North Houston Highway Improvement Project (NHHIP)

Segment 3D (I-10 and I-45)
Harris County, Texas
CSJ: 0500-03-599

Drainage Impact Analysis for Preliminary Design

Prepared on Behalf of:
Texas Department of Transportation

Texas Department of Transportation

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USB Drive

1.0 EXECUTIVE SUMMARY

The Texas Department of Transportation (TxDOT) Houston District is proposing to improve the existing Interstate Highway 45 (I-45) to address the traffic capacity limitations and obsolete functionality of certain aspects of the corridor. The proposed project is named North Houston Highway Improvement Project (NHHIP). The limits of the NHHIP project (the Project) are between the interchange of Interstate 69/US Highway 59 (I-69/US-59) and State Highway 288 (SH-288) south of downtown Houston and follow northward along I-45 to the interchange of I-45 and Beltway 8 North.

TxDOT has contracted Lockwood, Andrews & Newnam, Inc. (LAN) for the preparation of a preliminary drainage analysis for Segment 3D of NHHIP (See **Exhibit 2-1**). LAN is one of the 5 consulting teams performing drainage studies on different sections of the NHHIP Segment 3 - Segments A, B, C, D & E. The proposed improvements will include the realignment of I-45 and I-10, the replacement of main lanes, direct connectors, and ramp bridge structures over White Oak Bayou (E100-00-00) and Buffalo Bayou (W100-00-00).

The report consists of the following three components:

- Open Channel hydraulic analysis of White Oak Bayou and Buffalo Bayou. The effective models were calibrated to create a corrected effective model. The corrected effective model was used to analyze the proposed roadway improvements and the proposed channel and conveyance improvements.
- Preliminary drainage analysis and design for Segment 3D roadway reconstruction. The drainage analysis involves estimating the runoff impacts due to increase in impervious area and hydraulic system improvements and mitigating increased runoffs.
- Mitigation measures for fill placed with in the FEMA 100-year floodplain related to Segment 3D reconstruction.

Model Development and Calibration

To determine the accurate impacts and benefits of the Project, a Corrected Effective HEC-RAS model for White Oak, Little White Oak and Buffalo Bayous was created. The HCFCD M3 models for Buffalo and Little White Oak Bayous and FEMA Risk Map Study model for White Oak Bayou were used as base models for the calibration purposes. The use of these models was based on the direction from HCFCD. The Effective and Risk Map models were truncated and combined into an unsteady model focused on the study area. White Oak Bayou, Little White Oak Bayou and Buffalo Bayou were truncated at Ella Boulevard, Trimble Street and Shepherd Drive, respectively, at the upstream ends of the study area. Buffalo Bayou is truncated at Turning Basin on the downstream end. The study area, truncated limits and boundary conditions are shown on **Exhibit 3-1**.

The truncated locations were strategically selected to correspond to sub watershed boundaries and flow/stage gage locations. This information was used to assist with the boundary condition for design storms and calibration event analysis. The recorded storm data for nine storm gages

was obtained from the Harris County Flood Warning System Website (See **Exhibit 3-2**) and the Thiessen Polygon analysis was carried out to determine the relative rainfall factor for each catchment basin. The resultant rainfall data was input into HEC-HMS to create corresponding runoff hydrographs, at 15-minute time steps.

The combined truncated unsteady state HEC-RAS model geometry was updated to reflect current conditions and establish the Corrected Effective model. The WSEL from the combined unsteady state models were compared to the effective models and the conversion resulted in a WSEL drop of 0.5 feet to 1 feet. The conversion results from steady state models to unsteady state models are consistent with the standard practice. Significant revisions were made to many of the bridge structures, including the addition of the US-59 bridge crossing Buffalo Bayou. Only minor modifications were made to the channel geometry and overbank areas.

The combined effective model was calibrated with three historic storm events: Memorial Day (May 25th to 26th, 2015), Tax Day (April 18th, 2016) and Harvey (August 26th to 29th, 2017). The HEC-RAS WSEL results from these analyses were compared to recorded highwater marks (HWMs) collected during these events. Minor adjustments were made to the analysis to improve calibration including bank station location adjustments and Manning's n-value roughness coefficients.

The Water Surface Elevations (WSELs) computed by the Calibrated model were compared to the observed HWMs. Results showed that the differences between computed WSELs and observed HWMs are generally within 1 feet. See **Table 3-8** for a comparison of the calibrated model results to the observed HWMs. The measured HWMs/stage data is normally within +/- 1.0 feet of accuracy. Therefore, the WSELS were calibrated within 1 feet of HWMs. In summary, the model was calibrated reasonably well to the available high-water marks for the three major flood events.

Overall, the WSEL's in the corrected effective model in general are 1 to 3 feet higher than the effective models for all three channels. **Table 3-12** and profile plots **Figure 3-11** to **Figure 3-13** provide a comparison of the corrected effective model results to the effective model results. These results have significant impacts on the NHHIP project, and they alter the communities' and stakeholders' understanding of the flood risk for this region.

Proposed Channel Analysis

The Corrected Effective model was used as the basis for the development of the proposed condition models and the evaluation of benefits and impacts for the project. The impact of the proposed roadway improvements, as well as their mitigation benefits for White Oak Bayou, Little White Oak Bayou and Buffalo Bayou were analyzed with the unsteady state HEC-RAS modeling platform. The Corrected Effective model, described above, was used as the existing conditions model for the Project. The proposed model was developed using the preliminary roadway information that was part of the schematic design by HNTB Corporation.

The proposed changes to the roadway and bridges were incorporated in the model geometry. The proposed roadway design files indicated that the bridges at stream crossings will be on multiple different elevations due to the intersection configurations. In addition to the bridge modifications, a portion of the proposed I-10 and I-45 mainlanes, were recommended to be raised on grade to meet the minimum 100-year design criteria. These modifications will result in

additional fill in the 100-year floodplain which is discussed in detail in **Section 6.9**. The proposed conditions without any other improvements was called the "Unmitigated Proposed Conditions" for all the proposed scenarios. The following scenarios were evaluated to understand and mitigate the roadway impacts are:

- Unmitigated Proposed Conditions
- Scenario 1 – North Canal Only,
- Scenario 2 – North Canal and Heights Blvd Improvements,
- Scenario 3 – North Canal, South Canal, Heights Blvd Improvements and Mitigation Options
- Scenario 4 – Detention Only

Scenario 1 includes the Proposed North Canal, which diverts high flows from White Oak Bayou to Buffalo Bayou, immediately downstream of Main Street to upstream of McKee Street (See **Exhibit 4-2a**). The improvement is designed to reduce head loss and improve hydraulic efficiency by adding conveyance capacity at the confluence of White Oak and Buffalo Bayou. North Canal could potentially provide a reduction of 2.44 to 3.15 feet in the 100-year WSEL in the downtown area between confluence and I-45 crossing Buffalo Bayou. The 100-year WSEL reduction on Buffalo Bayou upstream of I-45 ranges from 1.69 to 2.56 feet. However, downstream of McKee Street, the north Canal project could result in a potential increase in WSEL of 0.70 feet to a maximum of 1.04 feet.

Scenario 2: The area upstream of and near Heights Boulevard and Yale Street along White Oak Bayou has experienced severe flooding during heavy storms in recent years. Scenario 2 includes the proposed modifications to the channel side slopes near these crossings and the removal of the abandoned partial UPRR crossing. This can improve the channel and crossing hydraulics resulting in an improved flooding condition (See **Exhibit 4-3**). Results showed that these channel improvements increase the hydraulic bridge opening, enhance conveyance capacity, and reduce the head loss across the bridges. These improvements effectively extend the benefits of Scenario 1 above the Heights Boulevard and Yale Street area. The 100-year WSEL decrease in White Oak Bayou at the UPRR upstream of Yale Street is approximately 3.45 feet, compared to 0.26 for Scenario 1. Similar to Scenario1, Scenario 2 improvements will have 100-year WSEL increase downstream of McKee Street from 0.88 to 1.23 feet.

Scenario 3 includes the addition of the South Canal as second bypass channel. Scenario 3 builds on the improvements described in Scenario 1 and 2. The South Canal improves conveyance in Buffalo Bayou by bypassing a bend in the channel near Elysian Street and the UPRR bridge, see **Exhibits 4-1** and **4-4a**. The proposed canal consists of a trapezoidal channel with 4:1 side slope and 80 feet bottom width. The combined improvements yield a 0.56 foot to 4.50 feet reduction in the 100-year WSEL in Buffalo Bayou upstream of Mckee street and 0.47 feet to 4.26 feet on White Oak Bayou. This is an additional 1.54 to 1.76 feet reduction in the 100-year WSEL compared to Scenario 2. Scenario 3 results in an increase in the 100-year WSEL downstream of I-69 up to 1.45 feet. The WSEL increase between McKee and I-69 in Scenario 2 is eliminated in Scenario 3

due to the addition of South Canal. Instead, there is a WSEL reduction in this area ranging from 0.06 to 0.99 feet.

Scenario 3 Mitigation: The downstream impacts associated with Scenario 3 are a direct result of the improved conveyance and lowered WSEL upstream of the project. These impacts were identified in previous North Canal initiatives by HCFCD and were expected. Two options to address the potential impacts are discussed:

Option 1 is to fully mitigate for and eliminate the increase in WSEL. This option involves significant mitigation detention volume near the project. Preliminary mitigation volume estimates to accomplish this goal are approximately 4300 ac-ft. Given the approximate depth of the channel near the needed detention, this volume translates to approximately 250 acres of land, which can potentially be obtained as a contiguous basin or as multiple basins. Such basins must have frontage to Buffalo Bayou to allow for an offline weir configuration.

Option 2 is an alternative to mitigation and elimination of impacts. It involves the potential to allow for the safe controlled increase in WSEL downstream of the project. Buffalo Bayou appears to have available capacity and freeboard for much of the reach downstream of I-69/US-59. An increase in WSEL results in relatively minor impacts relative to small increases in WSEL in other channels around the county. The minor impacts could be accounted for through agreements with property owners. Activities accompanying this option would include approvals by HCFCD and the City of Houston, compliance with FEMA NFIP regulations 44 CFR 65.12, and a potential variance with City of Houston's Ch 19 Floodplain Ordinance.

Scenario 4 is designed primarily to mitigating for the NHHIP project improvements and includes the construction of a regional detention pond, see **Exhibit 4-5.** This scenario was evaluated to offset the WSEL increases in White Oak Bayou and Buffalo Bayou that result from an unmitigated roadway improvement and to mitigate for the increases in the WSEL downstream of I-69/US-59. Scenario 4 does not include the North canal, South Canal, or the improvements in the vicinity of Heights Boulevard and Yale Street.

This scenario fully mitigates the impacts of the Project both upstream and downstream of the project limits. The benefits from the Scenario 4 in terms of the 100-year WSEL reduction is not as significant compared to Scenarios 1 to 3. However, Scenario 4 provides the WSEL reduction due to the NHHIP project both upstream and downstream and thus will mitigate the impacts of the propose roadway modifications related to the Project. There is a WSEL reduction of 0.05 feet in the Buffalo Bayou reach downstream of I-69/US-59 as compared to the WSELs for the Corrected Effective model. The Scenarios 1-3 improvements lead to additional impacts downstream that cannot be mitigated with the detention pond layout proposed in Scenario 4.

Recommendation: Scenario 3 is conditionally recommended given the significant benefits to the TxDOT roadway systems, the downtown area, and the flood mitigation benefits provided to the community. The conditional recommendation is contingent upon the resolution of downstream impacts. If Scenario 3 or another similar scenario is unable to be obtained, Scenario 4 is recommended given its ability to fully mitigate for the NHHIP Project.

Roadway Profile: Profile plots of the segment 3D corridor were prepared to compare the Edge of Pavement (EOP) for each alignment to the 100-year WSEL. The plots include the Effective, Corrected Effective and Scenario 3 water surface profiles. The majority of Segment 3D is above the elevated corrected effective 100-yr WSEL. The exceptions are I-10 westbound and eastbound mainlanes between Houston Street and Taylor Street and I-45 northbound and southbound main lanes north of Little White Oak Bayou crossing (in NHHIP Segment 2).

Segment 3D Impact Analysis

Drainage impacts associated with Segment 3D of the NHHIP were evaluated. Potential impacts investigated include increase peak runoff and volume resulting from an increase in impervious cover, improved system hydraulics resulting in a decrease in time of concentration and increase in peak runoff, and loss of floodplain storage. With the recommended mitigation measures, Segment 3D is fully mitigated resulting in no increase in discharge to the receiving channels White Oak Bayou and Buffalo Bayou.

A hydrologic analysis of existing and proposed conditions was conducted to determine the peak runoffs for each drainage area and outfall. The total contributing drainage area for Segment 3D was estimated to be approximately 467.87 acres; which 163.70 acres lies within the project ROW. The proposed Segment 3D improvements will increase the impervious area by 22.91 acres. This increase in flow is mitigated with two proposed detention basins.

There are total of ten drainage systems (A to J), which will be affected by the proposed roadway improvements. The drainage systems are proposed to collect the offsite flow and flows from the project ROW. No modifications are proposed to the City's drainage systems. The drainage System A and B outfall to Little White Oak Bayou (E101-00-00). The drainage Systems C, D, E, F, G and J outfall to White Oak Bayou (E100-00-00). The System C outfalls to Little White Oak Bayou though a 24-inch RCP along Quitman Street but majority of the overland flow drain towards White Oak Bayou. The drainage System I outfalls to Buffalo Bayou (W100-00-00) (See **Exhibits 5-1** and **5-2**).

There is limited existing storm sewer in the project corridor and most of the overland flow sheet flows to White Oak Bayou. In proposed conditions, the overland flow will be intercepted by the proposed storm sewer trunklines and directed towards the proposed detention ponds. Rational method was used to calculate peak runoffs. Clark Unit Hydrograph Method (CUHM) was used to generate runoff hydrographs by matching the peak flows with the respective Rational method peak flows for the given drainage areas.

The runoff impact analysis shows that that the proposed project has a cumulative 100-year discharge of 3275.2 cfs for existing conditions and 3460.1 cfs for proposed conditions. This results in a cumulative peak discharge rate increase of approximately 184.9 cfs. Based on the hydrograph calculations, the cumulative volumetric runoff impact volume for the project is 17.12 ac-ft.

A mitigation analysis was conducted for all outfalls to determine the storage volume needed to mitigate runoff volumes and the increase in peak flows. A combination of upgraded storm sewer trunklines and proposed detention ponds were recommended to mitigate for increases in peak

flow and volume. The mitigated XPSWMM model demonstrated that the proposed improvements will not cause any adverse impact for Segment 3D. The study recommended appropriate trunkline sizes to prevent the proposed roadway from overtopping for 100-year storm.

As a part of this study it was estimated the proposed roadway profile will add 101.90 ac-ft of fill in the floodplain. This volume is based on the corrected effective WSELs which in many areas is 3+ feet higher than the effective models. The proposed ponds were used to mitigate for the floodplain fill. The total detention storage in the proposed ponds was found to be 137.40 ac-ft (106.80 + 30.60). The roadway impact analysis required 17.12 ac-ft for mitigation volume to offset roadway impacts. The resultant detention volume of 120.28 ac-ft will mitigate for the required floodplain fill mitigation of 101.90 ac-ft. Therefore, the recommended mitigation measures will provide adequate storage volume to mitigate the runoff flow and floodplain fill impacts. **Tables 1-1** and **1-2** summarize the peak flows and volume mitigation for the project.

Table 1-1: 100-Year Peak Runoff Mitigation at Outfalls

Drainage System	Existing Peak Outflow	Mitigated Peak Outflow	ΔQ
(ID)	(cfs)	(cfs)	(cfs)
A+B	217.1	207.2	-9.9
C+D	213.7	191.6	-22.1
E+F	846.0	753.0	-93.0
G+H	823.3	543.5	-279.8
I	165.3	112.0	-53.3
J	101.4	99.3	-2.1

Table 1-2: 100-Year Volume Impact Mitigation

	Volume (ac-ft)
Proposed Pond 'F' Volume	30.60
Proposed Pond 'H' Volume	106.80
Total Proposed Volume	137.40
Required Total Volume Due to Roadway Impacts	17.12
Required Floodplain Fill Mitigation	101.90
Total Required Volume for Mitigation	119.02

Preliminary cost estimates, with 20% contingency, were prepared for proposed drainage improvements, North Canal and South Canal. The total cost for these improvements were calculated to be 24.8 million, 54.5 million and 16.1 million, respectively.

Based on the hydrologic and hydraulic analysis as part of this drainage impact study, the proposed NHHIP Segment 3D reconstruction and corresponding mitigation measures described within, will not adversely impact the receiving creeks, overland sheet flow patterns, or adjacent structures for events up to and including the 100-year storm event.

2.0 INTRODUCTION

The Texas Department of Transportation (TxDOT) Houston District is proposing to improve the existing Interstate Highway 45 (I-45) and interstate Highway (I-10) to address the traffic capacity limitations, obsolete functionality of certain aspects of the corridor, and existing major design deficiencies. The proposed project is named North Houston Highway Improvement Project (NHHIP). The limits of the NHHIP project are between the interchange of Interstate 69/US Highway 59 (I-69/US-59) and State Highway 288 (SH-288) south of downtown Houston and follow northward along I-45 to the interchange of I-45 and Beltway 8 North. The NHHIP is sectioned into 3 segments with the current focus on Segment 3. Segment 3 is further sectioned into multiple segments (A-E) for performing drainage studies. TxDOT has contracted Lockwood, Andrews & Newnam, Inc. (LAN) to perform engineering services for the preparation of a preliminary drainage analyses and report for Segment 3D. The NHHIP Segment 3D is to reconstruct limits along I-10 from West of Houston Avenue to McKee Street and on I-45 from McKee Street to I-45 at Little White Oak Bayou crossing. The proposed project is identified under CSJ 0500-03-599.

The preliminary drainage analysis involves:

- Calibrate and develop combined unsteady models from effective Harris County Flood Control District (HCFCD) HEC-RAS steady state models for Buffalo Bayou, White Oak Bayou and Little White Oak Bayou.
- Assess the hydrologic and hydraulic impacts of the proposed NHHIP infrastructure.
- Hydraulic analysis of proposed North Canal Project.
- Hydraulic analysis of Heights Blvd improvements.
- Hydraulic analysis of proposed South Canal (secondary bypass Canal for Buffalo Bayou).
- Determination of necessary mitigation volume for the hydraulic Improvements to prevent downstream impacts. However, it shall be noted that the complete determination of mitigating downstream impacts was not included in this study.

The preliminary drainage analysis also involves determining roadway impacts related to the roadway reconstruction for Segment 3D of the Project (See **Exhibit 2-1**). Segment 3D will consist of construction/reconstruction of the following highway corridors:

- Approximately 1.64 miles of I-10 eastbound mainlanes, and I-10 eastbound direct connectors and ramps and HOV lanes
- Approximately 1.57 miles of I-10 westbound mainlanes and I-10 direct connectors and ramps and HOV lanes
- Approximately 1.87 miles of I-45 southbound mainlanes and I-45 direct connectors and ramps and MaX lanes
- Approximately 1.82 miles of I-45 northbound mainlanes and I-45 direct connectors and ramps and MaX lanes.

The roadway impact analysis and drainage design, for Segment 3D involved determining the runoff impacts due to an increase in impervious area, design of storm sewer trunklines necessary to convey the runoffs to outfalls and mitigation of these increase runoffs within storm systems. Additionally, LAN also provided recommended mitigation measures for any fill placed with in FEMA 100-year floodplains.

2.1 Project Description

The Texas Department of Transportation (TxDOT), Houston District is proposing to reconstruct a portion of I-45, I-10 and I-69 in Harris County, Texas. The proposed project is named North Houston Highway Improvement Project (NHHIP). The limits of the NHHIP project are between the interchange of Interstate 69/US Highway 59 (I-69/US-59) and State Highway 288 (SH-288) south of downtown Houston and follow northward along I-45 to the interchange of I-45 and Beltway 8 North. The roadways within the NHHIP project are classified as Interstate highways.

The NHHIP is subdivided into the sections; Segment 1 from Beltway 8 North to Interstate 610 (I-610), Segment 2 from I-610 to I-10, and Segment 3 from I-10 to SH-288. The proposed project is identified under CSJ 0500-03-599. The NHHIP Segment 3 is further subdivided into 5 segments for the preliminary drainage analysis. Segment 3D includes I-10 from West of Houston Avenue to McKee Street and I-45 from McKee Street to I-45 at Little White Oak Bayou crossing. The existing I-45 runs across lower Buffalo Bayou, White Oak Bayou and Little White Oak Bayou in the Houston downtown area. The existing I-10 runs parallel to the White Oak Bayou. The proposed project involves the complete removal and reconstruction of the existing roadways. **Figures 2-1** to **2-3** provide an illustration of the existing and proposed roadways typical sections.

2.2 Purpose of Study

The purpose of this study is to perform the hydrologic and hydraulic analysis, evaluate the impacts and corresponding mitigation measures for the proposed improvements of NHHIP in Harris County, TX. This study determines the hydrologic and hydraulic impacts of the highway improvement and establish the mitigation needs.

The hydrologic analysis consists of examining the runoff impacts associated with the increase in impervious cover, hydraulic system changes and the determination of proposed fill within floodplain due to Segment 3D highway improvement. The hydraulic analysis also examines the design capacity of each affected drainage structure to determine hydraulic adequacy, and consequently determines any upstream and downstream hydraulic impacts of proposed roadway and drainage improvements. This includes an evaluation of the hydraulic grade line throughout the whole drainage system. The drainage study provides a detailed analysis for all storm drainage structures. The hydraulic impact analyses for the proposed improvements will evaluate the design with the objective of reducing the flooding potential, proposing long term drainage solutions that will be compatible with the proposed highway improvements. In addition, the drainage mitigation measures consist of proposed storm sewer trunklines and proposed detention ponds.

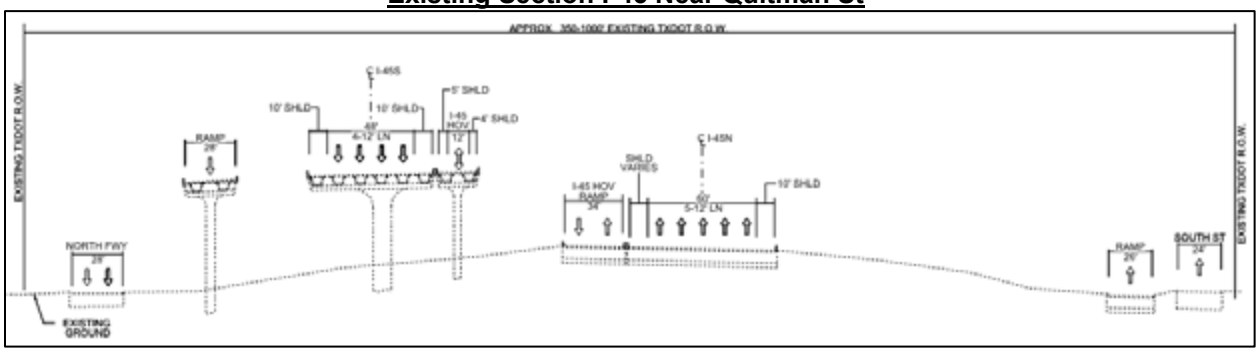
This report also documents the development of the hydrologic and hydraulic analysis, impacts and corresponding mitigation measures related to the NHHIP Segment 3. The analysis involved analyzing hydraulic impacts related to North Canal, South Canal and Heights Blvd improvements. The report is intended to address the following issues including:

1. Hydraulic Conveyance Impacts and Proposed Mitigation (Sections 3.0 and 4.0)
2. Roadway Impact and Mitigation (Sections 5.0 and 6.0)
3. Floodplain Fill Mitigation (Section 6.9)

It is the intent of this preliminary study to open dialogue with the appropriate permitting agencies to seek a solution for the downstream impact mitigation related to the improved hydraulic conveyance on White Oak Bayou and Buffalo Bayou. The improved hydraulic conveyance on White Oak Bayou and Buffalo Bayou was the result of proposed North Canal, proposed South Canal and proposed Heights Blvd improvements. Conceptual mitigation options such as detention ponds, easements and buyouts were identified to minimize any associated downstream impacts of the project.

Figure 2-1: Existing and Proposed Roadway Typical Sections at I-45 Near Quitman St

Existing Section I-45 Near Quitman St



Proposed Section I-45 Near Quitman St

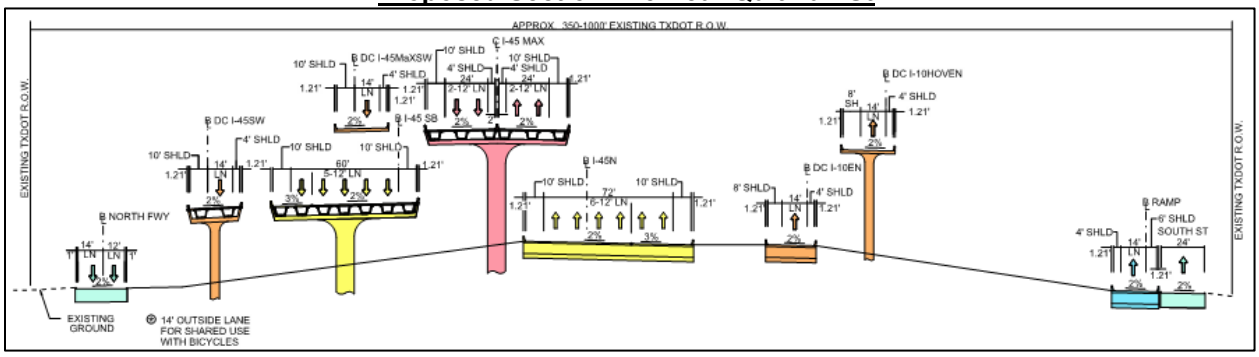
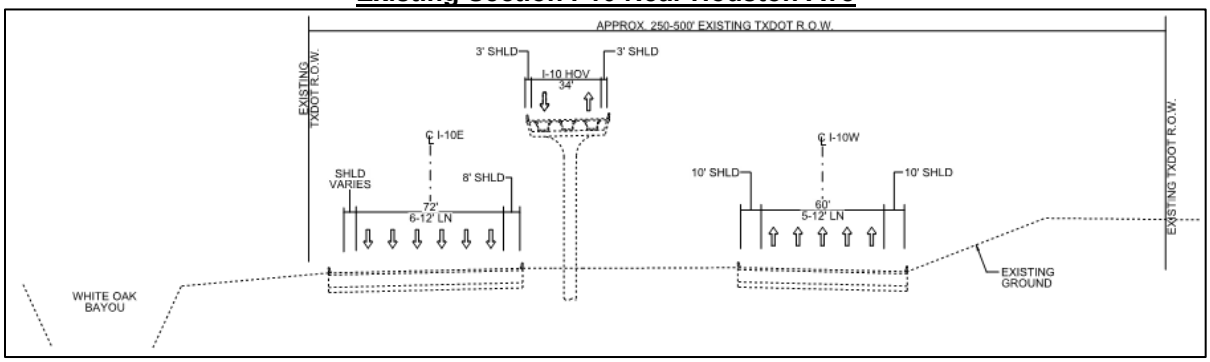


Figure 2-2: Existing and Proposed Roadway Typical Sections at I-10 Near Houston Ave

Existing Section I-10 Near Houston Ave



Proposed Section I-10 Near Houston Ave

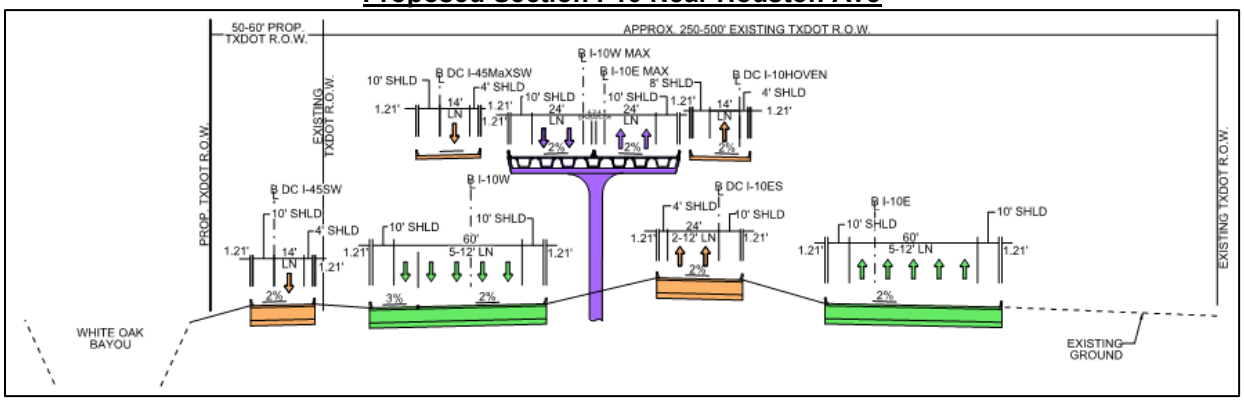
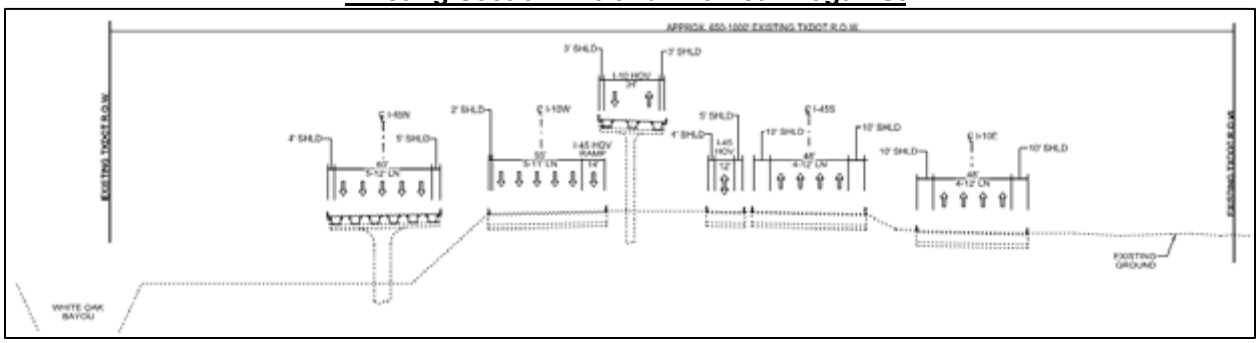
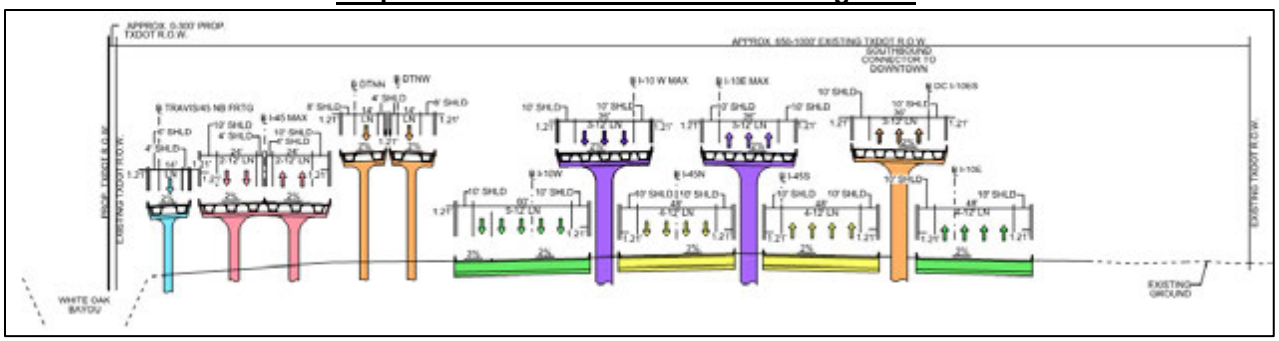


Figure 2-3: Existing and Proposed Roadway Typical Sections at I-10 and I-45 Near Hogan St

Existing Section I-10 and I-45 Near Hogan St



Proposed Section I-10 and I-45 Near Hogan St



2.3 References

The hydrologic and hydraulic analyses were performed in accordance with the methodology and procedures established in the following documents:

- Hydraulic Design Manual, Texas Department of Transportation (TxDOT); Revised July 2016.
- Hydrology & Hydraulics Guidance Manual, Harris County Flood Control District (HCFCD); December 2009.
- Policy Criterial & Procedure Manual (PCPM), Harris County Flood Control District (HCFCD); December 2010.
- Infrastructure Design Manual (IDM), City of Houston (CoH); July 2017.
- Scientific Investigations Report 2004-5041 Atlas of Depth-Duration Frequency of Precipitation Annual Maxima for Texas by W.H Asquith and M.C. Roussel. United States Geological Survey (USGS) and Texas Department of Transportation, Dated December 1, 2016
- Depth-Damage Relationships for structures, contents, and vehicles and content-to-structure value ratios (CSVR) in support of the Donaldsonville to the Gulf, Louisiana, feasibility study, US Army Corps of Engineers (USACE) New Orleans District, March 2006

Additionally, the drainage study for White Oak Bayou and Buffalo Bayou used models from prior studies to review and collect supplementary information. The following is a list of models collected through HCFCD and reviewed as part of this project.

- Effective M3[1] HEC-HMS and HEC-RAS models for Buffalo Bayou and White Oak Bayou.
- Effective M3 HEC-RAS models for Little White Oak Bayou.
- Risk Map[2] HEC-HMS and HEC-RAS models for White Oak Bayou.
- General Reevaluation Report (GRR)[3] model for combined Buffalo Bayou and lower White Oak Bayou.
- Charting Buffalo Bayou[4] model.
- 2D Buffalo Bayou and White Oak model –Developed by Pape Dawson Engineers.

A list of data sources used in this drainage study are summarized in **Table 2-1** below.

[1] Model and Map Management (M3) models are the Federal Emergency Management Agency's (FEMA) effective floodplain models.
[2] Risk Map models are models obtained from the Harris County Flood Control.
[3] GRR models are models obtained from U.S. Army Corps of Engineers (USACE) GRR reports.
[4] Charting Buffalo was a Harris County Flood Control District study that explored options along Buffalo Bayou and lower White Oak Bayou to reduce flooding.

Table 2-1: Summary of the Technical Design Considerations for the Project Area

Data	Data Source	Purpose
2008 LiDAR	**Houston-Galveston Area Council (HGAC)**	Generate cross sections
2014 Aerial Imagery	**Houston-Galveston Area Council (HGAC)**	Develop exhibits, identify locations in GIS
Historical Rainfall/Stage Gage Data	**Harris County Flood Warning System(FWS) and/or Provided by HCFCD** Link: http://www.harriscountyfws.org/	Rainfall data used to develop meteorological model in HEC-HMS, Rainfall gage locations used to develop Thiessen Polygons, Gaged stage hydrographs used to develop upstream and downstream boundary conditions for the HEC-RAS models
High-Water Marks	**Provided by HCFCD**	Used to compare with computed WSEs for calibration
Effective M3 HEC-RAS/HMS Models for Buffalo Bayou, Effective M3 HEC-RAS Model for Little White Oak Bayou, Risk Map HEC-RAS/HMS Models for White Oak Bayou	**Harris County Flood Control District (HCFCD)** Link: *https://www.hcfcd.org/technical-area/model-and-map-management-m3-system/*	To recognize pre-project conditions, creating revised existing model
TxDOT Plans of Proposed State Highway Improvements I-45N Bridge Over White Oak Bayou	**Texas Department of Transportation (TxDOT)** CSJ 0500-03-412; dated December 19, 1988	As-built drawings for Existing Conditions
TxDOT Plans of Proposed State Highway Improvements Freeway (Stage II) from Quitman Street to Interchange w/ North Loop Freeway	**Texas Department of Transportation (TxDOT)** CSJ 0500-03-097; dated March 20, 1961	As-built drawings for Existing Conditions
TxDOT Plans of Proposed State Highway Improvements I-45-North Freeway-Harris County in Houston from Franklin Street to Spur 261	**Texas Department of Transportation (TxDOT)** CSJ 0500-03-335; dated January 1, 1983	As-built drawings for Existing Conditions
TxDOT Plans of Proposed State Highway Improvements I-45N Bridge Over White Oak Bayou;	**Texas Department of Transportation (TxDOT)** CSJ 0500-03-412; dated December 19, 1988	As-built drawings for Existing Conditions
Geographic Information & Management System (GIMS)	**City of Houston** Link: *http://www.gims.houstontx.gov/PortalWS/MainPortal.aspx*	Existing Conditions and Shapefiles
North Houston Highway Improvement Project – Preliminary Design Study	**AECOM and TxDOT** CSJ 0912-00-146, dated November 2016	Prior Study for NHHIP
Field Survey topographic data	**Kuo & Associates, Inc.**	Existing Topographic Data

2.4 Design Criteria

A summary of design criteria and requirements considered for the project site is provided in **Table 2-2** below. The detailed Project Specific Design Criteria are provided in **Appendix E**.

Table 2-2: Summary of the Technical Design Considerations for the Project Area

Design Element	Mainlanes	Ramp	Direct Connect	Arterial / Cross Street	Application Notes
Minimum Roadway Elevations	100-year	25-year	100-year	10-year	Crossing or adjacent waterway Water Surface Elevation (WSEL), plus 1' FB at low EOP. Does not apply to storm drain or roadside ditch HGL.
Bridge Waterway Crossing	100-year plus 2.5' FB	100-year plus 1.5' FB	100-year plus 2.5' FB	Match Exist.	Applies to WSEL at new location bridges. For existing FR bridges, use min 10-year w/ Low Chord > WSEL
Storm Drain Conduits	10-year	10-year	10-year	Match Exist or better	Size conduit for non-pressure full flow; i.e. Design Q<=Full Flow capacity Q. See HGL requirements below.
Storm Drain HGL	100-year < EOP	25-year < EOP	100-year < EOP	10-year; max 1-lane ponding	Starting HGL at outfall: 25-year or starting HGL on Hydrograph timing or top of pipe. Determine and report maximum flood contained in ROW.
Detention Ponds	100-year + 3 feet freeboard. Provide Detention Summary with Area Services, Detention Storage Volume Required, Design WSEL, Maximum Outflow Rate Allowed, Maximum Outflow Rate Provided, and Restrictor Size.				
Outfall Ditches	Design for No Impact to 100-year WSEL. Use HCFCD Standard Details for Outfalls and other construction within HCFCD channels and ponds.				

2.5 Flood Hazard Area

The proposed NHHIP Segment 3D is located within the White Oak Bayou and Buffalo Bayou watershed. The majority of Segment 3D right of way is located almost entirely within the regulatory floodplain and floodway in FEMA Zone AE (Shaded and Unshaded) as shown on the FEMA Flood Insurance Rate Map (FIRM) for Harris County, Texas, Panel no. 48201C0690N, effective Date January 6, 2017. The FEMA FIRM panel for Segment 3D is shown on **Exhibit 2-2**. The FEMA FIRM panels for Buffalo Bayou and White Oak Bayou both upstream and downstream of the Segment 3D are included for reference purposes.

2.6 Project Datum

The project bearings and coordinates are based on The Texas State Plane Coordinate System, Central Zone (4204), North American Datum of 1983 (NAD83). All elevations are based on The North American Vertical Datum of 1988 (NAVD88), 2001 adjustment. This datum corresponds to current FEMA modeling and floodplain mapping for Harris County and is consistent with the NHHIP project datum.

3.0 MODEL CALIBRATION

This section documents the development of a combined unsteady model for Buffalo Bayou (W100-00-00), White Oak Bayou (E100-00-00) and Little White Oak Bayou (E101-00-00). The calibration of the combined model with three major storm events: Memorial Day (May 25th to 26th, 2015), Tax Day (April 18th, 2016) and Harvey (August 26th to 29th, 2017) is also discussed in this section. The model geometry for the calibrated model is based on following effective models: The HCFCD M3 models for Buffalo Bayou (W100-00-00) and Little White Oak Bayou (E101-00-00) and the Risk Map model for White Oak Bayou (E100-00-00). These effective models and Risk Map models were truncated and combined into an unsteady HEC-RAS model so that the analysis is focused on the study area. The study area for the Buffalo Bayou and White Oak Bayou watersheds are shown on **Exhibits 2-1** and **3-1**. The truncated limits and boundary conditions are shown on **Exhibit 3-1**.

Additional data from prior studies and models, as well as, data from HCFCD and HGAC were used to modify these effective models. See **Section 2.3** for further details regarding the reference files and data collection. The combined unsteady state model was used as the corrected effective model, for purposes of this report. The corrected effective model herein is not yet part of any request for a Conditional Letter of Map Revision. The development of the corrected effective model is discussed later in this section. The corrected effective model was used as the existing conditions model, to analyze the proposed roadway improvements and the proposed channel and conveyance improvements associated with the project. The results of the calibration in terms of the difference between the water surface elevations (WSEL) computed by the calibrated model and the observed High-Water Marks (HWMs) are also discussed in this section.

3.1 Hydrology

3.1.1 Calibration Model Development

To develop the corrected effective model and to focus on the study area the effective models were combined and truncated. The effective M3 Buffalo Bayou (W100-00-00) model was truncated at Shepherd Drive in upstream and at Turning Basin in downstream. The Risk Map White Oak Bayou model was truncated at Ella Boulevard and the effective M3 Little White Oak Bayou model was truncated at Trimble Street. These points were chosen to reduce the modeling efforts and to focus on the area of interest. The boundary conditions were kept at sufficient distance from the project limits to allow for an independent and accurate representation of the system.

The model truncation points were chosen due to their proximity to stream gages sub-watershed boundaries to assist with boundary conditions. HCFCD has stage gages at four locations: Gage 2240 at Shepherd Drive and Gage 2210 at Turning Basin on Buffalo Bayou, Gage 530 at Ella Boulevard on White Oak Bayou, and Gage 560 at Trimble Street on Little White Oak Bayou. The truncated models for these streams were then combined to create the pre-calibration geometry for unsteady calibration runs.

Stage hydrographs at the gage locations discussed above were used as the upstream and downstream boundary conditions. Buffalo Bayou, White Oak Bayou and Little White Oak Bayou receive lateral flows from internal sub drainage areas in addition to the stage hydrographs boundary conditions at the most upstream cross-section of the truncated models. These internal sub drainage areas include HCFCD catchment basins E100M, E100N, E100O and E100P for White Oak Bayou, E101H for Little White Oak Bayou and W100M, W100N and W100O for Buffalo Bayou. The gage locations and internal sub-watershed drainage areas are shown on **Exhibit 3-1**. It should be noted that approximately 17% of drainage area W100M contributes downstream of the truncated model for Buffalo Bayou at Shepherd Drive; the remaining 83% of W100M contributes to the reach upstream of Shepherd Drive. As a result, the flow from the remaining 83% of the W100M drainage area is already accounted for in the stage hydrograph at Shepherd Drive gage. Therefore, a multiplier of 17% was applied to the W100M lateral hydrograph in the calibration model.

For the three (3) storm events used for calibration– the 2015 Memorial Day, the 2016 Tax Day, and the 2017 Harvey – the recorded storm data was obtained from the Harris County Flood Warning System website <www.harriscountyfws.org>. Nine (9) rainfall gages in the area were identified and selected to develop the weighted rainfall input for the HEC-HMS model: Gage 1000, Gage 2210, Gage 2220, Gage 2240, Gage 3040, Gage 4820, Gage 520, Gage 530 and Gage 560 as shown on **Exhibit 3-1**. **Table 3-1** provides the gage information obtained from the HCFCD FWS website. The 15-minute time step rainfall data recorded at these gages were obtained from Harris County Flood Warning System.

Table 3-1: Location of Rainfall Gages

Gage ID	Location	Agency
Gage 1000	Houston Transtar	HCFCD
Gage 2210	Buffalo Bayou at Turning Basin	HCFCD
Gage 2220	Buffalo Bayou at Milam Street	HCFCD
Gage 2240	Buffalo Bayou at Shepherd Drive	HCFCD
Gage 3040	US-59 at Jefferson	HCFCD
Gage 4820	I-10 East W/B at Wayside	HCFCD
Gage 520	White Oak Bayou at Heights Blvd	HCFCD
Gage 530	White Oak Bayou at Ella Blvd	HCFCD
Gage 560	Little White Oak Bayou at Trimble Street	HCFCD

3.1.2 Thiessen Polygon Analysis

The Thiessen Polygon Analysis was carried out to determine the relative weight of rainfall data from each gage based on its respective area of influence in the Thiessen Polygon network. **Exhibit 3-1** also shows the Thiessen polygons created for the nine gages. The Thiessen polygons were then intersected with the catchment basins to determine the area-weighted factors

of the rainfall data for each basin. These area-weighted factors were employed to determine the contributing area of each precipitation data point within an individual sub-basin. **Table 3-2** summarizes the weighted factors calculated by the Thiessen polygons for each basin.

Table 3-2: Rainfall Gage Weighted Factors for Local Basins

Gage ID	E100M	E100N	E100O	E100P	E101H	W100M	W100N	W100O
Gage 1000	0.13	0.33				0.26		
Gage 2210								0.34
Gage 2220			0.06	0.85			0.19	0.36
Gage 2240		0.01				0.69	0.32	
Gage 3040							0.40	0.05
Gage 4820								0.23
Gage 520	0.01	0.62	0.75		0.01	0.05	0.09	
Gage 530	0.86	0.04						
Gage 560			0.19	0.15	0.99			0.02
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

The weighted factors of the rainfall gages were applied to the HEC-HMS model. The hydrographs associated with each basin for the Memorial Day, Tax Day and Harvey events were computed in the HEC-HMS model as explained below.

3.1.3 Development of HEC-HMS Model

The lateral hydrographs from the local contributing basins were computed using the HEC-HMS software. HEC-HMS version 3.3 was used for the M3 hydrological model for Buffalo Bayou and HEC-HMS version 3.5 was used for the Risk Map model for White Oak Bayou, which includes Little White Oak Bayou watershed. Therefore, version 3.3 of HEC-HMS software was used for Basins W100M, W100N and W100O and version 3.5 for Basins E100M, E100N, E100O, E100O and E101H. Hence, model version selection was consistent with the versions used to develop the original models.

The Green and Ampt method was used for rainfall loss computation and the Clark Unit Hydrograph method for runoff transform computation, same as the original models (i.e., M3 effective HEC-HMS model for the Buffalo Bayou watershed and Risk Map HEC-HMS model for the White Oak Bayou watershed). The rainfall loss and runoff transform parameters remained the same as the original models.

A meteorology file was generated to incorporate precipitation data into the watershed. The precipitation values were manually entered in inches for all the gages with the time interval of 15 minutes. The weighted factors of the rainfall gages determined by Thiessen polygons were applied to the depth weights (percent of precipitation gage depth that contributes to a sub-basin), and the time weights were assumed to be same as the depth weights.

The simulation runs for the three calibration storms were created for calculating the hydrographs generated from these basins during the storm events. The data showing the peak flow rate, the

time to peak, and the volume was generated from the runs. The peak flows for the historical storm events were reviewed against the peak flows for the synthetic storm events (shown in **Table 3-3**) and the results were reviewed for reasonableness.

3.1.4 Hydrological Results Generated by HEC-HMS Model

The hydrological results of the lateral catchments, computed in the HEC-HMS model for the three historic storm events, are shown on **Table 3-3.** **Table 3-3** also shows the peak flows for 10-, 50-, 100- and 500-year results generated form the effective M3 HEC-HMS model for Buffalo Bayou and Risk Map HEC-HMS models for White Oak Bayou and Little White Oak Bayou.

Table 3-3: Hydrological Results from HEC-HMS Models

	Memorial	*Tax*	*Harvey*	*10-Yr*	*50-Yr*	*100-Yr*	*500-Yr*
				E100M			
Total Precipitation (in)	9.04	6.36	28.96	7.52	11.3	13.2	18.9
Rainfall Duration (Day)	0.5	0.5	4	1	1	1	1
Peak Discharge (cfs)	4527.6	2402.6	3916.4	3167.9	4430	5079.9	6818.5
				E100N			
Total Precipitation (in)	9.39	6.81	26.08	7.52	11.3	13.2	18.9
Rainfall Duration (Day)	0.75	0.5	4	1	1	1	1
Peak Discharge (cfs)	2711.8	2084.5	4147.9	2203.3	3142.6	3621.1	4932.1
				E100O			
Total Precipitation (in)	9.17	6.43	23.38	7.52	11.3	13.2	18.9
Rainfall Duration (Day)	0.75	0.5	4	1	1	1	1
Peak Discharge (cfs)	2079	1586.9	3304.4	1806.7	2524.3	2893.1	3875.8
				E100P			
Total Precipitation (in)	8.11	6.29	15.75	7.52	11.3	13.2	18.9
Rainfall Duration (Day)	0.75	0.5	4	1	1	1	1
Peak Discharge (cfs)	879	1042.7	1023.2	1142.5	1592.1	1824.2	2444
				E101H			
Total Precipitation (in)	8.29	5.45	33.05	7.52	11.3	13.2	18.9
Rainfall Duration (Day)	0.75	0.5	4	1	1	1	1
Peak Discharge (cfs)	1116.1	772.6	1695.4	1013.5	1515.7	1772.2	2519.2
				W100M			
Total Precipitation (in)	8.9	6.9	32.18	7.52	11.3	13.2	18.9
Rainfall Duration (Day)	0.75	0.5	4	1	1	1	1
Peak Discharge (cfs)	1630.2	1217.9	3193.9	1415.4	2236.1	2697	4138.2
				W100N			
Total Precipitation (in)	8.14	6.75	27.36	7.52	11.3	13.2	18.9
Rainfall Duration (Day)	0.75	0.5	4	1	1	1	1
Peak Discharge (cfs)	1651.5	1546	3019.7	1689.1	2580.8	3053.7	4508.3
				W100O			
Total Precipitation (in)	6.74	7.11	26.89	7.52	11.3	13.2	18.9
Rainfall Duration (Day)	0.75	0.5	4	1	1	1	1
Peak Discharge (cfs)	2042.6	2371	5014.5	2820.3	4382.5	5230.2	7826.2

3.2 Hydraulics

3.2.1 Development of HEC-RAS Model

The HCFCD M3 models for Buffalo Bayou (W100-00-00) and Little White Oak Bayou (E101-00-00) and the Risk Map model for White Oak Bayou (E100-00-00) were used to develop the combined unsteady state HEC-RAS (4.1.0) model. The combined model was used to perform calibration to the Memorial Day, Tax Day and Harvey storm events. The following steps summarize the overall HEC-RAS model development during the calibration process:

- Truncate Buffalo Bayou, White Oak Bayou and Little White Oak Bayou HEC-RAS models at boundary cross sections.
- Convert the truncated steady HEC-RAS models to unsteady models.
- Combine three separate unsteady models into one unsteady model.
- Develop a HEC-HMS model to compute lateral contributing hydrographs and apply the hydrographs to the combined HEC-RAS model
- Add any missing bridges into the model using latest available survey data
- Adjust Manning's n values and bank stations to calibrate the model to three major storm events
- Run the model using observed stage hydrographs at model boundaries and HEC-HMS computed lateral hydrographs for three selected calibration storm events
- Check the agreement between the modeled WSELs and observed HWMs
- Re-adjust Manning's n values within a reasonable range to calibrate WSELs to HWMs.
- Re-ran the design storm event through the calibrated hydraulics model and compared the calibrated design storm event model results to the effective model results

In the combined model, Buffalo Bayou was truncated at Shepherd Drive on the upstream ends, and at Turning Basin at the downstream end, White Oak Bayou was truncated at Ella Boulevard and Little White Oak was truncated at Trimble Street. The combined model was calibrated to the Memorial Day, Tax Day and Harvey storm events. The conversion of the effective steady state models to the combined unsteady state model resulted in a WSEL drop of 0.5 feet to 1 feet.

3.2.2 Data Used for Calibration

The data used for the calibration were collected and reviewed for the three calibration storm events. The observed stage hydrographs were provided by HCFCD at Shepherd Drive and the Turning Basin on Buffalo Bayou, at Ella Blvd on White Oak Bayou and at Trimble Street on Little White Oak Bayou. These stage hydrographs were used as the boundary conditions in the calibration model. Stage hydrographs were also provided at Heights Blvd on White Oak Bayou

and at Milam Street on Buffalo Bayou. It was found that the stage hydrographs at these locations had missing data, but ware determined useful for calibration purposes despite this limitation.

3.2.3 High-Water Marks (HWMs)

High-Water Marks (HWMs) were provided by HCFCD for all the three storm events at Shepherd Drive, Sabine Street, Milam Street, San Jacinto Street, McKee Street and Turning Basin along Buffalo Bayou and at N. Shepherd Drive, Heights Blvd and Houston Avenue along White Oak Bayou. The HWM locations and values are shown on **Exhibit 3-2**. The HWMs measured for the calibration storm events were compared to the effective WSELs. The measured HWMs/stage data is normally within +/- 1.0 feet of accuracy. Therefore, the WSELS for the calibrated storm events were calibrated within 1 feet of HWMs. The return years for the events were estimated using statistical analysis based on the effective design storm WSELs, as shown on **Exhibit 3-2**.

In addition to the stage hydrographs and HWMs provided by HCFCD, observed stage hydrographs and/or flow hydrographs were obtained from USGS at USGS Gage 08074000 at Shepherd Drive on Buffalo Bayou, Gage 08074500 at Heights Blvd and Gage 08074598 at Main Street on White Oak, and Gage 08074540 at Trimble Street on Little White Oak Bayou. See **Exhibit 3-1** for USGS gage locations. It is found that many of these stage and flow hydrographs did not capture the peak stages/flow rates during the three storm events. The stage hydrographs that did capture peak stages were found to be consistent with those provided by HCFCD. The USGS gaged data were not directly used in the calibration model but were used to be compared with the data provided by HCFCD to check the reliability of HCFCD data.

The peak stages on the stage hydrographs and the HWMs were examined for reliability. **Table 3-4** compares the 24-hr rainfall of the Tax Day Event and the Memorial Day Event at various rain gages. The rainfall amounts of the Memorial Day Event are generally higher than those of the Tax Day Event.

Table 3-4: 24-hr Rainfall of Tax Day and Memorial Day Events

Gage ID	4820	2210	560	2220	520	2240	3040	530	1000
Storm Event	24-hr Rainfall (inches)								
Tax Day Event	6.28	6.52	5.08	6.12	6.28	6.56	6.48	6.08	6.72
Memorial Day Event	5.36	5.04	7.56	7.28	8.56	7.84	6.76	8.40	8.68

Table 3-5 shows that the Memorial Day Event peak stage at Buffalo Bayou at Shepherd Drive is higher than that of the Tax Day Event. This is consistent with the observation of higher rainfall in the Memorial Day Event. The peak stages at White Oak Bayou at Ella Blvd are similar, thus lending confidence to the rainfall and stage information for calibration purposes.

Table 3-5: Peak Stages of Tax Day and Memorial Day Events

	Memorial Day Event	Tax Day Event
Buffalo Bayou at Shepherd Dr	33.80	31.65
White Oak Bayou at Ella Blvd	50.76	50.75

Table 3-6 compares the HWMs from HCFCD with the available USGS stage information. The Buffalo Bayou HWMs of the Memorial Day Event are higher than those of the Tax Day Event. This is consistent with the above observations of rainfall amounts and peak stages. However, the Memorial Day HWMs observed on White Oak Bayou are 4.5 to 8.8 feet lower than corresponding HWMs observed in the Tax Day Event. The Tax Day HWMs on White Oak Bayou are consistent with the USGS gage records, but the Memorial Day HWMs appear to be low in comparison with the gage records.

At Heights Blvd, the USGS gage did not capture the peak stages of all three events. The highest stage observed during the Tax Day Event is 37.11 feet. However, for Memorial Day event, the highest stage recorded by the USGS gage is 36.81 feet, almost 3 feet higher than HCFCD HWM of 33.9 feet.

Moreover, the USGS gage at Main St recorded a peak stage of 31.03 feet for the Memorial Day Event. Since Houston Ave is upstream of Main St, it is expected that the water level at Houston Ave is higher than that at Main St, but the HWM at Houston Ave is 2 feet below the USGS peak stage at Main St.

The above analysis indicates that the Memorial Day HWMs on White Oak Bayou are unreasonable. Therefore, the Memorial Day HWMs on White Oak Bayou were not used in the calibration.

Table 3-6: HWMs and Peak Stages

ID	Location	Channel	Memorial Day 2015		Tax Day 2016		Harvey Day 2017	
			HWM	USGS Peak Stage	HWM	USGS Peak Stage	HWM	USGS Peak Stage
1	Shepherd Dr	Buffalo Bayou	33.80	33.80	31.80	31.65	41.40	38.79
2	Sabine St	Buffalo Bayou	32.10		29.90		39.90	
3	Milam St	Buffalo Bayou	31.30		28.70		37.80	
4	San Jacinto	Buffalo Bayou	29.40		27.20		37.20	
5	McKee St	Buffalo Bayou	23.40		22.50		30.10	
6	Turning Basin	Buffalo Bayou		5.25	6.80	7.67	12.10	12.05
7	N Shepherd	White Oak Bayou	35.30		44.10		51.30	
8	Heights Blvd	White Oak Bayou	33.90	36.81*	38.80	37.11*	45.60	39.49*
9	Houston Ave	White Oak Bayou	29.00		33.50		40.30	
10	Main St	White Oak Bayou		31.03		28.85		38.09

*Record incomplete. Highest stage shown in table but not the peak stage.
**The HWM elevations shown in red were not used for calibration.

3.2.4 Stage Hydrographs

The original stage hydrographs provided by HCFCD were converted to a 15-minute step time series stage versus time data (i.e., stage hydrograph) using the HEC-DSS tool. The stage hydrographs at Shepherd Drive on Buffalo Bayou, at Ella Blvd on White Oak Bayou and at Trimble Street on Little White Oak Bayou were then used as the upstream boundary conditions in the combined models. These Hydrographs were applied at the most upstream cross section of the corresponding stream in the simulations for the three calibration events. The observed stage gage at the Buffalo Bayou Turning Basin, where the most downstream cross section of the model is located, was used as the downstream boundary condition in the calibration simulations. **Exhibit 3-3** shows the stage gages used for model boundary conditions.

The peak stage on the stage hydrographs were compared to the observed high-water marks (HWM). All gage locations compared favorably with the HWM data except for one location. The peak stage on the recorded hydrograph at Gage 2240 on Buffalo Bayou during the Harvey storm is 38.79 feet, but the HMW at this location is 41.40 feet. The peak stage is 2.61 feet lower than the HWM. As a result, for the calibration purpose, the peak stage was manually raised to 41.40 feet to match the HWM. **Figure 3-1** to **Figure 3-3** display the stage hydrographs used as the upstream boundary conditions in the calibration simulations.

Figure 3-1: Memorial Day Stage Hydrographs

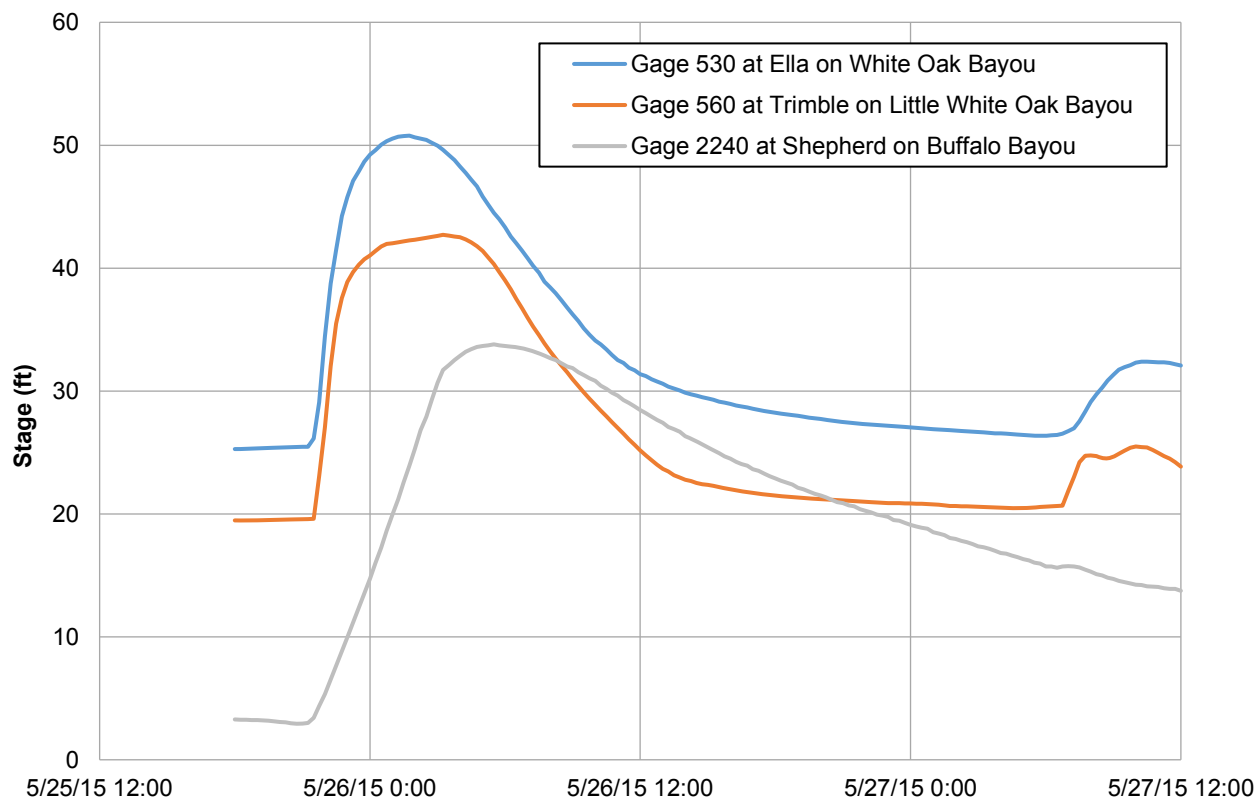


Figure 3-2: Tax Day Stage Hydrographs

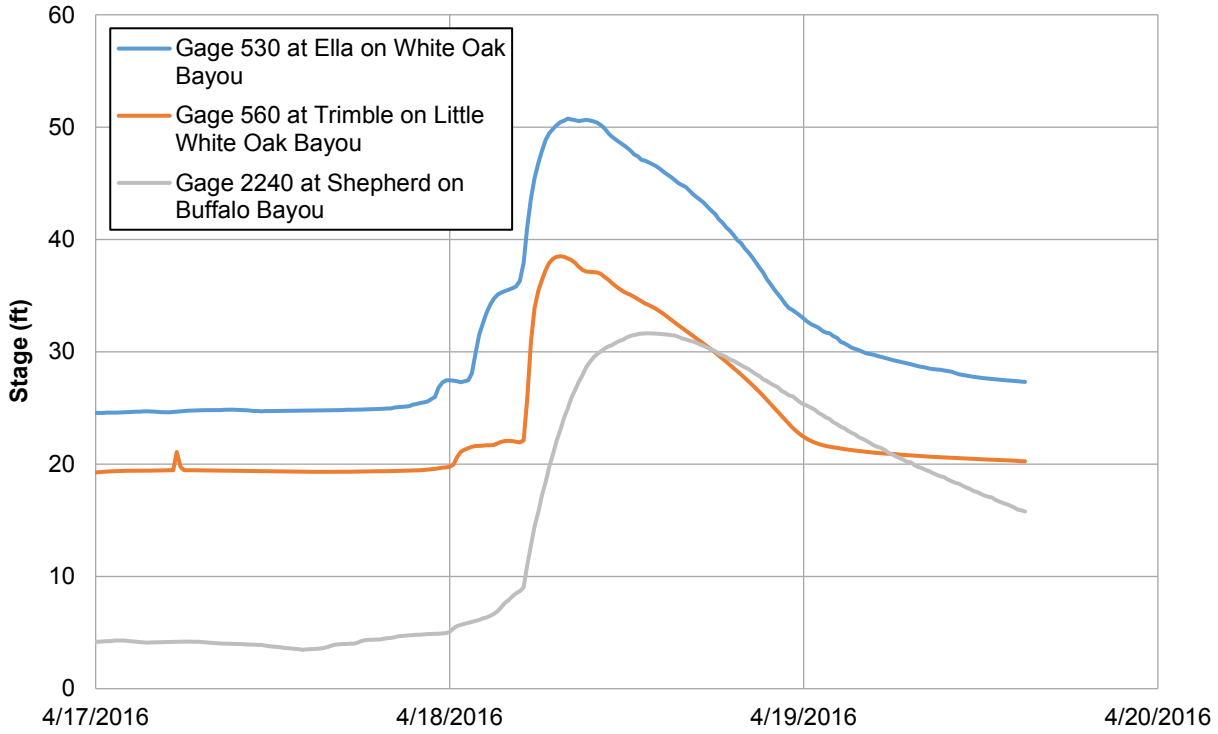
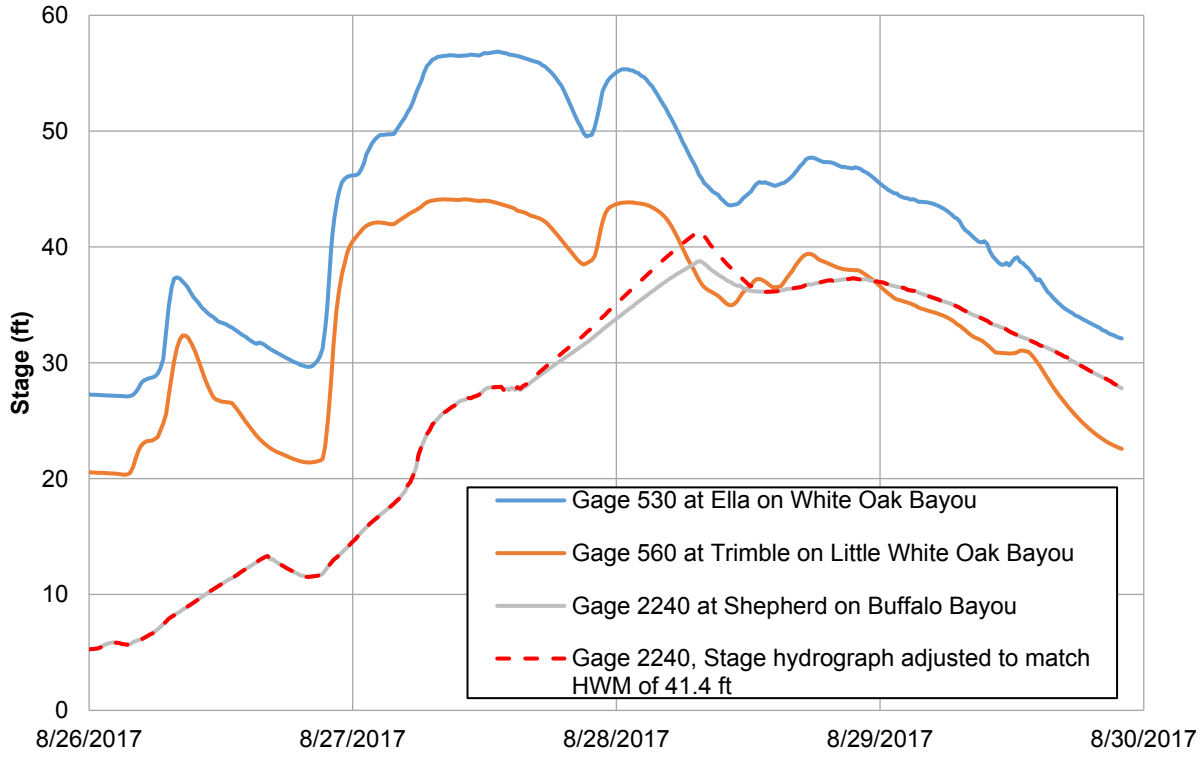


Figure 3-3: Harvey Stage Hydrographs



3.2.5 Model Calibration

The combined model was calibrated to the Memorial Day, Tax Day and Harvey events. It was observed that the WSEL profiles computed by the pre-calibration model are in general lower than the corresponding observed HWMs on both White Oak Bayou and Buffalo Bayou for all three storm events. Moreover, the corrected effective model geometry included addition of missing bridges, updated bridge data based on survey and as built plans, adjustment of bank stations and modification of Manning's n values.

The following bridges were not in the effective model and were added to the corrected effective model during the calibration. The associated cross sections were generated based on the HGAC LiDAR, aerials and limited survey information.

- I-10 mainlane and westbound and eastbound frontage roads bridges at River Stations 18800, 18595 and 18394 upstream of Yale Street on White Oak Bayou.
- I-10 mainlane bridge at River Station 14775 upstream of the Union Pacific Railroad on White Oak Bayou.
- I-45 direct connector from I-10 west to I-45 North at River Station 6046 upstream of Crockett/Hogan Street on White Oak Bayou
- Main Street Bridge at River Station 978 upstream of the 1st Street bridge on White Oak Bayou.
- A total of five US-59 bridges (including mainlane, frontage road and connector bridges) at River Stations 104204, 104271, 104383, 104566 and 104948, respectively on Buffalo Bayou.

Bridges on Buffalo Bayou

The bridge survey on the Buffalo Bayou for McKee Street, Elysian Street, US-59 mainlanes, frontage roads and ramps and the railroad were reviewed against the bridge data in effective model geometry. The column data used in the existing model were found to match the surveyed data for McKee, Elysian and railroad bridges. Therefore, no changes were made to these three bridges. The US-59 bridges were added to the corrected effective model geometry based on the surveyed column data. However, no survey data was available for the bridge data of the existing US-59 bridges across Buffalo Bayou. Therefore, the deck data was obtained from the LiDAR and it was observed that the bridge decks are much higher than the 100-year WSELs. The I-10 bridge on Buffalo Bayou was originally analyzed by the Segment 3E team. The surveyed existing conditions crossing geometry and the proposed conditions model geometry were provided by the segment 3E team and incorporated into the project corrected effective model.

I-10 and I-45 Bridges on White Oak Bayou

The bridge survey data on White Oak Bayou from Houston Avenue to the railroad bridge (just upstream of the confluence) were reviewed and compared with the bridge data in the effective model geometry. In general, the data inputs were consistent, and the differences were minor. Therefore, no changes were made to bridge geometry. However, there were two bridges on

White Oak Bayou which were missing in the effective model and were added to the corrected effective model. The first bridge is the I-45 direct connector from I-10 west to I-45 north located at Station 6046 immediately downstream of the existing I-45 northbound mainlane bridge in the model. Bridge bounding cross sections 6068 and 6020 were also added to the model for the bridge. The second bridge is the Main Street bridge located at Station 978 immediately upstream of the existing 1St Street road bridge in the model. The existing cross section 984 was used as the upstream bounding cross section for the new bridge. Cross section 971.6 was added to the model as the downstream bounding cross section for the bridge. The surveyed deck and column data were used for the two new bridges.

I-10 and I-45 Mainlanes and Direct Connectors Along White Oak Bayou

The existing I-45 and I-10 mainlanes and direct connectors run parallel to the White Oak Bayou channel in the area around Hogan Street. These lanes are elevated, and the bridge deck is expected not to cause any impedance to the flows. However, their piers do block the flow and therefore, blocked obstructions along the right over bank were added to represent the columns. The blocked obstructions were based on the combined width of the piers at each cross section. The piers were placed close to the bayou with in the floodplain.

Height Blvd and Yale Street Area Bridges Along White Oak Bayou

The Heights Blvd north lane and south lane bridges on White Oak Bayou are not separated in the RiskMap model. The combined bridge is located at River Station 17678.5 in the original model. During calibration, the bridges were separated into the north-lane bridge at River Station 17627 and the south-lane bridge at River Station 17726 to better represent the bridge hydraulics. In addition, four additional columns were added to reflect the columns of the pipe bridges near the Heights Blvd bridges. The pipe bridge columns do not appear to line up with the roadway bridge columns.

H&H Resources, Inc. (HHR) developed a White Oak Bayou HEC-RAS model for the Yale Street bridge replacement project for TxDOT in December 2015. The HHR model was reviewed and was found that the model has updated geometry data of cross sections and bridges. The data for the cross sections and bridges between cross sections 18857 and 17905 were replaced with the geometry data taken from the HHR model. The replacement included addition of I-10 westbound frontage bridge at Station 18800 and eastbound frontage bridge at Station 18394 and the Yale Street bridge at Station 18138 with the HHR model geometry. LAN added the I-10 mainlane bridges at Station 18595 using the adjacent frontage bridge cross sections. The I-10 mainlane bridge do not cause impedance to the flow. Since no data is available for the mainlane bridge, assumptions were made on the bridge deck data using LiDAR.

The I-10 mainlane bridges and frontage road downstream of Heights Blvd were also added to the model around Station 14775. The HHR model has updated bridge geometry for both the I-10 frontage road bridges. The model geometry of these frontage bridges was replaced using the HHR bridge data. The I-10 mainlane bridge does not cause impedance to the flow. Since no data is available for the mainlane bridge, assumptions were made on the bridge deck data using LiDAR and field observation.

I-45 Bridge Data Along Little White Oak Bayou

It was found that the deck elevation profiles at both upstream and downstream side of the I-45 Bridge on Little White Oak Bayou were inconsistent with the HGAC LiDAR. The deck elevations were updated based on the LiDAR elevations.

Table 3-7 below summarizes the data sources for bridges added or modified.

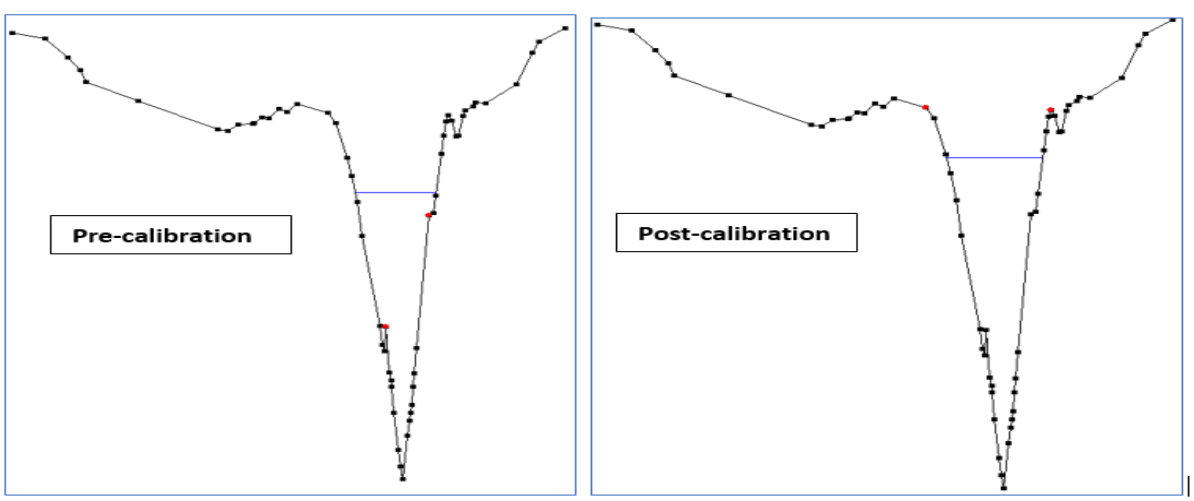
Table 3-7: Summary of Data Sources for Bridge Updates

Bridge	Bayou	RAS Station	Bridge Data
I-10 WBFR	White Oak	18800	H&H Resources Model
I-10 ML	White Oak	18595	Field Observation & LiDAR
I-10 EBFR	White Oak	18394	H&H Resources Model
Union Pacific RR	White Oak	18220	H&H Resources Model
Yale St	White Oak	18138	H&H Resources Model
Heights South	White Oak	17726	RISK Map
Heights North	White Oak	17627	RISK Map
I-10 EBFR	White Oak	14937	H&H Resources Model
I-10 ML	White Oak	14775	Field Observation & LiDAR
I-10 WBFR	White Oak	14562	H&H Resources Model
I-45 North DC	White Oak	6046	Survey
Main Street	White Oak	978	Survey
I-45 Bridge	Little White Oak	2797	Survey
US-59	Buffalo	104204	Survey

Bank Stations

In the pre-calibration model, bank stations were set very low, near the middle of channel, in Buffalo Bayou for many cross sections. During calibration, bank stations were moved to the top of channel in Buffalo Bayou. **Figure 3-4** is a typical example to show how bank stations were moved during calibration. The revisions made to bank stations changed the channel composite Manning's n values, and thus affected computed WSEL.

Figure 3-4: Illustration of Bank Station Change in Calibration



Manning's n Values

Manning's n values were adjusted along the Buffalo and White Oak channels. The following Manning's n value adjustments were made:

- White Oak Bayou - Between Shepherd Drive and the confluence with Buffalo Bayou, concrete n value changed from 0.015 to 0.024.
- White Oak Bayou - Between Shepherd Drive and the confluence with Buffalo Bayou, grass area n values were originally 0.032 or 0.04 and are changed to 0.045.
- Buffalo Bayou - Between Shepherd Drive and Milam Street, the original Manning's n values for the channel were in the range of 0.04 to 0.045. In the calibrated model, they are in the range of 0.0375 to 0.04.
- On Buffalo Bayou between Milam Street to the new added US-59, the original Manning's n values for the channel were in the range of 0.04 to 0.045. In the calibrated model, they are in the range of 0.04 to 0.05.
- From downstream of US-59 to the Turning Basin on Buffalo Bayou, the original Manning's n values in the earthen channel were 0.035. They are changed to 0.04.
- No Manning's n values were changed on Little White Oak Bayou.

In addition, minor adjustment to ineffective flow areas was made at a few cross sections.

3.2.6 Calibration Results

The WSELs computed by the calibrated model were compared with the corresponding observed HWMs for all three calibration events. **Table 3-8** presents the comparison between observed and calibrated WSELs. Note that the HWMs on White Oak Bayou measured during Memorial Day were not used for the calibration due to strong evidence that the data is not accurate, as discussed earlier. **Exhibit 3-3** also presents the comparison between WSELs computed by the calibrated model and the HWMs for the three storm events.

Results show that the differences between computed WSELs and observed HWMs are all within 1 foot except for at McKee Street on Buffalo Bayou in the Memorial Day event. The HWM at McKee Street in the Memorial Day event is 2.29 foot lower than the model-computed WSEL. The HWMs measured on White Oak Bayou for Memorial Day are suspicious as they appear to be several feet lower than what is expected. It is possible that the HWM at McKee Street on Buffalo Bayou may also be skewed in the measurement. The average differences between observed and modeled peak WSELs for Memorial Day, Tax Day and Harvey are -0.83, 0.11 and 0.28 feet, respectively.

Figures 3-5 to **3-10** show the comparison between the model-computed stage hydrographs and the observed stage hydrographs at Heights Blvd on White Oak Bayou and at Milam Street on Buffalo Bayou. Note that these observed stage hydrographs have data missing for all the three storm events and the hydrographs are incomplete. However, the timing of the modeled stage

hydrographs at the two locations appears to be consistent with the observed stage hydrographs for all three storm events. Overall, the calibrated model was able to generate satisfactory results for the three events in terms of the agreement of modeled WSELs with recorded HWMs.

Table 3-8: Comparison of WSELs Computed by Calibrated Model with HWMs

ID	Location	Channel	Cross-Section	Memorial Day			Tax Day			Harvey Day		
				Model	HWM	HWM-Model	Model	HWM	HWM-Model	Model	HWM	HWM-Model
1	Shepherd Dr	Buffalo Bayou	128104.6	33.80	33.80	0.00	31.65	31.80	0.15	41.40	41.40	0.00
2	Sabine St	Buffalo Bayou	116167.6	33.04	32.10	-0.94	30.78	29.90	-0.88	39.68	39.90	0.22
3	Milam St	Buffalo Bayou	110876.6	31.53	31.30	-0.23	27.94	28.70	0.76	37.19	37.80	0.61
4	San Jacinto St	Buffalo Bayou	109440.2	30.07	29.40	-0.67	26.45	27.20	0.75	36.60	37.20	0.60
5	McKee St	Buffalo Bayou	106151.4	25.69	23.40	-2.29	22.37	22.50	0.13	30.82	30.10	-0.72
6	Turning Basin	Buffalo Bayou	80538	5.25	No Data	--	7.67	6.80	-0.87	12.05	12.10	0.05
7	N Shepherd Dr	White Oak Bayou	22834	44.13	35.50	--	43.44	44.10	0.66	50.52	51.30	0.78
8	Heights Blvd	White Oak Bayou	17756	39.89	33.90	--	38.60	38.80	0.20	45.33	45.60	0.27
9	Houston Ave	White Oak Bayou	7649	36.10	29.00	--	33.45	33.50	0.05	39.63	40.30	0.67
10	Main St	White Oak Bayou	971.5	31.81	No Data	--	28.29	No Data	--	37.42	No Data	--

*The HWM elevations shown in red were not used for calibration.

Figure 3-5: Hydrograph Comparison at Heights on White Oak Bayou for Memorial Day

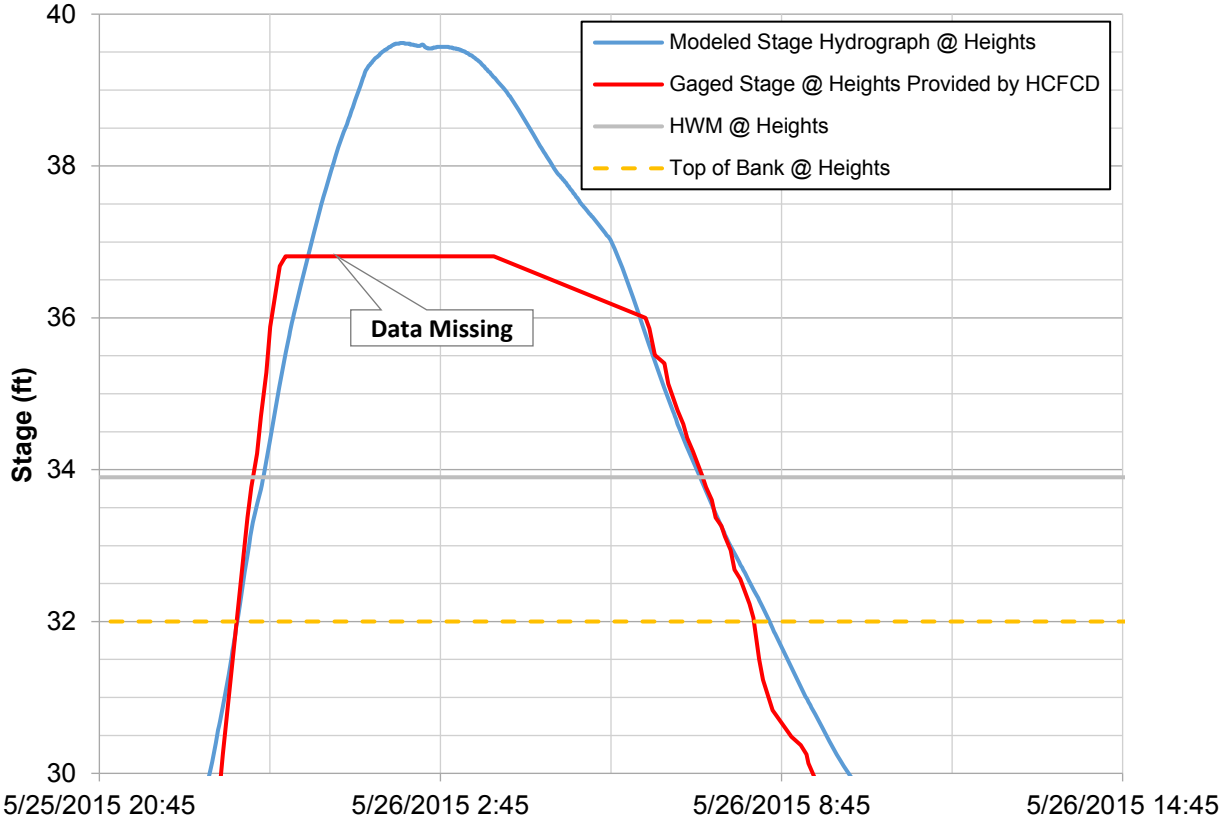


Figure 3-6: Hydrograph Comparison at Milam on Buffalo Bayou for Memorial Day

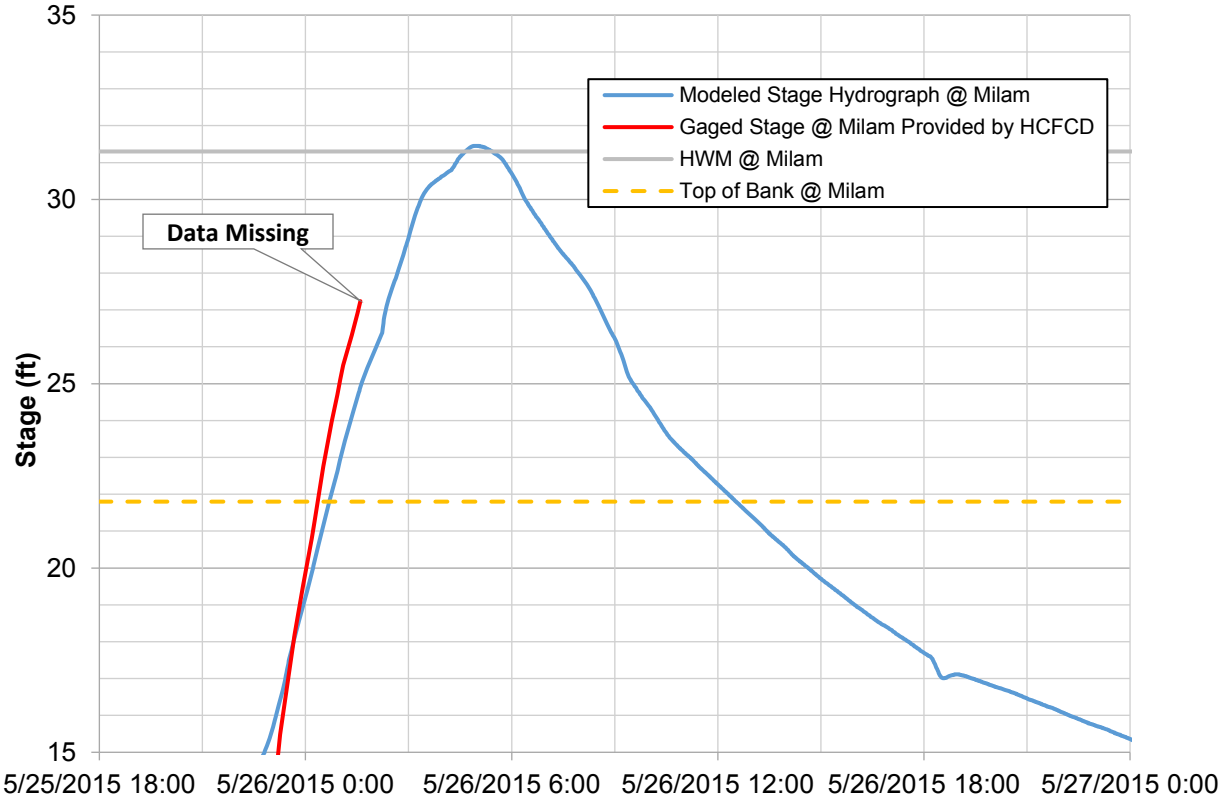


Figure 3-7: Hydrograph Comparison at Heights on White Oak Bayou for Tax Day

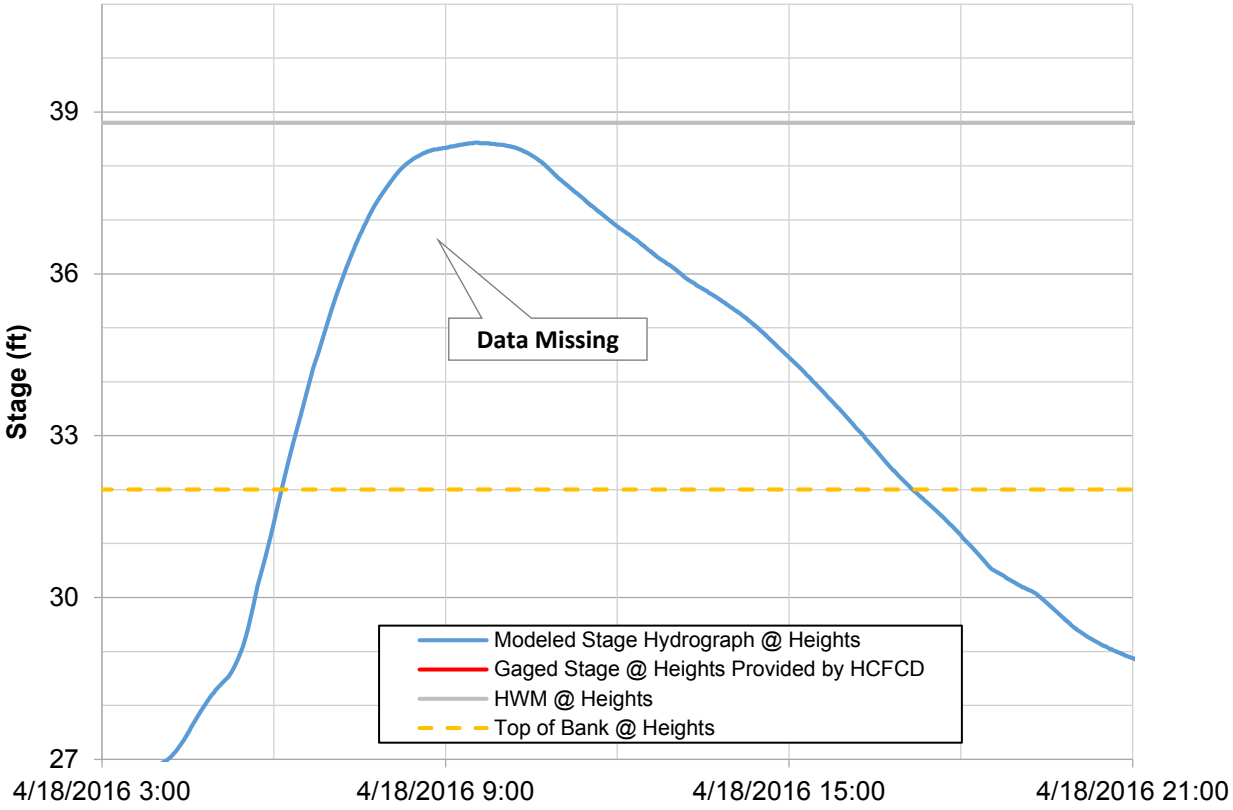


Figure 3-8: Hydrograph Comparison at Milam on Buffalo Bayou for Tax Day

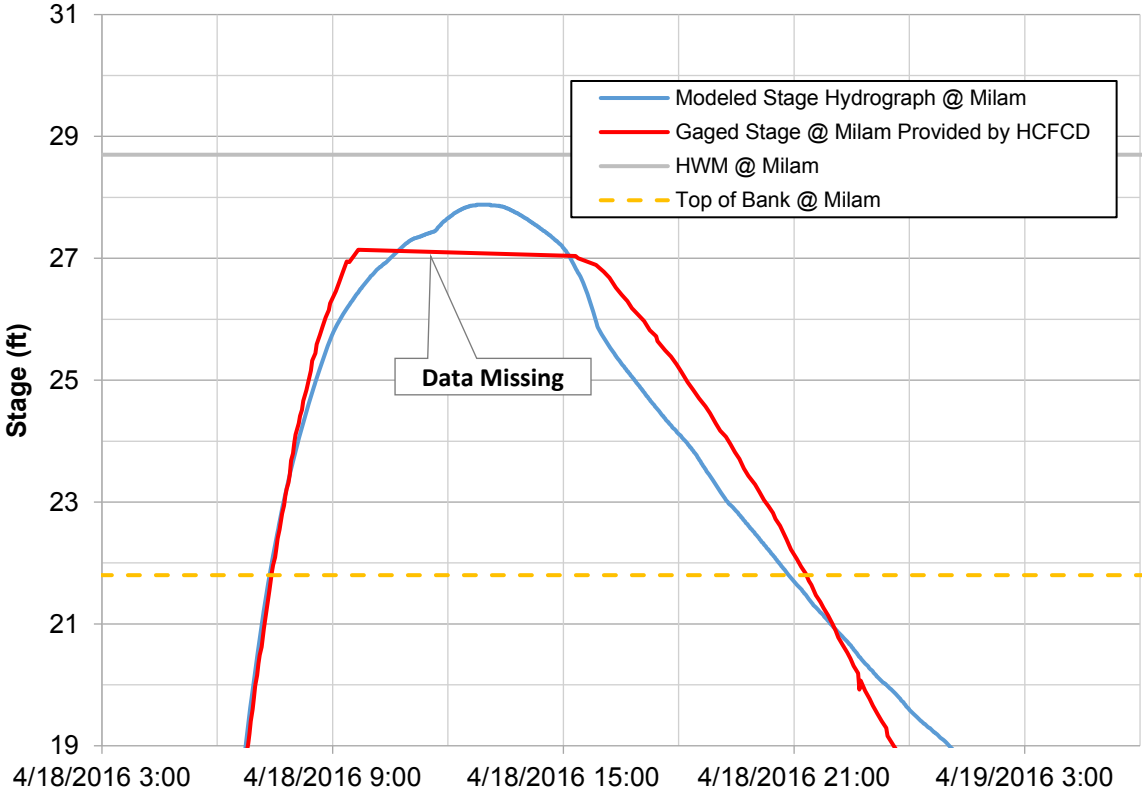


Figure 3-9: Hydrograph Comparison at Heights on White Oak Bayou for Harvey

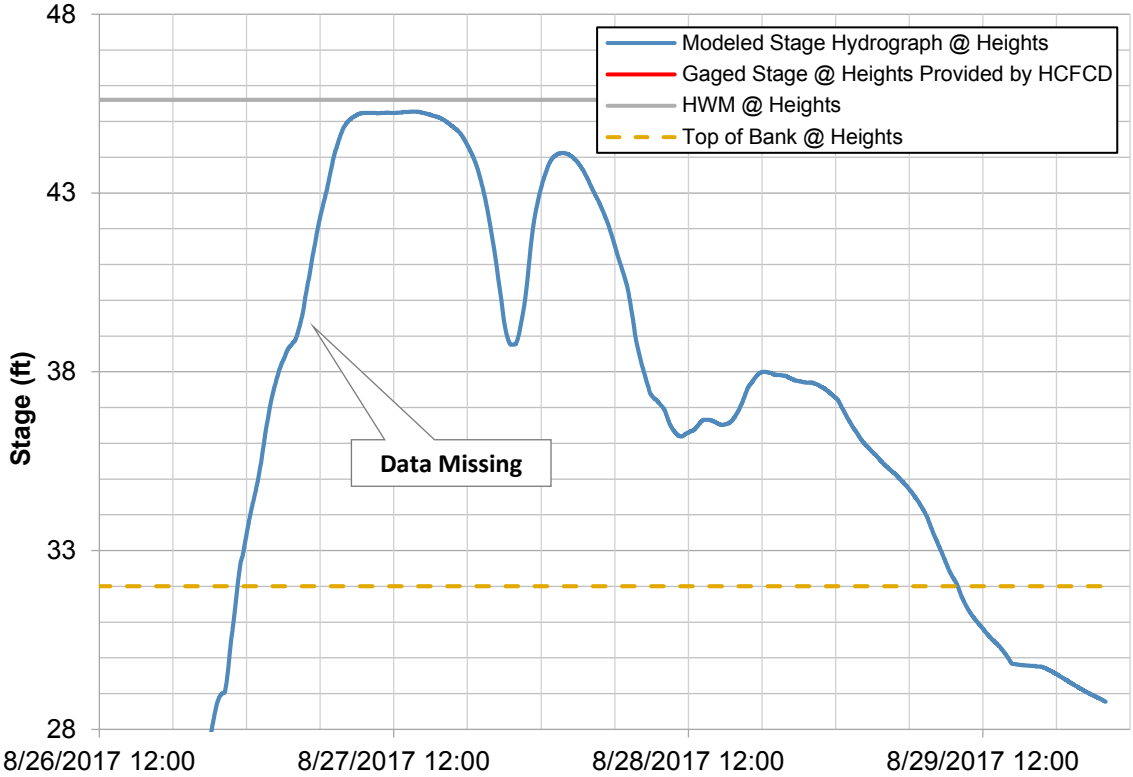
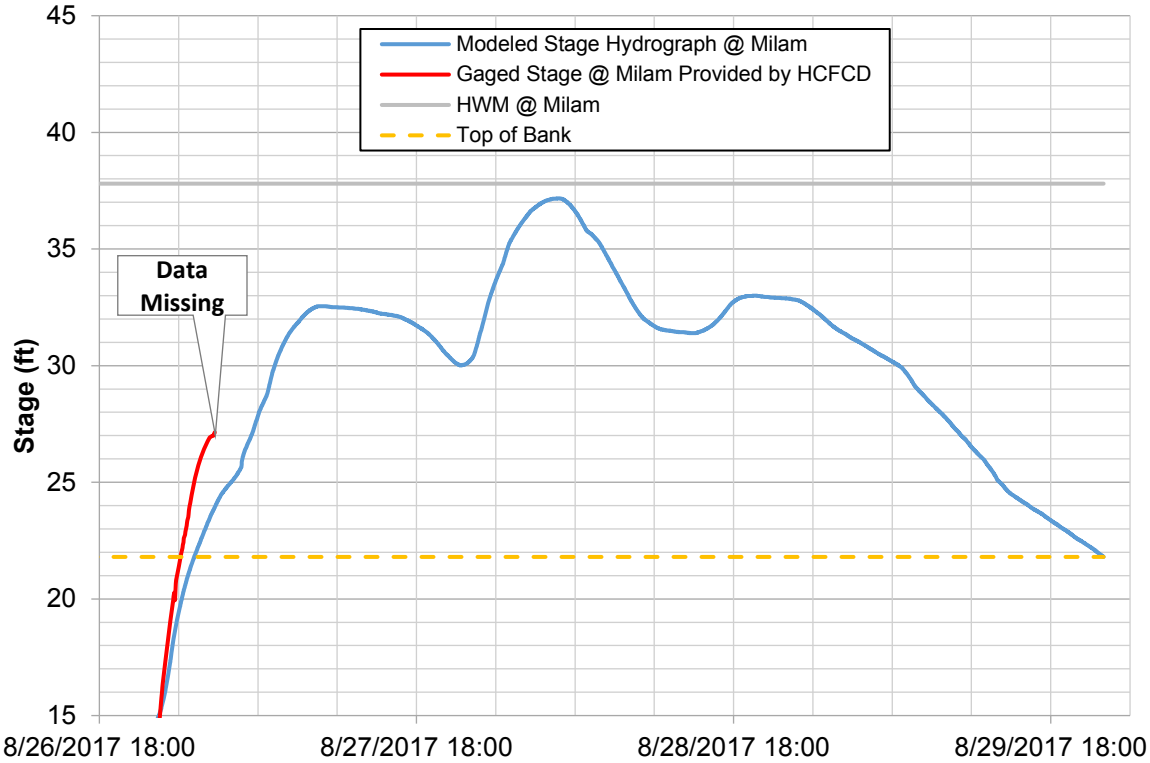


Figure 3-10: Hydrograph Comparison at Milam on Buffalo Bayou for Harvey



3.3 Development of Corrected Effective Model

3.3.1 Background

The corrected effective model was the baseline model and was used to develop proposed condition models to evaluate the impacts and perform the drainage impact analysis for the project. As discussed previously, the flow hydrographs generated by the Buffalo Watershed M3 effective HEC-HMS model were used as the upstream boundary conditions in Buffalo Bayou. It should be noted that the Buffalo Bayou does not have a M3 HEC-HMS node at Shepherd Drive where the calibration model begins. The Shepherd Drive location has the stage hydrograph needed for model calibration. The M3 HEC-HMS junction node W100_1488_J is located at just upstream of the South Pacific RR bridge. This location corresponds to the M3 cross section 148795.4. Therefore, the upstream end of Buffalo Bayou channel was extended to the M3 cross section 148795.4 such that the flow hydrograph at the junction node can be directly applied to the model.

3.3.2 Hydrologic Method

The Buffalo Bayou M3 and White Oak Bayou RiskMap HEC-HMS models were used to compute input hydrographs in the HEC-RAS model. These HEC-HMS models were used to compute the hydrographs at the upstream boundary conditions as well as the lateral contributing hydrographs form the internal drainage areas for the 10-, 50-, 100- and 500-year storms. The Buffalo Bayou M3 HEC-HMS model uses HEC-HMS version 3.3 and the White Oak Bayou RiskMap model uses HEC-HMS version 3.5. The same HEC-HMS version was used to run each of the models.

The 24-hour distribution rainfall data used in the models were based on the rainfall depths in Harris County Hydrologic Region 2 for corresponding storm return years. **Table 3-9** presents the rainfall data used in the HEC-HMS models.

Table 3-9: Design Storm 24-Hour Distribution Rainfall Data

	10-Year	50-Year	100-Year	500-Year
15 Minutes (Inch)	1.5	1.9	2.1	2.6
1 Hour (Inch)	2.9	3.8	4.3	5.5
2 Hours (Inch)	3.6	5.0	5.7	7.6
3 Hours (Inch)	4.1	5.8	6.7	9.2
6 Hours (Inch)	5.1	7.6	8.9	12.8
12 Hours (Inch)	6.2	9.2	10.8	15.5
1 Day (Inch)	7.6	11.3	13.2	18.9

No revisions to the drainage area boundaries and hydrologic parameters were made in the original models. The lateral contributing drainage areas which drain to the Buffalo Bayou, White Oak Bayou and Little White Oak Bayou include Buffalo Bayou Basins - W100M, W100N and W100O, White Oak Bayou Basins - E100M, E100N, E100O and E100P, and Little White Oak Bayou basin- E101H. **Exhibit 3-1** shows the contributing basins to the modeled Buffalo, White Oak and Little White Oak channels. **Table 3-10** shows lateral peak flow rates from the internal basins and the peak flow rates at the upstream boundary conditions.

Table 3-10: Lateral Peak Flow Rates to Modeled HEC-RAS Reaches

HMS ID	Drainage Area (sq mi)	Q 10 (cfs)	Q 50 (cfs)	Q 100 (cfs)	Q 500 (cfs)
Node W100_1488_J*	78.39	8,840.4	14,433.3	17,496.7	26,433.0
Basin W100M	6.90	1,415.4	2,236.1	2,697.0	4,138.2
Basin W100N	5.90	1,689.1	2,580.8	3,053.7	4,508.3
Basin W100O	10.52	2,820.3	4,382.5	5,230.2	7,826.2
Node E100_0357_J**	79.62	21,314.5	29,178.4	32,384.6	42,992.1
Basin E100M	3.37	3,167.9	4,430.0	5,079.9	6,818.5
Basin E100N	2.95	2,203.3	3,142.6	3,621.1	4,932.1
Basin E100O	1.83	1,806.7	2,524.3	2.893.1	3,875.8
Basin E100P	1.19	1,142.5	1,592.1	1,824.4	2,444.0
Node E101_0090_J***	19.21	7,955.2	10,391.8	11,494.1	15,738.4
Basin E101H	2.81	1,013.5	1,515.7	1,772.2	2,519.2

*Flow at Buffalo Bayou upstream boundary; **Flow at White Oak Bayou upstream boundary; ***Flow at Little White Oak Bayou upstream boundary.

3.3.3 Corrected Effective HEC-RAS Model

The geometry of the calibrated model was used to develop the corrected effective model to simulate the 10-, 50-, 100- and 500-year storm events. The flow hydrographs generated by the Buffalo Bayou M3 effective HEC-HMS model were used for the upstream boundary conditions in Buffalo Bayou hydraulic model. The flow hydrographs generated by the White Oak Bayou Risk Map HEC-HMS model were used for the upstream boundary conditions in the White Oak Bayou hydraulic model.

The White Oak Bayou HEC-HMS model has junction nodes at Ella Boulevard on White Oak Bayou and Trimble Street on Little White Oak Bayou. The hydrographs from these nodes were applied to the corrected effective model boundary conditions (see **Exhibit 3-1**). The Buffalo Bayou calibrated hydraulic model does not have a node at Shepherd Drive. The Buffalo Bayou Corrected Effective model was extended to the next upstream node in the HEC-HMS model, which is located approximately 20,700 feet (3.9 miles) upstream of Shepherd Drive at cross section 148800.4. The cross sections and bridge geometry in the extension were obtained from the Buffalo Bayou M3 HEC-RAS effective model.

A rating curve was used as the downstream boundary condition at Turning Basin for the Corrected Effective model. The rating curve was obtained from the General Reevaluation Report (GRR) model geometry. **Table 3-11** presents the rating curve.

Table 3-11: Rating Curve Used at Downstream Boundary in HEC-RAS Model for Design Storm Runs

Stage (ft)	Flow (cfs)
0	0
2.14	25,000
4.81	53,872
7.08	61,636
12.65	83,981
14.00	100,000

Table 3-12 presents the comparison of the 10-, 50-, 100- and 500-year WSELs computed by the Corrected Effective model and effective models (for Buffalo, Little White Oak Bayou and White Oak Bayou) at the same HWM locations presented in **Table 3-8**. The comparison table of WSELs computed from the corrected effective model and effective model is also provided in **Exhibit 3-4.** A tabular output of Peak flows and Peak 100-year WSEL's for Buffalo Bayou, White Oak Bayou and Little White Oak Bayou at all cross-sections within the study area is presented in **Appendix A**. The corrected effective model generated higher WSELs than the effective (M3 or Risk Map) models as shown in both comparison table and profile plots. The hydraulic cross-sections used in the effective and the proposed models are provided in **Exhibit 3-5**.

Figures 3-11 to **3-13** provide computed Corrected Effective 100-year peak WSEL profiles for Buffalo Bayou, White Oak Bayou and Little White Oak Bayou, respectively, together with the 100-year effective M3 WSEL profile (or the Risk Map WSEL profile for White Oak Bayou). This static visual comparison helps identify the difference between the calibrated and original model WSEL profiles along the bayou channels at different locations.

In addition to the WSEL profile comparison, the Corrected Effective 100-year floodplain was created using RAS mapper based on the 2008 LiDAR dataset. The Corrected Effective 100-year floodplain is compared with the existing FEMA 100-year Effective floodplain on **Exhibit 3-6**. **Table 3-13** provides a comparison between the Effective and Corrected Effective models 100-yr WSELs.

Table 3-12: Comparison of WSELs Computed by Existing Effective Models and Corrected Effective Model

ID	Location	Channel	Cross-Section	10-Year WSEL(ft)			50-Year WSEL (ft)			100-Year WSEL (ft)			500-Year WSEL (ft)		
				Effective	Corrected Effective	Corrected Effective - Effective	Effective	Corrected Effective	Corrected Effective - Effective	Effective	Corrected Effective	Corrected Effective - Effective	Effective	Corrected Effective	Corrected Effective - Effective
1	Shepherd Dr	Buffalo Bayou	128104.6	31.05	31.93	0.88	35.03	38.34	3.31	37.96	40.96	3.00	43.97	46.16	2.19
2	Sabine St	Buffalo Bayou	116167.6	30.27	31.20	0.93	33.83	37.67	3.84	37.03	40.20	3.17	42.93	45.49	2.56
3	Milam St	Buffalo Bayou	110876.6	27.11	28.83	1.72	32.65	36.35	3.70	35.65	38.67	3.02	41.31	44.25	2.94
4	San Jacinto St	Buffalo Bayou	109440.2	24.22	27.38	3.16	29.60	35.72	6.12	32.55	38.13	5.58	37.66	43.48	5.82
5	McKee St	Buffalo Bayou	106151.4	21.62	23.17	1.55	27.04	30.02	2.98	29.63	32.60	2.97	34.61	38.95	4.34
6	Turning Basin	Buffalo Bayou	80538	0.08	3.06	2.98	4.82	4.66	-0.16	7.09	6.42	-0.67	12.65	12.08	-0.57
7	N Shepherd Dr	White Oak Bayou	22834	42.47	44.37	1.90	46.96	50.04	3.08	48.84	51.05	2.21	51.84	53.39	1.55
8	Heights Blvd	White Oak Bayou	17756	37.39	39.13	1.74	41.80	44.53	2.73	43.28	45.50	2.22	46.73	48.50	1.77
9	Houston Ave	White Oak Bayou	7649	31.83	32.90	1.07	35.50	38.55	3.05	37.40	40.74	3.34	42.51	45.57	3.06
10	Main St	White Oak Bayou	971.5	26.51	29.51	3.00	31.80	36.61	4.81	34.33	38.91	4.58	40.38	44.32	3.94

Table 3-13: Comparison of Effective and Corrected Effective Max 100-Year WSEL

Location	RAS-Station	Effective 100-Year WSEL (ft)	Corrected Effective 100-Year WSEL (ft)	Corrected Effective - Effective (ft)
BUFFALO BAYOU				
S. PACIFIC RR	148768.4	40.78	42.88	2.10
FOOTBRIDGE @ WESTCOTT	133760.1	38.62	41.44	2.82
SHEPHERD	128066.7	37.96	40.96	3.00
MONTROSE	122572.1	37.57	40.53	2.96
MEMORIAL	119952.6	37.40	40.43	3.03
SABINE	116121.9	37.03	40.20	3.17
RUSK	114168.9	36.74	39.83	3.09
N. CAPITAL	114070.4	36.63	39.76	3.13
TEXAS AVE	113374.3	36.48	39.68	3.20
BAGBY	113238.6	36.24	39.43	3.19
PRAIRIE	112944.9	36.14	39.25	3.11
PRESTON	112534.5	36.08	39.19	3.11
CONGRESS	111953.3	36.00	39.08	3.08
MILAM	110837.8	35.65	38.67	3.02
MAIN	110154.2	34.34	38.57	4.23
WHITE OAK CONFLUENCE	**110103.2**	**--**	**--**	**--**
FANNIN	109518.7	33.68	38.42	4.74
SAN JACINTO	109395.2	32.55	38.13	5.58
MCKEE	106131.1	29.63	32.60	2.97
ELYSIAN	105667.4	29.28	31.67	2.39
U/S US-59 BRIDGE	104948	--	--	--
D/S US-59 BRIDGE	104204	--	--	--
HOUSTON BELT	102847.5	23.94	27.43	3.49
JENSEN	101790.1	22.38	25.84	3.46
LOCKWOOD	92741.1	17.24	19.28	2.04
HOUSTON BELT	86641.7	13.36	13.85	0.49
S. PACIFIC RR	80883.1	7.48	6.74	-0.74
WHITE OAK BAYOU				
ELLA	34951.5	57.40	56.45	-0.95
TC JESTER	29297.5	54.42	54.39	-0.03
SHEPHERD	22796.5	48.84	51.05	2.21
YALE	18138	45.18	47.02	1.84
S. HEIGHTS	17726	43.28	45.50	2.22
STUDEMONT	13182.5	38.47	41.49	3.02
HOUSTON	7608.5	37.40	40.74	3.34
LITTLE WHITE OAK CONFLUENCE	**6895**	**--**	**--**	**--**
CROCKETT/HOGAN	4774.5	36.37	39.89	3.52
MAIN ST	978	34.33	39.06	4.73
UNION PACIFIC RR	191	33.47	38.65	5.18
LITTLE WHITE OAK BAYOU				
N. MAIN	4091	39.19	40.81	1.62
WRIGHTWOOD	1029.5	34.91	40.6	5.69
QUITMAN/WHITE OAK DR.	538	34.63	40.58	5.95

* The RAS station presented are the upstream of the bridge.

Figure 3-11: Comparison of 100-Year WSEL Profiles on Buffalo Bayou

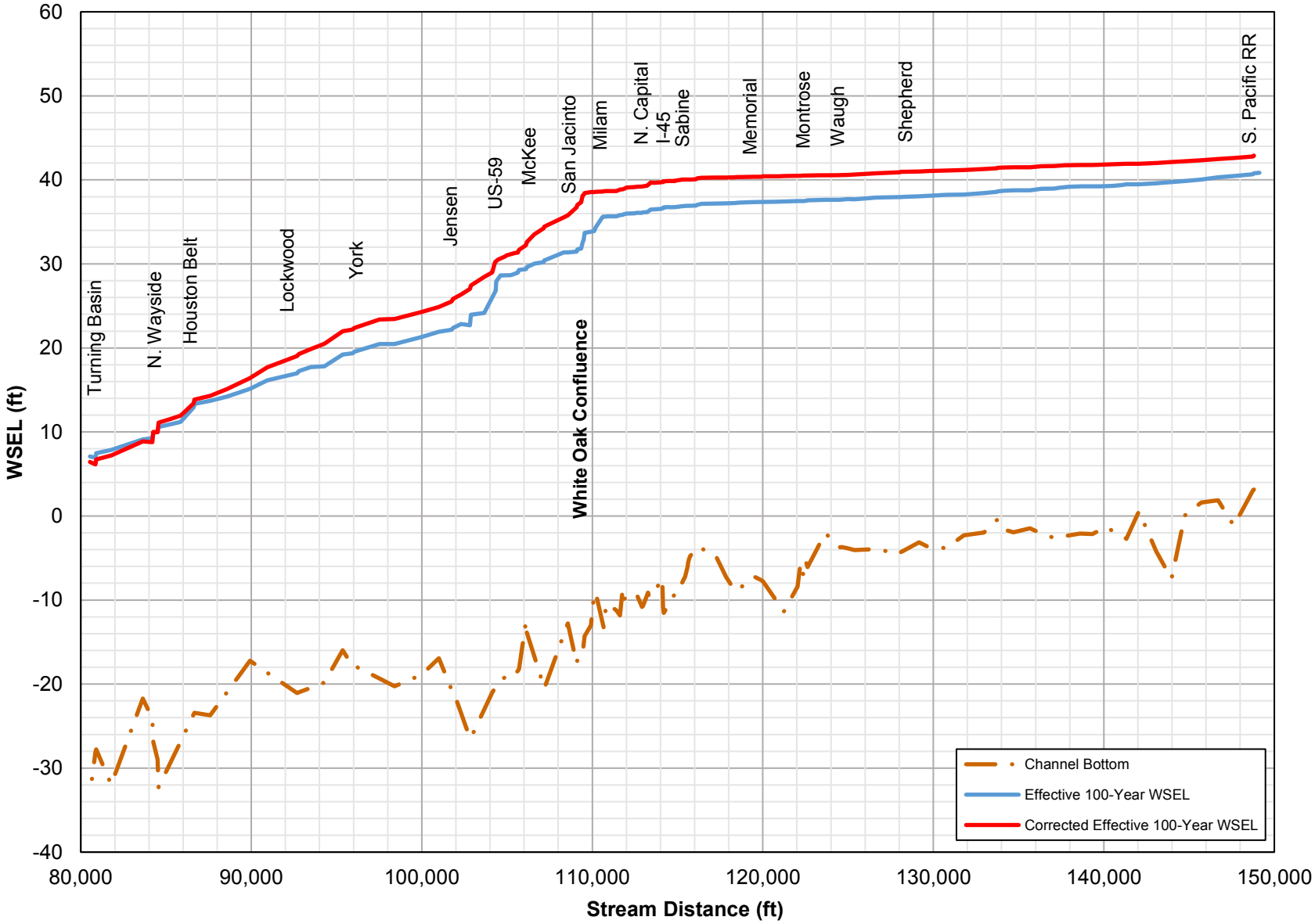


Figure 3-12: Comparison of 100-Year WSEL Profiles on White Oak Bayou

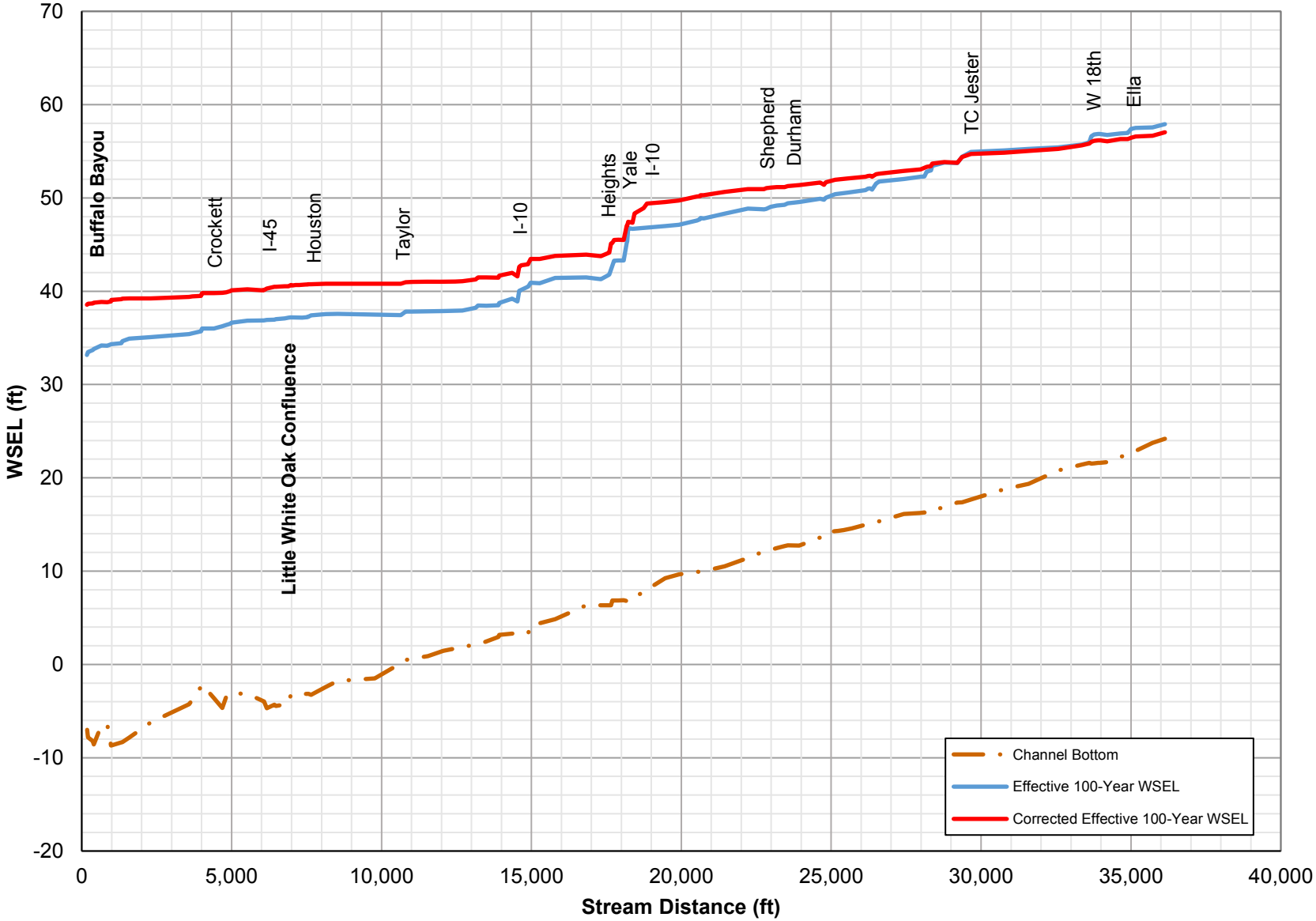
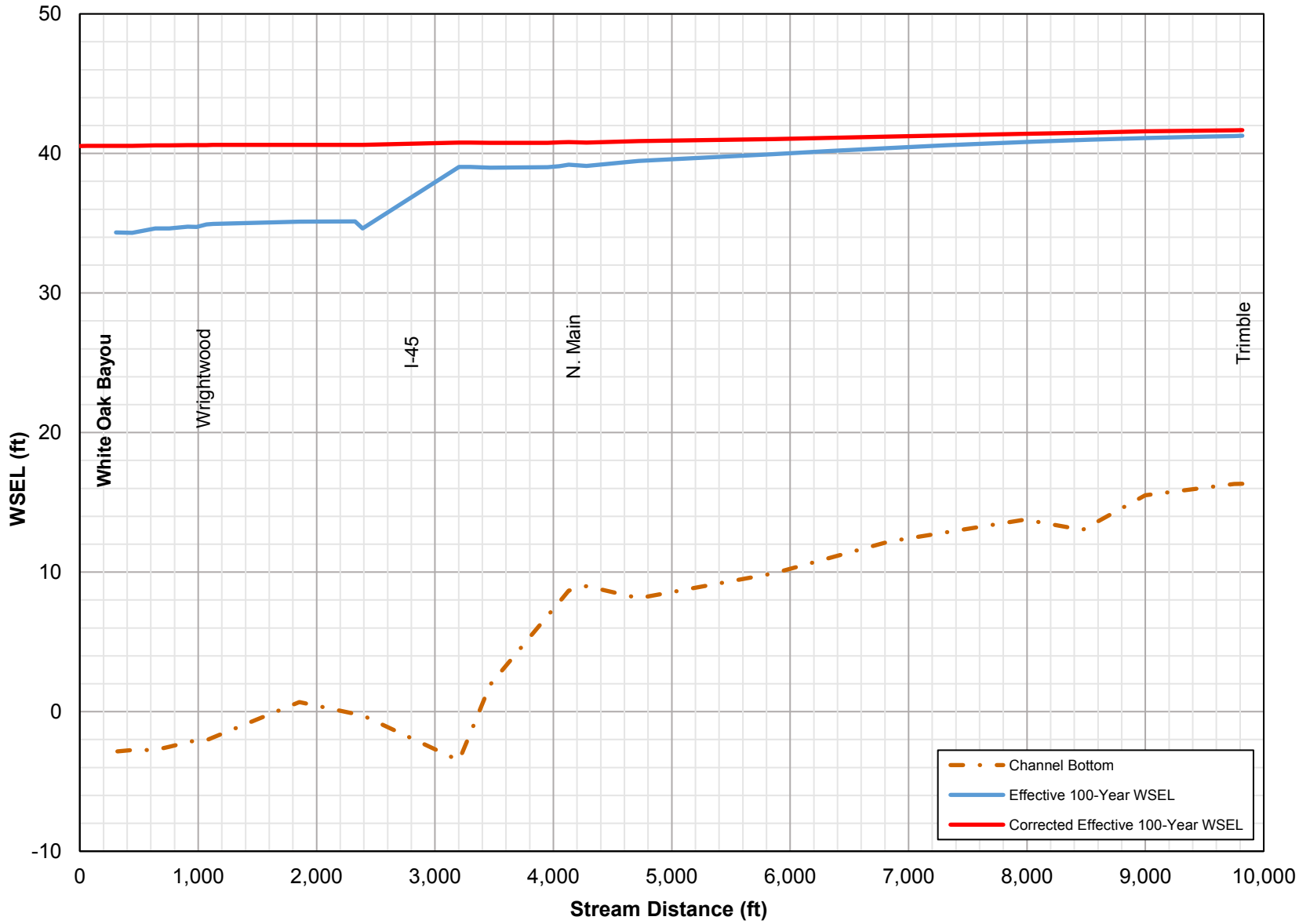


Figure 3-13: Comparison of 100-Year WSEL Profiles on Little White Oak Bayou



3.4 Water Surface Profile Evaluation

Water surface elevations were generated for the effective, corrected effective, and the proposed conditions (discussed in Section 4) and projected along the proposed roadway profiles. The water surface elevations were calculated for the 100-year storm events. A “critical” profile was created along the mainlanes in order to check against “overtopping” for a specific design frequency. The critical elevations are along the edge of pavement of the mainlane for the 100-year event. The water surface elevation comparison with the proposed roadway profiles is shown on **Exhibit 3-7**.

Profile plots of the segment 3D corridor were prepared to compare the Edge of Pavement (EOP) for each alignment to the 100-year WSEL. The plots include the Effective, Corrected Effective and Proposed Scenario 3 (discussed in Section 4) 100-year water surface profiles. The majority of Segment 3D is above the elevated corrected effective 100-yr WSEL. The exceptions are I-10 westbound and eastbound mainlanes between Houston Street and Taylor Street and I-45 northbound and southbound mainlanes north of Little White Oak Bayou crossing (portion of roadway in NHHIP Segment 2). The west edge of the project where the I-10 main lanes meet the existing I-10, the area is significantly below the 100-yr water surface profile. The north edge of the project where the I-45 main lanes meet the existing I-45, the area is significantly below the 100-yr water surface profile.

The I-10 westbound and eastbound main lanes and I-45 northbound and southbound main lanes near Hogan street were assumed to be raised above the corrected effective 100-year WSEL for the proposed condition analysis. **Section 4.1** discusses the above locations in detail where the proposed roadway doesn’t meet the 100-year WSEL at project limits.

4.0 PROPOSED CONDITION ANALYSIS

The NHHIP project (the Project) proposes realignments to I-45, I-10 and I-69 roadway and bridges. The proposed modifications will include the removal and addition of bridge crossings on Buffalo Bayou, White Oak Bayou and Little White Oak Bayou. This section describes the proposed condition analysis for to the NHHIP project. As discussed in detail in **Section 3.0** the corrected effective model was developed by combining Buffalo Bayou, White Oak Bayou and Little White Oak Bayou into a single combined corrected effective model. The backwater from the confluence significantly impacts the water surface elevation profile for Buffalo Bayou, White Oak Bayou and Little White Oak Bayou. This corrected effective model was used as the baseline model for the proposed condition analysis to determine the impacts of roadway and bridge addition to the proposed conveyance improvements. Section 3.0 also details the calibration results that warrant the use of this model as the impact determination baseline model.

The NHHIP project includes improvements related to roadway realignment, roadway widening, roadway profile adjustments and bridge addition and removal. The proposed HEC-RAS model was developed using the preliminary roadway information that was part of the schematic design by HNTB Corporation. These proposed changes to the roadway and bridges were incorporated in the model geometry, which will be the unmitigated proposed scenario.

TxDOT has previously studied conveyance improvements related to the North Canal and South Canal Project improvements as part of the Preliminary Drainage Study report prepared by AECOM dated November 2016. The proposed locations of the North Canal and South Canal are shown on **Exhibit 4-1**. HCFCD initially proposed the North Canal project to reduce the risk of flooding in downtown Houston and to provide flood reduction benefits for the area around both Buffalo Bayou and White Oak Bayou. The North Canal project includes a proposed channel connecting White Oak Bayou to Buffalo Bayou near the confluence of both streams. The South Canal project includes adding a second bypass channel, similar to the North Canal, between Elysian Street and Jensen Drive. The proposed scenarios for the canals were studied both independent of each other and combined. The analysis included the evaluation of potential benefits and impacts to the White Oak Bayou and Buffalo Bayou.

The following scenarios were analyzed both for their hydraulic impacts and their potential mitigation relative to the corrected effective model.

- Unmitigated Proposed Conditions
- Scenario 1 - North Canal Only
- Scenario 2 - North Canal and Heights Blvd Improvements
- Scenario 3 - North Canal, South Canal, Heights Blvd Improvements and Mitigation
- Scenario 4 - Detention Only

4.1 Unmitigated Proposed Conditions

This section describes the bridge and roadway impacts analysis of the Project. In this scenario the model geometry will be the unmitigated proposed condition and will help to understand the impacts of the Project. The HEC-RAS model developed for this condition will serve as the starting point model for the other proposed scenarios.

The NHHIP project will propose realignments to I-45, I-10 and I-69 roadway and bridges. The proposed modifications will include removal and addition of bridge crossings on Buffalo Bayou, White Oak Bayou and Little White Oak Bayou. The proposed HEC-RAS model was developed using the information obtained from the proposed roadway schematic design files provided by HNTB in April 2018. The existing I-45, I-10 and I-69 bridges were removed from the corrected existing model and the proposed bridge crossings were incorporated.

The proposed HEC-RAS model was developed using the information obtained from the proposed roadway schematic design files provided by HNTB Corporation. The proposed roadway design files indicated that the bridges at stream crossings will be on multiple different elevations due to the intersection configurations. Only the bridges at the lowest levels were added to the proposed model geometry. To account for the friction loss of the proposed columns for the bridges at higher levels, the piers of those bridges were added to the model geometry. For example, to represent the pier configuration for I-45 and I-10 Managed Express (MaX) lanes, which are parallel to White Oak Bayou, blocked obstructions were added along the right overbank based on their total column width in the 100-year floodplain. The total column width is added at the location of the closest column to the channel. Below is a summary of existing bridges and HEC-RAS bridge bounding cross-sections that were removed from the corrected effective model.

White Oak Bayou and Little White Oak Bayou

- I-10 direct connector from I-45 southbound mainlane to I-10 westbound mainlane at River Station 6935 on White Oak Bayou was removed from the model due to the proposed replacement of this ramp.
- I-45 direct connector from I-10 eastbound mainlane to I-45 northbound mainlane at River Station 6448.0 on White Oak Bayou was removed from the model due to proposed replacement. The bridge bounding cross sections 6474 and 6423 were also removed.
- I-45 northbound mainlane at River Station 6128 on White Oak Bayou was removed from the model due to proposed replacement. The bridge bounding cross sections 6174 and 6078 were also removed.
- I-45 direct connector from I-10 westbound mainlane to I-45 northbound mainlane at River Station 6046 on White Oak Bayou was removed due to proposed replacement. The bridge bounding cross sections 6068 and 6020 were also removed.
- The combined I-45 northbound and southbound mainlane bridges at River Station 2797 on Little White Oak Bayou was removed due to the proposed replacement. The upstream bridge adjacent cross sections 3300 and 3203 were removed. The proposed bridge width

change does not affect the downstream bridge bounding cross section. Therefore, the downstream bounding cross section remained in the NHHIP model.

Buffalo Bayou

Four bridges which run across the Buffalo Bayou bend in the downtown area were removed due to proposed realignment, which are as follow:

- I-69 direct connector from I-10 westbound mainlane to I-69 southbound mainlane at Station 104948
- I-69 southbound mainlane at Station 104566, I-69 northbound mainlane road at Station 104383
- I-10 direct connector from I-69 northbound mainlane road to I-10 eastbound mainlane road at Station 104271
- I-10 ramp from Chartres Street to I-10 eastbound mainlane road at Station 104204.

The proposed new bridges are realigned and moved downstream of their existing locations. The bridge bounding cross sections of these bridges do not conflict with the proposed bridge bounding cross sections, except cross section 104133. Therefore, to facilitate the comparison between the corrected existing model and the proposed NHHIP model, all existing bridge bounding cross sections, other than cross section 104133, remained in the proposed NHHIP model.

Proposed Improvements

Below is the summary of the proposed bridges with IDs and HEC-RAS river stations that were added to the model geometry. The proposed bridge IDs are obtained from the HNTB roadway design files dated April 2018 and are included for reference purposes only.

White Oak Bayou

- I-10 direct connector from I-45 southbound mainlanes to I-10 westbound mainlanes (DC045SW300) across both White Oak Bayou at Station 7205 and Little White Oak Bayou at Station 229 was added to the model. Bridge bounding cross sections 7253 and 7138.1 were added on White Oak Bayou for the bridge. Bridge bounding cross sections 259 and 180.1 were added on Little White Oak Bayou for the bridge.
- I-10 ramp from I-45 southbound managed express (MaX) lanes to I-10 westbound express lanes (RPX45SB301) was added to the model. The bridge runs across both White Oak Bayou at Station 7057 and Little White Oak Bayou at Station 130. Bridge bounding cross sections 7138 and 7016.1 were added on White Oak Bayou for the bridge. Bridge bounding cross sections 180 and 101.1 were added on Little White Oak Bayou for the bridge.
- I-45 direct connector from I-10 eastbound mainlanes to I-45 northbound mainlanes (DC010EN300) across White Oak Bayou was added at Station 6600. Bridge bounding cross sections 6637 and 6575.1 were added on White Oak Bayou for the bridge.

- I-45 ramp from I-10 eastbound express lanes to I-45 northbound MaX lanes (RPX10EB301) was added across White Oak Bayou at Station 6551. Bridge bounding cross sections 6575 and 6515 were added on White Oak Bayou for the bridge.
- I-45 northbound mainlane bridge (GP045NB300) across White Oak Bayou was added at Station 6352. Bridge bounding cross sections 6387 and 6298.1 were added for the bridge.
- I-45 direct connector from DTN to northbound I-45 mainlanes (DCDTNN300) across White Oak Bayou at Station 6252. Bridge bounding cross sections 6298 and 6201.1 were added for the bridge.
- I-45 ramp from I-45 northbound MaX lanes to I-45 northbound mainlanes (RP045NB302) across White Oak Bayou was added at Station 6164. Bridge bounding cross sections 6201 and 6122 were added on White Oak Bayou for the bridge.

White Oak Bayou - Upstream of White Oak Bayou and Buffalo Bayou Confluence

- I-10 westbound mainlane bridge (GP010WB300) was added across White Oak Bayou at Station 3094. Bridge bounding cross sections 3233 and 2954.1 were added on White Oak Bayou for the bridge.
- I-45 northbound mainlane bridge (GP045NB300) was added across White Oak Bayou at Station 2857. Bridge bounding cross sections 2954 and 2760.1 were added on White Oak Bayou for the bridge.
- I-10 westbound express lane bridge (ML010WB300) was added across White Oak Bayou at Station 2639. Bridge bounding cross sections 2760 and 2518.1 were added on White Oak Bayou for the bridge.
- I-45 southbound mainlane bridge (GP045SB300) was added across White Oak Bayou at Station 2434. Bridge bounding cross sections 2518 and 2350.1 were added on White Oak Bayou for the bridge.
- I-10 eastbound mainlane bridge (GP010EB300) was added across White Oak Bayou at Station 2280. Bridge bounding cross sections 2350 and 2210 were added on White Oak Bayou for the bridge.

Little White Oak Bayou

- I-45 ramp from South Street to I-45 northbound mainlane road (CD045NB201 /RP045NB203) was added across Little White Oak Bayou at Station 3278. Bridge bounding cross sections 3323 and 3236.1 were added on Little White Oak Bayou for the bridge.
- I-45 northbound mainlane bridge (GP045NB202) was added across Little White Oak Bayou at Station 3085. Bridge bounding cross sections 3236 and 2958.1 were added on Little White Oak Bayou for the bridge.
- I-45 southbound mainlane bridge (GP045SB202) was added across Little White Oak Bayou at Station 2833. Bridge bounding cross sections 2958 was added on the upstream

side of the bridge. The original downstream bounding cross section 2389 remained for the bridge.

Buffalo Bayou - Downstream of White Oak Bayou and Buffalo Bayou Confluence

- Proposed ramp from I-10 westbound mainlane road to I-69 southbound frontage road (RP010WB306) was added across Buffalo Bayou at Station 104070. Bridge bounding cross sections 104118 and 103955.1 were added on Buffalo Bayou for the bridge.
- Direct connector from I-10 eastbound mainlane road to I-69 southbound (DC010ES302) across Buffalo Bayou at Station 103846. Bridge bounding cross sections 103955 and 103786.1 were added on Buffalo Bayou for the bridge.
- I-69 southbound mainlane bridge (GP069SB300) was added across Buffalo Bayou at Station 103694. Bridge bounding cross sections 103786 and 103534.1 were added on Buffalo Bayou for the bridge.
- I-45 southbound mainlane bridge (GP045SB300) was added across Buffalo Bayou at Station 103383. Bridge bounding cross sections 103534 and 103241.1 were added on Buffalo Bayou for the bridge.
- I-69 northbound mainlane bridge (GP069NB300) was added across Buffalo Bayou at Station 103161. Bridge bounding cross sections 103241 and 103095.1 were added on Buffalo Bayou for the bridge.
- I-45 direct connector from I-69 northbound mainlane road to I-45 northbound mainlane road (DC069NN300) was added across Buffalo Bayou at Station 103065. Bridge bounding cross sections 103095 and 103025.1 were added on Buffalo Bayou for the bridge.
- I-45 direct connector from I-69 northbound mainlane road to I-10 eastbound mainlane (DC069NE300) was added across Buffalo Bayou at Station 102988. Bridge bounding cross sections 103025 and 102952 were added on Buffalo Bayou for the bridge.

In addition to the bridge modifications, a portion of the proposed I-10 and I-45 mainlanes, between Houston Avenue and Main street, which run parallel to the White Oak Bayou channel in the right overbank area were recommended to be raised, as part of this analysis, to meet the minimum 100-year design criteria. Additionally, the proposed roadway will be kept on grade, consistent with the existing conditions. This profile modification will result in additional fill in the 100-year floodplain. Blocked obstructions were added along the right overbank to the HEC-RAS cross-sections in the area to represent fill for the proposed roadway embankment. The mitigation for the floodplain fill is discussed later in **Section 6.9**.

The above modifications to the corrected effective model geometry will represent the unmitigated proposed condition model geometry and will serve as the baseline geometry for all proposed scenarios. **Table 4-1** shows the comparison of the computed 100-year WSELs at selected locations between the corrected effective model and the unmitigated proposed conditions model

for Buffalo Bayou and White Oak Bayou. This comparison was used to assess the impacts of the proposed Project.

As shown in **Table 4-1**, the proposed roadway and bridge construction due to the NHHIP project could potentially lower the Buffalo Bayou 100-year WSEL by approximately 0.27 feet upstream of I-69/US-59. Downstream of I-69/US-59, the NHHIP project could result in a WSEL increase of 0.02 feet to 0.05 feet. This increase in WSEL is due in part to the profile adjustments for I-10 and I-45 mainlanes. The portion of the proposed I-10 and I-45 mainlanes, between Houston Avenue and Main street, that run parallel to the White Oak Bayou channel in the right overbank area were raised so to be outside the 100-year floodplain.

The computed WSELs at bridges were compared to the proposed bridge low chord elevation. **Table 4-2** is a summary of this comparison. The computed WSELs in the table were obtained from the upstream cross sections at bridge locations. The design criteria for the bridge crossings recommends that low chords meet 100-year WSEL plus 2.5 feet of freeboard for mainlanes and direct connectors and 100-year WSEL plus 1.5 feet of freeboard for ramps and frontage roads. The table below includes the lowest level proposed bridges that are modeled in the unmitigated proposed conditions model. The bridges at levels significantly above the channel were not modeled in detail (piers only), as they will safely meet the design criteria. **Table 4-2** represents the roadway improvements related to NHHIP only without the addition of either of the North and South conveyance canals. The construction of the North and South Canals will lower the WSEL and improve the number of bridges that meet the given criteria.

The results showed that there is a WSEL difference of 0.30 feet between White Oak Bayou and Little White Oak Bayou in the confluence area. The weir coefficients were adjusted, and a sensitivity analysis was performed. No changes to the WSELs were observed. Further investigation showed that the White Oak Bayou has higher velocities in the channel as compared to the Little White Oak Bayou and could have been the reason for difference in WSELs at the confluence.

Table 4-1: Comparison of Corrected Effective and Unmitigated Proposed Max 100-Year WSEL

Location	RAS-Station	Corrected Effective 100-Year WSEL (ft)	Unmitigated Proposed 100-Year WSEL (ft)	Unmitigated Proposed - Corrected Effective (ft)
BUFFALO BAYOU				
S. PACIFIC RR	148768.4	42.88	42.77	-0.11
FOOTBRIDGE @ WESTCOTT	133760.1	41.44	41.30	-0.14
SHEPHERD	128066.7	40.96	40.81	-0.15
MONTROSE	122572.1	40.53	40.37	-0.16
MEMORIAL	119952.6	40.43	40.27	-0.16
SABINE	116121.9	40.20	40.03	-0.17
RUSK	114168.9	39.83	39.76	-0.07
N. CAPITAL	114070.4	39.76	39.69	-0.07
TEXAS AVE	113374.3	39.68	39.61	-0.07
BAGBY	113238.6	39.43	39.36	-0.07
PRAIRIE	112944.9	39.25	39.17	-0.08
PRESTON	112534.5	39.19	39.12	-0.07
CONGRESS	111953.3	39.08	39.00	-0.08
MILAM	110837.8	38.67	38.59	-0.08
MAIN	110154.2	38.57	38.48	-0.09
WHITE OAK CONFLUENCE	**110103.2**	**38.55**	**38.47**	**-0.08**
FANNIN	109518.7	38.42	38.33	-0.09
SAN JACINTO	109395.2	38.13	38.05	-0.08
MCKEE	106131.1	32.60	32.37	-0.23
ELYSIAN	105667.4	31.67	31.41	-0.26
U/S US-59 BRIDGE	104948	31.00	30.74	-0.26
D/S US-59 BRIDGE	104204	29.86	29.91	0.05
HOUSTON BELT	102847.5	27.43	27.46	0.03
JENSEN	101790.1	25.84	25.87	0.03
LOCKWOOD	92741.1	19.28	19.31	0.03
HOUSTON BELT	86641.7	13.85	13.88	0.03
S. PACIFIC RR	80883.1	6.74	6.76	0.02
WHITE OAK BAYOU				
ELLA	34951.5	56.45	56.46	0.01
TC JESTER	29297.5	54.39	54.40	0.01
SHEPHERD	22796.5	51.05	51.05	0.00
YALE	18138	47.02	47.01	-0.01
S. HEIGHTS	17726	45.50	45.49	-0.01
STUDEMONT	13182.5	41.49	41.43	-0.06
HOUSTON	7608.5	40.74	40.67	-0.07
LITTLE WHITE OAK CONFLUENCE	**6895**	**40.53**	**40.34**	**-0.19**
CROCKETT/HOGAN	4774.5	39.89	39.79	-0.10
MAIN ST ACCESS RD	978	39.06	38.98	-0.08
UNION PACIFIC RR	191	38.65	38.57	-0.08
LITTLE WHITE OAK BAYOU				
N. MAIN	4091	40.81	40.50	-0.31
WRIGHTWOOD	1029.5	40.60	40.40	-0.20
QUITMAN/WHITE OAK DR.	538	40.58	40.37	-0.21

* The RAS station presented are the upstream of the bridge.

Table 4-2: Proposed Bridge Crossing Hydraulic Summary Data

Bridge ID	Stream	RAS Station	Road Type	Low Chord El (ft)	100-YR WSEL (ft)	Freeboard above 100-YR WSEL (ft)	Required Min Low Chord El (ft)	Meet Criteria?
DC045SW300	WO & LWO	7205/229	Direct Connector	23.53	40.62/40.34	Depressed	43.12	No
DC010EN300	White Oak	6600	Direct Connector	44.73	40.30	4.43	42.80	Yes
RPX10EB301	White Oak	6551	Ramp	48.46	40.28	8.18	41.78	Yes
GP045NB300	White Oak	6352	Mainlane	48.27	40.27	8.00	42.77	Yes
DCDTNN300	White Oak	6252	Direct Connector	57.99	40.26	17.73	42.76	Yes
RP045NB302	White Oak	6164	Ramp	46.65	40.27	6.38	41.77	Yes
GP010WB300	White Oak	3094	Mainlane	38.58	39.47	-0.89	41.97	No
GP045NB300	White Oak	2857	Mainlane	47.76	39.44	8.32	41.94	Yes
ML010WB300	White Oak	2639	HOV Lane	67.38	39.43	27.95	41.93	Yes
GP045SB300	White Oak	2434	Mainlane	45.91	39.38	6.53	41.88	Yes
GP010EB300	White Oak	2280	Mainlane	41.47	39.27	2.20	41.77	No
RP010WB306	Buffalo	104070	Ramp	58.85	29.54	29.31	31.04	Yes
DC010ES302	Buffalo	103846	Direct Connector	54.16	29.42	24.74	31.92	Yes
GP069SB300	Buffalo	103694	Mainlane	40.38	29.16	11.22	31.66	Yes
GP045SB300	Buffalo	103383	Mainlane	35.46	28.64	6.82	31.14	Yes
GP069NB300	Buffalo	103161	Mainlane	32.55	28.38	4.17	30.88	Yes
DC069NN300	Buffalo	103065	Direct Connector	35.53	28.06	7.47	30.56	Yes
DC069NE300	Buffalo	102988	Direct Connector	35.72	27.85	7.87	30.35	Yes
CD045NB201/ RP045NB203	LWO	3278	Frontage/ Ramp	28.17	40.46	Depressed	41.96	No
GP045NB202	LWO	3085	Mainlane	26.51	40.45	Depressed	42.95	No
GP045SB202	LWO	2833	Mainlane	26.72	40.46	Depressed	42.96	No

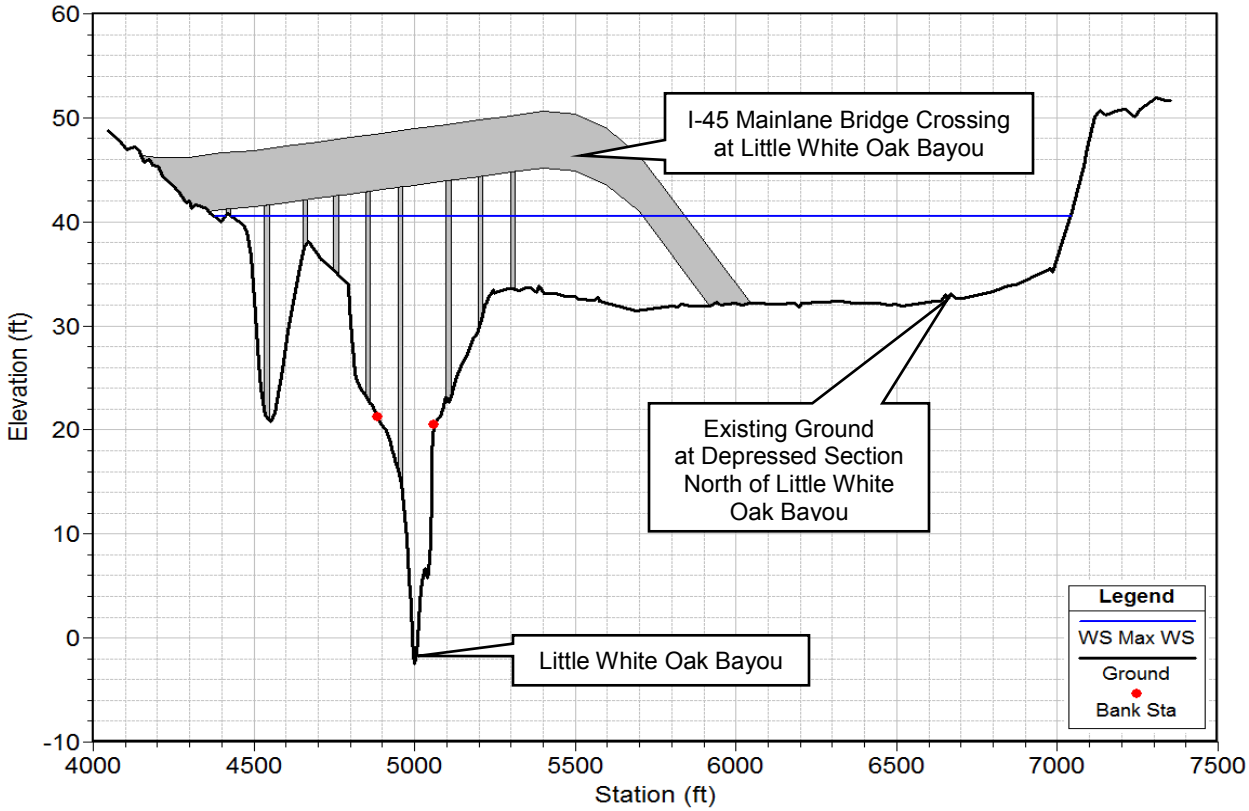
* The RAS station presented are the upstream of the bridge.

The low chord elevations in the table are preliminary and based on an assumption of deck thickness of 5.42 feet. The proposed profile from HNTB was used to develop the deck high chord and low chord elevations. It is recommended that the roadway profile and selection of beam types be optimized in the final design to meet the required design criteria. Following is the list of bridges that may require modifications to meet the design criteria:

I-45 Mainlanes at Little White Oak Bayou.

The I-45 northbound and southbound mainlane bridges (GP045NB202 and GP045SB202) on Little White Oak Bayou at Stations 3085 and 2833 run into a depressed area on the right bank of the Little White Oak Bayou. The proposed 100-year WSEL at the northbound bridge is 40.45 feet and that at the southbound bridge is 40.46 feet. The proposed profiles for I-45 northbound and southbound mainlanes are recommended to be adjusted to meet the minimum low chord requirements for mainlanes. In addition, the depressed area north of I-45 and Little White Oak Bayou crossings has the ground elevations around 31.00 to 34.00 feet based on the 2008 H-GAC LiDAR. There is a potential that the 100-year WSEL of White Oak Bayou will flood the I-45 depressed section. **Figure 4-1** illustrates the depressed right overbank area along I-45 mainlane in comparison with the 100-year WSEL. The model in this study doesn't account for the volume loss in the existing depressed section (part of Segment 2 roadway). It is recommended that the volume in this depressed section be further analyzed in future based on the recommended roadway design at the time.

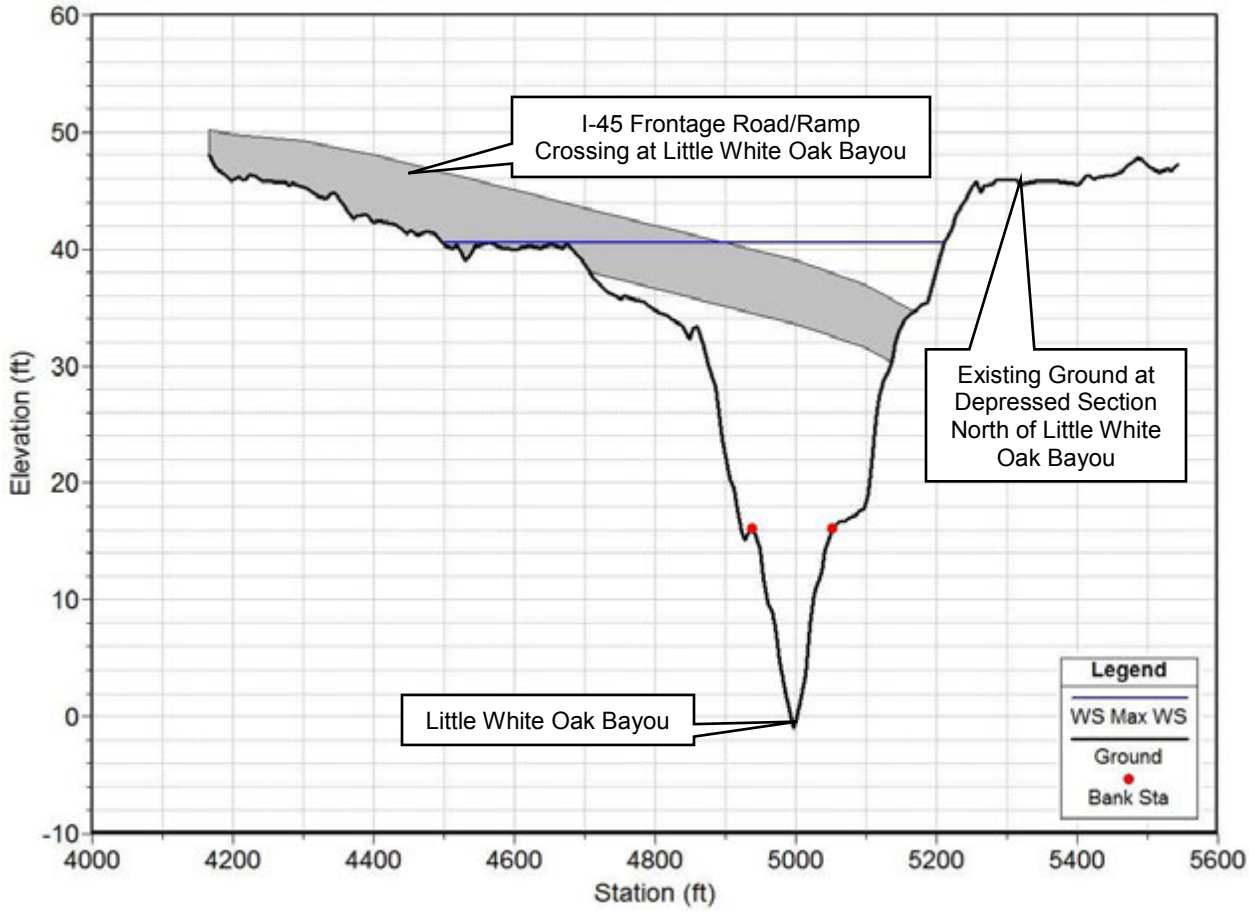
Figure 4-1: Depressed Right Overbank Area at I-45 Mainlane Crossing on Little White Oak at Station 3085



I-45 Ramps and frontage roads at Little White Oak Bayou

The I-45 ramp (RP045NB203) at Station 3278 on Little White Oak Bayou connects the frontage road (CD045NB201) to the depressed I-45 mainlanes. The frontage road and ramp does not meet the low chord criteria. The 100-year WSEL at the frontage road/ramp is 40.46. A low chord elevation of 41.96 is required to meet the low chord criteria for frontage roads and ramps. **Figure 4-2** illustrates the I-45 frontage road and ramp elevation with the 100-year WSEL profile at the location. The proposed bridge ties into the depressed section north of Little White Oak Bayou. It is recommended that the Segment 2 design will address the overtopping situation in this area.

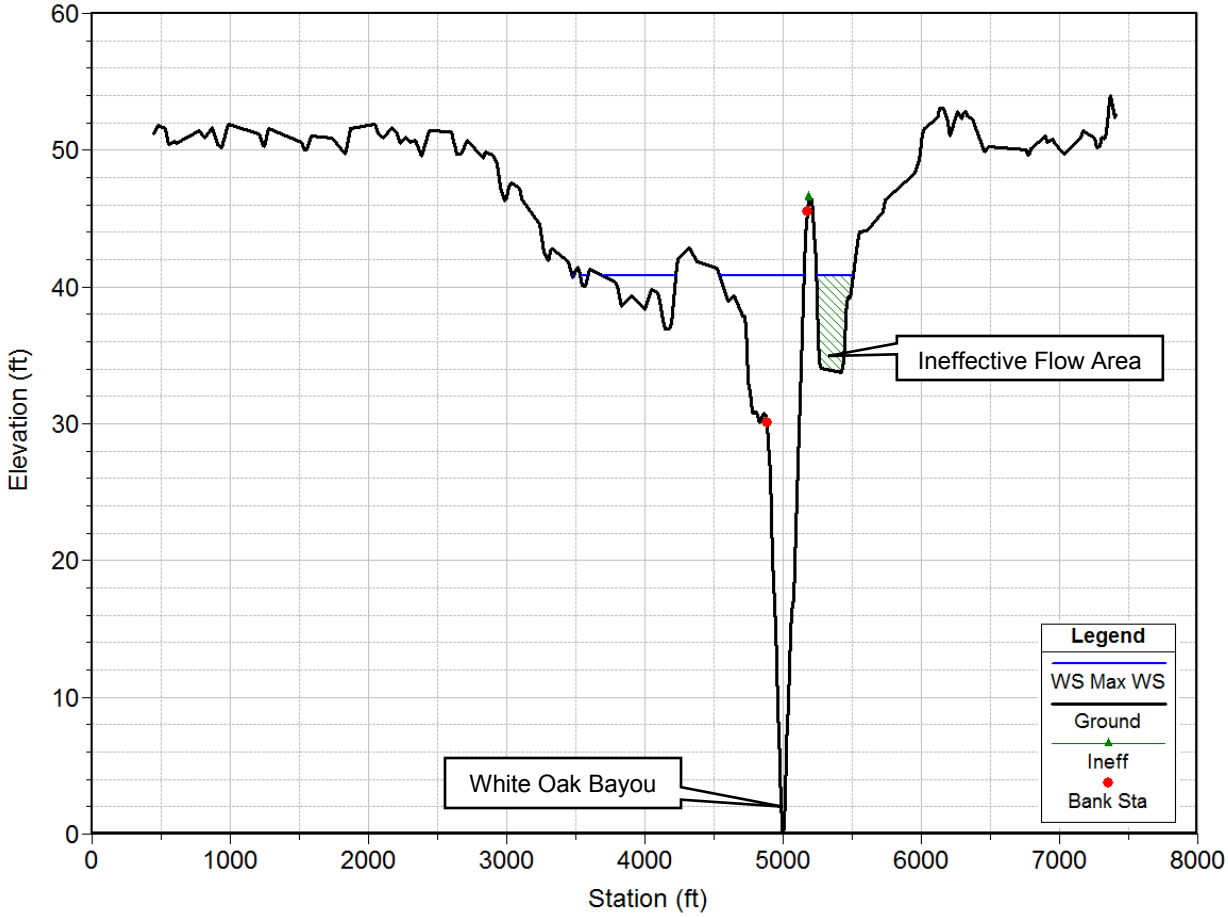
Figure 4-2: I-45 Frontage Road/Ramp Crossing on Little White Oak Bayou at Station 3278



I-10 Mainlanes at White Oak Bayou near Houston Street

The I-10 mainlanes between cross section 7529 just downstream of Houston Street and cross section 11021 just upstream of Taylor Street along White Oak Bayou is depressed on the right overbank. **Figure 4-3** is the plot of cross section 10643 located in that area. The existing elevation of the depressed area varies from ~ 29 feet to 34 feet. The corrected effective 100-year WSEL in the area is between 40.73 feet and 40.98 feet. The depressed area is inundated below the White Oak Bayou 100-year WSEL. Based on the current schematic design, the roadway in this area doesn't meet the required design criteria as the proposed roadway will tie to the existing pavement in depressed section.

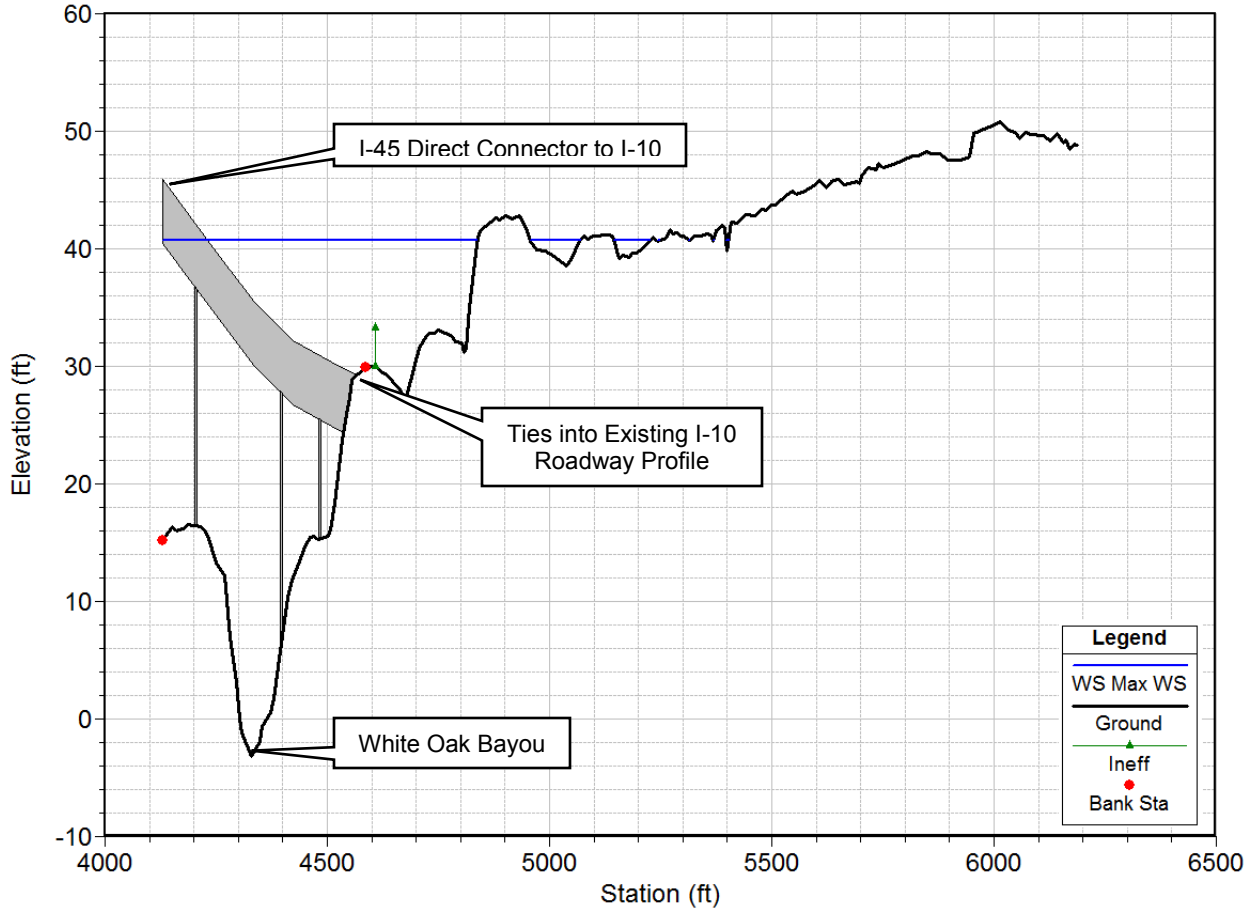
Figure 4-3: I-45 White Oak Bayou Upstream of Taylor Street at Station 10643



I-45 Direct Connector to I-10 Westbound Section Along White Oak Bayou

The direct connector from I-45 (DC045SW300) is connected to the I-10 westbound mainlanes depressed section and is located at River Station 7205 along White Oak Bayou. The mainlanes in this area are located within the White Oak Bayou 100-year floodplain. The 100-year unmitigated proposed WSEL at this location is 40.62 feet. **Figure 4-4** illustrate the proposed 100-year WSEL and the proposed bridge profile across White Oak Bayou

Figure 4-4: I-45 Direct Connector to I-10 Westbound Across White Oak Bayou at Station 7205



As shown on **Figure 4-4**, the proposed direct connector profile is lower than the 100-year WSEL as it approaches the depressed I-10 mainlanes.

I-10 Mainlanes at White Oak Bayou

The I-10 westbound mainlane bridge GP010WB300 and I-10 eastbound mainlane bridge GP010EB300 at Station 3094 and Station 2280, respectively, along White Oak Bayou also do not meet the low chord criteria in the right overbank area. The low chord elevation of bridge GP010WB300 should be set above 41.97 feet; and that of bridge GP010EB300 should be set above 41.77 feet to meet the clearance criteria of 2.5 feet above 100-year WSEL for mainlane bridges. The current proposed lowest low chord elevation is 38.58 feet for GP010WB300 and 41.47 feet for GP010EB300. **Figures 4-5** and **4-6** illustrate the proposed mainlane bridge profiles for GP045SB300 and GP010EB300, respectively, across White Oak Bayou.

Figure 4-5: I-10 Westbound Mainlane Bridge Across White Oak Bayou at Station 3094

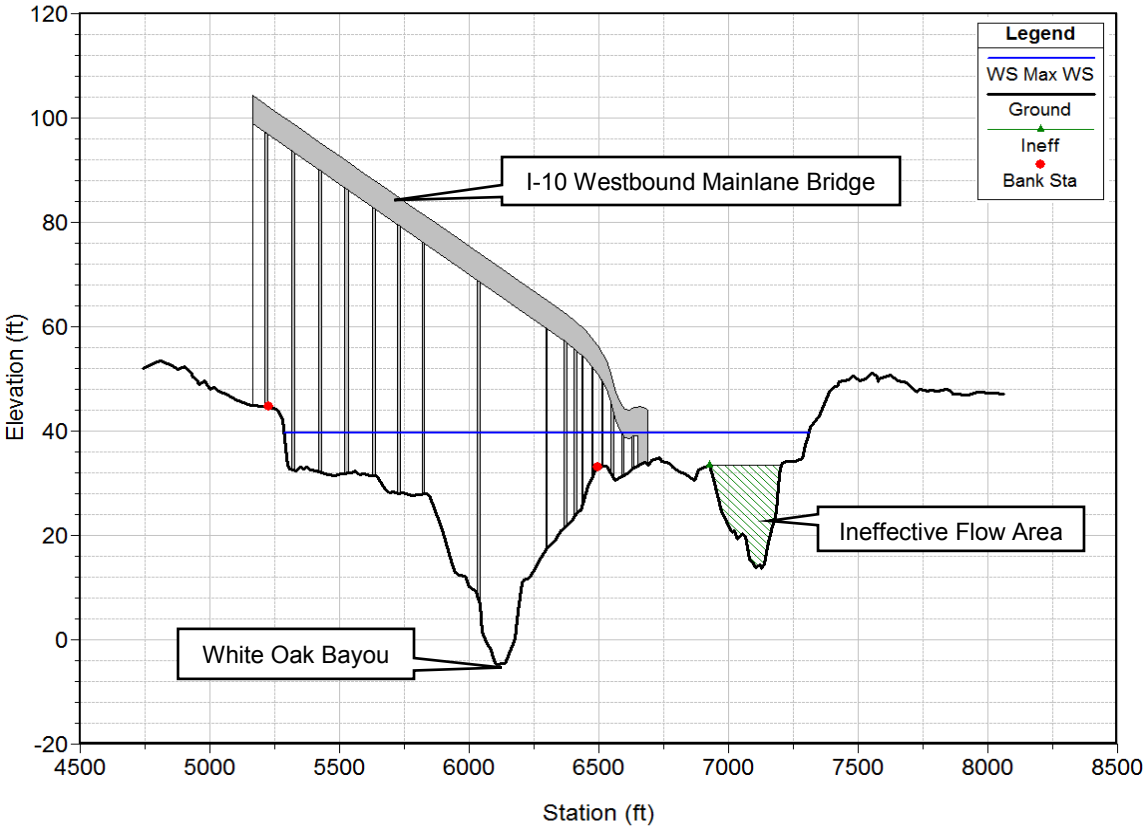
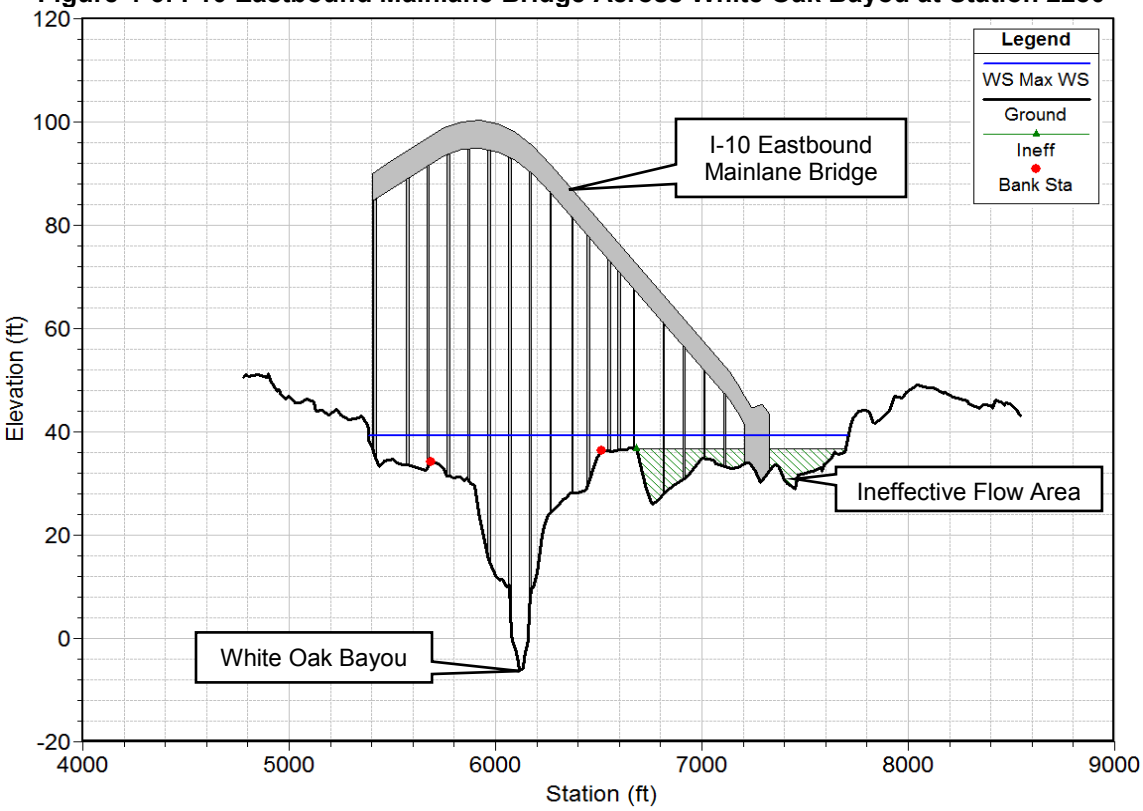


Figure 4-6: I-10 Eastbound Mainlane Bridge Across White Oak Bayou at Station 2280



Figures 4-7, **4-8** and **4-9** below show the 100-Year WSEL profile comparison between the Corrected Effective and Unmitigated Proposed Models at Buffalo Bayou, White Oak Bayou and Little White Oak Bayou, respectively.

Figure 4-7: WSEL Profile Comparison Between Corrected Effective and Unmitigated Proposed Models at Buffalo Bayou

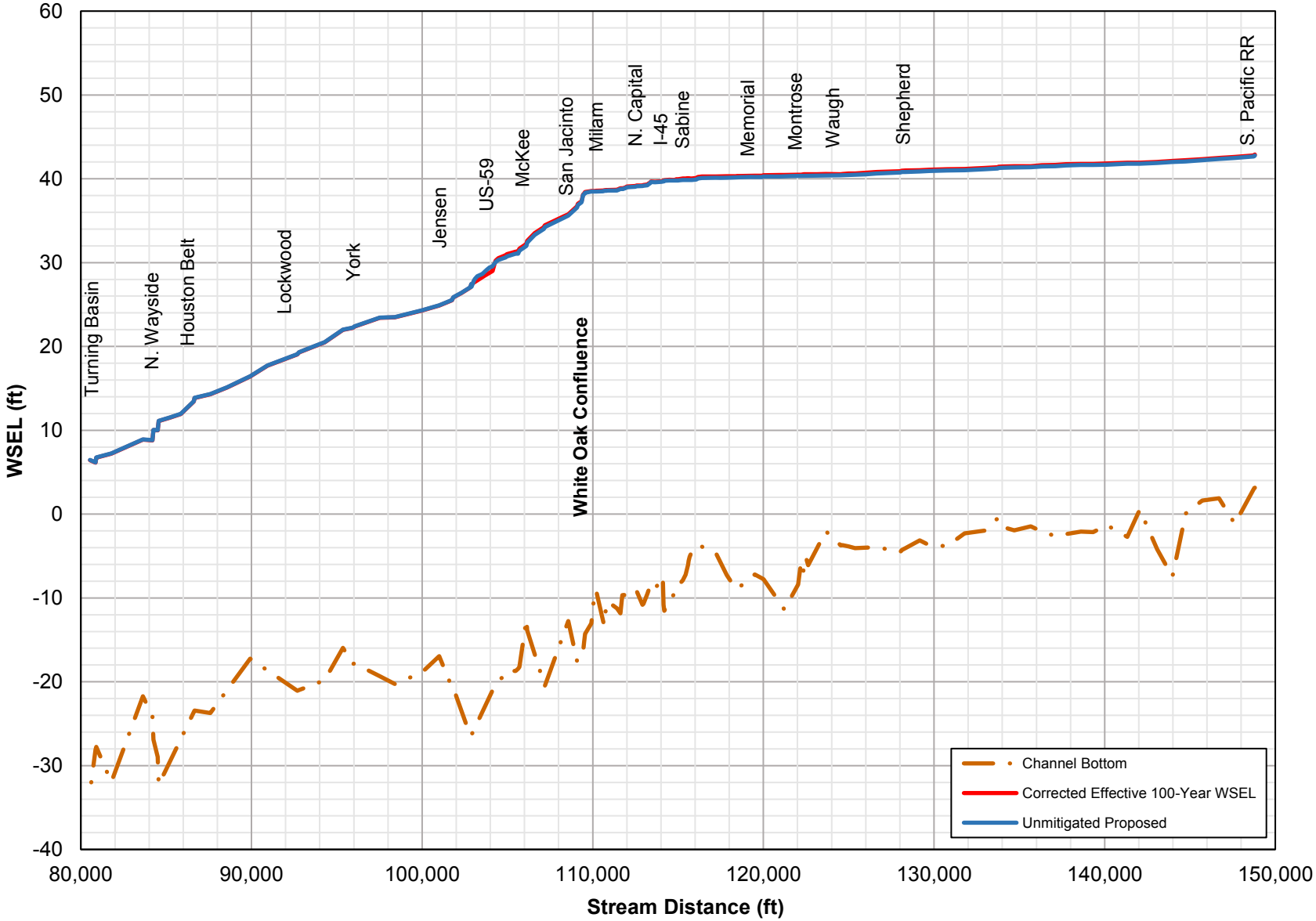


Figure 4-8: WSEL Profile Comparison Between Corrected Effective and Unmitigated Proposed Models at White Oak Bayou

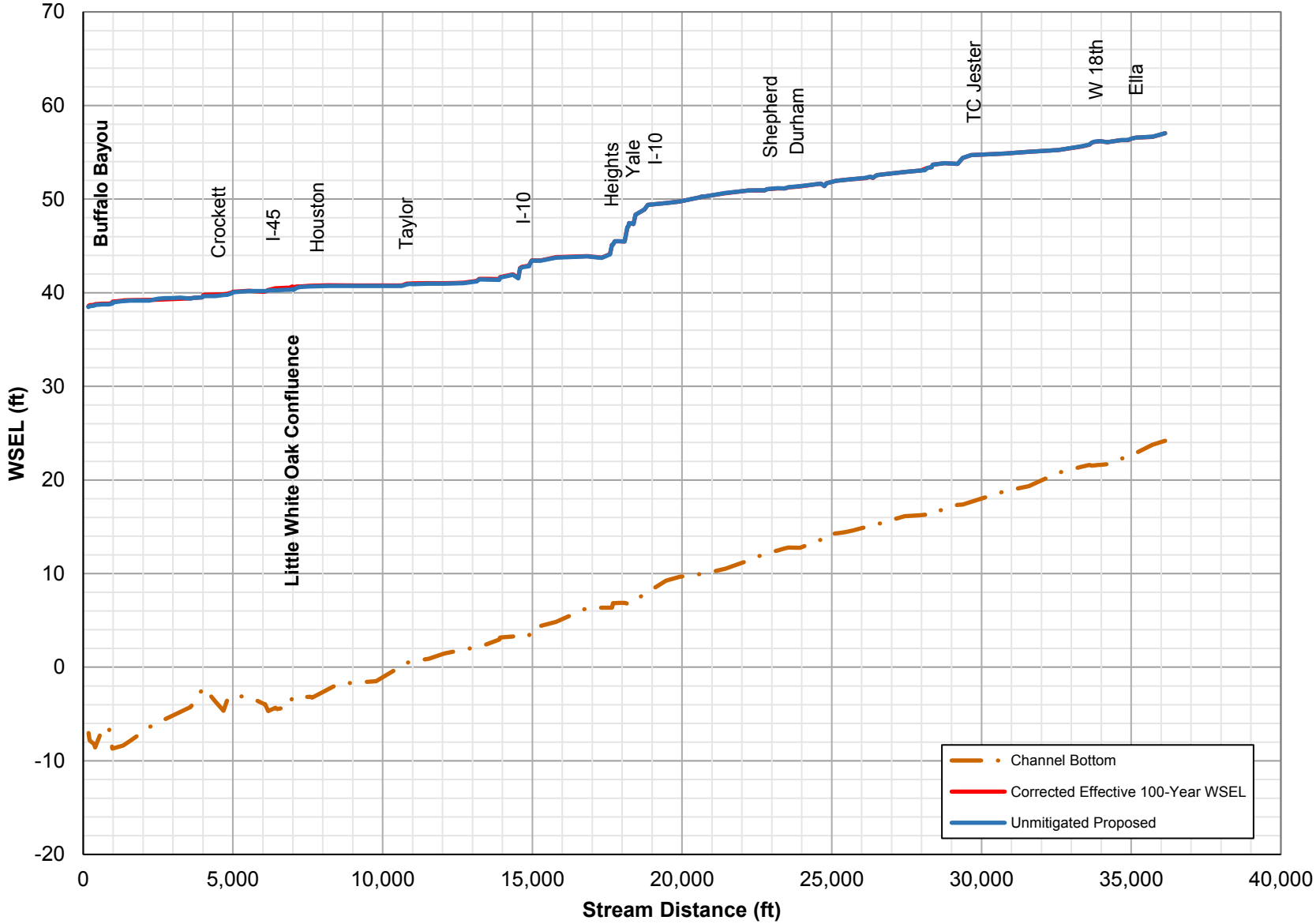
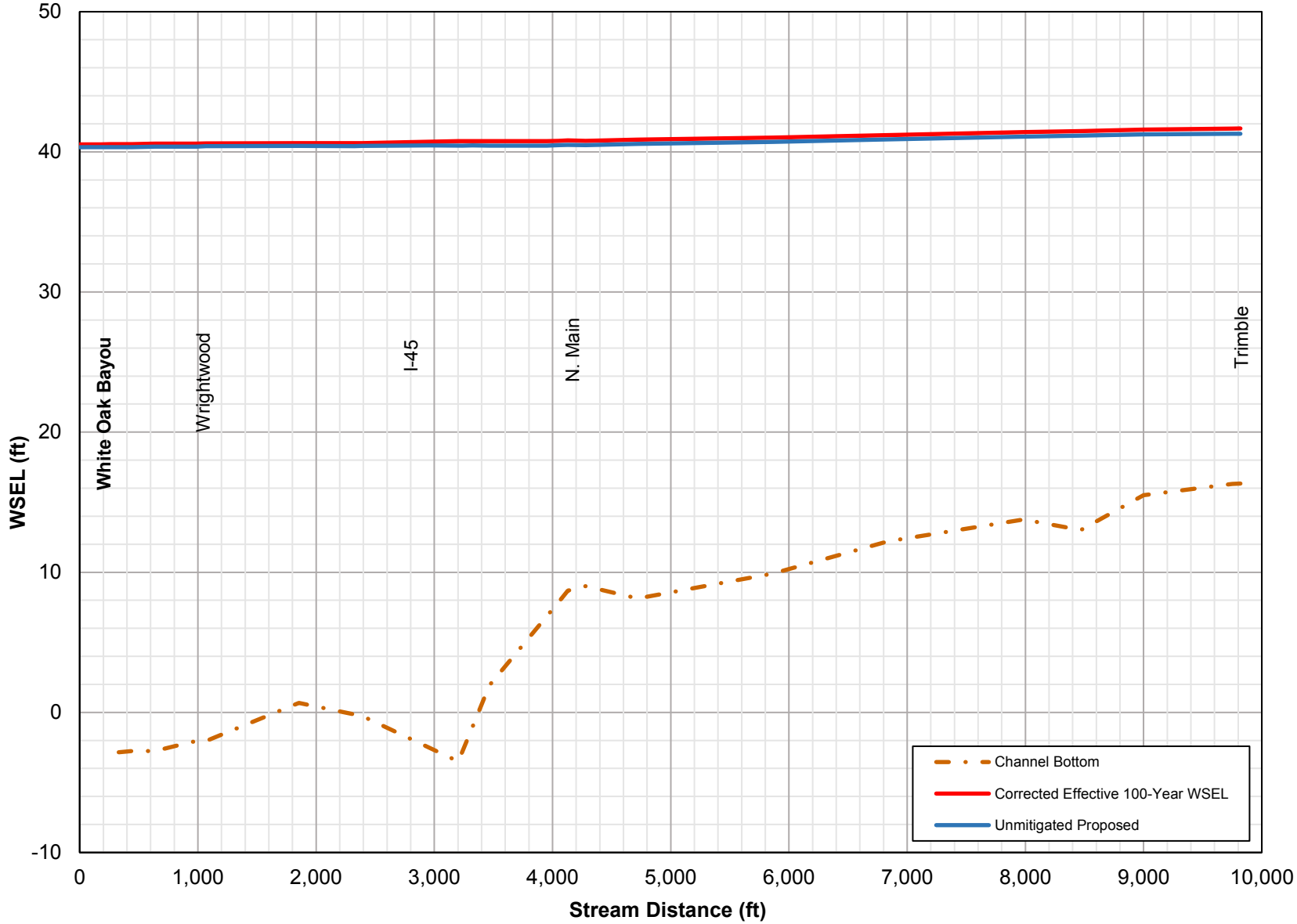


Figure 4-9: 100-Yr WSEL Profile Comparison Between Corrected Effective and Unmitigated Proposed Models at Little White Oak Bayou



Mitigation Alternatives

The unmitigated proposed model was used to develop the mitigated proposed conditions model for several scenarios. Buffalo Bayou borders the north side of the Houston downtown area. The Buffalo Bayou WSEL influences the White Oak Bayou WSEL and affects the proposed NHHIP project. As indicated earlier, four improvement scenarios were considered to reduce the WSEL. The list below shows the four scenarios evaluated in the study:

- Scenario 1 - North Canal Only
- Scenario 2 - North Canal and Heights Blvd Improvements
- Scenario 3- North Canal, South Canal, Heights Blvd Improvement and Mitigation
- Scenario 4- Detention only

An overview of the proposed improvements related to North Canal, South Canal, proposed regional detention location and Heights Improvements is shown in **Exhibit 4-1**. Modifications to the unmitigated proposed model geometry were made to develop the mitigated proposed conditions models for all scenarios. Potential impacts, both positive and negative, to the 100-year WSEL profiles of Buffalo Bayou, White Oak Bayou and Little White Oak Bayou were evaluated using the Mitigated models.

It should be noted that the impacts both positive and negative for this study were limited to the study reach. The effective Buffalo Bayou HEC-RAS model terminates at Turning Basin; therefore, the hydraulic analysis only demonstrates impacts upstream of Turning Basin at Buffalo Bayou. It is recommended that the model be extended downstream of Turning Basin to evaluate further downstream impacts.

4.2 Scenario 1 – North Canal Only

HCFCD initially proposed the North Canal project to reduce the risk of flooding in downtown Houston and to provide flood reduction benefits to the area around Buffalo Bayou and White Oak The North Canal project included a proposed channel connecting White Oak Bayou to Buffalo Bayou near the confluence for both the Bayous. The analysis included the evaluation of potential benefits and impacts to the White Oak Bayou and Buffalo Bayou.

The North Canal scenario involves diverting the high flow from White Oak Bayou immediately downstream of Main Street to Buffalo Bayou just upstream of McKee Street. The proposed North Canal provides an alternate route, to the natural bend along Buffalo Bayou, for the flow to travel between the confluence of the Bayous and McKee Street, as shown on **Exhibit 4-1**. The canal allows high flows to bypass the Buffalo Bayou natural bend in the area and therefore reduces the head loss significantly through the bend.

Three channel cross section scenarios were simulated in the HEC-RAS model for the North Canal, including 4:1 side slope trapezoidal channel, 1:1 side slope trapezoidal channel and stair slope channel. The proposed ROW for the North Canal is assumed to be 220 feet wide. A minimum 30-feet maintenance access is needed on each side of the channel. The top width for

the following canal scenarios is 160 feet. The top width is a function of available ROW and adjacent structures that would be difficult to remove or relocate.

The north canal runs across North San Jacinto Street and Union Pacific Railroad. Bridges are proposed to cross the north canal will be constructed for San Jacinto Street and the railroad. **Exhibit 4-2** also shows the location of the San Jacinto and the railroad bridges. These bridges were included in the HEC-RAS model with no piers. It is recommended that bridge and pier configuration be optimized to minimize hydraulic impacts during final design. The details of the simulated cross sections scenarios are discussed below.

Scenario 1A was a trapezoidal channel with 4:1 side slopes. Due to the ROW and top width constraints, the bottom of the channel was limited to an average elevation of 19 feet. This is considerably higher and a much smaller channel section than those previously analyzed by previous North Canal efforts. For perspective, the White Oak Bayou channel bottom elevation just upstream of the north canal is -6.40 feet and Buffalo Bayou channel bottom just downstream of the north canal is -16.70 feet. This proposed channel option was determined to be too small and did not result in significant benefits and was not considered further.

Scenario 1B was a trapezoidal channel with 1:1 side slopes. The proposed channel had a bottom width of 80 feet and a longitudinal slope of 0.1%. The upstream end bottom elevation is 4.30 feet and the downstream end bottom elevation is 3.28 feet. The Ordinary High-Water Mark (OHWM) elevations were not available for this study. Therefore, it is recommended to obtain OHWMs before finalizing the canal flowline elevations. The flowline elevations should be above the OHWM to avoid NWP requirements.

Scenario 1C was a stair slope cross section with the bottom width of 80 feet and top width of 160 feet. This section is consistent with the recommended section from the most recent HCFCD report, Computational Fluid Dynamics Modeling Summary Report for North Canal Bypass by RPS Klotz Associates dated May 2017. The assumed conceptual typical section is shown in **Figure 4-10**. The upstream end flowline elevation of the north canal channel is 4.50 feet and the downstream end flowline elevation is 3.00 feet. The WSEL impacts are similar between Scenarios 1B and 1C. Scenario 1C produces slightly less reduction in WSEL upstream of the proposed canal. It is recommended that future coordination be performed with stakeholders such as HCFCD and Buffalo Bayou Partnership organization for the adoption of a typical section for the North Canal. Additional considerations discussed but not analyzed in detail due to time constraints include the benefit and value of widening the top width by acquiring additional ROW and removing/replacing impacted structures.

This study has used Scenario 1C stair sloped cross-section for all additional scenarios that include the North canal.

Figure 4-10: Scenario 1C Stair Sloped Cross-Section

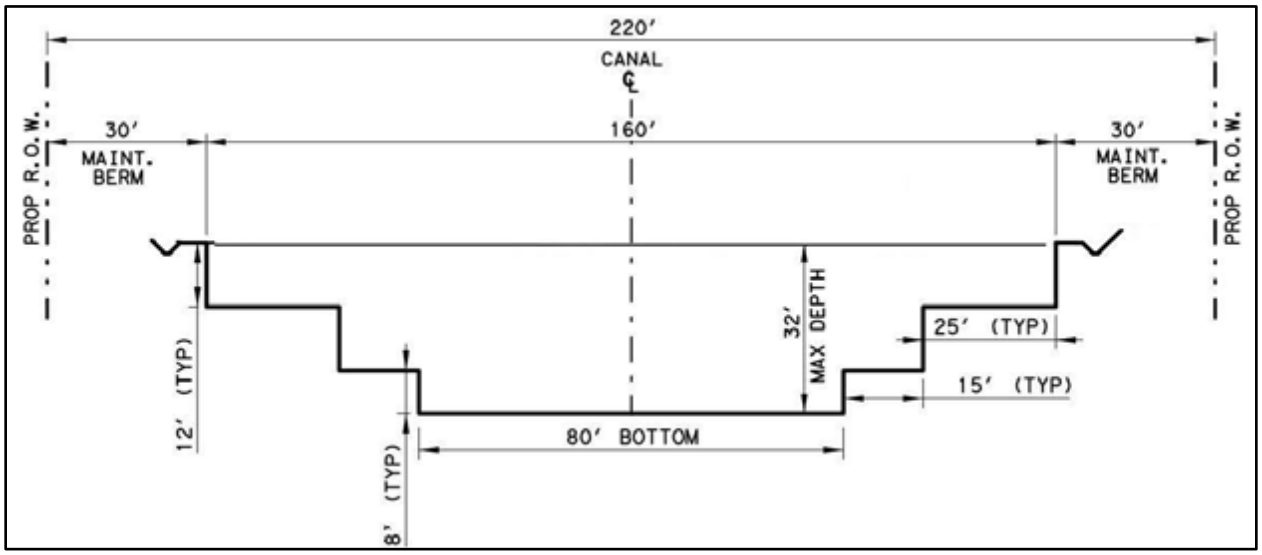


Table 4-3 compares the 100-year WSEL for corrected effective conditions and Scenario 1C. The North Canal could potentially provide a reduction of 2.44 feet to 3.15 feet in the 100-year WSEL in the downtown area between confluence and I-45 crossing Buffalo Bayou. The 100-year WSEL reduction on Buffalo Bayou upstream of I-45 ranges from 1.69 feet to 2.56 feet.

As indicated in **Table 4-3** downstream of McKee street, the north Canal project could result in a potential increase of 0.70 feet to a maximum of 1.04 feet. Mitigation would be required to offset the potential impacts to the water surface elevations downstream of the McKee Street.

Results of **Table 4-3** shows that in White Oak Bayou, the north canal could potentially reduce the 100-year WSEL by up to 3.15 feet in the downtown area just upstream of the Buffalo Bayou confluence. The reduction in the 100-year WSEL in the area around Houston and Taylor Street is approximately 2.35 feet. The proposed North Canal project only produces a minimal reduction of 0.31 to 0.45 feet in the Heights/Yale street area. In Little White Oak Bayou, the north canal project could potentially reduce the 100-year WSEL by approximately 2.65 feet. **Figures 4-11**, **4-12** and **4-13** below show the 100-Year WSEL profile comparison between the Corrected Effective and Scenario 1C Models at Buffalo Bayou, White Oak Bayou and Little White Oak Bayou, respectively. It is recommended that future analysis efforts for the North Canal extend the Little White Oak Bayou model upstream to better capture and quantify the full benefits of the improvements.

The potential challenges with the North Canal recommended to be explored and appropriately addressed as future project efforts include the following:

- Potential utility conflicts – The proposed alignment crosses water and waste water utilities that will need to be relocated. An existing 108-inch sanitary sewer line along San Jacinto Street will also cross the proposed canal. The canal flowlines are proposed above the 108-inch sanitary sewer line to avoid conflict and relocation.

- Channel Armoring – The entrance for the proposed North canal at White Oak Bayou and the exit for the proposed North canal at Buffalo Bayou may experience severe turbulence and may undergo sever erosion in the future. It is advised that proper and adequate channel armoring be proposed at these locations.
- ROW Acquisition – The proposed North canal alignment will cross privately owned land in the Houston downtown. None of the impacted land is owned publicly and ROW acquisition will be needed.
- Environmental considerations – The proposed canal will cross the metro facility and may need environmental assessment for contaminated soils.
- Consideration of potential rainfall changes related to National Oceanic and Atmospheric Administration (NOAA) Atlas 14 revisions to precipitation frequency estimates for project benefits and impacts.
- Soils evaluation and slope stability analysis – Validate proposed cross section meets HCFCD requirements with factor of safety.
- Railroad coordination – The proposed North Canal will cross the existing UPRR railroad. A bridge for the UPRR crossings will need to be proposed and coordinated with the railroad.

Table 4-3: Comparison of Corrected Effective and Scenario 1C Max 100-Year WSEL

Location	RAS-Station	Corrected Effective 100-Year WSEL (ft)	Scenario 1C 100-Year WSEL (ft)	Scenario 1C - Corrected Effective (ft)
BUFFALO BAYOU				
S. PACIFIC RR	148768.4	42.88	41.19	-1.69
FOOTBRIDGE @ WESTCOTT	133760.1	41.44	39.30	-2.14
SHEPHERD	128066.7	40.96	38.67	-2.29
MONTROSE	122572.1	40.53	38.19	-2.34
MEMORIAL	119952.6	40.43	38.06	-2.37
SABINE	116121.9	40.20	37.73	-2.47
RUSK	114168.9	39.83	37.38	-2.45
N. CAPITAL	114070.4	39.76	37.23	-2.53
TEXAS AVE	113374.3	39.68	37.05	-2.63
BAGBY	113238.6	39.43	36.83	-2.60
PRAIRIE	112944.9	39.25	36.63	-2.62
PRESTON	112534.5	39.19	36.53	-2.66
CONGRESS	111953.3	39.08	36.34	-2.74
MILAM	110837.8	38.67	35.72	-2.95
MAIN	110154.2	38.57	35.55	-3.02
WHITE OAK CONFLUENCE	**110103.2**	**38.55**	**35.40**	**-3.15**
FANNIN	109518.7	38.42	35.36	-3.06
SAN JACINTO	109395.2	38.13	35.27	-2.86
MCKEE	106131.1	32.60	33.35	0.75
ELYSIAN	105667.4	31.67	32.39	0.72
U/S US-59 BRIDGE	104948	31.00	31.70	0.70
D/S US-59 BRIDGE	104204	29.86	30.90	1.04
HOUSTON BELT	102847.5	27.43	28.41	0.98
JENSEN	101790.1	25.84	26.81	0.97
LOCKWOOD	92741.1	19.28	20.18	0.90
HOUSTON BELT	86641.7	13.85	14.69	0.84
S. PACIFIC RR	80883.1	6.74	7.57	0.83
WHITE OAK BAYOU				
ELLA	34951.5	56.45	56.43	-0.02
TC JESTER	29297.5	54.39	54.35	-0.04
SHEPHERD	22796.5	51.05	50.94	-0.11
YALE	18138	47.02	46.71	-0.31
S. HEIGHTS	17726	45.50	45.05	-0.45
STUDEMONT	13182.5	41.49	39.46	-2.03
HOUSTON	7608.5	40.74	38.39	-2.35
LITTLE WHITE OAK CONFLUENCE	**6895**	**40.53**	**37.89**	**-2.64**
CROCKETT/HOGAN	4774.5	39.89	37.06	-2.83
MAIN ST	978	39.06	35.61	-3.45
UNION PACIFIC RR	191	38.65	35.41	-3.24
LITTLE WHITE OAK BAYOU				
N. MAIN	4091	40.81	38.23	-2.58
WRIGHTWOOD	1029.5	40.60	38.01	-2.59
QUITMAN/WHITE OAK DR.	538	40.58	37.95	-2.63

* The RAS station presented are the upstream of the bridge.

Figure 4-11: 100-Yr WSEL Profile Comparison Between Corrected Effective and Scenario 1C Models at Buffalo Bayou

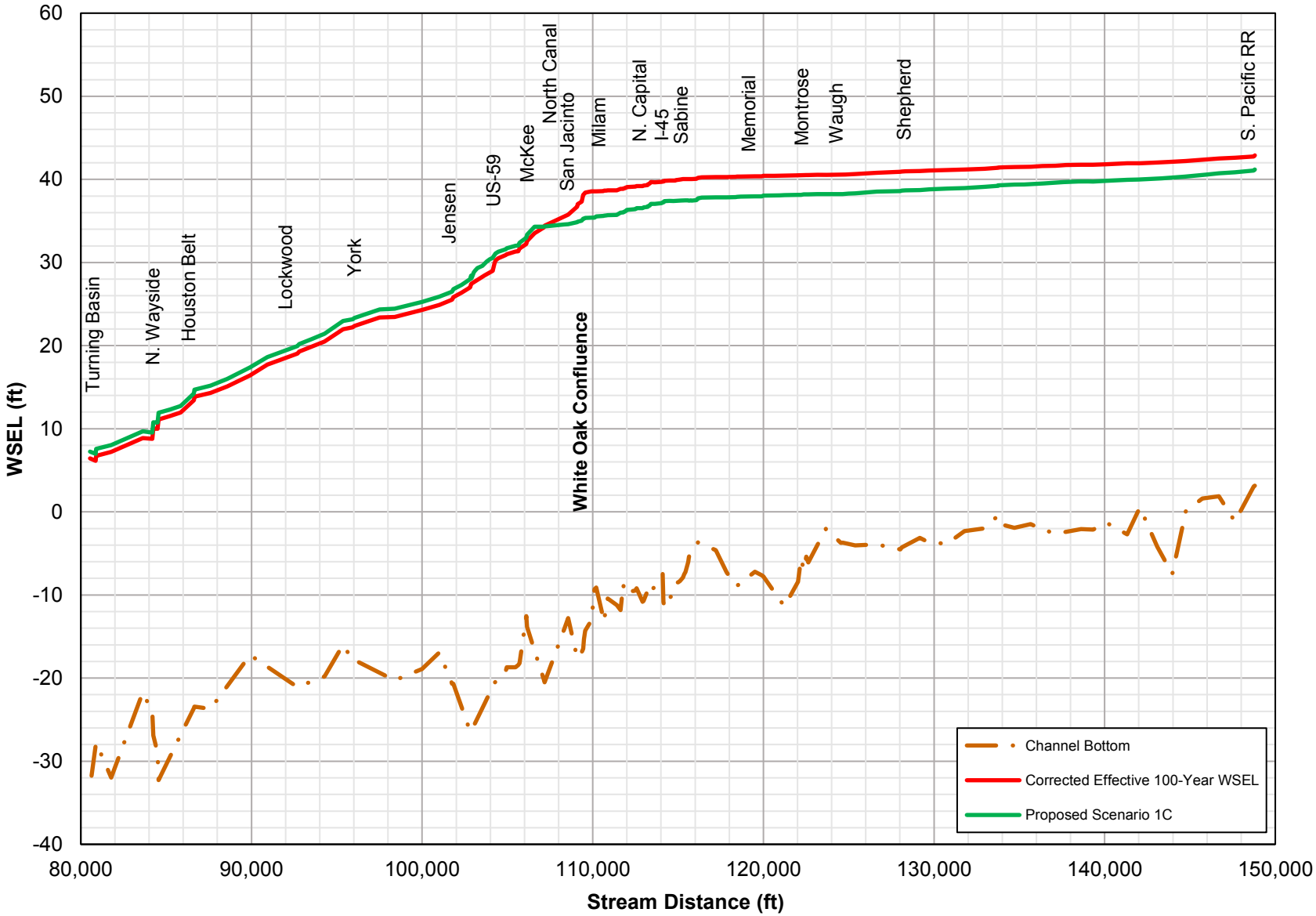


Figure 4-12: 100-Yr WSEL Profile Comparison Between Corrected Effective and Scenario 1C Models at White Oak Bayou

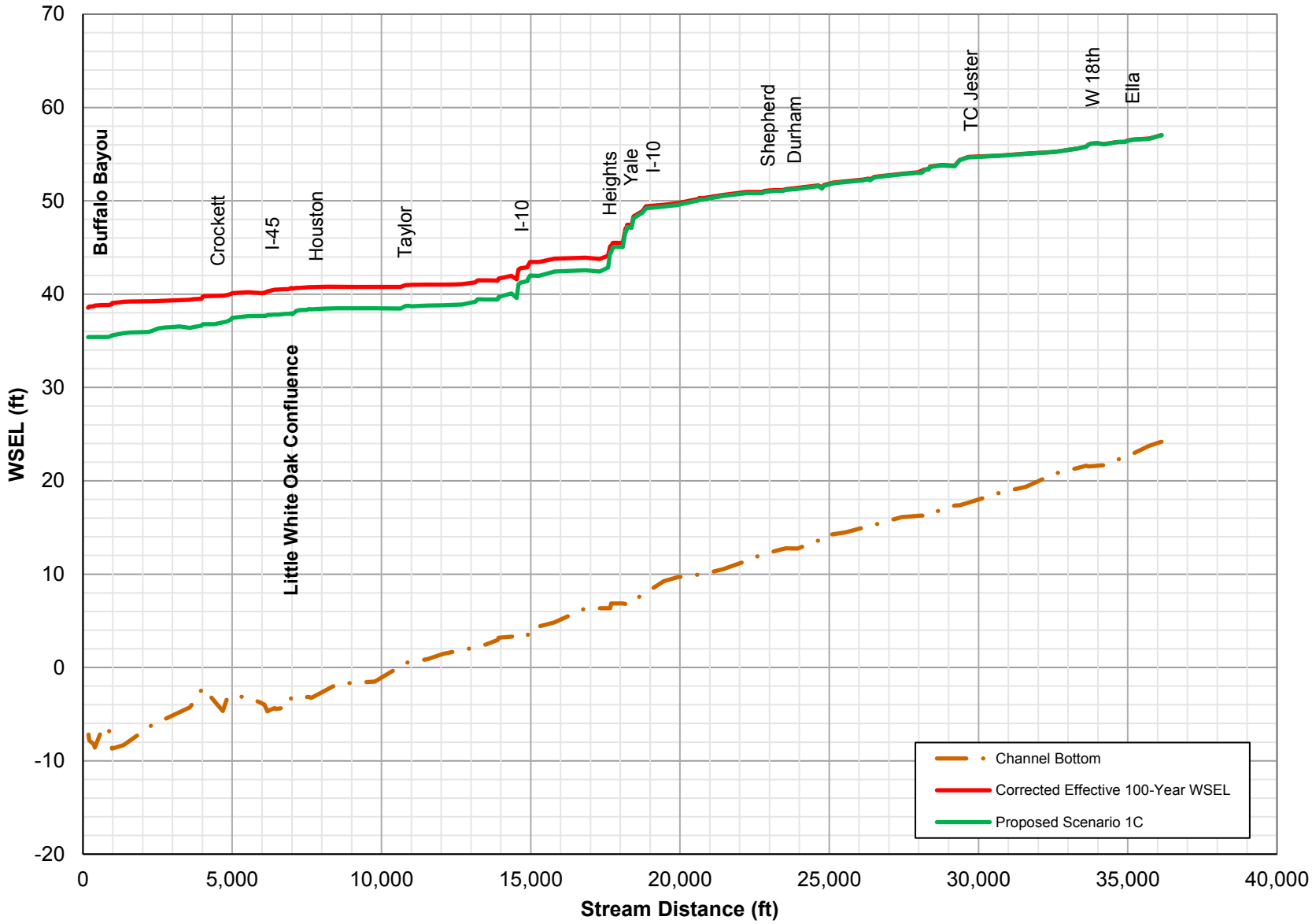
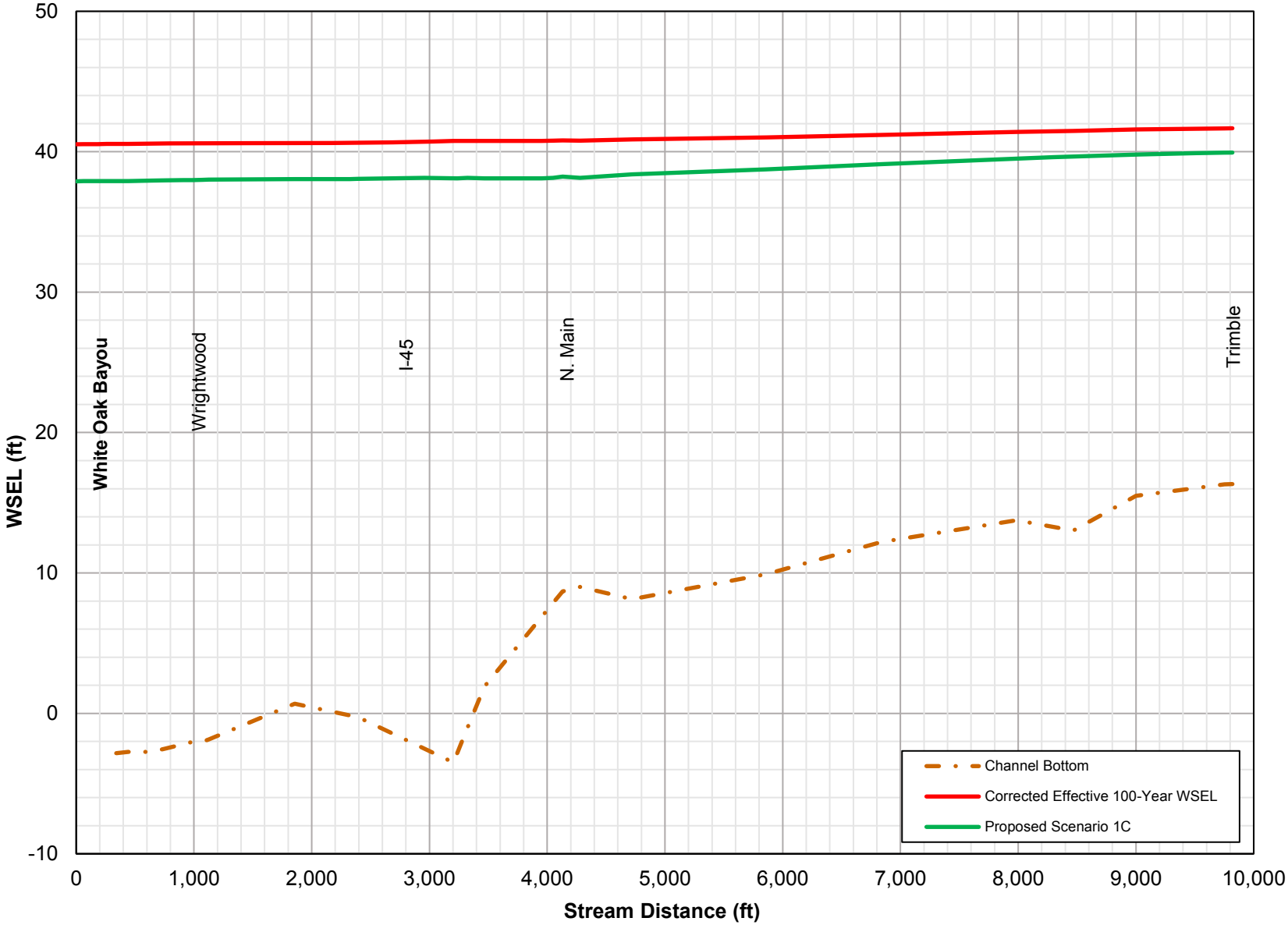


Figure 4-13: 100-Yr WSEL Profile Comparison Between Corrected Effective and Scenario 1C Models at Little White Oak Bayou



4.3 Scenario 2 – North Canal and Heights Blvd Improvements

The area in the vicinity of and upstream of Heights Blvd and Yale Street along White Oak Bayou has experienced severe flooding during heavy storms in recent years. The Proposed North Canal project can potentially provide reductions on the WSEL upstream of the NHHIP project limits. However, the reduction in WSEL is not adequate to address the existing flooding along White Oak Bayou in the Heights area and the I-10 depressed section between Patterson street and Studemont Street. The improvements in the Heights area are not part of the NHHIP project but were studied at the request of TxDOT and City of Houston.

Scenario 2 will analyze the hydraulic impacts related to hydraulic improvements in the vicinity of the Heights Blvd and Yale Street crossings and the proposed North Canal project (discussed in previous **section 4.2**). Several improvements were considered in the White Oak reach between the I-10 crossing upstream of Yale Street and the I-10 crossing downstream of Heights Blvd. The Yale Street bridge has been constructed recently and the Heights Blvd bridges are relatively new. The Heights Blvd and Yale street bridges tie to the I-10 east frontage road just north of the bridges. Only minor modifications can be made to the roadway profile. Therefore, no recommendations have been made to the existing bridge and roadway.

The proposed modifications in this area include removal of the remnant bridge structure of the abandoned Union Pacific Railroad bridge (UPRR) just upstream of the Yale street. This abandoned railroad bridge acts as an obstruction to the flow. Furthermore, it is proposed to widen the channel using a 1:1 side slopes. The limits of the channel widening are from upstream of Yale street bridge to the downstream of Heights Blvd Bridges and channel widening is also proposed underneath I-10 mainlanes and frontage road downstream of Heights Blvd. The above modifications are reflected in the HEC-RAS model from station 14532 to 14977 and 17597 to 18234. The improvements may extend below the OHWM and may require addressing environmental permitting. These channel improvements increase the hydraulic bridge opening, enhance conveyance capacity and reduce the head loss across the bridges. **Exhibit 4-3** shows the proposed channel improvements and UPRR bridge removal.

For this study, the review of the above described conveyance improvements was limited to the hydraulic effectiveness. A thorough review of the constructability of this project component is recommended prior to full adoption. Additional improvement scenarios may provide similar or better benefit and are recommended to be analyzed in detail to determine the optimal configuration.

In this Scenario, the proposed improvements in the Heights Blvd area were combined with the proposed north canal with stair slope channel. The geometry of the proposed north canal is same as that in Scenario 1C, including 80 feet bottom width and 160 feet top width. The model geometry of the proposed Scenario 2 model is built on the model geometry of Scenario 1.

Table 4-4 compares the 100-year WSEL for corrected effective conditions and Scenario 2. The North Canal and Height Blvd Improvements produces slightly different results compared to Scenario 1 for the Buffalo Bayou in downtown area and upstream of downtown. The area downstream of Mckee Street, the North Canal project and Height Blvd Improvements could result

in a potential increase of 0.88 feet to a maximum of 1.23 feet. Mitigation would be required to offset potential impacts to the water surface elevations downstream of the McKee Street.

The Heights Blvd improvements extends the benefits of the North canal upstream of the Heights Blvd and Yale Street crossings for White Oak Bayou. The maximum reduction of the 100-year WSEL in White Oak Bayou, at STA. 18377 located upstream of the UPRR and Yale Street, is approximately 3.83 feet. **Figures 4-14**, **4-15** and **4-16** below show the 100-Year WSEL profile comparison between the Corrected Effective and Scenario 2 Models at Buffalo Bayou, White Oak Bayou and Little White Oak Bayou, respectively.

Table 4-4: Comparison of Corrected Effective and Scenario 2 Max 100-Year WSEL

Location	RAS-Station	Corrected Effective 100-Year WSEL (ft)	Scenario 2 100-Year WSEL (ft)	Scenario 2 - Corrected Effective (ft)
BUFFALO BAYOU				
S. PACIFIC RR	148768.4	42.88	41.30	-1.58
FOOTBRIDGE @ WESTCOTT	133760.1	41.44	39.42	-2.02
SHEPHERD	128066.7	40.96	38.80	-2.16
MONTROSE	122572.1	40.53	38.33	-2.20
MEMORIAL	119952.6	40.43	38.20	-2.23
SABINE	116121.9	40.20	37.88	-2.32
RUSK	114168.9	39.83	37.53	-2.30
N. CAPITAL	114070.4	39.76	37.39	-2.37
TEXAS AVE	113374.3	39.68	37.22	-2.46
BAGBY	113238.6	39.43	36.98	-2.45
PRAIRIE	112944.9	39.25	36.78	-2.47
PRESTON	112534.5	39.19	36.69	-2.50
CONGRESS	111953.3	39.08	36.51	-2.57
MILAM	110837.8	38.67	35.89	-2.78
MAIN	110154.2	38.57	35.73	-2.84
WHITE OAK CONFLUENCE	**110103.2**	**38.55**	**35.61**	**-2.94**
FANNIN	109518.7	38.42	35.57	-2.85
SAN JACINTO	109395.2	38.13	35.47	-2.66
MCKEE	106131.1	32.60	33.55	0.95
ELYSIAN	105667.4	31.67	32.59	0.92
U/S US-59 BRIDGE	104948	31.00	31.89	0.89
D/S US-59 BRIDGE	104204	29.86	31.09	1.23
HOUSTON BELT	102847.5	27.43	28.60	1.17
JENSEN	101790.1	25.84	27.00	1.16
LOCKWOOD	92741.1	19.28	20.35	1.07
HOUSTON BELT	86641.7	13.85	14.86	1.01
S. PACIFIC RR	80883.1	6.74	7.72	0.98
WHITE OAK BAYOU				
ELLA	34951.5	56.45	55.87	-0.58
TC JESTER	29297.5	54.39	53.06	-1.33
SHEPHERD	22796.5	51.05	49.20	-1.85
YALE	18138	47.02	43.92	-3.10
S. HEIGHTS	17726	45.50	43.33	-2.17
STUDEMONT	13182.5	41.49	39.64	-1.85
HOUSTON	7608.5	40.74	38.58	-2.16
LITTLE WHITE OAK CONFLUENCE	**6895**	**40.53**	**38.09**	**-2.44**
CROCKETT/HOGAN	4774.5	39.89	37.26	-2.63
MAIN ST ACCESS RD	978	39.06	35.82	-3.24
UNION PACIFIC RR	191	38.65	35.61	-3.04
LITTLE WHITE OAK BAYOU				
N. MAIN	4091	40.81	38.42	-2.39
WRIGHTWOOD	1029.5	40.60	38.20	-2.40
QUITMAN/WHITE OAK DR.	538	40.58	38.15	-2.43

* The RAS station presented are the upstream of the bridge.

Figure 4-14: 100-Yr WSEL Profile Comparison Between Corrected Effective and Scenario 2 Models at Buffalo Bayou

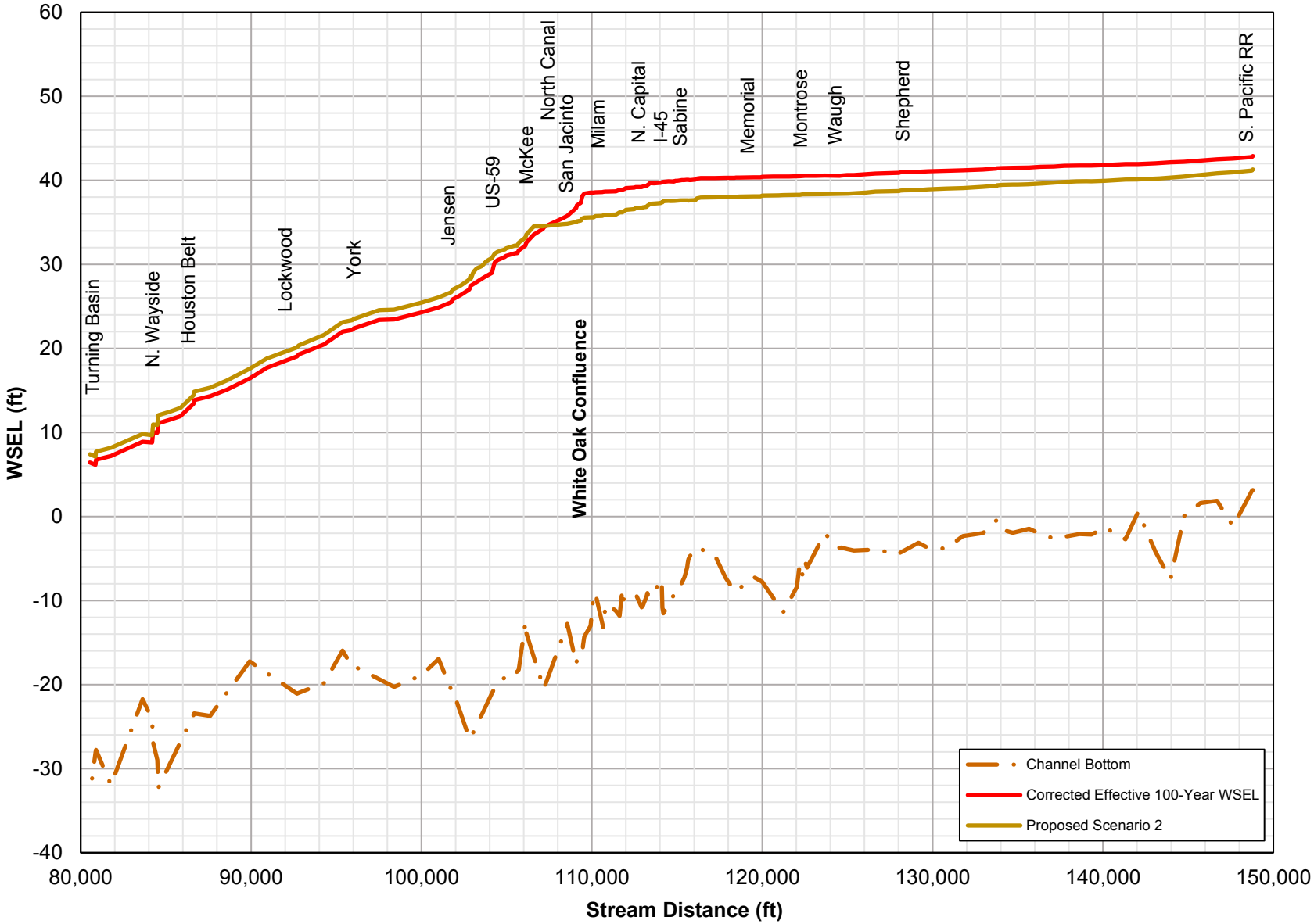


Figure 4-15: 100-Yr WSEL Profile Comparison Between Corrected Effective and Scenario 2 Models at White Oak Bayou

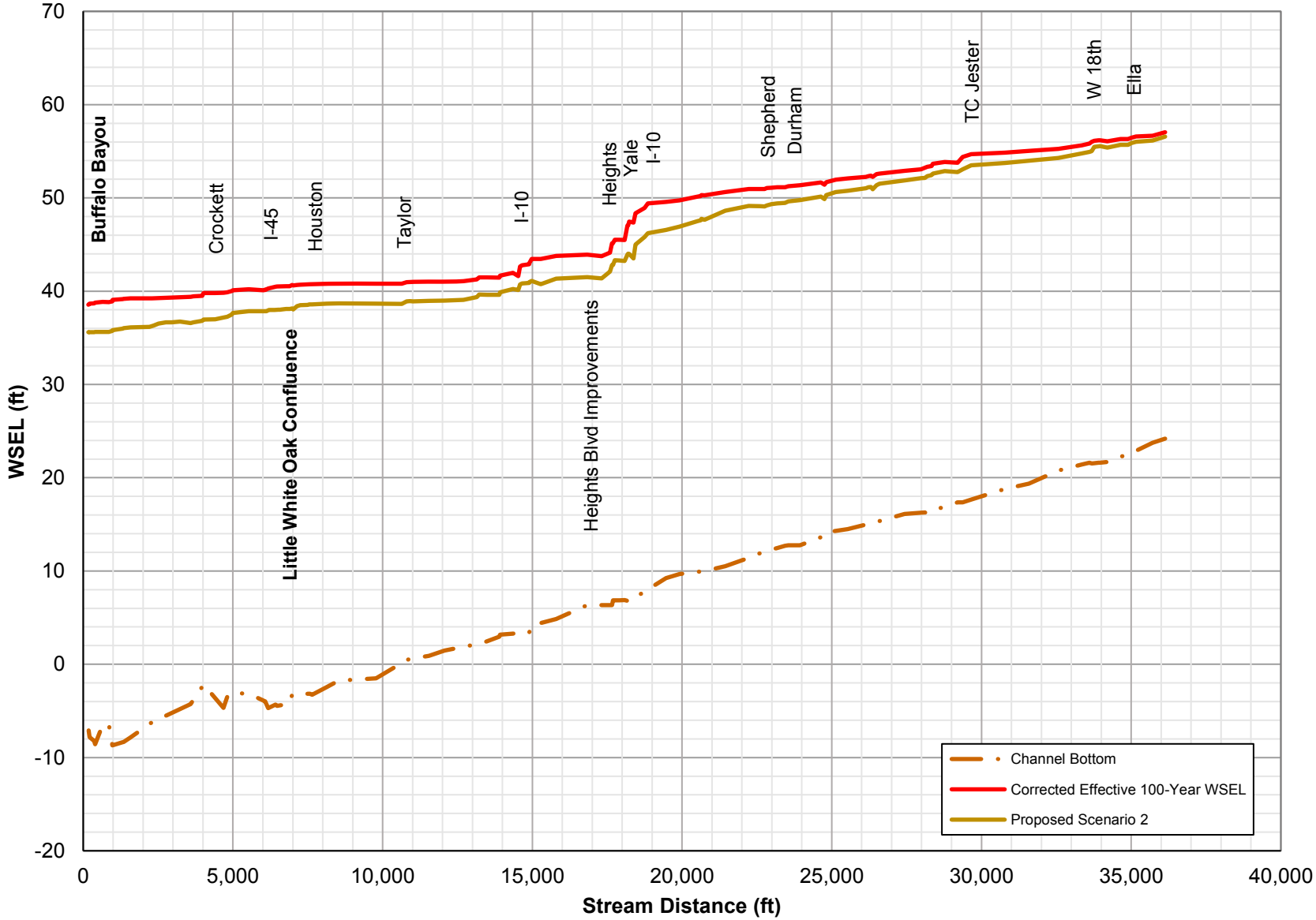
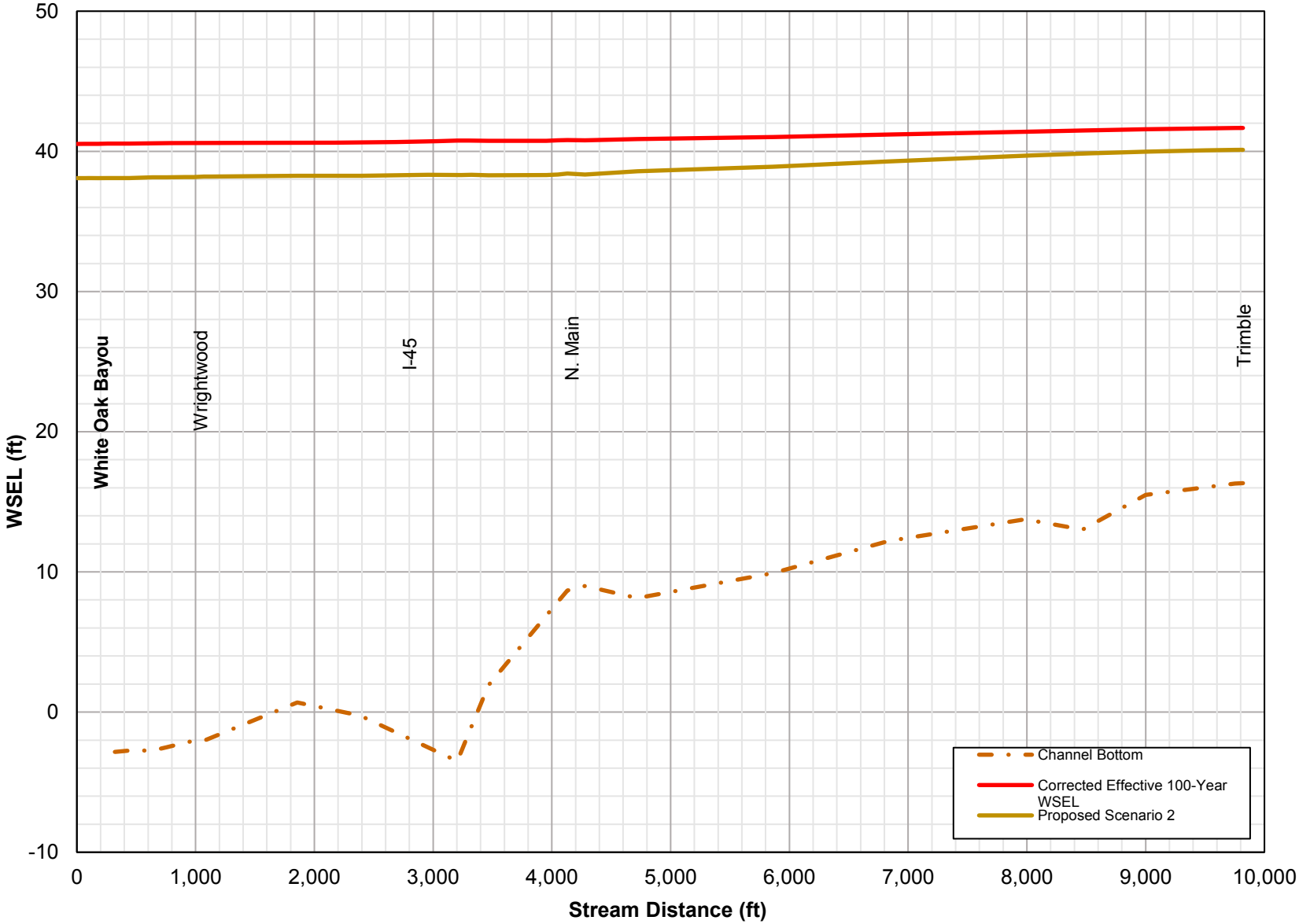


Figure 4-16: 100-Yr WSEL Profile Comparison Between Corrected Effective and Scenario 2 Models at Little White Oak Bayou



4.4 Scenario 3 – North Canal, South Canal, Heights Blvd Improvements and Mitigation Options

Scenario 3 includes the addition of a potential South Canal, a second bypass channel, to the Scenario 2 model geometry. South Canal bypasses the flow from the Buffalo Bayou channel just downstream of Elysian Street and is connected back to Buffalo Bayou upstream of the UPRR bridge, see **Exhibit 4-1**. The concept of the South Canal is similar to the North Canal concept which was intended to bypass the flows from the Buffalo Bayou channel meander (see **Exhibits 4-4a and 4-4b**).

The proposed canal consists of a trapezoidal channel with 4:1 side slope and 80 feet bottom width. Top width varies based on the ground surface elevation profile along the canal. The longitudinal slope is 0.1%. The bottom elevation is 3.25 feet at the upstream end and 2.00 feet at the downstream end. The Buffalo Bayou flowline elevation just upstream of the south canal is -18.43 feet and just downstream of the south canal is -26.39 feet. The south canal is proposed much higher than the Buffalo Bayou flowline elevations allowing low flow to run through the original Buffalo Bayou. It is recommended to obtain the OHWM elevations before the final design for setting the flowline elevations.

Table 4-5 compares the 100-year WSEL for corrected effective conditions and Scenario 3. The combined improvements yield 3.55 feet to 4.50 feet reduction in the 100-year WSEL in Buffalo Bayou downstream of the Fannin bridge to Station 109103. This is an additional 1.65 to 1.76 feet reduction in the 100-year WSEL compared to Scenario 2.

This scenario could potentially provide a reduction of 3.05 feet to 3.97 feet in the 100-year WSEL in the downtown area between confluence and I-45 crossing Buffalo Bayou. The 100-year WSEL reduction on Buffalo Bayou upstream of I-45 ranges from 2.06 feet to 3.17 feet. The downstream of I-69/US-59, this scenario could result in a potential increase of up to 1.45 feet in the 100-year WSEL. The proposed south canal eliminates the increases in WSEL between downstream of McKee Street and I-69/US-59 caused due to the proposed North canal. The proposed North Canal as discussed in Scenario 1 & 2 will potentially cause increase in the WSELs at McKee street and Elysian Street. Mitigation would be required to offset the potential impacts to the water surface elevations downstream of I-69/US-59.

In White Oak Bayou, the combined improvements could potentially reduce the 100-year WSEL by up to 4.26 feet in the downtown area just upstream of the Buffalo Bayou confluence. The reduction in the 100-year WSEL in the area around Houston and Taylor Street is approximately 2.70 feet. The maximum reduction of the 100-year WSEL in White Oak Bayou at the UPRR upstream of Yale Street is approximately 3.69 feet. In Little White Oak Bayou, the combined project could potentially reduce the 100-year WSEL by approximately 1.75 to 3.08 feet. **Figures 4-17**, **4-18** and **4-19** below show the 100-Year WSEL profile comparison between the Corrected Effective and Scenario 3 Models at Buffalo Bayou, White Oak Bayou and Little White Oak Bayou, respectively.

Improvement Scenarios 1 through 3 above all result in an increase in flow rate and water surface elevation downstream of the project limits. Analysis was performed in HEC-RAS to determine the

amount of storage needed to mitigate the impacts downstream. The addition of 4300 ac-ft capacity detention ponds will provide the required mitigation for the 100-year WSEL increase downstream of the proposed I-69/US-59 bridges in Buffalo Bayou. The pond capacity of approximately 4300 ac-ft would be needed to fully mitigate the proposed impacts due to the proposed North Canal, South Canal and Height Blvd area improvements. Given the approximate depth of the channel near the needed detention, this volume translates to approximately 250 acres in land, which can potentially be obtained as a contiguous basin or as multiple basins. Such basins must have frontage to Buffalo Bayou to allow for an offline weir configuration. The acquisition of this land will involve significant property owner and environmental coordination and will need to be assessed.

In-lieu of mitigating for the potential downstream impacts, an alternative to consider as part of future analysis/design phases is the potential to allow for the safe and secure increase in WSEL downstream of the project. Buy-outs, floodproofing and purchase of flood easement shall be considered in lieu of structural measures. Buffalo Bayou appears to have available freeboard for much of the reach downstream of I-69/US-59 to the turning basin. Therefore, an increase in WSEL downstream of I-69/US-59 till turning basin may have minimal impacts on the floodplain. Potential issues to be addressed with this approach include:

1. Potential impacts to existing structures within the floodplain. At least 1 structure is believed to be further impacted by an increase in WSEL associated with Scenario 3. Based on the initial research the HCAD account number of the building is 0371780000071 and building is classified as commercial (building shown on **Exhibit 4-8e**).
2. Preliminary analysis indicates that there are no structures added to the floodplain under Scenario 3.
3. Loss of productive use of land added to the floodplain. Approximately 11 acres of new floodplain are created with Scenario 3.
4. Potential impacts to the use of land added to the floodplain for existing business.
5. Obtaining a drainage easement downstream of I-69/US-59 for several parcels impacted due to the increase in WSEL.
6. Compliance with 44 CFR 65.12 and variance from City of Houston Stormwater Ordinance.

Table 4-5: Comparison of Corrected Effective and Scenario 3 Max 100-Year WSEL

Location	RAS-Station	Corrected Effective 100-Year WSEL (ft)	Scenario 3 100-Year WSEL (ft)	Scenario 3 - Corrected Effective (ft)
BUFFALO BAYOU				
S. PACIFIC RR	148768.4	42.88	40.82	-2.06
FOOTBRIDGE @ WESTCOTT	133760.1	41.44	38.79	-2.65
SHEPHERD	128066.7	40.96	38.11	-2.85
MONTROSE	122572.1	40.53	37.61	-2.92
MEMORIAL	119952.6	40.43	37.46	-2.97
SABINE	116121.9	40.20	37.12	-3.08
RUSK	114168.9	39.83	36.77	-3.06
N. CAPITAL	114070.4	39.76	36.58	-3.18
TEXAS AVE	113374.3	39.68	36.37	-3.31
BAGBY	113238.6	39.43	36.17	-3.26
PRAIRIE	112944.9	39.25	35.97	-3.28
PRESTON	112534.5	39.19	35.87	-3.32
CONGRESS	111953.3	39.08	35.66	-3.42
MILAM	110837.8	38.67	34.98	-3.69
MAIN	110154.2	38.57	34.79	-3.78
WHITE OAK CONFLUENCE	**110103.2**	**38.55**	**34.58**	**-3.97**
FANNIN	109518.7	38.42	34.55	-3.87
SAN JACINTO	109395.2	38.13	33.71	-4.42
MCKEE	106131.1	32.60	31.87	-0.73
ELYSIAN	105667.4	31.67	30.72	-0.95
U/S US-59 BRIDGE	104948	31.00	30.26	-0.74
D/S US-59 BRIDGE	104204	29.86	30.14	0.28
HOUSTON BELT	102847.5	27.43	28.88	1.45
JENSEN	101790.1	25.84	27.27	1.43
LOCKWOOD	92741.1	19.28	20.60	1.32
HOUSTON BELT	86641.7	13.85	15.09	1.24
S. PACIFIC RR	80883.1	6.74	7.94	1.20
WHITE OAK BAYOU				
ELLA	34951.5	56.45	55.88	-0.57
TC JESTER	29297.5	54.39	53.02	-1.37
SHEPHERD	22796.5	51.05	49.09	-1.96
YALE	18138	47.02	43.68	-3.34
S. HEIGHTS	17726	45.50	43.08	-2.42
STUDEMONT	13182.5	41.49	39.17	-2.32
HOUSTON	7608.5	40.74	38.00	-2.74
LITTLE WHITE OAK CONFLUENCE	**6895**	**40.53**	**37.46**	**-3.07**
CROCKETT/HOGAN	4774.5	39.89	36.53	-3.36
MAIN ST	978	39.06	34.81	-4.25
UNION PACIFIC RR	191	38.65	34.58	-4.07
LITTLE WHITE OAK BAYOU				
N. MAIN	4091	40.81	37.86	-2.95
WRIGHTWOOD	1029.5	40.60	37.60	-3.00
QUITMAN/WHITE OAK DR.	538	40.58	37.54	-3.04

* The RAS station presented are the upstream of the bridge.

Figure 4-17: 100-Yr WSEL Profile Comparison Between Corrected Effective and Scenario 3 Models at Buffalo Bayou

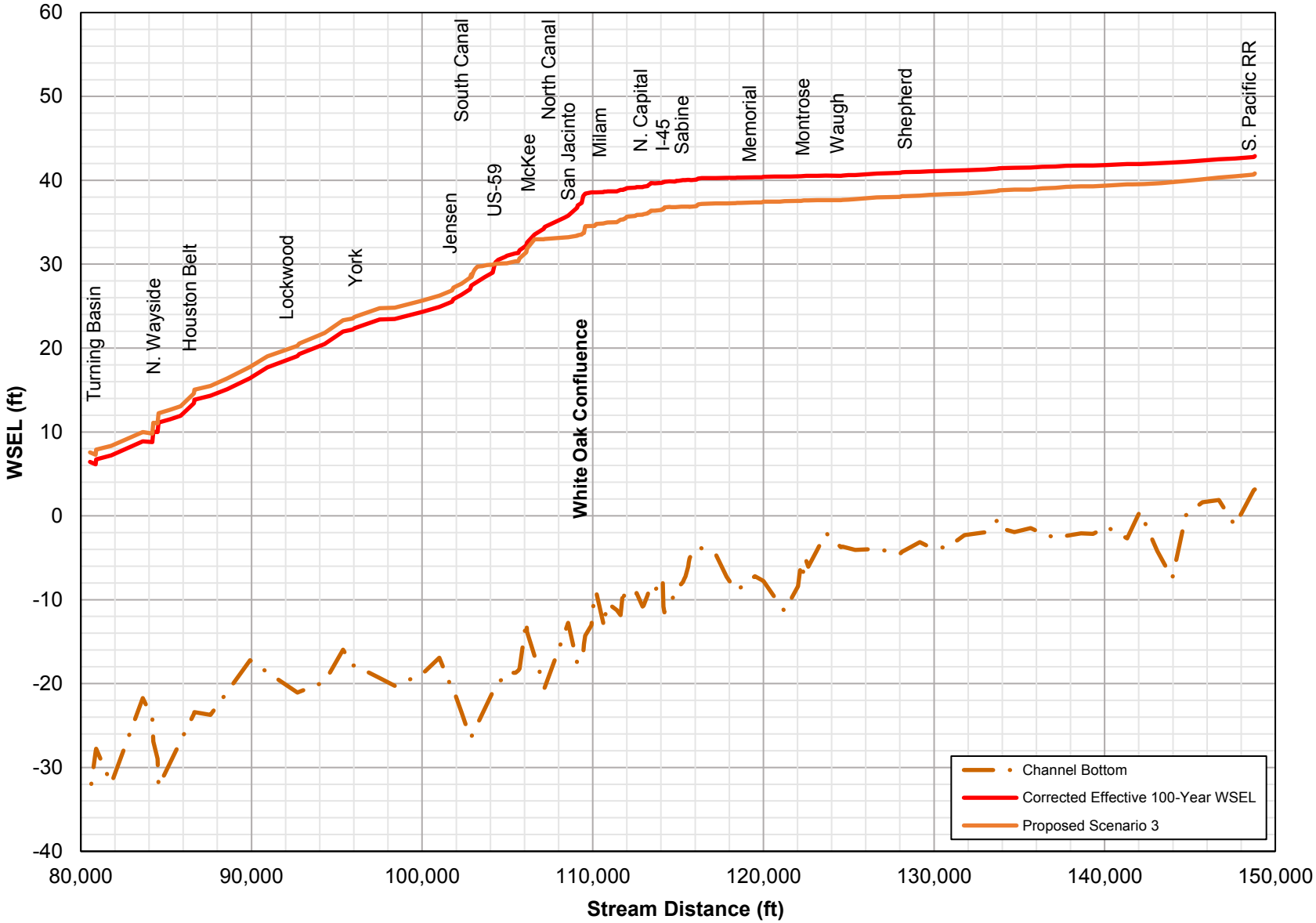


Figure 4-18: 100-Yr WSEL Profile Comparison Between Corrected Effective and Scenario 3 Models at White Oak Bayou

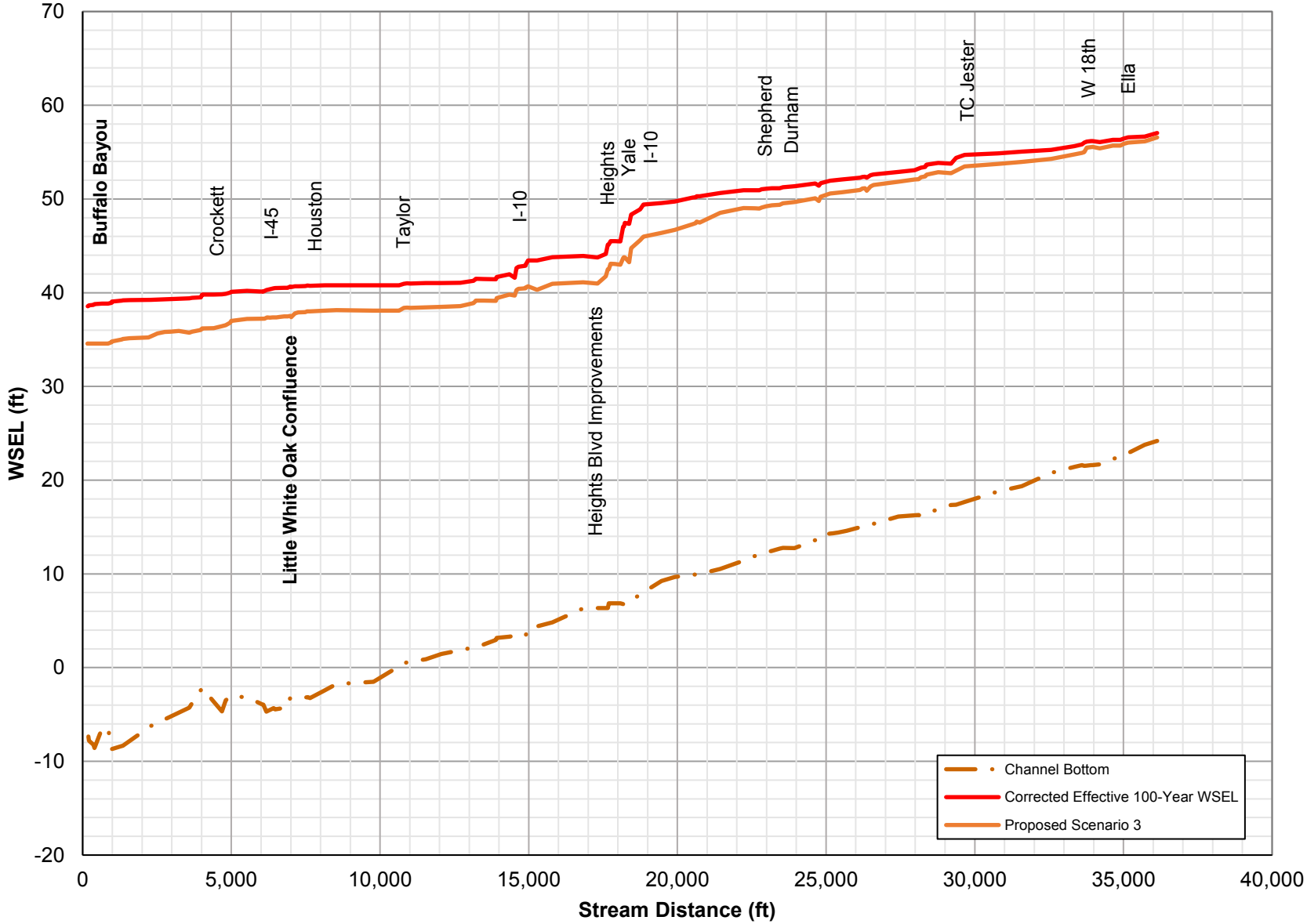
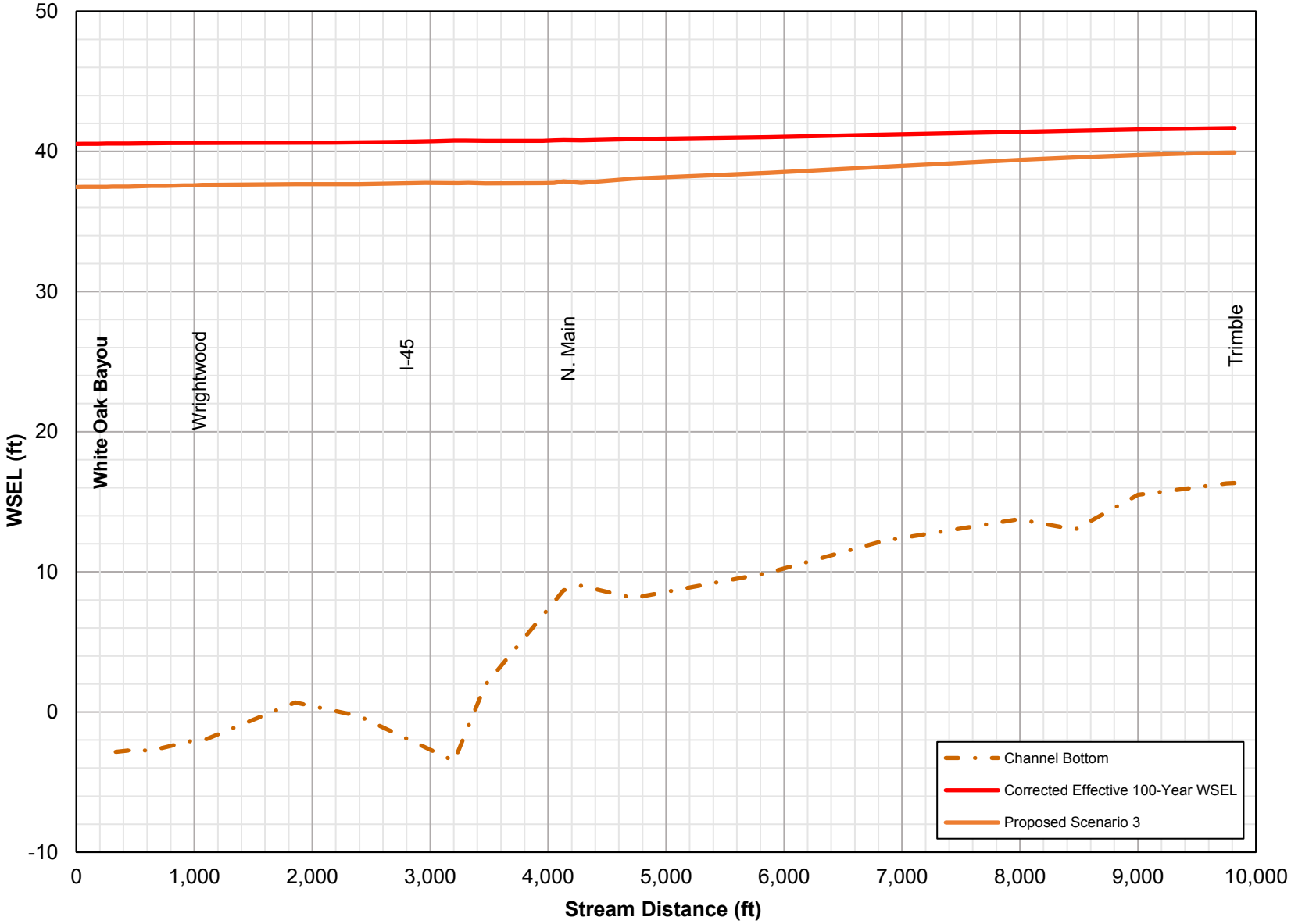


Figure 4-19: 100-Yr WSEL Profile Comparison Between Corrected Effective and Scenario 3 Models at Little White Oak Bayou



4.5 Scenario 4 –Detention Pond Only

Scenario 4 includes the construction of the detention Pond A, as shown on **Exhibit 4-5**. The grading and cross-sections of Pond A are shown on **Exhibit 6-5**. The Scenarios 1-3 improvements lead to additional impacts downstream that cannot be mitigated with the detention pond layout proposed in Scenario 4. This scenario was designed to fully mitigate the impacts of NHHIP project both upstream and downstream of the project limits. The NHHIP project results in impacts to both White Oak and Buffalo Bayous. This scenario will offset the WSEL increases in White Oak Bayou due to the placement of the fill and columns in the 100-year floodplain and to mitigate for the increases in the WSEL downstream of I-69/US-59. The detention pond was modeled as a storage area in unsteady HEC-RAS model for impact mitigation.

In this scenario, a 200 ac-ft detention facility adjacent to I-69/US-59 bridges, is needed for impact mitigation. **Table 4-6** shows the comparison in the 100-year WSEL between Scenario 4 and the Corrected Effective model. The HEC-RAS model results show that the benefits from the Scenario 4 in terms of the 100-tyear WSEL reduction is not as significant compared to Scenarios 1 to 3. However, the Scenario 4 provided up to 0.39 feet in the 100-year WSEL reduction in White Oak and Little White Oak Bayou and up to 0.34 feet reduction in Buffalo Bayou. Furthermore, this scenario could potentially eliminate the increase in the 100-year WSEL in the Buffalo Bayou reach downstream of I-69/US-59 and thus will mitigate the impacts of the propose roadway modifications related to the NHHIP project. **Figures 4-20**, **4-21** and **4-22** below show the 100-Year WSEL profile comparison between the Corrected Effective and Scenario 4 Models at Buffalo Bayou, White Oak Bayou and Little White Oak Bayou, respectively. **Exhibit 4-5** shows the proposed detention pond locations.

The Pond A will provide a total storage volume of 450 ac-ft**.** The 200 ac-ft of pond volume will be required for the flow mitigation as discussed above. The remaining volume from this pond will mitigate the roadway and floodplain fill impacts from Segment 3B and 3C. (refer to drainage impact analysis reports for Segment 3B and 3C). Coordination was performed with Segment 3B & 3C designers and the summary of the required mitigation volumes is provided in **Exhibit 4-5.**

Table 4-7 provides a master comparison table comparing the Effective, Corrected Effective, Unmitigated Proposed, and all the Scenarios.

Table 4-6: Comparison of Corrected Effective and Scenario 4 Max 100-Year WSEL

Location	RAS-Station	Corrected Effective 100-Year WSEL (ft)	Scenario 4 100-Year WSEL (ft)	Scenario 4 - Corrected Effective (ft)
BUFFALO BAYOU				
S. PACIFIC RR	148768.4	42.88	42.74	-0.14
FOOTBRIDGE @ WESTCOTT	133760.1	41.44	41.27	-0.17
SHEPHERD	128066.7	40.96	40.78	-0.18
MONTROSE	122572.1	40.53	40.34	-0.19
MEMORIAL	119952.6	40.43	40.24	-0.19
SABINE	116121.9	40.20	40.00	-0.20
RUSK	114168.9	39.83	39.73	-0.10
N. CAPITAL	114070.4	39.76	39.66	-0.10
TEXAS AVE	113374.3	39.68	39.58	-0.10
BAGBY	113238.6	39.43	39.32	-0.11
PRAIRIE	112944.9	39.25	39.14	-0.11
PRESTON	112534.5	39.19	39.08	-0.11
CONGRESS	111953.3	39.08	38.96	-0.12
MILAM	110837.8	38.67	38.54	-0.13
MAIN	110154.2	38.57	38.43	-0.14
WHITE OAK CONFLUENCE	**110103.2**	**38.55**	**38.42**	**-0.13**
FANNIN	109518.7	38.42	38.28	-0.14
SAN JACINTO	109395.2	38.13	38.00	-0.13
MCKEE	106131.1	32.60	32.30	-0.30
ELYSIAN	105667.4	31.67	31.34	-0.33
U/S US-59 BRIDGE	104948	31.00	30.66	-0.34
D/S US-59 BRIDGE	104204	29.86	29.84	-0.02
HOUSTON BELT	102847.5	27.43	27.38	-0.05
JENSEN	101790.1	25.84	25.79	-0.05
LOCKWOOD	92741.1	19.28	19.24	-0.04
HOUSTON BELT	86641.7	13.85	13.81	-0.04
S. PACIFIC RR	80883.1	6.74	6.69	-0.05
WHITE OAK BAYOU				
ELLA	34951.5	56.45	56.46	0.01
TC JESTER	29297.5	54.39	54.40	0.01
SHEPHERD	22796.5	51.05	51.05	0.00
YALE	18138	47.02	47.01	-0.01
S. HEIGHTS	17726	45.50	45.49	-0.01
STUDEMONT	13182.5	41.49	41.41	-0.08
HOUSTON	7608.5	40.74	40.64	-0.10
LITTLE WHITE OAK CONFLUENCE	**6895**	**40.53**	**40.30**	**-0.23**
CROCKETT/HOGAN	4774.5	39.89	39.75	-0.14
MAIN ST	978	39.06	38.92	-0.14
UNION PACIFIC RR	191	38.65	38.52	-0.13
LITTLE WHITE OAK BAYOU				
N. MAIN	4091	40.81	40.47	-0.34
WRIGHTWOOD	1029.5	40.60	40.37	-0.23
QUITMAN/WHITE OAK DR.	538	40.58	40.34	-0.24

* The RAS station presented are the upstream of the bridge.

Figure 4-20: 100-Yr WSEL Profile Comparison Between Corrected Effective and Scenario 4 Models at Buffalo Bayou

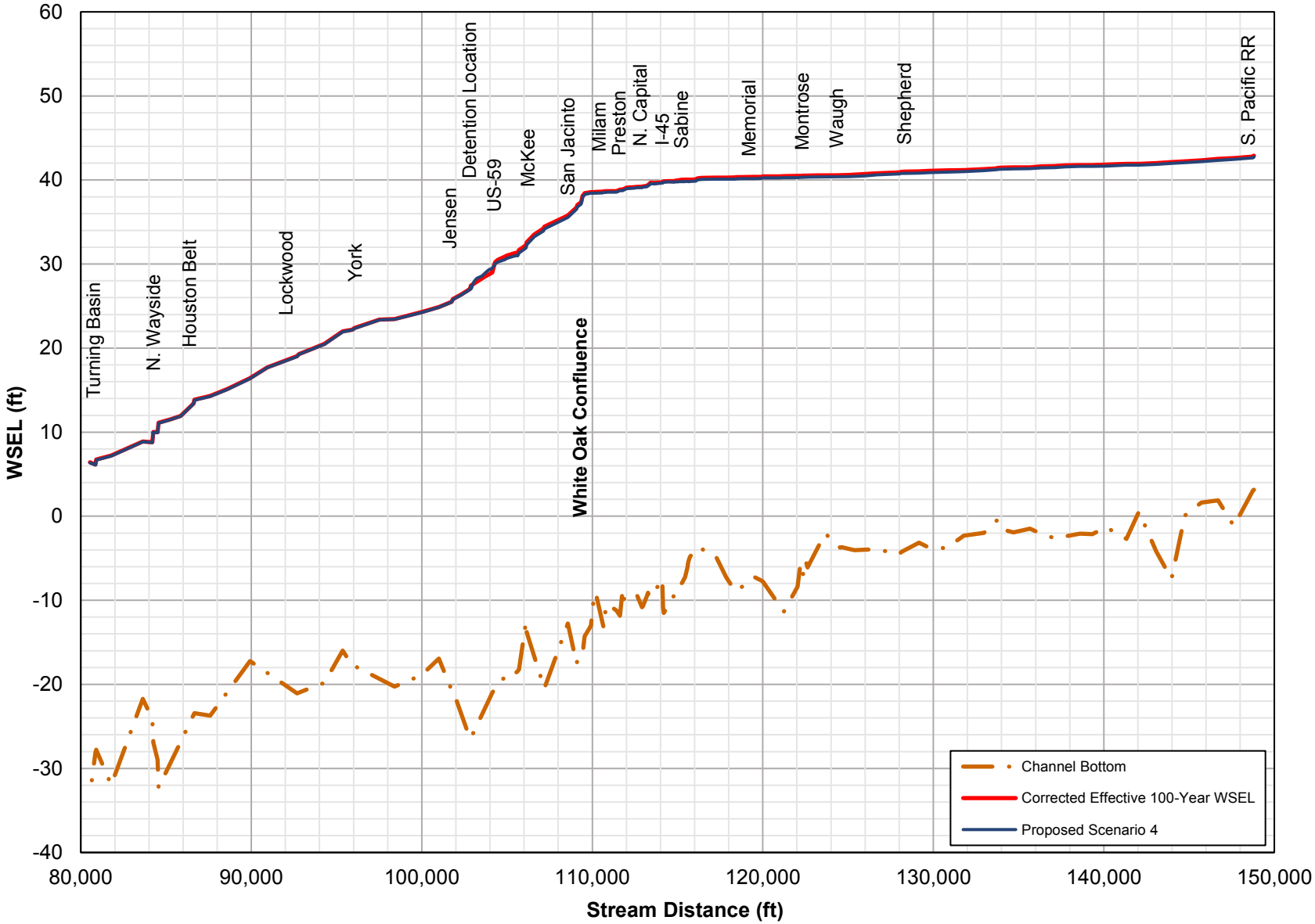


Figure 4-21: 100-Yr WSEL Profile Comparison Between Corrected Effective and Scenario 4 Models at White Oak Bayou

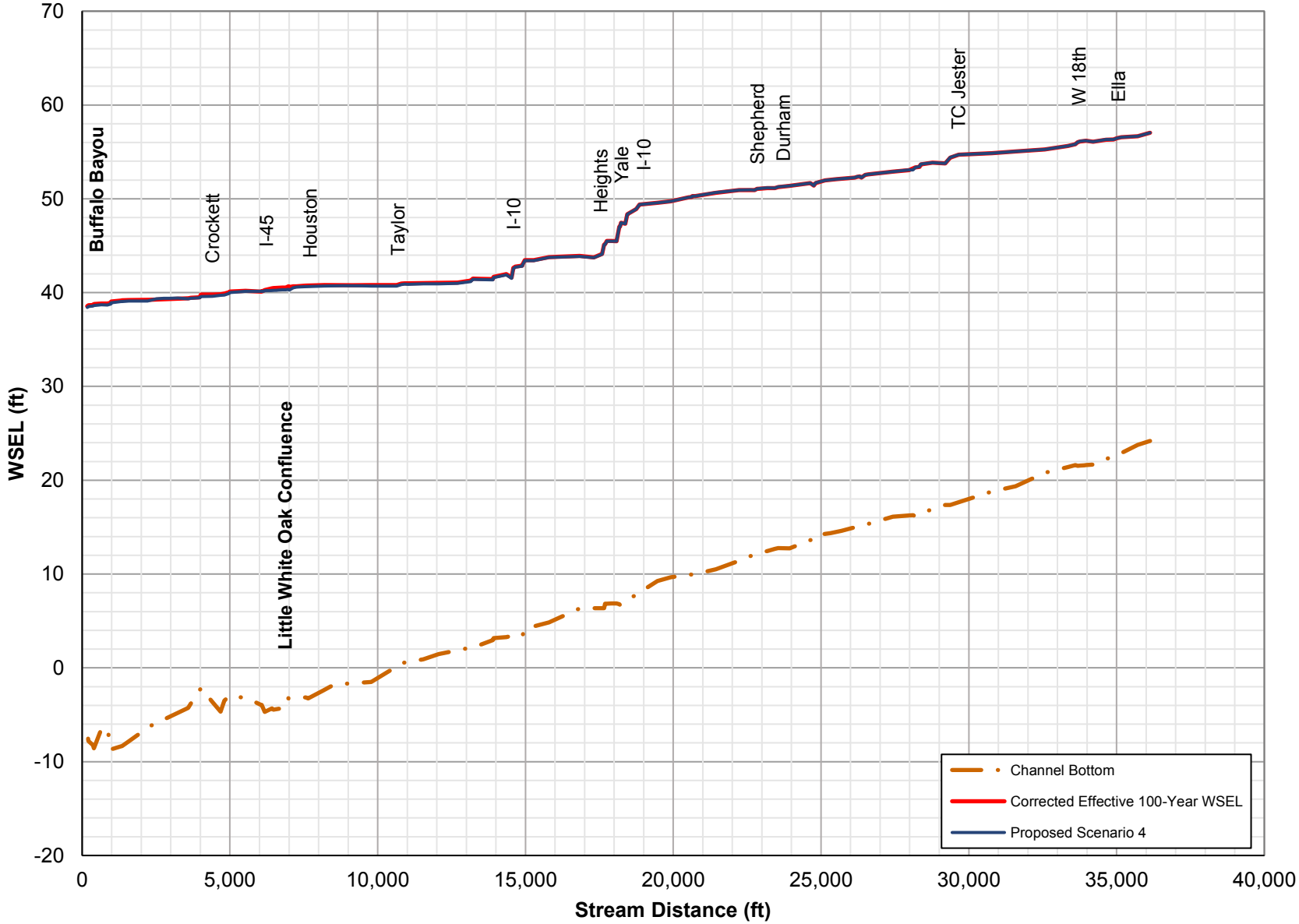


Figure 4-22: 100-Yr WSEL Profile Comparison Between Corrected Effective and Scenario 4 Models at Little White Oak Bayou

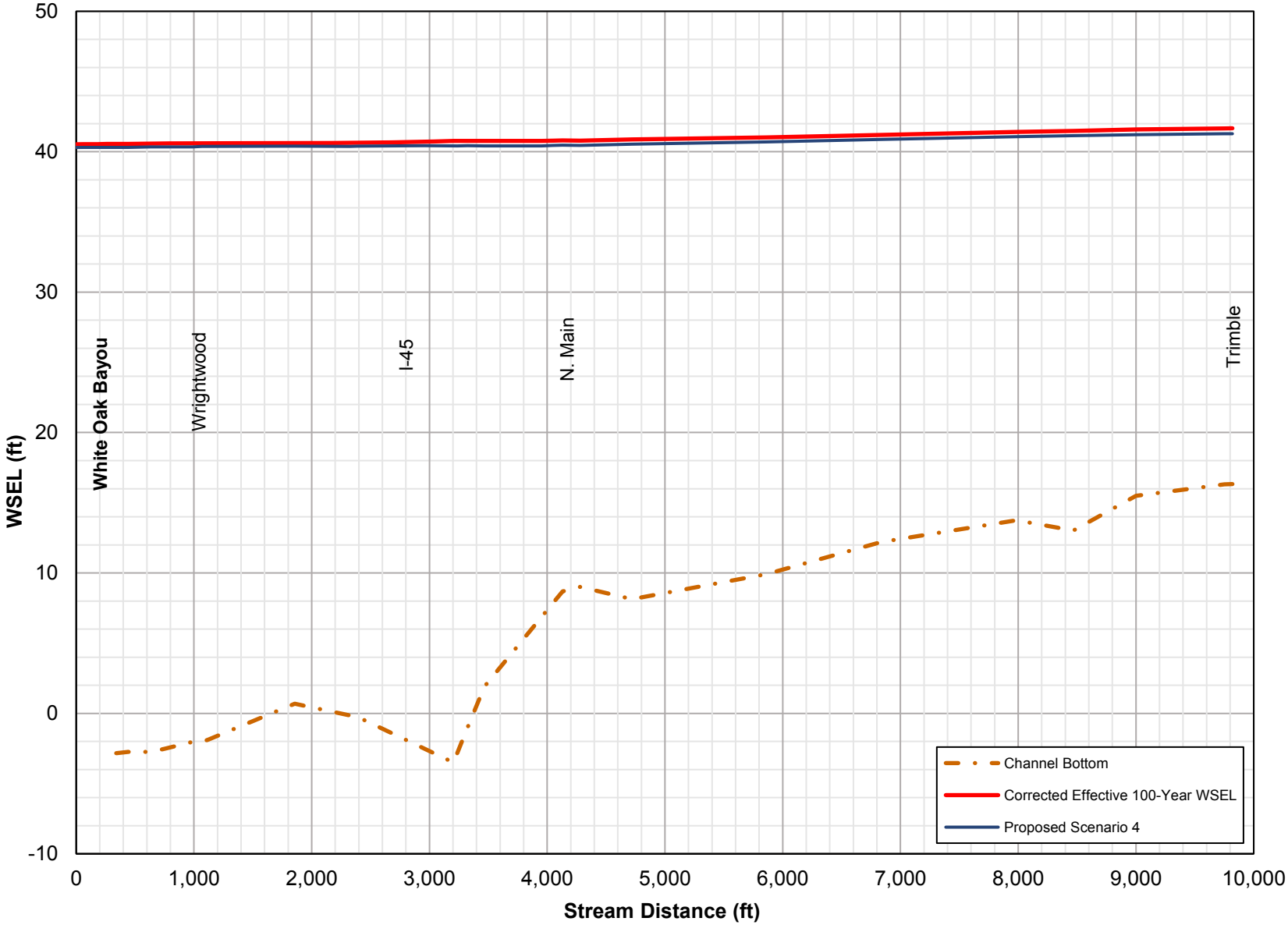


Table 4-7: Comparison Effective, Corrected Effective, Unmitigated Proposed with Scenarios Max 100-Year WSEL

Location	RAS-Station	Effective 100-Year WSEL (ft)	Corrected Effective 100-Year WSEL (ft)	Unmitigated Proposed 100-Year WSEL (ft)	Scenario 1C 100-Year WSEL (ft)	Scenario 2 100-Year WSEL (ft)	Scenario 3 100-Year WSEL (ft)	Scenario 4 100-Year WSEL (ft)
BUFFALO BAYOU								
S. PACIFIC RR	148768.4	40.78	42.88	42.77	41.19	41.30	40.82	42.74
FOOTBRIDGE @ WESTCOTT	133760.1	38.62	41.44	41.30	39.30	39.42	38.79	41.27
SHEPHERD	128066.7	37.96	40.96	40.81	38.67	38.80	38.11	40.78
MONTROSE	122572.1	37.57	40.53	40.37	38.19	38.33	37.61	40.34
MEMORIAL	119952.6	37.40	40.43	40.27	38.06	38.20	37.46	40.24
SABINE	116121.9	37.03	40.20	40.03	37.73	37.88	37.12	40.00
RUSK	114168.9	36.74	39.83	39.76	37.38	37.53	36.77	39.73
N. CAPITAL	114070.4	36.63	39.76	39.69	37.23	37.39	36.58	39.66
TEXAS AVE	113374.3	36.48	39.68	39.61	37.05	37.22	36.37	39.58
BAGBY	113238.6	36.24	39.43	39.36	36.83	36.98	36.17	39.32
PRAIRIE	112944.9	36.14	39.25	39.17	36.63	36.78	35.97	39.14
PRESTON	112534.5	36.08	39.19	39.12	36.53	36.69	35.87	39.08
CONGRESS	111953.3	36.00	39.08	39.00	36.34	36.51	35.66	38.96
MILAM	110837.8	35.65	38.67	38.59	35.72	35.89	34.98	38.54
MAIN	110154.2	34.34	38.57	38.48	35.55	35.73	34.79	38.43
WHITE OAK CONFLUENCE	**110103.2**	**--**	**38.55**	**38.47**	**35.40**	**35.61**	**34.58**	**38.42**
FANNIN	109518.7	33.68	38.42	38.33	35.36	35.57	34.55	38.28
SAN JACINTO	109395.2	32.55	38.13	38.05	35.27	35.47	33.71	38.00
MCKEE	106131.1	29.63	32.60	32.37	33.35	33.55	31.87	32.30
ELYSIAN	105667.4	29.28	31.67	31.41	32.39	32.59	30.72	31.34
U/S US-59 BRIDGE	104948	--	31.00	30.74	31.70	31.89	30.26	30.66
D/S US-59 BRIDGE	104204	--	29.86	29.91	30.90	31.09	30.14	29.84
HOUSTON BELT	102847.5	23.94	27.43	27.46	28.41	28.60	28.88	27.38
JENSEN	101790.1	22.38	25.84	25.87	26.81	27.00	27.27	25.79
LOCKWOOD	92741.1	17.24	19.28	19.31	20.18	20.35	20.60	19.24
HOUSTON BELT	86641.7	13.36	13.85	13.88	14.69	14.86	15.09	13.81
S. PACIFIC RR	80883.1	7.48	6.74	6.76	7.57	7.72	7.94	6.69

Location	RAS-Station	Effective 100-Year WSEL (ft)	Corrected Effective 100-Year WSEL (ft)	Unmitigated Proposed 100-Year WSEL (ft)	Scenario 1C 100-Year WSEL (ft)	Scenario 2 100-Year WSEL (ft)	Scenario 3 100-Year WSEL (ft)	Scenario 4 100-Year WSEL (ft)
WHITE OAK BAYOU								
ELLA	34951.5	57.40	56.45	56.46	56.43	55.87	55.88	56.46
TC JESTER	29297.5	54.42	54.39	54.40	54.35	53.06	53.02	54.40
SHEPHERD	22796.5	48.84	51.05	51.05	50.94	49.20	49.09	51.05
YALE	18138	45.18	47.02	47.01	46.71	43.92	43.68	47.01
S. HEIGHTS	17726	43.28	45.50	45.49	45.05	43.33	43.08	45.49
STUDEMONT	13182.5	38.47	41.49	41.43	39.46	39.64	39.17	41.41
HOUSTON	7608.5	37.40	40.74	40.67	38.39	38.58	38.00	40.64
LITTLE WHITE OAK CONFLUENCE	**6895**	**--**	**40.53**	**40.34**	**37.89**	**38.09**	**37.46**	**40.30**
CROCKETT/HOGAN	4774.5	36.37	39.89	39.79	37.06	37.26	36.53	39.75
MAIN ST	978	34.33	39.06	38.98	35.61	35.82	34.81	38.92
UNION PACIFIC RR	191	33.47	38.65	38.57	35.41	35.61	34.58	38.52
LITTLE WHITE OAK BAYOU								
N. MAIN	4091	39.19	40.81	40.50	38.23	38.42	37.86	40.47
WRIGHTWOOD	1029.5	34.91	40.60	40.40	38.01	38.2	37.6	40.37
QUITMAN/WHITE OAK DR.	538	34.63	40.58	40.37	37.95	38.15	37.54	40.34

* The RAS station presented are the upstream of the bridge.

4.6 Project Benefits

A key component of this study was to determine benefits of the proposed improvements within the study area. The benefits evaluated as part of this study include benefited structures, flood damage reduction cost and improved Level of Service (LOS) for highways/streets. This section provides a summary of the project benefits for Scenario 1 to 3. Additional benefits recognized by this study but not quantified include; various economic and commerce benefits, content damage and reduction in flooded vehicles.

Flood Damage Reduction Benefit

The benefits were estimated based on the 100-year floodplains for the proposed scenarios versus the 100-year floodplain for the corrected effective 100-year floodplain. The 100-year floodplains were superimposed with the building structural footprint database shapefile and the Harris County Appraisal District (HCAD) 2017 improvement values. The benefits from each scenario were quantified based on the number of structures completely removed from the floodplain and the decrease in inundation depth for the structures within floodplains. An assumed finished floor elevation above natural ground of 6-inches was applied to trigger a structure classified as flooded and to begin the flooding depth calculation.

The corrected effective conditions will flood approximately 3400 structures during a 100-year event. **Table 4-8** shows the number of structures from the 100-year floodplain for Scenarios 1-3. **Exhibits 4-6** to **4-8** shows the maps for the benefitted structures for Scenarios 1-3

Table 4-8: Number of Structures with the 100-year Floodplain Removed

	Corrected Effective	Scenario 1	Scenario 2	Scenario 3
Corrected Effective	3404	3084	2483	2401
Reduction	-	**320**	**921**	**1003**

The Scenario 3 produces the most benefit related to the reduction in WSEL. The benefits for Scenario 3 are discussed in greater detail for this reason. Scenario 3 includes North Canal, South Canal, the Heights Blvd Improvements. The combined improvements in this scenario yields a 2.06 to 4.50 feet reduction in the 100-year WSEL in Buffalo Bayou upstream of the crosswalk bridge at Station 109119. In White Oak Bayou, the combined improvements could potentially reduce the 100-year WSEL by up to 4.26 feet in the downtown area just upstream of the Buffalo Bayou confluence. Downstream of I-69/US-59, this scenario could result in a potential increase of up to 1.45 feet in the 100-year WSEL. The mitigation for the downstream impacts have been discussed previously in **Section 4.2**.

A cost analysis was performed to estimate the project benefits for Scenario 3. Harris County Appraisal District's (HCAD) 2017 parcel information was used to determine an approximate improvement value for the impacted buildings. The structural footprints were used with HCAD 2017 data to estimate the number and type of the benefitted structures. The benefits to the street/highways within the study area were quantified by determining the improved level of service (LOS). The USACE 2006 Depth-Damage Relationships of Louisiana Feasibility Study was used

for estimating the damage. Buildings used the information from the Structural Inventory and no contents or vehicle benefits were included. In addition, the following assumptions were made for this cost estimation:

- All residential buildings are single story.
- Any multi-family residential was treated as commercial and are wood and steel frame commercial structures.
- All commercial buildings are office buildings.

To estimate the benefits, the pre-project and post-project depth grids were aggregated to the building footprints from the structural inventory. For structures that straddled the edge of the floodplain and did not have full depth grid coverage, null values were replaced with 0 values (no flooding). For residential structures, 6-inch of depth was removed from the aggregated depth value to account for the assumed 6-inch slab height. Once the depth of flooding was known, the depth-damage tables were applied. The difference in damage pre-project and post-project damage was considered the benefit. It should be noted that the method remains the same for structures completely removed from the floodplain.

Table 4-9 below summarizes the reduction in damages (value) for the impacted structures for Scenario 3. It should be noted that no contents damage was calculated in the estimate below. Also, it is recommended that the hydraulic models be extended further upstream for Buffalo Bayou, White Oak Bayou and Little White Oak Bayou to have a more accurate representation of benefits around boundary conditions and further upstream. Finally, it is recommended that an in-depth evaluation of the commercial buildings in the downtown area be performed to improve the accuracy of the damage estimates for flooded buildings. The extension of the models to better capture the project benefits, the quantification of content damage reduction, and the improved downtown commercial damages are expected to greatly increase the overall dollar benefit of Scenario 3.

Table 4-9: Summary of the Damage Reduction Benefit Results for Scenario 3

Structure Type	Damages – Existing Conditions	Damages – Improvement Scenario 3	Benefits (Damage Delta)
Single Family Residential	$83,528,935	$53,944,525	$29,584,411
Commercial	$118,475,539	$66,301,332	$52,174,207
Total	**$202,004,474**	**$120,245,857**	**$81,758,618**

Table 4-10 below provides a summary of the acreage of land removed from the floodplain area and number of the benefitted residential and commercial structures. The results show that the acreage of land in the 100-year corrected effective floodplain area within the study area was estimated to be 2477 acres. In the proposed Scenario 3, the 100-year floodplain area was reduced to 2032 acres, a reduction of 445 acres. The reduced floodplain extents result in reducing the number of structures in the floodplain from 3404 in the existing condition to 2401 structures in the proposed condition (removal of 1003 structures in the floodplain). **Exhibit 4-8** provides an overall map for the benefited buildings in Scenario 3.

Table 4-10: Floodplain Area and Number of the Benefitted Structures in Scenario 3

	Floodplain Area (acres)	Number of Structures in Floodplain	Single Family Residential	Commercial
Corrected Effective	2477	3404	2725	679
Proposed Scenario 3	2032	2401	1957	444
Reduction	**445**	**1003**	**768**	**235**

Roadway and Mobility Benefit

White Oak Bayou has a history of inundating the I-10 and I-45 highways in the vicinity of the NHHIP, in many cases making the highways impassable, ineffective during a time of need, and potentially dangerous. It is estimated that within the last 20 years the following locations have been impacted and/or closed to traffic as a result of extreme event flooding at least 5 times. Each of these locations would be greatly benefited by the WSEL reductions associated with Scenario 3. In some cases, the proposed Scenario 3 improvements may be necessary for an effective solution.

- I-10 Mainlines west of Studemont Street
- I-45 on Little White Oak depressed section on North St.
- Union Pacific underpass west of TxDOT Washington office
- I-10 depressed section from Patterson Street to Washington Avenue
- I-10 at Houston St
- I-10 at Taylor St

Nine local streets will be made passable (above the 100-yr WSEL) and 25 additional streets will have an improved LOS. **Table 4-11** provides the summary list of roads removed from the 100-year floodplain and improved LOS in Scenario 3.

Table 4-11: Summary of Roads Removed from the Floodplain and with an Improved Level of Service for Scenario 3

Street Name	Improved Level of Service	Removed from Floodplain	Street Name	Improved Level of Service	Removed from Floodplain
Buffalo Bayou			**White Oak Bayou**		
Shepherd		X	Ella	X	
Montrose	X		W 18th St		X
Memorial	X		TC Jester	X	
Sabine		X	W 11th St	X	
Capital	X		TC Jester	X	
Texas	X		Durham	X	
Bagby	X		Shepherd	X	
Prairie		X	Yale	X	
Preston	X		Heights	X	
Congress	X		Studemont		X
Smith	X		Taylor		X
Louisiana	X		Houston	X	
Milam	X		Main	X	
Travis	X		1st St	X	
Main		X	N. Main	X	
Fannin		X	Wrightwood	X	
San Jacinto		X	Quitman	X	

NHHIP Project Benefit

Benefits and impacts to TxDOT NHHIP ROW were also considered as a part of this analysis. The proposed Scenario 3 improvements will reduce the compensatory mitigation for Segment 3B, 3C, 3D & 3E floodplain fill by approximately 180 ac-ft. The proposed scenario 3 will lower the 100-year WSELs and thus reduce the need to raise the profile to corrected effective WSELs. The embankment fill numbers for I-10 and I-45 main lanes are preliminary and computed based on the schematic profiles. The fill numbers are computed to be approximately 250,000 cubic yards.

Scenario 3 resulted in a higher benefit compared to the other Scenarios. The direct benefits included, reducing the number of structures in the floodplain, flood damage reduction costs and improved level of service. These are significant improvements compared to the current condition.

Finally, additional benefits of Scenario 3 not quantified here include reduced damages to commerce, building contents, vehicles, and drainage infrastructure. It is recommended that a detailed benefit-cost analysis be performed and discuss the impact or benefits on FEMA critical facilities in a separate study.

5.0 ROADWAY IMPACT ANALYSIS

This section presents the methodologies, parameters and description of drainage areas associated with the runoff calculations for subareas within the project limits. Supporting information for the peak flow calculations and drainage area parameters are provided in **Appendix B.**

5.1 Drainage Areas

The existing contributing drainage areas were delineated using ArcHydro tools within ArcGIS in conjunction with the project LiDAR, survey, City of Houston's GIMS, and aerials. The drainage area delineations were refined based on outfall locations and field observations. Additionally, the drainage areas were determined based on the higher runoff flow rates computed using a 150-foot development strip with a C value of 0.65 or the existing offsite contributing area. The total local drainage system contributing drainage area for Segment 3D is 467.87 acres; approximately 163.70 acres of which lie within the project ROW.

There is a total of 10 drainage systems that are affected by the proposed improvements. Drainage Systems A and B outfall to Little White Oak Bayou (HCFCD Unit No. E101-00-00). Drainage Systems C, D, E, F, G, H and J outfall to White Oak Bayou (HCFCD Unit No. E100-00-00). System C outfalls to Little White Oak Bayou though a 24-inch RCP along Quitman Street but the majority of the overland flow drain towards White Oak Bayou. Drainage System I outfalls to Buffalo Bayou (HCFCD Unit No. W100-00-00). The existing and proposed overall drainage areas and the general outfall locations are shown in **Exhibits 5-1** and **5-2. Table 5-1**, below, lists all the outfalls affected by the proposed roadway improvements. The existing and proposed impervious areas within each drainage area are shown in **Exhibits 5-3** and **5-4.**

Table 5-1: Affected Outfalls

Outfall Link (ID)	Existing Structure Description	Proposed Structure Description	Receiving Stream
A	30-Inch RCP	30-Inch RCP	Little White Oak Bayou
A-01	Grass-Lined Ditch	6'x4' RCB w/ 36-Inch Restrictor	Little White Oak Bayou
A-02	24-Inch RCP	Removed	Little White Oak Bayou
B	24-Inch RCP	24-Inch RCP	Little White Oak Bayou
C	24-Inch RCP	24-Inch RCP	Little White Oak Bayou
D-01	24-Inch RCP	24-Inch RCP w/ Graded Ditch Upstream	White Oak Bayou
D-02	2-24-Inch RCP	2-24-Inch RCP w/ Graded Ditch Upstream	White Oak Bayou
D-03	24-Inch RCP	24-Inch RCP w/ Graded Ditch Upstream	White Oak Bayou
E	54-Inch RCP	54-Inch RCP	White Oak Bayou
F	30-Inch RCP	2-6'x4' RCB w/ Pond-F	White Oak Bayou
F-01	Grass-Lined Ditch	Graded Grass-Lined Ditch	White Oak Bayou
F-02	24-Inch RCP	24-Inch RCP	White Oak Bayou
G	36-Inch RCP	2-54-Inch RCP	White Oak Bayou
H	60-Inch RCP	3-60-Inch RCP w/ Pond-H	White Oak Bayou
I	4'x4' RCB	4'x4' RCB	Buffalo Bayou
I-01	24-Inch RCP	24-Inch RCP	Buffalo Bayou
J	60-Inch RCP	60-Inch RCP	White Oak Bayou
J-01	24-Inch RCP	24-Inch RCP	White Oak Bayou

5.2 Topography

The contributing drainage areas are relatively flat with overland slopes averaging approximately 0.3-percent (0.003 feet/feet). The offsite contributing drainage areas are mainly located west of the I-10 with the predominant flow from west to east across the project ROW towards White Oak Bayou. There is limited existing storm sewer in the project corridor and most of the overland flow sheet flows to White Oak Bayou. In proposed conditions, the overland flow will be intercepted by the proposed storm sewer trunklines and directed towards the proposed detention ponds.

5.3 Land Use

The entire land use for the project's contributing drainage areas is developed urban area. The Runoff coefficients (C-Value) for the roadway and contributing drainage areas are based on the land use. The land use varies mainly based on the density and usage of the properties located in the offsite drainage areas. The land use for the offsite areas was determined using aerial photographs and project topographic files. A summary of the runoff coefficients for each land use is provided in **Table 5-2**.

Table 5-2: Summary of Rational Method Runoff Coefficients "C-Values"

Land Use Description	C-Value	Area (ac)	
		Existing	Proposed
Green Areas	0.35	88.08	65.17
High Density Residential	0.65	114.42	114.42
Apartments/Townhomes	0.75	8.15	8.15
High Density Commercial/ Industrial	0.85	82.65	82.65
Transportation	0.90	174.57	197.48

The land use data were intersected with the delineated drainage areas to allow for computation of the composite C-Values for each of the drainage areas. Once land uses within each drainage area were identified, following equation was used to determine the composite "C-Value" for each drainage area:

$$\bar{C} = \frac{\sum_{i=1}^{n} A_i C_i}{\sum_{i=1}^{n} A_i} \qquad \textit{Equation 5-1}$$

In which: n = Total number of land use elements within a drainage area;

C_i = C - value of the ith land use element within a drainage area;

A_i = Area associated with the ith land use element of a drainage area; and

$\bar{C}$ = Composite C-value for a drainage area.

Exhibits 5-3 and **5-4** show the existing and proposed land uses, respectively. The percent impervious for the loss rate calculations were determined based on the land use and HCFCD impervious ratio tables. **Appendix B** provides a detailed breakdown of the existing and proposed land uses and impervious percentage for each drainage area.

5.4 Rational Method

The hydrologic computation methodology utilized was based on the drainage area size. Rational Method shall be used for flow calculations for drainage areas less than 200 acres per TxDOT Hydraulic Manual.

The Rational Method parameters include: drainage area, runoff coefficient (C-value), time of concentration, and rainfall intensity. The Rational Method equation is provided in Equation 5-2.

$$Q = CiA \qquad \textit{Equation 5-2}$$

In which: Q = Computed Peak Runoff Discharge (cfs);

C = Runoff Coefficient;

i = Rainfall Intensity (in/hr); and

A = Drainage Area (ac).

<u>Rainfall Intensities,</u> for the Rational Method, are dependent on the time of concentration and the intensity coefficients (e, b, and d), which are storm frequency and location specific. The entire

project is located within Harris County. As a result, the e, b, and d factors for Harris County, from *United States Geological* Survey (USGS) *Scientific Investigations Report 2004-5041 Atlas of Depth-Duration Frequency (DDF) of Precipitation Annual Maxima for Texas (TxDOT 5-1301-01-1),* were used for this analysis. The equation for computing the rainfall intensity is provided in Equation 5-3. The multiple frequency intensity coefficient values are provided in **Table 5-3**.

$$i = \frac{b}{(d+Tc)^e}$$ *Equation 5-3*

In which: Tc = Time of Concentration (min);

i = Rainfall Intensity (in/hr); and

e, b, d= Intensity Coefficients.

Table 5-3: Rational Method e, b, d Coefficients

Coefficient	Storm Frequency		
	2-year	10-year	100-year
e	0.7939	0.7829	0.772
b (in.)	57.73	86.47	136.33
d (min)	9.48	11.27	14.08

Time of Concentration was determined by utilizing a velocity/distance-based method (Equation 5-4). For each drainage area, the flow paths were categorized into two segments: sheet flow and Channel/Roadway. These flow paths' travel time were summed to determine the total time of concentration for each of the drainage areas. Due to the relative uniformity of roadway slopes and the relative flatness of terrain, an average velocity of 0.5 fps and 2.5 fps were used for sheet flow path and channel flow path, respectively. Additionally, during determination, a 10-minute minimum time of concentration was considered for all drainage areas, in accordance with TxDOT Hydraulic Design Manual.

$$T_c = \frac{D_F}{60V}$$ *Equation 5-4*

In which: T_c = Time of Concentration (min);

D_F = Flow Distance (feet); and

V = Average Velocity of Runoff Flow (fps).

The rational method peak flows were used to calibrate the runoff values developed using the Clark Unit Hydrograph Method, discussed in section below.

5.5 Clark Unit Hydrograph Method

Clark Unit Hydrograph Method (CUHM) was used to compute the existing and proposed runoff hydrographs and total runoff volumes for all the drainage areas for use in dynamic XPSWMM modeling. HEC-HMS v3.5 was utilized as a platform for CUHM calculations.

The CUHM is an acceptable methodology within Harris County for determining the hydrology. The CUHM requires drainage area (DA), Time of concentration (T_c), Clark's storage coefficient (R), Length of longest watercourse (L), average slope (S) along longest watercourse, Manning's roughness coefficient (N), effective impervious ratio (I), and average basin slope of land draining overland into the longest watercourse (S_0) as parameters to determine a peak runoff discharge.

The metrological and control parameters along with other inputs used were based on Harris County Flood Control District (HCFCD) effective models for White Oak Bayou and Buffalo Bayou. The hydrographs were calibrated to match the respective Rational method peak flows for the given drainage areas. The calibration was performed by adjusting the storage R factor of the watershed parameters. The "R" values were adjusted so that the HEC-HMS flows are within 1% of the flows computed using the rational method.

5.6 Peak Runoff Rates

A summary of the peak runoff rates for existing and proposed condition is provided in **Table 5-4**. The drainage areas' peak discharges were calculated using the Rational Method. The peak runoff calculations and the hydrographs used for the drainage area are provided in **Appendix B**.

Table 5-4 :Summary of Drainage Area and Peak Runoffs for Existing & Proposed Drainage Areas

Drainage Area (ID)	Drainage Area (ac)		Weighted Coefficient C-Value		10-Year Storm Event Peak Runoff (cfs)		100-Year Storm Event Peak Runoff (cfs)	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
A-01	1.13	2.19	0.85	0.80	7.6	13.9	11.2	20.6
A-02	1.63	1.82	0.72	0.80	9.3	11.5	13.8	17.0
A-03	1.16	2.15	0.72	0.85	6.6	14.5	9.8	21.5
A-04	1.47	1.41	0.78	0.85	9.1	9.5	13.4	14.1
A-05	0.69	0.55	0.60	0.80	3.3	3.5	4.8	5.2
A-06	1.04	1.74	0.73	0.82	6.0	11.3	8.9	16.7
OFF-A01	11.01	11.00	0.74	0.74	61.9	61.8	92.0	91.9
OFF-A02	7.69	5.57	0.52	0.59	31.7	25.9	47.0	38.3
B-01	0.39	--	0.86	--	2.6	--	3.9	--
B-02	1.57	1.54	0.70	0.69	8.6	8.4	12.8	12.5
B-03	1.80	1.77	0.63	0.63	9.0	8.8	13.3	13.0
C-01	1.24	1.11	0.70	0.68	6.9	6.0	10.2	8.8
C-02	2.94	3.38	0.66	0.66	15.3	17.6	22.6	26.1
C-03	0.50	0.68	0.86	0.85	3.4	4.6	5.0	6.8
C-04	2.00	1.49	0.61	0.68	9.6	8.0	14.2	11.8
OFF-C01	4.59	4.59	0.72	0.72	26.0	26.0	38.5	38.5
OFF-C02	1.55	1.48	0.70	0.70	8.6	8.1	12.8	12.0
OFF-C03	1.84	1.79	0.79	0.79	11.5	11.2	17.1	16.6
D-01	6.05	5.45	0.65	0.64	30.9	27.5	45.8	40.7
D-02	3.09	3.73	0.52	0.76	12.7	22.4	18.8	33.2
D-03	6.74	6.69	0.47	0.44	25.0	23.0	37.1	34.1
E-01A	2.07	1.03	0.68	0.53	11.2	4.3	16.5	6.4
E-01B	--	0.79	--	0.77	--	4.8	--	7.1
E-02	2.43	1.63	0.75	0.76	14.4	9.8	21.3	14.5
E-03	--	0.96	--	0.85	--	6.5	--	9.6
OFF-E01	11.33	10.15	0.74	0.73	61.8	54.5	92.3	81.5
OFF-E02	29.59	29.58	0.82	0.82	140.3	150.1	215.0	228.5
F-01A	1.83	2.21	0.66	0.85	9.6	14.9	14.2	22.0
F-01B	3.21	2.25	0.57	0.85	14.4	15.2	21.4	22.5
F-01C	6.18	4.15	0.57	0.70	27.9	23.1	41.3	34.2
F-02	6.53	10.09	0.72	0.84	37.3	67.3	55.3	99.6
F-03	2.58	1.99	0.49	0.58	10.0	9.1	14.7	13.4
F-04	3.20	2.34	0.44	0.49	11.1	9.1	16.4	13.4
F-05	--	1.26	--	0.78	--	7.7	--	11.5
OFF-F01	109.21	110.24	0.78	0.78	357.5	360.3	562.4	566.7
OFF-F02	23.65	22.92	0.76	0.76	110.3	107.0	168.1	163.1
G-01	26.97	26.97	0.57	0.72	121.3	153.4	179.7	227.2
H-01	0.92	1.93	0.80	0.85	5.8	13.0	8.7	19.2
H-02	2.58	2.02	0.70	0.75	14.3	11.9	21.2	17.7
H-03	3.43	2.35	0.70	0.85	18.9	15.8	27.9	23.4
H-04	3.19	0.81	0.82	0.85	20.6	5.5	30.5	8.1
H-05A	3.30	0.69	0.60	0.85	15.6	4.6	23.2	6.9
H-05B	--	0.82	--	0.85	--	5.5	--	8.2
H-05C	--	0.74	--	0.86	--	5.0	--	7.4

Drainage Area (ID)	Drainage Area (ac)		Weighted Coefficient C-Value		10-Year Storm Event Peak Runoff (cfs)		100-Year Storm Event Peak Runoff (cfs)	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
H-05D	--	1.16	--	0.76	--	6.9	--	10.3
H-05E	--	1.01	--	0.60	--	4.8	--	7.1
H-06A	2.17	1.45	0.68	0.77	11.6	8.9	17.2	13.1
H-06B	--	18.85	--	0.60	--	89.6	--	132.7
H-07	2.39	0.35	0.70	0.85	13.2	2.4	19.5	3.5
H-08A	1.88	1.63	0.81	0.85	12.0	11.0	17.8	16.3
H-08B	--	1.58	--	0.85	--	10.6	--	15.7
H-09A	2.59	1.04	0.85	0.85	17.3	7.0	25.7	10.4
H-09B	--	1.12	--	0.85	--	7.5	--	11.1
H-10	1.56	1.00	0.85	0.85	10.5	6.7	15.6	9.9
H-11	4.00	4.02	0.60	0.80	19.0	25.5	28.1	37.8
H-12	4.14	5.72	0.54	0.85	17.6	38.5	26.1	57.0
H-13	4.48	4.35	0.35	0.75	12.4	25.7	18.3	38.0
OFF-H01A	20.72	9.54	0.76	0.82	108.3	61.4	163.0	91.0
OFF-H01B	--	4.96	--	0.84	--	32.8	--	48.6
OFF-H02	45.43	43.70	0.79	0.79	220.3	212.0	335.8	323.1
OFF-H03	17.96	17.07	0.74	0.74	88.0	83.5	133.1	126.2
OFF-H04	19.64	18.07	0.71	0.71	102.5	93.2	153.2	139.4
I-01	1.12	--	0.67	--	5.9	--	8.8	--
I-02	4.61	2.41	0.65	0.45	23.7	8.6	35.1	12.7
I-03	1.11	1.11	0.64	0.40	5.6	3.5	8.3	5.1
I-04	6.04	6.04	0.85	0.85	40.5	40.5	60.0	60.0
I-05	0.61	0.61	0.85	0.64	4.1	3.1	6.1	4.5
I-06	1.46	1.46	0.43	0.50	4.9	5.8	7.3	8.6
I-07	1.06	1.06	0.85	0.85	7.1	7.1	10.5	10.5
I-08	0.87	0.87	0.85	0.86	5.8	5.9	8.6	8.7
I-09	0.78	0.78	0.85	0.86	5.2	5.3	7.7	7.8
I-10	0.81	0.81	0.85	0.85	5.4	5.4	8.1	8.1
I-11	1.02	1.02	0.85	0.85	6.9	6.9	10.2	10.2
J-01A	5.27	3.20	0.69	0.66	28.9	16.6	42.8	24.6
J-01B	3.71	3.71	0.67	0.58	19.5	16.9	28.9	25.0
J-02	3.17	3.17	0.73	0.74	18.2	18.4	27.0	27.3
J-03	1.03	1.03	0.85	0.85	6.9	6.9	10.3	10.3
J-04	1.18	1.18	0.85	0.85	8.0	8.0	11.8	11.8
J-05	2.03	2.03	0.85	0.85	13.7	13.7	20.2	20.2
J-06	0.93	0.93	0.85	0.65	6.3	4.7	9.3	7.0
J-07	1.78	1.78	0.85	0.72	12.0	10.1	17.7	14.9

5.7 Runoff Impacts

A runoff impact analysis was performed to determine the potential runoff impacts resulting from the proposed roadway improvements. The runoff impacts are documented in terms of peak flow rates and runoff volume. The impact mitigation analysis was performed for the 10-year and 100-year storm events. This section presents the methodologies, watershed parameters and description of drainage areas associated with the runoff calculations for subareas within the project limits. Supporting information for the peak flow calculations and watershed parameters are provided in **Appendix B.**

The runoff impact analysis determines the relative peak runoff rate and runoff volume increases at each outfall resulting from the roadway improvements within the project ROW. No changes to the existing drainage patterns are proposed. The contributing drainage areas to each general outfall are the same in the existing and proposed conditions. The runoff impact analysis is limited to areas within the project ROW. The runoff impacts will be a direct result of the increase in pavement along the corridor and the proposed improvements to the conveyance system.

The total contributing drainage area for the project reach is 467.87 acres; approximately 163.70 acres of which lie within the project ROW. The proposed improvement project will generate approximately 22.91 acre increase in impervious cover. A summary of the existing and proposed drainage areas with respective impervious cover comparison is presented in **Table 5-5**.

Table 5-5: Drainage Area and Impervious Cover Comparison

Drainage System	Total Area (Existing)	Total Area (Proposed)	Weighted Coefficient C-Value		Impervious Cover			
					Pavement Area		Δ Pavement Area	
(ID)	(ac)	(ac)	Existing	Proposed	Existing	Proposed	(ac)	%
A	25.82	26.43	0.68	0.74	9.03	12.41	3.38	13%
B	3.76	3.31	0.68	0.41	1.25	0.83	-0.42	-13%
C	14.66	14.52	0.70	0.71	5.93	6.06	0.13	1%
D	15.88	15.87	0.55	0.58	4.68	5.67	0.99	6%
E	45.42	44.14	0.79	0.79	17.05	15.99	-1.06	-2%
F	156.39	157.45	0.75	0.77	55.80	63.64	7.84	5%
G	26.97	26.97	0.57	0.72	10.78	18.17	7.39	27%
H	140.38	152.70	0.73	20.85	53.38	66.25	12.87	8%
I	19.49	12.65	0.75	0.80	5.85	2.28	-3.57	-28%
J	19.10	13.83	0.75	0.72	10.82	6.18	-4.64	-34%
Total	**467.87**	**467.87**	**--**	**--**	**174.57**	**197.48**	**22.91**	**5%**

5.8 Runoff Calculations

The runoff impacts were determined in terms of increases in peak runoff rates and runoff volume. The runoff volume impacts represent the maximum volumetric difference between the existing and proposed hydrographs. The runoff hydrographs were developed for both existing and proposed conditions. The differential volume between existing and proposed conditions was used to estimate the storage requirements. Subtracting the area difference under the curves for the existing and proposed hydrographs produced the volumetric impact for the proposed runoff at each outfall. The volumetric impacts give primary consideration to increases in the impervious cover.

A hydraulic routing analysis was performed within the project limits to determine the existing flow rates, proposed flow rates and reduction in runoff rate. The 100-year peak runoff flow rates and volumes were computed and are provided in **Tables 5-6** and **5-7**. The tables provide the computed roadway 10-year and 100-year peak flow, runoff flow rate differences, and volumetric impact for each drainage system. The System I and the overland flow from System J drains to Buffalo Bayou. The realignment of roadways results in a net removal of pavement for Systems I and J. Therefore, to be conservative, the overall impact analysis for the White Oak Bayou systems doesn't include the pavement removal for the Buffalo Bayou systems.

Table 5-6: 100-year Peak Runoff Impact Summary

Drainage System (ID)	10-Year Peak Outflow (cfs)			100-Year Peak Outflow (cfs)		
	Existing	Proposed	Δ	Existing	Proposed	Δ
A	135.4	151.8	16.4	201.0	225.3	24.3
B	20.3	17.2	-3.1	30.0	25.5	-4.5
C	81.3	81.5	0.2	120.4	120.6	0.2
D	68.7	72.9	4.2	101.7	108.0	6.3
E	227.6	229.9	2.3	345.2	347.5	2.3
F	578.0	613.6	35.6	893.7	946.5	52.8
G	121.3	153.4	32.1	179.7	227.2	47.5
H	708.0	789.3	81.3	1064.9	1182.1	117.2
I	115.3	92.0	-23.3	170.7	136.3	-34.4
J	113.4	95.3	-18.1	167.9	141.1	-26.8
Total	**2169.3**	**2296.9**	**127.6**	**3275.2**	**3460.1**	**184.9**

Table 5-7: 100-Year Volume Impact Summary

Drainage System	Existing Flows	Proposed Flows	Required Mitigation Volume
(ID)	(cfs)	(cfs)	(ac-ft)
A	201.0	225.3	1.86
B	30.0	25.5	-0.23
C	120.4	120.6	0.08
D	101.7	108.0	0.54
E	345.2	347.5	-0.58
F	893.7	946.5	4.31
G	179.7	227.2	4.06
H	1064.9	1182.1	7.08
I*	170.7	136.3	-
J*	167.9	141.1	-
		Total	**17.12**

*System I & J not included in net volume estimation

6.0 PROPOSED DRAINAGE ANALYSIS

For the impact analysis, the peak flows from the existing and proposed conditions were computed using XPSWMM. A detailed SWMM network was created for analyzing existing conditions and proposed conditions. The SWMM network consists of nodes, links, and outfalls. The links are pipe/ditch runs. The network was created based on existing and proposed cross sections, survey data, aerials, and topographic information. To better define the overland flow patterns for the 100-years storm event, a 2D XPSWMM analysis was also conducted. The 1D XPSWMM drainage model was imported in 2D XPSWMM. The 2D Ponding Map (**Exhibit 6.1**) determines the overland flow patterns and validates the contributing drainage areas to the Segment 3D.

The SWMM model requires that a tailwater condition be defined at the outfall points as the boundary condition. The starting tailwater conditions for each outfall were obtained from the corrected effective HEC-RAS model developed as part of model calibration discussed in Section 3. The stage-hydrographs at corresponding cross-sections from HEC-RAS were imported in to XPSWMM and used as downstream tailwater conditions for the outfalls.

The detention ponds were modeled in XPSWMM as storage nodes with stage-area relationship. The stage-area relationships for the existing storage areas were calculated using the 2008 LiDAR. The stage-area relationship for the proposed detention ponds was taken from the proposed plans. The preliminary detention ponds plans are provided in **Exhibit 6-5** and the stage-storage relationships for the ponds are provided in **Tables 6-3** and **6-5**. The existing storm sewer sizes and alignment, flowline elevations were obtained from the City of Houston GIMS, survey and record drawings. Assumptions were made on the missing flowlines; therefore, it is recommended that a detailed survey be performed during the final design.

A detailed description of each system along with the impact and the proposed mitigation is described in the following sections.

6.1 Systems A and B

The systems A and B are located north of the White Oak Bayou along I-45. The system limits are Little White Oak Bayou on the north and Quitman Street ramps on the south. The offsite contributing drainage areas for System A and B are located east of the I-45 mainlanes.

<u>EXISTING CONDITIONS</u>

System A consists of 2 major outfalls. The ditch on the east collects the flow from the I-45 north mainlanes and the offsite drainage areas and outfalls to Little White Oak Bayou. Additionally, a 24-inch RCP is located at the low point of the ditch and outfalls directly to the 3 - 14’ x 16’ RCB culverts along the Little White Oak Bayou. The second outfall drains through a 30-inch RCP located west of I-45 and drains to the 3 - 14’ x 16’ RCB culverts located along the Little White Oak Bayou. This outfall collects flow from the trunkline located in the median. The trunkline in the median collects flow from the I-45 southbound mainlanes and Quitman Street southbound exit ramp.

The system B drains a portion of the existing HOV lanes and Wrightwood Street (west of I-45) through a 24-inch RCP along Wrightwood Street and outfalls to Little White Oak Bayou.

MITIGATED CONDITIONS

The proposed pavement design for I-45 removes the HOV lane and replaces it with four elevated MaX lanes. These MaX lanes are located in between the I-45 northbound and southbound mainlanes and are elevated throughout the project limits. The narrow space available within the proposed ROW limits the use of ditches, and therefore, storm sewer lines were used for conveyance and storage. Both systems A and B drain to the Little White Oak Bayou, therefore, systems A and B were combined for impact evaluation. Furthermore, to avoid any impact to the City of Houston storm sewer system located along Wrightwood Street, the proposed storm sewer system will divert portion of the runoff (DA B-01) from System B to System A.

In system A, the existing ditch and the 24-inch RCP on the east will be removed due to the construction of entrance ramp as part of the proposed improvements and replaced with a 6' x 4' RCB trunkline and a 36-inch RCP restrictor. The proposed trunkline will mitigate the ditch removal and collect the flows from offsite and I-45 mainlanes. The second outfall (30-inch RCP) will remain in place but the trunkline along I-45 southbound will be upsized to 36-inch RCP and, the trunkline along the median will be upsized to 48-inch RCP (see **Exhibit 6-2**, **6-3** and **6-4** for details).

In summary, Systems A and B had combined drainage area of 29.58 acres with pavement increase of 2.96 acres, which will lead to peak runoff increase of 19.7 cfs and net runoff volume increase of 1.63 ac-ft. These proposed increases will be mitigated in the storm sewer trunklines, which will reduce total mitigated outflow to 207.2 cfs and provide runoff mitigation of 1.55 ac-ft.

The detailed output for existing and mitigation XPSWMM networks are provided in **Appendix C - XPSWMM Output**. **Table 6-1** below provides a comparison of the outflows for Systems A and B. **Figure 6-1** shows the existing and mitigated outflow hydrograph comparisons for System A+B.

Table 6-1: Existing and Mitigated Outflow Comparison for System A+B

Outfall Link (ID)	100-YEAR Peak Outflow (CFS)		
	Existing	Mitigated	Δ
Total	217.1	207.2	-9.9

Figure 6-1A: Existing Outfall Hydrographs for System A+B

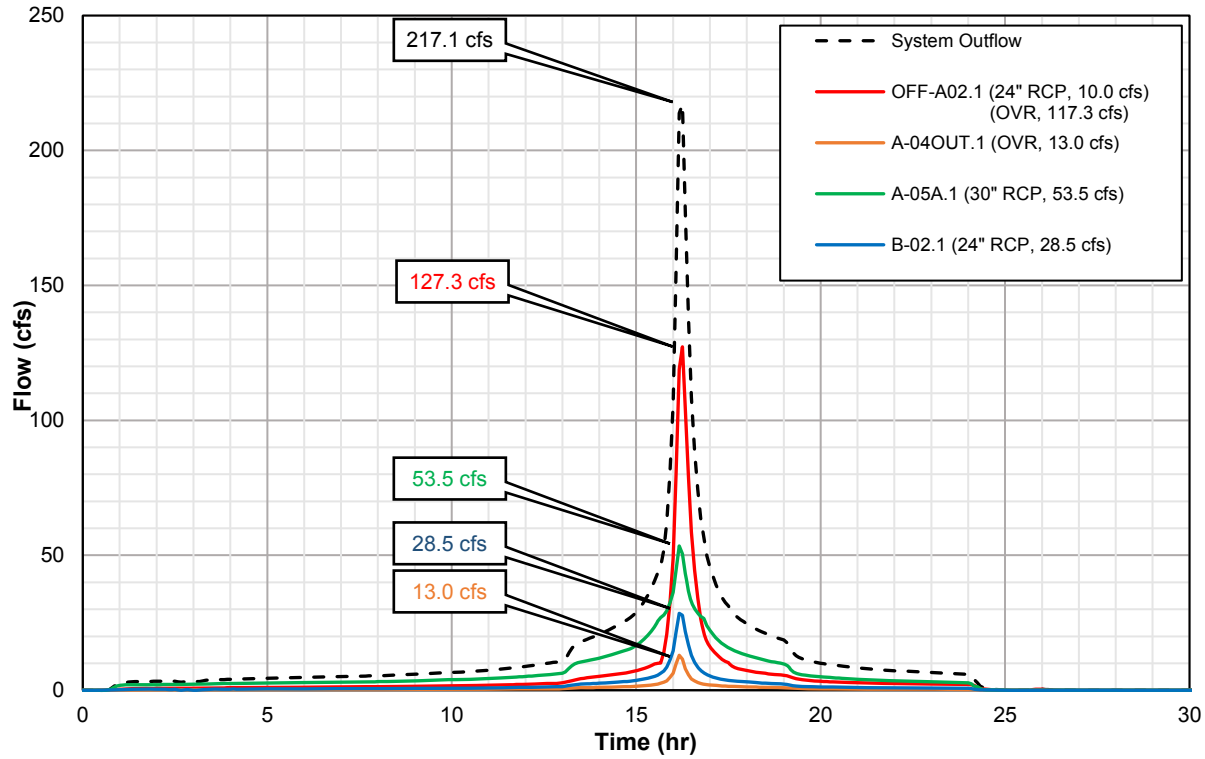
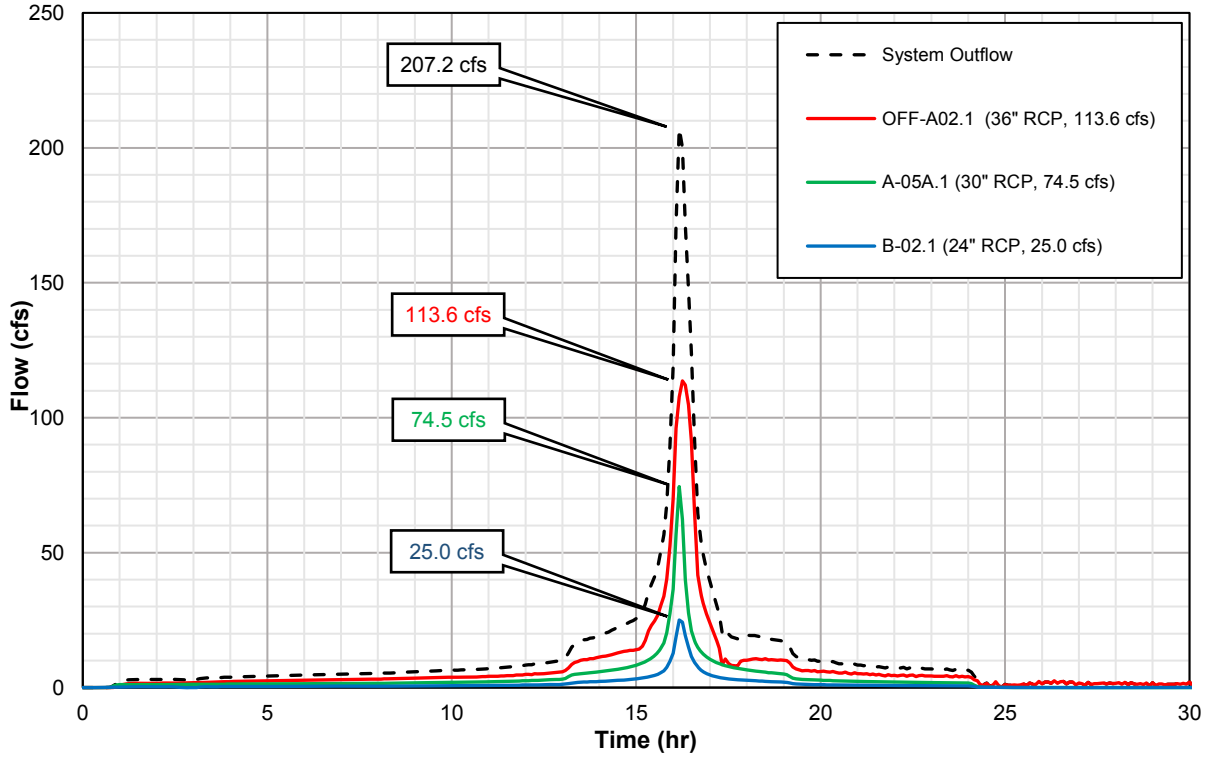


Figure 6-1B: Mitigated Outfall Hydrographs for System A+B



6.2 Systems C and D

The systems C and D are located along I-45 south of Systems A and B and north of White Oak Bayou. System C is bounded by Quitman Street on the south and system A and B on the north.

EXISTING CONDITIONS

The system C collects the neighborhood east of I-45, the I-45 northbound entrance ramp and I-45 south bound exist ramp from Wrightwood Street to Quitman Street. The system drains to Little White Oak Bayou on the west side through a 24-inch RCP along Quitman Street. However, due to the inadequacy of the existing drainage system and the local topography, System C overflows into System D (D-03) located just south of System C.

The drainage areas in System D flow overland directly into White Oak Bayou. The overland flow gets collected with the 24-inch backslope interceptors and then outfall to White Oak Bayou. This system is confined by White Oak Bayou on the south, Little White Oak Bayou on west, Quitman Street on north and South Street on east. Systems C and D outfall into Little White Oak and White Oak Bayou (just downstream of the Little White Oak Bayou Confluence), respectively. However, due to the proximity and the interaction between the two systems, the systems C and D are analyzed together.

MITIGATED CONDITIONS

In proposed conditions, I-10 direct connectors and I-45 bridges will be re-aligned in this location. The flow patterns will remain the same as existing and majority of the flow will still flow overland directly to White Oak Bayou. The ditches that collect the overland flow will be regarded and widened to provide the required impact mitigation. No changes are proposed to the backslope interceptors that drains to the White Oak Bayou.

To avoid any impacts to the City of Houston storm sewers, located along Quitman, no additional flow is directed towards the 24-inch storm sewer along Quitman Street. The proposed storm sewer improvements along east of I-45 northbound mainlanes will handle the additional flow (see **Exhibit 6-2**, **6-3** and **6-4** for details).

In summary, Systems C and D had combined drainage area of 30.54 acres with pavement increase of 1.12 acres, which will lead to peak runoff increase of 6.6 cfs and net runoff volume increase of 0.62 ac-ft. The ditches in System D will be graded to mitigate the increased runoff. These ditch improvements will reduce total mitigated outflow to 191.6 cfs and provide runoff mitigation of 1.66 ac-ft.

The detailed output for existing and mitigated XPSWMM networks are provided in **Appendix C - XPSWMM Output**. **Table 6-2** below provides a comparison of the outflows for System C and D. **Figure 6-2** shows the existing and mitigated outflow hydrograph comparisons for System C+D.

Table 6-2: Existing and Mitigated Outflow Comparison for System C+D

Outfall Link (ID)	100-Year Peak Outflow (cfs)		
	Existing	Mitigated	Δ
Total	213.7	191.6	-22.1

Figure 6-2A: Existing Outfall Hydrographs for System C+D

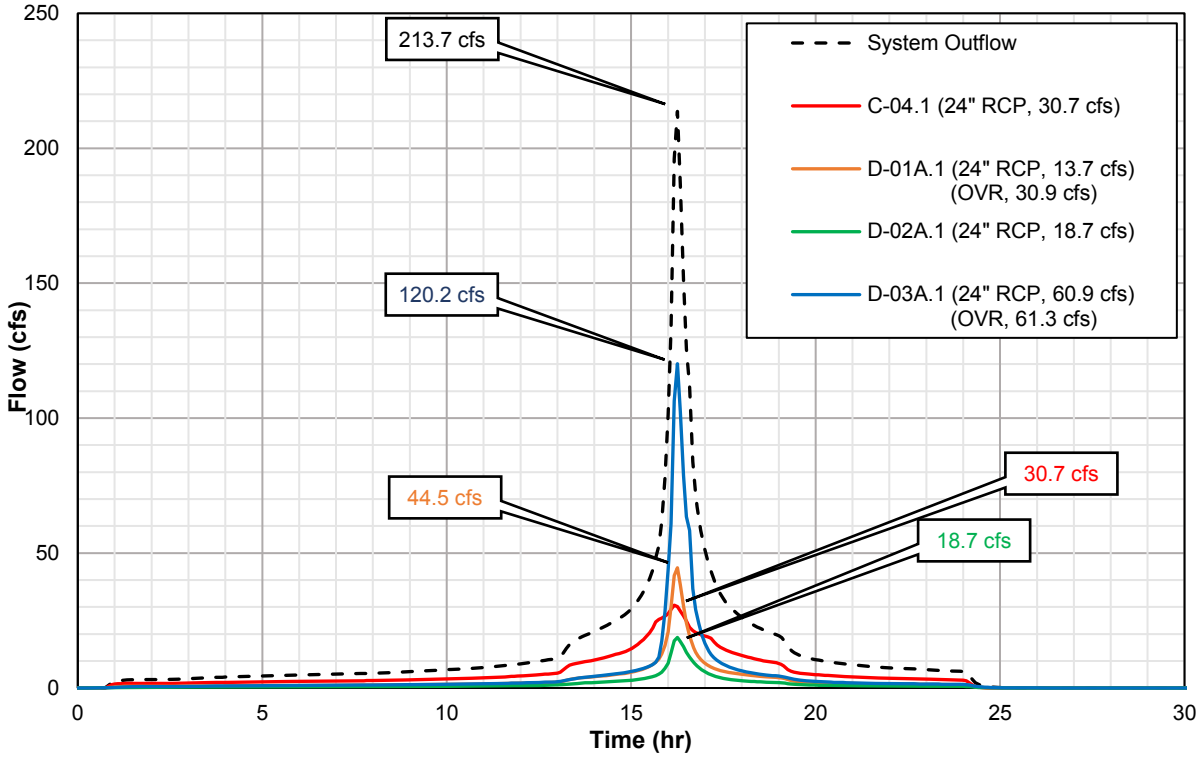
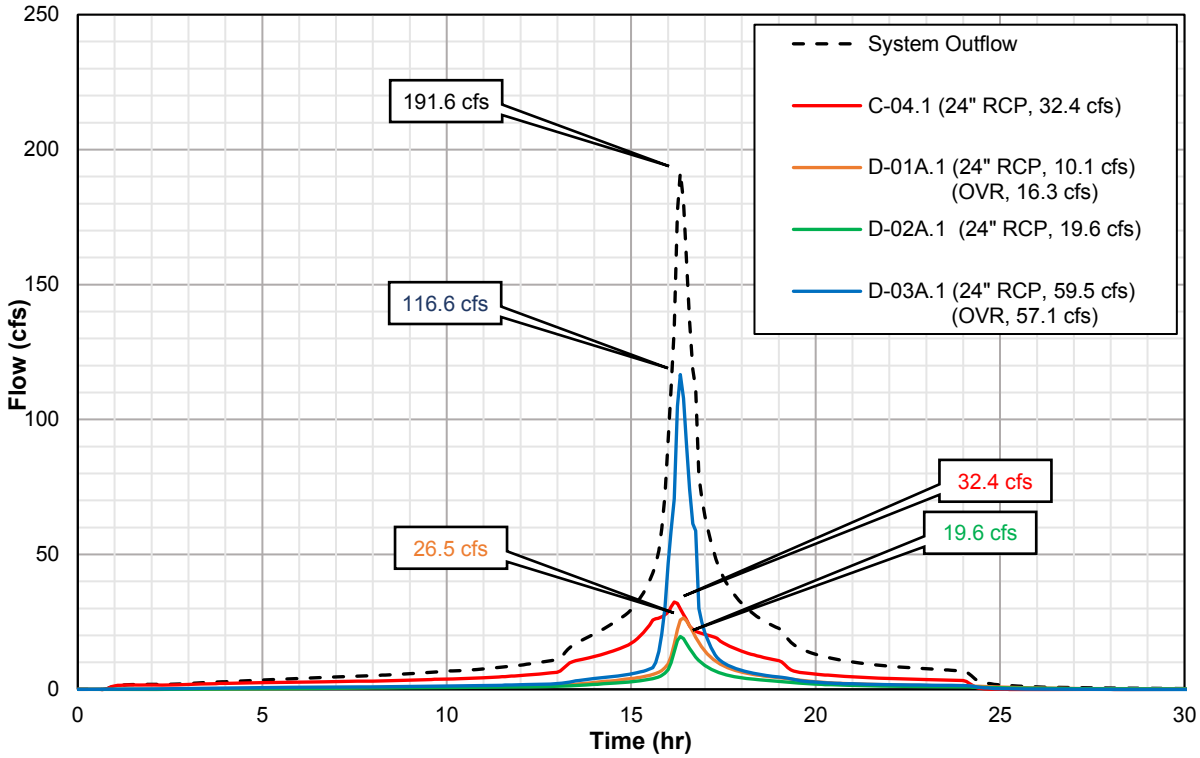


Figure 6-2B: Mitigated Outfall Hydrographs for System C+D



6.3 Systems E and F

The systems E and F are located south of the White Oak Bayou along I-10 and I-45. The system limits are south of White Oak Bayou, west of Houston Avenue and Winter Street/UPRR on the south. The offsite contributing drainage areas for System E and F are located west of I-10 and I-45. The overland sheet flow drains west to east across the project corridor to White Oak Bayou.

EXISTING CONDITIONS

The system E storm sewer has one outfall, a 54-inch RCP which is located approximately 450-feet west of Houston Avenue. The existing outfall and drainage area OFF-E02 are located outside of the project limits. A 36-inch RCP collects the flow from the drainage area OFF-E02 and drains to 54-inch RCP outfall. The overland flow from offsite drainage area OFF-E02 flow directly towards White Oak Bayou. A 54-inch RCP collects the flow from the offsite drainage area OFF-E01 and the overland flows drains east along the along the roadside ditch towards White Oak Bayou. No improvement has been proposed to the 54-inch RCP outfall.

A City of Houston 72-inch RCP along Shearn Street that crosses I-10 and I-45 corridor and outfalls to White Oak Bayou passes through System F. The 72-inch RCP collects flow from the contributing offsite drainage area OFF-F01, a neighborhood on the west. The review of available data determines that the existing 72-inch RCP doesn't collect any flow within TxDOT ROW. Therefore, no improvements are proposed to the 72-inch RCP. The existing storm sewer and the 72-inch outfall meets the 2-year design criteria for offsite system OFF-F01. The excess overflows above 2-year gets collected along Spring Street and Holly Street and sheet flows under the I-10 and I-45 bridges, and consequently outflow to White Oak Bayou. To reflect these conditions in SWMM modeling, the overland flow from drainage area OFF-F01 was calculated by subtracting a 2-year storm event hydrograph from the 100-year hydrograph. An overland link was modeled from drainage area/node OFF-F01 to F-02.

MITIGATED CONDITIONS

The offsite flow from drainage systems OFF-E01 and OFF-E02 cause ponding issues on the I-10 mainlanes in existing conditions. Since no improvements are proposed to the 54-inch RCP outfall, it is recommended that a new trunkline be proposed to collect flows from offsite drainage areas OFF-E01 and E01A and I-10 eastbound mainlanes. The proposed trunkline with sizes ranging from 48-inch RCP to 8' x 4' RCB has been proposed. A new 36-inch trunkline is also proposed to collect flows from the I-10 westbound mainlanes. The proposed trunkline will drain to the proposed detention pond "Pond-F". The outfall for the detention pond was designed to provide the required mitigation while not increasing the peak outflow for the 100-year storm event.

The storm sewer system located within OFF-F01 has the capacity to meet the 2-year storm event. The excess overflows from the drainage area OFF-F01 is determined by subtracting the 2-year runoff hydrographs from the 100-year hydrographs. The Spring Street and Holly Street will collect the overland flow from the offsite drainage area OFF-F01 and will drain towards the proposed detention pond (see **Exhibit 6-2**, **6-3** and **6-4** for details).

The proposed detention layout and cross-sections are provided in **Exhibit 6-5 – Proposed Detention Pond Layout**. The elevation-area rating table for the Pond-F is provided in **Table 6-3** below.

Table 6-3: Pond-F Elevation-Area Table

Elevation	Area	Cumulative Volume
(ft)	(ac)	(ac-ft)
7.00	0.00	0.0
9.00	3.99	3.61
10.33	4.19	9.12
11.00	4.32	11.91
13.00	4.67	20.90
15.00	5.02	30.60

To maintain the 100-year water surface elevation in Pond F and to not increase the proposed outflow for the system, the pond outlet was sized to be 2 - 6' x 4' RCBs to White Oak Bayou.

In conclusion, System E and F had combined drainage area of 201.81 acres with pavement increase of 6.78 acre, which will lead to peak runoff increase of 55.0 cfs and net runoff volume increase of 3.73 ac-ft. The peak runoff and volume increase will be mitigated in the proposed storm sewer trunklines and Pond-F, which will reduce total mitigated outflow to 752.2 cfs and provide runoff mitigation of 9.12 ac-ft.

The detailed output for existing and mitigated XPSWMM networks are provided in **Appendix C - XPSWMM Output**. **Table 6-4** below provides a comparison of the outflows for System E and F. **Figure 6-3** shows the existing and mitigated outflow hydrograph comparisons for System E+F.

Table 6-4: Existing and Proposed Outflow Comparison for System E+F

Outfall Link (ID)	100-Year Peak Outflow (cfs)		
	Existing	Mitigated	Δ
Total	**846.0**	**753.0**	**-93.0**

Figure 6-3A: Existing Outfall Hydrographs for System E+F

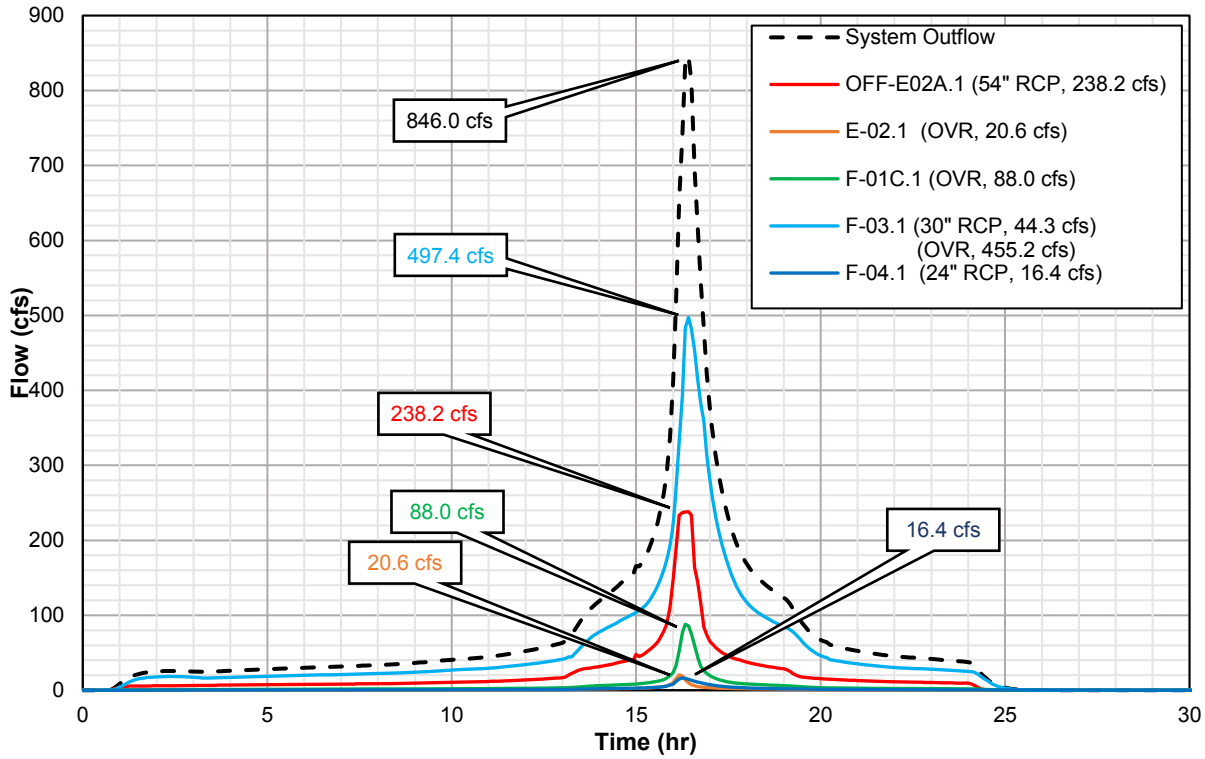
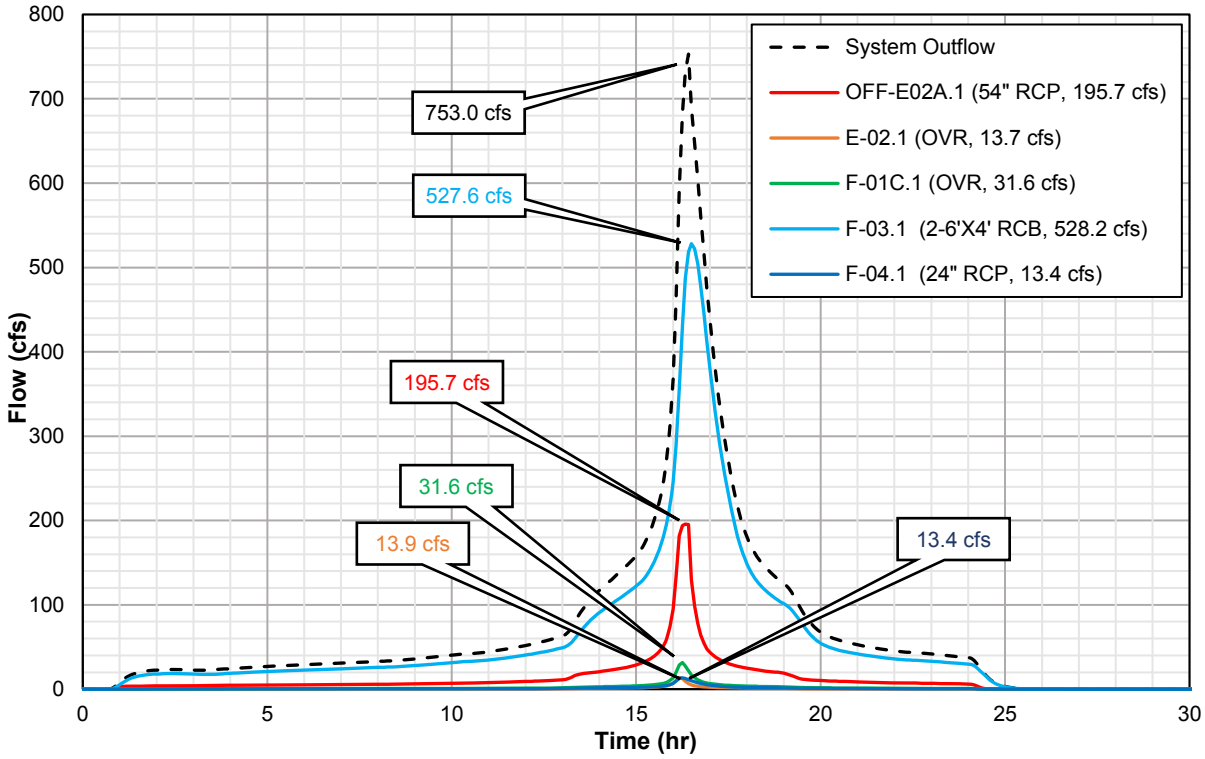


Figure 6-3B: Mitigated Outfall Hydrographs for System E+F



6.4 Systems G and H

The systems G and H are located in between Hogan Street on north, N Main Street on east and I-10/I-45 downtown connectors on south. System H is located west of White Oak Bayou and system G is located east of White Oak Bayou. Systems G and H were combined for analysis due to the close proximity of the outfalls.

EXISTING CONDITIONS

System G drains the project corridor west portion of N Main Street, Daly Street Lot Park N' Ride and the open grass area west of the parking lot through a 36-inch RCP to White Oak Bayou. System H collects I-10 and I-45 mainlanes and offsite areas through a single 60-inch RCP storm sewer trunkline and outfalls to White Oak Bayou. This 60-inch RCP also collects flow from the neighborhood on the west, crosses I-10 and I-45 corridor and outfalls to White Oak Bayou. The portion of the overland flow from the offsite areas in System H gets collected through inlets and 36-inch RCP that connects to a 60-inch storm sewer trunkline. The majority of the overflows sheet flows on the I-10 and I-45 mainlanes to White Oak Bayou.

The surveyor has confirmed existence of a 60-inch pipe, but it was not able to confirm exact outfall location and flowline elevations of the pipe due to inaccessibility and the existence of water in the pipe. Currently there is an inlet in the low points of Offsite Area OFF-H01 that collects the water from this area. No other connecting pipe to the 60-inch storm sewer trunkline was found by the surveyor in this area. In addition, the I-45 and I-10 road profiles are low in between Hogan Street and the UPRR bridges. In extreme events the overland flow from the offsite areas will overtop at these locations and will flow overland to the White Oak Bayou.

MITIGATED CONDITIONS

The I-10 and I-45 corridors will be re-aligned through System G. The proposed roadway in this location will be on bridges and will drain through slotted rails. The outfalls for System G and H are across each other, therefore, the roadway impacts from System G will be mitigated in Pond-H. Coordination was performed with Segment 3C designers for the System G impact mitigation. (Refer to Segment 3C report). Additionally, a detention pond, Pond-G, is proposed under the bridges to mitigate for the floodplain fill in Segment 3C (see **Exhibit 5-2** for Pond-G location). The existing 36-inch RCP will be replaced with 2 - 54-inch RCPs to White Oak Bayou. The proposed detention layout and proposed cross-sections are provided in **Exhibit 6-5 – Proposed Detention Pond Layout**. The elevation-area rating table for the Pond-G is provided in **Table 6-5** below.

Table 6-5: Pond-G Elevation-Area Table

Elevation	Area	Cumulative Volume
(ft)	(ac)	(ac-ft)
9.00	2.54	0.00
13.00	3.25	11.57
17.00	3.95	25.96
21.00	4.65	43.15
25.00	5.35	63.15
28.00	5.88	80.00

For System H, the proposed I-10 and I-45 roadways in System H will be raised embankment to ensure that the mainlane edge of pavement is higher than the 100-year Water Surface Elevation (WSEL) of White Oak Bayou. To avoid offsite flows from drainage systems OFF-H04, OFF-H04 and OFF-H02 to cause roadway flooding, it is recommended that a new trunkline be constructed to collect flows from these offsite areas. A trunkline with sizes ranging from 48-inch RCP to 8' x 4' RCB box has been proposed on the outside of I-10 eastbound mainlanes. A new 48-inch trunkline is also proposed to collect flows from I-45 southbound mainlanes, Direct Connector I-10 and I-10 East Bound MaX lanes. A 36-inch trunkline is proposed to collect flows from I-45 northbound mainlanes and I-10W MaX lanes. A 36-inch trunkline is proposed to collect flows from I-10 westbound mainlanes.

All four proposed trunklines will drain to the proposed detention pond "Pond-H". The outfall for the detention pond will provide the required mitigation and will not increase the peak outflow for the 100-year storm event. The remainder of the roads in this area are located on bridges and will drain overland to White Oak Bayou.

In the mitigated conditions, the existing 60-inch RCP will remain in place to collect the storm water from Offsite Areas OFF-H02 and OFF-H01. The remainder of the existing trunklines 36-inch RCP and 48-inch RCP in roadway corridor will be removed and replaced with four trunklines that run parallel to the mainlanes. It should be noted that the flowline elevation for the proposed storm sewer trunklines and the bottom of the pond (Flowline = 14.00) were set at a higher elevation than existing flowline of the existing 60-inch RCP (Flowline = 4.45). It is recommended to verify the flowline of the existing 60-inch RCP and to confirm the connection in this area. In addition, 2 - 60-inch equalizer pipes will be installed for the I-10 connecter road embankment that passes through Pond-H (see **Exhibit 6-2**, **6-3** and **6-4** for details).

The proposed detention layout and proposed cross-sections are provided in **Exhibit 6-5 – Proposed Detention Pond Layout**. The elevation-area rating table for the Pond-H is provided in **Table 6-6** below. In order to maintain the 100-year water surface elevation in Pond H and to not increase the proposed outflows, the pond outlet pipe was sized to be 2-60-inch RCP to White Oak Bayou.

Table 6-6: Pond-H Elevation-Area Table

Elevation	Pond-Ha		Pond-Hb		Total Volume
	Area	Cumulative Volume	Area	Cumulative Volume	
(ft)	(ac)	(ac-ft)	(ac)	(ac-ft)	(ac-ft)
14.00	0.00	0.00	0.00	0.00	0.00
18.00	5.28	13.57	1.36	3.49	17.06
20.74	5.87	29.22	1.51	7.52	36.74
22.00	6.14	36.41	1.58	9.37	45.78
26.00	7.03	62.76	1.81	16.16	78.92
29.00	7.72	84.89	1.99	21.91	106.80

In conclusion, System G and H had combined drainage area of 167.35 acres with pavement increase of 20.26 acres, which will lead to peak runoff increase of 164.7 cfs and net runoff volume

increase of 11.14 ac-ft. The peak runoff and volume increase will be mitigated in the proposed storm sewer trunklines and Pond-H, which will reduce total mitigated outflow to 543.5 cfs and provide runoff mitigation of 36.74 ac-ft.

The detailed output for existing and mitigated XPSWMM networks are provided in **Appendix C - XPSWMM Output**. **Table 6-7** below provides a comparison of the outflows for System G and H. **Figure 6-4** shows the existing and mitigated outflow hydrograph comparisons for System G+H.

Table 6-7: Existing and Mitigated Outflow Comparison for System G+H

Outfall Link (ID)	100-Year Peak Outflow (cfs)		
	Existing	Mitigated	Δ
Total	823.3	543.5	-279.8

Figure 6-4A: Existing Outfall Hydrographs for System G+H

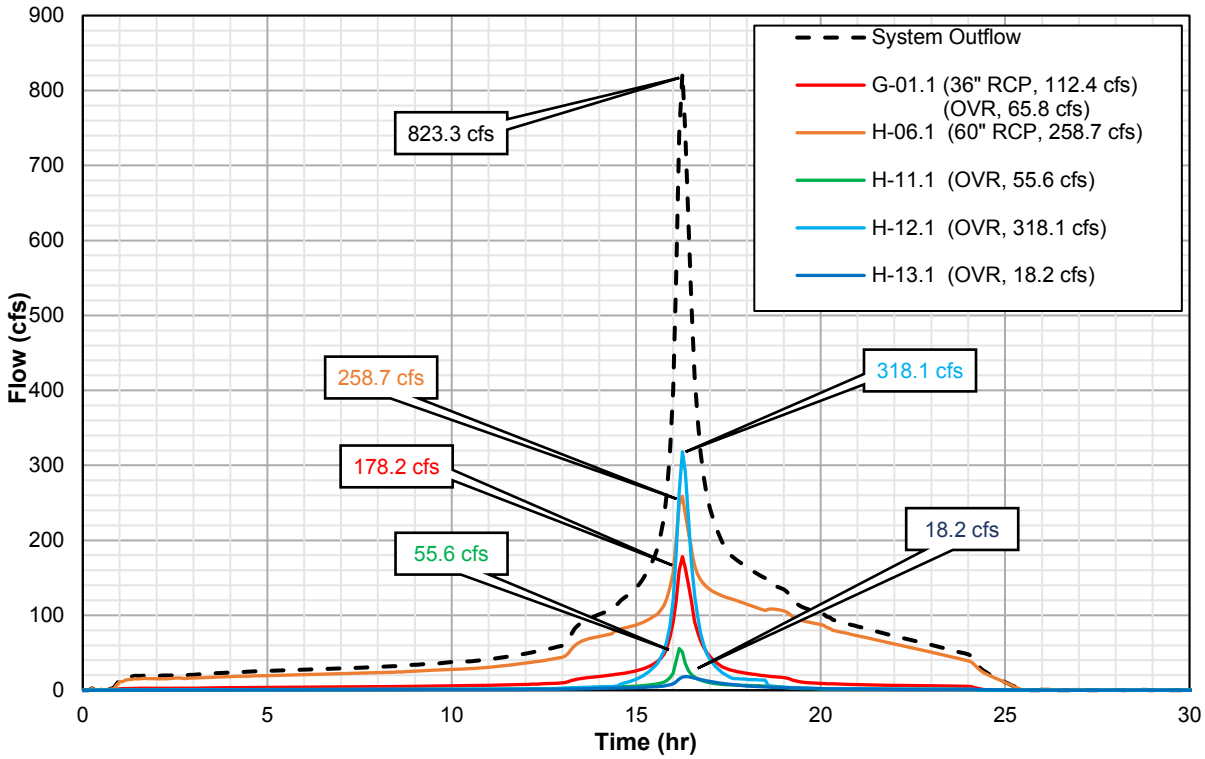
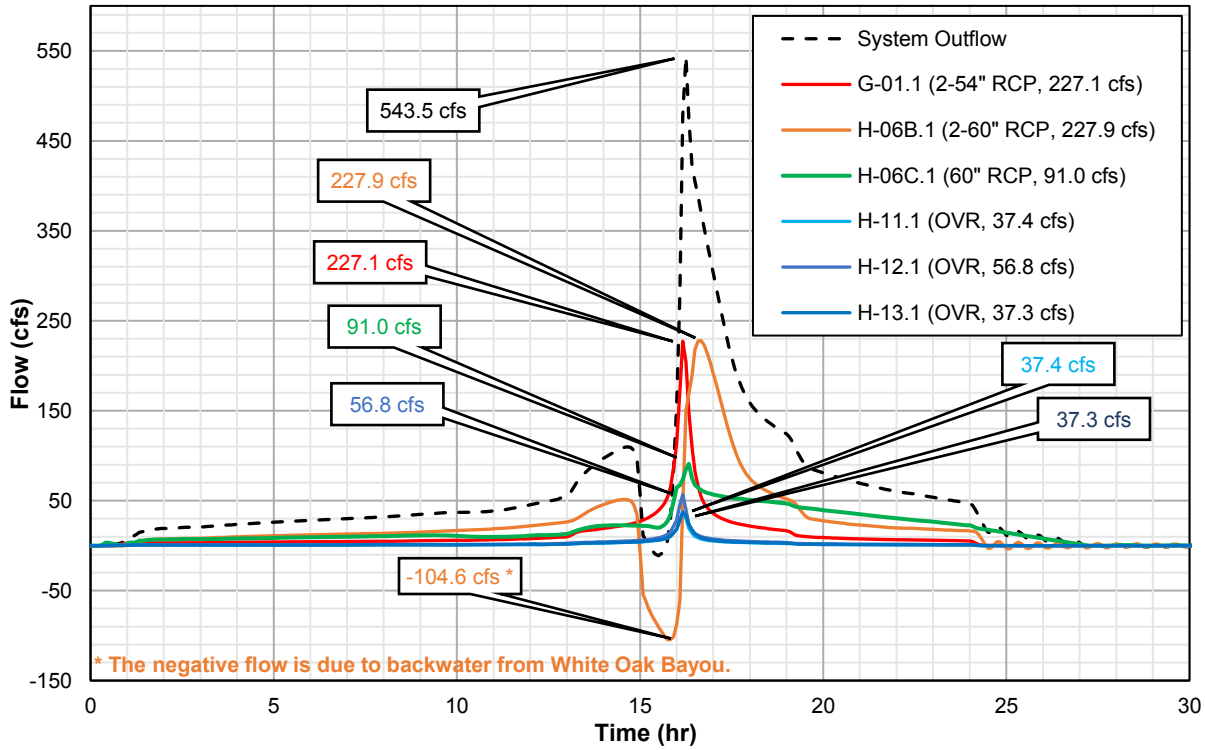


Figure 6-4B: Mitigated Outfall Hydrographs for System G+H



6.5 System I

The system I is located south of the White Oak Bayou and just north of Buffalo Bayou. The system I runs from I-10 underpass to Buffalo Bayou.

EXISTING CONDITIONS

System I consist of a single 4' x 4' RCB major outfall that drains to Buffalo Bayou. The storm sewer trunkline for System I collects the water from the I-10 underpass using a 30-inch RCP and conveys it through the 4' x 4' storm sewer trunkline beneath Louisiana Street exit ramp to Buffalo Bayou. Just upstream of the outfall, the 4' x 4' trunkline splits into a 24-inch RCP and 4' x 4' RCB outfall.

MITIGATED CONDITIONS

In the mitigated conditions, the existing roadway in this area will be removed and re-aligned, resulting in a net decrease in impervious area. A portion of the drainage areas I-02 and I-03, will be diverted to flow into Pond-H. Additionally, existing drainage area I-01 will be added to Pond-H. As a result, a decrease in total runoff was calculated and no improvement was proposed for this system. The existing system has the capacity to meet the design criteria (see **Exhibit 6-2**, **6-3** and **6-4** for details). **Table 6-8** below provides a comparison of the existing and proposed outflow hydrographs for System I. **Figure 6-5** shows the existing and mitigated outflow hydrograph comparisons for System I.

Table 6-8: Existing and Mitigated Outflow Comparison for System I

Outfall Link (ID)	100-Year Peak Outflow (cfs)		
	Existing	Mitigated	Δ
Total	165.3	112.0	-53.3

Figure 6-5A: Existing Outfall Hydrographs for System I

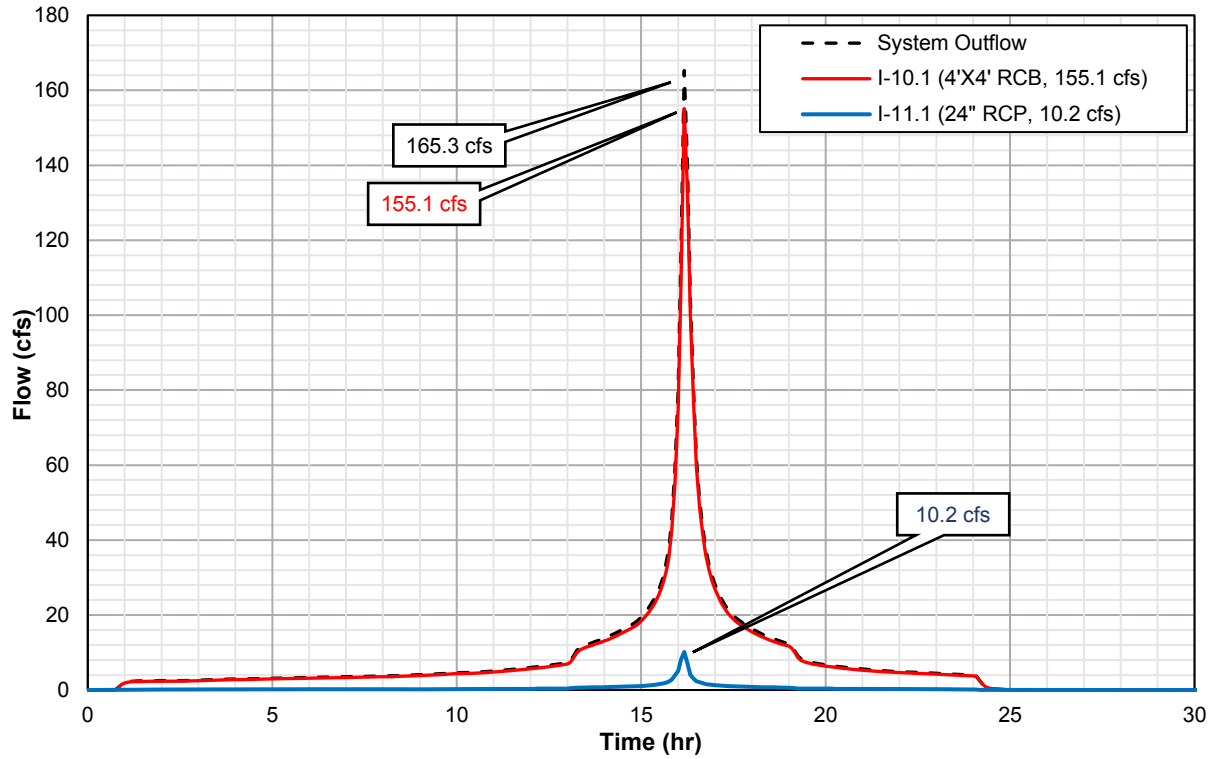
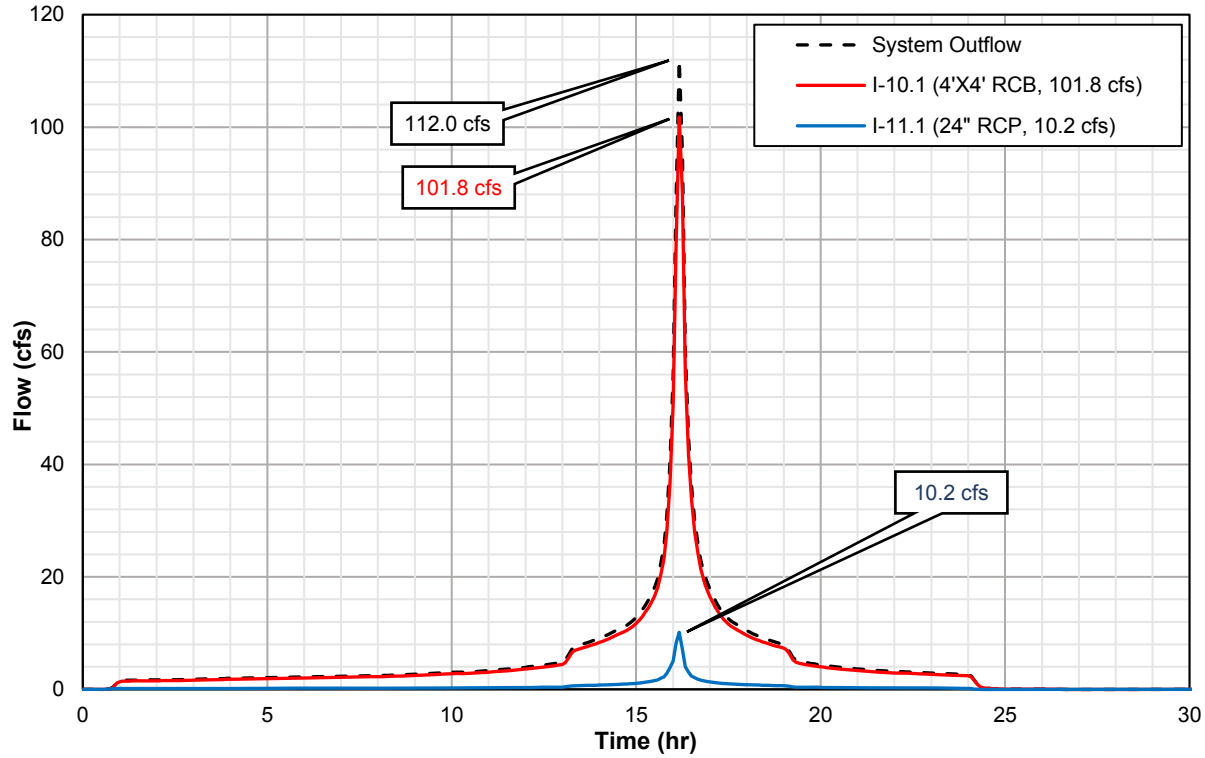


Figure 6-5B: Mitigated Outfall Hydrographs for System I



6.6 System J

System J is located east of System I and is located south of White Oak Bayou.

EXISTING CONDITIONS

In existing conditions, System J drains outfalls to White Oak Bayou through a 60-inch and 24-inch RCP. The 60-inch storm sewer trunkline collects the flows from the area around Milam and Travis Street exit ramps. There are concrete swales located along I-10 embankment that connects to the 60-inch storm sewer trunkline. The 24-inch storm sewer is a stand-alone pipe that drains a portion of the parking lot.

MITIGATED CONDITIONS

In the mitigated conditions, the existing roadway will be removed and re-aligned, resulting in a net decrease in impervious areas. In addition, a portion of the drainage area J-01A will be diverted to flow towards Pond-H. No improvements were proposed for this system and is recommended to keep the 60-inch and 24-inch RCP outfalls (see **Exhibit 6-2**, **6-3** and **6-4** for details). **Table 6-9** below provides a comparison of the outflow hydrographs for System J. **Figure 6-6** shows the existing and mitigated outflow hydrograph comparisons for System J.

Table 6-9: Existing and Mitigated Outflow Comparison for System J

Outfall Link (ID)	100-Year Peak Outflow (cfs)		
	Existing	Mitigated	Δ
Total	101.4	99.3	-2.1

Figure 6-6A: Existing Outfall Hydrographs for System J

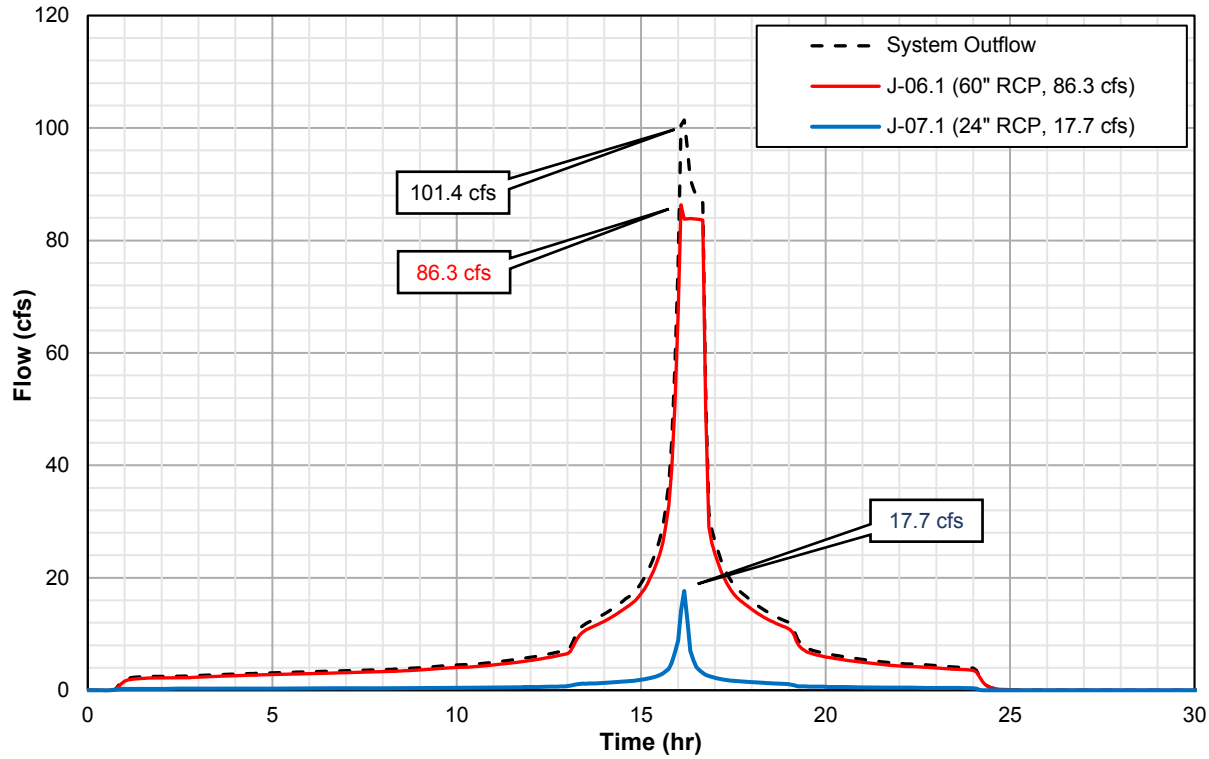
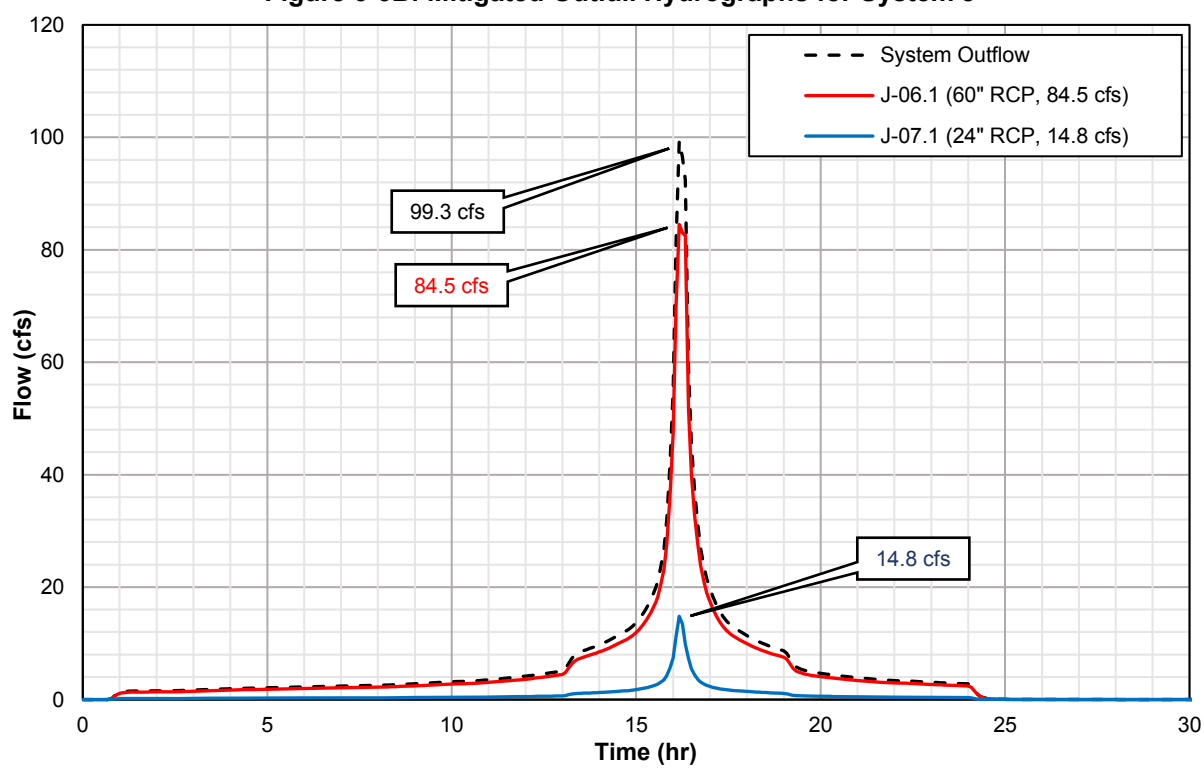


Figure 6-6B: Mitigated Outfall Hydrographs for System J



6.7 Mitigation Volume Results

Based on XPSWMM models for existing and proposed conditions, the proposed improvements in conjunction with the proposed detention pond were found to be adequate for the impact mitigation. The total required mitigation volume for Segment 3D impacts was computed to be 17.12 ac-ft based on XPSWMM model link results. The proposed mitigation will provide a volume storage of 49.07 ac-ft which is higher than the required 17.12 ac-ft of storage. The 45.86 ac-ft of storage volume is provided in the proposed detention ponds, below the 100-year WSEL. The remaining volume of 28.74 ac-ft (45.86-17.12) will be used for floodplain fill mitigation as discussed later in Section 6.9. See **Tables 6-10** for the summary of storage volumes between mitigated model and existing model.

Table 6-10: 100-Year Peak Volume Impact Mitigation

Drainage System	Required Mitigation Volume	Provided Mitigated Volume	ΔV (Mitigated - Required)
(ID)	(ac-ft)	(ac-ft)	(ac-ft)
A+B	1.63	1.55	-0.08
C+D	0.62	1.66	1.04
E+F	3.73	9.12*	5.39
G+H	11.14	36.74*	25.60
Total	**17.12**	**49.07**	**31.95**

* Detention Pond volume below the system100-yr WSEL. (9.12+36.74 = 45.86)

6.8 Geopak Analysis

The initial proposed storm sewer systems were designed using Bentley's Geopak Drainage for the 10-year storm event. The primary purpose of the Geopak modeling was to determine the minimum required storm sewer sizes to meet the design criteria as discussed in **Section 2.0**. The design criteria states that proposed storm sewers systems must contain the complete 10-year flow below the crown of the pipe. The proposed trunkline was further evaluated for 100-year storm event in XPSWMM. The final XPSWMM mitigation runs were then used to update the Geopak runs.

The top of pipe and the 100-year WSEL in the ponds were used as the outfall tailwater elevation in Geopak. The Geopak Drainage output results for the 10-year storm are provided in **Appendix D- Geopak Drainage Output**.

6.9 Floodplain Mitigation Analysis

As mentioned in Section 2.5 of this report, the project corridor is situated in White Oak Bayou FEMA Zone AE floodplain as shown on the FEMA FIRM Panel No. 48201C0690N, Effective Date January 6, 2017. The effective models from HCFCD were reviewed to check the validity of the effective floodplain.

In proposed condition the I-10 and I-45 mainlane profiles will be raised to meet the 100-year WSEL of White Oak Bayou. This adjustment in addition to the roadway widening will result in a

net floodplain fill. A preliminary floodplain fill impact was conducted by estimating the approximate fill volumes associated with the proposed road profile within the effective 100-year floodplain. The analysis considered the preliminary proposed profile developed as part of schematic design by HNTB Corporation. The fill elevation was computed above the existing ground and below the 100-year WSEL. The effective Base Flood Elevation in the area ranges from 35- to 38-feet.

As shown in Tables **6-11** and **6-12** the proposed project will result in 101.90 ac-ft of fill in the floodplain. As a result, proposed floodplain fill will need to be mitigated for White Oak Bayou. The mitigation for floodplain fill is provided in the proposed detention ponds 'F' and 'H'. The total detention storage in the proposed ponds results in 137.40 ac-ft (106.80+30.60). The roadway impact analysis will require 17.12 ac-ft for mitigation volume to offset roadway impacts. The resultant detention volume of 120.28 ac-ft will mitigate for the required floodplain fill mitigation of 101.90 ac-ft.

The preliminary floodplain cut and fill for White Oak Bayou and the fill location is shown in **Exhibit 6-6 – Preliminary Floodplain Fill Impact**. **Tables 6-13** below provides a summary of the floodplain fill quantity and mitigation volume within Ponds 'F' and 'H'.

Table 6-11: 100-Year Water Surface Elevation in the Floodplain Fill Area

HEC-RAS Cross Section	Effective WSE (feet)	Corrected Effective WSE (feet)
6775	37.08	40.53
6423	36.96	40.47
5525	36.85	40.20
4812	36.37	39.89
4687	36.25	39.83
4407	36.00	39.80
3585	35.41	39.40
2298	35.07	39.23

Table 6-12: Floodplain Fill Volume

Elevation (ft)	Fill in Effective Floodplain (ac-ft)	Fill in Corrected-Effective Floodplain (ac-ft)
30	6.1	8.4
32	23.5	34.6
34	15.0	26.9
36	9.6	18.7
37	2.2	3.7
38	--	6.5
40	--	1.7
41		1.5
Total	**56.5**	**101.9**

Table 6-13: Mitigation Volume in Provided Ponds ‘F’ and ‘H’

	Volume (ac-ft)
Proposed Pond 'F' Volume	30.60
Proposed Pond 'H' Volume	106.80
Total Proposed Volume	137.40
Required Total Volume Due to Roadway Impacts	17.12
Required Floodplain Fill Mitigation	101.90
Total Required Volume for Mitigation	119.02

7.0 PRELIMINARY COST ESTIMATES

The preliminary cost for proposed drainage improvements due to roadway reconstruction, North Canal and South Canal was determined as part of the study. (**See Tables 7-1, 7-2 and 7-3**). The TxDOT low bid unit price averages were used as reference and twenty percent (20%) contingency was applied. ROW acquisition, demolition and environmental costs for the proposed improvement were not included in these cost estimates. The preliminary cost for drainage improvements, North Canal and South Canal are estimated to be $24.8 million, $54.5 million, and $16.1 million respectively.

Table 7-1: Preliminary Cost Estimate – Drainage Improvements

Item No	Description	Total
1	EXCAVATION (3 PONDS)	$9,000,000
2	STRUCT EXCAV (BOX) *	$125,000
3	STRUCT EXCAV (PIPE) *	$280,000
4	TRENCH PROTECTION	$150,000
5	SPECIAL SHORING	$1,500,000
6	CEM STABIL BKFL	$1,440,000
7	CEM STABIL BKFL (INLET OR MH)	$120,000
8	CONC BOX CULV (4 FT X 4 FT)	$149,270
9	CONC BOX CULV (6 FT X 4FT)	$685,030
10	CONC BOX CULV (8 FT X 4FT)	$602,770
11	RC PIPE (CL III) (24 IN)	$226,460
12	RC PIPE (CL III) (30 IN)	$82,620
13	RC PIPE (CL III) (36 IN)	$1,045,780
14	RC PIPE (CL III) (42 IN)	$6,820
15	RC PIPE (CL III) (48 IN)	$603,950
16	RC PIPE (CL III) (54 IN)	$159,840
17	RC PIPE (CL III) (60 IN)	$506,690
18	RC PIPE (CL III) (72 IN)	$258,400
19	INLET (COMPL)(TY A)	$480,000
20	GRATE AND FRAME (BRIDGE DRAIN)	$360,000
21	MANH (COMPL)(TY A)	$192,000
22	OUTFALL STRUCTURES	$400,000
23	REMOV CULV. CROSSING (3 BARRELS)	$720,000
24	CONCRETE RIPRAP	$840,000
25	TEMPORARY DRAINAGE	$500,000
26	EROSION CONTROL	$250,000
	SUBTOTAL	**$20,684,630**
	CONTINGENCY (20%)	$4,136,926
	TOTAL	**$24,821,556**

Table 7-2: Preliminary Cost Estimate – North Canal

Item No	Description	Total
1	CANAL EXCAVATION	$3,750,000
2	INTAKE AND OUTTAKE STRUCTURE	$3,000,000
3	EROSION CONTROL	$2,000,000
4	BANK STABILIZATION (BUFFALO)	$1,500,000
5	BRIDGE AND ROAD (SAN JACINTO)	$3,000,000
6	BRIDGE (RR CROSSING)	$10,000,000
7	UTILITY ADJUSTMENTS	$3,000,000
8	SLOPE STABILITY (CONCRETE/RIPRAP)	$19,200,000
	SUBTOTAL	**$45,450,000**
	CONTINGENCY (20%)	$9,090,000
	TOTAL	**$54,540,000**

Table 7-3: Preliminary Cost Estimate – South Canal

Item No	Description	Total
1	CANAL EXCAVATION	$4,050,000
2	INTAKE AND OUTTAKE STRUCTURE	$3,000,000
3	EROSION CONTROL	$2,000,000
4	BANK STABILIZATION (BUFFALO)	$1,500,000
5	UTILITY ADJUSTMENTS	$500,000
6	SLOPE STABILITY (CONCRETE/RIPRAP)	$2,400,000
	SUBTOTAL	**$13,450,000**
	CONTINGENCY (20%)	$2,690,000
	TOTAL	**$16,140,000**

8.0 CONCLUSION & RECOMMENDATION

Segment 3 of the NHHIP includes key challenges with improvements occurring in and around the confluence of White Oak Bayou and Buffalo Bayou. Both bayous act as primary storm water conveyance routes for the greater part of West Houston. This report presents the open channel hydrologic and hydraulic analysis, evaluates the impacts and corresponding mitigation measures for the proposed Segment 3 improvements of NHHIP in Harris County, TX. This analysis explores scenarios for existing flood hazard mitigation, in addition to mitigating project impacts. In addition, the study also determines the runoff impacts and corresponding mitigation needs associated with the roadway widening and reconstruction for Segment 3D. The following is a list of the study conclusions and recommendations:

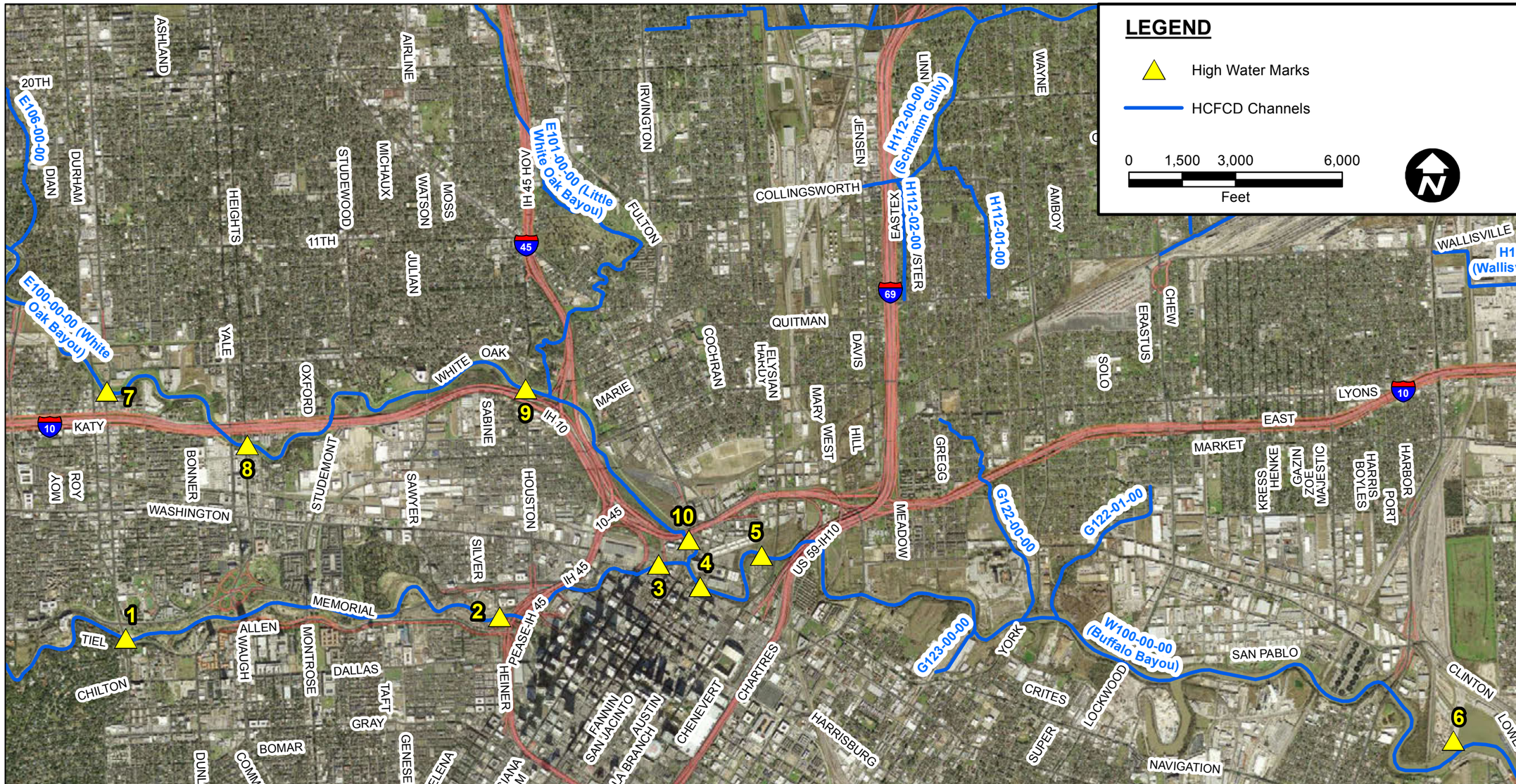
1. The Corrected Effective model results in a sizable increase in 100-yr WSEL relative to the existing conditions effective model. The Corrected Effective model was created by calibrating the effective HCFCD M3 and Risk map models with data collected from Harvey, Tax Day and Memorial Day events. The WSEL's in the Corrected Effective model are in general 1 to 3 feet higher than the WSELs in the effective model.
2. Hydraulic changes to bridges and floodplain fill result in an increase in 100-yr WSEL along White Oak Bayou without mitigation. The unmitigated proposed condition model was developed to assist with understanding the impacts of the NHHIP project. The results showed that the WSEL in the unmitigated proposed model will increase 0.05 feet compared to the WSEL in the Corrected Effective model.
3. Portions of the proposed profile do not meet the Project criteria, edge of pavement above the 100-yr WSEL. It is recommended that a portion of the proposed I-10 and I-45 main lanes between Hogan Street and UPRR, that run parallel to the White Oak Bayou, be raised to meet the minimum 100-year design criteria.
4. Improvement Scenario 3 provides significant benefit; improved roadway/highway LOS for both TxDOT highways and City streets, reduction in WSEL for the downtown area and Buffalo/White Oak Bayous upstream of downtown, and reduced project cost for the NHHIP through lowered profiles. The North Canal scenario involves diverting the high flow from White Oak Bayou immediately downstream of Main Street to Buffalo Bayou just upstream of McKee Street. The results showed that the WSEL in the north canal model (Scenario 1) varies from -3.45 to 1.04 compared to the Corrected Effective model. The reduction in WSEL removes or reduced flooding for over 1000 structures producing a significant measurable project benefit. Scenario 3 improvements are contingent upon the resolution of downstream impacts. The benefits for the Scenario 3 improvements involves reduced damages to commerce, building contents, vehicles, and drainage infrastructure. It is recommended further study be done to evaluate the full benefit cost analysis.
5. Improvements to the Heights Boulevard and Yale Street bridge crossings extend the benefits of the North and South Canals upstream into portions of the White Oak Bayou watershed with significant repetitive loss history. The Proposed North Canal project can potentially provide reductions on the WSEL upstream of the NHHIP project limits.

However, the reduction in WSEL is not adequate to address the existing flooding along White Oak Bayou in the Heights area and the I-10 depressed section between Patterson Street and Studemont Street. The proposed modifications near the Heights and Yale bridges includes the removal of the abandoned Union Pacific Railroad bridge (UPRR) remnants just upstream of the Yale street and channel side slope work beneath the bridges to add conveyance capacity. These improvements are included in Scenario 3. The North Canal and Height Blvd Improvements produces a -3.83 to 1.23 difference in WSEL from compared to the Corrected Effective model.

6. Scenario 3 conveyance improvements result in an increase in WSEL of up to 1.45 feet downstream of I-69. To mitigate for the increase in WSEL is estimated to require 4,300 ac-ft of detention downstream of the project area. An alternative to full mitigation is the acceptance of a safe increase in WSEL downstream of the project area where much of Buffalo Bayou has available freeboard. Scenario 3 is conditionally recommended pending resolution of the downstream impact issue.
7. Scenario 4 focuses on mitigating for the NHHIP Segment 3 impacts resulting from the proposed roadway work. Segment 3 of the NHHIP can be effectively mitigated with a local detention within the project ROW. Scenario 4 is recommended if no resolution can be found for Scenario 3.
8. Roadway impact analysis and drainage system design, for Segment 3D, was also carried out as part of this report. The proposed Segment 3D roadway improvements created a net increase of approximately 22.91 acres in impervious cover within a total ROW area of 163.70 acres. The increase in impervious cover resulted in a net peak flow rate increase of 184.8 cfs. A routing analysis performed in XPSWMM concluded that the existing storm sewer trunk lines will not be sufficient to provide the necessary flow reduction and mitigation volume. As a result, a combination of upgraded storm sewer lines, ditches as well as the proposed detention ponds was recommended to mitigate for increases in peak flow and volume. The proposed mitigation measures were shown to provide 49.07 ac-ft of compensating storage volume within the project limits, which is higher than the required volume of 17.12 ac-ft.
9. As a part of this study it was estimated the proposed roadway profile modifications will add 101.90 ac-ft of fill to the floodplain. To account for the additional fill, the excavation from Ponds ‘F’ and ‘H’ were used to mitigate for the floodplain fill. The total detention storage in the proposed ponds was found to be 137.40 ac-ft. The roadway impact analysis required 17.12 ac-ft for mitigation volume to offset roadway impacts. The resultant detention volume of 120.28 ac-ft will mitigate for the required floodplain fill mitigation of 101.90 ac-ft. Therefore, the recommended mitigation measures will provide adequate storage volume to mitigate the runoff flow impacts back to pre-project conditions.

Based on the hydrologic and hydraulic analysis as part of this drainage impact study, the proposed NHHIP Segment 3D reconstruction and some corresponding mitigation measures described within, will not adversely impact the receiving creeks, overland sheet flow patterns, or adjacent structures for the 100-year storm event.

EXHIBITS



ID	LOCATION	CHANNEL NAME	100 YR WSEL EFFECTIVE	500 YR WSEL EFFECTIVE	HWM (MEMORIAL DAY 2015)	HWM (TAX DAY 2016)	HWM (HARVEY 2017)	MEM DY / TAX DY/ HARVEY HWM EVENT (YR)
1	SHEPHERD DR	BUFFALO BAYOU	37.96	43.97	33.80	31.80	41.40	50 / 10 / 350
2	SABINE ST	BUFFALO BAYOU	37.03	42.93	32.10	29.90	39.90	50 / 10 / 300
3	MILAM ST	BUFFALO BAYOU	35.65	41.31	31.30	28.70	37.80	50 / 10 / 250
4	SAN JACINTO ST	BUFFALO BAYOU	32.55	37.66	29.40	27.20	37.20	50 / 40 / 500
5	MCKEE ST	BUFFALO BAYOU	29.63	34.61	23.40	22.50	30.10	20 / 20 / 150
6	TURNING BASIN	BUFFALO BAYOU	7.09	12.65	--	6.80	12.10	x / 90 / 420
7	N. SHEPHERD DR	WHITE OAK BAYOU	48.84	51.84	35.50	44.10	51.30	<10 / 20 /375
8	HEIGHTS BLVD	WHITE OAK BAYOU	43.28	46.73	33.90	38.80	45.60	<10 / 20 / 300
9	HOUSTON AVE	WHITE OAK BAYOU	37.40	42.51	29.00	33.50	40.30	<10 / 20 / 250
10	MAIN ST	WHITE OAK BAYOU	34.33	40.38	--	--	--	--

* HWMs IN RED NOT USED FOR CALIBRATION

ID	LOCATION	HWM (MEMORIAL DAY 2015)	HWM (TAX DAY 2016)	HWM (HARVEY 2017)
4	SAN JACINTO ST	29.40	27.20	37.20
5	MCKEE ST	23.40	22.50	30.10
	Δ HGL	**6.00**	**4.70**	**7.10**

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

HISTORICAL STORM EVENTS

PREPARED:

CHECKED:

APPROVED:

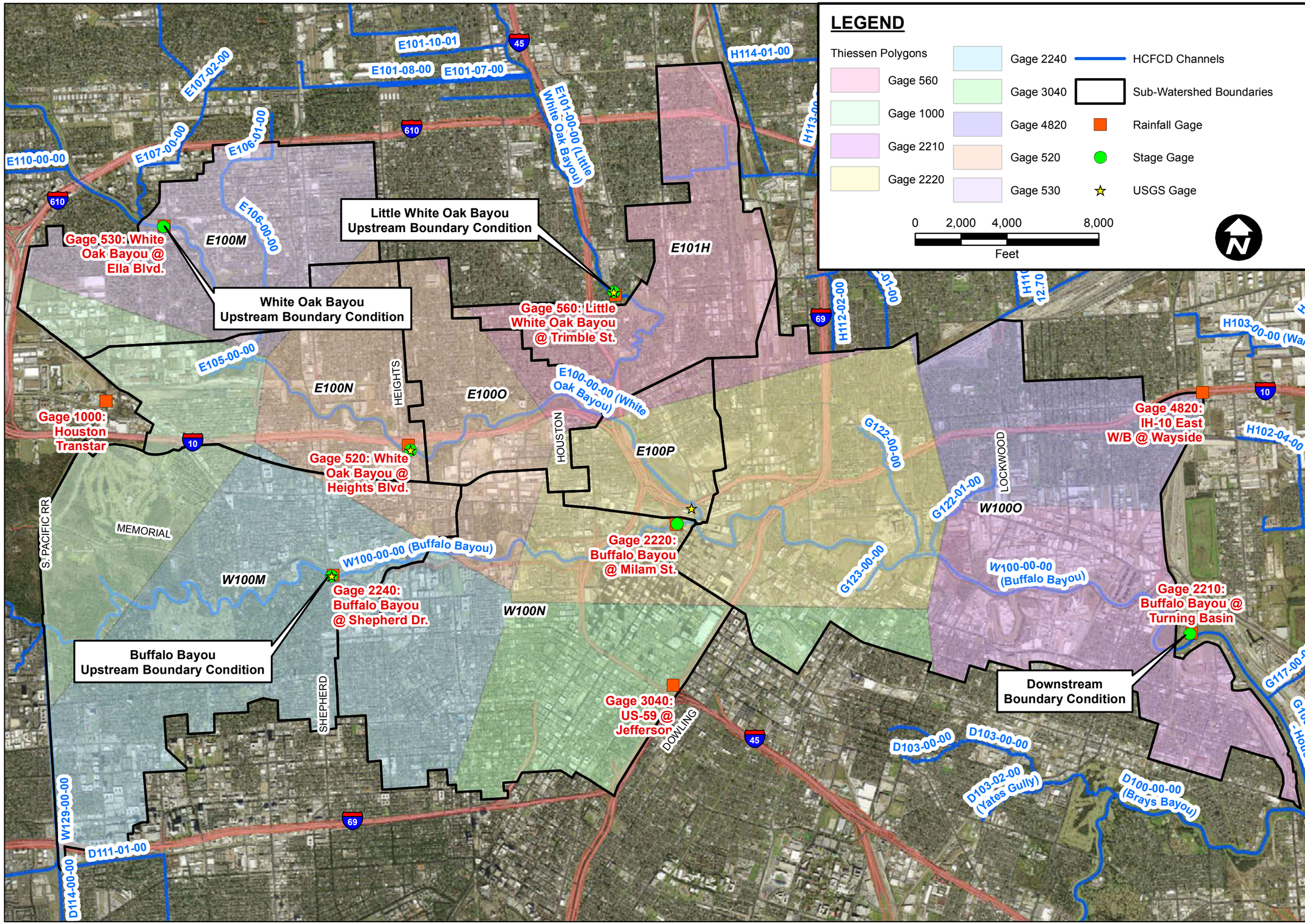
Lockwood, Andrews & Newnam, Inc.

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
3-2



NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

RAINFALL GAGE LOCATIONS AND THIESSEN POLYGONS

PREPARED:

CHECKED:

APPROVED:

Lockwood, Andrews & Newnam, Inc.

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
3-1

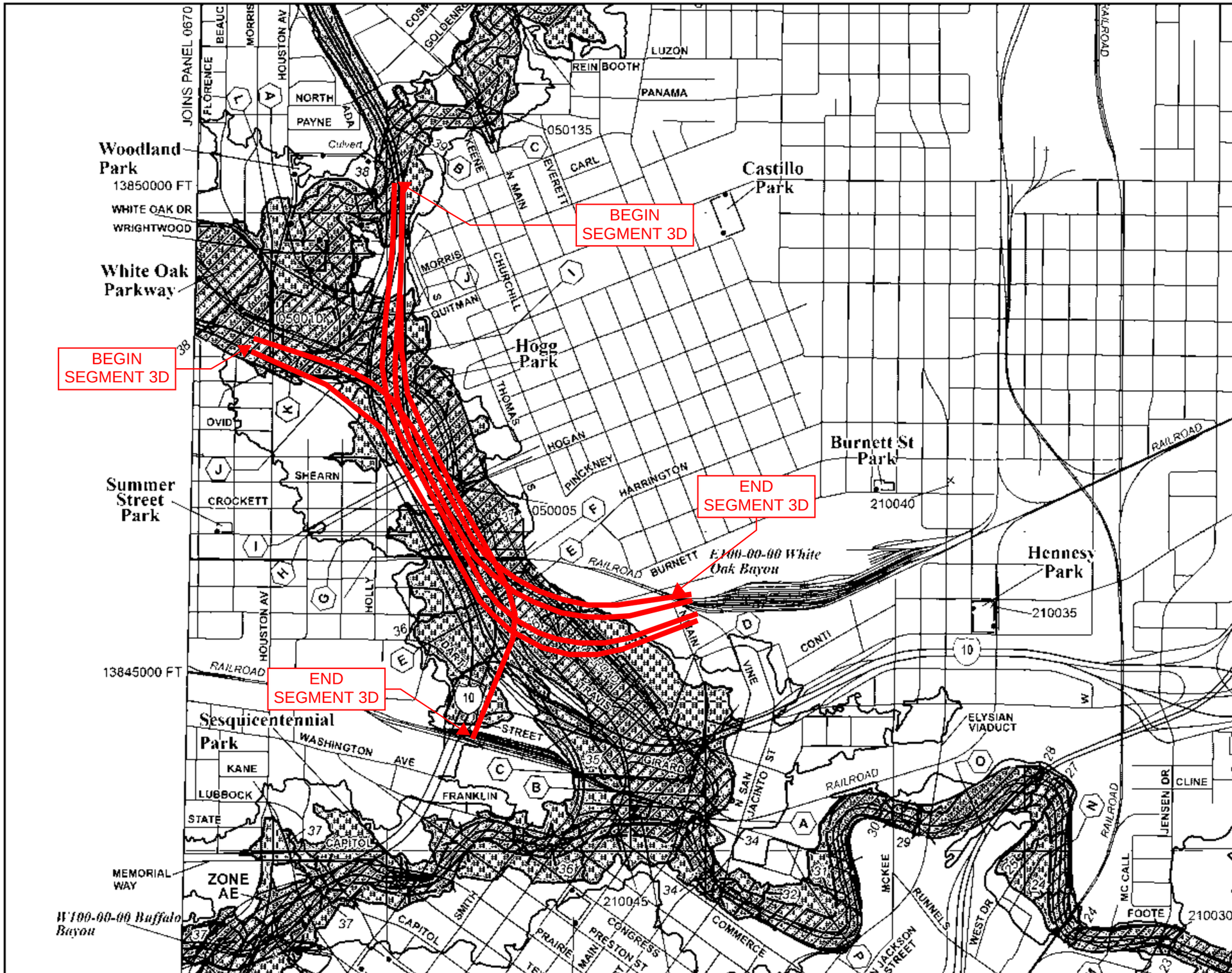


EXHIBIT 2-2a: SEGMENT 3D FEMA FIRM

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction, and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator, Zone 15. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the Harris Galveston Area Council and was revised and enhanced by Harris County.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **FEMA Map Service Center** (MSC) website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

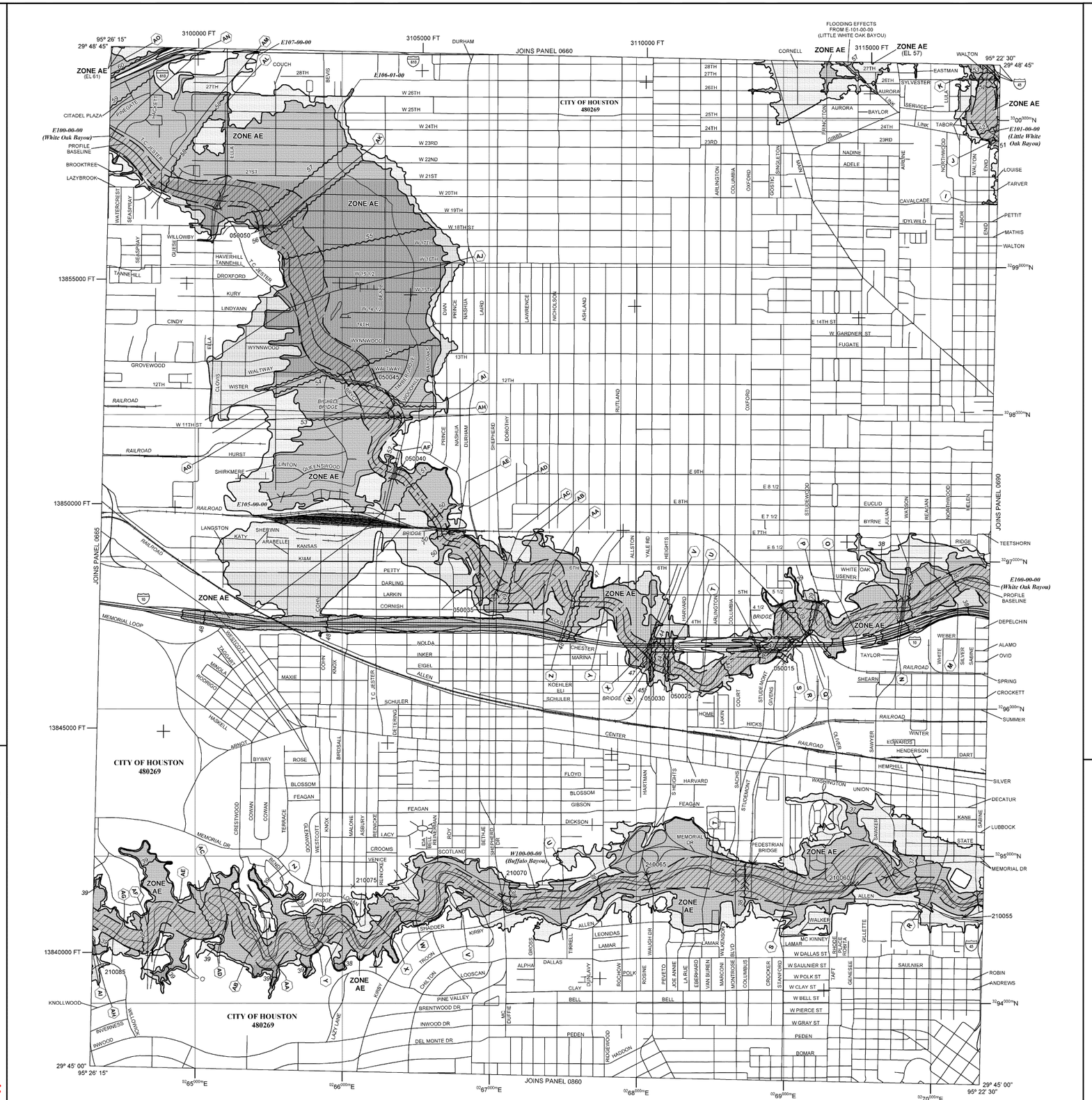
If you have **questions about this map**, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange (FMIX) at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

Vertical Datum Adjustment due to subsidence is the 2001 adjustment.

Benchmarks shown on this map were provided by either Harris County or the National Geodetic Survey. To obtain elevation, description, and location information for benchmarks provided by Harris County, please contact the Permits Office of the Public Infrastructure Department at (713) 956-3000 or visit their website at http://www.eng.hctx.net/permits. For information regarding the benchmarks provided by the National Geodetic Survey, please see note above.

Some bridges and other structures shown on the detailed studied streams are not labeled. See corresponding flood profile for appropriate name.

EXHIBIT 2-2b: OVERALL FEMA FIRM (UPSTREAM OF DOWNTOWN)



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) 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.

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 North American Vertical Datum of 1988

A — A	Cross section line
23 - - - 23	Transect line
	Culvert, Flume, Penstock or Aqueduct
	Road or Railroad Bridge
	Footbridge
97° 07' 30", 32° 22' 30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
6766000mE	1000-meter Universal Transverse Mercator grid values, zone 15
600000 FT	5000-foot grid ticks: Texas State Plane coordinate system, zone South Central (FIPSZONE 4204), Lambert Conformal Conic Projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index.

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP PANEL
SEPTEMBER 28, 1990

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
SEPTEMBER 30, 1992
NOVEMBER 6, 1996
APRIL 20, 2000
JUNE 18, 2007
OCTOBER 16, 2013
JUNE 9, 2014

For accompanying Reasons for Revision, refer to the Notice to Flood Insurance Study Users page in the Flood Insurance Study report.

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

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0670M

FIRM

FLOOD INSURANCE RATE MAP

HARRIS COUNTY, TEXAS

AND INCORPORATED AREAS

PANEL 670 OF 1150

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HOUSTON, CITY OF	480296	0670	M

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
48201C0670M

MAP REVISED
JUNE 9, 2014

Federal Emergency Management Agency

NOTES TO USERS

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Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator, Zone 15. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the Houston-Galveston Area Council and was revised and enhanced by Harris County.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Information eXchange** at 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Information eXchange may also be reached by Fax at 1-800-358-9620 and their website at http://www.msc.fema.gov/.

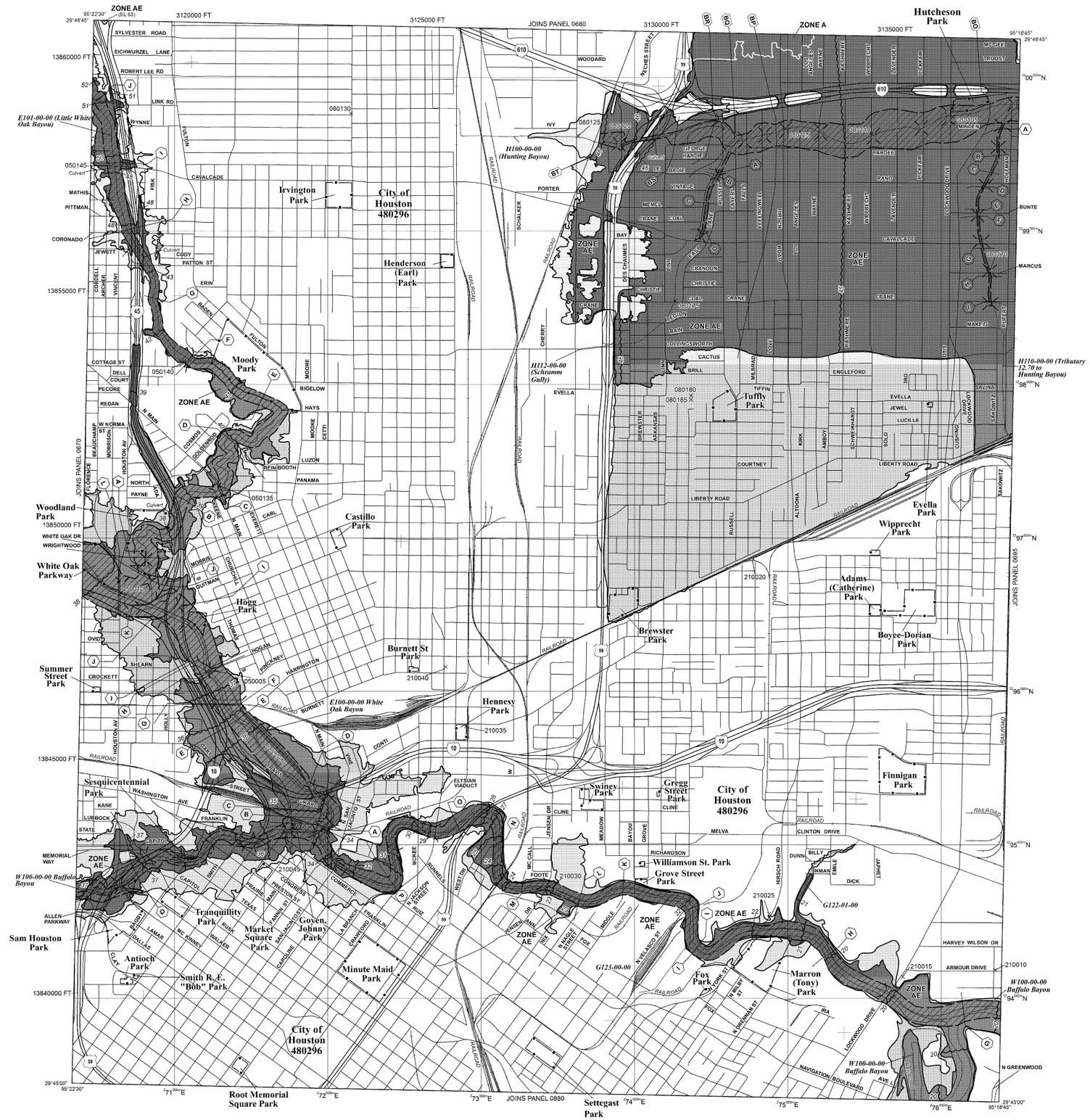
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/national-flood-insurance-program.

Vertical Datum Adjustment due to subsidence is the 2001 adjustment.

Benchmarks shown on this map were provided by either Harris County or the National Geodetic Survey. To obtain elevation, description, and location information for benchmarks provided by Harris County, please contact the Permits Office of the Engineering Department at 713-274-3900 or visit their website at http://www.eng.hctx.net/permits. For information regarding the benchmarks provided by National Geodetic Survey, please see note above.

Some bridges and other structures shown on the detailed studied streams are not labeled. See corresponding flood profile for appropriate names.

EXHIBIT 2-2c: OVERALL FEMA FIRM (DOWNTOWN AND DOWNSTREAM OF DOWNTOWN)



LEGEND

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

The 1% annual 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.

	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 North American Vertical Datum of 1988

(A)———(A)	Cross section Line
(B)- - - - -(B)	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
$^{3}76^{000m}$N	1000-meter Universal Transverse Mercator grid values, zone 15N
600000 FT	5000-foot grid values: Texas State Plane coordinate system, South Central zone (FIPSZONE 4204), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 28, 1990
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
September 30, 1992
November 6, 1996
April 20, 2000
June 18, 2007
October 16, 2013
June 9, 2014
January 6, 2017
FOR REASON OF REVISION
SEE NOTICE TO FLOOD INSURANCE STUDY USERS IN THE FIS REPORT

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

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0690N

FIRM

FLOOD INSURANCE RATE MAP

HARRIS COUNTY, TEXAS

AND INCORPORATED AREAS

PANEL 690 OF 1150

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

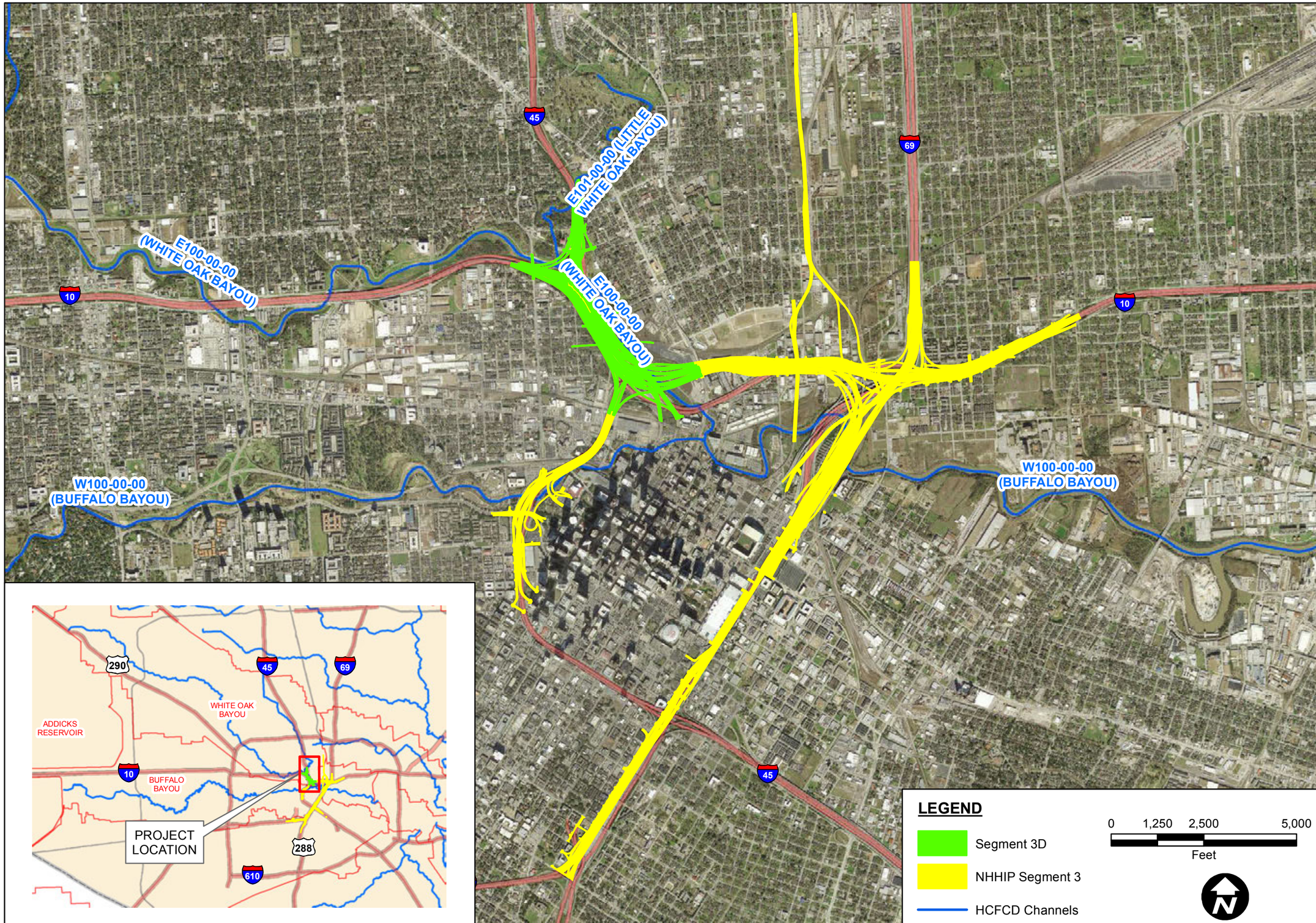
COMMUNITY	NUMBER	PANEL	SUFFIX
HOUSTON, CITY OF	480296	0690	N

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
48201C0690N

MAP REVISED
JANUARY 6, 2017

Federal Emergency Management Agency



NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT
SEGMENT 3D

PROJECT LOCATION MAP

PREPARED:

CHECKED:

APPROVED:

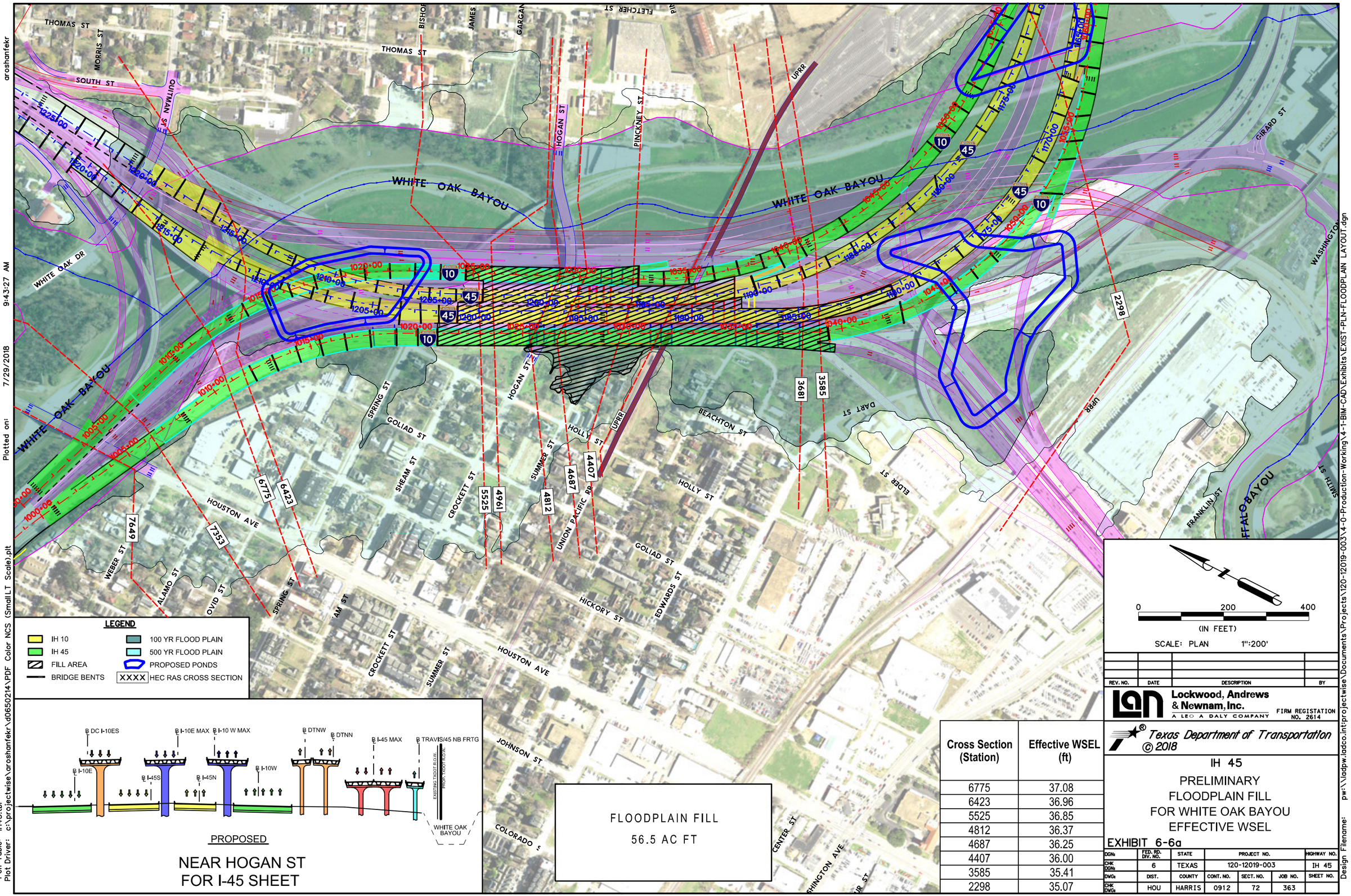
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Department of Transportation

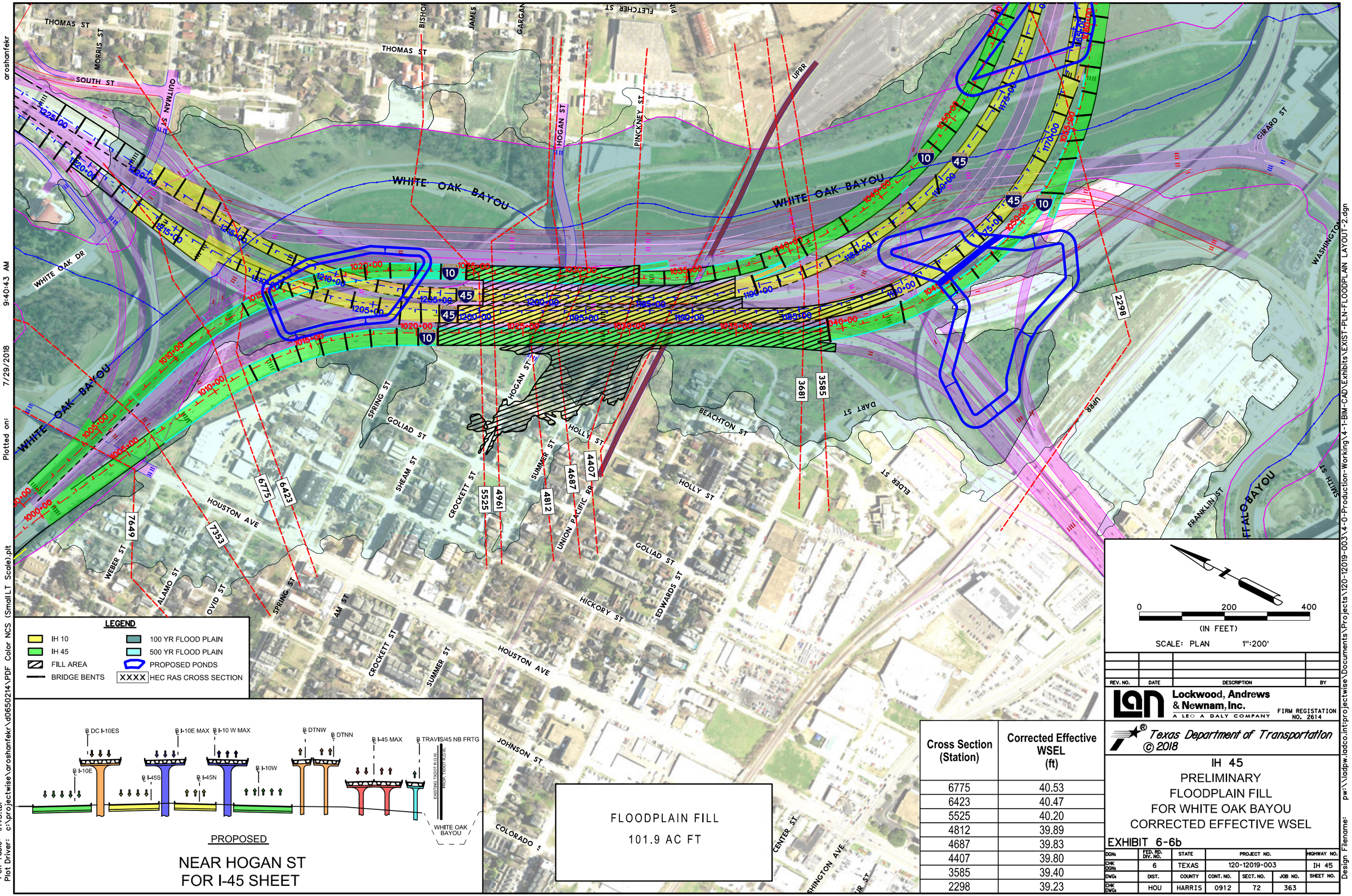
Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

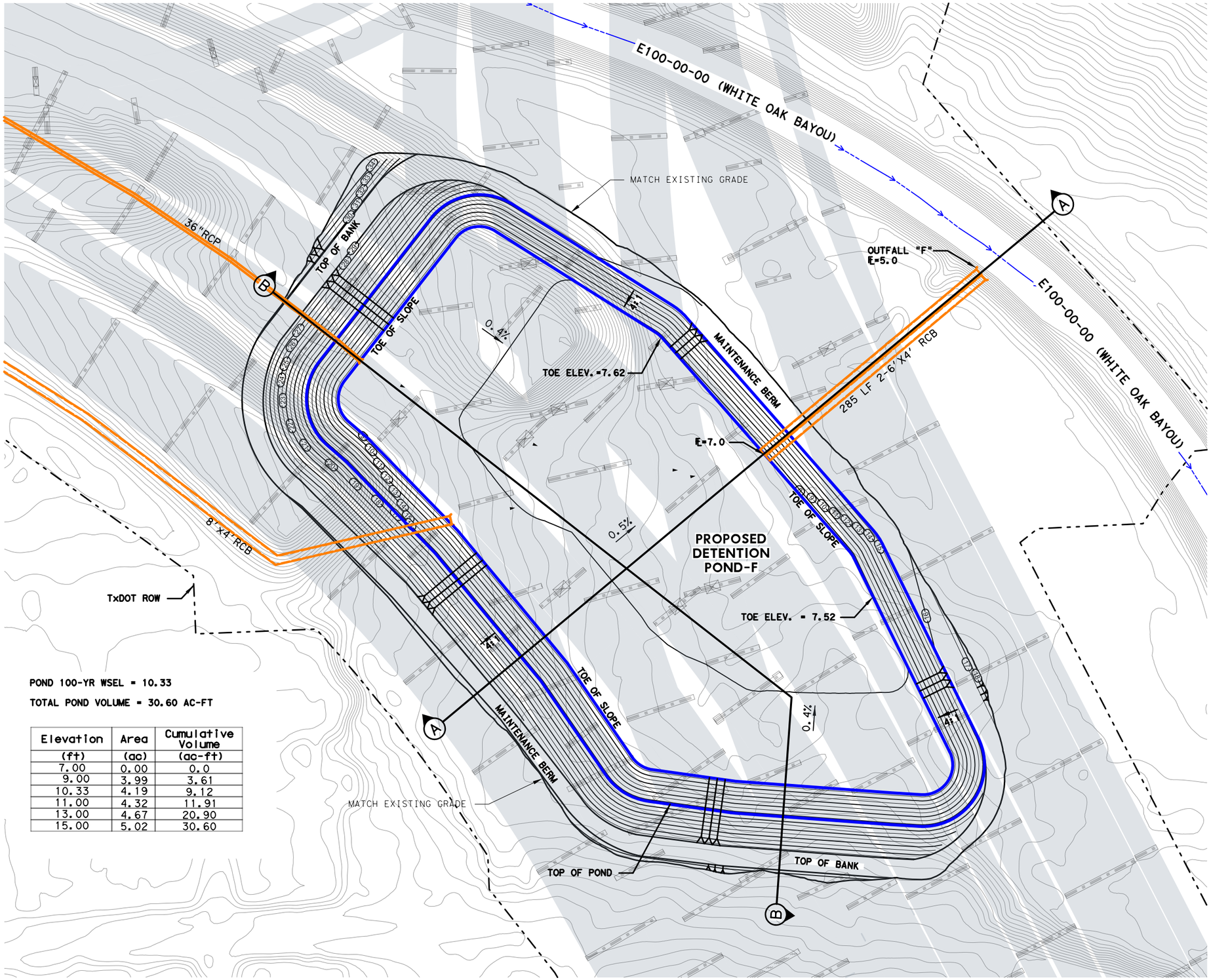
EXHIBIT
2-1



Cross Section (Station)	Effective WSEL (ft)
6775	37.08
6423	36.96
5525	36.85
4812	36.37
4687	36.25
4407	36.00
3585	35.41
2298	35.07



Cross Section (Station)	Corrected Effective WSEL (ft)
6775	40.53
6423	40.47
5525	40.20
4812	39.89
4687	39.83
4407	39.80
3585	39.40
2298	39.23



POND 100-YR WSEL = 10.33

TOTAL POND VOLUME = 30.60 AC-FT

Elevation (ft)	Area (ac)	Cumulative Volume (ac-ft)
7.00	0.00	0.0
9.00	3.99	3.61
10.33	4.19	9.12
11.00	4.32	11.91
13.00	4.67	20.90
15.00	5.02	30.60

LEGEND:

- PROP STORM SEWER
- EXIST STORM SEWER
- PROP DITCH ℄
- STREAM ℄
- PROP COLUMNS (PROVIDED BY HNTB)
- PROP PAVEMENT

NOTE:
1- FOR CROSS-SECTION DETAILS SEE SHEET 5 OF 8.

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H
1":10' - V

PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
FIRM REGISTATION NO. 2614

Texas Department of Transportation
© 2018

NHHIP - SEGMENT 3D

PROPOSED DETENTION POND "F"
PLAN

EXHIBIT 6-5

SHEET 1 OF 8

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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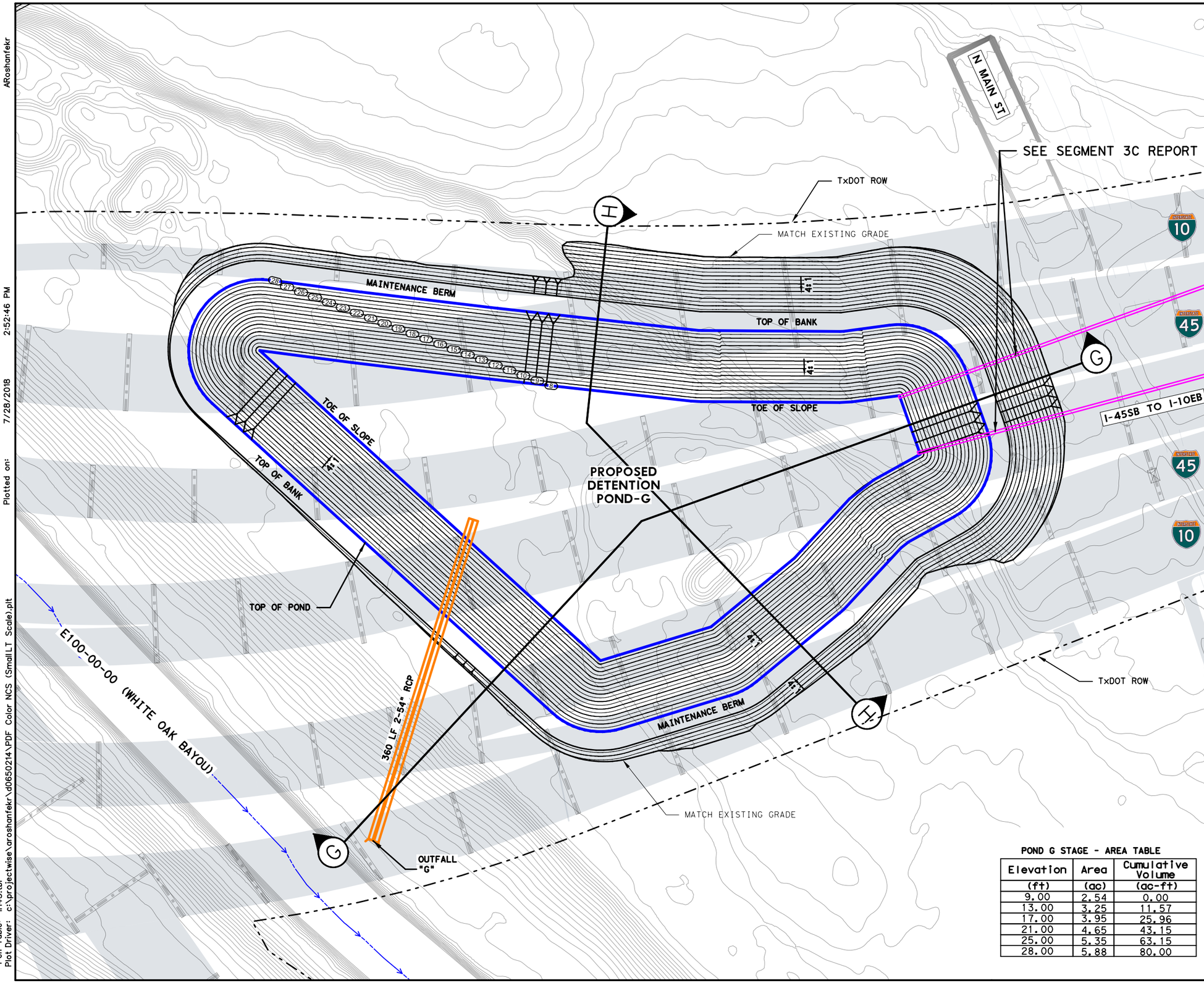

LEGEND:

- PROP STORM SEWER
- PROP SEGMENT 3C STORM SEWER (PROVIDED BY CIVILTECH)
- EXIST STORM SEWER
- PROP DITCH ℄
- STREAM ℄
- PROP COLUMNS (PROVIDED BY HNTB)
- PROP PAVEMENT

NOTE:
1- FOR CROSS-SECTION DETAILS SEE SHEET 6 OF 8.

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H
1":10' - V

PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

POND G STAGE - AREA TABLE

Elevation (ft)	Area (ac)	Cumulative Volume (ac-ft)
9.00	2.54	0.00
13.00	3.25	11.57
17.00	3.95	25.96
21.00	4.65	43.15
25.00	5.35	63.15
28.00	5.88	80.00

REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
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FIRM REGISTATION NO. 2614

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NHHIP - SEGMENT 3D

PROPOSED DETENTION POND "G"
PLAN

EXHIBIT 6-5

SHEET 2 OF 8

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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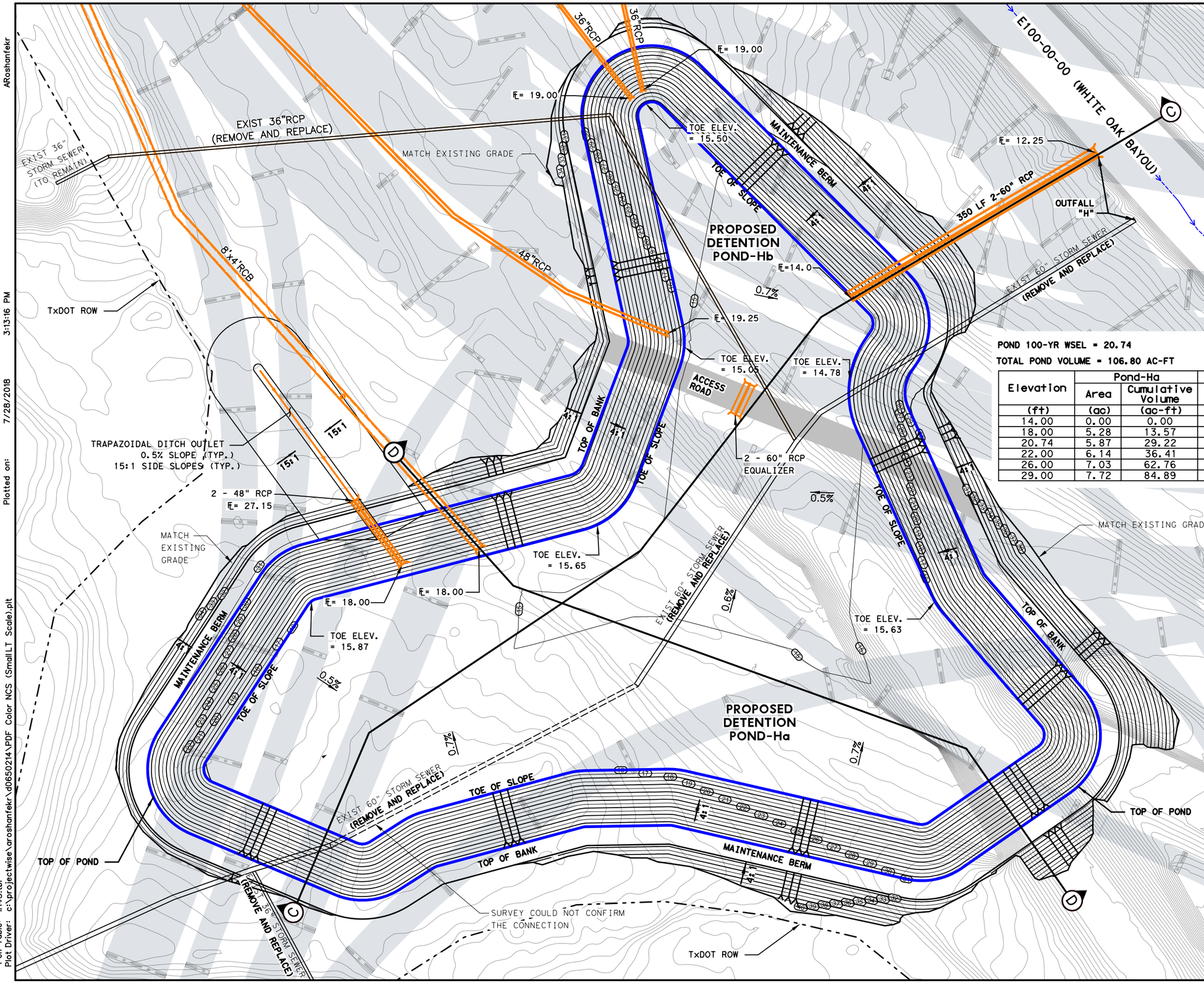

LEGEND:

- PROP STORM SEWER
- EXIST STORM SEWER
- PROP DITCH ℄
- STREAM ℄
- PROP COLUMNS (PROVIDED BY HNTB)
- PROP PAVEMENT

NOTE:
1- FOR CROSS-SECTION DETAILS SEE SHEET 7 OF 8.

POND 100-YR WSEL = 20.74

TOTAL POND VOLUME = 106.80 AC-FT

Elevation	Pond-Ha		Pond-Hb		Total Volume
	Area	Cumulative Volume	Area	Cumulative Volume	
(ft)	(ac)	(ac-ft)	(ac)	(ac-ft)	(ac-ft)
14.00	0.00	0.00	0.00	0.00	0.00
18.00	5.28	13.57	1.36	3.49	17.06
20.74	5.87	29.22	1.51	7.52	36.74
22.00	6.14	36.41	1.58	9.37	45.78
26.00	7.03	62.76	1.81	16.16	78.92
29.00	7.72	84.89	1.99	21.91	106.80

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H
1":10' - V

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NHHIP - SEGMENT 3D

PROPOSED DETENTION POND "H" PLAN

EXHIBIT 6-5

SHEET 3 OF 8

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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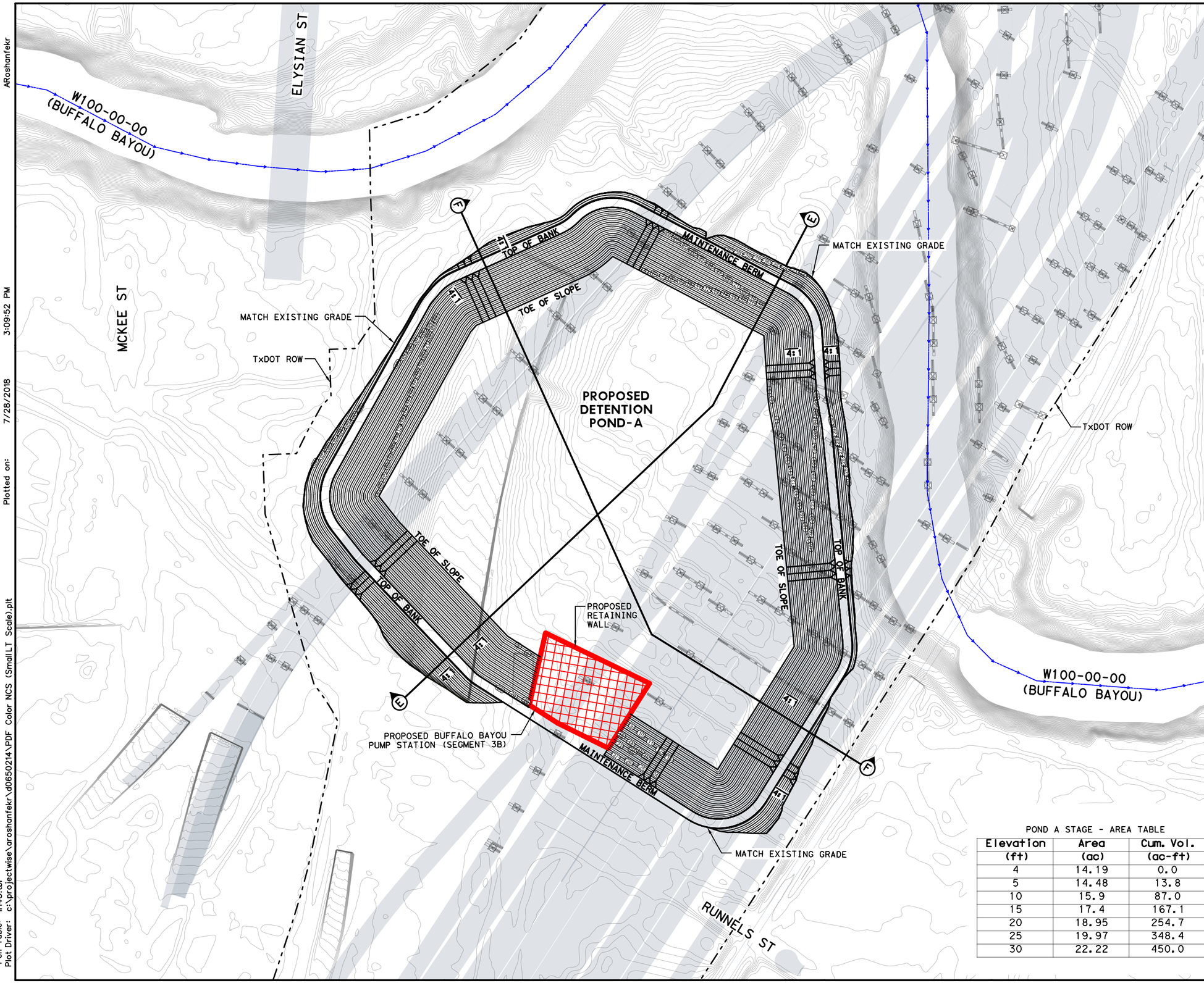

LEGEND:

- STREAM ℄
- PROP COLUMNS (PROVIDED BY HNTB)
- PROP PAVEMENT

NOTE:
1. FOR CROSS-SECTION DETAILS SEE SHEET 8 OF 8.

0 100 200 400
(IN FEET)
SCALE: PLAN 1":200'

PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

POND A STAGE - AREA TABLE

Elevation (ft)	Area (ac)	Cum. Vol. (ac-ft)
4	14.19	0.0
5	14.48	13.8
10	15.9	87.0
15	17.4	167.1
20	18.95	254.7
25	19.97	348.4
30	22.22	450.0

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Lockwood, Andrews & Newnam, Inc.
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PROPOSED DETENTION POND "A"
PLAN

EXHIBIT 6-5

SHEET 4 OF 8

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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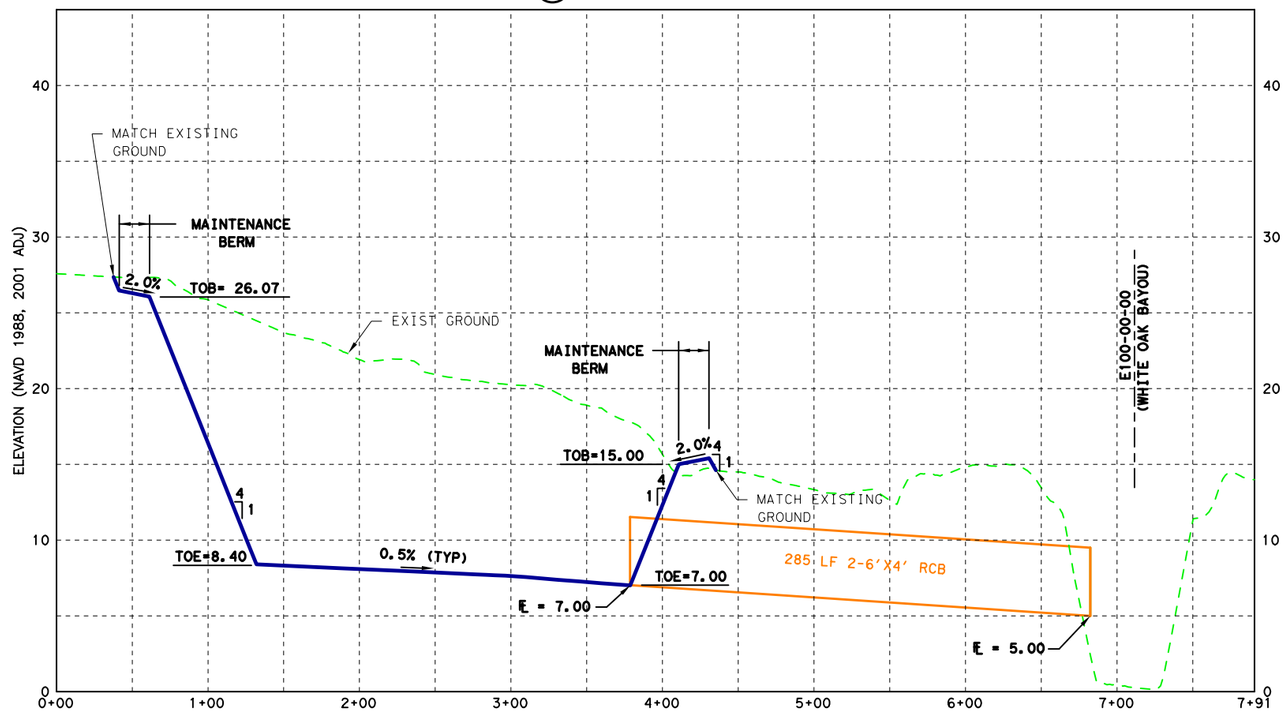
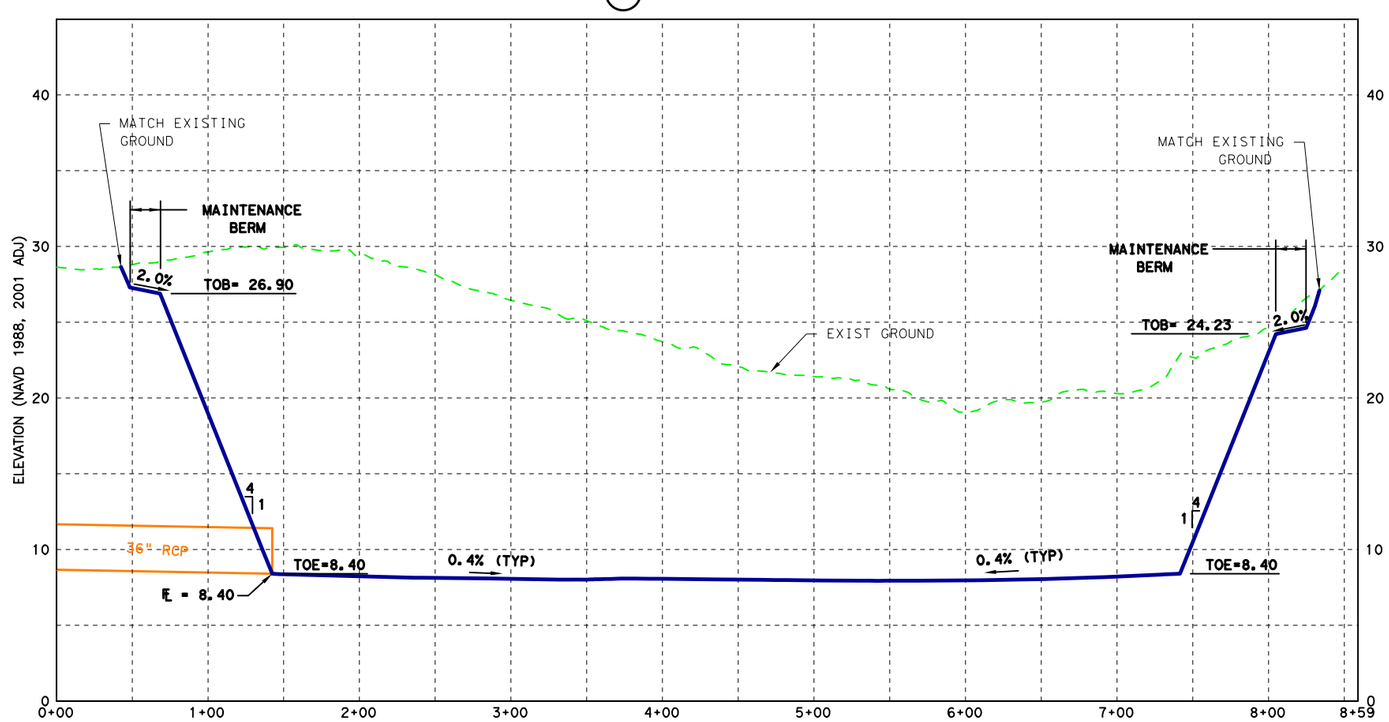
NOTE:
1- FOR PLAN DETAILS SEE SHEET 1 OF 8.

(A) SECTION A-A



(B) SECTION B-B



0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H
1":10' - V

PRELIMINARY

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REV. NO.	DATE	DESCRIPTION	BY

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FIRM REGISTATION NO. 2614

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NHHIP - SEGMENT 3D

PROPOSED DETENTION POND "F"
CROSS-SECTIONS

EXHIBIT 6-5 SHEET 5 OF 8

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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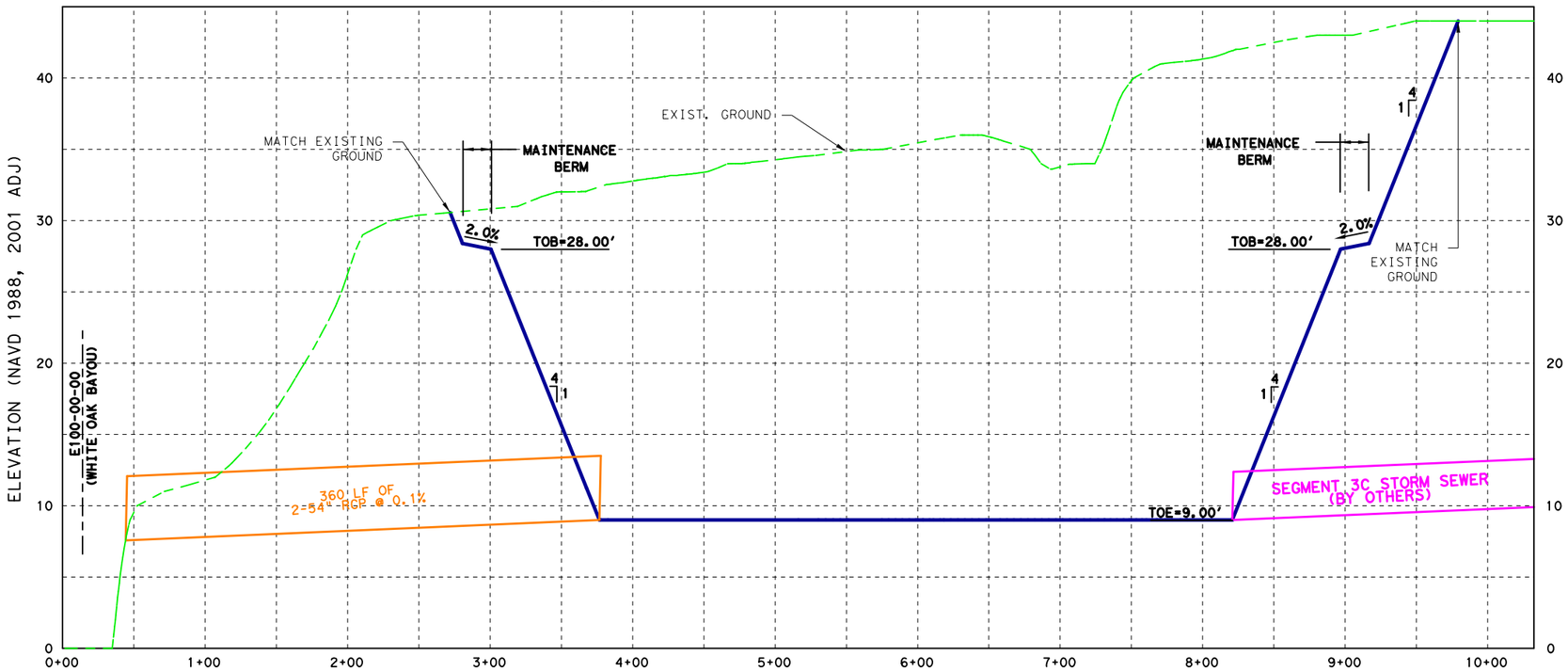
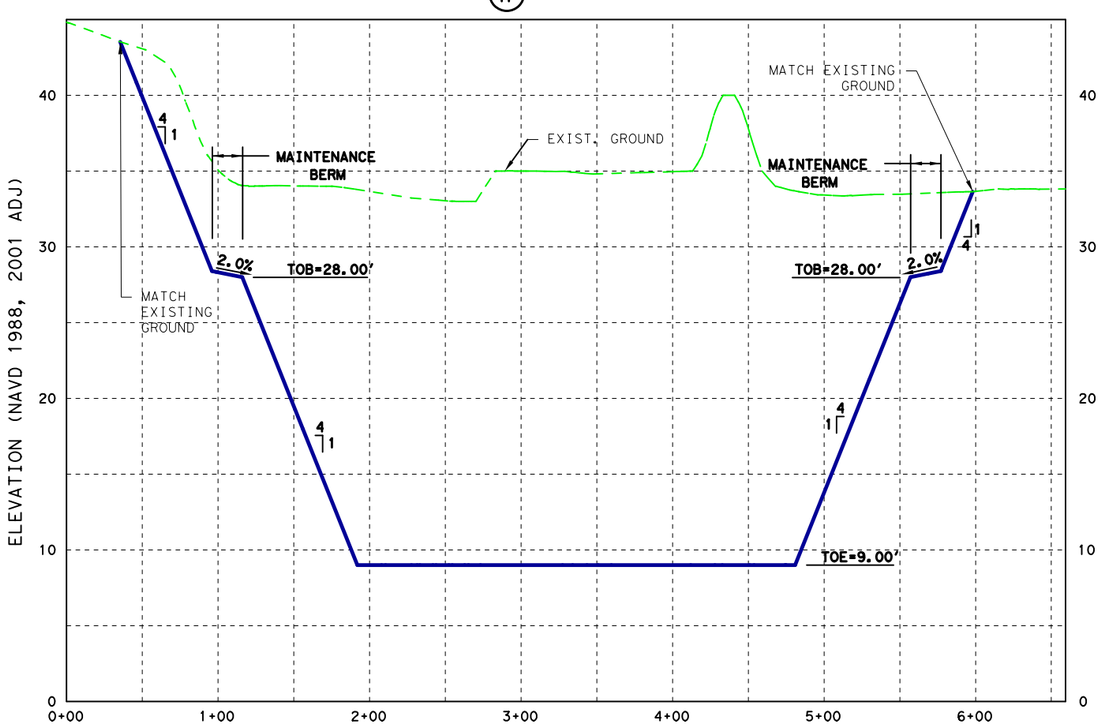
(G) SECTION G-G



(H) SECTION H-H



NOTE:
1- FOR PLAN DETAILS SEE SHEET 2 OF 8.

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H
1":10' - V

PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
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FIRM REGISTATION NO. 2614

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NHHIP - SEGMENT 3D

PROPOSED DETENTION POND "G"
CROSS-SECTIONS

EXHIBIT 6-5

SHEET 6 OF 8

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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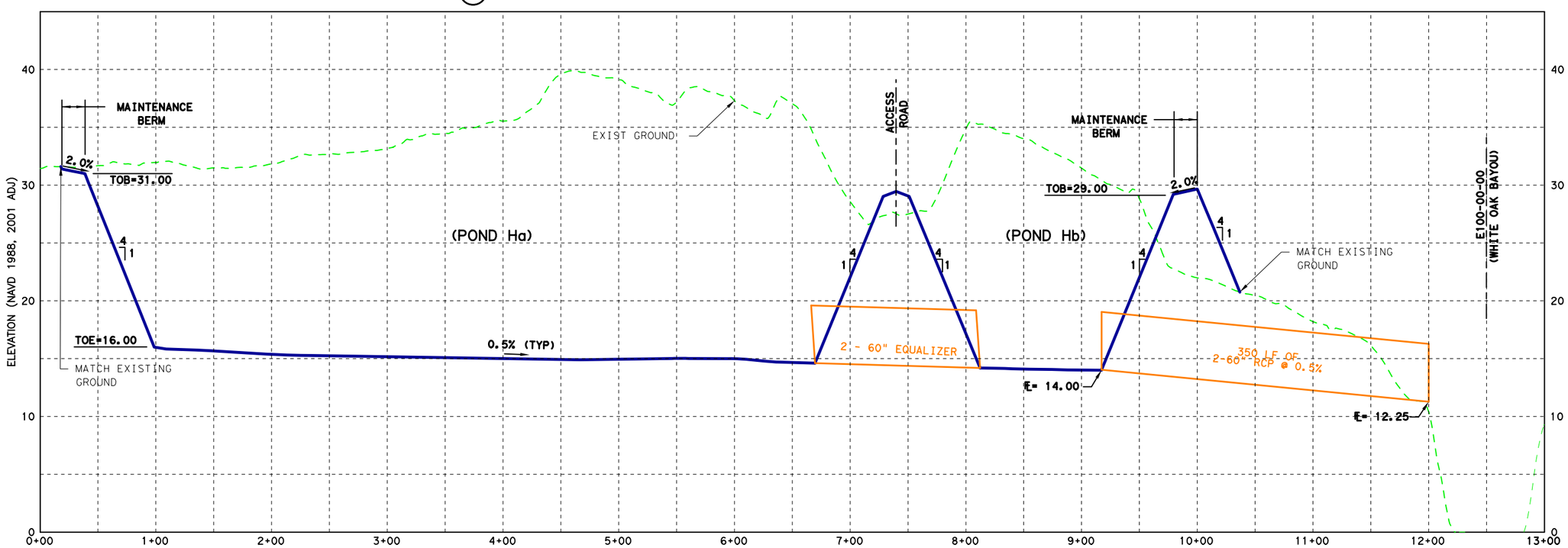
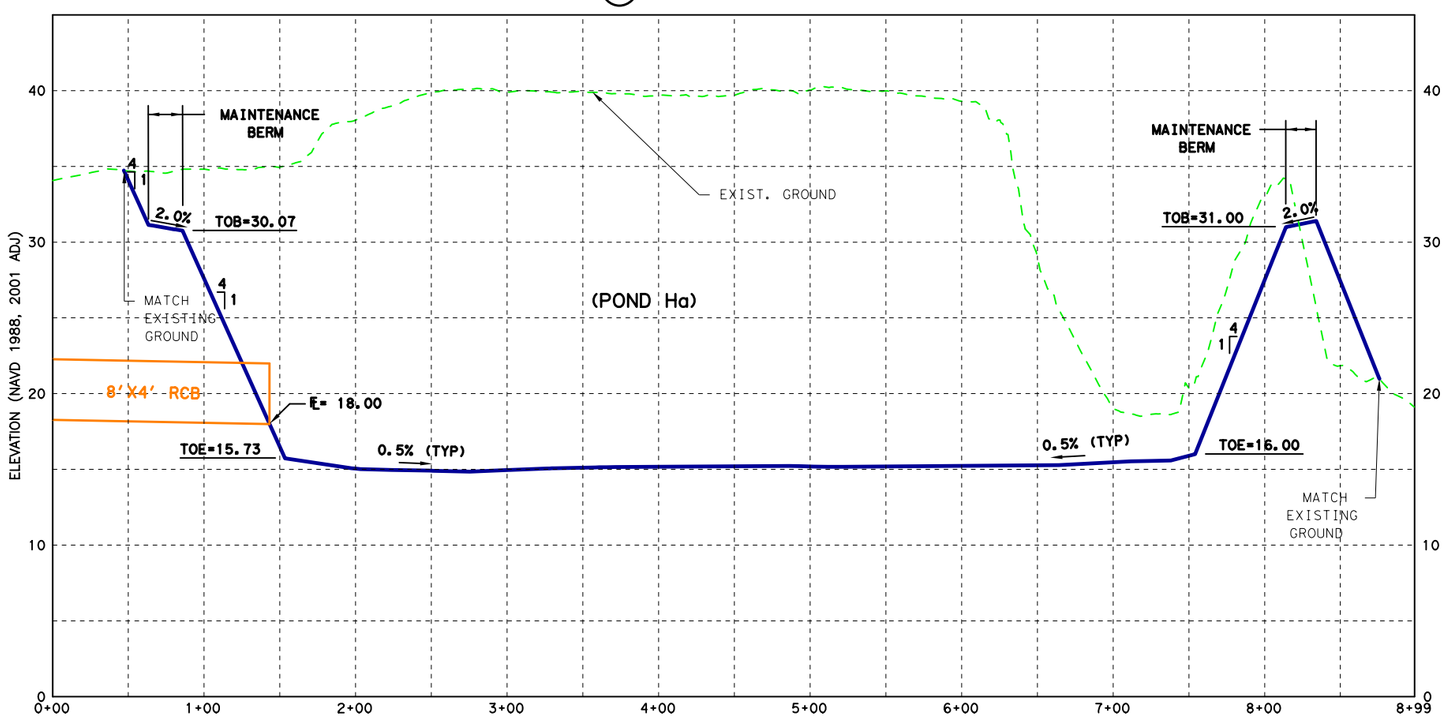
(C) SECTION C-C



(D) SECTION D-D



NOTE:
1- FOR PLAN DETAILS SEE SHEET 3 OF 8.

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H
1":10' - V

PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
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FIRM REGISTATION NO. 2614

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NHHIP - SEGMENT 3D

PROPOSED DETENTION POND "H"
CROSS-SECTIONS

EXHIBIT 6-5

SHEET 7 OF 8

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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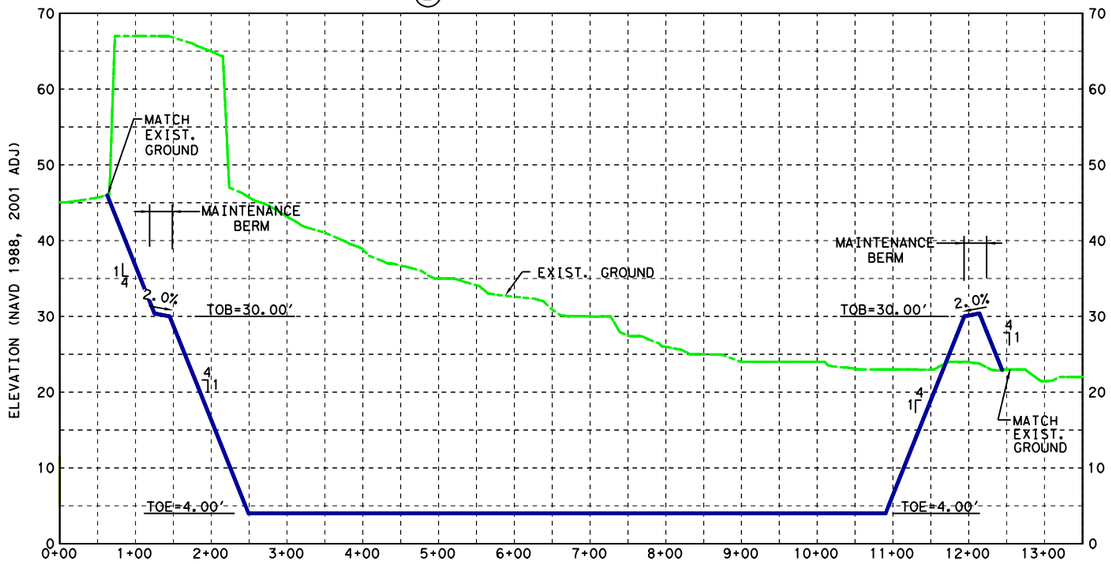
NOTE:
1- FOR PLAN DETAILS SEE SHEET 4 OF 8.

E SECTION E-E



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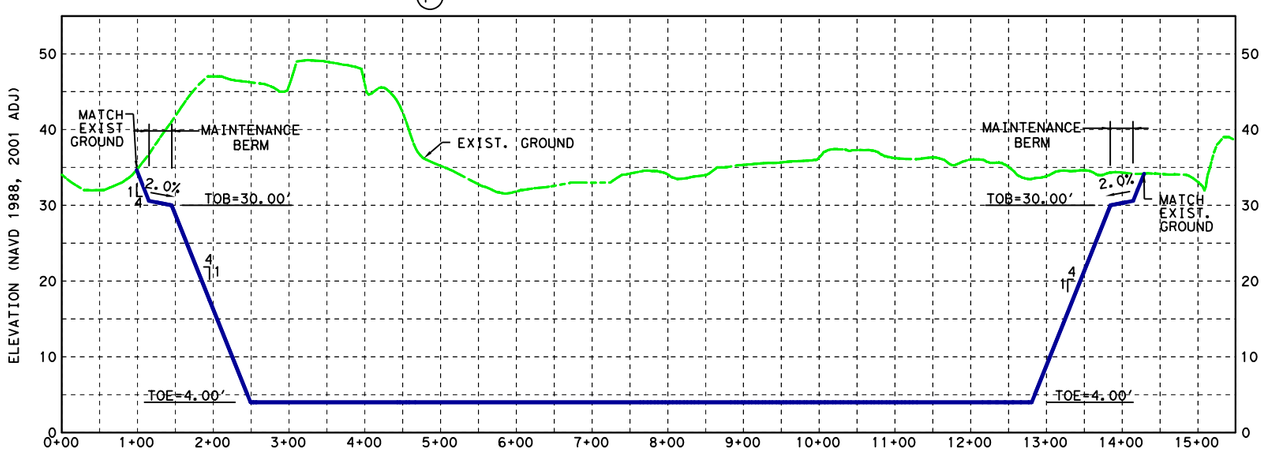

0 100 200 400
(IN FEET)
SCALE: PLAN 1":200' - H
1":10' - V

PRELIMINARY

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REV. NO.	DATE	DESCRIPTION	BY

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NHHIP - SEGMENT 3D

PROPOSED DETENTION POND "A"
CROSS-SECTIONS

EXHIBIT 6-5

SHEET 8 OF 8

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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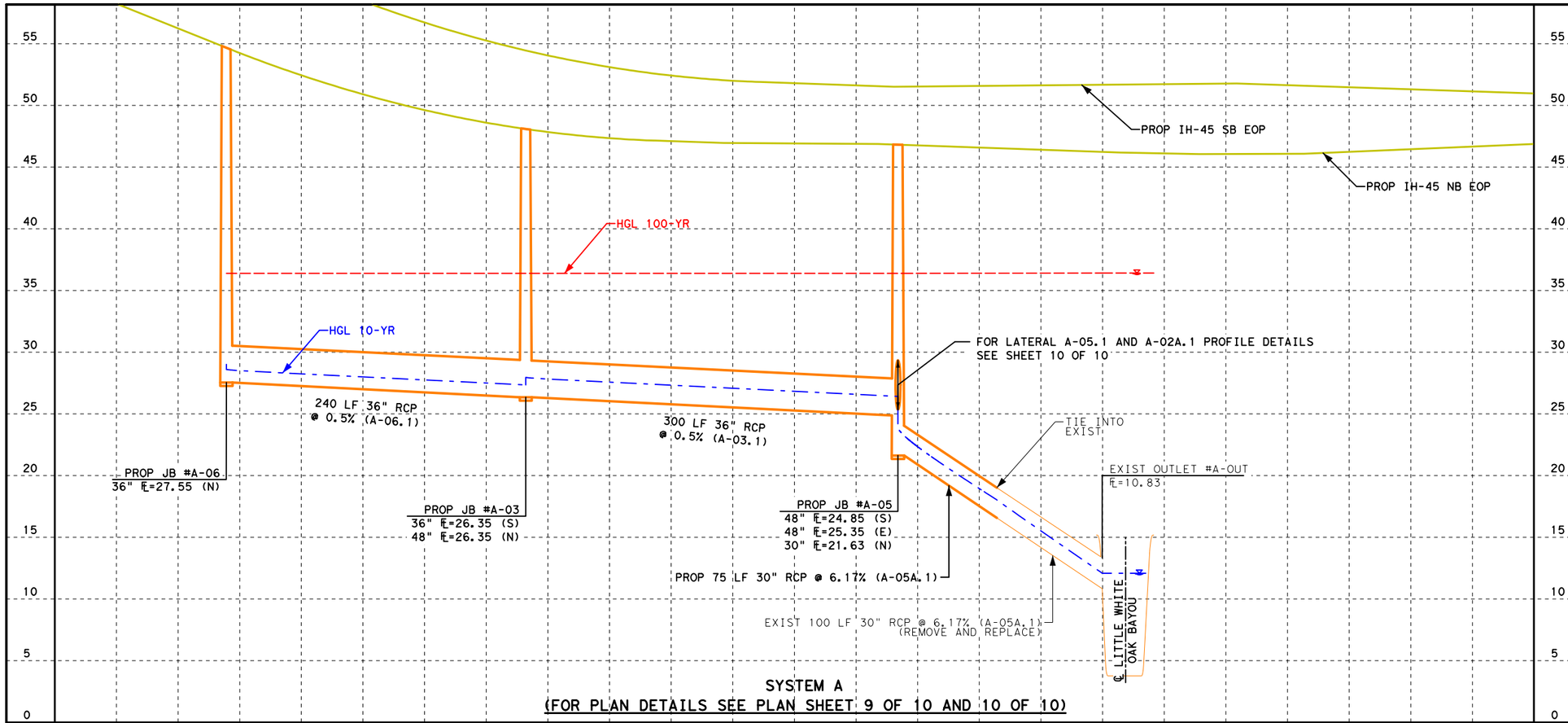
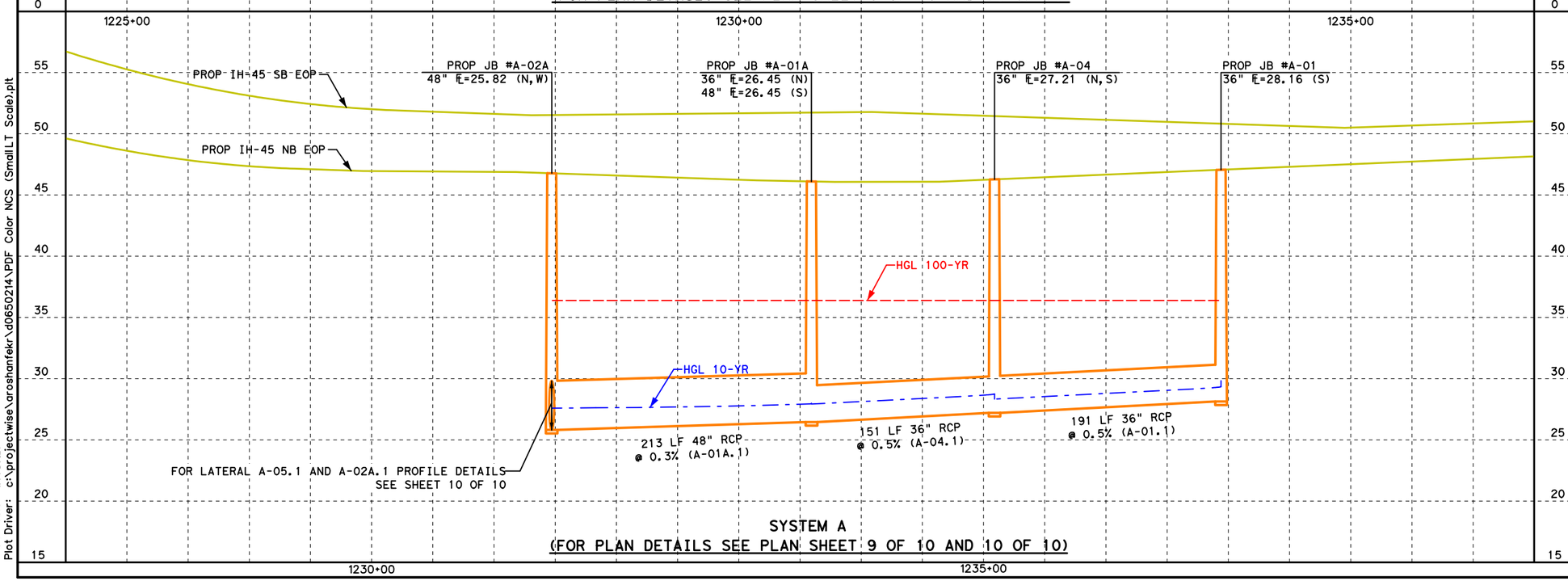


SYSTEM A
(FOR PLAN DETAILS SEE PLAN SHEET 9 OF 10 AND 10 OF 10)



SYSTEM A
(FOR PLAN DETAILS SEE PLAN SHEET 9 OF 10 AND 10 OF 10)

NOTE:
1- ALL STATIONING BASED ON IH-45 CENTERLINE STATIONING AND IS NOT REPRESENTATIVE OF THE TRUE PIPE LENGTH.
2- 100-YR HGL IS BASED ON XPSWMM.

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H
1":10' - V

PRELIMINARY

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STORM SEWER PROFILE
SYSTEM A
STA. 1025+00 TO STA. 1038+00

EXHIBIT 6-4 SHEET 1 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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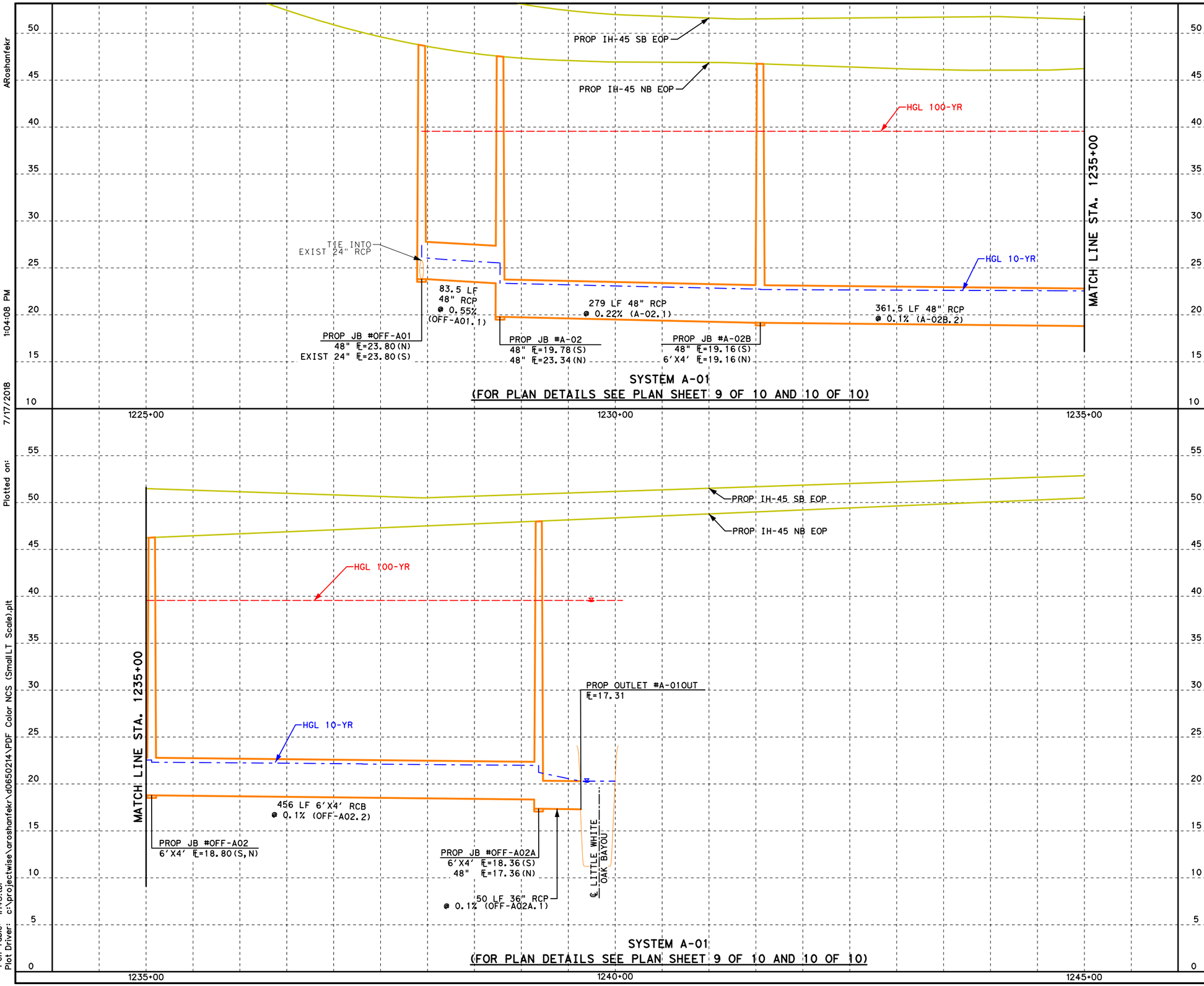

NOTE:
1- ALL STATIONING BASED ON IH-45 CENTERLINE STATIONING AND IS NOT REPRESENTATIVE OF THE TRUE PIPE LENGTH.
2- 100-YR HGL IS BASED ON XPSWMM.

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H
1":10' - V

PRELIMINARY

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REV. NO.	DATE	DESCRIPTION	BY

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NHHIP - SEGMENT 3D

STORM SEWER PROFILE
SYSTEM A-01
STA. 1028+00 TO STA. 1340+00

EXHIBIT 6-4 SHEET 2 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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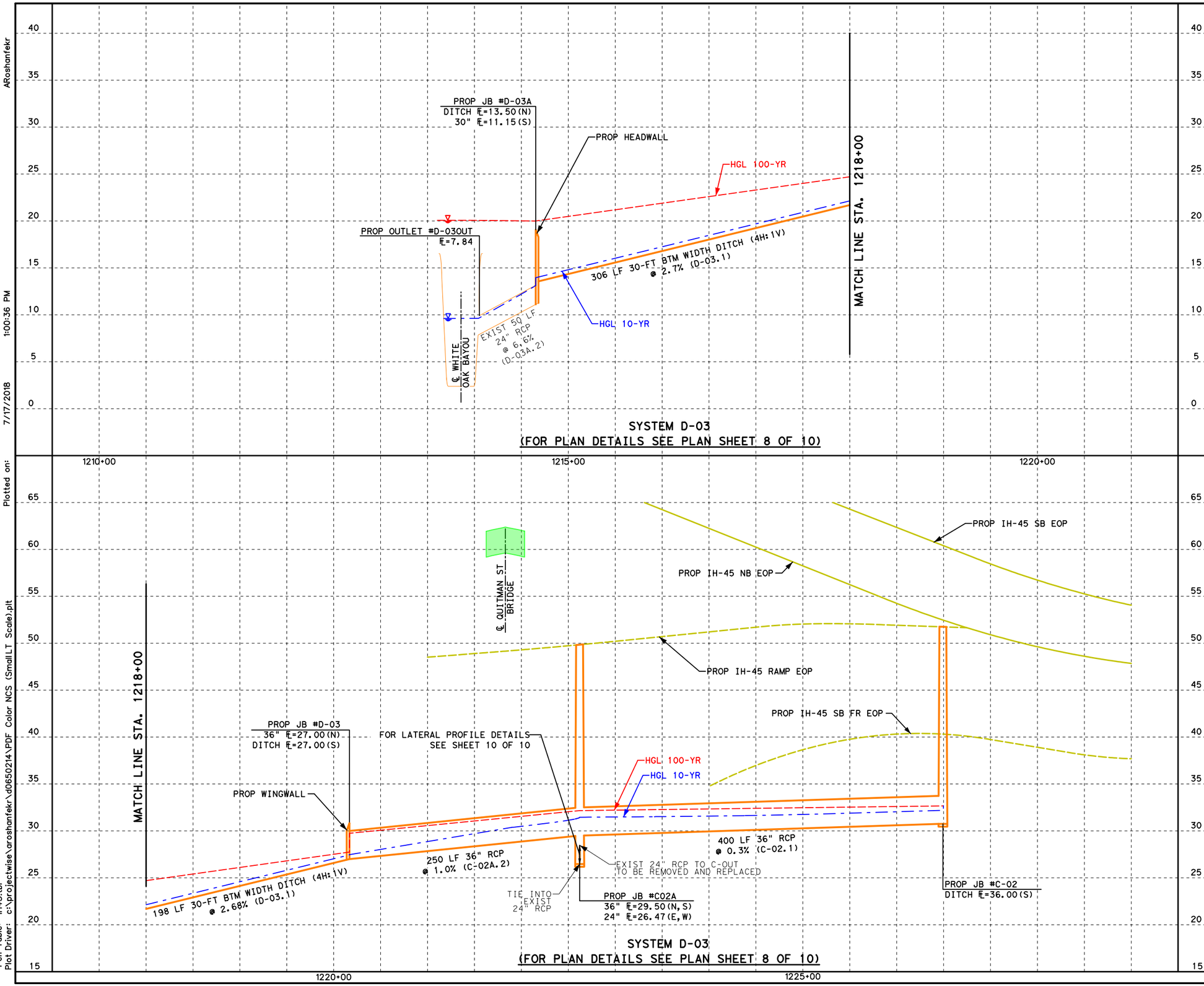

NOTE:
1- ALL STATIONING BASED ON IH-45 CENTERLINE STATIONING AND IS NOT REPRESENTATIVE OF THE TRUE PIPE LENGTH.
2- 100-YR HGL IS BASED ON XPSWMM.

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H
1":10' - V

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STORM SEWER PROFILE
SYSTEM D-03
STA. 1213+00 TO STA. 1227+00

EXHIBIT 6-4
SHEET 3 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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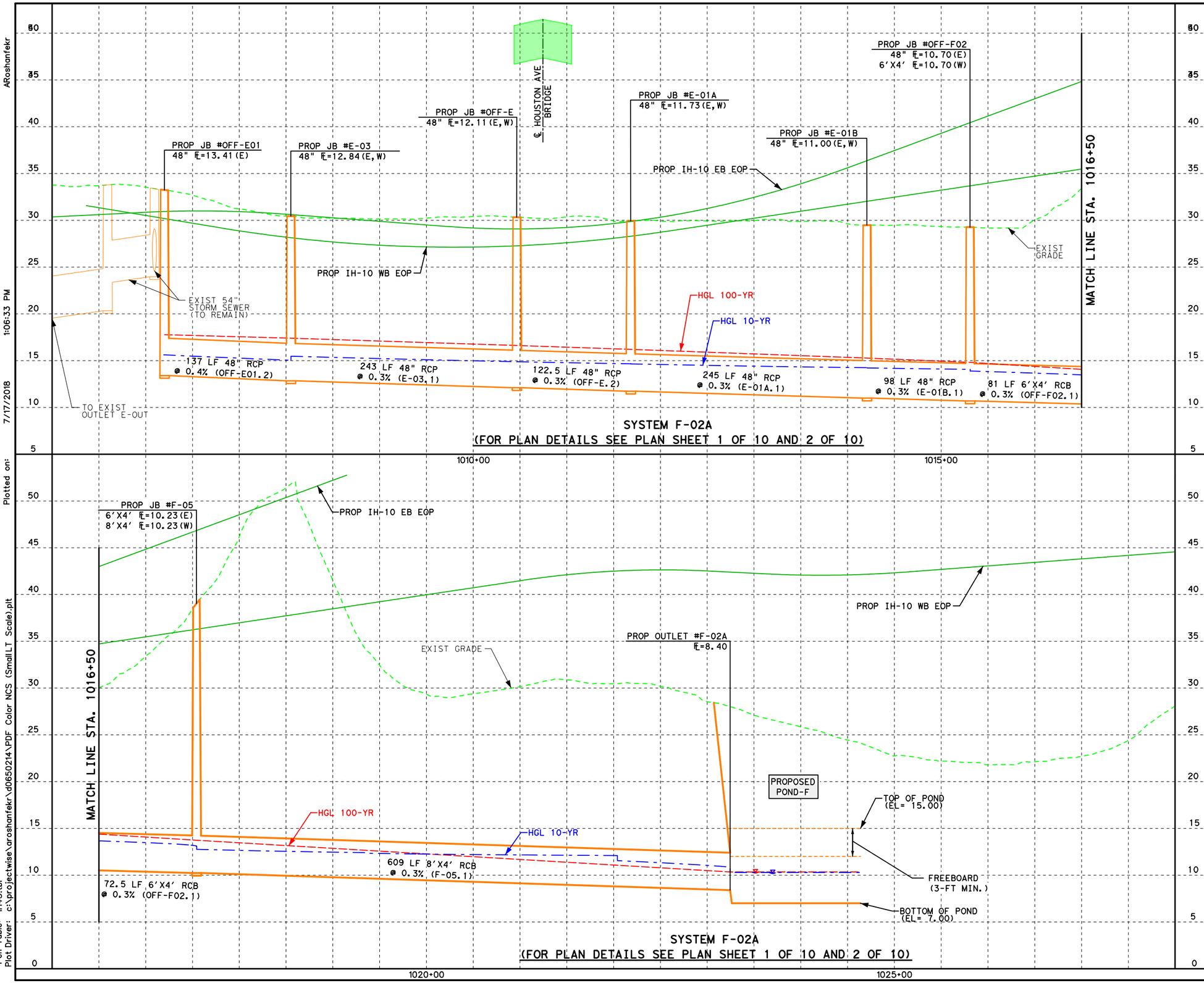

NOTE:
1- ALL STATIONING BASED ON IH-10 CENTERLINE STATIONING AND IS NOT REPRESENTATIVE OF THE TRUE PIPE LENGTH.
2- 100-YR HGL IS BASED ON XPSWMM.

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H
1":10' - V

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STORM SEWER PROFILE
SYSTEM F-02A
STA. 1006+00 TO STA. 1027+00

EXHIBIT 6-4 SHEET 4 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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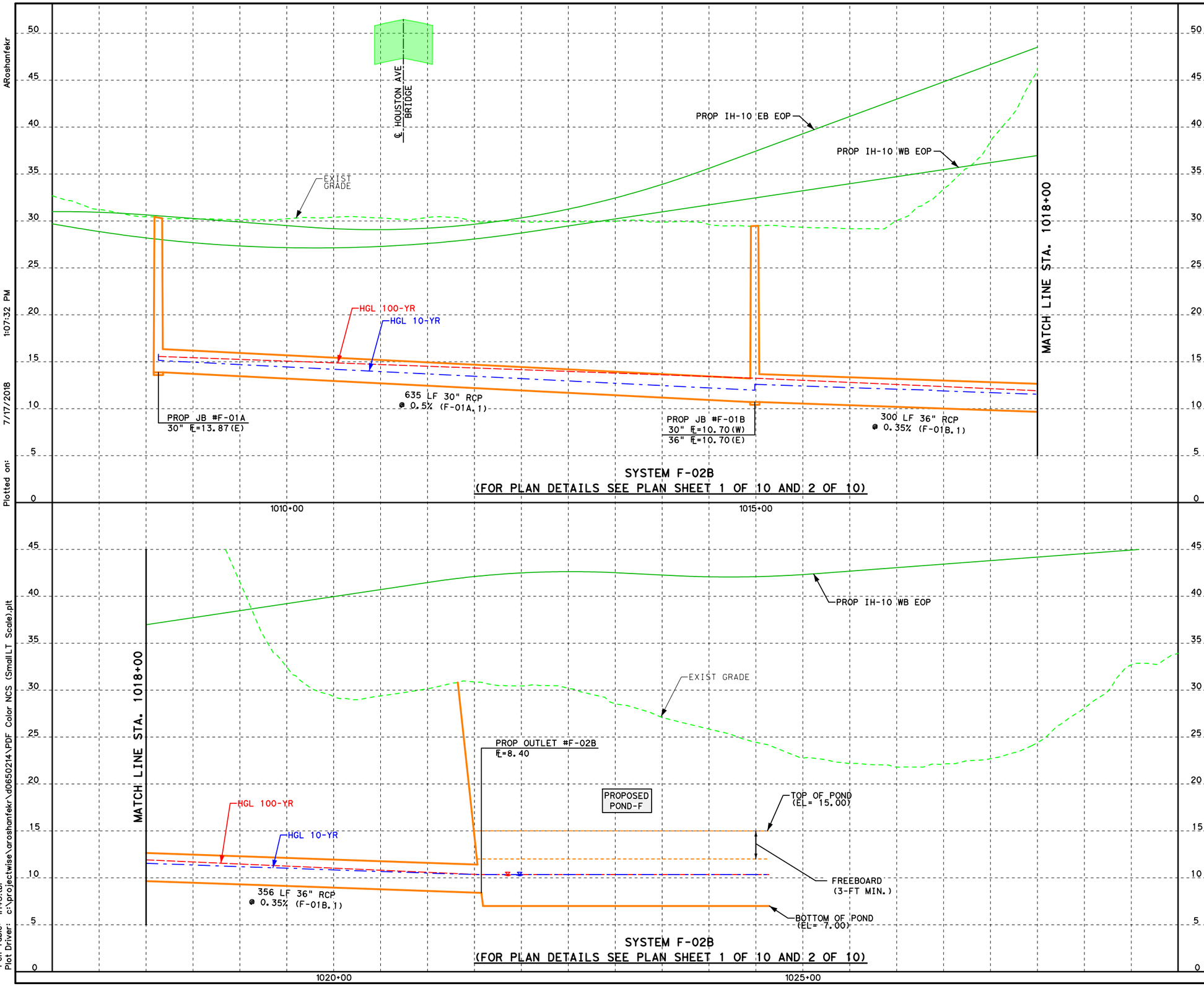

SYSTEM F-02B
(FOR PLAN DETAILS SEE PLAN SHEET 1 OF 10 AND 2 OF 10)

SYSTEM F-02B
(FOR PLAN DETAILS SEE PLAN SHEET 1 OF 10 AND 2 OF 10)

NOTE:
1- ALL STATIONING BASED ON IH-10 CENTERLINE STATIONING AND IS NOT REPRESENTATIVE OF THE TRUE PIPE LENGTH.
2- 100-YR HGL IS BASED ON XPSWMM.

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H
1":10' - V

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NHHIP - SEGMENT 3D

STORM SEWER PROFILE
SYSTEM F-02B
STA. 1008+00 TO STA. 1027+00

EXHIBIT 6-4 SHEET 5 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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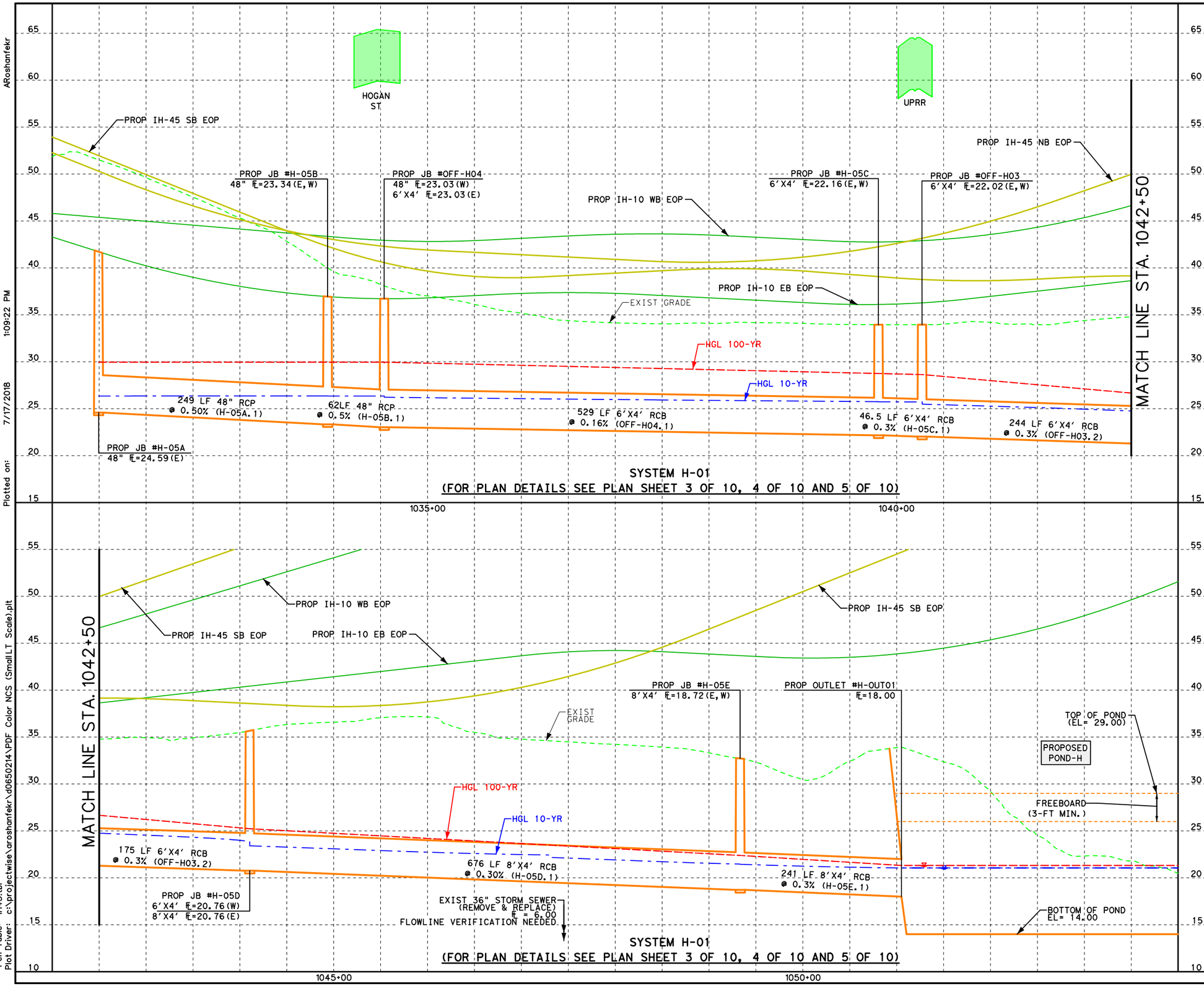

NOTE:
1- ALL STATIONING BASED ON IH-10 CENTERLINE STATIONING AND IS NOT REPRESENTATIVE OF THE TRUE PIPE LENGTH.
2- 100-YR HGL IS BASED ON XPSWMM.

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H
1":10' - V

PRELIMINARY

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STORM SEWER PROFILE
SYSTEM H-01
STA. 1031+00 TO STA. 1054+00

EXHIBIT 6-4 SHEET 6 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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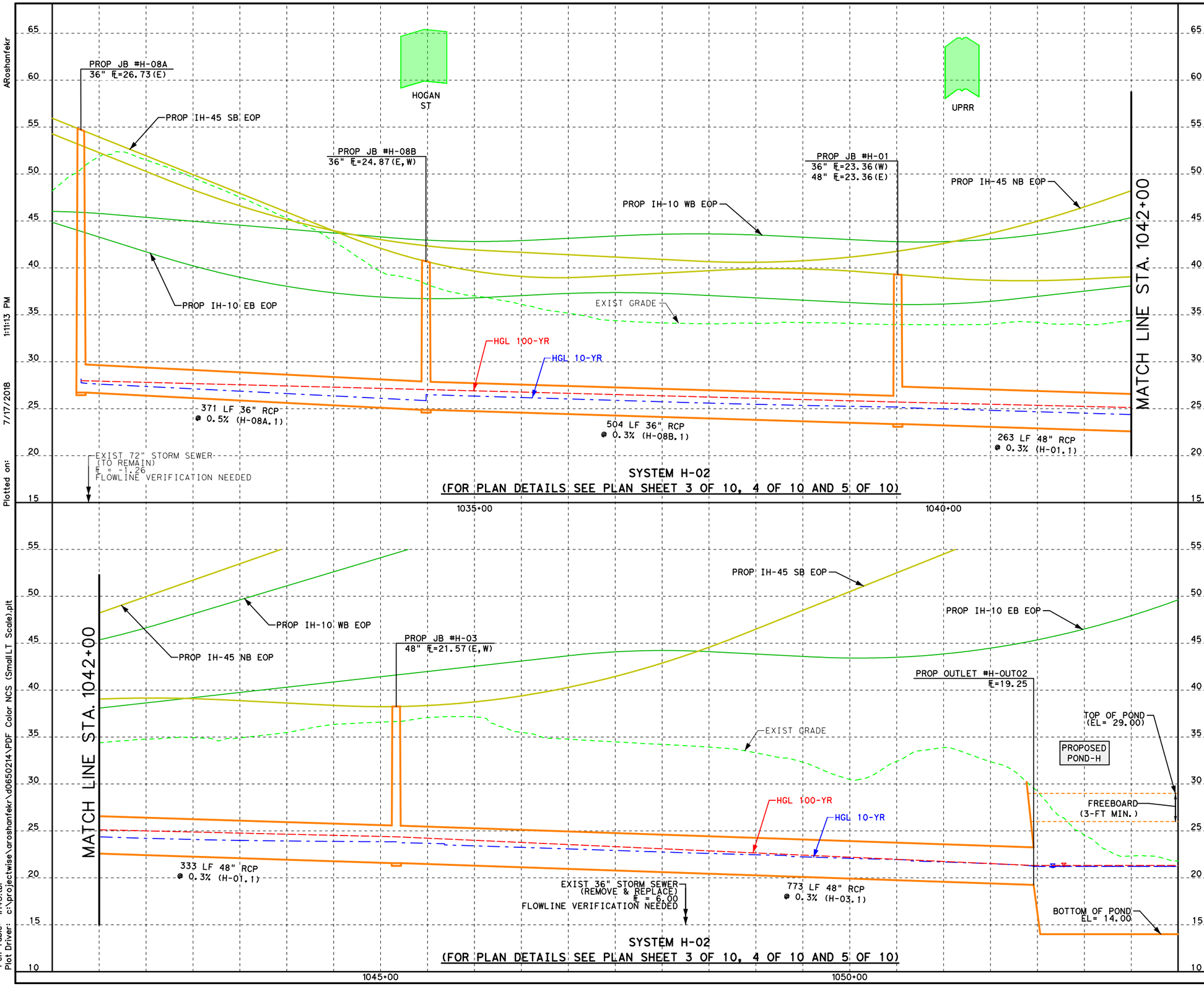

NOTE:
1- ALL STATIONING BASED ON IH-10 CENTERLINE STATIONING AND IS NOT REPRESENTATIVE OF THE TRUE PIPE LENGTH.
2- 100-YR HGL IS BASED ON XPSWMM.

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H
1":10' - V

PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

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NHHIP - SEGMENT 3D

STORM SEWER PROFILE
SYSTEM H-02
STA. 1031+00 TO STA. 1053+00

EXHIBIT 6-4

SHEET 7 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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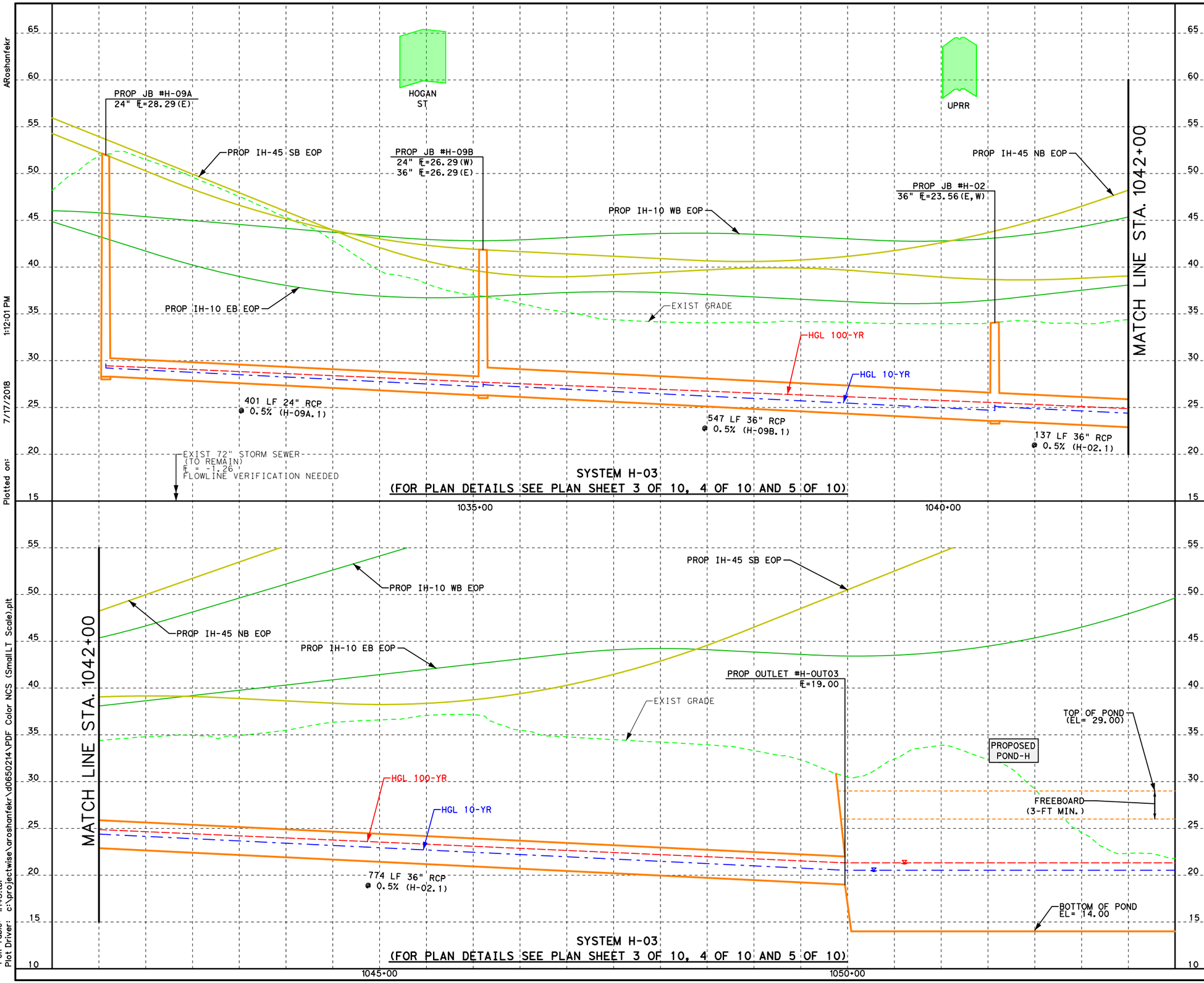

SYSTEM H-03
(FOR PLAN DETAILS SEE PLAN SHEET 3 OF 10, 4 OF 10 AND 5 OF 10)

SYSTEM H-03
(FOR PLAN DETAILS SEE PLAN SHEET 3 OF 10, 4 OF 10 AND 5 OF 10)

NOTE:
1- ALL STATIONING BASED ON IH-10 CENTERLINE STATIONING AND IS NOT REPRESENTATIVE OF THE TRUE PIPE LENGTH.
2- 100-YR HGL IS BASED ON XPSWMM.

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H
1":10' - V

PRELIMINARY

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STORM SEWER PROFILE
SYSTEM H-03
STA 1031+00 TO STA 1053+00

EXHIBIT 6-4
SHEET 8 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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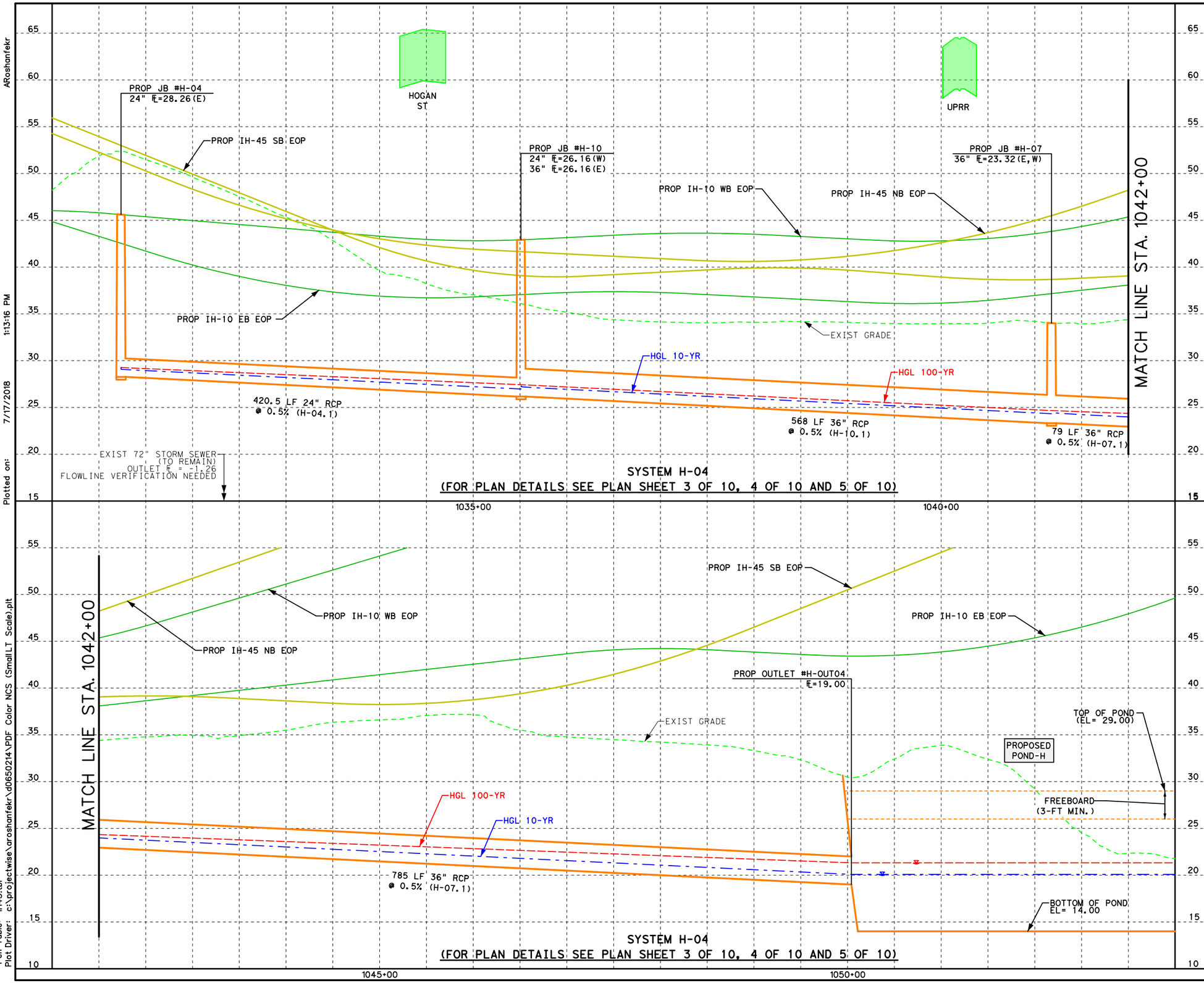

SYSTEM H-04
(FOR PLAN DETAILS SEE PLAN SHEET 3 OF 10, 4 OF 10 AND 5 OF 10)

SYSTEM H-04
(FOR PLAN DETAILS SEE PLAN SHEET 3 OF 10, 4 OF 10 AND 5 OF 10)

NOTE:
1- ALL STATIONING BASED ON IH-10 CENTERLINE STATIONING AND IS NOT REPRESENTATIVE OF THE TRUE PIPE LENGTH.
2- 100-YR HGL IS BASED ON XPSWMM.

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H
1":10' - V

PRELIMINARY

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REV. NO.	DATE	DESCRIPTION	BY

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STORM SEWER PROFILE
SYSTEM H-04
STA. 1031+00 TO STA. 1053+00

EXHIBIT 6-4 SHEET 9 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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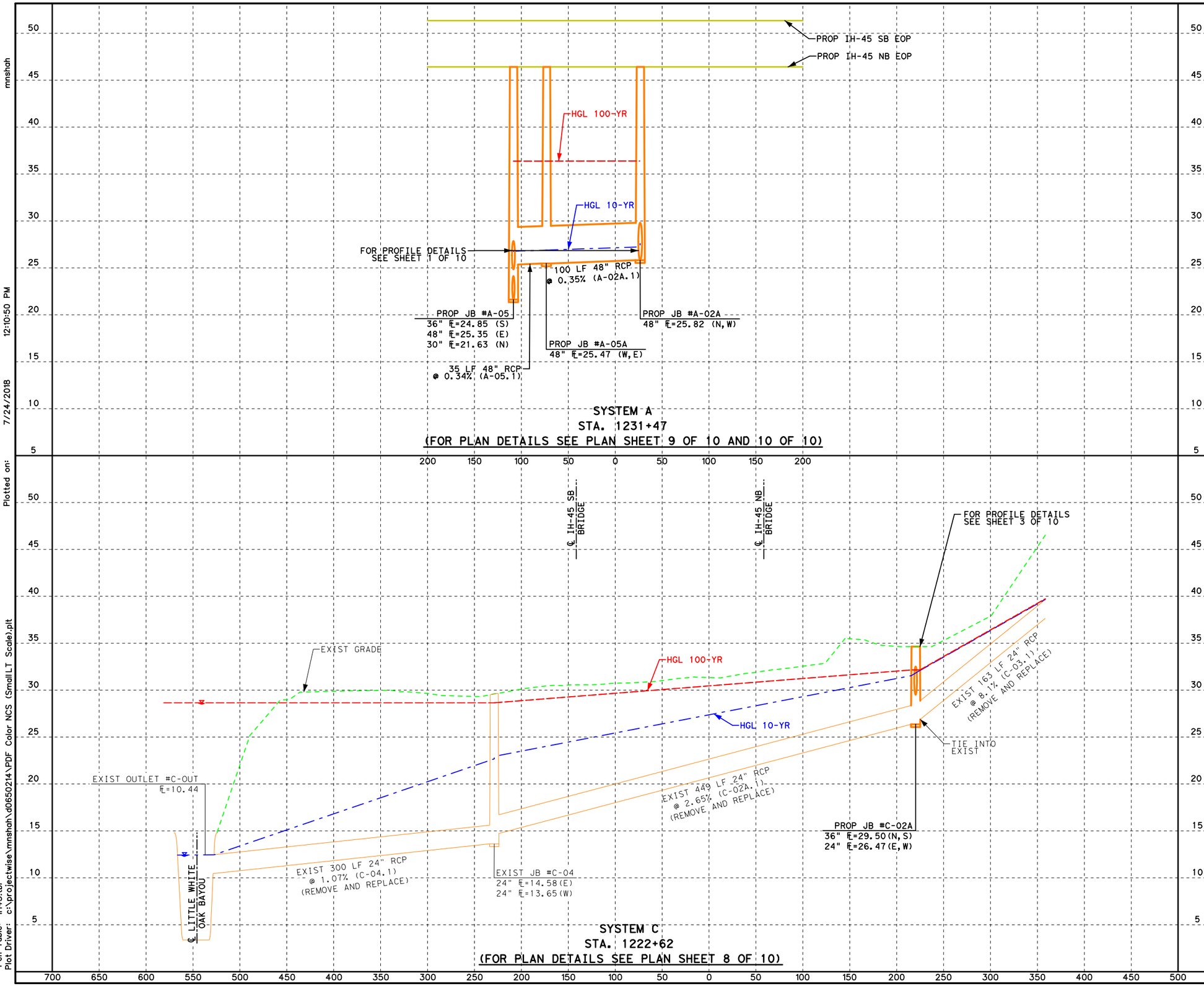

NOTE:
1- ALL STATIONING BASED ON IH-45 CENTERLINE STATIONING AND IS NOT REPRESENTATIVE OF THE TRUE PIPE LENGTH.
2- 100-YR HGL IS BASED ON XPSWMM.

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H
1":10' - V

PRELIMINARY

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NHHIP - SEGMENT 3D

STORM SEWER PROFILE
LATERALS

EXHIBIT 6-4 SHEET 10 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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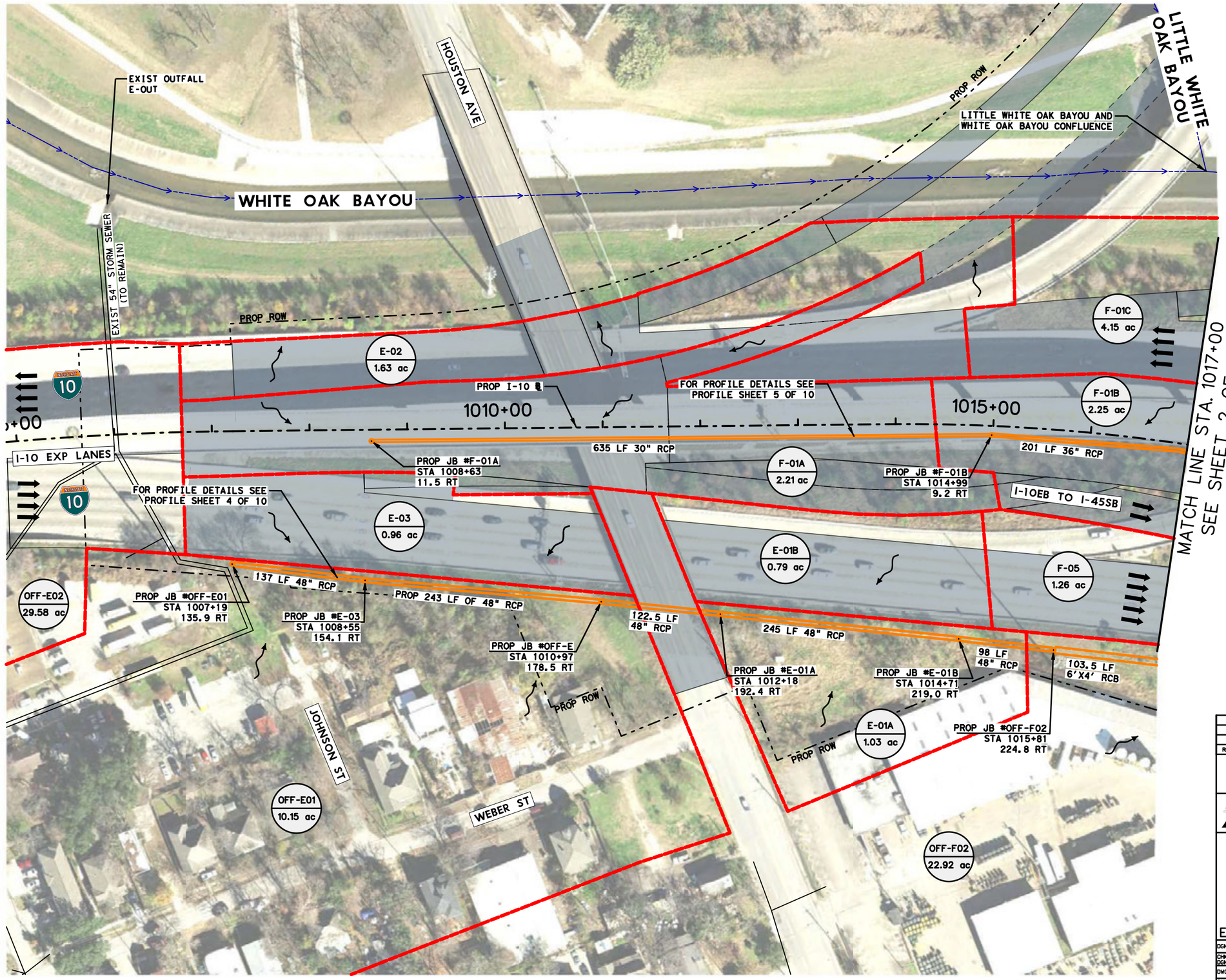

NOTE:

1- SEE OVERALL DRAINGE AREA MAP FOR OFFISTE DRAINGE AREAS.

LEGEND:

- PROP DRAINAGE AREA BOUNDARY
- A-01 / 0.0 ac — DRAINAGE AREA ID
- OVERLAND SHEET FLOW DIRECTION
- PROP STORM SEWER
- EXIST STORM SEWER
- PROP JUNCTION BOX
- TRAFFIC FLOW
- PROP DITCH ℄
- STREAM ℄
- PROP ROW

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H

PRELIMINARY

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NHHIP - SEGMENT 3D

PROPOSED DRAINAGE PLAN

BEGIN PROJECT TO STA 1017+00

EXHIBIT 6-3 SHEET 1 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

Plotted on: 7/17/2018 11:59:33 AM ARoshanfekr

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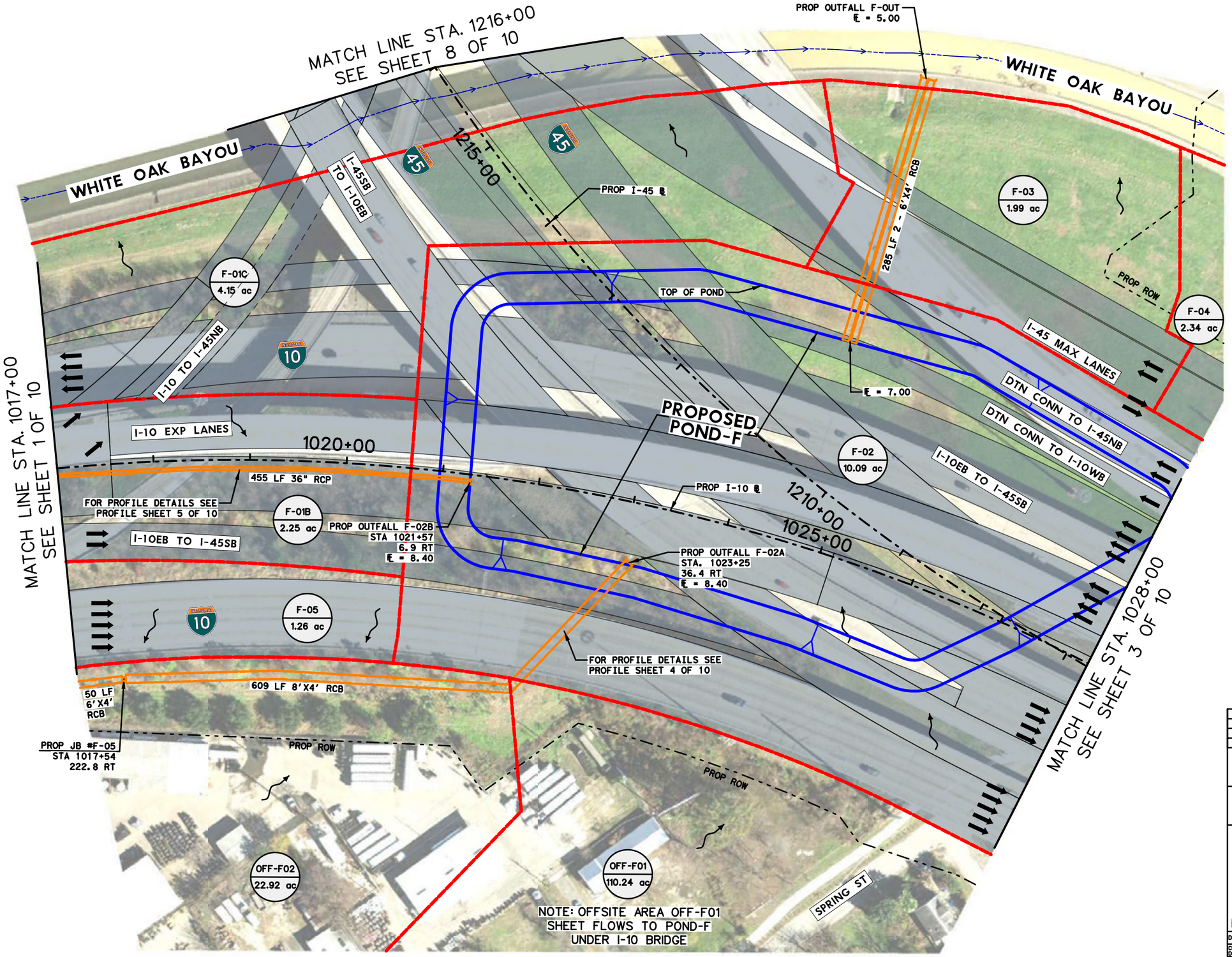

LEGEND:

- PROP DRAINAGE AREA BOUNDARY
- A-01 / 0.0 ac — DRAINAGE AREA ID
- OVERLAND SHEET FLOW DIRECTION
- PROP STORM SEWER
- EXIST STORM SEWER
- PROP JUNCTION BOX
- TRAFFIC FLOW
- PROP DITCH ℄
- STREAM ℄
- PROP ROW

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H

PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

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FIRM REGISTATION NO. 2614

Texas Department of Transportation
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NHHIP - SEGMENT 3D

PROPOSED DRAINAGE PLAN

STA 1017+00 TO STA 1028+00

EXHIBIT 6-3

SHEET 2 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

Plotted on: 7/17/2018 12:09:49 PM ARoshanfekr

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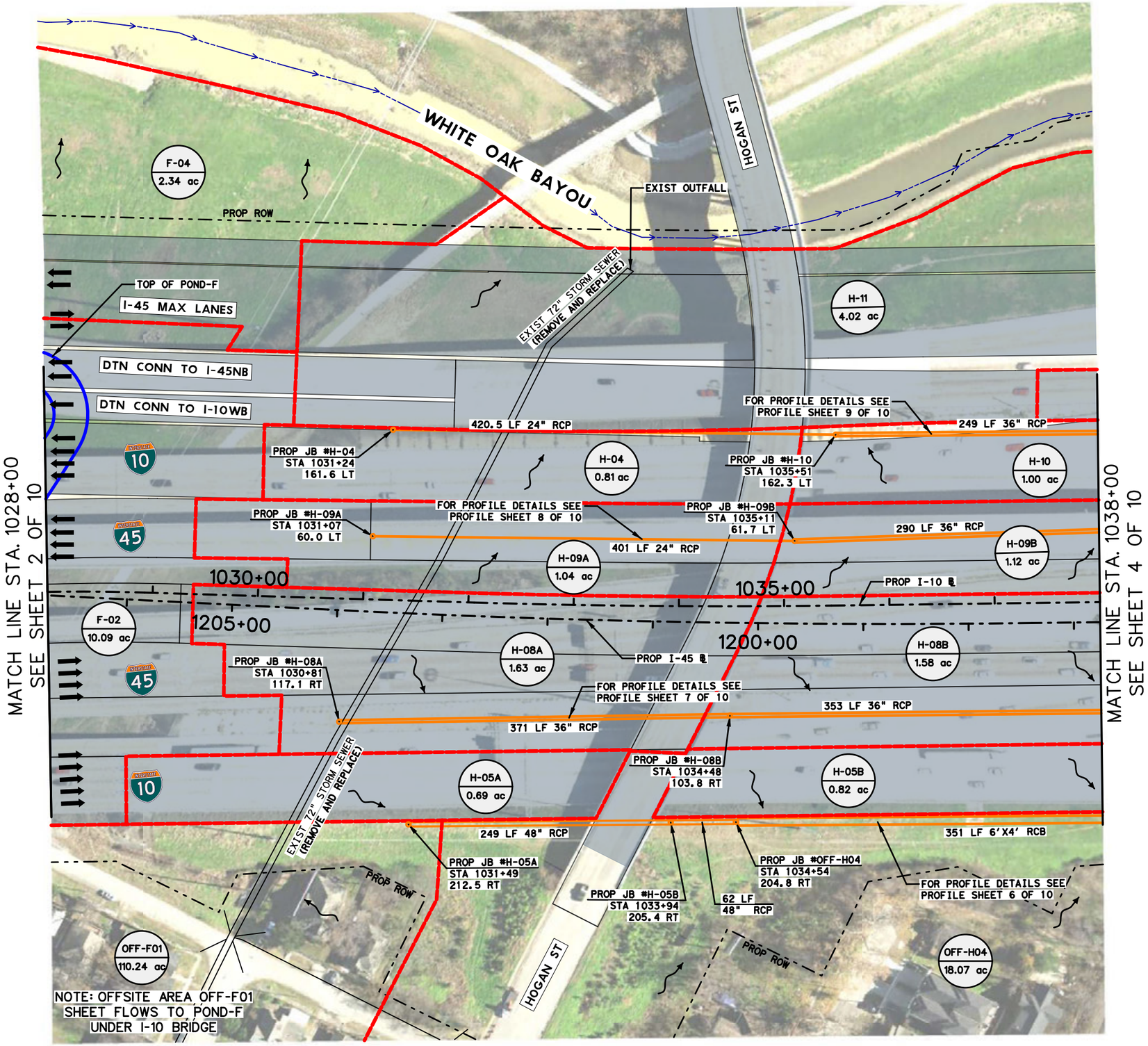

LEGEND:

- PROP DRAINAGE AREA BOUNDARY
- A-01 / 0.0 ac — DRAINAGE AREA ID
- OVERLAND SHEET FLOW DIRECTION
- PROP STORM SEWER
- EXIST STORM SEWER
- PROP JUNCTION BOX
- TRAFFIC FLOW
- PROP DITCH ℄
- STREAM ℄
- PROP ROW

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H

PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
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FIRM REGISTATION NO. 2614

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NHHIP - SEGMENT 3D
PROPOSED DRAINAGE
PLAN
STA 1028+00 TO STA 1040+00

EXHIBIT 6-3 SHEET 3 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

Pen Table: IH45.tbl
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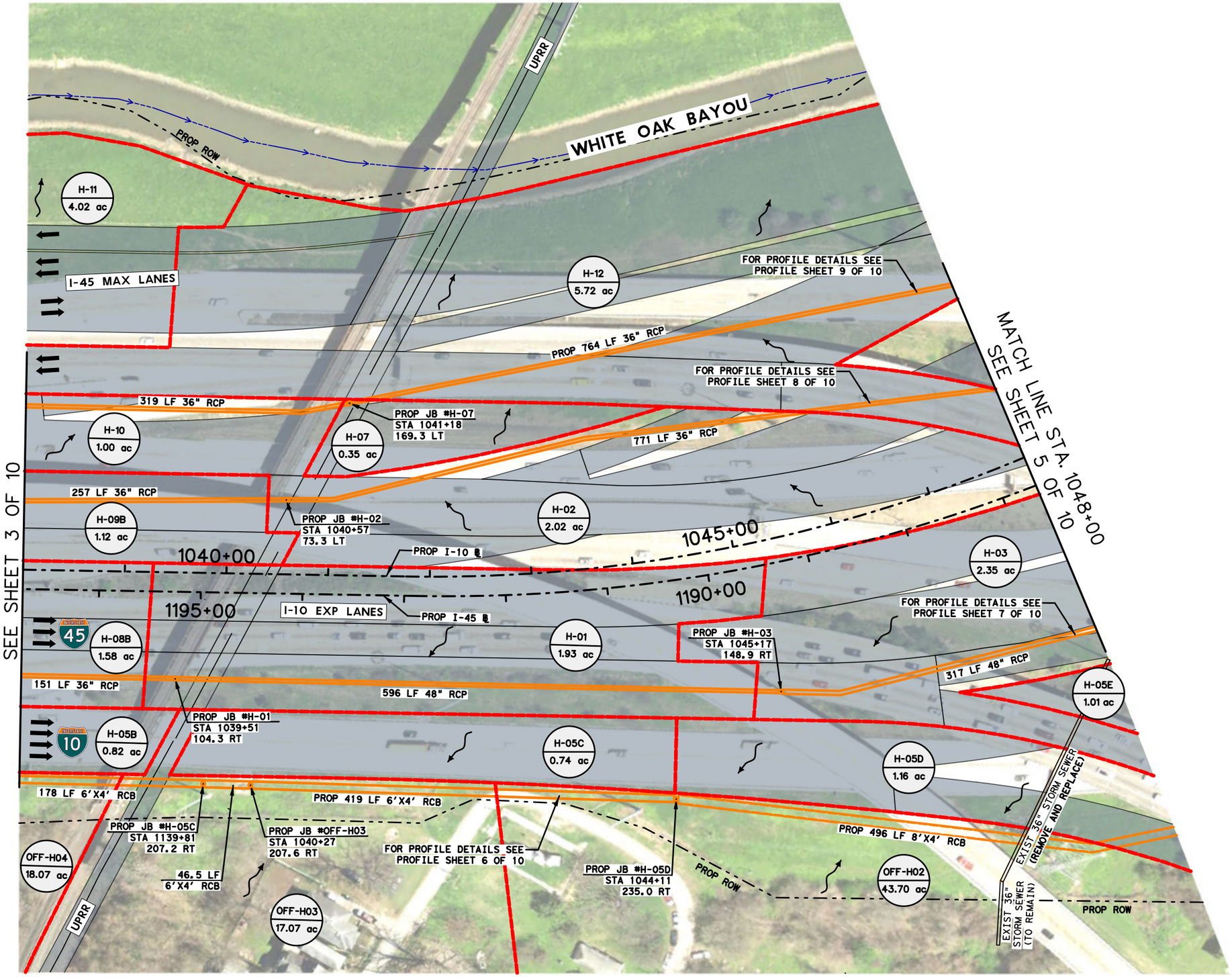

LEGEND:

- PROP DRAINAGE AREA BOUNDARY
- A-01 / 0.0 ac — DRAINAGE AREA ID
- OVERLAND SHEET FLOW DIRECTION
- PROP STORM SEWER
- EXIST STORM SEWER
- PROP JUNCTION BOX
- TRAFFIC FLOW
- PROP DITCH ℄
- STREAM ℄
- PROP ROW

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H

PRELIMINARY

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FIRM REGISTATION NO. 2614

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NHHIP - SEGMENT 3D

PROPOSED DRAINAGE PLAN

STA 1038+00 TO STA 1048+00

EXHIBIT 6-3 SHEET 4 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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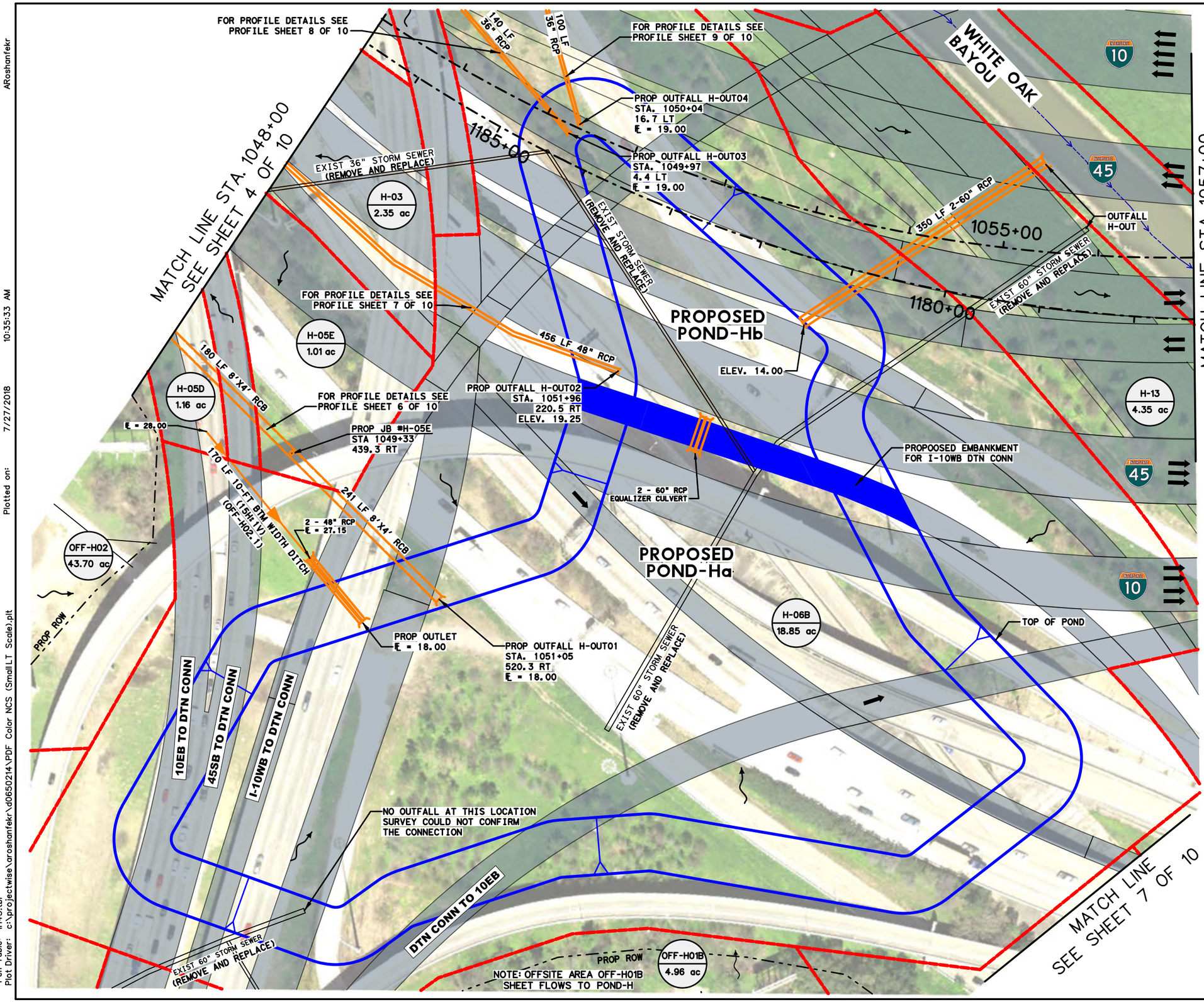

LEGEND:

- PROP DRAINAGE AREA BOUNDARY
- A-01 / 0.0 ac — DRAINAGE AREA ID
- OVERLAND SHEET FLOW DIRECTION
- PROP STORM SEWER
- EXIST STORM SEWER
- PROP JUNCTION BOX
- TRAFFIC FLOW
- PROP DITCH ℄
- STREAM ℄
- PROP ROW

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H

PRELIMINARY

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REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
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FIRM REGISTATION NO. 2614

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NHHIP - SEGMENT 3D

PROPOSED DRAINAGE PLAN

STA 1051+00 TO STA 1062+00

EXHIBIT 6-3 SHEET 5 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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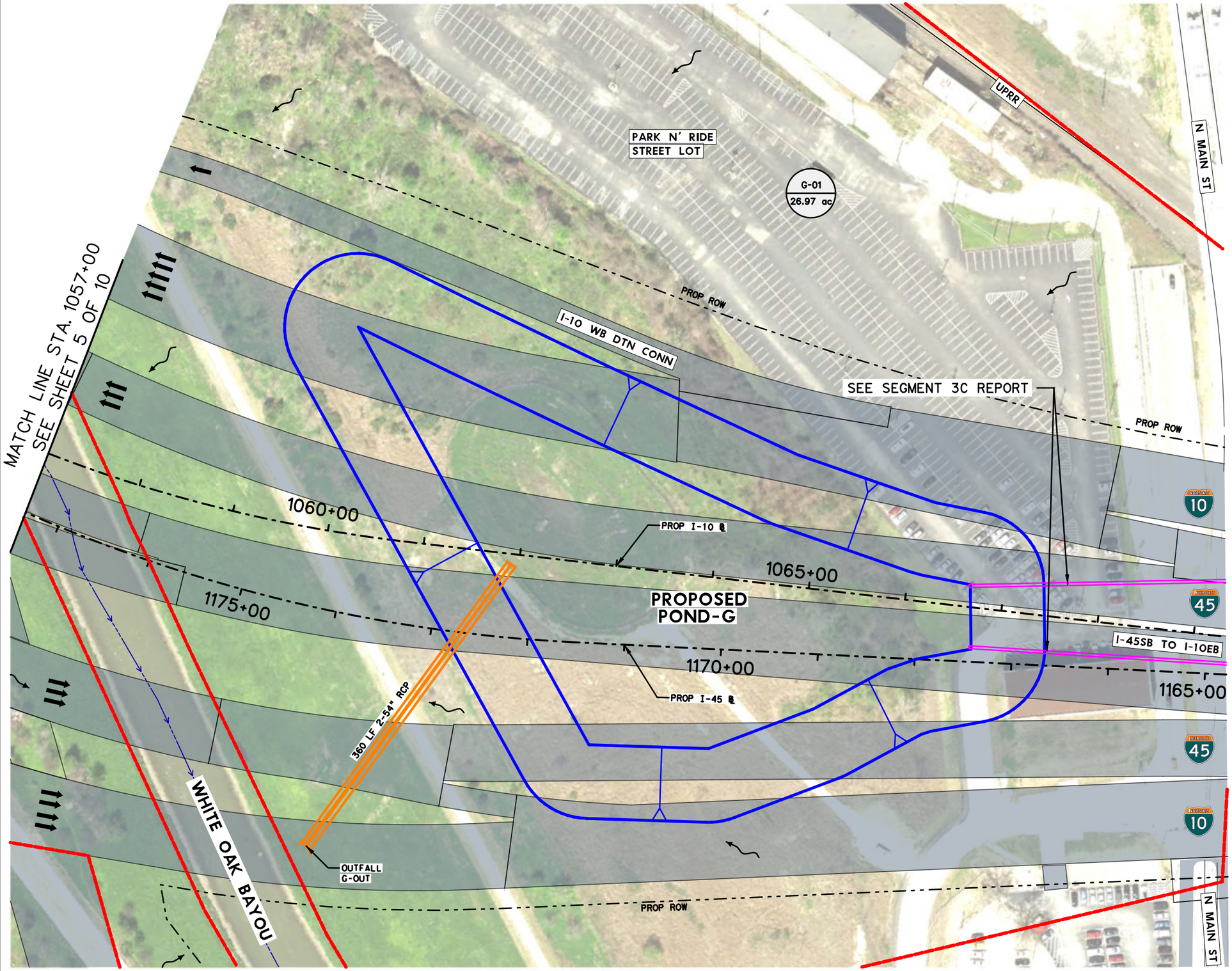

LEGEND:

- PROP DRAINAGE AREA BOUNDARY
- A-01 / 0.0 ac — DRAINAGE AREA ID
- OVERLAND SHEET FLOW DIRECTION
- PROP STORM SEWER
- EXIST STORM SEWER
- PROP JUNCTION BOX
- TRAFFIC FLOW
- PROP DITCH ℄
- STREAM ℄
- PROP ROW

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H

PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
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FIRM REGISTATION NO. 2614

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NHHIP - SEGMENT 3D

PROPOSED DRAINAGE PLAN

STA 1062+00 TO END PROJECT

EXHIBIT 6-3

SHEET 6 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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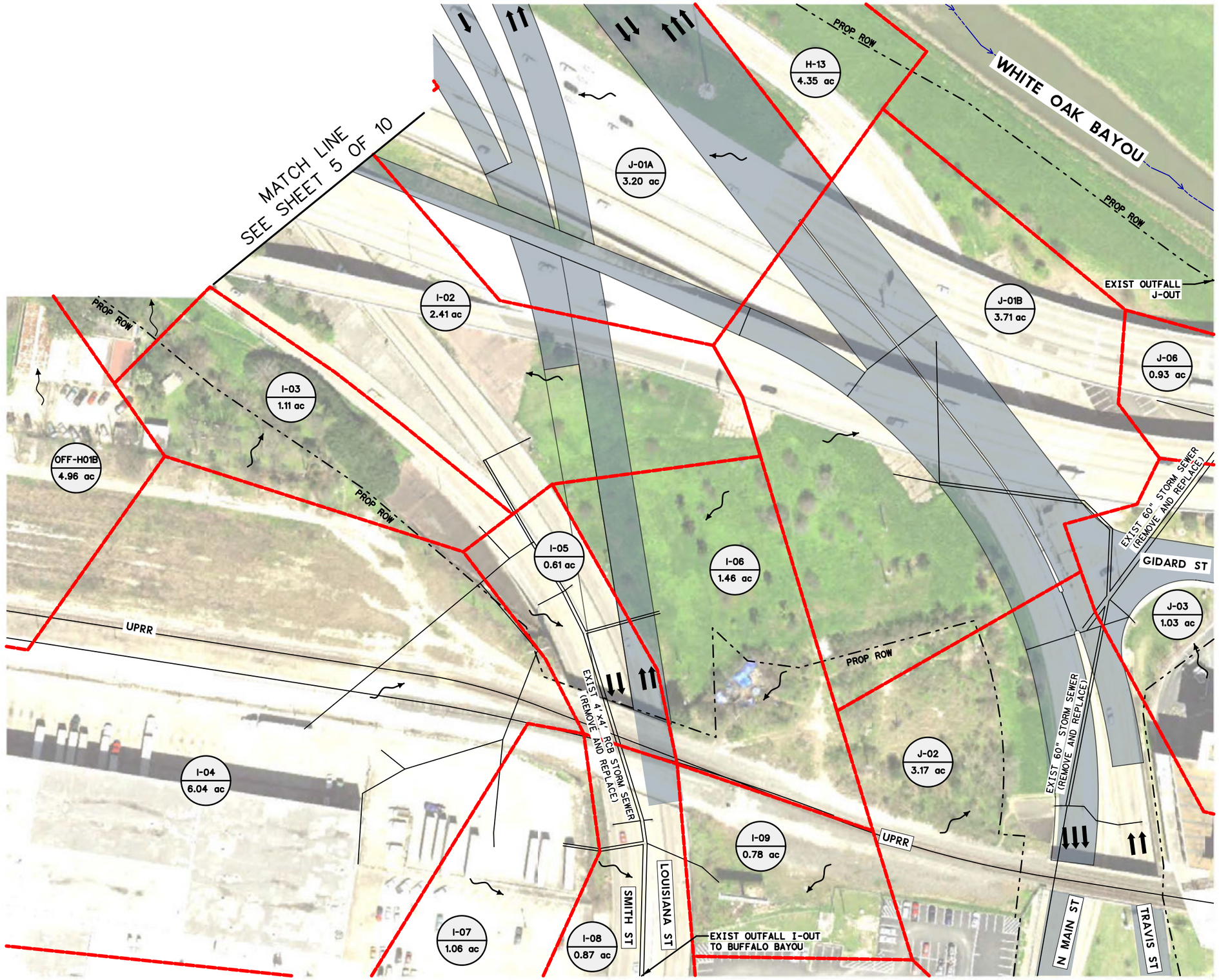

LEGEND:

- PROP DRAINAGE AREA BOUNDARY
- A-01 / 0.0 ac — DRAINAGE AREA ID
- OVERLAND SHEET FLOW DIRECTION
- PROP STORM SEWER
- EXIST STORM SEWER
- PROP JUNCTION BOX
- TRAFFIC FLOW
- PROP DITCH ℄
- STREAM ℄
- PROP ROW

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H

PRELIMINARY

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NHHIP - SEGMENT 3D
PROPOSED DRAINAGE
PLAN
MATCH LINE TO END PROJECT

EXHIBIT 6-3 SHEET 7 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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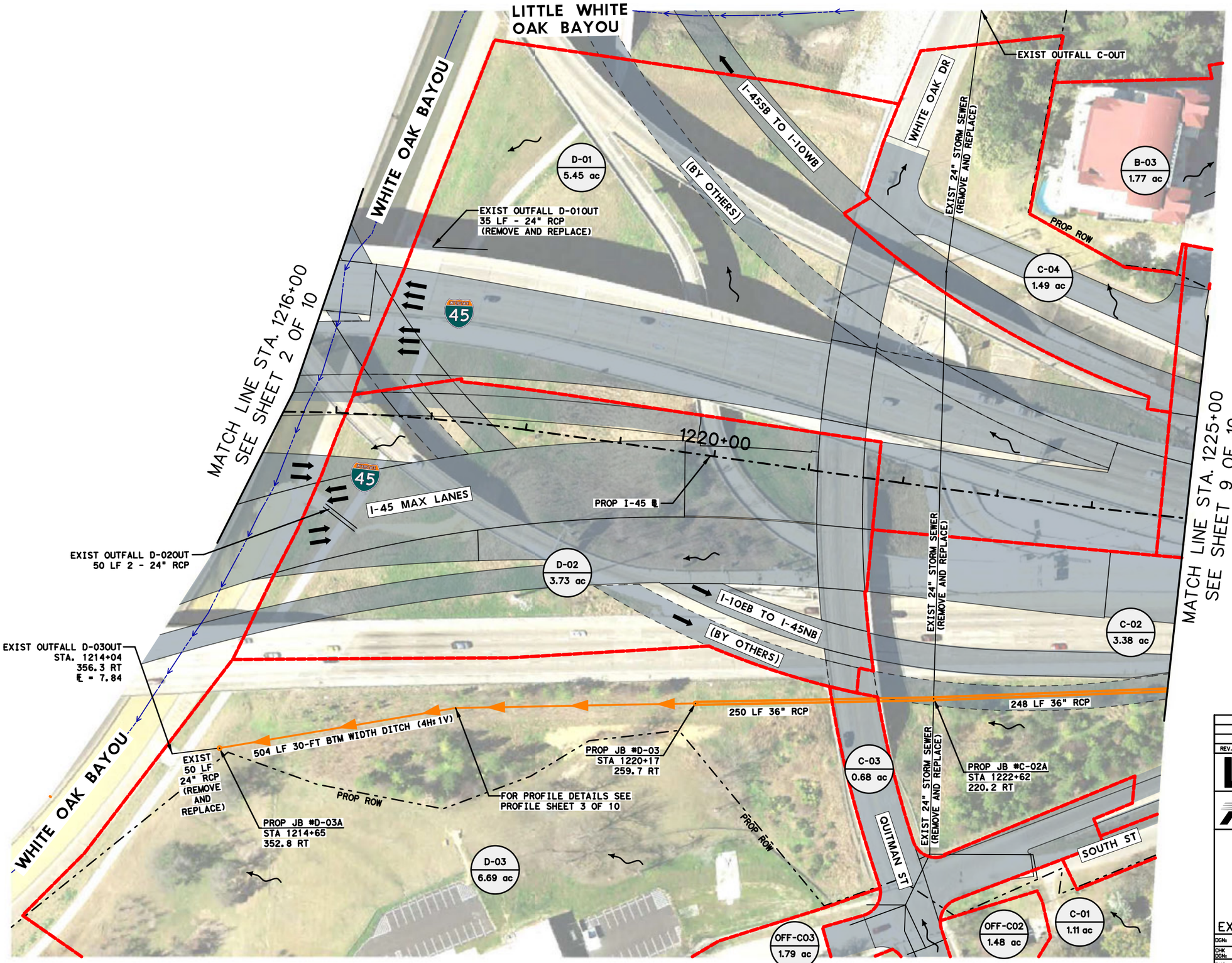

LEGEND:

- PROP DRAINAGE AREA BOUNDARY
- A-01 / 0.0 ac — DRAINAGE AREA ID
- OVERLAND SHEET FLOW DIRECTION
- PROP STORM SEWER
- EXIST STORM SEWER
- PROP JUNCTION BOX
- TRAFFIC FLOW
- PROP DITCH ℄
- STREAM ℄
- PROP ROW

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H

PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

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FIRM REGISTATION NO. 2614

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NHHIP - SEGMENT 3D
PROPOSED DRAINAGE PLAN
STA 1216+00 TO STA 1225+00

EXHIBIT 6-3 SHEET 8 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

Plotted on: 7/24/2018 11:41:28 AM mnshah
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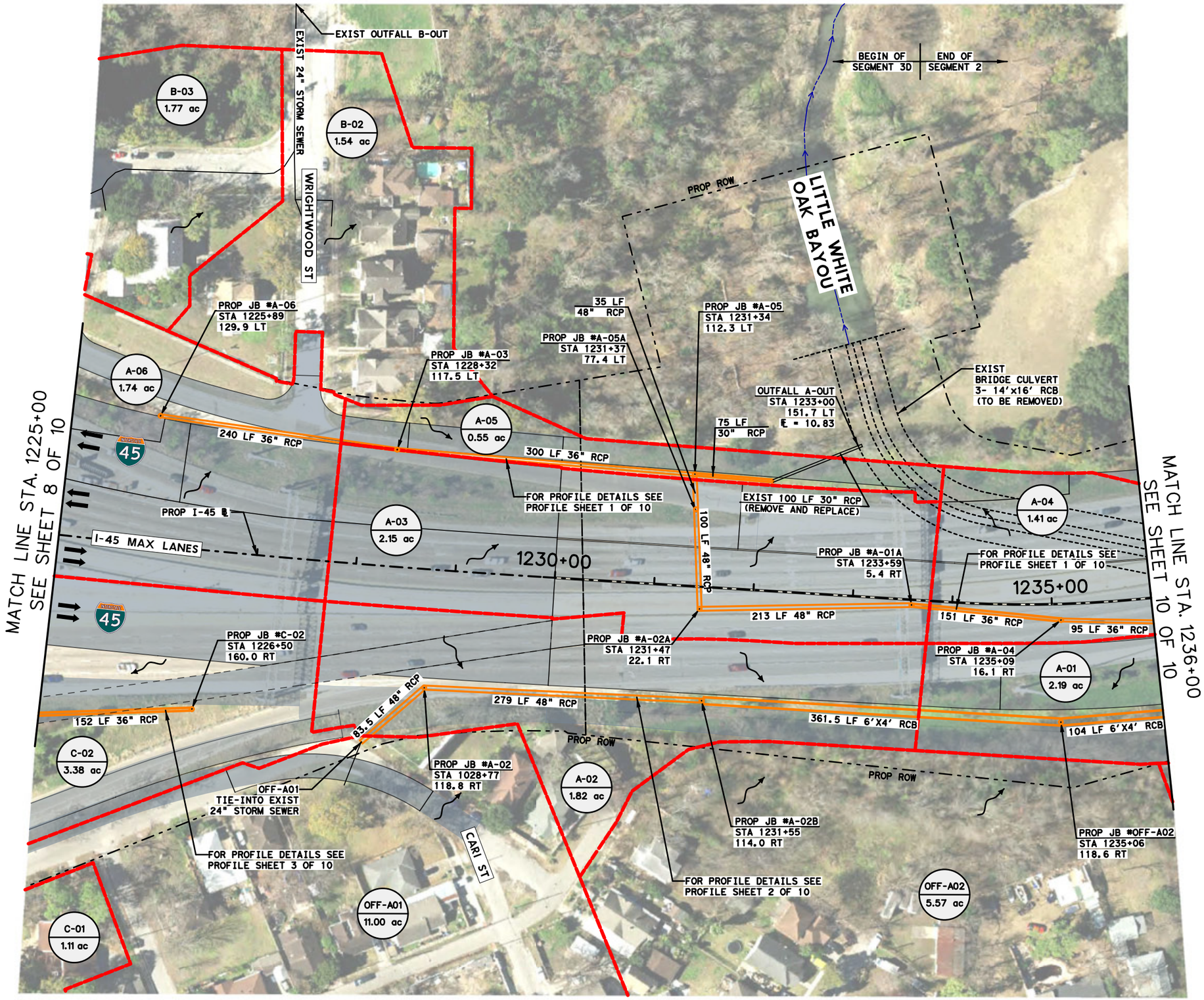

LEGEND:

- PROP DRAINAGE AREA BOUNDARY
- A-01 / 0.0 ac — DRAINAGE AREA ID
- OVERLAND SHEET FLOW DIRECTION
- PROP STORM SEWER
- EXIST STORM SEWER
- PROP JUNCTION BOX
- TRAFFIC FLOW
- PROP DITCH ℄
- STREAM ℄
- PROP ROW

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H

PRELIMINARY

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REV. NO.	DATE	DESCRIPTION	BY

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FIRM REGISTATION NO. 2614

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NHHIP - SEGMENT 3D

PROPOSED DRAINAGE PLAN

STA 1225+00 TO STA 1236+00

EXHIBIT 6-3

SHEET 9 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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Plotted on:

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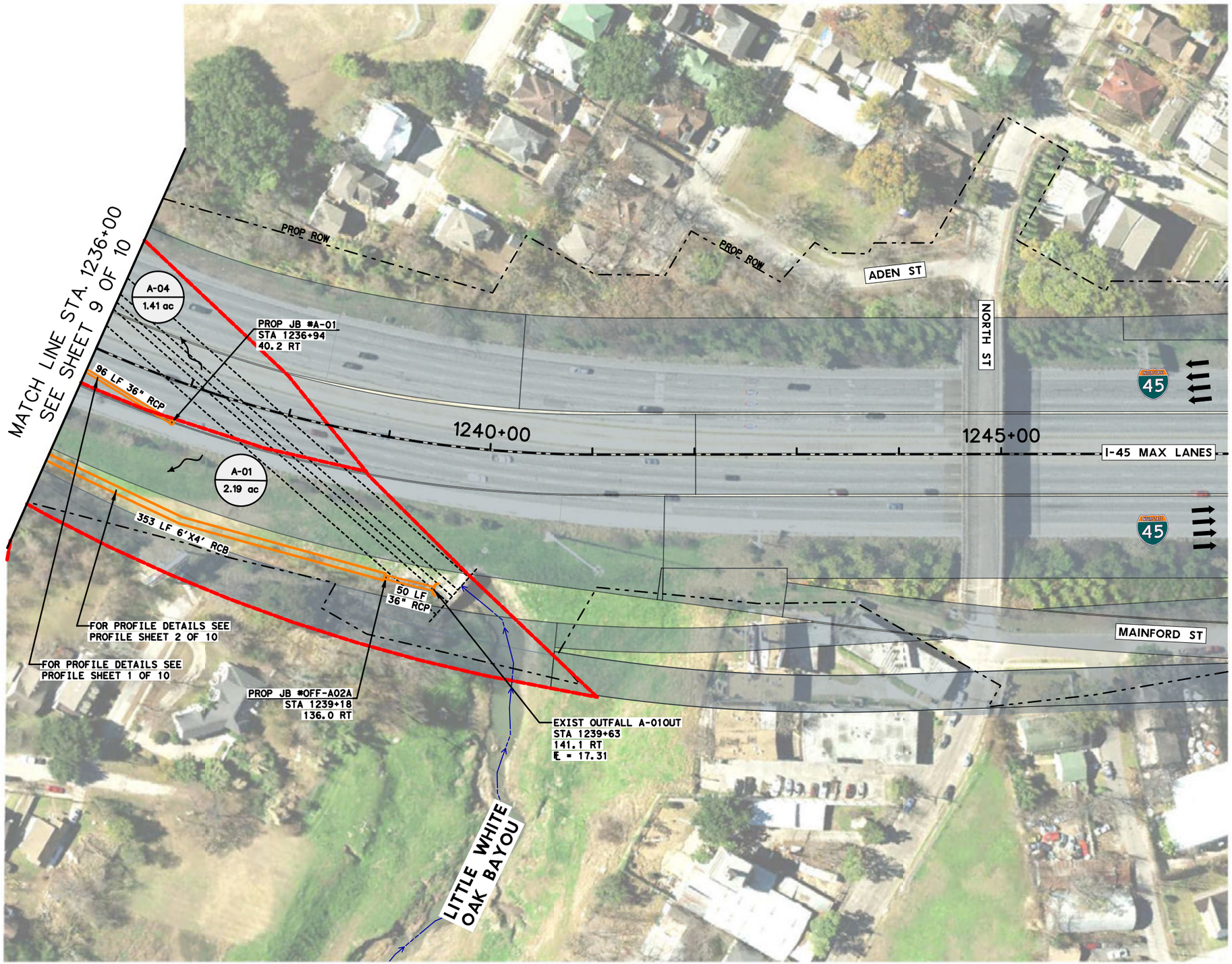

LEGEND:

- PROP DRAINAGE AREA BOUNDARY
- A-01 / 0.0 ac — DRAINAGE AREA ID
- OVERLAND SHEET FLOW DIRECTION
- PROP STORM SEWER
- EXIST STORM SEWER
- PROP JUNCTION BOX
- TRAFFIC FLOW
- PROP DITCH ℄
- STREAM ℄
- PROP ROW

0 50 100 200
(IN FEET)
SCALE: PLAN 1":100' - H

PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
FIRM REGISTATION NO. 2614

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NHHIP - SEGMENT 3D
PROPOSED DRAINAGE
PLAN
BEGIN PROJECT TO STA 1236+00

EXHIBIT 6-3 SHEET 10 OF 10

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

Pen Table: IH45.tbl
Plot Driver: c:\projectwise\mnshah\d0650214\PDF Color NCS (Small LT Scale).plt
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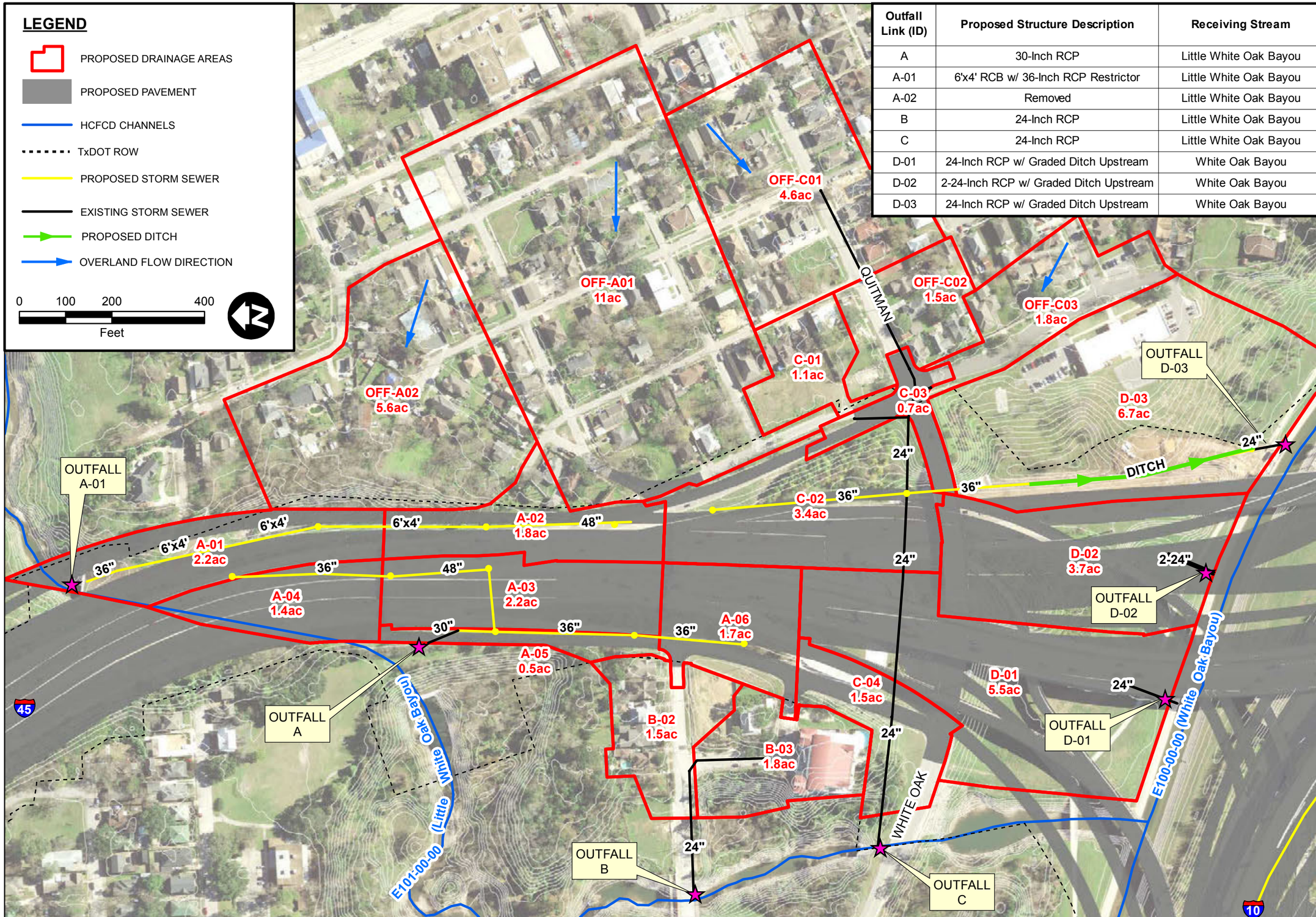


Outfall Link (ID)	Proposed Structure Description	Receiving Stream
A	30-Inch RCP	Little White Oak Bayou
A-01	6'x4' RCB w/ 36-Inch RCP Restrictor	Little White Oak Bayou
A-02	Removed	Little White Oak Bayou
B	24-Inch RCP	Little White Oak Bayou
C	24-Inch RCP	Little White Oak Bayou
D-01	24-Inch RCP w/ Graded Ditch Upstream	White Oak Bayou
D-02	2-24-Inch RCP w/ Graded Ditch Upstream	White Oak Bayou
D-03	24-Inch RCP w/ Graded Ditch Upstream	White Oak Bayou

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT
SEGMENT 3D

PROPOSED INTERNAL DRAINAGE AREA MAP
SYSTEMS A, B, C & D (SHEET 1 OF 3)

PREPARED:
CHECKED:
APPROVED:

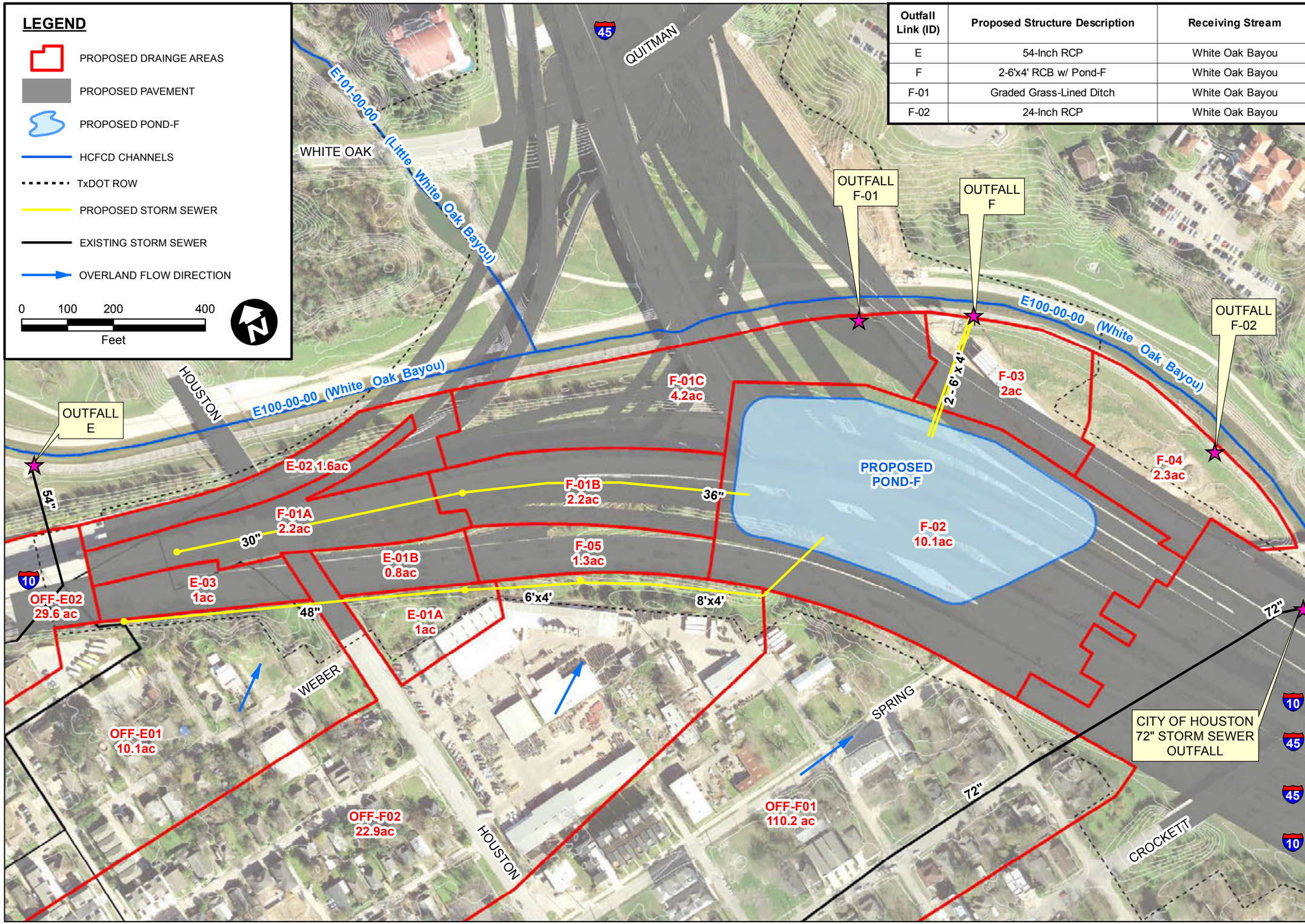
Lockwood, Andrews & Newnam, inc.
A LEO A DALY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
6-2



Outfall Link (ID)	Proposed Structure Description	Receiving Stream
E	54-Inch RCP	White Oak Bayou
F	2-6'x4' RCB w/ Pond-F	White Oak Bayou
F-01	Graded Grass-Lined Ditch	White Oak Bayou
F-02	24-Inch RCP	White Oak Bayou

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT
SEGMENT 3D

PROPOSED INTERNAL DRAINAGE AREA MAP
SYSTEMS E & F (SHEET 2 OF 3)

PREPARED:
CHECKED:
APPROVED:

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

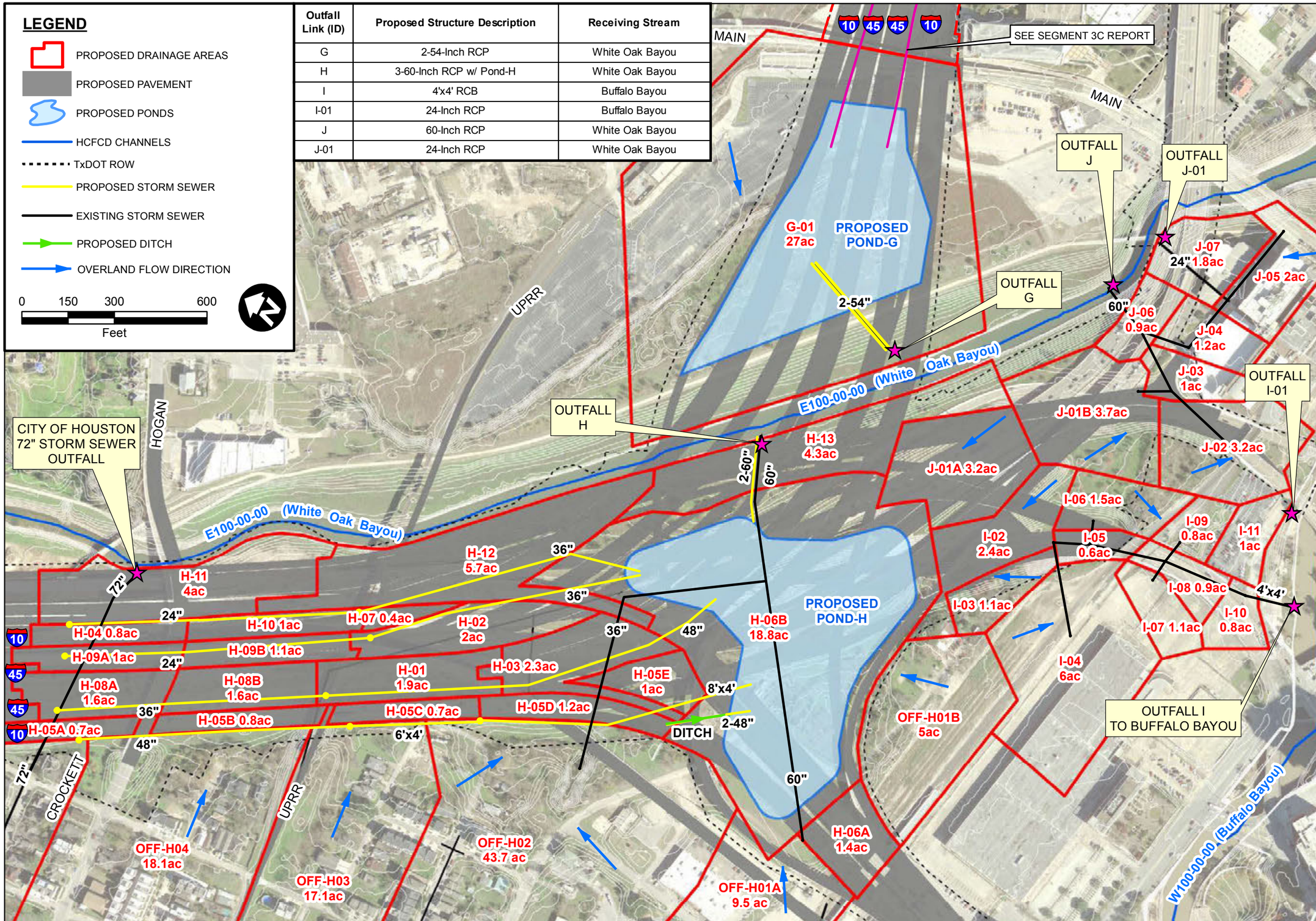
EXHIBIT
6-2

LEGEND

- PROPOSED DRAINAGE AREAS
- PROPOSED PAVEMENT
- PROPOSED PONDS
- HCFCD CHANNELS
- TxDOT ROW
- PROPOSED STORM SEWER
- EXISTING STORM SEWER
- PROPOSED DITCH
- OVERLAND FLOW DIRECTION

0 150 300 600
Feet

Outfall Link (ID)	Proposed Structure Description	Receiving Stream
G	2-54-Inch RCP	White Oak Bayou
H	3-60-Inch RCP w/ Pond-H	White Oak Bayou
I	4'x4' RCB	Buffalo Bayou
I-01	24-Inch RCP	Buffalo Bayou
J	60-Inch RCP	White Oak Bayou
J-01	24-Inch RCP	White Oak Bayou



NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT
SEGMENT 3D

PROPOSED INTERNAL DRAINAGE AREA MAP
SYSTEMS G, H, I & J (SHEET 3 OF 3)

PREPARED:
CHECKED:
APPROVED:

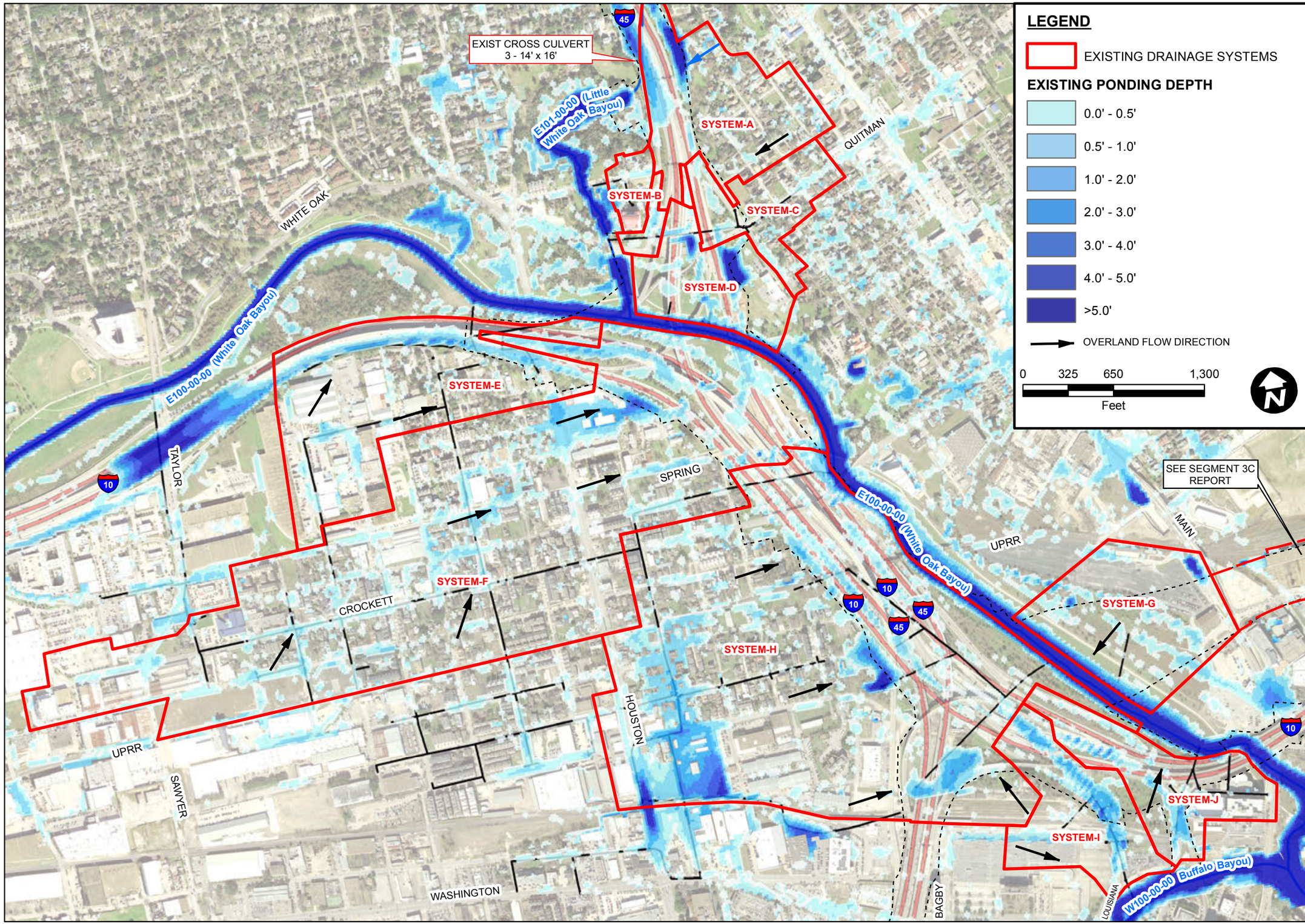
Lockwood, Andrews & Newnam, Inc.
A LEE & JACKSON COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
6-2



NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT
SEGMENT 3D

2D PONDING MAP

PREPARED:

CHECKED:

APPROVED:

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

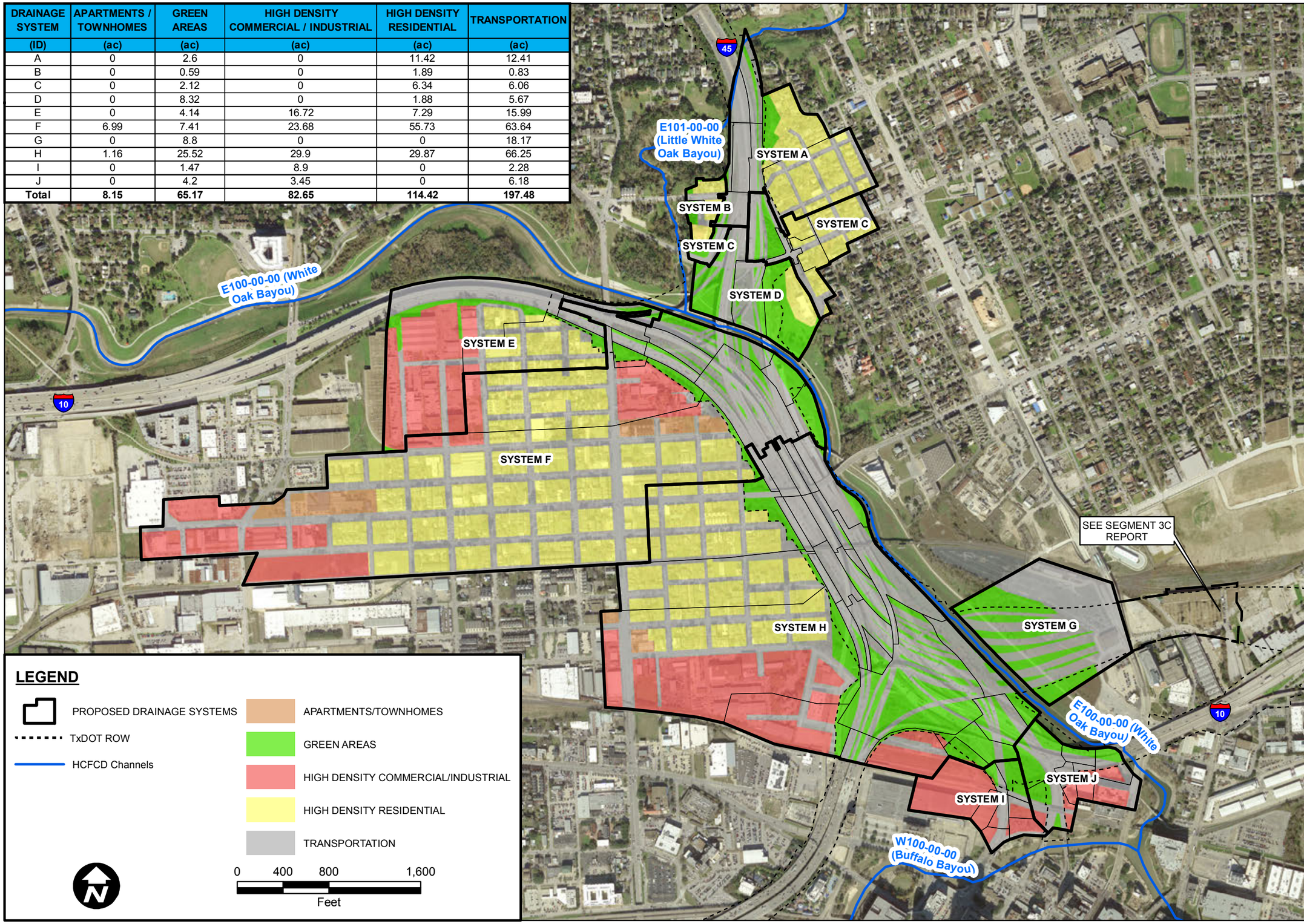
Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
6-1

DRAINAGE SYSTEM	APARTMENTS / TOWNHOMES	GREEN AREAS	HIGH DENSITY COMMERCIAL / INDUSTRIAL	HIGH DENSITY RESIDENTIAL	TRANSPORTATION
(ID)	(ac)	(ac)	(ac)	(ac)	(ac)
A	0	2.6	0	11.42	12.41
B	0	0.59	0	1.89	0.83
C	0	2.12	0	6.34	6.06
D	0	8.32	0	1.88	5.67
E	0	4.14	16.72	7.29	15.99
F	6.99	7.41	23.68	55.73	63.64
G	0	8.8	0	0	18.17
H	1.16	25.52	29.9	29.87	66.25
I	0	1.47	8.9	0	2.28
J	0	4.2	3.45	0	6.18
Total	**8.15**	**65.17**	**82.65**	**114.42**	**197.48**



NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT
SEGMENT 3D

PROPOSED LANDUSE MAP

PREPARED:
CHECKED:
APPROVED:

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

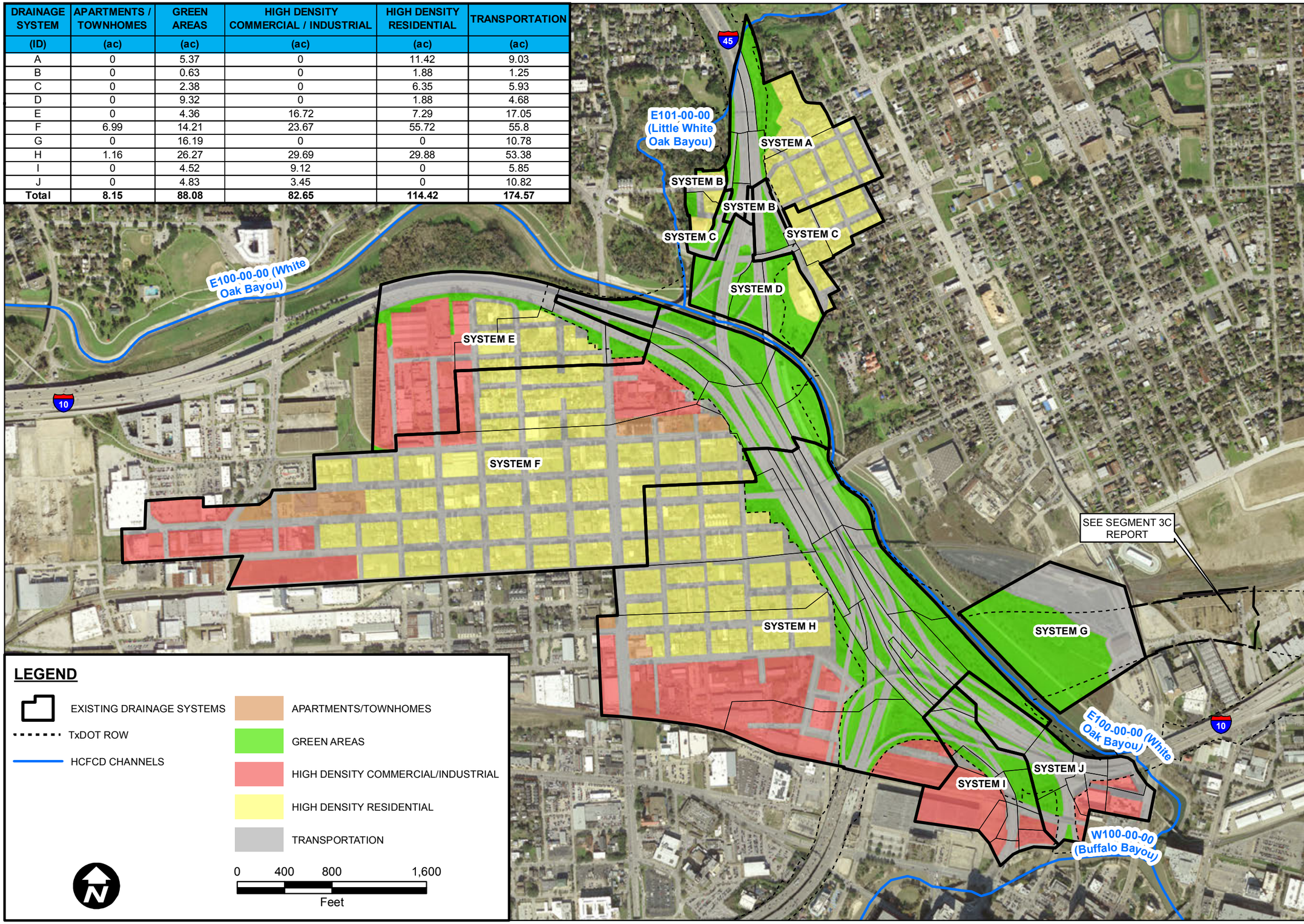
Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
5-4

DRAINAGE SYSTEM	APARTMENTS / TOWNHOMES	GREEN AREAS	HIGH DENSITY COMMERCIAL / INDUSTRIAL	HIGH DENSITY RESIDENTIAL	TRANSPORTATION
(ID)	(ac)	(ac)	(ac)	(ac)	(ac)
A	0	5.37	0	11.42	9.03
B	0	0.63	0	1.88	1.25
C	0	2.38	0	6.35	5.93
D	0	9.32	0	1.88	4.68
E	0	4.36	16.72	7.29	17.05
F	6.99	14.21	23.67	55.72	55.8
G	0	16.19	0	0	10.78
H	1.16	26.27	29.69	29.88	53.38
I	0	4.52	9.12	0	5.85
J	0	4.83	3.45	0	10.82
Total	**8.15**	**88.08**	**82.65**	**114.42**	**174.57**



NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT
SEGMENT 3D

EXISTING LANDUSE MAP

PREPARED:
CHECKED:
APPROVED:

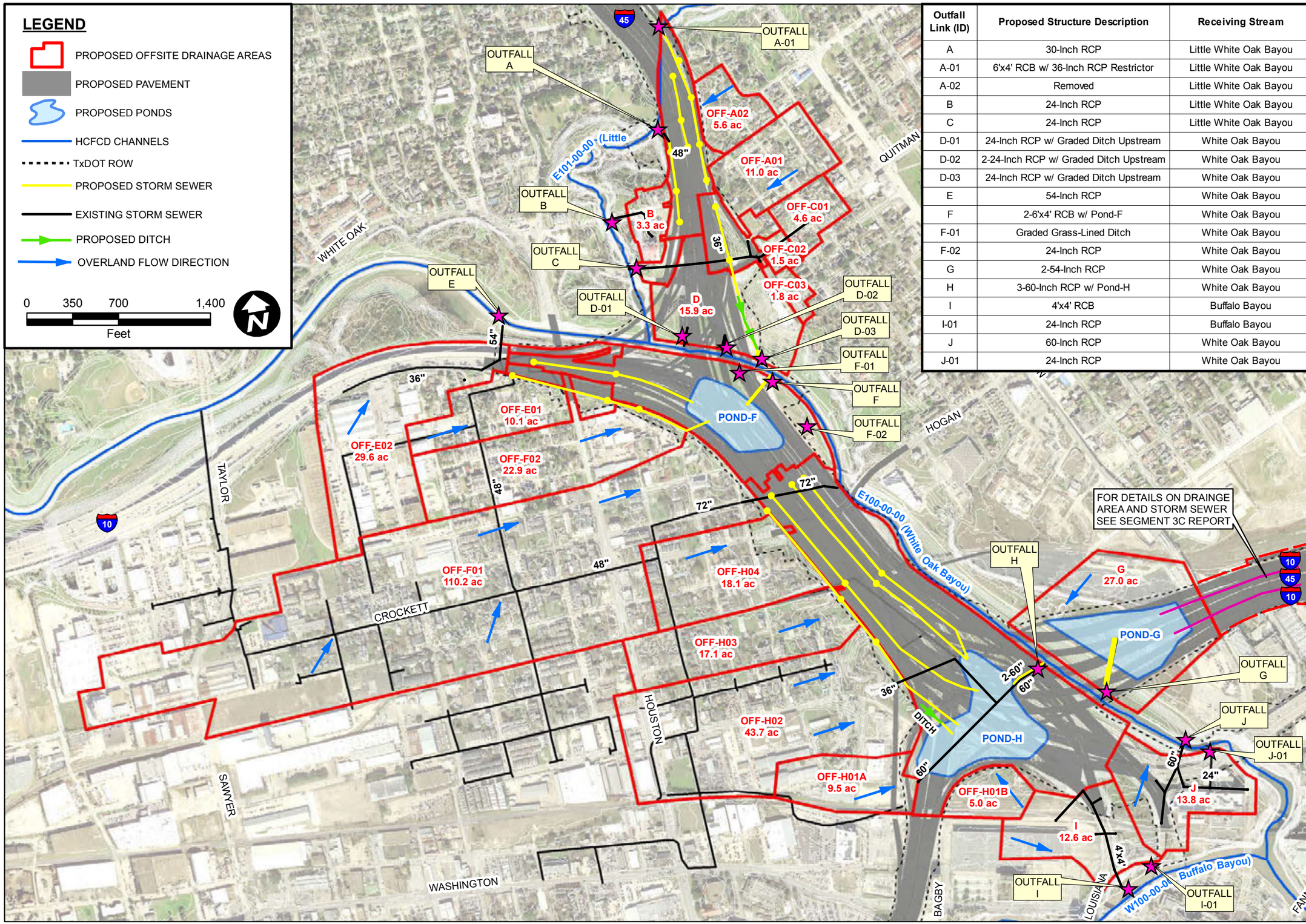
Lockwood, Andrews & Newnam, Inc.
A LJA & DALY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
5-3



Outfall Link (ID)	Proposed Structure Description	Receiving Stream
A	30-Inch RCP	Little White Oak Bayou
A-01	6'x4' RCB w/ 36-Inch RCP Restrictor	Little White Oak Bayou
A-02	Removed	Little White Oak Bayou
B	24-Inch RCP	Little White Oak Bayou
C	24-Inch RCP	Little White Oak Bayou
D-01	24-Inch RCP w/ Graded Ditch Upstream	White Oak Bayou
D-02	2-24-Inch RCP w/ Graded Ditch Upstream	White Oak Bayou
D-03	24-Inch RCP w/ Graded Ditch Upstream	White Oak Bayou
E	54-Inch RCP	White Oak Bayou
F	2-6'x4' RCB w/ Pond-F	White Oak Bayou
F-01	Graded Grass-Lined Ditch	White Oak Bayou
F-02	24-Inch RCP	White Oak Bayou
G	2-54-Inch RCP	White Oak Bayou
H	3-60-Inch RCP w/ Pond-H	White Oak Bayou
I	4'x4' RCB	Buffalo Bayou
I-01	24-Inch RCP	Buffalo Bayou
J	60-Inch RCP	White Oak Bayou
J-01	24-Inch RCP	White Oak Bayou

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT
SEGMENT 3D

OVERALL PROPOSED DRAINAGE AREA MAP

PREPARED:
CHECKED:
APPROVED:

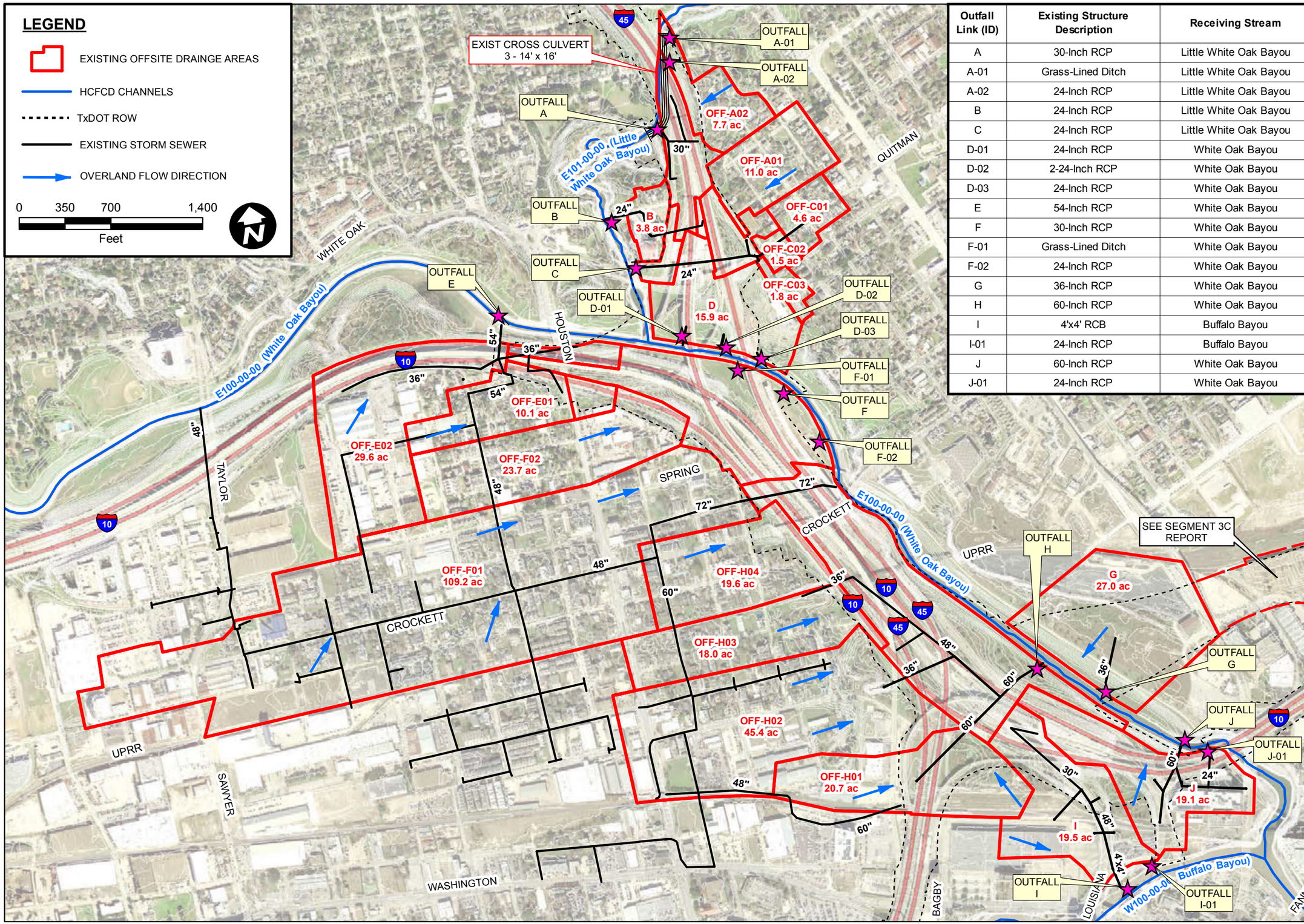
Lockwood, Andrews & Newnam, inc.
A LEE & RAY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
5-2



Outfall Link (ID)	Existing Structure Description	Receiving Stream
A	30-Inch RCP	Little White Oak Bayou
A-01	Grass-Lined Ditch	Little White Oak Bayou
A-02	24-Inch RCP	Little White Oak Bayou
B	24-Inch RCP	Little White Oak Bayou
C	24-Inch RCP	Little White Oak Bayou
D-01	24-Inch RCP	White Oak Bayou
D-02	2-24-Inch RCP	White Oak Bayou
D-03	24-Inch RCP	White Oak Bayou
E	54-Inch RCP	White Oak Bayou
F	30-Inch RCP	White Oak Bayou
F-01	Grass-Lined Ditch	White Oak Bayou
F-02	24-Inch RCP	White Oak Bayou
G	36-Inch RCP	White Oak Bayou
H	60-Inch RCP	White Oak Bayou
I	4'x4' RCB	Buffalo Bayou
I-01	24-Inch RCP	Buffalo Bayou
J	60-Inch RCP	White Oak Bayou
J-01	24-Inch RCP	White Oak Bayou

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT
SEGMENT 3D

OVERALL EXISTING DRAINAGE AREA MAP

PREPARED:
CHECKED:
APPROVED:

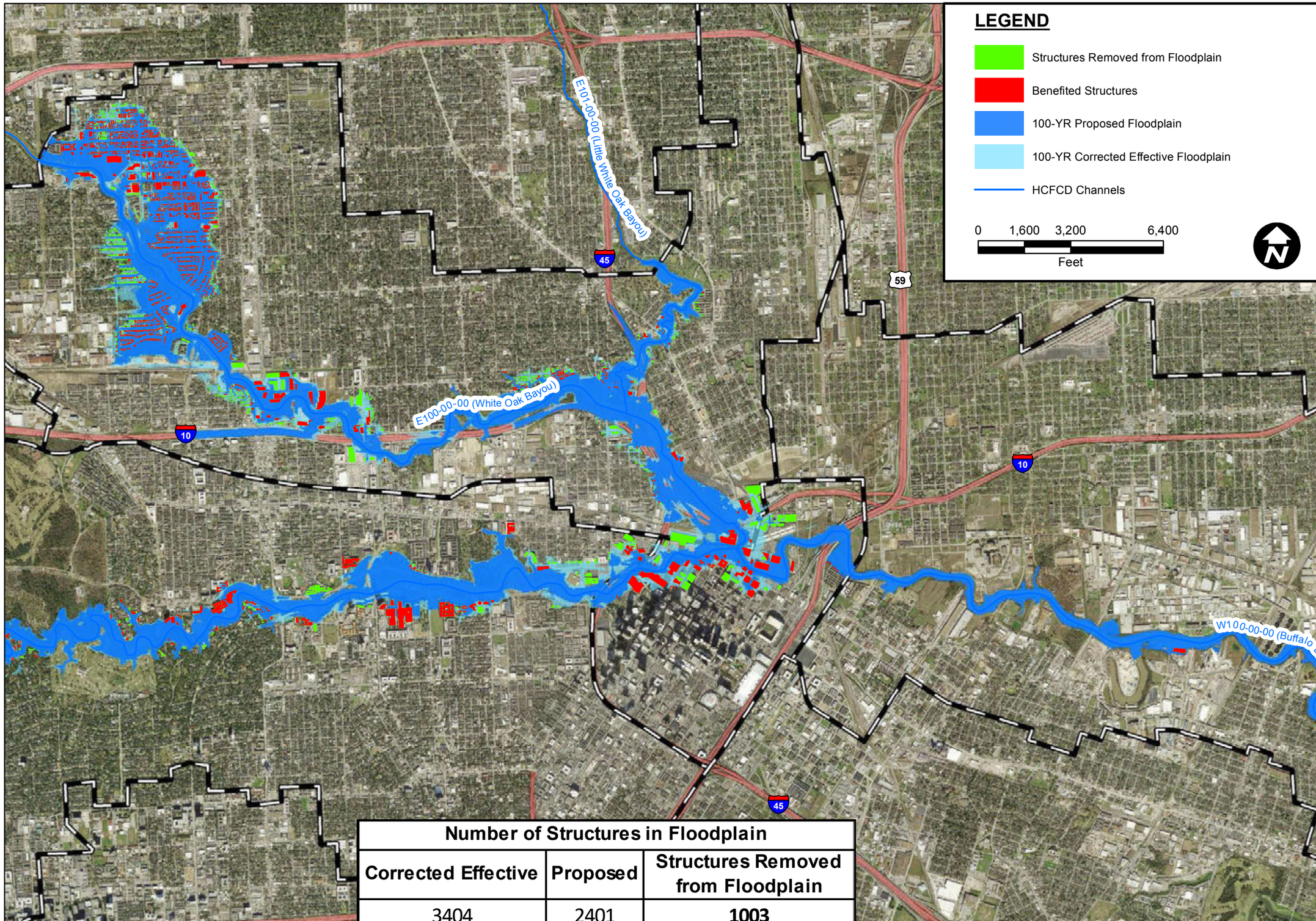
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
5-1



Number of Structures in Floodplain		
Corrected Effective	Proposed	Structures Removed from Floodplain
3404	2401	**1003**

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

BENEFITED BUILDINGS SCENARIO 3 - OVERALL MAP

PREPARED:

CHECKED:

APPROVED:

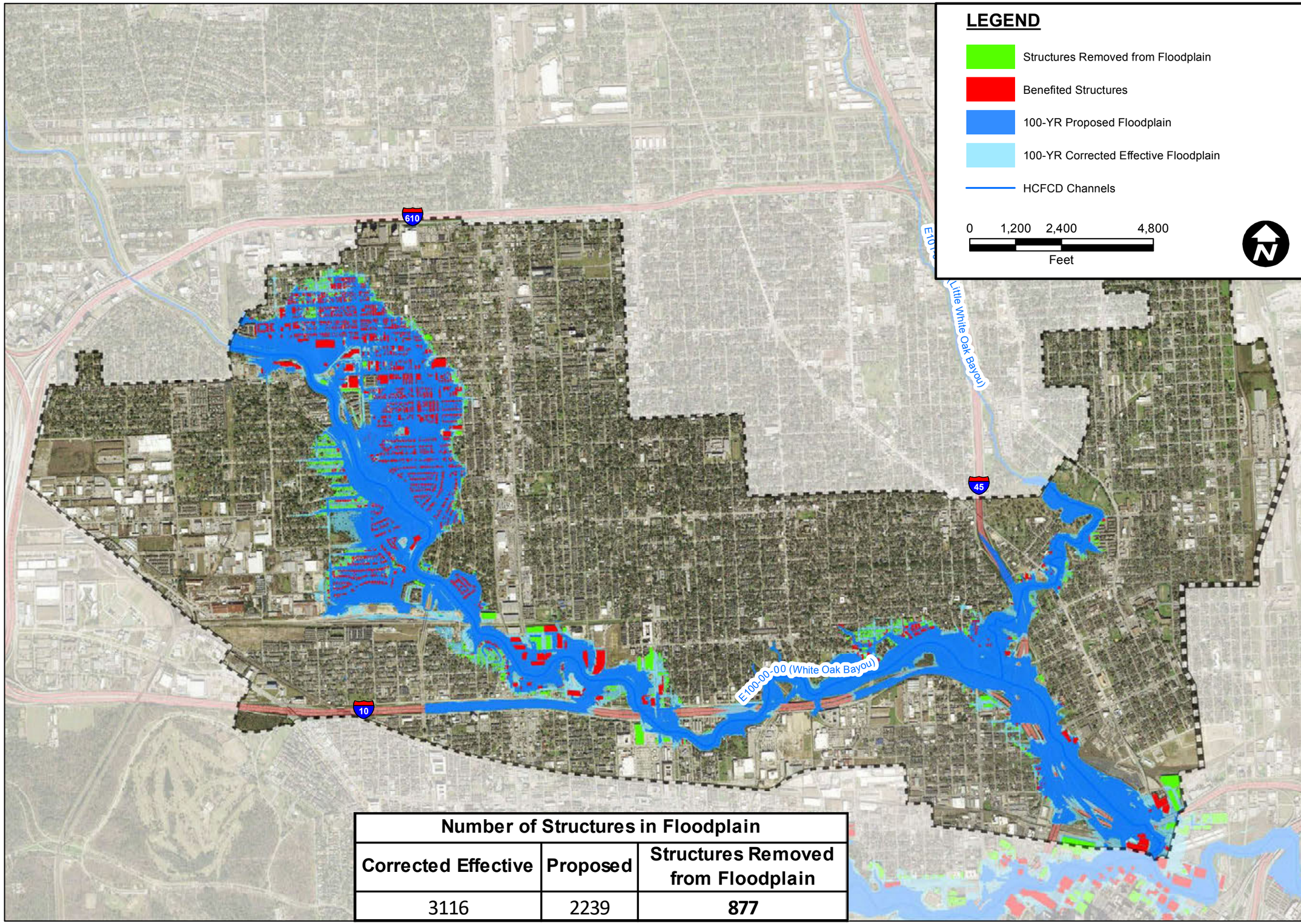
Lockwood, Andrews & Newnam, Inc.

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
4-8a



Number of Structures in Floodplain		
Corrected Effective	Proposed	Structures Removed from Floodplain
3116	2239	**877**

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

BENEFITED BUILDINGS
SCENARIO 3 - WHITE OAK BAYOU

PREPARED:
CHECKED:
APPROVED:

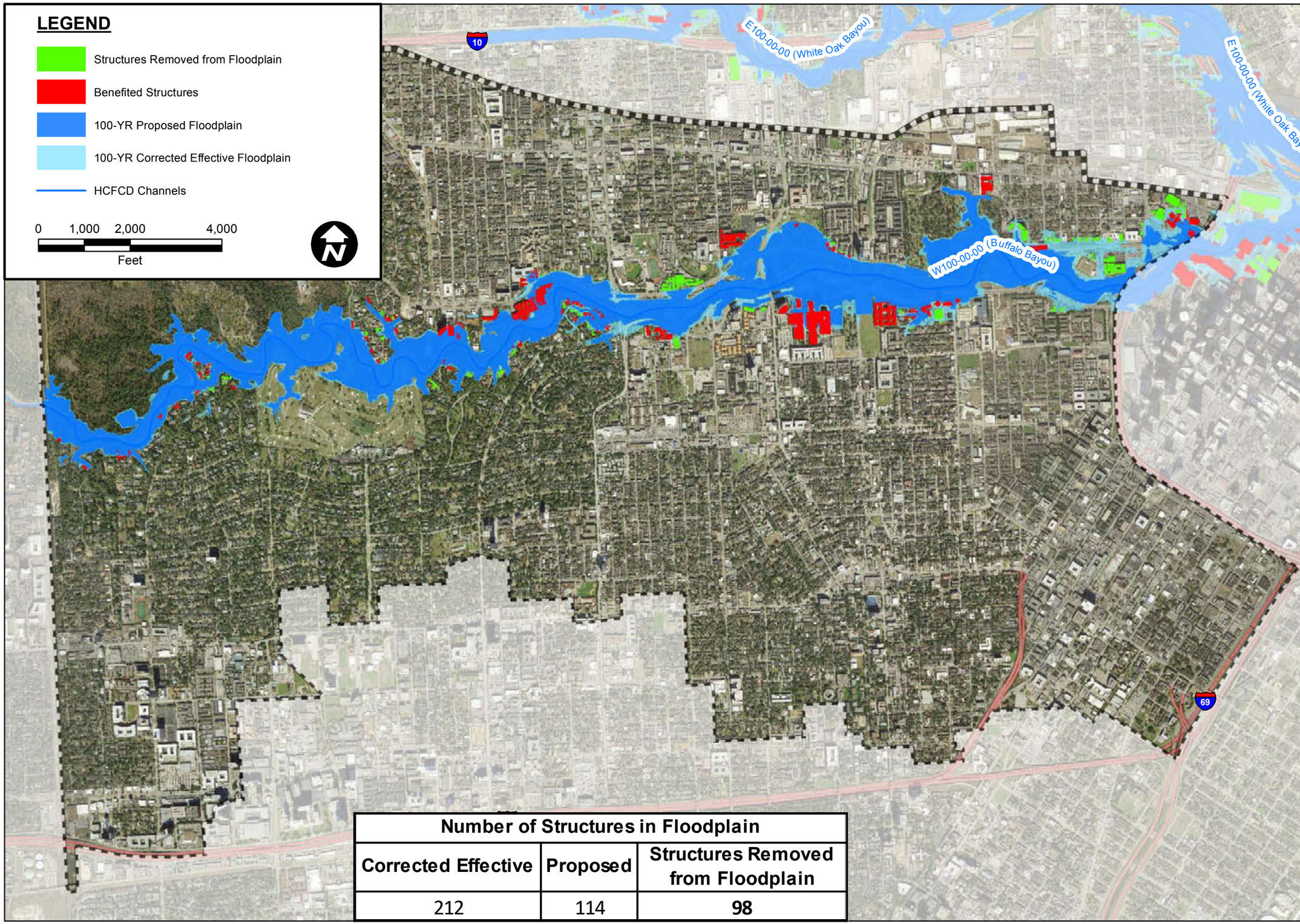
Lockwood, Andrews & Newnam, Inc.

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
4-8b



Number of Structures in Floodplain		
Corrected Effective	Proposed	Structures Removed from Floodplain
212	114	**98**

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

BENEFITED BUILDINGS
SCENARIO 3 - BUFFALO BAYOU (SHEET 1 OF 3)

PREPARED:
CHECKED:
APPROVED:

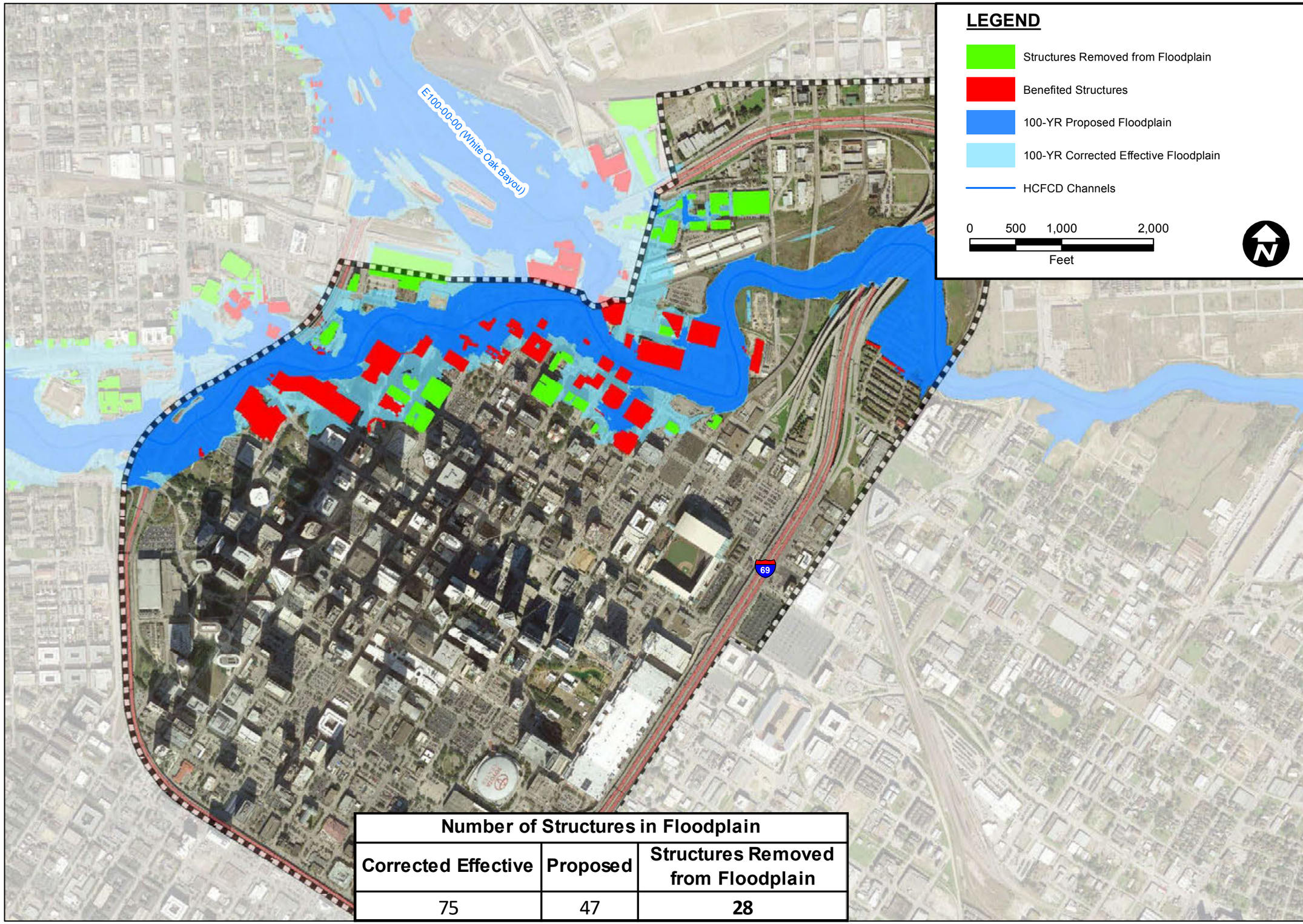
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
4-8c



Number of Structures in Floodplain		
Corrected Effective	Proposed	Structures Removed from Floodplain
75	47	**28**

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

BENEFITED BUILDINGS
SCENARIO 3 - BUFFALO BAYOU (SHEET 2 OF 3)

PREPARED:
CHECKED:
APPROVED:

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
4-8d

Number of Structures in Floodplain		
Corrected Effective	Proposed	Structures Removed from Floodplain
1	1	0

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

BENEFITED BUILDINGS
SCENARIO 3 - BUFFALO BAYOU (SHEET 3 OF 3)

PREPARED: CHECKED: APPROVED:

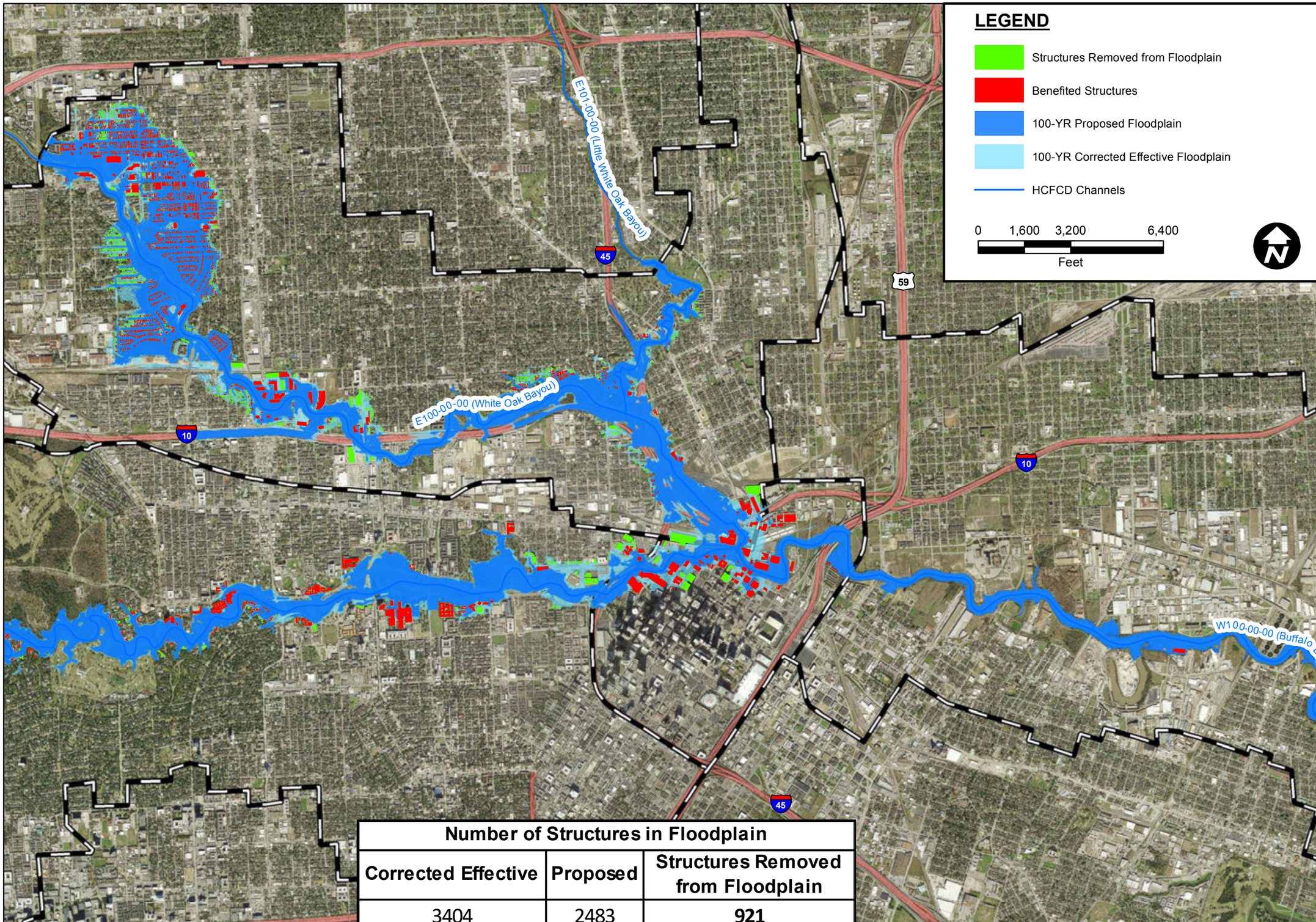
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
4-8e



Number of Structures in Floodplain		
Corrected Effective	Proposed	Structures Removed from Floodplain
3404	2483	**921**

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

BENEFITED BUILDINGS FOR SCENARIO 2 OVERALL MAP

PREPARED:

CHECKED:

APPROVED:

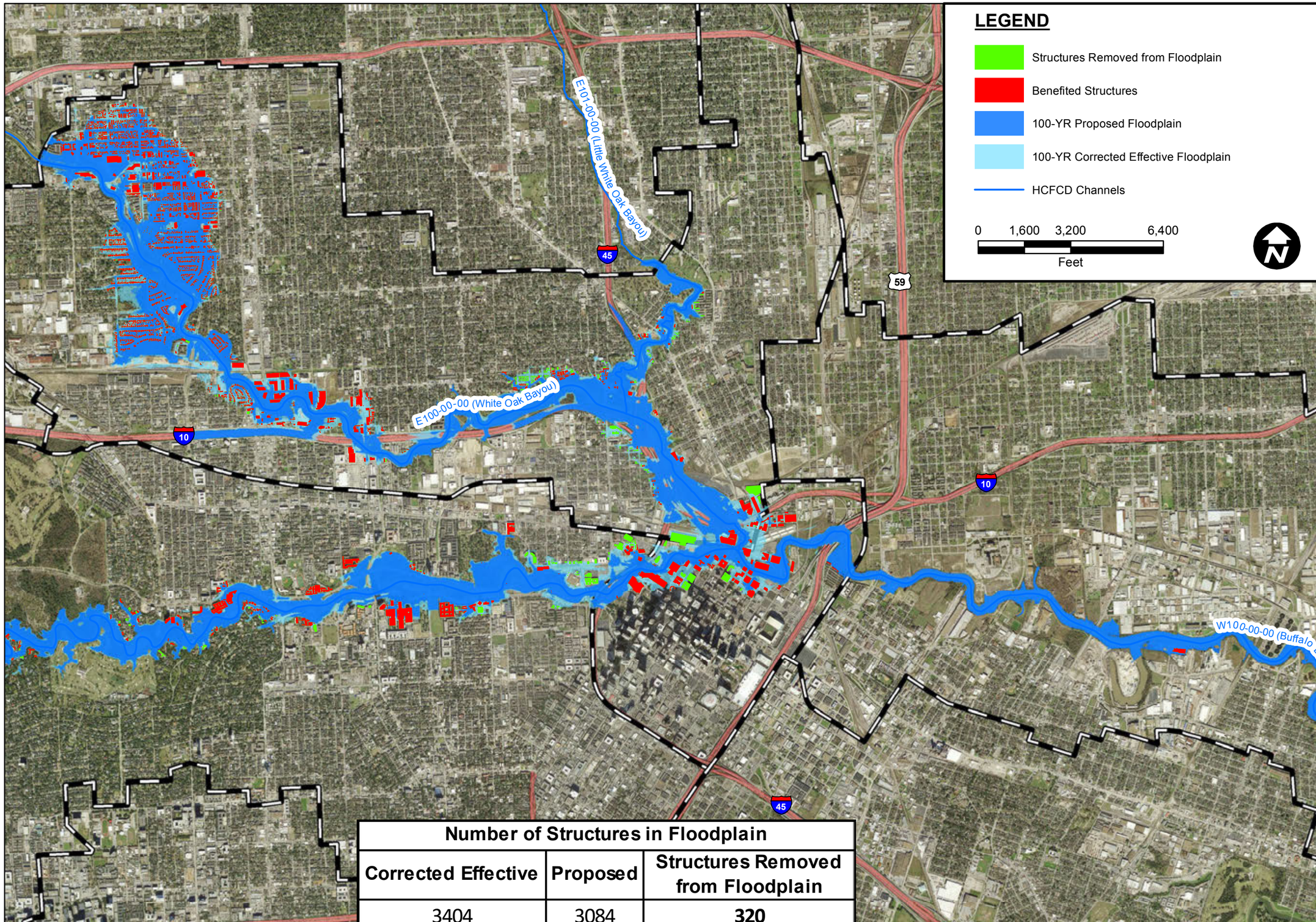
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
4-7



Number of Structures in Floodplain		
Corrected Effective	Proposed	Structures Removed from Floodplain
3404	3084	**320**

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

BENEFITED BUILDINGS SCENARIO 1 - OVERALL MAP

PREPARED:

CHECKED:

APPROVED:

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Department of Transportation

Houston, Texas

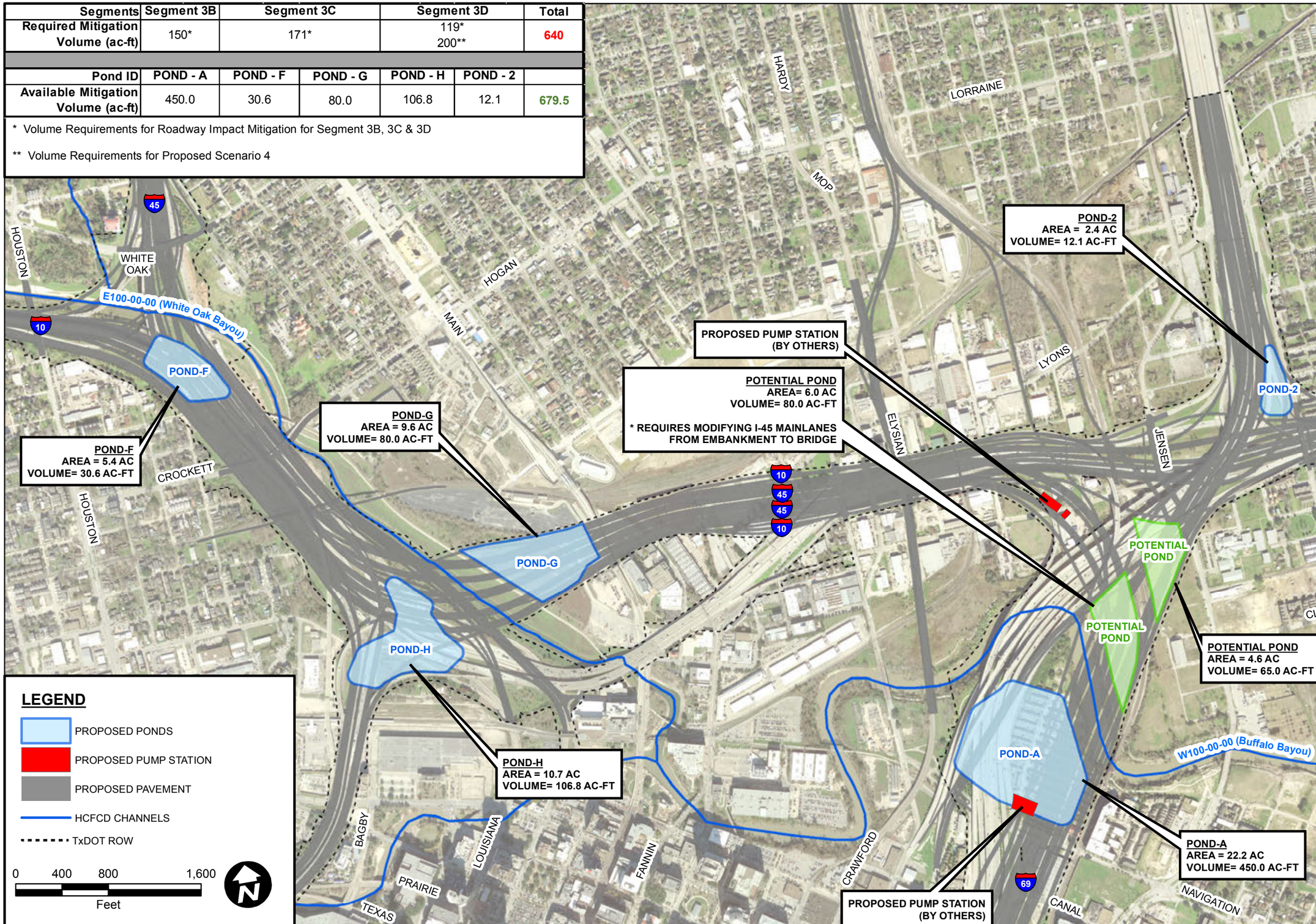
DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
4-6

Segments	Segment 3B	Segment 3C		Segment 3D		Total
Required Mitigation Volume (ac-ft)	150*	171*		119* 200**		640
Pond ID	POND - A	POND - F	POND - G	POND - H	POND - 2	
Available Mitigation Volume (ac-ft)	450.0	30.6	80.0	106.8	12.1	679.5

* Volume Requirements for Roadway Impact Mitigation for Segment 3B, 3C & 3D

** Volume Requirements for Proposed Scenario 4



NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT
SEGMENT 3D

PROPOSED DETENTION POND LOCATIONS

PREPARED:
CHECKED:
APPROVED:

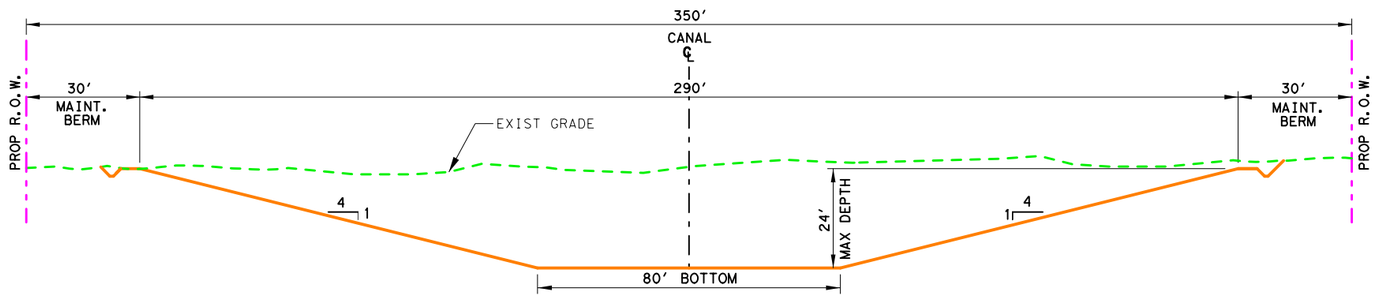
Lockwood, Andrews & Newnam, Inc.
A LEE & RUTH COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
4-5



SECTION

(IN FEET)
SCALE: PLAN 1":40' - H

PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
FIRM REGISTATION NO. 2614

Texas Department of Transportation
© 2018

CANAL

SOUTH CANAL
CROSS-SECTION

EXHIBT 4-4b

SHEET 2 OF 2

DGN:	MJG	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	GG	6	TEXAS	120-12019-003			IH 45
DWG:	MJG	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	GG	HOU	HARRIS	0912	72	363	

SOUTH CANAL CROSS-SECTION

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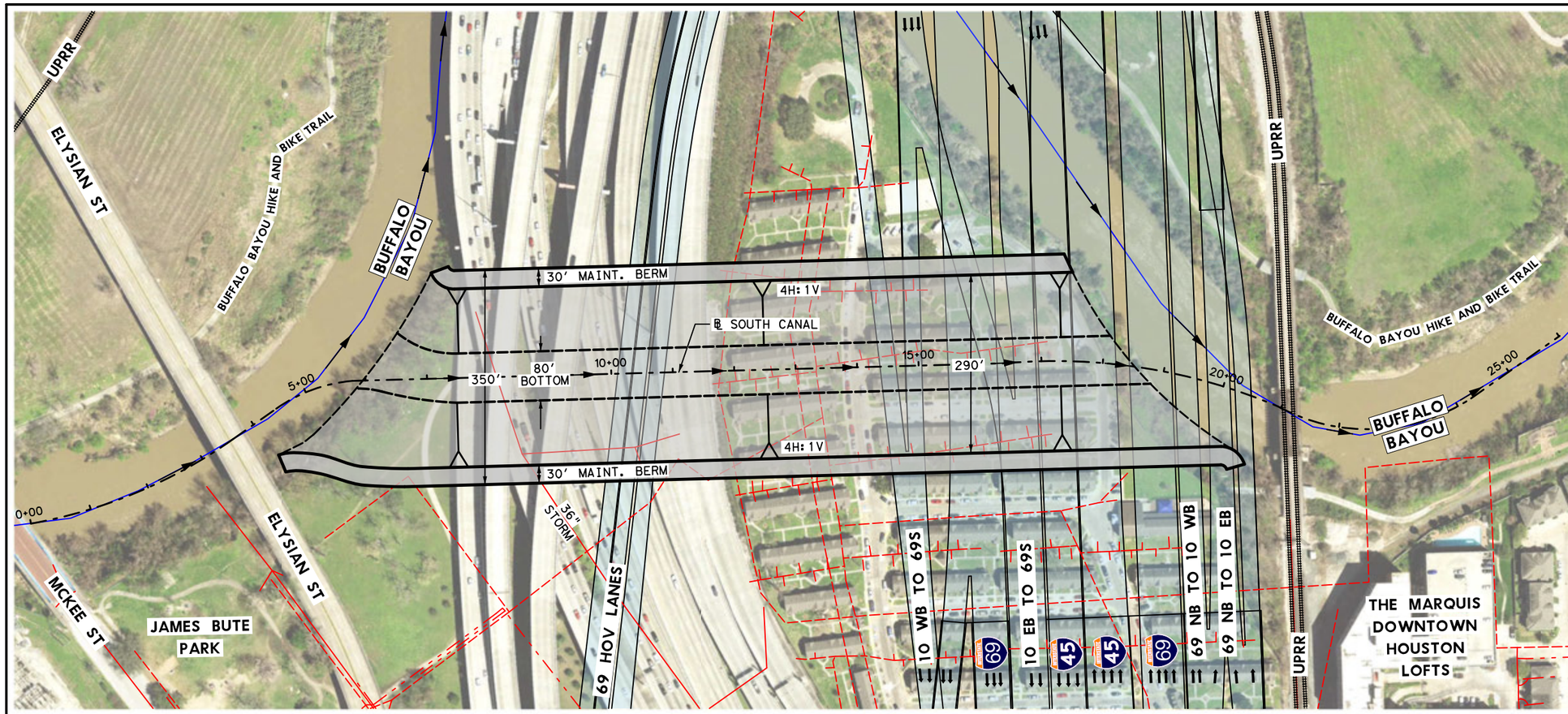


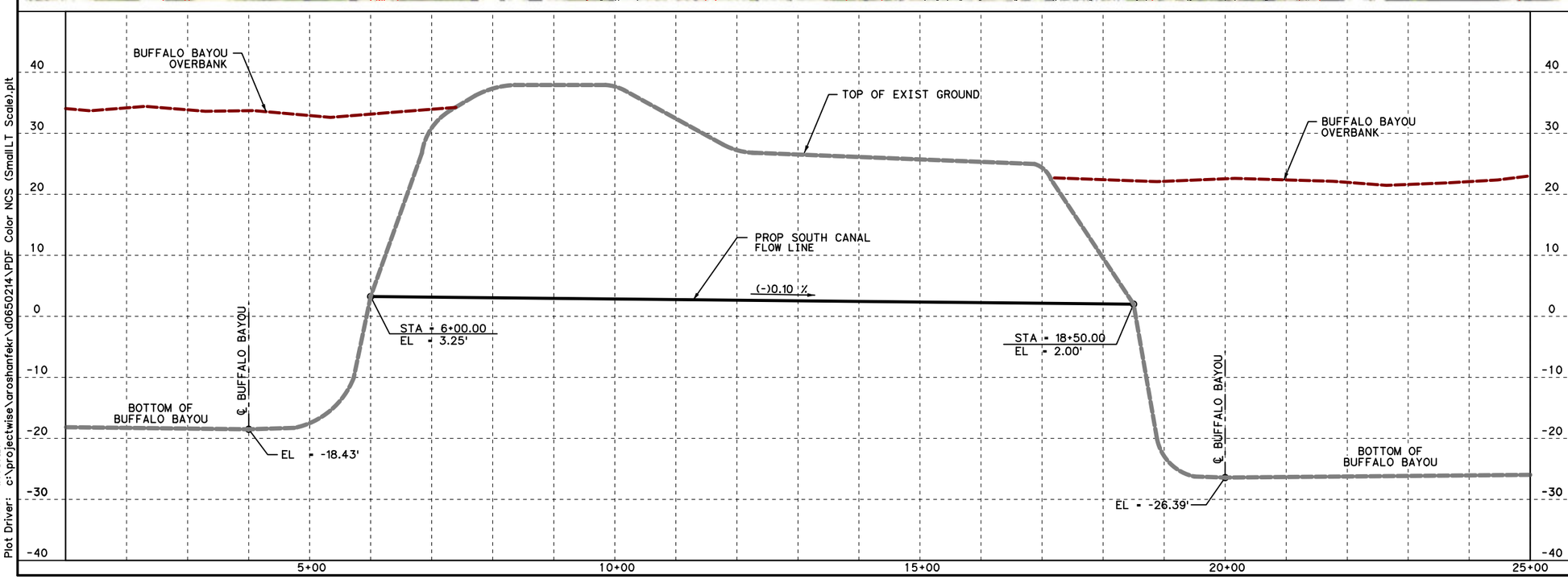
LEGEND:

- PROPOSED PAVEMENT
- PROPOSED SOUTH CANAL
- EXIST UTILITIES

NOTE:

1. FOR ADDITIONAL INFORMATION SEE CANAL TYPICAL SECTIONS SHEET 2 OF 2.
2. ALL UTILITIES ABOVE 24" ARE LABELLED.

0 100 200 400
(IN FEET)
SCALE: PLAN 1":200' - H
1":10' - V



PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
FIRM REGISTATION NO. 2614

Texas Department of Transportation
© 2018

CANAL

SOUTH CANAL
PLAN & PROFILE

EXHIBIT 4-4a

SHEET 1 OF 2

DGN: MJG	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN: GG	6	TEXAS	120-12019-003			IH 45
DWG: MJG	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG: GG	HOU	HARRIS	0912	72	363	

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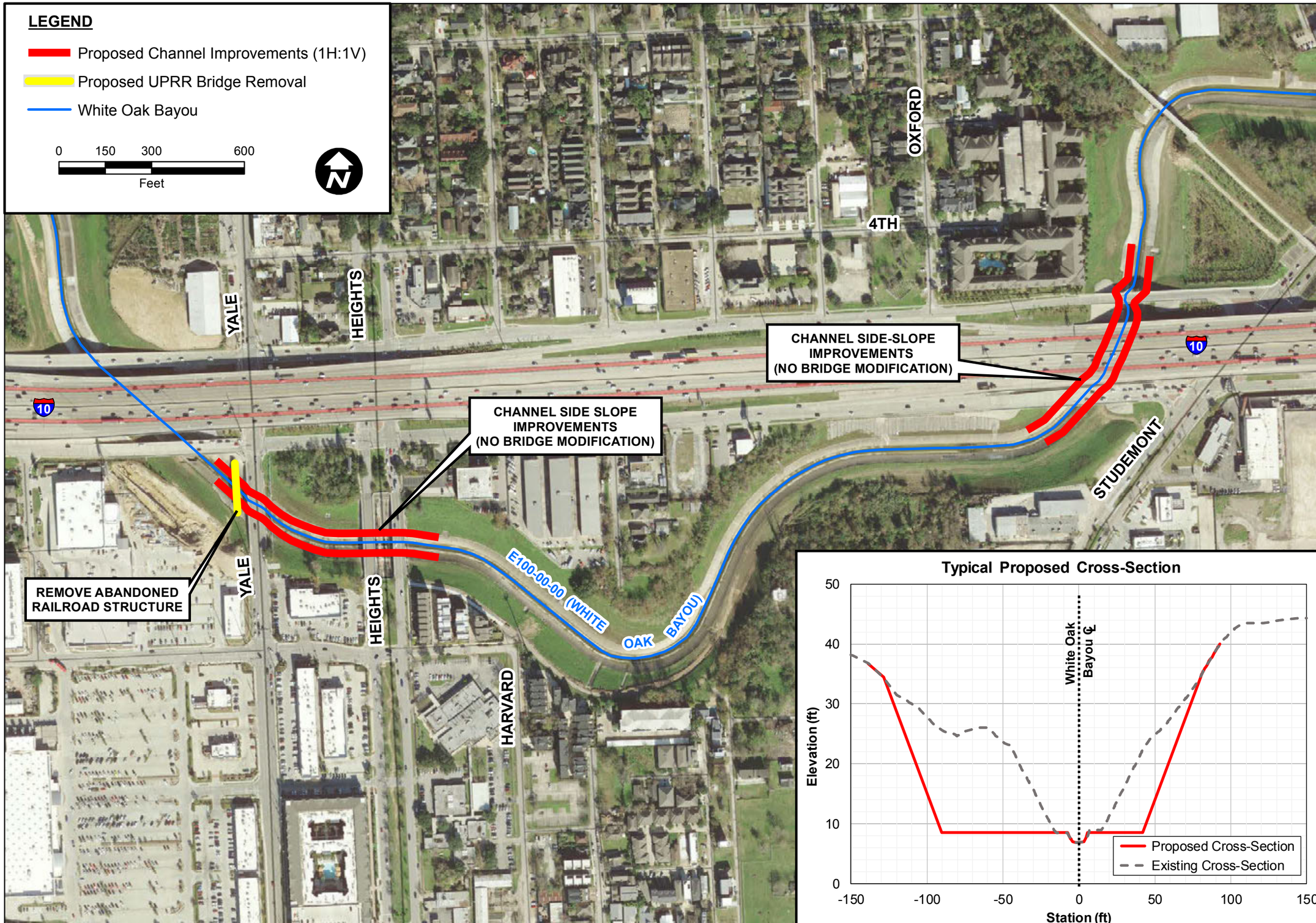


NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT (NHHIP)

HEIGHTS BLVD IMPROVEMENTS

PREPARED:

CHECKED:

APPROVED:

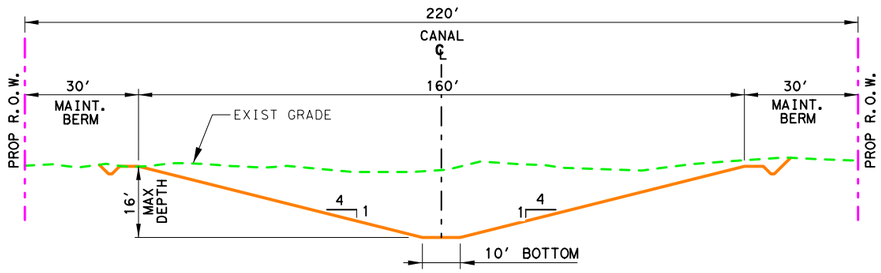
Lockwood, Andrews & Newnam, Inc.

Texas Department of Transportation

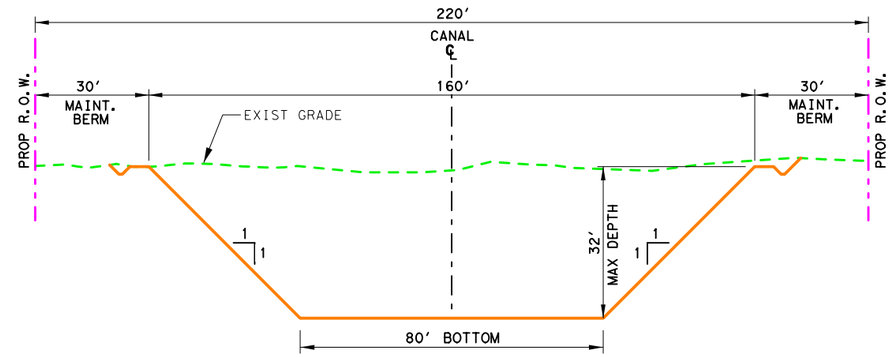
Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
4-3



SCENARIO 1-A



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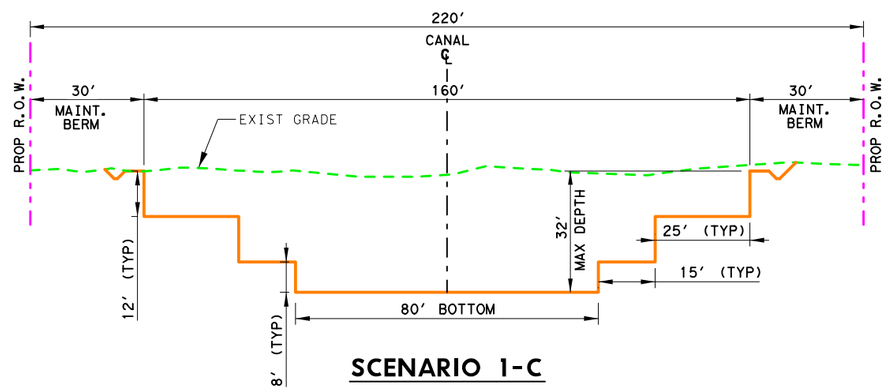

SCENARIO 1-C

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(IN FEET)

SCALE: PLAN 1":40' - H

PRELIMINARY

DOCUMENT NOT INTENDED FOR
PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
FIRM REGISTATION NO. 2614

Texas Department of Transportation
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CANAL

NORTH CANAL
CROSS-SECTIONS

EXHIBIT 4-2b

SHEET 2 OF 2

DGN: MJG	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN: GG	6	TEXAS	120-12019-003			IH 45
DWG: MJG	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG: GG	HOU	HARRIS	0912	72	363	

NORTH CANAL CROSS-SECTIONS

Pen Table: IH45.tbl
Plot Driver: c:\projectwise\aroshanfekr\d0650214\PDF Color NCS (Small LT Scale).plt
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ARoshanfekr

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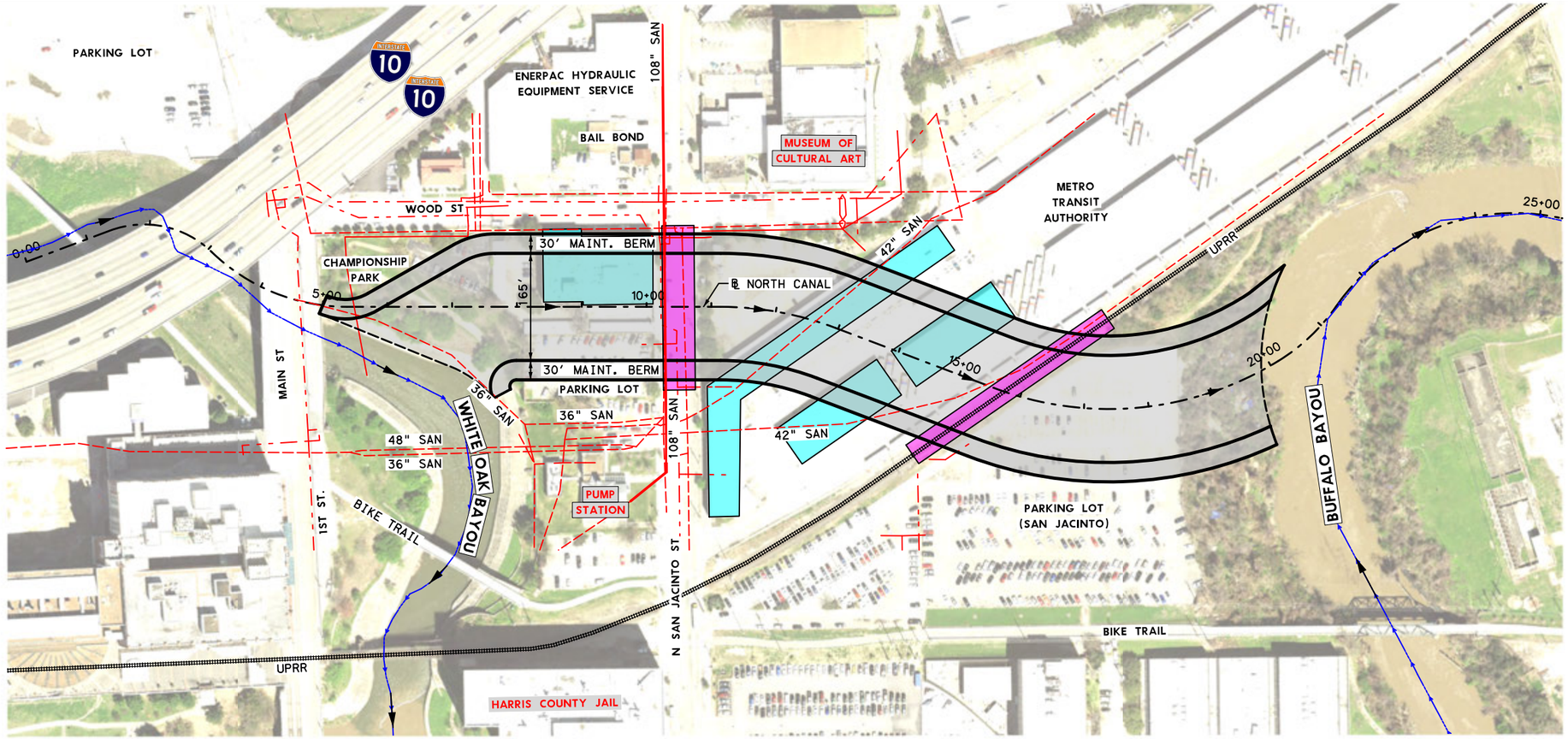


LEGEND:

- STRUCTURES IMPACTED
- PROPOSED BRIDGES
- EXIST UTILITIES

N

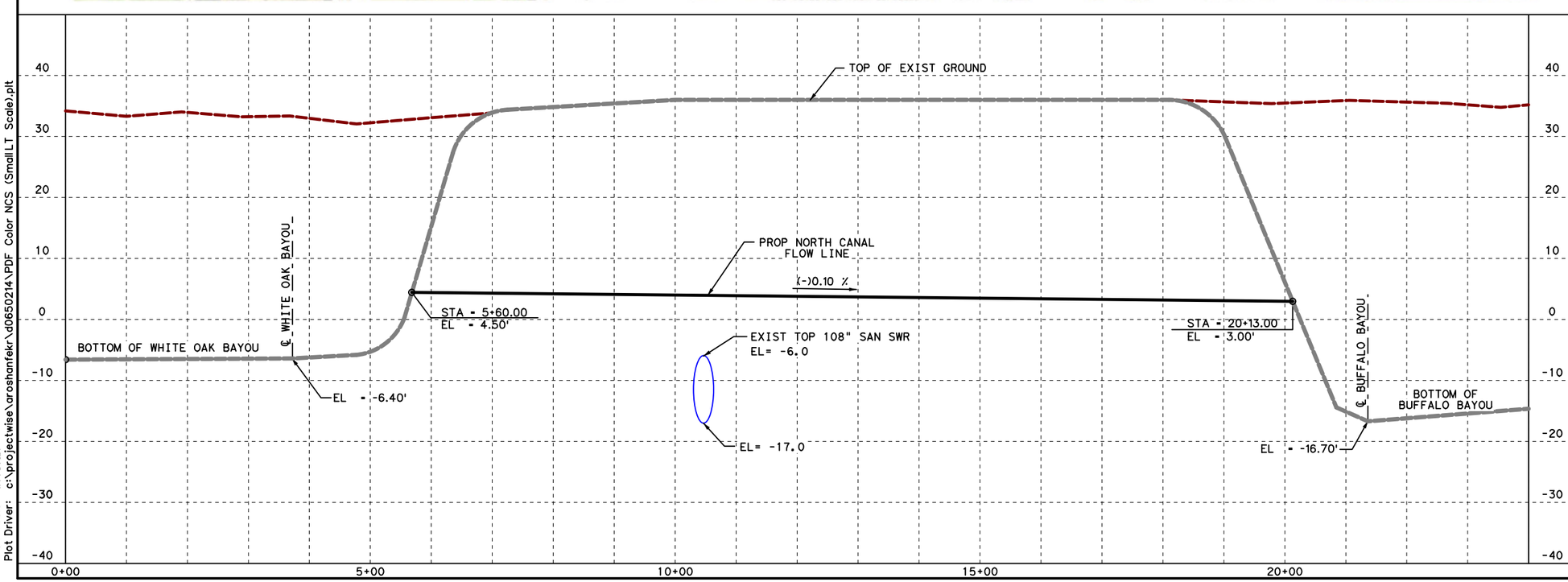
NOTE:

1. FOR ADDITIONAL INFORMATION SEE CANAL TYPICAL SECTIONS SHEET 2 OF 2.
2. ALL UTILITIES ABOVE 24" ARE LABELLED.

0 100 200 400

(IN FEET)

SCALE: PLAN 1":200' - H
1":10' - V



PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
FIRM REGISTATION NO. 2614

Texas Department of Transportation © 2018

CANAL

NORTH CANAL
PLAN & PROFILE

EXHIBIT 4-2a

SHEET 1 OF 2

DGN: MJG	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN: GG	6	TEXAS	120-12019-003			IH 45
DWG: MJG	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG: GG	HOU	HARRIS	0912	72	363	

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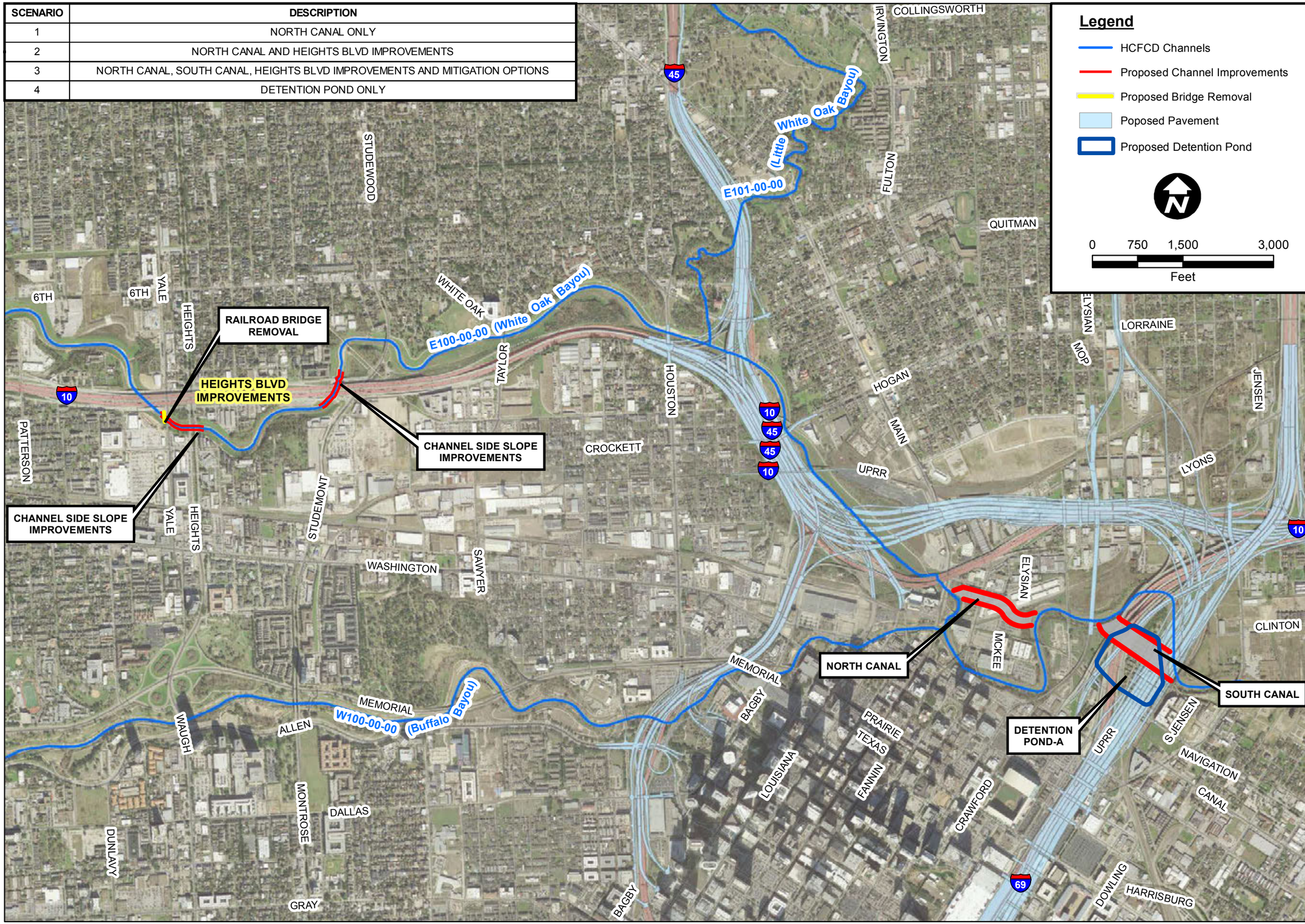
SCENARIO	DESCRIPTION
1	NORTH CANAL ONLY
2	NORTH CANAL AND HEIGHTS BLVD IMPROVEMENTS
3	NORTH CANAL, SOUTH CANAL, HEIGHTS BLVD IMPROVEMENTS AND MITIGATION OPTIONS
4	DETENTION POND ONLY



NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

PROPOSED OVERALL SCENARIOS MAP

PREPARED:

CHECKED:

APPROVED:

Lockwood, Andrews & Newnam, Inc.

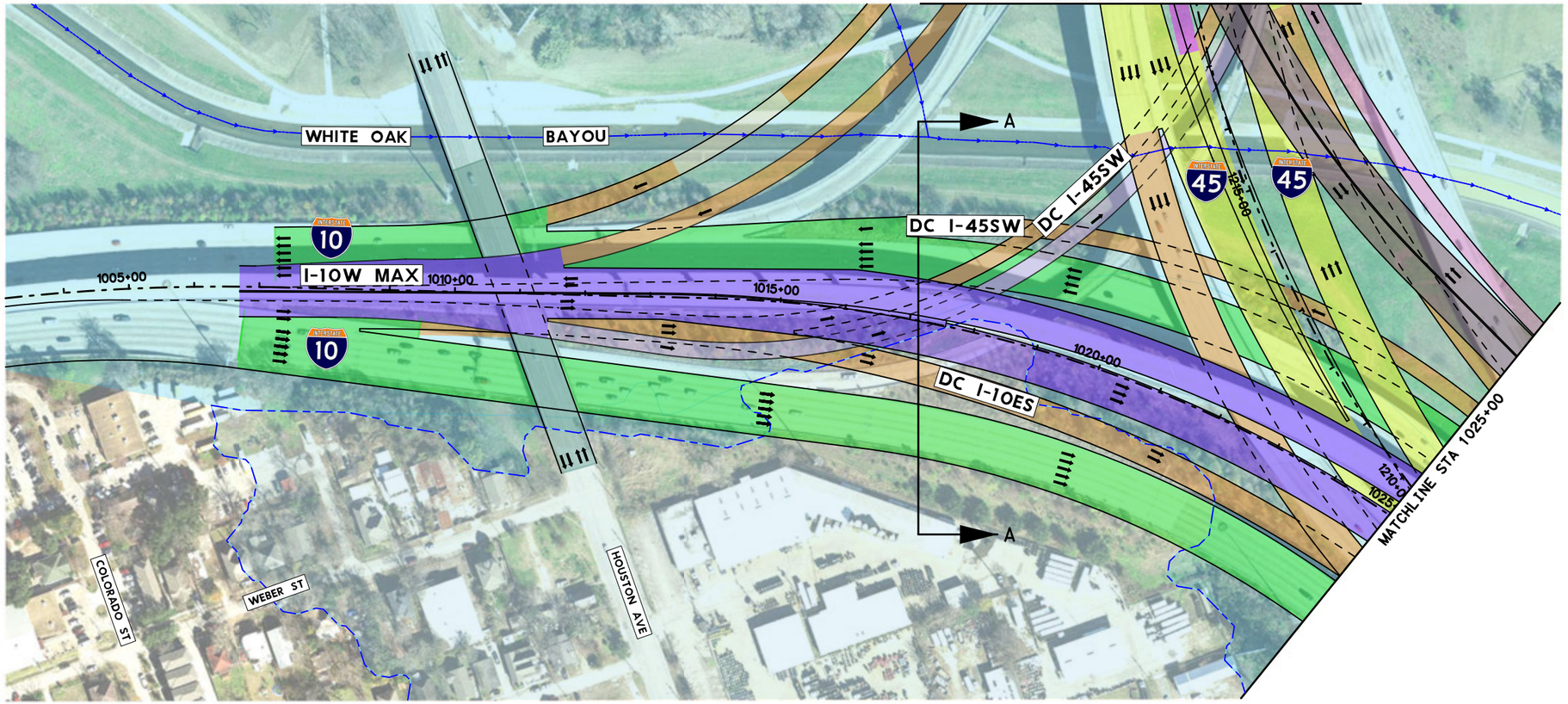
Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
4-1

MATCHLINE SEE SHEET 5 OF 6



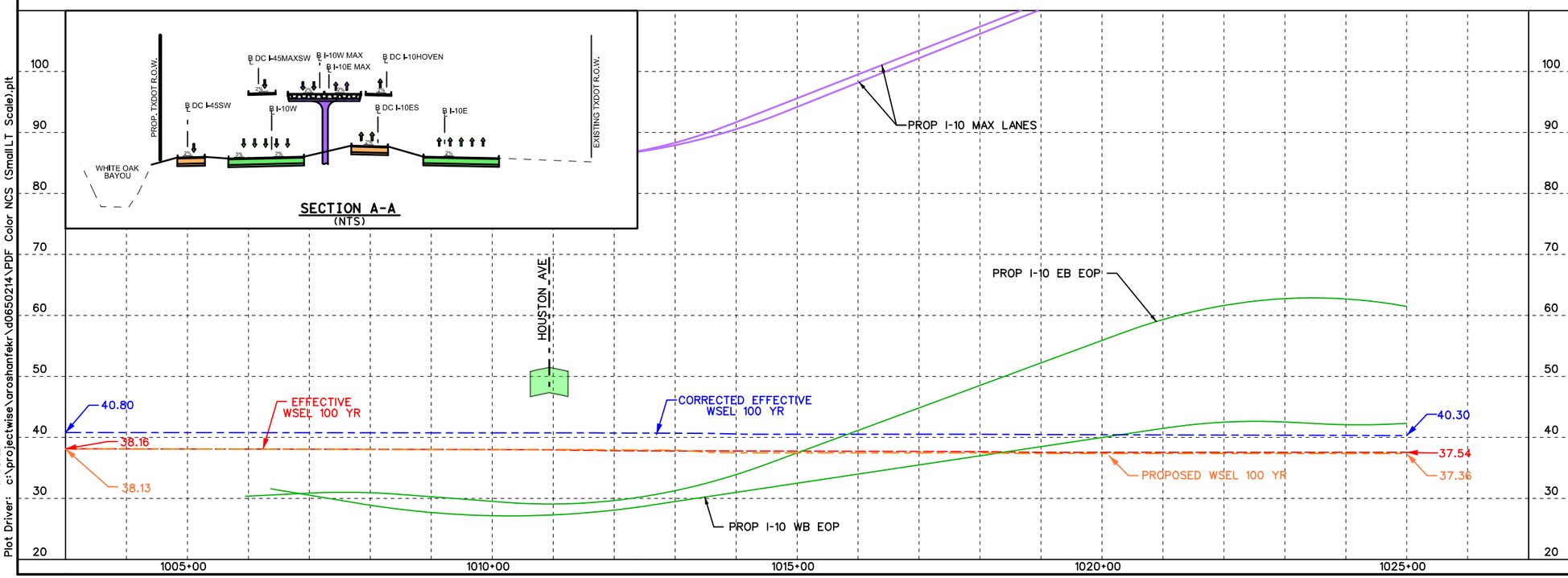
LEGEND:

- 100 YR FLOODPLAIN
- 500 YR FLOODPLAIN
- EFFECTIVE WSEL 100 YR
- CORRECTED EFFECTIVE WSEL 100 YR
- PROPOSED WSEL 100 YR (NORTH CANAL, SOUTH CANAL AND HEIGHTS AREA IMPROVEMENTS)
- TRAFFIC FLOW

NOTE
1. STATIONING IS BASE ON CL I-10 ALIGNMENTS SHOWN IN BOLD.
2. ROADWAY PROFILE OBTAINED FROM HNTB DESIGN FILES PROVIDED APRIL 2018.

0 100 200 400
(IN FEET)
SCALE: PLAN 1":200' - H
1":10' - V

SECTION A-A
(NTS)



PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
FIRM REGISTATION NO. 2614

Texas Department of Transportation
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NHHIP - SEGMENT 3D

PROPOSED ROADWAY VS WSEL
PLAN & PROFILE
100 YEAR

EXHIBIT 3-7 SHEET 1 OF 6

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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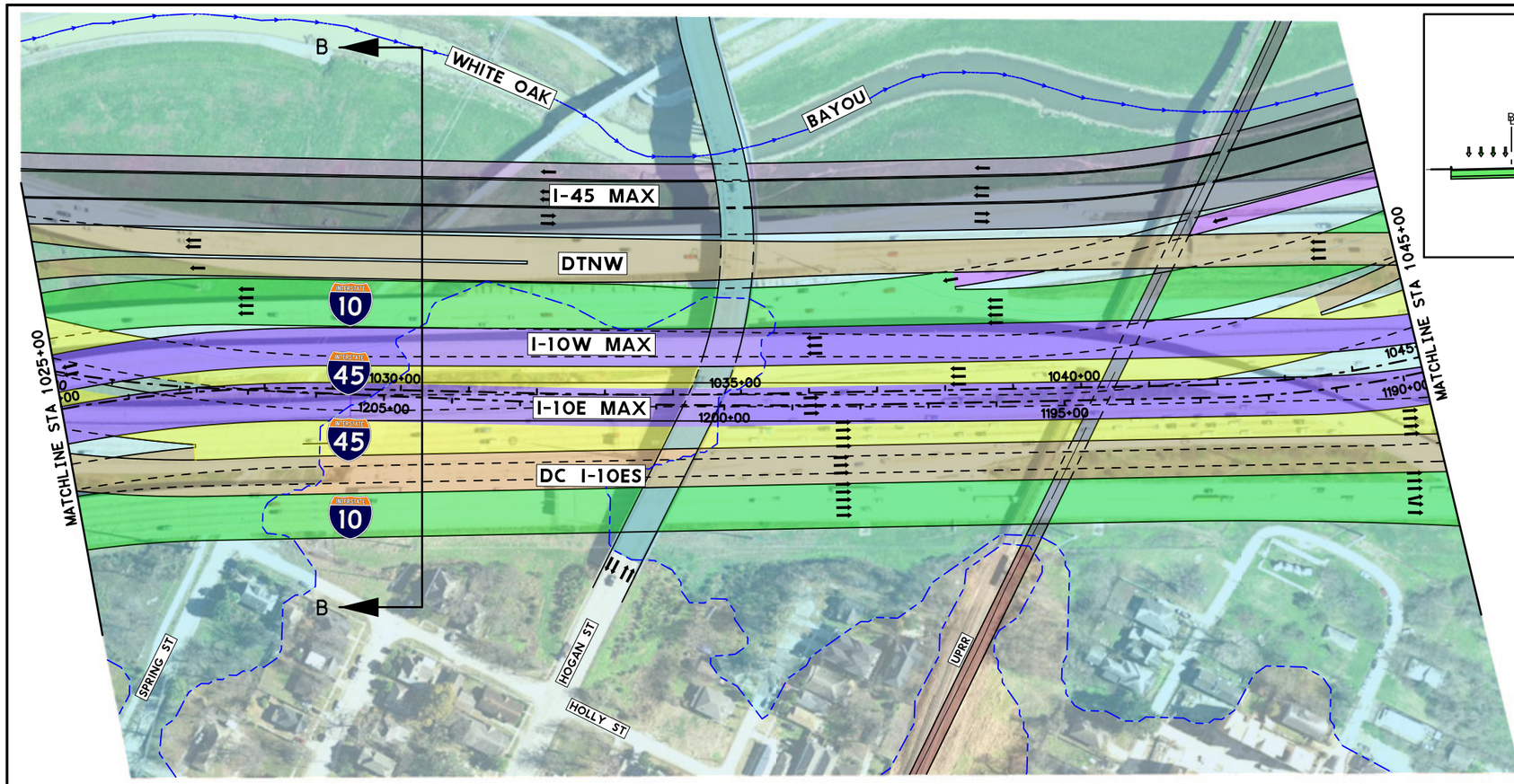
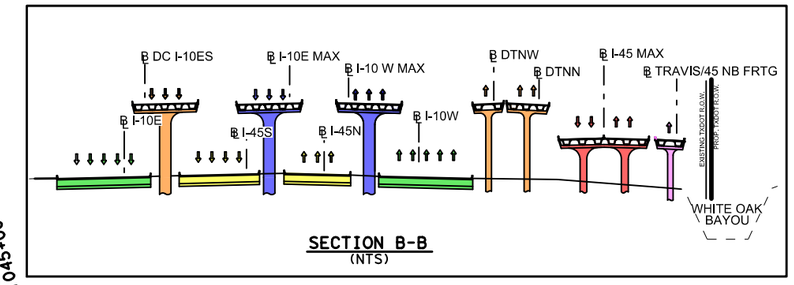




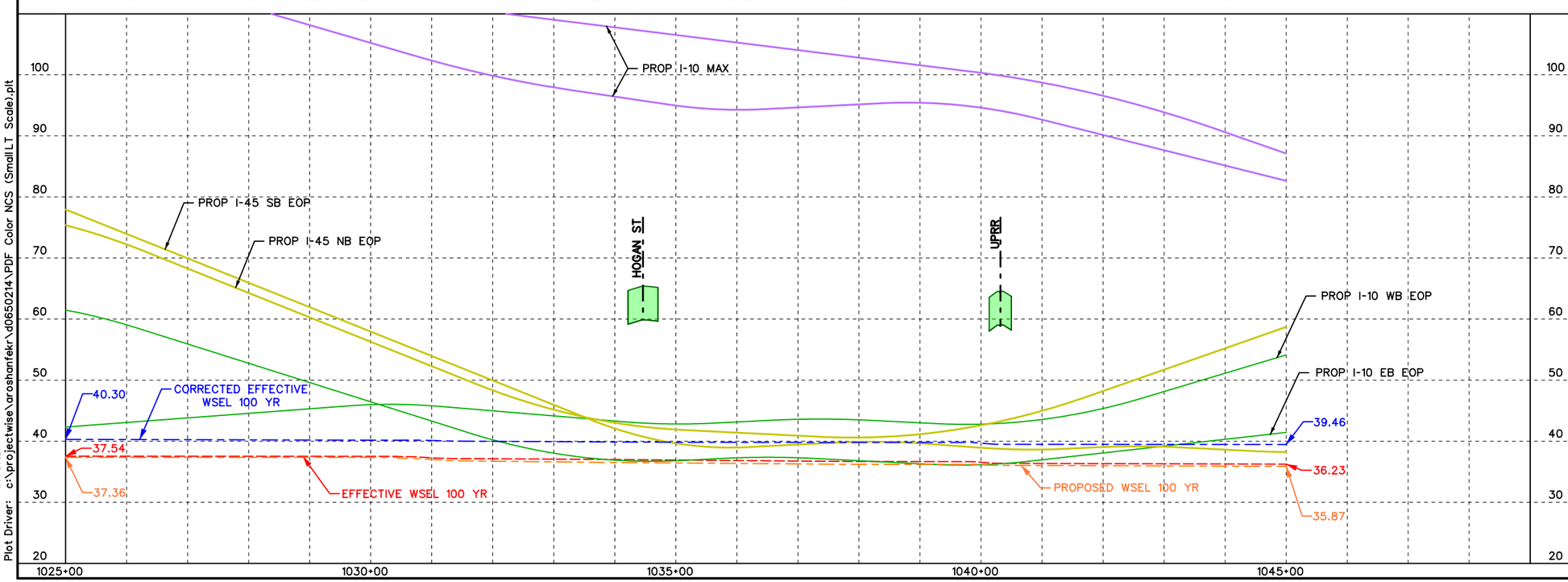
SECTION B-B
(NTS)

LEGEND:

- 100 YR FLOODPLAIN
- 500 YR FLOODPLAIN
- EFFECTIVE WSEL 100 YR
- CORRECTED EFFECTIVE WSEL 100 YR
- PROPOSED WSEL 100 YR (NORTH CANAL, SOUTH CANAL AND HEIGHTS AREA IMPROVEMENTS)
- TRAFFIC FLOW

NOTE
1. STATIONING IS BASE ON CL I-10 ALIGNMENTS SHOWN IN BOLD.
2. ROADWAY PROFILE OBTAINED FROM HNTB DESIGN FILES PROVIDED APRIL 2018.

0 100 200 400
(IN FEET)
SCALE: PLAN 1":200' - H
1":10' - V



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DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
FIRM REGISTATION NO. 2614

Texas Department of Transportation
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NHHIP - SEGMENT 3D

PROPOSED ROADWAY VS WSEL
PLAN & PROFILE
100 YEAR

EXHIBIT 3-7 SHEET 2 OF 6

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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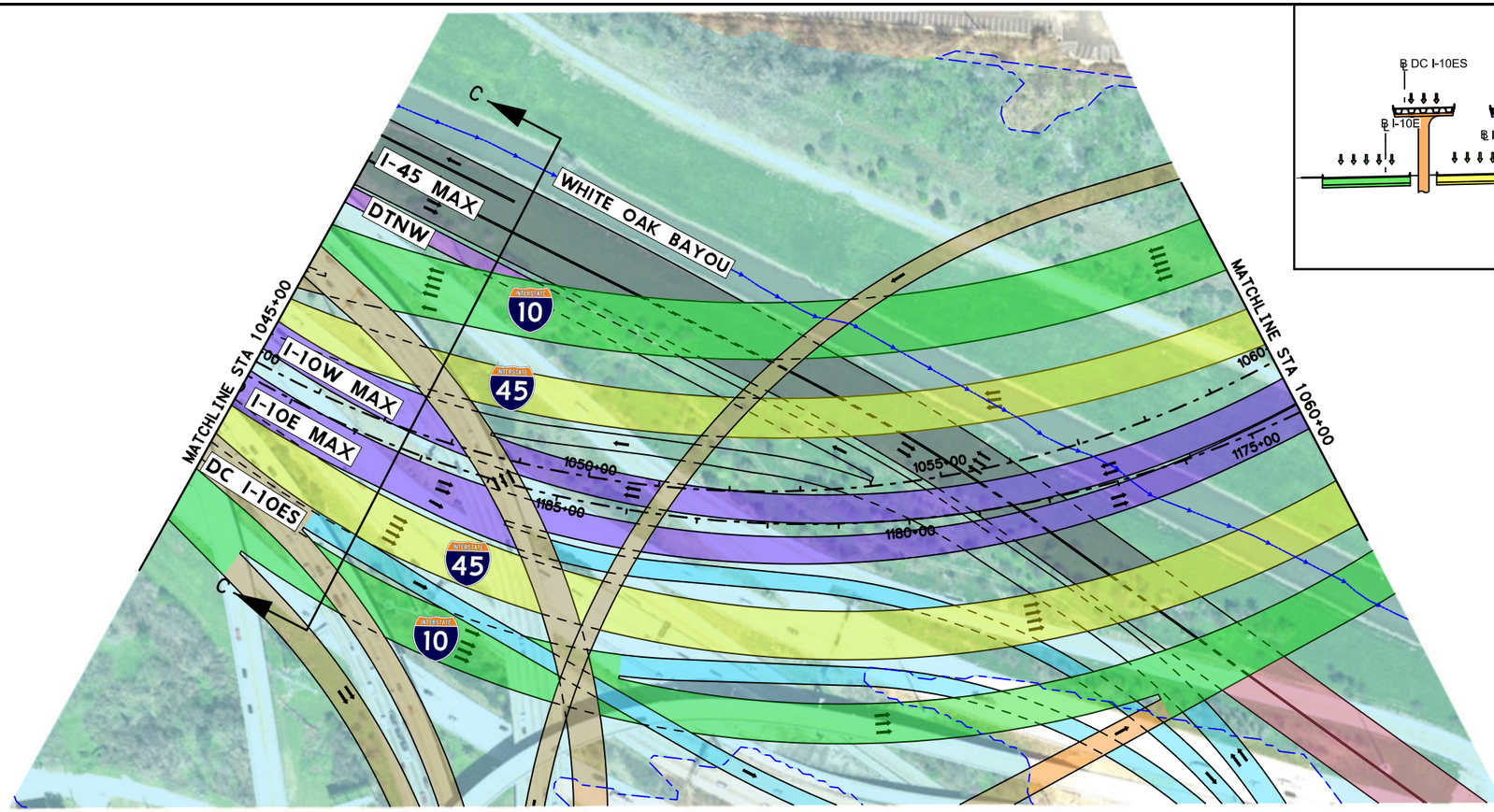
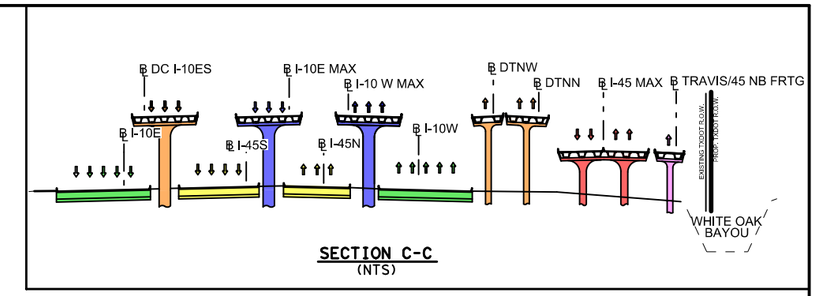




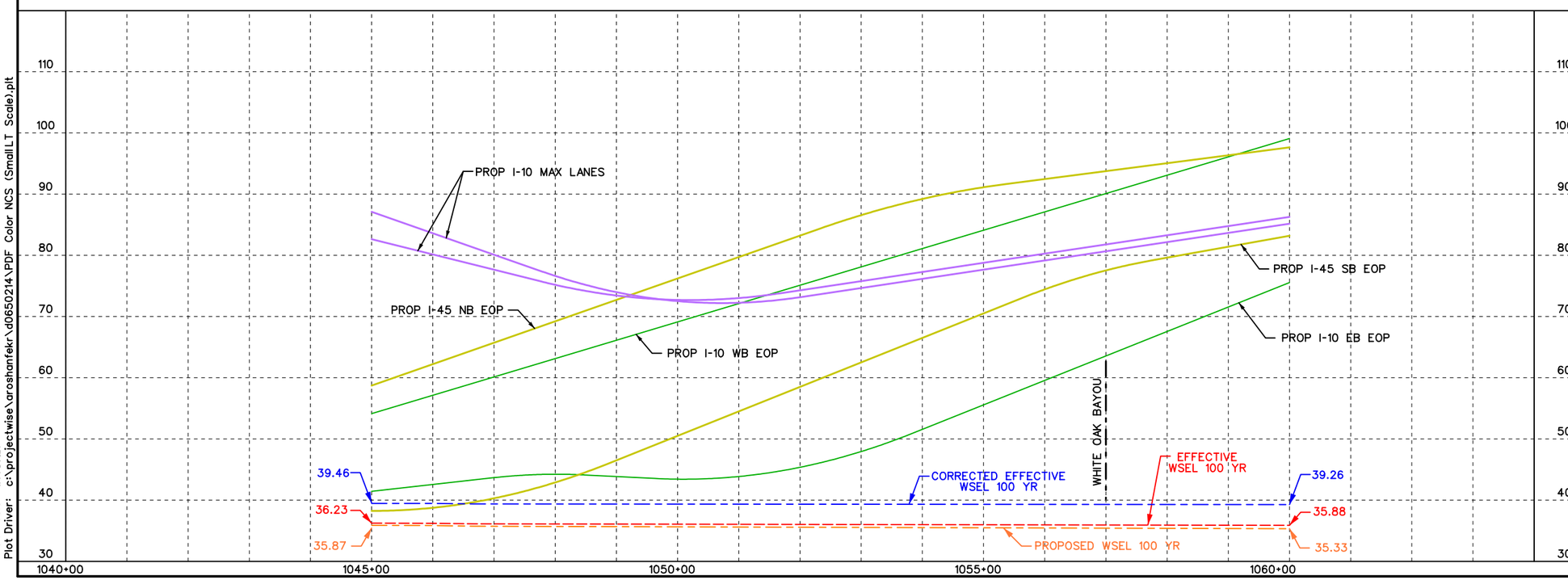
SECTION C-C
(NTS)

LEGEND:

- 100 YR FLOODPLAIN
- 500 YR FLOODPLAIN
- EFFECTIVE WSEL 100 YR
- CORRECTED EFFECTIVE WSEL 100 YR
- PROPOSED WSEL 100 YR (NORTH CANAL, SOUTH CANAL AND HEIGHTS AREA IMPROVEMENTS)
- TRAFFIC FLOW

NOTE
1. STATIONING IS BASE ON CL I-10 ALIGNMENTS SHOWN IN BOLD.
2. ROADWAY PROFILE OBTAINED FROM HNTB DESIGN FILES PROVIDED APRIL 2018.

0 100 200 400
(IN FEET)
SCALE: PLAN 1":200' - H
1":10' - V



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REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
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FIRM REGISTATION NO. 2614

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NHHIP - SEGMENT 3D

PROPOSED ROADWAY VS WSEL
PLAN & PROFILE
100 YEAR

EXHIBIT 3-7 SHEET 3 OF 6

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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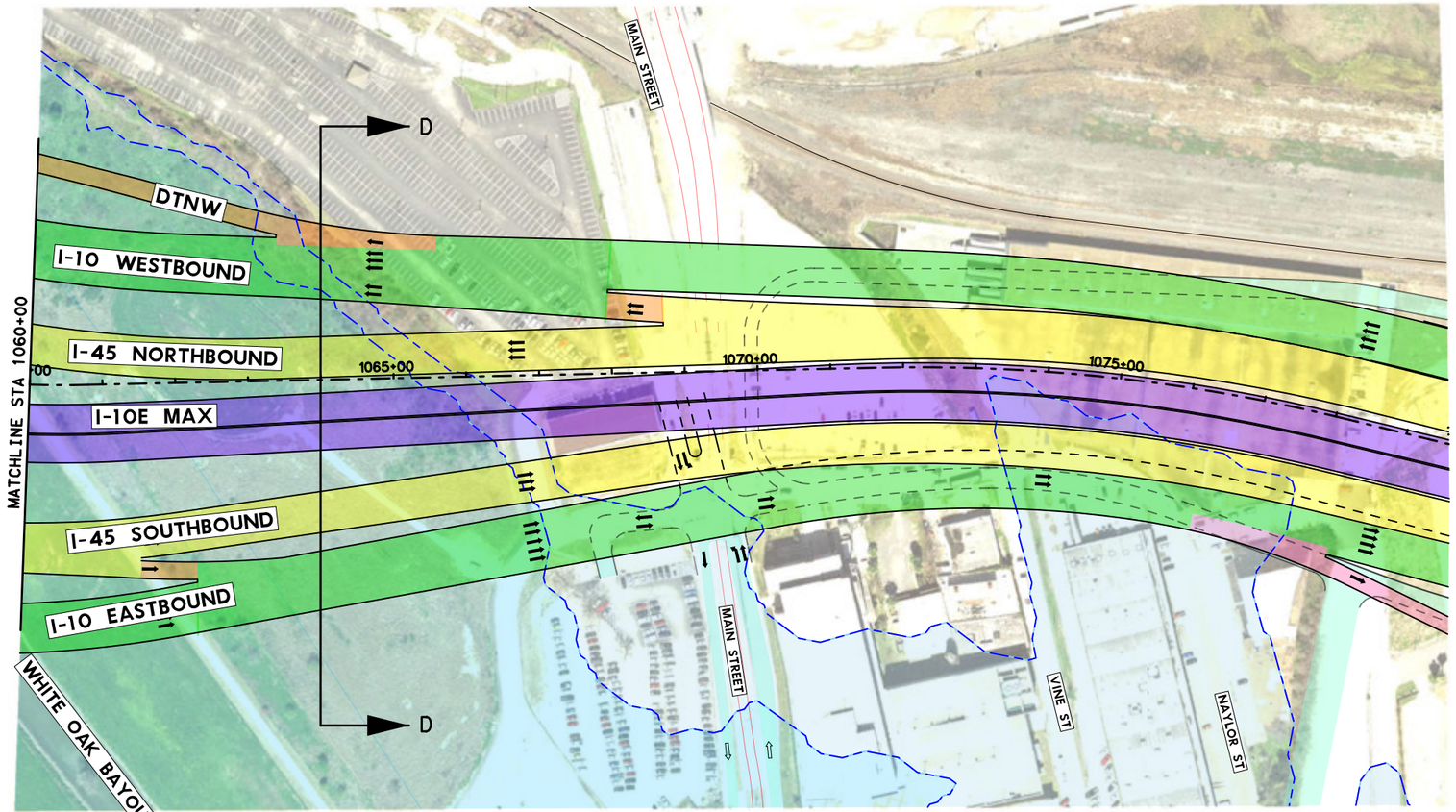
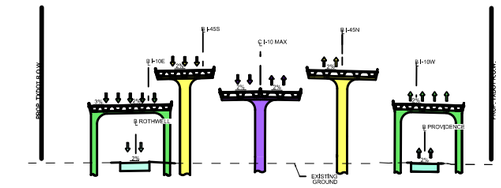




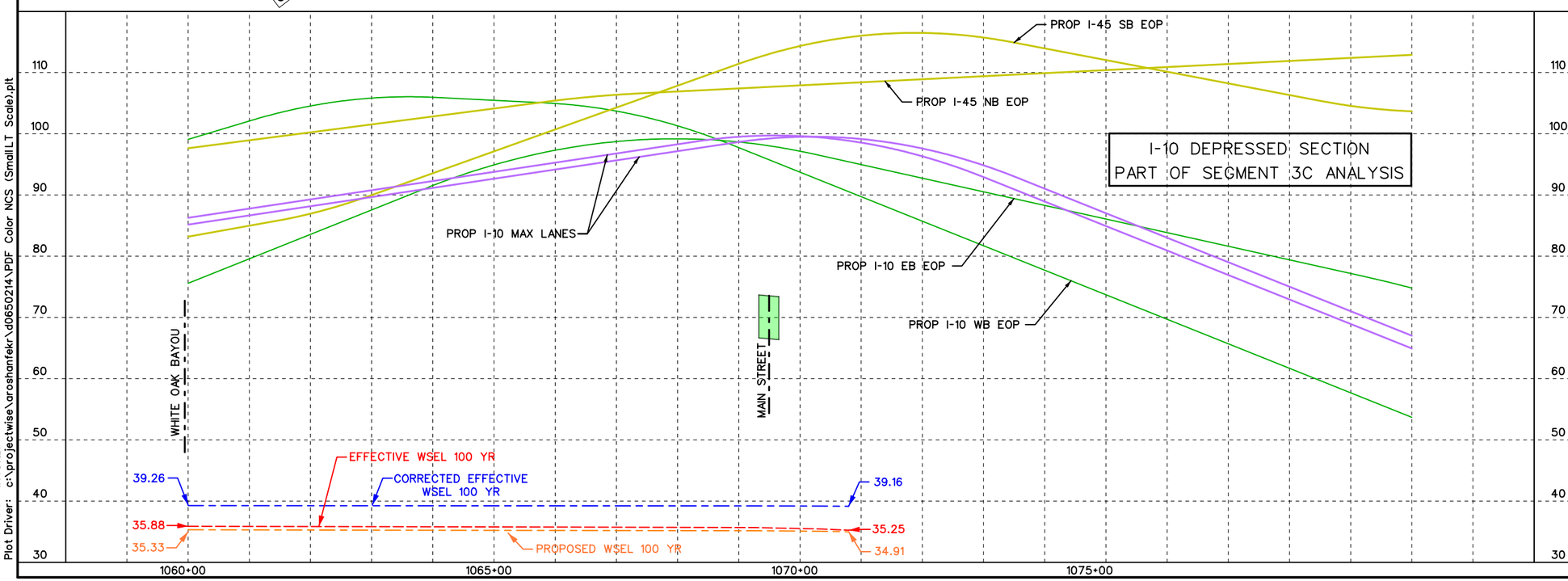
SECTION D-D
(NTS)

LEGEND:

- 100 YR FLOODPLAIN
- 500 YR FLOODPLAIN
- EFFECTIVE WSEL 100 YR
- CORRECTED EFFECTIVE WSEL 100 YR
- PROPOSED WSEL 100 YR (NORTH CANAL, SOUTH CANAL AND HEIGHTS AREA IMPROVEMENTS)
- TRAFFIC FLOW

NOTE
1. STATIONING IS BASE ON CL I-10 ALIGNMENTS SHOWN IN BOLD.
2. ROADWAY PROFILE OBTAINED FROM HNTB DESIGN FILES PROVIDED APRIL 2018.

0 100 200 400
(IN FEET)
SCALE: PLAN 1":200' - H
1":10' - V



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Lockwood, Andrews & Newnam, Inc.
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FIRM REGISTATION NO. 2614

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NHHIP - SEGMENT 3D

PROPOSED ROADWAY VS WSEL
PLAN & PROFILE
100 YEAR

EXHIBIT 3-7 SHEET 4 OF 6

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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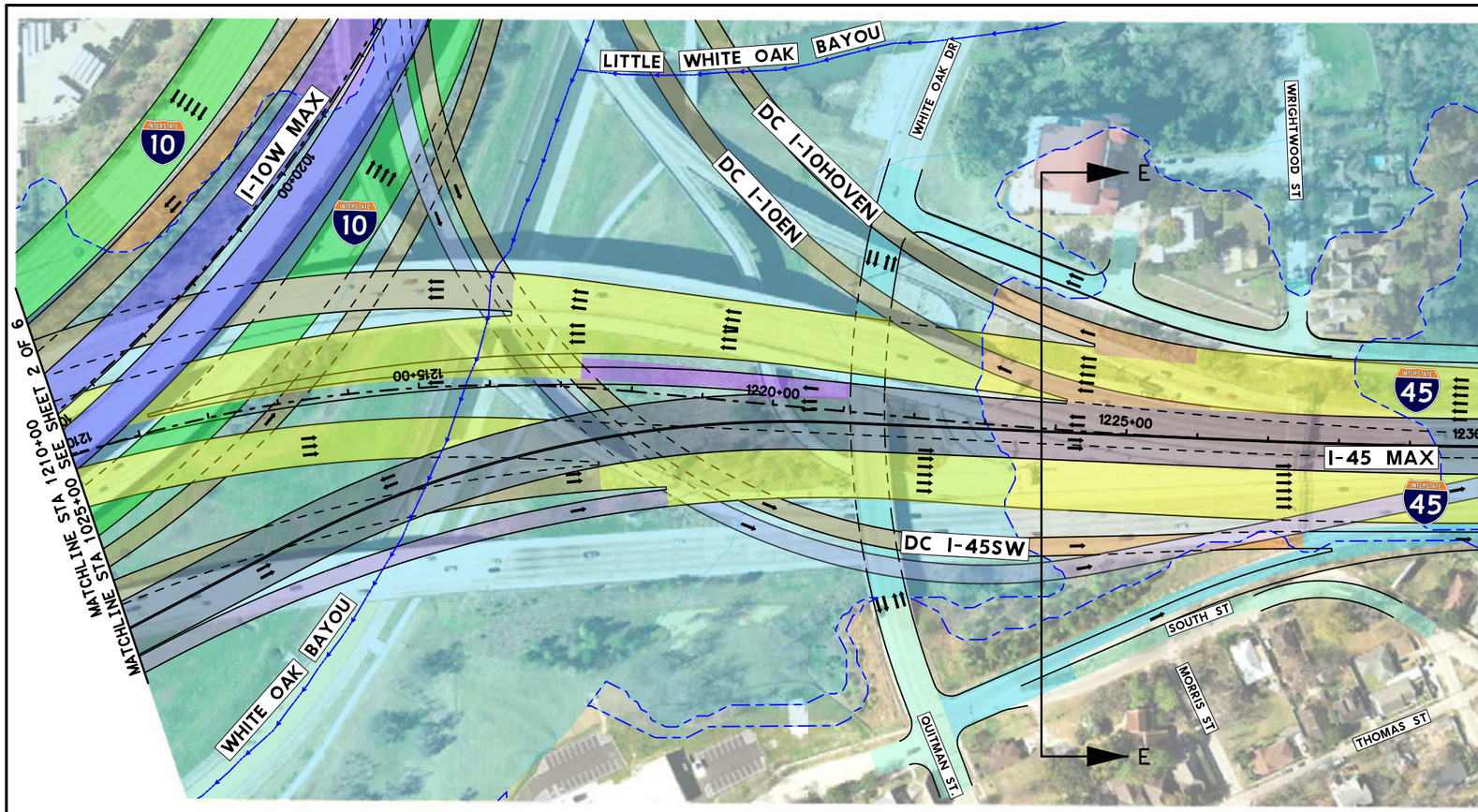
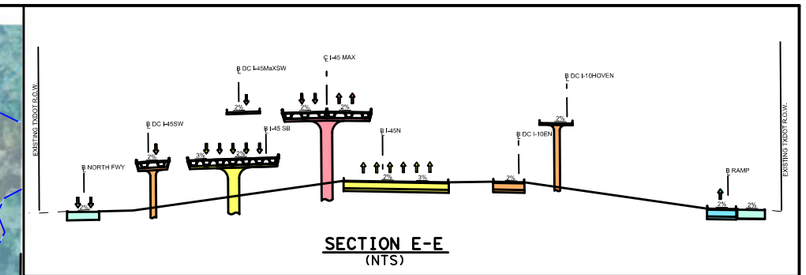




SECTION E-E
(NTS)

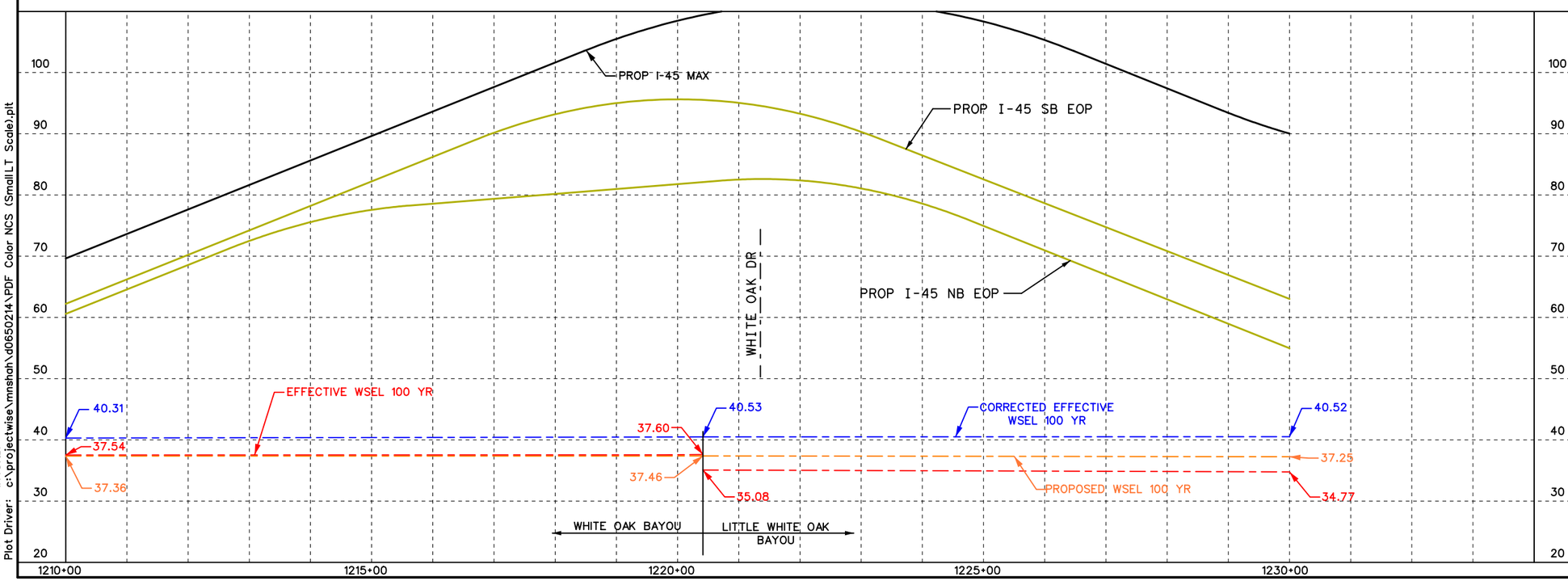
LEGEND:

- 100 YR FLOODPLAIN
- 500 YR FLOODPLAIN
- EFFECTIVE WSEL 100 YR
- CORRECTED EFFECTIVE WSEL 100 YR
- PROPOSED WSEL 100 YR (NORTH CANAL, SOUTH CANAL AND HEIGHTS AREA IMPROVEMENTS)
- TRAFFIC FLOW

NOTE
1. STATIONING IS BASE ON CL I-45 ALIGNMENTS SHOWN IN BOLD.
2. ROADWAY PROFILE OBTAINED FROM HNTB DESIGN FILES PROVIDED APRIL 2018.

0 100 200 400
(IN FEET)

SCALE: PLAN 1":200' - H
1":10' - V



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NHHIP - SEGMENT 3D

PROPOSED ROADWAY VS WSEL
PLAN & PROFILE
100 YEAR

EXHIBIT 3-7 SHEET 5 OF 6

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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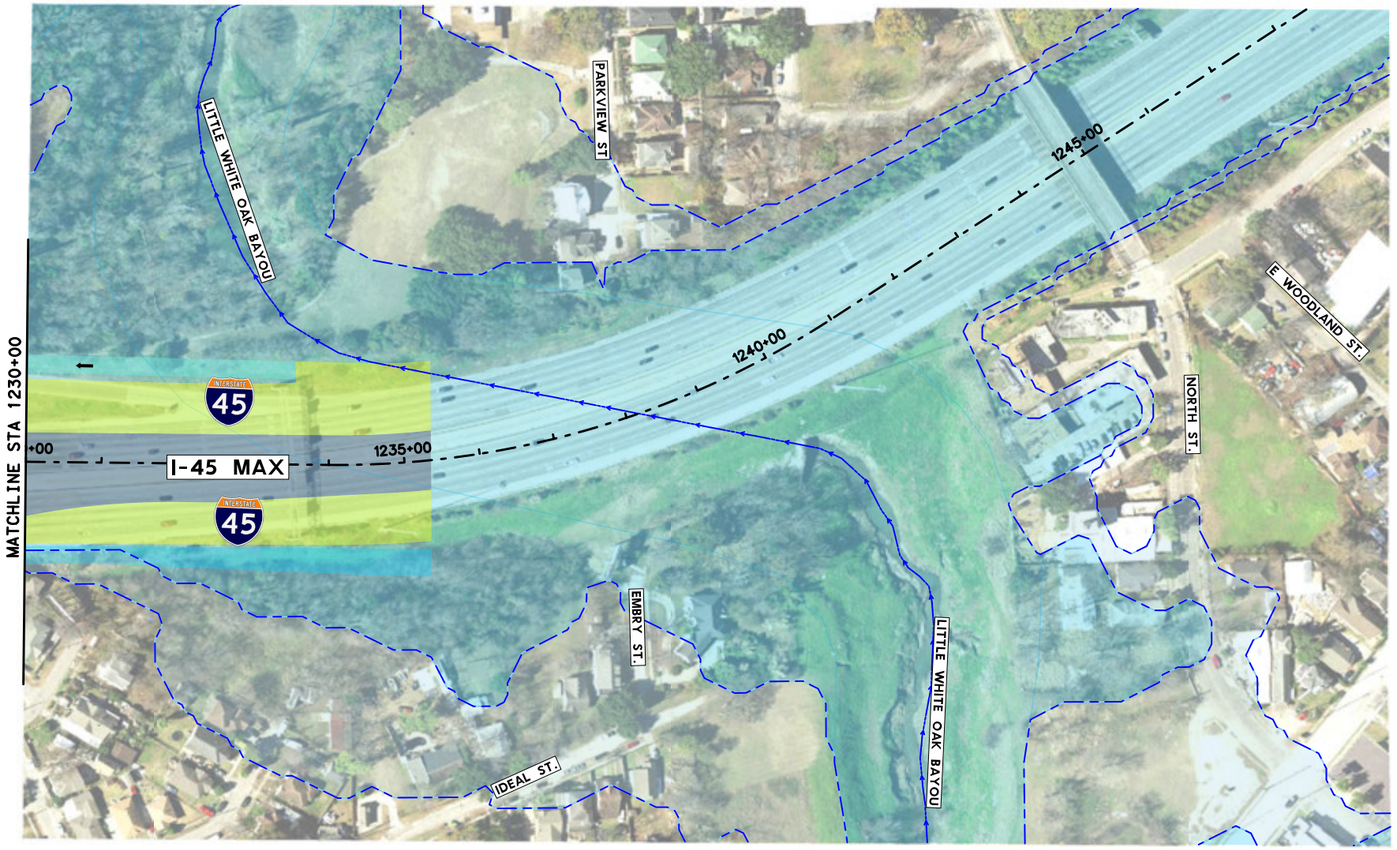
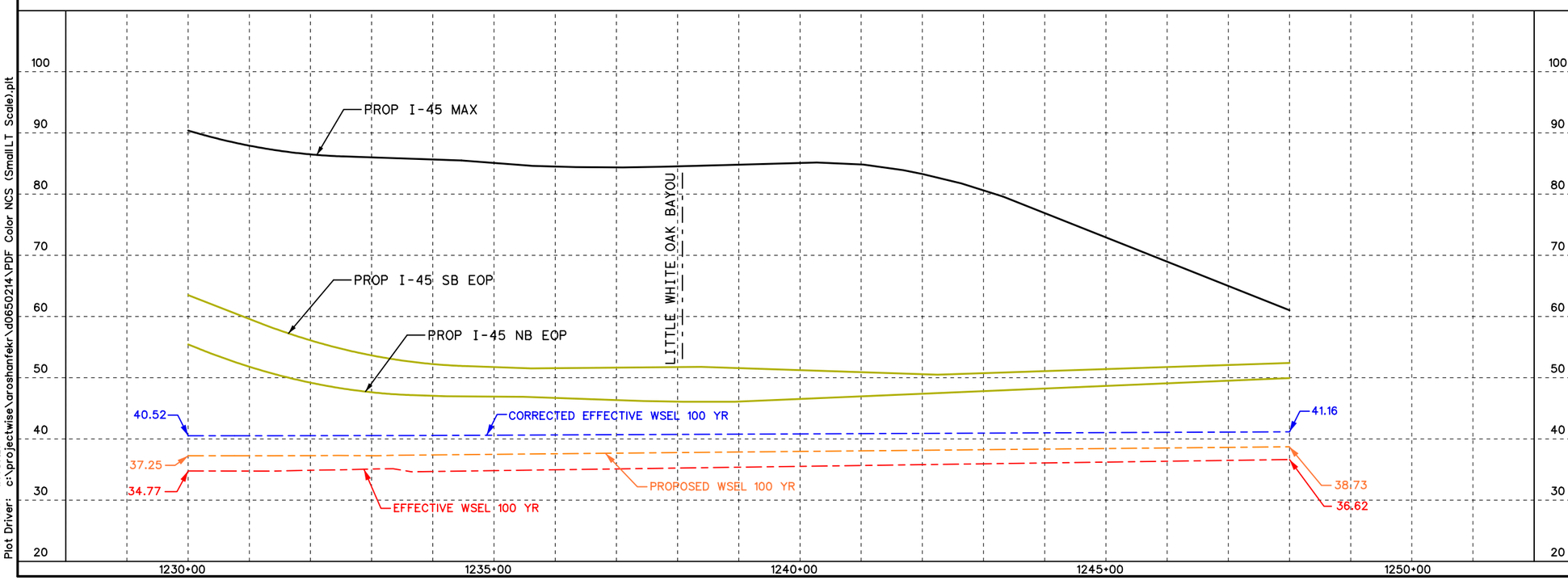


LEGEND:

- 100 YR FLOODPLAIN
- 500 YR FLOODPLAIN
- EFFECTIVE WSEL 100 YR
- CORRECTED EFFECTIVE WSEL 100 YR
- PROPOSED WSEL 100 YR (NORTH CANAL, SOUTH CANAL AND HEIGHTS AREA IMPROVEMENTS)
- TRAFFIC FLOW

NOTE
1. STATIONING IS BASE ON CL I-45 ALIGNMENTS SHOWN IN BOLD.
2. ROADWAY PROFILE OBTAINED FROM HNTB DESIGN FILES PROVIDED APRIL 2018.

0 100 200 400
(IN FEET)
SCALE: PLAN 1":200' - H
1":10' - V



PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
FIRM REGISTATION NO. 2614

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NHHIP - SEGMENT 3D

PROPOSED ROADWAY VS WSEL
PLAN & PROFILE
100 YEAR

EXHIBIT 3-7 SHEET 6 OF 6

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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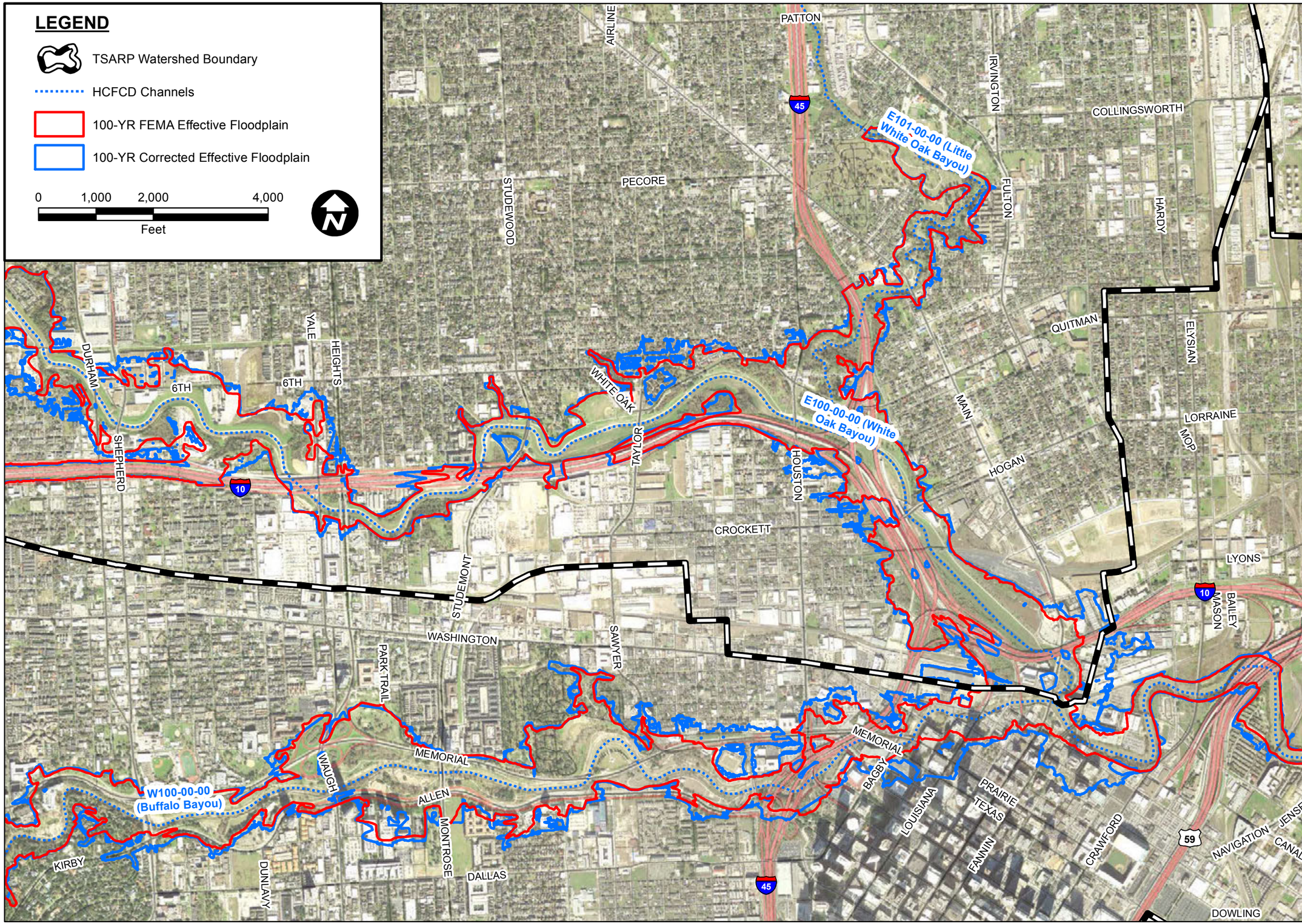


NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

100-YR FEMA EFFECTIVE FLOODPLAIN VS 100-YR CORRECTED EFFECTIVE FLOODPLAIN

PREPARED:

CHECKED:

APPROVED:

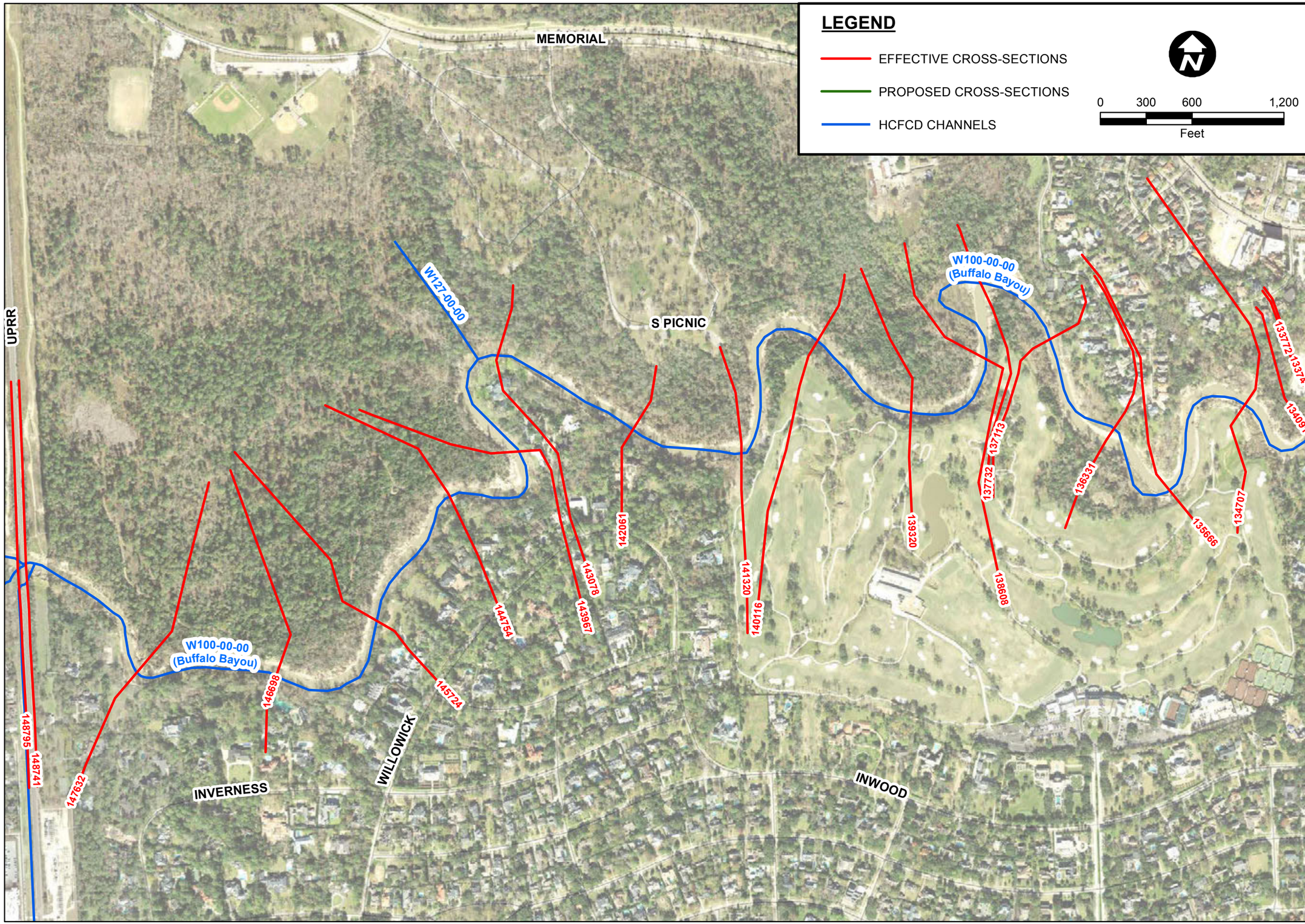
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
3-6



NORTH HOUSTON HIGHWAY
IMPROVEMENT PROJECT

HYDRAULIC CROSS-SECTIONS
FOR BUFFALO BAYOU (SHEET 1 OF 6)

PREPARED:

CHECKED:

APPROVED:

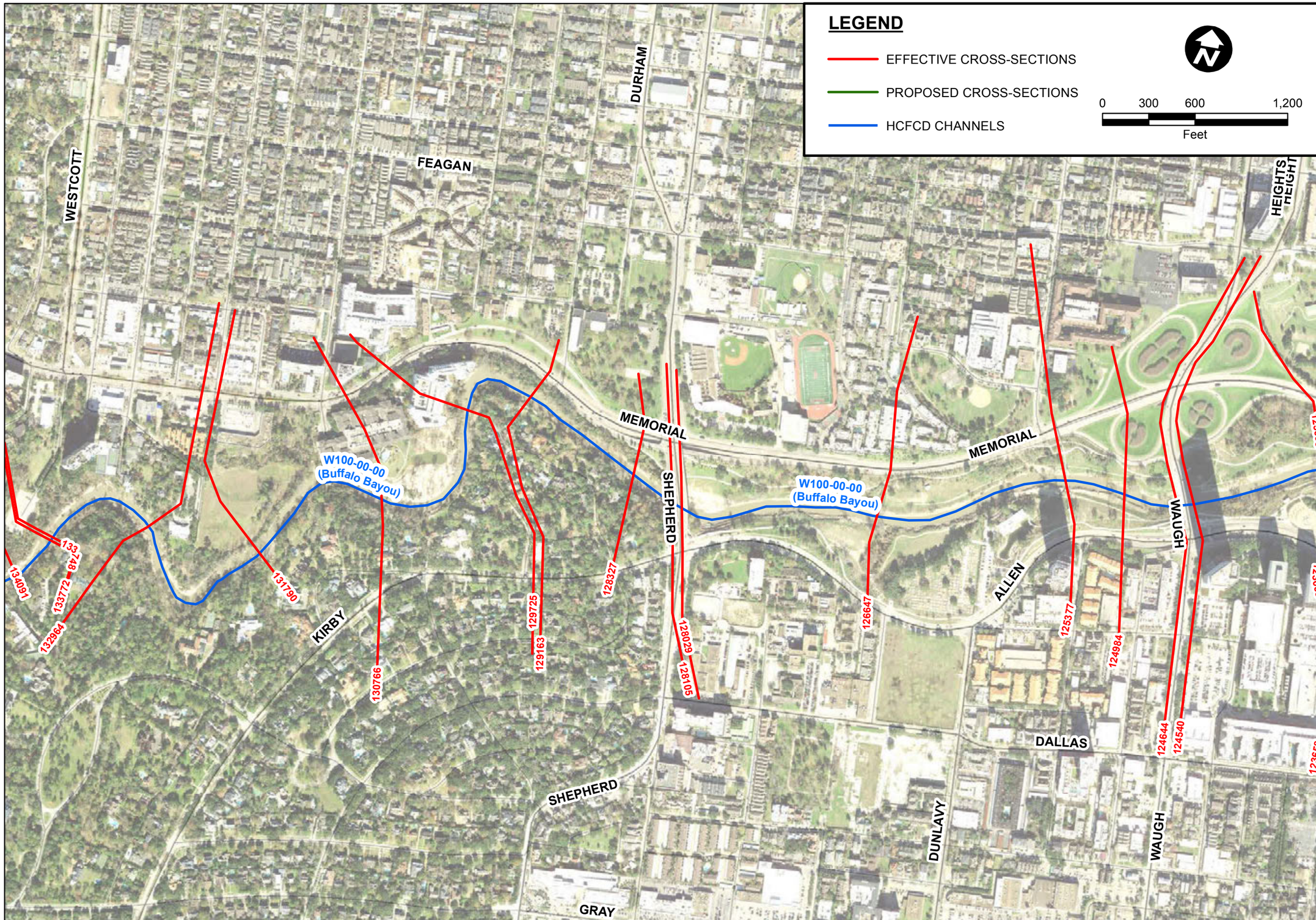
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JUNE, 2018
SCALE: AS NOTED

EXHIBIT
3-5



NORTH HOUSTON HIGHWAY
IMPROVEMENT PROJECT

HYDRAULIC CROSS-SECTIONS
FOR BUFFALO BAYOU (SHEET 2 OF 6)

PREPARED:

CHECKED:

APPROVED:

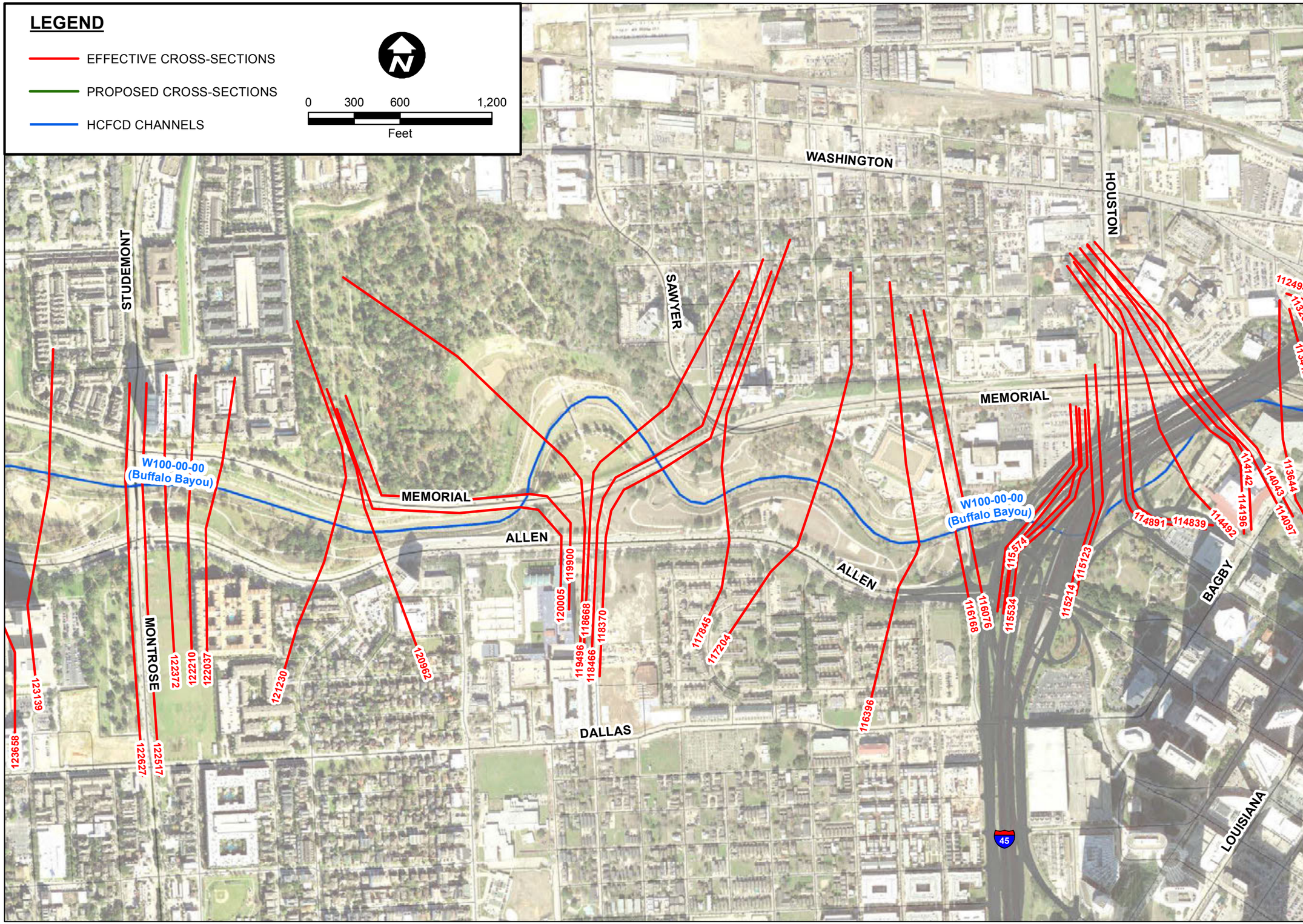
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
3-5



NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

HYDRAULIC CROSS-SECTIONS FOR BUFFALO BAYOU (SHEET 3 OF 6)

PREPARED:

CHECKED:

APPROVED:

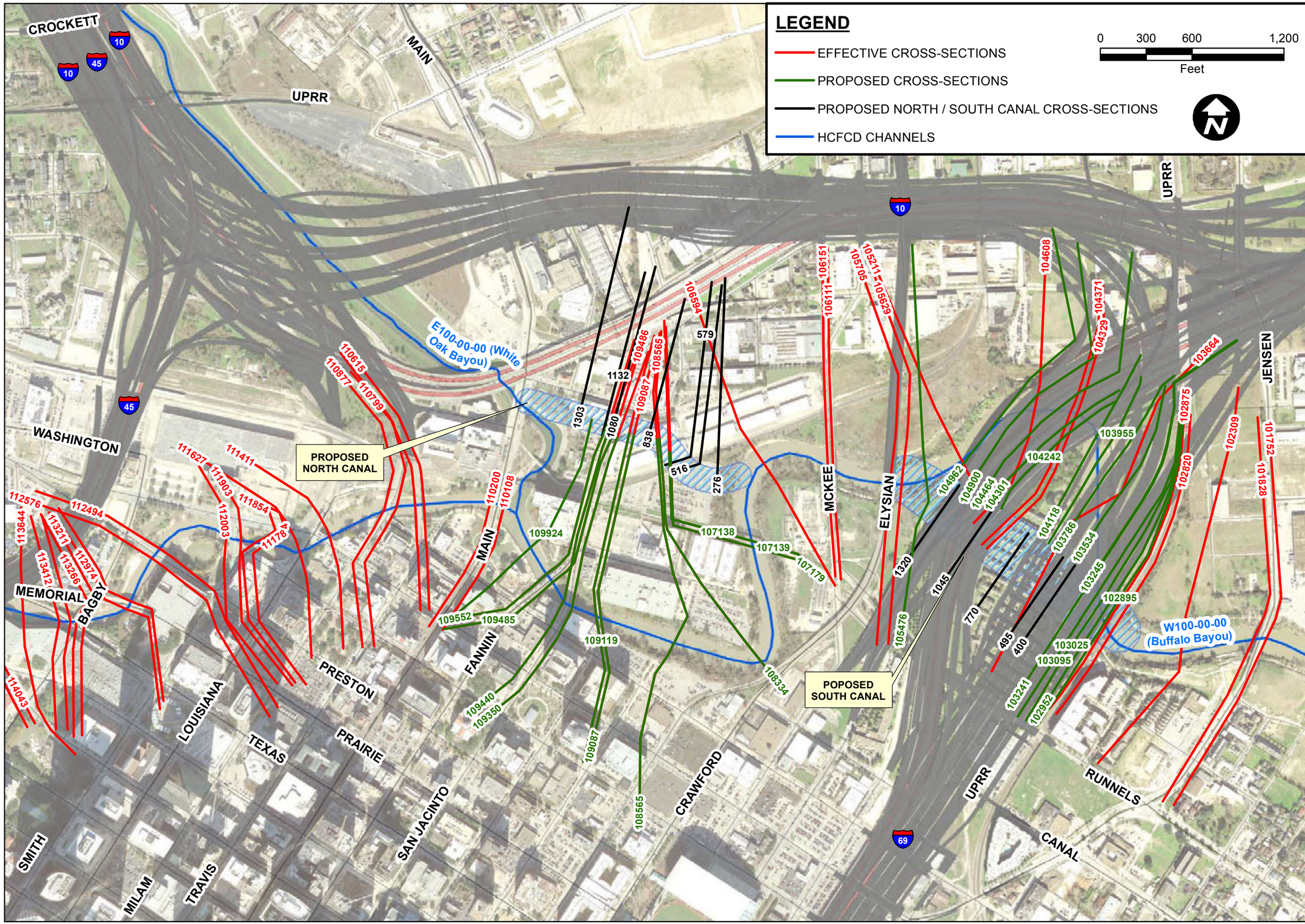
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
3-5



NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

HYDRAULIC CROSS-SECTIONS FOR BUFFALO BAYOU (SHEET 4 OF 6)

PREPARED:

CHECKED:

APPROVED:

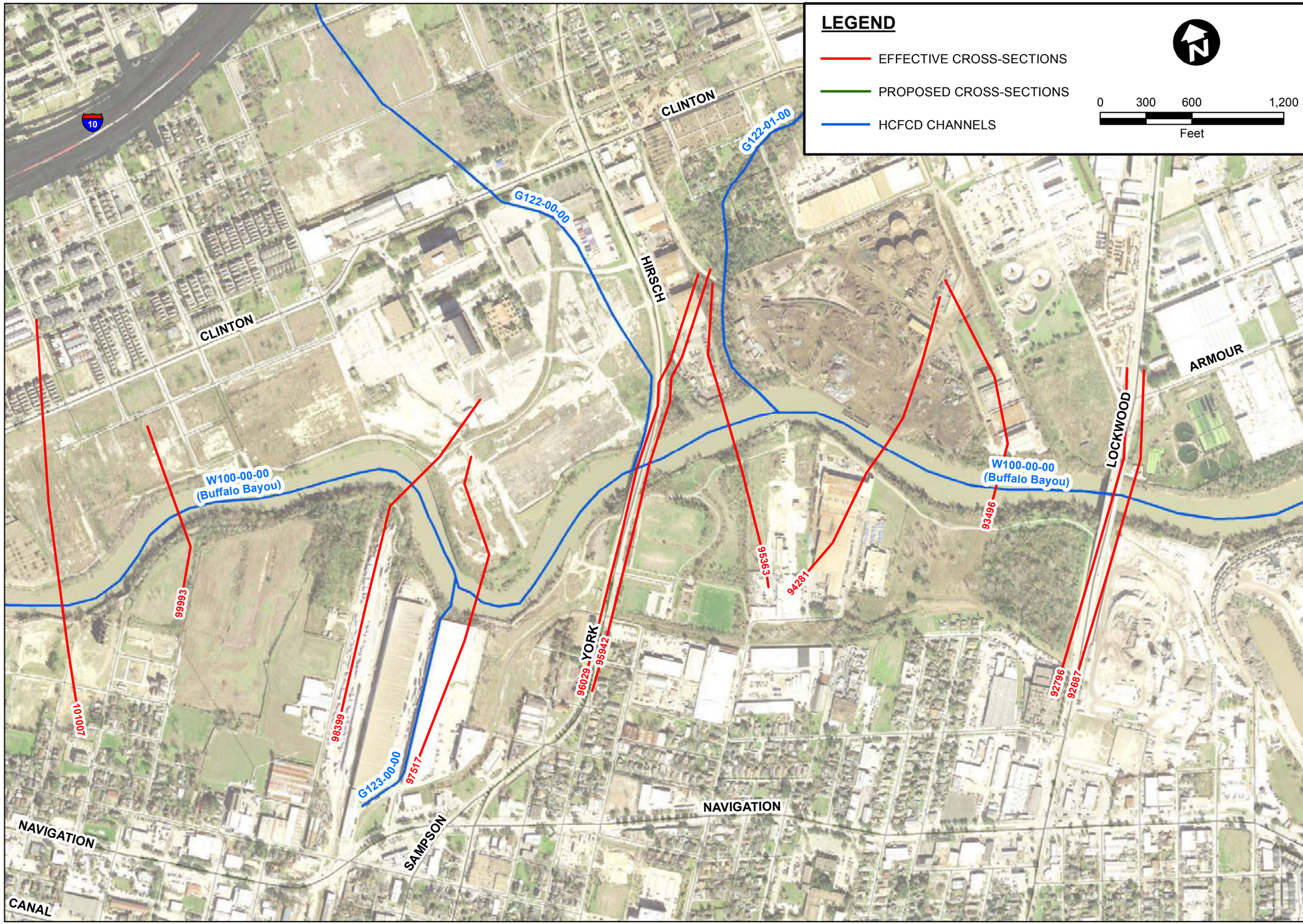
Lockwood, Andrews & Newnam, Inc.

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
3-5



NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

HYDRAULIC CROSS-SECTIONS FOR BUFFALO BAYOU (SHEET 5 OF 6)

PREPARED:

CHECKED:

APPROVED:

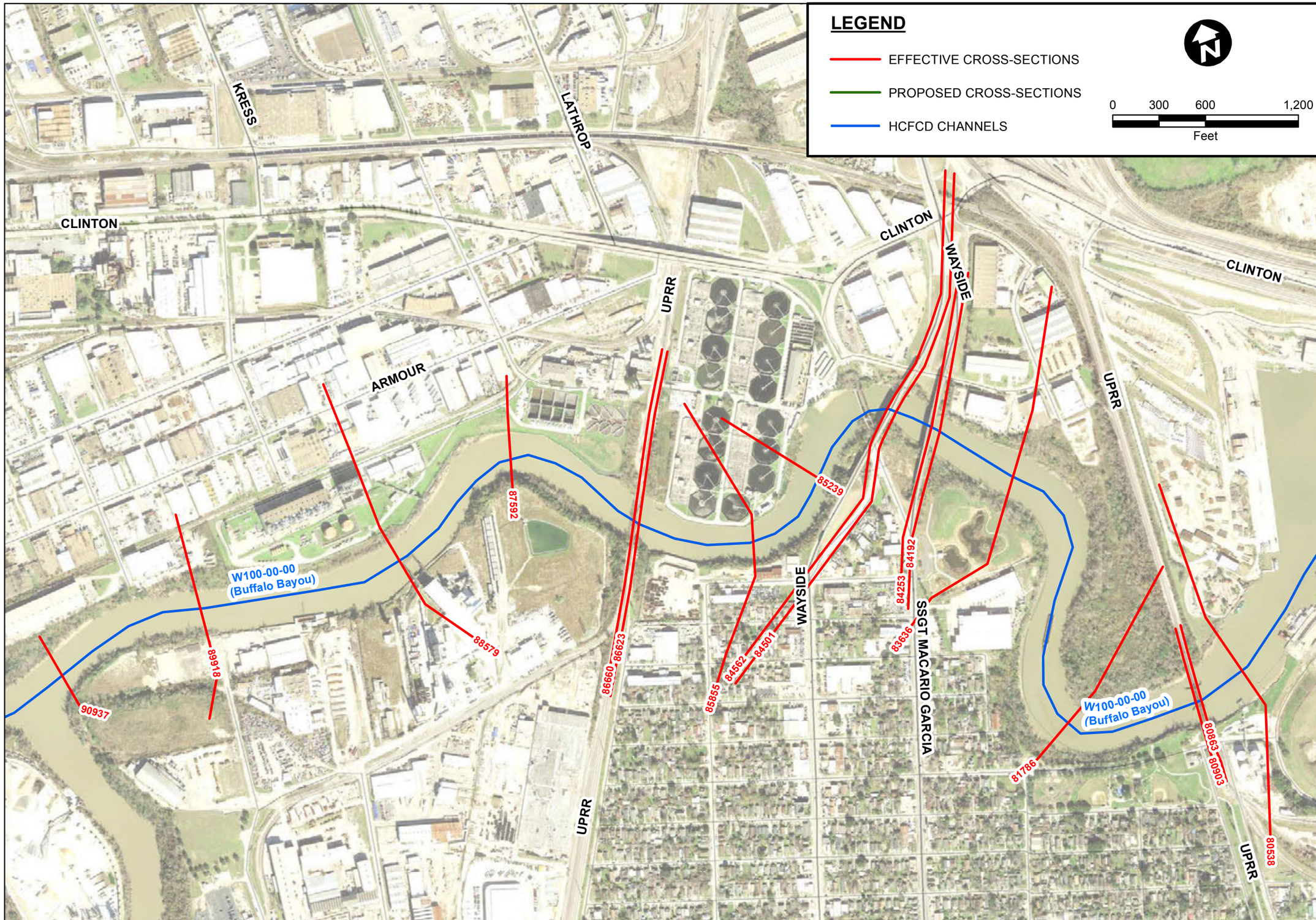
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
3-5



NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

HYDRAULIC CROSS-SECTIONS FOR BUFFALO BAYOU (SHEET 6 OF 6)

PREPARED:

CHECKED:

APPROVED:

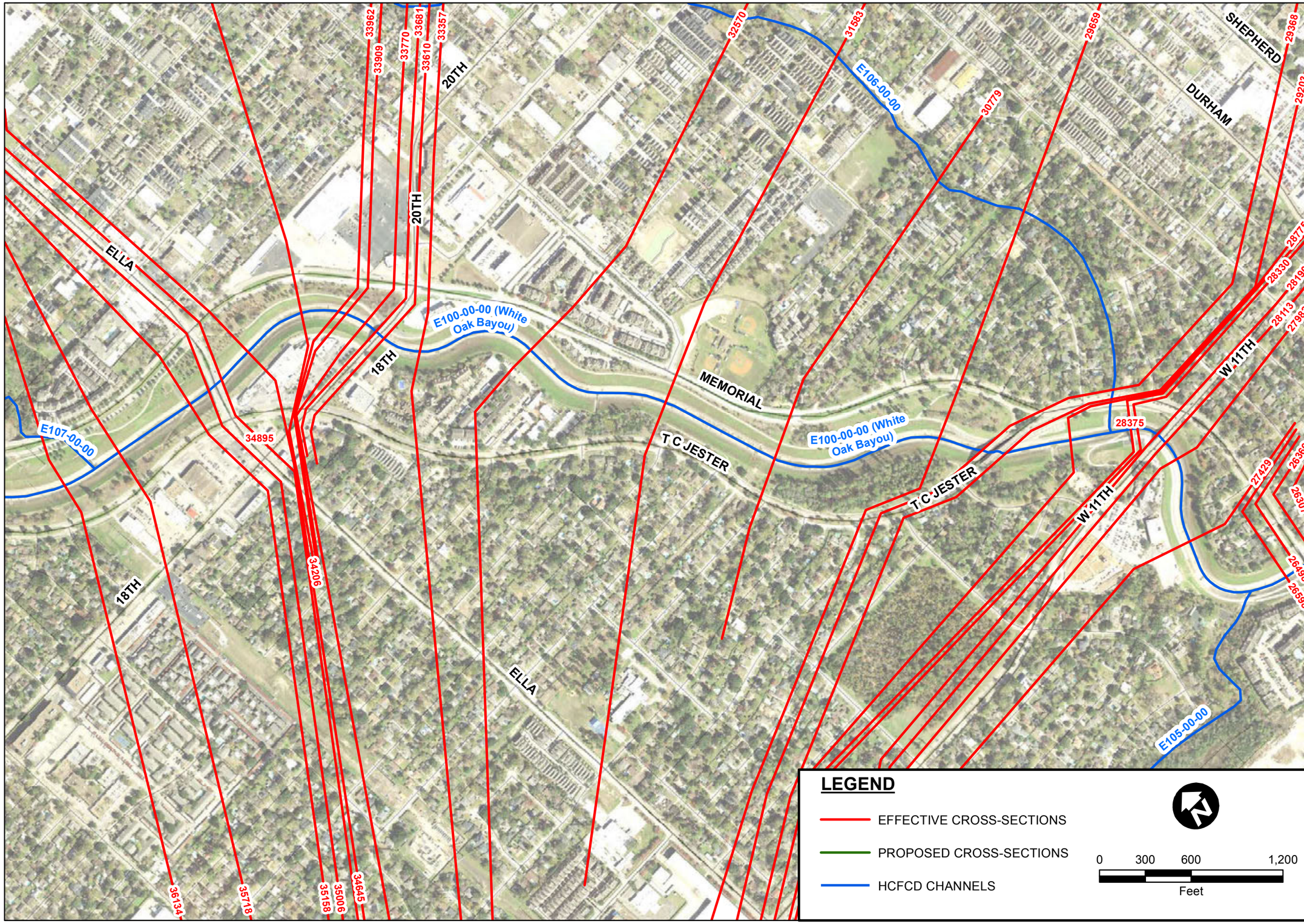
Lockwood, Andrews & Newnam, Inc.

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
3-5



NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

HYDRAULIC CROSS-SECTIONS FOR WHITE OAK BAYOU (SHEET 1 OF 4)

PREPARED:

CHECKED:

APPROVED:

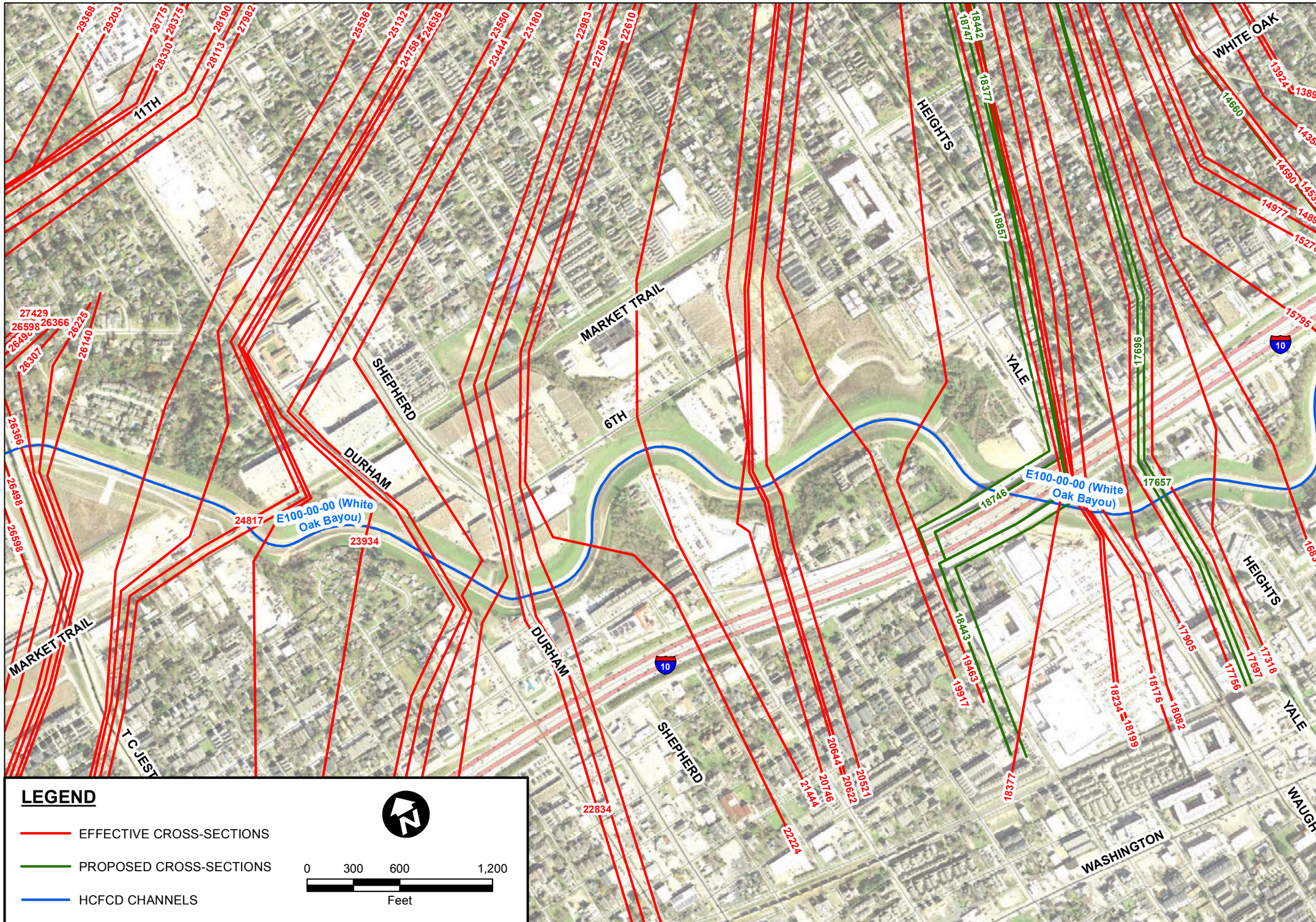
Lockwood, Andrews & Newnam, Inc.

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
3-5



LEGEND

- EFFECTIVE CROSS-SECTIONS
- PROPOSED CROSS-SECTIONS
- HCFCD CHANNELS

0 300 600 1,200
Feet

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

HYDRAULIC CROSS-SECTIONS FOR WHITE OAK BAYOU (SHEET 2 OF 4)

PREPARED:
CHECKED:
APPROVED:

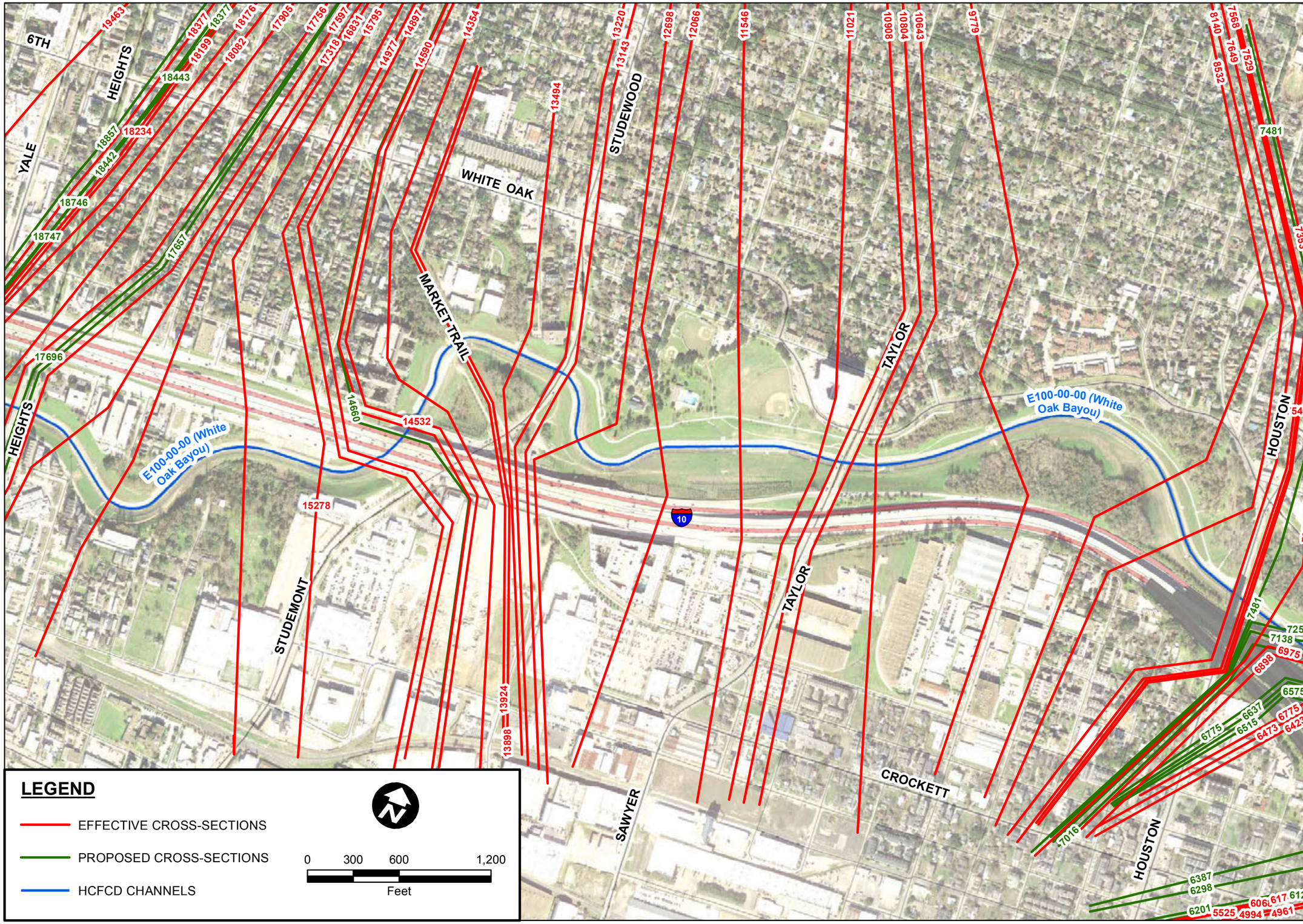
Lockwood, Andrews & Newnam, inc.

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
3-5



LEGEND

- EFFECTIVE CROSS-SECTIONS
- PROPOSED CROSS-SECTIONS
- HCFCD CHANNELS

0 300 600 1,200
Feet

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

HYDRAULIC CROSS-SECTIONS FOR WHITE OAK BAYOU (SHEET 3 OF 4)

PREPARED:

CHECKED:

APPROVED:

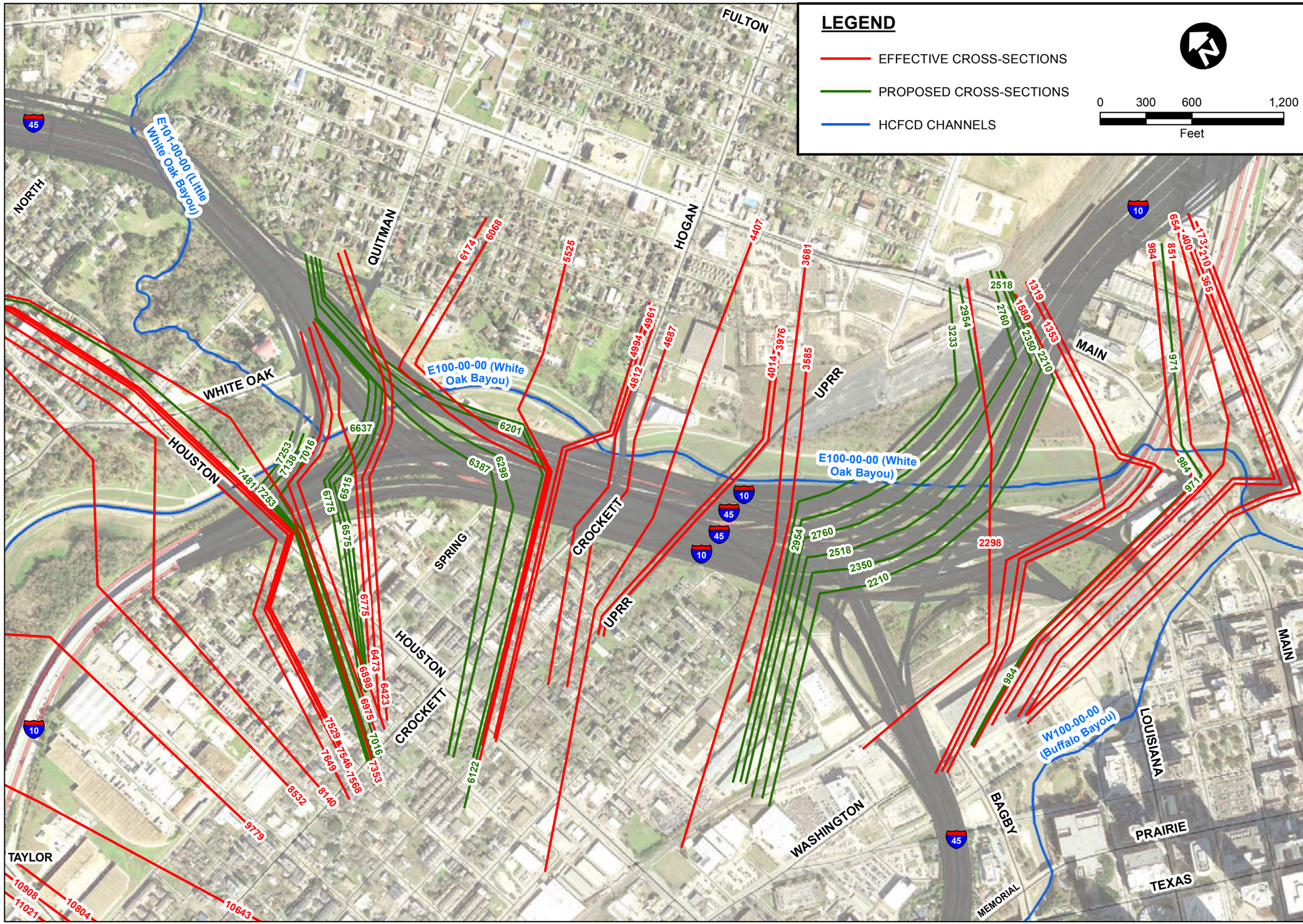
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
3-5



NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

HYDRAULIC CROSS-SECTIONS FOR WHITE OAK BAYOU (SHEET 4 OF 4)

PREPARED:

CHECKED:

APPROVED:

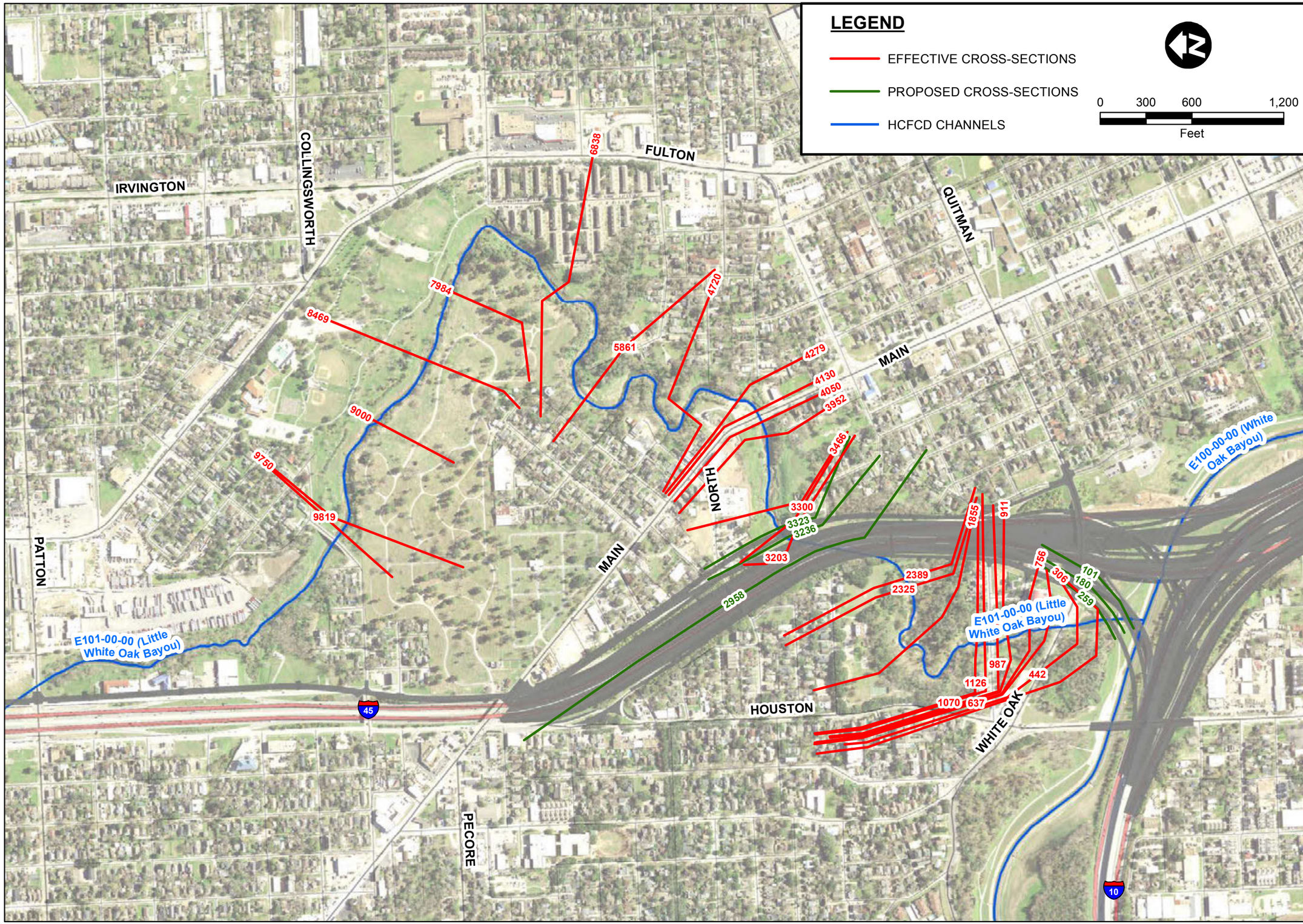
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
3-5



NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

HYDRAULIC CROSS-SECTIONS FOR LITTLE WHITE OAK BAYOU (SHEET 1 OF 1)

PREPARED:

CHECKED:

APPROVED:

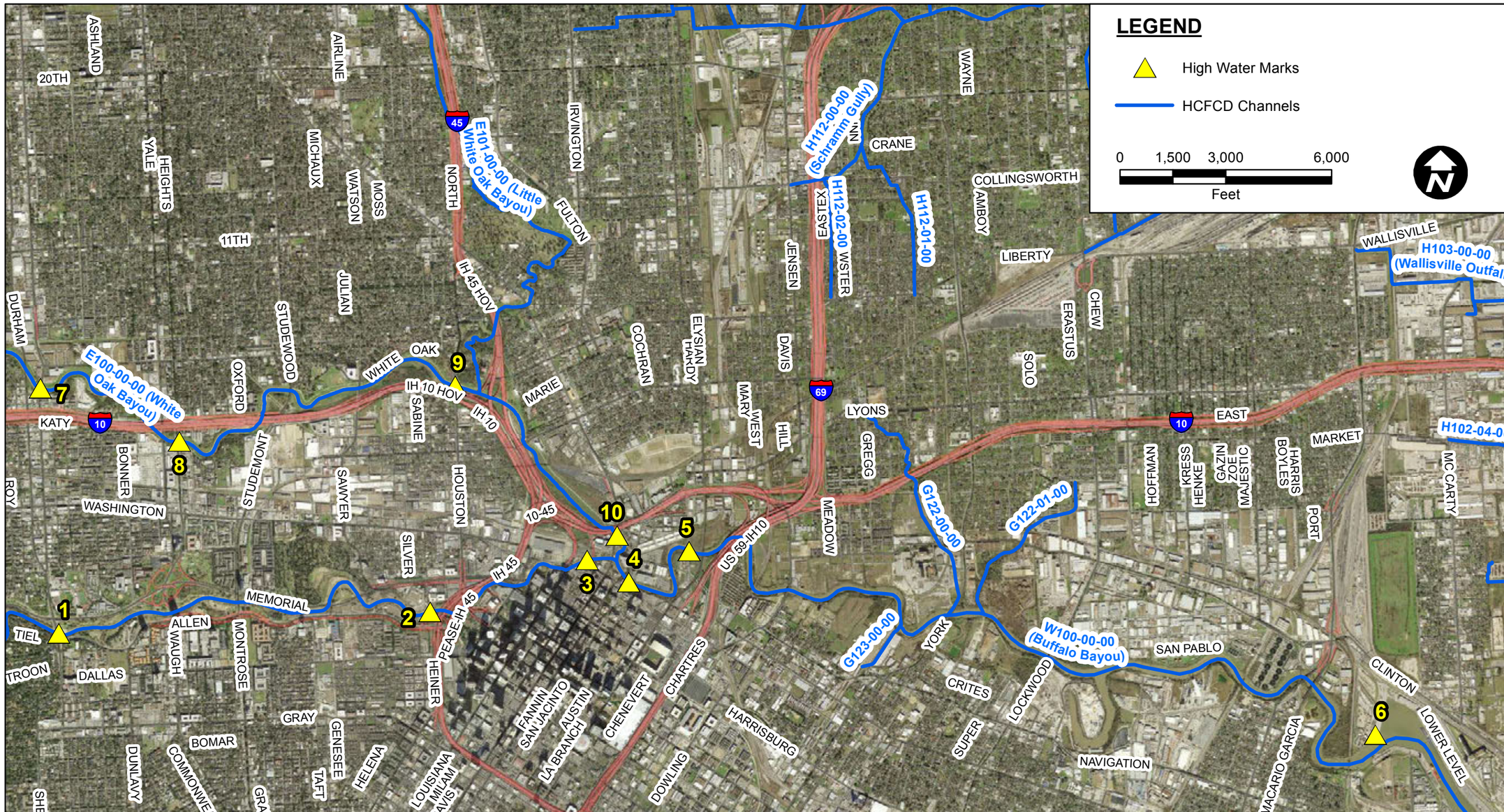
Lockwood, Andrews & Newnam, Inc.
A LEE & RAYT COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
3-5



ID	LOCATION	CHANNEL NAME	10-YR WSEL (FT)			50-YR WSEL (FT)			100-YR WSEL (FT)			500-YR WSEL (FT)		
			EFFECTIVE	CORRECTED EFFECTIVE	CORRECTED EFFECTIVE - EFFECTIVE	EFFECTIVE	CORRECTED EFFECTIVE	CORRECTED EFFECTIVE - EFFECTIVE	EFFECTIVE	CORRECTED EFFECTIVE	CORRECTED EFFECTIVE - EFFECTIVE	EFFECTIVE	CORRECTED EFFECTIVE	CORRECTED EFFECTIVE - EFFECTIVE
1	SHEPHERD DR	BUFFALO BAYOU	31.05	31.93	0.88	35.03	38.34	3.31	37.96	40.96	3.00	43.97	46.16	2.19
2	SABINE ST	BUFFALO BAYOU	30.27	31.20	0.93	33.83	37.67	3.84	37.03	40.20	3.17	42.93	45.49	2.56
3	MILAM ST	BUFFALO BAYOU	27.11	28.83	1.72	32.65	36.35	3.70	35.65	38.67	3.02	41.31	44.25	2.94
4	SAN JACINTO ST	BUFFALO BAYOU	24.22	27.38	3.16	29.60	35.72	6.12	32.55	38.13	5.58	37.66	43.48	5.82
5	MCKEE ST	BUFFALO BAYOU	21.62	23.17	1.55	27.04	30.02	2.98	29.63	32.60	2.97	34.61	38.95	4.34
6	TURNING BASIN	BUFFALO BAYOU	0.08	3.06	2.98	4.82	4.66	-0.16	7.09	6.42	-0.67	12.65	12.08	-0.57
7	N. SHEPHERD DR	WHITE OAK BAYOU	42.47	44.37	1.90	46.96	50.04	3.08	48.84	51.05	2.21	51.84	53.39	1.55
8	HEIGHTS BLVD	WHITE OAK BAYOU	37.39	39.13	1.74	41.80	44.53	2.73	43.28	45.50	2.22	46.73	48.50	1.77
9	HOUSTON AVE	WHITE OAK BAYOU	31.83	32.90	1.07	35.50	38.55	3.05	37.40	40.74	3.34	42.51	45.57	3.06
10	MAIN ST	WHITE OAK BAYOU	26.51	29.51	3.00	31.80	36.61	4.81	34.33	38.91	4.58	40.38	44.32	3.94

* EFFECTIVE M3 MODEL FOR BUFFALO BAYOU. RISK MAP MODEL FOR WHITE OAK BAYOU.

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

CORRECTED EFFECTIVE MODEL VS EFFECTIVE MODEL

PREPARED:

CHECKED:

APPROVED:

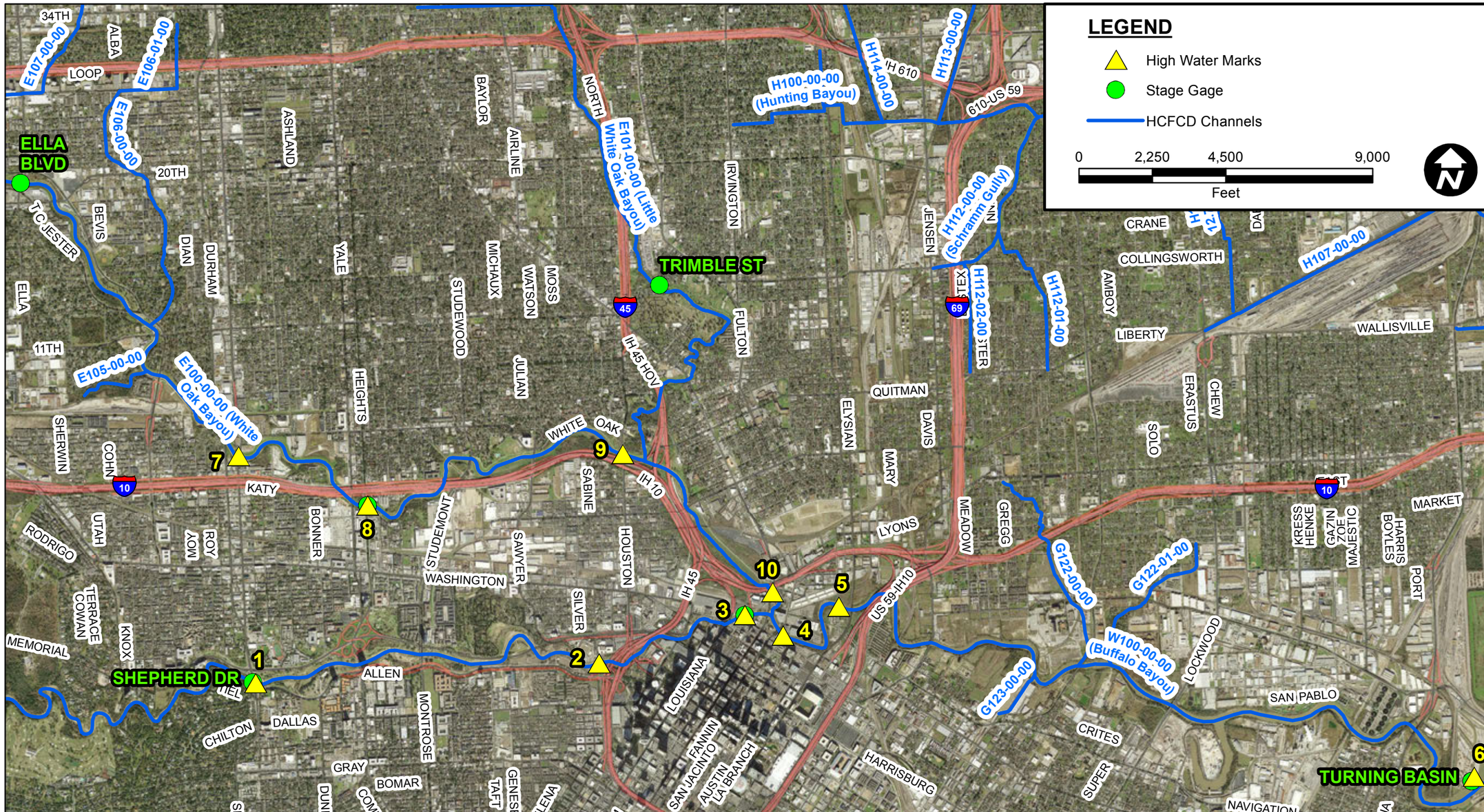
Lockwood, Andrews & Newnam, Inc.

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT 3-4



ID	LOCATION	CHANNEL NAME	CROSS-SECTION	MEMORIAL DAY			TAX DAY			HARVEY DAY		
				MODEL	HWM	HWM-MODEL	MODEL	HWM	HWM-MODEL	MODEL	HWM	HWM-MODEL
1	SHEPHERD DR	BUFFALO BAYOU	128104.6	33.80	33.80	0.00	31.65	31.80	0.15	41.40	41.40	0.00
2	SABINE ST	BUFFALO BAYOU	116167.6	33.04	32.10	-0.94	30.78	29.90	-0.88	39.68	39.90	0.22
3	MILAM ST	BUFFALO BAYOU	110876.6	31.53	31.30	-0.23	27.94	28.70	0.76	37.19	37.80	0.61
4	SAN JACINTO ST	BUFFALO BAYOU	109440.2	30.07	29.40	-0.67	26.45	27.20	0.75	36.60	37.20	0.60
5	MCKEE ST	BUFFALO BAYOU	106151.4	25.69	23.40	--	22.37	22.50	0.13	30.82	30.10	-0.72
6	TURNING BASIN	BUFFALO BAYOU	80538.0	5.25	--	--	7.67	6.80	-0.87	12.05	12.10	0.05
7	N. SHEPHERD DR	WHITE OAK BAYOU	22834.0	44.13	35.50	--	43.44	44.10	0.66	50.52	51.30	0.78
8	HEIGHTS BLVD	WHITE OAK BAYOU	17756.0	39.89	33.90	--	38.60	38.80	0.20	45.33	45.60	0.27
9	HOUSTON AVE	WHITE OAK BAYOU	7649.0	36.10	29.00	--	33.45	33.50	0.05	39.63	40.30	0.67
10	MAIN ST	WHITE OAK BAYOU	971.5	31.81	--	--	28.29	--	--	37.42	--	--

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

CALIBRATED WATER SURFACE ELEVATIONS (WSELs) VS OBSERVED HIGH WATER MARKS

PREPARED:

CHECKED:

APPROVED:

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Department of Transportation

Houston, Texas

DATE: JULY, 2018
SCALE: AS NOTED

EXHIBIT
3-3

Appendix A

Buffalo Bayou M3 Effective Steady Model
10-Year, 50-Year, 100-Year and 500-Year

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	248647.7	10PCT_10yr	1765.00	56.61	70.83		70.90	0.000046	2.03	870.91	103.95	0.12
W100-00-00_0805	248647.7	2PCT_50yr	3051.00	56.61	75.54		75.61	0.000037	2.13	1429.15	132.98	0.11
W100-00-00_0805	248647.7	1PCT_100yr	3803.00	56.61	77.30		77.38	0.000038	2.27	1672.20	148.79	0.12
W100-00-00_0805	248647.7	0.2PCT_500yr	6017.00	56.61	80.29		80.41	0.000044	2.80	2458.40	446.93	0.13
W100-00-00_0805	248547.8	10PCT_10yr	1765.00	56.16	70.83	61.12	70.88	0.000161	1.92	917.72	106.65	0.12
W100-00-00_0805	248547.8	2PCT_50yr	3051.00	56.16	75.54	62.77	75.61	0.000133	2.05	1488.74	135.65	0.11
W100-00-00_0805	248547.8	1PCT_100yr	3803.00	56.16	77.29	63.57	77.37	0.000135	2.19	1740.43	155.74	0.11
W100-00-00_0805	248547.8	0.2PCT_500yr	6017.00	56.16	80.28	65.49	80.40	0.000163	2.75	2233.76	479.83	0.13
W100-00-00_0805	248481.1		Bridge									
W100-00-00_0805	248414.4	10PCT_10yr	1765.00	55.90	70.58	60.85	70.64	0.000161	1.92	919.07	106.73	0.12
W100-00-00_0805	248414.4	2PCT_50yr	3051.00	55.90	75.29	62.52	75.36	0.000132	2.05	1490.22	135.71	0.11
W100-00-00_0805	248414.4	1PCT_100yr	3803.00	55.90	77.05	63.31	77.13	0.000134	2.19	1743.54	155.80	0.11
W100-00-00_0805	248414.4	0.2PCT_500yr	6017.00	55.90	80.17	65.23	80.28	0.000158	2.73	2259.01	498.85	0.12
W100-00-00_0805	247502.0	10PCT_10yr	1752.00	50.81	70.42		70.45	0.000218	1.44	1214.75	118.70	0.08
W100-00-00_0805	247502.0	2PCT_50yr	3042.00	50.81	75.14		75.18	0.000258	1.66	1836.90	145.56	0.08
W100-00-00_0805	247502.0	1PCT_100yr	3797.00	50.81	76.89		76.94	0.000295	1.81	2101.28	155.97	0.09
W100-00-00_0805	247502.0	0.2PCT_500yr	5984.00	50.81	79.98		80.06	0.000346	2.19	3842.38	1141.98	0.10
W100-00-00_0805	246449.8	10PCT_10yr	1752.00	52.30	70.23		70.26	0.000154	1.47	1193.56	122.81	0.08
W100-00-00_0805	246449.8	2PCT_50yr	3042.00	52.30	74.91		74.95	0.000188	1.66	1835.78	150.81	0.08
W100-00-00_0805	246449.8	1PCT_100yr	3797.00	52.30	76.63		76.68	0.000217	1.80	2127.88	232.91	0.09
W100-00-00_0805	246449.8	0.2PCT_500yr	5984.00	52.30	79.67		79.74	0.000268	2.14	4500.71	1511.39	0.10
W100-00-00_0805	245413.7	10PCT_10yr	1724.00	51.09	70.04		70.07	0.000219	1.38	1248.48	122.74	0.08
W100-00-00_0805	245413.7	2PCT_50yr	3022.00	51.09	74.69		74.73	0.000231	1.61	1876.32	147.63	0.08
W100-00-00_0805	245413.7	1PCT_100yr	3784.00	51.09	76.38		76.43	0.000259	1.77	2133.54	156.88	0.08
W100-00-00_0805	245413.7	0.2PCT_500yr	5907.00	51.09	79.36		79.42	0.000345	2.13	4148.59	1630.19	0.10
W100-00-00_0805	244345.5	10PCT_10yr	1724.00	49.00	69.89		69.92	0.000105	1.23	1400.71	136.03	0.07
W100-00-00_0805	244345.5	2PCT_50yr	3022.00	49.00	74.48		74.51	0.000184	1.43	2108.71	172.90	0.07
W100-00-00_0805	244345.5	1PCT_100yr	3784.00	49.00	76.14		76.18	0.000205	1.57	2412.63	193.08	0.08
W100-00-00_0805	244345.5	0.2PCT_500yr	5907.00	49.00	79.06		79.12	0.000235	1.91	4375.36	1331.48	0.08
W100-00-00_0805	243452.9	10PCT_10yr	1698.00	49.00	69.81		69.82	0.000096	1.08	1572.25	165.00	0.06
W100-00-00_0805	243452.9	2PCT_50yr	3003.00	49.00	74.35		74.38	0.000122	1.28	2672.47	418.59	0.06
W100-00-00_0805	243452.9	1PCT_100yr	3772.00	49.00	76.00		76.03	0.000138	1.38	3504.20	582.47	0.06
W100-00-00_0805	243452.9	0.2PCT_500yr	5835.00	49.00	78.89		78.92	0.000186	1.61	6591.10	1816.80	0.07
W100-00-00_0805	242655.3	10PCT_10yr	1698.00	49.31	69.67		69.70	0.000276	1.31	1292.08	127.09	0.07
W100-00-00_0805	242655.3	2PCT_50yr	3003.00	49.31	74.19		74.23	0.000326	1.55	2040.30	268.88	0.08
W100-00-00_0805	242655.3	1PCT_100yr	3772.00	49.31	75.83		75.87	0.000347	1.65	2852.32	690.13	0.08
W100-00-00_0805	242655.3	0.2PCT_500yr	5835.00	49.31	78.72		78.75	0.000267	1.63	7333.19	2497.80	0.07
W100-00-00_0805	241917.5	10PCT_10yr	1698.00	48.64	69.51	54.22	69.53	0.000187	1.13	1508.11	151.16	0.06
W100-00-00_0805	241917.5	2PCT_50yr	3003.00	48.64	74.03	56.27	74.05	0.000174	1.24	2711.02	617.25	0.06
W100-00-00_0805	241917.5	1PCT_100yr	3772.00	48.64	75.66	57.62	75.68	0.000178	1.32	3479.39	1170.52	0.06
W100-00-00_0805	241917.5	0.2PCT_500yr	5835.00	48.64	78.56	59.39	78.59	0.000173	1.41	8263.88	3548.90	0.06
W100-00-00_0805	241646.1	10PCT_10yr	1698.00	48.40	69.47	53.98	69.49	0.000137	1.09	1564.34	140.00	0.06
W100-00-00_0805	241646.1	2PCT_50yr	3003.00	48.40	73.98	56.03	74.00	0.000152	1.34	2261.64	214.58	0.06
W100-00-00_0805	241646.1	1PCT_100yr	3772.00	48.40	75.60	57.39	75.63	0.000162	0.88	3412.83	1190.01	0.04
W100-00-00_0805	241646.1	0.2PCT_500yr	5835.00	48.40	78.51	59.19	78.54	0.000143	1.56	9636.76	3121.63	0.06
W100-00-00_0805	241632.7		Bridge									
W100-00-00_0805	241619.3	10PCT_10yr	1698.00	48.33	69.39	53.91	69.41	0.000137	1.09	1563.02	139.95	0.06
W100-00-00_0805	241619.3	2PCT_50yr	3003.00	48.33	73.97	55.95	74.00	0.000150	1.34	2275.54	224.25	0.06
W100-00-00_0805	241619.3	1PCT_100yr	3772.00	48.33	75.58	57.31	75.61	0.000160	1.48	3473.86	1215.06	0.06
W100-00-00_0805	241619.3	0.2PCT_500yr	5835.00	48.33	78.50	59.11	78.53	0.000140	1.54	9809.34	3131.22	0.06
W100-00-00_0805	241079.0	10PCT_10yr	1665.00	49.13	69.36		69.37	0.000042	0.63	2647.01	209.56	0.03
W100-00-00_0805	241079.0	2PCT_50yr	2980.00	49.13	73.93		73.94	0.000056	0.80	4205.93	533.67	0.04
W100-00-00_0805	241079.0	1PCT_100yr	3758.00	49.13	75.54		75.55	0.000063	0.89	5452.21	941.13	0.04
W100-00-00_0805	241079.0	0.2PCT_500yr	5748.00	49.13	78.45		78.47	0.000072	1.03	10909.81	3766.93	0.04
W100-00-00_0805	240579.0	10PCT_10yr	1665.00	48.94	69.33		69.34	0.000070	0.81	2061.35	197.63	0.04
W100-00-00_0805	240579.0	2PCT_50yr	2980.00	48.94	73.89		73.91	0.000092	0.97	3083.34	254.59	0.05
W100-00-00_0805	240579.0	1PCT_100yr	3758.00	48.94	75.49		75.51	0.000103	1.08	3721.12	896.10	0.05
W100-00-00_0805	240579.0	0.2PCT_500yr	5748.00	48.94	78.40		78.42	0.000104	1.21	8658.79	2858.12	0.05
W100-00-00_0805	240376.3	10PCT_10yr	1665.00	48.86	69.31	53.01	69.32	0.000102	0.80	2073.84	198.01	0.04
W100-00-00_0805	240376.3	2PCT_50yr	2980.00	48.86	73.87	54.71	73.88	0.000129	0.98	3046.65	226.27	0.05
W100-00-00_0805	240376.3	1PCT_100yr	3758.00	48.86	75.47	55.58	75.49	0.000150	1.00	3601.72	755.69	0.05
W100-00-00_0805	240376.3	0.2PCT_500yr	5748.00	48.86	78.38	57.68	78.40	0.000145	1.18	9431.68	3352.70	0.05
W100-00-00_0805	240315.3		Bridge									
W100-00-00_0805	240254.3	10PCT_10yr	1665.00	48.68	69.18	52.83	69.19	0.000101	0.80	2083.00	198.29	0.04
W100-00-00_0805	240254.3	2PCT_50yr	2980.00	48.68	73.73	54.53	73.74	0.000128	0.98	3054.91	226.46	0.05
W100-00-00_0805	240254.3	1PCT_100yr	3758.00	48.68	75.44	55.40	75.46	0.000146	1.08	3691.31	832.22	0.05

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	240254.3	0.2PCT_500yr	5748.00	48.68	78.31	57.49	78.32	0.000139	1.16	9794.55	3377.03	0.05
W100-00-00_0805	239993.6	10PCT_10yr	3152.00	47.00	69.07		69.11	0.000506	1.71	1845.66	160.04	0.09
W100-00-00_0805	239993.6	2PCT_50yr	5370.00	47.00	73.58		73.64	0.000664	2.00	2802.31	516.26	0.10
W100-00-00_0805	239993.6	1PCT_100yr	6670.00	47.00	75.31		75.37	0.000562	1.97	4850.43	1668.26	0.09
W100-00-00_0805	239993.6	0.2PCT_500yr	10178.00	47.00	78.24		78.27	0.000297	1.61	12207.68	3582.63	0.07
W100-00-00_0805	239036.8	10PCT_10yr	3152.00	47.67	68.60		68.65	0.000458	1.75	1797.49	153.46	0.09
W100-00-00_0805	239036.8	2PCT_50yr	5370.00	47.67	72.98		73.05	0.000574	2.13	2520.36	199.88	0.10
W100-00-00_0805	239036.8	1PCT_100yr	6670.00	47.67	74.72		74.80	0.000608	2.32	3209.60	770.00	0.10
W100-00-00_0805	239036.8	0.2PCT_500yr	10178.00	47.67	77.86		77.92	0.000431	2.21	7724.60	1788.57	0.09
W100-00-00_0805	238060.4	10PCT_10yr	3152.00	45.20	68.14		68.19	0.000481	1.79	1758.25	157.61	0.09
W100-00-00_0805	238060.4	2PCT_50yr	5370.00	45.20	72.41		72.48	0.000600	2.14	2528.61	249.16	0.10
W100-00-00_0805	238060.4	1PCT_100yr	6670.00	45.20	74.13		74.21	0.000605	2.29	3346.53	638.28	0.11
W100-00-00_0805	238060.4	0.2PCT_500yr	10178.00	45.20	77.43		77.49	0.000450	2.24	8108.07	2128.38	0.09
W100-00-00_0805	237276.3	10PCT_10yr	3152.00	44.89	67.70		67.75	0.000675	1.75	1802.44	159.70	0.09
W100-00-00_0805	237276.3	2PCT_50yr	5370.00	44.89	71.92		71.98	0.000679	2.04	2953.35	477.10	0.09
W100-00-00_0805	237276.3	1PCT_100yr	6670.00	44.89	73.67		73.73	0.000611	2.05	3822.19	597.82	0.09
W100-00-00_0805	237276.3	0.2PCT_500yr	10178.00	44.89	77.11		77.15	0.000411	1.90	8696.80	1826.86	0.08
W100-00-00_0805	236611.0	10PCT_10yr	3361.00	44.63	67.26		67.31	0.000630	1.90	1773.37	158.89	0.10
W100-00-00_0805	236611.0	2PCT_50yr	5608.00	44.63	71.47		71.54	0.000638	2.20	2763.04	327.46	0.10
W100-00-00_0805	236611.0	1PCT_100yr	6923.00	44.63	73.24		73.32	0.000622	2.30	3613.09	696.05	0.10
W100-00-00_0805	236611.0	0.2PCT_500yr	10512.00	44.63	76.81		76.87	0.000455	2.22	8045.02	1947.56	0.09
W100-00-00_0805	235706.9	10PCT_10yr	3361.00	44.41	66.69		66.75	0.000611	2.01	1672.01	162.19	0.11
W100-00-00_0805	235706.9	2PCT_50yr	5608.00	44.41	70.88		70.96	0.000640	2.34	2438.53	263.62	0.11
W100-00-00_0805	235706.9	1PCT_100yr	6923.00	44.41	72.65		72.74	0.000647	2.49	3145.08	597.79	0.11
W100-00-00_0805	235706.9	0.2PCT_500yr	10512.00	44.41	76.37		76.45	0.000466	2.45	7799.39	1882.70	0.10
W100-00-00_0805	234807.9	10PCT_10yr	3539.00	44.91	66.43		66.47	0.000186	1.64	2783.62	365.21	0.09
W100-00-00_0805	234807.9	2PCT_50yr	5811.00	44.91	70.64		70.68	0.000175	1.76	4385.05	399.10	0.08
W100-00-00_0805	234807.9	1PCT_100yr	7139.00	44.91	72.41		72.45	0.000182	1.88	5116.13	430.94	0.08
W100-00-00_0805	234807.9	0.2PCT_500yr	10797.00	44.91	76.14		76.19	0.000184	2.08	9255.78	2117.19	0.08
W100-00-00_0805	233698.4	10PCT_10yr	3539.00	45.45	66.15	51.63	66.19	0.000359	1.67	2116.92	635.59	0.09
W100-00-00_0805	233698.4	2PCT_50yr	5811.00	45.45	70.34	53.58	70.40	0.000392	1.98	2948.21	778.07	0.09
W100-00-00_0805	233698.4	1PCT_100yr	7139.00	45.45	72.23	54.64	72.25	0.000164	1.37	8281.16	869.98	0.06
W100-00-00_0805	233698.4	0.2PCT_500yr	10797.00	45.45	75.94	57.25	75.97	0.000194	1.68	12633.90	2107.40	0.07
W100-00-00_0805	233029.3	10PCT_10yr	3539.00	43.15	65.85		65.91	0.000466	2.09	1696.63	149.38	0.11
W100-00-00_0805	233029.3	2PCT_50yr	5811.00	43.15	70.00		70.09	0.000518	2.49	2337.53	159.79	0.11
W100-00-00_0805	233029.3	1PCT_100yr	7139.00	43.15	71.94		72.05	0.000579	2.68	2687.98	256.63	0.12
W100-00-00_0805	233029.3	0.2PCT_500yr	10797.00	43.15	75.65		75.76	0.000579	2.80	6947.36	1846.98	0.12
W100-00-00_0805	232816.9	10PCT_10yr	3634.00	42.42	65.75	50.55	65.82	0.000441	1.98	1839.15	274.47	0.10
W100-00-00_0805	232816.9	2PCT_50yr	5919.00	42.42	69.90	52.70	69.98	0.000488	2.36	2505.61	462.55	0.11
W100-00-00_0805	232816.9	1PCT_100yr	7254.00	42.42	71.83	53.76	71.93	0.000542	2.55	2841.69	524.46	0.11
W100-00-00_0805	232816.9	0.2PCT_500yr	10948.00	42.42	75.58	57.11	75.64	0.000359	0.00	8497.21	1700.22	0.00
W100-00-00_0805	232805.9		Bridge									
W100-00-00_0805	232794.9	10PCT_10yr	3634.00	42.38	65.74	50.50	65.80	0.000439	1.97	1843.00	274.92	0.10
W100-00-00_0805	232794.9	2PCT_50yr	5919.00	42.38	69.88	52.65	69.96	0.000487	2.36	2508.99	462.97	0.11
W100-00-00_0805	232794.9	1PCT_100yr	7254.00	42.38	71.81	53.72	71.91	0.000541	2.55	2844.78	525.66	0.11
W100-00-00_0805	232794.9	0.2PCT_500yr	10948.00	42.38	75.53	57.07	75.59	0.000360	2.21	8481.17	1696.71	0.09
W100-00-00_0805	232790.8	10PCT_10yr	3634.00	42.38	65.73	50.46	65.80	0.000358	2.02	1795.13	267.72	0.10
W100-00-00_0805	232790.8	2PCT_50yr	5919.00	42.38	69.87	52.55	69.96	0.000425	2.42	2441.01	458.54	0.11
W100-00-00_0805	232790.8	1PCT_100yr	7254.00	42.38	71.80	53.59	71.90	0.000482	2.62	2767.20	520.73	0.12
W100-00-00_0805	232790.8	0.2PCT_500yr	10948.00	42.38	75.52	56.74	75.58	0.000344	2.29	8385.41	1694.21	0.10
W100-00-00_0805	232732.9		Bridge									
W100-00-00_0805	232681.7	10PCT_10yr	3634.00	43.64	65.60	51.23	65.66	0.000188	2.02	1795.63	145.47	0.10
W100-00-00_0805	232681.7	2PCT_50yr	5919.00	43.64	69.69	53.21	69.78	0.000295	2.42	2441.89	170.32	0.11
W100-00-00_0805	232681.7	1PCT_100yr	7254.00	43.64	71.55	54.16	71.65	0.000347	2.62	2768.54	181.31	0.12
W100-00-00_0805	232681.7	0.2PCT_500yr	10948.00	43.64	74.86	56.41	74.99	0.000443	2.98	6106.05	2129.05	0.13
W100-00-00_0805	232669.7		Bridge									
W100-00-00_0805	232657.7	10PCT_10yr	3634.00	44.33	65.57	51.92	65.64	0.000205	2.15	1693.25	141.12	0.11
W100-00-00_0805	232657.7	2PCT_50yr	5919.00	44.33	69.65	53.89	69.76	0.000325	2.55	2320.14	165.97	0.12
W100-00-00_0805	232657.7	1PCT_100yr	7254.00	44.33	71.49	54.86	71.61	0.000383	2.75	2634.52	176.92	0.13
W100-00-00_0805	232657.7	0.2PCT_500yr	10948.00	44.33	74.80	57.09	74.96	0.000530	1.85	4670.14	1618.70	0.08
W100-00-00_0805	232645.3		Bridge									
W100-00-00_0805	232632.3	10PCT_10yr	3634.00	44.30	65.56	51.89	65.63	0.000205	2.14	1696.58	141.42	0.11
W100-00-00_0805	232632.3	2PCT_50yr	5919.00	44.30	69.64	53.87	69.74	0.000325	2.55	2323.86	166.26	0.12
W100-00-00_0805	232632.3	1PCT_100yr	7254.00	44.30	71.46	54.83	71.58	0.000384	2.75	2637.37	177.38	0.13
W100-00-00_0805	232632.3	0.2PCT_500yr	10948.00	44.30	74.71	57.07	74.87	0.000540	3.27	4567.53	1583.33	0.14

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	231798.0	10PCT_10yr	3708.00	41.92	65.24		65.31	0.000942	2.16	1713.62	176.21	0.12
W100-00-00_0805	231798.0	2PCT_50yr	6003.00	41.92	69.21		69.30	0.000959	2.44	2461.69	208.46	0.12
W100-00-00_0805	231798.0	1PCT_100yr	7344.00	41.92	70.98		71.08	0.000999	2.59	2918.46	344.45	0.13
W100-00-00_0805	231798.0	0.2PCT_500yr	11067.00	41.92	74.14		74.26	0.000968	2.90	5510.05	1245.43	0.13
W100-00-00_0805	230908.0	10PCT_10yr	3878.00	42.68	64.70		64.74	0.000459	1.68	2824.80	351.92	0.09
W100-00-00_0805	230908.0	2PCT_50yr	6197.00	42.68	68.69		68.73	0.000449	1.81	5162.26	851.30	0.08
W100-00-00_0805	230908.0	1PCT_100yr	7549.00	42.68	70.52		70.55	0.000382	1.75	6910.05	1063.00	0.08
W100-00-00_0805	230908.0	0.2PCT_500yr	11338.00	42.68	73.73		73.76	0.000340	1.82	12193.13	2517.84	0.07
W100-00-00_0805	229882.5	10PCT_10yr	3878.00	41.58	64.40		64.45	0.000190	1.78	2530.40	419.09	0.09
W100-00-00_0805	229882.5	2PCT_50yr	6197.00	41.58	68.43		68.48	0.000153	1.84	5186.58	942.12	0.08
W100-00-00_0805	229882.5	1PCT_100yr	7549.00	41.58	70.31		70.34	0.000126	1.77	7706.61	1764.10	0.07
W100-00-00_0805	229882.5	0.2PCT_500yr	11338.00	41.58	73.56		73.59	0.000098	1.71	16237.00	3074.31	0.07
W100-00-00_0805	228917.1	10PCT_10yr	4040.00	41.61	64.25		64.28	0.000170	1.52	4130.35	591.89	0.08
W100-00-00_0805	228917.1	2PCT_50yr	6381.00	41.61	68.31		68.33	0.000143	1.58	6781.93	746.26	0.07
W100-00-00_0805	228917.1	1PCT_100yr	7745.00	41.61	70.19		70.22	0.000136	1.62	8381.30	980.54	0.07
W100-00-00_0805	228917.1	0.2PCT_500yr	11597.00	41.61	73.44		73.47	0.000155	1.89	15733.96	3751.87	0.07
W100-00-00_0805	228060.7	10PCT_10yr	4040.00	40.89	64.06		64.09	0.000282	1.54	4509.40	882.74	0.07
W100-00-00_0805	228060.7	2PCT_50yr	6381.00	40.89	68.18		68.20	0.000170	1.43	9222.33	1504.18	0.06
W100-00-00_0805	228060.7	1PCT_100yr	7745.00	40.89	70.09		70.10	0.000130	1.34	12696.68	2239.99	0.05
W100-00-00_0805	228060.7	0.2PCT_500yr	11597.00	40.89	73.34		73.36	0.000111	1.38	23151.60	4087.54	0.05
W100-00-00_0805	227524.1	10PCT_10yr	4040.00	40.54	63.95	48.62	63.98	0.000151	1.51	2689.82	257.13	0.07
W100-00-00_0805	227524.1	2PCT_50yr	6381.00	40.54	68.05	50.14	68.10	0.000190	1.86	3617.49	582.77	0.08
W100-00-00_0805	227524.1	1PCT_100yr	7745.00	40.54	69.97	50.85	70.02	0.000167	1.85	6827.46	1829.66	0.07
W100-00-00_0805	227524.1	0.2PCT_500yr	11597.00	40.54	73.24	52.35	73.28	0.000156	1.98	16151.08	4082.71	0.07
W100-00-00_0805	227144.7	10PCT_10yr	4139.00	40.30	63.90	48.47	63.93	0.000136	1.37	3244.27	380.92	0.06
W100-00-00_0805	227144.7	2PCT_50yr	6499.00	40.30	67.99	49.98	68.03	0.000135	1.60	5316.45	678.26	0.06
W100-00-00_0805	227144.7	1PCT_100yr	7870.00	40.30	69.92	50.66	69.96	0.000134	1.71	6620.45	1214.51	0.07
W100-00-00_0805	227144.7	0.2PCT_500yr	11750.00	40.30	73.18	52.15	73.23	0.000140	0.00	16766.78	4425.37	0.00
W100-00-00_0805	227088.2		Bridge									
W100-00-00_0805	227031.7	10PCT_10yr	4139.00	40.22	63.87	48.40	63.90	0.000134	1.36	3266.46	384.10	0.06
W100-00-00_0805	227031.7	2PCT_50yr	6499.00	40.22	67.97	49.89	68.01	0.000133	1.60	5354.53	680.11	0.06
W100-00-00_0805	227031.7	1PCT_100yr	7870.00	40.22	69.89	50.58	69.94	0.000133	1.70	6659.73	1255.20	0.07
W100-00-00_0805	227031.7	0.2PCT_500yr	11750.00	40.22	73.15	52.07	73.19	0.000138	1.91	16958.65	4447.48	0.07
W100-00-00_0805	225979.2	10PCT_10yr	4297.00	40.46	63.67		63.70	0.000284	1.64	3089.12	306.99	0.08
W100-00-00_0805	225979.2	2PCT_50yr	6735.00	40.46	67.77		67.81	0.000266	1.77	4413.03	337.01	0.08
W100-00-00_0805	225979.2	1PCT_100yr	8117.00	40.46	69.69		69.74	0.000280	1.91	5166.01	510.26	0.08
W100-00-00_0805	225979.2	0.2PCT_500yr	11964.00	40.46	72.97		73.00	0.000231	1.90	14208.07	4809.40	0.07
W100-00-00_0805	224981.6	10PCT_10yr	4484.00	40.72	63.20		63.25	0.000781	2.07	2919.72	391.93	0.10
W100-00-00_0805	224981.6	2PCT_50yr	7022.00	40.72	67.39		67.44	0.000554	2.06	5235.07	813.64	0.09
W100-00-00_0805	224981.6	1PCT_100yr	8422.00	40.72	69.34		69.39	0.000444	1.99	6963.70	1010.95	0.08
W100-00-00_0805	224981.6	0.2PCT_500yr	12239.00	40.72	72.70		72.73	0.000325	1.90	15162.38	4814.20	0.07
W100-00-00_0805	224198.0	10PCT_10yr	4484.00	39.20	62.73		62.78	0.000475	1.88	2738.68	346.58	0.09
W100-00-00_0805	224198.0	2PCT_50yr	7022.00	39.20	67.02		67.07	0.000386	1.96	4542.55	449.85	0.09
W100-00-00_0805	224198.0	1PCT_100yr	8422.00	39.20	69.02		69.07	0.000365	1.98	5463.51	478.64	0.08
W100-00-00_0805	224198.0	0.2PCT_500yr	12239.00	39.20	72.40		72.45	0.000376	2.14	9447.36	2453.78	0.08
W100-00-00_0805	223061.1	10PCT_10yr	4580.00	37.26	62.32	46.46	62.38	0.000267	1.95	2348.35	437.58	0.10
W100-00-00_0805	223061.1	2PCT_50yr	7185.00	37.26	66.62	49.26	66.70	0.000282	2.21	3349.26	756.20	0.10
W100-00-00_0805	223061.1	1PCT_100yr	8606.00	37.26	68.62	50.77	68.70	0.000286	2.32	3936.82	954.71	0.10
W100-00-00_0805	223061.1	0.2PCT_500yr	12425.00	37.26	72.17	53.02	72.20	0.000143	1.77	14495.97	3139.15	0.07
W100-00-00_0805	222172.8	10PCT_10yr	4580.00	38.92	61.94	48.20	62.00	0.000775	1.94	2577.99	603.83	0.10
W100-00-00_0805	222172.8	2PCT_50yr	7185.00	38.92	66.27	50.77	66.33	0.000628	1.97	3833.67	1169.55	0.09
W100-00-00_0805	222172.8	1PCT_100yr	8606.00	38.92	68.27	53.18	68.33	0.000603	1.99	4457.05	1449.10	0.09
W100-00-00_0805	222172.8	0.2PCT_500yr	12425.00	38.92	72.02	55.73	72.04	0.000218	1.31	16428.71	2349.52	0.05
W100-00-00_0805	221721.3	10PCT_10yr	4580.00	38.24	61.82		61.89	0.000111	2.19	2364.67	180.61	0.09
W100-00-00_0805	221721.3	2PCT_50yr	7185.00	38.24	66.10		66.21	0.000133	2.73	3247.80	231.80	0.10
W100-00-00_0805	221721.3	1PCT_100yr	8606.00	38.24	68.07		68.20	0.000143	2.98	3787.46	357.53	0.10
W100-00-00_0805	221721.3	0.2PCT_500yr	12425.00	38.24	71.80		71.94	0.000148	3.32	9669.90	2399.24	0.11
W100-00-00_0805	221523.4	10PCT_10yr	4616.00	37.95	61.80	44.28	61.86	0.000090	1.99	3081.78	249.52	0.08
W100-00-00_0805	221523.4	2PCT_50yr	7246.00	37.95	66.09	46.18	66.17	0.000104	2.43	4232.66	1277.97	0.09
W100-00-00_0805	221523.4	1PCT_100yr	8675.00	37.95	68.08	47.08	68.15	0.000094	2.43	8498.11	1919.13	0.08
W100-00-00_0805	221523.4	0.2PCT_500yr	12495.00	37.95	71.82	49.25	71.87	0.000078	2.42	17345.30	2883.78	0.08
W100-00-00_0805	221469.5		Bridge									
W100-00-00_0805	221415.6	10PCT_10yr	4616.00	37.86	61.70	44.19	61.75	0.000090	1.99	3078.37	249.40	0.08
W100-00-00_0805	221415.6	2PCT_50yr	7246.00	37.86	66.06	46.09	66.14	0.000103	2.42	4249.99	1298.10	0.09
W100-00-00_0805	221415.6	1PCT_100yr	8675.00	37.86	68.00	46.98	68.07	0.000093	2.43	8528.22	1923.10	0.08
W100-00-00_0805	221415.6	0.2PCT_500yr	12495.00	37.86	71.77	49.16	71.82	0.000077	2.41	17460.03	2894.82	0.08

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	220426.4	10PCT_10yr	4748.00	36.86	61.50		61.56	0.000717	1.95	2832.45	423.28	0.10
W100-00-00_0805	220426.4	2PCT_50yr	7471.00	36.86	65.87		65.92	0.000573	1.91	5036.94	581.15	0.09
W100-00-00_0805	220426.4	1PCT_100yr	8930.00	36.86	67.83		67.87	0.000486	1.89	6293.55	808.70	0.08
W100-00-00_0805	220426.4	0.2PCT_500yr	12752.00	36.86	71.65		71.68	0.000257	1.58	15685.36	3514.50	0.06
W100-00-00_0805	219577.1	10PCT_10yr	4748.00	35.81	60.64		60.72	0.001407	2.34	3007.99	315.07	0.12
W100-00-00_0805	219577.1	2PCT_50yr	7471.00	35.81	65.05		65.15	0.001568	2.64	5014.62	702.27	0.12
W100-00-00_0805	219577.1	1PCT_100yr	8930.00	35.81	67.09		67.19	0.001498	2.69	6489.96	753.86	0.12
W100-00-00_0805	219577.1	0.2PCT_500yr	12752.00	35.81	71.11		71.23	0.001524	2.92	10633.32	1920.97	0.12
W100-00-00_0805	218625.5	10PCT_10yr	4748.00	33.78	60.27		60.29	0.000208	1.25	6634.97	745.66	0.06
W100-00-00_0805	218625.5	2PCT_50yr	7471.00	33.78	64.71		64.73	0.000186	1.28	10167.14	838.73	0.05
W100-00-00_0805	218625.5	1PCT_100yr	8930.00	33.78	66.76		66.78	0.000184	1.30	11953.50	977.83	0.05
W100-00-00_0805	218625.5	0.2PCT_500yr	12752.00	33.78	70.78		70.80	0.000188	1.45	18176.87	3155.90	0.05
W100-00-00_0805	217899.8	10PCT_10yr	4835.00	35.59	59.83	44.30	59.91	0.002368	2.34	2062.18	177.00	0.12
W100-00-00_0805	217899.8	2PCT_50yr	7617.00	35.59	64.28	46.71	64.39	0.002277	2.63	2918.03	238.13	0.12
W100-00-00_0805	217899.8	1PCT_100yr	9096.00	35.59	66.33	47.83	66.44	0.002195	2.72	3591.62	519.00	0.12
W100-00-00_0805	217899.8	0.2PCT_500yr	12919.00	35.59	70.37	51.30	70.47	0.001873	2.72	6732.61	2152.92	0.11
W100-00-00_0805	216802.9	10PCT_10yr	4835.00	33.28	59.21	42.50	59.21	0.000281	0.94	7829.22	850.63	0.04
W100-00-00_0805	216802.9	2PCT_50yr	7617.00	33.28	63.82	44.87	63.83	0.000205	0.88	11884.65	896.43	0.04
W100-00-00_0805	216802.9	1PCT_100yr	9096.00	33.28	65.91	46.05	65.92	0.000188	0.87	13774.64	916.23	0.03
W100-00-00_0805	216802.9	0.2PCT_500yr	12919.00	33.28	69.90	50.20	69.91	0.000221	1.03	17809.36	2544.47	0.04
W100-00-00_0805	216032.5	10PCT_10yr	4835.00	33.72	58.81	42.94	58.83	0.000887	1.31	4186.12	412.69	0.07
W100-00-00_0805	216032.5	2PCT_50yr	7617.00	33.72	63.52	45.31	63.54	0.000696	1.34	6234.96	459.62	0.06
W100-00-00_0805	216032.5	1PCT_100yr	9096.00	33.72	65.63	46.49	65.65	0.000646	1.37	7226.51	481.84	0.06
W100-00-00_0805	216032.5	0.2PCT_500yr	12919.00	33.72	69.58	50.06	69.61	0.000639	1.58	9395.22	2098.99	0.06
W100-00-00_0805	215429.6	10PCT_10yr	4835.00	31.24	58.65		58.72	0.000085	2.31	4791.25	606.92	0.09
W100-00-00_0805	215429.6	2PCT_50yr	7617.00	31.24	63.37		63.44	0.000081	2.60	7729.09	638.47	0.09
W100-00-00_0805	215429.6	1PCT_100yr	9096.00	31.24	65.47		65.56	0.000080	2.74	9113.31	685.74	0.09
W100-00-00_0805	215429.6	0.2PCT_500yr	12919.00	31.24	69.41		69.51	0.000090	3.18	13205.68	2011.44	0.10
W100-00-00_0805	215022.5	10PCT_10yr	4922.00	33.23	58.66	40.71	58.69	0.000030	1.33	4058.95	756.73	0.06
W100-00-00_0805	215022.5	2PCT_50yr	7765.00	33.23	63.38	42.54	63.41	0.000030	1.58	5492.90	1062.39	0.06
W100-00-00_0805	215022.5	1PCT_100yr	9264.00	33.23	65.48	43.36	65.52	0.000031	1.69	6254.11	1218.98	0.06
W100-00-00_0805	215022.5	0.2PCT_500yr	13088.00	33.23	69.42	45.14	69.47	0.000035	2.00	7709.27	2566.86	0.07
W100-00-00_0805	214987.8		Bridge									
W100-00-00_0805	214953.1	10PCT_10yr	4922.00	34.51	58.64	41.77	58.68	0.000046	1.75	3331.90	687.43	0.07
W100-00-00_0805	214953.1	2PCT_50yr	7765.00	34.51	63.35	43.75	63.40	0.000044	1.98	4628.29	805.82	0.07
W100-00-00_0805	214953.1	1PCT_100yr	9264.00	34.51	65.46	44.67	65.52	0.000043	2.08	5323.29	844.61	0.07
W100-00-00_0805	214953.1	0.2PCT_500yr	13088.00	34.51	69.39	46.81	69.46	0.000048	2.39	6763.95	3178.52	0.08
W100-00-00_0805	214895.5	10PCT_10yr	4922.00	34.39	58.64	40.63	58.67	0.000033	1.45	3795.11	660.09	0.06
W100-00-00_0805	214895.5	2PCT_50yr	7765.00	34.39	63.35	42.30	63.40	0.000036	1.76	5156.45	768.80	0.06
W100-00-00_0805	214895.5	1PCT_100yr	9264.00	34.39	65.46	43.00	65.51	0.000037	1.90	5822.66	805.04	0.07
W100-00-00_0805	214895.5	0.2PCT_500yr	13088.00	34.39	69.39	44.62	69.46	0.000044	2.28	7312.57	2151.31	0.07
W100-00-00_0805	214806.4		Bridge									
W100-00-00_0805	214717.4	10PCT_10yr	4922.00	32.88	58.59	41.31	58.65	0.000062	1.99	2692.99	213.63	0.08
W100-00-00_0805	214717.4	2PCT_50yr	7765.00	32.88	63.30	43.44	63.37	0.000064	2.34	3775.73	253.67	0.09
W100-00-00_0805	214717.4	1PCT_100yr	9264.00	32.88	65.40	44.32	65.49	0.000064	2.50	4325.67	325.50	0.09
W100-00-00_0805	214717.4	0.2PCT_500yr	13088.00	32.88	69.32	46.30	69.43	0.000070	2.87	5531.47	1973.89	0.09
W100-00-00_0805	214669.3	10PCT_10yr	4942.00	32.30	58.58	40.87	58.65	0.000067	2.07	2533.71	185.99	0.08
W100-00-00_0805	214669.3	2PCT_50yr	7796.00	32.30	63.28	42.96	63.37	0.000071	2.49	3472.14	214.67	0.09
W100-00-00_0805	214669.3	1PCT_100yr	9299.00	32.30	65.38	43.91	65.48	0.000073	2.66	3943.45	464.31	0.09
W100-00-00_0805	214669.3	0.2PCT_500yr	13126.00	32.30	69.31	46.00	69.43	0.000074	2.96	9170.34	2449.01	0.10
W100-00-00_0805	214625.3		Bridge									
W100-00-00_0805	214581.3	10PCT_10yr	4942.00	34.85	58.53	41.56	58.63	0.000108	2.57	2201.65	183.48	0.10
W100-00-00_0805	214581.3	2PCT_50yr	7796.00	34.85	63.23	43.71	63.34	0.000107	2.95	3121.40	207.73	0.11
W100-00-00_0805	214581.3	1PCT_100yr	9299.00	34.85	65.33	44.73	65.45	0.000107	3.11	3574.77	491.26	0.11
W100-00-00_0805	214581.3	0.2PCT_500yr	13126.00	34.85	69.24	47.05	69.37	0.000104	3.36	9272.14	2836.56	0.11
W100-00-00_0805	213687.7	10PCT_10yr	5040.00	32.80	58.38		58.44	0.000401	2.24	3002.91	237.33	0.09
W100-00-00_0805	213687.7	2PCT_50yr	7946.00	32.80	63.07		63.15	0.000447	2.55	4138.24	246.55	0.10
W100-00-00_0805	213687.7	1PCT_100yr	9467.00	32.80	65.17		65.26	0.000459	2.70	4663.44	257.60	0.10
W100-00-00_0805	213687.7	0.2PCT_500yr	13311.00	32.80	69.08		69.19	0.000485	3.07	7758.20	2499.47	0.10
W100-00-00_0805	212742.1	10PCT_10yr	5040.00	32.47	58.22		58.28	0.000093	2.07	3933.34	294.33	0.08
W100-00-00_0805	212742.1	2PCT_50yr	7946.00	32.47	62.88		62.97	0.000109	2.57	5357.32	317.34	0.09
W100-00-00_0805	212742.1	1PCT_100yr	9467.00	32.47	64.97		65.07	0.000116	2.79	6034.34	334.08	0.09
W100-00-00_0805	212742.1	0.2PCT_500yr	13311.00	32.47	68.77		68.94	0.000160	3.57	10491.34	3034.75	0.11
W100-00-00_0805	211631.3	10PCT_10yr	5116.00	32.47	58.15		58.19	0.000080	1.94	7012.36	670.42	0.07
W100-00-00_0805	211631.3	2PCT_50yr	8063.00	32.47	62.82		62.86	0.000079	2.19	10226.19	723.45	0.08

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	211631.3	1PCT_100yr	9600.00	32.47	64.91		64.95	0.000079	2.31	11871.74	897.68	0.08
W100-00-00_0805	211631.3	0.2PCT_500yr	13465.00	32.47	68.72		68.78	0.000096	2.77	16724.08	2218.50	0.09
W100-00-00_0805	210975.8	10PCT_10yr	5116.00	30.49	58.00		58.10	0.000197	2.71	2740.29	188.23	0.11
W100-00-00_0805	210975.8	2PCT_50yr	8063.00	30.49	62.61		62.77	0.000246	3.40	3704.11	306.26	0.13
W100-00-00_0805	210975.8	1PCT_100yr	9600.00	30.49	64.67		64.86	0.000256	3.67	4556.21	563.04	0.13
W100-00-00_0805	210975.8	0.2PCT_500yr	13465.00	30.49	68.41		68.66	0.000297	4.35	8972.27	1890.41	0.14
W100-00-00_0805	209864.1	10PCT_10yr	5230.00	28.37	57.80		57.84	0.000261	1.90	4330.63	404.41	0.08
W100-00-00_0805	209864.1	2PCT_50yr	8237.00	28.37	62.43		62.47	0.000243	2.14	6316.69	494.42	0.08
W100-00-00_0805	209864.1	1PCT_100yr	9809.00	28.37	64.50		64.55	0.000236	2.23	7575.14	715.57	0.08
W100-00-00_0805	209864.1	0.2PCT_500yr	13744.00	28.37	68.28		68.33	0.000221	2.38	12678.06	1655.15	0.08
W100-00-00_0805	208924.8	10PCT_10yr	5230.00	31.48	57.42		57.49	0.000617	2.03	2613.02	226.17	0.10
W100-00-00_0805	208924.8	2PCT_50yr	8237.00	31.48	62.04		62.12	0.000663	2.28	3861.59	372.61	0.10
W100-00-00_0805	208924.8	1PCT_100yr	9809.00	31.48	64.14		64.22	0.000601	2.36	4949.82	686.23	0.10
W100-00-00_0805	208924.8	0.2PCT_500yr	13744.00	31.48	67.95		68.04	0.000515	2.48	9647.48	1847.45	0.09
W100-00-00_0805	207774.7	10PCT_10yr	5230.00	26.21	56.88		56.92	0.000405	1.88	4168.59	510.89	0.08
W100-00-00_0805	207774.7	2PCT_50yr	8237.00	26.21	61.54		61.57	0.000368	1.76	7100.56	663.89	0.07
W100-00-00_0805	207774.7	1PCT_100yr	9809.00	26.21	63.71		63.74	0.000312	1.72	8662.41	925.42	0.07
W100-00-00_0805	207774.7	0.2PCT_500yr	13744.00	26.21	67.60		67.63	0.000258	1.75	13496.93	1506.32	0.06
W100-00-00_0805	206741.3	10PCT_10yr	5230.00	31.91	56.51		56.56	0.000321	1.89	3219.67	308.36	0.08
W100-00-00_0805	206741.3	2PCT_50yr	8237.00	31.91	61.13		61.19	0.000395	2.14	4769.94	360.31	0.09
W100-00-00_0805	206741.3	1PCT_100yr	9809.00	31.91	63.32		63.38	0.000431	2.19	6003.54	732.30	0.08
W100-00-00_0805	206741.3	0.2PCT_500yr	13744.00	31.91	67.26		67.33	0.000390	2.34	10559.06	1431.45	0.08
W100-00-00_0805	205679.6	10PCT_10yr	5288.00	28.19	56.32		56.39	0.000100	2.24	4282.93	397.75	0.08
W100-00-00_0805	205679.6	2PCT_50yr	8324.00	28.19	60.91		60.99	0.000111	2.67	6329.10	549.96	0.09
W100-00-00_0805	205679.6	1PCT_100yr	9914.00	28.19	63.09		63.18	0.000113	2.83	7685.21	796.66	0.09
W100-00-00_0805	205679.6	0.2PCT_500yr	13883.00	28.19	67.01		67.12	0.000122	3.21	12619.50	1998.41	0.10
W100-00-00_0805	205102.2	10PCT_10yr	5288.00	28.33	56.27		56.33	0.000094	2.21	3940.36	305.52	0.08
W100-00-00_0805	205102.2	2PCT_50yr	8324.00	28.33	60.85		60.93	0.000108	2.67	5420.05	343.58	0.09
W100-00-00_0805	205102.2	1PCT_100yr	9914.00	28.33	63.02		63.11	0.000111	2.85	6356.38	611.85	0.09
W100-00-00_0805	205102.2	0.2PCT_500yr	13883.00	28.33	66.93		67.04	0.000123	3.26	10516.02	1486.41	0.10
W100-00-00_0805	204727.6	10PCT_10yr	5288.00	28.33	56.21	37.02	56.29	0.000109	2.37	3284.79	258.44	0.09
W100-00-00_0805	204727.6	2PCT_50yr	8324.00	28.33	60.77	39.37	60.88	0.000127	2.89	4690.88	350.86	0.10
W100-00-00_0805	204727.6	1PCT_100yr	9914.00	28.33	62.94	40.42	63.06	0.000130	3.08	5438.81	446.33	0.10
W100-00-00_0805	204727.6	0.2PCT_500yr	13883.00	28.33	66.89	42.64	67.00	0.000125	3.29	12907.27	2876.01	0.10
W100-00-00_0805	204673.8		Bridge									
W100-00-00_0805	204620.0	10PCT_10yr	5288.00	28.15	55.99	36.84	56.06	0.000110	2.38	3273.15	257.41	0.09
W100-00-00_0805	204620.0	2PCT_50yr	8324.00	28.15	60.68	39.18	60.78	0.000125	2.88	4719.57	352.23	0.10
W100-00-00_0805	204620.0	1PCT_100yr	9914.00	28.15	62.78	40.25	62.90	0.000130	3.08	5444.77	453.66	0.10
W100-00-00_0805	204620.0	0.2PCT_500yr	13883.00	28.15	66.74	42.46	66.85	0.000124	3.28	12993.30	2883.42	0.10
W100-00-00_0805	203658.9	10PCT_10yr	5497.00	28.97	55.80		55.83	0.000574	1.44	3826.76	305.84	0.07
W100-00-00_0805	203658.9	2PCT_50yr	8632.00	28.97	60.48		60.52	0.000620	1.61	5369.41	353.46	0.07
W100-00-00_0805	203658.9	1PCT_100yr	10276.00	28.97	62.58		62.62	0.000611	1.68	6136.33	378.16	0.07
W100-00-00_0805	203658.9	0.2PCT_500yr	14391.00	28.97	66.55		66.60	0.000516	1.78	10073.10	1668.43	0.07
W100-00-00_0805	202834.1	10PCT_10yr	5497.00	27.57	55.39		55.44	0.000392	1.79	3290.39	306.82	0.08
W100-00-00_0805	202834.1	2PCT_50yr	8632.00	27.57	60.08		60.14	0.000344	2.03	4818.96	346.76	0.08
W100-00-00_0805	202834.1	1PCT_100yr	10276.00	27.57	62.19		62.26	0.000332	2.14	5577.16	372.29	0.08
W100-00-00_0805	202834.1	0.2PCT_500yr	14391.00	27.57	66.18		66.26	0.000333	2.41	8552.29	1473.34	0.09
W100-00-00_0805	201783.6	10PCT_10yr	5620.00	27.98	54.88		54.94	0.000594	1.98	2857.08	280.16	0.10
W100-00-00_0805	201783.6	2PCT_50yr	8813.00	27.98	59.60		59.67	0.000609	2.14	4947.95	534.52	0.09
W100-00-00_0805	201783.6	1PCT_100yr	10489.00	27.98	61.75		61.82	0.000545	2.17	6183.54	610.62	0.09
W100-00-00_0805	201783.6	0.2PCT_500yr	14689.00	27.98	65.77		65.83	0.000506	2.24	10181.55	1690.41	0.09
W100-00-00_0805	201212.1	10PCT_10yr	5620.00	27.61	54.55	36.36	54.60	0.000592	1.74	3232.45	368.76	0.09
W100-00-00_0805	201212.1	2PCT_50yr	8813.00	27.61	59.30	38.43	59.35	0.000499	1.86	4749.33	459.76	0.09
W100-00-00_0805	201212.1	1PCT_100yr	10489.00	27.61	61.47	39.37	61.52	0.000469	1.92	5506.82	568.00	0.09
W100-00-00_0805	201212.1	0.2PCT_500yr	14689.00	27.61	65.54	41.70	65.59	0.000350	1.86	10047.69	1413.79	0.08
W100-00-00_0805	200299.3	10PCT_10yr	5620.00	27.02	54.11		54.18	0.000356	2.19	2645.52	214.22	0.09
W100-00-00_0805	200299.3	2PCT_50yr	8813.00	27.02	58.84		58.94	0.000398	2.61	3842.16	354.98	0.10
W100-00-00_0805	200299.3	1PCT_100yr	10489.00	27.02	61.00		61.12	0.000426	2.75	4790.72	493.86	0.10
W100-00-00_0805	200299.3	0.2PCT_500yr	14689.00	27.02	65.14		65.25	0.000413	2.90	8102.36	1059.75	0.10
W100-00-00_0805	200076.4	10PCT_10yr	5833.00	27.02	54.04	36.45	54.11	0.000305	2.10	2773.53	199.64	0.10
W100-00-00_0805	200076.4	2PCT_50yr	9127.00	27.02	58.77	38.57	58.86	0.000324	2.42	3774.21	224.57	0.10
W100-00-00_0805	200076.4	1PCT_100yr	10859.00	27.02	60.93	39.56	61.03	0.000312	2.55	4259.63	235.97	0.10
W100-00-00_0805	200076.4	0.2PCT_500yr	15206.00	27.02	65.04	41.77	65.16	0.000382	2.80	6683.43	951.50	0.11
W100-00-00_0805	200020.5		Bridge									
W100-00-00_0805	199964.6	10PCT_10yr	5833.00	26.77	53.71	36.20	53.78	0.000309	2.11	2758.31	199.23	0.10
W100-00-00_0805	199964.6	2PCT_50yr	9127.00	26.77	58.43	38.32	58.52	0.000329	2.43	3755.43	224.12	0.10

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	199964.6	1PCT_100yr	10859.00	26.77	60.59	39.30	60.69	0.000317	2.56	4238.38	235.48	0.10
W100-00-00_0805	199964.6	0.2PCT_500yr	15206.00	26.77	64.93	41.52	65.05	0.000372	2.77	6822.53	986.21	0.11
W100-00-00_0805	199440.6	10PCT_10yr	5977.00	27.48	53.53		53.58	0.000424	1.98	4109.91	450.19	0.09
W100-00-00_0805	199440.6	2PCT_50yr	9341.00	27.48	58.27		58.32	0.000371	2.12	6301.69	510.02	0.09
W100-00-00_0805	199440.6	1PCT_100yr	11113.00	27.48	60.43		60.49	0.000351	2.17	7826.67	843.51	0.08
W100-00-00_0805	199440.6	0.2PCT_500yr	15587.00	27.48	64.77		64.84	0.000334	2.37	12121.32	1313.06	0.08
W100-00-00_0805	198496.4	10PCT_10yr	5977.00	27.21	53.06		53.13	0.000523	2.13	2806.93	213.30	0.10
W100-00-00_0805	198496.4	2PCT_50yr	9341.00	27.21	57.76		57.85	0.000662	2.41	3881.69	242.22	0.11
W100-00-00_0805	198496.4	1PCT_100yr	11113.00	27.21	59.94		60.03	0.000661	2.52	4454.14	314.41	0.10
W100-00-00_0805	198496.4	0.2PCT_500yr	15587.00	27.21	64.32		64.43	0.000571	2.71	7639.91	1198.68	0.10
W100-00-00_0805	197506.8	10PCT_10yr	5977.00	26.73	52.63		52.72	0.000341	2.58	3445.89	371.45	0.10
W100-00-00_0805	197506.8	2PCT_50yr	9341.00	26.73	57.30		57.41	0.000330	2.94	5361.82	476.11	0.11
W100-00-00_0805	197506.8	1PCT_100yr	11113.00	26.73	59.48		59.60	0.000318	3.06	6476.02	542.38	0.11
W100-00-00_0805	197506.8	0.2PCT_500yr	15587.00	26.73	63.91		64.03	0.000303	3.32	9899.48	1225.74	0.11
W100-00-00_0805	196463.1	10PCT_10yr	5977.00	26.19	52.09		52.21	0.000803	2.78	2208.17	243.34	0.13
W100-00-00_0805	196463.1	2PCT_50yr	9341.00	26.19	56.80		56.94	0.000678	3.10	3765.12	396.43	0.13
W100-00-00_0805	196463.1	1PCT_100yr	11113.00	26.19	59.02		59.16	0.000618	3.19	4686.90	432.15	0.12
W100-00-00_0805	196463.1	0.2PCT_500yr	15587.00	26.19	63.50		63.64	0.000522	3.34	8201.77	1177.83	0.12
W100-00-00_0805	196182.3	10PCT_10yr	6059.00	25.30	51.88	36.33	52.04	0.000422	3.38	2565.53	392.67	0.14
W100-00-00_0805	196182.3	2PCT_50yr	9465.00	25.30	56.56	38.98	56.78	0.000446	4.02	3692.32	464.58	0.15
W100-00-00_0805	196182.3	1PCT_100yr	11262.00	25.30	58.75	40.07	59.00	0.000451	4.29	4262.64	671.79	0.15
W100-00-00_0805	196182.3	0.2PCT_500yr	15820.00	25.30	63.34	42.36	63.53	0.000340	4.15	10698.23	1397.20	0.13
W100-00-00_0805	196149.0		Bridge									
W100-00-00_0805	196115.7	10PCT_10yr	6059.00	25.16	51.75	36.19	51.92	0.000420	3.37	2569.68	392.95	0.14
W100-00-00_0805	196115.7	2PCT_50yr	9465.00	25.16	56.43	38.83	56.65	0.000445	4.02	3695.97	465.14	0.15
W100-00-00_0805	196115.7	1PCT_100yr	11262.00	25.16	58.62	39.94	58.86	0.000450	4.29	4263.98	672.07	0.15
W100-00-00_0805	196115.7	0.2PCT_500yr	15820.00	25.16	63.29	42.22	63.51	0.000377	4.38	10811.75	1422.75	0.14
W100-00-00_0805	195567.4	10PCT_10yr	6140.00	23.51	51.67		51.69	0.000204	1.29	7625.47	657.21	0.05
W100-00-00_0805	195567.4	2PCT_50yr	9586.00	23.51	56.38		56.40	0.000188	1.43	10888.75	715.90	0.05
W100-00-00_0805	195567.4	1PCT_100yr	11407.00	23.51	58.58		58.60	0.000182	1.50	12525.40	799.41	0.05
W100-00-00_0805	195567.4	0.2PCT_500yr	16047.00	23.51	63.26		63.28	0.000173	1.64	17478.37	1288.52	0.05
W100-00-00_0805	194614.1	10PCT_10yr	6140.00	26.15	51.42		51.47	0.000300	2.16	5326.91	475.15	0.09
W100-00-00_0805	194614.1	2PCT_50yr	9586.00	26.15	56.13		56.20	0.000294	2.47	7690.71	541.12	0.09
W100-00-00_0805	194614.1	1PCT_100yr	11407.00	26.15	58.34		58.41	0.000292	2.61	8937.70	590.73	0.09
W100-00-00_0805	194614.1	0.2PCT_500yr	16047.00	26.15	62.98		63.08	0.000331	3.10	12499.34	1344.84	0.10
W100-00-00_0805	193675.6	10PCT_10yr	6140.00	23.35	51.43		51.43	0.000009	0.57	14430.23	933.64	0.02
W100-00-00_0805	193675.6	2PCT_50yr	9586.00	23.35	56.15		56.16	0.000009	0.65	18921.12	972.07	0.02
W100-00-00_0805	193675.6	1PCT_100yr	11407.00	23.35	58.36		58.36	0.000010	0.69	21087.38	992.19	0.02
W100-00-00_0805	193675.6	0.2PCT_500yr	16047.00	23.35	63.02		63.03	0.000010	0.79	26291.44	1404.96	0.02
W100-00-00_0805	192820.3	10PCT_10yr	6303.00	24.17	51.34		51.41	0.000582	2.12	3337.11	278.83	0.09
W100-00-00_0805	192820.3	2PCT_50yr	9830.00	24.17	56.04		56.13	0.000548	2.43	5018.42	475.97	0.09
W100-00-00_0805	192820.3	1PCT_100yr	11699.00	24.17	58.25		58.33	0.000516	2.52	6163.64	575.94	0.09
W100-00-00_0805	192820.3	0.2PCT_500yr	16503.00	24.17	62.91		62.99	0.000466	2.70	10482.34	1565.49	0.09
W100-00-00_0805	191722.7	10PCT_10yr	6303.00	20.85	50.53		50.60	0.000990	2.01	3275.66	418.56	0.10
W100-00-00_0805	191722.7	2PCT_50yr	9830.00	20.85	55.39		55.45	0.000739	2.12	5507.73	521.68	0.09
W100-00-00_0805	191722.7	1PCT_100yr	11699.00	20.85	57.66		57.72	0.000647	2.16	6790.11	636.42	0.09
W100-00-00_0805	191722.7	0.2PCT_500yr	16503.00	20.85	62.43		62.49	0.000515	2.22	10984.81	1238.24	0.08
W100-00-00_0805	190794.0	10PCT_10yr	6303.00	20.58	49.93		50.01	0.000439	2.59	3704.49	339.59	0.11
W100-00-00_0805	190794.0	2PCT_50yr	9830.00	20.58	54.87		54.96	0.000400	2.89	5513.07	391.91	0.10
W100-00-00_0805	190794.0	1PCT_100yr	11699.00	20.58	57.16		57.27	0.000392	3.04	6481.09	462.96	0.10
W100-00-00_0805	190794.0	0.2PCT_500yr	16503.00	20.58	61.98		62.09	0.000371	3.31	9705.14	1042.33	0.10
W100-00-00_0805	189869.8	10PCT_10yr	6303.00	17.50	49.65		49.74	0.000226	2.60	3999.21	431.07	0.10
W100-00-00_0805	189869.8	2PCT_50yr	9830.00	17.50	54.62		54.72	0.000212	2.90	6486.14	563.38	0.10
W100-00-00_0805	189869.8	1PCT_100yr	11699.00	17.50	56.93		57.03	0.000203	3.00	7834.38	603.85	0.10
W100-00-00_0805	189869.8	0.2PCT_500yr	16503.00	17.50	61.76		61.87	0.000196	3.27	11362.79	1179.75	0.10
W100-00-00_0805	188903.7	10PCT_10yr	6388.00	21.71	49.45		49.50	0.000272	2.02	5099.66	570.87	0.08
W100-00-00_0805	188903.7	2PCT_50yr	9958.00	21.71	54.45		54.50	0.000223	2.13	8105.61	638.59	0.08
W100-00-00_0805	188903.7	1PCT_100yr	11852.00	21.71	56.78		56.83	0.000209	2.19	9680.16	718.53	0.08
W100-00-00_0805	188903.7	0.2PCT_500yr	16742.00	21.71	61.61		61.67	0.000205	2.43	14479.42	2122.68	0.08
W100-00-00_0805	187878.1	10PCT_10yr	6388.00	23.78	48.98		49.08	0.000689	2.74	2847.18	202.13	0.11
W100-00-00_0805	187878.1	2PCT_50yr	9958.00	23.78	54.00		54.13	0.000677	3.20	3951.24	252.88	0.12
W100-00-00_0805	187878.1	1PCT_100yr	11852.00	23.78	56.33		56.47	0.000668	3.38	4581.73	288.74	0.12
W100-00-00_0805	187878.1	0.2PCT_500yr	16742.00	23.78	61.15		61.32	0.000663	3.79	7630.94	1961.61	0.12
W100-00-00_0805	186536.1	10PCT_10yr	6388.00	20.17	48.14		48.23	0.000625	2.47	3475.96	484.63	0.12
W100-00-00_0805	186536.1	2PCT_50yr	9958.00	20.17	53.38		53.46	0.000411	2.49	6506.12	610.33	0.10
W100-00-00_0805	186536.1	1PCT_100yr	11852.00	20.17	55.79		55.86	0.000349	2.49	8016.61	651.03	0.10
W100-00-00_0805	186536.1	0.2PCT_500yr	16742.00	20.17	60.72		60.79	0.000276	2.55	13105.74	1653.60	0.09

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	185293.8	10PCT_10yr	6388.00	20.84	47.83		47.86	0.000186	1.72	5809.99	423.48	0.07
W100-00-00_0805	185293.8	2PCT_50yr	9958.00	20.84	53.12		53.16	0.000176	1.95	8165.20	465.97	0.07
W100-00-00_0805	185293.8	1PCT_100yr	11852.00	20.84	55.55		55.59	0.000174	2.06	9324.05	490.41	0.07
W100-00-00_0805	185293.8	0.2PCT_500yr	16742.00	20.84	60.49		60.54	0.000182	2.35	13692.46	1555.14	0.07
W100-00-00_0805	184862.8	10PCT_10yr	6500.00	21.37	47.64	31.26	47.74	0.000249	2.88	3102.88	231.37	0.11
W100-00-00_0805	184862.8	2PCT_50yr	10159.00	21.37	52.91	33.70	53.05	0.000248	3.33	4400.68	260.63	0.11
W100-00-00_0805	184862.8	1PCT_100yr	12103.00	21.37	55.33	34.79	55.47	0.000247	3.52	5044.50	492.90	0.11
W100-00-00_0805	184862.8	0.2PCT_500yr	17041.00	21.37	60.29	37.68	60.43	0.000228	3.75	10899.76	1840.88	0.11
W100-00-00_0805	184807.6		Bridge									
W100-00-00_0805	184752.4	10PCT_10yr	6500.00	21.24	47.50	31.13	47.61	0.000249	2.89	3101.13	231.33	0.11
W100-00-00_0805	184752.4	2PCT_50yr	10159.00	21.24	52.77	33.57	52.90	0.000248	3.33	4397.43	260.56	0.11
W100-00-00_0805	184752.4	1PCT_100yr	12103.00	21.24	55.27	34.65	55.41	0.000245	3.51	5063.22	500.67	0.11
W100-00-00_0805	184752.4	0.2PCT_500yr	17041.00	21.24	59.95	37.55	60.09	0.000237	3.81	10515.95	1772.38	0.11
W100-00-00_0805	184295.8	10PCT_10yr	6500.00	18.27	47.34		47.43	0.000631	2.60	3239.94	261.98	0.11
W100-00-00_0805	184295.8	2PCT_50yr	10159.00	18.27	52.61		52.71	0.000699	2.79	4727.08	308.66	0.10
W100-00-00_0805	184295.8	1PCT_100yr	12103.00	18.27	55.11		55.21	0.000711	2.84	5568.37	479.72	0.10
W100-00-00_0805	184295.8	0.2PCT_500yr	17041.00	18.27	59.79		59.90	0.000725	3.14	9026.74	1587.28	0.10
W100-00-00_0805	183335.1	10PCT_10yr	6500.00	20.58	46.82	30.65	46.98	0.000358	3.44	2497.64	170.44	0.13
W100-00-00_0805	183335.1	2PCT_50yr	10159.00	20.58	51.99	33.48	52.22	0.000394	4.17	3453.75	418.86	0.14
W100-00-00_0805	183335.1	1PCT_100yr	12103.00	20.58	54.45	34.69	54.71	0.000404	4.47	4060.66	555.25	0.15
W100-00-00_0805	183335.1	0.2PCT_500yr	17041.00	20.58	59.21	36.96	59.44	0.000356	4.64	9620.50	1363.38	0.14
W100-00-00_0805	182381.6	10PCT_10yr	6625.00	18.93	46.46		46.53	0.000616	2.12	3502.01	286.42	0.10
W100-00-00_0805	182381.6	2PCT_50yr	10382.00	18.93	51.65		51.72	0.000638	2.30	5084.87	330.20	0.09
W100-00-00_0805	182381.6	1PCT_100yr	12379.00	18.93	54.14		54.22	0.000580	2.38	5951.37	364.90	0.09
W100-00-00_0805	182381.6	0.2PCT_500yr	17390.00	18.93	58.91		59.00	0.000537	2.62	9626.70	1589.55	0.09
W100-00-00_0805	181623.0	10PCT_10yr	6625.00	18.35	46.27		46.29	0.000181	1.57	8479.67	900.24	0.07
W100-00-00_0805	181623.0	2PCT_50yr	10382.00	18.35	51.49		51.52	0.000139	1.63	13379.79	974.42	0.06
W100-00-00_0805	181623.0	1PCT_100yr	12379.00	18.35	54.01		54.03	0.000126	1.67	15878.67	1013.55	0.06
W100-00-00_0805	181623.0	0.2PCT_500yr	17390.00	18.35	58.78		58.81	0.000134	1.93	21073.74	1283.27	0.06
W100-00-00_0805	180731.2	10PCT_10yr	6625.00	19.12	45.98		46.04	0.000641	1.91	3521.53	297.26	0.09
W100-00-00_0805	180731.2	2PCT_50yr	10382.00	19.12	51.24		51.31	0.000639	2.12	5212.19	343.18	0.09
W100-00-00_0805	180731.2	1PCT_100yr	12379.00	19.12	53.77		53.84	0.000612	2.19	6122.36	386.96	0.09
W100-00-00_0805	180731.2	0.2PCT_500yr	17390.00	19.12	58.52		58.61	0.000578	2.45	9196.30	1305.54	0.09
W100-00-00_0805	179838.1	10PCT_10yr	6625.00	17.65	45.27		45.33	0.000991	2.05	3224.06	239.87	0.10
W100-00-00_0805	179838.1	2PCT_50yr	10382.00	17.65	50.48		50.56	0.001162	2.26	4585.11	286.34	0.10
W100-00-00_0805	179838.1	1PCT_100yr	12379.00	17.65	53.02		53.10	0.001201	2.31	5356.57	331.01	0.10
W100-00-00_0805	179838.1	0.2PCT_500yr	17390.00	17.65	57.84		57.93	0.001075	2.42	8119.59	916.61	0.09
W100-00-00_0805	179305.6	10PCT_10yr	6625.00	17.48	44.85		45.01	0.000379	3.48	2622.48	221.73	0.13
W100-00-00_0805	179305.6	2PCT_50yr	10382.00	17.48	50.00		50.21	0.000385	4.06	3916.88	281.21	0.14
W100-00-00_0805	179305.6	1PCT_100yr	12379.00	17.48	52.54		52.76	0.000370	4.23	4669.55	313.49	0.14
W100-00-00_0805	179305.6	0.2PCT_500yr	17390.00	17.48	57.34		57.60	0.000379	4.75	6605.86	644.88	0.14
W100-00-00_0805	178955.5	10PCT_10yr	6660.00	17.37	44.73	29.33	44.87	0.000353	3.36	3116.49	302.55	0.13
W100-00-00_0805	178955.5	2PCT_50yr	10445.00	17.37	49.90	31.86	50.06	0.000329	3.75	4821.73	460.00	0.13
W100-00-00_0805	178955.5	1PCT_100yr	12457.00	17.37	52.45	33.01	52.62	0.000311	3.89	5726.99	879.13	0.13
W100-00-00_0805	178955.5	0.2PCT_500yr	17489.00	17.37	57.25	35.80	57.45	0.000314	4.33	7494.48	1606.31	0.13
W100-00-00_0805	178899.3		Bridge									
W100-00-00_0805	178843.1	10PCT_10yr	6660.00	17.13	44.43	29.08	44.57	0.000358	3.37	3098.51	301.15	0.13
W100-00-00_0805	178843.1	2PCT_50yr	10445.00	17.13	49.60	31.62	49.77	0.000332	3.77	4801.88	440.61	0.13
W100-00-00_0805	178843.1	1PCT_100yr	12457.00	17.13	52.15	32.77	52.32	0.000314	3.90	5707.47	868.30	0.13
W100-00-00_0805	178843.1	0.2PCT_500yr	17489.00	17.13	57.07	35.57	57.26	0.000312	4.32	7514.63	1614.96	0.13
W100-00-00_0805	177732.9	10PCT_10yr	6893.00	16.54	44.04		44.10	0.000415	2.09	3685.63	273.71	0.09
W100-00-00_0805	177732.9	2PCT_50yr	10855.00	16.54	49.22		49.30	0.000446	2.35	5213.91	330.91	0.09
W100-00-00_0805	177732.9	1PCT_100yr	12967.00	16.54	51.78		51.87	0.000443	2.43	6134.95	376.29	0.09
W100-00-00_0805	177732.9	0.2PCT_500yr	18192.00	16.54	56.71		56.80	0.000437	2.61	8627.85	703.42	0.09
W100-00-00_0805	176644.1	10PCT_10yr	6893.00	17.41	43.75	27.24	43.81	0.000211	2.23	5355.35	570.90	0.10
W100-00-00_0805	176644.1	2PCT_50yr	10855.00	17.41	48.96	29.55	49.01	0.000184	2.32	8643.40	752.74	0.09
W100-00-00_0805	176644.1	1PCT_100yr	12967.00	17.41	51.54	30.63	51.60	0.000167	2.34	10402.88	828.94	0.08
W100-00-00_0805	176644.1	0.2PCT_500yr	18192.00	17.41	56.50	34.58	56.55	0.000146	2.39	16122.67	1296.58	0.08
W100-00-00_0805	175675.6	10PCT_10yr	6958.00	16.27	43.48	24.71	43.54	0.000370	1.94	3592.48	242.86	0.09
W100-00-00_0805	175675.6	2PCT_50yr	10990.00	16.27	48.69	27.37	48.76	0.000394	2.16	5007.57	301.07	0.09
W100-00-00_0805	175675.6	1PCT_100yr	13131.00	16.27	51.28	28.53	51.36	0.000382	2.21	5816.81	322.97	0.09
W100-00-00_0805	175675.6	0.2PCT_500yr	18441.00	16.27	56.24	30.98	56.33	0.000390	2.38	8075.57	1155.22	0.09
W100-00-00_0805	173819.4	10PCT_10yr	6958.00	14.97	42.79		42.81	0.000410	1.32	6570.40	604.20	0.07
W100-00-00_0805	173819.4	2PCT_50yr	10990.00	14.97	48.06		48.08	0.000331	1.36	10136.81	793.73	0.06
W100-00-00_0805	173819.4	1PCT_100yr	13131.00	14.97	50.73		50.75	0.000273	1.36	12374.88	882.90	0.06
W100-00-00_0805	173819.4	0.2PCT_500yr	18441.00	14.97	55.75		55.77	0.000227	1.46	18301.99	1431.60	0.05

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	172846.5	10PCT_10yr	6958.00	11.61	42.44		42.47	0.000461	1.68	6049.18	642.21	0.07
W100-00-00_0805	172846.5	2PCT_50yr	10990.00	11.61	47.81		47.84	0.000309	1.66	9569.08	665.54	0.06
W100-00-00_0805	172846.5	1PCT_100yr	13131.00	11.61	50.52		50.55	0.000262	1.66	11393.13	683.82	0.06
W100-00-00_0805	172846.5	0.2PCT_500yr	18441.00	11.61	55.57		55.60	0.000230	1.76	14983.35	731.55	0.06
W100-00-00_0805	171967.4	10PCT_10yr	6958.00	14.04	42.23		42.25	0.000198	1.65	7652.04	678.86	0.07
W100-00-00_0805	171967.4	2PCT_50yr	10990.00	14.04	47.66		47.69	0.000164	1.70	11419.60	709.56	0.06
W100-00-00_0805	171967.4	1PCT_100yr	13131.00	14.04	50.39		50.42	0.000151	1.70	13382.83	728.01	0.06
W100-00-00_0805	171967.4	0.2PCT_500yr	18441.00	14.04	55.45		55.48	0.000144	1.82	17178.74	826.91	0.06
W100-00-00_0805	171168.9	10PCT_10yr	6958.00	6.86	42.12		42.15	0.000127	1.57	7080.42	502.88	0.06
W100-00-00_0805	171168.9	2PCT_50yr	10990.00	6.86	47.55		47.59	0.000137	1.83	9909.72	552.01	0.06
W100-00-00_0805	171168.9	1PCT_100yr	13131.00	6.86	50.28		50.32	0.000140	1.93	11538.46	658.23	0.06
W100-00-00_0805	171168.9	0.2PCT_500yr	18441.00	6.86	55.34		55.39	0.000142	2.17	15391.37	903.38	0.07
W100-00-00_0805	170256.0	10PCT_10yr	6958.00	13.83	41.90		41.98	0.000315	2.30	3563.59	251.40	0.09
W100-00-00_0805	170256.0	2PCT_50yr	10990.00	13.83	47.31		47.41	0.000322	2.69	5156.45	381.03	0.10
W100-00-00_0805	170256.0	1PCT_100yr	13131.00	13.83	50.04		50.15	0.000300	2.79	6303.54	450.15	0.10
W100-00-00_0805	170256.0	0.2PCT_500yr	18441.00	13.83	55.09		55.22	0.000292	3.11	8827.81	581.39	0.10
W100-00-00_0805	169087.1	10PCT_10yr	6979.00	11.36	41.68		41.70	0.000182	1.35	8590.33	675.62	0.05
W100-00-00_0805	169087.1	2PCT_50yr	11034.00	11.36	47.11		47.14	0.000164	1.49	12549.49	806.74	0.05
W100-00-00_0805	169087.1	1PCT_100yr	13185.00	11.36	49.87		49.89	0.000151	1.53	14879.00	869.59	0.05
W100-00-00_0805	169087.1	0.2PCT_500yr	18522.00	11.36	54.94		54.97	0.000147	1.70	19496.98	1044.95	0.05
W100-00-00_0805	168169.9	10PCT_10yr	6979.00	14.35	41.44		41.49	0.000355	1.91	4594.74	352.59	0.08
W100-00-00_0805	168169.9	2PCT_50yr	11034.00	14.35	46.89		46.95	0.000333	2.04	6671.00	425.57	0.08
W100-00-00_0805	168169.9	1PCT_100yr	13185.00	14.35	49.67		49.72	0.000298	2.08	7899.70	457.14	0.07
W100-00-00_0805	168169.9	0.2PCT_500yr	18522.00	14.35	54.75		54.80	0.000269	2.23	11452.83	887.32	0.07
W100-00-00_0805	167249.9	10PCT_10yr	6989.00	11.50	41.02	21.90	41.10	0.000533	2.20	3170.26	204.17	0.10
W100-00-00_0805	167249.9	2PCT_50yr	11054.00	11.50	46.46	24.54	46.56	0.000566	2.55	4334.48	225.97	0.10
W100-00-00_0805	167249.9	1PCT_100yr	13209.00	11.50	49.26	25.79	49.37	0.000534	2.63	5571.87	635.84	0.10
W100-00-00_0805	167249.9	0.2PCT_500yr	18558.00	11.50	54.38	29.36	54.49	0.000480	2.74	9381.36	1042.91	0.10
W100-00-00_0805	166879.7	10PCT_10yr	6989.00	10.84	40.81		40.93	0.000364	3.41	4499.90	511.86	0.12
W100-00-00_0805	166879.7	2PCT_50yr	11054.00	10.84	46.31		46.41	0.000284	3.44	7432.49	550.51	0.11
W100-00-00_0805	166879.7	1PCT_100yr	13209.00	10.84	49.14		49.23	0.000247	3.41	9077.06	648.44	0.10
W100-00-00_0805	166879.7	0.2PCT_500yr	18558.00	10.84	54.28		54.37	0.000222	3.55	13032.45	928.24	0.10
W100-00-00_0805	166613.0	10PCT_10yr	7041.00	10.36	40.71	23.40	40.83	0.000334	0.00	4129.32	306.25	0.00
W100-00-00_0805	166613.0	2PCT_50yr	11152.00	10.36	46.14	26.72	46.30	0.000368	0.00	6134.71	503.74	0.00
W100-00-00_0805	166613.0	1PCT_100yr	13331.00	10.36	48.94	28.17	49.12	0.000381	0.00	8010.10	873.90	0.00
W100-00-00_0805	166613.0	0.2PCT_500yr	18740.00	10.36	54.13	31.41	54.27	0.000310	4.42	13534.63	1239.50	0.12
W100-00-00_0805	166585.6		Bridge									
W100-00-00_0805	166558.2	10PCT_10yr	7041.00	10.11	40.61	23.15	40.73	0.000325	3.43	4176.08	307.70	0.12
W100-00-00_0805	166558.2	2PCT_50yr	11152.00	10.11	46.01	26.47	46.17	0.000362	4.11	6193.34	514.52	0.13
W100-00-00_0805	166558.2	1PCT_100yr	13331.00	10.11	48.79	27.93	48.97	0.000375	4.42	8096.35	892.50	0.13
W100-00-00_0805	166558.2	0.2PCT_500yr	18740.00	10.11	53.98	31.40	54.12	0.000305	4.39	13663.03	1245.90	0.12
W100-00-00_0805	166297.3	10PCT_10yr	7261.00	8.40	40.56		40.62	0.000266	2.15	4271.56	264.92	0.08
W100-00-00_0805	166297.3	2PCT_50yr	11557.00	8.40	45.96		46.05	0.000303	2.63	5862.42	326.95	0.09
W100-00-00_0805	166297.3	1PCT_100yr	13835.00	8.40	48.74		48.84	0.000303	2.79	6816.66	359.10	0.09
W100-00-00_0805	166297.3	0.2PCT_500yr	19489.00	8.40	53.91		54.03	0.000326	3.20	9560.78	974.85	0.09
W100-00-00_0805	165903.2	10PCT_10yr	7261.00	10.27	40.44		40.51	0.000316	2.21	4571.53	355.49	0.08
W100-00-00_0805	165903.2	2PCT_50yr	11557.00	10.27	45.84		45.92	0.000326	2.60	6745.26	513.78	0.09
W100-00-00_0805	165903.2	1PCT_100yr	13835.00	10.27	48.63		48.72	0.000308	2.70	8280.85	597.91	0.09
W100-00-00_0805	165903.2	0.2PCT_500yr	19489.00	10.27	53.81		53.90	0.000290	2.91	13277.88	1363.71	0.09
W100-00-00_0805	165476.1	10PCT_10yr	7961.00	12.30	40.19	21.55	40.35	0.000296	3.39	3163.62	212.00	0.12
W100-00-00_0805	165476.1	2PCT_50yr	12845.00	12.30	45.50	24.13	45.73	0.000358	4.24	4388.07	249.17	0.13
W100-00-00_0805	165476.1	1PCT_100yr	15440.00	12.30	48.27	25.43	48.52	0.000360	4.50	5105.05	294.16	0.14
W100-00-00_0805	165476.1	0.2PCT_500yr	21875.00	12.30	53.40	28.56	53.69	0.000379	5.08	7959.86	1030.55	0.14
W100-00-00_0805	165428.1		Bridge									
W100-00-00_0805	165380.1	10PCT_10yr	7961.00	11.69	39.54	20.94	39.70	0.000298	3.40	3155.37	211.73	0.12
W100-00-00_0805	165380.1	2PCT_50yr	12845.00	11.69	44.84	23.52	45.08	0.000361	4.25	4375.89	248.83	0.14
W100-00-00_0805	165380.1	1PCT_100yr	15440.00	11.69	47.60	24.82	47.86	0.000362	4.51	5089.55	291.81	0.14
W100-00-00_0805	165380.1	0.2PCT_500yr	21875.00	11.69	53.21	27.95	53.48	0.000358	4.97	8411.69	1149.16	0.14
W100-00-00_0805	164555.2	10PCT_10yr	8093.00	8.31	39.27		39.39	0.000423	2.88	3197.78	208.19	0.12
W100-00-00_0805	164555.2	2PCT_50yr	13099.00	8.31	44.53		44.69	0.000498	3.45	4336.70	224.32	0.13
W100-00-00_0805	164555.2	1PCT_100yr	15757.00	8.31	47.27		47.45	0.000559	3.62	4968.52	239.15	0.13
W100-00-00_0805	164555.2	0.2PCT_500yr	22423.00	8.31	52.86		53.05	0.000644	3.83	7657.56	1237.22	0.13
W100-00-00_0805	163635.5	10PCT_10yr	8093.00	11.20	39.03		39.11	0.000244	2.66	5430.83	552.35	0.11
W100-00-00_0805	163635.5	2PCT_50yr	13099.00	11.20	44.34		44.42	0.000205	2.86	8457.03	589.29	0.10
W100-00-00_0805	163635.5	1PCT_100yr	15757.00	11.20	47.10		47.18	0.000183	2.90	10116.50	611.40	0.10
W100-00-00_0805	163635.5	0.2PCT_500yr	22423.00	11.20	52.70		52.78	0.000163	3.09	14075.52	830.21	0.09

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	162811.9	10PCT_10yr	8276.00	8.08	38.85		38.93	0.000198	2.54	4628.58	290.48	0.10
W100-00-00_0805	162811.9	2PCT_50yr	13483.00	8.08	44.11		44.23	0.000229	3.16	6239.73	320.99	0.11
W100-00-00_0805	162811.9	1PCT_100yr	16245.00	8.08	46.87		47.01	0.000231	3.39	7148.93	341.56	0.11
W100-00-00_0805	162811.9	0.2PCT_500yr	23323.00	8.08	52.43		52.61	0.000249	3.95	9206.13	402.06	0.12
W100-00-00_0805	161822.3	10PCT_10yr	8276.00	6.55	38.53		38.64	0.000491	2.86	3717.56	273.05	0.11
W100-00-00_0805	161822.3	2PCT_50yr	13483.00	6.55	43.75		43.89	0.000618	3.33	5214.73	300.04	0.12
W100-00-00_0805	161822.3	1PCT_100yr	16245.00	6.55	46.52		46.66	0.000608	3.43	6064.44	315.81	0.12
W100-00-00_0805	161822.3	0.2PCT_500yr	23323.00	6.55	52.10		52.26	0.000564	3.74	8903.67	662.20	0.12
W100-00-00_0805	160630.7	10PCT_10yr	8276.00	6.96	37.86		37.99	0.000589	2.99	3110.47	255.77	0.12
W100-00-00_0805	160630.7	2PCT_50yr	13483.00	6.96	42.93		43.11	0.000684	3.53	4489.20	288.25	0.13
W100-00-00_0805	160630.7	1PCT_100yr	16245.00	6.96	45.71		45.89	0.000681	3.63	5381.68	415.47	0.13
W100-00-00_0805	160630.7	0.2PCT_500yr	23323.00	6.96	51.36		51.56	0.000588	3.90	8179.36	628.00	0.13
W100-00-00_0805	159757.4	10PCT_10yr	8276.00	9.20	37.22		37.32	0.001022	2.58	3208.58	181.74	0.11
W100-00-00_0805	159757.4	2PCT_50yr	13483.00	9.20	42.16		42.32	0.001211	3.23	4534.86	322.30	0.12
W100-00-00_0805	159757.4	1PCT_100yr	16245.00	9.20	44.95		45.12	0.001157	3.38	5473.08	348.27	0.12
W100-00-00_0805	159757.4	0.2PCT_500yr	23323.00	9.20	50.69		50.88	0.001070	3.74	7851.41	522.43	0.12
W100-00-00_0805	158811.6	10PCT_10yr	8390.00	7.94	36.81		36.87	0.000263	2.06	4987.58	443.00	0.08
W100-00-00_0805	158811.6	2PCT_50yr	13731.00	7.94	41.73		41.81	0.000288	2.48	7362.30	578.25	0.09
W100-00-00_0805	158811.6	1PCT_100yr	16564.00	7.94	44.56		44.64	0.000266	2.56	9222.35	695.66	0.08
W100-00-00_0805	158811.6	0.2PCT_500yr	23927.00	7.94	50.35		50.44	0.000242	2.77	13753.57	920.20	0.08
W100-00-00_0805	157933.4	10PCT_10yr	8390.00	5.48	36.48	17.66	36.62	0.000321	3.20	4010.52	401.79	0.12
W100-00-00_0805	157933.4	2PCT_50yr	13731.00	5.48	41.37	20.92	41.54	0.000342	3.78	6102.80	453.78	0.13
W100-00-00_0805	157933.4	1PCT_100yr	16564.00	5.48	44.22	22.41	44.40	0.000315	3.88	7442.67	485.42	0.13
W100-00-00_0805	157933.4	0.2PCT_500yr	23927.00	5.48	50.04	25.79	50.22	0.000285	4.15	11876.87	1152.80	0.12
W100-00-00_0805	156882.1	10PCT_10yr	8390.00	5.55	36.22		36.34	0.000215	2.78	3513.47	231.81	0.10
W100-00-00_0805	156882.1	2PCT_50yr	13731.00	5.55	41.03		41.22	0.000282	3.62	4825.70	340.67	0.12
W100-00-00_0805	156882.1	1PCT_100yr	16564.00	5.55	43.87		44.08	0.000281	3.86	5944.73	469.95	0.12
W100-00-00_0805	156882.1	0.2PCT_500yr	23927.00	5.55	49.67		49.92	0.000284	4.35	9763.76	795.99	0.13
W100-00-00_0805	156116.3	10PCT_10yr	8390.00	5.91	36.09		36.14	0.000254	1.81	4643.07	282.79	0.08
W100-00-00_0805	156116.3	2PCT_50yr	13731.00	5.91	40.88		40.96	0.000298	2.27	6212.99	385.22	0.09
W100-00-00_0805	156116.3	1PCT_100yr	16564.00	5.91	43.74		43.83	0.000284	2.39	7414.78	455.36	0.09
W100-00-00_0805	156116.3	0.2PCT_500yr	23927.00	5.91	49.55		49.66	0.000274	2.69	10368.73	583.54	0.09
W100-00-00_0805	155861.6	10PCT_10yr	8437.00	6.03	36.01	16.31	36.07	0.000304	1.88	4494.00	293.22	0.08
W100-00-00_0805	155861.6	2PCT_50yr	13829.00	6.03	40.80	19.36	40.88	0.000348	2.32	6002.59	333.90	0.09
W100-00-00_0805	155861.6	1PCT_100yr	16690.00	6.03	43.66	20.86	43.75	0.000318	2.44	6997.11	427.58	0.09
W100-00-00_0805	155861.6	0.2PCT_500yr	24178.00	6.03	49.48	23.23	49.59	0.000288	2.71	10572.05	900.40	0.09
W100-00-00_0805	155805.1		Bridge									
W100-00-00_0805	155748.6	10PCT_10yr	8437.00	5.79	35.67	16.08	35.73	0.000310	1.89	4463.71	292.59	0.09
W100-00-00_0805	155748.6	2PCT_50yr	13829.00	5.79	40.58	19.12	40.66	0.000347	2.32	6010.84	334.06	0.09
W100-00-00_0805	155748.6	1PCT_100yr	16690.00	5.79	43.33	20.63	43.42	0.000323	2.45	6958.43	424.43	0.09
W100-00-00_0805	155748.6	0.2PCT_500yr	24178.00	5.79	49.04	23.00	49.15	0.000297	2.73	10389.57	893.59	0.09
W100-00-00_0805	154890.7	10PCT_10yr	8591.00	5.42	35.31	15.80	35.44	0.000302	2.96	3310.51	473.35	0.12
W100-00-00_0805	154890.7	2PCT_50yr	14060.00	5.42	40.12	18.87	40.32	0.000378	3.71	4748.86	733.29	0.13
W100-00-00_0805	154890.7	1PCT_100yr	16998.00	5.42	42.88	20.33	43.09	0.000361	3.90	5772.32	899.62	0.13
W100-00-00_0805	154890.7	0.2PCT_500yr	25037.00	5.42	48.59	23.78	48.84	0.000340	4.32	10717.80	2117.03	0.13
W100-00-00_0805	153992.6	10PCT_10yr	8591.00	3.83	35.10	16.21	35.19	0.000244	2.49	4871.53	851.17	0.11
W100-00-00_0805	153992.6	2PCT_50yr	14060.00	3.83	39.93	20.02	40.03	0.000247	2.80	8067.51	1145.31	0.11
W100-00-00_0805	153992.6	1PCT_100yr	16998.00	3.83	42.73	21.42	42.82	0.000218	2.79	10268.10	1335.47	0.10
W100-00-00_0805	153992.6	0.2PCT_500yr	25037.00	3.83	48.49	24.69	48.58	0.000191	2.92	15337.02	1553.01	0.09
W100-00-00_0805	153119.9	10PCT_10yr	8591.00	4.13	34.83	14.47	34.91	0.000431	2.37	3999.41	688.53	0.09
W100-00-00_0805	153119.9	2PCT_50yr	14060.00	4.13	39.59	17.68	39.71	0.000570	2.95	5557.93	858.38	0.11
W100-00-00_0805	153119.9	1PCT_100yr	16998.00	4.13	42.40	19.16	42.53	0.000536	3.08	6667.21	964.58	0.11
W100-00-00_0805	153119.9	0.2PCT_500yr	25037.00	4.13	48.24	22.22	48.35	0.000415	3.10	22331.98	1841.44	0.10
W100-00-00_0805	153108.9		Bridge									
W100-00-00_0805	153097.9	10PCT_10yr	8591.00	4.13	34.81	14.47	34.90	0.000433	2.37	3994.62	688.08	0.09
W100-00-00_0805	153097.9	2PCT_50yr	14060.00	4.13	39.57	17.68	39.69	0.000572	2.96	5549.49	857.47	0.11
W100-00-00_0805	153097.9	1PCT_100yr	16998.00	4.13	42.37	19.16	42.51	0.000538	3.09	6656.89	962.77	0.11
W100-00-00_0805	153097.9	0.2PCT_500yr	25037.00	4.13	48.18	22.22	48.29	0.000419	3.11	22223.93	1839.22	0.10
W100-00-00_0805	152376.3	10PCT_10yr	8591.00	3.84	34.58	15.82	34.66	0.000248	2.67	4622.38	990.20	0.10
W100-00-00_0805	152376.3	2PCT_50yr	14060.00	3.84	39.35	19.45	39.43	0.000219	2.89	7917.16	1245.94	0.10
W100-00-00_0805	152376.3	1PCT_100yr	16998.00	3.84	42.20	22.16	42.27	0.000174	2.76	10118.81	1364.13	0.09
W100-00-00_0805	152376.3	0.2PCT_500yr	25037.00	3.84	48.07	26.33	48.11	0.000116	2.56	25440.17	1540.69	0.08
W100-00-00_0805	151996.2	10PCT_10yr	8591.00	4.14	34.56	14.34	34.59	0.000074	1.46	6552.58	473.45	0.06
W100-00-00_0805	151996.2	2PCT_50yr	14060.00	4.14	39.31	17.03	39.37	0.000091	1.87	8663.25	802.15	0.07
W100-00-00_0805	151996.2	1PCT_100yr	16998.00	4.14	42.16	18.16	42.22	0.000089	2.00	9929.46	1126.49	0.07
W100-00-00_0805	151996.2	0.2PCT_500yr	25037.00	4.14	47.98	20.55	48.06	0.000097	2.37	12624.25	1637.57	0.07

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	151963.3		Bridge									
W100-00-00_0805	151930.4	10PCT_10yr	8591.00	3.37	34.53	13.57	34.56	0.000065	1.40	6879.62	478.73	0.06
W100-00-00_0805	151930.4	2PCT_50yr	14060.00	3.37	39.28	16.26	39.33	0.000081	1.81	8990.24	913.49	0.06
W100-00-00_0805	151930.4	1PCT_100yr	16998.00	3.37	42.13	17.39	42.19	0.000081	1.94	10258.37	1155.51	0.07
W100-00-00_0805	151930.4	0.2PCT_500yr	25037.00	3.37	47.90	19.78	47.98	0.000090	2.32	12950.90	1776.33	0.07
W100-00-00_0805	151925.3	10PCT_10yr	8591.00	2.99	34.53	11.76	34.55	0.000032	1.14	7971.56	609.52	0.04
W100-00-00_0805	151925.3	2PCT_50yr	14060.00	2.99	39.29	13.37	39.32	0.000046	1.54	9886.65	785.75	0.05
W100-00-00_0805	151925.3	1PCT_100yr	16998.00	2.99	42.14	14.10	42.18	0.000049	1.68	11080.95	1274.17	0.05
W100-00-00_0805	151925.3	0.2PCT_500yr	25037.00	2.99	47.91	15.91	47.97	0.000059	2.07	13504.67	1713.60	0.06
W100-00-00_0805	151846.3		Bridge									
W100-00-00_0805	151767.3	10PCT_10yr	8591.00	1.30	33.76	10.07	33.78	0.000029	1.10	8331.62	618.24	0.04
W100-00-00_0805	151767.3	2PCT_50yr	14060.00	1.30	38.61	11.68	38.64	0.000041	1.49	10308.04	1018.56	0.05
W100-00-00_0805	151767.3	1PCT_100yr	16998.00	1.30	41.52	12.41	41.56	0.000043	1.62	11530.68	1315.04	0.05
W100-00-00_0805	151767.3	0.2PCT_500yr	25037.00	1.30	47.85	14.22	47.91	0.000051	1.97	14189.55	1975.63	0.06
W100-00-00_0805	151736.6	10PCT_10yr	8591.00	3.46	33.70	12.83	33.76	0.000111	2.07	4713.41	308.68	0.08
W100-00-00_0805	151736.6	2PCT_50yr	14060.00	3.46	38.50	14.84	38.61	0.000156	2.78	6018.82	491.73	0.09
W100-00-00_0805	151736.6	1PCT_100yr	16998.00	3.46	41.39	15.80	41.53	0.000162	3.02	6849.85	648.38	0.10
W100-00-00_0805	151736.6	0.2PCT_500yr	25037.00	3.46	47.66	18.18	47.86	0.000188	3.68	9640.40	1317.00	0.11
W100-00-00_0805	151711.1		Bridge									
W100-00-00_0805	151685.6	10PCT_10yr	8591.00	4.19	33.67	13.56	33.74	0.000124	2.14	4512.77	303.19	0.08
W100-00-00_0805	151685.6	2PCT_50yr	14060.00	4.19	38.45	15.58	38.58	0.000171	2.86	5805.34	450.16	0.10
W100-00-00_0805	151685.6	1PCT_100yr	16998.00	4.19	41.34	16.53	41.49	0.000177	3.11	6616.13	606.90	0.10
W100-00-00_0805	151685.6	0.2PCT_500yr	25037.00	4.19	47.54	18.91	47.74	0.000203	3.76	8924.67	1158.28	0.11
W100-00-00_0805	151353.8	10PCT_10yr	8692.00	4.90	33.65	15.53	33.68	0.000118	1.70	7938.61	870.71	0.07
W100-00-00_0805	151353.8	2PCT_50yr	14211.00	4.90	38.45	18.32	38.49	0.000118	2.01	11155.03	1099.26	0.08
W100-00-00_0805	151353.8	1PCT_100yr	17200.00	4.90	41.35	20.12	41.39	0.000106	2.07	13199.67	1157.26	0.07
W100-00-00_0805	151353.8	0.2PCT_500yr	25603.00	4.90	47.57	23.75	47.62	0.000099	2.33	17591.50	1228.39	0.07
W100-00-00_0805	150358.8	10PCT_10yr	8798.00	3.31	33.45		33.53	0.000188	2.42	4219.64	372.52	0.10
W100-00-00_0805	150358.8	2PCT_50yr	14370.00	3.31	38.20		38.33	0.000222	3.03	6063.28	400.35	0.11
W100-00-00_0805	150358.8	1PCT_100yr	17412.00	3.31	41.10		41.24	0.000212	3.19	7244.04	412.96	0.11
W100-00-00_0805	150358.8	0.2PCT_500yr	26196.00	3.31	47.29		47.47	0.000219	3.71	9887.92	452.57	0.11
W100-00-00_0805	149526.4	10PCT_10yr	8798.00	3.15	33.33	14.03	33.39	0.000148	2.15	5956.18	465.50	0.08
W100-00-00_0805	149526.4	2PCT_50yr	14370.00	3.15	38.07	16.86	38.16	0.000169	2.64	8281.97	517.25	0.09
W100-00-00_0805	149526.4	1PCT_100yr	17412.00	3.15	40.99	18.07	41.08	0.000159	2.77	9833.25	546.66	0.09
W100-00-00_0805	149526.4	0.2PCT_500yr	26196.00	3.15	47.18	21.41	47.30	0.000163	3.20	13365.84	743.60	0.10
W100-00-00_0805	149122.7	10PCT_10yr	8798.00	3.15	33.25		33.33	0.000131	2.31	4445.38	268.30	0.08
W100-00-00_0805	149122.7	2PCT_50yr	14370.00	3.15	37.95		38.08	0.000185	3.09	5826.07	320.07	0.10
W100-00-00_0805	149122.7	1PCT_100yr	17412.00	3.15	40.84		41.00	0.000191	3.34	6800.43	358.67	0.10
W100-00-00_0805	149122.7	0.2PCT_500yr	26196.00	3.15	46.99		47.22	0.000219	4.03	9694.62	534.02	0.12
W100-00-00_0805	148795.4	10PCT_10yr	8840.00	3.15	33.20	13.60	33.27	0.000265	2.34	4824.00	1008.94	0.09
W100-00-00_0805	148795.4	2PCT_50yr	14434.00	3.15	37.88	16.49	38.00	0.000335	3.00	6353.81	1657.68	0.10
W100-00-00_0805	148795.4	1PCT_100yr	17497.00	3.15	40.78	17.94	40.91	0.000329	3.19	7325.42	1799.35	0.10
W100-00-00_0805	148795.4	0.2PCT_500yr	26433.00	3.15	46.93	21.63	47.11	0.000362	3.80	9385.25	1860.65	0.11
W100-00-00_0805	148768.4		Bridge									
W100-00-00_0805	148741.4	10PCT_10yr	8840.00	3.04	33.09	13.49	33.17	0.000264	2.34	4825.61	1009.49	0.09
W100-00-00_0805	148741.4	2PCT_50yr	14434.00	3.04	37.75	16.38	37.87	0.000336	3.00	6349.50	1657.06	0.10
W100-00-00_0805	148741.4	1PCT_100yr	17497.00	3.04	40.65	17.84	40.78	0.000330	3.19	7319.96	1799.19	0.10
W100-00-00_0805	148741.4	0.2PCT_500yr	26433.00	3.04	46.79	21.51	46.97	0.000363	3.80	9374.37	1860.17	0.11
W100-00-00_0805	147632.4	10PCT_10yr	8840.00	-1.17	32.93	10.76	33.00	0.000097	2.15	4872.72	397.77	0.09
W100-00-00_0805	147632.4	2PCT_50yr	14434.00	-1.17	37.55	13.71	37.66	0.000121	2.67	6812.37	444.74	0.10
W100-00-00_0805	147632.4	1PCT_100yr	17497.00	-1.17	40.46	15.09	40.57	0.000114	2.79	8140.20	489.89	0.10
W100-00-00_0805	147632.4	0.2PCT_500yr	26433.00	-1.17	46.60	18.59	46.74	0.000113	3.24	11252.03	689.75	0.10
W100-00-00_0805	146698.0	10PCT_10yr	8840.00	1.88	32.81	10.63	32.90	0.000115	2.49	4885.04	325.67	0.10
W100-00-00_0805	146698.0	2PCT_50yr	14434.00	1.88	37.39	13.54	37.53	0.000157	3.16	6481.70	534.82	0.12
W100-00-00_0805	146698.0	1PCT_100yr	17497.00	1.88	40.30	14.89	40.45	0.000158	3.30	7656.30	662.02	0.12
W100-00-00_0805	146698.0	0.2PCT_500yr	26433.00	1.88	46.43	18.10	46.61	0.000161	3.84	10754.53	1010.01	0.12
W100-00-00_0805	145723.9	10PCT_10yr	8840.00	1.61	32.62		32.76	0.000163	3.24	4541.38	380.83	0.12
W100-00-00_0805	145723.9	2PCT_50yr	14434.00	1.61	37.14		37.35	0.000206	4.09	6341.45	415.58	0.14
W100-00-00_0805	145723.9	1PCT_100yr	17497.00	1.61	40.05		40.27	0.000200	4.30	7585.76	441.43	0.14
W100-00-00_0805	145723.9	0.2PCT_500yr	26433.00	1.61	46.15		46.43	0.000216	5.04	10565.39	616.56	0.15
W100-00-00_0805	144753.5	10PCT_10yr	8840.00	0.07	32.49	11.07	32.61	0.000140	2.82	3896.26	297.42	0.11
W100-00-00_0805	144753.5	2PCT_50yr	14434.00	0.07	36.96	14.26	37.15	0.000196	3.63	5401.52	375.92	0.13
W100-00-00_0805	144753.5	1PCT_100yr	17497.00	0.07	39.87	15.82	40.07	0.000199	3.82	6558.83	417.58	0.13
W100-00-00_0805	144753.5	0.2PCT_500yr	26433.00	0.07	45.96	19.54	46.21	0.000213	4.38	10151.37	852.00	0.14

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	143966.8	10PCT_10yr	8840.00	-7.47	32.35	11.16	32.48	0.000188	3.04	4134.17	437.97	0.12
W100-00-00_0805	143966.8	2PCT_50yr	14434.00	-7.47	36.80	15.37	36.99	0.000230	3.76	6253.98	707.74	0.13
W100-00-00_0805	143966.8	1PCT_100yr	17497.00	-7.47	39.73	17.12	39.91	0.000209	3.86	8348.45	1047.56	0.13
W100-00-00_0805	143966.8	0.2PCT_500yr	26433.00	-7.47	45.85	21.21	46.05	0.000188	4.20	16154.27	1828.81	0.13
W100-00-00_0805	143078.2	10PCT_10yr	8840.00	-4.19	32.23		32.33	0.000138	2.57	5344.85	510.52	0.10
W100-00-00_0805	143078.2	2PCT_50yr	14434.00	-4.19	36.65		36.80	0.000168	3.27	7844.99	608.71	0.12
W100-00-00_0805	143078.2	1PCT_100yr	17497.00	-4.19	39.59		39.74	0.000158	3.43	9721.35	676.83	0.12
W100-00-00_0805	143078.2	0.2PCT_500yr	26433.00	-4.19	45.68		45.89	0.000167	4.06	16113.69	1384.78	0.13
W100-00-00_0805	142061.4	10PCT_10yr	8840.00	0.55	32.14		32.22	0.000082	2.29	5580.45	450.59	0.09
W100-00-00_0805	142061.4	2PCT_50yr	14434.00	0.55	36.54		36.65	0.000109	2.98	7658.83	498.92	0.10
W100-00-00_0805	142061.4	1PCT_100yr	17497.00	0.55	39.48		39.60	0.000107	3.16	9153.44	517.45	0.10
W100-00-00_0805	142061.4	0.2PCT_500yr	26433.00	0.55	45.56		45.74	0.000119	3.77	12474.19	688.00	0.11
W100-00-00_0805	141320.1	10PCT_10yr	8840.00	-2.70	32.13	9.03	32.16	0.000046	1.58	10199.14	741.57	0.06
W100-00-00_0805	141320.1	2PCT_50yr	14434.00	-2.70	36.53	11.99	36.58	0.000060	1.95	13611.75	827.13	0.07
W100-00-00_0805	141320.1	1PCT_100yr	17497.00	-2.70	39.48	13.28	39.53	0.000055	2.03	16108.21	866.29	0.07
W100-00-00_0805	141320.1	0.2PCT_500yr	26433.00	-2.70	45.58	16.66	45.64	0.000056	2.36	21815.92	1154.18	0.07
W100-00-00_0805	140116.2	10PCT_10yr	8840.00	-1.31	31.98	9.76	32.07	0.000116	2.54	5390.02	589.69	0.09
W100-00-00_0805	140116.2	2PCT_50yr	14434.00	-1.31	36.32	13.04	36.46	0.000151	3.23	8177.19	696.28	0.11
W100-00-00_0805	140116.2	1PCT_100yr	17497.00	-1.31	39.28	14.63	39.42	0.000144	3.37	10342.38	802.37	0.11
W100-00-00_0805	140116.2	0.2PCT_500yr	26433.00	-1.31	45.36	18.10	45.54	0.000149	3.86	15283.33	1126.13	0.11
W100-00-00_0805	139320.0	10PCT_10yr	8840.00	-2.14	31.92	9.43	31.99	0.000086	2.06	6240.12	583.56	0.08
W100-00-00_0805	139320.0	2PCT_50yr	14434.00	-2.14	36.25	12.35	36.35	0.000118	2.65	9137.82	774.08	0.09
W100-00-00_0805	139320.0	1PCT_100yr	17497.00	-2.14	39.21	13.67	39.31	0.000115	2.76	11696.43	920.06	0.09
W100-00-00_0805	139320.0	0.2PCT_500yr	26433.00	-2.14	45.31	16.87	45.42	0.000120	3.09	17504.35	1121.91	0.10
W100-00-00_0805	138607.9	10PCT_10yr	8717.00	-2.08	31.94	10.30	31.95	0.000021	1.12	15827.35	1067.19	0.04
W100-00-00_0805	138607.9	2PCT_50yr	14271.00	-2.08	36.28	13.40	36.29	0.000027	1.40	20468.94	1229.07	0.05
W100-00-00_0805	138607.9	1PCT_100yr	17455.00	-2.08	39.24	14.61	39.26	0.000026	1.46	23740.53	1318.33	0.05
W100-00-00_0805	138607.9	0.2PCT_500yr	25943.00	-2.08	45.34	18.08	45.36	0.000028	1.69	31227.98	1723.29	0.05
W100-00-00_0805	137732.0	10PCT_10yr	8717.00	-2.40	31.87	9.67	31.92	0.000063	2.15	9164.29	866.36	0.07
W100-00-00_0805	137732.0	2PCT_50yr	14271.00	-2.40	36.18	12.71	36.26	0.000080	2.68	12793.92	1009.81	0.09
W100-00-00_0805	137732.0	1PCT_100yr	17455.00	-2.40	39.15	14.16	39.22	0.000077	2.81	15453.94	1154.45	0.09
W100-00-00_0805	137732.0	0.2PCT_500yr	25943.00	-2.40	45.23	17.32	45.33	0.000083	3.26	22458.42	1617.73	0.09
W100-00-00_0805	137113.0	10PCT_10yr	8717.00	-2.62	31.78	9.45	31.87	0.000088	2.56	5908.77	439.98	0.09
W100-00-00_0805	137113.0	2PCT_50yr	14271.00	-2.62	36.03	12.49	36.19	0.000132	3.45	7660.19	722.10	0.11
W100-00-00_0805	137113.0	1PCT_100yr	17455.00	-2.62	38.97	13.94	39.15	0.000137	3.75	9031.33	1114.36	0.11
W100-00-00_0805	137113.0	0.2PCT_500yr	25943.00	-2.62	45.09	17.26	45.26	0.000124	4.00	19136.33	1424.68	0.11
W100-00-00_0805	136331.2	10PCT_10yr	8717.00	-2.09	31.73	9.33	31.75	0.000166	1.41	8929.13	633.19	0.05
W100-00-00_0805	136331.2	2PCT_50yr	14271.00	-2.09	35.98	11.82	36.01	0.000223	1.69	11717.11	682.02	0.06
W100-00-00_0805	136331.2	1PCT_100yr	17455.00	-2.09	38.94	13.22	38.97	0.000208	1.76	13784.57	713.47	0.06
W100-00-00_0805	136331.2	0.2PCT_500yr	25943.00	-2.09	45.05	15.97	45.09	0.000203	1.98	18522.34	958.09	0.06
W100-00-00_0805	135666.2	10PCT_10yr	8717.00	-1.47	31.61		31.68	0.000079	2.20	6588.21	544.42	0.08
W100-00-00_0805	135666.2	2PCT_50yr	14271.00	-1.47	35.81		35.91	0.000105	2.84	9077.02	645.17	0.10
W100-00-00_0805	135666.2	1PCT_100yr	17455.00	-1.47	38.76		38.87	0.000101	3.00	11053.07	693.48	0.10
W100-00-00_0805	135666.2	0.2PCT_500yr	25943.00	-1.47	44.86		44.99	0.000101	3.41	15971.44	933.80	0.10
W100-00-00_0805	134706.7	10PCT_10yr	8717.00	-1.93	31.59		31.62	0.000036	1.54	12330.61	857.74	0.06
W100-00-00_0805	134706.7	2PCT_50yr	14271.00	-1.93	35.79		35.83	0.000050	1.99	16177.46	1019.68	0.07
W100-00-00_0805	134706.7	1PCT_100yr	17455.00	-1.93	38.75		38.79	0.000050	2.13	19335.20	1099.88	0.07
W100-00-00_0805	134706.7	0.2PCT_500yr	25943.00	-1.93	44.86		44.91	0.000049	2.39	26459.82	1236.08	0.07
W100-00-00_0805	134090.6	10PCT_10yr	8717.00	-1.59	31.55		31.60	0.000049	1.89	9735.85	715.37	0.07
W100-00-00_0805	134090.6	2PCT_50yr	14271.00	-1.59	35.73		35.80	0.000069	2.48	12871.38	790.38	0.08
W100-00-00_0805	134090.6	1PCT_100yr	17455.00	-1.59	38.69		38.76	0.000069	2.65	15280.89	827.77	0.08
W100-00-00_0805	134090.6	0.2PCT_500yr	25943.00	-1.59	44.78		44.88	0.000072	3.04	20503.17	889.05	0.09
W100-00-00_0805	133772.1	10PCT_10yr	8717.00	-0.79	31.50	8.82	31.57	0.000072	0.00	8144.40	802.93	0.00
W100-00-00_0805	133772.1	2PCT_50yr	14271.00	-0.79	35.66	11.76	35.77	0.000097	3.10	11735.25	884.45	0.10
W100-00-00_0805	133772.1	1PCT_100yr	17455.00	-0.79	38.62	13.20	38.73	0.000093	3.21	14390.78	909.45	0.10
W100-00-00_0805	133772.1	0.2PCT_500yr	25943.00	-0.79	44.73	17.04	44.85	0.000093	3.58	20255.71	1025.89	0.10
W100-00-00_0805	133760.1		Bridge									
W100-00-00_0805	133748.1	10PCT_10yr	8717.00	-0.46	31.43	9.15	31.51	0.000077	2.49	7830.53	787.40	0.08
W100-00-00_0805	133748.1	2PCT_50yr	14271.00	-0.46	35.61	12.09	35.72	0.000103	3.17	11398.18	881.75	0.10
W100-00-00_0805	133748.1	1PCT_100yr	17455.00	-0.46	38.57	13.53	38.68	0.000098	3.28	14041.78	904.66	0.10
W100-00-00_0805	133748.1	0.2PCT_500yr	25943.00	-0.46	44.67	17.36	44.79	0.000097	3.64	19853.72	1015.97	0.10
W100-00-00_0805	132963.8	10PCT_10yr	8717.00	-1.98	31.35	8.67	31.44	0.000099	2.46	4860.66	446.36	0.09
W100-00-00_0805	132963.8	2PCT_50yr	14271.00	-1.98	35.47	11.94	35.61	0.000145	3.24	6950.76	529.05	0.11
W100-00-00_0805	132963.8	1PCT_100yr	17455.00	-1.98	38.42	13.46	38.58	0.000147	3.43	8545.15	556.52	0.11
W100-00-00_0805	132963.8	0.2PCT_500yr	25943.00	-1.98	44.46	16.80	44.67	0.000155	4.02	12525.95	1138.94	0.12
W100-00-00_0805	131789.8	10PCT_10yr	8717.00	-2.31	31.23	7.48	31.32	0.000095	2.58	5510.95	482.32	0.09
W100-00-00_0805	131789.8	2PCT_50yr	14271.00	-2.31	35.30	10.57	35.45	0.000135	3.38	7542.94	534.69	0.11

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	131789.8	1PCT_100yr	17455.00	-2.31	38.25	12.11	38.41	0.000134	3.59	9120.90	616.35	0.11
W100-00-00_0805	131789.8	0.2PCT_500yr	25943.00	-2.31	44.30	15.63	44.49	0.000143	4.16	12799.17	1199.72	0.12
W100-00-00_0805	130765.5	10PCT_10yr	8717.00	-3.81	31.21		31.25	0.000038	1.76	8174.01	487.21	0.06
W100-00-00_0805	130765.5	2PCT_50yr	14271.00	-3.81	35.27		35.34	0.000059	2.40	10214.44	520.54	0.08
W100-00-00_0805	130765.5	1PCT_100yr	17455.00	-3.81	38.21		38.30	0.000062	2.62	11796.25	557.90	0.08
W100-00-00_0805	130765.5	0.2PCT_500yr	25943.00	-3.81	44.24		44.37	0.000077	3.25	16361.63	1156.69	0.09
W100-00-00_0805	129725.3	10PCT_10yr	8717.00	-3.71	31.13		31.20	0.000070	2.37	7782.52	684.17	0.08
W100-00-00_0805	129725.3	2PCT_50yr	14271.00	-3.71	35.15		35.26	0.000098	3.08	10751.48	782.11	0.10
W100-00-00_0805	129725.3	1PCT_100yr	17455.00	-3.71	38.11		38.22	0.000096	3.23	13195.34	894.53	0.10
W100-00-00_0805	129725.3	0.2PCT_500yr	25943.00	-3.71	44.16		44.29	0.000097	3.63	21061.07	1840.13	0.10
W100-00-00_0805	129163.2	10PCT_10yr	8717.00	-3.13	31.09		31.16	0.000061	2.13	5887.89	478.07	0.07
W100-00-00_0805	129163.2	2PCT_50yr	14271.00	-3.13	35.09		35.20	0.000092	2.88	7992.35	574.16	0.09
W100-00-00_0805	129163.2	1PCT_100yr	17455.00	-3.13	38.03		38.16	0.000094	3.10	9802.08	664.68	0.10
W100-00-00_0805	129163.2	0.2PCT_500yr	25943.00	-3.13	44.06		44.22	0.000100	3.59	15520.89	1353.85	0.10
W100-00-00_0805	128326.9	10PCT_10yr	8717.00	-4.05	31.06	6.10	31.11	0.000042	1.88	8420.07	810.89	0.06
W100-00-00_0805	128326.9	2PCT_50yr	14271.00	-4.05	35.05	8.97	35.13	0.000066	2.58	10686.74	964.59	0.08
W100-00-00_0805	128326.9	1PCT_100yr	17455.00	-4.05	37.99	10.33	38.08	0.000069	2.81	12505.72	1201.94	0.08
W100-00-00_0805	128326.9	0.2PCT_500yr	25943.00	-4.05	44.03	13.41	44.13	0.000066	3.07	24428.43	1402.73	0.08
W100-00-00_0805	128104.6	10PCT_10yr	8588.00	-4.29	31.05	5.79	31.10	0.000041	1.87	6703.06	385.12	0.06
W100-00-00_0805	128104.6	2PCT_50yr	14103.00	-4.29	35.03	8.65	35.11	0.000066	2.60	8094.29	424.19	0.08
W100-00-00_0805	128104.6	1PCT_100yr	17411.00	-4.29	37.96	10.07	38.07	0.000072	2.88	9120.62	593.16	0.09
W100-00-00_0805	128104.6	0.2PCT_500yr	25433.00	-4.29	43.97	12.93	44.11	0.000078	3.34	16089.56	1335.10	0.09
W100-00-00_0805	128066.7		Bridge									
W100-00-00_0805	128028.8	10PCT_10yr	8588.00	-4.51	30.83	5.57	30.87	0.000041	1.87	6701.80	385.08	0.06
W100-00-00_0805	128028.8	2PCT_50yr	14103.00	-4.51	34.80	8.43	34.88	0.000066	2.60	8090.69	424.09	0.08
W100-00-00_0805	128028.8	1PCT_100yr	17411.00	-4.51	37.95	9.85	38.05	0.000070	2.86	9193.92	639.98	0.09
W100-00-00_0805	128028.8	0.2PCT_500yr	25433.00	-4.51	43.91	12.71	44.04	0.000077	3.33	16297.62	1396.66	0.09
W100-00-00_0805	126647.0	10PCT_10yr	8588.00	-3.93	30.79		30.82	0.000030	1.63	11110.27	740.82	0.05
W100-00-00_0805	126647.0	2PCT_50yr	14103.00	-3.93	34.75		34.79	0.000045	2.16	14522.70	915.35	0.07
W100-00-00_0805	126647.0	1PCT_100yr	17411.00	-3.93	37.90		37.95	0.000046	2.31	17507.71	994.37	0.07
W100-00-00_0805	126647.0	0.2PCT_500yr	25433.00	-3.93	43.87		43.92	0.000045	2.54	24147.84	1541.01	0.07
W100-00-00_0805	125376.9	10PCT_10yr	8588.00	-4.05	30.69		30.76	0.000055	2.28	5528.76	329.36	0.07
W100-00-00_0805	125376.9	2PCT_50yr	14103.00	-4.05	34.56		34.70	0.000092	3.18	6873.67	363.78	0.10
W100-00-00_0805	125376.9	1PCT_100yr	17411.00	-4.05	37.69		37.85	0.000099	3.49	8087.15	491.61	0.10
W100-00-00_0805	125376.9	0.2PCT_500yr	25433.00	-4.05	43.62		43.81	0.000111	4.08	13007.66	1203.60	0.11
W100-00-00_0805	124983.5	10PCT_10yr	8588.00	-3.86	30.68	7.86	30.73	0.000053	2.19	5742.11	980.71	0.07
W100-00-00_0805	124983.5	2PCT_50yr	14103.00	-3.86	34.56	11.09	34.65	0.000083	2.96	7279.16	1124.10	0.09
W100-00-00_0805	124983.5	1PCT_100yr	17411.00	-3.86	37.70	13.17	37.80	0.000082	3.13	8778.47	1271.88	0.09
W100-00-00_0805	124983.5	0.2PCT_500yr	25433.00	-3.86	43.71	15.91	43.74	0.000040	2.41	25465.75	1503.48	0.07
W100-00-00_0805	124644.1	10PCT_10yr	8588.00	-3.69	30.66	8.00	30.71	0.000058	2.27	5519.67	484.47	0.07
W100-00-00_0805	124644.1	2PCT_50yr	14103.00	-3.69	34.52	11.36	34.62	0.000089	3.07	6765.59	524.17	0.09
W100-00-00_0805	124644.1	1PCT_100yr	17411.00	-3.69	37.65	12.90	37.76	0.000091	3.30	7824.34	560.07	0.10
W100-00-00_0805	124644.1	0.2PCT_500yr	25433.00	-3.69	43.62	16.15	43.71	0.000081	3.43	15734.55	1916.59	0.09
W100-00-00_0805	124591.8		Bridge									
W100-00-00_0805	124539.5	10PCT_10yr	8588.00	-3.74	30.64	7.96	30.70	0.000058	2.27	5531.31	484.85	0.07
W100-00-00_0805	124539.5	2PCT_50yr	14103.00	-3.74	34.50	11.31	34.59	0.000089	3.07	6774.97	524.46	0.09
W100-00-00_0805	124539.5	1PCT_100yr	17411.00	-3.74	37.63	12.86	37.74	0.000091	3.29	7833.44	560.40	0.10
W100-00-00_0805	124539.5	0.2PCT_500yr	25433.00	-3.74	43.58	16.10	43.67	0.000081	3.42	15759.99	1920.12	0.09
W100-00-00_0805	123658.2	10PCT_10yr	8535.00	-2.04	30.62		30.65	0.000036	1.72	11078.74	1141.56	0.06
W100-00-00_0805	123658.2	2PCT_50yr	14033.00	-2.04	34.47		34.51	0.000047	2.15	16881.25	1633.62	0.07
W100-00-00_0805	123658.2	1PCT_100yr	17393.00	-2.04	37.62		37.65	0.000040	2.10	22276.67	2040.15	0.06
W100-00-00_0805	123658.2	0.2PCT_500yr	25223.00	-2.04	43.57		43.60	0.000030	2.05	36546.05	2579.11	0.06
W100-00-00_0805	123138.8	10PCT_10yr	8535.00	-4.08	30.62		30.63	0.000016	1.11	14727.39	946.83	0.04
W100-00-00_0805	123138.8	2PCT_50yr	14033.00	-4.08	34.47		34.49	0.000024	1.49	18781.82	1098.38	0.05
W100-00-00_0805	123138.8	1PCT_100yr	17393.00	-4.08	37.61		37.63	0.000024	1.59	22504.81	1447.30	0.05
W100-00-00_0805	123138.8	0.2PCT_500yr	25223.00	-4.08	43.56		43.58	0.000024	1.77	32799.88	1946.18	0.05
W100-00-00_0805	122627.1	10PCT_10yr	8535.00	-6.08	30.59	3.67	30.61	0.000027	1.40	8244.16	630.83	0.05
W100-00-00_0805	122627.1	2PCT_50yr	14033.00	-6.08	34.42	6.57	34.47	0.000041	1.89	11291.86	895.32	0.06
W100-00-00_0805	122627.1	1PCT_100yr	17393.00	-6.08	37.57	8.14	37.61	0.000038	1.96	14279.33	1054.75	0.06
W100-00-00_0805	122627.1	0.2PCT_500yr	25223.00	-6.08	43.52	10.99	43.56	0.000035	2.11	22218.06	1700.85	0.06
W100-00-00_0805	122572.1		Mult Open									
W100-00-00_0805	122517.1	10PCT_10yr	8535.00	-5.38	30.57	4.37	30.60	0.000020	1.58	7803.50	585.04	0.05
W100-00-00_0805	122517.1	2PCT_50yr	14033.00	-5.38	34.37	7.26	34.44	0.000032	2.21	10609.72	869.38	0.07
W100-00-00_0805	122517.1	1PCT_100yr	17393.00	-5.38	37.51	8.84	37.58	0.000031	2.33	13459.53	979.58	0.07
W100-00-00_0805	122517.1	0.2PCT_500yr	25223.00	-5.38	43.46	11.69	43.53	0.000031	2.59	20886.60	1592.09	0.07

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	122371.6	10PCT_10yr	8535.00	-7.00	30.53	3.74	30.59	0.000031	2.17	5851.49	827.83	0.07
W100-00-00_0805	122371.6	2PCT_50yr	14033.00	-7.00	34.31	7.04	34.42	0.000050	2.99	7822.69	936.48	0.09
W100-00-00_0805	122371.6	1PCT_100yr	17393.00	-7.00	37.49	8.66	37.58	0.000040	2.85	14275.78	1034.51	0.08
W100-00-00_0805	122371.6	0.2PCT_500yr	25223.00	-7.00	43.44	11.78	43.53	0.000038	3.08	21020.41	1267.29	0.08
W100-00-00_0805	122265		Bridge									
W100-00-00_0805	122210.0	10PCT_10yr	8535.00	-5.60	30.51	4.24	30.56	0.000025	1.96	6194.10	715.26	0.06
W100-00-00_0805	122210.0	2PCT_50yr	14033.00	-5.60	34.24	6.98	34.34	0.000043	2.77	7319.85	777.49	0.08
W100-00-00_0805	122210.0	1PCT_100yr	17393.00	-5.60	37.47	8.40	37.55	0.000036	2.71	12706.17	806.19	0.08
W100-00-00_0805	122210.0	0.2PCT_500yr	25223.00	-5.60	43.40	11.39	43.49	0.000036	2.99	17711.52	965.06	0.08
W100-00-00_0805	122036.7	10PCT_10yr	8535.00	-8.40	30.51		30.56	0.000023	1.89	7454.43	743.36	0.06
W100-00-00_0805	122036.7	2PCT_50yr	14033.00	-8.40	34.26		34.32	0.000034	2.48	10384.56	816.25	0.07
W100-00-00_0805	122036.7	1PCT_100yr	17393.00	-8.40	37.48		37.54	0.000033	2.58	13137.71	888.06	0.07
W100-00-00_0805	122036.7	0.2PCT_500yr	25223.00	-8.40	43.41		43.48	0.000031	2.77	19156.16	1225.50	0.07
W100-00-00_0805	121229.5	10PCT_10yr	8535.00	-11.37	30.49		30.53	0.000043	1.94	8225.13	832.28	0.06
W100-00-00_0805	121229.5	2PCT_50yr	14033.00	-11.37	34.22		34.28	0.000058	2.43	11404.03	868.88	0.07
W100-00-00_0805	121229.5	1PCT_100yr	17393.00	-11.37	37.45		37.51	0.000053	2.46	14257.53	900.43	0.07
W100-00-00_0805	121229.5	0.2PCT_500yr	25223.00	-11.37	43.39		43.45	0.000049	2.62	21333.03	1668.70	0.07
W100-00-00_0805	120962.2	10PCT_10yr	8535.00	-10.59	30.45		30.51	0.000056	2.20	6248.06	651.81	0.07
W100-00-00_0805	120962.2	2PCT_50yr	14033.00	-10.59	34.17		34.26	0.000082	2.86	8770.66	698.04	0.09
W100-00-00_0805	120962.2	1PCT_100yr	17393.00	-10.59	37.39		37.48	0.000077	2.95	11065.90	727.69	0.09
W100-00-00_0805	120962.2	0.2PCT_500yr	25223.00	-10.59	43.32		43.42	0.000077	3.25	17856.48	1715.81	0.09
W100-00-00_0805	120005.2	10PCT_10yr	8535.00	-7.78	30.46	3.11	30.47	0.000015	1.14	13454.53	900.30	0.04
W100-00-00_0805	120005.2	2PCT_50yr	14033.00	-7.78	34.17	6.20	34.19	0.000025	1.61	17056.20	1001.02	0.05
W100-00-00_0805	120005.2	1PCT_100yr	17393.00	-7.78	37.40	7.73	37.42	0.000023	1.66	20345.20	1036.12	0.05
W100-00-00_0805	120005.2	0.2PCT_500yr	25223.00	-7.78	43.33	10.86	43.36	0.000023	1.81	27560.17	1679.39	0.05
W100-00-00_0805	119952.6		Bridge									
W100-00-00_0805	119900.0	10PCT_10yr	8535.00	-7.64	30.44	3.25	30.45	0.000015	1.15	13312.94	891.73	0.04
W100-00-00_0805	119900.0	2PCT_50yr	14033.00	-7.64	34.12	6.34	34.14	0.000026	1.63	16865.25	998.71	0.05
W100-00-00_0805	119900.0	1PCT_100yr	17393.00	-7.64	37.36	7.88	37.38	0.000024	1.67	20160.57	1034.43	0.05
W100-00-00_0805	119900.0	0.2PCT_500yr	25223.00	-7.64	43.31	10.99	43.33	0.000023	1.82	27284.96	1674.07	0.05
W100-00-00_0805	119495.9	10PCT_10yr	8535.00	-7.21	30.44		30.44	0.000009	0.97	20401.08	1227.02	0.03
W100-00-00_0805	119495.9	2PCT_50yr	14033.00	-7.21	34.12		34.13	0.000015	1.29	25064.12	1298.59	0.04
W100-00-00_0805	119495.9	1PCT_100yr	17393.00	-7.21	37.35		37.37	0.000014	1.37	29337.34	1336.88	0.04
W100-00-00_0805	119495.9	0.2PCT_500yr	25223.00	-7.21	43.30		43.32	0.000016	1.57	38062.25	1989.40	0.04
W100-00-00_0805	118667.7	10PCT_10yr	8535.00	-8.56	30.40		30.43	0.000022	1.56	10523.03	697.97	0.05
W100-00-00_0805	118667.7	2PCT_50yr	14033.00	-8.56	34.06		34.10	0.000036	2.13	13305.81	796.10	0.06
W100-00-00_0805	118667.7	1PCT_100yr	17393.00	-8.56	37.29		37.34	0.000036	2.25	16113.73	922.82	0.06
W100-00-00_0805	118667.7	0.2PCT_500yr	25223.00	-8.56	43.23		43.29	0.000041	2.63	24522.19	2198.82	0.07
W100-00-00_0805	118466.1	10PCT_10yr	8535.00	-8.89	30.38	1.23	30.42	0.000028	1.77	8190.28	789.55	0.05
W100-00-00_0805	118466.1	2PCT_50yr	14033.00	-8.89	34.02	3.90	34.09	0.000046	2.42	11170.29	845.49	0.07
W100-00-00_0805	118466.1	1PCT_100yr	17393.00	-8.89	37.26	5.29	37.33	0.000046	2.56	14340.36	1126.47	0.07
W100-00-00_0805	118466.1	0.2PCT_500yr	25223.00	-8.89	43.20	8.04	43.28	0.000049	2.88	23077.43	2161.86	0.07
W100-00-00_0805	118418.1		Bridge									
W100-00-00_0805	118370.1	10PCT_10yr	8535.00	-8.87	30.35	1.25	30.39	0.000029	1.77	8152.25	788.70	0.05
W100-00-00_0805	118370.1	2PCT_50yr	14033.00	-8.87	34.00	3.92	34.07	0.000047	2.43	11131.54	844.71	0.07
W100-00-00_0805	118370.1	1PCT_100yr	17393.00	-8.87	37.23	5.31	37.30	0.000047	2.57	14281.25	1122.31	0.07
W100-00-00_0805	118370.1	0.2PCT_500yr	25223.00	-8.87	43.16	8.06	43.24	0.000049	2.88	22939.49	2142.04	0.07
W100-00-00_0805	117845.4	10PCT_10yr	8535.00	-7.26	30.34		30.37	0.000027	1.63	8949.30	567.28	0.05
W100-00-00_0805	117845.4	2PCT_50yr	14033.00	-7.26	33.98		34.03	0.000043	2.21	11196.11	661.79	0.07
W100-00-00_0805	117845.4	1PCT_100yr	17393.00	-7.26	37.21		37.26	0.000043	2.35	13730.28	833.06	0.07
W100-00-00_0805	117845.4	0.2PCT_500yr	25223.00	-7.26	43.14		43.20	0.000045	2.64	20876.44	1782.93	0.07
W100-00-00_0805	117204.3	10PCT_10yr	8535.00	-4.60	30.33		30.35	0.000026	1.54	10726.87	646.07	0.05
W100-00-00_0805	117204.3	2PCT_50yr	14033.00	-4.60	33.96		34.00	0.000042	2.10	13125.70	681.13	0.06
W100-00-00_0805	117204.3	1PCT_100yr	17393.00	-4.60	37.19		37.23	0.000041	2.22	15685.83	1083.08	0.06
W100-00-00_0805	117204.3	0.2PCT_500yr	25223.00	-4.60	43.12		43.17	0.000041	2.45	23689.61	1630.90	0.07
W100-00-00_0805	116395.7	10PCT_10yr	8535.00	-3.88	30.31		30.33	0.000023	1.53	9638.88	499.28	0.05
W100-00-00_0805	116395.7	2PCT_50yr	14033.00	-3.88	33.91		33.97	0.000040	2.17	11478.37	522.27	0.06
W100-00-00_0805	116395.7	1PCT_100yr	17393.00	-3.88	37.14		37.20	0.000044	2.39	13196.21	543.59	0.07
W100-00-00_0805	116395.7	0.2PCT_500yr	25223.00	-3.88	43.03		43.13	0.000055	2.94	19155.52	1535.10	0.08
W100-00-00_0805	116167.6	10PCT_10yr	8535.00	-3.68	30.27	3.80	30.32	0.000037	1.92	5863.01	270.08	0.06
W100-00-00_0805	116167.6	2PCT_50yr	14033.00	-3.68	33.83	6.02	33.94	0.000067	2.78	6782.77	281.01	0.08
W100-00-00_0805	116167.6	1PCT_100yr	17393.00	-3.68	37.03	7.26	37.16	0.000075	3.11	7608.40	290.81	0.09
W100-00-00_0805	116167.6	0.2PCT_500yr	25223.00	-3.68	42.93	9.79	43.09	0.000082	3.60	13975.50	1650.90	0.10
W100-00-00_0805	116121.9		Bridge									
W100-00-00_0805	116076.2	10PCT_10yr	8535.00	-3.86	30.09	3.61	30.14	0.000037	1.92	5864.13	270.09	0.06

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	116076.2	2PCT_50yr	14033.00	-3.86	33.78	5.84	33.89	0.000066	2.76	6816.69	281.41	0.08
W100-00-00_0805	116076.2	1PCT_100yr	17393.00	-3.86	36.92	7.08	37.06	0.000074	3.10	7627.24	291.04	0.09
W100-00-00_0805	116076.2	0.2PCT_500yr	25223.00	-3.86	42.83	9.61	43.00	0.000082	3.58	14122.90	1665.61	0.10
W100-00-00_0805	115655.5	10PCT_10yr	8535.00	-5.03	30.07	4.01	30.13	0.000033	2.06	6066.12	536.58	0.07
W100-00-00_0805	115655.5	2PCT_50yr	14033.00	-5.03	33.76	6.39	33.86	0.000053	2.77	8175.38	597.78	0.08
W100-00-00_0805	115655.5	1PCT_100yr	17393.00	-5.03	36.91	7.63	37.02	0.000054	2.90	10225.56	730.14	0.08
W100-00-00_0805	115655.5	0.2PCT_500yr	25223.00	-5.03	42.83	10.37	42.95	0.000054	3.31	16516.07	1433.03	0.09
W100-00-00_0805	115635.5		Bridge									
W100-00-00_0805	115615.5	10PCT_10yr	8535.00	-5.27	30.06	3.77	30.12	0.000032	2.04	6194.75	544.34	0.06
W100-00-00_0805	115615.5	2PCT_50yr	14033.00	-5.27	33.75	6.15	33.85	0.000051	2.77	8315.62	601.09	0.08
W100-00-00_0805	115615.5	1PCT_100yr	17393.00	-5.27	36.90	7.39	37.01	0.000052	2.96	10396.91	744.21	0.08
W100-00-00_0805	115615.5	0.2PCT_500yr	25223.00	-5.27	42.80	10.13	42.92	0.000053	3.28	16826.95	1458.27	0.09
W100-00-00_0805	115573.5	10PCT_10yr	8535.00	-5.72	30.07	2.70	30.11	0.000024	1.73	7396.36	493.76	0.05
W100-00-00_0805	115573.5	2PCT_50yr	14033.00	-5.72	33.77	5.16	33.84	0.000040	2.39	9240.42	504.49	0.07
W100-00-00_0805	115573.5	1PCT_100yr	17393.00	-5.72	36.91	6.45	36.99	0.000042	2.59	10842.60	513.64	0.07
W100-00-00_0805	115573.5	0.2PCT_500yr	25223.00	-5.72	42.81	9.08	42.90	0.000046	2.45	16272.45	1378.28	0.06
W100-00-00_0805	115553.5		Bridge									
W100-00-00_0805	115533.5	10PCT_10yr	8535.00	-6.77	30.07	1.65	30.10	0.000021	1.64	7915.40	496.80	0.05
W100-00-00_0805	115533.5	2PCT_50yr	14033.00	-6.77	33.76	4.12	33.82	0.000035	2.28	9769.25	507.53	0.07
W100-00-00_0805	115533.5	1PCT_100yr	17393.00	-6.77	36.91	5.40	36.98	0.000037	2.49	11380.19	659.36	0.07
W100-00-00_0805	115533.5	0.2PCT_500yr	25223.00	-6.77	42.79	8.03	42.87	0.000041	2.87	17753.79	1460.34	0.07
W100-00-00_0805	115214.0	10PCT_10yr	8535.00	-7.96	30.06	0.66	30.10	0.000020	1.63	6508.68	326.99	0.05
W100-00-00_0805	115214.0	2PCT_50yr	14033.00	-7.96	33.72	2.78	33.81	0.000037	2.37	7638.91	369.71	0.07
W100-00-00_0805	115214.0	1PCT_100yr	17393.00	-7.96	36.85	3.92	36.96	0.000042	2.52	9285.55	610.36	0.07
W100-00-00_0805	115214.0	0.2PCT_500yr	25223.00	-7.96	42.71	6.30	42.84	0.000050	1.23	15155.38	1317.35	0.03
W100-00-00_0805	115168.5		Bridge									
W100-00-00_0805	115123.0	10PCT_10yr	8535.00	-8.12	30.03	0.50	30.07	0.000020	1.63	6548.86	327.82	0.05
W100-00-00_0805	115123.0	2PCT_50yr	14033.00	-8.12	33.67	2.62	33.76	0.000037	2.37	7674.44	372.43	0.07
W100-00-00_0805	115123.0	1PCT_100yr	17393.00	-8.12	36.81	3.76	36.91	0.000042	2.66	9354.73	626.79	0.07
W100-00-00_0805	115123.0	0.2PCT_500yr	25223.00	-8.12	42.61	6.14	42.75	0.000050	3.18	15241.12	1319.19	0.08
W100-00-00_0805	114890.5	10PCT_10yr	8535.00	-8.56	30.02	1.24	30.06	0.000025	1.74	6830.89	416.98	0.06
W100-00-00_0805	114890.5	2PCT_50yr	14033.00	-8.56	33.65	3.57	33.74	0.000046	2.45	8690.62	605.77	0.07
W100-00-00_0805	114890.5	1PCT_100yr	17393.00	-8.56	36.78	4.82	36.89	0.000050	2.33	11591.39	1280.62	0.07
W100-00-00_0805	114890.5	0.2PCT_500yr	25223.00	-8.56	42.59	7.40	42.73	0.000057	3.28	21453.06	1910.39	0.09
W100-00-00_0805	114864.5		Bridge									
W100-00-00_0805	114838.5	10PCT_10yr	8535.00	-9.27	29.36	0.53	29.41	0.000025	1.74	6852.65	417.67	0.06
W100-00-00_0805	114838.5	2PCT_50yr	14033.00	-9.27	33.63	2.86	33.72	0.000043	2.47	9162.11	837.42	0.07
W100-00-00_0805	114838.5	1PCT_100yr	17393.00	-9.27	36.77	4.11	36.88	0.000047	2.73	12443.54	1369.98	0.08
W100-00-00_0805	114838.5	0.2PCT_500yr	25223.00	-9.27	42.58	6.68	42.71	0.000052	3.18	22792.95	1936.30	0.08
W100-00-00_0805	114492.0	10PCT_10yr	8535.00	-10.48	29.35		29.40	0.000030	1.76	6382.87	348.01	0.06
W100-00-00_0805	114492.0	2PCT_50yr	14033.00	-10.48	33.61		33.70	0.000049	2.47	7982.46	404.97	0.08
W100-00-00_0805	114492.0	1PCT_100yr	17393.00	-10.48	36.75		36.86	0.000053	2.75	9913.68	930.49	0.08
W100-00-00_0805	114492.0	0.2PCT_500yr	25223.00	-10.48	42.55		42.69	0.000058	3.18	18558.57	1746.13	0.09
W100-00-00_0805	114195.9	10PCT_10yr	8535.00	-11.52	29.35	0.77	29.39	0.000027	1.71	5845.68	322.03	0.06
W100-00-00_0805	114195.9	2PCT_50yr	14033.00	-11.52	33.60	3.73	33.69	0.000043	2.37	7187.52	373.46	0.07
W100-00-00_0805	114195.9	1PCT_100yr	17393.00	-11.52	36.74	5.12	36.84	0.000046	2.62	8904.54	799.93	0.08
W100-00-00_0805	114195.9	0.2PCT_500yr	25223.00	-11.52	42.54	7.92	42.67	0.000052	3.07	16565.11	1842.96	0.08
W100-00-00_0805	114168.9		Bridge									
W100-00-00_0805	114141.9	10PCT_10yr	8535.00	-10.83	29.33	1.46	29.38	0.000030	1.76	5628.09	317.60	0.06
W100-00-00_0805	114141.9	2PCT_50yr	14033.00	-10.83	33.51	4.41	33.60	0.000047	2.44	6938.44	361.94	0.08
W100-00-00_0805	114141.9	1PCT_100yr	17393.00	-10.83	36.62	5.82	36.72	0.000051	2.69	8322.75	594.21	0.08
W100-00-00_0805	114141.9	0.2PCT_500yr	25223.00	-10.83	42.49	8.61	42.62	0.000057	3.16	15201.73	1794.44	0.09
W100-00-00_0805	114097.4	10PCT_10yr	8535.00	-7.46	29.34	2.81	29.37	0.000025	1.59	6484.20	379.44	0.05
W100-00-00_0805	114097.4	2PCT_50yr	14033.00	-7.46	33.52	5.26	33.59	0.000038	2.16	8091.66	388.90	0.07
W100-00-00_0805	114097.4	1PCT_100yr	17393.00	-7.46	36.63	6.54	36.71	0.000040	2.36	10120.51	967.58	0.07
W100-00-00_0805	114097.4	0.2PCT_500yr	25223.00	-7.46	42.51	9.12	42.60	0.000042	2.69	18779.55	1870.86	0.08
W100-00-00_0805	114070.4		Bridge									
W100-00-00_0805	114043.4	10PCT_10yr	8535.00	-7.72	28.33	2.55	28.37	0.000028	1.65	6200.28	377.75	0.06
W100-00-00_0805	114043.4	2PCT_50yr	14033.00	-7.72	33.47	5.00	33.54	0.000037	2.15	8173.79	394.20	0.07
W100-00-00_0805	114043.4	1PCT_100yr	17393.00	-7.72	36.56	6.28	36.63	0.000039	2.35	10302.24	1000.98	0.07
W100-00-00_0805	114043.4	0.2PCT_500yr	25223.00	-7.72	42.47	8.86	42.56	0.000041	2.67	19203.22	1880.65	0.07
W100-00-00_0805	113644.0	10PCT_10yr	8535.00	-8.91	28.29		28.35	0.000047	1.91	5131.30	360.31	0.07
W100-00-00_0805	113644.0	2PCT_50yr	14033.00	-8.91	33.42		33.51	0.000060	2.48	7639.81	578.01	0.08
W100-00-00_0805	113644.0	1PCT_100yr	17393.00	-8.91	36.50		36.60	0.000062	2.71	9497.53	628.41	0.09

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	113644.0	0.2PCT_500yr	25223.00	-8.91	42.38		42.52	0.000067	3.16	14690.08	1139.22	0.09
W100-00-00_0805	113411.6	10PCT_10yr	8535.00	-9.61	28.29	-0.01	28.34	0.000025	1.75	5296.21	370.53	0.05
W100-00-00_0805	113411.6	2PCT_50yr	14033.00	-9.61	33.41	2.48	33.50	0.000039	2.44	6243.17	455.90	0.07
W100-00-00_0805	113411.6	1PCT_100yr	17393.00	-9.61	36.48	3.68	36.59	0.000046	2.77	6810.85	563.40	0.08
W100-00-00_0805	113411.6	0.2PCT_500yr	25223.00	-9.61	42.39	6.12	42.50	0.000046	3.05	17244.13	1161.43	0.08
W100-00-00_0805	113374.3		Bridge									
W100-00-00_0805	113337.0	10PCT_10yr	8535.00	-9.65	28.17	-0.05	28.22	0.000025	1.75	5282.16	370.33	0.05
W100-00-00_0805	113337.0	2PCT_50yr	14033.00	-9.65	33.33	2.44	33.41	0.000040	2.44	6235.42	454.84	0.07
W100-00-00_0805	113337.0	1PCT_100yr	17393.00	-9.65	36.34	3.64	36.45	0.000046	2.78	6791.89	559.89	0.08
W100-00-00_0805	113337.0	0.2PCT_500yr	25223.00	-9.65	42.24	6.08	42.35	0.000047	3.06	17123.07	1155.29	0.08
W100-00-00_0805	113266.4	10PCT_10yr	8535.00	-9.11	28.12	2.44	28.21	0.000055	2.35	4306.84	237.90	0.08
W100-00-00_0805	113266.4	2PCT_50yr	14033.00	-9.11	33.24	5.39	33.39	0.000081	3.18	5666.52	354.90	0.10
W100-00-00_0805	113266.4	1PCT_100yr	17393.00	-9.11	36.24	6.93	36.42	0.000089	3.55	6890.56	492.25	0.11
W100-00-00_0805	113266.4	0.2PCT_500yr	25223.00	-9.11	42.07	10.05	42.31	0.000102	4.21	12167.78	1351.73	0.12
W100-00-00_0805	113238.6		Bridge									
W100-00-00_0805	113210.8	10PCT_10yr	8535.00	-9.46	27.72	2.08	27.80	0.000056	2.35	4294.65	237.71	0.08
W100-00-00_0805	113210.8	2PCT_50yr	14033.00	-9.46	33.21	5.04	33.35	0.000078	3.15	5772.44	364.12	0.10
W100-00-00_0805	113210.8	1PCT_100yr	17393.00	-9.46	36.17	6.58	36.34	0.000087	3.52	7034.84	576.10	0.10
W100-00-00_0805	113210.8	0.2PCT_500yr	25223.00	-9.46	41.90	9.70	42.14	0.000100	4.18	12419.50	1357.39	0.11
W100-00-00_0805	112974.0	10PCT_10yr	8535.00	-10.69	27.71	0.51	27.79	0.000066	2.33	4106.31	199.72	0.08
W100-00-00_0805	112974.0	2PCT_50yr	14033.00	-10.69	33.19	3.83	33.33	0.000090	3.11	5228.87	209.73	0.10
W100-00-00_0805	112974.0	1PCT_100yr	17393.00	-10.69	36.14	5.99	36.32	0.000101	3.48	5878.78	265.70	0.10
W100-00-00_0805	112974.0	0.2PCT_500yr	25223.00	-10.69	41.86	9.60	42.11	0.000119	4.20	10390.89	1341.54	0.12
W100-00-00_0805	112944.9		Bridge									
W100-00-00_0805	112915.8	10PCT_10yr	8535.00	-10.82	27.56	0.38	27.64	0.000066	2.33	4101.89	199.68	0.08
W100-00-00_0805	112915.8	2PCT_50yr	14033.00	-10.82	33.03	3.70	33.17	0.000091	3.11	5222.18	209.73	0.10
W100-00-00_0805	112915.8	1PCT_100yr	17393.00	-10.82	36.08	5.87	36.26	0.000101	3.49	5897.70	268.95	0.10
W100-00-00_0805	112915.8	0.2PCT_500yr	25223.00	-10.82	41.70	9.47	41.95	0.000119	4.20	10350.43	1340.62	0.12
W100-00-00_0805	112575.5	10PCT_10yr	8535.00	-9.20	27.55	1.97	27.61	0.000049	2.10	4867.55	239.49	0.07
W100-00-00_0805	112575.5	2PCT_50yr	14033.00	-9.20	33.02	5.93	33.13	0.000070	2.84	6758.64	616.35	0.09
W100-00-00_0805	112575.5	1PCT_100yr	17393.00	-9.20	36.08	7.47	36.21	0.000076	3.13	9226.57	938.83	0.09
W100-00-00_0805	112575.5	0.2PCT_500yr	25223.00	-9.20	41.71	10.13	41.88	0.000085	3.66	16988.22	1860.99	0.10
W100-00-00_0805	112534.5		Bridge									
W100-00-00_0805	112493.5	10PCT_10yr	8535.00	-9.47	27.21	1.70	27.27	0.000049	2.11	4853.56	239.37	0.07
W100-00-00_0805	112493.5	2PCT_50yr	14033.00	-9.47	32.95	5.66	33.06	0.000068	2.82	6885.72	644.79	0.09
W100-00-00_0805	112493.5	1PCT_100yr	17393.00	-9.47	36.01	7.20	36.14	0.000074	3.11	9415.79	952.35	0.09
W100-00-00_0805	112493.5	0.2PCT_500yr	25223.00	-9.47	41.67	9.87	41.84	0.000083	3.63	17422.82	1899.25	0.10
W100-00-00_0805	112003.3	10PCT_10yr	8535.00	-9.69	27.20	1.61	27.25	0.000027	1.66	5817.23	284.57	0.06
W100-00-00_0805	112003.3	2PCT_50yr	14033.00	-9.69	32.94	3.64	33.02	0.000038	2.22	7413.32	307.48	0.07
W100-00-00_0805	112003.3	1PCT_100yr	17393.00	-9.69	36.00	4.73	36.09	0.000042	2.49	8802.68	480.86	0.07
W100-00-00_0805	112003.3	0.2PCT_500yr	25223.00	-9.69	41.66	6.99	41.79	0.000052	3.03	13972.51	1284.29	0.08
W100-00-00_0805	111953.3		Bridge									
W100-00-00_0805	111903.3	10PCT_10yr	8535.00	-9.84	27.18	1.45	27.22	0.000027	1.65	5852.29	285.08	0.05
W100-00-00_0805	111903.3	2PCT_50yr	14033.00	-9.84	32.83	3.50	32.90	0.000038	2.21	7424.24	308.85	0.07
W100-00-00_0805	111903.3	1PCT_100yr	17393.00	-9.84	35.92	4.58	36.01	0.000042	2.49	8836.37	483.05	0.07
W100-00-00_0805	111903.3	0.2PCT_500yr	25223.00	-9.84	41.56	6.84	41.69	0.000051	3.02	14045.46	1296.81	0.08
W100-00-00_0805	111853.5	10PCT_10yr	8535.00	-9.86	27.18	1.11	27.22	0.000024	1.60	5515.91	225.93	0.05
W100-00-00_0805	111853.5	2PCT_50yr	14033.00	-9.86	32.83	3.44	32.90	0.000034	2.18	6837.42	286.08	0.07
W100-00-00_0805	111853.5	1PCT_100yr	17393.00	-9.86	35.91	4.69	36.01	0.000039	2.46	8116.86	477.85	0.07
W100-00-00_0805	111853.5	0.2PCT_500yr	25223.00	-9.86	41.55	7.07	41.69	0.000049	3.02	13183.33	1258.84	0.08
W100-00-00_0805	111818.6		Bridge									
W100-00-00_0805	111783.7	10PCT_10yr	8535.00	-8.67	27.16	2.31	27.21	0.000028	1.67	5245.57	222.29	0.06
W100-00-00_0805	111783.7	2PCT_50yr	14033.00	-8.67	32.74	4.63	32.82	0.000039	2.26	6507.16	250.85	0.07
W100-00-00_0805	111783.7	1PCT_100yr	17393.00	-8.67	35.85	5.88	35.95	0.000044	2.56	7544.21	429.14	0.08
W100-00-00_0805	111783.7	0.2PCT_500yr	25223.00	-8.67	41.49	8.26	41.64	0.000055	3.14	11700.91	1139.15	0.09
W100-00-00_0805	111626.7	10PCT_10yr	8535.00	-11.83	27.15	0.77	27.20	0.000034	1.84	5441.92	229.26	0.06
W100-00-00_0805	111626.7	2PCT_50yr	14033.00	-11.83	32.72	3.49	32.81	0.000050	2.52	6928.10	409.87	0.08
W100-00-00_0805	111626.7	1PCT_100yr	17393.00	-11.83	35.82	4.87	35.94	0.000056	2.83	8423.34	572.97	0.08
W100-00-00_0805	111626.7	0.2PCT_500yr	25223.00	-11.83	41.46	7.92	41.62	0.000068	3.43	13477.09	1150.76	0.09
W100-00-00_0805	111518.6		Bridge									
W100-00-00_0805	111410.5	10PCT_10yr	8535.00	-11.23	27.12	1.37	27.17	0.000037	1.89	5297.47	228.20	0.06
W100-00-00_0805	111410.5	2PCT_50yr	14033.00	-11.23	32.66	4.09	32.76	0.000053	2.57	6669.63	368.18	0.08
W100-00-00_0805	111410.5	1PCT_100yr	17393.00	-11.23	35.66	5.48	35.78	0.000060	2.90	8013.27	517.34	0.09

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	111410.5	0.2PCT_500yr	25223.00	-11.23	41.31	8.52	41.48	0.000073	3.52	12626.09	1118.72	0.10
W100-00-00_0805	110876.6	10PCT_10yr	8535.00	-10.43	27.11	-0.98	27.15	0.000023	1.75	6846.90	331.17	0.05
W100-00-00_0805	110876.6	2PCT_50yr	14033.00	-10.43	32.65	1.25	32.72	0.000034	2.36	10573.56	1064.10	0.07
W100-00-00_0805	110876.6	1PCT_100yr	17393.00	-10.43	35.65	2.40	35.74	0.000038	2.61	14173.28	1376.80	0.07
W100-00-00_0805	110876.6	0.2PCT_500yr	25223.00	-10.43	41.31	4.82	41.42	0.000043	3.03	23006.17	1652.53	0.08
W100-00-00_0805	110837.8		Bridge									
W100-00-00_0805	110799.0	10PCT_10yr	8535.00	-10.72	27.08	-1.27	27.12	0.000023	1.73	6898.89	342.70	0.05
W100-00-00_0805	110799.0	2PCT_50yr	14033.00	-10.72	32.60	0.96	32.68	0.000033	2.34	10835.98	1078.48	0.07
W100-00-00_0805	110799.0	1PCT_100yr	17393.00	-10.72	35.62	2.11	35.70	0.000037	2.58	14530.85	1392.85	0.07
W100-00-00_0805	110799.0	0.2PCT_500yr	25223.00	-10.72	41.27	4.54	41.38	0.000042	3.00	23428.27	1657.05	0.08
W100-00-00_0805	110672.7	10PCT_10yr	8535.00	-13.25	27.07	-1.88	27.12	0.000032	1.82	7111.50	659.07	0.06
W100-00-00_0805	110672.7	2PCT_50yr	14033.00	-13.25	32.60	1.04	32.67	0.000042	2.33	11931.22	1101.00	0.07
W100-00-00_0805	110672.7	1PCT_100yr	17393.00	-13.25	35.61	2.49	35.70	0.000045	2.56	15696.36	1341.44	0.07
W100-00-00_0805	110672.7	0.2PCT_500yr	25223.00	-13.25	41.27	5.56	41.37	0.000049	2.92	23867.48	1544.19	0.08
W100-00-00_0805	110643.7		Bridge									
W100-00-00_0805	110614.7	10PCT_10yr	8535.00	-12.75	27.06	-1.37	27.11	0.000034	1.86	6812.11	639.79	0.06
W100-00-00_0805	110614.7	2PCT_50yr	14033.00	-12.75	32.57	1.54	32.65	0.000045	2.39	11368.82	1045.21	0.07
W100-00-00_0805	110614.7	1PCT_100yr	17393.00	-12.75	35.59	2.99	35.68	0.000048	2.62	15002.79	1321.56	0.08
W100-00-00_0805	110614.7	0.2PCT_500yr	25223.00	-12.75	41.23	6.06	41.34	0.000051	2.98	23042.29	1516.38	0.08
W100-00-00_0805	110200.2	10PCT_10yr	38441.00	-9.11	25.88	11.11	26.76	0.000661	8.12	6776.02	438.76	0.28
W100-00-00_0805	110200.2	2PCT_50yr	51660.00	-9.11	31.33	13.91	32.29	0.000582	8.64	9424.81	526.96	0.27
W100-00-00_0805	110200.2	1PCT_100yr	59250.00	-9.11	34.34	14.74	35.32	0.000540	8.84	11060.39	566.28	0.26
W100-00-00_0805	110200.2	0.2PCT_500yr	80561.00	-9.11	39.69	19.94	40.91	0.000574	10.03	14889.81	796.35	0.28
W100-00-00_0805	110154.2		Bridge									
W100-00-00_0805	110108.2	10PCT_10yr	38441.00	-9.31	25.47	10.91	26.37	0.000681	8.20	6684.25	433.75	0.28
W100-00-00_0805	110108.2	2PCT_50yr	51660.00	-9.31	30.92	13.70	31.89	0.000597	8.71	9313.96	524.31	0.27
W100-00-00_0805	110108.2	1PCT_100yr	59250.00	-9.31	33.89	14.54	34.89	0.000555	8.92	10923.19	562.32	0.27
W100-00-00_0805	110108.2	0.2PCT_500yr	80561.00	-9.31	39.02	19.74	40.28	0.000602	10.19	14513.98	789.46	0.29
W100-00-00_0805	109551.7	10PCT_10yr	38441.00	-14.28	25.27	4.90	25.97	0.000424	6.95	6871.41	334.13	0.22
W100-00-00_0805	109551.7	2PCT_50yr	51660.00	-14.28	30.71	8.56	31.55	0.000413	7.67	8746.63	354.74	0.23
W100-00-00_0805	109551.7	1PCT_100yr	59250.00	-14.28	33.68	10.44	34.58	0.000403	8.00	9816.95	365.98	0.23
W100-00-00_0805	109551.7	0.2PCT_500yr	80561.00	-14.28	38.77	14.76	39.94	0.000461	9.29	15668.77	2229.99	0.25
W100-00-00_0805	109518.7		Bridge									
W100-00-00_0805	109485.7	10PCT_10yr	38441.00	-15.31	24.45	3.87	25.14	0.000413	6.90	6940.46	334.91	0.22
W100-00-00_0805	109485.7	2PCT_50yr	51660.00	-15.31	29.88	7.53	30.70	0.000405	7.62	8814.64	355.47	0.22
W100-00-00_0805	109485.7	1PCT_100yr	59250.00	-15.31	32.85	9.41	33.73	0.000396	7.95	9888.00	366.72	0.23
W100-00-00_0805	109485.7	0.2PCT_500yr	80561.00	-15.31	38.24	13.72	39.36	0.000437	9.12	16784.20	2245.47	0.24
W100-00-00_0805	109440.2	10PCT_10yr	38441.00	-16.48	24.22	4.30	25.07	0.000475	7.65	6468.54	320.55	0.24
W100-00-00_0805	109440.2	2PCT_50yr	51660.00	-16.48	29.60	7.58	30.62	0.000478	8.51	8214.12	328.42	0.24
W100-00-00_0805	109440.2	1PCT_100yr	59250.00	-16.48	32.55	9.26	33.65	0.000473	8.90	9188.36	332.73	0.25
W100-00-00_0805	109440.2	0.2PCT_500yr	80561.00	-16.48	37.66	13.79	39.19	0.000573	10.60	11621.38	2390.69	0.28
W100-00-00_0805	109395.2		Bridge									
W100-00-00_0805	109350.2	10PCT_10yr	38441.00	-16.89	23.89	3.89	24.73	0.000471	7.63	6491.65	320.66	0.24
W100-00-00_0805	109350.2	2PCT_50yr	51660.00	-16.89	29.19	7.18	30.21	0.000478	8.51	8214.07	328.42	0.24
W100-00-00_0805	109350.2	1PCT_100yr	59250.00	-16.89	31.82	8.85	32.94	0.000487	8.99	9083.16	332.27	0.25
W100-00-00_0805	109350.2	0.2PCT_500yr	80561.00	-16.89	37.34	13.38	38.88	0.000568	10.57	11698.64	2392.72	0.28
W100-00-00_0805	109119.0	10PCT_10yr	38441.00	-17.14	23.53	5.52	24.55	0.000684	8.27	5166.79	340.54	0.27
W100-00-00_0805	109119.0	2PCT_50yr	51660.00	-17.14	29.01	9.12	30.07	0.000603	8.70	7002.15	448.78	0.26
W100-00-00_0805	109119.0	1PCT_100yr	59250.00	-17.14	31.73	10.94	32.80	0.000566	8.85	7974.53	502.82	0.25
W100-00-00_0805	109119.0	0.2PCT_500yr	80561.00	-17.14	37.43	15.01	38.54	0.000528	9.40	14184.91	2420.41	0.25
W100-00-00_0805	109103.1		Bridge									
W100-00-00_0805	109087.2	10PCT_10yr	38441.00	-17.55	23.29	5.11	24.29	0.000669	8.20	5218.13	342.86	0.27
W100-00-00_0805	109087.2	2PCT_50yr	51660.00	-17.55	28.80	8.71	29.84	0.000588	8.62	7071.56	451.22	0.26
W100-00-00_0805	109087.2	1PCT_100yr	59250.00	-17.55	31.47	10.52	32.53	0.000556	8.80	8033.55	506.66	0.25
W100-00-00_0805	109087.2	0.2PCT_500yr	80561.00	-17.55	36.97	14.61	38.08	0.000531	9.42	14120.45	2411.19	0.25
W100-00-00_0805	108565.3	10PCT_10yr	38441.00	-12.77	23.21	4.32	23.82	0.000430	6.28	6121.40	248.08	0.22
W100-00-00_0805	108565.3	2PCT_50yr	51660.00	-12.77	28.70	6.87	29.43	0.000412	6.84	8287.10	504.84	0.22
W100-00-00_0805	108565.3	1PCT_100yr	59250.00	-12.77	31.37	8.22	32.15	0.000401	7.14	9685.10	546.84	0.22
W100-00-00_0805	108565.3	0.2PCT_500yr	80561.00	-12.77	36.79	11.65	37.77	0.000419	8.10	16473.76	2308.26	0.23
W100-00-00_0805	108334.0	10PCT_10yr	38441.00	-14.06	23.17		23.70	0.000356	5.88	6567.94	271.65	0.20
W100-00-00_0805	108334.0	2PCT_50yr	51660.00	-14.06	28.68		29.31	0.000343	6.40	10076.46	749.02	0.20
W100-00-00_0805	108334.0	1PCT_100yr	59250.00	-14.06	31.36		32.03	0.000340	6.65	12204.91	840.53	0.21
W100-00-00_0805	108334.0	0.2PCT_500yr	80561.00	-14.06	36.81		37.63	0.000354	7.49	19585.77	2347.06	0.22

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	107179.4	10PCT_10yr	38563.00	-20.52	22.33	1.36	23.09	0.000676	7.00	5795.00	336.09	0.24
W100-00-00_0805	107179.4	2PCT_50yr	51891.00	-20.52	27.81	4.39	28.71	0.000632	7.68	7930.70	395.44	0.24
W100-00-00_0805	107179.4	1PCT_100yr	59499.00	-20.52	30.43	5.98	31.42	0.000627	8.07	8970.90	396.53	0.24
W100-00-00_0805	107179.4	0.2PCT_500yr	80918.00	-20.52	35.63	10.08	36.94	0.000704	9.39	11083.80	1236.30	0.26
W100-00-00_0805	107158.9		Bridge									
W100-00-00_0805	107138.4	10PCT_10yr	38563.00	-20.19	22.15	1.69	22.94	0.000723	7.14	5629.01	321.52	0.25
W100-00-00_0805	107138.4	2PCT_50yr	51891.00	-20.19	27.61	4.72	28.54	0.000671	7.82	7720.63	395.22	0.25
W100-00-00_0805	107138.4	1PCT_100yr	59499.00	-20.19	30.22	6.32	31.24	0.000664	8.21	8753.89	396.31	0.25
W100-00-00_0805	107138.4	0.2PCT_500yr	80918.00	-20.19	35.33	10.42	36.70	0.000745	9.56	10828.42	923.58	0.27
W100-00-00_0805	106594.0	10PCT_10yr	38563.00	-16.70	21.99	0.72	22.58	0.000342	6.20	6402.42	247.38	0.20
W100-00-00_0805	106594.0	2PCT_50yr	51891.00	-16.70	27.44	3.96	28.19	0.000362	6.99	7806.55	268.20	0.21
W100-00-00_0805	106594.0	1PCT_100yr	59499.00	-16.70	30.04	5.27	30.88	0.000378	7.42	8517.47	278.15	0.22
W100-00-00_0805	106594.0	0.2PCT_500yr	80918.00	-16.70	35.12	8.53	36.30	0.000447	8.77	10374.36	1176.78	0.24
W100-00-00_0805	106151.4	10PCT_10yr	38563.00	-13.85	21.62	3.57	22.36	0.000486	6.94	5887.83	254.90	0.24
W100-00-00_0805	106151.4	2PCT_50yr	51891.00	-13.85	27.04	6.80	27.95	0.000489	7.70	7333.94	278.83	0.24
W100-00-00_0805	106151.4	1PCT_100yr	59499.00	-13.85	29.63	8.11	30.64	0.000502	8.14	8070.27	291.23	0.25
W100-00-00_0805	106151.4	0.2PCT_500yr	80918.00	-13.85	34.61	11.41	36.00	0.000595	9.34	9578.46	625.31	0.27
W100-00-00_0805	106131.1		Bridge									
W100-00-00_0805	106110.8	10PCT_10yr	38563.00	-12.53	21.40	4.89	22.23	0.000585	7.37	5499.90	248.35	0.26
W100-00-00_0805	106110.8	2PCT_50yr	51891.00	-12.53	26.80	8.12	27.82	0.000574	8.12	6904.85	271.34	0.26
W100-00-00_0805	106110.8	1PCT_100yr	59499.00	-12.53	29.37	9.43	30.49	0.000583	8.55	7617.73	283.67	0.27
W100-00-00_0805	106110.8	0.2PCT_500yr	80918.00	-12.53	34.35	12.73	35.88	0.000685	10.00	9088.49	307.55	0.29
W100-00-00_0805	105705.4	10PCT_10yr	38563.00	-18.22	21.25	2.17	21.97	0.000431	6.79	5677.92	253.99	0.25
W100-00-00_0805	105705.4	2PCT_50yr	51891.00	-18.22	26.70	5.15	27.54	0.000397	7.35	7218.30	307.13	0.25
W100-00-00_0805	105705.4	1PCT_100yr	59499.00	-18.22	29.28	6.68	30.20	0.000393	7.69	8052.03	340.30	0.25
W100-00-00_0805	105705.4	0.2PCT_500yr	80918.00	-18.22	34.29	10.60	35.50	0.000442	8.87	10415.24	1248.51	0.27
W100-00-00_0805	105667.4		Bridge									
W100-00-00_0805	105629.4	10PCT_10yr	38563.00	-18.43	20.95	1.96	21.68	0.000437	6.82	5655.14	252.93	0.25
W100-00-00_0805	105629.4	2PCT_50yr	51891.00	-18.43	26.39	4.94	27.24	0.000401	7.38	7188.58	306.33	0.25
W100-00-00_0805	105629.4	1PCT_100yr	59499.00	-18.43	28.97	6.47	29.89	0.000397	7.71	8017.01	338.87	0.25
W100-00-00_0805	105629.4	0.2PCT_500yr	80918.00	-18.43	33.95	10.38	35.17	0.000447	8.90	10332.12	1231.02	0.27
W100-00-00_0805	105211.0	10PCT_10yr	38563.00	-16.14	20.60	2.31	21.45	0.000484	7.39	5215.45	217.49	0.27
W100-00-00_0805	105211.0	2PCT_50yr	51891.00	-16.14	26.02	5.38	26.99	0.000611	7.92	6550.05	296.66	0.30
W100-00-00_0805	105211.0	1PCT_100yr	59499.00	-16.14	28.65	6.96	29.66	0.000628	8.06	7382.52	333.78	0.30
W100-00-00_0805	105211.0	0.2PCT_500yr	80918.00	-16.14	33.74	10.97	34.93	0.000663	8.75	9388.13	964.48	0.32
W100-00-00_0805	104608.2	10PCT_10yr	38563.00	-18.46	20.43		21.06	0.000600	6.37	6053.64	386.45	0.28
W100-00-00_0805	104608.2	2PCT_50yr	51891.00	-18.46	25.97		26.57	0.000441	6.23	8335.65	437.38	0.25
W100-00-00_0805	104608.2	1PCT_100yr	59499.00	-18.46	28.64		29.24	0.000390	6.24	9548.66	483.41	0.24
W100-00-00_0805	104608.2	0.2PCT_500yr	80918.00	-18.46	33.79		34.50	0.000351	6.78	12620.39	820.31	0.24
W100-00-00_0805	104370.8	10PCT_10yr	38563.00	-19.99	19.80	3.74	20.81	0.000540	8.46	6377.41	436.14	0.28
W100-00-00_0805	104370.8	2PCT_50yr	51891.00	-19.99	25.29	7.17	26.33	0.000465	8.87	8888.23	480.84	0.27
W100-00-00_0805	104370.8	1PCT_100yr	59499.00	-19.99	27.92	9.54	29.00	0.000446	9.15	10167.49	491.01	0.27
W100-00-00_0805	104370.8	0.2PCT_500yr	80918.00	-19.99	32.87	13.56	34.22	0.000487	10.43	12719.76	618.49	0.29
W100-00-00_0805	104350.0		Bridge									
W100-00-00_0805	104329.2	10PCT_10yr	38563.00	-20.20	19.03	3.53	20.10	0.000587	8.70	6131.38	433.76	0.30
W100-00-00_0805	104329.2	2PCT_50yr	51891.00	-20.20	24.31	6.97	25.42	0.000512	9.16	8518.04	467.07	0.28
W100-00-00_0805	104329.2	1PCT_100yr	59499.00	-20.20	26.81	9.33	27.97	0.000496	9.48	9722.84	487.49	0.28
W100-00-00_0805	104329.2	0.2PCT_500yr	80918.00	-20.20	32.55	13.22	33.91	0.000493	10.46	12661.33	600.70	0.29
W100-00-00_0805	103664.0	10PCT_10yr	38563.00	-23.03	16.67		19.11	0.001445	13.24	4062.47	258.56	0.42
W100-00-00_0805	103664.0	2PCT_50yr	51891.00	-23.03	21.62		24.39	0.001422	14.49	5432.91	345.64	0.43
W100-00-00_0805	103664.0	1PCT_100yr	59499.00	-23.03	24.17		26.97	0.001365	14.87	6729.91	681.75	0.42
W100-00-00_0805	103664.0	0.2PCT_500yr	80918.00	-23.03	30.77		33.14	0.001087	14.74	12476.97	1008.96	0.39
W100-00-00_0805	102875.3	10PCT_10yr	38563.00	-26.39	16.12	0.66	17.86	0.000959	11.43	4870.04	338.71	0.35
W100-00-00_0805	102875.3	2PCT_50yr	51891.00	-26.39	21.34	7.17	23.03	0.000854	11.86	6711.52	367.19	0.33
W100-00-00_0805	102875.3	1PCT_100yr	59499.00	-26.39	23.94	10.40	25.64	0.000815	12.10	7686.86	382.29	0.33
W100-00-00_0805	102875.3	0.2PCT_500yr	80918.00	-26.39	30.44	15.78	32.16	0.000740	12.69	10315.52	508.99	0.32
W100-00-00_0805	102847.5		Bridge									
W100-00-00_0805	102819.7	10PCT_10yr	38563.00	-26.43	15.59	0.63	17.44	0.001030	11.73	4704.90	335.19	0.36
W100-00-00_0805	102819.7	2PCT_50yr	51891.00	-26.43	20.34	7.14	22.23	0.000966	12.41	6362.51	362.07	0.35
W100-00-00_0805	102819.7	1PCT_100yr	59499.00	-26.43	22.69	10.37	24.61	0.000943	12.76	7228.85	375.01	0.35
W100-00-00_0805	102819.7	0.2PCT_500yr	80918.00	-26.43	28.50	15.74	30.53	0.000900	13.63	9518.42	413.76	0.35
W100-00-00_0805	102309.0	10PCT_10yr	38563.00	-23.48	15.90		16.58	0.000329	6.59	5855.26	216.46	0.22
W100-00-00_0805	102309.0	2PCT_50yr	51891.00	-23.48	20.56		21.45	0.000352	7.58	6867.58	218.54	0.24
W100-00-00_0805	102309.0	1PCT_100yr	59499.00	-23.48	22.86		23.88	0.000367	8.10	7374.38	223.14	0.24
W100-00-00_0805	102309.0	0.2PCT_500yr	80918.00	-23.48	28.53		29.91	0.000406	9.44	8681.83	238.39	0.26

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	101828.0	10PCT_10yr	38563.00	-20.70	15.46	-0.76	16.33	0.000500	7.47	5162.13	219.13	0.27
W100-00-00_0805	101828.0	2PCT_50yr	51891.00	-20.70	20.09	2.02	21.19	0.000501	8.42	6321.12	272.64	0.28
W100-00-00_0805	101828.0	1PCT_100yr	59499.00	-20.70	22.38	3.45	23.61	0.000508	8.92	6972.23	298.02	0.28
W100-00-00_0805	101828.0	0.2PCT_500yr	80918.00	-20.70	28.06	7.10	29.64	0.000524	10.14	9002.80	415.93	0.30
W100-00-00_0805	101790.1		Bridge									
W100-00-00_0805	101752.2	10PCT_10yr	38563.00	-20.69	15.28	-0.75	16.16	0.000513	7.53	5120.75	217.53	0.27
W100-00-00_0805	101752.2	2PCT_50yr	51891.00	-20.69	19.89	2.03	21.00	0.000514	8.48	6263.44	270.72	0.28
W100-00-00_0805	101752.2	1PCT_100yr	59499.00	-20.69	22.16	3.46	23.41	0.000520	8.98	6905.48	295.20	0.29
W100-00-00_0805	101752.2	0.2PCT_500yr	80918.00	-20.69	27.83	7.11	29.43	0.000536	10.21	8903.69	413.40	0.30
W100-00-00_0805	101007.3	10PCT_10yr	38563.00	-16.93	15.01		15.72	0.000435	6.76	5704.17	255.98	0.25
W100-00-00_0805	101007.3	2PCT_50yr	51891.00	-16.93	19.65		20.52	0.000449	7.49	6930.45	271.26	0.26
W100-00-00_0805	101007.3	1PCT_100yr	59499.00	-16.93	21.94		22.91	0.000458	7.87	7559.23	277.41	0.27
W100-00-00_0805	101007.3	0.2PCT_500yr	80918.00	-16.93	27.65		28.86	0.000480	8.81	9209.95	363.67	0.28
W100-00-00_0805	99992.6	10PCT_10yr	38910.00	-18.90	14.45		15.25	0.000492	7.16	5432.77	238.49	0.26
W100-00-00_0805	99992.6	2PCT_50yr	52550.00	-18.90	19.02		20.01	0.000535	7.99	6577.33	259.09	0.28
W100-00-00_0805	99992.6	1PCT_100yr	60210.00	-18.90	21.29		22.38	0.000548	8.39	7173.15	266.17	0.28
W100-00-00_0805	99992.6	0.2PCT_500yr	81937.00	-18.90	26.94		28.30	0.000582	9.39	8725.37	283.78	0.30
W100-00-00_0805	98399.4	10PCT_10yr	38910.00	-20.26	13.71		14.46	0.000482	6.95	5601.33	250.78	0.26
W100-00-00_0805	98399.4	2PCT_50yr	52550.00	-20.26	18.23		19.16	0.000512	7.76	6775.64	268.61	0.27
W100-00-00_0805	98399.4	1PCT_100yr	60210.00	-20.26	20.48		21.51	0.000526	8.15	7390.39	277.50	0.28
W100-00-00_0805	98399.4	0.2PCT_500yr	81937.00	-20.26	26.09		27.37	0.000559	9.10	9008.15	299.61	0.29
W100-00-00_0805	97517.4	10PCT_10yr	38910.00	-19.35	13.65		14.07	0.000233	5.24	7438.00	311.01	0.19
W100-00-00_0805	97517.4	2PCT_50yr	52550.00	-19.35	18.20		18.75	0.000240	5.96	8867.19	316.93	0.20
W100-00-00_0805	97517.4	1PCT_100yr	60210.00	-19.35	20.46		21.08	0.000244	6.33	9587.71	319.88	0.20
W100-00-00_0805	97517.4	0.2PCT_500yr	81937.00	-19.35	26.09		26.91	0.000260	7.28	11407.38	327.78	0.21
W100-00-00_0805	96028.6	10PCT_10yr	38910.00	-17.81	12.83	-3.25	13.52	0.000446	6.70	5820.64	277.04	0.25
W100-00-00_0805	96028.6	2PCT_50yr	52550.00	-17.81	17.31	-0.68	18.18	0.000436	7.50	7125.14	304.41	0.26
W100-00-00_0805	96028.6	1PCT_100yr	60210.00	-17.81	19.53	1.33	20.50	0.000436	7.91	7809.26	311.19	0.26
W100-00-00_0805	96028.6	0.2PCT_500yr	81937.00	-17.81	25.05	4.58	26.29	0.000444	8.98	9767.86	422.40	0.27
W100-00-00_0805	95985.1		Bridge									
W100-00-00_0805	95941.6	10PCT_10yr	38910.00	-17.87	12.67	-3.30	13.38	0.000452	6.73	5794.68	276.46	0.25
W100-00-00_0805	95941.6	2PCT_50yr	52550.00	-17.87	17.15	-0.73	18.03	0.000442	7.53	7094.56	304.10	0.26
W100-00-00_0805	95941.6	1PCT_100yr	60210.00	-17.87	19.36	1.26	20.34	0.000442	7.94	7775.32	310.86	0.26
W100-00-00_0805	95941.6	0.2PCT_500yr	81937.00	-17.87	24.86	4.52	26.11	0.000450	9.02	9714.89	421.28	0.27
W100-00-00_0805	95362.9	10PCT_10yr	38910.00	-15.97	12.47		13.08	0.000419	6.26	6213.28	313.00	0.25
W100-00-00_0805	95362.9	2PCT_50yr	52550.00	-15.97	16.98		17.71	0.000415	6.85	7673.25	334.25	0.25
W100-00-00_0805	95362.9	1PCT_100yr	60210.00	-15.97	19.21		20.00	0.000416	7.14	8430.41	344.48	0.25
W100-00-00_0805	95362.9	0.2PCT_500yr	81937.00	-15.97	24.75		25.71	0.000421	7.87	10410.66	369.88	0.26
W100-00-00_0805	94280.7	10PCT_10yr	39073.00	-19.82	11.41		12.47	0.000664	8.25	4733.92	202.44	0.30
W100-00-00_0805	94280.7	2PCT_50yr	52860.00	-19.82	15.69		17.05	0.000760	9.37	5733.96	260.37	0.33
W100-00-00_0805	94280.7	1PCT_100yr	60545.00	-19.82	17.82		19.32	0.000793	9.86	6313.26	281.52	0.34
W100-00-00_0805	94280.7	0.2PCT_500yr	82417.00	-19.82	23.11		25.00	0.000823	11.08	7905.15	319.71	0.35
W100-00-00_0805	93495.6	10PCT_10yr	39073.00	-20.43	11.19		11.90	0.000530	6.80	5750.09	300.97	0.27
W100-00-00_0805	93495.6	2PCT_50yr	52860.00	-20.43	15.54		16.38	0.000558	7.37	7169.80	346.05	0.29
W100-00-00_0805	93495.6	1PCT_100yr	60545.00	-20.43	17.72		18.63	0.000555	7.62	7944.30	363.82	0.29
W100-00-00_0805	93495.6	0.2PCT_500yr	82417.00	-20.43	23.20		24.26	0.000499	8.25	10111.26	426.05	0.28
W100-00-00_0805	92795.6	10PCT_10yr	39136.00	-20.98	10.82	-5.19	11.54	0.000490	6.84	5719.39	277.87	0.27
W100-00-00_0805	92795.6	2PCT_50yr	52981.00	-20.98	15.09	-2.66	15.99	0.000526	7.61	6963.29	304.19	0.28
W100-00-00_0805	92795.6	1PCT_100yr	60674.00	-20.98	17.24	-1.36	18.22	0.000537	7.95	7630.82	317.69	0.29
W100-00-00_0805	92795.6	0.2PCT_500yr	82603.00	-20.98	22.65	2.25	23.85	0.000531	8.79	9499.63	389.06	0.29
W100-00-00_0805	92741.1		Bridge									
W100-00-00_0805	92686.6	10PCT_10yr	39136.00	-21.08	10.59	-5.29	11.32	0.000498	6.89	5684.00	277.08	0.27
W100-00-00_0805	92686.6	2PCT_50yr	52981.00	-21.08	14.84	-2.75	15.75	0.000535	7.66	6918.88	303.29	0.28
W100-00-00_0805	92686.6	1PCT_100yr	60674.00	-21.08	16.98	-1.46	17.98	0.000548	8.00	7582.19	316.48	0.29
W100-00-00_0805	92686.6	0.2PCT_500yr	82603.00	-21.08	22.37	2.16	23.59	0.000542	8.85	9429.23	385.28	0.29
W100-00-00_0805	90936.7	10PCT_10yr	39136.00	-18.64	9.61		10.30	0.000668	6.68	5860.45	382.21	0.30
W100-00-00_0805	90936.7	2PCT_50yr	52981.00	-18.64	13.97		14.73	0.000555	7.00	7581.13	406.21	0.28
W100-00-00_0805	90936.7	1PCT_100yr	60674.00	-18.64	16.15		16.95	0.000517	7.18	8481.30	417.51	0.28
W100-00-00_0805	90936.7	0.2PCT_500yr	82603.00	-18.64	21.66		22.56	0.000455	7.65	11203.98	573.98	0.27
W100-00-00_0805	89918.4	10PCT_10yr	39246.00	-17.23	8.44		9.46	0.000950	8.12	4831.02	305.25	0.36
W100-00-00_0805	89918.4	2PCT_50yr	53189.00	-17.23	12.89		14.02	0.000797	8.53	6439.92	489.52	0.34
W100-00-00_0805	89918.4	1PCT_100yr	60900.00	-17.23	15.13		16.29	0.000728	8.69	7695.42	631.54	0.33
W100-00-00_0805	89918.4	0.2PCT_500yr	82925.00	-17.23	20.82		22.01	0.000589	8.96	11790.13	749.78	0.31
W100-00-00_0805	88579.0	10PCT_10yr	39246.00	-20.97	7.24		8.22	0.000883	7.94	4941.76	306.25	0.35
W100-00-00_0805	88579.0	2PCT_50yr	53189.00	-20.97	11.89		12.95	0.000764	8.26	6437.07	336.07	0.33

HEC-RAS Plan: Eff+LOMR MP River: W100-00-00 Reach: W100-00-00_0805 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100-00-00_0805	88579.0	1PCT_100yr	60900.00	-20.97	14.20		15.30	0.000727	8.42	7228.83	353.07	0.33
W100-00-00_0805	88579.0	0.2PCT_500yr	82925.00	-20.97	19.97		21.16	0.000686	8.77	9468.77	440.07	0.32
W100-00-00_0805	87591.9	10PCT_10yr	39246.00	-23.72	6.68		7.45	0.000586	7.04	5572.13	298.65	0.29
W100-00-00_0805	87591.9	2PCT_50yr	53189.00	-23.72	11.38		12.28	0.000536	7.60	6997.62	308.11	0.28
W100-00-00_0805	87591.9	1PCT_100yr	60900.00	-23.72	13.69		14.66	0.000521	7.90	7712.96	311.48	0.28
W100-00-00_0805	87591.9	0.2PCT_500yr	82925.00	-23.72	19.40		20.58	0.000509	8.72	9518.04	332.13	0.28
W100-00-00_0805	86660.2	10PCT_10yr	39246.00	-23.42	6.35	-10.07	6.95	0.000359	6.20	6333.22	286.27	0.23
W100-00-00_0805	86660.2	2PCT_50yr	53189.00	-23.42	11.05	-7.65	11.80	0.000359	6.93	7709.04	299.36	0.24
W100-00-00_0805	86660.2	1PCT_100yr	60900.00	-23.42	13.36	-6.42	14.18	0.000364	7.29	8413.11	311.36	0.24
W100-00-00_0805	86660.2	0.2PCT_500yr	82925.00	-23.42	19.06	-3.25	20.11	0.000375	8.23	10281.21	346.31	0.25
W100-00-00_0805	86641.7		Bridge									
W100-00-00_0805	86623.2	10PCT_10yr	39246.00	-23.61	5.98	-10.26	6.59	0.000368	6.25	6282.69	285.17	0.23
W100-00-00_0805	86623.2	2PCT_50yr	53189.00	-23.61	10.64	-7.84	11.40	0.000368	6.99	7642.74	298.47	0.24
W100-00-00_0805	86623.2	1PCT_100yr	60900.00	-23.61	12.93	-6.61	13.77	0.000374	7.36	8338.10	310.39	0.24
W100-00-00_0805	86623.2	0.2PCT_500yr	82925.00	-23.61	18.57	-3.45	19.64	0.000387	8.31	10178.25	345.63	0.25
W100-00-00_0805	85855.2	10PCT_10yr	39246.00	-26.84	4.60		5.95	0.000907	9.31	4216.35	200.57	0.36
W100-00-00_0805	85855.2	2PCT_50yr	53189.00	-26.84	9.03		10.69	0.000949	10.36	5132.17	213.16	0.37
W100-00-00_0805	85855.2	1PCT_100yr	60900.00	-26.84	11.19		13.03	0.000972	10.87	5601.52	226.93	0.38
W100-00-00_0805	85855.2	0.2PCT_500yr	82925.00	-26.84	16.53		18.82	0.000973	12.18	6992.08	281.40	0.39
W100-00-00_0805	85238.7	10PCT_10yr	39246.00	-29.43	4.30		5.39	0.000671	8.38	4684.74	215.40	0.31
W100-00-00_0805	85238.7	2PCT_50yr	53189.00	-29.43	8.72		10.10	0.000726	9.42	5888.40	321.87	0.33
W100-00-00_0805	85238.7	1PCT_100yr	60900.00	-29.43	10.91		12.41	0.000734	9.88	6625.85	352.12	0.33
W100-00-00_0805	85238.7	0.2PCT_500yr	82925.00	-29.43	16.33		18.17	0.000721	11.03	8623.18	381.99	0.34
W100-00-00_0805	84561.7	10PCT_10yr	39246.00	-32.27	4.02	-13.15	4.90	0.000492	7.51	5222.58	214.35	0.27
W100-00-00_0805	84561.7	2PCT_50yr	53189.00	-32.27	8.42	-10.21	9.55	0.000543	8.56	6496.70	365.86	0.29
W100-00-00_0805	84561.7	1PCT_100yr	60900.00	-32.27	10.61	-8.74	11.86	0.000546	9.03	7358.45	422.85	0.29
W100-00-00_0805	84561.7	0.2PCT_500yr	82925.00	-32.27	16.05	-4.91	17.60	0.000555	10.17	10027.52	542.87	0.30
W100-00-00_0805	84531.4		Bridge									
W100-00-00_0805	84501.1	10PCT_10yr	39246.00	-28.97	3.54	-9.85	4.76	0.000786	8.85	4432.29	203.62	0.33
W100-00-00_0805	84501.1	2PCT_50yr	53189.00	-28.97	7.85	-6.92	9.39	0.000850	9.97	5336.28	222.84	0.35
W100-00-00_0805	84501.1	1PCT_100yr	60900.00	-28.97	9.98	-5.44	11.68	0.000876	10.48	5923.10	305.45	0.36
W100-00-00_0805	84501.1	0.2PCT_500yr	82925.00	-28.97	15.31	-1.60	17.40	0.000861	11.69	7977.40	462.03	0.37
W100-00-00_0805	84252.6	10PCT_10yr	39246.00	-26.90	3.45	-9.61	4.48	0.000697	8.16	4808.17	232.71	0.32
W100-00-00_0805	84252.6	2PCT_50yr	53189.00	-26.90	7.78	-6.92	9.07	0.000721	9.10	5849.89	255.77	0.33
W100-00-00_0805	84252.6	1PCT_100yr	60900.00	-26.90	9.93	-5.56	11.34	0.000710	9.55	6553.91	446.10	0.33
W100-00-00_0805	84252.6	0.2PCT_500yr	82925.00	-26.90	15.34	-2.05	16.99	0.000661	10.45	9856.16	655.54	0.33
W100-00-00_0805	84222.3		Bridge									
W100-00-00_0805	84192.0	10PCT_10yr	39246.00	-24.10	2.82	-6.81	4.30	0.001168	9.74	4029.62	222.16	0.40
W100-00-00_0805	84192.0	2PCT_50yr	53189.00	-24.10	7.13	-4.12	8.88	0.001134	10.61	5014.70	235.43	0.41
W100-00-00_0805	84192.0	1PCT_100yr	60900.00	-24.10	9.26	-2.76	11.15	0.001124	11.02	5524.06	242.01	0.41
W100-00-00_0805	84192.0	0.2PCT_500yr	82925.00	-24.10	14.50	0.75	16.76	0.001045	12.11	7548.06	610.26	0.40
W100-00-00_0805	83635.7	10PCT_10yr	39496.00	-21.72	2.49		3.47	0.000938	7.92	4989.55	326.20	0.36
W100-00-00_0805	83635.7	2PCT_50yr	53663.00	-21.72	6.93		8.00	0.000832	8.29	6473.43	358.96	0.34
W100-00-00_0805	83635.7	1PCT_100yr	61411.00	-21.72	9.13		10.22	0.000822	8.40	7312.18	394.24	0.34
W100-00-00_0805	83635.7	0.2PCT_500yr	83658.00	-21.72	14.56		15.75	0.000703	8.76	9553.90	429.00	0.33
W100-00-00_0805	81786.1	10PCT_10yr	39496.00	-31.97	1.01		1.87	0.000763	7.47	5290.18	322.17	0.32
W100-00-00_0805	81786.1	2PCT_50yr	53663.00	-31.97	5.64		6.59	0.000667	7.84	6841.06	347.91	0.31
W100-00-00_0805	81786.1	1PCT_100yr	61411.00	-31.97	7.86		8.87	0.000634	8.05	7626.14	358.33	0.31
W100-00-00_0805	81786.1	0.2PCT_500yr	83658.00	-31.97	13.38		14.54	0.000603	8.63	9693.23	393.86	0.31
W100-00-00_0805	80903.1	10PCT_10yr	39606.00	-27.77	0.49	-12.42	1.17	0.000625	6.65	5952.34	365.17	0.29
W100-00-00_0805	80903.1	2PCT_50yr	53872.00	-27.77	5.22	-10.11	5.97	0.000526	6.95	7758.56	395.71	0.28
W100-00-00_0805	80903.1	1PCT_100yr	61636.00	-27.77	7.48	-8.99	8.27	0.000490	7.12	8669.45	408.89	0.27
W100-00-00_0805	80903.1	0.2PCT_500yr	83981.00	-27.77	13.04	-6.02	13.95	0.000456	7.67	11036.90	447.74	0.27
W100-00-00_0805	80883.1		Bridge									
W100-00-00_0805	80863.1	10PCT_10yr	39606.00	-28.10	-0.06	-12.76	0.64	0.000648	6.74	5872.49	362.82	0.30
W100-00-00_0805	80863.1	2PCT_50yr	53872.00	-28.10	4.67	-10.44	5.43	0.000545	7.02	7671.63	394.13	0.28
W100-00-00_0805	80863.1	1PCT_100yr	61636.00	-28.10	6.93	-9.32	7.73	0.000506	7.20	8580.02	407.83	0.27
W100-00-00_0805	80863.1	0.2PCT_500yr	83981.00	-28.10	12.47	-6.35	13.40	0.000470	7.75	10927.85	446.26	0.27
W100-00-00_0805	80538.0	10PCT_10yr	39606.00	-33.12	0.08	-20.19	0.32	0.000150	3.95	10017.38	472.21	0.15
W100-00-00_0805	80538.0	2PCT_50yr	53872.00	-33.12	4.82	-18.06	5.12	0.000150	4.37	12327.25	498.50	0.15
W100-00-00_0805	80538.0	1PCT_100yr	61636.00	-33.12	7.09	-17.03	7.41	0.000150	4.58	13471.92	521.38	0.16
W100-00-00_0805	80538.0	0.2PCT_500yr	83981.00	-33.12	12.65	-14.34	13.06	0.000150	5.12	17259.39	793.78	0.16

White Oak Bayou RiskMap Steady Model
10-Year, 50-Year, 100-Year and 500-Year

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	135006.0	10%	142.00	122.35	128.62		128.67	0.000198	1.79	82.10	62.18	0.21
E100-00-00_N034	135006.0	2%	214.00	122.35	129.57		129.62	0.000212	1.79	197.66	210.48	0.20
E100-00-00_N034	135006.0	1%	251.00	122.35	129.93		129.98	0.000218	1.80	389.92	961.20	0.20
E100-00-00_N034	135006.0	0.2%	358.00	122.35	130.75		130.79	0.000208	1.79	1400.08	1502.84	0.18
E100-00-00_N034	133960.0	10%	205.00	121.48	128.09	125.40	128.19	0.001140	2.49	82.17	32.60	0.28
E100-00-00_N034	133960.0	2%	309.00	121.48	128.99	126.36	129.10	0.001185	2.67	118.78	292.03	0.28
E100-00-00_N034	133960.0	1%	362.00	121.48	129.34	126.67	129.46	0.001193	2.74	140.52	536.48	0.28
E100-00-00_N034	133960.0	0.2%	518.00	121.48	130.16	127.37	130.28	0.001192	2.86	213.62	1646.49	0.28
E100-00-00_N034	133211	10%	207.00	120.98	126.21	124.94	126.54	0.005586	4.62	44.83	21.35	0.56
E100-00-00_N034	133211	2%	312.00	120.98	127.04	125.87	127.39	0.005682	4.77	65.37	28.10	0.55
E100-00-00_N034	133211	1%	366.00	120.98	127.35	126.17	127.72	0.005807	4.92	74.45	30.62	0.56
E100-00-00_N034	133211	0.2%	523.00	120.98	128.08		128.51	0.006182	5.26	99.36	37.35	0.57
E100-00-00_N034	133191	10%	216.00	120.98	125.07	125.07	126.15	0.012598	8.35	25.86	11.93	1.00
E100-00-00_N034	133191	2%	325.00	120.98	125.94	125.94	127.00	0.017469	8.23	39.51	19.22	1.01
E100-00-00_N034	133191	1%	381.00	120.98	126.27	126.27	127.33	0.017855	8.25	46.16	21.85	1.00
E100-00-00_N034	133191	0.2%	545.00	120.98	127.62		128.29	0.009947	6.56	83.14	32.84	0.73
E100-00-00_N034	133109	10%	233.00	120.02	124.12		124.15	0.000049	1.39	167.20	57.81	0.14
E100-00-00_N034	133109	2%	351.00	120.02	125.68		125.71	0.000050	1.32	265.97	68.18	0.12
E100-00-00_N034	133109	1%	411.00	120.02	126.34		126.37	0.000053	1.32	312.12	72.49	0.11
E100-00-00_N034	133109	0.2%	587.00	120.02	127.92		127.95	0.000060	1.35	435.42	83.26	0.10
E100-00-00_N034	132955.0	10%	258.00	118.90	124.10	121.12	124.13	0.000307	1.37	187.83	59.41	0.14
E100-00-00_N034	132955.0	2%	389.00	118.90	125.67	121.54	125.69	0.000205	1.35	289.12	69.57	0.12
E100-00-00_N034	132955.0	1%	456.00	118.90	126.32	121.71	126.35	0.000184	1.36	336.04	73.64	0.11
E100-00-00_N034	132955.0	0.2%	652.00	118.90	127.91	122.15	127.94	0.000156	1.42	460.46	83.52	0.11
E100-00-00_N034	132898.0		Bridge									
E100-00-00_N034	132844.0	10%	258.00	118.39	123.56	120.61	123.59	0.000316	1.39	185.91	59.19	0.14
E100-00-00_N034	132844.0	2%	389.00	118.39	125.14	121.04	125.17	0.000208	1.35	287.73	69.45	0.12
E100-00-00_N034	132844.0	1%	456.00	118.39	125.80	121.21	125.82	0.000186	1.36	334.82	73.54	0.11
E100-00-00_N034	132844.0	0.2%	652.00	118.39	127.38	121.64	127.41	0.000158	1.42	459.14	83.42	0.11
E100-00-00_N034	132744.	10%	310.00	118.30	123.49		123.54	0.000508	1.75	177.30	57.28	0.18
E100-00-00_N034	132744.	2%	467.00	118.30	125.09		125.13	0.000328	1.68	277.44	68.19	0.15
E100-00-00_N034	132744.	1%	548.00	118.30	125.75		125.80	0.000294	1.69	324.03	72.71	0.14
E100-00-00_N034	132744.	0.2%	783.00	118.30	127.34		127.39	0.000248	1.75	448.65	84.47	0.13
E100-00-00_N034	131721.0	10%	326.00	117.42	123.14		123.17	0.000266	1.42	230.05	63.00	0.13
E100-00-00_N034	131721.0	2%	491.00	117.42	124.85		124.88	0.000188	1.42	345.51	71.97	0.11
E100-00-00_N034	131721.0	1%	575.00	117.42	125.53		125.57	0.000175	1.45	395.75	75.54	0.11
E100-00-00_N034	131721.0	0.2%	822.00	117.42	127.14		127.18	0.000162	1.57	584.93	232.09	0.11
E100-00-00_N034	131453.0	10%	333.00	117.00	123.06	119.49	123.10	0.000296	1.45	229.22	65.21	0.14
E100-00-00_N034	131453.0	2%	501.00	117.00	124.80	120.02	124.83	0.000194	1.43	349.73	73.60	0.12
E100-00-00_N034	131453.0	1%	588.00	117.00	125.48	120.26	125.52	0.000180	1.47	401.26	76.90	0.11
E100-00-00_N034	131453.0	0.2%	840.00	117.00	127.10	120.86	127.14	0.000167	1.57	627.65	456.14	0.11
E100-00-00_N034	131442.5		Bridge									
E100-00-00_N034	131432.0	10%	333.00	116.98	123.05	119.47	123.08	0.000296	1.45	229.31	65.22	0.14
E100-00-00_N034	131432.0	2%	501.00	116.98	124.78	120.00	124.82	0.000194	1.43	349.99	73.61	0.12
E100-00-00_N034	131432.0	1%	588.00	116.98	125.47	120.23	125.50	0.000180	1.47	401.36	76.91	0.11
E100-00-00_N034	131432.0	0.2%	840.00	116.98	127.09	120.84	127.13	0.000166	1.57	633.66	465.78	0.11
E100-00-00_N034	131331.	10%	362.00	116.84	123.01		123.05	0.000317	1.51	240.06	68.27	0.14
E100-00-00_N034	131331.	2%	545.00	116.84	124.76		124.79	0.000210	1.48	368.98	79.10	0.12
E100-00-00_N034	131331.	1%	640.00	116.84	125.44		125.48	0.000195	1.51	424.55	83.34	0.12
E100-00-00_N034	131331.	0.2%	914.00	116.84	127.07		127.11	0.000180	1.60	670.28	372.46	0.12
E100-00-00_N034	130861.0	10%	362.00	116.18	122.92		122.94	0.000155	1.17	309.16	74.82	0.10
E100-00-00_N034	130861.0	2%	545.00	116.18	124.70		124.72	0.000119	1.21	451.91	85.70	0.09
E100-00-00_N034	130861.0	1%	640.00	116.18	125.38		125.41	0.000115	1.25	512.21	89.67	0.09
E100-00-00_N034	130861.0	0.2%	914.00	116.18	127.01		127.04	0.000112	1.37	764.02	485.18	0.09
E100-00-00_N034	129818.0	10%	1118.00	112.78	122.41		122.52	0.000612	2.63	424.91	84.04	0.21
E100-00-00_N034	129818.0	2%	1682.00	112.78	124.23		124.36	0.000555	2.86	587.86	95.29	0.20
E100-00-00_N034	129818.0	1%	1966.00	112.78	124.91		125.05	0.000565	3.01	653.89	110.64	0.21
E100-00-00_N034	129818.0	0.2%	2795.00	112.78	126.49		126.67	0.000602	3.38	1513.93	1303.78	0.22
E100-00-00_N034	128748.	10%	1161.00	113.76	121.70		121.81	0.000711	2.71	428.58	91.82	0.22
E100-00-00_N034	128748.	2%	1745.00	113.76	123.62		123.75	0.000582	2.81	620.12	107.94	0.21
E100-00-00_N034	128748.	1%	2037.00	113.76	124.29		124.43	0.000592	2.93	730.37	210.48	0.21
E100-00-00_N034	128748.	0.2%	2888.00	113.76	125.84		126.00	0.000635	3.22	1572.24	1090.71	0.22

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	128646.0	10%	1161.00	113.85	121.59	117.81	121.73	0.000772	2.99	388.52	74.70	0.23
E100-00-00_N034	128646.0	2%	1745.00	113.85	123.51	118.55	123.67	0.000673	3.24	539.35	82.68	0.22
E100-00-00_N034	128646.0	1%	2037.00	113.85	124.16	118.89	124.35	0.000694	3.43	594.37	179.04	0.23
E100-00-00_N034	128646.0	0.2%	2888.00	113.85	125.66	119.77	125.91	0.000787	3.97	727.11	712.54	0.25
E100-00-00_N034	128595.0		Bridge									
E100-00-00_N034	128540.0	10%	1161.00	113.03	121.51	116.99	121.62	0.000520	2.61	444.85	77.75	0.19
E100-00-00_N034	128540.0	2%	1745.00	113.03	123.42	117.74	123.56	0.000493	2.90	601.40	85.75	0.19
E100-00-00_N034	128540.0	1%	2037.00	113.03	124.07	118.07	124.22	0.000520	3.10	657.79	173.16	0.20
E100-00-00_N034	128540.0	0.2%	2888.00	113.03	125.54	118.95	125.75	0.000641	3.64	793.36	670.70	0.23
E100-00-00_N034	128236.0	10%	1244.00	110.63	121.37		121.46	0.000443	2.42	514.64	90.13	0.18
E100-00-00_N034	128236.0	2%	1867.00	110.63	123.30		123.41	0.000423	2.67	699.55	101.91	0.18
E100-00-00_N034	128236.0	1%	2173.00	110.63	123.94		124.06	0.000446	2.84	769.82	156.73	0.19
E100-00-00_N034	128236.0	0.2%	3067.00	110.63	125.38		125.55	0.000524	3.30	1374.71	1031.88	0.21
E100-00-00_N034	127300.0	10%	1350.00	111.50	120.95		121.05	0.000449	2.43	556.44	98.23	0.18
E100-00-00_N034	127300.0	2%	2023.00	111.50	122.91		123.02	0.000413	2.67	758.60	109.07	0.18
E100-00-00_N034	127300.0	1%	2348.00	111.50	123.53		123.65	0.000435	2.84	827.78	120.75	0.18
E100-00-00_N034	127300.0	0.2%	3294.00	111.50	124.97		125.10	0.000425	3.05	2077.83	2944.87	0.19
E100-00-00_N034	126183.0	10%	1413.00	110.38	120.37		120.48	0.000559	2.72	520.34	92.02	0.20
E100-00-00_N034	126183.0	2%	2115.00	110.38	122.36		122.50	0.000513	2.95	716.63	104.81	0.20
E100-00-00_N034	126183.0	1%	2451.00	110.38	122.95		123.10	0.000547	3.14	826.56	324.68	0.21
E100-00-00_N034	126183.0	0.2%	3428.00	110.38	124.33		124.52	0.000619	3.59	2708.23	2534.19	0.22
E100-00-00_N034	125563.	10%	1494.00	111.26	120.03		120.14	0.000532	2.66	562.29	100.50	0.20
E100-00-00_N034	125563.	2%	2233.00	111.26	122.07		122.19	0.000468	2.87	778.07	111.99	0.19
E100-00-00_N034	125563.	1%	2582.00	111.26	122.63		122.78	0.000498	3.06	932.91	396.33	0.20
E100-00-00_N034	125563.	0.2%	3598.00	111.26	123.95		124.14	0.000605	3.56	2407.96	2948.33	0.22
E100-00-00_N034	125461.0	10%	1494.00	111.40	119.99	115.52	120.10	0.000404	2.61	572.09	104.54	0.20
E100-00-00_N034	125461.0	2%	2233.00	111.40	122.03	116.29	122.15	0.000347	2.80	797.76	116.81	0.19
E100-00-00_N034	125461.0	1%	2582.00	111.40	122.59	116.61	122.73	0.000369	2.99	864.67	388.87	0.20
E100-00-00_N034	125461.0	0.2%	3598.00	111.40	123.90	117.46	124.09	0.000444	3.50	1027.20	2689.56	0.22
E100-00-00_N034	125405.0		Bridge									
E100-00-00_N034	125344.0	10%	1494.00	111.39	119.90	115.51	120.01	0.000422	2.65	563.69	104.06	0.20
E100-00-00_N034	125344.0	2%	2233.00	111.39	121.95	116.29	122.07	0.000358	2.83	789.43	116.38	0.19
E100-00-00_N034	125344.0	1%	2582.00	111.39	122.51	116.61	122.65	0.000381	3.02	855.32	323.47	0.20
E100-00-00_N034	125344.0	0.2%	3598.00	111.39	123.79	117.45	123.99	0.000460	3.55	1014.46	2501.04	0.22
E100-00-00_N034	125237.	10%	1494.00	110.79	119.79	115.81	119.94	0.000795	3.08	485.70	94.30	0.24
E100-00-00_N034	125237.	2%	2233.00	110.79	121.85	116.68	122.01	0.000664	3.21	695.76	110.67	0.23
E100-00-00_N034	125237.	1%	2582.00	110.79	122.40	117.02	122.58	0.000716	3.40	758.32	236.99	0.24
E100-00-00_N034	125237.	0.2%	3598.00	110.79	123.67	117.93	123.91	0.000852	3.93	917.14	1743.58	0.26
E100-00-00_N034	125059.	10%	1494.00	109.80	119.68	115.17	119.80	0.000630	2.83	528.16	96.63	0.21
E100-00-00_N034	125059.	2%	2233.00	109.80	121.76	116.02	121.90	0.000558	2.99	746.52	173.16	0.21
E100-00-00_N034	125059.	1%	2582.00	109.80	122.30	116.37	122.46	0.000623	3.18	900.61	372.59	0.22
E100-00-00_N034	125059.	0.2%	3598.00	109.80	123.56	117.28	123.76	0.000684	3.65	2659.94	3235.86	0.23
E100-00-00_N034	124956.0	10%	1494.00	109.22	119.62	115.01	119.74	0.000585	2.75	543.42	96.88	0.20
E100-00-00_N034	124956.0	2%	2233.00	109.22	121.70	115.84	121.84	0.000510	2.94	765.82	147.55	0.20
E100-00-00_N034	124956.0	1%	2582.00	109.22	122.24	116.19	122.39	0.000550	3.15	904.94	392.38	0.21
E100-00-00_N034	124956.0	0.2%	3598.00	109.22	123.49	117.10	123.69	0.000639	3.67	2510.62	3133.79	0.23
E100-00-00_N034	124943.5		Bridge									
E100-00-00_N034	124931.0	10%	1494.00	109.16	119.53	114.95	119.65	0.000595	2.77	540.24	96.67	0.21
E100-00-00_N034	124931.0	2%	2233.00	109.16	121.52	115.78	121.66	0.000535	2.99	749.02	134.27	0.20
E100-00-00_N034	124931.0	1%	2582.00	109.16	122.12	116.13	122.28	0.000564	3.18	881.79	368.77	0.21
E100-00-00_N034	124931.0	0.2%	3598.00	109.16	123.39	117.04	123.60	0.000651	3.69	2390.91	2969.63	0.23
E100-00-00_N034	124809.	10%	1546.00	109.04	119.47		119.57	0.000510	2.59	597.92	106.69	0.19
E100-00-00_N034	124809.	2%	2309.00	109.04	121.47		121.59	0.000475	2.79	829.63	168.30	0.19
E100-00-00_N034	124809.	1%	2666.00	109.04	122.06		122.20	0.000527	2.94	1003.53	416.05	0.20
E100-00-00_N034	124809.	0.2%	3706.00	109.04	123.33		123.50	0.000564	3.38	2803.31	3020.76	0.21
E100-00-00_N034	124344.0	10%	1640.00	108.60	119.23		119.34	0.000480	2.64	621.89	102.73	0.19
E100-00-00_N034	124344.0	2%	2446.00	108.60	121.25		121.38	0.000450	2.91	863.45	195.06	0.19
E100-00-00_N034	124344.0	1%	2818.00	108.60	121.81		121.96	0.000480	3.11	1059.72	521.83	0.20
E100-00-00_N034	124344.0	0.2%	3902.00	108.60	123.05		123.24	0.000549	3.61	3227.37	3730.67	0.21
E100-00-00_N034	123541.0	10%	1742.00	107.69	119.00		119.07	0.000241	2.09	831.56	116.13	0.14
E100-00-00_N034	123541.0	2%	2595.00	107.69	121.01		121.10	0.000256	2.40	1543.89	1137.12	0.15
E100-00-00_N034	123541.0	1%	2983.00	107.69	121.56		121.66	0.000280	2.58	2329.00	1735.00	0.15

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	123541.0	0.2%	4113.00	107.69	122.76		122.89	0.000329	3.03	6345.34	5596.95	0.17
E100-00-00_N034	122719.	10%	1784.00	107.81	118.66		118.78	0.000509	2.85	626.30	96.74	0.20
E100-00-00_N034	122719.	2%	2656.00	107.81	120.64		120.79	0.000554	3.14	1367.28	930.92	0.21
E100-00-00_N034	122719.	1%	3050.00	107.81	121.16		121.34	0.000569	3.34	2003.70	1559.62	0.21
E100-00-00_N034	122719.	0.2%	4199.00	107.81	122.30		122.52	0.000635	3.87	6439.58	7609.01	0.23
E100-00-00_N034	122616.0	10%	1784.00	107.83	118.56	113.00	118.72	0.000639	3.14	567.94	86.78	0.22
E100-00-00_N034	122616.0	2%	2656.00	107.83	120.53	114.06	120.72	0.000674	3.53	751.95	761.97	0.23
E100-00-00_N034	122616.0	1%	3050.00	107.83	121.03	114.48	121.25	0.000740	3.79	803.99	1536.58	0.24
E100-00-00_N034	122616.0	0.2%	4199.00	107.83	122.08	115.58	122.41	0.000914	4.59	920.19	6488.25	0.27
E100-00-00_N034	122558.0		Bridge									
E100-00-00_N034	122498.0	10%	1784.00	107.80	118.35	112.98	118.51	0.000687	3.23	552.33	85.49	0.22
E100-00-00_N034	122498.0	2%	2656.00	107.80	120.26	114.03	120.47	0.000732	3.64	728.95	570.43	0.24
E100-00-00_N034	122498.0	1%	3050.00	107.80	120.73	114.45	120.97	0.000820	3.93	775.37	966.85	0.25
E100-00-00_N034	122498.0	0.2%	4199.00	107.80	121.61	115.53	121.98	0.001087	4.84	871.54	4308.51	0.29
E100-00-00_N034	122396.	10%	1871.00	107.58	118.32		118.43	0.000465	2.76	678.33	103.19	0.19
E100-00-00_N034	122396.	2%	2783.00	107.58	120.23		120.38	0.000500	3.12	1132.24	901.87	0.20
E100-00-00_N034	122396.	1%	3191.00	107.58	120.69		120.86	0.000571	3.35	1746.11	1919.39	0.22
E100-00-00_N034	122396.	0.2%	4378.00	107.58	121.58		121.82	0.000726	3.99	5221.66	5996.73	0.25
E100-00-00_N034	121745.0	10%	1975.00	106.17	118.11		118.20	0.000276	2.33	847.88	112.78	0.15
E100-00-00_N034	121745.0	2%	2934.00	106.17	120.00		120.12	0.000318	2.73	1497.41	953.99	0.16
E100-00-00_N034	121745.0	1%	3357.00	106.17	120.43		120.57	0.000354	2.95	2102.19	2016.79	0.17
E100-00-00_N034	121745.0	0.2%	4590.00	106.17	121.28		121.45	0.000441	3.48	5050.98	5488.52	0.20
E100-00-00_N034	121010.0	10%	1975.00	105.89	117.91		117.99	0.000272	2.32	1101.52	725.23	0.15
E100-00-00_N034	121010.0	2%	2934.00	105.89	119.79		119.89	0.000285	2.60	5802.19	3864.18	0.16
E100-00-00_N034	121010.0	1%	3357.00	105.89	120.21		120.32	0.000308	2.77	7522.26	4518.48	0.16
E100-00-00_N034	121010.0	0.2%	4590.00	105.89	120.99		121.14	0.000392	3.26	12082.03	6805.62	0.18
E100-00-00_N034	120253.0	10%	3100.00	103.73	117.28		117.56	0.001022	4.26	924.84	556.30	0.28
E100-00-00_N034	120253.0	2%	4663.00	103.73	119.29		119.51	0.000765	4.11	6260.06	4730.57	0.25
E100-00-00_N034	120253.0	1%	5380.00	103.73	119.73		119.93	0.000714	4.10	8540.02	5521.17	0.24
E100-00-00_N034	120253.0	0.2%	7474.00	103.73	120.56		120.73	0.000657	4.18	14292.27	8214.26	0.24
E100-00-00_N034	119390.0	10%	3100.00	100.59	116.59		116.80	0.000729	3.71	844.91	179.09	0.24
E100-00-00_N034	119390.0	2%	4663.00	100.59	118.63		118.87	0.000703	4.06	4737.79	4292.35	0.24
E100-00-00_N034	119390.0	1%	5380.00	100.59	119.06		119.31	0.000722	4.25	6918.78	5978.84	0.24
E100-00-00_N034	119390.0	0.2%	7474.00	100.59	119.81		120.08	0.000821	4.77	12240.20	8491.94	0.26
E100-00-00_N034	118660.0	10%	3079.00	101.55	115.86		116.15	0.001107	4.27	728.31	208.85	0.29
E100-00-00_N034	118660.0	2%	4787.00	101.55	118.07		118.31	0.000836	4.22	4010.92	3777.12	0.26
E100-00-00_N034	118660.0	1%	5592.00	101.55	118.52		118.74	0.000804	4.25	6129.41	5807.27	0.26
E100-00-00_N034	118660.0	0.2%	7863.00	101.55	119.25		119.46	0.000830	4.54	11279.50	8098.40	0.26
E100-00-00_N034	117779.0	10%	3418.00	102.24	114.69		115.04	0.001395	4.75	719.78	107.71	0.32
E100-00-00_N034	117779.0	2%	5135.00	102.24	117.02	111.58	117.40	0.001229	5.04	1791.33	1983.91	0.31
E100-00-00_N034	117779.0	1%	5950.00	102.24	117.47	112.14	117.84	0.001225	5.17	3029.01	3487.35	0.32
E100-00-00_N034	117779.0	0.2%	8348.00	102.24	118.46		118.69	0.000884	4.71	8385.19	7188.46	0.27
E100-00-00_N034	116759.	10%	3446.00	100.39	113.02		113.45	0.001740	5.26	655.39	99.63	0.36
E100-00-00_N034	116759.	2%	5163.00	100.39	115.66		116.08	0.001343	5.29	1240.21	751.42	0.33
E100-00-00_N034	116759.	1%	5978.00	100.39	115.87		116.38	0.001627	5.89	1424.31	1000.56	0.36
E100-00-00_N034	116759.	0.2%	8387.00	100.39	116.75	112.35	117.34	0.001866	6.69	3329.88	3785.96	0.39
E100-00-00_N034	116680	10%	2838.00	100.21	112.94	108.46	113.27	0.001419	4.62	614.10	95.35	0.32
E100-00-00_N034	116680	2%	5106.00	100.21	115.50	110.48	115.94	0.001779	5.48	1353.12	1196.37	0.37
E100-00-00_N034	116680	1%	5947.00	100.21	115.68	111.10	116.22	0.002290	6.11	1594.83	1498.62	0.42
E100-00-00_N034	116680	0.2%	8366.00	100.21	116.67	112.67	117.11	0.002060	6.05	4135.78	3972.89	0.40
E100-00-00_N034	116605.5		Bridge									
E100-00-00_N034	116529	10%	2838.00	99.66	112.65	107.91	112.95	0.001280	4.45	638.19	97.24	0.31
E100-00-00_N034	116529	2%	5106.00	99.66	115.37	109.93	115.65	0.001229	4.62	1781.69	1378.74	0.31
E100-00-00_N034	116529	1%	5947.00	99.66	115.96	110.55	116.18	0.000999	4.39	2897.78	2385.00	0.28
E100-00-00_N034	116529	0.2%	8366.00	99.66	116.95	112.12	117.11	0.000740	4.10	6180.68	4646.64	0.25
E100-00-00_N034	116453.	10%	2929.00	99.75	112.55		112.85	0.001250	4.36	672.09	104.92	0.30
E100-00-00_N034	116453.	2%	5221.00	99.75	115.22		115.55	0.001187	4.80	1690.84	1172.86	0.31
E100-00-00_N034	116453.	1%	6086.00	99.75	115.81		116.09	0.001030	4.69	2625.95	2034.36	0.29
E100-00-00_N034	116453.	0.2%	8520.00	99.75	116.84		117.04	0.000781	4.42	5335.94	3709.93	0.26
E100-00-00_N034	115807.0	10%	3055.00	100.32	111.68		112.01	0.001352	4.60	664.49	103.17	0.32
E100-00-00_N034	115807.0	2%	5378.00	100.32	114.18		114.67	0.001553	5.66	1074.75	594.44	0.35
E100-00-00_N034	115807.0	1%	6277.00	100.32	114.73	109.76	115.27	0.001624	6.00	1554.68	1198.17	0.37

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	115807.0	0.2%	8729.00	100.32	115.72	111.19	116.33	0.001735	6.69	3242.96	2234.78	0.38
E100-00-00_N034	114948.0	10%	3162.00	98.89	111.37		111.47	0.000298	2.45	1292.37	169.59	0.16
E100-00-00_N034	114948.0	2%	5510.00	98.89	113.81		113.97	0.000405	3.18	1807.33	464.23	0.19
E100-00-00_N034	114948.0	1%	6437.00	98.89	114.30		114.49	0.000467	3.48	2247.18	1783.02	0.20
E100-00-00_N034	114948.0	0.2%	8904.00	98.89	115.18		115.42	0.000593	4.14	4975.70	4196.41	0.23
E100-00-00_N034	114246.0	10%	3348.00	99.33	111.35		111.37	0.000061	1.14	2942.25	410.17	0.07
E100-00-00_N034	114246.0	2%	5736.00	99.33	113.80		113.83	0.000073	1.43	5213.65	2160.38	0.08
E100-00-00_N034	114246.0	1%	6712.00	99.33	114.29		114.33	0.000081	1.56	6530.76	3289.31	0.09
E100-00-00_N034	114246.0	0.2%	9202.00	99.33	115.17		115.22	0.000103	1.86	10524.72	6210.67	0.10
E100-00-00_N034	113821.	10%	3348.00	98.17	111.04		111.28	0.000887	3.90	884.57	202.56	0.26
E100-00-00_N034	113821.	2%	5736.00	98.17	113.46		113.73	0.000979	4.38	2453.10	1897.51	0.28
E100-00-00_N034	113821.	1%	6712.00	98.17	113.99		114.24	0.000896	4.36	3703.50	3006.43	0.27
E100-00-00_N034	113821.	0.2%	9202.00	98.17	114.94		115.13	0.000750	4.30	8055.64	6801.49	0.25
E100-00-00_N034	113668.0	10%	3348.00	97.75	110.82	105.40	111.12	0.001078	4.40	760.49	123.78	0.29
E100-00-00_N034	113668.0	2%	5736.00	97.75	113.17	107.35	113.56	0.001249	5.19	1759.99	1263.32	0.32
E100-00-00_N034	113668.0	1%	6712.00	97.75	113.67	108.03	114.07	0.001252	5.41	2693.46	2506.60	0.32
E100-00-00_N034	113668.0	0.2%	9202.00	97.75	114.76	109.57	115.01	0.000900	4.96	7240.52	6603.65	0.28
E100-00-00_N034	113632.0	10%	3348.00	97.28	110.81	104.93	111.08	0.000911	4.13	809.96	126.22	0.27
E100-00-00_N034	113632.0	2%	5736.00	97.28	113.15	106.88	113.51	0.001053	4.94	1801.93	1219.92	0.30
E100-00-00_N034	113632.0	1%	6712.00	97.28	113.64	107.57	114.02	0.001085	5.20	2695.61	2463.96	0.30
E100-00-00_N034	113632.0	0.2%	9202.00	97.28	114.72	109.09	114.98	0.000838	4.93	7052.91	6457.20	0.27
E100-00-00_N034	113539.	10%	3348.00	97.43	110.78		110.98	0.000681	3.60	931.07	125.98	0.23
E100-00-00_N034	113539.	2%	5736.00	97.43	113.12		113.40	0.000812	4.35	1912.92	1059.89	0.26
E100-00-00_N034	113539.	1%	6712.00	97.43	113.60		113.91	0.000902	4.67	2605.25	1916.49	0.28
E100-00-00_N034	113539.	0.2%	9202.00	97.43	114.64		114.91	0.000809	4.74	6258.05	6084.74	0.27
E100-00-00_N034	113080.0	10%	3533.00	98.18	110.49		110.68	0.000630	3.54	1001.42	154.08	0.23
E100-00-00_N034	113080.0	2%	5957.00	98.18	112.78		113.05	0.000706	4.27	2021.70	932.60	0.25
E100-00-00_N034	113080.0	1%	6982.00	98.18	113.21		113.52	0.000798	4.64	2542.14	1553.84	0.26
E100-00-00_N034	113080.0	0.2%	9492.00	98.18	114.21		114.52	0.000823	5.02	5647.59	4937.54	0.27
E100-00-00_N034	112547.0	10%	3533.00	97.39	110.19		110.36	0.000549	3.30	1080.17	192.53	0.21
E100-00-00_N034	112547.0	2%	5957.00	97.39	112.45		112.68	0.000625	4.00	2341.47	1280.44	0.23
E100-00-00_N034	112547.0	1%	6982.00	97.39	112.83		113.10	0.000716	4.38	2933.59	1940.25	0.25
E100-00-00_N034	112547.0	0.2%	9492.00	97.39	113.78		114.08	0.000774	4.85	5722.86	4305.22	0.26
E100-00-00_N034	111983.	10%	3741.00	96.47	109.86		110.04	0.000598	3.42	1098.76	174.59	0.22
E100-00-00_N034	111983.	2%	6202.00	96.47	112.08		112.32	0.000656	4.03	2335.11	1294.39	0.24
E100-00-00_N034	111983.	1%	7282.00	96.47	112.39		112.68	0.000784	4.50	2812.08	1974.30	0.26
E100-00-00_N034	111983.	0.2%	9810.00	96.47	113.34		113.63	0.000785	4.81	5721.39	4436.56	0.26
E100-00-00_N034	111861.0	10%	3741.00	96.70	109.70	104.34	109.94	0.000791	3.87	966.51	163.57	0.25
E100-00-00_N034	111861.0	2%	6202.00	96.70	111.91	105.84	112.21	0.000884	4.53	2192.24	1446.34	0.27
E100-00-00_N034	111861.0	1%	7282.00	96.70	112.20	106.40	112.55	0.001033	4.96	2664.78	1774.61	0.29
E100-00-00_N034	111861.0	0.2%	9810.00	96.70	113.18	107.61	113.50	0.000998	5.18	5280.42	4042.06	0.29
E100-00-00_N034	111833.5		Bridge									
E100-00-00_N034	111799.0	10%	3741.00	97.18	109.28	104.81	109.59	0.001726	4.46	838.15	139.67	0.29
E100-00-00_N034	111799.0	2%	6202.00	97.18	111.83	106.32	112.15	0.001864	4.75	1974.32	1272.74	0.29
E100-00-00_N034	111799.0	1%	7282.00	97.18	112.18	106.86	112.53	0.002073	5.05	2504.08	1726.14	0.31
E100-00-00_N034	111799.0	0.2%	9810.00	97.18	113.26	108.03	113.49	0.001678	4.71	5413.62	4432.59	0.27
E100-00-00_N034	111699.	10%	3741.00	96.78	109.23		109.43	0.000704	3.64	1038.65	170.69	0.24
E100-00-00_N034	111699.	2%	6202.00	96.78	111.79		112.00	0.000606	3.89	2726.06	1597.89	0.25
E100-00-00_N034	111699.	1%	7282.00	96.78	112.13		112.37	0.000693	4.23	3348.13	2159.01	0.27
E100-00-00_N034	111699.	0.2%	9810.00	96.78	113.18		113.40	0.000656	4.33	6814.83	4926.35	0.26
E100-00-00_N034	111409.0	10%	3741.00	96.85	109.03		109.23	0.000672	3.60	1038.38	139.19	0.23
E100-00-00_N034	111409.0	2%	6202.00	96.85	111.59		111.83	0.000632	4.08	2641.58	1511.93	0.23
E100-00-00_N034	111409.0	1%	7282.00	96.85	111.87		112.17	0.000765	4.57	3118.11	1926.93	0.26
E100-00-00_N034	111409.0	0.2%	9810.00	96.85	112.91		113.21	0.000772	4.92	5917.99	4110.54	0.26
E100-00-00_N034	110813.0	10%	3808.00	97.20	108.56		108.79	0.000816	3.83	1007.32	213.51	0.25
E100-00-00_N034	110813.0	2%	6279.00	97.20	111.30		111.48	0.000543	3.75	3698.00	2108.56	0.22
E100-00-00_N034	110813.0	1%	7376.00	97.20	111.53		111.75	0.000651	4.15	4213.55	2391.42	0.24
E100-00-00_N034	110813.0	0.2%	9910.00	97.20	112.63		112.82	0.000589	4.24	7974.63	4671.16	0.23
E100-00-00_N034	110549.	10%	3808.00	96.58	108.34		108.57	0.000809	3.85	990.30	143.46	0.25
E100-00-00_N034	110549.	2%	6279.00	96.58	111.12		111.33	0.000641	3.95	2891.76	1740.44	0.23
E100-00-00_N034	110549.	1%	7376.00	96.58	111.30		111.57	0.000785	4.43	3231.36	1928.69	0.26
E100-00-00_N034	110549.	0.2%	9910.00	96.58	112.48		112.68	0.000619	4.27	6554.60	3880.84	0.24

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	110454.0	10%	4049.00	96.36	108.26	102.96	108.50	0.000809	3.88	1043.12	143.53	0.25
E100-00-00_N034	110454.0	2%	6536.00	96.36	111.05	104.39	111.27	0.000607	4.00	2867.96	1644.96	0.23
E100-00-00_N034	110454.0	1%	7680.00	96.36	111.21	104.96	111.49	0.000764	4.53	3151.69	1859.72	0.26
E100-00-00_N034	110454.0	0.2%	10333.00	96.36	112.40	106.14	112.62	0.000609	4.38	6258.55	3643.90	0.24
E100-00-00_N034	110399.0		Bridge									
E100-00-00_N034	110346.0	10%	4049.00	95.88	108.11	102.48	108.33	0.000712	3.71	1090.86	145.89	0.24
E100-00-00_N034	110346.0	2%	6536.00	95.88	110.46	103.91	110.77	0.000779	4.49	1467.75	989.78	0.26
E100-00-00_N034	110346.0	1%	7680.00	95.88	111.21	104.49	111.47	0.000658	4.35	3242.32	1862.85	0.24
E100-00-00_N034	110346.0	0.2%	10333.00	95.88	112.40	105.66	112.61	0.000548	4.27	6328.56	3630.48	0.22
E100-00-00_N034	110243.	10%	4049.00	95.83	107.96		108.23	0.000983	4.12	983.89	143.41	0.28
E100-00-00_N034	110243.	2%	6536.00	95.83	110.38		110.67	0.000966	4.42	2142.93	1065.77	0.28
E100-00-00_N034	110243.	1%	7680.00	95.83	111.10		111.39	0.000902	4.53	3106.06	1741.56	0.28
E100-00-00_N034	110243.	0.2%	10333.00	95.83	112.30		112.54	0.000732	4.46	6106.85	3400.10	0.25
E100-00-00_N034	109208.0	10%	4049.00	95.31	106.57		106.94	0.001601	4.88	829.55	134.63	0.35
E100-00-00_N034	109208.0	2%	6536.00	95.31	108.95		109.43	0.001498	5.58	1264.84	401.86	0.35
E100-00-00_N034	109208.0	1%	7680.00	95.31	109.67		110.20	0.001518	5.90	1685.69	841.55	0.36
E100-00-00_N034	109208.0	0.2%	10333.00	95.31	110.98	106.00	111.53	0.001416	6.27	3799.80	2528.16	0.35
E100-00-00_N034	108454	10%	4049.00	94.03	105.41		105.75	0.001521	4.66	899.35	174.52	0.34
E100-00-00_N034	108454	2%	6536.00	94.03	107.96		108.37	0.001276	5.15	1393.05	215.35	0.33
E100-00-00_N034	108454	1%	7680.00	94.03	108.62		109.09	0.001368	5.55	1540.57	246.76	0.35
E100-00-00_N034	108454	0.2%	10333.00	94.03	109.75	104.79	110.38	0.001618	6.41	2416.69	1531.84	0.40
E100-00-00_N034	108354	10%	4049.00	93.86	105.27	101.74	105.60	0.001478	4.60	881.15	176.37	0.33
E100-00-00_N034	108354	2%	6536.00	93.86	107.84	103.01	108.24	0.001226	5.01	1303.52	268.72	0.34
E100-00-00_N034	108354	1%	7680.00	93.86	108.51	103.52	108.95	0.001294	5.32	1640.09	352.62	0.35
E100-00-00_N034	108354	0.2%	10333.00	93.86	109.64	104.59	110.20	0.001505	6.06	2430.65	1286.82	0.37
E100-00-00_N034	108339		Bridge									
E100-00-00_N034	108323	10%	4049.00	93.81	105.20	101.68	105.53	0.001481	4.59	881.45	175.13	0.33
E100-00-00_N034	108323	2%	6536.00	93.81	107.31	102.95	107.76	0.001480	5.36	1219.69	224.66	0.37
E100-00-00_N034	108323	1%	7680.00	93.81	108.12	103.46	108.60	0.001479	5.58	1378.81	298.36	0.38
E100-00-00_N034	108323	0.2%	10333.00	93.81	109.60	104.54	110.17	0.001531	6.10	2458.39	1207.92	0.38
E100-00-00_N034	108221	10%	4347.00	93.64	104.99		105.36	0.001705	4.91	904.52	174.55	0.36
E100-00-00_N034	108221	2%	6847.00	93.64	107.12		107.60	0.001565	5.55	1320.83	232.60	0.38
E100-00-00_N034	108221	1%	8046.00	93.64	107.94		108.45	0.001524	5.73	1550.50	341.30	0.40
E100-00-00_N034	108221	0.2%	10845.00	93.64	109.45		110.02	0.001484	6.10	2502.39	1173.82	0.38
E100-00-00_N034	107598.0	10%	4347.00	92.57	104.14		104.43	0.001249	4.33	1004.02	162.29	0.31
E100-00-00_N034	107598.0	2%	6847.00	92.57	106.35		106.73	0.001175	4.96	1409.44	236.98	0.31
E100-00-00_N034	107598.0	1%	8046.00	92.57	107.17		107.59	0.001169	5.22	1628.99	313.28	0.31
E100-00-00_N034	107598.0	0.2%	10845.00	92.57	108.68		109.17	0.001188	5.75	2654.27	1532.90	0.32
E100-00-00_N034	106727.0	10%	4347.00	90.24	103.33		103.55	0.000807	3.77	1153.37	164.82	0.25
E100-00-00_N034	106727.0	2%	6847.00	90.24	105.54		105.84	0.000853	4.44	1566.74	222.85	0.27
E100-00-00_N034	106727.0	1%	8046.00	90.24	106.34		106.69	0.000885	4.73	1765.60	266.82	0.28
E100-00-00_N034	106727.0	0.2%	10845.00	90.24	107.75		108.20	0.001015	5.43	2335.02	764.73	0.30
E100-00-00_N034	105640.0	10%	4347.00	89.76	102.37		102.63	0.000869	4.09	1062.27	142.23	0.26
E100-00-00_N034	105640.0	2%	6847.00	89.76	104.42		104.81	0.001047	5.01	1381.07	203.25	0.30
E100-00-00_N034	105640.0	1%	8046.00	89.76	105.17		105.62	0.001093	5.38	1643.14	493.51	0.31
E100-00-00_N034	105640.0	0.2%	10845.00	89.76	106.65		107.11	0.001016	5.71	3438.15	2010.39	0.30
E100-00-00_N034	104527.0	10%	3155.00	87.96	101.67		101.84	0.000523	3.30	955.41	118.33	0.20
E100-00-00_N034	104527.0	2%	4600.00	87.96	103.66		103.89	0.000544	3.81	1267.35	248.40	0.22
E100-00-00_N034	104527.0	1%	5617.00	87.96	104.34		104.61	0.000628	4.28	1516.13	405.56	0.23
E100-00-00_N034	104527.0	0.2%	8857.00	87.96	105.55		106.01	0.000958	5.68	2568.94	1914.31	0.29
E100-00-00_N034	103364.0	10%	3380.00	86.63	101.04	94.16	101.22	0.000529	3.45	979.43	153.20	0.21
E100-00-00_N034	103364.0	2%	4829.00	86.63	103.08	95.30	103.28	0.000493	3.72	1820.68	965.31	0.21
E100-00-00_N034	103364.0	1%	5872.00	86.63	103.75	96.02	103.95	0.000490	3.87	3156.34	2347.21	0.21
E100-00-00_N034	103364.0	0.2%	9210.00	86.63	105.04	97.93	105.20	0.000444	3.98	7574.06	4385.29	0.20
E100-00-00_N034	102317.0	10%	3583.00	85.24	100.37	94.34	100.59	0.000674	3.77	949.46	115.91	0.23
E100-00-00_N034	102317.0	2%	5031.00	85.24	102.50	95.33	102.73	0.000567	3.93	1865.67	1060.28	0.22
E100-00-00_N034	102317.0	1%	6098.00	85.24	103.18	95.98	103.41	0.000578	4.15	2730.22	1520.13	0.22
E100-00-00_N034	102317.0	0.2%	9519.00	85.24	104.50	97.81	104.73	0.000592	4.54	5947.86	3578.43	0.23
E100-00-00_N034	101430.	10%	3753.00	84.71	99.70	93.39	99.94	0.000807	3.88	968.19	132.79	0.25
E100-00-00_N034	101430.	2%	5198.00	84.71	101.97	94.46	102.20	0.000611	3.89	1647.81	698.29	0.23
E100-00-00_N034	101430.	1%	6284.00	84.71	102.61	95.17	102.86	0.000654	4.20	2301.62	1349.09	0.24
E100-00-00_N034	101430.	0.2%	9556.00	84.71	103.95	97.10	104.20	0.000665	4.60	4901.55	3688.75	0.25

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	101325.0	10%	3753.00	84.65	99.60	93.30	99.85	0.000747	4.02	934.03	220.95	0.25
E100-00-00_N034	101325.0	2%	5198.00	84.65	101.93	94.37	102.12	0.000540	3.75	2378.66	1268.21	0.21
E100-00-00_N034	101325.0	1%	6284.00	84.65	102.57	95.09	102.77	0.000546	3.94	3357.06	1701.36	0.22
E100-00-00_N034	101325.0	0.2%	9556.00	84.65	103.91	96.97	104.11	0.000552	4.30	6248.52	4309.58	0.22
E100-00-00_N034	101296.0		Bridge									
E100-00-00_N034	101274.0	10%	3753.00	84.67	99.52	93.32	99.78	0.000773	4.07	922.86	203.20	0.25
E100-00-00_N034	101274.0	2%	5198.00	84.67	101.76	94.39	101.98	0.000601	3.90	2154.20	1129.64	0.23
E100-00-00_N034	101274.0	1%	6284.00	84.67	102.43	95.11	102.65	0.000596	4.07	3081.64	1643.83	0.23
E100-00-00_N034	101274.0	0.2%	9556.00	84.67	103.74	96.98	103.94	0.000590	4.40	5666.27	3273.81	0.23
E100-00-00_N034	101172.	10%	3753.00	84.38	99.44	93.09	99.70	0.000824	4.05	926.12	119.85	0.26
E100-00-00_N034	101172.	2%	5198.00	84.38	101.71	94.19	101.91	0.000653	3.76	2243.82	1291.80	0.24
E100-00-00_N034	101172.	1%	6284.00	84.38	102.39	94.92	102.56	0.000572	3.70	3247.69	1711.55	0.22
E100-00-00_N034	101172.	0.2%	9556.00	84.38	103.72	96.87	103.84	0.000468	3.65	6614.08	3455.19	0.21
E100-00-00_N034	100723.0	10%	4115.00	83.09	98.96	92.75	99.28	0.000993	4.58	899.21	109.76	0.28
E100-00-00_N034	100723.0	2%	5693.00	83.09	101.18	93.96	101.52	0.000896	4.74	1581.81	867.64	0.27
E100-00-00_N034	100723.0	1%	6657.00	83.09	101.83	94.63	102.17	0.000876	4.89	2301.39	1240.28	0.27
E100-00-00_N034	100723.0	0.2%	9575.00	83.09	103.10	96.41	103.42	0.000844	5.20	4109.29	1700.78	0.27
E100-00-00_N034	99963.0	10%	4115.00	83.11	98.36	91.60	98.62	0.000733	4.07	1026.29	204.84	0.24
E100-00-00_N034	99963.0	2%	5693.00	83.11	100.71	92.74	100.96	0.000568	4.10	2118.36	885.30	0.22
E100-00-00_N034	99963.0	1%	6657.00	83.11	101.37	93.37	101.62	0.000565	4.26	2740.42	1010.18	0.22
E100-00-00_N034	99963.0	0.2%	9575.00	83.11	102.56	95.03	102.86	0.000655	4.90	4148.31	1528.24	0.24
E100-00-00_N034	99304.	10%	4115.00	83.36	97.87	90.88	98.11	0.000792	3.88	1060.27	141.71	0.25
E100-00-00_N034	99304.	2%	5693.00	83.36	100.35	92.01	100.57	0.000595	3.82	1926.19	884.67	0.22
E100-00-00_N034	99304.	1%	6657.00	83.36	101.00	92.64	101.23	0.000586	3.98	2613.73	1178.89	0.23
E100-00-00_N034	99304.	0.2%	9575.00	83.36	102.16	94.32	102.42	0.000654	4.53	4376.90	2017.05	0.24
E100-00-00_N034	99202.0	10%	4115.00	83.40	97.80	90.77	98.03	0.000652	3.88	1060.13	120.40	0.23
E100-00-00_N034	99202.0	2%	5693.00	83.40	100.28	91.92	100.51	0.000545	3.93	2057.79	953.27	0.22
E100-00-00_N034	99202.0	1%	6657.00	83.40	100.94	92.55	101.17	0.000544	4.09	2882.31	1503.16	0.22
E100-00-00_N034	99202.0	0.2%	9575.00	83.40	102.10	94.20	102.35	0.000583	4.53	4819.87	1922.22	0.23
E100-00-00_N034	99176.0		Bridge									
E100-00-00_N034	99154.0	10%	4115.00	82.29	97.74	89.66	97.93	0.000460	3.46	1187.96	122.65	0.20
E100-00-00_N034	99154.0	2%	5693.00	82.29	100.08	90.80	100.28	0.000439	3.70	2015.82	849.57	0.20
E100-00-00_N034	99154.0	1%	6657.00	82.29	100.75	91.43	100.98	0.000455	3.92	2752.14	1453.95	0.20
E100-00-00_N034	99154.0	0.2%	9575.00	82.29	101.93	93.09	102.18	0.000517	4.45	4649.18	1841.57	0.22
E100-00-00_N034	99044.	10%	4115.00	82.07	97.44	91.25	97.80	0.001175	4.84	849.89	108.50	0.30
E100-00-00_N034	99044.	2%	5693.00	82.07	99.82	92.67	100.17	0.001120	4.81	1564.28	908.07	0.30
E100-00-00_N034	99044.	1%	6657.00	82.07	100.56	93.41	100.88	0.001048	4.76	2341.02	1190.54	0.29
E100-00-00_N034	99044.	0.2%	9575.00	82.07	101.79	95.31	102.09	0.000984	5.01	4114.93	1857.65	0.29
E100-00-00_N034	98564.0	10%	4501.00	81.12	96.84	90.54	97.24	0.001135	5.10	882.84	100.43	0.30
E100-00-00_N034	98564.0	2%	6221.00	81.12	99.37	91.88	99.71	0.000832	4.94	2154.39	1141.53	0.27
E100-00-00_N034	98564.0	1%	7042.00	81.12	100.20	92.45	100.47	0.000674	4.66	3346.97	1718.86	0.24
E100-00-00_N034	98564.0	0.2%	10118.00	81.12	101.48	94.35	101.71	0.000623	4.81	6087.28	2634.35	0.24
E100-00-00_N034	97673.	10%	4501.00	80.03	95.49	89.87	96.02	0.001660	5.83	772.29	96.51	0.36
E100-00-00_N034	97673.	2%	6221.00	80.03	98.20	91.42	98.72	0.001537	5.77	1158.55	426.67	0.35
E100-00-00_N034	97673.	1%	7042.00	80.03	99.21	92.06	99.64	0.001371	5.42	2048.10	1520.06	0.33
E100-00-00_N034	97673.	0.2%	10118.00	80.03	100.82	94.17	101.08	0.000872	4.87	5309.15	3199.19	0.28
E100-00-00_N034	97571.0	10%	4501.00	79.91	95.32	89.39	95.85	0.001597	5.85	769.47	90.82	0.35
E100-00-00_N034	97571.0	2%	6221.00	79.91	98.00	90.83	98.56	0.001362	6.01	1125.43	606.35	0.34
E100-00-00_N034	97571.0	1%	7042.00	79.91	98.96	91.47	99.48	0.001252	5.92	1659.55	1448.77	0.32
E100-00-00_N034	97571.0	0.2%	10118.00	79.91	100.75	93.73	100.99	0.000768	4.87	5819.37	3244.08	0.26
E100-00-00_N034	97558.0		Bridge									
E100-00-00_N034	97546.0	10%	4501.00	80.13	95.02	89.61	95.62	0.001864	6.22	723.30	87.25	0.38
E100-00-00_N034	97546.0	2%	6221.00	80.13	97.69	91.06	98.32	0.001595	6.37	976.21	312.81	0.36
E100-00-00_N034	97546.0	1%	7042.00	80.13	98.55	91.70	99.18	0.001531	6.45	1379.06	1136.46	0.36
E100-00-00_N034	97546.0	0.2%	10118.00	80.13	100.53	93.95	100.82	0.000952	5.28	5234.05	2947.28	0.29
E100-00-00_N034	97445.	10%	4501.00	79.21	94.98	88.63	95.37	0.001209	5.03	895.34	110.01	0.31
E100-00-00_N034	97445.	2%	6221.00	79.21	97.67	90.09	98.06	0.001199	5.03	1249.41	201.38	0.31
E100-00-00_N034	97445.	1%	7042.00	79.21	98.54	90.71	98.92	0.001229	5.01	1676.63	821.66	0.32
E100-00-00_N034	97445.	0.2%	10118.00	79.21	100.48	92.68	100.71	0.000715	4.43	5405.99	2861.47	0.25
E100-00-00_N034	97054.0	10%	4501.00	75.66	94.73	85.22	95.00	0.000628	4.18	1077.14	103.19	0.23
E100-00-00_N034	97054.0	2%	6221.00	75.66	97.39	86.96	97.71	0.000635	4.54	1371.45	129.20	0.23
E100-00-00_N034	97054.0	1%	7042.00	75.66	98.21	87.63	98.57	0.000665	4.79	1527.31	400.14	0.24

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	97054.0	0.2%	10118.00	75.66	100.01	89.78	100.42	0.000705	5.39	3364.24	1826.69	0.25
E100-00-00_N034	96688.	10%	4501.00	74.63	94.65	83.54	94.81	0.000317	3.20	1407.63	123.33	0.17
E100-00-00_N034	96688.	2%	6221.00	74.63	97.31	85.17	97.51	0.000334	3.55	1753.27	138.94	0.18
E100-00-00_N034	96688.	1%	7042.00	74.63	98.13	85.80	98.35	0.000366	3.76	1872.75	151.75	0.19
E100-00-00_N034	96688.	0.2%	10118.00	74.63	99.82	87.81	100.17	0.000552	4.70	2154.06	1673.31	0.24
E100-00-00_N034	96586.0	10%	4501.00	74.34	94.63	82.60	94.77	0.000263	3.06	1472.80	118.11	0.15
E100-00-00_N034	96586.0	2%	6221.00	74.34	97.29	84.13	97.47	0.000288	3.46	1798.69	127.05	0.16
E100-00-00_N034	96586.0	1%	7042.00	74.34	98.10	85.11	98.31	0.000378	3.68	1913.97	153.12	0.18
E100-00-00_N034	96586.0	0.2%	10118.00	74.34	99.77	87.14	100.10	0.000592	4.63	2186.17	1785.92	0.23
E100-00-00_N034	96552.5		Bridge									
E100-00-00_N034	96514.0	10%	4501.00	74.57	94.59	82.83	94.74	0.000280	3.12	1441.34	117.21	0.16
E100-00-00_N034	96514.0	2%	6221.00	74.57	97.24	84.36	97.44	0.000304	3.53	1764.13	126.13	0.17
E100-00-00_N034	96514.0	1%	7042.00	74.57	98.04	85.34	98.26	0.000398	3.76	1870.95	150.42	0.19
E100-00-00_N034	96514.0	0.2%	10118.00	74.57	99.66	87.38	100.01	0.000630	4.76	2126.65	1563.47	0.24
E100-00-00_N034	96459.0	10%	4575.00	75.54	94.51	84.03	94.71	0.000476	3.56	1284.36	130.24	0.20
E100-00-00_N034	96459.0	2%	6322.00	75.54	97.18	85.64	97.40	0.000472	3.81	1661.24	152.46	0.20
E100-00-00_N034	96459.0	1%	7115.00	75.54	97.98	86.27	98.23	0.000491	3.98	1786.14	157.73	0.21
E100-00-00_N034	96459.0	0.2%	10303.00	75.54	99.56	88.57	99.96	0.000714	5.04	2042.99	358.65	0.25
E100-00-00_N034	96380.5		Bridge									
E100-00-00_N034	96298.0	10%	4575.00	75.98	94.37	84.47	94.60	0.000553	3.78	1210.65	125.55	0.21
E100-00-00_N034	96298.0	2%	6322.00	75.98	97.04	86.08	97.29	0.000540	4.01	1574.64	147.27	0.22
E100-00-00_N034	96298.0	1%	7115.00	75.98	97.84	86.71	98.11	0.000567	4.20	1694.54	154.03	0.22
E100-00-00_N034	96298.0	0.2%	10303.00	75.98	99.33	89.02	99.77	0.000832	5.33	1931.36	186.32	0.27
E100-00-00_N034	96244.0	10%	4575.00	76.20	94.26	86.35	94.54	0.000790	4.24	1078.35	124.57	0.25
E100-00-00_N034	96244.0	2%	6322.00	76.20	96.95	87.89	97.24	0.000715	4.37	1445.50	148.64	0.25
E100-00-00_N034	96244.0	1%	7115.00	76.20	97.74	88.49	98.06	0.000730	4.54	1565.87	154.67	0.25
E100-00-00_N034	96244.0	0.2%	10303.00	76.20	99.19	90.57	99.70	0.001058	5.73	1797.95	165.74	0.31
E100-00-00_N034	96210.5		Bridge									
E100-00-00_N034	96176.0	10%	4575.00	74.86	94.32	81.91	94.43	0.000204	2.66	1720.39	146.78	0.14
E100-00-00_N034	96176.0	2%	6322.00	74.86	97.00	83.27	97.14	0.000218	2.96	2135.02	162.85	0.14
E100-00-00_N034	96176.0	1%	7115.00	74.86	97.80	83.80	97.95	0.000235	3.14	2266.39	167.62	0.15
E100-00-00_N034	96176.0	0.2%	10303.00	74.86	99.26	85.72	99.52	0.000371	4.09	2518.53	176.41	0.19
E100-00-00_N034	96077.	10%	4048.00	74.81	94.32	81.40	94.40	0.000158	2.34	1726.98	147.05	0.12
E100-00-00_N034	96077.	2%	6271.00	74.81	96.98	83.18	97.12	0.000213	2.93	2139.99	192.63	0.14
E100-00-00_N034	96077.	1%	7111.00	74.81	97.77	83.75	97.93	0.000233	3.13	2271.03	405.32	0.15
E100-00-00_N034	96077.	0.2%	10302.00	74.81	99.23	85.67	99.48	0.000345	4.04	3020.83	1587.57	0.19
E100-00-00_N034	95826.70	10%	4048.00	74.68	94.28		94.36	0.000155	2.33	1740.46	147.60	0.12
E100-00-00_N034	95826.70	2%	6271.00	74.68	96.93		97.06	0.000209	2.91	2176.62	289.67	0.14
E100-00-00_N034	95826.70	1%	7111.00	74.68	97.72		97.87	0.000228	3.10	2501.63	561.14	0.15
E100-00-00_N034	95826.70	0.2%	10302.00	74.68	99.16		99.39	0.000338	3.91	3910.03	1521.06	0.18
E100-00-00_N034	95629.0	10%	4048.00	74.58	94.25	81.18	94.33	0.000152	2.31	1750.91	148.02	0.12
E100-00-00_N034	95629.0	2%	6271.00	74.58	96.89	82.95	97.02	0.000207	2.90	2162.53	285.36	0.14
E100-00-00_N034	95629.0	1%	7111.00	74.58	97.67	83.53	97.82	0.000227	3.10	2334.48	737.62	0.15
E100-00-00_N034	95629.0	0.2%	10302.00	74.58	99.08	85.44	99.32	0.000345	3.99	3315.94	2426.81	0.18
E100-00-00_N034	95449.5	10%	4048.00	74.49	94.22	81.08	94.31	0.000150	2.30	1760.37	148.41	0.12
E100-00-00_N034	95449.5	2%	6271.00	74.49	96.85	82.85	96.98	0.000205	2.89	2171.39	310.00	0.14
E100-00-00_N034	95449.5	1%	7111.00	74.49	97.63	83.43	97.78	0.000225	3.09	2350.82	839.71	0.15
E100-00-00_N034	95449.5	0.2%	10302.00	74.49	99.02	85.35	99.26	0.000342	3.97	3383.53	2521.61	0.18
E100-00-00_N034	95294.10	10%	4048.00	74.41	94.20	81.00	94.28	0.000148	2.29	1768.81	234.47	0.12
E100-00-00_N034	95294.10	2%	6271.00	74.41	96.82	82.78	96.95	0.000203	2.88	2179.34	444.62	0.14
E100-00-00_N034	95294.10	1%	7111.00	74.41	97.60	83.35	97.75	0.000219	3.07	2432.88	1136.08	0.15
E100-00-00_N034	95294.10	0.2%	10302.00	74.41	99.04	85.27	99.19	0.000230	3.37	4749.02	3006.31	0.15
E100-00-00_N034	95027.60	10%	4048.00	74.27	94.16	80.87	94.24	0.000145	2.27	1783.75	416.77	0.12
E100-00-00_N034	95027.60	2%	6271.00	74.27	96.77	82.63	96.90	0.000199	2.86	2199.53	622.70	0.14
E100-00-00_N034	95027.60	1%	7111.00	74.27	97.54	83.22	97.69	0.000210	3.05	2482.29	1088.76	0.14
E100-00-00_N034	95027.60	0.2%	10302.00	74.27	99.08	85.13	99.13	0.000093	2.18	7178.33	3790.09	0.10
E100-00-00_N034	94745.39	10%	4048.00	74.13	94.12	80.72	94.20	0.000141	2.25	1798.98	650.90	0.11
E100-00-00_N034	94745.39	2%	6271.00	74.13	96.72	82.49	96.84	0.000192	2.83	2247.37	1009.79	0.14
E100-00-00_N034	94745.39	1%	7111.00	74.13	97.49	83.07	97.63	0.000206	3.02	2481.83	1981.11	0.14
E100-00-00_N034	94745.39	0.2%	10302.00	74.13	99.09	84.99	99.11	0.000027	1.19	11510.13	4859.73	0.05
E100-00-00_N034	94536.70	10%	7650.00	74.02	93.83	83.32	94.12	0.000526	4.32	1771.42	698.00	0.22

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	94536.70	2%	11367.00	74.02	96.30	85.44	96.73	0.000685	5.27	2157.07	941.67	0.26
E100-00-00_N034	94536.70	1%	13025.00	74.02	96.99	86.26	97.50	0.000774	5.73	2301.77	1417.10	0.27
E100-00-00_N034	94536.70	0.2%	17512.00	74.02	99.06	88.23	99.10	0.000067	1.84	12785.20	4013.58	0.08
E100-00-00_N034	94345.79	10%	7650.00	73.92	93.92	82.95	94.01	0.000161	2.66	3197.65	990.59	0.13
E100-00-00_N034	94345.79	2%	11367.00	73.92	96.58	84.13	96.59	0.000017	0.96	15005.09	1538.00	0.04
E100-00-00_N034	94345.79	1%	13025.00	73.92	97.33	84.59	97.34	0.000019	1.04	15847.80	1975.59	0.04
E100-00-00_N034	94345.79	0.2%	17512.00	73.92	99.07	85.72	99.08	0.000024	1.24	18894.34	4541.28	0.05
E100-00-00_N034	94197.20	10%	7650.00	73.84	93.91	83.29	93.98	0.000126	2.36	3741.33	1166.11	0.11
E100-00-00_N034	94197.20	2%	11367.00	73.84	96.58	84.38	96.59	0.000012	0.75	17765.41	1426.50	0.03
E100-00-00_N034	94197.20	1%	13025.00	73.84	97.33	84.80	97.34	0.000014	0.80	18852.29	1794.08	0.04
E100-00-00_N034	94197.20	0.2%	17512.00	73.84	99.07	85.80	99.08	0.000017	0.97	21940.98	3208.33	0.04
E100-00-00_N034	94064.60	10%	7650.00	73.77	93.91	82.72	93.96	0.000082	1.91	4658.62	1418.24	0.09
E100-00-00_N034	94064.60	2%	11367.00	73.77	96.58	83.64	96.59	0.000008	0.61	21499.75	1611.08	0.03
E100-00-00_N034	94064.60	1%	13025.00	73.77	97.33	83.99	97.34	0.000010	0.66	22705.40	1989.21	0.03
E100-00-00_N034	94064.60	0.2%	17512.00	73.77	99.07	84.85	99.08	0.000012	0.79	25930.62	3482.95	0.04
E100-00-00_N034	93748.70	10%	7605.00	73.61	93.89	83.22	93.93	0.000082	1.92	4756.65	832.29	0.09
E100-00-00_N034	93748.70	2%	11163.00	73.61	96.57	84.14	96.58	0.000026	1.16	12564.79	1449.47	0.05
E100-00-00_N034	93748.70	1%	12917.00	73.61	97.31	84.53	97.33	0.000029	1.27	13704.71	1909.93	0.05
E100-00-00_N034	93748.70	0.2%	17463.00	73.61	99.05	85.39	99.07	0.000035	1.49	16768.55	3821.17	0.06
E100-00-00_N034	93630.	10%	7605.00	73.55	93.76	82.84	93.90	0.000257	3.38	2795.88	857.33	0.16
E100-00-00_N034	93630.	2%	11163.00	73.55	96.55	84.71	96.58	0.000064	1.82	9397.96	1185.52	0.08
E100-00-00_N034	93630.	1%	12917.00	73.55	97.29	85.45	97.32	0.000069	1.94	10360.01	1743.97	0.08
E100-00-00_N034	93630.	0.2%	17463.00	73.55	99.02	87.16	99.06	0.000075	2.16	13384.55	3650.26	0.09
E100-00-00_N034	93534.0	10%	7605.00	73.50	93.42	83.45	93.79	0.000685	4.93	1543.13	127.69	0.25
E100-00-00_N034	93534.0	2%	11163.00	73.50	95.86	85.63	96.40	0.001001	5.94	2011.63	719.02	0.30
E100-00-00_N034	93534.0	1%	12917.00	73.50	96.52	86.56	97.13	0.001074	6.36	2742.40	1174.25	0.32
E100-00-00_N034	93534.0	0.2%	17463.00	73.50	98.31	88.69	98.88	0.000962	6.58	6621.77	3203.09	0.31
E100-00-00_N034	93477.0		Bridge									
E100-00-00_N034	93419.0	10%	7605.00	73.44	93.23	83.39	93.62	0.000704	4.98	1527.45	127.07	0.25
E100-00-00_N034	93419.0	2%	11163.00	73.44	95.68	85.57	96.24	0.001031	6.00	1994.48	719.63	0.31
E100-00-00_N034	93419.0	1%	12917.00	73.44	96.23	86.50	96.87	0.001159	6.53	2550.54	1114.97	0.33
E100-00-00_N034	93419.0	0.2%	17463.00	73.44	97.65	88.63	98.37	0.001221	7.21	4980.79	2445.80	0.34
E100-00-00_N034	93320.	10%	7605.00	73.39	93.23	82.66	93.51	0.000517	4.28	1775.45	149.02	0.22
E100-00-00_N034	93320.	2%	11163.00	73.39	95.68	84.70	96.08	0.000636	5.11	2529.64	777.20	0.25
E100-00-00_N034	93320.	1%	12917.00	73.39	96.23	85.58	96.70	0.000730	5.58	2990.38	915.17	0.27
E100-00-00_N034	93320.	0.2%	17463.00	73.39	97.64	87.58	98.19	0.000825	6.32	5205.86	2501.48	0.29
E100-00-00_N034	92851.0	10%	7605.00	73.15	92.98	82.42	93.27	0.000517	4.28	1774.98	149.00	0.22
E100-00-00_N034	92851.0	2%	11163.00	73.15	95.38	84.46	95.78	0.000648	5.13	2607.46	1180.92	0.25
E100-00-00_N034	92851.0	1%	12917.00	73.15	95.88	85.35	96.35	0.000746	5.61	3073.99	1242.80	0.27
E100-00-00_N034	92851.0	0.2%	17463.00	73.15	97.22	87.33	97.81	0.000896	6.44	4441.87	1635.10	0.30
E100-00-00_N034	92147.	10%	7605.00	72.79	92.63		92.90	0.000509	4.25	1981.41	497.14	0.22
E100-00-00_N034	92147.	2%	11163.00	72.79	95.07		95.37	0.000478	4.66	3753.25	945.69	0.22
E100-00-00_N034	92147.	1%	12917.00	72.79	95.53		95.88	0.000546	5.08	4203.64	1036.00	0.23
E100-00-00_N034	92147.	0.2%	17463.00	72.79	96.80		97.24	0.000657	5.90	5931.08	1841.76	0.26
E100-00-00_N034	91972.0	10%	7605.00	72.70	92.55	82.36	92.81	0.000486	4.12	1855.27	213.80	0.21
E100-00-00_N034	91972.0	2%	11163.00	72.70	95.01	84.25	95.27	0.000454	4.36	4806.98	2925.18	0.21
E100-00-00_N034	91972.0	1%	12917.00	72.70	95.49	85.06	95.75	0.000467	4.50	6317.20	3360.53	0.21
E100-00-00_N034	91972.0	0.2%	17463.00	72.70	96.84	86.93	97.02	0.000381	4.29	11158.77	3744.83	0.19
E100-00-00_N034	91947.5		Bridge									
E100-00-00_N034	91923.0	10%	7605.00	72.67	92.43	82.33	92.70	0.000511	4.15	1831.04	157.52	0.21
E100-00-00_N034	91923.0	2%	11163.00	72.67	94.85	84.22	95.19	0.000568	4.81	3073.41	1731.49	0.23
E100-00-00_N034	91923.0	1%	12917.00	72.67	95.35	85.04	95.73	0.000622	5.12	4097.85	2285.60	0.24
E100-00-00_N034	91923.0	0.2%	17463.00	72.67	96.29	86.91	96.69	0.000709	5.64	6902.69	3421.19	0.26
E100-00-00_N034	91823.	10%	7605.00	72.62	92.35		92.64	0.000530	4.32	1762.05	172.03	0.22
E100-00-00_N034	91823.	2%	11163.00	72.62	94.80		95.13	0.000546	4.83	4576.98	3610.86	0.23
E100-00-00_N034	91823.	1%	12917.00	72.62	95.33		95.64	0.000529	4.88	6546.33	3749.36	0.23
E100-00-00_N034	91823.	0.2%	17463.00	72.62	96.29		96.57	0.000521	5.06	10237.19	3903.72	0.23
E100-00-00_N034	91339.0	10%	7605.00	72.37	92.09		92.38	0.000520	4.32	1783.35	191.89	0.22
E100-00-00_N034	91339.0	2%	11163.00	72.37	94.58		94.87	0.000480	4.61	5118.09	4018.85	0.22
E100-00-00_N034	91339.0	1%	12917.00	72.37	95.12		95.39	0.000461	4.63	7345.94	4191.25	0.21
E100-00-00_N034	91339.0	0.2%	17463.00	72.37	96.09		96.32	0.000444	4.75	11487.88	4314.17	0.21
E100-00-00_N034	90490.0	10%	8158.00	71.93	91.55		91.89	0.000624	4.68	1743.95	147.74	0.24

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	90490.0	2%	11702.00	71.93	93.98		94.38	0.000674	5.23	3580.11	2307.58	0.25
E100-00-00_N034	90490.0	1%	13492.00	71.93	94.47		94.89	0.000715	5.49	4949.63	3098.72	0.26
E100-00-00_N034	90490.0	0.2%	17716.00	71.93	95.49		95.86	0.000685	5.63	8203.32	3352.15	0.26
E100-00-00_N034	88972.0	10%	8158.00	71.15	90.57		90.92	0.000654	4.76	1714.37	146.55	0.25
E100-00-00_N034	88972.0	2%	11702.00	71.15	92.87		93.31	0.000747	5.43	3294.29	2088.72	0.27
E100-00-00_N034	88972.0	1%	13492.00	71.15	93.19		93.70	0.000872	5.91	4010.32	2350.38	0.29
E100-00-00_N034	88972.0	0.2%	17716.00	71.15	94.12		94.64	0.000955	6.39	6554.62	3074.77	0.30
E100-00-00_N034	87610.	10%	8158.00	70.45	89.70		90.03	0.000647	4.71	2056.29	454.90	0.24
E100-00-00_N034	87610.	2%	11702.00	70.45	92.00		92.33	0.000634	4.97	4320.09	1907.15	0.24
E100-00-00_N034	87610.	1%	13492.00	70.45	92.10		92.52	0.000809	5.63	4509.26	1959.92	0.28
E100-00-00_N034	87610.	0.2%	17716.00	70.45	92.70		93.25	0.001074	6.60	5764.48	2191.66	0.32
E100-00-00_N034	87508.0	10%	8158.00	70.40	89.66	80.14	89.95	0.000544	4.33	1881.91	192.92	0.22
E100-00-00_N034	87508.0	2%	11702.00	70.40	91.82	81.76	92.24	0.000693	5.21	2243.94	2086.16	0.26
E100-00-00_N034	87508.0	1%	13492.00	70.40	91.83	82.49	92.39	0.000918	6.01	2246.71	2119.30	0.29
E100-00-00_N034	87508.0	0.2%	17716.00	70.40	92.57	84.07	93.14	0.001016	6.46	5428.13	2683.70	0.31
E100-00-00_N034	87449.0		Bridge									
E100-00-00_N034	87390.0	10%	8158.00	70.34	89.49	80.07	89.79	0.000558	4.37	1864.92	177.58	0.23
E100-00-00_N034	87390.0	2%	11702.00	70.34	91.56	81.69	91.95	0.000680	5.14	3116.88	1668.90	0.25
E100-00-00_N034	87390.0	1%	13492.00	70.34	91.91	82.42	92.37	0.000793	5.60	3816.04	2251.82	0.27
E100-00-00_N034	87390.0	0.2%	17716.00	70.34	92.55	84.00	93.12	0.001017	6.46	5384.20	2655.55	0.31
E100-00-00_N034	87171.	10%	8158.00	70.23	89.25		89.63	0.000717	4.93	1655.82	144.11	0.26
E100-00-00_N034	87171.	2%	11702.00	70.23	91.28		91.76	0.000857	5.71	3184.80	2308.25	0.28
E100-00-00_N034	87171.	1%	13492.00	70.23	91.64		92.17	0.000957	6.09	4081.37	2577.49	0.30
E100-00-00_N034	87171.	0.2%	17716.00	70.23	92.34		92.90	0.001096	6.67	5935.25	2704.10	0.32
E100-00-00_N034	86973.10	10%	8120.00	70.13	89.09		89.49	0.000633	5.11	1628.11	2382.78	0.25
E100-00-00_N034	86973.10	2%	11698.00	70.13	91.16		91.57	0.000693	5.69	5904.36	3504.98	0.26
E100-00-00_N034	86973.10	1%	13490.00	70.13	91.52		91.95	0.000767	6.04	7194.26	3701.90	0.28
E100-00-00_N034	86973.10	0.2%	17716.00	70.13	92.20		92.67	0.000907	6.70	9750.19	3840.61	0.30
E100-00-00_N034	86924.79	10%	8120.00	70.11	89.09		89.40	0.000497	4.53	1860.41	2839.40	0.22
E100-00-00_N034	86924.79	2%	11698.00	70.11	91.22		91.43	0.000437	4.52	6809.16	4045.69	0.21
E100-00-00_N034	86924.79	1%	13490.00	70.11	91.58		91.79	0.000452	4.65	8298.36	4054.17	0.21
E100-00-00_N034	86924.79	0.2%	17716.00	70.11	92.28		92.47	0.000479	4.88	11125.79	4181.06	0.22
E100-00-00_N034	86535.60	10%	8120.00	69.91	89.06		89.19	0.000237	3.44	3067.27	3924.26	0.15
E100-00-00_N034	86535.60	2%	11698.00	69.91	91.12		91.27	0.000296	4.19	10584.43	4919.13	0.18
E100-00-00_N034	86535.60	1%	13490.00	69.91	91.49		91.63	0.000288	4.19	12423.88	4920.62	0.18
E100-00-00_N034	86535.60	0.2%	17716.00	69.91	92.19		92.31	0.000291	4.32	15852.81	4923.68	0.18
E100-00-00_N034	86342.39	10%	8120.00	69.81	89.02		89.13	0.000238	3.16	3326.01	2644.33	0.15
E100-00-00_N034	86342.39	2%	11698.00	69.81	91.07		91.19	0.000280	3.71	10385.97	4831.19	0.17
E100-00-00_N034	86342.39	1%	13490.00	69.81	91.45		91.56	0.000276	3.74	12185.64	4855.27	0.17
E100-00-00_N034	86342.39	0.2%	17716.00	69.81	92.14		92.24	0.000284	3.91	15553.01	4871.11	0.17
E100-00-00_N034	86132.20	10%	8120.00	69.70	88.57		88.95	0.000729	4.94	1711.81	2153.52	0.26
E100-00-00_N034	86132.20	2%	11698.00	69.70	90.71		91.03	0.000641	4.95	6577.82	4622.13	0.25
E100-00-00_N034	86132.20	1%	13490.00	69.70	91.11		91.40	0.000638	4.99	8427.66	4772.75	0.25
E100-00-00_N034	86132.20	0.2%	17716.00	69.70	91.86		92.10	0.000605	5.02	12018.08	4870.18	0.24
E100-00-00_N034	85832.39	10%	8120.00	69.55	88.33		88.72	0.000752	5.01	1622.84	2112.72	0.26
E100-00-00_N034	85832.39	2%	11698.00	69.55	90.54		90.81	0.000589	4.74	6653.88	4921.17	0.24
E100-00-00_N034	85832.39	1%	13490.00	69.55	90.93		91.18	0.000576	4.72	8625.27	4965.01	0.23
E100-00-00_N034	85832.39	0.2%	17716.00	69.55	91.69		91.88	0.000566	4.65	12392.87	4995.11	0.23
E100-00-00_N034	85534.79	10%	8120.00	69.40	88.10		88.50	0.000766	5.04	1616.98	2215.25	0.26
E100-00-00_N034	85534.79	2%	11698.00	69.40	90.34		90.63	0.000588	4.82	6500.80	4800.60	0.24
E100-00-00_N034	85534.79	1%	13490.00	69.40	90.74		91.00	0.000582	4.87	8388.82	4821.51	0.24
E100-00-00_N034	85534.79	0.2%	17716.00	69.40	91.48		91.71	0.000569	4.95	11974.59	4864.57	0.24
E100-00-00_N034	85293.70	10%	8120.00	69.28	87.91		88.31	0.000768	5.06	1696.05	1677.98	0.26
E100-00-00_N034	85293.70	2%	11698.00	69.28	90.09		90.48	0.000696	5.32	5755.50	4443.95	0.26
E100-00-00_N034	85293.70	1%	13490.00	69.28	90.44		90.84	0.000748	5.61	7314.37	4541.55	0.27
E100-00-00_N034	85293.70	0.2%	17716.00	69.28	91.15		91.54	0.000798	6.00	10564.91	4635.86	0.28
E100-00-00_N034	85091	10%	8120.00	69.18	87.75		88.15	0.000788	5.09	1677.51	506.63	0.27
E100-00-00_N034	85091	2%	11698.00	69.18	89.96		90.33	0.000727	5.26	5530.01	3568.99	0.26
E100-00-00_N034	85091	1%	13490.00	69.18	90.30		90.69	0.000785	5.56	6788.98	3885.51	0.27
E100-00-00_N034	85091	0.2%	17716.00	69.18	90.97		91.39	0.000885	6.11	9630.75	4458.90	0.29
E100-00-00_N034	84932.0	10%	8120.00	69.10	87.58	78.69	88.03	0.000757	5.36	1516.12	659.26	0.27
E100-00-00_N034	84932.0	2%	11698.00	69.10	89.68	80.69	90.20	0.000866	5.91	3008.42	4641.92	0.29
E100-00-00_N034	84932.0	1%	13490.00	69.10	90.33	81.52	90.55	0.000496	4.62	10171.64	5170.37	0.22

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	84932.0	0.2%	17716.00	69.10	91.02	83.26	91.23	0.000510	4.84	13857.45	5425.65	0.22
E100-00-00_N034	84716.0	10%	8120.00	68.99	87.43	78.58	87.84	0.000816	5.16	1573.04	211.08	0.27
E100-00-00_N034	84716.0	2%	11698.00	68.99	89.57	80.58	89.96	0.000780	5.37	5312.58	3860.98	0.27
E100-00-00_N034	84716.0	1%	13490.00	68.99	90.01	81.45	90.38	0.000781	5.44	7176.87	4455.48	0.27
E100-00-00_N034	84716.0	0.2%	17716.00	68.99	90.72	83.28	91.05	0.000806	5.67	10725.12	5299.95	0.28
E100-00-00_N034	84703.5		Bridge									
E100-00-00_N034	84692.0	10%	8120.00	68.98	87.37	78.57	87.79	0.000825	5.18	1566.46	239.21	0.27
E100-00-00_N034	84692.0	2%	11698.00	68.98	89.47	80.57	89.85	0.000779	5.36	5483.52	3996.53	0.27
E100-00-00_N034	84692.0	1%	13490.00	68.98	89.84	81.43	90.22	0.000812	5.52	7059.63	4428.19	0.28
E100-00-00_N034	84692.0	0.2%	17716.00	68.98	90.48	83.26	90.85	0.000883	5.88	10258.65	5297.17	0.29
E100-00-00_N034	84548.0	10%	8075.00	68.91	87.25	78.48	87.67	0.000826	5.18	1559.66	415.02	0.27
E100-00-00_N034	84548.0	2%	11914.00	68.91	89.36	80.61	89.73	0.000757	5.32	5936.70	4579.45	0.27
E100-00-00_N034	84548.0	1%	13895.00	68.91	89.73	81.56	90.09	0.000796	5.53	7760.03	5123.71	0.27
E100-00-00_N034	84548.0	0.2%	18417.00	68.91	90.37	83.47	90.71	0.000840	5.82	11153.53	5388.99	0.28
E100-00-00_N034	83815.0	10%	8075.00	68.53	86.61	78.09	87.04	0.000881	5.30	1522.36	538.48	0.28
E100-00-00_N034	83815.0	2%	11914.00	68.53	89.02	80.23	89.23	0.000513	4.43	8914.03	5984.17	0.22
E100-00-00_N034	83815.0	1%	13895.00	68.53	89.40	81.17	89.59	0.000487	4.38	11307.82	6364.66	0.22
E100-00-00_N034	83815.0	0.2%	18417.00	68.53	90.04	83.10	90.20	0.000480	4.45	15597.38	6951.79	0.21
E100-00-00_N034	82633.0	10%	7015.00	67.92	85.72	76.80	86.11	0.000678	5.01	1400.92	149.90	0.25
E100-00-00_N034	82633.0	2%	11272.00	67.92	88.09	79.23	88.52	0.000844	5.56	4276.69	4746.00	0.28
E100-00-00_N034	82633.0	1%	13491.00	67.92	88.46	80.26	88.90	0.000909	5.87	6476.91	6328.83	0.29
E100-00-00_N034	82633.0	0.2%	19032.00	67.92	89.26	82.59	89.59	0.000846	5.84	11886.41	7082.64	0.28
E100-00-00_N034	81638.0	10%	7015.00	67.41	85.05	76.29	85.40	0.000722	4.80	1460.63	423.51	0.26
E100-00-00_N034	81638.0	2%	11272.00	67.41	87.36	78.78	87.71	0.000757	5.20	5658.97	4828.49	0.26
E100-00-00_N034	81638.0	1%	13491.00	67.41	87.63	79.87	88.01	0.000880	5.65	7018.91	5425.29	0.29
E100-00-00_N034	81638.0	0.2%	19032.00	67.41	88.52	82.22	88.79	0.000773	5.49	12922.41	7680.02	0.27
E100-00-00_N034	80800.0	10%	7015.00	66.98	84.41	75.86	84.79	0.000742	4.91	1428.36	354.48	0.26
E100-00-00_N034	80800.0	2%	11272.00	66.98	86.18	78.35	86.90	0.001228	6.79	1659.45	2625.54	0.34
E100-00-00_N034	80800.0	1%	13491.00	66.98	86.69	79.44	87.21	0.001125	6.35	5156.46	3759.67	0.32
E100-00-00_N034	80800.0	0.2%	19032.00	66.98	87.54	81.78	88.04	0.001194	6.85	9124.18	6185.77	0.34
E100-00-00_N034	79748.0	10%	7015.00	66.44	83.56	75.32	83.96	0.000845	5.04	1393.14	450.94	0.27
E100-00-00_N034	79748.0	2%	11272.00	66.44	85.50	77.81	85.80	0.000741	5.07	6310.46	4637.62	0.26
E100-00-00_N034	79748.0	1%	13491.00	66.44	86.09	78.91	86.30	0.000597	4.67	9303.81	5201.95	0.24
E100-00-00_N034	79748.0	0.2%	19032.00	66.44	87.08	81.24	87.21	0.000481	4.36	14627.61	5568.32	0.21
E100-00-00_N034	78804.0	10%	7015.00	65.96	82.69	74.84	83.11	0.000935	5.23	1341.28	669.46	0.29
E100-00-00_N034	78804.0	2%	11272.00	65.96	84.97	77.33	85.19	0.000614	4.58	7690.07	4530.58	0.24
E100-00-00_N034	78804.0	1%	13491.00	65.96	85.69	78.42	85.84	0.000474	4.15	11246.62	5608.52	0.21
E100-00-00_N034	78804.0	0.2%	19032.00	65.96	86.74	80.76	86.85	0.000411	4.08	17213.72	6823.59	0.20
E100-00-00_N034	77625.0	10%	7015.00	65.35	81.43	74.23	81.91	0.001106	5.56	1314.73	320.33	0.31
E100-00-00_N034	77625.0	2%	11272.00	65.35	84.05	76.73	84.39	0.000863	5.35	5697.24	3477.93	0.28
E100-00-00_N034	77625.0	1%	13491.00	65.35	85.15	77.81	85.32	0.000514	4.38	10297.43	6209.26	0.22
E100-00-00_N034	77625.0	0.2%	19032.00	65.35	86.36	80.15	86.46	0.000356	3.88	19622.13	7542.42	0.19
E100-00-00_N034	77447.0	10%	7015.00	65.33	81.37	74.23	81.85	0.000157	5.58	1443.06	463.09	0.31
E100-00-00_N034	77447.0	2%	11272.00	65.33	83.69	76.71	84.30	0.000187	6.59	4870.27	3049.15	0.35
E100-00-00_N034	77447.0	1%	13491.00	65.33	84.71	77.80	85.24	0.000163	6.48	8575.17	4498.65	0.33
E100-00-00_N034	77447.0	0.2%	19032.00	65.33	85.75	80.14	86.36	0.000192	7.42	13529.97	7296.89	0.36
E100-00-00_N034	77436.0	10%	7015.00	65.38	81.48	72.94	81.80	0.000094	4.54	1788.92	518.69	0.25
E100-00-00_N034	77436.0	2%	11272.00	65.38	83.82	75.23	84.25	0.000118	5.49	5594.38	3165.02	0.28
E100-00-00_N034	77436.0	1%	13491.00	65.38	84.80	76.24	85.20	0.000111	5.55	9344.21	5269.11	0.27
E100-00-00_N034	77436.0	0.2%	19032.00	65.38	85.85	78.43	86.32	0.000132	6.39	14656.54	7345.13	0.30
E100-00-00_N034	77333.	10%	7015.00	64.36	81.48	72.48	81.79	0.000088	4.46	1878.49	577.99	0.24
E100-00-00_N034	77333.	2%	11272.00	64.36	83.82	74.81	84.23	0.000110	5.35	5953.76	3380.23	0.27
E100-00-00_N034	77333.	1%	13491.00	64.36	84.80	75.86	85.18	0.000104	5.46	9862.65	5404.97	0.27
E100-00-00_N034	77333.	0.2%	19032.00	64.36	85.84	78.11	86.30	0.000125	6.29	15313.93	7375.33	0.30
E100-00-00_N034	77129.0	10%	8518.00	62.35	81.28	72.45	81.73	0.000879	5.37	1585.82	488.28	0.28
E100-00-00_N034	77129.0	2%	12263.00	62.35	83.83	74.47	84.14	0.000648	4.98	5958.76	3311.41	0.25
E100-00-00_N034	77129.0	1%	14808.00	62.35	84.85	75.65	85.08	0.000503	4.62	9553.91	4946.93	0.22
E100-00-00_N034	77129.0	0.2%	21561.00	62.35	85.94	78.40	86.15	0.000534	5.01	13739.16	6384.33	0.23
E100-00-00_N034	76222.0	10%	8518.00	63.51	80.30	72.84	80.82	0.001129	5.79	1470.46	177.13	0.32
E100-00-00_N034	76222.0	2%	12263.00	63.51	82.55	74.80	83.27	0.001356	6.79	1805.58	1315.60	0.35
E100-00-00_N034	76222.0	1%	14808.00	63.51	84.04	75.94	84.45	0.000878	5.77	5944.32	2801.64	0.29
E100-00-00_N034	76222.0	0.2%	21561.00	63.51	84.94	78.52	85.43	0.001089	6.74	8805.66	4299.90	0.32

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	76041.0	10%	8518.00	61.17	80.16	71.07	80.60	0.000905	5.32	1600.76	144.02	0.28
E100-00-00_N034	76041.0	2%	12263.00	61.17	82.45	73.16	82.96	0.000995	5.93	3134.50	1568.74	0.30
E100-00-00_N034	76041.0	1%	14808.00	61.17	83.93	74.46	84.28	0.000718	5.33	6428.66	2976.44	0.26
E100-00-00_N034	76041.0	0.2%	21561.00	61.17	84.80	77.24	85.21	0.000931	6.26	9126.53	4289.03	0.30
E100-00-00_N034	75984.0		Bridge									
E100-00-00_N034	75927.0	10%	8518.00	64.54	79.14	74.62	80.09	0.002687	7.83	1088.28	124.20	0.47
E100-00-00_N034	75927.0	2%	12263.00	64.54	80.93	76.55	82.26	0.003343	9.26	1329.71	223.79	0.53
E100-00-00_N034	75927.0	1%	14808.00	64.54	82.06	77.73	83.35	0.003183	9.40	2167.63	1311.41	0.52
E100-00-00_N034	75927.0	0.2%	21561.00	64.54	84.17	83.35	84.69	0.001711	7.27	6781.58	3240.27	0.39
E100-00-00_N034	75698.0	10%	8518.00	61.92	78.75	73.09	79.47	0.001804	6.82	1249.19	133.37	0.39
E100-00-00_N034	75698.0	2%	12263.00	61.92	80.42	75.02	81.49	0.002362	8.28	1480.92	374.98	0.46
E100-00-00_N034	75698.0	1%	14808.00	61.92	81.50	76.17	82.64	0.002444	8.71	2387.56	1461.40	0.47
E100-00-00_N034	75698.0	0.2%	21561.00	61.92	82.89	78.71	84.03	0.002668	9.47	5335.25	2541.34	0.49
E100-00-00_N034	75102.0	10%	8518.00	61.74	78.59	73.35	78.70	0.000345	3.30	3409.51	739.50	0.18
E100-00-00_N034	75102.0	2%	12263.00	61.74	80.59	74.18	80.64	0.000149	2.32	7129.46	948.97	0.12
E100-00-00_N034	75102.0	1%	14808.00	61.74	81.70	74.64	81.75	0.000150	2.41	8454.31	1667.64	0.12
E100-00-00_N034	75102.0	0.2%	21561.00	61.74	83.01	75.65	83.08	0.000203	2.91	11593.92	2834.78	0.14
E100-00-00_N034	74115.0	10%	8518.00	61.56	78.47	71.82	78.50	0.000095	1.73	6652.56	1546.00	0.09
E100-00-00_N034	74115.0	2%	12263.00	61.56	80.55	72.36	80.56	0.000036	1.14	15455.53	2567.71	0.06
E100-00-00_N034	74115.0	1%	14808.00	61.56	81.65	72.67	81.67	0.000036	1.18	18472.76	3150.61	0.06
E100-00-00_N034	74115.0	0.2%	21561.00	61.56	82.95	73.36	82.97	0.000050	1.47	23122.31	4071.33	0.07
E100-00-00_N034	73083.0	10%	8518.00	61.68	77.85	70.60	78.34	0.000156	5.62	1528.58	428.95	0.31
E100-00-00_N034	73083.0	2%	12263.00	61.68	79.78	72.48	80.43	0.000184	6.56	2969.57	3039.72	0.35
E100-00-00_N034	73083.0	1%	14808.00	61.68	80.84	73.57	81.54	0.000185	6.94	4444.56	3915.44	0.35
E100-00-00_N034	73083.0	0.2%	21561.00	61.68	81.86	76.06	82.79	0.000245	8.43	9053.43	4695.26	0.41
E100-00-00_N034	72999.0	10%	8518.00	61.53	77.85	70.49	78.32	0.000150	5.49	1550.52	2461.06	0.31
E100-00-00_N034	72999.0	2%	12263.00	61.53	79.73	72.36	80.41	0.000182	6.63	1849.79	4570.80	0.34
E100-00-00_N034	72999.0	1%	14808.00	61.53	80.61	73.46	81.47	0.000207	7.43	1992.42	4797.38	0.37
E100-00-00_N034	72999.0	0.2%	21561.00	61.53	82.14	75.94	82.46	0.000111	5.87	17366.27	5154.77	0.28
E100-00-00_N034	72983.0		Bridge									
E100-00-00_N034	72965.0	10%	8518.00	61.71	77.76	70.67	78.25	0.000161	5.64	1509.02	2496.10	0.32
E100-00-00_N034	72965.0	2%	12263.00	61.71	78.98	72.53	79.79	0.000241	7.21	1700.51	3841.54	0.39
E100-00-00_N034	72965.0	1%	14808.00	61.71	79.39	73.64	80.48	0.000310	8.39	1765.94	4330.78	0.45
E100-00-00_N034	72965.0	0.2%	21561.00	61.71	80.23	76.11	82.22	0.000513	11.34	1901.20	4753.76	0.58
E100-00-00_N034	72931.0	10%	8871.00	61.69	77.73	70.37	78.24	0.000163	5.76	1555.00	3346.11	0.32
E100-00-00_N034	72931.0	2%	12281.00	61.69	78.99	72.08	79.76	0.000220	7.03	1850.77	4619.00	0.38
E100-00-00_N034	72931.0	1%	14766.00	61.69	79.41	73.19	80.43	0.000279	8.12	1966.15	4639.38	0.43
E100-00-00_N034	72931.0	0.2%	21327.00	61.69	80.31	75.68	82.10	0.000444	10.79	2213.81	4760.17	0.55
E100-00-00_N034	72919.5		Bridge									
E100-00-00_N034	72908.0	10%	8871.00	61.69	77.68	70.37	78.20	0.000165	5.79	1532.94	2574.42	0.32
E100-00-00_N034	72908.0	2%	12281.00	61.69	78.91	72.08	79.69	0.000226	7.09	1847.11	4380.34	0.38
E100-00-00_N034	72908.0	1%	14766.00	61.69	79.29	73.19	80.33	0.000289	8.20	1983.20	4634.46	0.43
E100-00-00_N034	72908.0	0.2%	21327.00	61.69	80.02	75.68	81.89	0.000480	11.04	2241.51	4654.35	0.57
E100-00-00_N034	72828.0	10%	8871.00	61.70	77.65	70.36	78.18	0.000160	5.87	1513.65	1133.02	0.32
E100-00-00_N034	72828.0	2%	12281.00	61.70	78.87	72.07	79.67	0.000220	7.18	2181.04	3352.68	0.38
E100-00-00_N034	72828.0	1%	14766.00	61.70	79.26	73.15	80.31	0.000283	8.28	2526.64	3642.89	0.44
E100-00-00_N034	72828.0	0.2%	21327.00	61.70	80.02	75.62	81.81	0.000466	10.94	3345.43	4218.97	0.57
E100-00-00_N034	71493.0	10%	8871.00	60.53	77.36	69.37	77.73	0.000817	5.04	3035.60	2192.23	0.27
E100-00-00_N034	71493.0	2%	12281.00	60.53	78.82	71.06	79.06	0.000615	4.69	6890.90	3333.61	0.24
E100-00-00_N034	71493.0	1%	14766.00	60.53	79.32	72.14	79.56	0.000622	4.85	8631.07	3679.05	0.24
E100-00-00_N034	71493.0	0.2%	21327.00	60.53	80.49	74.58	80.69	0.000591	5.02	12814.43	4419.84	0.24
E100-00-00_N034	70642.	10%	8871.00	57.60	76.79	67.61	77.05	0.000728	4.36	3071.40	1660.08	0.26
E100-00-00_N034	70642.	2%	12281.00	57.60	78.49	69.37	78.63	0.000419	3.65	7644.11	3805.71	0.20
E100-00-00_N034	70642.	1%	14766.00	57.60	79.02	70.52	79.14	0.000397	3.65	9697.83	4061.91	0.20
E100-00-00_N034	70642.	0.2%	21327.00	57.60	80.24	73.16	80.33	0.000336	3.57	14899.06	4975.94	0.18
E100-00-00_N034	70472.0	10%	8871.00	57.02	76.61	67.28	76.93	0.000664	4.65	2804.79	1561.29	0.24
E100-00-00_N034	70472.0	2%	12281.00	57.02	78.34	69.08	78.55	0.000502	4.29	6221.70	3190.17	0.22
E100-00-00_N034	70472.0	1%	14766.00	57.02	78.90	70.22	79.07	0.000454	4.17	9064.86	3785.09	0.21
E100-00-00_N034	70472.0	0.2%	21327.00	57.02	80.14	72.73	80.27	0.000390	4.12	14226.63	5412.48	0.19
E100-00-00_N034	70461.5		Bridge									
E100-00-00_N034	70450.0	10%	8871.00	57.01	76.58	67.27	76.90	0.000670	4.67	2777.49	1531.36	0.24

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	70450.0	2%	12281.00	57.01	78.29	69.07	78.51	0.000515	4.33	6132.38	3219.10	0.22
E100-00-00_N034	70450.0	1%	14766.00	57.01	78.82	70.20	79.01	0.000476	4.26	8810.07	3669.39	0.21
E100-00-00_N034	70450.0	0.2%	21327.00	57.01	80.06	72.72	80.20	0.000416	4.24	13814.64	5243.79	0.20
E100-00-00_N034	70347.0	10%	8871.00	57.23	76.53	67.55	76.80	0.000638	4.32	2980.07	1461.80	0.24
E100-00-00_N034	70347.0	2%	12281.00	57.23	78.23	69.24	78.41	0.000436	3.92	7335.38	4047.57	0.20
E100-00-00_N034	70347.0	1%	14766.00	57.23	78.75	70.32	78.91	0.000438	4.04	9247.24	5362.58	0.20
E100-00-00_N034	70347.0	0.2%	21327.00	57.23	79.97	72.67	80.11	0.000410	4.16	13871.31	5819.79	0.20
E100-00-00_N034	70306.5		Bridge									
E100-00-00_N034	70266.0	10%	8871.00	57.62	76.06	67.94	76.47	0.000984	5.12	1734.25	1630.96	0.29
E100-00-00_N034	70266.0	2%	12281.00	57.62	78.10	69.63	78.24	0.000436	3.80	8247.61	4090.09	0.20
E100-00-00_N034	70266.0	1%	14766.00	57.62	78.63	70.71	78.76	0.000423	3.86	10238.86	5322.35	0.20
E100-00-00_N034	70266.0	0.2%	21327.00	57.62	79.87	73.06	79.98	0.000378	3.90	14955.82	5789.40	0.19
E100-00-00_N034	70166.	10%	8871.00	57.58	75.96	67.73	76.37	0.000971	5.21	2282.08	936.61	0.29
E100-00-00_N034	70166.	2%	12281.00	57.58	77.94	69.54	78.17	0.000696	4.48	6261.69	3754.85	0.25
E100-00-00_N034	70166.	1%	14766.00	57.58	78.51	70.75	78.70	0.000676	4.38	8256.45	4359.18	0.24
E100-00-00_N034	70166.	0.2%	21327.00	57.58	79.81	73.42	79.93	0.000558	4.07	13170.67	5500.02	0.22
E100-00-00_N034	69408.0	10%	8871.00	57.30	75.47		75.76	0.000627	4.53	3073.76	1584.70	0.24
E100-00-00_N034	69408.0	2%	12281.00	57.30	77.70		77.83	0.000317	3.63	9414.57	4373.70	0.17
E100-00-00_N034	69408.0	1%	14766.00	57.30	78.26		78.38	0.000316	3.73	12104.37	5268.73	0.18
E100-00-00_N034	69408.0	0.2%	21327.00	57.30	79.58		79.68	0.000289	3.78	20142.79	6488.80	0.17
E100-00-00_N034	68633.	10%	8871.00	54.59	74.82		75.18	0.000914	4.90	2486.95	1461.84	0.28
E100-00-00_N034	68633.	2%	12281.00	54.59	77.38		77.55	0.000471	3.90	8976.23	4093.85	0.21
E100-00-00_N034	68633.	1%	14766.00	54.59	77.94		78.10	0.000474	4.04	11513.42	5040.99	0.21
E100-00-00_N034	68633.	0.2%	21327.00	54.59	79.30		79.44	0.000422	4.10	20256.93	7175.28	0.20
E100-00-00_N034	68533.0	10%	8871.00	54.24	74.59	65.84	75.06	0.000946	5.51	1609.09	814.79	0.29
E100-00-00_N034	68533.0	2%	12281.00	54.24	77.28	67.65	77.50	0.000494	4.38	8347.50	3881.32	0.21
E100-00-00_N034	68533.0	1%	14766.00	54.24	77.83	68.77	78.05	0.000515	4.59	10793.22	4880.43	0.22
E100-00-00_N034	68533.0	0.2%	21327.00	54.24	79.23	71.52	79.40	0.000444	4.55	19633.73	7220.52	0.21
E100-00-00_N034	68518.0		Bridge									
E100-00-00_N034	68503.0	10%	8871.00	54.87	74.36	66.47	74.92	0.001163	5.95	1489.68	212.61	0.32
E100-00-00_N034	68503.0	2%	12281.00	54.87	76.85	68.28	77.29	0.000929	5.73	4914.93	2762.20	0.29
E100-00-00_N034	68503.0	1%	14766.00	54.87	77.37	69.40	77.82	0.000979	6.04	6453.97	3031.95	0.30
E100-00-00_N034	68503.0	0.2%	21327.00	54.87	78.88	72.15	79.21	0.000814	5.94	12954.81	5843.35	0.28
E100-00-00_N034	68398.	10%	8871.00	54.97	74.35		74.71	0.000990	4.90	2311.26	1512.13	0.29
E100-00-00_N034	68398.	2%	12281.00	54.97	76.94		77.08	0.000406	3.62	9098.23	3623.66	0.19
E100-00-00_N034	68398.	1%	14766.00	54.97	77.46		77.61	0.000422	3.81	11333.20	5017.02	0.20
E100-00-00_N034	68398.	0.2%	21327.00	54.97	78.93		79.05	0.000366	3.85	20665.45	7089.83	0.19
E100-00-00_N034	67624.0	10%	8871.00	55.72	73.34	66.04	73.87	0.001144	5.85	1517.55	322.59	0.32
E100-00-00_N034	67624.0	2%	12281.00	55.72	76.07	67.75	76.56	0.000923	5.86	3149.94	2423.13	0.30
E100-00-00_N034	67624.0	1%	14766.00	55.72	76.78	68.85	77.12	0.000734	5.41	7084.99	3681.05	0.27
E100-00-00_N034	67624.0	0.2%	21327.00	55.72	78.48	71.30	78.67	0.000482	4.76	15908.38	6497.15	0.22
E100-00-00_N034	67364.0	10%	8871.00	56.86	73.10	65.66	73.55	0.000968	5.38	1650.65	359.69	0.29
E100-00-00_N034	67364.0	2%	12281.00	56.86	76.05	67.24	76.27	0.000440	4.27	6577.39	2963.82	0.21
E100-00-00_N034	67364.0	1%	14766.00	56.86	76.73	68.25	76.91	0.000401	4.21	8921.57	3960.97	0.20
E100-00-00_N034	67364.0	0.2%	21327.00	56.86	78.45	70.56	78.54	0.000250	3.60	16900.43	5298.93	0.16
E100-00-00_N034	67306.5		Bridge									
E100-00-00_N034	67246.0	10%	8871.00	55.91	72.95	64.70	73.34	0.000777	5.03	1765.42	297.18	0.27
E100-00-00_N034	67246.0	2%	12281.00	55.91	75.80	66.28	76.04	0.000440	4.39	5992.09	2740.87	0.21
E100-00-00_N034	67246.0	1%	14766.00	55.91	76.48	67.29	76.70	0.000415	4.40	8130.59	3640.39	0.20
E100-00-00_N034	67246.0	0.2%	21327.00	55.91	78.32	69.60	78.43	0.000250	3.70	16393.19	5228.73	0.16
E100-00-00_N034	67095.	10%	8871.00	54.40	72.61	64.59	73.15	0.001272	5.89	1504.97	251.48	0.33
E100-00-00_N034	67095.	2%	12281.00	54.40	75.55	66.44	75.91	0.000930	5.18	4691.39	2515.45	0.29
E100-00-00_N034	67095.	1%	14766.00	54.40	76.26	67.66	76.58	0.000879	5.15	6779.15	3269.77	0.28
E100-00-00_N034	67095.	0.2%	21327.00	54.40	78.23	70.56	78.37	0.000454	4.13	15783.37	5257.50	0.21
E100-00-00_N034	66832.0	10%	8871.00	51.77	72.42	63.52	72.84	0.000852	5.16	1719.60	247.87	0.27
E100-00-00_N034	66832.0	2%	12281.00	51.77	75.40	65.35	75.72	0.000587	4.81	5300.93	2662.08	0.23
E100-00-00_N034	66832.0	1%	14766.00	51.77	76.11	66.49	76.41	0.000574	4.93	7428.33	3411.17	0.23
E100-00-00_N034	66832.0	0.2%	21327.00	51.77	78.14	69.06	78.29	0.000347	4.20	16038.38	4837.38	0.19
E100-00-00_N034	66821.5		Bridge									
E100-00-00_N034	66806.0	10%	8871.00	51.65	72.37	63.41	72.78	0.000838	5.13	1730.22	250.30	0.27
E100-00-00_N034	66806.0	2%	12281.00	51.65	75.29	65.22	75.60	0.000585	4.81	5321.39	2667.39	0.23

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	66806.0	1%	14766.00	51.65	75.92	66.38	76.23	0.000599	5.02	7184.95	3311.40	0.24
E100-00-00_N034	66806.0	0.2%	21327.00	51.65	78.04	68.95	78.19	0.000343	4.18	16131.78	4840.93	0.19
E100-00-00_N034	66695.0	10%	8871.00	51.35	72.43	62.31	72.67	0.000105	3.96	2237.37	658.47	0.20
E100-00-00_N034	66695.0	2%	12281.00	51.35	75.34	63.61	75.52	0.000076	3.75	9876.03	3630.75	0.17
E100-00-00_N034	66695.0	1%	14766.00	51.35	75.96	64.48	76.16	0.000085	4.07	12212.55	3946.71	0.18
E100-00-00_N034	66695.0	0.2%	21327.00	51.35	78.00	66.51	78.17	0.000075	4.15	21062.85	4642.82	0.18
E100-00-00_N034	66641.5		Bridge									
E100-00-00_N034	66585.0	10%	8871.00	51.13	72.31	62.09	72.55	0.000102	3.93	2255.03	509.99	0.19
E100-00-00_N034	66585.0	2%	12281.00	51.13	75.08	63.40	75.39	0.000102	4.46	2751.90	3565.86	0.20
E100-00-00_N034	66585.0	1%	14766.00	51.13	75.82	64.26	76.03	0.000086	4.12	11720.67	3893.87	0.18
E100-00-00_N034	66585.0	0.2%	21327.00	51.13	77.84	66.28	78.02	0.000078	4.24	20380.45	4620.54	0.18
E100-00-00_N034	66480.	10%	8871.00	51.54	72.14	61.98	72.49	0.000722	4.77	1858.17	266.05	0.26
E100-00-00_N034	66480.	2%	12281.00	51.54	74.93	63.94	75.34	0.000763	5.13	2401.42	2555.85	0.27
E100-00-00_N034	66480.	1%	14766.00	51.54	75.75	65.15	76.00	0.000577	4.53	7489.98	3699.97	0.23
E100-00-00_N034	66480.	0.2%	21327.00	51.54	77.86	67.82	77.97	0.000302	3.61	17215.29	5083.63	0.18
E100-00-00_N034	65878.0	10%	8871.00	53.89	71.49	63.60	71.97	0.000994	5.57	1650.80	236.25	0.30
E100-00-00_N034	65878.0	2%	12281.00	53.89	74.31	65.33	74.82	0.000922	5.87	2564.31	2371.85	0.29
E100-00-00_N034	65878.0	1%	14766.00	53.89	75.35	66.44	75.64	0.000605	4.99	8228.42	4676.87	0.24
E100-00-00_N034	65878.0	0.2%	21327.00	53.89	77.70	68.92	77.79	0.000248	3.56	20660.45	6009.54	0.16
E100-00-00_N034	65650.	10%	8871.00	49.14	71.42	59.96	71.75	0.000625	4.56	2007.50	291.53	0.24
E100-00-00_N034	65650.	2%	12281.00	49.14	74.32	61.77	74.59	0.000569	4.41	4680.90	2088.35	0.23
E100-00-00_N034	65650.	1%	14766.00	49.14	75.25	62.96	75.51	0.000526	4.47	6396.16	2665.61	0.22
E100-00-00_N034	65650.	0.2%	21327.00	49.14	77.59	65.86	77.73	0.000319	3.90	14337.80	3555.88	0.18
E100-00-00_N034	65504.0	10%	8871.00	53.08	71.41	62.25	71.69	0.000128	4.30	2062.08	335.85	0.22
E100-00-00_N034	65504.0	2%	12281.00	53.08	74.27	63.57	74.55	0.000108	4.44	5843.22	2809.34	0.21
E100-00-00_N034	65504.0	1%	14766.00	53.08	75.17	64.45	75.46	0.000110	4.65	8871.33	3097.77	0.21
E100-00-00_N034	65504.0	0.2%	21327.00	53.08	77.41	66.51	77.66	0.000097	4.79	16487.58	3666.25	0.20
E100-00-00_N034	65467.5		Bridge									
E100-00-00_N034	65425.0	10%	8871.00	53.08	71.35	62.24	71.64	0.000130	4.32	2052.58	336.85	0.22
E100-00-00_N034	65425.0	2%	12281.00	53.08	74.24	63.57	74.52	0.000108	4.43	5894.10	2395.51	0.21
E100-00-00_N034	65425.0	1%	14766.00	53.08	75.09	64.44	75.39	0.000114	4.73	8254.05	3090.10	0.21
E100-00-00_N034	65425.0	0.2%	21327.00	53.08	77.24	66.51	77.51	0.000104	4.92	15693.66	3737.09	0.21
E100-00-00_N034	65422.0	10%	8871.00	54.64	71.26	62.60	71.62	0.000171	4.82	1838.73	179.77	0.25
E100-00-00_N034	65422.0	2%	12281.00	54.64	74.08	64.07	74.48	0.000160	5.17	3282.05	758.68	0.25
E100-00-00_N034	65422.0	1%	14766.00	54.64	74.83	65.03	75.33	0.000187	5.78	3999.67	1118.90	0.27
E100-00-00_N034	65422.0	0.2%	21327.00	54.64	76.79	67.27	77.40	0.000213	6.73	7248.43	1955.56	0.29
E100-00-00_N034	65411.0		Bridge									
E100-00-00_N034	65401.0	10%	8871.00	54.64	71.21	62.60	71.58	0.000173	4.84	1831.51	157.40	0.25
E100-00-00_N034	65401.0	2%	12281.00	54.64	74.01	64.07	74.42	0.000165	5.22	3177.22	757.80	0.25
E100-00-00_N034	65401.0	1%	14766.00	54.64	74.74	65.02	75.25	0.000193	5.86	3819.08	958.25	0.27
E100-00-00_N034	65401.0	0.2%	21327.00	54.64	76.57	67.26	77.24	0.000233	6.97	6528.24	1903.37	0.31
E100-00-00_N034	65268.	10%	8871.00	53.09	70.92		71.47	0.001196	5.94	1492.26	144.28	0.33
E100-00-00_N034	65268.	2%	12281.00	53.09	73.71		74.32	0.001242	6.29	2199.97	833.43	0.34
E100-00-00_N034	65268.	1%	14766.00	53.09	74.43		75.13	0.001394	6.88	2876.07	1051.63	0.36
E100-00-00_N034	65268.	0.2%	21327.00	53.09	76.53		77.17	0.001247	7.08	5854.96	1756.72	0.35
E100-00-00_N034	65068.0	10%	10765.00	54.12	70.35	64.17	71.16	0.001729	7.20	1494.43	142.89	0.39
E100-00-00_N034	65068.0	2%	14450.00	54.12	73.12	65.84	74.01	0.001582	7.55	1947.85	498.64	0.38
E100-00-00_N034	65068.0	1%	16189.00	54.12	73.89	66.54	74.82	0.001615	7.80	2514.99	787.47	0.39
E100-00-00_N034	65068.0	0.2%	23830.00	54.12	75.66	69.24	76.82	0.001952	9.12	4200.82	1246.91	0.44
E100-00-00_N034	63780.0	10%	10761.00	49.90	69.88	60.92	70.41	0.000241	5.86	1836.88	153.56	0.30
E100-00-00_N034	63780.0	2%	14449.00	49.90	72.71	62.68	73.29	0.000232	6.20	3130.38	989.87	0.30
E100-00-00_N034	63780.0	1%	16188.00	49.90	73.47	63.42	74.09	0.000235	6.41	4431.32	2823.41	0.30
E100-00-00_N034	63780.0	0.2%	23830.00	49.90	75.42	66.25	76.00	0.000227	6.86	10667.06	3339.85	0.30
E100-00-00_N034	62890.0	10%	10936.00	51.59	69.66		70.20	0.000246	5.90	1852.21	156.15	0.30
E100-00-00_N034	62890.0	2%	14715.00	51.59	72.51		73.09	0.000225	6.15	3832.22	2342.92	0.29
E100-00-00_N034	62890.0	1%	16414.00	51.59	73.33		73.87	0.000208	6.13	5785.80	2484.49	0.29
E100-00-00_N034	62890.0	0.2%	23946.00	51.59	75.28		75.79	0.000202	6.57	11163.69	2907.70	0.29
E100-00-00_N034	62522	10%	10936.00	50.98	69.73		70.06	0.000163	4.64	2358.87	212.84	0.25
E100-00-00_N034	62522	2%	14715.00	50.98	72.62		72.95	0.000138	4.70	4973.00	2014.29	0.23
E100-00-00_N034	62522	1%	16414.00	50.98	73.42		73.75	0.000130	4.75	6667.58	2277.81	0.23
E100-00-00_N034	62522	0.2%	23946.00	50.98	75.31		75.69	0.000142	5.42	11400.45	2664.45	0.24

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	61936.0	10%	10936.00	50.02	69.39		69.93	0.000229	5.87	1863.24	149.21	0.29
E100-00-00_N034	61936.0	2%	14715.00	50.02	72.27		72.83	0.000212	6.12	4258.02	1969.28	0.29
E100-00-00_N034	61936.0	1%	16414.00	50.02	73.10		73.64	0.000204	6.14	5936.04	2148.47	0.28
E100-00-00_N034	61936.0	0.2%	23946.00	50.02	74.97		75.58	0.000226	6.95	10044.58	2272.23	0.30
E100-00-00_N034	61125	10%	10936.00	49.92	69.39	59.10	69.73	0.000143	4.65	2353.45	439.25	0.23
E100-00-00_N034	61125	2%	14715.00	49.92	72.36	60.63	72.63	0.000101	4.36	6562.44	2278.30	0.20
E100-00-00_N034	61125	1%	16414.00	49.92	73.20	61.26	73.44	0.000093	4.34	8509.41	2487.27	0.20
E100-00-00_N034	61125	0.2%	23946.00	49.92	75.09	63.84	75.37	0.000103	4.94	13768.31	3090.01	0.21
E100-00-00_N034	60801	10%	11107.00	49.88	69.48	57.88	69.51	0.000059	1.54	8301.83	908.09	0.08
E100-00-00_N034	60801	2%	14974.00	49.88	72.44	58.76	72.46	0.000050	1.58	13585.24	2323.47	0.07
E100-00-00_N034	60801	1%	16633.00	49.88	73.26	59.10	73.29	0.000049	1.62	15668.97	2757.77	0.07
E100-00-00_N034	60801	0.2%	24059.00	49.88	75.16	60.51	75.19	0.000061	1.96	21491.78	3371.07	0.08
E100-00-00_N034	60338	10%	11107.00	48.56	69.09	58.30	69.36	0.000508	4.16	2672.80	295.97	0.22
E100-00-00_N034	60338	2%	14974.00	48.56	72.12	59.80	72.34	0.000362	3.97	6021.15	1970.70	0.19
E100-00-00_N034	60338	1%	16633.00	48.56	72.99	60.39	73.18	0.000311	3.83	7831.36	2153.60	0.18
E100-00-00_N034	60338	0.2%	24059.00	48.56	74.90	62.75	75.08	0.000300	4.09	13172.99	3237.42	0.18
E100-00-00_N034	59972.0	10%	11107.00	47.43	68.59	58.59	69.06	0.000760	5.47	2029.69	157.55	0.27
E100-00-00_N034	59972.0	2%	14974.00	47.43	71.68	60.36	72.10	0.000609	5.41	4116.91	1186.14	0.25
E100-00-00_N034	59972.0	1%	16633.00	47.43	72.57	61.08	72.96	0.000554	5.36	5254.33	1436.89	0.24
E100-00-00_N034	59972.0	0.2%	24059.00	47.43	74.47	63.75	74.87	0.000570	5.86	8233.49	2445.59	0.25
E100-00-00_N034	59440	10%	11107.00	46.98	68.37	57.47	68.68	0.000519	4.52	2465.56	277.67	0.22
E100-00-00_N034	59440	2%	14974.00	46.98	71.47	59.07	71.78	0.000452	4.58	4420.07	1370.06	0.21
E100-00-00_N034	59440	1%	16633.00	46.98	72.38	59.69	72.67	0.000413	4.56	5563.20	1514.56	0.21
E100-00-00_N034	59440	0.2%	24059.00	46.98	74.21	62.12	74.56	0.000468	5.24	8104.37	2045.62	0.22
E100-00-00_N034	58797.0	10%	11279.00	46.43	68.38	55.58	68.43	0.000096	2.13	5971.22	861.43	0.10
E100-00-00_N034	58797.0	2%	15235.00	46.43	71.54	56.31	71.56	0.000039	1.49	14166.08	2047.61	0.06
E100-00-00_N034	58797.0	1%	16853.00	46.43	72.44	56.58	72.46	0.000038	1.52	16026.25	2392.52	0.06
E100-00-00_N034	58797.0	0.2%	24170.00	46.43	74.29	57.71	74.31	0.000051	1.87	19962.73	3074.51	0.07
E100-00-00_N034	58544	10%	11279.00	46.22	68.33	55.54	68.40	0.000109	2.26	5436.31	571.58	0.10
E100-00-00_N034	58544	2%	15235.00	46.22	71.49	56.36	71.54	0.000096	2.28	9308.69	1561.11	0.10
E100-00-00_N034	58544	1%	16853.00	46.22	72.39	56.68	72.44	0.000092	2.31	10887.50	1944.63	0.10
E100-00-00_N034	58544	0.2%	24170.00	46.22	74.22	57.95	74.28	0.000112	2.73	15499.16	2964.97	0.11
E100-00-00_N034	58305	10%	11279.00	46.02	68.33	54.70	68.36	0.000047	1.60	8503.62	660.15	0.07
E100-00-00_N034	58305	2%	15235.00	46.02	71.48	55.44	71.51	0.000043	1.73	12083.49	1676.86	0.07
E100-00-00_N034	58305	1%	16853.00	46.02	72.38	55.71	72.41	0.000043	1.78	13807.93	2092.55	0.07
E100-00-00_N034	58305	0.2%	24170.00	46.02	74.21	56.85	74.25	0.000058	2.19	18731.62	3123.39	0.08
E100-00-00_N034	57991	10%	11279.00	45.75	67.95	55.48	68.23	0.000420	4.22	2733.90	418.34	0.20
E100-00-00_N034	57991	2%	15235.00	45.75	71.18	57.20	71.40	0.000331	3.95	5485.72	1292.33	0.18
E100-00-00_N034	57991	1%	16853.00	45.75	72.10	57.83	72.31	0.000311	3.93	7065.04	1973.49	0.18
E100-00-00_N034	57991	0.2%	24170.00	45.75	73.91	60.36	74.14	0.000343	4.35	11552.07	2772.27	0.19
E100-00-00_N034	57918.0	10%	11279.00	45.69	67.84		68.17	0.000496	4.65	2476.42	276.66	0.22
E100-00-00_N034	57918.0	2%	15235.00	45.69	71.00		71.33	0.000416	4.76	4690.57	1339.14	0.21
E100-00-00_N034	57918.0	1%	16853.00	45.69	71.94		72.25	0.000381	4.72	6064.62	1835.42	0.20
E100-00-00_N034	57918.0	0.2%	24170.00	45.69	73.72		74.06	0.000426	5.33	10088.68	2715.43	0.21
E100-00-00_N034	57015.	10%	11279.00	43.29	67.34		67.69	0.000573	4.75	2479.12	426.21	0.23
E100-00-00_N034	57015.	2%	15235.00	43.29	70.67		70.92	0.000444	4.30	6336.29	2162.76	0.21
E100-00-00_N034	57015.	1%	16853.00	43.29	71.70		71.89	0.000344	3.98	8836.24	2777.47	0.19
E100-00-00_N034	57015.	0.2%	24170.00	43.29	73.52		73.69	0.000317	4.14	14772.35	3627.16	0.18
E100-00-00_N034	56811.0	10%	11330.00	42.75	67.35	54.50	67.52	0.000285	3.27	3462.16	286.95	0.17
E100-00-00_N034	56811.0	2%	15312.00	42.75	70.65	56.14	70.81	0.000244	3.31	5984.38	1642.47	0.16
E100-00-00_N034	56811.0	1%	16918.00	42.75	71.66	56.72	71.81	0.000215	3.25	7950.24	2196.57	0.15
E100-00-00_N034	56811.0	0.2%	24203.00	42.75	73.46	58.96	73.63	0.000237	3.69	12426.88	2786.13	0.16
E100-00-00_N034	56718.5		Bridge									
E100-00-00_N034	56621.0	10%	11330.00	42.87	67.14	54.62	67.32	0.000307	3.36	3368.90	281.93	0.17
E100-00-00_N034	56621.0	2%	15312.00	42.87	70.16	56.27	70.35	0.000289	3.53	5084.89	1307.97	0.17
E100-00-00_N034	56621.0	1%	16918.00	42.87	71.15	56.84	71.34	0.000264	3.51	6663.73	1881.62	0.16
E100-00-00_N034	56621.0	0.2%	24203.00	42.87	73.03	59.08	73.24	0.000286	3.96	10938.78	2628.25	0.17
E100-00-00_N034	56486.	10%	11330.00	43.69	66.89		67.22	0.000539	4.61	2457.52	192.08	0.23
E100-00-00_N034	56486.	2%	15312.00	43.69	69.97		70.27	0.000433	4.54	5784.61	2377.92	0.21
E100-00-00_N034	56486.	1%	16918.00	43.69	71.06		71.28	0.000334	4.18	8650.31	2923.50	0.19
E100-00-00_N034	56486.	0.2%	24203.00	43.69	73.01		73.19	0.000291	4.22	15375.91	3927.40	0.18
E100-00-00_N034	56239.0	10%	11330.00	45.18	66.78		67.13	0.000243	4.76	2380.56	168.39	0.22
E100-00-00_N034	56239.0	2%	15312.00	45.18	69.85		70.19	0.000226	4.86	5955.39	2582.14	0.21

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	56239.0	1%	16918.00	45.18	70.95		71.22	0.000182	4.55	9200.29	3279.90	0.19
E100-00-00_N034	56239.0	0.2%	24203.00	45.18	72.89		73.13	0.000171	4.75	16588.14	4301.45	0.19
E100-00-00_N034	56231.0	10%	11330.00	41.74	66.78		67.11	0.000249	4.61	2466.15	217.48	0.21
E100-00-00_N034	56231.0	2%	15312.00	41.74	69.85		70.17	0.000235	4.73	5961.03	2585.90	0.21
E100-00-00_N034	56231.0	1%	16918.00	41.74	70.95		71.21	0.000189	4.43	9228.30	3311.17	0.19
E100-00-00_N034	56231.0	0.2%	24203.00	41.74	72.89		73.12	0.000177	4.59	16504.89	4150.51	0.18
E100-00-00_N034	55757.0	10%	14232.00	41.59	66.38	55.65	66.88	0.000385	5.66	2515.13	183.33	0.26
E100-00-00_N034	55757.0	2%	20642.00	41.59	69.20	57.94	69.85	0.000448	6.60	4260.06	1306.80	0.29
E100-00-00_N034	55757.0	1%	22978.00	41.59	70.26	58.70	70.89	0.000413	6.60	5613.53	1637.16	0.28
E100-00-00_N034	55757.0	0.2%	30570.00	41.59	72.11	60.92	72.77	0.000422	7.14	9310.76	2035.72	0.29
E100-00-00_N034	55190.	10%	14232.00	41.48	66.15	55.14	66.65	0.000441	5.69	2501.78	182.88	0.27
E100-00-00_N034	55190.	2%	20642.00	41.48	68.89	57.69	69.56	0.000575	6.65	4077.84	1837.20	0.30
E100-00-00_N034	55190.	1%	22978.00	41.48	70.04	58.47	70.62	0.000499	6.40	6703.92	2251.46	0.28
E100-00-00_N034	55190.	0.2%	30570.00	41.48	71.95	60.74	72.48	0.000447	6.54	11244.76	2488.01	0.27
E100-00-00_N034	55112.0	10%	14232.00	41.47	66.11	55.34	66.61	0.000401	5.72	2489.07	174.30	0.27
E100-00-00_N034	55112.0	2%	20642.00	41.47	68.80	57.77	69.51	0.000514	6.82	4035.04	1738.60	0.30
E100-00-00_N034	55112.0	1%	22978.00	41.47	69.90	58.52	70.56	0.000474	6.73	6250.99	2304.68	0.29
E100-00-00_N034	55112.0	0.2%	30570.00	41.47	71.81	60.71	72.42	0.000437	6.94	10812.56	2485.69	0.28
E100-00-00_N034	55086.0		Bridge									
E100-00-00_N034	55059.0	10%	14232.00	41.06	65.61	54.94	66.12	0.000407	5.75	2473.39	173.84	0.27
E100-00-00_N034	55059.0	2%	20642.00	41.06	68.64	57.36	69.34	0.000499	6.76	3726.86	1570.85	0.30
E100-00-00_N034	55059.0	1%	22978.00	41.06	69.70	58.11	70.38	0.000473	6.78	5636.77	2273.22	0.29
E100-00-00_N034	55059.0	0.2%	30570.00	41.06	71.57	60.31	72.24	0.000460	7.15	9865.14	2459.41	0.29
E100-00-00_N034	54895.0	10%	14232.00	41.14	65.57		66.04	0.000313	5.49	2591.79	188.55	0.26
E100-00-00_N034	54895.0	2%	20642.00	41.14	68.62		69.22	0.000363	6.30	4465.21	1514.86	0.28
E100-00-00_N034	54895.0	1%	22978.00	41.14	69.69		70.25	0.000329	6.26	6390.36	1983.22	0.27
E100-00-00_N034	54895.0	0.2%	30570.00	41.14	71.56		72.13	0.000326	6.68	10397.45	2402.87	0.27
E100-00-00_N034	54667.0	10%	14232.00	41.24	65.48	54.32	65.96	0.000322	5.57	2556.77	184.89	0.26
E100-00-00_N034	54667.0	2%	20642.00	41.24	68.54	56.81	69.13	0.000367	6.28	4996.28	1860.19	0.28
E100-00-00_N034	54667.0	1%	22978.00	41.24	69.64	57.60	70.16	0.000321	6.14	7213.06	2183.55	0.26
E100-00-00_N034	54667.0	0.2%	30570.00	41.24	71.52	59.89	72.02	0.000302	6.39	11815.26	2619.82	0.26
E100-00-00_N034	54606.0		Bridge									
E100-00-00_N034	54545.0	10%	14232.00	40.55	65.40	53.63	65.84	0.000292	5.33	2670.60	188.96	0.25
E100-00-00_N034	54545.0	2%	20642.00	40.55	68.09	56.12	68.69	0.000363	6.31	4345.22	1545.25	0.28
E100-00-00_N034	54545.0	1%	22978.00	40.55	69.08	56.91	69.66	0.000338	6.34	6172.62	2034.97	0.27
E100-00-00_N034	54545.0	0.2%	30570.00	40.55	71.26	59.20	71.79	0.000298	6.45	11279.28	2584.15	0.26
E100-00-00_N034	54398.	10%	14232.00	40.59	65.38		65.76	0.000372	4.93	2953.87	338.47	0.24
E100-00-00_N034	54398.	2%	20642.00	40.59	68.10		68.57	0.000377	5.63	5532.84	1741.22	0.25
E100-00-00_N034	54398.	1%	22978.00	40.59	69.11		69.54	0.000339	5.56	7461.78	2057.93	0.24
E100-00-00_N034	54398.	0.2%	30570.00	40.59	71.29		71.67	0.000295	5.63	12755.56	2669.85	0.23
E100-00-00_N034	54053.0	10%	14232.00	40.70	65.20		65.64	0.000319	5.36	3005.65	459.00	0.25
E100-00-00_N034	54053.0	2%	20642.00	40.70	67.94		68.45	0.000321	6.02	5775.80	1443.83	0.26
E100-00-00_N034	54053.0	1%	22978.00	40.70	68.94		69.43	0.000298	6.02	7239.27	1491.27	0.25
E100-00-00_N034	54053.0	0.2%	30570.00	40.70	71.08		71.57	0.000290	6.40	11115.12	2125.78	0.25
E100-00-00_N034	53766.	10%	14232.00	40.78	65.10		65.53	0.000412	5.29	2759.48	296.41	0.26
E100-00-00_N034	53766.	2%	20642.00	40.78	67.79		68.34	0.000443	6.08	5009.32	1550.07	0.27
E100-00-00_N034	53766.	1%	22978.00	40.78	68.81		69.33	0.000401	6.03	6756.17	1822.60	0.26
E100-00-00_N034	53766.	0.2%	30570.00	40.78	71.00		71.47	0.000354	6.15	11071.35	2070.65	0.25
E100-00-00_N034	53664.0	10%	14232.00	40.81	65.06	53.97	65.49	0.000364	5.29	2774.83	316.41	0.25
E100-00-00_N034	53664.0	2%	20642.00	40.81	67.75	56.22	68.29	0.000405	6.09	5469.03	1716.54	0.27
E100-00-00_N034	53664.0	1%	22978.00	40.81	68.78	56.95	69.28	0.000366	6.04	7279.19	1783.85	0.26
E100-00-00_N034	53664.0	0.2%	30570.00	40.81	70.94	59.12	71.43	0.000340	6.29	11528.80	2088.10	0.25
E100-00-00_N034	53653.5		Bridge									
E100-00-00_N034	53642.0	10%	14232.00	40.81	64.98	53.96	65.42	0.000370	5.32	2750.53	307.83	0.25
E100-00-00_N034	53642.0	2%	20642.00	40.81	67.72	56.23	68.27	0.000407	6.10	5425.08	1712.18	0.27
E100-00-00_N034	53642.0	1%	22978.00	40.81	68.68	56.95	69.20	0.000377	6.10	7111.96	1778.50	0.26
E100-00-00_N034	53642.0	0.2%	30570.00	40.81	70.76	59.12	71.27	0.000359	6.42	11153.81	2075.73	0.26
E100-00-00_N034	53459.0	10%	14232.00	41.48	64.88	54.38	65.34	0.000418	5.46	2608.42	261.13	0.26
E100-00-00_N034	53459.0	2%	20642.00	41.48	67.61	56.48	68.18	0.000477	6.24	5395.62	1904.15	0.28
E100-00-00_N034	53459.0	1%	22978.00	41.48	68.61	57.18	69.13	0.000437	6.14	7436.48	2163.41	0.26
E100-00-00_N034	53459.0	0.2%	30570.00	41.48	70.72	59.26	71.18	0.000380	6.20	12409.62	2501.28	0.25

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	53371.0		Bridge									
E100-00-00_N034	53282.0	10%	14232.00	41.06	64.83	53.95	65.27	0.000390	5.31	2678.39	260.84	0.25
E100-00-00_N034	53282.0	2%	20642.00	41.06	67.45	56.06	68.02	0.000465	6.20	5192.81	1807.67	0.27
E100-00-00_N034	53282.0	1%	22978.00	41.06	68.32	56.76	68.87	0.000447	6.23	6922.94	2105.75	0.27
E100-00-00_N034	53282.0	0.2%	30570.00	41.06	70.23	58.82	70.76	0.000422	6.51	11286.95	2422.68	0.26
E100-00-00_N034	53116.	10%	14232.00	40.32	64.78		65.19	0.000369	5.12	3029.83	530.67	0.24
E100-00-00_N034	53116.	2%	20642.00	40.32	67.45		67.89	0.000354	5.64	6616.47	1943.63	0.25
E100-00-00_N034	53116.	1%	22978.00	40.32	68.33		68.74	0.000326	5.61	8451.36	2217.25	0.24
E100-00-00_N034	53116.	0.2%	30570.00	40.32	70.24		70.63	0.000302	5.79	13078.04	2592.01	0.23
E100-00-00_N034	52833.	10%	14958.00	39.06	64.70		65.08	0.000322	5.01	3246.10	429.47	0.23
E100-00-00_N034	52833.	2%	21444.00	39.06	67.37		67.79	0.000313	5.51	6773.06	2233.69	0.23
E100-00-00_N034	52833.	1%	23882.00	39.06	68.25		68.64	0.000286	5.45	8844.78	2429.81	0.23
E100-00-00_N034	52833.	0.2%	31613.00	39.06	70.19		70.53	0.000258	5.53	13912.89	2731.81	0.22
E100-00-00_N034	52760.0	10%	14958.00	38.73	64.51	54.78	65.02	0.000452	5.74	2691.08	437.84	0.27
E100-00-00_N034	52760.0	2%	21444.00	38.73	67.21	56.87	67.73	0.000430	6.13	6220.60	2223.84	0.27
E100-00-00_N034	52760.0	1%	23882.00	38.73	68.14	57.58	68.59	0.000375	5.95	8376.46	2392.64	0.26
E100-00-00_N034	52760.0	0.2%	31613.00	38.73	70.12	59.64	70.50	0.000317	5.89	13447.16	2732.91	0.24
E100-00-00_N034	52742.0		Bridge									
E100-00-00_N034	52722.0	10%	14958.00	38.68	64.46	54.72	64.97	0.000453	5.75	2685.94	436.88	0.28
E100-00-00_N034	52722.0	2%	21444.00	38.68	67.03	56.82	67.57	0.000451	6.25	5937.30	2041.26	0.28
E100-00-00_N034	52722.0	1%	23882.00	38.68	67.95	57.53	68.43	0.000396	6.08	8034.44	2368.06	0.26
E100-00-00_N034	52722.0	0.2%	31613.00	38.68	70.04	59.59	70.42	0.000320	5.92	13361.65	2727.41	0.24
E100-00-00_N034	52589.0	10%	14958.00	38.93	64.46		64.86	0.000331	5.17	3188.27	431.30	0.24
E100-00-00_N034	52589.0	2%	21444.00	38.93	67.03		67.47	0.000337	5.70	6635.21	2148.68	0.24
E100-00-00_N034	52589.0	1%	23882.00	38.93	67.94		68.34	0.000303	5.60	8743.16	2412.62	0.23
E100-00-00_N034	52589.0	0.2%	31613.00	38.93	70.03		70.35	0.000254	5.52	14194.20	2724.51	0.22
E100-00-00_N034	51777.0	10%	14958.00	38.57	64.27		64.60	0.000262	4.80	4001.54	670.00	0.22
E100-00-00_N034	51777.0	2%	21444.00	38.57	66.86		67.21	0.000252	5.22	7626.58	2391.23	0.22
E100-00-00_N034	51777.0	1%	23882.00	38.57	67.80		68.10	0.000225	5.10	10009.99	2651.84	0.21
E100-00-00_N034	51777.0	0.2%	31613.00	38.57	69.91		70.16	0.000189	5.03	16049.98	3069.43	0.19
E100-00-00_N034	51021.	10%	14958.00	37.55	64.07		64.39	0.000323	4.70	4014.16	688.60	0.22
E100-00-00_N034	51021.	2%	21444.00	37.55	66.69		67.01	0.000286	4.96	7779.42	2381.39	0.21
E100-00-00_N034	51021.	1%	23882.00	37.55	67.66		67.93	0.000248	4.79	10224.59	2673.33	0.20
E100-00-00_N034	51021.	0.2%	31613.00	37.55	69.81		70.02	0.000198	4.63	16368.77	3066.51	0.18
E100-00-00_N034	50921.0	10%	14958.00	37.41	63.92	51.54	64.33	0.000314	5.15	2905.86	466.26	0.23
E100-00-00_N034	50921.0	2%	21444.00	37.41	66.48	53.95	66.94	0.000340	5.67	6264.82	2274.78	0.24
E100-00-00_N034	50921.0	1%	23882.00	37.41	67.49	54.76	67.87	0.000291	5.45	8897.37	2679.42	0.23
E100-00-00_N034	50921.0	0.2%	31613.00	37.41	69.69	56.98	69.97	0.000224	5.17	15364.09	3110.41	0.20
E100-00-00_N034	50865.0		Bridge									
E100-00-00_N034	50808.0	10%	14958.00	37.52	63.78	51.66	64.21	0.000327	5.23	2859.37	455.91	0.24
E100-00-00_N034	50808.0	2%	21444.00	37.52	65.99	54.06	66.51	0.000396	6.02	5298.85	1942.65	0.26
E100-00-00_N034	50808.0	1%	23882.00	37.52	66.92	54.87	67.40	0.000363	5.94	7452.64	2409.54	0.25
E100-00-00_N034	50808.0	0.2%	31613.00	37.52	69.52	57.11	69.82	0.000242	5.32	14808.56	3085.08	0.21
E100-00-00_N034	50694.	10%	14958.00	37.44	63.89		64.04	0.000181	3.59	6316.45	812.21	0.17
E100-00-00_N034	50694.	2%	21444.00	37.44	66.13		66.31	0.000193	4.05	9504.47	2319.15	0.18
E100-00-00_N034	50694.	1%	23882.00	37.44	67.05		67.21	0.000174	3.99	11793.09	2657.40	0.17
E100-00-00_N034	50694.	0.2%	31613.00	37.44	69.59		69.71	0.000130	3.78	19701.58	3493.51	0.15
E100-00-00_N034	49824.0	10%	14958.00	36.84	63.50		63.86	0.000249	4.83	3358.45	582.83	0.21
E100-00-00_N034	49824.0	2%	21444.00	36.84	65.62		66.10	0.000303	5.77	6410.60	2664.44	0.24
E100-00-00_N034	49824.0	1%	23882.00	36.84	66.60		67.02	0.000272	5.66	9532.23	3562.81	0.23
E100-00-00_N034	49824.0	0.2%	31613.00	36.84	69.33		69.59	0.000180	5.04	20240.14	4469.13	0.19
E100-00-00_N034	49564.	10%	14958.00	36.36	63.44		63.78	0.000283	4.69	3383.95	842.47	0.21
E100-00-00_N034	49564.	2%	21444.00	36.36	65.56		66.01	0.000332	5.56	6480.37	2442.58	0.24
E100-00-00_N034	49564.	1%	23882.00	36.36	66.54		66.95	0.000300	5.47	9316.15	3201.07	0.23
E100-00-00_N034	49564.	0.2%	31613.00	36.36	69.29		69.54	0.000197	4.88	19531.30	4071.77	0.19
E100-00-00_N034	49457.0	10%	14958.00	36.16	63.43	49.90	63.73	0.000332	4.37	3564.29	642.93	0.22
E100-00-00_N034	49457.0	2%	21444.00	36.16	65.56	52.18	65.93	0.000360	5.04	6781.34	2582.46	0.23
E100-00-00_N034	49457.0	1%	23882.00	36.16	66.55	52.92	66.88	0.000316	4.93	9723.56	3474.66	0.22
E100-00-00_N034	49457.0	0.2%	31613.00	36.16	69.30	55.00	69.50	0.000195	4.31	20218.15	4185.04	0.18
E100-00-00_N034	49446.0		Bridge									
E100-00-00_N034	49437.0	10%	14958.00	36.17	63.36	49.90	63.66	0.000340	4.41	3511.53	585.18	0.22

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	49437.0	2%	21444.00	36.17	65.54	52.19	65.91	0.000364	5.06	6697.83	2554.96	0.23
E100-00-00_N034	49437.0	1%	23882.00	36.17	66.44	52.94	66.79	0.000330	5.01	9335.46	3450.02	0.22
E100-00-00_N034	49437.0	0.2%	31613.00	36.17	69.19	55.01	69.40	0.000203	4.38	19728.71	4162.73	0.18
E100-00-00_N034	49281.	10%	14958.00	36.61	63.26		63.60	0.000228	4.72	3475.44	712.85	0.20
E100-00-00_N034	49281.	2%	21444.00	36.61	65.44		65.85	0.000260	5.45	8083.01	2778.42	0.22
E100-00-00_N034	49281.	1%	23882.00	36.61	66.36		66.74	0.000242	5.41	10762.37	3131.67	0.21
E100-00-00_N034	49281.	0.2%	31613.00	36.61	69.12		69.36	0.000165	4.87	21165.35	4356.59	0.18
E100-00-00_N034	48942.0	10%	14958.00	37.57	63.20		63.52	0.000220	4.62	3752.81	831.06	0.20
E100-00-00_N034	48942.0	2%	21444.00	37.57	65.33		65.77	0.000265	5.49	7266.19	2622.83	0.22
E100-00-00_N034	48942.0	1%	23882.00	37.57	66.25		66.65	0.000248	5.48	9792.92	2918.66	0.22
E100-00-00_N034	48942.0	0.2%	31613.00	37.57	69.02		69.30	0.000179	5.09	19627.57	4151.61	0.19
E100-00-00_N034	47857.0	10%	14958.00	34.44	63.00		63.29	0.000191	4.39	4476.58	1581.68	0.19
E100-00-00_N034	47857.0	2%	21444.00	34.44	65.19		65.48	0.000195	4.80	10493.65	3464.30	0.19
E100-00-00_N034	47857.0	1%	23882.00	34.44	66.14		66.39	0.000169	4.62	14014.27	3889.72	0.18
E100-00-00_N034	47857.0	0.2%	31613.00	34.44	68.98		69.12	0.000107	4.01	26128.00	4667.67	0.15
E100-00-00_N034	46827.0	10%	21261.00	33.93	62.22		62.92	0.000511	6.76	3632.66	1010.28	0.30
E100-00-00_N034	46827.0	2%	29052.00	33.93	64.35		65.11	0.000549	7.36	7101.87	2287.96	0.31
E100-00-00_N034	46827.0	1%	32346.00	33.93	65.40		66.07	0.000483	7.18	9636.95	2545.06	0.30
E100-00-00_N034	46827.0	0.2%	42986.00	33.93	68.48		68.92	0.000320	6.48	18506.10	3299.14	0.25
E100-00-00_N034	46096.0	10%	21261.00	33.45	61.88		62.55	0.000471	6.63	4173.20	953.98	0.29
E100-00-00_N034	46096.0	2%	29052.00	33.45	63.90		64.71	0.000525	7.54	6928.04	1800.28	0.31
E100-00-00_N034	46096.0	1%	32346.00	33.45	64.95		65.71	0.000482	7.50	9013.77	2176.78	0.30
E100-00-00_N034	46096.0	0.2%	42986.00	33.45	68.17		68.67	0.000325	6.83	17861.61	3234.01	0.25
E100-00-00_N034	45120.	10%	21261.00	32.65	61.46	49.33	62.06	0.000494	6.31	4263.67	1063.68	0.28
E100-00-00_N034	45120.	2%	29052.00	32.65	63.33	51.86	64.16	0.000609	7.53	5369.04	2256.01	0.31
E100-00-00_N034	45120.	1%	32346.00	32.65	64.30	52.79	65.17	0.000608	7.79	5995.81	2534.49	0.31
E100-00-00_N034	45120.	0.2%	42986.00	32.65	67.24	55.56	68.21	0.000589	8.44	7933.76	3188.13	0.32
E100-00-00_N034	44983.0	10%	21261.00	32.54	61.37	49.08	61.99	0.000461	6.31	3494.72	1062.90	0.28
E100-00-00_N034	44983.0	2%	29052.00	32.54	63.12	51.31	64.05	0.000608	7.76	3919.83	2231.55	0.32
E100-00-00_N034	44983.0	1%	32346.00	32.54	64.00	52.17	65.03	0.000642	8.22	4132.16	2490.10	0.33
E100-00-00_N034	44983.0	0.2%	42986.00	32.54	66.59	55.53	67.99	0.000731	9.56	4762.32	3079.39	0.36
E100-00-00_N034	44963.5		Bridge									
E100-00-00_N034	44945.0	10%	21261.00	32.27	61.04	48.81	61.66	0.000471	6.35	3464.26	896.06	0.28
E100-00-00_N034	44945.0	2%	29052.00	32.27	62.74	51.04	63.68	0.000625	7.82	3879.26	2027.45	0.33
E100-00-00_N034	44945.0	1%	32346.00	32.27	63.67	51.90	64.72	0.000653	8.26	4103.65	2378.79	0.34
E100-00-00_N034	44945.0	0.2%	42986.00	32.27	65.62	55.24	67.13	0.000823	9.91	4579.28	2863.19	0.38
E100-00-00_N034	44711.0	10%	21261.00	31.73	60.87	48.20	61.54	0.000408	6.58	3233.48	1125.45	0.28
E100-00-00_N034	44711.0	2%	29052.00	31.73	62.53	50.62	63.53	0.000580	8.06	4287.63	2119.20	0.33
E100-00-00_N034	44711.0	1%	32346.00	31.73	63.51	51.54	64.57	0.000600	8.38	4986.56	2312.89	0.34
E100-00-00_N034	44711.0	0.2%	42986.00	31.73	65.53	54.18	66.87	0.000696	9.64	6744.78	2716.39	0.37
E100-00-00_N034	44700.0		Bridge									
E100-00-00_N034	44688.0	10%	21261.00	31.70	60.74	48.18	61.41	0.000414	6.61	3214.09	1012.13	0.28
E100-00-00_N034	44688.0	2%	29052.00	31.70	62.35	50.59	63.36	0.000597	8.15	4180.48	2093.71	0.34
E100-00-00_N034	44688.0	1%	32346.00	31.70	63.35	51.51	64.43	0.000615	8.46	4887.07	2261.83	0.34
E100-00-00_N034	44688.0	0.2%	42986.00	31.70	65.44	54.15	66.79	0.000704	9.68	6691.81	2704.66	0.37
E100-00-00_N034	44556.	10%	21261.00	31.56	60.68	48.07	61.35	0.000520	6.61	3222.19	547.34	0.29
E100-00-00_N034	44556.	2%	29052.00	31.56	62.26	50.63	63.27	0.000725	8.12	4225.62	1926.72	0.34
E100-00-00_N034	44556.	1%	32346.00	31.56	63.27	51.57	64.33	0.000732	8.38	5008.10	2177.75	0.34
E100-00-00_N034	44556.	0.2%	42986.00	31.56	65.36	54.27	66.67	0.000824	9.55	6889.48	2781.41	0.37
E100-00-00_N034	44372.0	10%	21261.00	31.36	60.61		61.26	0.000418	6.45	3484.65	1122.28	0.28
E100-00-00_N034	44372.0	2%	29052.00	31.36	62.20		63.13	0.000589	7.83	4840.47	2014.91	0.33
E100-00-00_N034	44372.0	1%	32346.00	31.36	63.22		64.17	0.000596	8.02	5836.36	2388.94	0.33
E100-00-00_N034	44372.0	0.2%	42986.00	31.36	65.36		66.46	0.000670	8.92	8238.88	2958.16	0.35
E100-00-00_N034	43626.	10%	21261.00	30.94	60.17	48.12	60.88	0.000589	6.80	3583.54	1390.57	0.30
E100-00-00_N034	43626.	2%	29052.00	30.94	61.67	50.66	62.63	0.000767	8.08	5953.04	3031.78	0.35
E100-00-00_N034	43626.	1%	32346.00	30.94	62.83	51.62	63.68	0.000665	7.86	8473.76	3571.86	0.33
E100-00-00_N034	43626.	0.2%	42986.00	30.94	65.18	54.47	65.90	0.000566	7.87	14810.57	6060.65	0.31
E100-00-00_N034	43420.0	10%	21261.00	30.82	60.12	48.47	60.73	0.000414	6.24	3409.77	1121.99	0.27
E100-00-00_N034	43420.0	2%	29052.00	30.82	61.62	50.47	62.41	0.000542	7.38	6097.87	2678.99	0.30
E100-00-00_N034	43420.0	1%	32346.00	30.82	62.78	51.26	63.48	0.000476	7.21	8654.87	3920.92	0.29
E100-00-00_N034	43420.0	0.2%	42986.00	30.82	65.18	53.58	65.70	0.000369	6.86	16118.04	5216.60	0.26
E100-00-00_N034	43348.0		Bridge									

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	43276.0	10%	21261.00	30.57	59.39	48.22	60.03	0.000454	6.42	3312.21	523.35	0.28
E100-00-00_N034	43276.0	2%	29052.00	30.57	61.54	50.22	62.34	0.000532	7.35	6010.50	2606.70	0.30
E100-00-00_N034	43276.0	1%	32346.00	30.57	62.74	51.01	63.45	0.000465	7.17	8611.70	3862.49	0.29
E100-00-00_N034	43276.0	0.2%	42986.00	30.57	64.68	53.34	65.31	0.000429	7.33	14551.61	5022.37	0.28
E100-00-00_N034	42932.	10%	21261.00	30.49	59.29	46.83	59.83	0.000407	6.07	5016.17	1558.72	0.26
E100-00-00_N034	42932.	2%	29052.00	30.49	61.50	49.29	62.05	0.000400	6.52	9276.62	2825.44	0.26
E100-00-00_N034	42932.	1%	32346.00	30.49	62.73	50.21	63.19	0.000336	6.22	13093.77	4542.24	0.24
E100-00-00_N034	42932.	0.2%	42986.00	30.49	64.68	52.91	65.07	0.000301	6.25	19851.30	4872.74	0.23
E100-00-00_N034	42650.0	10%	21261.00	30.43	58.95	47.14	59.66	0.000459	6.74	3164.71	890.33	0.29
E100-00-00_N034	42650.0	2%	29052.00	30.43	61.25	49.60	61.90	0.000437	6.96	7805.23	2833.53	0.29
E100-00-00_N034	42650.0	1%	32346.00	30.43	62.58	50.51	63.08	0.000343	6.46	12067.11	4627.62	0.26
E100-00-00_N034	42650.0	0.2%	42986.00	30.43	64.58	53.13	64.99	0.000292	6.37	19547.06	5205.01	0.24
E100-00-00_N034	42603.0		Bridge									
E100-00-00_N034	42555.0	10%	21261.00	30.34	57.10	47.04	57.98	0.000617	7.54	2818.59	339.08	0.34
E100-00-00_N034	42555.0	2%	29052.00	30.34	61.21	49.52	61.87	0.000438	6.97	7715.03	2687.42	0.29
E100-00-00_N034	42555.0	1%	32346.00	30.34	62.29	50.41	62.85	0.000378	6.74	10752.59	4452.05	0.27
E100-00-00_N034	42555.0	0.2%	42986.00	30.34	64.20	53.03	64.66	0.000331	6.71	18092.36	5036.95	0.26
E100-00-00_N034	42356.	10%	21261.00	30.03	57.05	45.82	57.78	0.000662	6.86	3099.51	298.19	0.31
E100-00-00_N034	42356.	2%	29052.00	30.03	61.14	48.26	61.76	0.000483	6.60	7800.98	3342.42	0.27
E100-00-00_N034	42356.	1%	32346.00	30.03	62.23	49.18	62.75	0.000411	6.33	11467.98	4143.55	0.25
E100-00-00_N034	42356.	0.2%	42986.00	30.03	64.17	51.82	64.56	0.000342	6.16	20469.84	4730.66	0.24
E100-00-00_N034	41337.0	10%	21261.00	28.45	56.47	45.15	57.22	0.000461	6.96	3461.83	666.51	0.30
E100-00-00_N034	41337.0	2%	29052.00	28.45	60.83	47.62	61.36	0.000287	6.41	10699.45	3727.76	0.25
E100-00-00_N034	41337.0	1%	32346.00	28.45	62.04	48.55	62.42	0.000217	5.79	16580.20	3935.27	0.22
E100-00-00_N034	41337.0	0.2%	42986.00	28.45	63.98	51.25	64.29	0.000195	5.80	24137.36	4750.01	0.21
E100-00-00_N034	40384.0	10%	21261.00	27.79	55.90	44.58	56.57	0.001007	6.61	3673.75	828.59	0.36
E100-00-00_N034	40384.0	2%	29052.00	27.79	60.68	47.01	60.99	0.000364	5.00	11146.67	2756.21	0.23
E100-00-00_N034	40384.0	1%	32346.00	27.79	61.87	47.92	62.14	0.000304	4.81	13644.64	3136.49	0.21
E100-00-00_N034	40384.0	0.2%	42986.00	27.79	63.76	50.61	64.05	0.000305	5.19	17828.62	4400.53	0.22
E100-00-00_N034	39567.	10%	21261.00	27.06	55.13	43.71	55.90	0.000660	7.07	3012.95	289.63	0.32
E100-00-00_N034	39567.	2%	29052.00	27.06	59.95	46.33	60.61	0.000469	6.73	6056.89	2343.24	0.28
E100-00-00_N034	39567.	1%	32346.00	27.06	61.15	47.34	61.80	0.000437	6.77	7213.24	2590.18	0.27
E100-00-00_N034	39567.	0.2%	42986.00	27.06	62.84	50.23	63.66	0.000525	7.84	9111.62	2947.83	0.30
E100-00-00_N034	39419.0	10%	21261.00	26.87	55.06	43.70	55.81	0.000439	6.91	3077.15	315.14	0.29
E100-00-00_N034	39419.0	2%	29052.00	26.87	59.78	46.25	60.51	0.000423	6.97	5041.62	2259.09	0.28
E100-00-00_N034	39419.0	1%	32346.00	26.87	60.99	47.07	61.70	0.000481	6.95	6106.06	3293.22	0.28
E100-00-00_N034	39419.0	0.2%	42986.00	26.87	62.58	49.52	63.53	0.000597	8.18	8045.63	4809.22	0.32
E100-00-00_N034	39382.5		Bridge									
E100-00-00_N034	39329	10%	21261.00	26.81	54.86	43.69	55.61	0.000433	6.95	3057.21	200.10	0.30
E100-00-00_N034	39329	2%	29052.00	26.81	59.17	46.28	59.98	0.000454	7.25	4565.64	2468.26	0.29
E100-00-00_N034	39329	1%	32346.00	26.81	60.48	47.11	61.27	0.000526	7.24	5480.36	3816.62	0.30
E100-00-00_N034	39329	0.2%	42986.00	26.81	62.34	49.57	63.37	0.000625	8.42	7295.38	5472.77	0.33
E100-00-00_N034	39325	10%	21261.00	26.80	54.88	43.66	55.59	0.000478	6.79	3128.92	189.60	0.29
E100-00-00_N034	39325	2%	29052.00	26.80	59.17	45.76	59.97	0.000489	7.23	4264.81	1562.41	0.29
E100-00-00_N034	39325	1%	32346.00	26.80	60.44	46.58	61.26	0.000494	7.37	5146.43	2189.43	0.29
E100-00-00_N034	39325	0.2%	42986.00	26.80	62.34	49.12	63.35	0.000604	8.41	6868.03	2831.08	0.32
E100-00-00_N034	39223		Bridge									
E100-00-00_N034	39107	10%	21261.00	26.67	54.64	43.58	55.37	0.000485	6.85	3103.86	191.24	0.30
E100-00-00_N034	39107	2%	29052.00	26.67	58.89	45.70	59.72	0.000494	7.30	4147.09	1638.66	0.30
E100-00-00_N034	39107	1%	32346.00	26.67	60.17	46.52	61.02	0.000499	7.46	4976.26	2969.16	0.30
E100-00-00_N034	39107	0.2%	42986.00	26.67	62.00	49.02	63.07	0.000633	8.60	6544.78	3704.13	0.34
E100-00-00_N034	39103	10%	21261.00	26.67	54.63	43.27	55.37	0.000435	6.88	3088.45	196.88	0.29
E100-00-00_N034	39103	2%	29052.00	26.67	58.90	45.84	59.70	0.000439	7.28	4608.23	2479.24	0.29
E100-00-00_N034	39103	1%	32346.00	26.67	60.19	46.66	60.98	0.000506	7.29	5511.16	3714.28	0.29
E100-00-00_N034	39103	0.2%	42986.00	26.67	62.01	49.41	63.05	0.000639	8.50	7220.38	4584.41	0.33
E100-00-00_N034	39050.5		Bridge									
E100-00-00_N034	39010.0	10%	21261.00	26.67	54.46	43.27	55.21	0.000450	6.95	3057.32	196.16	0.30
E100-00-00_N034	39010.0	2%	29052.00	26.67	58.18	45.84	59.03	0.000491	7.49	4439.68	1900.70	0.30
E100-00-00_N034	39010.0	1%	32346.00	26.67	59.47	46.66	60.33	0.000477	7.61	5226.72	2288.55	0.30
E100-00-00_N034	39010.0	0.2%	42986.00	26.67	61.41	49.41	62.42	0.000645	8.46	7376.27	4901.48	0.33

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	38877.	10%	21261.00	26.33	54.35	43.13	55.13	0.000589	7.10	2994.45	229.11	0.32
E100-00-00_N034	38877.	2%	29052.00	26.33	58.04	45.70	58.95	0.000628	7.67	4113.17	1959.63	0.32
E100-00-00_N034	38877.	1%	32346.00	26.33	59.33	46.99	60.24	0.000627	7.78	4840.06	2394.47	0.32
E100-00-00_N034	38877.	0.2%	42986.00	26.33	61.60	49.48	62.11	0.000420	6.78	18084.79	5212.69	0.27
E100-00-00_N034	37857.0	10%	21261.00	25.40	53.83	42.07	54.57	0.000492	6.89	3085.57	235.21	0.30
E100-00-00_N034	37857.0	2%	29052.00	25.40	57.47	44.55	58.36	0.000526	7.59	4258.01	1674.87	0.31
E100-00-00_N034	37857.0	1%	32346.00	25.40	58.76	45.50	59.66	0.000516	7.73	5423.06	2162.17	0.31
E100-00-00_N034	37857.0	0.2%	42986.00	25.40	61.10	48.20	61.69	0.000385	7.11	16322.26	5029.55	0.27
E100-00-00_N034	36870.0	10%	21261.00	24.57	53.38	41.38	54.08	0.000477	6.75	3147.66	192.37	0.29
E100-00-00_N034	36870.0	2%	29052.00	24.57	56.94	43.83	57.79	0.000599	7.42	4229.14	550.09	0.32
E100-00-00_N034	36870.0	1%	32346.00	24.57	58.24	44.76	59.08	0.000624	7.46	5822.27	1973.40	0.32
E100-00-00_N034	36870.0	0.2%	42986.00	24.57	60.37	47.46	61.19	0.000593	7.84	11368.11	4576.02	0.31
E100-00-00_N034	36505.	10%	21261.00	24.44	53.23	40.61	53.89	0.000509	6.53	3254.85	198.62	0.28
E100-00-00_N034	36505.	2%	29052.00	24.44	56.86	43.13	57.53	0.000532	6.76	6410.80	2079.43	0.28
E100-00-00_N034	36505.	1%	32346.00	24.44	58.23	44.05	58.82	0.000450	6.54	8338.10	3073.37	0.27
E100-00-00_N034	36505.	0.2%	42986.00	24.44	60.53	46.75	60.92	0.000328	6.03	19809.99	4578.37	0.23
E100-00-00_N034	36318.0	10%	21261.00	24.37	53.17	40.53	53.78	0.000412	6.26	3395.80	204.15	0.27
E100-00-00_N034	36318.0	2%	29052.00	24.37	56.78	42.98	57.43	0.000477	6.61	6275.11	1735.19	0.28
E100-00-00_N034	36318.0	1%	32346.00	24.37	58.15	43.89	58.74	0.000455	6.46	8028.42	2305.24	0.27
E100-00-00_N034	36318.0	0.2%	42986.00	24.37	60.32	46.45	60.83	0.000411	6.52	15966.85	3824.53	0.26
E100-00-00_N034	36307.0		Bridge									
E100-00-00_N034	36296.0	10%	21261.00	24.36	53.13	40.51	53.75	0.000413	6.27	3390.87	204.02	0.27
E100-00-00_N034	36296.0	2%	29052.00	24.36	56.76	42.97	57.41	0.000482	6.65	6152.54	1729.18	0.28
E100-00-00_N034	36296.0	1%	32346.00	24.36	58.12	43.89	58.72	0.000462	6.50	7897.86	2294.26	0.27
E100-00-00_N034	36296.0	0.2%	42986.00	24.36	59.92	46.43	60.62	0.000528	7.29	10337.74	3398.51	0.29
E100-00-00_N034	36134.	10%	21261.00	24.19	53.03	40.31	53.66	0.000498	6.39	3327.36	201.17	0.28
E100-00-00_N034	36134.	2%	29052.00	24.19	56.61	42.82	57.31	0.000541	6.86	5523.04	1068.08	0.29
E100-00-00_N034	36134.	1%	32346.00	24.19	57.91	43.74	58.61	0.000503	6.89	7037.20	2509.02	0.28
E100-00-00_N034	36134.	0.2%	42986.00	24.19	59.62	46.37	60.48	0.000591	7.90	9493.38	3777.69	0.31
E100-00-00_N034	35718.0	10%	22165.00	23.76	52.70	40.73	53.45	0.000489	6.92	3201.13	193.66	0.30
E100-00-00_N034	35718.0	2%	28857.00	23.76	56.28	42.83	57.08	0.000508	7.26	4432.58	648.51	0.30
E100-00-00_N034	35718.0	1%	31890.00	23.76	57.57	43.69	58.39	0.000498	7.35	5274.29	1754.45	0.30
E100-00-00_N034	35718.0	0.2%	43104.00	23.76	59.25	46.50	60.22	0.000587	8.38	10089.33	3184.29	0.33
E100-00-00_N034	35158.	10%	22165.00	22.89	52.50	39.65	53.14	0.000513	6.40	3463.94	212.17	0.28
E100-00-00_N034	35158.	2%	28857.00	22.89	56.14	41.73	56.74	0.000486	6.37	6271.39	1335.51	0.27
E100-00-00_N034	35158.	1%	31890.00	22.89	57.51	42.58	58.05	0.000414	6.18	8433.84	2864.48	0.25
E100-00-00_N034	35158.	0.2%	43104.00	22.89	59.23	45.35	59.81	0.000454	6.86	14422.65	3624.65	0.27
E100-00-00_N034	35006.0	10%	22165.00	22.66	52.35	40.20	53.04	0.000463	6.70	3401.32	291.00	0.29
E100-00-00_N034	35006.0	2%	28857.00	22.66	56.00	42.27	56.66	0.000416	6.70	6348.97	1516.92	0.27
E100-00-00_N034	35006.0	1%	31890.00	22.66	57.40	43.11	57.97	0.000352	6.46	8687.85	2827.78	0.25
E100-00-00_N034	35006.0	0.2%	43104.00	22.66	59.10	45.90	59.73	0.000390	7.18	14660.49	3551.03	0.27
E100-00-00_N034	34951.5		Bridge									
E100-00-00_N034	34895.0	10%	22165.00	22.56	52.20	40.11	52.90	0.000466	6.72	3385.91	288.37	0.29
E100-00-00_N034	34895.0	2%	28857.00	22.56	55.43	42.17	56.15	0.000461	6.98	5719.10	1237.05	0.29
E100-00-00_N034	34895.0	1%	31890.00	22.56	56.95	43.01	57.58	0.000387	6.69	8074.77	2280.03	0.27
E100-00-00_N034	34895.0	0.2%	43104.00	22.56	58.72	45.80	59.41	0.000426	7.44	13684.10	3434.85	0.28
E100-00-00_N034	34645.	10%	22165.00	22.24	52.10	38.99	52.75	0.000532	6.48	3556.61	497.99	0.28
E100-00-00_N034	34645.	2%	28857.00	22.24	55.39	41.18	55.98	0.000416	6.47	6454.73	1131.68	0.26
E100-00-00_N034	34645.	1%	31890.00	22.24	56.91	42.06	57.44	0.000349	6.24	8480.89	2165.12	0.24
E100-00-00_N034	34645.	0.2%	43104.00	22.24	58.66	44.98	59.28	0.000403	7.07	14081.98	3573.19	0.26
E100-00-00_N034	34206.0	10%	22165.00	21.68	51.88	38.74	52.53	0.000455	6.45	3470.09	289.21	0.28
E100-00-00_N034	34206.0	2%	28857.00	21.68	55.11	40.85	55.78	0.000434	6.70	5517.98	2281.98	0.27
E100-00-00_N034	34206.0	1%	31890.00	21.68	56.75	41.72	57.27	0.000337	6.21	9351.13	3157.15	0.25
E100-00-00_N034	34206.0	0.2%	43104.00	21.68	58.56	44.57	59.05	0.000330	6.51	16674.87	4053.86	0.25
E100-00-00_N034	33962.58	10%	22165.00	21.61	51.95	37.86	52.36	0.000367	5.14	4491.15	593.19	0.25
E100-00-00_N034	33962.58	2%	28857.00	21.61	55.25	39.93	55.59	0.000266	4.91	8854.99	2710.65	0.21
E100-00-00_N034	33962.58	1%	31890.00	21.61	56.85	40.78	57.12	0.000199	4.51	13030.62	3238.24	0.19
E100-00-00_N034	33962.58	0.2%	43104.00	21.61	58.61	43.61	58.91	0.000214	4.99	18450.75	3791.74	0.20
E100-00-00_N034	33909.08	10%	22165.00	21.60	51.91	37.82	52.33	0.000482	5.22	4365.91	602.21	0.26
E100-00-00_N034	33909.08	2%	28857.00	21.60	55.24	40.00	55.58	0.000336	4.90	8749.31	2759.29	0.22
E100-00-00_N034	33909.08	1%	31890.00	21.60	56.85	40.89	57.10	0.000241	4.43	13078.68	3278.65	0.19
E100-00-00_N034	33909.08	0.2%	43104.00	21.60	58.62	43.84	58.89	0.000249	4.82	18656.11	3751.77	0.20

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	33770.	10%	22165.00	21.56	51.87	36.98	52.28	0.000257	5.24	4595.01	373.23	0.22
E100-00-00_N034	33770.	2%	28857.00	21.56	55.17	38.73	55.54	0.000230	5.21	9060.39	2698.13	0.21
E100-00-00_N034	33770.	1%	31890.00	21.56	56.79	39.47	57.07	0.000176	4.75	13480.38	3104.13	0.18
E100-00-00_N034	33770.	0.2%	43104.00	21.56	58.56	41.98	58.85	0.000191	5.22	19113.02	3619.18	0.19
E100-00-00_N034	33681.0	10%	22165.00	21.53	51.48	39.23	52.17	0.000464	6.68	3319.37	367.09	0.29
E100-00-00_N034	33681.0	2%	28857.00	21.53	54.54	41.27	55.37	0.000476	7.33	3955.31	2448.93	0.29
E100-00-00_N034	33681.0	1%	31890.00	21.53	56.62	42.13	57.02	0.000256	5.70	12758.84	3068.41	0.22
E100-00-00_N034	33681.0	0.2%	43104.00	21.53	58.44	44.91	58.81	0.000253	5.98	18742.86	3548.32	0.22
E100-00-00_N034	33645.5		Bridge									
E100-00-00_N034	33610.0	10%	22165.00	21.61	51.35	39.31	52.06	0.000482	6.77	3276.49	365.19	0.29
E100-00-00_N034	33610.0	2%	28857.00	21.61	54.07	41.36	54.96	0.000517	7.54	3841.00	1988.21	0.31
E100-00-00_N034	33610.0	1%	31890.00	21.61	55.95	42.20	56.47	0.000330	6.32	10534.75	2829.91	0.25
E100-00-00_N034	33610.0	0.2%	43104.00	21.61	58.30	45.00	58.70	0.000272	6.16	17974.40	3476.79	0.23
E100-00-00_N034	33357.	10%	22165.00	21.41	51.25		51.89	0.000587	6.40	3464.76	220.99	0.28
E100-00-00_N034	33357.	2%	28857.00	21.41	53.99		54.75	0.000655	7.01	4577.09	1186.11	0.30
E100-00-00_N034	33357.	1%	31890.00	21.41	55.72		56.34	0.000561	6.57	7908.56	2547.18	0.28
E100-00-00_N034	33357.	0.2%	43104.00	21.41	58.09		58.60	0.000487	6.48	15035.46	3170.55	0.26
E100-00-00_N034	32570.0	10%	22165.00	20.78	50.92		51.50	0.000392	6.11	3625.15	213.99	0.26
E100-00-00_N034	32570.0	2%	28857.00	20.78	53.62		54.30	0.000443	6.71	5545.90	1767.60	0.28
E100-00-00_N034	32570.0	1%	31890.00	20.78	55.42		55.95	0.000345	6.16	10236.01	2993.14	0.24
E100-00-00_N034	32570.0	0.2%	43104.00	20.78	57.78		58.23	0.000301	6.21	18374.09	3778.83	0.23
E100-00-00_N034	31583.0	10%	22165.00	19.35	50.60	36.45	51.12	0.000337	5.81	3834.61	254.91	0.24
E100-00-00_N034	31583.0	2%	28857.00	19.35	53.30	38.46	53.89	0.000350	6.31	6931.27	2826.87	0.25
E100-00-00_N034	31583.0	1%	31890.00	19.35	55.25	39.26	55.64	0.000235	5.48	13567.81	4445.76	0.21
E100-00-00_N034	31583.0	0.2%	43104.00	19.35	57.70	41.95	57.97	0.000180	5.15	27666.00	6423.79	0.19
E100-00-00_N034	30779.0	10%	22165.00	18.79	50.38	35.92	50.85	0.000295	5.56	4486.16	529.16	0.23
E100-00-00_N034	30779.0	2%	28857.00	18.79	53.11	37.94	53.61	0.000287	5.93	7747.94	2635.85	0.23
E100-00-00_N034	30779.0	1%	31890.00	18.79	55.08	38.77	55.46	0.000208	5.37	12669.76	3273.12	0.20
E100-00-00_N034	30779.0	0.2%	43104.00	18.79	57.52	41.51	57.82	0.000179	5.33	22724.21	3648.31	0.19
E100-00-00_N034	29659.	10%	22165.00	17.66	50.08	34.10	50.48	0.000337	5.10	4687.82	731.70	0.22
E100-00-00_N034	29659.	2%	28857.00	17.66	52.84	36.14	53.24	0.000329	5.25	8927.03	3203.01	0.21
E100-00-00_N034	29659.	1%	31890.00	17.66	54.93	36.97	55.19	0.000213	4.53	14449.72	4505.17	0.18
E100-00-00_N034	29659.	0.2%	43104.00	17.66	57.43	39.70	57.60	0.000153	4.15	30630.39	5644.97	0.15
E100-00-00_N034	29368.0	10%	22165.00	17.37	49.65	35.56	50.30	0.000414	6.44	3459.40	279.98	0.26
E100-00-00_N034	29368.0	2%	28857.00	17.37	52.22	37.83	53.00	0.000466	7.16	5497.36	1864.06	0.28
E100-00-00_N034	29368.0	1%	31890.00	17.37	54.42	38.62	55.00	0.000335	6.48	9237.12	2767.34	0.24
E100-00-00_N034	29368.0	0.2%	43104.00	17.37	56.97	41.33	57.43	0.000280	6.36	18770.65	3530.93	0.22
E100-00-00_N034	29297.5		Bridge									
E100-00-00_N034	29203.0	10%	22165.00	17.35	47.56	35.53	48.37	0.000555	7.22	3068.03	176.23	0.31
E100-00-00_N034	29203.0	2%	28857.00	17.35	51.97	37.81	52.77	0.000487	7.28	5129.73	1758.96	0.29
E100-00-00_N034	29203.0	1%	31890.00	17.35	53.74	38.60	54.42	0.000396	6.90	8082.01	2363.37	0.26
E100-00-00_N034	29203.0	0.2%	43104.00	17.35	56.46	41.30	56.99	0.000323	6.74	17074.22	3359.17	0.24
E100-00-00_N034	28775.	10%	22165.00	16.90	47.48	33.56	47.99	0.000514	5.70	3889.01	264.97	0.26
E100-00-00_N034	28775.	2%	28857.00	16.90	51.99	35.61	52.39	0.000377	5.24	8302.31	2723.24	0.23
E100-00-00_N034	28775.	1%	31890.00	16.90	53.80	36.42	54.10	0.000265	4.70	12864.26	3612.94	0.19
E100-00-00_N034	28775.	0.2%	43104.00	16.90	56.52	39.13	56.73	0.000198	4.45	25951.51	4951.12	0.17
E100-00-00_N034	28375.0	10%	22165.00	16.48	47.02	34.58	47.73	0.000482	6.76	3276.77	197.33	0.29
E100-00-00_N034	28375.0	2%	28857.00	16.48	51.47	36.69	52.15	0.000438	6.69	6017.83	2422.45	0.27
E100-00-00_N034	28375.0	1%	31890.00	16.48	53.43	37.56	53.92	0.000319	6.03	10766.75	3351.15	0.24
E100-00-00_N034	28375.0	0.2%	43104.00	16.48	56.26	40.47	56.61	0.000238	5.68	22885.19	4512.12	0.21
E100-00-00_N034	28357.0		Bridge									
E100-00-00_N034	28330.0	10%	22165.00	16.41	46.90	34.51	47.62	0.000485	6.78	3267.85	197.08	0.29
E100-00-00_N034	28330.0	2%	28857.00	16.41	51.40	36.63	52.08	0.000438	6.69	6018.65	2423.21	0.27
E100-00-00_N034	28330.0	1%	31890.00	16.41	52.94	37.50	53.50	0.000359	6.31	9748.09	3158.88	0.25
E100-00-00_N034	28330.0	0.2%	43104.00	16.41	56.17	40.38	56.52	0.000239	5.69	22802.78	4495.87	0.21
E100-00-00_N034	28190.0	10%	22904.00	16.18	46.80	34.33	47.54	0.000473	6.91	3312.29	190.60	0.29
E100-00-00_N034	28190.0	2%	29066.00	16.18	51.30	36.30	52.01	0.000375	6.84	5665.11	1960.36	0.26
E100-00-00_N034	28190.0	1%	31953.00	16.18	52.81	37.13	53.44	0.000320	6.61	8946.88	2518.74	0.24
E100-00-00_N034	28190.0	0.2%	42756.00	16.18	55.99	39.96	56.46	0.000247	6.32	19806.02	4112.93	0.22
E100-00-00_N034	28152.5		Bridge									
E100-00-00_N034	28113.0	10%	22904.00	16.28	46.65	34.43	47.41	0.000494	7.02	3264.96	190.56	0.30

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	28113.0	2%	29066.00	16.28	50.79	36.40	51.57	0.000420	7.11	4687.24	1183.63	0.27
E100-00-00_N034	28113.0	1%	31953.00	16.28	52.30	37.23	53.02	0.000371	6.98	7582.69	2255.77	0.26
E100-00-00_N034	28113.0	0.2%	42756.00	16.28	55.60	40.05	56.14	0.000282	6.68	17847.21	3923.96	0.23
E100-00-00_N034	27982.	10%	22904.00	16.25	46.50	34.63	47.33	0.000594	7.28	3146.90	192.50	0.32
E100-00-00_N034	27982.	2%	29066.00	16.25	50.74	36.63	51.49	0.000550	7.04	5207.62	1346.16	0.30
E100-00-00_N034	27982.	1%	31953.00	16.25	52.28	37.46	52.94	0.000455	6.77	7961.47	2120.53	0.27
E100-00-00_N034	27982.	0.2%	42756.00	16.25	55.60	40.30	56.07	0.000320	6.32	17601.77	3322.06	0.23
E100-00-00_N034	27429.0	10%	22904.00	16.12	46.25	34.64	47.00	0.000517	6.92	3309.61	200.39	0.30
E100-00-00_N034	27429.0	2%	29066.00	16.12	50.48	36.46	51.20	0.000482	6.84	4913.83	1112.51	0.28
E100-00-00_N034	27429.0	1%	31953.00	16.12	52.04	37.25	52.69	0.000459	6.62	7430.10	2147.46	0.27
E100-00-00_N034	27429.0	0.2%	42756.00	16.12	55.45	39.86	55.91	0.000314	6.13	16601.75	3130.32	0.23
E100-00-00_N034	26598.	10%	22904.00	15.35	45.89	33.55	46.56	0.000481	6.59	3474.16	210.11	0.29
E100-00-00_N034	26598.	2%	29066.00	15.35	50.17	35.32	50.78	0.000430	6.33	5446.42	833.87	0.26
E100-00-00_N034	26598.	1%	31953.00	15.35	51.76	36.10	52.30	0.000361	6.09	6926.38	1991.82	0.24
E100-00-00_N034	26598.	0.2%	42756.00	15.35	55.12	38.73	55.60	0.000294	6.12	11255.19	4889.00	0.23
E100-00-00_N034	26498.0	10%	22904.00	15.26	45.85	33.43	46.50	0.000465	6.47	3540.62	213.37	0.28
E100-00-00_N034	26498.0	2%	29066.00	15.26	50.07	35.17	50.72	0.000416	6.47	4493.71	699.20	0.26
E100-00-00_N034	26498.0	1%	31953.00	15.26	51.54	35.92	52.22	0.000401	6.59	4860.76	1420.51	0.26
E100-00-00_N034	26498.0	0.2%	42756.00	15.26	55.01	38.49	55.55	0.000305	6.39	10446.82	4921.48	0.23
E100-00-00_N034	26432.5		Bridge									
E100-00-00_N034	26366.0	10%	22904.00	15.16	45.64	33.32	46.30	0.000473	6.51	3516.83	212.70	0.28
E100-00-00_N034	26366.0	2%	29066.00	15.16	49.62	35.07	50.29	0.000437	6.59	4409.68	672.12	0.27
E100-00-00_N034	26366.0	1%	31953.00	15.16	50.90	35.82	51.61	0.000440	6.77	4719.60	856.05	0.27
E100-00-00_N034	26366.0	0.2%	42756.00	15.16	54.44	38.40	55.04	0.000338	6.64	9771.89	4711.48	0.24
E100-00-00_N034	26307.3	10%	22904.00	15.13	45.67	31.60	46.21	0.000404	5.93	3996.06	395.32	0.25
E100-00-00_N034	26307.3	2%	29066.00	15.13	49.70	33.44	50.16	0.000351	5.64	6424.41	847.84	0.23
E100-00-00_N034	26307.3	1%	31953.00	15.13	51.02	34.20	51.46	0.000313	5.58	7645.04	985.43	0.22
E100-00-00_N034	26307.3	0.2%	42756.00	15.13	54.52	36.81	54.93	0.000261	5.67	12266.33	4294.18	0.21
E100-00-00_N034	26225	10%	22904.00	15.04	45.65	31.24	46.18	0.000423	5.83	4017.52	376.99	0.25
E100-00-00_N034	26225	2%	29066.00	15.04	49.68	33.05	50.13	0.000355	5.56	6305.15	736.26	0.23
E100-00-00_N034	26225	1%	31953.00	15.04	50.99	33.84	51.43	0.000323	5.55	7347.57	867.76	0.22
E100-00-00_N034	26225	0.2%	42756.00	15.04	54.48	36.49	54.91	0.000276	5.71	11953.99	4383.13	0.21
E100-00-00_N034	26140.	10%	22904.00	14.97	45.47	33.19	46.13	0.000480	6.53	5883.85	428.19	0.29
E100-00-00_N034	26140.	2%	29066.00	14.97	49.50	35.04	50.09	0.000377	6.34	8955.87	1129.13	0.26
E100-00-00_N034	26140.	1%	31953.00	14.97	50.83	35.80	51.39	0.000338	6.28	10552.00	1271.99	0.25
E100-00-00_N034	26140.	0.2%	42756.00	14.97	54.38	38.40	54.88	0.000274	6.29	16553.12	4682.23	0.23
E100-00-00_N034	25536.0	10%	22904.00	14.48	45.16	33.12	45.83	0.000492	6.61	5679.91	563.67	0.29
E100-00-00_N034	25536.0	2%	29066.00	14.48	49.24	34.94	49.85	0.000407	6.43	8751.64	924.91	0.26
E100-00-00_N034	25536.0	1%	31953.00	14.48	50.57	35.73	51.18	0.000373	6.45	10161.36	1201.45	0.25
E100-00-00_N034	25536.0	0.2%	42756.00	14.48	54.15	38.34	54.71	0.000306	6.52	16168.67	4540.65	0.24
E100-00-00_N034	25132.	10%	22904.00	14.29	44.97	33.29	45.63	0.000489	6.61	3822.15	352.94	0.29
E100-00-00_N034	25132.	2%	29066.00	14.29	49.10	35.33	49.70	0.000340	6.39	5451.96	476.50	0.25
E100-00-00_N034	25132.	1%	31953.00	14.29	50.41	36.17	51.03	0.000326	6.53	6164.11	657.81	0.25
E100-00-00_N034	25132.	0.2%	42756.00	14.29	53.94	38.79	54.58	0.000293	6.87	10844.27	4451.68	0.25
E100-00-00_N034	24817.0	10%	22904.00	14.14	44.52	33.52	45.38	0.000777	7.43	3082.92	216.04	0.35
E100-00-00_N034	24817.0	2%	29066.00	14.14	48.71	35.48	49.50	0.000622	7.14	4107.31	378.70	0.31
E100-00-00_N034	24817.0	1%	31953.00	14.14	50.03	36.31	50.84	0.000579	7.25	4485.04	415.18	0.30
E100-00-00_N034	24817.0	0.2%	42756.00	14.14	53.33	39.36	54.34	0.000580	8.12	5485.38	3998.47	0.31
E100-00-00_N034	24789.0		Bridge									
E100-00-00_N034	24758.0	10%	22904.00	13.76	43.96	33.15	44.84	0.000788	7.54	3039.10	212.10	0.35
E100-00-00_N034	24758.0	2%	29066.00	13.76	48.17	35.10	48.98	0.000651	7.24	4036.50	364.78	0.32
E100-00-00_N034	24758.0	1%	31953.00	13.76	49.81	35.94	50.61	0.000570	7.21	4500.56	406.99	0.30
E100-00-00_N034	24758.0	0.2%	42756.00	13.76	52.67	38.98	53.72	0.000614	8.26	5359.52	1698.40	0.32
E100-00-00_N034	24636.	10%	22904.00	13.61	43.98		44.67	0.000526	6.71	3621.83	347.85	0.30
E100-00-00_N034	24636.	2%	29066.00	13.61	48.24		48.78	0.000425	6.12	5584.99	577.94	0.26
E100-00-00_N034	24636.	1%	31953.00	13.61	49.91		50.39	0.000368	5.88	6684.91	754.01	0.24
E100-00-00_N034	24636.	0.2%	42756.00	13.61	52.90		53.39	0.000331	6.15	10485.39	1704.13	0.23
E100-00-00_N034	23934.0	10%	22904.00	12.75	43.59		44.24	0.000671	6.45	3549.78	265.81	0.31
E100-00-00_N034	23934.0	2%	29066.00	12.75	47.89		48.46	0.000496	6.05	4926.12	466.66	0.27
E100-00-00_N034	23934.0	1%	31953.00	12.75	49.56		50.11	0.000431	5.97	5744.72	552.58	0.25
E100-00-00_N034	23934.0	0.2%	42756.00	12.75	52.44		53.10	0.000435	6.65	8566.64	1383.89	0.26
E100-00-00_N034	23550.0	10%	22904.00	12.77	43.45	30.55	43.99	0.000390	5.92	3868.12	238.24	0.26

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	23550.0	2%	29066.00	12.77	47.74	32.29	48.26	0.000405	5.82	4998.25	298.97	0.25
E100-00-00_N034	23550.0	1%	31953.00	12.77	49.42	33.04	49.94	0.000388	5.78	5604.10	456.81	0.24
E100-00-00_N034	23550.0	0.2%	42756.00	12.77	52.28	35.54	52.94	0.000407	6.56	7426.97	850.70	0.26
E100-00-00_N034	23506.5		Bridge									
E100-00-00_N034	23444.0	10%	22904.00	12.69	43.24	30.47	43.80	0.000397	5.97	3838.24	237.31	0.26
E100-00-00_N034	23444.0	2%	29066.00	12.69	47.52	32.22	48.06	0.000410	5.86	4958.77	296.69	0.25
E100-00-00_N034	23444.0	1%	31953.00	12.69	49.26	32.96	49.78	0.000394	5.81	5567.90	449.38	0.25
E100-00-00_N034	23444.0	0.2%	42756.00	12.69	52.12	35.46	52.79	0.000413	6.59	7358.94	847.08	0.26
E100-00-00_N034	23180.	10%	22904.00	12.46	42.95		43.64	0.000470	6.70	3521.46	307.59	0.29
E100-00-00_N034	23180.	2%	29066.00	12.46	47.36		47.95	0.000325	6.33	5889.94	839.19	0.25
E100-00-00_N034	23180.	1%	31953.00	12.46	49.17		49.70	0.000271	6.11	7704.53	1127.06	0.23
E100-00-00_N034	23180.	0.2%	42756.00	12.46	52.08		52.65	0.000270	6.62	11391.45	1489.11	0.23
E100-00-00_N034	22983.	10%	22904.00	12.29	42.60		43.51	0.000686	7.66	2989.57	195.21	0.35
E100-00-00_N034	22983.	2%	29066.00	12.29	47.16		47.86	0.000480	6.90	5415.61	786.55	0.29
E100-00-00_N034	22983.	1%	31953.00	12.29	49.04		49.63	0.000376	6.50	7139.24	1067.26	0.26
E100-00-00_N034	22983.	0.2%	42756.00	12.29	52.01		52.59	0.000342	6.80	11779.00	1808.23	0.25
E100-00-00_N034	22834.0	10%	22904.00	12.16	42.47	31.92	43.40	0.000631	7.75	2956.09	186.76	0.34
E100-00-00_N034	22834.0	2%	29066.00	12.16	46.96	33.87	47.76	0.000489	7.32	5190.64	965.61	0.30
E100-00-00_N034	22834.0	1%	31953.00	12.16	48.84	34.72	49.53	0.000411	6.99	7420.53	1424.02	0.27
E100-00-00_N034	22834.0	0.2%	42756.00	12.16	51.84	37.42	52.51	0.000367	7.24	12522.69	1847.60	0.26
E100-00-00_N034	22796.5		Bridge									
E100-00-00_N034	22758.0	10%	22904.00	12.11	42.24	31.87	43.20	0.000648	7.83	2923.45	182.86	0.35
E100-00-00_N034	22758.0	2%	29066.00	12.11	46.52	33.81	47.37	0.000532	7.52	4939.03	770.65	0.31
E100-00-00_N034	22758.0	1%	31953.00	12.11	48.77	34.66	49.47	0.000413	7.00	7399.38	1419.66	0.27
E100-00-00_N034	22758.0	0.2%	42756.00	12.11	51.71	37.37	52.39	0.000374	7.29	12364.60	1840.06	0.27
E100-00-00_N034	22610.	10%	22904.00	11.92	42.21		43.04	0.000635	7.35	3183.28	321.94	0.33
E100-00-00_N034	22610.	2%	29066.00	11.92	46.55		47.21	0.000433	6.76	5135.93	638.82	0.27
E100-00-00_N034	22610.	1%	31953.00	11.92	48.80		49.34	0.000320	6.26	7220.89	1253.15	0.24
E100-00-00_N034	22610.	0.2%	42756.00	11.92	51.74		52.26	0.000291	6.51	12642.33	2123.72	0.23
E100-00-00_N034	22224.0	10%	22904.00	11.41	42.22		42.67	0.000651	5.64	5335.73	632.40	0.27
E100-00-00_N034	22224.0	2%	29066.00	11.41	46.63		46.96	0.000348	5.00	8517.06	814.71	0.21
E100-00-00_N034	22224.0	1%	31953.00	11.41	48.86		49.15	0.000264	4.72	10712.05	1341.73	0.19
E100-00-00_N034	22224.0	0.2%	42756.00	11.41	51.79		52.10	0.000255	5.09	16416.44	2706.93	0.19
E100-00-00_N034	21444.0	10%	22904.00	10.52	41.30		42.13	0.000678	7.31	3131.93	205.33	0.33
E100-00-00_N034	21444.0	2%	29066.00	10.52	45.89		46.61	0.000503	6.87	4940.48	654.54	0.28
E100-00-00_N034	21444.0	1%	31953.00	10.52	48.31		48.89	0.000363	6.35	7161.78	1200.46	0.25
E100-00-00_N034	21444.0	0.2%	42756.00	10.52	51.24		51.85	0.000346	6.77	11559.70	1721.06	0.25
E100-00-00_N034	20746.0	10%	22904.00	10.00	40.81		41.66	0.000662	7.40	3093.11	202.21	0.33
E100-00-00_N034	20746.0	2%	29066.00	10.00	45.27		46.02	0.001707	6.94	4190.45	294.56	0.32
E100-00-00_N034	20746.0	1%	31953.00	10.00	47.80		48.42	0.001676	6.32	5642.21	1414.31	0.29
E100-00-00_N034	20746.0	0.2%	42756.00	10.00	50.96		51.41	0.001123	5.87	11265.71	1971.19	0.24
E100-00-00_N034	20644.0	10%	22904.00	9.95	40.78	29.94	41.56	0.000617	7.12	3448.45	557.67	0.32
E100-00-00_N034	20644.0	2%	29066.00	9.95	45.30	31.85	45.85	0.000361	6.25	6991.97	971.20	0.25
E100-00-00_N034	20644.0	1%	31953.00	9.95	47.85	32.63	48.26	0.000243	5.58	9891.31	1556.58	0.21
E100-00-00_N034	20644.0	0.2%	42756.00	9.95	50.95	35.39	51.33	0.000216	5.75	15479.86	1879.83	0.20
E100-00-00_N034	20633.0		Bridge									
E100-00-00_N034	20622.0	10%	22904.00	9.95	40.19		41.05	0.000696	7.43	3165.51	323.85	0.34
E100-00-00_N034	20622.0	2%	29066.00	9.95	45.17		45.73	0.000371	6.31	6853.84	967.75	0.25
E100-00-00_N034	20622.0	1%	31953.00	9.95	47.72		48.13	0.000250	5.63	9661.97	1484.31	0.21
E100-00-00_N034	20622.0	0.2%	42756.00	9.95	50.77		51.16	0.000225	5.83	15133.29	1875.24	0.21
E100-00-00_N034	20521.	10%	22904.00	9.91	40.07		40.96	0.000659	7.63	3219.76	548.29	0.34
E100-00-00_N034	20521.	2%	29066.00	9.91	45.05		45.68	0.000363	6.64	6329.67	811.29	0.26
E100-00-00_N034	20521.	1%	31953.00	9.91	47.59		48.08	0.000258	6.05	9049.71	1638.40	0.22
E100-00-00_N034	20521.	0.2%	42756.00	9.91	50.65		51.12	0.000237	6.32	14177.91	1723.25	0.22
E100-00-00_N034	19917.0	10%	22904.00	9.66	39.62		40.54	0.000744	7.72	3951.13	347.07	0.35
E100-00-00_N034	19917.0	2%	29066.00	9.66	44.60		45.39	0.000534	7.18	5913.11	424.17	0.30
E100-00-00_N034	19917.0	1%	31953.00	9.66	47.13		47.86	0.000431	6.88	7021.55	468.24	0.27
E100-00-00_N034	19917.0	0.2%	42756.00	9.66	49.91		50.87	0.000488	7.98	8954.47	911.30	0.29
E100-00-00_N034	19463.0	10%	22904.00	9.25	39.31		40.19	0.000735	7.67	6699.13	490.84	0.35
E100-00-00_N034	19463.0	2%	29066.00	9.25	44.39		45.13	0.000564	7.03	9477.33	703.27	0.30
E100-00-00_N034	19463.0	1%	31953.00	9.25	46.99		47.64	0.000415	6.63	11449.76	843.30	0.26
E100-00-00_N034	19463.0	0.2%	42756.00	9.25	49.77		50.61	0.000458	7.62	14678.18	1604.81	0.28

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	18377.	10%	22904.00	7.06	38.72	26.70	39.50	0.000517	7.09	3229.12	204.33	0.31
E100-00-00_N034	18377.	2%	29066.00	7.06	43.96	28.75	44.65	0.000330	6.69	4592.39	580.09	0.26
E100-00-00_N034	18377.	1%	31953.00	7.06	46.68	29.61	47.28	0.000249	6.32	6633.55	1207.12	0.23
E100-00-00_N034	18377.	0.2%	42756.00	7.06	49.46	32.43	50.21	0.000278	7.19	9070.26	1809.78	0.25
E100-00-00_N034	18234.0	10%	22904.00	6.77	38.81	27.73	39.34	0.000132	5.84	3924.54	265.56	0.26
E100-00-00_N034	18234.0	2%	29066.00	6.77	44.05	29.54	44.52	0.000102	5.46	5325.74	512.14	0.22
E100-00-00_N034	18234.0	1%	31953.00	6.77	46.77	30.27	47.14	0.000088	4.98	7163.00	883.04	0.21
E100-00-00_N034	18234.0	0.2%	42756.00	6.77	49.57	32.37	50.05	0.000106	5.67	9369.07	1475.85	0.22
E100-00-00_N034	18220.0		Bridge									
E100-00-00_N034	18199.0	10%	22904.00	6.70	38.42	27.67	38.97	0.000139	5.98	3833.30	263.05	0.27
E100-00-00_N034	18199.0	2%	29066.00	6.70	43.50	29.49	43.97	0.000110	5.50	5345.81	480.35	0.23
E100-00-00_N034	18199.0	1%	31953.00	6.70	45.36	30.22	45.81	0.000104	5.40	6314.38	560.08	0.23
E100-00-00_N034	18199.0	0.2%	42756.00	6.70	49.21	32.34	49.72	0.000111	5.78	9005.26	1414.45	0.22
E100-00-00_N034	18176.0	10%	22904.00	6.79	38.19	27.55	38.92	0.000586	6.82	3357.26	218.31	0.31
E100-00-00_N034	18176.0	2%	29066.00	6.79	43.29	29.34	43.92	0.000428	6.38	4595.24	539.47	0.26
E100-00-00_N034	18176.0	1%	31953.00	6.79	45.18	30.03	45.77	0.000363	6.22	6089.31	823.55	0.24
E100-00-00_N034	18176.0	0.2%	42756.00	6.79	49.08	32.43	49.68	0.000315	6.52	9444.11	1545.11	0.23
E100-00-00_N034	18138.0		Bridge									
E100-00-00_N034	18082.0	10%	22904.00	6.87	37.56	27.62	38.35	0.000657	7.15	3203.39	213.56	0.33
E100-00-00_N034	18082.0	2%	29066.00	6.87	41.87	29.42	42.62	0.000543	6.94	4194.04	279.63	0.29
E100-00-00_N034	18082.0	1%	31953.00	6.87	43.31	30.12	44.07	0.000519	7.01	4795.62	538.56	0.29
E100-00-00_N034	18082.0	0.2%	42756.00	6.87	46.71	32.50	47.56	0.000492	7.59	7268.60	1096.35	0.29
E100-00-00_N034	17905.	10%	22904.00	6.86	37.49		38.20	0.000615	6.79	3375.36	232.43	0.31
E100-00-00_N034	17905.	2%	29066.00	6.86	41.83		42.49	0.000445	6.53	5083.39	685.74	0.27
E100-00-00_N034	17905.	1%	31953.00	6.86	43.29		43.93	0.000402	6.54	6255.44	932.06	0.26
E100-00-00_N034	17905.	0.2%	42756.00	6.86	46.73		47.38	0.000355	6.84	10331.32	1437.03	0.25
E100-00-00_N034	17756.0	10%	22904.00	6.85	37.39	27.31	38.10	0.000708	6.75	3394.48	259.55	0.33
E100-00-00_N034	17756.0	2%	29066.00	6.85	41.80	29.06	42.37	0.000485	6.16	5343.34	875.43	0.27
E100-00-00_N034	17756.0	1%	31953.00	6.85	43.28	29.80	43.82	0.000415	6.05	6553.01	1071.76	0.26
E100-00-00_N034	17756.0	0.2%	42756.00	6.85	46.73	32.30	47.28	0.000357	6.33	9622.51	1576.70	0.24
E100-00-00_N034	17678.5		Bridge									
E100-00-00_N034	17597.0	10%	22904.00	6.35	36.09	26.81	36.89	0.000798	7.18	3191.79	247.95	0.35
E100-00-00_N034	17597.0	2%	29066.00	6.35	39.91	28.56	40.64	0.000678	6.85	4271.54	400.10	0.32
E100-00-00_N034	17597.0	1%	31953.00	6.35	41.77	29.30	42.45	0.000539	6.62	5193.50	613.71	0.29
E100-00-00_N034	17597.0	0.2%	42756.00	6.35	46.49	31.80	47.10	0.000367	6.48	8834.95	1195.01	0.25
E100-00-00_N034	17318.	10%	22904.00	6.35	35.71		36.64	0.000711	7.74	2958.11	199.37	0.35
E100-00-00_N034	17318.	2%	29066.00	6.35	39.46		40.39	0.000653	7.76	3747.21	223.14	0.33
E100-00-00_N034	17318.	1%	31953.00	6.35	41.30		42.21	0.000621	7.66	4171.84	237.62	0.32
E100-00-00_N034	17318.	0.2%	42756.00	6.35	45.88		46.86	0.000656	7.96	5845.74	498.57	0.31
E100-00-00_N034	16831.0	10%	23080.00	6.34	35.77	25.97	36.40	0.000174	6.39	3614.41	307.38	0.33
E100-00-00_N034	16831.0	2%	29077.00	6.34	39.60	27.51	40.14	0.000151	5.88	4945.01	392.16	0.29
E100-00-00_N034	16831.0	1%	31902.00	6.34	41.48	28.17	41.96	0.000139	5.57	5729.42	442.49	0.27
E100-00-00_N034	16831.0	0.2%	42290.00	6.34	46.15	30.37	46.57	0.000130	5.20	8138.00	856.45	0.25
E100-00-00_N034	15795.0	10%	23080.00	4.84	35.73		36.05	0.000378	4.54	5080.85	381.69	0.22
E100-00-00_N034	15795.0	2%	29077.00	4.84	39.55		39.85	0.000295	4.39	6641.66	470.25	0.20
E100-00-00_N034	15795.0	1%	31902.00	4.84	41.43		41.71	0.000255	4.28	7628.75	554.33	0.18
E100-00-00_N034	15795.0	0.2%	42290.00	4.84	46.08		46.36	0.000204	4.32	11068.14	865.30	0.17
E100-00-00_N034	15278.	10%	23080.00	4.41	35.13		35.84	0.000318	6.74	3423.79	223.76	0.30
E100-00-00_N034	15278.	2%	29077.00	4.41	38.96		39.67	0.000267	6.73	4361.64	333.02	0.28
E100-00-00_N034	15278.	1%	31902.00	4.41	40.87		41.54	0.000240	6.62	5164.18	618.15	0.26
E100-00-00_N034	15278.	0.2%	42290.00	4.41	45.61		46.22	0.000204	6.52	8458.86	911.34	0.24
E100-00-00_N034	14977.0	10%	23080.00	4.16	35.16	23.92	35.71	0.000102	5.95	3877.00	255.07	0.27
E100-00-00_N034	14977.0	2%	29077.00	4.16	39.00	25.55	39.55	0.000083	5.93	4908.55	394.47	0.25
E100-00-00_N034	14977.0	1%	31902.00	4.16	40.90	26.21	41.44	0.000073	5.86	5749.12	650.74	0.24
E100-00-00_N034	14977.0	0.2%	42290.00	4.16	45.61	28.40	46.17	0.000059	6.11	9433.86	1110.92	0.22
E100-00-00_N034	14937.0		Bridge									
E100-00-00_N034	14897.0	10%	23080.00	3.39	34.34	23.16	34.89	0.000103	5.97	3864.96	254.79	0.27
E100-00-00_N034	14897.0	2%	29077.00	3.39	38.77	24.77	39.28	0.000076	5.76	5053.20	364.79	0.24
E100-00-00_N034	14897.0	1%	31902.00	3.39	40.51	25.44	41.03	0.000069	5.75	5748.27	587.41	0.23
E100-00-00_N034	14897.0	0.2%	42290.00	3.39	44.79	27.62	45.36	0.000060	6.14	8878.82	818.81	0.22

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	14590.0	10%	23080.00	3.45	33.82	23.27	34.74	0.000168	7.70	2997.84	191.27	0.34
E100-00-00_N034	14590.0	2%	29077.00	3.45	38.29	25.14	39.15	0.000130	7.44	3909.49	239.52	0.31
E100-00-00_N034	14590.0	1%	31902.00	3.45	40.04	25.94	40.90	0.000119	7.42	4430.14	445.42	0.30
E100-00-00_N034	14590.0	0.2%	42290.00	3.45	44.29	28.60	45.23	0.000103	7.88	7628.27	982.59	0.29
E100-00-00_N034	14562.0		Bridge									
E100-00-00_N034	14532.0	10%	23080.00	3.41	33.70	23.23	34.63	0.000669	7.74	2981.80	190.80	0.35
E100-00-00_N034	14532.0	2%	29077.00	3.41	37.08	25.09	38.06	0.000651	7.94	3660.06	210.03	0.34
E100-00-00_N034	14532.0	1%	31902.00	3.41	38.91	25.90	39.88	0.000612	7.87	4074.62	348.56	0.32
E100-00-00_N034	14532.0	0.2%	42290.00	3.41	43.78	28.58	44.72	0.000468	7.94	7061.13	962.84	0.29
E100-00-00_N034	14354.0	10%	23080.00	3.29	33.95		34.31	0.000098	4.84	4764.94	467.27	0.21
E100-00-00_N034	14354.0	2%	29077.00	3.29	37.35		37.72	0.000106	4.84	6045.14	544.35	0.24
E100-00-00_N034	14354.0	1%	31902.00	3.29	39.20		39.52	0.000095	4.60	7108.64	610.99	0.22
E100-00-00_N034	14354.0	0.2%	42290.00	3.29	44.07		44.37	0.000082	4.43	10690.43	800.66	0.18
E100-00-00_N034	13924.0	10%	23080.00	3.18	33.46	22.38	34.14	0.000502	6.59	3500.74	313.57	0.29
E100-00-00_N034	13924.0	2%	29077.00	3.18	36.91	23.91	37.55	0.000432	6.56	4880.67	351.12	0.27
E100-00-00_N034	13924.0	1%	31902.00	3.18	38.75	24.61	39.37	0.000388	6.45	5545.39	369.36	0.25
E100-00-00_N034	13924.0	0.2%	42290.00	3.18	43.59	26.86	44.21	0.000352	6.59	7567.23	568.41	0.24
E100-00-00_N034	13909.5		Bridge									
E100-00-00_N034	13898.0	10%	23080.00	2.95	33.16	22.15	33.84	0.000508	6.62	3485.11	310.94	0.29
E100-00-00_N034	13898.0	2%	29077.00	2.95	36.63	23.68	37.29	0.000437	6.60	4836.92	349.14	0.27
E100-00-00_N034	13898.0	1%	31902.00	2.95	38.49	24.37	39.11	0.000392	6.48	5502.27	367.55	0.25
E100-00-00_N034	13898.0	0.2%	42290.00	2.95	43.34	26.63	43.97	0.000355	6.62	7486.79	551.49	0.24
E100-00-00_N034	13494.	10%	23080.00	2.47	33.00	22.08	33.54	0.000630	5.87	3934.84	388.16	0.27
E100-00-00_N034	13494.	2%	29077.00	2.47	36.58	23.72	36.98	0.000492	5.29	6065.72	428.43	0.23
E100-00-00_N034	13494.	1%	31902.00	2.47	38.45	24.37	38.82	0.000449	5.11	6890.88	453.51	0.21
E100-00-00_N034	13494.	0.2%	42290.00	2.47	43.34	26.42	43.70	0.000364	5.09	9571.95	674.94	0.19
E100-00-00_N034	13220.0	10%	23080.00	2.15	33.07	22.08	33.36	0.000100	4.29	5380.59	550.56	0.20
E100-00-00_N034	13220.0	2%	29077.00	2.15	36.60	23.31	36.86	0.000085	4.19	8006.33	655.25	0.18
E100-00-00_N034	13220.0	1%	31902.00	2.15	38.47	23.76	38.71	0.000077	4.10	9331.05	738.18	0.16
E100-00-00_N034	13220.0	0.2%	42290.00	2.15	43.37	25.19	43.60	0.000064	4.10	13751.86	1081.82	0.15
E100-00-00_N034	13182.5		Bridge									
E100-00-00_N034	13143.0	10%	23080.00	2.15	33.01	22.08	33.28	0.000098	4.20	5817.25	492.13	0.19
E100-00-00_N034	13143.0	2%	29077.00	2.15	36.54	23.31	36.81	0.000086	4.19	7651.61	558.70	0.18
E100-00-00_N034	13143.0	1%	31902.00	2.15	38.23	23.77	38.49	0.000080	4.16	8633.94	605.19	0.17
E100-00-00_N034	13143.0	0.2%	42290.00	2.15	43.20	25.20	43.46	0.000069	4.24	12641.39	1037.37	0.15
E100-00-00_N034	12698.	10%	23080.00	1.87	32.64		33.13	0.000383	5.64	4092.98	335.55	0.28
E100-00-00_N034	12698.	2%	29077.00	1.87	36.22		36.68	0.000306	5.44	5349.87	366.07	0.25
E100-00-00_N034	12698.	1%	31902.00	1.87	37.93		38.37	0.000279	5.33	5989.75	383.10	0.24
E100-00-00_N034	12698.	0.2%	42290.00	1.87	42.95		43.37	0.000210	5.22	8504.93	693.88	0.21
E100-00-00_N034	12066.0	10%	23080.00	1.47	32.56		32.85	0.000319	4.38	5270.08	371.67	0.20
E100-00-00_N034	12066.0	2%	29077.00	1.47	36.15		36.44	0.000301	4.34	6695.65	442.02	0.20
E100-00-00_N034	12066.0	1%	31902.00	1.47	37.87		38.15	0.000278	4.26	7484.98	472.40	0.19
E100-00-00_N034	12066.0	0.2%	42290.00	1.47	42.91		43.19	0.000217	4.22	10079.31	571.96	0.17
E100-00-00_N034	11546.0	10%	23080.00	0.90	32.51	20.83	32.76	0.000096	4.02	5842.20	557.00	0.20
E100-00-00_N034	11546.0	2%	29077.00	0.90	36.12	22.14	36.35	0.000081	3.84	8412.47	966.54	0.17
E100-00-00_N034	11546.0	1%	31902.00	0.90	37.86	22.69	38.06	0.000071	3.70	10110.15	991.55	0.16
E100-00-00_N034	11546.0	0.2%	42290.00	0.90	42.93	24.49	43.11	0.000055	3.49	16317.33	1574.84	0.13
E100-00-00_N034	11021.	10%	23080.00	0.63	32.49	20.24	32.70	0.000074	3.72	6573.28	714.23	0.17
E100-00-00_N034	11021.	2%	29077.00	0.63	36.10	21.64	36.30	0.000066	3.69	8478.35	864.09	0.15
E100-00-00_N034	11021.	1%	31902.00	0.63	37.83	22.18	38.03	0.000061	3.66	9437.49	970.47	0.15
E100-00-00_N034	11021.	0.2%	42290.00	0.63	42.89	23.82	43.08	0.000051	3.60	15854.68	1780.69	0.13
E100-00-00_N034	10908.0	10%	23080.00	0.57	32.49	20.34	32.68	0.000068	3.69	7809.41	851.18	0.17
E100-00-00_N034	10908.0	2%	29077.00	0.57	36.10	21.75	36.29	0.000059	3.64	10350.76	973.96	0.15
E100-00-00_N034	10908.0	1%	31902.00	0.57	37.83	22.33	38.01	0.000054	3.59	11822.78	1205.56	0.14
E100-00-00_N034	10908.0	0.2%	42290.00	0.57	42.90	24.05	43.06	0.000044	3.49	19046.59	1980.27	0.13
E100-00-00_N034	10852.5		Bridge									
E100-00-00_N034	10804.0	10%	23080.00	0.45	32.35	20.21	32.54	0.000068	3.67	7794.75	850.51	0.17
E100-00-00_N034	10804.0	2%	29077.00	0.45	35.96	21.63	36.14	0.000059	3.61	10334.65	973.32	0.15
E100-00-00_N034	10804.0	1%	31902.00	0.45	37.82	22.21	37.99	0.000053	3.53	11927.43	1226.05	0.14
E100-00-00_N034	10804.0	0.2%	42290.00	0.45	42.85	23.93	43.00	0.000043	3.43	19167.59	1981.94	0.12
E100-00-00_N034	10643.	10%	23080.00	0.14	31.91	18.52	32.42	0.000353	5.75	4141.03	359.25	0.25

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	10643.	2%	29077.00	0.14	35.54	20.22	36.03	0.000293	5.72	5529.53	580.54	0.23
E100-00-00_N034	10643.	1%	31902.00	0.14	37.43	20.95	37.89	0.000258	5.59	6319.46	678.25	0.22
E100-00-00_N034	10643.	0.2%	42290.00	0.14	42.53	23.37	42.92	0.000200	5.38	11565.78	2096.59	0.19
E100-00-00_N034	9779.0	10%	23080.00	-1.51	31.99	18.02	32.22	0.000075	3.88	6751.59	580.50	0.17
E100-00-00_N034	9779.0	2%	29077.00	-1.51	35.62	19.48	35.84	0.000067	3.87	8987.19	693.64	0.16
E100-00-00_N034	9779.0	1%	31902.00	-1.51	37.50	20.11	37.72	0.000062	3.82	10438.32	970.02	0.15
E100-00-00_N034	9779.0	0.2%	42290.00	-1.51	42.58	22.11	42.79	0.000053	3.83	17668.99	1803.70	0.13
E100-00-00_N034	8532.0	10%	23080.00	-1.76	32.07	17.26	32.11	0.000025	1.68	13755.32	850.06	0.07
E100-00-00_N034	8532.0	2%	29077.00	-1.76	35.70	17.80	35.75	0.000022	1.73	16991.67	1070.72	0.07
E100-00-00_N034	8532.0	1%	31902.00	-1.76	37.58	18.04	37.62	0.000020	1.73	18799.80	1187.28	0.07
E100-00-00_N034	8532.0	0.2%	42290.00	-1.76	42.65	18.85	42.70	0.000018	1.82	26970.11	2031.00	0.06
E100-00-00_N034	8140.	10%	23080.00	-2.43	32.04		32.09	0.000217	1.76	13830.96	1092.66	0.08
E100-00-00_N034	8140.	2%	29077.00	-2.43	35.68		35.73	0.000165	1.75	18387.14	1358.07	0.07
E100-00-00_N034	8140.	1%	31902.00	-2.43	37.56		37.61	0.000140	1.71	20978.36	1406.74	0.06
E100-00-00_N034	8140.	0.2%	42290.00	-2.43	42.65		42.69	0.000107	1.72	29636.73	2181.28	0.06
E100-00-00_N034	7649.0	10%	23080.00	-3.26	31.83	16.34	32.01	0.000048	3.53	11911.52	1352.09	0.14
E100-00-00_N034	7649.0	2%	29077.00	-3.26	35.50	17.72	35.66	0.000041	3.50	17086.60	1681.30	0.13
E100-00-00_N034	7649.0	1%	31902.00	-3.26	37.40	18.56	37.55	0.000036	3.40	20139.45	1736.95	0.12
E100-00-00_N034	7649.0	0.2%	42290.00	-3.26	42.51	20.54	42.64	0.000030	3.37	29155.17	2610.05	0.11
E100-00-00_N034	7608.5		Bridge									
E100-00-00_N034	7568.0	10%	23080.00	-3.15	31.73	16.46	31.91	0.000049	3.58	11627.87	1282.00	0.15
E100-00-00_N034	7568.0	2%	29077.00	-3.15	35.36	17.83	35.53	0.000042	3.55	16704.55	1625.33	0.13
E100-00-00_N034	7568.0	1%	31902.00	-3.15	37.27	18.67	37.43	0.000038	3.45	19760.42	1732.33	0.12
E100-00-00_N034	7568.0	0.2%	42290.00	-3.15	42.40	20.65	42.53	0.000031	3.41	28670.73	2433.97	0.11
E100-00-00_N034	7546.0	10%	23080.00	-3.16	31.73	16.32	31.90	0.000049	3.53	10529.87	1358.95	0.14
E100-00-00_N034	7546.0	2%	29077.00	-3.16	35.37	17.70	35.52	0.000040	3.42	16147.65	1685.67	0.13
E100-00-00_N034	7546.0	1%	31902.00	-3.16	37.28	18.55	37.42	0.000034	3.28	19379.85	1732.08	0.12
E100-00-00_N034	7546.0	0.2%	42290.00	-3.16	42.41	20.52	42.52	0.000028	3.21	28899.05	2689.40	0.10
E100-00-00_N034	7535.5		Bridge									
E100-00-00_N034	7529.0	10%	23080.00	-3.16	31.70	16.32	31.87	0.000049	3.54	10489.35	1357.84	0.14
E100-00-00_N034	7529.0	2%	29077.00	-3.16	35.31	17.69	35.47	0.000040	3.43	16058.53	1684.45	0.13
E100-00-00_N034	7529.0	1%	31902.00	-3.16	37.23	18.56	37.36	0.000035	3.29	19289.27	1729.23	0.12
E100-00-00_N034	7529.0	0.2%	42290.00	-3.16	42.35	20.51	42.47	0.000028	3.22	28777.34	2669.96	0.11
E100-00-00_N034	7353.	10%	23080.00	-3.18	31.66		31.86	0.000061	3.66	8560.15	1015.62	0.15
E100-00-00_N034	7353.	2%	29077.00	-3.18	35.25		35.45	0.000054	3.67	13120.84	1536.86	0.14
E100-00-00_N034	7353.	1%	31902.00	-3.18	37.17		37.34	0.000048	3.56	16343.54	1818.89	0.13
E100-00-00_N034	7353.	0.2%	42290.00	-3.18	42.31		42.46	0.000038	3.40	27715.14	2970.47	0.11
E100-00-00_N034	6975.0	10%	23080.00	-3.22	31.70	16.42	31.77	0.000047	2.23	10612.78	912.88	0.10
E100-00-00_N034	6975.0	2%	29077.00	-3.22	35.29	17.50	35.37	0.000042	2.25	14382.83	1016.94	0.09
E100-00-00_N034	6975.0	1%	31902.00	-3.22	37.20	17.84	37.28	0.000038	2.23	16333.33	1026.33	0.08
E100-00-00_N034	6975.0	0.2%	42290.00	-3.22	42.33	18.96	42.41	0.000034	2.31	22644.55	1581.32	0.08
E100-00-00_N034	6935.0		Bridge									
E100-00-00_N034	6898.0	10%	23080.00	-4.23	31.68	15.54	31.74	0.000042	2.10	11511.91	912.58	0.09
E100-00-00_N034	6898.0	2%	29077.00	-4.23	35.27	16.53	35.34	0.000039	2.15	14983.17	1016.83	0.08
E100-00-00_N034	6898.0	1%	31902.00	-4.23	37.18	16.87	37.25	0.000035	2.14	16933.85	1026.22	0.08
E100-00-00_N034	6898.0	0.2%	42290.00	-4.23	42.31	17.99	42.38	0.000033	2.24	23230.61	1580.45	0.07
E100-00-00_N034	6775.	10%	31339.00	-4.30	31.58	17.97	31.72	0.000077	2.96	10725.63	763.66	0.13
E100-00-00_N034	6775.	2%	40420.00	-4.30	35.17	18.92	35.31	0.000074	3.09	13680.25	860.12	0.12
E100-00-00_N034	6775.	1%	43720.00	-4.30	37.08	19.25	37.22	0.000066	3.02	15357.39	889.73	0.12
E100-00-00_N034	6775.	0.2%	53527.00	-4.30	42.24	20.14	42.36	0.000051	2.91	20261.90	1774.84	0.10
E100-00-00_N034	6473.0	10%	31339.00	-4.46	31.46	16.98	31.66	0.000288	3.54	8859.16	633.02	0.15
E100-00-00_N034	6473.0	2%	40420.00	-4.46	35.06	18.55	35.26	0.000245	3.65	12040.57	1136.61	0.14
E100-00-00_N034	6473.0	1%	43720.00	-4.46	37.00	18.91	37.18	0.000199	3.50	14033.18	1169.04	0.13
E100-00-00_N034	6473.0	0.2%	53527.00	-4.46	42.19	19.93	42.33	0.000125	3.19	19702.32	1979.87	0.11
E100-00-00_N034	6448.0		Bridge									
E100-00-00_N034	6423.0	10%	31339.00	-4.33	31.42	17.11	31.62	0.000296	3.57	8767.93	600.03	0.15
E100-00-00_N034	6423.0	2%	40420.00	-4.33	35.01	18.68	35.22	0.000253	3.69	11859.17	1134.44	0.15
E100-00-00_N034	6423.0	1%	43720.00	-4.33	36.96	19.04	37.14	0.000205	3.53	13853.29	1165.92	0.13
E100-00-00_N034	6423.0	0.2%	53527.00	-4.33	42.15	20.06	42.30	0.000128	3.22	19510.95	1943.41	0.11
E100-00-00_N034	6174.0	10%	31339.00	-4.69	31.36	17.84	31.55	0.000168	4.08	11524.13	943.97	0.16
E100-00-00_N034	6174.0	2%	40420.00	-4.69	34.96	19.61	35.15	0.000145	4.12	14646.03	1148.40	0.15

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	6174.0	1%	43720.00	-4.69	36.92	20.19	37.08	0.000115	3.88	17746.48	1171.82	0.14
E100-00-00_N034	6174.0	0.2%	53527.00	-4.69	42.13	20.91	42.26	0.000075	3.57	23984.68	1895.84	0.11
E100-00-00_N034	6128.0		Bridge									
E100-00-00_N034	6068.0	10%	31339.00	-3.96	31.31	18.52	31.51	0.000182	4.17	11298.23	939.45	0.17
E100-00-00_N034	6068.0	2%	40420.00	-3.96	34.91	20.25	35.11	0.000156	4.19	14417.41	1147.72	0.16
E100-00-00_N034	6068.0	1%	43720.00	-3.96	36.88	20.99	37.04	0.000122	3.93	17501.64	1171.30	0.14
E100-00-00_N034	6068.0	0.2%	53527.00	-3.96	42.09	22.64	42.22	0.000079	3.59	23747.62	1880.44	0.12
E100-00-00_N034	5525.0	10%	31339.00	-3.15	31.29	17.08	31.40	0.000113	2.66	11784.55	752.53	0.12
E100-00-00_N034	5525.0	2%	40420.00	-3.15	34.89	18.17	35.01	0.000098	2.78	14530.03	772.26	0.11
E100-00-00_N034	5525.0	1%	43720.00	-3.15	36.85	18.54	36.96	0.000085	2.72	16055.46	784.74	0.11
E100-00-00_N034	5525.0	0.2%	53527.00	-3.15	42.07	19.67	42.18	0.000061	2.65	20515.49	1751.39	0.09
E100-00-00_N034	4994.0	10%	31339.00	-3.09	31.06	15.86	31.28	0.000210	3.83	8793.09	613.39	0.15
E100-00-00_N034	4994.0	2%	40420.00	-3.09	34.65	17.10	34.90	0.000189	4.08	11060.96	648.31	0.15
E100-00-00_N034	4994.0	1%	43720.00	-3.09	36.63	17.52	36.87	0.000164	4.01	12361.21	667.49	0.14
E100-00-00_N034	4994.0	0.2%	53527.00	-3.09	41.88	18.71	42.10	0.000122	3.93	15997.05	1559.80	0.13
E100-00-00_N034	4980.0		Bridge									
E100-00-00_N034	4961.0	10%	31339.00	-3.03	30.65	15.92	30.89	0.000228	3.94	8508.89	608.59	0.16
E100-00-00_N034	4961.0	2%	40420.00	-3.03	34.46	17.16	34.71	0.000197	4.13	10895.14	645.83	0.15
E100-00-00_N034	4961.0	1%	43720.00	-3.03	36.53	17.58	36.77	0.000168	4.04	12254.49	665.94	0.14
E100-00-00_N034	4961.0	0.2%	53527.00	-3.03	41.83	18.76	42.06	0.000124	3.95	15921.92	1534.64	0.13
E100-00-00_N034	4812.0	10%	31339.00	-3.49	30.43	15.45	30.79	0.000724	4.87	6430.51	474.56	0.23
E100-00-00_N034	4812.0	2%	40420.00	-3.49	34.27	16.97	34.63	0.000630	4.84	8353.67	516.79	0.21
E100-00-00_N034	4812.0	1%	43720.00	-3.49	36.37	17.50	36.70	0.000533	4.62	9462.32	588.25	0.19
E100-00-00_N034	4812.0	0.2%	53527.00	-3.49	41.72	18.99	42.01	0.000376	4.29	12529.05	1247.46	0.16
E100-00-00_N034	4774.5		Bridge									
E100-00-00_N034	4687.0	10%	31339.00	-4.67	30.27	14.27	30.59	0.000635	4.52	6931.15	495.15	0.21
E100-00-00_N034	4687.0	2%	40420.00	-4.67	34.13	15.80	34.45	0.000534	4.54	8895.72	526.81	0.19
E100-00-00_N034	4687.0	1%	43720.00	-4.67	36.25	16.32	36.54	0.000455	4.36	10035.53	590.75	0.18
E100-00-00_N034	4687.0	0.2%	53527.00	-4.67	41.63	17.81	41.89	0.000319	4.08	13160.81	1223.47	0.15
E100-00-00_N034	4407.	10%	31339.00	-3.62	29.88	16.02	30.38	0.000518	5.64	5654.96	422.18	0.24
E100-00-00_N034	4407.	2%	40420.00	-3.62	33.77	18.21	34.26	0.000425	5.72	7927.78	1040.07	0.22
E100-00-00_N034	4407.	1%	43720.00	-3.62	36.00	18.87	36.40	0.000320	5.31	10077.14	1189.02	0.19
E100-00-00_N034	4407.	0.2%	53527.00	-3.62	41.57	20.48	41.82	0.000174	4.52	16101.13	1592.10	0.15
E100-00-00_N034	4014.0	10%	31339.00	-2.15	29.84	14.64	30.09	0.000344	4.05	7729.29	488.02	0.18
E100-00-00_N034	4014.0	2%	40420.00	-2.15	33.75	16.38	34.02	0.000290	4.15	10153.30	956.95	0.17
E100-00-00_N034	4014.0	1%	43720.00	-2.15	35.99	16.95	36.21	0.000224	3.90	12388.00	1008.72	0.15
E100-00-00_N034	4014.0	0.2%	53527.00	-2.15	41.55	18.47	41.72	0.000133	3.44	18081.83	1035.84	0.12
E100-00-00_N034	3997.0		Bridge									
E100-00-00_N034	3976.0	10%	31339.00	-2.40	29.54	14.39	29.80	0.000347	4.07	7706.31	487.78	0.18
E100-00-00_N034	3976.0	2%	40420.00	-2.40	33.46	16.14	33.72	0.000292	4.16	10112.05	952.48	0.17
E100-00-00_N034	3976.0	1%	43720.00	-2.40	35.70	16.70	35.93	0.000225	3.91	12354.21	1008.55	0.15
E100-00-00_N034	3976.0	0.2%	53527.00	-2.40	41.28	18.23	41.45	0.000133	3.45	18061.65	1035.75	0.12
E100-00-00_N034	3681.	10%	31339.00	-3.80	29.19		29.62	0.000539	5.27	5951.05	415.69	0.24
E100-00-00_N034	3681.	2%	40420.00	-3.80	33.15		33.57	0.000431	5.27	8466.81	1188.50	0.22
E100-00-00_N034	3681.	1%	43720.00	-3.80	35.48		35.82	0.000310	4.81	11459.71	1351.83	0.19
E100-00-00_N034	3681.	0.2%	53527.00	-3.80	41.20		41.40	0.000155	3.93	19807.77	1684.77	0.14
E100-00-00_N034	3585.0	10%	31339.00	-4.26	29.13		29.57	0.000447	5.34	5869.73	401.21	0.25
E100-00-00_N034	3585.0	2%	40420.00	-4.26	33.09		33.53	0.000376	5.33	8222.37	1136.84	0.23
E100-00-00_N034	3585.0	1%	43720.00	-4.26	35.41		35.79	0.000299	4.98	11182.20	1369.14	0.20
E100-00-00_N034	3585.0	0.2%	53527.00	-4.26	41.10		41.37	0.000187	4.38	19135.55	1427.50	0.16
E100-00-00_N034	2298.0	10%	31339.00	-6.21	28.59	13.51	28.98	0.000452	4.96	6412.53	549.49	0.21
E100-00-00_N034	2298.0	2%	40420.00	-6.21	32.66	15.32	33.05	0.000354	5.05	9925.25	934.28	0.19
E100-00-00_N034	2298.0	1%	43720.00	-6.21	35.07	15.93	35.41	0.000272	4.76	12360.15	1059.06	0.17
E100-00-00_N034	2298.0	0.2%	53527.00	-6.21	40.90	17.59	41.14	0.000161	4.24	20350.77	1945.90	0.14
E100-00-00_N034	1580.	10%	31339.00	-7.83	27.79	14.01	28.53	0.000725	6.94	4619.96	841.17	0.28
E100-00-00_N034	1580.	2%	40420.00	-7.83	32.40	16.37	32.79	0.000388	5.60	11839.12	1193.64	0.21
E100-00-00_N034	1580.	1%	43720.00	-7.83	34.92	17.07	35.21	0.000271	5.02	15309.40	1470.74	0.18
E100-00-00_N034	1580.	0.2%	53527.00	-7.83	40.85	18.97	41.02	0.000141	4.18	27130.20	2908.61	0.13
E100-00-00_N034	1353.0	10%	31339.00	-8.34	27.22	14.51	28.25	0.001124	8.14	3849.99	674.77	0.34
E100-00-00_N034	1353.0	2%	40420.00	-8.34	32.04	16.92	32.61	0.000598	6.75	9965.53	1342.16	0.25
E100-00-00_N034	1353.0	1%	43720.00	-8.34	34.64	17.70	35.09	0.000417	6.07	13135.36	1617.26	0.22

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	1353.0	0.2%	53527.00	-8.34	40.67	19.88	40.95	0.000225	5.17	23931.48	3032.73	0.16
E100-00-00_N034	1335.0		Bridge									
E100-00-00_N034	1319.0	10%	31339.00	-8.37	26.54	14.48	27.65	0.001231	8.44	3714.68	584.99	0.35
E100-00-00_N034	1319.0	2%	40420.00	-8.37	31.90	16.89	32.49	0.000607	6.77	9937.51	1420.19	0.26
E100-00-00_N034	1319.0	1%	43720.00	-8.37	34.44	17.67	34.89	0.000427	6.11	13041.32	1680.13	0.22
E100-00-00_N034	1319.0	0.2%	53527.00	-8.37	40.51	19.85	40.79	0.000227	5.17	23908.72	3093.73	0.16
E100-00-00_N034	984.0	10%	31339.00	-8.69	26.51	11.38	27.21	0.000453	6.73	4783.50	570.68	0.28
E100-00-00_N034	984.0	2%	40420.00	-8.69	31.80	13.69	32.31	0.000285	6.00	9739.44	744.51	0.23
E100-00-00_N034	984.0	1%	43720.00	-8.69	34.33	14.54	34.77	0.000232	5.67	11711.37	1068.53	0.21
E100-00-00_N034	984.0	0.2%	53527.00	-8.69	40.38	16.91	40.71	0.000141	5.09	24099.64	3206.94	0.17
E100-00-00_N034	961.5		Bridge									
E100-00-00_N034	851.0	10%	31339.00	-6.40	25.88	13.67	26.89	0.000767	8.08	3934.42	580.08	0.37
E100-00-00_N034	851.0	2%	40420.00	-6.40	31.58	15.98	32.17	0.000381	6.60	9410.96	796.39	0.26
E100-00-00_N034	851.0	1%	43720.00	-6.40	34.15	16.84	34.64	0.000293	6.09	11522.07	1037.06	0.23
E100-00-00_N034	851.0	0.2%	53527.00	-6.40	40.29	19.21	40.64	0.000175	5.35	23512.94	3089.03	0.18
E100-00-00_N034	654.0	10%	31339.00	-6.50	26.07	7.63	26.55	0.000210	5.53	5669.70	562.88	0.22
E100-00-00_N034	654.0	2%	40420.00	-6.50	31.65	9.99	32.01	0.000174	5.03	10884.11	690.74	0.19
E100-00-00_N034	654.0	1%	43720.00	-6.50	34.20	11.29	34.52	0.000144	4.78	13150.87	1291.06	0.17
E100-00-00_N034	654.0	0.2%	53527.00	-6.50	40.31	13.66	40.58	0.000090	4.42	25604.53	3037.78	0.14
E100-00-00_N034	400.0	10%	31339.00	-8.58	25.55	9.77	26.38	0.000313	7.32	4280.78	450.30	0.28
E100-00-00_N034	400.0	2%	40420.00	-8.58	31.23	13.44	31.88	0.000252	6.73	8525.59	535.55	0.24
E100-00-00_N034	400.0	1%	43720.00	-8.58	33.82	14.25	34.40	0.000217	6.43	10171.08	1141.07	0.22
E100-00-00_N034	400.0	0.2%	53527.00	-8.58	40.10	16.31	40.51	0.000130	5.66	24307.90	3352.52	0.18
E100-00-00_N034	381.0		Bridge									
E100-00-00_N034	365.0	10%	31339.00	-8.23	25.32	10.13	26.20	0.000336	7.53	4161.15	459.21	0.30
E100-00-00_N034	365.0	2%	40420.00	-8.23	31.16	13.79	31.82	0.000256	6.78	8281.67	548.88	0.25
E100-00-00_N034	365.0	1%	43720.00	-8.23	33.70	14.60	34.27	0.000220	6.44	9894.96	1067.57	0.23
E100-00-00_N034	365.0	0.2%	53527.00	-8.23	39.97	16.65	40.36	0.000131	5.63	23788.64	3335.14	0.18
E100-00-00_N034	210.0	10%	31339.00	-7.81	25.01	11.58	26.08	0.000411	8.32	3767.91	482.65	0.33
E100-00-00_N034	210.0	2%	40420.00	-7.81	30.87	13.81	31.72	0.000294	7.68	7656.19	915.11	0.27
E100-00-00_N034	210.0	1%	43720.00	-7.81	33.47	14.58	34.19	0.000243	7.22	9334.13	1008.61	0.25
E100-00-00_N034	210.0	0.2%	53527.00	-7.81	39.85	17.16	40.32	0.000142	6.22	23385.54	3346.10	0.19
E100-00-00_N034	191.0		Bridge									
E100-00-00_N034	173.0	10%	31339.00	-6.84	24.62	12.55	25.86	0.000498	8.91	3518.13	599.59	0.36
E100-00-00_N034	173.0	2%	40420.00	-6.84	30.47	14.78	31.47	0.000352	8.26	6854.52	1155.58	0.30
E100-00-00_N034	173.0	1%	43720.00	-6.84	33.17	15.55	34.01	0.000289	7.72	8619.50	1246.20	0.27
E100-00-00_N034	173.0	0.2%	53527.00	-6.84	39.69	18.13	40.20	0.000158	6.43	22525.73	3649.10	0.20
E100-00-00_N034	-442	10%	38619.00	-14.28	24.57	4.95	25.32	0.000466	7.18	6637.91	331.48	0.23
E100-00-00_N034	-442	2%	52430.00	-14.28	30.28	8.76	31.16	0.000445	7.90	8591.71	353.08	0.24
E100-00-00_N034	-442	1%	58803.00	-14.28	32.83	10.34	33.76	0.000432	8.15	9504.54	362.74	0.23
E100-00-00_N034	-442	0.2%	79988.00	-14.28	38.67	14.64	39.83	0.000459	9.26	15440.04	2226.80	0.25
E100-00-00_N034	-475		Bridge									
E100-00-00_N034	-508	10%	38619.00	-15.31	24.52	3.91	25.21	0.000413	6.91	6964.89	335.19	0.22
E100-00-00_N034	-508	2%	52430.00	-15.31	30.18	7.73	31.01	0.000404	7.66	8923.82	356.63	0.23
E100-00-00_N034	-508	1%	58803.00	-15.31	32.71	9.31	33.59	0.000395	7.92	9837.29	366.20	0.23
E100-00-00_N034	-508	0.2%	79988.00	-15.31	38.15	13.62	39.26	0.000435	9.08	16577.63	2242.61	0.24
E100-00-00_N034	-553.5	10%	38619.00	-16.48	24.30	4.35	25.15	0.000475	7.66	6491.70	320.66	0.24
E100-00-00_N034	-553.5	2%	52430.00	-16.48	29.91	7.77	30.93	0.000478	8.55	8314.02	328.86	0.24
E100-00-00_N034	-553.5	1%	58803.00	-16.48	32.41	9.17	33.50	0.000472	8.87	9143.04	332.53	0.25
E100-00-00_N034	-553.5	0.2%	79988.00	-16.48	37.58	13.64	39.08	0.000569	10.55	11550.53	2388.83	0.28
E100-00-00_N034	-598.5		Bridge									
E100-00-00_N034	-643.5	10%	38619.00	-16.89	23.96	3.94	24.80	0.000471	7.64	6514.48	320.76	0.24
E100-00-00_N034	-643.5	2%	52430.00	-16.89	29.49	7.36	30.52	0.000478	8.55	8311.80	328.85	0.24
E100-00-00_N034	-643.5	1%	58803.00	-16.89	31.71	8.76	32.82	0.000485	8.95	9044.70	332.10	0.25
E100-00-00_N034	-643.5	0.2%	79988.00	-16.89	37.19	13.23	38.67	0.000555	10.43	10888.41	2389.35	0.27
E100-00-00_N034	-874.7	10%	38619.00	-17.14	23.60	5.58	24.62	0.000684	8.28	5188.79	341.54	0.27
E100-00-00_N034	-874.7	2%	52430.00	-17.14	29.33	9.31	30.38	0.000596	8.70	7112.15	452.64	0.26
E100-00-00_N034	-874.7	1%	58803.00	-17.14	31.61	10.83	32.68	0.000565	8.84	7930.46	499.94	0.25
E100-00-00_N034	-874.7	0.2%	79988.00	-17.14	37.25	14.91	38.36	0.000531	9.40	13959.47	2387.94	0.25

HEC-RAS Plan: MP_RiskMAP16 River: E100-00-00 Reach: E100-00-00_N034 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_N034	-890.6		Bridge									
E100-00-00_N034	-906.5	10%	38619.00	-17.55	23.36	5.16	24.36	0.000668	8.22	5240.36	343.86	0.27
E100-00-00_N034	-906.5	2%	52430.00	-17.55	29.11	8.90	30.15	0.000582	8.63	7180.43	455.03	0.26
E100-00-00_N034	-906.5	1%	58803.00	-17.55	31.36	10.42	32.41	0.000555	8.78	7990.11	503.84	0.25
E100-00-00_N034	-906.5	0.2%	79988.00	-17.55	36.79	14.51	37.91	0.000534	9.42	13897.28	2378.87	0.25
E100-00-00_N034	-1428.4	10%	38619.00	-12.77	23.28	4.36	23.89	0.000430	6.29	6139.39	248.33	0.22
E100-00-00_N034	-1428.4	2%	52430.00	-12.77	29.01	7.01	29.74	0.000410	6.86	8443.20	509.18	0.22
E100-00-00_N034	-1428.4	1%	58803.00	-12.77	31.25	8.14	32.03	0.000400	7.11	9622.83	544.97	0.22
E100-00-00_N034	-1428.4	0.2%	79988.00	-12.77	36.61	11.56	37.59	0.000421	8.10	16065.54	2268.19	0.24
E100-00-00_N034	-1659.7	10%	38619.00	-14.06	23.24		23.78	0.000357	5.89	6587.64	272.18	0.20
E100-00-00_N034	-1659.7	2%	52430.00	-14.06	28.99		29.62	0.000342	6.42	10309.82	760.27	0.20
E100-00-00_N034	-1659.7	1%	58803.00	-14.06	31.25		31.91	0.000339	6.63	12108.70	836.70	0.21
E100-00-00_N034	-1659.7	0.2%	79988.00	-14.06	36.64		37.46	0.000356	7.48	19175.66	2231.62	0.22
E100-00-00_N034	-2814.3	10%	38739.00	-20.52	22.40	1.41	23.16	0.000676	7.01	5819.11	338.70	0.24
E100-00-00_N034	-2814.3	2%	52685.00	-20.52	28.11	4.56	29.02	0.000630	7.71	8051.70	395.57	0.24
E100-00-00_N034	-2814.3	1%	59086.00	-20.52	30.32	5.90	31.30	0.000625	8.04	8927.07	396.49	0.24
E100-00-00_N034	-2814.3	0.2%	80312.00	-20.52	35.45	9.97	36.76	0.000704	9.36	11013.03	1061.33	0.26
E100-00-00_N034	-2834.8		Bridge									
E100-00-00_N034	-2855.3	10%	38739.00	-20.19	22.22	1.74	23.02	0.000723	7.15	5651.90	323.56	0.25
E100-00-00_N034	-2855.3	2%	52685.00	-20.19	27.91	4.89	28.85	0.000668	7.86	7841.04	395.34	0.25
E100-00-00_N034	-2855.3	1%	59086.00	-20.19	30.11	6.23	31.12	0.000662	8.18	8710.62	396.26	0.25
E100-00-00_N034	-2855.3	0.2%	80312.00	-20.19	35.16	10.31	36.52	0.000745	9.53	10758.75	913.95	0.27
E100-00-00_N034	-3399.7	10%	38739.00	-16.70	22.06	0.76	22.66	0.000343	6.21	6419.95	247.65	0.20
E100-00-00_N034	-3399.7	2%	52685.00	-16.70	27.74	4.09	28.50	0.000363	7.03	7888.29	269.36	0.21
E100-00-00_N034	-3399.7	1%	59086.00	-16.70	29.93	5.19	30.77	0.000376	7.39	8487.36	277.73	0.22
E100-00-00_N034	-3399.7	0.2%	80312.00	-16.70	34.95	8.45	36.12	0.000447	8.75	10282.93	1028.34	0.24

Little White Oak Bayou M3 Effective Steady Model
10-Year, 50-Year, 100-Year and 500-Year

HEC-RAS Plan: Eff+LOMR MP River: E101-00-00 Reach: E101-00-00_0003

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	43743.00	10PCT_10yr	840.00	71.05	80.50	76.50	80.51	0.000143	1.19	2618.24	4200.94	0.09
E101-00-00_0003	43743.00	2PCT_50yr	1320.00	71.05	81.02	77.84	81.03	0.000125	1.17	3764.57	4484.09	0.08
E101-00-00_0003	43743.00	1PCT_100yr	1530.00	71.05	81.29	78.33	81.29	0.000109	1.13	4341.70	4576.41	0.08
E101-00-00_0003	43743.00	0.2PCT_500yr	2090.00	71.05	82.13	79.98	82.13	0.000067	0.96	6193.23	5186.42	0.06
E101-00-00_0003	43626.00	10PCT_10yr	840.00	71.47	80.49	76.64	80.49	0.000081	0.91	2967.24	4374.47	0.07
E101-00-00_0003	43626.00	2PCT_50yr	1320.00	71.47	81.01	79.07	81.02	0.000088	1.00	3910.33	4618.73	0.07
E101-00-00_0003	43626.00	1PCT_100yr	1530.00	71.47	81.27	79.27	81.28	0.000083	0.99	4387.18	4792.88	0.07
E101-00-00_0003	43626.00	0.2PCT_500yr	2090.00	71.47	82.12	79.45	82.12	0.000060	0.92	5918.13	5281.03	0.06
E101-00-00_0003	43602.00		Bridge									
E101-00-00_0003	43579.00	10PCT_10yr	840.00	71.47	80.48	76.65	80.48	0.000086	0.93	2909.93	4367.71	0.07
E101-00-00_0003	43579.00	2PCT_50yr	1320.00	71.47	81.00	79.16	81.01	0.000091	1.02	3857.51	4615.15	0.07
E101-00-00_0003	43579.00	1PCT_100yr	1530.00	71.47	81.27	79.27	81.27	0.000086	1.01	4337.15	4785.69	0.07
E101-00-00_0003	43579.00	0.2PCT_500yr	2090.00	71.47	82.11	79.45	82.12	0.000062	0.93	5874.70	5278.92	0.06
E101-00-00_0003	43547.00	10PCT_10yr	840.00	71.68	80.47	76.69	80.48	0.000094	0.98	2904.00	4503.89	0.07
E101-00-00_0003	43547.00	2PCT_50yr	1320.00	71.68	81.00	77.96	81.00	0.000097	1.05	3907.88	4722.17	0.07
E101-00-00_0003	43547.00	1PCT_100yr	1530.00	71.68	81.26	79.44	81.27	0.000090	1.03	4419.45	4807.54	0.07
E101-00-00_0003	43547.00	0.2PCT_500yr	2090.00	71.68	82.11	79.60	82.12	0.000062	0.93	6071.71	5512.69	0.06
E101-00-00_0003	43363.00	10PCT_10yr	880.00	71.32	80.43	76.65	80.45	0.000289	1.69	1788.44	4151.24	0.12
E101-00-00_0003	43363.00	2PCT_50yr	1340.00	71.32	80.96	77.86	80.97	0.000244	1.64	2674.63	4874.70	0.11
E101-00-00_0003	43363.00	1PCT_100yr	1570.00	71.32	81.23	78.38	81.24	0.000216	1.59	3129.21	5105.75	0.11
E101-00-00_0003	43363.00	0.2PCT_500yr	2210.00	71.32	82.09	80.03	82.10	0.000137	1.37	4601.66	5924.60	0.09
E101-00-00_0003	43257.00	10PCT_10yr	880.00	71.45	80.41	76.48	80.42	0.000162	1.28	2223.06	4738.32	0.09
E101-00-00_0003	43257.00	2PCT_50yr	1340.00	71.45	80.94	77.62	80.95	0.000155	1.33	3109.28	4973.44	0.09
E101-00-00_0003	43257.00	1PCT_100yr	1570.00	71.45	81.21	78.13	81.22	0.000144	1.31	3564.32	5279.97	0.09
E101-00-00_0003	43257.00	0.2PCT_500yr	2210.00	71.45	82.08	79.44	82.08	0.000102	1.19	5022.40	6063.71	0.08
E101-00-00_0003	43233.00		Bridge									
E101-00-00_0003	43207.00	10PCT_10yr	880.00	71.45	80.39	76.48	80.40	0.000169	1.30	2211.23	4727.62	0.09
E101-00-00_0003	43207.00	2PCT_50yr	1340.00	71.45	80.93	77.62	80.93	0.000157	1.33	3124.99	4965.05	0.09
E101-00-00_0003	43207.00	1PCT_100yr	1570.00	71.45	81.20	78.13	81.21	0.000145	1.31	3594.35	5211.11	0.09
E101-00-00_0003	43207.00	0.2PCT_500yr	2210.00	71.45	82.07	79.44	82.08	0.000100	1.19	5113.50	6059.87	0.08
E101-00-00_0003	42987.00	10PCT_10yr	970.00	71.10	80.35	76.27	80.36	0.000164	1.44	2257.87	5798.11	0.10
E101-00-00_0003	42987.00	2PCT_50yr	1400.00	71.10	80.89	77.34	80.90	0.000154	1.46	3050.46	6082.50	0.09
E101-00-00_0003	42987.00	1PCT_100yr	1650.00	71.10	81.16	77.90	81.17	0.000150	1.48	3460.68	6193.34	0.09
E101-00-00_0003	42987.00	0.2PCT_500yr	2500.00	71.10	82.04	79.60	82.05	0.000131	1.48	4779.90	6495.98	0.09
E101-00-00_0003	42896.00	10PCT_10yr	970.00	71.21	80.32	76.20	80.34	0.000270	1.81	1610.69	5772.39	0.12
E101-00-00_0003	42896.00	2PCT_50yr	1400.00	71.21	80.86	77.16	80.88	0.000259	1.87	2221.69	6019.67	0.12
E101-00-00_0003	42896.00	1PCT_100yr	1650.00	71.21	81.13	77.66	81.15	0.000253	1.90	2538.72	6202.06	0.12
E101-00-00_0003	42896.00	0.2PCT_500yr	2500.00	71.21	82.01	79.77	82.03	0.000223	1.92	3555.93	6456.68	0.12
E101-00-00_0003	42872.50		Bridge									
E101-00-00_0003	42847.00	10PCT_10yr	970.00	71.07	80.06	76.05	80.10	0.000395	2.17	1278.48	5663.49	0.15
E101-00-00_0003	42847.00	2PCT_50yr	1400.00	71.07	80.74	77.01	80.77	0.000313	2.06	1956.34	6036.69	0.14
E101-00-00_0003	42847.00	1PCT_100yr	1650.00	71.07	81.04	79.07	81.07	0.000301	2.08	2263.85	6235.79	0.13
E101-00-00_0003	42847.00	0.2PCT_500yr	2500.00	71.07	81.97	79.72	81.99	0.000259	2.08	3239.13	6473.24	0.13
E101-00-00_0003	42781.00	10PCT_10yr	970.00	70.25	79.76	75.71	79.99	0.001606	4.10	385.19	4807.35	0.29
E101-00-00_0003	42781.00	2PCT_50yr	1400.00	70.25	80.49	76.84	80.68	0.001393	4.11	728.12	6131.32	0.27
E101-00-00_0003	42781.00	1PCT_100yr	1650.00	70.25	80.81	77.41	80.99	0.001316	4.12	880.53	6254.76	0.27
E101-00-00_0003	42781.00	0.2PCT_500yr	2500.00	70.25	81.79	80.36	81.92	0.001091	4.08	1341.11	6589.08	0.25
E101-00-00_0003	42628.00	10PCT_10yr	970.00	69.85	79.46	75.40	79.72	0.001711	4.27	284.02	3659.33	0.31
E101-00-00_0003	42628.00	2PCT_50yr	1400.00	69.85	79.91	76.56	80.33	0.002553	5.45	363.16	5256.63	0.39
E101-00-00_0003	42628.00	1PCT_100yr	1650.00	69.85	80.04	77.21	80.58	0.003189	6.18	389.83	5589.65	0.43
E101-00-00_0003	42628.00	0.2PCT_500yr	2500.00	69.85	80.62	79.72	81.43	0.004613	7.87	552.28	6229.10	0.53
E101-00-00_0003	42611.00		Bridge									
E101-00-00_0003	42590.00	10PCT_10yr	970.00	69.59	79.00	75.15	79.31	0.001963	4.49	253.80	2898.23	0.33
E101-00-00_0003	42590.00	2PCT_50yr	1400.00	69.59	79.41	76.30	79.91	0.003065	5.81	319.76	4685.18	0.42
E101-00-00_0003	42590.00	1PCT_100yr	1650.00	69.59	79.61	76.87	80.21	0.003650	6.49	356.08	5184.67	0.46
E101-00-00_0003	42590.00	0.2PCT_500yr	2500.00	69.59	80.84	79.46	81.34	0.002919	6.55	787.27	6396.85	0.43
E101-00-00_0003	42569.00	10PCT_10yr	970.00	69.18	78.93	75.12	79.26	0.002281	4.67	250.04	2598.52	0.34
E101-00-00_0003	42569.00	2PCT_50yr	1400.00	69.18	79.27	76.40	79.82	0.003658	6.14	304.78	3446.06	0.43
E101-00-00_0003	42569.00	1PCT_100yr	1650.00	69.18	79.41	77.01	80.10	0.004556	6.96	328.96	4097.99	0.48
E101-00-00_0003	42569.00	0.2PCT_500yr	2500.00	69.18	79.63	79.59	80.98	0.008799	9.88	369.14	4804.46	0.67
E101-00-00_0003	42158.00	10PCT_10yr	1000.00	69.44	78.64	75.19	78.70	0.000679	2.67	1136.02	4126.12	0.19
E101-00-00_0003	42158.00	2PCT_50yr	1450.00	69.44	79.06	76.31	79.11	0.000689	2.81	1592.73	4807.07	0.19
E101-00-00_0003	42158.00	1PCT_100yr	1710.00	69.44	79.24	76.86	79.30	0.000713	2.91	1797.42	5017.75	0.20
E101-00-00_0003	42158.00	0.2PCT_500yr	2570.00	69.44	79.76	78.60	79.81	0.000784	3.20	2360.36	5394.00	0.21
E101-00-00_0003	41314.00	10PCT_10yr	1030.00	68.28	77.97	74.17	78.06	0.000820	3.00	1049.57	4032.04	0.21

HEC-RAS Plan: Eff+LOMR MP River: E101-00-00 Reach: E101-00-00_0003 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	41314.00	2PCT_50yr	1490.00	68.28	78.46	75.18	78.53	0.000666	2.84	1920.81	4790.35	0.19
E101-00-00_0003	41314.00	1PCT_100yr	1760.00	68.28	78.67	75.70	78.72	0.000619	2.79	2299.37	5377.81	0.18
E101-00-00_0003	41314.00	0.2PCT_500yr	2630.00	68.28	79.20	78.07	79.23	0.000560	2.78	3271.55	5818.52	0.18
E101-00-00_0003	40713.00	10PCT_10yr	1080.00	68.04	77.54	73.95	77.62	0.000652	2.78	1084.50	4438.97	0.21
E101-00-00_0003	40713.00	2PCT_50yr	1580.00	68.04	78.10	74.99	78.15	0.000545	2.68	1913.73	4808.58	0.19
E101-00-00_0003	40713.00	1PCT_100yr	1860.00	68.04	78.32	75.48	78.37	0.000528	2.70	2261.86	4819.48	0.19
E101-00-00_0003	40713.00	0.2PCT_500yr	2740.00	68.04	78.85	77.49	78.90	0.000524	2.84	3113.05	5146.39	0.19
E101-00-00_0003	39932.	10PCT_10yr	1080.00	65.72	76.80	72.53	76.96	0.001100	3.27	454.06	2880.71	0.25
E101-00-00_0003	39932.	2PCT_50yr	1580.00	65.72	77.27	73.48	77.48	0.001462	3.98	767.26	3675.43	0.29
E101-00-00_0003	39932.	1PCT_100yr	1860.00	65.72	77.43	73.94	77.67	0.001682	4.35	898.22	4014.73	0.31
E101-00-00_0003	39932.	0.2PCT_500yr	2740.00	65.72	77.71	75.27	78.08	0.002590	5.56	1160.29	4507.19	0.39
E101-00-00_0003	39831	10PCT_10yr	1080.00	65.14	76.56	71.81	76.81	0.001179	4.06	267.51	2826.42	0.26
E101-00-00_0003	39831	2PCT_50yr	1580.00	65.14	77.21	72.92	77.33	0.000763	3.24	1320.03	3954.26	0.21
E101-00-00_0003	39831	1PCT_100yr	1860.00	65.14	77.37	73.46	77.49	0.000852	3.47	1512.20	4253.04	0.22
E101-00-00_0003	39831	0.2PCT_500yr	2740.00	65.14	77.63	74.86	77.80	0.001302	4.39	1829.11	4481.71	0.27
E101-00-00_0003	39622.50		Culvert									
E101-00-00_0003	39477.00	10PCT_10yr	1130.00	63.41	74.57	70.06	74.89	0.002001	4.50	252.82	56.62	0.32
E101-00-00_0003	39477.00	2PCT_50yr	1670.00	63.41	75.43	71.36	75.93	0.002884	5.75	313.82	352.79	0.39
E101-00-00_0003	39477.00	1PCT_100yr	1960.00	63.41	75.63	71.96	76.28	0.003565	6.51	329.67	585.43	0.43
E101-00-00_0003	39477.00	0.2PCT_500yr	2860.00	63.41	76.12	73.54	77.27	0.005887	8.75	372.84	1468.14	0.56
E101-00-00_0003	39361.	10PCT_10yr	1130.00	63.30	74.58	69.97	74.64	0.000647	2.01	562.28	149.27	0.18
E101-00-00_0003	39361.	2PCT_50yr	1670.00	63.30	75.50	70.99	75.58	0.000664	2.34	830.43	624.59	0.19
E101-00-00_0003	39361.	1PCT_100yr	1960.00	63.30	75.75	71.39	75.84	0.000741	2.56	984.69	1181.96	0.20
E101-00-00_0003	39361.	0.2PCT_500yr	2860.00	63.30	76.42	72.33	76.55	0.000849	2.98	1601.90	2764.90	0.22
E101-00-00_0003	39016.00	10PCT_10yr	1130.00	62.98	74.04	69.07	74.31	0.001303	4.16	276.41	197.25	0.42
E101-00-00_0003	39016.00	2PCT_50yr	1670.00	62.98	75.02	70.37	75.25	0.001361	4.05	759.81	1637.73	0.40
E101-00-00_0003	39016.00	1PCT_100yr	1960.00	62.98	75.27	71.00	75.48	0.001412	4.09	1007.81	2167.12	0.39
E101-00-00_0003	39016.00	0.2PCT_500yr	2860.00	62.98	76.08	72.80	76.21	0.001088	3.60	1942.88	3259.52	0.31
E101-00-00_0003	38579.00	10PCT_10yr	1130.00	63.13	73.47	69.16	73.73	0.001365	4.14	350.69	297.41	0.30
E101-00-00_0003	38579.00	2PCT_50yr	1670.00	63.13	74.60	70.41	74.77	0.000952	3.85	1146.86	1322.59	0.26
E101-00-00_0003	38579.00	1PCT_100yr	1960.00	63.13	74.84	70.98	75.00	0.000977	3.99	1415.76	1673.78	0.26
E101-00-00_0003	38579.00	0.2PCT_500yr	2860.00	63.13	75.82	72.47	75.90	0.000592	3.38	2644.10	3360.96	0.21
E101-00-00_0003	38471.00	10PCT_10yr	1130.00	63.43	73.39	69.00	73.58	0.000908	3.52	320.79	243.80	0.26
E101-00-00_0003	38471.00	2PCT_50yr	1670.00	63.43	74.44	70.07	74.65	0.000943	3.87	579.39	1104.96	0.30
E101-00-00_0003	38471.00	1PCT_100yr	1960.00	63.43	74.59	70.57	74.86	0.001168	4.35	613.70	1266.44	0.33
E101-00-00_0003	38471.00	0.2PCT_500yr	2860.00	63.43	75.63	71.86	75.78	0.000960	3.65	1420.74	3932.94	0.29
E101-00-00_0003	38433.00		Bridge									
E101-00-00_0003	38394.00	10PCT_10yr	1130.00	64.09	73.32	69.63	73.55	0.001208	3.85	293.73	212.46	0.30
E101-00-00_0003	38394.00	2PCT_50yr	1670.00	64.09	73.88	70.67	74.29	0.001897	5.13	325.27	694.58	0.38
E101-00-00_0003	38394.00	1PCT_100yr	1960.00	64.09	74.05	71.15	74.58	0.002388	5.86	334.44	816.53	0.42
E101-00-00_0003	38394.00	0.2PCT_500yr	2860.00	64.09	74.86	72.40	75.23	0.002250	5.22	842.27	2075.79	0.47
E101-00-00_0003	38205.00	10PCT_10yr	1200.00	62.10	73.06	68.40	73.31	0.001148	4.15	379.37	383.75	0.29
E101-00-00_0003	38205.00	2PCT_50yr	1790.00	62.10	73.61	69.71	73.90	0.001406	4.81	792.41	1088.74	0.33
E101-00-00_0003	38205.00	1PCT_100yr	2090.00	62.10	73.76	70.28	74.07	0.001557	5.12	934.23	1182.41	0.34
E101-00-00_0003	38205.00	0.2PCT_500yr	3010.00	62.10	74.66	71.98	74.79	0.000854	4.07	1973.68	2316.16	0.26
E101-00-00_0003	38062.00	10PCT_10yr	1200.00	61.89	72.76	67.98	73.06	0.002255	4.84	476.42	658.54	0.35
E101-00-00_0003	38062.00	2PCT_50yr	1790.00	61.89	73.40	69.57	73.62	0.001880	4.73	985.00	993.76	0.32
E101-00-00_0003	38062.00	1PCT_100yr	2090.00	61.89	73.05	73.05	73.78	0.004417	6.99	684.99	812.40	0.49
E101-00-00_0003	38062.00	0.2PCT_500yr	3010.00	61.89	74.55	73.46	74.62	0.000891	3.62	2294.06	2274.12	0.23
E101-00-00_0003	38034.00		Bridge									
E101-00-00_0003	38013.00	10PCT_10yr	1200.00	62.22	72.69	68.31	73.05	0.002653	5.15	428.17	614.45	0.38
E101-00-00_0003	38013.00	2PCT_50yr	1790.00	62.22	73.37	69.87	73.61	0.002046	4.87	956.27	983.39	0.34
E101-00-00_0003	38013.00	1PCT_100yr	2090.00	62.22	73.54	71.13	73.77	0.002148	5.08	1114.47	1096.09	0.35
E101-00-00_0003	38013.00	0.2PCT_500yr	3010.00	62.22	74.43	73.47	74.52	0.001080	3.91	2126.02	2154.65	0.25
E101-00-00_0003	37966.00	10PCT_10yr	1200.00	61.75	72.73	68.55	72.87	0.001078	3.50	754.44	638.36	0.24
E101-00-00_0003	37966.00	2PCT_50yr	1790.00	61.75	73.37	69.86	73.48	0.000966	3.52	1393.21	1390.07	0.23
E101-00-00_0003	37966.00	1PCT_100yr	2090.00	61.75	73.53	71.19	73.64	0.001033	3.69	1602.56	1594.67	0.24
E101-00-00_0003	37966.00	0.2PCT_500yr	3010.00	61.75	74.41	72.34	74.46	0.000554	2.91	3068.05	2796.54	0.18
E101-00-00_0003	36718.00	10PCT_10yr	1258.00	60.99	70.46	66.57	70.89	0.002497	5.40	288.18	246.20	0.39
E101-00-00_0003	36718.00	2PCT_50yr	1886.00	60.99	72.18	68.20	72.32	0.000980	3.83	1575.75	1839.38	0.25
E101-00-00_0003	36718.00	1PCT_100yr	2206.00	60.99	73.06	68.87	73.09	0.000255	2.11	3757.54	2099.48	0.13
E101-00-00_0003	36718.00	0.2PCT_500yr	3137.00	60.99	74.16	72.04	74.17	0.000136	1.68	6229.26	2379.10	0.10
E101-00-00_0003	36142.00	10PCT_10yr	1258.00	58.93	67.72	65.89	68.56	0.007239	7.40	170.10	65.64	0.59
E101-00-00_0003	36142.00	2PCT_50yr	1886.00	58.93	71.01	67.26	71.43	0.002307	5.55	480.45	2019.61	0.36
E101-00-00_0003	36142.00	1PCT_100yr	2206.00	58.93	72.42	67.87	72.69	0.001314	4.70	721.46	3287.34	0.28
E101-00-00_0003	36142.00	0.2PCT_500yr	3137.00	58.93	74.12	70.40	74.12	0.000041	0.93	12348.23	4608.36	0.05

HEC-RAS Plan: Eff+LOMR MP River: E101-00-00 Reach: E101-00-00_0003 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	36083.00	10PCT_10yr	1258.00	59.75	66.81	65.69	68.23	0.001418	9.57	131.38	25.58	0.74
E101-00-00_0003	36083.00	2PCT_50yr	1886.00	59.75	70.14	67.41	71.19	0.000629	8.19	230.46	806.22	0.53
E101-00-00_0003	36083.00	1PCT_100yr	2206.00	59.75	71.34	67.99	72.40	0.000526	8.26	267.69	2272.19	0.49
E101-00-00_0003	36083.00	0.2PCT_500yr	3137.00	59.75	74.10	69.51	74.12	0.000028	2.16	11486.04	4160.75	0.12
E101-00-00_0003	36053.50		Bridge									
E101-00-00_0003	36024.00	10PCT_10yr	1258.00	59.75	65.69	65.69	67.95	0.002616	12.05	104.38	23.06	1.00
E101-00-00_0003	36024.00	2PCT_50yr	1886.00	59.75	67.34	67.34	69.94	0.002520	12.94	145.74	28.87	1.00
E101-00-00_0003	36024.00	1PCT_100yr	2206.00	59.75	67.94	67.94	70.79	0.002458	13.57	162.60	32.56	1.00
E101-00-00_0003	36024.00	0.2PCT_500yr	3137.00	59.75	69.50	69.50	73.04	0.002347	15.11	207.65	318.88	1.00
E101-00-00_0003	35953.	10PCT_10yr	1258.00	54.53	66.33		66.58	0.000216	4.01	313.36	42.06	0.26
E101-00-00_0003	35953.	2PCT_50yr	1886.00	54.53	67.26		67.70	0.000368	5.34	355.99	50.97	0.33
E101-00-00_0003	35953.	1PCT_100yr	2206.00	54.53	67.76		68.29	0.000430	5.89	382.64	56.26	0.35
E101-00-00_0003	35953.	0.2PCT_500yr	3137.00	54.53	69.69		70.27	0.000399	6.37	1140.83	982.18	0.34
E101-00-00_0003	35537.00	10PCT_10yr	1320.00	54.15	66.23	59.83	66.48	0.000224	4.06	325.34	43.06	0.26
E101-00-00_0003	35537.00	2PCT_50yr	1980.00	54.15	67.08	61.48	67.54	0.000411	5.47	368.50	60.34	0.34
E101-00-00_0003	35537.00	1PCT_100yr	2310.00	54.15	67.53	62.17	68.10	0.000508	6.03	401.18	78.53	0.36
E101-00-00_0003	35537.00	0.2PCT_500yr	3260.00	54.15	69.65	63.83	70.07	0.000356	5.70	2039.67	1920.97	0.31
E101-00-00_0003	35225.00	10PCT_10yr	1520.00	53.90	66.08	60.25	66.41	0.000203	4.61	329.37	45.09	0.30
E101-00-00_0003	35225.00	2PCT_50yr	2250.00	53.90	66.82	61.91	67.41	0.000332	6.20	363.91	51.61	0.39
E101-00-00_0003	35225.00	1PCT_100yr	2590.00	53.90	67.24	62.55	67.95	0.000369	6.76	387.29	60.84	0.41
E101-00-00_0003	35225.00	0.2PCT_500yr	3620.00	53.90	69.67	64.22	69.96	0.000153	5.17	3966.48	3295.98	0.28
E101-00-00_0003	34406.00	10PCT_10yr	1630.00	53.04	65.94	59.56	66.25	0.000171	4.47	365.64	52.81	0.28
E101-00-00_0003	34406.00	2PCT_50yr	2400.00	53.04	66.58	61.22	67.16	0.000286	6.08	399.19	174.63	0.37
E101-00-00_0003	34406.00	1PCT_100yr	2750.00	53.04	66.97	61.87	67.66	0.000323	6.66	427.28	816.10	0.39
E101-00-00_0003	34406.00	0.2PCT_500yr	3820.00	53.04	69.68	63.53	69.83	0.000085	4.07	6970.73	3879.51	0.21
E101-00-00_0003	34325.00	10PCT_10yr	1630.00	53.04	65.83	59.50	66.22	0.000208	4.97	329.57	42.54	0.30
E101-00-00_0003	34325.00	2PCT_50yr	2400.00	53.04	66.34	61.23	67.08	0.000372	6.91	352.14	136.68	0.40
E101-00-00_0003	34325.00	1PCT_100yr	2750.00	53.04	66.66	61.89	67.57	0.000436	7.64	368.03	443.60	0.44
E101-00-00_0003	34325.00	0.2PCT_500yr	3820.00	53.04	69.68	63.68	69.82	0.000090	4.18	7627.29	3753.97	0.21
E101-00-00_0003	34297.50		Bridge									
E101-00-00_0003	34266.00	10PCT_10yr	1630.00	52.98	65.68	59.38	66.10	0.000325	5.20	314.38	39.82	0.31
E101-00-00_0003	34266.00	2PCT_50yr	2400.00	52.98	65.91	61.21	66.77	0.000651	7.46	323.55	47.60	0.44
E101-00-00_0003	34266.00	1PCT_100yr	2750.00	52.98	66.02	61.92	67.13	0.000823	8.44	328.33	58.67	0.50
E101-00-00_0003	34266.00	0.2PCT_500yr	3820.00	52.98	66.48	63.78	68.40	0.001365	11.13	365.30	254.22	0.64
E101-00-00_0003	34234.00	10PCT_10yr	1630.00	52.91	65.72	59.43	66.05	0.000180	4.56	359.88	71.85	0.28
E101-00-00_0003	34234.00	2PCT_50yr	2400.00	52.91	66.00	61.10	66.65	0.000348	6.49	388.06	135.12	0.40
E101-00-00_0003	34234.00	1PCT_100yr	2750.00	52.91	66.14	61.74	66.97	0.000430	7.30	410.10	170.82	0.44
E101-00-00_0003	34234.00	0.2PCT_500yr	3820.00	52.91	66.76	63.43	68.07	0.000634	9.29	717.30	1297.10	0.55
E101-00-00_0003	33983.00	10PCT_10yr	1720.00	52.62	65.67	59.59	66.00	0.000176	4.64	495.08	415.98	0.29
E101-00-00_0003	33983.00	2PCT_50yr	2520.00	52.62	65.91	61.23	66.56	0.000339	6.56	618.85	628.13	0.40
E101-00-00_0003	33983.00	1PCT_100yr	2870.00	52.62	66.05	61.83	66.86	0.000407	7.28	718.39	750.54	0.44
E101-00-00_0003	33983.00	0.2PCT_500yr	3970.00	52.62	66.94	63.47	67.81	0.000435	8.05	2285.95	2323.27	0.46
E101-00-00_0003	33667.00	10PCT_10yr	1790.00	52.29	65.64	58.86	65.94	0.000141	4.44	633.62	701.91	0.26
E101-00-00_0003	33667.00	2PCT_50yr	2620.00	52.29	65.85	60.47	66.45	0.000273	6.27	833.56	1222.06	0.36
E101-00-00_0003	33667.00	1PCT_100yr	2970.00	52.29	66.01	61.06	66.71	0.000324	6.90	1045.31	1567.86	0.40
E101-00-00_0003	33667.00	0.2PCT_500yr	4090.00	52.29	67.05	62.72	67.60	0.000274	6.81	3586.12	2883.91	0.37
E101-00-00_0003	33575.00	10PCT_10yr	1790.00	52.22	65.67	57.81	65.89	0.000094	3.73	710.37	772.86	0.21
E101-00-00_0003	33575.00	2PCT_50yr	2620.00	52.22	65.92	59.33	66.34	0.000182	5.26	926.74	1487.48	0.30
E101-00-00_0003	33575.00	1PCT_100yr	2970.00	52.22	66.08	59.93	66.59	0.000217	5.81	1162.47	1938.09	0.33
E101-00-00_0003	33575.00	0.2PCT_500yr	4090.00	52.22	67.11	61.69	67.50	0.000185	5.74	4154.02	2967.14	0.31
E101-00-00_0003	33525.00		Culvert									
E101-00-00_0003	33473.00	10PCT_10yr	1790.00	52.04	65.19	57.63	65.42	0.000108	3.89	544.79	227.28	0.23
E101-00-00_0003	33473.00	2PCT_50yr	2620.00	52.04	65.85	59.16	66.27	0.000177	5.23	873.31	1047.15	0.30
E101-00-00_0003	33473.00	1PCT_100yr	2970.00	52.04	66.08	59.75	66.57	0.000206	5.72	1181.84	1677.76	0.32
E101-00-00_0003	33473.00	0.2PCT_500yr	4090.00	52.04	67.04	61.51	67.49	0.000201	6.00	3617.81	2846.83	0.32
E101-00-00_0003	33424.00	10PCT_10yr	1910.00	51.91	64.99	58.93	65.37	0.000187	4.95	530.69	645.54	0.30
E101-00-00_0003	33424.00	2PCT_50yr	2780.00	51.91	65.59	60.56	66.20	0.000287	6.42	1247.51	1983.50	0.38
E101-00-00_0003	33424.00	1PCT_100yr	3140.00	51.91	65.89	61.15	66.52	0.000297	6.67	1885.43	2209.34	0.39
E101-00-00_0003	33424.00	0.2PCT_500yr	4300.00	51.91	67.06	62.80	67.45	0.000213	6.11	4565.32	2757.65	0.33
E101-00-00_0003	33031.00	10PCT_10yr	2020.00	52.07	64.77	59.47	65.27	0.000285	5.68	586.86	703.44	0.36
E101-00-00_0003	33031.00	2PCT_50yr	2940.00	52.07	65.16	61.23	66.03	0.000487	7.66	885.21	855.51	0.47
E101-00-00_0003	33031.00	1PCT_100yr	3310.00	52.07	65.28	61.83	66.32	0.000575	8.40	996.12	977.46	0.51
E101-00-00_0003	33031.00	0.2PCT_500yr	4500.00	52.07	65.70	63.52	67.20	0.000820	10.37	1591.86	1703.77	0.62
E101-00-00_0003	32678.00	10PCT_10yr	2100.00	51.18	64.77	58.58	65.15	0.000191	5.07	916.82	1176.75	0.30
E101-00-00_0003	32678.00	2PCT_50yr	3050.00	51.18	65.18	60.33	65.83	0.000316	6.72	1541.03	1837.88	0.39

HEC-RAS Plan: Eff+LOMR MP River: E101-00-00 Reach: E101-00-00_0003 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	32678.00	1PCT_100yr	3410.00	51.18	65.35	60.89	66.07	0.000355	7.20	1862.30	2087.77	0.41
E101-00-00_0003	32678.00	0.2PCT_500yr	4630.00	51.18	66.08	62.59	66.78	0.000367	7.70	3732.16	2886.14	0.42
E101-00-00_0003	32570.00	10PCT_10yr	2100.00	51.02	64.80	58.40	65.08	0.000193	4.44	1324.17	1616.18	0.27
E101-00-00_0003	32570.00	2PCT_50yr	3050.00	51.02	65.27	60.10	65.68	0.000282	5.57	2243.06	2363.90	0.33
E101-00-00_0003	32570.00	1PCT_100yr	3410.00	51.02	65.45	60.67	65.89	0.000304	5.86	2711.30	2826.09	0.34
E101-00-00_0003	32570.00	0.2PCT_500yr	4630.00	51.02	66.22	62.43	66.57	0.000272	5.85	4843.96	3102.05	0.33
E101-00-00_0003	32553.00		Bridge									
E101-00-00_0003	32536.00	10PCT_10yr	2100.00	50.93	64.48	58.31	64.81	0.000229	4.74	980.36	1399.38	0.29
E101-00-00_0003	32536.00	2PCT_50yr	3050.00	50.93	65.16	60.01	65.60	0.000295	5.69	2217.20	2342.55	0.34
E101-00-00_0003	32536.00	1PCT_100yr	3410.00	50.93	65.33	60.57	65.81	0.000327	6.06	2629.51	2806.02	0.36
E101-00-00_0003	32536.00	0.2PCT_500yr	4630.00	50.93	65.83	62.33	66.35	0.000380	6.77	4098.73	3078.87	0.39
E101-00-00_0003	32450.00	10PCT_10yr	2270.00	50.82	64.27		64.75	0.000253	5.70	863.56	898.05	0.35
E101-00-00_0003	32450.00	2PCT_50yr	3280.00	50.82	64.75		65.48	0.000384	7.29	1720.34	2731.40	0.43
E101-00-00_0003	32450.00	1PCT_100yr	3650.00	50.82	64.97		65.70	0.000391	7.48	2363.27	2985.56	0.44
E101-00-00_0003	32450.00	0.2PCT_500yr	4910.00	50.82	65.71		66.29	0.000351	7.47	4714.96	3423.23	0.42
E101-00-00_0003	31975.00	10PCT_10yr	2680.00	50.84	64.15	59.57	64.62	0.000282	5.94	1704.89	1744.06	0.36
E101-00-00_0003	31975.00	2PCT_50yr	3827.00	50.84	64.72	61.38	65.25	0.000338	6.80	3126.28	3153.33	0.40
E101-00-00_0003	31975.00	1PCT_100yr	4199.00	50.84	65.01	61.87	65.44	0.000299	6.53	4072.26	3590.40	0.38
E101-00-00_0003	31975.00	0.2PCT_500yr	5565.00	50.84	65.80	65.02	66.07	0.000220	5.92	7115.78	3831.05	0.33
E101-00-00_0003	30984.00	10PCT_10yr	2860.00	50.16	63.89	59.32	64.35	0.000268	5.98	1874.62	1521.19	0.35
E101-00-00_0003	30984.00	2PCT_50yr	4020.00	50.16	63.94	61.08	64.81	0.000510	8.28	1942.25	1604.14	0.49
E101-00-00_0003	30984.00	1PCT_100yr	4450.00	50.16	64.32	61.79	65.07	0.000453	8.02	2716.94	2784.99	0.46
E101-00-00_0003	30984.00	0.2PCT_500yr	5950.00	50.16	65.52	64.69	65.85	0.000253	6.51	6671.96	4638.54	0.35
E101-00-00_0003	30651.00	10PCT_10yr	2860.00	49.29	63.88	58.54	64.25	0.000197	5.37	2085.53	1700.14	0.31
E101-00-00_0003	30651.00	2PCT_50yr	4020.00	49.29	63.91	60.33	64.61	0.000381	7.49	2126.70	1780.76	0.43
E101-00-00_0003	30651.00	1PCT_100yr	4450.00	49.29	64.19	61.06	64.92	0.000396	7.78	2557.27	2481.41	0.44
E101-00-00_0003	30651.00	0.2PCT_500yr	5950.00	49.29	65.31	63.96	65.75	0.000278	7.01	5745.28	4588.09	0.37
E101-00-00_0003	30580.00	10PCT_10yr	2860.00	49.34	63.92	58.59	64.18	0.000196	4.69	2360.83	2012.20	0.27
E101-00-00_0003	30580.00	2PCT_50yr	4020.00	49.34	63.99	60.21	64.48	0.000367	6.45	2473.90	2155.62	0.37
E101-00-00_0003	30580.00	1PCT_100yr	4450.00	49.34	64.29	60.71	64.77	0.000357	6.50	3088.10	3262.19	0.37
E101-00-00_0003	30580.00	0.2PCT_500yr	5950.00	49.34	65.37	63.55	65.65	0.000245	5.77	6417.61	4472.32	0.31
E101-00-00_0003	30552.00		Bridge									
E101-00-00_0003	30522.00	10PCT_10yr	2860.00	49.39	63.70	58.64	64.02	0.000234	5.03	1981.95	1553.36	0.29
E101-00-00_0003	30522.00	2PCT_50yr	4020.00	49.39	63.94	60.26	64.47	0.000395	6.64	2318.02	1955.80	0.38
E101-00-00_0003	30522.00	1PCT_100yr	4450.00	49.39	64.25	60.73	64.76	0.000383	6.69	2879.80	3044.70	0.38
E101-00-00_0003	30522.00	0.2PCT_500yr	5950.00	49.39	64.86	63.64	65.37	0.000409	7.20	4597.97	4298.90	0.40
E101-00-00_0003	30466.00	10PCT_10yr	3150.00	49.40	63.57	58.66	63.98	0.000231	5.74	2351.05	1872.41	0.33
E101-00-00_0003	30466.00	2PCT_50yr	4340.00	49.40	63.71	60.42	64.40	0.000394	7.56	2620.36	2259.32	0.44
E101-00-00_0003	30466.00	1PCT_100yr	4860.00	49.40	63.99	62.72	64.68	0.000400	7.77	3263.35	2873.79	0.44
E101-00-00_0003	30466.00	0.2PCT_500yr	6610.00	49.40	64.75	64.27	65.33	0.000374	7.91	5647.38	4335.72	0.43
E101-00-00_0003	29665.00	10PCT_10yr	3540.00	48.60	63.52	59.02	63.80	0.000172	5.22	3775.18	2866.93	0.29
E101-00-00_0003	29665.00	2PCT_50yr	4750.00	48.60	63.66	60.62	64.09	0.000268	6.59	4195.69	3066.96	0.37
E101-00-00_0003	29665.00	1PCT_100yr	5400.00	48.60	63.97	63.26	64.36	0.000256	6.57	5151.99	3736.95	0.36
E101-00-00_0003	29665.00	0.2PCT_500yr	7480.00	48.60	64.74	63.86	65.04	0.000235	6.61	8057.87	4555.36	0.35
E101-00-00_0003	28715.00	10PCT_10yr	3570.00	47.50	63.43	57.90	63.63	0.000116	4.52	4775.50	4465.68	0.24
E101-00-00_0003	28715.00	2PCT_50yr	4770.00	47.50	63.51	59.51	63.83	0.000194	5.87	4992.66	4583.02	0.31
E101-00-00_0003	28715.00	1PCT_100yr	5430.00	47.50	63.81	60.45	64.11	0.000190	5.92	5917.27	5093.98	0.31
E101-00-00_0003	28715.00	0.2PCT_500yr	7530.00	47.50	64.54	63.41	64.82	0.000196	6.26	8150.94	6447.19	0.32
E101-00-00_0003	28652.00	10PCT_10yr	3740.00	47.53	63.45	58.04	63.59	0.000194	4.03	4363.52	4630.65	0.21
E101-00-00_0003	28652.00	2PCT_50yr	4950.00	47.53	63.54	62.36	63.76	0.000310	5.12	4607.52	4781.34	0.27
E101-00-00_0003	28652.00	1PCT_100yr	5670.00	47.53	63.85	62.66	64.04	0.000293	5.07	5440.12	5064.99	0.26
E101-00-00_0003	28652.00	0.2PCT_500yr	7920.00	47.53	64.58	63.32	64.74	0.000283	5.19	7462.56	6695.66	0.26
E101-00-00_0003	28639.50		Bridge									
E101-00-00_0003	28627.00	10PCT_10yr	3740.00	47.53	61.51	58.04	62.59	0.001158	8.64	780.53	785.60	0.51
E101-00-00_0003	28627.00	2PCT_50yr	4950.00	47.53	63.30	62.36	63.59	0.000403	5.75	3958.95	4288.26	0.31
E101-00-00_0003	28627.00	1PCT_100yr	5670.00	47.53	63.65	62.65	63.89	0.000360	5.55	4913.22	4880.10	0.29
E101-00-00_0003	28627.00	0.2PCT_500yr	7920.00	47.53	64.44	63.32	64.62	0.000323	5.50	7059.59	6368.49	0.28
E101-00-00_0003	28589.00	10PCT_10yr	3740.00	47.44	61.51	58.71	62.52	0.000545	8.59	1392.40	1568.61	0.52
E101-00-00_0003	28589.00	2PCT_50yr	4950.00	47.44	63.23	61.91	63.56	0.000218	6.13	4816.44	3672.09	0.34
E101-00-00_0003	28589.00	1PCT_100yr	5670.00	47.44	63.56	62.40	63.86	0.000207	6.11	5670.61	4615.68	0.33
E101-00-00_0003	28589.00	0.2PCT_500yr	7920.00	47.44	64.30	63.23	64.58	0.000213	6.48	7562.12	6032.73	0.34
E101-00-00_0003	28271.00	10PCT_10yr	3950.00	47.60	60.39	58.37	62.21	0.001022	10.95	560.36	441.36	0.68
E101-00-00_0003	28271.00	2PCT_50yr	5160.00	47.60	62.34	62.32	63.39	0.000546	9.25	2884.73	2304.09	0.52
E101-00-00_0003	28271.00	1PCT_100yr	5950.00	47.60	62.65	62.65	63.69	0.000562	9.58	3595.31	2510.01	0.53
E101-00-00_0003	28271.00	0.2PCT_500yr	8380.00	47.60	63.67	63.36	64.43	0.000476	9.38	6171.15	4806.47	0.49

HEC-RAS Plan: Eff+LOMR MP River: E101-00-00 Reach: E101-00-00_0003 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	27838.00	10PCT_10yr	4138.00	46.88	59.53	58.19	61.68	0.001298	11.88	480.02	267.40	0.76
E101-00-00_0003	27838.00	2PCT_50yr	5349.00	46.88	62.40	61.75	63.10	0.000383	7.98	3599.38	2121.69	0.43
E101-00-00_0003	27838.00	1PCT_100yr	6200.00	46.88	62.48	62.11	63.36	0.000485	9.03	3748.25	2154.12	0.49
E101-00-00_0003	27838.00	0.2PCT_500yr	8806.00	46.88	62.92	62.92	64.16	0.000710	11.23	4587.67	2608.62	0.60
E101-00-00_0003	27692.00	10PCT_10yr	4138.00	46.76	59.75	57.67	61.14	0.000844	9.46	438.58	309.78	0.71
E101-00-00_0003	27692.00	2PCT_50yr	5349.00	46.76	62.56	59.42	62.85	0.000202	5.31	4516.71	2589.69	0.33
E101-00-00_0003	27692.00	1PCT_100yr	6200.00	46.76	62.68	61.23	63.03	0.000246	5.91	4788.20	2751.24	0.36
E101-00-00_0003	27692.00	0.2PCT_500yr	8806.00	46.76	63.21	62.10	63.67	0.000341	7.13	5942.00	3513.77	0.42
E101-00-00_0003	27650.50		Bridge									
E101-00-00_0003	27600.00	10PCT_10yr	4138.00	46.62	58.24	57.58	60.59	0.001669	12.29	336.73	58.11	0.90
E101-00-00_0003	27600.00	2PCT_50yr	5349.00	46.62	60.65	60.65	61.95	0.000777	9.55	1284.50	1230.60	0.67
E101-00-00_0003	27600.00	1PCT_100yr	6200.00	46.62	61.19	61.19	62.32	0.000704	9.33	2031.01	1515.16	0.63
E101-00-00_0003	27600.00	0.2PCT_500yr	8806.00	46.62	62.10	61.95	63.14	0.000704	9.77	3477.41	2101.37	0.62
E101-00-00_0003	27458.00	10PCT_10yr	4470.00	43.09	58.75	54.24	59.87	0.000452	8.50	589.96	316.80	0.47
E101-00-00_0003	27458.00	2PCT_50yr	5720.00	43.09	59.49	55.70	61.00	0.000567	9.99	824.23	685.75	0.54
E101-00-00_0003	27458.00	1PCT_100yr	6580.00	43.09	59.79	56.60	61.62	0.000667	11.04	989.92	895.83	0.59
E101-00-00_0003	27458.00	0.2PCT_500yr	9280.00	43.09	62.06	60.67	63.05	0.000383	9.47	4552.34	2027.28	0.46
E101-00-00_0003	27090.00	10PCT_10yr	4470.00	42.79	58.82	54.03	59.63	0.000347	7.61	1271.22	509.22	0.42
E101-00-00_0003	27090.00	2PCT_50yr	5720.00	42.79	59.73	55.63	60.66	0.000376	8.37	1790.52	770.71	0.44
E101-00-00_0003	27090.00	1PCT_100yr	6580.00	42.79	60.15	56.51	61.19	0.000414	9.00	2098.29	1003.75	0.46
E101-00-00_0003	27090.00	0.2PCT_500yr	9280.00	42.79	62.15	59.60	62.83	0.000286	8.31	5674.76	2701.21	0.40
E101-00-00_0003	26937.00	10PCT_10yr	4470.00	42.64	58.77	53.03	59.57	0.000304	7.29	741.64	449.37	0.39
E101-00-00_0003	26937.00	2PCT_50yr	5720.00	42.64	59.53	54.46	60.56	0.000369	8.41	1113.11	955.68	0.44
E101-00-00_0003	26937.00	1PCT_100yr	6580.00	42.64	59.83	55.32	61.06	0.000430	9.24	1302.18	1167.92	0.48
E101-00-00_0003	26937.00	0.2PCT_500yr	9280.00	42.64	60.51	57.73	62.41	0.000643	11.73	1768.09	1519.52	0.59
E101-00-00_0003	26909.00		Bridge									
E101-00-00_0003	26884.00	10PCT_10yr	4470.00	42.61	58.53	53.00	59.39	0.000329	7.48	678.50	282.05	0.41
E101-00-00_0003	26884.00	2PCT_50yr	5720.00	42.61	59.49	54.42	60.54	0.000374	8.45	1068.81	904.55	0.44
E101-00-00_0003	26884.00	1PCT_100yr	6580.00	42.61	59.79	55.30	61.04	0.000435	9.29	1254.55	1081.90	0.48
E101-00-00_0003	26884.00	0.2PCT_500yr	9280.00	42.61	61.01	57.70	62.40	0.000481	10.43	2834.62	1648.88	0.51
E101-00-00_0003	26602.00	10PCT_10yr	4470.00	42.77	58.06	53.70	59.20	0.000476	8.59	573.26	365.25	0.49
E101-00-00_0003	26602.00	2PCT_50yr	5720.00	42.77	59.20	55.14	60.39	0.000461	9.10	961.84	984.96	0.49
E101-00-00_0003	26602.00	1PCT_100yr	6580.00	42.77	59.67	56.03	60.91	0.000478	9.55	1246.83	1353.77	0.50
E101-00-00_0003	26602.00	0.2PCT_500yr	9280.00	42.77	61.09	60.50	62.08	0.000408	9.53	3061.67	2276.27	0.47
E101-00-00_0003	26304.00	10PCT_10yr	4770.00	42.57	58.04	53.36	59.02	0.000405	8.17	893.42	880.80	0.45
E101-00-00_0003	26304.00	2PCT_50yr	6060.00	42.57	59.25	54.80	60.20	0.000370	8.42	1874.00	1544.56	0.44
E101-00-00_0003	26304.00	1PCT_100yr	6920.00	42.57	59.74	55.66	60.71	0.000375	8.72	2353.03	1691.07	0.45
E101-00-00_0003	26304.00	0.2PCT_500yr	9700.00	42.57	61.29	58.63	61.86	0.000260	7.87	5518.46	3125.01	0.38
E101-00-00_0003	26180.00	10PCT_10yr	4770.00	42.13	58.20	53.28	58.71	0.000771	6.03	1344.28	929.75	0.35
E101-00-00_0003	26180.00	2PCT_50yr	6060.00	42.13	59.45	54.41	59.87	0.000615	5.87	2402.10	1420.16	0.32
E101-00-00_0003	26180.00	1PCT_100yr	6920.00	42.13	59.96	55.16	60.38	0.000593	5.96	2964.87	1673.60	0.32
E101-00-00_0003	26180.00	0.2PCT_500yr	9700.00	42.13	61.42	58.34	61.65	0.000375	5.16	6211.89	3086.71	0.26
E101-00-00_0003	26140.50		Bridge									
E101-00-00_0003	26097.00	10PCT_10yr	4770.00	42.13	58.15	53.28	58.68	0.000791	6.09	1317.67	915.64	0.36
E101-00-00_0003	26097.00	2PCT_50yr	6060.00	42.13	59.41	54.41	59.85	0.000625	5.91	2380.87	1407.95	0.33
E101-00-00_0003	26097.00	1PCT_100yr	6920.00	42.13	59.94	55.16	60.36	0.000596	5.97	2960.66	1665.21	0.32
E101-00-00_0003	26097.00	0.2PCT_500yr	9700.00	42.13	60.62	58.35	61.28	0.000895	7.62	3880.43	2238.50	0.40
E101-00-00_0003	26016.00	10PCT_10yr	4770.00	41.84	57.26	53.22	58.43	0.000487	8.85	826.09	712.07	0.49
E101-00-00_0003	26016.00	2PCT_50yr	6060.00	41.84	58.32	54.64	59.56	0.000482	9.43	1692.78	1391.27	0.50
E101-00-00_0003	26016.00	1PCT_100yr	6920.00	41.84	58.77	55.63	60.05	0.000496	9.82	2165.07	1646.07	0.51
E101-00-00_0003	26016.00	0.2PCT_500yr	9700.00	41.84	60.36	59.44	61.18	0.000355	9.05	5575.67	2975.02	0.44
E101-00-00_0003	25769.00	10PCT_10yr	4770.00	41.64	56.95	53.23	58.29	0.000570	9.36	702.53	668.07	0.53
E101-00-00_0003	25769.00	2PCT_50yr	6060.00	41.64	58.31	54.66	59.41	0.000452	9.10	2295.77	1647.18	0.48
E101-00-00_0003	25769.00	1PCT_100yr	6920.00	41.64	58.84	55.65	59.86	0.000430	9.15	3065.05	2162.17	0.47
E101-00-00_0003	25769.00	0.2PCT_500yr	9700.00	41.64	60.32	59.31	61.07	0.000343	8.85	6240.76	3484.36	0.43
E101-00-00_0003	25306.00	10PCT_10yr	4890.00	37.12	57.26	49.52	57.69	0.000959	5.45	1412.10	1404.63	0.31
E101-00-00_0003	25306.00	2PCT_50yr	6190.00	37.12	58.76	51.04	58.94	0.000471	4.21	4521.89	3196.74	0.22
E101-00-00_0003	25306.00	1PCT_100yr	7050.00	37.12	59.29	51.92	59.43	0.000400	4.00	5629.58	3559.17	0.21
E101-00-00_0003	25306.00	0.2PCT_500yr	9860.00	37.12	60.69	54.96	60.76	0.000250	3.41	10362.43	4188.70	0.17
E101-00-00_0003	25182.00	10PCT_10yr	4890.00	36.20	57.31	43.83	57.57	0.000133	4.11	1797.29	1691.73	0.18
E101-00-00_0003	25182.00	2PCT_50yr	6190.00	36.20	58.72	44.96	58.91	0.000110	3.96	5144.21	2889.21	0.17
E101-00-00_0003	25182.00	1PCT_100yr	7050.00	36.20	59.21	45.66	59.40	0.000113	4.07	6204.44	3110.09	0.17
E101-00-00_0003	25182.00	0.2PCT_500yr	9860.00	36.20	60.55	47.77	60.72	0.000113	4.27	9650.87	4288.04	0.17
E101-00-00_0003	25137.00		Culvert									
E101-00-00_0003	25087.00	10PCT_10yr	4890.00	36.20	57.00	44.09	57.28	0.000146	4.25	1497.17	1640.30	0.19

HEC-RAS Plan: Eff+LOMR MP River: E101-00-00 Reach: E101-00-00_0003 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	25087.00	2PCT_50yr	6190.00	36.20	58.70	45.27	58.89	0.000112	3.98	5041.29	2876.07	0.17
E101-00-00_0003	25087.00	1PCT_100yr	7050.00	36.20	59.18	46.01	59.38	0.000114	4.10	6056.10	3097.75	0.17
E101-00-00_0003	25087.00	0.2PCT_500yr	9860.00	36.20	60.53	48.25	60.69	0.000110	4.22	9998.51	4281.57	0.17
E101-00-00_0003	24940.00	10PCT_10yr	5150.00	37.72	56.16	49.81	57.06	0.000274	7.70	807.32	606.51	0.38
E101-00-00_0003	24940.00	2PCT_50yr	6475.00	37.72	58.13	51.26	58.75	0.000186	6.98	3641.89	2243.87	0.32
E101-00-00_0003	24940.00	1PCT_100yr	7339.00	37.72	58.66	52.08	59.24	0.000181	7.05	4602.62	2966.27	0.32
E101-00-00_0003	24940.00	0.2PCT_500yr	10210.00	37.72	60.15	54.59	60.59	0.000156	6.97	8556.03	3994.76	0.30
E101-00-00_0003	24854.00	10PCT_10yr	5150.00	37.82	56.43	48.87	56.75	0.000229	4.55	1134.79	1457.02	0.26
E101-00-00_0003	24854.00	2PCT_50yr	6475.00	37.82	58.35	49.95	58.50	0.000112	3.59	5815.28	3157.46	0.19
E101-00-00_0003	24854.00	1PCT_100yr	7339.00	37.82	58.86	50.58	59.01	0.000107	3.62	6951.57	3384.42	0.18
E101-00-00_0003	24854.00	0.2PCT_500yr	10210.00	37.82	60.30	52.55	60.41	0.000092	3.61	11358.00	4373.35	0.17
E101-00-00_0003	24808.00		Bridge									
E101-00-00_0003	24761.00	10PCT_10yr	5150.00	37.82	56.22	48.87	56.56	0.000246	4.65	1109.61	1301.23	0.27
E101-00-00_0003	24761.00	2PCT_50yr	6475.00	37.82	58.24	49.95	58.40	0.000122	3.73	5376.82	3021.02	0.19
E101-00-00_0003	24761.00	1PCT_100yr	7339.00	37.82	58.78	50.58	58.94	0.000115	3.73	6539.54	3342.13	0.19
E101-00-00_0003	24761.00	0.2PCT_500yr	10210.00	37.82	60.23	52.55	60.36	0.000100	3.76	10576.09	4358.25	0.18
E101-00-00_0003	24693.00	10PCT_10yr	5150.00	37.57	55.38	49.91	56.35	0.000328	8.07	793.63	300.27	0.41
E101-00-00_0003	24693.00	2PCT_50yr	6475.00	37.57	57.49	51.32	58.22	0.000228	7.51	2827.90	1823.15	0.35
E101-00-00_0003	24693.00	1PCT_100yr	7339.00	37.57	58.08	52.11	58.77	0.000218	7.55	3872.27	2825.49	0.35
E101-00-00_0003	24693.00	0.2PCT_500yr	10210.00	37.57	59.82	54.78	60.26	0.000160	6.96	8353.99	4291.85	0.30
E101-00-00_0003	24176.00	10PCT_10yr	5570.00	36.76	55.51	47.91	56.11	0.000193	6.31	1129.93	346.35	0.34
E101-00-00_0003	24176.00	2PCT_50yr	7020.00	36.76	57.53	49.35	58.07	0.000161	6.19	2974.44	1694.20	0.31
E101-00-00_0003	24176.00	1PCT_100yr	7860.00	36.76	58.10	50.12	58.63	0.000160	6.29	3834.60	2503.11	0.30
E101-00-00_0003	24176.00	0.2PCT_500yr	10800.00	36.76	59.75	53.07	60.18	0.000143	6.26	7969.52	4279.82	0.29
E101-00-00_0003	23475.00	10PCT_10yr	5570.00	36.00	55.07	48.52	55.78	0.002182	6.80	928.07	457.53	0.43
E101-00-00_0003	23475.00	2PCT_50yr	7020.00	36.00	57.49	50.04	57.78	0.000799	4.93	3257.70	2117.90	0.27
E101-00-00_0003	23475.00	1PCT_100yr	7860.00	36.00	58.12	51.25	58.34	0.000632	4.56	5000.93	3423.23	0.24
E101-00-00_0003	23475.00	0.2PCT_500yr	10800.00	36.00	59.84	54.11	59.93	0.000335	3.67	9048.07	4795.51	0.18
E101-00-00_0003	23015.00	10PCT_10yr	5570.00	35.70	54.64	48.41	55.50	0.000262	7.73	1180.87	605.33	0.38
E101-00-00_0003	23015.00	2PCT_50yr	7020.00	35.70	57.08	49.89	57.62	0.000158	6.72	4331.93	2499.01	0.30
E101-00-00_0003	23015.00	1PCT_100yr	7860.00	35.70	57.71	50.74	58.19	0.000146	6.64	5533.04	3434.87	0.29
E101-00-00_0003	23015.00	0.2PCT_500yr	10800.00	35.70	59.45	53.53	59.83	0.000125	6.57	8908.57	5215.81	0.27
E101-00-00_0003	22928.00	10PCT_10yr	5800.00	35.40	54.84	47.36	55.24	0.000224	5.16	1374.51	601.81	0.28
E101-00-00_0003	22928.00	2PCT_50yr	7310.00	35.40	57.20	48.56	57.47	0.000131	4.52	4698.79	2578.61	0.22
E101-00-00_0003	22928.00	1PCT_100yr	8130.00	35.40	57.82	49.15	58.06	0.000121	4.49	5850.58	3170.71	0.22
E101-00-00_0003	22928.00	0.2PCT_500yr	11110.00	35.40	59.52	51.08	59.73	0.000107	4.55	9155.00	5299.70	0.21
E101-00-00_0003	22902.50		Bridge									
E101-00-00_0003	22873.00	10PCT_10yr	5800.00	35.28	54.29	47.24	54.74	0.000260	5.41	1216.70	276.21	0.30
E101-00-00_0003	22873.00	2PCT_50yr	7310.00	35.28	57.03	48.44	57.30	0.000134	4.57	4571.30	2521.90	0.22
E101-00-00_0003	22873.00	1PCT_100yr	8130.00	35.28	57.76	49.02	58.00	0.000119	4.45	5894.06	3351.90	0.21
E101-00-00_0003	22873.00	0.2PCT_500yr	11110.00	35.28	59.42	50.97	59.64	0.000107	4.55	9024.30	5308.83	0.21
E101-00-00_0003	22815.00	10PCT_10yr	5800.00	35.11	53.71	47.64	54.59	0.000304	7.61	961.28	268.85	0.40
E101-00-00_0003	22815.00	2PCT_50yr	7310.00	35.11	56.65	49.09	57.21	0.000162	6.51	3770.61	2168.92	0.31
E101-00-00_0003	22815.00	1PCT_100yr	8130.00	35.11	57.46	49.79	57.92	0.000138	6.23	5164.32	3045.35	0.28
E101-00-00_0003	22815.00	0.2PCT_500yr	11110.00	35.11	59.18	52.04	59.57	0.000122	6.30	8224.60	4820.43	0.27
E101-00-00_0003	22303.00	10PCT_10yr	5980.00	33.80	54.02	44.10	54.35	0.000089	4.61	1296.67	137.33	0.25
E101-00-00_0003	22303.00	2PCT_50yr	7540.00	33.80	56.79	45.36	57.08	0.000069	4.37	3119.08	3187.78	0.22
E101-00-00_0003	22303.00	1PCT_100yr	8350.00	33.80	57.54	45.96	57.82	0.000066	4.39	4243.41	4116.43	0.21
E101-00-00_0003	22303.00	0.2PCT_500yr	11370.00	33.80	59.19	47.92	59.50	0.000071	4.83	6810.58	6125.70	0.22
E101-00-00_0003	21808.00	10PCT_10yr	6413.00	32.31	54.02	43.25	54.29	0.000080	4.15	1545.48	233.64	0.28
E101-00-00_0003	21808.00	2PCT_50yr	8098.00	32.31	56.83	44.58	57.02	0.000059	3.56	3344.26	1908.69	0.20
E101-00-00_0003	21808.00	1PCT_100yr	8871.00	32.31	57.58	45.14	57.76	0.000058	3.55	4036.53	4089.80	0.20
E101-00-00_0003	21808.00	0.2PCT_500yr	11947.00	32.31	59.22	47.11	59.44	0.000066	3.92	5691.25	6554.87	0.20
E101-00-00_0003	20818.00	10PCT_10yr	6413.00	27.89	54.05	41.56	54.13	0.000134	2.31	2773.59	250.69	0.11
E101-00-00_0003	20818.00	2PCT_50yr	8098.00	27.89	56.82	42.30	56.91	0.000109	2.36	3894.21	2063.95	0.10
E101-00-00_0003	20818.00	1PCT_100yr	8871.00	27.89	57.57	42.61	57.66	0.000109	2.44	4246.01	3517.81	0.11
E101-00-00_0003	20818.00	0.2PCT_500yr	11947.00	27.89	59.20	43.77	59.32	0.000138	2.91	5017.31	6597.70	0.12
E101-00-00_0003	20705.00	10PCT_10yr	6530.00	30.52	53.92	40.36	54.09	0.000283	3.25	2015.81	297.68	0.16
E101-00-00_0003	20705.00	2PCT_50yr	8250.00	30.52	56.69	41.57	56.86	0.000234	3.32	2516.05	1891.51	0.15
E101-00-00_0003	20705.00	1PCT_100yr	9050.00	30.52	57.42	42.09	57.61	0.000239	3.46	2649.73	2821.50	0.15
E101-00-00_0003	20705.00	0.2PCT_500yr	12210.00	30.52	58.98	43.98	59.26	0.000314	4.23	2934.00	6460.12	0.18
E101-00-00_0003	20688.00		Bridge									
E101-00-00_0003	20670.00	10PCT_10yr	6530.00	30.52	53.87	40.37	54.03	0.000286	3.26	2006.69	290.67	0.16
E101-00-00_0003	20670.00	2PCT_50yr	8250.00	30.52	56.64	41.56	56.81	0.000237	3.33	2505.68	1856.37	0.15
E101-00-00_0003	20670.00	1PCT_100yr	9050.00	30.52	57.36	42.09	57.55	0.000242	3.48	2638.38	2711.11	0.16
E101-00-00_0003	20670.00	0.2PCT_500yr	12210.00	30.52	58.65	43.98	58.94	0.000335	4.32	2874.46	5943.45	0.19

HEC-RAS Plan: Eff+LOMR MP River: E101-00-00 Reach: E101-00-00_0003 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	20611.00	10PCT_10yr	6530.00	28.66	53.55	38.41	53.94	0.000765	5.15	1523.76	442.88	0.19
E101-00-00_0003	20611.00	2PCT_50yr	8250.00	28.66	56.53	39.83	56.77	0.000485	4.45	2692.66	1964.32	0.15
E101-00-00_0003	20611.00	1PCT_100yr	9050.00	28.66	57.29	40.45	57.52	0.000462	4.43	2998.65	2580.76	0.15
E101-00-00_0003	20611.00	0.2PCT_500yr	12210.00	28.66	58.63	42.73	58.91	0.000566	5.07	3611.19	6639.41	0.17
E101-00-00_0003	20562.00		Culvert									
E101-00-00_0003	20513.00	10PCT_10yr	6530.00	28.66	52.44	38.43	52.94	0.001005	5.71	1224.63	292.83	0.22
E101-00-00_0003	20513.00	2PCT_50yr	8250.00	28.66	56.46	39.83	56.65	0.000427	4.16	3581.65	1923.85	0.14
E101-00-00_0003	20513.00	1PCT_100yr	9050.00	28.66	57.24	40.45	57.40	0.000386	4.04	4142.42	2497.15	0.14
E101-00-00_0003	20513.00	0.2PCT_500yr	12210.00	28.66	58.60	42.73	58.78	0.000441	4.46	5181.76	6593.18	0.15
E101-00-00_0003	20258.00	10PCT_10yr	6530.00	28.06	52.49	36.23	52.57	0.000431	2.17	3050.10	319.97	0.11
E101-00-00_0003	20258.00	2PCT_50yr	8250.00	28.06	56.45	37.30	56.50	0.000216	1.80	5964.74	2499.09	0.08
E101-00-00_0003	20258.00	1PCT_100yr	9050.00	28.06	57.23	37.76	57.27	0.000193	1.75	6961.46	3547.42	0.07
E101-00-00_0003	20258.00	0.2PCT_500yr	12210.00	28.06	58.59	39.42	58.63	0.000212	1.93	8740.61	6107.62	0.08
E101-00-00_0003	19806.00	10PCT_10yr	6800.00	25.57	52.47	33.54	52.51	0.000045	1.47	4690.88	315.44	0.06
E101-00-00_0003	19806.00	2PCT_50yr	8620.00	25.57	56.43	34.74	56.46	0.000035	1.46	7603.68	2816.26	0.06
E101-00-00_0003	19806.00	1PCT_100yr	9480.00	25.57	57.21	35.23	57.24	0.000035	1.51	8989.54	3461.40	0.06
E101-00-00_0003	19806.00	0.2PCT_500yr	12860.00	25.57	58.55	36.62	58.60	0.000047	1.82	11402.07	6807.17	0.07
E101-00-00_0003	19340.00	10PCT_10yr	6800.00	25.78	52.37	35.60	52.47	0.000152	2.51	2706.30	198.48	0.12
E101-00-00_0003	19340.00	2PCT_50yr	8620.00	25.78	56.35	36.88	56.43	0.000102	2.30	5009.86	2493.43	0.10
E101-00-00_0003	19340.00	1PCT_100yr	9480.00	25.78	57.13	37.50	57.21	0.000099	2.35	5828.54	2758.43	0.10
E101-00-00_0003	19340.00	0.2PCT_500yr	12860.00	25.78	58.45	39.42	58.56	0.000127	2.79	7236.80	3342.25	0.12
E101-00-00_0003	19205.00	10PCT_10yr	6800.00	26.95	51.90	36.51	52.33	0.000577	5.33	1397.46	125.90	0.20
E101-00-00_0003	19205.00	2PCT_50yr	8620.00	26.95	55.99	38.01	56.33	0.000414	5.03	2984.51	1782.47	0.17
E101-00-00_0003	19205.00	1PCT_100yr	9480.00	26.95	56.80	38.68	57.11	0.000398	5.03	3573.88	2218.07	0.17
E101-00-00_0003	19205.00	0.2PCT_500yr	12860.00	26.95	58.05	41.14	58.44	0.000509	5.86	4574.11	3253.96	0.19
E101-00-00_0003	18492.00		Culvert									
E101-00-00_0003	17777.00	10PCT_10yr	6800.00	24.28	48.28	33.84	48.76	0.000852	5.60	1276.52	102.51	0.21
E101-00-00_0003	17777.00	2PCT_50yr	8620.00	24.28	51.93	35.34	52.36	0.000682	5.54	1853.71	343.83	0.19
E101-00-00_0003	17777.00	1PCT_100yr	9480.00	24.28	52.53	36.02	52.99	0.000725	5.80	2007.67	393.49	0.20
E101-00-00_0003	17777.00	0.2PCT_500yr	12860.00	24.28	53.73	38.47	54.39	0.001024	7.11	2348.28	556.59	0.24
E101-00-00_0003	17644.00	10PCT_10yr	7026.00	23.70	48.21	36.60	48.60	0.000885	5.03	1396.64	103.70	0.24
E101-00-00_0003	17644.00	2PCT_50yr	8912.00	23.70	51.87	38.09	52.25	0.000692	4.93	1891.84	291.00	0.22
E101-00-00_0003	17644.00	1PCT_100yr	9828.00	23.70	52.46	38.75	52.88	0.000731	5.19	2105.88	435.60	0.23
E101-00-00_0003	17644.00	0.2PCT_500yr	13380.00	23.70	53.63	41.01	54.23	0.000997	6.35	2797.85	704.88	0.27
E101-00-00_0003	17621.00		Bridge									
E101-00-00_0003	17598.00	10PCT_10yr	7026.00	23.70	48.10	36.60	48.50	0.000904	5.07	1385.62	103.27	0.24
E101-00-00_0003	17598.00	2PCT_50yr	8912.00	23.70	51.23	38.09	51.65	0.000794	5.15	1750.79	177.86	0.23
E101-00-00_0003	17598.00	1PCT_100yr	9828.00	23.70	51.80	38.75	52.26	0.000854	5.46	1872.79	274.46	0.24
E101-00-00_0003	17598.00	0.2PCT_500yr	13380.00	23.70	53.10	41.01	53.78	0.001161	6.71	2447.77	607.17	0.29
E101-00-00_0003	17565.00	10PCT_10yr	7026.00	23.79	48.16		48.39	0.000500	3.83	1836.04	142.98	0.19
E101-00-00_0003	17565.00	2PCT_50yr	8912.00	23.79	51.31		51.54	0.000404	3.84	2403.33	286.00	0.17
E101-00-00_0003	17565.00	1PCT_100yr	9828.00	23.79	51.89		52.14	0.000428	4.06	2589.73	360.36	0.18
E101-00-00_0003	17565.00	0.2PCT_500yr	13380.00	23.79	53.23		53.60	0.000574	4.96	3301.66	750.28	0.21
E101-00-00_0003	16747.00	10PCT_10yr	7026.00	23.49	47.83	34.57	48.00	0.000416	3.39	2078.41	159.56	0.16
E101-00-00_0003	16747.00	2PCT_50yr	8912.00	23.49	51.05	35.61	51.22	0.000327	3.42	2941.54	559.73	0.14
E101-00-00_0003	16747.00	1PCT_100yr	9828.00	23.49	51.61	36.08	51.81	0.000349	3.61	3288.51	680.29	0.15
E101-00-00_0003	16747.00	0.2PCT_500yr	13380.00	23.49	52.87	37.78	53.14	0.000471	4.38	4267.16	940.02	0.18
E101-00-00_0003	16410.00	10PCT_10yr	7026.00	21.99	47.58	33.24	47.85	0.000428	4.18	1700.88	152.68	0.20
E101-00-00_0003	16410.00	2PCT_50yr	8912.00	21.99	50.85	34.70	51.11	0.000334	4.12	2422.29	404.59	0.18
E101-00-00_0003	16410.00	1PCT_100yr	9828.00	21.99	51.40	35.35	51.68	0.000355	4.34	2692.14	606.25	0.18
E101-00-00_0003	16410.00	0.2PCT_500yr	13380.00	21.99	52.57	37.72	52.97	0.000486	5.31	3490.34	848.28	0.22
E101-00-00_0003	16341.00	10PCT_10yr	7026.00	23.71	47.55	33.94	47.80	0.000824	4.05	1733.90	110.73	0.18
E101-00-00_0003	16341.00	2PCT_50yr	8912.00	23.71	50.82	35.19	51.06	0.000707	4.09	2362.86	397.43	0.17
E101-00-00_0003	16341.00	1PCT_100yr	9828.00	23.71	51.37	35.76	51.63	0.000752	4.31	2652.78	604.15	0.18
E101-00-00_0003	16341.00	0.2PCT_500yr	13380.00	23.71	52.54	37.71	52.90	0.001003	5.18	3547.39	1026.25	0.21
E101-00-00_0003	16318.00		Bridge									
E101-00-00_0003	16293.00	10PCT_10yr	7026.00	23.77	47.39	34.01	47.66	0.000857	4.11	1710.31	110.22	0.18
E101-00-00_0003	16293.00	2PCT_50yr	8912.00	23.77	50.49	35.25	50.76	0.000770	4.21	2244.40	287.14	0.18
E101-00-00_0003	16293.00	1PCT_100yr	9828.00	23.77	51.04	35.82	51.34	0.000825	4.45	2461.85	520.95	0.18
E101-00-00_0003	16293.00	0.2PCT_500yr	13380.00	23.77	52.32	37.77	52.72	0.001077	5.32	3336.24	948.55	0.21
E101-00-00_0003	16220.	10PCT_10yr	7026.00	23.71	47.38		47.58	0.000436	3.56	1971.82	126.36	0.16
E101-00-00_0003	16220.	2PCT_50yr	8912.00	23.71	50.48		50.69	0.000453	3.72	2423.44	246.96	0.16
E101-00-00_0003	16220.	1PCT_100yr	9828.00	23.71	51.02		51.26	0.000489	3.95	2577.72	335.07	0.17
E101-00-00_0003	16220.	0.2PCT_500yr	13380.00	23.71	52.28		52.64	0.000678	4.88	3178.52	626.99	0.20

HEC-RAS Plan: Eff+LOMR MP River: E101-00-00 Reach: E101-00-00_0003 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	16143.00	10PCT_10yr	7026.00	23.65	47.37	31.26	47.53	0.000329	3.26	2165.42	183.64	0.14
E101-00-00_0003	16143.00	2PCT_50yr	8912.00	23.65	50.48	32.55	50.63	0.000264	3.25	3180.28	410.18	0.13
E101-00-00_0003	16143.00	1PCT_100yr	9828.00	23.65	51.03	33.23	51.19	0.000283	3.43	3428.99	545.55	0.13
E101-00-00_0003	16143.00	0.2PCT_500yr	13380.00	23.65	52.30	35.20	52.53	0.000391	4.20	4145.58	718.87	0.16
E101-00-00_0003	16110.50		Bridge									
E101-00-00_0003	16074.00	10PCT_10yr	7026.00	23.65	47.28	31.26	47.44	0.000324	3.22	2261.65	182.89	0.14
E101-00-00_0003	16074.00	2PCT_50yr	8912.00	23.65	50.29	32.55	50.45	0.000275	3.30	3101.74	394.94	0.13
E101-00-00_0003	16074.00	1PCT_100yr	9828.00	23.65	50.83	33.22	51.01	0.000297	3.49	3332.17	470.81	0.14
E101-00-00_0003	16074.00	0.2PCT_500yr	13380.00	23.65	52.10	35.21	52.35	0.000410	4.27	4025.91	712.19	0.16
E101-00-00_0003	15999.00	10PCT_10yr	7290.00	22.44	47.28	33.21	47.40	0.000195	2.79	2612.29	200.55	0.14
E101-00-00_0003	15999.00	2PCT_50yr	9330.00	22.44	50.29	34.79	50.41	0.000171	2.87	3311.99	440.22	0.13
E101-00-00_0003	15999.00	1PCT_100yr	10290.00	22.44	50.83	35.39	50.97	0.000184	3.04	3515.91	552.26	0.14
E101-00-00_0003	15999.00	0.2PCT_500yr	14040.00	22.44	52.09	37.06	52.31	0.000259	3.80	4105.71	966.37	0.16
E101-00-00_0003	15374.00	10PCT_10yr	7290.00	19.32	47.08		47.26	0.000251	3.34	2180.05	147.30	0.15
E101-00-00_0003	15374.00	2PCT_50yr	9330.00	19.32	50.09		50.28	0.000237	3.50	2695.63	280.04	0.16
E101-00-00_0003	15374.00	1PCT_100yr	10290.00	19.32	50.61		50.83	0.000260	3.72	2864.80	368.46	0.17
E101-00-00_0003	15374.00	0.2PCT_500yr	14040.00	19.32	51.77		52.11	0.000380	4.68	3383.25	553.17	0.20
E101-00-00_0003	14721.00	10PCT_10yr	7290.00	21.46	46.87	31.46	47.08	0.000300	3.63	2005.98	181.40	0.17
E101-00-00_0003	14721.00	2PCT_50yr	9330.00	21.46	49.89	32.98	50.11	0.000287	3.76	2731.61	564.20	0.17
E101-00-00_0003	14721.00	1PCT_100yr	10290.00	21.46	50.40	33.63	50.64	0.000309	3.98	3008.52	671.63	0.17
E101-00-00_0003	14721.00	0.2PCT_500yr	14040.00	21.46	51.47	35.85	51.84	0.000440	4.95	3686.44	1138.53	0.21
E101-00-00_0003	14637.00	10PCT_10yr	7290.00	19.71	46.35	30.14	46.93	0.000395	6.13	1188.27	116.36	0.22
E101-00-00_0003	14637.00	2PCT_50yr	9330.00	19.71	49.88	31.76	50.08	0.000206	3.65	3119.69	566.61	0.14
E101-00-00_0003	14637.00	1PCT_100yr	10290.00	19.71	50.39	32.48	50.61	0.000225	3.87	3455.69	726.03	0.15
E101-00-00_0003	14637.00	0.2PCT_500yr	14040.00	19.71	51.46	35.11	51.79	0.000328	4.83	4366.03	1083.86	0.18
E101-00-00_0003	14560.00		Culvert									
E101-00-00_0003	14482.00	10PCT_10yr	7290.00	18.84	44.48	29.27	44.70	0.000276	3.74	1950.97	113.51	0.16
E101-00-00_0003	14482.00	2PCT_50yr	9330.00	18.84	47.52	30.90	47.78	0.000281	4.04	2341.13	202.93	0.16
E101-00-00_0003	14482.00	1PCT_100yr	10290.00	18.84	48.29	31.62	48.57	0.000300	4.27	2532.32	292.22	0.17
E101-00-00_0003	14482.00	0.2PCT_500yr	14040.00	18.84	49.98	34.24	50.39	0.000404	5.23	3300.98	606.54	0.20
E101-00-00_0003	14240.00	10PCT_10yr	7290.00	22.09	44.48	32.27	44.59	0.000175	2.73	2665.69	192.43	0.13
E101-00-00_0003	14240.00	2PCT_50yr	9330.00	22.09	47.54	33.07	47.66	0.000159	2.85	3276.42	211.12	0.13
E101-00-00_0003	14240.00	1PCT_100yr	10290.00	22.09	48.31	33.43	48.45	0.000169	2.99	3458.87	277.55	0.13
E101-00-00_0003	14240.00	0.2PCT_500yr	14040.00	22.09	50.01	34.70	50.22	0.000224	3.66	4258.70	762.85	0.15
E101-00-00_0003	13919.00	10PCT_10yr	7600.00	20.33	44.44		44.54	0.000150	2.55	2979.63	212.45	0.12
E101-00-00_0003	13919.00	2PCT_50yr	9820.00	20.33	47.50		47.61	0.000150	2.67	3675.95	264.57	0.12
E101-00-00_0003	13919.00	1PCT_100yr	10850.00	20.33	48.27		48.39	0.000156	2.81	3907.07	359.64	0.12
E101-00-00_0003	13919.00	0.2PCT_500yr	14830.00	20.33	49.96		50.14	0.000202	3.42	4767.39	659.58	0.14
E101-00-00_0003	13247.00	10PCT_10yr	7600.00	21.00	44.15	31.00	44.38	0.000363	3.81	1996.41	150.53	0.18
E101-00-00_0003	13247.00	2PCT_50yr	9820.00	21.00	47.22	32.55	47.45	0.000316	3.90	2781.59	380.07	0.18
E101-00-00_0003	13247.00	1PCT_100yr	10850.00	21.00	47.98	33.18	48.23	0.000327	4.06	3108.37	483.15	0.18
E101-00-00_0003	13247.00	0.2PCT_500yr	14830.00	21.00	49.60	35.30	49.94	0.000406	4.83	4133.97	878.76	0.20
E101-00-00_0003	13164.00	10PCT_10yr	7600.00	17.92	43.39	29.26	44.17	0.000686	7.07	1074.83	144.50	0.26
E101-00-00_0003	13164.00	2PCT_50yr	9820.00	17.92	47.23	31.05	47.40	0.000237	3.39	3149.09	373.49	0.14
E101-00-00_0003	13164.00	1PCT_100yr	10850.00	17.92	47.99	31.82	48.18	0.000250	3.57	3474.61	484.26	0.14
E101-00-00_0003	13164.00	0.2PCT_500yr	14830.00	17.92	49.60	34.62	49.88	0.000333	4.34	4469.48	913.63	0.17
E101-00-00_0003	12676.00		Culvert									
E101-00-00_0003	12177.00	10PCT_10yr	7600.00	16.10	39.79	27.44	40.00	0.000398	3.69	2062.13	144.40	0.17
E101-00-00_0003	12177.00	2PCT_50yr	9820.00	16.10	42.33	29.22	42.58	0.000464	4.01	2451.84	171.16	0.19
E101-00-00_0003	12177.00	1PCT_100yr	10850.00	16.10	43.16	30.00	43.43	0.000527	4.17	2600.16	188.81	0.20
E101-00-00_0003	12177.00	0.2PCT_500yr	14830.00	16.10	45.94	32.80	46.28	0.000574	4.64	3387.22	556.16	0.21
E101-00-00_0003	12084.	10PCT_10yr	7600.00	16.57	39.73		39.96	0.000365	3.86	1969.14	144.47	0.18
E101-00-00_0003	12084.	2PCT_50yr	9820.00	16.57	42.27		42.54	0.000387	4.17	2355.88	161.10	0.19
E101-00-00_0003	12084.	1PCT_100yr	10850.00	16.57	43.08		43.38	0.000409	4.36	2489.94	170.28	0.20
E101-00-00_0003	12084.	0.2PCT_500yr	14830.00	16.57	45.84		46.22	0.000433	4.96	3250.13	550.69	0.21
E101-00-00_0003	11540.00	10PCT_10yr	7800.00	19.29	39.22		39.62	0.001102	5.05	1543.20	147.97	0.28
E101-00-00_0003	11540.00	2PCT_50yr	10160.00	19.29	41.77		42.20	0.001018	5.22	1946.18	167.94	0.27
E101-00-00_0003	11540.00	1PCT_100yr	11230.00	19.29	42.57		43.02	0.001041	5.39	2082.25	174.16	0.27
E101-00-00_0003	11540.00	0.2PCT_500yr	15370.00	19.29	45.29		45.83	0.001167	5.92	2610.68	282.30	0.29
E101-00-00_0003	10539.00	10PCT_10yr	7800.00	15.51	38.44		38.75	0.000668	4.49	1736.05	136.35	0.22
E101-00-00_0003	10539.00	2PCT_50yr	10160.00	15.51	41.02		41.38	0.000643	4.81	2112.74	156.71	0.23
E101-00-00_0003	10539.00	1PCT_100yr	11230.00	15.51	41.78		42.18	0.000673	5.02	2235.09	163.76	0.24
E101-00-00_0003	10539.00	0.2PCT_500yr	15370.00	15.51	44.38		44.89	0.000769	5.72	2688.33	184.55	0.26
E101-00-00_0003	10015.00	10PCT_10yr	7940.00	17.99	38.08		38.37	0.000762	4.25	1866.53	177.99	0.23
E101-00-00_0003	10015.00	2PCT_50yr	10385.00	17.99	40.72		41.02	0.000667	4.41	2352.88	191.68	0.22
E101-00-00_0003	10015.00	1PCT_100yr	11487.00	17.99	41.46		41.79	0.000719	4.59	2500.04	203.00	0.23

HEC-RAS Plan: Eff+LOMR MP River: E101-00-00 Reach: E101-00-00_0003 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	10015.00	0.2PCT_500yr	15730.00	17.99	44.06		44.45	0.000748	5.05	3112.98	280.10	0.27
E101-00-00_0003	9905.000	10PCT_10yr	7940.00	16.32	38.06	27.19	38.26	0.000445	3.54	2240.65	186.43	0.18
E101-00-00_0003	9905.000	2PCT_50yr	10385.00	16.32	40.70	28.34	40.92	0.000431	3.77	2754.72	203.94	0.18
E101-00-00_0003	9905.000	1PCT_100yr	11487.00	16.32	41.44	28.81	41.69	0.000454	3.95	2908.67	208.89	0.19
E101-00-00_0003	9905.000	0.2PCT_500yr	15730.00	16.32	44.03	30.45	44.35	0.000527	4.53	3476.66	242.19	0.20
E101-00-00_0003	9874.500		Bridge									
E101-00-00_0003	9845.000	10PCT_10yr	7940.00	16.32	38.02	27.20	38.21	0.000450	3.56	2231.46	186.10	0.18
E101-00-00_0003	9845.000	2PCT_50yr	10385.00	16.32	40.65	28.34	40.87	0.000435	3.78	2745.09	203.62	0.18
E101-00-00_0003	9845.000	1PCT_100yr	11487.00	16.32	41.40	28.81	41.64	0.000458	3.96	2898.65	208.57	0.19
E101-00-00_0003	9845.000	0.2PCT_500yr	15730.00	16.32	43.97	30.45	44.29	0.000534	4.54	3462.93	240.18	0.21
E101-00-00_0003	9840.000	10PCT_10yr	7940.00	16.33	37.97	25.81	38.20	0.000481	3.82	2076.95	165.80	0.19
E101-00-00_0003	9840.000	2PCT_50yr	10385.00	16.33	40.60	27.25	40.86	0.000488	4.10	2533.96	181.62	0.19
E101-00-00_0003	9840.000	1PCT_100yr	11487.00	16.33	41.34	27.81	41.62	0.000523	4.30	2669.82	187.27	0.20
E101-00-00_0003	9840.000	0.2PCT_500yr	15730.00	16.33	43.89	29.78	44.27	0.000634	4.94	3198.50	232.92	0.22
E101-00-00_0003	9829.500		Bridge									
E101-00-00_0003	9819.000	10PCT_10yr	7940.00	16.33	37.90	25.81	38.13	0.000497	3.84	2066.49	165.39	0.19
E101-00-00_0003	9819.000	2PCT_50yr	10385.00	16.33	40.53	27.25	40.80	0.000495	4.12	2522.20	181.23	0.19
E101-00-00_0003	9819.000	1PCT_100yr	11487.00	16.33	41.27	27.81	41.56	0.000528	4.32	2657.13	186.40	0.20
E101-00-00_0003	9819.000	0.2PCT_500yr	15730.00	16.33	43.82	29.79	44.20	0.000644	4.96	3180.86	232.20	0.23
E101-00-00_0003	9750.000	10PCT_10yr	7940.00	16.31	37.88		38.09	0.000474	3.70	2144.52	176.35	0.19
E101-00-00_0003	9750.000	2PCT_50yr	10385.00	16.31	40.51		40.75	0.000464	3.95	2630.74	193.06	0.19
E101-00-00_0003	9750.000	1PCT_100yr	11487.00	16.31	41.25		41.51	0.000493	4.14	2774.30	198.52	0.20
E101-00-00_0003	9750.000	0.2PCT_500yr	15730.00	16.31	43.79		44.14	0.000597	4.73	3346.50	284.40	0.22
E101-00-00_0003	9000.000	10PCT_10yr	8180.00	15.50	37.68	27.23	37.78	0.000309	2.73	3431.66	522.93	0.15
E101-00-00_0003	9000.000	2PCT_50yr	10820.00	15.50	40.38	29.81	40.48	0.000229	2.68	4520.34	550.20	0.13
E101-00-00_0003	9000.000	1PCT_100yr	12000.00	15.50	41.12	30.50	41.22	0.000230	2.77	4821.65	557.15	0.13
E101-00-00_0003	9000.000	0.2PCT_500yr	16470.00	15.50	43.69	33.00	43.81	0.000232	3.07	5875.58	581.19	0.14
E101-00-00_0003	8469.000	10PCT_10yr	8180.00	13.02	37.49	25.23	37.61	0.000313	2.98	3235.30	362.26	0.14
E101-00-00_0003	8469.000	2PCT_50yr	10820.00	13.02	40.22	27.16	40.34	0.000273	3.07	4252.92	578.64	0.13
E101-00-00_0003	8469.000	1PCT_100yr	12000.00	13.02	40.96	27.90	41.09	0.000274	3.17	4554.36	605.31	0.13
E101-00-00_0003	8469.000	0.2PCT_500yr	16470.00	13.02	43.53	31.17	43.67	0.000273	3.46	5695.39	697.88	0.14
E101-00-00_0003	7984.000	10PCT_10yr	8180.00	13.76	37.32		37.45	0.000334	3.26	3102.10	339.84	0.15
E101-00-00_0003	7984.000	2PCT_50yr	10820.00	13.76	40.08		40.20	0.000277	3.27	4095.98	380.08	0.14
E101-00-00_0003	7984.000	1PCT_100yr	12000.00	13.76	40.82		40.95	0.000284	3.38	4379.03	389.51	0.15
E101-00-00_0003	7984.000	0.2PCT_500yr	16470.00	13.76	43.37		43.53	0.000306	3.79	5424.85	440.51	0.15
E101-00-00_0003	6838.000	10PCT_10yr	8180.00	12.20	36.86		37.03	0.000423	3.31	2470.69	233.48	0.18
E101-00-00_0003	6838.000	2PCT_50yr	10820.00	12.20	39.68		39.85	0.000369	3.35	3228.51	338.43	0.18
E101-00-00_0003	6838.000	1PCT_100yr	12000.00	12.20	40.40		40.59	0.000384	3.47	3485.91	373.93	0.19
E101-00-00_0003	6838.000	0.2PCT_500yr	16470.00	12.20	42.93		43.15	0.000401	3.76	4856.74	716.57	0.19
E101-00-00_0003	5861.000	10PCT_10yr	8360.00	9.91	36.36		36.56	0.000556	3.66	2560.76	326.10	0.18
E101-00-00_0003	5861.000	2PCT_50yr	11160.00	9.91	39.25		39.45	0.000446	3.76	3651.71	432.28	0.17
E101-00-00_0003	5861.000	1PCT_100yr	12410.00	9.91	39.95		40.17	0.000461	3.94	3963.56	453.74	0.17
E101-00-00_0003	5861.000	0.2PCT_500yr	17060.00	9.91	42.45		42.71	0.000488	4.46	5208.21	659.46	0.18
E101-00-00_0003	4720.000	10PCT_10yr	8360.00	8.13	35.80	20.40	36.02	0.000437	4.13	2896.08	336.81	0.17
E101-00-00_0003	4720.000	2PCT_50yr	11160.00	8.13	38.78	22.36	39.00	0.000406	4.29	4244.04	746.65	0.16
E101-00-00_0003	4720.000	1PCT_100yr	12410.00	8.13	39.47	23.16	39.71	0.000424	4.47	4684.56	773.38	0.17
E101-00-00_0003	4720.000	0.2PCT_500yr	17060.00	8.13	41.99	25.81	42.24	0.000437	4.88	6982.56	971.50	0.17
E101-00-00_0003	4279.000	10PCT_10yr	8360.00	9.00	35.39	22.25	35.75	0.000789	4.80	1774.30	198.32	0.23
E101-00-00_0003	4279.000	2PCT_50yr	11160.00	9.00	38.42	24.18	38.77	0.000657	4.88	2885.76	507.90	0.21
E101-00-00_0003	4279.000	1PCT_100yr	12410.00	9.00	39.10	24.94	39.47	0.000674	5.07	3211.25	558.93	0.21
E101-00-00_0003	4279.000	0.2PCT_500yr	17060.00	9.00	41.64	27.47	42.00	0.000642	5.37	4916.11	751.32	0.21
E101-00-00_0003	4130.000	10PCT_10yr	8360.00	8.68	35.48	18.36	35.59	0.000125	2.74	3443.05	529.52	0.11
E101-00-00_0003	4130.000	2PCT_50yr	11160.00	8.68	38.50	19.83	38.62	0.000112	2.87	5057.77	745.47	0.11
E101-00-00_0003	4130.000	1PCT_100yr	12410.00	8.68	39.19	20.43	39.31	0.000118	3.02	5543.62	787.92	0.11
E101-00-00_0003	4130.000	0.2PCT_500yr	17060.00	8.68	41.72	22.42	41.86	0.000128	3.38	8086.71	944.68	0.12
E101-00-00_0003	4091.000		Bridge									
E101-00-00_0003	4050.000	10PCT_10yr	8360.00	7.87	35.35	17.55	35.46	0.000110	2.63	3524.38	381.47	0.11
E101-00-00_0003	4050.000	2PCT_50yr	11160.00	7.87	38.39	19.02	38.51	0.000104	2.83	4771.85	640.01	0.11
E101-00-00_0003	4050.000	1PCT_100yr	12410.00	7.87	39.08	19.62	39.21	0.000112	3.01	5070.61	684.51	0.11
E101-00-00_0003	4050.000	0.2PCT_500yr	17060.00	7.87	41.63	21.60	41.78	0.000124	3.39	7570.47	891.60	0.12
E101-00-00_0003	3952.	10PCT_10yr	8360.00	6.87	35.33		35.44	0.000106	2.73	3213.27	202.16	0.11
E101-00-00_0003	3952.	2PCT_50yr	11160.00	6.87	38.34		38.49	0.000115	3.11	3845.89	219.91	0.11
E101-00-00_0003	3952.	1PCT_100yr	12410.00	6.87	39.02		39.19	0.000128	3.35	3996.62	226.97	0.12
E101-00-00_0003	3952.	0.2PCT_500yr	17060.00	6.87	41.48		41.73	0.000172	4.14	4673.98	458.81	0.14
E101-00-00_0003	3466.000	10PCT_10yr	8616.00	1.92	35.31	13.90	35.40	0.000043	2.84	4463.53	269.55	0.09

HEC-RAS Plan: Eff+LOMR MP River: E101-00-00 Reach: E101-00-00_0003 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	3466.000	2PCT_50yr	11630.00	1.92	38.31	15.91	38.45	0.000057	3.49	5392.12	413.27	0.11
E101-00-00_0003	3466.000	1PCT_100yr	12967.00	1.92	38.98	16.92	39.14	0.000064	3.75	5685.58	529.99	0.12
E101-00-00_0003	3466.000	0.2PCT_500yr	17865.00	1.92	41.46	19.79	41.66	0.000081	4.41	7254.74	673.12	0.13
E101-00-00_0003	3300.	10PCT_10yr	8616.00	-1.50	35.34		35.38	0.000036	2.05	6032.14	360.41	0.07
E101-00-00_0003	3300.	2PCT_50yr	11630.00	-1.50	38.36		38.42	0.000044	2.41	7205.53	456.76	0.07
E101-00-00_0003	3300.	1PCT_100yr	12967.00	-1.50	39.03		39.11	0.000050	2.62	7538.93	546.77	0.08
E101-00-00_0003	3300.	0.2PCT_500yr	17865.00	-1.50	41.52		41.62	0.000066	3.15	9077.40	674.02	0.09
E101-00-00_0003	3203.000	10PCT_10yr	8616.00	-3.50	35.19	8.19	35.35	0.000086	3.21	3068.21	396.75	0.10
E101-00-00_0003	3203.000	2PCT_50yr	11630.00	-3.50	38.35	10.53	38.41	0.000041	2.10	7324.16	491.15	0.07
E101-00-00_0003	3203.000	1PCT_100yr	12967.00	-3.50	39.03	11.50	39.10	0.000047	2.27	7679.87	564.30	0.07
E101-00-00_0003	3203.000	0.2PCT_500yr	17865.00	-3.50	41.52	14.78	41.61	0.000063	2.74	9299.19	719.10	0.08
E101-00-00_0003	2797.000		Culvert									
E101-00-00_0003	2389.000	10PCT_10yr	8616.00	-0.26	29.60	10.70	30.27	0.000781	6.58	1309.36	363.46	0.21
E101-00-00_0003	2389.000	2PCT_50yr	11630.00	-0.26	33.16	13.03	34.13	0.000972	7.92	1467.89	403.90	0.24
E101-00-00_0003	2389.000	1PCT_100yr	12967.00	-0.26	34.63	14.00	35.74	0.001045	8.46	1533.64	421.92	0.25
E101-00-00_0003	2389.000	0.2PCT_500yr	17865.00	-0.26	41.10	17.28	41.19	0.000134	2.86	10969.20	972.92	0.09
E101-00-00_0003	2325.	10PCT_10yr	8616.00	-0.15	29.87		29.95	0.000177	2.42	4763.44	376.41	0.09
E101-00-00_0003	2325.	2PCT_50yr	11630.00	-0.15	33.58		33.67	0.000169	2.63	6225.07	412.01	0.09
E101-00-00_0003	2325.	1PCT_100yr	12967.00	-0.15	35.12		35.22	0.000165	2.71	6872.23	427.33	0.09
E101-00-00_0003	2325.	0.2PCT_500yr	17865.00	-0.15	41.09		41.18	0.000132	2.78	11162.48	1051.11	0.09
E101-00-00_0003	1855.000	10PCT_10yr	8616.00	0.68	29.85		29.90	0.000075	1.75	5609.81	391.06	0.06
E101-00-00_0003	1855.000	2PCT_50yr	11630.00	0.68	33.56		33.62	0.000071	1.86	7128.68	427.46	0.06
E101-00-00_0003	1855.000	1PCT_100yr	12967.00	0.68	35.11		35.17	0.000069	1.90	7800.68	442.61	0.06
E101-00-00_0003	1855.000	0.2PCT_500yr	17865.00	0.68	41.09		41.14	0.000055	1.89	12314.12	1169.45	0.05
E101-00-00_0003	1126.	10PCT_10yr	8616.00	-1.85	29.61		29.80	0.000397	3.71	3101.42	416.96	0.13
E101-00-00_0003	1126.	2PCT_50yr	11630.00	-1.85	33.38		33.54	0.000320	3.66	5022.28	683.48	0.12
E101-00-00_0003	1126.	1PCT_100yr	12967.00	-1.85	34.95		35.09	0.000275	3.52	6183.80	783.81	0.11
E101-00-00_0003	1126.	0.2PCT_500yr	17865.00	-1.85	41.03		41.09	0.000130	2.73	13336.76	1615.46	0.08
E101-00-00_0003	1070.000	10PCT_10yr	8616.00	-2.04	29.59	10.82	29.77	0.000394	3.53	3088.84	384.56	0.14
E101-00-00_0003	1070.000	2PCT_50yr	11630.00	-2.04	33.34	12.69	33.51	0.000341	3.67	4816.19	704.17	0.13
E101-00-00_0003	1070.000	1PCT_100yr	12967.00	-2.04	34.91	13.47	35.07	0.000306	3.62	6254.73	898.53	0.12
E101-00-00_0003	1070.000	0.2PCT_500yr	17865.00	-2.04	41.01	16.12	41.08	0.000147	2.89	14032.18	1657.26	0.09
E101-00-00_0003	1029.500		Bridge									
E101-00-00_0003	987.000	10PCT_10yr	8616.00	-2.04	29.25	10.81	29.44	0.000468	3.61	2957.81	370.30	0.14
E101-00-00_0003	987.000	2PCT_50yr	11630.00	-2.04	33.06	12.69	33.24	0.000394	3.71	4664.72	670.82	0.13
E101-00-00_0003	987.000	1PCT_100yr	12967.00	-2.04	34.73	13.47	34.90	0.000357	3.69	5668.62	874.21	0.13
E101-00-00_0003	987.000	0.2PCT_500yr	17865.00	-2.04	40.95	16.12	41.03	0.000158	2.83	13946.55	1648.57	0.09
E101-00-00_0003	911.	10PCT_10yr	8616.00	-2.19	29.28		29.36	0.000234	2.73	4528.58	331.21	0.10
E101-00-00_0003	911.	2PCT_50yr	11630.00	-2.19	33.08		33.18	0.000220	2.94	5989.11	518.58	0.10
E101-00-00_0003	911.	1PCT_100yr	12967.00	-2.19	34.75		34.84	0.000209	2.98	7231.78	890.48	0.10
E101-00-00_0003	911.	0.2PCT_500yr	17865.00	-2.19	40.96		41.01	0.000114	2.51	14936.79	1578.80	0.08
E101-00-00_0003	756.	10PCT_10yr	8616.00	-2.51	29.11		29.31	0.000309	3.76	2595.38	213.94	0.14
E101-00-00_0003	756.	2PCT_50yr	11630.00	-2.51	32.93		33.13	0.000272	3.92	3976.07	491.81	0.14
E101-00-00_0003	756.	1PCT_100yr	12967.00	-2.51	34.62		34.80	0.000240	3.84	5258.26	916.86	0.13
E101-00-00_0003	756.	0.2PCT_500yr	17865.00	-2.51	40.90		40.99	0.000120	3.11	13233.84	1715.91	0.09
E101-00-00_0003	637.000	10PCT_10yr	8616.00	-2.75	29.11	13.79	29.24	0.000245	3.41	3409.10	312.86	0.13
E101-00-00_0003	637.000	2PCT_50yr	11630.00	-2.75	32.94	17.04	33.07	0.000209	3.49	5301.20	686.16	0.12
E101-00-00_0003	637.000	1PCT_100yr	12967.00	-2.75	34.63	18.38	34.75	0.000186	3.43	6453.84	1155.58	0.11
E101-00-00_0003	637.000	0.2PCT_500yr	17865.00	-2.75	40.90	22.96	40.97	0.000096	2.82	15933.12	1740.46	0.08
E101-00-00_0003	538.000		Bridge									
E101-00-00_0003	442.000	10PCT_10yr	8616.00	-2.75	28.47	13.80	28.63	0.000280	3.58	3217.56	296.32	0.13
E101-00-00_0003	442.000	2PCT_50yr	11630.00	-2.75	32.38	17.04	32.52	0.000233	3.64	4942.63	615.06	0.13
E101-00-00_0003	442.000	1PCT_100yr	12967.00	-2.75	34.31	18.38	34.44	0.000199	3.52	6171.11	1048.47	0.12
E101-00-00_0003	442.000	0.2PCT_500yr	17865.00	-2.75	40.83	22.96	40.89	0.000100	2.87	15571.22	1734.46	0.09
E101-00-00_0003	306.000	10PCT_10yr	8616.00	-2.86	28.51	9.23	28.56	0.000052	1.98	6074.84	872.85	0.08
E101-00-00_0003	306.000	2PCT_50yr	11630.00	-2.86	32.41	10.71	32.46	0.000046	2.07	9436.10	1435.75	0.07
E101-00-00_0003	306.000	1PCT_100yr	12967.00	-2.86	34.34	11.30	34.39	0.000039	2.00	11198.34	1684.32	0.07
E101-00-00_0003	306.000	0.2PCT_500yr	17865.00	-2.86	40.84	13.22	40.87	0.000025	1.84	17334.67	2157.75	0.06

Buffalo Bayou
Memorial Day 2015

HEC-RAS Plan: Memorial_Calib Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	128109.6	Max WS	10090.51	-4.29	33.80		33.83	0.000083	1.32	7665.04	412.80	0.05
W100_upstrm	128104.6	Max WS	10090.35	-4.29	33.80	6.64	33.83	0.000083	1.32	7664.89	412.79	0.05
W100_upstrm	128066.7 SHEPHERD		Bridge									
W100_upstrm	128028.8	Max WS	10090.35	-4.51	33.58		33.61	0.000056	1.32	7665.31	412.80	0.05
W100_upstrm	126647.0	Max WS	10302.27	-3.93	33.54		33.55	0.000019	0.78	13432.06	899.94	0.03
W100_upstrm	125376.9	Max WS	10441.40	-4.05	33.42		33.46	0.000131	1.62	6463.41	353.93	0.07
W100_upstrm	124983.5	Max WS	10480.86	-3.86	33.39		33.43	0.000032	1.54	6791.81	1088.19	0.07
W100_upstrm	124644.1	Max WS	10523.31	-3.69	33.37	9.21	33.41	0.000039	1.65	6388.60	512.38	0.07
W100_upstrm	124591.8 WAUGH DRIVE		Bridge									
W100_upstrm	124539.5	Max WS	10525.47	-3.74	33.36		33.40	0.000039	1.64	6401.10	512.78	0.07
W100_upstrm	123658.2	Max WS	10614.34	-2.04	33.36		33.37	0.000018	0.81	15086.13	1603.96	0.03
W100_upstrm	123138.8	Max WS	10662.31	-4.08	33.36		33.36	0.000011	0.64	17570.27	1079.36	0.02
W100_upstrm	122627.1	Max WS	10720.38	-6.08	33.33		33.37	0.000020	1.35	10329.19	867.43	0.05
W100_upstrm	122572.1 MONTROSE COURT		Mult Open									
W100_upstrm	122517.1	Max WS	10722.49	-5.38	33.33		33.36	0.000046	1.34	9719.41	827.04	0.05
W100_upstrm	122371.6	Max WS	10737.89	-7.00	33.31	5.17	33.35	0.000063	1.60	6691.49	919.57	0.06
W100_upstrm	122265 ROSEMONT		Bridge									
W100_upstrm	122210.0	Max WS	10737.89	-5.60	33.26		33.30	0.000039	1.53	7025.19	768.96	0.06
W100_upstrm	122036.7	Max WS	10760.44	-8.40	33.27		33.29	0.000037	1.31	9587.60	800.01	0.05
W100_upstrm	121229.5	Max WS	10858.93	-11.37	33.24		33.26	0.000027	1.23	10557.00	859.29	0.05
W100_upstrm	120962.2	Max WS	10893.44	-10.59	33.22		33.26	0.000039	1.54	8114.55	690.48	0.06
W100_upstrm	120005.2	Max WS	11006.47	-7.78	33.21	4.67	33.22	0.000029	0.68	16100.07	989.38	0.03
W100_upstrm	119952.6 MEMORIAL DRIVE		Bridge									
W100_upstrm	119900.0	Max WS	11004.02	-7.64	33.19		33.19	0.000018	0.69	15939.76	987.42	0.03
W100_upstrm	119495.9	Max WS	11055.31	-7.21	33.18		33.19	0.000008	0.47	23862.13	1282.90	0.02
W100_upstrm	118667.7	Max WS	11160.32	-8.56	33.16		33.17	0.000027	0.91	12597.21	784.21	0.04
W100_upstrm	118466.1	Max WS	11178.32	-8.89	33.15	2.60	33.17	0.000021	1.23	10435.81	832.48	0.05
W100_upstrm	118418.1 MEMORIAL DRIVE		Bridge									
W100_upstrm	118370.1	Max WS	10479.87	-8.87	33.12		33.14	0.000019	1.16	10393.23	831.73	0.04
W100_upstrm	117845.4	Max WS	10283.78	-7.26	33.10		33.12	0.000026	1.01	10622.99	645.10	0.04
W100_upstrm	117204.3	Max WS	10307.99	-4.60	33.09		33.10	0.000016	0.82	12542.00	668.50	0.03
W100_upstrm	116395.7	Max WS	10315.29	-3.88	33.08		33.09	0.000016	0.93	11043.63	515.87	0.04
W100_upstrm	116167.6	Max WS	10241.93	-3.68	33.04	4.53	33.08	0.000058	1.56	6579.85	278.60	0.05
W100_upstrm	116121.9 SABINE AVENUE		Bridge									
W100_upstrm	116076.2	Max WS	10196.83	-3.86	32.86		32.90	0.000056	1.55	6578.73	278.58	0.05
W100_upstrm	115804.5	Max WS	10192.36	-4.60	32.83	4.57	32.89	0.000031	2.09	6850.21	365.95	0.06
W100_upstrm	115800 I-45 S EXIT RAMP		Bridge									
W100_upstrm	115729.9	Max WS	10196.82	-4.81	32.83		32.88	0.000029	1.95	6808.06	422.88	0.06
W100_upstrm	115672.3	Max WS	10195.68	-5.10	32.83	4.72	32.88	0.000032	2.07	7285.30	476.12	0.06
W100_upstrm	115635.5 I-45 SBML		Bridge									
W100_upstrm	115621.1	Max WS	10215.92	-5.57	32.84		32.88	0.000022	1.74	9284.68	761.87	0.05
W100_upstrm	115594.6	Max WS	10218.14	-6.04	32.85	3.22	32.88	0.000016	1.51	10230.44	768.64	0.05
W100_upstrm	115553.5 I-45 S. - ALLEN		Bridge									
W100_upstrm	115545.8	Max WS	10218.14	-6.85	32.84		32.87	0.000017	1.56	10959.46	830.34	0.05
W100_upstrm	115438.9	Max WS	10228.47	-7.24	32.84	3.48	32.87	0.000017	1.54	9805.80	582.81	0.05
W100_upstrm	115400 I-45 NBML		Bridge									
W100_upstrm	115365.4	Max WS	10226.13	-7.52	32.84		32.87	0.000013	1.37	10426.50	685.75	0.04
W100_upstrm	115284.6	Max WS	10232.02	-7.89	32.84	2.67	32.87	0.000016	1.51	15310.22	1259.02	0.05
W100_upstrm	115168.5 I-45 N. ENTRANCE		Bridge									
W100_upstrm	115104.1	Max WS	10216.11	-8.31	32.81		32.84	0.000011	1.28	12335.97	806.24	0.04
W100_upstrm	115001.1	Max WS	10185.00	-8.48	32.79	2.60	32.85	0.000026	1.97	9347.09	742.98	0.06
W100_upstrm	115000 I-45 RAMP MCKINN		Bridge									
W100_upstrm	114890.5	Max WS	10195.63	-8.56	32.79		32.84	0.000027	1.89	8242.36	558.79	0.06
W100_upstrm	114885	Max WS	10189.74	-8.56	32.79	1.99	32.84	0.000027	1.89	8242.28	558.78	0.06
W100_upstrm	114864.5 I-45 N. ENTRANCE		Bridge									
W100_upstrm	114838.5	Max WS	10177.20	-9.27	32.78		32.83	0.000025	1.84	8646.50	596.48	0.06
W100_upstrm	114492.0	Max WS	10215.13	-10.48	32.79		32.81	0.000025	1.34	7651.77	393.21	0.05
W100_upstrm	114195.9	Max WS	10210.17	-11.52	32.77	1.83	32.80	0.000060	1.48	6919.97	361.09	0.06
W100_upstrm	114168.9 RUSK STREET		Bridge									
W100_upstrm	114141.9	Max WS	10172.00	-10.83	32.70		32.74	0.000064	1.52	6680.27	351.26	0.06
W100_upstrm	114097.4	Max WS	10182.35	-7.46	32.71	3.61	32.73	0.000038	1.31	7775.44	387.06	0.05
W100_upstrm	114070.4 CAPITAL STREE		Bridge									
W100_upstrm	114043.4	Max WS	10174.33	-7.72	32.69		32.71	0.000037	1.29	7868.59	387.60	0.05
W100_upstrm	113644.0	Max WS	10198.82	-8.91	32.65		32.70	0.000031	1.87	7204.01	557.96	0.06
W100_upstrm	113411.6	Max WS	10224.25	-9.61	32.65	0.77	32.69	0.000032	1.68	6102.46	436.68	0.05
W100_upstrm	113374.3 TEXAS AVE		Bridge									
W100_upstrm	113337.0	Max WS	10208.76	-9.65	32.56		32.60	0.000032	1.68	6092.47	435.32	0.05
W100_upstrm	113266.4	Max WS	10208.97	-9.11	32.53	3.41	32.59	0.000130	2.01	5439.66	291.25	0.07
W100_upstrm	113238.6 BAGBY		Bridge									
W100_upstrm	113210.8	Max WS	10193.12	-9.46	32.12		32.18	0.000134	2.01	5422.40	289.03	0.07
W100_upstrm	112974.0	Max WS	10179.84	-10.69	32.09	1.56	32.15	0.000090	2.04	5000.92	208.96	0.07
W100_upstrm	112944.9 PRAIRIE		Bridge									
W100_upstrm	112915.8	Max WS	10159.81	-10.82	31.94		32.01	0.000090	2.03	4997.06	208.92	0.07
W100_upstrm	112575.5	Max WS	10177.99	-9.20	31.92	3.99	31.97	0.000109	1.75	5923.84	358.81	0.06
W100_upstrm	112534.5 PRESTON STREET		Bridge									
W100_upstrm	112493.5	Max WS	10142.66	-9.47	31.85		31.90	0.000106	1.73	5991.09	396.60	0.06
W100_upstrm	112003.3	Max WS	10175.09	-9.69	31.82	2.27	31.85	0.000068	1.43	7098.28	303.00	0.05
W100_upstrm	111953.3 CONGRESS STREET		Bridge									
W100_upstrm	111903.3	Max WS	10137.82	-9.84	31.75		31.78	0.000067	1.42	7119.99	303.31	0.05
W100_upstrm	111853.5	Max WS	10138.06	-9.86	31.74	1.83	31.78	0.000070	1.55	6547.54	267.86	0.05
W100_upstrm	111818.6 SMITH STREET		Bridge									
W100_upstrm	111783.7	Max WS	10100.64	-8.67	31.68		31.72	0.000080	1.61	6264.51	235.92	0.05
W100_upstrm	111626.7	Max WS	10104.49	-11.83	31.67	1.64	31.71	0.000088	1.55	6504.64	310.28	0.05
W100_upstrm	111518.6 LOUISIANA AND FR		Bridge									
W100_upstrm	111410.5	Max WS	9918.43	-11.23	31.55		31.59	0.000061	1.57	6331.98	258.64	0.05
W100_upstrm	110876.6	Max WS	9954.17	-10.43	31.53	-0.33	31.56	0.000050	1.18	9423.09	998.84	0.04
W100_upstrm	110837.8 MILAM		Bridge									

HEC-RAS Plan: Memorial_Calib Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	110799.0	Max WS	9945.91	-10.72	31.50		31.52	0.000138	1.16	9678.17	1013.48	0.04
W100_upstrm	110672.7	Max WS	9954.32	-13.25	31.48	-1.06	31.50	0.000106	1.37	10757.56	1015.55	0.05
W100_upstrm	110643.7 TRAVIS STREET		Bridge									
W100_upstrm	110614.7	Max WS	9947.81	-12.75	31.45		31.47	0.000119	1.41	10223.00	989.44	0.05
W100_upstrm	110200.2	Max WS	9979.81	-9.11	31.42	1.82	31.44	0.000026	1.15	9472.10	528.09	0.04
W100_upstrm	110154.2 MAIN STREET		Bridge									
W100_upstrm	110108.2	Max WS	9977.32	-9.31	31.21		31.23	0.000026	1.15	9467.33	527.98	0.04
W100_upstrm	110103.2	Max WS	9977.31	-9.31	31.21		31.23	0.000026	1.15	9467.25	527.98	0.04
Downstream	109924.2	Max WS	39869.93	-13.02	31.21		31.58	0.000596	4.90	8553.00	400.62	0.17
Downstream	109551.7	Max WS	39865.10	-14.28	31.05	5.28	31.36	0.000562	4.50	8865.50	356.01	0.16
Downstream	109518.7 FANNIN STREET		Bridge									
Downstream	109485.7	Max WS	39861.57	-15.31	30.15		30.46	0.000554	4.47	8912.51	356.51	0.16
Downstream	109440.2	Max WS	39857.96	-16.48	30.07	4.67	30.43	0.000953	4.76	8369.33	329.11	0.17
Downstream	109395.2 SAN JACINTO		Bridge									
Downstream	109350.2	Max WS	39849.25	-16.89	29.70		30.05	0.000949	4.76	8379.54	329.15	0.17
Downstream	109119.0	Max WS	39832.59	-17.14	29.29	5.94	29.78	0.001356	5.61	7100.72	452.24	0.22
Downstream	109103.1 CROSSWALK		Bridge									
Downstream	109087.2	Max WS	39821.07	-17.55	29.08		29.56	0.001317	5.55	7169.14	454.63	0.22
Downstream	108565.3	Max WS	39799.62	-12.77	28.55		28.96	0.000955	5.17	8210.17	502.68	0.18
Downstream	108334.0	Max WS	39792.70	-14.06	28.34		28.67	0.001248	4.71	9818.28	742.37	0.17
Downstream	107179.4	Max WS	39747.77	-20.52	27.00	1.64	27.48	0.000995	5.69	7611.22	395.10	0.20
Downstream	107158.9 S. PACIFIC RR		Bridge									
Downstream	107138.4	Max WS	39741.45	-20.19	26.83		27.34	0.001058	5.82	7413.72	394.89	0.21
Downstream	106594.0	Max WS	39729.71	-16.70	26.36		26.80	0.000891	5.28	7521.42	264.11	0.17
Downstream	106151.4	Max WS	39712.38	-13.85	25.69	3.82	26.20	0.001822	5.70	6961.91	272.35	0.20
Downstream	106131.1 MCKEE		Bridge									
Downstream	106110.8	Max WS	39705.78	-12.53	25.37		25.95	0.002078	6.09	6521.53	265.26	0.22
Downstream	105705.4	Max WS	39689.95	-18.22	24.86	2.44	25.41	0.000587	5.95	6667.17	291.95	0.22
Downstream	105667.4 ELYSIAN STREET		Bridge									
Downstream	105629.4	Max WS	39685.41	-18.43	24.54		25.09	0.000595	5.98	6634.01	291.01	0.22
Downstream	105476	Max WS	39684.46	-18.70	24.46		24.90	0.001688	5.34	7438.39	382.65	0.21
Downstream	104962	Max WS	39671.86	-18.70	24.06	3.67	24.23	0.000851	3.29	12045.45	642.66	0.13
Downstream	104948 US-59 Bridge		Bridge									
Downstream	104900.1	Max WS	39668.36	-19.15	23.93		24.10	0.000229	3.26	12182.78	730.62	0.14
Downstream	104900	Max WS	39667.54	-19.15	23.93	3.57	24.10	0.000229	3.26	12182.77	730.62	0.14
Downstream	104566 US-59 Bridge		Bridge									
Downstream	104464.1	Max WS	39660.53	-19.86	23.52		23.80	0.002057	4.25	9332.95	627.50	0.19
Downstream	104464	Max WS	39660.53	-19.86	23.52	2.89	23.80	0.002057	4.25	9332.82	627.49	0.19
Downstream	104383 US-59 Bridge		Bridge									
Downstream	104301.1	Max WS	39656.05	-20.42	23.22		23.54	0.000314	4.55	8723.06	526.77	0.20
Downstream	104301	Max WS	39654.59	-20.42	23.22	2.82	23.54	0.000314	4.55	8723.04	526.77	0.20
Downstream	104271 US-59 Bridge		Bridge									
Downstream	104242.1	Max WS	39650.82	-20.62	23.06		23.45	0.001369	4.98	7968.16	414.05	0.20
Downstream	104242	Max WS	39651.58	-20.62	23.06	2.89	23.45	0.001369	4.98	7968.12	414.05	0.20
Downstream	104204 US-59 Bridge		Bridge									
Downstream	104133	Max WS	39636.08	-21.02	22.60		23.25	0.000883	6.51	6092.91	402.79	0.29
Downstream	103664.0	Max WS	39619.88	-23.03	21.73		22.55	0.002139	7.27	5469.85	354.43	0.30
Downstream	102875.3	Max WS	39574.41	-26.39	20.48	1.06	21.08	0.001584	6.18	6400.72	362.62	0.26
Downstream	102847.5 HOUTerminal RR		Bridge									
Downstream	102819.7	Max WS	39567.86	-26.43	20.12		20.74	0.001661	6.30	6284.79	360.95	0.27
Downstream	102309.0	Max WS	39605.79	-23.48	19.66		20.21	0.000427	5.94	6671.16	218.14	0.19
Downstream	101828.0	Max WS	39642.28	-20.70	19.22	-0.52	19.88	0.000917	6.51	6088.55	264.81	0.24
Downstream	101790.1 JENSEN ROAD		Bridge									
Downstream	101752.2	Max WS	39639.25	-20.69	19.01		19.68	0.000924	6.58	6028.38	262.75	0.24
Downstream	101007.3	Max WS	39702.09	-16.93	18.63		19.19	0.000387	5.96	6656.09	268.54	0.21
Downstream	99992.6	Max WS	39786.00	-18.90	18.14		18.75	0.000477	6.27	6349.48	256.33	0.22
Downstream	98399.4	Max WS	39925.44	-20.26	17.46		18.03	0.000421	6.08	6569.06	265.56	0.22
Downstream	97517.4	Max WS	39998.46	-19.35	17.39		17.72	0.000260	4.65	8610.45	315.88	0.16
Downstream	96028.6	Max WS	40118.94	-17.81	16.55	-3.00	17.07	0.000611	5.82	6894.58	300.20	0.21
Downstream	95985.1 YORK DRIVE		Bridge									
Downstream	95941.6	Max WS	40119.05	-17.87	16.40		16.93	0.000615	5.84	6866.72	299.63	0.22
Downstream	95362.9	Max WS	40168.32	-15.97	16.19		16.64	0.000350	5.42	7410.99	330.64	0.20
Downstream	94280.7	Max WS	40262.59	-19.82	15.07		15.88	0.001072	7.22	5575.29	253.41	0.27
Downstream	93495.6	Max WS	40319.90	-20.43	14.67		15.21	0.000624	5.87	6872.67	339.10	0.23
Downstream	92795.6	Max WS	40384.24	-20.98	14.27	-4.95	14.83	0.000440	6.01	6716.35	299.15	0.22
Downstream	92741.1 LOCKWOOD DRIVE		Bridge									
Downstream	92686.6	Max WS	40381.59	-21.08	14.05		14.62	0.000447	6.04	6681.13	298.42	0.23
Downstream	90936.7	Max WS	40486.68	-18.64	12.83		13.33	0.001019	5.68	7122.72	400.33	0.24
Downstream	89918.4	Max WS	40503.17	-17.23	11.65		12.39	0.000813	6.94	5881.37	406.83	0.29
Downstream	88579.0	Max WS	40535.93	-20.97	10.67		11.37	0.000699	6.72	6030.37	328.78	0.28
Downstream	87591.9	Max WS	40563.59	-23.72	10.17		10.75	0.000536	6.12	6626.23	306.01	0.23
Downstream	86660.2	Max WS	40592.50	-23.42	9.85	-9.83	10.32	0.000370	5.52	7351.80	295.74	0.20
Downstream	86641.7 HOUTerminal RR		Bridge									
Downstream	86623.2	Max WS	40579.34	-23.61	9.52		10.00	0.000375	5.55	7309.46	295.35	0.20
Downstream	85855.2	Max WS	40572.34	-26.84	8.56		9.57	0.000763	8.06	5032.63	211.83	0.29
Downstream	85238.7	Max WS	40591.30	-29.43	8.28		9.11	0.000711	7.32	5746.04	313.65	0.26
Downstream	84561.7	Max WS	40624.11	-32.27	8.02	-12.84	8.70	0.000433	6.62	6355.69	345.85	0.23
Downstream	84531.4 NORTH WAYSIDE RD		Bridge									
Downstream	84501.1	Max WS	40609.00	-28.97	7.42		8.35	0.000680	7.74	5244.04	214.64	0.28
Downstream	84252.6	Max WS	40619.39	-26.90	7.42	-9.33	8.19	0.000576	7.05	5758.28	250.25	0.26
Downstream	84222.3 M. GARCIA		Bridge									
Downstream	84192.0	Max WS	40608.96	-24.10	6.75		7.81	0.000909	8.24	4925.85	234.26	0.32
Downstream	83635.7	Max WS	40628.52	-21.72	6.74		7.36	0.000631	6.34	6404.85	352.83	0.26
Downstream	81786.1	Max WS	40690.43	-31.97	5.77		6.32	0.000480	5.92	6889.44	348.56	0.23
Downstream	80903.1	Max WS	40732.09	-27.77	5.51	-12.23	5.92	0.000401	5.17	7872.71	397.78	0.20
Downstream	80883.1 S. PACIFIC RR		Bridge									
Downstream	80863.1	Max WS	33863.23	-28.10	5.15		5.44	0.000321	4.31	7863.52	397.62	0.17

HEC-RAS Plan: Memorial_Calib Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	80538.0	Max WS	33834.38	-33.12	5.25	-21.15	5.36	0.000085	2.70	12542.62	500.38	0.09

White Oak Bayou
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HEC-RAS Plan: Memorial_Calib Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	36134.	Max WS	17953.75	24.19	50.78		51.38	0.000498	6.21	2890.61	187.34	0.28
E100-00-00	35718.0	Max WS	17952.03	23.76	50.54		51.18	0.000438	6.42	2796.75	181.49	0.29
E100-00-00	35158.	Max WS	18103.02	22.89	50.37		50.92	0.000461	5.97	3030.12	195.59	0.27
E100-00-00	35006.0	Max WS	18150.50	22.66	50.24	38.48	50.85	0.000428	6.27	2895.11	188.64	0.28
E100-00-00	34951.5 ELLA		Bridge									
E100-00-00	34895.0	Max WS	18150.09	22.56	50.10		50.71	0.000431	6.29	2887.06	188.41	0.28
E100-00-00	34645.	Max WS	18206.09	22.24	50.02		50.59	0.000501	6.10	2986.98	196.34	0.28
E100-00-00	34206.0	Max WS	18340.77	21.68	49.82		50.39	0.000395	6.08	3018.88	190.78	0.27
E100-00-00	33962.58	Max WS	18426.69	21.61	49.89		50.28	0.000413	5.06	3662.25	326.23	0.26
E100-00-00	33909.08	Max WS	18440.00	21.60	49.84		50.26	0.000575	5.18	3557.37	325.34	0.28
E100-00-00	33770.	Max WS	18477.99	21.56	49.81		50.20	0.000261	5.04	3848.81	351.95	0.22
E100-00-00	33681.0	Max WS	18502.48	21.53	49.56	37.07	50.17	0.000438	6.28	2944.72	332.40	0.28
E100-00-00	33645.5 W 18TH		Bridge									
E100-00-00	33610.0	Max WS	18501.59	21.61	49.42		50.05	0.000453	6.37	2903.45	328.83	0.29
E100-00-00	33357.	Max WS	18556.16	21.41	49.35		49.92	0.000557	6.07	3057.25	206.64	0.28
E100-00-00	32570.0	Max WS	18828.33	20.78	49.01		49.54	0.000377	5.83	3227.18	203.91	0.26
E100-00-00	31583.0	Max WS	19043.76	19.35	48.69		49.18	0.000331	5.58	3410.14	206.51	0.24
E100-00-00	30779.0	Max WS	19246.85	18.79	48.45		48.91	0.000316	5.48	3730.23	341.15	0.24
E100-00-00	29659.	Max WS	19473.93	17.66	48.12		48.52	0.000359	5.07	3840.20	237.60	0.22
E100-00-00	29368.0	Max WS	19620.41	17.37	47.78	34.49	48.41	0.000422	6.32	3104.35	176.97	0.27
E100-00-00	29297.5 TC JESTER SOUTH		Bridge									
E100-00-00	29203.0	Max WS	19612.11	17.35	47.39		48.04	0.000445	6.45	3039.10	175.64	0.27
E100-00-00	28775.	Max WS	19710.57	16.90	47.45		47.85	0.000409	5.08	3880.27	264.64	0.23
E100-00-00	28375.0	Max WS	19759.70	16.48	47.14	33.44	47.69	0.000376	5.99	3300.55	198.00	0.26
E100-00-00	28357.0 BICYCLE BRIDGE		Bridge									
E100-00-00	28330.0	Max WS	19758.18	16.41	47.03		47.59	0.000378	6.00	3293.28	197.80	0.26
E100-00-00	28190.0	Max WS	19788.81	16.18	47.00	32.91	47.54	0.000341	5.91	3349.96	190.63	0.25
E100-00-00	28152.5 W 11TH		Bridge									
E100-00-00	28113.0	Max WS	19783.93	16.28	46.88		47.43	0.000354	5.98	3308.47	190.60	0.25
E100-00-00	27982.	Max WS	19804.52	16.25	46.79		47.38	0.000428	6.19	3201.84	194.63	0.27
E100-00-00	27429.0	Max WS	19866.75	16.12	46.62		47.16	0.000369	5.87	3384.27	202.64	0.25
E100-00-00	26598.	Max WS	20036.90	15.35	46.36		46.85	0.000346	5.60	3575.47	213.81	0.24
E100-00-00	26498.0	Max WS	20053.94	15.26	46.35	32.27	46.82	0.000332	5.50	3647.28	216.31	0.24
E100-00-00	26432.5 TC JESTER		Bridge									
E100-00-00	26366.0	Max WS	20043.58	15.16	46.17		46.64	0.000335	5.52	3630.42	215.85	0.24
E100-00-00	26307.3	Max WS	20060.76	15.13	46.24		46.62	0.000291	5.00	4232.20	439.18	0.21
E100-00-00	26225	Max WS	20071.63	15.04	46.22		46.60	0.000309	4.92	4250.98	435.64	0.21
E100-00-00	26140.	Max WS	20069.46	14.97	46.08		46.57	0.000359	5.61	3576.68	221.81	0.25
E100-00-00	25536.0	Max WS	20137.75	14.48	45.86		46.35	0.000351	5.63	3661.10	287.19	0.24
E100-00-00	25132.	Max WS	20203.72	14.29	45.76		46.22	0.000324	5.51	4107.96	363.75	0.24
E100-00-00	24817.0	Max WS	20193.20	14.14	45.50	32.18	46.08	0.000523	6.12	3298.85	226.05	0.28
E100-00-00	24789.0 UNION PACIFIC RR		Bridge									
E100-00-00	24758.0	Max WS	20166.52	13.76	44.98		45.58	0.000525	6.18	3261.80	222.06	0.28
E100-00-00	24636.	Max WS	20209.15	13.61	45.07		45.52	0.000346	5.47	4036.84	405.13	0.24
E100-00-00	23934.0	Max WS	20297.65	12.75	44.82		45.24	0.000432	5.22	3887.84	282.27	0.25
E100-00-00	23550.0	Max WS	20370.32	12.77	44.74	28.63	45.10	0.000266	4.87	4181.57	252.57	0.21
E100-00-00	23506.5 DURHAM		Bridge									
E100-00-00	23444.0	Max WS	20355.25	12.69	44.57		44.94	0.000268	4.89	4159.50	251.68	0.21
E100-00-00	23180.	Max WS	20377.49	12.46	44.43		44.87	0.000289	5.41	4114.60	487.44	0.23
E100-00-00	22983.	Max WS	20387.40	12.29	44.24		44.81	0.000421	6.09	3548.36	451.41	0.27
E100-00-00	22834.0	Max WS	20409.36	12.16	44.13	30.69	44.73	0.000527	6.25	3267.13	458.62	0.27
E100-00-00	22796.5 SHEPHERD		Bridge									
E100-00-00	22758.0	Max WS	20391.65	12.11	43.97		44.58	0.000576	6.26	3454.95	448.40	0.27
E100-00-00	22610.	Max WS	20419.69	11.92	44.00		44.50	0.000510	5.75	3891.37	437.09	0.25
E100-00-00	22224.0	Max WS	20490.01	11.41	44.04		44.29	0.000410	4.27	6536.21	706.17	0.19
E100-00-00	21444.0	Max WS	20579.74	10.52	43.44		43.95	0.000559	5.73	3639.36	385.24	0.25
E100-00-00	20746.0	Max WS	20670.04	10.00	42.98		43.50	0.000731	5.79	3572.28	244.27	0.27
E100-00-00	20644.0	Max WS	20691.36	9.95	43.01	28.75	43.44	0.000441	5.36	4902.08	775.42	0.23
E100-00-00	20633.0 Pipeline		Bridge									
E100-00-00	20622.0	Max WS	20684.43	9.95	42.92		43.35	0.000450	5.40	4812.31	757.35	0.23
E100-00-00	20521.	Max WS	20700.73	9.91	42.86		43.31	0.000425	5.53	4797.36	614.03	0.23
E100-00-00	19917.0	Max WS	20799.88	9.66	42.47		43.00	0.000566	5.88	3563.07	406.83	0.26
E100-00-00	19463.0	Max WS	20871.55	9.25	42.17		42.74	0.000603	6.03	3463.94	215.16	0.26
E100-00-00	18857	Max WS	20622.58	8.03	41.78	27.79	42.35	0.000599	6.09	3533.59	296.81	0.26
E100-00-00	18800 I-10 WBFR		Bridge									
E100-00-00	18747	Max WS	20981.49	7.81	41.82		42.26	0.000423	5.37	4144.51	314.59	0.22
E100-00-00	18746	Max WS	20982.27	7.81	41.82	26.53	42.26	0.000423	5.37	4144.37	314.59	0.22
E100-00-00	18595 I-10 BRIDGE		Bridge									
E100-00-00	18443	Max WS	20637.82	7.19	41.05		41.50	0.000436	5.42	3915.29	283.74	0.23
E100-00-00	18442	Max WS	20637.98	7.19	41.05	26.29	41.50	0.000436	5.42	3915.15	283.74	0.23
E100-00-00	18394 I-10 EBFR		Bridge									
E100-00-00	18377.	Max WS	20652.88	6.98	40.81		41.30	0.000479	5.61	3773.47	275.79	0.24
E100-00-00	18234.0	Max WS	20684.36	6.77	40.96	25.49	41.24	0.000283	4.25	4872.38	288.71	0.18
E100-00-00	18220.0 UNION PACIFIC RR		Bridge									
E100-00-00	18199.0	Max WS	20683.81	6.70	40.74		41.03	0.000302	4.32	4793.16	282.62	0.18
E100-00-00	18176.0	Max WS	20686.96	6.79	40.66	25.56	41.02	0.000270	4.82	4288.17	271.68	0.19
E100-00-00	18138.0 YALE		Bridge									
E100-00-00	18082.0	Max WS	20686.06	6.87	39.94		40.44	0.000374	5.65	3659.64	228.60	0.23
E100-00-00	17905.	Max WS	20715.24	6.86	39.94		40.37	0.000432	5.26	4043.42	404.06	0.22
E100-00-00	17756.0	Max WS	20737.33	6.85	39.89	26.33	40.29	0.000541	5.07	4145.64	507.64	0.24
E100-00-00	17726 S. HEIGHTS		Bridge									
E100-00-00	17696	Max WS	20185.57	6.85	38.57		39.03	0.000644	5.44	3709.50	276.61	0.26
E100-00-00	17657	Max WS	20193.97	6.35	38.58	25.66	39.00	0.000594	5.24	3852.17	283.99	0.25
E100-00-00	17627 N. HEIGHTS		Bridge									
E100-00-00	17597.0	Max WS	19972.66	6.35	37.82		38.29	0.000656	5.48	3642.10	273.04	0.26
E100-00-00	17318.	Max WS	18747.29	6.35	37.56		38.05	0.000514	5.62	3336.64	210.54	0.25
E100-00-00	16831.0	Max WS	18826.50	6.34	37.57		37.88	0.000196	4.48	4199.20	344.38	0.23

HEC-RAS Plan: Memorial_Calib Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	15795.0	Max WS	18436.84	4.84	37.48		37.64	0.000231	3.20	5767.75	403.22	0.15
E100-00-00	15278.	Max WS	18172.70	4.41	37.18		37.52	0.000234	4.67	3899.24	239.86	0.20
E100-00-00	14977.0	Max WS	18244.89	4.16	37.21	21.95	37.47	0.000113	4.14	4412.00	267.16	0.18
E100-00-00	14937.0 I-10 EBFR ACCESS		Bridge									
E100-00-00	14897.0	Max WS	18178.14	3.39	37.18		37.42	0.000099	3.94	4612.67	271.20	0.17
E100-00-00	14890	Max WS	18129.42	3.42	37.13	21.15	37.42	0.000119	4.37	4150.22	239.99	0.19
E100-00-00	14775 I-10 BRIDGE		Bridge									
E100-00-00	14660	Max WS	18069.39	3.42	37.04		37.34	0.000120	4.37	4130.39	239.54	0.19
E100-00-00	14590.0	Max WS	18005.87	3.45	36.94	20.93	37.33	0.000156	4.97	3622.41	209.00	0.21
E100-00-00	14562.0 I-10 WB ACCESS		Bridge									
E100-00-00	14532.0	Max WS	17917.17	3.41	36.81		37.20	0.000369	4.97	3603.00	208.48	0.21
E100-00-00	14354.0	Max WS	18089.84	3.29	37.00		37.15	0.000096	3.10	5852.29	531.37	0.16
E100-00-00	13924.0	Max WS	17985.44	3.18	36.84	20.68	37.08	0.000232	4.05	4856.13	350.39	0.16
E100-00-00	13909.5 UNION PAC. RR		Bridge									
E100-00-00	13898.0	Max WS	17956.01	2.95	36.60		36.85	0.000233	4.06	4825.49	348.80	0.17
E100-00-00	13494.	Max WS	17980.86	2.47	36.60		36.75	0.000230	3.23	6074.99	428.67	0.14
E100-00-00	13220.0	Max WS	18003.71	2.15	36.61	20.51	36.70	0.000064	2.56	8010.36	655.47	0.11
E100-00-00	13182.5 STUDEMONT		Bridge									
E100-00-00	13143.0	Max WS	17992.04	2.15	36.57		36.67	0.000064	2.56	7671.07	559.66	0.11
E100-00-00	12698.	Max WS	17956.48	1.87	36.45		36.62	0.000170	3.30	5434.37	368.23	0.15
E100-00-00	12066.0	Max WS	17993.40	1.47	36.42		36.52	0.000148	2.64	6814.37	447.95	0.12
E100-00-00	11546.0	Max WS	18014.72	0.90	36.39		36.47	0.000058	2.31	8670.76	970.30	0.10
E100-00-00	11021.	Max WS	18046.46	0.63	36.37		36.44	0.000047	2.24	8625.45	878.29	0.09
E100-00-00	10908.0	Max WS	18062.41	0.57	36.38	18.40	36.44	0.000040	2.12	10556.88	981.27	0.09
E100-00-00	10852.5 TAYLOR (SAWYER)		Bridge									
E100-00-00	10804.0	Max WS	18059.68	0.45	36.24		36.30	0.000040	2.11	10551.41	980.90	0.09
E100-00-00	10643.	Max WS	18013.79	0.14	36.13		36.31	0.000144	3.41	5768.01	593.79	0.13
E100-00-00	9779.0	Max WS	18059.95	-1.51	36.14		36.21	0.000045	2.28	9327.83	736.78	0.09
E100-00-00	8532.0	Max WS	18148.81	-1.76	36.15		36.17	0.000013	1.05	17415.55	1101.59	0.04
E100-00-00	8140.	Max WS	18175.97	-2.43	36.14		36.15	0.000062	1.06	19006.11	1364.08	0.04
E100-00-00	7649.0	Max WS	18193.74	-3.26	36.10	14.39	36.15	0.000026	1.97	18045.91	1711.31	0.07
E100-00-00	7608.5 HOUSTON		Bridge									
E100-00-00	7568.0	Max WS	18196.14	-3.15	36.11		36.14	0.000018	1.66	17886.63	1709.34	0.06
E100-00-00	7546.0	Max WS	18200.30	-3.16	36.11	14.36	36.14	0.000020	1.71	17386.97	1702.51	0.06
E100-00-00	7535.5 Pipeline		Bridge									
E100-00-00	7529.0	Max WS	18193.18	-3.16	36.09		36.13	0.000020	1.71	17365.55	1702.22	0.06
E100-00-00	7353.	Max WS	18190.56	-3.18	36.08		36.13	0.000027	1.97	14439.09	1676.58	0.07
E100-00-00	6980	Max WS	18190.22	-3.22	36.09		36.11	0.000019	1.32	15189.82	1020.83	0.05
E100-00-00	6975.0	Max WS	18188.28	-3.22	36.09	15.41	36.11	0.000019	1.32	15189.72	1020.83	0.05
E100-00-00	6935.0 I-10 EAST RAMP		Bridge									
E100-00-00	6898.0	Max WS	18188.28	-4.23	36.08		36.10	0.000016	1.27	15801.26	1020.78	0.05
E100-00-00	6895	Max WS	18188.28	-4.23	36.08		36.10	0.000016	1.27	15801.21	1020.78	0.05
E100-00-00_02	6775.	Max WS	33355.60	-4.30	36.08		36.16	0.000062	2.42	14468.17	873.59	0.09
E100-00-00_02	6473.0	Max WS	33343.82	-4.46	36.02	17.23	36.15	0.000073	2.87	13014.68	1151.10	0.11
E100-00-00_02	6448.0 I-45 NORTH RAMP		Bridge									
E100-00-00_02	6423.0	Max WS	33334.88	-4.33	36.00		36.13	0.000075	2.88	12867.40	1148.66	0.11
E100-00-00_02	6174.0	Max WS	33254.55	-4.69	35.71	17.63	36.11	0.000289	5.09	6553.03	1158.47	0.19
E100-00-00_02	6128.0 I-45 NORTH		Bridge									
E100-00-00_02	6078	Max WS	33167.70	-3.96	35.48		35.91	0.000327	5.28	6300.81	1155.79	0.20
E100-00-00_02	6068.0	Max WS	33204.73	-3.96	35.57	17.58	35.92	0.000092	4.92	7297.65	1219.33	0.17
E100-00-00_02	6046 I-10 to I-45 DC		Bridge									
E100-00-00_02	6020	Max WS	33254.45	-3.89	35.70		35.89	0.000069	3.57	9514.71	1168.50	0.13
E100-00-00_02	5525.0	Max WS	33270.97	-3.15	35.78		35.86	0.000062	2.24	14858.23	753.91	0.09
E100-00-00_02	4994.0	Max WS	33291.45	-3.09	35.66	16.01	35.80	0.000159	3.12	11557.77	637.10	0.11
E100-00-00_02	4980.0 RR OVERPASS		Bridge									
E100-00-00_02	4961.0	Max WS	33258.66	-3.03	35.55		35.70	0.000179	3.16	11372.74	632.46	0.11
E100-00-00_02	4812.0	Max WS	33194.12	-3.49	35.39	15.80	35.63	0.000726	3.96	8374.35	503.62	0.17
E100-00-00_02	4774.5 CROCKETT/HOGAN		Bridge									
E100-00-00_02	4687.0	Max WS	31489.40	-4.67	33.24		33.46	0.000319	3.73	8434.78	518.18	0.16
E100-00-00_02	4407.	Max WS	31085.46	-3.62	33.05		33.37	0.000365	4.61	7292.36	909.36	0.18
E100-00-00_02	4014.0	Max WS	31154.55	-2.15	33.07	14.35	33.24	0.000235	3.35	9487.79	816.59	0.14
E100-00-00_02	3997.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	3976.0	Max WS	31063.10	-2.40	32.77		32.94	0.000226	3.34	9470.83	807.17	0.14
E100-00-00_02	3681.	Max WS	30439.69	-3.80	32.60		32.86	0.000342	4.10	7841.85	1094.01	0.17
E100-00-00_02	3585.0	Max WS	30395.63	-4.26	32.56		32.83	0.000287	4.13	7655.00	692.33	0.18
E100-00-00_02	2298.0	Max WS	30271.75	-6.21	32.26		32.48	0.000248	3.85	9573.99	831.50	0.15
E100-00-00_02	1580.	Max WS	30326.75	-7.83	32.16		32.33	0.000222	3.73	11564.09	1080.24	0.14
E100-00-00_02	1353.0	Max WS	30296.81	-8.34	32.07	13.94	32.29	0.000307	4.30	10000.78	1346.10	0.16
E100-00-00_02	1335.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	1319.0	Max WS	30248.04	-8.37	32.00		32.21	0.000307	4.29	10033.96	1422.67	0.16
E100-00-00_02	984.0	Max WS	30223.27	-8.69	31.86	10.84	32.13	0.000185	4.36	9786.34	745.92	0.16
E100-00-00_02	978 MAIN STREET		Bridge									
E100-00-00_02	971.6	Max WS	30200.47	-8.69	31.81		32.08	0.000187	4.37	9748.90	744.80	0.17
E100-00-00_02	971.5	Max WS	30192.89	-8.69	31.81	10.83	32.08	0.000187	4.37	9748.89	744.80	0.17
E100-00-00_02	961.5 1ST STREET		Bridge									
E100-00-00_02	851.0	Max WS	30143.86	-6.40	31.69		31.99	0.000244	4.74	9504.63	798.48	0.19
E100-00-00_02	654.0	Max WS	30176.17	-6.50	31.73		31.92	0.000138	3.68	10942.00	692.65	0.14
E100-00-00_02	400.0	Max WS	30125.61	-8.58	31.59	8.97	31.92	0.000202	4.83	8722.15	541.06	0.17
E100-00-00_02	381.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	365.0	Max WS	29961.58	-8.23	31.54		31.87	0.000202	4.81	8491.40	554.44	0.17
E100-00-00_02	210.0	Max WS	29918.85	-7.81	31.45	10.07	31.86	0.000236	5.37	8032.31	917.14	0.19
E100-00-00_02	191.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	173.1	Max WS	29892.62	-6.84	31.21		31.68	0.000277	5.75	7324.70	1166.02	0.20
E100-00-00_02	173.0	Max WS	29892.62	-6.84	31.21		31.68	0.000277	5.75	7324.68	1166.02	0.20

Little White Oak Bayou
Memorial Day 2015

HEC-RAS Plan: Memorial_Calib River: E101-00-00 Reach: E101-00-00_0003 Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	9819.000	Max WS	15016.91	16.33	42.71		43.12	0.000728	5.11	2938.90	204.79	0.24
E101-00-00_0003	9750.000	Max WS	15014.78	16.31	42.70		43.07	0.000677	4.88	3076.97	218.71	0.23
E101-00-00_0003	9000.000	Max WS	14975.51	15.50	42.58		42.71	0.000248	3.04	5420.26	570.85	0.14
E101-00-00_0003	8469.000	Max WS	15032.55	13.02	42.42		42.57	0.000297	3.48	5183.91	657.84	0.14
E101-00-00_0003	7984.000	Max WS	15096.45	13.76	42.26		42.42	0.000321	3.76	4952.66	407.94	0.16
E101-00-00_0003	6838.000	Max WS	15213.70	12.20	41.75		41.98	0.000453	3.87	4095.32	552.20	0.20
E101-00-00_0003	5861.000	Max WS	15324.15	9.91	41.28		41.54	0.000506	4.35	4582.98	481.99	0.18
E101-00-00_0003	4720.000	Max WS	15403.15	8.13	40.85		41.11	0.000464	4.87	5945.60	860.88	0.18
E101-00-00_0003	4279.000	Max WS	15448.10	9.00	40.51		40.90	0.000710	5.45	4133.01	638.86	0.22
E101-00-00_0003	4130.000	Max WS	15472.32	8.68	40.61	21.48	40.76	0.000133	3.34	6989.32	876.26	0.12
E101-00-00_0003	4091.000 N. MAIN		Bridge									
E101-00-00_0003	4050.000	Max WS	15469.84	7.87	40.53		40.68	0.000126	3.33	6517.26	777.95	0.12
E101-00-00_0003	3952.	Max WS	15483.52	6.87	40.44		40.67	0.000162	3.92	4331.30	244.74	0.14
E101-00-00_0003	3466.000	Max WS	15559.89	1.92	40.44		40.62	0.000073	4.10	6591.75	629.86	0.12
E101-00-00_0003	3300.	Max WS	15582.71	-1.50	40.49		40.58	0.000059	2.92	8411.24	628.56	0.09
E101-00-00_0003	3203.000	Max WS	15595.56	-3.50	40.49		40.57	0.000056	2.54	8596.27	667.16	0.08
E101-00-00_0003	2797.000 I-45		Culvert									
E101-00-00_0003	2389.000	Max WS	15040.51	-0.26	36.72		36.84	0.000191	3.11	7500.06	611.00	0.10
E101-00-00_0003	2325.	Max WS	15042.01	-0.15	36.72		36.83	0.000176	2.91	7646.57	588.33	0.10
E101-00-00_0003	1855.000	Max WS	15095.57	0.68	36.71		36.78	0.000074	2.03	8543.27	522.68	0.06
E101-00-00_0003	1126.	Max WS	15143.79	-1.85	36.58		36.68	0.000297	3.02	7607.98	988.51	0.11
E101-00-00_0003	1070.000	Max WS	15149.22	-2.04	36.53	13.76	36.69	0.000299	3.72	7862.24	1139.16	0.12
E101-00-00_0003	1029.500 WRIGHTWOOD		Bridge									
E101-00-00_0003	987.000	Max WS	15134.84	-2.04	36.40		36.56	0.000329	3.69	7723.59	1106.57	0.12
E101-00-00_0003	911.	Max WS	15144.61	-2.19	36.43		36.52	0.000207	3.08	8999.31	1161.13	0.10
E101-00-00_0003	756.	Max WS	15162.56	-2.51	36.34		36.45	0.000697	2.82	7082.50	1144.86	0.13
E101-00-00_0003	637.000	Max WS	15174.69	-2.75	36.31	18.64	36.38	0.000464	2.29	9062.17	1317.34	0.10
E101-00-00_0003	538.000 QUITMAN/WHITEOAK		Bridge									
E101-00-00_0003	442.000	Max WS	15167.37	-2.75	36.06		36.15	0.000356	2.62	8579.43	1250.97	0.10
E101-00-00_0003	306.000	Max WS	15167.32	-2.86	36.08		36.11	0.000037	1.58	12806.35	1799.72	0.06

Buffalo Bayou
Tax Day 2016

HEC-RAS Plan: Tax_Calib Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	128109.6	Max WS	9917.81	-4.29	31.65		31.68	0.000113	1.43	6912.54	391.25	0.06
W100_upstrm	128104.6	Max WS	9917.70	-4.29	31.65	6.54	31.68	0.000113	1.43	6912.34	391.24	0.06
W100_upstrm	128066.7 SHEPHERD		Bridge									
W100_upstrm	128028.8	Max WS	9917.27	-4.51	31.43		31.46	0.000076	1.43	6911.88	391.23	0.06
W100_upstrm	126647.0	Max WS	10048.96	-3.93	31.38		31.39	0.000026	0.87	11559.70	791.54	0.04
W100_upstrm	125376.9	Max WS	10130.54	-4.05	31.22		31.27	0.000170	1.78	5705.69	334.97	0.08
W100_upstrm	124983.5	Max WS	10153.90	-3.86	31.18		31.23	0.000042	1.71	5928.21	1002.50	0.08
W100_upstrm	124644.1	Max WS	10138.40	-3.69	31.16	8.98	31.21	0.000052	1.79	5678.99	489.67	0.07
W100_upstrm	124591.8 WAUGH DRIVE		Bridge									
W100_upstrm	124539.5	Max WS	10131.12	-3.74	31.15		31.20	0.000052	1.78	5690.58	490.04	0.07
W100_upstrm	123658.2	Max WS	10200.58	-2.04	31.15		31.16	0.000026	0.92	11734.99	1313.61	0.04
W100_upstrm	123138.8	Max WS	10233.39	-4.08	31.14		31.15	0.000014	0.69	15233.64	981.41	0.03
W100_upstrm	122627.1	Max WS	10269.79	-6.08	31.11		31.16	0.000027	1.47	8590.13	689.28	0.06
W100_upstrm	122572.1 MONTROSE COURT		Mult Open									
W100_upstrm	122517.1	Max WS	10269.79	-5.38	31.11		31.14	0.000044	1.48	8133.78	618.29	0.06
W100_upstrm	122371.6	Max WS	10278.26	-7.00	31.09	4.89	31.13	0.000081	1.71	6021.06	850.36	0.07
W100_upstrm	122265 ROSEMONT		Bridge									
W100_upstrm	122210.0	Max WS	10278.26	-5.60	31.05		31.09	0.000050	1.62	6357.93	735.12	0.06
W100_upstrm	122036.7	Max WS	10288.55	-8.40	31.05		31.09	0.000054	1.47	7859.04	754.13	0.06
W100_upstrm	121229.5	Max WS	10339.70	-11.37	31.02		31.05	0.000037	1.37	8671.73	837.56	0.06
W100_upstrm	120962.2	Max WS	10354.17	-10.59	30.99		31.04	0.000050	1.69	6603.96	661.30	0.07
W100_upstrm	120005.2	Max WS	10402.04	-7.78	30.98	4.34	30.99	0.000039	0.75	13937.51	927.38	0.03
W100_upstrm	119952.6 MEMORIAL DRIVE		Bridge									
W100_upstrm	119900.0	Max WS	10401.14	-7.64	30.96		30.97	0.000024	0.75	13788.39	925.67	0.03
W100_upstrm	119495.9	Max WS	10428.24	-7.21	30.96		30.96	0.000011	0.50	21047.27	1245.36	0.02
W100_upstrm	118667.7	Max WS	10492.46	-8.56	30.93		30.94	0.000035	0.97	10897.68	719.85	0.04
W100_upstrm	118466.1	Max WS	10503.46	-8.89	30.91	2.28	30.94	0.000025	1.33	8612.59	798.95	0.05
W100_upstrm	118418.1 MEMORIAL DRIVE		Bridge									
W100_upstrm	118370.1	Max WS	10503.46	-8.87	30.87		30.90	0.000027	1.33	8566.19	797.92	0.05
W100_upstrm	117845.4	Max WS	10539.67	-7.26	30.86		30.88	0.000039	1.17	9245.07	574.08	0.05
W100_upstrm	117204.3	Max WS	10586.42	-4.60	30.85		30.86	0.000024	0.96	11062.60	649.81	0.04
W100_upstrm	116395.7	Max WS	10638.77	-3.88	30.82		30.84	0.000022	1.07	9899.10	502.03	0.04
W100_upstrm	116167.6	Max WS	10656.68	-3.68	30.78	4.70	30.83	0.000086	1.78	5996.46	271.67	0.06
W100_upstrm	116121.9 SABINE AVENUE		Bridge									
W100_upstrm	116076.2	Max WS	10656.68	-3.86	30.59		30.64	0.000083	1.78	5993.20	271.63	0.07
W100_upstrm	115804.5	Max WS	10682.98	-4.60	30.55	4.79	30.63	0.000042	2.35	6120.17	302.87	0.07
W100_upstrm	115800 I-45 S EXIT RAMP		Bridge									
W100_upstrm	115729.9	Max WS	10682.98	-4.81	30.55		30.62	0.000043	2.25	5938.91	342.48	0.07
W100_upstrm	115672.3	Max WS	10686.83	-5.10	30.54	4.95	30.62	0.000048	2.40	6295.10	412.42	0.08
W100_upstrm	115635.5 I-45 SBML		Bridge									
W100_upstrm	115621.1	Max WS	10688.06	-5.57	30.56		30.61	0.000032	2.00	7677.69	636.47	0.06
W100_upstrm	115594.6	Max WS	10689.60	-6.04	30.57	3.46	30.61	0.000024	1.75	8586.98	690.12	0.06
W100_upstrm	115553.5 I-45 S. - ALLEN		Bridge									
W100_upstrm	115545.8	Max WS	10690.78	-6.85	30.56		30.60	0.000025	1.83	9225.06	697.60	0.06
W100_upstrm	115438.9	Max WS	10700.69	-7.24	30.56	3.69	30.60	0.000026	1.79	8562.32	522.43	0.06
W100_upstrm	115400 I-45 NBML		Bridge									
W100_upstrm	115365.4	Max WS	10701.79	-7.52	30.31		30.34	0.000020	1.59	8874.67	518.69	0.05
W100_upstrm	115284.6	Max WS	10707.49	-7.89	30.30	2.87	30.34	0.000026	1.80	12268.18	1123.22	0.06
W100_upstrm	115168.5 I-45 N. ENTRANCE		Bridge									
W100_upstrm	115104.1	Max WS	10707.49	-8.31	30.28		30.32	0.000016	1.48	10377.40	747.56	0.05
W100_upstrm	115001.1	Max WS	10719.18	-8.48	30.25	2.83	30.33	0.000039	2.27	7639.65	582.31	0.07
W100_upstrm	115000 I-45 RAMP MCKINN		Bridge									
W100_upstrm	114890.5	Max WS	10720.59	-8.56	30.25		30.32	0.000039	2.17	6991.44	421.82	0.07
W100_upstrm	114885	Max WS	10720.93	-8.56	30.25	2.23	30.32	0.000039	2.17	6991.36	421.80	0.07
W100_upstrm	114864.5 I-45 N. ENTRANCE		Bridge									
W100_upstrm	114838.5	Max WS	10720.93	-9.27	30.25		30.31	0.000036	2.12	7306.13	470.39	0.07
W100_upstrm	114492.0	Max WS	10747.05	-10.48	30.25		30.29	0.000038	1.60	6700.64	359.03	0.07
W100_upstrm	114195.9	Max WS	10766.31	-11.52	30.23	2.18	30.27	0.000085	1.76	6119.47	328.15	0.07
W100_upstrm	114168.9 RUSK STREET		Bridge									
W100_upstrm	114141.9	Max WS	10766.31	-10.83	30.19		30.25	0.000092	1.83	5894.28	323.01	0.07
W100_upstrm	114097.4	Max WS	10769.30	-7.46	30.20	3.88	30.24	0.000056	1.58	6813.39	381.39	0.07
W100_upstrm	114070.4 CAPITAL STREE		Bridge									
W100_upstrm	114043.4	Max WS	10769.30	-7.72	29.25		29.29	0.000063	1.64	6547.82	379.81	0.07
W100_upstrm	113644.0	Max WS	10796.17	-8.91	29.19		29.27	0.000058	2.32	5474.28	408.69	0.08
W100_upstrm	113411.6	Max WS	10814.18	-9.61	29.19	1.07	29.25	0.000052	1.98	5462.57	372.94	0.06
W100_upstrm	113374.3 TEXAS AVE		Bridge									
W100_upstrm	113337.0	Max WS	10812.19	-9.65	29.06		29.12	0.000053	1.99	5444.99	372.68	0.06
W100_upstrm	113266.4	Max WS	10810.74	-9.11	29.01	3.74	29.11	0.000217	2.52	4519.67	241.19	0.10
W100_upstrm	113238.6 BAGBY		Bridge									
W100_upstrm	113210.8	Max WS	10728.62	-9.46	28.58		28.67	0.000221	2.51	4499.15	240.88	0.10
W100_upstrm	112974.0	Max WS	10599.09	-10.69	28.53	1.82	28.63	0.000143	2.48	4271.07	201.45	0.09
W100_upstrm	112944.9 PRAIRIE		Bridge									
W100_upstrm	112915.8	Max WS	10487.27	-10.82	28.37		28.46	0.000140	2.46	4264.51	201.39	0.09
W100_upstrm	112575.5	Max WS	10438.82	-9.20	28.34	4.14	28.41	0.000169	2.07	5037.69	240.86	0.08
W100_upstrm	112534.5 PRESTON STREET		Bridge									
W100_upstrm	112493.5	Max WS	10385.49	-9.47	28.24		28.31	0.000164	2.05	5075.34	241.17	0.07
W100_upstrm	112003.3	Max WS	10381.61	-9.69	28.20	2.34	28.24	0.000104	1.70	6090.93	288.53	0.06
W100_upstrm	111953.3 CONGRESS STREET		Bridge									
W100_upstrm	111903.3	Max WS	10353.67	-9.84	28.14		28.18	0.000103	1.69	6115.92	288.90	0.06
W100_upstrm	111853.5	Max WS	10355.58	-9.86	28.13	1.92	28.18	0.000106	1.81	5729.25	228.78	0.06
W100_upstrm	111818.6 SMITH STREET		Bridge									
W100_upstrm	111783.7	Max WS	10347.37	-8.67	28.09		28.15	0.000120	1.90	5452.68	225.08	0.07
W100_upstrm	111626.7	Max WS	10355.09	-11.83	28.07	1.77	28.13	0.000129	1.83	5654.38	230.81	0.07
W100_upstrm	111518.6 LOUISIANA AND FR		Bridge									
W100_upstrm	111410.5	Max WS	10326.25	-11.23	27.97		28.03	0.000090	1.88	5492.28	229.63	0.07
W100_upstrm	110876.6	Max WS	10301.53	-10.43	27.94	-0.19	27.97	0.000092	1.45	7140.13	388.90	0.06
W100_upstrm	110837.8 MILAM		Bridge									

HEC-RAS Plan: Tax_Calib Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	110799.0	Max WS	10210.65	-10.72	27.88		27.91	0.000253	1.42	7226.40	413.39	0.05
W100_upstrm	110672.7	Max WS	10186.47	-13.25	27.84	-0.93	27.88	0.000207	1.74	7570.02	695.37	0.06
W100_upstrm	110643.7 TRAVIS STREET		Bridge									
W100_upstrm	110614.7	Max WS	10170.79	-12.75	27.81		27.86	0.000236	1.79	7256.02	670.56	0.07
W100_upstrm	110200.2	Max WS	10157.32	-9.11	27.77	1.91	27.80	0.000041	1.39	7641.05	473.57	0.05
W100_upstrm	110154.2 MAIN STREET		Bridge									
W100_upstrm	110108.2	Max WS	10149.48	-9.31	27.56		27.59	0.000041	1.39	7638.21	473.48	0.05
W100_upstrm	110103.2	Max WS	10149.48	-9.31	27.56		27.59	0.000041	1.39	7638.11	473.48	0.05
Downstream	109924.2	Max WS	31394.76	-13.02	27.56		27.87	0.000579	4.48	7144.42	371.38	0.16
Downstream	109551.7	Max WS	31394.27	-14.28	27.40	2.95	27.67	0.000522	4.14	7592.28	342.20	0.15
Downstream	109518.7 FANNIN STREET		Bridge									
Downstream	109485.7	Max WS	31394.05	-15.31	26.52		26.78	0.000513	4.11	7642.84	342.76	0.15
Downstream	109440.2	Max WS	31393.82	-16.48	26.45	2.38	26.75	0.000944	4.37	7186.54	323.81	0.16
Downstream	109395.2 SAN JACINTO		Bridge									
Downstream	109350.2	Max WS	31393.16	-16.89	26.13		26.42	0.000933	4.35	7214.20	323.94	0.16
Downstream	109119.0	Max WS	31392.09	-17.14	25.71	2.90	26.16	0.001374	5.36	5855.23	385.88	0.22
Downstream	109103.1 CROSSWALK		Bridge									
Downstream	109087.2	Max WS	31391.68	-17.55	25.54		25.97	0.001341	5.29	5934.28	392.91	0.22
Downstream	108565.3	Max WS	31390.72	-12.77	25.02		25.37	0.000959	4.75	6626.97	350.73	0.17
Downstream	108334.0	Max WS	31390.69	-14.06	24.81		25.11	0.001252	4.44	7286.14	627.44	0.17
Downstream	107179.4	Max WS	31389.49	-20.52	23.44	-0.71	23.88	0.000969	5.35	6208.63	390.25	0.20
Downstream	107158.9 S. PACIFIC RR		Bridge									
Downstream	107138.4	Max WS	31389.64	-20.19	23.29		23.75	0.001031	5.49	6023.94	387.26	0.21
Downstream	106594.0	Max WS	31389.30	-16.70	22.93		23.27	0.000726	4.73	6635.78	250.96	0.16
Downstream	106151.4	Max WS	31389.23	-13.85	22.37	1.89	22.78	0.001494	5.16	6080.55	258.10	0.19
Downstream	106131.1 MCKEE		Bridge									
Downstream	106110.8	Max WS	31389.04	-12.53	22.09		22.57	0.001712	5.53	5674.51	251.32	0.21
Downstream	105705.4	Max WS	31388.92	-18.22	21.65	0.35	22.11	0.000553	5.43	5780.00	258.69	0.20
Downstream	105667.4 ELYSIAN STREET		Bridge									
Downstream	105629.4	Max WS	31388.84	-18.43	21.34		21.80	0.000560	5.46	5753.67	257.48	0.20
Downstream	105476	Max WS	31388.82	-18.70	21.22		21.62	0.001681	5.04	6229.66	363.99	0.21
Downstream	104962	Max WS	31388.67	-18.70	20.79	1.48	20.94	0.000891	3.14	9988.89	610.18	0.14
Downstream	104948 US-59 Bridge		Bridge									
Downstream	104900.1	Max WS	31388.63	-19.15	20.65		20.81	0.000234	3.16	9943.34	628.80	0.14
Downstream	104900	Max WS	31388.61	-19.15	20.65	1.39	20.81	0.000234	3.16	9943.32	628.80	0.14
Downstream	104566 US-59 Bridge		Bridge									
Downstream	104464.1	Max WS	31388.60	-19.86	20.28		20.55	0.001666	4.17	7534.57	496.15	0.19
Downstream	104464	Max WS	31388.61	-19.86	20.28	0.97	20.55	0.001666	4.17	7534.49	496.15	0.19
Downstream	104383 US-59 Bridge		Bridge									
Downstream	104301.1	Max WS	31388.59	-20.42	20.05		20.34	0.000304	4.39	7151.74	466.43	0.20
Downstream	104301	Max WS	31388.60	-20.42	20.05	1.06	20.34	0.000304	4.39	7151.73	466.42	0.20
Downstream	104271 US-59 Bridge		Bridge									
Downstream	104242.1	Max WS	31388.59	-20.62	19.93		20.27	0.001199	4.66	6731.61	379.67	0.20
Downstream	104242	Max WS	31388.59	-20.62	19.93	1.03	20.27	0.001199	4.66	6731.57	379.67	0.20
Downstream	104204 US-59 Bridge		Bridge									
Downstream	104133	Max WS	31388.59	-21.02	19.52		20.13	0.000676	6.25	5018.17	282.53	0.26
Downstream	103664.0	Max WS	31388.59	-23.03	18.79		19.51	0.001964	6.79	4622.30	267.57	0.29
Downstream	102875.3	Max WS	31280.04	-26.39	17.59	-2.15	18.11	0.001567	5.82	5372.40	347.53	0.26
Downstream	102847.5 HOUTerminal RR		Bridge									
Downstream	102819.7	Max WS	31273.56	-26.43	17.28		17.83	0.001639	5.92	5280.00	345.94	0.27
Downstream	102309.0	Max WS	31303.16	-23.48	16.91		17.32	0.000322	5.15	6073.54	216.91	0.17
Downstream	101828.0	Max WS	31332.83	-20.70	16.58	-2.66	17.10	0.000604	5.78	5421.18	240.93	0.21
Downstream	101790.1 JENSEN ROAD		Bridge									
Downstream	101752.2	Max WS	31330.54	-20.69	16.43		16.96	0.000594	5.82	5382.64	238.42	0.22
Downstream	101007.3	Max WS	31383.14	-16.93	16.20		16.62	0.000325	5.22	6009.79	260.95	0.19
Downstream	99992.6	Max WS	31452.29	-18.90	15.80		16.27	0.000363	5.46	5760.33	246.96	0.20
Downstream	98399.4	Max WS	31549.25	-20.26	15.27		15.70	0.000340	5.26	5998.37	256.95	0.19
Downstream	97517.4	Max WS	31610.42	-19.35	15.21		15.46	0.000199	3.99	7925.46	313.04	0.14
Downstream	96028.6	Max WS	31701.56	-17.81	14.59	-4.74	14.98	0.000431	5.02	6319.68	288.04	0.19
Downstream	95985.1 YORK DRIVE		Bridge									
Downstream	95941.6	Max WS	31701.56	-17.87	14.46		14.86	0.000433	5.03	6299.67	287.60	0.19
Downstream	95362.9	Max WS	31494.17	-15.97	14.31		14.65	0.000277	4.63	6798.72	322.04	0.18
Downstream	94280.7	Max WS	31595.26	-19.82	13.54		14.11	0.000710	6.07	5200.93	236.17	0.23
Downstream	93495.6	Max WS	31656.88	-20.43	13.28		13.65	0.000447	4.94	6406.71	326.87	0.20
Downstream	92795.6	Max WS	31726.03	-20.98	13.00	-6.69	13.38	0.000318	5.00	6339.81	291.29	0.19
Downstream	92741.1 LOCKWOOD DRIVE		Bridge									
Downstream	92686.6	Max WS	31725.68	-21.08	12.82		13.21	0.000321	5.02	6317.61	290.83	0.19
Downstream	90936.7	Max WS	31281.06	-18.64	11.95		12.29	0.000692	4.62	6774.69	395.81	0.20
Downstream	89918.4	Max WS	31278.64	-17.23	11.19		11.66	0.000518	5.50	5707.90	357.48	0.23
Downstream	88579.0	Max WS	31364.39	-20.97	10.60		11.03	0.000423	5.22	6008.91	328.35	0.22
Downstream	87591.9	Max WS	31334.80	-23.72	10.31		10.66	0.000314	4.70	6669.77	306.31	0.18
Downstream	86660.2	Max WS	31388.05	-23.42	10.13	-11.61	10.40	0.000215	4.22	7434.09	296.49	0.15
Downstream	86641.7 HOUTerminal RR		Bridge									
Downstream	86623.2	Max WS	31245.16	-23.61	9.88		10.15	0.000215	4.21	7415.47	296.32	0.15
Downstream	85855.2	Max WS	31223.63	-26.84	9.35		9.91	0.000411	6.00	5201.68	214.08	0.21
Downstream	85238.7	Max WS	31255.77	-29.43	9.20		9.66	0.000388	5.43	6044.99	329.64	0.19
Downstream	84561.7	Max WS	31314.00	-32.27	9.07	-15.08	9.44	0.000227	4.88	6741.06	383.52	0.17
Downstream	84531.4 NORTH WAYSIDE RD		Bridge									
Downstream	84501.1	Max WS	31300.85	-28.97	8.76		9.25	0.000347	5.66	5566.18	274.36	0.20
Downstream	84252.6	Max WS	31323.65	-26.90	8.76	-11.33	9.17	0.000286	5.14	6121.89	306.18	0.18
Downstream	84222.3 M. GARCIA		Bridge									
Downstream	84192.0	Max WS	31313.22	-24.10	8.45		8.99	0.000430	5.88	5329.23	239.52	0.22
Downstream	83635.7	Max WS	31350.43	-21.72	8.47		8.77	0.000309	4.44	7054.19	388.39	0.18
Downstream	81786.1	Max WS	31440.03	-31.97	8.02		8.29	0.000206	4.10	7685.48	359.11	0.15
Downstream	80903.1	Max WS	31487.71	-27.77	7.91	-13.90	8.11	0.000178	3.56	8848.11	410.96	0.14
Downstream	80883.1 S. PACIFIC RR		Bridge									
Downstream	80863.1	Max WS	31493.11	-28.10	7.61		7.80	0.000204	3.56	8857.13	411.06	0.13

HEC-RAS Plan: Tax_Calib Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	80538.0	Max WS	31468.35	-33.12	7.67	-21.57	7.75	0.000077	2.28	13782.08	543.48	0.08

White Oak Bayou
Tax Day 2016

HEC-RAS Plan: Tax_Calib Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	36134.	Max WS	19113.36	24.19	50.76		51.44	0.000566	6.62	2886.86	187.23	0.30
E100-00-00	35718.0	Max WS	19098.87	23.76	50.49		51.22	0.000500	6.85	2787.03	181.22	0.31
E100-00-00	35158.	Max WS	19208.39	22.89	50.30		50.93	0.000525	6.37	3016.13	195.14	0.29
E100-00-00	35006.0	Max WS	19243.63	22.66	50.15	38.90	50.85	0.000488	6.69	2878.48	188.17	0.30
E100-00-00	34951.5 ELLA		Bridge									
E100-00-00	34895.0	Max WS	19240.82	22.56	50.00		50.70	0.000491	6.71	2868.79	187.90	0.30
E100-00-00	34645.	Max WS	19282.97	22.24	49.91		50.57	0.000570	6.50	2966.17	195.45	0.29
E100-00-00	34206.0	Max WS	19329.82	21.68	49.69		50.34	0.000445	6.45	2994.90	189.63	0.29
E100-00-00	33962.58	Max WS	19423.36	21.61	49.77		50.22	0.000473	5.38	3624.72	325.32	0.28
E100-00-00	33909.08	Max WS	19435.60	21.60	49.72		50.19	0.000661	5.53	3517.61	324.12	0.30
E100-00-00	33770.	Max WS	19467.40	21.56	49.68		50.13	0.000296	5.36	3805.12	350.86	0.24
E100-00-00	33681.0	Max WS	19479.49	21.53	49.40	37.46	50.10	0.000498	6.68	2915.07	329.84	0.30
E100-00-00	33645.5 W 18TH		Bridge									
E100-00-00	33610.0	Max WS	19438.56	21.61	49.24		49.95	0.000515	6.77	2869.36	325.86	0.31
E100-00-00	33357.	Max WS	19488.67	21.41	49.16		49.81	0.000633	6.46	3018.18	205.13	0.30
E100-00-00	32570.0	Max WS	19533.27	20.78	48.79		49.37	0.000421	6.14	3182.46	203.03	0.27
E100-00-00	31583.0	Max WS	19742.35	19.35	48.45		48.98	0.000369	5.88	3359.07	205.14	0.26
E100-00-00	30779.0	Max WS	19930.00	18.79	48.18		48.69	0.000357	5.78	3637.58	330.76	0.25
E100-00-00	29659.	Max WS	20127.85	17.66	47.81		48.26	0.000398	5.34	3767.31	233.71	0.23
E100-00-00	29368.0	Max WS	20246.15	17.37	47.44	34.69	48.13	0.000473	6.65	3043.65	175.73	0.28
E100-00-00	29297.5 TC JESTER SOUTH		Bridge									
E100-00-00	29203.0	Max WS	20019.04	17.35	46.99		47.70	0.000493	6.74	2968.80	174.20	0.29
E100-00-00	28775.	Max WS	20137.09	16.90	47.05		47.49	0.000456	5.33	3774.85	260.66	0.25
E100-00-00	28375.0	Max WS	20132.37	16.48	46.71	33.57	47.32	0.000415	6.26	3215.80	195.61	0.27
E100-00-00	28357.0 BICYCLE BRIDGE		Bridge									
E100-00-00	28330.0	Max WS	20131.32	16.41	46.60		47.21	0.000418	6.28	3207.77	195.38	0.27
E100-00-00	28190.0	Max WS	20153.82	16.18	46.56	33.06	47.15	0.000382	6.17	3266.69	190.56	0.26
E100-00-00	28152.5 W 11TH		Bridge									
E100-00-00	28113.0	Max WS	20148.18	16.28	46.43		47.03	0.000397	6.25	3222.32	190.53	0.27
E100-00-00	27982.	Max WS	20155.31	16.25	46.32		46.97	0.000471	6.48	3112.46	191.15	0.28
E100-00-00	27429.0	Max WS	20026.13	16.12	46.14		46.72	0.000401	6.09	3287.78	199.72	0.26
E100-00-00	26598.	Max WS	20158.14	15.35	45.87		46.39	0.000374	5.81	3470.01	209.96	0.25
E100-00-00	26498.0	Max WS	20171.23	15.26	45.85	32.30	46.35	0.000361	5.70	3540.12	213.35	0.25
E100-00-00	26432.5 TC JESTER		Bridge									
E100-00-00	26366.0	Max WS	20165.41	15.16	45.66		46.16	0.000366	5.73	3520.25	212.80	0.25
E100-00-00	26307.3	Max WS	20173.50	15.13	45.73		46.14	0.000311	5.20	4017.91	400.10	0.22
E100-00-00	26225	Max WS	20182.37	15.04	45.71		46.12	0.000327	5.12	4041.44	382.74	0.22
E100-00-00	26140.	Max WS	20184.91	14.97	45.56		46.09	0.000383	5.83	3462.69	215.39	0.26
E100-00-00	25536.0	Max WS	20238.21	14.48	45.32		45.85	0.000384	5.85	3511.55	266.49	0.26
E100-00-00	25132.	Max WS	20285.27	14.29	45.20		45.71	0.000365	5.75	3906.69	356.42	0.26
E100-00-00	24817.0	Max WS	20308.37	14.14	44.92	32.22	45.56	0.000576	6.41	3168.95	220.08	0.30
E100-00-00	24789.0 UNION PACIFIC RR		Bridge									
E100-00-00	24758.0	Max WS	20296.89	13.76	44.38		45.03	0.000581	6.48	3129.92	216.21	0.30
E100-00-00	24636.	Max WS	20320.90	13.61	44.47		44.98	0.000383	5.75	3801.64	376.07	0.25
E100-00-00	23934.0	Max WS	20392.88	12.75	44.19		44.66	0.000489	5.49	3713.31	276.09	0.26
E100-00-00	23550.0	Max WS	20444.94	12.77	44.11	28.65	44.51	0.000282	5.08	4027.06	243.12	0.22
E100-00-00	23506.5 DURHAM		Bridge									
E100-00-00	23444.0	Max WS	20438.30	12.69	43.93		44.34	0.000286	5.11	4003.37	242.40	0.22
E100-00-00	23180.	Max WS	20457.99	12.46	43.77		44.26	0.000326	5.68	3801.94	458.82	0.24
E100-00-00	22983.	Max WS	20467.88	12.29	43.55		44.18	0.000485	6.42	3263.54	368.84	0.29
E100-00-00	22834.0	Max WS	20486.50	12.16	43.44	30.71	44.10	0.000588	6.53	3136.34	375.80	0.28
E100-00-00	22796.5 SHEPHERD		Bridge									
E100-00-00	22758.0	Max WS	20476.97	12.11	43.25		43.93	0.000652	6.58	3162.49	345.98	0.28
E100-00-00	22610.	Max WS	20495.75	11.92	43.26		43.84	0.000595	6.10	3579.46	415.84	0.26
E100-00-00	22224.0	Max WS	20540.99	11.41	43.31		43.59	0.000495	4.53	6037.33	662.89	0.21
E100-00-00	21444.0	Max WS	20607.04	10.52	42.63		43.19	0.000635	6.04	3410.92	215.57	0.27
E100-00-00	20746.0	Max WS	20671.80	10.00	42.14		42.73	0.000700	6.12	3376.26	226.00	0.28
E100-00-00	20644.0	Max WS	20686.32	9.95	42.16	28.82	42.66	0.000533	5.75	4305.99	659.73	0.25
E100-00-00	20633.0 Pipeline		Bridge									
E100-00-00	20622.0	Max WS	20683.21	9.95	41.99		42.51	0.000553	5.84	4173.77	653.11	0.26
E100-00-00	20521.	Max WS	20694.61	9.91	41.93		42.46	0.000527	5.94	4255.57	564.56	0.25
E100-00-00	19917.0	Max WS	20763.70	9.66	41.48		42.09	0.000659	6.24	3326.89	208.92	0.28
E100-00-00	19463.0	Max WS	20812.82	9.25	41.14		41.78	0.000705	6.41	3245.00	208.44	0.29
E100-00-00	18857	Max WS	20872.59	8.03	40.67	27.87	41.35	0.000731	6.65	3240.68	260.66	0.29
E100-00-00	18800 I-10 WBFR		Bridge									
E100-00-00	18747	Max WS	20884.49	7.81	40.71		41.22	0.000519	5.76	3806.55	303.23	0.25
E100-00-00	18746	Max WS	20885.12	7.81	40.71	26.49	41.22	0.000519	5.76	3806.38	303.21	0.25
E100-00-00	18595 I-10 BRIDGE		Bridge									
E100-00-00	18443	Max WS	20862.29	7.19	39.80		40.34	0.000537	5.92	3569.02	268.41	0.25
E100-00-00	18442	Max WS	20862.41	7.19	39.80	26.36	40.34	0.000538	5.92	3568.86	268.40	0.25
E100-00-00	18394 I-10 EBFR		Bridge									
E100-00-00	18377.	Max WS	20867.03	6.98	39.56		40.14	0.000605	6.13	3434.82	256.81	0.27
E100-00-00	18234.0	Max WS	20893.75	6.77	39.74	25.58	40.07	0.000361	4.61	4531.72	280.98	0.20
E100-00-00	18220.0 UNION PACIFIC RR		Bridge									
E100-00-00	18199.0	Max WS	20888.04	6.70	39.50		39.84	0.000383	4.70	4446.22	277.63	0.21
E100-00-00	18176.0	Max WS	20887.81	6.79	39.42	25.62	39.84	0.000341	5.19	4020.97	237.29	0.21
E100-00-00	18138.0 YALE		Bridge									
E100-00-00	18082.0	Max WS	20845.62	6.87	38.70		39.27	0.000474	6.09	3423.91	219.52	0.25
E100-00-00	17905.	Max WS	20863.72	6.86	38.67		39.18	0.000554	5.73	3656.31	245.28	0.25
E100-00-00	17756.0	Max WS	20876.80	6.85	38.60	26.37	39.09	0.000685	5.62	3717.57	277.03	0.27
E100-00-00	17726 S. HEIGHTS		Bridge									
E100-00-00	17696	Max WS	20786.79	6.85	37.68		38.24	0.000787	5.99	3469.98	263.73	0.29
E100-00-00	17657	Max WS	20792.82	6.35	37.69	25.86	38.21	0.000726	5.76	3606.80	271.16	0.28
E100-00-00	17627 N. HEIGHTS		Bridge									
E100-00-00	17597.0	Max WS	20650.13	6.35	36.92		37.50	0.000810	6.07	3402.23	259.98	0.30
E100-00-00	17318.	Max WS	20579.66	6.35	36.61		37.28	0.000722	6.56	3138.72	204.78	0.30
E100-00-00	16831.0	Max WS	20619.68	6.34	36.59		37.03	0.000277	5.32	3872.33	324.22	0.27

HEC-RAS Plan: Tax_Calib Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	15795.0	Max WS	20645.40	4.84	36.47		36.70	0.000351	3.85	5364.02	390.71	0.18
E100-00-00	15278.	Max WS	20614.84	4.41	36.02		36.52	0.000370	5.69	3624.63	230.18	0.25
E100-00-00	14977.0	Max WS	20630.12	4.16	36.04	22.83	36.44	0.000177	5.03	4105.32	260.30	0.22
E100-00-00	14937.0 I-10 EBFR ACCESS		Bridge									
E100-00-00	14897.0	Max WS	20627.11	3.39	35.23		35.63	0.000179	5.04	4094.80	260.06	0.22
E100-00-00	14890	Max WS	20612.67	3.42	35.14	22.06	35.63	0.000214	5.59	3684.84	228.84	0.25
E100-00-00	14775 I-10 BRIDGE		Bridge									
E100-00-00	14660	Max WS	20561.84	3.42	34.99		35.49	0.000219	5.63	3650.93	228.00	0.25
E100-00-00	14590.0	Max WS	20503.91	3.45	34.82	22.04	35.47	0.000286	6.42	3191.95	196.97	0.28
E100-00-00	14562.0 I-10 WB ACCESS		Bridge									
E100-00-00	14532.0	Max WS	20459.46	3.41	34.69		35.34	0.000660	6.45	3173.58	196.44	0.28
E100-00-00	14354.0	Max WS	20570.48	3.29	34.99		35.25	0.000142	4.05	5077.27	484.89	0.17
E100-00-00	13924.0	Max WS	20469.45	3.18	34.66	21.40	35.12	0.000461	5.44	3759.64	327.35	0.23
E100-00-00	13909.5 UNION PAC. RR		Bridge									
E100-00-00	13898.0	Max WS	20441.62	2.95	34.36		34.83	0.000465	5.46	3745.16	324.80	0.23
E100-00-00	13494.	Max WS	20406.96	2.47	34.27		34.62	0.000527	4.77	4280.00	401.87	0.21
E100-00-00	13220.0	Max WS	20455.49	2.15	34.34	21.26	34.53	0.000130	3.50	5845.92	582.60	0.16
E100-00-00	13182.5 STUDEMONT		Bridge									
E100-00-00	13143.0	Max WS	20444.08	2.15	34.29		34.47	0.000123	3.38	6462.13	508.80	0.15
E100-00-00	12698.	Max WS	20388.30	1.87	34.06		34.37	0.000345	4.45	4578.17	347.56	0.22
E100-00-00	12066.0	Max WS	20396.71	1.47	33.99		34.18	0.000256	3.51	5810.81	384.86	0.16
E100-00-00	11546.0	Max WS	20405.00	0.90	33.93		34.08	0.000120	3.16	6678.67	620.15	0.15
E100-00-00	11021.	Max WS	20415.31	0.63	33.89		34.03	0.000091	2.96	7300.46	738.39	0.13
E100-00-00	10908.0	Max WS	20423.76	0.57	33.91	19.27	34.02	0.000079	2.83	8757.65	890.61	0.12
E100-00-00	10852.5 TAYLOR (SAWYER)		Bridge									
E100-00-00	10804.0	Max WS	20419.26	0.45	33.76		33.87	0.000079	2.81	8738.42	889.90	0.12
E100-00-00	10643.	Max WS	20363.44	0.14	33.55		33.87	0.000291	4.55	4753.29	383.20	0.19
E100-00-00	9779.0	Max WS	20395.18	-1.51	33.55		33.68	0.000088	3.04	7679.53	610.33	0.13
E100-00-00	8532.0	Max WS	20447.79	-1.76	33.57		33.59	0.000025	1.36	15052.84	935.63	0.06
E100-00-00	8140.	Max WS	20457.98	-2.43	33.53		33.56	0.000131	1.41	15574.28	1236.29	0.06
E100-00-00	7649.0	Max WS	20458.45	-3.26	33.45	15.28	33.55	0.000053	2.66	14117.94	1427.60	0.10
E100-00-00	7608.5 HOUSTON		Bridge									
E100-00-00	7568.0	Max WS	20453.47	-3.15	33.45		33.51	0.000038	2.27	13964.92	1415.32	0.09
E100-00-00	7546.0	Max WS	20450.56	-3.16	33.44	15.24	33.52	0.000045	2.44	13010.02	1540.14	0.10
E100-00-00	7535.5 Pipeline		Bridge									
E100-00-00	7529.0	Max WS	20448.06	-3.16	33.42		33.49	0.000045	2.45	12969.22	1538.87	0.10
E100-00-00	7353.	Max WS	20437.90	-3.18	33.38		33.48	0.000057	2.69	10451.25	1245.25	0.11
E100-00-00	6980	Max WS	20444.91	-3.22	33.41		33.45	0.000038	1.75	12496.73	955.52	0.07
E100-00-00	6975.0	Max WS	20441.47	-3.22	33.41	15.82	33.45	0.000038	1.75	12496.54	955.51	0.07
E100-00-00	6935.0 I-10 EAST RAMP		Bridge									
E100-00-00	6898.0	Max WS	20441.47	-4.23	33.39		33.44	0.000032	1.66	13105.47	954.99	0.07
E100-00-00	6895	Max WS	20442.66	-4.23	33.39		33.44	0.000032	1.66	13105.39	954.99	0.07
E100-00-00_02	6775.	Max WS	25848.63	-4.30	33.39		33.47	0.000057	2.18	12177.92	832.69	0.09
E100-00-00_02	6473.0	Max WS	25823.27	-4.46	33.34	15.85	33.45	0.000069	2.61	10303.03	1117.87	0.11
E100-00-00_02	6448.0 I-45 NORTH RAMP		Bridge									
E100-00-00_02	6423.0	Max WS	25806.55	-4.33	33.32		33.43	0.000070	2.63	10159.03	1116.46	0.11
E100-00-00_02	6174.0	Max WS	25707.93	-4.69	33.10	15.93	33.40	0.000249	4.43	5809.30	1023.57	0.17
E100-00-00_02	6128.0 I-45 NORTH		Bridge									
E100-00-00_02	6078	Max WS	25597.54	-3.96	32.93		33.26	0.000280	4.59	5576.95	1011.00	0.18
E100-00-00_02	6068.0	Max WS	25643.12	-3.96	33.00	16.11	33.26	0.000078	4.24	6534.70	1161.76	0.16
E100-00-00_02	6046 I-10 to I-45 DC		Bridge									
E100-00-00_02	6020	Max WS	25705.67	-3.89	33.10		33.25	0.000059	3.12	8336.28	1130.26	0.12
E100-00-00_02	5525.0	Max WS	25733.28	-3.15	33.16		33.22	0.000053	1.99	12906.17	738.41	0.08
E100-00-00_02	4994.0	Max WS	25702.78	-3.09	33.06	14.87	33.18	0.000139	2.78	9931.35	614.88	0.10
E100-00-00_02	4980.0 RR OVERPASS		Bridge									
E100-00-00_02	4961.0	Max WS	25656.09	-3.03	32.96		33.08	0.000155	2.81	9767.87	607.33	0.11
E100-00-00_02	4812.0	Max WS	25553.53	-3.49	32.82	14.22	33.02	0.000670	3.59	7112.20	480.69	0.16
E100-00-00_02	4774.5 CROCKETT/HOGAN		Bridge									
E100-00-00_02	4687.0	Max WS	25432.24	-4.67	30.71		30.91	0.000343	3.56	7150.01	498.23	0.17
E100-00-00_02	4407.	Max WS	25282.44	-3.62	30.51		30.81	0.000382	4.38	5930.27	467.04	0.18
E100-00-00_02	4014.0	Max WS	25310.81	-2.15	30.53	13.12	30.68	0.000236	3.15	8032.21	485.54	0.14
E100-00-00_02	3997.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	3976.0	Max WS	25293.16	-2.40	30.24		30.39	0.000232	3.15	8028.92	488.34	0.14
E100-00-00_02	3681.	Max WS	25224.04	-3.80	30.06		30.31	0.000379	4.01	6341.44	471.37	0.18
E100-00-00_02	3585.0	Max WS	25212.71	-4.26	30.02		30.27	0.000308	4.05	6233.80	432.53	0.18
E100-00-00_02	2298.0	Max WS	25165.49	-6.21	29.68		29.90	0.000278	3.73	6882.09	606.63	0.15
E100-00-00_02	1580.	Max WS	25138.28	-7.83	29.47		29.70	0.000317	4.22	7595.32	998.79	0.17
E100-00-00_02	1353.0	Max WS	25120.62	-8.34	29.38	12.11	29.64	0.000414	4.58	7518.29	1053.69	0.18
E100-00-00_02	1335.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	1319.0	Max WS	21650.75	-8.37	28.36		28.79	0.000577	5.28	4103.02	673.28	0.22
E100-00-00_02	984.0	Max WS	21691.33	-8.69	28.40	7.58	28.66	0.000197	4.15	5450.23	635.30	0.17
E100-00-00_02	978 MAIN STREET		Bridge									
E100-00-00_02	971.6	Max WS	21645.90	-8.69	28.29		28.56	0.000199	4.17	5413.91	631.82	0.17
E100-00-00_02	971.5	Max WS	21645.90	-8.69	28.29	7.56	28.56	0.000199	4.17	5413.90	631.82	0.17
E100-00-00_02	961.5 1ST STREET		Bridge									
E100-00-00_02	851.0	Max WS	21461.49	-6.40	28.01		28.36	0.000302	4.79	4659.13	663.98	0.21
E100-00-00_02	654.0	Max WS	21550.51	-6.50	28.14		28.29	0.000109	3.21	8602.14	610.10	0.13
E100-00-00_02	400.0	Max WS	21466.37	-8.58	28.03	5.62	28.33	0.000187	4.46	4809.67	488.97	0.17
E100-00-00_02	381.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	365.0	Max WS	21336.45	-8.23	27.85		28.17	0.000194	4.54	4694.70	501.28	0.17
E100-00-00_02	210.0	Max WS	21308.07	-7.81	27.75	6.50	28.14	0.000220	4.98	4278.90	566.82	0.18
E100-00-00_02	191.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	173.1	Max WS	21245.28	-6.84	27.56		27.99	0.000256	5.23	4062.36	852.15	0.20
E100-00-00_02	173.0	Max WS	21245.28	-6.84	27.56		27.99	0.000256	5.23	4062.35	852.15	0.20

Little White Oak Bayou
Tax Day 2016

HEC-RAS Plan: Tax_Calib River: E101-00-00 Reach: E101-00-00_0003 Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	9819.000	Max WS	7895.05	16.33	38.50		38.71	0.000432	3.64	2166.03	168.97	0.18
E101-00-00_0003	9750.000	Max WS	7893.43	16.31	38.49		38.68	0.000409	3.50	2252.84	180.20	0.17
E101-00-00_0003	9000.000	Max WS	7865.03	15.50	38.36		38.44	0.000225	2.41	3705.16	529.99	0.13
E101-00-00_0003	8469.000	Max WS	7904.09	13.02	38.22		38.32	0.000243	2.70	3482.69	441.85	0.12
E101-00-00_0003	7984.000	Max WS	7941.84	13.76	38.10		38.20	0.000252	2.91	3370.34	351.46	0.13
E101-00-00_0003	6838.000	Max WS	7961.90	12.20	37.74		37.88	0.000320	2.97	2681.80	249.26	0.16
E101-00-00_0003	5861.000	Max WS	8085.90	9.91	37.39		37.54	0.000387	3.21	2914.47	361.43	0.15
E101-00-00_0003	4720.000	Max WS	7464.86	8.13	37.07		37.21	0.000266	3.32	3352.70	389.25	0.13
E101-00-00_0003	4279.000	Max WS	7452.34	9.00	36.85		37.07	0.000447	3.80	2206.71	388.18	0.17
E101-00-00_0003	4130.000	Max WS	7487.08	8.68	36.93	17.49	37.00	0.000072	2.18	4216.04	632.51	0.09
E101-00-00_0003	4091.000 N. MAIN		Bridge									
E101-00-00_0003	4050.000	Max WS	7474.62	7.87	36.86		36.92	0.000064	2.12	4106.04	579.15	0.08
E101-00-00_0003	3952.	Max WS	7485.12	6.87	36.84		36.92	0.000066	2.25	3523.86	209.23	0.09
E101-00-00_0003	3466.000	Max WS	7548.13	1.92	36.84		36.90	0.000027	2.30	4884.97	282.15	0.07
E101-00-00_0003	3300.	Max WS	7566.63	-1.50	36.86		36.89	0.000022	1.66	6595.88	383.45	0.05
E101-00-00_0003	3203.000	Max WS	7559.50	-3.50	36.68		36.97	0.000112	4.36	1735.62	421.72	0.12
E101-00-00_0003	2797.000 I-45		Culvert									
E101-00-00_0003	2389.000	Max WS	5422.74	-0.26	33.60		33.63	0.000040	1.32	5994.65	409.34	0.05
E101-00-00_0003	2325.	Max WS	5430.42	-0.15	33.60		33.62	0.000037	1.23	6235.34	412.26	0.04
E101-00-00_0003	1855.000	Max WS	5460.83	0.68	33.60		33.61	0.000016	0.87	7144.32	427.82	0.03
E101-00-00_0003	1126.	Max WS	5474.27	-1.85	33.56		33.59	0.000082	1.45	5149.09	698.68	0.06
E101-00-00_0003	1070.000	Max WS	5473.76	-2.04	33.55	7.43	33.59	0.000073	1.70	4936.53	732.60	0.06
E101-00-00_0003	1029.500 WRIGHTWOOD		Bridge									
E101-00-00_0003	987.000	Max WS	5429.30	-2.04	33.50		33.53	0.000079	1.68	4907.31	725.77	0.06
E101-00-00_0003	911.	Max WS	5442.61	-2.19	33.51		33.53	0.000045	1.34	6253.87	677.70	0.05
E101-00-00_0003	756.	Max WS	5440.60	-2.51	33.48		33.51	0.000198	1.39	4316.95	714.36	0.07
E101-00-00_0003	637.000	Max WS	5444.11	-2.75	33.47	8.07	33.49	0.000129	1.09	5655.13	905.75	0.05
E101-00-00_0003	538.000 QUITMAN/WHITEOAK		Bridge									
E101-00-00_0003	442.000	Max WS	5402.10	-2.75	33.39		33.41	0.000088	1.18	5576.40	850.13	0.05
E101-00-00_0003	306.000	Max WS	5405.97	-2.86	33.39		33.40	0.000008	0.68	10329.26	1603.88	0.03

Buffalo Bayou
Harvey 2017

HEC-RAS Plan: Harvey_Calib Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	128109.6	Max WS	29397.57	-4.29	41.40		41.50	0.000493	2.62	12940.17	1160.21	0.09
W100_upstrm	128104.6	Max WS	29396.49	-4.29	41.40	14.10	41.50	0.000494	2.62	12937.28	1160.11	0.09
W100_upstrm	128066.7 SHEPHERD		Bridge									
W100_upstrm	128028.8	Max WS	29396.49	-4.51	41.26		41.37	0.000402	2.62	13038.87	1163.58	0.09
W100_upstrm	126647.0	Max WS	29334.63	-3.93	41.02		41.05	0.000054	1.50	20683.46	1035.11	0.05
W100_upstrm	125376.9	Max WS	29224.71	-4.05	40.61		40.76	0.000445	3.09	10106.59	855.59	0.12
W100_upstrm	124983.5	Max WS	29204.05	-3.86	40.59		40.65	0.000054	2.22	20953.08	1403.75	0.09
W100_upstrm	124644.1	Max WS	28724.04	-3.69	40.47	16.76	40.64	0.000117	3.26	8812.70	643.98	0.12
W100_upstrm	124591.8 WAUGH DRIVE		Bridge									
W100_upstrm	124539.5	Max WS	28623.95	-3.74	40.41		40.58	0.000116	3.25	8809.67	643.00	0.12
W100_upstrm	123658.2	Max WS	28829.01	-2.04	40.45		40.47	0.000039	1.34	28710.07	2434.26	0.05
W100_upstrm	123138.8	Max WS	28826.71	-4.08	40.43		40.45	0.000031	1.25	26987.64	1749.48	0.04
W100_upstrm	122627.1	Max WS	28819.49	-6.08	40.37		40.45	0.000051	2.41	17609.94	1315.72	0.08
W100_upstrm	122572.1 MONTROSE COURT		Mult Open									
W100_upstrm	122517.1	Max WS	28806.30	-5.38	40.38		40.45	0.000089	2.25	16599.21	1236.73	0.08
W100_upstrm	122371.6	Max WS	28811.87	-7.00	40.37	14.96	40.43	0.000092	2.18	17416.49	1137.24	0.07
W100_upstrm	122265 ROSEMONT		Bridge									
W100_upstrm	122210.0	Max WS	28757.82	-5.60	40.28		40.36	0.000079	2.45	15004.43	832.54	0.08
W100_upstrm	122036.7	Max WS	28750.19	-8.40	40.28		40.34	0.000074	2.28	15751.64	998.97	0.08
W100_upstrm	121229.5	Max WS	28596.61	-11.37	40.23		40.29	0.000062	2.15	16987.60	1071.72	0.07
W100_upstrm	120962.2	Max WS	28531.54	-10.59	40.17		40.28	0.000096	2.76	13434.11	1104.56	0.09
W100_upstrm	120005.2	Max WS	28577.83	-7.78	40.16	14.03	40.18	0.000067	1.23	23249.53	1065.97	0.05
W100_upstrm	119952.6 MEMORIAL DRIVE		Bridge									
W100_upstrm	119900.0	Max WS	28510.82	-7.64	40.06		40.08	0.000045	1.24	22993.24	1062.97	0.05
W100_upstrm	119495.9	Max WS	28526.61	-7.21	40.06		40.07	0.000023	0.89	32996.41	1374.29	0.03
W100_upstrm	118667.7	Max WS	28527.89	-8.56	40.00		40.04	0.000068	1.63	18804.94	1227.46	0.06
W100_upstrm	118466.1	Max WS	28513.12	-8.89	39.97	10.83	40.03	0.000053	2.15	17634.01	1296.71	0.07
W100_upstrm	118418.1 MEMORIAL DRIVE		Bridge									
W100_upstrm	118370.1	Max WS	28493.13	-8.87	39.93		40.00	0.000056	2.15	17560.06	1290.00	0.07
W100_upstrm	117845.4	Max WS	28513.26	-7.26	39.90		39.96	0.000082	2.04	16110.57	989.72	0.07
W100_upstrm	117204.3	Max WS	28539.27	-4.60	39.87		39.91	0.000048	1.64	19003.52	1322.38	0.06
W100_upstrm	116395.7	Max WS	28563.50	-3.88	39.81		39.87	0.000060	1.92	15057.36	920.57	0.07
W100_upstrm	116167.6	Max WS	28570.67	-3.68	39.68	11.00	39.85	0.000247	3.30	9504.09	1029.43	0.11
W100_upstrm	116121.9 SABINE AVENUE		Bridge									
W100_upstrm	116076.2	Max WS	28558.24	-3.86	39.36		39.53	0.000295	3.30	9361.21	1007.61	0.11
W100_upstrm	115804.5	Max WS	28571.59	-4.60	39.25	10.99	39.52	0.000115	4.56	11810.36	1257.95	0.13
W100_upstrm	115800 I-45 S EXIT RAMP		Bridge									
W100_upstrm	115729.9	Max WS	28569.34	-4.81	39.24		39.47	0.000106	4.21	11692.26	1355.41	0.12
W100_upstrm	115672.3	Max WS	28571.54	-5.10	39.24	12.11	39.47	0.000114	4.39	12590.82	1381.36	0.12
W100_upstrm	115635.5 I-45 SBML		Bridge									
W100_upstrm	115621.1	Max WS	28571.54	-5.57	39.29		39.43	0.000071	3.54	16721.28	1767.60	0.10
W100_upstrm	115594.6	Max WS	28572.38	-6.04	39.30	9.16	39.42	0.000055	3.13	17734.82	1775.69	0.09
W100_upstrm	115553.5 I-45 S. - ALLEN		Bridge									
W100_upstrm	115545.8	Max WS	28570.46	-6.85	39.29		39.40	0.000058	3.24	18622.01	1789.00	0.09
W100_upstrm	115438.9	Max WS	28575.64	-7.24	39.27	10.43	39.40	0.000062	3.29	16588.73	1831.14	0.09
W100_upstrm	115400 I-45 NBML		Bridge									
W100_upstrm	115365.4	Max WS	28575.64	-7.52	39.27		39.38	0.000050	2.99	18097.68	1997.35	0.08
W100_upstrm	115284.6	Max WS	28578.85	-7.89	39.28	9.09	39.38	0.000053	3.09	24427.50	1569.30	0.09
W100_upstrm	115168.5 I-45 N. ENTRANCE		Bridge									
W100_upstrm	115104.1	Max WS	28578.85	-8.31	39.18		39.29	0.000044	2.85	20060.89	1603.04	0.08
W100_upstrm	115001.1	Max WS	28585.62	-8.48	39.11	9.14	39.37	0.000104	4.38	17064.80	1718.63	0.12
W100_upstrm	115000 I-45 RAMP MCKINN		Bridge									
W100_upstrm	114890.5	Max WS	28585.89	-8.56	39.07		39.32	0.000106	4.23	14957.63	1586.17	0.12
W100_upstrm	114885	Max WS	28586.09	-8.56	39.07	8.39	39.32	0.000106	4.23	15044.75	1586.05	0.12
W100_upstrm	114864.5 I-45 N. ENTRANCE		Bridge									
W100_upstrm	114838.5	Max WS	28586.09	-9.27	38.91		39.14	0.000100	4.15	15762.46	1696.89	0.12
W100_upstrm	114492.0	Max WS	28599.11	-10.48	38.94		39.05	0.000096	2.71	12605.85	1453.32	0.10
W100_upstrm	114195.9	Max WS	28607.38	-11.52	38.84	9.16	38.98	0.000388	3.04	10967.77	1151.61	0.11
W100_upstrm	114168.9 RUSK STREET		Bridge									
W100_upstrm	114141.9	Max WS	28603.90	-10.83	38.62		38.78	0.000438	3.18	9980.21	1008.63	0.12
W100_upstrm	114097.4	Max WS	28605.63	-7.46	38.64	10.11	38.76	0.000140	2.79	12367.57	1261.20	0.10
W100_upstrm	114070.4 CAPITAL STREE		Bridge									
W100_upstrm	114043.4	Max WS	28605.63	-7.72	38.51		38.63	0.000137	2.77	12529.83	1277.74	0.10
W100_upstrm	113644.0	Max WS	22636.28	-8.91	38.38		38.54	0.000074	3.29	10719.17	725.46	0.10
W100_upstrm	113411.6	Max WS	28626.21	-9.61	38.44	7.40	38.52	0.000373	2.16	13306.94	705.41	0.08
W100_upstrm	113374.3 TEXAS AVE		Bridge									
W100_upstrm	113337.0	Max WS	20143.44	-9.65	38.12		38.16	0.000191	1.54	13114.88	661.63	0.06
W100_upstrm	113266.4	Max WS	18751.12	-9.11	38.03	7.51	38.15	0.000213	2.91	8060.40	760.92	0.09
W100_upstrm	113238.6 BAGBY		Bridge									
W100_upstrm	113210.8	Max WS	18051.29	-9.46	37.90		38.01	0.000196	2.77	8233.96	783.31	0.09
W100_upstrm	112974.0	Max WS	17732.55	-10.69	37.84	6.16	37.96	0.000158	2.85	6571.32	561.45	0.09
W100_upstrm	112944.9 PRAIRIE		Bridge									
W100_upstrm	112915.8	Max WS	17591.40	-10.82	37.78		37.90	0.000155	2.82	6611.68	574.56	0.09
W100_upstrm	112575.5	Max WS	17533.94	-9.20	37.77	7.54	37.84	0.000174	2.18	10982.34	1179.06	0.07
W100_upstrm	112534.5 PRESTON STREET		Bridge									
W100_upstrm	112493.5	Max WS	17412.58	-9.47	37.70		37.76	0.000167	2.14	11219.25	1212.49	0.07
W100_upstrm	112003.3	Max WS	17151.21	-9.69	37.63	4.65	37.69	0.000117	1.89	9822.40	741.19	0.06
W100_upstrm	111953.3 CONGRESS STREET		Bridge									
W100_upstrm	111903.3	Max WS	16970.05	-9.84	37.49		37.55	0.000114	1.87	9832.44	743.01	0.06
W100_upstrm	111853.5	Max WS	16941.28	-9.86	37.48	4.53	37.54	0.000125	2.09	9062.54	719.10	0.06
W100_upstrm	111818.6 SMITH STREET		Bridge									
W100_upstrm	111783.7	Max WS	16771.87	-8.67	37.40		37.47	0.000141	2.17	8260.54	511.74	0.07
W100_upstrm	111626.7	Max WS	16680.81	-11.83	37.38	4.60	37.45	0.000134	2.04	9482.34	760.19	0.06
W100_upstrm	111518.6 LOUISIANA AND FR		Bridge									
W100_upstrm	111410.5	Max WS	15981.95	-11.23	37.20		37.26	0.000095	2.02	8912.31	681.51	0.06
W100_upstrm	110876.6	Max WS	15911.96	-10.43	37.19	1.90	37.21	0.000055	1.42	16355.68	1475.20	0.05
W100_upstrm	110837.8 MILAM		Bridge									

HEC-RAS Plan: Harvey_Calib Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	110799.0	Max WS	15795.85	-10.72	37.17		37.20	0.000144	1.36	16772.18	1532.46	0.04
W100_upstrm	110672.7	Max WS	15726.20	-13.25	37.15	1.80	37.18	0.000110	1.60	17826.07	1410.50	0.05
W100_upstrm	110643.7 TRAVIS STREET		Bridge									
W100_upstrm	110614.7	Max WS	15480.08	-12.75	37.12		37.15	0.000120	1.62	17075.08	1397.06	0.05
W100_upstrm	110200.2	Max WS	14893.63	-9.11	37.09	4.03	37.11	0.000032	1.35	12878.80	741.98	0.05
W100_upstrm	110154.2 MAIN STREET		Bridge									
W100_upstrm	110108.2	Max WS	14776.68	-9.31	37.07		37.10	0.000030	1.33	13018.94	746.72	0.04
W100_upstrm	110103.2	Max WS	14765.57	-9.31	37.07		37.10	0.000030	1.33	13018.82	746.72	0.04
Downstream	109924.2	Max WS	52226.50	-13.02	37.07		37.49	0.000550	5.23	11412.52	2158.22	0.16
Downstream	109551.7	Max WS	52225.04	-14.28	36.93	8.71	37.28	0.000534	4.73	11797.60	1622.21	0.15
Downstream	109518.7 FANNIN STREET		Bridge									
Downstream	109485.7	Max WS	52223.49	-15.31	36.69		37.02	0.000491	4.60	12021.04	2153.22	0.15
Downstream	109440.2	Max WS	52222.34	-16.48	36.60	7.72	36.99	0.000809	4.95	10549.60	697.27	0.16
Downstream	109395.2 SAN JACINTO		Bridge									
Downstream	109350.2	Max WS	52217.20	-16.89	35.59		35.99	0.000859	5.05	10344.96	589.48	0.16
Downstream	109119.0	Max WS	52213.37	-17.14	35.20	9.26	35.57	0.002766	4.88	11654.94	1337.62	0.19
Downstream	109103.1 CROSSWALK		Bridge									
Downstream	109087.2	Max WS	52210.12	-17.55	34.91		35.27	0.002709	4.85	11777.79	1349.72	0.19
Downstream	108565.3	Max WS	52205.42	-12.77	33.85		34.30	0.001054	5.50	11492.78	1057.32	0.18
Downstream	108334.0	Max WS	52205.53	-14.06	33.64		33.98	0.001041	4.83	14339.86	1091.27	0.16
Downstream	107179.4	Max WS	52203.96	-20.52	32.48	4.46	32.99	0.000945	5.93	9794.59	502.35	0.19
Downstream	107158.9 S. PACIFIC RR		Bridge									
Downstream	107138.4	Max WS	52203.73	-20.19	32.29		32.83	0.000996	6.06	9582.43	498.01	0.19
Downstream	106594.0	Max WS	52202.70	-16.70	31.66		32.19	0.001356	5.81	8984.78	308.89	0.19
Downstream	106151.4	Max WS	52201.25	-13.85	30.82	6.86	31.42	0.002179	6.20	8422.25	296.97	0.21
Downstream	106131.1 MCKEE		Bridge									
Downstream	106110.8	Max WS	52197.57	-12.53	30.47		31.15	0.002453	6.58	7933.44	288.96	0.22
Downstream	105705.4	Max WS	52194.13	-18.22	29.91	5.21	30.53	0.000576	6.31	8269.72	351.62	0.23
Downstream	105667.4 ELYSIAN STREET		Bridge									
Downstream	105629.4	Max WS	52193.75	-18.43	29.58		30.21	0.000583	6.34	8228.05	349.08	0.23
Downstream	105476	Max WS	52193.53	-18.70	29.56		30.03	0.001554	5.52	9461.51	415.84	0.20
Downstream	104962	Max WS	52189.64	-18.70	29.24	6.19	29.41	0.000793	3.35	15593.59	725.97	0.13
Downstream	104948 US-59 Bridge		Bridge									
Downstream	104900.1	Max WS	52189.00	-19.15	29.12		29.28	0.000199	3.19	16359.93	875.43	0.13
Downstream	104900	Max WS	52188.81	-19.15	29.12	6.06	29.28	0.000199	3.19	16359.91	875.43	0.13
Downstream	104566 US-59 Bridge		Bridge									
Downstream	104464.1	Max WS	52187.83	-19.86	28.72		28.97	0.001853	3.99	13086.96	749.78	0.17
Downstream	104464	Max WS	52187.83	-19.86	28.72	5.42	28.97	0.001853	3.99	13086.82	749.78	0.17
Downstream	104383 US-59 Bridge		Bridge									
Downstream	104301.1	Max WS	52182.21	-20.42	28.45		28.75	0.000286	4.43	11779.79	652.21	0.18
Downstream	104301	Max WS	52181.91	-20.42	28.45	5.22	28.75	0.000286	4.43	11779.77	652.21	0.18
Downstream	104271 US-59 Bridge		Bridge									
Downstream	104242.1	Max WS	52179.69	-20.62	28.24		28.63	0.002352	5.01	10412.40	539.85	0.20
Downstream	104242	Max WS	52180.00	-20.62	28.24	5.77	28.63	0.002352	5.01	10412.28	539.85	0.20
Downstream	104204 US-59 Bridge		Bridge									
Downstream	104133	Max WS	52177.25	-21.02	27.72		28.31	0.000710	6.18	9350.04	973.72	0.28
Downstream	103664.0	Max WS	52177.42	-23.03	27.13		27.87	0.001510	7.04	9050.00	834.90	0.26
Downstream	102875.3	Max WS	52177.38	-26.39	26.15	9.00	26.73	0.001344	6.10	8549.64	397.29	0.23
Downstream	102847.5 HOUTerminal RR		Bridge									
Downstream	102819.7	Max WS	52177.29	-26.43	25.78		26.37	0.001395	6.20	8415.24	394.92	0.24
Downstream	102309.0	Max WS	52210.91	-23.48	25.19		25.87	0.000574	6.61	7901.89	228.98	0.20
Downstream	101828.0	Max WS	52241.25	-20.70	24.69	2.09	25.41	0.001360	6.79	7696.41	329.27	0.25
Downstream	101790.1 JENSEN ROAD		Bridge									
Downstream	101752.2	Max WS	52241.22	-20.69	24.39		25.13	0.001357	6.88	7595.10	323.34	0.25
Downstream	101007.3	Max WS	52289.97	-16.93	23.83		24.48	0.000379	6.46	8088.35	282.48	0.21
Downstream	99992.6	Max WS	52354.40	-18.90	23.29		24.01	0.000558	6.79	7711.38	272.40	0.22
Downstream	98399.4	Max WS	52459.27	-20.26	22.55		23.22	0.000421	6.58	7973.24	285.66	0.22
Downstream	97517.4	Max WS	52514.03	-19.35	22.49		22.90	0.000293	5.13	10240.22	322.53	0.16
Downstream	96028.6	Max WS	52603.12	-17.81	21.59	-0.67	22.19	0.000667	6.22	8454.31	317.46	0.21
Downstream	95985.1 YORK DRIVE		Bridge									
Downstream	95941.6	Max WS	52603.12	-17.87	21.43		22.04	0.000672	6.24	8424.45	317.17	0.21
Downstream	95362.9	Max WS	52639.66	-15.97	21.23		21.75	0.000330	5.76	9136.12	353.74	0.20
Downstream	94280.7	Max WS	52711.48	-19.82	19.94		20.84	0.001355	7.61	6927.09	296.83	0.28
Downstream	93495.6	Max WS	52754.90	-20.43	19.41		20.00	0.000765	6.15	8576.55	383.99	0.23
Downstream	92795.6	Max WS	52802.83	-20.98	18.93	-2.68	19.58	0.000431	6.45	8181.69	331.39	0.23
Downstream	92741.1 LOCKWOOD DRIVE		Bridge									
Downstream	92686.6	Max WS	52802.83	-21.08	18.71		19.37	0.000438	6.49	8141.57	330.41	0.23
Downstream	90936.7	Max WS	52906.39	-18.64	17.61		18.14	0.000963	5.81	9098.74	430.03	0.22
Downstream	89918.4	Max WS	52962.82	-17.23	16.57		17.32	0.000687	7.00	8676.57	714.95	0.26
Downstream	88579.0	Max WS	53018.39	-20.97	15.52		16.25	0.000878	6.88	7704.62	367.23	0.26
Downstream	87591.9	Max WS	53077.04	-23.72	14.90		15.57	0.000510	6.57	8090.34	313.24	0.23
Downstream	86660.2	Max WS	53120.53	-23.42	14.55	-7.66	15.12	0.000454	6.05	8786.63	316.17	0.20
Downstream	86641.7 HOUTerminal RR		Bridge									
Downstream	86623.2	Max WS	52065.49	-23.61	14.19		14.74	0.000439	5.96	8734.11	315.50	0.20
Downstream	85855.2	Max WS	41370.13	-26.84	13.53		14.23	0.000447	6.68	6189.18	259.23	0.24
Downstream	85238.7	Max WS	41392.68	-29.43	13.38		13.94	0.000488	6.09	7516.06	367.19	0.20
Downstream	84561.7	Max WS	41422.22	-32.27	13.22	-12.66	13.67	0.000243	5.47	8555.94	491.77	0.18
Downstream	84531.4 NORTH WAYSIDE RD		Bridge									
Downstream	84501.1	Max WS	38256.68	-28.97	12.88		13.40	0.000318	5.84	6938.05	394.41	0.20
Downstream	84252.6	Max WS	38266.12	-26.90	12.90	-9.81	13.33	0.000248	5.28	8292.33	625.22	0.17
Downstream	84222.3 M. GARCIA		Bridge									
Downstream	84192.0	Max WS	36315.10	-24.10	12.59		13.10	0.000335	5.71	6494.48	428.30	0.20
Downstream	83635.7	Max WS	36333.57	-21.72	12.67		12.94	0.000214	4.16	8753.81	417.84	0.16
Downstream	81786.1	Max WS	36383.29	-31.97	12.35		12.60	0.000154	3.95	9292.70	386.59	0.14
Downstream	80903.1	Max WS	36404.97	-27.77	12.29	-12.99	12.47	0.000131	3.41	10702.10	441.93	0.12
Downstream	80883.1 S. PACIFIC RR		Bridge									
Downstream	80863.1	Max WS	36404.97	-28.10	11.99		12.17	0.000149	3.41	10714.91	442.20	0.12

HEC-RAS Plan: Harvey_Calib Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	80538.0	Max WS	36391.57	-33.12	12.05	-20.71	12.13	0.000065	2.24	16785.16	785.80	0.07

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HEC-RAS Plan: Harvey_Calib Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	36134.	Max WS	32202.02	24.19	56.87		57.70	0.000633	7.45	5795.60	1153.52	0.31
E100-00-00	35718.0	Max WS	32192.80	23.76	56.48		57.46	0.000614	7.99	4551.68	688.49	0.33
E100-00-00	35158.	Max WS	32239.65	22.89	56.37		57.08	0.000573	6.98	6586.15	1438.92	0.29
E100-00-00	35006.0	Max WS	32258.30	22.66	56.25	42.99	57.02	0.000488	7.31	6731.31	1561.72	0.30
E100-00-00	34951.5 ELLA		Bridge									
E100-00-00	34895.0	Max WS	32256.11	22.56	56.12		56.90	0.000491	7.33	6692.83	1557.16	0.30
E100-00-00	34645.	Max WS	32269.16	22.24	56.11		56.76	0.000436	6.79	7311.61	1300.35	0.27
E100-00-00	34206.0	Max WS	32130.89	21.68	55.87		56.56	0.000444	6.92	7160.74	2831.90	0.28
E100-00-00	33962.58	Max WS	32237.36	21.61	55.98		56.33	0.000265	5.05	10713.10	2997.62	0.22
E100-00-00	33909.08	Max WS	32250.37	21.60	55.97		56.31	0.000329	5.00	10675.27	3032.95	0.22
E100-00-00	33770.	Max WS	32279.93	21.56	55.92		56.29	0.000235	5.33	11029.35	2756.64	0.21
E100-00-00	33681.0	Max WS	32287.03	21.53	55.81	42.00	56.35	0.000346	6.46	10336.46	2790.05	0.25
E100-00-00	33645.5 W 18TH		Bridge									
E100-00-00	33610.0	Max WS	32235.63	21.61	55.61		56.21	0.000378	6.69	9593.24	2741.33	0.26
E100-00-00	33357.	Max WS	32200.90	21.41	55.42		56.11	0.000621	6.86	7185.48	2327.88	0.29
E100-00-00	32570.0	Max WS	32160.91	20.78	55.02		55.62	0.000396	6.52	9071.38	2798.96	0.26
E100-00-00	31583.0	Max WS	32067.57	19.35	54.79		55.26	0.000278	5.86	11651.80	4091.26	0.22
E100-00-00	30779.0	Max WS	32142.47	18.79	54.60		55.03	0.000240	5.68	11421.60	3155.73	0.21
E100-00-00	29659.	Max WS	32244.06	17.66	54.42		54.73	0.000254	4.87	13064.53	4279.20	0.19
E100-00-00	29368.0	Max WS	32277.63	17.37	54.09	38.49	54.73	0.000373	6.76	8674.25	2604.16	0.25
E100-00-00	29297.5 TC JESTER SOUTH		Bridge									
E100-00-00	29203.0	Max WS	32274.15	17.35	53.44		54.19	0.000437	7.19	7560.98	2199.95	0.27
E100-00-00	28775.	Max WS	32339.65	16.90	53.53		53.86	0.000296	4.92	12188.07	3404.48	0.20
E100-00-00	28375.0	Max WS	32353.46	16.48	53.34	37.45	53.86	0.000337	6.18	10544.59	3307.29	0.24
E100-00-00	28357.0 BICYCLE BRIDGE		Bridge									
E100-00-00	28330.0	Max WS	32339.43	16.41	53.10		53.65	0.000353	6.29	10131.03	3230.07	0.25
E100-00-00	28190.0	Max WS	32346.07	16.18	53.02	37.00	53.63	0.000311	6.55	9436.80	2683.96	0.24
E100-00-00	28152.5 W 11TH		Bridge									
E100-00-00	28113.0	Max WS	32340.98	16.28	52.75		53.41	0.000341	6.78	8581.36	2361.95	0.25
E100-00-00	27982.	Max WS	32350.66	16.25	52.73		53.34	0.000414	6.56	8910.73	2385.24	0.26
E100-00-00	27429.0	Max WS	32373.87	16.12	52.54		53.13	0.000411	6.38	8413.38	2445.73	0.26
E100-00-00	26598.	Max WS	32453.11	15.35	52.24		52.74	0.000332	5.93	7477.23	3003.64	0.23
E100-00-00	26498.0	Max WS	32458.91	15.26	52.15	35.79	52.70	0.000330	6.10	6844.11	2549.98	0.24
E100-00-00	26432.5 TC JESTER		Bridge									
E100-00-00	26366.0	Max WS	32446.38	15.16	51.72		52.40	0.000395	6.60	4934.51	1937.77	0.26
E100-00-00	26307.3	Max WS	32456.08	15.13	51.95		52.34	0.000264	5.28	8614.18	1982.45	0.20
E100-00-00	26225	Max WS	32460.39	15.04	51.91		52.32	0.000282	5.34	8247.16	1660.04	0.21
E100-00-00	26140.	Max WS	32462.59	14.97	51.82		52.34	0.000294	6.05	9017.04	1902.89	0.23
E100-00-00	25536.0	Max WS	32491.46	14.48	51.62		52.18	0.000320	6.18	8660.25	1447.30	0.24
E100-00-00	25132.	Max WS	32516.36	14.29	51.49		52.05	0.000278	6.23	6935.10	916.53	0.23
E100-00-00	24817.0	Max WS	32528.99	14.14	51.20	36.16	51.93	0.000483	6.91	4830.44	641.95	0.28
E100-00-00	24789.0 UNION PACIFIC RR		Bridge									
E100-00-00	24758.0	Max WS	32521.19	13.76	50.95		51.68	0.000478	6.88	4835.14	603.92	0.28
E100-00-00	24636.	Max WS	32536.82	13.61	51.22		51.61	0.000283	5.39	7973.70	1289.86	0.21
E100-00-00	23934.0	Max WS	32572.69	12.75	50.90		51.38	0.000343	5.60	6801.60	918.64	0.23
E100-00-00	23550.0	Max WS	32596.93	12.77	50.79	32.94	51.25	0.000311	5.45	6319.27	610.95	0.22
E100-00-00	23506.5 DURHAM		Bridge									
E100-00-00	23444.0	Max WS	32593.06	12.69	50.66		51.12	0.000314	5.46	6287.46	601.89	0.22
E100-00-00	23180.	Max WS	32606.05	12.46	50.66		51.08	0.000207	5.58	9436.35	1224.10	0.20
E100-00-00	22983.	Max WS	32613.31	12.29	50.59		51.05	0.000280	5.89	9312.55	1644.11	0.22
E100-00-00	22834.0	Max WS	32622.49	12.16	50.52	34.59	51.02	0.000374	6.08	10165.78	1731.72	0.23
E100-00-00	22796.5 SHEPHERD		Bridge									
E100-00-00	22758.0	Max WS	32622.29	12.11	50.34		50.84	0.000412	6.13	9930.93	1719.74	0.23
E100-00-00	22610.	Max WS	32631.90	11.92	50.35		50.74	0.000324	5.54	9844.70	1932.01	0.20
E100-00-00	22224.0	Max WS	32653.72	11.41	50.35		50.57	0.000252	4.23	13188.39	1965.99	0.16
E100-00-00	21444.0	Max WS	32688.48	10.52	50.00		50.43	0.000357	5.61	9523.26	1569.95	0.21
E100-00-00	20746.0	Max WS	32723.81	10.00	49.51		49.91	0.001173	5.34	8530.37	1850.48	0.23
E100-00-00	20644.0	Max WS	32730.40	9.95	49.54	32.56	49.81	0.000233	4.81	12858.56	1843.14	0.18
E100-00-00	20633.0 Pipeline		Bridge									
E100-00-00	20622.0	Max WS	32730.20	9.95	49.43		49.71	0.000239	4.85	12631.25	1840.18	0.18
E100-00-00	20521.	Max WS	32736.09	9.91	49.37		49.70	0.000249	5.21	12015.54	1684.06	0.19
E100-00-00	19917.0	Max WS	32773.29	9.66	48.91		49.56	0.000483	6.50	6649.02	777.16	0.24
E100-00-00	19463.0	Max WS	32799.82	9.25	48.72		49.34	0.000489	6.42	7817.70	1240.90	0.25
E100-00-00	18857	Max WS	32833.98	8.03	48.51	31.88	49.07	0.000412	6.29	6280.61	960.95	0.23
E100-00-00	18800 I-10 WBFR		Bridge									
E100-00-00	18747	Max WS	32840.04	7.81	48.36		48.81	0.000314	5.69	6866.48	948.28	0.20
E100-00-00	18746	Max WS	32840.08	7.81	48.35	30.35	48.81	0.000314	5.69	6866.32	948.23	0.20
E100-00-00	18595 I-10 BRIDGE		Bridge									
E100-00-00	18443	Max WS	32840.12	7.19	47.76		48.23	0.000378	5.70	6745.32	892.32	0.22
E100-00-00	18442	Max WS	32840.09	7.19	47.75	30.01	48.23	0.000378	5.70	6745.12	892.26	0.22
E100-00-00	18394 I-10 EBFR		Bridge									
E100-00-00	18377.	Max WS	32845.85	6.98	47.23		47.77	0.000405	6.05	6454.80	768.99	0.22
E100-00-00	18234.0	Max WS	32857.39	6.77	47.34	29.43	47.68	0.000273	4.70	7986.26	1152.35	0.18
E100-00-00	18220.0 UNION PACIFIC RR		Bridge									
E100-00-00	18199.0	Max WS	32857.28	6.70	46.93		47.29	0.000274	4.87	7670.73	993.41	0.18
E100-00-00	18176.0	Max WS	32858.50	6.79	46.89	28.81	47.30	0.000290	5.26	8023.88	1202.79	0.19
E100-00-00	18138.0 YALE		Bridge									
E100-00-00	18082.0	Max WS	32638.05	6.87	45.31		45.90	0.000464	6.23	6483.14	826.78	0.24
E100-00-00	17905.	Max WS	32676.42	6.86	45.33		45.80	0.000384	5.74	8453.97	1277.33	0.22
E100-00-00	17756.0	Max WS	32705.22	6.85	45.33	29.74	45.72	0.000377	5.27	8338.90	1239.57	0.21
E100-00-00	17726 S. HEIGHTS		Bridge									
E100-00-00	17696	Max WS	32695.39	6.85	44.90		45.33	0.000413	5.44	7958.12	1201.93	0.22
E100-00-00	17657	Max WS	32702.28	6.35	44.87	29.25	45.31	0.000403	5.46	7426.45	797.83	0.22
E100-00-00	17627 N. HEIGHTS		Bridge									
E100-00-00	17597.0	Max WS	32666.53	6.35	43.67		44.20	0.000517	5.92	6501.06	749.78	0.24
E100-00-00	17318.	Max WS	32706.74	6.35	43.27		44.04	0.000693	7.03	4683.31	326.40	0.29
E100-00-00	16831.0	Max WS	32827.85	6.34	43.41		43.79	0.000239	4.95	6635.60	494.29	0.24

HEC-RAS Plan: Harvey_Calib Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	15795.0	Max WS	32956.88	4.84	43.29		43.53	0.000261	3.95	8799.97	780.77	0.16
E100-00-00	15278.	Max WS	33017.85	4.41	42.89		43.43	0.000303	6.01	6479.00	664.53	0.23
E100-00-00	14977.0	Max WS	33057.30	4.16	42.89	26.24	43.34	0.000139	5.41	7282.48	702.75	0.21
E100-00-00	14937.0 I-10 EBFR ACCESS		Bridge									
E100-00-00	14897.0	Max WS	33042.02	3.39	42.39		42.83	0.000135	5.37	7147.73	695.04	0.20
E100-00-00	14890	Max WS	33035.96	3.42	42.30	25.57	42.85	0.000168	5.98	6529.34	752.99	0.23
E100-00-00	14775 I-10 BRIDGE		Bridge									
E100-00-00	14660	Max WS	33026.10	3.42	42.17		42.72	0.000172	6.03	6428.88	747.58	0.23
E100-00-00	14590.0	Max WS	33031.91	3.45	42.00	25.97	42.74	0.000232	6.91	5569.65	820.17	0.26
E100-00-00	14562.0 I-10 WB ACCESS		Bridge									
E100-00-00	14532.0	Max WS	32972.76	3.41	40.71		41.54	0.000695	7.37	4705.28	621.07	0.29
E100-00-00	14354.0	Max WS	33020.86	3.29	41.13		41.39	0.000158	4.16	8419.28	749.43	0.19
E100-00-00	13924.0	Max WS	33070.27	3.18	40.80	24.62	41.30	0.000416	5.89	6321.51	389.29	0.22
E100-00-00	13909.5 UNION PAC. RR		Bridge									
E100-00-00	13898.0	Max WS	33065.85	2.95	40.54		41.05	0.000420	5.92	6276.30	387.03	0.22
E100-00-00	13494.	Max WS	33126.78	2.47	40.56		40.86	0.000430	4.57	7905.16	538.04	0.18
E100-00-00	13220.0	Max WS	33171.73	2.15	40.59	23.83	40.78	0.000109	3.65	10975.54	841.76	0.14
E100-00-00	13182.5 STUDEMONT		Bridge									
E100-00-00	13143.0	Max WS	33159.57	2.15	40.33		40.54	0.000119	3.79	10008.91	731.55	0.15
E100-00-00	12698.	Max WS	33205.27	1.87	40.08		40.45	0.000324	4.85	6882.44	489.50	0.21
E100-00-00	12066.0	Max WS	33311.02	1.47	40.01		40.25	0.000285	3.90	8531.25	503.83	0.17
E100-00-00	11546.0	Max WS	33393.65	0.90	40.00		40.15	0.000099	3.26	12453.80	1247.50	0.13
E100-00-00	11021.	Max WS	33475.25	0.63	39.93		40.10	0.000093	3.37	10917.78	1371.90	0.13
E100-00-00	10908.0	Max WS	33496.18	0.57	39.96	22.46	40.09	0.000075	3.11	14389.27	1691.46	0.12
E100-00-00	10852.5 TAYLOR (SAWYER)		Bridge									
E100-00-00	10804.0	Max WS	33494.84	0.45	39.93		40.05	0.000074	3.07	14510.52	1694.30	0.12
E100-00-00	10643.	Max WS	33506.74	0.14	39.70		40.07	0.000278	5.10	7798.85	1215.96	0.19
E100-00-00	9779.0	Max WS	33652.11	-1.51	39.71		39.87	0.000091	3.45	12400.35	1186.29	0.13
E100-00-00	8532.0	Max WS	33849.74	-1.76	39.73		39.77	0.000027	1.65	22230.68	1433.77	0.06
E100-00-00	8140.	Max WS	33913.33	-2.43	39.70		39.74	0.000115	1.61	24163.06	1609.26	0.06
E100-00-00	7649.0	Max WS	33975.98	-3.26	39.63	19.03	39.73	0.000049	2.90	23792.02	1781.04	0.10
E100-00-00	7608.5 HOUSTON		Bridge									
E100-00-00	7568.0	Max WS	33973.78	-3.15	39.64		39.69	0.000032	2.34	23620.90	1778.99	0.08
E100-00-00	7546.0	Max WS	33977.88	-3.16	39.64	19.01	39.69	0.000034	2.38	23443.68	1855.92	0.08
E100-00-00	7535.5 Pipeline		Bridge									
E100-00-00	7529.0	Max WS	33975.04	-3.16	39.61		39.67	0.000034	2.38	23403.74	1854.41	0.08
E100-00-00	7353.	Max WS	33973.18	-3.18	39.59		39.67	0.000047	2.78	21003.51	2061.04	0.10
E100-00-00	6980	Max WS	33975.48	-3.22	39.59		39.65	0.000038	2.03	18889.21	1187.20	0.07
E100-00-00	6975.0	Max WS	33976.13	-3.22	39.59	17.98	39.65	0.000038	2.03	18888.97	1187.17	0.07
E100-00-00	6935.0 I-10 EAST RAMP		Bridge									
E100-00-00	6898.0	Max WS	33973.56	-4.23	39.56		39.62	0.000033	1.97	19484.71	1184.13	0.07
E100-00-00	6895	Max WS	33975.48	-4.23	39.56		39.62	0.000033	1.97	19484.59	1184.12	0.07
E100-00-00_02	6775.	Max WS	53354.87	-4.30	39.56		39.72	0.000095	3.24	17616.96	1198.63	0.12
E100-00-00_02	6473.0	Max WS	53353.79	-4.46	39.49	19.86	39.70	0.000110	3.78	16682.70	1471.10	0.13
E100-00-00_02	6448.0 I-45 NORTH RAMP		Bridge									
E100-00-00_02	6423.0	Max WS	53350.58	-4.33	39.46		39.67	0.000111	3.78	16520.49	1448.24	0.13
E100-00-00_02	6174.0	Max WS	53315.20	-4.69	39.07	21.37	39.68	0.000396	6.51	9515.05	1195.27	0.22
E100-00-00_02	6128.0 I-45 NORTH		Bridge									
E100-00-00_02	6078	Max WS	53207.16	-3.96	38.72		39.38	0.000450	6.77	9120.98	1191.63	0.23
E100-00-00_02	6068.0	Max WS	53244.89	-3.96	38.81	20.83	39.38	0.000142	6.36	10166.60	1264.36	0.22
E100-00-00_02	6046 I-10 to I-45 DC		Bridge									
E100-00-00_02	6020	Max WS	53239.55	-3.89	38.80		39.19	0.000120	5.02	11014.68	1204.54	0.17
E100-00-00_02	5525.0	Max WS	53309.75	-3.15	38.97		39.12	0.000107	3.08	17306.17	803.76	0.11
E100-00-00_02	4994.0	Max WS	53274.28	-3.09	38.76	18.56	39.03	0.000269	4.30	13578.34	664.21	0.14
E100-00-00_02	4980.0 RR OVERPASS		Bridge									
E100-00-00_02	4961.0	Max WS	40885.28	-3.03	38.64		38.80	0.000181	3.34	13368.45	662.38	0.11
E100-00-00_02	4812.0	Max WS	40636.34	-3.49	38.47	17.12	38.73	0.000682	4.07	9973.75	665.43	0.17
E100-00-00_02	4774.5 CROCKETT/HOGAN		Bridge									
E100-00-00_02	4687.0	Max WS	40481.79	-4.67	38.40		38.60	0.000231	3.60	11238.58	701.49	0.14
E100-00-00_02	4407.	Max WS	40329.38	-3.62	38.33		38.55	0.000209	4.07	12510.64	1313.74	0.14
E100-00-00_02	4014.0	Max WS	40335.42	-2.15	38.33	16.13	38.47	0.000155	3.08	14686.24	1014.60	0.11
E100-00-00_02	3997.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	3976.0	Max WS	40264.35	-2.40	38.04		38.18	0.000150	3.08	14664.87	1014.41	0.11
E100-00-00_02	3681.	Max WS	40157.22	-3.80	37.96		38.14	0.000190	3.58	14877.29	1399.74	0.13
E100-00-00_02	3585.0	Max WS	40061.00	-4.26	37.91		38.13	0.000199	3.88	14632.97	1394.55	0.15
E100-00-00_02	2298.0	Max WS	39651.82	-6.21	37.70		37.89	0.000164	3.65	15499.02	1276.18	0.13
E100-00-00_02	1580.	Max WS	39606.40	-7.83	37.68		37.78	0.000113	3.09	19716.49	1670.29	0.10
E100-00-00_02	1353.0	Max WS	39480.63	-8.34	37.63	16.47	37.76	0.000152	3.52	17318.81	1778.95	0.12
E100-00-00_02	1335.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	1319.0	Max WS	39387.59	-8.37	37.61		37.73	0.000145	3.44	17500.68	1847.73	0.12
E100-00-00_02	984.0	Max WS	38742.26	-8.69	37.48	13.05	37.70	0.000129	4.11	14637.89	2121.87	0.14
E100-00-00_02	978 MAIN STREET		Bridge									
E100-00-00_02	971.6	Max WS	38489.30	-8.69	37.42		37.64	0.000129	4.10	14581.23	2114.96	0.14
E100-00-00_02	971.5	Max WS	38483.21	-8.69	37.42	12.98	37.64	0.000129	4.10	14581.21	2114.96	0.14
E100-00-00_02	961.5 1ST STREET		Bridge									
E100-00-00_02	851.0	Max WS	38343.66	-6.40	37.35		37.58	0.000157	4.27	14428.85	2086.86	0.15
E100-00-00_02	654.0	Max WS	38361.96	-6.50	37.37		37.53	0.000094	3.45	18182.70	2013.91	0.12
E100-00-00_02	400.0	Max WS	38183.85	-8.58	37.28	12.46	37.54	0.000143	4.49	16251.01	2308.57	0.15
E100-00-00_02	381.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	365.0	Max WS	37976.13	-8.23	37.21		37.46	0.000142	4.43	15989.96	2476.32	0.15
E100-00-00_02	210.0	Max WS	37764.42	-7.81	37.14	12.88	37.48	0.000175	5.09	15488.69	2955.70	0.16
E100-00-00_02	191.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	173.1	Max WS	37466.78	-6.84	37.07		37.42	0.000189	5.18	15076.49	3260.24	0.17
E100-00-00_02	173.0	Max WS	37460.93	-6.84	37.07		37.42	0.000189	5.18	15076.44	3260.23	0.17

Little White Oak Bayou
Harvey 2017

HEC-RAS Plan: Harvey_Calib River: E101-00-00 Reach: E101-00-00_0003 Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	9819.000	Max WS	18260.76	16.33	44.12		44.61	0.000816	5.64	3251.35	235.07	0.25
E101-00-00_0003	9750.000	Max WS	18260.22	16.31	44.11		44.56	0.000752	5.37	3441.28	308.76	0.24
E101-00-00_0003	9000.000	Max WS	18252.53	15.50	44.05		44.15	0.000205	2.92	7585.79	587.27	0.13
E101-00-00_0003	8469.000	Max WS	18350.33	13.02	43.88		44.02	0.000286	3.59	6962.17	711.99	0.14
E101-00-00_0003	7984.000	Max WS	18444.41	13.76	43.67		43.87	0.000361	4.16	5560.68	456.42	0.17
E101-00-00_0003	6838.000	Max WS	18557.88	12.20	43.13		43.39	0.000486	4.16	5002.69	800.95	0.20
E101-00-00_0003	5861.000	Max WS	18757.99	9.91	42.58		42.90	0.000575	4.87	5299.65	699.86	0.20
E101-00-00_0003	4720.000	Max WS	18915.33	8.13	42.12		42.42	0.000522	5.35	7107.49	986.40	0.19
E101-00-00_0003	4279.000	Max WS	18993.79	9.00	41.75		42.19	0.000772	5.92	5002.93	763.29	0.23
E101-00-00_0003	4130.000	Max WS	19025.42	8.68	41.85	22.90	42.03	0.000154	3.73	8217.82	953.25	0.13
E101-00-00_0003	4091.000 N. MAIN		Bridge									
E101-00-00_0003	4050.000	Max WS	19024.14	7.87	41.74		41.92	0.000151	3.76	7669.13	903.94	0.13
E101-00-00_0003	3952.	Max WS	19045.39	6.87	41.61		41.92	0.000210	4.60	4740.66	539.63	0.16
E101-00-00_0003	3466.000	Max WS	19155.53	1.92	41.63		41.85	0.000090	4.68	7368.15	684.40	0.14
E101-00-00_0003	3300.	Max WS	19188.16	-1.50	41.69		41.80	0.000074	3.35	9191.51	685.06	0.10
E101-00-00_0003	3203.000	Max WS	19207.04	-3.50	41.68		41.79	0.000071	2.92	9419.41	727.37	0.09
E101-00-00_0003	2797.000 I-45		Culvert									
E101-00-00_0003	2389.000	Max WS	19141.55	-0.26	39.98		40.11	0.000186	3.29	9937.51	878.20	0.10
E101-00-00_0003	2325.	Max WS	19155.87	-0.15	39.97		40.09	0.000183	3.19	10034.63	947.10	0.10
E101-00-00_0003	1855.000	Max WS	19225.21	0.68	39.97		40.03	0.000076	2.19	11047.49	1072.26	0.06
E101-00-00_0003	1126.	Max WS	19311.26	-1.85	39.88		39.96	0.000217	2.81	11632.29	1392.88	0.09
E101-00-00_0003	1070.000	Max WS	19324.12	-2.04	39.85	15.93	39.97	0.000228	3.50	12208.52	1505.88	0.11
E101-00-00_0003	1029.500 WRIGHTWOOD		Bridge									
E101-00-00_0003	987.000	Max WS	19322.68	-2.04	39.76		39.88	0.000248	3.46	12083.76	1493.01	0.11
E101-00-00_0003	911.	Max WS	19335.43	-2.19	39.77		39.85	0.000169	2.99	13195.58	1380.27	0.09
E101-00-00_0003	756.	Max WS	19362.33	-2.51	39.73		39.79	0.000481	2.35	11407.75	1375.92	0.10
E101-00-00_0003	637.000	Max WS	19380.80	-2.75	39.70	22.43	39.75	0.000300	2.04	13965.23	1557.90	0.08
E101-00-00_0003	538.000 QUITMAN/WHITEOAK		Bridge									
E101-00-00_0003	442.000	Max WS	19379.95	-2.75	39.56		39.63	0.000248	2.44	13518.50	1556.52	0.09
E101-00-00_0003	306.000	Max WS	19379.39	-2.86	39.56		39.60	0.000034	1.65	16107.28	1997.05	0.06

Buffalo Bayou
Corrected Effective 10-Year

HEC-RAS Plan: CE_10yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	148800.4	Max WS	8225.07	3.15	33.64		33.70	0.000212	2.12	4966.84	1107.11	0.08
W100_upstrm	148795.4	Max WS	8224.63	3.15	33.64	13.26	33.70	0.000212	2.12	4966.50	1106.56	0.08
W100_upstrm	148768.4 S. PACIFIC RR		Bridge									
W100_upstrm	148741.4	Max WS	8223.97	3.04	33.54		33.61	0.000211	2.12	4970.71	1113.25	0.08
W100_upstrm	147632.4	Max WS	8221.29	-1.17	33.39		33.44	0.000077	1.95	5055.95	401.27	0.08
W100_upstrm	146698.0	Max WS	8263.98	1.88	33.30		33.37	0.000093	2.27	5044.70	329.07	0.09
W100_upstrm	145723.9	Max WS	8306.41	1.61	33.17		33.28	0.000131	2.94	4750.58	385.45	0.11
W100_upstrm	144753.5	Max WS	8353.16	0.07	33.05		33.15	0.000115	2.58	4066.74	307.38	0.10
W100_upstrm	143966.8	Max WS	8380.69	-7.47	32.95		33.06	0.000152	2.77	4368.06	458.69	0.11
W100_upstrm	143078.2	Max WS	8422.56	-4.19	32.85		32.93	0.000111	2.36	5667.42	530.44	0.09
W100_upstrm	142061.4	Max WS	8473.92	0.55	32.77		32.84	0.000068	2.12	5866.96	456.72	0.08
W100_upstrm	141320.1	Max WS	8512.96	-2.70	32.76		32.78	0.000038	1.45	10667.36	747.23	0.06
W100_upstrm	140116.2	Max WS	8554.94	-1.31	32.66		32.74	0.000097	2.36	5794.74	606.09	0.08
W100_upstrm	139320.0	Max WS	8586.69	-2.14	32.61		32.66	0.000073	1.93	6649.18	606.79	0.07
W100_upstrm	138607.9	Max WS	8615.77	-2.08	32.61		32.62	0.000018	1.06	16535.63	1110.80	0.04
W100_upstrm	137732.0	Max WS	8635.15	-2.40	32.57		32.62	0.000054	2.03	9739.99	891.36	0.07
W100_upstrm	137113.0	Max WS	8662.00	-2.62	32.51		32.59	0.000079	2.46	6190.37	459.49	0.08
W100_upstrm	136331.2	Max WS	8698.85	-2.09	32.46		32.48	0.000147	1.32	9390.25	640.57	0.05
W100_upstrm	135666.2	Max WS	8713.33	-1.47	32.37		32.43	0.000069	2.10	7006.27	559.43	0.08
W100_upstrm	134706.7	Max WS	8751.91	-1.93	32.35		32.37	0.000032	1.48	12983.47	871.99	0.05
W100_upstrm	134090.6	Max WS	8769.01	-1.59	32.32		32.36	0.000044	1.82	10291.56	728.23	0.06
W100_upstrm	133772.1	Max WS	8777.88	-0.79	32.30	8.85	32.36	0.000065	2.35	8801.23	860.64	0.08
W100_upstrm	133760.1 FOOTBRIDGE		Bridge									
W100_upstrm	133748.1	Max WS	8773.96	-0.46	32.27		32.34	0.000067	2.38	8501.57	820.23	0.08
W100_upstrm	132963.8	Max WS	8803.26	-1.98	32.19		32.27	0.000089	2.37	5267.08	494.83	0.09
W100_upstrm	131789.8	Max WS	8839.46	-2.31	32.10		32.18	0.000085	2.49	5930.16	489.46	0.09
W100_upstrm	130765.5	Max WS	8888.66	-3.81	32.06		32.10	0.000035	1.72	8591.58	493.64	0.06
W100_upstrm	129725.3	Max WS	8919.96	-3.71	32.00		32.07	0.000063	2.30	8393.68	711.20	0.08
W100_upstrm	129163.2	Max WS	8949.98	-3.13	31.96		32.02	0.000057	2.10	6311.99	498.92	0.07
W100_upstrm	128326.9	Max WS	8987.18	-4.05	31.93		31.97	0.000039	1.86	8896.50	836.41	0.06
W100_upstrm	128109.6	Max WS	8985.71	-4.29	31.93		31.95	0.000088	1.28	7009.61	394.09	0.05
W100_upstrm	128104.6	Max WS	8987.88	-4.29	31.93	6.02	31.95	0.000089	1.28	7009.46	394.08	0.05
W100_upstrm	128066.7 SHEPHERD		Bridge									
W100_upstrm	128028.8	Max WS	8984.99	-4.51	31.71		31.73	0.000059	1.28	7009.80	394.09	0.05
W100_upstrm	126647.0	Max WS	8974.40	-3.93	31.67		31.68	0.000020	0.76	11793.08	816.31	0.03
W100_upstrm	125376.9	Max WS	9001.79	-4.05	31.55		31.58	0.000128	1.55	5815.61	337.78	0.07
W100_upstrm	124983.5	Max WS	9014.13	-3.86	31.52		31.55	0.000032	1.49	6055.00	1017.10	0.07
W100_upstrm	124644.1	Max WS	9025.07	-3.69	31.50	8.29	31.54	0.000039	1.56	5786.84	493.17	0.06
W100_upstrm	124591.8 WAUGH DRIVE		Bridge									
W100_upstrm	124539.5	Max WS	9022.29	-3.74	31.49		31.53	0.000039	1.56	5799.35	493.57	0.06
W100_upstrm	123658.2	Max WS	9071.42	-2.04	31.49		31.50	0.000019	0.80	12206.60	1428.45	0.04
W100_upstrm	123138.8	Max WS	9100.57	-4.08	31.48		31.49	0.000010	0.60	15581.11	1048.51	0.02
W100_upstrm	122627.1	Max WS	9123.66	-6.08	31.46		31.50	0.000020	1.28	8834.44	708.27	0.05
W100_upstrm	122572.1 MONTROSE COURT		Mult Open									
W100_upstrm	122517.1	Max WS	9122.52	-5.38	31.46		31.49	0.000033	1.29	8354.40	648.94	0.05
W100_upstrm	122371.6	Max WS	9122.05	-7.00	31.44	4.14	31.48	0.000060	1.49	6128.34	864.16	0.06
W100_upstrm	122265 ROSEMONT		Bridge									
W100_upstrm	122210.0	Max WS	9116.27	-5.60	31.41		31.44	0.000037	1.41	6465.98	745.17	0.05
W100_upstrm	122036.7	Max WS	9124.42	-8.40	31.41		31.44	0.000039	1.27	8130.57	761.28	0.05
W100_upstrm	121229.5	Max WS	9153.16	-11.37	31.39		31.41	0.000027	1.18	8979.24	841.14	0.05
W100_upstrm	120962.2	Max WS	9160.26	-10.59	31.37		31.40	0.000037	1.46	6851.73	667.82	0.06
W100_upstrm	120005.2	Max WS	9201.01	-7.78	31.36	3.58	31.36	0.000029	0.64	14289.95	951.67	0.03
W100_upstrm	119952.6 MEMORIAL DRIVE		Bridge									
W100_upstrm	119900.0	Max WS	9190.65	-7.64	31.34		31.35	0.000018	0.65	14143.53	941.65	0.03
W100_upstrm	119495.9	Max WS	9216.68	-7.21	31.34		31.34	0.000008	0.43	21523.79	1251.80	0.02
W100_upstrm	118667.7	Max WS	9256.95	-8.56	31.32		31.33	0.000026	0.84	11180.64	737.09	0.04
W100_upstrm	118466.1	Max WS	9258.44	-8.89	31.31	1.63	31.33	0.000019	1.14	8928.15	805.36	0.05
W100_upstrm	118418.1 MEMORIAL DRIVE		Bridge									
W100_upstrm	118370.1	Max WS	9250.43	-8.87	31.27		31.29	0.000019	1.14	8881.37	804.50	0.05
W100_upstrm	117845.4	Max WS	9271.52	-7.26	31.26		31.27	0.000028	1.01	9474.02	582.41	0.04
W100_upstrm	117204.3	Max WS	9304.54	-4.60	31.25		31.26	0.000017	0.82	11322.72	652.69	0.03
W100_upstrm	116395.7	Max WS	9337.25	-3.88	31.23		31.24	0.000016	0.92	10102.93	504.17	0.04
W100_upstrm	116167.6	Max WS	9342.56	-3.68	31.20	4.15	31.24	0.000062	1.53	6103.76	272.94	0.06
W100_upstrm	116121.9 SABINE AVENUE		Bridge									
W100_upstrm	116076.2	Max WS	9324.40	-3.86	31.01		31.05	0.000060	1.53	6102.74	272.93	0.06
W100_upstrm	115804.5	Max WS	9320.03	-4.60	30.99	4.15	31.04	0.000031	2.02	6252.77	307.47	0.06
W100_upstrm	115800 I-45 S EXIT RAMP		Bridge									
W100_upstrm	115729.9	Max WS	9316.96	-4.81	30.98		31.04	0.000031	1.92	6089.86	351.59	0.06
W100_upstrm	115672.3	Max WS	9318.94	-5.10	30.98	4.29	31.04	0.000034	2.05	6477.09	419.12	0.07
W100_upstrm	115635.5 I-45 SBML		Bridge									
W100_upstrm	115621.1	Max WS	9332.78	-5.57	30.99		31.03	0.000023	1.71	7960.64	673.27	0.05
W100_upstrm	115594.6	Max WS	9343.37	-6.04	31.00	2.79	31.03	0.000017	1.50	8886.85	703.32	0.05
W100_upstrm	115553.5 I-45 S. - ALLEN		Bridge									
W100_upstrm	115545.8	Max WS	9341.84	-6.85	30.99		31.02	0.000018	1.57	9531.08	715.88	0.05
W100_upstrm	115438.9	Max WS	9348.34	-7.24	30.99	3.07	31.02	0.000019	1.53	8789.38	528.06	0.05
W100_upstrm	115400 I-45 NBML		Bridge									
W100_upstrm	115365.4	Max WS	9349.87	-7.52	30.97		31.00	0.000014	1.35	9229.88	559.90	0.04
W100_upstrm	115284.6	Max WS	9352.01	-7.89	30.97	2.29	31.00	0.000018	1.52	13032.23	1176.63	0.05
W100_upstrm	115168.5 I-45 N. ENTRANCE		Bridge									
W100_upstrm	115104.1	Max WS	9341.15	-8.31	30.95		30.98	0.000011	1.26	10885.18	763.64	0.04
W100_upstrm	115001.1	Max WS	9339.06	-8.48	30.93	2.21	30.99	0.000027	1.93	8047.72	617.74	0.06
W100_upstrm	115000 I-45 RAMP MCKINN		Bridge									
W100_upstrm	114890.5	Max WS	9337.48	-8.56	30.93		30.98	0.000027	1.85	7294.99	469.61	0.06
W100_upstrm	114885	Max WS	9339.37	-8.56	30.93	1.62	30.98	0.000027	1.85	7294.93	469.60	0.06
W100_upstrm	114864.5 I-45 N. ENTRANCE		Bridge									
W100_upstrm	114838.5	Max WS	9337.79	-9.27	30.93		30.97	0.000025	1.80	7633.74	495.66	0.06
W100_upstrm	114492.0	Max WS	9365.57	-10.48	30.93		30.96	0.000026	1.35	6946.96	367.34	0.05

HEC-RAS Plan: CE_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	114195.9	Max WS	9367.22	-11.52	30.91	1.28	30.95	0.000060	1.48	6334.25	337.03	0.06
W100_upstrm	114168.9 RUSK STREET		Bridge									
W100_upstrm	114141.9	Max WS	9344.49	-10.83	30.87		30.91	0.000064	1.53	6105.60	327.57	0.06
W100_upstrm	114097.4	Max WS	9348.88	-7.46	30.88	3.21	30.91	0.000038	1.32	7071.57	382.93	0.05
W100_upstrm	114070.4 CAPITAL STREE		Bridge									
W100_upstrm	114043.4	Max WS	9337.45	-7.72	29.92		29.95	0.000042	1.37	6806.17	381.35	0.06
W100_upstrm	113644.0	Max WS	9327.54	-8.91	29.88		29.94	0.000039	1.94	5777.93	463.13	0.07
W100_upstrm	113411.6	Max WS	9345.72	-9.61	29.89	0.36	29.93	0.000036	1.67	5591.13	374.79	0.05
W100_upstrm	113374.3 TEXAS AVE		Bridge									
W100_upstrm	113337.0	Max WS	9315.35	-9.65	29.76		29.81	0.000036	1.67	5575.82	374.57	0.05
W100_upstrm	113266.4	Max WS	9292.50	-9.11	29.73	2.88	29.80	0.000149	2.09	4694.73	243.87	0.08
W100_upstrm	113238.6 BAGBY		Bridge									
W100_upstrm	113210.8	Max WS	9264.90	-9.46	29.32		29.38	0.000153	2.09	4678.28	243.62	0.08
W100_upstrm	112974.0	Max WS	9253.45	-10.69	29.28	0.97	29.35	0.000101	2.09	4423.37	203.04	0.08
W100_upstrm	112944.9 PRAIRIE		Bridge									
W100_upstrm	112915.8	Max WS	9237.53	-10.82	29.13		29.20	0.000101	2.09	4418.68	202.99	0.08
W100_upstrm	112575.5	Max WS	9241.28	-9.20	29.11	3.16	29.16	0.000121	1.78	5202.92	242.20	0.06
W100_upstrm	112534.5 PRESTON STREET		Bridge									
W100_upstrm	112493.5	Max WS	9194.34	-9.47	29.07		29.12	0.000117	1.75	5251.94	242.59	0.06
W100_upstrm	112003.3	Max WS	9199.85	-9.69	29.03	1.88	29.07	0.000074	1.46	6322.38	291.87	0.05
W100_upstrm	111953.3 CONGRESS STREET		Bridge									
W100_upstrm	111903.3	Max WS	9147.69	-9.84	28.98		29.01	0.000073	1.44	6349.67	292.27	0.05
W100_upstrm	111853.5	Max WS	9141.48	-9.86	28.97	1.41	29.01	0.000076	1.54	5920.90	231.34	0.05
W100_upstrm	111818.6 SMITH STREET		Bridge									
W100_upstrm	111783.7	Max WS	9099.65	-8.67	28.95		28.99	0.000085	1.61	5645.94	227.67	0.06
W100_upstrm	111626.7	Max WS	9098.28	-11.83	28.94	1.10	28.97	0.000091	1.55	5853.75	232.26	0.05
W100_upstrm	111518.6 LOUISIANA AND FR		Bridge									
W100_upstrm	111410.5	Max WS	8992.91	-11.23	28.85		28.89	0.000062	1.58	5694.73	231.11	0.06
W100_upstrm	110876.6	Max WS	9005.32	-10.43	28.83	-0.76	28.85	0.000061	1.21	7489.51	455.88	0.05
W100_upstrm	110837.8 MILAM		Bridge									
W100_upstrm	110799.0	Max WS	8966.02	-10.72	28.77		28.79	0.000170	1.19	7585.42	471.35	0.04
W100_upstrm	110672.7	Max WS	8942.56	-13.25	28.74	-1.64	28.77	0.000136	1.45	8114.37	732.25	0.05
W100_upstrm	110643.7 TRAVIS STREET		Bridge									
W100_upstrm	110614.7	Max WS	8910.48	-12.75	28.72		28.75	0.000154	1.48	7798.00	713.26	0.06
W100_upstrm	110200.2	Max WS	8893.79	-9.11	28.69	1.29	28.71	0.000028	1.16	8083.92	487.38	0.04
W100_upstrm	110154.2 MAIN STREET		Bridge									
W100_upstrm	110108.2	Max WS	8871.44	-9.31	28.49		28.51	0.000028	1.16	8081.59	487.31	0.04
W100_upstrm	110103.2	Max WS	8871.44	-9.31	28.49		28.51	0.000028	1.16	8081.52	487.31	0.04
Downstream	109924.2	Max WS	33314.08	-13.02	28.49		28.81	0.000579	4.57	7490.85	379.14	0.16
Downstream	109551.7	Max WS	33313.04	-14.28	28.33	3.51	28.60	0.000528	4.21	7910.15	345.70	0.16
Downstream	109518.7 FANNIN STREET		Bridge									
Downstream	109485.7	Max WS	33311.59	-15.31	27.44		27.72	0.000519	4.18	7961.42	346.26	0.15
Downstream	109440.2	Max WS	33311.58	-16.48	27.38	2.90	27.68	0.000937	4.45	7486.20	325.16	0.16
Downstream	109395.2 SAN JACINTO		Bridge									
Downstream	109350.2	Max WS	33310.59	-16.89	27.04		27.35	0.000928	4.43	7511.45	325.28	0.16
Downstream	109119.0	Max WS	33308.36	-17.14	26.63	3.57	27.08	0.001406	5.40	6164.31	412.89	0.23
Downstream	109103.1 CROSSWALK		Bridge									
Downstream	109087.2	Max WS	33307.12	-17.55	26.45		26.89	0.001372	5.33	6245.45	419.79	0.22
Downstream	108565.3	Max WS	33304.08	-12.77	25.92		26.29	0.000952	4.84	6977.77	418.54	0.18
Downstream	108334.0	Max WS	33303.32	-14.06	25.70		26.01	0.001316	4.51	7898.36	711.38	0.17
Downstream	107179.4	Max WS	33298.29	-20.52	24.30	-0.11	24.75	0.000977	5.43	6545.68	393.03	0.20
Downstream	107158.9 S. PACIFIC RR		Bridge									
Downstream	107138.4	Max WS	33298.10	-20.19	24.14		24.62	0.001039	5.57	6356.46	392.50	0.21
Downstream	106594.0	Max WS	33296.63	-16.70	23.75		24.12	0.000765	4.86	6844.68	254.13	0.17
Downstream	106151.4	Max WS	33295.04	-13.85	23.17	2.35	23.60	0.001572	5.29	6288.33	261.50	0.19
Downstream	106131.1 MCKEE		Bridge									
Downstream	106110.8	Max WS	33294.51	-12.53	22.88		23.38	0.001800	5.67	5874.16	254.68	0.21
Downstream	105705.4	Max WS	33292.54	-18.22	22.42	0.88	22.90	0.000561	5.56	5982.78	267.76	0.21
Downstream	105667.4 ELYSIAN STREET		Bridge									
Downstream	105629.4	Max WS	33292.54	-18.43	22.11		22.59	0.000569	5.59	5954.48	266.52	0.21
Downstream	105476	Max WS	33292.52	-18.70	22.00		22.41	0.001683	5.11	6514.45	368.67	0.21
Downstream	104962	Max WS	33291.15	-18.70	21.57	1.88	21.73	0.000885	3.18	10471.59	619.77	0.14
Downstream	104948 US-59 Bridge		Bridge									
Downstream	104900.1	Max WS	33291.00	-19.15	21.44		21.60	0.000233	3.19	10448.62	652.90	0.14
Downstream	104900	Max WS	33291.15	-19.15	21.44	1.71	21.60	0.000233	3.19	10448.60	652.89	0.14
Downstream	104566 US-59 Bridge		Bridge									
Downstream	104464.1	Max WS	33289.59	-19.86	20.97		21.25	0.001761	4.22	7882.60	519.73	0.19
Downstream	104464	Max WS	33289.76	-19.86	20.97	1.42	21.25	0.001761	4.22	7882.50	519.72	0.19
Downstream	104383 US-59 Bridge		Bridge									
Downstream	104301.1	Max WS	33289.10	-20.42	20.75		21.06	0.000309	4.45	7485.54	477.97	0.20
Downstream	104301	Max WS	33289.27	-20.42	20.75	1.49	21.06	0.000309	4.45	7485.52	477.97	0.20
Downstream	104271 US-59 Bridge		Bridge									
Downstream	104242.1	Max WS	33288.25	-20.62	20.53		20.88	0.001255	4.78	6960.08	385.26	0.20
Downstream	104242	Max WS	33288.08	-20.62	20.53	1.50	20.88	0.001255	4.78	6960.04	385.26	0.20
Downstream	104204 US-59 Bridge		Bridge									
Downstream	104133	Max WS	33285.33	-21.02	19.60		20.28	0.000751	6.60	5041.57	283.22	0.28
Downstream	103664.0	Max WS	33282.59	-23.03	18.78		19.58	0.002214	7.21	4618.09	267.50	0.31
Downstream	102875.3	Max WS	33277.82	-26.39	17.37	-1.35	17.99	0.001840	6.28	5297.77	346.25	0.28
Downstream	102847.5 HOUTerminal RR		Bridge									
Downstream	102819.7	Max WS	33276.84	-26.43	17.01		17.65	0.001944	6.42	5187.20	344.32	0.29
Downstream	102309.0	Max WS	33314.36	-23.48	16.58		17.06	0.000374	5.55	6001.76	216.76	0.19
Downstream	101828.0	Max WS	33348.39	-20.70	16.21	-2.01	16.81	0.000646	6.26	5331.47	234.09	0.23
Downstream	101790.1 JENSEN ROAD		Bridge									
Downstream	101752.2	Max WS	33347.83	-20.69	16.04		16.66	0.000623	6.30	5290.56	230.56	0.23
Downstream	101007.3	Max WS	33403.68	-16.93	15.78		16.28	0.000387	5.66	5901.85	259.20	0.21
Downstream	99992.6	Max WS	33477.82	-18.90	15.31		15.86	0.000431	5.94	5640.35	242.91	0.22
Downstream	98399.4	Max WS	33599.60	-20.26	14.67		15.18	0.000416	5.75	5844.80	254.58	0.21

HEC-RAS Plan: CE_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	97517.4	Max WS	33663.57	-19.35	14.59		14.89	0.000240	4.35	7733.25	312.24	0.15
Downstream	96028.6	Max WS	33769.11	-17.81	13.86	-4.30	14.33	0.000511	5.53	6108.70	283.44	0.21
Downstream	95985.1 YORK DRIVE		Bridge									
Downstream	95941.6	Max WS	33769.11	-17.87	13.71		14.19	0.000514	5.55	6084.84	282.91	0.21
Downstream	95362.9	Max WS	33812.86	-15.97	13.52		13.94	0.000356	5.17	6545.78	318.17	0.20
Downstream	94280.7	Max WS	33900.62	-19.82	12.60		13.32	0.000850	6.80	4983.43	226.63	0.26
Downstream	93495.6	Max WS	33953.55	-20.43	12.29		12.77	0.000584	5.58	6089.27	316.91	0.22
Downstream	92795.6	Max WS	34011.96	-20.98	11.93	-6.21	12.42	0.000418	5.64	6031.85	284.71	0.22
Downstream	92741.1 LOCKWOOD DRIVE		Bridge									
Downstream	92686.6	Max WS	34011.98	-21.08	11.73		12.22	0.000424	5.67	6003.43	284.09	0.22
Downstream	90936.7	Max WS	34144.20	-18.64	10.47		10.95	0.001034	5.51	6194.88	387.71	0.24
Downstream	89918.4	Max WS	34221.84	-17.23	9.30		10.00	0.000830	6.72	5095.23	308.42	0.29
Downstream	88579.0	Max WS	34321.93	-20.97	8.28		8.94	0.000736	6.52	5265.05	313.11	0.28
Downstream	87591.9	Max WS	34400.82	-23.72	7.79		8.31	0.000534	5.83	5902.68	300.98	0.23
Downstream	86660.2	Max WS	34463.86	-23.42	7.49	-10.98	7.90	0.000340	5.17	6660.97	289.35	0.19
Downstream	86641.7 HOUTerminal RR		Bridge									
Downstream	86623.2	Max WS	34463.89	-23.61	7.18		7.60	0.000345	5.20	6625.49	289.02	0.19
Downstream	85855.2	Max WS	34521.83	-26.84	6.31		7.20	0.000731	7.57	4563.15	205.44	0.28
Downstream	85238.7	Max WS	34566.55	-29.43	6.05		6.77	0.000631	6.84	5097.38	256.71	0.25
Downstream	84561.7	Max WS	34628.49	-32.27	5.83	-14.21	6.42	0.000407	6.16	5670.71	287.96	0.21
Downstream	84531.4 NORTH WAYSIDE RD		Bridge									
Downstream	84501.1	Max WS	34628.41	-28.97	5.30		6.11	0.000638	7.22	4794.96	208.61	0.27
Downstream	84252.6	Max WS	34647.21	-26.90	5.28	-10.59	5.96	0.000553	6.61	5240.10	238.37	0.25
Downstream	84222.3 M. GARCIA		Bridge									
Downstream	84192.0	Max WS	34647.00	-24.10	4.64		5.59	0.000896	7.81	4438.60	227.76	0.31
Downstream	83635.7	Max WS	34689.20	-21.72	4.57		5.15	0.000634	6.11	5674.98	332.34	0.26
Downstream	81786.1	Max WS	34824.88	-31.97	3.61		4.11	0.000496	5.67	6144.58	337.26	0.23
Downstream	80903.1	Max WS	34889.64	-27.77	3.33	-13.26	3.71	0.000391	4.97	7022.39	384.48	0.20
Downstream	80883.1 S. PACIFIC RR		Bridge									
Downstream	80863.1	Max WS	34889.64	-28.10	2.92		3.31	0.000454	4.99	6992.66	384.10	0.21
Downstream	80538.0	Max WS	34889.64	-33.12	3.06	-20.97	3.20	0.000111	3.05	11456.07	490.85	0.11

White Oak Bayou
Corrected Effective 10-Year

HEC-RAS Plan: CE_10yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	36134.	Max WS	21247.14	24.19	52.52		53.19	0.000535	6.59	3225.64	197.86	0.29
E100-00-00	35718.0	Max WS	21245.86	23.76	52.26		52.98	0.000477	6.82	3116.26	190.91	0.30
E100-00-00	35158.	Max WS	21323.94	22.89	52.09		52.71	0.000502	6.31	3376.95	208.80	0.28
E100-00-00	35006.0	Max WS	21348.93	22.66	51.95	39.66	52.63	0.000456	6.62	3225.84	271.76	0.29
E100-00-00	34951.5 ELLA		Bridge									
E100-00-00	34895.0	Max WS	21324.12	22.56	51.71		52.40	0.000465	6.67	3196.97	265.10	0.29
E100-00-00	34645.	Max WS	21352.39	22.24	51.63		52.27	0.000547	6.44	3355.36	354.03	0.29
E100-00-00	34206.0	Max WS	21417.36	21.68	51.41		52.05	0.000448	6.42	3343.99	241.82	0.28
E100-00-00	33962.58	Max WS	21464.36	21.61	51.53		51.94	0.000377	5.15	4270.49	484.54	0.25
E100-00-00	33909.08	Max WS	21471.41	21.60	51.49		51.92	0.000503	5.24	4137.85	477.13	0.26
E100-00-00	33770.	Max WS	21489.57	21.56	51.45		51.87	0.000260	5.23	4440.69	368.12	0.22
E100-00-00	33681.0	Max WS	21498.97	21.53	51.16	38.71	51.84	0.000462	6.60	3255.30	364.24	0.29
E100-00-00	33645.5 W 18TH		Bridge									
E100-00-00	33610.0	Max WS	21496.26	21.61	51.02		51.71	0.000478	6.70	3210.07	354.90	0.29
E100-00-00	33357.	Max WS	21524.20	21.41	50.95		51.58	0.000580	6.33	3399.22	218.95	0.28
E100-00-00	32570.0	Max WS	21657.99	20.78	50.61		51.19	0.000391	6.08	3560.29	212.21	0.26
E100-00-00	31583.0	Max WS	21765.08	19.35	50.30		50.82	0.000342	5.81	3760.19	240.06	0.24
E100-00-00	30779.0	Max WS	21872.87	18.79	50.09		50.56	0.000303	5.59	4342.88	428.34	0.23
E100-00-00	29659.	Max WS	21992.08	17.66	49.78		50.19	0.000351	5.17	4477.96	649.52	0.22
E100-00-00	29368.0	Max WS	22066.18	17.37	49.42	35.27	50.08	0.000423	6.49	3406.37	252.29	0.27
E100-00-00	29297.5 TC JESTER SOUTH		Bridge									
E100-00-00	29203.0	Max WS	21909.34	17.35	48.01		48.76	0.000508	6.96	3148.25	177.94	0.29
E100-00-00	28775.	Max WS	21955.39	16.90	48.10		48.55	0.000458	5.42	4053.24	271.86	0.25
E100-00-00	28375.0	Max WS	21968.51	16.48	47.73	34.22	48.37	0.000427	6.42	3419.62	201.31	0.27
E100-00-00	28357.0 BICYCLE BRIDGE		Bridge									
E100-00-00	28330.0	Max WS	21965.29	16.41	47.62		48.26	0.000430	6.44	3410.77	201.06	0.28
E100-00-00	28190.0	Max WS	21979.20	16.18	47.58	33.72	48.21	0.000391	6.35	3461.61	193.11	0.26
E100-00-00	28152.5 W 11TH		Bridge									
E100-00-00	28113.0	Max WS	21974.63	16.28	47.38		48.03	0.000401	6.46	3404.25	190.68	0.27
E100-00-00	27982.	Max WS	21979.48	16.25	47.28		47.97	0.000498	6.66	3298.37	198.87	0.29
E100-00-00	27429.0	Max WS	22008.51	16.12	47.09		47.71	0.000424	6.32	3479.61	205.49	0.27
E100-00-00	26598.	Max WS	22097.17	15.35	46.80		47.36	0.000397	6.02	3669.82	217.20	0.26
E100-00-00	26498.0	Max WS	22105.61	15.26	46.78	32.90	47.33	0.000379	5.91	3742.16	218.90	0.25
E100-00-00	26432.5 TC JESTER		Bridge									
E100-00-00	26366.0	Max WS	22103.25	15.16	46.62		47.16	0.000382	5.93	3727.43	218.50	0.25
E100-00-00	26307.3	Max WS	22110.67	15.13	46.70		47.14	0.000338	5.34	4446.25	480.58	0.23
E100-00-00	26225	Max WS	22115.40	15.04	46.69		47.11	0.000359	5.26	4461.52	476.66	0.23
E100-00-00	26140.	Max WS	22117.40	14.97	46.52		47.08	0.000415	6.02	3674.35	227.96	0.26
E100-00-00	25536.0	Max WS	22151.18	14.48	46.27		46.83	0.000400	6.03	3780.77	302.74	0.26
E100-00-00	25132.	Max WS	22183.44	14.29	46.16		46.69	0.000358	5.88	4254.97	369.65	0.25
E100-00-00	24817.0	Max WS	22187.33	14.14	45.86	32.91	46.53	0.000599	6.56	3381.41	229.77	0.30
E100-00-00	24789.0 UNION PACIFIC RR		Bridge									
E100-00-00	24758.0	Max WS	22174.35	13.76	45.33		46.01	0.000604	6.64	3338.73	225.39	0.30
E100-00-00	24636.	Max WS	22197.91	13.61	45.44		45.95	0.000394	5.84	4187.76	417.88	0.25
E100-00-00	23934.0	Max WS	22238.62	12.75	45.15		45.63	0.000489	5.59	3981.41	285.53	0.26
E100-00-00	23550.0	Max WS	22271.99	12.77	45.05	29.40	45.48	0.000305	5.23	4262.32	255.79	0.23
E100-00-00	23506.5 DURHAM		Bridge									
E100-00-00	23444.0	Max WS	22264.48	12.69	44.87		45.30	0.000309	5.26	4236.25	254.76	0.23
E100-00-00	23180.	Max WS	22275.43	12.46	44.72		45.23	0.000327	5.80	4256.98	500.16	0.24
E100-00-00	22983.	Max WS	22279.08	12.29	44.50		45.16	0.000477	6.53	3672.13	487.71	0.29
E100-00-00	22834.0	Max WS	22289.95	12.16	44.37	31.35	45.07	0.000607	6.73	3313.28	481.81	0.29
E100-00-00	22796.5 SHEPHERD		Bridge									
E100-00-00	22758.0	Max WS	22278.59	12.11	44.19		44.89	0.000664	6.74	3552.32	468.93	0.29
E100-00-00	22610.	Max WS	22292.25	11.92	44.22		44.79	0.000581	6.17	3989.07	443.53	0.26
E100-00-00	22224.0	Max WS	22325.86	11.41	44.27		44.55	0.000458	4.56	6701.66	719.86	0.21
E100-00-00	21444.0	Max WS	22360.16	10.52	43.59		44.18	0.000645	6.17	3695.95	400.02	0.27
E100-00-00	20746.0	Max WS	22392.21	10.00	43.04		43.64	0.000874	6.24	3587.80	245.66	0.29
E100-00-00	20644.0	Max WS	22403.96	9.95	43.09	29.39	43.58	0.000509	5.77	4958.55	789.33	0.25
E100-00-00	20633.0 Pipeline		Bridge									
E100-00-00	20622.0	Max WS	22398.73	9.95	42.97		43.47	0.000522	5.82	4849.22	766.68	0.25
E100-00-00	20521.	Max WS	22404.56	9.91	42.90		43.43	0.000494	5.96	4821.37	616.30	0.25
E100-00-00	19917.0	Max WS	22450.66	9.66	42.44		43.07	0.000663	6.36	3552.03	406.61	0.28
E100-00-00	19463.0	Max WS	22477.99	9.25	42.09		42.75	0.000708	6.52	3447.40	214.66	0.29
E100-00-00	18857	Max WS	22515.12	8.03	41.64	28.53	42.33	0.000731	6.72	3493.92	293.08	0.29
E100-00-00	18800 I-10 WBFR		Bridge									
E100-00-00	18747	Max WS	22515.12	7.81	41.69		42.20	0.000500	5.82	4103.91	313.72	0.24
E100-00-00	18746	Max WS	22514.69	7.81	41.69	27.12	42.20	0.000500	5.82	4103.75	313.72	0.24
E100-00-00	18595 I-10 BRIDGE		Bridge									
E100-00-00	18443	Max WS	22504.70	7.19	40.79		41.35	0.000544	6.01	3843.36	281.95	0.25
E100-00-00	18442	Max WS	22505.31	7.19	40.79	26.91	41.35	0.000544	6.01	3843.20	281.94	0.25
E100-00-00	18394 I-10 EBFR		Bridge									
E100-00-00	18377.	Max WS	22494.23	6.98	40.26		40.88	0.000631	6.32	3622.26	272.04	0.27
E100-00-00	18234.0	Max WS	22513.87	6.77	40.45	26.32	40.80	0.000368	4.76	4729.97	285.21	0.20
E100-00-00	18220.0 UNION PACIFIC RR		Bridge									
E100-00-00	18199.0	Max WS	22507.18	6.70	40.17		40.54	0.000396	4.86	4634.31	281.42	0.21
E100-00-00	18176.0	Max WS	22505.92	6.79	40.08	26.12	40.53	0.000353	5.41	4163.27	250.01	0.22
E100-00-00	18138.0 YALE		Bridge									
E100-00-00	18082.0	Max WS	22483.82	6.87	39.22		39.85	0.000502	6.38	3522.95	223.87	0.26
E100-00-00	17905.	Max WS	22498.54	6.86	39.20		39.76	0.000583	5.98	3794.71	278.96	0.26
E100-00-00	17756.0	Max WS	22507.25	6.85	39.13	26.90	39.66	0.000731	5.82	3867.65	284.78	0.28
E100-00-00	17726 S. HEIGHTS		Bridge									
E100-00-00	17696	Max WS	22267.31	6.85	37.79		38.42	0.000887	6.36	3499.56	265.36	0.31
E100-00-00	17657	Max WS	22269.24	6.35	37.81	26.34	38.39	0.000817	6.12	3637.68	272.81	0.30
E100-00-00	17627 N. HEIGHTS		Bridge									
E100-00-00	17597.0	Max WS	22056.97	6.35	36.91		37.56	0.000926	6.49	3398.05	259.75	0.32
E100-00-00	17318.	Max WS	21918.17	6.35	36.55		37.31	0.000828	7.01	3125.97	204.40	0.32
E100-00-00	16831.0	Max WS	21954.81	6.34	36.52		37.03	0.000318	5.70	3851.13	322.87	0.29

HEC-RAS Plan: CE_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	15795.0	Max WS	21995.65	4.84	36.38		36.65	0.000405	4.13	5331.10	389.67	0.20
E100-00-00	15278.	Max WS	22010.90	4.41	35.86		36.44	0.000435	6.13	3588.15	228.86	0.27
E100-00-00	14977.0	Max WS	22022.71	4.16	35.89	23.30	36.34	0.000208	5.42	4065.00	259.38	0.24
E100-00-00	14937.0 I-10 EBFR ACCESS		Bridge									
E100-00-00	14897.0	Max WS	22021.97	3.39	35.07		35.53	0.000210	5.43	4052.63	259.10	0.24
E100-00-00	14890	Max WS	22021.32	3.42	34.96	22.53	35.53	0.000252	6.04	3644.07	227.83	0.27
E100-00-00	14775 I-10 BRIDGE		Bridge									
E100-00-00	14660	Max WS	22020.00	3.42	34.78		35.36	0.000261	6.11	3602.67	226.79	0.27
E100-00-00	14590.0	Max WS	22021.91	3.45	34.58	22.59	35.34	0.000343	7.01	3143.66	195.58	0.31
E100-00-00	14562.0 I-10 WB ACCESS		Bridge									
E100-00-00	14532.0	Max WS	22021.38	3.41	34.42		35.19	0.000797	7.06	3120.54	194.88	0.31
E100-00-00	14354.0	Max WS	22028.90	3.29	34.78		35.08	0.000168	4.39	5014.01	481.33	0.19
E100-00-00	13924.0	Max WS	22042.92	3.18	34.38	21.83	34.93	0.000560	5.96	3698.63	324.13	0.25
E100-00-00	13909.5 UNION PAC. RR		Bridge									
E100-00-00	13898.0	Max WS	22042.92	2.95	34.07		34.62	0.000567	5.99	3680.85	321.40	0.26
E100-00-00	13494.	Max WS	22055.64	2.47	33.95		34.38	0.000647	5.26	4191.34	398.35	0.24
E100-00-00	13220.0	Max WS	22064.34	2.15	34.03	21.66	34.26	0.000160	3.85	5732.35	576.04	0.17
E100-00-00	13182.5 STUDEMONT		Bridge									
E100-00-00	13143.0	Max WS	22064.34	2.15	33.97		34.18	0.000152	3.73	6297.32	504.59	0.17
E100-00-00	12698.	Max WS	22074.32	1.87	33.67		34.06	0.000438	4.97	4444.31	344.29	0.24
E100-00-00	12066.0	Max WS	22092.32	1.47	33.58		33.81	0.000324	3.91	5653.61	381.07	0.18
E100-00-00	11546.0	Max WS	22103.87	0.90	33.49		33.69	0.000153	3.55	6414.32	601.95	0.17
E100-00-00	11021.	Max WS	22114.50	0.63	33.45		33.62	0.000116	3.31	7069.65	730.78	0.15
E100-00-00	10908.0	Max WS	22116.65	0.57	33.47	19.80	33.61	0.000100	3.17	8459.88	879.58	0.14
E100-00-00	10852.5 TAYLOR (SAWYER)		Bridge									
E100-00-00	10804.0	Max WS	22116.65	0.45	33.31		33.45	0.000101	3.15	8435.10	878.66	0.14
E100-00-00	10643.	Max WS	22109.94	0.14	33.05		33.45	0.000376	5.11	4560.58	379.10	0.22
E100-00-00	9779.0	Max WS	22122.84	-1.51	33.03		33.21	0.000114	3.41	7368.69	600.45	0.15
E100-00-00	8532.0	Max WS	22146.17	-1.76	33.05		33.09	0.000032	1.52	14602.36	900.85	0.06
E100-00-00	8140.	Max WS	22142.51	-2.43	33.01		33.05	0.000171	1.58	14935.77	1199.35	0.07
E100-00-00	7649.0	Max WS	22126.33	-3.26	32.90	15.90	33.02	0.000068	2.99	13359.34	1375.04	0.12
E100-00-00	7608.5 HOUSTON		Bridge									
E100-00-00	7568.0	Max WS	22115.72	-3.15	32.90		32.98	0.000050	2.57	13205.43	1372.67	0.10
E100-00-00	7546.0	Max WS	22111.09	-3.16	32.88	15.86	32.98	0.000060	2.79	12161.04	1512.59	0.11
E100-00-00	7535.5 Pipeline		Bridge									
E100-00-00	7529.0	Max WS	22111.09	-3.16	32.85		32.95	0.000061	2.79	12111.78	1510.95	0.11
E100-00-00	7481.0	Max WS	22100.37	-3.17	32.81		32.95	0.000090	3.16	9085.98	1262.05	0.14
E100-00-00	7253.1	Max WS	22094.39	-3.19	32.83		32.92	0.000037	2.41	9227.44	661.01	0.09
E100-00-00	7253.05		Lat Struct									
E100-00-00	7253	Max WS	22093.74	-3.19	32.83		32.92	0.000037	2.41	9227.43	661.01	0.09
E100-00-00	7138.1	Max WS	21561.59	-3.20	32.81		32.92	0.000046	2.65	8175.78	601.66	0.11
E100-00-00	7138	Max WS	21560.90	-3.20	32.81		32.92	0.000046	2.65	8175.78	601.66	0.11
E100-00-00	7016.1	Max WS	21056.22	-3.22	32.68		32.93	0.000089	4.03	5220.90	497.89	0.15
E100-00-00	7016	Max WS	21055.70	-3.22	32.68		32.93	0.000089	4.03	5220.91	497.89	0.15
E100-00-00	6980	Max WS	21082.81	-3.22	32.80		32.92	0.000076	2.78	7642.72	544.43	0.11
E100-00-00	6979		Lat Struct									
E100-00-00	6975.0	Max WS	21044.56	-3.22	32.80	14.67	32.92	0.000076	2.77	7642.92	544.45	0.11
E100-00-00	6935.0 I-10 EAST RAMP		Bridge									
E100-00-00	6898.0	Max WS	20992.74	-4.23	32.56		32.73	0.000204	3.31	6663.37	484.61	0.14
E100-00-00	6895	Max WS	20992.73	-4.23	32.56		32.73	0.000204	3.31	6663.06	484.61	0.14
E100-00-00_02	6775.	Max WS	29042.75	-4.30	32.56		32.66	0.000083	2.58	11490.53	810.54	0.11
E100-00-00_02	6473.0	Max WS	29009.59	-4.46	32.49	16.49	32.63	0.000100	3.09	9511.23	884.55	0.13
E100-00-00_02	6448.0 I-45 NORTH RAMP		Bridge									
E100-00-00_02	6423.0	Max WS	29009.59	-4.33	32.45		32.60	0.000102	3.11	9395.23	831.57	0.13
E100-00-00_02	6174.0	Max WS	28946.82	-4.69	32.14	16.68	32.56	0.000363	5.22	5547.41	981.05	0.20
E100-00-00_02	6128.0 I-45 NORTH		Bridge									
E100-00-00_02	6078	Max WS	28937.33	-3.96	31.90		32.37	0.000416	5.46	5298.13	970.23	0.22
E100-00-00_02	6068.0	Max WS	28941.91	-3.96	32.00	16.78	32.37	0.000114	5.02	6237.94	1149.71	0.19
E100-00-00_02	6046 I-10 to I-45 DC		Bridge									
E100-00-00_02	6020	Max WS	28952.10	-3.89	32.15		32.36	0.000086	3.68	7920.28	1117.90	0.15
E100-00-00_02	5525.0	Max WS	28925.21	-3.15	32.22		32.31	0.000077	2.37	12215.18	732.16	0.10
E100-00-00_02	4994.0	Max WS	28898.71	-3.09	32.07	15.37	32.24	0.000206	3.30	9328.13	605.24	0.13
E100-00-00_02	4980.0 RR OVERPASS		Bridge									
E100-00-00_02	4961.0	Max WS	28881.53	-3.03	31.84		32.01	0.000235	3.38	9090.05	596.36	0.13
E100-00-00_02	4812.0	Max WS	28873.76	-3.49	31.61	14.98	31.91	0.001083	4.42	6535.56	472.24	0.21
E100-00-00_02	4774.5 CROCKETT/HOGAN		Bridge									
E100-00-00_02	4687.0	Max WS	28868.89	-4.67	31.51		31.73	0.000374	3.83	7547.27	503.77	0.17
E100-00-00_02	4407.	Max WS	28860.75	-3.62	31.27		31.62	0.000434	4.78	6277.79	499.60	0.19
E100-00-00_02	4014.0	Max WS	28859.57	-2.15	31.29	13.89	31.48	0.000269	3.43	8408.30	508.44	0.15
E100-00-00_02	3997.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	3976.0	Max WS	28859.57	-2.40	30.99		31.18	0.000263	3.44	8400.68	508.92	0.15
E100-00-00_02	3681.	Max WS	27333.27	-3.80	30.79		31.05	0.000390	4.14	6695.26	494.30	0.18
E100-00-00_02	3585.0	Max WS	27331.63	-4.26	30.75		31.02	0.000318	4.18	6567.02	480.53	0.19
E100-00-00_02	2298.0	Max WS	27316.98	-6.21	30.40		30.63	0.000285	3.87	8214.26	685.82	0.16
E100-00-00_02	1580.	Max WS	27298.71	-7.83	30.24		30.44	0.000286	4.05	9561.70	1010.94	0.16
E100-00-00_02	1353.0	Max WS	27284.56	-8.34	30.12	12.90	30.39	0.000403	4.63	8174.10	1164.85	0.18
E100-00-00_02	1335.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	1319.0	Max WS	27253.11	-8.37	30.00		30.27	0.000407	4.64	8149.84	844.56	0.18
E100-00-00_02	984.0	Max WS	27218.69	-8.69	29.83	9.94	30.10	0.000211	4.44	8244.44	685.38	0.17
E100-00-00_02	978 MAIN STREET		Bridge									
E100-00-00_02	971.6	Max WS	27171.93	-8.69	29.51		29.87	0.000258	4.88	5850.41	673.57	0.19
E100-00-00_02	971.5	Max WS	27171.93	-8.69	29.51	9.92	29.87	0.000258	4.88	5850.41	673.57	0.19
E100-00-00_02	961.5 1ST STREET		Bridge									
E100-00-00_02	851.0	Max WS	25267.42	-6.40	29.18		29.59	0.000337	5.23	5070.20	711.30	0.22
E100-00-00_02	654.0	Max WS	25468.59	-6.50	29.28		29.46	0.000132	3.55	9314.02	636.14	0.14
E100-00-00_02	400.0	Max WS	25176.08	-8.58	29.15	7.09	29.45	0.000192	4.58	7445.20	504.91	0.17
E100-00-00_02	381.0 UNION PACIFIC RR		Bridge									

HEC-RAS Plan: CE_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_02	365.0	Max WS	24826.57	-8.23	28.91		29.30	0.000235	5.04	4927.37	517.34	0.19
E100-00-00_02	210.0	Max WS	24661.66	-7.81	28.73	7.79	29.21	0.000269	5.52	4464.64	745.90	0.20
E100-00-00_02	191.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	173.1	Max WS	24440.13	-6.84	28.49		29.00	0.000299	5.77	4234.48	1060.28	0.21
E100-00-00_02	173.0	Max WS	24442.64	-6.84	28.49		29.00	0.000299	5.77	4234.47	1060.28	0.21

Little White Oak Bayou
Corrected Effective 10-Year

HEC-RAS Plan: CE_10yr River: E101-00-00 Reach: E101-00-00_0003 Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	9819.000	Max WS	7321.48	16.33	38.49		38.67	0.000372	3.38	2164.62	168.92	0.17
E101-00-00_0003	9750.000	Max WS	7317.14	16.31	38.48		38.64	0.000352	3.25	2251.67	180.16	0.16
E101-00-00_0003	9000.000	Max WS	7276.45	15.50	38.37		38.44	0.000192	2.23	3709.23	530.09	0.12
E101-00-00_0003	8469.000	Max WS	7320.48	13.02	38.25		38.33	0.000207	2.49	3492.76	447.19	0.11
E101-00-00_0003	7984.000	Max WS	7361.11	13.76	38.15		38.23	0.000214	2.69	3386.52	352.14	0.12
E101-00-00_0003	6838.000	Max WS	7413.85	12.20	37.84		37.95	0.000270	2.74	2706.21	251.08	0.15
E101-00-00_0003	5861.000	Max WS	7495.82	9.91	37.54		37.67	0.000318	2.94	2971.07	366.77	0.14
E101-00-00_0003	4720.000	Max WS	7560.11	8.13	37.25		37.39	0.000263	3.31	3422.46	406.20	0.13
E101-00-00_0003	4279.000	Max WS	7576.35	9.00	37.03		37.25	0.000441	3.81	2276.85	404.73	0.17
E101-00-00_0003	4130.000	Max WS	7613.33	8.68	37.11	17.57	37.18	0.000071	2.19	4310.00	646.56	0.09
E101-00-00_0003	4091.000 N. MAIN		Bridge									
E101-00-00_0003	4050.000	Max WS	7599.44	7.87	37.03		37.10	0.000064	2.13	4180.52	587.69	0.08
E101-00-00_0003	3952.	Max WS	7610.60	6.87	37.01		37.09	0.000066	2.27	3559.67	210.42	0.09
E101-00-00_0003	3466.000	Max WS	7677.84	1.92	37.01		37.07	0.000027	2.32	4932.68	283.54	0.07
E101-00-00_0003	3300.	Max WS	7698.08	-1.50	37.03		37.06	0.000022	1.67	6661.09	386.44	0.05
E101-00-00_0003	3203.000	Max WS	7704.71	-3.50	36.84		37.15	0.000115	4.42	1742.95	427.13	0.12
E101-00-00_0003	2797.000 I-45		Culvert									
E101-00-00_0003	2389.000	Max WS	6891.71	-0.26	33.06		33.10	0.000071	1.72	5773.27	402.68	0.06
E101-00-00_0003	2325.	Max WS	6899.30	-0.15	33.06		33.09	0.000065	1.61	6011.92	406.72	0.06
E101-00-00_0003	1855.000	Max WS	6936.68	0.68	33.05		33.07	0.000028	1.14	6911.35	422.45	0.04
E101-00-00_0003	1126.	Max WS	6984.31	-1.85	32.98		33.03	0.000153	1.95	4762.88	612.17	0.08
E101-00-00_0003	1070.000	Max WS	6990.97	-2.04	32.95	8.64	33.02	0.000132	2.26	4609.10	658.80	0.08
E101-00-00_0003	1029.500 WRIGHTWOOD		Bridge									
E101-00-00_0003	987.000	Max WS	6990.97	-2.04	32.83		32.90	0.000149	2.26	4542.42	644.23	0.08
E101-00-00_0003	911.	Max WS	6997.90	-2.19	32.84		32.88	0.000083	1.79	5877.92	437.86	0.06
E101-00-00_0003	756.	Max WS	7012.64	-2.51	32.79		32.84	0.000397	1.92	3907.44	475.59	0.10
E101-00-00_0003	637.000	Max WS	7022.21	-2.75	32.77	10.07	32.80	0.000257	1.49	5194.10	646.84	0.07
E101-00-00_0003	538.000 QUITMAN/WHITEOAK		Bridge									
E101-00-00_0003	442.000	Max WS	7020.77	-2.75	32.59		32.63	0.000180	1.63	5076.09	619.28	0.07
E101-00-00_0003	306.000	Max WS	7020.54	-2.86	32.60		32.61	0.000015	0.93	9606.68	1457.58	0.04
E101-00-00_0003	259.1	Max WS	7020.45	-2.90	32.60		32.61	0.000015	0.96	7844.28	566.42	0.04
E101-00-00_0003	259	Max WS	7021.10	-2.90	32.60		32.61	0.000015	0.96	7844.26	566.42	0.04
E101-00-00_0003	180.1	Max WS	7545.35	-2.96	32.59		32.61	0.000017	1.01	7588.02	559.99	0.04
E101-00-00_0003	180	Max WS	7546.06	-2.96	32.59		32.61	0.000017	1.01	7587.99	559.98	0.04
E101-00-00_0003	101.1	Max WS	8005.72	-3.03	32.59		32.60	0.000014	0.93	8728.85	564.47	0.04
E101-00-00_0003	101	Max WS	8004.37	-3.03	32.59		32.60	0.000014	0.93	8728.84	564.47	0.04
E101-00-00_0003	68	Max WS	8004.31	-4.00	32.59		32.60	0.000025	1.07	7556.69	542.50	0.04
E101-00-00_0003	63	Max WS	8042.44	-4.00	32.59	8.28	32.60	0.000025	1.08	7556.44	542.48	0.04
E101-00-00_0003	33 I-10 EAST RAMP		Bridge									
E101-00-00_0003	3	Max WS	8050.02	-4.23	32.56		32.59	0.000032	1.32	6398.71	494.33	0.05
E101-00-00_0003	1	Max WS	8050.02	-4.23	32.56		32.59	0.000032	1.32	6398.68	494.33	0.05

Buffalo Bayou
Corrected Effective 100-Year

HEC-RAS Plan: CE_100yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	148800.4	Max WS	17181.94	3.15	42.89		42.99	0.000243	2.87	8031.03	1820.57	0.09
W100_upstrm	148795.4	Max WS	17181.92	3.15	42.88	17.82	42.99	0.000243	2.87	8030.62	1820.55	0.09
W100_upstrm	148768.4 S. PACIFIC RR		Bridge									
W100_upstrm	148741.4	Max WS	17176.49	3.04	42.77		42.87	0.000243	2.87	8028.24	1820.48	0.09
W100_upstrm	147632.4	Max WS	17161.72	-1.17	42.60		42.69	0.000080	2.48	9168.80	547.30	0.09
W100_upstrm	146698.0	Max WS	17222.30	1.88	42.50		42.61	0.000114	2.94	8636.52	799.76	0.10
W100_upstrm	145723.9	Max WS	17277.18	1.61	42.35		42.52	0.000144	3.84	8637.01	473.06	0.12
W100_upstrm	144753.5	Max WS	17337.37	0.07	42.21		42.36	0.000148	3.39	7640.25	559.40	0.12
W100_upstrm	143966.8	Max WS	17381.93	-7.47	42.13		42.26	0.000142	3.37	10819.95	1299.29	0.11
W100_upstrm	143078.2	Max WS	17440.04	-4.19	42.02		42.15	0.000115	3.11	11557.20	935.29	0.10
W100_upstrm	142061.4	Max WS	17514.04	0.55	41.93		42.04	0.000079	2.85	10443.17	532.34	0.09
W100_upstrm	141320.1	Max WS	17574.67	-2.70	41.93		41.96	0.000039	1.82	18291.04	974.20	0.06
W100_upstrm	140116.2	Max WS	17640.02	-1.31	41.82		41.93	0.000103	3.01	12329.33	882.52	0.09
W100_upstrm	139320.0	Max WS	17687.33	-2.14	41.77		41.85	0.000083	2.44	14079.98	943.65	0.08
W100_upstrm	138607.9	Max WS	17733.63	-2.08	41.77		41.79	0.000019	1.32	26630.39	1415.73	0.04
W100_upstrm	137732.0	Max WS	17764.82	-2.40	41.73		41.79	0.000058	2.55	18111.34	1340.13	0.08
W100_upstrm	137113.0	Max WS	17816.78	-2.62	41.65		41.77	0.000094	3.27	14385.40	1340.51	0.10
W100_upstrm	136331.2	Max WS	17879.90	-2.09	41.61		41.63	0.000150	1.59	15747.25	767.91	0.05
W100_upstrm	135666.2	Max WS	17916.08	-1.47	41.51		41.60	0.000073	2.71	13062.67	789.62	0.08
W100_upstrm	134706.7	Max WS	17976.61	-1.93	41.49		41.53	0.000036	1.92	22437.49	1160.90	0.06
W100_upstrm	134090.6	Max WS	18006.40	-1.59	41.46		41.52	0.000051	2.41	17612.11	852.29	0.07
W100_upstrm	133772.1	Max WS	18024.13	-0.79	41.44	13.44	41.52	0.000067	2.88	17006.97	951.89	0.08
W100_upstrm	133760.1 FOOTBRIDGE		Bridge									
W100_upstrm	133748.1	Max WS	18024.15	-0.46	41.39		41.47	0.000071	2.94	16646.67	945.80	0.08
W100_upstrm	132963.8	Max WS	18086.80	-1.98	41.29		41.42	0.000108	3.14	10225.98	700.76	0.10
W100_upstrm	131789.8	Max WS	18168.78	-2.31	41.18		41.31	0.000100	3.29	10814.29	739.51	0.10
W100_upstrm	130765.5	Max WS	18247.83	-3.81	41.13		41.21	0.000050	2.49	13524.67	668.65	0.07
W100_upstrm	129725.3	Max WS	18316.49	-3.71	41.07		41.16	0.000071	2.95	16374.73	1192.79	0.09
W100_upstrm	129163.2	Max WS	18375.62	-3.13	41.01		41.12	0.000072	2.88	12098.88	857.45	0.09
W100_upstrm	128326.9	Max WS	18442.38	-4.05	40.98		41.05	0.000049	2.50	20220.17	1351.86	0.07
W100_upstrm	128109.6	Max WS	18441.91	-4.29	40.96		41.00	0.000208	1.68	12433.44	1142.76	0.06
W100_upstrm	128104.6	Max WS	18441.49	-4.29	40.96	10.48	41.00	0.000208	1.68	12432.24	1142.72	0.06
W100_upstrm	128066.7 SHEPHERD		Bridge									
W100_upstrm	128028.8	Max WS	18441.28	-4.51	40.90		40.95	0.000167	1.67	12621.00	1149.25	0.06
W100_upstrm	126647.0	Max WS	18437.50	-3.93	40.80		40.81	0.000022	0.95	20456.38	1033.10	0.03
W100_upstrm	125376.9	Max WS	18524.32	-4.05	40.63		40.69	0.000178	1.96	10124.23	856.71	0.08
W100_upstrm	124983.5	Max WS	18552.93	-3.86	40.62		40.65	0.000022	1.40	21001.88	1404.54	0.05
W100_upstrm	124644.1	Max WS	18574.73	-3.69	40.57	13.70	40.64	0.000048	2.10	8849.39	652.93	0.07
W100_upstrm	124591.8 WAUGH DRIVE		Bridge									
W100_upstrm	124539.5	Max WS	18571.11	-3.74	40.55		40.62	0.000048	2.10	8858.09	654.24	0.07
W100_upstrm	123658.2	Max WS	18641.09	-2.04	40.56		40.57	0.000016	0.86	28985.96	2439.91	0.03
W100_upstrm	123138.8	Max WS	18675.68	-4.08	40.55		40.56	0.000013	0.80	27203.01	1772.61	0.03
W100_upstrm	122627.1	Max WS	18713.81	-6.08	40.53		40.58	0.000021	1.55	17814.43	1327.53	0.05
W100_upstrm	122572.1 MONTROSE COURT		Mult Open									
W100_upstrm	122517.1	Max WS	18716.55	-5.38	40.53		40.56	0.000037	1.45	16785.55	1251.88	0.05
W100_upstrm	122371.6	Max WS	18725.33	-7.00	40.53	9.25	40.55	0.000038	1.40	17591.88	1140.72	0.05
W100_upstrm	122265 ROSEMONT		Bridge									
W100_upstrm	122210.0	Max WS	18718.59	-5.60	40.49		40.52	0.000033	1.58	15177.14	835.03	0.05
W100_upstrm	122036.7	Max WS	18734.01	-8.40	40.49		40.51	0.000030	1.47	15961.01	1004.22	0.05
W100_upstrm	121229.5	Max WS	18791.75	-11.37	40.46		40.49	0.000026	1.39	17244.05	1123.70	0.05
W100_upstrm	120962.2	Max WS	18808.78	-10.59	40.44		40.48	0.000040	1.80	13734.57	1139.29	0.06
W100_upstrm	120005.2	Max WS	18868.15	-7.78	40.43	8.36	40.44	0.000028	0.80	23541.64	1088.91	0.03
W100_upstrm	119952.6 MEMORIAL DRIVE		Bridge									
W100_upstrm	119900.0	Max WS	18860.05	-7.64	40.37		40.38	0.000019	0.81	23323.25	1067.97	0.03
W100_upstrm	119495.9	Max WS	18892.17	-7.21	40.37		40.37	0.000010	0.58	33423.76	1380.22	0.02
W100_upstrm	118667.7	Max WS	18957.65	-8.56	40.34		40.36	0.000029	1.06	19243.91	1300.17	0.04
W100_upstrm	118466.1	Max WS	18965.21	-8.89	40.33	5.88	40.36	0.000022	1.40	18109.24	1339.04	0.05
W100_upstrm	118418.1 MEMORIAL DRIVE		Bridge									
W100_upstrm	118370.1	Max WS	18962.10	-8.87	40.31		40.34	0.000024	1.40	18055.13	1334.29	0.05
W100_upstrm	117845.4	Max WS	18997.29	-7.26	40.29		40.32	0.000035	1.33	16517.17	1116.25	0.05
W100_upstrm	117204.3	Max WS	19045.03	-4.60	40.28		40.30	0.000020	1.07	19548.83	1335.35	0.04
W100_upstrm	116395.7	Max WS	19090.73	-3.88	40.26		40.28	0.000026	1.26	15498.24	1072.45	0.05
W100_upstrm	116167.6	Max WS	19082.30	-3.68	40.20	7.85	40.27	0.000102	2.15	10089.84	1221.79	0.07
W100_upstrm	116121.9 SABINE AVENUE		Bridge									
W100_upstrm	116076.2	Max WS	19046.02	-3.86	40.08		40.15	0.000118	2.12	10156.76	1232.97	0.07
W100_upstrm	115804.5	Max WS	19049.91	-4.60	40.03	8.08	40.14	0.000046	2.93	12874.36	1508.67	0.08
W100_upstrm	115800 I-45 S EXIT RAMP		Bridge									
W100_upstrm	115729.9	Max WS	19048.95	-4.81	40.03		40.12	0.000043	2.70	12824.51	1514.43	0.08
W100_upstrm	115672.3	Max WS	19057.32	-5.10	40.03	8.62	40.12	0.000046	2.82	13723.34	1537.57	0.08
W100_upstrm	115635.5 I-45 SBML		Bridge									
W100_upstrm	115621.1	Max WS	19058.38	-5.57	40.05		40.10	0.000028	2.27	18100.87	1933.20	0.06
W100_upstrm	115594.6	Max WS	19066.94	-6.04	40.05	6.37	40.10	0.000022	2.01	19106.57	1944.73	0.06
W100_upstrm	115553.5 I-45 S. - ALLEN		Bridge									
W100_upstrm	115545.8	Max WS	19067.94	-6.85	40.05		40.09	0.000023	2.09	20031.21	1989.17	0.06
W100_upstrm	115438.9	Max WS	19076.01	-7.24	40.04	7.35	40.09	0.000025	2.12	18019.83	1885.96	0.06
W100_upstrm	115400 I-45 NBML		Bridge									
W100_upstrm	115365.4	Max WS	19071.17	-7.52	40.03		40.08	0.000020	1.93	19622.73	2018.30	0.05
W100_upstrm	115284.6	Max WS	19081.67	-7.89	40.03	5.95	40.08	0.000022	1.99	25617.97	1571.87	0.05
W100_upstrm	115168.5 I-45 N. ENTRANCE		Bridge									
W100_upstrm	115104.1	Max WS	19066.56	-8.31	39.98		40.03	0.000018	1.84	21352.24	1621.46	0.05
W100_upstrm	115001.1	Max WS	19061.38	-8.48	39.95	6.11	40.06	0.000042	2.82	18457.46	1763.82	0.08
W100_upstrm	115000 I-45 RAMP MCKINN		Bridge									
W100_upstrm	114890.5	Max WS	19054.16	-8.56	39.93		40.04	0.000044	2.76	16323.74	1768.83	0.08
W100_upstrm	114885	Max WS	19052.49	-8.56	39.93	5.39	40.04	0.000044	2.76	16433.15	1768.82	0.08
W100_upstrm	114864.5 I-45 N. ENTRANCE		Bridge									
W100_upstrm	114838.5	Max WS	19030.78	-9.27	39.85		39.95	0.000041	2.68	17341.24	1790.17	0.07
W100_upstrm	114492.0	Max WS	19060.92	-10.48	39.87		39.91	0.000038	1.72	14014.42	1577.77	0.06

HEC-RAS Plan: CE_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	114195.9	Max WS	19065.43	-11.52	39.83	5.77	39.89	0.000151	1.93	12155.41	1270.55	0.07
W100_upstrm	114168.9 RUSK STREET		Bridge									
W100_upstrm	114141.9	Max WS	18988.05	-10.83	39.75		39.81	0.000166	2.00	11223.83	1172.29	0.07
W100_upstrm	114097.4	Max WS	18994.87	-7.46	39.76	7.10	39.81	0.000070	1.74	13930.90	1494.43	0.06
W100_upstrm	114070.4 CAPITAL STREE		Bridge									
W100_upstrm	114043.4	Max WS	18968.72	-7.72	39.71		39.75	0.000069	1.72	14254.54	1590.41	0.06
W100_upstrm	113644.0	Max WS	18951.50	-8.91	39.65		39.75	0.000045	2.63	11789.99	919.70	0.08
W100_upstrm	113411.6	Max WS	19001.65	-9.61	39.68	4.21	39.71	0.000138	1.35	14347.13	963.28	0.05
W100_upstrm	113374.3 TEXAS AVE		Bridge									
W100_upstrm	113337.0	Max WS	18815.52	-9.65	39.51		39.53	0.000139	1.34	14217.59	952.94	0.05
W100_upstrm	113266.4	Max WS	18741.60	-9.11	39.43	7.51	39.54	0.000176	2.73	9187.67	831.03	0.09
W100_upstrm	113238.6 BAGBY		Bridge									
W100_upstrm	113210.8	Max WS	18631.04	-9.46	39.31		39.41	0.000173	2.68	9377.70	854.44	0.09
W100_upstrm	112974.0	Max WS	18584.84	-10.69	39.25	6.59	39.37	0.000159	2.82	7605.18	815.45	0.09
W100_upstrm	112944.9 PRAIRIE		Bridge									
W100_upstrm	112915.8	Max WS	18438.00	-10.82	39.20		39.32	0.000155	2.79	7672.04	818.97	0.09
W100_upstrm	112575.5	Max WS	18450.59	-9.20	39.19	7.94	39.26	0.000156	2.12	12834.85	1425.07	0.07
W100_upstrm	112534.5 PRESTON STREET		Bridge									
W100_upstrm	112493.5	Max WS	18378.88	-9.47	39.14		39.20	0.000150	2.09	13148.34	1465.18	0.07
W100_upstrm	112003.3	Max WS	18354.95	-9.69	39.08	5.03	39.13	0.000111	1.90	11054.89	974.02	0.06
W100_upstrm	111953.3 CONGRESS STREET		Bridge									
W100_upstrm	111903.3	Max WS	18221.56	-9.84	38.96		39.01	0.000109	1.89	11085.82	978.44	0.06
W100_upstrm	111853.5	Max WS	18202.14	-9.86	38.94	4.96	39.01	0.000121	2.12	10274.84	953.67	0.06
W100_upstrm	111818.6 SMITH STREET		Bridge									
W100_upstrm	111783.7	Max WS	18101.53	-8.67	38.87		38.94	0.000138	2.22	9211.42	746.35	0.07
W100_upstrm	111626.7	Max WS	18098.21	-11.83	38.86	5.22	38.92	0.000131	2.09	10663.91	848.65	0.06
W100_upstrm	111518.6 LOUISIANA AND FR		Bridge									
W100_upstrm	111410.5	Max WS	17852.10	-11.23	38.68		38.75	0.000099	2.13	10026.88	800.63	0.07
W100_upstrm	110876.6	Max WS	17885.75	-10.43	38.67	2.56	38.70	0.000056	1.48	18698.00	1612.67	0.05
W100_upstrm	110837.8 MILAM		Bridge									
W100_upstrm	110799.0	Max WS	17884.41	-10.72	38.66		38.69	0.000146	1.41	19149.29	1616.62	0.04
W100_upstrm	110672.7	Max WS	17873.25	-13.25	38.64	2.68	38.67	0.000113	1.67	19950.09	1447.85	0.05
W100_upstrm	110643.7 TRAVIS STREET		Bridge									
W100_upstrm	110614.7	Max WS	17847.48	-12.75	38.60		38.64	0.000126	1.71	19179.14	1434.41	0.05
W100_upstrm	110200.2	Max WS	17834.76	-9.11	38.57	5.08	38.60	0.000038	1.53	14003.09	779.20	0.05
W100_upstrm	110154.2 MAIN STREET		Bridge									
W100_upstrm	110108.2	Max WS	17817.48	-9.31	38.55		38.59	0.000037	1.52	14147.92	782.68	0.05
W100_upstrm	110103.2	Max WS	17813.16	-9.31	38.55		38.59	0.000037	1.52	14147.78	782.68	0.05
Downstream	109924.2	Max WS	57163.41	-13.02	38.55		39.00	0.000564	5.45	12956.37	2508.69	0.16
Downstream	109551.7	Max WS	57158.78	-14.28	38.42	9.95	38.78	0.000536	4.86	14881.42	2218.99	0.15
Downstream	109518.7 FANNIN STREET		Bridge									
Downstream	109485.7	Max WS	57158.46	-15.31	38.23		38.56	0.000477	4.68	16753.21	2245.04	0.15
Downstream	109440.2	Max WS	57154.57	-16.48	38.13	8.88	38.54	0.000819	5.14	12019.56	2405.21	0.16
Downstream	109395.2 SAN JACINTO		Bridge									
Downstream	109350.2	Max WS	57137.69	-16.89	37.32		37.74	0.000856	5.21	11679.58	2392.22	0.16
Downstream	109119.0	Max WS	57132.94	-17.14	37.02	10.45	37.37	0.002421	4.82	13673.99	2323.13	0.18
Downstream	109103.1 CROSSWALK		Bridge									
Downstream	109087.2	Max WS	57130.11	-17.55	36.73		37.08	0.002370	4.79	13828.17	2363.51	0.18
Downstream	108565.3	Max WS	57117.04	-12.77	35.77		36.23	0.000987	5.55	14287.68	1961.58	0.17
Downstream	108334.0	Max WS	57114.91	-14.06	35.55		35.89	0.001010	4.88	16980.45	1731.66	0.16
Downstream	107179.4	Max WS	57110.71	-20.52	34.43	5.50	34.96	0.000934	6.02	10594.14	776.23	0.19
Downstream	107158.9 S. PACIFIC RR		Bridge									
Downstream	107138.4	Max WS	57109.70	-20.19	34.23		34.78	0.000982	6.14	10377.15	544.82	0.19
Downstream	106594.0	Max WS	57107.45	-16.70	33.53		34.08	0.001526	5.96	9662.56	660.77	0.19
Downstream	106151.4	Max WS	57104.07	-13.85	32.60	7.70	33.24	0.002303	6.37	8959.26	305.53	0.21
Downstream	106131.1 MCKEE		Bridge									
Downstream	106110.8	Max WS	57102.50	-12.53	32.24		32.95	0.002590	6.76	8451.63	297.45	0.22
Downstream	105705.4	Max WS	57100.41	-18.22	31.67	6.21	32.31	0.000575	6.41	8928.43	484.93	0.23
Downstream	105667.4 ELYSIAN STREET		Bridge									
Downstream	105629.4	Max WS	57099.93	-18.43	31.34		31.98	0.000583	6.44	8875.77	456.25	0.23
Downstream	105476	Max WS	57099.92	-18.70	31.31		31.80	0.001594	5.60	10227.34	459.47	0.20
Downstream	104962	Max WS	57099.07	-18.70	31.00	7.15	31.17	0.000767	3.38	16941.52	905.87	0.13
Downstream	104948 US-59 Bridge		Bridge									
Downstream	104900.1	Max WS	57098.41	-19.15	30.90		31.06	0.000193	3.18	17971.61	931.63	0.13
Downstream	104900	Max WS	57098.41	-19.15	30.90	7.09	31.06	0.000193	3.18	17971.59	931.63	0.13
Downstream	104566 US-59 Bridge		Bridge									
Downstream	104464.1	Max WS	57097.30	-19.86	30.52		30.76	0.001672	3.95	14447.34	765.43	0.16
Downstream	104464	Max WS	57097.30	-19.86	30.52	6.31	30.76	0.001672	3.95	14447.21	765.42	0.16
Downstream	104383 US-59 Bridge		Bridge									
Downstream	104301.1	Max WS	57096.28	-20.42	30.23		30.53	0.000280	4.41	13061.20	817.88	0.18
Downstream	104301	Max WS	57096.76	-20.42	30.23	6.03	30.53	0.000280	4.41	13061.17	817.88	0.18
Downstream	104271 US-59 Bridge		Bridge									
Downstream	104242.1	Max WS	57094.92	-20.62	29.86		30.26	0.002979	5.04	11337.27	601.74	0.20
Downstream	104242	Max WS	57094.91	-20.62	29.86	7.23	30.26	0.002979	5.04	11337.10	601.72	0.20
Downstream	104204 US-59 Bridge		Bridge									
Downstream	104133	Max WS	57090.97	-21.02	29.00		29.59	0.000653	6.19	10711.69	1138.06	0.28
Downstream	103664.0	Max WS	57089.64	-23.03	28.45		29.19	0.001477	7.13	10202.15	930.48	0.26
Downstream	102875.3	Max WS	57087.43	-26.39	27.43	9.79	28.05	0.001403	6.30	9062.49	406.12	0.23
Downstream	102847.5 HOUTerminal RR		Bridge									
Downstream	102819.7	Max WS	57086.70	-26.43	27.02		27.66	0.001459	6.40	8913.48	403.59	0.24
Downstream	102309.0	Max WS	57140.25	-23.48	26.36		27.12	0.000658	6.99	8171.37	232.25	0.21
Downstream	101828.0	Max WS	57189.08	-20.70	25.84	3.03	26.62	0.001422	7.08	8110.17	374.92	0.25
Downstream	101790.1 JENSEN ROAD		Bridge									
Downstream	101752.2	Max WS	57187.78	-20.69	25.52		26.32	0.001479	7.18	7988.04	370.00	0.26
Downstream	101007.3	Max WS	57267.07	-16.93	24.89		25.62	0.000409	6.83	8388.82	285.32	0.22
Downstream	99992.6	Max WS	57372.34	-18.90	24.29		25.09	0.000624	7.19	7984.70	275.52	0.24
Downstream	98399.4	Max WS	57545.42	-20.26	23.46		24.22	0.000463	6.99	8234.96	289.25	0.23

HEC-RAS Plan: CE_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	97517.4	Max WS	57636.56	-19.35	23.40		23.86	0.000330	5.47	10532.49	323.71	0.17
Downstream	96028.6	Max WS	57785.34	-17.81	22.37	0.94	23.06	0.000752	6.64	8705.14	319.86	0.22
Downstream	95985.1 YORK DRIVE		Bridge									
Downstream	95941.6	Max WS	57784.50	-17.87	22.21		22.90	0.000758	6.66	8672.15	319.54	0.23
Downstream	95362.9	Max WS	57847.01	-15.97	21.98		22.57	0.000367	6.15	9404.19	357.20	0.21
Downstream	94280.7	Max WS	57968.55	-19.82	20.49		21.52	0.001579	8.18	7090.50	300.77	0.30
Downstream	93495.6	Max WS	58042.89	-20.43	19.86		20.54	0.000909	6.63	8748.31	389.28	0.25
Downstream	92795.6	Max WS	58124.55	-20.98	19.28	-1.78	20.05	0.000502	7.00	8298.14	334.21	0.25
Downstream	92741.1 LOCKWOOD DRIVE		Bridge									
Downstream	92686.6	Max WS	58124.00	-21.08	19.04		19.81	0.000510	7.05	8249.43	333.04	0.25
Downstream	90936.7	Max WS	58308.94	-18.64	17.71		18.34	0.001161	6.38	9141.79	431.15	0.24
Downstream	89918.4	Max WS	58417.38	-17.23	16.42		17.35	0.000853	7.78	8569.65	713.72	0.29
Downstream	88579.0	Max WS	58557.92	-20.97	15.10		16.03	0.001083	7.75	7551.41	362.73	0.30
Downstream	87591.9	Max WS	58668.73	-23.72	14.31		15.17	0.000666	7.43	7906.78	312.39	0.26
Downstream	86660.2	Max WS	58757.40	-23.42	13.85	-6.75	14.58	0.000580	6.86	8568.03	313.37	0.23
Downstream	86641.7 HOUTerminal RR		Bridge									
Downstream	86623.2	Max WS	58757.34	-23.61	13.42		14.17	0.000587	6.92	8492.77	312.39	0.23
Downstream	85855.2	Max WS	58838.63	-26.84	11.94		13.55	0.001091	10.18	5780.74	251.61	0.37
Downstream	85238.7	Max WS	58901.16	-29.43	11.52		12.85	0.001175	9.31	6843.53	357.89	0.31
Downstream	84561.7	Max WS	58988.00	-32.27	11.11	-9.09	12.21	0.000629	8.46	7575.32	436.06	0.29
Downstream	84531.4 NORTH WAYSIDE RD		Bridge									
Downstream	84501.1	Max WS	58987.82	-28.97	9.98		11.58	0.001073	10.15	5923.99	305.52	0.35
Downstream	84252.6	Max WS	59014.15	-26.90	10.02	-5.89	11.33	0.000860	9.19	6595.89	457.80	0.32
Downstream	84222.3 M. GARCIA		Bridge									
Downstream	84192.0	Max WS	59013.85	-24.10	8.80		10.64	0.001462	10.90	5411.84	240.58	0.41
Downstream	83635.7	Max WS	59072.57	-21.72	8.89		9.93	0.001029	8.18	7219.67	392.15	0.34
Downstream	81786.1	Max WS	59262.07	-31.97	7.21		8.21	0.000823	8.04	7394.64	355.29	0.31
Downstream	80903.1	Max WS	59352.67	-27.77	6.74	-9.31	7.52	0.000738	7.09	8368.19	405.32	0.28
Downstream	80883.1 S. PACIFIC RR		Bridge									
Downstream	80863.1	Max WS	59352.67	-28.10	6.14		6.94	0.000878	7.19	8260.28	404.03	0.28
Downstream	80538.0	Max WS	59352.66	-33.12	6.42	-17.33	6.74	0.000236	4.52	13131.05	505.47	0.16

White Oak Bayou
Corrected Effective 100-Year

HEC-RAS Plan: CE_100yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	36134.	Max WS	32201.00	24.19	57.04		57.85	0.000610	7.35	5981.57	1222.00	0.30
E100-00-00	35718.0	Max WS	32119.04	23.76	56.66		57.61	0.000592	7.87	4660.06	759.37	0.32
E100-00-00	35158.	Max WS	32147.21	22.89	56.57		57.25	0.000541	6.83	6878.98	1532.88	0.28
E100-00-00	35006.0	Max WS	32147.42	22.66	56.45	42.94	57.19	0.000460	7.15	7058.37	1705.71	0.29
E100-00-00	34951.5 ELLA		Bridge									
E100-00-00	34895.0	Max WS	32145.63	22.56	56.31		57.06	0.000465	7.17	6998.06	1659.19	0.29
E100-00-00	34645.	Max WS	32165.15	22.24	56.30		56.92	0.000414	6.66	7571.86	1646.15	0.26
E100-00-00	34206.0	Max WS	32179.53	21.68	56.08		56.73	0.000419	6.77	7664.37	2908.35	0.27
E100-00-00	33962.58	Max WS	32216.03	21.61	56.18		56.51	0.000249	4.93	11222.48	3029.64	0.21
E100-00-00	33909.08	Max WS	32222.14	21.60	56.17		56.49	0.000308	4.88	11204.85	3064.43	0.21
E100-00-00	33770.	Max WS	32231.31	21.56	56.12		56.47	0.000221	5.20	11563.69	2831.37	0.20
E100-00-00	33681.0	Max WS	32233.99	21.53	56.02	41.98	56.52	0.000321	6.26	10948.96	2927.41	0.24
E100-00-00	33645.5 W 18TH		Bridge									
E100-00-00	33610.0	Max WS	32230.41	21.61	55.82		56.38	0.000353	6.50	10163.17	2776.38	0.25
E100-00-00	33357.	Max WS	32207.32	21.41	55.63		56.29	0.000586	6.69	7702.83	2455.55	0.28
E100-00-00	32570.0	Max WS	32216.91	20.78	55.25		55.82	0.000370	6.35	9749.81	2910.89	0.25
E100-00-00	31583.0	Max WS	32251.49	19.35	55.05		55.48	0.000258	5.70	12483.99	4319.49	0.22
E100-00-00	30779.0	Max WS	32301.33	18.79	54.86		55.27	0.000227	5.56	12090.00	3219.19	0.21
E100-00-00	29659.	Max WS	32358.93	17.66	54.70		54.98	0.000235	4.73	13806.25	4425.37	0.18
E100-00-00	29368.0	Max WS	32382.13	17.37	54.39	38.52	54.99	0.000348	6.60	9189.42	2758.94	0.24
E100-00-00	29297.5 TC JESTER SOUTH		Bridge									
E100-00-00	29203.0	Max WS	32355.05	17.35	53.76		54.45	0.000406	6.99	8103.23	2370.03	0.26
E100-00-00	28775.	Max WS	32396.76	16.90	53.84		54.14	0.000271	4.76	12963.21	3654.51	0.19
E100-00-00	28375.0	Max WS	32401.07	16.48	53.67	37.46	54.15	0.000307	5.96	11373.91	3482.14	0.23
E100-00-00	28357.0 BICYCLE BRIDGE		Bridge									
E100-00-00	28330.0	Max WS	32380.18	16.41	53.41		53.92	0.000324	6.08	10899.36	3383.99	0.24
E100-00-00	28190.0	Max WS	32383.70	16.18	53.34	37.00	53.91	0.000288	6.37	10425.20	2757.15	0.23
E100-00-00	28152.5 W 11TH		Bridge									
E100-00-00	28113.0	Max WS	32374.64	16.28	53.08		53.70	0.000316	6.60	9442.35	2673.70	0.24
E100-00-00	27982.	Max WS	32382.92	16.25	53.06		53.63	0.000380	6.36	9821.85	2580.78	0.25
E100-00-00	27429.0	Max WS	32399.18	16.12	52.89		53.43	0.000376	6.17	9466.62	2543.21	0.25
E100-00-00	26598.	Max WS	32466.38	15.35	52.61		53.07	0.000304	5.75	7908.78	3846.16	0.23
E100-00-00	26498.0	Max WS	32472.16	15.26	52.54	35.80	53.05	0.000304	5.92	7235.25	3426.42	0.23
E100-00-00	26432.5 TC JESTER		Bridge									
E100-00-00	26366.0	Max WS	32455.79	15.16	52.26		52.78	0.000315	6.00	7049.06	3002.94	0.23
E100-00-00	26307.3	Max WS	32463.49	15.13	52.38		52.74	0.000241	5.12	9134.62	2915.66	0.19
E100-00-00	26225	Max WS	32468.06	15.04	52.34		52.71	0.000256	5.15	8768.34	2547.05	0.20
E100-00-00	26140.	Max WS	32469.73	14.97	52.26		52.74	0.000267	5.84	9721.00	2820.15	0.22
E100-00-00	25536.0	Max WS	32497.18	14.48	52.09		52.59	0.000289	5.96	9341.14	1541.18	0.23
E100-00-00	25132.	Max WS	32520.76	14.29	51.96		52.48	0.000255	6.06	7496.59	1288.56	0.23
E100-00-00	24817.0	Max WS	32533.93	14.14	51.68	36.16	52.38	0.000444	6.73	4975.85	733.50	0.27
E100-00-00	24789.0 UNION PACIFIC RR		Bridge									
E100-00-00	24758.0	Max WS	32522.13	13.76	51.40		52.09	0.000441	6.72	4970.48	683.03	0.27
E100-00-00	24636.	Max WS	32539.88	13.61	51.67		52.03	0.000255	5.19	8577.90	1403.15	0.20
E100-00-00	23934.0	Max WS	32573.56	12.75	51.37		51.82	0.000313	5.44	7256.93	1037.43	0.22
E100-00-00	23550.0	Max WS	32596.97	12.77	51.26	32.94	51.70	0.000285	5.30	6630.74	703.18	0.21
E100-00-00	23506.5 DURHAM		Bridge									
E100-00-00	23444.0	Max WS	32593.46	12.69	51.15		51.58	0.000287	5.31	6603.78	695.78	0.21
E100-00-00	23180.	Max WS	32606.10	12.46	51.15		51.54	0.000189	5.40	10072.10	1337.80	0.19
E100-00-00	22983.	Max WS	32613.98	12.29	51.10		51.52	0.000247	5.63	10180.94	1722.83	0.21
E100-00-00	22834.0	Max WS	32623.11	12.16	51.05	34.59	51.48	0.000328	5.79	11086.96	1777.91	0.21
E100-00-00	22796.5 SHEPHERD		Bridge									
E100-00-00	22758.0	Max WS	32619.50	12.11	50.94		51.37	0.000354	5.79	10973.19	1772.27	0.22
E100-00-00	22610.	Max WS	32628.32	11.92	50.94		51.28	0.000279	5.23	11007.86	1991.94	0.19
E100-00-00	22224.0	Max WS	32648.81	11.41	50.94		51.13	0.000220	4.03	14359.41	2047.96	0.15
E100-00-00	21444.0	Max WS	32683.49	10.52	50.64		51.02	0.000309	5.32	10553.79	1661.10	0.20
E100-00-00	20746.0	Max WS	32714.03	10.00	50.28		50.60	0.000908	4.84	9968.23	1884.67	0.20
E100-00-00	20644.0	Max WS	32720.80	9.95	50.29	32.51	50.52	0.000195	4.49	14248.64	1862.66	0.16
E100-00-00	20633.0 Pipeline		Bridge									
E100-00-00	20622.0	Max WS	32719.74	9.95	50.19		50.43	0.000199	4.53	14045.81	1860.08	0.16
E100-00-00	20521.	Max WS	32725.65	9.91	50.15		50.42	0.000209	4.87	13323.13	1701.86	0.17
E100-00-00	19917.0	Max WS	32759.08	9.66	49.73		50.32	0.000421	6.22	7336.78	900.86	0.23
E100-00-00	19463.0	Max WS	32784.32	9.25	49.57		50.13	0.000421	6.12	9022.25	1567.62	0.23
E100-00-00	18857	Max WS	32817.57	8.03	49.40	31.88	49.89	0.000350	5.94	6723.84	1080.78	0.21
E100-00-00	18800 I-10 WBFR		Bridge									
E100-00-00	18747	Max WS	32814.33	7.81	48.91		49.34	0.000285	5.51	7126.72	1019.51	0.19
E100-00-00	18746	Max WS	32814.29	7.81	48.91	30.33	49.34	0.000285	5.51	7126.58	1019.49	0.19
E100-00-00	18595 I-10 BRIDGE		Bridge									
E100-00-00	18443	Max WS	32811.77	7.19	48.34		48.78	0.000341	5.51	7042.01	985.03	0.21
E100-00-00	18442	Max WS	32811.69	7.19	48.34	29.99	48.78	0.000341	5.51	7041.83	984.98	0.21
E100-00-00	18394 I-10 EBFR		Bridge									
E100-00-00	18377.	Max WS	32797.22	6.98	47.35		47.87	0.000396	6.00	6510.25	775.42	0.22
E100-00-00	18234.0	Max WS	32810.00	6.77	47.45	29.42	47.78	0.000267	4.66	8068.09	1162.54	0.18
E100-00-00	18220.0 UNION PACIFIC RR		Bridge									
E100-00-00	18199.0	Max WS	32801.66	6.70	47.05		47.41	0.000267	4.83	7757.57	1051.76	0.18
E100-00-00	18176.0	Max WS	32802.58	6.79	47.02	28.80	47.42	0.000283	5.21	8131.80	1272.70	0.19
E100-00-00	18138.0 YALE		Bridge									
E100-00-00	18082.0	Max WS	32709.19	6.87	45.48		46.05	0.000451	6.18	6618.18	837.27	0.24
E100-00-00	17905.	Max WS	32720.52	6.86	45.50		45.96	0.000371	5.67	8676.04	1304.92	0.21
E100-00-00	17756.0	Max WS	32726.16	6.85	45.50	29.73	45.88	0.000364	5.20	8492.78	1254.96	0.21
E100-00-00	17726 S. HEIGHTS		Bridge									
E100-00-00	17696	Max WS	32667.80	6.85	45.16		45.56	0.000390	5.33	8185.76	1224.19	0.21
E100-00-00	17657	Max WS	32667.23	6.35	45.12	29.24	45.55	0.000382	5.36	7633.99	819.64	0.21
E100-00-00	17627 N. HEIGHTS		Bridge									
E100-00-00	17597.0	Max WS	32543.92	6.35	44.13		44.62	0.000465	5.71	6853.53	768.38	0.23
E100-00-00	17318.	Max WS	32509.57	6.35	43.76		44.48	0.000642	6.80	4856.73	377.48	0.27
E100-00-00	16831.0	Max WS	32548.25	6.34	43.91		44.25	0.000220	4.73	6882.98	511.14	0.23

HEC-RAS Plan: CE_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	15795.0	Max WS	32547.98	4.84	43.80		44.02	0.000233	3.79	9200.61	791.32	0.15
E100-00-00	15278.	Max WS	32521.54	4.41	43.45		43.93	0.000267	5.71	6856.00	675.15	0.22
E100-00-00	14977.0	Max WS	32524.77	4.16	43.45	26.13	43.85	0.000123	5.16	7675.95	712.36	0.20
E100-00-00	14937.0 I-10 EBFR ACCESS		Bridge									
E100-00-00	14897.0	Max WS	32466.94	3.39	42.96		43.36	0.000119	5.12	7544.37	703.90	0.19
E100-00-00	14890	Max WS	32457.96	3.42	42.88	25.43	43.38	0.000147	5.70	6973.03	778.10	0.21
E100-00-00	14775 I-10 BRIDGE		Bridge									
E100-00-00	14660	Max WS	32437.87	3.42	42.77		43.27	0.000149	5.73	6886.66	772.46	0.22
E100-00-00	14590.0	Max WS	32422.45	3.45	42.63	25.80	43.29	0.000200	6.55	6096.81	864.67	0.25
E100-00-00	14562.0 I-10 WB ACCESS		Bridge									
E100-00-00	14532.0	Max WS	32298.35	3.41	41.60		42.32	0.000569	6.86	5193.93	782.30	0.27
E100-00-00	14354.0	Max WS	32341.32	3.29	41.96		42.18	0.000133	3.85	9044.27	760.79	0.17
E100-00-00	13924.0	Max WS	32318.27	3.18	41.68	24.45	42.11	0.000350	5.49	6667.17	399.24	0.20
E100-00-00	13909.5 UNION PAC. RR		Bridge									
E100-00-00	13898.0	Max WS	32311.40	2.95	41.44		41.87	0.000352	5.51	6626.92	397.14	0.21
E100-00-00	13494.	Max WS	32317.86	2.47	41.47		41.72	0.000348	4.23	8406.92	575.94	0.17
E100-00-00	13220.0	Max WS	32323.81	2.15	41.49	23.72	41.65	0.000090	3.37	11770.11	961.83	0.13
E100-00-00	13182.5 STUDEMONT		Bridge									
E100-00-00	13143.0	Max WS	32306.12	2.15	41.27		41.45	0.000098	3.51	10743.90	826.65	0.13
E100-00-00	12698.	Max WS	32294.43	1.87	41.07		41.38	0.000257	4.44	7388.21	532.08	0.19
E100-00-00	12066.0	Max WS	32299.79	1.47	41.03		41.23	0.000224	3.57	9052.01	523.79	0.15
E100-00-00	11546.0	Max WS	32306.76	0.90	41.02		41.15	0.000077	2.92	13761.73	1284.77	0.12
E100-00-00	11021.	Max WS	32307.87	0.63	40.98		41.11	0.000072	3.03	13085.54	1628.30	0.11
E100-00-00	10908.0	Max WS	32312.37	0.57	41.00	22.23	41.10	0.000058	2.80	15930.31	1793.17	0.10
E100-00-00	10852.5 TAYLOR (SAWYER)		Bridge									
E100-00-00	10804.0	Max WS	32308.86	0.45	40.96		41.06	0.000058	2.76	16058.86	1797.43	0.10
E100-00-00	10643.	Max WS	32301.77	0.14	40.79		41.09	0.000215	4.58	8955.97	1471.83	0.17
E100-00-00	9779.0	Max WS	32313.76	-1.51	40.79		40.92	0.000072	3.15	13757.74	1641.12	0.11
E100-00-00	8532.0	Max WS	32327.92	-1.76	40.80		40.84	0.000021	1.50	23790.90	1458.43	0.05
E100-00-00	8140.	Max WS	32332.53	-2.43	40.79		40.82	0.000087	1.45	26006.82	1801.85	0.05
E100-00-00	7649.0	Max WS	32336.58	-3.26	40.74	18.31	40.81	0.000037	2.57	25667.69	1914.91	0.09
E100-00-00	7608.5 HOUSTON		Bridge									
E100-00-00	7568.0	Max WS	32336.78	-3.15	40.75		40.79	0.000024	2.06	25494.08	1899.47	0.07
E100-00-00	7546.0	Max WS	32336.93	-3.16	40.75	18.29	40.79	0.000025	2.08	25411.89	2021.96	0.07
E100-00-00	7535.5 Pipeline		Bridge									
E100-00-00	7529.0	Max WS	32336.86	-3.16	40.73		40.77	0.000025	2.09	25382.96	2016.59	0.07
E100-00-00	7481.0	Max WS	32337.00	-3.17	40.72		40.78	0.000036	2.29	22430.02	2206.03	0.08
E100-00-00	7253.1	Max WS	32336.65	-3.19	40.69		40.77	0.000027	2.39	15314.88	906.19	0.08
E100-00-00	7253.05		Lat Struct									
E100-00-00	7253	Max WS	32335.68	-3.19	40.69		40.77	0.000027	2.39	15314.88	906.19	0.08
E100-00-00	7138.1	Max WS	31644.40	-3.20	40.67		40.77	0.000033	2.58	14147.92	959.89	0.09
E100-00-00	7138	Max WS	31643.60	-3.20	40.67		40.77	0.000033	2.58	14147.91	959.89	0.09
E100-00-00	7016.1	Max WS	31176.85	-3.22	40.60		40.79	0.000060	3.78	11066.98	873.35	0.12
E100-00-00	7016	Max WS	31176.54	-3.22	40.60		40.79	0.000060	3.78	11066.99	873.35	0.12
E100-00-00	6980	Max WS	31176.74	-3.22	40.66		40.77	0.000052	2.70	13227.84	833.45	0.09
E100-00-00	6979		Lat Struct									
E100-00-00	6975.0	Max WS	31145.08	-3.22	40.66	16.65	40.77	0.000052	2.70	13227.95	833.47	0.09
E100-00-00	6935.0 I-10 EAST RAMP		Bridge									
E100-00-00	6898.0	Max WS	31144.94	-4.23	40.53		40.67	0.000112	3.11	11428.29	772.01	0.11
E100-00-00	6895	Max WS	31145.06	-4.23	40.53		40.67	0.000112	3.11	11428.03	771.99	0.11
E100-00-00_02	6775.	Max WS	40622.45	-4.30	40.53		40.61	0.000049	2.36	18533.86	1410.58	0.08
E100-00-00_02	6473.0	Max WS	40618.93	-4.46	40.49	18.32	40.60	0.000055	2.73	17788.26	1664.01	0.09
E100-00-00_02	6448.0 I-45 NORTH RAMP		Bridge									
E100-00-00_02	6423.0	Max WS	40608.95	-4.33	40.47		40.58	0.000055	2.72	17632.35	1644.66	0.09
E100-00-00_02	6174.0	Max WS	40502.24	-4.69	40.28	19.09	40.58	0.000190	4.65	10237.48	1318.57	0.15
E100-00-00_02	6128.0 I-45 NORTH		Bridge									
E100-00-00_02	6078	Max WS	40397.26	-3.96	40.12		40.44	0.000208	4.77	9953.90	1267.60	0.16
E100-00-00_02	6068.0	Max WS	40411.45	-3.96	40.15	18.83	40.44	0.000069	4.56	10870.35	1534.80	0.15
E100-00-00_02	6046 I-10 to I-45 DC		Bridge									
E100-00-00_02	6020	Max WS	40391.90	-3.89	40.11		40.32	0.000059	3.62	11672.44	1474.66	0.12
E100-00-00_02	5525.0	Max WS	40450.94	-3.15	40.20		40.28	0.000053	2.22	18328.13	915.61	0.08
E100-00-00_02	4994.0	Max WS	40390.16	-3.09	40.10	16.97	40.24	0.000131	3.07	14475.56	841.73	0.10
E100-00-00_02	4980.0 RR OVERPASS		Bridge									
E100-00-00_02	4961.0	Max WS	40343.43	-3.03	40.02		40.16	0.000149	3.09	14297.44	746.12	0.10
E100-00-00_02	4812.0	Max WS	40245.81	-3.49	39.89	17.06	40.11	0.000549	3.75	10743.86	905.27	0.15
E100-00-00_02	4774.5 CROCKETT/HOGAN		Bridge									
E100-00-00_02	4687.0	Max WS	40209.27	-4.67	39.83		40.00	0.000184	3.33	12067.85	925.40	0.13
E100-00-00_02	4407.	Max WS	40179.60	-3.62	39.80		39.97	0.000156	3.65	14106.88	1428.74	0.12
E100-00-00_02	4014.0	Max WS	40180.89	-2.15	39.79	16.11	39.90	0.000121	2.80	16171.23	1021.50	0.10
E100-00-00_02	3997.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	3976.0	Max WS	40168.18	-2.40	39.50		39.61	0.000118	2.81	16149.14	1021.30	0.10
E100-00-00_02	3681.	Max WS	40132.38	-3.80	39.45		39.58	0.000141	3.20	16980.16	1467.30	0.12
E100-00-00_02	3585.0	Max WS	40096.91	-4.26	39.40		39.58	0.000157	3.55	16719.63	1409.05	0.13
E100-00-00_02	2298.0	Max WS	39991.03	-6.21	39.23		39.39	0.000129	3.37	17540.13	1392.72	0.11
E100-00-00_02	1580.	Max WS	39991.09	-7.83	39.22		39.30	0.000085	2.79	22777.32	2262.75	0.09
E100-00-00_02	1353.0	Max WS	39971.59	-8.34	39.19	16.59	39.29	0.000116	3.18	20168.25	2580.61	0.10
E100-00-00_02	1335.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	1319.0	Max WS	39945.14	-8.37	39.16		39.26	0.000112	3.14	20437.63	2690.49	0.10
E100-00-00_02	984.0	Max WS	39871.30	-8.69	39.06	13.34	39.25	0.000109	3.91	20239.28	2984.27	0.13
E100-00-00_02	978 MAIN STREET		Bridge									
E100-00-00_02	971.6	Max WS	39708.97	-8.69	38.91		39.10	0.000111	3.94	19814.92	2963.30	0.13
E100-00-00_02	971.5	Max WS	39708.97	-8.69	38.91	13.29	39.10	0.000111	3.94	19814.90	2963.30	0.13
E100-00-00_02	961.5 1ST STREET		Bridge									
E100-00-00_02	851.0	Max WS	39623.05	-6.40	38.83		39.03	0.000136	4.11	19453.35	2789.62	0.14
E100-00-00_02	654.0	Max WS	39630.19	-6.50	38.84		38.98	0.000083	3.36	21612.28	2754.93	0.11
E100-00-00_02	400.0	Max WS	39555.96	-8.58	38.77	12.93	39.02	0.000130	4.42	20223.78	3193.07	0.14
E100-00-00_02	381.0 UNION PACIFIC RR		Bridge									

HEC-RAS Plan: CE_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_02	365.0	Max WS	39474.25	-8.23	38.69		38.93	0.000129	4.37	19928.15	3196.50	0.14
E100-00-00_02	210.0	Max WS	39433.57	-7.81	38.65	13.28	38.93	0.000142	4.74	19790.34	3233.50	0.15
E100-00-00_02	191.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	173.1	Max WS	39344.62	-6.84	38.55		38.84	0.000156	4.87	19167.55	3520.58	0.16
E100-00-00_02	173.0	Max WS	39350.25	-6.84	38.55		38.84	0.000156	4.87	19167.48	3520.58	0.16

Little White Oak Bayou
Corrected Effective 100-Year

HEC-RAS Plan: CE_100yr River: E101-00-00 Reach: E101-00-00_0003 Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	9819.000	Max WS	10914.35	16.33	41.67		41.92	0.000450	3.99	2732.70	191.50	0.19
E101-00-00_0003	9750.000	Max WS	10914.74	16.31	41.66		41.89	0.000419	3.82	2857.78	204.29	0.18
E101-00-00_0003	9000.000	Max WS	10868.84	15.50	41.58		41.66	0.000167	2.41	5009.45	561.46	0.11
E101-00-00_0003	8469.000	Max WS	9158.69	13.02	41.48		41.54	0.000140	2.30	4771.61	623.89	0.10
E101-00-00_0003	7984.000	Max WS	9097.67	13.76	41.40		41.47	0.000142	2.44	4609.99	397.03	0.10
E101-00-00_0003	6838.000	Max WS	8937.39	12.20	41.20		41.29	0.000178	2.40	3817.08	459.35	0.13
E101-00-00_0003	5861.000	Max WS	8828.40	9.91	41.02		41.12	0.000179	2.56	4461.67	475.83	0.11
E101-00-00_0003	4720.000	Max WS	8828.81	8.13	40.88		40.97	0.000151	2.78	5975.80	862.66	0.10
E101-00-00_0003	4279.000	Max WS	8684.00	9.00	40.78		40.90	0.000209	2.98	4309.86	661.78	0.12
E101-00-00_0003	4130.000	Max WS	8766.48	8.68	40.81	18.24	40.86	0.000041	1.86	7153.29	888.60	0.07
E101-00-00_0003	4091.000 N. MAIN		Bridge									
E101-00-00_0003	4050.000	Max WS	8703.68	7.87	40.79		40.83	0.000038	1.84	6699.05	794.44	0.07
E101-00-00_0003	3952.	Max WS	8621.45	6.87	40.76		40.83	0.000048	2.15	4409.98	262.89	0.08
E101-00-00_0003	3466.000	Max WS	8723.27	1.92	40.76		40.81	0.000022	2.25	6793.57	643.01	0.07
E101-00-00_0003	3300.	Max WS	8785.14	-1.50	40.77		40.80	0.000018	1.62	8590.14	638.84	0.05
E101-00-00_0003	3203.000	Max WS	8788.74	-3.50	40.77		40.80	0.000017	1.41	8786.62	675.53	0.04
E101-00-00_0003	2797.000 I-45		Culvert									
E101-00-00_0003	2389.000	Max WS	8253.33	-0.26	40.62		40.64	0.000031	1.36	10518.31	932.70	0.04
E101-00-00_0003	2325.	Max WS	8260.34	-0.15	40.62		40.64	0.000031	1.33	10679.52	1016.53	0.04
E101-00-00_0003	1855.000	Max WS	8332.94	0.68	40.62		40.63	0.000013	0.91	11769.19	1135.56	0.03
E101-00-00_0003	1126.	Max WS	8333.05	-1.85	40.61		40.62	0.000034	1.13	12681.39	1489.57	0.04
E101-00-00_0003	1070.000	Max WS	8328.48	-2.04	40.60	9.63	40.62	0.000035	1.40	13378.16	1589.66	0.04
E101-00-00_0003	1029.500 WRIGHTWOOD		Bridge									
E101-00-00_0003	987.000	Max WS	8322.18	-2.04	40.59		40.61	0.000038	1.37	13357.81	1587.51	0.04
E101-00-00_0003	911.	Max WS	8330.05	-2.19	40.59		40.60	0.000027	1.21	14376.57	1509.08	0.04
E101-00-00_0003	756.	Max WS	8335.89	-2.51	40.58		40.59	0.000075	0.90	12692.31	1691.54	0.04
E101-00-00_0003	637.000	Max WS	8345.81	-2.75	40.58	11.63	40.59	0.000044	0.81	15372.87	1715.93	0.03
E101-00-00_0003	538.000 QUITMAN/WHITEOAK		Bridge									
E101-00-00_0003	442.000	Max WS	8321.49	-2.75	40.55		40.56	0.000036	0.95	15090.81	1714.13	0.03
E101-00-00_0003	306.000	Max WS	8316.30	-2.86	40.55		40.56	0.000005	0.67	17056.61	2086.90	0.02
E101-00-00_0003	259.1	Max WS	8312.92	-2.90	40.55		40.56	0.000006	0.74	12424.87	584.80	0.03
E101-00-00_0003	259	Max WS	8315.48	-2.90	40.55		40.56	0.000006	0.74	12424.85	584.80	0.03
E101-00-00_0003	180.1	Max WS	8999.57	-2.96	40.55		40.55	0.000007	0.79	12470.93	626.13	0.03
E101-00-00_0003	180	Max WS	9000.53	-2.96	40.55		40.55	0.000007	0.79	12470.90	626.13	0.03
E101-00-00_0003	101.1	Max WS	9463.35	-3.03	40.54		40.55	0.000006	0.73	13753.82	698.80	0.03
E101-00-00_0003	101	Max WS	9468.85	-3.03	40.54		40.55	0.000006	0.73	13753.82	698.80	0.03
E101-00-00_0003	68	Max WS	9463.75	-4.00	40.54		40.55	0.000009	0.83	12209.68	595.06	0.03
E101-00-00_0003	63	Max WS	9497.07	-4.00	40.54	9.33	40.55	0.000009	0.83	12209.58	595.06	0.03
E101-00-00_0003	33 I-10 EAST RAMP		Bridge									
E101-00-00_0003	3	Max WS	9484.53	-4.23	40.53		40.54	0.000011	1.00	10422.56	512.48	0.03
E101-00-00_0003	1	Max WS	9477.40	-4.23	40.53		40.54	0.000011	1.00	10422.56	512.48	0.03

Buffalo Bayou
Unmitigated Proposed 10-Year

HEC-RAS Plan: UMProp_10yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	148800.4	Max WS	8214.38	3.15	33.13		33.19	0.000231	2.18	4802.41	1003.94	0.08
W100_upstrm	148795.4	Max WS	8214.48	3.15	33.13	13.26	33.19	0.000231	2.18	4802.03	1003.85	0.08
W100_upstrm	148768.4 SOUTHERN PACIFIC		Bridge									
W100_upstrm	148741.4	Max WS	8214.15	3.04	33.03		33.09	0.000231	2.18	4805.54	1004.66	0.08
W100_upstrm	147632.4	Max WS	8210.86	-1.17	32.86		32.92	0.000085	2.01	4844.04	397.22	0.08
W100_upstrm	146698.0	Max WS	8253.45	1.88	32.76		32.84	0.000101	2.34	4868.58	325.32	0.09
W100_upstrm	145723.9	Max WS	8298.38	1.61	32.62		32.74	0.000144	3.04	4539.36	380.78	0.11
W100_upstrm	144753.5	Max WS	8347.37	0.07	32.49		32.60	0.000125	2.66	3897.09	297.47	0.10
W100_upstrm	143966.8	Max WS	8378.27	-7.47	32.38		32.49	0.000168	2.87	4144.30	438.89	0.11
W100_upstrm	143078.2	Max WS	8421.52	-4.19	32.27		32.36	0.000124	2.45	5363.35	511.68	0.10
W100_upstrm	142061.4	Max WS	8473.69	0.55	32.18		32.25	0.000075	2.19	5598.00	450.97	0.08
W100_upstrm	141320.1	Max WS	8512.43	-2.70	32.16		32.19	0.000042	1.51	10224.28	741.87	0.06
W100_upstrm	140116.2	Max WS	8554.42	-1.31	32.05		32.14	0.000108	2.44	5431.56	591.51	0.09
W100_upstrm	139320.0	Max WS	8584.07	-2.14	32.00		32.06	0.000080	1.99	6284.78	586.14	0.07
W100_upstrm	138607.9	Max WS	8614.51	-2.08	32.00		32.01	0.000020	1.10	15890.74	1071.76	0.04
W100_upstrm	137732.0	Max WS	8633.96	-2.40	31.96		32.01	0.000060	2.11	9236.58	869.51	0.07
W100_upstrm	137113.0	Max WS	8664.83	-2.62	31.89		31.97	0.000086	2.53	5948.97	442.51	0.09
W100_upstrm	136331.2	Max WS	8702.76	-2.09	31.83		31.85	0.000163	1.40	8989.92	634.17	0.05
W100_upstrm	135666.2	Max WS	8717.38	-1.47	31.73		31.80	0.000078	2.19	6653.78	546.81	0.08
W100_upstrm	134706.7	Max WS	8757.27	-1.93	31.71		31.73	0.000036	1.54	12428.94	859.90	0.06
W100_upstrm	134090.6	Max WS	8772.81	-1.59	31.68		31.72	0.000049	1.89	9826.64	717.49	0.07
W100_upstrm	133772.1	Max WS	8781.13	-0.79	31.65	8.86	31.72	0.000071	2.42	8267.32	808.93	0.08
W100_upstrm	133760.1 FOOTBRIDGE AT WE		Bridge									
W100_upstrm	133748.1	Max WS	8775.90	-0.46	31.60		31.68	0.000076	2.48	7962.15	793.95	0.08
W100_upstrm	132963.8	Max WS	8804.31	-1.98	31.52		31.61	0.000099	2.46	4938.15	478.85	0.09
W100_upstrm	131789.8	Max WS	8840.80	-2.31	31.41		31.50	0.000095	2.59	5595.42	483.77	0.09
W100_upstrm	130765.5	Max WS	8889.55	-3.81	31.37		31.41	0.000039	1.78	8251.98	488.42	0.06
W100_upstrm	129725.3	Max WS	8922.06	-3.71	31.30		31.37	0.000071	2.40	7902.77	685.70	0.08
W100_upstrm	129163.2	Max WS	8952.81	-3.13	31.26		31.32	0.000063	2.17	5967.00	482.03	0.08
W100_upstrm	128326.9	Max WS	8990.84	-4.05	31.22		31.27	0.000043	1.93	8508.35	815.65	0.06
W100_upstrm	128109.6	Max WS	8990.83	-4.29	31.22		31.25	0.000100	1.33	6762.12	386.84	0.05
W100_upstrm	128104.6	Max WS	8988.57	-4.29	31.22	6.02	31.25	0.000100	1.33	6761.94	386.84	0.05
W100_upstrm	128066.7 SHEPHERD		Bridge									
W100_upstrm	128028.8	Max WS	8987.06	-4.51	31.00		31.03	0.000067	1.33	6761.98	386.84	0.05
W100_upstrm	126647.0	Max WS	8972.06	-3.93	30.95		30.96	0.000022	0.80	11232.04	754.90	0.04
W100_upstrm	125376.9	Max WS	8998.87	-4.05	30.82		30.86	0.000142	1.61	5572.36	330.83	0.07
W100_upstrm	124983.5	Max WS	9011.90	-3.86	30.79		30.82	0.000035	1.56	5781.38	985.34	0.07
W100_upstrm	124644.1	Max WS	9024.83	-3.69	30.77	8.30	30.81	0.000044	1.62	5555.37	485.64	0.07
W100_upstrm	124591.8 WAUGH DRIVE		Bridge									
W100_upstrm	124539.5	Max WS	9022.66	-3.74	30.76		30.80	0.000044	1.62	5567.47	486.03	0.07
W100_upstrm	123658.2	Max WS	9074.32	-2.04	30.75		30.77	0.000022	0.85	11241.26	1191.89	0.04
W100_upstrm	123138.8	Max WS	9098.96	-4.08	30.75		30.76	0.000012	0.62	14853.86	956.46	0.03
W100_upstrm	122627.1	Max WS	9121.02	-6.08	30.73		30.76	0.000022	1.33	8331.14	646.71	0.05
W100_upstrm	122572.1 MONTROSE COURT		Mult Open									
W100_upstrm	122517.1	Max WS	9122.30	-5.38	30.73		30.75	0.000037	1.34	7898.39	597.30	0.05
W100_upstrm	122371.6	Max WS	9118.38	-7.00	30.71	4.13	30.74	0.000068	1.54	5905.23	834.96	0.06
W100_upstrm	122265 ROSEMONT		Bridge									
W100_upstrm	122210.0	Max WS	9113.26	-5.60	30.67		30.71	0.000042	1.46	6243.43	722.07	0.06
W100_upstrm	122036.7	Max WS	9122.58	-8.40	30.67		30.70	0.000046	1.34	7573.63	746.55	0.06
W100_upstrm	121229.5	Max WS	9154.86	-11.37	30.64		30.67	0.000031	1.25	8357.07	833.88	0.05
W100_upstrm	120962.2	Max WS	9159.04	-10.59	30.62		30.66	0.000042	1.53	6358.96	654.78	0.07
W100_upstrm	120005.2	Max WS	9199.36	-7.78	30.61	3.58	30.62	0.000033	0.68	13593.85	922.85	0.03
W100_upstrm	119952.6 MEMORIAL DRIVE		Bridge									
W100_upstrm	119900.0	Max WS	9190.57	-7.64	30.59		30.60	0.000019	0.68	13447.93	899.25	0.03
W100_upstrm	119495.9	Max WS	9214.01	-7.21	30.59		30.59	0.000009	0.45	20587.66	1233.55	0.02
W100_upstrm	118667.7	Max WS	9252.81	-8.56	30.56		30.58	0.000029	0.87	10636.95	704.70	0.04
W100_upstrm	118466.1	Max WS	9248.24	-8.89	30.55	1.63	30.57	0.000021	1.19	8323.61	792.53	0.05
W100_upstrm	118418.1 MEMORIAL DRIVE		Bridge									
W100_upstrm	118370.1	Max WS	9238.50	-8.87	30.52		30.54	0.000022	1.20	8284.49	791.66	0.05
W100_upstrm	117845.4	Max WS	9259.57	-7.26	30.51		30.53	0.000032	1.05	9043.70	568.86	0.04
W100_upstrm	117204.3	Max WS	9289.32	-4.60	30.50		30.51	0.000020	0.86	10835.10	647.28	0.04
W100_upstrm	116395.7	Max WS	9316.48	-3.88	30.48		30.49	0.000018	0.96	9725.32	500.20	0.04
W100_upstrm	116167.6	Max WS	9301.10	-3.68	30.44	4.13	30.48	0.000068	1.57	5909.21	270.63	0.06
W100_upstrm	116121.9 SABINE AVENUE		Bridge									
W100_upstrm	116076.2	Max WS	9274.27	-3.86	30.26		30.30	0.000066	1.57	5907.52	270.61	0.06
W100_upstrm	115804.5	Max WS	9260.14	-4.60	30.23		30.29	0.000033	2.07	6022.55	299.62	0.07
W100_upstrm	115740.6	Max WS	9265.87	-4.78	30.23	4.30	30.28	0.000031	1.94	6071.93	327.64	0.06
W100_upstrm	115700 I-45 Allen Pkwy		Bridge									
W100_upstrm	115674.0	Max WS	9258.57	-5.10	30.22		30.27	0.000034	2.00	6374.95	420.23	0.06
W100_upstrm	115662.6	Max WS	9264.70	-5.20	30.22	4.03	30.27	0.000032	1.92	6496.90	433.44	0.06
W100_upstrm	115635.5 I-45 Houston Ave		Bridge									
W100_upstrm	115621.1	Max WS	9275.61	-5.57	30.23		30.27	0.000025	1.78	7186.54	505.69	0.06
W100_upstrm	115587.7	Max WS	9273.80	-6.22	30.23	3.82	30.27	0.000029	1.90	7542.43	563.08	0.06
W100_upstrm	115553.5 I-45 SBML		Bridge									
W100_upstrm	115514.4	Max WS	9281.07	-6.96	30.23		30.27	0.000021	1.60	8467.34	600.78	0.05
W100_upstrm	115509.1	Max WS	9281.40	-6.99	30.23	3.39	30.27	0.000021	1.62	8513.31	592.29	0.05
W100_upstrm	115490 I-45 NBML		Bridge									
W100_upstrm	115423.0	Max WS	9288.66	-7.30	30.24		30.27	0.000017	1.47	8749.55	508.15	0.05
W100_upstrm	115365.4	Max WS	9291.94	-7.52	30.24		30.26	0.000015	1.39	8839.05	515.15	0.04
W100_upstrm	115284.6	Max WS	9291.80	-7.89	30.23		30.27	0.000019	1.57	12192.25	1120.36	0.05
W100_upstrm	115104.1	Max WS	9299.65	-8.31	30.24		30.26	0.000012	1.29	10341.37	746.41	0.04
W100_upstrm	115001.2	Max WS	9287.82	-8.48	30.21	2.19	30.27	0.000028	1.91	7616.47	576.85	0.06
W100_upstrm	115000 I-45 Ramp McKee		Bridge									
W100_upstrm	114907.3	Max WS	9295.27	-9.19	30.22		30.26	0.000024	1.72	7200.34	464.98	0.06
W100_upstrm	114842.1	Max WS	9289.89	-9.48	30.21	1.90	30.26	0.000029	1.83	7152.52	524.93	0.06
W100_upstrm	114830 I-45 Ramp Walker		Bridge									
W100_upstrm	114804.3	Max WS	9288.02	-9.61	30.21		30.26	0.000030	1.87	7619.76	568.47	0.06

HEC-RAS Plan: UMProp_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	114492.0	Max WS	9318.49	-10.48	30.22		30.25	0.000029	1.39	6687.11	358.57	0.06
W100_upstrm	114195.9	Max WS	9310.20	-11.52	30.19	1.23	30.23	0.000064	1.52	6109.68	327.74	0.06
W100_upstrm	114168.9 RUSK STREET		Bridge									
W100_upstrm	114141.9	Max WS	9281.73	-10.83	30.17		30.21	0.000068	1.58	5886.78	322.86	0.06
W100_upstrm	114097.4	Max WS	9292.15	-7.46	30.18	3.19	30.21	0.000042	1.37	6803.24	381.33	0.06
W100_upstrm	114070.4 CAPITAL STREE		Bridge									
W100_upstrm	114043.4	Max WS	9275.01	-7.72	29.22		29.25	0.000047	1.42	6539.43	379.77	0.06
W100_upstrm	113644.0	Max WS	9240.41	-8.91	29.18		29.24	0.000042	1.98	5471.57	408.32	0.07
W100_upstrm	113411.6	Max WS	9267.29	-9.61	29.18	0.33	29.23	0.000038	1.70	5461.05	372.92	0.06
W100_upstrm	113374.3 TEXAS AVE		Bridge									
W100_upstrm	113337.0	Max WS	9218.01	-9.65	29.06		29.10	0.000038	1.69	5445.47	372.69	0.05
W100_upstrm	113266.4	Max WS	9178.62	-9.11	29.03	2.81	29.10	0.000156	2.14	4523.20	241.25	0.08
W100_upstrm	113238.6 BAGBY		Bridge									
W100_upstrm	113210.8	Max WS	9115.90	-9.46	28.61		28.68	0.000159	2.13	4506.39	240.99	0.08
W100_upstrm	112974.0	Max WS	9084.11	-10.69	28.57	0.86	28.64	0.000104	2.12	4279.67	201.54	0.08
W100_upstrm	112944.9 PRAIRIE		Bridge									
W100_upstrm	112915.8	Max WS	9042.75	-10.82	28.42		28.49	0.000104	2.12	4274.80	201.49	0.08
W100_upstrm	112575.5	Max WS	9048.25	-9.20	28.40	3.02	28.45	0.000126	1.79	5050.10	240.96	0.07
W100_upstrm	112534.5 PRESTON STREET		Bridge									
W100_upstrm	112493.5	Max WS	9002.32	-9.47	28.34		28.39	0.000122	1.77	5095.44	241.33	0.06
W100_upstrm	112003.3	Max WS	8989.77	-9.69	28.30	1.79	28.34	0.000077	1.47	6120.07	288.96	0.06
W100_upstrm	111953.3 CONGRESS STREET		Bridge									
W100_upstrm	111903.3	Max WS	8940.26	-9.84	28.26		28.29	0.000076	1.45	6148.86	289.37	0.05
W100_upstrm	111853.5	Max WS	8928.28	-9.86	28.25	1.31	28.29	0.000078	1.55	5756.85	229.15	0.05
W100_upstrm	111818.6 SMITH STREET		Bridge									
W100_upstrm	111783.7	Max WS	8897.53	-8.67	28.22		28.26	0.000088	1.62	5482.09	225.48	0.06
W100_upstrm	111626.7	Max WS	8890.07	-11.83	28.21	0.98	28.25	0.000094	1.56	5685.50	231.04	0.06
W100_upstrm	111518.6 LOUISIANA AND FR		Bridge									
W100_upstrm	111410.5	Max WS	8794.49	-11.23	28.13		28.17	0.000064	1.59	5528.67	229.89	0.06
W100_upstrm	110876.6	Max WS	8797.07	-10.43	28.11	-0.85	28.13	0.000066	1.23	7202.94	406.91	0.05
W100_upstrm	110837.8 MILAM		Bridge									
W100_upstrm	110799.0	Max WS	8703.95	-10.72	28.06		28.08	0.000178	1.20	7297.31	425.59	0.05
W100_upstrm	110672.7	Max WS	8666.35	-13.25	28.04	-1.80	28.07	0.000145	1.46	7686.49	704.52	0.05
W100_upstrm	110643.7 TRAVIS STREET		Bridge									
W100_upstrm	110614.7	Max WS	8631.30	-12.75	28.01		28.05	0.000164	1.50	7375.28	680.00	0.06
W100_upstrm	110200.2	Max WS	8611.16	-9.11	27.98	1.15	28.00	0.000029	1.16	7742.74	476.78	0.04
W100_upstrm	110154.2 MAIN STREET		Bridge									
W100_upstrm	110108.2	Max WS	8592.89	-9.31	27.78		27.80	0.000029	1.16	7741.89	476.75	0.04
W100_upstrm	110103.2	Max WS	8595.94	-9.31	27.78		27.80	0.000029	1.16	7741.82	476.75	0.04
Downstream	109924.2	Max WS	33272.63	-13.02	27.78		28.12	0.000632	4.70	7225.69	373.25	0.17
Downstream	109551.7	Max WS	33272.22	-14.28	27.60	3.49	27.90	0.000573	4.34	7661.92	342.97	0.16
Downstream	109518.7 FANNIN STREET		Bridge									
Downstream	109485.7	Max WS	33271.18	-15.31	26.71		27.00	0.000563	4.32	7709.10	343.49	0.16
Downstream	109440.2	Max WS	33270.82	-16.48	26.64	2.89	26.97	0.001034	4.59	7246.87	324.09	0.17
Downstream	109395.2 SAN JACINTO STRE		Bridge									
Downstream	109350.2	Max WS	33269.07	-16.89	26.29		26.62	0.001025	4.58	7267.26	324.18	0.17
Downstream	109119.0	Max WS	33266.64	-17.14	25.83	3.56	26.32	0.001524	5.64	5894.62	389.39	0.24
Downstream	109103.1 CROSSWALK		Bridge									
Downstream	109087.2	Max WS	33265.30	-17.55	25.64		26.12	0.001490	5.58	5966.81	395.78	0.23
Downstream	108565.3	Max WS	33263.06	-12.77	25.06		25.45	0.001072	5.02	6639.45	356.19	0.19
Downstream	108334.0	Max WS	33262.47	-14.06	24.82		25.16	0.001409	4.71	7291.15	629.08	0.18
Downstream	107179.4	Max WS	33257.68	-20.52	23.25	-0.12	23.75	0.001115	5.73	6135.34	389.06	0.22
Downstream	107158.9 SOUTHERN PACIFIC		Bridge									
Downstream	107138.4	Max WS	33257.09	-20.19	23.09		23.62	0.001041	5.88	5945.45	370.39	0.22
Downstream	106594.0	Max WS	33256.34	-16.70	22.71		23.11	0.000829	5.05	6581.46	250.14	0.17
Downstream	106151.4	Max WS	33254.90	-13.85	22.06	2.34	22.54	0.001721	5.54	6002.41	256.81	0.20
Downstream	106131.1 MCKEE		Bridge									
Downstream	106110.8	Max WS	33253.31	-12.53	21.75		22.30	0.001980	5.95	5587.52	249.85	0.22
Downstream	105705.4	Max WS	33252.41	-18.22	21.23	0.86	21.76	0.000657	5.86	5671.51	253.70	0.22
Downstream	105667.4 ELYSIAN STREET		Bridge									
Downstream	105629.4	Max WS	33251.75	-18.43	20.90		21.44	0.000668	5.89	5641.68	252.31	0.22
Downstream	105476	Max WS	33251.45	-18.70	20.76		21.23	0.002016	5.48	6063.86	360.65	0.24
Downstream	104962	Max WS	33250.17	-18.70	20.23		20.42	0.001094	3.45	9651.16	603.39	0.15
Downstream	104900	Max WS	33249.79	-19.15	20.05		20.24	0.000289	3.47	9571.02	611.82	0.15
Downstream	104464	Max WS	33249.34	-19.86	19.63		19.96	0.002071	4.61	7213.87	483.70	0.21
Downstream	104301	Max WS	33248.91	-20.42	19.39		19.76	0.000376	4.85	6851.19	455.69	0.22
Downstream	104242	Max WS	33248.81	-20.62	19.30		19.71	0.001463	5.12	6494.08	374.89	0.22
Downstream	104118.0	Max WS	33248.31	-21.10	18.62	6.05	19.49	0.002193	7.47	4453.67	254.78	0.31
Downstream	104070 Prop I-69 Ramp		Bridge									
Downstream	103955.1	Max WS	33248.31	-21.79	18.89		19.33	0.000948	5.36	6206.69	285.39	0.20
Downstream	103955.0	Max WS	33248.31	-21.79	18.89	1.92	19.33	0.000948	5.36	6206.66	285.39	0.20
Downstream	103846 Prop I-69 DC		Bridge									
Downstream	103786.1	Max WS	33248.12	-22.51	18.67		19.11	0.000819	5.28	6294.61	284.84	0.20
Downstream	103786.0	Max WS	33248.22	-22.51	18.67	0.87	19.11	0.000819	5.28	6294.58	284.84	0.20
Downstream	103694 Prop I-69 SBML		Bridge									
Downstream	103534.1	Max WS	33247.71	-23.58	18.37		18.82	0.000806	5.39	6164.06	271.61	0.20
Downstream	103534.0	Max WS	33247.71	-23.58	18.37	0.60	18.82	0.000806	5.39	6164.04	271.61	0.20
Downstream	103383 Prop I-45 SBML		Bridge									
Downstream	103241.1	Max WS	33247.39	-24.83	18.17		18.63	0.001300	5.47	6080.23	311.41	0.22
Downstream	103241.0	Max WS	33247.28	-24.83	18.17	0.05	18.63	0.001300	5.47	6080.18	311.41	0.22
Downstream	103161 Prop I-69 NBML		Bridge									
Downstream	103095.1	Max WS	33247.06	-25.45	18.04		18.49	0.000543	5.38	6180.75	288.67	0.20
Downstream	103095.0	Max WS	33247.16	-25.45	18.04	0.36	18.49	0.000543	5.38	6180.73	288.67	0.20
Downstream	103065 Prop I-45 DC		Bridge									
Downstream	103025.1	Max WS	33246.84	-25.75	17.94		18.41	0.000500	5.48	6062.76	260.22	0.20
Downstream	103025.0	Max WS	33246.95	-25.75	17.94	-3.65	18.41	0.000500	5.48	6062.74	260.22	0.20
Downstream	102988 Prop I-10 DC		Bridge									

HEC-RAS Plan: UMProp_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	102952	Max WS	33245.82	-26.06	17.46		18.10	0.000868	6.43	5172.67	251.74	0.25
Downstream	102895.0	Max WS	33245.59	-26.31	17.17		18.03	0.001656	7.43	4473.47	239.43	0.30
Downstream	102875.3	Max WS	33246.04	-26.39	17.38	-1.36	17.99	0.001834	6.27	5300.15	346.29	0.28
Downstream	102847.5 HOUTerminal RR		Bridge									
Downstream	102819.7	Max WS	33245.24	-26.43	17.01		17.65	0.001940	6.41	5187.62	344.32	0.29
Downstream	102309.0	Max WS	33284.69	-23.48	16.58		17.06	0.000373	5.55	6002.19	216.76	0.19
Downstream	101828.0	Max WS	33320.09	-20.70	16.21	-2.01	16.82	0.000645	6.25	5332.07	234.14	0.23
Downstream	101790.1 JENSEN ROAD		Bridge									
Downstream	101752.2	Max WS	33319.99	-20.69	16.04		16.66	0.000623	6.30	5291.19	230.62	0.23
Downstream	101007.3	Max WS	33378.07	-16.93	15.78		16.28	0.000387	5.65	5902.59	259.22	0.21
Downstream	99992.6	Max WS	33454.84	-18.90	15.32		15.86	0.000431	5.93	5641.20	242.94	0.22
Downstream	98399.4	Max WS	33581.05	-20.26	14.67		15.19	0.000415	5.74	5845.89	254.60	0.21
Downstream	97517.4	Max WS	33647.27	-19.35	14.60		14.89	0.000240	4.35	7734.58	312.25	0.15
Downstream	96028.6	Max WS	33756.40	-17.81	13.86	-4.29	14.33	0.000511	5.52	6110.11	283.47	0.21
Downstream	95985.1 YORK DRIVE		Bridge									
Downstream	95941.6	Max WS	33756.38	-17.87	13.72		14.19	0.000513	5.55	6086.27	282.95	0.21
Downstream	95362.9	Max WS	33801.54	-15.97	13.53		13.94	0.000355	5.16	6547.44	318.19	0.20
Downstream	94280.7	Max WS	33892.16	-19.82	12.60		13.32	0.000850	6.80	4984.41	226.66	0.26
Downstream	93495.6	Max WS	33946.82	-20.43	12.29		12.77	0.000584	5.57	6090.31	316.97	0.22
Downstream	92795.6	Max WS	34007.18	-20.98	11.93	-6.21	12.42	0.000418	5.64	6032.83	284.73	0.22
Downstream	92741.1 LOCKWOOD DRIVE		Bridge									
Downstream	92686.6	Max WS	34007.18	-21.08	11.73		12.23	0.000423	5.66	6004.42	284.11	0.22
Downstream	90936.7	Max WS	34143.73	-18.64	10.48		10.95	0.001033	5.51	6196.50	387.74	0.24
Downstream	89918.4	Max WS	34223.86	-17.23	9.30		10.00	0.000829	6.71	5096.71	308.44	0.29
Downstream	88579.0	Max WS	34327.17	-20.97	8.29		8.95	0.000736	6.52	5266.66	313.14	0.28
Downstream	87591.9	Max WS	34408.75	-23.72	7.79		8.32	0.000534	5.83	5904.23	300.99	0.23
Downstream	86660.2	Max WS	34473.93	-23.42	7.49	-10.98	7.91	0.000340	5.17	6662.44	289.36	0.19
Downstream	86641.7 HOUTerminal RR		Bridge									
Downstream	86623.2	Max WS	34473.96	-23.61	7.18		7.60	0.000345	5.20	6626.95	289.03	0.19
Downstream	85855.2	Max WS	34533.73	-26.84	6.31		7.20	0.000731	7.57	4564.13	205.45	0.28
Downstream	85238.7	Max WS	34580.01	-29.43	6.05		6.78	0.000631	6.84	5098.55	256.81	0.25
Downstream	84561.7	Max WS	34644.07	-32.27	5.83	-14.21	6.42	0.000407	6.17	5671.95	288.05	0.21
Downstream	84531.4 NORTH WAYSIDE RD		Bridge									
Downstream	84501.1	Max WS	34643.93	-28.97	5.30		6.11	0.000638	7.22	4795.80	208.63	0.27
Downstream	84252.6	Max WS	34663.48	-26.90	5.28	-10.58	5.96	0.000553	6.61	5241.06	238.38	0.25
Downstream	84222.3 M. GARCIA		Bridge									
Downstream	84192.0	Max WS	34663.11	-24.10	4.64		5.59	0.000896	7.81	4439.43	227.77	0.31
Downstream	83635.7	Max WS	34706.83	-21.72	4.58		5.16	0.000634	6.11	5676.18	332.35	0.26
Downstream	81786.1	Max WS	34847.13	-31.97	3.61		4.11	0.000496	5.67	6145.49	337.28	0.23
Downstream	80903.1	Max WS	34914.15	-27.77	3.33	-13.26	3.71	0.000392	4.97	7023.28	384.49	0.20
Downstream	80883.1 S. PACIFIC RR		Bridge									
Downstream	80863.1	Max WS	34914.15	-28.10	2.92		3.31	0.000455	4.99	6993.47	384.11	0.21
Downstream	80538.0	Max WS	34914.15	-33.12	3.06	-20.96	3.20	0.000111	3.05	11457.18	490.86	0.11

White Oak Bayou
Unmitigated Proposed 10-Year

HEC-RAS Plan: UMProp_10yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	36134.	Max WS	21247.14	24.19	52.54		53.22	0.000533	6.58	3230.31	198.02	0.29
E100-00-00	35718.0	Max WS	21245.93	23.76	52.29		53.01	0.000476	6.81	3120.95	191.06	0.30
E100-00-00	35158.	Max WS	21324.02	22.89	52.11		52.73	0.000500	6.30	3382.22	209.00	0.28
E100-00-00	35006.0	Max WS	21349.01	22.66	51.98	39.67	52.66	0.000455	6.61	3230.97	272.95	0.29
E100-00-00	34951.5 ELLA		Bridge									
E100-00-00	34895.0	Max WS	21323.48	22.56	51.73		52.42	0.000464	6.66	3201.08	266.05	0.29
E100-00-00	34645.	Max WS	21352.13	22.24	51.65		52.29	0.000544	6.43	3363.00	361.08	0.28
E100-00-00	34206.0	Max WS	21416.74	21.68	51.43		52.07	0.000447	6.41	3349.34	244.02	0.28
E100-00-00	33962.58	Max WS	21464.10	21.61	51.55		51.96	0.000375	5.14	4281.15	487.44	0.25
E100-00-00	33909.08	Max WS	21470.76	21.60	51.51		51.94	0.000500	5.23	4148.49	480.47	0.26
E100-00-00	33770.	Max WS	21489.69	21.56	51.48		51.89	0.000259	5.22	4448.88	368.34	0.22
E100-00-00	33681.0	Max WS	21497.53	21.53	51.19	38.72	51.86	0.000460	6.60	3259.98	364.45	0.29
E100-00-00	33645.5 W 18TH		Bridge									
E100-00-00	33610.0	Max WS	21495.57	21.61	51.04		51.73	0.000476	6.69	3214.70	355.28	0.29
E100-00-00	33357.	Max WS	21523.49	21.41	50.98		51.60	0.000578	6.32	3404.48	219.12	0.28
E100-00-00	32570.0	Max WS	21656.70	20.78	50.64		51.21	0.000389	6.07	3565.67	212.36	0.26
E100-00-00	31583.0	Max WS	21763.55	19.35	50.32		50.85	0.000340	5.80	3766.62	241.38	0.24
E100-00-00	30779.0	Max WS	21870.26	18.79	50.12		50.59	0.000302	5.58	4355.23	446.64	0.23
E100-00-00	29659.	Max WS	21988.13	17.66	49.81		50.22	0.000349	5.16	4497.82	658.04	0.22
E100-00-00	29368.0	Max WS	22060.90	17.37	49.45	35.27	50.11	0.000421	6.48	3413.34	257.12	0.26
E100-00-00	29297.5 TC JESTER SOUTH		Bridge									
E100-00-00	29203.0	Max WS	21892.51	17.35	48.12		48.86	0.000499	6.91	3167.38	178.36	0.29
E100-00-00	28775.	Max WS	21937.84	16.90	48.20		48.65	0.000450	5.37	4082.68	273.12	0.24
E100-00-00	28375.0	Max WS	21950.96	16.48	47.85	34.21	48.48	0.000420	6.38	3442.49	201.94	0.27
E100-00-00	28357.0 BICYCLE BRIDGE		Bridge									
E100-00-00	28330.0	Max WS	21950.96	16.41	47.73		48.37	0.000422	6.39	3433.73	201.69	0.27
E100-00-00	28190.0	Max WS	21962.13	16.18	47.69	33.71	48.31	0.000383	6.30	3483.67	193.13	0.26
E100-00-00	28152.5 W 11TH		Bridge									
E100-00-00	28113.0	Max WS	21951.17	16.28	47.46		48.10	0.000395	6.42	3419.85	190.69	0.27
E100-00-00	27982.	Max WS	21960.71	16.25	47.36		48.04	0.000493	6.62	3315.04	199.86	0.29
E100-00-00	27429.0	Max WS	21991.36	16.12	47.18		47.79	0.000419	6.29	3497.24	206.01	0.27
E100-00-00	26598.	Max WS	22081.39	15.35	46.89		47.45	0.000392	5.99	3689.37	217.89	0.26
E100-00-00	26498.0	Max WS	22089.03	15.26	46.87	32.90	47.41	0.000373	5.87	3761.89	219.44	0.25
E100-00-00	26432.5 TC JESTER		Bridge									
E100-00-00	26366.0	Max WS	22086.64	15.16	46.71		47.25	0.000376	5.89	3748.47	219.07	0.25
E100-00-00	26307.3	Max WS	22093.31	15.13	46.80		47.23	0.000335	5.30	4492.97	489.28	0.23
E100-00-00	26225	Max WS	22099.53	15.04	46.78		47.20	0.000355	5.22	4507.97	485.74	0.23
E100-00-00	26140.	Max WS	22099.99	14.97	46.61		47.17	0.000408	5.98	3696.78	229.98	0.26
E100-00-00	25536.0	Max WS	22133.12	14.48	46.37		46.93	0.000394	5.99	3812.06	306.68	0.26
E100-00-00	25132.	Max WS	22165.42	14.29	46.27		46.78	0.000349	5.83	4294.32	371.22	0.25
E100-00-00	24817.0	Max WS	22178.60	14.14	45.97	32.90	46.63	0.000589	6.51	3407.10	230.91	0.30
E100-00-00	24789.0 UNION PACIFIC RR		Bridge									
E100-00-00	24758.0	Max WS	22170.55	13.76	45.44		46.12	0.000593	6.59	3364.96	226.52	0.30
E100-00-00	24636.	Max WS	22186.03	13.61	45.56		46.06	0.000386	5.78	4236.56	423.60	0.25
E100-00-00	23934.0	Max WS	22236.58	12.75	45.27		45.74	0.000478	5.54	4015.97	286.72	0.26
E100-00-00	23550.0	Max WS	22269.36	12.77	45.17	29.40	45.59	0.000300	5.19	4293.48	257.02	0.22
E100-00-00	23506.5 DURHAM		Bridge									
E100-00-00	23444.0	Max WS	22265.59	12.69	44.99		45.42	0.000304	5.22	4267.63	256.00	0.23
E100-00-00	23180.	Max WS	22278.09	12.46	44.84		45.35	0.000319	5.75	4321.50	506.00	0.24
E100-00-00	22983.	Max WS	22283.45	12.29	44.64		45.28	0.000465	6.47	3739.77	512.74	0.28
E100-00-00	22834.0	Max WS	22293.22	12.16	44.50	31.36	45.20	0.000596	6.68	3339.05	494.70	0.28
E100-00-00	22796.5 SHEPHERD		Bridge									
E100-00-00	22758.0	Max WS	22285.81	12.11	44.33		45.01	0.000649	6.68	3618.66	482.38	0.28
E100-00-00	22610.	Max WS	22299.27	11.92	44.36		44.92	0.000566	6.11	4051.74	447.61	0.26
E100-00-00	22224.0	Max WS	22333.09	11.41	44.41		44.69	0.000442	4.50	6803.25	728.13	0.20
E100-00-00	21444.0	Max WS	22373.43	10.52	43.74		44.32	0.000630	6.11	3760.65	416.28	0.27
E100-00-00	20746.0	Max WS	22415.97	10.00	43.19		43.79	0.000912	6.18	3625.47	249.00	0.29
E100-00-00	20644.0	Max WS	22425.81	9.95	43.24	29.39	43.72	0.000492	5.70	5081.89	818.89	0.24
E100-00-00	20633.0 Pipeline		Bridge									
E100-00-00	20622.0	Max WS	22423.14	9.95	43.13		43.62	0.000504	5.75	4978.86	798.61	0.24
E100-00-00	20521.	Max WS	22430.04	9.91	43.07		43.58	0.000476	5.89	4924.55	625.43	0.24
E100-00-00	19917.0	Max WS	22478.70	9.66	42.61		43.23	0.000645	6.30	3623.26	408.03	0.27
E100-00-00	19463.0	Max WS	22511.31	9.25	42.28		42.93	0.000690	6.46	3487.11	215.86	0.28
E100-00-00	18857	Max WS	22554.81	8.03	41.84	28.55	42.51	0.000710	6.64	3547.69	298.12	0.28
E100-00-00	18800 I-10 WBFR		Bridge									
E100-00-00	18747	Max WS	22554.47	7.81	41.88		42.38	0.000482	5.75	4163.51	315.00	0.24
E100-00-00	18746	Max WS	22554.56	7.81	41.88	27.13	42.38	0.000482	5.75	4163.34	315.00	0.24
E100-00-00	18595 I-10 BRIDGE		Bridge									
E100-00-00	18443	Max WS	22549.37	7.19	41.01		41.55	0.000524	5.94	3904.87	283.41	0.25
E100-00-00	18442	Max WS	22549.45	7.19	41.01	26.92	41.55	0.000524	5.94	3904.71	283.41	0.25
E100-00-00	18394 I-10 EBFR		Bridge									
E100-00-00	18377.	Max WS	22542.88	6.98	40.48		41.08	0.000608	6.25	3680.69	273.45	0.27
E100-00-00	18234.0	Max WS	22560.63	6.77	40.66	26.34	41.00	0.000356	4.71	4788.52	287.48	0.20
E100-00-00	18220.0 UNION PACIFIC RR		Bridge									
E100-00-00	18199.0	Max WS	22557.31	6.70	40.38		40.74	0.000383	4.81	4692.97	281.87	0.21
E100-00-00	18176.0	Max WS	22558.18	6.79	40.29	26.13	40.73	0.000342	5.36	4208.16	252.85	0.21
E100-00-00	18138.0 YALE		Bridge									
E100-00-00	18082.0	Max WS	22546.64	6.87	39.42		40.05	0.000487	6.33	3561.21	225.26	0.26
E100-00-00	17905.	Max WS	22561.11	6.86	39.41		39.95	0.000564	5.92	3854.67	308.44	0.26
E100-00-00	17756.0	Max WS	22572.56	6.85	39.34	26.92	39.86	0.000711	5.75	3928.07	287.85	0.27
E100-00-00	17726 S. HEIGHTS		Bridge									
E100-00-00	17696	Max WS	22500.56	6.85	37.92		38.55	0.000888	6.37	3532.33	267.14	0.31
E100-00-00	17657	Max WS	22506.11	6.35	37.93	26.41	38.51	0.000818	6.13	3671.37	274.60	0.30
E100-00-00	17627 N. HEIGHTS		Bridge									
E100-00-00	17597.0	Max WS	22417.31	6.35	37.00		37.66	0.000943	6.55	3421.15	261.03	0.32
E100-00-00	17318.	Max WS	22381.67	6.35	36.62		37.41	0.000853	7.13	3141.21	204.85	0.32
E100-00-00	16831.0	Max WS	22411.59	6.34	36.60		37.12	0.000327	5.78	3875.52	324.42	0.29

HEC-RAS Plan: UMProp_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	15795.0	Max WS	22426.44	4.84	36.45		36.73	0.000416	4.19	5358.74	390.55	0.20
E100-00-00	15278.	Max WS	22351.03	4.41	35.91		36.51	0.000444	6.21	3601.05	229.33	0.27
E100-00-00	14977.0	Max WS	22369.68	4.16	35.95	23.41	36.41	0.000212	5.48	4079.94	259.72	0.24
E100-00-00	14937.0 I-10 EBFR ACCESS		Bridge									
E100-00-00	14897.0	Max WS	22359.87	3.39	35.13		35.60	0.000214	5.50	4067.10	259.43	0.24
E100-00-00	14890	Max WS	22334.95	3.42	35.02	22.63	35.60	0.000257	6.11	3656.19	228.14	0.27
E100-00-00	14775 I-10 BRIDGE		Bridge									
E100-00-00	14660	Max WS	22315.63	3.42	34.83		35.42	0.000265	6.18	3613.73	227.07	0.27
E100-00-00	14590.0	Max WS	22282.51	3.45	34.62	22.67	35.40	0.000349	7.07	3152.36	195.83	0.31
E100-00-00	14562.0 I-10 WB ACCESS		Bridge									
E100-00-00	14532.0	Max WS	22255.39	3.41	34.46		35.25	0.000809	7.11	3128.82	195.14	0.31
E100-00-00	14354.0	Max WS	22324.96	3.29	34.83		35.14	0.000171	4.44	5028.87	482.16	0.19
E100-00-00	13924.0	Max WS	22265.88	3.18	34.42	21.90	34.98	0.000567	6.01	3707.88	324.62	0.26
E100-00-00	13909.5 UNION PAC. RR		Bridge									
E100-00-00	13898.0	Max WS	22243.39	2.95	34.11		34.67	0.000574	6.03	3689.80	321.87	0.26
E100-00-00	13494.	Max WS	22228.99	2.47	33.99		34.42	0.000653	5.29	4202.58	398.80	0.24
E100-00-00	13220.0	Max WS	22257.03	2.15	34.08	21.71	34.31	0.000161	3.87	5747.98	577.17	0.17
E100-00-00	13182.5 STUDEMONT		Bridge									
E100-00-00	13143.0	Max WS	22262.90	2.15	34.01		34.23	0.000154	3.75	6320.15	505.18	0.17
E100-00-00	12698.	Max WS	22201.43	1.87	33.72		34.10	0.000439	4.98	4459.44	344.66	0.24
E100-00-00	12066.0	Max WS	22194.07	1.47	33.62		33.86	0.000324	3.91	5670.90	381.49	0.18
E100-00-00	11546.0	Max WS	22195.72	0.90	33.54		33.74	0.000153	3.55	6442.62	604.09	0.17
E100-00-00	11021.	Max WS	22199.14	0.63	33.50		33.67	0.000116	3.31	7094.71	731.61	0.15
E100-00-00	10908.0	Max WS	22206.63	0.57	33.52	19.83	33.66	0.000100	3.17	8492.61	880.80	0.14
E100-00-00	10852.5 TAYLOR (SAWYER)		Bridge									
E100-00-00	10804.0	Max WS	22199.61	0.45	33.36		33.50	0.000101	3.15	8467.42	879.86	0.14
E100-00-00	10643.	Max WS	22142.89	0.14	33.10		33.49	0.000374	5.10	4579.19	379.85	0.21
E100-00-00	9779.0	Max WS	22170.49	-1.51	33.09		33.26	0.000113	3.41	7400.24	601.46	0.15
E100-00-00	8532.0	Max WS	22209.66	-1.76	33.11		33.14	0.000032	1.52	14650.77	904.61	0.06
E100-00-00	8140.	Max WS	22215.92	-2.43	33.07		33.10	0.000170	1.58	15003.75	1203.33	0.07
E100-00-00	7649.0	Max WS	22209.66	-3.26	32.96	15.91	33.08	0.000068	2.99	13438.97	1376.27	0.12
E100-00-00	7608.5 HOUSTON		Bridge									
E100-00-00	7568.0	Max WS	22194.86	-3.15	32.96		33.03	0.000050	2.56	13283.87	1373.88	0.10
E100-00-00	7546.0	Max WS	22193.62	-3.16	32.94	15.88	33.04	0.000060	2.78	12248.34	1515.48	0.11
E100-00-00	7535.5 Pipeline		Bridge									
E100-00-00	7529.0	Max WS	22186.69	-3.16	32.91		33.01	0.000060	2.79	12199.61	1513.86	0.11
E100-00-00	7481.0	Max WS	22182.56	-3.17	32.87		33.01	0.000090	3.16	9160.42	1275.61	0.14
E100-00-00	7253.1	Max WS	22183.49	-3.19	32.89		32.98	0.000037	2.41	9255.55	668.01	0.09
E100-00-00	7253.05		Lat Struct									
E100-00-00	7253	Max WS	22182.67	-3.19	32.89	11.24	32.98	0.000037	2.41	9255.55	668.01	0.09
E100-00-00	7205 Prop I-10 DC		Bridge									
E100-00-00	7138.1	Max WS	22162.62	-3.20	32.76		32.88	0.000049	2.74	8152.26	599.98	0.11
E100-00-00	7138	Max WS	22162.80	-3.20	32.76	12.04	32.88	0.000049	2.74	8152.26	599.98	0.11
E100-00-00	7057 Prop I-10 Ramp		Bridge									
E100-00-00	7016.1	Max WS	22011.01	-3.22	32.34		32.62	0.000102	4.28	5139.65	493.83	0.16
E100-00-00	7016	Max WS	22010.44	-3.22	32.34		32.62	0.000102	4.28	5139.65	493.83	0.16
E100-00-00	6980	Max WS	22071.39	-3.22	32.48		32.61	0.000088	2.96	7510.88	534.63	0.12
E100-00-00	6979		Lat Struct									
E100-00-00	6975.0	Max WS	22052.85	-3.22	32.48		32.61	0.000087	2.95	7510.82	534.62	0.12
E100-00-00	6898.0	Max WS	21925.25	-4.23	32.42		32.61	0.000228	3.49	6595.72	483.68	0.14
E100-00-00	6895	Max WS	21924.10	-4.23	32.42		32.61	0.000228	3.49	6595.38	483.68	0.14
E100-00-00_02	6775.	Max WS	28250.67	-4.30	32.42		32.51	0.000073	2.40	12352.24	995.56	0.10
E100-00-00_02	6637.0	Max WS	28199.69	-4.37	32.39	16.94	32.50	0.000075	2.67	10768.04	878.96	0.11
E100-00-00_02	6600 Prop I-45 DC		Bridge									
E100-00-00_02	6575.1	Max WS	27844.09	-4.41	32.36		32.47	0.000077	2.66	10739.86	940.14	0.11
E100-00-00_02	6575.0	Max WS	27837.69	-4.41	32.36	17.14	32.47	0.000077	2.66	10739.86	940.14	0.11
E100-00-00_02	6551 Prop I-45 Ramp		Bridge									
E100-00-00_02	6515.0	Max WS	27808.83	-4.44	32.34		32.45	0.000079	2.66	10895.34	879.90	0.11
E100-00-00_02	6387.0	Max WS	27765.21	-4.38	32.33	17.73	32.44	0.000080	2.65	10494.29	1241.86	0.11
E100-00-00_02	6352 Prop I-45 NBML		Bridge									
E100-00-00_02	6298.1	Max WS	27761.77	-4.51	32.33		32.43	0.000070	2.48	11181.44	1212.54	0.10
E100-00-00_02	6298	Max WS	27765.21	-4.51	32.33	16.23	32.43	0.000070	2.48	11181.44	1212.54	0.10
E100-00-00_02	6252 Prop I-45 DC		Bridge									
E100-00-00_02	6201.1	Max WS	27815.15	-4.65	32.34		32.42	0.000049	2.25	12334.92	1023.46	0.09
E100-00-00_02	6201	Max WS	27812.03	-4.65	32.34	15.30	32.42	0.000049	2.25	12334.92	1023.46	0.09
E100-00-00_02	6164 Prop I-45 Ramp		Bridge									
E100-00-00_02	6122.0	Max WS	27752.78	-4.33	32.24		32.35	0.000059	2.72	10193.42	851.92	0.11
E100-00-00_02	5525.0	Max WS	27770.88	-3.15	32.22		32.31	0.000070	2.47	11262.55	649.93	0.10
E100-00-00_02	4994.0	Max WS	27795.82	-3.09	32.04	15.14	32.24	0.000242	3.68	8144.72	547.92	0.14
E100-00-00_02	4980.0 RR OVERPASS		Bridge									
E100-00-00_02	4961.0	Max WS	27791.77	-3.03	31.71		31.93	0.000292	3.86	7755.00	544.09	0.15
E100-00-00_02	4812.0	Max WS	27800.94	-3.49	31.45	14.11	31.84	0.000885	5.06	5497.95	420.11	0.25
E100-00-00_02	4774.5 CROCKETT/HOGAN		Bridge									
E100-00-00_02	4687.0	Max WS	27799.62	-4.67	31.36		31.66	0.000565	4.37	6363.25	442.74	0.20
E100-00-00_02	4407.	Max WS	27813.17	-3.62	31.14		31.52	0.000433	4.96	5833.80	435.42	0.19
E100-00-00_02	4014.0	Max WS	27832.25	-2.15	31.12	13.62	31.36	0.000350	3.92	7105.97	404.57	0.16
E100-00-00_02	3997.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	3976.0	Max WS	27831.77	-2.40	30.99		31.23	0.000357	3.93	7084.55	405.18	0.17
E100-00-00_02	3681.	Max WS	27847.63	-3.80	30.76		31.11	0.000473	4.80	5898.55	402.30	0.20
E100-00-00_02	3585.0	Max WS	27851.49	-4.26	30.69		31.07	0.000417	4.92	5683.63	370.07	0.20
E100-00-00_02	3233.0	Max WS	27868.00	-4.79	30.85	8.85	30.94	0.000124	2.40	11609.90	1100.34	0.11
E100-00-00_02	3094 Prop I-10 WBML		Bridge									
E100-00-00_02	2954.1	Max WS	27869.68	-5.22	30.73		30.84	0.000191	2.72	10258.86	1049.63	0.14
E100-00-00_02	2954.0	Max WS	27869.68	-5.22	30.73	9.85	30.84	0.000191	2.72	10258.84	1049.62	0.14
E100-00-00_02	2857 Prop I-45 BNML		Bridge									
E100-00-00_02	2760.1	Max WS	27869.68	-5.51	30.71		30.80	0.000151	2.51	11101.54	1062.21	0.12
E100-00-00_02	2760.0	Max WS	27869.69	-5.51	30.71	11.83	30.80	0.000151	2.51	11101.52	1062.21	0.12

HEC-RAS Plan: UMProp_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_02	2639 Prop I-10 WB Exp		Bridge									
E100-00-00_02	2518.1	Max WS	27869.69	-5.88	30.55		30.69	0.000205	3.03	9275.16	890.21	0.14
E100-00-00_02	2518.0	Max WS	27869.69	-5.88	30.55	12.38	30.69	0.000205	3.03	9275.14	890.20	0.14
E100-00-00_02	2434 Prop I-45 SBML		Bridge									
E100-00-00_02	2350.1	Max WS	27869.69	-6.13	30.32		30.54	0.000330	3.70	7541.55	797.66	0.18
E100-00-00_02	2350.0	Max WS	27869.70	-6.13	30.32	13.09	30.54	0.000330	3.70	7541.53	797.65	0.18
E100-00-00_02	2280 Prop I-10 EBML		Bridge									
E100-00-00_02	2210.0	Max WS	27871.47	-6.34	30.21		30.44	0.000299	3.82	7293.98	704.82	0.17
E100-00-00_02	1580.	Max WS	27856.52	-7.83	30.02		30.24	0.000313	4.22	9343.57	1007.40	0.16
E100-00-00_02	1353.0	Max WS	27836.19	-8.34	29.90	13.11	30.19	0.000444	4.83	7985.14	1149.32	0.19
E100-00-00_02	1335.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	1319.0	Max WS	26208.41	-8.37	29.21		29.49	0.000438	4.70	7516.68	729.23	0.19
E100-00-00_02	984.0	Max WS	26066.81	-8.69	29.00	9.47	29.35	0.000257	4.82	5666.20	655.96	0.19
E100-00-00_02	978 MAIN STREET		Bridge									
E100-00-00_02	971.6	Max WS	25629.84	-8.69	28.81		29.16	0.000257	4.79	5599.99	649.62	0.19
E100-00-00_02	971.5	Max WS	25629.84	-8.69	28.81	9.27	29.16	0.000257	4.79	5599.98	649.62	0.19
E100-00-00_02	961.5 1ST STREET		Bridge									
E100-00-00_02	851.0	Max WS	25258.09	-6.40	28.43		28.89	0.000387	5.48	4807.33	680.97	0.23
E100-00-00_02	654.0	Max WS	25379.24	-6.50	28.61		28.80	0.000142	3.68	8890.27	620.79	0.14
E100-00-00_02	400.0	Max WS	25302.42	-8.58	28.46	7.15	28.79	0.000211	4.78	7102.17	495.01	0.18
E100-00-00_02	381.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	365.0	Max WS	25010.23	-8.23	28.17		28.60	0.000258	5.25	4764.79	506.65	0.20
E100-00-00_02	210.0	Max WS	24890.96	-7.81	28.04	7.88	28.55	0.000293	5.75	4332.62	571.60	0.21
E100-00-00_02	191.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	173.1	Max WS	24680.11	-6.84	27.78		28.34	0.000335	6.02	4103.02	930.95	0.23
E100-00-00_02	173.0	Max WS	24676.69	-6.84	27.78		28.34	0.000335	6.01	4103.01	930.94	0.23

Little White Oak Bayou
Unmitigated Proposed 10-Year

HEC-RAS Plan: UMProp_10yr River: E101-00-00 Reach: E101-00-00_0003 Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	9819.000	Max WS	7766.61	16.33	36.57		36.84	0.000641	4.20	1851.35	157.35	0.22
E101-00-00_0003	9750.000	Max WS	7763.25	16.31	36.55		36.80	0.000619	4.05	1915.04	167.88	0.21
E101-00-00_0003	9000.000	Max WS	7737.43	15.50	36.26		36.39	0.000479	3.12	2867.89	508.28	0.18
E101-00-00_0003	8469.000	Max WS	7793.26	13.02	36.00		36.14	0.000444	3.34	2748.91	318.50	0.16
E101-00-00_0003	7984.000	Max WS	7838.73	13.76	35.75		35.91	0.000499	3.74	2585.06	316.25	0.18
E101-00-00_0003	6838.000	Max WS	7862.90	12.20	35.03		35.26	0.000648	3.80	2068.66	202.73	0.21
E101-00-00_0003	5861.000	Max WS	7798.65	9.91	34.18		34.45	0.000960	4.23	1932.26	251.19	0.23
E101-00-00_0003	4720.000	Max WS	7485.47	8.13	33.29		33.59	0.000617	4.61	2123.56	286.55	0.20
E101-00-00_0003	4279.000	Max WS	6831.23	9.00	32.84		33.19	0.000904	4.74	1439.98	107.53	0.23
E101-00-00_0003	4130.000	Max WS	7140.52	8.68	32.98	17.27	33.11	0.000160	2.80	2556.70	216.92	0.13
E101-00-00_0003	4091.000 N. MAIN		Bridge									
E101-00-00_0003	4050.000	Max WS	6941.87	7.87	32.92		33.02	0.000129	2.59	2696.36	265.38	0.11
E101-00-00_0003	3952.	Max WS	6911.25	6.87	32.91		33.01	0.000114	2.59	2735.12	192.50	0.11
E101-00-00_0003	3466.000	Max WS	6953.23	1.92	32.90		32.98	0.000041	2.60	3838.24	250.77	0.09
E101-00-00_0003	3323.0	Max WS	7011.13	-1.03	32.91	11.44	32.96	0.000023	1.94	4609.85	294.28	0.07
E101-00-00_0003	3278.0 I-45 Ramp		Bridge									
E101-00-00_0003	3236.1	Max WS	7045.13	-2.82	32.93		32.96	0.000019	1.67	5666.96	438.42	0.06
E101-00-00_0003	3236.0	Max WS	7042.07	-2.82	32.93	10.23	32.96	0.000019	1.67	5666.96	438.42	0.06
E101-00-00_0003	3085 I-45 NBML		Bridge									
E101-00-00_0003	2958.1	Max WS	7040.54	-2.52	32.93		32.95	0.000017	1.49	6629.30	1834.60	0.06
E101-00-00_0003	2958	Max WS	7037.49	-2.52	32.93	10.27	32.95	0.000017	1.49	6629.30	1834.60	0.06
E101-00-00_0003	2833 I-45 SBML		Bridge									
E101-00-00_0003	2389.000	Max WS	6956.68	-0.26	32.87		32.91	0.000074	1.76	5698.94	400.42	0.06
E101-00-00_0003	2325.	Max WS	6969.32	-0.15	32.87		32.91	0.000068	1.64	5936.79	405.03	0.06
E101-00-00_0003	1855.000	Max WS	6995.34	0.68	32.87		32.89	0.000029	1.17	6833.32	420.63	0.04
E101-00-00_0003	1126.	Max WS	6914.85	-1.85	32.79		32.84	0.000157	1.96	4651.16	584.18	0.08
E101-00-00_0003	1070.000	Max WS	6884.78	-2.04	32.77	8.56	32.83	0.000133	2.26	4510.71	637.22	0.08
E101-00-00_0003	1029.500 WRIGHTWOOD		Bridge									
E101-00-00_0003	987.000	Max WS	6609.78	-2.04	32.64		32.70	0.000138	2.17	4444.36	623.47	0.08
E101-00-00_0003	911.	Max WS	6629.96	-2.19	32.65		32.69	0.000076	1.71	5795.94	426.32	0.06
E101-00-00_0003	756.	Max WS	6537.08	-2.51	32.60		32.65	0.000363	1.82	3819.08	472.22	0.09
E101-00-00_0003	637.000	Max WS	6522.64	-2.75	32.59	9.46	32.62	0.000232	1.41	5075.68	636.71	0.07
E101-00-00_0003	538.000 QUITMAN/WHITE OA		Bridge									
E101-00-00_0003	442.000	Max WS	6203.14	-2.75	32.43		32.46	0.000146	1.46	4974.39	616.07	0.06
E101-00-00_0003	306.000	Max WS	6218.75	-2.86	32.43		32.44	0.000012	0.83	9456.53	1438.36	0.03
E101-00-00_0003	259.1	Max WS	6207.42	-2.90	32.43		32.44	0.000012	0.86	7750.73	565.62	0.03
E101-00-00_0003	259	Max WS	6215.29	-2.90	32.43	6.00	32.44	0.000012	0.86	7750.72	565.62	0.03
E101-00-00_0003	229 Prop I-10 DC		Bridge									
E101-00-00_0003	180.1	Max WS	6215.15	-2.96	32.43		32.44	0.000012	0.84	7497.11	550.20	0.04
E101-00-00_0003	180	Max WS	6214.58	-2.96	32.43	7.61	32.44	0.000012	0.84	7497.09	550.20	0.04
E101-00-00_0003	130 Prop-10 Ramp		Bridge									
E101-00-00_0003	101.1	Max WS	6224.16	-3.03	32.43		32.44	0.000009	0.73	8638.11	562.77	0.03
E101-00-00_0003	101	Max WS	6229.25	-3.03	32.43		32.44	0.000009	0.73	8638.10	562.77	0.03
E101-00-00_0003	68	Max WS	6219.36	-4.00	32.43		32.44	0.000015	0.84	7471.39	527.83	0.03
E101-00-00_0003	63	Max WS	6228.34	-4.00	32.43		32.44	0.000015	0.84	7471.30	527.81	0.03
E101-00-00_0003	3	Max WS	6326.57	-4.23	32.42		32.44	0.000020	1.05	6329.64	493.80	0.04
E101-00-00_0003	1	Max WS	6326.57	-4.23	32.42		32.44	0.000020	1.05	6329.62	493.80	0.04

Buffalo Bayou
Unmitigated Proposed 100-Year

HEC-RAS Plan: UMProp_100yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	148800.4	Max WS	17192.86	3.15	42.77		42.88	0.000246	2.88	7992.65	1819.41	0.09
W100_upstrm	148795.4	Max WS	17192.85	3.15	42.77	17.83	42.88	0.000246	2.88	7992.23	1819.40	0.09
W100_upstrm	148768.4 SOUTHERN PACIFIC		Bridge									
W100_upstrm	148741.4	Max WS	17186.91	3.04	42.65		42.76	0.000247	2.88	7989.62	1819.32	0.09
W100_upstrm	147632.4	Max WS	17172.70	-1.17	42.48		42.57	0.000082	2.49	9110.44	544.04	0.09
W100_upstrm	146698.0	Max WS	17234.15	1.88	42.38		42.49	0.000116	2.96	8577.44	793.84	0.10
W100_upstrm	145723.9	Max WS	17296.14	1.61	42.23		42.40	0.000147	3.86	8579.03	471.37	0.12
W100_upstrm	144753.5	Max WS	17359.76	0.07	42.08		42.24	0.000151	3.41	7572.88	546.25	0.12
W100_upstrm	143966.8	Max WS	17402.38	-7.47	42.00		42.14	0.000145	3.39	10674.26	1289.11	0.11
W100_upstrm	143078.2	Max WS	17463.60	-4.19	41.89		42.02	0.000117	3.13	11438.88	895.67	0.10
W100_upstrm	142061.4	Max WS	17541.44	0.55	41.80		41.91	0.000080	2.87	10373.50	531.55	0.09
W100_upstrm	141320.1	Max WS	17600.36	-2.70	41.80		41.83	0.000040	1.84	18170.41	966.74	0.06
W100_upstrm	140116.2	Max WS	17666.18	-1.31	41.69		41.80	0.000105	3.03	12222.89	878.41	0.09
W100_upstrm	139320.0	Max WS	17714.58	-2.14	41.64		41.71	0.000085	2.46	13953.10	941.79	0.08
W100_upstrm	138607.9	Max WS	17761.03	-2.08	41.64		41.65	0.000020	1.33	26473.36	1409.62	0.04
W100_upstrm	137732.0	Max WS	17792.54	-2.40	41.60		41.66	0.000059	2.57	17964.97	1319.29	0.08
W100_upstrm	137113.0	Max WS	17844.95	-2.62	41.50		41.63	0.000096	3.30	14194.14	1337.42	0.10
W100_upstrm	136331.2	Max WS	17908.73	-2.09	41.47		41.49	0.000153	1.60	15640.63	764.32	0.05
W100_upstrm	135666.2	Max WS	17944.85	-1.47	41.37		41.46	0.000075	2.74	12951.28	788.08	0.09
W100_upstrm	134706.7	Max WS	18005.91	-1.93	41.35		41.39	0.000037	1.94	22273.18	1158.23	0.06
W100_upstrm	134090.6	Max WS	18035.74	-1.59	41.32		41.38	0.000052	2.43	17490.88	851.02	0.07
W100_upstrm	133772.1	Max WS	18053.63	-0.79	41.30	13.46	41.38	0.000069	2.91	16871.09	949.60	0.08
W100_upstrm	133760.1 FOOTBRIDGE AT WE		Bridge									
W100_upstrm	133748.1	Max WS	18053.63	-0.46	41.25		41.33	0.000072	2.96	16510.68	943.49	0.09
W100_upstrm	132963.8	Max WS	18116.40	-1.98	41.14		41.27	0.000110	3.16	10135.45	696.08	0.10
W100_upstrm	131789.8	Max WS	18198.55	-2.31	41.03		41.16	0.000102	3.32	10725.53	734.13	0.10
W100_upstrm	130765.5	Max WS	18278.13	-3.81	40.98		41.06	0.000051	2.50	13425.65	657.29	0.07
W100_upstrm	129725.3	Max WS	18346.17	-3.71	40.92		41.01	0.000073	2.97	16195.76	1178.13	0.09
W100_upstrm	129163.2	Max WS	18405.12	-3.13	40.86		40.97	0.000073	2.90	11969.11	846.91	0.09
W100_upstrm	128326.9	Max WS	18471.72	-4.05	40.83		40.90	0.000050	2.52	20013.27	1349.95	0.07
W100_upstrm	128109.6	Max WS	18470.32	-4.29	40.81		40.85	0.000213	1.70	12259.73	1136.72	0.06
W100_upstrm	128104.6	Max WS	18470.60	-4.29	40.81	10.50	40.85	0.000213	1.70	12258.60	1136.68	0.06
W100_upstrm	128066.7 SHEPHERD		Bridge									
W100_upstrm	128028.8	Max WS	18469.49	-4.51	40.75		40.80	0.000171	1.69	12447.55	1143.25	0.06
W100_upstrm	126647.0	Max WS	18462.53	-3.93	40.64		40.66	0.000022	0.96	20297.18	1031.68	0.03
W100_upstrm	125376.9	Max WS	18547.08	-4.05	40.47		40.53	0.000184	1.98	9988.57	848.11	0.08
W100_upstrm	124983.5	Max WS	18575.88	-3.86	40.46		40.49	0.000022	1.42	20777.89	1400.91	0.06
W100_upstrm	124644.1	Max WS	18594.82	-3.69	40.41	13.71	40.48	0.000049	2.11	8792.10	636.88	0.08
W100_upstrm	124591.8 WAUGH DRIVE		Bridge									
W100_upstrm	124539.5	Max WS	18593.37	-3.74	40.39		40.46	0.000049	2.11	8801.05	640.00	0.07
W100_upstrm	123658.2	Max WS	18661.51	-2.04	40.40		40.41	0.000016	0.87	28597.27	2431.95	0.03
W100_upstrm	123138.8	Max WS	18697.44	-4.08	40.39		40.40	0.000013	0.81	26922.34	1742.41	0.03
W100_upstrm	122627.1	Max WS	18735.73	-6.08	40.37		40.42	0.000022	1.57	17602.55	1315.29	0.05
W100_upstrm	122572.1 MONTROSE COURT		Mult Open									
W100_upstrm	122517.1	Max WS	18737.06	-5.38	40.37		40.40	0.000038	1.46	16586.19	1235.67	0.05
W100_upstrm	122371.6	Max WS	18748.11	-7.00	40.37	9.27	40.39	0.000039	1.42	17409.21	1137.10	0.05
W100_upstrm	122265 ROSEMONT		Bridge									
W100_upstrm	122210.0	Max WS	18737.69	-5.60	40.33		40.36	0.000033	1.59	15043.06	833.10	0.05
W100_upstrm	122036.7	Max WS	18751.60	-8.40	40.32		40.35	0.000031	1.48	15799.76	1000.18	0.05
W100_upstrm	121229.5	Max WS	18807.83	-11.37	40.30		40.33	0.000027	1.41	17066.36	1077.03	0.05
W100_upstrm	120962.2	Max WS	18826.98	-10.59	40.28		40.32	0.000041	1.81	13551.73	1118.29	0.06
W100_upstrm	120005.2	Max WS	18885.94	-7.78	40.27	8.38	40.28	0.000029	0.81	23366.60	1069.33	0.03
W100_upstrm	119952.6 MEMORIAL DRIVE		Bridge									
W100_upstrm	119900.0	Max WS	18875.32	-7.64	40.21		40.22	0.000019	0.82	23148.42	1064.79	0.03
W100_upstrm	119495.9	Max WS	18907.92	-7.21	40.21		40.21	0.000010	0.59	33197.61	1377.08	0.02
W100_upstrm	118667.7	Max WS	18970.32	-8.56	40.18		40.20	0.000029	1.07	19031.42	1281.43	0.04
W100_upstrm	118466.1	Max WS	18977.66	-8.89	40.17	5.89	40.19	0.000023	1.42	17889.97	1319.68	0.05
W100_upstrm	118418.1 MEMORIAL DRIVE		Bridge									
W100_upstrm	118370.1	Max WS	18973.41	-8.87	40.14		40.17	0.000024	1.41	17836.39	1314.91	0.05
W100_upstrm	117845.4	Max WS	19008.65	-7.26	40.13		40.15	0.000035	1.34	16342.09	1016.38	0.05
W100_upstrm	117204.3	Max WS	19057.61	-4.60	40.12		40.14	0.000021	1.08	19328.01	1330.11	0.04
W100_upstrm	116395.7	Max WS	19102.11	-3.88	40.09		40.12	0.000026	1.27	15325.43	1014.83	0.05
W100_upstrm	116167.6	Max WS	19093.83	-3.68	40.03	7.85	40.11	0.000105	2.17	9889.84	1160.63	0.07
W100_upstrm	116121.9 SABINE AVENUE		Bridge									
W100_upstrm	116076.2	Max WS	19049.65	-3.86	39.90		39.97	0.000121	2.14	9948.49	1180.40	0.07
W100_upstrm	115804.5	Max WS	19049.24	-4.60	39.86		39.97	0.000047	2.95	12617.97	1440.30	0.08
W100_upstrm	115740.6	Max WS	19055.11	-4.78	39.86	8.33	39.96	0.000042	2.74	12122.35	1526.01	0.08
W100_upstrm	115700 I-45 Allen Pkwy		Bridge									
W100_upstrm	115674.0	Max WS	19039.21	-5.10	39.84		39.93	0.000044	2.76	12305.22	1662.82	0.08
W100_upstrm	115662.6	Max WS	19041.10	-5.20	39.84	8.33	39.93	0.000042	2.67	12026.94	1742.50	0.08
W100_upstrm	115635.5 I-45 Houston Ave		Bridge									
W100_upstrm	115621.1	Max WS	19049.63	-5.57	39.84		39.91	0.000035	2.51	12582.36	1768.40	0.07
W100_upstrm	115587.7	Max WS	19057.14	-6.22	39.85	8.17	39.91	0.000033	2.44	17999.83	2036.36	0.07
W100_upstrm	115553.5 I-45 SBML		Bridge									
W100_upstrm	115514.4	Max WS	19063.54	-6.96	39.85		39.90	0.000024	2.09	20138.73	2237.55	0.06
W100_upstrm	115509.1	Max WS	19070.25	-6.99	39.85	7.23	39.90	0.000024	2.11	20217.27	2265.22	0.06
W100_upstrm	115490 I-45 NBML		Bridge									
W100_upstrm	115423.0	Max WS	19054.45	-7.30	39.84		39.88	0.000023	2.02	18596.44	2073.22	0.06
W100_upstrm	115365.4	Max WS	19063.79	-7.52	39.84		39.88	0.000020	1.93	20393.80	2268.71	0.05
W100_upstrm	115284.6	Max WS	19066.27	-7.89	39.84		39.88	0.000022	2.00	26250.09	1777.84	0.06
W100_upstrm	115104.1	Max WS	19073.76	-8.31	39.83		39.88	0.000018	1.85	22106.24	1832.19	0.05
W100_upstrm	115001.2	Max WS	19061.67	-8.48	39.80	6.10	39.91	0.000041	2.75	18181.70	1756.69	0.08
W100_upstrm	115000 I-45 Ramp McKee		Bridge									
W100_upstrm	114907.3	Max WS	19061.67	-9.19	39.80		39.89	0.000036	2.52	16019.66	1708.00	0.07
W100_upstrm	114842.1	Max WS	19058.79	-9.48	39.80	5.77	39.90	0.000042	2.66	15949.40	1630.93	0.08
W100_upstrm	114830 I-45 Ramp Walker		Bridge									
W100_upstrm	114804.3	Max WS	19047.64	-9.61	39.78		39.88	0.000044	2.72	16225.98	1637.33	0.08

HEC-RAS Plan: UMProp_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	114492.0	Max WS	19089.64	-10.48	39.80		39.84	0.000038	1.73	13906.01	1568.54	0.06
W100_upstrm	114195.9	Max WS	19067.56	-11.52	39.76	5.78	39.82	0.000152	1.93	12067.76	1257.78	0.07
W100_upstrm	114168.9 RUSK STREET		Bridge									
W100_upstrm	114141.9	Max WS	18978.20	-10.83	39.68		39.74	0.000167	2.00	11141.40	1165.67	0.07
W100_upstrm	114097.4	Max WS	18993.47	-7.46	39.69	7.10	39.74	0.000071	1.75	13826.46	1471.34	0.06
W100_upstrm	114070.4 CAPITAL STREE		Bridge									
W100_upstrm	114043.4	Max WS	18955.00	-7.72	39.64		39.68	0.000069	1.73	14143.07	1540.26	0.06
W100_upstrm	113644.0	Max WS	18931.13	-8.91	39.58		39.68	0.000045	2.63	11724.63	909.45	0.08
W100_upstrm	113411.6	Max WS	18979.31	-9.61	39.61	4.21	39.64	0.000140	1.35	14278.54	957.82	0.05
W100_upstrm	113374.3 TEXAS AVE		Bridge									
W100_upstrm	113337.0	Max WS	18781.48	-9.65	39.43		39.46	0.000140	1.35	14146.53	947.22	0.05
W100_upstrm	113266.4	Max WS	18721.00	-9.11	39.36	7.49	39.47	0.000177	2.73	9125.27	827.24	0.09
W100_upstrm	113238.6 BAGBY		Bridge									
W100_upstrm	113210.8	Max WS	18595.19	-9.46	39.23		39.34	0.000174	2.68	9313.67	844.00	0.09
W100_upstrm	112974.0	Max WS	18545.75	-10.69	39.17	6.56	39.30	0.000160	2.83	7543.62	812.09	0.09
W100_upstrm	112944.9 PRAIRIE		Bridge									
W100_upstrm	112915.8	Max WS	18388.78	-10.82	39.13		39.25	0.000156	2.79	7610.36	815.72	0.09
W100_upstrm	112575.5	Max WS	18407.20	-9.20	39.12	7.93	39.18	0.000157	2.12	12727.64	1411.09	0.07
W100_upstrm	112534.5 PRESTON STREET		Bridge									
W100_upstrm	112493.5	Max WS	18364.61	-9.47	39.06		39.12	0.000151	2.09	13036.42	1450.99	0.07
W100_upstrm	112003.3	Max WS	18322.93	-9.69	39.00	5.02	39.05	0.000112	1.91	10980.20	963.25	0.06
W100_upstrm	111953.3 CONGRESS STREET		Bridge									
W100_upstrm	111903.3	Max WS	18201.25	-9.84	38.88		38.93	0.000110	1.89	11008.95	967.41	0.06
W100_upstrm	111853.5	Max WS	18180.35	-9.86	38.86	4.96	38.93	0.000122	2.13	10199.83	940.25	0.06
W100_upstrm	111818.6 SMITH STREET		Bridge									
W100_upstrm	111783.7	Max WS	18107.67	-8.67	38.79		38.86	0.000140	2.23	9152.18	735.63	0.07
W100_upstrm	111626.7	Max WS	18108.45	-11.83	38.78	5.23	38.84	0.000132	2.09	10596.23	843.29	0.06
W100_upstrm	111518.6 LOUISIANA AND FR		Bridge									
W100_upstrm	111410.5	Max WS	17887.41	-11.23	38.60		38.67	0.000100	2.15	9961.73	795.90	0.07
W100_upstrm	110876.6	Max WS	17919.79	-10.43	38.59	2.58	38.62	0.000057	1.49	18565.92	1611.52	0.05
W100_upstrm	110837.8 MILAM		Bridge									
W100_upstrm	110799.0	Max WS	17896.40	-10.72	38.58		38.60	0.000148	1.42	19016.35	1615.46	0.04
W100_upstrm	110672.7	Max WS	17878.64	-13.25	38.56	2.68	38.59	0.000115	1.68	19830.70	1445.78	0.05
W100_upstrm	110643.7 TRAVIS STREET		Bridge									
W100_upstrm	110614.7	Max WS	17859.13	-12.75	38.52		38.56	0.000128	1.72	19060.53	1432.33	0.05
W100_upstrm	110200.2	Max WS	17849.85	-9.11	38.48	5.09	38.52	0.000038	1.53	13938.51	777.11	0.05
W100_upstrm	110154.2 MAIN STREET		Bridge									
W100_upstrm	110108.2	Max WS	17830.12	-9.31	38.47		38.50	0.000038	1.52	14082.92	781.47	0.05
W100_upstrm	110103.2	Max WS	17827.01	-9.31	38.47		38.50	0.000037	1.52	14082.77	781.47	0.05
Downstream	109924.2	Max WS	57199.52	-13.02	38.47		38.93	0.000570	5.47	12861.93	2495.31	0.17
Downstream	109551.7	Max WS	57196.88	-14.28	38.33	9.95	38.70	0.000543	4.88	14691.68	2216.34	0.16
Downstream	109518.7 FANNIN STREET		Bridge									
Downstream	109485.7	Max WS	57193.97	-15.31	38.15		38.48	0.000483	4.70	16571.55	2242.53	0.15
Downstream	109440.2	Max WS	57191.87	-16.48	38.05	8.88	38.46	0.000827	5.15	11950.15	2399.30	0.16
Downstream	109395.2 SAN JACINTO STRE		Bridge									
Downstream	109350.2	Max WS	57179.13	-16.89	37.18		37.61	0.000875	5.25	10883.22	2389.01	0.16
Downstream	109119.0	Max WS	57173.34	-17.14	36.86	10.45	37.22	0.002489	4.87	13488.46	2239.50	0.18
Downstream	109103.1 CROSSWALK		Bridge									
Downstream	109087.2	Max WS	57171.95	-17.55	36.58		36.94	0.002433	4.83	13648.34	2314.61	0.18
Downstream	108565.3	Max WS	57159.93	-12.77	35.60		36.07	0.001011	5.59	13960.65	1788.72	0.18
Downstream	108334.0	Max WS	57159.09	-14.06	35.38		35.72	0.001034	4.93	16690.11	1568.70	0.16
Downstream	107179.4	Max WS	57154.89	-20.52	34.23	5.50	34.76	0.000953	6.07	10511.17	674.03	0.19
Downstream	107158.9 SOUTHERN PACIFIC		Bridge									
Downstream	107138.4	Max WS	57152.89	-20.19	34.03		34.58	0.001004	6.19	10292.89	519.55	0.19
Downstream	106594.0	Max WS	57151.59	-16.70	33.31		33.87	0.001551	6.01	9574.14	628.32	0.20
Downstream	106151.4	Max WS	57149.10	-13.85	32.37	7.72	33.01	0.002344	6.43	8887.81	304.41	0.21
Downstream	106131.1 MCKEE		Bridge									
Downstream	106110.8	Max WS	57147.01	-12.53	32.00		32.72	0.002638	6.82	8379.73	296.28	0.23
Downstream	105705.4	Max WS	57145.90	-18.22	31.41	6.22	32.07	0.000592	6.48	8823.30	434.49	0.23
Downstream	105667.4 ELYSIAN STREET		Bridge									
Downstream	105629.4	Max WS	57145.27	-18.43	31.08		31.74	0.000599	6.52	8773.55	427.95	0.24
Downstream	105476	Max WS	57145.57	-18.70	31.06		31.56	0.001625	5.66	10113.84	452.67	0.20
Downstream	104962	Max WS	57144.59	-18.70	30.74		30.92	0.000794	3.42	16717.95	821.50	0.13
Downstream	104900	Max WS	57144.15	-19.15	30.63		30.79	0.000199	3.23	17720.55	924.03	0.13
Downstream	104464	Max WS	57143.49	-19.86	30.31		30.56	0.001729	4.00	14292.14	761.62	0.16
Downstream	104301	Max WS	57143.56	-20.42	30.09		30.40	0.000285	4.44	12947.56	808.14	0.18
Downstream	104242	Max WS	57143.39	-20.62	29.91		30.30	0.002988	5.03	11364.84	603.66	0.20
Downstream	104118.0	Max WS	57143.09	-21.10	29.54	11.05	30.05	0.001185	6.20	11657.85	970.54	0.22
Downstream	104070 Prop I-69 Ramp		Bridge									
Downstream	103955.1	Max WS	57143.09	-21.79	29.42		29.86	0.000753	5.53	12133.44	828.61	0.18
Downstream	103955.0	Max WS	57142.98	-21.79	29.42	6.01	29.86	0.000753	5.53	12133.39	828.61	0.18
Downstream	103846 Prop I-69 DC		Bridge									
Downstream	103786.1	Max WS	57142.66	-22.51	29.16		29.62	0.000876	5.58	11441.72	753.67	0.19
Downstream	103786.0	Max WS	57142.75	-22.51	29.16	5.35	29.62	0.000876	5.58	11441.65	753.67	0.19
Downstream	103694 Prop I-69 SBML		Bridge									
Downstream	103534.1	Max WS	57142.18	-23.58	28.64		29.19	0.000927	6.02	10262.80	623.78	0.20
Downstream	103534.0	Max WS	57142.26	-23.58	28.64	4.73	29.19	0.000927	6.02	10262.74	623.77	0.20
Downstream	103383 Prop I-45 SBML		Bridge									
Downstream	103241.1	Max WS	57141.83	-24.83	28.38		28.91	0.001819	5.86	9770.54	513.37	0.22
Downstream	103241.0	Max WS	57141.91	-24.83	28.38	4.72	28.91	0.001819	5.86	9770.44	513.35	0.22
Downstream	103161 Prop I-69 NBML		Bridge									
Downstream	103095.1	Max WS	57141.39	-25.45	28.06		28.64	0.000635	6.11	9360.91	382.95	0.21
Downstream	103095.0	Max WS	57141.47	-25.45	28.06	4.47	28.64	0.000635	6.11	9360.89	382.95	0.21
Downstream	103065 Prop I-45 DC		Bridge									
Downstream	103025.1	Max WS	57141.03	-25.75	27.85		28.49	0.000632	6.42	8903.77	323.30	0.21
Downstream	103025.0	Max WS	57141.03	-25.75	27.85	3.62	28.49	0.000632	6.42	8903.74	323.30	0.21
Downstream	102988 Prop I-10 DC		Bridge									

HEC-RAS Plan: UMProp_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	102952	Max WS	57140.45	-26.06	27.41		28.19	0.001106	7.07	8161.29	414.83	0.26
Downstream	102895.0	Max WS	57140.15	-26.31	27.13		28.11	0.001626	7.94	7198.89	313.44	0.29
Downstream	102875.3	Max WS	57140.53	-26.39	27.46	9.81	28.07	0.001402	6.30	9073.04	406.29	0.23
Downstream	102847.5 HOUTerminal RR		Bridge									
Downstream	102819.7	Max WS	57140.05	-26.43	27.05		27.69	0.001457	6.40	8924.17	403.77	0.24
Downstream	102309.0	Max WS	57195.17	-23.48	26.39		27.15	0.000658	6.99	8177.42	232.33	0.21
Downstream	101828.0	Max WS	57244.63	-20.70	25.87	3.04	26.64	0.001420	7.08	8120.26	375.84	0.25
Downstream	101790.1 JENSEN ROAD		Bridge									
Downstream	101752.2	Max WS	57244.13	-20.69	25.55		26.35	0.001477	7.18	7998.14	370.14	0.26
Downstream	101007.3	Max WS	57324.23	-16.93	24.92		25.64	0.000408	6.83	8396.73	285.40	0.22
Downstream	99992.6	Max WS	57431.77	-18.90	24.31		25.12	0.000624	7.19	7992.36	275.60	0.24
Downstream	98399.4	Max WS	57606.96	-20.26	23.49		24.25	0.000462	6.99	8243.02	289.36	0.23
Downstream	97517.4	Max WS	57698.82	-19.35	23.43		23.89	0.000330	5.47	10541.51	323.74	0.17
Downstream	96028.6	Max WS	57850.01	-17.81	22.40	0.94	23.08	0.000752	6.64	8714.09	319.94	0.22
Downstream	95985.1 YORK DRIVE		Bridge									
Downstream	95941.6	Max WS	57849.67	-17.87	22.24		22.93	0.000758	6.66	8681.12	319.63	0.23
Downstream	95362.9	Max WS	57912.05	-15.97	22.01		22.60	0.000366	6.15	9414.26	357.33	0.21
Downstream	94280.7	Max WS	58036.33	-19.82	20.51		21.55	0.001580	8.18	7098.94	300.97	0.30
Downstream	93495.6	Max WS	58111.28	-20.43	19.89		20.57	0.000910	6.63	8758.96	389.61	0.25
Downstream	92795.6	Max WS	58194.46	-20.98	19.31	-1.77	20.07	0.000501	7.01	8307.10	334.43	0.25
Downstream	92741.1 LOCKWOOD DRIVE		Bridge									
Downstream	92686.6	Max WS	58194.20	-21.08	19.07		19.84	0.000510	7.05	8258.38	333.25	0.25
Downstream	90936.7	Max WS	58381.64	-18.64	17.74		18.37	0.001161	6.38	9153.48	431.46	0.24
Downstream	89918.4	Max WS	58491.65	-17.23	16.45		17.37	0.000852	7.78	8589.85	713.95	0.29
Downstream	88579.0	Max WS	58633.98	-20.97	15.13		16.06	0.001085	7.75	7561.18	363.02	0.30
Downstream	87591.9	Max WS	58746.19	-23.72	14.34		15.19	0.000666	7.43	7914.71	312.42	0.26
Downstream	86660.2	Max WS	58836.01	-23.42	13.88	-6.74	14.61	0.000581	6.86	8575.90	313.47	0.23
Downstream	86641.7 HOUTerminal RR		Bridge									
Downstream	86623.2	Max WS	58836.03	-23.61	13.45		14.19	0.000588	6.92	8500.57	312.49	0.23
Downstream	85855.2	Max WS	58918.38	-26.84	11.97		13.58	0.001091	10.18	5786.86	252.41	0.37
Downstream	85238.7	Max WS	58981.84	-29.43	11.54		12.88	0.001175	9.32	6852.13	358.01	0.31
Downstream	84561.7	Max WS	59069.73	-32.27	11.13	-9.08	12.23	0.000629	8.46	7585.65	436.68	0.29
Downstream	84531.4 NORTH WAYSIDE RD		Bridge									
Downstream	84501.1	Max WS	59069.58	-28.97	10.01		11.60	0.001073	10.16	5930.86	306.01	0.35
Downstream	84252.6	Max WS	59096.21	-26.90	10.05	-5.88	11.36	0.000859	9.19	6606.32	460.66	0.32
Downstream	84222.3 M. GARCIA		Bridge									
Downstream	84192.0	Max WS	59096.01	-24.10	8.82		10.67	0.001462	10.91	5417.24	240.65	0.41
Downstream	83635.7	Max WS	59155.56	-21.72	8.92		9.96	0.001028	8.18	7229.03	392.36	0.34
Downstream	81786.1	Max WS	59347.44	-31.97	7.24		8.24	0.000822	8.04	7403.44	355.41	0.31
Downstream	80903.1	Max WS	59439.18	-27.77	6.76	-9.29	7.55	0.000738	7.09	8378.42	405.44	0.28
Downstream	80883.1 S. PACIFIC RR		Bridge									
Downstream	80863.1	Max WS	59439.18	-28.10	6.17		6.97	0.000878	7.19	8270.49	404.16	0.28
Downstream	80538.0	Max WS	59439.18	-33.12	6.45	-17.31	6.76	0.000237	4.52	13143.82	505.58	0.16

White Oak Bayou
Unmitigated Proposed 100-Year

HEC-RAS Plan: UMProp_100yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	36134.	Max WS	32204.80	24.19	57.04		57.85	0.000610	7.35	5986.34	1223.63	0.30
E100-00-00	35718.0	Max WS	32121.09	23.76	56.67		57.61	0.000591	7.87	4662.62	761.13	0.32
E100-00-00	35158.	Max WS	32167.47	22.89	56.57		57.25	0.000542	6.83	6885.87	1536.16	0.28
E100-00-00	35006.0	Max WS	32162.68	22.66	56.46	42.96	57.19	0.000460	7.15	7065.74	1711.69	0.29
E100-00-00	34951.5 ELLA		Bridge									
E100-00-00	34895.0	Max WS	32162.25	22.56	56.32		57.06	0.000465	7.17	7004.54	1662.77	0.29
E100-00-00	34645.	Max WS	32180.97	22.24	56.31		56.92	0.000414	6.66	7577.62	1651.43	0.26
E100-00-00	34206.0	Max WS	32189.55	21.68	56.08		56.73	0.000419	6.77	7674.52	2909.87	0.27
E100-00-00	33962.58	Max WS	32233.04	21.61	56.18		56.51	0.000249	4.93	11232.92	3030.36	0.21
E100-00-00	33909.08	Max WS	32237.53	21.60	56.18		56.49	0.000308	4.88	11215.66	3065.07	0.21
E100-00-00	33770.	Max WS	32236.77	21.56	56.13		56.47	0.000220	5.20	11574.63	2832.93	0.20
E100-00-00	33681.0	Max WS	32239.08	21.53	56.03	41.98	56.53	0.000321	6.26	10961.31	2929.13	0.24
E100-00-00	33645.5 W 18TH		Bridge									
E100-00-00	33610.0	Max WS	32238.64	21.61	55.83		56.38	0.000352	6.50	10174.40	2777.15	0.25
E100-00-00	33357.	Max WS	32227.61	21.41	55.64		56.29	0.000586	6.70	7712.83	2458.70	0.28
E100-00-00	32570.0	Max WS	32231.30	20.78	55.26		55.83	0.000370	6.35	9761.52	2912.90	0.25
E100-00-00	31583.0	Max WS	32270.57	19.35	55.05		55.48	0.000258	5.70	12497.38	4322.85	0.22
E100-00-00	30779.0	Max WS	32316.21	18.79	54.87		55.27	0.000227	5.56	12100.50	3220.18	0.21
E100-00-00	29659.	Max WS	32374.35	17.66	54.70		54.98	0.000235	4.73	13817.27	4425.92	0.18
E100-00-00	29368.0	Max WS	32400.28	17.37	54.40	38.52	55.00	0.000348	6.60	9197.27	2760.32	0.24
E100-00-00	29297.5 TC JESTER SOUTH		Bridge									
E100-00-00	29203.0	Max WS	32374.83	17.35	53.76		54.46	0.000406	7.00	8111.77	2372.71	0.26
E100-00-00	28775.	Max WS	32416.12	16.90	53.85		54.15	0.000271	4.76	12975.66	3659.74	0.19
E100-00-00	28375.0	Max WS	32417.37	16.48	53.68	37.47	54.16	0.000307	5.96	11386.80	3484.31	0.23
E100-00-00	28357.0 BICYCLE BRIDGE		Bridge									
E100-00-00	28330.0	Max WS	32398.51	16.41	53.42		53.92	0.000324	6.08	10910.95	3386.72	0.24
E100-00-00	28190.0	Max WS	32401.48	16.18	53.34	37.00	53.91	0.000288	6.37	10437.72	2758.20	0.23
E100-00-00	28152.5 W 11TH		Bridge									
E100-00-00	28113.0	Max WS	32394.03	16.28	53.08		53.70	0.000316	6.60	9455.80	2674.86	0.24
E100-00-00	27982.	Max WS	32403.17	16.25	53.07		53.63	0.000380	6.36	9834.82	2584.65	0.25
E100-00-00	27429.0	Max WS	32421.20	16.12	52.90		53.44	0.000376	6.18	9479.49	2543.64	0.25
E100-00-00	26598.	Max WS	32487.84	15.35	52.61		53.07	0.000304	5.75	7914.56	3852.51	0.23
E100-00-00	26498.0	Max WS	32492.10	15.26	52.54	35.81	53.05	0.000304	5.92	7240.51	3438.41	0.23
E100-00-00	26432.5 TC JESTER		Bridge									
E100-00-00	26366.0	Max WS	32477.61	15.16	52.27		52.79	0.000315	6.00	7054.25	3014.68	0.23
E100-00-00	26307.3	Max WS	32485.63	15.13	52.38		52.74	0.000241	5.12	9141.18	2924.91	0.19
E100-00-00	26225	Max WS	32489.69	15.04	52.35		52.72	0.000256	5.16	8774.78	2564.19	0.20
E100-00-00	26140.	Max WS	32490.42	14.97	52.27		52.74	0.000267	5.84	9729.43	2828.82	0.22
E100-00-00	25536.0	Max WS	32518.11	14.48	52.09		52.60	0.000289	5.96	9348.95	1543.85	0.23
E100-00-00	25132.	Max WS	32543.31	14.29	51.96		52.49	0.000256	6.06	7503.07	1289.47	0.23
E100-00-00	24817.0	Max WS	32555.76	14.14	51.69	36.17	52.38	0.000444	6.73	4977.27	734.34	0.27
E100-00-00	24789.0 UNION PACIFIC RR		Bridge									
E100-00-00	24758.0	Max WS	32544.49	13.76	51.40		52.10	0.000442	6.72	4971.66	683.78	0.27
E100-00-00	24636.	Max WS	32562.54	13.61	51.67		52.03	0.000255	5.19	8583.93	1404.14	0.20
E100-00-00	23934.0	Max WS	32598.47	12.75	51.38		51.83	0.000313	5.44	7261.11	1038.60	0.22
E100-00-00	23550.0	Max WS	32622.16	12.77	51.27	32.95	51.70	0.000285	5.30	6633.47	703.92	0.21
E100-00-00	23506.5 DURHAM		Bridge									
E100-00-00	23444.0	Max WS	32615.91	12.69	51.15		51.59	0.000287	5.32	6606.44	696.51	0.21
E100-00-00	23180.	Max WS	32630.31	12.46	51.16		51.55	0.000189	5.40	10077.30	1338.69	0.19
E100-00-00	22983.	Max WS	32638.84	12.29	51.11		51.52	0.000247	5.63	10187.72	1723.22	0.21
E100-00-00	22834.0	Max WS	32647.13	12.16	51.05	34.59	51.49	0.000329	5.79	11093.91	1778.25	0.21
E100-00-00	22796.5 SHEPHERD		Bridge									
E100-00-00	22758.0	Max WS	32642.56	12.11	50.94		51.37	0.000355	5.79	10980.72	1772.64	0.22
E100-00-00	22610.	Max WS	32652.20	11.92	50.95		51.29	0.000279	5.23	11016.32	1992.37	0.19
E100-00-00	22224.0	Max WS	32674.33	11.41	50.94		51.14	0.000220	4.03	14367.97	2049.50	0.15
E100-00-00	21444.0	Max WS	32707.93	10.52	50.65		51.02	0.000310	5.32	10560.48	1661.41	0.20
E100-00-00	20746.0	Max WS	32739.61	10.00	50.28		50.60	0.000908	4.85	9975.79	1884.86	0.20
E100-00-00	20644.0	Max WS	32746.26	9.95	50.29	32.51	50.52	0.000195	4.49	14255.98	1862.77	0.16
E100-00-00	20633.0 Pipeline		Bridge									
E100-00-00	20622.0	Max WS	32745.40	9.95	50.19		50.43	0.000199	4.53	14052.93	1860.18	0.16
E100-00-00	20521.	Max WS	32751.81	9.91	50.15		50.43	0.000209	4.87	13329.60	1702.03	0.17
E100-00-00	19917.0	Max WS	32785.93	9.66	49.74		50.33	0.000421	6.22	7339.76	901.06	0.23
E100-00-00	19463.0	Max WS	32811.13	9.25	49.57		50.13	0.000421	6.12	9027.13	1568.58	0.23
E100-00-00	18857	Max WS	32844.74	8.03	49.40	31.89	49.89	0.000351	5.94	6725.31	1081.00	0.21
E100-00-00	18800 I-10 WBFR		Bridge									
E100-00-00	18747	Max WS	32841.91	7.81	48.92		49.34	0.000286	5.51	7127.62	1019.64	0.19
E100-00-00	18746	Max WS	32841.53	7.81	48.91	30.35	49.34	0.000286	5.51	7127.48	1019.62	0.19
E100-00-00	18595 I-10 BRIDGE		Bridge									
E100-00-00	18443	Max WS	32839.62	7.19	48.34		48.78	0.000341	5.52	7042.78	985.27	0.21
E100-00-00	18442	Max WS	32838.48	7.19	48.34	30.00	48.78	0.000341	5.52	7042.60	985.22	0.21
E100-00-00	18394 I-10 EBFR		Bridge									
E100-00-00	18377.	Max WS	32826.76	6.98	47.34		47.87	0.000396	6.01	6509.96	775.39	0.22
E100-00-00	18234.0	Max WS	32838.12	6.77	47.45	29.42	47.78	0.000267	4.67	8067.81	1162.51	0.18
E100-00-00	18220.0 UNION PACIFIC RR		Bridge									
E100-00-00	18199.0	Max WS	32832.85	6.70	47.05		47.41	0.000268	4.84	7756.63	1051.13	0.18
E100-00-00	18176.0	Max WS	32832.28	6.79	47.01	28.80	47.42	0.000283	5.21	8130.58	1272.09	0.19
E100-00-00	18138.0 YALE		Bridge									
E100-00-00	18082.0	Max WS	32754.67	6.87	45.47		46.05	0.000453	6.19	6611.77	836.77	0.24
E100-00-00	17905.	Max WS	32767.25	6.86	45.50		45.96	0.000373	5.68	8665.59	1303.58	0.22
E100-00-00	17756.0	Max WS	32773.83	6.85	45.49	29.75	45.88	0.000365	5.21	8485.64	1254.24	0.21
E100-00-00	17726 S. HEIGHTS		Bridge									
E100-00-00	17696	Max WS	32722.78	6.85	45.14		45.55	0.000393	5.34	8172.90	1222.89	0.22
E100-00-00	17657	Max WS	32720.55	6.35	45.11	29.26	45.53	0.000385	5.37	7622.08	818.41	0.21
E100-00-00	17627 N. HEIGHTS		Bridge									
E100-00-00	17597.0	Max WS	32587.97	6.35	44.10		44.59	0.000469	5.73	6829.97	767.20	0.23
E100-00-00	17318.	Max WS	32554.67	6.35	43.73		44.45	0.000646	6.82	4844.40	371.99	0.28
E100-00-00	16831.0	Max WS	32593.20	6.34	43.87		44.22	0.000221	4.75	6866.45	509.77	0.23

HEC-RAS Plan: UMProp_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	15795.0	Max WS	32594.77	4.84	43.76		43.98	0.000235	3.80	9174.37	790.80	0.16
E100-00-00	15278.	Max WS	32569.85	4.41	43.41		43.90	0.000270	5.73	6831.23	674.44	0.22
E100-00-00	14977.0	Max WS	32574.21	4.16	43.41	26.14	43.82	0.000124	5.18	7650.20	711.73	0.20
E100-00-00	14937.0 I-10 EBFR ACCESS		Bridge									
E100-00-00	14897.0	Max WS	32521.34	3.39	42.92		43.32	0.000120	5.13	7518.06	703.25	0.19
E100-00-00	14890	Max WS	32511.56	3.42	42.84	25.44	43.34	0.000148	5.72	6943.34	776.17	0.21
E100-00-00	14775 I-10 BRIDGE		Bridge									
E100-00-00	14660	Max WS	32494.92	3.42	42.73		43.23	0.000151	5.75	6856.03	770.45	0.22
E100-00-00	14590.0	Max WS	32478.37	3.45	42.59	25.82	43.25	0.000202	6.58	6060.88	861.71	0.25
E100-00-00	14562.0 I-10 WB ACCESS		Bridge									
E100-00-00	14532.0	Max WS	32347.74	3.41	41.54		42.27	0.000576	6.90	5158.02	767.98	0.27
E100-00-00	14354.0	Max WS	32394.95	3.29	41.90		42.13	0.000135	3.87	9001.98	759.99	0.17
E100-00-00	13924.0	Max WS	32365.25	3.18	41.62	24.46	42.06	0.000353	5.51	6643.84	398.39	0.21
E100-00-00	13909.5 UNION PAC. RR		Bridge									
E100-00-00	13898.0	Max WS	32360.30	2.95	41.38		41.82	0.000356	5.53	6603.24	396.26	0.21
E100-00-00	13494.	Max WS	32368.09	2.47	41.41		41.66	0.000352	4.25	8372.55	573.27	0.17
E100-00-00	13220.0	Max WS	32372.34	2.15	41.43	23.72	41.59	0.000091	3.38	11713.78	922.40	0.13
E100-00-00	13182.5 STUDEMONT		Bridge									
E100-00-00	13143.0	Max WS	32350.25	2.15	41.21		41.39	0.000099	3.53	10692.21	820.37	0.13
E100-00-00	12698.	Max WS	32333.59	1.87	41.01		41.32	0.000260	4.47	7353.53	529.05	0.19
E100-00-00	12066.0	Max WS	32332.37	1.47	40.96		41.16	0.000227	3.59	9017.33	522.49	0.15
E100-00-00	11546.0	Max WS	32339.65	0.90	40.96		41.08	0.000078	2.94	13675.74	1283.35	0.12
E100-00-00	11021.	Max WS	32344.59	0.63	40.91		41.04	0.000073	3.04	12993.11	1624.64	0.11
E100-00-00	10908.0	Max WS	32346.92	0.57	40.93	22.24	41.03	0.000059	2.82	15826.73	1789.73	0.11
E100-00-00	10852.5 TAYLOR (SAWYER)		Bridge									
E100-00-00	10804.0	Max WS	32344.50	0.45	40.89		40.99	0.000058	2.78	15955.17	1793.99	0.10
E100-00-00	10643.	Max WS	32329.84	0.14	40.72		41.02	0.000218	4.61	8872.79	1443.29	0.17
E100-00-00	9779.0	Max WS	32343.82	-1.51	40.72		40.86	0.000073	3.17	13659.59	1631.37	0.11
E100-00-00	8532.0	Max WS	32358.32	-1.76	40.74		40.77	0.000021	1.51	23690.53	1456.01	0.05
E100-00-00	8140.	Max WS	32363.14	-2.43	40.72		40.75	0.000089	1.46	25882.59	1791.24	0.05
E100-00-00	7649.0	Max WS	32368.02	-3.26	40.67	18.32	40.74	0.000038	2.59	25543.85	1903.91	0.09
E100-00-00	7608.5 HOUSTON		Bridge									
E100-00-00	7568.0	Max WS	32367.81	-3.15	40.68		40.72	0.000024	2.07	25372.84	1888.60	0.07
E100-00-00	7546.0	Max WS	32367.71	-3.16	40.68	18.31	40.72	0.000025	2.10	25284.08	1998.13	0.07
E100-00-00	7535.5 Pipeline		Bridge									
E100-00-00	7529.0	Max WS	32367.97	-3.16	40.66		40.71	0.000025	2.10	25254.82	1992.63	0.07
E100-00-00	7481.0	Max WS	32367.84	-3.17	40.65		40.71	0.000036	2.31	22277.92	2163.74	0.08
E100-00-00	7253.1	Max WS	32368.10	-3.19	40.62		40.70	0.000028	2.40	15252.05	899.44	0.08
E100-00-00	7253.05		Lat Struct									
E100-00-00	7253	Max WS	32367.04	-3.19	40.62	14.59	40.70	0.000028	2.40	15252.05	899.44	0.08
E100-00-00	7205 Prop I-10 DC		Bridge									
E100-00-00	7138.1	Max WS	32367.04	-3.20	40.55		40.65	0.000035	2.65	14026.42	931.44	0.09
E100-00-00	7138	Max WS	32366.04	-3.20	40.55	16.23	40.65	0.000035	2.65	14026.42	931.44	0.09
E100-00-00	7057 Prop I-10 Ramp		Bridge									
E100-00-00	7016.1	Max WS	32365.72	-3.22	40.30		40.51	0.000068	3.99	10811.52	820.18	0.13
E100-00-00	7016	Max WS	32366.04	-3.22	40.30		40.51	0.000068	3.99	10811.52	820.18	0.13
E100-00-00	6980	Max WS	32366.16	-3.22	40.37		40.49	0.000058	2.84	12986.96	816.09	0.10
E100-00-00	6979		Lat Struct									
E100-00-00	6975.0	Max WS	32357.90	-3.22	40.37		40.49	0.000058	2.84	12986.81	816.09	0.10
E100-00-00	6898.0	Max WS	32281.53	-4.23	40.34		40.49	0.000124	3.25	11280.16	764.19	0.11
E100-00-00	6895	Max WS	32281.60	-4.23	40.34		40.49	0.000124	3.25	11279.88	764.18	0.11
E100-00-00_02	6775.	Max WS	40646.51	-4.30	40.34		40.41	0.000044	2.19	21041.02	1696.43	0.08
E100-00-00_02	6637.0	Max WS	40628.78	-4.37	40.30	18.30	40.40	0.000051	2.58	17191.22	1376.66	0.09
E100-00-00_02	6600 Prop I-45 DC		Bridge									
E100-00-00_02	6575.1	Max WS	40621.85	-4.41	40.28		40.38	0.000052	2.57	17419.97	1463.29	0.09
E100-00-00_02	6575.0	Max WS	40620.10	-4.41	40.28	18.55	40.38	0.000052	2.57	17419.96	1463.28	0.09
E100-00-00_02	6551 Prop I-45 Ramp		Bridge									
E100-00-00_02	6515.0	Max WS	40614.85	-4.44	40.27		40.37	0.000052	2.56	17686.91	1439.49	0.09
E100-00-00_02	6387.0	Max WS	40616.49	-4.38	40.27	19.04	40.36	0.000052	2.55	17809.38	1751.55	0.09
E100-00-00_02	6352 Prop I-45 NBML		Bridge									
E100-00-00_02	6298.1	Max WS	40611.40	-4.51	40.26		40.35	0.000048	2.43	20076.37	1827.41	0.08
E100-00-00_02	6298	Max WS	40609.68	-4.51	40.26	17.55	40.35	0.000048	2.43	20076.37	1827.41	0.08
E100-00-00_02	6252 Prop I-45 DC		Bridge									
E100-00-00_02	6201.1	Max WS	40611.40	-4.65	40.27		40.34	0.000036	2.27	20517.95	1908.11	0.08
E100-00-00_02	6201	Max WS	40609.68	-4.65	40.27	16.68	40.34	0.000036	2.27	20517.95	1908.11	0.08
E100-00-00_02	6164 Prop I-45 Ramp		Bridge									
E100-00-00_02	6122.0	Max WS	40568.06	-4.33	40.18		40.29	0.000043	2.72	18267.42	1849.04	0.09
E100-00-00_02	5525.0	Max WS	40562.70	-3.15	40.17		40.26	0.000050	2.45	16647.38	819.68	0.09
E100-00-00_02	4994.0	Max WS	40477.81	-3.09	40.04	17.11	40.22	0.000153	3.52	12841.36	750.72	0.11
E100-00-00_02	4980.0 RR OVERPASS		Bridge									
E100-00-00_02	4961.0	Max WS	40451.55	-3.03	39.95		40.13	0.000169	3.58	12556.74	647.08	0.12
E100-00-00_02	4812.0	Max WS	40344.68	-3.49	39.79	17.22	40.08	0.000406	4.35	9271.82	629.13	0.17
E100-00-00_02	4774.5 CROCKETT/HOGAN		Bridge									
E100-00-00_02	4687.0	Max WS	40291.80	-4.67	39.74		39.98	0.000294	3.87	10402.81	645.37	0.15
E100-00-00_02	4407.	Max WS	40248.28	-3.62	39.65		39.92	0.000226	4.41	10933.59	966.40	0.14
E100-00-00_02	4014.0	Max WS	40224.91	-2.15	39.63	16.04	39.82	0.000196	3.59	11820.28	606.74	0.13
E100-00-00_02	3997.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	3976.0	Max WS	40211.96	-2.40	39.51		39.70	0.000198	3.59	11828.49	607.35	0.13
E100-00-00_02	3681.	Max WS	40159.99	-3.80	39.45		39.65	0.000208	3.89	14068.83	1203.64	0.14
E100-00-00_02	3585.0	Max WS	40124.11	-4.26	39.38		39.65	0.000232	4.30	14018.00	1188.92	0.15
E100-00-00_02	3233.0	Max WS	40206.29	-4.79	39.47	12.86	39.52	0.000048	1.75	26528.61	2023.55	0.07
E100-00-00_02	3094 Prop I-10 WBML		Bridge									
E100-00-00_02	2954.1	Max WS	40162.76	-5.22	39.44		39.49	0.000059	1.79	25700.11	2132.57	0.08
E100-00-00_02	2954.0	Max WS	40164.50	-5.22	39.44	13.10	39.49	0.000059	1.79	25700.09	2132.57	0.08
E100-00-00_02	2857 Prop I-45 BNML		Bridge									
E100-00-00_02	2760.1	Max WS	40151.79	-5.51	39.43		39.48	0.000053	1.71	26987.40	2256.24	0.08
E100-00-00_02	2760.0	Max WS	40144.56	-5.51	39.43	14.40	39.48	0.000053	1.71	26987.40	2256.24	0.08

HEC-RAS Plan: UMProp_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_02	2639 Prop I-10 WB Exp		Bridge									
E100-00-00_02	2518.1	Max WS	40113.60	-5.88	39.38		39.44	0.000063	2.04	24443.77	2254.85	0.08
E100-00-00_02	2518.0	Max WS	40115.29	-5.88	39.38	14.96	39.44	0.000063	2.04	24443.75	2254.85	0.08
E100-00-00_02	2434 Prop I-45 SBML		Bridge									
E100-00-00_02	2350.1	Max WS	40047.30	-6.13	39.27		39.37	0.000109	2.58	18921.80	2323.59	0.11
E100-00-00_02	2350.0	Max WS	40047.31	-6.13	39.27	15.65	39.37	0.000109	2.58	18921.79	2323.59	0.11
E100-00-00_02	2280 Prop I-10 EBML		Bridge									
E100-00-00_02	2210.0	Max WS	39962.79	-6.34	39.16		39.29	0.000132	2.92	14877.09	2186.17	0.12
E100-00-00_02	1580.	Max WS	39968.16	-7.83	39.15		39.23	0.000086	2.80	22611.71	2239.37	0.09
E100-00-00_02	1353.0	Max WS	39944.13	-8.34	39.11	16.59	39.21	0.000117	3.19	20001.29	2539.66	0.10
E100-00-00_02	1335.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	1319.0	Max WS	39930.96	-8.37	39.09		39.19	0.000114	3.15	20266.44	2657.81	0.10
E100-00-00_02	984.0	Max WS	39855.93	-8.69	38.98	13.32	39.17	0.000110	3.93	20021.68	2973.54	0.13
E100-00-00_02	978 MAIN STREET		Bridge									
E100-00-00_02	971.6	Max WS	39691.47	-8.69	38.82		39.04	0.000119	4.08	16533.29	2951.68	0.14
E100-00-00_02	971.5	Max WS	39687.70	-8.69	38.82	13.28	39.04	0.000119	4.08	16533.27	2951.68	0.14
E100-00-00_02	961.5 1ST STREET		Bridge									
E100-00-00_02	851.0	Max WS	39611.23	-6.40	38.75		38.96	0.000138	4.13	19240.54	2772.75	0.14
E100-00-00_02	654.0	Max WS	39618.75	-6.50	38.76		38.91	0.000084	3.37	21403.93	2742.19	0.11
E100-00-00_02	400.0	Max WS	39579.77	-8.58	38.69	12.94	38.93	0.000127	4.36	19980.01	3178.69	0.14
E100-00-00_02	381.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	365.0	Max WS	39499.07	-8.23	38.61		38.86	0.000131	4.40	19689.94	3187.74	0.14
E100-00-00_02	210.0	Max WS	39468.84	-7.81	38.57	13.28	38.85	0.000145	4.78	19545.21	3224.76	0.15
E100-00-00_02	191.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	173.1	Max WS	39374.44	-6.84	38.47		38.76	0.000159	4.90	18928.64	3510.45	0.16
E100-00-00_02	173.0	Max WS	39372.52	-6.84	38.47		38.76	0.000159	4.90	18928.59	3510.45	0.16

Little White Oak Bayou
Unmitigated Proposed 100-Year

HEC-RAS Plan: UMProp_100yr River: E101-00-00 Reach: E101-00-00_0003 Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	9819.000	Max WS	8676.60	16.33	41.29		41.46	0.000300	3.26	2661.85	186.72	0.15
E101-00-00_0003	9750.000	Max WS	8674.26	16.31	41.29		41.44	0.000279	3.12	2782.79	199.12	0.15
E101-00-00_0003	9000.000	Max WS	8637.18	15.50	41.24		41.29	0.000116	1.97	4867.99	558.21	0.09
E101-00-00_0003	8469.000	Max WS	8670.60	13.02	41.16		41.22	0.000136	2.25	4636.53	612.39	0.09
E101-00-00_0003	7984.000	Max WS	8673.71	13.76	41.09		41.15	0.000139	2.39	4485.13	392.98	0.10
E101-00-00_0003	6838.000	Max WS	8634.94	12.20	40.89		40.97	0.000178	2.38	3677.63	432.28	0.13
E101-00-00_0003	5861.000	Max WS	8550.48	9.91	40.71		40.80	0.000181	2.54	4313.45	469.78	0.11
E101-00-00_0003	4720.000	Max WS	8469.75	8.13	40.57		40.65	0.000151	2.76	5706.61	846.72	0.10
E101-00-00_0003	4279.000	Max WS	8295.18	9.00	40.47		40.58	0.000207	2.94	4106.08	636.45	0.12
E101-00-00_0003	4130.000	Max WS	8396.72	8.68	40.50	18.03	40.54	0.000040	1.83	6895.15	869.11	0.07
E101-00-00_0003	4091.000 N. MAIN		Bridge									
E101-00-00_0003	4050.000	Max WS	8319.12	7.87	40.47		40.52	0.000037	1.80	6476.87	774.25	0.07
E101-00-00_0003	3952.	Max WS	8259.15	6.87	40.45		40.51	0.000046	2.09	4332.91	244.84	0.07
E101-00-00_0003	3466.000	Max WS	8329.48	1.92	40.45		40.50	0.000021	2.20	6595.54	630.11	0.07
E101-00-00_0003	3323.0	Max WS	8389.05	-1.03	40.46	12.46	40.49	0.000010	1.54	7981.18	702.82	0.05
E101-00-00_0003	3278.0 I-45 Ramp		Bridge									
E101-00-00_0003	3236.1	Max WS	8359.77	-2.82	40.45		40.47	0.000007	1.24	10312.59	886.90	0.04
E101-00-00_0003	3236.0	Max WS	8358.27	-2.82	40.45	11.08	40.47	0.000007	1.24	10312.59	886.90	0.04
E101-00-00_0003	3085 I-45 NBML		Bridge									
E101-00-00_0003	2958.1	Max WS	8375.23	-2.52	40.46		40.46	0.000002	0.62	23956.64	2636.19	0.02
E101-00-00_0003	2958	Max WS	8376.81	-2.52	40.46	11.15	40.46	0.000002	0.62	23956.64	2636.19	0.02
E101-00-00_0003	2833 I-45 SBML		Bridge									
E101-00-00_0003	2389.000	Max WS	8212.23	-0.26	40.42		40.44	0.000032	1.37	10329.84	915.37	0.04
E101-00-00_0003	2325.	Max WS	8220.92	-0.15	40.42		40.44	0.000031	1.34	10473.72	1000.92	0.04
E101-00-00_0003	1855.000	Max WS	8304.04	0.68	40.42		40.43	0.000013	0.92	11539.17	1118.50	0.03
E101-00-00_0003	1126.	Max WS	8288.83	-1.85	40.40		40.42	0.000035	1.15	12379.78	1460.40	0.04
E101-00-00_0003	1070.000	Max WS	8293.71	-2.04	40.40	9.61	40.42	0.000037	1.42	13055.69	1559.97	0.04
E101-00-00_0003	1029.500 WRIGHTWOOD		Bridge									
E101-00-00_0003	987.000	Max WS	8286.25	-2.04	40.38		40.40	0.000039	1.39	13034.56	1558.92	0.04
E101-00-00_0003	911.	Max WS	8295.72	-2.19	40.39		40.40	0.000027	1.22	14069.63	1476.67	0.04
E101-00-00_0003	756.	Max WS	8302.11	-2.51	40.38		40.39	0.000079	0.92	12349.94	1632.32	0.04
E101-00-00_0003	637.000	Max WS	8306.16	-2.75	40.37	11.58	40.38	0.000046	0.82	15025.03	1645.82	0.03
E101-00-00_0003	538.000 QUITMAN/WHITE OA		Bridge									
E101-00-00_0003	442.000	Max WS	8283.59	-2.75	40.34		40.35	0.000037	0.97	14744.06	1632.50	0.03
E101-00-00_0003	306.000	Max WS	8276.70	-2.86	40.34		40.35	0.000006	0.67	16856.99	2046.34	0.02
E101-00-00_0003	259.1	Max WS	8276.63	-2.90	40.34		40.35	0.000006	0.74	12304.04	584.38	0.03
E101-00-00_0003	259	Max WS	8277.77	-2.90	40.34	7.40	40.35	0.000006	0.74	12304.02	584.38	0.03
E101-00-00_0003	229 Prop I-10 DC		Bridge									
E101-00-00_0003	180.1	Max WS	8279.59	-2.96	40.34		40.35	0.000006	0.73	12342.31	625.58	0.03
E101-00-00_0003	180	Max WS	8280.60	-2.96	40.34	9.08	40.35	0.000006	0.73	12342.28	625.58	0.03
E101-00-00_0003	130 Prop-10 Ramp		Bridge									
E101-00-00_0003	101.1	Max WS	8294.32	-3.03	40.34		40.35	0.000005	0.65	13611.29	698.36	0.02
E101-00-00_0003	101	Max WS	8292.33	-3.03	40.34		40.35	0.000005	0.65	13611.29	698.36	0.02
E101-00-00_0003	68	Max WS	8282.06	-4.00	40.34		40.35	0.000007	0.73	12088.60	594.61	0.03
E101-00-00_0003	63	Max WS	8292.15	-4.00	40.34		40.35	0.000007	0.73	12088.57	594.61	0.03
E101-00-00_0003	3	Max WS	8364.91	-4.23	40.34		40.35	0.000009	0.89	10323.71	512.19	0.03
E101-00-00_0003	1	Max WS	8364.91	-4.23	40.34		40.35	0.000009	0.89	10323.70	512.19	0.03

Buffalo Bayou
Scenario 1: North Canal Only 10-Year

HEC-RAS Plan: NC_10yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	148800.4	Max WS	8217.74	3.15	31.85		31.93	0.000293	2.36	4396.78	931.49	0.09
W100_upstrm	148795.4	Max WS	8217.74	3.15	31.85	13.26	31.93	0.000293	2.36	4396.31	931.41	0.09
W100_upstrm	148768.4 SOUTHERN PACIFIC		Bridge									
W100_upstrm	148741.4	Max WS	8217.30	3.04	31.74		31.82	0.000293	2.36	4396.88	931.50	0.09
W100_upstrm	147632.4	Max WS	8216.34	-1.17	31.52		31.59	0.000110	2.19	4320.18	387.06	0.09
W100_upstrm	146698.0	Max WS	8264.44	1.88	31.40		31.49	0.000124	2.54	4433.06	314.04	0.10
W100_upstrm	145723.9	Max WS	8313.63	1.61	31.22		31.37	0.000187	3.32	4015.50	367.76	0.12
W100_upstrm	144753.5	Max WS	8366.88	0.07	31.06		31.19	0.000158	2.89	3488.56	273.30	0.11
W100_upstrm	143966.8	Max WS	8401.24	-7.47	30.91		31.05	0.000219	3.17	3606.10	388.08	0.13
W100_upstrm	143078.2	Max WS	8448.93	-4.19	30.76		30.87	0.000168	2.71	4627.33	468.98	0.11
W100_upstrm	142061.4	Max WS	8505.43	0.55	30.65		30.73	0.000099	2.40	4920.04	430.88	0.09
W100_upstrm	141320.1	Max WS	8547.30	-2.70	30.62		30.66	0.000056	1.69	9090.64	726.08	0.07
W100_upstrm	140116.2	Max WS	8595.49	-1.31	30.48		30.58	0.000136	2.63	4613.66	397.26	0.10
W100_upstrm	139320.0	Max WS	8629.59	-2.14	30.41		30.48	0.000105	2.19	5456.28	457.27	0.08
W100_upstrm	138607.9	Max WS	8662.07	-2.08	30.40		30.42	0.000028	1.24	14226.31	1035.94	0.05
W100_upstrm	137732.0	Max WS	8684.45	-2.40	30.35		30.41	0.000083	2.38	7947.75	787.23	0.09
W100_upstrm	137113.0	Max WS	8718.76	-2.62	30.26		30.36	0.000111	2.75	5337.47	403.12	0.10
W100_upstrm	136331.2	Max WS	8761.76	-2.09	30.18		30.21	0.000217	1.62	7957.04	617.35	0.06
W100_upstrm	135666.2	Max WS	8782.47	-1.47	30.05		30.13	0.000107	2.45	5757.46	523.28	0.10
W100_upstrm	134706.7	Max WS	8824.82	-1.93	30.02		30.05	0.000050	1.74	10995.22	837.46	0.07
W100_upstrm	134090.6	Max WS	8843.30	-1.59	29.98		30.03	0.000067	2.10	8627.28	691.23	0.08
W100_upstrm	133772.1	Max WS	8852.35	-0.79	29.93	8.90	30.03	0.000098	2.73	6974.51	721.23	0.09
W100_upstrm	133760.1 FOOTBRIDGE		Bridge									
W100_upstrm	133748.1	Max WS	8848.12	-0.46	29.84		29.95	0.000106	2.81	6672.06	717.96	0.10
W100_upstrm	132963.8	Max WS	8883.71	-1.98	29.74		29.85	0.000132	2.74	4310.29	308.15	0.10
W100_upstrm	131789.8	Max WS	8927.95	-2.31	29.58		29.70	0.000133	2.90	4735.16	458.04	0.11
W100_upstrm	130765.5	Max WS	8979.93	-3.81	29.53		29.58	0.000052	1.97	7367.56	474.54	0.07
W100_upstrm	129725.3	Max WS	9015.98	-3.71	29.43		29.53	0.000101	2.74	6637.87	668.30	0.10
W100_upstrm	129163.2	Max WS	9050.20	-3.13	29.38		29.46	0.000086	2.42	5107.97	419.01	0.09
W100_upstrm	128326.9	Max WS	9091.67	-4.05	29.33		29.39	0.000059	2.14	7493.12	752.97	0.07
W100_upstrm	128109.6	Max WS	9090.98	-4.29	29.33		29.36	0.000144	1.49	6099.20	367.44	0.06
W100_upstrm	128104.6	Max WS	9090.31	-4.29	29.33	6.08	29.36	0.000144	1.49	6098.94	367.43	0.06
W100_upstrm	128066.7 SHEPHERD		Bridge									
W100_upstrm	128028.8	Max WS	9073.16	-4.51	29.14		29.18	0.000096	1.48	6112.77	367.84	0.06
W100_upstrm	126647.0	Max WS	9058.52	-3.93	29.08		29.09	0.000031	0.92	9889.00	690.26	0.04
W100_upstrm	125376.9	Max WS	9093.28	-4.05	28.90		28.95	0.000193	1.83	4956.81	309.51	0.08
W100_upstrm	124983.5	Max WS	9103.27	-3.86	28.85		28.90	0.000049	1.79	5099.45	854.14	0.08
W100_upstrm	124644.1	Max WS	9116.83	-3.69	28.83	8.35	28.88	0.000063	1.84	4953.24	465.69	0.08
W100_upstrm	124591.8 WAUGH DRIVE		Bridge									
W100_upstrm	124539.5	Max WS	9113.14	-3.74	28.81		28.87	0.000063	1.84	4964.00	466.05	0.08
W100_upstrm	123658.2	Max WS	9168.71	-2.04	28.81		28.82	0.000032	0.99	9303.14	823.00	0.05
W100_upstrm	123138.8	Max WS	9197.46	-4.08	28.80		28.81	0.000016	0.70	13114.92	841.27	0.03
W100_upstrm	122627.1	Max WS	9220.76	-6.08	28.77		28.82	0.000030	1.47	7204.50	502.42	0.06
W100_upstrm	122572.1 MONTROSE COURT		Mult Open									
W100_upstrm	122517.1	Max WS	9220.76	-5.38	28.77		28.80	0.000050	1.50	6868.97	454.55	0.06
W100_upstrm	122371.6	Max WS	9219.50	-7.00	28.74	4.21	28.79	0.000100	1.74	5311.69	598.74	0.07
W100_upstrm	122265 ROSEMONT		Bridge									
W100_upstrm	122210.0	Max WS	9213.06	-5.60	28.72		28.76	0.000060	1.63	5651.87	603.73	0.07
W100_upstrm	122036.7	Max WS	9221.16	-8.40	28.71		28.75	0.000075	1.57	6150.85	682.09	0.07
W100_upstrm	121229.5	Max WS	9251.73	-11.37	28.66		28.70	0.000045	1.46	6753.19	777.81	0.07
W100_upstrm	120962.2	Max WS	9259.54	-10.59	28.63		28.68	0.000057	1.76	5293.56	379.58	0.08
W100_upstrm	120005.2	Max WS	9304.91	-7.78	28.62	3.65	28.63	0.000039	0.78	11923.08	767.43	0.03
W100_upstrm	119952.6 MEMORIAL DRIVE		Bridge									
W100_upstrm	119900.0	Max WS	9299.95	-7.64	28.60		28.61	0.000024	0.79	11801.43	760.13	0.04
W100_upstrm	119495.9	Max WS	9325.30	-7.21	28.60		28.60	0.000012	0.51	18218.32	1147.77	0.02
W100_upstrm	118667.7	Max WS	9366.88	-8.56	28.56		28.58	0.000044	1.01	9309.95	623.74	0.05
W100_upstrm	118466.1	Max WS	9363.58	-8.89	28.54	1.69	28.57	0.000028	1.36	6883.93	480.81	0.05
W100_upstrm	118418.1 MEMORIAL DRIVE		Bridge									
W100_upstrm	118370.1	Max WS	9334.32	-8.87	28.51		28.54	0.000029	1.36	6866.34	475.34	0.05
W100_upstrm	117845.4	Max WS	9358.68	-7.26	28.49		28.52	0.000048	1.19	7919.77	541.55	0.05
W100_upstrm	117204.3	Max WS	9392.35	-4.60	28.48		28.49	0.000028	0.98	9541.70	632.71	0.04
W100_upstrm	116395.7	Max WS	9419.64	-3.88	28.45		28.47	0.000024	1.08	8722.16	489.48	0.05
W100_upstrm	116167.6	Max WS	9394.98	-3.68	28.41	4.17	28.46	0.000094	1.74	5384.53	264.39	0.07
W100_upstrm	116121.9 SABINE AVENUE		Bridge									
W100_upstrm	116076.2	Max WS	9369.43	-3.86	28.22		28.26	0.000090	1.74	5381.59	264.36	0.07
W100_upstrm	115804.5	Max WS	9359.13	-4.60	28.18		28.25	0.000044	2.26	5427.08	281.99	0.07
W100_upstrm	115740.6	Max WS	9361.30	-4.78	28.18	4.35	28.25	0.000040	2.12	5442.57	294.79	0.07
W100_upstrm	115700 I-45 Allen Pkwy		Bridge									
W100_upstrm	115674.0	Max WS	9345.15	-5.10	28.16		28.23	0.000046	2.21	5572.83	382.53	0.07
W100_upstrm	115662.6	Max WS	9345.85	-5.20	28.17	4.07	28.23	0.000043	2.13	5677.52	398.47	0.07
W100_upstrm	115635.5 I-45 Houston Ave		Bridge									
W100_upstrm	115621.1	Max WS	9360.00	-5.57	28.18		28.23	0.000034	1.98	6311.89	447.06	0.07
W100_upstrm	115587.7	Max WS	9357.90	-6.22	28.17	3.86	28.23	0.000039	2.13	6441.94	497.92	0.07
W100_upstrm	115553.5 I-45 SBML		Bridge									
W100_upstrm	115514.4	Max WS	9367.97	-6.96	28.18		28.23	0.000029	1.80	7278.52	559.67	0.06
W100_upstrm	115509.1	Max WS	9370.33	-6.99	28.18	3.44	28.23	0.000029	1.82	7338.54	555.06	0.06
W100_upstrm	115490 I-45 NBML		Bridge									
W100_upstrm	115423.0	Max WS	9376.35	-7.30	28.19		28.23	0.000024	1.63	7737.74	482.85	0.05
W100_upstrm	115365.4	Max WS	9379.86	-7.52	28.19		28.22	0.000020	1.53	7856.53	458.69	0.05
W100_upstrm	115284.6	Max WS	9377.51	-7.89	28.18		28.23	0.000027	1.77	10004.29	992.43	0.06
W100_upstrm	115104.1	Max WS	9388.00	-8.31	28.19		28.22	0.000016	1.41	8879.75	675.51	0.05
W100_upstrm	115001.2	Max WS	9374.32	-8.48	28.16	2.23	28.22	0.000037	2.09	6503.72	510.49	0.07
W100_upstrm	115000 I-45 Ramp McKee		Bridge									
W100_upstrm	114907.3	Max WS	9384.71	-9.19	28.17		28.22	0.000032	1.87	6352.16	372.17	0.06
W100_upstrm	114842.1	Max WS	9380.60	-9.48	28.16	1.95	28.22	0.000038	2.01	6129.24	472.45	0.07
W100_upstrm	114830 I-45 Ramp Walker		Bridge									
W100_upstrm	114804.3	Max WS	9376.43	-9.61	28.15		28.21	0.000041	2.06	6489.06	528.54	0.07
W100_upstrm	114492.0	Max WS	9405.46	-10.48	28.16		28.20	0.000038	1.57	5974.94	334.65	0.07
W100_upstrm	114195.9	Max WS	9393.09	-11.52	28.13	1.30	28.18	0.000088	1.72	5469.70	314.84	0.07
W100_upstrm	114168.9 RUSK STREET		Bridge									
W100_upstrm	114141.9	Max WS	9376.05	-10.83	28.11		28.15	0.000100	1.79	5250.07	311.01	0.08
W100_upstrm	114097.4	Max WS	9387.58	-7.46	28.11	3.23	28.15	0.000061	1.56	6021.26	376.67	0.07
W100_upstrm	114070.4 CAPITAL STREE		Bridge									

HEC-RAS Plan: NC_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	114043.4	Max WS	9368.36	-7.72	27.17		27.21	0.000069	1.63	5762.65	375.12	0.07
W100_upstrm	113644.0	Max WS	9327.76	-8.91	27.11		27.18	0.000059	2.21	4737.38	312.68	0.08
W100_upstrm	113411.6	Max WS	9352.79	-9.61	27.11	0.37	27.17	0.000050	1.84	5078.45	367.39	0.06
W100_upstrm	113374.3 TEXAS AVE		Bridge									
W100_upstrm	113337.0	Max WS	9310.30	-9.65	26.99		27.04	0.000050	1.84	5062.29	367.15	0.06
W100_upstrm	113266.4	Max WS	9255.73	-9.11	26.94	2.86	27.03	0.000197	2.40	4028.57	233.52	0.09
W100_upstrm	113238.6 BAGBY		Bridge									
W100_upstrm	113210.8	Max WS	9169.06	-9.46	26.52		26.61	0.000201	2.38	4011.79	233.25	0.09
W100_upstrm	112974.0	Max WS	9115.37	-10.69	26.48	0.88	26.57	0.000131	2.36	3862.42	197.13	0.09
W100_upstrm	112944.9 PRAIRIE		Bridge									
W100_upstrm	112915.8	Max WS	9037.08	-10.82	26.32		26.41	0.000129	2.34	3856.64	197.07	0.09
W100_upstrm	112575.5	Max WS	9011.39	-9.20	26.29	3.00	26.35	0.000161	1.96	4599.19	237.31	0.07
W100_upstrm	112534.5 PRESTON STREET		Bridge									
W100_upstrm	112493.5	Max WS	8979.72	-9.47	25.95		26.01	0.000161	1.96	4583.11	237.18	0.07
W100_upstrm	112003.3	Max WS	8919.72	-9.69	25.90	1.77	25.94	0.000103	1.63	5458.79	279.48	0.06
W100_upstrm	111953.3 CONGRESS STREET		Bridge									
W100_upstrm	111903.3	Max WS	8850.23	-9.84	25.72		25.76	0.000101	1.62	5451.40	279.37	0.06
W100_upstrm	111853.5	Max WS	8828.44	-9.86	25.71	1.26	25.76	0.000095	1.70	5187.38	221.50	0.06
W100_upstrm	111818.6 SMITH STREET		Bridge									
W100_upstrm	111783.7	Max WS	8774.32	-8.67	25.68		25.73	0.000103	1.78	4919.13	217.81	0.07
W100_upstrm	111626.7	Max WS	8759.62	-11.83	25.67	0.91	25.71	0.000121	1.72	5103.45	226.77	0.06
W100_upstrm	111518.6 LOUISIANA		Bridge									
W100_upstrm	111410.5	Max WS	8597.76	-11.23	25.60		25.64	0.000081	1.74	4952.11	225.65	0.07
W100_upstrm	110876.6	Max WS	8580.00	-10.43	25.57	-0.95	25.60	0.000074	1.35	6337.88	321.07	0.05
W100_upstrm	110837.8 MILAM		Bridge									
W100_upstrm	110799.0	Max WS	8389.87	-10.72	25.52		25.55	0.000208	1.31	6411.61	322.57	0.05
W100_upstrm	110672.7	Max WS	8270.54	-13.25	25.48	-2.04	25.52	0.000211	1.63	6182.67	574.74	0.06
W100_upstrm	110643.7 TRAVIS STREET		Bridge									
W100_upstrm	110614.7	Max WS	8176.90	-12.75	25.46		25.50	0.000240	1.67	5884.95	563.19	0.07
W100_upstrm	110200.2	Max WS	8063.36	-9.11	25.41	0.87	25.44	0.000036	1.24	6574.65	427.69	0.05
W100_upstrm	110154.2 MAIN STREET		Bridge									
W100_upstrm	110108.2	Max WS	8007.07	-9.31	25.21		25.23	0.000035	1.23	6571.26	427.50	0.05
W100_upstrm	110103.2	Max WS	8001.19	-9.31	25.20		25.23	0.000035	1.23	6571.18	427.50	0.05
Downstream	109924.2	Max WS	13580.14	-13.02	25.20		25.28	0.000149	2.15	6315.73	291.60	0.08
Downstream	109551.7	Max WS	13580.12	-14.28	25.16	-3.15	25.23	0.000129	1.99	6835.93	333.73	0.08
Downstream	109518.7 FANNIN STREET		Bridge									
Downstream	109485.7	Max WS	13580.03	-15.31	24.39		24.45	0.000125	1.96	6922.83	334.71	0.08
Downstream	109440.2	Max WS	13580.02	-16.48	24.38	-3.55	24.45	0.000239	2.08	6518.08	320.78	0.08
Downstream	109395.2 SAN JACINTO STRE		Bridge									
Downstream	109350.2	Max WS	13580.10	-16.89	24.20		24.26	0.000231	2.06	6591.73	321.12	0.08
Downstream	109119.0	Max WS	13580.07	-17.14	24.10	-4.17	24.20	0.000316	2.54	5341.96	348.41	0.11
Downstream	109103.1 CROSSWALK		Bridge									
Downstream	109087.2	Max WS	13580.04	-17.55	24.06		24.16	0.000301	2.49	5457.99	355.58	0.11
Downstream	108565.3	Max WS	13579.97	-12.77	23.97		24.04	0.000131	2.15	6313.95	266.77	0.08
Downstream	108334.0	Max WS	13579.91	-14.06	23.95		24.01	0.000178	2.00	6828.89	427.03	0.07
Downstream	107179.4	Max WS	13579.30	-20.52	23.73	-7.58	23.81	0.000175	2.28	6324.33	392.11	0.09
Downstream	107158.9 S. PACIFIC RR		Bridge									
Downstream	107139	Max WS	13579.41	-20.19	23.71		23.79	0.000183	2.32	6185.25	389.87	0.09
Downstream	107138.4	Max WS	13579.30	-20.19	23.71		23.79	0.000183	2.32	6185.17	389.87	0.09
W100_downstream1	106594.0	Max WS	35247.83	-16.70	23.71		24.12	0.000861	5.16	6833.06	253.95	0.18
W100_downstream1	106151.4	Max WS	35246.68	-13.85	23.04	2.82	23.54	0.001781	5.63	6255.73	260.97	0.20
W100_downstream1	106131.1 MCKEE		Bridge									
W100_downstream1	106110.8	Max WS	35245.68	-12.53	22.72		23.29	0.002046	6.04	5832.55	253.98	0.22
W100_downstream1	105705.4	Max WS	35244.68	-18.22	22.19	1.36	22.74	0.000648	5.95	5920.92	265.03	0.22
W100_downstream1	105667.4 ELYSIAN STREET		Bridge									
W100_downstream1	105629.4	Max WS	35244.28	-18.43	21.86		22.42	0.000659	5.98	5888.95	263.60	0.22
W100_downstream1	105476	Max WS	35244.00	-18.70	21.74		22.21	0.001960	5.49	6420.38	367.22	0.23
W100_downstream1	104962	Max WS	35243.48	-18.70	21.24		21.42	0.001045	3.43	10265.72	615.70	0.15
W100_downstream1	104900	Max WS	35243.25	-19.15	21.07		21.25	0.000277	3.45	10207.82	641.53	0.15
W100_downstream1	104464	Max WS	35242.97	-19.86	20.66		20.99	0.001988	4.56	7723.43	504.11	0.21
W100_downstream1	104301	Max WS	35242.89	-20.42	20.44		20.79	0.000363	4.81	7334.54	472.84	0.22
W100_downstream1	104242	Max WS	35242.68	-20.62	20.33		20.74	0.001439	5.12	6886.31	383.46	0.21
W100_downstream1	104118.0	Max WS	35242.32	-21.10	19.65	6.60	20.52	0.002283	7.46	4723.36	272.02	0.31
W100_downstream1	104070 Prop I-69 Ramp		Bridge									
W100_downstream1	103955.1	Max WS	35242.47	-21.79	19.89		20.35	0.001039	5.42	6499.13	303.07	0.21
W100_downstream1	103955.0	Max WS	35242.40	-21.79	19.89	2.30	20.35	0.001039	5.42	6499.10	303.07	0.21
W100_downstream1	103846 Prop I-69 DC		Bridge									
W100_downstream1	103786.1	Max WS	35242.32	-22.51	19.67		20.11	0.000843	5.36	6579.64	289.32	0.20
W100_downstream1	103786.0	Max WS	35242.32	-22.51	19.67	1.28	20.11	0.000843	5.36	6579.62	289.32	0.20
W100_downstream1	103694 Prop I-69 SBML		Bridge									
W100_downstream1	103534.1	Max WS	35242.12	-23.58	19.35		19.81	0.000832	5.48	6430.63	275.53	0.20
W100_downstream1	103534.0	Max WS	35242.12	-23.58	19.35	0.98	19.81	0.000832	5.48	6430.60	275.53	0.20
W100_downstream1	103383 Prop I-45 SBML		Bridge									
W100_downstream1	103241.1	Max WS	35241.75	-24.83	19.15		19.63	0.001302	5.52	6389.95	316.58	0.22
W100_downstream1	103241.0	Max WS	35241.82	-24.83	19.15	0.55	19.63	0.001302	5.52	6389.90	316.58	0.22
W100_downstream1	103161 Prop I-69 NBML		Bridge									
W100_downstream1	103095.1	Max WS	35241.68	-25.45	19.02		19.48	0.000546	5.45	6464.80	293.28	0.20
W100_downstream1	103095.0	Max WS	35241.68	-25.45	19.02	0.76	19.48	0.000546	5.45	6464.78	293.28	0.20
W100_downstream1	103065 Prop I-45 DC		Bridge									
W100_downstream1	103025.1	Max WS	35241.54	-25.75	18.90		19.39	0.000515	5.58	6316.36	265.69	0.20
W100_downstream1	103025.0	Max WS	35241.47	-25.75	18.90	-0.57	19.39	0.000515	5.58	6316.35	265.69	0.20
W100_downstream1	102988 Prop I-10 DC		Bridge									
W100_downstream1	102952	Max WS	35240.84	-26.06	18.42		19.08	0.000869	6.50	5417.99	256.01	0.25
W100_downstream1	102895.0	Max WS	35240.67	-26.31	18.14		19.01	0.001618	7.49	4707.49	243.02	0.30
W100_downstream1	102875.3	Max WS	35240.75	-26.39	18.37	-0.59	18.97	0.001746	6.24	5645.45	351.60	0.27
W100_downstream1	102847.5 HOUTerminal RR		Bridge									
W100_downstream1	102819.7	Max WS	35240.75	-26.43	18.01		18.64	0.001840	6.37	5533.67	349.94	0.28
W100_downstream1	102309.0	Max WS	35284.95	-23.48	17.57		18.07	0.000391	5.68	6216.40	217.20	0.19
W100_downstream1	101828.0	Max WS	35324.85	-20.70	17.16	-1.53	17.79	0.000764	6.35	5562.57	246.18	0.24
W100_downstream1	101790.1 JENSEN ROAD		Bridge									
W100_downstream1	101752.2	Max WS	35324.93	-20.69	16.99		17.63	0.000765	6.40	5517.47	244.52	0.24
W100_downstream1	101007.3	Max WS	35389.70	-16.93	16.68		17.20	0.000390	5.77	6135.95	262.97	0.21
W100_downstream1	99992.6	Max WS	35475.75	-18.90	16.20		16.77	0.000444	6.06	5858.57	250.23	0.22

HEC-RAS Plan: NC_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_downstream1	98399.4	Max WS	35617.05	-20.26	15.54		16.08	0.000420	5.87	6068.00	258.02	0.21
W100_downstream1	97517.4	Max WS	35690.86	-19.35	15.47		15.78	0.000248	4.46	8006.29	313.38	0.16
W100_downstream1	96028.6	Max WS	35812.77	-17.81	14.69	-3.87	15.18	0.000547	5.64	6347.42	288.63	0.21
W100_downstream1	95985.1 YORK DRIVE		Bridge									
W100_downstream1	95941.6	Max WS	35812.77	-17.87	14.54		15.04	0.000550	5.66	6322.65	288.10	0.21
W100_downstream1	95362.9	Max WS	35863.14	-15.97	14.35		14.78	0.000357	5.27	6810.13	322.20	0.20
W100_downstream1	94280.7	Max WS	35964.18	-19.82	13.33		14.09	0.000928	6.98	5151.62	233.80	0.26
W100_downstream1	93495.6	Max WS	36025.14	-20.43	12.98		13.48	0.000601	5.71	6309.15	323.87	0.23
W100_downstream1	92795.6	Max WS	36092.41	-20.98	12.60	-5.80	13.12	0.000433	5.80	6223.71	288.83	0.22
W100_downstream1	92741.1 LOCKWOOD DRIVE		Bridge									
W100_downstream1	92686.6	Max WS	36092.39	-21.08	12.39		12.92	0.000438	5.83	6193.57	288.19	0.22
W100_downstream1	90936.7	Max WS	36244.64	-18.64	11.12		11.61	0.001056	5.62	6445.03	391.48	0.24
W100_downstream1	89918.4	Max WS	36334.06	-17.23	9.90		10.64	0.000850	6.88	5282.91	310.66	0.29
W100_downstream1	88579.0	Max WS	36449.24	-20.97	8.86		9.56	0.000754	6.69	5447.64	316.92	0.28
W100_downstream1	87591.9	Max WS	36540.14	-23.72	8.35		8.91	0.000556	6.02	6071.61	302.16	0.24
W100_downstream1	86660.2	Max WS	36612.73	-23.42	8.03	-10.57	8.48	0.000363	5.37	6818.25	290.81	0.20
W100_downstream1	86641.7 HOUTerminal RR		Bridge									
W100_downstream1	86623.2	Max WS	36612.76	-23.61	7.70		8.16	0.000368	5.40	6778.67	290.45	0.20
W100_downstream1	85855.2	Max WS	36679.48	-26.84	6.77		7.73	0.000777	7.87	4658.36	206.75	0.29
W100_downstream1	85238.7	Max WS	36730.99	-29.43	6.49		7.28	0.000684	7.14	5214.83	277.37	0.26
W100_downstream1	84561.7	Max WS	36802.27	-32.27	6.25	-13.70	6.89	0.000439	6.44	5793.44	296.40	0.22
W100_downstream1	84531.4 NORTH WAYSIDE RD		Bridge									
W100_downstream1	84501.1	Max WS	36802.16	-28.97	5.67		6.55	0.000688	7.55	4872.34	209.66	0.28
W100_downstream1	84252.6	Max WS	36823.86	-26.90	5.65	-10.12	6.39	0.000595	6.91	5328.92	239.51	0.26
W100_downstream1	84222.3 M. GARCIA		Bridge									
W100_downstream1	84192.0	Max WS	36823.64	-24.10	4.95		5.99	0.000966	8.17	4509.57	228.72	0.32
W100_downstream1	83635.7	Max WS	36872.23	-21.72	4.89		5.52	0.000677	6.38	5780.15	333.27	0.27
W100_downstream1	81786.1	Max WS	37028.37	-31.97	3.84		4.39	0.000541	5.95	6224.18	339.50	0.24
W100_downstream1	80903.1	Max WS	37102.94	-27.77	3.54	-12.86	3.96	0.000428	5.22	7103.14	385.52	0.21
W100_downstream1	80883.1 S. PACIFIC RR		Bridge									
W100_downstream1	80863.1	Max WS	37102.94	-28.10	3.11		3.54	0.000499	5.25	7065.93	385.04	0.22
W100_downstream1	80538.0	Max WS	37102.94	-33.12	3.26	-20.59	3.42	0.000123	3.21	11556.96	491.74	0.12

White Oak Bayou
Scenario 1: North Canal Only 10-Year

HEC-RAS Plan: NC_10yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	36134.	Max WS	21247.14	24.19	52.52		53.20	0.000535	6.59	3226.25	197.88	0.29
E100-00-00	35718.0	Max WS	21246.36	23.76	52.27		52.99	0.000477	6.82	3116.86	190.93	0.30
E100-00-00	35158.	Max WS	21324.67	22.89	52.09		52.71	0.000502	6.31	3377.61	208.82	0.28
E100-00-00	35006.0	Max WS	21349.68	22.66	51.96	39.67	52.64	0.000456	6.62	3226.48	271.91	0.29
E100-00-00	34951.5 ELLA		Bridge									
E100-00-00	34895.0	Max WS	21327.32	22.56	51.71		52.40	0.000465	6.67	3197.34	265.18	0.29
E100-00-00	34645.	Max WS	21356.08	22.24	51.63		52.27	0.000547	6.44	3356.03	354.65	0.29
E100-00-00	34206.0	Max WS	21422.12	21.68	51.41		52.05	0.000448	6.42	3344.43	242.00	0.28
E100-00-00	33962.58	Max WS	21468.86	21.61	51.53		51.94	0.000377	5.15	4271.38	484.78	0.25
E100-00-00	33909.08	Max WS	21475.95	21.60	51.49		51.92	0.000503	5.24	4138.72	477.54	0.26
E100-00-00	33770.	Max WS	21494.22	21.56	51.46		51.87	0.000260	5.23	4441.35	368.14	0.22
E100-00-00	33681.0	Max WS	21503.40	21.53	51.17	38.71	51.84	0.000462	6.61	3255.65	364.26	0.29
E100-00-00	33645.5 W 18TH		Bridge									
E100-00-00	33610.0	Max WS	21501.11	21.61	51.02		51.71	0.000478	6.70	3210.40	354.93	0.29
E100-00-00	33357.	Max WS	21529.17	21.41	50.96		51.58	0.000580	6.33	3399.58	218.96	0.28
E100-00-00	32570.0	Max WS	21663.59	20.78	50.61		51.19	0.000391	6.08	3560.61	212.22	0.26
E100-00-00	31583.0	Max WS	21772.01	19.35	50.30		50.82	0.000342	5.81	3760.51	240.13	0.25
E100-00-00	30779.0	Max WS	21880.71	18.79	50.09		50.56	0.000303	5.60	4343.38	428.66	0.23
E100-00-00	29659.	Max WS	22000.17	17.66	49.78		50.19	0.000351	5.17	4478.57	649.78	0.22
E100-00-00	29368.0	Max WS	22075.08	17.37	49.42	35.27	50.08	0.000424	6.49	3406.51	252.38	0.27
E100-00-00	29297.5 TC JESTER SOUTH		Bridge									
E100-00-00	29203.0	Max WS	21950.23	17.35	47.98		48.74	0.000511	6.98	3143.34	177.83	0.29
E100-00-00	28775.	Max WS	21996.40	16.90	48.07		48.53	0.000462	5.44	4045.73	271.53	0.25
E100-00-00	28375.0	Max WS	22011.19	16.48	47.70	34.24	48.35	0.000431	6.45	3413.49	201.14	0.28
E100-00-00	28357.0 BICYCLE BRIDGE		Bridge									
E100-00-00	28330.0	Max WS	22008.35	16.41	47.59		48.24	0.000433	6.46	3404.58	200.89	0.28
E100-00-00	28190.0	Max WS	22023.12	16.18	47.55	33.74	48.18	0.000394	6.37	3455.61	193.11	0.27
E100-00-00	28152.5 W 11TH		Bridge									
E100-00-00	28113.0	Max WS	22016.28	16.28	47.36		48.01	0.000404	6.48	3399.92	190.68	0.27
E100-00-00	27982.	Max WS	22023.55	16.25	47.25		47.95	0.000501	6.69	3293.67	198.59	0.29
E100-00-00	27429.0	Max WS	22054.98	16.12	47.06		47.69	0.000428	6.35	3474.43	205.33	0.27
E100-00-00	26598.	Max WS	22143.61	15.35	46.77		47.34	0.000401	6.04	3663.73	216.98	0.26
E100-00-00	26498.0	Max WS	22153.57	15.26	46.76	32.92	47.30	0.000382	5.93	3735.97	218.74	0.25
E100-00-00	26432.5 TC JESTER		Bridge									
E100-00-00	26366.0	Max WS	22149.95	15.16	46.59		47.14	0.000385	5.95	3720.78	218.32	0.25
E100-00-00	26307.3	Max WS	22157.33	15.13	46.67		47.11	0.000341	5.37	4431.78	478.18	0.23
E100-00-00	26225	Max WS	22163.09	15.04	46.66		47.08	0.000362	5.28	4447.09	473.81	0.23
E100-00-00	26140.	Max WS	22164.29	14.97	46.49		47.05	0.000419	6.04	3667.17	227.31	0.26
E100-00-00	25536.0	Max WS	22199.93	14.48	46.24		46.80	0.000404	6.06	3770.36	301.42	0.26
E100-00-00	25132.	Max WS	22233.05	14.29	46.13		46.65	0.000363	5.91	4241.53	369.12	0.26
E100-00-00	24817.0	Max WS	22250.48	14.14	45.82	32.92	46.50	0.000606	6.60	3372.25	229.36	0.30
E100-00-00	24789.0 UNION PACIFIC RR		Bridge									
E100-00-00	24758.0	Max WS	22244.26	13.76	45.28		45.98	0.000611	6.68	3329.11	224.98	0.31
E100-00-00	24636.	Max WS	22260.23	13.61	45.40		45.92	0.000399	5.87	4170.19	416.41	0.26
E100-00-00	23934.0	Max WS	22312.41	12.75	45.10		45.59	0.000496	5.62	3968.23	285.07	0.27
E100-00-00	23550.0	Max WS	22347.41	12.77	45.01	29.43	45.43	0.000309	5.26	4250.23	255.31	0.23
E100-00-00	23506.5 DURHAM		Bridge									
E100-00-00	23444.0	Max WS	22346.21	12.69	44.82		45.26	0.000313	5.29	4223.87	254.26	0.23
E100-00-00	23180.	Max WS	22359.74	12.46	44.66		45.18	0.000333	5.84	4230.94	497.79	0.24
E100-00-00	22983.	Max WS	22368.75	12.29	44.45		45.11	0.000487	6.58	3644.55	477.21	0.29
E100-00-00	22834.0	Max WS	22380.96	12.16	44.31	31.39	45.03	0.000617	6.78	3302.18	476.24	0.29
E100-00-00	22796.5 SHEPHERD		Bridge									
E100-00-00	22758.0	Max WS	22374.19	12.11	44.12		44.84	0.000677	6.80	3523.35	462.93	0.29
E100-00-00	22610.	Max WS	22387.25	11.92	44.15		44.74	0.000594	6.23	3961.39	441.71	0.27
E100-00-00	22224.0	Max WS	22419.05	11.41	44.21		44.50	0.000470	4.60	6657.13	716.20	0.21
E100-00-00	21444.0	Max WS	22462.96	10.52	43.51		44.11	0.000659	6.23	3665.22	392.06	0.27
E100-00-00	20746.0	Max WS	22506.05	10.00	42.96		43.58	0.000862	6.31	3567.73	243.86	0.29
E100-00-00	20644.0	Max WS	22516.12	9.95	43.00	29.42	43.51	0.000523	5.84	4893.95	773.39	0.25
E100-00-00	20633.0 Pipeline		Bridge									
E100-00-00	20622.0	Max WS	22513.32	9.95	42.88		43.39	0.000538	5.90	4780.29	749.16	0.25
E100-00-00	20521.	Max WS	22521.23	9.91	42.81		43.35	0.000510	6.04	4764.77	610.62	0.25
E100-00-00	19917.0	Max WS	22571.28	9.66	42.33		42.98	0.000683	6.44	3509.72	405.76	0.28
E100-00-00	19463.0	Max WS	22607.24	9.25	41.98		42.66	0.000729	6.61	3422.64	213.91	0.29
E100-00-00	18857	Max WS	22653.45	8.03	41.50	28.58	42.22	0.000756	6.82	3458.16	289.69	0.29
E100-00-00	18800 I-10 WBFR		Bridge									
E100-00-00	18747	Max WS	22653.18	7.81	41.56		42.08	0.000520	5.90	4063.33	312.85	0.25
E100-00-00	18746	Max WS	22653.53	7.81	41.56	27.18	42.08	0.000520	5.90	4063.15	312.84	0.25
E100-00-00	18595 I-10 BRIDGE		Bridge									
E100-00-00	18443	Max WS	22650.75	7.19	40.63		41.21	0.000568	6.10	3798.91	280.90	0.26
E100-00-00	18442	Max WS	22650.56	7.19	40.63	26.96	41.21	0.000568	6.10	3798.74	280.89	0.26
E100-00-00	18394 I-10 EBFR		Bridge									
E100-00-00	18377.	Max WS	22647.71	6.98	40.10		40.74	0.000659	6.43	3577.39	270.72	0.28
E100-00-00	18234.0	Max WS	22665.07	6.77	40.29	26.38	40.65	0.000384	4.84	4685.78	283.83	0.21
E100-00-00	18220.0 UNION PACIFIC RR		Bridge									
E100-00-00	18199.0	Max WS	22663.13	6.70	40.01		40.39	0.000413	4.94	4588.60	280.53	0.22
E100-00-00	18176.0	Max WS	22664.24	6.79	39.91	26.16	40.38	0.000368	5.49	4127.81	247.76	0.22
E100-00-00	18138.0 YALE		Bridge									
E100-00-00	18082.0	Max WS	22659.88	6.87	39.04		39.70	0.000526	6.49	3489.25	222.55	0.27
E100-00-00	17905.	Max WS	22674.54	6.86	39.02		39.60	0.000612	6.09	3744.88	267.39	0.27
E100-00-00	17756.0	Max WS	22686.38	6.85	38.94	26.95	39.49	0.000765	5.95	3814.09	282.04	0.29
E100-00-00	17726 S. HEIGHTS		Bridge									
E100-00-00	17696	Max WS	22657.33	6.85	37.58		38.25	0.000950	6.58	3443.69	262.28	0.32
E100-00-00	17657	Max WS	22660.65	6.35	37.60	26.46	38.22	0.000875	6.33	3580.55	269.75	0.31
E100-00-00	17627 N. HEIGHTS		Bridge									
E100-00-00	17597.0	Max WS	22640.01	6.35	36.66		37.38	0.001015	6.79	3335.04	256.20	0.33
E100-00-00	17318.	Max WS	22648.89	6.35	36.26		37.11	0.000926	7.38	3067.85	202.67	0.33
E100-00-00	16831.0	Max WS	22686.04	6.34	36.22		36.79	0.000357	6.04	3755.26	316.68	0.31

HEC-RAS Plan: NC_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	15795.0	Max WS	22721.97	4.84	36.06		36.36	0.000461	4.36	5206.80	385.73	0.21
E100-00-00	15278.	Max WS	22727.72	4.41	35.47		36.12	0.000498	6.49	3499.57	225.83	0.29
E100-00-00	14977.0	Max WS	22739.44	4.16	35.50	23.53	36.01	0.000238	5.74	3964.63	257.10	0.26
E100-00-00	14937.0 I-10 EBFR ACCESS		Bridge									
E100-00-00	14897.0	Max WS	22738.09	3.39	34.68		35.19	0.000240	5.75	3951.06	256.78	0.26
E100-00-00	14890	Max WS	22734.97	3.42	34.56	22.77	35.19	0.000289	6.40	3551.76	225.46	0.28
E100-00-00	14775 I-10 BRIDGE		Bridge									
E100-00-00	14660	Max WS	22727.91	3.42	34.34		35.00	0.000300	6.49	3504.25	224.25	0.29
E100-00-00	14590.0	Max WS	22722.71	3.45	34.11	22.83	34.97	0.000396	7.44	3053.36	192.91	0.33
E100-00-00	14562.0 I-10 WB ACCESS		Bridge									
E100-00-00	14532.0	Max WS	22716.62	3.41	33.93		34.81	0.000915	7.51	3026.63	192.13	0.33
E100-00-00	14354.0	Max WS	22737.19	3.29	34.34		34.68	0.000192	4.66	4883.60	473.97	0.20
E100-00-00	13924.0	Max WS	22738.91	3.18	33.88	22.03	34.51	0.000647	6.33	3591.51	318.43	0.27
E100-00-00	13909.5 UNION PAC. RR		Bridge									
E100-00-00	13898.0	Max WS	22733.85	2.95	33.56		34.19	0.000657	6.37	3570.94	315.54	0.28
E100-00-00	13494.	Max WS	22744.72	2.47	33.41		33.90	0.000747	5.62	4045.24	392.50	0.26
E100-00-00	13220.0	Max WS	22758.88	2.15	33.51	21.83	33.77	0.000186	4.11	5539.76	562.13	0.19
E100-00-00	13182.5 STUDEMONT		Bridge									
E100-00-00	13143.0	Max WS	22758.88	2.15	33.43		33.67	0.000179	4.00	6026.51	497.60	0.18
E100-00-00	12698.	Max WS	22761.85	1.87	33.08		33.52	0.000528	5.37	4240.21	339.24	0.27
E100-00-00	12066.0	Max WS	22784.38	1.47	32.96		33.23	0.000387	4.20	5419.64	375.37	0.19
E100-00-00	11546.0	Max WS	22802.63	0.90	32.85		33.08	0.000184	3.86	6037.96	572.78	0.19
E100-00-00	11021.	Max WS	22823.76	0.63	32.81		33.00	0.000139	3.58	6735.24	719.66	0.16
E100-00-00	10908.0	Max WS	22827.89	0.57	32.82	20.01	32.99	0.000121	3.43	8029.24	862.70	0.15
E100-00-00	10852.5 TAYLOR (SAWYER)		Bridge									
E100-00-00	10804.0	Max WS	22827.18	0.45	32.67		32.83	0.000121	3.41	8008.40	861.79	0.15
E100-00-00	10643.	Max WS	22828.81	0.14	32.36		32.83	0.000456	5.52	4303.46	368.55	0.24
E100-00-00	9779.0	Max WS	22862.59	-1.51	32.34		32.55	0.000137	3.70	6956.71	587.10	0.16
E100-00-00	8532.0	Max WS	22909.64	-1.76	32.36		32.40	0.000039	1.64	14007.07	855.80	0.07
E100-00-00	8140.	Max WS	22925.10	-2.43	32.31		32.36	0.000211	1.72	14128.10	1116.21	0.07
E100-00-00	7649.0	Max WS	22940.99	-3.26	32.18	16.10	32.32	0.000084	3.28	12375.72	1359.75	0.13
E100-00-00	7608.5 HOUSTON		Bridge									
E100-00-00	7568.0	Max WS	22940.99	-3.15	32.19		32.29	0.000064	2.85	12243.53	1357.57	0.11
E100-00-00	7546.0	Max WS	22941.84	-3.16	32.17	16.07	32.29	0.000074	3.05	11137.44	1375.40	0.12
E100-00-00	7535.5 Pipeline		Bridge									
E100-00-00	7529.0	Max WS	22941.84	-3.16	32.13		32.25	0.000075	3.06	11078.05	1373.80	0.12
E100-00-00	7481.0	Max WS	22941.80	-3.17	32.08		32.25	0.000112	3.49	8233.29	1063.80	0.16
E100-00-00	7253.1	Max WS	22941.71	-3.19	32.11		32.22	0.000044	2.59	8884.02	609.52	0.10
E100-00-00	7253.05		Lat Struct									
E100-00-00	7253	Max WS	22940.84	-3.19	32.11	11.48	32.22	0.000044	2.59	8884.01	609.52	0.10
E100-00-00	7205 Prop I-10 DC		Bridge									
E100-00-00	7138.1	Max WS	22940.84	-3.20	31.96		32.10	0.000059	2.96	7790.18	558.78	0.12
E100-00-00	7138	Max WS	22940.08	-3.20	31.96	12.31	32.10	0.000059	2.96	7790.18	558.78	0.12
E100-00-00	7057 Prop I-10 Ramp		Bridge									
E100-00-00	7016.1	Max WS	22940.04	-3.22	31.47		31.80	0.000124	4.65	4929.79	486.93	0.18
E100-00-00	7016	Max WS	22940.65	-3.22	31.47		31.80	0.000124	4.65	4929.79	486.93	0.18
E100-00-00	6980	Max WS	22940.65	-3.22	31.63		31.79	0.000108	3.22	7163.00	528.97	0.13
E100-00-00	6979		Lat Struct									
E100-00-00	6975.0	Max WS	22926.12	-3.22	31.63		31.79	0.000108	3.22	7162.95	528.97	0.13
E100-00-00	6898.0	Max WS	22791.05	-4.23	31.55		31.78	0.000295	3.84	6179.03	477.91	0.16
E100-00-00	6895	Max WS	22791.08	-4.23	31.55		31.78	0.000295	3.84	6178.59	477.90	0.16
E100-00-00_02	6775.	Max WS	30391.99	-4.30	31.55		31.67	0.000098	2.73	11507.10	941.15	0.12
E100-00-00_02	6637.0	Max WS	30385.56	-4.37	31.51	17.19	31.65	0.000099	3.03	10178.66	832.37	0.13
E100-00-00_02	6600 Prop I-45 DC		Bridge									
E100-00-00_02	6575.1	Max WS	30381.73	-4.41	31.47		31.62	0.000106	3.07	10126.60	895.48	0.13
E100-00-00_02	6575.0	Max WS	30380.46	-4.41	31.47	17.43	31.62	0.000106	3.07	10126.61	895.48	0.13
E100-00-00_02	6551 Prop I-45 Ramp		Bridge									
E100-00-00_02	6515.0	Max WS	30377.85	-4.44	31.45		31.60	0.000108	3.07	10228.70	828.77	0.13
E100-00-00_02	6387.0	Max WS	30374.00	-4.38	31.44	18.01	31.58	0.000110	3.05	9965.07	1212.11	0.13
E100-00-00_02	6352 Prop I-45 NBML		Bridge									
E100-00-00_02	6298.1	Max WS	30375.27	-4.51	31.44		31.56	0.000095	2.85	10674.29	1120.60	0.12
E100-00-00_02	6298	Max WS	30376.54	-4.51	31.44	16.51	31.56	0.000095	2.85	10674.28	1120.60	0.12
E100-00-00_02	6252 Prop I-45 DC		Bridge									
E100-00-00_02	6201.1	Max WS	30379.08	-4.65	31.45		31.55	0.000068	2.58	11767.11	981.29	0.11
E100-00-00_02	6201	Max WS	30377.81	-4.65	31.45	15.59	31.55	0.000068	2.58	11767.11	981.29	0.11
E100-00-00_02	6164 Prop I-45 Ramp		Bridge									
E100-00-00_02	6122.0	Max WS	30358.57	-4.33	31.32		31.47	0.000080	3.12	9726.68	848.77	0.13
E100-00-00_02	5525.0	Max WS	30350.76	-3.15	31.29		31.42	0.000097	2.85	10660.10	649.05	0.12
E100-00-00_02	4994.0	Max WS	30316.85	-3.09	31.04	15.56	31.31	0.000344	4.27	7601.27	538.21	0.17
E100-00-00_02	4980.0 RR OVERPASS		Bridge									
E100-00-00_02	4961.0	Max WS	29906.31	-3.03	30.38		30.69	0.000434	4.51	7043.76	530.74	0.18
E100-00-00_02	4812.0	Max WS	29740.00	-3.49	29.99	14.86	30.56	0.001317	6.06	4906.76	383.96	0.30
E100-00-00_02	4774.5 CROCKETT/HOGAN		Bridge									
E100-00-00_02	4687.0	Max WS	29643.50	-4.67	29.86		30.28	0.000884	5.19	5709.55	431.01	0.25
E100-00-00_02	4407.	Max WS	29544.51	-3.62	29.56		30.07	0.000642	5.75	5212.63	359.02	0.23
E100-00-00_02	4014.0	Max WS	29558.12	-2.15	29.51	13.99	29.84	0.000522	4.57	6460.88	396.34	0.20
E100-00-00_02	3997.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	3976.0	Max WS	29553.57	-2.40	29.36		29.69	0.000536	4.60	6430.62	396.85	0.20
E100-00-00_02	3681.	Max WS	29541.62	-3.80	29.02		29.51	0.000700	5.63	5252.41	311.65	0.24
E100-00-00_02	3585.0	Max WS	29538.55	-4.26	28.93		29.44	0.000619	5.78	5108.25	305.13	0.25
E100-00-00_02	3233.0	Max WS	29582.47	-4.79	29.13	9.48	29.26	0.000200	2.89	10225.93	1023.99	0.14
E100-00-00_02	3094 Prop I-10 WBML		Bridge									
E100-00-00_02	2954.1	Max WS	29565.84	-5.22	28.95		29.12	0.000273	3.34	8863.17	890.91	0.16
E100-00-00_02	2954.0	Max WS	29565.85	-5.22	28.95	10.46	29.12	0.000273	3.34	8863.15	890.91	0.16
E100-00-00_02	2857 Prop I-45 BNML		Bridge									
E100-00-00_02	2760.1	Max WS	29562.18	-5.51	28.93		29.07	0.000203	3.06	9674.25	832.63	0.14
E100-00-00_02	2760.0	Max WS	29564.03	-5.51	28.93	12.26	29.07	0.000203	3.06	9674.23	832.63	0.14

HEC-RAS Plan: NC_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_02	2639 Prop I-10 WB Exp		Bridge									
E100-00-00_02	2518.1	Max WS	29536.45	-5.88	28.70		28.90	0.000297	3.66	8066.71	637.19	0.17
E100-00-00_02	2518.0	Max WS	29536.46	-5.88	28.70	12.78	28.90	0.000297	3.66	8066.69	637.19	0.17
E100-00-00_02	2434 Prop I-45 SBML		Bridge									
E100-00-00_02	2350.1	Max WS	29499.22	-6.13	28.35		28.67	0.000521	4.56	6466.11	593.31	0.23
E100-00-00_02	2350.0	Max WS	29499.22	-6.13	28.35	13.47	28.67	0.000521	4.56	6466.08	593.30	0.23
E100-00-00_02	2280 Prop I-10 EBML		Bridge									
E100-00-00_02	2210.0	Max WS	29471.07	-6.34	28.19		28.53	0.000501	4.66	6329.43	639.76	0.22
E100-00-00_02	1580.	Max WS	29329.37	-7.83	27.44		28.12	0.000841	6.59	4521.75	785.57	0.27
E100-00-00_02	1353.0	Max WS	29165.45	-8.34	26.95	13.59	27.87	0.001279	7.69	3793.55	666.93	0.32
E100-00-00_02	1335.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	1319.0	Max WS	28572.68	-8.37	26.30		27.25	0.001340	7.80	3665.51	577.49	0.33
E100-00-00_02	984.0	Max WS	28625.61	-8.69	26.34	10.39	26.93	0.000489	6.20	4727.12	565.03	0.26
E100-00-00_02	978 MAIN STREET		Bridge									
E100-00-00_02	971.6	Max WS	28403.89	-8.69	26.08		26.68	0.000505	6.25	4638.62	556.05	0.27
E100-00-00_02	971.5	Max WS	28403.89	-8.69	26.08	10.33	26.68	0.000505	6.25	4638.60	556.05	0.27
E100-00-00_02	961.5 1ST STREET		Bridge									
E100-00-00_02	852	Max WS	27356.79	-6.40	25.25		26.09	0.000819	7.36	3740.13	551.57	0.34
E100-00-00_02	851.0	Max WS	27363.36	-6.40	25.25		26.09	0.000819	7.36	3739.85	551.52	0.34
E100-00-00_03	654.0	Max WS	5780.60	-6.50	25.25		25.27	0.000012	1.06	5433.64	546.60	0.04
E100-00-00_03	400.0	Max WS	5699.46	-8.58	25.24	-1.89	25.27	0.000018	1.35	4217.17	446.35	0.05
E100-00-00_03	381.0 UNION PACIFIC RR		Bridge									
E100-00-00_03	365.0	Max WS	5675.74	-8.23	25.23		25.26	0.000018	1.37	4143.10	457.31	0.05
E100-00-00_03	210.0	Max WS	5643.46	-7.81	25.22	-1.69	25.25	0.000022	1.48	3807.48	491.56	0.06
E100-00-00_03	191.0 UNION PACIFIC RR		Bridge									
E100-00-00_03	173.1	Max WS	5581.90	-6.84	25.20		25.24	0.000025	1.54	3625.00	648.29	0.06
E100-00-00_03	173.0	Max WS	5578.95	-6.84	25.20		25.24	0.000025	1.54	3625.00	648.29	0.06

Little White Oak Bayou
Scenario 1: North Canal Only 10-Year

HEC-RAS Plan: NC_10yr River: E101-00-00 Reach: E101-00-00_0003 Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	9819.000	Max WS	7910.93	16.33	36.51		36.80	0.000675	4.30	1841.53	156.96	0.22
E101-00-00_0003	9750.000	Max WS	7910.57	16.31	36.48		36.75	0.000652	4.15	1904.28	167.43	0.22
E101-00-00_0003	9000.000	Max WS	7905.70	15.50	36.17		36.31	0.000519	3.23	2833.14	507.38	0.19
E101-00-00_0003	8469.000	Max WS	7982.00	13.02	35.89		36.04	0.000482	3.46	2713.69	317.54	0.17
E101-00-00_0003	7984.000	Max WS	7908.70	13.76	35.62		35.79	0.000531	3.83	2544.17	314.31	0.19
E101-00-00_0003	6838.000	Max WS	7974.21	12.20	34.85		35.09	0.000702	3.92	2031.79	198.86	0.22
E101-00-00_0003	5861.000	Max WS	7945.03	9.91	33.89		34.19	0.001101	4.44	1860.14	242.17	0.25
E101-00-00_0003	4720.000	Max WS	7801.43	8.13	32.84		33.20	0.000741	4.99	1999.11	271.32	0.21
E101-00-00_0003	4279.000	Max WS	7607.41	9.00	32.27		32.74	0.001264	5.51	1379.70	104.43	0.27
E101-00-00_0003	4130.000	Max WS	7727.59	8.68	32.46	17.64	32.61	0.000210	3.14	2461.31	174.95	0.14
E101-00-00_0003	4091.000 N. MAIN		Bridge									
E101-00-00_0003	4050.000	Max WS	7697.76	7.87	32.40		32.54	0.000177	2.97	2600.65	231.09	0.13
E101-00-00_0003	3952.	Max WS	7705.91	6.87	32.39		32.52	0.000158	2.99	2636.34	188.29	0.13
E101-00-00_0003	3466.000	Max WS	7759.76	1.92	32.37		32.48	0.000056	2.99	3707.23	249.16	0.10
E101-00-00_0003	3323.0	Max WS	7795.39	-1.03	32.40	12.03	32.46	0.000031	2.22	4460.83	280.47	0.08
E101-00-00_0003	3278.0 I-45 Ramp		Bridge									
E101-00-00_0003	3236.1	Max WS	7800.86	-2.82	32.41		32.46	0.000025	1.92	5443.72	429.21	0.07
E101-00-00_0003	3236.0	Max WS	7797.58	-2.82	32.41	10.73	32.46	0.000025	1.92	5443.72	429.21	0.07
E101-00-00_0003	3085 I-45 NBML		Bridge									
E101-00-00_0003	2958.1	Max WS	7797.58	-2.52	32.41		32.45	0.000024	1.74	5807.01	1607.69	0.07
E101-00-00_0003	2958	Max WS	7798.69	-2.52	32.41	10.77	32.45	0.000024	1.74	5807.00	1607.69	0.07
E101-00-00_0003	2833 I-45 SBML		Bridge									
E101-00-00_0003	2389.000	Max WS	7759.06	-0.26	32.34		32.40	0.000100	2.02	5488.52	393.98	0.07
E101-00-00_0003	2325.	Max WS	7769.78	-0.15	32.34		32.39	0.000092	1.88	5723.28	400.40	0.07
E101-00-00_0003	1855.000	Max WS	7805.31	0.68	32.33		32.36	0.000039	1.34	6610.70	415.41	0.04
E101-00-00_0003	1126.	Max WS	7801.30	-1.85	32.22		32.29	0.000228	2.32	4333.59	529.90	0.09
E101-00-00_0003	1070.000	Max WS	7785.80	-2.04	32.19	9.24	32.29	0.000190	2.65	4221.52	579.18	0.10
E101-00-00_0003	1029.500 WRIGHTWOOD		Bridge									
E101-00-00_0003	987.000	Max WS	7689.41	-2.04	31.97		32.06	0.000213	2.64	4114.83	540.76	0.10
E101-00-00_0003	911.	Max WS	7711.50	-2.19	31.99		32.04	0.000116	2.07	5520.04	407.57	0.07
E101-00-00_0003	756.	Max WS	7667.81	-2.51	31.91		31.99	0.000606	2.29	3496.14	450.50	0.12
E101-00-00_0003	637.000	Max WS	7662.75	-2.75	31.88	10.83	31.93	0.000387	1.77	4641.41	593.92	0.09
E101-00-00_0003	538.000 QUITMAN/WHITE OA		Bridge									
E101-00-00_0003	442.000	Max WS	7445.77	-2.75	31.56		31.62	0.000261	1.88	4456.63	569.01	0.09
E101-00-00_0003	306.000	Max WS	7453.79	-2.86	31.57		31.59	0.000021	1.07	8681.31	1232.85	0.05
E101-00-00_0003	259.1	Max WS	7451.13	-2.90	31.57		31.59	0.000020	1.09	7266.99	555.75	0.05
E101-00-00_0003	259	Max WS	7450.64	-2.90	31.57	6.88	31.59	0.000020	1.09	7266.97	555.75	0.05
E101-00-00_0003	229 Prop I-10 DC		Bridge									
E101-00-00_0003	180.1	Max WS	7457.64	-2.96	31.57		31.58	0.000020	1.06	7082.21	446.92	0.05
E101-00-00_0003	180	Max WS	7458.45	-2.96	31.57	8.51	31.58	0.000020	1.06	7082.18	446.92	0.05
E101-00-00_0003	130 Prop-10 Ramp		Bridge									
E101-00-00_0003	101.1	Max WS	7465.12	-3.03	31.57		31.58	0.000015	0.92	8168.11	495.75	0.04
E101-00-00_0003	101	Max WS	7465.85	-3.03	31.57		31.58	0.000015	0.92	8168.11	495.75	0.04
E101-00-00_0003	68	Max WS	7460.55	-4.00	31.57		31.58	0.000026	1.06	7067.10	438.48	0.04
E101-00-00_0003	63	Max WS	7475.09	-4.00	31.56		31.58	0.000026	1.06	7066.98	438.47	0.04
E101-00-00_0003	3	Max WS	7602.22	-4.23	31.55		31.58	0.000035	1.34	5903.12	489.52	0.06
E101-00-00_0003	1	Max WS	7600.91	-4.23	31.55		31.58	0.000035	1.33	5903.08	489.52	0.06

North Canal
Scenario 1: North Canal Only 10-Year

HEC-RAS Plan: NC_10yr River: E100-00-00 Reach: North_Canal Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
North_Canal	1303	Max WS	21582.76	4.30	25.25		26.84	0.001146	10.11	2134.08	159.82	0.49
North_Canal	1302.9	Max WS	21582.76	4.30	25.25		26.84	0.001146	10.11	2134.05	159.82	0.49
North_Canal	1302		Lat Struct									
North_Canal	1132	Max WS	21606.53	4.13	25.00	16.88	26.64	0.001195	10.25	2108.17	159.82	0.50
North_Canal	1106 San Jacinto		Bridge									
North_Canal	1080	Max WS	21604.81	4.08	24.91		26.56	0.001215	10.30	2097.33	159.82	0.50
North_Canal	1079		Lat Struct									
North_Canal	838	Max WS	21637.88	3.84	24.53		26.25	0.001301	10.53	2055.12	159.81	0.52
North_Canal	579	Max WS	21673.15	3.58	24.12	16.51	25.92	0.001402	10.78	2010.51	159.80	0.54
North_Canal	548 Union Pacific RR		Bridge									
North_Canal	516	Max WS	21671.39	3.52	24.00		25.83	0.001433	10.85	1996.84	159.80	0.54
North_Canal	276	Max WS	21668.53	3.28	23.71		25.56	0.001000	10.93	1983.32	110.00	0.45

Buffalo Bayou
Scenario 1: North Canal Only 100-Year

HEC-RAS Plan: NC_100yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	148800.4	Max WS	17340.25	3.15	41.20		41.32	0.000306	3.10	7465.06	1803.55	0.10
W100_upstrm	148795.4	Max WS	17340.24	3.15	41.19	17.88	41.32	0.000306	3.10	7464.55	1803.53	0.10
W100_upstrm	148768.4 SOUTHERN PACIFIC		Bridge									
W100_upstrm	148741.4	Max WS	17337.77	3.04	41.07		41.19	0.000307	3.11	7459.09	1803.37	0.10
W100_upstrm	147632.4	Max WS	17324.57	-1.17	40.85		40.96	0.000105	2.71	8323.61	499.68	0.10
W100_upstrm	146698.0	Max WS	17390.68	1.88	40.72		40.85	0.000148	3.22	7832.48	680.72	0.11
W100_upstrm	145723.9	Max WS	17455.61	1.61	40.53		40.73	0.000187	4.20	7797.41	447.98	0.13
W100_upstrm	144753.5	Max WS	17526.85	0.07	40.34		40.54	0.000188	3.74	6758.20	422.93	0.13
W100_upstrm	143966.8	Max WS	17574.80	-7.47	40.23		40.41	0.000195	3.77	8826.06	1115.13	0.13
W100_upstrm	143078.2	Max WS	17639.91	-4.19	40.09		40.24	0.000150	3.38	10065.34	692.24	0.12
W100_upstrm	142061.4	Max WS	17721.64	0.55	39.98		40.10	0.000103	3.13	9413.35	520.49	0.10
W100_upstrm	141320.1	Max WS	17784.50	-2.70	39.97		40.01	0.000053	2.02	16531.34	874.26	0.07
W100_upstrm	140116.2	Max WS	17855.70	-1.31	39.82		39.96	0.000139	3.35	10759.76	820.74	0.10
W100_upstrm	139320.0	Max WS	17905.74	-2.14	39.76		39.85	0.000112	2.74	12198.53	924.45	0.09
W100_upstrm	138607.9	Max WS	17954.05	-2.08	39.76		39.77	0.000026	1.47	24320.40	1334.23	0.05
W100_upstrm	137732.0	Max WS	17988.44	-2.40	39.70		39.78	0.000077	2.85	16002.07	1220.02	0.09
W100_upstrm	137113.0	Max WS	18042.88	-2.62	39.58		39.76	0.000137	3.79	9349.81	1190.95	0.12
W100_upstrm	136331.2	Max WS	18109.12	-2.09	39.53		39.56	0.000206	1.77	14207.67	722.02	0.06
W100_upstrm	135666.2	Max WS	18146.94	-1.47	39.40		39.51	0.000100	3.02	11496.55	704.13	0.10
W100_upstrm	134706.7	Max WS	18210.19	-1.93	39.38		39.42	0.000049	2.16	20026.75	1114.03	0.07
W100_upstrm	134090.6	Max WS	18240.95	-1.59	39.33		39.41	0.000069	2.68	15817.76	833.34	0.08
W100_upstrm	133772.1	Max WS	18259.80	-0.79	39.30	13.55	39.41	0.000092	3.24	15007.97	917.87	0.10
W100_upstrm	133760.1 FOOTBRIDGE		Bridge									
W100_upstrm	133748.1	Max WS	18259.23	-0.46	39.24		39.35	0.000097	3.31	14646.86	912.95	0.10
W100_upstrm	132963.8	Max WS	18323.13	-1.98	39.11		39.27	0.000147	3.50	8929.51	612.49	0.12
W100_upstrm	131789.8	Max WS	18407.18	-2.31	38.95		39.12	0.000136	3.67	9515.47	648.60	0.11
W100_upstrm	130765.5	Max WS	18490.53	-3.81	38.89		38.98	0.000065	2.71	12177.54	568.81	0.08
W100_upstrm	129725.3	Max WS	18559.71	-3.71	38.81		38.92	0.000099	3.33	13860.81	1032.43	0.10
W100_upstrm	129163.2	Max WS	18619.91	-3.13	38.72		38.86	0.000098	3.21	10285.12	730.72	0.10
W100_upstrm	128326.9	Max WS	18688.64	-4.05	38.67		38.77	0.000073	2.92	12939.40	1231.03	0.09
W100_upstrm	128109.6	Max WS	18688.30	-4.29	38.67		38.73	0.000146	1.99	9368.59	704.95	0.07
W100_upstrm	128104.6	Max WS	18688.30	-4.29	38.67	10.58	38.73	0.000146	1.99	9368.34	704.78	0.07
W100_upstrm	128066.7 SHEPHERD		Bridge									
W100_upstrm	128028.8	Max WS	18684.42	-4.51	38.59		38.65	0.000096	1.98	9419.72	762.68	0.07
W100_upstrm	126647.0	Max WS	18681.52	-3.93	38.54		38.56	0.000030	1.07	18153.25	1009.77	0.04
W100_upstrm	125376.9	Max WS	18759.87	-4.05	38.33		38.41	0.000229	2.25	8439.61	583.67	0.09
W100_upstrm	124983.5	Max WS	18786.95	-3.86	38.28		38.35	0.000052	2.11	9129.76	1351.74	0.09
W100_upstrm	124644.1	Max WS	18806.69	-3.69	38.24	13.78	38.33	0.000064	2.34	8028.54	567.43	0.09
W100_upstrm	124591.8 WAUGH DRIVE		Bridge									
W100_upstrm	124539.5	Max WS	18805.79	-3.74	38.22		38.31	0.000064	2.34	8038.88	567.88	0.09
W100_upstrm	123658.2	Max WS	18877.39	-2.04	38.24		38.25	0.000024	1.01	23578.60	2148.97	0.04
W100_upstrm	123138.8	Max WS	18914.67	-4.08	38.23		38.24	0.000017	0.90	23418.79	1512.72	0.03
W100_upstrm	122627.1	Max WS	18956.08	-6.08	38.19		38.24	0.000030	1.78	14956.73	1109.96	0.06
W100_upstrm	122572.1 MONTROSE COURT		Mult Open									
W100_upstrm	122517.1	Max WS	18956.67	-5.38	38.20		38.23	0.000056	1.68	14144.16	1026.14	0.06
W100_upstrm	122371.6	Max WS	18967.26	-7.00	38.19	9.37	38.23	0.000058	1.64	15013.17	1071.51	0.06
W100_upstrm	122265 ROSEMONT		Bridge									
W100_upstrm	122210.0	Max WS	18954.80	-5.60	38.14		38.18	0.000048	1.80	13246.60	811.74	0.06
W100_upstrm	122036.7	Max WS	18968.25	-8.40	38.13		38.17	0.000046	1.70	13730.39	913.65	0.06
W100_upstrm	121229.5	Max WS	19026.45	-11.37	38.10		38.14	0.000037	1.60	14868.92	950.61	0.06
W100_upstrm	120962.2	Max WS	19044.21	-10.59	38.07		38.13	0.000056	2.04	11563.53	734.81	0.07
W100_upstrm	120005.2	Max WS	19105.41	-7.78	38.06	8.47	38.07	0.000040	0.91	21036.67	1042.46	0.04
W100_upstrm	119952.6 MEMORIAL DRIVE		Bridge									
W100_upstrm	119900.0	Max WS	19088.97	-7.64	37.96		37.97	0.000026	0.92	20785.98	1040.17	0.04
W100_upstrm	119495.9	Max WS	19120.58	-7.21	37.96		37.96	0.000013	0.65	30146.91	1343.13	0.02
W100_upstrm	118667.7	Max WS	19189.97	-8.56	37.92		37.94	0.000039	1.21	16699.25	942.84	0.04
W100_upstrm	118466.1	Max WS	19192.53	-8.89	37.90	5.97	37.94	0.000032	1.61	15083.73	1177.62	0.06
W100_upstrm	118418.1 MEMORIAL DRIVE		Bridge									
W100_upstrm	118370.1	Max WS	19191.05	-8.87	37.88		37.91	0.000033	1.61	15030.23	1174.02	0.06
W100_upstrm	117845.4	Max WS	19222.55	-7.26	37.86		37.89	0.000046	1.51	14271.33	842.34	0.05
W100_upstrm	117204.3	Max WS	19270.30	-4.60	37.84		37.87	0.000029	1.22	16421.99	1190.08	0.05
W100_upstrm	116395.7	Max WS	19316.66	-3.88	37.81		37.84	0.000033	1.42	13565.85	563.56	0.05
W100_upstrm	116167.6	Max WS	19295.64	-3.68	37.73	7.91	37.83	0.000130	2.47	7844.86	379.43	0.08
W100_upstrm	116121.9 SABINE AVENUE		Bridge									
W100_upstrm	116076.2	Max WS	19211.36	-3.86	37.52		37.62	0.000126	2.46	7834.90	376.39	0.08
W100_upstrm	115804.5	Max WS	19216.38	-4.60	37.47		37.61	0.000065	3.33	9825.38	965.51	0.09
W100_upstrm	115740.6	Max WS	19226.88	-4.78	37.47	8.39	37.60	0.000057	3.06	9684.99	937.89	0.09
W100_upstrm	115700 I-45 Allen Pkwy		Bridge									
W100_upstrm	115674.0	Max WS	19123.77	-5.10	37.44		37.57	0.000060	3.09	9999.31	1100.59	0.09
W100_upstrm	115662.6	Max WS	19126.83	-5.20	37.45	8.37	37.56	0.000057	2.99	9780.07	1208.49	0.09
W100_upstrm	115635.5 I-45 Houston Ave		Bridge									
W100_upstrm	115621.1	Max WS	19144.94	-5.57	37.47		37.56	0.000044	2.71	10511.13	1328.44	0.08
W100_upstrm	115587.7	Max WS	19224.91	-6.22	37.47	8.26	37.56	0.000047	2.80	13855.06	1432.55	0.08
W100_upstrm	115553.5 I-45 SBML		Bridge									
W100_upstrm	115514.4	Max WS	19232.91	-6.96	37.48		37.55	0.000034	2.37	15463.77	1732.41	0.07
W100_upstrm	115509.1	Max WS	19232.42	-6.99	37.48	7.29	37.55	0.000034	2.39	15397.38	1751.50	0.07
W100_upstrm	115490 I-45 NBML		Bridge									
W100_upstrm	115423.0	Max WS	19235.15	-7.30	37.47		37.53	0.000031	2.26	14168.15	1501.47	0.07
W100_upstrm	115365.4	Max WS	19234.22	-7.52	37.47		37.53	0.000028	2.15	15467.58	1710.74	0.06
W100_upstrm	115284.6	Max WS	19240.45	-7.89	37.47		37.53	0.000030	2.24	22080.52	1706.19	0.06
W100_upstrm	115104.1	Max WS	19247.64	-8.31	37.46		37.52	0.000023	2.02	17873.37	1673.27	0.06
W100_upstrm	115001.2	Max WS	19156.85	-8.48	37.42	6.14	37.55	0.000053	3.02	14450.87	1482.57	0.09
W100_upstrm	115000 I-45 Ramp McKee		Bridge									
W100_upstrm	114907.3	Max WS	19162.37	-9.19	37.43		37.54	0.000047	2.74	12750.54	1244.10	0.08
W100_upstrm	114842.1	Max WS	19162.19	-9.48	37.42	5.85	37.54	0.000054	2.90	12671.96	1269.73	0.08
W100_upstrm	114830 I-45 Ramp Walker		Bridge									
W100_upstrm	114804.3	Max WS	19143.48	-9.61	37.41		37.53	0.000056	2.93	12993.57	1290.56	0.09
W100_upstrm	114492.0	Max WS	19189.21	-10.48	37.43		37.49	0.000052	1.97	10615.08	1143.99	0.08
W100_upstrm	114195.9	Max WS	19166.63	-11.52	37.38	5.82	37.45	0.000211	2.19	9449.14	911.58	0.08
W100_upstrm	114168.9 RUSK STREET		Bridge									
W100_upstrm	114141.9	Max WS	19001.08	-10.83	37.22		37.30	0.000232	2.26	8738.89	762.54	0.08
W100_upstrm	114097.4	Max WS	19003.54	-7.46	37.23	7.11	37.29	0.000076	1.98	10728.17	1075.30	0.07
W100_upstrm	114070.4 CAPITAL STREE		Bridge									

HEC-RAS Plan: NC_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	114043.4	Max WS	18940.76	-7.72	37.14		37.20	0.000073	1.96	10904.92	1104.72	0.07
W100_upstrm	113644.0	Max WS	18932.00	-8.91	37.06		37.19	0.000060	2.89	9857.19	637.35	0.09
W100_upstrm	113411.6	Max WS	18943.29	-9.61	37.05	4.19	37.15	0.000198	2.49	7614.71	583.07	0.10
W100_upstrm	113374.3 TEXAS AVE		Bridge									
W100_upstrm	113337.0	Max WS	18732.42	-9.65	36.86		36.97	0.000072	2.72	6888.73	577.87	0.08
W100_upstrm	113266.4	Max WS	18705.69	-9.11	36.83	7.49	36.97	0.000249	3.06	7223.86	638.27	0.10
W100_upstrm	113238.6 BAGBY		Bridge									
W100_upstrm	113210.8	Max WS	18613.63	-9.46	36.70		36.83	0.000245	3.01	7369.89	668.23	0.10
W100_upstrm	112974.0	Max WS	18578.01	-10.69	36.63	6.58	36.78	0.000194	3.12	6015.05	315.09	0.10
W100_upstrm	112944.9 PRAIRIE		Bridge									
W100_upstrm	112915.8	Max WS	18513.46	-10.82	36.55		36.70	0.000191	3.10	6028.71	327.85	0.10
W100_upstrm	112575.5	Max WS	18537.72	-9.20	36.53	7.98	36.62	0.000234	2.45	9663.02	972.16	0.08
W100_upstrm	112534.5 PRESTON STREET		Bridge									
W100_upstrm	112493.5	Max WS	18445.25	-9.47	36.42		36.51	0.000226	2.42	9821.03	985.23	0.08
W100_upstrm	112003.3	Max WS	18433.96	-9.69	36.34	5.05	36.41	0.000159	2.14	8975.39	551.56	0.07
W100_upstrm	111953.3 CONGRESS STREET		Bridge									
W100_upstrm	111903.3	Max WS	18354.08	-9.84	36.16		36.23	0.000158	2.13	8961.02	544.18	0.07
W100_upstrm	111853.5	Max WS	18346.19	-9.86	36.14	5.01	36.23	0.000172	2.38	8225.89	492.33	0.08
W100_upstrm	111818.6 SMITH STREET		Bridge									
W100_upstrm	111783.7	Max WS	18279.42	-8.67	36.04		36.13	0.000196	2.49	7626.30	439.61	0.08
W100_upstrm	111626.7	Max WS	18277.00	-11.83	36.02	5.93	36.10	0.000190	2.36	8538.34	600.27	0.08
W100_upstrm	111518.6 LOUISIANA		Bridge									
W100_upstrm	111410.5	Max WS	18112.91	-11.23	35.74		35.83	0.000145	2.43	8056.29	521.14	0.08
W100_upstrm	110876.6	Max WS	18153.82	-10.43	35.72	2.65	35.76	0.000089	1.75	14263.60	1380.87	0.06
W100_upstrm	110837.8 MILAM		Bridge									
W100_upstrm	110799.0	Max WS	18145.86	-10.72	35.69		35.73	0.000239	1.69	14629.51	1397.25	0.06
W100_upstrm	110672.7	Max WS	18140.36	-13.25	35.66	2.79	35.71	0.000187	2.02	15753.97	1343.08	0.06
W100_upstrm	110643.7 TRAVIS STREET		Bridge									
W100_upstrm	110614.7	Max WS	18109.40	-12.75	35.61		35.66	0.000210	2.07	15018.93	1322.03	0.07
W100_upstrm	110200.2	Max WS	18123.93	-9.11	35.55	5.18	35.60	0.000055	1.74	11739.15	658.63	0.06
W100_upstrm	110154.2 MAIN STREET		Bridge									
W100_upstrm	110108.2	Max WS	18114.78	-9.31	35.40		35.44	0.000055	1.74	11765.11	661.03	0.06
W100_upstrm	110103.2	Max WS	18115.76	-9.31	35.40		35.44	0.000055	1.74	11764.94	661.01	0.06
Downstream	109924.2	Max WS	25357.52	-13.02	35.40		35.51	0.000153	2.68	10322.64	464.65	0.08
Downstream	109551.7	Max WS	25357.29	-14.28	35.36	1.14	35.45	0.000149	2.43	10471.03	503.29	0.08
Downstream	109518.7 FANNIN STREET		Bridge									
Downstream	109485.7	Max WS	25356.97	-15.31	35.29		35.37	0.000134	2.35	11025.00	670.16	0.08
Downstream	109440.2	Max WS	25357.22	-16.48	35.27	0.58	35.37	0.000218	2.51	10097.83	336.70	0.08
Downstream	109395.2 SAN JACINTO STRE		Bridge									
Downstream	109350.2	Max WS	25356.22	-16.89	35.02		35.12	0.000214	2.50	10153.61	338.03	0.08
Downstream	109119.0	Max WS	25356.38	-17.14	34.93	0.66	35.02	0.000685	2.41	11360.61	1058.73	0.09
Downstream	109103.1 CROSSWALK		Bridge									
Downstream	109087.2	Max WS	25356.28	-17.55	34.86		34.95	0.000644	2.36	11728.97	1067.75	0.09
Downstream	108565.3	Max WS	25355.78	-12.77	34.62		34.73	0.000227	2.59	12300.19	1168.05	0.08
Downstream	108334.0	Max WS	25355.65	-14.06	34.58		34.65	0.000220	2.25	15446.01	1231.88	0.07
Downstream	107179.4	Max WS	25355.22	-20.52	34.35	-2.64	34.45	0.000185	2.68	10560.36	614.05	0.08
Downstream	107158.9 S. PACIFIC RR		Bridge									
Downstream	107139	Max WS	25355.29	-20.19	34.31		34.42	0.000192	2.72	10409.58	540.65	0.08
Downstream	107138.4	Max WS	25355.22	-20.19	34.31		34.42	0.000192	2.72	10409.49	540.61	0.08
W100_downstream1	106594.0	Max WS	59736.26	-16.70	34.31		34.88	0.001585	6.07	9993.42	903.47	0.20
W100_downstream1	106151.4	Max WS	59735.00	-13.85	33.35	8.14	34.01	0.002358	6.50	9189.32	384.68	0.21
W100_downstream1	106131.1 MCKEE		Bridge									
W100_downstream1	106110.8	Max WS	59733.26	-12.53	32.98		33.71	0.002692	6.89	8671.70	300.98	0.23
W100_downstream1	105705.4	Max WS	59732.62	-18.22	32.39	6.73	33.05	0.000585	6.50	9255.45	599.36	0.23
W100_downstream1	105667.4 ELYSIAN STREET		Bridge									
W100_downstream1	105629.4	Max WS	59732.11	-18.43	32.05		32.71	0.000593	6.54	9190.95	541.79	0.23
W100_downstream1	105476	Max WS	59732.07	-18.70	32.04		32.54	0.001653	5.68	10570.72	549.63	0.20
W100_downstream1	104962	Max WS	59731.69	-18.70	31.70		31.88	0.000768	3.43	17610.06	991.93	0.13
W100_downstream1	104900	Max WS	59731.48	-19.15	31.60		31.76	0.000194	3.22	18626.76	951.20	0.12
W100_downstream1	104464	Max WS	59731.32	-19.86	31.30		31.54	0.001606	3.97	15057.16	796.90	0.16
W100_downstream1	104301	Max WS	59731.04	-20.42	31.09		31.39	0.000279	4.41	13774.51	848.15	0.17
W100_downstream1	104242	Max WS	59730.99	-20.62	30.90		31.28	0.003492	4.98	11988.12	658.53	0.21
W100_downstream1	104118.0	Max WS	59731.05	-21.10	30.53	11.49	31.00	0.001069	6.05	12623.24	985.61	0.21
W100_downstream1	104070 Prop I-69 Ramp		Bridge									
W100_downstream1	103955.1	Max WS	59730.86	-21.79	30.38		30.81	0.000725	5.50	12952.01	869.42	0.18
W100_downstream1	103955.0	Max WS	59730.98	-21.79	30.38	6.43	30.81	0.000725	5.50	12951.94	869.42	0.18
W100_downstream1	103846 Prop I-69 DC		Bridge									
W100_downstream1	103786.1	Max WS	59730.86	-22.51	30.12		30.57	0.000842	5.56	12184.76	792.45	0.18
W100_downstream1	103786.0	Max WS	59730.91	-22.51	30.12	5.78	30.57	0.000842	5.56	12184.69	792.45	0.18
W100_downstream1	103694 Prop I-69 SBML		Bridge									
W100_downstream1	103534.1	Max WS	59730.77	-23.58	29.60		30.15	0.000905	6.03	10886.53	654.96	0.19
W100_downstream1	103534.0	Max WS	59730.77	-23.58	29.60	5.14	30.15	0.000905	6.03	10886.46	654.96	0.19
W100_downstream1	103383 Prop I-45 SBML		Bridge									
W100_downstream1	103241.1	Max WS	59730.59	-24.83	29.33		29.87	0.001737	5.87	10280.32	539.80	0.21
W100_downstream1	103241.0	Max WS	59730.62	-24.83	29.33	5.17	29.87	0.001737	5.87	10280.22	539.80	0.21
W100_downstream1	103161 Prop I-69 NBML		Bridge									
W100_downstream1	103095.1	Max WS	59730.38	-25.45	29.00		29.59	0.000627	6.16	9756.77	438.44	0.21
W100_downstream1	103095.0	Max WS	59730.50	-25.45	29.00	4.87	29.59	0.000627	6.16	9756.74	438.44	0.21
W100_downstream1	103065 Prop I-45 DC		Bridge									
W100_downstream1	103025.1	Max WS	59730.38	-25.75	28.77		29.43	0.000650	6.49	9228.96	383.17	0.21
W100_downstream1	103025.0	Max WS	59730.38	-25.75	28.77	4.05	29.43	0.000650	6.49	9228.92	383.16	0.21
W100_downstream1	102988 Prop I-10 DC		Bridge									
W100_downstream1	102952	Max WS	59730.19	-26.06	28.36		29.14	0.001066	7.09	8562.95	428.52	0.25
W100_downstream1	102895.0	Max WS	59730.08	-26.31	28.08		29.06	0.001598	7.97	7498.99	318.94	0.29
W100_downstream1	102875.3	Max WS	59730.08	-26.39	28.41	10.21	29.03	0.001387	6.31	9463.53	412.85	0.23
W100_downstream1	102847.5 HOUTerminal RR		Bridge									
W100_downstream1	102819.7	Max WS	59729.99	-26.43	28.00		28.64	0.001441	6.41	9311.71	410.31	0.24
W100_downstream1	102309.0	Max WS	59791.79	-23.48	27.31		28.09	0.000694	7.12	8392.61	234.93	0.21
W100_downstream1	101828.0	Max WS	59847.54	-20.70	26.81	3.52	27.59	0.001390	7.12	8488.25	402.66	0.25
W100_downstream1	101790.1 JENSEN ROAD		Bridge									
W100_downstream1	101752.2	Max WS	59847.34	-20.69	26.50		27.31	0.001442	7.21	8361.14	397.38	0.26
W100_downstream1	101007.3	Max WS	59937.36	-16.93	25.87		26.61	0.000407	6.91	8670.05	287.96	0.22
W100_downstream1	99992.6	Max WS	60056.95	-18.90	25.26		26.08	0.000638	7.28	8254.12	278.55	0.24

HEC-RAS Plan: NC_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_downstream1	98399.4	Max WS	60252.72	-20.26	24.42		25.20	0.000462	7.08	8515.14	293.05	0.23
W100_downstream1	97517.4	Max WS	60355.00	-19.35	24.36		24.84	0.000337	5.57	10844.70	324.96	0.17
W100_downstream1	96028.6	Max WS	60523.45	-17.81	23.33	1.38	24.03	0.000753	6.71	9056.10	407.11	0.22
W100_downstream1	95985.1 YORK DRIVE		Bridge									
W100_downstream1	95941.6	Max WS	60523.36	-17.87	23.17		23.87	0.000761	6.74	9014.44	406.20	0.22
W100_downstream1	95362.9	Max WS	60593.10	-15.97	22.94		23.54	0.000363	6.22	9749.47	361.60	0.21
W100_downstream1	94280.7	Max WS	60732.19	-19.82	21.42		22.47	0.001626	8.24	7374.58	307.51	0.30
W100_downstream1	93495.6	Max WS	60816.06	-20.43	20.77		21.46	0.000936	6.68	9107.72	399.55	0.25
W100_downstream1	92795.6	Max WS	60908.79	-20.98	20.18	-1.31	20.96	0.000496	7.08	8600.51	341.44	0.25
W100_downstream1	92741.1 LOCKWOOD DRIVE		Bridge									
W100_downstream1	92686.6	Max WS	60908.64	-21.08	19.93		20.72	0.000505	7.12	8550.64	340.26	0.25
W100_downstream1	90936.7	Max WS	61117.93	-18.64	18.63		19.27	0.001152	6.41	9560.92	492.11	0.24
W100_downstream1	89918.4	Max WS	61240.87	-17.23	17.39		18.29	0.000822	7.76	9261.12	721.62	0.28
W100_downstream1	88579.0	Max WS	61399.56	-20.97	16.01		16.95	0.001159	7.79	7885.32	372.47	0.30
W100_downstream1	87591.9	Max WS	61524.68	-23.72	15.16		16.05	0.000665	7.54	8173.75	313.63	0.26
W100_downstream1	86660.2	Max WS	61624.70	-23.42	14.69	-6.31	15.45	0.000605	6.98	8833.19	316.77	0.23
W100_downstream1	86641.7 HOUTerminal RR		Bridge									
W100_downstream1	86623.2	Max WS	61624.70	-23.61	14.26		15.03	0.000613	7.04	8755.10	315.77	0.24
W100_downstream1	85855.2	Max WS	61716.66	-26.84	12.75		14.40	0.001091	10.31	5987.09	256.62	0.38
W100_downstream1	85238.7	Max WS	61787.39	-29.43	12.33		13.70	0.001198	9.46	7133.27	361.93	0.31
W100_downstream1	84561.7	Max WS	61885.37	-32.27	11.91	-8.55	13.04	0.000631	8.60	7931.70	459.09	0.29
W100_downstream1	84531.4 NORTH WAYSIDE RD		Bridge									
W100_downstream1	84501.1	Max WS	61885.36	-28.97	10.74		12.39	0.001077	10.33	6161.79	322.20	0.36
W100_downstream1	84252.6	Max WS	61915.07	-26.90	10.79	-5.39	12.14	0.000856	9.34	6999.73	599.00	0.32
W100_downstream1	84222.3 M. GARCIA		Bridge									
W100_downstream1	84192.0	Max WS	61915.07	-24.10	9.54		11.44	0.001465	11.07	5591.37	242.87	0.41
W100_downstream1	83635.7	Max WS	61981.51	-21.72	9.68		10.73	0.001007	8.23	7532.91	399.17	0.33
W100_downstream1	81786.1	Max WS	62195.60	-31.97	8.03		9.05	0.000807	8.12	7686.44	359.12	0.31
W100_downstream1	80903.1	Max WS	62297.95	-27.77	7.57	-8.89	8.37	0.000733	7.15	8707.59	409.34	0.27
W100_downstream1	80883.1 S. PACIFIC RR		Bridge									
W100_downstream1	80863.1	Max WS	62297.93	-28.10	6.98		7.79	0.000868	7.24	8598.84	408.05	0.28
W100_downstream1	80538.0	Max WS	62297.93	-33.12	7.25	-16.93	7.58	0.000282	4.59	13558.11	527.62	0.16

White Oak Bayou
Scenario 1: North Canal Only 100-Year

HEC-RAS Plan: NC_100yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	36134.	Max WS	32208.60	24.19	57.02		57.83	0.000613	7.37	5963.86	1215.90	0.30
E100-00-00	35718.0	Max WS	32142.39	23.76	56.64		57.59	0.000594	7.89	4649.38	752.05	0.32
E100-00-00	35158.	Max WS	32184.87	22.89	56.55		57.23	0.000545	6.85	6849.63	1522.47	0.28
E100-00-00	35006.0	Max WS	32181.33	22.66	56.43	42.97	57.17	0.000464	7.17	7025.46	1678.90	0.29
E100-00-00	34951.5 ELLA		Bridge									
E100-00-00	34895.0	Max WS	32180.90	22.56	56.30		57.04	0.000468	7.19	6968.99	1643.09	0.29
E100-00-00	34645.	Max WS	32202.04	22.24	56.29		56.90	0.000417	6.68	7545.94	1630.45	0.26
E100-00-00	34206.0	Max WS	32202.09	21.68	56.06		56.71	0.000422	6.79	7614.92	2900.92	0.27
E100-00-00	33962.58	Max WS	32253.78	21.61	56.16		56.49	0.000251	4.95	11172.64	3026.19	0.21
E100-00-00	33909.08	Max WS	32259.12	21.60	56.15		56.47	0.000310	4.89	11153.00	3061.36	0.21
E100-00-00	33770.	Max WS	32267.39	21.56	56.10		56.45	0.000222	5.22	11510.44	2823.78	0.20
E100-00-00	33681.0	Max WS	32255.62	21.53	56.00	41.99	56.51	0.000324	6.28	10887.50	2918.84	0.24
E100-00-00	33645.5 W 18TH		Bridge									
E100-00-00	33610.0	Max WS	32246.27	21.61	55.80		56.36	0.000355	6.52	10106.73	2773.00	0.26
E100-00-00	33357.	Max WS	32245.72	21.41	55.61		56.27	0.000591	6.72	7649.43	2438.63	0.28
E100-00-00	32570.0	Max WS	32267.83	20.78	55.23		55.80	0.000374	6.38	9676.29	2898.25	0.25
E100-00-00	31583.0	Max WS	32308.99	19.35	55.02		55.46	0.000262	5.73	12391.77	4296.30	0.22
E100-00-00	30779.0	Max WS	32355.31	18.79	54.83		55.24	0.000229	5.59	12012.21	3211.88	0.21
E100-00-00	29659.	Max WS	32418.41	17.66	54.66		54.95	0.000239	4.76	13718.31	4421.04	0.19
E100-00-00	29368.0	Max WS	32438.41	17.37	54.35	38.53	54.96	0.000353	6.63	9121.93	2747.06	0.25
E100-00-00	29297.5 TC JESTER SOUTH		Bridge									
E100-00-00	29203.0	Max WS	32421.62	17.35	53.71		54.41	0.000413	7.04	8020.19	2343.98	0.27
E100-00-00	28775.	Max WS	32463.40	16.90	53.79		54.10	0.000276	4.79	12845.39	3605.01	0.20
E100-00-00	28375.0	Max WS	32469.05	16.48	53.62	37.49	54.11	0.000313	6.01	11243.85	3460.19	0.23
E100-00-00	28357.0 BICYCLE BRIDGE		Bridge									
E100-00-00	28330.0	Max WS	32449.87	16.41	53.36		53.88	0.000330	6.13	10777.44	3355.29	0.24
E100-00-00	28190.0	Max WS	32451.49	16.18	53.29	37.03	53.86	0.000293	6.41	10056.44	2745.41	0.23
E100-00-00	28152.5 W 11TH		Bridge									
E100-00-00	28113.0	Max WS	32447.79	16.28	53.02		53.65	0.000322	6.65	9287.35	2660.30	0.24
E100-00-00	27982.	Max WS	32455.19	16.25	53.01		53.58	0.000388	6.41	9672.69	2535.85	0.25
E100-00-00	27429.0	Max WS	32474.39	16.12	52.83		53.38	0.000385	6.23	9307.17	2537.94	0.25
E100-00-00	26598.	Max WS	32545.73	15.35	52.54		53.01	0.000311	5.80	7829.06	3755.59	0.23
E100-00-00	26498.0	Max WS	32551.52	15.26	52.47	35.82	52.99	0.000310	5.97	7162.15	3260.52	0.23
E100-00-00	26432.5 TC JESTER		Bridge									
E100-00-00	26366.0	Max WS	32536.45	15.16	52.18		52.71	0.000323	6.05	6966.41	2809.02	0.23
E100-00-00	26307.3	Max WS	32544.24	15.13	52.30		52.66	0.000247	5.16	9032.83	2729.72	0.20
E100-00-00	26225	Max WS	32546.79	15.04	52.26		52.64	0.000262	5.20	8667.24	2360.49	0.20
E100-00-00	26140.	Max WS	32550.99	14.97	52.18		52.66	0.000272	5.88	9584.75	2650.58	0.22
E100-00-00	25536.0	Max WS	32579.89	14.48	52.00		52.52	0.000297	6.02	9206.98	1495.54	0.23
E100-00-00	25132.	Max WS	32604.49	14.29	51.87		52.40	0.000262	6.12	7379.62	1271.87	0.23
E100-00-00	24817.0	Max WS	32618.69	14.14	51.59	36.18	52.30	0.000453	6.78	4947.23	716.74	0.27
E100-00-00	24789.0 UNION PACIFIC RR		Bridge									
E100-00-00	24758.0	Max WS	32610.21	13.76	51.31		52.01	0.000451	6.77	4943.30	664.44	0.27
E100-00-00	24636.	Max WS	32627.49	13.61	51.58		51.95	0.000262	5.25	8455.42	1382.82	0.21
E100-00-00	23934.0	Max WS	32663.37	12.75	51.28		51.74	0.000320	5.48	7160.73	1010.02	0.22
E100-00-00	23550.0	Max WS	32688.42	12.77	51.17	32.97	51.61	0.000292	5.35	6564.42	684.84	0.22
E100-00-00	23506.5 DURHAM		Bridge									
E100-00-00	23444.0	Max WS	32686.21	12.69	51.05		51.49	0.000294	5.36	6535.79	676.84	0.22
E100-00-00	23180.	Max WS	32699.13	12.46	51.05		51.45	0.000193	5.45	9938.40	1314.71	0.20
E100-00-00	22983.	Max WS	32707.43	12.29	51.00		51.42	0.000255	5.70	10001.94	1712.58	0.22
E100-00-00	22834.0	Max WS	32716.86	12.16	50.94	34.61	51.39	0.000339	5.86	10898.00	1768.53	0.22
E100-00-00	22796.5 SHEPHERD		Bridge									
E100-00-00	22758.0	Max WS	32713.92	12.11	50.81		51.26	0.000368	5.87	10758.18	1761.56	0.22
E100-00-00	22610.	Max WS	32723.13	11.92	50.82		51.17	0.000289	5.31	10767.63	1979.71	0.19
E100-00-00	22224.0	Max WS	32745.52	11.41	50.82		51.02	0.000228	4.08	14116.73	2017.10	0.15
E100-00-00	21444.0	Max WS	32781.32	10.52	50.51		50.90	0.000321	5.39	10335.59	1644.61	0.20
E100-00-00	20746.0	Max WS	32816.19	10.00	50.12		50.46	0.000962	4.96	9671.02	1877.23	0.21
E100-00-00	20644.0	Max WS	32823.36	9.95	50.13	32.56	50.38	0.000203	4.57	13960.98	1858.64	0.16
E100-00-00	20633.0 Pipeline		Bridge									
E100-00-00	20622.0	Max WS	32822.11	9.95	50.03		50.28	0.000208	4.60	13752.03	1855.96	0.17
E100-00-00	20521.	Max WS	32828.45	9.91	49.99		50.28	0.000218	4.95	13051.31	1697.61	0.17
E100-00-00	19917.0	Max WS	32865.29	9.66	49.56		50.17	0.000436	6.30	7182.26	884.62	0.23
E100-00-00	19463.0	Max WS	32891.85	9.25	49.39		49.97	0.000437	6.20	8745.78	1512.30	0.23
E100-00-00	18857	Max WS	32926.70	8.03	49.21	31.91	49.72	0.000365	6.03	6629.22	1066.54	0.22
E100-00-00	18800 I-10 WBFR		Bridge									
E100-00-00	18747	Max WS	32925.59	7.81	48.73		49.16	0.000296	5.59	7039.42	1006.28	0.20
E100-00-00	18746	Max WS	32925.75	7.81	48.73	30.36	49.16	0.000296	5.59	7039.27	1006.26	0.20
E100-00-00	18595 I-10 BRIDGE		Bridge									
E100-00-00	18443	Max WS	32925.32	7.19	48.14		48.60	0.000355	5.59	6941.90	953.60	0.21
E100-00-00	18442	Max WS	32925.68	7.19	48.14	30.02	48.60	0.000355	5.59	6941.71	953.54	0.21
E100-00-00	18394 I-10 EBFR		Bridge									
E100-00-00	18377.	Max WS	32921.11	6.98	47.08		47.62	0.000418	6.12	6375.88	759.82	0.23
E100-00-00	18234.0	Max WS	32933.25	6.77	47.19	29.44	47.53	0.000282	4.75	7871.15	1090.01	0.18
E100-00-00	18220.0 UNION PACIFIC RR		Bridge									
E100-00-00	18199.0	Max WS	32931.71	6.70	46.75		47.12	0.000284	4.93	7547.32	913.45	0.18
E100-00-00	18176.0	Max WS	32932.44	6.79	46.71	28.82	47.13	0.000301	5.33	7870.26	1128.63	0.20
E100-00-00	18138.0 YALE		Bridge									
E100-00-00	18082.0	Max WS	32915.90	6.87	45.04		45.65	0.000498	6.40	6263.35	809.59	0.25
E100-00-00	17905.	Max WS	32926.96	6.86	45.06		45.56	0.000413	5.90	8107.41	1233.20	0.23
E100-00-00	17756.0	Max WS	32934.99	6.85	45.05	29.79	45.47	0.000406	5.41	8094.16	1214.95	0.22
E100-00-00	17726 S. HEIGHTS		Bridge									
E100-00-00	17696	Max WS	32923.27	6.85	44.47		44.94	0.000461	5.65	7582.77	1167.95	0.23
E100-00-00	17657	Max WS	32926.09	6.35	44.44	29.30	44.92	0.000446	5.66	7090.31	780.17	0.23
E100-00-00	17627 N. HEIGHTS		Bridge									
E100-00-00	17597.0	Max WS	32895.27	6.35	42.86		43.47	0.000623	6.31	5916.09	691.34	0.27
E100-00-00	17318.	Max WS	32900.29	6.35	42.43		43.28	0.000803	7.40	4444.74	249.96	0.31
E100-00-00	16831.0	Max WS	32927.77	6.34	42.57		43.00	0.000273	5.29	6227.50	471.67	0.26

HEC-RAS Plan: NC_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	15795.0	Max WS	32943.79	4.84	42.43		42.70	0.000303	4.15	8205.01	614.58	0.17
E100-00-00	15278.	Max WS	32942.12	4.41	41.96		42.57	0.000353	6.38	5866.34	653.09	0.25
E100-00-00	14977.0	Max WS	32948.68	4.16	41.98	26.22	42.48	0.000163	5.67	6649.43	690.14	0.22
E100-00-00	14937.0 I-10 EBFR ACCESS		Bridge									
E100-00-00	14897.0	Max WS	32936.39	3.39	41.52		42.00	0.000157	5.61	6544.17	684.91	0.22
E100-00-00	14890	Max WS	32932.21	3.42	41.40	25.54	42.01	0.000196	6.28	5693.55	703.07	0.24
E100-00-00	14775 I-10 BRIDGE		Bridge									
E100-00-00	14660	Max WS	32926.26	3.42	41.24		41.86	0.000202	6.34	5591.21	686.82	0.25
E100-00-00	14590.0	Max WS	32921.00	3.45	41.05	25.95	41.86	0.000271	7.25	4932.43	682.01	0.28
E100-00-00	14562.0 I-10 WB ACCESS		Bridge									
E100-00-00	14532.0	Max WS	32858.71	3.41	39.58		40.53	0.000835	7.81	4278.39	456.92	0.32
E100-00-00	14354.0	Max WS	32888.06	3.29	40.07		40.38	0.000187	4.45	7663.70	669.64	0.21
E100-00-00	13924.0	Max WS	32873.71	3.18	39.70	24.58	40.26	0.000487	6.23	5898.89	377.84	0.24
E100-00-00	13909.5 UNION PAC. RR		Bridge									
E100-00-00	13898.0	Max WS	32869.89	2.95	39.42		39.99	0.000494	6.26	5848.15	375.89	0.24
E100-00-00	13494.	Max WS	32875.73	2.47	39.44		39.77	0.000502	4.87	7346.42	470.23	0.20
E100-00-00	13220.0	Max WS	32880.68	2.15	39.46	23.79	39.68	0.000130	3.88	10071.77	767.08	0.15
E100-00-00	13182.5 STUDEMONT		Bridge									
E100-00-00	13143.0	Max WS	32868.96	2.15	39.19		39.42	0.000140	4.01	9227.02	638.91	0.16
E100-00-00	12698.	Max WS	32861.83	1.87	38.90		39.31	0.000389	5.16	6367.16	398.26	0.23
E100-00-00	12066.0	Max WS	32865.68	1.47	38.82		39.08	0.000335	4.14	7939.39	486.03	0.18
E100-00-00	11546.0	Max WS	32872.89	0.90	38.78		38.96	0.000121	3.51	11044.36	1039.77	0.15
E100-00-00	11021.	Max WS	32878.63	0.63	38.72		38.90	0.000108	3.55	9981.25	1218.10	0.14
E100-00-00	10908.0	Max WS	32882.20	0.57	38.75	22.34	38.89	0.000088	3.31	12785.93	1359.26	0.13
E100-00-00	10852.5 TAYLOR (SAWYER)		Bridge									
E100-00-00	10804.0	Max WS	32883.14	0.45	38.72		38.86	0.000087	3.26	12888.81	1384.04	0.13
E100-00-00	10643.	Max WS	32871.98	0.14	38.45		38.88	0.000327	5.40	6844.48	775.83	0.20
E100-00-00	9779.0	Max WS	32888.56	-1.51	38.47		38.65	0.000105	3.62	11268.71	1041.41	0.14
E100-00-00	8532.0	Max WS	32909.35	-1.76	38.49		38.54	0.000031	1.71	19761.20	1352.20	0.06
E100-00-00	8140.	Max WS	32913.97	-2.43	38.47		38.51	0.000133	1.68	22276.78	1476.25	0.06
E100-00-00	7649.0	Max WS	32919.33	-3.26	38.39	18.61	38.49	0.000057	3.04	21745.28	1756.42	0.11
E100-00-00	7608.5 HOUSTON		Bridge									
E100-00-00	7568.0	Max WS	32919.25	-3.15	38.39		38.45	0.000038	2.49	21568.88	1754.29	0.09
E100-00-00	7546.0	Max WS	32919.56	-3.16	38.39	18.58	38.45	0.000040	2.54	21269.01	1781.36	0.09
E100-00-00	7535.5 Pipeline		Bridge									
E100-00-00	7529.0	Max WS	32919.47	-3.16	38.36		38.43	0.000040	2.55	21221.04	1780.25	0.09
E100-00-00	7481.0	Max WS	32919.85	-3.17	38.33		38.43	0.000061	2.88	17743.18	1830.74	0.11
E100-00-00	7253.1	Max WS	32919.53	-3.19	38.30		38.41	0.000038	2.71	13436.82	700.00	0.09
E100-00-00	7253.05		Lat Struct									
E100-00-00	7253	Max WS	32918.59	-3.19	38.30	14.73	38.41	0.000038	2.71	13436.82	700.00	0.09
E100-00-00	7205 Prop I-10 DC		Bridge									
E100-00-00	7138.1	Max WS	32917.53	-3.20	38.20		38.33	0.000049	3.02	12149.21	687.14	0.11
E100-00-00	7138	Max WS	32915.55	-3.20	38.20	16.33	38.33	0.000049	3.02	12149.21	687.14	0.11
E100-00-00	7057 Prop I-10 Ramp		Bridge									
E100-00-00	7016.1	Max WS	32912.24	-3.22	37.84		38.14	0.000098	4.61	9053.90	607.78	0.16
E100-00-00	7016	Max WS	32912.21	-3.22	37.84		38.14	0.000098	4.61	9053.90	607.78	0.16
E100-00-00	6980	Max WS	32913.50	-3.22	37.95		38.11	0.000084	3.25	11224.67	630.79	0.12
E100-00-00	6979		Lat Struct									
E100-00-00	6975.0	Max WS	32901.08	-3.22	37.95		38.10	0.000084	3.25	11224.54	630.79	0.12
E100-00-00	6898.0	Max WS	32790.31	-4.23	37.89		38.10	0.000188	3.77	9635.99	580.07	0.14
E100-00-00	6895	Max WS	32789.18	-4.23	37.89		38.10	0.000188	3.77	9635.66	580.07	0.14
E100-00-00_02	6775.	Max WS	42243.92	-4.30	37.89		37.99	0.000067	2.58	18067.56	1099.86	0.10
E100-00-00_02	6637.0	Max WS	42235.92	-4.37	37.85	18.47	37.99	0.000076	3.00	15026.04	1102.84	0.11
E100-00-00_02	6600 Prop I-45 DC		Bridge									
E100-00-00_02	6575.1	Max WS	42230.84	-4.41	37.82		37.96	0.000079	3.01	15245.39	1143.13	0.11
E100-00-00_02	6575.0	Max WS	42231.94	-4.41	37.82	18.72	37.96	0.000079	3.01	15245.40	1143.13	0.11
E100-00-00_02	6551 Prop I-45 Ramp		Bridge									
E100-00-00_02	6515.0	Max WS	42229.81	-4.44	37.81		37.94	0.000079	2.99	15512.10	1087.92	0.11
E100-00-00_02	6387.0	Max WS	42226.67	-4.38	37.80	19.19	37.93	0.000079	2.97	15670.70	1562.09	0.11
E100-00-00_02	6352 Prop I-45 NBML		Bridge									
E100-00-00_02	6298.1	Max WS	42226.67	-4.51	37.79		37.91	0.000072	2.83	17458.29	1488.73	0.10
E100-00-00_02	6298	Max WS	42225.66	-4.51	37.79	17.71	37.91	0.000072	2.83	17458.29	1488.73	0.10
E100-00-00_02	6252 Prop I-45 DC		Bridge									
E100-00-00_02	6201.1	Max WS	42227.70	-4.65	37.80		37.90	0.000053	2.62	17649.72	1461.48	0.09
E100-00-00_02	6201	Max WS	42226.67	-4.65	37.80	16.84	37.90	0.000053	2.62	17649.71	1461.48	0.09
E100-00-00_02	6164 Prop I-45 Ramp		Bridge									
E100-00-00_02	6122.0	Max WS	42201.52	-4.33	37.67		37.83	0.000064	3.17	15254.83	1481.93	0.11
E100-00-00_02	5525.0	Max WS	42195.00	-3.15	37.66		37.78	0.000075	2.84	14862.30	676.08	0.11
E100-00-00_02	4994.0	Max WS	42159.58	-3.09	37.47	17.34	37.71	0.000236	4.15	11261.52	600.63	0.14
E100-00-00_02	4980.0 RR OVERPASS		Bridge									
E100-00-00_02	4961.0	Max WS	42119.86	-3.03	37.31		37.57	0.000267	4.25	10954.98	597.80	0.15
E100-00-00_02	4812.0	Max WS	42050.86	-3.49	37.06	17.58	37.49	0.000683	5.27	7982.08	476.41	0.22
E100-00-00_02	4774.5 CROCKETT/HOGAN		Bridge									
E100-00-00_02	4687.0	Max WS	42014.16	-4.67	36.98		37.32	0.000482	4.67	8992.01	494.93	0.19
E100-00-00_02	4407.	Max WS	41957.02	-3.62	36.80		37.22	0.000386	5.42	8929.89	789.34	0.18
E100-00-00_02	4014.0	Max WS	41957.64	-2.15	36.77	16.34	37.06	0.000323	4.33	10107.13	592.79	0.16
E100-00-00_02	3997.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	3976.0	Max WS	41944.66	-2.40	36.64		36.92	0.000328	4.34	10104.25	593.38	0.16
E100-00-00_02	3681.	Max WS	41895.57	-3.80	36.47		36.83	0.000393	5.02	10671.05	1121.84	0.18
E100-00-00_02	3585.0	Max WS	41875.44	-4.26	36.38		36.81	0.000396	5.34	10494.64	1159.96	0.20
E100-00-00_02	3233.0	Max WS	41914.68	-4.79	36.54	13.15	36.61	0.000101	2.26	20621.55	1999.61	0.10
E100-00-00_02	3094 Prop I-10 WBML		Bridge									
E100-00-00_02	2954.1	Max WS	41898.58	-5.22	36.47		36.56	0.000137	2.38	19398.09	2108.33	0.12
E100-00-00_02	2954.0	Max WS	41901.02	-5.22	36.47	13.40	36.56	0.000137	2.38	19398.05	2108.33	0.12
E100-00-00_02	2857 Prop I-45 BNML		Bridge									
E100-00-00_02	2760.1	Max WS	41897.41	-5.51	36.45		36.52	0.000124	2.29	20312.02	2204.62	0.11
E100-00-00_02	2760.0	Max WS	41896.25	-5.51	36.45	14.73	36.52	0.000124	2.29	20311.99	2204.62	0.11

HEC-RAS Plan: NC_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_02	2639 Prop I-10 WB Exp		Bridge									
E100-00-00_02	2518.1	Max WS	41868.65	-5.88	36.33		36.44	0.000147	2.79	17701.06	2172.06	0.12
E100-00-00_02	2518.0	Max WS	41868.65	-5.88	36.33	15.28	36.44	0.000147	2.79	17701.01	2172.06	0.12
E100-00-00_02	2434 Prop I-45 SBML		Bridge									
E100-00-00_02	2350.1	Max WS	41785.77	-6.13	36.11		36.30	0.000259	3.49	12425.04	2103.67	0.16
E100-00-00_02	2350.0	Max WS	41785.77	-6.13	36.11	15.94	36.30	0.000259	3.49	12425.02	2103.67	0.16
E100-00-00_02	2280 Prop I-10 EBML		Bridge									
E100-00-00_02	2210.0	Max WS	41736.57	-6.34	35.96		36.18	0.000272	3.79	11441.27	1879.41	0.17
E100-00-00_02	1580.	Max WS	41722.39	-7.83	35.91		36.05	0.000179	3.73	16833.54	1594.35	0.13
E100-00-00_02	1353.0	Max WS	41707.69	-8.34	35.83	17.01	36.02	0.000247	4.29	14741.67	1713.74	0.15
E100-00-00_02	1335.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	1319.0	Max WS	41684.45	-8.37	35.79		35.97	0.000241	4.23	14876.19	1786.81	0.15
E100-00-00_02	984.0	Max WS	41632.16	-8.69	35.61	13.74	35.92	0.000198	4.85	12826.71	1384.35	0.17
E100-00-00_02	978 MAIN STREET		Bridge									
E100-00-00_02	971.6	Max WS	41606.17	-8.69	35.54		35.85	0.000201	4.86	12759.61	1374.07	0.17
E100-00-00_02	971.5	Max WS	41606.18	-8.69	35.54	13.74	35.85	0.000201	4.86	12759.60	1374.07	0.17
E100-00-00_02	961.5 1ST STREET		Bridge									
E100-00-00_02	852	Max WS	41551.68	-6.40	35.42		35.75	0.000244	5.13	12614.57	1277.69	0.19
E100-00-00_02	851.0	Max WS	41550.35	-6.40	35.42		35.75	0.000244	5.13	12614.35	1277.65	0.19
E100-00-00_03	654.0	Max WS	7262.85	-6.50	35.42		35.42	0.000005	0.73	14081.17	956.06	0.03
E100-00-00_03	400.0	Max WS	7261.70	-8.58	35.41	-0.99	35.42	0.000007	0.96	11490.43	855.44	0.03
E100-00-00_03	381.0 UNION PACIFIC RR		Bridge									
E100-00-00_03	365.0	Max WS	7257.25	-8.23	35.41		35.42	0.000007	0.95	11328.72	937.24	0.03
E100-00-00_03	210.0	Max WS	7246.05	-7.81	35.41	-0.71	35.42	0.000008	1.06	10674.84	1067.12	0.04
E100-00-00_03	191.0 UNION PACIFIC RR		Bridge									
E100-00-00_03	173.1	Max WS	7242.82	-6.84	35.40		35.41	0.000010	1.12	10345.03	1625.84	0.04
E100-00-00_03	173.0	Max WS	7241.77	-6.84	35.40		35.41	0.000010	1.12	10345.03	1625.84	0.04

Little White Oak Bayou
Scenario 1: North Canal Only 100-Year

HEC-RAS Plan: NC_100yr River: E101-00-00 Reach: E101-00-00_0003 Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	9819.000	Max WS	10166.53	16.33	39.94		40.22	0.000532	4.21	2416.32	177.67	0.20
E101-00-00_0003	9750.000	Max WS	10144.84	16.31	39.93		40.18	0.000498	4.03	2519.65	189.37	0.19
E101-00-00_0003	9000.000	Max WS	10002.00	15.50	39.81		39.90	0.000231	2.62	4288.19	544.84	0.13
E101-00-00_0003	8469.000	Max WS	9960.35	13.02	39.65		39.77	0.000271	2.99	4027.80	562.82	0.13
E101-00-00_0003	7984.000	Max WS	9966.66	13.76	39.51		39.63	0.000272	3.18	3882.64	372.63	0.14
E101-00-00_0003	6838.000	Max WS	9842.64	12.20	39.11		39.27	0.000350	3.22	3052.48	294.69	0.18
E101-00-00_0003	5861.000	Max WS	9694.86	9.91	38.74		38.91	0.000385	3.42	3435.50	411.33	0.16
E101-00-00_0003	4720.000	Max WS	9491.55	8.13	38.39		38.56	0.000323	3.78	4000.75	672.21	0.15
E101-00-00_0003	4279.000	Max WS	9258.66	9.00	38.14		38.40	0.000487	4.17	2761.78	483.18	0.18
E101-00-00_0003	4130.000	Max WS	9329.59	8.68	38.23	18.55	38.31	0.000083	2.45	4911.27	728.52	0.10
E101-00-00_0003	4091.000 N. MAIN		Bridge									
E101-00-00_0003	4050.000	Max WS	9299.54	7.87	38.15		38.23	0.000076	2.40	4664.36	628.82	0.09
E101-00-00_0003	3952.	Max WS	9282.52	6.87	38.12		38.22	0.000082	2.62	3796.56	218.12	0.10
E101-00-00_0003	3466.000	Max WS	9330.73	1.92	38.11		38.20	0.000038	2.83	5314.45	398.62	0.09
E101-00-00_0003	3323.0	Max WS	9388.93	-1.03	38.13	13.07	38.18	0.000018	1.96	6724.94	494.34	0.06
E101-00-00_0003	3278.0 I-45 Ramp		Bridge									
E101-00-00_0003	3236.1	Max WS	9373.23	-2.82	38.12		38.15	0.000013	1.60	8405.89	671.05	0.05
E101-00-00_0003	3236.0	Max WS	9373.24	-2.82	38.12	11.70	38.15	0.000013	1.60	8405.89	671.05	0.05
E101-00-00_0003	3085 I-45 NBML		Bridge									
E101-00-00_0003	2958.1	Max WS	9392.40	-2.52	38.13		38.14	0.000005	0.95	17992.13	2532.22	0.03
E101-00-00_0003	2958	Max WS	9388.11	-2.52	38.13	11.70	38.14	0.000005	0.95	17992.16	2532.22	0.03
E101-00-00_0003	2833 I-45 SBML		Bridge									
E101-00-00_0003	2389.000	Max WS	9341.35	-0.26	38.06		38.10	0.000061	1.80	8398.71	724.12	0.06
E101-00-00_0003	2325.	Max WS	9342.07	-0.15	38.05		38.09	0.000059	1.74	8520.07	688.56	0.06
E101-00-00_0003	1855.000	Max WS	9385.07	0.68	38.05		38.08	0.000024	1.19	9320.86	693.81	0.04
E101-00-00_0003	1126.	Max WS	9412.63	-1.85	38.02		38.05	0.000081	1.64	9198.75	1196.50	0.06
E101-00-00_0003	1070.000	Max WS	9408.84	-2.04	38.01	10.38	38.05	0.000081	2.01	9662.10	1286.18	0.07
E101-00-00_0003	1029.500 WRIGHTWOOD		Bridge									
E101-00-00_0003	987.000	Max WS	9375.07	-2.04	37.98		38.02	0.000088	1.98	9622.73	1281.54	0.06
E101-00-00_0003	911.	Max WS	9390.09	-2.19	37.98		38.01	0.000058	1.68	10858.16	1241.57	0.05
E101-00-00_0003	756.	Max WS	9387.26	-2.51	37.96		37.99	0.000175	1.43	9036.41	1271.13	0.06
E101-00-00_0003	637.000	Max WS	9387.50	-2.75	37.95	12.79	37.97	0.000112	1.18	11319.64	1433.16	0.05
E101-00-00_0003	538.000 QUITMAN/WHITE OA		Bridge									
E101-00-00_0003	442.000	Max WS	9338.81	-2.75	37.91		37.93	0.000084	1.35	11028.42	1411.20	0.05
E101-00-00_0003	306.000	Max WS	9340.50	-2.86	37.91		37.92	0.000010	0.87	14528.47	1940.59	0.03
E101-00-00_0003	259.1	Max WS	9336.05	-2.90	37.90		37.92	0.000011	0.94	10886.04	579.11	0.03
E101-00-00_0003	259	Max WS	9339.79	-2.90	37.90	8.03	37.92	0.000011	0.94	10886.02	579.11	0.03
E101-00-00_0003	229 Prop I-10 DC		Bridge									
E101-00-00_0003	180.1	Max WS	9347.88	-2.96	37.90		37.91	0.000010	0.93	10824.71	619.39	0.03
E101-00-00_0003	180	Max WS	9349.00	-2.96	37.90	9.79	37.91	0.000010	0.93	10824.69	619.39	0.03
E101-00-00_0003	130 Prop-10 Ramp		Bridge									
E101-00-00_0003	101.1	Max WS	9356.03	-3.03	37.90		37.91	0.000008	0.82	11915.75	690.31	0.03
E101-00-00_0003	101	Max WS	9353.79	-3.03	37.90		37.91	0.000008	0.82	11915.75	690.31	0.03
E101-00-00_0003	68	Max WS	9355.54	-4.00	37.90		37.91	0.000014	0.93	10645.27	589.20	0.03
E101-00-00_0003	63	Max WS	9365.89	-4.00	37.90		37.91	0.000014	0.93	10645.20	589.20	0.03
E101-00-00_0003	3	Max WS	9459.67	-4.23	37.89		37.91	0.000017	1.14	9077.79	508.34	0.04
E101-00-00_0003	1	Max WS	9454.74	-4.23	37.89		37.91	0.000017	1.14	9077.78	508.34	0.04

North Canal
Scenario 1: North Canal Only 100-Year

HEC-RAS Plan: NC_100yr River: E100-00-00 Reach: North_Canal Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
North_Canal	1303	Max WS	34287.50	4.30	35.42		36.71	0.000497	9.11	3951.59	516.74	0.33
North_Canal	1302.9	Max WS	34287.71	4.30	35.42		36.71	0.000497	9.11	3951.56	516.73	0.33
North_Canal	1302		Lat Struct									
North_Canal	1132	Max WS	34314.36	4.13	35.36	20.69	36.62	0.000490	9.05	4861.98	876.23	0.33
North_Canal	1106 San Jacinto		Bridge									
North_Canal	1080	Max WS	34311.49	4.08	35.09		36.39	0.000507	9.15	4732.06	883.69	0.33
North_Canal	1079		Lat Struct									
North_Canal	838	Max WS	34348.59	3.84	34.95		36.26	0.000513	9.20	4287.98	697.11	0.34
North_Canal	579	Max WS	34384.68	3.58	34.81	20.35	36.13	0.000518	9.23	4116.52	561.34	0.34
North_Canal	548 Union Pacific RR		Bridge									
North_Canal	516	Max WS	34380.54	3.52	34.44		35.80	0.000542	9.36	4047.02	550.66	0.34
North_Canal	276	Max WS	34381.04	3.28	34.31		35.67	0.000542	9.36	4102.03	505.78	0.34

Buffalo Bayou
Scenario 2: North Canal and Heights Improvements 10-Year

HEC-RAS Plan: NC_H_10yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	148800.4	Max WS	8225.24	3.15	31.84		31.92	0.000294	2.36	4393.72	930.99	0.09
W100_upstrm	148795.4	Max WS	8224.80	3.15	31.84	13.26	31.92	0.000294	2.36	4393.25	930.91	0.09
W100_upstrm	148768.4 SOUTHERN PACIFIC		Bridge									
W100_upstrm	148741.4	Max WS	8224.69	3.04	31.73		31.81	0.000294	2.36	4393.77	931.00	0.09
W100_upstrm	147632.4	Max WS	8223.24	-1.17	31.51		31.58	0.000110	2.20	4316.05	386.97	0.09
W100_upstrm	146698.0	Max WS	8271.74	1.88	31.39		31.48	0.000125	2.54	4429.59	313.91	0.10
W100_upstrm	145723.9	Max WS	8321.17	1.61	31.20		31.35	0.000187	3.33	4011.18	367.65	0.12
W100_upstrm	144753.5	Max WS	8374.76	0.07	31.05		31.17	0.000159	2.90	3485.22	273.09	0.11
W100_upstrm	143966.8	Max WS	8409.32	-7.47	30.89		31.04	0.000220	3.17	3601.59	387.64	0.13
W100_upstrm	143078.2	Max WS	8457.41	-4.19	30.75		30.86	0.000169	2.71	4620.98	468.63	0.11
W100_upstrm	142061.4	Max WS	8514.44	0.55	30.63		30.71	0.000099	2.41	4913.96	430.67	0.09
W100_upstrm	141320.1	Max WS	8556.58	-2.70	30.61		30.64	0.000056	1.69	9080.30	725.91	0.07
W100_upstrm	140116.2	Max WS	8605.77	-1.31	30.46		30.56	0.000137	2.63	4607.77	396.08	0.10
W100_upstrm	139320.0	Max WS	8640.56	-2.14	30.40		30.46	0.000106	2.20	5449.35	456.81	0.09
W100_upstrm	138607.9	Max WS	8673.41	-2.08	30.39		30.40	0.000028	1.25	14210.54	1035.78	0.05
W100_upstrm	137732.0	Max WS	8695.86	-2.40	30.33		30.40	0.000084	2.38	7935.52	786.94	0.09
W100_upstrm	137113.0	Max WS	8731.80	-2.62	30.24		30.35	0.000111	2.76	5331.61	402.73	0.10
W100_upstrm	136331.2	Max WS	8775.06	-2.09	30.16		30.19	0.000218	1.62	7946.88	617.18	0.06
W100_upstrm	135666.2	Max WS	8796.96	-1.47	30.03		30.12	0.000108	2.46	5748.45	523.13	0.10
W100_upstrm	134706.7	Max WS	8838.79	-1.93	30.00		30.03	0.000050	1.74	10980.60	837.30	0.07
W100_upstrm	134090.6	Max WS	8857.91	-1.59	29.96		30.01	0.000067	2.11	8615.05	690.96	0.08
W100_upstrm	133772.1	Max WS	8868.73	-0.79	29.92	8.92	30.01	0.000099	2.74	6961.54	721.07	0.09
W100_upstrm	133760.1 FOOTBRIDGE AT WE		Bridge									
W100_upstrm	133748.1	Max WS	8862.81	-0.46	29.83		29.93	0.000107	2.82	6659.97	717.86	0.10
W100_upstrm	132963.8	Max WS	8899.46	-1.98	29.72		29.83	0.000133	2.74	4304.93	307.83	0.11
W100_upstrm	131789.8	Max WS	8947.78	-2.31	29.57		29.68	0.000134	2.91	4726.69	457.76	0.11
W100_upstrm	130765.5	Max WS	9000.54	-3.81	29.51		29.57	0.000053	1.97	7358.62	474.39	0.07
W100_upstrm	129725.3	Max WS	9038.98	-3.71	29.41		29.51	0.000102	2.75	6624.75	668.11	0.10
W100_upstrm	129163.2	Max WS	9073.66	-3.13	29.36		29.44	0.000087	2.42	5099.58	418.55	0.09
W100_upstrm	128326.9	Max WS	9115.42	-4.05	29.31		29.37	0.000059	2.15	7482.38	752.28	0.07
W100_upstrm	128109.6	Max WS	9114.78	-4.29	29.31		29.34	0.000145	1.50	6092.06	367.23	0.06
W100_upstrm	128104.6	Max WS	9114.15	-4.29	29.30	6.10	29.34	0.000145	1.50	6091.80	367.22	0.06
W100_upstrm	128066.7 SHEPHERD		Bridge									
W100_upstrm	128028.8	Max WS	9097.58	-4.51	29.12		29.16	0.000096	1.49	6105.35	367.62	0.06
W100_upstrm	126647.0	Max WS	9083.79	-3.93	29.06		29.07	0.000031	0.92	9873.91	689.76	0.04
W100_upstrm	125376.9	Max WS	9125.39	-4.05	28.87		28.93	0.000195	1.84	4949.52	309.25	0.08
W100_upstrm	124983.5	Max WS	9135.74	-3.86	28.83		28.88	0.000050	1.79	5091.44	852.78	0.08
W100_upstrm	124644.1	Max WS	9151.69	-3.69	28.80	8.37	28.86	0.000064	1.85	4945.82	465.44	0.08
W100_upstrm	124591.8 WAUGH DRIVE		Bridge									
W100_upstrm	124539.5	Max WS	9148.22	-3.74	28.79		28.84	0.000064	1.85	4956.51	465.80	0.08
W100_upstrm	123658.2	Max WS	9202.51	-2.04	28.78		28.80	0.000032	1.00	9282.95	818.71	0.05
W100_upstrm	123138.8	Max WS	9232.69	-4.08	28.77		28.78	0.000017	0.71	13094.20	839.98	0.03
W100_upstrm	122627.1	Max WS	9258.24	-6.08	28.74		28.79	0.000031	1.48	7191.98	500.90	0.06
W100_upstrm	122572.1 MONTROSE COURT		Mult Open									
W100_upstrm	122517.1	Max WS	9256.23	-5.38	28.74		28.77	0.000051	1.51	6857.63	452.79	0.06
W100_upstrm	122371.6	Max WS	9254.67	-7.00	28.72	4.23	28.76	0.000101	1.74	5304.06	596.55	0.07
W100_upstrm	122265 ROSEMONT		Bridge									
W100_upstrm	122210.0	Max WS	9246.46	-5.60	28.69		28.73	0.000060	1.64	5644.20	590.33	0.07
W100_upstrm	122036.7	Max WS	9253.72	-8.40	28.68		28.72	0.000076	1.58	6133.44	679.77	0.07
W100_upstrm	121229.5	Max WS	9285.31	-11.37	28.64		28.67	0.000045	1.47	6732.91	776.50	0.07
W100_upstrm	120962.2	Max WS	9294.75	-10.59	28.61		28.66	0.000058	1.77	5283.57	377.87	0.08
W100_upstrm	120005.2	Max WS	9339.57	-7.78	28.59	3.68	28.60	0.000040	0.78	11902.75	766.21	0.04
W100_upstrm	119952.6 MEMORIAL DRIVE		Bridge									
W100_upstrm	119900.0	Max WS	9334.02	-7.64	28.57		28.58	0.000024	0.79	11781.38	758.91	0.04
W100_upstrm	119495.9	Max WS	9362.29	-7.21	28.57		28.58	0.000013	0.51	18187.99	1147.34	0.02
W100_upstrm	118667.7	Max WS	9402.46	-8.56	28.54		28.55	0.000045	1.01	9293.22	623.30	0.05
W100_upstrm	118466.1	Max WS	9400.19	-8.89	28.52	1.71	28.54	0.000028	1.37	6875.16	478.08	0.05
W100_upstrm	118418.1 MEMORIAL DRIVE		Bridge									
W100_upstrm	118370.1	Max WS	9379.01	-8.87	28.48		28.51	0.000029	1.37	6857.51	472.60	0.05
W100_upstrm	117845.4	Max WS	9404.16	-7.26	28.47		28.49	0.000048	1.20	7904.92	540.97	0.05
W100_upstrm	117204.3	Max WS	9437.01	-4.60	28.45		28.46	0.000028	0.99	9524.20	632.51	0.04
W100_upstrm	116395.7	Max WS	9465.79	-3.88	28.42		28.44	0.000025	1.09	8708.48	489.34	0.05
W100_upstrm	116167.6	Max WS	9447.40	-3.68	28.38	4.19	28.43	0.000095	1.76	5377.21	264.31	0.07
W100_upstrm	116121.9 SABINE AVENUE		Bridge									
W100_upstrm	116076.2	Max WS	9419.60	-3.86	28.19		28.24	0.000092	1.75	5374.16	264.27	0.07
W100_upstrm	115804.5	Max WS	9405.29	-4.60	28.15		28.22	0.000044	2.28	5418.79	281.73	0.07
W100_upstrm	115740.6	Max WS	9413.33	-4.78	28.15	4.37	28.22	0.000041	2.13	5433.91	294.56	0.07
W100_upstrm	115700 I-45 Allen Pkwy		Bridge									
W100_upstrm	115674.0	Max WS	9392.11	-5.10	28.14		28.21	0.000046	2.23	5561.69	381.92	0.08
W100_upstrm	115662.6	Max WS	9394.76	-5.20	28.14	4.08	28.20	0.000044	2.15	5666.08	397.94	0.07
W100_upstrm	115635.5 I-45 Houston Ave		Bridge									
W100_upstrm	115621.1	Max WS	9408.28	-5.57	28.15		28.20	0.000034	1.99	6299.55	445.88	0.07
W100_upstrm	115587.7	Max WS	9406.38	-6.22	28.14	3.88	28.20	0.000040	2.14	6427.24	496.09	0.07
W100_upstrm	115553.5 I-45 SBML		Bridge									
W100_upstrm	115514.4	Max WS	9416.01	-6.96	28.15		28.20	0.000029	1.81	7262.05	559.16	0.06
W100_upstrm	115509.1	Max WS	9416.36	-6.99	28.15	3.46	28.20	0.000029	1.83	7322.20	554.53	0.06
W100_upstrm	115490 I-45 NBML		Bridge									
W100_upstrm	115423.0	Max WS	9424.03	-7.30	28.16		28.20	0.000024	1.64	7723.57	482.58	0.06
W100_upstrm	115365.4	Max WS	9431.40	-7.52	28.16		28.19	0.000021	1.54	7843.09	458.37	0.05
W100_upstrm	115284.6	Max WS	9425.61	-7.89	28.15		28.20	0.000027	1.78	9975.07	990.26	0.06
W100_upstrm	115104.1	Max WS	9435.97	-8.31	28.16		28.19	0.000017	1.42	8859.92	674.80	0.05
W100_upstrm	115001.2	Max WS	9417.72	-8.48	28.13	2.25	28.19	0.000037	2.10	6488.55	509.34	0.07
W100_upstrm	115000 I-45 Ramp McKee		Bridge									
W100_upstrm	114907.3	Max WS	9431.54	-9.19	28.14		28.19	0.000032	1.89	6341.14	371.98	0.06
W100_upstrm	114842.1	Max WS	9425.91	-9.48	28.13	1.97	28.19	0.000039	2.02	6115.20	471.73	0.07
W100_upstrm	114830 I-45 Ramp Walker		Bridge									
W100_upstrm	114804.3	Max WS	9417.99	-9.61	28.12		28.18	0.000041	2.07	6473.27	528.04	0.07
W100_upstrm	114492.0	Max WS	9452.57	-10.48	28.13		28.17	0.000039	1.58	5964.99	334.37	0.07
W100_upstrm	114195.9	Max WS	9441.95	-11.52	28.10	1.33	28.15	0.000089	1.73	5460.44	314.68	0.07
W100_upstrm	114168.9 RUSK STREET		Bridge									
W100_upstrm	114141.9	Max WS	9423.55	-10.83	28.07		28.13	0.000101	1.80	5240.77	310.85	0.08
W100_upstrm	114097.4	Max WS	9434.79	-7.46	28.08	3.25	28.12	0.000062	1.57	6009.85	376.60	0.07
W100_upstrm	114070.4 CAPITAL STREE		Bridge									

HEC-RAS Plan: NC_H_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	114043.4	Max WS	9414.20	-7.72	27.13		27.18	0.000070	1.64	5751.20	375.05	0.07
W100_upstrm	113644.0	Max WS	9378.18	-8.91	27.08		27.15	0.000060	2.23	4727.61	312.21	0.09
W100_upstrm	113411.6	Max WS	9400.90	-9.61	27.08	0.39	27.14	0.000051	1.85	5072.69	367.30	0.06
W100_upstrm	113374.3 TEXAS AVE		Bridge									
W100_upstrm	113337.0	Max WS	9352.94	-9.65	26.95		27.01	0.000051	1.85	5056.44	367.07	0.06
W100_upstrm	113266.4	Max WS	9299.66	-9.11	26.91	2.89	27.00	0.000200	2.41	4021.04	233.40	0.09
W100_upstrm	113238.6 BAGBY		Bridge									
W100_upstrm	113210.8	Max WS	9205.46	-9.46	26.49		26.58	0.000203	2.40	4004.15	233.13	0.09
W100_upstrm	112974.0	Max WS	9151.37	-10.69	26.45	0.91	26.53	0.000133	2.37	3855.87	197.06	0.09
W100_upstrm	112944.9 PRAIRIE		Bridge									
W100_upstrm	112915.8	Max WS	9080.67	-10.82	26.29		26.37	0.000131	2.36	3850.01	197.00	0.09
W100_upstrm	112575.5	Max WS	9041.02	-9.20	26.26	3.02	26.32	0.000163	1.97	4591.94	237.25	0.07
W100_upstrm	112534.5 PRESTON STREET		Bridge									
W100_upstrm	112493.5	Max WS	9009.78	-9.47	25.91		25.97	0.000163	1.97	4575.85	237.12	0.08
W100_upstrm	112003.3	Max WS	8946.30	-9.69	25.86	1.77	25.91	0.000104	1.64	5449.39	279.34	0.06
W100_upstrm	111953.3 CONGRESS STREET		Bridge									
W100_upstrm	111903.3	Max WS	8856.37	-9.84	25.69		25.73	0.000102	1.63	5442.00	279.24	0.06
W100_upstrm	111853.5	Max WS	8837.57	-9.86	25.68	1.26	25.72	0.000096	1.71	5179.77	221.39	0.06
W100_upstrm	111818.6 SMITH STREET		Bridge									
W100_upstrm	111783.7	Max WS	8787.37	-8.67	25.65		25.70	0.000103	1.79	4911.61	217.71	0.07
W100_upstrm	111626.7	Max WS	8757.81	-11.83	25.63	0.90	25.68	0.000121	1.72	5095.59	226.71	0.06
W100_upstrm	111518.6 LOUISIANA		Bridge									
W100_upstrm	111410.5	Max WS	8599.33	-11.23	25.56		25.61	0.000082	1.74	4944.22	225.59	0.07
W100_upstrm	110876.6	Max WS	8574.13	-10.43	25.54	-0.96	25.57	0.000074	1.36	6326.94	320.83	0.05
W100_upstrm	110837.8 MILAM		Bridge									
W100_upstrm	110799.0	Max WS	8377.91	-10.72	25.48		25.51	0.000208	1.31	6400.67	322.35	0.05
W100_upstrm	110672.7	Max WS	8235.46	-13.25	25.44	-2.06	25.48	0.000211	1.63	6162.48	573.96	0.06
W100_upstrm	110643.7 TRAVIS STREET		Bridge									
W100_upstrm	110614.7	Max WS	8164.67	-12.75	25.42		25.46	0.000241	1.67	5865.12	562.41	0.07
W100_upstrm	110200.2	Max WS	8019.96	-9.11	25.38	0.85	25.40	0.000035	1.24	6559.60	426.85	0.05
W100_upstrm	110154.2 MAIN STREET		Bridge									
W100_upstrm	110108.2	Max WS	7954.59	-9.31	25.17		25.19	0.000035	1.23	6556.22	426.67	0.05
W100_upstrm	110103.2	Max WS	7954.59	-9.31	25.17		25.19	0.000035	1.23	6556.14	426.66	0.05
Downstream	109924.2	Max WS	13529.50	-13.02	25.17		25.24	0.000148	2.15	6305.46	291.45	0.08
Downstream	109551.7	Max WS	13529.27	-14.28	25.13	-3.17	25.19	0.000128	1.98	6824.22	333.60	0.08
Downstream	109518.7 FANNIN STREET		Bridge									
Downstream	109485.7	Max WS	13528.34	-15.31	24.36		24.42	0.000124	1.96	6911.54	334.59	0.08
Downstream	109440.2	Max WS	13528.21	-16.48	24.34	-3.57	24.41	0.000238	2.08	6507.28	320.73	0.08
Downstream	109395.2 SAN JACINTO STRE		Bridge									
Downstream	109350.2	Max WS	13528.14	-16.89	24.16		24.23	0.000230	2.06	6580.96	321.07	0.08
Downstream	109119.0	Max WS	13527.91	-17.14	24.07	-4.20	24.17	0.000315	2.54	5331.65	347.95	0.11
Downstream	109103.1 CROSSWALK		Bridge									
Downstream	109087.2	Max WS	13527.99	-17.55	24.03		24.12	0.000300	2.48	5447.60	354.83	0.11
Downstream	108565.3	Max WS	13527.72	-12.77	23.94		24.01	0.000118	2.15	6305.51	263.07	0.08
Downstream	108334.0	Max WS	13527.43	-14.06	23.92		23.98	0.000174	2.00	6815.75	419.33	0.07
Downstream	107179.4	Max WS	13526.66	-20.52	23.70	-7.60	23.78	0.000174	2.28	6313.15	391.93	0.09
Downstream	107158.9 S. PACIFIC RR		Bridge									
Downstream	107139	Max WS	13526.66	-20.19	23.68		23.76	0.000182	2.32	6174.19	389.69	0.09
Downstream	107138.4	Max WS	13526.66	-20.19	23.68		23.76	0.000182	2.32	6174.12	389.69	0.09
W100_downstream1	106594.0	Max WS	35165.95	-16.70	23.68		24.09	0.000858	5.15	6825.86	253.84	0.18
W100_downstream1	106151.4	Max WS	35165.07	-13.85	23.02	2.79	23.51	0.001776	5.63	6248.72	260.85	0.20
W100_downstream1	106131.1 MCKEE		Bridge									
W100_downstream1	106110.8	Max WS	35164.69	-12.53	22.69		23.26	0.002041	6.04	5825.89	253.87	0.22
W100_downstream1	105705.4	Max WS	35164.11	-18.22	22.17	1.35	22.71	0.000648	5.95	5914.26	264.73	0.22
W100_downstream1	105667.4 ELYSIAN STREET		Bridge									
W100_downstream1	105629.4	Max WS	35163.92	-18.43	21.83		22.39	0.000658	5.98	5882.39	263.31	0.22
W100_downstream1	105476	Max WS	35163.74	-18.70	21.72		22.19	0.001959	5.48	6411.11	367.07	0.23
W100_downstream1	104962	Max WS	35163.32	-18.70	21.22		21.40	0.001044	3.43	10250.23	615.39	0.15
W100_downstream1	104900	Max WS	35163.42	-19.15	21.04		21.23	0.000277	3.45	10191.69	640.76	0.15
W100_downstream1	104464	Max WS	35163.29	-19.86	20.63		20.96	0.001985	4.56	7709.22	503.27	0.21
W100_downstream1	104301	Max WS	35163.18	-20.42	20.40		20.76	0.000363	4.80	7320.04	472.33	0.22
W100_downstream1	104242	Max WS	35163.14	-20.62	20.30		20.71	0.001438	5.11	6874.66	383.18	0.21
W100_downstream1	104118.0	Max WS	35162.87	-21.10	19.62	6.58	20.49	0.002279	7.46	4715.34	270.64	0.31
W100_downstream1	104070 Prop I-69 Ramp		Bridge									
W100_downstream1	103955.1	Max WS	35163.07	-21.79	19.86		20.32	0.001036	5.42	6490.35	302.56	0.21
W100_downstream1	103955.0	Max WS	35163.02	-21.79	19.86	2.29	20.32	0.001036	5.42	6490.32	302.56	0.21
W100_downstream1	103846 Prop I-69 DC		Bridge									
W100_downstream1	103786.1	Max WS	35162.84	-22.51	19.64		20.08	0.000842	5.35	6571.54	289.20	0.20
W100_downstream1	103786.0	Max WS	35162.87	-22.51	19.64	1.26	20.08	0.000842	5.35	6571.51	289.20	0.20
W100_downstream1	103694 Prop I-69 SBML		Bridge									
W100_downstream1	103534.1	Max WS	35162.84	-23.58	19.32		19.78	0.000830	5.47	6423.17	275.42	0.20
W100_downstream1	103534.0	Max WS	35162.80	-23.58	19.32	0.96	19.78	0.000830	5.47	6423.15	275.42	0.20
W100_downstream1	103383 Prop I-45 SBML		Bridge									
W100_downstream1	103241.1	Max WS	35162.80	-24.83	19.13		19.60	0.001301	5.51	6381.37	316.44	0.22
W100_downstream1	103241.0	Max WS	35162.80	-24.83	19.13	0.53	19.60	0.001301	5.51	6381.32	316.43	0.22
W100_downstream1	103161 Prop I-69 NBML		Bridge									
W100_downstream1	103095.1	Max WS	35162.73	-25.45	18.99		19.45	0.000545	5.45	6456.98	293.15	0.20
W100_downstream1	103095.0	Max WS	35162.77	-25.45	18.99	0.75	19.45	0.000545	5.45	6456.96	293.15	0.20
W100_downstream1	103065 Prop I-45 DC		Bridge									
W100_downstream1	103025.1	Max WS	35162.61	-25.75	18.88		19.36	0.000514	5.57	6309.40	265.52	0.20
W100_downstream1	103025.0	Max WS	35162.69	-25.75	18.88	-0.59	19.36	0.000514	5.57	6309.38	265.51	0.20
W100_downstream1	102988 Prop I-10 DC		Bridge									
W100_downstream1	102952	Max WS	35162.45	-26.06	18.40		19.05	0.000868	6.50	5411.48	255.90	0.25
W100_downstream1	102895.0	Max WS	35162.44	-26.31	18.11		18.98	0.001617	7.48	4701.39	242.92	0.30
W100_downstream1	102875.3	Max WS	35162.48	-26.39	18.34	-0.63	18.95	0.001745	6.24	5636.33	351.46	0.27
W100_downstream1	102847.5 HOUTerminal RR		Bridge									
W100_downstream1	102819.7	Max WS	35162.41	-26.43	17.99		18.61	0.001840	6.36	5524.79	349.81	0.28
W100_downstream1	102309.0	Max WS	35207.77	-23.48	17.54		18.04	0.000390	5.67	6211.08	217.19	0.19
W100_downstream1	101828.0	Max WS	35248.71	-20.70	17.14	-1.54	17.77	0.000761	6.34	5556.79	245.97	0.24
W100_downstream1	101790.1 JENSEN ROAD		Bridge									
W100_downstream1	101752.2	Max WS	35248.71	-20.69	16.97		17.60	0.000762	6.40	5511.81	244.31	0.24
W100_downstream1	101007.3	Max WS	35314.91	-16.93	16.66		17.17	0.000389	5.76	6130.15	262.87	0.21
W100_downstream1	99992.6	Max WS	35403.05	-18.90	16.18		16.75	0.000443	6.05	5853.25	250.05	0.22

HEC-RAS Plan: NC_H_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_downstream1	98399.4	Max WS	35547.27	-20.26	15.52		16.05	0.000419	5.86	6062.78	257.94	0.21
W100_downstream1	97517.4	Max WS	35622.52	-19.35	15.45		15.75	0.000247	4.45	7999.92	313.35	0.16
W100_downstream1	96028.6	Max WS	35746.93	-17.81	14.67	-3.88	15.16	0.000546	5.64	6342.03	288.52	0.21
W100_downstream1	95985.1 YORK DRIVE		Bridge									
W100_downstream1	95941.6	Max WS	35746.93	-17.87	14.53		15.02	0.000548	5.66	6317.30	287.98	0.21
W100_downstream1	95362.9	Max WS	35798.40	-15.97	14.33		14.76	0.000356	5.26	6804.24	322.12	0.20
W100_downstream1	94280.7	Max WS	35901.56	-19.82	13.31		14.07	0.000925	6.97	5147.88	233.62	0.26
W100_downstream1	93495.6	Max WS	35963.79	-20.43	12.96		13.47	0.000601	5.70	6304.20	323.72	0.23
W100_downstream1	92795.6	Max WS	36032.49	-20.98	12.58	-5.81	13.10	0.000432	5.79	6219.45	288.74	0.22
W100_downstream1	92741.1 LOCKWOOD DRIVE		Bridge									
W100_downstream1	92686.6	Max WS	36032.49	-21.08	12.38		12.90	0.000438	5.82	6189.37	288.10	0.22
W100_downstream1	90936.7	Max WS	36187.93	-18.64	11.10		11.59	0.001054	5.62	6439.77	391.41	0.24
W100_downstream1	89918.4	Max WS	36279.19	-17.23	9.89		10.62	0.000849	6.87	5279.17	310.61	0.29
W100_downstream1	88579.0	Max WS	36396.77	-20.97	8.85		9.55	0.000753	6.69	5444.15	316.84	0.28
W100_downstream1	87591.9	Max WS	36489.52	-23.72	8.34		8.90	0.000556	6.01	6068.44	302.14	0.24
W100_downstream1	86660.2	Max WS	36563.79	-23.42	8.02	-10.58	8.47	0.000362	5.36	6815.32	290.79	0.20
W100_downstream1	86641.7 HOUTerminal RR		Bridge									
W100_downstream1	86623.2	Max WS	36563.70	-23.61	7.69		8.15	0.000367	5.40	6775.83	290.42	0.20
W100_downstream1	85855.2	Max WS	36631.85	-26.84	6.76		7.72	0.000776	7.87	4656.66	206.73	0.29
W100_downstream1	85238.7	Max WS	36684.53	-29.43	6.48		7.27	0.000683	7.13	5212.67	276.98	0.26
W100_downstream1	84561.7	Max WS	36757.34	-32.27	6.24	-13.71	6.88	0.000438	6.44	5791.22	296.25	0.22
W100_downstream1	84531.4 NORTH WAYSIDE RD		Bridge									
W100_downstream1	84501.1	Max WS	36757.19	-28.97	5.66		6.55	0.000687	7.55	4871.00	209.65	0.28
W100_downstream1	84252.6	Max WS	36779.40	-26.90	5.65	-10.13	6.39	0.000594	6.90	5327.38	239.49	0.26
W100_downstream1	84222.3 M. GARCIA		Bridge									
W100_downstream1	84192.0	Max WS	36779.03	-24.10	4.95		5.98	0.000965	8.16	4508.38	228.70	0.32
W100_downstream1	83635.7	Max WS	36828.73	-21.72	4.88		5.52	0.000676	6.37	5778.36	333.25	0.27
W100_downstream1	81786.1	Max WS	36988.39	-31.97	3.84		4.39	0.000540	5.95	6222.83	339.48	0.24
W100_downstream1	80903.1	Max WS	37064.62	-27.77	3.53	-12.87	3.96	0.000427	5.22	7101.75	385.50	0.21
W100_downstream1	80883.1 S. PACIFIC RR		Bridge									
W100_downstream1	80863.1	Max WS	37064.62	-28.10	3.11		3.54	0.000499	5.25	7064.66	385.02	0.22
W100_downstream1	80538.0	Max WS	37064.62	-33.12	3.26	-20.60	3.42	0.000122	3.21	11555.22	491.72	0.12

White Oak Bayou
Scenario 2: North Canal and Heights Improvements 10-Year

HEC-RAS Plan: NC_H_10yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	36134.	Max WS	21255.27	24.19	52.01		52.73	0.000577	6.80	3125.01	194.53	0.30
E100-00-00	35718.0	Max WS	21255.02	23.76	51.73		52.50	0.000514	7.05	3015.09	187.58	0.31
E100-00-00	35158.	Max WS	21335.36	22.89	51.54		52.20	0.000542	6.54	3263.06	204.31	0.29
E100-00-00	35006.0	Max WS	21360.35	22.66	51.39	39.67	52.12	0.000497	6.86	3114.82	246.00	0.30
E100-00-00	34951.5 ELLA		Bridge									
E100-00-00	34895.0	Max WS	21352.43	22.56	51.19		51.93	0.000504	6.90	3095.88	241.57	0.30
E100-00-00	34645.	Max WS	21381.80	22.24	51.10		51.79	0.000599	6.67	3205.96	218.58	0.30
E100-00-00	34206.0	Max WS	21451.70	21.68	50.86		51.55	0.000479	6.65	3223.51	201.04	0.29
E100-00-00	33962.58	Max WS	21497.89	21.61	50.98		51.43	0.000428	5.38	4032.84	383.92	0.27
E100-00-00	33909.08	Max WS	21505.54	21.60	50.94		51.41	0.000581	5.49	3921.21	337.73	0.28
E100-00-00	33770.	Max WS	21525.17	21.56	50.90		51.35	0.000289	5.44	4237.65	362.49	0.23
E100-00-00	33681.0	Max WS	21537.37	21.53	50.59	38.73	51.32	0.000506	6.85	3142.62	349.26	0.30
E100-00-00	33645.5 W 18TH		Bridge									
E100-00-00	33610.0	Max WS	21536.80	21.61	50.42		51.18	0.000525	6.96	3094.92	345.23	0.31
E100-00-00	33357.	Max WS	21565.89	21.41	50.35		51.03	0.000642	6.60	3268.44	214.63	0.30
E100-00-00	32570.0	Max WS	21708.17	20.78	49.97		50.60	0.000430	6.34	3425.77	208.48	0.28
E100-00-00	31583.0	Max WS	21823.04	19.35	49.62		50.19	0.000380	6.05	3605.60	220.11	0.26
E100-00-00	30779.0	Max WS	21936.95	18.79	49.37		49.90	0.000347	5.88	4060.32	377.68	0.25
E100-00-00	29659.	Max WS	22060.90	17.66	49.01		49.47	0.000405	5.44	4074.20	332.93	0.24
E100-00-00	29368.0	Max WS	22140.02	17.37	48.62	35.29	49.34	0.000477	6.81	3253.44	180.24	0.28
E100-00-00	29297.5 TC JESTER SOUTH		Bridge									
E100-00-00	29203.0	Max WS	22137.51	17.35	47.31		48.14	0.000575	7.32	3024.17	175.33	0.31
E100-00-00	28775.	Max WS	22189.23	16.90	47.39		47.90	0.000524	5.74	3863.40	264.01	0.26
E100-00-00	28375.0	Max WS	22216.80	16.48	46.98	34.31	47.70	0.000486	6.80	3269.51	197.13	0.29
E100-00-00	28357.0 BICYCLE BRIDGE		Bridge									
E100-00-00	28330.0	Max WS	22216.65	16.41	46.86		47.58	0.000490	6.82	3259.87	196.86	0.30
E100-00-00	28190.0	Max WS	22232.54	16.18	46.82	33.81	47.52	0.000444	6.70	3316.07	190.61	0.28
E100-00-00	28152.5 W 11TH		Bridge									
E100-00-00	28113.0	Max WS	22232.05	16.28	46.66		47.38	0.000465	6.81	3266.21	190.56	0.29
E100-00-00	27982.	Max WS	22244.49	16.25	46.54		47.31	0.000558	7.05	3153.08	192.74	0.31
E100-00-00	27429.0	Max WS	22286.52	16.12	46.32		47.02	0.000485	6.71	3322.99	200.79	0.29
E100-00-00	26598.	Max WS	22398.07	15.35	45.98		46.62	0.000454	6.41	3494.46	210.86	0.28
E100-00-00	26498.0	Max WS	22408.70	15.26	45.96	33.00	46.57	0.000438	6.29	3564.16	214.02	0.27
E100-00-00	26432.5 TC JESTER		Bridge									
E100-00-00	26366.0	Max WS	22407.63	15.16	45.74		46.37	0.000445	6.33	3539.30	213.33	0.27
E100-00-00	26307.3	Max WS	22413.24	15.13	45.83		46.34	0.000379	5.74	4061.21	407.47	0.25
E100-00-00	26225	Max WS	22420.23	15.04	45.82		46.31	0.000400	5.65	4081.55	391.97	0.24
E100-00-00	26140.	Max WS	22425.73	14.97	45.63		46.27	0.000470	6.45	3477.20	216.22	0.28
E100-00-00	25536.0	Max WS	22472.80	14.48	45.33		45.99	0.000473	6.49	3514.14	266.86	0.28
E100-00-00	25132.	Max WS	22512.60	14.29	45.18		45.81	0.000452	6.39	3899.58	356.13	0.28
E100-00-00	24817.0	Max WS	22539.96	14.14	44.82	33.03	45.62	0.000720	7.16	3148.00	219.10	0.33
E100-00-00	24789.0 UNION PACIFIC RR		Bridge									
E100-00-00	24758.0	Max WS	22537.71	13.76	44.24		45.06	0.000732	7.27	3098.53	214.80	0.34
E100-00-00	24636.	Max WS	22551.92	13.61	44.35		44.98	0.000480	6.43	3756.64	369.21	0.28
E100-00-00	23934.0	Max WS	22615.26	12.75	43.99		44.58	0.000624	6.18	3658.32	274.12	0.30
E100-00-00	23550.0	Max WS	22657.31	12.77	43.89	29.55	44.39	0.000358	5.70	3973.84	241.50	0.25
E100-00-00	23506.5 DURHAM		Bridge									
E100-00-00	23444.0	Max WS	22656.25	12.69	43.68		44.19	0.000364	5.75	3943.00	240.55	0.25
E100-00-00	23180.	Max WS	22673.11	12.46	43.46		44.10	0.000422	6.42	3685.80	328.34	0.27
E100-00-00	22983.	Max WS	22683.88	12.29	43.17		44.00	0.000628	7.31	3132.51	322.84	0.33
E100-00-00	22834.0	Max WS	22697.86	12.16	43.04	31.50	43.89	0.000768	7.42	3060.54	280.06	0.32
E100-00-00	22796.5 SHEPHERD		Bridge									
E100-00-00	22758.0	Max WS	22692.38	12.11	42.77		43.65	0.000864	7.51	3020.87	209.49	0.33
E100-00-00	22610.	Max WS	22704.92	11.92	42.77		43.53	0.000802	7.00	3380.14	378.44	0.31
E100-00-00	22224.0	Max WS	22739.82	11.41	42.82		43.20	0.000692	5.24	5718.34	647.09	0.25
E100-00-00	21444.0	Max WS	22784.76	10.52	41.89		42.65	0.000870	7.00	3253.80	209.57	0.31
E100-00-00	20746.0	Max WS	22824.27	10.00	41.23		42.03	0.000894	7.18	3178.00	206.07	0.32
E100-00-00	20644.0	Max WS	22834.66	9.95	41.22	29.52	41.94	0.000799	6.85	3700.07	602.81	0.31
E100-00-00	20633.0 Pipeline		Bridge									
E100-00-00	20622.0	Max WS	22819.61	9.95	40.74		41.52	0.000886	7.11	3407.71	556.07	0.32
E100-00-00	20521.	Max WS	22826.61	9.91	40.63		41.44	0.000846	7.27	3528.55	552.49	0.32
E100-00-00	19917.0	Max WS	22870.63	9.66	39.97		40.87	0.001020	7.58	3018.48	199.49	0.34
E100-00-00	19463.0	Max WS	22897.12	9.25	39.40		40.37	0.001132	7.92	2892.66	197.14	0.36
E100-00-00	18857	Max WS	22923.53	8.03	38.55	28.68	39.65	0.001276	8.40	2753.17	204.35	0.38
E100-00-00	18800 I-10 WBFR		Bridge									
E100-00-00	18747	Max WS	22923.04	7.81	38.58		39.41	0.000900	7.30	3217.75	260.27	0.32
E100-00-00	18746	Max WS	22923.13	7.81	38.58	27.27	39.40	0.000900	7.30	3217.48	260.26	0.32
E100-00-00	18595 I-10 BRIDGE		Bridge									
E100-00-00	18443	Max WS	22885.90	7.19	37.23		38.13	0.001001	7.65	2992.88	196.57	0.35
E100-00-00	18442	Max WS	22886.54	7.19	37.23	27.03	38.13	0.001001	7.65	2992.65	196.56	0.35
E100-00-00	18394 I-10 EBFR		Bridge									
E100-00-00	18377.	Max WS	22854.13	6.98	36.50		37.53	0.001153	8.15	2803.11	186.09	0.37
E100-00-00	18234.0	Max WS	22891.90	6.77	37.11		37.33	0.000079	3.74	6112.80	266.55	0.14
E100-00-00	18199.0	Max WS	22894.47	6.70	37.14		37.33	0.000053	3.49	6565.52	266.11	0.12
E100-00-00	18176.0	Max WS	22893.24	6.79	37.04	17.36	37.33	0.000077	4.29	5341.87	221.55	0.15
E100-00-00	18138.0 YALE		Bridge									
E100-00-00	18082.0	Max WS	22882.37	6.87	36.73		37.12	0.000113	5.04	4540.06	202.20	0.18
E100-00-00	17905.	Max WS	22900.17	6.86	36.80		37.10	0.000098	4.39	5211.38	224.19	0.16
E100-00-00	17756.0	Max WS	22911.10	6.85	36.81	16.77	37.09	0.000114	4.24	5409.62	251.08	0.16
E100-00-00	17726 S. HEIGHTS		Bridge									
E100-00-00	17696	Max WS	22906.20	6.85	36.66		36.95	0.000114	4.26	5371.26	248.97	0.16
E100-00-00	17657	Max WS	22910.31	6.35	36.68	16.00	36.94	0.000111	4.13	5551.36	256.42	0.16
E100-00-00	17627 N. HEIGHTS		Bridge									
E100-00-00	17597.0	Max WS	22905.93	6.35	36.55		36.81	0.000111	4.15	5517.66	254.51	0.16
E100-00-00	17318.	Max WS	22888.41	6.35	35.79		36.71	0.001023	7.70	2973.65	199.84	0.35
E100-00-00	16831.0	Max WS	22925.16	6.34	35.73		36.36	0.000397	6.36	3602.85	306.60	0.33
E100-00-00	15795.0	Max WS	22959.49	4.84	35.55		35.88	0.000521	4.58	5011.96	379.47	0.22

HEC-RAS Plan: NC_H_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	15278.	Max WS	22944.59	4.41	34.89		35.61	0.000561	6.81	3370.63	222.30	0.31
E100-00-00	14977.0	Max WS	22976.85	4.16	35.28	12.97	35.46	0.000045	3.43	6707.27	256.73	0.12
E100-00-00	14937.0 I-10 EBFR ACCESS		Bridge									
E100-00-00	14897.0	Max WS	22976.85	3.39	34.77		34.95	0.000045	3.43	6707.86	257.38	0.12
E100-00-00	14890	Max WS	22973.57	3.42	34.71	13.45	34.95	0.000062	3.94	5823.64	228.67	0.14
E100-00-00	14775 I-10 BRIDGE		Bridge									
E100-00-00	14660	Max WS	22970.85	3.42	34.65		34.90	0.000062	3.95	5810.99	228.56	0.14
E100-00-00	14590.0	Max WS	22967.35	3.45	34.55	14.45	34.89	0.000091	4.65	4937.95	199.10	0.16
E100-00-00	14562.0 I-10 WB ACCESS		Bridge									
E100-00-00	14532.0	Max WS	22965.27	3.41	34.49		34.83	0.000091	4.66	4933.23	199.12	0.16
E100-00-00	14354.0	Max WS	22973.21	3.29	34.46		34.80	0.000193	4.67	4919.30	475.99	0.20
E100-00-00	13924.0	Max WS	22961.67	3.18	34.00	22.09	34.63	0.000647	6.35	3616.94	319.79	0.27
E100-00-00	13909.5 UNION PAC. RR		Bridge									
E100-00-00	13898.0	Max WS	22956.54	2.95	33.68		34.31	0.000657	6.38	3596.38	316.90	0.28
E100-00-00	13494.	Max WS	22962.36	2.47	33.53		34.03	0.000747	5.63	4077.78	393.81	0.26
E100-00-00	13220.0	Max WS	22981.10	2.15	33.63	21.88	33.89	0.000186	4.12	5583.91	565.33	0.19
E100-00-00	13182.5 STUDEMONT		Bridge									
E100-00-00	13143.0	Max WS	22979.69	2.15	33.55		33.79	0.000179	4.00	6084.68	499.11	0.18
E100-00-00	12698.	Max WS	22974.76	1.87	33.19		33.64	0.000525	5.37	4280.30	340.24	0.27
E100-00-00	12066.0	Max WS	22998.87	1.47	33.08		33.35	0.000385	4.21	5464.43	376.47	0.19
E100-00-00	11546.0	Max WS	23014.74	0.90	32.97		33.20	0.000183	3.85	6107.50	578.28	0.19
E100-00-00	11021.	Max WS	23036.46	0.63	32.93		33.12	0.000138	3.58	6797.44	721.74	0.16
E100-00-00	10908.0	Max WS	23041.68	0.57	32.94	20.07	33.11	0.000120	3.43	8109.52	866.22	0.15
E100-00-00	10852.5 TAYLOR (SAWYER)		Bridge									
E100-00-00	10804.0	Max WS	23041.10	0.45	32.79		32.95	0.000121	3.41	8087.35	865.25	0.15
E100-00-00	10643.	Max WS	23035.58	0.14	32.48		32.95	0.000454	5.53	4347.43	370.37	0.24
E100-00-00	9779.0	Max WS	23071.77	-1.51	32.46		32.67	0.000137	3.71	7027.51	589.42	0.16
E100-00-00	8532.0	Max WS	23121.13	-1.76	32.48		32.53	0.000039	1.64	14110.59	862.33	0.07
E100-00-00	8140.	Max WS	23137.46	-2.43	32.43		32.48	0.000210	1.72	14264.05	1126.90	0.07
E100-00-00	7649.0	Max WS	23153.99	-3.26	32.30	16.15	32.44	0.000084	3.28	12541.08	1362.38	0.13
E100-00-00	7608.5 HOUSTON		Bridge									
E100-00-00	7568.0	Max WS	23153.15	-3.15	32.31		32.40	0.000063	2.84	12403.06	1360.20	0.11
E100-00-00	7546.0	Max WS	23154.48	-3.16	32.29	16.12	32.41	0.000074	3.05	11300.84	1379.80	0.12
E100-00-00	7535.5 Pipeline		Bridge									
E100-00-00	7529.0	Max WS	23154.29	-3.16	32.25		32.37	0.000074	3.06	11243.19	1378.25	0.12
E100-00-00	7481.0	Max WS	23154.05	-3.17	32.20		32.37	0.000113	3.50	8363.12	1100.10	0.16
E100-00-00	7253.1	Max WS	23154.27	-3.19	32.23		32.34	0.000044	2.60	8940.72	613.55	0.10
E100-00-00	7253.05		Lat Struct									
E100-00-00	7253	Max WS	23153.42	-3.19	32.23	11.55	32.34	0.000044	2.60	8940.72	613.55	0.10
E100-00-00	7205 Prop I-10 DC		Bridge									
E100-00-00	7138.1	Max WS	23153.09	-3.20	32.08		32.22	0.000059	2.97	7843.51	561.57	0.12
E100-00-00	7138	Max WS	23152.02	-3.20	32.08	12.39	32.22	0.000059	2.97	7843.51	561.57	0.12
E100-00-00	7057 Prop I-10 Ramp		Bridge									
E100-00-00	7016.1	Max WS	23149.93	-3.22	31.58		31.92	0.000125	4.67	4957.08	487.83	0.18
E100-00-00	7016	Max WS	23150.38	-3.22	31.58		31.92	0.000125	4.67	4957.08	487.83	0.18
E100-00-00	6980	Max WS	23150.91	-3.22	31.74		31.91	0.000108	3.23	7210.10	529.73	0.13
E100-00-00	6979		Lat Struct									
E100-00-00	6975.0	Max WS	23136.71	-3.22	31.74		31.91	0.000108	3.23	7210.04	529.73	0.13
E100-00-00	6898.0	Max WS	23003.07	-4.23	31.67		31.90	0.000293	3.85	6234.23	478.68	0.16
E100-00-00	6895	Max WS	23002.90	-4.23	31.67		31.89	0.000293	3.85	6233.79	478.67	0.16
E100-00-00_02	6775.	Max WS	30800.96	-4.30	31.67		31.78	0.000098	2.75	11616.35	952.77	0.12
E100-00-00_02	6637.0	Max WS	30794.31	-4.37	31.63	17.23	31.77	0.000100	3.05	10254.48	840.36	0.13
E100-00-00_02	6600 Prop I-45 DC		Bridge									
E100-00-00_02	6575.1	Max WS	30790.34	-4.41	31.59		31.74	0.000106	3.08	10204.45	902.37	0.13
E100-00-00_02	6575.0	Max WS	30791.68	-4.41	31.59	17.48	31.74	0.000106	3.08	10204.45	902.37	0.13
E100-00-00_02	6551 Prop I-45 Ramp		Bridge									
E100-00-00_02	6515.0	Max WS	30787.66	-4.44	31.57		31.71	0.000109	3.09	10312.50	835.47	0.13
E100-00-00_02	6387.0	Max WS	30786.28	-4.38	31.55	18.06	31.70	0.000111	3.07	10032.35	1215.89	0.13
E100-00-00_02	6352 Prop I-45 NBML		Bridge									
E100-00-00_02	6298.1	Max WS	30786.28	-4.51	31.55		31.68	0.000096	2.87	10738.88	1143.16	0.12
E100-00-00_02	6298	Max WS	30784.99	-4.51	31.55	16.56	31.68	0.000096	2.87	10738.88	1143.15	0.12
E100-00-00_02	6252 Prop I-45 DC		Bridge									
E100-00-00_02	6201.1	Max WS	30786.28	-4.65	31.56		31.67	0.000068	2.60	11839.80	981.53	0.11
E100-00-00_02	6201	Max WS	30784.99	-4.65	31.56	15.64	31.67	0.000068	2.60	11839.80	981.53	0.11
E100-00-00_02	6164 Prop I-45 Ramp		Bridge									
E100-00-00_02	6122.0	Max WS	30763.60	-4.33	31.43		31.58	0.000081	3.14	9783.30	849.15	0.13
E100-00-00_02	5525.0	Max WS	30758.14	-3.15	31.40		31.53	0.000098	2.87	10732.61	649.16	0.12
E100-00-00_02	4994.0	Max WS	30744.34	-3.09	31.15	15.63	31.43	0.000347	4.30	7660.11	539.26	0.17
E100-00-00_02	4980.0 RR OVERPASS		Bridge									
E100-00-00_02	4961.0	Max WS	30544.50	-3.03	30.49		30.81	0.000444	4.58	7101.69	531.90	0.18
E100-00-00_02	4812.0	Max WS	30377.22	-3.49	30.09	15.02	30.68	0.001355	6.14	4944.64	387.53	0.30
E100-00-00_02	4774.5 CROCKETT/HOGAN		Bridge									
E100-00-00_02	4687.0	Max WS	30243.87	-4.67	29.96		30.39	0.000905	5.26	5748.73	432.94	0.25
E100-00-00_02	4407.	Max WS	30073.44	-3.62	29.64		30.16	0.000656	5.83	5242.03	363.25	0.23
E100-00-00_02	4014.0	Max WS	30084.94	-2.15	29.59	14.10	29.93	0.000533	4.63	6493.23	396.76	0.20
E100-00-00_02	3997.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	3976.0	Max WS	30050.10	-2.40	29.44		29.78	0.000546	4.65	6462.47	397.26	0.20
E100-00-00_02	3681.	Max WS	29956.43	-3.80	29.09		29.59	0.000712	5.68	5275.50	319.85	0.24
E100-00-00_02	3585.0	Max WS	29953.71	-4.26	29.00		29.53	0.000629	5.84	5130.14	305.39	0.25
E100-00-00_02	3233.0	Max WS	30004.00	-4.79	29.20	9.58	29.34	0.000202	2.92	10285.99	1025.78	0.14
E100-00-00_02	3094 Prop I-10 WBML		Bridge									
E100-00-00_02	2954.1	Max WS	29973.76	-5.22	29.02		29.20	0.000284	3.36	8914.02	908.59	0.17
E100-00-00_02	2954.0	Max WS	29973.76	-5.22	29.02	10.60	29.20	0.000284	3.36	8913.99	908.58	0.17
E100-00-00_02	2857 Prop I-45 BNML		Bridge									
E100-00-00_02	2760.1	Max WS	29971.20	-5.51	29.00		29.15	0.000208	3.08	9724.13	841.17	0.15
E100-00-00_02	2760.0	Max WS	29968.64	-5.51	29.00	12.35	29.15	0.000208	3.08	9724.11	841.16	0.15
E100-00-00_02	2639 Prop I-10 WB Exp		Bridge									

HEC-RAS Plan: NC_H_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_02	2518.1	Max WS	29928.92	-5.88	28.76		28.98	0.000301	3.69	8105.97	643.26	0.17
E100-00-00_02	2518.0	Max WS	29926.48	-5.88	28.76	12.87	28.98	0.000300	3.69	8105.95	643.25	0.17
E100-00-00_02	2434 Prop I-45 SBML		Bridge									
E100-00-00_02	2350.1	Max WS	29854.45	-6.13	28.41		28.74	0.000530	4.59	6498.07	599.23	0.23
E100-00-00_02	2350.0	Max WS	29854.45	-6.13	28.41	13.55	28.74	0.000530	4.59	6498.04	599.22	0.23
E100-00-00_02	2280 Prop I-10 EBML		Bridge									
E100-00-00_02	2210.0	Max WS	29822.16	-6.34	28.25		28.60	0.000507	4.69	6357.23	641.12	0.22
E100-00-00_02	1580.	Max WS	29734.15	-7.83	27.49		28.18	0.000859	6.67	4533.68	787.61	0.27
E100-00-00_02	1353.0	Max WS	29593.92	-8.34	26.98	13.71	27.92	0.001311	7.79	3800.28	667.84	0.32
E100-00-00_02	1335.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	1319.0	Max WS	29169.48	-8.37	26.31		27.29	0.001396	7.95	3666.82	577.69	0.33
E100-00-00_02	984.0	Max WS	29221.61	-8.69	26.35	10.56	26.97	0.000509	6.32	4729.84	565.30	0.27
E100-00-00_02	978 MAIN STREET		Bridge									
E100-00-00_02	971.6	Max WS	28942.23	-8.69	26.07		26.70	0.000524	6.37	4636.68	555.85	0.27
E100-00-00_02	971.5	Max WS	28942.24	-8.69	26.07	10.48	26.70	0.000524	6.37	4636.66	555.85	0.27
E100-00-00_02	961.5 1ST STREET		Bridge									
E100-00-00_02	852	Max WS	27485.16	-6.40	25.22		26.07	0.000831	7.41	3729.90	549.99	0.34
E100-00-00_02	851.0	Max WS	27485.16	-6.40	25.22		26.07	0.000831	7.41	3729.62	549.95	0.34
E100-00-00_03	654.0	Max WS	5931.36	-6.50	25.22		25.24	0.000013	1.09	5423.98	545.92	0.04
E100-00-00_03	400.0	Max WS	5797.79	-8.58	25.20	-1.83	25.23	0.000018	1.38	4210.02	445.91	0.05
E100-00-00_03	381.0 UNION PACIFIC RR		Bridge									
E100-00-00_03	365.0	Max WS	5741.74	-8.23	25.19		25.22	0.000019	1.39	4135.93	456.56	0.05
E100-00-00_03	210.0	Max WS	5695.53	-7.81	25.19	-1.66	25.22	0.000022	1.50	3800.98	490.21	0.06
E100-00-00_03	191.0 UNION PACIFIC RR		Bridge									
E100-00-00_03	173.1	Max WS	5577.83	-6.84	25.17		25.21	0.000025	1.54	3618.49	646.82	0.06
E100-00-00_03	173.0	Max WS	5574.91	-6.84	25.17		25.21	0.000025	1.54	3618.49	646.82	0.06

Little White Oak Bayou
Scenario 2: North Canal and Heights Improvements 10-Year

HEC-RAS Plan: NC_H_10yr River: E101-00-00 Reach: E101-00-00_0003 Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	9819.000	Max WS	7908.82	16.33	36.51		36.80	0.000674	4.29	1842.47	157.00	0.22
E101-00-00_0003	9750.000	Max WS	7909.14	16.31	36.49		36.76	0.000651	4.15	1905.29	167.47	0.22
E101-00-00_0003	9000.000	Max WS	7790.81	15.50	36.19		36.32	0.000501	3.18	2839.10	507.53	0.18
E101-00-00_0003	8469.000	Max WS	7821.40	13.02	35.91		36.06	0.000459	3.38	2722.45	317.78	0.17
E101-00-00_0003	7984.000	Max WS	7876.56	13.76	35.65		35.83	0.000520	3.80	2555.69	314.86	0.19
E101-00-00_0003	6838.000	Max WS	7948.04	12.20	34.90		35.14	0.000687	3.89	2042.24	199.96	0.21
E101-00-00_0003	5861.000	Max WS	7940.79	9.91	33.96		34.26	0.001071	4.41	1878.98	244.56	0.24
E101-00-00_0003	4720.000	Max WS	7811.02	8.13	32.95		33.30	0.000725	4.95	2027.55	272.73	0.21
E101-00-00_0003	4279.000	Max WS	7662.87	9.00	32.38		32.85	0.001254	5.51	1391.41	104.83	0.27
E101-00-00_0003	4130.000	Max WS	7756.02	8.68	32.57	17.66	32.72	0.000207	3.13	2480.87	178.99	0.14
E101-00-00_0003	4091.000 N. MAIN		Bridge									
E101-00-00_0003	4050.000	Max WS	7734.69	7.87	32.51		32.65	0.000174	2.97	2620.83	238.32	0.13
E101-00-00_0003	3952.	Max WS	7743.04	6.87	32.50		32.63	0.000156	2.98	2656.82	189.30	0.13
E101-00-00_0003	3466.000	Max WS	7801.78	1.92	32.48		32.59	0.000055	2.99	3734.37	249.49	0.10
E101-00-00_0003	3323.0	Max WS	7830.60	-1.03	32.50	12.05	32.57	0.000030	2.22	4491.49	283.61	0.08
E101-00-00_0003	3278.0 I-45 Ramp		Bridge									
E101-00-00_0003	3236.1	Max WS	7834.82	-2.82	32.52		32.57	0.000025	1.91	5490.50	431.00	0.07
E101-00-00_0003	3236.0	Max WS	7835.89	-2.82	32.52	10.75	32.57	0.000025	1.91	5490.50	431.00	0.07
E101-00-00_0003	3085 I-45 NBML		Bridge									
E101-00-00_0003	2958.1	Max WS	7830.61	-2.52	32.52		32.55	0.000023	1.73	5970.45	1626.39	0.07
E101-00-00_0003	2958	Max WS	7831.67	-2.52	32.52	10.77	32.55	0.000023	1.73	5970.43	1626.38	0.07
E101-00-00_0003	2833 I-45 SBML		Bridge									
E101-00-00_0003	2389.000	Max WS	7808.33	-0.26	32.45		32.51	0.000100	2.02	5531.61	395.29	0.07
E101-00-00_0003	2325.	Max WS	7815.80	-0.15	32.45		32.50	0.000092	1.88	5767.06	401.36	0.07
E101-00-00_0003	1855.000	Max WS	7852.81	0.68	32.44		32.47	0.000039	1.34	6656.17	416.48	0.04
E101-00-00_0003	1126.	Max WS	7864.57	-1.85	32.33		32.40	0.000225	2.32	4392.73	540.29	0.09
E101-00-00_0003	1070.000	Max WS	7863.93	-2.04	32.30	9.30	32.40	0.000190	2.66	4275.36	593.24	0.10
E101-00-00_0003	1029.500 WRIGHTWOOD		Bridge									
E101-00-00_0003	987.000	Max WS	7783.24	-2.04	32.08		32.18	0.000213	2.65	4170.46	563.07	0.10
E101-00-00_0003	911.	Max WS	7799.61	-2.19	32.11		32.16	0.000116	2.08	5567.85	410.88	0.07
E101-00-00_0003	756.	Max WS	7787.76	-2.51	32.02		32.10	0.000605	2.30	3549.17	456.52	0.12
E101-00-00_0003	637.000	Max WS	7785.81	-2.75	32.00	10.98	32.04	0.000387	1.78	4711.14	600.65	0.09
E101-00-00_0003	538.000 QUITMAN/WHITE OA		Bridge									
E101-00-00_0003	442.000	Max WS	7638.57	-2.75	31.68		31.73	0.000267	1.92	4523.32	579.60	0.09
E101-00-00_0003	306.000	Max WS	7644.59	-2.86	31.69		31.71	0.000021	1.08	8785.56	1251.21	0.05
E101-00-00_0003	259.1	Max WS	7644.57	-2.90	31.69		31.70	0.000021	1.11	7331.64	557.06	0.05
E101-00-00_0003	259	Max WS	7644.23	-2.90	31.69	6.99	31.70	0.000021	1.11	7331.63	557.06	0.05
E101-00-00_0003	229 Prop I-10 DC		Bridge									
E101-00-00_0003	180.1	Max WS	7649.05	-2.96	31.68		31.70	0.000021	1.08	7134.08	448.90	0.05
E101-00-00_0003	180	Max WS	7649.87	-2.96	31.68	8.65	31.70	0.000021	1.08	7134.05	448.90	0.05
E101-00-00_0003	130 Prop-10 Ramp		Bridge									
E101-00-00_0003	101.1	Max WS	7658.77	-3.03	31.69		31.70	0.000015	0.93	8227.13	522.51	0.04
E101-00-00_0003	101	Max WS	7658.16	-3.03	31.69		31.70	0.000015	0.93	8227.13	522.51	0.04
E101-00-00_0003	68	Max WS	7654.65	-4.00	31.68		31.70	0.000026	1.08	7117.95	440.30	0.05
E101-00-00_0003	63	Max WS	7670.20	-4.00	31.68		31.70	0.000027	1.08	7117.83	440.30	0.05
E101-00-00_0003	3	Max WS	7799.20	-4.23	31.67		31.70	0.000036	1.36	5959.67	490.43	0.06
E101-00-00_0003	1	Max WS	7798.06	-4.23	31.67		31.70	0.000036	1.36	5959.63	490.43	0.06

North Canal
Scenario 2: North Canal and Heights Improvements 10-Year

HEC-RAS Plan: NC_H_10yr River: E100-00-00 Reach: North_Canal Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
North_Canal	1303	Max WS	21557.04	4.30	25.22		26.81	0.001152	10.13	2128.65	159.82	0.49
North_Canal	1302.9	Max WS	21556.82	4.30	25.22		26.81	0.001152	10.13	2128.63	159.82	0.49
North_Canal	1302		Lat Struct									
North_Canal	1132	Max WS	21580.18	4.13	24.97	16.87	26.60	0.001202	10.26	2102.43	159.82	0.50
North_Canal	1106 San Jacinto		Bridge									
North_Canal	1080	Max WS	21578.19	4.08	24.87		26.53	0.001222	10.32	2091.41	159.82	0.50
North_Canal	1079		Lat Struct									
North_Canal	838	Max WS	21610.14	3.84	24.49		26.21	0.001311	10.55	2048.63	159.81	0.52
North_Canal	579	Max WS	21644.05	3.58	24.08	16.50	25.89	0.001411	10.80	2004.76	159.80	0.54
North_Canal	548 Union Pacific RR		Bridge									
North_Canal	516	Max WS	21642.68	3.52	23.97		25.80	0.000982	10.86	1992.94	110.00	0.45
North_Canal	276	Max WS	21639.19	3.28	23.68		25.53	0.001002	10.93	1980.20	109.99	0.45

Buffalo Bayou
Scenario 2: North Canal and Heights Improvements 100-Year

HEC-RAS Plan: NC_H_100yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	148800.4	Max WS	17372.24	3.15	41.30		41.43	0.000303	3.10	7500.61	1804.62	0.10
W100_upstrm	148795.4	Max WS	17372.24	3.15	41.30	17.90	41.42	0.000303	3.10	7500.10	1804.60	0.10
W100_upstrm	148768.4 SOUTHERN PACIFIC		Bridge									
W100_upstrm	148741.4	Max WS	17369.40	3.04	41.17		41.30	0.000303	3.10	7494.72	1804.44	0.10
W100_upstrm	147632.4	Max WS	17359.94	-1.17	40.96		41.07	0.000104	2.70	8375.08	502.52	0.10
W100_upstrm	146698.0	Max WS	17428.45	1.88	40.83		40.96	0.000146	3.21	7879.74	685.69	0.11
W100_upstrm	145723.9	Max WS	17497.72	1.61	40.64		40.84	0.000185	4.19	7847.68	449.52	0.13
W100_upstrm	144753.5	Max WS	17572.56	0.07	40.46		40.65	0.000187	3.73	6806.34	424.22	0.13
W100_upstrm	143966.8	Max WS	17622.12	-7.47	40.34		40.52	0.000192	3.76	8939.66	1124.02	0.13
W100_upstrm	143078.2	Max WS	17691.59	-4.19	40.20		40.36	0.000148	3.38	10146.05	696.07	0.11
W100_upstrm	142061.4	Max WS	17774.85	0.55	40.09		40.22	0.000102	3.12	9474.52	521.20	0.10
W100_upstrm	141320.1	Max WS	17837.86	-2.70	40.08		40.13	0.000052	2.01	16634.42	876.98	0.07
W100_upstrm	140116.2	Max WS	17911.22	-1.31	39.94		40.08	0.000137	3.34	10851.95	824.64	0.10
W100_upstrm	139320.0	Max WS	17962.75	-2.14	39.88		39.97	0.000110	2.73	12309.45	925.42	0.09
W100_upstrm	138607.9	Max WS	18011.63	-2.08	39.88		39.89	0.000025	1.46	24455.57	1338.42	0.05
W100_upstrm	137732.0	Max WS	18046.21	-2.40	39.82		39.90	0.000076	2.84	16123.70	1225.65	0.09
W100_upstrm	137113.0	Max WS	18101.26	-2.62	39.70		39.88	0.000136	3.79	9416.27	1206.97	0.11
W100_upstrm	136331.2	Max WS	18168.06	-2.09	39.65		39.68	0.000203	1.77	14295.83	724.06	0.06
W100_upstrm	135666.2	Max WS	18205.39	-1.47	39.52		39.63	0.000099	3.02	11583.41	706.19	0.10
W100_upstrm	134706.7	Max WS	18269.43	-1.93	39.50		39.54	0.000049	2.15	20164.53	1116.83	0.07
W100_upstrm	134090.6	Max WS	18300.49	-1.59	39.46		39.53	0.000068	2.68	15921.05	834.44	0.08
W100_upstrm	133772.1	Max WS	18319.21	-0.79	39.42	13.58	39.53	0.000091	3.23	15122.12	919.57	0.10
W100_upstrm	133760.1 FOOTBRIDGE AT WE		Bridge									
W100_upstrm	133748.1	Max WS	18316.55	-0.46	39.36		39.47	0.000096	3.30	14760.77	914.51	0.10
W100_upstrm	132963.8	Max WS	18377.28	-1.98	39.23		39.39	0.000145	3.49	9000.54	617.15	0.11
W100_upstrm	131789.8	Max WS	18457.27	-2.31	39.08		39.24	0.000135	3.66	9587.88	670.25	0.11
W100_upstrm	130765.5	Max WS	18538.40	-3.81	39.02		39.11	0.000064	2.71	12250.28	570.86	0.08
W100_upstrm	129725.3	Max WS	18605.51	-3.71	38.93		39.05	0.000098	3.31	13994.21	1040.70	0.10
W100_upstrm	129163.2	Max WS	18662.02	-3.13	38.85		38.99	0.000097	3.20	10380.11	737.69	0.10
W100_upstrm	128326.9	Max WS	18727.96	-4.05	38.80		38.90	0.000072	2.91	13021.84	1236.87	0.09
W100_upstrm	128109.6	Max WS	18728.40	-4.29	38.80		38.86	0.000144	1.99	9414.01	750.03	0.07
W100_upstrm	128104.6	Max WS	18728.39	-4.29	38.80	10.60	38.86	0.000144	1.99	9413.75	749.46	0.07
W100_upstrm	128066.7 SHEPHERD		Bridge									
W100_upstrm	128028.8	Max WS	18721.63	-4.51	38.72		38.78	0.000095	1.98	9465.34	789.19	0.07
W100_upstrm	126647.0	Max WS	18713.56	-3.93	38.68		38.69	0.000030	1.07	18285.73	1011.43	0.04
W100_upstrm	125376.9	Max WS	18778.31	-4.05	38.46		38.54	0.000226	2.24	8518.21	592.73	0.09
W100_upstrm	124983.5	Max WS	18797.37	-3.86	38.42		38.48	0.000051	2.09	9215.10	1354.60	0.09
W100_upstrm	124644.1	Max WS	18815.86	-3.69	38.38	13.79	38.46	0.000063	2.33	8075.27	569.44	0.09
W100_upstrm	124591.8 WAUGH DRIVE		Bridge									
W100_upstrm	124539.5	Max WS	18811.09	-3.74	38.36		38.44	0.000063	2.33	8085.72	569.88	0.09
W100_upstrm	123658.2	Max WS	18887.10	-2.04	38.37		38.39	0.000023	1.01	23869.51	2172.54	0.04
W100_upstrm	123138.8	Max WS	18927.36	-4.08	38.36		38.37	0.000017	0.90	23623.49	1526.98	0.03
W100_upstrm	122627.1	Max WS	18964.38	-6.08	38.33		38.37	0.000029	1.76	15107.73	1123.09	0.06
W100_upstrm	122572.1 MONTROSE COURT		Mult Open									
W100_upstrm	122517.1	Max WS	18965.25	-5.38	38.33		38.37	0.000055	1.67	14283.55	1035.36	0.06
W100_upstrm	122371.6	Max WS	18975.71	-7.00	38.33	9.36	38.36	0.000057	1.62	15158.39	1073.98	0.06
W100_upstrm	122265 ROSEMONT		Bridge									
W100_upstrm	122210.0	Max WS	18959.00	-5.60	38.28		38.32	0.000047	1.79	13357.14	812.87	0.06
W100_upstrm	122036.7	Max WS	18969.32	-8.40	38.27		38.31	0.000045	1.68	13855.08	916.83	0.06
W100_upstrm	121229.5	Max WS	19024.79	-11.37	38.24		38.28	0.000037	1.59	14999.29	956.17	0.06
W100_upstrm	120962.2	Max WS	19034.89	-10.59	38.21		38.27	0.000055	2.02	11664.49	736.24	0.07
W100_upstrm	120005.2	Max WS	19101.83	-7.78	38.20	8.46	38.21	0.000039	0.90	21180.00	1043.77	0.04
W100_upstrm	119952.6 MEMORIAL DRIVE		Bridge									
W100_upstrm	119900.0	Max WS	19073.88	-7.64	38.10		38.11	0.000026	0.91	20931.62	1041.50	0.04
W100_upstrm	119495.9	Max WS	19105.99	-7.21	38.10		38.10	0.000013	0.64	30334.96	1344.58	0.02
W100_upstrm	118667.7	Max WS	19168.28	-8.56	38.06		38.08	0.000039	1.20	16832.05	947.32	0.04
W100_upstrm	118466.1	Max WS	19171.29	-8.89	38.04	5.96	38.08	0.000031	1.60	15250.49	1188.79	0.05
W100_upstrm	118418.1 MEMORIAL DRIVE		Bridge									
W100_upstrm	118370.1	Max WS	19170.25	-8.87	38.02		38.06	0.000032	1.60	15196.99	1185.22	0.05
W100_upstrm	117845.4	Max WS	19197.72	-7.26	38.00		38.03	0.000045	1.49	14390.71	844.51	0.05
W100_upstrm	117204.3	Max WS	19246.88	-4.60	37.98		38.01	0.000028	1.21	16591.71	1204.56	0.04
W100_upstrm	116395.7	Max WS	19284.22	-3.88	37.95		37.98	0.000032	1.41	13647.57	589.41	0.05
W100_upstrm	116167.6	Max WS	19256.44	-3.68	37.88	7.91	37.97	0.000128	2.45	7894.92	396.49	0.08
W100_upstrm	116121.9 SABINE AVENUE		Bridge									
W100_upstrm	116076.2	Max WS	19143.72	-3.86	37.67		37.76	0.000123	2.44	7885.21	391.63	0.08
W100_upstrm	115804.5	Max WS	19143.14	-4.60	37.61		37.75	0.000064	3.30	9967.91	986.01	0.09
W100_upstrm	115740.6	Max WS	19152.06	-4.78	37.62	8.37	37.74	0.000056	3.03	9808.91	953.55	0.09
W100_upstrm	115700 I-45 Allen Pkwy		Bridge									
W100_upstrm	115674.0	Max WS	19121.74	-5.10	37.59		37.71	0.000059	3.07	10113.48	1147.17	0.09
W100_upstrm	115662.6	Max WS	19121.46	-5.20	37.59	8.37	37.71	0.000056	2.97	9889.17	1253.24	0.09
W100_upstrm	115635.5 I-45 Houston Ave		Bridge									
W100_upstrm	115621.1	Max WS	19134.34	-5.57	37.61		37.70	0.000043	2.69	10578.58	1342.05	0.08
W100_upstrm	115587.7	Max WS	19143.85	-6.22	37.62	8.22	37.70	0.000046	2.77	14066.15	1467.36	0.08
W100_upstrm	115553.5 I-45 SBML		Bridge									
W100_upstrm	115514.4	Max WS	19149.68	-6.96	37.63		37.69	0.000033	2.34	15718.47	1766.96	0.07
W100_upstrm	115509.1	Max WS	19151.34	-6.99	37.63	7.26	37.69	0.000033	2.37	15655.72	1797.44	0.07
W100_upstrm	115490 I-45 NBML		Bridge									
W100_upstrm	115423.0	Max WS	19151.34	-7.30	37.61		37.68	0.000030	2.24	14387.20	1521.31	0.06
W100_upstrm	115365.4	Max WS	19152.42	-7.52	37.62		37.67	0.000027	2.13	15717.40	1732.06	0.06
W100_upstrm	115284.6	Max WS	19159.77	-7.89	37.62		37.67	0.000029	2.22	22328.86	1720.63	0.06
W100_upstrm	115104.1	Max WS	19166.98	-8.31	37.61		37.67	0.000023	2.03	18118.26	1707.14	0.06
W100_upstrm	115001.2	Max WS	19149.27	-8.48	37.57	6.14	37.69	0.000052	3.00	14660.18	1496.42	0.08
W100_upstrm	115000 I-45 Ramp McKee		Bridge									
W100_upstrm	114907.3	Max WS	19150.47	-9.19	37.58		37.68	0.000046	2.73	12929.50	1265.96	0.08
W100_upstrm	114842.1	Max WS	19149.93	-9.48	37.57	5.84	37.69	0.000053	2.88	12852.34	1286.66	0.08
W100_upstrm	114830 I-45 Ramp Walker		Bridge									
W100_upstrm	114804.3	Max WS	19141.52	-9.61	37.56		37.68	0.000055	2.92	13171.11	1311.15	0.09
W100_upstrm	114492.0	Max WS	19178.99	-10.48	37.58		37.64	0.000051	1.96	10784.31	1184.47	0.08
W100_upstrm	114195.9	Max WS	19163.45	-11.52	37.53	5.81	37.60	0.000207	2.18	9584.46	937.26	0.08
W100_upstrm	114168.9 RUSK STREET		Bridge									
W100_upstrm	114141.9	Max WS	19000.12	-10.83	37.38		37.46	0.000228	2.25	8860.94	790.31	0.08
W100_upstrm	114097.4	Max WS	19010.79	-7.46	37.39	7.12	37.45	0.000074	1.96	10896.68	1103.36	0.07
W100_upstrm	114070.4 CAPITAL STREE		Bridge									

HEC-RAS Plan: NC_H_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	114043.4	Max WS	18941.62	-7.72	37.30		37.36	0.000072	1.94	11084.73	1133.88	0.07
W100_upstrm	113644.0	Max WS	18934.71	-8.91	37.23		37.35	0.000059	2.87	9962.20	639.94	0.09
W100_upstrm	113411.6	Max WS	18941.29	-9.61	37.22	4.19	37.31	0.000196	2.47	7675.04	588.78	0.09
W100_upstrm	113374.3 TEXAS AVE		Bridge									
W100_upstrm	113337.0	Max WS	18744.44	-9.65	37.05		37.14	0.000193	2.46	7628.49	584.38	0.09
W100_upstrm	113266.4	Max WS	18699.89	-9.11	36.98	7.49	37.12	0.000244	3.03	7326.94	664.11	0.10
W100_upstrm	113238.6 BAGBY		Bridge									
W100_upstrm	113210.8	Max WS	18604.52	-9.46	36.86		36.99	0.000240	2.99	7476.09	678.29	0.10
W100_upstrm	112974.0	Max WS	18575.82	-10.69	36.78	6.58	36.93	0.000191	3.10	6068.48	362.99	0.10
W100_upstrm	112944.9 PRAIRIE		Bridge									
W100_upstrm	112915.8	Max WS	18517.96	-10.82	36.71		36.86	0.000189	3.08	6089.47	382.19	0.10
W100_upstrm	112575.5	Max WS	18538.41	-9.20	36.69	7.98	36.78	0.000228	2.43	9820.11	985.16	0.08
W100_upstrm	112534.5 PRESTON STREET		Bridge									
W100_upstrm	112493.5	Max WS	18463.91	-9.47	36.59		36.67	0.000221	2.40	9984.38	1000.12	0.08
W100_upstrm	112003.3	Max WS	18446.65	-9.69	36.51	5.05	36.58	0.000156	2.12	9070.74	597.39	0.07
W100_upstrm	111953.3 CONGRESS STREET		Bridge									
W100_upstrm	111903.3	Max WS	18372.20	-9.84	36.33		36.40	0.000155	2.12	9055.71	591.09	0.07
W100_upstrm	111853.5	Max WS	18362.55	-9.86	36.31	5.01	36.39	0.000169	2.37	8312.14	539.35	0.07
W100_upstrm	111818.6 SMITH STREET		Bridge									
W100_upstrm	111783.7	Max WS	18307.43	-8.67	36.21		36.30	0.000192	2.47	7701.11	448.79	0.08
W100_upstrm	111626.7	Max WS	18310.70	-11.83	36.19	5.94	36.27	0.000187	2.35	8641.72	623.79	0.08
W100_upstrm	111518.6 LOUISIANA		Bridge									
W100_upstrm	111410.5	Max WS	18135.44	-11.23	35.92		36.01	0.000142	2.41	8148.35	529.19	0.08
W100_upstrm	110876.6	Max WS	18175.71	-10.43	35.89	2.66	35.94	0.000087	1.73	14507.85	1391.82	0.06
W100_upstrm	110837.8 MILAM		Bridge									
W100_upstrm	110799.0	Max WS	18169.01	-10.72	35.87		35.91	0.000233	1.68	14878.68	1408.29	0.05
W100_upstrm	110672.7	Max WS	18162.26	-13.25	35.84	2.80	35.89	0.000182	2.00	15994.30	1349.90	0.06
W100_upstrm	110643.7 TRAVIS STREET		Bridge									
W100_upstrm	110614.7	Max WS	18127.48	-12.75	35.79		35.84	0.000204	2.05	15256.85	1328.88	0.07
W100_upstrm	110200.2	Max WS	18136.01	-9.11	35.73	5.19	35.78	0.000054	1.73	11843.55	668.26	0.06
W100_upstrm	110154.2 MAIN STREET		Bridge									
W100_upstrm	110108.2	Max WS	18128.03	-9.31	35.61		35.65	0.000054	1.73	11886.52	672.16	0.06
W100_upstrm	110103.2	Max WS	18132.07	-9.31	35.61		35.65	0.000054	1.73	11886.37	672.14	0.06
Downstream	109924.2	Max WS	25681.03	-13.02	35.61		35.72	0.000154	2.70	10414.72	473.63	0.08
Downstream	109551.7	Max WS	25681.20	-14.28	35.57	1.24	35.66	0.000149	2.44	10579.65	535.41	0.08
Downstream	109518.7 FANNIN STREET		Bridge									
Downstream	109485.7	Max WS	25680.85	-15.31	35.49		35.58	0.000135	2.36	11167.61	787.32	0.08
Downstream	109440.2	Max WS	25680.78	-16.48	35.47	0.68	35.57	0.000219	2.53	10167.35	340.04	0.08
Downstream	109395.2 SAN JACINTO STRE		Bridge									
Downstream	109350.2	Max WS	25679.99	-16.89	35.22		35.32	0.000215	2.51	10219.65	352.76	0.08
Downstream	109119.0	Max WS	25680.12	-17.14	35.12	0.78	35.21	0.000679	2.41	11570.40	1063.87	0.09
Downstream	109103.1 CROSSWALK		Bridge									
Downstream	109087.2	Max WS	25679.94	-17.55	35.06		35.15	0.000638	2.36	11942.13	1073.96	0.09
Downstream	108565.3	Max WS	25679.50	-12.77	34.82		34.93	0.000226	2.60	12535.82	1181.10	0.08
Downstream	108334.0	Max WS	25679.51	-14.06	34.78		34.86	0.000225	2.28	15693.47	1243.12	0.07
Downstream	107179.4	Max WS	25679.35	-20.52	34.55	-2.54	34.65	0.000188	2.69	10641.90	651.54	0.08
Downstream	107158.9 S. PACIFIC RR		Bridge									
Downstream	107139	Max WS	25679.35	-20.19	34.51		34.62	0.000193	2.73	10490.74	576.96	0.08
Downstream	107138.4	Max WS	25679.32	-20.19	34.51		34.62	0.000193	2.73	10490.66	576.92	0.08
W100_downstream1	106594.0	Max WS	60265.15	-16.70	34.51		35.08	0.001591	6.08	10081.31	933.61	0.20
W100_downstream1	106151.4	Max WS	60263.56	-13.85	33.55	8.24	34.21	0.002349	6.52	9249.62	415.27	0.21
W100_downstream1	106131.1 MCKEE		Bridge									
W100_downstream1	106110.8	Max WS	60262.66	-12.53	33.17		33.91	0.002703	6.90	8730.22	301.91	0.23
W100_downstream1	105705.4	Max WS	60262.07	-18.22	32.59	6.83	33.24	0.000584	6.51	9353.96	633.65	0.23
W100_downstream1	105667.4 ELYSIAN STREET		Bridge									
W100_downstream1	105629.4	Max WS	60261.81	-18.43	32.24		32.91	0.000592	6.55	9284.57	609.59	0.23
W100_downstream1	105476	Max WS	60261.96	-18.70	32.23		32.73	0.001659	5.69	10682.55	620.52	0.20
W100_downstream1	104962	Max WS	60261.50	-18.70	31.89		32.07	0.000767	3.43	17798.75	1006.20	0.13
W100_downstream1	104900	Max WS	60261.50	-19.15	31.78		31.95	0.000194	3.22	18807.19	956.51	0.12
W100_downstream1	104464	Max WS	60261.38	-19.86	31.49		31.74	0.001585	3.97	15211.04	804.64	0.16
W100_downstream1	104301	Max WS	60261.15	-20.42	31.28		31.58	0.000278	4.41	13939.78	852.44	0.17
W100_downstream1	104242	Max WS	60261.23	-20.62	31.09		31.47	0.003553	4.97	12117.06	684.15	0.21
W100_downstream1	104118.0	Max WS	60261.20	-21.10	30.72	11.57	31.19	0.001049	6.02	12815.39	989.76	0.21
W100_downstream1	104070 Prop I-69 Ramp		Bridge									
W100_downstream1	103955.1	Max WS	60261.18	-21.79	30.57		31.00	0.000719	5.49	13117.89	870.55	0.18
W100_downstream1	103955.0	Max WS	60261.18	-21.79	30.57	6.51	31.00	0.000719	5.49	13117.82	870.55	0.18
W100_downstream1	103846 Prop I-69 DC		Bridge									
W100_downstream1	103786.1	Max WS	60261.19	-22.51	30.31		30.76	0.000835	5.55	12337.65	793.39	0.18
W100_downstream1	103786.0	Max WS	60261.20	-22.51	30.31	5.87	30.76	0.000835	5.55	12337.58	793.39	0.18
W100_downstream1	103694 Prop I-69 SBML		Bridge									
W100_downstream1	103534.1	Max WS	60261.18	-23.58	29.79		30.34	0.000900	6.02	11012.83	655.93	0.19
W100_downstream1	103534.0	Max WS	60261.18	-23.58	29.79	5.22	30.34	0.000900	6.02	11012.77	655.93	0.19
W100_downstream1	103383 Prop I-45 SBML		Bridge									
W100_downstream1	103241.1	Max WS	60261.19	-24.83	29.52		30.06	0.001722	5.87	10384.11	542.28	0.21
W100_downstream1	103241.0	Max WS	60261.18	-24.83	29.52	5.26	30.06	0.001722	5.87	10384.01	542.28	0.21
W100_downstream1	103161 Prop I-69 NBML		Bridge									
W100_downstream1	103095.1	Max WS	60261.00	-25.45	29.19		29.78	0.000625	6.17	9839.18	440.71	0.21
W100_downstream1	103095.0	Max WS	60261.04	-25.45	29.19	4.95	29.78	0.000625	6.17	9839.17	440.71	0.21
W100_downstream1	103065 Prop I-45 DC		Bridge									
W100_downstream1	103025.1	Max WS	60260.97	-25.75	28.96		29.62	0.000649	6.51	9300.07	384.96	0.21
W100_downstream1	103025.0	Max WS	60260.83	-25.75	28.96	4.14	29.62	0.000649	6.51	9300.04	384.96	0.21
W100_downstream1	102988 Prop I-10 DC		Bridge									
W100_downstream1	102952	Max WS	60260.88	-26.06	28.55		29.33	0.001059	7.09	8645.06	431.89	0.25
W100_downstream1	102895.0	Max WS	60260.86	-26.31	28.27		29.26	0.001593	7.97	7559.78	320.04	0.29
W100_downstream1	102875.3	Max WS	60260.85	-26.39	28.60	10.30	29.22	0.001384	6.31	9542.63	414.17	0.23
W100_downstream1	102847.5 HOUTerminal RR		Bridge									
W100_downstream1	102819.7	Max WS	60260.83	-26.43	28.19		28.83	0.001437	6.42	9390.31	411.63	0.24
W100_downstream1	102309.0	Max WS	60324.25	-23.48	27.49		28.29	0.000702	7.15	8436.09	235.45	0.21
W100_downstream1	101828.0	Max WS	60381.39	-20.70	27.00	3.61	27.78	0.001384	7.13	8564.45	404.63	0.25
W100_downstream1	101790.1 JENSEN ROAD		Bridge									
W100_downstream1	101752.2	Max WS	60381.34	-20.69	26.69		27.50	0.001436	7.22	8436.71	401.30	0.25
W100_downstream1	101007.3	Max WS	60473.73	-16.93	26.06		26.81	0.000407	6.93	8724.46	288.46	0.22
W100_downstream1	99992.6	Max WS	60596.39	-18.90	25.45		26.27	0.000641	7.30	8306.21	279.13	0.24

HEC-RAS Plan: NC_H_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_downstream1	98399.4	Max WS	60797.16	-20.26	24.61		25.39	0.000462	7.09	8569.24	293.77	0.23
W100_downstream1	97517.4	Max WS	60901.75	-19.35	24.54		25.03	0.000339	5.58	10904.62	325.20	0.17
W100_downstream1	96028.6	Max WS	61074.67	-17.81	23.51	1.46	24.22	0.000753	6.73	9131.05	408.75	0.22
W100_downstream1	95985.1 YORK DRIVE		Bridge									
W100_downstream1	95941.6	Max WS	61074.73	-17.87	23.35		24.06	0.000761	6.76	9089.30	407.83	0.22
W100_downstream1	95362.9	Max WS	61146.16	-15.97	23.13		23.73	0.000362	6.23	9816.30	362.45	0.21
W100_downstream1	94280.7	Max WS	61289.27	-19.82	21.60		22.66	0.001635	8.25	7429.62	308.79	0.30
W100_downstream1	93495.6	Max WS	61375.36	-20.43	20.94		21.64	0.000939	6.69	9177.78	401.45	0.25
W100_downstream1	92795.6	Max WS	61470.59	-20.98	20.35	-1.22	21.13	0.000495	7.10	8659.52	342.83	0.25
W100_downstream1	92741.1 LOCKWOOD DRIVE		Bridge									
W100_downstream1	92686.6	Max WS	61470.57	-21.08	20.11		20.90	0.000504	7.14	8609.36	341.65	0.25
W100_downstream1	90936.7	Max WS	61685.54	-18.64	18.81		19.45	0.001147	6.41	9649.85	496.40	0.24
W100_downstream1	89918.4	Max WS	61811.88	-17.23	17.58		18.48	0.000816	7.75	9398.87	723.18	0.28
W100_downstream1	88579.0	Max WS	61974.69	-20.97	16.19		17.13	0.001174	7.79	7952.26	374.39	0.30
W100_downstream1	87591.9	Max WS	62103.13	-23.72	15.33		16.22	0.000665	7.56	8226.36	313.87	0.26
W100_downstream1	86660.2	Max WS	62205.83	-23.42	14.86	-6.22	15.62	0.000610	7.00	8885.61	317.44	0.23
W100_downstream1	86641.7 HOUTerminal RR		Bridge									
W100_downstream1	86623.2	Max WS	62205.83	-23.61	14.42		15.20	0.000618	7.06	8806.44	316.43	0.24
W100_downstream1	85855.2	Max WS	62300.26	-26.84	12.91		14.57	0.001091	10.34	6027.33	257.14	0.38
W100_downstream1	85238.7	Max WS	62372.95	-29.43	12.48		13.86	0.001204	9.49	7189.72	362.71	0.31
W100_downstream1	84561.7	Max WS	62473.54	-32.27	12.06	-8.45	13.20	0.000632	8.63	8002.73	463.65	0.29
W100_downstream1	84531.4 NORTH WAYSIDE RD		Bridge									
W100_downstream1	84501.1	Max WS	62473.54	-28.97	10.89		12.55	0.001079	10.37	6209.32	325.22	0.36
W100_downstream1	84252.6	Max WS	62504.05	-26.90	10.94	-5.29	12.30	0.000855	9.37	7089.03	600.85	0.32
W100_downstream1	84222.3 M. GARCIA		Bridge									
W100_downstream1	84192.0	Max WS	62504.05	-24.10	9.68		11.59	0.001468	11.11	5624.71	243.29	0.41
W100_downstream1	83635.7	Max WS	62572.33	-21.72	9.83		10.89	0.001004	8.24	7591.56	400.48	0.33
W100_downstream1	81786.1	Max WS	62792.29	-31.97	8.18		9.21	0.000806	8.14	7739.92	359.81	0.31
W100_downstream1	80903.1	Max WS	62897.39	-27.77	7.72	-8.81	8.52	0.000732	7.17	8769.35	410.06	0.27
W100_downstream1	80883.1 S. PACIFIC RR		Bridge									
W100_downstream1	80863.1	Max WS	62897.36	-28.10	7.13		7.94	0.000868	7.26	8659.95	408.77	0.28
W100_downstream1	80538.0	Max WS	62897.37	-33.12	7.40	-16.85	7.73	0.000295	4.61	13637.27	533.28	0.16

White Oak Bayou
Scenario 2: North Canal and Heights Improvements 100-Year

HEC-RAS Plan: NC_H_100yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	36134.	Max WS	32245.94	24.19	56.57		57.44	0.000671	7.63	5485.25	1062.95	0.32
E100-00-00	35718.0	Max WS	32236.37	23.76	56.16		57.18	0.000646	8.17	4362.77	638.93	0.34
E100-00-00	35158.	Max WS	32294.95	22.89	56.02		56.79	0.000626	7.21	6108.76	1281.31	0.30
E100-00-00	35006.0	Max WS	32308.06	22.66	55.87	42.99	56.72	0.000536	7.58	6168.63	1401.71	0.31
E100-00-00	34951.5 ELLA		Bridge									
E100-00-00	34895.0	Max WS	32307.23	22.56	55.70		56.56	0.000544	7.63	6072.12	1342.46	0.31
E100-00-00	34645.	Max WS	32398.41	22.24	55.70		56.41	0.000485	7.06	6815.95	1151.92	0.28
E100-00-00	34206.0	Max WS	32406.85	21.68	55.40		56.19	0.000512	7.32	6092.64	2482.89	0.30
E100-00-00	33962.58	Max WS	32465.50	21.61	55.55		55.95	0.000308	5.34	9600.49	2930.02	0.23
E100-00-00	33909.08	Max WS	32468.42	21.60	55.54		55.93	0.000386	5.32	9513.61	2926.31	0.24
E100-00-00	33770.	Max WS	32476.52	21.56	55.47		55.90	0.000270	5.65	9858.53	2721.34	0.22
E100-00-00	33681.0	Max WS	32386.57	21.53	55.00	42.02	56.00	0.000559	8.03	4052.14	2675.80	0.32
E100-00-00	33645.5 W 18TH		Bridge									
E100-00-00	33610.0	Max WS	32406.72	21.61	54.94		55.70	0.000473	7.36	7767.40	2659.37	0.29
E100-00-00	33357.	Max WS	32420.36	21.41	54.77		55.59	0.000722	7.39	5773.73	2008.10	0.31
E100-00-00	32570.0	Max WS	32471.98	20.78	54.29		55.05	0.000491	7.13	7110.37	2589.19	0.29
E100-00-00	31583.0	Max WS	32527.22	19.35	53.98		54.61	0.000370	6.59	9027.98	3479.89	0.26
E100-00-00	30779.0	Max WS	32593.73	18.79	53.75		54.30	0.000310	6.28	9306.54	3018.17	0.24
E100-00-00	29659.	Max WS	32671.54	17.66	53.50		53.91	0.000346	5.50	10610.14	3534.91	0.22
E100-00-00	29368.0	Max WS	32715.27	17.37	53.06	38.60	53.90	0.000495	7.55	6893.31	2105.11	0.29
E100-00-00	29297.5 TC JESTER SOUTH		Bridge									
E100-00-00	29203.0	Max WS	32715.27	17.35	52.77		53.66	0.000529	7.74	6398.76	2057.28	0.30
E100-00-00	28775.	Max WS	32754.30	16.90	52.89		53.29	0.000370	5.37	10540.51	3158.80	0.22
E100-00-00	28375.0	Max WS	32766.72	16.48	52.61	37.55	53.27	0.000425	6.77	8770.91	2974.68	0.27
E100-00-00	28357.0 BICYCLE BRIDGE		Bridge									
E100-00-00	28330.0	Max WS	32765.43	16.41	52.43		53.11	0.000440	6.86	8471.36	2920.44	0.27
E100-00-00	28190.0	Max WS	32775.49	16.18	52.34	37.12	53.07	0.000377	7.08	7879.12	2287.76	0.26
E100-00-00	28152.5 W 11TH		Bridge									
E100-00-00	28113.0	Max WS	32772.99	16.28	52.13		52.92	0.000406	7.27	7202.12	2215.04	0.27
E100-00-00	27982.	Max WS	32783.59	16.25	52.12		52.84	0.000499	7.05	7635.80	2025.67	0.29
E100-00-00	27429.0	Max WS	32808.34	16.12	51.87		52.58	0.000507	6.91	7078.55	2059.40	0.29
E100-00-00	26598.	Max WS	32884.07	15.35	51.53		52.13	0.000404	6.39	6683.43	1511.83	0.26
E100-00-00	26498.0	Max WS	32889.18	15.26	51.35	35.91	52.07	0.000439	6.85	4809.29	1029.98	0.27
E100-00-00	26432.5 TC JESTER		Bridge									
E100-00-00	26366.0	Max WS	32876.32	15.16	50.92		51.67	0.000464	6.96	4724.65	861.93	0.28
E100-00-00	26307.3	Max WS	32886.03	15.13	51.18		51.63	0.000319	5.67	7808.09	1033.67	0.22
E100-00-00	26225	Max WS	32891.06	15.04	51.15		51.61	0.000331	5.64	7486.47	887.83	0.22
E100-00-00	26140.	Max WS	32892.25	14.97	51.02		51.62	0.000356	6.48	7887.22	1290.47	0.25
E100-00-00	25536.0	Max WS	32919.83	14.48	50.77		51.42	0.000393	6.66	7500.18	1263.82	0.26
E100-00-00	25132.	Max WS	32946.13	14.29	50.63		51.27	0.000333	6.64	6310.00	672.27	0.25
E100-00-00	24817.0	Max WS	32953.26	14.14	50.29	36.28	51.13	0.000587	7.36	4560.52	483.35	0.30
E100-00-00	24789.0 UNION PACIFIC RR		Bridge									
E100-00-00	24758.0	Max WS	32948.46	13.76	49.86		50.71	0.000600	7.41	4515.95	408.36	0.31
E100-00-00	24636.	Max WS	32965.55	13.61	50.15		50.64	0.000372	5.95	6865.31	803.99	0.24
E100-00-00	23934.0	Max WS	33004.18	12.75	49.77		50.34	0.000441	6.08	5862.53	581.15	0.26
E100-00-00	23550.0	Max WS	33030.21	12.77	49.63	33.05	50.17	0.000398	5.91	5702.51	475.93	0.25
E100-00-00	23506.5 DURHAM		Bridge									
E100-00-00	23444.0	Max WS	33024.78	12.69	49.46		50.00	0.000405	5.94	5659.08	467.89	0.25
E100-00-00	23180.	Max WS	33035.81	12.46	49.41		49.95	0.000275	6.20	7977.94	1137.72	0.23
E100-00-00	22983.	Max WS	33044.92	12.29	49.32		49.91	0.000378	6.57	7438.72	1113.93	0.26
E100-00-00	22834.0	Max WS	33053.36	12.16	49.20	34.71	49.87	0.000526	6.92	7953.08	1535.20	0.27
E100-00-00	22796.5 SHEPHERD		Bridge									
E100-00-00	22758.0	Max WS	33052.99	12.11	49.08		49.75	0.000570	6.93	7855.90	1511.36	0.27
E100-00-00	22610.	Max WS	33063.12	11.92	49.11		49.63	0.000443	6.25	7624.28	1457.01	0.24
E100-00-00	22224.0	Max WS	33088.50	11.41	49.14		49.42	0.000334	4.68	11085.32	1382.10	0.18
E100-00-00	21444.0	Max WS	33121.79	10.52	48.63		49.21	0.000498	6.34	7559.03	1257.91	0.24
E100-00-00	20746.0	Max WS	33147.06	10.00	47.64		48.32	0.002114	6.65	5433.93	1218.81	0.30
E100-00-00	20644.0	Max WS	33156.00	9.95	47.75	32.64	48.16	0.000365	5.70	9731.79	1501.09	0.22
E100-00-00	20633.0 Pipeline		Bridge									
E100-00-00	20622.0	Max WS	33154.09	9.95	47.60		48.02	0.000377	5.77	9490.95	1428.64	0.22
E100-00-00	20521.	Max WS	33158.55	9.91	47.51		48.01	0.000394	6.20	8912.89	1635.00	0.23
E100-00-00	19917.0	Max WS	33194.55	9.66	46.91		47.73	0.000692	7.30	5455.99	462.03	0.29
E100-00-00	19463.0	Max WS	33219.68	9.25	46.58		47.41	0.000736	7.34	5788.56	797.07	0.30
E100-00-00	18857	Max WS	33254.02	8.03	46.21	32.01	47.01	0.000655	7.40	5202.02	571.56	0.28
E100-00-00	18800 I-10 WBFR		Bridge									
E100-00-00	18747	Max WS	33248.90	7.81	45.82		46.48	0.000506	6.72	5694.49	572.94	0.25
E100-00-00	18746	Max WS	33248.96	7.81	45.82	30.46	46.48	0.000506	6.72	5694.23	572.90	0.25
E100-00-00	18595 I-10 BRIDGE		Bridge									
E100-00-00	18443	Max WS	33241.20	7.19	45.01		45.71	0.000622	6.84	5389.24	561.62	0.27
E100-00-00	18442	Max WS	33241.44	7.19	45.01	30.11	45.71	0.000622	6.84	5388.91	561.56	0.27
E100-00-00	18394 I-10 EBFR		Bridge									
E100-00-00	18377.	Max WS	33207.35	6.98	43.52		44.41	0.000787	7.65	4664.50	447.65	0.31
E100-00-00	18234.0	Max WS	33230.85	6.77	44.00		44.26	0.000096	4.11	8300.27	484.15	0.14
E100-00-00	18199.0	Max WS	33232.93	6.70	44.02		44.26	0.000064	3.90	8802.48	488.89	0.13
E100-00-00	18176.0	Max WS	33231.52	6.79	43.92	19.66	44.26	0.000110	4.72	7541.66	586.21	0.16
E100-00-00	18138.0 YALE		Bridge									
E100-00-00	18082.0	Max WS	33213.95	6.87	43.23		43.70	0.000181	5.47	6458.29	668.53	0.19
E100-00-00	17905.	Max WS	33227.77	6.86	43.30		43.66	0.000109	4.87	8223.07	922.72	0.16
E100-00-00	17756.0	Max WS	33238.03	6.85	43.33	19.08	43.64	0.000127	4.49	8760.69	1076.32	0.16
E100-00-00	17726 S. HEIGHTS		Bridge									
E100-00-00	17696	Max WS	33219.55	6.85	42.80		43.13	0.000138	4.61	8316.60	1029.34	0.16
E100-00-00	17657	Max WS	33222.24	6.35	42.81	18.31	43.12	0.000127	4.51	8090.95	688.99	0.16
E100-00-00	17627 N. HEIGHTS		Bridge									
E100-00-00	17597.0	Max WS	33195.26	6.35	42.10		42.43	0.000141	4.65	7612.66	653.58	0.17
E100-00-00	17318.	Max WS	33179.71	6.35	41.37		42.34	0.000939	7.92	4187.93	238.24	0.33
E100-00-00	16831.0	Max WS	33211.78	6.34	41.51		42.03	0.000327	5.78	5741.35	443.21	0.28
E100-00-00	15795.0	Max WS	33226.04	4.84	41.35		41.66	0.000372	4.47	7585.25	552.38	0.19

HEC-RAS Plan: NC_H_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	15278.	Max WS	33206.66	4.41	40.75		41.49	0.000437	6.94	5089.58	575.86	0.28
E100-00-00	14977.0	Max WS	33232.00	4.16	41.10	15.00	41.35	0.000052	3.99	8844.33	677.42	0.13
E100-00-00	14937.0 I-10 EBFR ACCESS		Bridge									
E100-00-00	14897.0	Max WS	33225.23	3.39	40.97		41.21	0.000050	3.95	8733.83	659.42	0.13
E100-00-00	14890	Max WS	33222.51	3.42	40.89	15.68	41.21	0.000069	4.53	7621.11	638.86	0.15
E100-00-00	14775 I-10 BRIDGE		Bridge									
E100-00-00	14660	Max WS	33217.57	3.42	40.83		41.15	0.000070	4.54	7584.10	631.12	0.15
E100-00-00	14590.0	Max WS	33213.23	3.45	40.71	16.94	41.15	0.000101	5.31	6539.00	577.05	0.18
E100-00-00	14562.0 I-10 WB ACCESS		Bridge									
E100-00-00	14532.0	Max WS	33180.64	3.41	40.13		40.58	0.000130	5.41	6277.00	500.78	0.18
E100-00-00	14354.0	Max WS	33191.41	3.29	40.25		40.55	0.000185	4.44	7783.33	684.47	0.20
E100-00-00	13924.0	Max WS	33175.20	3.18	39.88	24.65	40.44	0.000482	6.22	5966.48	379.44	0.24
E100-00-00	13909.5 UNION PAC. RR		Bridge									
E100-00-00	13898.0	Max WS	33171.12	2.95	39.60		40.17	0.000489	6.26	5916.31	377.52	0.24
E100-00-00	13494.	Max WS	33176.34	2.47	39.62		39.95	0.000499	4.85	7432.42	473.72	0.20
E100-00-00	13220.0	Max WS	33185.80	2.15	39.64	23.85	39.86	0.000129	3.87	10212.77	778.05	0.15
E100-00-00	13182.5 STUDEMONT		Bridge									
E100-00-00	13143.0	Max WS	33168.95	2.15	39.37		39.60	0.000138	4.00	9343.10	653.23	0.16
E100-00-00	12698.	Max WS	33155.02	1.87	39.08		39.49	0.000383	5.15	6440.13	402.10	0.23
E100-00-00	12066.0	Max WS	33158.54	1.47	39.00		39.27	0.000331	4.13	8029.32	488.68	0.18
E100-00-00	11546.0	Max WS	33167.19	0.90	38.97		39.15	0.000119	3.49	11240.18	1054.32	0.15
E100-00-00	11021.	Max WS	33171.40	0.63	38.90		39.09	0.000107	3.54	10117.49	1241.79	0.14
E100-00-00	10908.0	Max WS	33174.97	0.57	38.94	22.40	39.08	0.000087	3.30	13000.55	1410.37	0.13
E100-00-00	10852.5 TAYLOR (SAWYER)		Bridge									
E100-00-00	10804.0	Max WS	33174.97	0.45	38.90		39.04	0.000086	3.25	13106.14	1434.73	0.13
E100-00-00	10643.	Max WS	33157.05	0.14	38.64		39.06	0.000323	5.39	6954.18	825.04	0.20
E100-00-00	9779.0	Max WS	33176.79	-1.51	38.66		38.84	0.000103	3.62	11434.43	1055.72	0.14
E100-00-00	8532.0	Max WS	33201.28	-1.76	38.68		38.73	0.000030	1.71	19976.81	1368.80	0.06
E100-00-00	8140.	Max WS	33206.06	-2.43	38.66		38.70	0.000131	1.67	22556.19	1484.28	0.06
E100-00-00	7649.0	Max WS	33211.73	-3.26	38.58	18.73	38.68	0.000056	3.03	22056.10	1760.17	0.11
E100-00-00	7608.5 HOUSTON		Bridge									
E100-00-00	7568.0	Max WS	33211.07	-3.15	38.58		38.64	0.000037	2.48	21880.15	1758.05	0.09
E100-00-00	7546.0	Max WS	33210.07	-3.16	38.58	18.71	38.64	0.000039	2.53	21598.51	1788.92	0.09
E100-00-00	7535.5 Pipeline		Bridge									
E100-00-00	7529.0	Max WS	33210.07	-3.16	38.55		38.62	0.000040	2.53	21551.42	1787.84	0.09
E100-00-00	7481.0	Max WS	33208.53	-3.17	38.52		38.62	0.000060	2.86	18097.13	1854.58	0.11
E100-00-00	7253.1	Max WS	33210.59	-3.19	38.49		38.60	0.000038	2.71	13570.40	700.56	0.09
E100-00-00	7253.05		Lat Struct									
E100-00-00	7253	Max WS	33207.68	-3.19	38.49	14.81	38.60	0.000038	2.71	13570.40	700.56	0.09
E100-00-00	7205 Prop I-10 DC		Bridge									
E100-00-00	7138.1	Max WS	33205.45	-3.20	38.39		38.52	0.000049	3.01	12281.81	695.40	0.11
E100-00-00	7138	Max WS	33205.05	-3.20	38.39	16.39	38.52	0.000049	3.01	12281.80	695.41	0.11
E100-00-00	7057 Prop I-10 Ramp		Bridge									
E100-00-00	7016.1	Max WS	33199.09	-3.22	38.03		38.33	0.000097	4.60	9172.40	608.40	0.16
E100-00-00	7016	Max WS	33199.57	-3.22	38.03		38.33	0.000097	4.60	9172.40	608.41	0.16
E100-00-00	6980	Max WS	33201.06	-3.22	38.14		38.30	0.000083	3.24	11346.82	631.37	0.12
E100-00-00	6979		Lat Struct									
E100-00-00	6975.0	Max WS	33187.85	-3.22	38.14		38.30	0.000083	3.24	11346.68	631.37	0.11
E100-00-00	6898.0	Max WS	33078.68	-4.23	38.09		38.29	0.000185	3.76	9748.73	580.65	0.14
E100-00-00	6895	Max WS	33078.49	-4.23	38.09		38.29	0.000185	3.76	9748.39	580.65	0.14
E100-00-00_02	6775.	Max WS	42775.94	-4.30	38.09		38.19	0.000067	2.59	18281.59	1103.87	0.10
E100-00-00_02	6637.0	Max WS	42765.83	-4.37	38.04	18.53	38.18	0.000076	3.01	15196.47	1105.56	0.11
E100-00-00_02	6600 Prop I-45 DC		Bridge									
E100-00-00_02	6575.1	Max WS	42755.61	-4.41	38.02		38.16	0.000079	3.01	15416.30	1144.56	0.11
E100-00-00_02	6575.0	Max WS	42761.75	-4.41	38.02	18.77	38.16	0.000079	3.01	15416.29	1144.55	0.11
E100-00-00_02	6551 Prop I-45 Ramp		Bridge									
E100-00-00_02	6515.0	Max WS	42748.59	-4.44	38.00		38.14	0.000079	3.00	15682.69	1091.83	0.11
E100-00-00_02	6387.0	Max WS	42747.48	-4.38	37.99	19.24	38.13	0.000079	2.98	15838.20	1564.45	0.11
E100-00-00_02	6352 Prop I-45 NBML		Bridge									
E100-00-00_02	6298.1	Max WS	42746.46	-4.51	37.99		38.11	0.000072	2.84	17660.58	1503.02	0.10
E100-00-00_02	6298	Max WS	42747.48	-4.51	37.99	17.76	38.11	0.000072	2.84	17660.57	1503.02	0.10
E100-00-00_02	6252 Prop I-45 DC		Bridge									
E100-00-00_02	6201.1	Max WS	42749.49	-4.65	37.99		38.10	0.000053	2.63	17866.73	1466.63	0.09
E100-00-00_02	6201	Max WS	42744.53	-4.65	37.99	16.89	38.10	0.000053	2.63	17866.73	1466.63	0.09
E100-00-00_02	6164 Prop I-45 Ramp		Bridge									
E100-00-00_02	6122.0	Max WS	42707.63	-4.33	37.87		38.02	0.000064	3.18	15476.60	1487.10	0.11
E100-00-00_02	5525.0	Max WS	42704.52	-3.15	37.85		37.98	0.000075	2.85	14993.33	677.13	0.11
E100-00-00_02	4994.0	Max WS	42664.85	-3.09	37.66	17.41	37.91	0.000235	4.16	11378.17	602.51	0.14
E100-00-00_02	4980.0 RR OVERPASS		Bridge									
E100-00-00_02	4961.0	Max WS	42629.27	-3.03	37.50		37.76	0.000266	4.26	11071.95	599.12	0.15
E100-00-00_02	4812.0	Max WS	42556.74	-3.49	37.26	17.69	37.69	0.000677	5.27	8073.30	478.43	0.22
E100-00-00_02	4774.5 CROCKETT/HOGAN		Bridge									
E100-00-00_02	4687.0	Max WS	42522.32	-4.67	37.18		37.52	0.000479	4.68	9089.39	497.22	0.19
E100-00-00_02	4407.	Max WS	42487.43	-3.62	37.00		37.42	0.000383	5.43	9062.98	801.44	0.18
E100-00-00_02	4014.0	Max WS	42487.42	-2.15	36.97	16.43	37.26	0.000322	4.34	10224.80	593.82	0.16
E100-00-00_02	3997.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	3976.0	Max WS	42464.92	-2.40	36.83		37.12	0.000326	4.34	10222.27	594.40	0.16
E100-00-00_02	3681.	Max WS	42425.63	-3.80	36.68		37.03	0.000387	5.01	10900.25	1123.76	0.18
E100-00-00_02	3585.0	Max WS	42396.21	-4.26	36.58		37.01	0.000393	5.35	10730.11	1161.90	0.20
E100-00-00_02	3233.0	Max WS	42451.71	-4.79	36.74	13.24	36.82	0.000099	2.25	21024.87	2000.82	0.10
E100-00-00_02	3094 Prop I-10 WBML		Bridge									
E100-00-00_02	2954.1	Max WS	42437.23	-5.22	36.67		36.76	0.000133	2.37	19825.11	2109.78	0.12
E100-00-00_02	2954.0	Max WS	42438.39	-5.22	36.67	13.50	36.76	0.000133	2.37	19825.07	2109.78	0.12
E100-00-00_02	2857 Prop I-45 BNML		Bridge									
E100-00-00_02	2760.1	Max WS	42424.78	-5.51	36.65		36.73	0.000120	2.28	20759.95	2208.54	0.11
E100-00-00_02	2760.0	Max WS	42430.48	-5.51	36.65	14.83	36.73	0.000120	2.28	20759.93	2208.54	0.11
E100-00-00_02	2639 Prop I-10 WB Exp		Bridge									

HEC-RAS Plan: NC_H_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_02	2518.1	Max WS	42394.96	-5.88	36.54		36.65	0.000142	2.77	18148.84	2177.24	0.12
E100-00-00_02	2518.0	Max WS	42393.89	-5.88	36.54	15.38	36.65	0.000142	2.77	18148.82	2177.24	0.12
E100-00-00_02	2434 Prop I-45 SBML		Bridge									
E100-00-00_02	2350.1	Max WS	42306.59	-6.13	36.32		36.50	0.000253	3.48	12654.59	2138.98	0.16
E100-00-00_02	2350.0	Max WS	42300.67	-6.13	36.32	16.03	36.50	0.000253	3.48	12654.57	2138.97	0.16
E100-00-00_02	2280 Prop I-10 EBML		Bridge									
E100-00-00_02	2210.0	Max WS	42234.73	-6.34	36.17		36.39	0.000267	3.78	11643.14	1905.61	0.17
E100-00-00_02	1580.	Max WS	42232.66	-7.83	36.11		36.26	0.000176	3.71	17166.80	1599.63	0.13
E100-00-00_02	1353.0	Max WS	42210.22	-8.34	36.04	17.12	36.23	0.000242	4.26	15037.64	1718.29	0.15
E100-00-00_02	1335.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	1319.0	Max WS	42192.71	-8.37	36.00		36.18	0.000235	4.20	15176.51	1791.26	0.15
E100-00-00_02	984.0	Max WS	42145.60	-8.69	35.82	13.88	36.13	0.000198	4.87	13022.45	1412.42	0.17
E100-00-00_02	978 MAIN STREET		Bridge									
E100-00-00_02	971.6	Max WS	42122.20	-8.69	35.75		36.06	0.000200	4.88	12953.48	1403.64	0.17
E100-00-00_02	971.5	Max WS	42115.90	-8.69	35.75	13.88	36.06	0.000200	4.88	12953.46	1403.64	0.17
E100-00-00_02	961.5 1ST STREET		Bridge									
E100-00-00_02	852	Max WS	42063.69	-6.40	35.63		35.96	0.000242	5.13	12802.84	1302.13	0.19
E100-00-00_02	851.0	Max WS	42067.53	-6.40	35.63		35.96	0.000242	5.13	12802.61	1302.10	0.19
E100-00-00_03	654.0	Max WS	7575.42	-6.50	35.63		35.63	0.000005	0.76	14282.72	960.14	0.03
E100-00-00_03	400.0	Max WS	7568.56	-8.58	35.62	-0.82	35.63	0.000008	0.99	11676.05	945.70	0.03
E100-00-00_03	381.0 UNION PACIFIC RR		Bridge									
E100-00-00_03	365.0	Max WS	7567.45	-8.23	35.62		35.63	0.000007	0.98	11522.41	1076.26	0.03
E100-00-00_03	210.0	Max WS	7557.58	-7.81	35.61	-0.52	35.63	0.000009	1.09	10842.72	1117.33	0.04
E100-00-00_03	191.0 UNION PACIFIC RR		Bridge									
E100-00-00_03	173.1	Max WS	7548.96	-6.84	35.61		35.63	0.000010	1.16	10551.23	1724.03	0.04
E100-00-00_03	173.0	Max WS	7548.96	-6.84	35.61		35.63	0.000010	1.16	10551.23	1724.03	0.04

Little White Oak Bayou
Scenario 2: North Canal and Heights Improvements 100-Year

HEC-RAS Plan: NC_H_100yr River: E101-00-00 Reach: E101-00-00_0003 Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	9819.000	Max WS	10195.13	16.33	40.11		40.38	0.000518	4.17	2446.61	178.70	0.20
E101-00-00_0003	9750.000	Max WS	10192.53	16.31	40.10		40.35	0.000485	3.99	2552.07	190.45	0.19
E101-00-00_0003	9000.000	Max WS	10158.75	15.50	39.98		40.07	0.000226	2.61	4359.38	546.48	0.13
E101-00-00_0003	8469.000	Max WS	10190.33	13.02	39.83		39.94	0.000270	3.01	4097.69	567.23	0.13
E101-00-00_0003	7984.000	Max WS	10191.45	13.76	39.69		39.81	0.000271	3.19	3948.72	375.08	0.14
E101-00-00_0003	6838.000	Max WS	10065.67	12.20	39.28		39.44	0.000351	3.24	3104.14	300.75	0.18
E101-00-00_0003	5861.000	Max WS	9773.47	9.91	38.92		39.08	0.000374	3.39	3508.90	418.56	0.15
E101-00-00_0003	4720.000	Max WS	9587.78	8.13	38.58		38.75	0.000315	3.75	4117.73	718.24	0.14
E101-00-00_0003	4279.000	Max WS	9422.89	9.00	38.34		38.59	0.000479	4.16	2848.43	497.28	0.18
E101-00-00_0003	4130.000	Max WS	9525.68	8.68	38.42	18.66	38.51	0.000083	2.47	5014.74	740.49	0.10
E101-00-00_0003	4091.000 N. MAIN		Bridge									
E101-00-00_0003	4050.000	Max WS	9454.72	7.87	38.34		38.42	0.000075	2.41	4749.03	636.61	0.09
E101-00-00_0003	3952.	Max WS	9447.45	6.87	38.31		38.42	0.000083	2.64	3839.03	219.63	0.10
E101-00-00_0003	3466.000	Max WS	9519.91	1.92	38.30		38.39	0.000039	2.86	5388.48	412.62	0.09
E101-00-00_0003	3323.0	Max WS	9562.22	-1.03	38.33	13.16	38.37	0.000018	1.97	6821.50	497.44	0.06
E101-00-00_0003	3278.0 I-45 Ramp		Bridge									
E101-00-00_0003	3236.1	Max WS	9548.96	-2.82	38.31		38.34	0.000013	1.61	8537.60	691.33	0.05
E101-00-00_0003	3236.0	Max WS	9547.46	-2.82	38.31	11.78	38.34	0.000013	1.61	8537.60	691.33	0.05
E101-00-00_0003	3085 I-45 NBML		Bridge									
E101-00-00_0003	2958.1	Max WS	9563.01	-2.52	38.33		38.33	0.000005	0.94	18482.86	2535.24	0.03
E101-00-00_0003	2958	Max WS	9562.25	-2.52	38.33	11.87	38.33	0.000005	0.94	18482.86	2535.24	0.03
E101-00-00_0003	2833 I-45 SBML		Bridge									
E101-00-00_0003	2389.000	Max WS	9522.25	-0.26	38.25		38.29	0.000061	1.82	8540.69	741.38	0.06
E101-00-00_0003	2325.	Max WS	9521.85	-0.15	38.25		38.29	0.000059	1.75	8653.93	695.69	0.06
E101-00-00_0003	1855.000	Max WS	9575.18	0.68	38.25		38.27	0.000024	1.20	9459.05	735.52	0.04
E101-00-00_0003	1126.	Max WS	9602.10	-1.85	38.21		38.24	0.000080	1.64	9435.49	1240.17	0.06
E101-00-00_0003	1070.000	Max WS	9595.71	-2.04	38.20	10.51	38.24	0.000081	2.01	9914.63	1317.00	0.07
E101-00-00_0003	1029.500 WRIGHTWOOD		Bridge									
E101-00-00_0003	987.000	Max WS	9569.76	-2.04	38.17		38.21	0.000087	1.98	9875.03	1312.22	0.06
E101-00-00_0003	911.	Max WS	9593.15	-2.19	38.18		38.20	0.000058	1.69	11103.71	1286.31	0.05
E101-00-00_0003	756.	Max WS	9591.01	-2.51	38.16		38.18	0.000175	1.43	9287.44	1325.12	0.06
E101-00-00_0003	637.000	Max WS	9598.89	-2.75	38.15	13.03	38.17	0.000112	1.19	11600.37	1470.64	0.05
E101-00-00_0003	538.000 QUITMAN/WHITE OA		Bridge									
E101-00-00_0003	442.000	Max WS	9571.31	-2.75	38.10		38.12	0.000084	1.36	11304.91	1428.73	0.05
E101-00-00_0003	306.000	Max WS	9572.03	-2.86	38.10		38.11	0.000010	0.88	14712.83	1947.00	0.03
E101-00-00_0003	259.1	Max WS	9568.10	-2.90	38.10		38.11	0.000011	0.96	10998.68	579.53	0.03
E101-00-00_0003	259	Max WS	9569.22	-2.90	38.10	8.15	38.11	0.000011	0.96	10998.66	579.53	0.03
E101-00-00_0003	229 Prop I-10 DC		Bridge									
E101-00-00_0003	180.1	Max WS	9579.17	-2.96	38.10		38.11	0.000011	0.94	10945.18	619.88	0.03
E101-00-00_0003	180	Max WS	9578.55	-2.96	38.10	9.91	38.11	0.000011	0.94	10945.16	619.88	0.03
E101-00-00_0003	130 Prop-10 Ramp		Bridge									
E101-00-00_0003	101.1	Max WS	9587.19	-3.03	38.10		38.11	0.000009	0.83	12050.50	693.46	0.03
E101-00-00_0003	101	Max WS	9587.53	-3.03	38.10		38.11	0.000009	0.83	12050.50	693.46	0.03
E101-00-00_0003	68	Max WS	9585.90	-4.00	38.10		38.11	0.000014	0.95	10759.86	589.63	0.03
E101-00-00_0003	63	Max WS	9597.83	-4.00	38.10		38.11	0.000014	0.95	10759.78	589.63	0.03
E101-00-00_0003	3	Max WS	9698.29	-4.23	38.09		38.11	0.000017	1.16	9176.58	508.76	0.04
E101-00-00_0003	1	Max WS	9697.45	-4.23	38.09		38.11	0.000017	1.16	9176.56	508.76	0.04

North Canal
Scenario 2: North Canal and Heights Improvements 100-Year

HEC-RAS Plan: NC_H_100yr River: E100-00-00 Reach: North_Canal Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
North_Canal	1303	Max WS	34492.11	4.30	35.63		36.91	0.000489	9.08	4064.72	561.22	0.33
North_Canal	1302.9	Max WS	34491.91	4.30	35.63		36.91	0.000489	9.08	4064.69	561.20	0.33
North_Canal	1302		Lat Struct									
North_Canal	1132	Max WS	34518.36	4.13	35.57	20.75	36.82	0.000481	9.01	5052.63	898.00	0.33
North_Canal	1106 San Jacinto		Bridge									
North_Canal	1080	Max WS	34515.79	4.08	35.30		36.58	0.000498	9.12	4922.19	952.80	0.33
North_Canal	1079		Lat Struct									
North_Canal	838	Max WS	34552.24	3.84	35.16		36.46	0.000505	9.17	4444.02	773.94	0.33
North_Canal	579	Max WS	34589.52	3.58	35.02	20.40	36.33	0.000509	9.19	4245.06	722.75	0.33
North_Canal	548 Union Pacific RR		Bridge									
North_Canal	516	Max WS	34585.88	3.52	34.63		35.98	0.000533	9.33	4157.69	573.70	0.34
North_Canal	276	Max WS	34585.83	3.28	34.51		35.86	0.000534	9.33	4207.11	562.42	0.34

Buffalo Bayou
Scenario 3: North Canal, South Canal & Heights Improvements 10-Year

HEC-RAS Plan: N&SC_H_10yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	148800.4	Max WS	8258.11	3.15	31.31		31.39	0.000329	2.45	4225.07	899.84	0.10
W100_upstrm	148795.4	Max WS	8258.11	3.15	31.30	13.28	31.39	0.000329	2.45	4224.55	899.69	0.10
W100_upstrm	148768.4 SOUTHERN PACIFIC		Bridge									
W100_upstrm	148741.4	Max WS	8257.30	3.04	31.19		31.28	0.000329	2.45	4224.49	899.67	0.10
W100_upstrm	147632.4	Max WS	8253.38	-1.17	30.94		31.02	0.000124	2.29	4098.32	382.67	0.10
W100_upstrm	146698.0	Max WS	8301.95	1.88	30.81		30.91	0.000135	2.64	4250.13	306.99	0.11
W100_upstrm	145723.9	Max WS	8351.00	1.61	30.60		30.77	0.000211	3.47	3792.59	361.58	0.13
W100_upstrm	144753.5	Max WS	8405.33	0.07	30.43		30.57	0.000177	3.01	3318.72	266.92	0.12
W100_upstrm	143966.8	Max WS	8440.03	-7.47	30.26		30.42	0.000248	3.32	3384.02	365.69	0.13
W100_upstrm	143078.2	Max WS	8488.95	-4.19	30.09		30.21	0.000194	2.84	4317.54	451.98	0.12
W100_upstrm	142061.4	Max WS	8547.05	0.55	29.96		30.05	0.000114	2.52	4646.49	376.43	0.10
W100_upstrm	141320.1	Max WS	8590.13	-2.70	29.92		29.96	0.000065	1.79	8588.27	717.55	0.07
W100_upstrm	140116.2	Max WS	8640.74	-1.31	29.76		29.87	0.000155	2.75	4347.92	357.17	0.10
W100_upstrm	139320.0	Max WS	8676.24	-2.14	29.69		29.76	0.000120	2.30	5131.13	439.95	0.09
W100_upstrm	138607.9	Max WS	8709.72	-2.08	29.67		29.69	0.000033	1.32	13474.86	1028.59	0.05
W100_upstrm	137732.0	Max WS	8733.07	-2.40	29.61		29.69	0.000098	2.52	7372.29	772.63	0.09
W100_upstrm	137113.0	Max WS	8770.39	-2.62	29.51		29.63	0.000126	2.87	5065.68	382.79	0.10
W100_upstrm	136331.2	Max WS	8815.04	-2.09	29.41		29.45	0.000250	1.74	7488.90	609.79	0.07
W100_upstrm	135666.2	Max WS	8838.71	-1.47	29.27		29.36	0.000125	2.60	5350.63	516.21	0.10
W100_upstrm	134706.7	Max WS	8882.38	-1.93	29.23		29.26	0.000059	1.85	10336.60	830.16	0.07
W100_upstrm	134090.6	Max WS	8902.31	-1.59	29.18		29.24	0.000078	2.22	8081.78	679.16	0.08
W100_upstrm	133772.1	Max WS	8912.83	-0.79	29.13	8.93	29.24	0.000116	2.91	6396.79	715.59	0.10
W100_upstrm	133760.1 FOOTBRIDGE AT WE		Bridge									
W100_upstrm	133748.1	Max WS	8908.17	-0.46	29.03		29.15	0.000123	2.95	6103.56	661.39	0.10
W100_upstrm	132963.8	Max WS	8948.59	-1.98	28.91		29.03	0.000153	2.88	4059.61	299.17	0.11
W100_upstrm	131789.8	Max WS	8998.33	-2.31	28.73		28.86	0.000156	3.08	4351.01	433.39	0.11
W100_upstrm	130765.5	Max WS	9052.78	-3.81	28.67		28.73	0.000061	2.07	6960.21	468.00	0.07
W100_upstrm	129725.3	Max WS	9093.64	-3.71	28.55		28.66	0.000118	2.88	6053.65	648.32	0.10
W100_upstrm	129163.2	Max WS	9129.08	-3.13	28.49		28.58	0.000101	2.55	4747.09	391.65	0.09
W100_upstrm	128326.9	Max WS	9173.01	-4.05	28.43		28.50	0.000069	2.26	7022.95	714.97	0.08
W100_upstrm	128109.6	Max WS	9172.99	-4.29	28.43		28.47	0.000172	1.59	5785.62	358.22	0.07
W100_upstrm	128104.6	Max WS	9171.88	-4.29	28.43	6.13	28.46	0.000172	1.59	5785.32	358.21	0.07
W100_upstrm	128066.7 SHEPHERD		Bridge									
W100_upstrm	128028.8	Max WS	9158.27	-4.51	28.23		28.27	0.000115	1.58	5793.52	358.46	0.07
W100_upstrm	126647.0	Max WS	9144.84	-3.93	28.15		28.16	0.000037	0.99	9256.45	668.73	0.05
W100_upstrm	125376.9	Max WS	9186.13	-4.05	27.94		28.00	0.000228	1.97	4664.08	298.84	0.09
W100_upstrm	124983.5	Max WS	9201.90	-3.86	27.88		27.94	0.000059	1.92	4782.63	800.45	0.09
W100_upstrm	124644.1	Max WS	9215.89	-3.69	27.85	8.41	27.91	0.000078	1.98	4656.83	454.78	0.09
W100_upstrm	124591.8 WAUGH DRIVE		Bridge									
W100_upstrm	124539.5	Max WS	9211.11	-3.74	27.84		27.90	0.000077	1.97	4666.41	455.21	0.09
W100_upstrm	123658.2	Max WS	9268.24	-2.04	27.82		27.84	0.000039	1.08	8564.68	669.88	0.05
W100_upstrm	123138.8	Max WS	9299.91	-4.08	27.82		27.82	0.000020	0.76	12312.08	790.61	0.03
W100_upstrm	122627.1	Max WS	9326.09	-6.08	27.78		27.83	0.000037	1.58	6740.61	434.17	0.07
W100_upstrm	122572.1 MONTROSE COURT		Mult Open									
W100_upstrm	122517.1	Max WS	9326.09	-5.38	27.78		27.81	0.000059	1.61	6449.52	400.89	0.07
W100_upstrm	122371.6	Max WS	9327.00	-7.00	27.75	4.28	27.80	0.000122	1.86	5011.84	479.29	0.08
W100_upstrm	122265 ROSEMONT		Bridge									
W100_upstrm	122210.0	Max WS	9319.21	-5.60	27.72		27.77	0.000072	1.74	5352.91	438.40	0.07
W100_upstrm	122036.7	Max WS	9328.65	-8.40	27.71		27.75	0.000094	1.71	5549.77	488.80	0.08
W100_upstrm	121229.5	Max WS	9361.31	-11.37	27.65		27.69	0.000055	1.59	6030.56	618.21	0.07
W100_upstrm	120962.2	Max WS	9371.69	-10.59	27.62		27.67	0.000068	1.90	4941.42	306.44	0.08
W100_upstrm	120005.2	Max WS	9418.29	-7.78	27.60	3.72	27.61	0.000046	0.84	11164.53	728.02	0.04
W100_upstrm	119952.6 MEMORIAL DRIVE		Bridge									
W100_upstrm	119900.0	Max WS	9414.42	-7.64	27.59		27.60	0.000028	0.85	11051.89	725.04	0.04
W100_upstrm	119495.9	Max WS	9440.47	-7.21	27.58		27.59	0.000015	0.55	17062.27	1132.67	0.03
W100_upstrm	118667.7	Max WS	9482.99	-8.56	27.54		27.56	0.000055	1.09	8681.06	606.99	0.05
W100_upstrm	118466.1	Max WS	9480.87	-8.89	27.52	1.75	27.55	0.000033	1.45	6553.28	372.75	0.06
W100_upstrm	118418.1 MEMORIAL DRIVE		Bridge									
W100_upstrm	118370.1	Max WS	9460.06	-8.87	27.49		27.52	0.000034	1.45	6536.57	354.72	0.06
W100_upstrm	117845.4	Max WS	9485.16	-7.26	27.47		27.49	0.000060	1.29	7381.11	499.91	0.06
W100_upstrm	117204.3	Max WS	9516.62	-4.60	27.44		27.46	0.000035	1.07	8892.66	625.27	0.05
W100_upstrm	116395.7	Max WS	9547.82	-3.88	27.41		27.44	0.000029	1.16	8217.63	484.01	0.05
W100_upstrm	116167.6	Max WS	9533.91	-3.68	27.37	4.23	27.42	0.000113	1.86	5117.22	261.20	0.07
W100_upstrm	116121.9 SABINE AVENUE		Bridge									
W100_upstrm	116076.2	Max WS	9513.30	-3.86	27.17		27.23	0.000109	1.86	5113.77	261.16	0.07
W100_upstrm	115804.5	Max WS	9502.51	-4.60	27.13		27.21	0.000051	2.40	5135.18	273.88	0.08
W100_upstrm	115740.6	Max WS	9508.57	-4.78	27.13	4.41	27.20	0.000048	2.25	5137.18	286.29	0.08
W100_upstrm	115700 I-45 Allen Pkwy		Bridge									
W100_upstrm	115674.0	Max WS	9492.59	-5.10	27.11		27.19	0.000054	2.34	5188.44	348.98	0.08
W100_upstrm	115662.6	Max WS	9493.31	-5.20	27.11	4.13	27.19	0.000052	2.28	5278.21	377.64	0.08
W100_upstrm	115635.5 I-45 Houston Ave		Bridge									
W100_upstrm	115621.1	Max WS	9503.98	-5.57	27.13		27.19	0.000041	2.11	5876.93	422.80	0.07
W100_upstrm	115587.7	Max WS	9504.20	-6.22	27.12	3.93	27.19	0.000047	2.28	5938.81	462.15	0.08
W100_upstrm	115553.5 I-45 SBML		Bridge									
W100_upstrm	115514.4	Max WS	9514.82	-6.96	27.13		27.18	0.000034	1.92	6711.34	517.80	0.07
W100_upstrm	115509.1	Max WS	9513.43	-6.99	27.13	3.51	27.18	0.000035	1.94	6766.49	522.86	0.07
W100_upstrm	115490 I-45 NBML		Bridge									
W100_upstrm	115423.0	Max WS	9518.73	-7.30	27.14		27.18	0.000029	1.75	7236.69	471.38	0.06
W100_upstrm	115365.4	Max WS	9524.11	-7.52	27.14		27.18	0.000024	1.63	7381.82	445.19	0.06
W100_upstrm	115284.6	Max WS	9522.89	-7.89	27.13		27.18	0.000033	1.90	8996.12	928.00	0.06
W100_upstrm	115104.1	Max WS	9534.86	-8.31	27.14		27.17	0.000019	1.50	8188.17	638.11	0.05
W100_upstrm	115001.2	Max WS	9523.07	-8.48	27.10	2.30	27.18	0.000043	2.21	5981.89	479.17	0.07
W100_upstrm	115000 I-45 Ramp McKee		Bridge									
W100_upstrm	114907.3	Max WS	9528.53	-9.19	27.11		27.17	0.000038	1.98	5964.08	364.14	0.07
W100_upstrm	114842.1	Max WS	9525.57	-9.48	27.10	2.02	27.17	0.000045	2.13	5645.06	445.00	0.07
W100_upstrm	114830 I-45 Ramp Walker		Bridge									
W100_upstrm	114804.3	Max WS	9514.57	-9.61	27.09		27.16	0.000049	2.19	5938.98	512.02	0.08
W100_upstrm	114492.0	Max WS	9542.91	-10.48	27.10		27.15	0.000046	1.70	5626.55	324.51	0.07
W100_upstrm	114195.9	Max WS	9532.94	-11.52	27.07	1.39	27.12	0.000110	1.85	5143.90	309.15	0.08
W100_upstrm	114168.9 RUSK STREET		Bridge									
W100_upstrm	114141.9	Max WS	9496.81	-10.83	27.04		27.10	0.000124	1.93	4925.16	301.67	0.08
W100_upstrm	114097.4	Max WS	9505.64	-7.46	27.05	3.29	27.09	0.000077	1.69	5620.82	374.26	0.08
W100_upstrm	114070.4 CAPITAL STREE		Bridge									

HEC-RAS Plan: N&SC_H_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	114043.4	Max WS	9478.70	-7.72	26.10		26.14	0.000088	1.77	5362.91	372.70	0.08
W100_upstrm	113644.0	Max WS	9425.46	-8.91	26.03		26.11	0.000070	2.36	4408.67	296.75	0.09
W100_upstrm	113411.6	Max WS	9462.96	-9.61	26.04	0.41	26.10	0.000058	1.94	4879.38	364.51	0.07
W100_upstrm	113374.3 TEXAS AVE		Bridge									
W100_upstrm	113337.0	Max WS	9067.61	-9.65	25.91		25.96	0.000054	1.86	4862.31	364.26	0.06
W100_upstrm	113266.4	Max WS	9009.00	-9.11	25.86	2.72	25.95	0.000210	2.47	3777.15	229.50	0.10
W100_upstrm	113238.6 BAGBY		Bridge									
W100_upstrm	113210.8	Max WS	8945.20	-9.46	25.44		25.53	0.000216	2.46	3761.00	229.24	0.10
W100_upstrm	112974.0	Max WS	8854.06	-10.69	25.39	0.72	25.48	0.000140	2.43	3649.44	194.84	0.10
W100_upstrm	112944.9 PRAIRIE		Bridge									
W100_upstrm	112915.8	Max WS	8810.76	-10.82	25.23		25.32	0.000139	2.42	3643.84	194.78	0.10
W100_upstrm	112575.5	Max WS	8798.36	-9.20	25.21	2.77	25.27	0.000177	2.02	4366.19	235.42	0.08
W100_upstrm	112534.5 PRESTON STREET		Bridge									
W100_upstrm	112493.5	Max WS	8768.90	-9.47	24.86		24.93	0.000178	2.02	4350.84	235.30	0.08
W100_upstrm	112003.3	Max WS	8732.58	-9.69	24.81	1.69	24.85	0.000114	1.69	5160.58	275.20	0.07
W100_upstrm	111953.3 CONGRESS STREET		Bridge									
W100_upstrm	111903.3	Max WS	8699.71	-9.84	24.63		24.68	0.000114	1.69	5154.03	275.11	0.07
W100_upstrm	111853.5	Max WS	8683.52	-9.86	24.62	1.19	24.67	0.000100	1.75	4948.17	218.21	0.06
W100_upstrm	111818.6 SMITH STREET		Bridge									
W100_upstrm	111783.7	Max WS	8641.10	-8.67	24.59		24.64	0.000108	1.84	4683.53	214.54	0.07
W100_upstrm	111626.7	Max WS	8618.79	-11.83	24.58	0.82	24.62	0.000133	1.77	4857.02	224.94	0.07
W100_upstrm	111518.6 LOUISIANA		Bridge									
W100_upstrm	111410.5	Max WS	8530.64	-11.23	24.50		24.55	0.000091	1.81	4705.79	223.81	0.07
W100_upstrm	110876.6	Max WS	8525.81	-10.43	24.47	-0.98	24.50	0.000081	1.42	5997.82	311.26	0.06
W100_upstrm	110837.8 MILAM		Bridge									
W100_upstrm	110799.0	Max WS	8441.49	-10.72	24.42		24.45	0.000245	1.39	6071.85	313.14	0.06
W100_upstrm	110672.7	Max WS	8379.69	-13.25	24.37	-1.98	24.42	0.000262	1.78	5559.86	554.32	0.07
W100_upstrm	110643.7 TRAVIS STREET		Bridge									
W100_upstrm	110614.7	Max WS	8319.39	-12.75	24.34		24.40	0.000297	1.83	5268.02	548.50	0.08
W100_upstrm	110200.2	Max WS	8267.85	-9.11	24.29	0.97	24.32	0.000044	1.35	6135.10	372.52	0.06
W100_upstrm	110154.2 MAIN STREET		Bridge									
W100_upstrm	110108.2	Max WS	8246.69	-9.31	24.08		24.11	0.000044	1.35	6130.61	372.37	0.06
W100_upstrm	110103.2	Max WS	8246.69	-9.31	24.08		24.11	0.000044	1.35	6130.52	372.36	0.06
Downstream	109924.2	Max WS	13720.80	-13.02	24.08		24.16	0.000173	2.29	5990.29	286.95	0.09
Downstream	109551.7	Max WS	13720.49	-14.28	24.03	-3.09	24.10	0.000153	2.12	6460.25	329.44	0.08
Downstream	109518.7 FANNIN STREET		Bridge									
Downstream	109485.7	Max WS	13720.22	-15.31	23.23		23.30	0.000148	2.10	6534.80	330.30	0.08
Downstream	109440.2	Max WS	13720.08	-16.48	23.21	-3.50	23.29	0.000293	2.23	6143.75	319.07	0.09
Downstream	109395.2 SAN JACINTO STRE		Bridge									
Downstream	109350.2	Max WS	13719.94	-16.89	23.02		23.10	0.000283	2.21	6214.93	319.40	0.09
Downstream	109119.0	Max WS	13719.52	-17.14	22.90	-4.11	23.02	0.000382	2.76	4977.94	331.90	0.12
Downstream	109103.1 CROSSWALK		Bridge									
Downstream	109087.2	Max WS	13719.40	-17.55	22.86		22.97	0.000362	2.70	5087.69	336.94	0.12
Downstream	108565.3	Max WS	13719.02	-12.77	22.77		22.85	0.000090	2.28	6014.34	246.62	0.08
Downstream	108334.0	Max WS	13719.10	-14.06	22.76		22.83	0.000129	2.12	6457.26	268.67	0.08
Downstream	107179.4	Max WS	13718.85	-20.52	22.57	-7.51	22.66	0.000157	2.45	5879.23	354.11	0.09
Downstream	107158.9 S. PACIFIC RR		Bridge									
Downstream	107139	Max WS	13718.77	-20.19	22.54		22.64	0.000134	2.49	5757.15	332.82	0.09
Downstream	107138.4	Max WS	13718.77	-20.19	22.54		22.64	0.000134	2.49	5757.11	332.81	0.09
W100_downstream1	106594.0	Max WS	36112.79	-16.70	22.54		23.02	0.000990	5.52	6540.34	249.51	0.19
W100_downstream1	106151.4	Max WS	36108.14	-13.85	21.76	3.01	22.34	0.002082	6.09	5924.72	255.52	0.22
W100_downstream1	106131.1 MCKEE		Bridge									
W100_downstream1	106110.8	Max WS	36104.34	-12.53	21.37		22.04	0.002413	6.57	5492.46	248.22	0.25
W100_downstream1	105705.4	Max WS	36100.10	-18.22	20.72	1.58	21.38	0.000831	6.51	5544.07	247.71	0.24
W100_downstream1	105667.4 ELYSIAN STREET		Bridge									
W100_downstream1	105629.5	Max WS	36097.84	-18.43	20.36		21.03	0.000846	6.55	5507.91	246.45	0.24
W100_downstream1	105629.4	Max WS	36098.49	-18.43	20.36		21.03	0.000846	6.55	5507.89	246.45	0.24
W100_DS01	105476	Max WS	19518.64	-18.70	20.36		20.53	0.000737	3.30	5919.93	357.72	0.14
W100_DS01	104962	Max WS	19517.68	-18.70	20.17		20.28	0.000261	2.56	7630.67	602.66	0.10
W100_DS01	104900	Max WS	19517.36	-19.15	20.16		20.23	0.000098	2.02	9640.95	613.93	0.09
W100_DS01	104464	Max WS	19517.23	-19.86	20.03		20.14	0.000670	2.63	7409.01	491.32	0.12
W100_DS01	104301	Max WS	19517.10	-20.42	19.96		20.07	0.000119	2.75	7110.05	464.95	0.12
W100_DS01	104242	Max WS	19517.31	-20.62	19.93		20.06	0.000464	2.90	6730.56	379.64	0.12
W100_DS01	104118.0	Max WS	19516.76	-21.10	19.72	2.09	19.99	0.000696	4.12	4742.55	275.28	0.17
W100_DS01	104070 Prop I-69 Ramp		Bridge									
W100_DS01	103955.1	Max WS	19516.88	-21.79	19.80		19.94	0.000321	3.02	6470.27	301.38	0.11
W100_DS01	103955.0	Max WS	19516.76	-21.79	19.80	-1.20	19.94	0.000321	3.02	6470.26	301.38	0.11
W100_DS01	103846 Prop I-69 DC		Bridge									
W100_DS01	103786.1	Max WS	19516.76	-22.51	19.73		19.86	0.000257	2.96	6596.53	289.59	0.11
W100_DS01	103786.0	Max WS	19516.76	-22.51	19.73	-6.08	19.86	0.000257	2.96	6596.52	289.59	0.11
W100_DS01	103694 Prop I-69 SBML		Bridge									
W100_DS01	103534.1	Max WS	19516.45	-23.58	19.63		19.77	0.000249	3.00	6508.08	276.66	0.11
W100_DS01	103534.0	Max WS	19516.76	-23.58	19.63	-6.41	19.77	0.000249	3.00	6508.08	276.66	0.11
W100_DS01	103383 Prop I-45 SBML		Bridge									
W100_DS01	103245.1	Max WS	19516.45	-24.83	19.53		19.69	0.000298	3.14	6212.48	276.36	0.12
W100_DS01	103245	Max WS	19516.45	-24.83	19.53		19.69	0.000298	3.14	6212.47	276.36	0.12
W100_DS02	103241.1	Max WS	36094.41	-24.83	19.53		20.01	0.001326	5.54	6511.02	320.11	0.22
W100_DS02	103241.0	Max WS	36094.41	-24.83	19.53	0.73	20.01	0.001326	5.54	6510.98	320.11	0.22
W100_DS02	103161 Prop I-69 NBML		Bridge									
W100_DS02	103095.1	Max WS	36093.74	-25.45	19.39		19.86	0.000550	5.49	6575.70	295.27	0.20
W100_DS02	103095.0	Max WS	36093.74	-25.45	19.39	0.95	19.86	0.000550	5.49	6575.68	295.27	0.20
W100_DS02	103065 Prop I-45 DC		Bridge									
W100_DS02	103025.1	Max WS	36093.52	-25.75	19.28		19.77	0.000524	5.63	6415.78	268.17	0.20
W100_DS02	103025.0	Max WS	36093.52	-25.75	19.28	-0.33	19.77	0.000524	5.63	6415.76	268.17	0.20
W100_DS02	102988 Prop I-10 DC		Bridge									
W100_DS02	102952	Max WS	36090.50	-26.06	18.79		19.46	0.000873	6.55	5513.23	257.65	0.25
W100_DS02	102895.0	Max WS	36090.02	-26.31	18.51		19.39	0.001611	7.52	4797.89	244.39	0.30
W100_DS02	102875.3	Max WS	36090.73	-26.39	18.75	-0.26	19.35	0.001722	6.25	5779.08	353.57	0.27
W100_DS02	102847.5 HOUTerminal RR		Bridge									
W100_DS02	102819.7	Max WS	36089.28	-26.43	18.39		19.02	0.001813	6.37	5666.05	351.90	0.28
W100_DS02	102309.0	Max WS	36133.50	-23.48	17.94		18.45	0.000399	5.74	6297.06	217.37	0.19
W100_DS02	101828.0	Max WS	36173.64	-20.70	17.53	-1.32	18.16	0.000797	6.40	5652.31	249.46	0.24
W100_DS02	101790.1 JENSEN ROAD		Bridge									

HEC-RAS Plan: N&SC_H_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_DS02	101752.2	Max WS	36172.91	-20.69	17.35		18.00	0.000799	6.45	5605.87	247.77	0.24
W100_DS02	101007.3	Max WS	36238.67	-16.93	17.03		17.55	0.000392	5.82	6227.33	264.22	0.21
W100_DS02	99992.6	Max WS	36326.34	-18.90	16.54		17.12	0.000453	6.11	5943.94	251.34	0.22
W100_DS02	98399.4	Max WS	36470.08	-20.26	15.87		16.42	0.000423	5.93	6153.90	259.32	0.21
W100_DS02	97517.4	Max WS	36545.97	-19.35	15.80		16.12	0.000252	4.51	8110.63	313.81	0.16
W100_DS02	96028.6	Max WS	36670.37	-17.81	15.01	-3.70	15.51	0.000563	5.70	6438.88	290.60	0.21
W100_DS02	95985.1 YORK DRIVE		Bridge									
W100_DS02	95941.6	Max WS	36670.24	-17.87	14.86		15.37	0.000566	5.72	6413.53	290.06	0.21
W100_DS02	95362.9	Max WS	36721.82	-15.97	14.66		15.10	0.000359	5.31	6910.52	323.63	0.20
W100_DS02	94280.7	Max WS	36824.95	-19.82	13.61		14.39	0.000962	7.06	5218.27	236.99	0.27
W100_DS02	93495.6	Max WS	36887.18	-20.43	13.25		13.77	0.000608	5.77	6398.18	326.61	0.23
W100_DS02	92795.6	Max WS	36956.16	-20.98	12.86	-5.62	13.40	0.000439	5.87	6301.08	290.48	0.22
W100_DS02	92741.1 LOCKWOOD DRIVE		Bridge									
W100_DS02	92686.6	Max WS	36955.99	-21.08	12.66		13.20	0.000444	5.89	6270.24	289.82	0.22
W100_DS02	90936.7	Max WS	37111.93	-18.64	11.37		11.87	0.001063	5.67	6545.62	392.80	0.24
W100_DS02	89918.4	Max WS	37203.46	-17.23	10.14		10.89	0.000858	6.94	5358.22	311.55	0.30
W100_DS02	88579.0	Max WS	37321.60	-20.97	9.10		9.80	0.000761	6.76	5521.16	318.44	0.29
W100_DS02	87591.9	Max WS	37414.78	-23.72	8.57		9.15	0.000565	6.09	6139.24	302.63	0.24
W100_DS02	86660.2	Max WS	37489.31	-23.42	8.25	-10.40	8.71	0.000372	5.45	6881.26	291.40	0.20
W100_DS02	86641.7 HOUTerminal RR		Bridge									
W100_DS02	86623.2	Max WS	37489.32	-23.61	7.92		8.38	0.000377	5.48	6840.21	291.02	0.20
W100_DS02	85855.2	Max WS	37557.87	-26.84	6.95		7.95	0.000796	8.00	4696.57	207.27	0.30
W100_DS02	85238.7	Max WS	37610.66	-29.43	6.66		7.48	0.000706	7.25	5264.44	284.13	0.26
W100_DS02	84561.7	Max WS	37683.79	-32.27	6.42	-13.50	7.08	0.000451	6.55	5843.47	299.78	0.23
W100_DS02	84531.4 NORTH WAYSIDE RD		Bridge									
W100_DS02	84501.1	Max WS	37683.77	-28.97	5.82		6.73	0.000709	7.69	4903.33	210.08	0.28
W100_DS02	84252.6	Max WS	37705.95	-26.90	5.80	-9.93	6.57	0.000612	7.03	5364.54	239.97	0.26
W100_DS02	84222.3 M. GARCIA		Bridge									
W100_DS02	84192.0	Max WS	37705.89	-24.10	5.08		6.15	0.000995	8.31	4537.97	229.10	0.33
W100_DS02	83635.7	Max WS	37755.60	-21.72	5.02		5.67	0.000694	6.48	5822.39	333.64	0.27
W100_DS02	81786.1	Max WS	37915.72	-31.97	3.94		4.51	0.000559	6.06	6256.22	339.94	0.25
W100_DS02	80903.1	Max WS	37992.17	-27.77	3.62	-12.70	4.06	0.000442	5.32	7135.58	385.94	0.22
W100_DS02	80883.1 S. PACIFIC RR		Bridge									
W100_DS02	80863.1	Max WS	37992.17	-28.10	3.19		3.63	0.000518	5.35	7095.37	385.42	0.22
W100_DS02	80538.0	Max WS	37992.16	-33.12	3.35	-20.45	3.51	0.000128	3.28	11597.55	492.10	0.12

White Oak Bayou
Scenario 3: North Canal, South Canal & Heights Improvements 10-Year

HEC-RAS Plan: N&SC_H_10yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	36134.	Max WS	21256.84	24.19	52.00		52.72	0.000577	6.80	3123.91	194.49	0.30
E100-00-00	35718.0	Max WS	21256.31	23.76	51.72		52.49	0.000514	7.05	3013.98	187.54	0.31
E100-00-00	35158.	Max WS	21336.34	22.89	51.53		52.19	0.000542	6.54	3261.79	204.26	0.29
E100-00-00	35006.0	Max WS	21361.61	22.66	51.38	39.68	52.11	0.000498	6.86	3113.59	245.71	0.30
E100-00-00	34951.5 ELLA		Bridge									
E100-00-00	34895.0	Max WS	21353.32	22.56	51.18		51.92	0.000505	6.90	3094.68	241.29	0.30
E100-00-00	34645.	Max WS	21383.02	22.24	51.09		51.78	0.000600	6.67	3204.59	217.95	0.30
E100-00-00	34206.0	Max WS	21452.85	21.68	50.86		51.54	0.000480	6.66	3222.19	200.58	0.29
E100-00-00	33962.58	Max WS	21499.38	21.61	50.98		51.43	0.000429	5.39	4030.31	383.08	0.27
E100-00-00	33909.08	Max WS	21507.04	21.60	50.93		51.40	0.000582	5.49	3918.94	337.66	0.28
E100-00-00	33770.	Max WS	21526.72	21.56	50.89		51.34	0.000289	5.45	4235.21	362.42	0.23
E100-00-00	33681.0	Max WS	21539.29	21.53	50.58	38.73	51.31	0.000506	6.86	3141.25	349.14	0.30
E100-00-00	33645.5 W 18TH		Bridge									
E100-00-00	33610.0	Max WS	21538.79	21.61	50.42		51.17	0.000526	6.96	3093.50	345.11	0.31
E100-00-00	33357.	Max WS	21567.91	21.41	50.34		51.02	0.000643	6.60	3266.84	214.57	0.30
E100-00-00	32570.0	Max WS	21710.55	20.78	49.96		50.59	0.000431	6.34	3424.09	208.44	0.28
E100-00-00	31583.0	Max WS	21825.71	19.35	49.61		50.18	0.000380	6.06	3603.70	219.90	0.26
E100-00-00	30779.0	Max WS	21940.03	18.79	49.36		49.89	0.000347	5.88	4056.81	377.28	0.25
E100-00-00	29659.	Max WS	22064.57	17.66	49.00		49.46	0.000406	5.44	4070.85	329.02	0.24
E100-00-00	29368.0	Max WS	22143.68	17.37	48.61	35.29	49.33	0.000478	6.81	3251.50	180.20	0.28
E100-00-00	29297.5 TC JESTER SOUTH		Bridge									
E100-00-00	29203.0	Max WS	22141.78	17.35	47.30		48.14	0.000575	7.32	3023.19	175.31	0.31
E100-00-00	28775.	Max WS	22193.94	16.90	47.38		47.89	0.000524	5.75	3861.90	263.95	0.26
E100-00-00	28375.0	Max WS	22221.31	16.48	46.97	34.31	47.69	0.000487	6.80	3268.30	197.09	0.29
E100-00-00	28357.0 BICYCLE BRIDGE		Bridge									
E100-00-00	28330.0	Max WS	22221.03	16.41	46.85		47.58	0.000490	6.82	3258.65	196.82	0.30
E100-00-00	28190.0	Max WS	22237.62	16.18	46.81	33.81	47.51	0.000445	6.71	3314.87	190.60	0.28
E100-00-00	28152.5 W 11TH		Bridge									
E100-00-00	28113.0	Max WS	22237.04	16.28	46.65		47.37	0.000465	6.81	3264.96	190.56	0.29
E100-00-00	27982.	Max WS	22250.38	16.25	46.53		47.30	0.000559	7.06	3151.77	192.69	0.31
E100-00-00	27429.0	Max WS	22291.85	16.12	46.31		47.01	0.000485	6.71	3321.55	200.75	0.29
E100-00-00	26598.	Max WS	22404.83	15.35	45.97		46.61	0.000455	6.41	3492.81	210.80	0.28
E100-00-00	26498.0	Max WS	22415.13	15.26	45.95	33.00	46.57	0.000439	6.29	3562.46	213.97	0.27
E100-00-00	26432.5 TC JESTER		Bridge									
E100-00-00	26366.0	Max WS	22414.34	15.16	45.74		46.36	0.000446	6.34	3537.56	213.28	0.27
E100-00-00	26307.3	Max WS	22419.52	15.13	45.83		46.34	0.000380	5.74	4057.91	406.92	0.25
E100-00-00	26225	Max WS	22426.95	15.04	45.81		46.30	0.000400	5.65	4078.38	391.25	0.24
E100-00-00	26140.	Max WS	22432.99	14.97	45.62		46.27	0.000470	6.45	3475.38	216.11	0.28
E100-00-00	25536.0	Max WS	22480.49	14.48	45.32		45.98	0.000474	6.50	3511.73	266.52	0.28
E100-00-00	25132.	Max WS	22519.89	14.29	45.17		45.80	0.000453	6.40	3896.16	355.99	0.28
E100-00-00	24817.0	Max WS	22548.31	14.14	44.81	33.04	45.61	0.000722	7.17	3145.71	219.00	0.33
E100-00-00	24789.0 UNION PACIFIC RR		Bridge									
E100-00-00	24758.0	Max WS	22546.46	13.76	44.22		45.05	0.000734	7.28	3096.15	214.69	0.34
E100-00-00	24636.	Max WS	22560.20	13.61	44.34		44.97	0.000482	6.44	3752.60	368.59	0.28
E100-00-00	23934.0	Max WS	22625.94	12.75	43.98		44.57	0.000626	6.19	3655.02	274.00	0.30
E100-00-00	23550.0	Max WS	22668.10	12.77	43.88	29.54	44.38	0.000359	5.71	3970.88	241.41	0.25
E100-00-00	23506.5 DURHAM		Bridge									
E100-00-00	23444.0	Max WS	22666.15	12.69	43.67		44.18	0.000365	5.75	3939.96	240.46	0.25
E100-00-00	23180.	Max WS	22683.84	12.46	43.45		44.08	0.000423	6.42	3681.36	327.79	0.27
E100-00-00	22983.	Max WS	22695.79	12.29	43.15		43.98	0.000630	7.32	3127.83	321.08	0.33
E100-00-00	22834.0	Max WS	22709.74	12.16	43.02	31.51	43.88	0.000770	7.43	3057.78	275.18	0.32
E100-00-00	22796.5 SHEPHERD		Bridge									
E100-00-00	22758.0	Max WS	22705.19	12.11	42.76		43.63	0.000867	7.52	3017.91	205.35	0.33
E100-00-00	22610.	Max WS	22718.44	11.92	42.75		43.51	0.000806	7.02	3373.91	376.74	0.31
E100-00-00	22224.0	Max WS	22753.21	11.41	42.80		43.19	0.000696	5.25	5707.44	646.68	0.25
E100-00-00	21444.0	Max WS	22801.52	10.52	41.87		42.63	0.000874	7.02	3249.34	209.42	0.31
E100-00-00	20746.0	Max WS	22843.75	10.00	41.20		42.01	0.000896	7.20	3172.95	205.54	0.32
E100-00-00	20644.0	Max WS	22854.89	9.95	41.19	29.53	41.92	0.000805	6.87	3684.82	593.37	0.31
E100-00-00	20633.0 Pipeline		Bridge									
E100-00-00	20622.0	Max WS	22842.16	9.95	40.70		41.49	0.000895	7.14	3386.41	554.58	0.32
E100-00-00	20521.	Max WS	22849.87	9.91	40.59		41.41	0.000855	7.30	3506.20	552.12	0.32
E100-00-00	19917.0	Max WS	22896.21	9.66	39.93		40.83	0.001030	7.61	3009.28	199.20	0.34
E100-00-00	19463.0	Max WS	22924.74	9.25	39.35		40.33	0.001145	7.95	2882.15	196.79	0.37
E100-00-00	18857	Max WS	22952.87	8.03	38.49	28.69	39.59	0.001291	8.44	2739.92	202.81	0.38
E100-00-00	18800 I-10 WBFR		Bridge									
E100-00-00	18747	Max WS	22952.41	7.81	38.52		39.35	0.000915	7.34	3200.45	259.93	0.33
E100-00-00	18746	Max WS	22952.50	7.81	38.52	27.28	39.35	0.000915	7.34	3200.18	259.93	0.33
E100-00-00	18595 I-10 BRIDGE		Bridge									
E100-00-00	18443	Max WS	22918.56	7.19	37.14		38.06	0.001016	7.70	2976.71	195.98	0.35
E100-00-00	18442	Max WS	22919.17	7.19	37.14	27.04	38.06	0.001017	7.70	2976.48	195.98	0.35
E100-00-00	18394 I-10 EBFR		Bridge									
E100-00-00	18377.	Max WS	22886.21	6.98	36.40		37.45	0.001175	8.22	2784.99	185.52	0.37
E100-00-00	18234.0	Max WS	22922.67	6.77	37.02		37.24	0.000080	3.76	6089.45	266.11	0.14
E100-00-00	18199.0	Max WS	22925.28	6.70	37.05		37.24	0.000053	3.50	6542.31	265.72	0.12
E100-00-00	18176.0	Max WS	22923.16	6.79	36.95	17.37	37.24	0.000078	4.31	5322.88	221.24	0.15
E100-00-00	18138.0 YALE		Bridge									
E100-00-00	18082.0	Max WS	22914.12	6.87	36.64		37.04	0.000114	5.07	4523.14	201.81	0.18
E100-00-00	17905.	Max WS	22931.36	6.86	36.72		37.02	0.000099	4.42	5191.49	223.31	0.16
E100-00-00	17756.0	Max WS	22944.22	6.85	36.72	16.78	37.00	0.000115	4.26	5387.34	249.79	0.16
E100-00-00	17726 S. HEIGHTS		Bridge									
E100-00-00	17696	Max WS	22937.92	6.85	36.58		36.86	0.000115	4.29	5349.49	247.69	0.16
E100-00-00	17657	Max WS	22942.05	6.35	36.59	16.01	36.86	0.000111	4.15	5529.00	255.15	0.16
E100-00-00	17627 N. HEIGHTS		Bridge									
E100-00-00	17597.0	Max WS	22938.55	6.35	36.46		36.73	0.000111	4.17	5495.81	253.26	0.16
E100-00-00	17318.	Max WS	22928.00	6.35	35.69		36.63	0.001044	7.76	2953.75	199.24	0.36
E100-00-00	16831.0	Max WS	22966.83	6.34	35.63		36.27	0.000406	6.43	3571.01	304.45	0.33
E100-00-00	15795.0	Max WS	23002.55	4.84	35.44		35.78	0.000534	4.63	4970.85	378.13	0.22

HEC-RAS Plan: N&SC_H_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	15278.	Max WS	22998.85	4.41	34.77		35.50	0.000576	6.88	3343.15	221.54	0.31
E100-00-00	14977.0	Max WS	23026.94	4.16	35.16	12.98	35.35	0.000046	3.45	6677.60	256.50	0.12
E100-00-00	14937.0 I-10 EBFR ACCESS		Bridge									
E100-00-00	14897.0	Max WS	23024.50	3.39	34.65		34.84	0.000046	3.45	6678.34	256.98	0.12
E100-00-00	14890	Max WS	23023.96	3.42	34.59	13.47	34.84	0.000063	3.97	5797.21	228.44	0.14
E100-00-00	14775 I-10 BRIDGE		Bridge									
E100-00-00	14660	Max WS	23021.49	3.42	34.54		34.78	0.000064	3.98	5784.42	228.32	0.14
E100-00-00	14590.0	Max WS	23019.97	3.45	34.44	14.47	34.78	0.000093	4.68	4914.51	198.86	0.17
E100-00-00	14562.0 I-10 WB ACCESS		Bridge									
E100-00-00	14532.0	Max WS	23018.09	3.41	34.37		34.72	0.000093	4.69	4909.69	198.89	0.17
E100-00-00	14354.0	Max WS	23024.86	3.29	34.34		34.69	0.000197	4.72	4883.30	473.96	0.21
E100-00-00	13924.0	Max WS	23021.83	3.18	33.87	22.10	34.51	0.000664	6.42	3588.49	318.27	0.28
E100-00-00	13909.5 UNION PAC. RR		Bridge									
E100-00-00	13898.0	Max WS	23017.27	2.95	33.54		34.19	0.000675	6.45	3567.28	315.35	0.28
E100-00-00	13494.	Max WS	23027.26	2.47	33.39		33.90	0.000768	5.70	4039.36	392.26	0.26
E100-00-00	13220.0	Max WS	23043.49	2.15	33.49	21.89	33.76	0.000191	4.16	5532.81	561.63	0.19
E100-00-00	13182.5 STUDEMONT		Bridge									
E100-00-00	13143.0	Max WS	23042.26	2.15	33.41		33.66	0.000185	4.05	6014.55	497.29	0.19
E100-00-00	12698.	Max WS	23044.13	1.87	33.04		33.50	0.000546	5.45	4228.15	338.94	0.27
E100-00-00	12066.0	Max WS	23067.72	1.47	32.92		33.20	0.000400	4.27	5404.71	375.00	0.20
E100-00-00	11546.0	Max WS	23087.48	0.90	32.81		33.05	0.000190	3.92	6012.94	570.79	0.19
E100-00-00	11021.	Max WS	23110.39	0.63	32.76		32.96	0.000143	3.63	6711.94	718.88	0.17
E100-00-00	10908.0	Max WS	23116.23	0.57	32.78	20.09	32.95	0.000125	3.49	7999.58	861.40	0.16
E100-00-00	10852.5 TAYLOR (SAWYER)		Bridge									
E100-00-00	10804.0	Max WS	23113.93	0.45	32.63		32.79	0.000126	3.47	7978.49	860.47	0.16
E100-00-00	10643.	Max WS	23116.45	0.14	32.30		32.79	0.000473	5.61	4282.81	367.69	0.24
E100-00-00	9779.0	Max WS	23152.84	-1.51	32.28		32.49	0.000142	3.77	6923.07	586.01	0.16
E100-00-00	8532.0	Max WS	23204.82	-1.76	32.31		32.35	0.000040	1.66	13958.58	854.49	0.07
E100-00-00	8140.	Max WS	23222.19	-2.43	32.25		32.30	0.000219	1.74	14062.67	1111.06	0.08
E100-00-00	7649.0	Max WS	23239.60	-3.26	32.11	16.17	32.26	0.000088	3.34	12289.17	1358.33	0.13
E100-00-00	7608.5 HOUSTON		Bridge									
E100-00-00	7568.0	Max WS	23239.58	-3.15	32.13		32.23	0.000066	2.90	12158.25	1356.17	0.12
E100-00-00	7546.0	Max WS	23240.53	-3.16	32.11	16.15	32.23	0.000077	3.11	11049.17	1373.02	0.13
E100-00-00	7535.5 Pipeline		Bridge									
E100-00-00	7529.0	Max WS	23240.53	-3.16	32.06		32.19	0.000078	3.12	10988.10	1371.37	0.13
E100-00-00	7481.0	Max WS	23240.57	-3.17	32.01		32.19	0.000117	3.55	8162.64	1035.05	0.17
E100-00-00	7253.1	Max WS	23240.41	-3.19	32.05		32.16	0.000045	2.64	8852.86	604.07	0.11
E100-00-00	7253.05		Lat Struct									
E100-00-00	7253	Max WS	23239.65	-3.19	32.05	11.57	32.16	0.000045	2.64	8852.86	604.07	0.11
E100-00-00	7205 Prop I-10 DC		Bridge									
E100-00-00	7138.1	Max WS	23239.57	-3.20	31.89		32.03	0.000061	3.01	7758.59	558.34	0.13
E100-00-00	7138	Max WS	23238.75	-3.20	31.89	12.43	32.03	0.000061	3.01	7758.58	558.34	0.13
E100-00-00	7057 Prop I-10 Ramp		Bridge									
E100-00-00	7016.1	Max WS	23238.68	-3.22	31.38		31.73	0.000129	4.73	4908.74	486.24	0.18
E100-00-00	7016	Max WS	23239.36	-3.22	31.38		31.73	0.000129	4.73	4908.74	486.24	0.18
E100-00-00	6980	Max WS	23239.35	-3.22	31.55		31.71	0.000112	3.28	7129.46	528.42	0.14
E100-00-00	6979		Lat Struct									
E100-00-00	6975.0	Max WS	23224.35	-3.22	31.55		31.71	0.000112	3.27	7129.41	528.42	0.14
E100-00-00	6898.0	Max WS	23084.85	-4.23	31.47		31.70	0.000308	3.91	6138.30	477.34	0.17
E100-00-00	6895	Max WS	23084.89	-4.23	31.47		31.70	0.000308	3.91	6137.84	477.33	0.17
E100-00-00_02	6775.	Max WS	31027.07	-4.30	31.47		31.59	0.000103	2.81	11427.11	934.24	0.12
E100-00-00_02	6637.0	Max WS	31024.07	-4.37	31.43	17.25	31.58	0.000105	3.11	10121.29	826.29	0.13
E100-00-00_02	6600 Prop I-45 DC		Bridge									
E100-00-00_02	6575.1	Max WS	31021.07	-4.41	31.38		31.54	0.000112	3.15	10065.82	890.07	0.14
E100-00-00_02	6575.0	Max WS	31022.08	-4.41	31.38	17.51	31.54	0.000112	3.15	10065.82	890.07	0.14
E100-00-00_02	6551 Prop I-45 Ramp		Bridge									
E100-00-00_02	6515.0	Max WS	31019.08	-4.44	31.36		31.51	0.000114	3.15	10162.38	823.43	0.14
E100-00-00_02	6387.0	Max WS	31020.03	-4.38	31.35	18.09	31.50	0.000117	3.13	9911.11	1209.07	0.13
E100-00-00_02	6352 Prop I-45 NBML		Bridge									
E100-00-00_02	6298.1	Max WS	31018.09	-4.51	31.35		31.48	0.000101	2.92	10622.51	1102.52	0.12
E100-00-00_02	6298	Max WS	31019.06	-4.51	31.35	16.58	31.48	0.000101	2.92	10622.50	1102.51	0.12
E100-00-00_02	6252 Prop I-45 DC		Bridge									
E100-00-00_02	6201.1	Max WS	31017.10	-4.65	31.36		31.47	0.000072	2.65	11709.39	981.11	0.11
E100-00-00_02	6201	Max WS	31019.06	-4.65	31.36	15.67	31.47	0.000072	2.65	11709.38	981.11	0.11
E100-00-00_02	6164 Prop I-45 Ramp		Bridge									
E100-00-00_02	6122.0	Max WS	31006.18	-4.33	31.22		31.38	0.000085	3.20	9676.86	848.43	0.13
E100-00-00_02	5525.0	Max WS	31005.22	-3.15	31.19		31.32	0.000103	2.93	10594.92	648.96	0.13
E100-00-00_02	4994.0	Max WS	31021.74	-3.09	30.92	15.68	31.21	0.000368	4.40	7538.12	537.07	0.17
E100-00-00_02	4980.0 RR OVERPASS		Bridge									
E100-00-00_02	4961.0	Max WS	30959.01	-3.03	30.18		30.52	0.000484	4.73	6937.44	528.61	0.19
E100-00-00_02	4812.0	Max WS	30926.83	-3.49	29.74	15.15	30.38	0.001475	6.43	4811.80	374.83	0.32
E100-00-00_02	4774.5 CROCKETT/HOGAN		Bridge									
E100-00-00_02	4687.0	Max WS	30901.36	-4.67	29.59		30.07	0.001009	5.52	5593.18	424.97	0.27
E100-00-00_02	4407.	Max WS	30877.48	-3.62	29.24		29.82	0.000740	6.12	5102.43	342.70	0.25
E100-00-00_02	4014.0	Max WS	30889.59	-2.15	29.18	14.25	29.55	0.000606	4.88	6331.31	394.67	0.21
E100-00-00_02	3997.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	3976.0	Max WS	30874.68	-2.40	29.02		29.39	0.000623	4.90	6295.85	395.11	0.22
E100-00-00_02	3681.	Max WS	30820.90	-3.80	28.62		29.18	0.000811	6.00	5134.26	296.63	0.25
E100-00-00_02	3585.0	Max WS	30803.80	-4.26	28.51		29.11	0.000720	6.18	4983.23	303.67	0.27
E100-00-00_02	3233.0	Max WS	30871.74	-4.79	28.74	9.95	28.89	0.000236	3.11	9925.39	1011.36	0.15
E100-00-00_02	3094 Prop I-10 WBML		Bridge									
E100-00-00_02	2954.1	Max WS	30833.36	-5.22	28.54		28.74	0.000275	3.59	8593.96	800.91	0.17
E100-00-00_02	2954.0	Max WS	30834.86	-5.22	28.54	11.17	28.74	0.000275	3.59	8593.94	800.90	0.17
E100-00-00_02	2857 Prop I-45 BNML		Bridge									
E100-00-00_02	2760.1	Max WS	30828.84	-5.51	28.51		28.68	0.000238	3.28	9391.93	816.22	0.16
E100-00-00_02	2760.0	Max WS	30830.36	-5.51	28.51	12.55	28.68	0.000238	3.28	9391.92	816.22	0.16
E100-00-00_02	2639 Prop I-10 WB Exp		Bridge									

HEC-RAS Plan: N&SC_H_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_02	2518.1	Max WS	30776.29	-5.88	28.24		28.48	0.000355	3.94	7803.73	612.42	0.19
E100-00-00_02	2518.0	Max WS	30779.44	-5.88	28.24	13.07	28.48	0.000355	3.94	7803.71	612.42	0.19
E100-00-00_02	2434 Prop I-45 SBML		Bridge									
E100-00-00_02	2350.1	Max WS	30633.88	-6.13	27.83		28.21	0.000547	4.92	6221.83	521.73	0.23
E100-00-00_02	2350.0	Max WS	30637.48	-6.13	27.83	13.73	28.21	0.000548	4.92	6221.81	521.72	0.23
E100-00-00_02	2280 Prop I-10 EBML		Bridge									
E100-00-00_02	2210.0	Max WS	30550.39	-6.34	27.65		28.04	0.000606	5.03	6076.91	627.29	0.24
E100-00-00_02	1580.	Max WS	29915.06	-7.83	26.77		27.52	0.000971	6.97	4347.11	757.15	0.29
E100-00-00_02	1353.0	Max WS	29529.50	-8.34	26.20	13.69	27.23	0.001458	8.11	3639.01	643.65	0.34
E100-00-00_02	1335.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	1319.0	Max WS	29030.91	-8.37	25.46		26.54	0.001570	8.31	3495.43	553.29	0.35
E100-00-00_02	984.0	Max WS	29071.54	-8.69	25.49	10.52	26.17	0.000588	6.63	4447.21	536.01	0.29
E100-00-00_02	978 MAIN STREET		Bridge									
E100-00-00_02	971.6	Max WS	28828.81	-8.69	25.17		25.86	0.000614	6.71	4346.10	525.08	0.29
E100-00-00_02	971.5	Max WS	28828.82	-8.69	25.17	10.45	25.86	0.000614	6.71	4346.08	525.08	0.29
E100-00-00_02	961.5 1ST STREET		Bridge									
E100-00-00_02	852	Max WS	27925.00	-6.40	24.13		25.15	0.000954	8.11	3443.81	466.82	0.37
E100-00-00_02	851.0	Max WS	27925.00	-6.40	24.13		25.15	0.000954	8.11	3443.55	466.78	0.37
E100-00-00_03	654.0	Max WS	5612.19	-6.50	24.13		24.15	0.000014	1.10	5118.24	523.69	0.04
E100-00-00_03	400.0	Max WS	5566.85	-8.58	24.11	-1.97	24.14	0.000020	1.40	3986.74	431.62	0.06
E100-00-00_03	381.0 UNION PACIFIC RR		Bridge									
E100-00-00_03	365.0	Max WS	5541.49	-8.23	24.10		24.14	0.000021	1.42	3913.54	434.90	0.06
E100-00-00_03	210.0	Max WS	5510.55	-7.81	24.10	-1.78	24.13	0.000025	1.53	3599.32	424.29	0.06
E100-00-00_03	191.0 UNION PACIFIC RR		Bridge									
E100-00-00_03	173.1	Max WS	5476.91	-6.84	24.08		24.12	0.000028	1.60	3418.82	542.81	0.07
E100-00-00_03	173.0	Max WS	5474.12	-6.84	24.08		24.12	0.000028	1.60	3418.82	542.81	0.07

Little White Oak Bayou
Scenario 3: North Canal, South Canal & Heights Improvements 10-Year

HEC-RAS Plan: N&SC_H_10yr River: E101-00-00 Reach: E101-00-00_0003 Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	9819.000	Max WS	7910.58	16.33	36.51		36.80	0.000675	4.30	1841.70	156.96	0.22
E101-00-00_0003	9750.000	Max WS	7910.22	16.31	36.48		36.75	0.000652	4.15	1904.46	167.44	0.22
E101-00-00_0003	9000.000	Max WS	7905.33	15.50	36.18		36.31	0.000519	3.23	2833.58	507.39	0.19
E101-00-00_0003	8469.000	Max WS	7874.46	13.02	35.89		36.04	0.000469	3.42	2714.31	317.55	0.17
E101-00-00_0003	7984.000	Max WS	7894.80	13.76	35.62		35.80	0.000528	3.82	2546.06	314.40	0.19
E101-00-00_0003	6838.000	Max WS	7971.29	12.20	34.86		35.10	0.000700	3.92	2033.45	199.03	0.22
E101-00-00_0003	5861.000	Max WS	7968.71	9.91	33.90		34.20	0.001104	4.45	1862.15	242.42	0.25
E101-00-00_0003	4720.000	Max WS	7879.56	8.13	32.84		33.21	0.000756	5.04	1998.34	271.28	0.22
E101-00-00_0003	4279.000	Max WS	7763.99	9.00	32.25		32.74	0.001323	5.64	1377.46	104.35	0.27
E101-00-00_0003	4130.000	Max WS	7832.99	8.68	32.44	17.70	32.60	0.000216	3.19	2458.83	174.44	0.15
E101-00-00_0003	4091.000 N. MAIN		Bridge									
E101-00-00_0003	4050.000	Max WS	7822.30	7.87	32.39		32.53	0.000183	3.03	2597.76	230.05	0.14
E101-00-00_0003	3952.	Max WS	7832.23	6.87	32.37		32.51	0.000163	3.04	2633.30	188.13	0.13
E101-00-00_0003	3466.000	Max WS	7892.04	1.92	32.35		32.46	0.000058	3.05	3703.00	249.11	0.11
E101-00-00_0003	3323.0	Max WS	7918.41	-1.03	32.38	12.12	32.45	0.000032	2.26	4456.31	280.00	0.08
E101-00-00_0003	3278.0 I-45 Ramp		Bridge									
E101-00-00_0003	3236.1	Max WS	7921.29	-2.82	32.40		32.44	0.000026	1.95	5437.01	428.95	0.07
E101-00-00_0003	3236.0	Max WS	7923.22	-2.82	32.40	10.81	32.44	0.000026	1.95	5437.01	428.95	0.07
E101-00-00_0003	3085 I-45 NBML		Bridge									
E101-00-00_0003	2958.1	Max WS	7918.42	-2.52	32.39		32.43	0.000024	1.77	5783.43	1593.11	0.07
E101-00-00_0003	2958	Max WS	7920.37	-2.52	32.39	10.82	32.43	0.000025	1.77	5783.41	1593.10	0.07
E101-00-00_0003	2833 I-45 SBML		Bridge									
E101-00-00_0003	2389.000	Max WS	7898.74	-0.26	32.32		32.38	0.000104	2.06	5481.23	393.77	0.07
E101-00-00_0003	2325.	Max WS	7906.36	-0.15	32.32		32.37	0.000096	1.92	5715.85	400.24	0.07
E101-00-00_0003	1855.000	Max WS	7944.01	0.68	32.32		32.35	0.000041	1.37	6602.85	415.22	0.05
E101-00-00_0003	1126.	Max WS	7968.72	-1.85	32.19		32.27	0.000239	2.38	4320.71	528.60	0.09
E101-00-00_0003	1070.000	Max WS	7964.75	-2.04	32.16	9.37	32.26	0.000200	2.72	4209.08	575.34	0.10
E101-00-00_0003	1029.500 WRIGHTWOOD		Bridge									
E101-00-00_0003	987.000	Max WS	7897.45	-2.04	31.93		32.03	0.000226	2.72	4096.22	533.27	0.10
E101-00-00_0003	911.	Max WS	7915.46	-2.19	31.96		32.00	0.000123	2.13	5504.72	406.51	0.07
E101-00-00_0003	756.	Max WS	7901.42	-2.51	31.86		31.95	0.000651	2.37	3476.59	448.27	0.12
E101-00-00_0003	637.000	Max WS	7901.54	-2.75	31.83	11.11	31.88	0.000416	1.83	4614.42	591.30	0.09
E101-00-00_0003	538.000 QUITMAN/WHITE OA		Bridge									
E101-00-00_0003	442.000	Max WS	7777.30	-2.75	31.48		31.54	0.000291	1.98	4408.92	561.31	0.09
E101-00-00_0003	306.000	Max WS	7781.71	-2.86	31.49		31.51	0.000023	1.12	8606.75	1201.77	0.05
E101-00-00_0003	259.1	Max WS	7782.72	-2.90	31.49		31.51	0.000022	1.14	7220.60	554.70	0.05
E101-00-00_0003	259	Max WS	7783.55	-2.90	31.49	7.08	31.51	0.000022	1.14	7220.58	554.70	0.05
E101-00-00_0003	229 Prop I-10 DC		Bridge									
E101-00-00_0003	180.1	Max WS	7784.29	-2.96	31.48		31.50	0.000022	1.11	7044.83	445.50	0.05
E101-00-00_0003	180	Max WS	7786.23	-2.96	31.48	8.74	31.50	0.000022	1.11	7044.80	445.49	0.05
E101-00-00_0003	130 Prop-10 Ramp		Bridge									
E101-00-00_0003	101.1	Max WS	7793.80	-3.03	31.49		31.50	0.000016	0.96	8126.88	493.39	0.04
E101-00-00_0003	101	Max WS	7794.27	-3.03	31.49		31.50	0.000016	0.96	8126.88	493.39	0.04
E101-00-00_0003	68	Max WS	7791.01	-4.00	31.48		31.50	0.000028	1.11	7030.34	437.05	0.05
E101-00-00_0003	63	Max WS	7804.96	-4.00	31.48		31.50	0.000028	1.11	7030.21	437.04	0.05
E101-00-00_0003	3	Max WS	7942.18	-4.23	31.47		31.50	0.000038	1.40	5861.39	488.85	0.06
E101-00-00_0003	1	Max WS	7942.18	-4.23	31.47		31.50	0.000038	1.40	5861.35	488.85	0.06

North Canal
Scenario 3: North Canal, South Canal & Heights Improvements 10-Year

HEC-RAS Plan: N&SC_H_10yr River: E100-00-00 Reach: North_Canal Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
North_Canal	1303	Max WS	22312.81	4.30	24.13		26.15	0.001617	11.41	1954.73	159.80	0.58
North_Canal	1302.9	Max WS	22312.50	4.30	24.13		26.15	0.001617	11.41	1954.70	159.80	0.58
North_Canal	1302		Lat Struct									
North_Canal	1132	Max WS	22335.68	4.13	23.84	17.11	25.92	0.001148	11.57	1930.37	110.00	0.49
North_Canal	1106 San Jacinto		Bridge									
North_Canal	1080	Max WS	22333.84	4.08	23.74		25.83	0.001161	11.61	1923.06	110.00	0.49
North_Canal	1079		Lat Struct									
North_Canal	838	Max WS	22365.59	3.84	23.39		25.53	0.001203	11.75	1903.49	109.99	0.50
North_Canal	579	Max WS	22399.43	3.58	23.01	16.75	25.21	0.001249	11.90	1882.49	109.98	0.51
North_Canal	548 Union Pacific RR		Bridge									
North_Canal	516	Max WS	22397.23	3.52	22.90		25.12	0.001264	11.94	1875.41	109.98	0.51
North_Canal	276	Max WS	22394.02	3.28	22.54		24.81	0.001306	12.07	1855.42	109.98	0.52

South Canal
Scenario 3: North Canal, South Canal & Heights Improvements 10-Year

HEC-RAS Plan: N&SC_H_10yr River: W100-00-00 Reach: Second Bypass Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Second Bypass	1320.1	Max WS	16579.58	2.92	20.36		20.99	0.000844	6.35	2612.69	219.55	0.32
Second Bypass	1320	Max WS	16579.72	2.92	20.36		20.99	0.000844	6.35	2612.67	219.55	0.32
Second Bypass	1319.9		Lat Struct									
Second Bypass	1045	Max WS	16579.06	2.65	20.14		20.76	0.000834	6.32	2623.55	219.95	0.32
Second Bypass	770	Max WS	16578.68	2.37	19.92		20.53	0.000824	6.29	2635.11	220.37	0.32
Second Bypass	769.9		Lat Struct									
Second Bypass	495	Max WS	16578.20	2.10	19.63		20.27	0.001038	6.42	2580.82	214.31	0.33
Second Bypass	400	Max WS	16577.96	2.00	19.53		20.18	0.001039	6.43	2579.95	214.28	0.33

Buffalo Bayou
Scenario 3: North Canal, South Canal & Heights Improvements 100-Year

HEC-RAS Plan: N&SC_H_100yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	148800.4	Max WS	17391.08	3.15	40.82		40.95	0.000323	3.16	7340.15	1799.79	0.10
W100_upstrm	148795.4	Max WS	17391.32	3.15	40.82	17.91	40.95	0.000323	3.16	7339.60	1799.78	0.10
W100_upstrm	148768.4 SOUTHERN PACIFIC		Bridge									
W100_upstrm	148741.4	Max WS	17389.67	3.04	40.69		40.82	0.000324	3.17	7333.63	1799.60	0.10
W100_upstrm	147632.4	Max WS	17383.66	-1.17	40.46		40.57	0.000112	2.77	8141.31	489.94	0.10
W100_upstrm	146698.0	Max WS	17454.65	1.88	40.32		40.46	0.000156	3.29	7664.01	662.85	0.12
W100_upstrm	145723.9	Max WS	17527.20	1.61	40.12		40.34	0.000199	4.30	7615.53	442.35	0.14
W100_upstrm	144753.5	Max WS	17605.25	0.07	39.92		40.13	0.000200	3.83	6581.40	418.19	0.13
W100_upstrm	143966.8	Max WS	17656.24	-7.47	39.80		39.99	0.000210	3.88	8413.04	1058.36	0.13
W100_upstrm	143078.2	Max WS	17727.87	-4.19	39.65		39.81	0.000161	3.47	9763.35	678.72	0.12
W100_upstrm	142061.4	Max WS	17813.40	0.55	39.53		39.66	0.000110	3.21	9180.23	517.76	0.10
W100_upstrm	141320.1	Max WS	17876.65	-2.70	39.52		39.56	0.000057	2.07	16139.22	866.75	0.07
W100_upstrm	140116.2	Max WS	17951.20	-1.31	39.36		39.51	0.000150	3.44	10404.28	805.15	0.11
W100_upstrm	139320.0	Max WS	18003.01	-2.14	39.29		39.39	0.000120	2.83	11766.72	920.68	0.09
W100_upstrm	138607.9	Max WS	18052.04	-2.08	39.29		39.31	0.000028	1.51	23794.24	1319.80	0.05
W100_upstrm	137732.0	Max WS	18086.56	-2.40	39.23		39.31	0.000082	2.90	15534.23	1165.65	0.09
W100_upstrm	137113.0	Max WS	18139.64	-2.62	39.10		39.29	0.000146	3.88	9094.56	1132.48	0.12
W100_upstrm	136331.2	Max WS	18205.64	-2.09	39.04		39.08	0.000223	1.83	13858.64	714.37	0.06
W100_upstrm	135666.2	Max WS	18238.81	-1.47	38.90		39.02	0.000108	3.11	11148.88	695.80	0.10
W100_upstrm	134706.7	Max WS	18303.00	-1.93	38.88		38.92	0.000054	2.22	19473.06	1102.72	0.07
W100_upstrm	134090.6	Max WS	18332.54	-1.59	38.83		38.91	0.000075	2.76	15399.79	828.87	0.09
W100_upstrm	133772.1	Max WS	18349.88	-0.79	38.79	13.59	38.91	0.000100	3.35	14545.13	911.56	0.10
W100_upstrm	133760.1 FOOTBRIDGE AT WE		Bridge									
W100_upstrm	133748.1	Max WS	18346.52	-0.46	38.73		38.85	0.000106	3.42	14182.95	906.60	0.10
W100_upstrm	132963.8	Max WS	18403.02	-1.98	38.59		38.76	0.000159	3.59	8638.25	579.86	0.12
W100_upstrm	131789.8	Max WS	18478.77	-2.31	38.42		38.59	0.000147	3.78	9214.50	622.02	0.12
W100_upstrm	130765.5	Max WS	18555.51	-3.81	38.35		38.45	0.000069	2.78	11873.95	560.14	0.08
W100_upstrm	129725.3	Max WS	18615.38	-3.71	38.26		38.39	0.000107	3.42	13331.81	903.67	0.10
W100_upstrm	129163.2	Max WS	18666.24	-3.13	38.17		38.31	0.000105	3.30	9893.89	677.97	0.10
W100_upstrm	128326.9	Max WS	18728.13	-4.05	38.11		38.22	0.000078	3.00	12586.15	1206.00	0.09
W100_upstrm	128109.6	Max WS	18727.40	-4.29	38.11		38.18	0.000157	2.04	9173.92	637.90	0.07
W100_upstrm	128104.6	Max WS	18727.40	-4.29	38.11	10.60	38.18	0.000157	2.04	9173.65	637.88	0.07
W100_upstrm	128066.7 SHEPHERD		Bridge									
W100_upstrm	128028.8	Max WS	18713.63	-4.51	38.04		38.10	0.000103	2.03	9225.21	643.24	0.07
W100_upstrm	126647.0	Max WS	18702.53	-3.93	37.98		38.00	0.000033	1.10	17589.13	997.39	0.04
W100_upstrm	125376.9	Max WS	18744.08	-4.05	37.75		37.83	0.000245	2.32	8114.91	520.24	0.09
W100_upstrm	124983.5	Max WS	18762.31	-3.86	37.70		37.77	0.000056	2.17	8776.78	1271.10	0.09
W100_upstrm	124644.1	Max WS	18776.78	-3.69	37.66	13.77	37.75	0.000069	2.40	7827.14	560.17	0.09
W100_upstrm	124591.8 WAUGH DRIVE		Bridge									
W100_upstrm	124539.5	Max WS	18769.63	-3.74	37.64		37.73	0.000069	2.40	7836.97	560.52	0.09
W100_upstrm	123658.2	Max WS	18847.66	-2.04	37.65		37.67	0.000026	1.05	22353.85	2046.76	0.04
W100_upstrm	123138.8	Max WS	18887.64	-4.08	37.64		37.66	0.000019	0.92	22552.91	1450.82	0.03
W100_upstrm	122627.1	Max WS	18917.48	-6.08	37.61		37.65	0.000033	1.83	14320.25	1058.10	0.07
W100_upstrm	122572.1 MONTROSE COURT		Mult Open									
W100_upstrm	122517.1	Max WS	18919.65	-5.38	37.61		37.65	0.000063	1.74	13553.20	986.08	0.06
W100_upstrm	122371.6	Max WS	18927.84	-7.00	37.60	9.35	37.64	0.000065	1.70	14391.99	1035.71	0.06
W100_upstrm	122265 ROSEMONT		Bridge									
W100_upstrm	122210.0	Max WS	18900.79	-5.60	37.55		37.59	0.000052	1.86	12768.00	806.82	0.07
W100_upstrm	122036.7	Max WS	18914.65	-8.40	37.54		37.58	0.000051	1.75	13196.90	889.57	0.06
W100_upstrm	121229.5	Max WS	18966.25	-11.37	37.51		37.55	0.000041	1.65	14311.91	902.50	0.06
W100_upstrm	120962.2	Max WS	18971.42	-10.59	37.47		37.54	0.000061	2.10	11126.08	728.56	0.08
W100_upstrm	120005.2	Max WS	19033.73	-7.78	37.46	8.43	37.47	0.000043	0.93	20413.48	1036.75	0.04
W100_upstrm	119952.6 MEMORIAL DRIVE		Bridge									
W100_upstrm	119900.0	Max WS	19005.88	-7.64	37.36		37.38	0.000028	0.94	20167.81	1034.49	0.04
W100_upstrm	119495.9	Max WS	19039.80	-7.21	37.36		37.37	0.000014	0.66	29347.96	1336.96	0.02
W100_upstrm	118667.7	Max WS	19097.45	-8.56	37.32		37.35	0.000042	1.24	16140.37	923.74	0.05
W100_upstrm	118466.1	Max WS	19099.50	-8.89	37.30	5.94	37.34	0.000034	1.66	14390.67	1130.01	0.06
W100_upstrm	118418.1 MEMORIAL DRIVE		Bridge									
W100_upstrm	118370.1	Max WS	19092.89	-8.87	37.28		37.32	0.000036	1.66	14337.61	1126.28	0.06
W100_upstrm	117845.4	Max WS	19117.38	-7.26	37.25		37.29	0.000050	1.54	13765.96	833.57	0.05
W100_upstrm	117204.3	Max WS	19167.83	-4.60	37.24		37.26	0.000031	1.25	15736.88	1090.02	0.05
W100_upstrm	116395.7	Max WS	19202.50	-3.88	37.20		37.24	0.000034	1.45	13232.56	544.23	0.05
W100_upstrm	116167.6	Max WS	19175.81	-3.68	37.12	7.87	37.22	0.000124	2.51	7632.17	291.10	0.08
W100_upstrm	116121.9 SABINE AVENUE		Bridge									
W100_upstrm	116076.2	Max WS	19049.08	-3.86	36.92		37.01	0.000119	2.50	7625.72	291.02	0.08
W100_upstrm	115804.5	Max WS	19023.68	-4.60	36.86		37.01	0.000069	3.39	9267.61	842.71	0.10
W100_upstrm	115740.6	Max WS	19028.05	-4.78	36.86	8.33	37.00	0.000060	3.11	9185.72	858.55	0.09
W100_upstrm	115700 I-45 Allen Pkwy		Bridge									
W100_upstrm	115674.0	Max WS	18996.13	-5.10	36.83		36.96	0.000064	3.16	9558.53	965.77	0.09
W100_upstrm	115662.6	Max WS	19006.88	-5.20	36.84	8.31	36.96	0.000058	2.97	9451.47	1046.68	0.09
W100_upstrm	115635.5 I-45 Houston Ave		Bridge									
W100_upstrm	115621.1	Max WS	19015.53	-5.57	36.86		36.95	0.000046	2.76	10228.93	1264.06	0.08
W100_upstrm	115587.7	Max WS	19027.95	-6.22	36.86	8.16	36.95	0.000050	2.85	13010.45	1339.30	0.08
W100_upstrm	115553.5 I-45 SBML		Bridge									
W100_upstrm	115514.4	Max WS	19032.83	-6.96	36.87		36.94	0.000036	2.41	14469.95	1581.82	0.07
W100_upstrm	115509.1	Max WS	19034.57	-6.99	36.87	7.22	36.94	0.000036	2.43	14390.45	1595.47	0.07
W100_upstrm	115490 I-45 NBML		Bridge									
W100_upstrm	115423.0	Max WS	19034.57	-7.30	36.86		36.93	0.000032	2.29	13283.94	1398.62	0.07
W100_upstrm	115365.4	Max WS	19035.57	-7.52	36.86		36.92	0.000029	2.18	14475.14	1572.56	0.06
W100_upstrm	115284.6	Max WS	19050.60	-7.89	36.86		36.92	0.000032	2.29	21063.12	1652.33	0.07
W100_upstrm	115104.1	Max WS	19048.01	-8.31	36.86		36.92	0.000024	2.05	16882.16	1602.62	0.06
W100_upstrm	115001.2	Max WS	19028.97	-8.48	36.81	6.09	36.95	0.000056	3.07	13596.48	1409.61	0.09
W100_upstrm	115000 I-45 Ramp McKee		Bridge									
W100_upstrm	114907.3	Max WS	19034.08	-9.19	36.82		36.93	0.000049	2.78	12029.05	1177.07	0.08
W100_upstrm	114842.1	Max WS	19027.02	-9.48	36.81	5.76	36.94	0.000056	2.94	11938.42	1195.75	0.09
W100_upstrm	114830 I-45 Ramp Walker		Bridge									
W100_upstrm	114804.3	Max WS	19019.46	-9.61	36.80		36.93	0.000059	2.98	12297.31	1180.28	0.09
W100_upstrm	114492.0	Max WS	19068.58	-10.48	36.82		36.89	0.000055	2.03	9981.50	944.47	0.08
W100_upstrm	114195.9	Max WS	19040.47	-11.52	36.77	5.77	36.85	0.000226	2.24	8924.59	804.31	0.08
W100_upstrm	114168.9 RUSK STREET		Bridge									
W100_upstrm	114141.9	Max WS	18883.58	-10.83	36.57		36.65	0.000250	2.32	8294.48	577.01	0.09
W100_upstrm	114097.4	Max WS	18898.42	-7.46	36.58	7.08	36.65	0.000082	2.03	10074.74	958.99	0.07
W100_upstrm	114070.4 CAPITAL STREE		Bridge									

HEC-RAS Plan: N&SC_H_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	114043.4	Max WS	18816.44	-7.72	36.46		36.53	0.000080	2.00	10211.25	984.40	0.07
W100_upstrm	113644.0	Max WS	18784.17	-8.91	36.39		36.51	0.000065	2.95	9428.66	626.69	0.09
W100_upstrm	113411.6	Max WS	18799.16	-9.61	36.37	4.15	36.49	0.000077	2.77	6791.02	559.73	0.08
W100_upstrm	113374.3 TEXAS AVE		Bridge									
W100_upstrm	113337.0	Max WS	18647.87	-9.65	36.20		36.32	0.000076	2.76	6766.99	555.29	0.08
W100_upstrm	113266.4	Max WS	18645.29	-9.11	36.17	7.46	36.31	0.000270	3.13	6854.33	484.43	0.11
W100_upstrm	113238.6 BAGBY		Bridge									
W100_upstrm	113210.8	Max WS	18568.93	-9.46	36.04		36.18	0.000266	3.08	6967.46	519.54	0.10
W100_upstrm	112974.0	Max WS	18541.97	-10.69	35.97	6.56	36.12	0.000206	3.19	5832.79	256.58	0.11
W100_upstrm	112944.9 PRAIRIE		Bridge									
W100_upstrm	112915.8	Max WS	18487.71	-10.82	35.90		36.05	0.000204	3.17	5847.99	259.78	0.11
W100_upstrm	112575.5	Max WS	18506.42	-9.20	35.87	7.97	35.97	0.000257	2.53	9036.03	925.01	0.08
W100_upstrm	112534.5 PRESTON STREET		Bridge									
W100_upstrm	112493.5	Max WS	18415.47	-9.47	35.74		35.84	0.000249	2.50	9169.74	934.73	0.08
W100_upstrm	112003.3	Max WS	18427.33	-9.69	35.66	5.05	35.73	0.000174	2.19	8638.80	469.91	0.07
W100_upstrm	111953.3 CONGRESS STREET		Bridge									
W100_upstrm	111903.3	Max WS	18347.07	-9.84	35.47		35.55	0.000173	2.19	8624.16	468.89	0.07
W100_upstrm	111853.5	Max WS	18337.11	-9.86	35.45	5.01	35.54	0.000186	2.44	7897.88	462.84	0.08
W100_upstrm	111818.6 SMITH STREET		Bridge									
W100_upstrm	111783.7	Max WS	18258.13	-8.67	35.33		35.44	0.000212	2.55	7330.90	400.66	0.08
W100_upstrm	111626.7	Max WS	18259.56	-11.83	35.31	5.92	35.40	0.000207	2.43	8145.46	528.94	0.08
W100_upstrm	111518.6 LOUISIANA		Bridge									
W100_upstrm	111410.5	Max WS	18095.09	-11.23	35.00		35.10	0.000159	2.50	7684.76	487.31	0.08
W100_upstrm	110876.6	Max WS	18135.13	-10.43	34.98	2.65	35.02	0.000099	1.81	13258.27	1319.15	0.06
W100_upstrm	110837.8 MILAM		Bridge									
W100_upstrm	110799.0	Max WS	18124.21	-10.72	34.94		34.99	0.000269	1.77	13603.50	1350.82	0.06
W100_upstrm	110672.7	Max WS	18125.09	-13.25	34.91	2.79	34.96	0.000211	2.11	14755.88	1314.41	0.07
W100_upstrm	110643.7 TRAVIS STREET		Bridge									
W100_upstrm	110614.7	Max WS	18090.46	-12.75	34.85		34.91	0.000228	2.12	14033.67	1284.50	0.07
W100_upstrm	110200.2	Max WS	18096.66	-9.11	34.79	5.18	34.84	0.000060	1.80	11310.56	573.53	0.06
W100_upstrm	110154.2 MAIN STREET		Bridge									
W100_upstrm	110108.2	Max WS	18083.39	-9.31	34.58		34.62	0.000060	1.80	11300.04	573.23	0.06
W100_upstrm	110103.2	Max WS	18084.44	-9.31	34.58		34.62	0.000060	1.80	11299.87	573.23	0.06
Downstream	109924.2	Max WS	20766.51	-13.02	34.58		34.65	0.000112	2.26	9960.81	439.16	0.07
Downstream	109551.7	Max WS	20766.40	-14.28	34.55	-0.38	34.61	0.000109	2.05	10133.86	371.55	0.07
Downstream	109518.7 FANNIN STREET		Bridge									
Downstream	109485.7	Max WS	20766.34	-15.31	33.73		33.79	0.000106	2.03	10213.01	376.41	0.07
Downstream	109440.2	Max WS	20766.12	-16.48	33.71	-0.92	33.79	0.000172	2.17	9576.21	334.43	0.07
Downstream	109395.2 SAN JACINTO STRE		Bridge									
Downstream	109350.2	Max WS	20765.88	-16.89	33.56		33.63	0.000167	2.15	9660.86	334.80	0.07
Downstream	109119.0	Max WS	20765.56	-17.14	33.47	-1.09	33.54	0.000590	2.14	9850.14	918.07	0.09
Downstream	109103.1 CROSSWALK		Bridge									
Downstream	109087.2	Max WS	20765.29	-17.55	33.41		33.48	0.000557	2.10	10202.69	1029.72	0.08
Downstream	108565.3	Max WS	20765.14	-12.77	33.21		33.29	0.000179	2.23	10890.70	781.72	0.07
Downstream	108334.0	Max WS	20765.13	-14.06	33.18		33.23	0.000174	1.96	13852.86	1000.57	0.06
Downstream	107179.4	Max WS	20764.98	-20.52	33.00	-4.49	33.07	0.000142	2.31	10006.41	507.97	0.07
Downstream	107158.9 S. PACIFIC RR		Bridge									
Downstream	107139	Max WS	20764.98	-20.19	32.97		33.05	0.000147	2.34	9860.73	503.70	0.07
Downstream	107138.4	Max WS	20764.99	-20.19	32.97		33.05	0.000147	2.34	9860.67	503.70	0.07
W100_downstream1	106594.0	Max WS	60644.55	-16.70	32.97		33.62	0.001787	6.45	9439.13	506.58	0.21
W100_downstream1	106151.4	Max WS	60643.43	-13.85	31.87	8.31	32.62	0.002733	6.94	8735.41	302.00	0.23
W100_downstream1	106131.1 MCKEE		Bridge									
W100_downstream1	106110.8	Max WS	60642.55	-12.53	31.42		32.27	0.003094	7.39	8210.00	293.52	0.25
W100_downstream1	105705.4	Max WS	60641.80	-18.22	30.72	6.91	31.50	0.000716	7.08	8559.87	395.68	0.26
W100_downstream1	105667.4 ELYSIAN STREET		Bridge									
W100_downstream1	105629.5	Max WS	60641.48	-18.43	30.35		31.14	0.000727	7.13	8501.08	386.12	0.26
W100_downstream1	105629.4	Max WS	60641.57	-18.43	30.35		31.14	0.000727	7.13	8501.05	386.12	0.26
W100_DS01	105476	Max WS	25198.50	-18.70	30.35		30.45	0.000334	2.57	9797.31	433.85	0.09
W100_DS01	104962	Max WS	25198.43	-18.70	30.26		30.33	0.000123	2.20	11439.55	739.91	0.07
W100_DS01	104900	Max WS	25198.42	-19.15	30.28		30.31	0.000040	1.45	17398.23	914.17	0.06
W100_DS01	104464	Max WS	25198.36	-19.86	30.22		30.27	0.000341	1.77	14217.90	760.85	0.07
W100_DS01	104301	Max WS	25198.33	-20.42	30.17		30.23	0.000055	1.95	13014.26	815.71	0.08
W100_DS01	104242	Max WS	25198.32	-20.62	30.14		30.21	0.000584	2.19	11505.47	613.40	0.09
W100_DS01	104118.0	Max WS	25198.30	-21.10	30.06	3.73	30.17	0.000227	2.76	10703.36	664.16	0.10
W100_DS01	104070 Prop I-69 Ramp		Bridge									
W100_DS01	103955.1	Max WS	25198.30	-21.79	30.04		30.13	0.000143	2.43	11347.40	533.92	0.08
W100_DS01	103955.0	Max WS	25198.15	-21.79	30.04	0.33	30.13	0.000143	2.43	11347.39	533.92	0.08
W100_DS01	103846 Prop I-69 DC		Bridge									
W100_DS01	103786.1	Max WS	25198.15	-22.51	29.99		30.08	0.000162	2.43	10839.38	465.60	0.08
W100_DS01	103786.0	Max WS	25197.98	-22.51	29.99	-2.48	30.08	0.000162	2.43	10839.38	465.60	0.08
W100_DS01	103694 Prop I-69 SBML		Bridge									
W100_DS01	103534.1	Max WS	25197.98	-23.58	29.89		29.99	0.000173	2.61	9656.49	318.79	0.08
W100_DS01	103534.0	Max WS	25197.98	-23.58	29.89	-3.07	29.99	0.000173	2.61	9656.49	318.78	0.08
W100_DS01	103383 Prop I-45 SBML		Bridge									
W100_DS01	103245.1	Max WS	25197.98	-24.83	29.81		29.92	0.000172	2.75	9147.55	292.13	0.09
W100_DS01	103245	Max WS	25198.00	-24.83	29.81		29.92	0.000172	2.75	9147.54	292.13	0.09
W100_DS02	103241.1	Max WS	61072.92	-24.83	29.81		30.34	0.001701	5.88	10537.63	545.93	0.21
W100_DS02	103241.0	Max WS	61072.92	-24.83	29.81	5.40	30.34	0.001701	5.88	10537.53	545.93	0.21
W100_DS02	103161 Prop I-69 NBML		Bridge									
W100_DS02	103095.1	Max WS	61072.92	-25.45	29.46		30.06	0.000624	6.19	9961.21	444.04	0.21
W100_DS02	103095.0	Max WS	61072.93	-25.45	29.46	5.07	30.06	0.000624	6.19	9961.18	444.04	0.21
W100_DS02	103065 Prop I-45 DC		Bridge									
W100_DS02	103025.1	Max WS	61072.93	-25.75	29.23		29.89	0.000649	6.53	9405.28	387.61	0.21
W100_DS02	103025.0	Max WS	61072.92	-25.75	29.23	4.27	29.89	0.000649	6.53	9405.24	387.61	0.21
W100_DS02	102988 Prop I-10 DC		Bridge									
W100_DS02	102952	Max WS	61072.90	-26.06	28.83		29.61	0.001049	7.10	8766.82	435.74	0.25
W100_DS02	102895.0	Max WS	61072.83	-26.31	28.55		29.54	0.001587	7.98	7649.34	321.66	0.29
W100_DS02	102875.3	Max WS	61072.85	-26.39	28.88	10.42	29.50	0.001381	6.32	9659.21	416.10	0.23
W100_DS02	102847.5 HOUTerminal RR		Bridge									
W100_DS02	102819.7	Max WS	61072.83	-26.43	28.47		29.11	0.001434	6.42	9506.00	413.56	0.24
W100_DS02	102309.0	Max WS	61137.38	-23.48	27.76		28.57	0.000713	7.19	8499.87	236.22	0.21
W100_DS02	101828.0	Max WS	61195.47	-20.70	27.27	3.76	28.06	0.001378	7.14	8676.32	407.54	0.25
W100_DS02	101790.1 JENSEN ROAD		Bridge									

HEC-RAS Plan: N&SC_H_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_DS02	101752.2	Max WS	61195.53	-20.69	26.96		27.78	0.001429	7.24	8547.65	404.19	0.25
W100_DS02	101007.3	Max WS	61289.57	-16.93	26.34		27.09	0.000407	6.96	8803.74	289.20	0.22
W100_DS02	99992.6	Max WS	61414.52	-18.90	25.72		26.55	0.000646	7.33	8381.99	279.98	0.24
W100_DS02	98399.4	Max WS	61618.93	-20.26	24.87		25.66	0.000463	7.13	8647.78	294.83	0.23
W100_DS02	97517.4	Max WS	61725.55	-19.35	24.81		25.30	0.000342	5.62	10991.44	325.55	0.17
W100_DS02	96028.6	Max WS	61901.57	-17.81	23.78	1.60	24.49	0.000753	6.76	9239.79	411.11	0.22
W100_DS02	95985.1 YORK DRIVE		Bridge									
W100_DS02	95941.6	Max WS	61901.54	-17.87	23.62		24.33	0.000761	6.78	9197.86	410.20	0.22
W100_DS02	95362.9	Max WS	61974.32	-15.97	23.40		24.00	0.000362	6.25	9912.96	363.67	0.21
W100_DS02	94280.7	Max WS	62120.06	-19.82	21.86		22.92	0.001650	8.27	7509.15	310.65	0.30
W100_DS02	93495.6	Max WS	62207.91	-20.43	21.20		21.89	0.000944	6.71	9278.95	404.18	0.25
W100_DS02	92795.6	Max WS	62304.82	-20.98	20.60	-1.09	21.39	0.000495	7.12	8744.64	346.35	0.25
W100_DS02	92741.1 LOCKWOOD DRIVE		Bridge									
W100_DS02	92686.6	Max WS	62304.80	-21.08	20.35		21.15	0.000503	7.17	8693.86	343.64	0.25
W100_DS02	90936.7	Max WS	62523.91	-18.64	19.07		19.71	0.001140	6.42	9778.20	502.54	0.24
W100_DS02	89918.4	Max WS	62652.62	-17.23	17.85		18.75	0.000809	7.75	9595.19	725.40	0.28
W100_DS02	88579.0	Max WS	62818.47	-20.97	16.44		17.39	0.001196	7.81	8047.55	377.19	0.30
W100_DS02	87591.9	Max WS	62949.36	-23.72	15.57		16.46	0.000666	7.60	8300.61	314.22	0.26
W100_DS02	86660.2	Max WS	63053.98	-23.42	15.09	-6.09	15.86	0.000618	7.04	8959.62	318.38	0.23
W100_DS02	86641.7 HOUTerminal RR		Bridge									
W100_DS02	86623.2	Max WS	63053.98	-23.61	14.65		15.43	0.000626	7.10	8879.13	317.36	0.24
W100_DS02	85855.2	Max WS	63150.18	-26.84	13.13		14.80	0.001093	10.38	6083.96	257.87	0.38
W100_DS02	85238.7	Max WS	63224.25	-29.43	12.70		14.09	0.001212	9.54	7269.15	363.80	0.32
W100_DS02	84561.7	Max WS	63326.74	-32.27	12.28	-8.29	13.43	0.000633	8.67	8103.59	469.65	0.29
W100_DS02	84531.4 NORTH WAYSIDE RD		Bridge									
W100_DS02	84501.1	Max WS	63326.76	-28.97	11.09		12.77	0.001082	10.42	6276.90	333.88	0.36
W100_DS02	84252.6	Max WS	63357.84	-26.90	11.15	-5.15	12.52	0.000855	9.42	7214.54	603.43	0.32
W100_DS02	84222.3 M. GARCIA		Bridge									
W100_DS02	84192.0	Max WS	63357.83	-24.10	9.87		11.81	0.001471	11.17	5671.61	244.96	0.41
W100_DS02	83635.7	Max WS	63427.43	-21.72	10.04		11.10	0.000999	8.26	7674.49	402.02	0.33
W100_DS02	81786.1	Max WS	63651.57	-31.97	8.39		9.42	0.000804	8.17	7815.75	360.80	0.31
W100_DS02	80903.1	Max WS	63758.68	-27.77	7.94	-8.68	8.74	0.000729	7.20	8857.59	411.07	0.27
W100_DS02	80883.1 S. PACIFIC RR		Bridge									
W100_DS02	80863.1	Max WS	63758.68	-28.10	7.34		8.16	0.000869	7.29	8747.60	409.81	0.28
W100_DS02	80538.0	Max WS	63758.68	-33.12	7.62	-16.74	7.95	0.000313	4.64	13752.49	541.41	0.16

White Oak Bayou
Scenario 3: North Canal, South Canal & Heights Improvements 100-Year

HEC-RAS Plan: N&SC_H_100yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	36134.	Max WS	32267.48	24.19	56.57		57.45	0.000672	7.64	5486.68	1063.14	0.32
E100-00-00	35718.0	Max WS	32259.20	23.76	56.16		57.18	0.000647	8.17	4363.27	639.00	0.34
E100-00-00	35158.	Max WS	32315.70	22.89	56.02		56.79	0.000627	7.21	6109.93	1281.69	0.30
E100-00-00	35006.0	Max WS	32328.74	22.66	55.88	43.01	56.72	0.000536	7.59	6169.71	1402.43	0.31
E100-00-00	34951.5 ELLA		Bridge									
E100-00-00	34895.0	Max WS	32329.59	22.56	55.71		56.57	0.000545	7.63	6073.26	1342.91	0.31
E100-00-00	34645.	Max WS	32347.98	22.24	55.70		56.41	0.000483	7.05	6816.50	1151.95	0.28
E100-00-00	34206.0	Max WS	32389.34	21.68	55.39		56.19	0.000512	7.32	6088.41	2481.25	0.30
E100-00-00	33962.58	Max WS	32411.93	21.61	55.55		55.95	0.000307	5.34	9592.24	2929.36	0.23
E100-00-00	33909.08	Max WS	32413.29	21.60	55.53		55.93	0.000385	5.31	9504.71	2925.07	0.24
E100-00-00	33770.	Max WS	32420.80	21.56	55.47		55.90	0.000269	5.65	9848.88	2721.06	0.22
E100-00-00	33681.0	Max WS	32415.81	21.53	54.99	42.04	55.99	0.000560	8.04	4051.34	2675.34	0.32
E100-00-00	33645.5 W 18TH		Bridge									
E100-00-00	33610.0	Max WS	32449.25	21.61	54.91		55.68	0.000479	7.40	7685.02	2655.64	0.30
E100-00-00	33357.	Max WS	32458.09	21.41	54.74		55.58	0.000725	7.41	5733.01	1959.14	0.32
E100-00-00	32570.0	Max WS	32522.59	20.78	54.26		55.03	0.000496	7.16	7048.92	2581.88	0.29
E100-00-00	31583.0	Max WS	32583.80	19.35	53.95		54.59	0.000375	6.63	8936.39	3472.71	0.26
E100-00-00	30779.0	Max WS	32654.12	18.79	53.72		54.28	0.000314	6.32	9231.40	3016.63	0.24
E100-00-00	29659.	Max WS	32732.37	17.66	53.46		53.88	0.000351	5.54	10521.25	3512.95	0.22
E100-00-00	29368.0	Max WS	32778.78	17.37	53.02	38.62	53.87	0.000502	7.60	6822.56	2098.46	0.29
E100-00-00	29297.5 TC JESTER SOUTH		Bridge									
E100-00-00	29203.0	Max WS	32778.65	17.35	52.74		53.64	0.000535	7.77	6354.31	2049.11	0.30
E100-00-00	28775.	Max WS	32817.04	16.90	52.86		53.27	0.000374	5.40	10477.72	3152.28	0.23
E100-00-00	28375.0	Max WS	32830.64	16.48	52.59	37.58	53.25	0.000431	6.81	8698.79	2961.32	0.27
E100-00-00	28357.0 BICYCLE BRIDGE		Bridge									
E100-00-00	28330.0	Max WS	32831.42	16.41	52.40		53.09	0.000445	6.90	8405.96	2908.32	0.28
E100-00-00	28190.0	Max WS	32840.69	16.18	52.31	37.13	53.05	0.000381	7.11	7817.97	2281.21	0.26
E100-00-00	28152.5 W 11TH		Bridge									
E100-00-00	28113.0	Max WS	32838.86	16.28	52.11		52.90	0.000410	7.30	7148.06	2209.20	0.27
E100-00-00	27982.	Max WS	32849.86	16.25	52.09		52.82	0.000504	7.08	7586.78	2012.18	0.29
E100-00-00	27429.0	Max WS	32877.94	16.12	51.84		52.56	0.000513	6.95	7023.01	2045.46	0.29
E100-00-00	26598.	Max WS	32959.27	15.35	51.50		52.10	0.000409	6.42	6651.37	1464.76	0.26
E100-00-00	26498.0	Max WS	32963.37	15.26	51.31	35.93	52.05	0.000444	6.88	4801.20	1004.30	0.27
E100-00-00	26432.5 TC JESTER		Bridge									
E100-00-00	26366.0	Max WS	32950.85	15.16	50.88		51.64	0.000469	6.99	4713.60	849.02	0.28
E100-00-00	26307.3	Max WS	32960.66	15.13	51.14		51.60	0.000324	5.70	7766.29	1021.15	0.22
E100-00-00	26225	Max WS	32965.47	15.04	51.11		51.57	0.000335	5.67	7449.32	881.27	0.22
E100-00-00	26140.	Max WS	32967.92	14.97	50.97		51.59	0.000361	6.52	7829.40	1286.02	0.25
E100-00-00	25536.0	Max WS	32999.04	14.48	50.72		51.38	0.000399	6.70	7439.23	1253.26	0.26
E100-00-00	25132.	Max WS	33024.45	14.29	50.58		51.23	0.000338	6.68	6276.53	668.98	0.26
E100-00-00	24817.0	Max WS	33036.95	14.14	50.23	36.30	51.08	0.000596	7.41	4544.69	447.69	0.31
E100-00-00	24789.0 UNION PACIFIC RR		Bridge									
E100-00-00	24758.0	Max WS	33034.55	13.76	49.78		50.64	0.000612	7.47	4491.90	406.22	0.31
E100-00-00	24636.	Max WS	33049.25	13.61	50.07		50.57	0.000381	6.00	6801.04	779.46	0.25
E100-00-00	23934.0	Max WS	33092.19	12.75	49.68		50.26	0.000451	6.13	5812.12	569.10	0.26
E100-00-00	23550.0	Max WS	33119.53	12.77	49.54	33.07	50.09	0.000407	5.95	5659.67	468.01	0.25
E100-00-00	23506.5 DURHAM		Bridge									
E100-00-00	23444.0	Max WS	33113.85	12.69	49.36		49.92	0.000415	5.99	5615.07	459.04	0.25
E100-00-00	23180.	Max WS	33126.94	12.46	49.31		49.86	0.000282	6.27	7864.45	1133.31	0.23
E100-00-00	22983.	Max WS	33135.81	12.29	49.21		49.82	0.000389	6.65	7324.28	1096.33	0.26
E100-00-00	22834.0	Max WS	33145.23	12.16	49.09	34.73	49.78	0.000543	7.00	7792.27	1497.65	0.27
E100-00-00	22796.5 SHEPHERD		Bridge									
E100-00-00	22758.0	Max WS	33145.09	12.11	48.98		49.67	0.000589	7.02	7700.93	1481.08	0.27
E100-00-00	22610.	Max WS	33155.25	11.92	49.00		49.54	0.000456	6.32	7480.32	1325.27	0.24
E100-00-00	22224.0	Max WS	33181.47	11.41	49.04		49.32	0.000343	4.73	10944.94	1367.06	0.19
E100-00-00	21444.0	Max WS	33216.86	10.52	48.51		49.10	0.000514	6.42	7408.30	1236.43	0.25
E100-00-00	20746.0	Max WS	33241.80	10.00	47.47		48.17	0.002224	6.77	5225.50	1100.55	0.31
E100-00-00	20644.0	Max WS	33250.79	9.95	47.58	32.66	48.01	0.000382	5.80	9480.15	1419.19	0.22
E100-00-00	20633.0 Pipeline		Bridge									
E100-00-00	20622.0	Max WS	33249.19	9.95	47.42		47.87	0.000395	5.88	9245.59	1353.96	0.22
E100-00-00	20521.	Max WS	33255.16	9.91	47.33		47.85	0.000412	6.31	8620.08	1562.06	0.24
E100-00-00	19917.0	Max WS	33290.77	9.66	46.71		47.55	0.000721	7.40	5364.29	456.48	0.29
E100-00-00	19463.0	Max WS	33315.59	9.25	46.37		47.22	0.000772	7.46	5615.70	785.98	0.30
E100-00-00	18857	Max WS	33351.07	8.03	45.96	32.04	46.80	0.000692	7.55	5092.85	559.47	0.29
E100-00-00	18800 I-10 WBFR		Bridge									
E100-00-00	18747	Max WS	33346.95	7.81	45.59		46.28	0.000530	6.83	5593.79	555.68	0.26
E100-00-00	18746	Max WS	33347.02	7.81	45.59	30.48	46.28	0.000530	6.83	5593.53	555.64	0.26
E100-00-00	18595 I-10 BRIDGE		Bridge									
E100-00-00	18443	Max WS	33339.74	7.19	44.75		45.48	0.000639	6.97	5269.92	532.25	0.28
E100-00-00	18442	Max WS	33339.32	7.19	44.75	30.13	45.48	0.000639	6.97	5269.60	532.22	0.28
E100-00-00	18394 I-10 EBFR		Bridge									
E100-00-00	18377.	Max WS	33316.59	6.98	43.25		44.18	0.000829	7.80	4547.91	438.60	0.31
E100-00-00	18234.0	Max WS	33337.17	6.77	43.76		44.03	0.000099	4.16	8185.99	479.35	0.14
E100-00-00	18199.0	Max WS	33339.30	6.70	43.78		44.02	0.000066	3.95	8687.36	486.43	0.13
E100-00-00	18176.0	Max WS	33339.45	6.79	43.68	19.68	44.03	0.000114	4.78	7402.10	563.84	0.16
E100-00-00	18138.0 YALE		Bridge									
E100-00-00	18082.0	Max WS	33325.95	6.87	42.98		43.46	0.000188	5.55	6294.76	646.96	0.20
E100-00-00	17905.	Max WS	33339.61	6.86	43.05		43.43	0.000113	4.94	7998.75	908.83	0.17
E100-00-00	17756.0	Max WS	33349.25	6.85	43.08	19.10	43.40	0.000133	4.56	8553.81	1054.49	0.16
E100-00-00	17726 S. HEIGHTS		Bridge									
E100-00-00	17696	Max WS	33334.45	6.85	42.50		42.84	0.000145	4.69	8066.22	999.84	0.17
E100-00-00	17657	Max WS	33337.45	6.35	42.51	18.34	42.83	0.000134	4.59	7886.89	675.32	0.16
E100-00-00	17627 N. HEIGHTS		Bridge									
E100-00-00	17597.0	Max WS	33321.70	6.35	41.75		42.10	0.000149	4.75	7395.92	612.00	0.17
E100-00-00	17318.	Max WS	33316.36	6.35	40.98		42.01	0.000994	8.13	4095.58	234.65	0.34
E100-00-00	16831.0	Max WS	33347.11	6.34	41.11		41.67	0.000350	5.99	5568.80	432.66	0.29
E100-00-00	15795.0	Max WS	33368.79	4.84	40.94		41.27	0.000403	4.61	7364.02	542.38	0.20

HEC-RAS Plan: N&SC_H_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	15278.	Max WS	33362.86	4.41	40.29		41.08	0.000475	7.16	4858.44	457.57	0.29
E100-00-00	14977.0	Max WS	33380.69	4.16	40.69	15.03	40.94	0.000056	4.08	8424.18	605.62	0.13
E100-00-00	14937.0 I-10 EBFR ACCESS		Bridge									
E100-00-00	14897.0	Max WS	33376.73	3.39	40.56		40.81	0.000053	4.02	8504.48	591.95	0.13
E100-00-00	14890	Max WS	33374.94	3.42	40.48	15.71	40.81	0.000073	4.62	7392.00	591.15	0.15
E100-00-00	14775 I-10 BRIDGE		Bridge									
E100-00-00	14660	Max WS	33373.04	3.42	40.41		40.74	0.000074	4.63	7356.02	582.89	0.15
E100-00-00	14590.0	Max WS	33371.67	3.45	40.29	16.98	40.74	0.000108	5.42	6345.49	470.35	0.18
E100-00-00	14562.0 I-10 WB ACCESS		Bridge									
E100-00-00	14532.0	Max WS	33352.87	3.41	39.70		40.17	0.000137	5.53	6119.07	477.47	0.19
E100-00-00	14354.0	Max WS	33360.44	3.29	39.81		40.14	0.000200	4.60	7493.01	647.89	0.21
E100-00-00	13924.0	Max WS	33355.38	3.18	39.41	24.69	40.01	0.000525	6.42	5791.45	375.29	0.25
E100-00-00	13909.5 UNION PAC. RR		Bridge									
E100-00-00	13898.0	Max WS	33351.66	2.95	39.12		39.74	0.000533	6.47	5737.62	373.25	0.25
E100-00-00	13494.	Max WS	33360.36	2.47	39.14		39.50	0.000538	5.04	7207.98	464.55	0.21
E100-00-00	13220.0	Max WS	33365.65	2.15	39.17	23.86	39.40	0.000141	4.01	9847.62	749.62	0.16
E100-00-00	13182.5 STUDEMONT		Bridge									
E100-00-00	13143.0	Max WS	33352.39	2.15	38.88		39.13	0.000151	4.14	9031.89	623.04	0.16
E100-00-00	12698.	Max WS	33345.83	1.87	38.57		39.01	0.000419	5.35	6235.43	392.96	0.24
E100-00-00	12066.0	Max WS	33354.80	1.47	38.48		38.76	0.000364	4.29	7774.25	481.12	0.19
E100-00-00	11546.0	Max WS	33364.93	0.90	38.43		38.63	0.000133	3.65	10686.25	1012.60	0.16
E100-00-00	11021.	Max WS	33374.52	0.63	38.36		38.56	0.000117	3.68	9753.87	1075.42	0.15
E100-00-00	10908.0	Max WS	33377.50	0.57	38.40	22.43	38.55	0.000097	3.44	12402.34	1300.80	0.13
E100-00-00	10852.5 TAYLOR (SAWYER)		Bridge									
E100-00-00	10804.0	Max WS	33377.22	0.45	38.37		38.52	0.000095	3.39	12501.38	1314.66	0.13
E100-00-00	10643.	Max WS	33367.97	0.14	38.08		38.54	0.000358	5.61	6644.33	729.50	0.21
E100-00-00	9779.0	Max WS	33389.39	-1.51	38.10		38.30	0.000114	3.76	10944.28	1013.06	0.14
E100-00-00	8532.0	Max WS	33416.16	-1.76	38.12		38.17	0.000033	1.77	19353.56	1240.39	0.07
E100-00-00	8140.	Max WS	33422.32	-2.43	38.09		38.14	0.000146	1.74	21729.47	1428.64	0.06
E100-00-00	7649.0	Max WS	33431.41	-3.26	38.00	18.83	38.12	0.000062	3.17	21121.91	1748.88	0.11
E100-00-00	7608.5 HOUSTON		Bridge									
E100-00-00	7568.0	Max WS	33430.55	-3.15	38.00		38.07	0.000042	2.61	20938.59	1746.66	0.09
E100-00-00	7546.0	Max WS	33430.86	-3.16	38.00	18.80	38.07	0.000045	2.66	20601.69	1765.99	0.09
E100-00-00	7535.5 Pipeline		Bridge									
E100-00-00	7529.0	Max WS	33430.34	-3.16	37.97		38.04	0.000045	2.67	20548.75	1764.77	0.09
E100-00-00	7481.0	Max WS	33430.14	-3.17	37.94		38.05	0.000067	3.00	17041.57	1748.63	0.12
E100-00-00	7253.1	Max WS	33430.33	-3.19	37.91		38.03	0.000041	2.80	13161.90	698.86	0.10
E100-00-00	7253.05		Lat Struct									
E100-00-00	7253	Max WS	33429.22	-3.19	37.91	14.87	38.03	0.000041	2.80	13161.89	698.86	0.10
E100-00-00	7205 Prop I-10 DC		Bridge									
E100-00-00	7138.1	Max WS	33427.54	-3.20	37.79		37.94	0.000054	3.12	11875.10	673.91	0.11
E100-00-00	7138	Max WS	33426.81	-3.20	37.79	16.42	37.94	0.000054	3.12	11875.11	673.92	0.11
E100-00-00	7057 Prop I-10 Ramp		Bridge									
E100-00-00	7016.1	Max WS	33422.72	-3.22	37.40		37.72	0.000108	4.80	8786.75	606.37	0.16
E100-00-00	7016	Max WS	33423.40	-3.22	37.40		37.72	0.000108	4.80	8786.75	606.37	0.16
E100-00-00	6980	Max WS	33424.47	-3.22	37.52		37.69	0.000092	3.37	10954.71	629.51	0.12
E100-00-00	6979		Lat Struct									
E100-00-00	6975.0	Max WS	33411.30	-3.22	37.52		37.69	0.000092	3.37	10954.58	629.51	0.12
E100-00-00	6898.0	Max WS	33290.43	-4.23	37.46		37.68	0.000209	3.92	9384.46	578.77	0.14
E100-00-00	6895	Max WS	33289.99	-4.23	37.46		37.68	0.000209	3.92	9384.09	578.76	0.14
E100-00-00_02	6775.	Max WS	43263.83	-4.30	37.46		37.57	0.000075	2.71	17591.97	1090.89	0.10
E100-00-00_02	6637.0	Max WS	43251.40	-4.37	37.41	18.57	37.56	0.000085	3.14	14649.01	1067.05	0.12
E100-00-00_02	6600 Prop I-45 DC		Bridge									
E100-00-00_02	6575.1	Max WS	43245.05	-4.41	37.38		37.53	0.000088	3.15	14856.50	1139.89	0.12
E100-00-00_02	6575.0	Max WS	43244.14	-4.41	37.38	18.82	37.53	0.000088	3.15	14856.50	1139.89	0.12
E100-00-00_02	6551 Prop I-45 Ramp		Bridge									
E100-00-00_02	6515.0	Max WS	43235.98	-4.44	37.36		37.51	0.000089	3.13	15122.38	1057.17	0.12
E100-00-00_02	6387.0	Max WS	43236.86	-4.38	37.35	19.28	37.50	0.000088	3.11	15287.19	1556.69	0.12
E100-00-00_02	6352 Prop I-45 NBML		Bridge									
E100-00-00_02	6298.1	Max WS	43236.03	-4.51	37.35		37.48	0.000080	2.96	16996.86	1463.17	0.11
E100-00-00_02	6298	Max WS	43236.86	-4.51	37.35	17.81	37.48	0.000080	2.96	16996.85	1463.17	0.11
E100-00-00_02	6252 Prop I-45 DC		Bridge									
E100-00-00_02	6201.1	Max WS	43232.42	-4.65	37.35		37.47	0.000059	2.74	17156.39	1449.69	0.10
E100-00-00_02	6201	Max WS	43234.29	-4.65	37.35	16.94	37.47	0.000059	2.74	17156.38	1449.69	0.10
E100-00-00_02	6164 Prop I-45 Ramp		Bridge									
E100-00-00_02	6122.0	Max WS	43197.83	-4.33	37.21		37.38	0.000072	3.32	14734.16	1469.72	0.12
E100-00-00_02	5525.0	Max WS	43191.57	-3.15	37.20		37.33	0.000083	2.97	14551.75	673.60	0.11
E100-00-00_02	4994.0	Max WS	43154.15	-3.09	36.98	17.48	37.26	0.000265	4.36	10972.73	595.94	0.15
E100-00-00_02	4980.0 RR OVERPASS		Bridge									
E100-00-00_02	4961.0	Max WS	43100.80	-3.03	36.81		37.09	0.000302	4.47	10655.64	593.62	0.16
E100-00-00_02	4812.0	Max WS	43035.77	-3.49	36.53	17.78	37.01	0.000786	5.56	7734.45	461.86	0.24
E100-00-00_02	4774.5 CROCKETT/HOGAN		Bridge									
E100-00-00_02	4687.0	Max WS	42989.49	-4.67	36.43		36.81	0.000549	4.93	8722.26	489.00	0.21
E100-00-00_02	4407.	Max WS	42948.23	-3.62	36.22		36.69	0.000444	5.73	8551.51	755.25	0.20
E100-00-00_02	4014.0	Max WS	42949.47	-2.15	36.19	16.51	36.51	0.000371	4.57	9762.55	589.78	0.17
E100-00-00_02	3997.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	3976.0	Max WS	42931.98	-2.40	36.04		36.37	0.000376	4.58	9754.35	590.32	0.17
E100-00-00_02	3681.	Max WS	42865.41	-3.80	35.84		36.26	0.000461	5.36	9966.81	1107.03	0.20
E100-00-00_02	3585.0	Max WS	42837.92	-4.26	35.74		36.23	0.000457	5.68	9753.44	1153.34	0.21
E100-00-00_02	3233.0	Max WS	42904.82	-4.79	35.92	13.31	36.01	0.000124	2.43	19392.23	1995.91	0.11
E100-00-00_02	3094 Prop I-10 WBML		Bridge									
E100-00-00_02	2954.1	Max WS	42877.91	-5.22	35.84		35.94	0.000172	2.59	18066.52	2088.73	0.13
E100-00-00_02	2954.0	Max WS	42884.14	-5.22	35.84	13.57	35.94	0.000173	2.59	18066.48	2088.73	0.13
E100-00-00_02	2857 Prop I-45 BNML		Bridge									
E100-00-00_02	2760.1	Max WS	42871.74	-5.51	35.81		35.90	0.000148	2.49	18912.34	2124.48	0.12
E100-00-00_02	2760.0	Max WS	42872.80	-5.51	35.81	14.92	35.90	0.000148	2.49	18912.31	2124.47	0.12
E100-00-00_02	2639 Prop I-10 WB Exp		Bridge									

HEC-RAS Plan: N&SC_H_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_02	2518.1	Max WS	42816.95	-5.88	35.66		35.79	0.000184	3.04	16246.53	2148.66	0.14
E100-00-00_02	2518.0	Max WS	42821.32	-5.88	35.66	15.45	35.79	0.000184	3.04	16246.48	2148.66	0.14
E100-00-00_02	2434 Prop I-45 SBML		Bridge									
E100-00-00_02	2350.1	Max WS	42741.13	-6.13	35.41		35.62	0.000317	3.78	11654.09	2022.83	0.18
E100-00-00_02	2350.0	Max WS	42741.13	-6.13	35.41	16.10	35.62	0.000317	3.78	11654.05	2022.83	0.18
E100-00-00_02	2280 Prop I-10 EBML		Bridge									
E100-00-00_02	2210.0	Max WS	42682.37	-6.34	35.24		35.49	0.000332	4.08	10735.71	1786.72	0.19
E100-00-00_02	1580.	Max WS	42681.34	-7.83	35.16		35.33	0.000221	4.06	15668.12	1511.69	0.14
E100-00-00_02	1353.0	Max WS	42649.02	-8.34	35.06	17.23	35.30	0.000305	4.67	13690.14	1636.23	0.16
E100-00-00_02	1335.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	1319.0	Max WS	42629.45	-8.37	35.01		35.24	0.000300	4.62	13795.17	1707.30	0.16
E100-00-00_02	984.0	Max WS	42574.59	-8.69	34.81	14.00	35.16	0.000234	5.18	12110.55	1170.27	0.19
E100-00-00_02	978 MAIN STREET		Bridge									
E100-00-00_02	971.6	Max WS	42533.34	-8.69	34.72		35.08	0.000236	5.20	12040.29	1153.75	0.19
E100-00-00_02	971.5	Max WS	42532.19	-8.69	34.72	13.98	35.08	0.000236	5.20	12040.27	1153.75	0.19
E100-00-00_02	961.5 1ST STREET		Bridge									
E100-00-00_02	852	Max WS	42479.24	-6.40	34.58		34.97	0.000293	5.52	11886.63	1074.07	0.21
E100-00-00_02	851.0	Max WS	42476.88	-6.40	34.58		34.97	0.000293	5.52	11886.38	1074.05	0.21
E100-00-00_03	654.0	Max WS	2694.14	-6.50	34.58		34.58	0.000001	0.28	13287.80	942.00	0.01
E100-00-00_03	400.0	Max WS	2697.31	-8.58	34.58	-4.00	34.58	0.000001	0.37	10782.49	829.88	0.01
E100-00-00_03	381.0 UNION PACIFIC RR		Bridge									
E100-00-00_03	365.0	Max WS	2693.05	-8.23	34.58		34.58	0.000001	0.37	10611.07	866.01	0.01
E100-00-00_03	210.0	Max WS	2687.48	-7.81	34.58	-3.82	34.58	0.000001	0.41	10068.83	979.29	0.01
E100-00-00_03	191.0 UNION PACIFIC RR		Bridge									
E100-00-00_03	173.1	Max WS	2678.77	-6.84	34.58		34.58	0.000001	0.43	9635.68	1338.34	0.01
E100-00-00_03	173.0	Max WS	2682.07	-6.84	34.58		34.58	0.000001	0.43	9635.68	1338.34	0.01

Little White Oak Bayou
Scenario 3: North Canal, South Canal & Heights Improvements 100-Year

HEC-RAS Plan: N&SC_H_100yr River: E101-00-00 Reach: E101-00-00_0003 Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	9819.000	Max WS	11398.52	16.33	39.92		40.27	0.000673	4.73	2412.13	177.53	0.23
E101-00-00_0003	9750.000	Max WS	11397.68	16.31	39.90		40.22	0.000632	4.53	2514.43	189.19	0.22
E101-00-00_0003	9000.000	Max WS	11393.36	15.50	39.74		39.86	0.000305	3.01	4261.37	544.21	0.15
E101-00-00_0003	8469.000	Max WS	10684.92	13.02	39.55		39.68	0.000321	3.25	3985.21	560.13	0.14
E101-00-00_0003	7984.000	Max WS	10675.94	13.76	39.38		39.52	0.000323	3.45	3832.41	370.61	0.15
E101-00-00_0003	6838.000	Max WS	10379.22	12.20	38.89		39.08	0.000409	3.47	2990.08	287.20	0.19
E101-00-00_0003	5861.000	Max WS	10026.93	9.91	38.46		38.65	0.000443	3.62	3323.28	400.02	0.17
E101-00-00_0003	4720.000	Max WS	9860.24	8.13	38.05		38.25	0.000377	4.04	3805.14	578.80	0.16
E101-00-00_0003	4279.000	Max WS	9687.70	9.00	37.75		38.06	0.000594	4.53	2589.14	465.56	0.20
E101-00-00_0003	4130.000	Max WS	9793.15	8.68	37.86	18.81	37.96	0.000099	2.65	4711.91	705.45	0.10
E101-00-00_0003	4091.000 N. MAIN		Bridge									
E101-00-00_0003	4050.000	Max WS	9709.56	7.87	37.76		37.86	0.000090	2.58	4496.72	614.57	0.10
E101-00-00_0003	3952.	Max WS	9703.91	6.87	37.73		37.85	0.000096	2.79	3712.22	215.41	0.10
E101-00-00_0003	3466.000	Max WS	9774.41	1.92	37.71		37.82	0.000044	3.03	5171.11	372.20	0.10
E101-00-00_0003	3323.0	Max WS	9819.04	-1.03	37.74	13.31	37.80	0.000021	2.09	6534.22	488.14	0.07
E101-00-00_0003	3278.0 I-45 Ramp		Bridge									
E101-00-00_0003	3236.1	Max WS	9810.42	-2.82	37.73		37.76	0.000015	1.71	8152.77	631.75	0.06
E101-00-00_0003	3236.0	Max WS	9810.44	-2.82	37.73	11.95	37.76	0.000015	1.71	8152.77	631.75	0.06
E101-00-00_0003	3085 I-45 NBML		Bridge									
E101-00-00_0003	2958.1	Max WS	9822.64	-2.52	37.75		37.76	0.000006	1.05	17083.28	2509.94	0.04
E101-00-00_0003	2958	Max WS	9821.94	-2.52	37.75	11.97	37.76	0.000006	1.05	17083.29	2509.94	0.04
E101-00-00_0003	2833 I-45 SBML		Bridge									
E101-00-00_0003	2389.000	Max WS	9783.16	-0.26	37.66		37.71	0.000071	1.93	8119.53	695.33	0.06
E101-00-00_0003	2325.	Max WS	9788.35	-0.15	37.66		37.71	0.000069	1.86	8251.74	674.03	0.06
E101-00-00_0003	1855.000	Max WS	9840.78	0.68	37.66		37.69	0.000027	1.26	9066.27	610.63	0.04
E101-00-00_0003	1126.	Max WS	9870.87	-1.85	37.62		37.65	0.000098	1.79	8729.35	1141.92	0.06
E101-00-00_0003	1070.000	Max WS	9872.96	-2.04	37.60	10.69	37.66	0.000099	2.20	9148.65	1248.93	0.07
E101-00-00_0003	1029.500 WRIGHTWOOD		Bridge									
E101-00-00_0003	987.000	Max WS	9847.34	-2.04	37.56		37.61	0.000107	2.16	9099.76	1245.51	0.07
E101-00-00_0003	911.	Max WS	9855.96	-2.19	37.57		37.60	0.000069	1.82	10353.37	1214.48	0.06
E101-00-00_0003	756.	Max WS	9867.70	-2.51	37.55		37.58	0.000214	1.58	8513.48	1235.65	0.07
E101-00-00_0003	637.000	Max WS	9874.11	-2.75	37.54	13.33	37.56	0.000139	1.30	10725.57	1402.99	0.05
E101-00-00_0003	538.000 QUITMAN/WHITE OA		Bridge									
E101-00-00_0003	442.000	Max WS	9830.86	-2.75	37.47		37.50	0.000104	1.48	10426.05	1372.25	0.06
E101-00-00_0003	306.000	Max WS	9833.05	-2.86	37.48		37.49	0.000012	0.94	14120.11	1926.33	0.03
E101-00-00_0003	259.1	Max WS	9831.52	-2.90	37.47		37.49	0.000013	1.02	10635.81	578.18	0.04
E101-00-00_0003	259	Max WS	9830.53	-2.90	37.47	8.30	37.49	0.000013	1.02	10635.79	578.18	0.04
E101-00-00_0003	229 Prop I-10 DC		Bridge									
E101-00-00_0003	180.1	Max WS	9840.77	-2.96	37.47		37.48	0.000012	1.00	10556.87	618.30	0.04
E101-00-00_0003	180	Max WS	9844.07	-2.96	37.47	10.07	37.48	0.000012	1.00	10556.84	618.30	0.04
E101-00-00_0003	130 Prop-10 Ramp		Bridge									
E101-00-00_0003	101.1	Max WS	9851.40	-3.03	37.47		37.48	0.000010	0.88	11622.20	669.50	0.03
E101-00-00_0003	101	Max WS	9850.87	-3.03	37.47		37.48	0.000010	0.88	11622.20	669.50	0.03
E101-00-00_0003	68	Max WS	9849.38	-4.00	37.47		37.48	0.000016	1.00	10390.38	588.24	0.04
E101-00-00_0003	63	Max WS	9861.06	-4.00	37.47		37.48	0.000016	1.01	10390.29	588.24	0.04
E101-00-00_0003	3	Max WS	9973.85	-4.23	37.46		37.48	0.000020	1.23	8857.28	507.40	0.04
E101-00-00_0003	1	Max WS	9973.85	-4.23	37.46		37.48	0.000020	1.23	8857.27	507.40	0.04

North Canal
Scenario 3: North Canal, South Canal & Heights Improvements 100-Year

HEC-RAS Plan: N&SC_H_100yr River: E100-00-00 Reach: North_Canal Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
North_Canal	1303	Max WS	39782.74	4.30	34.58		36.45	0.000749	10.97	3635.57	241.39	0.41
North_Canal	1302.9	Max WS	39783.16	4.30	34.58		36.45	0.000749	10.97	3635.55	241.36	0.41
North_Canal	1302		Lat Struct									
North_Canal	1132	Max WS	39809.26	4.13	34.46	22.23	36.32	0.000750	10.97	4135.69	721.91	0.41
North_Canal	1106 San Jacinto		Bridge									
North_Canal	1080	Max WS	39807.46	4.08	34.12		36.04	0.000785	11.13	3954.10	731.87	0.42
North_Canal	1079		Lat Struct									
North_Canal	838	Max WS	39844.70	3.84	33.90		35.85	0.000800	11.21	3691.50	511.78	0.42
North_Canal	579	Max WS	39881.80	3.58	33.67	21.81	35.64	0.000815	11.27	3637.34	301.94	0.42
North_Canal	548 Union Pacific RR		Bridge									
North_Canal	516	Max WS	39879.11	3.52	33.20		35.25	0.000867	11.50	3510.91	251.35	0.44
North_Canal	276	Max WS	39879.56	3.28	32.97		35.04	0.000881	11.56	3550.69	291.39	0.44

South Canal
Scenario 3: North Canal, South Canal & Heights Improvements 100-Year

HEC-RAS Plan: N&SC_H_100yr River: W100-00-00 Reach: Second Bypass Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Second Bypass	1320.1	Max WS	35443.14	2.92	30.35		31.07	0.000589	6.81	5204.67	303.56	0.29
Second Bypass	1320	Max WS	35443.14	2.92	30.35		31.07	0.000589	6.81	5204.65	303.56	0.29
Second Bypass	1319.9		Lat Struct									
Second Bypass	1045	Max WS	35443.00	2.65	30.20		30.91	0.000578	6.76	5241.06	300.43	0.29
Second Bypass	770	Max WS	35373.54	2.37	30.07		30.77	0.000504	6.71	5493.33	350.40	0.27
Second Bypass	769.9		Lat Struct									
Second Bypass	495	Max WS	35709.88	2.10	29.87		30.59	0.000723	6.86	5580.56	448.06	0.28
Second Bypass	400	Max WS	35874.92	2.00	29.81		30.52	0.000711	6.86	5730.36	453.94	0.27

Buffalo Bayou
Scenario 4: Detention Only 10-Year

HEC-RAS Plan: Det_10yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	148800.4	Max WS	8213.27	3.15	33.12		33.18	0.000232	2.18	4798.33	1003.00	0.08
W100_upstrm	148795.4	Max WS	8213.38	3.15	33.12	13.26	33.18	0.000232	2.18	4797.96	1002.91	0.08
W100_upstrm	148768.4 SOUTHERN PACIFIC		Bridge									
W100_upstrm	148741.4	Max WS	8212.94	3.04	33.02		33.08	0.000231	2.18	4801.44	1003.72	0.08
W100_upstrm	147632.4	Max WS	8207.64	-1.17	32.84		32.90	0.000085	2.01	4838.81	397.12	0.08
W100_upstrm	146698.0	Max WS	8253.63	1.88	32.75		32.82	0.000101	2.34	4864.23	325.22	0.09
W100_upstrm	145723.9	Max WS	8298.67	1.61	32.60		32.72	0.000144	3.04	4534.15	380.66	0.11
W100_upstrm	144753.5	Max WS	8347.44	0.07	32.48		32.58	0.000125	2.66	3892.94	297.22	0.10
W100_upstrm	143966.8	Max WS	8378.51	-7.47	32.36		32.48	0.000169	2.88	4138.81	438.39	0.11
W100_upstrm	143078.2	Max WS	8422.05	-4.19	32.26		32.34	0.000125	2.45	5355.90	511.21	0.10
W100_upstrm	142061.4	Max WS	8473.68	0.55	32.17		32.23	0.000075	2.19	5591.32	450.83	0.08
W100_upstrm	141320.1	Max WS	8512.92	-2.70	32.15		32.18	0.000042	1.51	10213.23	741.74	0.06
W100_upstrm	140116.2	Max WS	8554.77	-1.31	32.03		32.12	0.000108	2.45	5422.59	591.12	0.09
W100_upstrm	139320.0	Max WS	8584.19	-2.14	31.99		32.04	0.000080	2.00	6275.82	585.63	0.07
W100_upstrm	138607.9	Max WS	8615.38	-2.08	31.98		31.99	0.000020	1.10	15874.63	1070.59	0.04
W100_upstrm	137732.0	Max WS	8634.50	-2.40	31.94		31.99	0.000061	2.11	9224.02	868.97	0.07
W100_upstrm	137113.0	Max WS	8664.50	-2.62	31.87		31.96	0.000086	2.53	5942.98	442.13	0.09
W100_upstrm	136331.2	Max WS	8702.86	-2.09	31.81		31.83	0.000163	1.40	8979.92	634.01	0.05
W100_upstrm	135666.2	Max WS	8717.94	-1.47	31.72		31.78	0.000078	2.19	6645.02	546.49	0.08
W100_upstrm	134706.7	Max WS	8756.31	-1.93	31.69		31.72	0.000036	1.54	12415.09	859.60	0.06
W100_upstrm	134090.6	Max WS	8772.35	-1.59	31.66		31.71	0.000049	1.89	9815.03	717.22	0.07
W100_upstrm	133772.1	Max WS	8780.22	-0.79	31.63	8.86	31.71	0.000071	2.43	8254.16	808.29	0.08
W100_upstrm	133760.1 FOOTBRIDGE AT WE		Bridge									
W100_upstrm	133748.1	Max WS	8775.77	-0.46	31.58		31.66	0.000076	2.48	7948.81	793.29	0.08
W100_upstrm	132963.8	Max WS	8804.54	-1.98	31.50		31.59	0.000099	2.47	4930.03	478.45	0.09
W100_upstrm	131789.8	Max WS	8840.38	-2.31	31.39		31.48	0.000096	2.59	5587.04	483.63	0.09
W100_upstrm	130765.5	Max WS	8889.68	-3.81	31.35		31.39	0.000039	1.78	8243.48	488.28	0.06
W100_upstrm	129725.3	Max WS	8922.83	-3.71	31.28		31.36	0.000071	2.41	7890.67	685.50	0.08
W100_upstrm	129163.2	Max WS	8953.66	-3.13	31.24		31.31	0.000063	2.17	5958.45	481.60	0.08
W100_upstrm	128326.9	Max WS	8990.25	-4.05	31.21		31.25	0.000044	1.93	8498.61	815.13	0.06
W100_upstrm	128109.6	Max WS	8990.22	-4.29	31.20		31.23	0.000100	1.33	6755.87	386.66	0.05
W100_upstrm	128104.6	Max WS	8990.98	-4.29	31.20	6.02	31.23	0.000100	1.33	6755.69	386.66	0.05
W100_upstrm	128066.7 SHEPHERD		Bridge									
W100_upstrm	128028.8	Max WS	8986.46	-4.51	30.98		31.01	0.000067	1.33	6755.73	386.66	0.05
W100_upstrm	126647.0	Max WS	8973.85	-3.93	30.94		30.95	0.000022	0.80	11218.43	753.34	0.04
W100_upstrm	125376.9	Max WS	9000.51	-4.05	30.80		30.84	0.000143	1.62	5566.27	330.62	0.07
W100_upstrm	124983.5	Max WS	9011.45	-3.86	30.77		30.81	0.000035	1.56	5774.56	984.54	0.07
W100_upstrm	124644.1	Max WS	9024.35	-3.69	30.75	8.29	30.79	0.000044	1.63	5549.55	485.45	0.07
W100_upstrm	124591.8 WAUGH DRIVE		Bridge									
W100_upstrm	124539.5	Max WS	9022.20	-3.74	30.74		30.78	0.000044	1.62	5561.63	485.84	0.07
W100_upstrm	123658.2	Max WS	9073.83	-2.04	30.74		30.75	0.000022	0.85	11219.17	1185.18	0.04
W100_upstrm	123138.8	Max WS	9099.70	-4.08	30.73		30.74	0.000012	0.62	14836.08	955.12	0.03
W100_upstrm	122627.1	Max WS	9123.04	-6.08	30.71		30.75	0.000022	1.33	8319.10	644.55	0.05
W100_upstrm	122572.1 MONTROSE COURT		Mult Open									
W100_upstrm	122517.1	Max WS	9124.33	-5.38	30.71		30.73	0.000037	1.34	7887.26	596.29	0.05
W100_upstrm	122371.6	Max WS	9120.34	-7.00	30.69	4.14	30.72	0.000069	1.55	5899.57	834.21	0.06
W100_upstrm	122265 ROSEMONT		Bridge									
W100_upstrm	122210.0	Max WS	9115.19	-5.60	30.66		30.69	0.000042	1.46	6237.79	721.29	0.06
W100_upstrm	122036.7	Max WS	9123.23	-8.40	30.65		30.68	0.000046	1.34	7559.66	746.17	0.06
W100_upstrm	121229.5	Max WS	9152.82	-11.37	30.63		30.65	0.000031	1.25	8341.36	833.69	0.05
W100_upstrm	120962.2	Max WS	9159.80	-10.59	30.60		30.64	0.000042	1.54	6346.59	654.45	0.07
W100_upstrm	120005.2	Max WS	9200.26	-7.78	30.59	3.58	30.60	0.000033	0.68	13576.40	920.30	0.03
W100_upstrm	119952.6 MEMORIAL DRIVE		Bridge									
W100_upstrm	119900.0	Max WS	9190.05	-7.64	30.57		30.58	0.000019	0.68	13430.78	896.49	0.03
W100_upstrm	119495.9	Max WS	9216.48	-7.21	30.57		30.57	0.000009	0.45	20564.11	1232.73	0.02
W100_upstrm	118667.7	Max WS	9252.16	-8.56	30.54		30.56	0.000029	0.88	10623.45	703.90	0.04
W100_upstrm	118466.1	Max WS	9250.76	-8.89	30.53	1.63	30.55	0.000021	1.20	8308.36	792.19	0.05
W100_upstrm	118418.1 MEMORIAL DRIVE		Bridge									
W100_upstrm	118370.1	Max WS	9240.97	-8.87	30.50		30.52	0.000022	1.20	8269.42	791.32	0.05
W100_upstrm	117845.4	Max WS	9258.67	-7.26	30.49		30.51	0.000032	1.05	9032.85	568.68	0.04
W100_upstrm	117204.3	Max WS	9291.79	-4.60	30.48		30.49	0.000020	0.86	10822.73	647.14	0.04
W100_upstrm	116395.7	Max WS	9320.74	-3.88	30.46		30.47	0.000018	0.96	9715.74	500.10	0.04
W100_upstrm	116167.6	Max WS	9300.17	-3.68	30.43	4.13	30.46	0.000069	1.58	5904.24	270.57	0.06
W100_upstrm	116121.9 SABINE AVENUE		Bridge									
W100_upstrm	116076.2	Max WS	9275.21	-3.86	30.24		30.28	0.000066	1.57	5902.54	270.55	0.06
W100_upstrm	115804.5	Max WS	9261.17	-4.60	30.21		30.27	0.000033	2.07	6016.74	299.43	0.07
W100_upstrm	115740.6	Max WS	9266.89	-4.78	30.21	4.30	30.26	0.000031	1.94	6065.59	327.31	0.06
W100_upstrm	115700 I-45 Allen Pkwy		Bridge									
W100_upstrm	115674.0	Max WS	9261.44	-5.10	30.20		30.26	0.000034	2.00	6367.11	419.94	0.06
W100_upstrm	115662.6	Max WS	9263.91	-5.20	30.20	4.03	30.25	0.000032	1.92	6488.91	433.04	0.06
W100_upstrm	115635.5 I-45 Houston Ave		Bridge									
W100_upstrm	115621.1	Max WS	9273.01	-5.57	30.21		30.25	0.000025	1.78	7178.12	504.76	0.06
W100_upstrm	115587.7	Max WS	9274.82	-6.22	30.21	3.82	30.25	0.000029	1.91	7531.51	562.69	0.06
W100_upstrm	115553.5 I-45 SBML		Bridge									
W100_upstrm	115514.4	Max WS	9285.70	-6.96	30.21		30.25	0.000021	1.60	8455.71	600.39	0.05
W100_upstrm	115509.1	Max WS	9286.03	-6.99	30.21	3.39	30.25	0.000021	1.62	8501.84	591.88	0.05
W100_upstrm	115490 I-45 NBML		Bridge									
W100_upstrm	115423.0	Max WS	9289.65	-7.30	30.22		30.25	0.000018	1.47	8739.72	507.85	0.05
W100_upstrm	115365.4	Max WS	9294.75	-7.52	30.22		30.25	0.000015	1.39	8829.09	514.52	0.04
W100_upstrm	115284.6	Max WS	9292.82	-7.89	30.21		30.25	0.000019	1.57	12170.56	1119.64	0.05
W100_upstrm	115104.1	Max WS	9302.49	-8.31	30.22		30.24	0.000012	1.29	10326.93	745.95	0.04
W100_upstrm	115001.2	Max WS	9287.03	-8.48	30.19	2.19	30.25	0.000028	1.91	7605.29	576.34	0.06
W100_upstrm	115000 I-45 Ramp McKee		Bridge									
W100_upstrm	114907.3	Max WS	9294.46	-9.19	30.20		30.24	0.000024	1.72	7191.33	464.10	0.06
W100_upstrm	114842.1	Max WS	9290.96	-9.48	30.19	1.90	30.24	0.000029	1.83	7142.35	524.38	0.06
W100_upstrm	114830 I-45 Ramp Walker		Bridge									
W100_upstrm	114804.3	Max WS	9289.10	-9.61	30.19		30.24	0.000031	1.87	7608.72	568.19	0.06

HEC-RAS Plan: Det_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	114492.0	Max WS	9317.69	-10.48	30.20		30.23	0.000029	1.39	6680.14	358.33	0.06
W100_upstrm	114195.9	Max WS	9313.22	-11.52	30.18	1.24	30.21	0.000064	1.53	6103.61	327.49	0.06
W100_upstrm	114168.9 RUSK STREET		Bridge									
W100_upstrm	114141.9	Max WS	9281.02	-10.83	30.15		30.19	0.000068	1.58	5880.75	322.74	0.06
W100_upstrm	114097.4	Max WS	9293.31	-7.46	30.16	3.19	30.19	0.000042	1.37	6795.84	381.29	0.06
W100_upstrm	114070.4 CAPITAL STREE		Bridge									
W100_upstrm	114043.4	Max WS	9276.22	-7.72	29.20		29.24	0.000047	1.42	6532.09	379.73	0.06
W100_upstrm	113644.0	Max WS	9243.72	-8.91	29.16		29.22	0.000042	1.99	5463.63	407.27	0.07
W100_upstrm	113411.6	Max WS	9264.71	-9.61	29.16	0.33	29.21	0.000039	1.70	5457.46	372.86	0.06
W100_upstrm	113374.3 TEXAS AVE		Bridge									
W100_upstrm	113337.0	Max WS	9221.46	-9.65	29.04		29.08	0.000039	1.69	5441.87	372.64	0.06
W100_upstrm	113266.4	Max WS	9176.30	-9.11	29.01	2.81	29.08	0.000156	2.14	4518.48	241.17	0.08
W100_upstrm	113238.6 BAGBY		Bridge									
W100_upstrm	113210.8	Max WS	9123.95	-9.46	28.59		28.66	0.000160	2.13	4501.65	240.91	0.08
W100_upstrm	112974.0	Max WS	9084.07	-10.69	28.55	0.86	28.62	0.000105	2.12	4275.69	201.50	0.08
W100_upstrm	112944.9 PRAIRIE		Bridge									
W100_upstrm	112915.8	Max WS	9051.00	-10.82	28.40		28.47	0.000104	2.12	4270.81	201.45	0.08
W100_upstrm	112575.5	Max WS	9042.03	-9.20	28.38	3.02	28.43	0.000126	1.79	5045.85	240.93	0.07
W100_upstrm	112534.5 PRESTON STREET		Bridge									
W100_upstrm	112493.5	Max WS	9000.30	-9.47	28.31		28.36	0.000122	1.77	5089.44	241.28	0.06
W100_upstrm	112003.3	Max WS	8992.25	-9.69	28.27	1.80	28.31	0.000078	1.47	6112.31	288.84	0.06
W100_upstrm	111953.3 CONGRESS STREET		Bridge									
W100_upstrm	111903.3	Max WS	8938.62	-9.84	28.23		28.26	0.000076	1.46	6141.14	289.26	0.05
W100_upstrm	111853.5	Max WS	8931.03	-9.86	28.22	1.31	28.26	0.000078	1.55	5750.55	229.07	0.05
W100_upstrm	111818.6 SMITH STREET		Bridge									
W100_upstrm	111783.7	Max WS	8900.36	-8.67	28.19		28.23	0.000088	1.63	5475.79	225.39	0.06
W100_upstrm	111626.7	Max WS	8895.17	-11.83	28.18	0.98	28.22	0.000094	1.57	5679.03	230.99	0.06
W100_upstrm	111518.6 LOUISIANA		Bridge									
W100_upstrm	111410.5	Max WS	8797.68	-11.23	28.10		28.14	0.000065	1.59	5522.27	229.84	0.06
W100_upstrm	110876.6	Max WS	8799.16	-10.43	28.08	-0.85	28.10	0.000066	1.23	7192.31	403.96	0.05
W100_upstrm	110837.8 MILAM		Bridge									
W100_upstrm	110799.0	Max WS	8709.05	-10.72	28.03		28.06	0.000179	1.20	7286.58	423.89	0.05
W100_upstrm	110672.7	Max WS	8665.65	-13.25	28.01	-1.80	28.04	0.000145	1.47	7669.95	703.22	0.05
W100_upstrm	110643.7 TRAVIS STREET		Bridge									
W100_upstrm	110614.7	Max WS	8633.55	-12.75	27.99		28.02	0.000165	1.50	7358.91	678.71	0.06
W100_upstrm	110200.2	Max WS	8601.67	-9.11	27.95	1.14	27.98	0.000029	1.16	7729.58	476.36	0.04
W100_upstrm	110154.2 MAIN STREET		Bridge									
W100_upstrm	110108.2	Max WS	8580.59	-9.31	27.75		27.77	0.000029	1.16	7728.78	476.34	0.04
W100_upstrm	110103.2	Max WS	8580.59	-9.31	27.75		27.77	0.000029	1.16	7728.71	476.34	0.04
Downstream	109924.2	Max WS	33283.69	-13.02	27.75		28.10	0.000635	4.71	7215.43	373.02	0.17
Downstream	109551.7	Max WS	33282.70	-14.28	27.58	3.49	27.87	0.000575	4.35	7652.21	342.86	0.16
Downstream	109518.7 FANNIN STREET		Bridge									
Downstream	109485.7	Max WS	33281.49	-15.31	26.68		26.97	0.000566	4.32	7699.16	343.38	0.16
Downstream	109440.2	Max WS	33281.18	-16.48	26.61	2.89	26.94	0.001038	4.60	7237.39	324.04	0.17
Downstream	109395.2 SAN JACINTO STRE		Bridge									
Downstream	109350.2	Max WS	33279.95	-16.89	26.26		26.59	0.001029	4.59	7257.53	324.13	0.17
Downstream	109119.0	Max WS	33277.83	-17.14	25.80	3.56	26.29	0.001530	5.66	5883.92	388.44	0.24
Downstream	109103.1 CROSSWALK		Bridge									
Downstream	109087.2	Max WS	33276.34	-17.55	25.60		26.09	0.001496	5.59	5955.65	394.79	0.23
Downstream	108565.3	Max WS	33274.30	-12.77	25.02		25.42	0.001078	5.03	6626.74	350.62	0.19
Downstream	108334.0	Max WS	33273.50	-14.06	24.78		25.13	0.001398	4.72	7269.44	621.98	0.18
Downstream	107179.4	Max WS	33268.86	-20.52	23.22	-0.12	23.72	0.001120	5.74	6123.08	388.87	0.22
Downstream	107158.9 S. PACIFIC RR		Bridge									
Downstream	107138.4	Max WS	33268.28	-20.19	23.05		23.59	0.001021	5.89	5933.69	367.52	0.22
Downstream	106594.0	Max WS	33267.33	-16.70	22.68		23.08	0.000831	5.06	6574.73	250.03	0.17
Downstream	106151.4	Max WS	33265.70	-13.85	22.04	2.35	22.51	0.001726	5.55	5994.95	256.69	0.20
Downstream	106131.1 MCKEE		Bridge									
Downstream	106110.8	Max WS	33264.27	-12.53	21.72		22.27	0.001987	5.96	5579.98	249.72	0.22
Downstream	105705.4	Max WS	33262.62	-18.22	21.20	0.86	21.73	0.000660	5.87	5663.34	253.32	0.22
Downstream	105667.4 ELYSIAN STREET		Bridge									
Downstream	105629.4	Max WS	33262.44	-18.43	20.87		21.41	0.000671	5.90	5633.47	251.92	0.22
Downstream	105476	Max WS	33261.95	-18.70	20.73		21.20	0.002027	5.50	6051.60	360.40	0.24
Downstream	104962	Max WS	33260.63	-18.70	20.20		20.38	0.001102	3.45	9628.44	602.93	0.15
Downstream	104900	Max WS	33260.11	-19.15	20.01		20.20	0.000290	3.48	9547.20	611.12	0.16
Downstream	104895		Lat Struct									
Downstream	104464	Max WS	33189.04	-19.86	19.59		19.92	0.002076	4.61	7195.38	482.97	0.21
Downstream	104301	Max WS	33188.63	-20.42	19.36		19.72	0.000376	4.86	6833.48	455.05	0.22
Downstream	104242	Max WS	33188.54	-20.62	19.26		19.67	0.001466	5.12	6479.56	374.67	0.22
Downstream	104118.0	Max WS	33187.85	-21.10	18.58	6.02	19.45	0.002190	7.47	4443.74	254.30	0.31
Downstream	104070 Prop I-69 Ramp		Bridge									
Downstream	103955.1	Max WS	33188.13	-21.79	18.85		19.30	0.000948	5.36	6195.85	285.13	0.20
Downstream	103955.0	Max WS	33188.13	-21.79	18.85	1.91	19.30	0.000948	5.36	6195.83	285.13	0.20
Downstream	103846 Prop I-69 DC		Bridge									
Downstream	103786.1	Max WS	33188.03	-22.51	18.64		19.07	0.000819	5.28	6283.80	284.66	0.20
Downstream	103786.0	Max WS	33187.75	-22.51	18.64	0.85	19.07	0.000819	5.28	6283.78	284.66	0.20
Downstream	103694 Prop I-69 SBML		Bridge									
Downstream	103534.1	Max WS	33187.45	-23.58	18.33		18.79	0.000806	5.39	6153.86	271.45	0.20
Downstream	103534.0	Max WS	33187.14	-23.58	18.33	0.59	18.79	0.000806	5.39	6153.83	271.45	0.20
Downstream	103383 Prop I-45 SBML		Bridge									
Downstream	103241.1	Max WS	33187.14	-24.83	18.13		18.59	0.001301	5.47	6068.26	311.21	0.22
Downstream	103241.0	Max WS	33186.93	-24.83	18.13	0.03	18.59	0.001301	5.47	6068.22	311.21	0.22
Downstream	103161 Prop I-69 NBML		Bridge									
Downstream	103095.1	Max WS	33186.93	-25.45	18.00		18.45	0.000544	5.38	6169.73	288.49	0.20
Downstream	103095.0	Max WS	33186.93	-25.45	18.00	0.35	18.45	0.000544	5.38	6169.72	288.49	0.20
Downstream	103065 Prop I-45 DC		Bridge									
Downstream	103025.1	Max WS	33186.72	-25.75	17.90		18.37	0.000500	5.48	6052.91	260.11	0.20
Downstream	103025.0	Max WS	33186.72	-25.75	17.90	-3.68	18.37	0.000500	5.48	6052.89	260.11	0.20

HEC-RAS Plan: Det_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	102988 Prop I-10 DC		Bridge									
Downstream	102952	Max WS	33185.96	-26.06	17.42		18.06	0.000869	6.43	5162.95	251.57	0.25
Downstream	102895.0	Max WS	33185.39	-26.31	17.13		17.99	0.001660	7.43	4464.10	239.28	0.30
Downstream	102875.3	Max WS	33185.84	-26.39	17.34	-1.38	17.95	0.001840	6.28	5286.40	346.05	0.28
Downstream	102847.5 HOUTerminal RR		Bridge									
Downstream	102819.7	Max WS	33184.93	-26.43	16.97		17.61	0.001947	6.41	5173.67	344.08	0.29
Downstream	102309.0	Max WS	33224.53	-23.48	16.54		17.02	0.000373	5.54	5993.36	216.74	0.19
Downstream	101828.0	Max WS	33260.17	-20.70	16.17	-2.02	16.78	0.000638	6.25	5322.79	233.34	0.23
Downstream	101790.1 JENSEN ROAD		Bridge									
Downstream	101752.2	Max WS	33259.75	-20.69	16.00		16.62	0.000615	6.30	5282.11	229.83	0.23
Downstream	101007.3	Max WS	33317.88	-16.93	15.75		16.24	0.000387	5.65	5893.05	259.06	0.21
Downstream	99992.6	Max WS	33394.99	-18.90	15.28		15.83	0.000431	5.93	5632.22	242.63	0.22
Downstream	98399.4	Max WS	33521.32	-20.26	14.64		15.15	0.000415	5.74	5836.36	254.45	0.21
Downstream	97517.4	Max WS	33587.31	-19.35	14.56		14.85	0.000240	4.35	7722.82	312.20	0.15
Downstream	96028.6	Max WS	33696.53	-17.81	13.82	-4.31	14.30	0.000510	5.52	6099.55	283.24	0.21
Downstream	95985.1 YORK DRIVE		Bridge									
Downstream	95941.6	Max WS	33696.56	-17.87	13.68		14.16	0.000512	5.55	6075.71	282.71	0.21
Downstream	95362.9	Max WS	33741.74	-15.97	13.49		13.90	0.000356	5.16	6535.55	318.01	0.20
Downstream	94280.7	Max WS	33832.38	-19.82	12.58		13.29	0.000848	6.80	4978.33	226.48	0.26
Downstream	93495.6	Max WS	33887.06	-20.43	12.27		12.75	0.000583	5.57	6084.19	316.59	0.22
Downstream	92795.6	Max WS	33947.45	-20.98	11.91	-6.22	12.40	0.000418	5.63	6027.48	284.61	0.22
Downstream	92741.1 LOCKWOOD DRIVE		Bridge									
Downstream	92686.6	Max WS	33947.45	-21.08	11.71		12.21	0.000423	5.66	5999.12	284.00	0.22
Downstream	90936.7	Max WS	34084.04	-18.64	10.46		10.93	0.001032	5.51	6189.58	387.63	0.24
Downstream	89918.4	Max WS	34164.23	-17.23	9.28		9.98	0.000829	6.71	5091.55	308.38	0.29
Downstream	88579.0	Max WS	34267.59	-20.97	8.27		8.93	0.000735	6.51	5261.69	313.04	0.28
Downstream	87591.9	Max WS	34349.16	-23.72	7.78		8.30	0.000534	5.82	5899.62	300.96	0.23
Downstream	86660.2	Max WS	34414.35	-23.42	7.48	-10.99	7.89	0.000340	5.17	6658.16	289.32	0.19
Downstream	86641.7 HOUTerminal RR		Bridge									
Downstream	86623.2	Max WS	34414.35	-23.61	7.17		7.59	0.000344	5.20	6622.77	288.99	0.19
Downstream	85855.2	Max WS	34474.19	-26.84	6.30		7.19	0.000729	7.56	4561.54	205.42	0.28
Downstream	85238.7	Max WS	34520.48	-29.43	6.04		6.77	0.000630	6.84	5095.46	256.53	0.25
Downstream	84561.7	Max WS	34584.57	-32.27	5.82	-14.23	6.41	0.000406	6.16	5668.64	287.81	0.21
Downstream	84531.4 NORTH WAYSIDE RD		Bridge									
Downstream	84501.1	Max WS	34584.40	-28.97	5.29		6.10	0.000637	7.21	4793.69	208.60	0.27
Downstream	84252.6	Max WS	34603.91	-26.90	5.27	-10.60	5.95	0.000552	6.61	5238.64	238.35	0.25
Downstream	84222.3 M. GARCIA		Bridge									
Downstream	84192.0	Max WS	34603.56	-24.10	4.64		5.58	0.000894	7.80	4437.53	227.74	0.31
Downstream	83635.7	Max WS	34647.33	-21.72	4.57		5.15	0.000633	6.11	5673.36	332.32	0.26
Downstream	81786.1	Max WS	34787.71	-31.97	3.60		4.10	0.000495	5.67	6143.37	337.22	0.23
Downstream	80903.1	Max WS	34854.74	-27.77	3.33	-13.27	3.71	0.000391	4.96	7021.11	384.46	0.20
Downstream	80883.1 S. PACIFIC RR		Bridge									
Downstream	80863.1	Max WS	34854.74	-28.10	2.92		3.30	0.000453	4.99	6991.50	384.08	0.21
Downstream	80538.0	Max WS	34854.73	-33.12	3.05	-20.97	3.20	0.000110	3.04	11454.48	490.83	0.11

White Oak Bayou
Scenario 4: Detention Only 10-Year

HEC-RAS Plan: Det_10yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	36134.	Max WS	21247.14	24.19	52.54		53.22	0.000533	6.58	3230.29	198.01	0.29
E100-00-00	35718.0	Max WS	21245.93	23.76	52.29		53.01	0.000476	6.81	3120.92	191.06	0.30
E100-00-00	35158.	Max WS	21324.02	22.89	52.11		52.73	0.000500	6.30	3382.19	209.00	0.28
E100-00-00	35006.0	Max WS	21349.02	22.66	51.98	39.66	52.66	0.000455	6.61	3230.94	272.94	0.29
E100-00-00	34951.5 ELLA		Bridge									
E100-00-00	34895.0	Max WS	21323.50	22.56	51.73		52.42	0.000464	6.66	3201.06	266.04	0.29
E100-00-00	34645.	Max WS	21351.37	22.24	51.65		52.29	0.000544	6.43	3362.95	361.04	0.28
E100-00-00	34206.0	Max WS	21417.51	21.68	51.43		52.07	0.000447	6.41	3349.31	244.01	0.28
E100-00-00	33962.58	Max WS	21464.11	21.61	51.55		51.96	0.000375	5.14	4281.08	487.42	0.25
E100-00-00	33909.08	Max WS	21470.39	21.60	51.51		51.94	0.000500	5.23	4148.42	480.46	0.26
E100-00-00	33770.	Max WS	21489.32	21.56	51.48		51.89	0.000259	5.22	4448.83	368.34	0.22
E100-00-00	33681.0	Max WS	21498.70	21.53	51.19	38.71	51.86	0.000460	6.60	3259.95	364.45	0.29
E100-00-00	33645.5 W 18TH		Bridge									
E100-00-00	33610.0	Max WS	21495.58	21.61	51.04		51.73	0.000476	6.69	3214.67	355.28	0.29
E100-00-00	33357.	Max WS	21522.72	21.41	50.98		51.60	0.000578	6.32	3404.45	219.11	0.28
E100-00-00	32570.0	Max WS	21656.31	20.78	50.64		51.21	0.000389	6.07	3565.64	212.36	0.26
E100-00-00	31583.0	Max WS	21763.96	19.35	50.32		50.85	0.000340	5.80	3766.58	241.37	0.24
E100-00-00	30779.0	Max WS	21871.06	18.79	50.12		50.59	0.000302	5.58	4355.15	446.58	0.23
E100-00-00	29659.	Max WS	21988.16	17.66	49.81		50.22	0.000349	5.16	4497.69	657.98	0.22
E100-00-00	29368.0	Max WS	22061.52	17.37	49.45	35.27	50.11	0.000421	6.48	3413.29	257.09	0.27
E100-00-00	29297.5 TC JESTER SOUTH		Bridge									
E100-00-00	29203.0	Max WS	21891.83	17.35	48.12		48.86	0.000499	6.91	3167.28	178.35	0.29
E100-00-00	28775.	Max WS	21937.86	16.90	48.20		48.65	0.000450	5.37	4082.53	273.11	0.24
E100-00-00	28375.0	Max WS	21950.96	16.48	47.85	34.21	48.48	0.000420	6.38	3442.37	201.93	0.27
E100-00-00	28357.0 BICYCLE BRIDGE		Bridge									
E100-00-00	28330.0	Max WS	21949.62	16.41	47.73		48.37	0.000422	6.39	3433.62	201.69	0.27
E100-00-00	28190.0	Max WS	21962.81	16.18	47.69	33.71	48.31	0.000383	6.30	3483.56	193.13	0.26
E100-00-00	28152.5 W 11TH		Bridge									
E100-00-00	28113.0	Max WS	21951.86	16.28	47.46		48.10	0.000395	6.42	3419.78	190.69	0.27
E100-00-00	27982.	Max WS	21960.70	16.25	47.36		48.04	0.000493	6.62	3314.96	199.85	0.29
E100-00-00	27429.0	Max WS	21990.63	16.12	47.17		47.79	0.000419	6.29	3497.15	206.01	0.27
E100-00-00	26598.	Max WS	22080.61	15.35	46.89		47.45	0.000392	5.99	3689.28	217.89	0.26
E100-00-00	26498.0	Max WS	22089.03	15.26	46.87	32.90	47.41	0.000373	5.87	3761.79	219.44	0.25
E100-00-00	26432.5 TC JESTER		Bridge									
E100-00-00	26366.0	Max WS	22088.24	15.16	46.71		47.25	0.000376	5.89	3748.37	219.07	0.25
E100-00-00	26307.3	Max WS	22093.30	15.13	46.80		47.23	0.000335	5.30	4492.74	489.23	0.23
E100-00-00	26225	Max WS	22098.77	15.04	46.78		47.20	0.000355	5.22	4507.75	485.70	0.23
E100-00-00	26140.	Max WS	22101.56	14.97	46.61		47.17	0.000408	5.98	3696.68	229.97	0.26
E100-00-00	25536.0	Max WS	22133.09	14.48	46.37		46.93	0.000394	5.99	3811.92	306.66	0.26
E100-00-00	25132.	Max WS	22164.59	14.29	46.27		46.78	0.000349	5.83	4294.14	371.21	0.25
E100-00-00	24817.0	Max WS	22179.37	14.14	45.97	32.90	46.63	0.000589	6.51	3406.98	230.91	0.30
E100-00-00	24789.0 UNION PACIFIC RR		Bridge									
E100-00-00	24758.0	Max WS	22171.30	13.76	45.44		46.12	0.000593	6.59	3364.85	226.52	0.30
E100-00-00	24636.	Max WS	22187.55	13.61	45.55		46.06	0.000387	5.78	4236.34	423.55	0.25
E100-00-00	23934.0	Max WS	22234.95	12.75	45.27		45.74	0.000478	5.54	4015.81	286.72	0.26
E100-00-00	23550.0	Max WS	22269.26	12.77	45.17	29.39	45.59	0.000300	5.19	4293.34	257.02	0.22
E100-00-00	23506.5 DURHAM		Bridge									
E100-00-00	23444.0	Max WS	22264.72	12.69	44.99		45.42	0.000304	5.22	4267.49	256.00	0.23
E100-00-00	23180.	Max WS	22276.51	12.46	44.84		45.35	0.000319	5.75	4321.22	505.97	0.24
E100-00-00	22983.	Max WS	22282.59	12.29	44.64		45.28	0.000465	6.47	3739.47	512.63	0.28
E100-00-00	22834.0	Max WS	22292.38	12.16	44.50	31.34	45.19	0.000596	6.68	3338.94	494.64	0.28
E100-00-00	22796.5 SHEPHERD		Bridge									
E100-00-00	22758.0	Max WS	22285.00	12.11	44.32		45.01	0.000649	6.68	3618.38	482.32	0.28
E100-00-00	22610.	Max WS	22299.12	11.92	44.36		44.92	0.000566	6.11	4051.48	447.60	0.26
E100-00-00	22224.0	Max WS	22332.31	11.41	44.41		44.69	0.000442	4.50	6802.83	728.10	0.20
E100-00-00	21444.0	Max WS	22373.30	10.52	43.74		44.32	0.000630	6.11	3760.38	416.21	0.27
E100-00-00	20746.0	Max WS	22415.46	10.00	43.19		43.79	0.000911	6.18	3625.31	248.98	0.29
E100-00-00	20644.0	Max WS	22425.73	9.95	43.24	29.39	43.72	0.000493	5.70	5081.36	818.77	0.24
E100-00-00	20633.0 Pipeline		Bridge									
E100-00-00	20622.0	Max WS	22422.67	9.95	43.13		43.62	0.000504	5.75	4978.29	798.47	0.24
E100-00-00	20521.	Max WS	22430.45	9.91	43.07		43.58	0.000477	5.89	4924.10	625.40	0.24
E100-00-00	19917.0	Max WS	22478.42	9.66	42.61		43.23	0.000645	6.30	3622.95	408.02	0.27
E100-00-00	19463.0	Max WS	22512.51	9.25	42.28		42.93	0.000690	6.46	3486.92	215.85	0.28
E100-00-00	18857	Max WS	22555.38	8.03	41.84	28.54	42.51	0.000710	6.64	3547.43	298.10	0.28
E100-00-00	18800 I-10 WBFR		Bridge									
E100-00-00	18747	Max WS	22555.06	7.81	41.88		42.38	0.000482	5.75	4163.23	315.00	0.24
E100-00-00	18746	Max WS	22555.46	7.81	41.88	27.14	42.38	0.000482	5.75	4163.07	314.99	0.24
E100-00-00	18595 I-10 BRIDGE		Bridge									
E100-00-00	18443	Max WS	22550.39	7.19	41.01		41.55	0.000524	5.94	3904.57	283.40	0.25
E100-00-00	18442	Max WS	22550.12	7.19	41.01	26.92	41.55	0.000524	5.94	3904.41	283.40	0.25
E100-00-00	18394 I-10 EBFR		Bridge									
E100-00-00	18377.	Max WS	22545.10	6.98	40.48		41.08	0.000609	6.25	3680.38	273.44	0.27
E100-00-00	18234.0	Max WS	22562.07	6.77	40.66	26.34	41.00	0.000356	4.71	4788.22	287.46	0.20
E100-00-00	18220.0 UNION PACIFIC RR		Bridge									
E100-00-00	18199.0	Max WS	22558.45	6.70	40.38		40.74	0.000383	4.81	4692.65	281.87	0.21
E100-00-00	18176.0	Max WS	22559.71	6.79	40.29	26.13	40.73	0.000342	5.36	4207.92	252.84	0.21
E100-00-00	18138.0 YALE		Bridge									
E100-00-00	18082.0	Max WS	22548.43	6.87	39.42		40.04	0.000487	6.33	3560.98	225.25	0.26
E100-00-00	17905.	Max WS	22562.50	6.86	39.41		39.95	0.000564	5.92	3854.28	308.21	0.26
E100-00-00	17756.0	Max WS	22573.94	6.85	39.34	26.92	39.85	0.000711	5.75	3927.69	287.83	0.27
E100-00-00	17726 S. HEIGHTS		Bridge									
E100-00-00	17696	Max WS	22506.65	6.85	37.92		38.55	0.000889	6.37	3531.94	267.12	0.31
E100-00-00	17657	Max WS	22510.39	6.35	37.93	26.41	38.51	0.000819	6.13	3670.97	274.58	0.30
E100-00-00	17627 N. HEIGHTS		Bridge									
E100-00-00	17597.0	Max WS	22423.06	6.35	36.99		37.66	0.000944	6.56	3420.64	261.00	0.32
E100-00-00	17318.	Max WS	22392.17	6.35	36.62		37.41	0.000854	7.13	3140.72	204.83	0.32
E100-00-00	16831.0	Max WS	22423.09	6.34	36.59		37.11	0.000327	5.79	3874.70	324.37	0.30

HEC-RAS Plan: Det_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	15795.0	Max WS	22440.80	4.84	36.45		36.72	0.000416	4.19	5357.64	390.51	0.20
E100-00-00	15278.	Max WS	22366.46	4.41	35.91		36.51	0.000444	6.21	3600.17	229.30	0.28
E100-00-00	14977.0	Max WS	22385.99	4.16	35.94	23.41	36.41	0.000213	5.49	4078.96	259.70	0.24
E100-00-00	14937.0 I-10 EBFR ACCESS		Bridge									
E100-00-00	14897.0	Max WS	22370.00	3.39	35.12		35.59	0.000214	5.50	4066.10	259.41	0.24
E100-00-00	14890	Max WS	22350.59	3.42	35.01	22.64	35.59	0.000258	6.11	3655.25	228.11	0.27
E100-00-00	14775 I-10 BRIDGE		Bridge									
E100-00-00	14660	Max WS	22323.05	3.42	34.82		35.42	0.000266	6.18	3612.73	227.05	0.27
E100-00-00	14590.0	Max WS	22293.49	3.45	34.62	22.68	35.40	0.000349	7.07	3151.43	195.80	0.31
E100-00-00	14562.0 I-10 WB ACCESS		Bridge									
E100-00-00	14532.0	Max WS	22270.13	3.41	34.46		35.24	0.000811	7.12	3127.83	195.11	0.31
E100-00-00	14354.0	Max WS	22330.17	3.29	34.83		35.13	0.000171	4.44	5027.55	482.09	0.19
E100-00-00	13924.0	Max WS	22280.81	3.18	34.42	21.90	34.98	0.000569	6.01	3706.76	324.56	0.26
E100-00-00	13909.5 UNION PAC. RR		Bridge									
E100-00-00	13898.0	Max WS	22263.24	2.95	34.10		34.67	0.000575	6.04	3688.64	321.81	0.26
E100-00-00	13494.	Max WS	22243.32	2.47	33.98		34.42	0.000654	5.29	4201.00	398.73	0.24
E100-00-00	13220.0	Max WS	22272.36	2.15	34.07	21.71	34.30	0.000162	3.88	5745.93	577.02	0.17
E100-00-00	13182.5 STUDEMONT		Bridge									
E100-00-00	13143.0	Max WS	22278.19	2.15	34.01		34.22	0.000154	3.75	6317.17	505.10	0.17
E100-00-00	12698.	Max WS	22222.34	1.87	33.71		34.10	0.000440	4.99	4457.11	344.60	0.24
E100-00-00	12066.0	Max WS	22219.40	1.47	33.61		33.85	0.000325	3.92	5668.18	381.43	0.18
E100-00-00	11546.0	Max WS	22210.09	0.90	33.53		33.73	0.000153	3.55	6438.12	603.75	0.17
E100-00-00	11021.	Max WS	22220.58	0.63	33.49		33.66	0.000116	3.32	7090.78	731.48	0.15
E100-00-00	10908.0	Max WS	22229.31	0.57	33.51	19.84	33.65	0.000100	3.17	8487.54	880.61	0.14
E100-00-00	10852.5 TAYLOR (SAWYER)		Bridge									
E100-00-00	10804.0	Max WS	22225.77	0.45	33.35		33.49	0.000101	3.16	8462.25	879.67	0.14
E100-00-00	10643.	Max WS	22161.01	0.14	33.09		33.49	0.000375	5.11	4575.94	379.72	0.21
E100-00-00	9779.0	Max WS	22189.86	-1.51	33.08		33.25	0.000113	3.41	7395.03	601.29	0.15
E100-00-00	8532.0	Max WS	22234.55	-1.76	33.10		33.14	0.000032	1.52	14643.25	904.02	0.06
E100-00-00	8140.	Max WS	22237.86	-2.43	33.06		33.10	0.000170	1.59	14993.20	1202.72	0.07
E100-00-00	7649.0	Max WS	22230.04	-3.26	32.95	15.92	33.07	0.000068	3.00	13426.43	1376.08	0.12
E100-00-00	7608.5 HOUSTON		Bridge									
E100-00-00	7568.0	Max WS	22223.33	-3.15	32.95		33.02	0.000050	2.57	13271.16	1373.68	0.10
E100-00-00	7546.0	Max WS	22219.16	-3.16	32.93	15.89	33.03	0.000060	2.79	12234.13	1515.01	0.11
E100-00-00	7535.5 Pipeline		Bridge									
E100-00-00	7529.0	Max WS	22214.37	-3.16	32.90		33.00	0.000060	2.79	12185.26	1513.39	0.11
E100-00-00	7481.0	Max WS	22206.55	-3.17	32.86		33.00	0.000090	3.17	9148.08	1274.12	0.14
E100-00-00	7253.1	Max WS	22208.39	-3.19	32.88		32.97	0.000037	2.41	9251.03	667.16	0.09
E100-00-00	7253.05		Lat Struct									
E100-00-00	7253	Max WS	22207.55	-3.19	32.88	11.25	32.97	0.000037	2.41	9251.02	667.16	0.09
E100-00-00	7205 Prop I-10 DC		Bridge									
E100-00-00	7138.1	Max WS	22189.29	-3.20	32.75		32.87	0.000049	2.74	8147.74	599.66	0.11
E100-00-00	7138	Max WS	22187.54	-3.20	32.75	12.05	32.87	0.000049	2.74	8147.74	599.66	0.11
E100-00-00	7057 Prop I-10 Ramp		Bridge									
E100-00-00	7016.1	Max WS	22049.00	-3.22	32.33		32.61	0.000102	4.29	5136.82	493.73	0.16
E100-00-00	7016	Max WS	22049.58	-3.22	32.33		32.61	0.000102	4.29	5136.82	493.73	0.16
E100-00-00	6980	Max WS	22103.17	-3.22	32.47		32.60	0.000088	2.96	7506.34	534.55	0.12
E100-00-00	6979		Lat Struct									
E100-00-00	6975.0	Max WS	22096.59	-3.22	32.47		32.60	0.000088	2.96	7506.28	534.55	0.12
E100-00-00	6898.0	Max WS	21969.35	-4.23	32.41		32.60	0.000230	3.50	6590.17	483.60	0.15
E100-00-00	6895	Max WS	21968.27	-4.23	32.41		32.59	0.000230	3.50	6589.83	483.60	0.15
E100-00-00_02	6775.	Max WS	28342.39	-4.30	32.41		32.50	0.000073	2.41	12340.82	995.38	0.10
E100-00-00_02	6637.0	Max WS	28271.42	-4.37	32.38	16.94	32.49	0.000075	2.68	10760.04	878.60	0.11
E100-00-00_02	6600 Prop I-45 DC		Bridge									
E100-00-00_02	6575.1	Max WS	28238.47	-4.41	32.35		32.46	0.000080	2.70	10731.45	939.76	0.11
E100-00-00_02	6575.0	Max WS	28238.47	-4.41	32.35	17.18	32.46	0.000080	2.70	10731.45	939.76	0.11
E100-00-00_02	6551 Prop I-45 Ramp		Bridge									
E100-00-00_02	6515.0	Max WS	28212.92	-4.44	32.33		32.44	0.000081	2.70	10885.90	879.47	0.12
E100-00-00_02	6387.0	Max WS	28195.09	-4.38	32.32	17.78	32.43	0.000082	2.69	10486.71	1241.34	0.11
E100-00-00_02	6352 Prop I-45 NBML		Bridge									
E100-00-00_02	6298.1	Max WS	28197.64	-4.51	32.32		32.42	0.000072	2.52	11174.17	1211.53	0.10
E100-00-00_02	6298	Max WS	28197.64	-4.51	32.32	16.28	32.42	0.000072	2.52	11174.17	1211.53	0.10
E100-00-00_02	6252 Prop I-45 DC		Bridge									
E100-00-00_02	6201.1	Max WS	28207.80	-4.65	32.33		32.41	0.000051	2.29	12326.94	1020.92	0.09
E100-00-00_02	6201	Max WS	28205.26	-4.65	32.33	15.35	32.41	0.000051	2.29	12326.94	1020.92	0.09
E100-00-00_02	6164 Prop I-45 Ramp		Bridge									
E100-00-00_02	6122.0	Max WS	28074.43	-4.33	32.22		32.34	0.000060	2.76	10185.55	851.87	0.11
E100-00-00_02	5525.0	Max WS	27808.84	-3.15	32.20		32.30	0.000070	2.47	11252.46	649.91	0.10
E100-00-00_02	4994.0	Max WS	27718.80	-3.09	32.03	15.12	32.23	0.000241	3.68	8136.44	547.77	0.14
E100-00-00_02	4980.0 RR OVERPASS		Bridge									
E100-00-00_02	4961.0	Max WS	27711.50	-3.03	31.69		31.91	0.000292	3.85	7747.00	543.94	0.15
E100-00-00_02	4812.0	Max WS	27719.27	-3.49	31.43	14.09	31.83	0.000883	5.05	5492.15	420.02	0.25
E100-00-00_02	4774.5 CROCKETT/HOGAN		Bridge									
E100-00-00_02	4687.0	Max WS	27719.27	-4.67	31.35		31.64	0.000563	4.36	6357.32	442.65	0.20
E100-00-00_02	4407.	Max WS	27733.34	-3.62	31.13		31.51	0.000431	4.95	5828.71	435.09	0.19
E100-00-00_02	4014.0	Max WS	27753.41	-2.15	31.11	13.61	31.35	0.000349	3.91	7101.04	404.51	0.16
E100-00-00_02	3997.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	3976.0	Max WS	27753.41	-2.40	30.98		31.22	0.000356	3.92	7079.68	405.12	0.17
E100-00-00_02	3681.	Max WS	27769.84	-3.80	30.74		31.10	0.000471	4.79	5894.15	402.06	0.20
E100-00-00_02	3585.0	Max WS	27774.37	-4.26	30.68		31.06	0.000416	4.91	5679.72	369.47	0.20
E100-00-00_02	3233.0	Max WS	27792.75	-4.79	30.84	8.82	30.93	0.000124	2.40	11600.41	1099.05	0.11
E100-00-00_02	3094 Prop I-10 WBML		Bridge									
E100-00-00_02	2954.1	Max WS	27792.75	-5.22	30.72		30.83	0.000190	2.71	10250.05	1048.38	0.14
E100-00-00_02	2954.0	Max WS	27792.76	-5.22	30.72	9.83	30.83	0.000190	2.71	10250.09	1048.38	0.14
E100-00-00_02	2857 Prop I-45 BNML		Bridge									
E100-00-00_02	2760.1	Max WS	27792.76	-5.51	30.69		30.79	0.000151	2.51	11092.19	1061.24	0.12
E100-00-00_02	2760.0	Max WS	27792.76	-5.51	30.69	11.81	30.79	0.000151	2.51	11092.18	1061.24	0.12

HEC-RAS Plan: Det_10yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_02	2639 Prop I-10 WB Exp		Bridge									
E100-00-00_02	2518.1	Max WS	27794.08	-5.88	30.54		30.68	0.000204	3.02	9267.49	887.99	0.14
E100-00-00_02	2518.0	Max WS	27794.09	-5.88	30.54	12.36	30.68	0.000204	3.02	9267.48	887.98	0.14
E100-00-00_02	2434 Prop I-45 SBML		Bridge									
E100-00-00_02	2350.1	Max WS	27794.09	-6.13	30.31		30.53	0.000328	3.69	7536.43	796.48	0.18
E100-00-00_02	2350.0	Max WS	27794.09	-6.13	30.31	13.08	30.53	0.000328	3.69	7536.41	796.47	0.18
E100-00-00_02	2280 Prop I-10 EBML		Bridge									
E100-00-00_02	2210.0	Max WS	27794.09	-6.34	30.20		30.43	0.000298	3.81	7289.95	703.95	0.17
E100-00-00_02	1580.	Max WS	27785.04	-7.83	30.01		30.23	0.000312	4.21	9334.89	1007.26	0.16
E100-00-00_02	1353.0	Max WS	27770.99	-8.34	29.89	13.08	30.18	0.000443	4.82	7978.50	1148.30	0.19
E100-00-00_02	1335.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	1319.0	Max WS	26216.83	-8.37	29.18		29.46	0.000441	4.71	7496.92	723.24	0.19
E100-00-00_02	984.0	Max WS	26081.12	-8.69	28.97	9.47	29.33	0.000259	4.83	5656.09	655.00	0.19
E100-00-00_02	978 MAIN STREET		Bridge									
E100-00-00_02	971.6	Max WS	25637.81	-8.69	28.79		29.14	0.000258	4.79	5590.80	648.75	0.19
E100-00-00_02	971.5	Max WS	25641.53	-8.69	28.79	9.28	29.14	0.000258	4.80	5590.79	648.74	0.19
E100-00-00_02	961.5 1ST STREET		Bridge									
E100-00-00_02	851.0	Max WS	25269.26	-6.40	28.40		28.87	0.000389	5.49	4797.72	679.87	0.23
E100-00-00_02	654.0	Max WS	25380.14	-6.50	28.58		28.78	0.000143	3.69	8873.75	620.19	0.14
E100-00-00_02	400.0	Max WS	25310.12	-8.58	28.43	7.14	28.77	0.000212	4.79	7088.74	494.64	0.18
E100-00-00_02	381.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	365.0	Max WS	25031.88	-8.23	28.15		28.58	0.000260	5.26	4759.30	506.24	0.20
E100-00-00_02	210.0	Max WS	24951.90	-7.81	28.01	7.90	28.53	0.000295	5.77	4327.79	570.84	0.21
E100-00-00_02	191.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	173.1	Max WS	24699.76	-6.84	27.75		28.32	0.000337	6.03	4097.89	921.35	0.23
E100-00-00_02	173.0	Max WS	24703.10	-6.84	27.75		28.32	0.000337	6.03	4097.89	921.34	0.23

Little White Oak Bayou
Scenario 4: Detention Only 10-Year

HEC-RAS Plan: Det_10yr River: E101-00-00 Reach: E101-00-00_0003 Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	9819.000	Max WS	7764.93	16.33	36.57		36.84	0.000641	4.19	1851.26	157.34	0.22
E101-00-00_0003	9750.000	Max WS	7763.25	16.31	36.55		36.80	0.000619	4.05	1914.94	167.88	0.21
E101-00-00_0003	9000.000	Max WS	7737.41	15.50	36.26		36.39	0.000479	3.12	2867.60	508.28	0.18
E101-00-00_0003	8469.000	Max WS	7793.19	13.02	36.00		36.14	0.000444	3.34	2748.67	318.50	0.16
E101-00-00_0003	7984.000	Max WS	7837.32	13.76	35.75		35.91	0.000499	3.74	2584.83	316.24	0.18
E101-00-00_0003	6838.000	Max WS	7863.42	12.20	35.03		35.26	0.000648	3.80	2068.53	202.72	0.21
E101-00-00_0003	5861.000	Max WS	7799.44	9.91	34.18		34.45	0.000960	4.23	1932.11	251.18	0.23
E101-00-00_0003	4720.000	Max WS	7496.23	8.13	33.29		33.59	0.000619	4.61	2123.10	286.52	0.20
E101-00-00_0003	4279.000	Max WS	6857.82	9.00	32.83		33.18	0.000912	4.76	1439.40	107.49	0.23
E101-00-00_0003	4130.000	Max WS	7178.83	8.68	32.98	17.30	33.10	0.000162	2.82	2556.04	216.54	0.13
E101-00-00_0003	4091.000 N. MAIN		Bridge									
E101-00-00_0003	4050.000	Max WS	7016.14	7.87	32.91		33.02	0.000132	2.62	2695.52	265.08	0.12
E101-00-00_0003	3952.	Max WS	6962.74	6.87	32.90		33.01	0.000116	2.61	2734.21	192.48	0.11
E101-00-00_0003	3466.000	Max WS	7001.94	1.92	32.89		32.97	0.000042	2.62	3837.01	250.76	0.09
E101-00-00_0003	3323.0	Max WS	7056.54	-1.03	32.91	11.47	32.96	0.000023	1.96	4608.50	294.17	0.07
E101-00-00_0003	3278.0 I-45 Ramp		Bridge									
E101-00-00_0003	3236.1	Max WS	7116.71	-2.82	32.92		32.96	0.000019	1.69	5665.03	438.30	0.06
E101-00-00_0003	3236.0	Max WS	7115.21	-2.82	32.92	10.28	32.96	0.000019	1.69	5665.03	438.30	0.06
E101-00-00_0003	3085 I-45 NBML		Bridge									
E101-00-00_0003	2958.1	Max WS	7110.66	-2.52	32.92		32.95	0.000017	1.50	6621.60	1832.73	0.06
E101-00-00_0003	2958	Max WS	7107.66	-2.52	32.92	10.32	32.95	0.000017	1.50	6621.60	1832.73	0.06
E101-00-00_0003	2833 I-45 SBML		Bridge									
E101-00-00_0003	2389.000	Max WS	6999.21	-0.26	32.87		32.91	0.000075	1.77	5696.97	400.36	0.06
E101-00-00_0003	2325.	Max WS	7005.64	-0.15	32.87		32.90	0.000069	1.65	5934.79	404.98	0.06
E101-00-00_0003	1855.000	Max WS	7036.34	0.68	32.86		32.88	0.000029	1.17	6831.22	420.58	0.04
E101-00-00_0003	1126.	Max WS	6941.56	-1.85	32.78		32.83	0.000159	1.97	4647.79	583.51	0.08
E101-00-00_0003	1070.000	Max WS	6915.45	-2.04	32.76	8.58	32.83	0.000134	2.27	4507.61	636.54	0.08
E101-00-00_0003	1029.500 WRIGHTWOOD		Bridge									
E101-00-00_0003	987.000	Max WS	6634.25	-2.04	32.63		32.69	0.000139	2.18	4440.24	622.75	0.08
E101-00-00_0003	911.	Max WS	6677.92	-2.19	32.65		32.68	0.000078	1.72	5792.60	426.10	0.06
E101-00-00_0003	756.	Max WS	6603.39	-2.51	32.59		32.65	0.000372	1.84	3815.06	472.07	0.09
E101-00-00_0003	637.000	Max WS	6551.90	-2.75	32.58	9.49	32.61	0.000235	1.42	5070.08	636.11	0.07
E101-00-00_0003	538.000 QUITMAN/WHITE OA		Bridge									
E101-00-00_0003	442.000	Max WS	6245.92	-2.75	32.42		32.45	0.000149	1.47	4967.44	615.85	0.07
E101-00-00_0003	306.000	Max WS	6261.92	-2.86	32.42		32.43	0.000012	0.84	9446.41	1437.07	0.04
E101-00-00_0003	259.1	Max WS	6257.54	-2.90	32.42		32.43	0.000012	0.86	7744.39	565.56	0.04
E101-00-00_0003	259	Max WS	6254.00	-2.90	32.42	6.03	32.43	0.000012	0.86	7744.37	565.56	0.04
E101-00-00_0003	229 Prop I-10 DC		Bridge									
E101-00-00_0003	180.1	Max WS	6260.87	-2.96	32.42		32.43	0.000012	0.84	7490.88	549.52	0.04
E101-00-00_0003	180	Max WS	6263.19	-2.96	32.42	7.64	32.43	0.000012	0.85	7490.86	549.52	0.04
E101-00-00_0003	130 Prop-10 Ramp		Bridge									
E101-00-00_0003	101.1	Max WS	6275.84	-3.03	32.42		32.43	0.000009	0.73	8631.75	562.66	0.03
E101-00-00_0003	101	Max WS	6270.89	-3.03	32.42		32.43	0.000009	0.73	8631.74	562.66	0.03
E101-00-00_0003	68	Max WS	6265.07	-4.00	32.42		32.43	0.000016	0.85	7465.41	526.42	0.04
E101-00-00_0003	63	Max WS	6278.41	-4.00	32.42		32.43	0.000016	0.85	7465.32	526.40	0.04
E101-00-00_0003	3	Max WS	6372.67	-4.23	32.41		32.43	0.000020	1.06	6323.97	493.76	0.04
E101-00-00_0003	1	Max WS	6374.12	-4.23	32.41		32.43	0.000020	1.06	6323.95	493.76	0.04

Buffalo Bayou
Scenario 4: Detention Only 100-Year

HEC-RAS Plan: Det_100yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	148800.4	Max WS	17190.38	3.15	42.75		42.85	0.000247	2.89	7984.22	1819.16	0.09
W100_upstrm	148795.4	Max WS	17189.38	3.15	42.74	17.83	42.85	0.000247	2.89	7983.80	1819.15	0.09
W100_upstrm	148768.4 SOUTHERN PACIFIC		Bridge									
W100_upstrm	148741.4	Max WS	17182.94	3.04	42.63		42.73	0.000247	2.89	7981.16	1819.07	0.09
W100_upstrm	147632.4	Max WS	17168.76	-1.17	42.46		42.54	0.000082	2.50	9097.73	543.33	0.09
W100_upstrm	146698.0	Max WS	17230.27	1.88	42.35		42.46	0.000117	2.96	8564.64	792.55	0.10
W100_upstrm	145723.9	Max WS	17287.15	1.61	42.20		42.37	0.000147	3.86	8566.55	471.01	0.12
W100_upstrm	144753.5	Max WS	17353.02	0.07	42.06		42.21	0.000151	3.42	7558.62	543.44	0.12
W100_upstrm	143966.8	Max WS	17396.16	-7.47	41.97		42.11	0.000145	3.40	10643.45	1281.92	0.11
W100_upstrm	143078.2	Max WS	17455.89	-4.19	41.86		41.99	0.000117	3.13	11414.51	887.29	0.10
W100_upstrm	142061.4	Max WS	17532.51	0.55	41.77		41.88	0.000080	2.87	10358.85	531.38	0.09
W100_upstrm	141320.1	Max WS	17590.73	-2.70	41.77		41.81	0.000040	1.84	18145.10	965.17	0.06
W100_upstrm	140116.2	Max WS	17656.19	-1.31	41.66		41.77	0.000106	3.03	12200.68	877.55	0.09
W100_upstrm	139320.0	Max WS	17704.61	-2.14	41.61		41.69	0.000085	2.47	13926.69	941.40	0.08
W100_upstrm	138607.9	Max WS	17751.35	-2.08	41.61		41.62	0.000020	1.33	26440.71	1408.35	0.04
W100_upstrm	137732.0	Max WS	17783.85	-2.40	41.57		41.63	0.000059	2.57	17934.79	1316.55	0.08
W100_upstrm	137113.0	Max WS	17835.73	-2.62	41.47		41.63	0.000107	3.48	10456.93	1336.78	0.10
W100_upstrm	136331.2	Max WS	17899.10	-2.09	41.44		41.46	0.000154	1.60	15618.71	763.58	0.05
W100_upstrm	135666.2	Max WS	17935.19	-1.47	41.34		41.43	0.000075	2.74	12928.48	787.76	0.09
W100_upstrm	134706.7	Max WS	17996.14	-1.93	41.32		41.36	0.000037	1.94	22239.58	1157.68	0.06
W100_upstrm	134090.6	Max WS	18025.94	-1.59	41.29		41.35	0.000053	2.43	17466.14	850.76	0.07
W100_upstrm	133772.1	Max WS	18043.80	-0.79	41.27	13.46	41.35	0.000069	2.91	16843.42	949.13	0.08
W100_upstrm	133760.1 FOOTBRIDGE AT WE		Bridge									
W100_upstrm	133748.1	Max WS	18043.90	-0.46	41.22		41.30	0.000072	2.96	16483.07	943.02	0.09
W100_upstrm	132963.8	Max WS	18106.70	-1.98	41.11		41.25	0.000110	3.17	10117.22	695.14	0.10
W100_upstrm	131789.8	Max WS	18188.59	-2.31	41.00		41.13	0.000103	3.32	10707.78	733.05	0.10
W100_upstrm	130765.5	Max WS	18268.04	-3.81	40.95		41.03	0.000051	2.50	13406.06	655.02	0.07
W100_upstrm	129725.3	Max WS	18336.41	-3.71	40.89		40.98	0.000073	2.97	16160.40	1175.21	0.09
W100_upstrm	129163.2	Max WS	18394.43	-3.13	40.83		40.94	0.000073	2.90	11943.58	844.82	0.09
W100_upstrm	128326.9	Max WS	18461.08	-4.05	40.79		40.87	0.000050	2.53	19972.38	1349.57	0.07
W100_upstrm	128109.6	Max WS	18459.95	-4.29	40.78		40.82	0.000214	1.70	12225.51	1135.53	0.06
W100_upstrm	128104.6	Max WS	18461.32	-4.29	40.78	10.49	40.82	0.000214	1.70	12224.40	1135.49	0.06
W100_upstrm	128066.7 SHEPHERD		Bridge									
W100_upstrm	128028.8	Max WS	18459.46	-4.51	40.72		40.77	0.000172	1.69	12413.41	1142.07	0.06
W100_upstrm	126647.0	Max WS	18453.76	-3.93	40.61		40.63	0.000023	0.96	20266.71	1031.41	0.03
W100_upstrm	125376.9	Max WS	18536.22	-4.05	40.44		40.50	0.000185	1.98	9963.07	846.55	0.08
W100_upstrm	124983.5	Max WS	18566.21	-3.86	40.43		40.46	0.000022	1.42	20735.66	1400.22	0.06
W100_upstrm	124644.1	Max WS	18585.95	-3.69	40.38	13.71	40.45	0.000049	2.12	8781.32	633.20	0.08
W100_upstrm	124591.8 WAUGH DRIVE		Bridge									
W100_upstrm	124539.5	Max WS	18582.40	-3.74	40.36		40.43	0.000049	2.11	8790.33	636.28	0.08
W100_upstrm	123658.2	Max WS	18652.66	-2.04	40.37		40.38	0.000016	0.87	28524.28	2430.45	0.03
W100_upstrm	123138.8	Max WS	18687.12	-4.08	40.36		40.37	0.000013	0.81	26870.10	1736.73	0.03
W100_upstrm	122627.1	Max WS	18725.69	-6.08	40.34		40.39	0.000022	1.57	17562.99	1313.00	0.05
W100_upstrm	122572.1 MONTROSE COURT		Mult Open									
W100_upstrm	122517.1	Max WS	18726.88	-5.38	40.34		40.37	0.000038	1.46	16549.06	1232.62	0.05
W100_upstrm	122371.6	Max WS	18737.35	-7.00	40.34	9.26	40.36	0.000039	1.42	17374.99	1136.42	0.05
W100_upstrm	122265 ROSEMONT		Bridge									
W100_upstrm	122210.0	Max WS	18731.98	-5.60	40.30		40.33	0.000034	1.59	15017.98	832.74	0.05
W100_upstrm	122036.7	Max WS	18742.81	-8.40	40.29		40.32	0.000031	1.48	15769.63	999.42	0.05
W100_upstrm	121229.5	Max WS	18802.59	-11.37	40.27		40.30	0.000027	1.41	17033.90	1074.52	0.05
W100_upstrm	120962.2	Max WS	18818.15	-10.59	40.25		40.29	0.000041	1.81	13517.97	1114.37	0.06
W100_upstrm	120005.2	Max WS	18877.21	-7.78	40.24	8.37	40.25	0.000029	0.81	23334.28	1068.29	0.03
W100_upstrm	119952.6 MEMORIAL DRIVE		Bridge									
W100_upstrm	119900.0	Max WS	18867.48	-7.64	40.18		40.19	0.000019	0.82	23115.84	1064.41	0.03
W100_upstrm	119495.9	Max WS	18896.95	-7.21	40.17		40.18	0.000010	0.59	33155.48	1376.50	0.02
W100_upstrm	118667.7	Max WS	18962.97	-8.56	40.15		40.16	0.000030	1.07	18992.20	1277.94	0.04
W100_upstrm	118466.1	Max WS	18971.42	-8.89	40.13	5.89	40.16	0.000023	1.42	17849.52	1316.08	0.05
W100_upstrm	118418.1 MEMORIAL DRIVE		Bridge									
W100_upstrm	118370.1	Max WS	18966.75	-8.87	40.11		40.14	0.000024	1.42	17796.05	1311.30	0.05
W100_upstrm	117845.4	Max WS	19003.08	-7.26	40.10		40.12	0.000036	1.34	16311.04	1005.01	0.05
W100_upstrm	117204.3	Max WS	19047.99	-4.60	40.09		40.10	0.000021	1.08	19287.11	1329.14	0.04
W100_upstrm	116395.7	Max WS	19094.94	-3.88	40.06		40.09	0.000026	1.27	15294.30	1007.28	0.05
W100_upstrm	116167.6	Max WS	19088.97	-3.68	40.00	7.85	40.08	0.000105	2.17	9854.02	1148.94	0.07
W100_upstrm	116121.9 SABINE AVENUE		Bridge									
W100_upstrm	116076.2	Max WS	19038.79	-3.86	39.87		39.94	0.000121	2.14	9911.13	1167.94	0.07
W100_upstrm	115804.5	Max WS	19038.53	-4.60	39.83		39.94	0.000047	2.95	12572.13	1424.95	0.08
W100_upstrm	115740.6	Max WS	19044.37	-4.78	39.83	8.33	39.93	0.000042	2.74	12084.19	1519.41	0.08
W100_upstrm	115700 I-45 Allen Pkwy		Bridge									
W100_upstrm	115674.0	Max WS	19032.18	-5.10	39.80		39.90	0.000044	2.76	12268.45	1656.04	0.08
W100_upstrm	115662.6	Max WS	19030.94	-5.20	39.80	8.32	39.90	0.000042	2.67	11991.13	1732.30	0.08
W100_upstrm	115635.5 I-45 Houston Ave		Bridge									
W100_upstrm	115621.1	Max WS	19040.15	-5.57	39.80		39.88	0.000035	2.52	12546.54	1761.02	0.07
W100_upstrm	115587.7	Max WS	19051.54	-6.22	39.82	8.17	39.88	0.000033	2.45	17935.50	2027.44	0.07
W100_upstrm	115553.5 I-45 SBML		Bridge									
W100_upstrm	115514.4	Max WS	19056.56	-6.96	39.82		39.87	0.000024	2.09	20067.96	2232.82	0.06
W100_upstrm	115509.1	Max WS	19053.99	-6.99	39.82	7.23	39.87	0.000024	2.11	20145.62	2262.89	0.06
W100_upstrm	115490 I-45 NBML		Bridge									
W100_upstrm	115423.0	Max WS	19050.95	-7.30	39.81		39.85	0.000023	2.02	18531.02	2070.36	0.06
W100_upstrm	115365.4	Max WS	19054.01	-7.52	39.81		39.85	0.000021	1.93	20322.15	2267.73	0.05
W100_upstrm	115284.6	Max WS	19057.60	-7.89	39.81		39.85	0.000022	2.00	26193.94	1777.75	0.06
W100_upstrm	115104.1	Max WS	19063.08	-8.31	39.80		39.85	0.000018	1.85	22048.35	1832.01	0.05
W100_upstrm	115001.2	Max WS	19054.12	-8.48	39.77	6.10	39.87	0.000041	2.76	18129.44	1755.06	0.08
W100_upstrm	115000 I-45 Ramp McKee		Bridge									
W100_upstrm	114907.3	Max WS	19057.32	-9.19	39.77		39.86	0.000036	2.52	15967.60	1699.22	0.07
W100_upstrm	114842.1	Max WS	19057.94	-9.48	39.77	5.77	39.87	0.000042	2.66	15900.43	1620.58	0.08
W100_upstrm	114830 I-45 Ramp Walker		Bridge									
W100_upstrm	114804.3	Max WS	19045.15	-9.61	39.75		39.85	0.000044	2.72	16178.43	1635.21	0.08

HEC-RAS Plan: Det_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
W100_upstrm	114492.0	Max WS	19078.70	-10.48	39.77		39.81	0.000039	1.73	13856.86	1564.34	0.06
W100_upstrm	114195.9	Max WS	19074.81	-11.52	39.73	5.78	39.79	0.000153	1.94	12028.18	1251.96	0.07
W100_upstrm	114168.9 RUSK STREET		Bridge									
W100_upstrm	114141.9	Max WS	19000.22	-10.83	39.65		39.71	0.000169	2.01	11103.92	1162.65	0.07
W100_upstrm	114097.4	Max WS	19004.77	-7.46	39.66	7.11	39.70	0.000071	1.75	13779.32	1460.80	0.06
W100_upstrm	114070.4 CAPITAL STREE		Bridge									
W100_upstrm	114043.4	Max WS	18973.86	-7.72	39.61		39.65	0.000069	1.73	14093.13	1529.60	0.06
W100_upstrm	113644.0	Max WS	18961.51	-8.91	39.55		39.65	0.000045	2.64	11694.84	904.37	0.08
W100_upstrm	113411.6	Max WS	18998.74	-9.61	39.58	4.21	39.60	0.000141	1.35	14247.24	955.32	0.05
W100_upstrm	113374.3 TEXAS AVE		Bridge									
W100_upstrm	113337.0	Max WS	18811.77	-9.65	39.40		39.42	0.000141	1.35	14113.12	944.52	0.05
W100_upstrm	113266.4	Max WS	18747.88	-9.11	39.32	7.51	39.43	0.000179	2.74	9095.56	825.42	0.09
W100_upstrm	113238.6 BAGBY		Bridge									
W100_upstrm	113210.8	Max WS	18643.80	-9.46	39.20		39.30	0.000176	2.69	9282.82	838.91	0.09
W100_upstrm	112974.0	Max WS	18609.29	-10.69	39.14	6.59	39.26	0.000161	2.84	7513.39	810.28	0.09
W100_upstrm	112944.9 PRAIRIE		Bridge									
W100_upstrm	112915.8	Max WS	18479.53	-10.82	39.09		39.21	0.000158	2.81	7579.10	814.07	0.09
W100_upstrm	112575.5	Max WS	18493.21	-9.20	39.08	7.96	39.14	0.000159	2.14	12673.48	1403.97	0.07
W100_upstrm	112534.5 PRESTON STREET		Bridge									
W100_upstrm	112493.5	Max WS	18424.28	-9.47	39.02		39.09	0.000153	2.11	12979.10	1443.67	0.07
W100_upstrm	112003.3	Max WS	18414.58	-9.69	38.96	5.05	39.02	0.000114	1.92	10941.47	957.62	0.06
W100_upstrm	111953.3 CONGRESS STREET		Bridge									
W100_upstrm	111903.3	Max WS	18292.01	-9.84	38.84		38.89	0.000112	1.90	10968.04	961.49	0.06
W100_upstrm	111853.5	Max WS	18283.74	-9.86	38.82	4.99	38.89	0.000124	2.14	10159.86	932.19	0.06
W100_upstrm	111818.6 SMITH STREET		Bridge									
W100_upstrm	111783.7	Max WS	18213.08	-8.67	38.74		38.82	0.000142	2.24	9120.02	729.74	0.07
W100_upstrm	111626.7	Max WS	18224.18	-11.83	38.73	5.36	38.80	0.000135	2.11	10559.15	840.34	0.07
W100_upstrm	111518.6 LOUISIANA		Bridge									
W100_upstrm	111410.5	Max WS	18011.38	-11.23	38.55		38.62	0.000102	2.16	9924.16	793.16	0.07
W100_upstrm	110876.6	Max WS	18040.16	-10.43	38.54	2.61	38.57	0.000058	1.50	18489.34	1610.85	0.05
W100_upstrm	110837.8 MILAM		Bridge									
W100_upstrm	110799.0	Max WS	18032.30	-10.72	38.53		38.56	0.000152	1.43	18939.01	1614.78	0.04
W100_upstrm	110672.7	Max WS	18025.58	-13.25	38.51	2.75	38.54	0.000117	1.70	19760.85	1444.57	0.05
W100_upstrm	110643.7 TRAVIS STREET		Bridge									
W100_upstrm	110614.7	Max WS	18005.44	-12.75	38.47		38.51	0.000131	1.74	18990.72	1431.10	0.05
W100_upstrm	110200.2	Max WS	18025.55	-9.11	38.43	5.16	38.47	0.000039	1.55	13900.08	775.87	0.05
W100_upstrm	110154.2 MAIN STREET		Bridge									
W100_upstrm	110108.2	Max WS	18012.68	-9.31	38.42		38.46	0.000039	1.54	14044.01	780.53	0.05
W100_upstrm	110103.2	Max WS	18012.68	-9.31	38.42		38.45	0.000039	1.54	14043.85	780.52	0.05
Downstream	109924.2	Max WS	57139.54	-13.02	38.42		38.88	0.000571	5.48	12805.61	2487.30	0.17
Downstream	109551.7	Max WS	57136.13	-14.28	38.28	9.94	38.65	0.000545	4.89	14579.08	2214.76	0.16
Downstream	109518.7 FANNIN STREET		Bridge									
Downstream	109485.7	Max WS	57131.82	-15.31	38.10		38.43	0.000485	4.70	16464.37	2241.04	0.15
Downstream	109440.2	Max WS	57128.16	-16.48	38.00	8.87	38.41	0.000830	5.16	11909.48	2398.24	0.16
Downstream	109395.2 SAN JACINTO STRE		Bridge									
Downstream	109350.2	Max WS	57107.67	-16.89	37.12		37.55	0.000878	5.26	10862.35	2387.64	0.16
Downstream	109119.0	Max WS	57100.11	-17.14	36.80	10.44	37.16	0.002510	4.88	13412.17	2203.16	0.18
Downstream	109103.1 CROSSWALK		Bridge									
Downstream	109087.2	Max WS	57092.04	-17.55	36.52		36.88	0.002452	4.84	13574.91	2276.99	0.18
Downstream	108565.3	Max WS	57061.25	-12.77	35.53		36.00	0.001017	5.60	13841.95	1720.07	0.18
Downstream	108334.0	Max WS	57058.13	-14.06	35.31		35.66	0.001040	4.93	16587.51	1525.56	0.16
Downstream	107179.4	Max WS	57050.75	-20.52	34.16	5.49	34.69	0.000956	6.07	10482.11	657.71	0.19
Downstream	107158.9 S. PACIFIC RR		Bridge									
Downstream	107138.4	Max WS	57051.22	-20.19	33.95		34.51	0.001007	6.20	10263.72	517.67	0.19
Downstream	106594.0	Max WS	57045.71	-16.70	33.24		33.80	0.001553	6.01	9545.34	616.99	0.20
Downstream	106151.4	Max WS	57038.30	-13.85	32.30	7.70	32.94	0.002347	6.43	8865.73	304.06	0.21
Downstream	106131.1 MCKEE		Bridge									
Downstream	106110.8	Max WS	57037.50	-12.53	31.93		32.65	0.002642	6.82	8357.98	295.94	0.23
Downstream	105705.4	Max WS	57025.09	-18.22	31.34	6.18	31.99	0.000594	6.49	8793.94	430.64	0.24
Downstream	105667.4 ELYSIAN STREET		Bridge									
Downstream	105629.4	Max WS	57028.86	-18.43	31.00		31.66	0.000602	6.52	8744.25	424.06	0.24
Downstream	105476	Max WS	57016.25	-18.70	30.99		31.49	0.001627	5.67	10079.62	450.56	0.21
Downstream	104962	Max WS	56964.93	-18.70	30.66		30.84	0.000796	3.42	16655.63	810.99	0.13
Downstream	104900	Max WS	56841.73	-19.15	30.56		30.72	0.000199	3.23	17653.26	921.98	0.13
Downstream	104895		Lat Struct									
Downstream	104464	Max WS	56152.05	-19.86	30.25		30.50	0.001684	3.94	14246.41	761.15	0.16
Downstream	104301	Max WS	56641.50	-20.42	30.03		30.33	0.000282	4.42	12895.71	798.05	0.18
Downstream	104242	Max WS	56854.50	-20.62	29.84		30.23	0.002952	5.02	11324.03	600.81	0.20
Downstream	104118.0	Max WS	57017.09	-21.10	29.47	11.03	29.98	0.001197	6.22	11587.96	969.70	0.22
Downstream	104070 Prop I-69 Ramp		Bridge									
Downstream	103955.1	Max WS	57016.51	-21.79	29.35		29.79	0.000758	5.54	12074.99	828.15	0.18
Downstream	103955.0	Max WS	57016.71	-21.79	29.35	5.99	29.79	0.000758	5.54	12074.93	828.15	0.18
Downstream	103846 Prop I-69 DC		Bridge									
Downstream	103786.1	Max WS	57014.84	-22.51	29.09		29.55	0.000880	5.59	11388.63	752.89	0.19
Downstream	103786.0	Max WS	57015.48	-22.51	29.09	5.33	29.55	0.000880	5.59	11388.56	752.89	0.19
Downstream	103694 Prop I-69 SBML		Bridge									
Downstream	103534.1	Max WS	57013.14	-23.58	28.57		29.12	0.000931	6.02	10218.44	619.42	0.20
Downstream	103534.0	Max WS	57013.14	-23.58	28.57	4.71	29.12	0.000931	6.02	10218.37	619.42	0.20
Downstream	103383 Prop I-45 SBML		Bridge									
Downstream	103241.1	Max WS	57011.84	-24.83	28.30		28.84	0.001829	5.87	9734.08	505.99	0.22
Downstream	103241.0	Max WS	57011.61	-24.83	28.30	4.70	28.84	0.001829	5.87	9733.99	505.98	0.22
Downstream	103161 Prop I-69 NBML		Bridge									
Downstream	103095.1	Max WS	57009.39	-25.45	27.99		28.57	0.000637	6.11	9334.10	379.44	0.21
Downstream	103095.0	Max WS	57009.39	-25.45	27.99	4.45	28.57	0.000637	6.11	9334.08	379.43	0.21
Downstream	103065 Prop I-45 DC		Bridge									
Downstream	103025.1	Max WS	57008.04	-25.75	27.78		28.42	0.000633	6.42	8881.29	320.41	0.21
Downstream	103025.0	Max WS	57007.81	-25.75	27.78	3.60	28.42	0.000633	6.42	8881.26	320.41	0.21

HEC-RAS Plan: Det_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Downstream	102988 Prop I-10 DC		Bridge									
Downstream	102952	Max WS	57005.31	-26.06	27.34		28.11	0.001112	7.08	8130.97	412.89	0.26
Downstream	102895.0	Max WS	57002.95	-26.31	27.06		28.04	0.001632	7.94	7175.77	312.97	0.29
Downstream	102875.3	Max WS	57005.07	-26.39	27.38	9.79	28.00	0.001406	6.30	9043.26	405.79	0.24
Downstream	102847.5 HOUTerminal RR		Bridge									
Downstream	102819.7	Max WS	57003.44	-26.43	26.98		27.61	0.001462	6.41	8894.32	403.26	0.24
Downstream	102309.0	Max WS	57053.70	-23.48	26.31		27.07	0.000657	6.99	8160.48	232.12	0.21
Downstream	101828.0	Max WS	57099.14	-20.70	25.79	3.01	26.57	0.001425	7.08	8091.97	373.23	0.25
Downstream	101790.1 JENSEN ROAD		Bridge									
Downstream	101752.2	Max WS	57096.77	-20.69	25.47		26.27	0.001483	7.18	7969.74	369.74	0.26
Downstream	101007.3	Max WS	57172.27	-16.93	24.84		25.56	0.000409	6.83	8374.43	285.19	0.22
Downstream	99992.6	Max WS	57274.38	-18.90	24.24		25.04	0.000624	7.19	7970.73	275.36	0.24
Downstream	98399.4	Max WS	57441.07	-20.26	23.41		24.17	0.000463	6.99	8220.20	289.05	0.23
Downstream	97517.4	Max WS	57530.12	-19.35	23.35		23.81	0.000330	5.47	10515.97	323.64	0.17
Downstream	96028.6	Max WS	57673.39	-17.81	22.32	0.91	23.01	0.000752	6.64	8688.69	319.70	0.22
Downstream	95985.1 YORK DRIVE		Bridge									
Downstream	95941.6	Max WS	57673.03	-17.87	22.16		22.85	0.000759	6.66	8655.68	319.39	0.23
Downstream	95362.9	Max WS	57732.93	-15.97	21.93		22.52	0.000367	6.15	9385.68	356.96	0.21
Downstream	94280.7	Max WS	57848.90	-19.82	20.43		21.47	0.001578	8.18	7074.91	300.40	0.30
Downstream	93495.6	Max WS	57920.18	-20.43	19.81		20.49	0.000907	6.64	8728.64	388.68	0.25
Downstream	92795.6	Max WS	57999.44	-20.98	19.24	-1.80	20.00	0.000502	7.00	8281.53	333.81	0.25
Downstream	92741.1 LOCKWOOD DRIVE		Bridge									
Downstream	92686.6	Max WS	57998.60	-21.08	18.99		19.76	0.000511	7.04	8232.83	332.63	0.25
Downstream	90936.7	Max WS	58177.45	-18.64	17.66		18.29	0.001160	6.38	9120.08	430.59	0.24
Downstream	89918.4	Max WS	58281.56	-17.23	16.37		17.29	0.000856	7.79	8532.01	713.29	0.29
Downstream	88579.0	Max WS	58418.35	-20.97	15.05		15.98	0.001079	7.75	7533.19	362.19	0.30
Downstream	87591.9	Max WS	58526.11	-23.72	14.26		15.12	0.000667	7.42	7891.95	312.32	0.26
Downstream	86660.2	Max WS	58612.31	-23.42	13.81	-6.78	14.54	0.000579	6.85	8553.33	313.18	0.23
Downstream	86641.7 HOUTerminal RR		Bridge									
Downstream	86623.2	Max WS	58612.15	-23.61	13.38		14.12	0.000586	6.91	8478.21	312.21	0.23
Downstream	85855.2	Max WS	58691.01	-26.84	11.90		13.50	0.001091	10.17	5769.33	250.11	0.37
Downstream	85238.7	Max WS	58751.96	-29.43	11.48		12.80	0.001174	9.30	6827.43	357.67	0.31
Downstream	84561.7	Max WS	58836.41	-32.27	11.07	-9.12	12.16	0.000629	8.45	7556.02	434.90	0.29
Downstream	84531.4 NORTH WAYSIDE RD		Bridge									
Downstream	84501.1	Max WS	58835.93	-28.97	9.94		11.54	0.001073	10.14	5911.16	304.59	0.35
Downstream	84252.6	Max WS	58861.67	-26.90	9.98	-5.92	11.29	0.000860	9.18	6576.54	452.44	0.32
Downstream	84222.3 M. GARCIA		Bridge									
Downstream	84192.0	Max WS	58860.94	-24.10	8.75		10.60	0.001463	10.90	5401.73	240.45	0.41
Downstream	83635.7	Max WS	58918.29	-21.72	8.85		9.89	0.001030	8.18	7202.17	391.75	0.34
Downstream	81786.1	Max WS	59102.63	-31.97	7.16		8.17	0.000824	8.03	7378.19	355.07	0.31
Downstream	80903.1	Max WS	59190.86	-27.77	6.69	-9.33	7.47	0.000739	7.09	8349.06	405.09	0.28
Downstream	80883.1 S. PACIFIC RR		Bridge									
Downstream	80863.1	Max WS	59190.86	-28.10	6.09		6.90	0.000879	7.18	8241.20	403.81	0.28
Downstream	80538.0	Max WS	59190.86	-33.12	6.37	-17.35	6.69	0.000236	4.52	13107.16	505.26	0.16

White Oak Bayou
Scenario 4: Detention Only 100-Year

HEC-RAS Plan: Det_100yr Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	36134.	Max WS	32203.85	24.19	57.04		57.85	0.000610	7.35	5986.23	1223.59	0.30
E100-00-00	35718.0	Max WS	32122.02	23.76	56.67		57.61	0.000591	7.87	4662.55	761.08	0.32
E100-00-00	35158.	Max WS	32164.27	22.89	56.57		57.25	0.000541	6.83	6885.69	1536.06	0.28
E100-00-00	35006.0	Max WS	32164.47	22.66	56.46	42.96	57.19	0.000460	7.15	7065.53	1711.52	0.29
E100-00-00	34951.5 ELLA		Bridge									
E100-00-00	34895.0	Max WS	32160.42	22.56	56.32		57.06	0.000465	7.17	7004.35	1662.66	0.29
E100-00-00	34645.	Max WS	32179.19	22.24	56.31		56.92	0.000414	6.66	7577.45	1651.27	0.26
E100-00-00	34206.0	Max WS	32188.01	21.68	56.08		56.73	0.000419	6.77	7674.20	2909.82	0.27
E100-00-00	33962.58	Max WS	32234.73	21.61	56.18		56.51	0.000249	4.93	11232.58	3030.33	0.21
E100-00-00	33909.08	Max WS	32238.39	21.60	56.18		56.49	0.000308	4.88	11215.33	3065.05	0.21
E100-00-00	33770.	Max WS	32242.58	21.56	56.13		56.47	0.000220	5.20	11574.28	2832.88	0.20
E100-00-00	33681.0	Max WS	32239.54	21.53	56.02	41.98	56.53	0.000321	6.26	10960.93	2929.07	0.24
E100-00-00	33645.5 W 18TH		Bridge									
E100-00-00	33610.0	Max WS	32235.13	21.61	55.83		56.38	0.000352	6.50	10174.06	2777.13	0.25
E100-00-00	33357.	Max WS	32225.96	21.41	55.64		56.29	0.000586	6.70	7712.51	2458.60	0.28
E100-00-00	32570.0	Max WS	32233.39	20.78	55.26		55.83	0.000370	6.35	9761.07	2912.82	0.25
E100-00-00	31583.0	Max WS	32268.40	19.35	55.05		55.48	0.000258	5.70	12496.86	4322.72	0.22
E100-00-00	30779.0	Max WS	32315.40	18.79	54.87		55.27	0.000227	5.56	12100.07	3220.14	0.21
E100-00-00	29659.	Max WS	32376.72	17.66	54.70		54.98	0.000235	4.73	13816.79	4425.89	0.18
E100-00-00	29368.0	Max WS	32401.48	17.37	54.40	38.52	55.00	0.000348	6.60	9196.91	2760.26	0.24
E100-00-00	29297.5 TC JESTER SOUTH		Bridge									
E100-00-00	29203.0	Max WS	32374.43	17.35	53.76		54.46	0.000406	7.00	8111.34	2372.57	0.26
E100-00-00	28775.	Max WS	32416.47	16.90	53.85		54.15	0.000271	4.76	12975.06	3659.49	0.19
E100-00-00	28375.0	Max WS	32420.32	16.48	53.68	37.47	54.16	0.000307	5.96	11386.14	3484.20	0.23
E100-00-00	28357.0 BICYCLE BRIDGE		Bridge									
E100-00-00	28330.0	Max WS	32399.32	16.41	53.42		53.92	0.000324	6.08	10910.30	3386.57	0.24
E100-00-00	28190.0	Max WS	32402.67	16.18	53.34	37.01	53.91	0.000288	6.37	10437.00	2758.14	0.23
E100-00-00	28152.5 W 11TH		Bridge									
E100-00-00	28113.0	Max WS	32394.11	16.28	53.08		53.70	0.000316	6.60	9455.03	2674.79	0.24
E100-00-00	27982.	Max WS	32400.88	16.25	53.07		53.63	0.000380	6.36	9834.07	2584.43	0.25
E100-00-00	27429.0	Max WS	32419.41	16.12	52.90		53.44	0.000376	6.18	9478.73	2543.61	0.25
E100-00-00	26598.	Max WS	32486.78	15.35	52.61		53.07	0.000304	5.75	7914.17	3852.09	0.23
E100-00-00	26498.0	Max WS	32492.91	15.26	52.54	35.81	53.05	0.000304	5.92	7240.14	3437.58	0.23
E100-00-00	26432.5 TC JESTER		Bridge									
E100-00-00	26366.0	Max WS	32477.64	15.16	52.27		52.79	0.000315	6.00	7053.86	3013.79	0.23
E100-00-00	26307.3	Max WS	32485.66	15.13	52.38		52.74	0.000241	5.12	9140.69	2924.25	0.19
E100-00-00	26225	Max WS	32489.76	15.04	52.35		52.72	0.000256	5.16	8774.30	2562.91	0.20
E100-00-00	26140.	Max WS	32491.24	14.97	52.27		52.74	0.000267	5.84	9728.77	2828.15	0.22
E100-00-00	25536.0	Max WS	32519.08	14.48	52.09		52.60	0.000289	5.96	9348.32	1543.64	0.23
E100-00-00	25132.	Max WS	32542.27	14.29	51.96		52.49	0.000256	6.06	7502.53	1289.40	0.23
E100-00-00	24817.0	Max WS	32555.15	14.14	51.69	36.16	52.38	0.000444	6.73	4977.14	734.26	0.27
E100-00-00	24789.0 UNION PACIFIC RR		Bridge									
E100-00-00	24758.0	Max WS	32544.33	13.76	51.40		52.10	0.000442	6.72	4971.54	683.71	0.27
E100-00-00	24636.	Max WS	32563.08	13.61	51.67		52.03	0.000255	5.19	8583.37	1404.05	0.20
E100-00-00	23934.0	Max WS	32598.33	12.75	51.38		51.83	0.000313	5.44	7260.68	1038.48	0.22
E100-00-00	23550.0	Max WS	32620.63	12.77	51.27	32.95	51.70	0.000285	5.30	6633.17	703.84	0.21
E100-00-00	23506.5 DURHAM		Bridge									
E100-00-00	23444.0	Max WS	32617.71	12.69	51.15		51.58	0.000287	5.32	6606.13	696.43	0.21
E100-00-00	23180.	Max WS	32631.38	12.46	51.16		51.55	0.000189	5.40	10076.69	1338.59	0.19
E100-00-00	22983.	Max WS	32638.70	12.29	51.11		51.52	0.000247	5.63	10186.91	1723.17	0.21
E100-00-00	22834.0	Max WS	32647.02	12.16	51.05	34.60	51.49	0.000329	5.79	11093.05	1778.21	0.21
E100-00-00	22796.5 SHEPHERD		Bridge									
E100-00-00	22758.0	Max WS	32643.75	12.11	50.94		51.37	0.000355	5.79	10979.75	1772.60	0.22
E100-00-00	22610.	Max WS	32651.90	11.92	50.95		51.29	0.000279	5.23	11015.24	1992.32	0.19
E100-00-00	22224.0	Max WS	32674.90	11.41	50.94		51.14	0.000221	4.03	14366.86	2049.30	0.15
E100-00-00	21444.0	Max WS	32707.64	10.52	50.65		51.02	0.000310	5.32	10559.50	1661.37	0.20
E100-00-00	20746.0	Max WS	32740.19	10.00	50.28		50.60	0.000908	4.85	9974.45	1884.83	0.20
E100-00-00	20644.0	Max WS	32746.86	9.95	50.29	32.51	50.52	0.000195	4.49	14254.69	1862.75	0.16
E100-00-00	20633.0 Pipeline		Bridge									
E100-00-00	20622.0	Max WS	32746.13	9.95	50.19		50.43	0.000199	4.53	14051.62	1860.16	0.16
E100-00-00	20521.	Max WS	32751.54	9.91	50.15		50.43	0.000209	4.87	13328.39	1702.00	0.17
E100-00-00	19917.0	Max WS	32785.92	9.66	49.74		50.33	0.000421	6.22	7339.06	901.01	0.23
E100-00-00	19463.0	Max WS	32811.46	9.25	49.57		50.13	0.000421	6.12	9025.86	1568.33	0.23
E100-00-00	18857	Max WS	32844.84	8.03	49.40	31.90	49.89	0.000351	5.94	6724.88	1080.94	0.21
E100-00-00	18800 I-10 WBFR		Bridge									
E100-00-00	18747	Max WS	32842.22	7.81	48.91		49.34	0.000286	5.51	7127.22	1019.58	0.19
E100-00-00	18746	Max WS	32842.04	7.81	48.91	30.35	49.34	0.000286	5.51	7127.08	1019.56	0.19
E100-00-00	18595 I-10 BRIDGE		Bridge									
E100-00-00	18443	Max WS	32840.22	7.19	48.34		48.78	0.000341	5.52	7042.32	985.13	0.21
E100-00-00	18442	Max WS	32840.75	7.19	48.34	30.00	48.78	0.000341	5.52	7042.14	985.07	0.21
E100-00-00	18394 I-10 EBFR		Bridge									
E100-00-00	18377.	Max WS	32827.36	6.98	47.34		47.87	0.000396	6.01	6509.34	775.32	0.22
E100-00-00	18234.0	Max WS	32839.53	6.77	47.45	29.42	47.78	0.000268	4.67	8066.89	1162.42	0.18
E100-00-00	18220.0 UNION PACIFIC RR		Bridge									
E100-00-00	18199.0	Max WS	32833.32	6.70	47.05		47.41	0.000268	4.84	7755.62	1050.46	0.18
E100-00-00	18176.0	Max WS	32833.94	6.79	47.01	28.80	47.41	0.000283	5.22	8129.33	1271.47	0.19
E100-00-00	18138.0 YALE		Bridge									
E100-00-00	18082.0	Max WS	32764.02	6.87	45.47		46.04	0.000453	6.19	6609.58	836.60	0.24
E100-00-00	17905.	Max WS	32775.28	6.86	45.49		45.95	0.000373	5.69	8662.00	1303.14	0.22
E100-00-00	17756.0	Max WS	32782.84	6.85	45.49	29.76	45.88	0.000366	5.22	8483.17	1254.00	0.21
E100-00-00	17726 S. HEIGHTS		Bridge									
E100-00-00	17696	Max WS	32737.50	6.85	45.14		45.55	0.000394	5.35	8168.77	1222.48	0.22
E100-00-00	17657	Max WS	32735.50	6.35	45.10	29.26	45.53	0.000385	5.38	7618.26	818.01	0.21
E100-00-00	17627 N. HEIGHTS		Bridge									
E100-00-00	17597.0	Max WS	32614.08	6.35	44.09		44.59	0.000471	5.74	6822.12	766.80	0.23
E100-00-00	17318.	Max WS	32589.16	6.35	43.72		44.44	0.000648	6.83	4840.15	370.08	0.28
E100-00-00	16831.0	Max WS	32625.81	6.34	43.86		44.21	0.000222	4.76	6860.78	509.31	0.23

HEC-RAS Plan: Det_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00	15795.0	Max WS	32626.79	4.84	43.75		43.97	0.000236	3.81	9165.22	790.61	0.16
E100-00-00	15278.	Max WS	32595.90	4.41	43.40		43.89	0.000271	5.74	6822.38	674.19	0.22
E100-00-00	14977.0	Max WS	32600.34	4.16	43.40	26.14	43.81	0.000124	5.19	7640.98	711.51	0.20
E100-00-00	14937.0 I-10 EBFR ACCESS		Bridge									
E100-00-00	14897.0	Max WS	32553.45	3.39	42.91		43.31	0.000121	5.14	7508.45	703.01	0.19
E100-00-00	14890	Max WS	32542.68	3.42	42.83	25.45	43.33	0.000149	5.73	6932.45	775.46	0.22
E100-00-00	14775 I-10 BRIDGE		Bridge									
E100-00-00	14660	Max WS	32530.10	3.42	42.72		43.22	0.000152	5.76	6844.71	769.71	0.22
E100-00-00	14590.0	Max WS	32516.67	3.45	42.57	25.82	43.24	0.000203	6.59	6047.47	860.61	0.25
E100-00-00	14562.0 I-10 WB ACCESS		Bridge									
E100-00-00	14532.0	Max WS	32391.67	3.41	41.51		42.25	0.000580	6.92	5143.77	762.21	0.27
E100-00-00	14354.0	Max WS	32431.11	3.29	41.88		42.11	0.000135	3.88	8985.27	759.67	0.17
E100-00-00	13924.0	Max WS	32414.19	3.18	41.59	24.47	42.03	0.000355	5.53	6634.49	398.04	0.21
E100-00-00	13909.5 UNION PAC. RR		Bridge									
E100-00-00	13898.0	Max WS	32408.39	2.95	41.35		41.80	0.000358	5.55	6593.72	395.91	0.21
E100-00-00	13494.	Max WS	32413.75	2.47	41.38		41.64	0.000355	4.27	8358.76	572.25	0.17
E100-00-00	13220.0	Max WS	32419.17	2.15	41.41	23.73	41.57	0.000091	3.39	11691.81	908.21	0.13
E100-00-00	13182.5 STUDEMONT		Bridge									
E100-00-00	13143.0	Max WS	32402.43	2.15	41.18		41.37	0.000100	3.54	10671.19	817.80	0.13
E100-00-00	12698.	Max WS	32387.74	1.87	40.98		41.29	0.000263	4.48	7339.13	527.78	0.19
E100-00-00	12066.0	Max WS	32388.44	1.47	40.93		41.13	0.000229	3.60	9002.81	521.94	0.15
E100-00-00	11546.0	Max WS	32397.32	0.90	40.93		41.05	0.000079	2.95	13639.62	1282.75	0.12
E100-00-00	11021.	Max WS	32399.94	0.63	40.88		41.01	0.000074	3.05	12954.12	1623.09	0.12
E100-00-00	10908.0	Max WS	32401.77	0.57	40.90	22.24	41.00	0.000060	2.83	15783.10	1788.28	0.11
E100-00-00	10852.5 TAYLOR (SAWYER)		Bridge									
E100-00-00	10804.0	Max WS	32399.97	0.45	40.87		40.96	0.000059	2.79	15911.37	1792.54	0.10
E100-00-00	10643.	Max WS	32392.15	0.14	40.69		40.99	0.000220	4.62	8837.66	1427.62	0.17
E100-00-00	9779.0	Max WS	32402.57	-1.51	40.69		40.83	0.000074	3.18	13617.36	1627.16	0.11
E100-00-00	8532.0	Max WS	32416.60	-1.76	40.71		40.74	0.000022	1.51	23647.21	1455.36	0.05
E100-00-00	8140.	Max WS	32420.34	-2.43	40.69		40.72	0.000089	1.46	25829.17	1766.30	0.05
E100-00-00	7649.0	Max WS	32424.98	-3.26	40.64	18.35	40.71	0.000038	2.60	25490.19	1899.12	0.09
E100-00-00	7608.5 HOUSTON		Bridge									
E100-00-00	7568.0	Max WS	32424.98	-3.15	40.65		40.69	0.000024	2.08	25320.20	1883.87	0.07
E100-00-00	7546.0	Max WS	32425.51	-3.16	40.65	18.33	40.69	0.000025	2.11	25228.81	1987.74	0.07
E100-00-00	7535.5 Pipeline		Bridge									
E100-00-00	7529.0	Max WS	32425.06	-3.16	40.63		40.68	0.000025	2.11	25199.35	1982.18	0.07
E100-00-00	7481.0	Max WS	32425.00	-3.17	40.62		40.68	0.000036	2.32	22212.37	2147.91	0.09
E100-00-00	7253.1	Max WS	32425.04	-3.19	40.59		40.67	0.000028	2.41	15224.65	897.13	0.08
E100-00-00	7253.05		Lat Struct									
E100-00-00	7253	Max WS	32423.99	-3.19	40.59	14.60	40.67	0.000028	2.41	15224.64	897.13	0.08
E100-00-00	7205 Prop I-10 DC		Bridge									
E100-00-00	7138.1	Max WS	32423.27	-3.20	40.51		40.62	0.000036	2.66	13997.50	925.57	0.09
E100-00-00	7138	Max WS	32422.26	-3.20	40.51	16.24	40.62	0.000036	2.66	13997.49	925.57	0.09
E100-00-00	7057 Prop I-10 Ramp		Bridge									
E100-00-00	7016.1	Max WS	32419.96	-3.22	40.26		40.48	0.000068	4.00	10784.51	810.77	0.13
E100-00-00	7016	Max WS	32420.79	-3.22	40.26		40.48	0.000068	4.00	10784.51	810.76	0.13
E100-00-00	6980	Max WS	32420.87	-3.22	40.34		40.46	0.000059	2.85	12960.49	814.88	0.10
E100-00-00	6979		Lat Struct									
E100-00-00	6975.0	Max WS	32412.20	-3.22	40.34		40.46	0.000059	2.85	12960.35	814.87	0.10
E100-00-00	6898.0	Max WS	32335.65	-4.23	40.30		40.45	0.000125	3.27	11255.14	762.96	0.11
E100-00-00	6895	Max WS	32335.82	-4.23	40.30		40.45	0.000125	3.27	11254.85	762.95	0.11
E100-00-00_02	6775.	Max WS	40789.15	-4.30	40.30		40.37	0.000045	2.20	20985.76	1676.84	0.08
E100-00-00_02	6637.0	Max WS	40777.16	-4.37	40.27	18.32	40.37	0.000052	2.59	17161.87	1349.79	0.09
E100-00-00_02	6600 Prop I-45 DC		Bridge									
E100-00-00_02	6575.1	Max WS	40766.38	-4.41	40.25		40.35	0.000053	2.59	17390.43	1450.07	0.09
E100-00-00_02	6575.0	Max WS	40769.55	-4.41	40.25	18.57	40.35	0.000053	2.59	17390.43	1450.06	0.09
E100-00-00_02	6551 Prop I-45 Ramp		Bridge									
E100-00-00_02	6515.0	Max WS	40764.89	-4.44	40.24		40.34	0.000053	2.57	17657.32	1436.60	0.09
E100-00-00_02	6387.0	Max WS	40761.67	-4.38	40.23	19.06	40.33	0.000053	2.57	17780.22	1725.47	0.09
E100-00-00_02	6352 Prop I-45 NBML		Bridge									
E100-00-00_02	6298.1	Max WS	40761.67	-4.51	40.23		40.32	0.000049	2.44	20040.18	1822.30	0.08
E100-00-00_02	6298	Max WS	40760.18	-4.51	40.23	17.56	40.32	0.000049	2.44	20040.18	1822.30	0.08
E100-00-00_02	6252 Prop I-45 DC		Bridge									
E100-00-00_02	6201.1	Max WS	40760.18	-4.65	40.23		40.31	0.000036	2.28	20474.94	1892.70	0.08
E100-00-00_02	6201	Max WS	40763.25	-4.65	40.23	16.70	40.31	0.000036	2.28	20474.94	1892.70	0.08
E100-00-00_02	6164 Prop I-45 Ramp		Bridge									
E100-00-00_02	6122.0	Max WS	40736.14	-4.33	40.15		40.26	0.000043	2.74	18223.28	1833.78	0.09
E100-00-00_02	5525.0	Max WS	40734.35	-3.15	40.13		40.23	0.000051	2.46	16621.03	815.80	0.09
E100-00-00_02	4994.0	Max WS	40697.10	-3.09	40.01	17.14	40.18	0.000155	3.55	12818.49	725.52	0.12
E100-00-00_02	4980.0 RR OVERPASS		Bridge									
E100-00-00_02	4961.0	Max WS	40649.83	-3.03	39.91		40.09	0.000172	3.61	12533.34	642.53	0.12
E100-00-00_02	4812.0	Max WS	40559.46	-3.49	39.75	17.27	40.05	0.000413	4.38	9252.28	625.92	0.18
E100-00-00_02	4774.5 CROCKETT/HOGAN		Bridge									
E100-00-00_02	4687.0	Max WS	40519.33	-4.67	39.70		39.94	0.000299	3.90	10380.97	642.21	0.15
E100-00-00_02	4407.	Max WS	40462.39	-3.62	39.61		39.88	0.000230	4.44	10901.56	961.13	0.14
E100-00-00_02	4014.0	Max WS	40456.58	-2.15	39.58	16.08	39.78	0.000199	3.62	11793.66	606.53	0.13
E100-00-00_02	3997.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	3976.0	Max WS	40424.80	-2.40	39.46		39.66	0.000201	3.62	11801.70	607.14	0.13
E100-00-00_02	3681.	Max WS	40396.90	-3.80	39.40		39.61	0.000212	3.93	14013.91	1199.55	0.14
E100-00-00_02	3585.0	Max WS	40351.90	-4.26	39.34		39.60	0.000236	4.34	13962.36	1188.46	0.15
E100-00-00_02	3233.0	Max WS	40418.99	-4.79	39.43	12.90	39.47	0.000049	1.76	26437.20	2023.27	0.07
E100-00-00_02	3094 Prop I-10 WBML		Bridge									
E100-00-00_02	2954.1	Max WS	40398.24	-5.22	39.40		39.45	0.000060	1.80	25601.92	2131.95	0.08
E100-00-00_02	2954.0	Max WS	40399.97	-5.22	39.40	13.15	39.45	0.000060	1.80	25601.92	2131.95	0.08
E100-00-00_02	2857 Prop I-45 BNML		Bridge									
E100-00-00_02	2760.1	Max WS	40380.91	-5.51	39.39		39.43	0.000055	1.73	26882.70	2255.48	0.08
E100-00-00_02	2760.0	Max WS	40384.34	-5.51	39.39	14.44	39.43	0.000055	1.73	26882.69	2255.48	0.08

HEC-RAS Plan: Det_100yr Profile: Max WS (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E100-00-00_02	2639 Prop I-10 WB Exp		Bridge									
E100-00-00_02	2518.1	Max WS	40347.59	-5.88	39.33		39.39	0.000064	2.06	24336.22	2252.31	0.08
E100-00-00_02	2518.0	Max WS	40350.98	-5.88	39.33	15.01	39.39	0.000064	2.06	24336.20	2252.31	0.08
E100-00-00_02	2434 Prop I-45 SBML		Bridge									
E100-00-00_02	2350.1	Max WS	40279.67	-6.13	39.22		39.32	0.000112	2.61	18805.77	2323.28	0.11
E100-00-00_02	2350.0	Max WS	40279.67	-6.13	39.22	15.69	39.32	0.000112	2.61	18805.74	2323.28	0.11
E100-00-00_02	2280 Prop I-10 EBML		Bridge									
E100-00-00_02	2210.0	Max WS	40215.73	-6.34	39.11		39.24	0.000136	2.95	14765.23	2166.48	0.12
E100-00-00_02	1580.	Max WS	40207.33	-7.83	39.10		39.17	0.000088	2.83	22495.64	2222.83	0.09
E100-00-00_02	1353.0	Max WS	40193.90	-8.34	39.06	16.65	39.16	0.000119	3.22	19883.84	2517.69	0.11
E100-00-00_02	1335.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	1319.0	Max WS	39746.06	-8.37	39.04		39.13	0.000114	3.15	20146.08	2636.25	0.10
E100-00-00_02	984.0	Max WS	39643.61	-8.69	38.92	13.27	39.12	0.000110	3.93	19870.50	2966.06	0.13
E100-00-00_02	978 MAIN STREET		Bridge									
E100-00-00_02	971.6	Max WS	39429.59	-8.69	38.77		38.98	0.000119	4.06	16434.23	2943.95	0.14
E100-00-00_02	971.5	Max WS	39429.59	-8.69	38.77	13.21	38.98	0.000119	4.06	16434.20	2943.94	0.14
E100-00-00_02	961.5 1ST STREET		Bridge									
E100-00-00_02	851.0	Max WS	39361.42	-6.40	38.69		38.90	0.000137	4.12	19102.69	2761.76	0.14
E100-00-00_02	654.0	Max WS	39376.40	-6.50	38.70		38.85	0.000084	3.37	21269.36	2733.93	0.11
E100-00-00_02	400.0	Max WS	39314.48	-8.58	38.63	12.84	38.87	0.000126	4.35	19824.95	3164.32	0.14
E100-00-00_02	381.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	365.0	Max WS	39249.59	-8.23	38.56		38.79	0.000125	4.28	19540.93	3181.25	0.14
E100-00-00_02	210.0	Max WS	39224.43	-7.81	38.52	13.23	38.80	0.000145	4.77	19393.50	3219.34	0.15
E100-00-00_02	191.0 UNION PACIFIC RR		Bridge									
E100-00-00_02	173.1	Max WS	39130.92	-6.84	38.42		38.71	0.000158	4.89	18785.88	3504.38	0.16
E100-00-00_02	173.0	Max WS	39126.86	-6.84	38.42		38.71	0.000158	4.89	18785.81	3504.38	0.16

Little White Oak Bayou
Scenario 4: Detention Only 100-Year

HEC-RAS Plan: Det_100yr River: E101-00-00 Reach: E101-00-00_0003 Profile: Max WS

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E101-00-00_0003	9819.000	Max WS	8751.60	16.33	41.28		41.45	0.000306	3.29	2659.70	186.58	0.15
E101-00-00_0003	9750.000	Max WS	8746.13	16.31	41.28		41.43	0.000285	3.15	2780.48	198.96	0.15
E101-00-00_0003	9000.000	Max WS	8666.69	15.50	41.22		41.27	0.000117	1.98	4862.81	558.09	0.09
E101-00-00_0003	8469.000	Max WS	8710.06	13.02	41.15		41.21	0.000138	2.26	4630.88	611.91	0.09
E101-00-00_0003	7984.000	Max WS	8738.42	13.76	41.07		41.14	0.000141	2.41	4479.36	392.79	0.10
E101-00-00_0003	6838.000	Max WS	8653.79	12.20	40.87		40.96	0.000180	2.39	3669.57	430.66	0.13
E101-00-00_0003	5861.000	Max WS	8611.61	9.91	40.69		40.78	0.000184	2.57	4303.20	469.36	0.11
E101-00-00_0003	4720.000	Max WS	8503.60	8.13	40.54		40.63	0.000153	2.78	5685.33	845.44	0.10
E101-00-00_0003	4279.000	Max WS	8412.55	9.00	40.44		40.56	0.000215	2.99	4088.16	634.85	0.12
E101-00-00_0003	4130.000	Max WS	8507.63	8.68	40.47	18.10	40.52	0.000041	1.86	6873.17	867.44	0.07
E101-00-00_0003	4091.000 N. MAIN		Bridge									
E101-00-00_0003	4050.000	Max WS	8441.05	7.87	40.45		40.49	0.000038	1.83	6457.27	772.45	0.07
E101-00-00_0003	3952.	Max WS	8384.59	6.87	40.42		40.49	0.000048	2.12	4325.89	244.39	0.07
E101-00-00_0003	3466.000	Max WS	8463.09	1.92	40.42		40.47	0.000022	2.23	6577.39	628.91	0.07
E101-00-00_0003	3323.0	Max WS	8515.84	-1.03	40.43	12.54	40.46	0.000010	1.57	7961.32	699.63	0.05
E101-00-00_0003	3278.0 I-45 Ramp		Bridge									
E101-00-00_0003	3236.1	Max WS	8494.91	-2.82	40.42		40.44	0.000007	1.26	10287.16	886.23	0.04
E101-00-00_0003	3236.0	Max WS	8491.90	-2.82	40.42	11.16	40.44	0.000007	1.26	10287.16	886.23	0.04
E101-00-00_0003	3085 I-45 NBML		Bridge									
E101-00-00_0003	2958.1	Max WS	8509.91	-2.52	40.43		40.43	0.000002	0.63	23881.89	2632.11	0.02
E101-00-00_0003	2958	Max WS	8508.43	-2.52	40.43	11.23	40.43	0.000002	0.63	23881.89	2632.11	0.02
E101-00-00_0003	2833 I-45 SBML		Bridge									
E101-00-00_0003	2389.000	Max WS	8382.88	-0.26	40.39		40.41	0.000033	1.40	10302.29	912.81	0.04
E101-00-00_0003	2325.	Max WS	8379.43	-0.15	40.39		40.41	0.000033	1.36	10443.49	998.61	0.04
E101-00-00_0003	1855.000	Max WS	8426.70	0.68	40.39		40.40	0.000014	0.93	11505.42	1115.93	0.03
E101-00-00_0003	1126.	Max WS	8447.69	-1.85	40.37		40.39	0.000037	1.17	12334.76	1456.57	0.04
E101-00-00_0003	1070.000	Max WS	8439.25	-2.04	40.37	9.71	40.39	0.000038	1.45	13007.21	1557.56	0.05
E101-00-00_0003	1029.500 WRIGHTWOOD		Bridge									
E101-00-00_0003	987.000	Max WS	8411.07	-2.04	40.35		40.37	0.000041	1.42	12985.37	1556.47	0.04
E101-00-00_0003	911.	Max WS	8422.08	-2.19	40.35		40.37	0.000029	1.24	14023.18	1471.62	0.04
E101-00-00_0003	756.	Max WS	8425.77	-2.51	40.35		40.36	0.000082	0.93	12298.20	1622.03	0.04
E101-00-00_0003	637.000	Max WS	8411.25	-2.75	40.34	11.70	40.35	0.000048	0.83	14972.68	1632.04	0.03
E101-00-00_0003	538.000 QUITMAN/WHITE OA		Bridge									
E101-00-00_0003	442.000	Max WS	8360.43	-2.75	40.31		40.32	0.000038	0.98	14691.27	1618.50	0.04
E101-00-00_0003	306.000	Max WS	8367.31	-2.86	40.31		40.32	0.000006	0.68	16825.63	2039.96	0.02
E101-00-00_0003	259.1	Max WS	8355.01	-2.90	40.31		40.32	0.000006	0.75	12285.02	584.31	0.03
E101-00-00_0003	259	Max WS	8365.57	-2.90	40.31	7.46	40.32	0.000006	0.75	12284.99	584.31	0.03
E101-00-00_0003	229 Prop I-10 DC		Bridge									
E101-00-00_0003	180.1	Max WS	8366.37	-2.96	40.31		40.32	0.000006	0.74	12321.90	625.49	0.03
E101-00-00_0003	180	Max WS	8366.01	-2.96	40.31	9.13	40.32	0.000006	0.74	12321.87	625.49	0.03
E101-00-00_0003	130 Prop-10 Ramp		Bridge									
E101-00-00_0003	101.1	Max WS	8372.65	-3.03	40.31		40.31	0.000005	0.66	13588.53	698.29	0.02
E101-00-00_0003	101	Max WS	8372.32	-3.03	40.31		40.31	0.000005	0.66	13588.53	698.29	0.02
E101-00-00_0003	68	Max WS	8376.34	-4.00	40.31		40.31	0.000008	0.74	12069.19	594.53	0.03
E101-00-00_0003	63	Max WS	8379.36	-4.00	40.31		40.31	0.000008	0.74	12069.15	594.53	0.03
E101-00-00_0003	3	Max WS	8450.60	-4.23	40.30		40.31	0.000009	0.90	10306.93	512.14	0.03
E101-00-00_0003	1	Max WS	8453.33	-4.23	40.30		40.31	0.000009	0.90	10306.92	512.14	0.03

Appendix B

Existing Conditions Rational Method Runoff Parameters

Project No.: 120-12019-003
Project: IH45 - Segment 3D
Client TxDOT
County: Harris

TxDOT e, b, d coefficients for Harris County:

	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
b	57.73	73.87	86.47	102.23	116.88	136.33
d	9.48	10.46	11.27	12.32	12.95	14.08
e	0.7939	0.7855	0.7829	0.7774	0.7727	0.772

Runoff Coefficients:

	APARTMENTS / TOWNHOMES	GREEN AREAS	HIGH DENSITY COMMERCIAL / INDUSTRIAL	HIGH DENSITY RESIDENTIAL	TRANSPORTATION
C	0.75	0.35	0.85	0.65	0.9

Time of Concertation, Intensity, and Flow Calculations:

Existing Conditions

SYSTEM ID	Drainge Area ID	Total Area (acres)	LAND USE (acres)					Weighted C	Percent Impervious (%)	Tc (min)	Intensity (I)						Flow (Q)					
			APARTMENTS / TOWNHOMES	GREEN AREAS	HIGH DENSITY COMMERCIAL / INDUSTRIAL	HIGH DENSITY RESIDENTIAL	TRANSPORTATION				2 Year (in/hr)	5 Year (in/hr)	10 Year (in/hr)	25 Year (in/hr)	50 Year (in/hr)	100 Year (in/hr)	2 Year (cfs)	5 Year (cfs)	10 Year (cfs)	25 Year (cfs)	50 Year (cfs)	100 Year (cfs)
A	A-01	1.13	0.00	0.10	0.00	0.00	1.03	0.85	83.4	10.0	5.47	6.90	7.90	9.14	10.38	11.69	5.3	6.6	7.6	8.8	10.0	11.2
	A-02	1.63	0.00	0.46	0.00	0.13	1.04	0.72	64.8	10.0	5.47	6.90	7.90	9.14	10.38	11.69	6.5	8.2	9.3	10.8	12.3	13.8
	A-03	1.16	0.00	0.37	0.00	0.00	0.79	0.72	66.1	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.6	5.8	6.6	7.7	8.7	9.8
	A-04	1.47	0.00	0.32	0.00	0.00	1.15	0.78	73.7	10.0	5.47	6.90	7.90	9.14	10.38	11.69	6.3	7.9	9.1	10.5	11.9	13.4
	A-05	0.69	0.00	0.36	0.00	0.04	0.29	0.60	48.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	2.3	2.8	3.3	3.8	4.3	4.8
	A-06	1.04	0.00	0.32	0.00	0.01	0.71	0.73	66.4	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.1	5.2	6.0	6.9	7.9	8.9
	OFF-A01	11.01	0.00	0.00	0.00	7.20	3.81	0.74	57.3	11.0	5.26	6.66	7.63	8.85	10.06	11.35	42.7	54.0	61.9	71.8	81.6	92.0
	OFF-A02	7.69	0.00	3.44	0.00	4.04	0.21	0.52	30.2	10.0	5.47	6.90	7.90	9.14	10.38	11.69	22.0	27.7	31.7	36.7	41.7	47.0
B	B-01	0.39	0.00	0.03	0.00	0.00	0.36	0.86	84.2	10.0	5.47	6.90	7.90	9.14	10.38	11.69	1.8	2.3	2.6	3.1	3.5	3.9
	B-02	1.57	0.00	0.16	0.00	0.92	0.49	0.70	53.1	10.0	5.47	6.90	7.90	9.14	10.38	11.69	6.0	7.6	8.6	10.0	11.4	12.8
	B-03	1.80	0.00	0.44	0.00	0.96	0.40	0.63	45.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	6.2	7.9	9.0	10.4	11.8	13.3
C	C-01	1.24	0.00	0.00	0.00	0.98	0.26	0.70	50.5	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.8	6.0	6.9	8.0	9.0	10.2
	C-02	2.94	0.00	1.29	0.00	0.00	1.65	0.66	57.1	10.0	5.47	6.90	7.90	9.14	10.38	11.69	10.6	13.4	15.3	17.7	20.1	22.6
	C-03	0.50	0.00	0.04	0.00	0.00	0.46	0.86	84.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	2.3	3.0	3.4	3.9	4.4	5.0
	C-04	2.00	0.00	1.05	0.00	0.03	0.92	0.61	49.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	6.6	8.4	9.6	11.1	12.6	14.2
	OFF-C01	4.59	0.00	0.00	0.00	3.35	1.24	0.72	53.5	10.0	5.47	6.90	7.90	9.14	10.38	11.69	18.0	22.7	26.0	30.1	34.2	38.5
	OFF-C02	1.55	0.00	0.00	0.00	1.21	0.34	0.70	51.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	6.0	7.5	8.6	10.0	11.3	12.8
	OFF-C03	1.84	0.00	0.00	0.00	0.78	1.06	0.79	68.8	10.0	5.47	6.90	7.90	9.14	10.38	11.69	8.0	10.1	11.5	13.4	15.2	17.1
D	D-01	6.05	0.00	2.78	0.00	0.00	3.27	0.65	55.5	10.0	5.47	6.90	7.90	9.14	10.38	11.69	21.4	27.0	30.9	35.8	40.7	45.8
	D-02	3.09	0.00	2.13	0.00	0.00	0.96	0.52	38.3	10.0	5.47	6.90	7.90	9.14	10.38	11.69	8.8	11.1	12.7	14.7	16.7	18.8
	D-03	6.74	0.00	4.41	0.00	1.88	0.45	0.47	27.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	17.3	21.9	25.0	29.0	32.9	37.1
E	E-01*	2.07	0.00	0.79	0.30	0.00	0.98	0.68	60.7	10.0	5.47	6.90	7.90	9.14	10.38	11.69	7.7	9.8	11.2	12.9	14.7	16.5
	E-02	2.43	0.00	0.66	0.00	0.00	1.77	0.75	69.6	10.0	5.47	6.90	7.90	9.14	10.38	11.69	10.0	12.6	14.4	16.7	18.9	21.3
	OFF-E01*	11.33	0.00	0.62	0.60	5.62	4.49	0.74	60.8	12.1	5.04	6.39	7.34	8.53	9.70	10.96	42.4	53.8	61.8	71.8	81.7	92.3
	OFF-E02	29.59	0.00	2.29	15.82	1.67	9.81	0.82	78.7	20.2	3.91	5.02	5.81	6.82	7.81	8.90	94.5	121.3	140.3	164.8	188.7	215.0
F	F-01A	1.83	0.00	0.79	0.00	0.00	1.04	0.66	57.6	10.0	5.47	6.90	7.90	9.14	10.38	11.69	6.6	8.4	9.6	11.1	12.6	14.2
	F-01B	3.21	0.00	1.93	0.00	0.00	1.28	0.57	44.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	10.0	12.6	14.4	16.7	19.0	21.4
	F-01C	6.18	0.00	3.69	0.00	0.00	2.49	0.57	45.2	10.0	5.47	6.90	7.90	9.14	10.38	11.69	19.3	24.4	27.9	32.3	36.7	41.3
	F-02	6.53	0.00	2.09	0.02	0.00	4.42	0.72	66.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	25.8	32.6	37.3	43.2	49.1	55.3
	F-03	2.58	0.00	1.93	0.00	0.00	0.65	0.49	33.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	6.9	8.7	10.0	11.5	13.1	14.7
	F-04*	3.20	0.00	2.69	0.00	0.00	0.51	0.44	27.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	7.7	9.7	11.1	12.8	14.5	16.4
	OFF-F01	109.21	6.88	0.00	16.71	46.44	39.18	0.78	66.1	36.1	2.78	3.61	4.22	5.01	5.77	6.63	235.9	306.5	357.5	424.5	489.3	562.4
	OFF-F02	23.65	0.11	1.09	6.94	9.28	6.23	0.76	65.3	18.1	4.14	5.30	6.12	7.18	8.21	9.34	74.6	95.4	110.3	129.2	147.8	168.1
G	G-01	26.97	0.00	16.19	0.00	0.00	10.78	0.57	45.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	84.0	106.0	121.3	140.5	159.5	179.7
H	H-01	0.92	0.00	0.16	0.00	0.00	0.76	0.80	77.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.0	5.1	5.8	6.8	7.7	8.7
	H-02	2.58	0.00	0.92	0.00	0.00	1.66	0.70	63.3	10.0	5.47	6.90	7.90	9.14	10.38	11.69	9.9	12.5	14.3	16.6	18.9	21.2
	H-03	3.43	0.00	1.27	0.00	0.00	2.16	0.70	62.2	10.0	5.47	6.90	7.90	9.14	10.38	11.69	13.1	16.5	18.9	21.8	24.8	27.9
	H-04	3.19	0.00	0.48	0.00	0.00	2.71	0.82	78.7	10.0	5.47	6.90	7.90	9.14	10.38	11.69	14.2	18.0	20.6	23.8	27.1	30.5
	H-05*	3.30	0.00	1.80	0.00	0.00	1.50	0.60	49.1	10.0	5.47	6.90	7.90	9.14	10.38	11.69	10.8	13.7	15.6	18.1	20.6	23.2
	H-06*	2.17	0.00	0.87	0.00	0.00	1.30	0.68	59.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	8.1	10.2	11.6	13.5	15.3	17.2
	H-07	2.39	0.00	0.88	0.00	0.00	1.51	0.70	62.4	10.0	5.47	6.90	7.90	9.14	10.38	11.69	9.1	11.5	13.2	15.2	17.3	19.5
	H-08*	1.88	0.00	0.30	0.00	0.01	1.57	0.81	77.8	10.0	5.47	6.90	7.90	9.14	10.38	11.69	8.3	10.5	12.0	13.9	15.8	17.8
	H-09*	2.59	0.00	0.25	0.00	0.00	2.34	0.85	82.8	10.0	5.47	6.90	7.90	9.14	10.38	11.69	12.0	15.1	17.3	20.1	22.8	25.7
	H-10	1.56	0.00	0.13	0.00	0.00	1.43	0.85	83.8	10.0	5.47	6.90	7.90	9.14	10.38	11.69	7.3	9.2	10.5	12.2	13.8	15.6
	H-11	4.00	0.00	2.17	0.00	0.00	1.83	0.60	49.3	10.0	5.47	6.90	7.90	9.14	10.38	11.69	13.2	16.6	19.0	22.0	25.0	28.1
	H-12	4.14	0.00	2.72	0.00	0.00	1.42	0.54	40.7	10.0	5.47	6.90	7.90	9.14	10.38	11.69	12.2	15.4	17.6	20.4	23.2	26.1
	H-13	4.48	0.00	4.48	0.00	0.00	0.00	0.35	15.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	8.6	10.8	12.4	14.3	16.3	18.3
	OFF-H01*	20.72	0.00	4.42	11.13	0.00	5.17	0.76	71.3	13.9	4.72	6.01	6.92	8.06	9.19	10.41	74.0	94.1	108.3	126.3	143.9	163.0
	OFF-H02	45.43	1.16	2.83	18.56	9.34	13.54	0.79	72.2	18.1	4.15	5.31	6.14	7.19	8.22	9.35	149.0	190.7	220.3	258.2	295.2	335.8
	OFF-H03	17.96	0.00	0.41	0.00	10.67	6.88	0.74	58.6	15.3	4.51	5.76	6.63	7.75	8.84	10.03	59.9	76.4	88.0	102.8	117.3	133.1
	OFF-H04	19.64	0.00	2.18	0.00	9.86	7.60	0.71	56.6	12.2	5.02	6.37	7.31	8.50	9.68	10.94	70.4	89.3	102.5	119.2	135.6	153.2

*Drainage area divided in proposed conditions

Existing Conditions

SYSTEM ID	Drainge Area ID	Total Area (acres)	LAND USE (acres)					Weighted C	Percent Impervious (%)	Tc (min)	Intensity (I)						Flow (Q)					
			APARTMENTS / TOWNHOMES	GREEN AREAS	HIGH DENSITY COMMERCIAL / INDUSTRIAL	HIGH DENSITY RESIDENTIAL	TRANSPORTATION				2 Year (in/hr)	5 Year (in/hr)	10 Year (in/hr)	25 Year (in/hr)	50 Year (in/hr)	100 Year (in/hr)	2 Year (cfs)	5 Year (cfs)	10 Year (cfs)	25 Year (cfs)	50 Year (cfs)	100 Year (cfs)
I	I-01	1.12	0.00	0.47	0.00	0.00	0.65	0.67	58.5	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.1	5.2	5.9	6.9	7.8	8.8
	I-02	4.61	0.00	2.07	0.13	0.00	2.41	0.65	56.2	10.0	5.47	6.90	7.90	9.14	10.38	11.69	16.4	20.7	23.7	27.5	31.2	35.1
	I-03	1.11	0.00	0.52	0.10	0.00	0.49	0.64	54.4	10.0	5.47	6.90	7.90	9.14	10.38	11.69	3.9	4.9	5.6	6.5	7.4	8.3
	I-04	6.04	0.00	0.01	6.03	0.00	0.00	0.85	84.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	28.0	35.4	40.5	46.9	53.2	60.0
	I-05	0.61	0.00	0.05	0.04	0.00	0.52	0.85	83.5	10.0	5.47	6.90	7.90	9.14	10.38	11.69	2.8	3.6	4.1	4.7	5.4	6.1
	I-06	1.46	0.00	1.25	0.00	0.00	0.21	0.43	25.8	10.0	5.47	6.90	7.90	9.14	10.38	11.69	3.4	4.3	4.9	5.7	6.5	7.3
	I-07	1.06	0.00	0.00	1.04	0.00	0.02	0.85	85.1	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.9	6.2	7.1	8.2	9.4	10.5
	I-08	0.87	0.00	0.06	0.22	0.00	0.59	0.85	83.6	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.0	5.1	5.8	6.8	7.7	8.6
	I-09	0.78	0.00	0.03	0.48	0.00	0.27	0.85	84.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	3.6	4.6	5.2	6.0	6.9	7.7
	I-10	0.81	0.00	0.04	0.34	0.00	0.43	0.85	84.2	10.0	5.47	6.90	7.90	9.14	10.38	11.69	3.8	4.8	5.4	6.3	7.2	8.1
	I-11	1.02	0.00	0.02	0.74	0.00	0.26	0.85	84.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.8	6.0	6.9	8.0	9.0	10.2
J	J-01A	5.27	0.00	1.97	0.00	0.00	3.30	0.69	62.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	20.0	25.2	28.9	33.5	38.0	42.8
	J-01B	3.71	0.00	1.58	0.00	0.00	2.13	0.67	58.1	10.0	5.47	6.90	7.90	9.14	10.38	11.69	13.5	17.0	19.5	22.6	25.6	28.9
	J-02	3.17	0.00	0.93	0.68	0.00	1.56	0.73	66.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	12.6	15.9	18.2	21.1	24.0	27.0
	J-03	1.03	0.00	0.05	0.44	0.00	0.54	0.85	84.2	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.8	6.1	6.9	8.0	9.1	10.3
	J-04	1.18	0.00	0.03	0.76	0.00	0.39	0.85	84.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	5.5	7.0	8.0	9.2	10.5	11.8
	J-05	2.03	0.00	0.08	1.07	0.00	0.88	0.85	84.4	10.0	5.47	6.90	7.90	9.14	10.38	11.69	9.5	11.9	13.7	15.8	18.0	20.2
	J-06	0.93	0.00	0.08	0.00	0.00	0.85	0.85	83.5	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.3	5.5	6.3	7.3	8.2	9.3
	J-07	1.78	0.00	0.11	0.50	0.00	1.17	0.85	84.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	8.3	10.5	12.0	13.9	15.7	17.7
	TOTAL AREA:	**467.87**	**8.15**	**88.08**	**82.65**	**114.42**	**174.57**															

Existing Conditions					
SYSTEM ID	Drainge Area ID	Total Area (acres)	Water Course Length		Time of Concentration
			Overland (ft) - L_{ov}	Channel / Road (ft) - L_{ch}	$t_c = t_{ov} + t_{ch} + t_{ss}$ (min.)
A	A-01	1.13	100	101	4.0
	A-02	1.63	100	269	5.1
	A-03	1.16	100	243	5.0
	A-04	1.47	100	210	4.7
	A-05	0.69	100	210	4.7
	A-OFF1	11.01	100	1143	11.0
	A-OFF2	7.69	100	732	8.2
B	B-01	0.39	100	191	4.6
	B-02	1.57	100	166	4.4
	B-03	1.80	100	125	4.2
C	C-01	1.24	100	187	4.6
	C-02	2.94	100	438	6.3
	C-03	0.50	89	221	4.4
	C-04	2.00	73	106	3.1
	C-OFF1	4.59	100	350	5.7
	C-OFF2	1.55	100	276	5.2
	C-OFF3	1.84	100	492	6.6
D	D-01	6.05	100	751	8.3
	D-02	3.09	100	437	6.2
	D-03	6.74	100	672	7.8
E	E-01	2.07	100	223	4.8
	E-02	2.43	100	751	8.3
	E-OFF1	11.33	100	1314	12.1
	E-OFF2	29.59	100	2533	20.2
F	F-01A	1.83	100	862	9.1
	F-01B	3.21	100	417	6.1
	F-01C	6.18	100	451	6.3
	F-02	6.53	100	383	5.9
	F-03	2.58	100	360	5.7
	F-04	3.20	100	199	4.7
	F-OFF1	109.21	100	4920	36.1
	F-OFF2	23.65	100	2222	18.1
G	G-01	26.97	100	884	9.2
H	H-01	0.92	100	170	4.5
	H-02	2.58	100	354	5.7
	H-03	3.43	100	679	7.9
	H-04	3.19	100	638	7.6
	H-05	3.30	100	526	6.8
	H-06	2.17	100	278	5.2
	H-07	2.39	100	621	7.5
	H-08	1.88	100	813	8.8
	H-09	2.59	100	715	8.1
	H-10	1.56	100	664	7.8
	H-11	4.00	100	163	4.4
	H-12	4.14	100	260	5.1
	H-13	4.48	100	409	6.1
	H-OFF1	20.72	100	1588	13.9
	H-OFF2	45.43	100	2211	18.1
	H-OFF3	17.96	100	1795	15.3
	H-OFF4	19.64	100	1327	12.2
I	I-01	1.12	100	171	4.5
	I-02	4.61	100	478	6.5
	I-03	1.11	100	339	5.6
	I-04	6.04	100	616	7.4
	I-05	0.61	96	171	4.3
	I-06	1.46	100	188	4.6
	I-07	1.06	100	218	4.8
	I-08	0.87	72	153	3.4
	I-09	0.78	75	124	3.3
	I-10	0.81	54	169	2.9
	I-11	1.02	42	135	2.3
J	J-01A	5.27	100	352	5.7
	J-01B	3.71	100	369	5.8
	J-02	3.17	100	363	5.8
	J-03	1.03	100	260	5.1
	J-04	1.18	100	300	5.3
	J-05	2.03	100	434	6.2
	J-06	0.93	100	120	4.1
	J-07	1.78	100	292	5.3

Proposed Conditions Rational Method Runoff Parameters

Project No.: 120-12019-003
Project: IH45 - Segment 3D
Client TxDOT
County: Harris

TxDOT e, b, d coefficients for Harris County:

	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
b	57.73	73.87	86.47	102.23	116.88	136.33
d	9.48	10.46	11.27	12.32	12.95	14.08
e	0.7939	0.7855	0.7829	0.7774	0.7727	0.772

Runoff Coefficients:

	APARTMENTS / TOWNHOMES	GREEN AREAS	HIGH DENSITY COMMERCIAL / INDUSTRIAL	HIGH DENSITY RESIDENTIAL	TRANSPORTATION
C	0.75	0.35	0.85	0.65	0.9

Time of Concertation, Intensity, and Flow Calculations:

Proposed Condtions

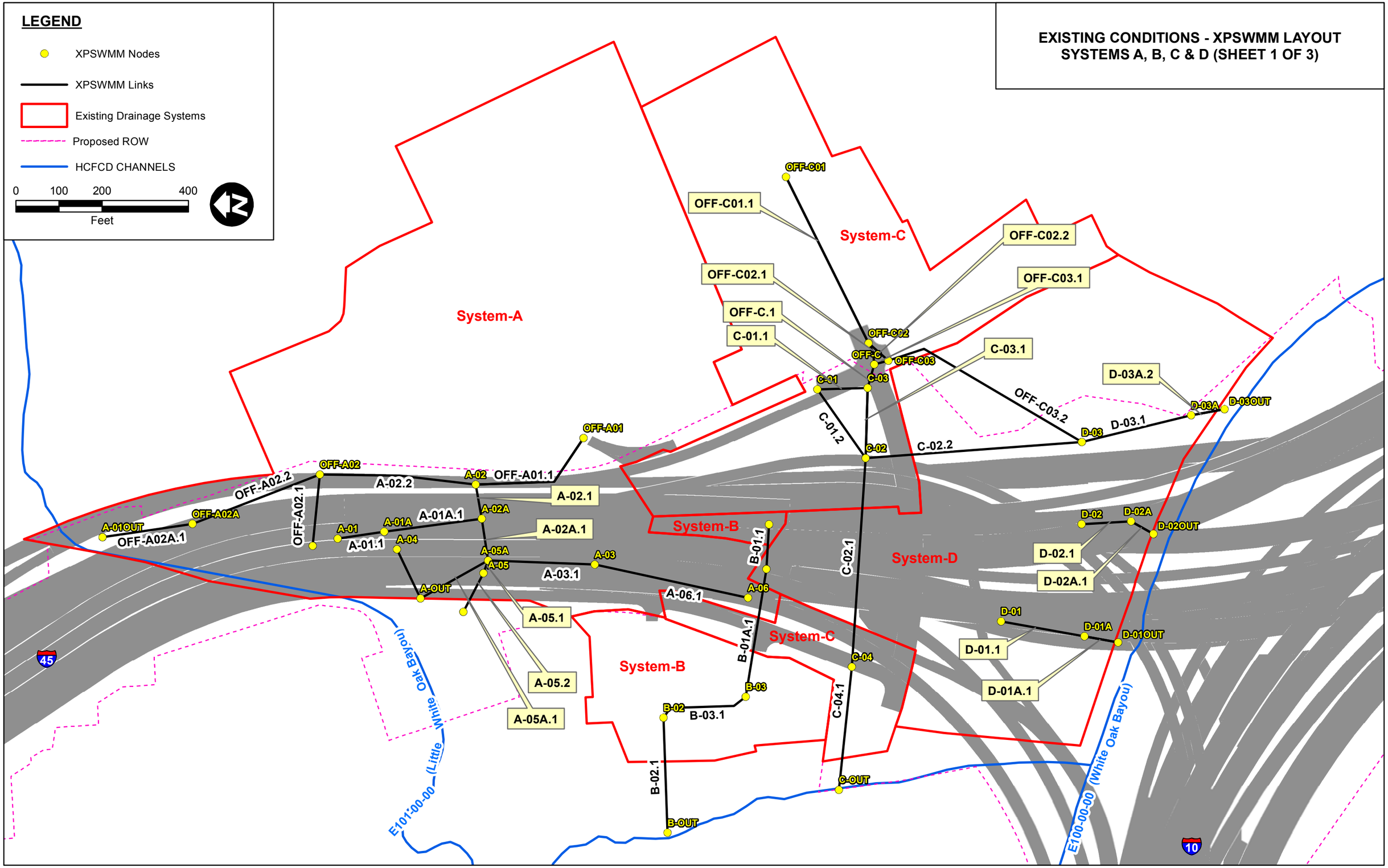
SYSTEM ID	Drainge Area ID	Total Area (acres)	LAND USE (acres)					Weighted C	Percent Impervious (%)	Tc (min)	Intensity (I)						Flow (Q)					
			APARTMENTS / TOWNHOMES	GREEN AREAS	HIGH DENSITY COMMERCIAL / INDUSTRIAL	HIGH DENSITY RESIDENTIAL	TRANSPORTATION				2 Year (in/hr)	5 Year (in/hr)	10 Year (in/hr)	25 Year (in/hr)	50 Year (in/hr)	100 Year (in/hr)	2 Year (cfs)	5 Year (cfs)	10 Year (cfs)	25 Year (cfs)	50 Year (cfs)	100 Year (cfs)
A	A-01	2.19	0.00	0.38	0.00	0.00	1.81	0.80	77.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	9.6	12.2	13.9	16.1	18.3	20.6
	A-02	1.82	0.00	0.28	0.00	0.13	1.41	0.80	74.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	7.9	10.0	11.5	13.3	15.1	17.0
	A-03	2.15	0.00	0.18	0.00	0.00	1.97	0.85	83.7	10.0	5.47	6.90	7.90	9.14	10.38	11.69	10.0	12.7	14.5	16.8	19.1	21.5
	A-04	1.41	0.00	0.12	0.00	0.00	1.29	0.85	83.6	10.0	5.47	6.90	7.90	9.14	10.38	11.69	6.6	8.3	9.5	11.0	12.5	14.1
	A-05	0.55	0.00	0.08	0.00	0.04	0.43	0.80	75.5	10.0	5.47	6.90	7.90	9.14	10.38	11.69	2.4	3.0	3.5	4.0	4.6	5.2
	A-06	1.74	0.00	0.24	0.00	0.01	1.49	0.82	79.4	10.0	5.47	6.90	7.90	9.14	10.38	11.69	7.8	9.9	11.3	13.1	14.9	16.7
	OFF-A01	11.00	0.00	0.00	0.00	7.20	3.80	0.74	57.3	11.0	5.26	6.66	7.63	8.85	10.06	11.35	42.6	53.9	61.8	71.7	81.5	91.9
	OFF-A02	5.57	0.00	1.32	0.00	4.04	0.21	0.59	36.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	17.9	22.6	25.9	30.0	34.0	38.3
B	B-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	B-02	1.54	0.00	0.16	0.00	0.92	0.46	0.69	52.3	10.0	5.47	6.90	7.90	9.14	10.38	11.69	5.8	7.4	8.4	9.8	11.1	12.5
	B-03	1.77	0.00	0.43	0.00	0.97	0.37	0.63	44.4	10.0	5.47	6.90	7.90	9.14	10.38	11.69	6.1	7.7	8.8	10.2	11.6	13.0
C	C-01	1.11	0.00	0.00	0.00	0.98	0.13	0.68	45.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.1	5.2	6.0	6.9	7.8	8.8
	C-02	3.38	0.00	1.47	0.00	0.00	1.91	0.66	57.4	10.0	5.47	6.90	7.90	9.14	10.38	11.69	12.2	15.4	17.6	20.4	23.2	26.1
	C-03	0.68	0.00	0.06	0.00	0.00	0.62	0.85	83.4	10.0	5.47	6.90	7.90	9.14	10.38	11.69	3.2	4.0	4.6	5.3	6.0	6.8
	C-04	1.49	0.00	0.59	0.00	0.02	0.88	0.68	59.6	10.0	5.47	6.90	7.90	9.14	10.38	11.69	5.5	7.0	8.0	9.2	10.5	11.8
	OFF-C01	4.59	0.00	0.00	0.00	3.35	1.24	0.72	53.5	10.0	5.47	6.90	7.90	9.14	10.38	11.69	18.0	22.7	26.0	30.1	34.2	38.5
	OFF-C02	1.48	0.00	0.00	0.00	1.21	0.27	0.70	49.1	10.0	5.47	6.90	7.90	9.14	10.38	11.69	5.6	7.1	8.1	9.4	10.7	12.0
	OFF-C03	1.79	0.00	0.00	0.00	0.78	1.01	0.79	68.2	10.0	5.47	6.90	7.90	9.14	10.38	11.69	7.7	9.8	11.2	12.9	14.7	16.6
D	D-01	5.45	0.00	2.59	0.00	0.00	2.86	0.64	54.4	10.0	5.47	6.90	7.90	9.14	10.38	11.69	19.0	24.0	27.5	31.8	36.1	40.7
	D-02	3.73	0.00	0.94	0.00	0.00	2.79	0.76	71.1	10.0	5.47	6.90	7.90	9.14	10.38	11.69	15.5	19.6	22.4	26.0	29.5	33.2
	D-03	6.69	0.00	4.79	0.00	1.88	0.02	0.44	22.2	10.0	5.47	6.90	7.90	9.14	10.38	11.69	15.9	20.1	23.0	26.7	30.3	34.1
E	E-01A	1.03	0.00	0.66	0.30	0.00	0.07	0.53	40.5	10.0	5.47	6.90	7.90	9.14	10.38	11.69	3.0	3.8	4.3	5.0	5.7	6.4
	E-01B	0.79	0.00	0.19	0.00	0.00	0.60	0.77	72.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	3.3	4.2	4.8	5.5	6.3	7.1
	E-02	1.63	0.00	0.42	0.00	0.00	1.21	0.76	70.7	10.0	5.47	6.90	7.90	9.14	10.38	11.69	6.8	8.5	9.8	11.3	12.8	14.5
	E-03	0.96	0.00	0.08	0.00	0.00	0.88	0.85	83.8	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.5	5.7	6.5	7.5	8.5	9.6
	OFF-E01	10.15	0.00	0.49	0.60	5.62	3.44	0.73	58.4	12.1	5.04	6.39	7.34	8.53	9.70	10.96	37.4	47.5	54.5	63.4	72.1	81.5
	OFF-E02	29.58	0.00	2.30	15.82	1.67	9.79	0.82	78.7	17.6	4.21	5.38	6.21	7.28	8.32	9.46	101.6	130.0	150.1	175.8	201.0	228.5
F	F-01A	2.21	0.00	0.19	0.00	0.00	2.02	0.85	83.6	10.0	5.47	6.90	7.90	9.14	10.38	11.69	10.3	13.0	14.9	17.2	19.6	22.0
	F-01B	2.25	0.00	0.19	0.00	0.00	2.06	0.85	83.7	10.0	5.47	6.90	7.90	9.14	10.38	11.69	10.5	13.2	15.2	17.6	19.9	22.5
	F-01C	4.15	0.00	1.48	0.00	0.00	2.67	0.70	63.3	10.0	5.47	6.90	7.90	9.14	10.38	11.69	16.0	20.2	23.1	26.7	30.3	34.2
	F-02	10.09	0.00	1.02	0.00	0.00	9.07	0.84	82.4	10.0	5.47	6.90	7.90	9.14	10.38	11.69	46.6	58.8	67.3	77.9	88.5	99.6
	F-03	1.99	0.00	1.17	0.00	0.00	0.82	0.58	45.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	6.3	7.9	9.1	10.5	11.9	13.4
	F-04	2.34	0.00	1.74	0.00	0.00	0.60	0.49	34.2	10.0	5.47	6.90	7.90	9.14	10.38	11.69	6.3	7.9	9.1	10.5	11.9	13.4
	F-05	1.26	0.00	0.28	0.00	0.00	0.98	0.78	73.3	10.0	5.47	6.90	7.90	9.14	10.38	11.69	5.4	6.8	7.7	9.0	10.2	11.5
	OFF-F01	110.24	6.88	0.48	16.74	46.45	39.69	0.78	66.0	36.1	2.78	3.61	4.22	5.01	5.77	6.63	237.7	308.9	360.3	427.8	493.1	566.7
	OFF-F02	22.92	0.11	0.86	6.94	9.28	5.73	0.76	65.3	18.1	4.14	5.30	6.12	7.18	8.21	9.34	72.4	92.6	107.0	125.4	143.4	163.1
G	G-01	26.97	0.00	8.80	0.00	0.00	18.17	0.72	65.5	10.0	5.47	6.90	7.90	9.14	10.38	11.69	106.2	134.1	153.4	177.7	201.7	227.2
H	H-01	1.93	0.00	0.17	0.00	0.00	1.76	0.85	83.4	10.0	5.47	6.90	7.90	9.14	10.38	11.69	9.0	11.3	13.0	15.0	17.1	19.2
	H-02	2.02	0.00	0.56	0.00	0.00	1.46	0.75	69.2	10.0	5.47	6.90	7.90	9.14	10.38	11.69	8.3	10.4	11.9	13.8	15.7	17.7
	H-03	2.35	0.00	0.20	0.00	0.00	2.15	0.85	83.6	10.0	5.47	6.90	7.90	9.14	10.38	11.69	11.0	13.8	15.8	18.3	20.8	23.4
	H-04	0.81	0.00	0.07	0.00	0.00	0.74	0.85	83.5	10.0	5.47	6.90	7.90	9.14	10.38	11.69	3.8	4.8	5.5	6.3	7.2	8.1
	H-05A	0.69	0.00	0.06	0.00	0.00	0.63	0.85	83.5	10.0	5.47	6.90	7.90	9.14	10.38	11.69	3.2	4.1	4.6	5.4	6.1	6.9
	H-05B	0.82	0.00	0.07	0.00	0.00	0.75	0.85	83.6	10.0	5.47	6.90	7.90	9.14	10.38	11.69	3.8	4.8	5.5	6.4	7.3	8.2
	H-05C	0.74	0.00	0.06	0.00	0.00	0.68	0.86	83.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	3.5	4.4	5.0	5.8	6.6	7.4
	H-05D	1.16	0.00	0.30	0.00	0.00	0.86	0.76	70.6	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.8	6.1	6.9	8.0	9.1	10.3
	H-05E	1.01	0.00	0.55	0.00	0.00	0.46	0.60	49.2	10.0	5.47	6.90	7.90	9.14	10.38	11.69	3.3	4.2	4.8	5.5	6.3	7.1
	H-06A	1.45	0.00	0.33	0.00	0.00	1.12	0.77	72.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	6.1	7.8	8.9	10.3	11.7	13.1
	H-06B	18.85	0.00	10.22	0.00	0.00	8.63	0.60	49.3	10.0	5.47	6.90	7.90	9.14	10.38	11.69	62.0	78.3	89.6	103.7	117.8	132.7
	H-07	0.35	0.00	0.03	0.00	0.00	0.32	0.85	83.6	10.0	5.47	6.90	7.90	9.14	10.38	11.69	1.6	2.1	2.4	2.7	3.1	3.5
	H-08A	1.63	0.00	0.14	0.00	0.00	1.49	0.85	83.6	10.0	5.47	6.90	7.90	9.14	10.38	11.69	7.6	9.6	11.0	12.7	14.4	16.3
	H-08B	1.58	0.00	0.14	0.00	0.00	1.44	0.85	83.4	10.0	5.47	6.90	7.90	9.14	10.38	11.69	7.4	9.3	10.6	12.3	14.0	15.7

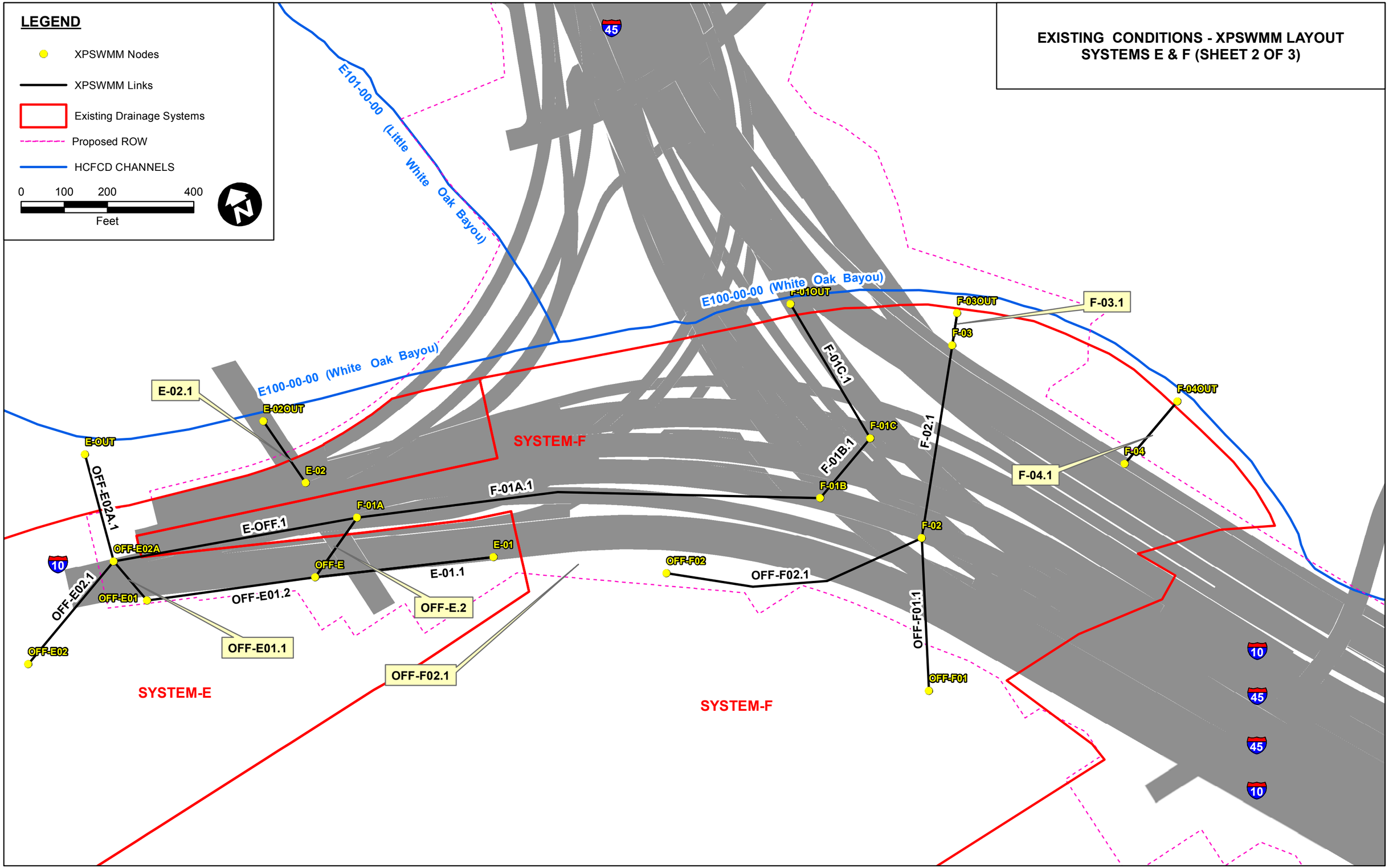
Proposed Condtions

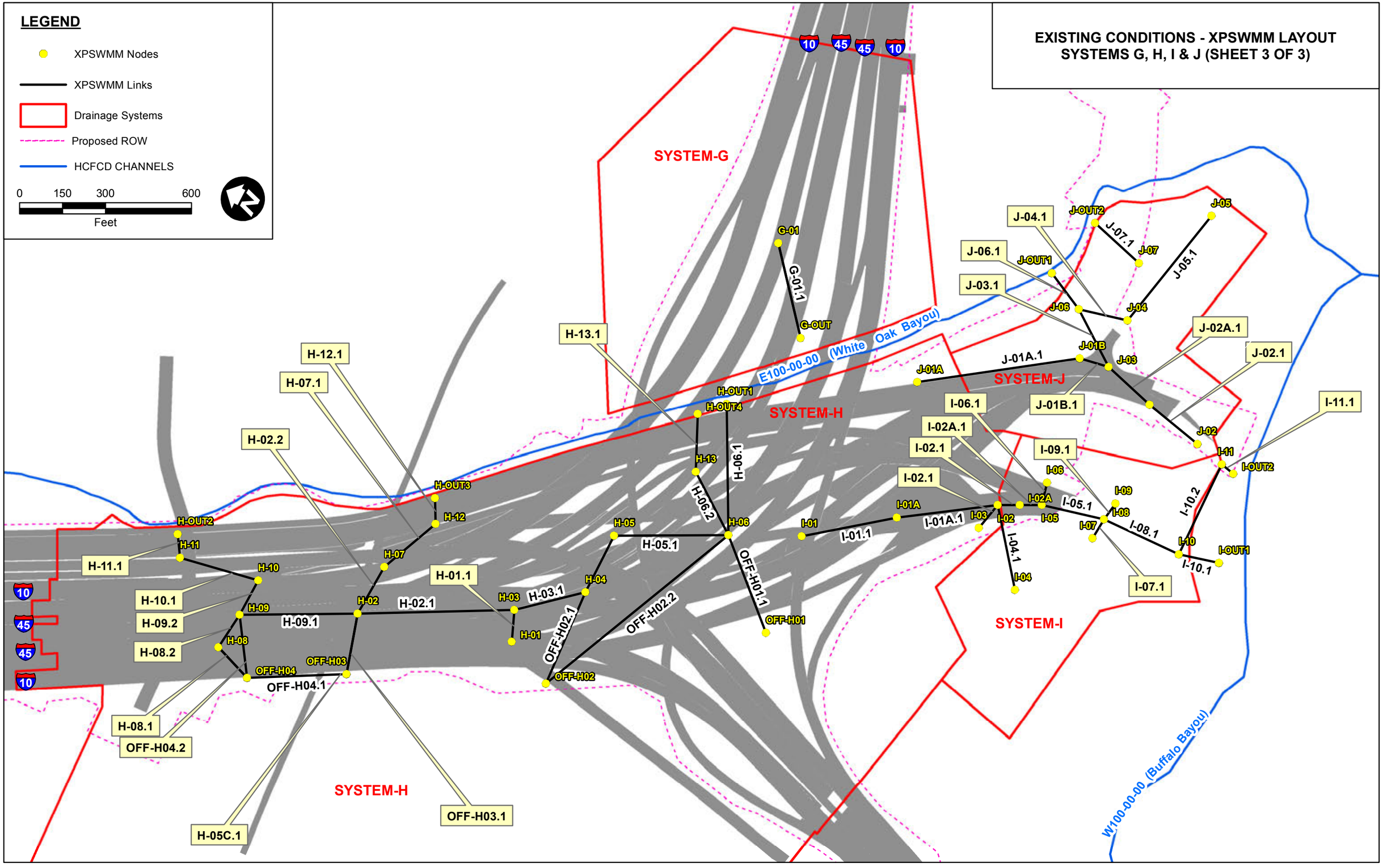
SYSTEM ID	Drainge Area ID	Total Area (acres)	LAND USE (acres)					Weighted C	Percent Impervious (%)	Tc (min)	Intensity (I)						Flow (Q)					
			APARTMENTS / TOWNHOMES	GREEN AREAS	HIGH DENSITY COMMERCIAL / INDUSTRIAL	HIGH DENSITY RESIDENTIAL	TRANSPORTATION				2 Year (in/hr)	5 Year (in/hr)	10 Year (in/hr)	25 Year (in/hr)	50 Year (in/hr)	100 Year (in/hr)	2 Year (cfs)	5 Year (cfs)	10 Year (cfs)	25 Year (cfs)	50 Year (cfs)	100 Year (cfs)
H	H-09A	1.04	0.00	0.09	0.00	0.00	0.95	0.85	83.5	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.8	6.1	7.0	8.1	9.2	10.4
	H-09B	1.12	0.00	0.10	0.00	0.00	1.02	0.85	83.3	10.0	5.47	6.90	7.90	9.14	10.38	11.69	5.2	6.6	7.5	8.7	9.9	11.1
	H-10	1.00	0.00	0.09	0.00	0.00	0.91	0.85	83.3	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.6	5.9	6.7	7.8	8.8	9.9
	H-11	4.02	0.00	0.70	0.00	0.00	3.32	0.80	76.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	17.7	22.3	25.5	29.6	33.6	37.8
	H-12	5.72	0.00	0.49	0.00	0.00	5.23	0.85	83.6	10.0	5.47	6.90	7.90	9.14	10.38	11.69	26.7	33.7	38.5	44.6	50.6	57.0
	H-13	4.35	0.00	1.21	0.00	0.00	3.14	0.75	69.1	10.0	5.47	6.90	7.90	9.14	10.38	11.69	17.8	22.4	25.7	29.7	33.7	38.0
	OFF-H01A	9.54	0.00	0.78	7.17	0.00	1.59	0.82	80.1	10.1	5.45	6.88	7.88	9.13	10.36	11.67	42.5	53.7	61.4	71.2	80.8	91.0
	OFF-H01B	4.96	0.00	0.22	3.78	0.00	0.96	0.84	82.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	22.7	28.7	32.8	38.0	43.1	48.6
	OFF-H02	43.70	1.16	2.44	18.72	9.34	12.04	0.79	72.2	18.1	4.15	5.31	6.14	7.19	8.22	9.35	143.4	183.5	212.0	248.4	284.1	323.1
	OFF-H03	17.07	0.00	0.20	0.00	10.67	6.20	0.74	57.9	15.3	4.51	5.76	6.63	7.75	8.84	10.03	56.8	72.5	83.5	97.5	111.3	126.2
	OFF-H04	18.07	0.00	1.92	0.00	9.86	6.29	0.71	54.7	12.2	5.02	6.37	7.31	8.50	9.68	10.94	64.0	81.2	93.2	108.4	123.3	139.4
I	I-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	I-02	2.41	0.00	1.96	0.13	0.00	0.32	0.45	28.7	10.0	5.47	6.90	7.90	9.14	10.38	11.69	5.9	7.5	8.6	9.9	11.3	12.7
	I-03	1.11	0.00	1.01	0.10	0.00	0.00	0.40	21.3	10.0	5.47	6.90	7.90	9.14	10.38	11.69	2.4	3.0	3.5	4.0	4.6	5.1
	I-04	6.04	0.00	0.00	6.04	0.00	0.00	0.85	85.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	28.1	35.4	40.5	46.9	53.3	60.0
	I-05	0.61	0.00	0.29	0.04	0.00	0.28	0.64	54.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	2.1	2.7	3.1	3.5	4.0	4.5
	I-06	1.46	0.00	1.05	0.00	0.00	0.41	0.50	36.1	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.0	5.1	5.8	6.7	7.6	8.6
	I-07	1.06	0.00	0.00	1.04	0.00	0.02	0.85	85.1	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.9	6.2	7.1	8.2	9.4	10.5
	I-08	0.87	0.00	0.05	0.22	0.00	0.60	0.86	84.4	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.1	5.1	5.9	6.8	7.7	8.7
	I-09	0.78	0.00	0.02	0.48	0.00	0.28	0.86	85.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	3.6	4.6	5.3	6.1	6.9	7.8
	I-10	0.81	0.00	0.04	0.34	0.00	0.43	0.85	84.2	10.0	5.47	6.90	7.90	9.14	10.38	11.69	3.8	4.8	5.4	6.3	7.2	8.1
	I-11	1.02	0.00	0.02	0.74	0.00	0.26	0.85	84.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.8	6.0	6.9	8.0	9.0	10.2
J	J-01A	3.20	0.00	1.41	0.00	0.00	1.79	0.66	57.0	10.0	5.47	6.90	7.90	9.14	10.38	11.69	11.5	14.5	16.6	19.2	21.8	24.6
	J-01B	3.71	0.00	2.18	0.00	0.00	1.53	0.58	45.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	11.7	14.8	16.9	19.6	22.2	25.0
	J-02	3.17	0.00	0.88	0.68	0.00	1.61	0.74	68.1	10.0	5.47	6.90	7.90	9.14	10.38	11.69	12.8	16.1	18.4	21.3	24.2	27.3
	J-03	1.03	0.00	0.05	0.44	0.00	0.54	0.85	84.2	10.0	5.47	6.90	7.90	9.14	10.38	11.69	4.8	6.1	6.9	8.0	9.1	10.3
	J-04	1.18	0.00	0.03	0.76	0.00	0.39	0.85	84.9	10.0	5.47	6.90	7.90	9.14	10.38	11.69	5.5	7.0	8.0	9.2	10.5	11.8
	J-05	2.03	0.00	0.08	1.07	0.00	0.88	0.85	84.4	10.0	5.47	6.90	7.90	9.14	10.38	11.69	9.5	11.9	13.7	15.8	18.0	20.2
	J-06	0.93	0.00	0.43	0.00	0.00	0.50	0.65	55.3	10.0	5.47	6.90	7.90	9.14	10.38	11.69	3.3	4.1	4.7	5.5	6.2	7.0
	J-07	1.78	0.00	0.55	0.50	0.00	0.73	0.72	65.4	10.0	5.47	6.90	7.90	9.14	10.38	11.69	7.0	8.8	10.1	11.7	13.2	14.9
	TOTAL AREA:	**467.87**	**8.15**	**65.17**	**82.65**	**114.42**	**197.48**															

Proposed Conditions					
SYSTEM ID	Drainge Area ID	Total Area (acres)	Water Course Length		Time of Concentration
			Overland (ft) - L_{ov}	Channel / Road (ft) - L_{ch}	$t_c = t_{ov} + t_{ch} + t_{ss}$ (min.)
A	A-01	2.19	98	149	4.3
	A-02	1.82	100	269	5.1
	A-03	2.15	100	142	4.3
	A-04	1.41	100	210	4.7
	A-05	0.55	100	210	4.7
	A-06	1.74	100	180	4.5
	A-OFF1	11.00	100	1143	11.0
	A-OFF2	5.57	100	720	8.1
B	B-02	1.54	100	166	4.4
	B-03	1.77	100	125	4.2
C	C-01	1.11	100	187	4.6
	C-02	3.38	100	438	6.3
	C-03	0.68	89	221	4.4
	C-04	1.49	73	106	3.1
	C-OFF1	4.59	100	350	5.7
	C-OFF2	1.48	100	276	5.2
	C-OFF3	1.79	100	492	6.6
D	D-01	5.45	100	751	8.3
	D-02	3.73	100	437	6.2
	D-03	6.69	100	672	7.8
E	E-01	1.03	100	223	4.8
	E-02	0.79	100	751	8.3
	E-OFF1	1.63	100	1314	12.1
	E-OFF2	0.96	100	2141	17.6
F	F-01A	10.15	100	862	9.1
	F-01B	29.58	100	417	6.1
	F-01C	2.21	100	451	6.3
	F-02	2.25	100	556	7.0
	F-03	4.15	100	314	5.4
	F-04	10.09	100	274	5.2
	F-OFF1	1.99	100	4920	36.1
	F-OFF2	2.34	100	2222	18.1
G	K-01	1.26	100	884	9.2
H	H-01	110.24	100	331	5.5
	H-02	22.92	100	178	4.5
	H-03	26.97	100	342	5.6
	H-04	1.93	100	159	4.4
	H-05	2.02	100	299	5.3
	H-06	2.35	100	944	9.6
	H-07	0.81	100	176	4.5
	H-08	0.69	100	646	7.6
	H-09A	0.82	100	191	4.6
	H-09B	0.74	100	214	4.8
	H-10	1.16	100	165	4.4
	H-11	1.01	100	163	4.4
	H-12	1.45	100	260	5.1
	H-13	18.85	100	429	6.2
	H-OFF1	0.35	100	1008	10.1
	H-OFF2	1.63	100	2211	18.1
	H-OFF3	1.58	100	1795	15.3
	H-OFF4	1.04	100	1327	12.2
	I-01	1.12	100	171	4.5
	I-02	1.00	100	478	6.5
	I-03	4.02	100	339	5.6
I	I-04	5.72	100	616	7.4
	I-05	4.35	96	171	4.3
	I-06	9.54	100	188	4.6
	I-07	4.96	100	218	4.8
	I-08	43.70	72	153	3.4
	I-09	17.07	75	124	3.3
	I-10	18.07	54	169	2.9
	I-11	2.41	42	135	2.3
H	J-01A	1.11	100	352	5.7
J	J-01B	6.04	100	369	5.8
	J-02	0.61	100	363	5.8
	J-03	1.46	100	260	5.1
	J-04	1.06	100	300	5.3
	J-05	0.87	100	434	6.2
	J-06	0.78	100	120	4.1
	J-07	0.81	100	292	5.3

Appendix C


EXISTING CONDITIONS - XPSWMM LAYOUT
SYSTEMS A, B, C & D (SHEET 1 OF 3)
LEGEND
XPSWMM Nodes
XPSWMM Links
Existing Drainage Systems
Proposed ROW
HCFCD CHANNELS
0 100 200 400
Feet
System-A
System-B
System-C
System-D
OFF-C01
OFF-C01.1
OFF-C02.2
OFF-C02.1
OFF-C03.1
OFF-C.1
C-01.1
OFF-C02
OFF-C
OFF-C03
C-03.1
C-01
C-03
D-03A.2
D-03A
D-03OUT
OFF-C03.2
D-03
D-03.1
C-01.2
C-02
C-02.2
OFF-A01
OFF-A02
A-02
OFF-A01.1
A-02.2
A-02.1
OFF-A02.2
OFF-A02.1
OFF-A02A
A-01OUT
OFF-A02A.1
A-01
A-01A
A-01A.1
A-02A
A-02A.1
A-01.1
A-04
A-05A
A-05
A-03
A-03.1
A-OUT
A-06.1
A-06
A-05.1
A-05.2
A-05A.1
B-01.1
B-01A.1
B-03
B-02
B-03.1
B-02.1
B-OUT
C-02.1
C-04
C-04.1
C-OUT
D-02
D-02A
D-02OUT
D-02.1
D-02A.1
D-01
D-01A
D-01OUT
D-01.1
D-01A.1
E101-00-00 (Little White Oak Bayou)
E100-00-00 (White Oak Bayou)
45
10


EXISTING CONDITIONS - XPSWMM LAYOUT
SYSTEMS E & F (SHEET 2 OF 3)
LEGEND
XPSWMM Nodes
XPSWMM Links
Existing Drainage Systems
Proposed ROW
HCFCD CHANNELS
0 100 200 400
Feet
E101-00-00 (Little White Oak Bayou)
E100-00-00 (White Oak Bayou)
E100-00-00 (White Oak Bayou)
SYSTEM-F
SYSTEM-E
SYSTEM-F
E-02.1
E-02OUT
E-02
E-OUT
OFF-E02A.1
OFF-E02.1
OFF-E02
OFF-E02A
OFF-E01
OFF-E01.1
OFF-E01.2
E-OFF.1
F-01A
OFF-E
E-01.1
E-01
OFF-E.2
F-01A.1
F-01OUT
F-01C.1
F-01C
F-01B.1
F-01B
F-03.1
F-03OUT
F-03
F-02.1
F-02
OFF-F02
OFF-F02.1
OFF-F02.1
OFF-F01.1
OFF-F01
F-04OUT
F-04
F-04.1
45
10
45
45
10


EXISTING CONDITIONS - XPSWMM LAYOUT
SYSTEMS G, H, I & J (SHEET 3 OF 3)
LEGEND
XPSWMM Nodes
XPSWMM Links
Drainage Systems
Proposed ROW
HCFCD CHANNELS
0 150 300 600
Feet
SYSTEM-G
SYSTEM-H
SYSTEM-I
SYSTEM-J
E100-00-00 (White Oak Bayou)
W100-00-00 (Buffalo Bayou)
G-01
G-01.1
G-OUT
H-13.1
H-12.1
H-07.1
H-02.2
H-OUT1
H-OUT4
H-13
H-06.1
H-06.2
H-OUT3
H-12
H-OUT2
H-11
H-11.1
H-10
H-10.1
H-09.2
H-09
H-08.2
H-08
H-08.1
OFF-H04
OFF-H04.1
OFF-H04.2
OFF-H03
H-07
H-02
H-09.1
H-02.1
H-01.1
H-03
H-03.1
H-01
H-04
H-05
H-05.1
H-06
OFF-H02.1
OFF-H02
OFF-H02.2
OFF-H01.1
OFF-H01
H-05C.1
OFF-H03.1
J-04.1
J-OUT2
J-07.1
J-07
J-05
J-05.1
J-06.1
J-OUT1
J-03.1
J-06
J-04
J-02A.1
J-02.1
J-01A
J-01A.1
J-01B
J-03
J-01B.1
J-02
I-06.1
I-02A.1
I-02.1
I-09.1
I-06
I-02.1
I-01A
I-02A
I-05.1
I-09
I-08
I-11
I-OUT2
I-10.2
I-01
I-01.1
I-01A.1
I-03
I-02
I-05
I-07
I-08.1
I-10
I-OUT1
I-10.1
I-04.1
I-04
I-07.1

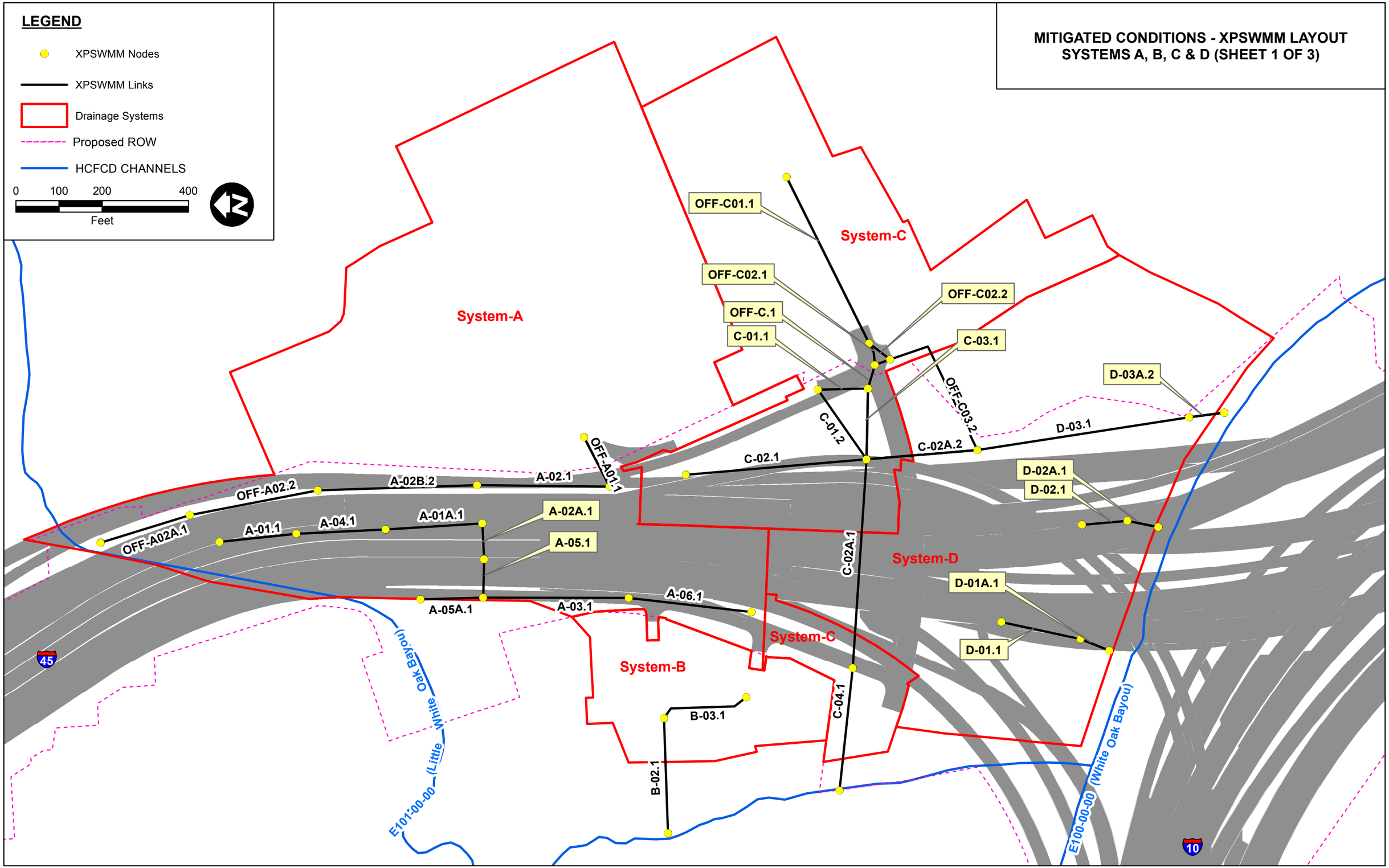
Name	Link Name	Upstream Node Name	Downstream Node Name	Upstream Invert Elevation	Downstream Invert Elevation	Number of Barrels	Shape	Diameter (Height)	Bottom Width	Length	Conduit Slope	Max Flow	Max Velocity	Max Volume	Maximum Water Elevation (US)	Maximum Water Elevation (DS)
				ft	ft			ft	ft	ft		cfs	ft/s	ft^3	ft	ft
A-01.1	A-01.1	A-01	A-01A	26.57	25.63	1	Circular	1.5	0	335	0.281	7.416	4.19	605.03	28.701	27.176
A-01A.1	A-01A.1	A-01A	A-02A	25.63	25.01	1	Circular	1.5	0	228	0.272	7.032	4.04	349.73	27.176	26.036
A-02.1	A-02.1	A-02	A-02A	26.35	24.41	1	Circular	2.5	0	80	2.425	20.024	11.45	89.73	27.317	25.531
A-02.2	A-02.2	A-02	OFF-A02	32	28	1	Natural	10	0	300	1.333	49.976	3.43	3010.82	33.133	29.926
A-02A.1	A-02A.1	A-02A	A-05A	24.41	21.87	1	Circular	2.5	0	100	2.54	27.039	12.68	94.04	25.531	22.991
A-03.1	A-03.1	A-03	A-05A	32	22.83	1	Circular	1.5	0	299	3.067	12.362	11.16	32.52	32.901	23.73
A-04OUT.1	A-04OUT.1	A-04	A-OUT	36	30	1	Natural	0.82	0	100	6	8.826	1.73	4773.32	36.265	31.26
A-05.1	A-05.1	A-05	A-05A	25.84	24.77	1	Circular	2	0	35	3.057	3.259	7.61	5.42	26.228	25.157
A-05.2	A-05.2	A-05	A-05OUT	30	21	1	Natural	6.9	0	150	6	0	0	0	N/A	N/A
A-05A.1	A-05A.1	A-05A	A-OUT	21.63	10.83	1	Circular	2.5	0	180	6	42.576	17.37	923.92	22.767	31.26
A-06.1	A-06.1	A-06	A-03	34.2	32.12	1	Circular	1.5	0	349	0.596	5.86	4.99	182.96	35.15	33.054
OFF-A01.1OVR	OFF-A01.1	OFF-A01	A-02	40	32	1	Natural	3	0	300	2.667	51.291	4.06	667.14	40.805	33.133
OFF-A01.1RCP	OFF-A01.1	OFF-A01	A-02	34.19	26.79	1	Circular	2	0	280	2.643	10.004	9.96	27.07	34.903	27.502
OFF-A02.1	OFF-A02.1	OFF-A02	OFF-A02OUT	21.04	13	1	Circular	2	0	200	4.02	10.037	7.16	639.57	22.86	22
OFF-A02.2	OFF-A02.2	OFF-A02	OFF-A02A	29	26	1	Natural	6.5	0	200	1.5	70.646	3.34	671.43	29.926	26.6
OFF-A02A.1	OFF-A02A.1	OFF-A02A	A-01OUT	26	15	1	Natural	7	0	200	5.5	70.611	1.88	255123	26.6	36.23
B-01.1	B-01.1	B-01	B-01A	17.725	16.9	1	Circular	1.5	0	60	1.375	2.498	2.36	109.04	25.086	25.084
B-01A.1	B-01A.1	B-01A	B-03	16.9	16.43	1	Circular	1.5	0	385	0.122	2.48	1.37	700.93	25.084	25.057
B-02.1	B-02.1	B-02	B-OUT	15.8	10	1	Circular	2	0	270	2.148	19.942	6.28	883.33	25.025	25
B-03.1	B-03.1	B-03	B-02	16.43	15.8	1	Circular	1.5	0	210	0.3	11.437	6.33	383.27	25.057	25.025
C-01.1	C-01.1	C-01	C-03	46.66	46.44	1	Circular	1.5	0	100	0.22	5.005	3.83	119.44	47.729	47.3
C-01.2	C-01.2	C-01	C-02	49	29	1	Natural	1.15	0	160	12.5	1.513	3.05	111.56	49.152	29.961
C-02.1	C-02.1	C-02	C-04	26.47	14.58	1	Circular	2	0	450	2.642	26.861	9.65	1216.62	29.961	25.169
C-02.2	C-02.2	C-02	D-03	29	25	1	Natural	6.83	0	400	1	29.335	2.94	1300.4	29.961	26.16
C-03.1OVR	C-03.1	C-03	C-02	49	29	1	Natural	1.15	0	160	12.5	0.004	0.33	100.06	49.008	29.961
C-03.1RCP	C-03.1	C-03	C-02	39.67	26.47	1	Circular	2	0	163	8.098	38.369	19.46	118.89	40.806	29.961
C-04.1	C-04.1	C-04	C-OUT	13.65	10.44	1	Circular	2	0	300	1.07	34.676	10.75	980.16	25.169	25
C-OFF1.1PAV	OFF-C01.1	OFF-C01	OFF-C02	50	49.5	1	Natural	1.05	0	250	0.2	15.897	1.82	1332.11	50.356	49.832
C-OFF1.1RCP	OFF-C01.1	OFF-C01	OFF-C02	43.2	42.13	1	Circular	2	0	425	0.252	11.254	3.83	1399.63	45.897	45.003
OFF-C.1	OFF-C.1	OFF-C	C-03	42	41.87	1	Circular	2	0	50	0.26	30.174	9.62	156.89	44.605	43.729
OFF-C02.1	OFF-C02.1	OFF-C02	OFF-C	42.13	42	1	Circular	2	0	50	0.26	20.818	6.4	164.67	45.003	44.605
OFF-C02.2	OFF-C02.2	OFF-C02	OFF-C03	49.5	49.4	1	Natural	0.85	0	50	0.2	14.177	1.83	351.07	49.832	49.685
OFF-C03.1	OFF-C03.1	OFF-C03	OFF-C	42.1	42	1	Circular	2	0	40	0.25	10.454	3.3	131.74	44.683	44.605
OFF-C03.2	OFF-C03.2	OFF-C03	D-03	48	25	1	Natural	2.88	0	450	5.111	13.906	1.26	643.29	48.239	26.16
D-01.1	D-01.1	D-01	D-01A	16.06	13.56	1	Natural	2.6	0	250	1	30.33	1.86	680.75	16.711	14.064
D-01A.1OVR	D-01A.1	D-01A	D-01OUT	13.56	7.65	1	Natural	2.1	0	75	7.88	19.75	0.2	0	N/A	N/A
D-01A.1RCP	D-01A.1	D-01A	D-01OUT	13.38	11.42	1	Circular	2	0	35	5.6	10.576	10.2	112.26	13.983	20
D-02.1	D-02.1	D-02	D-02A	13.5	11	1	Natural	4.25	0	125	1.75	12.649	2.83	109.09	14.067	11.521
D-02A.1OVR	D-02A.1	D-02A	D-02OUT	13	8	1	Natural	2.5	0	75	6.667	0	0	10650.3	1.30E+01	2.00E+01
D-02A.1RCP	D-02A.1	D-02A	D-02OUT	9.8	8.95	2	Circular	2	0	50	1.7	12.649	5.84	161.6	10.429	20
D-03.1	D-03.1	D-03	D-03A	25	11.15	1	Natural	9.1	0	250	5.54	67.699	6.35	3310.71	26.16	15.287
D-03A.1OVR	D-03A.1	D-03A	D-03OUT	15	12	1	Natural	1.55	0	50	6	1.923	0.15	0	N/A	N/A
D-03A.1RCP	D-03A.1	D-03A	D-03OUT	11.15	7.84	1	Circular	2	0	50	6.62	62.481	21.29	162.16	15.287	20
E-01.1OVR	E-01.1	E-01	OFF-E	35	28.72	1	Trapezoidal	1	0	300	2.093	0.737	0.97	996.39	35.247	31.385
E-01.1RCP	E-01.1	E-01	OFF-E	24.96	23.875	1	Circular	1.5	0	250	0.434	10.161	5.64	458.28	31.04	28.779
E-02.1	E-02.1	E-02	E-02OUT	25	10	1	Natural	1.5	0	100	15	14.084	0.04	0	N/A	N/A
E-OFF.1	E-OFF.1	F-01A	OFF-E02A	23.3	17.57	1	Circular	3	0	600	0.955	66.438	9.36	4258.66	28.638	25.059
E-OFF.2OVR	OFF-E.2	OFF-E	F-01A	31	30	1	Natural	1	0	200	0.5	41.922	1.83	1584.59	31.385	30.366
E-OFF.2RCP	OFF-E.2	OFF-E	F-01A	23.875	23.3	1	Circular	2.5	0	115	0.5	30.461	6.31	590.36	28.779	28.638

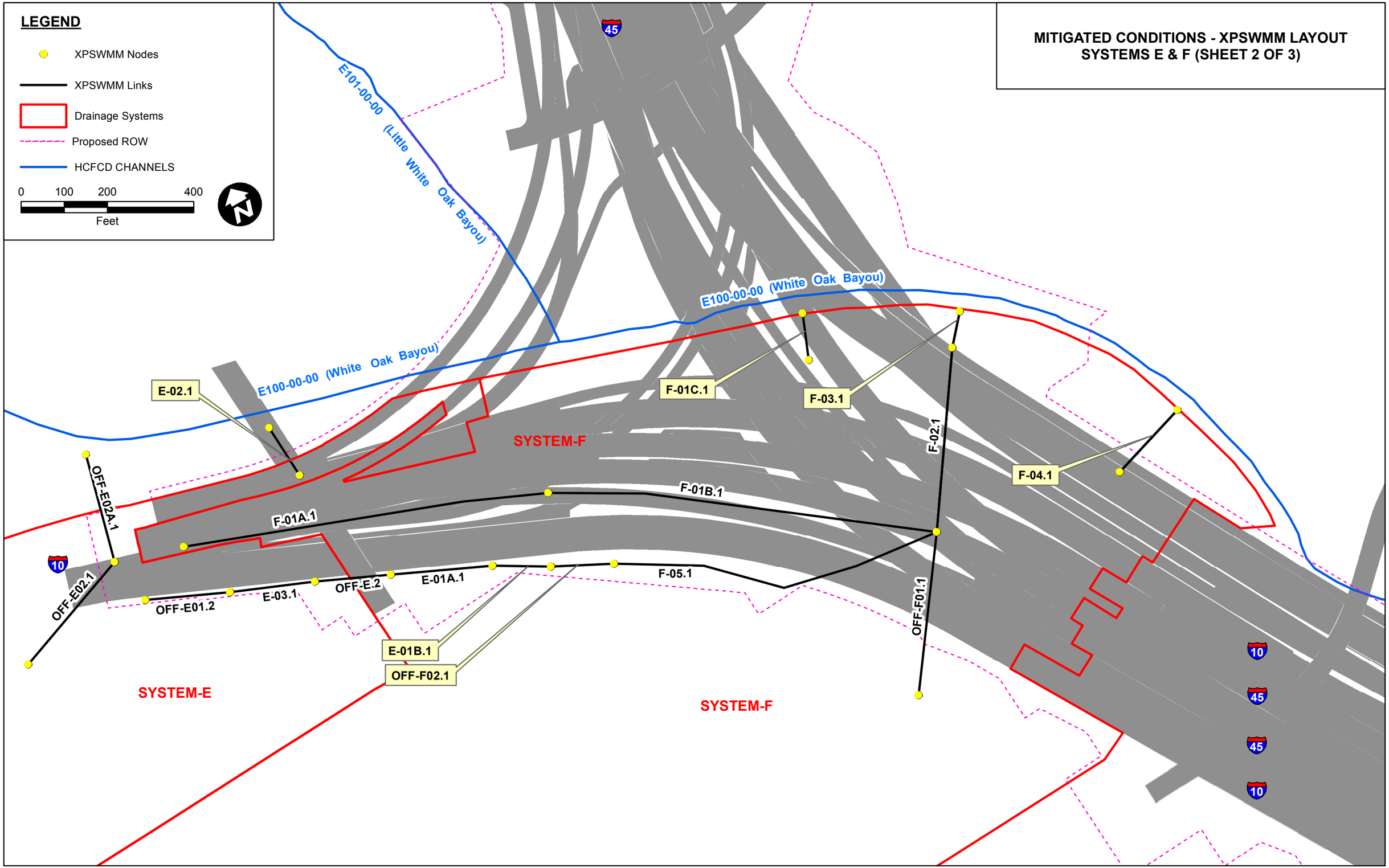
Name	Link Name	Upstream Node Name	Downstream Node Name	Upstream Invert Elevation	Downstream Invert Elevation	Number of Barrels	Shape	Diameter (Height)	Bottom Width	Length	Conduit Slope	Max Flow	Max Velocity	Max Volume	Maximum Water Elevation (US)	Maximum Water Elevation (DS)
				ft	ft			ft	ft	ft		cfs	ft/s	ft^3	ft	ft
OFF-E01.1	OFF-E01.1	OFF-E01	OFF-E02A	20.34	18.07	1	Circular	4.5	0	130	1.746	14.373	7.01	2074.83	25.078	25.059
OFF-E01.2	OFF-E01.2	OFF-E01	OFF-E	35.7	30.5	1	Trapezoidal	1	0	400	1.3	51.495	4.42	1515.73	37.685	32.315
OFF-E02.1	OFF-E02.1	OFF-E02	OFF-E02A	19.96	18.37	1	Circular	3	0	160	0.994	140.289	19.57	1168.56	30.208	25.059
OFF-E02A.1	OFF-E02A.1	OFF-E02A	E-OUT	13.17	11.75	1	Circular	4.5	0	295	0.481	212.329	13.25	4777.17	25.059	25
F-01A.1	F-01A.1	F-01A	F-01B	30	27.5	1	Natural	7.1	0	1000	0.25	0	0	0	N/A	N/A
F-01B.1	F-01B.1	F-01B	F-01C	27.5	17.5	1	Natural	3.55	0	250	4	14.365	2.67	71.18	27.797	17.929
F-01C.1	F-01C.1	F-01C	F-01OUT	17.5	8.5	1	Natural	2.3	0	450	2	38.165	0.14	0	N/A	N/A
F-02.1	F-02.1	F-02	F-03	20	11.64	1	Natural	2.85	0	400	2.09	233.535	2.47	106172	21.053	15.739
F-03.1OVR	F-03.1	F-03	F-03OUT	11.64	10.94	1	Natural	5.54	0	100	0.7	196.288	4.71	11335.8	15.739	20
F-03.1RCP	F-03.1	F-03	F-03OUT	9.21	8.44	1	Circular	2.5	0	75	1.027	44.622	9.81	376.65	15.739	20
F-04.1OVR	F-04.1	F-04	F-04OUT	15.5	5	1	Natural	1.6	0	200	5.25	0	0	0	N/A	N/A
F-04.1RCP	F-04.1	F-04	F-04OUT	13.5	6.35	1	Circular	2	0	130	5.5	11.052	10.34	423.55	14.12	20
OFF-F01.1	OFF-F01.1	OFF-F01	F-02	35	25	1	Natural	3.55	0	250	4	124.441	5.61	453.72	35.825	25.823
OFF-F02.1	OFF-F02.1	OFF-F02	F-02	36	29	1	Natural	3.8	0	500	1.4	108.368	4.34	2460.22	37.686	30.479
G-01.1OVER	G-01.1	G-01	G-OUT	30.94	28.86	1	Natural	0.82	0	200	1.04	8.363	1.04	109.45	31.218	29.048
G-01.1RCP	G-01.1	G-01	G-OUT	19.49	11.39	1	Circular	3	0	360	2.25	110.646	15.4	2615.43	31.218	27.49
H-01.1	H-01.1	H-01	H-03	10.3	9.6	1	Circular	3	0	110	0.636	5.823	0.84	805.84	22.904	22.903
H-02.1	H-02.1	H-02	H-03	14	9.6	1	Circular	3	0	550	0.8	48.565	6.77	3972.72	25.679	22.903
H-02.2	H-02.2	H-02	H-07	31	28	1	Natural	1.76	0	200	1.5	171.862	5.16	8472.05	31.791	29.351
H-03.1	H-03.1	H-03	H-04	9.6	7.75	1	Circular	3	0	280	0.661	72.157	10.01	2023.1	22.903	21.202
H-04.1	H-04.1	H-04	H-05	7.75	6.55	1	Circular	3.5	0	200	0.6	104.833	10.73	1961.51	21.202	20.703
H-05.1	H-05.1	H-05	H-06	6.55	4.45	1	Circular	4	0	350	0.6	115.675	9.1	4480.84	20.703	20.251
H-06.1	H-06.1	H-06	H-OUT1	4.45	4	1	Circular	5	0	450	0.1	221.6	11.19	9262.71	20.251	20
H-06.2	H-06.2	H-06	H-13	26	21	1	Natural	3.1	0	250	2	0	0	0	N/A	N/A
H-07.1	H-07.1	H-07	H-12	28	19	1	Natural	9.9	0	250	3.6	182.236	6.28	599.37	29.351	19.937
H-08.1OVR	H-08.1	H-08	OFF-H04	36	35.5	1	Natural	1.9	0	100	0.5	1.056	0.32	10.58	36.099	35.538
H-08.1RCP	H-08.1	H-08	OFF-H04	26.68	25.55	1	Circular	1.5	0	175	0.646	10	5.74	293.94	28.293	26.768
H-08.2	H-08.2	H-08	H-09	37	36	1	Natural	1.9	0	135	0.741	0	0	0	N/A	N/A
H-09.1	H-09.1	H-09	H-02	23.65	23.02	1	Circular	3	0	315	0.2	29.939	5.48	2047.45	26.198	25.679
H-09.2	H-09.2	H-09	H-10	36	34	1	Natural	0.75	0	150	1.333	5.581	0.98	59.61	36.237	34.183
H-10.1	H-10.1	H-10	H-11	20.5	16	1	Natural	13	0	150	3	15.324	3.88	53.63	21.274	16.548
H-11.1	H-11.1	H-11	H-OUT2	16	5	1	Natural	2.34	0	100	11	34.175	0.44	0	N/A	N/A
H-12.1	H-12.1	H-12	H-OUT3	19	5	1	Natural	1.75	0	75	18.667	199.127	1.24	0	N/A	N/A
H-13.1	H-13.1	H-13	H-OUT4	21	11	1	Natural	2.7	0	200	5	12.282	0.95	299156	21.186	20
H-OFF3.1OVR	OFF-H03.1	OFF-H03	H-02	35	33	1	Natural	2.9	0	200	1	169.439	3.29	1816.72	35.364	33.36
H-OFF3.1RCP	OFF-H03.1	OFF-H03	H-02	24.23	22.94	1	Circular	3	0	225	0.573	10.859	5.6	1128.76	25.705	25.679
OFF-H01.1OVR	OFF-H01.1	OFF-H01	H-06	36	26	1	Natural	9.5	0	365	2.74	31.948	2.86	158.7	36.473	26.445
OFF-H01.1RCP	OFF-H01.1	OFF-H01	H-06	5.1	4.45	1	Circular	5	0	325	0.2	74.231	3.76	6689.73	20.256	20.251
OFF-H02.1	OFF-H02.1	OFF-H02	H-04	9.43	7.75	1	Circular	3	0	375	0.448	57.259	7.94	2709.51	22.235	21.202
OFF-H02.2	OFF-H02.2	OFF-H02	H-06	28.2	26.4	1	Natural	1.04	0	450	0.4	0	0	0	N/A	N/A
OFF-H04.1	OFF-H04.1	OFF-H04	OFF-H03	33	32.1	1	Natural	2.66	0	220	0.409	92.838	1.03	22997.4	35.467	35.364
OFF-H04.2	OFF-H04.2	OFF-H04	H-09	24.07	23.65	1	Circular	3	0	200	0.21	20.018	3.9	1211.32	26.343	26.198
I-01.1	I-01.1	I-01	I-01A	12.88	12.03	1	Circular	2	0	340	0.25	5.989	3.63	657.03	13.945	13.35
I-01A.1	I-01A.1	I-01A	I-02	12.03	10.81	1	Circular	2.5	0	310	0.394	7.012	3.98	1128.42	13.35	13.155
I-02.1	I-02.1	I-02	I-02A	9.97	9.52	1	Circular	3	0	60	0.75	36.352	6.41	444.56	13.155	13.041
I-02A.1	I-02A.1	I-02A	I-05	9.52	9.08	1	Circular	3.5	0	46.3	0.95	71.3	8.31	458.19	13.041	12.849
I-03.1	I-03.1	I-03	I-02	13.95	13.7	1	Circular	1.5	0	50	0.5	5.599	4.76	57.72	14.904	14.612
I-04.1	I-04.1	I-04	I-02A	12.65	10.65	1	Circular	2	0	400	0.5	40.242	12.39	1308.55	24.757	13.041
I-05.1	I-05.1	I-05	I-08	8.99	7.72	1	Circular	3.5	0	222	0.572	79.432	8.03	2226.95	12.849	11.58

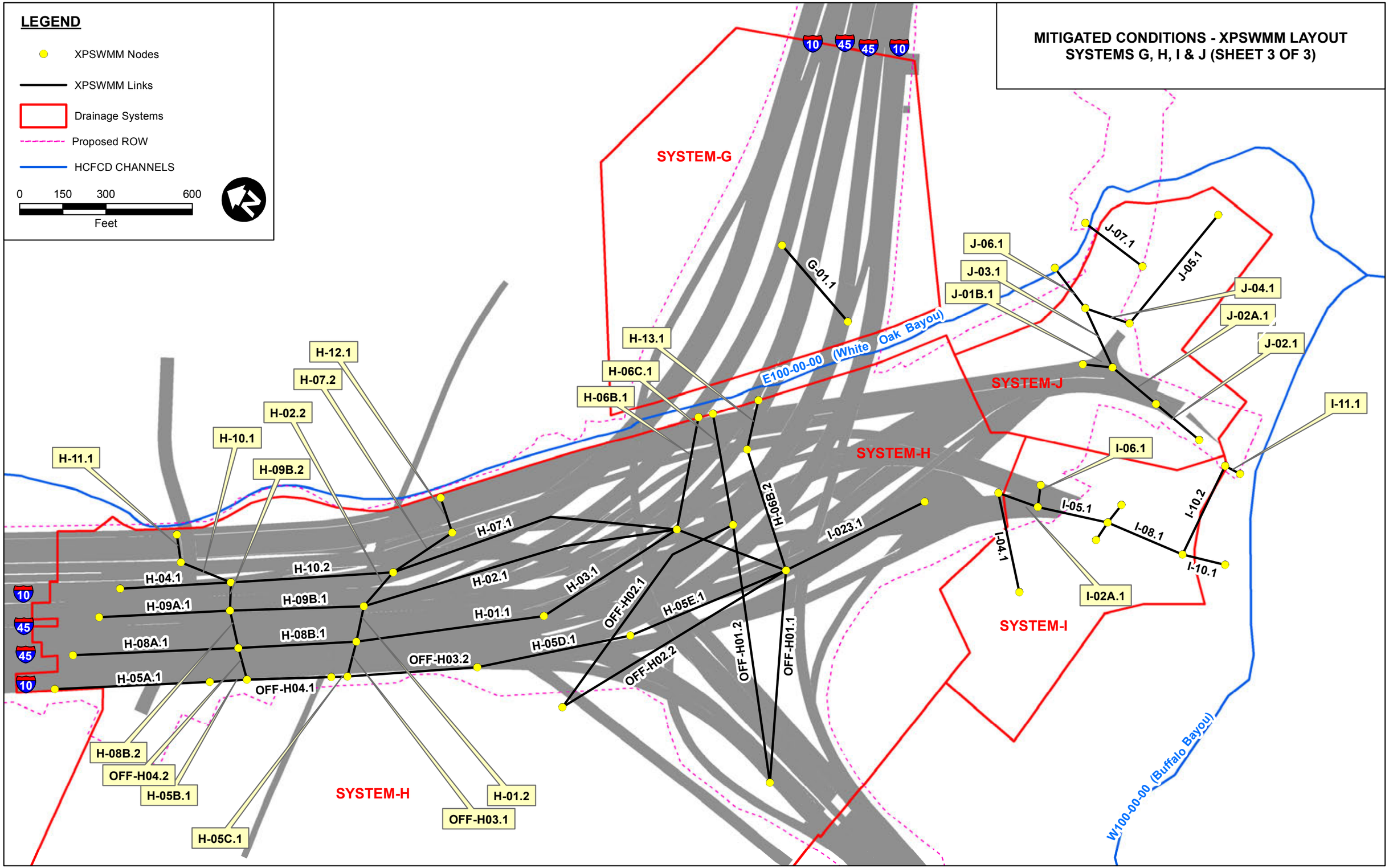
Name	Link Name	Upstream Node Name	Downstream Node Name	Upstream Invert Elevation	Downstream Invert Elevation	Number of Barrels	Shape	Diameter (Height)	Bottom Width	Length	Conduit Slope	Max Flow	Max Velocity	Max Volume	Maximum Water Elevation (US)	Maximum Water Elevation (DS)
				ft	ft			ft	ft	ft		cfs	ft/s	ft^3	ft	ft
I-06.1	I-06.1	I-06	I-05	11.058	10.81	1	Circular	2.5	0	80	0.31	5.544	3.78	323.01	12.864	12.849
I-07.1	I-07.1	I-07	I-08	8.9	8.69	1	Circular	3	0	60	0.35	6.852	2.74	409.42	11.584	11.58
I-08.1	I-08.1	I-08	I-10	7.3	6.95	1	Circular	4	0	342	0.102	96.839	7.65	3922.82	11.58	9.931
I-09.1	I-09.1	I-09	I-08	13.43	13.25	1	Circular	1.5	0	60	0.3	5.223	4.21	70.09	14.438	14.13
I-10.1	I-10.1	I-10	I-OUT1	2.85	2	1	Rectangular	4	4	85	1	101.893	10.82	1390.8	5.02	24.12
I-10.2	I-10.2	I-10	I-11	18.5	17	1	Circular	2	0	375	0.4	0	0	0	N/A	N/A
I-11.1	I-11.1	I-11	I-OUT2	9	8.5	1	Circular	2	0	50	1	6.851	6.08	163.88	9.755	24.1
J-01A.1	J-01A.1	J-01A	J-01B	25	20	1	Natural	2.45	0	550	0.909	26.94	2.15	678.84	25.802	20.596
J-01B.1	J-01B.1	J-01B	J-03	10.33	9.11	1	Circular	3	0	70	1.743	47.089	12.52	497.42	14.908	14.606
J-02.1	J-02.1	J-02	J-02A	19.25	8.57	1	Circular	2	0	215	4.967	18.171	14.03	352.09	20.14	14.717
J-02A.1	J-02A.1	J-02A	J-03	8.57	4.96	1	Circular	3	0	217	1.664	21.336	6.59	1555.51	14.717	14.606
J-03.1	J-03.1	J-03	J-06	4.96	4.16	1	Circular	5	0	215	0.372	69.412	4.78	4422.05	14.606	14.475
J-04.1	J-04.1	J-04	J-06	12.32	12	1	Circular	3	0	160	0.2	20.967	5.14	934.79	14.511	14.475
J-05.1	J-05.1	J-05	J-04	13.75	12.8	1	Circular	3	0	475	0.2	13.468	4.15	1625.31	15.184	14.511
J-06.1	J-06.1	J-06	J-OUT1	4.16	4	1	Circular	5	0	160	0.1	88.414	4.73	3293.41	14.475	25
J-07.1	J-07.1	J-07	J-OUT2	4.6	4	1	Circular	2	0	300	0.2	11.996	3.75	999.48	25.005	25

Name	Link Name	Upstream Node Name	Downstream Node Name	Upstream Invert Elevation	Downstream Invert Elevation	Number of Barrels	Shape	Diameter (Height)	Bottom Width	Length	Conduit Slope	Max Flow	Max Velocity	Max Volume	Maximum Water Elevation (US)	Maximum Water Elevation (DS)
				ft	ft			ft	ft	ft		cfs	ft/s	ft^3	ft	ft
A-01.1	A-01.1	A-01	A-01A	26.57	25.63	1	Circular	1.5	0	335	0.281	11.115	6.18	611.11	32.432	28.789
A-01A.1	A-01A.1	A-01A	A-02A	25.63	25.01	1	Circular	1.5	0	228	0.272	11.111	6.31	385	28.789	26.284
A-02.1	A-02.1	A-02	A-02A	26.35	24.41	1	Circular	2.5	0	80	2.425	20.015	11.44	103.3	27.322	25.626
A-02.2	A-02.2	A-02	OFF-A02	32	28	1	Natural	10	0	300	1.333	84.045	4.05	4514.95	33.438	30.19
A-02A.1	A-02A.1	A-02A	A-05A	24.41	21.87	1	Circular	2.5	0	100	2.54	31.127	13.15	113.21	25.626	23.085
A-03.1	A-03.1	A-03	A-05A	32	22.83	1	Circular	1.5	0	299	3.067	18.21	11.87	60.92	33.217	24.047
A-04OUT.1	A-04OUT.1	A-04	A-OUT	36	30	1	Natural	0.82	0	100	6	12.95	1.74	33471.6	36.282	36.42
A-05.1	A-05.1	A-05	A-05A	25.84	24.77	1	Circular	2	0	35	3.057	4.834	8.54	8.74	26.313	25.242
A-05.2	A-05.2	A-05	A-05OUT	30	21	1	Natural	6.9	0	150	6	0	0	0	N/A	N/A
A-05A.1	A-05A.1	A-05A	A-OUT	21.63	10.83	1	Circular	2.5	0	180	6	53.465	19.04	935.53	22.937	36.42
A-06.1	A-06.1	A-06	A-03	34.2	32.12	1	Circular	1.5	0	349	0.596	8.617	5.25	295.93	35.547	33.256
OFF-A01.1OVR	OFF-A01.1	OFF-A01	A-02	40	32	1	Natural	3	0	300	2.667	81.203	4.55	1216.69	40.988	33.438
OFF-A01.1RCP	OFF-A01.1	OFF-A01	A-02	34.19	26.79	1	Circular	2	0	280	2.643	10.001	9.96	27.06	34.903	27.502
OFF-A02.1	OFF-A02.1	OFF-A02	OFF-A02OUT	21.04	13	1	Circular	2	0	200	4.02	10	4.68	638.46	22.791	22
OFF-A02.2	OFF-A02.2	OFF-A02	OFF-A02A	29	26	1	Natural	6.5	0	200	1.5	119.318	3.95	1202.66	30.19	26.765
OFF-A02A.1	OFF-A02A.1	OFF-A02A	A-01OUT	26	15	1	Natural	7	0	200	5.5	117.246	1.19	240919	26.765	39.55
B-01.1	B-01.1	B-01	B-01A	17.725	16.9	1	Circular	1.5	0	60	1.375	3.581	2.15	112.74	33.374	33.316
B-01A.1	B-01A.1	B-01A	B-03	16.9	16.43	1	Circular	1.5	0	385	0.122	3.508	1.87	723.68	33.316	32.936
B-02.1	B-02.1	B-02	B-OUT	15.8	10	1	Circular	2	0	270	2.148	28.504	8.96	883.33	28.196	25
B-03.1	B-03.1	B-03	B-02	16.43	15.8	1	Circular	1.5	0	210	0.3	16.654	8.87	388.26	32.936	28.196
C-01.1	C-01.1	C-01	C-03	46.66	46.44	1	Circular	1.5	0	100	0.22	5.004	3.83	119.41	47.729	47.3
C-01.2	C-01.2	C-01	C-02	49	29	1	Natural	1.15	0	160	12.5	4.963	0.7	238.6	49.244	30.222
C-02.1	C-02.1	C-02	C-04	26.47	14.58	1	Circular	2	0	450	2.642	21.79	8.09	1464.08	30.222	27.975
C-02.2	C-02.2	C-02	D-03	29	25	1	Natural	6.83	0	400	1	50.271	3.47	2383.99	30.222	26.473
C-03.1OVR	C-03.1	C-03	C-02	49	29	1	Natural	1.15	0	160	12.5	0.001	3.05	201.96	49.003	30.222
C-03.1RCP	C-03.1	C-03	C-02	39.67	26.47	1	Circular	2	0	163	8.098	39.981	19.5	130.33	40.85	30.222
C-04.1	C-04.1	C-04	C-OUT	13.65	10.44	1	Circular	2	0	300	1.07	30.69	9.42	980.16	27.975	25
C-OFF1.1PAV	OFF-C01.1	OFF-C01	OFF-C02	50	49.5	1	Natural	1.05	0	250	0.2	28.215	2.28	2726.78	50.443	49.948
C-OFF1.1RCP	OFF-C01.1	OFF-C01	OFF-C02	43.2	42.13	1	Circular	2	0	425	0.252	11.256	3.76	1399.02	45.834	45
OFF-C.1	OFF-C.1	OFF-C	C-03	42	41.87	1	Circular	2	0	50	0.26	30.1	9.6	156.79	44.604	43.728
OFF-C02.1	OFF-C02.1	OFF-C02	OFF-C	42.13	42	1	Circular	2	0	50	0.26	20.716	6.37	164.67	45	44.604
OFF-C02.2	OFF-C02.2	OFF-C02	OFF-C03	49.5	49.4	1	Natural	0.85	0	50	0.2	30.48	2.47	575.52	49.948	49.797
OFF-C03.1	OFF-C03.1	OFF-C03	OFF-C	42.1	42	1	Circular	2	0	40	0.25	10.384	3.3	131.74	44.685	44.604
OFF-C03.2	OFF-C03.2	OFF-C03	D-03	48	25	1	Natural	2.88	0	450	5.111	35.964	1.98	1196.22	48.353	26.473
D-01.1	D-01.1	D-01	D-01A	16.06	13.56	1	Natural	2.6	0	250	1	44.704	2.09	1045.34	16.816	14.146
D-01A.1OVR	D-01A.1	D-01A	D-01OUT	13.56	7.65	1	Natural	2.1	0	75	7.88	30.852	0.24	0	N/A	N/A
D-01A.1RCP	D-01A.1	D-01A	D-01OUT	13.38	11.42	1	Circular	2	0	35	5.6	13.692	11.56	112.26	14.071	20
D-02.1	D-02.1	D-02	D-02A	13.5	11	1	Natural	4.25	0	125	1.75	18.759	3.22	172.06	14.171	11.622
D-02A.1OVR	D-02A.1	D-02A	D-02OUT	13	8	1	Natural	2.5	0	75	6.667	0	0	10398.8	1.30E+01	2.00E+01
D-02A.1RCP	D-02A.1	D-02A	D-02OUT	9.8	8.95	2	Circular	2	0	50	1.7	18.733	7.02	161.6	10.575	20
D-03.1	D-03.1	D-03	D-03A	25	11.15	1	Natural	9.1	0	250	5.54	121.613	6.36	7132.84	26.473	16.518
D-03A.1OVR	D-03A.1	D-03A	D-03OUT	15	12	1	Natural	1.55	0	50	6	61.327	2.02	0	N/A	N/A
D-03A.1RCP	D-03A.1	D-03A	D-03OUT	11.15	7.84	1	Circular	2	0	50	6.62	60.914	20.84	162.16	16.518	20

Name	Link Name	Upstream Node Name	Downstream Node Name	Upstream Invert Elevation	Downstream Invert Elevation	Number of Barrels	Shape	Diameter (Height)	Bottom Width	Length	Conduit Slope	Max Flow	Max Velocity	Max Volume	Maximum Water Elevation (US)	Maximum Water Elevation (DS)
				ft	ft			ft	ft	ft		cfs	ft/s	ft^3	ft	ft
E-01.1OVR	E-01.1	E-01	OFF-E	35	28.72	1	Trapezoidal	1	0	300	2.093	6.31	1.95	1334.65	35.554	31.55
E-01.1RCP	E-01.1	E-01	OFF-E	24.96	23.875	1	Circular	1.5	0	250	0.434	10.029	5.57	448.2	30.97	28.762
E-02.1	E-02.1	E-02	E-02OUT	25	10	1	Natural	1.5	0	100	15	20.608	0.06	0	N/A	N/A
E-OFF.1	E-OFF.1	F-01A	OFF-E02A	23.3	17.57	1	Circular	3	0	600	0.955	55.557	7.79	4319.07	31.325	29.228
E-OFF.2OVR	OFF-E.2	OFF-E	F-01A	31	30	1	Natural	1	0	200	0.5	154.859	2.65	50356.8	31.55	31.325
E-OFF.2RCP	OFF-E.2	OFF-E	F-01A	23.875	23.3	1	Circular	2.5	0	115	0.5	-61.968	-12.46	590.36	28.762	31.325
OFF-E01.1	OFF-E01.1	OFF-E01	OFF-E02A	20.34	18.07	1	Circular	4.5	0	130	1.746	23.172	5.27	2087.03	29.231	29.228
OFF-E01.2	OFF-E01.2	OFF-E01	OFF-E	35.7	30.5	1	Trapezoidal	1	0	400	1.3	81.23	5.11	2772.12	38.002	32.782
OFF-E02.1	OFF-E02.1	OFF-E02	OFF-E02A	19.96	18.37	1	Circular	3	0	160	0.994	188.609	25.74	1149.83	41.236	29.228
OFF-E02A.1	OFF-E02A.1	OFF-E02A	E-OUT	13.17	11.75	1	Circular	4.5	0	295	0.481	238.224	14.76	4777.31	29.228	25
F-01A.1	F-01A.1	F-01A	F-01B	30	27.5	1	Natural	7.1	0	1000	0.25	36.846	1.63	3074.95	31.325	28.049
F-01B.1	F-01B.1	F-01B	F-01C	27.5	17.5	1	Natural	3.55	0	250	4	54.596	4.21	217.32	28.049	18.123
F-01C.1	F-01C.1	F-01C	F-01OUT	17.5	8.5	1	Natural	2.3	0	450	2	88.052	0.19	0	N/A	N/A
F-02.1	F-02.1	F-02	F-03	20	11.64	1	Natural	2.85	0	400	2.09	487.268	2.6	180392	21.373	17.508
F-03.1OVR	F-03.1	F-03	F-03OUT	11.64	10.94	1	Natural	5.54	0	100	0.7	455.217	4.5	16920.7	17.508	20
F-03.1RCP	F-03.1	F-03	F-03OUT	9.21	8.44	1	Circular	2.5	0	75	1.027	44.296	9.59	376.65	17.508	20
F-04.1OVR	F-04.1	F-04	F-04OUT	15.5	5	1	Natural	1.6	0	200	5.25	0	0	0	N/A	N/A
F-04.1RCP	F-04.1	F-04	F-04OUT	13.5	6.35	1	Circular	2	0	130	5.5	16.384	12.44	423.55	14.263	20
OFF-F01.1	OFF-F01.1	OFF-F01	F-02	35	25	1	Natural	3.55	0	250	4	325.759	7.21	1450.44	36.286	26.286
OFF-F02.1	OFF-F02.1	OFF-F02	F-02	36	29	1	Natural	3.8	0	500	1.4	165.219	4.46	4574.56	37.987	30.849
G-01.1OVER	G-01.1	G-01	G-OUT	30.94	28.86	1	Natural	0.82	0	200	1.04	65.826	1.65	93295.6	31.527	30
G-01.1RCP	G-01.1	G-01	G-OUT	19.49	11.39	1	Circular	3	0	360	2.25	112.383	15.61	2628.98	31.527	30
H-01.1	H-01.1	H-01	H-03	10.3	9.6	1	Circular	3	0	110	0.636	8.714	1.19	805.84	28.916	28.89
H-02.1	H-02.1	H-02	H-03	14	9.6	1	Circular	3	0	550	0.8	50.305	6.91	4022.12	31.127	28.89
H-02.2	H-02.2	H-02	H-07	31	28	1	Natural	1.76	0	200	1.5	278.388	5.08	18565.8	31.928	29.678
H-03.1	H-03.1	H-03	H-04	9.6	7.75	1	Circular	3	0	280	0.661	81.181	11.12	2042.02	28.89	25.706
H-04.1	H-04.1	H-04	H-05	7.75	6.55	1	Circular	3.5	0	200	0.6	98.021	9.95	1976.1	25.706	24.871
H-05.1	H-05.1	H-05	H-06	6.55	4.45	1	Circular	4	0	350	0.6	105.789	8.25	4506.03	24.871	23.851
H-06.1	H-06.1	H-06	H-OUT1	4.45	4	1	Circular	5	0	450	0.1	258.727	12.95	9262.71	23.851	20
H-06.2	H-06.2	H-06	H-13	26	21	1	Natural	3.1	0	250	2	0	0	0	N/A	N/A
H-07.1	H-07.1	H-07	H-12	28	19	1	Natural	9.9	0	250	3.6	294.029	7.37	945.99	29.678	20.095
H-08.1OVR	H-08.1	H-08	OFF-H04	36	35.5	1	Natural	1.9	0	100	0.5	6.743	0.47	212.53	36.195	35.62
H-08.1RCP	H-08.1	H-08	OFF-H04	26.68	25.55	1	Circular	1.5	0	175	0.646	10.114	5.6	320.15	33.447	31.927
H-08.2	H-08.2	H-08	H-09	37	36	1	Natural	1.9	0	135	0.741	0	0	0	N/A	N/A
H-09.1	H-09.1	H-09	H-02	23.65	23.02	1	Circular	3	0	315	0.2	30.189	4.99	2330.64	31.751	31.127
H-09.2	H-09.2	H-09	H-10	36	34	1	Natural	0.75	0	150	1.333	13.626	2.24	157.76	36.319	34.252
H-10.1	H-10.1	H-10	H-11	20.5	16	1	Natural	13	0	150	3	28.499	4.68	102.94	21.553	16.678
H-11.1	H-11.1	H-11	H-OUT2	16	5	1	Natural	2.34	0	100	11	55.616	0.52	0	N/A	N/A
H-12.1	H-12.1	H-12	H-OUT3	19	5	1	Natural	1.75	0	75	18.667	318.058	1.26	0	N/A	N/A
H-13.1	H-13.1	H-13	H-OUT4	21	11	1	Natural	2.7	0	200	5	18.203	0.83	319523	21.219	20
H-OFF3.1OVR	OFF-H03.1	OFF-H03	H-02	35	33	1	Natural	2.9	0	200	1	269.477	3.83	2813.13	35.418	33.41
H-OFF3.1RCP	OFF-H03.1	OFF-H03	H-02	24.23	22.94	1	Circular	3	0	225	0.573	14.353	5.56	1607.94	31.177	31.127
OFF-H01.1OVR	OFF-H01.1	OFF-H01	H-06	36	26	1	Natural	9.5	0	365	2.74	89.083	3.91	584.79	36.734	26.722
OFF-H01.1RCP	OFF-H01.1	OFF-H01	H-06	5.1	4.45	1	Circular	5	0	325	0.2	74.354	3.73	6689.73	24.109	23.851
OFF-H02.1	OFF-H02.1	OFF-H02	H-04	9.43	7.75	1	Circular	3	0	375	0.448	60.348	8.29	2734.85	27.037	25.706
OFF-H02.2	OFF-H02.2	OFF-H02	H-06	28.2	26.4	1	Natural	1.04	0	450	0.4	0	0	0	N/A	N/A
OFF-H04.1	OFF-H04.1	OFF-H04	OFF-H03	33	32.1	1	Natural	2.66	0	220	0.409	149.566	1.45	31806.9	35.62	35.418
OFF-H04.2	OFF-H04.2	OFF-H04	H-09	24.07	23.65	1	Circular	3	0	200	0.21	20.172	3.9	1482.03	31.927	31.751


MITIGATED CONDITIONS - XPSWMM LAYOUT
SYSTEMS A, B, C & D (SHEET 1 OF 3)
LEGEND
XPSWMM Nodes
XPSWMM Links
Drainage Systems
Proposed ROW
HCFCD CHANNELS
0 100 200 400
Feet
System-A
System-B
System-C
System-C
System-D
OFF-C01.1
OFF-C02.1
OFF-C02.2
OFF-C.1
C-01.1
C-03.1
OFF-C03.2
D-03A.2
C-01.2
D-03.1
C-02A.2
C-02.1
OFF-A01.1
A-02.1
A-02B.2
OFF-A02.2
OFF-A02A.1
A-01.1
A-04.1
A-01A.1
A-02A.1
A-05.1
D-02A.1
D-02.1
C-02A.1
D-01A.1
A-05A.1
A-03.1
A-06.1
D-01.1
B-03.1
C-04.1
B-02.1
E101-00-00 (Little White Oak Bayou)
E100-00-00 (White Oak Bayou)
45
10


MITIGATED CONDITIONS - XPSWMM LAYOUT
SYSTEMS E & F (SHEET 2 OF 3)
LEGEND
XPSWMM Nodes
XPSWMM Links
Drainage Systems
Proposed ROW
HCFCD CHANNELS
0 100 200 400
Feet
E101-00-00 (Little White Oak Bayou)
E100-00-00 (White Oak Bayou)
E100-00-00 (White Oak Bayou)
45
10
E-02.1
F-01C.1
F-03.1
F-02.1
F-04.1
SYSTEM-F
OFF-E02A.1
F-01B.1
F-01A.1
OFF-E02.1
OFF-E01.2
E-03.1
OFF-E.2
E-01A.1
F-05.1
OFF-F01.1
E-01B.1
OFF-F02.1
SYSTEM-E
SYSTEM-F


MITIGATED CONDITIONS - XPSWMM LAYOUT
SYSTEMS G, H, I & J (SHEET 3 OF 3)
LEGEND
XPSWMM Nodes
XPSWMM Links
Drainage Systems
Proposed ROW
HCFCD CHANNELS
0 150 300 600
Feet
SYSTEM-G
SYSTEM-H
SYSTEM-I
SYSTEM-J
E100-00-00 (White Oak Bayou)
W100-00-00 (Buffalo Bayou)
10
45
45
10
G-01.1
J-06.1
J-03.1
J-01B.1
J-07.1
J-05.1
J-04.1
J-02A.1
J-02.1
I-11.1
I-06.1
I-05.1
I-08.1
I-10.2
I-10.1
I-04.1
I-02A.1
I-023.1
H-13.1
H-06C.1
H-06B.1
H-12.1
H-07.2
H-02.2
H-10.1
H-11.1
H-09B.2
H-07.1
H-10.2
H-04.1
H-09A.1
H-09B.1
H-02.1
H-03.1
H-01.1
H-08A.1
H-08B.1
H-05A.1
OFF-H04.1
OFF-H03.2
H-05D.1
OFF-H02.1
H-05E.1
OFF-H02.2
OFF-H01.2
OFF-H01.1
H-06B.2
H-08B.2
OFF-H04.2
H-05B.1
H-05C.1
OFF-H03.1
H-01.2

Name	Link Name	Upstream Node Name	Downstream Node Name	Upstream Invert Elevation	Downstream Invert Elevation	Number of Barrels	Shape	Diameter (Height)	Bottom Width	Length	Conduit Slope	Max Flow	Max Velocity	Max Volume	Maximum Water Elevation (US)	Maximum Water Elevation (DS)
				ft	ft			ft	ft	ft		cfs	ft/s	ft^3	ft	ft
I-01.1	I-01.1	I-01	I-01A	12.88	12.03	1	Circular	2	0	340	0.25	9.19	3.69	1099.82	18.886	18.378
I-01A.1	I-01A.1	I-01A	I-02	12.03	10.81	1	Circular	2.5	0	310	0.394	11.423	4.08	1540.67	18.378	18.204
I-02.1	I-02.1	I-02	I-02A	9.97	9.52	1	Circular	3	0	60	0.75	53.087	7.44	444.52	18.204	17.842
I-02A.1	I-02A.1	I-02A	I-05	9.52	9.08	1	Circular	3.5	0	46.3	0.95	109.033	11.24	466.98	17.842	17.307
I-03.1	I-03.1	I-03	I-02	13.95	13.7	1	Circular	1.5	0	50	0.5	8.647	5.33	92.63	18.507	18.204
I-04.1	I-04.1	I-04	I-02A	12.65	10.65	1	Circular	2	0	400	0.5	57.002	16.89	1311.31	40.062	17.842
I-05.1	I-05.1	I-05	I-08	8.99	7.72	1	Circular	3.5	0	222	0.572	121.811	12.56	2236.53	17.307	14.102
I-06.1	I-06.1	I-06	I-05	11.058	10.81	1	Circular	2.5	0	80	0.31	7.947	4.17	411.66	17.335	17.307
I-07.1	I-07.1	I-07	I-08	8.9	8.69	1	Circular	3	0	60	0.35	10.449	2.63	444.61	14.117	14.102
I-08.1	I-08.1	I-08	I-10	7.3	6.95	1	Circular	4	0	342	0.102	148.088	11.81	4182.39	14.102	10.524
I-09.1	I-09.1	I-09	I-08	13.43	13.25	1	Circular	1.5	0	60	0.3	7.753	4.9	89.01	14.716	14.329
I-10.1	I-10.1	I-10	I-OUT1	2.85	2	1	Rectangular	4	4	85	1	155.121	12.5	1400.8	5.866	30
I-10.2	I-10.2	I-10	I-11	18.5	17	1	Circular	2	0	375	0.4	0	0	0	N/A	N/A
I-11.1	I-11.1	I-11	I-OUT2	9	8.5	1	Circular	2	0	50	1	10.151	6.25	164.33	9.94	25
J-01A.1	J-01A.1	J-01A	J-01B	25	20	1	Natural	2.45	0	550	0.909	41.267	2.46	84145.4	25.896	24.248
J-01B.1	J-01B.1	J-01B	J-03	10.33	9.11	1	Circular	3	0	70	1.743	66.633	12.59	507.17	24.248	23.892
J-02.1	J-02.1	J-02	J-02A	19.25	8.57	1	Circular	2	0	215	4.967	28.586	14.33	704.38	26.161	24.029
J-02A.1	J-02A.1	J-02A	J-03	8.57	4.96	1	Circular	3	0	217	1.664	29.432	6.46	1585.74	24.029	23.892
J-03.1	J-03.1	J-03	J-06	4.96	4.16	1	Circular	5	0	215	0.372	91.655	4.63	4417.64	23.892	23.752
J-04.1	J-04.1	J-04	J-06	12.32	12	1	Circular	3	0	160	0.2	46.696	6.92	1185.61	24.811	23.752
J-05.1	J-05.1	J-05	J-04	13.75	12.8	1	Circular	3	0	475	0.2	28.377	4.44	3428.96	27.59	24.811
J-06.1	J-06.1	J-06	J-OUT1	4.16	4	1	Circular	5	0	160	0.1	86.339	4.74	3293.41	23.752	25
J-07.1	J-07.1	J-07	J-OUT2	4.6	4	1	Circular	2	0	300	0.2	17.66	5.43	999.48	25.025	25

			10-Year		100-Year	
Node Name	Invert Elevation	Ground Elevation (Spill	Max Water Elevation	Max Water Depth	Max Water Elevation	Max Water Depth
	ft	ft	ft	ft	ft	ft
A-01	26.57	40	28.701	2.131	32.432	5.862
A-01A	25.63	40	27.176	1.546	28.789	3.159
A-01OUT	15	40	36.23	21.23	39.55	24.55
A-02	26.35	45	27.317	0.967	27.322	0.972
A-02A	24.41	40	25.531	1.121	25.626	1.216
A-03	32	40	32.901	0.901	33.217	1.217
A-04	25.97	40	36.265	10.295	36.282	10.312
A-05	25.84	37	26.228	0.388	26.313	0.473
A-05A	21.63	40	22.766	1.136	22.937	1.307
A-05OUT	21	30	31.26	10.26	36.42	15.42
A-06	34.2	40	35.15	0.95	35.547	1.347
A-OUT	1	40	31.26	30.26	36.42	35.42
B-01	17.725	50	25.086	7.361	33.374	15.649
B-01A	16.9	51	25.084	8.184	33.316	16.416
B-02	15.8	30	25.025	9.225	28.196	12.396
B-03	16.43	45	25.057	8.627	32.936	16.506
B-OUT	10	25	31.06	21.06	36.57	26.57
C-01	46.66	52	47.729	1.069	47.729	1.069
C-02	26.47	36	29.961	3.491	30.222	3.752
C-03	39.67	51	40.806	1.136	40.85	1.18
C-04	13.65	30	25.169	11.519	27.975	14.325
C-OUT	10.44	25	30.51	20.07	36.48	26.04
D-01	16.06	25	16.711	0.651	16.816	0.756
D-01A	13.38	20	13.983	0.603	14.071	0.691
D-01OUT	7.65	20	30.24	22.59	36.29	28.64
D-02	13.5	25	14.067	0.567	14.171	0.671
D-02A	9.8	20	10.429	0.629	10.575	0.775
D-02OUT	8	20	30.24	22.24	36.29	28.29
D-03	25	35	26.16	1.16	26.473	1.473
D-03A	11.15	23	15.287	4.137	16.518	5.368
D-03OUT	7.84	20	30.24	22.4	36.29	28.45
E-01	24.96	40	31.04	6.08	30.97	6.01
E-02	25	30	25.137	0.137	25.163	0.163
E-02OUT	10	20	30.95	20.95	36.84	26.84
E-OUT	11.75	25	30.95	19.2	36.84	25.09
F-01A	23.3	40	28.638	5.338	31.325	8.025
F-01B	27.5	40	27.797	0.297	28.049	0.549
F-01C	17.5	25	17.929	0.429	18.123	0.623
F-01OUT	8.5	25	30.24	21.74	36.29	27.79
F-02	20	35	21.053	1.053	21.373	1.373
F-03	9.21	25	15.739	6.529	17.508	8.298
F-03OUT	8.44	20	30.01	21.57	36.29	27.85
F-04	13.5	25	14.12	0.62	14.263	0.763
F-04OUT	5	20	30.01	25.01	36.08	31.08
G-01	19.49	35	31.218	11.728	31.527	12.037
G-OUT	11.39	30	27.49	16.1	34.7	23.31
H-01	10.3	40	22.904	12.604	28.915	18.615
H-02	14	40	25.679	11.679	31.127	17.127
H-03	9.6	40	22.903	13.303	28.89	19.29
H-04	7.75	35	21.202	13.452	25.706	17.956
H-05	6.55	35	20.703	14.153	24.871	18.321
H-06	4.45	35.5	20.251	15.801	23.85	19.4
H-07	28	40	29.351	1.351	29.678	1.678
H-08	26.68	45	28.293	1.613	33.447	6.767

			10-Year		100-Year	
Node Name	Invert Elevation	Ground Elevation (Spill	Max Water Elevation	Max Water Depth	Max Water Elevation	Max Water Depth
	ft	ft	ft	ft	ft	ft
H-09	23.65	42	26.198	2.548	31.751	8.101
H-10	20.5	35	21.274	0.774	21.553	1.053
H-11	16	30	16.548	0.548	16.678	0.678
H-12	19	30	19.937	0.937	20.095	1.095
H-13	21	25	21.186	0.186	21.219	0.219
H-OUT1	4	20	27.49	23.49	34.7	30.7
H-OUT2	5	20	29.21	24.21	35.81	30.81
H-OUT3	5	20	28.16	23.16	35.1	30.1
H-OUT4	11	20	27.49	16.49	34.7	23.7
I-01	12.88	35	13.945	1.065	18.886	6.006
I-01A	12.03	30	13.35	1.32	18.378	6.348
I-02	9.97	30	13.155	3.185	18.204	8.234
I-02A	9.52	35	13.041	3.521	17.841	8.321
I-03	13.95	40	14.904	0.954	18.507	4.557
I-04	12.65	40	24.757	12.107	40.062	27.412
I-05	8.99	40	12.849	3.859	17.307	8.317
I-06	11.058	40	12.864	1.806	17.335	6.277
I-07	8.9	40	11.584	2.684	14.116	5.216
I-08	7.3	40	11.58	4.28	14.101	6.801
I-09	13.43	40	14.438	1.008	14.716	1.286
I-10	2.85	30	5.02	2.17	5.866	3.016
I-11	9	30	9.755	0.755	9.94	0.94
I-OUT1	2	30	24.12	22.12	33.73	31.73
I-OUT2	8.5	25	24.1	15.6	33.72	25.22
J-01A	25	30	25.802	0.802	25.896	0.896
J-01B	10.33	30	14.907	4.577	24.248	13.918
J-02	19.25	35	20.139	0.889	26.161	6.911
J-02A	8.57	35	14.717	6.147	24.029	15.459
J-03	4.96	35	14.604	9.644	23.892	18.932
J-04	12.32	35	14.511	2.191	24.754	12.434
J-05	13.75	35	15.184	1.434	27.467	13.717
J-06	4.16	35	14.474	10.314	23.752	19.592
J-07	4.6	30	25.005	20.405	25.025	20.425
J-OUT1	4	25	26.66	22.66	34.57	30.57
J-OUT2	4	25	26.13	22.13	34.42	30.42
OFF-A01	34.19	45	34.903	0.713	34.903	0.713
OFF-A02	21.04	40	22.86	1.82	22.791	1.751
OFF-A02A	26	40	26.6	0.6	26.765	0.765
OFF-A02OUT	13	22	36.23	23.23	39.55	26.55
OFF-C	42	60	44.605	2.605	44.603	2.603
OFF-C01	43.2	52	45.897	2.697	45.834	2.634
OFF-C02	42.13	52	45.002	2.872	44.999	2.869
OFF-C03	42.1	52	44.683	2.583	44.684	2.584
OFF-E	23.875	40	28.779	4.904	28.762	4.887
OFF-E01	20.34	40	25.076	4.736	29.231	8.891
OFF-E02	19.96	40	30.209	10.249	41.236	21.276
OFF-E02A	13.17	40	25.056	11.886	29.227	16.057
OFF-F01	35	42	35.825	0.825	36.286	1.286
OFF-F02	36	45	37.686	1.686	37.987	1.987
OFF-H01	5.1	45.5	20.256	15.156	24.109	19.009
OFF-H02	9.43	30	22.235	12.805	27.037	17.607
OFF-H03	24.23	40	25.705	1.475	31.177	6.947
OFF-H04	24.07	40	26.343	2.273	31.927	7.857

Name	Link Name	Upstream Node Name	Downstream Node Name	Upstream Invert Elevation	Downstream Invert Elevation	Number of Barrels	Shape	Diameter (Height)	Bottom Width	Length	Conduit Slope	Max Flow	Max Velocity	Max Volume	Maximum Water Elevation (US)	Maximum Water Elevation (DS)
				ft	ft			ft	ft	ft		cfs	ft/s	ft^3	ft	ft
A-01.1	A-01.1	A-01	A-04	28.16	27.21	1	Circular	3	0	190	0.5	13.87	5.3	571.94	29.325	28.704
A-01A.1	A-01A.1	A-01A	A-02A	26.45	25.82	1	Circular	4	0	210	0.3	23.255	5.5	873.01	27.945	27.253
A-02.1	A-02.1	A-02	A-02B	19.78	19.16	1	Circular	4	6	280	0.221	70.974	5.7	3687.43	36.24	36.238
A-02A.1	A-02A.1	A-02A	A-05A	25.82	25.47	1	Circular	4	8	100	0.35	23.237	5.75	404.7	27.253	26.904
A-02B.2	A-02B.2	A-02B	OFF-A02	19.16	18.8	1	Rectangular	4	6	362	0.099	70.955	2.94	8833.93	36.238	36.237
A-03.1	A-03.1	A-03	A-05	26.35	24.85	1	Circular	3	6	300	0.5	25.325	6.79	1120.55	27.92	26.415
A-04.1	A-04.1	A-04	A-01A	27.21	26.45	1	Circular	3	100	152	0.5	23.276	6.64	533.36	28.704	27.945
A-05.1	A-05.1	A-05A	A-05	25.47	25.355	1	Circular	4	0	35	0.33	23.245	5.75	140.95	26.904	26.776
A-05A.1	A-05A.1	A-05	A-OUT	21.63	10.83	1	Circular	2.5	0	180	6	51.637	18.75	923.92	22.901	31.26
A-06.1	A-06.1	A-06	A-03	27.55	26.35	1	Circular	3	6	240	0.5	11.236	4.85	700.03	28.588	27.92
OFF-A01.1OVR	OFF-A01.1	OFF-A01	A-02	40	32	1	Natural	3	0	300	2.667	50.794	4.33	19765.8	40.791	36.24
OFF-A01.1RCP	OFF-A01.1	OFF-A01	A-02	23.8	23.34	1	Circular	4	0	83.6	0.55	13.975	5.37	1101.32	36.24	36.24
OFF-A02.2	OFF-A02.2	OFF-A02	OFF-A02A	18.8	18.36	1	Rectangular	4	6	456	0.096	96.597	4	11133.8	36.237	36.237
OFF-A02A.1	OFF-A02A.1	OFF-A02A	A-01OUT	17.36	17.31	1	Circular	3	3	50	0.1	96.583	13.51	370.51	36.237	36.23
B-02.1	B-02.1	B-02	B-OUT	15.8	10	1	Circular	2	0	270	2.148	17.212	5.43	883.33	25.03	25
B-03.1	B-03.1	B-03	B-02	16.43	15.8	1	Circular	1.5	0	210	0.3	8.821	4.91	383.27	25.052	25.03
C-01.1	C-01.1	C-01	C-03	46.66	46.44	1	Circular	1.5	0	100	0.3	5.005	3.83	119.43	47.729	47.3
C-01.2	C-01.2	C-01	C-02A	49	29	1	Natural	1.15	0	160	12.5	0.589	2.43	1881.59	49.08	31.56
C-02.1	C-02.1	C-02	C-02A	30.75	29.5	1	Circular	3	10	400	0.313	17.561	4.62	1751.36	32.294	31.56
C-02A.1	C-02A.1	C-02A	C-04	26.47	14.58	1	Circular	2	0	450	2.642	28.62	9.86	1260.95	31.56	25.342
C-02A2.1OVR	C-02A.2	C-02A	D-03	33.5	31	1	Trapezoidal	6	30	500	0.5	0	0	0	N/A	N/A
C-02A2.1RCP	C-02A.2	C-02A	D-03	29.5	27	1	Circular	3	50	250	1	47.773	10.06	156.73	31.56	27.567
C-03.1OVR	C-03.1	C-03	C-02A	49	29	1	Natural	1.15	0	160	12.5	0.004	2.69	1879.88	49.006	31.56
C-03.1RCP	C-03.1	C-03	C-02A	39.67	26.47	1	Circular	2	8	163	8.098	39.582	18.58	184.09	40.896	31.56
C-04.1	C-04.1	C-04	C-OUT	13.65	10.44	1	Circular	2	0	300	1.07	35.71	11.06	980.16	25.342	25
C-OFF1.1PAV	OFF-C01.1	OFF-C01	OFF-C02	50	49.5	1	Natural	1.05	0	250	0.2	15.899	1.82	1306.38	50.358	49.828
C-OFF1.1RCP	OFF-C01.1	OFF-C01	OFF-C02	43.2	42.13	1	Circular	2	0	425	0.252	11.435	3.84	1396.03	45.896	45.003
OFF-C.1	OFF-C.1	OFF-C	C-03	42	41.87	1	Circular	2	0	50	0.26	30.174	9.62	157.57	44.606	43.729
OFF-C02.1	OFF-C02.1	OFF-C02	OFF-C	42.13	42	1	Circular	2	0	50	0.26	21.875	6.9	164.67	45.003	44.606
OFF-C02.2	OFF-C02.2	OFF-C02	OFF-C03	49.5	49.4	1	Natural	0.85	0	50	0.2	13.672	1.8	342.92	49.828	49.681
OFF-C03.1	OFF-C03.1	OFF-C03	OFF-C	42.1	42	1	Circular	2	0	40	0.25	10.025	3.19	131.74	44.684	44.606
OFF-C03.2	OFF-C03.2	OFF-C03	D-03	48	27	1	Natural	2.88	0	450	4.667	13.227	1.91	150.41	48.245	27.567
D-01.1	D-01.1	D-01	D-01A	14.06	13.56	1	Trapezoidal	2.6	0	250	0.2	14.924	1.64	1646.99	15.45	14.445
D-01A.1OVR	D-01A.2	D-01A	D-01OUT	13.56	7.65	1	Natural	2.1	0	75	7.88	7.888	0.08	0	N/A	N/A
D-01A.1RCP	D-01A.2	D-01A	D-01OUT	13.38	11.42	1	Circular	2	0	35	5.6	7.032	8.22	112.26	13.869	20
D-02.1	D-02.1	D-02	D-02A	11.5	11	1	Trapezoidal	4.25	0	125	0.4	10.792	1.85	558.68	12.607	11.772
D-02.1AOVR	D-02A.2	D-02A	D-02OUT	13	8	1	Natural	2.5	0	75	6.667	0	0	10376.7	1.30E+01	2.00E+01
D-02.1ARCP	D-02A.2	D-02A	D-02OUT	9.8	8.95	2	Circular	2	0	50	1.7	10.792	5.39	161.6	10.379	20
D-03.1	D-03.1	D-03	D-03A	27	13.5	1	Trapezoidal	7	30	500	2.7	83.28	4.13	16204.3	27.567	18.005
D-03A.1OVR	D-03A.2	D-03A	D-03OUT	16	16	1	Natural	1.55	0	50	0	8.118	0.4	217.93	18.005	30.24
D-03A.1RCP.1	D-03A.2	D-03A	D-03OUT	11.15	7.84	1	Circular	2	0	50	6.62	62.491	20.8	167.28	18.005	30.24
E-01A.1	E-01A.1	E-01A	E-01B	11.73	10.995	1	Circular	4	6	245	0.3	64.375	6.84	2365.37	14.553	13.917
E-01B.1	E-01B.1	E-01B	OFF-F02	10.995	10.695	1	Circular	4	6	100	0.3	68.684	7.18	985.97	13.917	13.635
E-02.1	E-02.1	E-02	E-02OUT	25	10	1	Natural	1.5	0	100	15	9.513	0.03	0	-9.00E+99	-9.00E+99
E-03.1	E-03.1	E-03	OFF-E	12.84	12.105	1	Circular	4	0	245	0.3	60.413	6.76	2215.3	15.513	14.848
OFF-E.2	OFF-E.2	OFF-E	E-01A	12.105	11.73	1	Circular	4	0	125	0.3	60.198	6.56	1166.28	14.848	14.553
OFF-E01.2	OFF-E01.2	OFF-E01	E-03	13.41	12.84	1	Circular	4	0	137	0.416	54.538	6.77	1157.59	15.841	15.513
OFF-E02.1	OFF-E02.1	OFF-E02	OFF-E02A	19.96	18.37	1	Circular	3	0	160	0.994	150.116	20.94	1149.32	29.395	25.018
OFF-E02A.1	OFF-E02A.1	OFF-E02A	E-OUT	13.17	11.75	1	Circular	4.5	0	295	0.481	150.418	9.41	4777.16	25.018	25
F-01A.1	F-01A.1	F-01A	F-01B	13.87	10.7	1	Circular	2.5	0	635	0.499	14.62	5.57	1231.52	15.13	12.618

Name	Link Name	Upstream Node Name	Downstream Node Name	Upstream Invert Elevation	Downstream Invert Elevation	Number of Barrels	Shape	Diameter (Height)	Bottom Width	Length	Conduit Slope	Max Flow	Max Velocity	Max Volume	Maximum Water Elevation (US)	Maximum Water Elevation (DS)
				ft	ft			ft	ft	ft		cfs	ft/s	ft^3	ft	ft
F-01B.1	F-01B.1	F-01B	F-02/Pond-F	10.7	8.4	1	Circular	3	10	655	0.351	28.386	6.05	2197.68	12.618	10.123
F-01C.1	F-01C.1	F-01C	F-01OUT	17.5	7	1	Trapezoidal	1.25	0	450	2.333	21.646	0.32	297727	18.457	25
F-02.1OVR	F-02.1	F-02/Pond-F	F-03	12	11.5	1	Natural	3	100	140	0.357	0	0	0	-9.00E+99	-9.00E+99
F-02.1RCP	F-02.1	F-02/Pond-F	F-03	7	5.5	2	Rectangular	4	6	200	0.75	275.445	11.03	5078.37	9.073	7.659
F-03B.1OVR	F-03.1	F-03	F-03OUT	11.5	10.5	1	Natural	5.54	0	100	1	0	0	21215.9	1.15E+01	2.00E+01
F-03B.1RCP	F-03.1	F-03	F-03OUT	5.5	5	2	Rectangular	4	6	75	0.667	281.425	9.99	1824.75	7.659	20
F-04.1OVR	F-04.1	F-04	F-04OUT	15.5	5	1	Natural	1.6	0	200	5.25	0	0	0	-9.00E+99	-9.00E+99
F-04.1RCP	F-04.1	F-04	F-04OUT	13.5	6.35	1	Circular	2	0	130	5.5	9.067	9.35	423.55	14.06	20
F-05.1	F-05.1	F-05	F-02/Pond-F	10.23	8.4	1	Rectangular	4	8	610	0.3	181.146	8.63	12596.1	12.88	10.915
OFF-F01.1	OFF-F01.1	OFF-F01	F-02/Pond-F	35	25	1	Natural	3.55	0	200	5	125.447	6.12	319.8	35.79	25.786
OFF-F02.1	OFF-F02.1	OFF-F02	F-05	10.695	10.23	1	Rectangular	4	6	155	0.3	174.925	10.03	2596.65	13.635	12.88
G-01.1OVR	G-01.1	G-01	G-OUT	30.94	28.86	1	Natural	0.82	50	200	1.04	2.946	0.85	11.28	31.11	28.962
G-01.1RCP	G-01.1	G-01	G-OUT	19.49	11.39	1	Circular	3	0	360	2.25	145.579	20.26	2615.43	31.11	27.49
H-01.1	H-01.1	H-01	H-03	23.36	21.57	1	Circular	4	0	595	0.3	32.985	5.66	3822.51	25.209	23.814
H-01.1.1	H-01.1.1	H-01	H-02	35	33.04	1	Trapezoidal	1	0	125	1.568	0	0	0	-9.00E+99	-9.00E+99
H-02.1	H-02.1	H-02	Pond-Hb	23.56	19	1	Circular	3	0	910	0.5	25.013	6.77	1144.75	25.115	20.553
H-02.2	H-02.2	H-02	H-07	28.14	26.64	1	Trapezoidal	1.76	0	200	0.75	0	0	0	-9.00E+99	-9.00E+99
H-03.1	H-03.1	H-03	Pond-Hb	21.57	19.25	1	Circular	4	0	775	0.3	46.259	6.48	4646.21	23.814	21.285
H-04.1	H-04.1	H-04	H-10	28.26	26.16	1	Circular	2	0	420	0.5	5.35	4.41	284.33	29.057	27.185
H-05A.1	H-05A.1	H-05A	H-05B	24.59	23.34	1	Circular	4	0	250	0.5	4.407	2.27	1610.64	26.048	26.052
H-05B.1	H-05B.1	H-05B	OFF-H04	23.34	23.03	1	Circular	4	0	62	0.5	9.139	1.68	596.23	26.052	26.05
H-05C.1	H-05C.1	H-05C	OFF-H03	22.16	22.02	1	Rectangular	4	6	46.667	0.3	104.497	5.41	916.82	25.385	25.344
H-05D.1	H-05D.1	H-05D	H-05E	20.76	18.72	1	Rectangular	4	8	680	0.3	193.143	8.73	15046.7	23.538	21.476
H-05E.1	H-05E.1	H-05E	H-06B/Pond-H	18.72	18	1	Rectangular	4	8	240	0.3	197.653	9.02	5204.24	21.476	20.666
H-06B.1	H-06B.1	Pond-Hb	H-OUT1	14	12.25	2	Circular	5	6	350	0.5	-321.262	9.57	11552.6	20.064	20
H-06B.2	H-06B.2	H-06B/Pond-H	H-13	26	21	1	Trapezoidal	3.1	100	250	2	0	0	0	-9.00E+99	-9.00E+99
H-06BN.1	H-06BN.1	H-06B/Pond-H	Pond-Hb	14.02	14	2	Circular	5	4	50	0.04	-257.055	7.66	1962.46	20.072	20.064
H-06C.1	H-06C.1	H-06C	H-OUT5	4.45	4	1	Circular	5	0	450	0.1	103.332	5.23	9262.71	20.052	20
H-07.1	H-07.1	H-07	Pond-Hb	23.32	19	1	Circular	3	0	865	0.499	13.538	5.76	517.83	24.422	20.1
H-07.2	H-07.2	H-07	H-12	26.64	19	1	Trapezoidal	1	0	250	3.056	0	0	3.59	24.422	19.149
H-08A.1	H-08A.1	H-08A	H-08B	26.73	24.87	1	Circular	3	0	372	0.5	10.872	4.91	980.15	27.717	26.531
H-08B.1	H-08B.1	H-08B	H-01	24.87	23.36	1	Circular	3	0	505	0.3	20.946	5.16	2163.74	26.531	25.209
H-08B.2	H-08B.2	H-08B	H-09B	36.5	36	1	Trapezoidal	1	0	125	0	0	0	0	-9.00E+99	-9.00E+99
H-09A.1	H-09A.1	H-09A	H-09B	28.29	26.29	1	Circular	2	0	400	0.5	6.917	4.77	361.84	29.21	27.415
H-09B.1	H-09B.1	H-09B	H-02	26.29	23.56	1	Circular	3	0	545	0.501	14.127	5.56	935.57	27.415	25.115
H-09B.2	H-09B.2	H-09B	H-10	36	35	1	Trapezoidal	1	0	150	0.667	0	0	0	-9.00E+99	-9.00E+99
H-10.1	H-10.1	H-10	H-11	35.5	16	1	Trapezoidal	1	0	150	13	0	0	0.64	27.185	16.136
H-10.2	H-10.2	H-10	H-07	26.16	23.32	1	Circular	3	0	565	0.5	11.873	5.52	486.88	27.185	24.422
H-11.1	H-11.1	H-11	H-OUT2	16	5	1	Trapezoidal	2.34	50	100	11	25.356	0.21	64377.2	16.136	20
H-12.1	H-12.1	H-12	H-OUT3	19	5	1	Trapezoidal	1.75	50	75	18.667	38.446	0.38	48249.5	19.149	20
H-13.1	H-13.1	H-13	H-OUT4	17	5	1	Trapezoidal	2.7	50	150	8	25.435	0.32	96519.8	17.15	20
OFF-H01.1	OFF-H01.1	OFF-H01+06A	H-06B/Pond-H	35	30	1	Natural	9.5	0	200	2.5	26.295	2.62	143.23	35.447	30.418
OFF-H01.2	OFF-H01.2	OFF-H01+06A	H-06C	5.1	4.45	1	Circular	5	0	325	0.2	74.324	3.77	6689.73	20.062	20.052
OFF-H02.1	OFF-H02.1	OFF-H02	H-06C	9.43	4.45	1	Circular	3	0	1000	0.498	37.438	5.24	7257.59	20.114	20.052
OFF-H02.2	OFF-H02.2	OFF-H02	H-06B/Pond-H	28	27.15	1	Trapezoidal	2	10	170	0.5	0	0	0	-9.00E+99	-9.00E+99
OFF-H03.1	OFF-H03.1	OFF-H03	H-01	37	35	1	Trapezoidal	2.9	0	120	1.667	0	0	0	-9.00E+99	-9.00E+99
OFF-H03.2	OFF-H03.2	OFF-H03	H-05D	22.02	20.76	1	Rectangular	4	6	420	0.3	187.188	9.57	7677.4	2.53E+01	2.35E+01
OFF-H04.1OVR	OFF-H04.1	OFF-H04	H-05C	33	32.1	1	Natural	2.66	0	220	0.409	0	0	0	-9.00E+99	-9.00E+99
OFF-H04.1RCP	OFF-H04.1	OFF-H04	H-05C	23.03	22.16	1	Rectangular	4	6	530	0.164	100.468	5.53	9925.68	2.61E+01	2.54E+01
OFF-H04.2	OFF-H04.2	OFF-H04	H-08B	37	36.5	1	Trapezoidal	1	0	120	0.417	0	0	0	-9.00E+99	-9.00E+99

Name	Link Name	Upstream Node Name	Downstream Node Name	Upstream Invert Elevation	Downstream Invert Elevation	Number of Barrels	Shape	Diameter (Height)	Bottom Width	Length	Conduit Slope	Max Flow	Max Velocity	Max Volume	Maximum Water Elevation (US)	Maximum Water Elevation (DS)
				ft	ft			ft	ft	ft		cfs	ft/s	ft^3	ft	ft
I-023.1	I-023.1	I-023+J-01A	H-06B/Pond-H	32	30	1	Natural	3	150	200	1	27.766	1.07	189.91	32.176	30.093
I-02A.1	I-02A.1	I-02A	I-05	9.52	9.08	1	Circular	3.5	0	46.3	0.95	40.327	7.54	264.94	11.398	11.234
I-04.1	I-04.1	I-04	I-02A	12.65	10.65	1	Circular	2	0	400	0.5	40.331	12.48	1276.96	24.841	12.65
I-05.1	I-05.1	I-05	I-08	8.99	7.72	1	Circular	3.5	0	222	0.572	48.71	7.3	1627.34	11.234	10.506
I-06.1.1	I-06.1.1	I-06	I-05	11.058	10.81	1	Circular	2	0	80	0.31	5.795	4.1	108.05	11.988	11.66
I-07.1	I-07.1	I-07	I-08	10.21	10	1	Circular	3	0	60	0.35	7.113	4.29	98.71	11.07	10.839
I-08.1	I-08.1	I-08	I-10	7.3	6.95	1	Circular	4	0	342	0.102	66.065	6.3	3214.61	10.506	9.403
I-09.1	I-09.1	I-09	I-08	13.43	13.25	1	Circular	1.5	0	60	0.3	5.243	4.22	70.26	14.44	14.131
I-10.1	I-10.1	I-10	I-OUT1	2.85	2	1	Rectangular	4	4	85	1	71.211	9.38	1390.8	4.51E+00	2.41E+01
I-10.2	I-10.2	I-10	I-11	18.5	17	1	Circular	2	0	375	0.4	0	0	0	N/A	N/A
I-11.1	I-11.1	I-11	I-OUT2	9	8.5	1	Circular	2	0	50	1	6.866	6.08	163.88	9.76E+00	2.41E+01
J-01B.1	J-01B.1	J-01B	J-03	10.33	9.11	1	Circular	3	0	70	1.743	16.885	9.62	89.6	11.221	9.999
J-02.1	J-02.1	J-02	J-02A	19.25	8.57	1	Circular	2	0	215	4.967	18.389	14.49	26.59	20.086	9.535
J-02A.1	J-02A.1	J-02A	J-03	8.57	4.96	1	Circular	3	0	217	1.664	18.362	7.62	639.93	9.535	7.603
J-03.1	J-03.1	J-03	J-06	4.96	4.16	1	Circular	5	0	215	0.372	40.746	4.15	2647.98	7.603	7.555
J-04.1	J-04.1	J-04	J-06	12.32	12	1	Circular	3	0	160	0.2	21.01	5.14	608.06	14.031	13.472
J-05.1	J-05.1	J-05	J-04	13.75	12.8	1	Circular	3	0	475	0.2	13.5	4.15	1435	15.185	14.031
J-06.1	J-06.1	J-06	J-OUT1	4.16	4	1	Circular	5	0	160	0.1	66.224	4.49	3293.41	7.555	25
J-07.1	J-07.1	J-07	J-OUT2	4.6	4	1	Circular	2	0	300	0.2	10.089	3.16	999.48	2.50E+01	2.50E+01

Name	Link Name	Upstream Node Name	Downstream Node Name	Upstream Invert Elevation	Downstream Invert Elevation	Number of Barrels	Shape	Diameter (Height)	Bottom Width	Length	Conduit Slope	Max Flow	Max Velocity	Max Volume	Maximum Water Elevation (US)	Maximum Water Elevation (DS)
				ft	ft			ft	ft	ft		cfs	ft/s	ft^3	ft	ft
A-01.1	A-01.1	A-01	A-04	28.16	27.21	1	Circular	3	0	190	0.5	20.517	5.72	776.13	29.649	29.104
A-01A.1	A-01A.1	A-01A	A-02A	26.45	25.82	1	Circular	4	0	210	0.3	34.412	6.16	1156.88	28.296	27.591
A-02.1	A-02.1	A-02	A-02B	19.78	19.16	1	Circular	4	6	280	0.221	79.721	6.21	3687.38	39.581	39.578
A-02A.1	A-02A.1	A-02A	A-05A	25.82	25.47	1	Circular	4	8	100	0.35	34.395	6.43	535	27.591	27.233
A-02B.2	A-02B.2	A-02B	OFF-A02	19.16	18.8	1	Rectangular	4	6	362	0.099	79.756	3.27	8870.2	39.578	39.577
A-03.1	A-03.1	A-03	A-05	26.35	24.85	1	Circular	3	6	300	0.5	37.406	7.45	1505.83	28.374	26.839
A-04.1	A-04.1	A-04	A-01A	27.21	26.45	1	Circular	3	100	152	0.5	34.39	7.38	702.82	29.104	28.296
A-05.1	A-05.1	A-05A	A-05	25.47	25.355	1	Circular	4	0	35	0.33	34.407	6.47	185.45	27.233	27.099
A-05A.1	A-05A.1	A-05	A-OUT	21.63	10.83	1	Circular	2.5	0	180	6	74.469	21.47	935.53	23.263	36.42
A-06.1	A-06.1	A-06	A-03	27.55	26.35	1	Circular	3	6	240	0.5	16.603	5.13	963.6	28.89	28.374
OFF-A01.1OVR	OFF-A01.1	OFF-A01	A-02	40	32	1	Natural	3	0	300	2.667	80.758	4.23	34296.82	40.977	39.581
OFF-A01.1RCP	OFF-A01.1	OFF-A01	A-02	23.8	23.34	1	Circular	4	0	83.6	0.55	14.983	5.32	1101.31	39.581	39.581
OFF-A02.2	OFF-A02.2	OFF-A02	OFF-A02A	18.8	18.36	1	Rectangular	4	6	456	0.096	113.942	4.67	11179.5	39.577	39.575
OFF-A02A.1	OFF-A02A.1	OFF-A02A	A-01OUT	17.36	17.31	1	Circular	3	3	50	0.1	113.642	15.62	370.51	39.575	39.55
B-02.1	B-02.1	B-02	B-OUT	15.8	10	1	Circular	2	0	270	2.148	25.036	7.83	883.33	27.174	25
B-03.1	B-03.1	B-03	B-02	16.43	15.8	1	Circular	1.5	0	210	0.3	12.993	7	386.65	30.085	27.174
C-01.1	C-01.1	C-01	C-03	46.66	46.44	1	Circular	1.5	0	100	0.3	5.006	3.83	119.46	47.729	47.3
C-01.2	C-01.2	C-01	C-02A	49	29	1	Natural	1.15	0	160	12.5	3.604	0.25	2853.45	49.169	32.21
C-02.1	C-02.1	C-02	C-02A	30.75	29.5	1	Circular	3	10	400	0.313	25.761	4.82	2392.56	32.85	32.21
C-02A.1	C-02A.1	C-02A	C-04	26.47	14.58	1	Circular	2	0	450	2.642	23.637	8.52	1467.5	32.21	28.532
C-02A2.1OVR	C-02A.2	C-02A	D-03	33.5	31	1	Trapezoidal	6	30	500	0.5	0	0	0	N/A	N/A
C-02A2.1RCP	C-02A.2	C-02A	D-03	29.5	27	1	Circular	3	50	250	1	66.944	10.87	278.2	32.21	27.749
C-03.1OVR	C-03.1	C-03	C-02A	49	29	1	Natural	1.15	0	160	12.5	0.004	6.1	2853.25	49.006	32.21
C-03.1RCP	C-03.1	C-03	C-02A	39.67	26.47	1	Circular	2	8	163	8.098	41.763	18.56	211.71	40.976	32.21
C-04.1	C-04.1	C-04	C-OUT	13.65	10.44	1	Circular	2	0	300	1.07	32.354	9.92	980.16	28.532	25
C-OFF1.1PAV	OFF-C01.1	OFF-C01	OFF-C02	50	49.5	1	Natural	1.05	0	250	0.2	28.309	2.29	2689.53	50.444	49.944
C-OFF1.1RCP	OFF-C01.1	OFF-C01	OFF-C02	43.2	42.13	1	Circular	2	0	425	0.252	11.319	3.78	1392.05	45.838	45.001
OFF-C.1	OFF-C.1	OFF-C	C-03	42	41.87	1	Circular	2	0	50	0.26	30.108	9.6	157.88	44.603	43.729
OFF-C02.1	OFF-C02.1	OFF-C02	OFF-C	42.13	42	1	Circular	2	0	50	0.26	21.885	6.93	164.67	45.001	44.603
OFF-C02.2	OFF-C02.2	OFF-C02	OFF-C03	49.5	49.4	1	Natural	0.85	0	50	0.2	29.849	2.45	567.74	49.944	49.793
OFF-C03.1	OFF-C03.1	OFF-C03	OFF-C	42.1	42	1	Circular	2	0	40	0.25	10.027	3.19	131.74	44.685	44.603
OFF-C03.2	OFF-C03.2	OFF-C03	D-03	48	27	1	Natural	2.88	0	450	4.667	34.93	2.71	329.48	48.371	27.749
D-01.1	D-01.1	D-01	D-01A	14.06	13.56	1	Trapezoidal	2.6	0	250	0.2	26.476	1.95	2508.74	15.757	14.675
D-01A.1OVR	D-01A.2	D-01A	D-01OUT	13.56	7.65	1	Natural	2.1	0	75	7.88	16.337	0.13	0	N/A	N/A
D-01A.1RCP	D-01A.2	D-01A	D-01OUT	13.38	11.42	1	Circular	2	0	35	5.6	10.12	9.95	112.26	13.969	20
D-02.1	D-02.1	D-02	D-02A	11.5	11	1	Trapezoidal	4.25	0	125	0.4	19.569	2.2	872.7	12.866	11.986
D-02.1AOVR	D-02A.2	D-02A	D-02OUT	13	8	1	Natural	2.5	0	75	6.667	0	0	10419.16	13	20
D-02.1ARCP	D-02A.2	D-02A	D-02OUT	9.8	8.95	2	Circular	2	0	50	1.7	19.569	7.15	161.6	10.593	20
D-03.1	D-03.1	D-03	D-03A	27	13.5	1	Trapezoidal	7	30	500	2.7	133.838	4.1	39484.02	27.749	20.085
D-03A.1OVR	D-03A.2	D-03A	D-03OUT	16	16	1	Natural	1.55	0	50	0	57.143	0.7	2102.09	20.085	35
D-03A.1RCP.1	D-03A.2	D-03A	D-03OUT	11.15	7.84	1	Circular	2	0	50	6.62	59.491	20.77	169.66	20.085	35
E-01A.1	E-01A.1	E-01A	E-01B	11.73	10.995	1	Circular	4	6	245	0.3	93.62	7.23	3192.29	16.212	15.28
E-01B.1	E-01B.1	E-01B	OFF-F02	10.995	10.695	1	Circular	4	6	100	0.3	99.627	7.91	1282.3	15.28	14.821
E-02.1	E-02.1	E-02	E-02OUT	25	10	1	Natural	1.5	0	100	15	13.873	0.05	0	-9.00E+99	-9.00E+99
E-03.1	E-03.1	E-03	OFF-E	12.84	12.105	1	Circular	4	0	245	0.3	88.672	6.96	3224.99	17.419	16.618
OFF-E.2	OFF-E.2	OFF-E	E-01A	12.105	11.73	1	Circular	4	0	125	0.3	87.776	6.82	1643.61	16.618	16.212
OFF-E01.2	OFF-E01.2	OFF-E01	E-03	13.41	12.84	1	Circular	4	0	137	0.416	80.662	6.79	1804.79	17.799	17.419
OFF-E02.1	OFF-E02.1	OFF-E02	OFF-E02A	19.96	18.37	1	Circular	3	0	160	0.994	196.196	26.8	1146.56	40.894	27.863
OFF-E02A.1	OFF-E02A.1	OFF-E02A	E-OUT	13.17	11.75	1	Circular	4.5	0	295	0.481	195.741	12.16	4777.23	27.863	25

Name	Link Name	Upstream Node Name	Downstream Node Name	Upstream Invert Elevation	Downstream Invert Elevation	Number of Barrels	Shape	Diameter (Height)	Bottom Width	Length	Conduit Slope	Max Flow	Max Velocity	Max Volume	Maximum Water Elevation (US)	Maximum Water Elevation (DS)
				ft	ft			ft	ft	ft		cfs	ft/s	ft^3	ft	ft
F-01A.1	F-01A.1	F-01A	F-01B	13.87	10.7	1	Circular	2.5	0	635	0.499	21.513	5.81	2241.56	15.577	13.315
F-01B.1	F-01B.1	F-01B	F-02/Pond-F	10.7	8.4	1	Circular	3	10	655	0.351	41.96	6.57	3548.26	13.315	10.509
F-01C.1	F-01C.1	F-01C	F-01OUT	17.5	7	1	Trapezoidal	1.25	0	450	2.333	31.553	0.21	303875.1	18.603	25
F-02.1OVR	F-02.1	F-02/Pond-F	F-03	12	11.5	1	Natural	3	100	140	0.357	0	0	0	-9.00E+99	-9.00E+99
F-02.1RCP	F-02.1	F-02/Pond-F	F-03	7	5.5	2	Rectangular	4	6	200	0.75	520.508	12.96	8136.57	10.337	8.943
F-03B.1OVR	F-03.1	F-03	F-03OUT	11.5	10.5	1	Natural	5.54	0	100	1	0	0	24573.64	11.5	20
F-03B.1RCP	F-03.1	F-03	F-03OUT	5.5	5	2	Rectangular	4	6	75	0.667	528.199	12.56	1824.75	8.943	20
F-04.1OVR	F-04.1	F-04	F-04OUT	15.5	5	1	Natural	1.6	0	200	5.25	0	0	0	-9.00E+99	-9.00E+99
F-04.1RCP	F-04.1	F-04	F-04OUT	13.5	6.35	1	Circular	2	0	130	5.5	13.429	11.34	423.55	14.186	20
F-05.1	F-05.1	F-05	F-02/Pond-F	10.23	8.4	1	Rectangular	4	8	610	0.3	270.245	9.74	16572.5	13.742	11.684
OFF-F01.1	OFF-F01.1	OFF-F01	F-02/Pond-F	35	25	1	Natural	3.55	0	200	5	328.669	7.85	1031.31	36.238	26.235
OFF-F02.1	OFF-F02.1	OFF-F02	F-05	10.695	10.23	1	Rectangular	4	6	155	0.3	261.42	11.12	3494.05	14.821	13.742
G-01.1OVR	G-01.1	G-01	G-OUT	30.94	28.86	1	Natural	0.82	50	200	1.04	0	0	0	-9.00E+99	-9.00E+99
G-01.1RCP	G-01.1	G-01	G-OUT	10	9.64	2	Circular	4.5	0	360	0.1	227.136	7.1	11240.13	30.011	30
H-01.1	H-01.1	H-01	H-03	23.36	21.57	1	Circular	4	0	595	0.3	48.645	6.05	5231.14	25.756	24.484
H-01.1.1	H-01.1.1	H-01	H-02	35	33.04	1	Trapezoidal	1	0	125	1.568	0	0	0	-9.00E+99	-9.00E+99
H-02.1	H-02.1	H-02	Pond-Hb	23.56	19	1	Circular	3	0	910	0.5	37.045	7.4	1970.34	25.573	20.979
H-02.2	H-02.2	H-02	H-07	28.14	26.64	1	Trapezoidal	1.76	0	200	0.75	0	0	0	-9.00E+99	-9.00E+99
H-03.1	H-03.1	H-03	Pond-Hb	21.57	19.25	1	Circular	4	0	775	0.3	68.592	7.14	6990.7	24.484	21.751
H-04.1	H-04.1	H-04	H-10	28.26	26.16	1	Circular	2	0	420	0.5	7.965	4.91	465.21	29.261	27.431
H-05A.1	H-05A.1	H-05A	H-05B	24.59	23.34	1	Circular	4	0	250	0.5	-11.977	2.15	3253.98	30.434	30.175
H-05B.1	H-05B.1	H-05B	OFF-H04	23.34	23.03	1	Circular	4	0	62	0.5	18.686	1.78	816.76	30.175	30.099
H-05C.1	H-05C.1	H-05C	OFF-H03	22.16	22.02	1	Rectangular	4	6	46.667	0.3	168.131	6.99	1123.71	28.784	28.671
H-05D.1	H-05D.1	H-05D	H-05E	20.76	18.72	1	Rectangular	4	8	680	0.3	289.406	9.65	20873.48	25.292	22.395
H-05E.1	H-05E.1	H-05E	H-06B/Pond-H	18.72	18	1	Rectangular	4	8	240	0.3	294.508	10.25	6865.71	22.395	21.478
H-06B.1	H-06B.1	Pond-Hb	H-OUT1	14	12.25	2	Circular	5	6	350	0.5	227.930	5.81	11621.22	20.67	20
H-06B.2	H-06B.2	H-06B/Pond-H	H-13	26	21	1	Trapezoidal	3.1	100	250	2	0	0	0	-9.00E+99	-9.00E+99
H-06BN.1	H-06BN.1	H-06B/Pond-H	Pond-Hb	14.02	14	2	Circular	5	4	50	0.04	200.084	5.08	1963.06	20.743	20.67
H-06C.1	H-06C.1	H-06C	H-OUT5	4.45	4	1	Circular	5	0	450	0.1	90.968	4.6	9262.71	20.693	20
H-07.1	H-07.1	H-07	Pond-Hb	23.32	19	1	Circular	3	0	865	0.499	20.215	6.41	866.79	24.696	20.67
H-07.2	H-07.2	H-07	H-12	26.64	19	1	Trapezoidal	1	0	250	3.056	0	0	7.24	24.696	19.188
H-08A.1	H-08A.1	H-08A	H-08B	26.73	24.87	1	Circular	3	0	372	0.5	16.04	5.2	1524.62	27.994	27.065
H-08B.1	H-08B.1	H-08B	H-01	24.87	23.36	1	Circular	3	0	505	0.3	30.837	5.53	2924.69	27.065	25.756
H-08B.2	H-08B.2	H-08B	H-09B	36.5	36	1	Trapezoidal	1	0	125	0	0	0	0	-9.00E+99	-9.00E+99
H-09A.1	H-09A.1	H-09A	H-09B	28.29	26.29	1	Circular	2	0	400	0.5	10.239	5.23	607.41	29.467	27.707
H-09B.1	H-09B.1	H-09B	H-02	26.29	23.56	1	Circular	3	0	545	0.501	21.043	6.11	1640	27.707	25.573
H-09B.2	H-09B.2	H-09B	H-10	36	35	1	Trapezoidal	1	0	150	0.667	0	0	0	-9.00E+99	-9.00E+99
H-10.1	H-10.1	H-10	H-11	35.5	16	1	Trapezoidal	1	0	150	13	0	0	1.3	27.431	16.172
H-10.2	H-10.2	H-10	H-07	26.16	23.32	1	Circular	3	0	565	0.5	17.625	6.14	815.16	27.431	24.696
H-11.1	H-11.1	H-11	H-OUT2	16	5	1	Trapezoidal	2.34	50	100	11	37.414	0.19	67056.34	16.172	20
H-12.1	H-12.1	H-12	H-OUT3	19	5	1	Trapezoidal	1.75	50	75	18.667	56.768	0.29	50462.61	19.188	20
H-13.1	H-13.1	H-13	H-OUT4	17	5	1	Trapezoidal	2.7	50	150	8	37.342	0.21	99759.66	17.189	20
OFF-H01.1	OFF-H01.1	OFF-H01+06A	H-06B/Pond-H	35	30	1	Natural	9.5	0	200	2.5	75.42	3.58	527.33	35.697	30.673
OFF-H01.2	OFF-H01.2	OFF-H01+06A	H-06C	5.1	4.45	1	Circular	5	0	325	0.2	74.187	3.74	6689.73	20.85	20.693
OFF-H02.1	OFF-H02.1	OFF-H02	H-06C	9.43	4.45	1	Circular	3	0	1000	0.498	38.707	5.35	7267.12	23.381	20.693
OFF-H02.2	OFF-H02.2	OFF-H02	H-06B/Pond-H	28	27.15	1	Trapezoidal	2	10	170	0.5	0	0	0	-9.00E+99	-9.00E+99
OFF-H03.1	OFF-H03.1	OFF-H03	H-01	37	35	1	Trapezoidal	2.9	0	120	1.667	0	0	0	-9.00E+99	-9.00E+99
OFF-H03.2	OFF-H03.2	OFF-H03	H-05D	22.02	20.76	1	Rectangular	4	6	420	0.3	281.825	11.82	10138.95	28.671	25.291
OFF-H04.1OVR	OFF-H04.1	OFF-H04	H-05C	33	32.1	1	Natural	2.66	0	220	0.409	0	0	0	-9.00E+99	-9.00E+99
OFF-H04.1RCP	OFF-H04.1	OFF-H04	H-05C	23.03	22.16	1	Rectangular	4	6	530	0.164	160.109	6.65	12763.2	30.099	28.784

Name	Link Name	Upstream Node Name	Downstream Node Name	Upstream Invert Elevation	Downstream Invert Elevation	Number of Barrels	Shape	Diameter (Height)	Bottom Width	Length	Conduit Slope	Max Flow	Max Velocity	Max Volume	Maximum Water Elevation (US)	Maximum Water Elevation (DS)
				ft	ft			ft	ft	ft		cfs	ft/s	ft^3	ft	ft
OFF-H04.2	OFF-H04.2	OFF-H04	H-08B	37	36.5	1	Trapezoidal	1	0	120	0.417	0	0	0	-9.00E+99	-9.00E+99
I-023.1	I-023.1	I-023+J-01A	H-06B/Pond-H	32	30	1	Natural	3	150	200	1	41.009	1.26	343.42	32.218	30.13
I-02A.1	I-02A.1	I-02A	I-05	9.52	9.08	1	Circular	3.5	0	46.3	0.95	59.289	7.61	442.37	12.765	12.66
I-04.1	I-04.1	I-04	I-02A	12.65	10.65	1	Circular	2	0	400	0.5	59.702	17.8	1316.87	37.767	12.765
I-05.1	I-05.1	I-05	I-08	8.99	7.72	1	Circular	3.5	0	222	0.572	71.823	7.43	2213.64	12.66	11.599
I-06.1.1	I-06.1.1	I-06	I-05	11.058	10.81	1	Circular	2	0	80	0.31	8.827	4.66	234.93	12.757	12.66
I-07.1	I-07.1	I-07	I-08	10.21	10	1	Circular	3	0	60	0.35	10.364	4.54	213.5	11.63	11.599
I-08.1	I-08.1	I-08	I-10	7.3	6.95	1	Circular	4	0	342	0.102	97.452	7.68	3932.75	11.599	9.94
I-09.1	I-09.1	I-09	I-08	13.43	13.25	1	Circular	1.5	0	60	0.3	7.753	4.9	89.02	14.716	14.329
I-10.1	I-10.1	I-10	I-OUT1	2.85	2	1	Rectangular	4	4	85	1	101.796	10.93	1400.8	5.069	30
I-10.2	I-10.2	I-10	I-11	18.5	17	1	Circular	2	0	375	0.4	0	0	0	N/A	N/A
I-11.1	I-11.1	I-11	I-OUT2	9	8.5	1	Circular	2	0	50	1	10.154	6.26	164.33	9.94	25
J-01B.1	J-01B.1	J-01B	J-03	10.33	9.11	1	Circular	3	0	70	1.743	27.468	10.7	498.35	15.588	15.488
J-02.1	J-02.1	J-02	J-02A	19.25	8.57	1	Circular	2	0	215	4.967	27.181	15.51	437.56	20.496	15.766
J-02A.1	J-02A.1	J-02A	J-03	8.57	4.96	1	Circular	3	0	217	1.664	28.217	7.61	1558.38	15.766	15.488
J-03.1	J-03.1	J-03	J-06	4.96	4.16	1	Circular	5	0	215	0.372	61.118	4.26	4421.81	15.488	15.386
J-04.1	J-04.1	J-04	J-06	12.32	12	1	Circular	3	0	160	0.2	31.139	5.9	1184.6	15.512	15.386
J-05.1	J-05.1	J-05	J-04	13.75	12.8	1	Circular	3	0	475	0.2	19.926	4.61	2769.38	15.759	15.512
J-06.1	J-06.1	J-06	J-OUT1	4.16	4	1	Circular	5	0	160	0.1	84.507	4.73	3293.41	15.386	25
J-07.1	J-07.1	J-07	J-OUT2	4.6	4	1	Circular	2	0	300	0.2	14.815	4.57	999.48	25.028	25

			10-Year		100-Year	
Node Name	Invert Elevation	Ground Elevation (Spill Crest)	Max Water Elevation	Max Water Depth	Max Water Elevation	Max Water Depth
	ft	ft	ft	ft	ft	ft
A-01	28.16	40	29.325	1.165	29.649	1.489
A-01A	26.45	40	27.945	1.495	28.296	1.846
A-01OUT	17.31	40	36.23	18.92	39.55	22.24
A-02	19.78	45	36.241	16.461	39.581	19.801
A-02A	25.82	40	27.253	1.433	27.591	1.771
A-02B	19.16	45	36.239	17.079	39.578	20.418
A-03	26.35	40	27.92	1.57	28.373	2.023
A-04	27.21	40	28.704	1.494	29.104	1.894
A-05	21.63	45	22.901	1.271	23.263	1.633
A-05A	25.47	40	26.904	1.434	27.233	1.763
A-06	27.55	40	28.588	1.038	28.89	1.34
A-OUT	10.83	40	31.26	20.43	36.42	25.59
B-02	15.8	30	25.029	9.229	27.174	11.374
B-03	16.43	45	25.052	8.622	30.085	13.655
B-OUT	10	25	31.06	21.06	36.57	26.57
C-01	46.66	52	47.729	1.069	47.729	1.069
C-02	30.75	44	32.294	1.544	32.85	2.1
C-02A	26.47	39.5	31.56	5.09	32.21	5.74
C-03	39.67	51	40.896	1.226	40.976	1.306
C-04	13.65	30	25.342	11.692	28.532	14.882
C-OUT	10.44	25	30.51	20.07	36.48	26.04
D-01	14.06	25	15.45	1.39	15.757	1.697
D-01A	13.38	20	13.869	0.489	13.969	0.589
D-01OUT	7.65	20	30.24	22.59	36.29	28.64
D-02	11.5	25	12.607	1.107	12.866	1.366
D-02A	9.8	20	10.379	0.579	10.593	0.793
D-02OUT	8	20	30.24	22.24	36.29	28.29
D-03	27	37	27.567	0.567	27.749	0.749
D-03A	11.15	35	18.006	6.856	20.085	8.935
D-03OUT	7.84	35	30.24	22.4	36.29	28.45
E-01A	11.73	40	14.553	2.823	16.212	4.482
E-01B	10.995	40	13.917	2.922	15.28	4.285
E-02	25	30	25.139	0.139	25.164	0.164
E-02OUT	10	20	30.95	20.95	36.84	26.84
E-03	12.84	30	15.513	2.673	17.419	4.579
E-OUT	11.75	25	30.95	19.2	36.84	25.09
F-01A	13.87	30	15.13	1.26	15.577	1.707
F-01B	10.7	30	12.618	1.918	13.315	2.615
F-01C	17.5	30	18.457	0.957	18.603	1.103
F-01OUT	7	25	30.24	23.24	36.29	29.29
F-02/Pond-F	7	30	9.073	2.073	10.337	3.337
F-03	5.5	25	7.659	2.159	8.943	3.443
F-03OUT	5	20	30.01	25.01	36.29	31.29
F-04	13.5	25	14.06	0.56	14.186	0.686
F-04OUT	5	20	30.01	25.01	36.08	31.08
F-05	10.23	35	12.88	2.65	13.742	3.512
G-01	19.49	33	27.49	18.49	30.011	20.011
G-OUT	11.39	30	27.49	18.85	34.7	25.06
H-01	23.36	40	25.209	1.849	25.756	2.396
H-02	23.56	40	25.115	1.555	25.573	2.013
H-03	21.57	35	23.814	2.244	24.484	2.914
H-04	28.26	40	29.057	0.797	29.261	1.001
H-05A	24.59	35	26.048	1.458	30.415	5.825
H-05B	23.34	40	26.052	2.712	30.171	6.831
H-05C	22.16	40	25.385	3.225	28.78	6.62
H-05D	20.76	35	23.538	2.778	25.286	4.526

			10-Year		100-Year	
Node Name	Invert Elevation	Ground Elevation (Spill Crest)	Max Water Elevation	Max Water Depth	Max Water Elevation	Max Water Depth
	ft	ft	ft	ft	ft	ft
H-05E	18.72	35	21.476	2.756	22.395	3.675
H-06B/Pond-Ha	14.02	40	20.072	6.052	20.743	6.723
H-06C	4.45	32	20.048	15.598	20.686	16.236
H-07	23.32	40	24.422	1.102	24.696	1.376
H-08A	26.73	40	27.717	0.987	27.994	1.264
H-08B	24.87	40	26.531	1.661	27.065	2.195
H-09A	28.29	40	29.21	0.92	29.467	1.177
H-09B	26.29	40	27.415	1.125	27.707	1.417
H-10	26.16	40	27.185	1.025	27.431	1.271
H-11	16	30	16.136	0.136	16.172	0.172
H-12	19	30	19.149	0.149	19.188	0.188
H-13	17	25	17.15	0.15	17.189	0.189
H-OUT1	12.25	20	27.49	15.24	34.7	22.45
H-OUT2	5	20	29.21	24.21	35.81	30.81
H-OUT3	5	20	28.16	23.16	35.1	30.1
H-OUT4	5	20	27.49	22.49	34.7	29.7
H-OUT5	4	20	27.49	23.49	34.7	30.7
I-023+J-01A	32	35	32.176	0.176	32.218	0.218
I-02A	9.52	30	11.398	1.878	12.765	3.245
I-04	12.65	40	24.841	12.191	37.767	25.117
I-05	8.99	40	11.234	2.244	12.66	3.67
I-06	11.058	40	11.988	0.93	12.757	1.699
I-07	10.21	40	11.07	0.86	11.63	1.42
I-08	7.3	40	10.506	3.206	11.599	4.299
I-09	13.43	40	14.44	1.01	14.716	1.286
I-10	2.85	30	4.511	1.661	5.069	2.219
I-11	9	30	9.756	0.756	9.94	0.94
I-OUT1	2	30	24.12	22.12	33.73	31.73
I-OUT2	8.5	25	24.1	15.6	33.72	25.22
J-01B	10.33	30	11.221	0.891	15.588	5.258
J-02	19.25	35	20.086	0.836	20.496	1.246
J-02A	8.57	35	9.535	0.965	15.766	7.196
J-03	4.96	35	7.603	2.643	15.488	10.528
J-04	12.32	35	14.031	1.711	15.511	3.191
J-05	13.75	35	15.185	1.435	15.759	2.009
J-06	4.16	35	7.555	3.395	15.386	11.226
J-07	4.6	30	25.004	20.404	25.028	20.428
J-OUT1	4	25	26.66	22.66	34.57	30.57
J-OUT2	4	25	26.13	22.13	34.42	30.42
OFF-A01	23.8	45	36.241	12.441	39.581	15.781
OFF-A02	18.8	40	36.238	17.438	39.577	20.777
OFF-A02A	17.36	40	36.237	18.877	39.575	22.215
OFF-C	42	60	44.605	2.605	44.603	2.603
OFF-C01	43.2	52	45.896	2.696	45.838	2.638
OFF-C02	42.13	52	45.003	2.873	45.001	2.871
OFF-C03	42.1	52	44.684	2.584	44.685	2.585
OFF-E	12.105	30	14.848	2.743	16.618	4.513
OFF-E01	13.41	40	15.841	2.431	17.799	4.389
OFF-E02	19.96	40	29.389	9.429	40.894	20.934
OFF-E02A	13.17	40	25.018	11.848	27.863	14.693
OFF-F01	35	45	35.79	0.79	36.238	1.238
OFF-F02	10.695	35	13.635	2.94	14.821	4.126
OFF-H01+06A	5.1	45	20.061	14.961	20.833	15.733
OFF-H02	9.43	30	20.114	10.684	23.381	13.951
OFF-H03	22.02	40	25.344	3.324	28.664	6.644
OFF-H04	23.03	40	26.05	3.02	30.099	7.069
Pond-Hb	14	40	20.064	6.064	20.67	6.67

Appendix D

NOTE:
1- RESULTS ARE BASED ON GEOPAK DRAINAGE.

RUNOFF COMPUTATIONS - 10 YEAR & 100 YEAR

DRAINAGE AREA ID	TOTAL AREA (ACRES)	COMPOSITE C	C x A	T_c USED (MIN)	10-YEAR PEAK FLOW (CFS) Q	100-YEAR PEAK FLOW (CFS) Q
A-01	2.19	0.81	1.76	10.00	13.9	20.6
A-02	1.82	0.80	1.45	10.00	11.5	17.0
A-03	2.15	0.85	1.84	10.00	14.5	21.5
A-04	1.41	0.85	1.20	10.00	9.5	14.1
A-05	0.55	0.80	0.44	10.00	3.5	5.2
A-06	1.74	0.82	1.43	10.00	11.3	16.7
OFF-A01	11.00	0.74	8.10	10.95	61.8	91.9
OFF-A02	5.57	0.59	3.28	10.00	25.9	38.3
B-02	1.54	0.69	1.07	10.00	8.4	12.5
B-03	1.77	0.63	1.11	10.00	8.8	13.0
C-01	1.11	0.68	0.75	10.00	6.0	8.8
C-02	3.38	0.66	2.23	10.00	17.6	26.1
C-03	0.68	0.85	0.58	10.00	4.6	6.8
C-04	1.49	0.68	1.01	10.00	8.0	11.8
OFF-C01	4.59	0.72	3.30	10.00	26.0	38.5
OFF-C02	1.48	0.70	1.03	10.00	8.1	12.0
OFF-C03	1.79	0.79	1.42	10.00	11.2	16.6
D-01	5.45	0.64	3.48	10.00	27.5	40.7
D-02	3.73	0.76	2.84	10.00	22.4	33.2
D-03	6.69	0.44	2.92	10.00	23.0	34.1
E-01A	1.03	0.53	0.55	10.00	4.3	6.4
E-01B	0.79	0.77	0.61	10.00	4.8	7.1
E-02	1.63	0.76	1.24	10.00	9.8	14.4
E-03	0.96	0.85	0.82	10.00	6.5	9.6
OFF-E01	10.15	0.73	7.43	12.09	54.5	81.5
OFF-E02	29.58	0.82	24.14	17.61	150.0	228.3
F-01A	2.21	0.85	1.89	10.00	14.9	22.0
F-01B	2.25	0.85	1.92	10.00	15.2	22.5
F-01C	4.15	0.70	2.92	10.00	23.1	34.2
F-02	10.09	0.84	8.52	10.00	67.2	99.6
F-03	1.99	0.58	1.15	10.00	9.1	13.4
F-04	2.34	0.49	1.15	10.00	9.1	13.4
F-05	1.26	0.78	0.98	10.00	7.7	11.5
OFF-F01	110.24	0.78	85.44	36.13	360.2	566.5
OFF-F02	22.92	0.76	17.47	18.15	107.0	163.1

RUNOFF COMPUTATIONS - 10 YEAR & 100 YEAR

DRAINAGE AREA ID	TOTAL AREA (ACRES)	COMPOSITE C	C x A	T_c USED (MIN)	10-YEAR PEAK FLOW (CFS) Q	100-YEAR PEAK FLOW (CFS) Q
G-01	26.97	0.72	19.45	10.00	153.4	227.4
H-01	1.93	0.85	1.64	10.00	13.0	19.2
H-02	2.02	0.75	1.51	10.00	11.9	17.7
H-03	2.35	0.85	2.00	10.00	15.8	23.4
H-04	0.81	0.85	0.69	10.00	5.5	8.1
H-05A	0.69	0.85	0.59	10.00	4.6	6.9
H-05B	0.82	0.85	0.70	10.00	5.5	8.2
H-05C	0.74	0.86	0.63	10.00	5.0	7.4
H-05D	1.16	0.76	0.88	10.00	6.9	10.3
H-05E	1.01	0.60	0.61	10.00	4.8	7.1
H-06A	1.45	0.78	1.12	10.00	8.9	13.1
H-06B	18.85	0.60	11.35	10.00	89.6	132.7
H-07	0.35	0.85	0.30	10.00	2.4	3.5
H-08A	1.63	0.85	1.39	10.00	11.0	16.3
H-08B	1.58	0.85	1.34	10.00	10.6	15.7
H-09A	1.04	0.85	0.89	10.00	7.0	10.4
H-09B	1.12	0.85	0.95	10.00	7.5	11.1
H-10	1.00	0.85	0.85	10.00	6.7	10.0
H-11	4.02	0.80	3.23	10.00	25.5	37.8
H-12	5.72	0.85	4.88	10.00	38.5	57.1
H-13	4.35	0.75	3.25	10.00	25.7	38.0
OFF-H01A	9.54	0.82	7.80	10.05	61.5	91.1
OFF-H01B	4.96	0.84	4.16	10.00	32.8	48.6
OFF-H02	43.70	0.79	34.52	18.07	211.9	322.9
OFF-H03	17.07	0.74	12.58	15.30	83.4	126.2
OFF-H04	18.07	0.71	12.74	12.18	93.2	139.3
I-02	2.41	0.45	1.08	10.00	8.6	12.7
I-03	1.11	0.40	0.44	10.00	3.5	5.1
I-04	6.04	0.85	5.13	10.00	40.5	60.0
I-05	0.61	0.64	0.39	10.00	3.1	4.5
I-06	1.46	0.50	0.74	10.00	5.8	8.6
I-07	1.06	0.85	0.90	10.00	7.1	10.5
I-08	0.87	0.86	0.74	10.00	5.9	8.7
I-09	0.78	0.86	0.67	10.00	5.3	7.8
I-10	0.81	0.85	0.69	10.00	5.4	8.1
I-11	1.02	0.85	0.87	10.00	6.9	10.2
J-01A	3.20	0.66	2.11	10.00	16.6	24.6
J-01B	3.71	0.58	2.14	10.00	16.9	25.0
J-02	3.17	0.74	2.34	10.00	18.4	27.3
J-03	1.03	0.85	0.88	10.00	6.9	10.3
J-04	1.18	0.85	1.01	10.00	8.0	11.8
J-05	2.03	0.85	1.73	10.00	13.7	20.2
J-06	0.93	0.65	0.60	10.00	4.7	7.0
J-07	1.78	0.72	1.27	10.00	10.1	14.9

10-YEAR		
e	b (in.)	d (min)
0.7829	86.47	11.27

100-YEAR		
e	b (in.)	d (min)
0.772	136.33	14.08

PRELIMINARY

DOCUMENT NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION

REV. NO.	DATE	DESCRIPTION	BY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
FIRM REGISTATION NO. 2614

Texas Department of Transportation
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NHHIP - SEGMENT 3D

HYDRAULIC CALCULATION
DATA SHEET
DRAINAGE AREAS

SHEET 1 OF 2

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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NOTE:
1- RESULTS ARE BASED ON GEOPAK DRAINAGE OUTPUT FOR 10-YEAR STORM EVENT.
2- "*" REFERS TO EXIST STORM SEWER LINES.
3- FLOWLINES FOR EXISTING STORM SEWER NEED TO BE VERIFIED.

STORM SEWER LINE CALCULATIONS - 10 YEAR

SYSTEM ID	LINK ID	FROM	TO	SIZE	UPSTREAM FLOWLINE (FT)	DOWNSTREAM FLOWLINE (FT)	ACTUAL LENGTH (FT)	PIPE SLOPE (%)	HGL UPSTREAM (FT)	HGL DOWNSTREAM (FT)	CUMULATIVE TIME OF CONC. (MIN)	INTENSITY (IN/HR)	CUMULATIVE DISCHARGE (CFS)	CAPACITY (CFS)
SYSTEM A	A-01.1	A-01	A-04	36" RCP	28.16	27.21	191.0	0.50	29.84	28.33	10.0	7.9	13.9	50.6
SYSTEM A	A-02.1	A-02	A-02B	48" RCP	19.78	19.16	279.0	0.22	23.82	22.73	11.1	7.6	72.5	72.9
SYSTEM A	A-03.1	A-03	A-05	36" RCP	26.35	24.85	300.0	0.50	28.15	26.41	10.7	7.7	25.1	50.7
SYSTEM A	A-04.1	A-04	A-01A	36" RCP	27.21	26.45	151.0	0.50	28.90	27.92	10.6	7.7	22.9	50.9
SYSTEM A	A-05.1	A-05A	A-05	48" RCP	25.47	25.35	35.0	0.34	26.90	26.76	11.9	7.7	22.9	90.4
SYSTEM A	A-06.1	A-06	A-03	36" RCP	27.55	26.35	240.0	0.50	29.02	27.35	10.0	7.9	11.3	50.7
SYSTEM A	A-01A.1	A-01A	A-02A	48" RCP	26.45	25.82	213.0	0.30	28.01	27.60	10.9	7.7	22.9	84.1
SYSTEM A	A-02A.1	A-02A	A-05A	48" RCP	25.82	25.47	100.0	0.35	27.60	26.90	11.6	7.7	22.9	91.4
SYSTEM A	A-02B.2	A-02B	OFF-A02	6ft x 4ft Box	19.16	18.80	361.5	0.10	22.73	22.56	11.9	7.6	72.5	122.4
SYSTEM A *	A-05A.1	A-05	A-OUT	30" RCP	21.63	10.83	175.0	6.17	25.44	12.09	12.0	7.4	49.1	109.6
SYSTEM A	OFF-A02A.1	OFF-A02A	A-01OUT	36" RCP	17.36	17.31	50.0	0.10	21.99	20.31	14.9	7.1	90.6	22.7
SYSTEM A	OFF-A01.1	OFF-A01	A-02	48" RCP	23.80	23.34	83.5	0.55	27.41	25.54	11.0	7.6	61.8	114.6
SYSTEM A	OFF-A02.2	OFF-A02	OFF-A02A	6ft x 4ft Box	18.80	18.36	456.0	0.10	22.56	21.99	13.3	7.1	90.6	120.5
SYSTEM C *	C-02A.1	C-02A	C-04	24" RCP	26.47	14.58	449.0	2.65	34.74	22.92	0.0	0.0	33.8	39.6
SYSTEM C	C-02A.2	C-02A	D-03	36" RCP	29.50	27.00	250.0	1.00	31.46	28.58	11.3	7.5	36.4	71.7
SYSTEM C *	C-01.1	C-01	C-03	18" RCP	46.66	46.44	108.5	0.20	48.16	47.38	10.0	7.9	6.0	5.1
SYSTEM C	C-02.1	C-02	C-02A	36" RCP	30.75	29.50	400.0	0.31	32.70	31.46	10.0	7.9	17.6	40.1
SYSTEM C *	C-03.1	C-03	C-02A	24" RCP	39.67	26.47	163.0	8.08	44.48	27.91	11.0	7.6	53.9	69.2
SYSTEM C *	C-04.1	C-04	C-OUT	24" RCP	13.65	10.44	300.0	1.07	22.92	12.44	10.0	7.9	41.8	25.2
SYSTEM C *	OFF-C.1	OFF-C	C-03	24" RCP	42.00	41.87	59.0	0.22	49.06	44.48	10.9	7.6	43.8	11.4
SYSTEM C *	OFF-C01.1	OFF-C01	OFF-C02	24" RCP	43.20	42.13	429.0	0.25	56.98	50.24	10.0	7.9	26.0	12.1
SYSTEM C *	OFF-C02.1	OFF-C02	OFF-C	24" RCP	42.13	42.00	50.0	0.26	50.24	49.06	10.8	7.7	33.1	12.4
SYSTEM C *	OFF-C03.1	OFF-C03	OFF-C	24" RCP	42.10	42.00	41.0	0.25	49.35	49.06	10.0	7.9	11.2	12.1
SYSTEM D *	D-03A.2	D-03A	D-03OUT	24" RCP	11.15	7.84	50.0	6.60	14.85	9.61	13.8	7.4	57.0	62.5
SYSTEM D	D-03.1	D-03	D-03A	48" RCP	27.00	13.50	504.0	2.68	27.59	13.95	11.7	7.4	57.0	7836.8
SYSTEM E	E-03.1	E-03	OFF-E	48" RCP	12.84	12.11	243.0	0.30	15.53	14.89	12.4	7.3	59.9	85.0
SYSTEM E	OFF-E.2	OFF-E	E-01A	48" RCP	12.11	11.73	122.5	0.31	14.89	14.66	13.0	7.3	59.9	85.5
SYSTEM E	OFF-E01.2	OFF-E01	E-03	48" RCP	13.41	12.84	137.0	0.42	16.75	15.04	12.1	7.3	54.5	99.6
SYSTEM E	E-01A.1	E-01A	E-01B	48" RCP	11.73	11.00	245.0	0.30	14.66	14.24	13.3	7.1	62.1	84.6
SYSTEM E	E-01B.1	E-01B	OFF-F02	48" RCP	11.00	10.70	98.0	0.31	14.24	14.06	13.9	6.9	65.2	85.6
SYSTEM F	F-01A.1	F-01A	F-01B	30" RCP	13.87	10.70	635.0	0.50	15.80	11.97	10.0	7.9	14.9	31.2
SYSTEM F	F-01B.1	F-01B	F-02B	36" RCP	10.70	8.40	656.0	0.35	12.73	10.34	11.8	7.4	28.2	42.5
SYSTEM F	F-05.1	F-05	F-02A	8 ' x 4 ' BOX	10.23	8.40	609.0	0.30	12.88	10.81	18.4	6.1	169.3	314.1
SYSTEM F	OFF-F02.1	OFF-F02	F-05	6ft x 4ft Box	10.70	10.23	153.5	0.30	14.06	13.09	18.1	6.1	164.6	213.5
SYSTEM H	H-01.1	H-01	H-03	48" RCP	23.36	21.57	596.0	0.30	25.18	23.84	12.7	7.2	31.5	84.6
SYSTEM H	H-02.1	H-02	H-OUT03	36" RCP	23.56	19.00	911.0	0.50	25.26	20.52	12.9	7.1	23.9	50.8
SYSTEM H	H-03.1	H-03	H-OUT02	48" RCP	21.57	19.25	773.0	0.30	23.84	21.22	14.4	6.8	43.5	84.6
SYSTEM H	H-04.1	H-04	H-10	24" RCP	28.26	26.16	420.5	0.50	29.44	26.97	10.0	7.9	5.5	17.2
SYSTEM H	H-07.1	H-07	H-OUT04	36" RCP	23.32	19.00	864.0	0.50	24.50	20.08	13.2	7.1	13.0	50.7
SYSTEM H	H-10.1	H-10	H-07	36" RCP	26.16	23.32	568.0	0.50	27.32	24.33	11.5	7.5	11.5	50.7
SYSTEM H	H-05A.1	H-05A	H-05B	48" RCP	24.59	23.34	249.0	0.50	26.37	26.35	10.0	7.9	4.6	109.4
SYSTEM H	H-05B.1	H-05B	OFF-H04	48" RCP	23.34	23.03	62.0	0.50	26.35	26.35	11.0	7.6	9.8	109.7
SYSTEM H	H-05C.1	H-05C	OFF-H03	6ft x 4ft Box	22.16	22.02	46.5	0.30	25.75	25.72	13.6	7.3	107.2	212.2
SYSTEM H	H-05D.1	H-05D	H-05E	8 ' x 4 ' BOX	20.76	18.72	676.0	0.30	23.53	21.46	16.1	6.5	182.3	314.7
SYSTEM H	H-05E.1	H-05E	H-OUT01	8 ' x 4 ' BOX	18.72	18.00	241.0	0.30	21.46	21.05	17.4	6.5	186.2	313.3
SYSTEM H	H-08A.1	H-08A	H-08B	36" RCP	26.73	24.87	371.0	0.50	28.17	25.86	10.0	7.9	11.0	50.7
SYSTEM H	H-08B.1	H-08B	H-01	36" RCP	24.87	23.36	504.0	0.30	26.60	25.18	11.1	7.6	20.7	39.3
SYSTEM H	H-09A.1	H-09A	H-09B	24" RCP	28.29	26.29	401.0	0.50	29.66	27.21	10.0	7.9	7.0	17.2
SYSTEM H	H-09B.1	H-09B	H-02	36" RCP	26.29	23.56	547.0	0.50	27.56	24.67	11.4	7.5	13.8	50.7
SYSTEM H	OFF-H03.2	OFF-H03	H-05D	6ft x 4ft Box	22.02	20.76	419.0	0.30	25.72	23.80	15.3	6.6	180.7	212.7
SYSTEM H	OFF-H04.1	OFF-H04	H-05C	6ft x 4ft Box	23.03	22.16	529.0	0.16	26.35	25.75	12.2	7.3	102.6	157.2

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HYDRAULIC CALCULATION
DATA SHEET
LINKS

SHEET 2 F 2

DGN:	FED. RD. DIV. NO.	STATE	PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS	120-12019-003			IH 45
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	HOU	HARRIS	0912	72	363	

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Appendix E

TEXAS DEPARTMENT OF TRANSPORTATION

TECHNICAL PROVISIONS

NHHIP I-45 SEGMENT 3

DRAINAGE

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FEBRUARY 14, 2018

AHW	Allowable High Water	HOU	District Design Practice
HCFCD	Policy Criteria & Procedure Manual (HCFCD)	RCB	Reinforced Concrete Box
HDM	Hydraulic Design Manual (TxDOT)	RCP	Reinforced Concrete Pipe
HGL	Hydraulic Grade Line	WSEL	Water Surface Elevation
EOP	Edge of Pavement	FB	Freedboard

Table 12-1: Drainage Design Frequencies

(Any deviation requires TxDOT approval)

Design Element	Mainlanes	Ramp	Direct Connect.	Frontage Road	Arterial / Cross Street	Application Notes
Minimum Roadway Elevation	100-yr	25-yr	100-yr	10-yr	10-yr*	Crossing or adjacent waterway WSEL, **plus 1' FB at low EOP**. Does not apply to storm drain or roadside ditch HGL. *No FB required.
Bridge Waterway Crossing	100-yr plus 2.5' FB	100-yr plus 1.5' FB	100-yr plus 2.5' FB	100-yr plus 1.5' FB	Match Exist.	Applies to WSEL at new location bridges. **For existing FR bridges**, use min 10-yr w/ Low chord > WSEL
Cross Drain Culverts	100-yr	25-yr	100-yr	10-yr	Match Exist.	Set maximum AHW at 1' below low EOP. Check for 100-year.
Storm Drain Inlets and Pavement Drainage	10-yr	10-yr	10-yr	2-yr	Match Exist. or better	Applies to ponded widths in gutter and inlet capacity.
Storm Drain Conduits	10-yr	10-yr	10-yr	2-yr	Match Exist. or better	Size conduit for non-pressure full flow; i.e. Design Q<= Full Flow Capacity Q. See HGL requirements below.
Storm Drain HGL	100-yr < EOP	25-yr < EOP	100-yr < EOP	10-yr: max 1-lane ponding	10-yr: max 1-lane ponding	Starting HGL at outfall: 25-yr if it works. Otherwise, base the starting HGL on hydrograph timing or top of pipe. Determine and report maximum frequency flood contained in ROW.
Depressed Roadway Storm Drain, Inlets and Pavement Drainage	100-yr	100-yr	100-yr	100-yr	100-yr	Depressed roadway occurs if water has nowhere to drain overland when curb height is exceeded. Size conduit for non-pressure full flow. Check for 100-yr HGL < EOP.
Storm Water Pumping Stations	100-yr	100-yr	100-yr	100-yr	100-yr	Design pump capacity >/= 100-yr Q + 25%. Check for 100-year < EOP.
Detention Ponds	100-year + 3' FB. Provide Detention Summary with Area Serviced, Detention Storage Volume Required, Detention Storage Volume Provided, Maximum Design WSEL, Maximum Outflow Rate Allowed, Maximum Outflow Rate Provided, and Restrictor Size.					Sample plans available from TxDOT upon request.

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Design Element	Mainlanes	Ramp	Direct Connect.	Frontage Road	Arterial / Cross Street	Application Notes
Outfall Ditches	Design for No Impact to 100-yr WSEL. Use HCFCD Standard Details for Outfalls and other construction within HCFCD channels and ponds.					
Separation Ditches	10-yr	10-yr	10-yr	N/A	N/A	Separation Ditches are those in medians between adjacent roadways. AHW = 1' below EOP.
Roadside Ditches***	N/A	N/A	N/A	2-yr*	2-yr**	*If required outside curb line. **Or match existing capacity. *** Roadside ditches are those between the roadway and ROW

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