.3
GR	1181.8	19861.5	1182.8	19882.7	1183.6	19886.2	1183.2	19891.3	1183.7	19924.7
GR	1185.6	19949.7	1187.6	20029.1	1188.3	20086.5	1187.7	20119.4	1187.2	20120
GR	1187.8	20137.4	1187.5	20318.7	1188.5	20469.4	1188.7	20519.1	1196	20533.2
GR	1203.5	20556.3	1203.8	20592.3	1203.5	20663.4	1202.9	20689.2	1204.7	20698.9
GR	1204.6	20787.2	1203.2	20834.8	1203.5	20903.5	1203.6	20913.2	1204.3	20988.1
GR	1203.9	21060.7	1203.9	21128.6	1204.8	21172.6	1207.4	21256.2	1207.4	21258.9
GR	1202.4	21271	1207	21288.1	1206.8	21353	1206.8	21357.8	1207.6	21429.4
GR	1207.8	21453.5								
NH	4	0.029	19382.8	0.028	19554.4	0.028	20592.3	0.032	21453.5	
ET		7.1					19554.4	20592.3		
X1	226.49	46	19554.4	20592.3	1	1	1			
GR	1206.2	19382.8	1206.1	19487.9	1205.8	19531.8	1204.6	19554.4	1203.8	19612.5
GR	1191.4	19639.4	1186.0	19650	1186.0	19671.1	1186.0	19681.3	1186.0	19793.3
GR	1186.0	19861.5	1186.0	19882.7	1186.0	19886.2	1186.0	19891.3	1186.0	19924.7
GR	1186.0	19949.7	1187.6	20029.1	1188.3	20086.5	1187.7	20119.4	1187.2	20120
GR	1187.8	20137.4	1187.5	20318.7	1188.5	20469.4	1188.7	20519.1	1196	20533.2
GR	1203.5	20556.3	1203.8	20592.3	1203.5	20663.4	1202.9	20689.2	1204.7	20698.9
GR	1204.6	20787.2	1203.2	20834.8	1203.5	20903.5	1203.6	20913.2	1204.3	20988.1
GR	1203.9	21060.7	1203.9	21128.6	1204.8	21172.6	1207.4	21256.2	1207.4	21258.9
GR	1202.4	21271	1207	21288.1	1206.8	21353	1206.8	21357.8	1207.6	21429.4
GR	1207.8	21453.5								

Downstream face of Alma School Rd Bridges

All data used to model this bridge was taken from survey notes and from as-built plans dated 7-80

.	4	0.029	19487.9	0.028	19554.4	0.028	20592.3	0.032	21453.5	
ET		7.1					19554.4	20592.3		
X1	226.50	46	19554.4	20592.3	10	10	10			
GR	1206.2	19382.8	1206.1	19487.9	1205.8	19531.8	1204.6	19554.4	1203.8	19612.5
GR	1191.4	19639.4	1186.0	19650	1186.0	19671.1	1186.0	19681.3	1186.0	19793.3
GR	1186.0	19861.5	1186.0	19882.7	1186.0	19886.2	1186.0	19891.3	1186.0	19924.7
GR	1186.0	19949.7	1187.6	20029.1	1188.3	20086.5	1187.7	20119.4	1187.2	20120
GR	1187.8	20137.4	1187.5	20318.7	1188.5	20469.4	1188.7	20519.1	1196	20533.2
GR	1203.5	20556.3	1203.8	20592.3	1203.5	20663.4	1202.9	20689.2	1204.7	20698.9
GR	1204.6	20787.2	1203.2	20834.8	1203.5	20903.5	1203.6	20913.2	1204.3	20988.1
GR	1203.9	21060.7	1203.9	21128.6	1204.8	21172.6	1207.4	21256.2	1207.4	21258.9
GR	1202.4	21271	1207	21288.1	1206.8	21353	1206.8	21357.8	1207.6	21429.4
GR	1207.8	21453.5								

12 degree skew angle (cosine 12 degrees = 0.9781)

NC	0.028	0.032	0.028							
ET		7.1					19615.6	20548.2		
X1	226.51	77	19615.6	20548.2	2	2	2	0.9781		
X2									0.9781	
BT	-19	19030	1204	1204	19615.5	1206.13	1206.13	19615.5	1206.13	1202.48
BT		19670.8	1206.22	1202.57	19729.6	1206.26	1202.61	19788.4	1206.26	1202.61
F		19847.6	1206.3	1202.65	19905.5	1206.31	1202.66	19963.3	1206.27	1202.62
L		20022.4	1206.2	1202.55	20081.3	1206.15	1202.5	20139.1	1206.05	1202.4
BT		20197.8	1205.92	1202.27	20257.6	1205.8	1202.15	20315	1205.63	1201.98
BT		20372.7	1205.5	1201.85	20434	1205.38	1201.73	20489.6	1205.09	1201.44
BT		20548.1	1204.81	1201.16						
GR	1204	19030	1206.13	19615.5	1202.48	19615.6	1194.51	19615.7	1190.16	19629.5
GR	1187.9	19670.8	1202.57	19670.8	1202.57	19673.3	1187.89	19673.3	1186.93	19729.6
GR	1202.6	19729.6	1202.6	19732.1	1186.93	19732.1	1186.07	19757.1	1186.00	19788.4
GR	1202.6	19788.4	1202.61	19790.9	1186.00	19790.9	1186.00	19829.4	1186.00	19847.6
GR	1202.7	19847.6	1202.7	19850.1	1186.00	19850.1	1186.00	19863.9	1186.0	19905.5
GR	1202.7	19905.5	1202.7	19908	1186.0	19908	1186.0	19922.2	1186.0	19951.8
GR	1186.0	19963.3	1202.62	19963.3	1202.62	19965.8	1186.00	19965.8	1186.29	20022.4
GR	1202.6	20022.4	1202.6	20024.9	1186.29	20024.9	1187.03	20051.5	1187.08	20081.3
GR	1202.5	20081.3	1202.5	20083.8	1187.08	20083.8	1186.63	20139.1	1202.4	20139.1
GR	1202.4	20141.6	1186.63	20141.6	1187.14	20197.8	1202.27	20197.8	1202.27	20200.3
GR	1187.1	20200.3	1187.7	20257.6	1202.15	20257.6	1202.15	20260.1	1187.68	20260.1
GR	1186.8	20315	1202	20315	1202	20317.5	1186.83	20317.5	1187.56	20372.7
GR	1201.9	20372.7	1201.9	20375.2	1187.56	20375.2	1187	20434	1201.73	20434
GR	1201.7	20436.5	1187	20436.5	1187.64	20459.6	1186.2	20489.6	1201.44	20489.6
GR	1201.4	20492.1	1186.2	20492.1	1187.68	20520.2	1193.39	20548.1	1201.16	20548.2
GR	1204.8	20548.3	1204	20760						
ET		7.1					19615.6	20548.2		
X1	226.52	77	19615.6	20548.2	84	84	84	0.9781		
X2									0.9781	
BT	-19	19030	1204	1204	19615.5	1206.13	1206.13	19615.5	1206.13	1202.48
		19670.8	1206.22	1202.57	19729.6	1206.26	1202.61	19788.4	1206.26	1202.61
BT		19847.6	1206.3	1202.65	19905.5	1206.31	1202.66	19963.3	1206.27	1202.62

BT		20022.4	1206.2	1202.55	20081.3	1206.15	1202.5	20139.1	1206.05	1202.4
		20197.8	1205.92	1202.27	20257.6	1205.8	1202.15	20315	1205.63	1201.98
BT		20372.7	1205.5	1201.85	20434	1205.38	1201.73	20489.6	1205.09	1201.44
BT		20548.1	1204.81	1201.16						
GR	1204	19030	1206.13	19615.5	1202.48	19615.6	1194.51	19615.7	1190.16	19629.5
GR	1187.9	19670.8	1202.57	19670.8	1202.57	19673.3	1187.89	19673.3	1186.93	19729.6
GR	1202.6	19729.6	1202.6	19732.1	1186.93	19732.1	1186.07	19757.1	1186.00	19788.4
GR	1202.6	19788.4	1202.61	19790.9	1186.00	19790.9	1186.00	19829.4	1186.00	19847.6
GR	1202.7	19847.6	1202.7	19850.1	1186.00	19850.1	1186.00	19863.9	1186.00	19905.5
GR	1202.7	19905.5	1202.7	19908	1186.0	19908	1186.0	19922.2	1186.0	19951.8
GR	1186.0	19963.3	1202.62	19963.3	1202.62	19965.8	1186.00	19965.8	1186.29	20022.4
GR	1202.6	20022.4	1202.6	20024.9	1186.29	20024.9	1187.03	20051.5	1187.08	20081.3
GR	1202.5	20081.3	1202.5	20083.8	1187.08	20083.8	1186.63	20139.1	1202.4	20139.1
GR	1202.4	20141.6	1186.63	20141.6	1187.14	20197.8	1202.27	20197.8	1202.27	20200.3
GR	1187.1	20200.3	1187.7	20257.6	1202.15	20257.6	1202.15	20260.1	1187.68	20260.1
GR	1186.8	20315	1202	20315	1202	20317.5	1186.83	20317.5	1187.56	20372.7
GR	1201.9	20372.7	1201.9	20375.2	1187.56	20375.2	1187	20434	1201.73	20434
GR	1201.7	20436.5	1187	20436.5	1187.64	20459.6	1186.2	20489.6	1201.44	20489.6
GR	1201.4	20492.1	1186.2	20492.1	1187.68	20520.2	1193.39	20548.1	1201.16	20548.2
GR	1204.8	20548.3	1204	20760						

Upstream face of Alma School Rd Bridge

NH	3	0.029	19522.9	0.028	20594.3	0.032	20976.5			
-		7.1					19522.9	20594.3		
.	226.53	40	19522.9	20594.3	2	2	2			
GR	1207.3	19400.7	1208.3	19413.5	1209.1	19437.4	1209.9	19470.5	1212	19522.9
GR	1211.8	19539.6	1206.3	19582.3	1203	19614.7	1188.3	19644.6	1186	19653.3
GR	1186.0	19685.6	1186.0	19697.2	1186.0	19724.9	1186.0	19901.4	1186.0	19903.5
GR	1186.0	19935.8	1186.0	19968.1	1186.0	19972.2	1187.9	20054.4	1188	20058.9
GR	1188.1	20107	1188.1	20107.1	1187.6	20144.4	1186.3	20145.7	1187.7	20508.1
GR	1187.9	20519	1194.9	20532.1	1202.8	20554.6	1204.2	20571.1	1204.5	20594.3
GR	1203.7	20692.8	1203.3	20729.5	1203.9	20736.7	1203.6	20756.4	1203.6	20799.1
GR	1204.8	20834	1203.2	20847.8	1203	20900.8	1203.5	20925.7	1203.9	20976.5

NH	3	0.028	19623.6	0.028	20581.5	0.032	21318.1			
ET		7.1					19549.9	20581.5		
X1	226.61	40	19623.6	20542.5	560	360	478.1			
GR	1213.2	19483.8	1213.4	19549.9	1212.4	19581.4	1197.5	19610.7	1194.6	19619.8
GR	1190.6	19623.6	1188.3	19650.1	1188.2	19726.3	1187.0	19791.6	1187.0	19803.2
GR	1187.0	19883.3	1187.0	19964.1	1187.0	19991.7	1187.0	20038.5	1187.0	20063.8
GR	1187.0	20064.4	1187.0	20152.2	1187.0	20232.2	1188.2	20333.6	1188.5	20515.4
GR	1190	20542.5	1202.9	20571.1	1205.6	20581.5	1205.3	20676.4	1205.8	20765
GR	1207.4	20777	1204.5	20783.9	1200.5	20797.8	1201.5	20801.4	1203.3	20879.2
GR	1204.1	20903.5	1203.7	20927	1205.3	20950.3	1206.4	21025.9	1199.3	21086.6
GR	1200.4	21161	1201.8	21224.7	1206.9	21255.6	1208.6	21307	1208.4	21318.1

	3	0.031	19621.8	0.028	20724.5	0.032	21674.9			
ET		7.1					19491.0	20724.5		
X1	226.70	55	19621.8	20687.5	490	510	503.99			
GR	1205.2	19345.1	1205.6	19395.9	1205.7	19443.8	1205.8	19491.0	1206.4	19531.6
GR	1204.9	19584.1	1204.4	19593	1191.8	19621.8	1190.4	19639.9	1189.5	19664.4
GR	1189.6	19702.3	1189.2	19759.1	1188.3	19767.6	1189.7	19797.4	1188	19861
GR	1188.0	19870.8	1188.0	19871.6	1188.0	20148.3	1190.4	20560.2	1189.9	20561.9
GR	1190.7	20591.4	1190.5	20594.8	1192.8	20675.2	1193.1	20687.5	1203.4	20724.5
GR	1196.6	20744.3	1196.5	20783.1	1197	20799.3	1202	20840.1	1198.3	20878.9
GR	1195.1	20903.1	1195.3	20915.8	1189.4	20948	1188.9	20971.4	1191.7	21016.3
GR	1194.3	21030.4	1195.1	21046.5	1204.8	21098.9	1206.7	21109.5	1207.4	21157.1
GR	1207.7	21170.9	1208.4	21212	1207.8	21239	1206.8	21246.3	1199.2	21270.6
GR	1197.8	21295.6	1197.9	21303.4	1198.9	21365.1	1199.6	21411.3	1208.8	21447.3
GR	1205.5	21474.7	1208.5	21506.6	1208.6	21515.6	1208.5	21579.6	1209.9	21674.9
NH	5	0.028	19309.8	0.031	19441.4	0.031	19606.8	0.028	20598	0.032
NH	21791									
ET		7.1					19441.4	20598.0		
X1	226.80	70	19621.0	20537.0	560	480	487.43			
GR	1204.9	19289.4	1205.2	19309.8	1205	19352.7	1205.2	19398	1205.2	19399.9
GR	1205	19436	1205.1	19441.4	1204.8	19484	1204.2	19500.3	1204.2	19526.5
GR	1204.5	19544.7	1204	19577.8	1203.3	19606.8	1194.2	19621	1193.6	19621.4
GR	1193.1	19628.3	1191.8	19665.2	1192.2	19666.9	1191.7	19698.9	1192.5	20222.1
[illegible]	192.9	20527.5	1192.8	20535.4	1193.2	20536.6	1192.7	20537	1205.7	20585.8
[illegible]	1206.4	20589.8	1206.8	20598	1203.7	20641.3	1203.6	20649.8	1202.6	20711.9
GR	1202.2	20771.2	1201.9	20775.1	1200.3	20806.1	1195	20869.6	1195.1	20882.9
GR	1195.6	20935.9	1195.7	20944.5	1195.6	20972.8	1192.1	20992.5	1192	21007.1
GR	1192.3	21020.1	1192.8	21028.7	1201.5	21071.5	1204.1	21090.1	1206.1	21161
GR	1206.4	21170.5	1206.4	21184.9	1206.2	21271.6	1206.6	21311.6	1207.3	21334.3
GR	1207.3	21346.4	1206.7	21356.8	1202.6	21372.6	1200.1	21381	1199.5	21407.5
GR	1199.3	21410	1200.4	21434	1200.7	21436.3	1206.7	21465.8	1207.6	21517.2
GR	1207.8	21532.9	1208.5	21564.4	1210	21638.9	1210.5	21684.1	1210.3	21700.8
GR	1209.8	21714.6	1208.2	21730.5	1207.8	21748.7	1208.9	21772.5	1210.8	21791
NH	3	0.028	19026.7	0.028	20593.8	0.032	21751.8			
ET		7.1					19600.0	20593.8		
X1	226.89	96	19600.1	20464.2	550	525	510.72			
GR	1210.8	18699.3	1210.7	18704	1210.4	18760	1210.2	18812.2	1210.6	18825.2
GR	1209.3	18833.5	1210.5	18839.9	1210.1	18881.5	1210	18884.7	1210	18885.9
GR	1209.9	18900.2	1206.3	18960	1205.9	18965	1204.2	19008.2	1204.4	19026.7
GR	1202.5	19043.1	1197.3	19073.7	1195	19098.5	1193.6	19101.3	1193.6	19131
GR	1192.9	19351.9	1193.3	19352.3	1193.4	19357.5	1194.3	19389.5	1194.3	19392.7
GR	1194.3	19393.6	1194.3	19399.7	1193.7	19428	1193.2	19437.3	1192.5	19447.7
GR	1192.7	19448.7	1193.5	19456.5	1193.4	19486.1	1193.4	19491.2	1193.1	19600.1
GR	1192.8	19840.5	1192.9	19851.8	1193.6	20155.5	1193.7	20191	1193.7	20277.3
GR	1194.1	20461.8	1194.1	20464.2	1198.9	20506.8	1202.7	20534	1205.7	20552
GR	1205.8	20553.4	1207.2	20593.8	1205.3	20640.7	1204.4	20656.9	1204.5	20665.3
GR	1204	20691.7	1204.2	20701.6	1203.6	20722.5	1203.9	20741.1	1205.4	20776.1
[illegible]	1205.8	20783	1205.8	20783.7	1205.8	20791.9	1205.8	20826.9	1206	20838.5
GR	1206.1	20855.5	1206.7	20894.8	1210.3	20924.6	1210.6	20926.4	1210.8	20929

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      1210.9     20936    1211.4   21005.5    1211.2   21018.4    1211.1   21025.6    1209.9   21059.1
      1210.2   21081.5    1210.2   21113.8    1210.2     21155    1209.7   21178.6    1209.5   21235.1
GR    1209.2   21247.9    1209.2   21256.3      1209   21261.9    1209.6   21334.4    1209.5   21340.6
GR    1209.5     21345    1209.8   21399.5    1210.3   21437.5    1210.4   21455.1    1210.7   21460.8
GR    1210.5   21528.7    1209.6   21547.4    1208.9     21559      1209   21575.1      1209   21579.2
GR    1208.9   21584.7    1208.8   21613.8    1209.3   21642.8    1210.2   21683.1    1210.9   21714.4
GR    1211.1   21751.8

      Split flow starts at Sec. 226.89 for Alma School Bridge and ends at
      Sec. 225.76  -  Q upstream to Granite Reef Dam is 220000 cfs


QT         1    220000
NH         3     0.031   19356.4     0.028   20574.1     0.032   21859.4
ET                 7.1                                          19356.4   20574.1
X1    226.99        96   19395.3   20492.4       170       490    492.08
GR    1209.4   18363.1      1209   18395.6      1209   18401.2    1208.7   18434.8    1208.1     18452
GR    1207.9   18482.1    1208.1   18515.9    1208.5   18520.3      1209   18569.9    1209.4   18588.5
GR      1210   18595.7    1217.7   18683.9      1216   18695.7    1208.7   18708.4    1208.1   18722.1
GR    1208.2   18756.7    1208.4   18786.4    1208.2   18867.7    1207.6   18890.7    1206.9   18938.3
GR    1205.9   19001.2    1205.6   19002.6    1205.7   19004.4    1204.7     19037    1206.3   19054.8
GR      1209   19091.8    1208.7   19169.5    1208.5   19173.3    1203.7   19255.9    1200.2   19305.4
GR    1200.1   19306.1    1204.1   19326.7    1205.4   19337.4    1208.5   19351.6    1208.5   19356.4
GR    1207.5   19362.5    1206.5   19379.1    1200.5   19395.3    1194.3   19414.1    1194.6   19416.8
GR    1194.6   19453.4    1193.9     19524    1193.9   19529.1    1193.8   20095.1    1193.8   20212.5
GR    1193.8   20367.5    1193.7     20423      1195     20441    1195.5   20470.9    1199.6   20492.4
      1206.9   20532.5    1212.6   20574.1    1210.4     20583    1207.6   20592.4    1209.6   20613.5
      1212.7   20658.2    1214.4   20686.5    1217.2   20734.7    1217.9   20737.5    1217.1   20774.9
GR    1216.6   20786.2    1214.5   20827.4    1214.1   20840.4    1212.6   20857.8    1213.7   20893.9
GR    1213.9   20907.7    1213.4     20964    1213.1   21020.4      1208   21051.2    1209.5   21098.4
GR    1209.5   21112.5      1210   21120.2    1213.9   21185.1    1212.5   21194.8    1213.5   21209.7
GR    1212.1   21249.7    1211.8   21260.3    1213.4   21300.4    1214.2   21326.5    1214.1   21375.4
GR    1214.1   21394.8    1213.4   21430.3      1213   21466.9    1213.1     21495    1212.4   21529.4
GR    1210.4   21570.9    1209.3   21584.3    1209.5   21595.1    1209.7   21645.2    1209.8   21681.2
GR    1210.2     21698    1210.9   21729.2    1210.1   21763.2      1211   21792.1    1210.9   21833.7
GR    1212.1   21859.4

ET                 7.1                                            19475     20579
NH         3      0.03   19598.4     0.028   20588.8     0.032   21544.1
X1    227.08        96   19699.1   20433.7       585       500    504.96
GR    1212.5   18806.6    1212.3   18812.6    1210.7   18907.8    1210.1   18984.8      1209   19010.2
GR    1216.1   19028.4    1216.5     19030    1214.7   19070.7      1209   19077.5    1209.2   19091.4
GR    1209.2   19128.9    1208.8   19166.3    1209.8   19226.8      1210     19241    1218.9   19252.7
GR    1219.3   19254.9    1213.4   19301.3    1211.8   19312.2    1210.1   19319.1    1209.7   19337.5
GR    1209.8   19367.2    1209.6   19420.1    1209.6     19421    1209.9   19465.5    1209.9   19465.7
GR    1209.8     19527      1210   19531.3    1210.9   19574.1    1211.4   19598.4    1208.5   19602.9
GR    1194.1     19639    1194.1   19677.6    1194.3   19691.1    1195.3   19694.8    1195.6   19699.1
GR    1194.7   19700.2    1194.2   19704.7    1194.4   19726.1    1194.9   19921.6    1194.5   19935.8
GR    1194.5     19964    1194.2   20088.5    1194.2     20090    1196.1   20096.8    1195.7   20127.5
GR    1194.2   20146.2    1194.2   20165.4    1194.6   20173.5    1194.2   20203.2    1194.2   20240.9
GR    1194.4     20246      1195     20373    1194.7   20384.7    1198.4   20400.9    1200.2   20414.9
GR    1199.1   20420.6    1200.9   20433.7    1201.1   20447.4    1200.2   20489.6    1199.8     20518
      1199.9   20537.4    1208.9   20571.6      1215   20588.8    1212.3   20615.3    1212.4     20618
GR    1213.1   20663.3    1216.5   20713.5    1217.3   20735.3    1216.4   20762.4    1217.4   20772.9
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GR	1215.7	20795.5	1214.3	20806.9	1214.5	20812.2	1212.8	20875.4	1212.9	20885
	1212	20902.2	1212.1	20912.2	1211.2	20951.7	1211.2	20957.4	1211.4	21013.1
GR	1211.2	21047.8	1209.7	21086.2	1211	21096	1212.2	21149	1213.7	21180.5
GR	1213.6	21210.4	1212.4	21229.4	1210.8	21266.5	1210	21309.1	1209.5	21350.5
GR	1208.8	21378.1	1209.3	21431.3	1208	21455	1212	21490.1	1212.5	21497.2
GR	1213	21544.1								
NH	3	0.03	19582.3	0.028	20583.2	0.032	22652.2			
ET		7.1					19582.3	20583.2		
X1	227.18	96	19611.0	20546.1	500	505	509.22			
GR	1214.2	18653.9	1214.7	18735.4	1214.4	18808.3	1214.4	18866.3	1214.3	18881.6
GR	1213.7	19038.7	1212.4	19096.3	1212.4	19157.5	1212.2	19228.9	1212.2	19231.5
GR	1213.3	19351.8	1213.3	19354.9	1207.1	19372.8	1197.2	19405.9	1197.4	19406.7
GR	1195.1	19413.3	1194.6	19452	1195.8	19463.6	1195.9	19471.4	1200	19483.3
GR	1210.2	19507.1	1211	19512.5	1208	19547.4	1207.9	19572.9	1212.5	19582.3
GR	1211	19588.4	1201.8	19611	1194.6	19649.7	1194.7	19842.7	1194.5	19898.6
GR	1194.6	20015.1	1194.6	20178	1195.9	20197.8	1196.8	20233.3	1199.1	20298.1
GR	1200.4	20332.4	1200.5	20386.7	1201.8	20410	1201.5	20426.7	1205.2	20438.6
GR	1201.8	20447.1	1199.1	20452.3	1201.4	20510.7	1201.9	20546.1	1214.1	20575.5
GR	1216.5	20583.2	1215	20640.8	1218.1	20672.9	1217.5	20686	1219.3	20751.5
GR	1220.8	20808.6	1217.5	20845.6	1217.3	20863.7	1218.8	20895.4	1222	20919.6
GR	1221.3	20996.5	1219.9	21043.3	1220.1	21097.8	1221	21108.8	1220.4	21120.1
GR	1218.2	21133.6	1214.2	21152.1	1212.4	21188.4	1212.6	21238.3	1211.4	21271.1
GR	1212.3	21307.1	1210.7	21371.8	1211.8	21423.4	1213.7	21471.8	1212	21506.8
GR	1207.7	21556.2	1206.3	21557.8	1206.1	21563.9	1209	21609	1208.9	21634.6
GR	1207.8	21723.3	1211.5	21756	1212	21770.4	1213.5	21835.5	1213.6	21899.4
GR	1211.8	21956.1	1212.9	22002.8	1212.1	22054.9	1214.1	22094.3	1214.3	22151.4
	1213.4	22165.3	1212.5	22223.9	1213	22307.6	1213.8	22373.3	1213.7	22433
GR	1213.7	22475.3	1213.3	22547.6	1213.2	22605.9	1215.2	22634	1210.5	22645.3
GR	1210.5	22652.2								
NH	3	0.028	19556.7	0.028	20636.5	0.032	22107.2			
ET		7.1					19556.7	20636.5		
X1	227.27	95	19556.7	20607.1	780	170	498.96			
GR	1217.3	19509.1	1217.4	19518.9	1217.7	19556.7	1212.9	19563	1194.1	19600.6
GR	1193.7	19601.1	1194.4	19781.3	1194.4	19890.4	1194.8	20100.6	1194.9	20107.6
GR	1194.9	20171.2	1194.9	20172.2	1194.4	20172.3	1197.2	20180.4	1198.2	20182.1
GR	1198.1	20190.6	1198.1	20221.7	1198.8	20291.1	1199.4	20363.2	1199.4	20378.1
GR	1199.5	20400.4	1201.3	20484	1201.8	20519.2	1201.6	20538.3	1201.3	20557.6
GR	1205.5	20572.4	1207.9	20583.2	1213.6	20607.1	1219.9	20636.5	1219.2	20652.9
GR	1219.8	20698.7	1219.9	20718.4	1219.4	20733.5	1217.7	20760.3	1216.7	20779.1
GR	1215.2	20799.6	1215.2	20840.2	1215	20853.4	1214.3	20862.6	1213.7	20872.8
GR	1216.1	20974.7	1216.5	20985	1216.5	20985.7	1217.5	21021.1	1217.7	21026.5
GR	1217.7	21038.6	1218.4	21073.4	1220.6	21108.5	1220.3	21116.8	1219.5	21137.8
GR	1219	21149.5	1216.3	21179.1	1213.5	21202.3	1213.1	21210.3	1212.1	21246.7
GR	1211.7	21275	1211.6	21282.8	1211	21319.7	1210.9	21331.9	1210.6	21342.4
GR	1209.8	21376.3	1209.7	21405.3	1209.5	21410.9	1209.4	21422.6	1209.7	21439.7
GR	1211	21486.9	1211.2	21494.9	1211.2	21495.9	1208.7	21528.8	1210.9	21561.1
GR	1211	21562.6	1210.6	21620	1210	21661.6	1208.3	21677.6	1211	21698.3
GR	1212	21705.4	1212.2	21714	1212.9	21744.9	1211.7	21800.1	1211.4	21805.4
GR	1209.9	21837.3	1209.8	21846	1211.3	21876.7	1212.9	21895.9	1213.1	21912.5
	1213.2	21917.5	1210	21949.4	1206.8	21981.8	1207.9	21999.1	1208.8	22015.7
GR	1209.1	22022.4	1210.9	22046.1	1211.1	22051.3	1211.4	22053.3	1215.5	22107.2

Remove vertical ineffective flow area below EL. 1200 between Sta
19125 and Sta 19400.7. This area is an inlet from the channel that
would contribute to more coneyance in the left overbank than would
truly exist

NH	3	0.03	19489.2	0.028	20492.2	0.032	22225.6			
ET		7.1					19100.0	20492.2		
X1	227.37	95	19489.2	20492.2	590	425	509.52			
GR	1217.8	18504.3	1217.6	18527.7	1216.6	18573.4	1216.2	18591	1214.2	18623.6
GR	1213.7	18663.4	1212.6	18687.2	1212.5	18745.9	1212.5	18759.9	1211.3	18826.1
GR	1211.1	18867.1	1211	18896.7	1210.4	18955.8	1209.6	19006.2	1209.7	19047.6
GR	1208.1	19089.6	1207.9	19112.9	1200	19139.3	1200	19147.6	1200	19160.3
GR	1200	19220	1200	19258.9	1200	19282	1200	19321.2	1200	19331.9
GR	1200	19343.9	1200	19363	1200	19376.3	1200	19381.8	1200	19389.7
GR	1206.2	19416.5	1208.1	19439.9	1210.8	19451.1	1211.9	19489.2	1201.5	19503.7
GR	1194	19508.5	1194.1	19515.1	1194	19667.6	1194.1	19971.1	1195.5	20013.7
GR	1198.9	20051.9	1201.9	20105	1201.6	20167	1199.5	20211.9	1198.7	20252.3
GR	1199.1	20277.6	1198.3	20309.7	1198.7	20372.2	1210.3	20418	1215.7	20441
GR	1217.7	20492.2	1218.4	20508.3	1219.4	20562.5	1219.9	20586.1	1218.5	20645.6
GR	1218.2	20666.3	1217.5	20709.8	1214.7	20763.5	1214.1	20787.5	1212.6	20827.7
GR	1212.5	20849.9	1213.7	20865.9	1213.2	20885.8	1212.4	20929.8	1211.8	20942.5
GR	1211.9	20988.4	1212	21031.9	1212.4	21106.3	1212.4	21110.3	1211.3	21158.1
GR	1210.3	21183.8	1210.1	21227.6	1209.8	21277.9	1208.5	21326.3	1207.7	21379.1
GR	1208.6	21432.8	1209	21478.3	1208.4	21520.3	1208.6	21570.8	1210	21616.9
GR	1210.9	21644.1	1210	21695.4	1210.7	21708.1	1214	21754.1	1214.3	21783.3
GR	1214.2	21824.9	1215	21889.7	1215.5	21912.3	1214.4	21970.6	1214.4	22012.6
GR	1214.4	22059.9	1214.6	22065.6	1216.7	22147.8	1217.2	22161.9	1220.4	22225.6

NH	3	0.03	19537.7	0.028	20537.3	0.032	22146.6			
ET		7.1					19150.0	20537.3		
X1	227.46	96	19537.7	20537.3	370	550	506.97			
GR	1214	17260	1212	17390	1212	17510	1212	17710	1212	18210
GR	1212	18400	1212	18850	1213.2	18982.2	1214	19044.7	1211.6	19081.4
GR	1211.6	19083.2	1214	19098.2	1211.9	19112.1	1211.7	19121.7	1215.7	19129.2
GR	1220.4	19141.4	1218.6	19152.6	1218.2	19159.4	1215.5	19170.1	1209.3	19188.4
GR	1208.9	19207.4	1209.7	19248.5	1209.2	19259.5	1209.2	19300.9	1209.2	19317.9
GR	1209.8	19331.2	1210	19360.3	1209.5	19383.5	1207.5	19422.8	1206	19439.2
GR	1206	19488.8	1207	19500.6	1206.2	19500.9	1207.6	19502.6	1210.5	19509.5
GR	1208.5	19521	1209.9	19537.7	1203.3	19545.6	1194.6	19578.4	1194.1	19581.3
GR	1194.1	19584.9	1194.2	19669.4	1194.3	19752.4	1194.3	19815	1194.8	20097.5
GR	1194.9	20109.3	1195	20261.3	1195.1	20282.9	1199.2	20315.6	1199.4	20323.2
GR	1199.4	20362.3	1199.4	20375.3	1199.2	20418.4	1209.7	20436.7	1210.6	20442.8
GR	1214.2	20475.7	1215.5	20492.4	1216.1	20537.3	1214	20584.8	1213.7	20613.1
GR	1213.6	20635.1	1214.4	20657.2	1216.8	20738.9	1216.8	20741.9	1216.9	20777.4
GR	1217.5	20844.5	1217	20867.3	1213.2	20942.9	1211.6	20976	1211.7	20990.5
GR	1212.5	21038.5	1212.3	21066.8	1211.7	21123.5	1211.2	21154.1	1210.7	21189.5
GR	1210.3	21257.5	1210.5	21278	1212.5	21361.7	1212.7	21382	1213.2	21414
GR	1213.3	21484.4	1213.8	21524.9	1214	21558.3	1214.2	21581	1214.6	21651.6
GR	1214.9	21679.8	1215.2	21710.9	1215.2	21738	1215.3	21780	1216	21887.3
	1216	21929.1	1216.3	21963	1216.6	22046.6	1216.7	22050.8	1217	22104.7
GR	1217.2	22146.6								

NH	3	0.032	19355.5	0.028	20597.9	0.032	21468.6			
ET		7.1					19300.0	20597.9		
X1	227.56	96	19406.8	20480.0	90	385	490.8			
GR	1214	16930	1212	17360	1212	18510	1209	19017.6	1205.1	19024.3
GR	1203.6	19032.4	1198.8	19063.9	1198.9	19073.7	1198.9	19086.2	1203.6	19109.7
GR	1201.7	19121.9	1202.9	19130.3	1204.8	19159.6	1205.3	19186.9	1205.3	19187.9
GR	1204.8	19218	1204.5	19236.6	1203.9	19270.9	1203.9	19279.4	1204.4	19307
GR	1204.4	19313	1204.3	19316.2	1206.3	19347.7	1206.3	19355.5	1206.1	19380.9
GR	1204.5	19392.1	1205	19406.8	1204.4	19413.3	1202	19427.9	1200.4	19441.3
GR	1198.5	19457.7	1198.5	19459.9	1198.4	19462.9	1198.1	19477.6	1201.3	19501.7
GR	1201.4	19506.1	1201.8	19509.3	1200.8	19544.8	1199.5	19571.8	1199.4	19580.1
GR	1199.4	19591	1199	19598.4	1197.7	19621.9	1195.6	19669.2	1195.6	19670.4
GR	1195.7	19677.6	1194.6	19709.3	1194.7	19738.7	1195.9	19765.5	1196.6	19777.5
GR	1195.7	19811.8	1195.3	19817.7	1195	20011.2	1195.2	20373.3	1195.2	20414.3
GR	1195.6	20416.8	1196.1	20423.3	1198.9	20458.9	1206.5	20480	1209.1	20485.6
GR	1210.3	20500.3	1211.7	20521.4	1213	20540.4	1214.8	20568.7	1215.4	20597.9
GR	1214.4	20639	1214.1	20645.2	1214.4	20656.7	1214.2	20693.4	1215.9	20710
GR	1215.5	20727.3	1215.4	20754.3	1215.1	20766.2	1213.2	20780.5	1212.7	20799.9
GR	1212.5	20822.4	1212.7	20911.9	1212.8	20951.8	1213.2	20974.3	1213.4	20997.1
GR	1213.5	21018.2	1213.9	21028.8	1214.8	21045.3	1215.2	21071.6	1218.6	21136.3
GR	1217.3	21162.3	1216.2	21187.9	1215.9	21191.2	1216	21214.4	1216.4	21309.3
GR	1216.6	21325.6	1216.5	21335.5	1216.5	21341.6	1216	21414.7	1215.8	21441
GR	1216.2	21468.6								

1	3	0.032	19359.8	0.028	20751.7	0.032	21124.5			
ET		7.1					19350.0	20751.8		
X1	227.61	96	19359.8	20751.7	40	370	289.93			
GR	1217.9	17661.5	1215.9	17920.6	1211.1	18250.1	1213	18408.6	1212.1	18425.8
GR	1212.1	18464.7	1212.5	18503.3	1212.8	18523.7	1212.8	18539.4	1212.6	18550.4
GR	1212.4	18558	1214	18609.7	1214.3	18621.8	1214	18651.9	1213.9	18699.5
GR	1214.4	18764.3	1214.8	18785.9	1213.8	18850.6	1214.8	18871.9	1215.7	18890.9
GR	1216.1	18904.4	1217.2	18927.7	1217.7	18941.4	1218.4	18972.8	1218.1	18990.1
GR	1218.1	19016.9	1217.2	19053.3	1216	19063.9	1215.1	19072.7	1211.8	19130
GR	1211.6	19130.7	1210.6	19160.4	1209.9	19206.1	1209.7	19241.5	1210	19283.2
GR	1211.9	19308.7	1214.5	19329.6	1214.8	19351.3	1215.8	19359.8	1214.1	19367.5
GR	1210.6	19391.9	1210.6	19392	1210.6	19392.1	1210.6	19392.2	1198	19442
GR	1197.8	19484.7	1198.1	19499.2	1198.3	19519.3	1199.5	19575.8	1199.2	19605.7
GR	1199	19651.4	1200	19695.4	1200.3	19707.3	1200	19753.7	1199.2	19785.1
GR	1198.6	19845.4	1198.4	19850.1	1194.9	19899.7	1194.9	19931.8	1194.9	19933.8
GR	1194.9	19939.5	1194.9	20157.2	1195	20177	1195	20207.4	1195.1	20303.9
GR	1195.2	20407.2	1195.3	20485.1	1195.3	20514.6	1195.5	20605.9	1195.6	20621.3
GR	1195.6	20641.4	1197.1	20646.3	1197.3	20647.4	1214.1	20709.3	1214.2	20709.4
GR	1214.2	20709.5	1214.2	20709.6	1221.8	20745.2	1223.3	20751.7	1223.7	20805.2
GR	1223.7	20807.4	1223.7	20807.5	1224.2	20818.1	1225.9	20859.5	1226	20860.2
GR	1226	20860.5	1226	20861.1	1225.9	20861.8	1225.1	20991.8	1225.1	20993.8
GR	1225.1	20995.3	1224	21111.7	1224.1	21113	1224	21113.2	1224	21115.4
GR	1223.7	21124.5								

Downstream face of Country Club bridge

All data used to model this bridge was taken from survey notes and from as-built plans dated 5-86

21 degree skew angle (cosine 21 degrees=0.9336)

Remove vertical ineffective areas below El.1194.9 (Scour hole)

NC	0.032	0.028	0.028							
ET		7.1					19388	20725.5		
X1	227.62	80	19388	20725.5	18	18	18	0.9336		
X2									0.9336	
BT	-34	17300	1217.9	1217.9	17400	1216.6	1216.6	17500	1216.9	1216.9
BT		17600	1217	1217	17700	1217.7	1217.7	17800	1216.6	1216.6
BT		17900	1215.2	1215.2	18000	1213.8	1213.8	18100	1214.2	1214.2
BT		18200	1211.5	1211.5	18300	1211.9	1211.9	18400	1211.5	1211.5
BT		18500	1212.3	1212.3	18600	1213.6	1213.6	18700	1214.9	1214.9
BT		18800	1215.5	1215.5	18900	1219.1	1219.1	19000	1221	1221
BT		19100	1222	1222	19200	1224.3	1224.3	19300	1225.2	1225.2
BT		19387.9	1226.84	1226.84	19387.9	1226.84	1220.14	19513.7	1227.96	1221.2
BT		19650.3	1228.84	1222.1	19784.9	1229.57	1222.8	19919.5	1229.93	1223.2
BT		20053.9	1230.03	1223.3	20187.6	1229.87	1223.1	20323.2	1229.45	1222.7
BT		20457.4	1228.74	1222	20591.3	1227.89	1221.1	20725.4	1226.62	1219.9
BT		20725.4	1226.62	1226.6						
GR	1217.9	17300	1216.6	17400	1216.9	17500	1217	17600	1217.7	17700
GR	1216.6	17800	1215.2	17900	1213.8	18000	1214.2	18100	1211.5	18200
GR	1211.9	18300	1211.5	18400	1212.3	18500	1213.6	18600	1214.9	18700
GR	1215.5	18800	1219.1	18900	1221	19000	1222	19100	1224.3	19200
	1225.2	19300	1226.8	19387.9	1220.1	19388	1217.8	19388.1	1216.1	19398.2
GR	1204.3	19427.8	1197.4	19463.6	1197.2	19513.7	1221.2	19513.7	1221.2	19519.7
GR	1197.3	19519.7	1197.5	19589.2	1197.5	19650.3	1222.1	19650.3	1222.1	19656.3
GR	1197.5	19656.3	1198.3	19722.6	1196.6	19784.9	1222.8	19784.9	1222.8	19790.9
GR	1196.7	19790.9	1197	19853.3	1196.7	19886	1194.9	19904.6	1194.9	19919.5
GR	1223.2	19919.5	1223.2	19925.5	1194.9	19925.5	1194.9	20053.9	1223.3	20053.9
GR	1223.3	20059.9	1194.9	20059.9	1194.9	20111.6	1195.2	20124.9	1194.9	20187.6
GR	1223.1	20187.6	1223.2	20193.6	1194.9	20193.6	1194.9	20258.4	1195.1	20323.2
GR	1222.7	20323.2	1222.8	20329.2	1195.1	20329.2	1196.6	20389.7	1196.4	20457.4
GR	1222	20457.4	1222	20463.4	1196.4	20463.4	1194.9	20529.1	1194.9	20591.3
GR	1221.1	20591.3	1194.9	20597.3	1194.9	20637.5	1201.6	20683.5	1217.3	20725.4
GR	1219.9	20725.5	1226.6	20725.6	1224	20980	1220	21500	1220	21960

Upstream face of Country Club bridge

ET		7.1					19388	20725.5		
X1	227.63	80	19388	20725.5	72	72	72	0.9336		
X2									0.9336	
BT	-34	17300	1217.9	1217.9	17400	1216.6	1216.6	17500	1216.9	1216.9
BT		17600	1217	1217	17700	1217.7	1217.7	17800	1216.6	1216.6
BT		17900	1215.2	1215.2	18000	1213.8	1213.8	18100	1214.2	1214.2
BT		18200	1211.5	1211.5	18300	1211.9	1211.9	18400	1211.5	1211.5
BT		18500	1212.3	1212.3	18600	1213.6	1213.6	18700	1214.9	1214.9
BT		18800	1215.5	1215.5	18900	1219.1	1219.1	19000	1221	1221
		19100	1222	1222	19200	1224.3	1224.3	19300	1225.2	1225.2
BT		19387.9	1226.84	1226.84	19387.9	1226.84	1220.14	19513.7	1227.96	1221.2

-		19650.3	1228.84	1222.1	19784.9	1229.57	1222.8	19919.5	1229.93	1223.2
.		20053.9	1230.03	1223.3	20187.6	1229.87	1223.1	20323.2	1229.45	1222.7
BT		20457.4	1228.74	1222	20591.3	1227.89	1221.1	20725.4	1226.62	1219.9
BT		20725.4	1226.62	1226.6						
GR	1217.9	17300	1216.6	17400	1216.9	17500	1217	17600	1217.7	17700
GR	1216.6	17800	1215.2	17900	1213.8	18000	1214.2	18100	1211.5	18200
GR	1211.9	18300	1211.5	18400	1212.3	18500	1213.6	18600	1214.9	18700
GR	1215.5	18800	1219.1	18900	1221	19000	1222	19100	1224.3	19200
GR	1225.2	19300	1226.8	19387.9	1220.1	19388	1217.8	19388.1	1216.1	19398.2
GR	1204.3	19427.8	1197.4	19463.6	1197.2	19513.7	1221.2	19513.7	1221.2	19519.7
GR	1197.3	19519.7	1197.5	19589.2	1197.5	19650.3	1222.1	19650.3	1222.1	19656.3
GR	1197.5	19656.3	1198.3	19722.6	1196.6	19784.9	1222.8	19784.9	1222.8	19790.9
GR	1196.7	19790.9	1197	19853.3	1196.7	19886	1194.9	19904.6	1194.9	19919.5
GR	1223.2	19919.5	1223.2	19925.5	1194.9	19925.5	1194.9	20053.9	1223.3	20053.9
GR	1223.3	20059.9	1194.9	20059.9	1194.9	20111.6	1195.2	20124.9	1194.9	20187.6
GR	1223.1	20187.6	1223.2	20193.6	1194.9	20193.6	1194.9	20258.4	1195.1	20323.2
GR	1222.7	20323.2	1222.8	20329.2	1195.1	20329.2	1196.6	20389.7	1196.4	20457.4
GR	1222	20457.4	1222	20463.4	1196.4	20463.4	1194.9	20529.1	1194.9	20591.3
GR	1221.1	20591.3	1194.9	20597.3	1194.9	20637.5	1201.6	20683.5	1217.3	20725.4
GR	1219.9	20725.5	1226.6	20725.6	1224	20980	1220	21500	1220	21960

NH	3	0.032	19259.5	0.028	20779.6	0.032	21096.2			
ET		7.1					18700.0	20779.7		
X1	227.64	96	19259.5	20779.6	18	18	18			
GR	1216.4	17751.9	1213.3	18050.2	1210.8	18212.6	1210.7	18224.9	1211.8	18240.6
'	212.1	18259	1212	18285.6	1211	18303.8	1211	18311.6	1210.7	18337.6
G..	1211	18371	1211.2	18393	1211.6	18422.6	1211.6	18461.7	1210.9	18488.8
GR	1210.8	18495.8	1210.7	18510.3	1210.5	18524.3	1210.5	18524.9	1210.9	18536.9
GR	1212	18598.4	1213.4	18629.1	1213.2	18641.9	1213.2	18650.4	1213.4	18672.2
GR	1214.1	18697.2	1214.1	18716	1215	18747.9	1215.1	18782.8	1215.5	18810.3
GR	1213.3	18849.1	1213.2	18858.8	1211.6	18873.7	1211.8	18926.6	1211.9	18942.5
GR	1211.9	18948.5	1212	18957.3	1211.6	18985	1215.2	19003	1217.6	19020.8
GR	1225.4	19083.3	1225.3	19090.6	1225.3	19092.8	1225.4	19094.4	1225.9	19156.3
GR	1226	19162.1	1226	19248.1	1226.1	19250.8	1226.1	19259.5	1225.7	19352.6
GR	1223.6	19367.1	1220.7	19376.7	1198.7	19449.1	1198.7	19449.4	1197.5	19458.9
GR	1198.8	19474.2	1198.9	19488.9	1198.3	19511.8	1198.7	19545.4	1199.5	19589.3
GR	1199	19641.5	1199.7	19715.4	1199.7	19721.6	1199.7	19724.5	1198.7	19764.3
GR	1199.4	19832.7	1199.2	19850.5	1198.4	19885.2	1198.2	19903.3	1196.5	19927.6
GR	1194.9	19968.9	1194.9	20034.7	1194.9	20039.8	1194.9	20047.7	1195	20072.9
GR	1195.1	20266.3	1195.2	20315.5	1195.2	20394.4	1195.6	20635.8	1195.6	20637.5
GR	1195.6	20640.1	1197.7	20647.6	1201.9	20660.6	1219.3	20730	1222.6	20743.9
GR	1225.6	20777.7	1225.8	20779.6	1225.8	20779.9	1225.7	20783.8	1222.9	20929.3
GR	1222.9	20933.4	1223.1	20937	1223	20939	1223	20949.1	1223.1	21017.2
GR	1222.2	21096.2								

NH	3	0.032	19292.4	0.028	20687.1	0.032	21553.7			
ET		7.1					18550.0	20800.3		
X1	227.69	96	19292.4	20687.1	1350	95	312.26			
GR	1218.4	17692.3	1218.3	17705.9	1215.8	17746.3	1215.9	17753.4	1215.1	17808.9
C^	1214.3	17846.8	1214.4	17903.4	1214.4	17970.6	1214.5	18009.3	1214.5	18026
	1214.9	18087.7	1214.7	18114.6	1214.2	18176.6	1213.7	18201.1	1211.7	18230.2
GR	1211	18246.1	1211	18279	1231	18302.1	1236.2	18309	1235.7	18346.1

GR	1235.1	18359.6	1230.5	18365.8	1211	18389.2	1211	18408.1	1211.3	18456.9
	1211.5	18478.3	1212.2	18514.3	1213.1	18633.4	1213.1	18650.5	1213.6	18764.1
GR	1213.3	18804.8	1213.3	18834.1	1213.3	18905.2	1213.4	18971.2	1213	19070.7
GR	1213	19132.1	1213.3	19157	1213.1	19198.2	1213.2	19265.1	1216	19292.4
GR	1211.9	19315.5	1208	19340.6	1203.1	19362	1201.6	19379.6	1203.6	19405.4
GR	1203.5	19418.4	1203.3	19473.3	1204.1	19498.6	1205.8	19539.6	1206.2	19577.4
GR	1206.1	19617.3	1206.2	19674.9	1206.3	19685.4	1206.2	19722.5	1206.2	19764.6
GR	1206.5	19819	1206.3	19831.4	1205.1	19888.9	1203.2	19912.6	1202.5	19917.5
GR	1200.2	19954.3	1197	19996.4	1195	20027.6	1195.4	20416	1195.5	20447.6
GR	1195.6	20569.5	1195.7	20618.4	1203	20642.7	1216.6	20687.1	1214.6	20699.7
GR	1214.2	20707.3	1214.8	20743.7	1214.3	20755.9	1211.4	20800.3	1210.8	20837.5
GR	1210.3	20850.5	1209.6	20888.3	1210.2	20916.2	1210.1	20941.9	1210.7	20989.1
GR	1210.3	20999.7	1214.3	21032.7	1214.4	21035.9	1215.4	21089.2	1215.6	21110.7
GR	1214.5	21149.1	1214.4	21177.7	1214.9	21203.9	1215.3	21263.8	1215	21295.6
GR	1214.9	21351.5	1215.1	21404.3	1216.4	21451.1	1216.6	21474.6	1217.6	21517.9
GR	1218.4	21553.7								
NH	3	0.032	19295.5	0.028	20696	0.032	21737			
ET		7.1					18323.4	21120.0		
X1	227.79	96	19295.5	20696.0	800	450	493.17			
GR	1222.1	17036.6	1221.8	17080.5	1221.1	17190.4	1220.9	17331.6	1219.8	17459.9
GR	1219.5	17519.4	1219.3	17574	1219	17625	1218.2	17736	1217.6	17813.7
GR	1217.6	17843.8	1203.6	17866.2	1204.2	17891.6	1215.8	17934.6	1216.6	17990.3
GR	1205.9	18038.9	1208.3	18075.6	1209.9	18130.8	1210.4	18161.5	1206.5	18228
GR	1206.1	18231.9	1213.1	18287.7	1215.6	18299.3	1217.6	18323.4	1211.5	18341.7
GR	1212.8	18387.1	1212.3	18406.9	1215.6	18423.7	1216.7	18481	1213.7	18496.2
GR	1213.3	18512.8	1208.1	18549.4	1209.2	18555.7	1206.6	18584.4	1207.8	18636.9
GR	1212	18670.6	1207.5	18683.3	1206.2	18706.9	1212.2	18735.8	1212.7	18797.4
GR	1212.9	18843.1	1212.7	18894.6	1213.9	18938.7	1214.3	19000.4	1213.9	19080.3
GR	1213.7	19133.5	1214.9	19203.7	1215.2	19230	1213.4	19263.4	1212.3	19269.8
GR	1215.9	19295.5	1211.2	19342.3	1211.6	19382.4	1207	19407.6	1206.9	19480
GR	1207	19484.5	1200.5	19524.4	1204.3	19588.9	1207	19641.8	1206.1	19667.1
GR	1208	19754.9	1208.4	19812.4	1208.2	19827	1204.4	19893.4	1203.4	19904.7
GR	1199	19930.7	1198.6	20019.6	1198.5	20030.9	1197.8	20103.5	1196.8	20471.9
GR	1196.1	20637.4	1206.5	20670.7	1215	20688.5	1216.1	20696	1212.1	20723.1
GR	1213.7	20799.3	1213.2	20855	1211.6	20901.6	1211.4	20954.4	1211.2	20967.9
GR	1213.3	21022.3	1214.1	21052.9	1210.7	21109.4	1210.3	21114.4	1213.2	21151.6
GR	1214.6	21190.4	1215.2	21247.3	1215.8	21306.4	1214.5	21389.9	1213.9	21455
GR	1217.7	21491	1215.8	21523.5	1219	21596.2	1216.9	21651.5	1217.4	21704.4
GR	1219.6	21737								

THIS RUN EXECUTED 31AUG95 12:40:22

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

PIMA FREEWAY TO DOBSON

SUMMARY PRINTOUT

SECNO	ELMIN	CWSEL	Q	VCH	DIFWSX	TOPWID	DEPTH	HV	SSTA	ENDST	FRCH
20.500	1147.00	1166.59	215000.00	11.07	.00	1037.18	19.59	1.90	383.29	1420.47	.45
22.000	1147.20	1166.70	215000.00	11.49	.11	1009.57	19.50	2.05	388.54	1398.11	.47
22.650	1147.20	1166.81	215000.00	11.46	.11	1006.63	19.61	2.04	198.58	1205.21	.47
23.550	1147.30	1168.48	215000.00	10.45	1.67	1060.68	21.18	1.69	268.86	1329.54	.42
28.000	1147.70	1168.95	215000.00	10.27	.47	1002.76	21.25	1.64	93.53	1150.17	.41
29.000	1148.10	1169.17	215000.00	11.32	.22	922.79	21.07	1.99	333.63	1310.30	.45
30.000	1148.40	1169.13	215000.00	13.87	-.04	768.48	20.73	2.99	484.47	1306.82	.56
31.000	1148.80	1169.70	215000.00	15.02	.57	700.77	20.90	3.50	163.50	918.10	.61
32.000	1149.20	1170.48	215000.00	15.84	.78	653.90	21.28	3.90	318.32	1026.09	.64
33.000	1149.60	1171.29	215000.00	16.74	.82	608.52	21.69	4.35	317.41	979.80	.67
34.000	1150.00	1172.77	215000.00	16.17	1.48	606.74	22.77	4.06	354.32	1014.93	.63
35.000	1150.40	1174.48	215000.00	14.74	1.70	630.01	24.08	3.37	326.72	1010.58	.56
36.000	1150.80	1175.78	215000.00	13.61	1.31	657.32	24.98	2.88	330.32	1041.48	.51
37.000	1151.20	1177.56	215000.00	10.51	1.78	802.49	26.36	1.71	278.34	1134.66	.38
38.000	1151.70	1178.25	215000.00	9.68	.69	862.57	26.55	1.46	478.96	1341.54	.34
39.000	1152.20	1178.49	220000.00	10.28	.23	840.03	26.29	1.64	494.65	1334.69	.36
40.000	1152.70	1179.32	220000.00	8.77	.83	968.78	26.62	1.19	460.37	1429.16	.30

SECNO	ELMIN	CWSEL	Q	VCH	DIFWSX	TOPWID	DEPTH	HV	SSTA	ENDST	FRCH
40.100	1152.80	1179.35	220000.00	8.79	.03	969.51	26.55	1.20	5004.75	5974.25	.30
40.200	1152.80	1179.61	220000.00	8.64	.26	977.02	26.81	1.16	5004.49	5981.51	.30
40.300	1152.90	1179.74	220000.00	8.42	.13	1000.28	26.84	1.10	5004.46	6004.74	.29
40.400	1153.00	1179.86	220000.00	8.22	.12	1023.52	26.86	1.05	5004.44	6027.96	.28
40.500	1153.10	1180.05	220000.00	8.04	.19	1042.31	26.95	1.00	5004.35	6046.65	.28
40.600	1153.10	1180.12	220000.00	7.92	.06	1054.95	27.02	.97	5004.38	6059.33	.27
41.100	1153.20	1180.17	220000.00	7.84	.05	1067.83	26.97	.95	5004.43	6072.26	.27
41.200	1153.20	1180.34	220000.00	7.75	.17	1073.68	27.14	.93	5004.66	6078.34	.27
42.100	1154.00	1180.91	220000.00	6.35	.57	1313.83	26.91	.63	4913.09	6226.91	.22
224.340	1155.00	1180.92	220000.00	6.59	.01	1313.66	25.92	.67	19826.18	21139.83	.23
224.430	1157.00	1181.04	220000.00	7.05	.12	1322.88	24.04	.77	19826.26	21149.14	.26
224.530	1159.00	1181.27	220000.00	7.00	.23	1433.13	22.27	.76	19668.23	21101.37	.26
24.620	1161.00	1181.34	220000.00	8.25	.07	1332.28	20.34	1.06	19522.86	20855.14	.32
224.710	1161.00	1181.82	220000.00	8.06	.48	1332.24	20.82	1.01	19330.08	20662.32	.31
224.810	1161.00	1182.24	220000.00	7.90	.42	1333.08	21.24	.97	19085.36	20418.44	.30
224.900	1161.00	1182.58	220000.00	7.83	.34	1323.37	21.58	.95	18906.12	20229.48	.30
225.000	1162.00	1182.79	220000.00	8.38	.21	1282.84	20.79	1.09	18734.55	20017.39	.33
225.100	1163.00	1182.87	220000.00	9.69	.08	1162.29	19.87	1.46	18773.88	19936.17	.39
225.190	1163.00	1183.18	220000.00	10.17	.32	1092.37	20.18	1.60	18703.82	19796.18	.40
225.280	1163.00	1183.91	220000.00	9.31	.72	1145.21	20.91	1.35	18662.37	19807.58	.36
225.380	1162.40	1184.93	220000.00	7.87	1.02	1256.23	22.53	.96	18531.91	19788.13	.29
* 225.480	1160.30	1184.15	220000.00	13.45	-.78	970.42	23.85	2.81	18717.08	19687.50	.58
225.570	1157.90	1186.21	220000.00	10.33	2.06	1153.99	28.31	1.66	18719.54	19873.54	.42
225.660	1158.80	1186.79	220000.00	10.44	.58	1045.50	27.99	1.69	18745.30	19790.80	.41
225.760	1165.00	1187.24	220000.00	11.21	.45	1105.57	22.24	1.95	18691.41	19796.98	.47
225.850	1166.80	1188.59	220000.00	9.02	1.35	1277.30	21.79	1.26	18640.00	19917.30	.36

	SECNO	ELMIN	CWSEL	Q	VCH	DIFWSX	TOPWID	DEPTH	HV	SSTA	ENDST	FRCH
	225.950	1167.90	1189.38	220000.00	7.86	.79	1763.69	21.48	.96	18378.28	20141.97	.35
*	226.040	1173.10	1188.93	147500.00	12.45	-.44	1018.97	15.83	2.36	19349.97	20368.94	.61
	226.130	1170.50	1189.16	147500.00	15.56	.23	876.56	18.66	3.74	19608.60	20485.16	.81
*	226.230	1172.30	1190.44	147500.00	17.84	1.27	919.14	18.14	4.69	19646.77	20565.91	.92
	226.350	1173.40	1194.21	147500.00	15.23	3.77	913.74	20.81	3.59	19628.50	20542.24	.81
	226.480	1181.80	1196.86	147500.00	15.30	2.65	908.31	15.06	3.63	19627.55	20535.86	.83
*	226.490	1186.00	1196.67	147500.00	17.45	-.19	907.31	10.67	4.73	19627.96	20535.27	1.01
	226.500	1186.00	1197.71	147500.00	15.70	1.03	912.73	11.71	3.83	19625.72	20538.45	.86
	226.510	1186.00	1197.54	147500.00	16.21	-.17	862.63	11.54	4.08	19615.60	20514.91	.90
	226.520	1186.00	1198.99	147500.00	14.26	1.45	862.65	12.99	3.16	19615.60	20514.92	.74
*	226.530	1186.00	1199.71	147500.00	12.70	.72	924.40	13.71	2.50	19621.39	20545.79	.63
	226.610	1187.00	1200.88	147500.00	11.99	1.17	962.58	13.88	2.22	19604.05	20566.63	.58
	26.700	1188.00	1202.16	147500.00	10.57	1.28	1121.92	14.16	1.72	19598.12	20720.04	.52
*	226.800	1191.70	1201.55	147500.00	17.24	-.61	960.68	9.85	4.58	19609.53	20570.22	1.00
*	226.890	1192.50	1205.16	147500.00	13.98	3.61	948.73	12.66	2.98	19600.00	20548.73	.72
	226.990	1193.70	1205.67	220000.00	17.20	.52	1144.43	11.97	4.58	19381.33	20525.76	.89
*	227.080	1194.10	1207.78	220000.00	19.92	2.10	962.61	13.68	5.91	19604.72	20567.33	.98
*	227.180	1194.50	1211.83	220000.00	15.45	4.06	985.01	17.33	3.69	19585.02	20570.03	.70
	227.270	1193.70	1214.03	220000.00	12.58	2.20	1047.65	20.33	2.46	19561.50	20609.15	.54
	227.370	1194.00	1215.57	220000.00	10.31	1.54	1340.47	21.57	1.53	19100.00	20440.47	.43
	227.460	1194.10	1215.75	220000.00	11.28	.17	1341.90	21.65	1.88	19169.11	20511.02	.46
	227.560	1194.60	1216.58	220000.00	9.79	.83	1297.90	21.98	1.45	19300.00	20597.90	.38
	227.610	1194.90	1217.13	220000.00	8.35	.56	1373.35	22.23	1.08	19350.00	20723.35	.33
	227.620	1194.90	1216.78	220000.00	10.17	-.36	1068.52	21.88	1.61	19388.00	20496.66	.41
	227.630	1194.90	1216.86	220000.00	10.13	.08	1068.75	21.96	1.59	19388.00	20496.87	.40
	227.640	1194.90	1217.48	220000.00	8.27	.61	1655.32	22.58	1.05	18700.00	20722.73	.34

SECNO	ELMIN	CWSEL	Q	VCH	DIFWSX	TOPWID	DEPTH	HV	SSTA	ENDST	FRCH
227.690	1195.00	1217.57	220000.00	8.92	.10	2250.30	22.57	1.18	18550.00	20800.30	.38
227.790	1196.10	1218.11	220000.00	8.45	.54	2796.60	22.01	.99	18323.40	21120.00	.37

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 23.550 PROFILE= 1 HYDRAULIC JUMP D.S.

WARNING SECNO= 225.480 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 226.040 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 226.230 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 226.230 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 226.490 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 226.490 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 226.490 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 226.530 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 226.800 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 226.800 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 226.890 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 227.080 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 227.080 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 227.180 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 227.640 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

HEC-2

Design Condition 2 Model
South Hardbank in Place and
North SRPMIC Hardbank in Place
South Split at Alma School

Summary Printout (SUMPO)
& Complete Printout

Filename = DSGN2SS.DAT

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*******************************************
* HEC-2 WATER SURFACE PROFILES            *
*                                         *
* Version   4.6.2;  May 1991              *
*                                         *
  RUN DATE    31AUG95    TIME    12:47:36 *
*******************************************
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**************************************
* U.S. ARMY CORPS OF ENGINEERS       *
* HYDROLOGIC ENGINEERING CENTER      *
* 609 SECOND STREET, SUITE D         *
* DAVIS, CALIFORNIA 95616-4687       *
*         (916) 756-1104             *
**************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
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THIS RUN EXECUTED 31AUG95 12:47:36

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*************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
*************************************


T1      SALT/GILA FLOOD DELINEATION
T2      100-YEAR FLOOD
T3      REACH 5: Split B   X-sec's  225.95 - 226.89
T1     RED MOUNTAIN PHASE II SALT RIVER EXISTING CONDITION MODEL
T2     BASED ON MCFCD PRELIMINARY SALT RIVER MODEL SPLITB.DAT
T3     PREPARED BY MICHAEL BAKER JR. ENGINEERS, INC.
T4     STARTING WSEL FROM DESIGN CONDITION MODEL DESGN220.DAT
T4     SALT RIVER, MCCLINTOCK DRIVE TO COUNTRY CLUB DRIVE
T4     REVISED BY WOOD, PATEL & ASSOCIATES, INC. 03-15-95
T4      The following analysis is for design conditions and reflects the roadway
T4      & hardbank for Phase II of the Red Mountain Freeway.  Certain revisions
T4      were made to the original file as received from Michael Baker Jr.
T4      Engineers. These included revisions to the encroachments, bank station
T4      locations, the Q used for analysis, the starting water surface elevation
T4      and the addition of the drop structures constructed by MCDOT under the
T4      north and south Alma School Road bridges.
.       This file also reflects the effect of the north SRPMIC hardbank
T4      File=DSGN2SS.DAT - Design Condition 2 - South Split at Alma School
T4

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC    HVINS     Q        WSEL      FQ

       0        2        0        0       0.0        0       0.0  220000.0  1189.38

J2  NPROF    IPLOT    PRFVS    XSECV    XSECH     FN      ALLDC     IBW      CHNIM     ITRACE

     1        0       0.0      0.0      0.0      0.0     -1.0     -6.0      0.0       15


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    38       42        1        43        26        51        4        8        10        53
    54       68                 150

J5  LPRNT    NUMSEC                  ********REQUESTED SECTION NUMBERS********

    -10      -10

NC      0.0       0.0       0.0       0.1       0.3
NH       5      0.032   18228.4    0.028   18335.5     0.028    20237.2     0.031    21188.1     0.032
NH   21595.
F-                7.1                                          18335.5    20237.2
```

	225.95	94	18335.5	20237.2	0.0	0.0	0.0	1.0	0.0	
GR	1203.7	17840.6	1202.4	17848.9	1193.6	17889.2	1193.7	17922.2	1194.0	17963.8
GR	1193.7	18003.5	1193.3	18049.4	1194.4	18075.7	1196.9	18116.2	1197.0	18196.1
GR	1196.0	18228.4	1194.6	18269.0	1193.2	18321.5	1192.9	18335.5	1190.1	18375.5
GR	1182.4	18405.1	1183.0	18428.5	1181.5	18445.0	1177.9	18462.5	1176.1	18485.6
GR	1176.8	18517.9	1176.6	18533.3	1175.3	18553.3	1176.3	18604.6	1178.0	18637.4
GR	1176.0	18671.4	1175.9	18692.9	1167.9	18708.4	1168.7	18708.7	1167.9	18717.5
GR	1167.9	18817.2	1168.0	18863.1	1168.6	18952.0	1168.8	19096.8	1168.8	19116.2
GR	1172.1	19129.0	1172.9	19130.4	1174.6	19160.5	1175.5	19215.6	1174.7	19255.3
GR	1175.1	19282.8	1173.9	19324.0	1172.5	19402.1	1173.3	19480.7	1173.4	19487.4
GR	1173.5	19546.6	1173.2	19561.6	1171.5	19597.0	1171.8	19766.1	1172.0	19774.5
GR	1172.2	19849.9	1172.6	19953.3	1173.0	20020.4	1173.0	20028.3	1183.6	20039.7
GR	1183.9	20085.7	1184.1	20114.6	1196.9	20181.0	1208.9	20237.2	1206.8	20284.1
GR	1208.4	20295.6	1203.3	20308.8	1195.4	20337.0	1194.8	20347.3	1194.6	20393.0
GR	1194.6	20446.4	1194.6	20457.2	1194.6	20542.6	1195.3	20585.5	1198.7	20639.1
GR	1198.6	20647.5	1200.8	20699.8	1201.6	20747.8	1201.5	20820.4	1201.6	20865.5
GR	1202.1	20977.3	1202.1	20982.5	1201.9	21042.6	1201.8	21084.5	1199.8	21122.5
GR	1199.8	21145.3	1200.5	21188.1	1200.5	21201.5	1198.1	21246.4	1196.8	21266.9
GR	1197.8	21298.1	1197.5	21304.9	1198.3	21344.9	1198.8	21373.7	1200.5	21418.9
GR	1199.0	21475.2	1199.6	21525.8	1200.0	21556.4	1202.2	21595.0		
NH	1	0.028	19322.6							
QT	1	72500.0								
ET		7.1					18005.0	19322.6		
X1	226.04	36	18287.0	18930.5	920.0	480.0	476.46	1.0	0.0	
GR	1193.2	18218.0	1192.4	18233.8	1192.8	18247.6	1191.8	18287.0	1184.8	18304.5
	1180.9	18318.6	1177.5	18347.5	1174.5	18388.8	1172.7	18426.1	1173.2	18435.0
GR	1172.8	18468.8	1171.2	18491.7	1171.7	18494.6	1171.7	18506.8	1171.7	18552.0
GR	1171.8	18561.4	1171.8	18594.4	1170.7	18804.6	1170.7	18825.8	1182.5	18862.3
GR	1183.7	18894.7	1199.3	18930.5	1194.4	18942.7	1194.9	18956.4	1189.5	18992.3
GR	1189.5	18993.7	1169.5	19060.0	1169.3	19074.1	1168.4	19207.2	1168.4	19211.5
GR	1169.4	19214.6	1181.4	19235.1	1188.9	19246.2	1189.7	19251.8	1190.6	19296.5
GR	1190.7	19322.6								
NH	1	0.028	19593.2							
ET		7.1					17850.0	19100.0		
X1	226.13	40	18151.2	18774.9	510.0	500.0	502.01	1.0	0.0	
GR	1190.7	18007.0	1190.0	18069.5	1190.0	18121.5	1189.5	18147.2	1188.4	18151.2
GR	1178.1	18168.9	1177.2	18204.8	1172.4	18213.2	1172.6	18256.4	1173.0	18340.7
GR	1172.2	18362.9	1173.0	18403.5	1173.0	18405.0	1173.0	18426.6	1173.0	18447.3
GR	1173.0	18499.7	1173.0	18538.4	1173.0	18572.4	1173.0	18661.7	1173.0	18668.6
GR	1173.0	18774.9	1173.0	18821.8	1173.0	18843.7	1173.0	18848.8	1171.5	18876.1
GR	1170.6	18876.4	1170.7	18925.4	1170.7	18929.6	1171.1	19032.6	1171.0	19140.5
GR	1171.6	19157.7	1171.2	19255.2	1170.7	19306.5	1171.3	19354.4	1171.8	19366.1
GR	1170.5	19437.3	1170.7	19485.6	1172.2	19504.1	1195.1	19553.4	1197.4	19593.2
NH	1	0.028	19603.5							
ET		7.1					18060.0	18630.0		
X1	226.23	67	18223.2	19078.5	270	270	270.0	1.0	0.0	
GR	1204.2	17743.6	1191.9	17776.7	1190.6	17813.8	1190.1	17827.3	1188.8	17871.1
GR	1188.8	17877.4	1188.5	17916.5	1187.7	17942.6	1187.6	17969.4	1187.5	17973.1
GR	1189.3	17979.5	1190.1	17984.0	1188.6	17991.3	1187.8	17993.2	1187.9	18001.4
	1188.4	18051.2	1191.5	18059.4	1184.3	18074.3	1184.4	18093.6	1186.4	18103.8
GR	1186.5	18106.5	1187.0	18127.1	1186.8	18142.8	1185.6	18208.7	1185.3	18223.2

	1181.8	18234.6	1181.2	18239.8	1180.1	18287.5	1180.0	18290.9	1179.02	18344.8
GR	1178.8	18359.2	1177.87	18408.1	1177.35	18437.0	1176.56	18480.3	1175.86	18519.3
GR	1175.2	18554.1	1174.80	18577.7	1174.5	18594.2	1174.7	18658.7	1174.7	18692.9
GR	1174.8	18734.4	1174.8	18749.9	1175.0	18796.6	1175.5	18799.4	1176.4	18835.0
GR	1176.9	18843.3	1177.0	18851.6	1178.9	18889.7	1179.6	18910.8	1179.6	18953.7
GR	1179.8	18975.1	1180.1	19006.5	1180.3	19029.6	1180.6	19046.8	1180.6	19075.0
GR	1181.0	19078.5	1170.8	19096.4	1171.5	19100.9	1171.8	19210.2	1172.0	19274.6
GR	1172.3	19327.9	1172.5	19354.8	1172.5	19507.5	1172.5	19559.6	1172.8	19569.4
GR	1178.2	19577.6	1195.5	19603.5						

NH	1	0.028	19598.4							
ET		7.1					18050	18572.1		
X1	226.35	59	18134.0	18572.1	150	240	200.0	1.0	0.0	
GR	1195.3	17801.4	1192.9	17812.7	1191.5	17823.9	1191.2	17859.1	1192.1	17899.8
GR	1190.9	17918.1	1189.1	17926.5	1189.0	17932.0	1188.8	17996.3	1188.5	18046.6
GR	1188.5	18068.6	1189.2	18086.1	1189.0	18091.9	1187.2	18134.0	1183.7	18147.0
GR	1182.2	18167.7	1179.4	18184.0	1179.3	18223.9	1178.6	18265.3	1178.4	18309.3
GR	1178.5	18326.0	1177.4	18344.3	1177.3	18388.0	1176.9	18431.1	1176.4	18469.8
GR	1176.3	18535.4	1176.2	18542.6	1178.1	18554.3	1180.5	18560.6	1183.6	18565.7
GR	1184.1	18572.1	1180.1	18591.0	1178.8	18592.7	1176.9	18597.0	1175.7	18643.3
GR	1175.5	18660.7	1172.0	18694.7	1171.3	18736.1	1172.5	18745.3	1172.5	18750.4
GR	1172.3	18881.4	1172.7	18909.7	1172.3	18942.1	1171.7	18947.4	1172.1	18981.1
GR	1171.6	19026.5	1171.8	19034.3	1172.5	19265.7	1172.5	19308.0	1172.9	19335.6
GR	1173.4	19477.2	1173.4	19478.6	1179.8	19487.8	1194.4	19507.4	1201.1	19533.2
GR	1201.9	19538.7	1202.2	19547.6	1202.0	19590.8	1204.3	19598.4		

	2	0.028	19319.7	0.028	19382.8					
ET		7.1					17912.9	18393.7		
X1	226.48	51	17912.9	18393.7	309.0	989.0	234.0	1.0	0.0	
GR	1204.1	17345.9	1204.8	17430.4	1202.5	17436.1	1202.4	17534.9	1202.4	17538.7
GR	1202.7	17599.2	1203.7	17611.9	1205.0	17613.0	1204.3	17625.1	1204.9	17654.1
GR	1204.8	17689.8	1203.3	17728.1	1202.9	17760.4	1203.5	17850.7	1203.9	17912.9
GR	1191.8	17933.5	1186.9	17940.6	1182.7	17957.6	1181.4	17960.0	1179.4	18021.5
GR	1179.4	18021.8	1178.6	18212.3	1179.3	18212.6	1186.1	18235.4	1186.2	18254.9
GR	1188.1	18259.6	1187.7	18268.8	1186.0	18283.7	1186.2	18286.9	1185.3	18290.3
GR	1200.0	18316.1	1202.9	18322.5	1204.3	18393.7	1202.2	18411.3	1202.9	18449.3
GR	1202.5	18483.7	1201.7	18561.0	1202.1	18632.7	1201.6	18694.6	1203.0	18739.3
GR	1202.7	18789.3	1201.8	18812.1	1202.2	18830.9	1202.0	18923.1	1202.1	18980.8
GR	1202.8	19057.9	1204.8	19157.6	1205.9	19268.4	1205.4	19298.9	1205.8	19319.7
GR	1206.2	19382.8								

NH	2	0.028	19319.7	0.028	19382.8					
ET		7.1					17912.9	18393.7		
X1	226.49	51	17912.9	18393.7	1	1	1	1.0	0.0	
GR	1204.1	17345.9	1204.8	17430.4	1202.5	17436.1	1202.4	17534.9	1202.4	17538.7
GR	1202.7	17599.2	1203.7	17611.9	1205.0	17613.0	1204.3	17625.1	1204.9	17654.1
GR	1204.8	17689.8	1203.3	17728.1	1202.9	17760.4	1203.5	17850.7	1203.9	17912.9
GR	1191.8	17933.5	1188.0	17940.6	1188.0	17957.6	1188.0	17960.0	1188.0	18056.0
GR	1185.0	18059.0	1185.0	18141.0	1188.0	18144.0	1188.0	18235.4	1188.0	18254.9
GR	1188.1	18259.6	1188.0	18268.8	1188.0	18283.7	1188.0	18286.9	1188.0	18290.3
GR	1200.0	18316.1	1202.9	18322.5	1204.3	18393.7	1202.2	18411.3	1202.9	18449.3
GR	1202.5	18483.7	1201.7	18561.0	1202.1	18632.7	1201.6	18694.6	1203.0	18739.3
GR	1202.7	18789.3	1201.8	18812.1	1202.2	18830.9	1202.0	18923.1	1202.1	18980.8
GR	1202.8	19057.9	1204.8	19157.6	1205.9	19268.4	1205.4	19298.9	1205.8	19319.7

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 206.2   19382.8

NH         2     0.028   19319.7     0.028   19382.8
  ALMA SCHOOL ROAD BRIDGE
ET               7.1                                               17912.8   18393.8
       ALMA SCHOOL ROAD BRIDGE
X1    226.50        51   17912.9   18393.7      15.0      15.0      15.0       1.0       0.0
X3       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
GR    1204.1   17345.9    1204.8   17430.4    1202.5   17436.1    1202.4   17534.9    1202.4   17538.7
GR    1202.7   17599.2    1203.7   17611.9    1205.0   17613.0    1204.3   17625.1    1204.9   17654.1
GR    1204.8   17689.8    1203.3   17728.1    1202.9   17760.4    1203.5   17850.7    1203.9   17912.9
GR    1191.8   17933.5    1188.0   17940.6    1188.0   17957.6    1188.0   17960.0    1188.0   18056.0
GR    1185.0   18059.0    1185.0   18141.0    1188.0   18144.0    1188.0   18235.4    1188.0   18254.9
GR    1188.1   18259.6    1188.0   18268.8    1188.0   18283.7    1188.0   18286.9    1188.0   18290.3
GR    1200.0   18316.1    1202.9   18322.5    1204.3   18393.7    1202.2   18411.3    1202.9   18449.3
GR    1202.5   18483.7    1201.7   18561.0    1202.1   18632.7    1201.6   18694.6    1203.0   18739.3
GR    1202.7   18789.3    1201.8   18812.1    1202.2   18830.9    1202.0   18923.1    1202.1   18980.8
GR    1202.8   19057.9    1204.8   19157.6    1205.9   19268.4    1205.4   19298.9    1205.8   19319.7
GR    1206.2   19382.8

NC     0.028     0.028     0.028       0.0       0.0
ET               7.1                                               17915.5   18322.7
X1    226.51        40   17915.6   18322.6       1.0       1.0       1.0       1.0       0.0
X3       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
BT       -12   17370.0    1204.0    1204.0   17590.0    1204.0    1204.0   17915.5   1205.74   1205.74
BT             17915.5   1205.74   1202.09   17971.2   1205.98   1202.33   18030.0   1206.19   1202.54
               18088.7    1206.3    1202.6   18147.2   1206.26   1202.61   18205.7   1206.18   1202.53
BT             18264.2   1205.97    1202.3   18322.5    1205.7   1202.05   18322.5    1205.7    1205.7
GR    1204.0   17370.0    1204.0   17590.0   1205.74   17915.5   1202.09   17915.6   1196.84   17915.7
GR    1188.0   17962.5   1188.00   17971.2   1202.33   17971.2   1202.33   17973.7   1188.00   17973.7
GR    1188.0   18030.0   1202.54   18030.0   1202.54   18032.5    1188.0   18032.5    1185.0   18058.5
GR    1185.0   18088.7   1202.62   18088.7   1202.62   18091.2    1185.0   18091.2    1185.0   18147.2
GR    1202.6   18147.2    1202.6   18149.7    1188.0   18149.7   1188.00   18188.7   1188.00   18205.7
GR    1202.5   18205.7    1202.5   18208.2   1188.00   18208.2   1188.00   18213.5   1188.00   18264.2
GR    1202.3   18264.2   1202.32   18266.7   1188.00   18266.7   1188.00   18297.5   1196.26   18311.5
GR    1198.7   18322.5    1202.1   18322.6    1205.7   18322.7    1204.0   18560.0    1204.0   19240.0

NC     0.028     0.028     0.028       0.0       0.0
ET               7.1                                               17915.6   18322.6
X1    226.52        40   17915.6   18322.6      84.0      84.0      84.0       1.0       0.0
X3               0.0
BT       -12   17370.0    1204.0    1204.0   17590.0    1204.0    1204.0   17915.5   1205.74   1205.74
BT             17915.5   1205.74   1202.09   17971.2   1205.98   1202.33   18030.0   1206.19   1202.54
BT             18088.7    1206.3    1202.6   18147.2   1206.26   1202.61   18205.7   1206.18   1202.53
BT             18264.2   1205.97    1202.3   18322.5    1205.7   1202.05   18322.5    1205.7    1205.7
GR    1204.0   17370.0    1204.0   17590.0   1205.74   17915.5   1202.09   17915.6   1196.84   17915.7
GR    1188.0   17962.5   1188.00   17971.2   1202.33   17971.2   1202.33   17973.7   1188.00   17973.7
GR    1188.0   18030.0   1202.54   18030.0   1202.54   18032.5    1185.0   18032.5    1185.0   18058.5
GR    1185.0   18088.7   1202.62   18088.7   1202.62   18091.2    1185.0   18091.2    1185.0   18147.2
GR    1202.6   18147.2    1202.6   18149.7    1188.0   18149.7   1188.00   18188.7   1188.00   18205.7
GR    1202.5   18205.7    1202.5   18208.2   1188.00   18208.2   1188.00   18213.5   1188.00   18264.2
      1202.3   18264.2   1202.32   18266.7   1188.00   18266.7   1188.00   18297.5   1196.26   18311.5
      1198.7   18322.5    1202.1   18322.6    1205.7   18322.7    1204.0   18560.0    1204.0   19240.0
```

N	1	0.028	19522.9							
ET		7.1					17899.8	18325.5		
X1	226.53	60	17899.8	18325.5	1.0	1.0	1.0	1.0	0.0	
GR	1203.0	17546.3	1203.2	17577.3	1203.3	17661.8	1203.3	17689.5	1201.7	17704.7
GR	1201.8	17732.1	1203.0	17746.1	1202.7	17801.3	1203.8	17825.7	1204.5	17871.9
GR	1205.1	17899.8	1204.8	17905.5	1201.5	17910.5	1202.9	17911.1	1201.8	17913.9
GR	1189.3	17931.6	1188.00	17955.6	1188.0	17995.0	1188.0	18040.0	1185.0	18049.0
GR	1185.0	18107.8	1185.0	18176.3	1188.0	18185.7	1188.0	18218.8	1188.0	18258.6
GR	1188.7	18288.5	1188.0	18291.6	1194.4	18307.2	1203.1	18322.7	1204.0	18325.5
GR	1203.6	18377.0	1202.5	18509.4	1203.1	18521.2	1203.4	18585.4	1203.5	18606.5
GR	1203.4	18677.5	1203.4	18702.5	1203.0	18735.8	1203.0	18747.2	1203.6	18807.7
GR	1204.4	18828.8	1206.3	18926.4	1207.6	18983.2	1207.5	18996.9	1207.5	19141.4
GR	1207.5	19145.6	1207.5	19181.3	1206.7	19219.8	1204.6	19237.6	1202.8	19238.8
GR	1203.7	19284.4	1203.9	19306.3	1204.3	19339.1	1206.3	19346.9	1206.4	19377.7
GR	1207.3	19400.7	1208.3	19413.5	1209.1	19437.4	1209.9	19470.5	1212.0	19522.9
NH	1	0.028	19449.9							
ET		7.1					17800.0	18750.2		
X1	226.58	95	17885.1	18188.6	450.0	450.0	450.0	1.0	0.0	
X3		1185.87								
GR	1205.9	17263.7	1205.5	17287.8	1205.3	17314.2	1206.7	17356.2	1206.7	17370.8
GR	1204.9	17448.3	1204.3	17469.9	1204.2	17504.0	1202.9	17575.1	1202.1	17616.0
GR	1202.3	17674.1	1201.9	17684.3	1201.7	17708.4	1201.3	17729.6	1201.1	17799.9
GR	1200.7	17835.5	1200.0	17842.6	1199.5	17855.1	1200.1	17877.2	1200.4	17880.0
GR	1200.1	17885.1	1199.7	17885.4	1190.1	17904.6	1181.4	17925.1	1180.7	17928.5
	1179.7	17930.2	1179.8	17942.1	1179.4	17943.9	1179.6	18030.2	1179.8	18093.5
GR	1179.0	18103.1	1179.9	18110.1	1181.4	18135.1	1188.3	18150.1	1189.0	18171.5
GR	1189.5	18174.4	1193.8	18188.6	1196.5	18199.7	1197.4	18202.3	1197.9	18251.8
GR	1197.6	18278.2	1197.1	18311.0	1196.4	18315.6	1199.4	18333.3	1200.5	18357.8
GR	1201.5	18402.8	1202.8	18438.4	1202.9	18459.0	1202.9	18490.5	1202.8	18515.6
GR	1202.9	18523.4	1203.7	18562.2	1203.7	18568.8	1203.2	18571.7	1204.6	18617.2
GR	1204.7	18626.8	1205.3	18654.2	1205.9	18675.4	1206.9	18706.9	1213.4	18727.2
GR	1214.1	18750.2	1211.9	18773.8	1211.0	18813.2	1211.0	18825.2	1210.7	18850.7
GR	1210.1	18882.4	1212.0	18899.2	1212.4	18910.9	1209.1	18923.2	1207.9	18950.7
GR	1207.8	18958.6	1207.0	18970.4	1207.3	18983.5	1206.7	19021.8	1206.5	19028.8
GR	1218.1	19045.4	1228.4	19062.3	1228.0	19069.0	1228.2	19083.1	1225.3	19097.8
GR	1220.5	19122.0	1203.4	19157.3	1203.6	19177.8	1203.8	19184.0	1203.6	19198.3
GR	1203.5	19227.4	1203.8	19258.4	1203.7	19267.3	1210.3	19300.5	1219.6	19353.4
GR	1219.7	19359.0	1219.7	19380.0	1219.6	19394.7	1220.0	19449.5	1220.0	19449.9
NH	2	0.028	18230.1	0.031	19549.9					
ET		7.1					17865.0	18800.0		
X1	226.61	57	17790.0	18230.1	950.0	360.0	600.0	1.0	0.0	
X3		1187.03								
GR	1207.8	17550.0	1207.2	17647.2	1206.7	17717.6	1205.9	17790.0	1193.0	17816.8
GR	1189.5	17889.1	1188.0	17930.8	1187.7	17988.5	1185.3	17992.6	1182.0	17994.4
GR	1180.3	17994.5	1180.6	17996.8	1180.0	18092.3	1180.6	18093.8	1180.3	18168.1
GR	1180.5	18177.1	1203.0	18230.1	1203.6	18260.5	1213.4	18279.5	1212.0	18303.2
GR	1203.6	18312.8	1202.9	18317.4	1202.4	18356.0	1204.7	18368.5	1222.5	18397.5
GR	1205.1	18437.3	1204.5	18486.7	1206.5	18533.8	1218.4	18560.4	1214.7	18580.6
G	1214.7	18583.8	1205.8	18608.2	1205.0	18622.9	1206.5	18698.6	1208.4	18723.1
GR	1207.9	18772.1	1209.5	18799.3	1208.6	18818.5	1208.0	18868.4	1209.6	18871.8
GR	1208.7	18942.8	1209.3	18978.9	1207.1	19001.4	1206.6	19064.5	1204.5	19139.1

	1203.2	19175.2	1204.1	19252.7	1205.2	19260.4	1207.9	19270.6	1208.4	19291.1
	1209.8	19301.6	1211.1	19358.3	1211.0	19388.0	1211.9	19397.9	1213.6	19451.8
GR	1213.2	19483.8	1213.4	19549.9						
NH	2	0.028	18900.3	0.031	19491.0					
ET		7.1					18246.6	19000.0		
X1	226.70	44	18246.6	18900.3	640.0	495.0	650.0	1.0	0.0	
X3		1188.29								
GR	1208.4	18246.6	1207.0	18271.6	1206.0	18310.1	1193.0	18339.9	1191.4	18347.0
GR	1190.0	18355.8	1188.7	18371.3	1184.8	18419.6	1183.9	18442.8	1184.3	18443.8
GR	1182.6	18556.1	1182.0	18628.4	1182.9	18630.6	1183.7	18635.7	1190.6	18688.9
GR	1190.3	18724.7	1191.6	18757.0	1193.2	18764.0	1195.7	18779.2	1198.6	18793.6
GR	1198.0	18830.1	1200.8	18841.7	1203.1	18859.2	1203.7	18871.2	1208.7	18891.3
GR	1210.2	18900.3	1209.4	18919.0	1208.6	18923.3	1209.7	18928.4	1208.0	18962.6
GR	1207.0	19004.4	1207.1	19007.1	1210.8	19027.4	1210.5	19034.9	1210.8	19052.1
GR	1205.8	19062.7	1206.0	19080.4	1204.1	19152.9	1204.5	19218.6	1204.0	19277.2
GR	1205.2	19345.1	1205.6	19395.9	1205.7	19443.8	1205.8	19491.0		
NH	2	0.028	19227.0	0.031	19441.4					
ET		7.1					18517.6	19440.0		
X1	226.80	32	18678.9	19309.8	560.0	480.0	570.0	1.0	0.0	
X3		1189.39								
GR	1210.7	18517.6	1210.2	18590.0	1210.2	18591.2	1208.5	18678.9	1205.8	18684.9
GR	1188.2	18724.9	1188.9	18727.7	1189.0	18729.8	1188.6	18790.3	1188.1	18895.9
GR	1188.0	18897.7	1190.6	18911.8	1191.7	18940.6	1190.7	18977.1	1190.6	18980.7
GR	1190.4	19009.0	1190.7	19011.1	1190.5	19014.4	1191.0	19029.1	1190.3	19109.1
	1190.5	19182.7	1191.1	19188.4	1203.1	19225.3	1203.7	19227.0	1203.8	19232.2
GR	1204.9	19289.4	1205.2	19309.8	1205.0	19352.7	1205.2	19398.0	1205.2	19399.9
GR	1205.0	19436.0	1205.1	19441.4						
NH	3	0.028	19026.7	0.028	20553.4	0.032	21751.8			
ET		7.1					18699.3	19600.0		
X1	226.89	96	19026.7	19599.9	600.0	525.0	570.0	1.0	0.0	
GR	1210.8	18699.3	1210.7	18704.0	1210.4	18760.0	1210.2	18812.2	1210.6	18825.2
GR	1209.3	18833.5	1210.5	18839.9	1210.1	18881.5	1210.0	18884.7	1210.0	18885.9
GR	1209.9	18900.2	1206.3	18960.0	1205.9	18965.0	1204.2	19008.2	1204.4	19026.7
GR	1202.5	19043.1	1197.3	19073.7	1195.0	19098.5	1193.6	19101.3	1193.6	19131.0
GR	1192.9	19351.9	1193.3	19352.3	1193.4	19357.5	1194.3	19389.5	1194.3	19392.7
GR	1194.3	19393.6	1194.3	19399.7	1193.7	19428.0	1193.2	19437.3	1192.5	19447.7
GR	1192.7	19448.7	1193.5	19456.5	1193.4	19486.1	1193.4	19491.2	1193.1	19599.9
GR	1192.8	19840.5	1192.9	19851.8	1193.6	20155.5	1193.7	20191.0	1193.7	20277.3
GR	1194.1	20461.8	1194.1	20464.2	1198.9	20506.8	1202.7	20534.0	1205.7	20552.0
GR	1205.8	20553.4	1207.2	20593.8	1205.3	20640.7	1204.4	20656.9	1204.5	20665.3
GR	1204.0	20691.7	1204.2	20701.6	1203.6	20722.5	1203.9	20741.1	1205.4	20776.1
GR	1205.8	20783.0	1205.8	20783.7	1205.8	20791.9	1205.8	20826.9	1206.0	20838.5
GR	1206.1	20855.5	1206.7	20894.8	1210.3	20924.6	1210.6	20926.4	1210.8	20929.0
GR	1210.9	20936.0	1211.4	21005.5	1211.2	21018.4	1211.1	21025.6	1209.9	21059.1
GR	1210.2	21081.5	1210.2	21113.8	1210.2	21155.0	1209.7	21178.6	1209.5	21235.1
GR	1209.2	21247.9	1209.2	21256.3	1209.0	21261.9	1209.6	21334.4	1209.5	21340.6
GR	1209.5	21345.0	1209.8	21399.5	1210.3	21437.5	1210.4	21455.1	1210.7	21460.8
GR	1210.5	21528.7	1209.6	21547.4	1208.9	21559.0	1209.0	21575.1	1209.0	21579.2
GR	1208.9	21584.7	1208.8	21613.8	1209.3	21642.8	1210.2	21683.1	1210.9	21714.4
	1211.1	21751.8								

CNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 225.95 CWSEL= 1189.38

STA=	18378.	20181.
PER Q=	100.0	
AREA=	27983.2	
VEL=	7.9	
DEPTH=	15.9	

FLOW DISTRIBUTION FOR SECNO= 226.04 CWSEL= 1190.19

STA=	18291.	18931.	19060.	19074.	19207.	19212.	19215.	19235.	19246.	19276.
PER Q=	67.2	3.6	2.4	23.6	.8	.5	1.8	.2	.0	
AREA=	9878.6	711.4	293.2	2840.6	93.7	66.0	303.2	56.0	11.0	
VEL=	4.9	3.7	5.9	6.0	6.1	5.8	4.3	2.0	.5	
DEPTH=	16.0	5.5	20.8	21.3	21.8	21.3	14.8	5.0	.4	

FLOW DISTRIBUTION FOR SECNO= 226.13 CWSEL= 1190.40

STA=	18034.	18151.	18775.	18822.	18876.	18925.	19033.	19100.
PER Q=	.0	62.1	4.9	5.9	6.4	13.6	7.1	
AREA=	49.8	10549.2	815.8	965.0	973.3	2090.7	1302.5	
VEL=	.4	4.3	4.4	4.4	4.7	4.7	4.0	
DEPTH=	.4	16.9	17.4	17.8	19.7	19.5	19.3	

FLOW DISTRIBUTION FOR SECNO= 226.23 CWSEL= 1187.95

STA=	18067.	18223.	18630.
PER Q=	2.6	97.4	
AREA=	306.4	4184.5	
VEL=	6.1	16.9	
DEPTH=	2.0	10.3	

FLOW DISTRIBUTION FOR SECNO= 226.35 CWSEL= 1190.01

STA=	18050.	18134.	18572.
PER Q=	.7	99.3	
AREA=	133.9	5077.7	
VEL=	3.9	14.2	
DEPTH=	1.6	11.6	

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 226.48 CWSEL= 1191.98

STA= 17933. 18316.
PER Q= 100.0
AREA= 3897.5
VEL= 18.6
DEPTH= 10.6

FLOW DISTRIBUTION FOR SECNO= 226.49 CWSEL= 1198.09

STA= 17923. 18316.
PER Q= 100.0
AREA= 3982.2
VEL= 18.2
DEPTH= 10.2

FLOW DISTRIBUTION FOR SECNO= 226.50 CWSEL= 1199.28

STA= 17921. 18316.
PER Q= 100.0
AREA= 4447.5
VEL= 16.3
DEPTH= 11.3

FLOW DISTRIBUTION FOR SECNO= 226.51 CWSEL= 1198.98

STA= 17916. 18323.
PER Q= 100.0
AREA= 4232.3
VEL= 17.1
DEPTH= 10.8

FLOW DISTRIBUTION FOR SECNO= 226.52 CWSEL= 1200.82

STA= 17916. 18323.
PER Q= 100.0
AREA= 4990.2
VEL= 14.5
DEPTH= 12.7

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 226.53 CWSEL= 1201.53

STA=	17910.	18323.
PER Q=	100.0	
AREA=	5565.0	
VEL=	13.0	
DEPTH=	13.7	

FLOW DISTRIBUTION FOR SECNO= 226.58 CWSEL= 1202.07

STA=	17800.	17885.	18189.	18252.	18333.	18419.
PER Q=	.7	92.4	3.0	3.4	.5	
AREA=	147.6	4561.3	309.1	367.4	104.8	
VEL=	3.7	14.7	7.1	6.6	3.2	
DEPTH=	1.7	15.0	4.9	4.5	1.2	

FLOW DISTRIBUTION FOR SECNO= 226.61 CWSEL= 1203.80

STA=	17865.	18230.	18261.	18356.	18364.
PER Q=	99.8	.0	.1	.0	
AREA=	5629.6	15.2	47.0	5.3	
VEL=	12.9	1.2	2.1	1.5	
DEPTH=	15.4	.5	.5	.7	

FLOW DISTRIBUTION FOR SECNO= 226.70 CWSEL= 1206.00

STA=	18310.	18891.
PER Q=	100.0	
AREA=	8204.8	
VEL=	8.8	
DEPTH=	14.4	

FLOW DISTRIBUTION FOR SECNO= 226.80 CWSEL= 1206.53

STA=	18683.	19227.	19310.	19353.	19398.	19436.	19440.
PER Q=	99.1	.5	.1	.1	.1	.0	
AREA=	8312.7	169.5	61.4	64.9	54.2	6.0	
VEL=	8.6	2.1	1.6	1.6	1.6	1.4	
DEPTH=	15.3	2.0	1.4	1.4	1.4	1.5	

CNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 226.89 CWSEL= 1206.76

STA= 18952. 19027. 19600. 19600.

PER Q=	.5	99.5	.0
AREA=	124.3	7232.5	1.3
VEL=	2.8	10.0	.4
DEPTH=	1.7	12.6	13.7

PROFILE FOR STREAM REPARED BY MICHAEL BAKER

- ..ED POINTS (BY PRIORITY) E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA

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ELEVATION  1168.     1173.     1178.     1183.     1188.     1193.     1198.     1203.     1208.     1213.
    SECNO   CUMDIS

   225.95     0.  I         .         .     C   .         .  W E    L         .        M.         .         .         R
             50.  I         .         .    C    .         .  W E    L         .     M   .         .         .         R
            100.  I         .         .    C    .         .  W E    L         .   M     .         .         .         R
            150.  I         .         .   C     .         .  W E   L.         .M        .         .         .         R
            200.  I         .         .   C     .         .   WE   L.        M.         .         .         .         R
            250.  .I        .         .   C     .         .   WE   L.      M  .         .         .         .         R
            300.  .I        .         .  C      .         .   WE   L.   M     .         .         .         .         R
            350.  .I        .         .  C      .         .   WE  L . M       .         .         .         .         R
            400.  .I        .         . C       .         .   WE  LM.         .         .         .         .         R
            450.  .I        .         . C       .         .   WE ML .         .         .         .         .         R
   226.04   500.  .I        .         . C       .         .    EM L .         .  R      .         .         .         .
            550.  .I        .         . C       .         .    E L  .       R .         .         .         .         .
            600.  . I       .         . C       .         .    EL M . R       .         .         .         .         .
            650.  . I       .         .C        .         .    ELR  M         .         .         .         .         .
            700.  .  I      .         .C        .         . R  E    .M        .         .         .         .         .
            750.  .  I      .         .C        .      R  .   LE    . M       .         .         .         .         .
            800.  .   I     .         .C        .R        .  LWE    .  M      .         .         .         .         .
            850.  .   I     .         .C    R   .         . L WE    .    M    .         .         .         .         .
            900.  .   I     .         .C        .         . L WE    .     M   .         .         .         .         .
            950.  .    I    .     R   .C        .         . L WE    .       M .         .         .         .         .
   226.13  1000.  .    I    R         .C        .         .L  WE    .        M.         .         .         .         .
           1050.  .    I    .         .    C    .         L  W E    .      M  .         .         .         .         R
           1100.  .    I    .         .       C .        L.  W  E   .      M  .         .         .         .         R
           1150.  .     I   .         .         . C     L . W    E  .     M   .         .         .         .         R
           1200.  .     I   .         .         .    CL   .W     E  .    M    .         .         .         .         R
   226.23  1250.  .     I   .         .         .    L   W         E.    M    .         .         .         .         R
           1300.  .     I   .         .         .     L  CW        E.         M         .         .         .         R
           1350.  .     I   .         .         .      L C W        E         .  M      .         .         .         R
           1400.  .      I  .         .         .       L C  W      E         .      M  .         .         .         R
   226.35  1450.  .      I  .         .         .        LC   W     E         .         .  M      .         .         R
           1500.  .         I         .         .         . C   WL  . E       .         .   M     .         .         R
           1550.  .         .  I      .         .         .   C W   . LE      .         .   M     .         .         R
           1600.  .         .     I   .         .         .    C W  .    E   L          .    M    .         .         R
           1650.  .         .        I.         .         .      CW .      E  .     L   .     M   .         .         R
   226.48  1700.  .         .         .I        .         .      W  .       E .         . L    M  .         .         R
   226.49  1750.  .         .         .         .  I      .         .         W         .EL   M   .         .         R
   226.50  1800.  .         .         .         .  I      .         .         C  W      .ELR  M   .         .         .
   226.51  1850.  .         .         .         .  I      .         .         .CW     L .EM       .         .         .
   226.52  1900.  .         .         .         .  I      .         .         .C   W L  . E       .         .         R
   226.53  1950.  .         .         .         .  I      .         .       C.      W   . EL      .      M .          R
           2000.  .         .         .         .  I      .         .         C     W   .  E      .         M         R
           2050.  .         .         .         .   I     .         .         C     W   .LE       .         .M        R
           2100.  .         .         .         .   I     .         .         .C     W  .L E      .         .  M      R
           2150.  .         .         .         .   I     .         .         .C     W  L E       .         .   M     R
           2200.  .         .         .         .   I     .         .         . C    WL.   E      .         .     M   R
   226.58  2250.  .         .         .         .    I    .         . R       .  C   W  .    E    .         .         M
           2300.  .         .         .         .    I    .         .  R      .  C     W.    E    .         .         L
           2350.  .         .         .         .    I    .         .    R    .  C     W.    E    .         .         L
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          2400.   .         .         .         .      I  .         .     R   .  C     W.    E    .         .         L
          2450.   .         .         .         .      I  .         .       R .  C     W.    E    .         .         L
          2500.   .         .         .         .      I  .         .        R.  C      W     E   .         .        ML
          2550.   .         .         .         .      I  .         .         .R C      W     E   .         .       M L
          2600.   .         .         .         .      I  .         .         .  C      W     E   .         .     M   L
          2650.   .         .         .         .      I  .         .         .  CR    .W     E   .         .    M    L
          2700.   .         .         .         .       I .         .         . C   R  .W     E   .         .   M     L
          2750.   .         .         .         .       I .         .         . C    R .W      E  .         .  M      L
          2800.   .         .         .         .       I .         .         . C      R. W    E  .         . M       L
  226.61  2850.   .         .         .         .       I .         .         . C       R W    E  .         .M        L
          2900.   .         .         .         .       I .         .         . C       .RW    E  .         M         L
          2950.   .         .         .         .        I.         .         . C       . W    E  .        M.         L
          3000.   .         .         .         .        I.         .         . C       .  WR  E  .      M  .         L
          3050.   .         .         .         .        I.         .         . C       .  W R E  .     M   .         L
          3100.   .         .         .         .        I.         .         . C       .   W R E .    M    .         L
          3150.   .         .         .         .        I.         .         . C       .   W  RE .   M     .         L
          3200.   .         .         .         .         I         .         . C       .   W   E .  M      .         L
          3250.   .         .         .         .         I         .         . C       .    W  ER. M       .         L
          3300.   .         .         .         .         I         .         . C       .    W  E R         .         L
          3350.   .         .         .         .         I         .         . C       .    W  EM.R        .         L
          3400.   .         .         .         .         I         .         . C       .     W E . R       .         L
          3450.   .         .         .         .         .I        .         . C       .     WME .  R      .         L
  226.70  3500.   .         .         .         .         .I        .         . C       .     W  E.    R    .         L
          3550.   .         .         .         .         .I        .         . C       .     W  E.   R     .         L
          3600.   .         .         .         .         .I        .         . C       .     W  E.  R      .         L
          3650.   .         .         .         .         .I        .         . C       .    MW  E. R       .         L
          3700.   .         .         .         .         . I       .         . C       .    M W E.R        .         L
          3750.   .         .         .         .         . I       .         . C       .    M W ER         .         L
          3800.   .         .         .         .         . I       .         . C       .    M W E.         .         L
          3850.   .         .         .         .         . I       .         . C       .    M WRE.         .         L
          3900.   .         .         .         .         . I       .         . C       .    M WRE.         .         L
          3950.   .         .         .         .         .  I      .         . C       .    M W E.         .         L
          4000.   .         .         .         .         .  I      .         . C       .    MRW E.         .  L      .
          4050.   .         .         .         .         .  I      .         . C       .   MR W E.    L    .         .
  226.80  4100.   .         .         .         .         .  I      .         . C       .   MR W EL         .         .
          4150.   .         .         .         .         .   I     .         .  C      . R  M W  E         .         .
          4200.   .         .         .         .         .   I     .         .  C      R      W  E         .         .
          4250.   .         .         .         .         .    I    .         .   C   R .      WMLE         .         .
          4300.   .         .         .         .         .    I    .         .   C R   .      WLME         .         .
          4350.   .         .         .         .         .     I   .         .   RC    .      WL E         .         .
          4400.   .         .         .         .         .     I   .         . R  C    .      LW EM        .         .
          4450.   .         .         .         .         .      I  .         R     C   .     L W E M       .         .
          4500.   .         .         .         .         .      I  .       R .     C   .    L  W E  M      .         .
          4550.   .         .         .         .         .       I .    R    .      C  .    L  W.E   M     .         .
          4600.   .         .         .         .         .       I . R      .      C  .   L   W.E    M    .         .
  226.89  4650.   .         .         .         .         .        IR         .       C .  L    W.E     M   .         .
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THIS RUN EXECUTED 31AUG95 12:47:41

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

REPARED BY MICHAEL BAKER

SUMMARY PRINTOUT

	SECNO	ELMIN	CWSEL	Q	VCH	DIFWSX	TOPWID	DEPTH	HV	SSTA	ENDST	FRCH
	225.950	1167.90	1189.38	220000.00	7.86	.00	1763.72	21.48	.96	18378.27	20141.99	.35
*	226.040	1168.40	1190.19	72500.00	4.93	.81	907.09	21.79	.40	18291.02	19276.22	.22
	226.130	1170.50	1190.40	72500.00	4.27	.21	1065.75	19.90	.29	18034.25	19100.00	.18
	226.230	1170.80	1187.95	72500.00	16.88	-2.45	563.26	17.15	4.32	18066.74	18630.00	.93
	226.350	1171.30	1190.01	72500.00	14.18	2.06	522.10	18.71	3.10	18050.00	18572.10	.73
*	226.480	1178.60	1191.98	72500.00	18.60	1.97	368.82	13.38	5.37	17933.20	18302.02	1.01
*	226.490	1185.00	1198.09	72500.00	18.21	6.11	389.18	13.09	5.15	17922.80	18311.98	1.00
	226.500	1185.00	1199.28	72500.00	16.30	1.19	393.76	14.28	4.13	17920.78	18314.54	.85
	226.510	1185.00	1198.98	72500.00	17.13	-.30	391.85	13.98	4.56	17915.66	18322.51	.94
	226.520	1185.00	1200.82	72500.00	14.53	1.84	391.94	15.82	3.28	17915.62	18322.56	.73
*	226.530	1185.00	1201.53	72500.00	13.03	.71	405.67	16.53	2.64	17910.46	18319.90	.62
	226.580	1185.87	1202.07	72500.00	14.68	.54	618.51	16.20	3.14	17800.00	18418.51	.67
	226.610	1187.03	1203.80	72500.00	12.86	1.72	446.93	16.77	2.56	17865.00	18363.61	.58
*	226.700	1188.29	1206.00	72500.00	8.84	2.20	570.80	17.71	1.21	18309.69	18880.49	.41
	226.800	1189.39	1206.53	72500.00	8.51	.53	756.72	17.14	1.12	18683.27	19440.00	.41
	226.890	1192.50	1206.76	72500.00	9.98	.23	647.60	14.26	1.54	18952.40	19600.00	.49

ED BY MICHAEL BAKER

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	225.950	.00	.00	.00	1167.90	220000.00	1189.38	1180.67	1190.34	5.54	7.86	27983.17	93442.33
*	226.040	476.46	.00	.00	1168.40	72500.00	1190.19	1178.74	1190.60	2.17	4.93	14253.69	49222.16
	226.130	502.01	.00	.00	1170.50	72500.00	1190.40	1178.39	1190.70	1.50	4.27	16746.41	59153.98
*	226.230	270.00	.00	.00	1170.80	72500.00	1187.95	1187.95	1192.28	47.28	16.88	4490.90	10544.40
	226.350	200.00	.00	.00	1171.30	72500.00	1190.01	1187.93	1193.11	27.88	14.18	5211.62	13731.89
*	226.480	234.00	.00	.00	1178.60	72500.00	1191.98	1191.98	1197.35	54.17	18.60	3897.51	9850.21
*	226.490	1.00	.00	.00	1185.00	72500.00	1198.09	1198.09	1203.23	54.31	18.21	3982.18	9837.58
	226.500	15.00	.00	.00	1185.00	72500.00	1199.28	1198.06	1203.40	38.23	16.30	4447.54	11725.73
	226.510	1.00	1204.00	1205.70	1185.00	72500.00	1198.98	1198.32	1203.54	66.67	17.13	4232.28	8878.85
	226.520	84.00	1204.00	1205.70	1185.00	72500.00	1200.82	1198.22	1204.10	41.24	14.53	4990.24	11289.33
*	226.530	1.00	.00	.00	1185.00	72500.00	1201.53	1197.56	1204.17	18.84	13.03	5565.03	16704.37
	226.580	450.00	.00	.00	1185.87	72500.00	1202.07	1199.83	1205.21	21.05	14.68	5490.39	15800.98
	226.610	600.00	.00	.00	1187.03	72500.00	1203.80	1198.91	1206.36	16.22	12.86	5697.19	18000.22
*	226.700	650.00	.00	.00	1188.29	72500.00	1206.00	1198.82	1207.21	8.02	8.84	8204.84	25604.51
	226.800	570.00	.00	.00	1189.39	72500.00	1206.53	1199.09	1207.65	7.09	8.51	8668.67	27229.06
	226.890	570.00	.00	.00	1192.50	72500.00	1206.76	1201.89	1208.30	12.06	9.98	7358.11	20876.28

D BY MICHAEL BAKER

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	225.950	220000.00	1189.38	.00	.00	.00	1763.72	.00
*	226.040	72500.00	1190.19	.00	.81	.00	907.09	476.46
	226.130	72500.00	1190.40	.00	.21	.00	1065.75	502.01
*	226.230	72500.00	1187.95	.00	-2.45	.00	563.26	270.00
	226.350	72500.00	1190.01	.00	2.06	.00	522.10	200.00
*	226.480	72500.00	1191.98	.00	1.97	.00	368.82	234.00
*	226.490	72500.00	1198.09	.00	6.11	.00	389.18	1.00
	226.500	72500.00	1199.28	.00	1.19	.00	393.76	15.00
	226.510	72500.00	1198.98	.00	-.30	.00	391.85	1.00
	226.520	72500.00	1200.82	.00	1.84	.00	391.94	84.00
*	226.530	72500.00	1201.53	.00	.71	.00	405.67	1.00
	226.580	72500.00	1202.07	.00	.54	.00	618.51	450.00
	226.610	72500.00	1203.80	.00	1.72	.00	446.93	600.00
*	226.700	72500.00	1206.00	.00	2.20	.00	570.80	650.00
	226.800	72500.00	1206.53	.00	.53	.00	756.72	570.00
	226.890	72500.00	1206.76	.00	.23	.00	647.60	570.00

SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 226.040 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 226.230 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 226.230 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 226.480 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 226.480 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 226.490 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 226.490 PROFILE= 1 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 226.530 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 226.700 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

HEC-6

Sediment Transport Model
Main Channel Analysis

Filename = T2A

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****************************************************     ***********************************
* SCOUR AND DEPOSITION IN RIVERS AND RESERVOIRS  *       * U.S. ARMY CORPS OF ENGINEERS    *
*      Version: 4.1.00 -  OCTOBER 1993            *       * HYDROLOGIC ENGINEERING CENTER   *
* INPUT FILE:  T2A                                *       * 609 SECOND STREET               *
  OUTPUT FILE: T2A.OT                             *       * DAVIS, CALIFORNIA 95616-4687    *
* RUN DATE: 10 AUG 95    RUN TIME: 11:38:37       *       * (916) 756-1104                  *
****************************************************     ***********************************

          X     X XXXXXXX  XXXXX         XXXXX
          X     X X       X     X       X     X
          X     X X       X             X
          XXXXXXX XXXX    X       XXXXX XXXXXX
          X     X X       X             X     X
          X     X X       X     X       X     X
          X     X XXXXXXX  XXXXX         XXXXX

     ***********************************************************************
     *  MAXIMUM LIMITS FOR THIS VERSION ARE:                               *
     *       10  Stream Segments (Main Stem + Tributaries)                 *
     *      500  Cross Sections                                            *
     *      200  Elevation/Station Points per Cross Section                *
     *       20  Grain Sizes                                               *
     *       10  Control Points                                            *
     ***********************************************************************

T1      RED MOUNTAIN FREEWAY - SALT RIVER SOUTH LEVEE PROTECTION
T2      COUNTRY CLUB DRIVE TO EVERGREEN ROAD, MAIN CHANNEL  -  MODEL: T2A.IN
T3      SALT RIVER,   100-YEAR HYDROGRAPH TAKEN FROM APRIL 1994 SLA REPORT
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REACH GEOMETRY FOR STREAM SEGMENT 1

CROSS SECTION NO.	REACH LENGTH (ft)	MOVABLE BED WIDTH	INITIAL BED-ELEVATIONS LEFT SIDE (ft)	THALWEG (ft)	RIGHT SIDE (ft)	ACCUMULATED CHANNEL DISTANCE FROM DOWNSTREAM (ft)	(miles)
	500.000						
224.620		1315.799	1161.000	1161.000	1161.000	0.000	0.000
	630.000						
224.710		1315.099	1161.000	1161.000	1161.000	630.000	0.119
	600.000						
224.810		1315.399	1161.000	1161.000	1161.000	1230.000	0.233
	540.000						
224.900		652.649	1161.000	1161.000	1161.000	1770.000	0.335
	470.000						
225.000		1265.799	1162.000	1162.000	1162.000	2240.000	0.424
	400.000						
225.100		1146.149	1163.000	1163.000	1163.000	2640.000	0.500
	400.000						
225.190		1075.999	1163.000	1163.000	1163.000	3040.000	0.576
	450.000						
225.280		1132.849	1163.730	1163.730	1163.730	3490.000	0.661
	870.000						
225.380		1242.199	1165.130	1165.130	1165.130	4360.000	0.826
	507.130						
225.480		925.250	1165.900	1161.500	1162.900	4867.130	0.922
	475.360						
225.570		1035.100	1166.900	1158.300	1163.700	5342.490	1.012
	512.770						

225.660		963.000	1167.000	1158.800	1165.900	5855.260	1.109
	482.780						
225.760		949.900	1165.500	1165.000	1170.900	6338.040	1.200
	509.560						
5.850		1174.351	1167.175	1167.175	1168.400	6847.600	1.297
	509.990						
225.950		1084.001	1168.587	1168.587	1173.000	7357.590	1.393
	476.460						
226.040		762.250	1174.300	1173.100	1174.600	7834.050	1.484
	502.010						
226.130		785.950	1175.000	1174.100	1182.000	8336.060	1.579
	492.850						
226.230		893.850	1178.500	1177.600	1186.100	8828.910	1.672
	666.570						
226.350		879.250	1180.300	1180.200	1185.700	9495.480	1.798
	670.300						
226.470		879.250	1181.700	1181.600	1187.100	10165.780	1.925
	670.310						
226.610		892.100	1188.300	1187.000	1188.500	10836.090	2.052
	503.990						
226.700		982.850	1189.500	1188.000	1190.500	11340.080	2.148
	487.430						
226.800		914.650	1191.800	1191.700	1192.700	11827.510	2.240
	510.720						
226.890		885.501	1193.100	1192.800	1194.100	12338.230	2.337
	492.080						
226.990		1027.300	1194.300	1193.700	1193.700	12830.310	2.430
	504.960						
227.080		771.850	1194.100	1194.100	1194.700	13335.270	2.526
	509.220						
7.180		851.150	1194.600	1194.500	1199.100	13844.490	2.622
	498.960						
227.270		983.200	1194.100	1193.700	1201.300	14343.450	2.717
	509.520						
227.370		889.000	1194.000	1194.000	1198.700	14852.970	2.813
	506.970						
227.460		865.550	1194.600	1194.100	1199.200	15359.940	2.909
	490.800						
227.560		774.500	1195.600	1194.600	1195.600	15850.740	3.002

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TIME STEP # 1

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 0.500 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	0.03	1201.56	1194.63	18116.	6838.
227.460	0.00	1201.34	1194.10	18116.	6692.
227.370	-0.05	1200.95	1193.95	18116.	8492.
227.270	-0.05	1200.48	1193.65	18116.	10606.
227.180	-0.23	1199.52	1194.27	18116.	18693.
227.080	-0.26	1198.31	1193.84	18116.	28480.
226.990	0.02	1197.52	1193.72	18116.	27560.
226.890	-0.08	1196.44	1192.72	12146.	21672.
226.800	-1.25	1194.13	1190.45	12146.	74104.
226.700	0.64	1191.71	1188.64	12146.	45869.
226.610	0.00	1189.51	1187.00	12146.	45869.
226.470	0.28	1187.67	1181.88	12146.	31336.
226.350	-0.30	1185.10	1179.90	12146.	43549.

226.230	-0.58	1181.07	1177.02	12146.	62700.
226.130	0.18	1179.15	1174.28	12146.	57369.
226.040	-0.29	1176.78	1172.81	12146.	66853.
225.950	-0.35	1174.02	1168.24	18116.	81726.
225.850	0.80	1172.58	1167.97	18116.	41587.
225.760	0.16	1171.50	1165.16	18116.	34419.
225.660	0.55	1171.19	1159.35	18116.	9842.
225.570	0.02	1170.79	1158.32	18116.	8946.
225.480	-0.22	1169.72	1161.28	18116.	17437.
225.380	0.00	1169.03	1165.13	18116.	17373.
225.280	-0.01	1167.93	1163.72	18116.	17881.
225.190	-0.02	1167.36	1162.98	18116.	18586.
225.100	-0.07	1166.70	1162.93	18116.	21535.
225.000	0.09	1166.25	1162.09	18116.	17097.
224.900	0.12	1165.97	1161.12	18116.	9948.
224.810	0.01	1165.63	1161.01	18116.	9481.
224.710	-0.05	1165.11	1160.95	18116.	13153.
224.620	0.00	1163.60	1161.00	18116.	13153.

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TIME STEP # 2

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 0.750 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	0.05	1201.54	1194.65	18699.	7008.
227.460	0.01	1201.31	1194.11	18699.	6804.
227.370	-0.06	1200.88	1193.94	18699.	8002.
227.270	-0.08	1200.35	1193.62	18699.	9682.
227.180	-0.26	1199.40	1194.24	18699.	11978.
227.080	-0.28	1198.35	1193.82	18699.	14027.
226.990	-0.01	1197.58	1193.69	18699.	16616.
226.890	-0.49	1195.51	1192.31	12537.	45345.
226.800	-1.08	1193.51	1190.62	12537.	30850.
226.700	0.71	1191.96	1188.71	12537.	25087.
226.610	0.00	1189.75	1187.00	12537.	25087.
226.470	0.38	1187.84	1181.98	12537.	15612.
226.350	-0.77	1184.37	1179.43	12537.	52953.
226.230	-0.46	1181.03	1177.14	12537.	44658.
226.130	0.37	1179.31	1174.47	12537.	33914.
226.040	-0.94	1176.26	1172.16	12537.	77141.
225.950	-0.19	1174.60	1168.39	18699.	63836.
225.850	1.18	1172.99	1168.36	18699.	25425.
225.760	0.19	1171.69	1165.19	18699.	22465.
225.660	0.74	1171.24	1159.54	18699.	5225.
225.570	-0.01	1170.78	1158.29	18699.	7938.
225.480	-0.28	1169.77	1161.22	18699.	12490.
225.380	0.00	1169.11	1165.13	18699.	12224.
225.280	-0.02	1167.99	1163.71	18699.	14340.
225.190	-0.03	1167.42	1162.97	18699.	15215.
225.100	-0.08	1166.80	1162.92	18699.	15856.
225.000	0.13	1166.34	1162.13	18699.	12003.
224.900	0.16	1166.03	1161.16	18699.	7207.
224.810	0.00	1165.68	1161.00	18699.	8519.
224.710	-0.06	1165.16	1160.94	18699.	10559.
224.620	0.00	1163.65	1161.00	18699.	10559.

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TIME STEP # 3

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 1.000 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	0.07	1201.68	1194.67	19505.	7765.
227.460	0.01	1201.44	1194.11	19505.	7619.
227.370	-0.08	1200.99	1193.92	19505.	8799.
227.270	-0.10	1200.44	1193.60	19505.	10561.
227.180	-0.30	1199.43	1194.20	19505.	12937.
227.080	-0.31	1198.31	1193.79	19505.	15070.
226.990	-0.14	1197.31	1193.56	19505.	26789.
226.890	-0.49	1195.47	1192.31	13077.	18223.
226.800	-1.18	1193.73	1190.52	13077.	26670.
226.700	0.71	1192.01	1188.71	13077.	26706.
226.610	0.00	1189.93	1187.00	13077.	26706.
226.470	0.44	1187.81	1182.04	13077.	20140.
226.350	-0.86	1183.99	1179.34	13077.	27787.
226.230	-0.47	1181.55	1177.13	13077.	28441.
226.130	0.03	1178.91	1174.13	13077.	48301.
226.040	-0.85	1176.03	1172.25	13077.	42296.
225.950	-0.17	1175.06	1168.42	19505.	40023.
225.850	1.27	1173.22	1168.45	19505.	30984.
225.760	0.28	1171.86	1165.28	19505.	22481.
225.660	0.92	1171.36	1159.72	19505.	6268.
225.570	-0.03	1170.88	1158.27	19505.	7817.
225.480	-0.30	1169.87	1161.20	19505.	9981.
225.380	0.00	1169.21	1165.13	19505.	10854.
225.280	-0.04	1168.10	1163.69	19505.	12869.
225.190	-0.04	1167.53	1162.96	19505.	13736.
225.100	-0.08	1166.91	1162.92	19505.	14178.
225.000	0.15	1166.45	1162.15	19505.	11270.
224.900	0.19	1166.13	1161.19	19505.	7113.
224.810	-0.01	1165.76	1160.99	19505.	8565.
224.710	-0.07	1165.24	1160.93	19505.	10030.
224.620	0.00	1163.71	1161.00	19505.	10030.

TIME STEP # 4

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 1.250 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	0.13	1202.53	1194.73	25007.	11587.
227.460	0.01	1202.26	1194.11	25007.	11356.
227.370	-0.09	1201.80	1193.91	25007.	12307.
227.270	-0.13	1201.20	1193.57	25007.	14867.
227.180	-0.33	1200.11	1194.17	25007.	17096.
227.080	-0.38	1198.75	1193.72	25007.	22191.
226.990	-0.17	1197.77	1193.53	25007.	24824.
226.890	-0.54	1195.82	1192.26	16766.	21318.
226.800	-1.19	1194.06	1190.51	16766.	22324.
226.700	0.61	1192.35	1188.61	16766.	31025.
226.610	0.00	1190.38	1187.00	16766.	31025.
226.470	0.47	1188.29	1182.07	16766.	27718.
226.350	-0.88	1184.68	1179.32	16766.	29209.
226.230	-0.58	1181.75	1177.02	16766.	36949.
226.130	-0.39	1179.23	1173.71	16766.	61762.
226.040	-0.80	1176.59	1172.30	16766.	57911.

225.950	-0.07	1175.65	1168.51	25007.	48728.
225.850	1.39	1173.94	1168.57	25007.	35461.
225.760	0.41	1172.68	1165.41	25007.	24404.
225.660	1.08	1172.14	1159.88	25007.	10092.
225.570	-0.04	1171.65	1158.26	25007.	11119.
225.480	-0.33	1170.53	1161.17	25007.	13434.
225.380	-0.01	1169.89	1165.12	25007.	13919.
225.280	-0.06	1168.77	1163.67	25007.	17641.
225.190	-0.06	1168.19	1162.94	25007.	19689.
225.100	-0.08	1167.57	1162.92	25007.	19550.
225.000	0.21	1167.12	1162.21	25007.	13625.
224.900	0.22	1166.78	1161.22	25007.	9578.
224.810	-0.02	1166.38	1160.98	25007.	11062.
224.710	-0.09	1165.80	1160.91	25007.	13160.
224.620	0.00	1164.12	1161.00	25007.	13160.

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TIME STEP # 5

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 1.500 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	0.35	1203.70	1194.95	33997.	17918.
227.460	0.00	1203.38	1194.10	33997.	18661.
227.370	-0.10	1202.94	1193.90	33997.	19356.
227.270	-0.17	1202.30	1193.53	33997.	22320.
227.180	-0.40	1201.02	1194.10	33997.	27566.
227.080	-0.43	1199.43	1193.67	33997.	31418.
226.990	-0.20	1198.39	1193.50	33997.	34076.
226.890	-0.60	1196.39	1192.20	22794.	27167.
226.800	-1.22	1194.55	1190.48	22794.	29308.
226.700	0.53	1192.90	1188.53	22794.	36810.
226.610	0.00	1191.01	1187.00	22794.	36810.
226.470	0.45	1188.95	1182.05	22794.	39678.
226.350	-0.89	1185.53	1179.31	22794.	40609.
226.230	-0.62	1182.05	1176.98	22794.	43601.
226.130	-0.62	1179.66	1173.48	22794.	57180.
226.040	-0.86	1177.40	1172.24	22794.	61953.
225.950	-0.02	1176.53	1168.57	33997.	56709.
225.850	1.53	1175.04	1168.70	33997.	42510.
225.760	0.52	1173.84	1165.52	33997.	31711.
225.660	1.24	1173.28	1160.04	33997.	16812.
225.570	-0.05	1172.77	1158.25	33997.	17619.
225.480	-0.36	1171.50	1161.14	33997.	20165.
225.380	0.00	1170.88	1165.13	33997.	19615.
225.280	-0.08	1169.77	1163.65	33997.	21949.
225.190	-0.08	1169.15	1162.92	33997.	23962.
225.100	-0.10	1168.54	1162.90	33997.	25903.
225.000	0.30	1168.07	1162.30	33997.	17113.
224.900	0.25	1167.71	1161.25	33997.	14422.
224.810	-0.04	1167.26	1160.96	33997.	16493.
224.710	-0.10	1166.60	1160.90	33997.	18113.
224.620	0.00	1164.80	1161.00	33997.	18113.

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STEP # 6

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 1.750 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	0.75	1204.09	1195.35	37800.	16333.
227.460	-0.03	1203.76	1194.07	37800.	19190.
227.370	-0.12	1203.31	1193.88	37800.	21136.
227.270	-0.20	1202.65	1193.50	37800.	24152.
227.180	-0.44	1201.38	1194.06	37800.	27686.
227.080	-0.47	1199.65	1193.63	37800.	31271.
226.990	-0.29	1198.59	1193.41	37800.	39096.
226.890	-0.63	1196.59	1192.17	25343.	28910.
226.800	-1.25	1194.68	1190.45	25343.	31171.
226.700	0.49	1193.13	1188.49	25343.	34254.
226.610	0.00	1191.25	1187.00	25343.	34254.
226.470	0.36	1189.07	1181.96	25343.	43253.
226.350	-0.90	1185.89	1179.30	25343.	44113.
226.230	-0.76	1182.10	1176.84	25343.	54115.
226.130	-0.59	1179.75	1173.51	25343.	52149.
226.040	-0.89	1177.75	1172.21	25343.	53987.
225.950	0.01	1176.96	1168.59	37800.	51724.
225.850	1.58	1175.53	1168.76	37800.	45676.
225.760	0.62	1174.32	1165.62	37800.	36587.
225.660	1.41	1173.71	1160.21	37800.	20959.
225.570	-0.05	1173.19	1158.25	37800.	21595.
225.480	-0.40	1171.88	1161.10	37800.	24675.
225.380	0.01	1171.27	1165.14	37800.	22613.
225.280	-0.09	1170.14	1163.64	37800.	23926.
225.190	-0.10	1169.53	1162.90	37800.	25536.
225.100	-0.15	1168.92	1162.85	37800.	29764.
225.000	0.40	1168.43	1162.40	37800.	19308.
224.900	0.27	1168.05	1161.27	37800.	16430.
224.810	-0.05	1167.59	1160.95	37800.	18117.
224.710	-0.11	1166.91	1160.89	37800.	20434.
224.620	0.00	1165.10	1161.00	37800.	20434.

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TIME STEP # 7

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 2.000 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	1.25	1204.74	1195.85	44420.	22052.
227.460	-0.05	1204.39	1194.05	44420.	23272.
227.370	-0.15	1203.95	1193.85	44420.	25511.
227.270	-0.24	1203.26	1193.46	44420.	28628.
227.180	-0.49	1201.95	1194.01	44420.	32323.
227.080	-0.52	1200.07	1193.58	44420.	36003.
226.990	-0.39	1199.01	1193.31	44420.	45667.
226.890	-0.67	1196.96	1192.13	29782.	34216.
226.800	-1.28	1194.99	1190.42	29782.	36697.
226.700	0.48	1193.52	1188.48	29782.	38015.
226.610	0.00	1191.57	1187.00	29782.	38015.
226.470	0.29	1189.50	1181.89	29782.	46289.
226.350	-0.93	1186.09	1179.27	29782.	50086.
226.230	-0.83	1182.67	1176.77	29782.	54851.
226.130	-0.72	1180.09	1173.38	29782.	63008.
226.040	-0.74	1178.31	1172.36	29782.	51919.
225.950	-0.05	1177.54	1168.53	44420.	57678.
225.850	1.68	1176.26	1168.85	44420.	47897.
225.760	0.67	1175.05	1165.67	44420.	43704.

225.660	1.59	1174.40	1160.39	44420.	28115.
225.570	-0.07	1173.87	1158.23	44420.	29419.
225.480	-0.44	1172.51	1161.06	44420.	33487.
225.380	0.04	1171.91	1165.17	44420.	29463.
225.280	-0.10	1170.77	1163.63	44420.	30453.
225.190	-0.11	1170.13	1162.89	44420.	31570.
225.100	-0.16	1169.54	1162.84	44420.	32357.
225.000	0.47	1169.04	1162.47	44420.	25138.
224.900	0.31	1168.65	1161.31	44420.	19936.
224.810	-0.06	1168.16	1160.94	44420.	21605.
224.710	-0.14	1167.45	1160.86	44420.	25561.
224.620	0.00	1165.70	1161.00	44420.	25561.

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TIME STEP # 8

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 2.250 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	2.03	1206.28	1196.63	61956.	41782.
227.460	-0.08	1205.87	1194.02	61956.	44287.
227.370	-0.16	1205.45	1193.84	61956.	45450.
227.270	-0.27	1204.68	1193.43	61956.	48330.
227.180	-0.53	1203.25	1193.97	61956.	51836.
227.080	-0.63	1200.98	1193.47	61956.	60130.
226.990	-0.39	1199.95	1193.31	61956.	59516.
226.890	-0.71	1197.83	1192.09	41539.	43133.
226.800	-1.30	1195.82	1190.40	41539.	45325.
226.700	0.42	1194.47	1188.42	41539.	50561.
226.610	0.00	1192.46	1187.00	41539.	50561.
226.470	0.05	1190.29	1181.65	41539.	76027.
226.350	-1.01	1187.15	1179.19	41539.	83550.
226.230	-0.88	1183.50	1176.72	41539.	87800.
226.130	-0.79	1181.14	1173.31	41539.	91914.
226.040	-0.54	1179.49	1172.56	41539.	77485.
225.950	-0.15	1178.95	1168.44	61956.	86614.
225.850	1.89	1177.88	1169.07	61956.	63887.
225.760	0.68	1176.67	1165.68	61956.	62685.
225.660	1.75	1175.96	1160.55	61956.	48203.
225.570	-0.09	1175.41	1158.21	61956.	50131.
225.480	-0.48	1173.94	1161.02	61956.	53744.
225.380	0.07	1173.46	1165.20	61956.	49131.
225.280	-0.10	1172.28	1163.63	61956.	50114.
225.190	-0.12	1171.60	1162.88	61956.	50679.
225.100	-0.16	1171.01	1162.84	61956.	50749.
225.000	0.57	1170.52	1162.57	61956.	40823.
224.900	0.41	1170.11	1161.41	61956.	29298.
224.810	-0.08	1169.59	1160.92	61956.	32247.
224.710	-0.17	1168.84	1160.83	61956.	36934.
224.620	0.00	1167.33	1161.00	61956.	36934.

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TIME STEP # 9

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 2.500 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	2.83	1207.32	1197.43	76003.	64534.

227.460	-0.10	1206.91	1194.00	76003.	65970.
227.370	-0.17	1206.51	1193.83	76003.	66780.
227.270	-0.32	1205.65	1193.38	76003.	71175.
227.180	-0.57	1204.13	1193.93	76003.	74413.
227.080	-0.68	1201.66	1193.42	76003.	78466.
226.990	-0.42	1200.62	1193.28	76003.	81467.
226.890	-0.79	1198.45	1192.01	50957.	61003.
226.800	-1.37	1196.36	1190.33	50957.	66791.
226.700	0.53	1195.18	1188.53	50957.	57294.
226.610	0.00	1192.97	1187.00	50957.	57294.
226.470	-0.11	1190.87	1181.49	50957.	73826.
226.350	-1.10	1187.86	1179.10	50957.	83414.
226.230	-0.93	1184.22	1176.67	50957.	86850.
226.130	-0.84	1182.10	1173.26	50957.	89775.
226.040	-0.46	1180.44	1172.64	50957.	84031.
225.950	-0.30	1180.08	1168.29	76003.	98241.
225.850	2.04	1179.06	1169.22	76003.	81906.
225.760	0.66	1177.84	1165.66	76003.	83467.
225.660	1.94	1177.10	1160.74	76003.	66448.
225.570	-0.10	1176.55	1158.20	76003.	67540.
225.480	-0.51	1175.01	1160.99	76003.	70102.
225.380	0.10	1174.60	1165.23	76003.	65810.
225.280	-0.11	1173.42	1163.62	76003.	66562.
225.190	-0.13	1172.72	1162.87	76003.	66980.
225.100	-0.16	1172.14	1162.84	76003.	66922.
225.000	0.70	1171.65	1162.70	76003.	53863.
224.900	0.55	1171.26	1161.55	76003.	37245.
224.810	-0.11	1170.74	1160.89	76003.	41086.
224.710	-0.19	1170.02	1160.81	76003.	44216.
224.620	0.00	1168.76	1161.00	76003.	44216.

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TIME STEP # 10

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 2.750 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	3.37	1207.79	1197.97	83205.	86950.
227.460	-0.11	1207.42	1193.99	83205.	87473.
227.370	-0.17	1207.02	1193.83	83205.	87192.
227.270	-0.36	1206.14	1193.34	83205.	90745.
227.180	-0.61	1204.57	1193.89	83205.	93834.
227.080	-0.74	1201.96	1193.36	83205.	99044.
226.990	-0.54	1200.90	1193.16	83205.	109872.
226.890	-0.86	1198.65	1191.94	55785.	80176.
226.800	-1.39	1196.74	1190.31	55785.	81776.
226.700	0.49	1195.55	1188.49	55785.	84943.
226.610	0.00	1193.16	1187.00	55785.	84943.
226.470	-0.20	1191.06	1181.40	55785.	95495.
226.350	-1.14	1188.17	1179.06	55785.	99094.
226.230	-0.98	1184.59	1176.62	55785.	102541.
226.130	-0.88	1182.54	1173.22	55785.	105418.
226.040	-0.37	1180.90	1172.73	55785.	98956.
225.950	-0.29	1180.66	1168.30	83205.	98481.
225.850	2.11	1179.65	1169.28	83205.	91792.
225.760	0.70	1178.45	1165.70	83205.	88906.
225.660	2.06	1177.64	1160.86	83205.	77358.
225.570	-0.11	1177.11	1158.19	83205.	78049.
225.480	-0.54	1175.53	1160.96	83205.	80386.

225.380	0.14	1175.16	1165.27	83205.	73359.
225.280	-0.11	1173.99	1163.62	83205.	73801.
225.190	-0.13	1173.29	1162.87	83205.	74278.
225.100	-0.16	1172.73	1162.84	83205.	74346.
225.000	0.83	1172.23	1162.83	83205.	61491.
224.900	0.70	1171.83	1161.70	83205.	42274.
224.810	-0.14	1171.33	1160.86	83205.	45735.
224.710	-0.21	1170.63	1160.79	83205.	48629.
224.620	0.00	1169.47	1161.00	83205.	48629.

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TIME STEP # 11

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 3.000 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	4.09	1209.40	1198.69	108032.	131192.
227.460	-0.14	1209.04	1193.96	108032.	133531.
227.370	-0.13	1208.67	1193.87	108032.	130519.
227.270	-0.39	1207.69	1193.31	108032.	133699.
227.180	-0.69	1206.01	1193.81	108032.	140942.
227.080	-0.81	1202.83	1193.29	108032.	146099.
226.990	-0.68	1201.84	1193.02	108032.	158715.
226.890	-0.92	1199.59	1191.88	72431.	111238.
226.800	-1.53	1197.65	1190.17	72431.	123397.
226.700	0.48	1196.64	1188.48	72431.	124136.
226.610	0.00	1194.07	1187.00	72431.	124136.
226.470	-0.36	1191.93	1181.24	72431.	140556.
226.350	-1.16	1189.40	1179.04	72431.	142334.
226.230	-1.02	1185.71	1176.58	72431.	145681.
226.130	-0.91	1183.99	1173.19	72431.	148017.
226.040	-0.21	1182.56	1172.89	72431.	136144.
225.950	-0.23	1182.39	1168.36	108032.	130300.
225.850	2.22	1181.51	1169.40	108032.	118048.
225.760	0.69	1180.29	1165.69	108032.	118405.
225.660	2.16	1179.42	1160.96	108032.	109976.
225.570	-0.13	1178.92	1158.17	108032.	112025.
225.480	-0.55	1177.30	1160.95	108032.	113572.
225.380	0.25	1177.05	1165.38	108032.	97101.
225.280	-0.11	1175.89	1163.62	108032.	96846.
225.190	-0.15	1175.21	1162.85	108032.	98799.
225.100	-0.15	1174.71	1162.85	108032.	97650.
225.000	1.03	1174.27	1163.03	108032.	77448.
224.900	0.89	1173.93	1161.89	108032.	54516.
224.810	-0.16	1173.48	1160.84	108032.	57493.
224.710	-0.22	1172.87	1160.78	108032.	59148.
224.620	0.00	1171.99	1161.00	108032.	59148.

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TIME STEP # 12

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 3.250 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	5.19	1211.75	1199.79	149141.	219274.
227.460	-0.15	1211.46	1193.95	149141.	220841.
227.370	0.01	1211.15	1194.01	149141.	208265.
227.270	-0.42	1209.97	1193.28	149141.	211032.

227.180	-0.75	1208.15	1193.75	149141.	215248.
227.080	-1.29	1204.38	1192.81	149141.	253237.
226.990	-0.86	1203.22	1192.84	149141.	268725.
226.890	-0.97	1200.87	1191.83	99992.	184201.
226.800	-1.57	1199.12	1190.13	99992.	186861.
226.700	0.58	1198.32	1188.58	99992.	178185.
226.610	0.00	1195.43	1187.00	99992.	178169.
226.470	-0.46	1193.49	1181.14	99992.	188882.
226.350	-1.18	1191.21	1179.02	99992.	191710.
226.230	-1.19	1187.32	1176.41	99992.	207372.
226.130	-0.75	1186.33	1173.35	99992.	195107.
226.040	0.00	1185.30	1173.10	99992.	179020.
225.950	-0.24	1185.04	1168.35	149141.	179920.
225.850	2.36	1184.24	1169.54	149141.	164940.
225.760	0.70	1183.08	1165.70	149141.	164193.
225.660	2.11	1182.17	1160.91	149141.	168264.
225.570	-0.15	1181.72	1158.15	149141.	169628.
225.480	-0.59	1180.00	1160.91	149141.	173023.
225.380	0.49	1179.93	1165.62	149141.	137293.
225.280	-0.12	1178.82	1163.61	149141.	138893.
225.190	-0.16	1178.16	1162.84	149141.	139538.
225.100	-0.14	1177.73	1162.86	149141.	139256.
225.000	1.36	1177.37	1163.36	149141.	105407.
224.900	1.14	1177.09	1162.14	149141.	74980.
224.810	-0.17	1176.70	1160.83	149141.	77111.
224.710	-0.22	1176.17	1160.78	149141.	77424.
224.620	0.00	1175.48	1161.00	149141.	77424.

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TIME STEP # 13

ɔLE SB-2: STATUS OF THE BED PROFILE AT TIME = 3.500 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	5.33	1213.98	1199.93	198617.	344453.
227.460	-0.15	1213.90	1193.95	198617.	344450.
227.370	1.04	1213.60	1195.04	198617.	255576.
227.270	-0.48	1212.17	1193.22	198617.	260935.
227.180	-0.81	1209.81	1193.69	198617.	266141.
227.080	-3.20	1205.97	1190.90	198617.	417853.
226.990	-1.25	1204.68	1192.45	198617.	453241.
226.890	-0.84	1202.43	1191.96	133164.	292970.
226.800	-1.49	1200.73	1190.21	133164.	286613.
226.700	0.92	1200.12	1188.92	133164.	256071.
226.610	1.07	1197.00	1188.07	133164.	149012.
226.470	-0.61	1195.26	1180.99	133164.	165005.
226.350	-1.25	1192.15	1178.95	133164.	172014.
226.230	-1.36	1189.72	1176.24	133164.	188378.
226.130	-0.72	1188.79	1173.38	133164.	186025.
226.040	0.04	1188.27	1173.14	133164.	183217.
225.950	-0.28	1187.96	1168.31	198617.	186933.
225.850	2.16	1187.27	1169.34	198617.	208492.
225.760	0.71	1186.16	1165.71	198617.	207697.
225.660	1.98	1185.28	1160.78	198617.	220002.
225.570	-0.16	1184.89	1158.14	198617.	221110.
225.480	-0.65	1183.15	1160.85	198617.	226625.
225.380	0.81	1183.22	1165.94	198617.	178752.
225.280	-0.13	1182.19	1163.60	198617.	180153.
225.190	-0.16	1181.57	1162.84	198617.	180417.

225.100	-0.15	1181.22	1162.85	198617.	180772.
225.000	1.77	1180.90	1163.77	198617.	139076.
224.900	1.48	1180.69	1162.48	198617.	98066.
224.810	-0.18	1180.35	1160.82	198617.	99237.
224.710	-0.22	1179.89	1160.78	198617.	98559.
224.620	0.00	1179.32	1161.00	198617.	98559.

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TIME STEP # 14

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 3.750 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	5.32	1214.86	1199.92	220000.	399793.
227.460	-0.15	1214.80	1193.95	220000.	399494.
227.370	2.63	1214.32	1196.63	220000.	260590.
227.270	-0.55	1212.90	1193.15	220000.	266509.
227.180	-5.97	1208.10	1188.53	220000.	693358.
227.080	-3.60	1206.42	1190.50	220000.	724774.
226.990	-0.38	1205.51	1193.32	220000.	646611.
226.890	-0.87	1203.57	1191.93	147500.	436039.
226.800	-1.25	1202.52	1190.45	147500.	415610.
226.700	2.24	1202.20	1190.24	147500.	295763.
226.610	0.00	1198.01	1187.00	147500.	402689.
226.470	-0.73	1195.91	1180.87	147500.	415831.
226.350	-1.40	1192.72	1178.80	147500.	432648.
226.230	-1.44	1190.82	1176.16	147500.	440418.
226.130	-0.15	1189.96	1173.95	147500.	396971.
226.040	1.65	1189.62	1174.75	147500.	274521.
225.950	-0.19	1189.29	1168.39	220000.	266266.
225.850	2.56	1188.74	1169.74	220000.	222988.
225.760	0.56	1187.64	1165.56	220000.	236619.
225.660	2.00	1186.85	1160.80	220000.	234301.
225.570	-0.17	1186.48	1158.13	220000.	235198.
225.480	-0.69	1184.83	1160.81	220000.	238538.
225.380	1.10	1184.90	1166.23	220000.	194680.
225.280	-0.12	1183.99	1163.61	220000.	193359.
225.190	-0.16	1183.41	1162.84	220000.	193062.
225.100	-0.13	1183.12	1162.87	220000.	191653.
225.000	2.16	1182.81	1164.16	220000.	152662.
224.900	1.85	1182.64	1162.85	220000.	108439.
224.810	-0.18	1182.36	1160.82	220000.	108327.
224.710	-0.21	1181.96	1160.79	220000.	106561.
224.620	0.00	1181.48	1161.00	220000.	106561.

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TIME STEP # 15

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 4.000 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	4.73	1212.56	1199.33	181038.	338625.
227.460	-0.20	1212.46	1193.90	181038.	342249.
227.370	2.02	1210.35	1196.02	181038.	395668.
227.270	-0.65	1208.15	1193.05	181038.	404792.
227.180	-5.89	1208.39	1188.61	181038.	398404.
227.080	-3.79	1206.29	1190.31	181038.	413372.
226.990	-0.74	1204.41	1192.96	181038.	445697.

226.890	-0.90	1202.66	1191.90	121378.	301310.
226.800	-1.35	1201.57	1190.35	121378.	309745.
226.700	-0.12	1199.09	1187.88	121378.	523110.
226.610	3.60	1196.12	1190.60	121378.	164758.
226.470	-0.86	1194.52	1180.74	121378.	178879.
226.350	-1.64	1191.57	1178.56	121378.	204198.
226.230	-1.51	1189.88	1176.09	121378.	210954.
226.130	-0.45	1188.72	1173.65	121378.	233571.
226.040	-0.29	1186.70	1172.81	121378.	380995.
225.950	0.49	1186.96	1169.07	181038.	315046.
225.850	3.32	1186.18	1170.50	181038.	233808.
225.760	0.72	1185.15	1165.72	181038.	219092.
225.660	2.13	1184.28	1160.93	181038.	207696.
225.570	-0.18	1183.87	1158.12	181038.	208712.
225.480	-0.72	1182.25	1160.78	181038.	212184.
225.380	1.31	1182.11	1166.44	181038.	180116.
225.280	-0.12	1181.14	1163.61	181038.	180456.
225.190	-0.17	1180.49	1162.83	181038.	180999.
225.100	-0.13	1180.13	1162.87	181038.	181120.
225.000	2.35	1179.62	1164.35	181038.	161272.
224.900	2.27	1179.40	1163.27	181038.	109915.
224.810	-0.18	1179.06	1160.82	181038.	110034.
224.710	-0.20	1178.58	1160.80	181038.	109707.
224.620	0.00	1177.97	1161.00	181038.	109707.

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TIME STEP # 16

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 4.250 DAYS

CTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	5.38	1211.77	1199.98	168019.	272889.
227.460	-0.25	1211.51	1193.85	168019.	277468.
227.370	1.37	1209.75	1195.37	168019.	332756.
227.270	-0.83	1207.42	1192.87	168019.	349163.
227.180	-5.91	1207.61	1188.59	168019.	350617.
227.080	-3.94	1205.61	1190.16	168019.	362276.
226.990	-0.70	1204.41	1193.00	168019.	358321.
226.890	-0.85	1203.27	1191.95	112649.	236418.
226.800	-1.09	1202.73	1190.61	112649.	214712.
226.700	0.01	1202.81	1188.01	112649.	203201.
226.610	0.03	1198.89	1187.03	112649.	558232.
226.470	-0.90	1193.80	1180.70	112649.	562856.
226.350	-1.65	1190.93	1178.55	112649.	563249.
226.230	-1.42	1188.79	1176.18	112649.	554686.
226.130	1.32	1187.42	1175.42	112649.	420744.
226.040	1.91	1186.96	1175.01	112649.	254130.
225.950	0.54	1186.41	1169.13	168019.	248705.
225.850	3.15	1185.36	1170.33	168019.	266886.
225.760	1.24	1184.39	1166.24	168019.	219382.
225.660	2.41	1183.52	1161.21	168019.	193905.
225.570	-0.19	1183.11	1158.11	168019.	194940.
225.480	-0.76	1181.55	1160.74	168019.	198256.
225.380	1.50	1181.30	1166.63	168019.	169509.
225.280	-0.13	1180.32	1163.60	168019.	170073.
225.190	-0.17	1179.70	1162.83	168019.	170327.
225.100	-0.14	1179.31	1162.86	168019.	170480.
225.000	2.48	1178.72	1164.48	168019.	157840.
224.900	2.68	1178.46	1163.68	168019.	107241.

224.810	-0.18	1178.12	1160.82	168019.	107376.
224.710	-0.20	1177.62	1160.80	168019.	107171.
224.620	0.00	1176.98	1161.00	168019.	107171.

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STEP # 17

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 4.500 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	4.64	1211.10	1199.24	166499.	322163.
227.460	-0.32	1211.01	1193.78	166499.	327699.
227.370	1.68	1209.58	1195.68	166499.	301730.
227.270	-1.01	1207.31	1192.69	166499.	317224.
227.180	-5.95	1207.42	1188.55	166499.	320383.
227.080	-4.08	1205.54	1190.02	166499.	331551.
226.990	-0.85	1203.96	1192.85	166499.	345198.
226.890	-1.02	1202.16	1191.78	111630.	245563.
226.800	-1.52	1199.38	1190.18	111630.	281670.
226.700	0.31	1199.29	1188.31	111630.	254570.
226.610	0.04	1195.41	1187.04	111630.	254119.
226.470	-1.01	1193.72	1180.59	111630.	265377.
226.350	-1.73	1191.97	1178.47	111630.	274456.
226.230	-1.40	1191.03	1176.20	111630.	272594.
226.130	-0.40	1188.09	1173.70	111630.	402348.
226.040	1.43	1186.33	1174.53	111630.	438154.
225.950	1.84	1186.43	1170.42	166499.	313197.
225.850	3.67	1185.49	1170.84	166499.	258234.
225.760	1.40	1184.31	1166.40	166499.	242925.
225.660	2.76	1183.42	1161.56	166499.	211172.
225.570	-0.19	1183.04	1158.11	166499.	210858.
225.480	-0.79	1181.53	1160.71	166499.	213496.
225.380	1.74	1181.22	1166.87	166499.	176376.
225.280	-0.12	1180.26	1163.61	166499.	175562.
225.190	-0.17	1179.64	1162.83	166499.	175393.
225.100	-0.13	1179.26	1162.87	166499.	174620.
225.000	2.60	1178.62	1164.60	166499.	162215.
224.900	3.09	1178.33	1164.09	166499.	112752.
224.810	-0.18	1178.01	1160.82	166499.	111914.
224.710	-0.20	1177.51	1160.80	166499.	110894.
224.620	0.00	1176.87	1161.00	166499.	110894.

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TIME STEP # 18

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 4.750 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	4.93	1210.32	1199.53	143600.	236657.
227.460	-0.37	1210.07	1193.73	143600.	240201.
227.370	0.91	1208.12	1194.91	143600.	305364.
227.270	-1.15	1206.15	1192.55	143600.	318272.
227.180	-5.86	1206.21	1188.64	143600.	311062.
227.080	-4.17	1204.57	1189.93	143600.	318548.
226.990	-0.88	1202.92	1192.82	143600.	321395.
226.890	-1.11	1200.72	1191.69	95795.	221905.
226.800	-1.52	1198.91	1190.18	95795.	222013.
226.700	0.21	1198.30	1188.21	95795.	231186.

226.610	0.03	1194.54	1187.03	95795.	231797.
226.470	-1.09	1192.74	1180.51	95795.	240646.
226.350	-1.78	1190.21	1178.42	95795.	246441.
226.230	-1.56	1188.33	1176.04	95795.	261454.
226.130	-0.02	1187.40	1174.08	95795.	232872.
226.040	1.55	1185.91	1174.65	95795.	223880.
225.950	1.08	1185.26	1169.67	142880.	297124.
225.850	3.88	1184.14	1171.06	142880.	274056.
225.760	1.94	1182.97	1166.94	142880.	224415.
225.660	3.07	1181.96	1161.87	142880.	196382.
225.570	-0.16	1181.61	1158.14	142880.	193701.
225.480	-0.80	1180.20	1160.70	142880.	194978.
225.380	1.95	1179.72	1167.08	142880.	163556.
225.280	-0.10	1178.73	1163.63	142880.	161180.
225.190	-0.16	1178.11	1162.84	142880.	160528.
225.100	-0.12	1177.71	1162.88	142880.	159764.
225.000	2.62	1176.93	1164.62	142880.	158203.
224.900	3.50	1176.57	1164.50	142880.	108549.
224.810	-0.16	1176.21	1160.84	142880.	106743.
224.710	-0.19	1175.67	1160.81	142880.	106413.
224.620	0.00	1174.96	1161.00	142880.	106413.

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TIME STEP # 19

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 5.000 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	4.55	1208.63	1199.15	119885.	202678.
227.460	-0.42	1208.47	1193.68	119885.	206807.
227.370	0.62	1206.87	1194.62	119885.	232088.
227.270	-1.27	1204.95	1192.43	119885.	243042.
227.180	-5.83	1204.94	1188.67	119885.	240527.
227.080	-4.22	1203.58	1189.88	119885.	244419.
226.990	-0.91	1202.05	1192.79	119885.	246762.
226.890	-1.17	1199.94	1191.63	80377.	170387.
226.800	-1.55	1198.05	1190.15	80377.	172550.
226.700	0.23	1197.38	1188.23	80377.	170700.
226.610	0.02	1193.88	1187.02	80377.	171543.
226.470	-1.18	1191.86	1180.42	80377.	181085.
226.350	-1.86	1189.20	1178.34	80377.	188597.
226.230	-1.60	1187.62	1176.00	80377.	191835.
226.130	-0.09	1186.47	1174.01	80377.	197044.
226.040	1.13	1184.39	1174.23	80377.	228479.
225.950	1.38	1184.27	1169.97	119885.	199280.
225.850	3.61	1183.02	1170.79	119885.	227905.
225.760	2.04	1181.58	1167.04	119885.	218640.
225.660	3.50	1180.50	1162.30	119885.	180529.
225.570	-0.01	1180.16	1158.29	119885.	167341.
225.480	-0.82	1178.88	1160.68	119885.	168608.
225.380	2.09	1178.24	1167.22	119885.	147226.
225.280	-0.08	1177.22	1163.65	119885.	143203.
225.190	-0.14	1176.62	1162.86	119885.	141267.
225.100	-0.11	1176.21	1162.89	119885.	140277.
225.000	2.58	1175.35	1164.58	119885.	144062.
224.900	3.86	1174.88	1164.86	119885.	100510.
224.810	-0.14	1174.50	1160.86	119885.	97068.
224.710	-0.19	1173.94	1160.81	119885.	97208.
224.620	0.00	1173.15	1161.00	119885.	97208.

TIME STEP # 20

E SB-2: STATUS OF THE BED PROFILE AT TIME = 5.250 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	4.52	1207.37	1199.12	98547.	136750.
227.460	-0.46	1207.16	1193.64	98547.	140073.
227.370	0.05	1205.57	1194.05	98547.	188347.
227.270	-1.37	1203.80	1192.33	98547.	196718.
227.180	-5.76	1203.73	1188.74	98547.	190782.
227.080	-4.23	1202.61	1189.87	98547.	191679.
226.990	-0.92	1201.17	1192.78	98547.	192524.
226.890	-1.21	1199.09	1191.59	66071.	132555.
226.800	-1.57	1197.25	1190.13	66071.	134409.
226.700	0.24	1196.46	1188.24	66071.	133355.
226.610	0.02	1193.11	1187.02	66071.	133885.
226.470	-1.25	1190.95	1180.35	66071.	141450.
226.350	-1.92	1188.13	1178.28	66071.	148682.
226.230	-1.63	1186.41	1175.97	66071.	151934.
226.130	-0.14	1185.05	1173.96	66071.	156210.
226.040	1.08	1183.27	1174.18	66071.	160029.
225.950	1.23	1182.90	1169.81	98547.	174827.
225.850	3.65	1181.78	1170.82	98547.	171155.
225.760	1.98	1180.34	1166.98	98547.	176590.
225.660	3.64	1179.06	1162.44	98547.	164011.
225.570	0.71	1178.71	1159.01	98547.	97456.
225.480	-0.86	1177.56	1160.64	98547.	100911.
225.380	1.91	1176.75	1167.04	98547.	128281.
225.280	-0.04	1175.68	1163.69	98547.	123384.
225.190	-0.11	1175.10	1162.89	98547.	121046.
225.100	-0.10	1174.67	1162.90	98547.	120751.
225.000	2.44	1173.71	1164.44	98547.	135153.
224.900	4.16	1173.07	1165.16	98547.	99109.
224.810	-0.09	1172.63	1160.91	98547.	91838.
224.710	-0.21	1171.98	1160.79	98547.	94066.
224.620	0.00	1171.00	1161.00	98547.	94066.

TIME STEP # 21

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 5.500 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	4.47	1206.29	1199.07	85397.	112606.
227.460	-0.50	1206.11	1193.60	85397.	116067.
227.370	-0.23	1204.76	1193.77	85397.	139621.
227.270	-1.45	1203.03	1192.25	85397.	146692.
227.180	-5.74	1202.92	1188.76	85397.	145071.
227.080	-4.26	1201.94	1189.84	85397.	146902.
226.990	-0.94	1200.57	1192.76	85397.	149281.
226.890	-1.25	1198.55	1191.55	57255.	102811.
226.800	-1.60	1196.72	1190.10	57255.	105189.
226.700	0.23	1195.84	1188.23	57255.	105735.
226.610	0.02	1192.64	1187.02	57255.	106124.
226.470	-1.31	1190.29	1180.29	57255.	112427.
226.350	-1.99	1187.44	1178.21	57255.	119252.

226.230	-1.66	1185.68	1175.94	57255.	122214.
226.130	-0.15	1184.33	1173.95	57255.	122400.
226.040	0.87	1182.39	1173.97	57255.	137672.
225.950	1.24	1182.10	1169.82	85397.	136957.
225.850	3.54	1180.89	1170.71	85397.	148929.
225.760	2.02	1179.54	1167.02	85397.	145872.
225.660	3.66	1178.23	1162.46	85397.	143618.
225.570	1.36	1177.66	1159.66	85397.	83368.
225.480	-0.89	1176.62	1160.61	85397.	86138.
225.380	1.75	1175.81	1166.88	85397.	110033.
225.280	-0.01	1174.72	1163.72	85397.	105427.
225.190	-0.09	1174.15	1162.91	85397.	103993.
225.100	-0.11	1173.72	1162.89	85397.	104232.
225.000	2.30	1172.77	1164.30	85397.	117854.
224.900	4.34	1172.00	1165.34	85397.	96094.
224.810	0.02	1171.51	1161.02	85397.	80571.
224.710	-0.24	1170.82	1160.76	85397.	84783.
224.620	0.00	1169.69	1161.00	85397.	84783.

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TIME STEP # 22

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 5.750 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	4.40	1204.80	1199.00	65892.	79373.
227.460	-0.55	1204.71	1193.55	65892.	82896.
227.370	-0.27	1203.39	1193.73	65892.	87013.
227.270	-1.55	1201.73	1192.15	65892.	96377.
227.180	-5.69	1201.61	1188.81	65892.	92033.
227.080	-4.28	1200.84	1189.82	65892.	93937.
226.990	-0.96	1199.61	1192.74	65892.	95516.
226.890	-1.27	1197.66	1191.53	44178.	66150.
226.800	-1.63	1195.86	1190.07	44178.	68689.
226.700	0.23	1194.90	1188.23	44178.	69284.
226.610	0.01	1191.83	1187.01	44178.	69810.
226.470	-1.35	1189.36	1180.25	44178.	74730.
226.350	-2.18	1186.28	1178.02	44178.	94548.
226.230	-1.65	1184.45	1175.95	44178.	93493.
226.130	-0.17	1182.95	1173.93	44178.	95096.
226.040	0.83	1181.17	1173.93	44178.	98152.
225.950	1.20	1180.76	1169.78	65892.	102014.
225.850	3.41	1179.45	1170.59	65892.	115351.
225.760	2.10	1178.17	1167.10	65892.	108086.
225.660	3.70	1176.92	1162.50	65892.	104675.
225.570	1.74	1176.09	1160.04	65892.	69502.
225.480	-0.91	1175.18	1160.59	65892.	71643.
225.380	1.67	1174.33	1166.80	65892.	83500.
225.280	0.03	1173.24	1163.76	65892.	77371.
225.190	-0.08	1172.72	1162.92	65892.	75889.
225.100	-0.11	1172.30	1162.89	65892.	76595.
225.000	2.17	1171.38	1164.17	65892.	90284.
224.900	4.40	1170.45	1165.40	65892.	83052.
224.810	0.24	1169.88	1161.24	65892.	53187.
224.710	-0.28	1169.15	1160.72	65892.	59514.
224.620	0.00	1167.73	1161.00	65892.	59514.

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TIME STEP # 23

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 6.000 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	-2.46	1203.28	1192.14	41870.	289609.
227.460	1.29	1202.80	1195.39	41870.	146527.
227.370	-0.24	1201.35	1193.76	41870.	143774.
227.270	-1.56	1199.72	1192.14	41870.	144310.
227.180	-4.67	1199.66	1189.83	41870.	64937.
227.080	-4.24	1199.17	1189.86	41870.	61757.
226.990	-0.93	1198.20	1192.77	41870.	58757.
226.890	-1.29	1196.38	1191.51	28072.	41009.
226.800	-1.65	1194.63	1190.05	28072.	42973.
226.700	0.25	1193.57	1188.25	28072.	40964.
226.610	0.01	1190.75	1187.01	28072.	41379.
226.470	-1.45	1187.92	1180.15	28072.	51933.
226.350	-2.36	1184.67	1177.84	28072.	69676.
226.230	-1.61	1182.73	1175.99	28072.	66960.
226.130	-0.05	1181.51	1174.05	28072.	59698.
226.040	0.71	1179.43	1173.81	28072.	68424.
225.950	1.26	1178.95	1169.85	41870.	61933.
225.850	3.30	1177.50	1170.47	41870.	74018.
225.760	2.21	1176.25	1167.21	41870.	63346.
225.660	3.75	1175.06	1162.55	41870.	58337.
225.570	1.91	1174.00	1160.21	41870.	42525.
225.480	-0.92	1173.22	1160.58	41870.	43615.
225.380	1.60	1172.30	1166.73	41870.	54372.
225.280	0.10	1171.19	1163.83	41870.	44884.
225.190	-0.04	1170.76	1162.96	41870.	41759.
225.100	-0.12	1170.40	1162.88	41870.	41882.
225.000	2.07	1169.59	1164.07	41870.	52085.
224.900	4.37	1168.56	1165.37	41870.	55425.
224.810	0.45	1167.89	1161.45	41870.	26074.
224.710	-0.30	1167.21	1160.70	41870.	29822.
224.620	0.00	1165.47	1161.00	41870.	29822.

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TIME STEP # 24

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 6.250 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	-1.98	1203.81	1192.62	41066.	17753.
227.460	0.68	1202.78	1194.78	41066.	65712.
227.370	-0.31	1201.33	1193.69	41066.	71515.
227.270	-1.64	1199.92	1192.06	41066.	78799.
227.180	-4.29	1199.56	1190.21	41066.	48081.
227.080	-4.28	1199.14	1189.82	41066.	51339.
226.990	-0.97	1198.14	1192.73	41066.	55035.
226.890	-1.31	1196.25	1191.49	27533.	38853.
226.800	-1.67	1194.58	1190.03	27533.	40350.
226.700	0.26	1193.53	1188.26	27533.	39113.
226.610	0.01	1190.69	1187.01	27533.	39138.
226.470	-1.55	1187.69	1180.05	27533.	49187.
226.350	-2.46	1184.58	1177.74	27533.	59597.
226.230	-1.60	1182.69	1176.00	27533.	58610.
226.130	-0.11	1181.30	1173.99	27533.	62365.
226.040	0.76	1179.39	1173.86	27533.	58387.

225.950	1.24	1178.82	1169.83	41066.	60450.
225.850	3.26	1177.46	1170.44	41066.	64067.
225.760	2.24	1176.20	1167.24	41066.	61381.
225.660	3.81	1175.03	1162.61	41066.	56140.
225.570	2.05	1173.90	1160.35	41066.	43527.
225.480	-0.94	1173.10	1160.56	41066.	44758.
225.380	1.56	1172.21	1166.69	41066.	50864.
225.280	0.16	1171.08	1163.89	41066.	42794.
225.190	-0.02	1170.64	1162.98	41066.	41287.
225.100	-0.11	1170.28	1162.89	41066.	41159.
225.000	2.01	1169.52	1164.01	41066.	46827.
224.900	4.33	1168.54	1165.33	41066.	51403.
224.810	0.62	1167.82	1161.62	41066.	27566.
224.710	-0.32	1167.14	1160.68	41066.	29484.
224.620	0.00	1165.40	1161.00	41066.	29484.

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TIME STEP # 25

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 6.500 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	-1.88	1201.97	1192.72	26885.	12366.
227.460	0.53	1201.31	1194.63	26885.	23696.
227.370	-0.51	1199.87	1193.49	26885.	38774.
227.270	-1.69	1198.60	1192.01	26885.	42452.
227.180	-4.04	1198.17	1190.46	26885.	23102.
227.080	-4.29	1197.87	1189.81	26885.	23363.
226.990	-1.01	1197.08	1192.69	26885.	26794.
226.890	-1.34	1195.39	1191.46	18025.	19896.
226.800	-1.69	1193.74	1190.01	18025.	22155.
226.700	0.26	1192.60	1188.26	18025.	22653.
226.610	0.00	1189.95	1187.00	18025.	22872.
226.470	-1.58	1186.62	1180.02	18025.	26288.
226.350	-2.62	1183.37	1177.58	18025.	39177.
226.230	-1.56	1181.45	1176.04	18025.	36494.
226.130	-0.04	1180.38	1174.06	18025.	32293.
226.040	0.63	1178.26	1173.73	18025.	41657.
225.950	1.30	1177.64	1169.89	26885.	35998.
225.850	3.20	1176.13	1170.37	26885.	42984.
225.760	2.32	1174.88	1167.32	26885.	36104.
225.660	3.86	1173.74	1162.66	26885.	31941.
225.570	2.11	1172.43	1160.41	26885.	25855.
225.480	-0.94	1171.70	1160.56	26885.	26139.
225.380	1.51	1170.79	1166.64	26885.	34342.
225.280	0.23	1169.64	1163.96	26885.	24536.
225.190	0.00	1169.26	1163.00	26885.	22592.
225.100	-0.12	1168.96	1162.88	26885.	22731.
225.000	1.96	1168.30	1163.96	26885.	27938.
224.900	4.30	1167.32	1165.30	26885.	32193.
224.810	0.73	1166.56	1161.73	26885.	17187.
224.710	-0.33	1165.92	1160.67	26885.	18329.
224.620	0.00	1164.27	1161.00	26885.	18329.

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: STEP # 26

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 6.750 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	-1.83	1201.68	1192.77	26079.	13662.
227.460	0.45	1201.02	1194.55	26079.	19805.
227.370	-0.55	1199.73	1193.45	26079.	22637.
227.270	-1.71	1198.58	1191.99	26079.	24035.
227.180	-4.01	1198.08	1190.49	26079.	21854.
227.080	-4.29	1197.80	1189.81	26079.	22012.
226.990	-1.02	1197.02	1192.68	26079.	22958.
226.890	-1.36	1195.30	1191.44	17485.	17246.
226.800	-1.72	1193.67	1189.98	17485.	19185.
226.700	0.26	1192.54	1188.26	17485.	19196.
226.610	0.00	1189.90	1187.00	17485.	19248.
226.470	-1.70	1186.41	1179.90	17485.	31705.
226.350	-2.70	1183.23	1177.50	17485.	38576.
226.230	-1.50	1181.41	1176.10	17485.	34841.
226.130	-0.06	1180.17	1174.04	17485.	36114.
226.040	0.67	1178.23	1173.77	17485.	33254.
225.950	1.28	1177.54	1169.87	26079.	34782.
225.850	3.17	1176.07	1170.34	26079.	37861.
225.760	2.35	1174.84	1167.35	26079.	34768.
225.660	3.90	1173.69	1162.70	26079.	30823.
225.570	2.17	1172.33	1160.47	26079.	25341.
225.480	-0.94	1171.60	1160.56	26079.	25657.
225.380	1.46	1170.70	1166.59	26079.	32554.
225.280	0.33	1169.53	1164.06	26079.	17629.
225.190	-0.04	1169.14	1162.96	26079.	20717.
225.100	-0.12	1168.84	1162.88	26079.	21444.
225.000	1.92	1168.21	1163.92	26079.	25601.
224.900	4.26	1167.26	1165.26	26079.	29977.
224.810	0.82	1166.47	1161.82	26079.	17522.
224.710	-0.33	1165.84	1160.67	26079.	18376.
224.620	0.00	1164.21	1161.00	26079.	18376.

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TIME STEP # 27

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 7.000 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	-1.82	1201.31	1192.78	23782.	12296.
227.460	0.41	1200.69	1194.51	23782.	15746.
227.370	-0.58	1199.46	1193.42	23782.	18430.
227.270	-1.73	1198.30	1191.97	23782.	20259.
227.180	-3.99	1197.80	1190.51	23782.	18767.
227.080	-4.29	1197.55	1189.81	23782.	18661.
226.990	-1.02	1196.82	1192.68	23782.	19313.
226.890	-1.38	1195.13	1191.42	15945.	14893.
226.800	-1.74	1193.50	1189.96	15945.	16860.
226.700	0.27	1192.38	1188.27	15945.	15936.
226.610	0.00	1189.75	1187.00	15945.	15981.
226.470	-1.74	1186.08	1179.86	15945.	19759.
226.350	-2.84	1183.03	1177.36	15945.	31484.
226.230	-1.47	1181.19	1176.13	15945.	28939.
226.130	-0.06	1180.06	1174.04	15945.	28854.
226.040	0.61	1177.98	1173.71	15945.	33100.
225.950	1.32	1177.30	1169.90	23782.	30131.
225.850	3.14	1175.83	1170.31	23782.	33283.
225.760	2.38	1174.60	1167.38	23782.	30749.

225.660	3.94	1173.46	1162.74	23782.	27307.
225.570	2.22	1172.04	1160.52	23782.	22852.
225.480	-0.94	1171.33	1160.56	23782.	22781.
225.380	1.42	1170.46	1166.55	23782.	28928.
225.280	0.43	1169.24	1164.16	23782.	15812.
225.190	-0.07	1168.86	1162.93	23782.	18207.
225.100	-0.13	1168.57	1162.87	23782.	18398.
225.000	1.88	1167.97	1163.88	23782.	21947.
224.900	4.23	1167.05	1165.23	23782.	26052.
224.810	0.89	1166.24	1161.89	23782.	16183.
224.710	-0.34	1165.62	1160.66	23782.	16968.
224.620	0.00	1164.03	1161.00	23782.	16968.

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TIME STEP # 28

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 7.500 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	-1.81	1201.14	1192.79	22770.	11447.
227.460	0.35	1200.53	1194.45	22770.	13600.
227.370	-0.62	1199.31	1193.38	22770.	15003.
227.270	-1.76	1198.19	1191.94	22770.	16051.
227.180	-4.01	1197.70	1190.49	22770.	16613.
227.080	-4.29	1197.45	1189.81	22770.	16840.
226.990	-1.04	1196.73	1192.66	22770.	17531.
226.890	-1.41	1195.01	1191.39	15266.	12829.
226.800	-1.77	1193.43	1189.93	15266.	13921.
226.700	0.26	1192.29	1188.26	15266.	14091.
226.610	0.00	1189.71	1187.00	15266.	13997.
226.470	-1.79	1185.85	1179.81	15266.	16499.
226.350	-2.87	1182.92	1177.33	15266.	17816.
226.230	-1.50	1181.08	1176.10	15266.	18915.
226.130	-0.20	1179.85	1173.90	15266.	22860.
226.040	0.56	1177.94	1173.66	15266.	24570.
225.950	1.26	1177.21	1169.85	22770.	27286.
225.850	3.09	1175.74	1170.27	22770.	29742.
225.760	2.40	1174.52	1167.40	22770.	28658.
225.660	4.01	1173.40	1162.81	22770.	25614.
225.570	2.30	1171.92	1160.60	22770.	22270.
225.480	-0.94	1171.20	1160.56	22770.	22249.
225.380	1.38	1170.37	1166.51	22770.	25687.
225.280	0.57	1169.11	1164.30	22770.	15344.
225.190	-0.09	1168.74	1162.91	22770.	16447.
225.100	-0.14	1168.45	1162.86	22770.	16878.
225.000	1.82	1167.87	1163.82	22770.	19998.
224.900	4.16	1166.97	1165.16	22770.	24022.
224.810	1.00	1166.14	1162.00	22770.	16219.
224.710	-0.34	1165.51	1160.66	22770.	16678.
224.620	0.00	1163.96	1161.00	22770.	16678.

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TIME STEP # 29

E SB-2: STATUS OF THE BED PROFILE AT TIME = 8.000 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	-1.82	1201.06	1192.78	22412.	11323.

227.460	0.33	1200.46	1194.43	22412.	12236.
227.370	-0.66	1199.24	1193.34	22412.	13657.
227.270	-1.79	1198.12	1191.91	22412.	14787.
227.180	-4.03	1197.63	1190.47	22412.	15900.
227.080	-4.30	1197.39	1189.80	22412.	16067.
226.990	-1.05	1196.66	1192.65	22412.	16479.
226.890	-1.43	1194.95	1191.37	15026.	12153.
226.800	-1.79	1193.36	1189.91	15026.	13286.
226.700	0.28	1192.24	1188.28	15026.	12772.
226.610	0.00	1189.68	1187.00	15026.	12791.
226.470	-1.87	1185.78	1179.73	15026.	17048.
226.350	-2.90	1182.85	1177.30	15026.	18294.
226.230	-1.48	1180.92	1176.12	15026.	17652.
226.130	-0.21	1179.76	1173.89	15026.	17976.
226.040	0.46	1177.85	1173.56	15026.	21123.
225.950	1.21	1177.12	1169.79	22412.	23567.
225.850	3.05	1175.72	1170.23	22412.	25696.
225.760	2.37	1174.54	1167.37	22412.	27181.
225.660	4.05	1173.41	1162.85	22412.	25376.
225.570	2.36	1171.87	1160.66	22412.	22261.
225.480	-0.94	1171.15	1160.56	22412.	22210.
225.380	1.36	1170.37	1166.49	22412.	23181.
225.280	0.68	1169.05	1164.41	22412.	15511.
225.190	-0.11	1168.67	1162.89	22412.	16232.
225.100	-0.14	1168.38	1162.86	22412.	16400.
225.000	1.78	1167.81	1163.78	22412.	18528.
224.900	4.10	1166.96	1165.10	22412.	22102.
224.810	1.08	1166.10	1162.08	22412.	16683.
224.710	-0.35	1165.47	1160.65	22412.	17019.
224.620	0.00	1163.93	1161.00	22412.	17019.

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TIME STEP # 30

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 8.250 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	-1.83	1200.79	1192.77	20936.	10133.
227.460	0.32	1200.21	1194.42	20936.	11012.
227.370	-0.69	1199.01	1193.31	20936.	13799.
227.270	-1.81	1197.90	1191.89	20936.	15764.
227.180	-4.01	1197.43	1190.49	20936.	13590.
227.080	-4.30	1197.20	1189.80	20936.	13820.
226.990	-1.05	1196.52	1192.65	20936.	14391.
226.890	-1.46	1194.81	1191.34	14037.	11889.
226.800	-1.82	1193.27	1189.88	14037.	13704.
226.700	0.29	1192.16	1188.29	14037.	12106.
226.610	0.00	1189.58	1187.00	14037.	12313.
226.470	-1.90	1185.58	1179.70	14037.	15046.
226.350	-2.98	1182.71	1177.22	14037.	21547.
226.230	-1.44	1180.77	1176.16	14037.	18968.
226.130	-0.20	1179.54	1173.90	14037.	18331.
226.040	0.47	1177.68	1173.57	14037.	17677.
225.950	1.19	1176.95	1169.77	20936.	19800.
225.850	3.02	1175.51	1170.20	20936.	23281.
225.760	2.37	1174.37	1167.37	20936.	23413.
225.660	4.06	1173.30	1162.86	20936.	22379.
225.570	2.38	1171.70	1160.68	20936.	21006.
225.480	-0.93	1170.99	1160.57	20936.	20342.

225.380	1.36	1170.24	1166.49	20936.	21419.
225.280	0.73	1168.85	1164.46	20936.	14984.
225.190	-0.11	1168.48	1162.89	20936.	14840.
225.100	-0.14	1168.20	1162.86	20936.	14721.
225.000	1.77	1167.65	1163.77	20936.	16099.
224.900	4.07	1166.84	1165.07	20936.	19501.
224.810	1.10	1165.96	1162.10	20936.	16194.
224.710	-0.35	1165.32	1160.65	20936.	16253.
224.620	0.00	1163.82	1161.00	20936.	16253.

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TIME STEP # 31

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 8.500 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	-1.84	1200.73	1192.76	20666.	10123.
227.460	0.31	1200.13	1194.41	20666.	10816.
227.370	-0.73	1198.97	1193.27	20666.	13556.
227.270	-1.84	1197.88	1191.86	20666.	15472.
227.180	-3.98	1197.41	1190.52	20666.	13269.
227.080	-4.30	1197.17	1189.80	20666.	13415.
226.990	-1.06	1196.49	1192.64	20666.	13993.
226.890	-1.49	1194.72	1191.31	13856.	11729.
226.800	-1.83	1193.23	1189.87	13856.	13318.
226.700	0.31	1192.14	1188.31	13856.	11988.
226.610	0.00	1189.55	1187.00	13856.	11993.
226.470	-1.93	1185.48	1179.67	13856.	14926.
226.350	-3.01	1182.64	1177.19	13856.	17085.
226.230	-1.44	1180.72	1176.16	13856.	17193.
226.130	-0.20	1179.54	1173.90	13856.	17272.
226.040	0.46	1177.61	1173.56	13856.	18570.
225.950	1.18	1176.88	1169.77	20666.	18683.
225.850	2.99	1175.47	1170.17	20666.	21734.
225.760	2.36	1174.35	1167.36	20666.	22403.
225.660	4.07	1173.29	1162.87	20666.	21812.
225.570	2.39	1171.64	1160.69	20666.	21278.
225.480	-0.93	1170.91	1160.57	20666.	20947.
225.380	1.36	1170.19	1166.49	20666.	19841.
225.280	0.76	1168.81	1164.49	20666.	14964.
225.190	-0.10	1168.43	1162.90	20666.	14781.
225.100	-0.14	1168.16	1162.86	20666.	14595.
225.000	1.75	1167.61	1163.75	20666.	15842.
224.900	4.05	1166.80	1165.05	20666.	19097.
224.810	1.13	1165.92	1162.13	20666.	15933.
224.710	-0.35	1165.28	1160.65	20666.	16234.
224.620	0.00	1163.80	1161.00	20666.	16234.

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TIME STEP # 32

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 9.000 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	-1.86	1200.65	1192.74	20174.	9510.
227.460	0.30	1200.06	1194.40	20174.	10001.
227.370	-0.77	1198.90	1193.23	20174.	11406.
227.270	-1.87	1197.83	1191.83	20174.	12554.

227.180	-3.98	1197.34	1190.52	20174.	12671.
227.080	-4.30	1197.12	1189.80	20174.	12807.
226.990	-1.07	1196.42	1192.63	20174.	13274.
226.890	-1.52	1194.67	1191.28	13526.	10122.
226.800	-1.86	1193.21	1189.84	13526.	11125.
226.700	0.31	1192.10	1188.31	13526.	11155.
226.610	0.00	1189.55	1187.00	13526.	11077.
226.470	-1.96	1185.40	1179.64	13526.	12701.
226.350	-3.04	1182.58	1177.16	13526.	13997.
226.230	-1.45	1180.67	1176.15	13526.	14087.
226.130	-0.23	1179.49	1173.87	13526.	15120.
226.040	0.41	1177.55	1173.51	13526.	16497.
225.950	1.16	1176.81	1169.75	20174.	17468.
225.850	2.95	1175.41	1170.12	20174.	19849.
225.760	2.33	1174.29	1167.33	20174.	21409.
225.660	4.08	1173.24	1162.88	20174.	21002.
225.570	2.40	1171.59	1160.70	20174.	20418.
225.480	-0.92	1170.89	1160.58	20174.	20219.
225.380	1.37	1170.18	1166.50	20174.	19364.
225.280	0.82	1168.75	1164.55	20174.	15179.
225.190	-0.10	1168.37	1162.90	20174.	14955.
225.100	-0.13	1168.09	1162.87	20174.	14803.
225.000	1.74	1167.54	1163.74	20174.	15326.
224.900	4.01	1166.76	1165.01	20174.	17533.
224.810	1.15	1165.87	1162.15	20174.	15981.
224.710	-0.35	1165.23	1160.65	20174.	16221.
224.620	0.00	1163.76	1161.00	20174.	16221.

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TIME STEP # 33

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 9.250 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	-1.88	1200.35	1192.72	18520.	8384.
227.460	0.29	1199.77	1194.39	18520.	8968.
227.370	-0.80	1198.62	1193.20	18520.	11633.
227.270	-1.89	1197.56	1191.81	18520.	13340.
227.180	-3.95	1197.08	1190.55	18520.	11093.
227.080	-4.30	1196.86	1189.80	18520.	11114.
226.990	-1.08	1196.19	1192.62	18520.	11633.
226.890	-1.54	1194.53	1191.26	12417.	9968.
226.800	-1.88	1193.08	1189.82	12417.	11653.
226.700	0.33	1191.97	1188.33	12417.	9758.
226.610	0.00	1189.42	1187.00	12417.	9948.
226.470	-1.99	1185.20	1179.61	12417.	12885.
226.350	-3.06	1182.43	1177.14	12417.	15008.
226.230	-1.43	1180.45	1176.17	12417.	14001.
226.130	-0.22	1179.25	1173.88	12417.	13534.
226.040	0.41	1177.37	1173.51	12417.	13977.
225.950	1.15	1176.59	1169.74	18520.	15291.
225.850	2.92	1175.16	1170.10	18520.	17567.
225.760	2.32	1174.06	1167.32	18520.	18422.
225.660	4.08	1173.04	1162.88	18520.	18512.
225.570	2.40	1171.37	1160.70	18520.	18164.
225.480	-0.92	1170.70	1160.58	18520.	17738.
225.380	1.37	1170.00	1166.50	18520.	17879.
225.280	0.85	1168.53	1164.58	18520.	14118.
225.190	-0.09	1168.15	1162.91	18520.	13328.

225.100	-0.13	1167.89	1162.87	18520.	13026.
225.000	1.74	1167.36	1163.74	18520.	13581.
224.900	3.99	1166.59	1164.99	18520.	16003.
224.810	1.16	1165.69	1162.16	18520.	14511.
224.710	-0.35	1165.06	1160.65	18520.	14657.
224.620	0.00	1163.63	1161.00	18520.	14657.

==

TIME STEP # 34

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 10.000 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
227.560	-1.93	1200.15	1192.67	17714.	7533.
227.460	0.26	1199.57	1194.36	17714.	8137.
227.370	-0.84	1198.48	1193.16	17714.	9016.
227.270	-1.92	1197.47	1191.78	17714.	9729.
227.180	-3.95	1197.01	1190.55	17714.	9748.
227.080	-4.31	1196.80	1189.79	17714.	9915.
226.990	-1.09	1196.15	1192.61	17714.	10309.
226.890	-1.58	1194.44	1191.22	11876.	7969.
226.800	-1.90	1193.01	1189.80	11876.	8700.
226.700	0.33	1191.92	1188.33	11876.	8589.
226.610	0.00	1189.36	1187.00	11876.	8505.
226.470	-2.07	1185.07	1179.53	11876.	11236.
226.350	-3.09	1182.33	1177.11	11876.	12034.
226.230	-1.43	1180.39	1176.17	11876.	11934.
226.130	-0.24	1179.20	1173.86	11876.	12268.
226.040	0.37	1177.25	1173.47	11876.	13021.
225.950	1.13	1176.47	1169.72	17714.	13593.
225.850	2.86	1175.05	1170.04	17714.	15735.
225.760	2.28	1173.95	1167.28	17714.	16972.
225.660	4.08	1172.95	1162.88	17714.	16983.
225.570	2.40	1171.28	1160.70	17714.	17036.
225.480	-0.91	1170.62	1160.59	17714.	16824.
225.380	1.37	1169.93	1166.50	17714.	16987.
225.280	0.91	1168.43	1164.64	17714.	13836.
225.190	-0.07	1168.05	1162.93	17714.	13244.
225.100	-0.12	1167.79	1162.88	17714.	12913.
225.000	1.74	1167.27	1163.74	17714.	12944.
224.900	3.94	1166.50	1164.94	17714.	15035.
224.810	1.18	1165.59	1162.18	17714.	14006.
224.710	-0.35	1164.96	1160.65	17714.	14089.
224.620	0.00	1163.57	1161.00	17714.	14089.

$$END

0 DATA ERRORS DETECTED.

TOTAL NO. OF TIME STEPS READ = 34
TOTAL NO. OF WS PROFILES = 34
ITERATIONS IN EXNER EQ = 51000

COMPUTATIONS COMPLETED
TIME = 0 HOURS, 0 MINUTES & 33.00 SECONDS

Appendix C

Bank Protection Design Criteria Documentation

DMJM
31802
300.11
500.11.1, 800

FLOOD CONTROL DISTRICT
of
Maricopa County

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

D. E. Sagramoso, P.E., Chief Engineer and General Manager

TE RECEIVED FEB 25 1992

FEB 18 1992

E. PAPAGO
SHB - Otto ?.
SLA
RS
JW
DM
JZ ME CH FILE 1
TM

Mr. Gary Robinson, P.E.
State Engineer
Arizona Department of Transportation
206 South 17th Avenue
Phoenix, Arizona 85007-3213

SUBJECT: Letter of Intent for Salt River South Bank Stabilization

Dear Mr. Robinson:

Enclosed are three copies of the Letter of Intent for the Salt River South Bank Stabilization with Exhibits A and B. Please sign all three copies and keep one copy for your records. We will provide one copy to the City of Tempe and keep the last copy for our records.

We appreciate all of the work and cooperation that ADOT's staff has provided in the channelization of the Salt River. Now that the Letter of Intent has been signed, we need to write the Intergovernmental Agreement to allow the transfer of funds to ADOT for the field exploration work. I've been told that ADOT staff is preparing this document.

Should you have any questions, please contact me or Dick Perreault at 506-1501.

Sincerely,

Stanley L. Smith

Stanley L. Smith, Jr., P.E.
Acting Chief Engineer and General Manager

Enclosures

RECEIVED
FEB 20 1992
Urban Highways Section

DMJM
EAST PAPAGO PROJECT
FEB 24 1992
RECEIVED ☐ SENT ☐

LETTER OF INTENT

SALT RIVER SOUTH BANK STABILIZATION

The Arizona Department of Transportation (ADOT) has been closely coordinating with the City of Tempe and the Flood Control District of Maricopa County (FCDMC) for the design and construction of the East Papago Freeway. Cooperative agreements have been implemented and the majority of the freeway and associated Salt River Channelization features, west of the Indian Bend Wash Outlet Channel, have been constructed or will be completed in the near future. The challenge that now requires all of our efforts involves that portion of the freeway east of McClintock Drive, lying predominantly outside of Tempe corporate boundaries.

During the last year, ADOT has negotiated an "Agreement and Covenant Not to Sue" (Region 9 Docket No. 91-23) with the Environmental Protection Agency (EPA) that allows ADOT to construct the freeway through the South Indian Bend Wash Superfund Site without incurring future liability beyond the freeway rights-of-way. In accordance with guidance and direction from EPA, ADOT has applied for a Section 404 Permit with the U.S. Army Corps of Engineers (COE). The permit application included 100-year level protection for the north and south river banks east of the Price Road alignment; 10-year protection along the north bank between Price Road and McClintock Drive, and no protection to the south bank west of the Pima/Red Mountain Freeway Traffic Interchange (T.I.) to McClintock Drive. Tempe and the FCDMC have provided written responses to the COE expressing concerns that the proposed construction does not provide any protection to approximately 4000 linear feet of the south bank and does not preclude the potential of a 100-year flood from overtopping McClintock Drive.

ADOT, the City of Tempe, and the FCDMC agree to work together to resolve the concerns for construction in the Salt River east of McClintock Drive and agree to support the timely construction of the East Papago Freeway to the Pima/Red Mountain T.I. An agreed upon goal of the three parties is the construction of 100-year protection for the north and south banks between McClintock Drive and the T.I. (See Exhibit "A", attached hereto and made a part hereof). The parties understand that ADOT's participation in this effort is subject to the EPA's written concurrence, and that ADOT's liability will be no greater than that specified in the "Covenant Not to Sue", and the parties agree to aggressively pursue such concurrence. The parties further acknowledge that participation by the FCDMC and the City of Tempe will be subject to ratification and agreement by the FCDMC Board of Directors and the Tempe City Council, respectively.

ADOT, at its own expense, has conducted extensive geotechnical testing and analyses of an alignment along the south bank that would be sufficient to construct 10-year level flood protection. In order to be able to construct 100-year level protection, additional geotechnical testing and environmental investigation is necessary. ADOT is willing to have this additional work performed under its direction. The terms included in this Letter of Intent define general provisions and responsibilities that the parties agree to in order to conduct the additional testing and analysis. An Intergovernmental Agreement shall be negotiated which defines the specific responsibilities of each party when the results of the additional testing and analysis have been reviewed. The present estimated costs of the approximately 4000 linear feet of 10-year to 100-year flood protection range from $3.8 million to $14.0 million.

TERMS OF THE LETTER OF INTENT:

1. ADOT will:

   a. Have additional geotechnical testing and environmental investigations performed which will provide the necessary information required to construct increased south bank flood protection from the 10-year to the 100-year level of protection. ADOT agrees to pay for up to one-third of the costs associated with the additional testing, which shall be deducted from ADOT's maximum $2.5 million commitment for south bank protection.

   b. Design the bank protection using criteria as shown on Exhibit "B", attached hereto and made a part hereof. The desired level of protection is 100-year; however, ADOT will design and construct a minimum of 10-year level of protection with 100-year toe-down protection, should higher levels of protection be impossible due to landfill considerations. The design shall include such features as necessary to create conditions such that the 100-year flood will not overtop McClintock Drive.

   c. Fund up to one-third of the additional testing costs, and the costs to acquire rights-of-way, design and construct the south bank protection subsequent to the date of this letter in an amount not to exceed $2.5 million.

   d. Construct the south bank protection with the earliest ADOT project possible, preferably with the adjacent south bank protection and/or the north bank protection.

   e. Acquire all necessary rights-of-way to construct the south bank protection and for operation and maintenance of the completed bank protection, provided that such purchases are covered under the provisions of the "Covenant Not to Sue". After construction has been accepted by the FCDMC, ADOT shall grant access to the FCDMC for operation and maintenance purposes. EPA cooperation shall be solicited such that the FCDMC will assume no responsibility for any existing contamination under the provisions of EPA's "Covenant Not to Sue".

   f. Coordinate with and seek the approval for all design and construction plans for all proposed channel/bank protection work with the jurisdiction having floodplain regulatory responsibility.

   g. Pay for the design and construction of the north bank levee between McClintock Drive and Loop 101L to the 100-year flood level of protection, when and if the corresponding south bank improvements are constructed. Costs for the design and construction of the north bank to the 100-year level of protection are in addition to ADOT's $2.5 million commitment for the south bank work.

2. The FCDMC staff will recommend to its Board of Directors the following. The FCDMC will:

   a. Support ADOT's Section 404 Permit Application based on ADOT's intentions stated above. The FCDMC will work closely with ADOT and the City of Tempe to achieve the desired 100-year level of protection for the Salt River east of McClintock Drive.

b. Reimburse ADOT for up to one-third of the additional costs incurred by ADOT for the additional geotechnical testing and environmental investigation necessary to increase the south bank protection from 10-year to 100-year.

c. Review, comment on and have right of approval on flood control features to be operated and maintained by FCDMC. The flood control features will be designed and constructed using FCDMC-provided criteria, as shown in Exhibit "B", attached hereto and made a part hereof, with the understanding that certain portions of the bank protection between McClintock Drive and Loop 101L may only be constructed to approximately the 10-year flood frequency elevation. The FCDMC will assist ADOT in the creation of conditions such that the 100-year flood will not overtop McClintock Drive.

d. Accept the operation and maintenance responsibility for flood control features constructed using FCDMC criteria between McClintock Drive and Dobson Road upon acceptance of easements or permits provided by ADOT or others that are clear of EPA Superfund liability.

e. Jointly cost-share with ADOT in the construction of 100-year protection for the approximately 4000 linear feet of south bank east of McClintock Drive. It is understood that ADOT's maximum commitment is $2.5 million. FCDMC cost-share may be as much as $11.0 million. If less than 100-year level of protection is the only feasible option, the FCDMC will match up to ADOT's maximum cost-share of $2.5 million for 10-year level of protection. Higher levels of protection will be paid for by FCDMC to a maximum commitment of $11.0 million.

f. Not hold ADOT or Tempe responsible for any future flood control operation and maintenance costs associated with the south bank protection or enhancements between McClintock Drive and Loop 101L once FCDMC has accepted operation and maintenance access.

g. Assist the City of Tempe in its application to the Federal Emergency Management Agency for revising the floodplain delineations of the Salt River through Tempe.

3. The staff of the City of Tempe will recommend to the City Council the following. Tempe will:

a. Support ADOT's Section 404 Permit Application based on ADOT's intentions, stated above.

b. Tempe's sole contribution towards the undertaking described in this LOI and any related obligations or requirements will be $250,000 to be used by ADOT for the additional geotechnical testing and environmental investigation necessary to increase the south bank protection from 10-year to 100-year.

c. Have the right to review and comment on all geotechnical testing results, environmental investigations and flood control features that could impact the Salt River Floodplain within the City. Tempe agrees to closely coordinate with ADOT and the FCDMC and shall provide any technical or environmental data that it has developed to the two entities.

This LOI will be incorporated into an Intergovernmental Agreement (IGA), ADOT File No. JPA 91-117, to be negotiated once conditions, costs, and design constraints are better defined, and the FCDMC staff and the City of Tempe staff will recommend to the Board of Directors and the City Council, respectively, that such an agreement be approved if it is consistent with this Letter of Intent. After this LOI is signed, ADOT will proceed with preliminary plans for geotechnical, and environmental investigations, concurrent with the preparation of an IGA. ADOT shall proceed and conduct the field investigation once all the parties have signed an IGA committing funds for the field investigation. The parties agree and understand that a second future IGA will be more comprehensive, and that in the event of conflict between the LOI and IGA, the terms of the IGA executed by the Board of Directors and the City Council will control.

I concur with the terms stated above in this Letter of Intent.

Robert P. Mickelson for 2/20/92
Gary Robinson, P.E. Date
State Engineer
Arizona Department
of Transportation

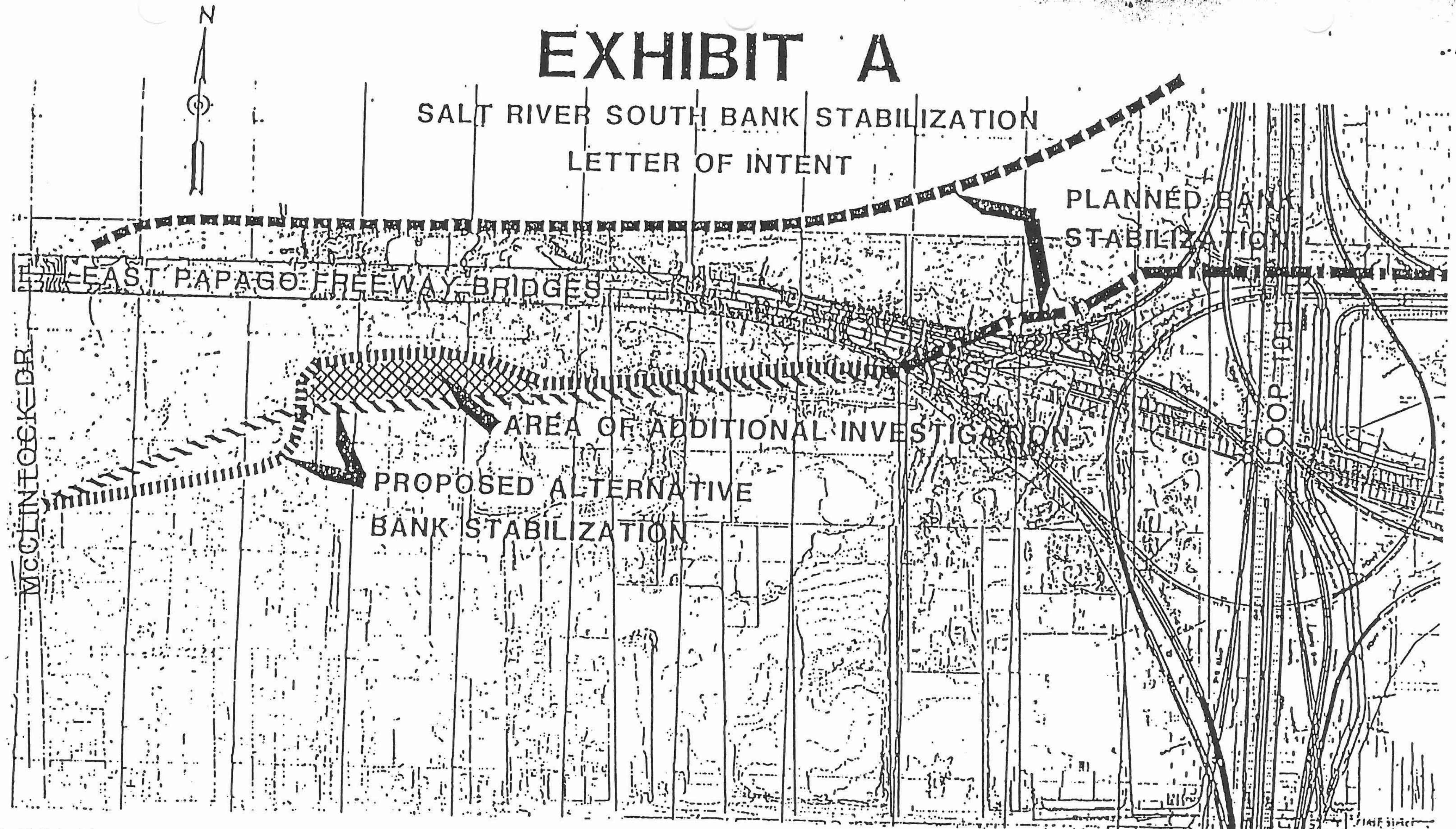
Gary R Brown Acting City Manager 2/20/92
Terry L. Zerkle Date
City Manager
City of Tempe

Stanley L. Smith 2-18-92
Stanley L. Smith, Jr., P.E. Date
Acting Chief Engineer and General Manager
Flood Control District of Maricopa County

EXHIBIT A

SALT RIVER SOUTH BANK STABILIZATION

LETTER OF INTENT



LEGEND

PROPOSED ALTERNATIVE SALT RIVER BANK STABILIZATION)

10 YEAR PROTECTION

100 YEAR PROTECTION

LEGEND

(PLANNED SALT RIVER BANK STABILIZATION)

10 YEAR PROTECTION

100 YEAR PROTECTION

EXHIBIT B

SALT RIVER CHANNEL DESIGN CRITERIA
UPSTREAM OF McCLINTOCK DRIVE

1. All geotechnical test results must be provided for District review. Gradation data should be available that is representative of the full depth of the moveable bed in this reach. The District's rule of thumb for bore hole/test pit intervals is one per 500 lineal feet. If an armoring analysis is to be presented for review, gradation test results for the channel bed samples should include the percentages of the 3 inch plus material encountered.

2. The geotechnical exploration must determine if landfill deposits are present within the channel alignment, and if so, their impacts on channel design and costs.

3. If the existing gravel pits are to be filled, gradation specs will be needed for the material that is to be placed in the moveable bed zone.

4. The channel should be designed with capacity for the current 100-year frequency peak flow with three feet of freeboard. The 100-year peak flow rate for this reach is 215,000 cfs. (This rate is 220,000 cfs upstream of Price Road). The freeboard requirement will provide a capacity in the channel approaching that of the Standard Project Flood peak flow with Modified Roosevelt Dam improvements in place and result in a consistent design with channelization immediately downstream. If design for 215,000 cfs is achievable only through unacceptably large impacts to known landfill wastes, the reach between McClintock Drive and the Pima Freeway is to be designed for, as a minimum, a flow rate that is necessary to contain a 10-year frequency flow along the south bank, and that precludes the 100-year frequency flow from overtopping McClintock Drive.

5. Tributary (side) drainage to the Salt River channel must be addressed consistent with ADOT criteria which state that the more severe of the following two conditions govern; (1) 100-year frequency peak in the main channel with 10-year frequency peak tributary drainage or (2) 10-year frequency peak in the main channel with 100-year frequency peak tributary drainage.

6. Consideration must be given to the upstream river and floodplain conditions and how those conditions may impact the proposed channel. Existing and potential material extraction and landfill operations must be addressed in this context. Overbank flooding upstream of the channelization must be analyzed to ensure that those flows enter and are contained within the improved channel.

7. Maintenance access and channel invert access ramps must be incorporated into the design.

8. The design and analysis will address the potential impacts of known future modifications that may be proposed by the City of Tempe and/or the Salt River Indian Community.

9. The location of cross sections used in the water surface profile calculations must be provided on a scaled map. Computer files must also be provided such that velocity, depth, HGL and EGL can be verified for each cross section.

10. The final plans shall include profiles showing the top of levee protection, HGL, invert, and the low chords for all bridges.

11. The scour analysis should be performed using an analytical approach, based on the velocity associated with the 100-year frequency peak flow of 215,000/220,000 cfs, the depth of the thalweg, and the D_{50} of the channel bed materials.

12. Degradation and aggradation analyses should include factors for dunes and antidunes.

13. The depth of scour, measured from the low-flow thalweg invert elevation, should be used to determine the toe-down elevations for bank protection and grade control structures based on the 100-year frequency peak flow of 215,000/220,000 cfs.

14. Local scour calculations shall be provided for District review if structures that are to be maintained by the District are affected by scour. These calculations are to be tabulated at all critical design locations and presented with a map showing the locations.

15. Levee slope stability analysis calculations must be submitted for District review. The analysis should consider pore pressures caused by rapid draw down.

16. All calculations performed in the design of riprap and filter materials for slope stabilization must be provided for District review.

17. All calculations should be independently checked by a person at least as competent as the designer before submitting them to the District. Both the designer and checker must initial and date each page of calculations that is submitted.

18. Minimum factors of safety for the project should be 1.5 based on the 100-year frequency peak flow of 215,000/220,000 cfs. If a tractive shear approach is used, the safety factor should be applied to the calculated tractive shear.

ATTACHMENT A

ANALYTICAL APPROACH FOR DETERMINING REQUIRED TOE DEPTHS FOR BANK PROTECTION ALONG SALT RIVER UPSTREAM OF McCLINTOCK DRIVE

The following analytical approach shall be utilized for determining required toe depths for bank protection along the Salt River upstream of McClintock Drive:

1. Contraction Scour (includes General Scour), in the vicinity of bridge crossings and river sections that have been contracted due to landfill encroachment shall be computed by methods described in Federal Highway Administration, FHWA, Hydraulic Engineering Circular Nos. 18 and 20, and other publications deemed appropriate for the 100-year frequency peak flow of 215,000/220,000 cfs. General scour for uncontracted reaches, is to be quantified by computer models for flows representing a hydrological history, as described in Item 3 below, and must be supplemented with hand calculations. For hand calculations, the 100-year frequency peak flow of 215,000/220,000 cfs is to be used.

2. Bed-form Scour, due to the passage of dunes or anti-dunes, shall be computed from analytical relationships developed by investigators such as Yalin and Kennedy, as described in textbooks on sediment/transport technology. The maximum hydraulic parameters associated with the passage of a 100-year frequency peak will be used to establish the quantitative values for this scour component.

3. Long-term Aggradation/Degradation shall be computed by using either the concept of equilibrium slope or the concept of streambed armoring, depending upon which approach controls the long-term channel profile of the Salt River upstream of McClintock Drive. The equilibrium-slope concept shall utilize a sediment/transport relationship which incorporates the D_{50} and gradation of the streambed sediments. The streambed-armoring concept shall utilize the critical-tractive-stress approach and the representative (armor) particle size. A series of flood frequency hydrographs from 10 to 100-year, should be used to represent the hydrologic history that the structure may experience in its life as a basis for determining these long-term trends. The "dominant" discharge will be the 10-year frequency discharge.

4. Once the scour components are quantified, as described in Items 1 through 3, they will be added together (i.e., as if they each act independently) to inherently incorporate a factor of safety of 1.2 to 1.3 in the estimate of Total Scour. This

value for the summed Total Scour will then be multiplied by an appropriate factor (approximately 1.3) to assure a final minimum factor of safety of 1.5 in accordance with Item 18 of Exhibit B.

5. Finally, the bank-protection toe depth shall be based on the scour depth established in Item 4 and shall everywhere be measured from the low-flow thalweg invert elevation in accordance with Item 13 of Exhibit B.

Any sediment analysis will have to consider the sediment load entering the study reach. If the hydraulic parameters are known upstream, flow depth, velocity and tractive shear, and the gradation of the streambed can be determined upstream, a practical estimate of the sediment load entering the study reach can be made.

Coding files as well as model documentation are to be made available to the District for review.

PA3 - DMJM - 03 25

FLOOD CONTROL DISTRICT
of
Maricopa County

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

AUG 1 1 1992

Mr. Thomas M. Monchak, P.E.
Project Manager
Daniel, Mann, Johnson & Mendenhall
300 West Clarendon Avenue, Suite 335
Phoenix, Arizona 85013

SUBJECT: Salt River Channel East of McClintock Drive - Bank Protection Toe-Down Depths

Dear Mr. Monchak:

The Flood Control District has reviewed its copy of the July 29, 1992 letter to you from Dennis L. Richards, of Simons, Li & Associates, Inc. (SLA), in which Mr. Richards presents recommendations and criteria for the establishment of bank protection toe-down depths in the vicinity of sand and gravel mining pits for the subject project.

The District is of the opinion that the recommendations and criteria presented by SLA are reasonable. They should be used in conjunction with the criteria outlined in Attachment A of the Letter of Intent for the final design of the levee protection being done by SLA.

If you have any questions, please call me or Warren Rosebraugh at 506-1501.

Sincerely,

Donald J. Rerick

Donald J. Rerick
Project Manager

Copies to: Dennis L. Richards, SLA
Michael Shapiro, DMJM
Steve Jimenez, ADOT/UHS

Simons, Li & Associates, Inc.
Water Resources & Civil Engineering Consultants

July 29, 1992

Mr. Thomas M. Monchak
Daniel, Mann, Johnson & Mendenhall
300 West Clarendon Avenue, Suite 335
Phoenix, Arizona 85013

RE: BANK PROTECTION TOE-DOWN DEPTHS IN THE VICINITY OF SAND AND GRAVEL MINING PITS

Dear Tom:

The recommendations presented herein relate to the establishment of bank protection toe-down depths for Section 6 of the East Papago Freeway, and the Red Mountain Traffic Interchange. Since there has been extensive in-stream sand and gravel mining in the reach of the Salt River between McClintock Drive and Dobson Road, longitudinal and lateral migration of the existing pits must be considered.

Upstream of the Pima Freeway crossing of the Salt River, sand and gravel mining setbacks have been established. No sand and gravel mining will be allowed within these setback distances. The recommended setback distances were developed utilizing results from 1) a research study completed in 1989 for the Arizona Transportation Research Center by SLA titled "Effects of In-stream Mining on Channel Stability"; and 2) a physical model study prepared for Anderson-Nichols by the Colorado State University (CSU) Engineering Research Center in 1980 titled "Investigation of Gravel Mining Effects, Salt River Channelization Project at Sky Harbor International Airport". The sand and gravel mining setback distance from the Pima Freeway structures is 1300 feet. The sand and gravel mining setback distance measured perpendicular to each bank of the proposed bank protection system is 300 feet.

For the reach of the Salt River between McClintock Drive and the Pima Freeway, no additional mining will be allowed. Grade-control Structure No. 5, located immediately downstream of the McClintock Drive bridge, will help provide vertical stability to this reach. Based on the available topography, the existing sand and gravel mining pits in this reach have depths as great as 40 feet (the depth of pit is the depth measured from the design channel invert to the low point in the pit). Bank protection toe-down depths must consider lateral migration of the pits where pits are located within 300 feet of the bank. It is expected that over time the

4600 South Mill Avenue, Suite 190 • Tempe, AZ 85282 • Phone: (602) 491-1393 • Fax: (602) 491-1396

existing pits will be filled by sediment supplied from upstream reaches. In those areas where there are existing pits adjacent to the bank, the design concept is to fill the pits to the design invert elevation for a horizontal distance of 150 feet measured perpendicular to the bank.

For this reach of the Salt River, there are three conditions to address with regards to lateral migration of sand and gravel mining pits. These three conditions are as follows:

1) Sand and gravel mining pits located within 150 feet of the bank (i.e., fill required adjacent to the bank). See Figure 1.
2) No sand and gravel mining pits located within 150 feet (i.e., fill not required adjacent to the bank), but sand and gravel mining pits located within 300 feet of the bank. See Figure 2.
3) No sand and gravel mining pits located within 300 feet of the bank. See Figure 3.

For the above outlined conditions, toe-downs will be based on the following:

1) Total Scour depth, as determined by the procedure outlined in Attachment A of the Letter of Intent, plus a lateral migration depth component. The toe-down depths will, at a minimum, extend three (3) feet below the point where the fill meets the existing channel invert.
2) Total Scour depth, as determined by the procedure outlined in Attachment A of the Letter of Intent, plus a lateral migration depth component.
3) Total Scour depth as determined by the procedure outlined in Attachment A of the Letter of Intent.

The criteria recommended for predicting the lateral migration depth is based on data from the CSU physical model study. This study indicates that the long-term lateral migration length for 40-foot pit depths are in the order of 300 feet. The CSU study found that for a 40-foot pit depth, the lateral migration depth was approximately 12.5 feet for a channel in which the low flow channel follows the natural thalweg. This depth is approximately 31% of the pit depth. The lateral migration depth decreases as the distance from the pit increases. As stated previously, the design concept for the proposed project is to fill the pits to the design invert for a horizontal distance of 150 feet. Based on this design concept and the data presented in the CSU report, it is recommended that the lateral migration scour component used for establishing toe-down depths be 1/4 the pit depth. Where fill is placed within 150 feet of the bank, the toe-down depths shall in all cases extend a minimum of three feet below the point where the fill slope meets the existing channel invert.

Should you have any questions regarding the recommended criteria for toe-downs, please feel free to contact me.

Sincerely,

SIMONS, LI & ASSOCIATES, INC.

Registered Professional Engineer (Civil)
CERTIFICATE NO. 21560
DENNIS L. RICHARDS
Date Signed 7-29-92
ARIZONA, U.S.A.

Dennis L. Richards

Dennis L. Richards, P.E.
Vice President

DLR:cia

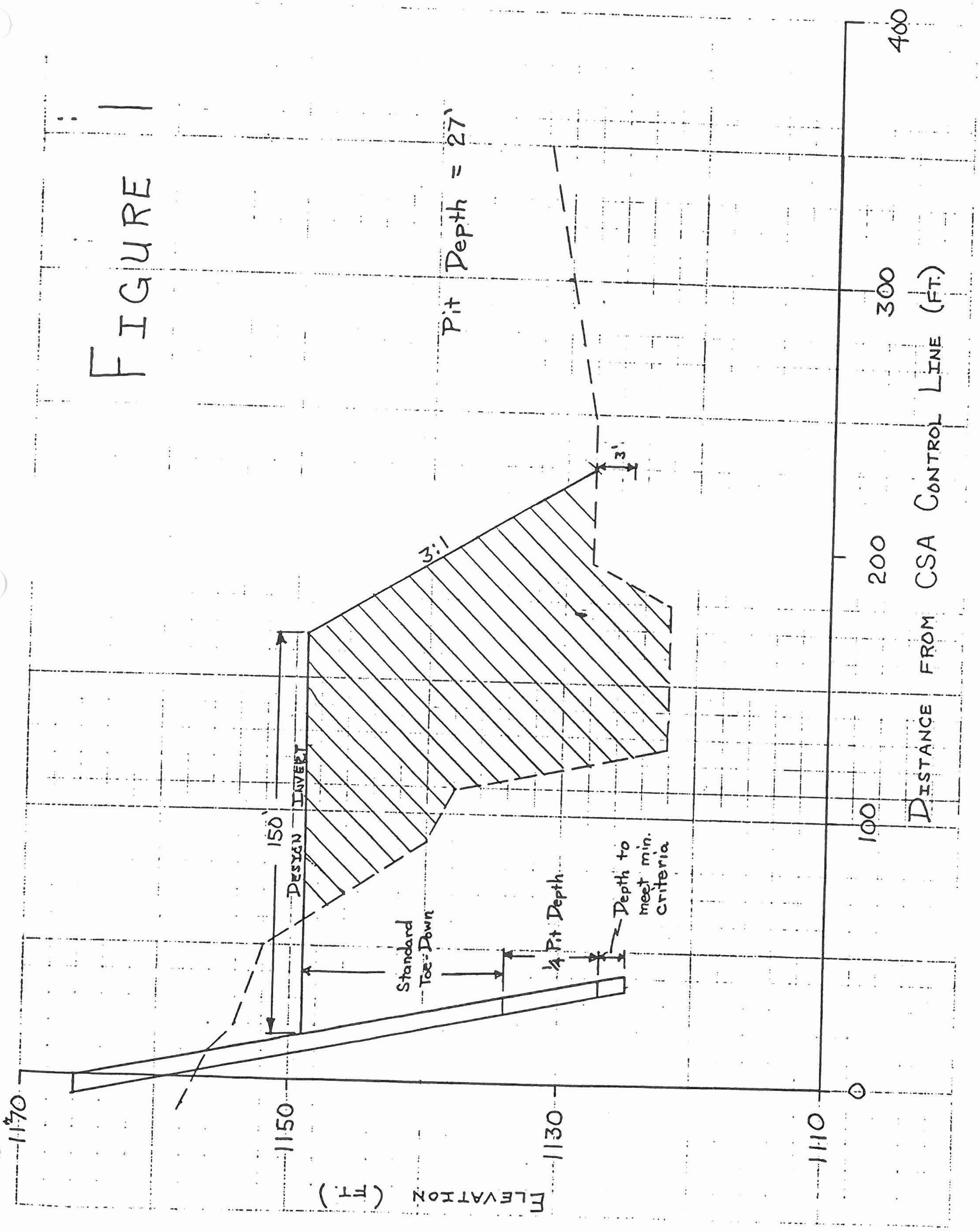
Attachments

cc: Ray Jordan, ADOT
Don Rerick, FCD

(PAZ-DMJM-03)

sla
SIMONS, LI & ASSOCIATES, INC.

CLIENT ____
PROJECT PAZ-DMJM-03
DETAIL ____
JOB NO. ____
DATE CHECKED ____
CHECKED BY ____
PAGE ____
DATE 7-28-92
COMPUTED BY ____



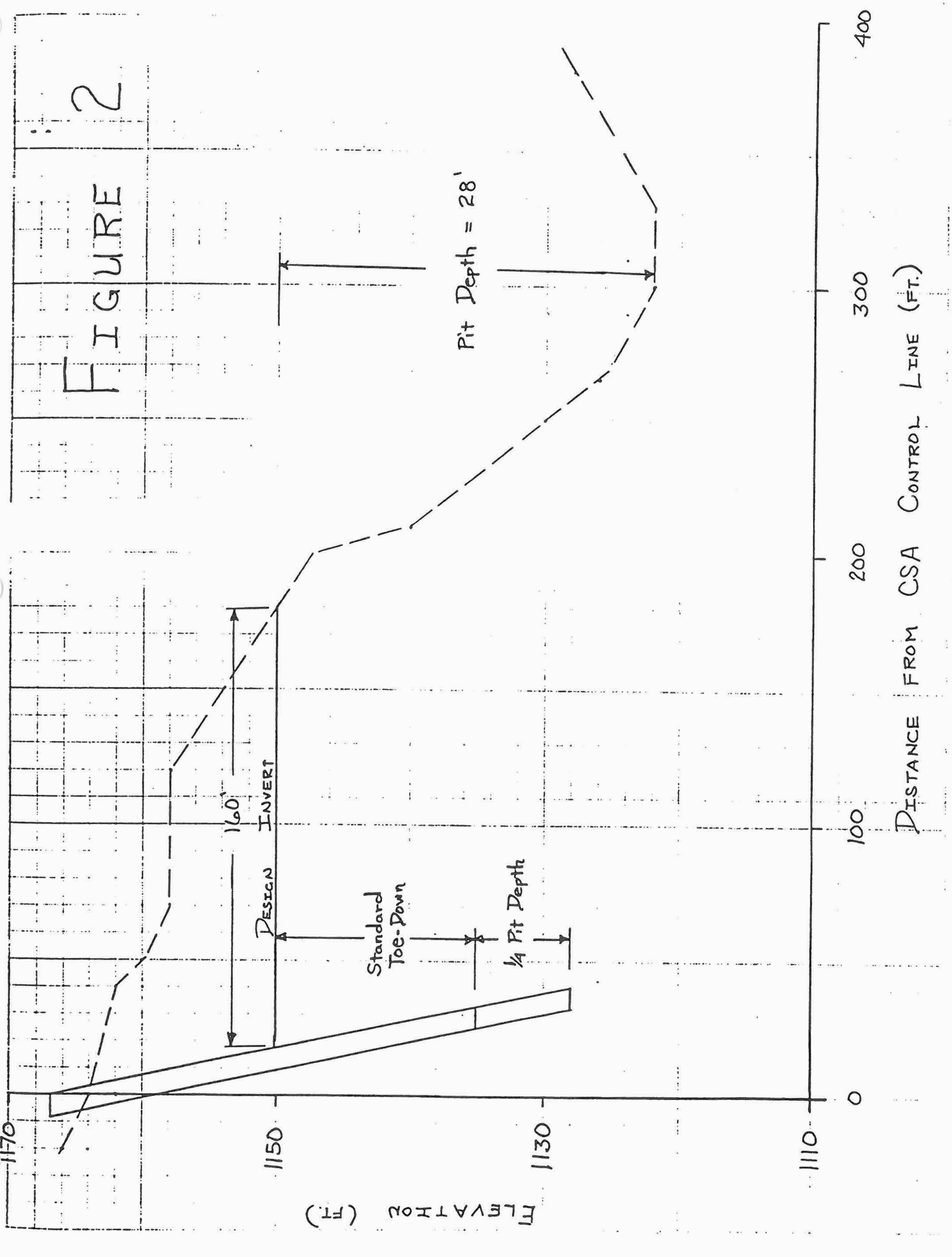

Pit Depth = 28'
160'
Design Invert
Standard Toe-Down
1/4 Pit Depth
0
100
200
300
400
Distance from CSA Control Line (ft.)
1170
1150
1130
1110
Elevation (ft.)

FIGURE 2

sla
SIMONS, LI & ASSOCIATES, INC.

CLIENT ______
PROJECT PAZ- DMJM-03
DETAIL ______

JOB NO. ______
DATE CHECKED ______
CHECKED BY ______

PAGE ______
DATE 7-28-92
COMPUTED BY ______

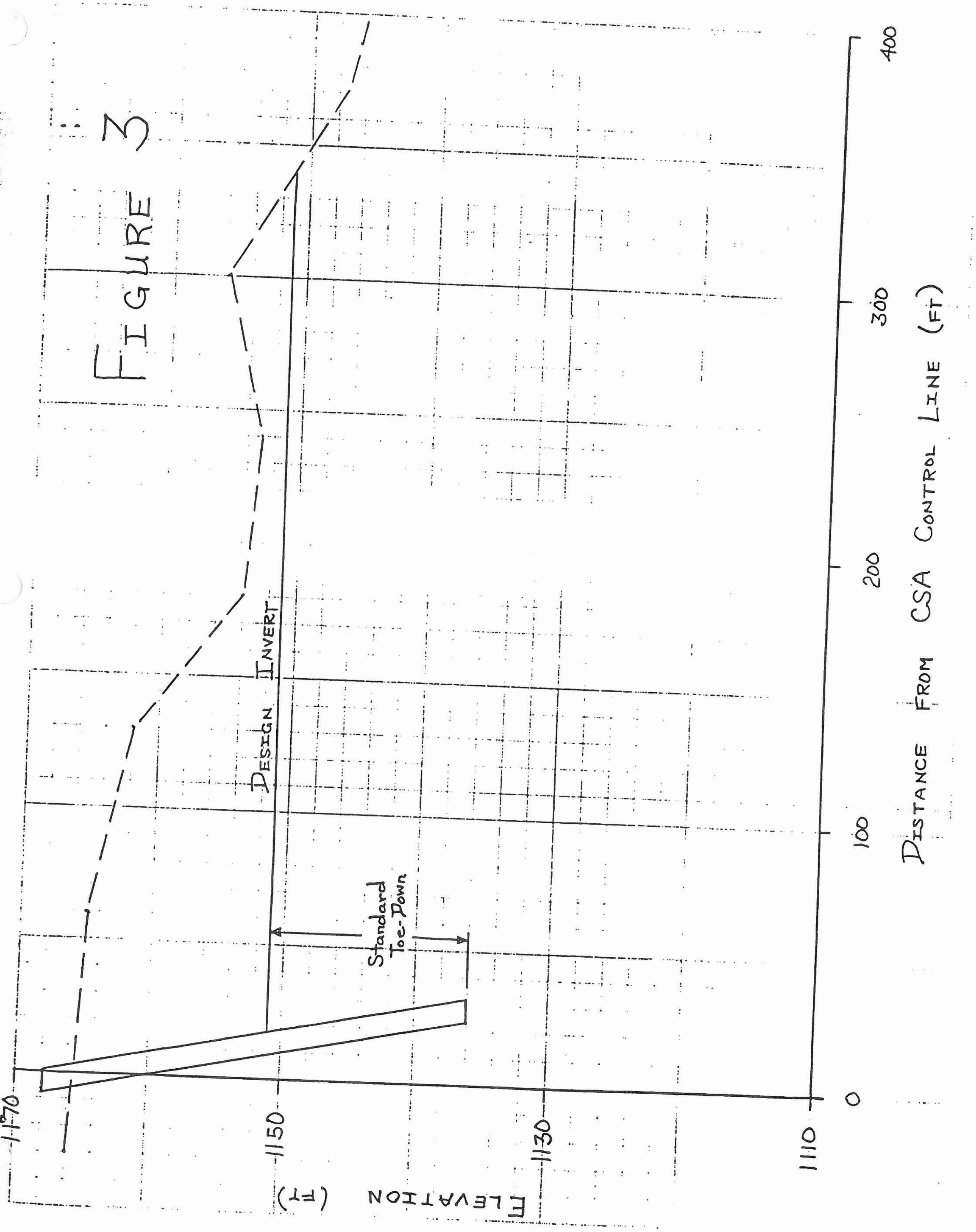


FIGURE 3