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Final Salt River Drainage Report

SR143/Sky Harbor Boulevard TI
Phoenix, Arizona

Prepared for:
Arizona Department of Transportation

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DATE SIGNED 2-25-2010
ARIZONA U.S.A.
Expires: 6/30/2012

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February 2010
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FINAL SALT RIVER DRAINAGE REPORT
FOR
SR143/SKY HARBOR BOULEVARD TI

ARIZONA DEPARTMENT OF TRANSPORTATION
Project No. 143 MA 02
TRACS No. H7528 01C

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FINAL SALT RIVER DRAINAGE REPORT

FOR

SR143/SKY HARBOR BLVD TI

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1.0 EXECUTIVE SUMMARY

This Final Salt River Drainage Report has been prepared by Kimley-Horn and Associates, Inc. (KHA) for the Arizona Department of Transportation. The report has been prepared in support of the proposed improvements associated with the State Route 143 (SR143)/Sky Harbor Blvd Traffic Interchange (TI) project. The overall project limits on SR143 are from MP 0.75 to MP 2.58.

The project will reconfigure the existing SR143/Sky Harbor Blvd TI to provide more efficient freeway-to-freeway directional ramps and consolidate the airport access to SR143 and Sky Harbor Blvd. The existing west to south loop ramp will be removed and a flyover ramp will be constructed to provide this access. Traffic to and out of Sky Harbor International Airport will be improved by the additions of an east to south ramp and a south to west ramp. The existing north to west ramp will be reconstructed with concrete pavement. The north to east ramp will remain as in existing conditions. Southbound SR143 will generally be widened by one lane between Washington Street and University Drive to support the new directional ramps. The Salt River Bridge will be widened to the west accordingly.

This report documents the hydrology and hydraulics of the flow in the Salt River, the scour analysis at the foundation of the SR143 Bridge, and the bridge deck drainage. A separate drainage report, titled "*Final On-Site Drainage Report for SR143/Sky Harbor Blvd TI" (KHA, February 2010)*, has been prepared to address onsite roadway drainage.

2.0 INTRODUCTION

2.1 Authorization

This drainage report was prepared by Kimley-Horn and Associates, Inc. (KHA) for the Arizona Department of Transportation (ADOT) in support of the proposed improvements associated with the SR143/Sky Harbor Blvd TI project.

2.2 Purpose

This report has been prepared in support of the drainage design associated with the final stage plan documents. In particular, this report has been prepared in support of the proposed improvements (widening) to the existing Salt River Bridge at State Route 143 (SR143). This report updates the drainage report prepared for stage III of the project and incorporates the corresponding review comments and resolutions. A copy of these comments is included in **Appendix I**. The corresponding report for Stage II (30%) documents was prepared by J2 Engineering and Environmental Design LLC (Ref. 5).

A separate drainage report, titled "*Final On-Site Drainage Report for SR143/Sky Harbor Blvd TI" (KHA, February 2010)*, has been prepared to address onsite roadway drainage.

2.3 Project Description

SR143 is a six-lane barrier divided freeway and Sky Harbor Blvd is a six lane major arterial roadway. The existing SR143/Sky Harbor Blvd TI features ramps from westbound Sky Harbor Blvd to southbound SR143 (Ramp W-S), from northbound SR143 to westbound Sky Harbor Blvd (Ramp N-W), and from northbound SR143 to eastbound Sky Harbor Blvd (Ramp N-E).

The proposed improvements consist of constructing new ramps from eastbound Sky Harbor Blvd to southbound SR143 (Ramp E-S), from westbound Sky Harbor Blvd to southbound SR143 (Ramp W-S), and from southbound SR143 to westbound Sky Harbor Blvd (Ramp S-W). Ramps W-S and E-S will join prior to merging with southbound SR143. Existing Ramp W-S will be removed, existing Ramp N-E will be retained, and exiting Ramp N-W will be reconstructed with concrete pavement. SR143 will be widened at the north and south ends to accommodate the new access ramps. In addition, southbound SR143 will be generally widened by one lane between Washington Street and University Drive to accommodate the new directional ramps. Accordingly, the existing Salt River Bridge at SR143 (ADOT structure No. 2182) will be widened as described in the following section.

2.4 Overview of the Salt River Bridge Improvements

The width of the existing Salt River Bridge at SR143 ranges from approximately 117 feet at the south side (main line) to 161 feet at the north side (main line and ramps). The bridge is supported by two abutments and eight pier bents, aligned with the river flow

direction. Excerpts from the as-built plans that show the subject bridge are included in **Appendix B**.

The abutments are located behind the river banks that were constructed with cement stabilized alluvium (CSA). The southern six pier bents contain four drilled shafts and the two northern pier bents contain five drilled shafts.

To accommodate the proposed TI improvements, the Salt River Bridge at SR143 will be widened to the west (downstream side) by approximately 15 to 46 feet. To accommodate the widened section, the southern seven pier bents will require one additional drilled shaft and the northern pier bent will require two additional drilled shafts. Therefore, six of the pier bents will contain five shafts, one will contain 6 shafts, and one will contain 7 shafts. The additional piers will have the same diameter as the existing piers, will be aligned with the existing piers, and will be at a similar distance from the protected river banks. Excerpts from the bridge plans that show the proposed improvements are included in **Appendix C**.

2.5 Scope

This report focuses on the hydrology and hydraulics of the flow in the Salt River, the scour analysis at the foundation of the SR143 Bridge, and the bridge deck drainage.

2.6 Location

The project limits on SR143 are from MP 0.75 to MP 2.58, located within the cities of Phoenix and Tempe. This segment is in ADOT's Phoenix construction district within Maricopa County in east central Arizona. A project location map **(Figure 1)** and a vicinity map **(Figure 2)** are provided in **Appendix A**.

3.0 SURVEY DATUM

The basis of vertical elevations for this project is from the National Geodetic Survey datasheet published for the following monuments:

Monument ID	NAVD 88 Elev.
1CG1	1154.10 ft
1BH1	1154.40 ft

Vertical elevations on the project plans will be presented based on the NAVD88 datum. Several referenced studies and plans with relevant data to this project were based on the NGVD29 datum. Where appropriate, the datum reference was indicated. The project survey team has established the following elevation equation to correlate elevations with different datum. The Stage III Salt River Bridge plans, prepared by Stanley Consultants Inc. **(Appendix C),** were based on the same conversion equation.

NAVD88 elevation (ft) = NAVD29 elevation (ft) + 1.92 ft

4.0 SALT RIVER HYDROLOGY AND HYDRAULICS (BEFORE THE SALT RIVER HYDRAULIC MASTER PLAN "HMP" STUDY)

The hydrology and hydraulics for the reach of the Salt River that includes the project site have been addressed in the drainage report prepared in support of Stage II (30%) plans (Ref. 5). A summary is presented in the following sub-sections. Additionally, section 5 of this report discusses a drainage study along the Salt River recently completed for the Flood Control District of Maricopa County (FCDMC). A conclusion on the selected design study for this project is discussed in section 5.

4.1 Salt River Hydrology

The hydrologic analysis of the Salt River was initially presented in a drainage study titled "Gila River and Tributaries – Hydrology Report" that was prepared by the US Army Corps of Engineers (USACE) in May of 1982 (Ref. 7). A subsequent study (Ref. 8) was also prepared by the USACE to evaluate the impact of implemented modifications to Roosevelt Dam on the magnitude of the flow in the Salt River. These two studies provided the best available hydrologic data in the Salt River for pre- and post-Roosevelt dam modifications. A summary of selected flows from these studies, which were estimated at the Mill Avenue Bridge and considered applicable for the project site, are provided in **Table 1**. The Mill Avenue Bridge is approximately 2.2 miles upstream of the project site. The existing Salt River Bridge and bank protection were designed based on pre-dam modifications flows. The Flood Control District of Maricopa County (FCDMC) indicated that the Salt River channelization at SR143 was based on the pre-Roosevelt dam modifications Standard Project Flood (SPF) and that the hydraulic analysis should include this flow to evaluate the impact on channel capacity.

Table 1. Salt River Discharges at the Mill Avenue Bridge

Return Interval (Years)	Pre-Roosevelt Dam Modifications Flows (cfs)	Post-Roosevelt Dam Modifications Flows (cfs)
10 – year	93,000	55,000
50 – year	160,000	140,000
100 – year	215,000	169,000
500 – year	330,000	243,000
SPF	289,000	187,000

4.2 Salt River Hydraulics-Existing conditions

The existing hydraulic conditions along the reach of the Salt River that includes the project site is documented in the Flood Insurance Study (FIS) for Maricopa County, Arizona, and Incorporated Areas, Volume 7 of 16, revised July 19, 2001 (Ref. 9). This study is published by the Federal Emergency Management Agency (FEMA). The current

effective FIRM set for Maricopa County is dated September 30, 2005. The TI project site is located on FIRM panel 04013C2155G and 04013C2165H. Excerpts from these panels are shown on **Figure 3**. The corresponding 100-year water surface profile sheet from the FIS (sheet 283P) is included as **Figure 4**.

The hydraulic analysis in the FIS was based on the 100-year post-dam modifications flow. This flow was estimated to be 169,000 cfs at the location of Mill Avenue Bridge, approximately 2.2 miles upstream of the SR143 Bridge.

The project site is located within Reach 4 of the FIS hydraulic model of the Salt River. The SR143 is located between modeled cross-sections AR and AT (**Figure 3**). The HEC-RAS model for existing conditions along the Salt River has been addressed in the stage II drainage report (Ref. 5). This model was basically derived from the FIS model for river Reach 4. To allow the model to run in newer versions of the HEC-RAS program, minor modifications were implemented, which are mainly related to no-longer supported zero upstream distance coding at a bridge. These modifications were listed in the Stage II report (Ref. 5) as follows:

- At RS 224.21 (Loop 101 Bridge), the distance from the upstream cross section to the upstream face of the bridge was set to 1 foot.

- At RS 224.13 (Loop 101 Ramp Bridge), the distance from cross section 224.14 to 224.12 was changed from 86 feet to 87 feet.

- At RS 220.05 (Priest Road Bridge), the distance from the upstream cross section to the bridge was set to 1 foot

The output of the modified existing conditions model is included in **Appendix D**. The electronic models are included on a CD in **Appendix J**. **Table 2** shows the computed water surface elevations at the upstream face of the bridge (section 219.03).

4.3 Salt River Hydraulics-Proposed Conditions

The proposed conditions HEC-RAS model, as presented in the Stage II drainage report, was based on the existing conditions model and modified to incorporate the proposed width increase to the SR143 Bridge. The proposed improvements will add between 15 to 46 feet of width to the downstream side of the existing bridge (**Appendix C**). The width of the SR143 Bridge structure incorporated in the HEC-RAS model (RS 219.02) was extended an average of 20 feet downstream to account for these changes. All other model parameters, such as boundary conditions, design flow, and Manning roughness coefficients remained unchanged. The model output data is included in **Appendix E**. The electronic models are included on a CD in **Appendix J**. **Table 2** shows the computed water surface elevations at the upstream face of the bridge (cross section 219.03). The table reflects an insignificant increase of 0.05 feet for the 100-year storm under proposed conditions. Accordingly, the change to the floodplain and flood zone limits due to the project improvements will be insignificant in the defined channel, and no Letter of Map Revision (LOMR) from FEMA would be required.

The lowest top of bank at the upstream side of the SR143 Bridge **(Appendix B)** is at approximately 1135.7 feet (NGVD 29), and the lowest chord of the bridge is at approximately 1137.45 feet (NGVD 29). **Table 2** shows the freeboard available.

Table 2. Water Surface Elevations at the upstream face of the SR143 Bridge

	Exist[3]. Cond. WSE (NGVD29) (ft)	Prop[3]. Cond. WSE (NGVD29) (ft)	Difference in WSE (ft)	Freeboard[1] to Top of Bank Prop. Cond (ft)	Freeboard[2] to Min Deck Elev prop.Cond. (ft)	Exist[3]. Cond. WSE (NAVD88) (ft)	Prop[3]. Cond. WSE (NAVD88) (ft)
Before Salt River HMP							
100–year pre-dam modifications	1127.80	1127.85	0.05	7.85	9.60	1129.72	1129.77
500–year pre-dam modifications	1131.62	1131.67	0.05	4.03	5.78	1133.54	1133.59
SPF pre-dam modifications	1133.77	1133.82	0.05	1.88	3.63	1135.69	1135.74
Per Salt River HMP							
100–year pre-dam modifications	1126.36	1126.44	0.08	9.26	11.01	1128.28	1128.36
500–year pre-dam modifications	1130.25	1130.54	0.29	5.16	6.91	1132.17	1132.46
SPF pre-dam modifications	1132.44	1132.91	0.47	2.79	4.54	1134.36	1134.83

1: Minimum Top of Bank = 1135.7 ft (NGVD29)
2: Minimum Deck Elevation = 1137.45 ft (NGVD29)
3:NAVD88=NGVD29+1.92 ft

5.0 SALT RIVER HYDROLOGY AND HYDRAULICS (PER THE SALT RIVER HMP)

The Flood Control District of Maricopa County (FCDMC) has recently sponsored a drainage study titled "Salt River Hydraulic Master Plan (HMP)" to quantify and establish the design flows for the reach of the Salt River between the Interstate 10 (I-10) Bridge and Alma School Road Bridge. The study was conducted by Stantec Consulting, Inc. (Ref. 6). A copy of the study report has been provided to KHA by the FCDMC for review. As quoted from the HMP report, "the purpose of the Salt River Hydraulic Master Plan is to determine the maximum amount of flow that can be conveyed between the levees along the Salt River from the Interstate 10 Bridge to Alma School Road Bridge. This information will be used by the cities, communities, and agencies for the design of future projects, as well as to regulate encroachments or improvements within the subject reach of the Salt River". The provided copy of the HMP report has been reviewed to evaluate any potential impact to the SR143 Bridge and adjacent areas.

The river hydrology discussed in the Salt River HMP referenced the same USACE hydrologic study (Ref. 8) indicated in Stage II drainage report. Excerpts from the HMP, including a summary table of peak flows, are included in **Appendix F1**. These peak flows, which are identical to the flows listed in **Table 2**, are summarized in **Table 3**.

Table 3. Summary of Peak Discharges

	Discharge Frequency Values							
Location	5-Yr (cfs)	10-Yr (cfs)	20-Yr (cfs)	50-Yr (cfs)	100-Yr (cfs)	200-Yr (cfs)	500-Yr (cfs)	SPF (cfs)
Pre-Roosevelt Dam Modifications								
Alma School Road	44,000	100,000	139,000	170,000	230,000	285,000	345,000	292,000
Mill Avenue	40,000	93,000	135,000	160,000	215,000	275,000	330,000	289,000
Post-Roosevelt Dam Modifications								
Alma School Road	21,000	58,000	95,000	145,000	172,000	207,000	246,000	190,000
Mill Avenue	20,500	55,000	90,000	140,000	169,000	204,000	243,000	187,000

The HEC-RAS program was used in the HMP to analyze the hydraulic conditions along the Salt River. The project site is located between designated Reach numbers 3 and 4. The locations and numbers of the modeled cross sections appear to be generally consistent with those used in the FEMA study. The topography used in the analysis was compiled by the HMP consultant from different sources, and all converted to NGVD29 datum. HEC-RAS models were prepared for existing conditions and for a range of other conditions, including a proposed condition that incorporates the anticipated improvements to the SR143 Bridge. The models were executed on a range of pre- and

post-Roosevelt dam modifications peak flows. The corresponding flow containment conditions along the analyzed reach were documented and tabulated in the HMP report. Documentation excerpts are included in **Appendix F-1**. Excerpts from the HEC-RAS model for existing and proposed condition are included in **Appendices F-2 and F-3** respectively. The model output and tabulated data indicate that Reaches 3 and 4 of the river are capable of containing a wide range of modeled flows, including the 100-year and 500-year post-dam modifications flows, and the pre-dam modifications SPF.

Table 2 lists the water surface elevations for existing and proposed condition at the upstream face of the bridge (cross-section 219.04). The differences in water surface elevations at the upstream face of the bridge between the existing and proposed conditions were observed to be minor (approximately 0.08 feet for the 100-year storm). Accordingly, the change to the floodplain and flood zone limits due to the project improvements will be insignificant in the defined channel.

The water surface elevations in the HMP were observed to be lower than those based on the FEMA study. Additionally, it was observed that the river bed elevation of 1106.59 (NGVD29) feet at the SR143 Bridge (cross-section 219.04), as modeled in the HMP, is significantly lower than the corresponding elevation of 1112.90 (NGVD29) feet in the FIS model (cross-section 219.03).

6.0 DESIGN HYDRAULIC MODEL

As the HMP data represents the most current conditions in the studied reach, the proposed conditions data in the HMP was considered for the design in evaluating the hydraulics and scour potential for the SR143 Bridge.

7.0 BRIDGE SCOUR EVALUATION

The total scour depth was estimated in accordance with ADOT criteria (Ref. 1, 2 and 3). Additionally, the total scour depth was also estimated in accordance with the FCDMC approach. The FCDMC manages several elements along the Salt River, including river banks and levees. The FCDMC has been involved in reviewing the scour analysis for this project. Copies of accumulated county comments and resolutions are included in **Appendix I**. References used in the analysis include:

- ADOT Roadway Design Guidelines-Chapter 600 (Ref. 1), ADOT Bridge Hydraulic Guideline-ADOT Bridge Group (Ref. 2).
- ADOT Hydraulic Manual (Ref. 3).
- FHWA publication entitled Estimating Scour at Bridges "HEC-18" (Ref. 4).
- FCDMC Drainage Design Manual-Hydraulics (Ref. 10).

Bureau of Reclamation entitled Computing Degradation and Local Scour (Ref. 11).
ADOT requires that bridge foundations be designed to withstand the effect of the scour without failing during flow events up-to and including the 500-year storm event, and that the bridge remains fully functional and open to traffic for flow events up-to and including the scour design storm. If bridge overtopping occurs at less than the 500-year storm, the overtopping flow and its impact shall be also evaluated.

SR143 is classified by ADOT as Class I roadway. Accordingly, per table 603.2A of the ADOT Roadway Design Guidelines-Chapter 600 (Ref. 1), the applicable design storm for bridge flow conveyance is the 50-year event, and the required freeboard, between the lowest point of the super structure and the design water surface elevation is a minimum of 3 feet.

The reach of the Salt River in the vicinity of the project site is channelized and the banks are constructed with cement stabilized alluvium (CSA). **Table 2** indicates that adequate freeboard is available and that no bridge overtopping takes place for the listed storms, including the 500-year storm.

Scour analysis at the bridge location was evaluated for the 100-year and 500-year flows for post-Roosevelt dam modifications. Additionally, the scour analysis was evaluated for the SPF pre-dam modifications SPF (289,000 cfs). Per ADOT guidelines, the geotechnical analysis of the bridge foundations shall be performed on the basis that all stream bed material in the scour prism above the total scour line of the flood being considered has been removed and is not available for bearing or lateral support. The estimated scour depth should be accordingly incorporated in the total required depth of the proposed additional piers. The SR143 Bridge construction documents reflects a total applied scour depth of approximately 35 feet from the river thalweg (1112.90 ft) to the indicated scour elevation (1078.00 ft), both based on the NGVD29 datum. Detailed calculations could not be found for the original SR143 Bridge structure. Calculations for the total scour depth for the proposed additional piers are included in **Appendix G.**

The scour components applicable to the project location are: long-term aggradation/degradation, general scour, and local scour due to piers (pier scour). The abutments of the SR143 Bridge are located behind the hard banks and are not subject to scour. The low-flow channel incisement scour will be accounted for by measuring the scour depth from the already established low flow channel section (FCDMC recommended 1.0 ft). The bed forms effect is incorporated in the K3 factor of the utilized HEC-18 pier scour equation. No significant bed forms or dunes, however, are expected in this channelized reach of the Salt River since the flow is subcritical and the bed is armored by large cobbles and boulders.

7.1 Long-Term Degradation

Long term degradation is a measure of the change in streambed elevations due to natural and man-made causes and effects over long reaches of a watercourse. These changes take place over long periods of time and are not the result of a single flood event.

Several technical methods to evaluate long-term scour are documented in Reference 11, "Computing Degradation and Local Scour". The Schoklitch Method was utilized in this report. The method description and calculations are included in **Appendix G.** The long-term degradation analysis require the use of what is defined as the dominant flow, the flow that would generate the same effect on channels dimensions as the natural occurring flow. The 10-year frequency flow is typically used in Maricopa County as the dominant flow for long term scour estimates, and was considered in this report.

A sediment gradation is also required in the long-term scour equations. The Salt River sediment grain size distribution for this study, summarized in **Table 4**, was based on a representative gradation for the Salt River presented in a drainage report by Aztec Engineering titled "Initial Salt River and Indian Bend wash Drainage Report" (Ref. 13). This gradation was referenced in the Aztec report to earlier work on the Salt River by Simon Li and Associates (SLA) in 1977.

The average equilibrium slope per the Schoklitch Method was estimated to be 0.00216 ft/ft. The long-term degradation at a point is estimated relative to a physical downstream hard point (pivot point) that is scour resistant due to natural or manmade conditions. A grade control structure across the Salt River exists approximately 6749 feet downstream of the SR143 Bridge. This structure was considered the controlling downstream hard point for long term scour estimate at the SR143 Bridge. This structure was modeled as Cross-Section 217.76 in the HEC-RAS models of the HMP (Appendix F-3) with a bed elevation of 1091.10 feet (NGVD 29). The corresponding long term scour depth at the SR143 Bridge was estimated to be approximately 0.99 feet **(Appendix G)**.

The Stage II drainage report indicated that the Salt River bed profile reflects a sharp drop in the vicinity of the SR143 Bridge (**Figure 4**) and suggested incorporating a 5 to 6 feet of additional anticipated long term scour. Review of the river profile as modeled in the most current Salt River HMP study (**Appendix F**) shows that such drop no longer exists. Accordingly, the calculated scour depth is considered adequate.

Table 4. Salt River Characteristic Grain Size Distribution

Particle Size (mm)	Surface Material (% finer)
362.00	100
181.00	89
90.50	52
45.20	44
22.60	35
11.31	28
5.66	21
2.00	16
0.50	8
0.13	3

7.2 General/Contraction Scour

As defined in HEC-18, general scour at a bridge is the decrease in the elevation of the bed across the bridge opening. It may not have a uniform depth across the opening. Contraction scour is the most common form of general scour. Typically, contraction scour at a bridge location occurs where the bridge opening is less than the flow area of the upstream channel. The Salt River reach in the vicinity of the project site is uniformly channelized. The abutments are located outside the hard banks. Therefore, the channel flow area is only reduced by the size of the bridge piers.

The contraction scour was estimated by equations developed by Laursen as documented in HEC-18 (Ref. 4). Contraction scour can be controlled by clear water conditions or live bed conditions, depending on whether the critical velocity capable of transporting bed particles is lower than the upstream flow velocity (live bed) or higher (clear water). The applicable contraction scour depths were estimated to be 0.52 ft for the 100-year storm and 0.65 ft for the 500-year storm (**Appendix G**).

The FCDMC recommended estimating the general scour depth as the average of scour depths estimated by using Blench Equation and Lacey Equation (**Ref. 11**). The average general scour depths were estimated to be 6.47 ft for the 100 year storm and 7.99 ft for the 500-year storm (**Appendix G**). Additional discussion on the FCDMC approach for estimating general scour is provided in section 7.4 of this report.

Calculations sheets, with equations description, and summary tables, for each of ADOT and the FCDMC methods, are included in **Appendix G**.

7.3 Local Scour/Pier Scour

Local scour at a bridge involves the removal of material from around piers, abutments, spurs and embankments. It is caused by an acceleration of flow and resulting vortices induced by obstructions to the flow. Local scour is typically the largest component of scour at a bridge structure.

As indicated earlier, the abutments for the Salt River Bridge at SR143 are located outside the channel hard banks and are not subject to direct scouring forces. Local scour is only applicable to the bridge piers. The proposed additional piers will have the same diameter as the existing piers (6 ft) and will be aligned with the existing piers. Pier scour was estimated using the Colorado State University (CSU) method as documented in HEC-18. Potential debris build-up was considered in the pier scour estimate by adding a debris width at the pier, as reflected in the calculation sheets. The applicable pier scour depths were estimated to be 20.40 ft for the 100-year storm and 22.00 ft for the 500-year storm. Calculation sheets, with equations description, are included in **Appendix G.**

7.4 Total Scour

The total scour depth was estimated per each of ADOT and the FCDMC approach. Summary tables for each method and for the selected design scour depth are provided in **Appendix G.**

For ADOT approach, the total scour was estimated as the sum of individual applicable scour components.

For the FCDMC approach, and as indicated in the 30% drainage report and the corresponding county comments (**Appendix I**), the FCDMC suggests that if the summation of the applicable long term scour, general scour, bed form scour, and low-flow scour, all multiplied by a factor of safety of 1.3, is less than 10 feet (13 feet for curved channel), to use a minimum of 10 feet for that sum. This interpretation was referenced to the US Army Corps of Engineers practice. The FCDMC computes the total scour at a pier as the pier scour multiplied by a safety factor of 1.3 (1.0 if debris impact is considered in the pier scour depth) plus the higher value of 10 feet or the sum of the applicable long term, general, bed form, and low flow scour components, multiplied by a safety factor of 1.3. The impact of debris was considered in estimating pier scour for the SR 143 Bridge and therefore the applicable safety factor for pier scour is 1.0.

The design scour depths for the additional piers (30.40 ft for the 100-year storm and 33.69 ft for the 500-year storm), as shown on the Design Scour Depth table in **Appendix G**, were selected based on discussions and coordination with ADOT and the FCDMC. The bridge foundation design should assume the effective length of drilled shafts to begin at the bottom of the estimated scour hole and extend downward to satisfy other structural design elements, such as stable bearing pressure.

7.5 Impact of Pier Scour on Adjacent CSA Bank Protection

Copies of the bridge plan sheets that show the piers and river banks layout and related data are included in **Appendix B**. The proposed additional piers will be aligned with the existing piers. To evaluate the impact of the potential scour hole at the pier on the adjacent river banks, the radius of the scour hole top area was estimated per a method documented in HEC-18 for cohesionless bed material. The existing bank protection was originally designed for the 100-year pre-dam modifications flow and, therefore, the calculated 100-year scour was used to evaluate the scour hole impact on the banks. The method description and calculations are included in **Appendix G**. The radius of the scour hole top area was estimated to be approximately 40.3 feet. As reflected by supporting sketches in **Appendix B**, the scour does not reach the bank. Therefore, the proposed additional piers are not anticipated to increase scour risk to the existing hard banks, and no improvements to the banks would be required.

8.0 BRIDGE DECK DRAINAGE

Roadway drainage for the project site, including bridge deck drainage, is covered in a separate drainage report, titled "*Draft Final On-Site Drainage Report for SR143/Sky Harbor Blvd" (KHA, February 2010)*, that specifically addresses onsite roadway drainage. Drainage inlets have been sized and located to intercept the entire design storm water runoff before reaching the bridge deck. This section will address the drainage of the bridge deck itself.

Under existing conditions, both of the north and south bounds of the bridge deck drain through existing drains (round scuppers) that discharge directly into the Salt River below. The south bound of the bridge will be widened to the west to accommodate the proposed TI improvements. The existing deck drains along the south bound are generally spaced at intervals that do not exceed 100 feet. **Appendix B** includes a copy of the existing deck drain details. The proposed design provides similar drains at the edge of the widened section with similar spacing to maintain the existing drainage pattern. The bridge deck is anticipated to be subject to routine mechanical sweeping for maintenance. This practice can be considered an effective non-structural best management (BMP) measure to mitigate the water quality of discharged runoff. The maintained inlet spacing was verified through calculations based on a method presented in HEC-21 (Ref. 12). Based on the allowable spread of 18 feet, these calculations showed that the first inlet needs to be approximately 1564 ft from the northern end of the bridge. The total length of the bridge is approximately 1161 ft and therefore no inlet would be required along the bridge deck, and providing inlet spacing similar to the existing spacing is more than adequate. Calculation sheets are included in **Appendix H**.

9.0 HYDROPLANING

The hydroplaning phenomena can be described by the following quote: "As the depth of water flowing over a roadway surface increase, the potential for hydroplaning increases. When a rolling tire encounters a film of water on the roadway, the water is channeled through the tire tread pattern and through the surface roughness of the pavement. Hydroplaning occurs when the drainage capacity of the tire tread pattern and the pavement surface is exceeded and the water begins to build up in front of the tire. As the water builds up, a water wedge is created and this wedge produces a hydrodynamic force which can lift the tire off the pavement surface".

Hydroplaning potential can be evaluated by estimating the critical rainfall intensity at which value or higher hydroplaning may be a hazard. Design intensities should fall below this critical value, or appropriate measures, such as using a rougher surface or reducing design speeds, may need to be considered to lower the critical rainfall intensity. A method presented in HEC-21 (Ref. 12) was utilized to estimate the critical rainfall intensity applicable for the project at the corresponding design speed of 55 mile per hour. This value, based on selected method parameters assumed to be reasonable, was estimated to be 4.26 inch per hour. The 10-year design intensity for the project is a maximum of 3.42 inch per hour, associated with a minimum time of concentration of 10 minutes. Accordingly, hydroplaning does not appear to be a high risk under the design storm. The corresponding calculation sheets are included in **Appendix H**.

10.0 CONCLUSION

The Salt River HMP was considered the most current data available and the draft copy provided to KHA was considered for the design of this project. The design scour elevation of the existing piers, as reflected on the SR 143 Bridge construction plans, was also considered, supported by the scour analysis in this report, as the design scour elevation for the proposed additional piers. The estimated top width of the scour hole at the additional piers would not increase the scour risk to the existing hard banks and no bank improvements would be required. The proposed piers are aligned with the existing piers. The impact of the additional piers on the river water surface elevations would be insignificant (0.08 feet for the 100-year storm). The proposed deck inlet spacing, provided similar to the existing spacing, was shown to be adequate. The provided hydroplaning analysis indicates that hydroplaning would not be a high risk for this project during the design storm.

11.0 REFERENCES

1. Arizona Department of Transportation, *Roadway Design Guidelines*, March 1993
2. Arizona Department of Transportation, *Bridge Hydraulics Guidelines,* November 2007.
3. Arizona Department of Transportation, *Highway Drainage Design Manual, Hydraulics*, January 2007
4. HEC – 18, USDOT – FHWA, *Evaluating Scour at Bridges*, Fourth Edition, May 2001
5. J2 Engineering and Environmental Design, LLC, *SR143/Sky Harbor Blvd TI Initial Salt River Drainage Concept Report*, January 2009
6. Stantec Consulting Inc. *Salt River Hydraulic Master Plan (HMP)*, August 2009
7. US Army Corps of Engineers, Los Angeles District, *Gila River and Tributaries Hydrology*, May 1982
8. US Army Corps of Engineers, Los Angeles District, *Gila River Basin, Arizona, Section 7 Study for Modified Roosevelt Dam, Arizona*, March 1996.
9. *Flood Insurance Study*, Maricopa County Arizona and Incorporated Areas, Revised September 30, 2005.
10. Flood Control District of Maricopa County, *Drainage Design Manual, Hydraulics*, March 2009 (DRAFT).
11. Ernest L. Pemberton and Joseph M. Lara (Bureau of Reclamation), *Computing Degradation and Local Scour*, January 1984
12. Federal Highways Administration, *HEC-21, Design of Bridge Deck Drainage*, May 1993.
13. Aztec Engineering Inc, *Initial Salt River and Indian Bend Wash Drainage Report, October 2007.*

Appendix A Figures

Figure 1 Location Map
Figure 2 Vicinity Map
Figure 3 Flood Insurance Rate Map
Figure 4 FIS Study - Flood Profile

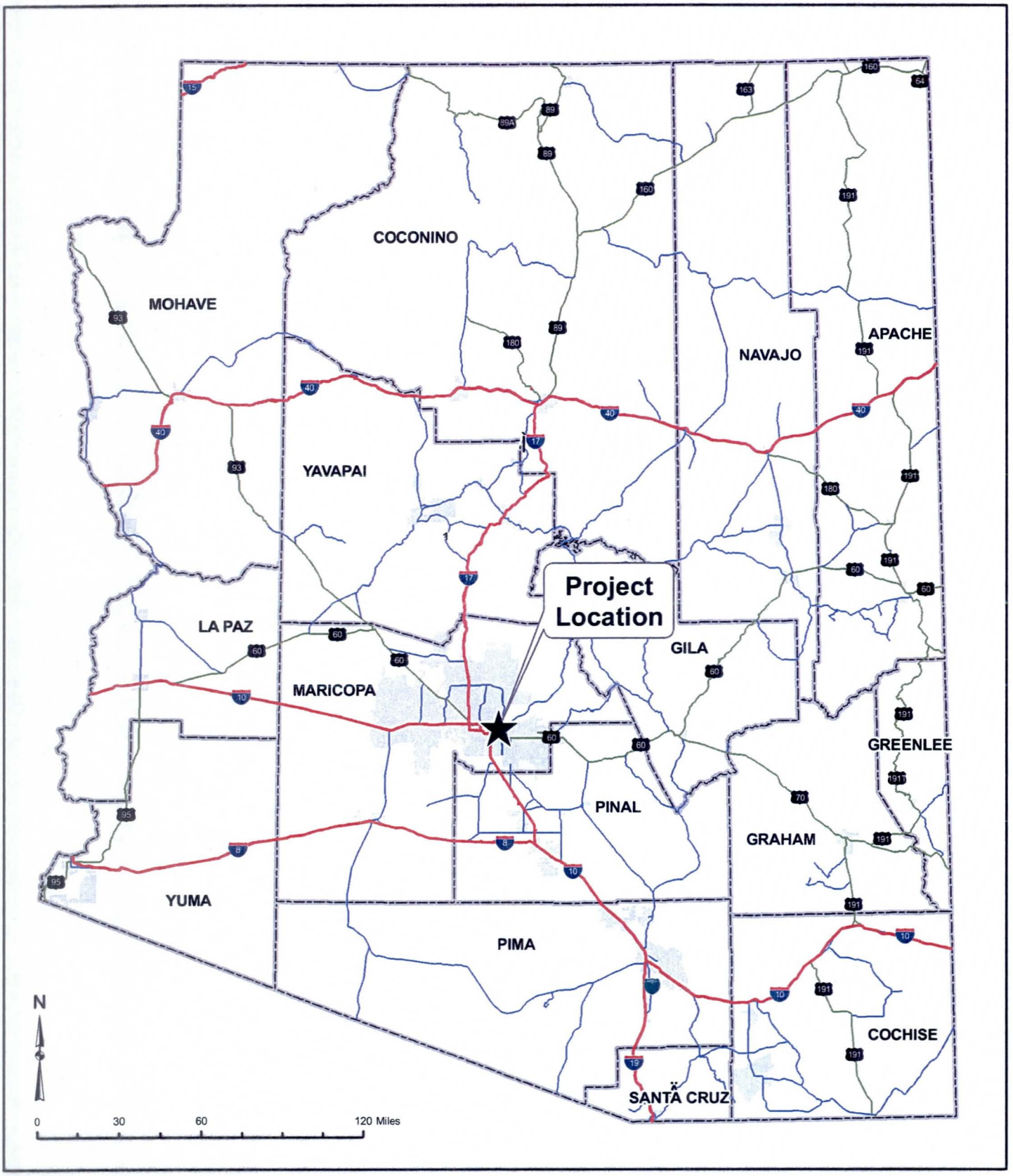


Figure 1. Project Location Map

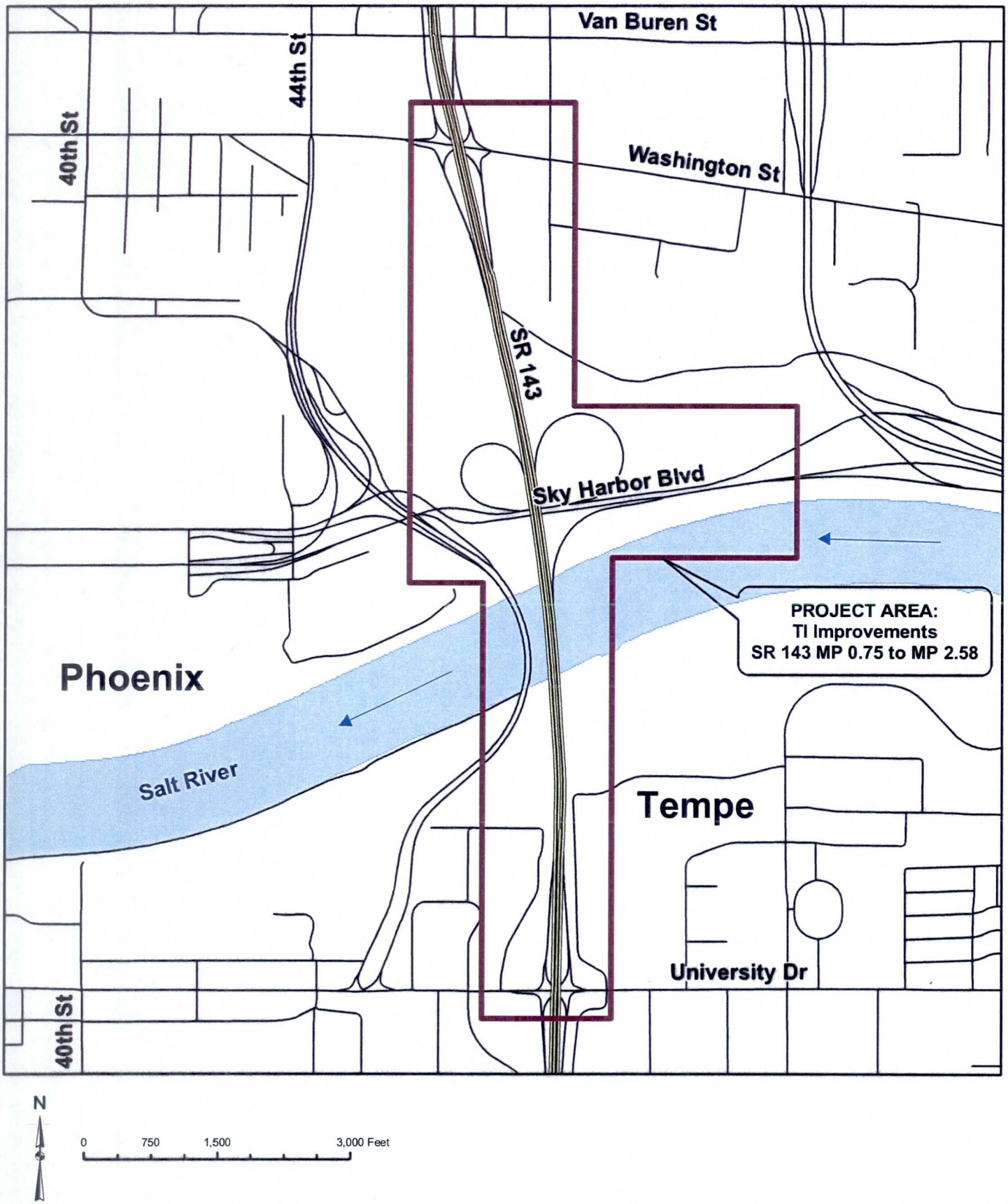
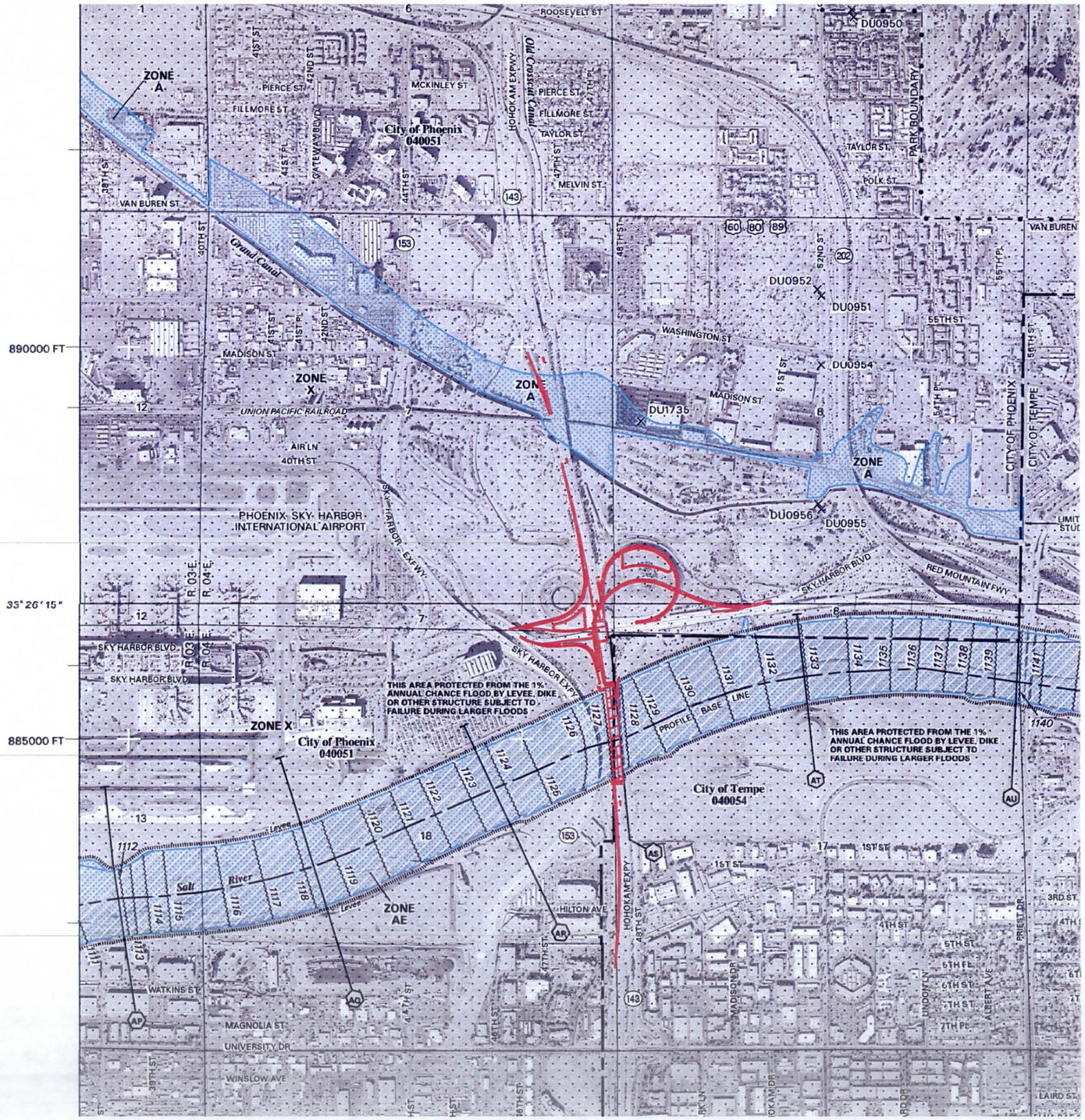


Figure 2. Project Vicinity Map



NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2155G

FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS

PANEL 2155 OF 4350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	2155	G
PHOENIX, CITY OF	040051	2155	G
SCOTTSDALE, CITY OF	045012	2155	G
TEMPE, CITY OF	040054	2155	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04013C2155G

MAP REVISED
SEPTEMBER 30, 2005

Federal Emergency Management Agency

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2165H

FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS

PANEL 2165 OF 4350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
GUADALUPE, TOWN OF	040117	2165	H
MARICOPA COUNTY	040037	2165	H
PHOENIX, CITY OF	040051	2165	H
TEMPE, CITY OF	040054	2165	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04013C2165H

MAP REVISED
SEPTEMBER 30, 2005

Federal Emergency Management Agency

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The **1% annual chance flood** (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The **Special Flood Hazard Area** is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The **Base Flood Elevation** is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones, and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the National Geodetic Vertical Datum of 1929

(A)——(A)	Cross section line
(2)------(2)	Transect line
112° 07' 08", 33° 25' 41"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4278000 FT E	1000-meter Universal Transverse Mercator grid tick values zone 12
875000 FT	5000-foot grid tick values: Arizona State Plane coordinate system, central zone (FIPSZONE 3176) NAD83 (Transverse Mercator)
×DV2313	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORY

Refer to Repositories Listing on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP

April 15, 1988

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

September 30, 1986, July 18, 2001

September 30, 2005 - to update corporate limits, to change Base Flood Elevations, to add Base Flood Elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to change zone designations, to add roads and road names, to incorporate previously issued Letters of Map Revision, and to incorporate previously issued Letters of Map Amendment.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

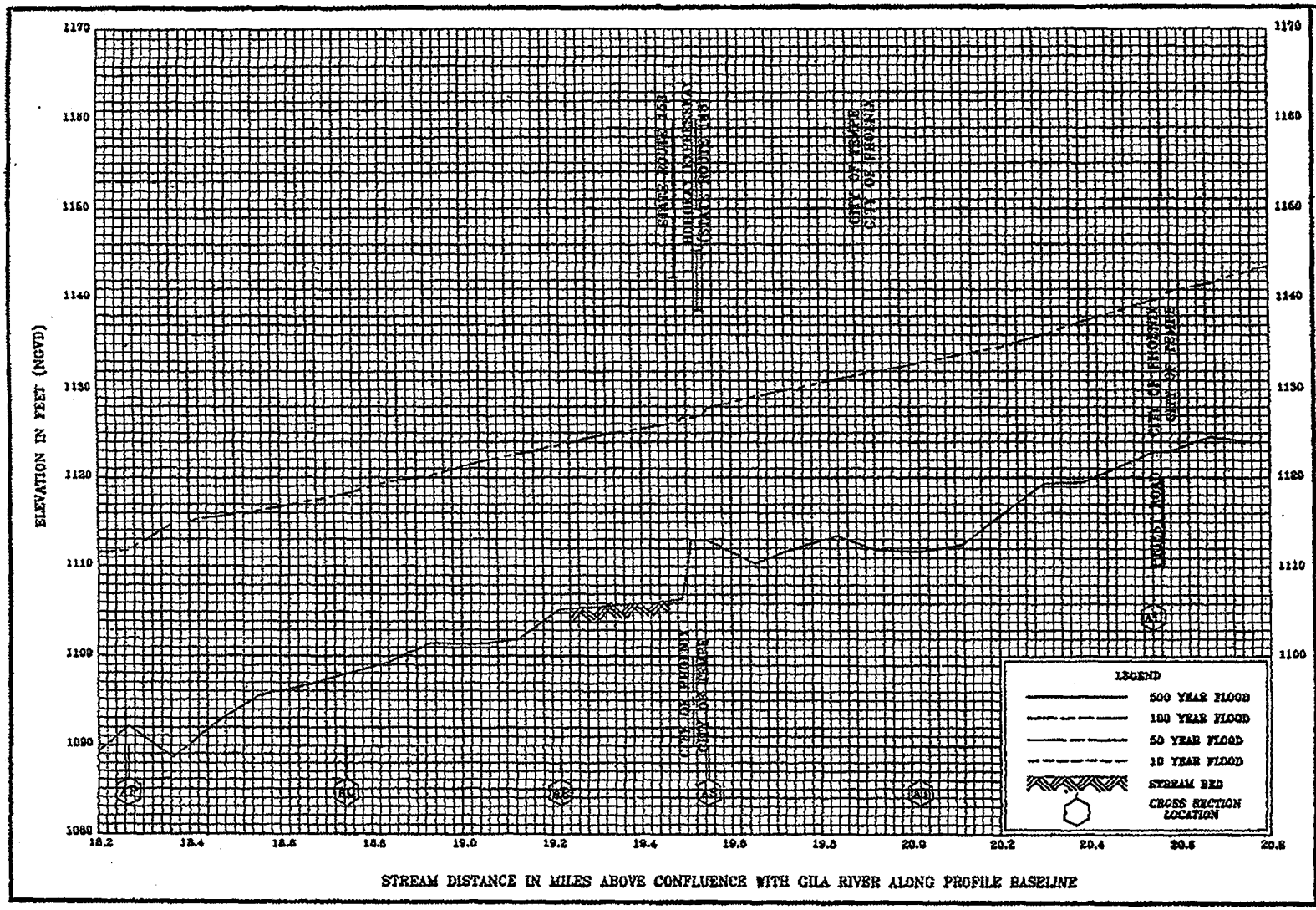
*To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

SR 143/SKY HARBOR BLVD TI	FEMA EFFECTIVE FIRM	FIGURE 3
		DATE PREPARED: 06-30-2009



FLOOD PROFILES

SALT RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

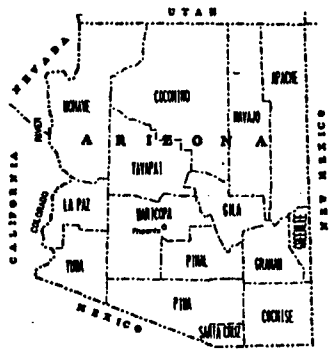
MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

283P

Figure 4

Appendix B As-built Plans for SR143



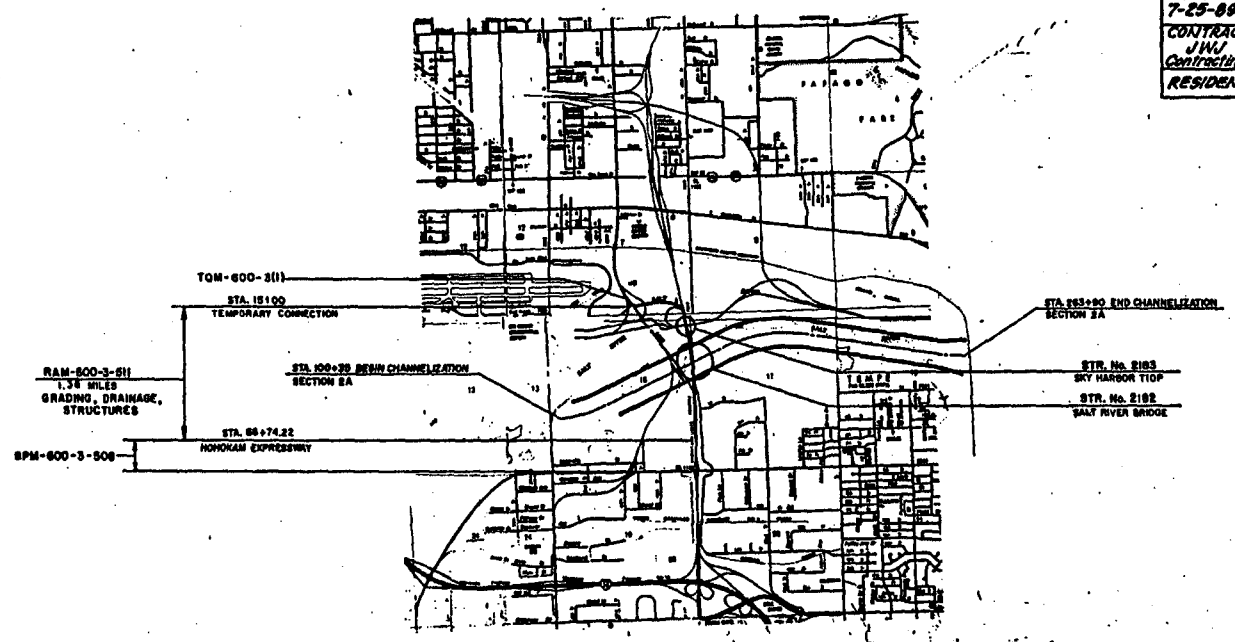
STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PLAN AND PROFILE OF PROPOSED

PHOENIX URBANIZED AREA
HOHOKAM EXPRESSWAY (SR 143)
MARICOPA COUNTY
RAM-600-3-511
143 MA. 1

RAM 600-3-511	AS-BUILT 3-2-92 KK
START 7-25-89	FINISH 2-20-92
CONTRACTOR JWJ Contracting Co.	BID - $32,089,360.20 FINAL - $33,106,698.87
RESIDENT ENGINEER - RICHARD WESTON	

Disk 12



ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
APPROVED R. S. FORD
ASSISTANT DIRECTOR
STATE ENGINEER

APPROVED DATE
DEPUTY STATE ENGINEER

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED DATE
DIVISION ADMINISTRATOR

UNIVERSITY DRIVE-SKY HARBOR BLVD

TRACS NO H 204801C | RAM 600-3-511 | SHT. 1 OF 109 | OF

ADDENDUM 2 REVISIONS

FEDERAL AID NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
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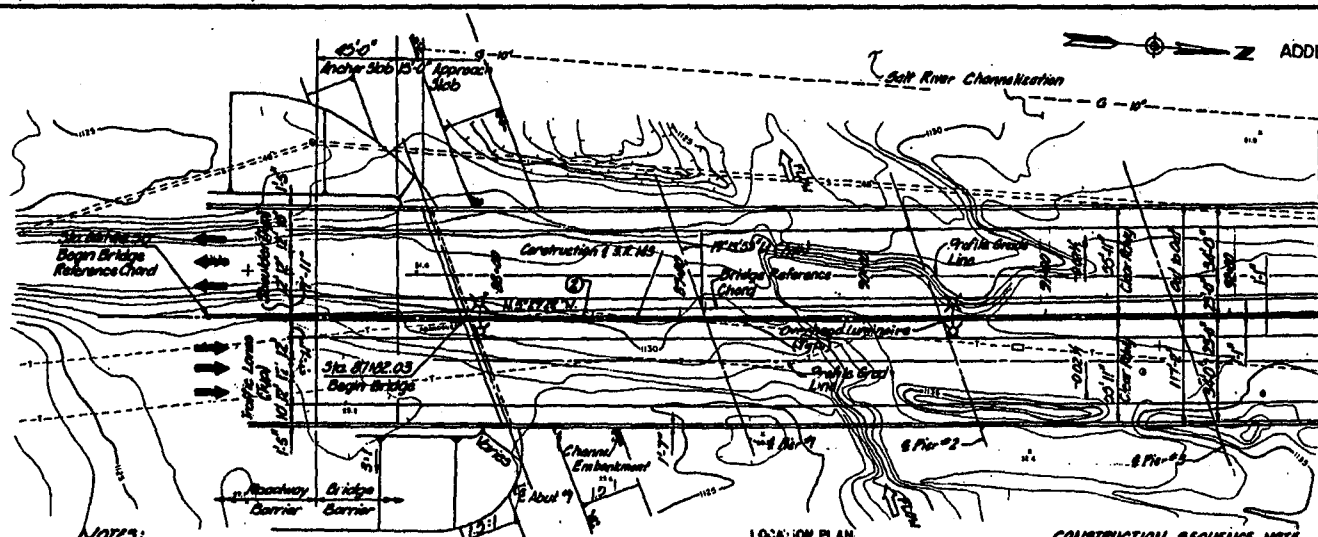

DRAWING INDEX

TITLE	DWG. NO.
General Plan	3-2.1, 3-2.3
General Notes & Quantities	3-2.4
Foundation Data Sheet	3-2.5, 3-2.12
Foundation Layout	3-2.13
Drilled Shaft & Column Details	3-2.14
Abutment #1 Details	3-2.15, 3-2.16
Abutment #2 Details	3-2.17
Abutment #2A and Misc. Abut. Details	3-2.18
Wingwall Details	3-2.19
Pier #1, #2, #3 Details	3-2.20
Pier #4 Details	3-2.21
Pier #5 Details	3-2.22
Pier #5 - Sign Support Details	3-2.23
Pier #6 Details	3-2.24
Pier #7 Details	3-2.25
Pier #8 Details	3-2.26
Pier Details	3-2.27
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Girder Details	3-2.31, 3-2.32
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Deck Details - Span #5, #6, #7, #8	3-2.38
Deck Details - Span #9	3-2.39
Deck Details - Miscellaneous	3-2.40
Deck Details - Diaphragms	3-2.41, 3-2.42
Deck Drain Details	3-2.43
Lighting Details	3-2.44 - 3-2.46
Miscellaneous Details	3-2.47, 3-2.48
Strip Seal Joint	3-2.49

Deck Screed Elevations shall be obtained from the Engineer.

NOTES:

1. See ADOT Standards B-19.30 and B-19.40 for limits of Structural Excavation & Structural Backfill.
2. See Dwg. No. 3-2.47 for Approach Slab & Anchor Slab limits & Notes.

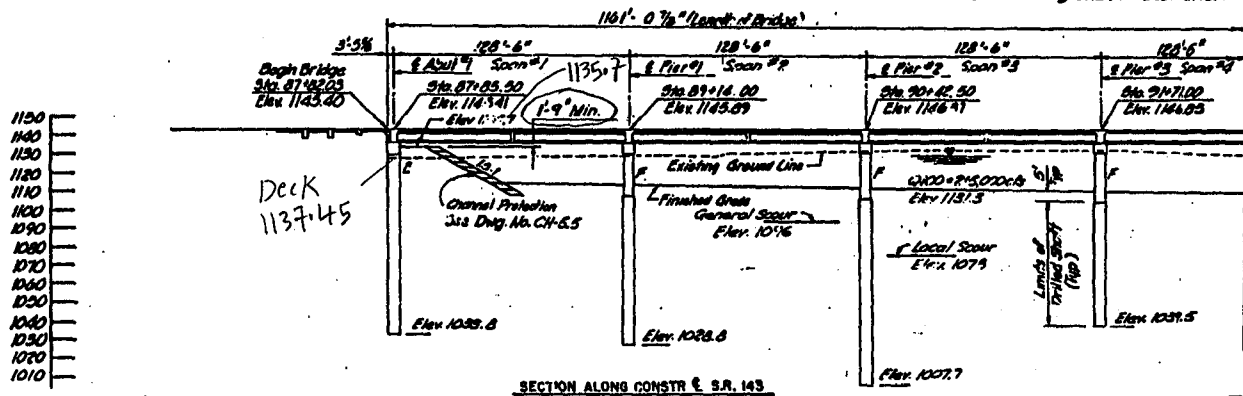
LOCATION PLAN

New 9 Span Prestressed Concrete Girder Bridge AASHTO Type II Girders Skew 16°12'51" Left (from Bridge Reference Chord)

Scale: 1" = 30'

CONSTRUCTION SEQUENCE NOTE

The Salt River Channelization, including Channel Excavation, Embankment, Channel Protection and Utility relocation is to be constructed prior to construction of the bridge. Utilities within the limits of Drilled Shaft Construction shall be removed as required during Channel Excavation.



SECTION ALONG CONSTR ℄ S.R. 143

(STA., DIMS., & ELEVS. ON CONSTR. ℄ S.R. 143)
SCALE: 1" = 30' HORIZONTAL & VERTICAL

BRIDGE REFERENCE CHORD NOTE

1. The Bridge Reference Chord is a line between Station 88+44.70 on Construction ℄ S.R. 143 and the intersection of ℄ abutment #2 and Construction ℄ S.R. 143.
2. Skew is measured with respect to the Bridge Reference Chord.

SECTION & DETAIL LEGEND

A — Letter denoting Section or Detail
E.S. — Dwg. No. where Section or Detail is shown or referred. 3-series unless noted otherwise. Blank if shown on same sheet.

DESIGN	W.F.C.		
DRAWN	H.R.S.		
CHECKED	D.W.		

MORRISON-KNUDSEN ENGINEERS

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRUCTURES SECTION

SALT RIVER BRIDGE
GENERAL PLAN

DR. NO.	SHEET	STRUCTURE NO.
137	2982	

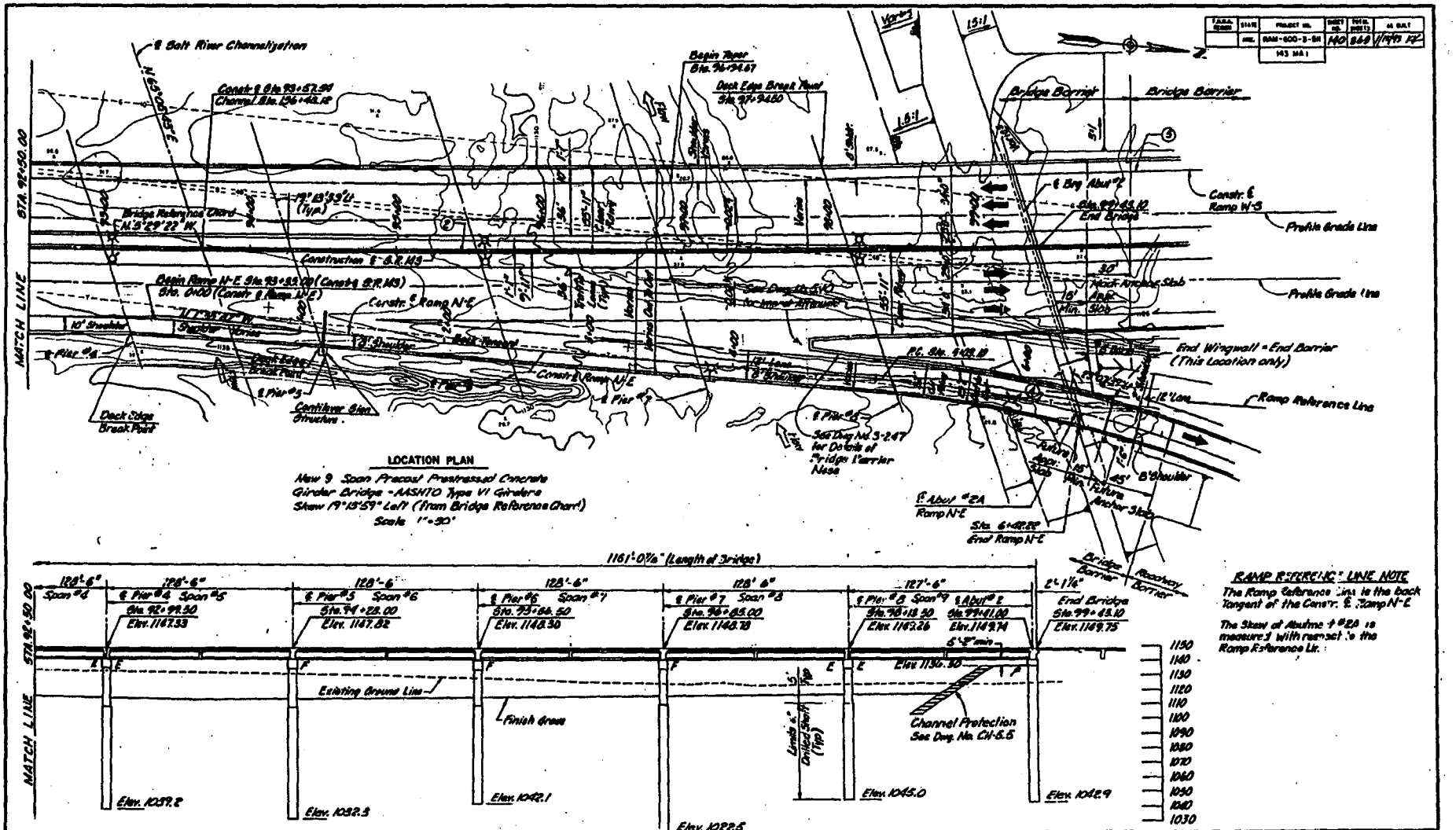
LOCATION: HOLBROOK-BLUE RIDGE - WHITE MOUNTAINS

DWG. NO. 3-2.1

TRACS NO. H2046 01 C

RAM 600-3-011 137
138 of 369

___ OF ___



LOCATION PLAN

New 9 Span Precast Prestressed Concrete Girder Bridge - AASHTO Type VI Girders
Skew 19°15'59" Left (From Bridge Reference Chart)
Scale 1" = 30'

SECTION ALONG CONSTR ℄ S.R. 143
(STA., DIMS., & ELEVS. ON CONSTR ℄ S.R. 143)
SCALE: 1" = 30' HORIZONTAL & VERTICAL

RAMP REFERENCE LINE NOTE

The Ramp Reference Line is the back Tangent of the Constr. ℄ Ramp N-E

The Skew at Abutment #2A is measured with respect to the Ramp Reference Line.

REVISED	H.L.C.	6-89
DRAWN	H.R.S.	6-89
CHECKED	D.W.	10-88

MORRISON-KNUDSEN ENGINEERS

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRUCTURES SECTION

SALT RIVER BRIDGE
GENERAL PLAN

LOCATION: HONKKAM UNIVERSITY - (SKY HARBOR)

SR 143	1 37	2862
ROUTE	SHEET	STRUCTURE NO.

Dwg. No. 9-2.2

TRACE NO. H 2045 01 C

RAM 800-3-511 3417
140 of 369

___ OF ___

F.A.P. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
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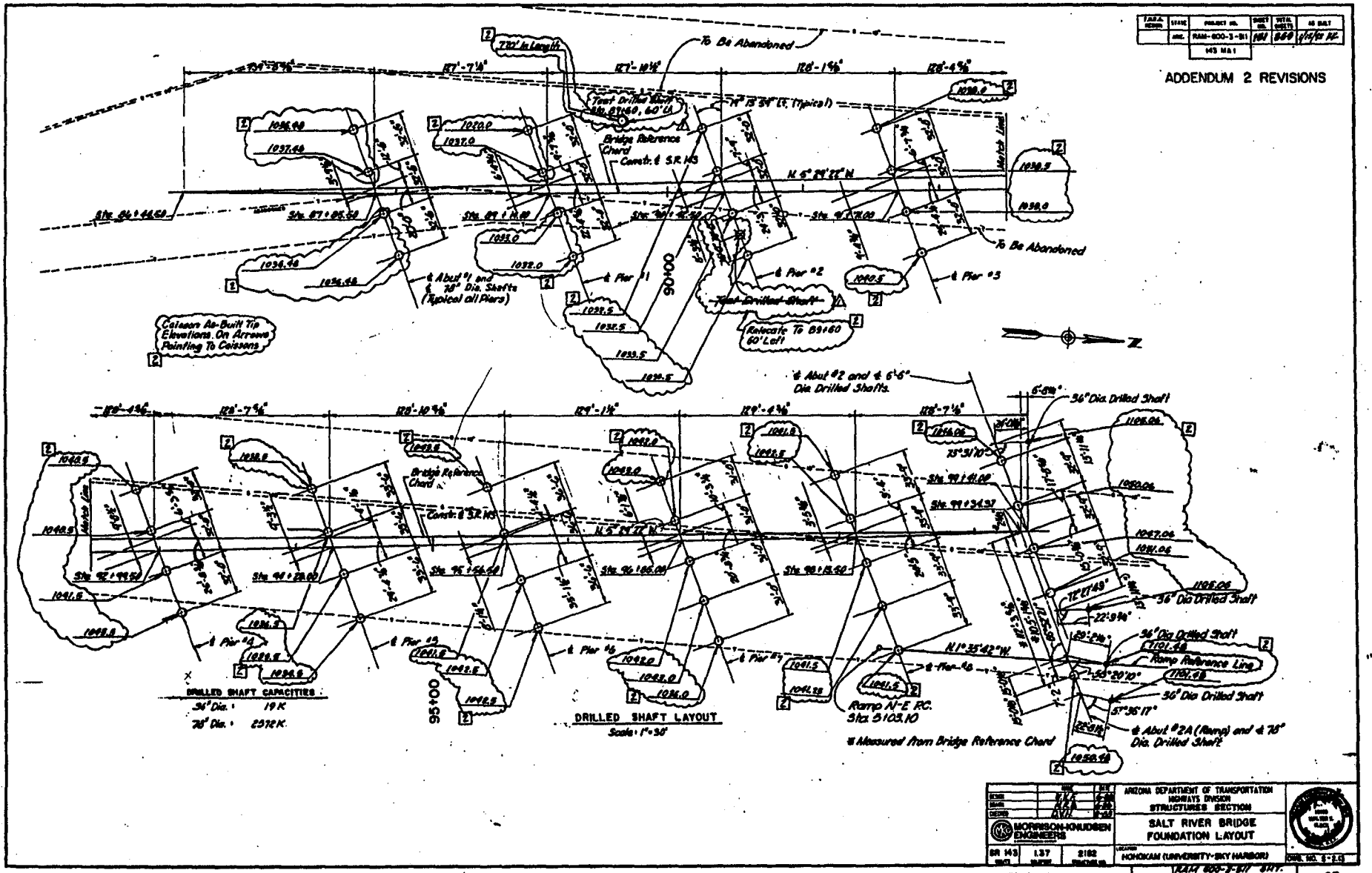
		143 MA 1			

ADDENDUM 2 REVISIONS



DESIGN	R.K.A.	4-96	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STRUCTURES SECTION
DRAWN	R.K.A.	4-96	
CHECKED	D.V.H.	11-96	
MORRISON-KNUDSEN ENGINEERS			SALT RIVER BRIDGE FOUNDATION LAYOUT
BR 143	1.37	2182	HOHOKAM (UNIVERSITY-SKY HARBOR)

TRACS NO. H 2046 01 C

RAM 600-3-911 SHT. 181 of 369

OF

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
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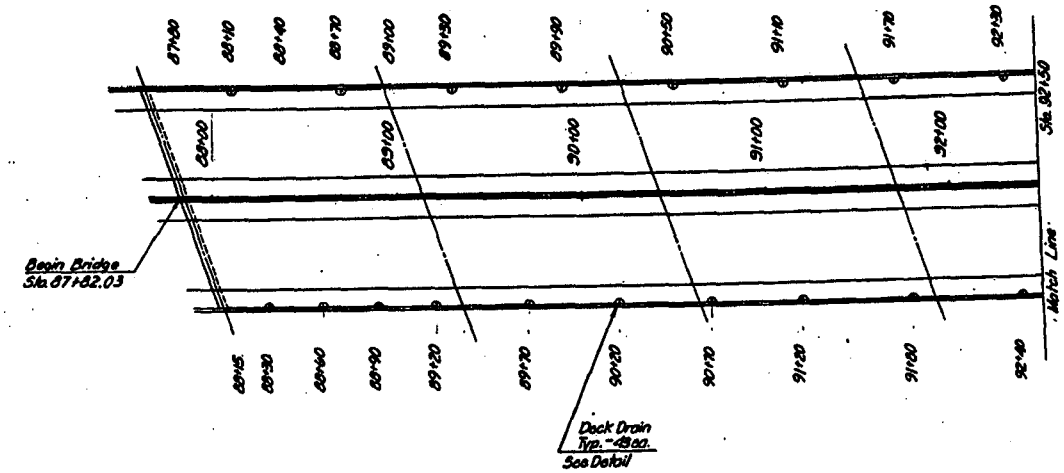
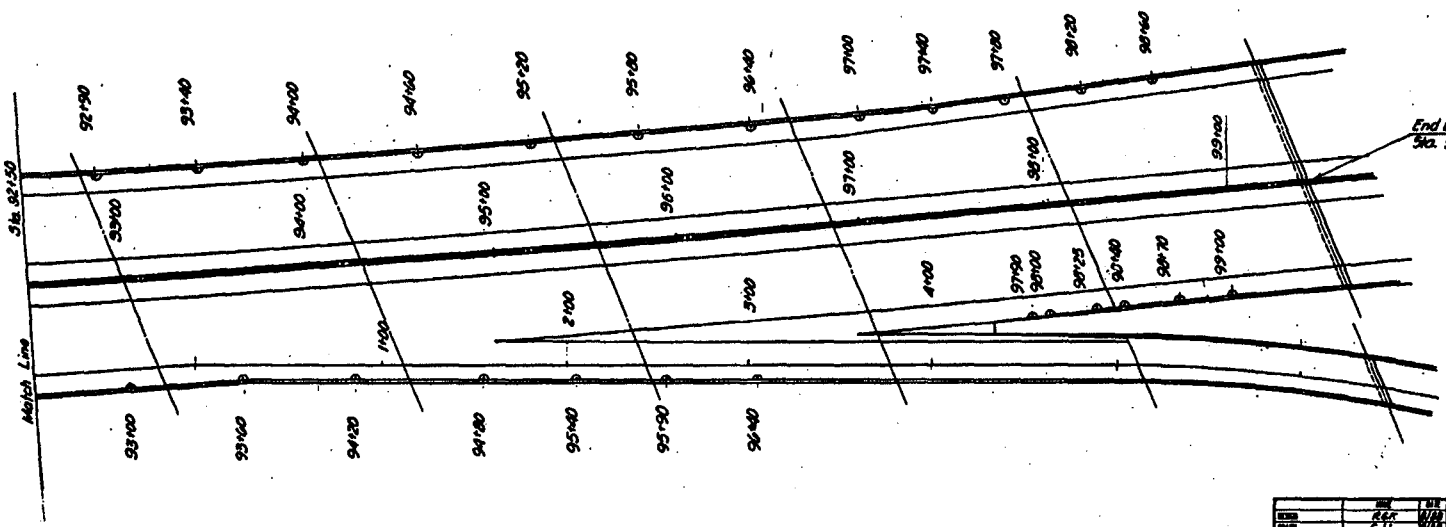
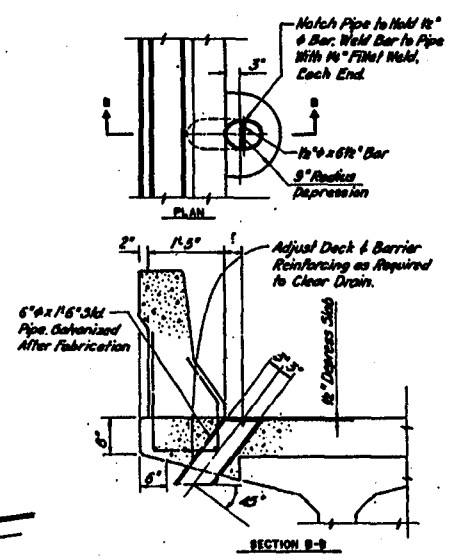
		H3 MA 1			







DECK DRAIN DETAIL
Scale: 1" = 1'-0"

DESIGN	R.G.K.	11/89
DRAWN	C.J.L.	11/89
CHECKED	R.E.S.	11/89

MORRISON-KNUDSEN ENGINEERS

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRUCTURES SECTION

SALT RIVER BRIDGE
DECK DRAIN DETAILS

LOCATION: HOHOKAM (UNIVERSITY-SKY HARBOR)

SR 143	1.37	2182
ROUTE	MILEPOST	STRUCTURE NO.

TRACS NO. H 2045 01 C

RAM 600-3-SH SHT 181 of 969

DWG. NO. S-2.43

___ OF ___

F.A.P.N.	DATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
	ARIZ.	RAM-600-3-511	207	369	
		143 MA 1			

STATE of ARIZONA
DEPARTMENT of TRANSPORTATION
HIGHWAYS DIVISION

SALT RIVER CHANNELIZATION

HOHOKAM (UNIVERSITY-SKY HARBOR)
RAM-600-3-511
143 MA 1

MARICOPA COUNTY
1989

GENERAL NOTES

THIS PROJECT HAS BEEN DESIGNED USING THE 1986 CONSTRUCTION STANDARDS AND CURRENT REVISIONS TO SAME.

THIS PROJECT HAS BEEN DESIGNED USING THE STATE OF ARIZONA 1987 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

FOR ADDITIONAL RIGHT-OF-WAY INFORMATION, SEE RIGHT-OF-WAY PROJECT NUMBER RBA-600-3-708.

THE CONTRACTOR SHALL REMOVE ALL STRUCTURES AND OBSTRUCTIONS WITHIN THE PROJECT LIMITS UNLESS OTHERWISE NOTED ON THE PLANS.

RIGHT-OF-WAY MARKERS SHALL BE FURNISHED AND PLACED BY THE CONTRACTOR, AS DIRECTED BY THE ENGINEER, STANDARD C-21.10.

BENCH MARKERS SHALL BE FURNISHED BY THE STATE AND PLACED BY THE CONTRACTOR, STANDARD C-21.20.

THE INFORMATION ON THESE DRAWINGS CONCERNING THE TYPE, SIZE, AND LOCATION OF UTILITIES HAS BEEN SHOWN BASED ON THE BEST INFORMATION AVAILABLE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL EXISTING UTILITY FACILITIES PRIOR TO CONSTRUCTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROTECT ALL EXISTING UTILITIES, IN PLACE, UNLESS OTHERWISE NOTED OR SPECIFIED.

ALL SOIL BORINGS AND TEST PITS ENCOUNTERING LANDFILL REFUSE, AS DOCUMENTED IN THE PRELIMINARY GEOTECHNICAL INVESTIGATION REPORT, DESIGN SECTION 7, SALT RIVER CHANNELIZATION, DATED MARCH 17, 1988, ARE SHOWN ON DRAWING NO. CH-2.1 THRU CH-2.14. THE REMAINING SOIL BORINGS AND TEST PITS APPLICABLE TO THIS PROJECT, ARE INCLUDED IN THE PRELIMINARY GEOTECHNICAL INVESTIGATION REPORTS: DESIGN SECTION 7, SALT RIVER CHANNELIZATION, DATED MARCH 17, 1988, DESIGN SECTIONS 6B AND 8C, DATED OCTOBER 26, 1988 AND THE GEOTECHNICAL INVESTIGATION REPORT, PRIEST DRIVE BRIDGE & ROADWAY DESIGN, DATED OCTOBER 21, 1988.

EXISTING GROUND WITHIN THE CHANNEL BOTTOM BELOW DESIGN ELEVATION SHALL BE LEFT AS IS.

TOPOGRAPHIC INFORMATION SHOWN ON CHANNEL ALIGNMENT PLANS (CH-2.1, 2.3, 2.5, 2.7, 2.9, 2.11 AND 2.13) ARE BASED ON AERIAL PHOTOGRAPHIC INFORMATION DATED MARCH THRU APRIL, 1987. THE SUMMARY OF EARTHWORK QUANTITIES AND THE OFFSETS AND ELEVATIONS SHEETS ARE BASED ON UPDATED AERIAL PHOTOGRAPHIC INFORMATION DATED JANUARY 24, 1989.

DESIGN DATA

SALT RIVER CHANNELIZATION DESIGN FLOWS:

10-YEAR FREQUENCY FLOOD = 93,000 CFS
100-YEAR FREQUENCY FLOOD = 215,000 CFS
STANDARD PROJECT FLOOD = 289,000 CFS

SPECIAL SYMBOLS

⊕ CH-121 SOIL BORING INDICATING LANDFILL REFUSE.
⊞ CH-18 TEST PIT INDICATING LANDFILL REFUSE.
Ⓐ APPROXIMATE CENTERLINE OF LOW FLOW CHANNEL.

DRAWING INDEX

DRAWING NO.	TITLE
CH-1	TITLE SHEET
6-4.6	SUMMARY OF CHANNEL EARTHWORK
6-4.7	STORM DRAIN PIPE SCHEDULE
CH-1.2 THRU 1.3	GEOMETRIC LAYOUT
CH-1.4 THRU 1.7	TYPICAL SECTIONS
CH-2.1 THRU 2.14	CHANNEL ALIGNMENT PLANS AND PROFILES
CH-3.1 THRU 3.3	OFFSET AND ELEVATION SHEETS
CH-4.1 THRU 4.4	GRADE CONTROL STRUCTURES
CH-5.1 THRU 5.6	LEVEE TRANSITION DETAILS
CH-6.1 THRU 6.2	ACCESS RAMP DETAILS
CH-7.1 THRU 7.2	GABION MATTRESS DETAILS
CH-8.1	CROSS CUT CANAL CONNECTION DETAIL
CH-9.1 THRU 9.6	STORM DRAIN EXTENSION PLANS AND PROFILES
CH-10.1 THRU 10.4	MISCELLANEOUS DETAILS

APPROVED _____ MARICOPA COUNTY FLOOD CONTROL DISTRICT DATE _____

	NAME	DATE
DESIGN	DMJ	4/89
DRAWN	JCP	4/89
CHECKED	MAP	4/89

DMJM CONSULTING ENGINEERS PHOENIX, ARIZONA

ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

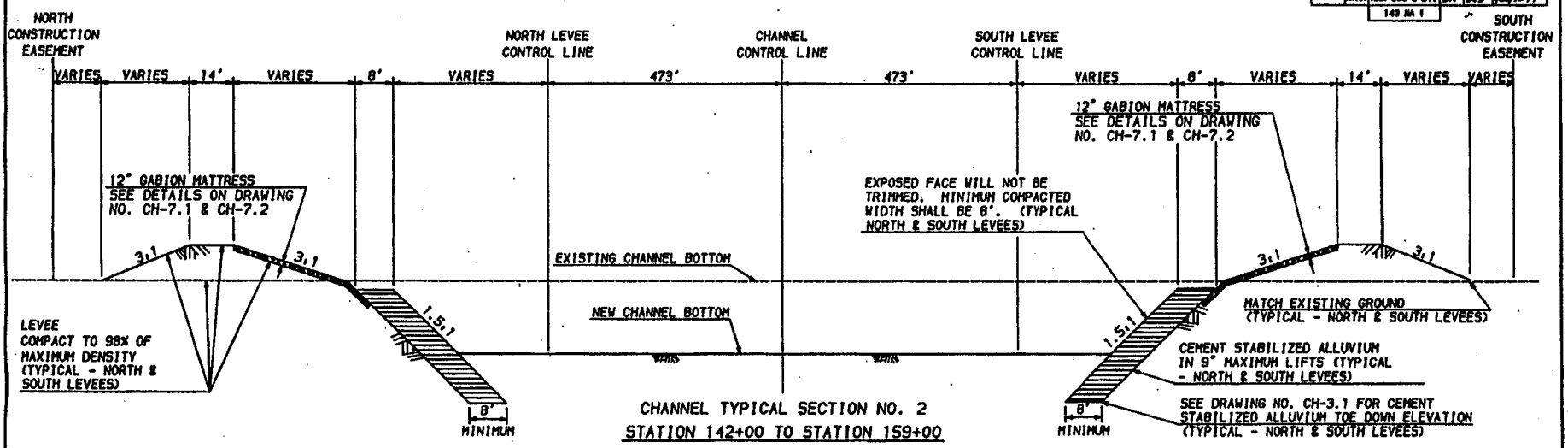
TITLE SHEET

143 | 1 | HOHOKAM (UNIVERSITY - SKY HARBOR) | DWG NO. CH-1.1

TRACS NO. H 2045 01C

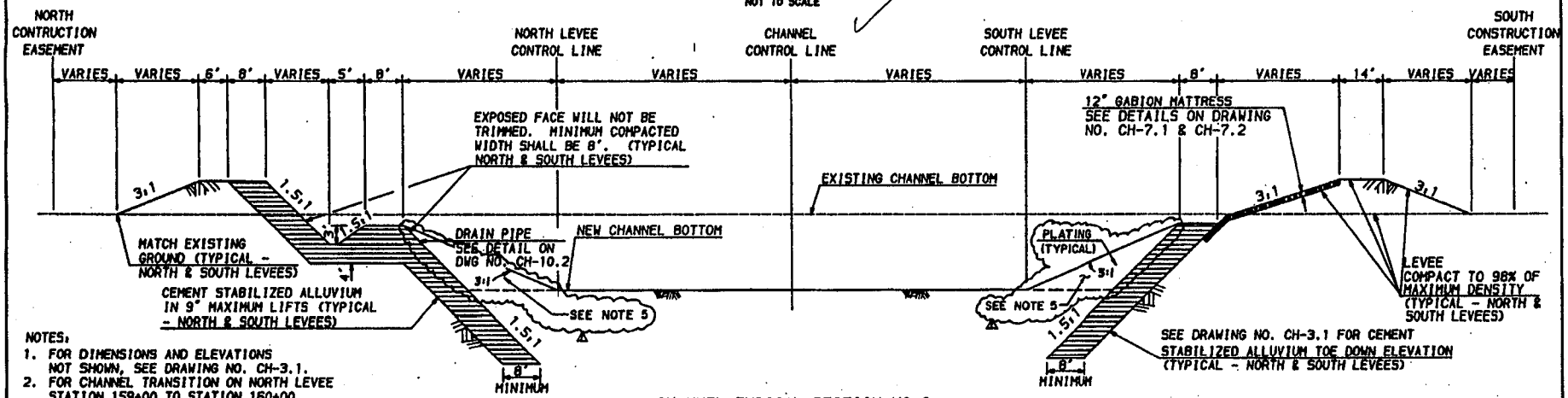
RAM 600-3-511 SHT 207 of 369 OF

TO ACCOMPANY ADDENDUM NO. 2



CHANNEL TYPICAL SECTION NO. 2
STATION 142+00 TO STATION 159+00

NOT TO SCALE



NOTES:

1. FOR DIMENSIONS AND ELEVATIONS NOT SHOWN, SEE DRAWING NO. CH-3.1.
2. FOR CHANNEL TRANSITION ON NORTH LEVEE STATION 159+00 TO STATION 160+00 SEE DETAIL ON DRAWING NO. CH-5.3.
3. FOR CHANNEL TRANSITION ON NORTH LEVEE STATION 172+00 TO STATION 174+00 SEE DETAIL ON DRAWING NO. CH-5.3.
4. FOR LOW FLOW CHANNEL TYPICAL SECTION, SEE DETAIL ON DRAWING NO. CH-10.2.
5. BEGIN PLATING ALONG NORTH LEVEE AT STA. 160+50. END PLATING ALONG NORTH LEVEE AT STA. 174+00. BEGIN PLATING ALONG SOUTH LEVEE AT STA. 163+12.

CHANNEL TYPICAL SECTION NO.3
STATION 159+00 TO STATION 174+00

NOT TO SCALE

	NAME	DATE
DESIGN	G.N.J.	4/99
DRAWN	S.L.B.	4/99
CHECKED	R.A.P.	4/99

DMJM CONSULTING ENGINEERS PHOENIX ARIZONA

143 | 1

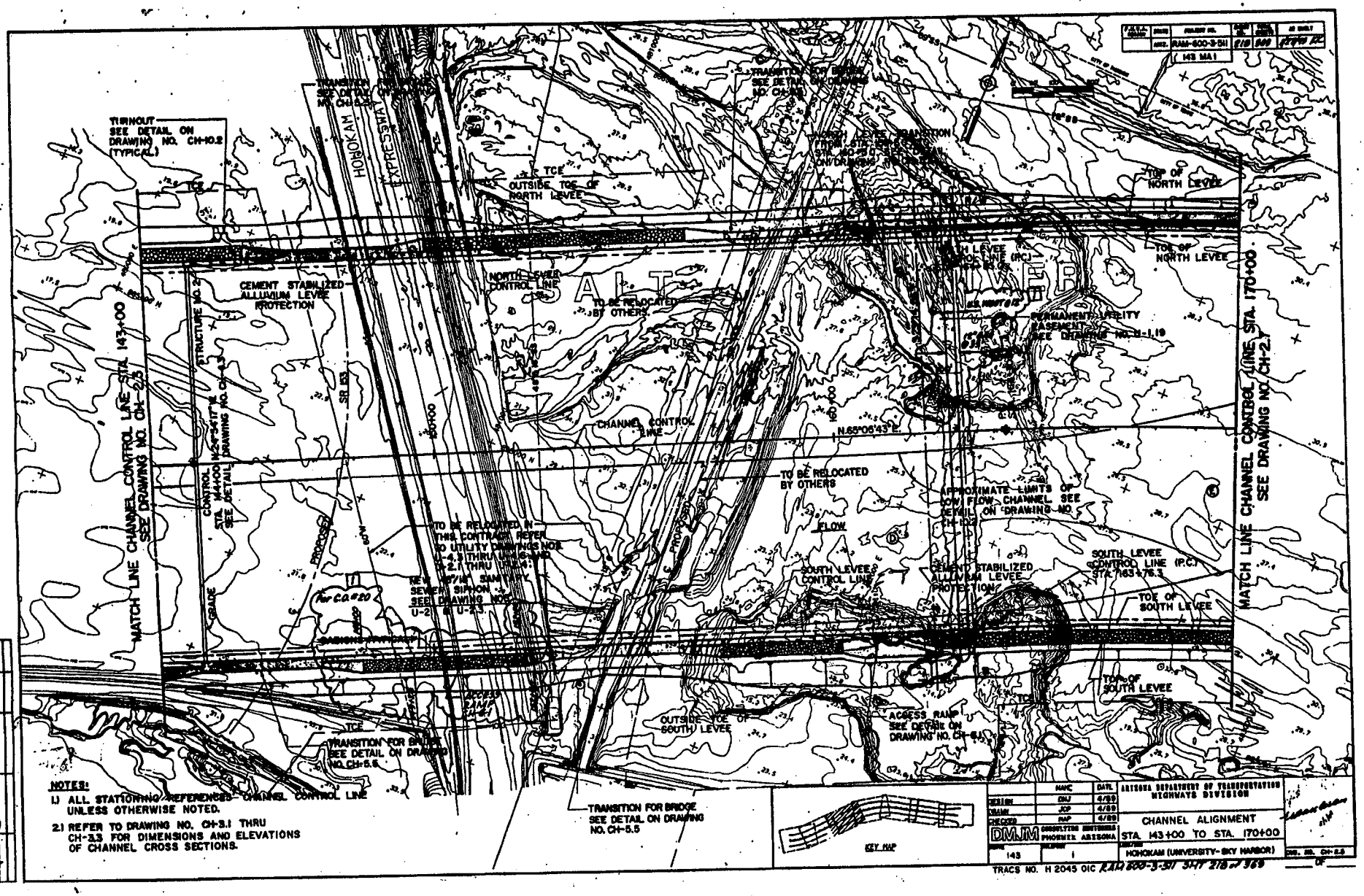
ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

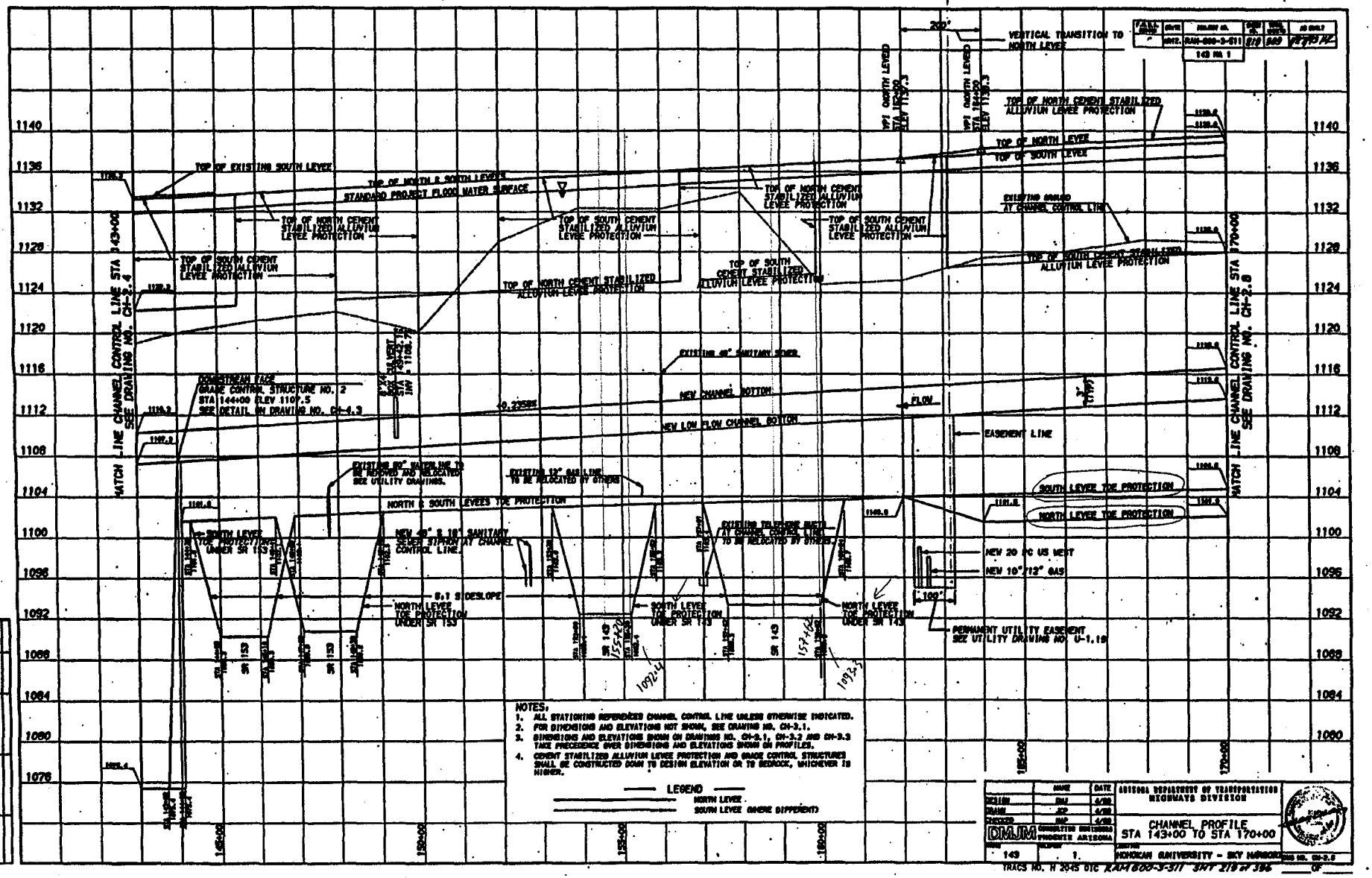
TYPICAL SECTIONS
STA. 142+00 TO STA. 174+00

HONOKAN UNIVERSITY - SKY HARBOR

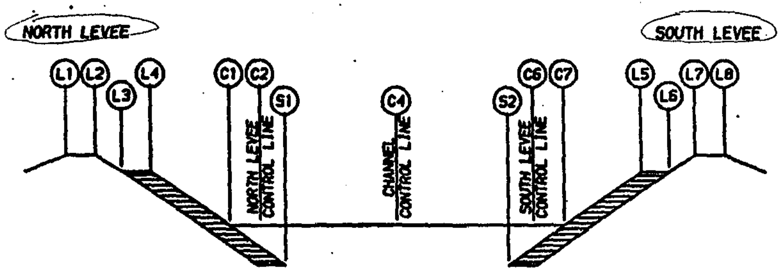
DWG NO. CH-1.5

TRACS NO. H 2045 01C RAM 800-3-811 SHT 811 of 949 ____ OF ____

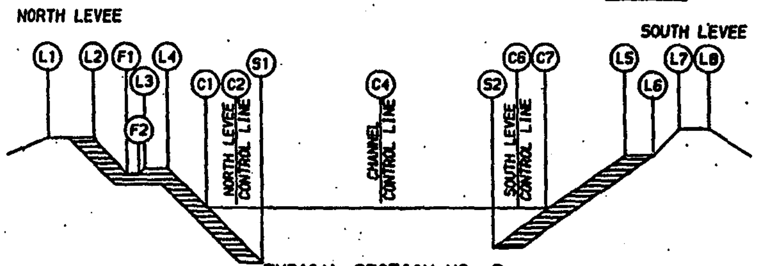

143 MA1
RAM-800-3-511
TURNOUT SEE DETAIL ON DRAWING NO. CH-10.2 (TYPICAL)
HOHOKAM EXPRESSWAY
TRANSITION FOR BRIDGE SEE DETAIL ON DRAWING NO. CH-5.5
TCE
OUTSIDE TOE OF NORTH LEVEE
NORTH LEVEE TRANSITION
TOE OF NORTH LEVEE
CEMENT STABILIZED ALLUVIUM LEVEE PROTECTION
NORTH LEVEE CONTROL LINE
TO BE RELOCATED BY OTHERS
SALT RIVER
PERMANENT UTILITY EASEMENT SEE DRAWING NO. U-1.19
MATCH LINE CHANNEL CONTROL LINE STA. 143+00 SEE DRAWING NO. CH-2.3
MATCH LINE CHANNEL CONTROL LINE STA. 170+00 SEE DRAWING NO. CH-2.7
STRUCTURE NO. 2
CHANNEL CONTROL LINE
N.65°06'43"E
TO BE RELOCATED BY OTHERS
APPROXIMATE LIMITS OF LOW FLOW CHANNEL SEE DETAIL ON DRAWING NO. CH-10.2
FLOW
PROPOSED
TO BE RELOCATED IN THIS CONTRACT REFER TO UTILITY DRAWINGS NOS. U-4.3 THRU U-4.4 AND U-2.1 THRU U-2.4
NEW 10" SANITARY SEWER SIPHON SEE DRAWING NOS. U-2.1 & U-2.3
SOUTH LEVEE CONTROL LINE
CEMENT STABILIZED ALLUVIUM LEVEE PROTECTION
SOUTH LEVEE CONTROL LINE (P.C.) STA. 163+76.3
TOE OF SOUTH LEVEE
GABIONS (TYPICAL)
OUTSIDE TOE OF SOUTH LEVEE
ACCESS RAMP SEE DETAIL ON DRAWING NO. CH-8.1
TRANSITION FOR BRIDGE SEE DETAIL ON DRAWING NO. CH-5.6
TRANSITION FOR BRIDGE SEE DETAIL ON DRAWING NO. CH-5.5
KEY MAP
NOTES:
1.) ALL STATIONING REFERENCES CHANNEL CONTROL LINE UNLESS OTHERWISE NOTED.
2.) REFER TO DRAWING NO. CH-3.1 THRU CH-3.3 FOR DIMENSIONS AND ELEVATIONS OF CHANNEL CROSS SECTIONS.
DESIGN DMJ 4/89
DRAWN JCP 4/89
CHECKED RAP 4/89
DMJM CONSULTING ENGINEERS PHOENIX ARIZONA
ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
CHANNEL ALIGNMENT
STA. 143+00 TO STA. 170+00
HOHOKAM (UNIVERSITY-SKY HARBOR)
143
TRACS NO. H 2045 OIC RAM 800-3-511 SHT 218 of 369


VERTICAL TRANSITION TO NORTH LEVEE
200'
TOP OF NORTH CEMENT STABILIZED ALLUVIUM LEVEE PROTECTION
TOP OF NORTH LEVEE
TOP OF SOUTH LEVEE
TOP OF EXISTING SOUTH LEVEE
TOP OF NORTH & SOUTH LEVEES
STANDARD PROJECT FLOOD WATER SURFACE
TOP OF NORTH CEMENT STABILIZED ALLUVIUM LEVEE PROTECTION
TOP OF SOUTH CEMENT STABILIZED ALLUVIUM LEVEE PROTECTION
TOP OF SOUTH CEMENT STABILIZED ALLUVIUM LEVEE PROTECTION
EXISTING GROUND AT CHANNEL CONTROL LINE
TOP OF SOUTH CEMENT STABILIZED ALLUVIUM LEVEE PROTECTION
TOP OF NORTH CEMENT STABILIZED ALLUVIUM LEVEE PROTECTION
TOP OF SOUTH CEMENT STABILIZED ALLUVIUM LEVEE PROTECTION
TOP OF NORTH CEMENT STABILIZED ALLUVIUM LEVEE PROTECTION
EXISTING 60" SANITARY SEWER
DOWNSTREAM FACE GRADE CONTROL STRUCTURE NO. 2 STA 144+00 ELEV 1107.5 SEE DETAIL ON DRAWING NO. CH-4.3
NEW CHANNEL BOTTOM
FLOW
NEW LOW FLOW CHANNEL BOTTOM
EASEMENT LINE
EXISTING 60" WATERLINE TO BE REMOVED AND RELOCATED SEE UTILITY DRAWINGS.
EXISTING 12" GAS LINE TO BE RELOCATED BY OTHERS
NORTH & SOUTH LEVEES TOE PROTECTION
SOUTH LEVEE TOE PROTECTION
NORTH LEVEE TOE PROTECTION
NEW 48" & 18" SANITARY SEWER STRUCTURE AT CHANNEL CONTROL LINE
EXISTING TELEPHONE DUCTS AT CHANNEL CONTROL LINE TO BE RELOCATED BY OTHERS
NEW 20 PC US WEST
NEW 10"/12" GAS
100'
9:1 SIDESLOPE
NORTH LEVEE TOE PROTECTION UNDER SR 153
SOUTH LEVEE TOE PROTECTION UNDER SR 143
NORTH LEVEE TOE PROTECTION UNDER SR 143
PERMANENT UTILITY EASEMENT SEE UTILITY DRAWING NO. U-1.19
MATCH LINE CHANNEL CONTROL LINE STA 143+00 SEE DRAWING NO. CH-2.4
MATCH LINE CHANNEL CONTROL LINE STA 170+00 SEE DRAWING NO. CH-2.6
1140
1136
1132
1128
1124
1120
1116
1112
1108
1104
1100
1096
1092
1088
1084
1080
1076
145+00
150+00
155+00
160+00
165+00
170+00
NOTES:
1. ALL STATIONING REFERENCED CHANNEL CONTROL LINE UNLESS OTHERWISE INDICATED.
2. FOR DIMENSIONS AND ELEVATIONS NOT SHOWN, SEE DRAWING NO. CH-3.1.
3. DIMENSIONS AND ELEVATIONS SHOWN ON DRAWINGS NO. CH-3.1, CH-3.2 AND CH-3.3 TAKE PRECEDENCE OVER DIMENSIONS AND ELEVATIONS SHOWN ON PROFILES.
4. CEMENT STABILIZED ALLUVIUM LEVEE PROTECTION AND GRADE CONTROL STRUCTURES SHALL BE CONSTRUCTED DOWN TO DESIGN ELEVATION OR TO BEDROCK, WHICHEVER IS HIGHER.
LEGEND
NORTH LEVEE
SOUTH LEVEE (WHERE DIFFERENT)
DMJM
ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
CHANNEL PROFILE
STA 143+00 TO STA 170+00
PHOENIX ARIZONA
143
1
PHOENIX - SKY HARBOR
TRACS NO. H 2045 DIC RAM 800-3-511 SHT 219 of 396

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
	ARIZ.	RAM-600-3-511	228	349	[illegible]
		143 MA 1			



TYPICAL SECTIONS NO. 2
STATION 100+35 TO STATION 160+00



TYPICAL SECTION NO. 3
STATION 160+00 TO STATION 174+00

STATION	L1 OFFSET (-)	L1 ELEVATION	L2 OFFSET (-)	L2 ELEVATION	F1 OFFSET (-)	F1 ELEVATION	F2 OFFSET (-)	F2 ELEVATION	L3 OFFSET (-)	L3 ELEVATION	L4 OFFSET (-)	L4 ELEVATION	C1 OFFSET (-)	C1 ELEVATION	C2 OFFSET (-)	C2 ELEVATION	S1 OFFSET (-)	S1 ELEVATION	C4 OFFSET (+)	C4 ELEVATION	S2 OFFSET (+)	S2 ELEVATION	C6 OFFSET (+)	C6 ELEVATION	C7 OFFSET (+)	C7 ELEVATION	L5 OFFSET (+)	L5 ELEVATION	L6 OFFSET (+)	L6 ELEVATION	L7 OFFSET (+)	L7 ELEVATION	L8 OFFSET (+)	L8 ELEVATION	STATION
TYPICAL SECTION NO. 2 - STATION 100+35 TO STATION 160+00																																			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TYPICAL SECTION NO. 3 - STATION 160+00 TO STATION 174+00																																			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

155+20 S

157+62 N

* MATCH EXISTING CHANNEL BOTTOM, SEE DRAWING NO. CH-1.4.

** PLACE CEMENT STABILIZED ALLUVIUM LEVEE PROTECTION OVER EXISTING GABION LEVEE PROTECTION.

*** LOCATED WITHIN LEVEE TRANSITION, SEE DETAILS ON DRAWINGS NO. CH-5.1 THRU CH-5.6.

**** LOCATED WITHIN ACCESS RAMP, SEE DETAILS ON DRAWINGS NO. CH-6.1 AND CH-6.2.

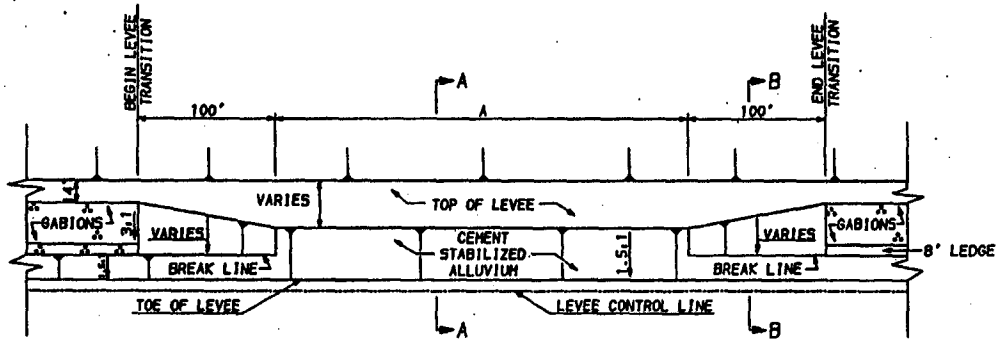
NOTE: ALL STATIONING REFERENCES CHANNEL CONTROL LINE UNLESS OTHERWISE NOTED.

	NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
DESIGN	DWJ	4/88	
DRAWN	SLB	4/88	OFFSETS & ELEVATION SHEET
CHECKED	MAP	4/88	STA 100+35 TO STA 174+00
DMJM CONSULTING ENGINEERS PHOENIX ARIZONA			
ROUTE 143	MILEPOST 1		LOCATION HOHOKAM UNIVERSITY - SKY HARBOR

DWG. NO. CH-3.1

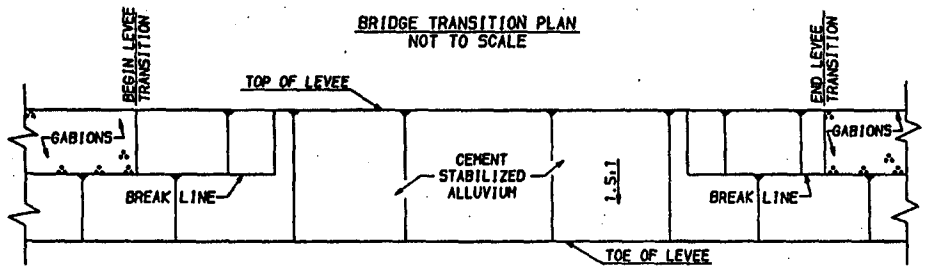
TRACS NO. H 2045 01C RAM 600-3-511 SHT 228 of 349 ___ OF ___

F.A.P. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
	ARIZ.	RAM-800-3-511	299	369	2/2/93 RC
		143 NA 1			

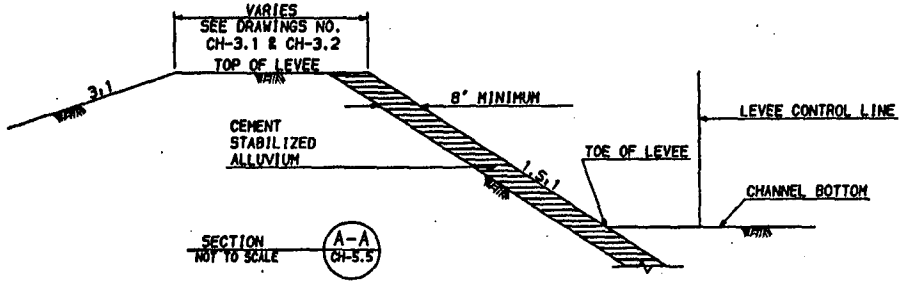


BRIDGE TRANSITION PLAN
NOT TO SCALE

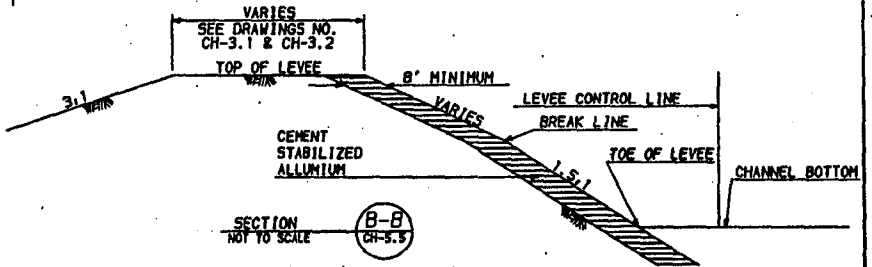
BRIDGE	LEVEE	BEGIN LEVEE TRANSITION	END LEVEE TRANSITION	A
SR153	NORTH	145+50	150+00	250'
SR153	SOUTH	143+00	148+00	300'
SR143	NORTH	156+50	160+50	200'
SR143	SOUTH	152+00	157+00	300'
PRIEST RD.	NORTH	209+00	213+00	200'



ELEVATION
NOT TO SCALE



SECTION A-A
NOT TO SCALE
CH-5.5



SECTION B-B
NOT TO SCALE
CH-5.5

NOTE:
1. ALL STATIONING REFERENCES CHANNEL CONTROL LINE UNLESS OTHERWISE INDICATED.

	NAME	DATE
DESIGN	DRJ	4/89
DRAWN	SLD	4/89
CHECKED	RAP	4/89

DMJM CONSULTING ENGINEERS PHOENIX ARIZONA

ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

LEVEE TRANSITION DETAILS

143 1

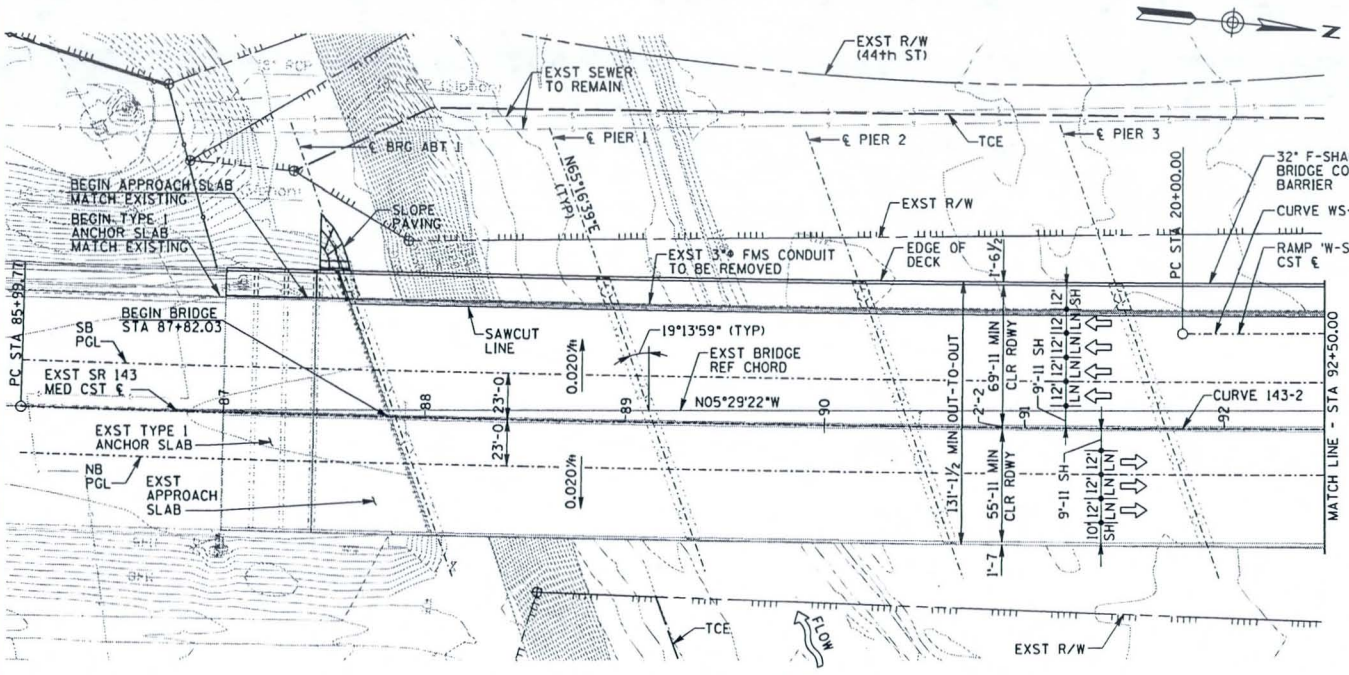
HOHOKAM UNIVERSITY - SKY HARBOR

SHEET NO. CH-5.5

TRACS NO. H 2045 01C RAM 800-3-511 SHT 299 of 369 ___ OF ___

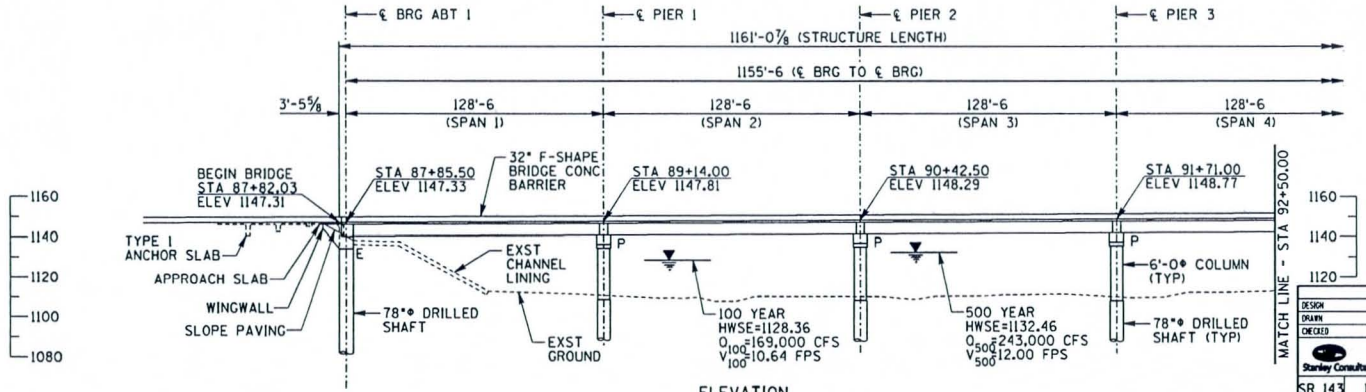
Appendix C Improvement Plans for SR143/Sky Harbor Blvd. TI

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	143-A(200)			
		143 MA 002			



PLAN

EXST 9 SPAN PRECAST/PRESTRESSED CONCRETE AASHTO TYPE VI GIRDER BRIDGE
WIDENED LEFT WITH AASHTO TYPE VI GIRDERS
SKEW 19°13'59" LT
1' CONTOUR INTERVAL
SCALE: 1"=30'-0



ELEVATION

SCALE: 1"=30'-0

SHEET INDEX:

GENERAL PLAN & ELEVATION	S-2.01
GENERAL PLAN & ELEVATION	S-2.02
TYPICAL SECTION & GEOMETRICS	S-2.03
GENERAL NOTES & QUANTITIES	S-2.04
REMOVAL DETAILS	S-2.05
REMOVAL DETAILS	S-2.06
STRUCTURAL EXCAVATION & BACKFILL	S-2.07
FOUNDATION PLAN	S-2.08
FOUNDATION PLAN	S-2.09
DRILLED SHAFT DETAILS	S-2.10
ABUTMENT 1 PLAN & ELEVATION	S-2.11
ABUTMENT 2 PLAN & ELEVATION	S-2.12
ABUTMENT 1 SECTIONS & DETAILS	S-2.13
ABUTMENT 2 SECTIONS & DETAILS	S-2.14
WINGWALL DETAILS	S-2.15
PIERS 1-4 PLAN & ELEVATION	S-2.16
PIERS 5-7 PLAN & ELEVATION	S-2.17
PIER 8 PLAN & ELEVATION	S-2.18
PIERS 1-5 SECTIONS & DETAILS	S-2.19
PIERS 6&7 SECTIONS & DETAILS	S-2.20
PIER 8 SECTIONS & DETAILS	S-2.21
FRAMING PLAN	S-2.22
FRAMING PLAN	S-2.23
TYPE VI GIRDER DETAILS	S-2.24
GIRDER SCHEDULE	S-2.25
DECK DETAILS	S-2.26
DECK DETAILS	S-2.27
ABUTMENT 1 DIAPHRAGM DETAILS	S-2.28
ABUTMENT 2 DIAPHRAGM DETAILS	S-2.29
PINNED PIER DIAPHRAGM DETAILS	S-2.30
EXPANSION PIER DIAPHRAGM DETAILS	S-2.31
INTERMEDIATE DIAPHRAGM DETAILS	S-2.32
BEARING PAD & EXPANSION JOINT DETAILS	S-2.33
RESTRAINER DETAILS	S-2.34
FMS DETAILS	S-2.35
DECK POUR & SIP FORM DETAILS	S-2.36
APPROACH SLAB & SLOPE PAVING LAYOUT	S-2.37
MISCELLANEOUS DETAILS	S-2.38
CAMBER DETAILS	S-2.39
CAMBER DETAILS	S-2.40
FOUNDATION DATA	SF-2.01 - 2.XX

NOTES:

1. STATIONS, DIMENSIONS AND ELEVATIONS ARE MEASURED ALONG EXST SR 143 MED CST ℄.
2. ALL ELEVATIONS ARE BASED ON NAVD 88 DATUM WITH 92 REVISION.
3. BRIDGE REFERENCE CHORD IS BASED ON EXISTING BRIDGE PLANS AND IS DEFINED AS A LINE FROM SR 143 MED CST ℄ STA 86+44.50 TO 99+41.00.
4. EXISTING BRIDGE WAS BUILT IN 1990 UNDER PROJECT NO. RAM 600-3-511.

		DATE
DESIGN	DB	03/10
DRAWN	NRD	03/10
CHECKED	DRS	03/10

Stanley Consultants Inc.
4041 East Camelback Road, Suite 400
Phoenix, Arizona 85018
Phone: (602) 337-2700

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
BRIDGE GROUP

87+
SALT RIVER BRIDGE
GENERAL PLAN & ELEVATION

PRELIMINARY
STAGE V
100% Review
NOT FOR CONSTRUCTION OR RECORDING

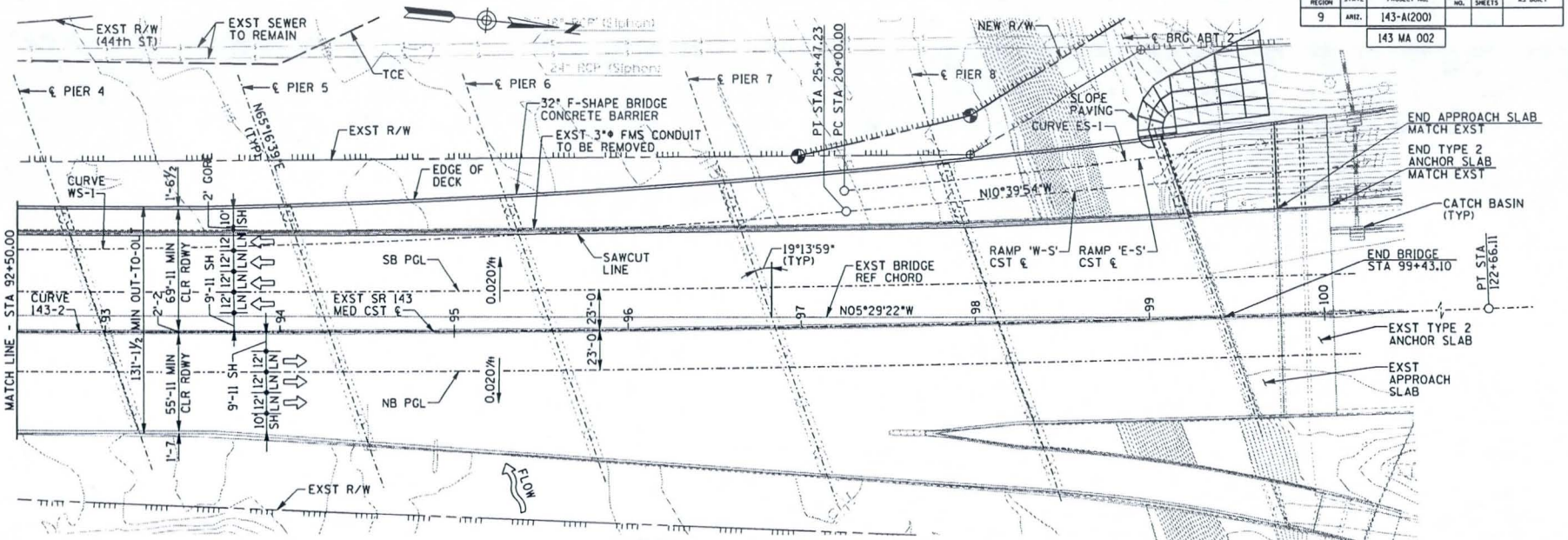
ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
SR 143	1.73	2182	SR 143 / SKY HARBOR BLVD TI

DWG NO. S-2.01

TRACS NO. H7528 01C | 143-A(200) | ___ OF ___

2/24/2010 q:\21926\11-cadd\05-strc\s2182\s2182GP01.dgn

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	143-A(200)			
		143 MA 002			

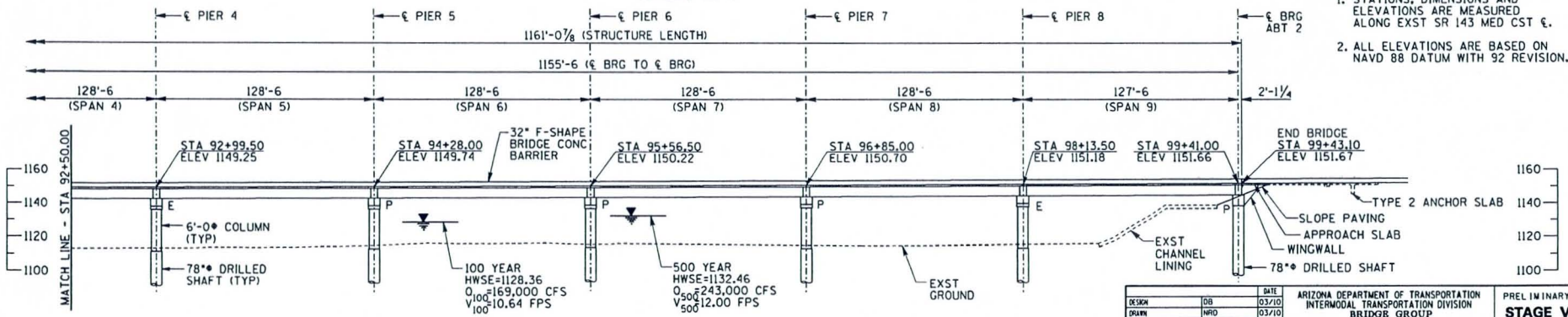


PLAN

EXST 9 SPAN PRECAST/PRESTRESSED CONCRETE AASHTO TYPE VI GIRDER BRIDGE
WIDENED LEFT WITH AASHTO TYPE VI GIRDERS
SKEW 19°13'59"LT
1' CONTOUR INTERVAL
SCALE: 1"=30'-0

NOTES:

1. STATIONS, DIMENSIONS AND ELEVATIONS ARE MEASURED ALONG EXST SR 143 MED CST ℄.
2. ALL ELEVATIONS ARE BASED ON NAVD 88 DATUM WITH 92 REVISION.



ELEVATION

SCALE: 1"=30'-0

		DATE
DESIGN	DB	03/10
DRAWN	NRO	03/10
CHECKED	DRS	03/10

Stanley Consultants inc.
3641 East Camelback Road, Suite 100
Phoenix, Arizona 85018
Phone: (602) 319-2200

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
BRIDGE GROUP

87+
SALT RIVER BRIDGE
GENERAL PLAN & ELEVATION

ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
SR 143	1.73	2182	SR 143 / SKY HARBOR BLVD TI

PRELIMINARY
STAGE V
100% Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-2.02

TRACS NO. H7528 01C | 143-A(200) | ___ OF ___

2/24/2010 q:\21926\11-cadd\05-strc\s2182\s2182GP02.dgn

Appendix D Stage II Initial Drainage Concept Report – Modified Existing Conditions HEC-RAS Model

Excerpts

SR 143 / Sky Harbor Blvd. TI
Initial Salt River
Drainage Concept Report

TRACS NO. H7528 O1C

Prepared for:

ADOT

and

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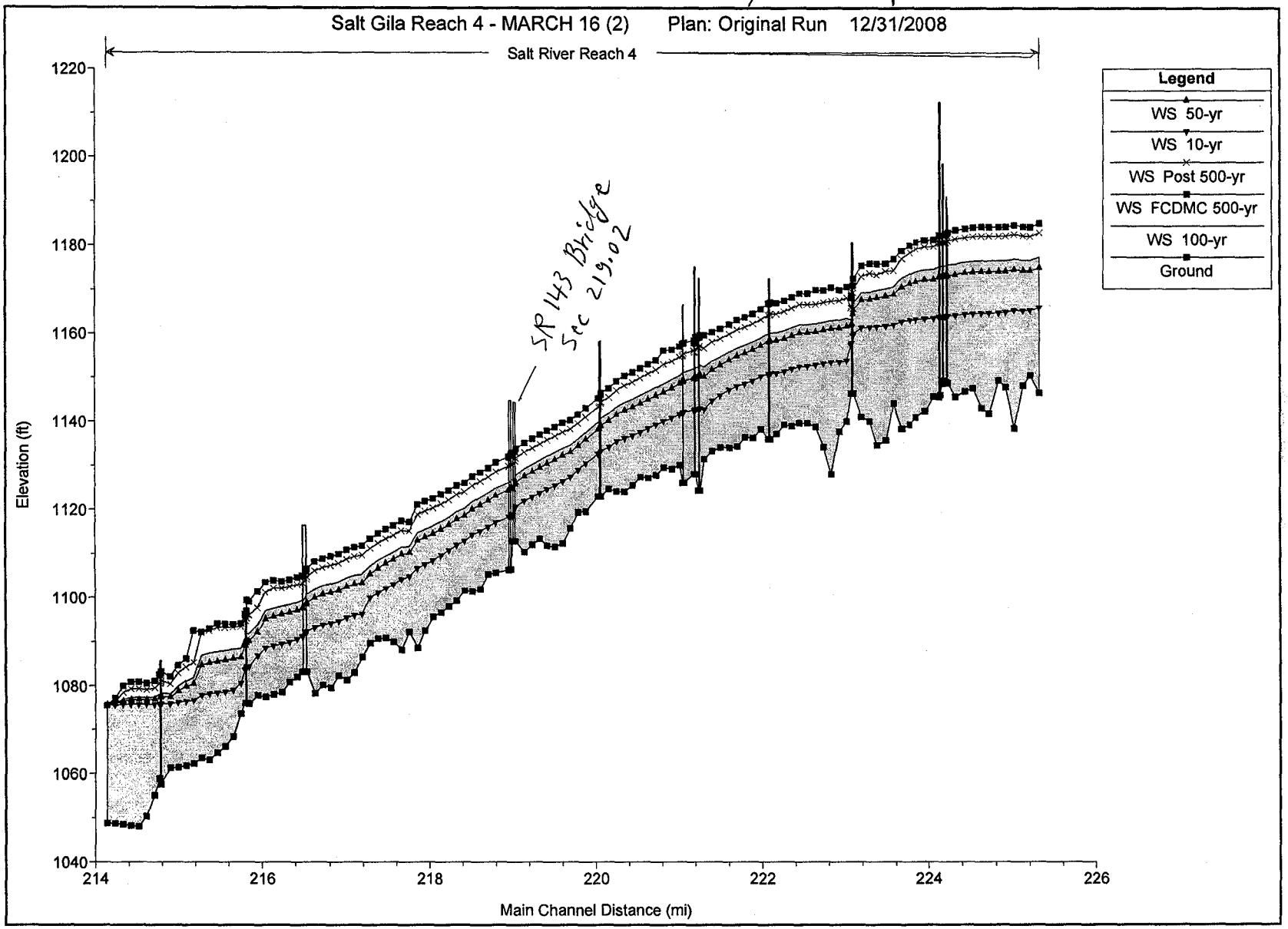
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO. 23170
JEFFREY J. HOLZMEISTER
Date Signed 1/2/09
ARIZONA, U.S.A.
Expires 03/31/09

January 2009

per FEMA study
(modified slightly
as explained in text)



HEC-RAS Plan: ORIG River: Salt River Reach: Reach 4 (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Reach 4	221.61	100-yr	172000.00	1155.69	1133.98	21.71	1149.71	1157.97	0.001593	12.12	14189.54	1387.40	15.32	18794.29	20399.20	1387.40	0.55
Reach 4	221.61	50-yr	145000.00	1153.87	1133.98	19.89	1148.45	1155.95	0.001624	11.58	12517.81	887.55	14.10	19491.39	20392.79	887.55	0.54
Reach 4	221.61	10-yr	58000.00	1147.11	1133.98	13.13	1143.74	1148.18	0.001562	8.31	6979.87	1104.75	8.80	18803.12	20364.71	1104.75	0.49
Reach 4	221.61	Post 500-yr	246000.00	1159.80	1133.98	25.82	1152.96	1162.68	0.001518	13.63	18047.29	1810.84	18.96	18790.08	21158.39	1810.84	0.55
Reach 4	221.61	FCDMC 500-yr	292000.00	1162.00	1133.98	28.02	1154.92	1165.25	0.001509	14.49	20155.83	1920.28	20.88	18787.84	21245.24	1920.28	0.56
Reach 4	221.50	100-yr	172000.00	1154.61	1134.08	20.53	1149.19	1157.01	0.001736	12.44	13831.85	1332.19	14.89	18874.31	20456.32	1332.19	0.57
Reach 4	221.50	50-yr	145000.00	1152.68	1134.08	18.60	1147.96	1154.93	0.001913	12.03	12056.78	916.01	13.16	19533.67	20449.68	916.01	0.58
Reach 4	221.50	10-yr	58000.00	1145.85	1134.08	11.77	1143.28	1147.13	0.002099	9.06	6399.85	905.23	8.01	18908.02	20388.63	905.23	0.56
Reach 4	221.50	Post 500-yr	246000.00	1158.82	1134.08	24.74	1152.63	1161.78	0.001595	13.82	17804.20	1404.89	18.61	18869.29	20470.87	1404.89	0.56
Reach 4	221.50	FCDMC 500-yr	292000.00	1161.02	1134.08	26.94	1154.18	1164.35	0.001637	14.64	19944.28	1538.94	19.91	18866.68	20756.20	1538.94	0.58
Reach 4	221.40	100-yr	172000.00	1153.70	1133.21	20.49	1147.88	1155.98	0.002231	12.11	14204.80	1061.47	14.96	19292.76	20460.91	1061.47	0.55
Reach 4	221.40	50-yr	145000.00	1151.67	1133.21	18.45	1146.66	1153.82	0.002392	11.78	12313.90	904.15	13.62	19523.45	20429.19	904.15	0.56
Reach 4	221.40	10-yr	58000.00	1144.66	1133.21	11.45	1141.77	1145.90	0.002780	8.94	6485.99	834.55	8.01	19337.81	20393.37	834.55	0.56
Reach 4	221.40	Post 500-yr	246000.00	1158.06	1133.21	24.85	1151.13	1160.79	0.002098	13.26	18546.45	1356.46	17.97	18974.13	20507.84	1356.46	0.55
Reach 4	221.40	FCDMC 500-yr	292000.00	1160.30	1133.21	27.09	1153.03	1163.32	0.002092	13.95	20927.13	1529.38	19.43	18965.14	20845.97	1529.38	0.56
Reach 4	221.31	100-yr	172000.00	1152.34	1131.43	20.91	1146.83	1154.79	0.002382	12.57	13682.95	1151.95	15.03	19154.65	21017.15	1151.95	0.57
Reach 4	221.31	50-yr	145000.00	1150.14	1131.43	18.71	1145.57	1152.52	0.002667	12.37	11719.02	869.26	13.48	19581.11	20459.41	869.26	0.59
Reach 4	221.31	10-yr	58000.00	1142.65	1131.43	11.22	1140.74	1144.23	0.003850	10.07	5759.15	767.96	7.50	19602.05	20370.01	767.96	0.65
Reach 4	221.31	Post 500-yr	246000.00	1156.70	1131.43	25.27	1150.27	1159.68	0.002230	13.84	17768.61	1700.28	18.26	18823.97	21026.88	1700.28	0.57
Reach 4	221.31	FCDMC 500-yr	292000.00	1159.57	1131.43	28.14	1152.04	1162.24	0.001803	13.42	24638.14	1917.44	13.73	18698.13	21033.68	1917.44	0.52
Reach 4	221.26	100-yr	169000.00	1152.74	1124.29	28.45	1142.64	1154.08	0.000958	9.29	18194.16	1086.76	19.03	19355.33	20451.88	1086.76	0.38
Reach 4	221.26	50-yr	140000.00	1150.61	1124.29	26.32	1141.36	1151.77	0.000928	8.64	16194.81	925.49	17.50	19518.52	20444.02	925.49	0.36
Reach 4	221.26	10-yr	55000.00	1142.99	1124.29	18.70	1136.85	1143.51	0.000783	5.82	9446.41	862.71	10.95	19534.20	20396.91	862.71	0.31
Reach 4	221.26	Post 500-yr	243000.00	1157.20	1124.29	32.91	1145.57	1158.93	0.000971	10.64	23643.89	1245.69	20.14	19250.65	20679.00	1245.69	0.39
Reach 4	221.26	FCDMC 500-yr	289000.00	1159.73	1124.29	35.44	1147.28	1161.69	0.000968	11.32	26686.46	1412.08	21.82	19250.65	20686.76	1412.08	0.40
Reach 4	221.25		Bridge														
Reach 4	221.24	100-yr	169000.00	1152.40	1124.29	28.11	1142.64	1153.79	0.001016	9.46	17871.03	1071.47	18.71	19356.58	20450.63	1071.47	0.39
Reach 4	221.24	50-yr	140000.00	1150.31	1124.29	26.02	1141.36	1151.51	0.000981	8.80	15916.11	923.90	17.23	19519.00	20442.91	923.90	0.37
Reach 4	221.24	10-yr	55000.00	1142.80	1124.29	18.51	1136.85	1143.34	0.000828	5.92	9283.92	861.54	10.78	19535.10	20396.64	861.54	0.32
Reach 4	221.24	Post 500-yr	243000.00	1156.80	1124.29	32.51	1145.57	1158.60	0.001028	10.84	23179.56	1224.68	19.87	19250.65	20677.79	1224.68	0.40
Reach 4	221.24	FCDMC 500-yr	289000.00	1159.33	1124.29	35.04	1147.28	1161.35	0.001021	11.52	26194.66	1386.98	21.56	19250.65	20685.53	1386.98	0.41
Reach 4	221.2	100-yr	169000.00	1152.18	1128.00	24.18	1142.36	1153.60	0.001063	9.54	17708.00	1104.45	18.21	19206.68	20391.90	1104.45	0.39
Reach 4	221.2	50-yr	140000.00	1150.09	1128.00	22.09	1141.05	1151.32	0.000981	8.90	15732.78	904.14	17.40	19448.45	20386.05	904.14	0.38
Reach 4	221.2	10-yr	55000.00	1142.65	1128.00	14.65	1136.35	1143.20	0.000785	5.92	9285.64	833.51	11.14	19505.22	20338.73	833.51	0.31
Reach 4	221.2	Post 500-yr	243000.00	1156.56	1128.00	28.56	1145.41	1158.40	0.001066	10.95	22857.27	1241.31	19.38	19176.78	20499.86	1241.31	0.41
Reach 4	221.2	FCDMC 500-yr	289000.00	1159.11	1128.00	31.10	1147.26	1161.16	0.001044	11.59	26158.52	1326.11	19.73	19172.34	20526.07	1326.11	0.41
Reach 4	221.195		Bridge														
Reach 4	221.19	100-yr	169000.00	1151.82	1128.00	23.82	1142.36	1153.29	0.001131	9.74	17353.06	1048.85	17.91	19208.19	20390.87	1048.85	0.41
Reach 4	221.19	50-yr	140000.00	1149.77	1128.00	21.77	1141.05	1151.05	0.001033	9.07	15443.04	897.48	17.21	19487.67	20385.15	897.48	0.39
Reach 4	221.19	10-yr	55000.00	1142.47	1128.00	14.47	1136.35	1143.03	0.000828	6.02	9132.20	832.47	10.97	19505.57	20338.05	832.47	0.32
Reach 4	221.19	Post 500-yr	243000.00	1156.01	1128.00	28.01	1145.41	1157.95	0.001159	11.24	22210.48	1227.10	18.94	19177.74	20494.75	1227.10	0.42
Reach 4	221.19	FCDMC 500-yr	289000.00	1158.37	1128.00	30.37	1147.26	1160.57	0.001160	11.99	25010.75	1289.51	20.81	19173.63	20518.11	1289.51	0.43
Reach 4	221.06	100-yr	169000.00	1151.09	1126.00	25.09	1141.03	1152.57	0.001073	9.77	17296.33	1353.11	18.76	19173.07	20583.73	1353.11	0.40
Reach 4	221.06	50-yr	140000.00	1149.15	1126.00	23.15	1139.66	1150.40	0.000927	8.97	15612.42	848.38	18.40	19582.05	20430.44	848.38	0.37
Reach 4	221.06	10-yr	55000.00	1142.04	1126.00	16.04	1134.52	1142.54	0.000640	5.65	9742.22	805.10	12.10	19597.83	20402.93	805.10	0.29
Reach 4	221.06	Post 500-yr	243000.00	1155.41	1126.00	29.41	1144.16	1157.18	0.001046	10.88	24270.48	1474.12	18.08	19124.05	20616.11	1474.12	0.40

HEC-RAS Plan: ORIG River: Salt River Reach: Reach 4 (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Reach 4	221.06	FCDMC 500-yr	289000.00	1157.88	1126.00	31.88	1145.90	1159.77	0.001009	11.37	28539.77	1512.69	18.87	19106.65	20619.34	1512.69	0.40
Reach 4	221.055		Bridge														
Reach 4	221.05	100-yr	169000.00	1150.84	1126.00	24.84	1141.03	1152.36	0.001100	9.90	17069.98	1318.22	18.79	19175.20	20568.36	1318.22	0.40
Reach 4	221.05	50-yr	140000.00	1148.95	1126.00	22.95	1139.66	1150.23	0.000960	9.07	15439.52	846.99	18.23	19582.51	20429.49	846.99	0.37
Reach 4	221.05	10-yr	55000.00	1141.94	1126.00	15.94	1134.52	1142.44	0.000659	5.69	9658.32	804.54	12.00	19598.06	20402.60	804.54	0.29
Reach 4	221.05	Post 500-yr	243000.00	1154.87	1126.00	28.87	1144.16	1156.98	0.001236	11.67	20827.29	1464.70	22.02	19127.88	20615.40	1464.70	0.44
Reach 4	221.05	FCDMC 500-yr	289000.00	1157.61	1126.00	31.61	1145.90	1159.43	0.000994	11.20	28138.26	1510.47	18.63	19108.53	20619.00	1510.47	0.40
Reach 4	221.02	100-yr	169000.00	1150.36	1130.06	20.30	1142.60	1152.13	0.001403	10.69	15806.15	1161.03	17.56	19197.81	20574.31	1161.03	0.45
Reach 4	221.02	50-yr	140000.00	1148.49	1130.06	18.43	1141.31	1150.01	0.001370	9.90	14136.15	887.58	15.93	19524.26	20411.85	887.58	0.44
Reach 4	221.02	10-yr	55000.00	1141.58	1130.06	11.52	1136.73	1142.28	0.001188	6.70	8204.85	833.62	9.84	19537.46	20371.07	833.62	0.38
Reach 4	221.02	Post 500-yr	243000.00	1154.63	1130.06	24.57	1145.67	1156.76	0.001381	11.89	21483.40	1488.87	16.34	19083.05	20639.33	1488.87	0.46
Reach 4	221.02	FCDMC 500-yr	289000.00	1157.02	1130.06	26.96	1147.40	1159.20	0.001279	12.22	26535.18	2825.59	9.39	15839.33	20649.24	2825.59	0.45
Reach 4	220.92	100-yr	169000.00	1149.39	1129.16	20.23	1142.53	1151.34	0.001666	11.22	15057.52	1071.91	16.62	19123.61	20454.11	1071.91	0.49
Reach 4	220.92	50-yr	140000.00	1147.54	1129.16	18.38	1141.21	1149.24	0.001659	10.45	13391.94	894.41	14.97	19551.49	20445.91	894.41	0.48
Reach 4	220.92	10-yr	55000.00	1140.78	1129.16	11.62	1136.63	1141.59	0.001504	7.22	7614.39	824.29	9.24	19564.55	20388.85	824.29	0.42
Reach 4	220.92	Post 500-yr	243000.00	1153.67	1129.16	24.51	1145.70	1156.00	0.001563	12.42	20642.84	1497.55	14.26	16988.62	20591.82	1497.55	0.49
Reach 4	220.92	FCDMC 500-yr	289000.00	1156.31	1129.16	27.15	1147.39	1158.54	0.001343	12.42	28315.62	4471.92	6.33	15076.14	20609.46	4471.92	0.46
Reach 4	220.82	100-yr	169000.00	1148.53	1129.56	18.97	1141.75	1150.47	0.001688	11.19	15099.48	1082.76	16.41	19230.50	20430.30	1082.76	0.49
Reach 4	220.82	50-yr	140000.00	1146.67	1129.56	17.11	1140.45	1148.36	0.001700	10.45	13399.04	911.03	14.71	19511.81	20422.84	911.03	0.48
Reach 4	220.82	10-yr	55000.00	1140.00	1129.56	10.44	1135.83	1140.81	0.001523	7.21	7631.91	837.09	9.12	19519.00	20356.09	837.09	0.42
Reach 4	220.82	Post 500-yr	243000.00	1152.97	1129.56	23.41	1144.89	1155.17	0.001482	12.14	22512.50	3261.35	6.90	15034.75	20448.18	3261.35	0.47
Reach 4	220.82	FCDMC 500-yr	289000.00	1156.14	1129.56	26.58	1146.56	1157.74	0.001018	10.98	35876.48	5010.18	7.39	14966.67	21291.85	5010.18	0.40
Reach 4	220.73	100-yr	169000.00	1147.59	1127.69	19.90	1141.07	1149.62	0.001716	11.43	14781.46	1018.33	16.71	18748.70	21437.99	1018.33	0.49
Reach 4	220.73	50-yr	140000.00	1145.76	1127.69	18.07	1139.80	1147.52	0.001705	10.63	13171.64	875.80	15.04	19538.15	20413.95	875.80	0.48
Reach 4	220.73	10-yr	55000.00	1139.20	1127.69	11.51	1135.27	1140.03	0.001607	7.30	7532.32	844.45	8.92	19547.29	20391.74	844.45	0.43
Reach 4	220.73	Post 500-yr	243000.00	1151.60	1127.69	23.91	1144.05	1154.31	0.001785	13.23	18365.33	2732.77	20.23	14944.37	21680.77	2732.77	0.52
Reach 4	220.73	FCDMC 500-yr	289000.00	1153.81	1127.69	26.12	1145.75	1156.93	0.001834	14.17	20399.63	5052.42	21.96	14827.56	21754.82	5052.42	0.53
Reach 4	220.63	100-yr	169000.00	1146.74	1127.10	19.64	1140.26	1148.75	0.001735	11.38	14855.62	981.89	16.45	19413.69	21324.74	981.89	0.49
Reach 4	220.63	50-yr	140000.00	1144.92	1127.10	17.82	1139.00	1146.66	0.001691	10.57	13239.61	881.86	15.01	19548.46	20430.32	881.86	0.48
Reach 4	220.63	10-yr	55000.00	1138.40	1127.10	11.30	1134.49	1139.22	0.001627	7.28	7557.53	860.26	8.79	19556.97	20417.23	860.26	0.43
Reach 4	220.63	Post 500-yr	243000.00	1150.73	1127.10	23.63	1143.21	1153.40	0.001796	13.12	18526.20	2565.37	19.87	14824.00	21785.68	2565.37	0.52
Reach 4	220.63	FCDMC 500-yr	289000.00	1152.94	1127.10	25.84	1144.86	1155.99	0.001822	14.03	20599.02	4476.73	21.76	14824.00	22761.49	4476.73	0.53
Reach 4	220.54	100-yr	169000.00	1145.84	1127.32	18.52	1139.56	1147.87	0.001789	11.42	14796.37	1107.03	16.17	15189.17	21276.41	1107.03	0.50
Reach 4	220.54	50-yr	140000.00	1144.03	1127.32	16.71	1138.26	1145.79	0.001763	10.64	13158.48	896.19	14.68	19534.85	20438.18	896.19	0.49
Reach 4	220.54	10-yr	55000.00	1137.54	1127.32	10.22	1133.77	1138.39	0.001691	7.37	7464.74	896.05	8.70	19394.49	20415.23	896.05	0.44
Reach 4	220.54	Post 500-yr	243000.00	1149.81	1127.32	22.49	1142.47	1152.49	0.001825	13.16	18470.12	2767.30	19.72	14801.12	21646.44	2767.30	0.52
Reach 4	220.54	FCDMC 500-yr	289000.00	1152.00	1127.32	24.68	1144.13	1155.07	0.001847	14.07	20536.91	4920.88	21.64	14801.12	21963.71	4920.88	0.53
Reach 4	220.45	100-yr	169000.00	1144.97	1125.43	19.54	1138.58	1146.99	0.001759	11.39	14837.15	1293.62	16.33	14868.06	21355.78	1293.62	0.50
Reach 4	220.45	50-yr	140000.00	1143.20	1125.43	17.77	1137.29	1144.93	0.001705	10.57	13241.39	887.10	14.93	19556.54	20443.63	887.10	0.48
Reach 4	220.45	10-yr	55000.00	1136.77	1125.43	11.33	1132.76	1137.57	0.001571	7.22	7621.61	895.06	8.92	19400.51	20418.87	895.06	0.43
Reach 4	220.45	Post 500-yr	243000.00	1148.91	1125.43	23.48	1141.43	1151.59	0.001832	13.15	18478.30	3430.98	19.67	14746.98	21978.05	3430.98	0.52
Reach 4	220.45	FCDMC 500-yr	289000.00	1151.09	1125.43	25.66	1143.17	1154.16	0.001860	14.07	20540.41	5585.27	21.53	14746.98	21998.95	5585.27	0.53
Reach 4	220.35	100-yr	169000.00	1144.24	1123.99	20.25	1137.16	1146.11	0.001554	10.95	15436.70	1375.58	16.86	15058.62	22111.54	1375.58	0.47
Reach 4	220.35	50-yr	140000.00	1142.50	1123.99	18.51	1135.86	1144.08	0.001480	10.10	13856.07	894.44	15.49	19547.92	20453.60	894.44	0.45
Reach 4	220.35	10-yr	55000.00	1136.17	1123.99	12.18	1131.41	1136.85	0.001182	6.61	8318.20	877.08	9.67	19426.82	20439.18	877.08	0.37
Reach 4	220.35	Post 500-yr	243000.00	1148.14	1123.99	24.15	1140.11	1150.66	0.001659	12.75	19057.73	3997.03	20.21	14725.39	22118.32	3997.03	0.50

HEC-RAS Plan: ORIG River: Salt River Reach: Reach 4 (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Reach 4	220.35	FCDMC 500-yr	289000.00	1150.30	1123.99	26.31	1141.79	1153.21	0.001703	13.69	21111.85	6278.33	22.05	14725.39	22121.54	6278.33	0.51
Reach 4	220.25	100-yr	169000.00	1143.14	1124.01	19.13	1137.11	1145.23	0.001890	11.59	14576.29	1743.51	15.85	14669.30	21509.23	1743.51	0.51
Reach 4	220.25	50-yr	140000.00	1141.45	1124.01	17.44	1135.76	1143.24	0.001822	10.73	13041.61	899.27	14.50	19553.39	20462.08	899.27	0.50
Reach 4	220.25	10-yr	55000.00	1135.37	1124.01	11.36	1131.39	1136.16	0.001545	7.15	7691.21	863.96	8.90	19580.78	20444.74	863.96	0.42
Reach 4	220.25	Post 500-yr	243000.00	1146.94	1124.01	22.93	1140.05	1149.73	0.001963	13.41	18119.25	4394.54	19.19	14669.30	21950.88	4394.54	0.54
Reach 4	220.25	FCDMC 500-yr	289000.00	1149.06	1124.01	25.05	1141.74	1152.26	0.001993	14.35	20135.58	6445.95	21.01	14669.30	22184.01	6445.95	0.55
Reach 4	220.16	100-yr	169000.00	1141.74	1124.58	17.16	1136.93	1144.14	0.002358	12.43	13590.90	1469.68	14.89	14558.26	21594.09	1469.68	0.57
Reach 4	220.16	50-yr	140000.00	1140.10	1124.58	15.52	1135.69	1142.18	0.002354	11.57	12103.00	905.35	13.37	19564.43	20469.79	905.35	0.56
Reach 4	220.16	10-yr	55000.00	1134.19	1124.58	9.61	1131.20	1135.20	0.002357	8.06	6821.10	933.54	7.75	19576.08	21211.61	933.54	0.51
Reach 4	220.16	Post 500-yr	243000.00	1145.44	1124.58	20.86	1139.83	1148.61	0.002384	14.29	17005.47	4646.68	18.22	14558.26	21636.50	4646.68	0.59
Reach 4	220.16	FCDMC 500-yr	289000.00	1147.51	1124.58	22.93	1141.47	1151.12	0.002397	15.25	18953.38	6167.20	20.01	14558.26	21772.77	6167.20	0.60
Reach 4	220.06	100-yr	169000.00	1140.72	1122.90	17.82	1135.42	1142.99	0.002142	12.08	13991.98	909.53	15.38	19565.91	20475.44	909.53	0.54
Reach 4	220.06	50-yr	140000.00	1139.09	1122.90	16.19	1134.19	1141.04	0.002115	11.19	12513.69	904.71	13.83	19568.07	20472.78	904.71	0.53
Reach 4	220.06	10-yr	55000.00	1133.24	1122.90	10.34	1129.84	1134.12	0.001881	7.53	7305.09	879.08	8.31	19584.13	20463.21	879.08	0.46
Reach 4	220.06	Post 500-yr	243000.00	1144.40	1122.90	21.50	1138.33	1147.44	0.002201	14.00	17355.22	942.21	18.86	18820.00	20481.45	942.21	0.57
Reach 4	220.06	FCDMC 500-yr	289000.00	1146.45	1122.90	23.55	1139.97	1149.95	0.002228	15.02	19247.08	1060.95	20.77	18820.00	20484.79	1060.95	0.58
Reach 4	220.05		Bridge														
Reach 4	220.03	100-yr	169000.00	1139.74	1122.90	16.84	1135.42	1142.32	0.002655	12.90	13098.31	906.62	14.45	19567.21	20473.83	906.62	0.60
Reach 4	220.03	50-yr	140000.00	1138.18	1122.90	15.28	1134.19	1140.40	0.002624	11.98	11689.03	897.42	13.03	19573.86	20471.29	897.42	0.58
Reach 4	220.03	10-yr	55000.00	1132.59	1122.90	9.69	1129.84	1133.62	0.002457	8.17	6734.99	876.98	7.68	19585.18	20462.15	876.98	0.52
Reach 4	220.03	Post 500-yr	243000.00	1143.25	1122.90	20.34	1138.33	1146.70	0.002698	14.91	16297.45	917.01	17.77	19562.56	20479.57	917.01	0.62
Reach 4	220.03	FCDMC 500-yr	289000.00	1145.19	1122.90	22.29	1139.97	1149.16	0.002723	15.98	18089.72	988.40	19.60	18820.00	20482.75	988.40	0.64
Reach 4	219.88	100-yr	169000.00	1137.45	1119.50	17.94	1133.48	1140.11	0.002848	13.11	12892.66	2003.97	14.04	18513.00	21604.89	2003.97	0.62
Reach 4	219.88	50-yr	140000.00	1135.91	1119.50	16.41	1132.25	1138.22	0.002834	12.18	11490.07	910.69	12.62	19568.33	20479.02	910.69	0.60
Reach 4	219.88	10-yr	55000.00	1130.47	1119.50	10.96	1127.99	1131.55	0.002721	8.36	6579.60	892.89	7.37	19577.60	20470.48	892.89	0.54
Reach 4	219.88	Post 500-yr	243000.00	1140.95	1119.50	21.45	1136.32	1144.47	0.002869	15.05	16147.01	3955.07	17.19	14514.07	21618.17	3955.07	0.64
Reach 4	219.88	FCDMC 500-yr	289000.00	1142.92	1119.50	23.42	1137.95	1146.92	0.002873	16.05	18006.48	5444.16	18.93	14514.07	21620.13	5444.16	0.65
Reach 4	219.79	100-yr	169000.00	1135.96	1119.30	16.66	1132.29	1138.69	0.003007	13.26	12748.07	2039.46	13.68	18525.15	21705.02	2039.46	0.63
Reach 4	219.79	50-yr	140000.00	1134.40	1119.30	15.10	1131.07	1136.78	0.003060	12.39	11295.26	925.95	12.20	19516.66	20442.62	925.95	0.63
Reach 4	219.79	10-yr	55000.00	1128.91	1119.30	9.61	1126.81	1130.11	0.003229	8.76	6278.18	963.56	6.94	19525.27	21630.26	963.56	0.59
Reach 4	219.79	Post 500-yr	243000.00	1139.52	1119.30	20.22	1135.12	1143.05	0.002945	15.10	16096.77	3787.18	16.91	14407.68	21873.07	3787.18	0.65
Reach 4	219.79	FCDMC 500-yr	289000.00	1141.52	1119.30	22.22	1136.72	1145.51	0.002914	16.04	18012.90	5124.33	18.68	14407.68	21876.57	5124.33	0.65
Reach 4	219.70	100-yr	169000.00	1134.64	1115.81	18.82	1130.66	1137.22	0.002805	12.91	13092.72	2045.94	13.85	18573.71	21924.35	2045.94	0.61
Reach 4	219.70	50-yr	140000.00	1133.02	1115.81	17.21	1129.46	1135.29	0.002877	12.10	11570.15	938.76	12.32	19569.15	20507.90	938.76	0.61
Reach 4	219.70	10-yr	55000.00	1127.32	1115.81	11.51	1125.27	1128.51	0.003279	8.75	6282.71	916.67	6.85	19576.57	20493.24	916.67	0.59
Reach 4	219.70	Post 500-yr	243000.00	1138.26	1115.81	22.45	1133.48	1141.60	0.002752	14.67	16559.96	2950.02	17.05	14890.70	22128.24	2950.02	0.63
Reach 4	219.70	FCDMC 500-yr	289000.00	1140.30	1115.81	24.48	1135.09	1144.06	0.002726	15.57	18557.69	4764.45	18.78	14652.28	22131.71	4764.45	0.63
Reach 4	219.61	100-yr	169000.00	1133.86	1112.39	21.47	1128.54	1135.93	0.002050	11.54	14651.07	2912.71	14.82	18557.63	21995.03	2912.71	0.53
Reach 4	219.61	50-yr	140000.00	1132.22	1112.39	19.83	1127.37	1134.01	0.002020	10.74	13041.36	970.58	13.44	19580.17	20550.75	970.58	0.52
Reach 4	219.61	10-yr	55000.00	1126.33	1112.39	13.94	1123.27	1127.20	0.002030	7.46	7375.75	1068.24	7.72	19586.83	21449.07	1068.24	0.47
Reach 4	219.61	Post 500-yr	243000.00	1137.56	1112.39	25.17	1131.24	1140.29	0.002054	13.25	18334.87	3321.22	18.26	17674.52	22243.60	3321.22	0.55
Reach 4	219.61	FCDMC 500-yr	289000.00	1139.63	1112.39	27.24	1132.81	1142.74	0.002053	14.15	20425.82	5047.58	20.16	14651.85	22247.28	5047.58	0.56
Reach 4	219.51	100-yr	169000.00	1132.93	1111.64	21.29	1127.41	1134.90	0.001942	11.27	14994.46	1910.51	14.90	18667.05	21891.06	1910.51	0.51
Reach 4	219.51	50-yr	140000.00	1131.28	1111.64	19.64	1126.24	1132.99	0.001941	10.49	13342.42	996.88	13.38	19546.32	20544.89	996.88	0.51
Reach 4	219.51	10-yr	55000.00	1125.39	1111.64	13.75	1122.16	1126.21	0.001884	7.25	7583.09	967.90	7.83	19567.48	20535.38	967.90	0.46
Reach 4	219.51	Post 500-yr	243000.00	1136.65	1111.64	25.01	1130.03	1139.25	0.001947	12.95	18763.71	3152.04	18.35	15079.31	22140.76	3152.04	0.53

HEC-RAS Plan: ORIG River: Salt River Reach: Reach 4 (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Reach 4	219.51	FCDMC 500-yr	289000.00	1138.73	1111.64	27.09	1131.71	1141.70	0.001945	13.82	20906.01	4332.60	20.27	14907.10	22145.56	4332.60	0.54
Reach 4	219.42	100-yr	169000.00	1132.00	1111.83	20.17	1126.40	1133.94	0.001898	11.18	15122.62	2401.01	14.97	18335.65	21973.03	2401.01	0.51
Reach 4	219.42	50-yr	140000.00	1130.35	1111.83	18.52	1125.23	1132.03	0.001899	10.40	13461.55	1002.92	13.42	19493.71	20496.62	1002.92	0.50
Reach 4	219.42	10-yr	55000.00	1124.49	1111.83	12.66	1121.18	1125.28	0.001815	7.15	7692.74	1601.73	7.89	18917.27	21633.06	1601.73	0.45
Reach 4	219.42	Post 500-yr	243000.00	1135.72	1111.83	23.89	1129.10	1138.28	0.001908	12.85	18907.41	4178.53	18.42	14620.63	22174.03	4178.53	0.53
Reach 4	219.42	FCDMC 500-yr	289000.00	1137.80	1111.83	25.97	1130.62	1140.73	0.001908	13.72	21061.70	5014.06	20.33	14620.63	22178.84	5014.06	0.54
Reach 4	219.33	100-yr	169000.00	1131.10	1113.40	17.70	1125.56	1133.04	0.001929	11.17	15132.27	2726.12	14.77	18119.30	21908.13	2726.12	0.51
Reach 4	219.33	50-yr	140000.00	1129.45	1113.40	16.04	1124.41	1131.13	0.001922	10.41	13450.92	1010.48	13.31	19442.24	20452.72	1010.48	0.50
Reach 4	219.33	10-yr	55000.00	1123.62	1113.40	10.22	1120.36	1124.42	0.001843	7.18	7663.22	2248.16	7.84	18815.76	21879.50	2248.16	0.45
Reach 4	219.33	Post 500-yr	243000.00	1134.83	1113.40	21.43	1128.29	1137.37	0.001917	12.80	18986.53	3706.97	18.22	15003.69	22038.56	3706.97	0.53
Reach 4	219.33	FCDMC 500-yr	289000.00	1136.93	1113.40	23.53	1129.77	1139.82	0.001907	13.64	21184.31	4621.46	20.15	14841.36	22165.46	4621.46	0.54
Reach 4	219.24	100-yr	169000.00	1130.16	1112.10	18.06	1124.69	1132.12	0.001988	11.23	15052.39	2682.79	14.58	18817.22	22208.36	2682.79	0.52
Reach 4	219.24	50-yr	140000.00	1128.51	1112.10	16.41	1123.52	1130.21	0.001969	10.48	13360.10	1009.86	13.23	19482.91	20497.77	1009.86	0.51
Reach 4	219.24	10-yr	55000.00	1122.77	1112.10	10.67	1119.47	1123.56	0.001816	7.15	7692.47	2083.19	7.89	18870.15	22188.63	2083.19	0.45
Reach 4	219.24	Post 500-yr	243000.00	1133.92	1112.10	21.82	1127.41	1136.47	0.001951	12.81	18965.60	3526.42	18.05	15333.78	22382.23	3526.42	0.53
Reach 4	219.24	FCDMC 500-yr	289000.00	1136.03	1112.10	23.93	1129.00	1138.92	0.001930	13.63	21199.57	5036.85	19.99	14646.32	22739.29	5036.85	0.54
Reach 4	219.14	100-yr	169000.00	1129.20	1110.40	18.80	1123.57	1131.11	0.001887	11.10	15231.13	2551.96	14.88	18939.02	22510.15	2551.96	0.51
Reach 4	219.14	50-yr	140000.00	1127.55	1110.40	17.15	1122.42	1129.21	0.001896	10.33	13550.50	1017.90	13.31	19484.33	20502.23	1017.90	0.50
Reach 4	219.14	10-yr	55000.00	1121.91	1110.40	11.51	1118.39	1122.66	0.001658	6.94	7928.89	1727.44	8.07	18998.06	22411.65	1727.44	0.43
Reach 4	219.14	Post 500-yr	243000.00	1132.97	1110.40	22.57	1126.29	1135.48	0.001866	12.72	19109.23	3905.81	18.45	17255.03	22550.50	3905.81	0.52
Reach 4	219.14	FCDMC 500-yr	289000.00	1135.09	1110.40	24.69	1127.85	1137.94	0.001853	13.56	21312.29	5240.48	20.45	15492.42	23254.48	5240.48	0.53
Reach 4	219.03 Post	100-yr	169000.00	1127.80	1112.90	14.90	1123.17	1129.95	0.002298	11.76	14371.47	1026.67	14.00	19340.45	20367.12	1026.67	0.55
Reach 4	219.03 "	50-yr	140000.00	1126.12	1112.90	13.22	1122.04	1128.02	0.002394	11.07	12648.80	1021.38	12.38	19342.75	20364.13	1021.38	0.55
Reach 4	219.03 "	10-yr	55000.00	1120.57	1112.90	7.67	1118.06	1121.52	0.002540	7.82	7036.40	1003.94	7.01	19350.34	20354.28	1003.94	0.52
Reach 4	219.03 "	Post 500-yr	243000.00	1131.62	1112.90	18.72	1125.82	1134.36	0.002154	13.26	18321.86	1038.71	17.64	19335.21	20373.92	1038.71	0.56
Reach 4	219.03 Pre	FCDMC ~~500-yr~~ SPF	289000.00	1133.77	1112.90	20.87	1127.26	1136.84	0.002096	14.06	20558.94	1045.47	19.66	19332.27	20377.74	1045.47	0.56
Reach 4	219.02		Bridge	←	SR 143 Bridge												
Reach 4	219.01	100-yr	169000.00	1126.36	1112.90	13.46	1123.17	1129.03	0.003271	13.10	12899.50	1022.15	12.62	19342.41	20364.57	1022.15	0.65
Reach 4	219.01	50-yr	140000.00	1124.60	1112.90	11.70	1122.04	1127.07	0.003672	12.61	11100.54	1016.60	10.92	19344.83	20361.43	1016.60	0.67
Reach 4	219.01	10-yr	55000.00	1118.25	1112.90	5.35	1118.06	1120.37	0.009577	11.68	4708.85	996.62	4.72	19353.52	20350.14	996.62	0.95
Reach 4	219.01	Post 500-yr	243000.00	1130.23	1112.90	17.33	1125.82	1133.45	0.002814	14.40	16875.25	1034.32	16.32	19337.12	20371.44	1034.32	0.63
Reach 4	219.01	FCDMC 500-yr	289000.00	1132.37	1112.90	19.46	1127.26	1135.92	0.002665	15.14	19091.86	1041.04	18.34	19334.20	20375.24	1041.04	0.62
Reach 4	218.97	100-yr	169000.00	1126.74	1106.45	20.29	1120.33	1128.50	0.001620	10.65	15870.35	1056.96	15.72	19490.06	20617.67	1056.96	0.47
Reach 4	218.97	50-yr	140000.00	1125.00	1106.45	18.55	1119.16	1126.52	0.001596	9.91	14130.36	991.55	14.25	19492.65	20484.20	991.55	0.46
Reach 4	218.97	10-yr	55000.00	1118.89	1106.45	12.43	1115.12	1119.60	0.001510	6.77	8126.14	972.30	8.36	19501.73	20474.03	972.30	0.41
Reach 4	218.97	Post 500-yr	243000.00	1130.61	1106.45	24.16	1123.03	1132.95	0.001642	12.27	19811.79	1089.45	19.26	19484.32	20617.67	1089.45	0.49
Reach 4	218.97	FCDMC 500-yr	289000.00	1132.75	1106.45	26.30	1124.56	1135.42	0.001656	13.12	22024.86	1107.44	21.19	19481.14	20617.67	1107.44	0.50
Reach 4	218.965		Bridge														
Reach 4	218.96	100-yr	169000.00	1126.03	1106.31	19.72	1120.69	1128.02	0.002010	11.32	14931.15	1096.74	14.63	19477.87	20641.85	1096.74	0.52
Reach 4	218.96	50-yr	140000.00	1124.31	1106.31	18.00	1119.55	1126.06	0.002033	10.61	13198.83	1003.75	13.15	19480.26	20484.02	1003.75	0.52
Reach 4	218.96	10-yr	55000.00	1118.30	1106.31	11.99	1115.51	1119.20	0.002279	7.62	7218.99	986.01	7.32	19488.65	20474.66	986.01	0.50
Reach 4	218.96	Post 500-yr	243000.00	1129.83	1106.31	23.52	1123.38	1132.41	0.001962	12.90	18839.62	1124.76	18.15	19472.57	20641.85	1124.76	0.53
Reach 4	218.96	FCDMC 500-yr	289000.00	1131.92	1106.31	25.61	1124.86	1134.86	0.001951	13.74	21026.04	1140.23	20.07	19469.64	20641.85	1140.23	0.54
Reach 4	218.80	100-yr	169000.00	1124.77	1105.09	19.68	1118.27	1126.50	0.001572	10.55	16025.08	2479.22	15.84	19390.29	23036.71	2479.22	0.47
Reach 4	218.80	50-yr	140000.00	1123.07	1105.70	17.37	1117.08	1124.55	0.001538	9.78	14317.33	996.80	14.36	19494.54	20491.35	996.80	0.45

HEC-RAS Plan: ORIG River: Salt River Reach: Reach 4 (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Reach 4	218.80	10-yr	55000.00	1117.04	1105.09	11.95	1113.07	1117.71	0.001382	6.57	8367.85	1581.72	8.55	19503.80	21687.86	1581.72	0.40
Reach 4	218.80	Post 500-yr	243000.00	1128.57	1105.09	23.48	1120.96	1130.88	0.001620	12.21	19897.64	3115.04	19.33	19389.90	23165.45	3115.04	0.49
Reach 4	218.80	FCDMC 500-yr	289000.00	1130.66	1105.09	25.57	1122.44	1133.32	0.001647	13.10	22057.06	3268.84	21.24	19389.69	23180.28	3268.84	0.50
Reach 4	218.71	100-yr	169000.00	1123.63	1105.38	18.25	1118.14	1125.63	0.001939	11.35	14891.77	3165.43	15.09	19053.70	23203.02	3165.43	0.51
Reach 4	218.71	50-yr	140000.00	1121.96	1105.38	16.58	1116.95	1123.69	0.001949	10.57	13244.79	981.01	13.50	19512.95	20493.96	981.01	0.51
Reach 4	218.71	10-yr	55000.00	1116.10	1105.38	10.72	1112.88	1116.92	0.001889	7.28	7559.10	2043.98	7.87	19523.59	23131.81	2043.98	0.46
Reach 4	218.71	Post 500-yr	243000.00	1127.34	1105.38	21.96	1120.86	1129.99	0.001970	13.06	18603.92	3796.15	18.44	19040.17	23417.76	3796.15	0.54
Reach 4	218.71	FCDMC 500-yr	289000.00	1129.37	1105.38	23.99	1122.39	1132.41	0.001991	13.98	20665.36	4092.77	20.28	17665.32	23470.69	4092.77	0.55
Reach 4	218.61	100-yr	169000.00	1122.61	1101.91	20.70	1117.13	1124.63	0.001987	11.40	14827.75	3020.81	14.91	18798.47	24161.57	3020.81	0.52
Reach 4	218.61	50-yr	140000.00	1120.95	1101.91	19.04	1115.95	1122.70	0.001957	10.61	13196.70	974.86	13.54	19518.08	20492.94	974.86	0.51
Reach 4	218.61	10-yr	55000.00	1115.17	1101.91	13.26	1111.85	1115.98	0.001822	7.22	7621.06	2140.52	7.99	18825.80	21697.37	2140.52	0.45
Reach 4	218.61	Post 500-yr	243000.00	1126.31	1101.91	24.40	1119.87	1128.98	0.002012	13.09	18562.53	4358.97	18.20	18784.76	24409.37	4358.97	0.54
Reach 4	218.61	FCDMC 500-yr	289000.00	1128.35	1101.91	26.44	1121.41	1131.39	0.002027	14.00	20647.03	5212.11	20.02	14942.16	24491.21	5212.11	0.55
Reach 4	218.52	100-yr	169000.00	1121.59	1097.15	24.44	1116.21	1123.62	0.002038	11.43	14789.69	2019.27	14.67	18820.79	22544.58	2019.27	0.53
Reach 4	218.52	50-yr	140000.00	1119.94	1101.37	18.57	1115.04	1121.70	0.001993	10.64	13158.72	982.43	13.39	19513.66	20496.09	982.43	0.51
Reach 4	218.52	10-yr	55000.00	1114.24	1097.15	17.09	1110.96	1115.05	0.001853	7.23	7607.96	1361.19	7.90	18863.80	21015.02	1361.19	0.45
Reach 4	218.52	Post 500-yr	243000.00	1125.30	1097.15	28.15	1118.94	1127.96	0.002028	13.09	18560.63	2759.82	18.09	18484.08	22708.30	2759.82	0.54
Reach 4	218.52	FCDMC 500-yr	289000.00	1127.32	1097.15	30.17	1120.50	1130.37	0.002037	13.99	20652.43	3280.36	19.93	18338.79	24759.24	3280.36	0.55
Reach 4	218.42	100-yr	169000.00	1120.20	1101.56	18.64	1115.75	1122.48	0.002467	12.11	13956.46	1630.10	13.85	19506.78	22608.77	1630.10	0.57
Reach 4	218.42	50-yr	140000.00	1118.57	1101.56	17.01	1114.61	1120.57	0.002508	11.36	12318.75	990.86	12.43	19510.51	20501.37	990.86	0.57
Reach 4	218.42	10-yr	55000.00	1112.88	1101.56	11.32	1110.51	1113.91	0.002791	8.16	6743.17	1082.25	6.95	19523.46	22397.27	1082.25	0.55
Reach 4	218.42	Post 500-yr	243000.00	1123.95	1101.56	22.39	1118.47	1126.85	0.002345	13.68	17764.81	2332.85	17.30	17430.76	22862.81	2332.85	0.58
Reach 4	218.42	FCDMC 500-yr	289000.00	1125.97	1101.56	24.41	1120.04	1129.26	0.002322	14.55	19855.80	2668.21	19.14	17380.33	23801.06	2668.21	0.59
Reach 4	218.33	100-yr	169000.00	1119.49	1099.30	20.19	1113.67	1121.30	0.001772	10.78	15675.27	1051.47	14.91	19490.05	20541.51	1051.47	0.49
Reach 4	218.33	50-yr	140000.00	1117.83	1099.30	18.53	1112.54	1119.39	0.001754	10.04	13946.58	1033.89	13.49	19493.78	20527.67	1033.89	0.48
Reach 4	218.33	10-yr	55000.00	1112.02	1099.30	12.72	1108.54	1112.76	0.001664	6.87	8010.32	1011.66	7.92	19507.19	20518.85	1011.66	0.43
Reach 4	218.33	Post 500-yr	243000.00	1123.32	1099.30	24.02	1116.31	1125.68	0.001744	12.31	19743.83	1071.51	18.43	19481.65	20553.16	1071.51	0.51
Reach 4	218.33	FCDMC 500-yr	289000.00	1125.38	1099.30	26.08	1117.79	1128.07	0.001755	13.16	21962.31	1102.25	20.29	19428.10	20610.94	1102.25	0.51
Reach 4	218.24	100-yr	169000.00	1118.20	1097.97	20.23	1113.43	1120.30	0.002216	11.61	14553.05	1209.42	14.06	19418.16	22846.28	1209.42	0.55
Reach 4	218.24	50-yr	140000.00	1116.54	1097.97	18.57	1112.28	1118.39	0.002284	10.90	12838.83	1026.93	12.50	19422.49	20449.41	1026.93	0.54
Reach 4	218.24	10-yr	55000.00	1110.77	1097.97	12.80	1108.25	1111.73	0.002569	7.87	6992.78	999.38	7.00	19437.48	20436.86	999.38	0.52
Reach 4	218.24	Post 500-yr	243000.00	1122.05	1097.97	24.08	1116.04	1124.71	0.002084	13.08	18572.53	1637.66	17.63	18058.27	22853.24	1637.66	0.55
Reach 4	218.24	FCDMC 500-yr	289000.00	1124.22	1097.97	26.25	1117.58	1127.13	0.001999	13.75	21856.29	2210.57	13.06	15715.13	22857.16	2210.57	0.55
Reach 4	218.14	100-yr	169000.00	1117.26	1096.58	20.68	1111.95	1119.21	0.001975	11.22	15057.22	1392.55	14.58	19389.50	22922.42	1392.55	0.52
Reach 4	218.14	50-yr	140000.00	1115.56	1096.58	18.98	1110.82	1117.28	0.002024	10.52	13309.78	1025.38	12.98	19393.70	20419.08	1025.38	0.51
Reach 4	218.14	10-yr	55000.00	1109.64	1096.58	13.06	1106.54	1110.52	0.002218	7.52	7312.47	1000.63	7.31	19408.56	20409.20	1000.63	0.49
Reach 4	218.14	Post 500-yr	243000.00	1121.17	1096.58	24.59	1114.60	1123.68	0.001880	12.70	19132.44	1840.46	18.25	18260.79	22931.99	1840.46	0.52
Reach 4	218.14	FCDMC 500-yr	289000.00	1123.31	1096.58	26.73	1116.11	1126.15	0.001859	13.52	21382.79	2466.92	20.22	15678.39	22937.22	2466.92	0.53
Reach 4	218.04	100-yr	169000.00	1116.28	1095.51	20.77	1110.92	1118.21	0.001943	11.14	15166.22	1038.72	14.60	19390.10	20428.82	1038.72	0.51
Reach 4	218.04	50-yr	140000.00	1114.54	1095.51	19.03	1109.79	1116.24	0.002009	10.47	13368.86	1031.16	12.96	19394.22	20425.38	1031.16	0.51
Reach 4	218.04	10-yr	55000.00	1108.40	1095.51	12.89	1105.35	1109.33	0.002438	7.73	7119.00	1004.42	7.09	19408.80	20413.22	1004.42	0.51
Reach 4	218.04	Post 500-yr	243000.00	1120.27	1095.51	24.76	1113.56	1122.72	0.001829	12.56	19343.24	1542.91	18.32	17997.70	20436.71	1542.91	0.52
Reach 4	218.04	FCDMC 500-yr	289000.00	1122.42	1095.51	26.91	1115.06	1125.19	0.001806	13.36	21629.21	2179.11	20.31	17580.14	20440.98	2179.11	0.52
Reach 4	217.95	100-yr	169000.00	1115.57	1092.47	23.10	1109.19	1117.25	0.001553	10.40	16247.96	1042.17	15.59	19437.72	20479.88	1042.17	0.46
Reach 4	217.95	50-yr	140000.00	1113.81	1092.47	21.34	1108.02	1115.27	0.001572	9.71	14416.72	1035.17	13.93	19440.98	20476.16	1035.17	0.46
Reach 4	217.95	10-yr	55000.00	1107.51	1092.47	15.04	1103.32	1108.25	0.001682	6.89	7977.76	1010.19	7.90	19452.66	20462.85	1010.19	0.43
Reach 4	217.95	Post 500-yr	243000.00	1119.61	1092.47	27.14	1111.82	1121.79	0.001517	11.86	20486.47	1843.03	19.36	17851.64	20488.41	1843.03	0.48

HEC-RAS Plan: ORIG River: Salt River Reach: Reach 4 (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Reach 4	217.95	FCDMC 500-yr	289000.00	1121.77	1092.47	29.30	1113.32	1124.27	0.001523	12.68	22786.55	2604.88	21.37	17845.54	20492.75	2604.88	0.48
Reach 4	217.86	100-yr	169000.00	1114.83	1088.60	26.23	1108.37	1116.49	0.001531	10.34	16338.88	1206.98	15.65	18517.29	20541.25	1206.98	0.46
Reach 4	217.86	50-yr	140000.00	1113.05	1088.60	24.45	1107.17	1114.50	0.001551	9.66	14492.09	1036.85	13.98	19501.35	20538.21	1036.85	0.46
Reach 4	217.86	10-yr	55000.00	1106.68	1088.60	18.08	1100.72	1107.42	0.001697	6.90	7965.47	1139.93	7.87	18536.34	20527.28	1139.93	0.43
Reach 4	217.86	Post 500-yr	243000.00	1118.89	1088.60	30.29	1111.01	1121.05	0.001494	11.79	20609.50	1921.39	19.43	17954.50	20548.21	1921.39	0.47
Reach 4	217.86	FCDMC 500-yr	289000.00	1121.05	1088.60	32.45	1112.50	1123.52	0.001503	12.61	22912.38	2524.60	21.43	17934.95	20551.92	2524.60	0.48
Reach 4	217.76	100-yr	169000.00	1111.73	1092.19	19.54		1115.15	0.003709	14.83	11392.72	823.79	13.83	19555.64	20379.43	823.79	0.70
Reach 4	217.76	50-yr	140000.00	1110.24	1092.19	18.05		1113.18	0.003673	13.77	10167.96	816.84	12.45	19559.07	20375.92	816.84	0.69
Reach 4	217.76	10-yr	55000.00	1104.88	1092.19	12.69		1106.23	0.002968	9.32	5900.65	726.76	8.12	19636.54	20363.30	726.76	0.58
Reach 4	217.76	Post 500-yr	243000.00	1115.20	1092.19	23.01		1119.67	0.003698	16.98	14460.52	1009.80	14.32	18721.23	20387.60	1009.80	0.73
Reach 4	217.76	FCDMC 500-yr	289000.00	1117.24	1092.19	25.05	1113.60	1122.14	0.003579	17.87	16789.39	1341.95	12.51	18718.88	20392.39	1341.95	0.73
Reach 4	217.66	100-yr	169000.00	1111.44	1088.14	23.30	1106.04	1113.41	0.001960	11.25	15025.05	1099.77	14.72	19569.80	23397.16	1099.77	0.52
Reach 4	217.66	50-yr	140000.00	1109.80	1088.14	21.66	1104.89	1111.51	0.001967	10.48	13358.30	1012.06	13.20	19574.86	20586.92	1012.06	0.51
Reach 4	217.66	10-yr	55000.00	1104.14	1088.14	16.00	1098.22	1104.93	0.001820	7.14	7707.58	982.59	7.84	19591.44	20574.03	982.59	0.45
Reach 4	217.66	Post 500-yr	243000.00	1115.25	1088.14	27.11	1108.73	1117.81	0.001922	12.82	18952.55	1849.48	18.20	15719.11	23414.13	1849.48	0.53
Reach 4	217.66	FCDMC 500-yr	289000.00	1117.38	1088.14	29.24	1110.26	1120.27	0.001905	13.64	21181.48	2659.17	20.13	13922.33	23414.55	2659.17	0.54
Reach 4	217.57	100-yr	169000.00	1110.33	1089.90	20.43	1105.37	1112.36	0.002115	11.42	14802.77	1041.20	14.22	19521.41	20562.61	1041.20	0.53
Reach 4	217.57	50-yr	140000.00	1108.66	1089.90	18.76	1104.22	1110.44	0.002179	10.72	13062.56	1033.73	12.64	19525.11	20558.84	1033.73	0.53
Reach 4	217.57	10-yr	55000.00	1102.99	1089.90	13.09	1099.51	1103.88	0.002262	7.55	7281.63	1003.94	7.25	19537.58	20546.10	1003.94	0.49
Reach 4	217.57	Post 500-yr	243000.00	1114.24	1089.90	24.33	1107.93	1116.80	0.001984	12.86	18898.52	1897.93	17.85	18155.88	20571.38	1897.93	0.54
Reach 4	217.57	FCDMC 500-yr	289000.00	1116.40	1089.90	26.50	1109.49	1119.29	0.001938	13.63	21200.88	2353.17	19.85	18070.83	20682.46	2353.17	0.54
Reach 4	217.48	100-yr	169000.00	1109.48	1090.80	18.68	1104.01	1111.36	0.001879	11.00	15368.22	1524.27	14.69	19290.32	20982.15	1524.27	0.51
Reach 4	217.48	50-yr	140000.00	1107.77	1090.80	16.96	1102.87	1109.41	0.001927	10.31	13583.15	1038.87	13.07	19439.99	20478.87	1038.87	0.50
Reach 4	217.48	10-yr	55000.00	1102.08	1090.80	11.28	1098.73	1102.86	0.001872	7.10	7742.33	1381.79	7.63	19452.24	20954.09	1381.79	0.45
Reach 4	217.48	Post 500-yr	243000.00	1113.45	1090.80	22.65	1106.61	1115.85	0.001780	12.43	19556.03	2260.28	18.41	18607.36	20999.80	2260.28	0.51
Reach 4	217.48	FCDMC 500-yr	289000.00	1115.64	1090.80	24.84	1108.11	1118.35	0.001750	13.20	21892.79	2672.68	20.43	18236.01	21009.40	2672.68	0.51
Reach 4	217.38	100-yr	169000.00	1108.43	1090.70	17.73	1103.12	1110.38	0.001969	11.20	15093.34	1100.29	14.59	19309.66	20497.62	1100.29	0.52
Reach 4	217.38	50-yr	140000.00	1106.69	1090.70	15.99	1101.99	1108.41	0.002042	10.53	13292.65	1027.32	12.94	19466.76	20494.08	1027.32	0.52
Reach 4	217.38	10-yr	55000.00	1101.08	1090.70	10.38	1097.95	1101.90	0.001959	7.23	7603.35	1003.43	7.58	19479.29	20482.71	1003.43	0.46
Reach 4	217.38	Post 500-yr	243000.00	1112.48	1090.70	21.77	1105.78	1114.93	0.001834	12.58	19310.33	2119.09	18.36	18086.73	20505.82	2119.09	0.52
Reach 4	217.38	FCDMC 500-yr	289000.00	1114.68	1090.70	23.98	1107.28	1117.45	0.001798	13.35	21640.73	2583.10	20.39	18086.73	20879.24	2583.10	0.52
Reach 4	217.29	100-yr	169000.00	1107.17	1083.07	24.10	1102.34	1109.33	0.002236	11.78	14340.42	1217.45	14.35	19201.40	20509.98	1217.45	0.55
Reach 4	217.29	50-yr	140000.00	1105.38	1089.70	15.68	1101.19	1107.31	0.002365	11.15	12556.00	992.41	12.65	19514.12	20506.53	992.41	0.55
Reach 4	217.29	10-yr	55000.00	1099.97	1083.07	16.90	1097.05	1100.87	0.002208	7.59	7246.71	1147.92	7.46	19219.72	20496.14	1147.92	0.49
Reach 4	217.29	Post 500-yr	243000.00	1111.27	1083.07	28.20	1105.04	1113.96	0.002035	13.15	18473.80	1835.47	18.19	18342.05	20517.86	1835.47	0.54
Reach 4	217.29	FCDMC 500-yr	289000.00	1113.47	1083.07	30.40	1106.58	1116.49	0.001990	13.95	20714.18	2850.53	20.23	17592.29	20522.09	2850.53	0.55
Reach 4	217.19	100-yr	169000.00	1105.32	1044.40	60.92	1101.54	1107.97	0.002945	13.06	12942.85	1368.81	13.62	19047.38	20511.81	1368.81	0.62
Reach 4	217.19	50-yr	140000.00	1103.33	1086.43	16.90	1100.37	1105.82	0.003377	12.67	11052.37	942.03	11.73	19565.66	20507.70	942.03	0.65
Reach 4	217.19	10-yr	55000.00	1096.16	1044.40	51.76	1096.15	1098.58	0.010661	12.48	4407.32	1280.13	4.83	19069.57	20492.95	1280.13	1.00
Reach 4	217.19	Post 500-yr	243000.00	1109.61	1044.40	65.21	1104.38	1112.76	0.002493	14.25	17054.45	1557.78	17.62	18746.89	20520.63	1557.78	0.60
Reach 4	217.19	FCDMC 500-yr	289000.00	1111.80	1044.40	67.40	1105.95	1115.32	0.002416	15.07	19179.94	2398.65	19.64	18044.31	20525.17	2398.65	0.60
Reach 4	217.10	100-yr	169000.00	1105.06	1045.05	60.01	1097.13	1106.73	0.001306	10.37	16300.07	1514.17	17.90	18902.41	20517.63	1514.17	0.43
Reach 4	217.10	50-yr	140000.00	1103.05	1083.00	20.05	1095.87	1104.50	0.001312	9.67	14477.67	901.97	16.05	19611.46	20513.43	901.97	0.43
Reach 4	217.10	10-yr	55000.00	1095.92	1045.05	50.87	1091.25	1096.63	0.001301	6.74	8159.05	1429.39	9.37	18921.29	20498.53	1429.39	0.39
Reach 4	217.10	Post 500-yr	243000.00	1109.35	1045.05	64.30	1100.05	1111.59	0.001349	12.00	20247.34	1670.81	21.78	18751.48	20526.59	1670.81	0.45
Reach 4	217.10	FCDMC 500-yr	289000.00	1111.53	1045.05	66.48	1101.69	1114.14	0.001408	12.97	22278.99	2747.64	23.72	17745.40	20613.52	2747.64	0.47

HEC-RAS Plan: ORIG River: Salt River Reach: Reach 4 (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Reach 4	217.00	100-yr	169000.00	1104.50	1044.41	60.09	1096.16	1106.11	0.001205	10.18	16607.83	1669.76	18.33	18752.93	20517.96	1669.76	0.42
Reach 4	217.00	50-yr	140000.00	1102.49	1081.30	21.19	1094.89	1103.88	0.001199	9.46	14794.56	897.76	16.48	19616.03	20513.79	897.76	0.41
Reach 4	217.00	10-yr	55000.00	1095.39	1044.41	50.98	1090.44	1096.03	0.001108	6.45	8521.62	1585.60	9.82	18771.50	20499.05	1585.60	0.36
Reach 4	217.00	Post 500-yr	243000.00	1108.76	1044.41	64.35	1099.09	1110.94	0.001269	11.85	20505.02	1756.16	22.20	16333.70	20526.60	1756.16	0.44
Reach 4	217.00	FCDMC 500-yr	289000.00	1110.90	1044.41	66.49	1100.75	1113.46	0.001338	12.85	22489.82	3294.11	24.12	16328.74	20708.29	3294.11	0.46
Reach 4	216.91	100-yr	169000.00	1103.62	1045.16	58.46	1096.35	1105.42	0.001457	10.77	15692.78	1823.38	17.33	18598.73	20510.01	1823.38	0.46
Reach 4	216.91	50-yr	140000.00	1101.61	1082.32	19.29	1095.09	1103.19	0.001485	10.09	13879.78	897.57	15.46	19608.25	20505.82	897.57	0.45
Reach 4	216.91	10-yr	55000.00	1094.54	1045.16	49.38	1090.52	1095.35	0.001604	7.21	7633.39	1741.86	8.78	18618.46	20491.37	1741.86	0.43
Reach 4	216.91	Post 500-yr	243000.00	1107.82	1045.16	62.66	1099.25	1110.22	0.001492	12.44	19534.43	1865.50	21.16	16468.48	20519.02	1865.50	0.48
Reach 4	216.91	FCDMC 500-yr	289000.00	1109.89	1045.16	64.73	1100.92	1112.71	0.001566	13.47	21451.57	2954.20	23.02	16464.49	20523.46	2954.20	0.49
Reach 4	216.81	100-yr	169000.00	1103.13	1044.74	58.39	1094.42	1104.70	0.001158	10.08	16768.70	1751.01	18.70	18632.47	20502.23	1751.01	0.41
Reach 4	216.81	50-yr	140000.00	1101.11	1079.55	21.56	1093.12	1102.47	0.001142	9.35	14973.04	887.36	16.87	19610.75	20498.11	887.36	0.40
Reach 4	216.81	10-yr	55000.00	1094.07	1044.74	49.33	1088.53	1094.67	0.000967	6.22	8839.37	1657.46	10.35	18660.52	20483.69	1657.46	0.34
Reach 4	216.81	Post 500-yr	243000.00	1107.30	1044.74	62.56	1097.40	1109.47	0.001254	11.82	20550.46	1799.42	22.42	16491.93	20510.77	1799.42	0.44
Reach 4	216.81	FCDMC 500-yr	289000.00	1109.33	1044.74	64.58	1099.08	1111.91	0.001347	12.89	22419.64	3186.68	24.21	16488.04	22990.05	3186.68	0.46
Reach 4	216.72	100-yr	169000.00	1102.67	1080.17	22.50	1093.19	1104.13	0.001012	9.69	17444.24	899.78	19.39	19595.79	20495.57	899.78	0.39
Reach 4	216.72	50-yr	140000.00	1100.67	1080.17	20.50	1091.87	1101.91	0.000981	8.95	15650.82	890.04	17.58	19601.44	20491.47	890.04	0.38
Reach 4	216.72	10-yr	55000.00	1093.71	1080.17	13.54	1087.40	1094.22	0.000736	5.74	9579.39	856.23	11.19	19621.03	20477.26	856.23	0.30
Reach 4	216.72	Post 500-yr	243000.00	1106.80	1080.17	26.63	1096.17	1108.84	0.001127	11.46	21197.31	1726.70	23.04	16615.10	22908.66	1726.70	0.42
Reach 4	216.72	FCDMC 500-yr	289000.00	1108.78	1080.17	28.61	1097.84	1111.22	0.001227	12.55	23031.84	4223.48	24.78	16603.64	23211.30	4223.48	0.44
Reach 4	216.62	100-yr	169000.00	1101.88	1078.33	23.55	1093.68	1103.51	0.001420	10.24	16498.01	1128.48	16.31	17347.92	20649.84	1128.48	0.45
Reach 4	216.62	50-yr	140000.00	1099.92	1078.33	21.59	1092.38	1101.33	0.001237	9.53	14688.13	905.00	16.23	19595.76	20500.76	905.00	0.42
Reach 4	216.62	10-yr	55000.00	1093.16	1078.33	14.83	1087.73	1093.78	0.001016	6.31	8713.87	861.41	10.12	19614.33	20475.74	861.41	0.35
Reach 4	216.62	Post 500-yr	243000.00	1106.12	1078.33	27.79	1096.66	1108.14	0.001668	11.40	21310.97	2664.68	17.00	17316.37	20832.43	2664.68	0.49
Reach 4	216.62	FCDMC 500-yr	289000.00	1108.19	1078.33	29.86	1098.34	1110.45	0.001667	12.07	23948.35	3624.15	18.51	17273.63	22525.24	3624.15	0.49
Reach 4	216.52	100-yr	169000.00	1100.75	1083.20	17.55	1094.30	1102.67	0.001837	11.11	15204.69	1001.89	15.18	19518.77	20520.66	1001.89	0.50
Reach 4	216.52	50-yr	140000.00	1098.83	1083.20	15.63	1093.03	1100.55	0.001872	10.53	13293.84	963.69	13.79	19553.34	20517.03	963.69	0.50
Reach 4	216.52	10-yr	55000.00	1092.25	1083.20	9.05	1088.58	1093.10	0.001729	7.40	7436.57	864.54	8.60	19605.44	20469.98	864.54	0.44
Reach 4	216.52	Post 500-yr	243000.00	1104.76	1083.20	21.56	1097.23	1107.24	0.001770	12.62	19253.42	1017.67	18.92	19510.56	20528.23	1017.67	0.51
Reach 4	216.52	FCDMC 500-yr	289000.00	1106.60	1083.20	23.40	1099.21	1109.50	0.001856	13.68	21130.06	1024.90	20.62	19506.79	20531.70	1024.90	0.53
Reach 4	216.505		Bridge														
Reach 4	216.49	100-yr	169000.00	1099.40	1083.20	16.20	1094.30	1101.71	0.002471	12.20	13853.79	992.02	13.97	19526.09	20518.11	992.02	0.58
Reach 4	216.49	50-yr	140000.00	1097.57	1083.20	14.37	1093.03	1099.64	0.002345	11.55	12117.91	905.28	13.39	19589.56	20494.84	905.28	0.56
Reach 4	216.49	10-yr	55000.00	1091.24	1083.20	8.04	1088.58	1092.33	0.002600	8.38	6559.92	858.27	7.64	19608.48	20466.75	858.27	0.53
Reach 4	216.49	Post 500-yr	243000.00	1103.38	1083.20	20.18	1097.23	1106.26	0.002261	13.61	17848.32	1012.22	17.63	19513.39	20525.62	1012.22	0.57
Reach 4	216.49	FCDMC 500-yr	289000.00	1105.01	1083.20	21.81	1099.21	1108.42	0.002401	14.82	19505.22	1018.65	19.15	19510.05	20528.70	1018.65	0.60
Reach 4	216.42	100-yr	169000.00	1098.86	1082.00	16.86	1093.08	1100.93	0.001943	11.56	14613.77	1034.26	15.28	18929.47	20482.14	1034.26	0.52
Reach 4	216.42	50-yr	140000.00	1097.04	1082.00	15.04	1091.81	1098.87	0.001977	10.85	12908.26	933.47	13.83	19541.59	20475.07	933.47	0.51
Reach 4	216.42	10-yr	55000.00	1090.57	1082.00	8.57	1087.50	1091.52	0.002159	7.83	7020.60	885.01	7.93	19564.80	20449.81	885.01	0.49
Reach 4	216.42	Post 500-yr	243000.00	1102.95	1082.00	20.95	1095.99	1105.51	0.001813	12.93	19478.12	1976.20	15.75	18285.76	20498.08	1976.20	0.52
Reach 4	216.42	FCDMC 500-yr	289000.00	1104.61	1082.00	22.61	1097.65	1107.60	0.001925	14.02	21549.63	2244.27	17.18	17954.42	20504.56	2244.27	0.54
Reach 4	216.33	100-yr	169000.00	1098.36	1080.80	17.55	1091.42	1099.99	0.001446	10.25	16490.19	1473.76	16.07	18464.39	21676.54	1473.76	0.45
Reach 4	216.33	50-yr	140000.00	1096.50	1080.80	15.70	1090.24	1097.92	0.001464	9.59	14594.39	1012.86	14.41	19407.22	20420.08	1012.86	0.45
Reach 4	216.33	10-yr	55000.00	1089.83	1080.80	9.03	1086.11	1090.56	0.001563	6.87	8004.77	964.55	8.30	19433.44	20397.99	964.55	0.42
Reach 4	216.33	Post 500-yr	243000.00	1102.46	1080.80	21.66	1094.16	1104.59	0.001441	11.70	20767.85	2380.55	19.66	17625.46	21697.60	2380.55	0.46
Reach 4	216.33	FCDMC 500-yr	289000.00	1104.04	1080.80	23.24	1095.69	1106.62	0.001597	12.87	22446.69	3484.05	21.03	17235.48	21705.70	3484.05	0.49

HEC-RAS Plan: ORIG River: Salt River Reach: Reach 4 (Continued)

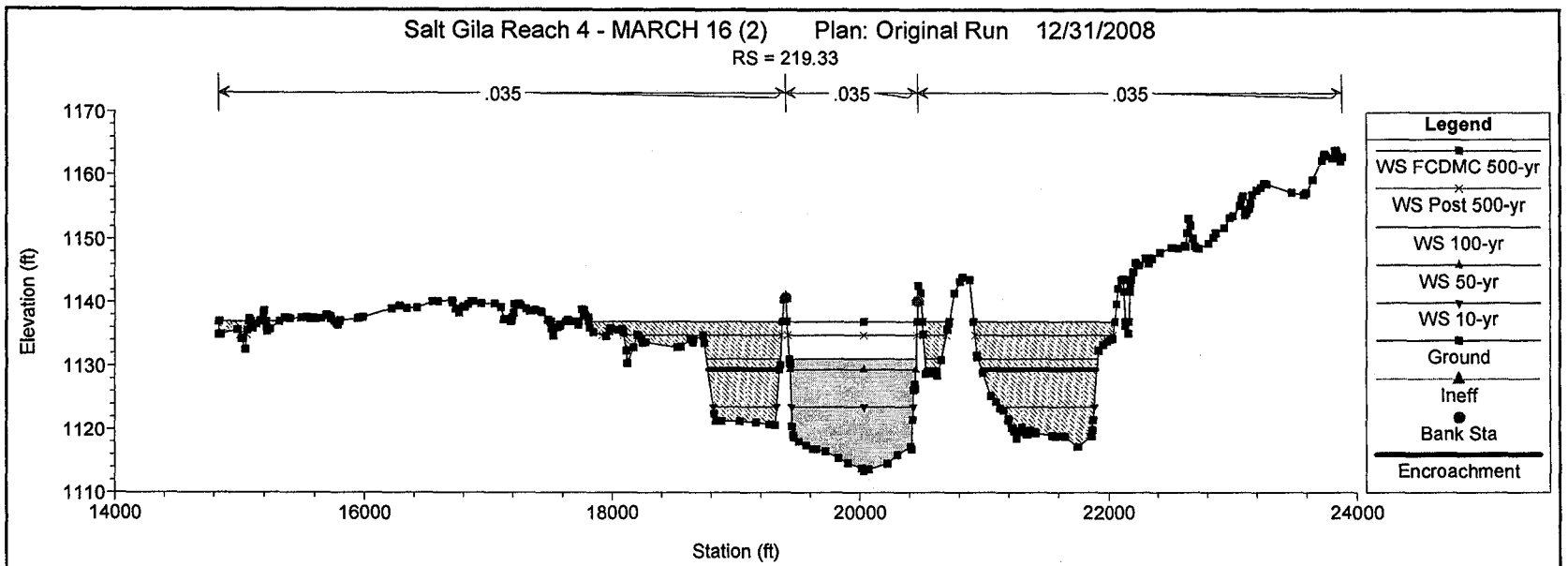
Reach	River Sta	Profile	Q Total	W.S. Elev	Min El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Reach 4	216.23	100-yr	169000.00	1097.99	1078.50	19.49	1089.39	1099.28	0.001058	9.13	18502.61	1738.54	17.07	18306.15	20413.21	1738.54	0.39
Reach 4	216.23	50-yr	140000.00	1096.11	1078.50	17.61	1088.21	1097.23	0.001053	8.50	16473.33	1070.97	15.38	19336.97	20407.94	1070.97	0.38
Reach 4	216.23	10-yr	55000.00	1089.42	1078.50	10.92	1084.00	1089.93	0.000883	5.75	9573.00	982.90	9.74	19406.29	20389.19	982.90	0.32
Reach 4	216.23	Post 500-yr	243000.00	1102.13	1078.50	23.63	1092.20	1103.86	0.001072	10.56	23021.13	3270.69	21.02	17803.51	22129.65	3270.69	0.41
Reach 4	216.23	FCDMC 500-yr	289000.00	1103.69	1078.50	25.18	1093.76	1105.81	0.001202	11.69	24723.16	3943.31	22.48	17295.80	22138.53	3943.31	0.43
Reach 4	216.13	100-yr	169000.00	1097.54	1078.00	19.54	1088.74	1098.73	0.000954	8.75	19304.38	2129.81	17.33	18011.78	22519.82	2129.81	0.37
Reach 4	216.13	50-yr	140000.00	1095.66	1078.00	17.66	1087.55	1096.68	0.000945	8.13	17216.23	1102.13	15.62	19330.58	20432.71	1102.13	0.36
Reach 4	216.13	10-yr	55000.00	1089.02	1078.00	11.01	1083.49	1089.48	0.000815	5.47	10050.15	1045.01	9.62	19369.13	20414.13	1045.01	0.31
Reach 4	216.13	Post 500-yr	243000.00	1102.16	1078.00	24.16	1091.37	1103.22	0.000704	8.74	36067.27	4752.75	7.59	17102.93	22540.22	4752.75	0.33
Reach 4	216.13	FCDMC 500-yr	289000.00	1103.94	1078.00	25.94	1092.85	1105.04	0.000689	9.11	45792.99	5938.25	7.71	16604.90	22548.10	5938.25	0.33
Reach 4	216.04	100-yr	169000.00	1096.93	1077.50	19.43	1088.53	1098.22	0.001041	9.13	18516.63	1448.65	17.31	18803.84	20467.69	1448.65	0.39
Reach 4	216.04	50-yr	140000.00	1095.07	1077.50	17.57	1087.37	1096.18	0.001029	8.47	16533.93	1060.85	15.59	19402.54	20463.39	1060.85	0.38
Reach 4	216.04	10-yr	55000.00	1088.55	1077.50	11.05	1083.28	1089.05	0.000888	5.65	9727.40	1026.14	9.48	19422.20	20448.33	1026.14	0.32
Reach 4	216.04	Post 500-yr	243000.00	1101.17	1077.50	23.66	1091.16	1102.75	0.000997	10.24	26975.17	5226.63	7.97	17067.89	22879.47	5226.63	0.39
Reach 4	216.04	FCDMC 500-yr	289000.00	1103.50	1077.50	26.00	1092.66	1104.67	0.000736	9.42	44256.64	5748.08	7.70	17065.65	22888.62	5748.08	0.34
Reach 4	215.94	100-yr	169000.00	1093.70	1077.80	15.90	1090.85	1097.08	0.004115	14.74	11462.80	984.02	12.64	18177.35	20479.02	984.02	0.73
Reach 4	215.94	50-yr	140000.00	1092.06	1077.80	14.26	1089.44	1095.07	0.003957	13.93	10053.09	841.24	11.95	19577.80	20419.04	841.24	0.71
Reach 4	215.94	10-yr	55000.00	1086.76	1077.80	8.96	1084.57	1088.17	0.003428	9.51	5783.91	771.14	7.50	19595.45	20366.58	771.14	0.61
Reach 4	215.94	Post 500-yr	243000.00	1097.57	1077.80	19.77	1094.14	1101.63	0.003602	16.18	15017.50	2175.78	16.08	18141.69	21574.60	2175.78	0.71
Reach 4	215.94	FCDMC 500-yr	289000.00	1101.31	1077.80	23.51	1095.76	1103.94	0.002020	13.79	26929.68	4573.88	7.60	17331.81	23118.89	4573.88	0.55
Reach 4	215.84	100-yr	169000.00	1091.72	1075.80	15.91	1088.75	1094.94	0.003648	14.42	11721.69	870.82	13.46	19571.98	20442.80	870.82	0.69
Reach 4	215.84	50-yr	140000.00	1090.05	1075.80	14.25	1087.46	1092.93	0.003841	13.62	10275.40	864.51	11.89	19574.83	20439.34	864.51	0.70
Reach 4	215.84	10-yr	55000.00	1084.23	1075.80	8.43	1083.02	1085.90	0.005145	10.35	5311.86	842.51	6.30	19584.75	20427.27	842.51	0.73
Reach 4	215.84	Post 500-yr	243000.00	1095.89	1075.80	20.09	1091.70	1099.76	0.003135	15.78	15398.40	898.99	17.30	18965.50	20454.79	898.99	0.67
Reach 4	215.84	FCDMC 500-yr	289000.00	1098.99	1075.80	23.19	1093.38	1102.64	0.002479	15.52	21270.67	5055.54	6.09	17802.70	23324.79	5055.54	0.61
Reach 4	215.82	100-yr	169000.00	1091.84	1076.00	15.84	1087.04	1094.37	0.002408	12.75	13249.74	860.86	15.39	19550.04	20410.90	860.86	0.57
Reach 4	215.82	50-yr	140000.00	1090.16	1076.00	14.16	1085.79	1092.35	0.002416	11.86	11805.26	860.83	13.71	19550.07	20410.90	860.83	0.56
Reach 4	215.82	10-yr	55000.00	1084.27	1076.00	8.27	1081.26	1085.30	0.002274	8.12	6774.07	840.50	8.06	19563.95	20404.45	840.50	0.50
Reach 4	215.82	Post 500-yr	243000.00	1096.04	1076.00	20.04	1090.00	1099.23	0.002231	14.36	17490.95	1779.72	9.83	18260.00	20410.94	1779.72	0.57
Reach 4	215.82	FCDMC 500-yr	289000.00	1099.40	1076.00	23.40	1091.66	1102.11	0.001633	13.65	25920.49	3134.95	8.27	18260.00	21394.95	3134.95	0.50
Reach 4	215.815		Bridge														
Reach 4	215.81	100-yr	169000.00	1090.81	1076.00	14.81	1087.04	1093.71	0.003024	13.67	12363.78	860.84	14.36	19550.06	20410.90	860.84	0.64
Reach 4	215.81	50-yr	140000.00	1089.20	1076.00	13.20	1085.79	1091.73	0.003070	12.75	10977.01	860.82	12.75	19550.08	20410.90	860.82	0.63
Reach 4	215.81	10-yr	55000.00	1083.62	1076.00	7.62	1081.26	1084.83	0.003000	8.84	6222.81	837.04	7.43	19565.81	20402.85	837.04	0.57
Reach 4	215.81	Post 500-yr	243000.00	1094.78	1076.00	18.78	1090.00	1098.46	0.002806	15.40	15778.77	914.83	17.25	18598.67	20410.90	914.83	0.63
Reach 4	215.81	FCDMC 500-yr	289000.00	1096.15	1076.00	20.15	1091.66	1100.60	0.003093	16.97	17684.74	1803.76	9.80	18260.00	20410.95	1803.76	0.67
Reach 4	215.75	100-yr	169000.00	1088.45	1073.60	14.84	1086.84	1092.56	0.005283	16.27	10385.48	854.81	12.15	19576.70	20431.51	854.81	0.82
Reach 4	215.75	50-yr	140000.00	1086.38	1073.60	12.78	1085.48	1090.44	0.006355	16.18	8650.24	824.72	10.49	19585.88	20410.60	824.72	0.88
Reach 4	215.75	10-yr	55000.00	1080.58	1073.60	6.98	1080.58	1083.35	0.010061	13.34	4122.97	742.32	5.55	19611.57	20353.89	742.32	1.00
Reach 4	215.75	Post 500-yr	243000.00	1093.35	1073.60	19.75	1090.01	1097.55	0.003793	16.44	14777.93	933.41	15.83	19558.60	20492.01	933.41	0.73
Reach 4	215.75	FCDMC 500-yr	289000.00	1094.07	1073.60	20.47	1091.78	1099.50	0.004754	18.70	15450.48	970.37	16.22	19556.50	22141.51	970.37	0.82
Reach 4	215.65	100-yr	169000.00	1088.28	1068.30	19.97	1082.43	1090.46	0.001959	11.87	14233.05	890.00	15.99	19594.84	20484.84	890.00	0.52
Reach 4	215.65	50-yr	140000.00	1086.11	1068.30	17.81	1081.13	1088.11	0.002130	11.37	12318.17	876.52	14.05	19601.95	20478.46	876.52	0.53
Reach 4	215.65	10-yr	55000.00	1079.05	1068.30	10.75	1076.57	1080.24	0.002874	8.74	6290.75	832.55	7.56	19625.14	20457.70	832.55	0.56
Reach 4	215.65	Post 500-yr	243000.00	1093.24	1068.30	24.94	1085.41	1095.85	0.001702	12.98	18725.06	1771.25	20.33	19578.59	23463.60	1771.25	0.51
Reach 4	215.65	FCDMC 500-yr	289000.00	1093.89	1068.30	25.58	1087.11	1097.36	0.002180	14.96	19323.94	2561.99	20.89	19576.46	23562.82	2561.99	0.58

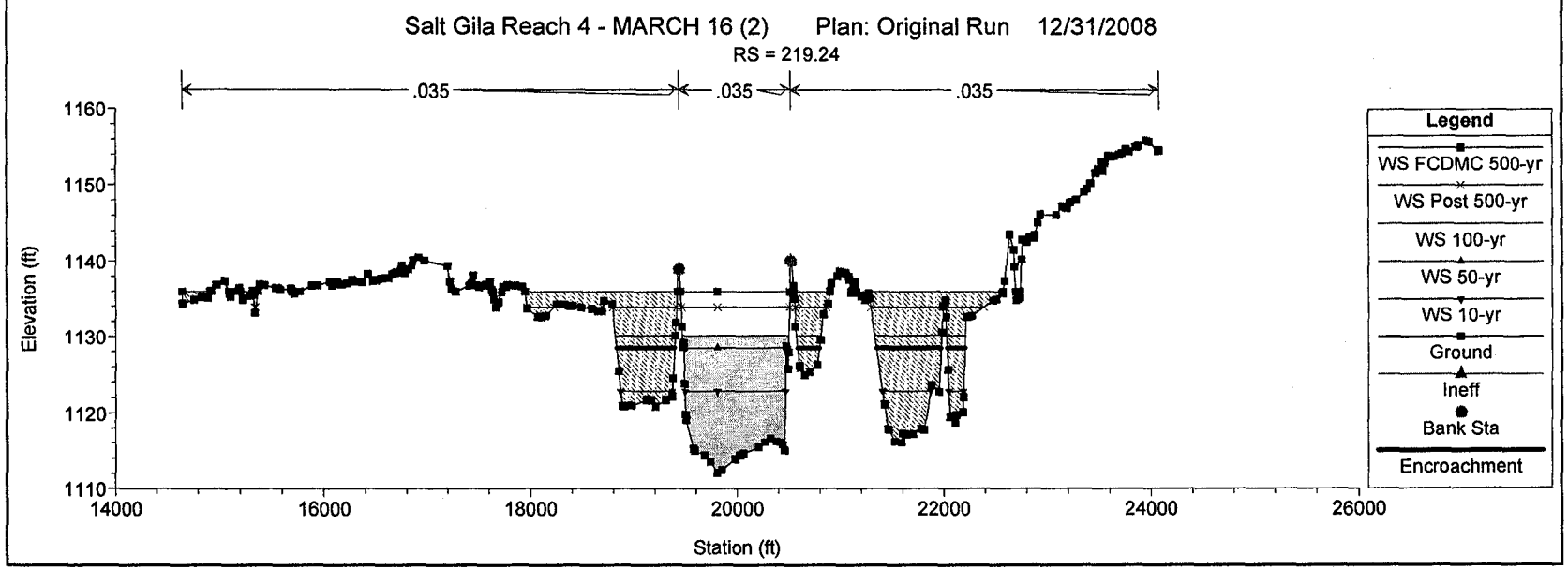
HEC-RAS Plan: ORIG River: Salt River Reach: Reach 4 (Continued)

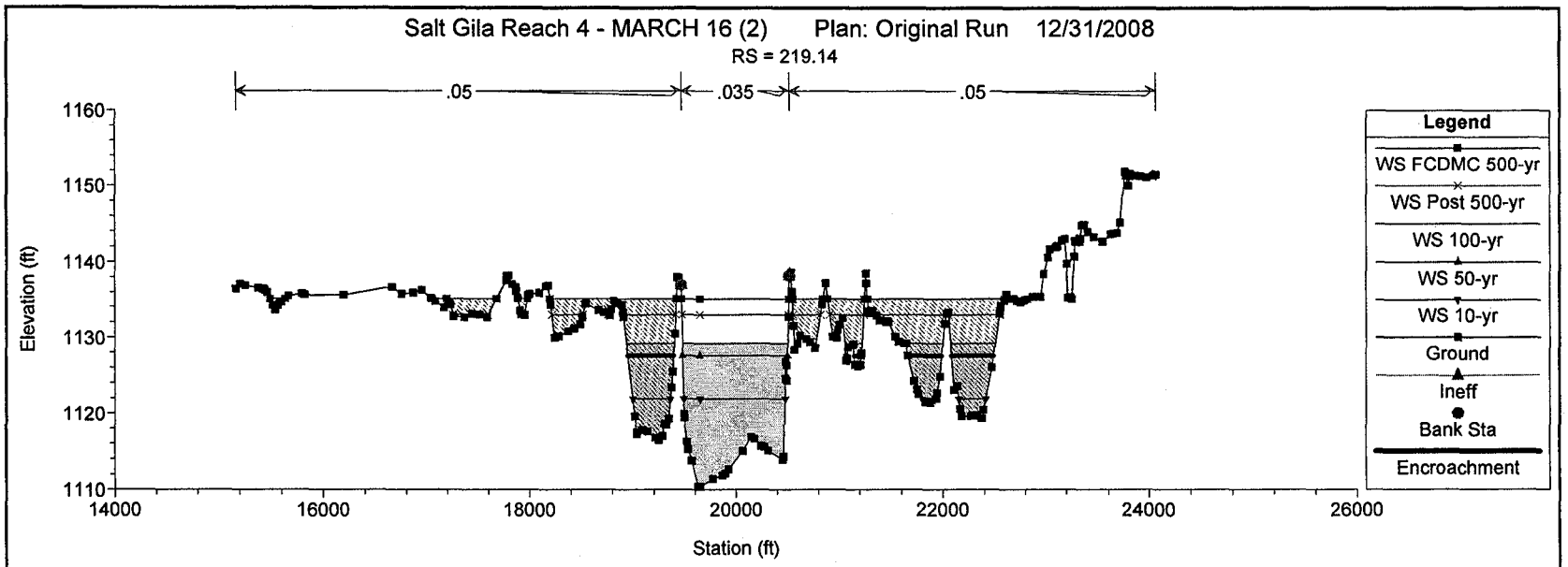
Reach	River Sta	Profile	Q Total	W.S. Elev	Min El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Reach 4	215.56	100-yr	169000.00	1087.99	1066.10	21.89	1079.21	1089.55	0.001145	10.02	16860.06	907.88	18.57	19587.37	20495.25	907.88	0.41
Reach 4	215.56	50-yr	140000.00	1085.78	1066.10	19.68	1077.91	1087.16	0.001168	9.41	14875.33	894.36	16.63	19594.00	20488.36	894.36	0.41
Reach 4	215.56	10-yr	55000.00	1078.65	1066.10	12.55	1073.40	1079.28	0.001024	6.36	8650.65	850.79	10.17	19615.46	20466.25	850.79	0.35
Reach 4	215.56	Post 500-yr	243000.00	1093.16	1066.10	27.06	1082.16	1094.97	0.001014	10.93	26008.26	4123.60	6.31	18343.27	23548.20	4123.60	0.40
Reach 4	215.56	FCDMC 500-yr	289000.00	1093.99	1066.10	27.89	1083.89	1096.19	0.001209	12.22	29470.86	4229.33	6.97	18303.92	23609.09	4229.33	0.44
Reach 4	215.46	100-yr	169000.00	1087.61	1064.60	23.01	1077.69	1088.98	0.000932	9.38	18010.01	916.86	19.64	19599.36	20516.22	916.86	0.37
Reach 4	215.46	50-yr	140000.00	1085.40	1064.60	20.80	1076.41	1086.59	0.000933	8.75	15993.92	905.36	17.67	19605.16	20510.52	905.36	0.37
Reach 4	215.46	10-yr	55000.00	1078.32	1064.60	13.72	1071.95	1078.82	0.000715	5.66	9716.17	868.58	11.19	19623.71	20492.28	868.58	0.30
Reach 4	215.46	Post 500-yr	243000.00	1093.11	1064.60	28.51	1080.63	1094.39	0.000703	9.53	34289.62	4875.54	7.03	18596.77	23536.79	4875.54	0.34
Reach 4	215.46	FCDMC 500-yr	289000.00	1093.99	1064.60	29.39	1082.33	1095.49	0.000814	10.49	38606.33	5023.91	7.68	18115.62	23542.89	5023.91	0.36
Reach 4	215.36	100-yr	169000.00	1087.34	1063.00	24.34	1075.38	1088.49	0.000701	8.61	19624.38	3559.81	21.35	18653.88	22880.53	3559.81	0.33
Reach 4	215.36	50-yr	140000.00	1085.13	1063.00	22.13	1074.11	1086.11	0.000679	7.95	17603.14	907.08	19.41	19625.36	20532.44	907.08	0.32
Reach 4	215.36	10-yr	55000.00	1078.14	1063.00	15.14	1069.53	1078.50	0.000413	4.82	11417.86	861.90	13.25	19651.47	20513.37	861.90	0.23
Reach 4	215.36	Post 500-yr	243000.00	1092.45	1063.00	29.45	1078.42	1094.00	0.000709	9.99	24317.88	5619.97	26.46	17790.57	23682.47	5619.97	0.34
Reach 4	215.36	FCDMC 500-yr	289000.00	1092.84	1063.00	29.84	1080.15	1094.97	0.000956	11.71	24675.06	5779.62	26.85	17765.00	23683.87	5779.62	0.40
Reach 4	215.27	100-yr	169000.00	1086.84	1063.50	23.34	1076.05	1088.11	0.000846	9.02	18737.07	3991.57	19.86	18748.01	23327.23	3991.57	0.36
Reach 4	215.27	50-yr	140000.00	1084.63	1063.50	21.13	1074.71	1085.73	0.000847	8.40	16658.83	932.04	17.87	19610.60	20542.64	932.04	0.35
Reach 4	215.27	10-yr	55000.00	1077.85	1063.50	14.35	1069.76	1078.27	0.000522	5.18	10623.03	857.73	12.39	19668.08	20525.81	857.73	0.26
Reach 4	215.27	Post 500-yr	243000.00	1091.97	1063.50	28.47	1079.06	1093.62	0.000814	10.31	23571.37	6318.87	24.99	17117.47	23703.23	6318.87	0.36
Reach 4	215.27	FCDMC 500-yr	289000.00	1092.14	1063.50	28.64	1080.77	1094.44	0.001125	12.18	23735.69	6380.53	25.16	17108.66	23704.08	6380.53	0.43
Reach 4	215.18	100-yr	169000.00	1081.87	1062.20	19.67	1079.46	1086.91	0.004582	18.01	9383.28	686.95	15.80	19683.21	21493.99	686.95	0.80
Reach 4	215.18	50-yr	140000.00	1080.49	1062.20	18.29	1077.68	1084.63	0.004126	16.33	8570.89	580.85	14.76	19688.76	20269.62	580.85	0.75
Reach 4	215.18	10-yr	55000.00	1076.63	1062.20	14.43	1071.21	1077.78	0.001544	8.59	6400.37	544.41	11.76	19704.25	20248.66	544.41	0.44
Reach 4	215.18	Post 500-yr	243000.00	1085.25	1062.20	23.05	1083.53	1092.24	0.005554	21.22	11452.66	2143.73	17.49	19644.67	22064.55	2143.73	0.89
Reach 4	215.18	FCDMC 500-yr	289000.00	1092.50	1062.20	30.30	1088.41	1093.59	0.000905	10.43	48219.34	6367.10	7.57	17264.20	23656.24	6367.10	0.38
Reach 4	215.09	100-yr	169000.00	1081.09	1061.70	19.39	1076.40	1084.77	0.002894	15.38	10986.15	619.02	17.75	19674.20	20293.22	619.02	0.64
Reach 4	215.09	50-yr	140000.00	1079.81	1061.70	18.11	1074.76	1082.74	0.002520	13.73	10193.84	614.35	16.59	19676.96	20291.30	614.35	0.59
Reach 4	215.09	10-yr	55000.00	1076.42	1061.70	14.72	1069.03	1077.13	0.000802	6.76	8130.40	602.01	13.51	19684.23	20286.24	602.01	0.32
Reach 4	215.09	Post 500-yr	243000.00	1084.16	1061.70	22.46	1080.17	1089.67	0.003587	18.83	12902.81	765.73	20.52	19669.01	21580.91	765.73	0.73
Reach 4	215.09	FCDMC 500-yr	289000.00	1086.08	1061.70	24.38	1082.34	1092.31	0.003698	20.17	15776.96	2550.16	6.98	17421.13	22535.72	2550.16	0.75
Reach 4	214.99	100-yr	169000.00	1079.92	1061.30	18.61	1075.60	1083.17	0.002926	14.48	11673.56	727.59	16.04	19601.52	20329.11	727.59	0.64
Reach 4	214.99	50-yr	140000.00	1078.76	1061.30	17.46	1074.16	1081.35	0.002546	12.92	10838.71	722.77	15.00	19604.38	20327.15	722.77	0.59
Reach 4	214.99	10-yr	55000.00	1076.12	1061.30	14.82	1068.94	1076.70	0.000730	6.15	8939.25	711.70	12.56	19610.95	20322.64	711.70	0.31
Reach 4	214.99	Post 500-yr	243000.00	1082.87	1061.30	21.57	1079.00	1087.66	0.003511	17.55	13844.88	739.96	18.71	19594.18	20334.14	739.96	0.72
Reach 4	214.99	FCDMC 500-yr	289000.00	1084.57	1061.30	23.27	1080.92	1090.25	0.003765	19.13	15106.82	1204.78	20.22	19589.97	23156.72	1204.78	0.75
Reach 4	214.9	100-yr	169000.00	1078.13	1061.20	16.93	1074.96	1081.52	0.003588	14.78	11435.69	934.52	14.11	19563.88	20809.73	934.52	0.69
Reach 4	214.9	50-yr	140000.00	1077.38	1061.20	16.18	1073.55	1079.98	0.002929	12.93	10828.40	805.58	13.44	19565.89	20371.47	805.58	0.62
Reach 4	214.9	10-yr	55000.00	1075.82	1061.20	14.61	1068.79	1076.33	0.000669	5.74	9575.35	795.57	12.04	19570.09	20365.67	795.57	0.29
Reach 4	214.9	Post 500-yr	243000.00	1080.42	1061.20	19.22	1078.09	1085.60	0.004598	18.26	13306.58	976.22	16.10	19557.74	20824.88	976.22	0.80
Reach 4	214.9	FCDMC 500-yr	289000.00	1082.08	1061.20	20.88	1079.93	1088.09	0.004765	19.67	14693.08	1235.30	17.53	19553.27	21151.87	1235.30	0.83
Reach 4	214.79	100-yr	169000.00	1078.39	1057.60	20.79	1070.73	1079.83	0.001221	9.62	17558.59	1056.42	16.62	19461.73	20518.15	1056.42	0.42
Reach 4	214.79	50-yr	140000.00	1077.53	1057.60	19.93	1069.59	1078.62	0.000994	8.41	16647.57	1051.19	15.84	19464.15	20515.33	1051.19	0.37
Reach 4	214.79	10-yr	55000.00	1075.82	1057.60	18.22	1065.59	1076.04	0.000221	3.70	14866.05	1040.88	14.28	19468.91	20509.79	1040.88	0.17
Reach 4	214.79	Post 500-yr	243000.00	1081.12	1057.60	23.52	1073.39	1083.30	0.001528	11.85	20909.93	1589.29	13.16	19457.67	21422.72	1589.29	0.48
Reach 4	214.79	FCDMC 500-yr	289000.00	1083.21	1057.60	25.61	1074.92	1085.61	0.001490	12.53	24727.05	2063.74	11.98	19457.66	21786.10	2063.74	0.48
Reach 4	214.785		Bridge														

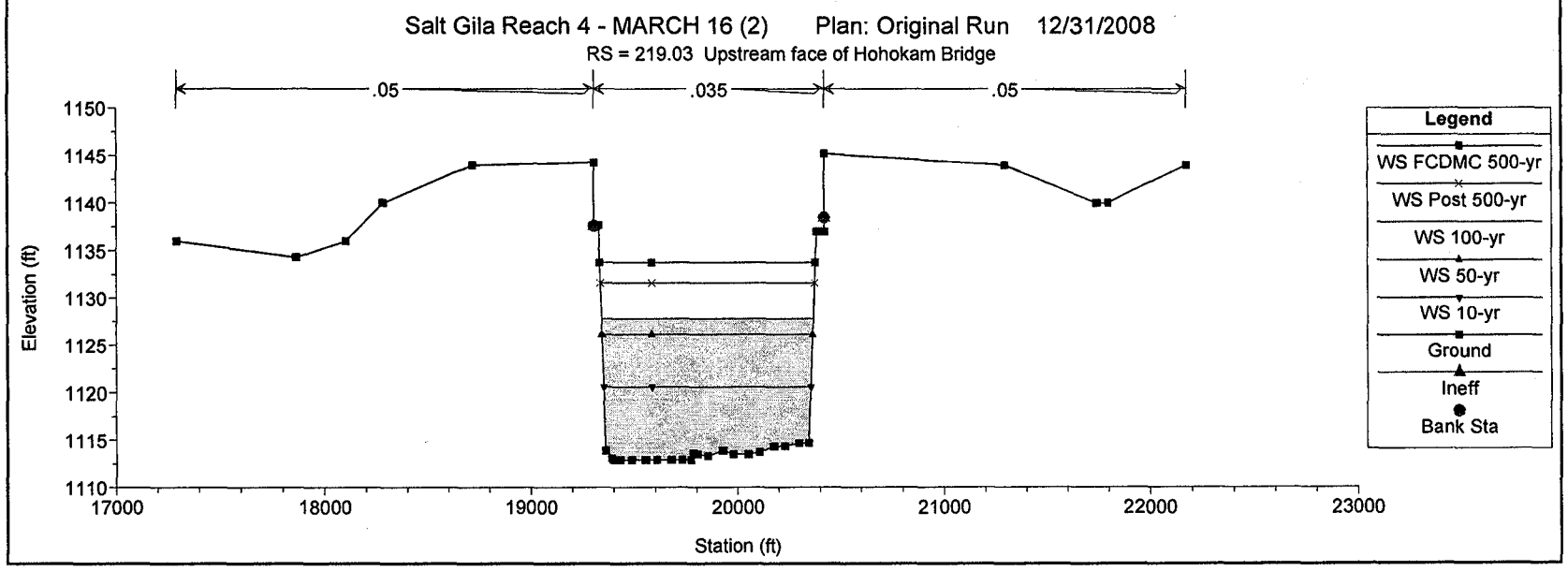
HEC-RAS Plan: ORIG River: Salt River Reach: Reach 4 (Continued)

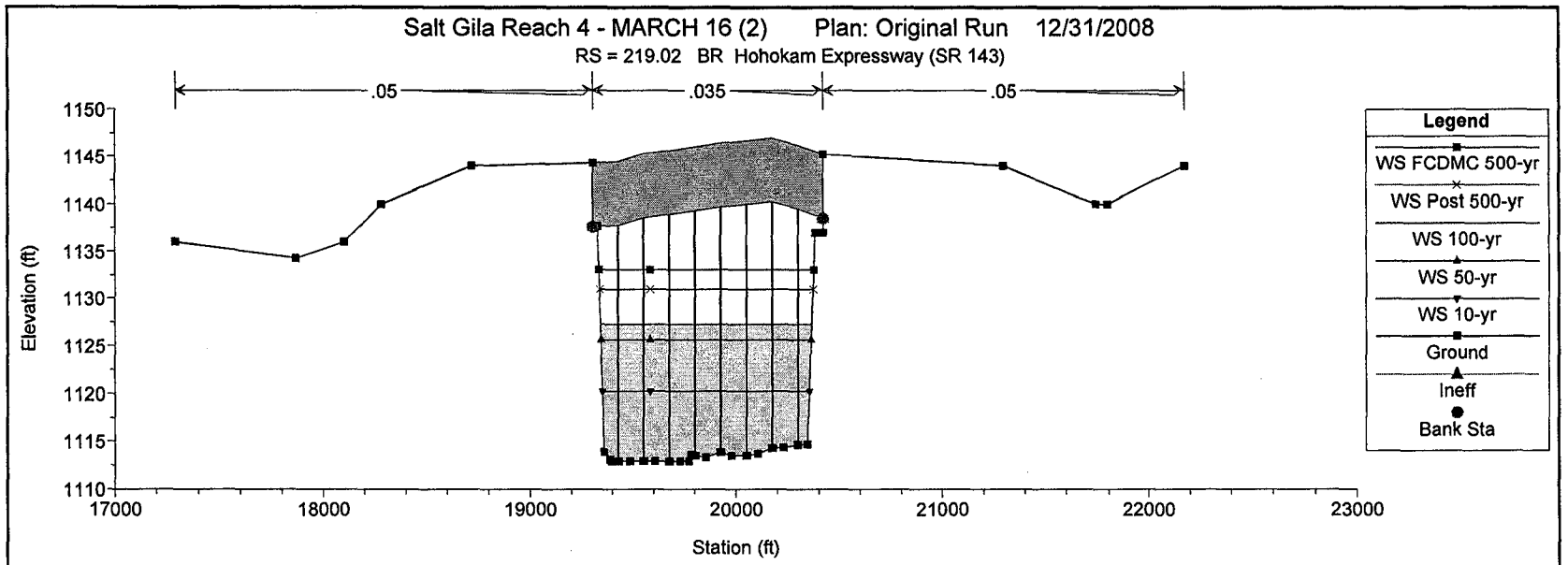
Reach	River Sta	Profile	Q Total	W.S. Elev	Min El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Reach 4	214.78	100-yr	169000.00	1078.06	1058.80	19.26	1070.74	1079.56	0.001306	9.83	17191.94	1054.44	16.30	19462.64	20517.08	1054.44	0.43
Reach 4	214.78	50-yr	140000.00	1077.28	1058.80	18.48	1069.61	1078.42	0.001049	8.55	16368.72	1049.71	15.59	19464.83	20514.54	1049.71	0.38
Reach 4	214.78	10-yr	55000.00	1075.78	1058.80	16.98	1065.61	1075.99	0.000224	3.72	14798.93	1040.62	14.22	19469.04	20509.65	1040.62	0.17
Reach 4	214.78	Post 500-yr	243000.00	1080.60	1058.80	21.80	1073.43	1082.92	0.001685	12.21	20093.07	1471.32	13.66	19457.68	21332.36	1471.32	0.50
Reach 4	214.78	FCDMC 500-yr	289000.00	1082.51	1058.80	23.71	1074.94	1085.13	0.001690	13.05	23319.08	1905.14	12.24	19457.66	21664.63	1905.14	0.51
Reach 4	214.71	100-yr	169000.00	1077.48	1055.10	22.38	1069.32	1079.15	0.001272	10.38	16287.08	901.57	18.07	19640.29	20541.86	901.57	0.43
Reach 4	214.71	50-yr	140000.00	1076.87	1055.10	21.77	1068.04	1078.09	0.000973	8.90	15738.64	898.09	17.52	19642.05	20540.14	898.09	0.37
Reach 4	214.71	10-yr	55000.00	1075.71	1055.10	20.61	1063.51	1075.93	0.000186	3.74	14706.76	891.50	16.50	19645.39	20536.89	891.50	0.16
Reach 4	214.71	Post 500-yr	243000.00	1079.54	1055.10	24.44	1072.31	1082.32	0.001863	13.38	18160.05	948.27	19.88	19634.31	20613.66	948.27	0.53
Reach 4	214.71	FCDMC 500-yr	289000.00	1081.10	1055.10	26.00	1074.01	1084.48	0.002074	14.75	19590.42	1096.15	21.24	19629.80	21208.69	1096.15	0.56
Reach 4	214.61	100-yr	169000.00	1077.25	1050.40	26.85	1064.30	1078.56	0.000723	9.21	18346.35	792.44	23.15	19685.17	20477.61	792.44	0.34
Reach 4	214.61	50-yr	140000.00	1076.70	1050.40	26.30	1062.85	1077.65	0.000533	7.81	17918.51	789.20	22.70	19686.72	20475.91	789.20	0.29
Reach 4	214.61	10-yr	55000.00	1075.69	1050.40	25.29	1057.63	1075.85	0.000095	3.21	17118.46	783.09	21.86	19689.63	20472.71	783.09	0.12
Reach 4	214.61	Post 500-yr	243000.00	1079.11	1050.40	28.71	1067.69	1081.44	0.001174	12.25	19836.19	803.57	24.69	19679.84	20483.41	803.57	0.43
Reach 4	214.61	FCDMC 500-yr	289000.00	1080.55	1050.40	30.15	1069.61	1083.49	0.001395	13.76	20995.41	821.15	25.85	19675.74	21412.85	821.15	0.48
Reach 4	214.52	100-yr	169000.00	1077.35	1048.00	29.35	1060.66	1078.15	0.000391	7.19	23492.42	928.22	25.31	19525.26	20453.48	928.22	0.25
Reach 4	214.52	50-yr	140000.00	1076.77	1048.00	28.77	1059.25	1077.35	0.000288	6.10	22960.85	924.43	24.84	19526.86	20451.29	924.43	0.22
Reach 4	214.52	10-yr	55000.00	1075.70	1048.00	27.70	1054.41	1075.79	0.000051	2.50	21968.71	917.32	23.95	19529.85	20447.17	917.32	0.09
Reach 4	214.52	Post 500-yr	243000.00	1079.33	1048.00	31.33	1063.77	1080.75	0.000640	9.59	25340.69	1018.75	26.92	19402.23	20461.03	1018.75	0.33
Reach 4	214.52	FCDMC 500-yr	289000.00	1080.86	1048.00	32.85	1065.50	1082.65	0.000754	10.77	27370.04	1583.05	18.65	19376.54	21007.83	1583.05	0.36
Reach 4	214.42	100-yr	169000.00	1077.32	1048.20	29.12	1059.41	1077.93	0.000288	6.27	26966.84	1193.48	25.89	19382.08	20971.94	1193.48	0.22
Reach 4	214.42	50-yr	140000.00	1076.75	1048.20	28.55	1058.18	1077.19	0.000211	5.31	26376.73	1037.97	25.41	19383.88	20421.85	1037.97	0.19
Reach 4	214.42	10-yr	55000.00	1075.69	1048.20	27.49	1053.89	1075.77	0.000037	2.18	25282.63	1082.28	24.52	19387.25	20903.42	1082.28	0.08
Reach 4	214.42	Post 500-yr	243000.00	1079.29	1048.20	31.09	1062.25	1080.38	0.000470	8.37	29078.37	1988.60	24.60	19161.50	21251.77	1988.60	0.28
Reach 4	214.42	FCDMC 500-yr	289000.00	1080.87	1048.20	32.67	1063.86	1082.19	0.000540	9.30	33447.65	2493.86	13.41	19091.73	21585.59	2493.86	0.30
Reach 4	214.33	100-yr	169000.00	1076.88	1048.50	28.38	1060.45	1077.73	0.000413	7.40	22823.47	1266.44	25.37	19492.07	21035.27	1266.44	0.26
Reach 4	214.33	50-yr	140000.00	1076.44	1048.50	27.94	1059.09	1077.05	0.000299	6.24	22427.90	896.72	25.01	19493.43	20390.14	896.72	0.22
Reach 4	214.33	10-yr	55000.00	1075.64	1048.50	27.14	1054.30	1075.74	0.000051	2.53	21712.98	1059.73	24.35	19495.89	20841.91	1059.73	0.09
Reach 4	214.33	Post 500-yr	243000.00	1078.49	1048.50	29.99	1063.61	1080.05	0.000709	10.01	24281.27	1814.86	26.60	19455.71	21494.27	1814.86	0.34
Reach 4	214.33	FCDMC 500-yr	289000.00	1079.97	1048.50	31.47	1065.33	1081.82	0.000802	11.02	28898.14	2253.23	12.83	19317.19	21597.06	2253.23	0.37
Reach 4	214.23	100-yr	169000.00	1075.93	1048.70	27.23	1062.88	1077.39	0.000784	9.71	17406.42	1126.00	23.59	19023.29	21328.86	1126.00	0.35
Reach 4	214.23	50-yr	140000.00	1075.79	1048.70	27.09	1061.29	1076.80	0.000548	8.09	17304.15	737.10	23.48	19614.73	20351.83	737.10	0.29
Reach 4	214.23	10-yr	55000.00	1075.54	1048.70	26.84	1055.69	1075.70	0.000087	3.21	17122.86	1047.52	23.28	19045.28	21311.21	1047.52	0.12
Reach 4	214.23	Post 500-yr	243000.00	1076.54	1048.70	27.84	1066.51	1079.41	0.001499	13.61	17856.88	1412.11	24.07	19004.27	21674.33	1412.11	0.49
Reach 4	214.23	FCDMC 500-yr	289000.00	1077.14	1048.70	28.44	1068.57	1081.01	0.001966	15.79	18304.36	1835.19	24.54	18987.77	21688.13	1835.19	0.56
Reach 4	214.14	100-yr	169000.00	1075.49	1048.70	26.79	1062.70	1076.99	0.000805	9.84	17171.67	1257.06	23.63	19654.98	21463.38	1257.06	0.36
Reach 4	214.14	50-yr	140000.00	1075.50	1048.70	26.80	1061.11	1076.53	0.000552	8.15	17178.94	726.84	23.64	19654.98	20381.82	726.84	0.30
Reach 4	214.14	10-yr	55000.00	1075.50	1048.70	26.80	1055.59	1075.66	0.000085	3.20	17178.94	1292.04	23.63	19654.95	21463.81	1292.04	0.12
Reach 4	214.14	Post 500-yr	243000.00	1075.50	1048.70	26.80	1066.31	1078.61	0.001662	14.15	17178.94	1292.04	23.63	19654.95	21463.81	1292.04	0.51
Reach 4	214.14	FCDMC 500-yr	289000.00	1075.50	1048.70	26.80	1068.35	1079.90	0.002351	16.82	17178.94	1292.04	23.63	19654.95	21463.81	1292.04	0.61

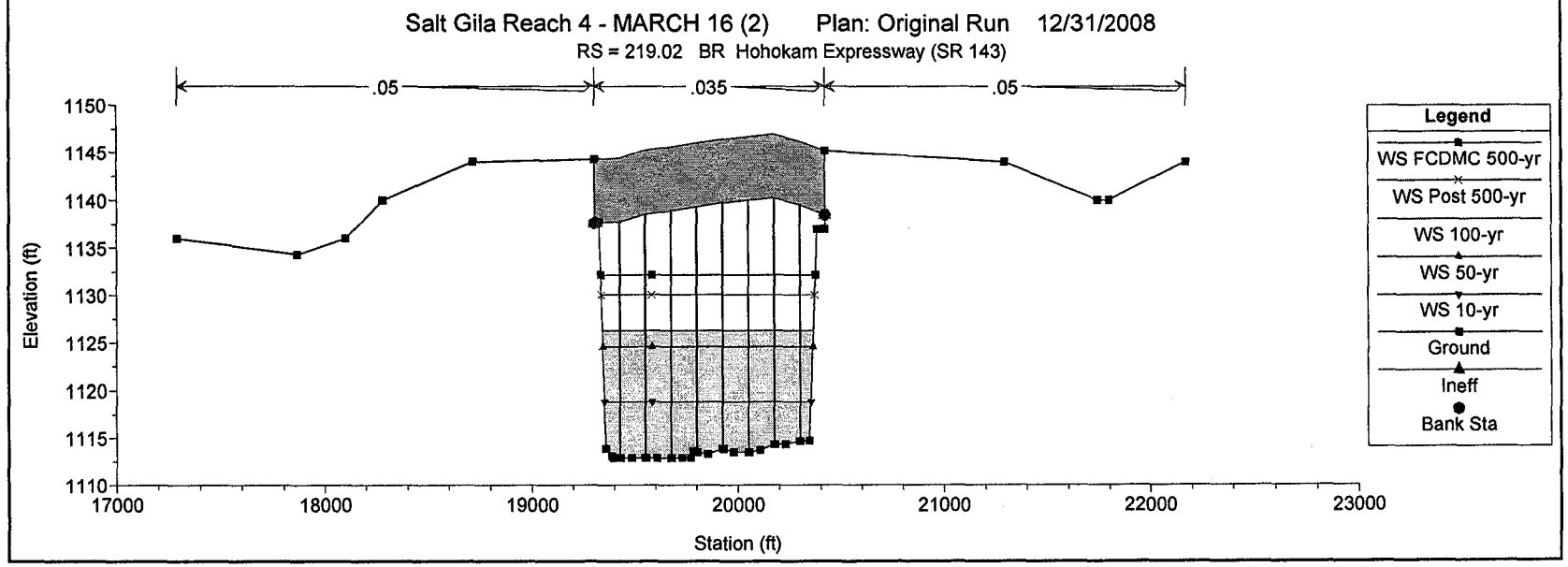

Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 219.33
.035
.035
.035
Elevation (ft)
1170
1160
1150
1140
1130
1120
1110
14000
16000
18000
20000
22000
24000
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta
Encroachment

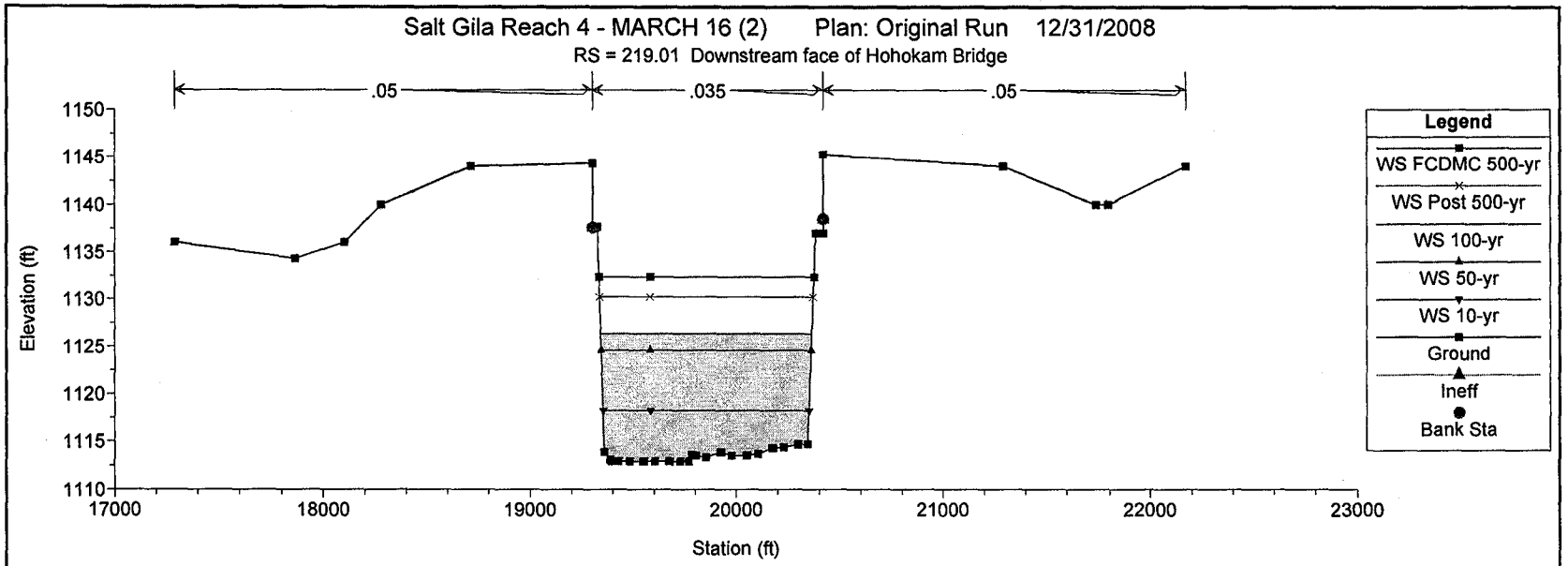

Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 219.24
.035
.035
.035
Elevation (ft)
1160
1150
1140
1130
1120
1110
14000
16000
18000
20000
22000
24000
26000
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta
Encroachment

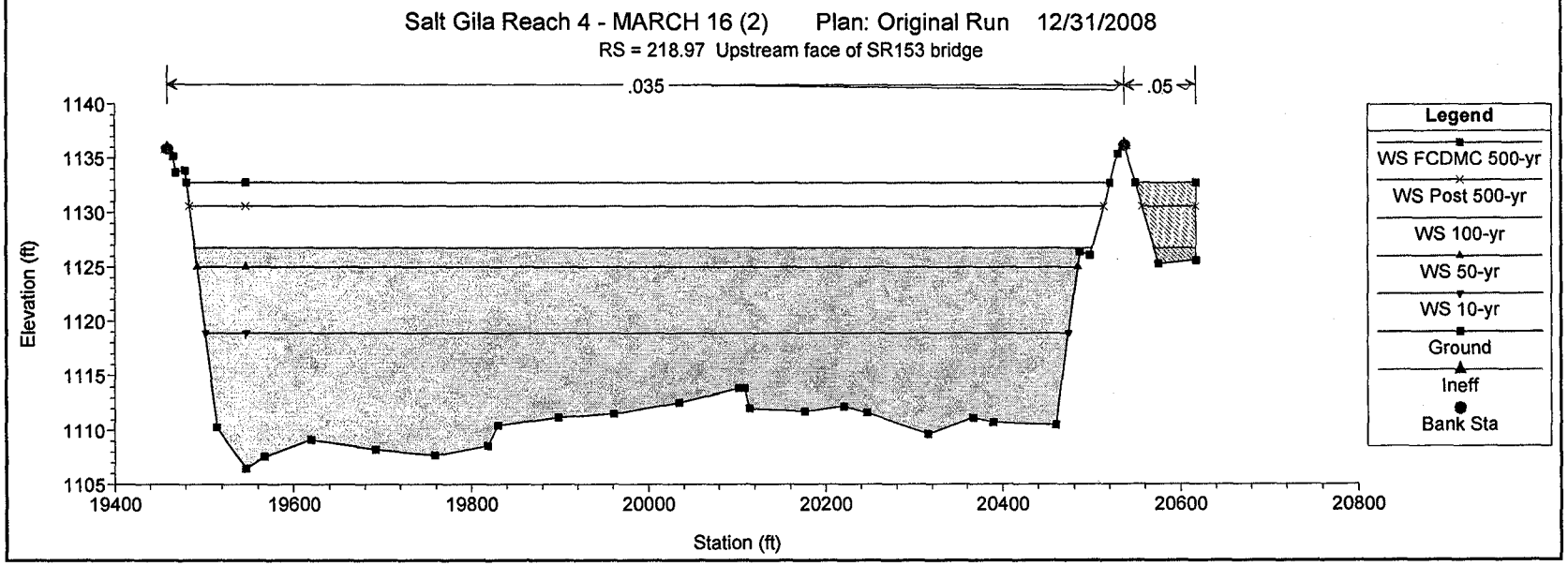

Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 219.14
.05
.035
.05
Elevation (ft)
1160
1150
1140
1130
1120
1110
14000
16000
18000
20000
22000
24000
26000
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta
Encroachment

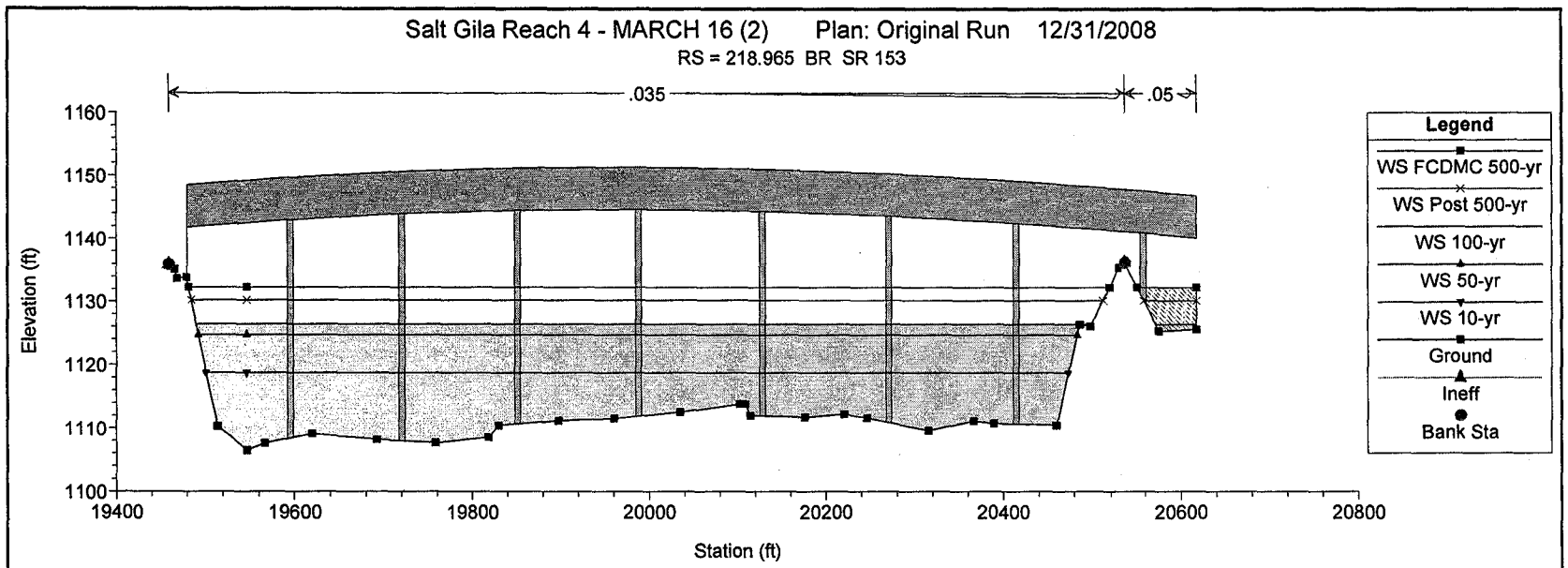

Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 219.03 Upstream face of Hohokam Bridge
.05
.035
.05
Elevation (ft)
1150
1145
1140
1135
1130
1125
1120
1115
1110
17000
18000
19000
20000
21000
22000
23000
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta

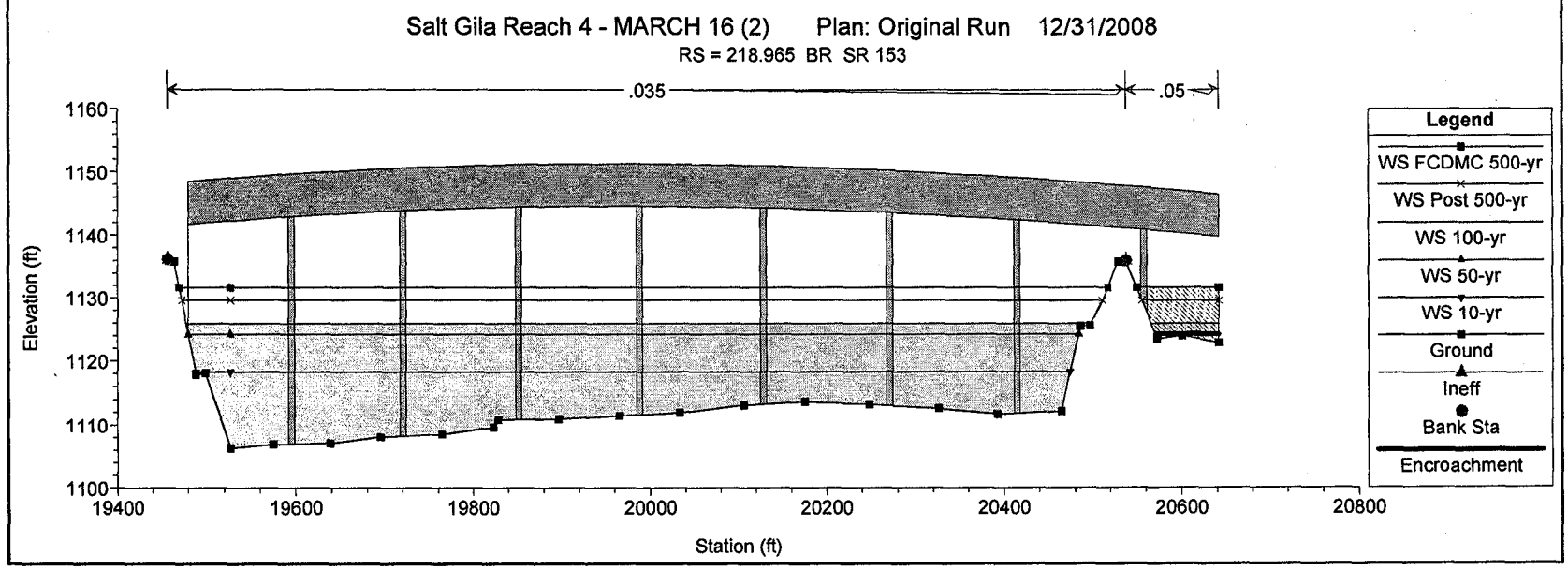

Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 219.02 BR Hohokam Expressway (SR 143)
.05
.035
.05
Elevation (ft)
1150
1145
1140
1135
1130
1125
1120
1115
1110
17000
18000
19000
20000
21000
22000
23000
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta

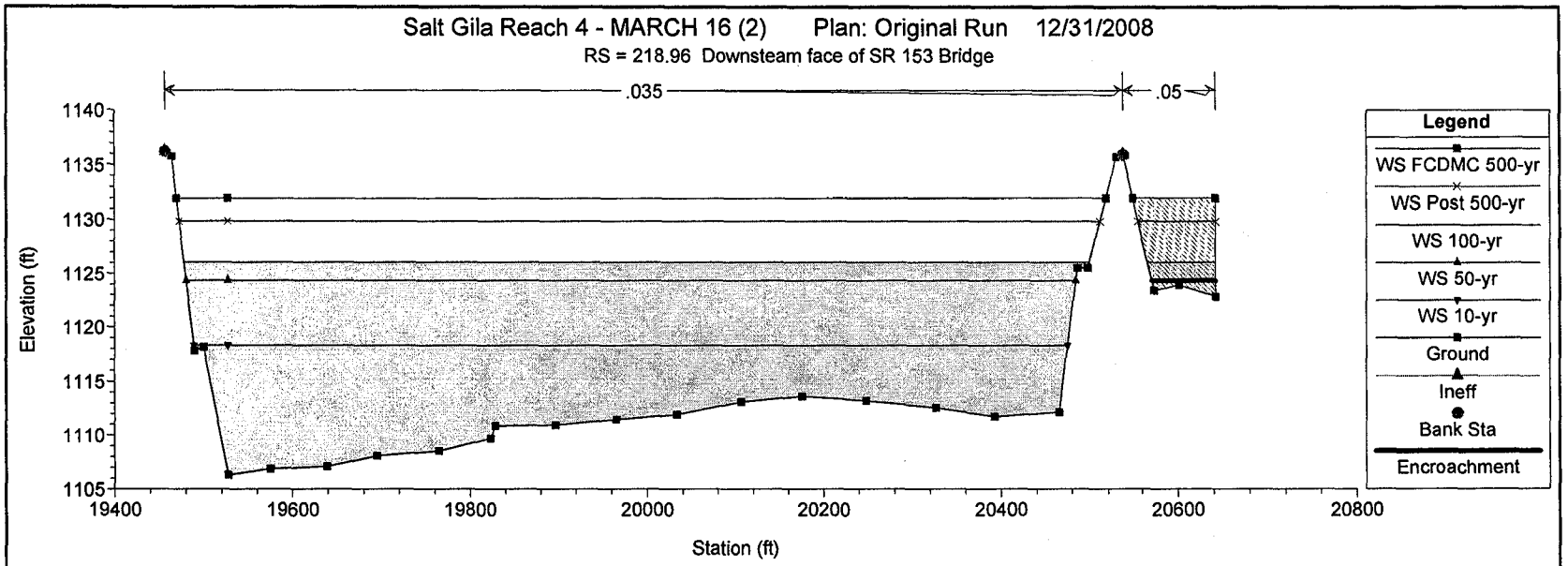

Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 219.02 BR Hohokam Expressway (SR 143)
.05
.035
.05
Elevation (ft)
1150
1145
1140
1135
1130
1125
1120
1115
1110
17000
18000
19000
20000
21000
22000
23000
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta

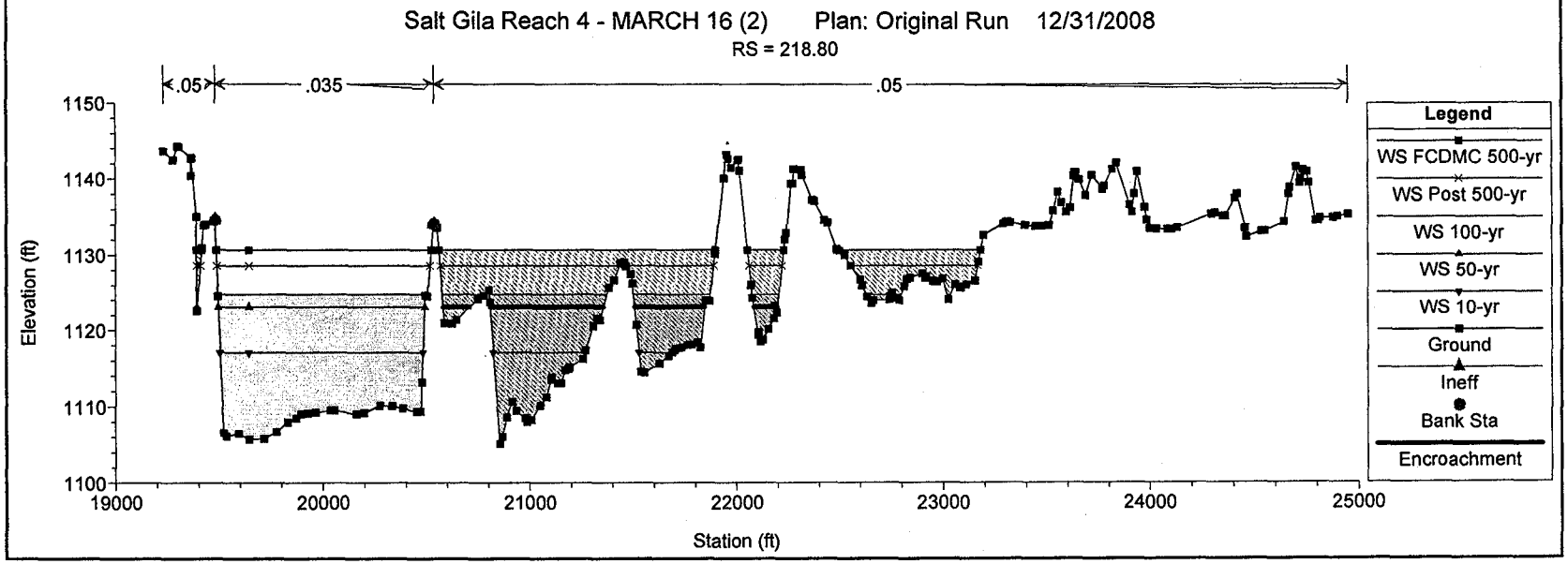

Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 219.01 Downstream face of Hohokam Bridge
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta


Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 218.97 Upstream face of SR153 bridge
.035
.05
Elevation (ft)
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta


Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 218.965 BR SR 153
.035
.05
Elevation (ft)
1160
1150
1140
1130
1120
1110
1100
19400
19600
19800
20000
20200
20400
20600
20800
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta


Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 218.965 BR SR 153
.035
.05
Elevation (ft)
1160
1150
1140
1130
1120
1110
1100
19400
19600
19800
20000
20200
20400
20600
20800
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta
Encroachment


Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 218.96 Downsteam face of SR 153 Bridge
.035
.05
Elevation (ft)
1140
1135
1130
1125
1120
1115
1110
1105
19400
19600
19800
20000
20200
20400
20600
20800
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta
Encroachment


Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 218.80
.05
.035
.05
Elevation (ft)
1150
1140
1130
1120
1110
1100
19000
20000
21000
22000
23000
24000
25000
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta
Encroachment

Appendix E Stage II Initial Drainage Concept Report –Proposed Conditions HEC-RAS Model

Excerpts

SR 143 / Sky Harbor Blvd. TI
Initial Salt River
Drainage Concept Report

TRACS NO. H7528 O1C

Prepared for:

ADOT

and

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Prepared by:

J2 engineering and environmental design

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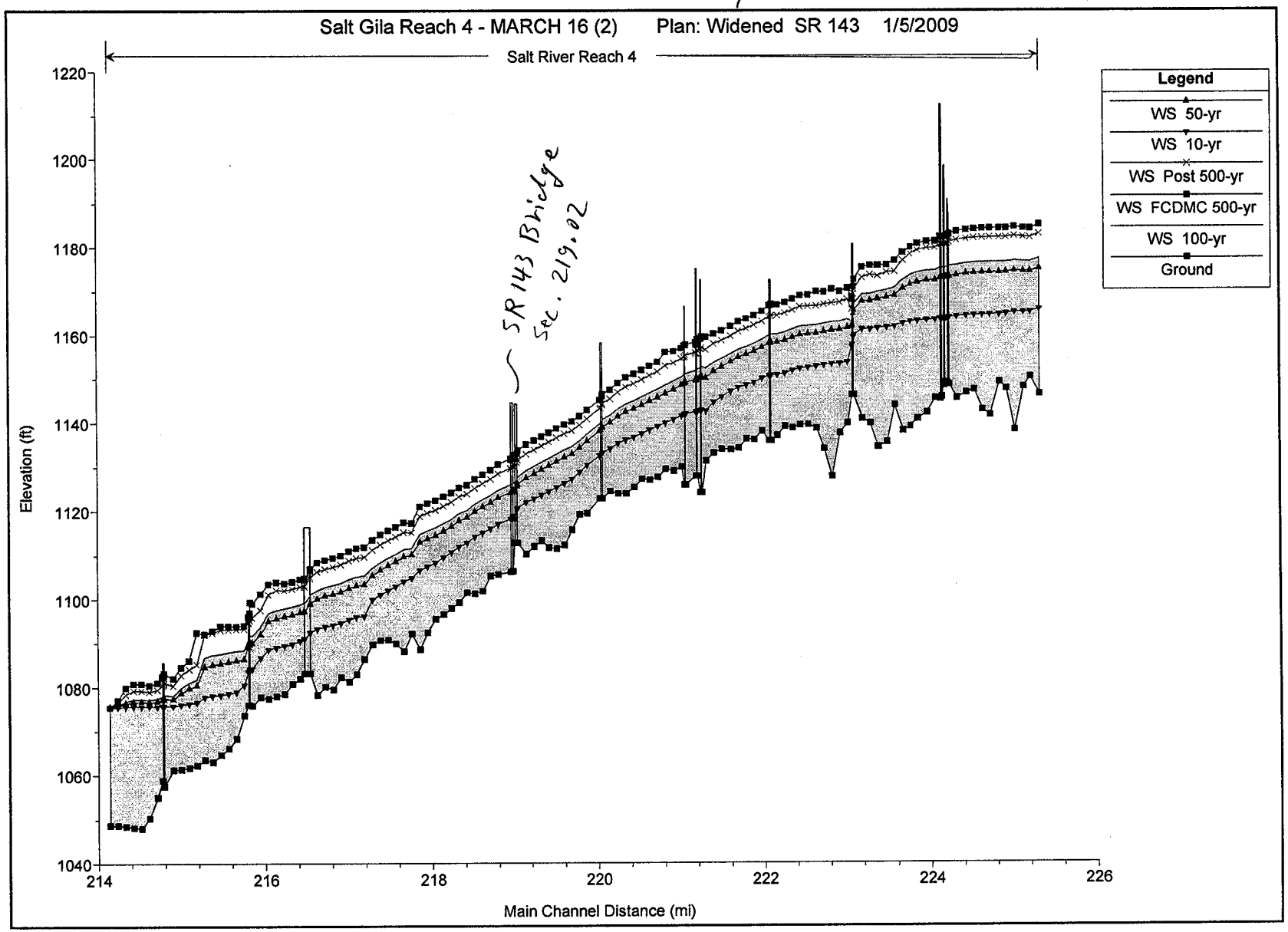
Phoenix, AZ 85040

January 2009

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
23170
JEFFREY J.
HOLZMEISTER
Date Signed 1/2/09
ARIZONA, U.S.A.
Expires 03/31/09

proposed conditions



HEC-RAS Plan: widened River: Salt River Reach: Reach 4 (Continued)

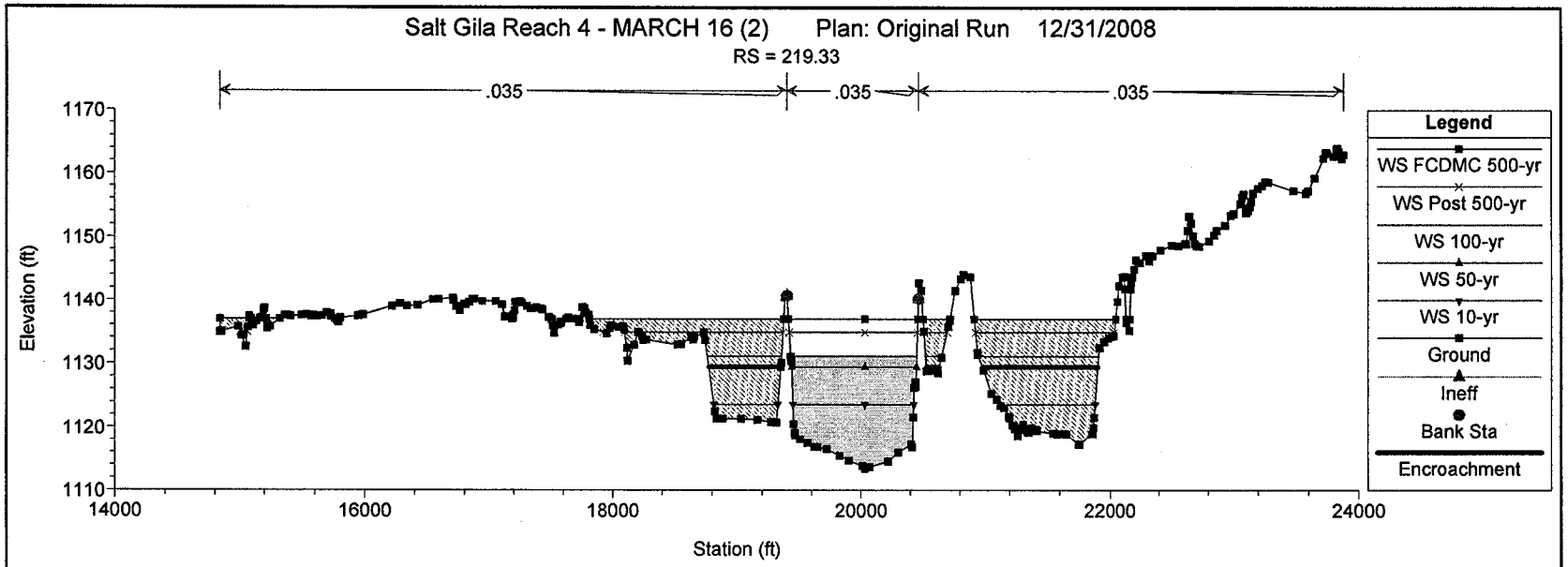
Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	
Reach 4	220.45	Post 500-yr	243000.00	1148.91	1125.43	23.48	1141.43	1151.59	0.001831	13.15	18479.11	3431.84	19.67	14746.98	21978.08	0.52
Reach 4	220.45	FCDMC 500-yr	289000.00	1151.09	1125.43	25.66	1143.17	1154.16	0.001860	14.07	20541.23	5585.54	21.53	14746.98	21998.95	0.53
Reach 4	220.35	100-yr	169000.00	1144.24	1123.99	20.25	1137.16	1146.11	0.001554	10.95	15436.93	1375.62	16.86	15058.62	22111.54	0.47
Reach 4	220.35	50-yr	140000.00	1142.50	1123.99	18.51	1135.86	1144.08	0.001480	10.10	13856.17	894.44	15.49	19547.92	20453.60	0.45
Reach 4	220.35	10-yr	55000.00	1136.17	1123.99	12.18	1131.41	1136.85	0.001182	6.61	8318.20	877.08	9.67	19426.82	20439.18	0.37
Reach 4	220.35	Post 500-yr	243000.00	1148.14	1123.99	24.15	1140.11	1150.66	0.001658	12.75	19058.53	3997.97	20.21	14725.39	22118.32	0.50
Reach 4	220.35	FCDMC 500-yr	289000.00	1150.30	1123.99	26.31	1141.78	1153.21	0.001703	13.69	21112.78	6279.42	22.05	14725.39	22121.54	0.51
Reach 4	220.25	100-yr	169000.00	1143.14	1124.01	19.13	1137.11	1145.23	0.001890	11.59	14576.52	1743.55	15.85	14669.30	21509.23	0.51
Reach 4	220.25	50-yr	140000.00	1141.45	1124.01	17.44	1135.81	1143.24	0.001822	10.73	13041.83	899.28	14.50	19553.38	20462.08	0.50
Reach 4	220.25	10-yr	55000.00	1135.37	1124.01	11.36	1131.40	1136.16	0.001545	7.15	7691.21	863.96	8.90	19580.78	20444.74	0.42
Reach 4	220.25	Post 500-yr	243000.00	1146.94	1124.01	22.93	1140.05	1149.73	0.001963	13.41	18120.17	4395.31	19.19	14669.30	21950.90	0.54
Reach 4	220.25	FCDMC 500-yr	289000.00	1149.06	1124.01	25.05	1141.74	1152.26	0.001993	14.35	20136.75	6446.40	21.02	14669.30	22184.01	0.55
Reach 4	220.16	100-yr	169000.00	1141.74	1124.58	17.16	1136.93	1144.14	0.002358	12.43	13591.24	1469.79	14.89	14558.26	21594.09	0.57
Reach 4	220.16	50-yr	140000.00	1140.10	1124.58	15.52	1135.69	1142.18	0.002354	11.57	12103.33	905.36	13.37	19564.43	20469.79	0.56
Reach 4	220.16	10-yr	55000.00	1134.19	1124.58	9.61	1131.20	1135.20	0.002357	8.06	6821.10	933.54	7.75	19576.08	21211.61	0.51
Reach 4	220.16	Post 500-yr	243000.00	1145.44	1124.58	20.86	1139.83	1148.62	0.002384	14.29	17006.73	4648.27	18.22	14558.26	21636.60	0.59
Reach 4	220.16	FCDMC 500-yr	289000.00	1147.52	1124.58	22.94	1141.47	1151.13	0.002397	15.25	18954.88	6168.21	20.01	14558.26	21772.85	0.60
Reach 4	220.06	100-yr	169000.00	1140.72	1122.90	17.82	1135.42	1142.99	0.002142	12.08	13992.42	909.54	15.38	19565.91	20475.44	0.54
Reach 4	220.06	50-yr	140000.00	1139.09	1122.90	16.19	1134.19	1141.04	0.002114	11.19	12514.13	904.71	13.83	19568.07	20472.78	0.53
Reach 4	220.06	10-yr	55000.00	1133.24	1122.90	10.34	1129.84	1134.12	0.001881	7.53	7305.09	879.08	8.31	19584.13	20463.21	0.46
Reach 4	220.06	Post 500-yr	243000.00	1144.40	1122.90	21.50	1138.33	1147.44	0.002200	14.00	17356.68	942.30	18.86	18820.00	20481.45	0.57
Reach 4	220.06	FCDMC 500-yr	289000.00	1146.45	1122.90	23.55	1139.97	1149.95	0.002228	15.01	19249.00	1061.07	20.78	18820.00	20484.80	0.58
Reach 4	220.05		Bridge													
Reach 4	220.03	100-yr	169000.00	1139.74	1122.90	16.84	1135.42	1142.32	0.002655	12.90	13099.08	906.63	14.45	19567.21	20473.84	0.60
Reach 4	220.03	50-yr	140000.00	1138.18	1122.90	15.28	1134.19	1140.41	0.002624	11.98	11689.47	897.43	13.03	19573.86	20471.29	0.58
Reach 4	220.03	10-yr	55000.00	1132.59	1122.90	9.69	1129.84	1133.62	0.002456	8.17	6735.10	876.98	7.68	19585.18	20462.15	0.52
Reach 4	220.03	Post 500-yr	243000.00	1143.25	1122.90	20.35	1138.33	1146.70	0.002697	14.91	16299.13	917.01	17.77	19562.56	20479.57	0.62
Reach 4	220.03	FCDMC 500-yr	289000.00	1145.20	1122.90	22.30	1139.97	1149.16	0.002721	15.97	18092.43	988.58	19.61	18820.00	20482.75	0.64
Reach 4	219.88	100-yr	169000.00	1137.45	1119.50	17.95	1133.48	1140.11	0.002847	13.11	12894.68	2004.18	14.04	18512.97	21604.97	0.62
Reach 4	219.88	50-yr	140000.00	1135.91	1119.50	16.41	1132.25	1138.22	0.002833	12.18	11491.51	910.69	12.62	19568.33	20479.02	0.60
Reach 4	219.88	10-yr	55000.00	1130.47	1119.50	10.97	1127.99	1131.55	0.002720	8.36	6580.03	892.89	7.37	19577.60	20470.48	0.54
Reach 4	219.88	Post 500-yr	243000.00	1140.95	1119.50	21.45	1136.32	1144.47	0.002867	15.05	16150.80	3960.01	17.20	14514.07	21618.18	0.64
Reach 4	219.88	FCDMC 500-yr	289000.00	1142.92	1119.50	23.42	1137.95	1146.92	0.002870	16.04	18012.40	5445.87	18.94	14514.07	21620.14	0.65
Reach 4	219.79	100-yr	169000.00	1135.96	1119.30	16.66	1132.29	1138.69	0.003005	13.25	12751.83	2039.69	13.68	18525.04	21705.04	0.63
Reach 4	219.79	50-yr	140000.00	1134.40	1119.30	15.10	1131.07	1136.78	0.003057	12.39	11298.09	925.96	12.20	19516.66	20442.62	0.63
Reach 4	219.79	10-yr	55000.00	1128.92	1119.30	9.61	1126.80	1130.11	0.003226	8.76	6279.51	964.38	6.94	19525.27	21631.07	0.59
Reach 4	219.79	Post 500-yr	243000.00	1139.52	1119.30	20.22	1135.10	1143.06	0.002941	15.09	16103.39	3796.63	16.91	14407.68	21873.08	0.65
Reach 4	219.79	FCDMC 500-yr	289000.00	1141.52	1119.30	22.22	1136.72	1145.52	0.002910	16.04	18021.37	5128.62	18.69	14407.68	21876.58	0.65
Reach 4	219.70	100-yr	169000.00	1134.64	1115.81	18.83	1130.66	1137.23	0.002801	12.90	13098.60	2046.87	13.86	18573.58	21924.37	0.61
Reach 4	219.70	50-yr	140000.00	1133.02	1115.81	17.21	1129.46	1135.30	0.002873	12.09	11575.08	938.78	12.33	19569.14	20507.92	0.61
Reach 4	219.70	10-yr	55000.00	1127.32	1115.81	11.51	1125.27	1128.51	0.003272	8.75	6286.85	916.69	6.86	19576.57	20493.26	0.59
Reach 4	219.70	Post 500-yr	243000.00	1138.27	1115.81	22.46	1133.48	1141.61	0.002747	14.67	16569.46	2954.88	17.05	14889.92	22128.26	0.63
Reach 4	219.70	FCDMC 500-yr	289000.00	1140.31	1115.81	24.50	1135.09	1144.07	0.002721	15.56	18569.39	4774.34	18.79	14650.18	22131.73	0.63
Reach 4	219.61	100-yr	169000.00	1133.87	1112.39	21.48	1128.54	1135.94	0.002046	11.53	14659.03	2913.24	14.83	18557.47	21995.12	0.53
Reach 4	219.61	50-yr	140000.00	1132.22	1112.39	19.83	1127.37	1134.01	0.002016	10.73	13048.11	970.60	13.44	19580.16	20550.76	0.52

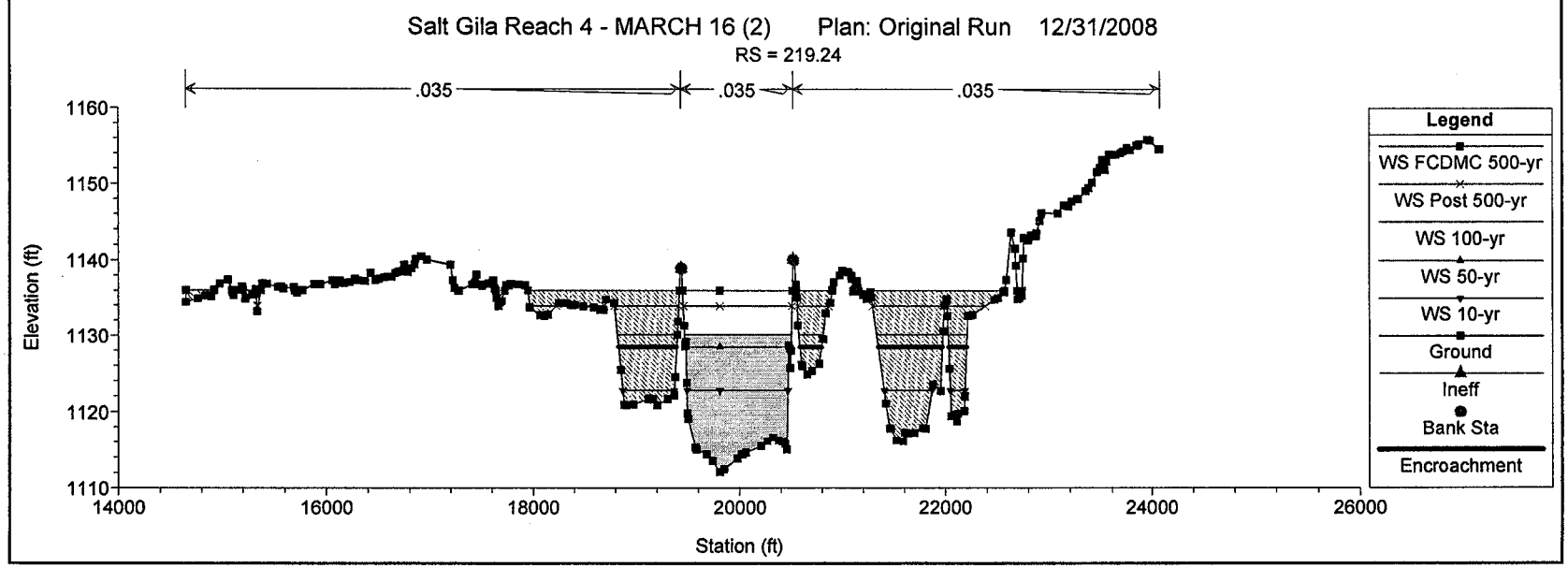
HEC-RAS Plan: widened River: Salt River Reach: Reach 4 (Continued)

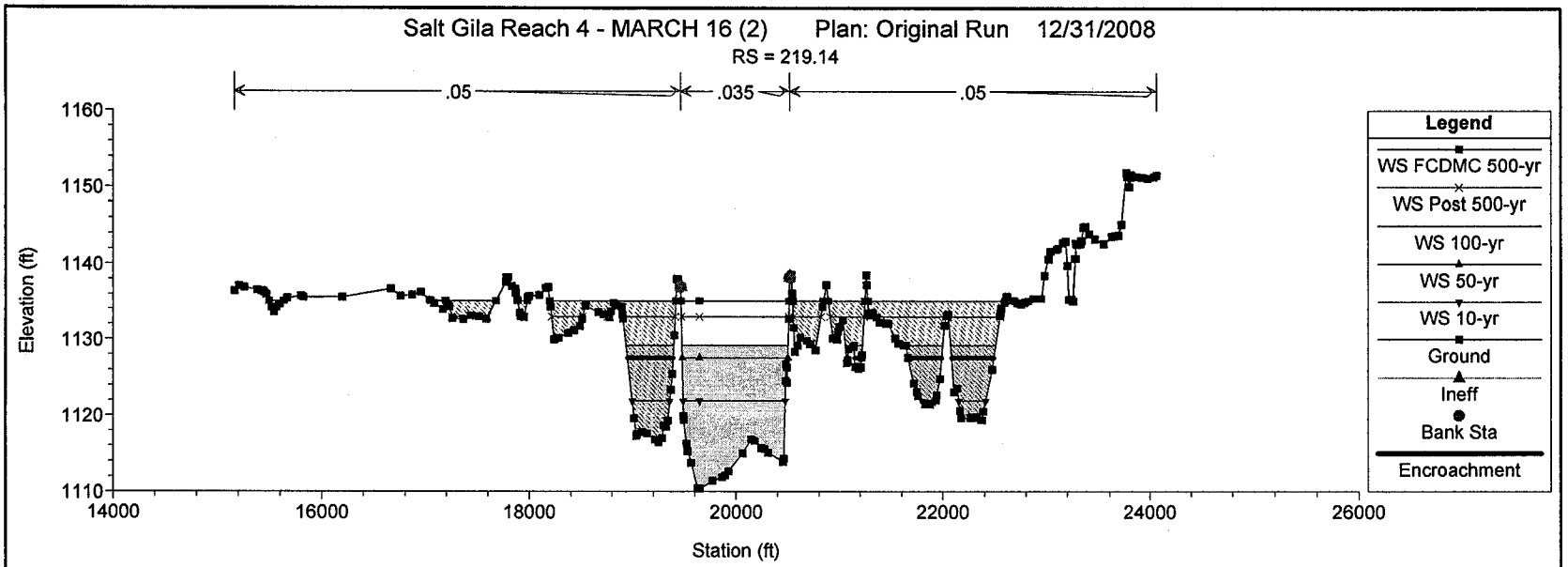
Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	
Reach 4	219.61	10-yr	55000.00	1126.34	1112.39	13.95	1123.27	1127.20	0.002022	7.45	7383.80	1068.46	7.73	19586.82	21449.17	0.47
Reach 4	219.61	Post 500-yr	243000.00	1137.57	1112.39	25.18	1131.24	1140.30	0.002049	13.24	18346.77	3322.83	18.27	17674.21	22243.62	0.55
Reach 4	219.61	FCDMC 500-yr	289000.00	1139.65	1112.39	27.26	1132.83	1142.75	0.002048	14.14	20439.92	5058.02	20.17	14651.85	22247.31	0.55
Reach 4	219.51	100-yr	169000.00	1132.94	1111.64	21.30	1127.41	1134.91	0.001938	11.26	15004.90	1912.08	14.91	18666.55	21891.12	0.51
Reach 4	219.51	50-yr	140000.00	1131.29	1111.64	19.65	1126.24	1133.00	0.001937	10.49	13351.43	997.05	13.39	19546.29	20544.91	0.50
Reach 4	219.51	10-yr	55000.00	1125.40	1111.64	13.76	1122.16	1126.22	0.001874	7.24	7596.33	967.94	7.85	19567.46	20535.40	0.46
Reach 4	219.51	Post 500-yr	243000.00	1136.66	1111.64	25.02	1130.03	1139.26	0.001942	12.94	18778.55	3157.80	18.36	15079.06	22140.79	0.53
Reach 4	219.51	FCDMC 500-yr	289000.00	1138.75	1111.64	27.11	1131.71	1141.71	0.001940	13.81	20923.39	4339.61	20.28	14907.10	22145.60	0.54
Reach 4	219.42	100-yr	169000.00	1132.01	1111.83	20.18	1126.40	1133.95	0.001892	11.17	15136.19	2402.57	14.98	18335.45	21973.08	0.51
Reach 4	219.42	50-yr	140000.00	1130.36	1111.83	18.53	1125.23	1132.04	0.001894	10.39	13473.43	1002.97	13.43	19493.67	20496.64	0.50
Reach 4	219.42	10-yr	55000.00	1124.51	1111.83	12.68	1121.18	1125.30	0.001799	7.13	7713.46	1609.37	7.91	18916.99	21633.85	0.45
Reach 4	219.42	Post 500-yr	243000.00	1135.73	1111.83	23.90	1129.10	1138.29	0.001902	12.84	18925.71	4189.21	18.44	14620.63	22174.07	0.53
Reach 4	219.42	FCDMC 500-yr	289000.00	1137.83	1111.83	25.99	1130.62	1140.74	0.001902	13.71	21082.68	5022.91	20.35	14620.63	22178.89	0.54
Reach 4	219.33	100-yr	169000.00	1131.12	1113.40	17.72	1125.56	1133.05	0.001922	11.16	15149.91	2727.46	14.78	18119.26	21908.19	0.51
Reach 4	219.33	50-yr	140000.00	1129.46	1113.40	16.06	1124.41	1131.14	0.001914	10.40	13467.20	1010.53	13.33	19442.22	20452.75	0.50
Reach 4	219.33	10-yr	55000.00	1123.65	1113.40	10.25	1120.37	1124.45	0.001817	7.15	7696.64	2249.89	7.87	18815.51	21879.63	0.45
Reach 4	219.33	Post 500-yr	243000.00	1134.85	1113.40	21.45	1128.29	1137.39	0.001910	12.78	19009.17	3715.25	18.24	15003.25	22038.68	0.53
Reach 4	219.33	FCDMC 500-yr	289000.00	1136.95	1113.40	23.55	1129.77	1139.84	0.001900	13.63	21209.73	4635.53	20.17	14841.36	22165.50	0.53
Reach 4	219.24	100-yr	169000.00	1130.18	1112.10	18.08	1124.69	1132.13	0.001978	11.21	15076.34	2683.92	14.60	18817.06	22208.42	0.52
Reach 4	219.24	50-yr	140000.00	1128.53	1112.10	16.43	1123.52	1130.23	0.001960	10.46	13382.05	1010.40	13.24	19482.88	20497.81	0.51
Reach 4	219.24	10-yr	55000.00	1122.82	1112.10	10.72	1119.47	1123.60	0.001777	7.10	7742.95	2089.88	7.94	18869.76	22188.77	0.44
Reach 4	219.24	Post 500-yr	243000.00	1133.95	1112.10	21.84	1127.41	1136.49	0.001941	12.79	18994.58	3545.81	18.08	15333.66	22385.15	0.53
Reach 4	219.24	FCDMC 500-yr	289000.00	1136.06	1112.10	23.96	1129.00	1138.94	0.001921	13.61	21230.52	5062.12	20.01	14646.32	22739.36	0.54
Reach 4	219.14	100-yr	169000.00	1129.23	1110.40	18.83	1123.57	1131.14	0.001875	11.07	15261.74	2562.36	14.91	18938.77	22510.47	0.51
Reach 4	219.14	50-yr	140000.00	1127.58	1110.40	17.18	1122.42	1129.23	0.001883	10.31	13579.58	1017.99	13.34	19484.29	20502.28	0.50
Reach 4	219.14	10-yr	55000.00	1121.99	1110.40	11.59	1118.38	1122.72	0.001606	6.87	8005.34	1742.67	8.14	18997.44	22412.87	0.42
Reach 4	219.14	Post 500-yr	243000.00	1133.00	1110.40	22.60	1126.29	1135.50	0.001855	12.69	19144.38	3958.41	18.48	17254.40	22550.86	0.52
Reach 4	219.14	FCDMC 500-yr	289000.00	1135.12	1110.40	24.72	1127.85	1137.97	0.001843	13.54	21348.94	5264.81	20.48	15491.31	23254.60	0.53
Reach 4	219.03 Post	100-yr	169000.00	1127.85	1112.90	14.95	1123.17	1129.98	0.002273	11.72	14419.98	1026.82	14.04	19340.38	20367.21	0.55
Reach 4	219.03 "	50-yr	140000.00	1126.17	1112.90	13.26	1122.04	1128.05	0.002364	11.03	12697.93	1021.53	12.43	19342.68	20364.21	0.55
Reach 4	219.03 "	10-yr	55000.00	1120.74	1112.90	7.84	1118.06	1121.65	0.002350	7.63	7204.34	1004.47	7.17	19350.11	20354.57	0.50
Reach 4	219.03 "	Post 500-yr	243000.00	1131.67	1112.90	18.77	1125.82	1134.39	0.002135	13.23	18371.94	1038.86	17.68	19335.14	20374.01	0.55
Reach 4	219.03 pre	FCDMC 500-yr SPF	289000.00	1133.82	1112.90	20.92	1127.26	1136.87	0.002079	14.02	20609.22	1045.62	19.71	19332.21	20377.82	0.56
Reach 4	219.02		Bridge	← SR 143 Bridge												
Reach 4	219.01	100-yr	169000.00	1126.36	1112.90	13.46	1123.17	1129.03	0.003273	13.10	12897.13	1022.15	12.62	19342.42	20364.56	0.65
Reach 4	219.01	50-yr	140000.00	1124.60	1112.90	11.70	1122.04	1127.07	0.003672	12.61	11100.67	1016.60	10.92	19344.83	20361.43	0.67
Reach 4	219.01	10-yr	55000.00	1118.25	1112.90	5.35	1118.06	1120.37	0.009574	11.68	4709.34	996.62	4.73	19353.52	20350.14	0.95
Reach 4	219.01	Post 500-yr	243000.00	1130.23	1112.90	17.33	1125.82	1133.45	0.002813	14.40	16876.64	1034.32	16.32	19337.12	20371.44	0.63
Reach 4	219.01	FCDMC 500-yr	289000.00	1132.37	1112.90	19.46	1127.26	1135.92	0.002665	15.14	19091.86	1041.04	18.34	19334.20	20375.24	0.62
Reach 4	218.97	100-yr	169000.00	1126.74	1106.45	20.29	1120.33	1128.50	0.001620	10.65	15870.60	1056.96	15.72	19490.06	20617.67	0.47
Reach 4	218.97	50-yr	140000.00	1125.00	1106.45	18.55	1119.16	1126.52	0.001596	9.91	14130.36	991.55	14.25	19492.65	20484.20	0.46
Reach 4	218.97	10-yr	55000.00	1118.89	1106.45	12.43	1115.12	1119.60	0.001510	6.77	8126.14	972.30	8.36	19501.73	20474.03	0.41
Reach 4	218.97	Post 500-yr	243000.00	1130.61	1106.45	24.16	1123.03	1132.95	0.001642	12.27	19812.41	1089.46	19.26	19484.32	20617.67	0.49
Reach 4	218.97	FCDMC 500-yr	289000.00	1132.75	1106.45	26.30	1124.56	1135.43	0.001656	13.12	22026.12	1107.45	21.20	19481.14	20617.67	0.50
Reach 4	218.965		Bridge													

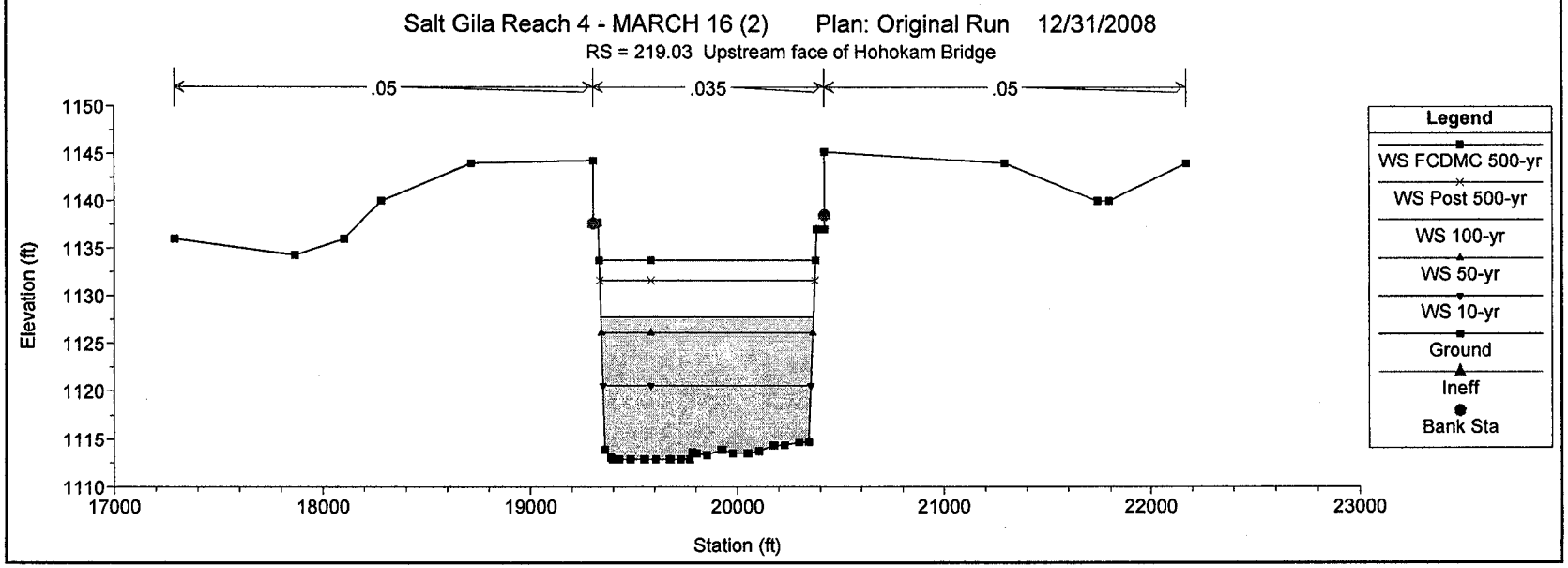
HEC-RAS Plan: widened River: Salt River Reach: Reach 4 (Continued)

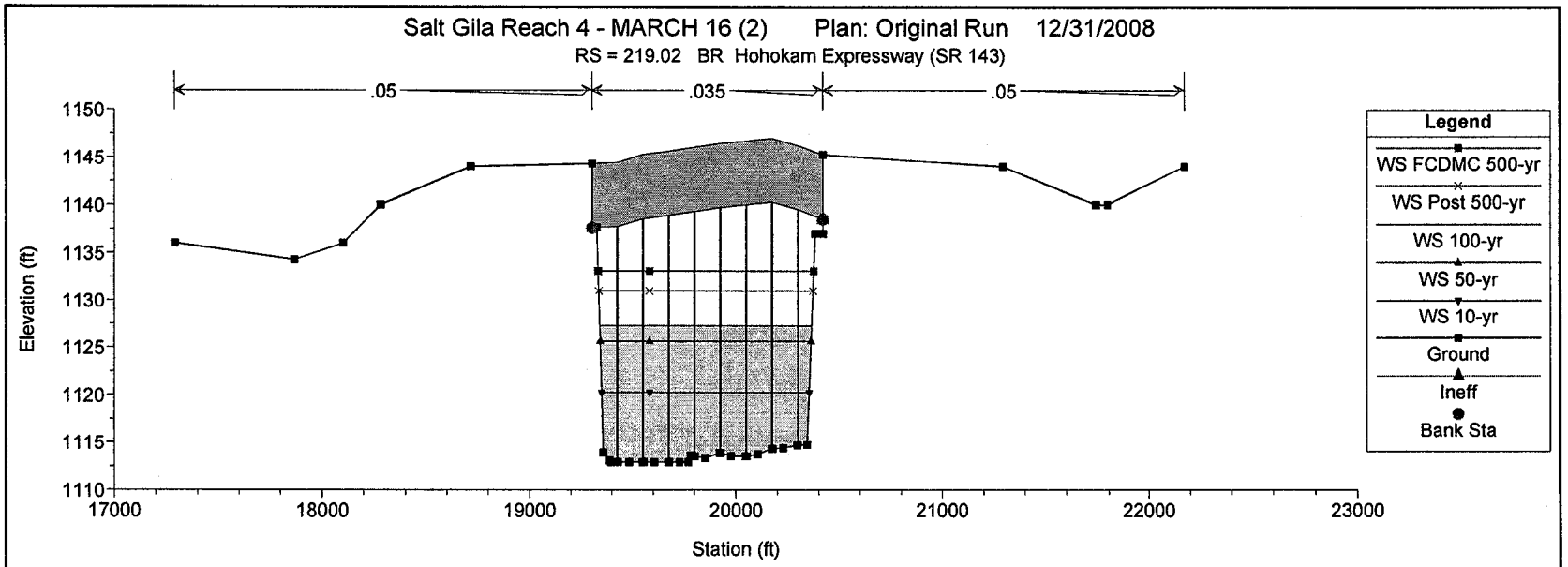
Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	
Reach 4	218.96	100-yr	169000.00	1126.03	1106.31	19.72	1120.69	1128.02	0.002010	11.32	14931.39	1096.74	14.63	19477.87	20641.85	0.52
Reach 4	218.96	50-yr	140000.00	1124.31	1106.31	18.00	1119.55	1126.06	0.002033	10.61	13198.83	1003.75	13.15	19480.26	20484.02	0.52
Reach 4	218.96	10-yr	55000.00	1118.30	1106.31	11.99	1115.51	1119.20	0.002279	7.62	7218.99	986.01	7.32	19488.65	20474.66	0.50
Reach 4	218.96	Post 500-yr	243000.00	1129.83	1106.31	23.52	1123.38	1132.41	0.001962	12.90	18840.38	1124.76	18.15	19472.57	20641.85	0.53
Reach 4	218.96	FCDMC 500-yr	289000.00	1131.92	1106.31	25.61	1124.87	1134.86	0.001950	13.74	21027.70	1140.24	20.07	19469.64	20641.85	0.54
Reach 4	218.80	100-yr	169000.00	1124.77	1105.70	19.68	1118.27	1126.50	0.001572	10.55	16025.46	2479.28	15.84	19390.29	23036.72	0.47
Reach 4	218.80	50-yr	140000.00	1123.07	1105.70	17.37	1117.08	1124.55	0.001538	9.78	14317.45	996.80	14.36	19494.54	20491.35	0.45
Reach 4	218.80	10-yr	55000.00	1117.04	1105.70	11.95	1113.07	1117.71	0.001382	6.57	8367.85	1581.72	8.55	19503.80	21687.86	0.40
Reach 4	218.80	Post 500-yr	243000.00	1128.57	1105.70	23.48	1120.96	1130.88	0.001619	12.21	19898.65	3115.12	19.34	19389.90	23165.46	0.49
Reach 4	218.80	FCDMC 500-yr	289000.00	1130.66	1105.70	25.57	1122.44	1133.32	0.001647	13.10	22059.09	3269.04	21.24	19389.69	23180.29	0.50
Reach 4	218.71	100-yr	169000.00	1123.63	1105.38	18.25	1118.14	1125.63	0.001938	11.35	14892.14	3165.46	15.09	19053.70	23203.02	0.51
Reach 4	218.71	50-yr	140000.00	1121.96	1105.38	16.58	1116.95	1123.69	0.001949	10.57	13244.91	981.01	13.50	19512.95	20493.96	0.51
Reach 4	218.71	10-yr	55000.00	1116.10	1105.38	10.72	1112.88	1116.92	0.001889	7.28	7559.10	2043.98	7.87	19523.59	23131.81	0.46
Reach 4	218.71	Post 500-yr	243000.00	1127.34	1105.38	21.96	1120.86	1129.99	0.001969	13.06	18605.15	3796.23	18.44	19040.17	23417.79	0.54
Reach 4	218.71	FCDMC 500-yr	289000.00	1129.38	1105.38	24.00	1122.40	1132.41	0.001990	13.98	20668.10	4093.77	20.29	17665.31	23470.77	0.55
Reach 4	218.61	100-yr	169000.00	1122.61	1101.91	20.70	1117.13	1124.63	0.001986	11.40	14828.12	3020.86	14.91	18798.47	24161.57	0.52
Reach 4	218.61	50-yr	140000.00	1120.95	1101.91	19.04	1115.95	1122.70	0.001956	10.61	13196.82	974.86	13.54	19518.08	20492.94	0.51
Reach 4	218.61	10-yr	55000.00	1115.17	1101.91	13.26	1111.85	1115.98	0.001822	7.22	7621.06	2140.52	7.99	18825.80	21697.37	0.45
Reach 4	218.61	Post 500-yr	243000.00	1126.32	1101.91	24.41	1119.87	1128.98	0.002012	13.09	18564.15	4359.45	18.20	18784.75	24409.41	0.54
Reach 4	218.61	FCDMC 500-yr	289000.00	1128.35	1101.91	26.44	1121.41	1131.39	0.002026	13.99	20650.55	5213.74	20.03	14941.85	24491.51	0.55
Reach 4	218.52	100-yr	169000.00	1121.59	1101.37	24.44	1116.22	1123.62	0.002038	11.43	14790.30	2019.33	14.67	18820.79	22544.59	0.53
Reach 4	218.52	50-yr	140000.00	1119.95	1101.37	18.57	1115.04	1121.70	0.001993	10.64	13158.84	982.43	13.39	19513.66	20496.09	0.51
Reach 4	218.52	10-yr	55000.00	1114.24	1101.37	17.09	1110.96	1115.05	0.001853	7.23	7607.96	1361.19	7.90	18863.80	21015.02	0.45
Reach 4	218.52	Post 500-yr	243000.00	1125.30	1101.37	28.15	1118.94	1127.96	0.002027	13.09	18562.63	2759.95	18.09	18484.03	22708.30	0.54
Reach 4	218.52	FCDMC 500-yr	289000.00	1127.33	1101.37	30.18	1120.50	1130.37	0.002035	13.99	20656.74	3281.68	19.94	18338.45	24759.33	0.55
Reach 4	218.42	100-yr	169000.00	1120.21	1101.56	18.65	1115.75	1122.48	0.002467	12.11	13957.44	1630.15	13.85	19506.78	22608.78	0.57
Reach 4	218.42	50-yr	140000.00	1118.57	1101.56	17.01	1114.61	1120.57	0.002507	11.36	12318.99	990.86	12.43	19510.51	20501.37	0.57
Reach 4	218.42	10-yr	55000.00	1112.88	1101.56	11.32	1110.51	1113.91	0.002791	8.16	6743.17	1082.25	6.95	19523.46	22397.27	0.55
Reach 4	218.42	Post 500-yr	243000.00	1123.95	1101.56	22.39	1118.47	1126.85	0.002343	13.68	17767.69	2333.18	17.30	17430.69	22862.82	0.58
Reach 4	218.42	FCDMC 500-yr	289000.00	1125.98	1101.56	24.42	1120.04	1129.27	0.002320	14.55	19862.01	2669.28	19.14	17380.19	23801.16	0.59
Reach 4	218.33	100-yr	169000.00	1119.49	1099.30	20.19	1113.67	1121.30	0.001772	10.78	15676.55	1051.47	14.91	19490.04	20541.52	0.49
Reach 4	218.33	50-yr	140000.00	1117.83	1099.30	18.53	1112.54	1119.39	0.001754	10.04	13946.95	1033.89	13.49	19493.78	20527.67	0.48
Reach 4	218.33	10-yr	55000.00	1112.02	1099.30	12.72	1108.54	1112.76	0.001664	6.87	8010.32	1011.66	7.92	19507.19	20518.85	0.43
Reach 4	218.33	Post 500-yr	243000.00	1123.33	1099.30	24.03	1116.31	1125.68	0.001743	12.31	19747.36	1071.53	18.43	19481.64	20553.17	0.51
Reach 4	218.33	FCDMC 500-yr	289000.00	1125.39	1099.30	26.09	1117.79	1128.08	0.001753	13.15	21969.71	1102.44	20.30	19428.09	20610.96	0.51
Reach 4	218.24	100-yr	169000.00	1118.21	1097.97	20.24	1113.43	1120.30	0.002215	11.61	14554.82	1209.47	14.06	19418.16	22846.28	0.55
Reach 4	218.24	50-yr	140000.00	1116.54	1097.97	18.57	1112.28	1118.39	0.002283	10.90	12839.58	1026.93	12.50	19422.48	20449.42	0.54
Reach 4	218.24	10-yr	55000.00	1110.77	1097.97	12.80	1108.25	1111.73	0.002569	7.87	6992.78	999.38	7.00	19437.48	20436.86	0.52
Reach 4	218.24	Post 500-yr	243000.00	1122.06	1097.97	24.09	1116.04	1124.72	0.002083	13.08	18577.28	1641.44	17.64	18058.05	22853.25	0.55
Reach 4	218.24	FCDMC 500-yr	289000.00	1124.23	1097.97	26.26	1117.58	1127.14	0.001995	13.74	21872.65	2214.35	13.05	15715.11	22857.18	0.55
Reach 4	218.14	100-yr	169000.00	1117.26	1096.58	20.68	1111.95	1119.21	0.001974	11.22	15059.49	1392.78	14.59	19389.50	22922.42	0.52
Reach 4	218.14	50-yr	140000.00	1115.56	1096.58	18.98	1110.82	1117.28	0.002023	10.52	13310.78	1025.39	12.98	19393.70	20419.08	0.51
Reach 4	218.14	10-yr	55000.00	1109.64	1096.58	13.06	1106.54	1110.52	0.002218	7.52	7312.47	1000.63	7.31	19408.56	20409.20	0.49
Reach 4	218.14	Post 500-yr	243000.00	1121.18	1096.58	24.60	1114.59	1123.68	0.001878	12.70	19138.20	1841.00	18.25	18260.39	22932.01	0.52
Reach 4	218.14	FCDMC 500-yr	289000.00	1123.32	1096.58	26.74	1116.11	1126.15	0.001855	13.51	21394.79	2473.89	20.23	15676.58	22937.25	0.53

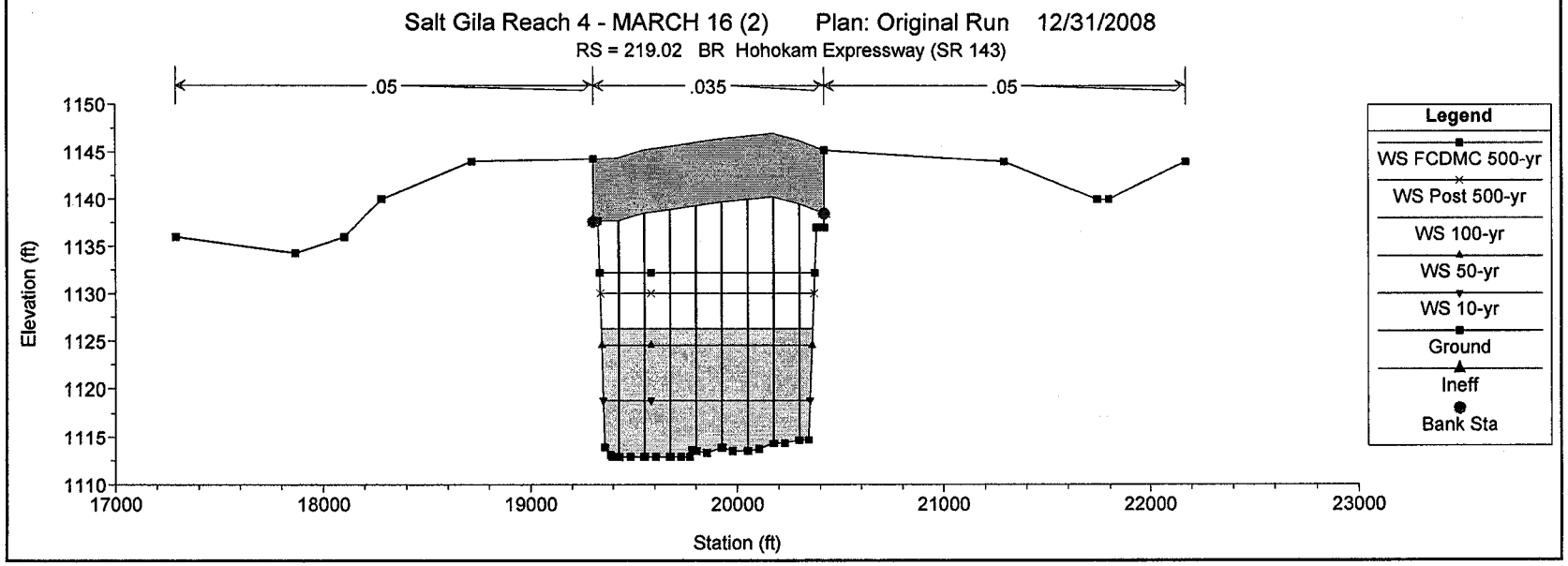

Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 219.33
.035
.035
.035
Elevation (ft)
1170
1160
1150
1140
1130
1120
1110
14000
16000
18000
20000
22000
24000
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta
Encroachment

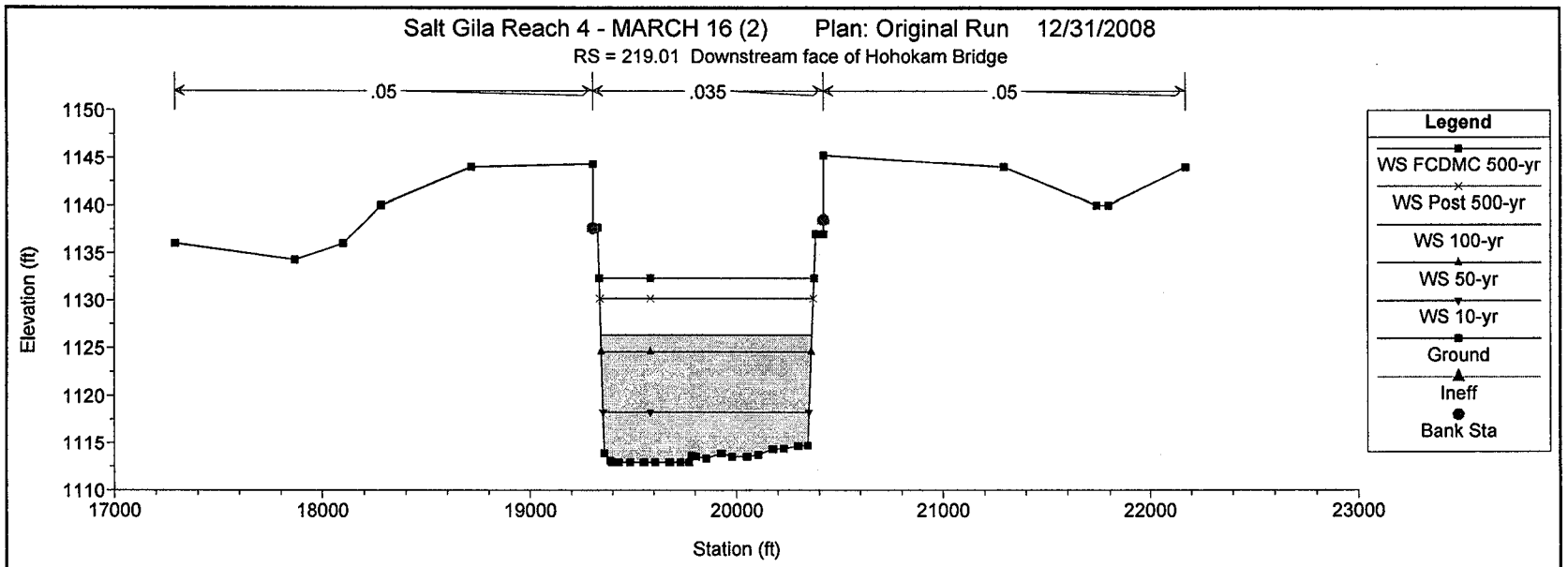

Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 219.24
.035
.035
.035
Elevation (ft)
1160
1150
1140
1130
1120
1110
14000
16000
18000
20000
22000
24000
26000
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta
Encroachment

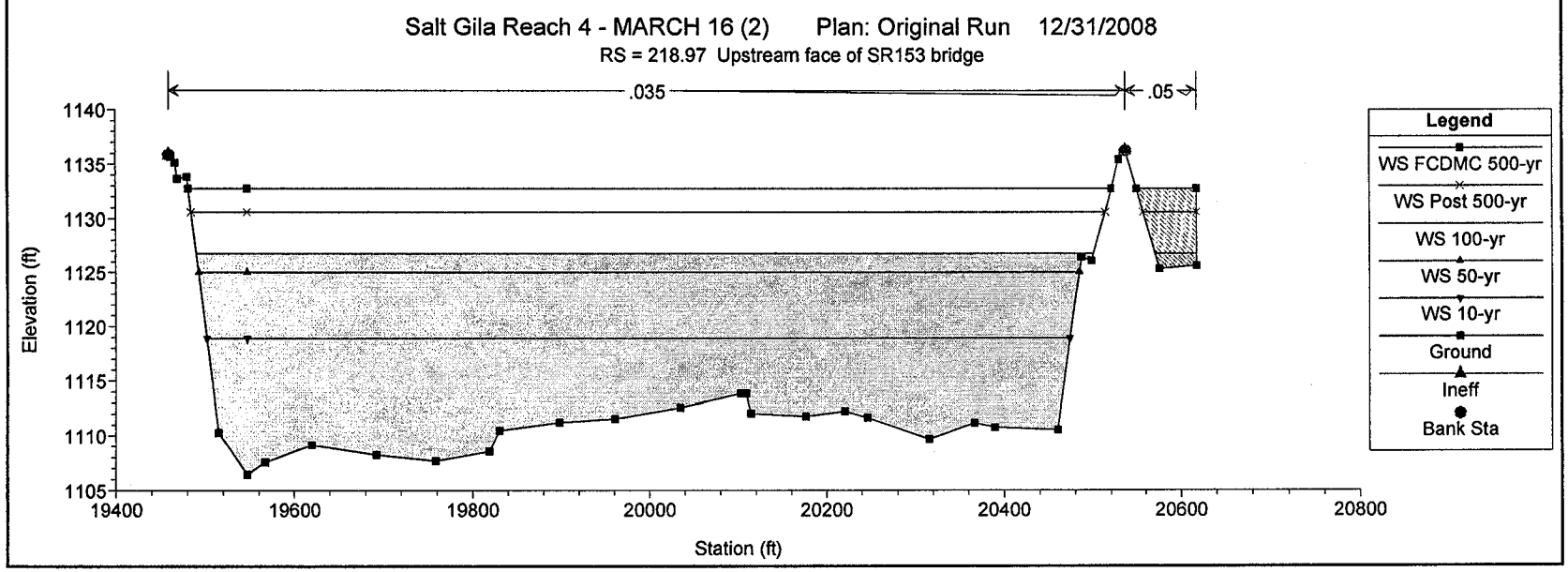

Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 219.14
.05
.035
.05
Elevation (ft)
1160
1150
1140
1130
1120
1110
14000
16000
18000
20000
22000
24000
26000
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta
Encroachment

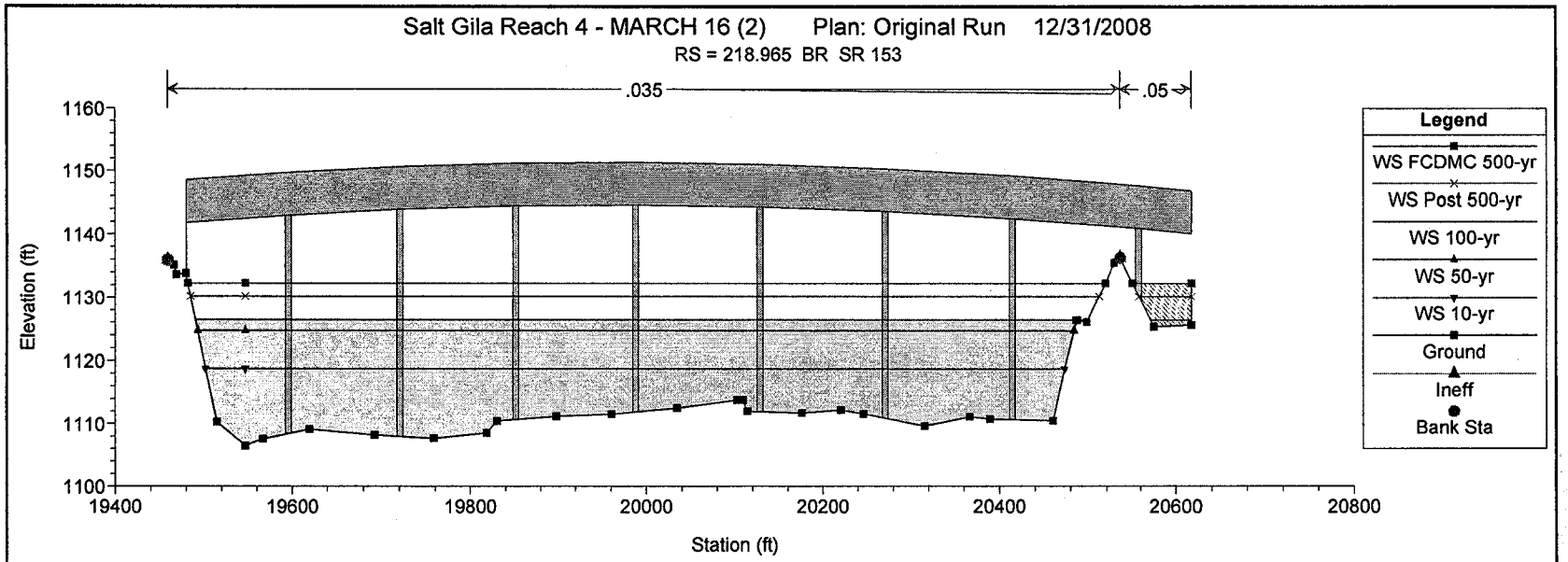

Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 219.03 Upstream face of Hohokam Bridge
.05
.035
.05
Elevation (ft)
1150
1145
1140
1135
1130
1125
1120
1115
1110
17000
18000
19000
20000
21000
22000
23000
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta


Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 219.02 BR Hohokam Expressway (SR 143)
.05
.035
.05
Elevation (ft)
1150
1145
1140
1135
1130
1125
1120
1115
1110
17000
18000
19000
20000
21000
22000
23000
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta


Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 219.02 BR Hohokam Expressway (SR 143)
.05
.035
.05
Elevation (ft)
1150
1145
1140
1135
1130
1125
1120
1115
1110
17000
18000
19000
20000
21000
22000
23000
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta


Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 219.01 Downstream face of Hohokam Bridge
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta


Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 218.97 Upstream face of SR153 bridge
.035
.05
Elevation (ft)
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta


Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
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.05
Elevation (ft)
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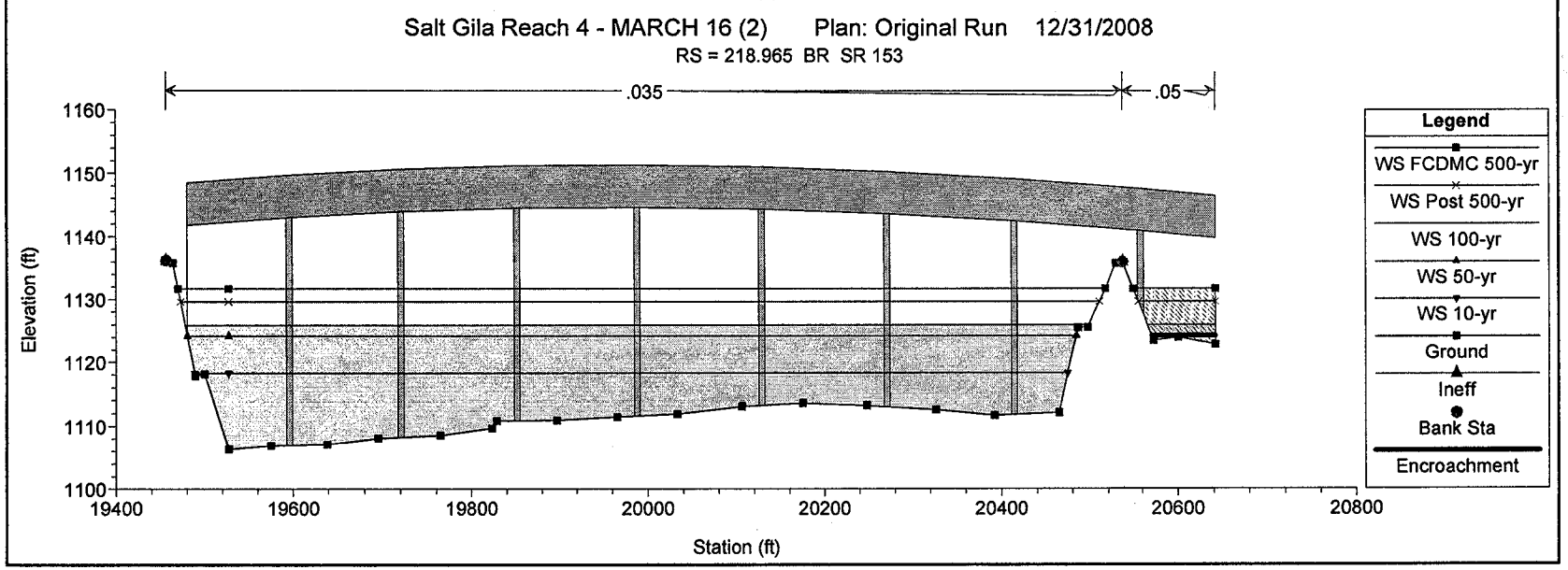
1140
1130
1120
1110
1100
19400
19600
19800
20000
20200
20400
20600
20800
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta


Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 218.965 BR SR 153
.035
.05
Elevation (ft)
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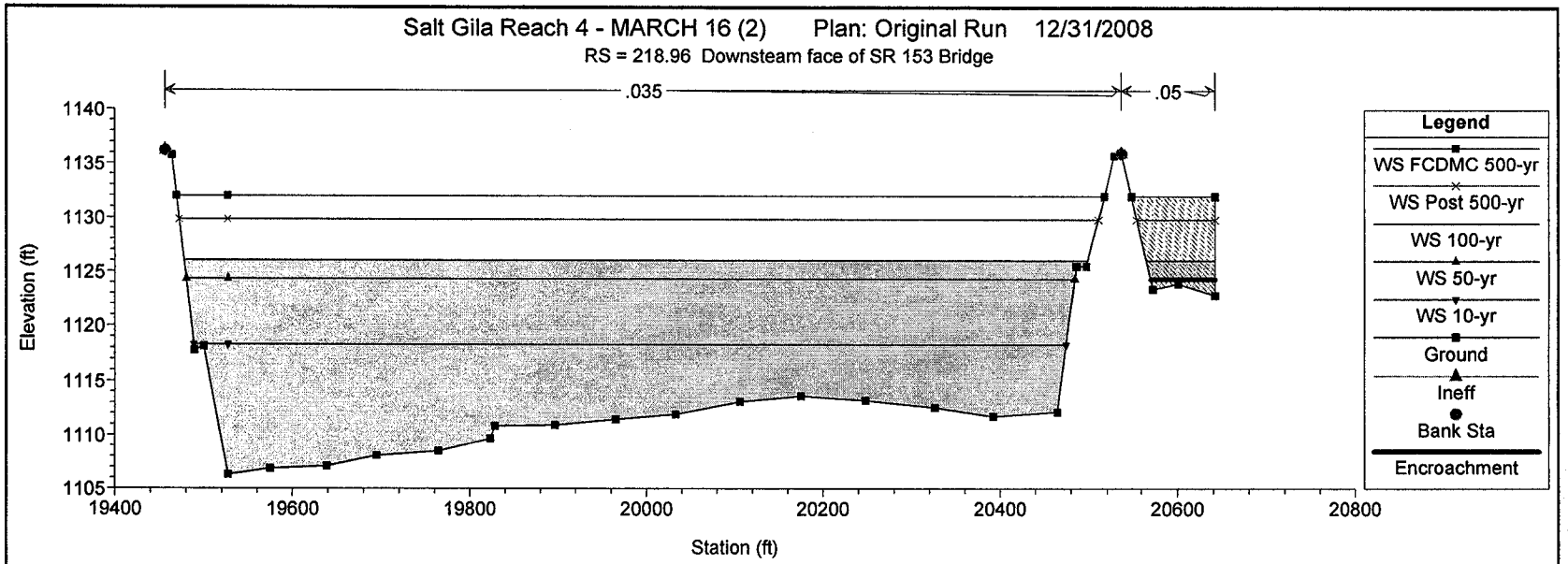
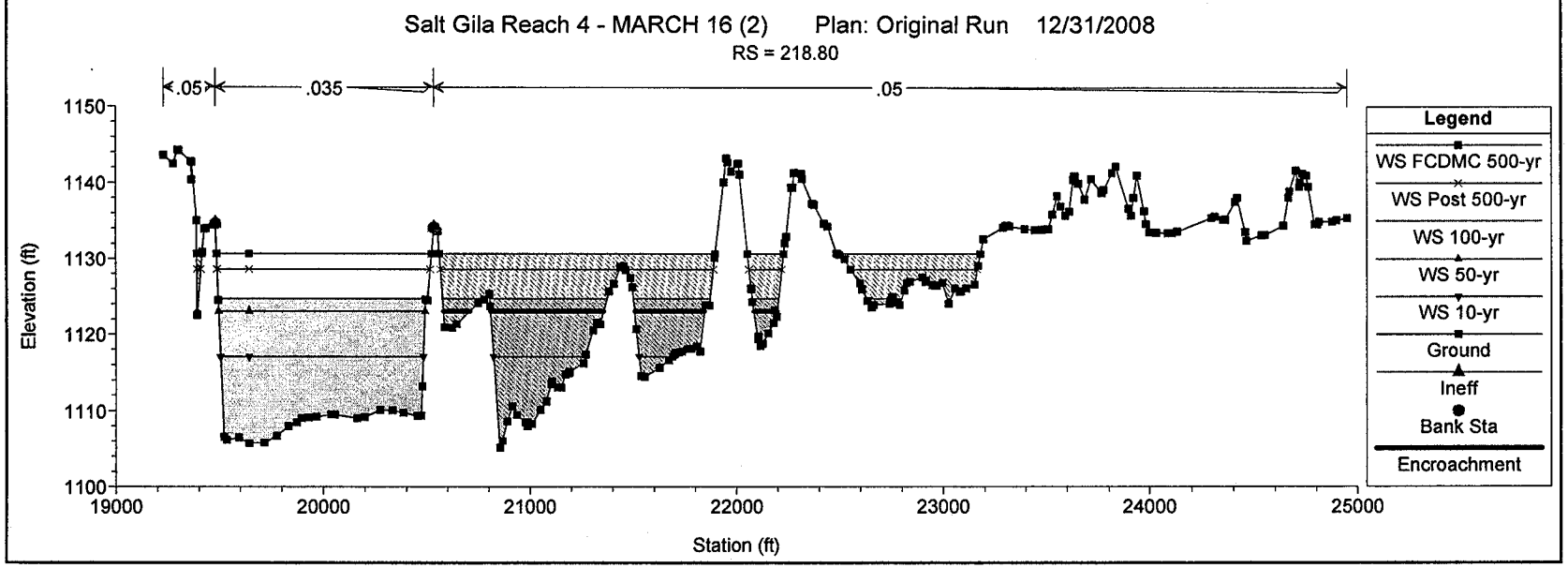
1150
1140
1130
1120
1110
1100
19400
19600
19800
20000
20200
20400
20600
20800
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta
Encroachment


Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
RS = 218.96 Downsteam face of SR 153 Bridge
.035
.05
Elevation (ft)
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta
Encroachment


Salt Gila Reach 4 - MARCH 16 (2) Plan: Original Run 12/31/2008
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.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS FCDMC 500-yr
WS Post 500-yr
WS 100-yr
WS 50-yr
WS 10-yr
Ground
Ineff
Bank Sta
Encroachment

Appendix F Salt River HMP

1. Salt River HMP General Data
2. HEC-RAS Existing Conditions
3. HEC-RAS Proposed Conditions

1. Salt River HMP General Data

Excerpts

Salt River Hydraulic Master Plan

FCD 2007C017 Work Assignment 5

Prepared For:
Flood Control District
Of Maricopa County

PREPARED BY:

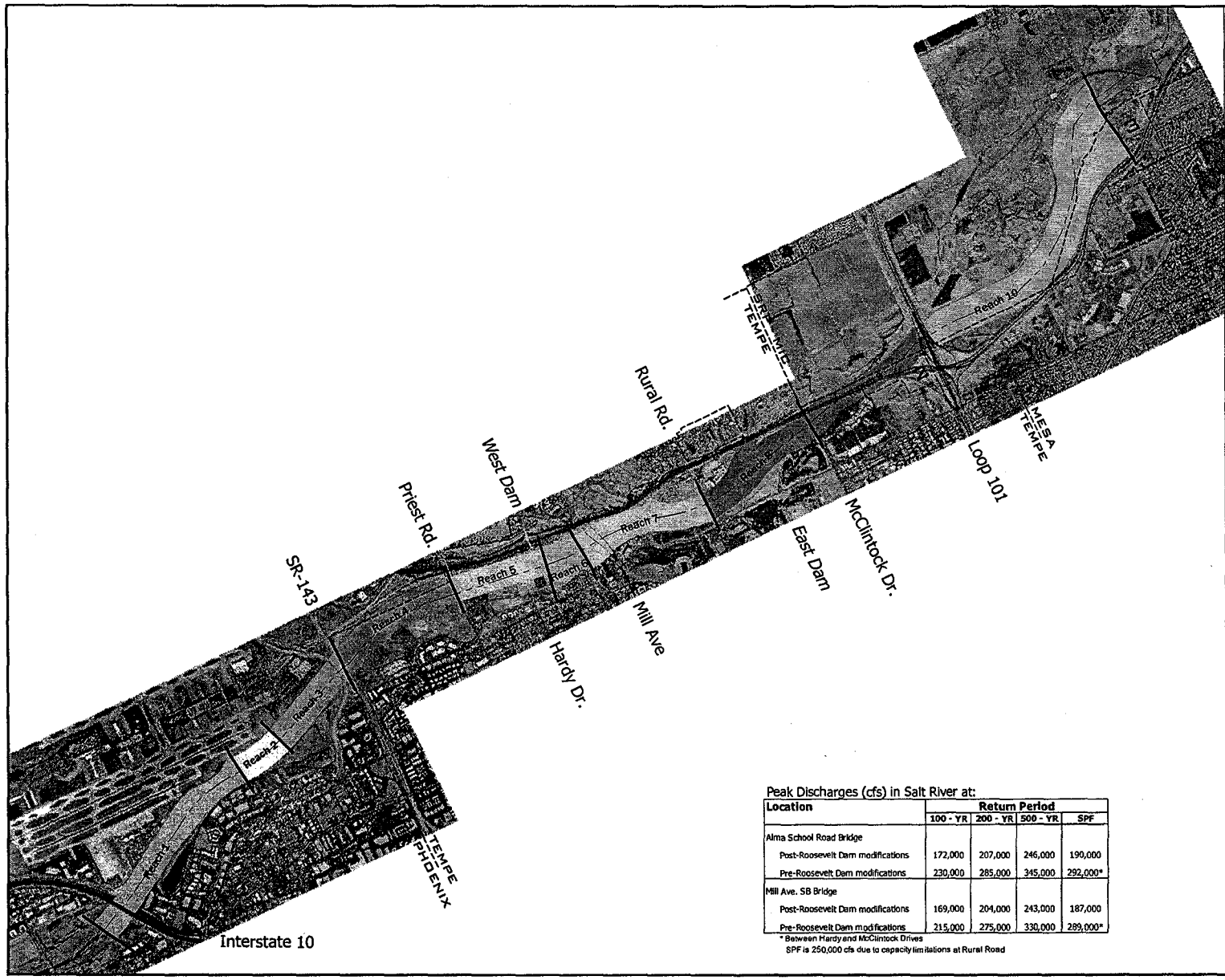
Registered Professional Engineer (Civil)
CERTIFICATE NO.
31680
PATRICK J.
ELLISON
Date Signed 8/21/2009
ARIZONA U.S.A.

Exp. 9/30/2009

STANTEC CONSULTING INC.
8211 South 48th Street
Phoenix, Arizona 85044
(602) 438-2200

August 2009

Stantec Consulting Inc.
Project No. 181300035



Peak Discharges (cfs) in Salt River at:

Location	Return Period			
	100 - YR	200 - YR	500 - YR	SPF
Alma School Road Bridge				
Post-Roosevelt Dam modifications	172,000	207,000	246,000	190,000
Pre-Roosevelt Dam modifications	230,000	285,000	345,000	292,000*
Mill Ave. SB Bridge				
Post-Roosevelt Dam modifications	169,000	204,000	243,000	187,000
Pre-Roosevelt Dam modifications	215,000	275,000	330,000	289,000*

* Between Hardy and McClintock Drives
SPF is 250,000 cfs due to capacity limitations at Rural Road

LEGEND

FLOW CAPACITY REACHES

	Reach 1	363,000 cfs
	Reach 2	261,000 cfs
	Reach 3	375,000 cfs
	Reach 4	360,000 cfs
	Reach 5	380,000 cfs
	Reach 6	210,000 cfs
	Reach 7	260,000 cfs
	Reach 8	280,000 cfs
	Reach 9	230,050 cfs
	Reach 10	217,000 cfs

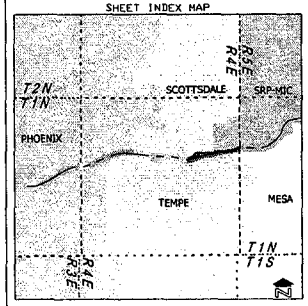
HYDRAULIC BASE LINE

CORPORATE LIMITS

NOTES

Areas Labeled 1 through 3 are Unincorporated Maricopa County

SHEET INDEX MAP



N.T.S.

NO	REVISION	BY	DATE

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

Salt River Hydraulic Master Plan
Flow Capacity Reaches

Existing Conditions – Initial Breakout Discharges

FCD Contract 2007C017 / PCN 126.06.20

STANTEC CONSULTING, Inc.

	BY	DATE
DESIGN	–	–
DESIGN CHK.	–	–
PLANS	AML	4/2009
PLANS CHK.	FJE	4/2009

SHEET 1 OF 1

3.0 HYDROLOGY

Hydrology utilized for this study was obtained from the *Gila River Basin, Arizona, Section 7 Study for Modified Roosevelt Dam, Arizona, Hydrologic Evaluation of Water Control Plans, Salt River Project to Gila River at Gillespie Dam,* U.S. Army Corp of Engineers, Los Angeles District, March 1996. Values listed in Table 2-4 for locations CP-109 and CP-110 of the U.S. Army Corp of Engineers report were used at Alma School Road and Mill Avenue respectively. Tables 3.1 and 3.2 lists discharge frequency values for Pre- (without Project) and Post-Roosevelt (with Project) Dam modifications conditions used in this study.

Table 3.1
Summary of Peak Discharges Pre-Roosevelt Dam Modifications (Without Project)

Location	Discharge Frequency Values							
	5-YR (cfs)	10-YR (cfs)	20-YR (cfs)	50-YR (cfs)	100-YR (cfs)	200-YR (cfs)	500-YR (cfs)	SPF (cfs)
Alma School Road	44,000	100,000	139,000	170,000	230,000	285,000	345,000	292,000
Mill Avenue	40,000	93,000	135,000	160,000	215,000	275,000	330,000	289,000

Table 3.2
Summary of Peak Discharges Post-Roosevelt Dam Modifications (With Project)

Location	Discharge Frequency Values							
	5-YR (cfs)	10-YR (cfs)	20-YR (cfs)	50-YR (cfs)	100-YR (cfs)	200-YR (cfs)	500-YR (cfs)	SPF (cfs)
Alma School Road	21,000	58,000	95,000	145,000	172,000	207,000	246,000	190,000
Mill Avenue	20,500	55,000	90,000	140,000	169,000	204,000	243,000	187,000

4.0 HYDRAULIC ANALYSIS

4.1 METHOD DESCRIPTION

Hydraulic analysis is performed in accordance with applicable guidelines and criteria set forth in the *Guidelines and Specifications for Flood Hazard Mapping Partners (Federal Emergency Management Agency* (FEMA), 2003), and the District's Consultant Guidelines (Flood Control District of Maricopa County, 2003). Flow capacity was evaluated for the Salt River for approximately 13 miles between the Interstate 10 Bridge on the downstream limit, and Alma School Road Bridge on the upstream limit of study. Flow capacity for the watercourse was evaluated using the COE HEC-RAS Computer Program, version 3.1.3, dated May 2005. The location of the watercourse is shown in Figure 1.2. The HEC-RAS model data files developed for the project; both input and output, for the watercourse are provided digitally on a CD in Appendix E. Copies of the HEC-RAS files are located in Appendix C. HEC-RAS project and plan names are listed in Table 4.1

Starting water surface elevations for the floodplain profiles for the study reach were computed using the normal depth approach.

Table 4.1 Salt River – Hydraulic Model Summary

Project Name (1)	Plan Name (2)	Geometry (3)	Steady Flow (4)	Description (5)
SALT_HMP.prj	SR HMP - Existing - Pre / Post Q's	SR-HMP - Existing Conditions	Salt River HMP - Pre/Post Q's	Model developed to evaluate existing conditions
SALT_HMP.prj	SR HMP - Proposed - Pre / Post Q's	SR-HMP - Proposed Conditions	Salt River HMP - Pre/Post Q's	Model developed to evaluate proposed conditions described in Section 4.11
SALT_HMP.prj	SR HMP - Proposed 9 & 10- Pre / Post Q's	SR-HMP - Proposed Conditions	Salt River HMP - Pro 9 & 10- Pre / Post Q's	Model developed to evaluate mitigation measures described in Section 5.3 for Reaches 9 and 10. Original Design Discharges are used in the model.
SALT_HMP.prj	SR HMP - Existing - Capacity Exceeded	SR-HMP - Existing Conditions	Salt River HMP - Capacity Exceeded	Model developed to evaluate the maximum capacity of a reach before flow breakout occurs under existing conditions.
SALT_HMP.prj	SR HMP - Proposed Capacity Exceeded	SR-HMP - Proposed Conditions	Salt River HMP - Prop Capacity Exceeded	Model developed to evaluate the maximum capacity of a reach before flow breakout occurs under proposed conditions.
SR_HMP_COT.prj	COT Intermediate Piers 1	COT Intermediate Piers 1	Salt River HMP - Pre/Post Q's	Model developed to evaluate proposed improvement to Tempe Town Lake Dam
SR_HMP_COT.prj	COT Intermediate Piers 2	COT Intermediate Piers 2	Salt River HMP - Pre/Post Q's	Model developed to evaluate proposed improvement to Tempe Town Lake Dam

4.10.1 Results for the Initial Flow Breakout Evaluation

A suite of discharge values were utilized in the HEC-RAS models to determine at what discharge initial overtopping of a reach would occur. Results from the evaluation are depicted in Figure 4.1 and in Plate 1. Figure 4.1 depicts the flow capacity results for the project reach. The project reach was subdivided into 10 reaches based on the maximum capacity (discharge at which overtopping occurs) of the reach. Plate 1 (14 sheets) depicts the results of evaluation in greater detail. Plate 1 depicts maximum capacity or reach, location of initial flow break out, topography, and flood control features. Plate 1 is provided in large format at a scale of 1"=200' and half size format at a scale of 1"= 400'. Plate 1 (full size and half size) is located in the back of the report.

Table 4.3 lists the design discharges, the existing condition maximum peak discharges for specific reaches and Post-Roosevelt Dam Modification discharges. In summary the data indicates that the capacity of the subject reach of the Salt River has decreased (discharges listed in red) since the design condition.

Table 4.3
Discharge Summary Post-Roosevelt Dam Modification, Existing Condition

original

Reach	Location	Design Discharge[1]	Existing Condition Maximum Capacity	100-YR	SPF	200-YR	500-YR
		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1	Phoenix	289,000	363,000	169,000	187,000	204,000	243,000
2	Phoenix	289,000	261,000	169,000	187,000	204,000	243,000
3	Phoenix	289,000	375,000	169,000	187,000	204,000	243,000
4	Tempe	289,000	360,000	169,000	187,000	204,000	243,000
5	Tempe	250,000	380,000	169,000	187,000	204,000	243,000
6	Tempe	250,000	210,000	169,000	187,000	204,000	243,000
7	Tempe	250,000	260,000	172,000	190,000	207,000	246,000
8	Tempe	250,000	280,000	172,000	190,000	207,000	246,000
9	Tempe, SRP-MIC	215,000	230,050	172,000	190,000	207,000	246,000
10	County Mesa SRP-MIC	220,000	217,000	172,000	190,000	207,000	246,000

1) Design discharges are based on Pre-Roosevelt Dam Modification Conditions.

Table 4.8
Flow Capacity Summary Post-Roosevelt Dam Modification, Existing Condition

		Discharge Frequency			
Reach	**Location**	**100-year**	**200-Year**	**500-year**	**SPF**
1	Phoenix	C	C	C	C
2	Phoenix	C	C	C	C
3	Phoenix	C	C	C	C
4	Tempe	C	C	C	C
5	Tempe	C	C	C	C
6	Tempe	C	C	CE	C
7	Tempe	C	C	CE	C
8	Tempe	C	C	C	C
9	Tempe SRP-MIC County	C	C	CE	C
10	Mesa, SRP-MIC	C	C	CE	C

C=Reach has the flow capacity to convey the discharge frequency without overtopping.
CE =The discharge frequency magnitude exceeds the capacity of the reach

4.10.4 Results for the 100-YR, 200-YR, 500-YR and SPF Flood Frequencies Pre-Roosevelt Dam Modification

Results from the HEC-RAS model utilizing the 100-year, 200-year, 500-year, and SPF flood frequencies for the Pre-Roosevelt Dam Modification Condition are depicted graphically in figures provided in Appendix C.5. Table 4.9 lists a flow capacity summary showing discharge frequency and whether or not a reach has the capacity to convey the discharge frequency.

Table 4.9
Flow Capacity Summary Pre-Roosevelt Dam Modification, Existing Condition

		Discharge Frequency			
Reach	**Location**	**100-year**	**200-Year**	**500-year**	**SPF**
1	Phoenix	C	C	C	C
2	Phoenix	C	CE	CE	CE
3	Phoenix	C	C	CE	C
4	Tempe	C	C	C	C
5	Tempe	C	C	C	C
6	Tempe	C	CE	CE	CE
7	Tempe	C	CE	CE	CE
8	Tempe	C	CE	CE	CE
9	Tempe SRP-MIC County	CE	CE	CE	CE
10	Mesa, SRP-MIC	CE	CE	CE	CE

C=Reach has the flow capacity to convey the discharge frequency without overtopping.
CE =The discharge frequency magnitude exceeds the capacity of the reach.

4.11 HEC-RAS PROPOSED CONDITION HYDRAULIC ANALYSES RESULTS

A proposed condition hydraulic model was developed to determine the impacts of encroachments and or obstructions due to a proposed project on the hydraulic capacity of a subject reach. The following projects were evaluated:

- Sky Harbor – Extension of a runway safety area resulting in an encroachment into the Salt River along the north bank of Reach 2. Evaluation of the encroachment showed that the reach would no longer have the capacity to convey the 500-year event. Channelization and the placement of fill to raise the south bank levee for a portion of the reach are now design elements. The south bank levee will be raised to so that the reach will convey the 500-year event. See Figure 4.2 for the location of where the levee will be raised.
- SR 143 – Widening of SR 143 at the crossing of the Salt River may add additional obstructions to flow.
- Pedestrian Walkway, Tempe Town Lake West Dam – Walk way may be an additional obstruction to flow.
- Loop 202 Widening – Additional piers are obstructions to flow.
- Dobson Road Bridge – Potential obstructions to flow.

Results of the hydraulic evaluation for proposed conditions indicate that the Sky Harbor project and the SR 143 project will accommodate flows up to the 500-year event. The Loop 202 (Reach 9 and 10), and Dobson Road Bridge (Reach 9 and 10), projects will have impacts on the flow conveyance for specific discharge frequencies. Table 4.10 lists whether a sub reach has the capacity to convey the Post-Roosevelt Dam Modification peak discharges under proposed conditions. A comparison of water surface profiles between existing and proposed conditions for the 100-year, SPF, 200-year and 500-year Post Roosevelt Dam Modification events are provided in Appendices C.6, C.7, C.8 and C.9 respectively.

Table 4.10
Flow Capacity Summary Post-Roosevelt Dam Modification, Proposed Condition

		Discharge Frequency			
Reach	**Location**	**100-year**	**200-Year**	**500-year**	**SPF**
1	Phoenix	C	C	C	C
2	Phoenix	C	C	C	C
3	Phoenix	C	C	C	C
4	Tempe	C	C	C	C
5	Tempe	C	C	C	C
6	Tempe	C	C	CE	C
7	Tempe	C	C	CE	C
8	Tempe	C	C	C	C
9	Tempe SRP-MIC County	C	C	CE	C
10	Mesa, SRP-MIC	C	C	CE	C

C=Reach has the flow capacity to convey the discharge frequency without overtopping.
CE =The discharge frequency magnitude exceeds the capacity of the reach

Table 4.11 lists the design discharges and the existing and proposed condition maximum peak discharges for specific reaches. The maximum peak discharge for each reach is set at the discharge resulting in a water surface elevation in which the conveyance capacity is exceeded and over topping of a levee or channel section is realized. In summary the data indicates that the capacity of the subject reach of the Salt River has decreased (discharges listed in red) since the design condition.

Table 4.11
Discharge Summary Post-Roosevelt Dam Modification, Proposed Condition

original

Reach	Location	Design Discharge[1]	Maximum Capacity Under Proposed Condition	100-YR	SPF	200-YR	500-YR
		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1	Phoenix	289,000	363,000	169,000	187,000	204,000	243,000
2	Phoenix	289,000	251,600	169,000	187,000	204,000	243,000
3	Phoenix	289,000	375,000	169,000	187,000	204,000	243,000
4	Tempe	289,000	360,000	169,000	187,000	204,000	243,000
5	Tempe	250,000	380,000	169,000	187,000	204,000	243,000
6	Tempe	250,000	210,000	169,000	187,000	204,000	243,000
7	Tempe	250,000	260,000	172,000	190,000	207,000	246,000[2]
8	Tempe	250,000	280,000	172,000	190,000	207,000	246,000
9	Tempe, SRP-MIC	215,000	213,000	172,000	190,000	207,000	246,000
10	County Mesa SRP-MIC	220,000	208,600	172,000	190,000	207,000	246,000

1) Design discharges are based on Pre-Roosevelt Dam Modification Conditions.
2) Due to backwater in the Tempe Town Lake Marina area flood inundation occurs behind the north levee between the marina and Rural Road.

Review of the data listed in Table 4.11 indicates that regardless of the original design event the majority of the study reaches all have the capacity to convey up to the 200-year event and seven reaches have the capacity to convey up to the 500-year event. The capacities of Reaches 2, 6, 9 and 10 (values listed in red) will be diminished and will no longer have the capacity to convey the original design discharge.

6.0 REFERENCES

Federal Emergency Management Agency, April 2003, Guidelines and Specifications for Flood Hazard Mapping Partners.

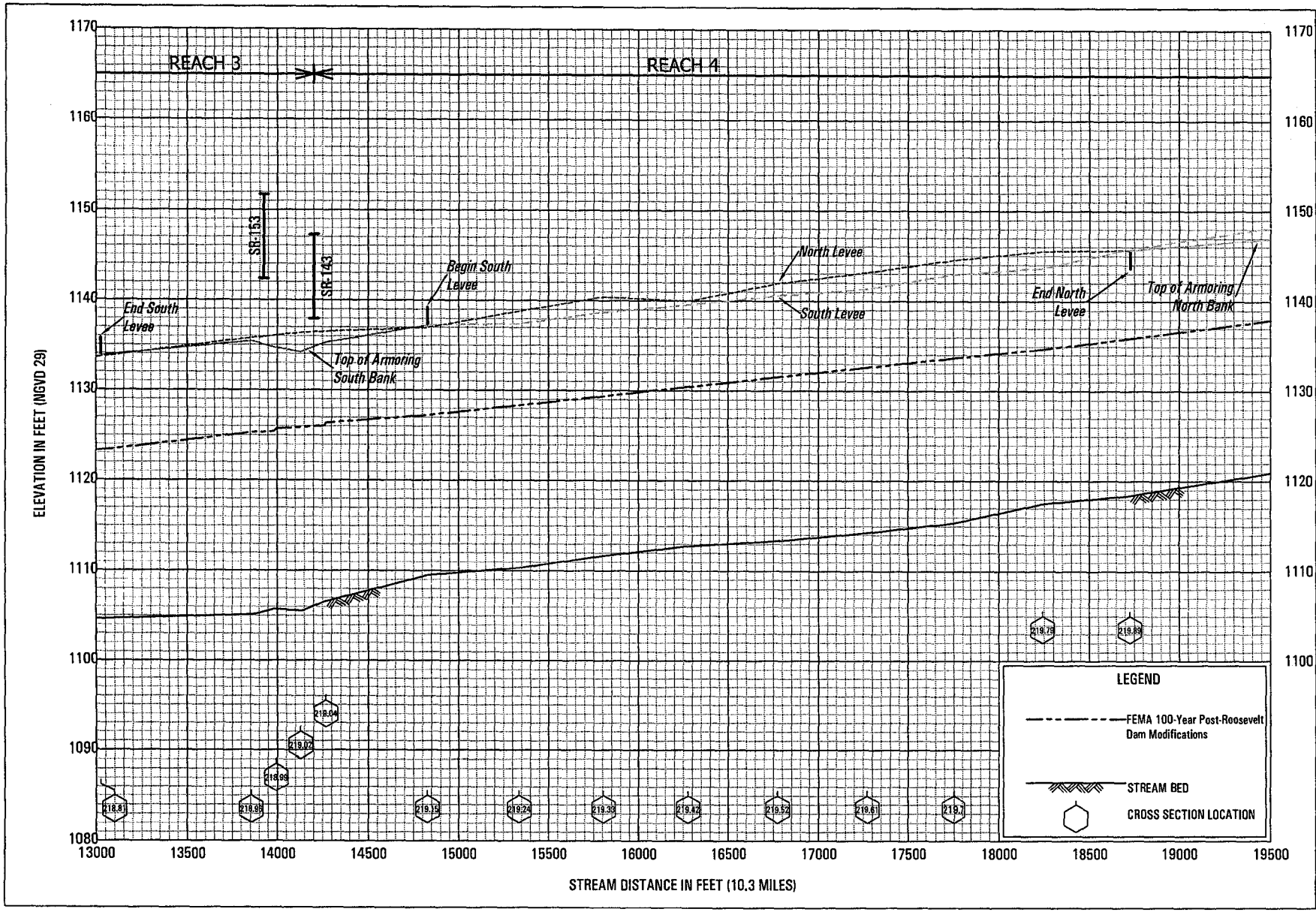
Flood Control District of Maricopa County, 2003, Consultant Guidelines.

Greiner Inc. 1993, Salt-Gila Watercourse Master Plan Phase 1 Surveyors Report

Michael Baker Jr., 1999, Salt-Gila River Floodplain Delineation Restudy by Greiner, Inc, (Greiner, 1997)

U.S. Army Corp of Engineers, Los Angeles District, March 1996, Gila River Basin, Arizona, Section 7 Study for Modified Roosevelt Dam, Arizona, Hydrologic Evaluation of Water Control Plans, Salt River Project to Gila River at Gillespie Dam

U.S. Army, Corps of Engineers, 2001, HEC-RAS Hydraulic Reference Manual



APPENDIX C.3

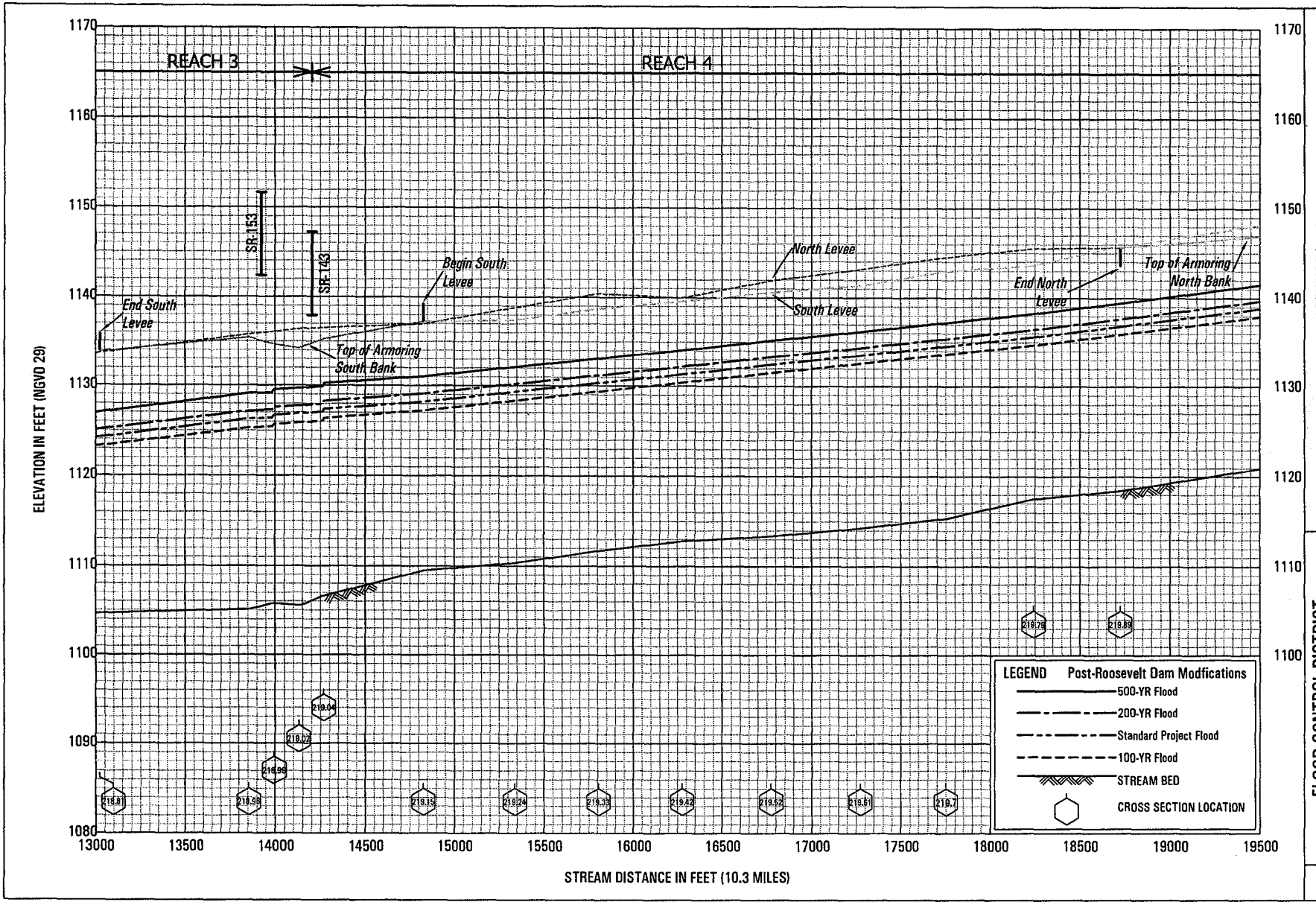
FEMA 100-YR Flood Profile Post-Roosevelt Dam Modifications

SALT RIVER

FLOOD CONTROL DISTRICT

PHOENIX, TEMPE, MESA, SRP-MIC

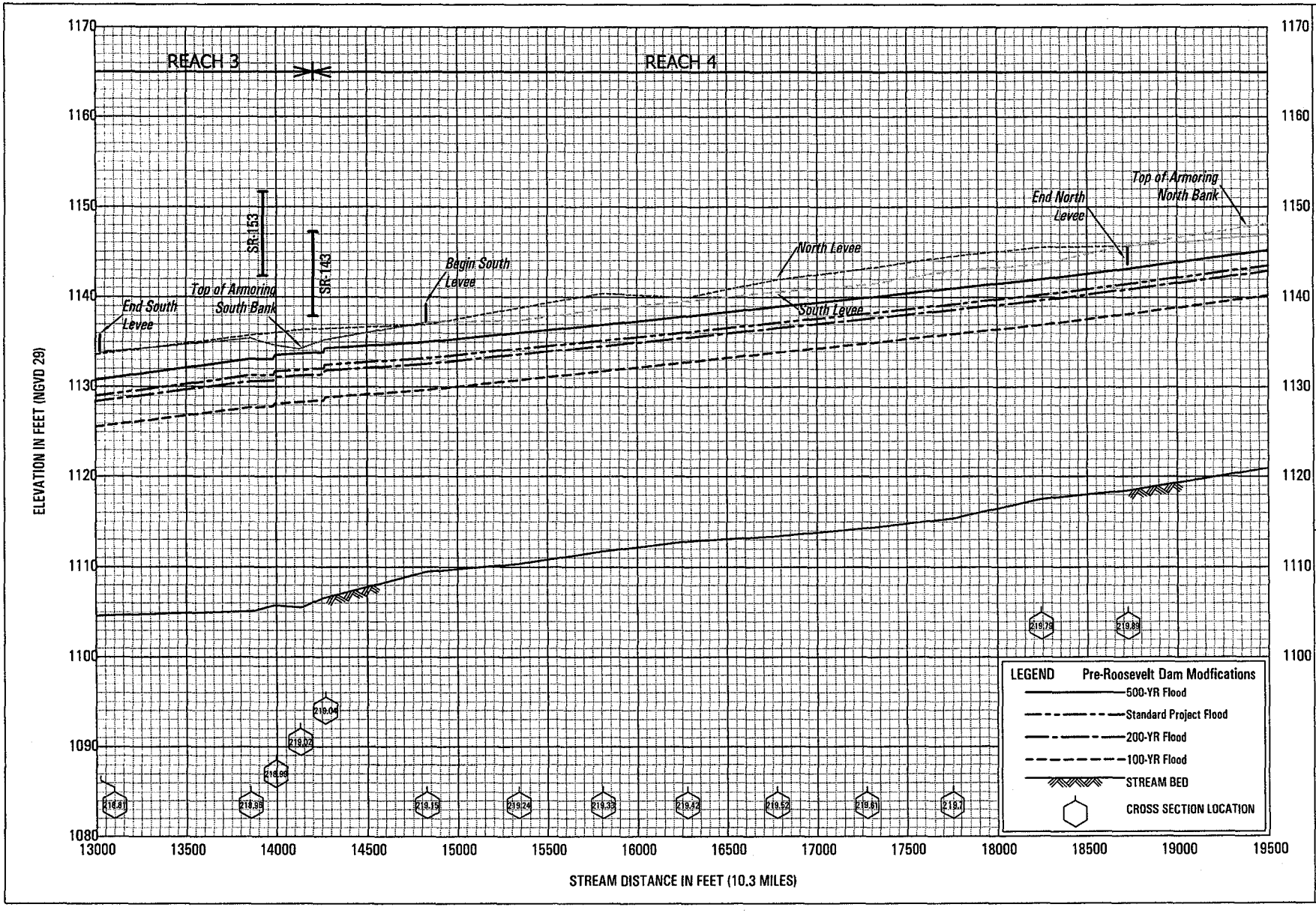
MARICOPA COUNTY, AZ



APPENDIX C.4
Flood Profiles Post-Roosevelt Dam Modifications

SALT RIVER

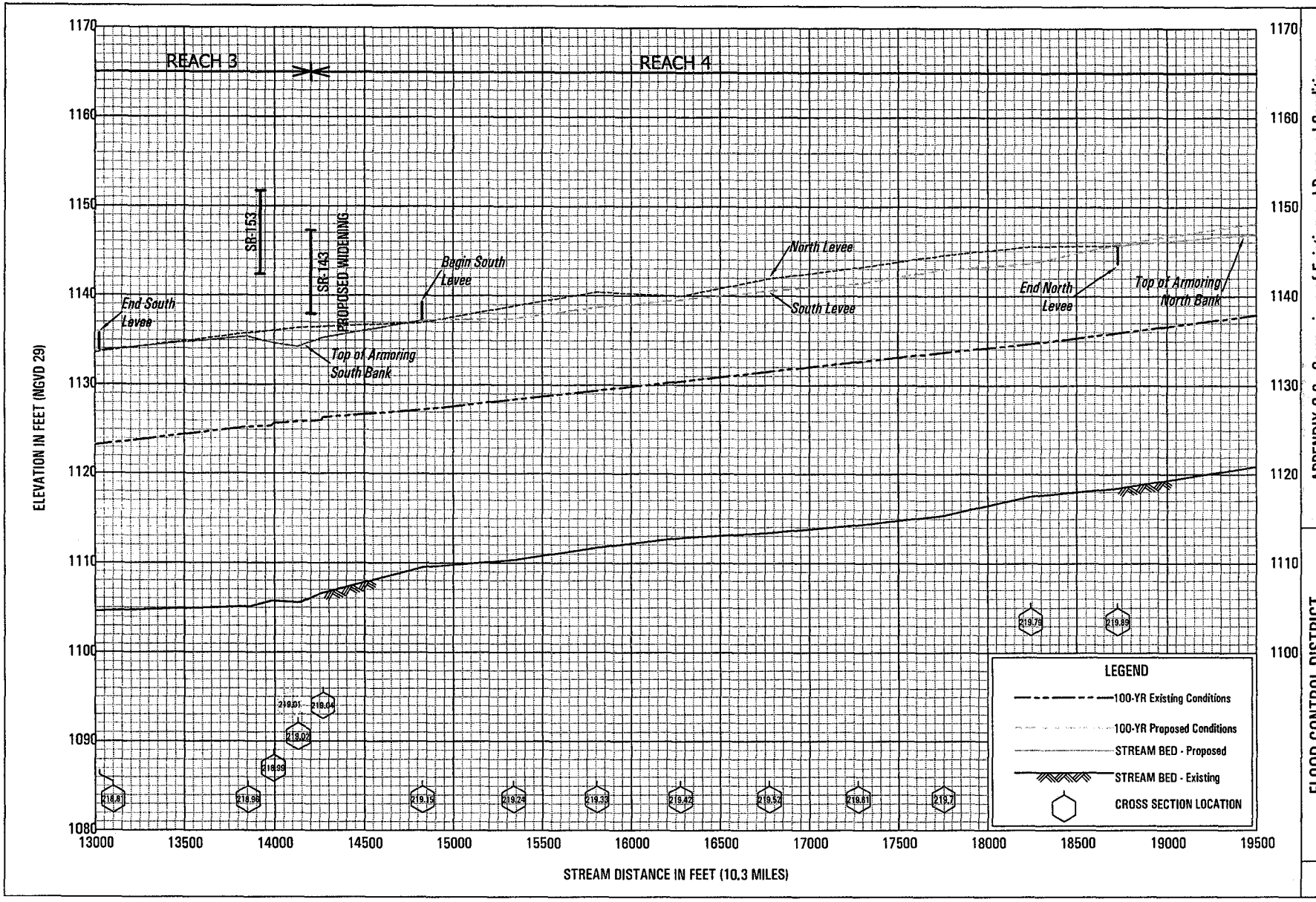
FLOOD CONTROL DISTRICT
PHOENIX, TEMPE, MESA, SRP-MIC
MARICOPA COUNTY, AZ



APPENDIX C.5
Flood Profiles Pre-Roosevelt Dam Modifications

SALT RIVER

FLOOD CONTROL DISTRICT
PHOENIX, TEMPE, MESA, SRP-MIC
MARICOPA COUNTY, AZ



APPENDIX C.6 - Comparison of Existing and Proposed Conditions
100-YR, Post-Roosevelt Dam Modifications

SALT RIVER

FLOOD CONTROL DISTRICT
PHOENIX, TEMPE, MESA, SRP-MIC
MARICOPA COUNTY, AZ

LEGEND

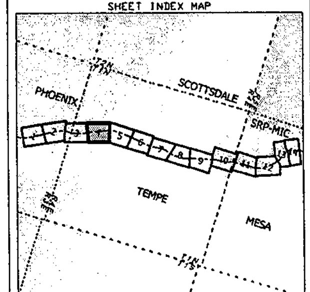
CROSS SECTION
HYDRAULIC BASE LINE
STATION 20,000
LEVEE
TOP OF ARMORING
TOP OF BANK
TOP OF BANK MAXIMUM CONVEYANCE SECTION
CORPORATE LIMITS
FLOW CAPACITY REACHES

Reach 1	363,000 cfs
Reach 2	261,000 cfs
Reach 3	375,000 cfs
Reach 4	360,000 cfs
Reach 5	380,000 cfs
Reach 6	210,000 cfs
Reach 7	260,000 cfs
Reach 8	280,000 cfs
Reach 9	230,050 cfs
Reach 10	217,000 cfs

NOTES

DATUM
HORIZONTAL: North American Datum of 1983
VERTICAL: National Geodetic Vetical Datum of 1929

SHEET INDEX MAP



200' 0' 200' 400'

CONTOUR INTERVAL = 2 FOOT

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Salt River Hydraulic Master Plan
Flow Capacity Maps
INITIAL LEVEE OVERTOPPING
FCD Contract 2007C017 / PCN 126.06.20

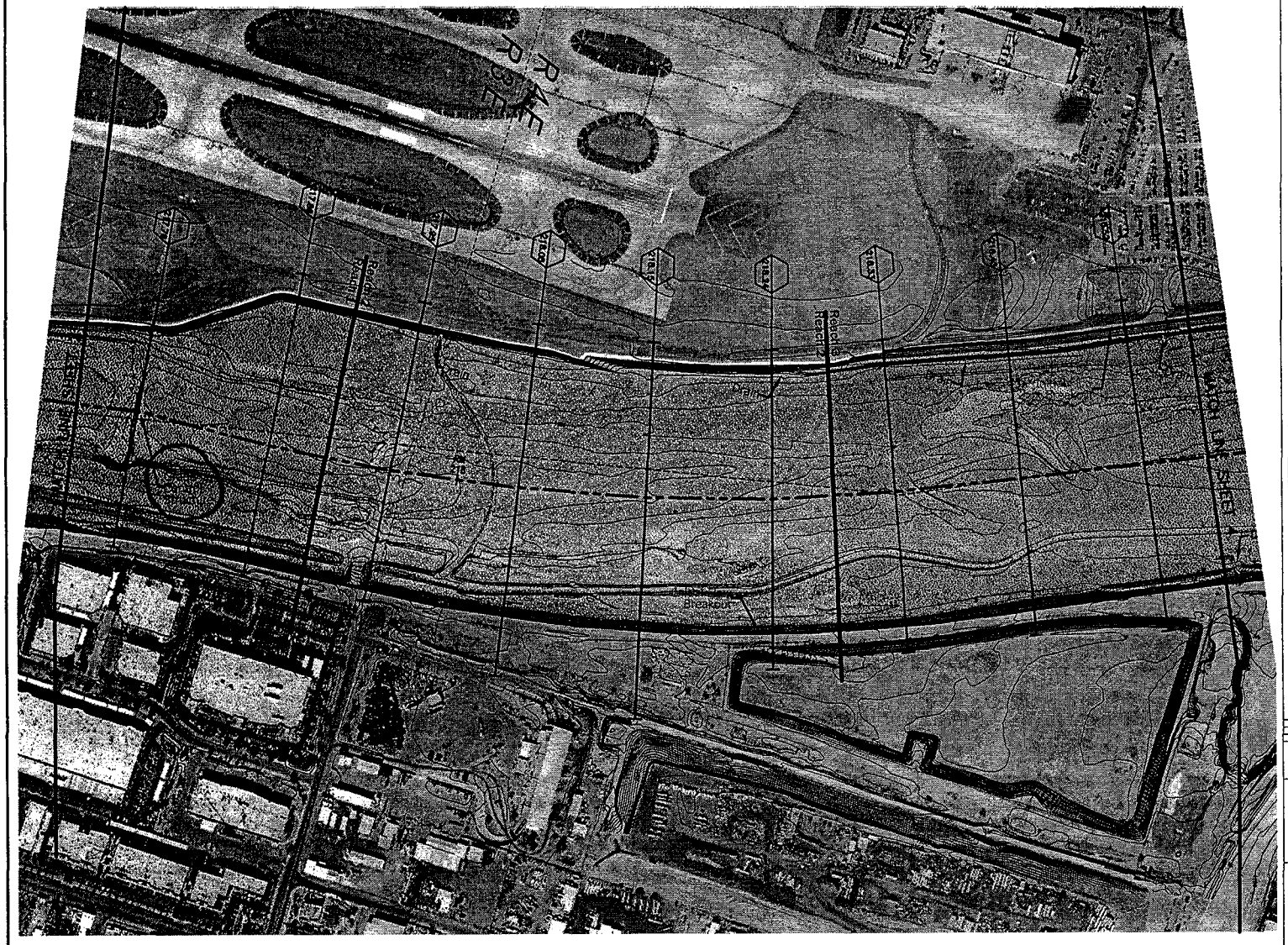
STANTEC CONSULTING, Inc.

	BY	DATE
DESIGN	–	–
DESIGN CHK.	–	–
PLANS	AML	4/2009
PLANS CHK.	PJE	4/2009

PLATE 1 SHEET 4 OF 14

219.02

219.04



LEGEND

CROSS SECTION — 0.10 — DISTANCE UPSTREAM FROM CENTERLINE OF STATION

HYDRAULIC BASE LINE — RM 219

STATION 20,000

LEVEE

TOP OF ARMORING

TOP OF BANK

TOP OF BANK MAXIMUM CONVEYANCE SECTION

CORPORATE LIMITS

FLOW CAPACITY REACHES

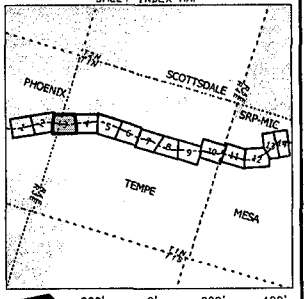
Reach 1	363,000 cfs
Reach 2	261,000 cfs
Reach 3	375,000 cfs
Reach 4	360,000 cfs
Reach 5	380,000 cfs
Reach 6	210,000 cfs
Reach 7	260,000 cfs
Reach 8	280,000 cfs
Reach 9	230,050 cfs
Reach 10	217,000 cfs

NOTES

DATUM

HORIZONTAL: North American Datum of 1983
VERTICAL: National Geodetic Vertical Datum of 1929

SHEET INDEX MAP



200' 0' 200' 400'

CONTOUR INTERVAL = 2 FOOT

NO.	REVISION	BY	DATE

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Salt River Hydraulic Master Plan

Flow Capacity Maps

INITIAL LEVEE OVERTOPPING

FCD Contract 2007C017 / PCN 126.06.20

STANTEC CONSULTING, Inc.

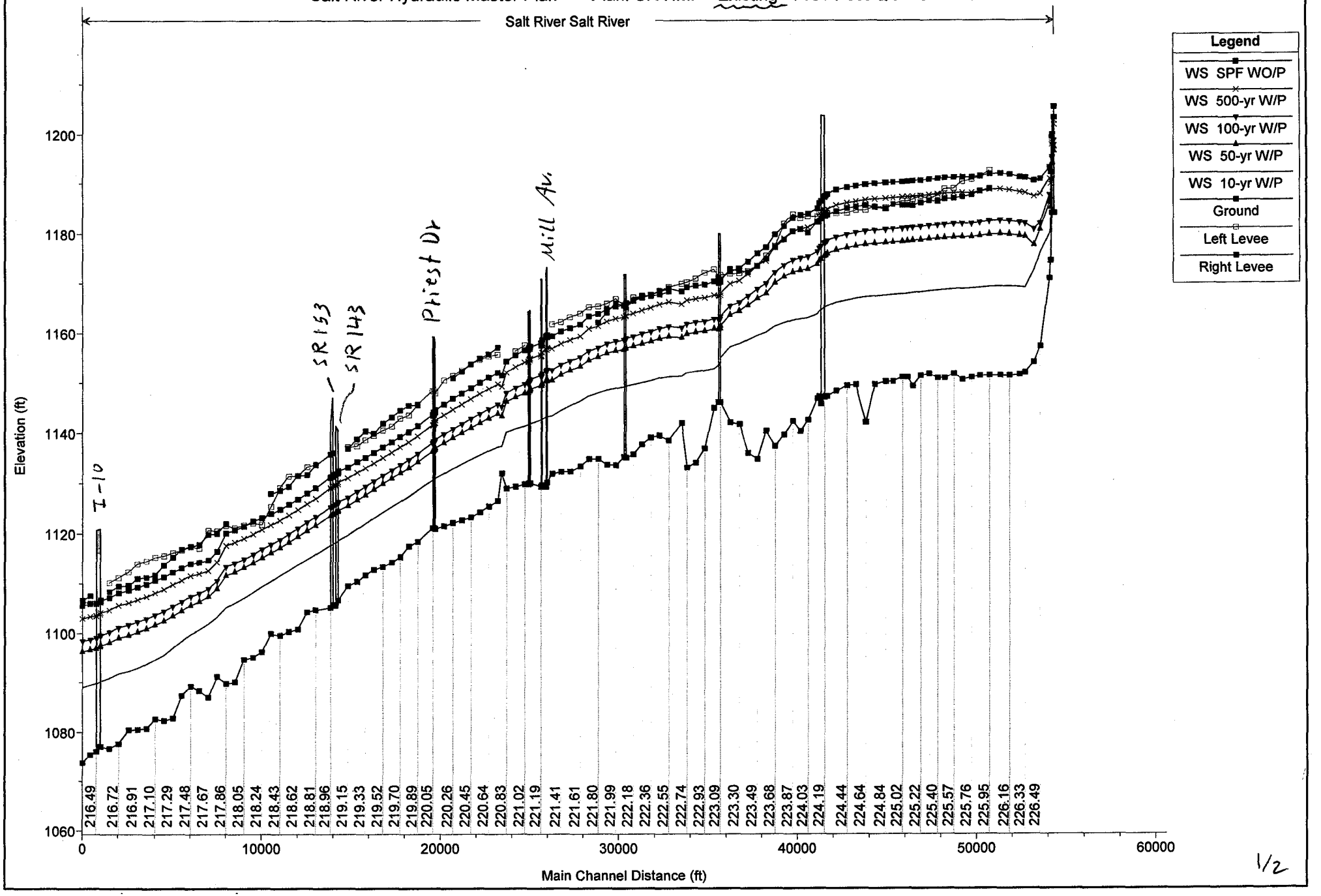
	BY	DATE
DESIGN	-	-
DESIGN CHK.	-	-
PLANS	AML	4/2009
PLANS CHK.	PJE	4/2009

PLATE 1 SHEET 3 OF 14

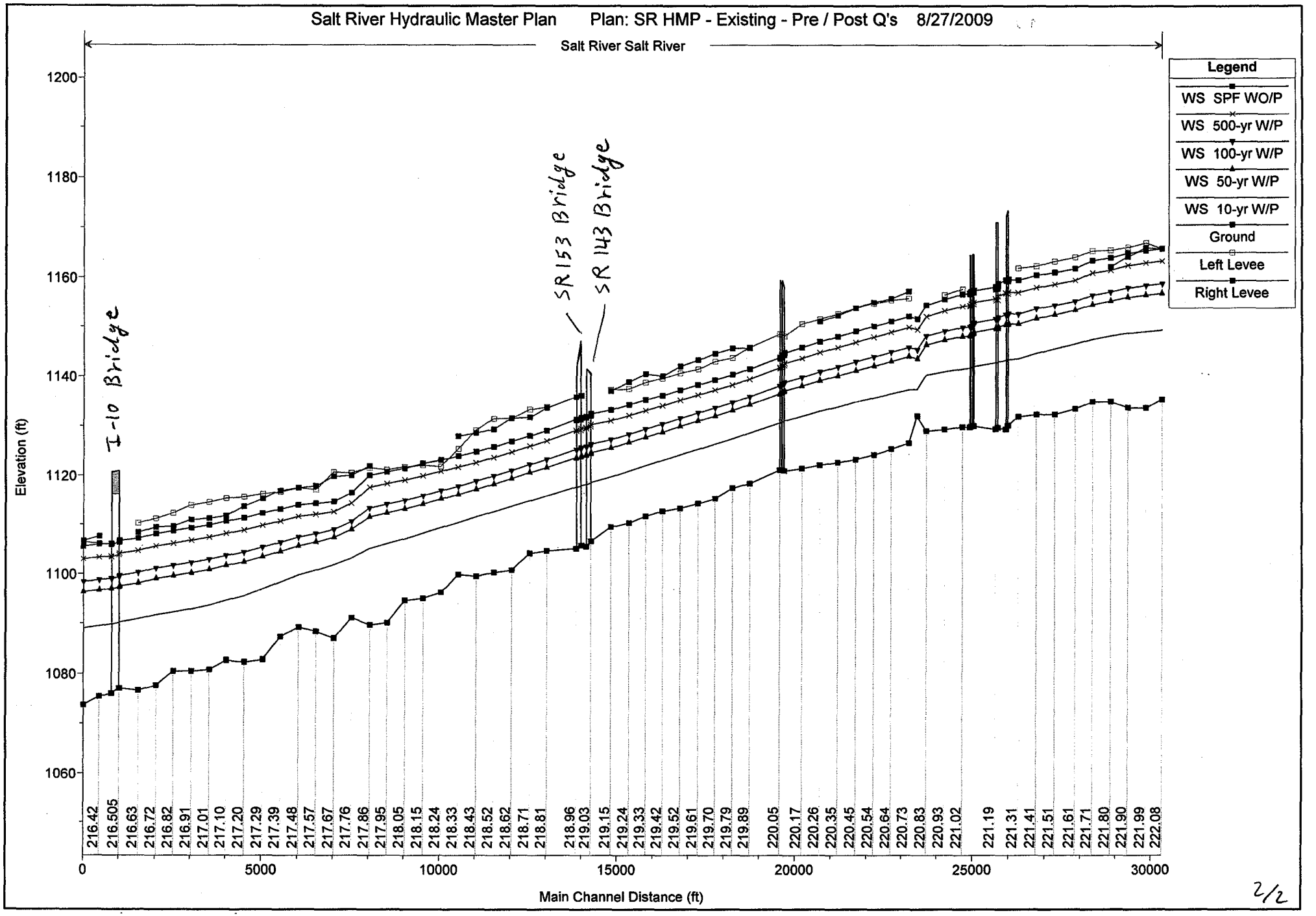
2. HEC-RAS Existing Conditions

Regenerated from the electronic model

Salt River Hydraulic Master Plan Plan: SR HMP - Existing - Pre / Post Q's 8/27/2009



1/2


Salt River Hydraulic Master Plan
Plan: SR HMP - Existing - Pre / Post Q's 8/27/2009
Salt River Salt River
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Left Levee
Right Levee
I-10 Bridge
SR 153 Bridge
SR 143 Bridge
Elevation (ft)
1200
1180
1160
1140
1120
1100
1080
1060
0
5000
10000
15000
20000
25000
30000
Main Channel Distance (ft)
216.42
216.505
216.63
216.72
216.82
216.91
217.01
217.10
217.20
217.29
217.39
217.48
217.57
217.67
217.76
217.86
217.95
218.05
218.15
218.24
218.33
218.43
218.52
218.62
218.71
218.81
218.96
219.03
219.15
219.24
219.33
219.42
219.52
219.61
219.70
219.79
219.89
220.05
220.17
220.26
220.35
220.45
220.54
220.64
220.73
220.83
220.93
221.02
221.19
221.31
221.41
221.51
221.61
221.71
221.80
221.90
221.99
222.08

2/2

HMP - Existing cond.

HEC-RAS Plan: PrePost Q's River: Salt River Reach: Salt River (Continued)

Regenerated from electronic model

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Salt River	222.08	SPF WO/P	292000.00	1165.69	1135.30	30.39	1153.21	1167.78	0.000929	11.67	26067.97	2039.68	24.16	19449.06	21630.16	2039.68	0.39
Salt River	221.99	10-yr W/P	58000.00	1148.93	1133.64	15.29	1142.03	1149.42	0.000671	5.65	10262.51	876.64	11.71	19512.09	20388.73	876.64	0.29
Salt River	221.99	50-yr W/P	145000.00	1156.46	1133.64	22.82	1146.66	1157.58	0.000797	8.53	17309.76	1001.45	17.28	19421.34	20422.79	1001.45	0.34
Salt River	221.99	100-yr W/P	172000.00	1158.38	1133.64	24.74	1147.82	1159.67	0.000808	9.15	19244.29	1013.95	18.98	19414.36	20428.31	1013.95	0.35
Salt River	221.99	500-yr W/P	246000.00	1162.88	1133.64	29.24	1150.74	1164.62	0.000850	10.68	23874.12	1044.62	22.85	19396.90	20441.53	1044.62	0.37
Salt River	221.99	SPF WO/P	292000.00	1165.33	1133.64	31.69	1152.41	1167.34	0.000873	11.50	26454.16	1060.78	24.94	19389.39	20450.16	1060.78	0.38
Salt River	221.90	10-yr W/P	58000.00	1148.59	1133.69	14.90	1141.63	1149.09	0.000648	5.65	10264.27	853.23	12.03	19470.96	20324.20	853.23	0.29
Salt River	221.90	50-yr W/P	145000.00	1156.01	1133.69	22.32	1146.16	1157.17	0.000810	8.67	17047.30	976.35	17.46	19392.50	20368.86	976.35	0.35
Salt River	221.90	100-yr W/P	172000.00	1157.91	1133.69	24.22	1147.35	1159.25	0.000828	9.33	18915.34	990.01	19.11	19384.34	20374.35	990.01	0.36
Salt River	221.90	500-yr W/P	246000.00	1162.35	1133.69	28.66	1150.33	1164.17	0.000882	10.93	23382.43	1024.16	22.83	19363.79	20387.95	1024.16	0.38
Salt River	221.90	SPF WO/P	292000.00	1164.75	1133.69	31.06	1152.03	1166.87	0.000914	11.80	25885.76	1994.22	24.34	19351.77	21345.99	1994.22	0.39
Salt River	221.80	10-yr W/P	58000.00	1148.04	1134.88	13.16	1142.46	1148.69	0.000970	6.44	9006.19	833.88	10.80	19485.24	20319.13	833.88	0.35
Salt River	221.80	50-yr W/P	145000.00	1155.25	1134.88	20.37	1147.04	1156.68	0.001108	9.60	15278.32	928.69	16.45	19430.86	20359.55	928.69	0.40
Salt River	221.80	100-yr W/P	172000.00	1157.12	1134.88	22.23	1148.22	1158.75	0.001114	10.29	17023.24	944.61	18.02	19420.17	20364.78	944.61	0.41
Salt River	221.80	500-yr W/P	246000.00	1161.44	1134.88	26.56	1151.14	1163.64	0.001161	11.98	21198.63	991.86	21.37	19381.43	20373.29	991.86	0.43
Salt River	221.80	SPF WO/P	292000.00	1163.90	1134.88	29.02	1152.99	1166.34	0.001147	12.71	25074.09	1795.93	19.94	19369.88	21165.81	1795.93	0.43
Salt River	221.71	10-yr W/P	58000.00	1147.40	1134.89	12.51	1142.42	1148.13	0.001186	6.90	8764.36	907.46	9.66	19548.66	20547.20	907.46	0.38
Salt River	221.71	50-yr W/P	145000.00	1154.54	1134.89	19.64	1147.07	1156.06	0.001268	10.04	15807.70	1171.38	13.49	19466.01	20637.38	1171.38	0.43
Salt River	221.71	100-yr W/P	172000.00	1156.45	1134.89	21.56	1148.32	1158.14	0.001234	10.61	18120.62	1287.31	14.67	19457.68	20745.00	1287.31	0.43
Salt River	221.71	500-yr W/P	246000.00	1160.90	1134.89	26.01	1151.27	1163.01	0.001192	11.98	23658.80	1506.05	18.88	19439.74	20945.79	1506.05	0.44
Salt River	221.71	SPF WO/P	292000.00	1163.37	1134.89	28.48	1153.35	1165.72	0.001175	12.71	26767.14	1528.09	21.16	19427.85	20955.94	1528.09	0.44
Salt River	221.61	10-yr W/P	58000.00	1146.43	1133.43	13.00	1142.66	1147.40	0.001805	7.90	7341.66	796.06	9.22	19568.73	20364.79	796.06	0.46
Salt River	221.61	50-yr W/P	145000.00	1153.34	1133.43	19.91	1147.34	1155.29	0.001760	11.22	13073.02	904.55	14.45	19503.66	20408.21	904.55	0.49
Salt River	221.61	100-yr W/P	172000.00	1155.21	1133.43	21.78	1148.56	1157.39	0.001702	11.88	14782.60	927.60	15.94	19487.44	20415.05	927.60	0.50
Salt River	221.61	500-yr W/P	246000.00	1159.41	1133.43	25.98	1151.66	1162.25	0.001685	13.60	18773.79	984.74	19.06	19463.54	20675.54	984.74	0.51
Salt River	221.61	SPF WO/P	292000.00	1161.75	1133.43	28.32	1153.52	1164.95	0.001674	14.50	21398.06	1213.61	17.63	19452.57	20722.16	1213.61	0.52
Salt River	221.51	10-yr W/P	58000.00	1145.47	1132.35	13.12	1141.51	1146.39	0.001674	7.67	7559.00	809.81	9.33	19586.86	20396.67	809.81	0.44
Salt River	221.51	50-yr W/P	145000.00	1152.45	1132.35	20.10	1146.12	1154.29	0.001637	10.91	13429.15	908.17	14.79	19539.69	20447.87	908.17	0.48
Salt River	221.51	100-yr W/P	172000.00	1154.37	1132.35	22.02	1147.35	1156.41	0.001571	11.51	15190.16	925.42	16.41	19530.91	20456.33	925.42	0.48
Salt River	221.51	500-yr W/P	246000.00	1158.61	1132.35	26.26	1150.42	1161.27	0.001558	13.19	19220.82	983.95	19.53	19487.06	20471.01	983.95	0.49
Salt River	221.51	SPF WO/P	292000.00	1160.97	1132.35	28.62	1152.28	1163.97	0.001546	14.05	21572.60	1007.47	21.41	19471.75	20479.22	1007.47	0.50
Salt River	221.41	10-yr W/P	58000.00	1144.55	1132.32	12.23	1140.67	1145.50	0.001824	7.82	7413.46	825.41	8.98	19586.40	20411.81	825.41	0.46
Salt River	221.41	50-yr W/P	145000.00	1151.64	1132.32	19.32	1145.46	1153.43	0.001688	10.75	13559.86	936.47	14.48	19524.41	20460.88	936.47	0.48
Salt River	221.41	100-yr W/P	172000.00	1153.63	1132.32	21.31	1146.66	1155.59	0.001572	11.25	15453.98	967.79	15.97	19512.14	20479.94	967.79	0.48
Salt River	221.41	500-yr W/P	246000.00	1157.96	1132.32	25.64	1149.73	1160.44	0.001497	12.74	19814.90	1074.66	18.44	19491.50	20566.16	1074.66	0.48
Salt River	221.41	SPF WO/P	292000.00	1160.38	1132.32	28.06	1151.51	1163.14	0.001455	13.47	22434.87	1100.66	20.38	19465.50	20566.16	1100.66	0.48
Salt River	221.31	10-yr W/P	58000.00	1143.46	1131.90	11.56	1140.06	1144.51	0.002071	8.21	7061.91	800.68	8.82	19583.62	20384.30	800.68	0.49
Salt River	221.31	50-yr W/P	145000.00	1150.52	1131.90	18.62	1144.73	1152.52	0.001873	11.34	12834.73	912.72	14.06	19574.20	20486.92	912.72	0.51
Salt River	221.31	100-yr W/P	172000.00	1152.57	1131.90	20.67	1145.95	1154.74	0.001736	11.83	14758.42	1006.96	14.66	19451.84	20505.78	1006.96	0.50
Salt River	221.31	500-yr W/P	246000.00	1156.98	1131.90	25.08	1149.04	1159.64	0.001615	13.24	19458.88	1083.21	17.96	19436.53	20519.73	1083.21	0.50
Salt River	221.31	SPF WO/P	292000.00	1159.44	1131.90	27.54	1150.95	1162.36	0.001554	13.94	22147.51	1102.78	20.08	19423.40	20526.17	1102.78	0.50
Salt River	221.26	10-yr W/P	55000.00	1143.32	1130.16	13.16	1138.70	1143.97	0.001187	6.45	8525.92	917.86	9.29	19542.39	20460.25	917.86	0.37
Salt River	221.26	50-yr W/P	140000.00	1150.61	1130.16	20.45	1143.00	1151.91	0.001136	9.14	15317.79	958.11	15.99	19533.52	20491.62	958.11	0.40
Salt River	221.26	100-yr W/P	169000.00	1152.67	1130.16	22.51	1144.23	1154.15	0.001116	9.79	17327.92	988.44	17.53	19531.39	20519.82	988.44	0.40
Salt River	221.26	500-yr W/P	243000.00	1157.12	1130.16	26.96	1147.02	1159.06	0.001099	11.23	22176.36	1230.00	18.70	19354.25	20796.44	1230.00	0.42
Salt River	221.26	SPF WO/P	289000.00	1159.61	1130.16	29.45	1148.65	1161.78	0.001079	11.93	25166.42	1439.92	20.61	19340.74	20796.44	1439.92	0.42
Salt River	221.255		Bridge														
Salt River	221.25	10-yr W/P	55000.00	1143.19	1129.35	13.84	1138.45	1143.82	0.001127	6.34	8681.35	923.91	9.40	19541.29	20465.21	923.91	0.36
Salt River	221.25	50-yr W/P	140000.00	1150.44	1129.35	21.09	1142.75	1151.71	0.001110	9.05	15467.62	959.73	16.12	19529.47	20489.20	959.73	0.40

HEC-RAS Plan: PrePost Q's River: Salt River Reach: Salt River (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Salt River	221.25	100-yr W/P	169000.00	1152.48	1129.35	23.13	1143.94	1153.94	0.001093	9.70	17537.49	1201.89	14.59	19295.40	20544.28	1201.89	0.40
Salt River	221.25	500-yr W/P	243000.00	1156.95	1129.35	27.60	1146.72	1158.79	0.001049	10.98	23392.76	1527.06	17.17	19237.28	20791.85	1527.06	0.41
Salt River	221.25	SPF WO/P	289000.00	1159.47	1129.35	30.12	1148.32	1161.48	0.001013	11.57	26850.98	1561.88	19.50	19229.97	20791.85	1561.88	0.41
Salt River	221.21	10-yr W/P	55000.00	1142.82	1129.68	13.14	1138.22	1143.55	0.001278	6.84	8045.61	838.08	9.60	19563.83	20401.92	838.08	0.39
Salt River	221.21	50-yr W/P	140000.00	1149.88	1129.68	20.20	1142.78	1151.42	0.001355	9.97	14042.79	863.87	16.26	19558.89	20422.77	863.87	0.43
Salt River	221.21	100-yr W/P	169000.00	1151.86	1129.68	22.18	1144.05	1153.64	0.001353	10.73	15787.47	898.95	17.56	19557.16	20456.11	898.95	0.44
Salt River	221.21	500-yr W/P	243000.00	1156.20	1129.68	26.52	1147.05	1158.49	0.001327	12.24	21040.51	1302.18	16.16	19268.56	20570.74	1302.18	0.45
Salt River	221.21	SPF WO/P	289000.00	1158.70	1129.68	29.02	1148.74	1161.19	0.001279	12.88	24335.30	1347.45	18.06	19259.36	20606.81	1347.45	0.45
Salt River	221.20		Bridge														
Salt River	221.19	10-yr W/P	55000.00	1142.66	1129.36	13.30	1137.81	1143.35	0.001164	6.65	8264.61	833.97	9.91	19562.57	20396.55	833.97	0.37
Salt River	221.19	50-yr W/P	140000.00	1149.59	1129.36	20.23	1142.33	1151.11	0.001325	9.90	14142.81	860.88	16.43	19552.50	20413.39	860.88	0.43
Salt River	221.19	100-yr W/P	169000.00	1151.54	1129.36	22.18	1143.63	1153.31	0.001336	10.68	15831.86	881.81	17.95	19551.16	20432.97	881.81	0.44
Salt River	221.19	500-yr W/P	243000.00	1155.71	1129.36	26.35	1146.65	1158.05	0.001365	12.36	20526.78	1288.10	15.94	19265.23	20553.33	1288.10	0.46
Salt River	221.19	SPF WO/P	289000.00	1158.07	1129.36	28.71	1148.36	1160.67	0.001341	13.10	23613.96	1315.63	17.95	19246.38	20562.01	1315.63	0.46
Salt River	221.08	10-yr W/P	55000.00	1141.94	1130.03	11.91	1137.17	1142.64	0.001210	6.69	8219.32	843.53	9.74	19539.46	20382.99	843.53	0.38
Salt River	221.08	50-yr W/P	140000.00	1148.80	1130.03	18.77	1141.67	1150.32	0.001341	9.90	14342.07	966.69	14.84	19376.09	20392.06	966.69	0.43
Salt River	221.08	100-yr W/P	169000.00	1150.76	1130.03	20.73	1142.96	1152.50	0.001337	10.62	16274.96	1032.16	15.77	19376.09	20416.98	1032.16	0.44
Salt River	221.08	500-yr W/P	243000.00	1154.96	1130.03	24.93	1145.97	1157.21	0.001336	12.18	20849.51	1167.32	17.86	19024.83	20531.11	1167.32	0.45
Salt River	221.08	SPF WO/P	289000.00	1157.34	1130.03	27.31	1147.79	1159.84	0.001315	12.92	24598.52	1701.44	14.46	18847.07	20548.50	1701.44	0.46
Salt River	221.075		Bridge														
Salt River	221.07	10-yr W/P	55000.00	1141.80	1130.05	11.75	1137.13	1142.53	0.001273	6.88	7993.88	813.16	9.83	19567.62	20382.02	813.16	0.39
Salt River	221.07	50-yr W/P	140000.00	1148.47	1130.05	18.42	1141.71	1150.13	0.001502	10.37	13597.76	1124.92	15.41	19217.24	20390.09	1124.92	0.45
Salt River	221.07	100-yr W/P	169000.00	1150.36	1130.05	20.31	1143.00	1152.29	0.001518	11.18	15287.47	1214.08	16.98	19156.76	20390.32	1214.08	0.46
Salt River	221.07	500-yr W/P	243000.00	1154.82	1130.05	24.77	1146.10	1156.94	0.001316	12.03	22468.50	1469.26	15.29	19078.09	20573.96	1469.26	0.45
Salt River	221.07	SPF WO/P	289000.00	1157.30	1130.05	27.25	1147.90	1159.53	0.001233	12.49	26157.84	1514.99	17.27	19068.58	20583.57	1514.99	0.44
Salt River	221.065	10-yr W/P	55000.00	1141.74	1129.91	11.83	1136.86	1142.48	0.001227	6.90	7965.90	791.69	10.06	19591.26	20382.96	791.69	0.38
Salt River	221.065	50-yr W/P	140000.00	1148.32	1129.91	18.41	1141.60	1150.07	0.001535	10.60	13206.06	1055.55	16.45	19179.49	20389.52	1055.55	0.46
Salt River	221.065	100-yr W/P	169000.00	1150.17	1129.91	20.26	1142.93	1152.22	0.001580	11.51	14687.80	1144.16	18.26	19132.14	20390.14	1144.16	0.47
Salt River	221.065	500-yr W/P	243000.00	1154.64	1129.91	24.73	1145.93	1156.87	0.001365	12.36	22073.24	1501.41	14.70	19073.70	20603.88	1501.41	0.46
Salt River	221.065	SPF WO/P	289000.00	1157.16	1129.91	27.25	1147.77	1159.48	0.001265	12.76	25900.38	1552.77	16.68	19064.34	20619.44	1552.77	0.45
Salt River	221.063		Bridge														
Salt River	221.06	10-yr W/P	55000.00	1141.65	1129.78	11.87	1136.66	1142.39	0.001188	6.90	7975.39	777.59	10.26	19602.50	20394.55	777.59	0.38
Salt River	221.06	50-yr W/P	140000.00	1148.12	1129.78	18.34	1141.42	1149.90	0.001557	10.70	13141.70	965.08	16.00	19273.76	20410.84	965.08	0.47
Salt River	221.06	100-yr W/P	169000.00	1149.94	1129.78	20.16	1142.79	1152.03	0.001605	11.60	14642.75	1146.97	17.64	19157.80	20415.44	1146.97	0.48
Salt River	221.06	500-yr W/P	243000.00	1154.35	1129.78	24.57	1145.98	1156.68	0.001417	12.60	21586.52	1482.14	14.56	19105.91	20617.54	1482.14	0.47
Salt River	221.06	SPF WO/P	289000.00	1156.84	1129.78	27.06	1147.78	1159.27	0.001318	13.03	25336.63	1537.82	16.48	19082.90	20630.96	1537.82	0.46
Salt River	221.02	10-yr W/P	55000.00	1141.43	1129.81	11.62	1136.75	1142.13	0.001232	6.75	8145.62	840.63	9.69	19528.65	20369.28	840.63	0.38
Salt River	221.02	50-yr W/P	140000.00	1147.92	1129.81	18.11	1141.27	1149.54	0.001487	10.23	13686.63	1003.58	15.75	19254.39	20385.31	1003.58	0.45
Salt River	221.02	100-yr W/P	169000.00	1149.76	1129.81	19.94	1142.56	1151.65	0.001520	11.05	15291.88	1142.03	17.42	19197.66	20391.99	1142.03	0.47
Salt River	221.02	500-yr W/P	243000.00	1154.12	1129.81	24.31	1145.50	1156.37	0.001387	12.23	21312.51	1351.24	15.77	19174.74	20525.98	1351.24	0.46
Salt River	221.02	SPF WO/P	289000.00	1156.59	1129.81	26.78	1147.26	1158.99	0.001308	12.76	24674.59	1371.23	17.99	19167.63	20538.85	1371.23	0.46
Salt River	220.93	10-yr W/P	55000.00	1140.90	1129.32	11.58	1135.73	1141.54	0.001051	6.45	8527.09	836.20	10.20	19562.18	20398.37	836.20	0.36
Salt River	220.93	50-yr W/P	140000.00	1147.22	1129.32	17.90	1140.26	1148.80	0.001408	10.09	13869.66	855.31	16.22	19551.43	20407.15	855.31	0.44
Salt River	220.93	100-yr W/P	169000.00	1149.03	1129.32	19.71	1141.56	1150.89	0.001450	10.96	15448.45	914.50	17.15	19182.45	20449.85	914.50	0.46
Salt River	220.93	500-yr W/P	243000.00	1153.19	1129.32	23.87	1144.53	1155.63	0.001458	12.61	19992.43	1339.03	17.12	19061.91	20554.53	1339.03	0.47
Salt River	220.93	SPF WO/P	289000.00	1155.58	1129.32	26.25	1146.25	1158.27	0.001425	13.35	22836.46	1402.63	18.86	19051.29	20567.21	1402.63	0.48
Salt River	220.83	10-yr W/P	55000.00	1140.25	1129.02	11.23	1135.54	1140.95	0.001221	6.74	8166.15	839.76	9.72	19523.72	20363.48	839.76	0.38
Salt River	220.83	50-yr W/P	140000.00	1146.28	1129.02	17.26	1140.06	1148.01	0.001614	10.54	13288.56	856.06	15.52	19510.92	20366.97	856.06	0.47

HEC-RAS Plan: PrePost Q's River: Salt River Reach: Salt River (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth.	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Salt River	220.83	100-yr W/P	169000.00	1148.05	1129.02	19.03	1141.33	1150.08	0.001659	11.41	14810.56	880.67	16.82	19509.16	20389.83	880.67	0.49
Salt River	220.83	500-yr W/P	243000.00	1152.07	1129.02	23.05	1144.34	1154.78	0.001720	13.24	18509.46	1178.14	19.17	18601.63	20449.04	1178.14	0.51
Salt River	220.83	SPF WO/P	289000.00	1154.34	1129.02	25.32	1146.00	1157.43	0.001712	14.15	20741.62	1630.84	20.72	18366.77	20480.99	1630.84	0.52
Salt River	220.78	10-yr W/P	55000.00	1137.40	1132.00	5.40	1137.40	1140.06	0.010701	13.08	4204.20	794.43	5.29	19546.79	20406.01	794.43	1.00
Salt River	220.78	50-yr W/P	140000.00	1143.44	1132.00	11.43	1142.05	1147.11	0.005816	15.38	9105.62	830.62	10.96	19537.75	20415.06	830.62	0.82
Salt River	220.78	100-yr W/P	169000.00	1145.30	1132.00	13.30	1143.35	1149.20	0.005152	15.85	10663.92	841.80	12.67	19534.95	20417.86	841.80	0.78
Salt River	220.78	500-yr W/P	243000.00	1149.30	1132.00	17.30	1146.42	1153.92	0.004482	17.26	14076.62	958.25	16.26	18770.29	20423.85	958.25	0.75
Salt River	220.78	SPF WO/P	289000.00	1151.52	1132.00	19.52	1148.14	1156.58	0.004255	18.04	16020.37	1005.94	18.13	18759.13	20446.71	1005.94	0.74
Salt River	220.73	10-yr W/P	55000.00	1137.27	1126.56	10.71	1132.70	1137.97	0.001238	6.70	8208.78	859.21	9.55	19548.48	20407.70	859.21	0.38
Salt River	220.73	50-yr W/P	140000.00	1143.88	1126.56	17.32	1137.03	1145.44	0.001423	10.02	13967.46	883.41	15.81	19538.41	20421.81	883.41	0.44
Salt River	220.73	100-yr W/P	169000.00	1145.75	1126.56	19.19	1138.39	1147.57	0.001440	10.82	15623.54	888.28	17.59	19535.39	20423.67	888.28	0.45
Salt River	220.73	500-yr W/P	243000.00	1149.78	1126.56	23.22	1141.33	1152.26	0.001527	12.63	19232.66	903.10	21.30	19528.73	20431.83	903.10	0.48
Salt River	220.73	SPF WO/P	289000.00	1152.03	1126.56	25.47	1142.99	1154.89	0.001593	13.58	21274.76	924.68	23.01	19523.46	20448.14	924.68	0.50
Salt River	220.64	10-yr W/P	55000.00	1136.48	1125.40	11.08	1132.40	1137.27	0.001525	7.13	7711.80	862.12	8.95	19553.13	20415.25	862.12	0.42
Salt River	220.64	50-yr W/P	140000.00	1142.95	1125.40	17.55	1136.92	1144.66	0.001647	10.48	13359.10	884.71	15.10	19543.24	20427.96	884.71	0.48
Salt River	220.64	100-yr W/P	169000.00	1144.80	1125.40	19.40	1138.18	1146.77	0.001685	11.26	15010.93	907.73	16.54	19530.63	20439.68	907.73	0.49
Salt River	220.64	500-yr W/P	243000.00	1148.81	1125.40	23.41	1141.10	1151.43	0.001737	13.00	18691.87	930.65	20.08	19520.11	20450.76	930.65	0.51
Salt River	220.64	SPF WO/P	289000.00	1151.03	1125.40	25.63	1142.77	1154.04	0.001762	13.91	20779.39	944.54	22.00	19513.13	20457.68	944.54	0.52
Salt River	220.54	10-yr W/P	55000.00	1135.66	1124.24	11.42	1131.79	1136.48	0.001623	7.28	7554.74	857.14	8.81	19558.13	20415.27	857.14	0.43
Salt River	220.54	50-yr W/P	140000.00	1142.03	1124.24	17.79	1136.27	1143.80	0.001756	10.68	13109.79	885.11	14.81	19548.93	20434.04	885.11	0.49
Salt River	220.54	100-yr W/P	169000.00	1143.85	1124.24	19.61	1137.53	1145.89	0.001798	11.46	14745.55	910.93	16.19	19536.93	20447.86	910.93	0.50
Salt River	220.54	500-yr W/P	243000.00	1147.82	1124.24	23.58	1140.48	1150.53	0.001834	13.21	18394.73	930.56	19.77	19527.05	20457.61	930.56	0.52
Salt River	220.54	SPF WO/P	289000.00	1150.02	1124.24	25.78	1142.15	1153.12	0.001858	14.12	20462.70	945.07	21.65	19519.80	20464.87	945.07	0.53
Salt River	220.45	10-yr W/P	55000.00	1134.79	1123.26	11.53	1131.11	1135.65	0.001742	7.43	7400.83	859.50	8.61	19561.37	20420.87	859.50	0.45
Salt River	220.45	50-yr W/P	140000.00	1141.07	1123.26	17.81	1135.59	1142.90	0.001860	10.87	12877.45	884.27	14.56	19554.39	20438.67	884.27	0.50
Salt River	220.45	100-yr W/P	169000.00	1142.86	1123.26	19.60	1136.83	1144.98	0.001882	11.68	14468.66	899.33	16.09	19542.75	20442.09	899.33	0.51
Salt River	220.45	500-yr W/P	243000.00	1146.78	1123.26	23.52	1139.79	1149.59	0.001945	13.44	18078.15	931.70	19.40	19531.91	20463.61	931.70	0.54
Salt River	220.45	SPF WO/P	289000.00	1148.97	1123.26	25.71	1141.44	1152.17	0.001959	14.36	20129.75	944.26	21.32	19525.82	20470.08	944.26	0.55
Salt River	220.35	10-yr W/P	55000.00	1133.87	1122.68	11.19	1130.39	1134.74	0.001836	7.51	7321.92	869.49	8.42	19568.88	20438.37	869.49	0.46
Salt River	220.35	50-yr W/P	140000.00	1140.08	1122.68	17.40	1134.77	1141.94	0.001920	10.96	12777.23	886.95	14.41	19559.17	20446.12	886.95	0.51
Salt River	220.35	100-yr W/P	169000.00	1141.85	1122.68	19.17	1136.03	1144.00	0.001969	11.77	14358.72	911.41	15.75	19546.91	20458.32	911.41	0.52
Salt River	220.35	500-yr W/P	243000.00	1145.74	1122.68	23.06	1138.93	1148.59	0.002001	13.54	17946.99	933.53	19.22	19536.48	20470.01	933.53	0.54
Salt River	220.35	SPF WO/P	289000.00	1147.92	1122.68	25.24	1140.59	1151.16	0.002012	14.45	19993.80	946.05	21.13	19530.15	20476.19	946.05	0.55
Salt River	220.26	10-yr W/P	55000.00	1132.97	1122.15	10.82	1129.40	1133.83	0.001793	7.45	7381.27	872.12	8.46	19572.94	20445.06	872.12	0.45
Salt River	220.26	50-yr W/P	140000.00	1139.12	1122.15	16.97	1133.81	1140.98	0.001915	10.93	12805.86	890.98	14.37	19562.61	20453.58	890.98	0.51
Salt River	220.26	100-yr W/P	169000.00	1140.87	1122.15	18.72	1135.07	1143.01	0.001968	11.75	14381.53	915.86	15.70	19551.50	20467.36	915.86	0.52
Salt River	220.26	500-yr W/P	243000.00	1144.74	1122.15	22.59	1137.95	1147.58	0.001999	13.52	17970.89	936.71	19.19	19540.34	20477.05	936.71	0.54
Salt River	220.26	SPF WO/P	289000.00	1146.92	1122.15	24.77	1139.65	1150.15	0.002009	14.44	20020.65	949.15	21.09	19534.23	20483.38	949.15	0.55
Salt River	220.17	10-yr W/P	55000.00	1131.96	1121.50	10.46	1128.70	1132.88	0.002004	7.67	7167.09	881.37	8.13	19577.28	20458.65	881.37	0.47
Salt River	220.17	50-yr W/P	140000.00	1138.06	1121.50	16.56	1133.08	1139.98	0.002047	11.12	12589.41	897.25	14.03	19568.12	20465.36	897.25	0.52
Salt River	220.17	100-yr W/P	169000.00	1139.78	1121.50	18.28	1134.29	1142.00	0.002045	11.96	14134.50	902.10	15.67	19565.56	20467.66	902.10	0.53
Salt River	220.17	500-yr W/P	243000.00	1143.58	1121.50	22.08	1137.20	1146.54	0.002116	13.82	17589.04	925.51	19.00	19551.55	20477.06	925.51	0.56
Salt River	220.17	SPF WO/P	289000.00	1145.72	1121.50	24.22	1138.84	1149.10	0.002154	14.75	19599.57	947.76	20.68	19539.75	20487.51	947.76	0.57
Salt River	220.07	10-yr W/P	55000.00	1131.01	1120.97	10.04	1127.67	1131.90	0.001914	7.58	7256.33	876.65	8.28	19585.06	20461.71	876.65	0.46
Salt River	220.07	50-yr W/P	140000.00	1137.06	1120.97	16.09	1132.01	1138.97	0.002028	11.10	12617.45	895.51	14.09	19576.64	20472.15	895.51	0.52
Salt River	220.07	100-yr W/P	169000.00	1138.77	1120.97	17.80	1133.26	1140.98	0.002052	11.93	14163.18	908.48	15.59	19566.52	20474.99	908.48	0.53
Salt River	220.07	500-yr W/P	243000.00	1142.54	1120.97	21.57	1136.11	1145.50	0.002092	13.80	17604.26	918.39	19.17	19561.70	20480.09	918.39	0.56
Salt River	220.07	SPF WO/P	289000.00	1144.64	1120.97	23.67	1137.78	1148.04	0.002109	14.79	19543.59	923.57	21.16	19558.87	20482.44	923.57	0.57
Salt River	220.066		Bridge														

HEC-RAS Plan: PrePost Q's River: Salt River Reach: Salt River (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Salt River	220.063	10-yr W/P	55000.00	1130.81	1121.11	9.70	1127.50	1131.71	0.001956	7.63	7207.74	875.84	8.23	19586.19	20462.02	875.84	0.47
Salt River	220.063	50-yr W/P	140000.00	1136.76	1121.11	15.65	1131.86	1138.71	0.002106	11.22	12479.24	896.09	13.93	19577.00	20473.10	896.09	0.53
Salt River	220.063	100-yr W/P	169000.00	1138.44	1121.11	17.33	1133.11	1140.70	0.002136	12.07	13996.32	908.84	15.40	19566.75	20475.59	908.84	0.54
Salt River	220.063	500-yr W/P	243000.00	1142.12	1121.11	21.01	1135.97	1145.17	0.002189	14.00	17363.34	917.69	18.92	19562.04	20479.73	917.69	0.57
Salt River	220.063	SPF WO/P	289000.00	1144.18	1121.11	23.07	1137.70	1147.68	0.002214	15.01	19256.20	922.82	20.87	19559.19	20482.01	922.82	0.58
Salt River	220.06	10-yr W/P	55000.00	1130.79	1121.11	9.68	1127.45	1131.69	0.001923	7.59	7250.08	877.48	8.26	19585.54	20463.03	877.48	0.47
Salt River	220.06	50-yr W/P	140000.00	1136.75	1121.11	15.64	1131.81	1138.68	0.002080	11.17	12533.52	897.57	13.96	19576.26	20473.83	897.57	0.53
Salt River	220.06	100-yr W/P	169000.00	1138.43	1121.11	17.32	1133.05	1140.67	0.002112	12.03	14053.36	910.13	15.44	19565.99	20476.11	910.13	0.54
Salt River	220.06	500-yr W/P	243000.00	1142.12	1121.11	21.01	1135.94	1145.13	0.002167	13.94	17426.99	919.16	18.96	19561.25	20480.40	919.16	0.56
Salt River	220.06	SPF WO/P	289000.00	1144.17	1121.11	23.06	1137.62	1147.65	0.002193	14.96	19324.01	924.41	20.90	19558.39	20482.80	924.41	0.58
Salt River	220.055		Bridge														
Salt River	220.05	10-yr W/P	55000.00	1130.60	1121.14	9.46	1127.33	1131.50	0.001965	7.64	7200.10	876.42	8.22	19586.89	20463.31	876.42	0.47
Salt River	220.05	50-yr W/P	140000.00	1136.44	1121.14	15.29	1131.66	1138.42	0.002168	11.32	12372.94	896.00	13.81	19576.84	20472.84	896.00	0.54
Salt River	220.05	100-yr W/P	169000.00	1138.08	1121.14	16.94	1132.90	1140.39	0.002209	12.20	13856.99	908.57	15.25	19566.63	20475.20	908.57	0.55
Salt River	220.05	500-yr W/P	243000.00	1141.67	1121.14	20.53	1135.77	1144.80	0.002286	14.18	17140.27	917.94	18.67	19562.23	20480.17	917.94	0.58
Salt River	220.05	SPF WO/P	289000.00	1143.68	1121.14	22.53	1137.48	1147.27	0.002323	15.22	18982.01	923.01	20.57	19559.78	20482.79	923.01	0.59
Salt River	219.89	10-yr W/P	55000.00	1128.65	1118.42	10.23	1125.91	1129.66	0.002410	8.06	6827.28	894.53	7.63	19576.53	20471.06	894.53	0.51
Salt River	219.89	50-yr W/P	140000.00	1134.31	1118.42	15.89	1130.19	1136.45	0.002501	11.73	11930.75	910.71	13.10	19568.67	20479.39	910.71	0.57
Salt River	219.89	100-yr W/P	169000.00	1135.91	1118.42	17.49	1131.41	1138.38	0.002531	12.60	13410.08	926.95	14.47	19554.59	20481.54	926.95	0.58
Salt River	219.89	500-yr W/P	243000.00	1139.46	1118.42	21.04	1134.23	1142.74	0.002566	14.54	16718.25	941.11	17.76	19545.27	20486.39	941.11	0.61
Salt River	219.89	SPF WO/P	289000.00	1141.45	1118.42	23.03	1135.91	1145.20	0.002577	15.54	18600.86	949.79	19.58	19539.62	20489.40	949.79	0.62
Salt River	219.79	10-yr W/P	55000.00	1127.42	1117.50	9.92	1124.77	1128.46	0.002561	8.16	6738.38	907.50	7.43	19528.40	20435.90	907.50	0.53
Salt River	219.79	50-yr W/P	140000.00	1133.09	1117.50	15.59	1129.03	1135.22	0.002552	11.71	11955.28	931.58	12.83	19519.32	20450.90	931.58	0.58
Salt River	219.79	100-yr W/P	169000.00	1134.69	1117.50	17.19	1130.30	1137.14	0.002560	12.56	13460.25	945.94	14.23	19506.32	20452.26	945.94	0.59
Salt River	219.79	500-yr W/P	243000.00	1138.25	1117.50	20.75	1133.11	1141.48	0.002562	14.42	16850.93	960.48	17.54	19494.78	20455.27	960.48	0.61
Salt River	219.79	SPF WO/P	289000.00	1140.26	1117.50	22.76	1134.74	1143.93	0.002558	15.38	18786.62	970.16	19.36	19489.16	20459.32	970.16	0.62
Salt River	219.70	10-yr W/P	55000.00	1126.36	1115.35	11.01	1123.35	1127.27	0.002141	7.68	7163.37	924.73	7.75	19579.85	20504.58	924.73	0.49
Salt River	219.70	50-yr W/P	140000.00	1132.03	1115.35	16.68	1127.58	1133.99	0.002263	11.22	12472.66	946.35	13.18	19573.10	20519.45	946.35	0.54
Salt River	219.70	100-yr W/P	169000.00	1133.64	1115.35	18.28	1128.78	1135.90	0.002297	12.07	13999.57	962.51	14.54	19560.23	20522.74	962.51	0.56
Salt River	219.70	500-yr W/P	243000.00	1137.21	1115.35	21.86	1131.54	1140.22	0.002326	13.91	17474.26	979.29	17.84	19548.12	20527.41	979.29	0.58
Salt River	219.70	SPF WO/P	289000.00	1139.24	1115.35	23.89	1133.18	1142.66	0.002328	14.85	19464.81	988.63	19.69	19542.33	20530.96	988.63	0.59
Salt River	219.61	10-yr W/P	55000.00	1125.32	1114.26	11.06	1122.46	1126.23	0.002222	7.67	7170.14	952.84	7.52	19598.37	20551.21	952.84	0.49
Salt River	219.61	50-yr W/P	140000.00	1130.99	1114.26	16.73	1126.57	1132.90	0.002245	11.09	12625.26	969.23	13.03	19591.25	20560.48	969.23	0.54
Salt River	219.61	100-yr W/P	169000.00	1132.59	1114.26	18.33	1127.74	1134.79	0.002274	11.91	14186.50	986.41	14.38	19575.63	20562.04	986.41	0.55
Salt River	219.61	500-yr W/P	243000.00	1136.18	1114.26	21.92	1130.47	1139.09	0.002269	13.68	17758.33	999.18	17.77	19565.72	20564.90	999.18	0.57
Salt River	219.61	SPF WO/P	289000.00	1138.22	1114.26	23.96	1132.09	1141.53	0.002263	14.59	19806.10	1009.34	19.62	19559.69	20569.03	1009.34	0.58
Salt River	219.52	10-yr W/P	55000.00	1124.25	1113.36	10.89	1121.35	1125.13	0.002158	7.55	7284.70	968.60	7.52	19581.70	20550.30	968.60	0.49
Salt River	219.52	50-yr W/P	140000.00	1129.92	1113.36	16.56	1125.39	1131.77	0.002205	10.91	12835.75	994.92	12.90	19563.79	20558.71	994.92	0.54
Salt River	219.52	100-yr W/P	169000.00	1131.52	1113.36	18.16	1126.58	1133.65	0.002195	11.71	14432.91	1001.87	14.41	19559.72	20561.59	1001.87	0.54
Salt River	219.52	500-yr W/P	243000.00	1135.15	1113.36	21.79	1129.28	1137.95	0.002183	13.44	18084.11	1014.42	17.83	19549.55	20563.97	1014.42	0.56
Salt River	219.52	SPF WO/P	289000.00	1137.20	1113.36	23.84	1130.80	1140.39	0.002175	14.32	20180.13	1025.12	19.69	19543.07	20568.19	1025.12	0.57
Salt River	219.42	10-yr W/P	55000.00	1123.10	1112.78	10.32	1120.38	1124.02	0.002311	7.69	7156.42	975.90	7.33	19531.54	20507.45	975.90	0.50
Salt River	219.42	50-yr W/P	140000.00	1128.79	1112.78	16.01	1124.40	1130.66	0.002270	10.98	12755.67	1002.33	12.73	19513.54	20515.87	1002.33	0.54
Salt River	219.42	100-yr W/P	169000.00	1130.41	1112.78	17.63	1125.56	1132.55	0.002237	11.75	14383.54	1008.46	14.26	19509.52	20517.98	1008.46	0.55
Salt River	219.42	500-yr W/P	243000.00	1134.06	1112.78	21.28	1128.26	1136.86	0.002195	13.43	18089.09	1020.26	17.73	19501.10	20521.36	1020.26	0.56
Salt River	219.42	SPF WO/P	289000.00	1136.13	1112.78	23.35	1129.82	1139.30	0.002176	14.30	20208.19	1030.04	19.62	19494.10	20524.14	1030.04	0.57
Salt River	219.33	10-yr W/P	55000.00	1122.00	1111.69	10.31	1119.27	1122.92	0.002329	7.70	7141.96	976.66	7.31	19451.54	20428.20	976.66	0.50
Salt River	219.33	50-yr W/P	140000.00	1127.73	1111.69	16.04	1123.32	1129.59	0.002263	10.93	12803.81	1009.78	12.68	19442.48	20452.26	1009.78	0.54
Salt River	219.33	100-yr W/P	169000.00	1129.37	1111.69	17.68	1124.49	1131.49	0.002236	11.67	14482.11	1025.87	14.12	19428.94	20454.81	1025.87	0.55
Salt River	219.33	500-yr W/P	243000.00	1133.08	1111.69	21.39	1127.20	1135.81	0.002161	13.27	18312.69	1041.12	17.59	19419.22	20460.34	1041.12	0.56

HEC-RAS Plan: PrePost Q's River: Salt River Reach: Salt River (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Salt River	219.33	SPF WO/P	289000.00	1135.18	1111.69	23.49	1128.78	1138.26	0.002125	14.09	20506.27	1050.83	19.51	19412.65	20463.48	1050.83	0.56
Salt River	219.24	10-yr W/P	55000.00	1120.94	1110.33	10.61	1118.16	1121.85	0.002263	7.64	7194.70	973.76	7.39	19492.83	20466.59	973.76	0.50
Salt River	219.24	50-yr W/P	140000.00	1126.69	1110.33	16.36	1122.20	1128.53	0.002227	10.87	12875.81	1011.31	12.73	19483.41	20494.71	1011.31	0.54
Salt River	219.24	100-yr W/P	169000.00	1128.35	1110.33	18.02	1123.37	1130.44	0.002200	11.60	14574.26	1029.16	14.16	19468.31	20497.47	1029.16	0.54
Salt River	219.24	500-yr W/P	243000.00	1132.11	1110.33	21.78	1126.10	1134.80	0.002113	13.15	18478.54	1046.59	17.66	19456.91	20503.49	1046.59	0.55
Salt River	219.24	SPF WO/P	289000.00	1134.24	1110.33	23.91	1127.67	1137.26	0.002070	13.95	20711.51	1055.98	19.61	19450.71	20506.70	1055.98	0.56
Salt River	219.15	10-yr W/P	55000.00	1119.72	1109.49	10.23	1117.05	1120.66	0.002385	7.75	7097.94	978.76	7.25	19495.96	20474.72	978.76	0.51
Salt River	219.15	50-yr W/P	140000.00	1125.55	1109.49	16.06	1121.09	1127.39	0.002217	10.90	12847.18	1001.31	12.83	19487.78	20500.46	1001.31	0.54
Salt River	219.15	100-yr W/P	169000.00	1127.23	1109.49	17.73	1122.25	1129.32	0.002186	11.62	14549.73	1018.90	14.28	19484.83	20503.73	1018.90	0.54
Salt River	219.15	500-yr W/P	243000.00	1131.03	1109.49	21.54	1124.95	1133.72	0.002095	13.16	18461.51	1036.21	17.82	19474.41	20510.62	1036.21	0.55
Salt River	219.15	SPF WO/P	289000.00	1133.18	1109.49	23.69	1126.52	1136.21	0.002052	13.96	20696.11	1046.13	19.78	19467.50	20513.63	1046.13	0.55
Salt River	219.04	10-yr W/P	55000.00	1118.63	1106.59	12.04	1115.54	1119.42	0.001927	7.12	7729.79	1031.11	7.50	19472.90	20504.01	1031.11	0.46
Salt River	219.04	50-yr W/P	140000.00	1124.64	1106.59	18.05	1119.42	1126.20	0.001783	10.01	13983.21	1051.13	13.30	19462.39	20513.52	1051.13	0.48
Salt River	219.04	100-yr W/P	169000.00	1126.36	1106.59	19.77	1120.52	1128.14	0.001748	10.70	15793.11	1058.04	14.93	19459.26	20517.30	1058.04	0.49
Salt River	219.04	500-yr W/P	243000.00	1130.25	1106.59	23.66	1123.11	1132.56	0.001693	12.19	19941.29	1070.94	18.62	19451.85	20522.79	1070.94	0.50
Salt River	219.04	SPF WO/P	289000.00	1132.44	1106.59	25.85	1124.57	1135.05	0.001668	12.96	22291.75	1077.93	20.68	19447.74	20525.68	1077.93	0.50
Salt River	219.03		Bridge	← SR 143 Bridge													
Salt River	219.02	10-yr W/P	55000.00	1118.23	1105.53	12.70		1119.02	0.001951	7.15	7696.99	1030.48	7.47	19474.37	20504.85	1030.48	0.46
Salt River	219.02	50-yr W/P	140000.00	1124.17	1105.53	18.64		1125.75	0.001825	10.09	13875.94	1049.79	13.22	19463.98	20513.77	1049.79	0.49
Salt River	219.02	100-yr W/P	169000.00	1125.87	1105.53	20.34		1127.67	0.001792	10.79	15661.03	1055.46	14.84	19461.02	20516.48	1055.46	0.49
Salt River	219.02	500-yr W/P	243000.00	1129.71	1105.53	24.18		1132.06	0.001745	12.31	19741.80	1068.88	18.47	19454.32	20523.19	1068.88	0.50
Salt River	219.02	SPF WO/P	289000.00	1131.86	1105.53	26.33		1134.53	0.001725	13.11	22052.57	1076.18	20.49	19450.60	20526.79	1076.18	0.51
Salt River	218.99	10-yr W/P	55000.00	1118.03	1105.72	12.31	1114.66	1118.76	0.001694	6.86	8020.11	1027.20	7.81	19452.69	20479.89	1027.20	0.43
Salt River	218.99	50-yr W/P	140000.00	1123.98	1105.72	18.26	1118.53	1125.49	0.001685	9.86	14195.92	1046.49	13.57	19441.53	20488.03	1046.49	0.47
Salt River	218.99	100-yr W/P	169000.00	1125.68	1105.72	19.96	1119.68	1127.42	0.001667	10.58	15978.84	1051.27	15.20	19438.35	20489.62	1051.27	0.48
Salt River	218.99	500-yr W/P	243000.00	1129.54	1105.72	23.82	1122.29	1131.81	0.001667	12.08	20111.74	1081.91	18.59	19431.11	20513.01	1081.91	0.49
Salt River	218.99	SPF WO/P	289000.00	1131.70	1105.72	25.98	1123.76	1134.27	0.001653	12.86	22465.04	1092.30	20.57	19427.10	20519.40	1092.30	0.50
Salt River	218.965		Bridge														
Salt River	218.96	10-yr W/P	55000.00	1117.69	1105.11	12.58	1114.39	1118.42	0.001745	6.84	8038.73	1056.84	7.61	19423.36	20480.21	1056.84	0.44
Salt River	218.96	50-yr W/P	140000.00	1123.60	1105.11	18.49	1118.27	1125.08	0.001690	9.76	14341.09	1076.78	13.32	19412.45	20489.23	1076.78	0.47
Salt River	218.96	100-yr W/P	169000.00	1125.29	1105.11	20.18	1119.37	1126.98	0.001681	10.45	16164.69	1089.82	14.83	19409.71	20499.96	1089.82	0.48
Salt River	218.96	500-yr W/P	243000.00	1129.11	1105.11	24.00	1121.91	1131.32	0.001651	11.92	20378.26	1111.26	18.34	19402.41	20513.67	1111.26	0.49
Salt River	218.96	SPF WO/P	289000.00	1131.26	1105.11	26.15	1123.36	1133.76	0.001634	12.69	22778.36	1122.20	20.30	19398.19	20520.39	1122.20	0.50
Salt River	218.81	10-yr W/P	55000.00	1115.90	1104.63	11.26	1113.03	1116.78	0.002187	7.56	7279.24	974.88	7.47	19504.88	20479.76	974.88	0.49
Salt River	218.81	50-yr W/P	140000.00	1121.65	1104.63	17.02	1117.07	1123.47	0.002144	10.83	12931.64	991.25	13.05	19496.98	20488.23	991.25	0.53
Salt River	218.81	100-yr W/P	169000.00	1123.29	1104.63	18.66	1118.17	1125.38	0.002118	11.60	14563.92	996.05	14.62	19494.73	20490.79	996.05	0.53
Salt River	218.81	500-yr W/P	243000.00	1126.97	1104.63	22.34	1120.93	1129.71	0.002126	13.29	18290.53	1022.37	17.89	19489.69	20512.06	1022.37	0.55
Salt River	218.81	SPF WO/P	289000.00	1129.05	1104.63	24.42	1122.45	1132.16	0.002109	14.15	20427.60	1031.95	19.80	19486.25	20518.21	1031.95	0.56
Salt River	218.71	10-yr W/P	55000.00	1114.87	1104.16	10.71	1111.89	1115.74	0.002098	7.51	7323.02	959.44	7.63	19525.88	20485.33	959.44	0.48
Salt River	218.71	50-yr W/P	140000.00	1120.59	1104.16	16.43	1115.95	1122.43	0.002145	10.87	12874.78	981.67	13.12	19512.24	20493.91	981.67	0.53
Salt River	218.71	100-yr W/P	169000.00	1122.23	1104.16	18.07	1117.15	1124.34	0.002147	11.66	14495.42	995.44	14.56	19500.98	20496.42	995.44	0.54
Salt River	218.71	500-yr W/P	243000.00	1125.91	1104.16	21.75	1119.87	1128.68	0.002131	13.37	18181.59	1009.98	18.00	19492.46	20502.44	1009.98	0.56
Salt River	218.71	SPF WO/P	289000.00	1127.99	1104.16	23.83	1121.42	1131.14	0.002119	14.24	20289.25	1019.85	19.89	19488.31	20508.16	1019.85	0.56
Salt River	218.62	10-yr W/P	55000.00	1113.74	1100.72	13.02	1110.86	1114.65	0.002211	7.65	7193.89	953.60	7.54	19529.69	20483.29	953.60	0.49
Salt River	218.62	50-yr W/P	140000.00	1119.40	1100.72	18.68	1114.96	1121.30	0.002258	11.07	12651.29	975.83	12.96	19516.37	20492.20	975.83	0.54
Salt River	218.62	100-yr W/P	169000.00	1121.04	1100.72	20.32	1116.14	1123.22	0.002260	11.85	14262.80	992.78	14.37	19502.99	20495.77	992.78	0.55
Salt River	218.62	500-yr W/P	243000.00	1124.74	1100.72	24.02	1118.84	1127.57	0.002231	13.50	17996.40	1018.69	17.67	19495.42	20514.10	1018.69	0.57
Salt River	218.62	SPF WO/P	289000.00	1126.84	1100.72	26.12	1120.48	1130.04	0.002197	14.34	20152.03	1029.47	19.58	19491.09	20520.56	1029.47	0.57

HEC-RAS Plan: PrePost Q's River: Salt River Reach: Salt River (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Salt River	218.52	10-yr W/P	55000.00	1112.65	1100.27	12.38	1109.73	1113.54	0.002170	7.58	7258.24	962.48	7.54	19525.78	20488.26	962.48	0.49
Salt River	218.52	50-yr W/P	140000.00	1118.29	1100.27	18.02	1113.81	1120.16	0.002220	10.98	12748.83	982.81	12.97	19513.46	20496.27	982.81	0.54
Salt River	218.52	100-yr W/P	169000.00	1119.93	1100.27	19.66	1115.00	1122.08	0.002238	11.76	14367.69	1004.53	14.30	19503.39	20507.92	1004.53	0.55
Salt River	218.52	500-yr W/P	243000.00	1123.66	1100.27	23.39	1117.71	1126.44	0.002177	13.39	18150.43	1022.15	17.76	19495.22	20517.37	1022.15	0.56
Salt River	218.52	SPF WO/P	289000.00	1125.79	1100.27	25.52	1119.25	1128.93	0.002139	14.21	20340.90	1033.33	19.68	19491.11	20524.43	1033.33	0.56
Salt River	218.43	10-yr W/P	55000.00	1111.57	1099.50	12.07	1108.64	1112.46	0.002192	7.56	7270.41	973.47	7.47	19520.41	20493.88	973.47	0.49
Salt River	218.43	50-yr W/P	140000.00	1117.20	1099.50	17.70	1112.75	1119.06	0.002215	10.93	12811.72	992.62	12.91	19509.34	20501.96	992.62	0.54
Salt River	218.43	100-yr W/P	169000.00	1118.84	1099.50	19.34	1113.91	1120.97	0.002210	11.69	14454.96	1009.88	14.31	19506.07	20515.95	1009.88	0.54
Salt River	218.43	500-yr W/P	243000.00	1122.63	1099.50	23.13	1116.60	1125.36	0.002133	13.27	18309.97	1028.80	17.80	19498.43	20527.22	1028.80	0.55
Salt River	218.43	SPF WO/P	289000.00	1124.79	1099.50	25.29	1118.18	1127.86	0.002087	14.07	20546.72	1040.03	19.76	19494.01	20534.04	1040.03	0.56
Salt River	218.33	10-yr W/P	55000.00	1110.39	1099.85	10.54	1107.75	1111.30	0.002403	7.66	7184.59	1013.02	7.09	19505.79	20518.81	1013.02	0.51
Salt River	218.33	50-yr W/P	140000.00	1116.15	1099.85	16.30	1111.71	1117.93	0.002177	10.70	13082.03	1033.27	12.66	19493.56	20526.83	1033.27	0.53
Salt River	218.33	100-yr W/P	169000.00	1117.82	1099.85	17.97	1112.86	1119.84	0.002143	11.41	14816.12	1050.47	14.10	19490.17	20540.64	1050.47	0.54
Salt River	218.33	500-yr W/P	243000.00	1121.71	1099.85	21.86	1115.45	1124.27	0.002003	12.83	18938.30	1068.46	17.72	19482.35	20550.81	1068.46	0.54
Salt River	218.33	SPF WO/P	289000.00	1123.93	1099.85	24.08	1116.97	1126.78	0.001936	13.55	21321.75	1079.02	19.76	19477.99	20557.02	1079.02	0.54
Salt River	218.24	10-yr W/P	55000.00	1109.37	1096.23	13.14	1106.34	1110.20	0.002026	7.31	7528.55	1003.79	7.50	19427.56	20431.35	1003.79	0.47
Salt River	218.24	50-yr W/P	140000.00	1115.21	1096.23	18.98	1110.35	1116.89	0.001957	10.39	13477.28	1030.29	13.08	19412.63	20442.92	1030.29	0.51
Salt River	218.24	100-yr W/P	169000.00	1116.90	1096.23	20.67	1111.48	1118.81	0.001920	11.10	15220.00	1037.40	14.67	19408.87	20446.27	1037.40	0.51
Salt River	218.24	500-yr W/P	243000.00	1120.85	1096.23	24.62	1114.13	1123.30	0.001821	12.56	19350.44	1053.56	18.37	19401.25	20454.81	1053.56	0.52
Salt River	218.24	SPF WO/P	289000.00	1123.11	1096.23	26.87	1115.62	1125.84	0.001760	13.29	21822.20	1118.00	19.52	19342.35	20460.35	1118.00	0.52
Salt River	218.15	10-yr W/P	55000.00	1108.22	1095.03	13.19	1104.92	1109.11	0.002305	7.59	7247.59	1003.90	7.22	19393.30	20397.20	1003.90	0.50
Salt River	218.15	50-yr W/P	140000.00	1114.16	1095.03	19.13	1109.45	1115.88	0.002050	10.53	13298.61	1030.21	12.91	19378.77	20408.98	1030.21	0.52
Salt River	218.15	100-yr W/P	169000.00	1115.88	1095.03	20.85	1110.62	1117.83	0.001986	11.21	15076.80	1037.20	14.54	19374.72	20411.92	1037.20	0.52
Salt River	218.15	500-yr W/P	243000.00	1119.92	1095.03	24.89	1113.27	1122.38	0.001847	12.59	19294.95	1053.84	18.31	19365.54	20419.38	1053.84	0.52
Salt River	218.15	SPF WO/P	289000.00	1122.44	1095.03	27.41	1114.75	1124.92	0.001618	12.79	23457.21	1390.36	16.87	19034.25	20424.61	1390.36	0.50
Salt River	218.05	10-yr W/P	55000.00	1107.08	1094.62	12.46	1103.73	1107.96	0.002210	7.52	7309.85	994.27	7.35	19397.49	20391.76	994.27	0.49
Salt River	218.05	50-yr W/P	140000.00	1113.19	1094.62	18.57	1108.27	1114.85	0.001939	10.34	13533.46	1033.07	13.10	19384.31	20417.38	1033.07	0.50
Salt River	218.05	100-yr W/P	169000.00	1114.95	1094.62	20.33	1109.43	1116.83	0.001872	11.00	15360.40	1040.40	14.76	19380.36	20420.77	1040.40	0.50
Salt River	218.05	500-yr W/P	243000.00	1119.08	1094.62	24.46	1112.05	1121.44	0.001734	12.34	19686.45	1057.76	18.61	19370.98	20428.74	1057.76	0.50
Salt River	218.05	SPF WO/P	289000.00	1121.44	1094.62	26.82	1113.56	1124.07	0.001667	13.02	22199.15	1067.82	20.79	19365.50	20433.32	1067.82	0.50
Salt River	217.95	10-yr W/P	55000.00	1106.10	1090.05	16.04	1101.95	1106.89	0.001903	7.15	7689.25	1008.25	7.63	19445.66	20453.91	1008.25	0.46
Salt River	217.95	50-yr W/P	140000.00	1112.36	1090.05	22.30	1106.92	1113.89	0.001702	9.94	14080.93	1033.36	13.63	19432.61	20465.98	1033.36	0.47
Salt River	217.95	100-yr W/P	169000.00	1114.15	1090.05	24.10	1108.06	1115.90	0.001656	10.60	15943.22	1040.29	15.33	19428.98	20469.26	1040.29	0.48
Salt River	217.95	500-yr W/P	243000.00	1118.35	1090.05	28.30	1110.69	1120.56	0.001556	11.95	20342.79	1057.38	19.24	19420.38	20477.76	1057.38	0.48
Salt River	217.95	SPF WO/P	289000.00	1120.74	1090.05	30.69	1112.17	1123.22	0.001504	12.63	22889.87	1066.21	21.47	19416.56	20482.77	1066.21	0.48
Salt River	217.86	10-yr W/P	55000.00	1105.09	1089.65	15.44	1100.06	1105.92	0.002052	7.31	7527.08	1010.96	7.45	19507.77	20518.72	1010.96	0.47
Salt River	217.86	50-yr W/P	140000.00	1111.53	1089.65	21.88	1106.05	1113.06	0.001693	9.92	14116.99	1034.67	13.64	19495.27	20529.94	1034.67	0.47
Salt River	217.86	100-yr W/P	169000.00	1113.36	1089.65	23.71	1107.21	1115.09	0.001636	10.55	16013.38	1040.98	15.38	19491.71	20532.69	1040.98	0.47
Salt River	217.86	500-yr W/P	243000.00	1117.61	1089.65	27.96	1109.82	1119.80	0.001527	11.87	20477.93	1058.60	19.34	19482.74	20541.34	1058.60	0.48
Salt River	217.86	SPF WO/P	289000.00	1120.04	1089.65	30.39	1111.34	1122.48	0.001475	12.53	23065.17	1069.81	21.56	19476.77	20546.57	1069.81	0.48
Salt River	217.76	10-yr W/P	55000.00	1103.17	1091.08	12.09	1100.17	1104.54	0.003328	9.41	5842.52	769.97	7.59	19577.76	20352.23	769.97	0.60
Salt River	217.76	50-yr W/P	140000.00	1108.94	1091.08	17.86	1105.74	1111.74	0.003347	13.44	10417.78	806.08	12.92	19555.69	20361.77	806.08	0.66
Salt River	217.76	100-yr W/P	169000.00	1110.55	1091.08	19.47	1107.10	1113.78	0.003329	14.42	11717.72	811.23	14.44	19552.05	20363.28	811.23	0.67
Salt River	217.76	500-yr W/P	243000.00	1114.30	1091.08	23.22	1110.18	1118.50	0.003245	16.43	14786.29	823.30	17.96	19543.77	20367.07	823.30	0.68
Salt River	217.76	SPF WO/P	289000.00	1116.46	1091.08	25.38	1111.92	1121.18	0.003186	17.44	16568.01	830.99	19.94	19538.16	20369.15	830.99	0.69
Salt River	217.67	10-yr W/P	55000.00	1101.80	1086.96	14.84	1097.82	1103.02	0.002665	8.85	6211.54	758.84	8.19	19580.54	20339.38	758.84	0.55
Salt River	217.67	50-yr W/P	140000.00	1107.37	1086.96	20.41	1103.86	1110.12	0.003123	13.31	10519.45	781.61	13.46	19562.46	20344.07	781.61	0.64
Salt River	217.67	100-yr W/P	169000.00	1108.95	1086.96	21.99	1105.22	1112.16	0.003172	14.38	11752.39	785.29	14.97	19559.27	20344.57	785.29	0.66
Salt River	217.67	500-yr W/P	243000.00	1112.60	1086.96	25.64	1108.37	1116.88	0.003220	16.60	14639.97	794.33	18.43	19551.40	20345.73	794.33	0.68
Salt River	217.67	SPF WO/P	289000.00	1114.70	1086.96	27.74	1110.16	1119.57	0.003213	17.72	16312.81	799.61	20.40	19546.79	20346.40	799.61	0.69

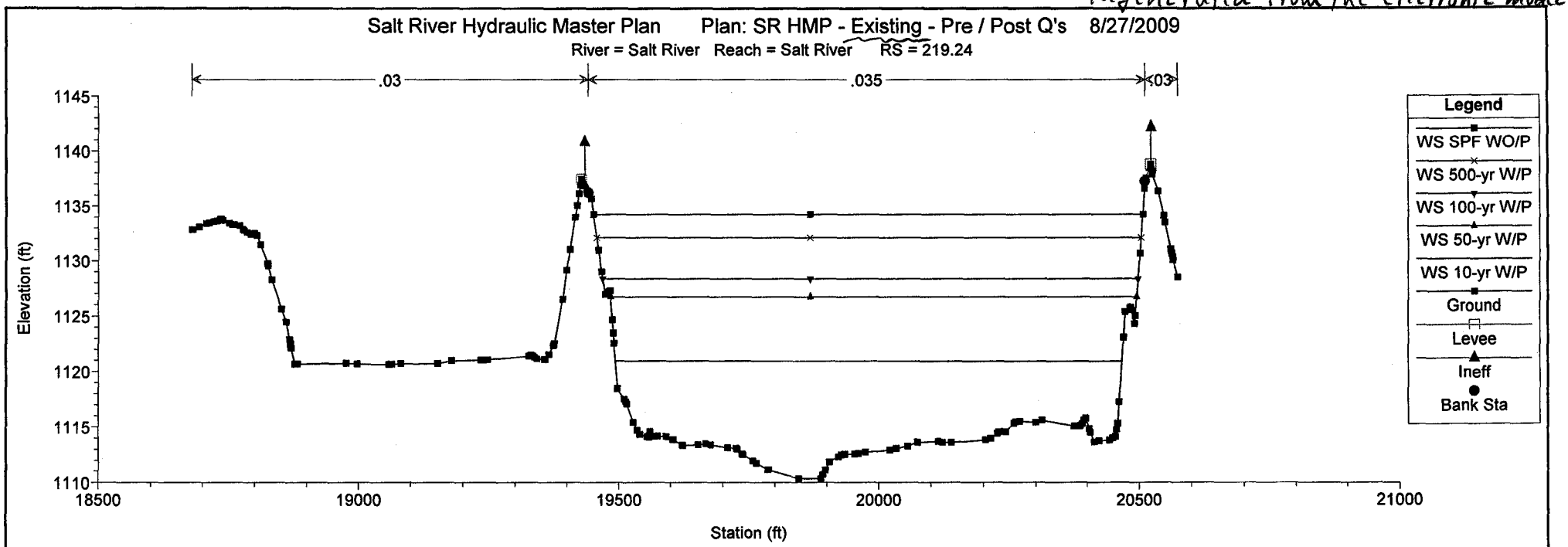
HEC-RAS Plan: PrePost Q's River: Salt River Reach: Salt River (Continued)

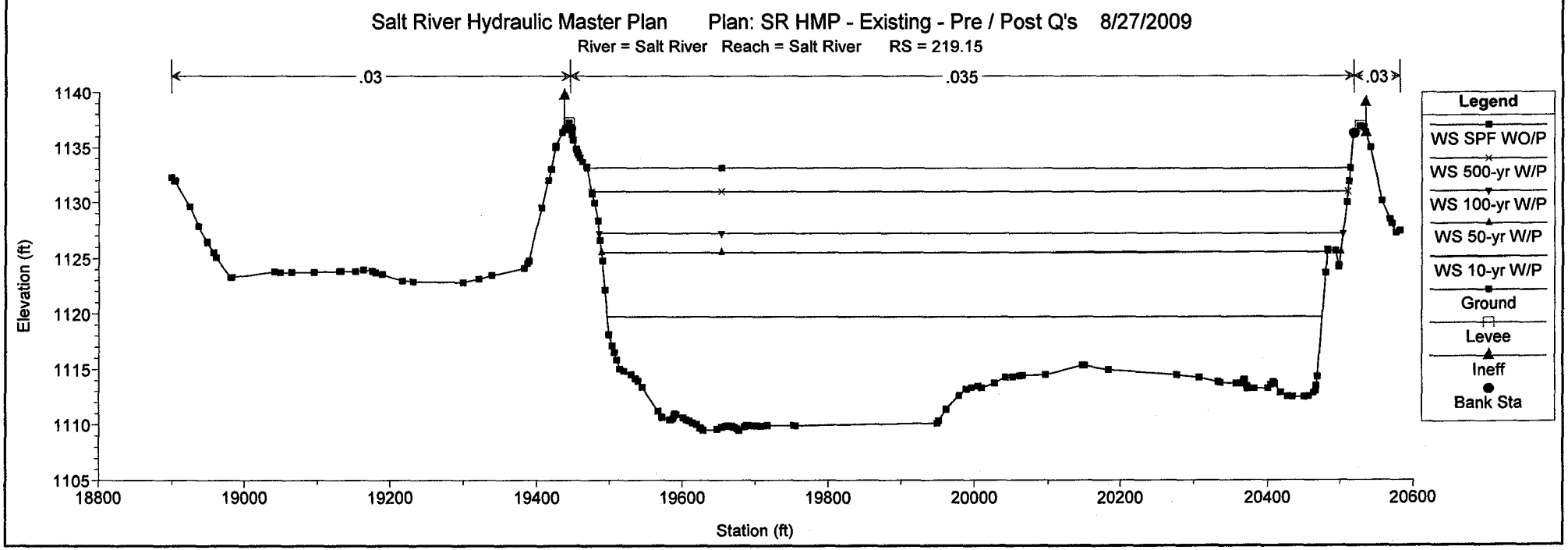
Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Salt River	217.57	10-yr W/P	55000.00	1100.69	1088.30	12.39	1097.28	1101.69	0.002306	8.01	6863.62	872.39	7.87	19535.17	20431.18	872.39	0.50
Salt River	217.57	50-yr W/P	140000.00	1106.37	1088.30	18.07	1102.16	1108.50	0.002524	11.72	11943.30	912.38	13.09	19522.87	20435.25	912.38	0.57
Salt River	217.57	100-yr W/P	169000.00	1108.06	1088.30	19.76	1103.42	1110.49	0.002474	12.53	13486.85	916.69	14.71	19519.30	20435.99	916.69	0.58
Salt River	217.57	500-yr W/P	243000.00	1112.01	1088.30	23.71	1106.32	1115.13	0.002350	14.19	17126.71	925.95	18.50	19511.03	20436.97	925.95	0.58
Salt River	217.57	SPF WO/P	289000.00	1114.28	1088.30	25.98	1107.92	1117.79	0.002279	15.02	19239.45	931.11	20.66	19506.43	20437.54	931.11	0.58
Salt River	217.48	10-yr W/P	55000.00	1099.74	1089.15	10.59	1096.56	1100.58	0.002105	7.36	7472.99	1012.27	7.38	19452.87	20465.13	1012.27	0.48
Salt River	217.48	50-yr W/P	140000.00	1105.63	1089.15	16.48	1100.78	1107.30	0.001964	10.37	13502.96	1035.72	13.04	19439.71	20475.42	1035.72	0.51
Salt River	217.48	100-yr W/P	169000.00	1107.41	1089.15	18.26	1101.92	1109.29	0.001881	11.00	15360.67	1042.79	14.73	19435.83	20478.62	1042.79	0.51
Salt River	217.48	500-yr W/P	243000.00	1111.59	1089.15	22.44	1104.52	1113.94	0.001725	12.30	19749.63	1060.91	18.62	19427.09	20488.00	1060.91	0.50
Salt River	217.48	SPF WO/P	289000.00	1113.98	1089.15	24.83	1106.03	1116.59	0.001648	12.96	22303.91	1070.05	20.84	19422.47	20492.52	1070.05	0.50
Salt River	217.39	10-yr W/P	55000.00	1098.36	1087.28	11.08	1096.00	1099.36	0.002765	8.01	6863.27	1003.62	6.84	19477.42	20481.04	1003.62	0.54
Salt River	217.39	50-yr W/P	140000.00	1104.46	1087.28	17.18	1100.01	1106.25	0.002173	10.71	13066.79	1029.09	12.70	19465.08	20494.17	1029.09	0.53
Salt River	217.39	100-yr W/P	169000.00	1106.33	1087.28	19.05	1101.13	1108.30	0.002023	11.27	14996.04	1036.72	14.46	19461.04	20497.76	1036.72	0.52
Salt River	217.39	500-yr W/P	243000.00	1110.63	1087.28	23.35	1103.76	1113.05	0.001788	12.46	19494.78	1054.34	18.49	19451.80	20506.14	1054.34	0.51
Salt River	217.39	SPF WO/P	289000.00	1113.09	1087.28	25.81	1105.27	1115.75	0.001689	13.08	22094.86	1064.10	20.76	19446.99	20511.09	1064.10	0.51
Salt River	217.29	10-yr W/P	55000.00	1096.99	1082.79	14.20	1094.50	1098.01	0.002717	8.08	6808.42	967.47	7.04	19524.09	20491.56	967.47	0.54
Salt River	217.29	50-yr W/P	140000.00	1103.44	1082.79	20.65	1098.59	1105.20	0.002054	10.67	13122.87	993.13	13.21	19511.75	20504.88	993.13	0.52
Salt River	217.29	100-yr W/P	169000.00	1105.38	1082.79	22.58	1099.81	1107.33	0.001914	11.22	15056.44	1000.93	15.04	19508.03	20508.96	1000.93	0.51
Salt River	217.29	500-yr W/P	243000.00	1109.77	1082.79	26.98	1102.52	1112.19	0.001717	12.46	19497.12	1019.06	19.13	19499.16	20518.21	1019.06	0.50
Salt River	217.29	SPF WO/P	289000.00	1112.26	1082.79	29.47	1104.05	1114.93	0.001637	13.11	22041.48	1029.42	21.41	19494.02	20523.44	1029.42	0.50
Salt River	217.20	10-yr W/P	55000.00	1095.53	1082.28	13.25	1093.07	1096.60	0.002777	8.30	6624.92	919.37	7.21	19577.24	20496.61	919.37	0.55
Salt River	217.20	50-yr W/P	140000.00	1102.37	1082.28	20.09	1097.32	1104.17	0.001980	10.76	13012.48	946.88	13.74	19563.60	20510.47	946.88	0.51
Salt River	217.20	100-yr W/P	169000.00	1104.37	1082.28	22.09	1098.52	1106.36	0.001855	11.33	14911.94	955.03	15.61	19559.48	20514.50	955.03	0.51
Salt River	217.20	500-yr W/P	243000.00	1108.82	1082.28	26.54	1101.31	1111.30	0.001698	12.66	19198.54	972.89	19.73	19550.17	20523.06	972.89	0.50
Salt River	217.20	SPF WO/P	289000.00	1111.31	1082.28	29.03	1102.90	1114.08	0.001637	13.36	21634.94	982.90	22.01	19544.95	20527.85	982.90	0.50
Salt River	217.10	10-yr W/P	55000.00	1094.60	1082.61	11.99	1090.89	1095.44	0.001736	7.33	7504.55	877.96	8.55	19622.14	20500.09	877.96	0.44
Salt River	217.10	50-yr W/P	140000.00	1101.63	1082.61	19.02	1095.33	1103.23	0.001558	10.16	13775.40	907.42	15.18	19607.16	20514.57	907.42	0.46
Salt River	217.10	100-yr W/P	169000.00	1103.65	1082.61	21.04	1096.58	1105.47	0.001513	10.82	15622.15	916.00	17.05	19602.78	20518.78	916.00	0.46
Salt River	217.10	500-yr W/P	243000.00	1108.12	1082.61	25.51	1099.48	1110.47	0.001474	12.30	19754.91	935.00	21.13	19593.04	20528.04	935.00	0.47
Salt River	217.10	SPF WO/P	289000.00	1110.61	1082.61	28.00	1101.10	1113.27	0.001458	13.08	22099.67	945.49	23.37	19587.73	20533.22	945.49	0.48
Salt River	217.01	10-yr W/P	55000.00	1093.67	1080.76	12.91	1090.27	1094.56	0.001903	7.57	7260.89	872.29	8.32	19628.17	20500.46	872.29	0.46
Salt River	217.01	50-yr W/P	140000.00	1100.83	1080.76	20.06	1094.56	1102.47	0.001593	10.29	13608.45	900.91	15.11	19613.61	20514.52	900.91	0.47
Salt River	217.01	100-yr W/P	169000.00	1102.88	1080.76	22.12	1095.88	1104.73	0.001536	10.93	15466.75	909.11	17.01	19609.39	20518.50	909.11	0.47
Salt River	217.01	500-yr W/P	243000.00	1107.36	1080.76	26.60	1098.81	1109.75	0.001489	12.41	19579.15	926.90	21.12	19600.30	20527.20	926.90	0.48
Salt River	217.01	SPF WO/P	289000.00	1109.86	1080.76	29.09	1100.44	1112.56	0.001471	13.19	21905.85	936.65	23.39	19595.40	20532.05	936.65	0.48
Salt River	216.91	10-yr W/P	55000.00	1092.85	1080.48	12.37	1088.63	1093.65	0.001585	7.18	7657.02	868.48	8.82	19621.43	20489.92	868.48	0.43
Salt River	216.91	50-yr W/P	140000.00	1100.15	1080.48	19.67	1093.37	1101.68	0.001408	9.92	14108.47	899.03	15.69	19607.11	20506.13	899.03	0.44
Salt River	216.91	100-yr W/P	169000.00	1102.23	1080.48	21.75	1094.63	1103.96	0.001371	10.57	15985.33	906.73	17.63	19603.19	20509.92	906.73	0.44
Salt River	216.91	500-yr W/P	243000.00	1106.72	1080.48	26.24	1097.56	1108.99	0.001360	12.09	20104.27	925.65	21.72	19592.72	20518.36	925.65	0.46
Salt River	216.91	SPF WO/P	289000.00	1109.23	1080.48	28.75	1099.21	1111.81	0.001355	12.88	22435.53	935.28	23.99	19588.01	20523.29	935.28	0.46
Salt River	216.82	10-yr W/P	55000.00	1092.22	1080.42	11.80	1087.56	1092.92	0.001234	6.71	8190.98	852.69	9.61	19629.88	20482.57	852.69	0.38
Salt River	216.82	50-yr W/P	140000.00	1099.55	1080.42	19.13	1092.06	1100.98	0.001243	9.61	14566.58	887.33	16.42	19610.33	20497.66	887.33	0.42
Salt River	216.82	100-yr W/P	169000.00	1101.64	1080.42	21.22	1093.32	1103.28	0.001231	10.29	16429.69	896.80	18.32	19604.46	20501.27	896.80	0.42
Salt River	216.82	500-yr W/P	243000.00	1106.13	1080.42	25.70	1096.26	1108.31	0.001258	11.85	20502.22	918.06	22.33	19591.96	20510.02	918.06	0.44
Salt River	216.82	SPF WO/P	289000.00	1108.63	1080.42	28.21	1097.98	1111.12	0.001269	12.67	22813.26	929.32	24.55	19585.99	20515.31	929.32	0.45
Salt River	216.72	10-yr W/P	55000.00	1091.70	1077.60	14.10	1086.59	1092.33	0.001058	6.40	8590.83	855.94	10.04	19619.33	20475.27	855.94	0.36
Salt River	216.72	50-yr W/P	140000.00	1099.01	1077.60	21.41	1091.07	1100.37	0.001139	9.35	14976.50	890.65	16.82	19599.09	20489.74	890.65	0.40
Salt River	216.72	100-yr W/P	169000.00	1101.10	1077.60	23.50	1092.33	1102.67	0.001139	10.03	16852.70	901.32	18.70	19592.35	20493.67	901.32	0.41
Salt River	216.72	500-yr W/P	243000.00	1105.58	1077.60	27.98	1095.32	1107.67	0.001181	11.61	20936.37	922.33	22.70	19579.74	20502.07	922.33	0.43
Salt River	216.72	SPF WO/P	289000.00	1108.08	1077.60	30.48	1096.99	1110.48	0.001197	12.43	23253.45	933.24	24.92	19574.25	20507.48	933.24	0.44

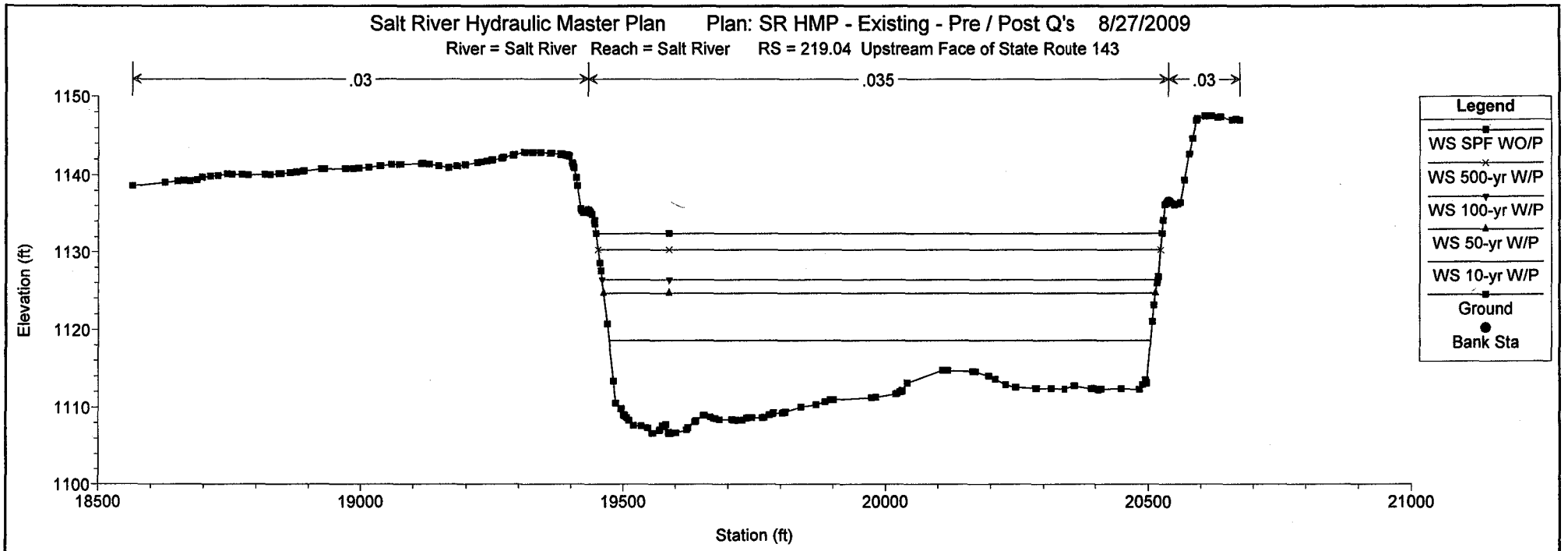
HEC-RAS Plan: PrePost Q's River: Salt River Reach: Salt River (Continued)

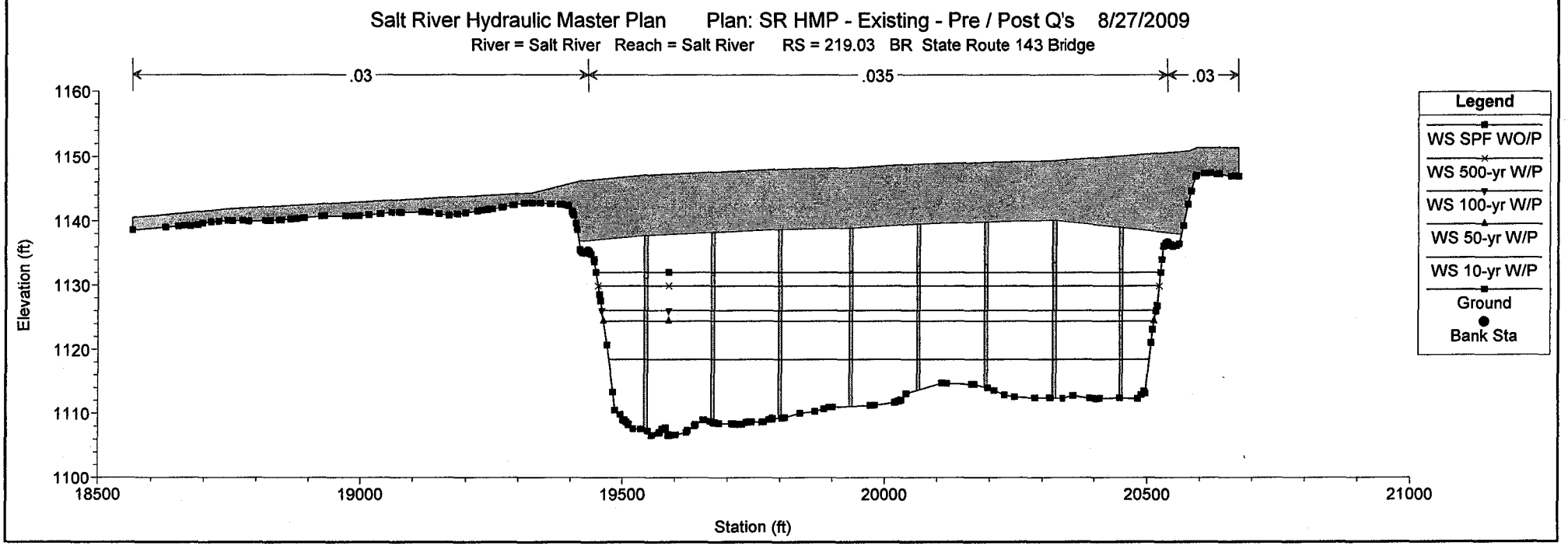
Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Salt River	216.63	10-yr W/P	55000.00	1090.86	1076.61	14.25	1086.81	1091.67	0.001568	7.23	7605.36	847.81	8.97	19617.33	20465.14	847.81	0.43
Salt River	216.63	50-yr W/P	140000.00	1098.12	1076.61	21.51	1091.35	1099.70	0.001444	10.07	13903.03	884.28	15.72	19597.48	20481.76	884.28	0.45
Salt River	216.63	100-yr W/P	169000.00	1100.22	1076.61	23.61	1092.65	1102.00	0.001404	10.72	15766.71	893.04	17.66	19592.83	20485.88	893.04	0.45
Salt River	216.63	500-yr W/P	243000.00	1104.64	1076.61	28.03	1095.64	1106.99	0.001412	12.30	19761.01	913.22	21.64	19582.63	20495.85	913.22	0.47
Salt River	216.63	SPF WO/P	289000.00	1107.12	1076.61	30.51	1097.32	1109.79	0.001416	13.11	22036.52	925.78	23.80	19576.09	20501.87	925.78	0.47
Salt River	216.53	10-yr W/P	55000.00	1090.19	1077.04	13.15	1085.63	1090.91	0.001307	6.83	8057.11	853.35	9.44	19626.67	20480.02	853.35	0.39
Salt River	216.53	50-yr W/P	140000.00	1097.51	1077.04	20.47	1090.14	1098.96	0.001296	9.67	14476.02	901.73	16.05	19605.37	20507.11	901.73	0.43
Salt River	216.53	100-yr W/P	169000.00	1099.62	1077.04	22.58	1091.43	1101.27	0.001332	10.30	16412.30	986.39	16.64	19531.11	20517.50	986.39	0.44
Salt River	216.53	500-yr W/P	243000.00	1104.13	1077.04	27.09	1094.39	1106.24	0.001280	11.68	20973.90	1026.98	20.42	19522.69	20549.66	1026.98	0.44
Salt River	216.53	SPF WO/P	289000.00	1106.65	1077.04	29.61	1096.08	1109.02	0.001242	12.39	23582.18	1036.29	22.76	19518.01	20554.29	1036.29	0.45
Salt River	216.505		Bridge														
Salt River	216.49	10-yr W/P	55000.00	1089.75	1075.99	13.76		1090.48	0.001311	6.82	8070.36	860.09	9.38	19631.18	20491.28	860.09	0.39
Salt River	216.49	50-yr W/P	140000.00	1096.97	1075.99	20.98		1098.43	0.001308	9.70	14426.24	901.28	16.01	19610.38	20511.66	901.28	0.43
Salt River	216.49	100-yr W/P	169000.00	1099.04	1075.99	23.05		1100.71	0.001341	10.35	16338.72	979.60	16.68	19544.38	20542.27	979.60	0.44
Salt River	216.49	500-yr W/P	243000.00	1103.51	1075.99	27.52		1105.65	0.001285	11.76	20828.08	1014.41	20.53	19536.49	20550.90	1014.41	0.45
Salt River	216.49	SPF WO/P	289000.00	1106.02	1075.99	30.03		1108.42	0.001252	12.48	23387.90	1023.68	22.85	19531.63	20555.31	1023.68	0.45
Salt River	216.42	10-yr W/P	55000.00	1089.40	1075.34	14.06	1084.51	1090.05	0.001127	6.44	8537.77	883.71	9.66	19567.36	20451.07	883.71	0.37
Salt River	216.42	50-yr W/P	140000.00	1096.65	1075.34	21.31	1088.95	1097.98	0.001170	9.27	15107.59	930.64	16.23	19544.55	20475.19	930.64	0.41
Salt River	216.42	100-yr W/P	169000.00	1098.72	1075.34	23.38	1090.21	1100.25	0.001178	9.91	17059.41	982.01	17.37	19500.52	20482.53	982.01	0.41
Salt River	216.42	500-yr W/P	243000.00	1103.28	1075.34	27.94	1093.12	1105.17	0.001123	11.11	22537.92	1249.24	18.04	19254.03	20503.27	1249.24	0.42
Salt River	216.42	SPF WO/P	289000.00	1105.88	1075.34	30.54	1094.77	1107.93	0.001074	11.65	25813.81	1298.24	19.88	19212.38	20510.63	1298.24	0.42
Salt River	216.34	10-yr W/P	55000.00	1088.99	1073.65	15.34	1083.93	1089.55	0.001001	6.01	9146.84	960.18	9.53	19440.42	20400.60	960.18	0.34
Salt River	216.34	50-yr W/P	140000.00	1096.31	1073.65	22.66	1088.15	1097.45	0.001001	8.57	16344.10	1007.09	16.23	19416.15	20423.24	1007.09	0.37
Salt River	216.34	100-yr W/P	169000.00	1098.40	1073.65	24.75	1089.36	1099.70	0.000989	9.15	18467.30	1020.45	18.10	19409.40	20429.85	1020.45	0.38
Salt River	216.34	500-yr W/P	243000.00	1102.94	1073.65	29.29	1092.12	1104.65	0.001000	10.49	23163.20	1050.82	22.04	19394.65	20445.46	1050.82	0.39
Salt River	216.34	SPF WO/P	289000.00	1105.50	1073.65	31.85	1093.67	1107.44	0.001001	11.17	25881.35	1070.42	24.18	19385.00	20455.42	1070.42	0.40

Regenerated from the electronic model






Salt River Hydraulic Master Plan Plan: SR HMP - Existing - Pre / Post Q's 8/27/2009
River = Salt River Reach = Salt River RS = 219.04 Upstream Face of State Route 143
.03
.035
.03
Elevation (ft)
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Bank Sta


Salt River Hydraulic Master Plan Plan: SR HMP - Existing - Pre / Post Q's 8/27/2009
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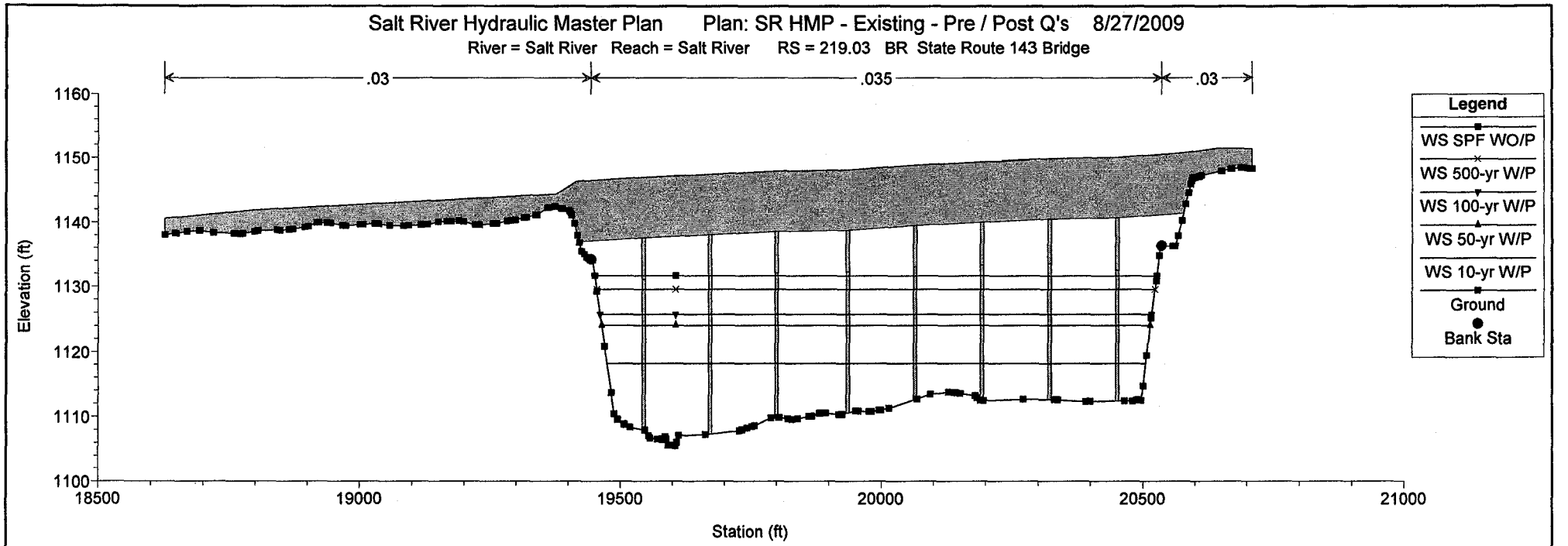
.03
.035
.03
Elevation (ft)
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Bank Sta


Salt River Hydraulic Master Plan Plan: SR HMP - Existing - Pre / Post Q's 8/27/2009
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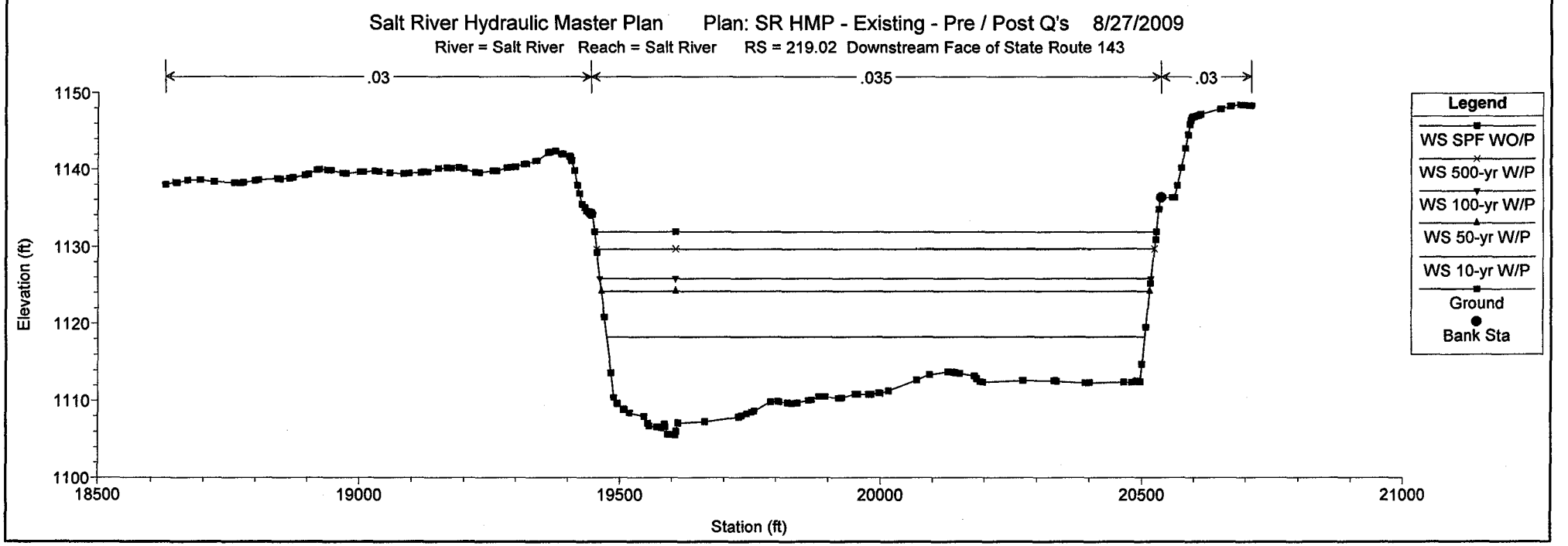
.03
.035
.03
Elevation (ft)
1160
1150
1140
1130
1120
1110
1100
18500
19000
19500
20000
20500
21000
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Bank Sta


Salt River Hydraulic Master Plan Plan: SR HMP - Existing - Pre / Post Q's 8/27/2009
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.035
.03
Elevation (ft)
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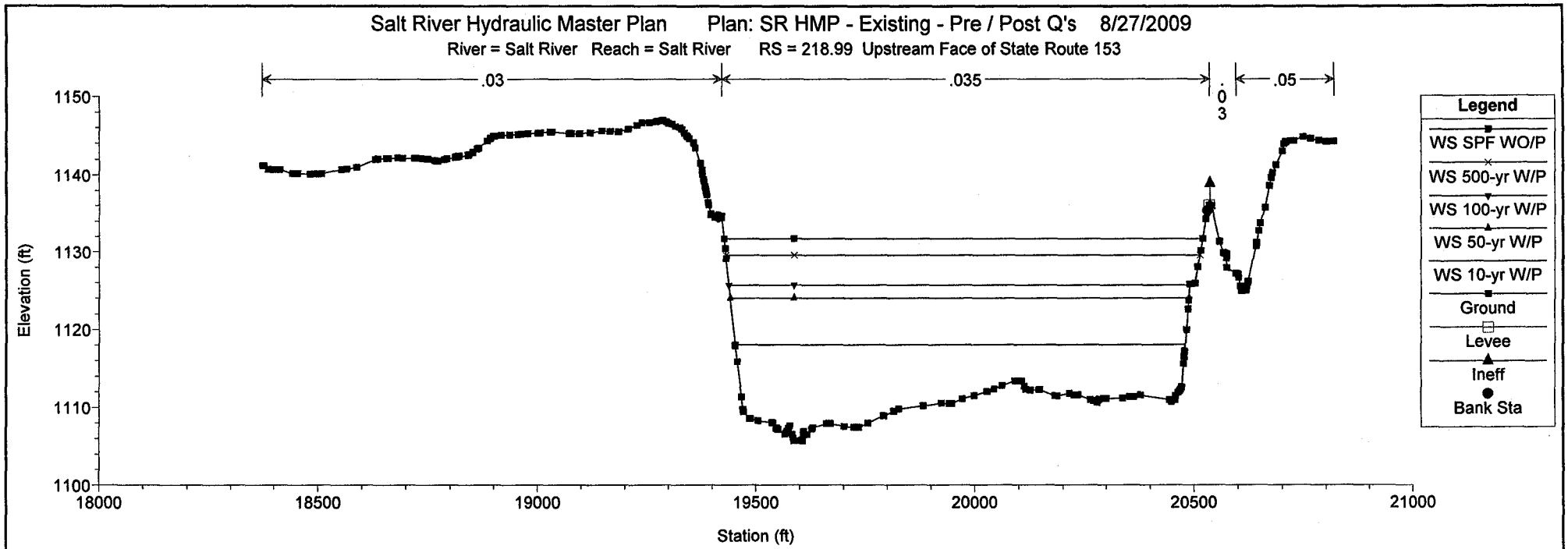
1130
1120
1110
1100
18500
19000
19500
20000
20500
21000
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Bank Sta


Salt River Hydraulic Master Plan Plan: SR HMP - Existing - Pre / Post Q's 8/27/2009
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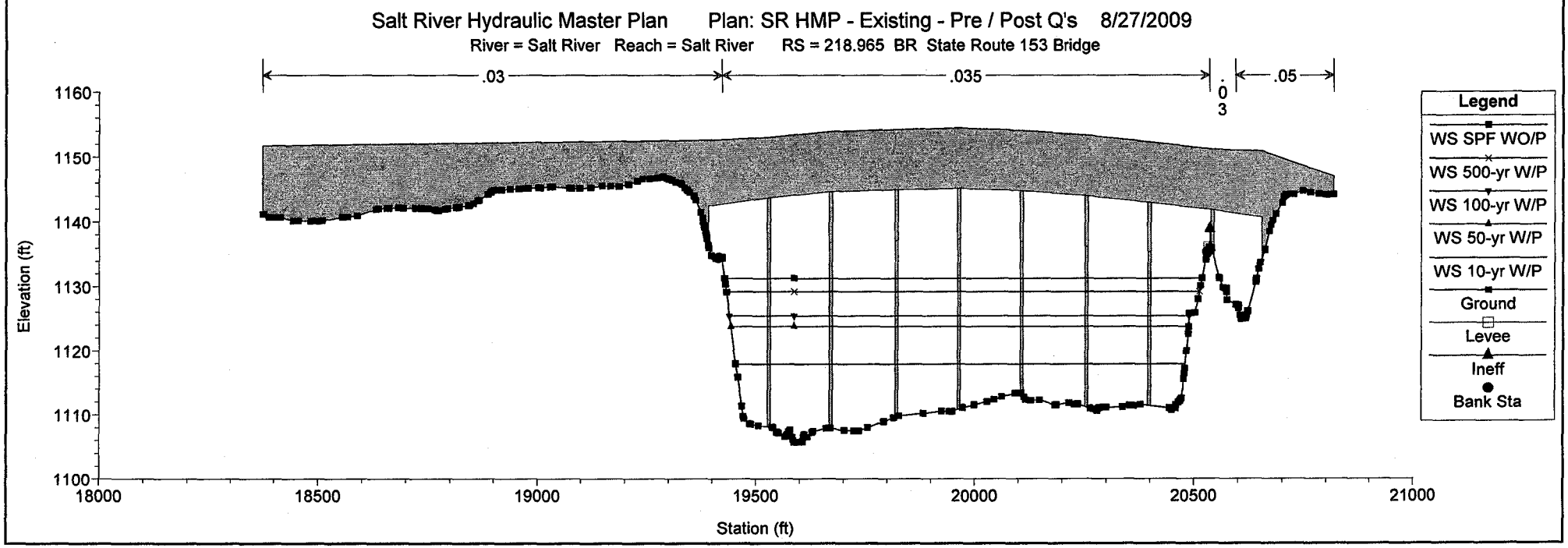
.03
.035
.03
.05
Elevation (ft)
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Levee
Ineff
Bank Sta


Salt River Hydraulic Master Plan Plan: SR HMP - Existing - Pre / Post Q's 8/27/2009
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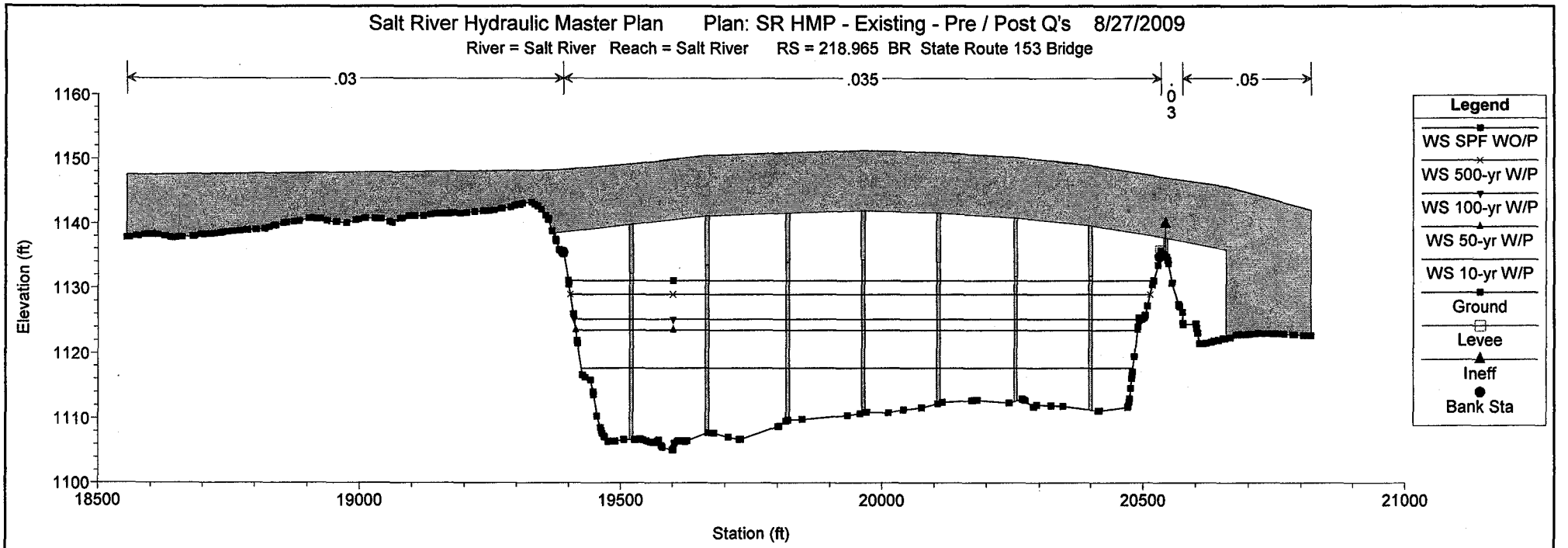
.03
.035
.03
.05
Elevation (ft)
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Levee
Ineff
Bank Sta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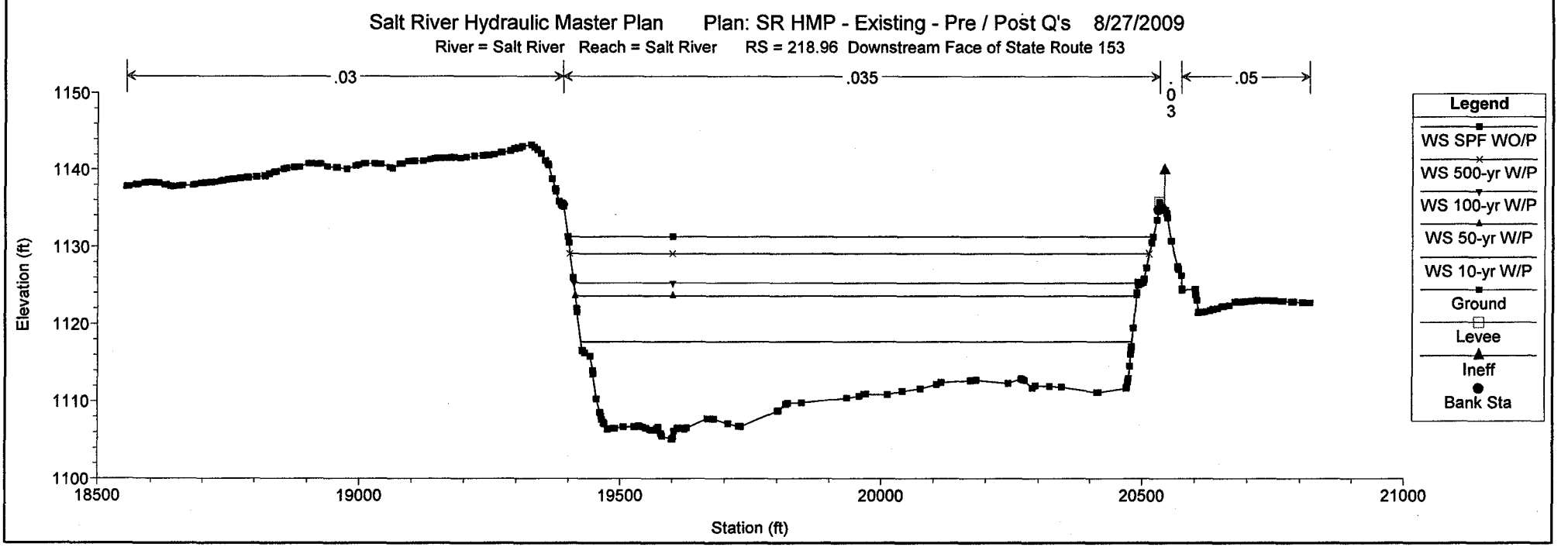
.03
.035
.03
.05
Elevation (ft)
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Levee
Ineff
Bank Sta


Salt River Hydraulic Master Plan Plan: SR HMP - Existing - Pre / Post Q's 8/27/2009
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.03
.035
.03
.05
Elevation (ft)
Station (ft)
Legend
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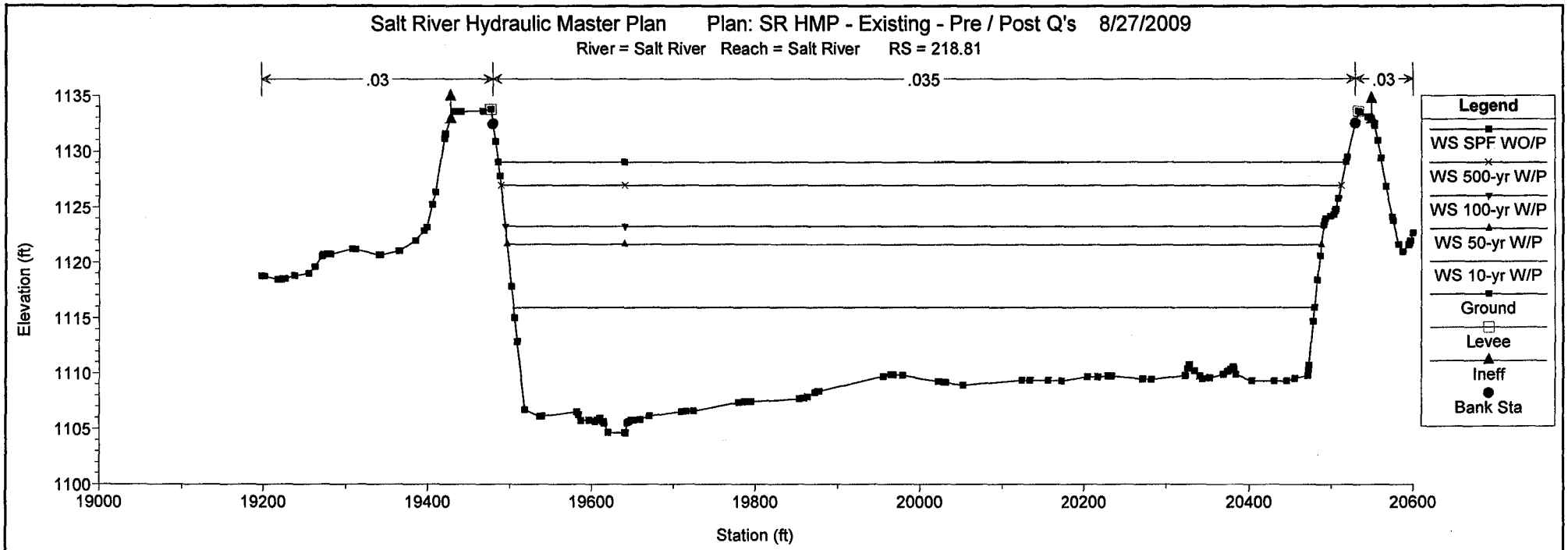
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Levee
Ineff
Bank Sta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1120
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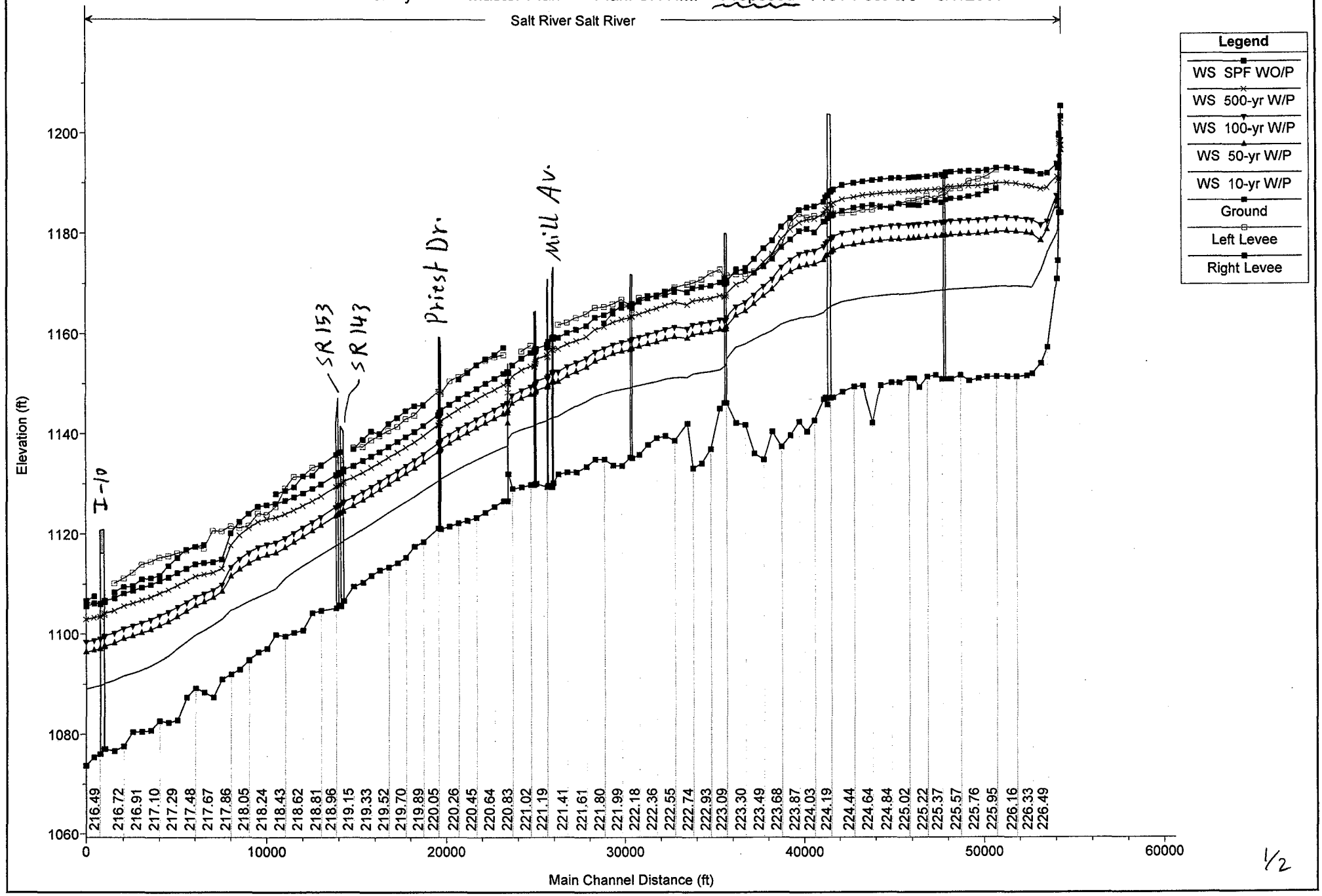
1105
1100
19000
19200
19400
19600
19800
20000
20200
20400
20600
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Levee
Ineff
Bank Sta

3. HEC-RAS Proposed Conditions

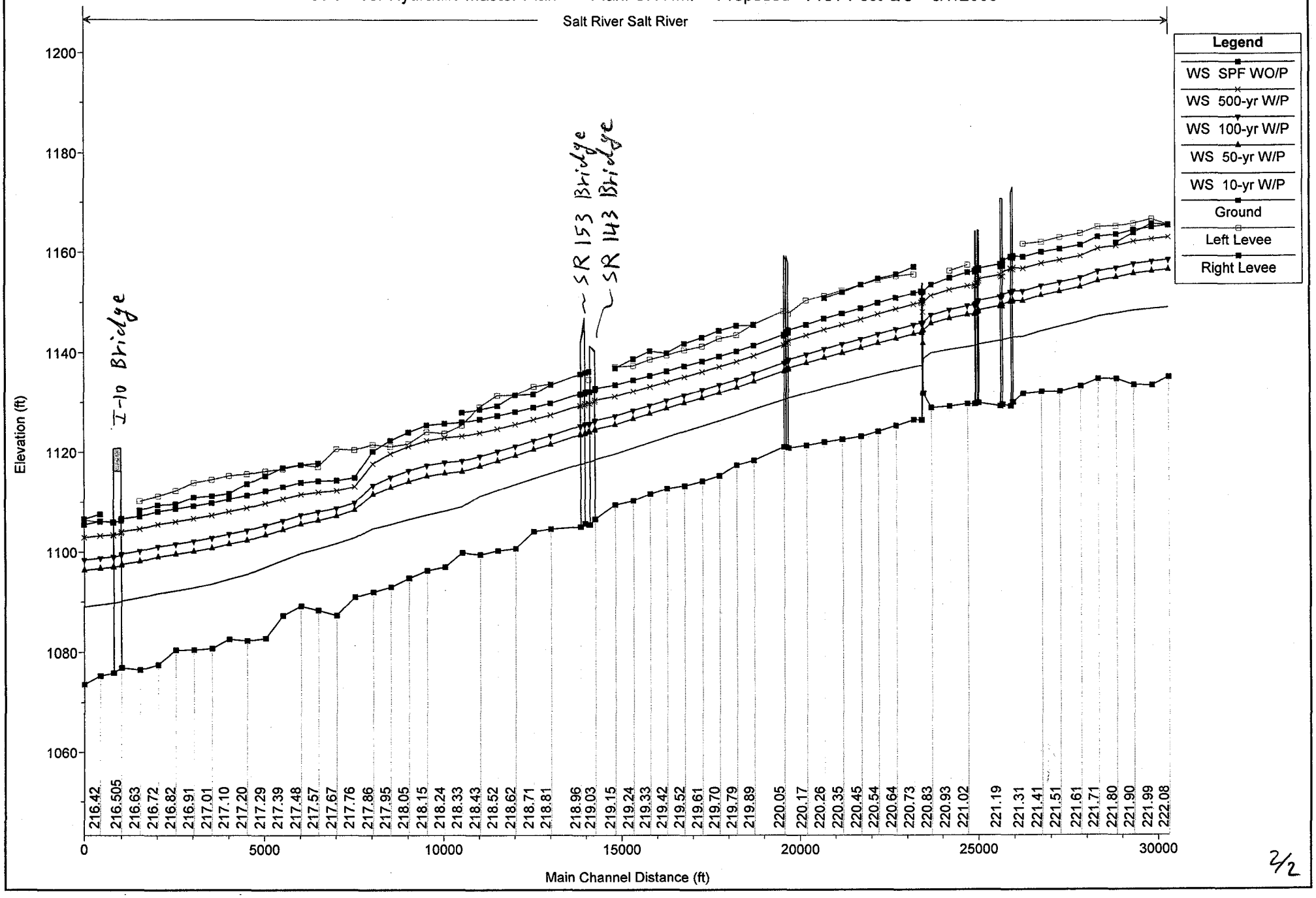
Regenerated from the electronic model

Salt River Hydraulic Master Plan Plan: SR HMP - Proposed - Pre / Post Q's 8/7/2009



1/2

Salt River Hydraulic Master Plan Plan: SR HMP - Proposed - Pre / Post Q's 8/7/2009



2/2

HMP - Proposed Conditions

Regenerated from the electronic model

HEC-RAS Plan: Prop PrePost River: Salt River Reach: Salt River (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Salt River	222.10	SPF WO/P	292000.00	1166.03	1135.13	30.90	1152.93	1168.00	0.000866	11.35	26983.24	2331.47	21.47	18783.10	21621.24	2331.47	0.38
Salt River	222.09		Bridge														
Salt River	222.08	10-yr W/P	58000.00	1149.23	1135.30	13.93	1143.20	1149.77	0.000799	5.91	9806.16	891.20	11.00	19552.89	20444.09	891.20	0.31
Salt River	222.08	50-yr W/P	145000.00	1156.79	1135.30	21.49	1147.58	1157.96	0.000875	8.71	16849.88	998.80	16.87	19487.66	20486.46	998.80	0.36
Salt River	222.08	100-yr W/P	172000.00	1158.69	1135.30	23.39	1148.73	1160.04	0.000883	9.34	18768.68	1016.24	18.47	19476.79	20493.04	1016.24	0.37
Salt River	222.08	500-yr W/P	246000.00	1163.23	1135.30	27.93	1151.59	1165.04	0.000909	10.85	23465.00	1049.92	22.35	19458.03	20507.95	1049.92	0.38
Salt River	222.08	SPF WO/P	292000.00	1165.62	1135.30	30.32	1153.21	1167.71	0.000937	11.70	25987.02	1065.82	24.38	19449.39	20515.21	1065.82	0.39
Salt River	221.99	10-yr W/P	58000.00	1148.92	1133.64	15.28	1142.03	1149.42	0.000671	5.65	10258.45	876.62	11.70	19512.11	20388.72	876.62	0.29
Salt River	221.99	50-yr W/P	145000.00	1156.44	1133.64	22.80	1146.66	1157.56	0.000800	8.54	17287.26	1001.30	17.26	19421.42	20422.72	1001.30	0.34
Salt River	221.99	100-yr W/P	172000.00	1158.34	1133.64	24.70	1147.82	1159.64	0.000813	9.17	19203.83	1013.70	18.94	19414.49	20428.19	1013.70	0.35
Salt River	221.99	500-yr W/P	246000.00	1162.87	1133.64	29.23	1150.74	1164.61	0.000851	10.68	23865.57	1044.56	22.85	19396.93	20441.49	1044.56	0.37
Salt River	221.99	SPF WO/P	292000.00	1165.25	1133.64	31.61	1152.41	1167.27	0.000882	11.54	26367.67	1060.58	24.86	19389.43	20450.00	1060.58	0.38
Salt River	221.90	10-yr W/P	58000.00	1148.59	1133.69	14.90	1141.63	1149.08	0.000648	5.65	10259.90	853.23	12.02	19470.96	20324.19	853.23	0.29
Salt River	221.90	50-yr W/P	145000.00	1155.98	1133.69	22.29	1146.16	1157.15	0.000814	8.68	17023.34	976.18	17.44	19392.61	20368.78	976.18	0.35
Salt River	221.90	100-yr W/P	172000.00	1157.87	1133.69	24.18	1147.35	1159.21	0.000833	9.35	18872.32	989.71	19.07	19384.53	20374.23	989.71	0.36
Salt River	221.90	500-yr W/P	246000.00	1162.34	1133.69	28.65	1150.33	1164.16	0.000883	10.93	23373.29	1024.08	22.82	19363.83	20387.91	1024.08	0.38
Salt River	221.90	SPF WO/P	292000.00	1164.67	1133.69	30.98	1152.03	1166.80	0.000924	11.84	25791.77	1993.79	24.26	19352.17	21345.96	1993.79	0.39
Salt River	221.80	10-yr W/P	58000.00	1148.04	1134.88	13.16	1142.46	1148.68	0.000972	6.44	9001.20	833.87	10.79	19485.24	20319.12	833.87	0.35
Salt River	221.80	50-yr W/P	145000.00	1155.22	1134.88	20.34	1147.04	1156.66	0.001114	9.62	15251.80	928.39	16.43	19431.05	20359.44	928.39	0.40
Salt River	221.80	100-yr W/P	172000.00	1157.06	1134.88	22.18	1148.22	1158.71	0.001124	10.31	16975.74	944.21	17.98	19420.48	20364.68	944.21	0.41
Salt River	221.80	500-yr W/P	246000.00	1161.43	1134.88	26.55	1151.14	1163.63	0.001163	11.98	21188.34	991.79	21.36	19381.48	20373.27	991.79	0.43
Salt River	221.80	SPF WO/P	292000.00	1163.79	1134.88	28.91	1152.99	1166.26	0.001163	12.76	24944.24	1795.21	19.84	19370.22	21165.43	1795.21	0.44
Salt River	221.71	10-yr W/P	58000.00	1147.40	1134.89	12.51	1142.42	1148.13	0.001188	6.90	8757.39	907.42	9.65	19548.70	20547.20	907.42	0.38
Salt River	221.71	50-yr W/P	145000.00	1154.50	1134.89	19.61	1147.07	1156.04	0.001276	10.06	15768.44	1167.38	13.51	19466.20	20633.58	1167.38	0.43
Salt River	221.71	100-yr W/P	172000.00	1156.39	1134.89	21.50	1148.32	1158.09	0.001248	10.65	18045.69	1283.74	14.61	19457.93	20741.67	1283.74	0.43
Salt River	221.71	500-yr W/P	246000.00	1160.89	1134.89	26.00	1151.27	1163.00	0.001194	11.99	23644.27	1505.96	18.87	19439.79	20945.74	1505.96	0.44
Salt River	221.71	SPF WO/P	292000.00	1163.26	1134.89	28.36	1153.35	1165.63	0.001193	12.77	26623.71	1527.03	21.05	19428.44	20955.47	1527.03	0.44
Salt River	221.61	10-yr W/P	58000.00	1146.42	1133.43	12.99	1142.66	1147.39	0.001812	7.91	7332.62	796.04	9.21	19568.75	20364.79	796.04	0.46
Salt River	221.61	50-yr W/P	145000.00	1153.30	1133.43	19.87	1147.34	1155.26	0.001777	11.25	13031.96	904.00	14.42	19504.04	20408.04	904.00	0.50
Salt River	221.61	100-yr W/P	172000.00	1155.13	1133.43	21.70	1148.56	1157.33	0.001728	11.93	14710.17	926.60	15.88	19488.13	20414.72	926.60	0.50
Salt River	221.61	500-yr W/P	246000.00	1159.40	1133.43	25.97	1151.66	1162.23	0.001690	13.61	18756.75	982.38	19.09	19463.63	20675.44	982.38	0.51
Salt River	221.61	SPF WO/P	292000.00	1161.60	1133.43	28.17	1153.52	1164.84	0.001710	14.59	21220.77	1205.90	17.60	19453.22	20721.47	1205.90	0.52
Salt River	221.51	10-yr W/P	58000.00	1145.46	1132.35	13.11	1141.51	1146.37	0.001685	7.69	7545.16	809.77	9.32	19586.88	20396.65	809.77	0.44
Salt River	221.51	50-yr W/P	145000.00	1152.39	1132.35	20.04	1146.12	1154.25	0.001657	10.95	13376.84	907.50	14.74	19539.96	20447.46	907.50	0.48
Salt River	221.51	100-yr W/P	172000.00	1154.27	1132.35	21.92	1147.35	1156.34	0.001600	11.58	15101.40	924.64	16.33	19531.36	20456.00	924.64	0.48
Salt River	221.51	500-yr W/P	246000.00	1158.59	1132.35	26.24	1150.42	1161.25	0.001563	13.21	19200.77	983.74	19.52	19487.20	20470.94	983.74	0.49
Salt River	221.51	SPF WO/P	292000.00	1160.80	1132.35	28.45	1152.28	1163.85	0.001584	14.16	21400.90	1006.23	21.27	19472.40	20478.63	1006.23	0.50
Salt River	221.41	10-yr W/P	58000.00	1144.52	1132.32	12.20	1140.67	1145.48	0.001840	7.85	7391.91	824.98	8.96	19586.52	20411.50	824.98	0.46
Salt River	221.41	50-yr W/P	145000.00	1151.57	1132.32	19.25	1145.46	1153.38	0.001715	10.80	13492.58	935.16	14.43	19525.21	20460.37	935.16	0.49
Salt River	221.41	100-yr W/P	172000.00	1153.52	1132.32	21.20	1146.66	1155.50	0.001609	11.33	15342.35	965.59	15.89	19512.74	20478.34	965.59	0.48
Salt River	221.41	500-yr W/P	246000.00	1157.93	1132.32	25.61	1149.73	1160.43	0.001503	12.75	19789.59	1074.54	18.42	19491.62	20566.16	1074.54	0.48
Salt River	221.41	SPF WO/P	292000.00	1160.18	1132.32	27.86	1151.51	1162.99	0.001497	13.59	22221.50	1095.16	20.29	19471.00	20566.16	1095.16	0.49
Salt River	221.31	10-yr W/P	58000.00	1143.42	1131.90	11.52	1140.06	1144.48	0.002105	8.25	7026.62	800.60	8.78	19583.68	20384.27	800.60	0.49
Salt River	221.31	50-yr W/P	145000.00	1150.42	1131.90	18.52	1144.73	1152.44	0.001912	11.41	12745.41	907.46	14.05	19574.31	20481.77	907.46	0.51
Salt River	221.31	100-yr W/P	172000.00	1152.42	1131.90	20.52	1145.95	1154.62	0.001788	11.94	14606.03	999.79	14.61	19452.19	20504.79	999.79	0.50
Salt River	221.31	500-yr W/P	246000.00	1156.95	1131.90	25.05	1149.04	1159.62	0.001622	13.26	19426.74	1083.01	17.94	19436.65	20519.66	1083.01	0.50
Salt River	221.31	SPF WO/P	292000.00	1159.20	1131.90	27.30	1150.95	1162.19	0.001610	14.10	21887.13	1100.84	19.88	19424.72	20525.55	1100.84	0.51
Salt River	221.26	10-yr W/P	55000.00	1143.27	1130.16	13.11	1138.70	1143.92	0.001208	6.48	8481.22	917.65	9.24	19542.45	20460.10	917.65	0.38
Salt River	221.26	50-yr W/P	140000.00	1150.51	1130.16	20.35	1143.00	1151.83	0.001159	9.20	15222.68	956.31	15.92	19533.62	20489.93	956.31	0.40

HEC-RAS Plan: Prop PrePost River: Salt River Reach: Salt River (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Salt River	221.26	100-yr W/P	169000.00	1152.52	1130.16	22.36	1144.23	1154.03	0.001147	9.87	17177.63	987.60	17.39	19531.52	20519.12	987.60	0.41
Salt River	221.26	500-yr W/P	243000.00	1157.09	1130.16	26.93	1147.02	1159.04	0.001104	11.25	22141.49	1225.94	18.68	19354.45	20796.44	1225.94	0.42
Salt River	221.26	SPF WO/P	289000.00	1159.38	1130.16	29.22	1148.65	1161.60	0.001115	12.05	24882.57	1406.93	20.52	19341.75	20796.44	1406.93	0.42
Salt River	221.255		Bridge														
Salt River	221.25	10-yr W/P	55000.00	1143.14	1129.35	13.79	1138.45	1143.77	0.001147	6.37	8634.33	923.58	9.35	19541.48	20465.07	923.58	0.37
Salt River	221.25	50-yr W/P	140000.00	1150.33	1129.35	20.98	1142.75	1151.62	0.001133	9.11	15368.66	956.72	16.06	19529.58	20486.30	956.72	0.40
Salt River	221.25	100-yr W/P	169000.00	1152.32	1129.35	22.97	1143.94	1153.81	0.001125	9.79	17355.32	1106.29	15.69	19302.25	20542.97	1106.29	0.40
Salt River	221.25	500-yr W/P	243000.00	1156.92	1129.35	27.57	1146.72	1158.76	0.001054	11.00	23350.86	1526.26	17.15	19237.38	20791.85	1526.26	0.41
Salt River	221.25	SPF WO/P	289000.00	1159.23	1129.35	29.87	1148.32	1161.29	0.001050	11.70	26514.68	1561.20	19.26	19230.65	20791.85	1561.20	0.41
Salt River	221.21	10-yr W/P	55000.00	1142.76	1129.68	13.08	1138.22	1143.50	0.001304	6.88	7996.92	837.96	9.54	19563.87	20401.83	837.96	0.39
Salt River	221.21	50-yr W/P	140000.00	1149.76	1129.68	20.08	1142.78	1151.33	0.001387	10.04	13943.04	861.90	16.18	19558.99	20420.90	861.90	0.44
Salt River	221.21	100-yr W/P	169000.00	1151.68	1129.68	22.00	1144.05	1153.50	0.001397	10.83	15629.63	895.72	17.45	19557.32	20453.04	895.72	0.45
Salt River	221.21	500-yr W/P	243000.00	1156.17	1129.68	26.49	1147.05	1158.46	0.001335	12.26	20994.90	1301.97	16.13	19268.66	20570.63	1301.97	0.45
Salt River	221.21	SPF WO/P	289000.00	1158.42	1129.68	28.74	1148.74	1160.98	0.001333	13.05	23960.40	1341.74	17.86	19260.56	20602.30	1341.74	0.46
Salt River	221.20		Bridge														
Salt River	221.19	10-yr W/P	55000.00	1142.60	1129.36	13.24	1137.81	1143.29	0.001188	6.70	8213.20	833.80	9.85	19562.65	20396.45	833.80	0.38
Salt River	221.19	50-yr W/P	140000.00	1149.47	1129.36	20.11	1142.33	1151.01	0.001358	9.97	14036.68	860.66	16.31	19552.59	20413.25	860.66	0.44
Salt River	221.19	100-yr W/P	169000.00	1151.35	1129.36	21.99	1143.63	1153.16	0.001382	10.79	15667.04	877.44	17.86	19551.29	20428.72	877.44	0.45
Salt River	221.19	500-yr W/P	243000.00	1155.67	1129.36	26.31	1146.65	1158.02	0.001373	12.39	20478.83	1287.04	15.91	19266.15	20553.19	1287.04	0.46
Salt River	221.19	SPF WO/P	289000.00	1157.77	1129.36	28.41	1148.36	1160.45	0.001402	13.28	23223.33	1312.68	17.69	19248.24	20560.92	1312.68	0.47
Salt River	221.08	10-yr W/P	55000.00	1141.86	1130.03	11.83	1137.16	1142.57	0.001244	6.75	8149.83	843.23	9.66	19539.60	20382.83	843.23	0.38
Salt River	221.08	50-yr W/P	140000.00	1148.65	1130.03	18.62	1141.67	1150.20	0.001383	10.00	14196.58	964.91	14.71	19376.09	20391.78	964.91	0.44
Salt River	221.08	100-yr W/P	169000.00	1150.54	1130.03	20.51	1142.96	1152.32	0.001393	10.75	16046.65	1019.01	15.75	19376.09	20411.55	1019.01	0.45
Salt River	221.08	500-yr W/P	243000.00	1154.92	1130.03	24.89	1145.97	1157.18	0.001345	12.20	20799.25	1164.81	17.86	19026.57	20530.86	1164.81	0.46
Salt River	221.08	SPF WO/P	289000.00	1156.99	1130.03	26.96	1147.79	1159.59	0.001390	13.16	24003.00	1661.08	14.45	18884.46	20545.54	1661.08	0.47
Salt River	221.075		Bridge														
Salt River	221.07	10-yr W/P	55000.00	1141.71	1130.05	11.66	1137.11	1142.46	0.001310	6.94	7923.71	812.92	9.75	19567.67	20381.91	812.92	0.39
Salt River	221.07	50-yr W/P	140000.00	1148.31	1130.05	18.26	1141.71	1150.01	0.001552	10.47	13456.63	1114.41	15.27	19222.53	20390.06	1114.41	0.46
Salt River	221.07	100-yr W/P	169000.00	1150.12	1130.05	20.07	1143.02	1152.11	0.001588	11.33	15069.48	1205.17	16.78	19162.05	20390.29	1205.17	0.47
Salt River	221.07	500-yr W/P	243000.00	1154.32	1130.05	24.27	1146.09	1156.91	0.001586	13.02	19286.21	1459.86	18.00	19082.89	20570.86	1459.86	0.49
Salt River	221.07	SPF WO/P	289000.00	1156.95	1130.05	26.89	1147.86	1159.26	0.001304	12.72	25613.74	1510.48	16.96	19070.28	20583.36	1510.48	0.45
Salt River	221.065	10-yr W/P	55000.00	1141.66	1129.91	11.75	1136.85	1142.41	0.001262	6.97	7896.42	791.55	9.98	19591.28	20382.83	791.55	0.39
Salt River	221.065	50-yr W/P	140000.00	1148.16	1129.91	18.25	1141.57	1149.94	0.001586	10.71	13075.82	1043.08	16.29	19189.12	20389.46	1043.08	0.47
Salt River	221.065	100-yr W/P	169000.00	1149.92	1129.91	20.01	1142.92	1152.03	0.001652	11.66	14488.77	1132.62	18.01	19138.99	20390.05	1132.62	0.48
Salt River	221.065	500-yr W/P	243000.00	1153.99	1129.91	24.08	1146.04	1156.82	0.001708	13.56	18411.31	1492.23	17.95	19077.16	20600.26	1492.23	0.51
Salt River	221.065	SPF WO/P	289000.00	1156.78	1129.91	26.87	1147.78	1159.20	0.001344	13.02	25318.11	1532.57	16.52	19064.91	20617.50	1532.57	0.46
Salt River	221.063		Bridge														
Salt River	221.06	10-yr W/P	55000.00	1141.56	1129.78	11.78	1136.68	1142.31	0.001223	6.96	7905.17	777.10	10.17	19602.61	20394.34	777.10	0.38
Salt River	221.06	50-yr W/P	140000.00	1147.95	1129.78	18.17	1141.42	1149.76	0.001611	10.81	13001.88	957.09	15.85	19278.04	20410.41	957.09	0.47
Salt River	221.06	100-yr W/P	169000.00	1149.68	1129.78	19.90	1142.79	1151.83	0.001684	11.78	14426.37	1128.03	17.40	19167.30	20414.78	1128.03	0.49
Salt River	221.06	500-yr W/P	243000.00	1153.68	1129.78	23.90	1145.98	1156.55	0.001740	13.68	18363.46	1471.17	17.56	19111.14	20614.34	1471.17	0.52
Salt River	221.06	SPF WO/P	289000.00	1156.44	1129.78	26.66	1147.78	1158.99	0.001405	13.31	24725.84	1518.18	16.29	19088.10	20628.77	1518.18	0.47
Salt River	221.02	10-yr W/P	55000.00	1141.33	1129.81	11.52	1136.76	1142.05	0.001275	6.82	8062.21	840.25	9.59	19528.78	20369.03	840.25	0.39
Salt River	221.02	50-yr W/P	140000.00	1147.74	1129.81	17.93	1141.27	1149.40	0.001542	10.35	13529.14	969.00	15.59	19259.11	20384.59	969.00	0.46
Salt River	221.02	100-yr W/P	169000.00	1149.48	1129.81	19.67	1142.57	1151.44	0.001600	11.23	15049.30	1131.30	17.16	19200.81	20391.16	1131.30	0.48
Salt River	221.02	500-yr W/P	243000.00	1153.50	1129.81	23.69	1145.54	1156.13	0.001636	13.03	18854.58	1344.88	18.53	19176.89	20521.76	1344.88	0.50
Salt River	221.02	SPF WO/P	289000.00	1156.17	1129.81	26.36	1147.26	1158.69	0.001396	13.03	24108.29	1368.15	17.62	19168.75	20536.90	1368.15	0.47

HEC-RAS Plan: Prop PrePost River: Salt River Reach: Salt River (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Salt River	220.93	10-yr W/P	55000.00	1140.78	1129.32	11.46	1135.73	1141.44	0.001093	6.53	8425.74	835.87	10.08	19562.38	20398.25	835.87	0.36
Salt River	220.93	50-yr W/P	140000.00	1147.01	1129.32	17.69	1140.26	1148.63	0.001468	10.23	13687.04	854.42	16.02	19551.80	20407.05	854.42	0.45
Salt River	220.93	100-yr W/P	169000.00	1148.71	1129.32	19.39	1141.56	1150.64	0.001541	11.16	15156.49	892.58	16.98	19549.50	20442.08	892.58	0.47
Salt River	220.93	500-yr W/P	243000.00	1152.75	1129.32	23.43	1144.53	1155.31	0.001567	12.90	19479.85	1319.76	16.91	19063.77	20528.74	1319.76	0.49
Salt River	220.93	SPF WO/P	289000.00	1155.09	1129.32	25.77	1146.25	1157.92	0.001534	13.66	22245.07	1390.94	18.48	19053.72	20564.32	1390.94	0.49
Salt River	220.83	10-yr W/P	55000.00	1140.09	1129.02	11.07	1135.54	1140.82	0.001288	6.85	8034.15	839.32	9.57	19524.12	20363.44	839.32	0.39
Salt River	220.83	50-yr W/P	140000.00	1146.01	1129.02	16.99	1140.06	1147.79	0.001711	10.73	13052.68	855.49	15.26	19511.28	20366.78	855.49	0.48
Salt River	220.83	100-yr W/P	169000.00	1147.63	1129.02	18.61	1141.33	1149.76	0.001797	11.70	14446.74	861.13	16.78	19509.33	20370.46	861.13	0.50
Salt River	220.83	500-yr W/P	243000.00	1151.52	1129.02	22.50	1144.34	1154.39	0.001883	13.61	17979.52	1062.44	18.75	18838.81	20442.63	1062.44	0.53
Salt River	220.83	SPF WO/P	289000.00	1153.73	1129.02	24.71	1146.00	1157.00	0.001876	14.55	20134.46	1560.66	20.27	18386.04	20473.39	1560.66	0.54
Salt River	220.79	10-yr W/P	55000.00	1138.99	1132.00	6.99	1137.09	1140.31	0.003611	9.23	5960.19	861.81	6.92	19544.78	20406.59	861.81	0.62
Salt River	220.79	50-yr W/P	140000.00	1144.63	1132.00	12.63	1141.44	1147.21	0.003270	12.88	10865.60	880.52	12.34	19537.04	20417.56	880.52	0.65
Salt River	220.79	100-yr W/P	169000.00	1146.21	1132.00	14.21	1142.72	1149.16	0.003222	13.79	12258.44	886.98	13.82	19534.88	20421.86	886.98	0.65
Salt River	220.79	500-yr W/P	243000.00	1150.10	1132.00	18.10	1145.65	1153.79	0.002976	15.42	15759.84	994.40	17.43	18776.11	20430.87	994.40	0.65
Salt River	220.79	SPF WO/P	289000.00	1152.29	1132.00	20.29	1147.37	1156.41	0.002848	16.28	17770.23	1145.98	19.24	18699.31	20448.97	1145.98	0.65
Salt River	220.78		Bridge														
Salt River	220.77	10-yr W/P	55000.00	1137.55	1126.54	11.01	1132.87	1138.24	0.001230	6.63	8291.24	860.00	9.64	19548.29	20408.28	860.00	0.38
Salt River	220.77	50-yr W/P	140000.00	1144.21	1126.54	17.67	1137.30	1145.75	0.001413	9.94	14084.16	880.42	16.00	19538.10	20418.53	880.42	0.44
Salt River	220.77	100-yr W/P	169000.00	1146.09	1126.54	19.55	1138.56	1147.88	0.001436	10.74	15740.60	886.26	17.76	19535.13	20421.39	886.26	0.45
Salt River	220.77	500-yr W/P	243000.00	1150.15	1126.54	23.61	1141.50	1152.59	0.001520	12.55	19367.15	1005.07	21.54	18757.42	20427.61	1005.07	0.48
Salt River	220.77	SPF WO/P	289000.00	1152.41	1126.54	25.86	1143.19	1155.24	0.001559	13.50	21403.56	1253.21	23.63	18610.01	20430.11	1253.21	0.49
Salt River	220.73	10-yr W/P	55000.00	1137.27	1126.56	10.71	1132.70	1137.97	0.001238	6.70	8208.78	859.21	9.55	19548.48	20407.70	859.21	0.38
Salt River	220.73	50-yr W/P	140000.00	1143.88	1126.56	17.32	1137.03	1145.44	0.001423	10.02	13967.46	883.41	15.81	19538.41	20421.81	883.41	0.44
Salt River	220.73	100-yr W/P	169000.00	1145.75	1126.56	19.19	1138.39	1147.57	0.001440	10.82	15623.76	888.28	17.59	19535.39	20423.67	888.28	0.45
Salt River	220.73	500-yr W/P	243000.00	1149.79	1126.56	23.23	1141.33	1152.26	0.001527	12.63	19235.08	903.12	21.30	19528.73	20431.84	903.12	0.48
Salt River	220.73	SPF WO/P	289000.00	1152.03	1126.56	25.47	1142.99	1154.90	0.001592	13.58	21280.51	924.78	23.01	19523.44	20448.22	924.78	0.50
Salt River	220.64	10-yr W/P	55000.00	1136.48	1125.40	11.08	1132.40	1137.27	0.001525	7.13	7711.80	862.12	8.95	19553.13	20415.25	862.12	0.42
Salt River	220.64	50-yr W/P	140000.00	1142.95	1125.40	17.55	1136.92	1144.66	0.001647	10.48	13359.10	884.71	15.10	19543.24	20427.96	884.71	0.48
Salt River	220.64	100-yr W/P	169000.00	1144.80	1125.40	19.40	1138.18	1146.77	0.001685	11.26	15011.26	907.75	16.54	19530.63	20439.68	907.75	0.49
Salt River	220.64	500-yr W/P	243000.00	1148.81	1125.40	23.41	1141.10	1151.43	0.001736	13.00	18694.93	930.67	20.09	19520.10	20450.77	930.67	0.51
Salt River	220.64	SPF WO/P	289000.00	1151.04	1125.40	25.64	1142.77	1154.04	0.001760	13.90	20786.54	944.59	22.01	19513.11	20457.70	944.59	0.52
Salt River	220.54	10-yr W/P	55000.00	1135.66	1124.24	11.42	1131.79	1136.48	0.001623	7.28	7554.74	857.14	8.81	19558.13	20415.27	857.14	0.43
Salt River	220.54	50-yr W/P	140000.00	1142.03	1124.24	17.79	1136.27	1143.80	0.001756	10.68	13109.79	885.11	14.81	19548.93	20434.04	885.11	0.49
Salt River	220.54	100-yr W/P	169000.00	1143.85	1124.24	19.61	1137.53	1145.89	0.001798	11.46	14745.99	910.94	16.19	19536.93	20447.86	910.94	0.50
Salt River	220.54	500-yr W/P	243000.00	1147.82	1124.24	23.58	1140.48	1150.53	0.001833	13.21	18398.49	930.59	19.77	19527.03	20457.62	930.59	0.52
Salt River	220.54	SPF WO/P	289000.00	1150.03	1124.24	25.79	1142.15	1153.13	0.001856	14.12	20471.46	945.13	21.66	19519.77	20464.90	945.13	0.53
Salt River	220.45	10-yr W/P	55000.00	1134.79	1123.26	11.53	1131.11	1135.65	0.001742	7.43	7400.83	859.50	8.61	19561.37	20420.87	859.50	0.45
Salt River	220.45	50-yr W/P	140000.00	1141.07	1123.26	17.81	1135.59	1142.90	0.001860	10.87	12877.56	884.27	14.56	19554.39	20438.67	884.27	0.50
Salt River	220.45	100-yr W/P	169000.00	1142.86	1123.26	19.60	1136.83	1144.98	0.001882	11.68	14469.21	899.34	16.09	19542.75	20442.09	899.34	0.51
Salt River	220.45	500-yr W/P	243000.00	1146.79	1123.26	23.53	1139.79	1149.59	0.001943	13.44	18082.82	931.73	19.41	19531.89	20463.62	931.73	0.54
Salt River	220.45	SPF WO/P	289000.00	1148.98	1123.26	25.72	1141.44	1152.18	0.001955	14.35	20140.82	944.33	21.33	19525.79	20470.12	944.33	0.55
Salt River	220.35	10-yr W/P	55000.00	1133.87	1122.68	11.19	1130.39	1134.74	0.001836	7.51	7321.92	869.49	8.42	19568.88	20438.37	869.49	0.46
Salt River	220.35	50-yr W/P	140000.00	1140.08	1122.68	17.40	1134.77	1141.94	0.001920	10.96	12777.45	886.95	14.41	19559.17	20446.12	886.95	0.51
Salt River	220.35	100-yr W/P	169000.00	1141.85	1122.68	19.17	1136.03	1144.00	0.001969	11.77	14359.50	911.42	15.76	19546.91	20458.33	911.42	0.52
Salt River	220.35	500-yr W/P	243000.00	1145.75	1122.68	23.07	1138.93	1148.59	0.001999	13.54	17953.03	933.56	19.23	19536.46	20470.02	933.56	0.54
Salt River	220.35	SPF WO/P	289000.00	1147.93	1122.68	25.25	1140.59	1151.17	0.002008	14.44	20007.89	946.13	21.15	19530.10	20476.23	946.13	0.55
Salt River	220.26	10-yr W/P	55000.00	1132.97	1122.15	10.82	1129.40	1133.83	0.001793	7.45	7381.27	872.12	8.46	19572.94	20445.06	872.12	0.45
Salt River	220.26	50-yr W/P	140000.00	1139.13	1122.15	16.97	1133.81	1140.98	0.001915	10.93	12806.07	890.98	14.37	19562.61	20453.58	890.98	0.51
Salt River	220.26	100-yr W/P	169000.00	1140.87	1122.15	18.72	1135.07	1143.01	0.001968	11.75	14382.42	915.86	15.70	19551.50	20467.36	915.86	0.52
Salt River	220.26	500-yr W/P	243000.00	1144.75	1122.15	22.60	1137.95	1147.59	0.001996	13.52	17978.32	936.76	19.19	19540.32	20477.08	936.76	0.54

HEC-RAS Plan: Prop PrePost River: Salt River Reach: Salt River (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Salt River	220.26	SPF WO/P	289000.00	1146.94	1122.15	24.78	1139.65	1150.17	0.002003	14.42	20037.69	949.26	21.11	19534.18	20483.44	949.26	0.55
Salt River	220.17	10-yr W/P	55000.00	1131.96	1121.50	10.46	1128.70	1132.88	0.002004	7.67	7167.09	881.37	8.13	19577.28	20458.65	881.37	0.47
Salt River	220.17	50-yr W/P	140000.00	1138.06	1121.50	16.56	1133.08	1139.98	0.002047	11.12	12589.63	897.25	14.03	19568.12	20465.36	897.25	0.52
Salt River	220.17	100-yr W/P	169000.00	1139.78	1121.50	18.28	1134.29	1142.00	0.002045	11.96	14135.71	902.10	15.67	19565.56	20467.66	902.10	0.53
Salt River	220.17	500-yr W/P	243000.00	1143.59	1121.50	22.09	1137.20	1146.55	0.002112	13.81	17598.75	925.63	19.01	19551.48	20477.11	925.63	0.56
Salt River	220.17	SPF WO/P	289000.00	1145.74	1121.50	24.24	1138.84	1149.11	0.002146	14.73	19621.80	947.95	20.70	19539.67	20487.62	947.95	0.57
Salt River	220.07	10-yr W/P	55000.00	1131.01	1120.97	10.04	1127.67	1131.90	0.001914	7.58	7256.33	876.65	8.28	19585.06	20461.71	876.65	0.46
Salt River	220.07	50-yr W/P	140000.00	1137.06	1120.97	16.09	1132.01	1138.97	0.002028	11.10	12617.78	895.51	14.09	19576.64	20472.15	895.51	0.52
Salt River	220.07	100-yr W/P	169000.00	1138.77	1120.97	17.80	1133.26	1140.98	0.002051	11.93	14164.62	908.48	15.59	19566.51	20475.00	908.48	0.53
Salt River	220.07	500-yr W/P	243000.00	1142.55	1120.97	21.58	1136.11	1145.51	0.002088	13.79	17616.37	918.43	19.18	19561.68	20480.11	918.43	0.56
Salt River	220.07	SPF WO/P	289000.00	1144.67	1120.97	23.70	1137.78	1148.06	0.002099	14.77	19571.21	923.64	21.19	19558.82	20482.47	923.64	0.57
Salt River	220.066		Bridge														
Salt River	220.063	10-yr W/P	55000.00	1130.81	1121.11	9.70	1127.50	1131.71	0.001956	7.63	7207.74	875.84	8.23	19586.19	20462.02	875.84	0.47
Salt River	220.063	50-yr W/P	140000.00	1136.76	1121.11	15.65	1131.86	1138.71	0.002106	11.22	12479.68	896.09	13.93	19577.00	20473.10	896.09	0.53
Salt River	220.063	100-yr W/P	169000.00	1138.44	1121.11	17.33	1133.11	1140.70	0.002135	12.07	13997.87	908.84	15.40	19566.75	20475.59	908.84	0.54
Salt River	220.063	500-yr W/P	243000.00	1142.14	1121.11	21.03	1135.97	1145.18	0.002184	13.98	17376.56	917.73	18.93	19562.02	20479.74	917.73	0.57
Salt River	220.063	SPF WO/P	289000.00	1144.21	1121.11	23.10	1137.70	1147.70	0.002202	14.98	19286.95	922.90	20.90	19559.14	20482.04	922.90	0.58
Salt River	220.06	10-yr W/P	55000.00	1130.79	1121.11	9.68	1127.45	1131.69	0.001923	7.59	7250.08	877.48	8.26	19585.54	20463.03	877.48	0.47
Salt River	220.06	50-yr W/P	140000.00	1136.75	1121.11	15.64	1131.81	1138.68	0.002080	11.17	12533.96	897.57	13.96	19576.26	20473.83	897.57	0.53
Salt River	220.06	100-yr W/P	169000.00	1138.43	1121.11	17.32	1133.05	1140.67	0.002111	12.02	14054.91	910.13	15.44	19565.98	20476.11	910.13	0.54
Salt River	220.06	500-yr W/P	243000.00	1142.13	1121.11	21.02	1135.94	1145.14	0.002162	13.93	17440.23	919.19	18.97	19561.23	20480.42	919.19	0.56
Salt River	220.06	SPF WO/P	289000.00	1144.21	1121.11	23.10	1137.62	1147.67	0.002182	14.93	19354.93	924.49	20.94	19558.34	20482.84	924.49	0.58
Salt River	220.055		Bridge														
Salt River	220.05	10-yr W/P	55000.00	1130.60	1121.14	9.46	1127.33	1131.50	0.001965	7.64	7200.10	876.42	8.22	19586.89	20463.31	876.42	0.47
Salt River	220.05	50-yr W/P	140000.00	1136.44	1121.14	15.30	1131.66	1138.42	0.002167	11.31	12373.60	896.00	13.81	19576.84	20472.84	896.00	0.54
Salt River	220.05	100-yr W/P	169000.00	1138.08	1121.14	16.94	1132.90	1140.39	0.002208	12.19	13858.99	908.58	15.25	19566.63	20475.20	908.58	0.55
Salt River	220.05	500-yr W/P	243000.00	1141.69	1121.14	20.55	1135.77	1144.81	0.002280	14.16	17155.40	917.98	18.69	19562.21	20480.19	917.98	0.58
Salt River	220.05	SPF WO/P	289000.00	1143.71	1121.14	22.57	1137.48	1147.30	0.002309	15.20	19016.93	923.10	20.60	19559.74	20482.84	923.10	0.59
Salt River	219.89	10-yr W/P	55000.00	1128.65	1118.42	10.23	1125.91	1129.66	0.002410	8.06	6827.28	894.53	7.63	19576.53	20471.06	894.53	0.51
Salt River	219.89	50-yr W/P	140000.00	1134.31	1118.42	15.89	1130.19	1136.45	0.002500	11.73	11932.08	910.72	13.10	19568.67	20479.39	910.72	0.57
Salt River	219.89	100-yr W/P	169000.00	1135.92	1118.42	17.50	1131.41	1138.38	0.002528	12.60	13414.38	926.97	14.47	19554.58	20481.55	926.97	0.58
Salt River	219.89	500-yr W/P	243000.00	1139.49	1118.42	21.07	1134.23	1142.76	0.002551	14.51	16748.58	941.25	17.79	19545.19	20486.44	941.25	0.61
Salt River	219.89	SPF WO/P	289000.00	1141.52	1118.42	23.10	1135.91	1145.24	0.002548	15.48	18667.88	950.10	19.65	19539.41	20489.51	950.10	0.62
Salt River	219.79	10-yr W/P	55000.00	1127.42	1117.50	9.92	1124.77	1128.46	0.002561	8.16	6738.49	907.50	7.43	19528.40	20435.90	907.50	0.53
Salt River	219.79	50-yr W/P	140000.00	1133.09	1117.50	15.59	1129.03	1135.22	0.002551	11.71	11957.21	931.59	12.84	19519.32	20450.90	931.59	0.58
Salt River	219.79	100-yr W/P	169000.00	1134.70	1117.50	17.20	1130.30	1137.15	0.002556	12.55	13466.48	945.96	14.24	19506.30	20452.26	945.96	0.59
Salt River	219.79	500-yr W/P	243000.00	1138.30	1117.50	20.79	1133.11	1141.51	0.002541	14.38	16893.02	960.64	17.59	19494.66	20455.30	960.64	0.60
Salt River	219.79	SPF WO/P	289000.00	1140.35	1117.50	22.85	1134.74	1143.99	0.002520	15.31	18876.30	970.61	19.45	19488.90	20459.51	970.61	0.61
Salt River	219.70	10-yr W/P	55000.00	1126.36	1115.35	11.01	1123.35	1127.27	0.002140	7.68	7163.60	924.73	7.75	19579.85	20504.58	924.73	0.49
Salt River	219.70	50-yr W/P	140000.00	1132.04	1115.35	16.69	1127.58	1133.99	0.002261	11.22	12475.55	946.36	13.18	19573.09	20519.46	946.36	0.54
Salt River	219.70	100-yr W/P	169000.00	1133.64	1115.35	18.29	1128.78	1135.90	0.002292	12.06	14008.26	962.55	14.55	19560.20	20522.76	962.55	0.56
Salt River	219.70	500-yr W/P	243000.00	1137.27	1115.35	21.92	1131.54	1140.25	0.002302	13.86	17529.86	979.55	17.90	19547.93	20527.48	979.55	0.58
Salt River	219.70	SPF WO/P	289000.00	1139.35	1115.35	24.00	1133.18	1142.74	0.002285	14.76	19579.86	989.22	19.79	19542.02	20531.24	989.22	0.58
Salt River	219.61	10-yr W/P	55000.00	1125.32	1114.26	11.06	1122.46	1126.23	0.002221	7.67	7170.61	952.85	7.53	19598.37	20551.21	952.85	0.49
Salt River	219.61	50-yr W/P	140000.00	1131.00	1114.26	16.73	1126.57	1132.90	0.002243	11.09	12629.52	969.24	13.03	19591.25	20560.49	969.24	0.54
Salt River	219.61	100-yr W/P	169000.00	1132.60	1114.26	18.34	1127.74	1134.80	0.002267	11.90	14198.77	986.45	14.39	19575.60	20562.05	986.45	0.55
Salt River	219.61	500-yr W/P	243000.00	1136.26	1114.26	22.00	1130.47	1139.14	0.002239	13.63	17831.15	999.43	17.84	19565.52	20564.95	999.43	0.57
Salt River	219.61	SPF WO/P	289000.00	1138.37	1114.26	24.11	1132.09	1141.63	0.002211	14.48	19952.53	1010.09	19.75	19559.26	20569.35	1010.09	0.57

HEC-RAS Plan: Prop PrePost River: Salt River Reach: Salt River (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Salt River	219.52	10-yr W/P	55000.00	1124.25	1113.36	10.89	1121.35	1125.13	0.002157	7.55	7285.53	968.60	7.52	19581.70	20550.30	968.60	0.49
Salt River	219.52	50-yr W/P	140000.00	1129.93	1113.36	16.57	1125.39	1131.78	0.002201	10.90	12841.95	994.94	12.91	19563.78	20558.72	994.94	0.53
Salt River	219.52	100-yr W/P	169000.00	1131.54	1113.36	18.18	1126.58	1133.66	0.002187	11.70	14449.90	1001.93	14.42	19559.67	20561.60	1001.93	0.54
Salt River	219.52	500-yr W/P	243000.00	1135.24	1113.36	21.88	1129.28	1138.01	0.002147	13.37	18178.61	1014.90	17.91	19549.26	20564.16	1014.90	0.56
Salt River	219.52	SPF WO/P	289000.00	1137.38	1113.36	24.02	1130.80	1140.51	0.002112	14.19	20365.04	1026.06	19.85	19542.51	20568.56	1026.06	0.56
Salt River	219.42	10-yr W/P	55000.00	1123.10	1112.78	10.32	1120.38	1124.02	0.002309	7.68	7158.09	975.91	7.33	19531.54	20507.45	975.91	0.50
Salt River	219.42	50-yr W/P	140000.00	1128.80	1112.78	16.02	1124.40	1130.66	0.002265	10.97	12765.33	1002.37	12.74	19513.51	20515.88	1002.37	0.54
Salt River	219.42	100-yr W/P	169000.00	1130.43	1112.78	17.65	1125.56	1132.57	0.002225	11.73	14408.54	1008.55	14.29	19509.46	20518.01	1008.55	0.55
Salt River	219.42	500-yr W/P	243000.00	1134.18	1112.78	21.40	1128.26	1136.94	0.002148	13.34	18211.17	1020.76	17.84	19500.69	20521.46	1020.76	0.56
Salt River	219.42	SPF WO/P	289000.00	1136.35	1112.78	23.57	1129.82	1139.45	0.002098	14.14	20439.67	1031.22	19.82	19493.33	20524.55	1031.22	0.56
Salt River	219.33	10-yr W/P	55000.00	1122.01	1111.69	10.32	1119.27	1122.93	0.002326	7.70	7145.30	976.67	7.32	19451.53	20428.20	976.67	0.50
Salt River	219.33	50-yr W/P	140000.00	1127.74	1111.69	16.05	1123.32	1129.60	0.002255	10.92	12817.62	1009.82	12.69	19442.46	20452.28	1009.82	0.54
Salt River	219.33	100-yr W/P	169000.00	1129.41	1111.69	17.72	1124.49	1131.51	0.002219	11.64	14516.80	1026.00	14.15	19428.86	20454.86	1026.00	0.55
Salt River	219.33	500-yr W/P	243000.00	1133.23	1111.69	21.54	1127.20	1135.92	0.002103	13.16	18469.70	1041.82	17.73	19418.75	20460.57	1041.82	0.55
Salt River	219.33	SPF WO/P	289000.00	1135.45	1111.69	23.76	1128.78	1138.45	0.002032	13.90	20794.68	1052.10	19.77	19411.79	20463.88	1052.10	0.55
Salt River	219.24	10-yr W/P	55000.00	1120.94	1110.33	10.61	1118.16	1121.85	0.002257	7.64	7200.77	973.78	7.39	19492.82	20466.60	973.78	0.49
Salt River	219.24	50-yr W/P	140000.00	1126.71	1110.33	16.38	1122.20	1128.54	0.002216	10.86	12895.31	1011.37	12.75	19483.38	20494.75	1011.37	0.54
Salt River	219.24	100-yr W/P	169000.00	1128.40	1110.33	18.07	1123.37	1130.47	0.002177	11.56	14621.00	1029.38	14.20	19468.17	20497.55	1029.38	0.54
Salt River	219.24	500-yr W/P	243000.00	1132.30	1110.33	21.97	1126.10	1134.93	0.002042	13.01	18675.63	1047.42	17.83	19456.36	20503.78	1047.42	0.54
Salt River	219.24	SPF WO/P	289000.00	1134.57	1110.33	24.24	1127.67	1137.49	0.001961	13.72	21062.50	1057.45	19.92	19449.75	20507.20	1057.45	0.54
Salt River	219.15	10-yr W/P	55000.00	1119.74	1109.49	10.25	1117.05	1120.67	0.002370	7.73	7111.44	978.79	7.27	19495.94	20474.73	978.79	0.51
Salt River	219.15	50-yr W/P	140000.00	1125.58	1109.49	16.09	1121.09	1127.41	0.002202	10.87	12876.28	1001.56	12.86	19487.72	20500.52	1001.56	0.53
Salt River	219.15	100-yr W/P	169000.00	1127.29	1109.49	17.80	1122.25	1129.37	0.002154	11.56	14616.28	1019.13	14.34	19484.73	20503.86	1019.13	0.54
Salt River	219.15	500-yr W/P	243000.00	1131.28	1109.49	21.79	1124.95	1133.89	0.002006	12.99	18711.72	1037.32	18.04	19473.63	20510.95	1037.32	0.54
Salt River	219.15	SPF WO/P	289000.00	1133.59	1109.49	24.10	1126.52	1136.49	0.001929	13.68	21123.63	1051.02	20.10	19463.19	20514.21	1051.02	0.54
Salt River	219.04	10-yr W/P	55000.00	1118.66	1106.59	12.07	1115.54	1119.44	0.001905	7.09	7756.22	1031.19	7.52	19472.86	20504.04	1031.19	0.46
Salt River	219.04	50-yr W/P	140000.00	1124.68	1106.59	18.09	1119.42	1126.23	0.001766	9.98	14024.01	1051.29	13.34	19462.32	20513.61	1051.29	0.48
Salt River	219.04	100-yr W/P	169000.00	1126.44	1106.59	19.85	1120.52	1128.20	0.001717	10.64	15881.71	1058.37	15.01	19459.11	20517.48	1058.37	0.48
Salt River	219.04	500-yr W/P	243000.00	1130.54	1106.59	23.95	1123.11	1132.78	0.001611	12.00	20249.94	1071.86	18.89	19451.31	20523.17	1071.86	0.49
Salt River	219.04	SPF WO/P	289000.00	1132.91	1106.59	26.32	1124.59	1135.41	0.001551	12.68	22799.62	1079.44	21.12	19446.86	20526.30	1079.44	0.49
Salt River	219.03		Bridge	← SR 143 Bridge													
Salt River	219.01	10-yr W/P	55000.00	1118.14	1105.53	12.60	1115.18	1118.95	0.002025	7.23	7609.53	1030.20	7.39	19474.20	20504.40	1030.20	0.47
Salt River	219.01	50-yr W/P	140000.00	1124.09	1105.53	18.56	1119.08	1125.69	0.001858	10.15	13799.39	1049.93	13.14	19463.81	20513.73	1049.93	0.49
Salt River	219.01	100-yr W/P	169000.00	1125.83	1105.53	20.30	1120.19	1127.65	0.001800	10.81	15639.75	1056.18	14.81	19460.83	20517.01	1056.18	0.49
Salt River	219.01	500-yr W/P	243000.00	1129.91	1105.53	24.38	1122.80	1132.21	0.001683	12.17	19970.03	1070.86	18.65	19453.89	20524.76	1070.86	0.50
Salt River	219.01	SPF WO/P	289000.00	1132.26	1105.53	26.73	1124.25	1134.82	0.001617	12.84	22504.67	1079.37	20.85	19449.88	20529.24	1079.37	0.50
Salt River	218.99	10-yr W/P	55000.00	1118.02	1105.72	12.30	1114.66	1118.75	0.001699	6.86	8012.84	1027.18	7.80	19452.70	20479.88	1027.18	0.43
Salt River	218.99	50-yr W/P	140000.00	1123.99	1105.72	18.27	1118.53	1125.50	0.001683	9.86	14200.01	1046.51	13.57	19441.52	20488.03	1046.51	0.47
Salt River	218.99	100-yr W/P	169000.00	1125.74	1105.72	20.02	1119.68	1127.46	0.001647	10.54	16037.75	1051.43	15.25	19438.24	20489.67	1051.43	0.48
Salt River	218.99	500-yr W/P	243000.00	1129.83	1105.72	24.11	1122.29	1132.03	0.001586	11.90	20424.82	1083.32	18.85	19430.55	20513.87	1083.32	0.48
Salt River	218.99	SPF WO/P	289000.00	1132.20	1105.72	26.48	1123.76	1134.65	0.001531	12.56	23004.97	1094.64	21.02	19426.21	20520.85	1094.64	0.48
Salt River	218.965		Bridge														
Salt River	218.96	10-yr W/P	55000.00	1117.68	1105.11	12.57	1114.39	1118.41	0.001752	6.85	8029.70	1056.82	7.60	19423.38	20480.19	1056.82	0.44
Salt River	218.96	50-yr W/P	140000.00	1123.60	1105.11	18.49	1118.27	1125.08	0.001688	9.76	14345.69	1076.79	13.32	19412.44	20489.23	1076.79	0.47
Salt River	218.96	100-yr W/P	169000.00	1125.35	1105.11	20.24	1119.37	1127.03	0.001662	10.41	16232.59	1091.53	14.87	19409.61	20501.37	1091.53	0.48
Salt River	218.96	500-yr W/P	243000.00	1129.43	1105.11	24.32	1121.91	1131.56	0.001563	11.72	20730.25	1112.80	18.63	19401.78	20514.58	1112.80	0.48
Salt River	218.96	SPF WO/P	289000.00	1131.80	1105.11	26.69	1123.36	1134.17	0.001503	12.36	23381.77	1125.16	20.78	19397.15	20522.31	1125.16	0.48
Salt River	218.81	10-yr W/P	55000.00	1115.87	1104.63	11.24	1113.03	1116.76	0.002212	7.58	7254.85	974.81	7.44	19504.91	20479.72	974.81	0.49
Salt River	218.81	50-yr W/P	140000.00	1121.65	1104.63	17.02	1117.07	1123.47	0.002140	10.82	12939.63	991.27	13.05	19496.97	20488.24	991.27	0.53

HEC-RAS Plan: Prop PrePost River: Salt River Reach: Salt River (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Salt River	218.81	100-yr W/P	169000.00	1123.40	1104.63	18.76	1118.17	1125.46	0.002069	11.52	14670.56	996.37	14.72	19494.59	20490.96	996.37	0.53
Salt River	218.81	500-yr W/P	243000.00	1127.48	1104.63	22.85	1120.93	1130.07	0.001943	12.92	18807.74	1024.55	18.36	19489.00	20513.55	1024.55	0.53
Salt River	218.81	SPF WO/P	289000.00	1129.87	1104.63	25.24	1122.45	1132.73	0.001853	13.59	21271.60	1036.00	20.53	19484.75	20520.75	1036.00	0.53
Salt River	218.71	10-yr W/P	55000.00	1114.82	1104.16	10.66	1111.89	1115.71	0.002138	7.55	7281.44	959.29	7.59	19525.97	20485.26	959.29	0.48
Salt River	218.71	50-yr W/P	140000.00	1120.60	1104.16	16.44	1115.95	1122.43	0.002139	10.86	12886.29	981.72	13.13	19512.21	20493.93	981.72	0.53
Salt River	218.71	100-yr W/P	169000.00	1122.38	1104.16	18.22	1117.15	1124.45	0.002079	11.54	14645.16	996.91	14.69	19499.74	20496.65	996.91	0.53
Salt River	218.71	500-yr W/P	243000.00	1126.55	1104.16	22.39	1119.87	1129.14	0.001902	12.90	18832.72	1012.41	18.60	19491.15	20503.56	1012.41	0.53
Salt River	218.71	SPF WO/P	289000.00	1128.99	1104.16	24.83	1121.42	1131.85	0.001802	13.56	21320.69	1025.68	20.79	19486.47	20512.15	1025.68	0.52
Salt River	218.62	10-yr W/P	55000.00	1113.65	1100.72	12.93	1110.86	1114.58	0.002297	7.73	7110.68	953.30	7.46	19529.85	20483.15	953.30	0.50
Salt River	218.62	50-yr W/P	140000.00	1119.42	1100.72	18.70	1114.96	1121.31	0.002248	11.05	12668.93	975.91	12.98	19516.32	20492.23	975.91	0.54
Salt River	218.62	100-yr W/P	169000.00	1121.25	1100.72	20.53	1116.14	1123.37	0.002166	11.67	14476.16	997.98	14.51	19502.54	20500.52	997.98	0.54
Salt River	218.62	500-yr W/P	243000.00	1125.59	1100.72	24.87	1118.84	1128.16	0.001918	12.88	18865.23	1023.04	18.44	19493.68	20516.71	1023.04	0.53
Salt River	218.62	SPF WO/P	289000.00	1128.11	1100.72	27.39	1120.48	1130.92	0.001799	13.47	21457.25	1036.28	20.71	19488.16	20524.43	1036.28	0.52
Salt River	218.52	10-yr W/P	55000.00	1112.48	1100.27	12.21	1109.73	1113.41	0.002335	7.75	7098.97	961.87	7.38	19526.14	20488.02	961.87	0.50
Salt River	218.52	50-yr W/P	140000.00	1118.32	1100.27	18.05	1113.81	1120.18	0.002206	10.96	12774.14	982.90	13.00	19513.40	20496.31	982.90	0.54
Salt River	218.52	100-yr W/P	169000.00	1120.21	1100.27	19.94	1115.00	1122.28	0.002101	11.53	14657.03	1006.78	14.56	19501.74	20508.51	1006.78	0.53
Salt River	218.52	500-yr W/P	243000.00	1124.72	1100.27	24.45	1117.71	1127.20	0.001808	12.63	19235.91	1027.70	18.72	19493.18	20520.88	1027.70	0.51
Salt River	218.52	SPF WO/P	289000.00	1127.31	1100.27	27.04	1119.25	1130.01	0.001686	13.19	21915.61	1041.29	21.05	19488.17	20529.46	1041.29	0.51
Salt River	218.43	10-yr W/P	55000.00	1111.22	1099.50	11.72	1108.64	1112.19	0.002568	7.94	6930.04	972.31	7.13	19521.08	20493.39	972.31	0.52
Salt River	218.43	50-yr W/P	140000.00	1117.24	1099.50	17.74	1112.75	1119.08	0.002195	10.90	12847.83	992.95	12.94	19509.27	20502.22	992.95	0.53
Salt River	218.43	100-yr W/P	169000.00	1119.23	1099.50	19.73	1113.91	1121.24	0.002027	11.38	14844.20	1011.49	14.68	19505.30	20516.79	1011.49	0.52
Salt River	218.43	500-yr W/P	243000.00	1123.92	1099.50	24.42	1116.60	1126.30	0.001703	12.37	19646.28	1035.72	18.97	19495.78	20531.50	1035.72	0.50
Salt River	218.43	SPF WO/P	289000.00	1126.59	1099.50	27.08	1118.18	1129.16	0.001579	12.89	22423.41	1048.98	21.38	19490.10	20539.07	1048.98	0.49
Salt River	218.33	10-yr W/P	55000.00	1109.08	1099.85	9.23	1107.75	1110.45	0.004691	9.38	5866.04	1008.40	5.82	19508.57	20516.96	1008.40	0.69
Salt River	218.33	50-yr W/P	140000.00	1116.20	1099.85	16.35	1111.71	1117.97	0.002149	10.66	13134.50	1033.45	12.71	19493.45	20526.90	1033.45	0.53
Salt River	218.33	100-yr W/P	169000.00	1118.33	1099.85	18.48	1112.86	1120.21	0.001909	11.01	15352.69	1052.67	14.58	19489.14	20541.81	1052.67	0.51
Salt River	218.33	500-yr W/P	243000.00	1123.26	1099.85	23.41	1115.45	1125.42	0.001529	11.80	20598.38	1075.85	19.15	19479.29	20555.14	1075.85	0.48
Salt River	218.33	SPF WO/P	289000.00	1126.01	1099.85	26.16	1116.97	1128.34	0.001397	12.25	23632.87	1139.94	20.73	19422.65	20562.59	1139.94	0.46
Salt River	218.24	10-yr W/P	55000.00	1108.22	1096.99	11.23	1104.18	1108.97	0.001701	6.95	7916.14	998.43	7.93	19430.65	20429.07	998.43	0.43
Salt River	218.24	50-yr W/P	140000.00	1115.79	1096.99	18.80	1108.77	1117.04	0.001203	8.97	15613.91	1032.73	15.12	19411.34	20444.07	1032.73	0.41
Salt River	218.24	100-yr W/P	169000.00	1117.97	1096.99	20.98	1109.95	1119.36	0.001133	9.46	17867.59	1041.90	17.15	19406.49	20448.39	1041.90	0.40
Salt River	218.24	500-yr W/P	243000.00	1122.97	1096.99	25.98	1112.53	1124.68	0.001013	10.51	23129.45	1060.42	21.81	19399.61	20460.03	1060.42	0.40
Salt River	218.24	SPF WO/P	289000.00	1125.76	1096.99	28.77	1114.10	1127.65	0.000963	11.05	26359.25	1157.81	22.77	19320.31	20478.13	1157.81	0.39
Salt River	218.15	10-yr W/P	55000.00	1107.46	1096.28	11.18	1102.56	1108.17	0.001464	6.77	8126.04	948.85	8.56	19394.82	20343.67	948.85	0.41
Salt River	218.15	50-yr W/P	140000.00	1115.21	1096.28	18.93	1107.68	1116.46	0.001132	8.96	15624.48	984.74	15.87	19376.30	20361.04	984.74	0.40
Salt River	218.15	100-yr W/P	169000.00	1117.40	1096.28	21.12	1108.88	1118.80	0.001086	9.50	17788.51	994.79	17.88	19371.15	20365.95	994.79	0.40
Salt River	218.15	500-yr W/P	243000.00	1122.42	1096.28	26.14	1111.64	1124.18	0.001003	10.64	22836.16	1015.87	22.48	19361.32	20377.19	1015.87	0.40
Salt River	218.15	SPF WO/P	289000.00	1125.44	1096.28	29.16	1113.18	1127.14	0.000846	10.62	28632.43	1477.58	19.38	19026.76	20504.34	1477.58	0.37
Salt River	218.05	10-yr W/P	55000.00	1106.55	1094.77	11.78	1101.63	1107.39	0.001546	7.34	7491.01	805.93	9.29	19398.74	20204.67	805.93	0.42
Salt River	218.05	50-yr W/P	140000.00	1114.18	1094.77	19.41	1107.05	1115.78	0.001398	10.18	13757.10	837.88	16.42	19382.10	20219.99	837.88	0.44
Salt River	218.05	100-yr W/P	169000.00	1116.30	1094.77	21.53	1108.40	1118.14	0.001376	10.87	15548.15	846.94	18.36	19377.31	20224.26	846.94	0.45
Salt River	218.05	500-yr W/P	243000.00	1121.17	1094.77	26.40	1111.48	1123.53	0.001331	12.32	19744.20	937.97	21.05	19366.13	20304.09	937.97	0.46
Salt River	218.05	SPF WO/P	289000.00	1124.01	1094.77	29.24	1113.21	1126.53	0.001249	12.83	23503.12	1356.14	17.33	19172.11	20528.25	1356.14	0.45
Salt River	217.95	10-yr W/P	55000.00	1105.54	1092.98	12.56	1100.90	1106.53	0.001771	7.98	6890.00	723.58	9.52	19446.83	20170.40	723.58	0.46
Salt River	217.95	50-yr W/P	140000.00	1112.97	1092.98	19.99	1106.57	1114.96	0.001729	11.31	12378.53	753.83	16.42	19431.63	20185.47	753.83	0.49
Salt River	217.95	100-yr W/P	169000.00	1115.03	1092.98	22.05	1107.99	1117.31	0.001726	12.13	13937.47	762.63	18.28	19427.00	20189.64	762.63	0.50
Salt River	217.95	500-yr W/P	243000.00	1119.74	1092.98	26.76	1111.28	1122.71	0.001704	13.83	17578.69	812.65	21.63	19418.14	20230.79	812.65	0.51
Salt River	217.95	SPF WO/P	289000.00	1122.41	1092.98	29.43	1113.17	1125.73	0.001652	14.64	20240.65	1140.99	17.74	19364.72	20505.71	1140.99	0.51
Salt River	217.86	10-yr W/P	55000.00	1104.71	1091.99	12.72	1099.69	1105.73	0.001530	8.09	6802.41	626.92	10.85	19508.73	20135.65	626.92	0.43
Salt River	217.86	50-yr W/P	140000.00	1111.58	1091.99	19.59	1105.43	1114.00	0.002001	12.49	11204.73	654.40	17.12	19495.17	20149.57	654.40	0.53

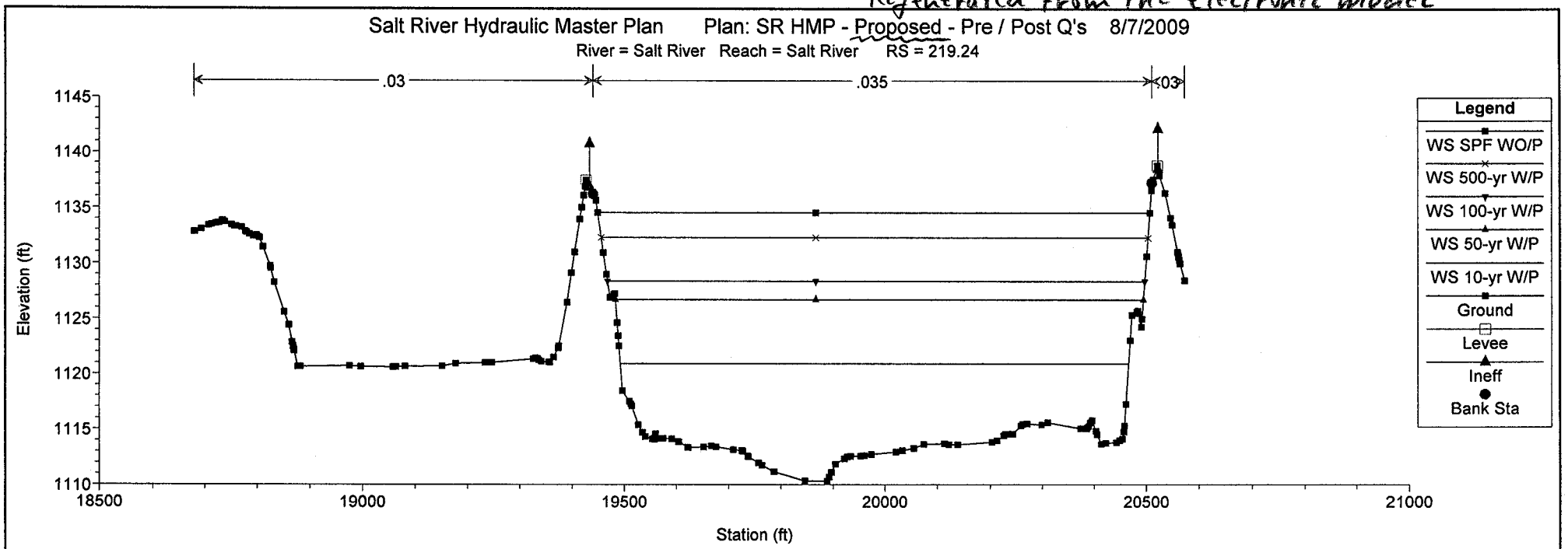
HEC-RAS Plan: Prop PrePost River: Salt River Reach: Salt River (Continued)

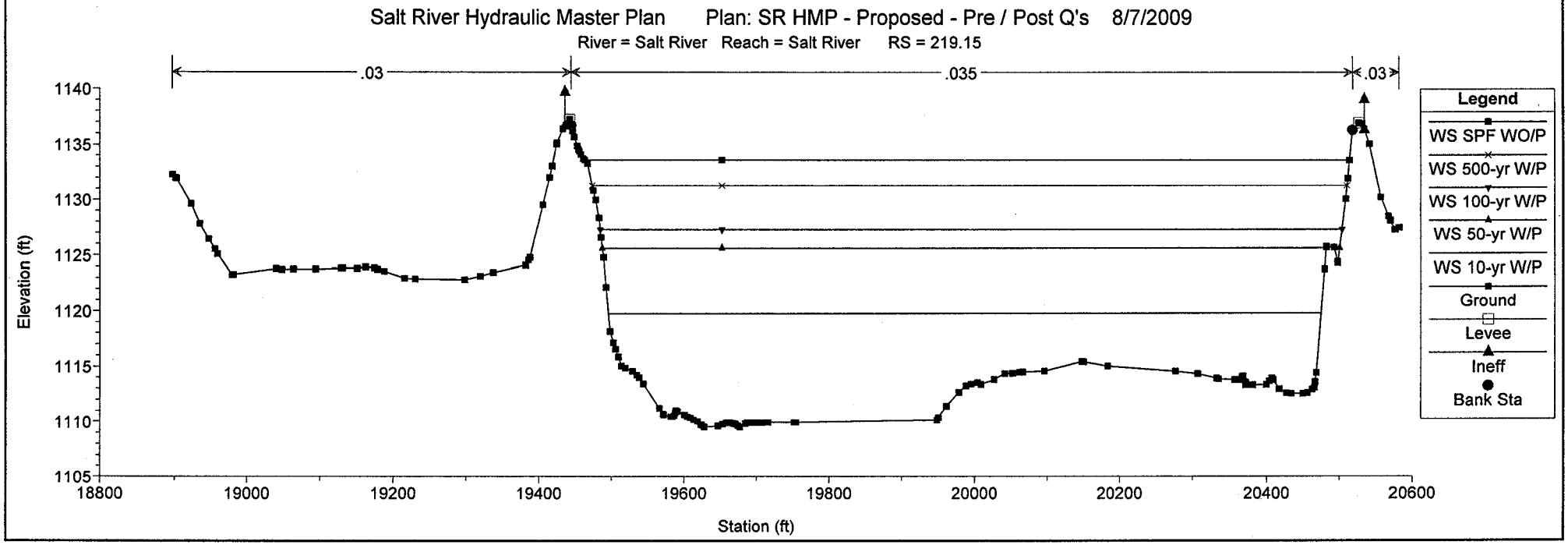
Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Salt River	217.86	100-yr W/P	169000.00	1113.46	1091.99	21.47	1107.02	1116.32	0.002092	13.58	12440.41	661.86	18.80	19491.51	20153.37	661.86	0.55
Salt River	217.86	500-yr W/P	243000.00	1117.75	1091.99	25.76	1110.69	1121.66	0.002247	15.86	15318.42	679.67	22.54	19482.40	20162.07	679.67	0.59
Salt River	217.86	SPF WO/P	289000.00	1120.19	1091.99	28.20	1112.75	1124.67	0.002280	16.99	17247.24	955.04	18.06	19476.42	20431.46	955.04	0.60
Salt River	217.76	10-yr W/P	55000.00	1102.94	1091.00	11.94	1100.23	1104.57	0.003187	10.25	5363.64	600.87	8.93	19578.76	20179.63	600.87	0.60
Salt River	217.76	50-yr W/P	140000.00	1108.45	1091.00	17.45	1106.02	1112.40	0.004307	15.95	8778.15	633.67	13.85	19557.00	20190.66	633.67	0.76
Salt River	217.76	100-yr W/P	169000.00	1109.91	1091.00	18.91	1107.60	1114.61	0.004559	17.41	9704.69	640.21	15.16	19553.36	20193.57	640.21	0.79
Salt River	217.76	500-yr W/P	243000.00	1113.15	1091.00	22.15	1111.29	1119.73	0.005054	20.58	11805.22	653.35	18.07	19546.72	20200.07	653.35	0.85
Salt River	217.76	SPF WO/P	289000.00	1114.96	1091.00	23.96	1113.37	1122.64	0.005291	22.25	12990.20	661.61	19.63	19542.06	20203.67	661.61	0.88
Salt River	217.67	10-yr W/P	55000.00	1101.76	1087.30	14.46	1098.39	1103.03	0.002622	9.04	6085.89	712.61	8.54	19580.84	20293.45	712.61	0.54
Salt River	217.67	50-yr W/P	140000.00	1107.25	1087.30	19.95	1103.89	1110.24	0.003328	13.87	10092.96	740.96	13.62	19562.71	20303.66	740.96	0.66
Salt River	217.67	100-yr W/P	169000.00	1108.79	1087.30	21.49	1105.32	1112.30	0.003430	15.04	11237.67	746.93	15.05	19559.59	20306.53	746.93	0.68
Salt River	217.67	500-yr W/P	243000.00	1112.35	1087.30	25.05	1108.63	1117.08	0.003567	17.45	13926.09	761.22	18.29	19551.94	20313.16	761.22	0.72
Salt River	217.67	SPF WO/P	289000.00	1114.41	1087.30	27.11	1110.50	1119.81	0.003589	18.65	15498.25	769.55	20.14	19547.43	20316.98	769.55	0.73
Salt River	217.57	10-yr W/P	55000.00	1100.69	1088.30	12.39	1097.28	1101.69	0.002306	8.01	6863.62	872.39	7.87	19535.17	20431.18	872.39	0.50
Salt River	217.57	50-yr W/P	140000.00	1106.37	1088.30	18.07	1102.16	1108.50	0.002524	11.72	11943.30	912.38	13.09	19522.87	20435.25	912.38	0.57
Salt River	217.57	100-yr W/P	169000.00	1108.06	1088.30	19.76	1103.42	1110.49	0.002474	12.53	13486.85	916.69	14.71	19519.30	20435.99	916.69	0.58
Salt River	217.57	500-yr W/P	243000.00	1112.01	1088.30	23.70	1106.32	1115.13	0.002351	14.19	17124.90	925.94	18.49	19511.03	20436.97	925.94	0.58
Salt River	217.57	SPF WO/P	289000.00	1114.29	1088.30	25.99	1107.92	1117.79	0.002278	15.02	19243.66	931.12	20.67	19506.42	20437.54	931.12	0.58
Salt River	217.48	10-yr W/P	55000.00	1099.74	1089.15	10.59	1096.56	1100.58	0.002105	7.36	7472.99	1012.27	7.38	19452.87	20465.13	1012.27	0.48
Salt River	217.48	50-yr W/P	140000.00	1105.63	1089.15	16.48	1100.78	1107.30	0.001964	10.37	13502.96	1035.72	13.04	19439.71	20475.42	1035.72	0.51
Salt River	217.48	100-yr W/P	169000.00	1107.41	1089.15	18.26	1101.92	1109.29	0.001881	11.00	15360.67	1042.79	14.73	19435.83	20478.62	1042.79	0.51
Salt River	217.48	500-yr W/P	243000.00	1111.58	1089.15	22.43	1104.52	1113.94	0.001726	12.31	19747.30	1060.90	18.61	19427.09	20487.99	1060.90	0.50
Salt River	217.48	SPF WO/P	289000.00	1113.99	1089.15	24.84	1106.03	1116.59	0.001646	12.95	22309.13	1070.07	20.85	19422.46	20492.53	1070.07	0.50
Salt River	217.39	10-yr W/P	55000.00	1098.36	1087.28	11.08	1096.00	1099.36	0.002765	8.01	6863.27	1003.62	6.84	19477.42	20481.04	1003.62	0.54
Salt River	217.39	50-yr W/P	140000.00	1104.46	1087.28	17.18	1100.01	1106.25	0.002173	10.71	13066.79	1029.09	12.70	19465.08	20494.17	1029.09	0.53
Salt River	217.39	100-yr W/P	169000.00	1106.33	1087.28	19.05	1101.13	1108.30	0.002023	11.27	14996.04	1036.72	14.46	19461.04	20497.76	1036.72	0.52
Salt River	217.39	500-yr W/P	243000.00	1110.63	1087.28	23.35	1103.76	1113.04	0.001789	12.47	19491.83	1054.33	18.49	19451.81	20506.14	1054.33	0.51
Salt River	217.39	SPF WO/P	289000.00	1113.09	1087.28	25.81	1105.27	1115.75	0.001688	13.08	22101.22	1064.12	20.77	19446.98	20511.10	1064.12	0.51
Salt River	217.29	10-yr W/P	55000.00	1096.99	1082.79	14.20	1094.50	1098.01	0.002717	8.08	6808.42	967.47	7.04	19524.09	20491.56	967.47	0.54
Salt River	217.29	50-yr W/P	140000.00	1103.44	1082.79	20.65	1098.59	1105.20	0.002054	10.67	13122.87	993.13	13.21	19511.75	20504.88	993.13	0.52
Salt River	217.29	100-yr W/P	169000.00	1105.38	1082.79	22.58	1099.81	1107.33	0.001914	11.22	15056.44	1000.93	15.04	19508.03	20508.96	1000.93	0.51
Salt River	217.29	500-yr W/P	243000.00	1109.77	1082.79	26.98	1102.52	1112.18	0.001718	12.47	19493.77	1019.04	19.13	19499.17	20518.21	1019.04	0.50
Salt River	217.29	SPF WO/P	289000.00	1112.26	1082.79	29.47	1104.05	1114.93	0.001636	13.11	22048.76	1029.45	21.42	19494.01	20523.46	1029.45	0.50
Salt River	217.20	10-yr W/P	55000.00	1095.53	1082.28	13.25	1093.07	1096.60	0.002777	8.30	6624.92	919.37	7.21	19577.24	20496.61	919.37	0.55
Salt River	217.20	50-yr W/P	140000.00	1102.37	1082.28	20.09	1097.32	1104.17	0.001980	10.76	13012.48	946.88	13.74	19563.60	20510.47	946.88	0.51
Salt River	217.20	100-yr W/P	169000.00	1104.37	1082.28	22.09	1098.52	1106.36	0.001855	11.33	14911.94	955.03	15.61	19559.48	20514.50	955.03	0.51
Salt River	217.20	500-yr W/P	243000.00	1108.81	1082.28	26.53	1101.31	1111.30	0.001699	12.66	19194.63	972.88	19.73	19550.18	20523.06	972.88	0.50
Salt River	217.20	SPF WO/P	289000.00	1111.32	1082.28	29.04	1102.90	1114.08	0.001635	13.35	21643.09	982.94	22.02	19544.93	20527.87	982.94	0.50
Salt River	217.10	10-yr W/P	55000.00	1094.60	1082.61	11.99	1090.89	1095.44	0.001736	7.33	7504.55	877.96	8.55	19622.14	20500.09	877.96	0.44
Salt River	217.10	50-yr W/P	140000.00	1101.63	1082.61	19.02	1095.33	1103.23	0.001558	10.16	13775.40	907.42	15.18	19607.16	20514.57	907.42	0.46
Salt River	217.10	100-yr W/P	169000.00	1103.65	1082.61	21.04	1096.58	1105.47	0.001513	10.82	15622.15	916.00	17.05	19602.78	20518.78	916.00	0.46
Salt River	217.10	500-yr W/P	243000.00	1108.11	1082.61	25.50	1099.48	1110.46	0.001475	12.30	19750.69	934.99	21.12	19593.05	20528.04	934.99	0.47
Salt River	217.10	SPF WO/P	289000.00	1110.62	1082.61	28.01	1101.10	1113.28	0.001456	13.07	22108.44	945.53	23.38	19587.71	20533.24	945.53	0.48
Salt River	217.01	10-yr W/P	55000.00	1093.67	1080.76	12.91	1090.27	1094.56	0.001903	7.57	7260.89	872.29	8.32	19628.17	20500.46	872.29	0.46
Salt River	217.01	50-yr W/P	140000.00	1100.83	1080.76	20.06	1094.56	1102.47	0.001593	10.29	13608.45	900.91	15.11	19613.61	20514.52	900.91	0.47
Salt River	217.01	100-yr W/P	169000.00	1102.88	1080.76	22.12	1095.88	1104.73	0.001536	10.93	15466.75	909.11	17.01	19609.39	20518.50	909.11	0.47
Salt River	217.01	500-yr W/P	243000.00	1107.35	1080.76	26.59	1098.81	1109.75	0.001490	12.41	19574.40	926.88	21.12	19600.31	20527.19	926.88	0.48
Salt River	217.01	SPF WO/P	289000.00	1109.87	1080.76	29.11	1100.44	1112.57	0.001469	13.19	21915.68	936.69	23.40	19595.38	20532.07	936.69	0.48
Salt River	216.91	10-yr W/P	55000.00	1092.85	1080.48	12.37	1088.63	1093.65	0.001585	7.18	7657.02	868.48	8.82	19621.43	20489.92	868.48	0.43
Salt River	216.91	50-yr W/P	140000.00	1100.15	1080.48	19.67	1093.37	1101.68	0.001408	9.92	14108.47	899.03	15.69	19607.11	20506.13	899.03	0.44

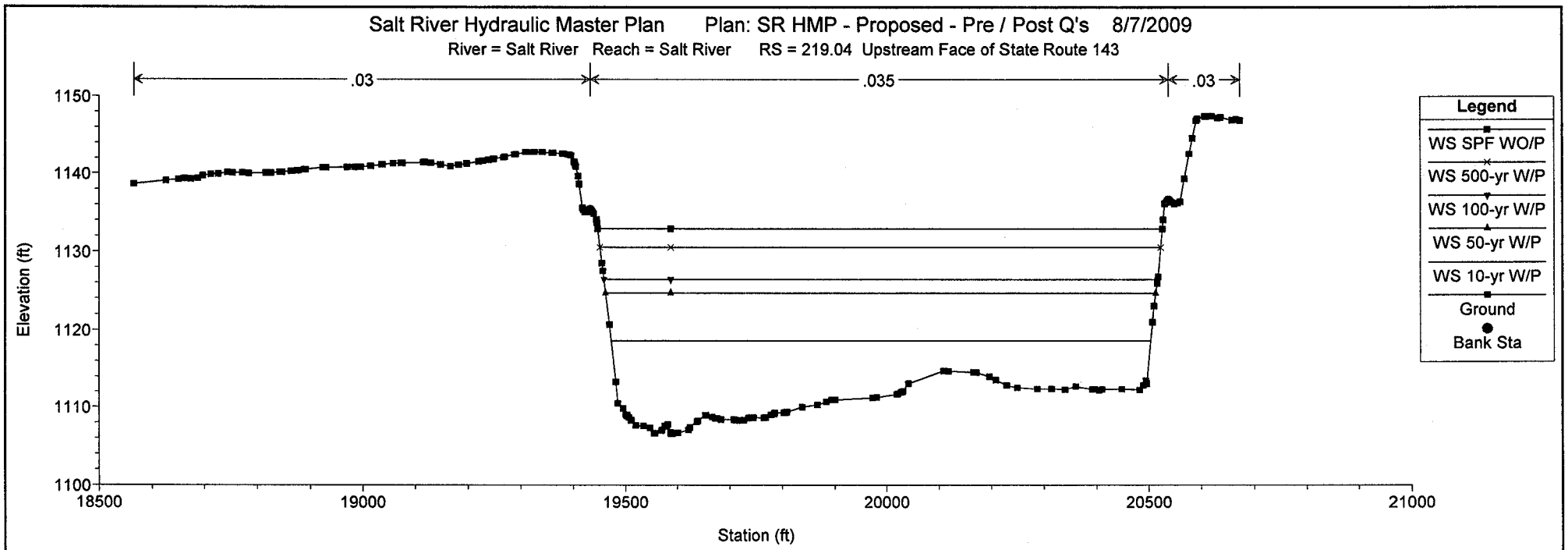
HEC-RAS Plan: Prop PrePost River: Salt River Reach: Salt River (Continued)

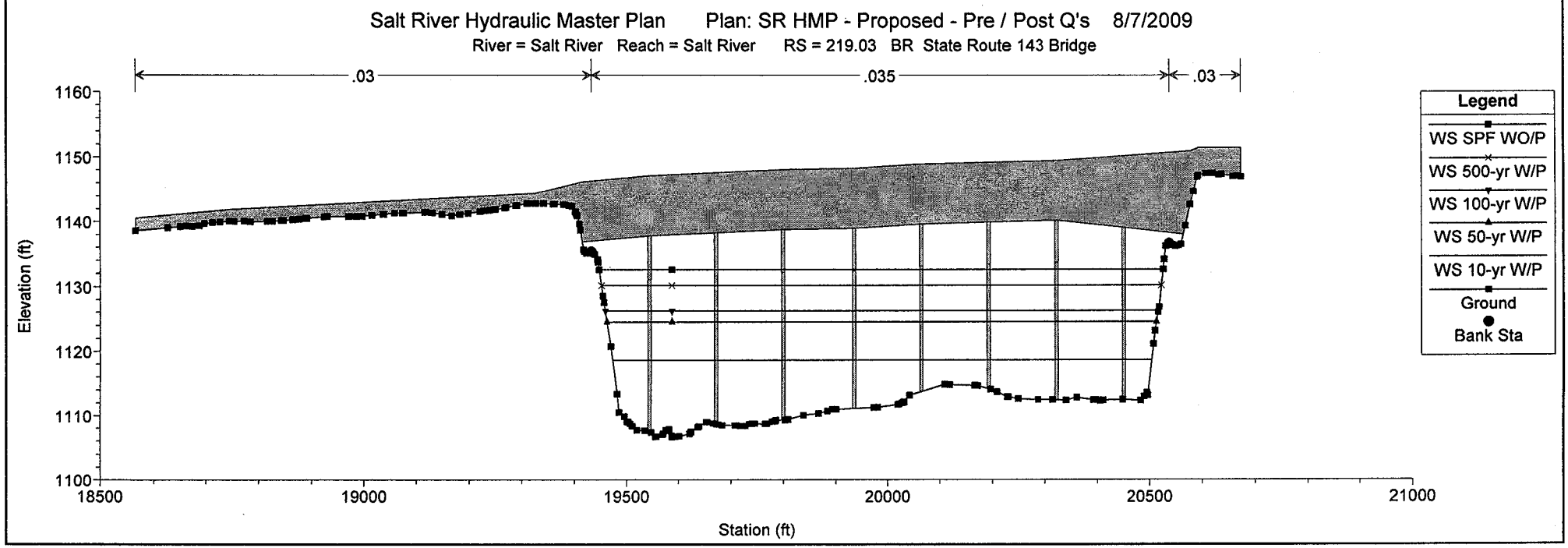
Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Max Chl Dpth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Hydr Depth	Sta W.S. Lft	Sta W.S. Rgt	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Salt River	216.91	100-yr W/P	169000.00	1102.23	1080.48	21.75	1094.63	1103.96	0.001371	10.57	15985.33	906.73	17.63	19603.19	20509.92	906.73	0.44
Salt River	216.91	500-yr W/P	243000.00	1106.72	1080.48	26.24	1097.56	1108.99	0.001362	12.09	20098.96	925.62	21.71	19592.73	20518.35	925.62	0.46
Salt River	216.91	SPF WO/P	289000.00	1109.24	1080.48	28.76	1099.21	1111.81	0.001353	12.88	22446.49	935.33	24.00	19587.98	20523.31	935.33	0.46
Salt River	216.82	10-yr W/P	55000.00	1092.22	1080.42	11.80	1087.56	1092.92	0.001234	6.71	8190.98	852.69	9.61	19629.88	20482.57	852.69	0.38
Salt River	216.82	50-yr W/P	140000.00	1099.55	1080.42	19.13	1092.06	1100.98	0.001243	9.61	14566.58	887.33	16.42	19610.33	20497.66	887.33	0.42
Salt River	216.82	100-yr W/P	169000.00	1101.64	1080.42	21.22	1093.32	1103.28	0.001231	10.29	16429.69	896.80	18.32	19604.46	20501.27	896.80	0.42
Salt River	216.82	500-yr W/P	243000.00	1106.12	1080.42	25.70	1096.26	1108.30	0.001260	11.86	20496.51	918.04	22.33	19591.97	20510.01	918.04	0.44
Salt River	216.82	SPF WO/P	289000.00	1108.64	1080.42	28.22	1097.98	1111.13	0.001267	12.66	22825.17	929.38	24.56	19585.96	20515.34	929.38	0.45
Salt River	216.72	10-yr W/P	55000.00	1091.70	1077.60	14.10	1086.59	1092.33	0.001058	6.40	8590.83	855.94	10.04	19619.33	20475.27	855.94	0.36
Salt River	216.72	50-yr W/P	140000.00	1099.01	1077.60	21.41	1091.07	1100.37	0.001139	9.35	14976.50	890.65	16.82	19599.09	20489.74	890.65	0.40
Salt River	216.72	100-yr W/P	169000.00	1101.10	1077.60	23.50	1092.33	1102.67	0.001139	10.03	16852.70	901.32	18.70	19592.35	20493.67	901.32	0.41
Salt River	216.72	500-yr W/P	243000.00	1105.57	1077.60	27.97	1095.32	1107.67	0.001182	11.61	20930.07	922.30	22.69	19579.75	20502.05	922.30	0.43
Salt River	216.72	SPF WO/P	289000.00	1108.09	1077.60	30.49	1096.99	1110.49	0.001195	12.42	23266.44	933.30	24.93	19574.22	20507.52	933.30	0.44
Salt River	216.63	10-yr W/P	55000.00	1090.86	1076.61	14.25	1086.81	1091.67	0.001568	7.23	7605.36	847.81	8.97	19617.33	20465.14	847.81	0.43
Salt River	216.63	50-yr W/P	140000.00	1098.12	1076.61	21.51	1091.35	1099.70	0.001444	10.07	13903.03	884.28	15.72	19597.48	20481.76	884.28	0.45
Salt River	216.63	100-yr W/P	169000.00	1100.22	1076.61	23.61	1092.65	1102.00	0.001404	10.72	15766.71	893.04	17.66	19592.83	20485.88	893.04	0.45
Salt River	216.63	500-yr W/P	243000.00	1104.64	1076.61	28.03	1095.64	1106.99	0.001414	12.30	19753.65	913.18	21.63	19582.65	20495.83	913.18	0.47
Salt River	216.63	SPF WO/P	289000.00	1107.13	1076.61	30.52	1097.32	1109.80	0.001413	13.11	22051.55	925.87	23.82	19576.04	20501.91	925.87	0.47
Salt River	216.53	10-yr W/P	55000.00	1090.19	1077.04	13.15	1085.63	1090.91	0.001307	6.83	8057.11	853.35	9.44	19626.67	20480.02	853.35	0.39
Salt River	216.53	50-yr W/P	140000.00	1097.51	1077.04	20.47	1090.14	1098.96	0.001296	9.67	14476.02	901.73	16.05	19605.37	20507.11	901.73	0.43
Salt River	216.53	100-yr W/P	169000.00	1099.62	1077.04	22.58	1091.43	1101.27	0.001332	10.30	16412.30	986.39	16.64	19531.11	20517.50	986.39	0.44
Salt River	216.53	500-yr W/P	243000.00	1104.12	1077.04	27.08	1094.39	1106.23	0.001281	11.68	20964.76	1026.95	20.41	19522.70	20549.65	1026.95	0.44
Salt River	216.53	SPF WO/P	289000.00	1106.67	1077.04	29.63	1096.08	1109.04	0.001239	12.38	23600.64	1036.36	22.77	19517.97	20554.32	1036.36	0.44
Salt River	216.505		Bridge														
Salt River	216.49	10-yr W/P	55000.00	1089.75	1075.99	13.76		1090.48	0.001311	6.82	8070.36	860.09	9.38	19631.18	20491.28	860.09	0.39
Salt River	216.49	50-yr W/P	140000.00	1096.97	1075.99	20.98		1098.43	0.001308	9.70	14426.24	901.28	16.01	19610.38	20511.66	901.28	0.43
Salt River	216.49	100-yr W/P	169000.00	1099.04	1075.99	23.05		1100.71	0.001341	10.35	16338.72	979.60	16.68	19544.38	20542.27	979.60	0.44
Salt River	216.49	500-yr W/P	243000.00	1103.50	1075.99	27.51		1105.64	0.001287	11.76	20817.93	1014.38	20.52	19536.51	20550.89	1014.38	0.45
Salt River	216.49	SPF WO/P	289000.00	1106.04	1075.99	30.05		1108.44	0.001248	12.47	23408.27	1023.75	22.87	19531.59	20555.34	1023.75	0.45
Salt River	216.42	10-yr W/P	55000.00	1089.40	1075.34	14.06	1084.51	1090.05	0.001127	6.44	8537.77	883.71	9.66	19567.36	20451.07	883.71	0.37
Salt River	216.42	50-yr W/P	140000.00	1096.65	1075.34	21.31	1088.95	1097.98	0.001170	9.27	15107.59	930.64	16.23	19544.55	20475.19	930.64	0.41
Salt River	216.42	100-yr W/P	169000.00	1098.72	1075.34	23.38	1090.21	1100.25	0.001178	9.91	17059.41	982.01	17.37	19500.52	20482.53	982.01	0.41
Salt River	216.42	500-yr W/P	243000.00	1103.27	1075.34	27.93	1093.12	1105.16	0.001125	11.12	22524.50	1249.16	18.03	19254.09	20503.25	1249.16	0.42
Salt River	216.42	SPF WO/P	289000.00	1106.13	1075.34	30.79	1094.77	1107.88	0.000941	10.97	28982.80	1815.30	15.97	18689.07	20511.35	1815.30	0.39
Salt River	216.34	10-yr W/P	55000.00	1088.99	1073.65	15.34	1083.93	1089.55	0.001001	6.01	9146.84	960.18	9.53	19440.42	20400.60	960.18	0.34
Salt River	216.34	50-yr W/P	140000.00	1096.31	1073.65	22.66	1088.15	1097.45	0.001001	8.57	16344.10	1007.09	16.23	19416.15	20423.24	1007.09	0.37
Salt River	216.34	100-yr W/P	169000.00	1098.40	1073.65	24.75	1089.36	1099.70	0.000989	9.15	18467.30	1020.45	18.10	19409.40	20429.85	1020.45	0.38
Salt River	216.34	500-yr W/P	243000.00	1102.93	1073.65	29.27	1092.12	1104.64	0.001002	10.50	23151.39	1050.73	22.03	19394.69	20445.42	1050.73	0.39
Salt River	216.34	SPF WO/P	289000.00	1105.49	1073.65	31.84	1093.67	1107.43	0.001001	11.17	25874.70	1070.37	24.17	19385.03	20455.39	1070.37	0.40

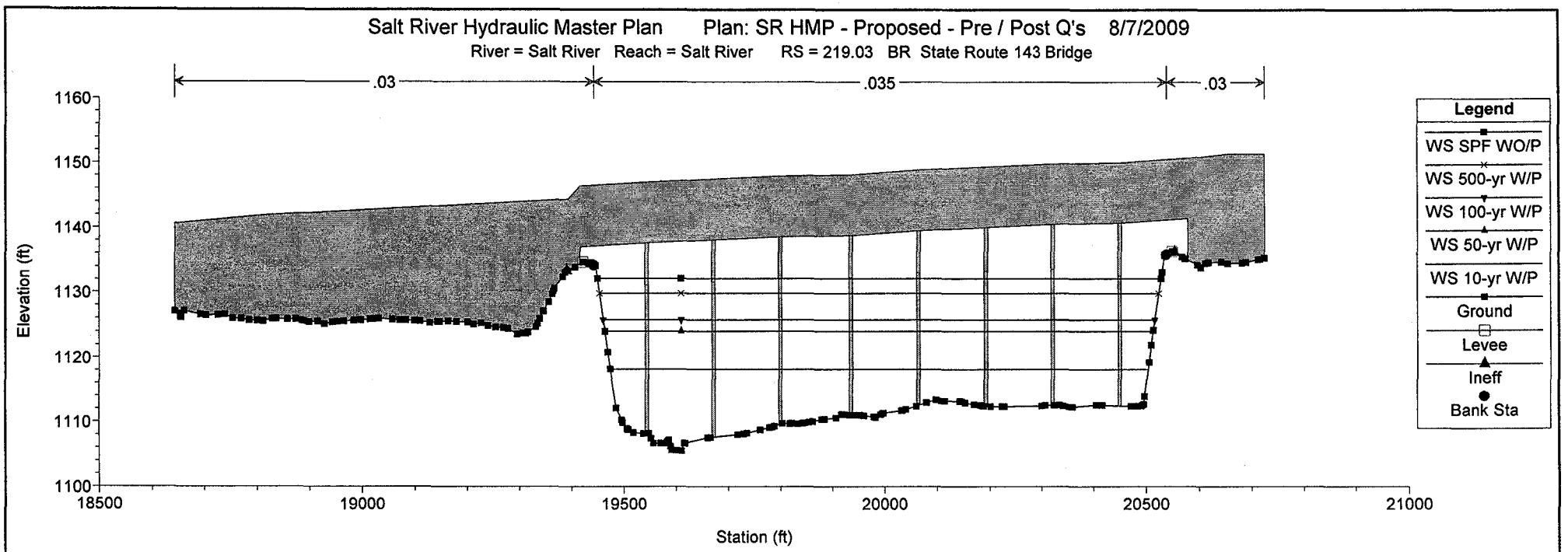
Regenerated from the electronic model






Salt River Hydraulic Master Plan Plan: SR HMP - Proposed - Pre / Post Q's 8/7/2009
River = Salt River Reach = Salt River RS = 219.04 Upstream Face of State Route 143
.03
.035
.03
Elevation (ft)
1150
1140
1130
1120
1110
1100
18500
19000
19500
20000
20500
21000
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Bank Sta


Salt River Hydraulic Master Plan Plan: SR HMP - Proposed - Pre / Post Q's 8/7/2009
River = Salt River Reach = Salt River RS = 219.03 BR State Route 143 Bridge
.03
.035
.03
Elevation (ft)
1160
1150
1140
1130
1120
1110
1100
18500
19000
19500
20000
20500
21000
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Bank Sta


Salt River Hydraulic Master Plan Plan: SR HMP - Proposed - Pre / Post Q's 8/7/2009
River = Salt River Reach = Salt River RS = 219.03 BR State Route 143 Bridge
.03
.035
.03
Elevation (ft)
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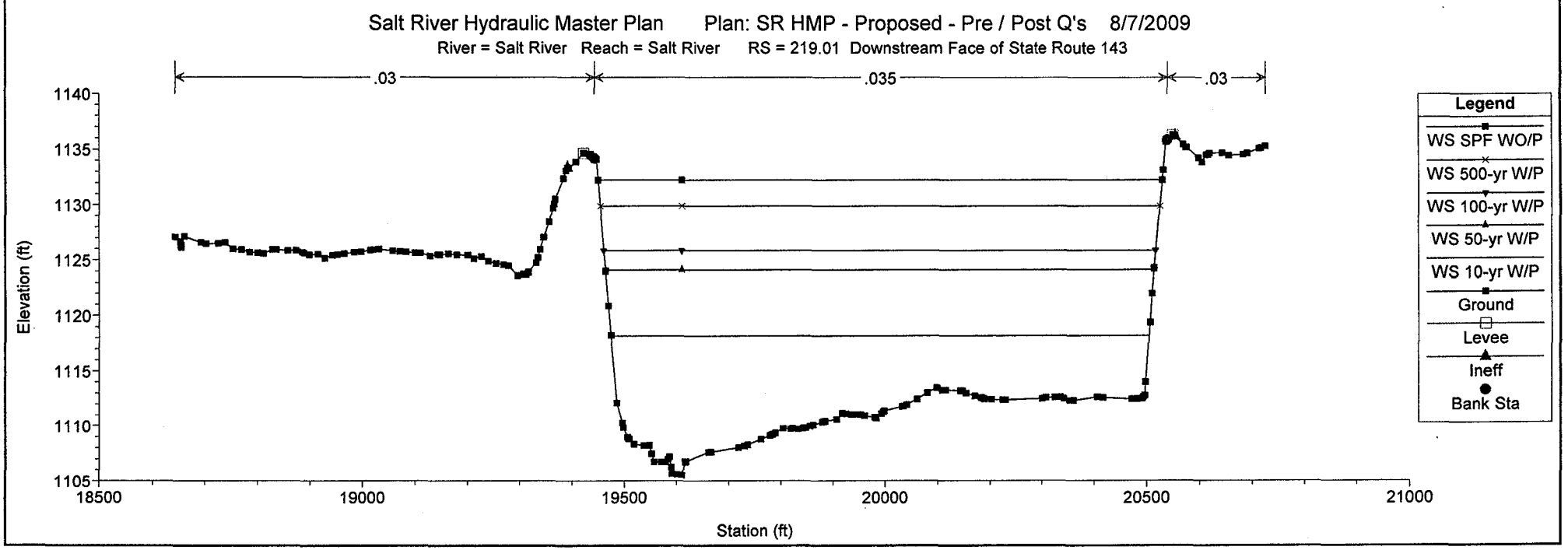
1150
1140
1130
1120
1110
1100
18500
19000
19500
20000
20500
21000
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Levee
Ineff
Bank Sta


Salt River Hydraulic Master Plan Plan: SR HMP - Proposed - Pre / Post Q's 8/7/2009
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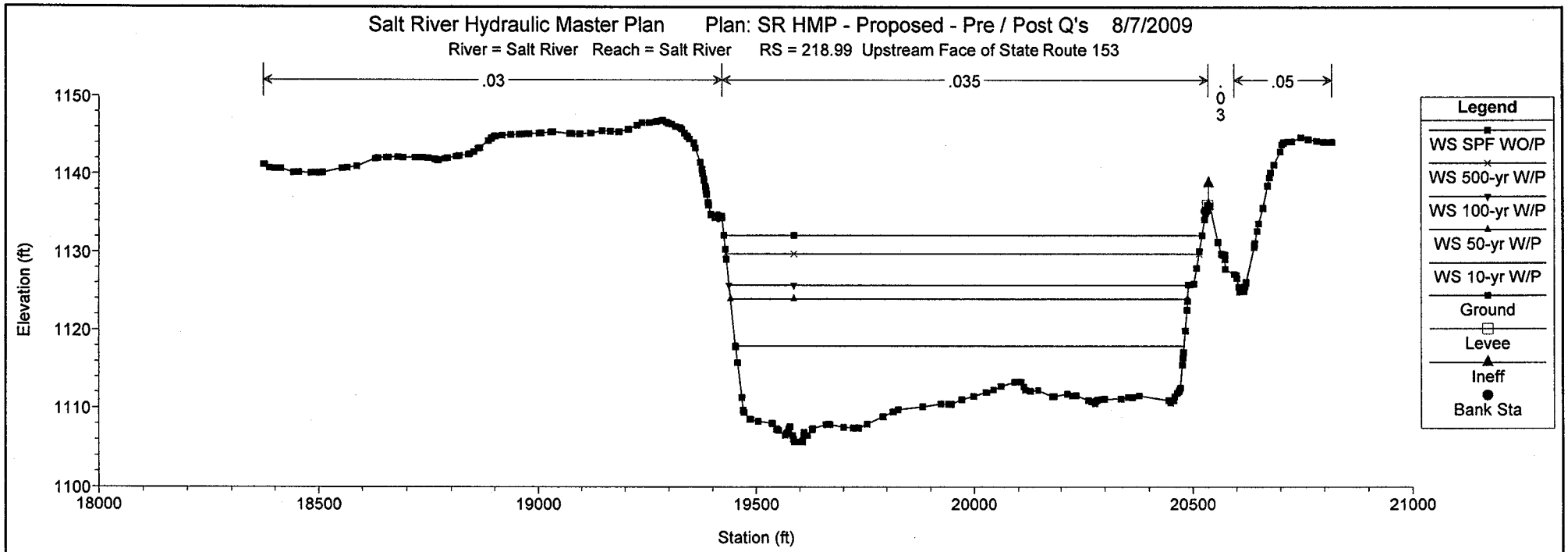
.03
.035
.03
Elevation (ft)
1140
1135
1130
1125
1120
1115
1110
1105
18500
19000
19500
20000
20500
21000
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Levee
Ineff
Bank Sta


Salt River Hydraulic Master Plan Plan: SR HMP - Proposed - Pre / Post Q's 8/7/2009
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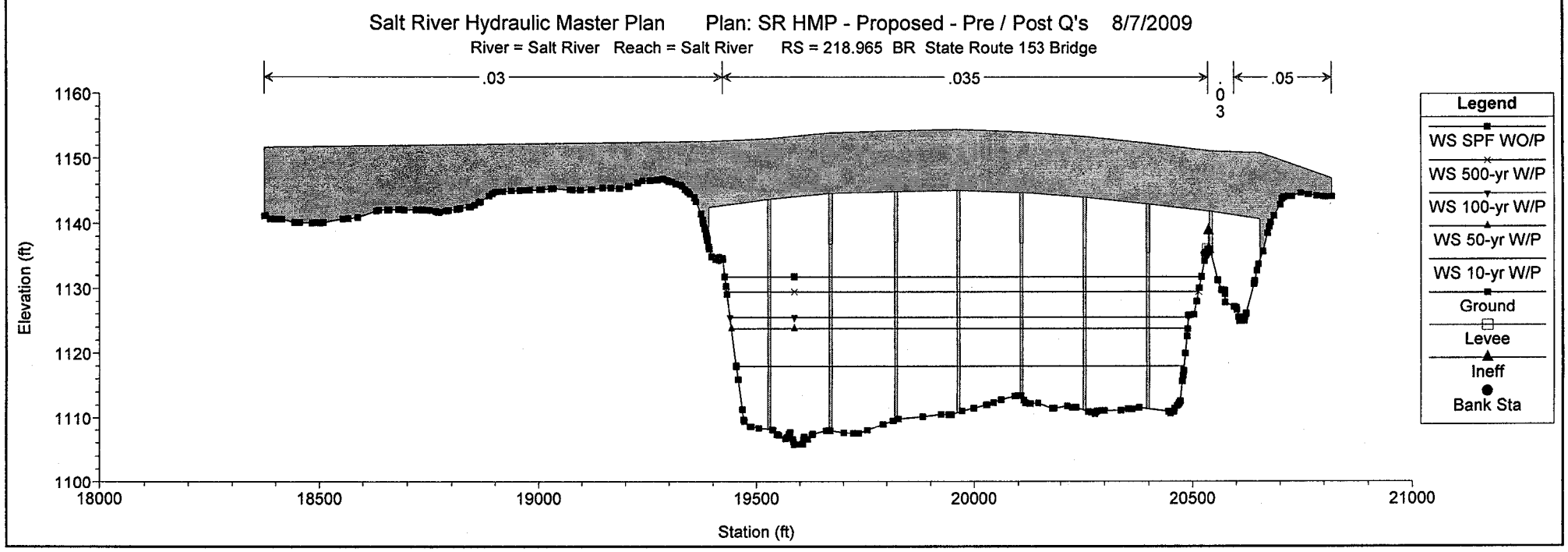
.03
.035
.03
.05
Elevation (ft)
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Levee
Ineff
Bank Sta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.03
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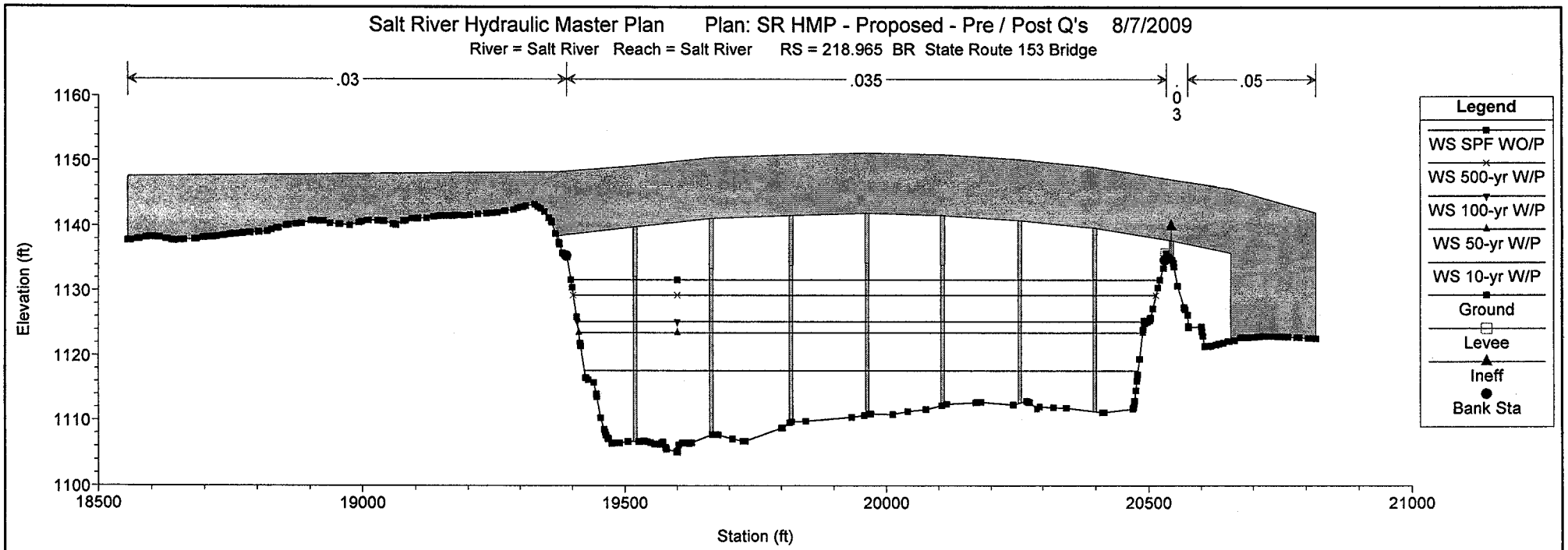
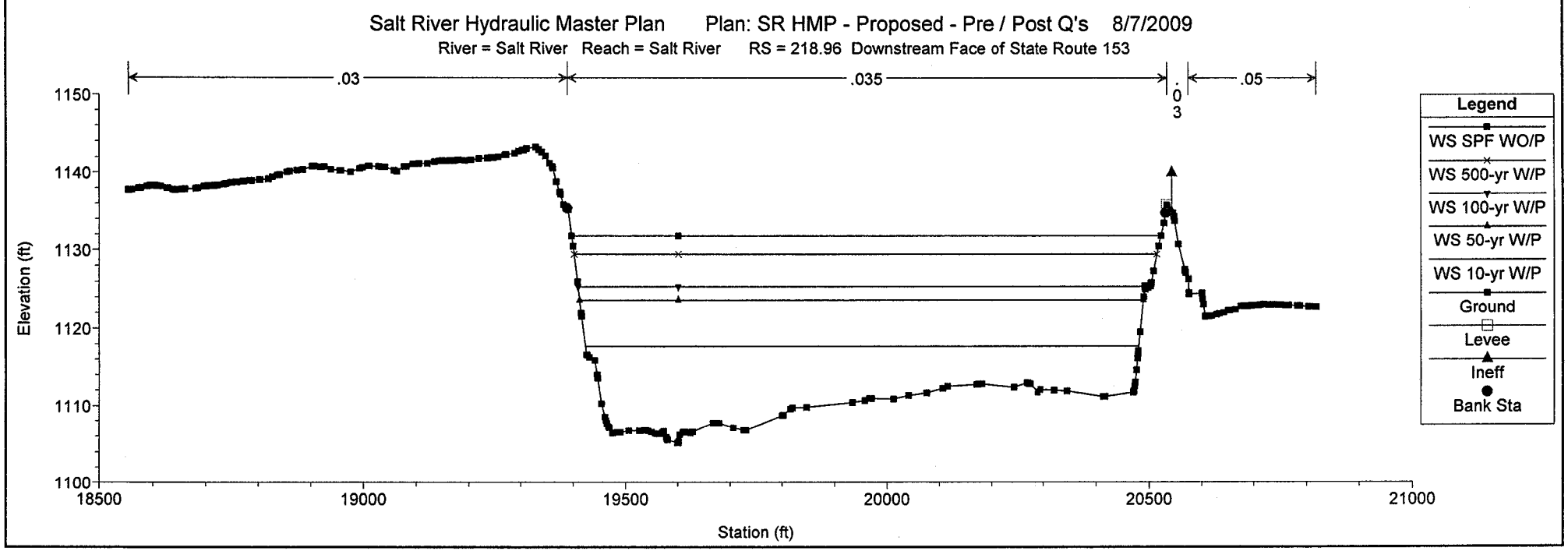
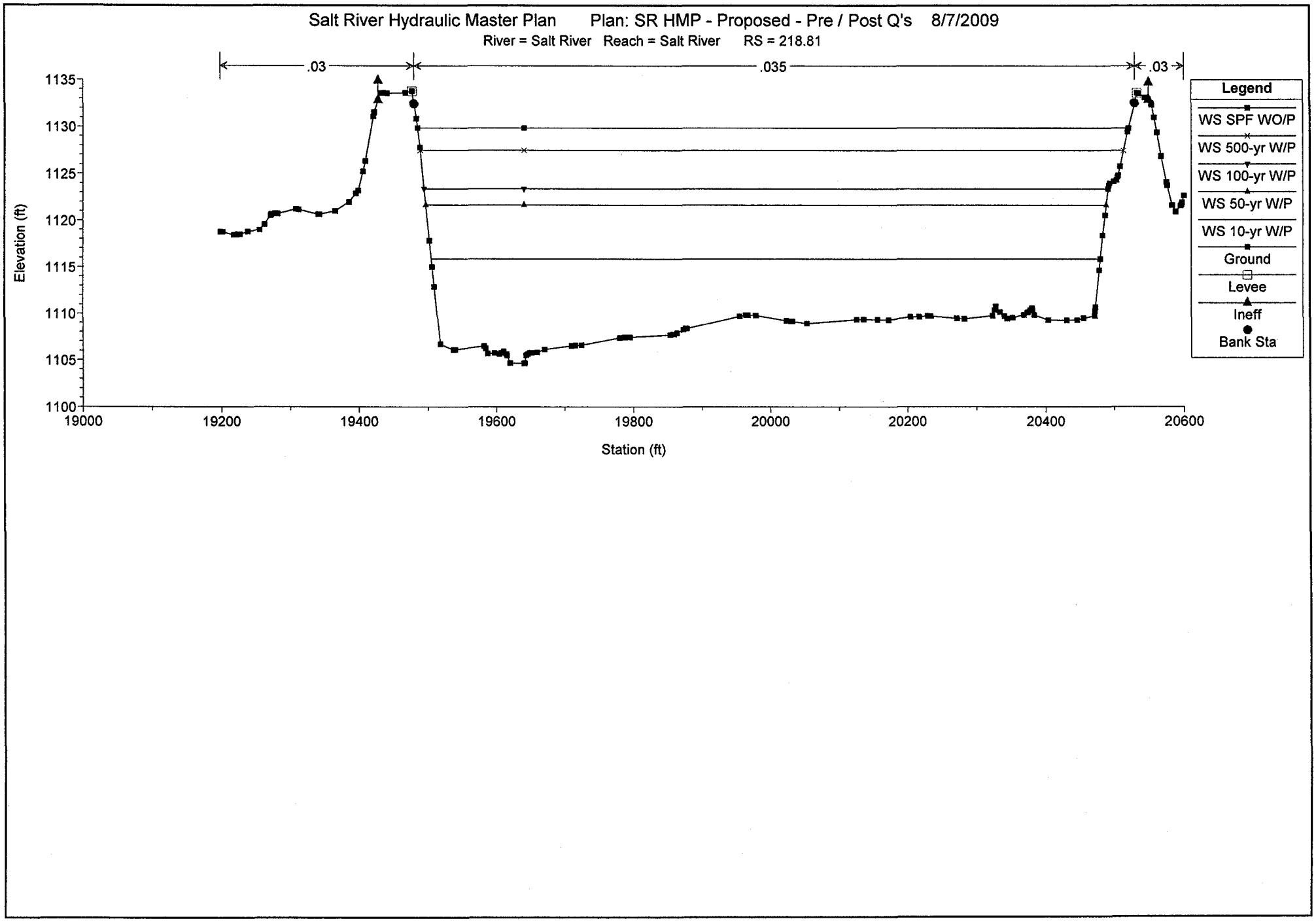
.03
.05
Elevation (ft)
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Levee
Ineff
Bank Sta


Salt River Hydraulic Master Plan Plan: SR HMP - Proposed - Pre / Post Q's 8/7/2009
River = Salt River Reach = Salt River RS = 218.965 BR State Route 153 Bridge
.03
.035
.03
.05
Elevation (ft)
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Levee
Ineff
Bank Sta


Salt River Hydraulic Master Plan Plan: SR HMP - Proposed - Pre / Post Q's 8/7/2009
River = Salt River Reach = Salt River RS = 218.96 Downstream Face of State Route 153
.03
.035
.03
.05
Elevation (ft)
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Levee
Ineff
Bank Sta


Salt River Hydraulic Master Plan Plan: SR HMP - Proposed - Pre / Post Q's 8/7/2009
River = Salt River Reach = Salt River RS = 218.81
.03
.035
.03
Elevation (ft)
1135
1130
1125
1120
1115
1110
1105
1100
19000
19200
19400
19600
19800
20000
20200
20400
20600
Station (ft)
Legend
WS SPF WO/P
WS 500-yr W/P
WS 100-yr W/P
WS 50-yr W/P
WS 10-yr W/P
Ground
Levee
Ineff
Bank Sta

Appendix G Scour Analysis

Project:	SR143/Sky Harbor TI
Project # :	191543000
Date:	11/11/2009
Comp by:	GA
Rev by:	RAE

Total Scour Depth Estimate-ADOT Procedures (see attached components calculations)[3]

Design Storm Frequency	Peak Flow (cfs)	Contraction[1] Scour (ft)	Long Term Scour (ft)	Calculated cont+Long Term Scour (ft)	Pier Scour (ft)	Total[2] Scour depth Required (ft)
100-Yr post-dam modif.	169,000	0.52	0.99	1.51	20.40	21.91
500-Yr post-dam modif.	243,000	0.65	0.99	1.64	22.00	23.64

1- Contraction Scour was estimated using Laursen Equation

2- Design Scour Elevation for existing piers=1078.00 ft (NGVD29); Available Scour depth from current river bed bottom =1106.59-1078.00 =28.59 ft.
Accodingly, 28.59 ft would be the minimum design scour depth considered for this set of calculations

3- The applicable components are decribed in section 7 of this drainage report

Total Scour Depth Estimate-FCDMC Procedures (see attached components calculations)[7]

Design Storm Frequency	Peak Flow (cfs)	General Scour Blench Eq. (ft)	General Scour Lacey Eq. (ft)	General[1] Scour Average value (ft)	Long[2] Term (LT) Scour (ft)	Low[3] Flow (LF) Scour (ft)	Calculated[4] Gen+LT+LF Scour (ft)	Applied Safety Factor (SF)	Gen+LT+LF Scour with SF (ft)	Applic[5] Gen+LT+LF Scour (ft)	Pier Scour (ft)	Safety[6] Factor for Pier	Pier Scour W/SF (ft)	Total Scour Depth Required (ft)
100-Yr post-dam modif.	169,000	10.33	2.60	6.47	0.00	1.00	7.47	1.30	9.70	10.00	20.40	1.00	20.40	30.40
500-Yr post-dam modif.	243,000	13.05	2.93	7.99	0.00	1.00	8.99	1.30	11.69	11.69	22.00	1.00	22.00	33.69

1- Per the FCDMC, the general scour depth was estimated as the average of the Blench and Lacy equations

2- Per the FCDMC, since the calculated equilibrium slope is close to the existing bed slope, long term scour is considered to be zero feet.

3- As recommended by the FCDMC.

4- Bed form scour is accounted for in the pier scour calculations by applying the factor K3=1.1

5- Per the FCDMC practice, if the sum of the of scour components for long, general, bed form, and low flow scour is less than 10 ft (for a straigh reach), a minimum of 10 ft is considered.

6- Per the FCDMC criteria, if debris width is considered in the pier scour calculations, a SF of 1.0 can be used for Pier scour.

7- The applicable components are decribed in section 7 of this drainage report

Design Scour Depth

Design Storm Frequency	Gen+LT+LF Scour Depth (ft)	Pier Scour Depth (ft)	Total Scour Depth (ft)	Bed Elev (NGVD29) (ft)	Design Scour Elev (NGVD29) (ft)	Bed Elev (NAVD88) (ft)	Design Scour Elev (NAVD88) (ft)
100-Yr post-dam modif.	10.00	20.40	30.40	1106.59	1076.19	1108.51	1078.11
500-Yr post-dam modif.	11.69	22.00	33.69	1106.59	1072.90	1108.51	1074.82

Project:	SR 143/Sky harbor TI
Proj. No:	191543000
Date:	7/17/2009
Prep by:	GA
Rev by:	RAE

Long Term Scour Estimate - Using the Stable (Equilibrium) Slope Analysis Method

Reference: Computing Degradation and Local Scour, by Ernest L. Pemberton and Joseph M. Lara, Technical Guidelines for Bureau of Reclamation, January, 1984.

Stable (Equilibrium) Slope Analysis						Long Term Scour								
Schoklitch Method														
Location/ Sec. No.	Average Grain Size D_{50} (mm)	Dominant Discharge Storm (cfs)	Dominant Discharge Q (cfs)	Bankfull Width B (ft)	Equilib. Slope S_L (ft/ft)	Location/ Sec. No.	Pivot (Control) Point Location	Distance to Pivot Point L_w (ft)	Channel* Bed Elev at Upst Section (ft)	Channel* Bed Elev at Pivot Point (ft)	Existing Bed Slope S_{ex} (ft/ft)	Equilib. Slope S_l (ft/ft)	Slope Degradat. (S_{ex}-S_l) ΔS (ft/ft)	Long Term Scour Z_{lt} (ft)
219.04	79.20	10-Yr	55,000.0	928.0	0.00216	219.04	HMP HEC-RAS Sec. 217.76	6,749.0	1106.59	1091.00	0.00231	0.00216	0.00015	0.99

Schoklitsch Method (Zero bed transport)

$S_L=K(DB/Q)^{3/4}$

S_L=Stable slope, (ft/ft)

K=.00174

D=Mean particle size, D_{50} (mm)

B=Channel Width (bankfull width), (ft)

Q=Dominant discharge, (cfs)

Notes:

*: Elevations based on NGVD29 datum

Contarction Scour (a form of General Scour)	Project:	SR143/Sky Harbor TI
"Live Bed" or "Clear Water" Conditions	Project # :	191543000
[Reference: HEC 18, 2001]	Date:	8/6/2009
	Prep by:	GA
	Rev by:	RAE

Base sheet prepared by GA

Location/Structure ID:	Design storm	Contracted Scetion	Section Upst of Contraction	Hydraulic Data Source
SR143 Bridge over the Salt River	100-yr	219.04	219.04	HMP HEC-RAS Model for Proposed Cond.

Contraction Scour Estimate-Live Bed Conditions

D_{50} (mm)	D_{50} (inch)	Selected Temp Curve	ω (m/s)	ω (fps)	Y_1 (ft)	S_1 (ft/ft)	V^* (fps)	V^*/ω	k_1
79.2000	0.2598	20°C/68°F	0.3500	1.15	15.01	0.00171	0.91	0.79	0.64

Y_1 (ft)	Q_1 (cfs)	W_1 (ft)	Y_o (ft)	Q_2 (cfs)	W_2 (ft)	k_1	Y2 (ft)	Y_s (ft)
15.01	169000.0	928.00	15.01	169000.0	880.00	0.64	15.53	0.52

Contraction Scour Estimate-Clear Water Conditions

D_{50} (ft)	D_m (ft)	Q (cfs)	W (ft)	Y_o (ft)	Y2 (ft)	Y_s (ft)
0.2598	0.3247	169000.0	880.00	15.01	15.52	0.51

Applicable Scour Conditions (Live Bed or Clear water)

D_{50} (mm)	D_{50} (ft)	Y_1 (ft)	V_1 (fps)	$V_{c\text{-}D50}$ (fps)	Velocity Cond.	Scour Conditions	Applicable Y_s (ft)	Selected Y_s (ft)
79.2000	0.2598	15.01	10.64	11.19	V1<Vc	Clear Water	0.51	**0.52**

Criticall Velocity Equation

$Vc = 11.17\ Y_1^{1/6} D^{1/3}$

Live Bed Equation

$Y_2 = Y_1[(Q_2/Q_1)^{6/7}(W_1/W_2)^{k1}]$

$V^* = (gY_1S_1)^{1/2}$

$Y_s = Y_2 - Y_0$

Clear Water Equation

$Y_2 = [0.0077Q^2/(D_m^{2/3}W^2)]^{3/7}$

$Y_s = Y_2 - Y_0$

Vc= Critical velocity above which bed material of size D and smaller will be transported,(fps)

V_1= mean flow velocity in the upstream main channel (upst of contraction), (fps)

D= Particle size for Vc (ft)

D_{50}= Particle size in a mixture of which 50 percent are smaller (ft)

D_m= Diameter of the smallest non-transportable particle in the bed material (1.25 D_{50}) in the contarcted section, (ft)

Y_s= Average scour depth, (ft)

Y_1= Average flow depth (hydraulic depth) in upstream main cahnnel (upst of contraction), (ft)

Y_2= Average equilibrium flow depth in contracted section, after contaction scour depth, (ft)

Y_0= Existing flow depth in contracted section before scour, (ft)

Q_1= Flow in upstream channel transporting sediments, (cfs)

Q_2= Flow in contarcted channel, (cfs)

Q= Similar to "Q2", (cfs)

W_1= Bottom width of the upstream main channel (upst of contraction) that is transporting bed material, (ft)

W_2= Bottom width of the main channel in contracted section (less pier width at a bridge location), (ft)

W= Similar to "W2", (ft)

θ= Angle of attack (approach) of the flow, (degree)

(minimum value recommended by ADOT = 15 degree)

K_1= Exponent that is a function of V^*/ω

V^*/ω	< 0.5	0.5 to 2	> 2.0
K_1	0.59	0.64	0.69

V^*= Shear velocity in Upstream section, (fps)

ω= Fall velocity of bed material (m/s) based on D50 and selected tempreture, from Figure 5.8 of reference.

(Multiply by 3.28 to get "fps")

g= Acceleration of gravity, (32.2 ft/sec^2)

S1= Slope of energy grade line of main channel, (ft/ft)

Contarction Scour (a form of General Scour)	Project:	SR143/Sky Harbor TI
"Live Bed" or "Clear Water" Conditions	Project # :	191543000
[Reference: HEC 18, 2001]	Date:	8/6/2009
	Prep by:	GA
	Rev by:	RAE

Base sheet prepared by GA

Location/Structure ID:	Design storm	Contracted Scetion	Section Upst of Contraction	Hydraulic Data Source
SR143 Bridge over the Salt River	500-yr	219.04	219.04	HMP HEC-RAS Model for Proposed Cond.

Contraction Scour Estimate-Live Bed Conditions

D_{50} (mm)	D_{50} (inch)	Selected Temp Curve	ω (m/s)	ω (fps)	Y_1 (ft)	S_1 (ft/ft)	V^* (fps)	V^*/ω	k_1
79.2000	0.2598	20°C/68°F	0.3500	1.15	18.89	0.00161	0.99	0.86	0.64

Y_1 (ft)	Q_1 (cfs)	W_1 (ft)	Y_o (ft)	Q_2 (cfs)	W_2 (ft)	k_1	Y2 (ft)	Y_s (ft)
18.89	243000.0	928.00	18.89	243000.0	880.00	0.64	19.54	0.65

Contraction Scour Estimate-Clear Water Conditions

D_{50} (ft)	D_m (ft)	Q (cfs)	W (ft)	Y_o (ft)	Y2 (ft)	Y_s (ft)
0.2598	0.3247	243000.0	880.00	18.89	21.19	2.30

Applicable Scour Conditions (Live Bed or Clear water)

D_{50} (mm)	D_{50} (ft)	Y_1 (ft)	V_1 (fps)	$V_{c\text{-}D50}$ (fps)	Velocity Cond.	Scour Conditions	Applicable Y_s (ft)	Selected Y_s (ft)
79.2000	0.2598	18.89	12.00	11.63	V1>Vc	Live Bed	0.65	**0.65**

Criticall Velocity Equation

$Vc = 11.17\, Y_1^{1/6} D^{1/3}$

Live Bed Equation

$Y_2 = Y_1[(Q_2/Q_1)^{6/7}(W_1/W_2)^{k1}]$

$V^* = (gY_1S_1)^{1/2}$

$Y_s = Y_2 - Y_0$

Clear Water Equation

$Y_2 = [0.0077Q^2/(D_m^{2/3}W^2)]^{3/7}$

$Y_s = Y_2 - Y_0$

Vc= Critical velocity above which bed material of size D and smaller will be transported,(fps)

V_1= mean flow velocity in the upstream main channel (upst of contraction), (fps)

D= Particle size for Vc (ft)

D_{50}= Particle size in a mixture of which 50 percent are smaller (ft)

D_m= Diameter of the smallest non-transportable particle in the bed material (1.25 D_{50}) in the contarcted section, (ft)

Y_s= Average scour depth, (ft)

Y_1= Average flow depth (hydraulic depth) in upstream main cahnnel (upst of contraction), (ft)

Y_2= Average equilibrium flow depth in contracted section, after contaction scour depth, (ft)

Y_0= Existing flow depth in contracted section before scour, (ft)

Q_1= Flow in upstream channel transporting sediments, (cfs)

Q_2= Flow in contarcted channel, (cfs)

Q= Similar to "Q2", (cfs)

W_1= Bottom width of the upstream main channel (upst of contraction) that is transporting bed material, (ft)

W_2= Bottom width of the main channel in contracted section (less pier width at a bridge location), (ft)

W= Similar to "W2", (ft)

θ= Angle of attack (approach) of the flow, (degree)

(minimum value recommended by ADOT = 15 degree)

K_1= Exponent that is a function of V^*/ω

V^*/ω	< 0.5	0.5 to 2	> 2.0
K_1	0.59	0.64	0.69

V^*= Shear velocity in Upstream section, (fps)

ω= Fall velocity of bed material (m/s) based on D50 and selected tempreture, from Figure 5.8 of reference.

(Multiply by 3.28 to get "fps")

g= Acceleration of gravity, (32.2 ft/sec^2)

S1= Slope of energy grade line of main channel, (ft/ft)

Local Scour at Bridge Piers *Per Colorado State University "CSU" Equation* *Reference: HEC 18, 2001*		Project: SR143/Sky Harbor TI Project # : 191543000 Date: 8/6/2009 Comp by: GA Rev by: RAE Base sheet by GA

Bridge ID/Location	Design Storm	Data Section No./ID
SR143 Bridge over the Salt River	100-yr	219.04 (HMP HEC-RAS Model for Proposed Conditions)

Assessment of design approach for piers composed of group of cylinders/multiple columns bent (when applicable)

Pier Shape	No of Columns	Diam d (ft)	CS (ft)	Is CS<5d (Y/N)	Evaluate Pier as	Equiv. a (ft)	Equiv. L (ft)
Group of Cylinders	7	6.00	32.00	N	Single Column	6.00	6.0

CS=Clear Spacing
Equiv. Pier=equivalent round nose pier with: equivalent length=sum of individual diameters, and equivalent width=column diameter

Estimate of K4: (note: for ADOT application, K4=1 should be always used)
(Applicable when D_{50},bed equals or larger than 2 mm (0.079") and D_{95},bed equals or larger than 20 mm (0.787"), otherwise K4=1)

D_{50} (mm)	D_{95} (mm)	D_{50} (ft)	D_{95} (ft)	V_1 (fps)	Grain Size Applicability	V_{cD50} (fps)	V_{cD95} (fps)	V_{icD50} (fps)	V_{icD95} (fps)	V_R	$K_{4,calc}$
0.00	0.00	0.000	0.000	---	---	---	---	---	---	---	---

Scour Depth estimate

Y_1 (ft)	F_{r1}	θ (degree)	a (ft)	w (ft)	L (ft)	L_{effec} (ft)	a_{proj} (ft)	K_1	K_2	K_3	K_4	Y_s (ft)
19.85	0.48	15.0	6.00	2.00	6.0	6.0	10.00	1.0	1.0	1.1	1.0	**20.4**

$$Y_s = Y_1[\,2.0\, K_1\, K_2^{*}\, K_3\, K_4\, (a^{*}/Y_1)^{0.65}\, Fr^{0.43}$$

[*: Per HEC-18, when debris is considered, use k_2=1 and use a=a_{proj} in the Ys equation]

Y_s = Predicted scour depth, (ft)

Y_1 = Flow depth directly upstream of pier, (ft)

F_{r1} = Froude number directly upstream of the pier

θ = Skew angle of flow with pier length/Angle of attack (degree)

(Note: ADOT suggests that a minimum value of 15 degree may be used to account for channel meandering)

K_1 = Correction factor for pier nose shape

For θ equal to or smaller than 5 degree, use Table 6.1 of reference

For θ larger than 5 degree, use K_1 =1

(Note: ADOT suggests K1=1.1 to account for debris; However, when a debris width is incorporated, HEC-18 uses k1=1.0)

L = Length of pier, (ft); (Applicable "L" per pier shape is shown on Fig. 6.3 of reference)

L_{effec} = Effective Length of pier, beyond which the length does not add significant scour, =max of (L,12a)

a = Width of pier, (ft); (typical pier shapes are shown on Fig. 6.3 of reference)

w= Estimated debris width on each side and at front of piers, (ft)

(Note: Recommended debris widths are: ADOT--> w=2 ft ; FCDMC--> w=maximum of (a/2 , 1))

$a_{projected}$ = Total projected (obstructed) width, including debris, normal to flow direction; a_{proj}= max(2w+a cosθ, w+a cosθ+L_{effc} sinθ)

(Note: ADOT guidelines state that for pier frame with multiple columns:

- if the clear distance between columns (across flow) > 16 ft, they shall be evaluated as single columns

- if the distance is <16 ft, consider one pier with a_{effect} = width between exterior columns

K_2= Correction factor for angle between flow direction and pier alignment, estimated as follows (see top comment) :

$K_2 = [(\cos\theta + (L/a)\sin\theta]^{0.65}$; L/a,max =12, i.e K_2,max =5.0

K_3= Correction factor for bed conditions, from table 6.3 of reference

K_4= Reduction factor for armoring by bed material

Applicable when D_{50},bed equals or larger than 2 mm (0.079") and D_{95},bed equals or larger than 20 mm (0.787"), otherwise K4=1

K4 is calculated as follows:

$V_{cDx} = 11.17\, y_1^{(1/6)} D_x^{(1/3)}$. Calculate for x=50 and x=95

$V_{icDx} = 0.645\,(D_x/a)^{0.053} V_{cDx}$. Calculate for x=50 and x=95

$V_R = (V_1 - V_{icD50})/(V_{cD50} - V_{icD95}) > 0$

$K_4 = 0.4(V_R)^{0.15}$; When applicable and when $V_1 < V_{icD50}$, $K_{4,minim}$=0.4

VcDx = Critical Velocity (fps) for incipient motion for the grain size Dx, (ft)

VicDx = Approach Velocity (fps) required to initiate scour at the grain size Dx, (ft)

Dx = Grain size for which x% of the bed material is finer.

V_1 = Velocity of approach flow just upstream of the pier, (fps)

(Note: ADOT requires to always use K4=1.0, i.e no allowance for scour reduction due to potential bed armoring)

Local Scour at Bridge Piers *Per Colorado State University "CSU" Equation* *Reference: HEC 18, 2001*		Project: SR143/Sky Harbor TI Project # : 191543000 Date: 8/6/2009 Comp by: GA Rev by: RAE Base sheet by GA

Bridge ID/Location	Design Storm	Data Section No./ID
SR143 Bridge over the Salt River	500-yr	219.04 (HMP HEC-RAS Model for Proposed Conditions)

Assessment of design approach for piers composed of group of cylinders/multiple columns bent (when applicable)

Pier Shape	No of Columns	Diam d (ft)	CS (ft)	Is CS<5d (Y/N)	Evaluate Pier as	Equiv. a (ft)	Equiv. L (ft)
Group of Cylinders	7	6.00	32.00	N	Single Column	6.00	6.0

CS=Clear Spacing
Equiv. Pier=equivalent round nose pier with: equivalent length=sum of individual diameters, and equivalent width=column diameter

Estimate of K4: (note: for ADOT application, K4=1 should be always used)
(Applicable when D_{50},bed equals or larger than 2 mm (0.079") and D_{95},bed equals or larger than 20 mm (0.787"), otherwise K4=1)

D_{50} (mm)	D_{95} (mm)	D_{50} (ft)	D_{95} (ft)	V_1 (fps)	Grain Size Applicability	V_{cD50} (fps)	V_{cD95} (fps)	V_{icD50} (fps)	V_{icD95} (fps)	V_R	$K_{4,calc}$
0.00	0.00	0.000	0.000	---	---	---	---	---	---	---	---

Scour Depth estimate

Y_1 (ft)	F_{r1}	θ (degree)	a (ft)	w (ft)	L (ft)	L_{effec} (ft)	a_{proj} (ft)	K_1	K_2	K_3	K_4	Y_s (ft)
23.95	0.49	15.0	6.00	2.00	6.0	6.0	10.00	1.0	1.0	1.1	1.0	**22.0**

$$Y_s = Y_1[\,2.0\, K_1\, K_2^{*}\, K_3\, K_4\, (a^{*}/Y_1)^{0.65}\, Fr^{0.43}$$

[*: Per HEC-18, when debris is considered, use k_2=1 and use a=a_{proj} in the Ys equation]

Y_s = Predicted scour depth, (ft)

Y_1 = Flow depth directly upstream of pier, (ft)

F_{r1} = Froude number directly upstream of the pier

θ = Skew angle of flow with pier length/Angle of attack (degree)

(Note: ADOT suggests that a minimum value of 15 degree may be used to account for channel meandering)

K_1 = Correction factor for pier nose shape

For θ equal to or smaller than 5 degree, use Table 6.1 of reference

For θ larger than 5 degree, use K_1 =1

(Note: ADOT suggests K1=1.1 to account for debris; However, when a debris width is incorporated, HEC-18 uses k1=1.0)

L = Length of pier, (ft); (Applicable "L" per pier shape is shown on Fig. 6.3 of reference)

L_{effec} = Effective Length of pier, beyond which the length does not add significant scour, =max of (L,12a)

a = Width of pier, (ft); (typical pier shapes are shown on Fig. 6.3 of reference)

w= Estimated debris width on each side and at front of piers, (ft)

(Note: Recommended debris widths are: ADOT--> w=2 ft ; FCDMC--> w=maximum of (a/2 , 1))

$a_{projected}$ = Total projected (obstructed) width, including debris, normal to flow direction; a_{proj}= max(2w+a cosθ, w+a cosθ+L_{effc} sinθ)

(Note: ADOT guidelines state that for pier frame with multiple columns:

- if the clear distance between columns (across flow) > 16 ft, they shall be evaluated as single columns

- if the distance is <16 ft, consider one pier with $a_{,effect}$ = width between exterior columns

K_2= Correction factor for angle between flow direction and pier alignment, estimated as follows (see top comment) :

$K_2 = [(\cos\theta + (L/a)\sin\theta]^{0.65}$; L/a,max =12, i.e $K_{2,}$max =5.0

K_3= Correction factor for bed conditions, from table 6.3 of reference

K_4= Reduction factor for armoring by bed material

Applicable when D_{50},bed equals or larger than 2 mm (0.079") and D_{95},bed equals or larger than 20 mm (0.787"), otherwise K4=1

K4 is calculated as follows:

$V_{cDx} = 11.17\, y_1^{(1/6)} D_x^{(1/3)}$. Calculate for x=50 and x=95

$V_{icDx} = 0.645\,(D_x/a)^{0.053} V_{cDx}$. Calculate for x=50 and x=95

$V_R = (V_1 - V_{icD50})/(V_{cD50} - V_{icD95}) > 0$

$K_4 = 0.4(V_R)^{0.15}$; When applicable and when $V_1 < V_{icD50}$, $K_{4,minim}$=0.4

VcDx = Critical Velocity (fps) for incipient motion for the grain size Dx, (ft)

VicDx = Approach Velocity (fps) required to initiate scour at the grain size Dx, (ft)

Dx = Grain size for which x% of the bed material is finer.

V_1 = Velocity of approach flow just upstream of the pier, (fps)

(Note: ADOT requires to always use K4=1.0, i.e no allowance for scour reduction due to potential bed armoring)

General Scour Depth

Blench Equation

(Typically applicable to clear-ware conditions where there is a reservoir, sand and gravel pit, or upstream structure that reduces sediment supply significantly)

Project:	SR 143/Sky harbor TI
Project # :	191543000
Date:	10/12/2009
Comp by:	GA
Rev by:	RAE

Base sheet by GA

(Ref: Computing Degradation and Local Scour, by Ernest L. Pemberton and Joseph M. Lara,Technical Guidelines for Bureau of Reclamation, January, 1984).

General Scour depth (for Types A&B); Type A: Natural channels for restrictions and bends; Type B: Bankline structures

Type A applications: Siphon crossing or burried pipelines; Stability study of a natural bank; Waterway for open-span bridge.

Type B applications: Abutments to bridge or siphon crossing; Bank slope protection such as riprap,etc; Spur dikes, groins,etc; Pumping plants; Canal headworks.

Location: SR143 Bridge at the Salt River

Application: General scour upstream of bridge

Section ID	Design Storm	Design Total Flow	Design Top Water Surface	Design Flow Rate Per Unit Width	Bed Mean Grain Size	Blench's Zero Bed Factor	Multiplying Factor	**Scour Depth Below Streambed**
---	Storm	Q_f (cfs)	TW_f (ft)	q_f (cfs/ft)	D_{50} (mm)	F_{bo} (ft/sec^2)	Z	**d_s (ft)**
219.04	100-yr	169,000.0	1058.40	159.67	79.20	5.00	0.60	**10.33**
219.04	500-yr	243,000.0	1071.90	226.70	79.20	5.00	0.60	**13.05**
219.04	SPF	289,000.0	1079.40	267.74	79.20	5.00	0.60	**14.58**

Blench Equation:

$d_{fo}=q_f^{2/3}/F_{bo}^{1/3}$

$q_f=Q_f/TW_f$

$d_s=Zd_f$

ds=Scour depth below streambed

d_{fo}=Depth for zero bed sediment transport

Q_f=Design Flow

TW_f=Design flow top water width

q_f=Design flood discharge per unit width

F_{bo}=Blench's "zero bed factor"

Z=Empirical multiplying factor (per Table 7 of reference)

Notes:

Z factors in Table 7 of reference incorporate bend scour.

Z-Values:

Equations Type A&B:

0.60 - Straight reach

0.60 - Moderate bend

0.60 - Severe bend

1.25 - Right angle bends

----- - Vertical rock bank or wall

Equations Type C&D:

0.50 to 1.00 - Nose of Piers

1.00 to 1.75 - Nose of guide banks

0.75 to 1.25 - small dam or control across river

Notes:

General Scour Depth
Lacey Equation (1930)
(Typically applicable to natural river systems)

Project:	SR 143/Sky harbor TI
Project # :	191543000
Date:	10/12/2009
Comp by:	GA
Rev by:	RAE

Base sheet by GA

(Ref: Computing Degradation and Local Scour, by Ernest L. Pemberton and Joseph M. Lara,Technical Guidelines for Bureau of Reclamation, January, 1984).

General Scour depth (for Types A&B); Type A: Natural channels for restrictions and bends; Type B: Bankline structures

Type A applications: Siphon crossing or burried pipelines; Stability study of a natural bank; Waterway for open-span bridge.

Type B applications: Abutments to bridge or siphon crossing; Bank slope protection such as riprap,etc; Spur dikes, groins,etc; Pumping plants; Canal headworks.

Location: SR143 Bridge at the Salt River

Application: General scour upstream of bridge

Section ID	Design Storm	Design Flow	Bed Mean Grain Size	Lacy's Silt Factor	Multiplying Factor	**Scour Depth Below Streambed**
---	Storm	Q (cfs)	D_{50} (mm)	f	Z	d_s (ft)
219.04	100-yr	169,000.0	79.20	15.66	0.25	**2.60**
219.04	500-yr	243,000.0	79.20	15.66	0.25	**2.93**
219.04	SPF	289,000.0	79.20	15.66	0.25	**3.10**

Lacey Equation:

$d_m=0.47(Q/f)^{1/3}$

$f=1.76\ D_m^{0.5}$

$d_s=Zd_f$

d_s=Scour depth below streambed

d_m=Mean depth at design discharge

Q=Design Flow

f=Lacy's Silt Factor

D_m=Mean garin size of bed material (=D_{50})

Z=Empirical multiplying factor (per Table 7 of reference)

Notes:

Z factors in Table 7 of reference incorporate bend scour.

Z-Values:

Equations Type A&B:

0.25 - Straight reach
0.50 - Moderate bend
0.75 - Severe bend
1.00 - Right angle bends
1.25 - Vertical rock bank or wall

Equations Type C&D:

----- - Nose of Piers
1.50 to 1.75 - Nose of guide banks
1.50 - small dam or control across river

Notes:

Topwidth of Scour Hole at Piers or Footings

Reference: HEC 18, 2001

Project:	SR143/Sky harbor TI
Project # :	191543000
Date:	8/6/2009
Prep by:	GA
Rev by:	RAE

Base sheet prepared by GA

Location/Structure ID: SR143 Bridge over the Salt river

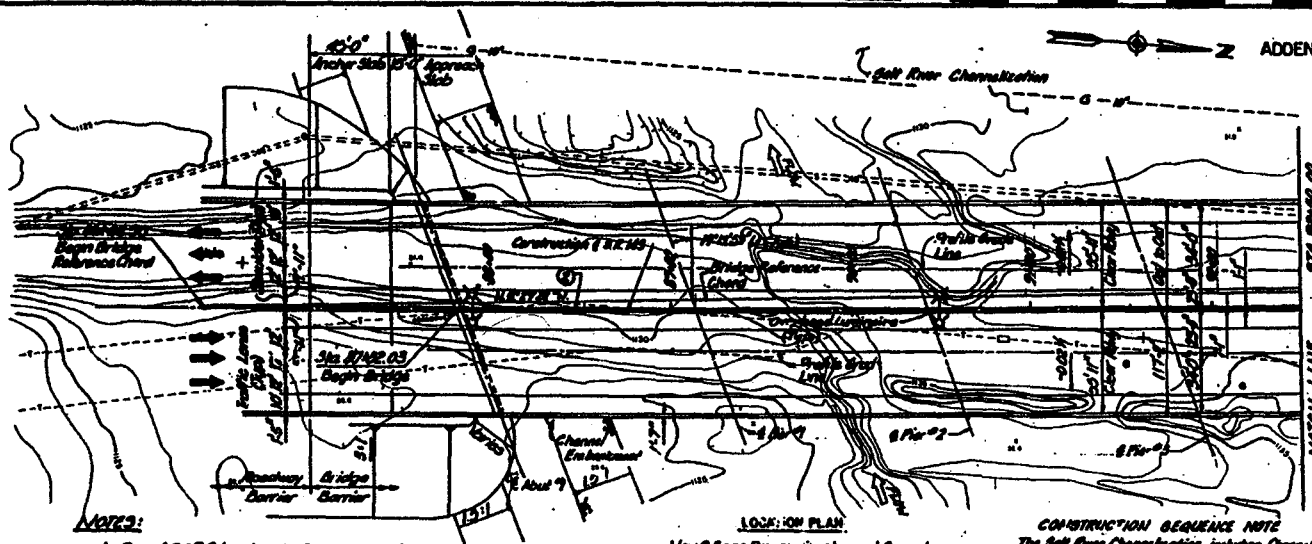
Design Storm	Y_s (ft)	k	ϕ (degree)	W (ft)
100-yr	30.40	0.0	37.0	40.3

$W=Y_s(K+\text{Cot}\ \theta)$

W= Top-width of the scour hole from each side of the outside of pier or footing
Ys= Calculated scour depth
K= Coefficient that relates the bottom width of scour hole to its depth (K=BW/Ys)
(K ranges from K=0 for deep scour holes with BW=0 to K=1 for BW=Ys)
ϕ =Angle of repose of cohesionless material (ranges from 30° to 44° in un-submerged conditions; it is less under water)

Notes:
See diagram on following sheets

ADDENDUM 2 REVISIONS



NOTES:

1. See ADOT Standards B-19.30 and B-19.40 for limits of Structural Excavation & Structural Backfill.
2. See Dwg. No. 3-2.67 for Approach Slab & Anchor Slab limits & Notes.

LOCATION PLAN

New 9 Span Prestressed Concrete Girder Bridge (AASHTO Type II Girders Skew 19°23'5" Left (from Bridge Reference Chord))

Scale: 1" = 30'

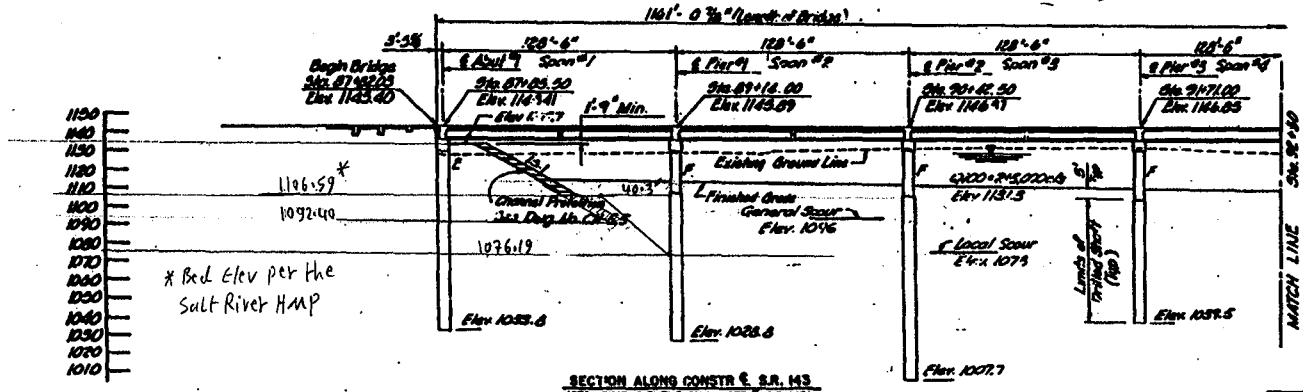
CONSTRUCTION SEQUENCE NOTE

The Salt River Channelization, including Channel Enchantment, Embankment, Channel Protection and Utility relocation is to be constructed prior to construction of the bridge. Utilities within the limits of Drilled Shaft Construction shall be removed as required during Channel Excavation.

DRAWING INDEX

TITLE	DWG. NO.
General Plan	3-2.1, 3-2.3
General Notes & Quantities	3-2.4
Foundation Data Sheet	3-2.5, 3-2.12
Foundation Layout	3-2.13
Drilled Shaft & Column Details	3-2.14
Abutment #1 Details	3-2.15, 3-2.16
Abutment #2 Details	3-2.17
Abutment #2A and Misc. Abut. Details	3-2.18
Wingwall Details	3-2.19
Pier #1, #2, #3 Details	3-2.20
Pier #4 Details	3-2.21
Pier #5 Details	3-2.22
Pier #5 - Sign Support Details	3-2.23
Pier #6 Details	3-2.24
Pier #7 Details	3-2.25
Pier #8 Details	3-2.26
Pier Details	3-2.27
Girder Layout	3-2.28, 3-2.30
Girder Details	3-2.31, 3-2.32
Deck Details - Plan	3-2.33, 3-2.35
Deck Detail - Partial Plan	3-2.36
Deck Details - Span #1, #2, #3, #4	3-2.37
Deck Details - Span #5, #6, #7, #8	3-2.38
Deck Details - Span #9	3-2.39
Deck Details - Miscellaneous	3-2.40
Deck Details - Diaphragms	3-2.41, 3-2.42
Deck Drain Details	3-2.43
Lighting Details	3-2.44 - 3-2.46
Miscellaneous Details	3-2.47, 3-2.48
Strip Seal Joint	3-2.49

Deck Surface Elevations shall be obtained from the Engineer.



* Bed Elev per the Salt River HMP

SECTION ALONG CONSTR ℄ S.R. 143
(STA., DIMS., & ELEVS. ON CONSTR. ℄ S.R. 143)
SCALE: 1" = 30' HORIZONTAL & VERTICAL

BRIDGE REFERENCE CHORD NOTE

1. The Bridge Reference Chord is a line between Station 89+44.70 on Construction ℄ S.R. 143 and the intersection of ℄ abutment #2 and Construction ℄ S.R. 143.
2. Skew is measured with respect to the Bridge Reference Chord.

SECTION & DETAIL LEGEND

Letter Denoting Section or Detail

Dwg. No. where Section or Detail is Shown or Referred. 3-series unless noted otherwise. Blank if Shown on same sheet.

Note: Elevations are based on NGVD29 Datum

Scale: 1" = ~~68'~~ 106'

See Supporting data in Appendix B

MORRISON-KNUDSEN ENGINEERS

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STRUCTURES SECTION

SALT RIVER BRIDGE
GENERAL PLAN

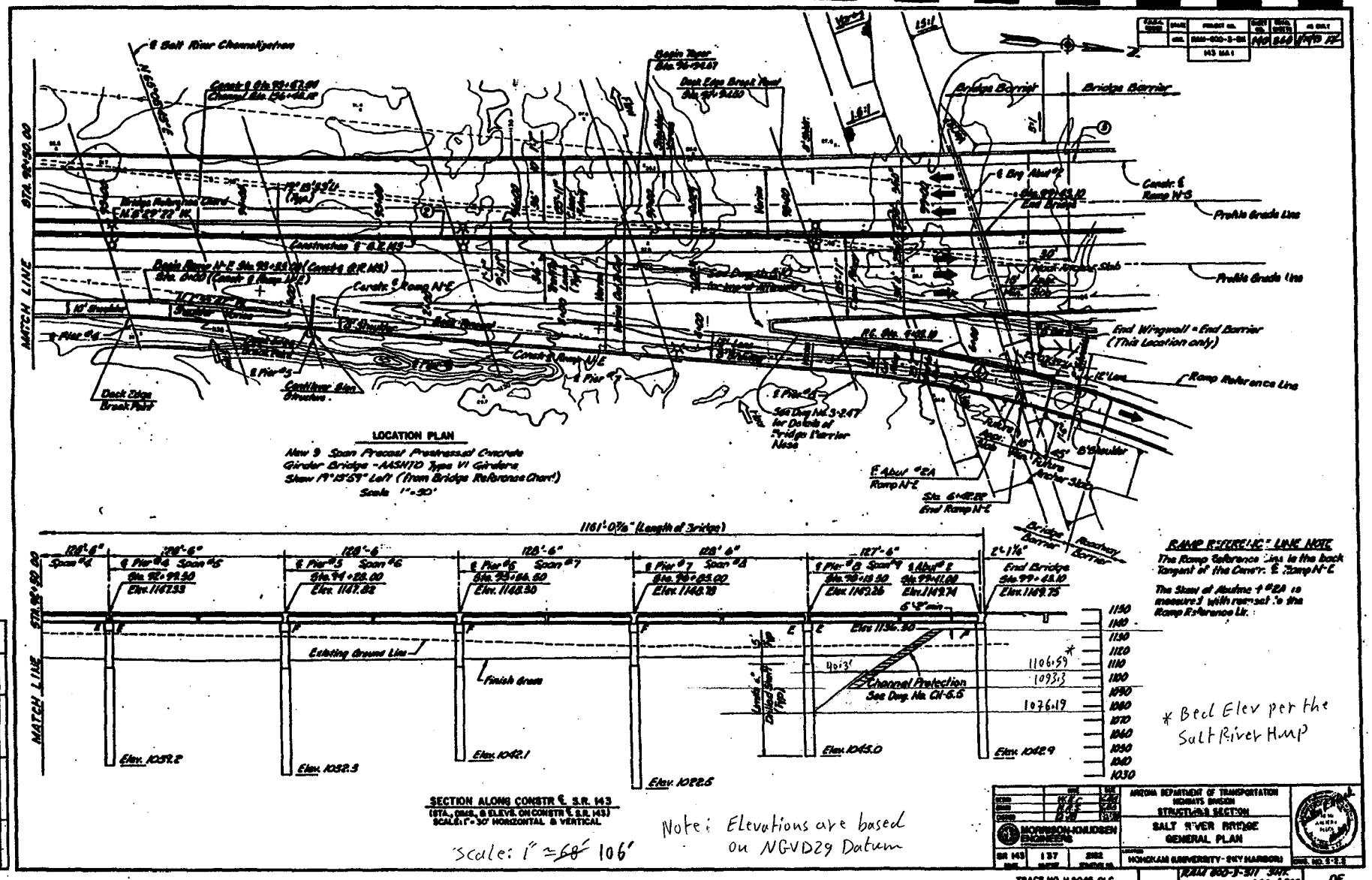
SR 143 | 137 | 2162

TRACS NO. H2045 01 C

FAU 800-3-201 2007
130 of 349

DWG. NO. 3-2.1

OF



See supporting data in Appendix B

Appendix H Salt River Bridge Deck Drainage

Bridge Deck Inlet Spacing
Ref: USDOT-FHWA , Design of Bridge Deck Drainage, HEC-21 (May, 1993)

Project:	SR 143/Sky harbor TI
Proj. No:	191543000
Date:	7/17/2009
Prep by:	GA
Rev by:	RAE

Base sheet by GA

Inlet location/ID	S (fr/ft)	Su (fr/ft)	Sx (fr/ft)	n	T (ft)	Wp (ft)	C	Freq	i (inch)	E	Q (cfs)	K	Lc (ft)
1st inlet (CB#4 at Sta. 100+20)	0.0037	0.0037	0.0200	0.016	18.00	59.00	0.95	10-Yr	3.47	1.00	7.0	1.00	1558

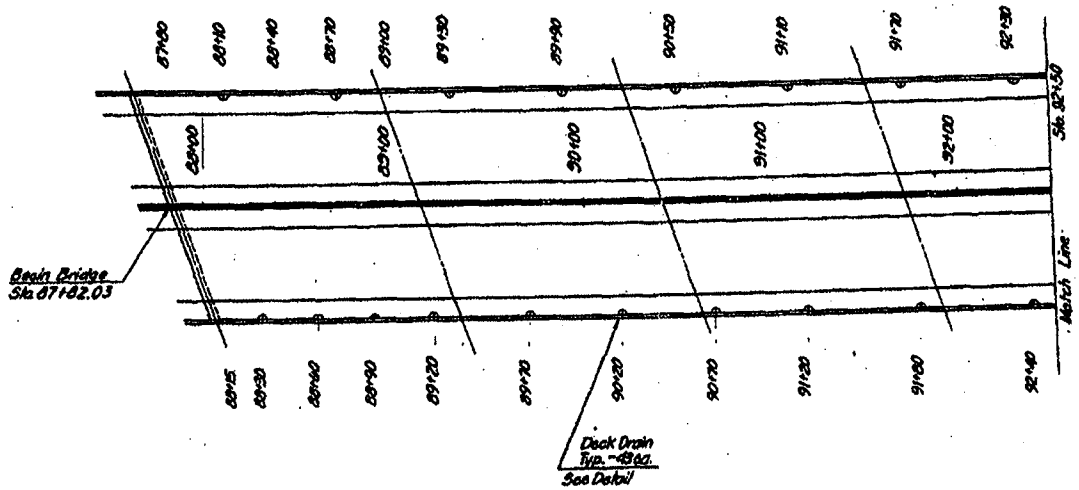
Lc=43560 Q K/(C i Wp)
Q= 0.56/n $Sx^{1.67}$ $S^{0.5}$ $T^{2.67}$
K=1-(1-E) $(Su/S)^{0.5}$

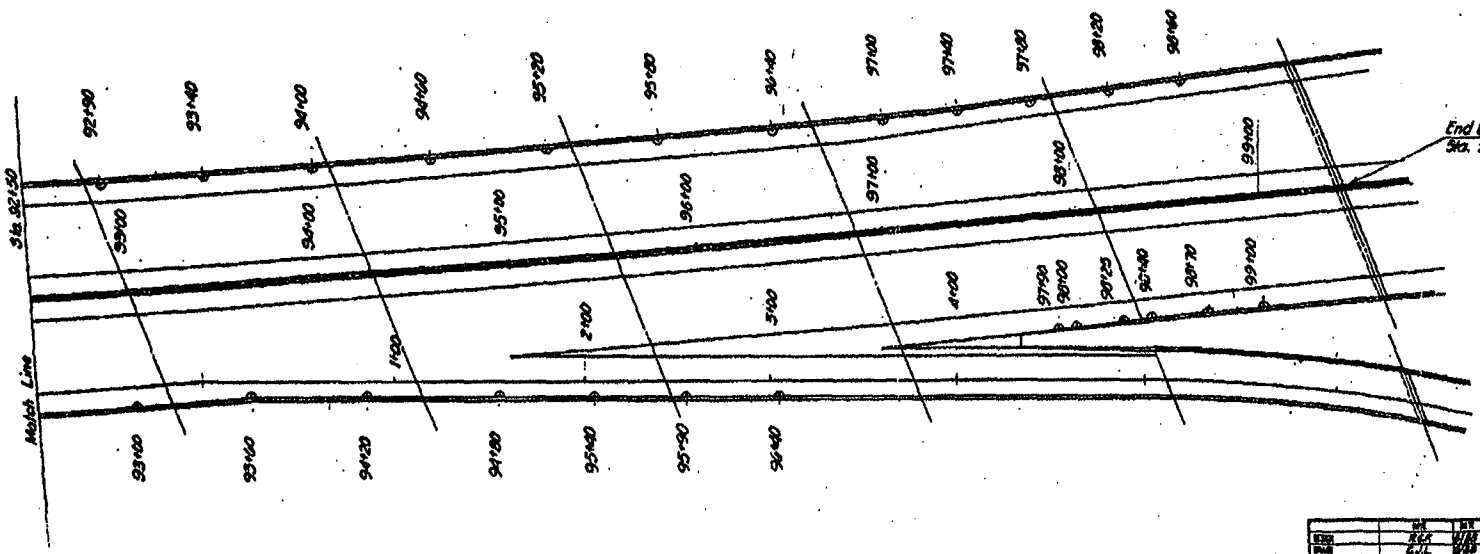
S= Longitudinal slope at inlet
Su= Longitudinal slope at immediate upstream inlet
n= Manning coefficient
T= Design flow spread
Q= Gutter for desin spread
E= Capture effeciency (=1 for the first inlet)
K= A coffecient, as defined by the equation below
C= Rational runoff coefficient
i= design rainfall intensity
Wp= Width of pavement contributing to gutter flow
Lo= Distance from upstream end of bridge to first inlet (E=1)
Lc= Inlet spacing subsequent to first inlet

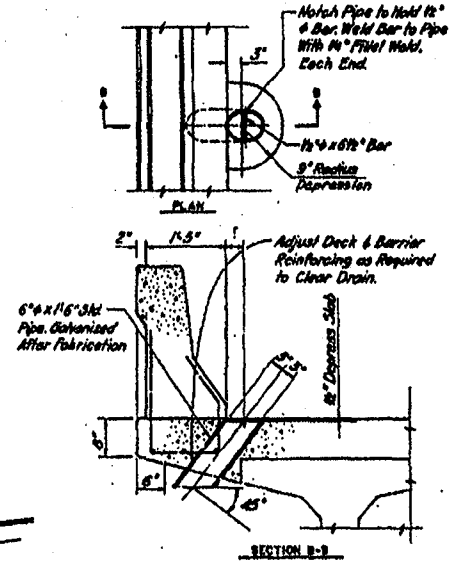
For inlets on constant grade (i.e S=Su), K=E
For first upstream inlet, no flow is allowed from an upstream reach, i.e interception effeciencty is 100% (E=1)
For inlets downstreamof first inlet, find E using the applicable charts

For first inlet on a constant garde, and by substitution of above equations, the following equation can be derived:
Lc=24393.6 Sx1.67 S0.5 T2.67/(C n i Wp)

F.A.P.M. NUMBER	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	M 200.1
	ARIZ.	RAM-800-3-911 (43 MA)	181	369	1/Info Ref







DECK DRAIN DETAIL
Scale: 1"=1'-0"

DESIGN	R.E.F.	11/83	ARIZONA DEPARTMENT OF TRANSPORTATION
DRAWN	G.V.L.	11/83	HIGHWAYS DIVISION
CHECKED	H.R.B.	11/83	STRUCTURES SECTION
MORRISON-KNUDSEN ENGINEERS			SALT RIVER BRIDGE
			DECK DRAIN DETAILS
SR 143	1.37	2182	LOCATION: HOHOKAM (UNIVERSITY-SKYHARBOR)
STATE	MILEPOST	STRUCTURE NO.	

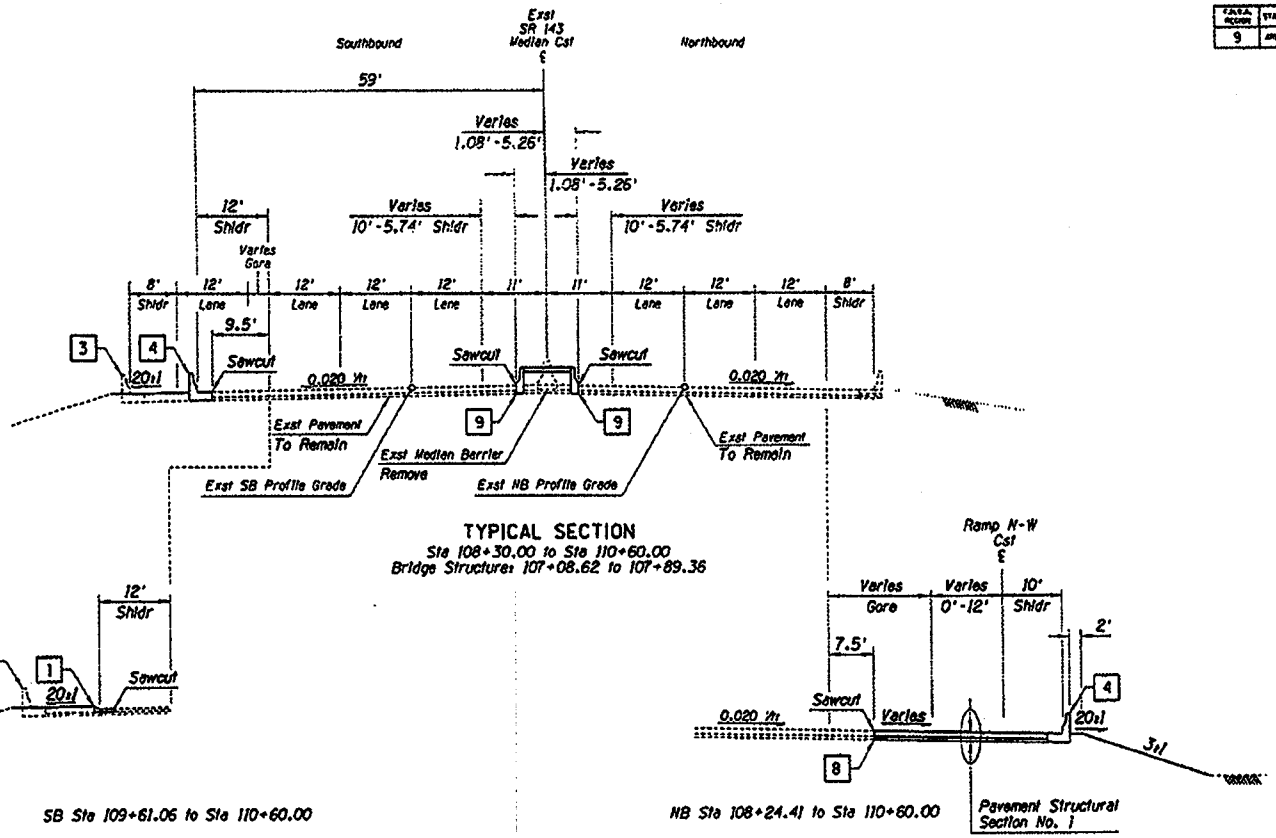
DWG. NO. S-3.43

TRACS NO. H 2045 01 C

RAM 800-3-911 43 MA
181 of 369

OF

F.A.P.N. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	143-A(200)	5	302	
		143 MA 02			



1. Conc Curb & Gutter, Type C
   ADOT Std C-05.10
   (See Plans for Location)
3. Exst Conc Half Barrier & PCCP, Remove
   (See Plans for Type & Location)
4. Conc Half Barrier, 32"
   ADOT Std C-10.52 on 12" AB Class 2
   (See Plans for Location)
8. New LC Joint per Std C-07.01
   with ⅝" x 2' dowels
   30" on Center
9. Conc Half Barrier, 32"
   ADOT Std C-10.54
   (See Plans for Location)

	NAME	DATE
DESIGN	CEM	07/09
DRAWN	A.L.	07/09
CHECKED	CCD	07/09

Kimley-Horn and Associates, Inc.

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

DESIGN SHEET
SR 143
TYPICAL SECTIONS

PRELIMINARY
STAGE III
60%
Review
NOT FOR CONSTRUCTION OR RECORDING

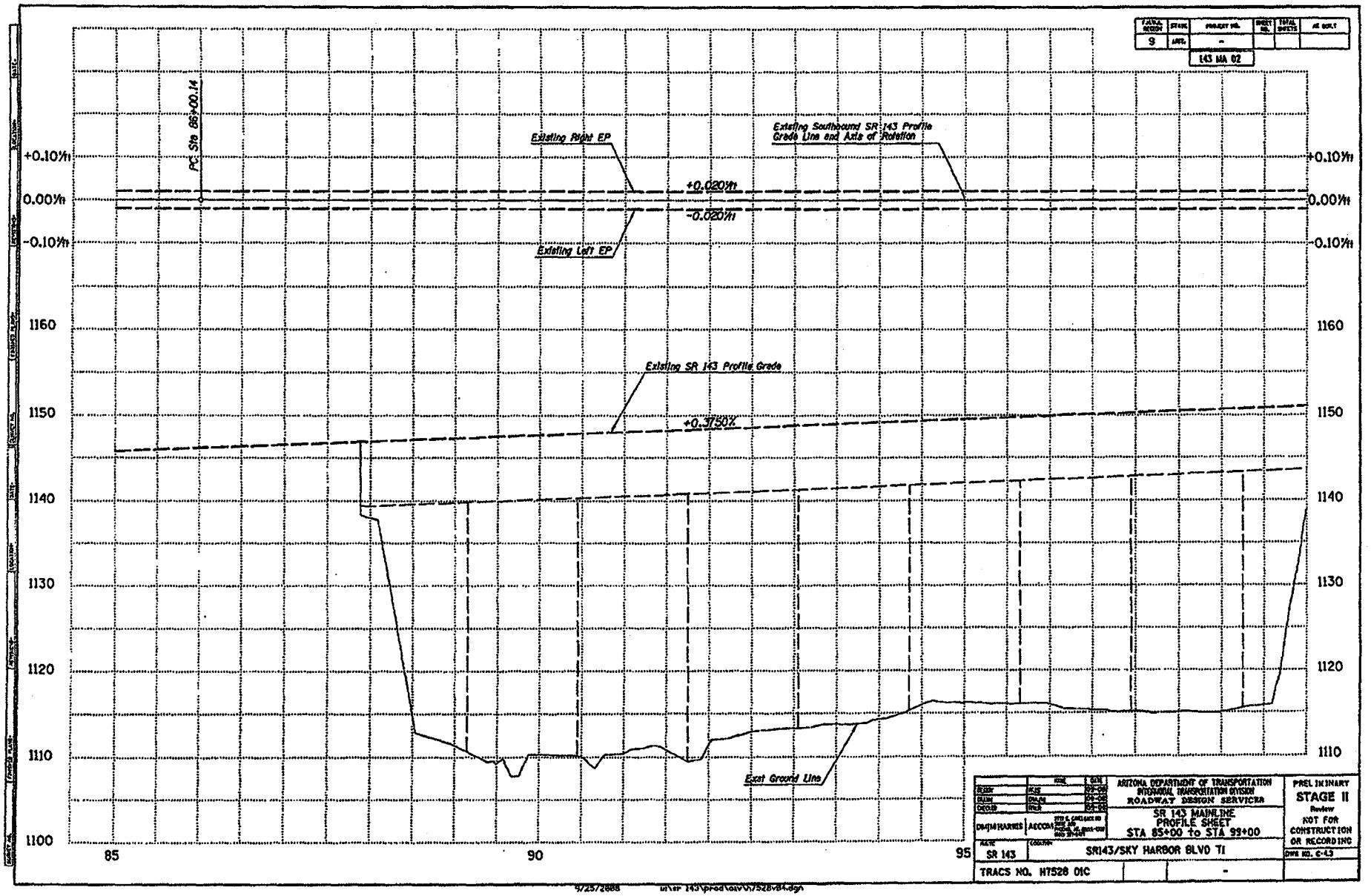
ROUTE: SR 143
LOCATION: SR 143/SKY HARBOR BLVD TI

TRACS NO. H7528 01C

DWG NO. D-5.2

___ OF ___

8:44:31 AM 7/21/2009 ANTHONY.DOUCETTE K:\PHX_ROADWAY\141543000-143_INTERCHANGE\CADD\H7528TS02.DGN 7/21/2009 K:\PHX_Roadway\141543000-143_Interchange\Cadd\h7528ts02.dgn


FEDERAL REGION 9
STATE ARIZ.
PROJECT NO. -
143 MA 02
PC Sta 85+00.14
Existing Right EP
Existing Southbound SR 143 Profile Grade Line and Axis of Rotation
+0.10%/ft
0.00%/ft
-0.10%/ft
+0.020%/ft
-0.020%/ft
Existing Left EP
1160
1150
1140
1130
1120
1110
1100
Existing SR 143 Profile Grade
+0.3750%
Exist Ground Line
85
90
95
ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
ROADWAY DESIGN SERVICES
SR 143 MAINLINE
PROFILE SHEET
STA 85+00 to STA 99+00
PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING
DWG NO. C-43
DMJM HARRIS
AECOM
SR 143
SR143/SKY HARBOR BLVD TI
TRACS NO. H7528 01C
9/25/2008
u:\sr 143\prod\civil\7528v84.dgn

Project:	SR 143/Sky harbor TI
Proj. No:	191543000
Date:	7/17/2009
Prep by:	GA
Rev by:	RAE

Hydroplaning

Estimate of Critical Rainfall Intensity for Hydroplanning Hazard

Ref: USDOT-FHWA , Design of Bridge Deck Drainage, HEC-21 (May, 1993)

Vehicle Design Speed	Tire Spindown	Tire Pressure	Tire Tread Depth	Mean Pavement Texture	Water Film Depth using the A_{T1} equation	Water Film Depth using the A_{T2} equation	Applicable Watre Film Depth at Spread line
V	SD	Pt	TD	TXD	d,A_{T1}	d,A_{T2}	d
(fps)	(%)	(psi)	(1/32 in)	(in)	(in)	(in)	(in)
55	10	28	7	0.038	0.032	0.085	0.0848

Runoff Coefficient	Manning Number	Street Longitudinal Slope	pavement Cross Slope	Deck Width to Gutter	Permissible Spread	Sheet Flow Width	Critical Rainfall Intensity
C	n	S	Sx	Wp	T	(Wp-T)	i
		(ft/ft)	(ft/ft)	(ft)	(ft)	(ft)	(in/hr)
0.95	0.016	0.00375	0.02	54	18	36	4.26

Note: The maximum intensity (10-year storm) applicable to this project, associated with a minimum time of concentration of 10 minutes, is 3.84 inches (App. J). Therefore Hydroplaning would not be a cocern under design conditions

POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

PHOENIX WSFO AP, ARIZONA (02-6481) 33.4431 N 111.9903 W 1148 feet

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

Extracted: Thu Jun 11 2009

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

Precipitation Frequency Estimates (inches)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.17	0.27	0.33	0.44	0.55	0.63	0.67	0.81	0.91	1.10	1.21	1.32	1.45	1.58	1.93	2.25	2.61	2.89
2	0.23	0.35	0.43	0.58	0.72	0.81	0.86	1.03	1.16	1.40	1.55	1.68	1.85	2.02	2.48	2.89	3.35	3.72
5	0.31	0.48	0.59	0.79	0.98	1.09	1.14	1.33	1.48	1.81	2.03	2.21	2.43	2.65	3.26	3.80	4.41	4.88
10	0.38	0.57	0.71	0.96	1.19	1.31	1.36	1.57	1.73	2.14	2.42	2.64	2.90	3.16	3.86	4.49	5.19	5.72
25	0.46	0.70	0.87	1.18	1.46	1.60	1.67	1.90	2.06	2.59	2.96	3.25	3.57	3.88	4.65	5.42	6.21	6.82
50	0.53	0.81	1.00	1.35	1.67	1.83	1.92	2.16	2.32	2.95	3.38	3.73	4.10	4.45	5.26	6.12	6.97	7.62
100	0.60	0.91	1.13	1.52	1.88	2.07	2.18	2.43	2.59	3.33	3.83	4.26	4.67	5.05	5.88	6.85	7.74	8.42
200	0.67	1.02	1.26	1.70	2.10	2.30	2.45	2.70	2.85	3.71	4.31	4.81	5.26	5.69	6.51	7.58	8.49	9.20
500	0.76	1.16	1.44	1.94	2.40	2.62	2.83	3.08	3.22	4.24	4.96	5.59	6.11	6.57	7.35	8.56	9.49	10.21
1000	0.83	1.27	1.57	2.12	2.62	2.87	3.13	3.37	3.50	4.66	5.49	6.22	6.79	7.29	8.00	9.31	10.23	10.96

$i_{10\text{-min}} = \frac{0.57 \times 60}{10}$

$= 3.42$ in/hr

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

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

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.20	0.31	0.39	0.52	0.64	0.72	0.77	0.93	1.04	1.23	1.35	1.47	1.61	1.76	2.15	2.50	2.90	3.20
2	0.27	0.41	0.51	0.68	0.84	0.94	0.99	1.18	1.32	1.56	1.73	1.88	2.06	2.25	2.75	3.20	3.72	4.12
5	0.36	0.56	0.69	0.93	1.15	1.26	1.31	1.52	1.69	2.02	2.26	2.47	2.71	2.96	3.62	4.20	4.88	5.40
10	0.44	0.67	0.83	1.11	1.38	1.51	1.56	1.78	1.97	2.38	2.68	2.94	3.22	3.53	4.27	4.96	5.74	6.33
25	0.54	0.82	1.01	1.36	1.69	1.83	1.91	2.14	2.34	2.88	3.28	3.61	3.96	4.32	5.15	5.97	6.87	7.54
50	0.61	0.93	1.16	1.56	1.93	2.09	2.19	2.42	2.63	3.27	3.75	4.16	4.55	4.95	5.84	6.74	7.72	8.44
100	0.69	1.05	1.30	1.75	2.16	2.36	2.48	2.73	2.94	3.68	4.26	4.74	5.18	5.63	6.53	7.53	8.56	9.32
200	0.77	1.17	1.45	1.95	2.42	2.63	2.79	3.04	3.25	4.11	4.79	5.37	5.85	6.35	7.24	8.33	9.40	10.18
500	0.88	1.34	1.66	2.24	2.77	3.00	3.23	3.49	3.69	4.70	5.53	6.24	6.78	7.35	8.19	9.43	10.54	11.33
1000	0.97	1.47	1.83	2.46	3.04	3.31	3.60	3.85	4.05	5.17	6.13	6.95	7.55	8.14	8.91	10.28	11.38	12.18

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

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

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

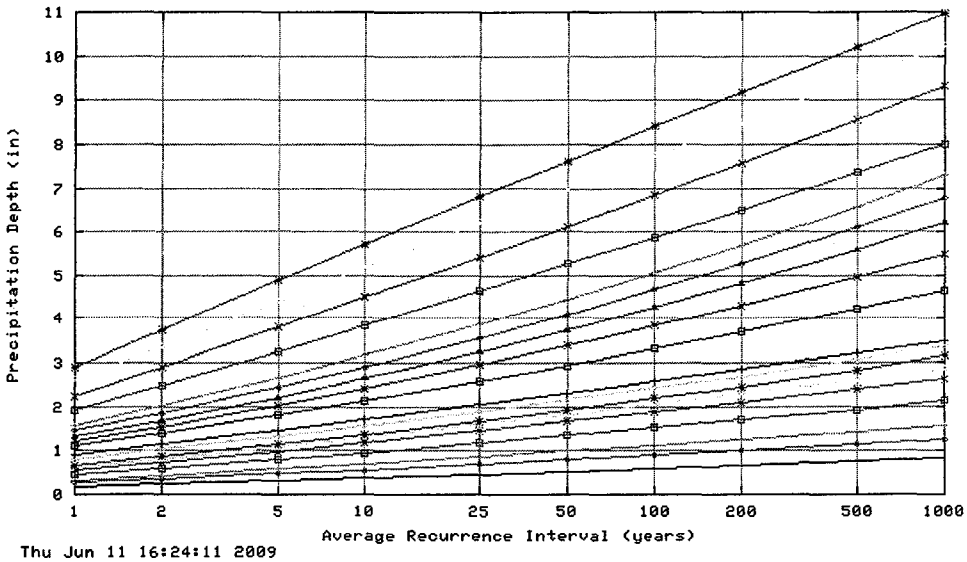
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.15	0.23	0.28	0.38	0.47	0.55	0.58	0.72	0.81	0.99	1.09	1.19	1.30	1.42	1.73	2.02	2.35	2.61
2	0.20	0.30	0.37	0.50	0.62	0.71	0.76	0.93	1.03	1.26	1.40	1.51	1.67	1.81	2.23	2.60	3.03	3.36
5	0.27	0.41	0.51	0.68	0.84	0.96	0.99	1.19	1.31	1.63	1.82	1.99	2.19	2.38	2.93	3.40	3.97	4.39
10	0.32	0.49	0.61	0.82	1.01	1.14	1.18	1.40	1.52	1.92	2.17	2.36	2.60	2.83	3.46	4.01	4.66	5.14
25	0.39	0.59	0.74	0.99	1.23	1.37	1.43	1.66	1.80	2.30	2.63	2.89	3.18	3.45	4.15	4.81	5.55	6.10
50	0.44	0.67	0.83	1.12	1.39	1.55	1.62	1.85	2.00	2.61	3.00	3.30	3.64	3.93	4.68	5.42	6.21	6.80
100	0.49	0.74	0.92	1.24	1.53	1.72	1.81	2.05	2.20	2.91	3.38	3.74	4.11	4.43	5.21	6.04	6.88	7.49
200	0.54	0.81	1.01	1.36	1.68	1.88	2.00	2.23	2.38	3.23	3.77	4.19	4.60	4.96	5.74	6.65	7.51	8.15
500	0.59	0.90	1.12	1.50	1.86	2.09	2.23	2.48	2.62	3.65	4.29	4.81	5.27	5.66	6.42	7.47	8.34	9.01
1000	0.64	0.97	1.20	1.61	2.00	2.23	2.41	2.65	2.80	3.98	4.70	5.30	5.80	6.21	6.93	8.05	8.95	9.61

* The lower bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are less than.

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

Text version of tables

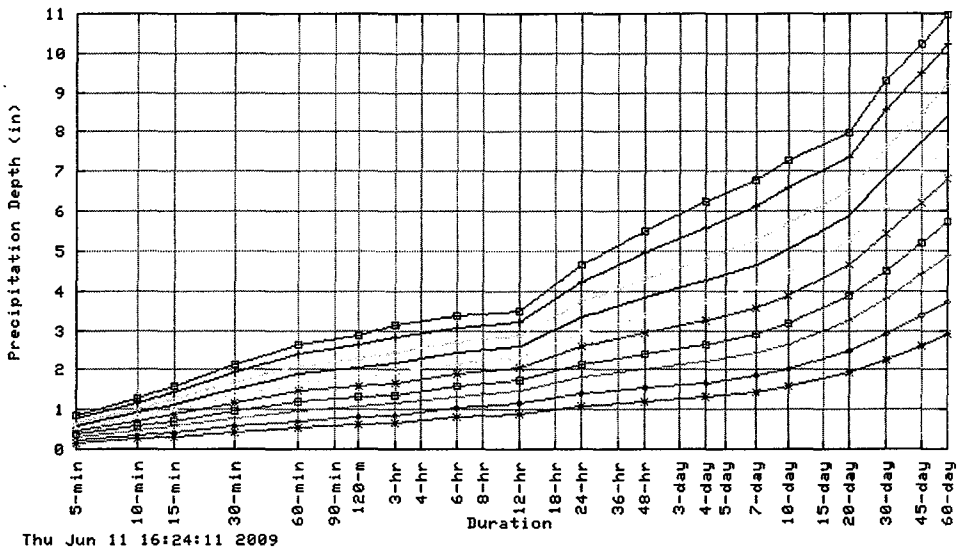
Partial duration based Point Precipitation Frequency Estimates - Version: 4
33.4431 N 111.9903 W 1148 ft



Thu Jun 11 16:24:11 2009

Duration			
5-min		48-hr	30-day
10-min	3-hr	4-day	
15-min		7-day	60-day
30-min	12-hr	10-day	
60-min	24-hr	20-day	

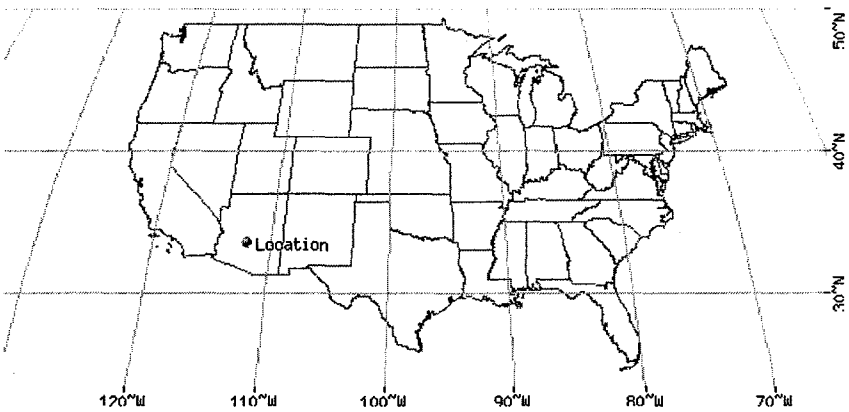
Partial duration based Point Precipitation Frequency Estimates - Version: 4
33.4431 N 111.9903 W 1148 ft

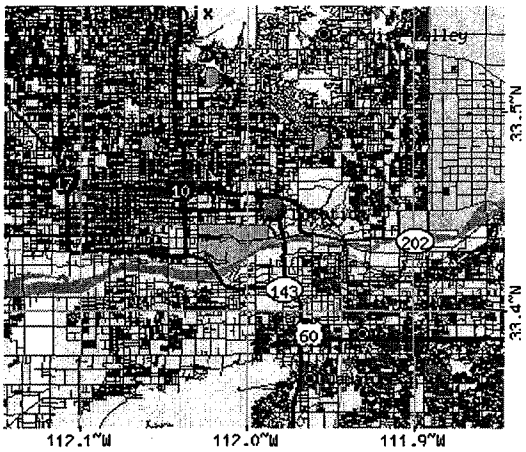


Thu Jun 11 16:24:11 2009

Average Recurrence Interval (years)	
1	
2	100
5	
10	500
25	1000

Maps -





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

Please read disclaimer for more information.

LEGEND

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

Scale 1:228583 (0 2 4 6 8 mi; 0 2 4 6 8 10 km)

*average--true scale depends on monitor resolution

Other Maps/Photographs -

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

Watershed/Stream Flow Information -

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

Climate Data Sources -

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

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

+/-30 minutes ...OR... +/-1 degree of this location (33.4431/-111.9903). Digital ASCII data can be obtained directly from **NCDC**.

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

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

Disclaimer

Appendix I FCDMC Comments

1. Comments from the 30% Drainage Report

2. Comments from the 60% and 95% Drainage Reports

1. Comments from the 30% Drainage Report

Flood Control District
of Maricopa County

INTEROFFICE MEMORANDUM

Date: January 22, 2009

To: Afshin Ahouraiyan, P.E, Project Manager, Planning & Project Management Division

From: Apurba K. Borah, PhD, P.E., Senior Civil Engineer, Engineering Application Development and River Mechanics Branch, Engineering Division

CC: Bing Zhao, PhD, P.E., Engineering Application Development and River Mechanics Branch Manager, Engineering Division

Subject: SR 143/Sky Harbor Blvd. TI Initial Salt River Drainage Concept Report by J2 Engineering and Environmental Design, dated January 8, 2009

The Engineering Application Development and River Mechanics Branch (EADRM) has received the report on 1/8/2009 and finished its review of Scour Analysis and has the following comments. The texts that are grayed out are comments that are resolved:

1. **FCDMC (10/16/2006):**
   Bed form scour is not required to calculate separately when local scour at piers is computed, since the K_3 factor (Page 16) already accounts for the increase in scour due to bed forms. Therefore, description of bed form scour in the last paragraph (Page 13) needs to be modified.
   J2 (10/23/2008):
   We looked at bed form scour in the following two ways: incorporated into the pier scour equation (K_3); and as an independent equation from the ADWR guidelines. We will clarify the text in the report.
   FCDMC (10/24/08):
   This suggestion was based on the few lines in the report that bed form scour was not included in the scour evaluation—Page 13; there was no equation cited from the ADWR guidelines. We will wait for the next version of the report.
   J2 (01/06/2009):
   Will modify.
   FCDMC (10/24/08):
   The text has been modified in the latest report dated January 2009; issue resolved.

2. **FCDMC (10/16/2006):**
In Appendix B, for local scour calculation at Piers, water surface elevation immediately upstream of the bridge is 1127.85 ft instead of 1227.84 ft based on HEC-RAS data provided in the report. There is a 100 feet difference.
J2 (10/23/2008):
We will correct the typographical error (1227.84 to 1127.85) in the Appendix.
FCDMC (10/24/08):
We will wait for the next version of the report.
J2 (01/06/2009):
Will modify the typo.
FCDMC (01/22/2009):
Report has been modified; issue resolved.

3. **FCDMC (10/16/2006):**
No HEC-RAS data are provided for 500-year flow. There is also no explanation or assumption how data for local scour calculation (upstream depth=18.77 ft, and Froude number=0.55) are obtained in this case. Please provide an HEC-RAS model with 500-year flow and use the results for scour analysis instead of using 100-year RAS results.
J2 (10/23/2008):
The estimated scour depth for the 500-year event was included in the report. We will clarify the text for the 500-year event.
FCDMC (10/24/08):
We will wait for the next version of the report.
J2 (01/06/2009):
Will provide separate model and summary output for 500-yr flow.
FCDMC (01/22/2009):
500-yr model results are provided in the report; issue resolved.

4. **FCDMC (10/16/2006):**
Calculation for top width of the scour hole at Piers is wrong based on the data provided in Appendix B. Using these data, calculated top width of scour hole will be 62.83 ($27*(1+\cot 37^0)$) ft instead of 36 ft. At the pier, y_s (local scour) is 25.48 ft (1.3*19.6 ft). FHA suggests top width of $2.0y_s$ for practical applications (FHA Hydraulic Engineering Circular No. 18). Therefore, 51.0 ft. top width for scour hole can be used. Section 5.5 in the report needs to be modified based on this new top width for scour hole. The bank protection should be outside the pier's local scour influence zone unless the bank protection toe down is increased or the two outside piers (on either side) can be located away from the banks.
J2 (10/23/2008):

According to HEC-18, the width of the scour hole may range from 1.07 y_s to 2.80 y_s (based on design assumptions). HEC-18 recommends a default value of 2.0 y_s. The topwidth of the scour hole is dependent upon the following two variables: 1) angle of repose, and 2) bottom width of the scour hole. The range of the angle of repose (in air) varies from 30 to 44 degrees. The angle of repose for cohesion less material in water will be less than in air. In addition, HEC-18 states that the deeper the scour hole the smaller the bottom width of the scour hole. Based on the estimated total scour depth of over 35 feet, it is reasonable to assume that the bottom width of the scour hole would be relatively small. It should be noted that the pier configuration is in line with the existing (previously approved) pier bents. The additional pier bents did not significantly increase the impact on the existing bank protection. Therefore, the values stated in the report seem reasonable for this application.

FCDMC (10/24/08):
Since the distance is the same as that for the existing piers, we will allow 36 feet although the default should be 2*ys = 51 feet. However, Appendix B calculation needs to be corrected as 27(1+cot37) is not 36 ft.
J2 (01/06/2009):
The top width is reasonable for the width of the pier and depth of scour. The minimum and maximum top widths were calculated. It is not reasonable for 6-8 foot drilled shaft to create a scour hole of 126 feet wide. The ref states that the bottom of the scour hole decreases as the depth increases and the angle of repose is less (steeper) in water than in air. The value of 28.95 = (0+cot43) or 35.8 = (0+cot37) is reasonable. Will document in the report.
FCDMC (01/22/2009):
Report has been modified; issue resolved.

5. **FCDMC (10/16/2006):**
For general scour, J2's estimate based on live-bed contraction scour equation is 1.0 ft for 100-year flow (Appendix B). FCDMC's estimate for general scour based on Neill's equation for 100-year flow is 5.59 ft. FCDMC recommends that the higher value between the contraction scour equation and Neill's general scour equation should be used for the general scour component. Therefore, it should be 5.59 feet instead of 1 foot.
J2 (10/23/2008):
Typically, Neill's equation produces a very conservative estimate for general scour. The 5.59 feet referenced in the FCDMC comment seems very conservative for a watercourse that is channelized with minor constrictions. It seems that the use Laursen's equation may be a better estimate of contraction scour (general scour) for this application. Results from Laursen's equation seem to produce a reasonable scour depth for a structure spanning the water

course (abutments outside of the channel) with piers that "block" less than 10 percent of the channel width.

FCDMC (10/24/08:
Laursen's equation is for only contraction scour, but Neill's equation is for both contraction as well as other general scour under design flow condition. Neill's equation should be used. When there is no bridge constriction, Lacey or Blench scour should be used for general scour. In fact, for arid or semi-arid alluvial channels, the general scour is around 5 feet (herein, general scour is the scour for design flood), which is the major portion of the total scour for a natural channel without bridge. Long-term scour is usually smaller than general scour.
J2 (01/06/2009):
The J2 and FCDMC total scour depth was the same. In this case the FCDMC general scour appears to be conservative. We can use the general scour from the FCDMC if we eliminate the J2 "headcut" term. The total scour depth remains the same.
FCDMC (01/22/2009):
Although J2 used the ADOT methodology of scour computation for final design, scour calculations utilizing FCDMC methodology are also shown in the Appendix B.

6. **FCDMC (10/16/2006):** J2 assumed 6.0 ft of long term degradation for this section in order to match the total scour depth computed in an older report. Long term scour should be zero because existing bed slope and equilibrium slope are equal.

J2 (10/23/2008):
The Schoklitsch Equation was utilized to determine the equilibrium slope of the Salt River. Results of the analysis indicated that the invert elevation at the structure would be 1111 feet (approximately 1 -2 feet below the existing elevation at the structure). Review of the Salt River profile from the FIS shows that the SR 143 is constructed on a "hump" in the Salt River. Team members felt that is was prudent to assume that approximately 6 feet of additional scour could occur. The 6 feet value was not added to match the total scour number in the old report.

FCDMC (10/24/08:
Thanks for clarifying that the 6 feet value was not added to match the total scour number in the old report. However, since the equilibrium slope and existing slope are equal, long term scour for the dominant flow condition should be zero instead of 6 feet.
J2 (01/06/2009):
We determined the long term and contraction scour based on the site. Together they equal to FCD scour depth. Will clarify in the report.
FCDMC (01/22/2009):
Report has been modified; issue resolved

7. **FCDMC (10/16/2006):**
The minimum requirement per US Army Corps of Engineers for the long term scour, general scour, bed form scour, and low flow scour is 10 feet for a straight channel and 13 feet for a curve channel. The sum of long term scour, general scour, bed form scour, and low flow scour is only 7.27 (1.3*(0.0+5.59+0+0)) ft in this site. Based on US Army Corps of Engineers' requirement, the total scour would be 10+19.6*1.3 = 35.50 feet for 100-year flow. J2's total scour is 35 feet. Although the results are the same, the report needs to be revised.

J2 (10/23/2008):
It was my understanding that the Corps of Engineers numbers of 10 feet and 13 feet were for toe down of bank protection and may not be additive for pier scour at a bridge crossing. Please clarify the Corps reference and we will incorporate into the scour evaluation accordingly. It appears that the total scour depth determined by J2 and the FCDMC is in agreement. The components of the total scour differed. I feel that the majority of the issues may be a matter of semantics, but we are willing to discuss the report presentation (i.e., I feel that 5 – 6 feet of general scour is excessive for this situation).

FCDMC (10/24/08:
Although total scour was equal for J2 and FCDMC, we used our standard procedures to arrive at our result which we believe is more logical. US Corps of Engineers' number of 10 ft is for bank toe protection, but when the sum of scour components other than local scour is less than 10 ft, addition of 10 ft to local scour will provide a more reasonable estimate. In fact, the general scour component is the major component of the 10 feet requirement for bank protection. 5 feet of general scour is very common in our major rivers. Other components such as bed form, bend, and low flow incisement will not be able to generate a 10-foot total scour without a large general scour value for a river that is already in long-term equilibrium condition. The long term scour may play a major role if there is a nearby upstream dam that captures a lot of sediment. However, if the equilibrium slope and existing slope are the same, the long term scour is then zero regardless of if there is any pivot point downstream.
J2 (01/06/2009):
We believe this is not a correct statement and misrepresentation of the Corp's guideline. It was decided to use a 10' toe down for straight sections of channel as a conservative default value. It was not based on a specific assumption of scour components and it should not be added to the local scour depth unless it is justified.
FCDMC (01/22/2009):
It is assumed to be resolved as the results are very close.

8. **FCDMC (10/16/2006):**

Similarly, total scour for 500-year flow should be calculated. The general scour for the 500-year needs to be computed based on Neill's equation and multiplied by 1.3 and compared with Corps 10-foot minimum requirement. Again, please provide an HEC-RAS model for the 500-year flood.

J2 (10/23/2008):

The total scour depth for the 500-year event was determined to be 37 feet below the thalweg. We will include the 500-year run in the HEC-RAS models.

FCDMC (10/24/08):

We will wait for the next version of the report.

J2 (01/06/2009):

The 500-year scour was calculated. We will make it clearer in the report.

FCDMC (01/22/2009):

HEC-RAS model results for 500-year run and scour calculations are provided in the report; issue resolved.

2. Comments from the 60% and 95% Drainage Reports

Flood Control District
of Maricopa County

INTEROFFICE MEMORANDUM

Date: January 22, 2010

To: Afshin Ahouraiyan, P.E, Project Manager, Planning & Project Management Division

From: Apurba K. Borah, PhD, P.E., PMP, Senior Civil Engineer, Engineering Application Development and River Mechanics Branch, Engineering Division

CC: Bing Zhao, PhD, P.E., Engineering Application Development and River Mechanics Branch Manager, Engineering Division

Subject: Final Salt River Drainage Report for SR143/Sky Harbor Boulevard TI prepared by Kimley-Horn and Associates, Inc., dated December 2009

The Engineering Application Development and River Mechanics Branch (EADRM) has received the Final Salt River Drainage Report and 95% construction plans to review the scour calculations on 01/05/2010 and have completed the review of the final report on 1/22/2010. ***All the issues have been resolved as can be seen in the latest comments.***

1. **FCDMC (9/2/2009):** During 30% design, the 100-year and 500-year scour depths to be used for design of the bridge piers are 31.0 ft and 33.3 ft respectively. These values were approved by the District. However in Appendix G, the scour depths were re-calculated and found to be smaller although the design scour depth was chosen to be 28.59 ft for both 100-year and 500-year event. The scour depth for the existing piers is approximately 35 feet. Please correct the scour calculation based on the comments below (No.2 and No.3).

   KHA (10/1/2009): We will comply

   FCDMC (11/20/2009): We received the scour calculations and agree with the results. Please use 34 feet for scour depth. However, please document the results in the next submittal (report and plans).

   FCDMC (01/22/2010): The results have been documented in the Final drainage report and 95% design plans, issue resolved.

2. **FCDMC (9/2/2009):** In Appendix G, FDMC procedures shown are not correct as we use Neill's equation for both contraction as well as other general scour under design flow condition. Laursen's equation is for only contraction scour. When

there is no bridge constriction, Lacey or Blench equation should be used. For this case, the Neill's equation should be used for general scour. Based on our preliminary estimate, the long term scour component could be zero since the existing channel slope is close to the equilibrium slope.

KHA (10/1/2009): We will evaluate and coordinate with FCDMC

FCDMC (11/20/2009): We received the scour calculations and agree with the results. Please use 34 feet for scour depth. However, please document the results in the next submittal (report and plans).

FCDMC (01/22/2010): Final drainage report and 95% design plans have been reviewed, issue resolved

3. **FCDMC (9/2/2009):** The safety factor for all scour components is 1.3 except that it may be 1.0 for pier scour if debris width is included in pier scour calculation or the flow depth is significantly large such that the debris will have less impact on the pier scour. Please re-calculate the total scour depth.

   KHA (10/1/2009): We will recalculate accordingly.

   FCDMC (11/20/2009): We received the scour calculations and agree with the results. Please use 34 feet for scour depth. However, please document the results in the next submittal (report and plans).

   FCDMC (01/22/2010): Final drainage report and 95% design plans have been reviewed, issue resolved

4. **FCDMC (9/2/2009):** Although calculations are shown in Appendix G, estimated scour depths for each component need to be shown in each section of the report from page 11 through 17.

   KHA (10/1/2009): OK, will incorporate.

   FCDMC (11/20/2009): We received the scour calculations and agree with the results. Please use 34 feet for scour depth. However, please document the results in the next submittal (report and plans).

   FCDMC (01/22/2010): Final drainage report has been modified to include the scour amount in the text section, issue resolved.

5. **FCDMC (9/2/2009):** Change "thawleg" to "thalweg" on page 11.

   KHA (10/1/2009): OK, will incorporate.

FCDMC (11/20/2009): Thanks for documenting it in the next submittal.

FCDMC (01/22/2010): Final drainage report has been modified, issue resolved.

6. **KHA (11/9/2009):** Here is the final design scour depth per coordination with ADOT and the FCDMC:

   [To be measured from the current lowest bed elevation of 1106.59 ft-NGVD29, established by the Salt River Hydraulic Master Plan]
   These numbers will be reflected in the next 95% stage submittal
   100-year Design Scour Depth = 30.4 ft
   500-year Design Scour Depth = 33.7 ft

   FCDMC (11/20/2009): We received the scour calculations and agree with the results. Please use 34 feet for scour depth. However, please document the results in the next submittal (report and plans).

   FCDMC (01/22/2010): The results have been documented in the final drainage report and 95% design plans, issue resolved.

Appendix J Data CD