MOSSY OAKS WATERSHED IMPROVEMENTS

BASIN #2 DRAINAGE STUDY

FINAL

Prepared for:

City of Beaufort and Town of Port Royal, South Carolina

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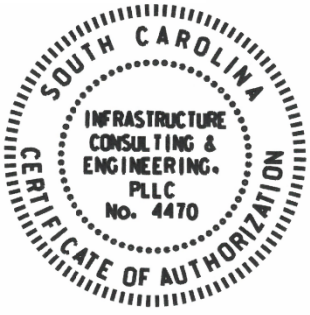


TABLE OF CONTENTS

List of Appendices:

1.0 EXECUTIVE SUMMARY

1.1 Introduction

The 582-acre Mossy Oaks watershed lies within the limits of the City of Beaufort and the Town of Port Royal, South Carolina. The watershed is divided into two basins that both flow to Battery Creek. This report focuses on the southern basin (referred to as Basin #2) and improvements that can be made to improve existing drainage and to reduce flooding throughout the watershed. A study report for Basin #1 has been submitted under separate cover.

The Basin #2 analysis revealed that many of the drainage/flooding issues experienced by Mossy Oaks property owners are related to inadequate drainage infrastructure. The study shows that Basin #2 stormwater discharges are similar to those produced in Basin #1 over a range of rainfall return periods, but overall, the drainage structures in place to handle the discharges have less flow capacity than those found in Basin #1. Backup of floodwaters upstream of these drainage structures has been observed during recent floods.

Tidal elevations along Battery Creek play an important role in flooding. Recent tropical storms (Hurricane Matthew in October, 2016 and Tropical Storm Irma in September, 2017) have impacted the Mossy Oaks area with significant storm tides (peak tropical storm surge height added to the normal astronomical tide). Both of these events resulted in widespread flooding and property damage across Mossy Oaks.

Like Basin #1, the flooding problem in Basin #2 is exacerbated by the presence of many properties located in low-lying areas of the watershed.

Four drainage scenarios that were discussed in the Mossy Oaks Basin #1 study report were used as a basis for the Basin #2 analysis as well:

- Lower intensity rainfall during ”normal” astronomical tides (Mean Low Water through Mean High Water)
- Lower intensity rainfall during higher & extreme tides (spring tides, king tides, and tropical storm tides)
- High intensity rainfall during normal tides, and
- High intensity rainfall during higher & extreme tides.

The watershed was analyzed for 10-, 25-, 50-, and 100-year rainfall events occurring at Mean Low Water, Mean Tide Level (both rising and falling), Mean High Water, spring/king tide, and 10- and 25-year tropical storm tides.

Currently, the Basin #2 drainage system only performs adequately for the first scenario, a lower-intensity rainfall during normal daily tides. Recent intense rainfall events that have occurred during normal daily tide levels on Battery Creek have led to significant flooding throughout Mossy Oaks.

The capacity of the existing 24-inch and 36-inch crossline pipes under the Spanish Moss Trail is much less than the stormwater discharges this watershed produces. The “bottleneck” these pipes create results in flooding headwaters upstream of the trail which back up through and beyond Battery Creek Road.

By upgrading the existing crossline to triple 60-inch RC pipes with flap gates on the downstream end and providing other drainage upgrades as discussed in the next section of this report, proposed improvements could allow mitigation for 3 of the 4 scenarios, as shown in Figure 1.0.

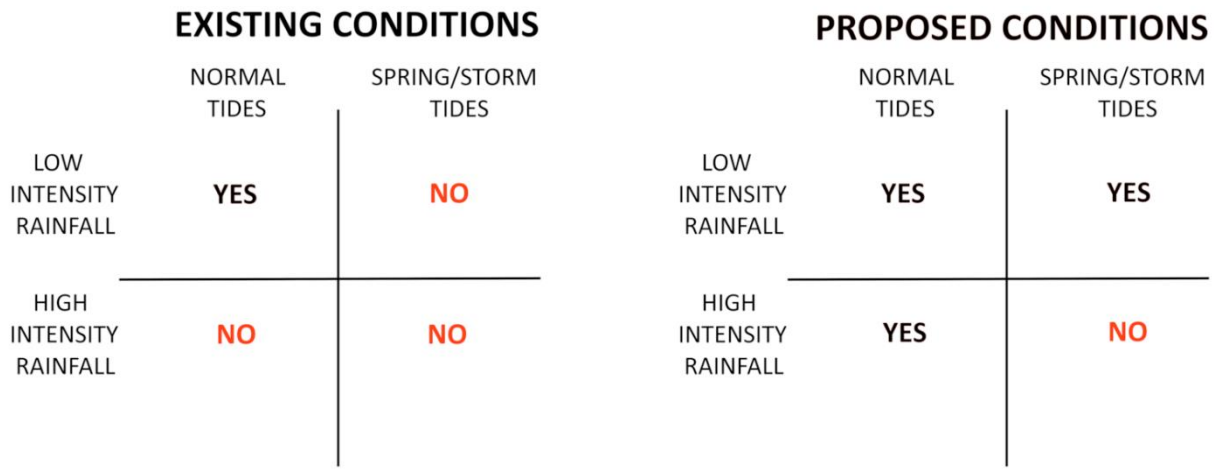


Figure 1.0 – Summary of effects of proposed improvements

1.2 Recommendations

While improvements to undersized and substandard drainage infrastructure will help mitigate flooding during certain rainfall events, the benefits of the improvements will be limited during heavy rain events occurring during higher spring tides or tropical storm tides. This is because the higher tidal tailwaters along Battery Creek block the flow of stormwater out of Basin #2 and leave nowhere for the water to flow, leading to unavoidable flooding of upstream areas. The recommendations, however, will still result in some level of improvement over existing conditions for any flooding event up to a 100-year rainfall occurring at any tide level up to a 25-year tropical storm tide.

Per the study and detailed analysis presented in this report, the following improvements are recommended and listed in order of priority:

- Replace the 24-inch and 36-inch crossline pipes under the Spanish Moss Trail with triple 60-inch RC pipes.
- Provide a tidal flap gate on the downstream end of each of the Spanish Moss Trail pipes. The gates would be the type that allow backflow during normal tidal cycles to keep the upstream salt marsh healthy.
- Provide regular maintenance to the flap gates, and have a plan in place to close the gates ahead of predicted extreme tides and possible heavy rainfall.
- Replace the dual 30-inch RC crossline pipes under Battery Creek Road at Southside Park with twin 60-inch RC pipes.

- Improve Battery Creek Road from Battery Green Court northward to Brotherhood Road. Raise the centerline elevation of the roadway to a minimum of 8.5 feet (NAVD 1988) to accommodate the construction of the new larger pipes and to prevent the road from overtopping up to a 100-year flood.

- Consider raising approximately 1,300 linear feet of the Spanish Moss Trail by an average of approximately 1.5 feet (2.3 feet maximum) to protect upstream areas from flooding during a 25-year tropical storm event. Before this improvement is made, it is recommended that a geotechnical engineer provide technical expertise as to the stability of the trail embankment fill in this area as subjected to extreme tides.

- Develop a mitigation plan for properties along the Battery Creek marsh (upstream of Spanish Moss Trail) and along Battery Creek Road subject to flooding.

- Provide a new 18-inch RC outlet pipe for an existing retention pond at the Gentry Woods subdivision on Brotherhood Road. Pond outflow should be tied into the Battery Creek Road sideline ditch at a location approximately 180 feet from the pond. (Note: no study was performed on this pond, but existing flooding issues were noted in the field.)

- Perform cleaning on the Twin Lakes Road ponds near Southside Boulevard. Locate and clean pond outlet pipes such that the ponds drain freely, and provide new outlet pipes if necessary. (Note: no study was performed on these ponds, but there have been many past complaints about chronic flooding around the ponds.)

The inclusion of tidal flap gates on the proposed new Spanish Moss Trail crossline pipes would help to keep tidal waters from backing up into areas upstream of the trail, thus allowing for more storage area for stormwater flowing from the basin. This would, in turn, greatly reduce areas of flooding created by heavy stormwater flows.

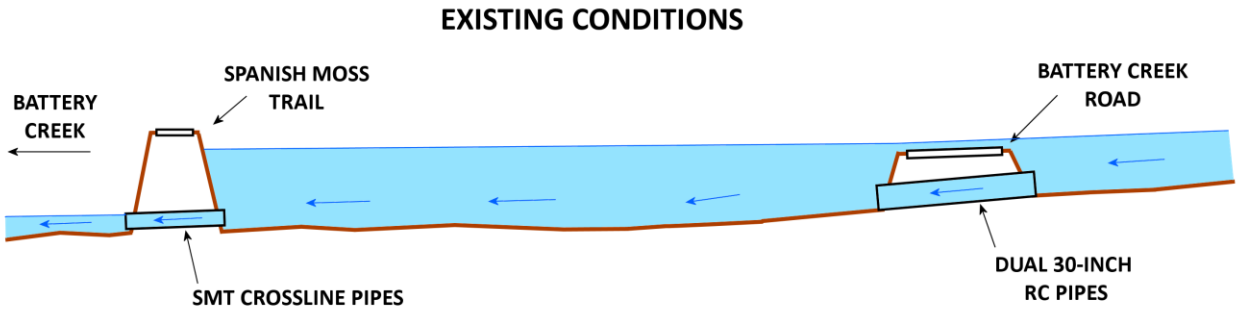
A 25-year or greater storm tide would likely overtop the Spanish Moss Trail, and property damage for the region would be significant. For this reason, it is recommended that raising the elevation of the trail be considered as a means of protecting upstream areas against storm tides up to a 25-year event.

As a frame of reference, the peak storm tide created by Hurricane Matthew in October of 2016 (elevation 7.4 feet NAVD 1988) was approximately a 10-year event along Battery Creek, while Tropical Storm Irma in September of 2017 (8.3 feet) was between a 10-year and 25-year event.

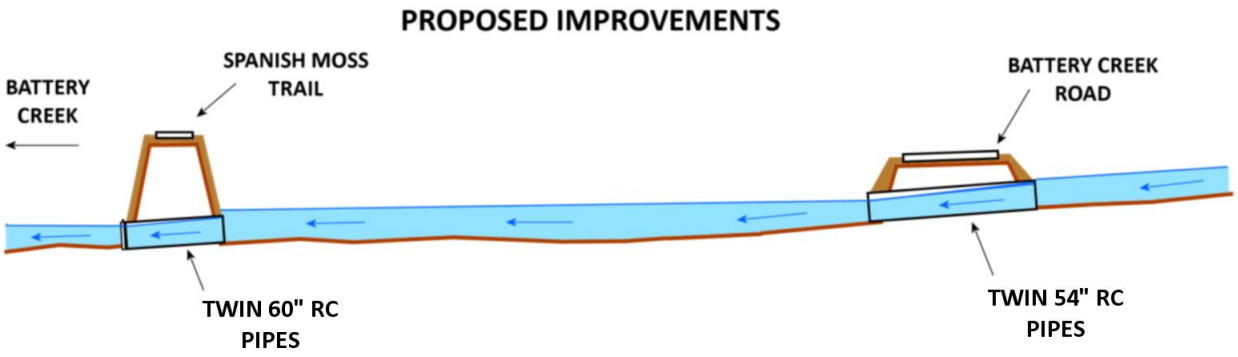
1.3 Example Scenarios

The following illustrations present two scenarios that demonstrate how proposed upgrades at the Spanish Moss Trail, the highest priority improvement, and Battery Creek Road would improve overall flooding conditions within Basin #2:

- **Scenario #1 – Heavy rainfall during normal (daily) range of tides (Mean Low Water through Mean High Water):**

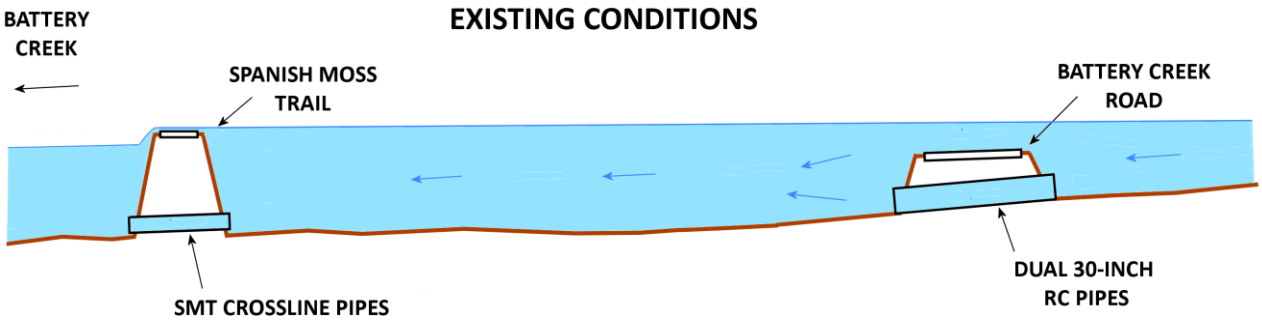


Existing conditions: Because the existing 24-inch and 36-inch crossline pipes under the Spanish Moss Trail are severely undersized, high-intensity rainfall events have the potential to create significant backup and widespread flooding upstream, even during lower tides on Battery Creek. Extreme rainfall amounts (100-year or greater) will produce flows capable of overtopping the trail during normal tide elevations.

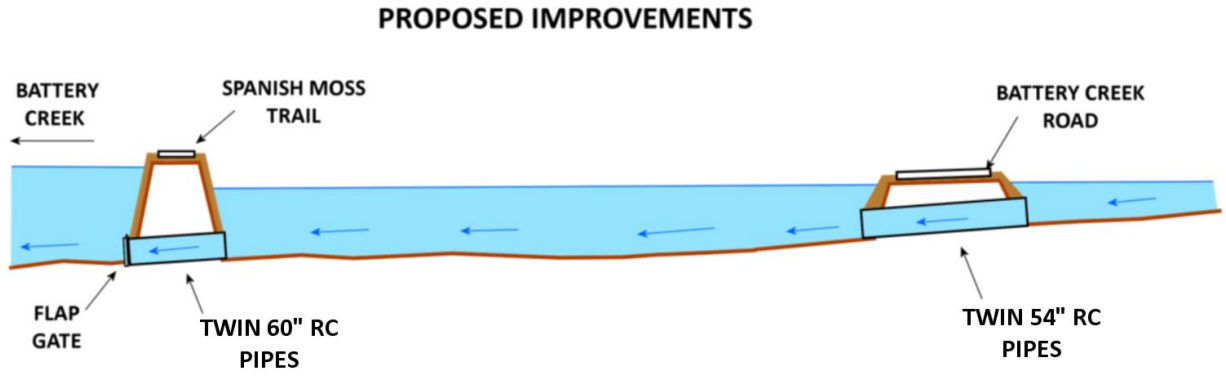


Proposed improvements: The proposed new pipe crossings under Spanish Moss Trail and Battery Creek Road would provide enough capacity to pass floodwaters through and into Battery Creek with significantly reduced floodwaters upstream. For 50-year or greater rainfall events, flood elevations would decrease by up to 3 feet along the marsh between the Spanish Moss Trail and Battery Creek Road and up to 1 feet upstream of Battery Creek Road, compared to existing conditions.

- **Scenario #2 – Heavy rainfall during spring tides, king tides, or tropical storm tides (up to 25-year magnitude):**



Existing conditions: The combination of a high tidal tailwater along Battery Creek and large stormwater flows from the watershed would result in overtopping of the Spanish Moss Trail and widespread flooding upstream. For example, the trail would overtop during a 25-year or greater rainfall occurring during a 10-year Battery Creek tropical storm tide. Also, a 25-year storm tide would overtop the trail (from downstream) and potentially cause catastrophic flooding throughout Basin #2 if combined with heavy stormwater flows.



Proposed improvements: The inclusion of flap gates on the proposed Spanish Moss Trail pipes would keep high tides from flowing upstream and into the marsh area. The lower floodwater elevations would then allow for more storage of stormwater runoff arriving from the watershed, and less flooding in Basin #2. Raising the Spanish Moss Trail by an average height of 1.5 feet would protect the basin from tidal flooding (from downstream) up to a 25-year storm tide event. Also, raising the elevation of Battery Creek Road by approximately 2 feet would protect the roadway from overtopping/flooding up to and including a 100-year flood.

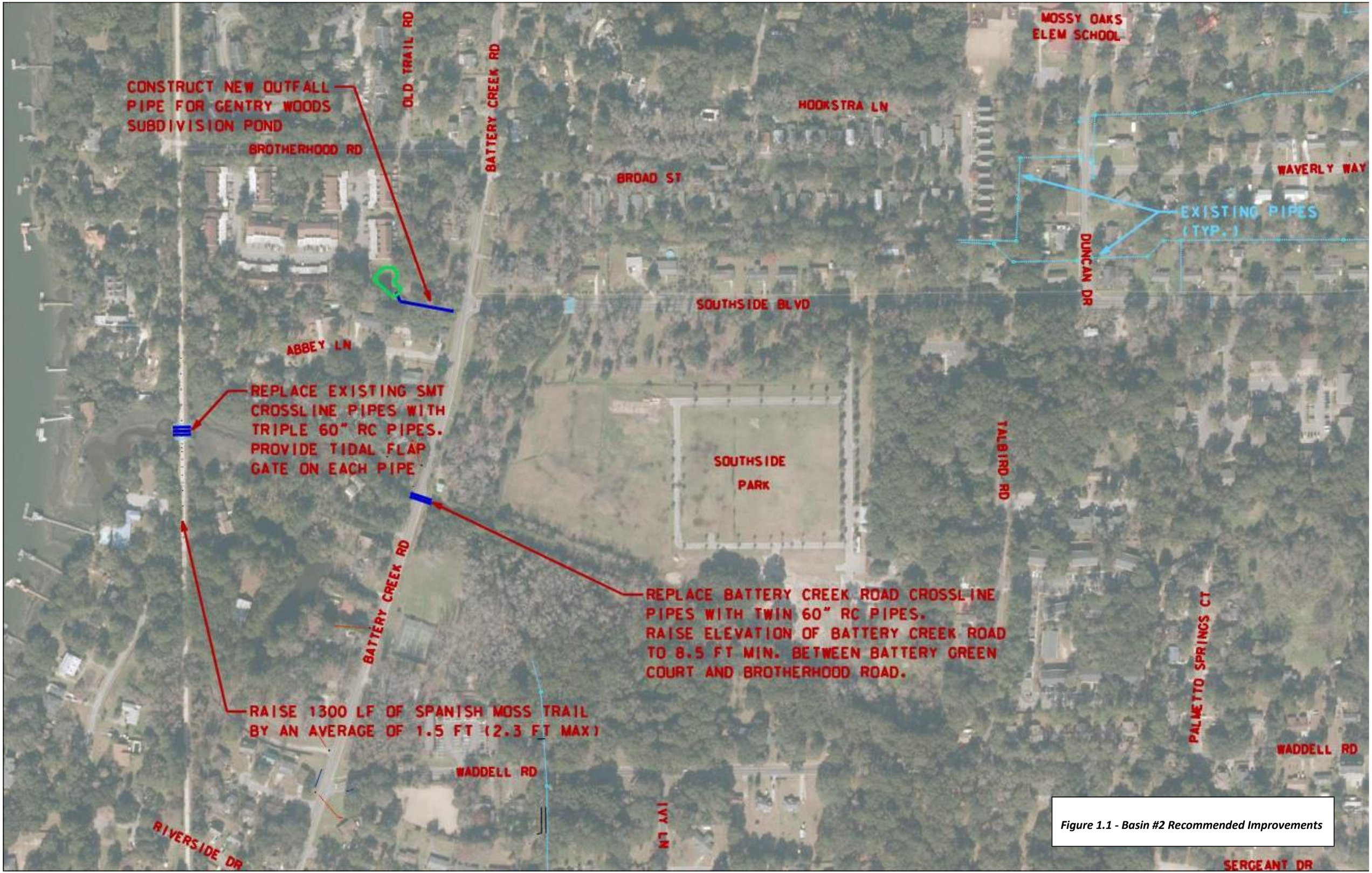


Figure 1.1 - Basin #2 Recommended Improvements

2.0 INTRODUCTION

2.1 Project Description

The Mossy Oaks district lies within the city limits of the City of Beaufort and the Town of Port Royal, South Carolina. It is generally bounded by SC Route 281 (Ribaut Road) to the east and Battery Creek to the west (see map, Figure 2.0). Covering 582 acres, Mossy Oaks is heavily developed with high- and low-density residential dwellings, two schools, and scattered commercial properties.

The Mossy Oaks area consists of two separate watersheds, and flooding issues have been prevalent over an approximate 20-year period. Infrastructure Consulting & Engineering has been contracted by the City of Beaufort and the Town of Port Royal to provide independent hydrologic and hydraulic analyses of both Mossy Oaks watersheds.

Basin #1, in the northern portion of Mossy Oaks, covers 213 acres, while Basin #2 to the south covers 369 acres. Drainage in both basins flows generally westward along tidally-influenced drainage ditches, crossline pipes, and canals to reach their outfalls at Battery Creek. Both cross under the Spanish Moss Trail, a 12-foot wide paved multi-use "Rails-to-Trail" pathway, before reaching Battery Creek.

A drainage study report of Basin #1 has been submitted to the City of Beaufort and Town of Port Royal under separate cover, and it discusses recommended improvements to the watershed such as upgraded pipes, tidal flap gates, and ditch maintenance that would improve overall drainage flow efficiency and reduce flooding during heavy rainfall events. This study concludes, however, that during higher tropical storm and spring tides, some flooding from heavy rainfall would be unavoidable.

This report will focus on Basin #2, and similar to the Basin #1 study, it will detail the methodologies used to analyze the watershed, document existing drainage and flooding conditions, and discuss the impacts of proposed improvements on the watershed.

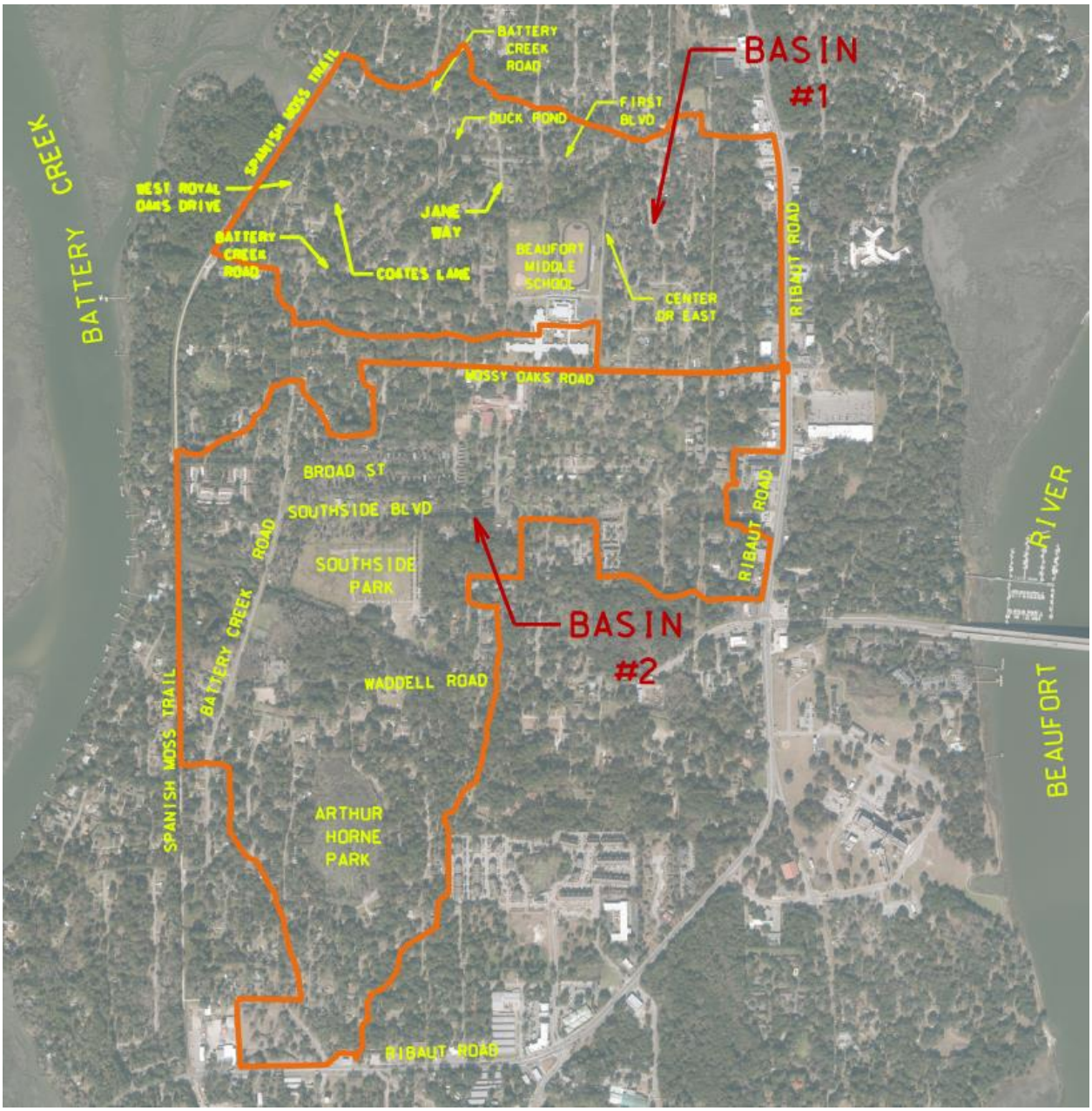


Figure 2.0 – Watershed Map of Mossy Oaks District

2.2 Basin #2 Watershed Characteristics

As shown on Figure 2.0, the 369-acre Basin #2 watershed covers the area south of Mossy Oaks Road between Ribaut Road and Battery Creek. It extends southward to the area surrounding Arthur Horne Park.

Three drainage ditches converge at Southside Park and flow through dual 30-inch reinforced concrete (RC) crossline pipes under Battery Creek Road. This ditch then flows downstream an additional 800 feet through a salt marsh, under the Spanish Moss Trail via 24-inch and 36-inch RC pipes, and into a tributary of Battery Creek. Both the Battery Creek Road and Spanish Moss Trail crossline pipes are partially buried or blocked.

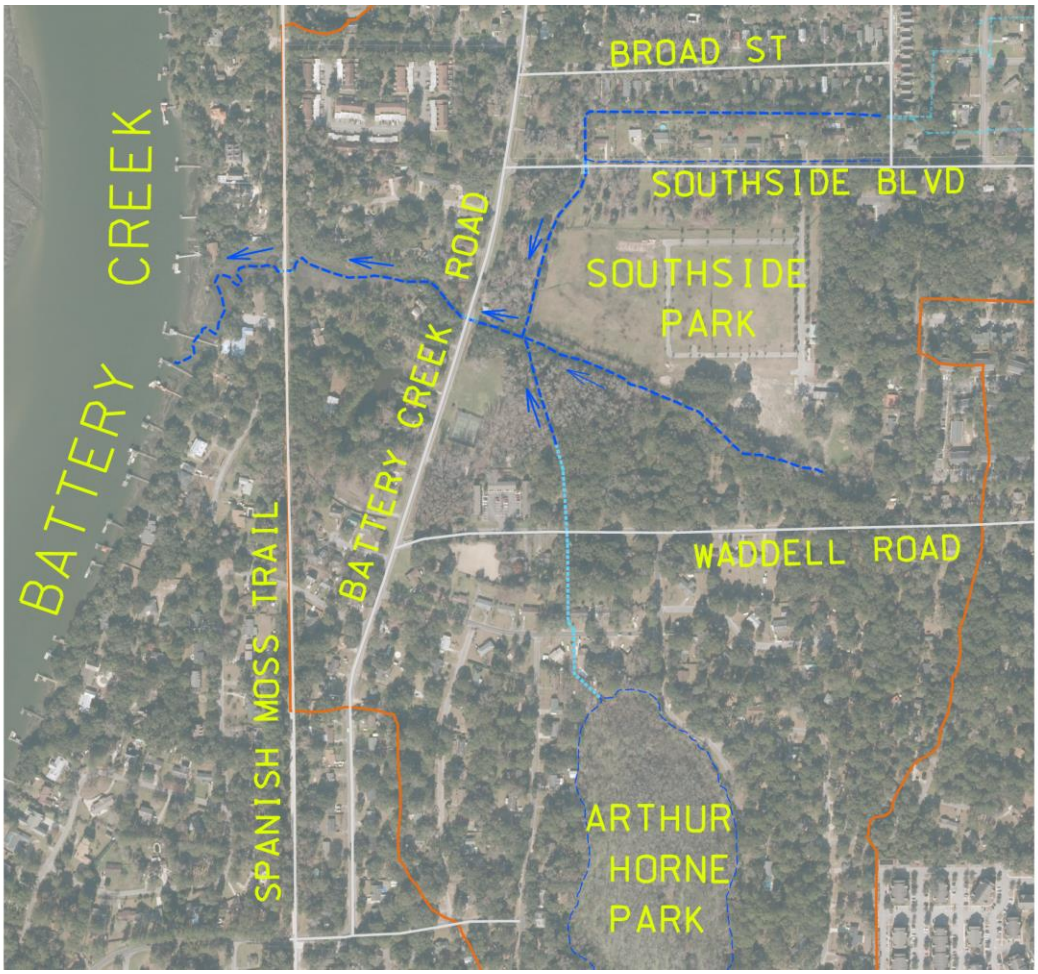


Figure 2.1 –Basin #2 ditches and Battery Creek outfall

Basin #2 is mostly covered with residential developments which create a high potential for runoff during heavy rainfall events. There are also areas of undeveloped property, such as the City-owned Southside Park, and several ponds which have a beneficial effect on Basin #2 stormwater management. The largest

of these is the 15-acre wetland/pond at Arthur Horne Park, which stores and detains runoff from 95 acres of developed residential property.

The Basin #2 drainage ditches and pipes that lie between Battery Creek and Southside Park are influenced by astronomical (daily) high tides, and heavy rainfall occurring during the range of normal tides has recently been shown to contribute to flooding. During spring tides or tropical storm tides (peak tropical storm surge height added to the normal astronomical tide), major rainfall events have the potential to cause widespread flooding and property damage in areas upstream of the Spanish Moss Trail, along Battery Creek Road, Southside Boulevard, and Broad Street, as well as in other areas. During these events, stormwater is blocked from flowing into Battery Creek by the high tidal elevations.

Significant property impacts begin in many homes and properties in lower parts of Basin #2 when flood elevations reach approximately elevation 7.0 feet (NAVD 1988).

2.3 Flooding History

While the City of Beaufort has received chronic complaints about Mossy Oaks Basin #2 flooding for decades, two tropical storms that have impacted the Beaufort area in recent years have brought these drainage issues to the forefront.

Hurricane Matthew moved on a path parallel to and just offshore of the South Carolina coast on October 8th, 2016, and its storm surge produced flood elevations in excess of 7.5 feet (NAVD 1988) in areas along Battery Creek. In addition, the Beaufort area received over 14 inches of rainfall in 24 hours between October 7th and 8th. The combination of a high tidal surge combined with extreme rainfall amounts led to flooding and property damage throughout Basin #2.

Less than one year later, many of those same properties were flooded again as Tropical Storm Irma moved along the west coast of Florida and into southern Georgia on September 11th, 2017. Although the storm paralleled Florida's gulf coast, it created a significant storm surge along the Atlantic coast, including storm tide elevations of greater than 8 feet along Battery Creek. While the storm produced lower rainfall amounts in the Mossy Oaks area compared to Hurricane Matthew, the bulk of the recorded 5.7 inches fell in a few hours prior to the arrival of the peak storm tide on September 11th. Flooding occurred as peak stormwater discharges and peak storm tide arrived in flood-prone areas at the same time.

As previously mentioned, there have also been reports of Mossy Oaks flooding associated with heavy rainfall events that have occurred during normal astronomical tides along Battery Creek. These types of floods can be attributed to poor existing drainage infrastructure that cannot handle the heavy flooding discharges.

Figure 2.2 – Flooding along Battery Creek Road near Southside Park as a result of Tropical Storm Irma, September 11th, 2017 (photo credit: The Beaufort Gazette)

2.4 Factors Contributing to Flooding

The factors contributing to flooding throughout Mossy Oaks are discussed in detail in the Mossy Oaks Basin #1 study report, and these same factors also apply to Basin #2. They are summarized below:

- The low-lying elevation of many of the properties. Some properties are subject to shallow flooding during higher astronomical tides combined with moderate amounts of rainfall.
- Rising sea levels along the South Carolina coast. The 1-foot increase in Mean Sea Level over the past century correlates to significantly higher average floodwater elevations.
- Watershed development contributing to runoff and lack of stormwater management. While there are ponds such as the Arthur Horne pond present in this watershed, the majority of Basin #2 has little or no stormwater management facilities in place to control flooding.
- Substandard drainage infrastructure. Pipe crossings at the Spanish Moss Trail and Battery Creek Road are severely undersized, which results in backup of stormwater in upstream areas. In addition, there are several other inefficient, undersized, or poorly-maintained pipes and ditches throughout the watershed that can contribute to increased floodwaters.

2.5 Project Approach

The following steps were taken in order to fully understand the complex interaction of tidal storm surges and rainfall events within Basin #2, and to develop and recommend the most practical and cost-effective improvements:

Existing conditions analysis:

- Development, calibration, and analysis of storm tide boundary conditions at Battery Creek for a range of tropical storm surge events using two-dimensional hydrodynamic modeling.
- Development and analysis of Basin #2 existing flooding conditions using computerized flood routing and one-dimensional hydraulic models for 10- through 100-year rainfall events, paired with a range of tide levels as downstream boundary conditions.
- Identification of major existing drainage problem areas within Basin #2.

Proposed conditions analysis:

- Analysis of and recommendations for proposed improvements to Basin #2 using computerized flood routing and one-dimensional hydraulic models for 10- through 100-year rainfall events, paired with a range of tide levels as downstream boundary conditions.
- Comparison of existing conditions to proposed conditions results and evaluation of proposed impacts to the overall watershed.

The Basin #2 study approach will be discussed in greater detail in the next two sections of this report.

3.0 EXISTING CONDITIONS ANALYSIS

3.1 Tidal Storm Surge Modeling

Tidal storm surge modeling was accomplished using the two-dimensional computer program Surface Water Modeling System (SMS). With this program, a two-dimensional mesh was constructed from the Beaufort River inlet (Fort Fremont tidal gage) upstream through Beaufort River and Battery Creek, with the intent of predicting the propagation effects of a storm surge arriving at the inlet and moving upstream through the river system.

This methodology and results of the SMS model analysis are discussed in detail in the Mossy Oaks Basin #1 study report.

3.1.1 Tidal Datums at Battery Creek NOAA Station

The tidal datum records for the Battery Creek station used in this analysis were as follows:

Battery Creek – NOAA tidal station 8668092 (ft. NAVD 1988):

Mean Higher High Water = 3.78
Mean High Water = 3.38
Mean Tide Level = -0.44
Mean Low Water = -4.26
Mean Lower Low Water = -4.46
King Tide = 5.8 (approx.)

3.1.2 Results of Storm Tide Analysis

The calculations generated by the SMS storm tide model of Beaufort River and Battery Creek provided the following elevations at the Basin #2 outfall at Battery Creek:

Storm Magnitude	Storm Tide Elevation (ft. NAVD 1988)
10-year	7.7
25-year	10.1
50-year	12.6
100-year	15.0

3.2 Existing Basin #2 Watershed Analysis

In order to analyze existing drainage conditions with the Basin #2 watershed, two computer programs were utilized. The hydrodynamic model CivilStorm was used to determine flood discharges produced by various rainfall events ranging from 10- through 100-year magnitude. The unsteady flow capabilities of the US Army Corps of Engineers stream/river hydraulic analysis program HEC-RAS was used to determine flood elevations along the Basin #2 main ditch from just downstream of the Spanish Moss Trail (at Battery Creek) to just upstream of Battery Creek Road at Southside Park.

3.2.1 Hydrologic Modeling/CivilStorm

A CivilStorm model of the 369-acre Basin #2 watershed was constructed by first dividing the overall watershed into 13 separate subareas, as shown in Figure 3.0. The model computed runoff hydrographs from each of the subareas, routing them through existing ditches and pipes downstream to the Basin #2 outlet at Battery Creek.

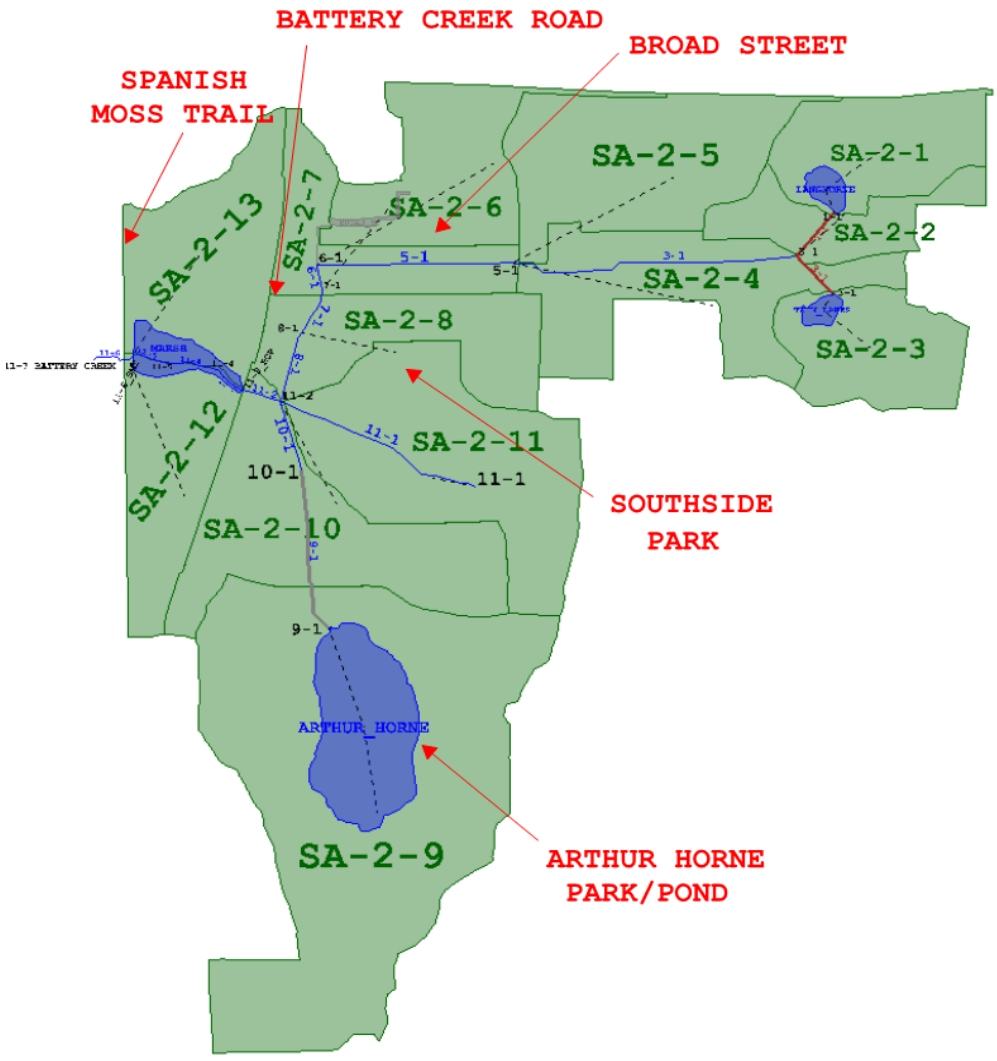


Figure 3.0 – CivilStorm model layout

The subareas were analyzed using Natural Resources Conservation Service (NRCS) TR-55 methodology. The subarea flow hydrographs were developed based on NRCS Type III rainfall distribution and the following 24-hour rainfall amounts, which were found on the NOAA "Precipitation Frequency Data Server" website:

Rainfall Return Event	24-hour Rainfall (in.)
10-year	6.4
25-year	7.8
50-year	8.9
100-year	10.2

The TR-55 method requires the assignment of a weighted Curve Number for each subarea based on its land cover types and soil characteristics. This dimensionless, empirical parameter is an indicator of the potential for runoff from a particular area.

Also required by the TR-55 method is the time of concentration for each subarea, or the time required for the entire subarea to contribute to flow to its outlet. Times of concentration were also computed for each subarea using the NRCS computer program Win-TR55.

3.2.2 CivilStorm Flood Discharge Results

Based on 10- through 100-year analyses of rainfall/runoff conditions within the Basin #2 watershed, peak stormwater flow discharges (cfs) at the two major pipe crossings for both existing and proposed conditions are presented in Table 3.0 below.

Table 3.0 CivilStorm Results– Peak Discharges (cfs)

Return Period	Battery Creek Marsh, Upstream of Spanish Moss Trail 24-/36-inch RCPs (EXISTING) Triple 60-inch RCPs (PROPOSED)	Upstream of Battery Creek Road Dual 30-inch RCPs (EXISTING) Twin 60-inch RCPs (PROPOSED)
10-year	260	212
25-year	366	299
50-year	449	384
100-year	516	485

3.2.3 Hydraulic Modeling/HEC-RAS

An unsteady flow model of the main Basin #2 drainage ditch was constructed using HEC-RAS version 5.0. Geometric cross-sectional, pipe, roadway, and ditch data was input into the model based on field survey data provided by Andrews Engineering & Surveying, Inc., and SCDNR LiDAR data. The model extends from Battery Creek upstream to the confluence of three main Southside Park drainage ditches, approximately 200 feet east (upstream) of Battery Creek Road.

This model was calibrated for daily tide cycles using the temporary gage records provided by WEC, Inc., which are presented in Appendix "C". Good calibration results confirmed the accuracy of the HEC-RAS geometry and Manning's roughness coefficients.

The model included the existing pipe crossings at the Spanish Moss Trail and Battery Creek Road.

The results generated by the CivilStorm runoff/flood routing analysis were input as flow hydrographs into the HEC-RAS model.

Model calculations were performed for the 10- through 100-year rainfall events and a range of downstream tidal boundary conditions from Mean Low Water through the 25-year storm tide level. In all, 28 different rainfall/tidal combinations were simulated for existing conditions analyses.

Because 25-year magnitude or greater tropical storm tides (elevation 10.1 feet NAVD 1988 or greater) would cause overtopping of the Spanish Moss Trail (the low point of which is approximately 9.2 feet NAVD 1988 near Battery Green Court), these tidal events combined with heavy rainfall would cause catastrophic flooding throughout most of Basin #2, generating widespread flood elevations greater than 10 feet (NAVD 1988).

A complete table of existing conditions HEC-RAS results is presented in the next section.

3.2.4 Existing Conditions HEC-RAS Analysis Results

Water surface elevations (NAVD 1988 datum) generated by the HEC-RAS existing conditions analysis at the two key pipe crossings (shown in Figure 3.1) along the Basin #2 main drainage ditch are presented in Table 3.1 below.

For a frame of reference, substantial flooding and damage of habitable structures begins at approximately elevation 7.0 feet (NAVD 1988) in lower parts of the watershed.

Inundation maps presented in Appendix “A” for select rainfall and tidal events give an idea as to the extent of flooding produced during these conditions.

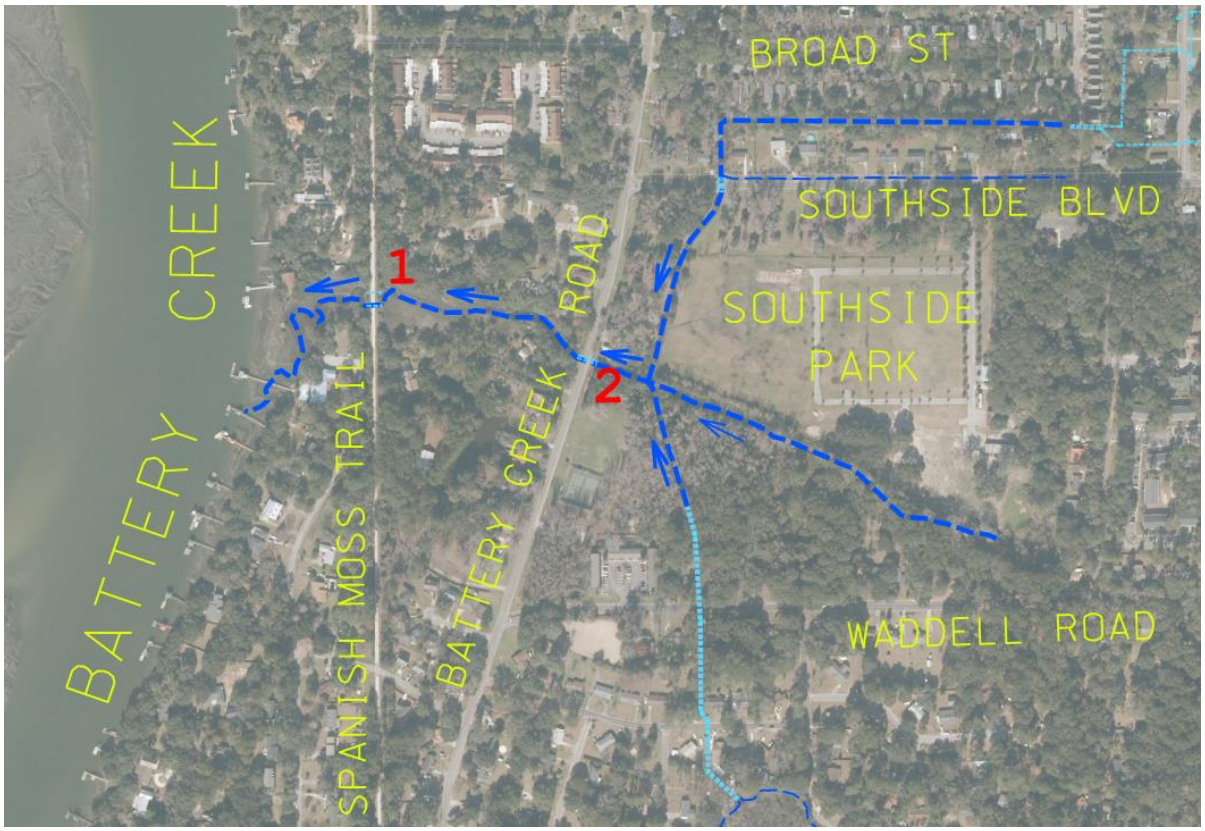


Figure 3.1 –HEC-RAS results locations (presented in Table 3.1)

Table 3.1 Existing Conditions HEC-RAS Results
Water Surface Elevations (feet NAVD 1988)

Rainfall Return Period/ Tidal Event	(1) Battery Creek Marsh, just upstream of Spanish Moss Trail (24-/36-inch RC pipes)	(2) Southside Park, just Upstream of Battery Creek Road (Dual 30-inch RC pipes)
10-year/ MLW	6.7	6.7
25-year/ MLW	7.3	7.3
50-year/ MLW	8.1	8.1
100-year/ MLW	8.8	8.8
10-year/ MTL rising	6.6	6.7
25-year/ MTL rising	7.6	7.6
50-year/ MTL rising	8.2	8.2
100-year/ MTL rising	8.8	8.8

Table 3.1 (continued):

Rainfall Return Period/ Tidal Event	(1) Battery Creek Marsh, just upstream of Spanish Moss Trail (24-/36-inch RC pipes)	(2) Southside Park, just Upstream of Battery Creek Road (Dual 30-inch RC pipes)
10-year/ MTL falling	6.7	6.7
25-year/ MTL falling	7.6	7.6
50-year/ MTL falling	8.2	8.2
100-year/ MTL falling	8.3	8.3
10-year/ MHW	6.8	6.8
25-year/ MHW	7.4	7.4
50-year/ MHW	8.2	8.2
100-year/ MHW	8.9	8.9
10-year/ King Tide	7.6	7.6
25-year/ King Tide	8.3	8.3
50-year/ King Tide	8.7	8.7
100-year/ King Tide	9.3	9.3
10-year/ 10-year Storm Tide	8.1	8.1
25-year/ 10-year Storm Tide	8.7	8.7
50-year/ 10-year Storm Tide	9.1	9.1
100-year/ 10-year Storm Tide	9.5	9.5
10-year/ 25-year Storm Tide	10.3	10.3
25-year/ 25-year Storm Tide	10.3	10.3
50-year/ 25-year Storm Tide	10.3	10.3
100-year/ 25-year Storm Tide	10.3	10.3

3.2.5 Existing Conditions Analysis Discussion

The existing conditions CivilStorm hydrologic model revealed that Basin #2 produces significant flood discharges due to a high amount of watershed development. Basin #2 discharges are similar to those produced in Basin #1, even though the Basin #2 watershed is over 150 acres larger than Basin #1. This can be attributed to several Basin #2 ponds that have a noticeable overall detention effect and reduction in discharges, especially the 15-acre Arthur Horne Park pond.

The HEC-RAS hydraulic analysis of the Basin #2 main drainage ditch showed that existing pipe crossings at the Spanish Moss Trail and Battery Creek Road are severely undersized in handling the high discharges. This is reflected in the headwater elevations shown in Table 3.1 for both crossings. These figures show that a 100-year or greater rainfall would produce flood elevations capable of overtopping, or nearly overtopping, the Spanish Moss Trail (approximate elevation 9.2 NAVD 1988 at its lowest point), regardless of the Battery Creek tide level. These flood elevations would propagate far upstream as well, with significant property impacts.

The results also showed that Battery Creek Road, with a centerline sag elevation of 6.3 feet (NAVD 1988) adjacent to Southside Park, overtops during a 10-year rainfall event, regardless of the Battery Creek tide level. This presents a safety hazard to the public and requires frequent closures of the roadway.

In summary, the results of the existing conditions analysis demonstrates the inability of the existing drainage network in handling all but the smallest rainfall events. In addition, extreme tide levels (spring tides and tropical storm tides) would significantly worsen the magnitude of flooding produced.

4.0 PROPOSED CONDITIONS ANALYSIS

4.1 Criteria

Similar to the approach used for existing conditions, Basin #2 proposed conditions analyses were made for 10- through 100-year rainfall events, paired with downstream tidal conditions ranging from Mean Low Water through a 25-year storm tide.

For proposed new drainage, analysis was made based on requirements established by South Carolina Department of Transportation hydraulic design criteria. For secondary and local roads, such as those found throughout Mossy Oaks, crossline pipes were designed to handle 25-year storm discharges.

Although the drainage systems were sized to handle 10- to 25-year storms, the proposed analysis also included 50- and 100-year storms (similar to the existing conditions analysis) to understand the overall effects on the watershed by major rainfall events.

For downstream boundary conditions, a 25-year storm tide was chosen as the design event. A storm surge of this magnitude could be contained on the downstream side of the Spanish Moss Trail by raising the trail approximately 2.3 feet at its lowest point and providing flap gates on downstream end of the proposed crossline pipes. Raising the trail higher to accommodate 50-year or higher storm tides would be impractical due to exponentially higher construction costs and permitting constraints.

4.2 Proposed Conditions CivilStorm, HEC-RAS, and HY-8 Models

The proposed conditions analysis was developed by modifying existing conditions models to reflect improved drainage structures and to address problem areas identified in the previous section of this report.

4.2.1 CivilStorm Model

The proposed conditions CivilStorm model was created by making only minor revisions to the existing conditions model to reflect the proposed new pipe sizes at the Spanish Moss Trail and Battery Creek Road crossings.

4.2.2 HEC-RAS Model Modifications (Basin #2 main ditch)

The proposed HEC-RAS analysis reflects the following modifications as compared to the existing conditions:

- The 24- and 36-inch RC crossline pipes under the Spanish Moss Trail were replaced with triple 60-inch RC pipes.
- The trail profile was raised to a minimum elevation of 11.5 feet NAVD 1988 to investigate the benefit of keeping the 25-year storm tide from overtopping the trail (from downstream) and inundating Basin #2.
- Trail pipe replacements included tidal flap gates on the downstream ends of the new pipes.
- The existing dual 30-inch crossline pipes under Battery Creek Road were replaced with twin 60-inch RC pipes.
- The centerline profile of Battery Creek Road was raised to a minimum of 8.5 feet (NAVD 1988) to accommodate the larger pipes.

Similar to the existing conditions analysis, HEC-RAS model calculations were performed for the 10- through 100-year rainfall events and a range of downstream tidal boundary conditions from Mean Low Water through the 25-year storm tide level. In all, 28 different rainfall/tidal combinations were simulated for proposed conditions.

4.2.3 HY-8 Analyses

The FHWA culvert analysis program HY-8 was used to check the performance of the proposed culverts at the Spanish Moss Trail and Battery Creek Road. These checks were made to validate the HEC-RAS results for these crossings.

In addition, a Broad Street canal triple 30-in RC pipe crossing at Southside Boulevard was checked for proposed conditions capacity and performance using HY-8.

4.3 Proposed Conditions Analysis Results

4.3.1 Proposed Conditions HEC-RAS Analysis Results

Table 4.0 presents the results of the proposed conditions HEC-RAS analysis.

Inundation maps presented in Appendix “A” for select rainfall and tidal events give an idea as to the effectiveness of proposed improvements by comparing existing conditions vs. proposed conditions flooding at the two key pipe crossings.

As discussed earlier, substantial flooding and damage of habitable structures begins at approximate elevation 7.0 feet (NAVD 1988) in the Basin #2 watershed.

Table 4.0 Proposed Conditions HEC-RAS Results
Water Surface Elevations (NAVD 1988)
(Results from existing conditions analysis shown in parentheses for comparison)

Rainfall Return Period/ Tidal Event	(1) Battery Creek Marsh, Upstream of Spanish Moss Trail Twin 60" RCPs	(2) Southside Park, just Upstream of Battery Creek Road Twin 54" RCPs
10-year/ MLW	3.0 (6.7)	6.1 (6.7)
25-year/ MLW	3.9 (7.3)	6.9 (7.3)
50-year/ MLW	4.0 (8.1)	7.6 (8.1)
100-year/ MLW	5.2 (8.8)	7.9 (8.8)
10-year/ MTL rising	3.5 (6.6)	6.1 (6.7)
25-year/ MTL rising	3.9 (7.6)	6.9 (7.6)
50-year/ MTL rising	4.4 (8.2)	7.6 (8.2)
100-year/ MTL rising	5.4 (8.8)	7.9 (8.8)
10-year/ MTL falling	3.4 (6.7)	6.1 (6.7)
25-year/ MTL falling	3.9 (7.6)	6.9 (7.6)
50-year/ MTL falling	4.4 (8.2)	7.6 (8.2)
100-year/ MTL falling	5.4 (8.3)	7.9 (8.3)
10-year/ MHW	3.8 (6.8)	6.1 (6.8)
25-year/ MHW	4.1 (7.4)	6.9 (7.4)
50-year/ MHW	4.4 (8.2)	7.6 (8.2)
100-year/ MHW	5.3 (8.9)	7.9 (8.9)
10-year/ King Tide	6.0 (7.6)	6.6 (7.6)
25-year/ King Tide	6.3 (8.3)	7.3 (8.3)
50-year/ King Tide	6.5 (8.7)	7.8 (8.7)
100-year/ King Tide	6.9 (9.3)	8.1 (9.3)
10-year/ 10-year Storm Tide	7.4 (8.1)	7.4 (8.1)
25-year/ 10-year Storm Tide	7.6 (8.7)	7.6 (8.7)
50-year/ 10-year Storm Tide	8.1 (9.1)	8.1 (9.1)
100-year/ 10-year Storm Tide	8.3 (9.5)	8.3 (9.5)
10-year/ 25-year Storm Tide	7.6 (10.3)	7.7 (10.3)
25-year/ 25-year Storm Tide	8.5 (10.3)	8.5 (10.3)
50-year/ 25-year Storm Tide	8.8 (10.3)	8.8 (10.3)
100-year/ 25-year Storm Tide	9.3 (10.3)	9.3 (10.3)

4.4 Proposed Conditions Analysis Discussion

The proposed conditions results show that drainage improvements would produce significantly lower flood profile elevations along the Basin #2 main ditch compared to existing conditions results. In fact, 3- to 4-foot lower flood elevations were computed for some scenarios.

Raising the elevation of Battery Creek Road would keep the roadway from overtopping up to a 100-year rainfall event (except during extreme storm tides), which would keep the roadway open and provide a safer travelway during flooding.

Raising the Spanish Moss Trail and providing larger pipes at the trail crossing would result in 1 to 3 feet of decrease in flood elevations during a 25-year tropical storm tide combined with heavy rainfall.

The recommended tidal flap gates on the proposed Spanish Moss Trail pipes would be identical to the ones recommended for the Basin #1 trail crossing. This type of gate would allow normal tidal flow (low tide to high tide) into and out of the pipes so that the upstream marsh receives its normal daily saltwater flow. However, it would be set to close when the downstream tidal tailwater reaches a certain elevation in extreme tide events. For this reason, the flap gate would have no measurable impact on upstream flood profiles during any Battery Creek tidal event up to Mean High Water, but it would be beneficial for flooding rainfall at higher tidal levels.

The flap gate type would allow for manual closure, and if the gate were to be closed at the lowest tidal elevation possible in advance of an oncoming storm tide event, there could be a significant benefit to areas upstream by eliminating saltwater flooding above the Spanish Moss Trail. While the hydraulic modeling software used to perform this investigation does not adequately model this scenario, it is believed that water surface profiles upstream of the Spanish Moss Trail culvert could benefit as much as 1 to 1.5 feet in reduced flood elevations if a timely closure of the flap gate is made in advance of a rising storm tide.

The HY-8 analysis on the Southside Boulevard triple 30-inch RC crossline pipes showed that the pipes are adequate in handling proposed discharges, and no improvements are necessary. In addition, HY-8 analyses of the Spanish Moss Trail and Battery Creek Road culverts validated the HEC-RAS results for the proposed culvert sizes.

Consideration was also given to upgrading the size of the 15-inch RC outfall pipe flowing out of the Arthur Horne Park 15-acre pond due to minor flooding issues associated with the pond. Upgrading the pipe to 36-inch would only result in approximately 0.1 feet and 0.35 feet of decrease in water surface elevation in the pond for the 10- and 100-year storm events, respectively. Because the outfall pipe is over 1000 feet in length, is very deep in some locations, and lies beneath a number of residential properties, its replacement would be very costly. Replacement is therefore not recommended because the slight benefit of reduced water surface elevations would not outweigh the cost of replacement.

Clearing of storm-related debris and downed timber in the Arthur Horne pond would be beneficial, mostly from an aesthetic and functional point of view given that the pond's trails were used for recreation prior to storm-related blockages and downed timber. However, since the pond is owned and maintained by Beaufort County, any clearing would have to be performed under County budget and scheduling constraints.

It should be stated again that the efficiency of the proposed drainage improvements would be limited during higher-intensity rainfall events combined with high tidal elevations on Battery Creek because

stormwater flow out of the basin will be trapped by extreme tides. However, there would still be significant improvements in flood elevations compared to existing conditions, as shown in Table 4.0.

Unfortunately, even if all recommended improvements are implemented, there will still be low-lying properties located in tidally-affected areas that will be left vulnerable to flood damage during extreme tidal events. These properties are mostly located along Battery Creek Road near the Basin #2 main ditch and along the salt marsh upstream of the Spanish Moss Trail.

Sea level rise will likely be another continuing issue that Basin #2 will likely face in the future. Scientific estimates of sea level rise vary greatly, and there is very little solid guidance for engineers to design or plan for exact future increases (either in amount or time period over which the increases may occur).

The water surface elevations presented in Table 4.0 would increase proportionately with any future increases in sea level. For example, a one-foot sea level increase would result in approximately one foot of increase in all of the elevations reported for the various storm events. However, exact future sea level increases were not accounted for in the analysis or recommendations presented in this study.

Based upon the overall findings of this study, the most efficient, cost-effective, and practical solutions to Basin #2 flooding issues were developed and are presented in the next section of this report.

5.0 CONCLUSION/FINDINGS

5.1 Recommendations

Based on the observations and findings discussed in this report, the following improvements are recommended for Basin #2:

- Replace the 24- and 36-inch RC crossline pipes under the Spanish Moss Trail with triple 60-inch RC pipes.
- Provide a flap gate on the downstream end of each of the Spanish Moss Trail pipes. These gates would be the type that allow backflow during normal tidal cycles to keep the upstream salt marsh healthy.
- Provide regular maintenance to the flap gates, and have a plan in place to close the gates ahead of predicted extreme tides and possible heavy rainfall.
- Replace the dual 30-inch RC crossline pipes under Battery Creek Road at Southside Park with twin 60-inch RC pipes.
- Improve Battery Creek Road from Battery Green Court northward to Brotherhood Road. Raise the centerline elevation of the roadway to a minimum of 8.5 feet (NAVD 1988) to accommodate the construction of the new crossline pipes and to prevent the road from overtopping up to a 100-year flood.
- Consider raising approximately 1,300 linear feet of the Spanish Moss Trail by an average of approximately 1.5 feet (2.3 feet maximum) to protect upstream areas from flooding during a 25-year tropical storm event. Before this improvement is made, it is recommended that a geotechnical engineer provide technical expertise as to the stability of the trail embankment fill in this area as subjected to extreme tides.
- Develop a mitigation plan for properties along the Battery Creek marsh (upstream of Spanish Moss Trail) and along Battery Creek Road subject to flooding.
- Provide a new 18-inch RC outlet pipe for an existing retention pond at the Gentry Woods subdivision on Brotherhood Road. Pond outflow should be tied into the Battery Creek Road sideline ditch at a location approximately 180 feet from the pond. (Note: no study was performed on this pond, but existing flooding issues were noted in the field.)
- Perform cleaning on the Twin Lakes Road ponds near Southside Boulevard. Locate and clean pond outlet pipes such that the ponds drain freely, and provide new outlet pipes if necessary. (Note: no study was performed on these ponds, but its condition was noted in the field. This recommendation is being made to address chronic complaints about flooding around these ponds that have been made by local residents for several years.)

5.2 Summary of Improvements

Extensive study was undertaken to research, model, and understand the complexity of the flooding issues within Mossy Oaks Basin #2.

The Basin #2 study showed that existing drainage structures are severely undersized, and the proposed pipes and other improvements recommended in this report would provide immediate and positive impacts to the capacity of the Basin #2 drainage system. This would result in reduced flooding during high-intensity rainfall events.

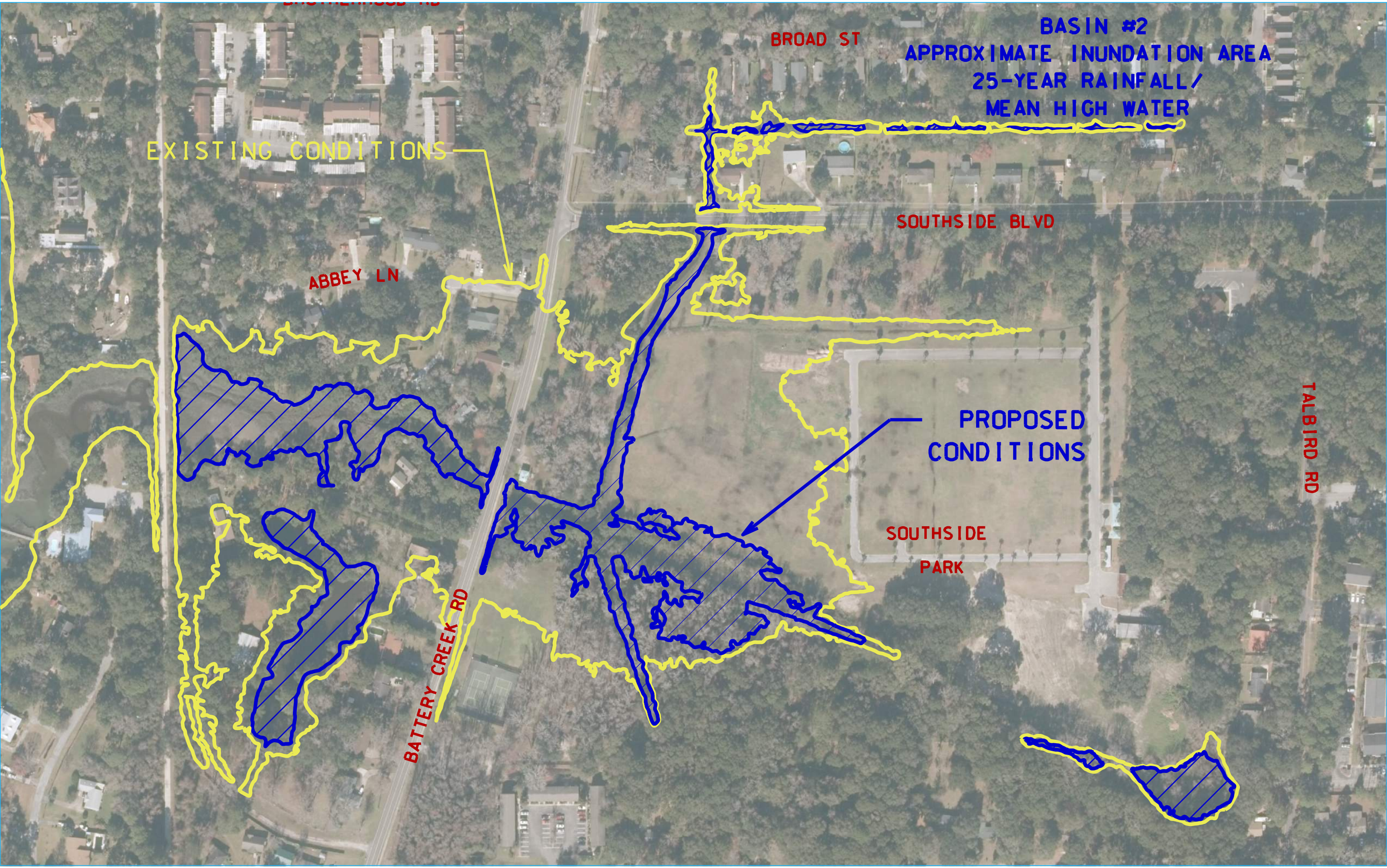
And while these recommendations would not solve all flooding issues encountered during extreme rainfall combined with tidal storm events, if implemented they will all result in substantial improvements over existing conditions.

In summary, the impact of these recommendations would be the following:

- Construction of new RC crossline pipes at the Spanish Moss Trail would significantly lower floodwater elevations (compared to existing conditions) for 10- through 100-year rainfall events that occur during normal tides (Mean Low Water through Mean High Water).
- Inclusion of a flap gate on the downstream end of the proposed new Spanish Moss Trail pipe crossing would lower flooding potential in the watershed for 10- through 100-year rainfall events that occur concurrently with higher storm tides, from spring tides up through 10-year tropical storm tides (similar in magnitude to the Hurricane Matthew storm tide the Beaufort area). The flap gates would allow for manual operation, and timely closure of the gates prior to approaching storm tides could reduce flooding elevations in Basin #2 by a significantly lower amount.
- Raising the elevation of the Spanish Moss Trail to a minimum of 11.5 feet (NAVD 1988) for 1300 feet around the low point (near Battery Green Court) would protect upstream areas from tropical storm tide inundation up to a 25-year tropical storm tide event by preventing the trail from overtopping. Further geotechnical exploration on the stability of the trail embankment would need to be undertaken prior to implementing this recommendation.

APPENDIX A

INUNDATION MAPS FOR 25-YEAR RAINFALL EVENTS AT VARIOUS TIDE CONDTIONS


BASIN #2
APPROXIMATE INUNDATION AREA
25-YEAR RAINFALL/
MEAN HIGH WATER
BROAD ST
SOUTHSIDE BLVD
EXISTING CONDITIONS
ABBEY LN
PROPOSED
CONDITIONS
SOUTHSIDE
PARK
BATTERY CREEK RD
TALBIRD RD

BASIN #2
APPROXIMATE INUNDATION AREA
25-YEAR RAINFALL/
KING TIDE

EXISTING CONDITIONS

PROPOSED
CONDITIONS

BROAD ST

SOUTHSIDE BLVD

SPANISH MOSS TRAIL

ABBEY LN

BATTERY CREEK RD

SOUTHSIDE
PARK

TALBIRD RD

BASIN #2
APPROXIMATE INUNDATION AREA
25-YEAR RAINFALL/
10-YEAR STORM TIDE

EXISTING CONDITIONS

PROPOSED
CONDITIONS

BROAD ST

SOUTHSIDE BLVD

ABBEY LN

SOUTHSIDE
PARK

BATTERY CREEK RD

TALBIRD RD

BASIN #2
APPROXIMATE INUNDATION AREA
25-YEAR RAINFALL/
25-YEAR STORM TIDE

EXISTING CONDITIONS

PROPOSED
CONDITIONS

BROAD ST

SOUTHSIDE BLVD

SOUTHSIDE
PARK

DUNCAN DR

TALBIRD RD

SPANISH MOSS TRAIL

ABBEY LN

BATTERY CREEK RD

BATTERY GREEN CT

WADDELL RD

IVY LN

PALMETTO SPRINGS CT

APPENDIX B

RAINFALL TABLES FOR MOSSY OAKS

NOAA Atlas 14, Volume 2, Version 3
Location name: Beaufort, South Carolina, USA*
Latitude: 32.4066°, Longitude: -80.6986°
Elevation: 8.46 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.499 (0.455-0.544)	0.586 (0.535-0.640)	0.678 (0.618-0.740)	0.760 (0.691-0.830)	0.854 (0.772-0.935)	0.929 (0.833-1.02)	1.00 (0.891-1.11)	1.07 (0.942-1.20)	1.16 (1.00-1.31)	1.23 (1.05-1.41)
10-min	0.797 (0.727-0.869)	0.937 (0.856-1.02)	1.09 (0.990-1.19)	1.22 (1.11-1.33)	1.36 (1.23-1.49)	1.48 (1.33-1.63)	1.59 (1.42-1.76)	1.70 (1.49-1.89)	1.83 (1.58-2.07)	1.94 (1.66-2.21)
15-min	0.996 (0.909-1.09)	1.18 (1.08-1.29)	1.37 (1.25-1.50)	1.54 (1.40-1.68)	1.73 (1.56-1.89)	1.87 (1.68-2.06)	2.01 (1.79-2.23)	2.15 (1.88-2.39)	2.31 (1.99-2.60)	2.44 (2.08-2.78)
30-min	1.37 (1.25-1.49)	1.63 (1.49-1.78)	1.95 (1.78-2.13)	2.23 (2.03-2.43)	2.56 (2.31-2.80)	2.82 (2.53-3.10)	3.08 (2.74-3.41)	3.34 (2.93-3.72)	3.67 (3.17-4.14)	3.95 (3.37-4.50)
60-min	1.70 (1.55-1.86)	2.04 (1.87-2.23)	2.50 (2.28-2.73)	2.90 (2.64-3.17)	3.40 (3.07-3.72)	3.83 (3.43-4.20)	4.25 (3.78-4.70)	4.68 (4.11-5.22)	5.26 (4.55-5.93)	5.76 (4.92-6.57)
2-hr	2.03 (1.86-2.21)	2.46 (2.25-2.68)	3.05 (2.79-3.32)	3.56 (3.24-3.86)	4.17 (3.79-4.54)	4.67 (4.21-5.10)	5.16 (4.62-5.67)	5.65 (5.01-6.24)	6.28 (5.48-7.00)	6.81 (5.88-7.67)
3-hr	2.17 (1.99-2.37)	2.63 (2.41-2.88)	3.27 (2.99-3.57)	3.84 (3.49-4.19)	4.56 (4.12-4.98)	5.16 (4.63-5.67)	5.77 (5.12-6.37)	6.40 (5.61-7.11)	7.23 (6.23-8.13)	7.96 (6.76-9.05)
6-hr	2.54 (2.32-2.79)	3.06 (2.80-3.37)	3.81 (3.47-4.20)	4.50 (4.08-4.95)	5.42 (4.86-5.97)	6.22 (5.51-6.89)	7.04 (6.16-7.86)	7.92 (6.83-8.92)	9.13 (7.70-10.4)	10.2 (8.43-11.8)
12-hr	2.94 (2.66-3.28)	3.55 (3.22-3.97)	4.47 (4.04-4.99)	5.33 (4.78-5.94)	6.47 (5.73-7.23)	7.47 (6.53-8.39)	8.53 (7.34-9.65)	9.67 (8.16-11.0)	11.3 (9.25-13.0)	12.7 (10.2-14.9)
24-hr	3.44 (3.18-3.74)	4.19 (3.86-4.56)	5.41 (4.98-5.88)	6.40 (5.88-6.94)	7.80 (7.13-8.45)	8.94 (8.13-9.69)	10.2 (9.18-11.0)	11.4 (10.3-12.4)	13.2 (11.8-14.4)	14.7 (13.0-16.0)
2-day	4.04 (3.75-4.35)	4.89 (4.55-5.28)	6.26 (5.80-6.74)	7.37 (6.82-7.94)	8.93 (8.22-9.63)	10.2 (9.35-11.0)	11.6 (10.5-12.5)	13.0 (11.8-14.1)	15.0 (13.5-16.3)	16.7 (14.8-18.1)
3-day	4.34 (4.05-4.67)	5.26 (4.89-5.65)	6.67 (6.20-7.18)	7.82 (7.24-8.40)	9.43 (8.69-10.1)	10.7 (9.85-11.5)	12.1 (11.0-13.0)	13.6 (12.3-14.6)	15.6 (14.0-16.9)	17.2 (15.4-18.7)
4-day	4.65 (4.34-4.99)	5.62 (5.24-6.03)	7.09 (6.59-7.61)	8.27 (7.67-8.87)	9.92 (9.16-10.6)	11.3 (10.3-12.1)	12.7 (11.6-13.6)	14.1 (12.8-15.2)	16.2 (14.6-17.4)	17.8 (15.9-19.2)
7-day	5.41 (5.07-5.79)	6.51 (6.10-6.97)	8.13 (7.60-8.69)	9.40 (8.77-10.0)	11.2 (10.4-11.9)	12.6 (11.6-13.4)	14.0 (12.9-15.0)	15.5 (14.2-16.6)	17.6 (16.0-18.9)	19.2 (17.4-20.7)
10-day	6.21 (5.83-6.62)	7.45 (6.99-7.95)	9.14 (8.55-9.74)	10.4 (9.76-11.1)	12.2 (11.4-13.0)	13.6 (12.6-14.5)	15.0 (13.9-16.0)	16.4 (15.2-17.5)	18.4 (16.8-19.7)	19.9 (18.2-21.3)
20-day	8.32 (7.84-8.85)	9.92 (9.34-10.6)	12.0 (11.3-12.7)	13.6 (12.7-14.4)	15.7 (14.7-16.7)	17.4 (16.2-18.5)	19.0 (17.7-20.3)	20.7 (19.2-22.1)	23.1 (21.2-24.6)	24.9 (22.8-26.6)
30-day	10.3 (9.70-10.9)	12.2 (11.5-12.9)	14.4 (13.6-15.3)	16.1 (15.2-17.1)	18.3 (17.3-19.4)	20.1 (18.8-21.3)	21.8 (20.4-23.1)	23.5 (21.9-24.9)	25.8 (23.9-27.4)	27.5 (25.4-29.3)
45-day	12.9 (12.2-13.6)	15.2 (14.5-16.0)	17.8 (16.9-18.7)	19.7 (18.7-20.7)	22.2 (21.0-23.3)	24.1 (22.7-25.3)	25.9 (24.4-27.3)	27.7 (26.0-29.3)	30.1 (28.2-31.9)	32.0 (29.8-33.9)
60-day	15.3 (14.5-16.1)	18.0 (17.1-18.9)	20.9 (19.8-21.9)	23.0 (21.8-24.1)	25.7 (24.3-27.0)	27.8 (26.2-29.2)	29.7 (28.0-31.3)	31.7 (29.8-33.4)	34.2 (32.0-36.1)	36.1 (33.6-38.3)

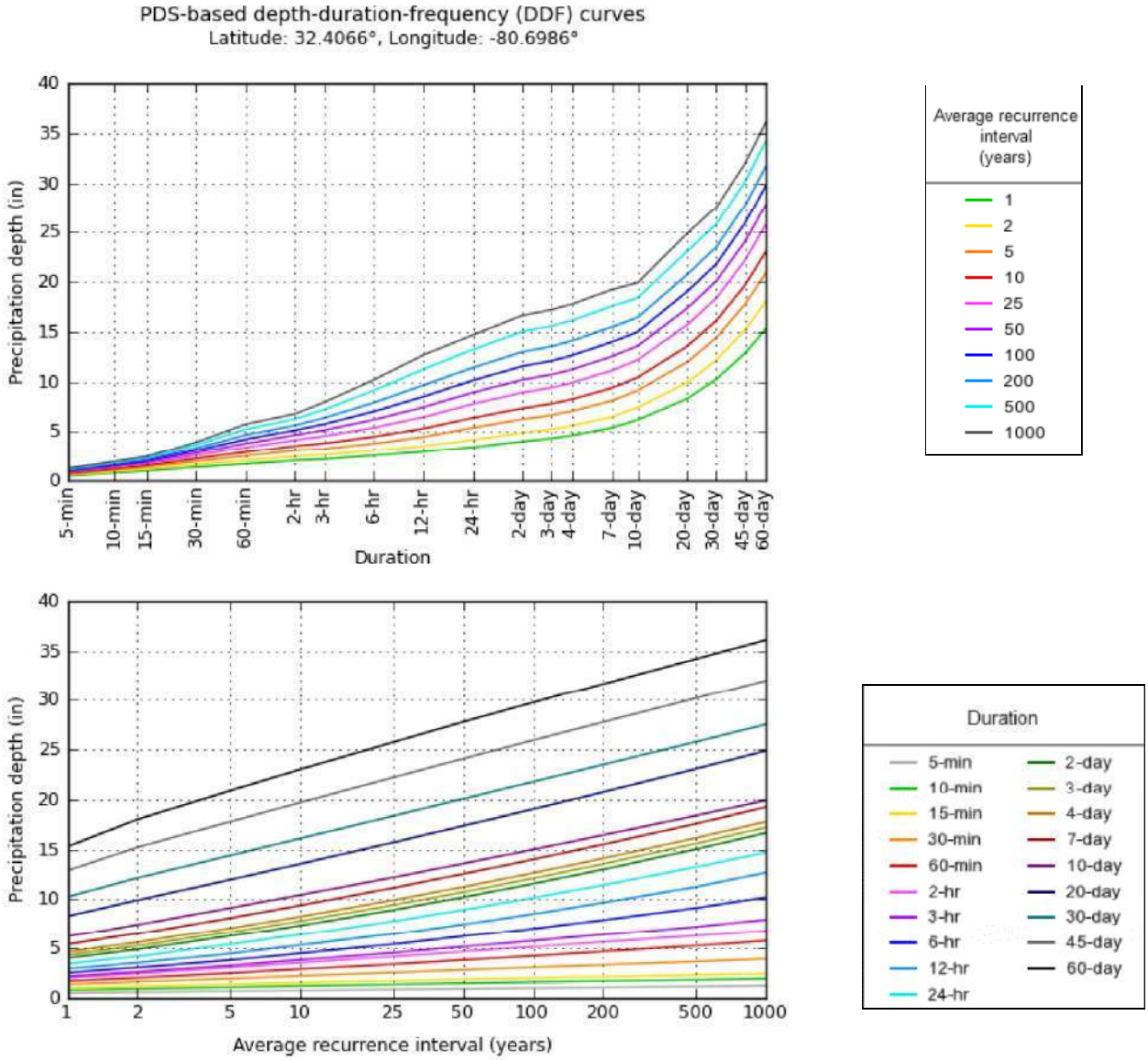
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical



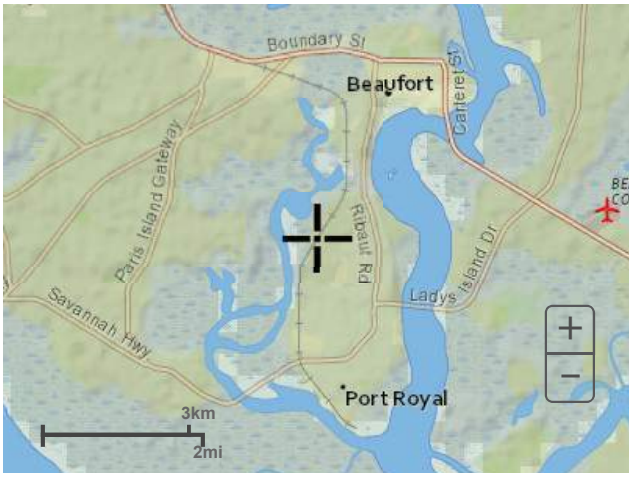
NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Tue May 8 11:36:05 2018

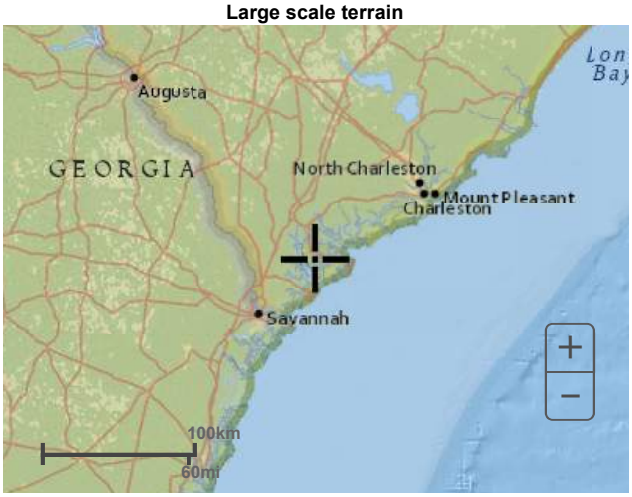
Back to Top

Maps & aerials

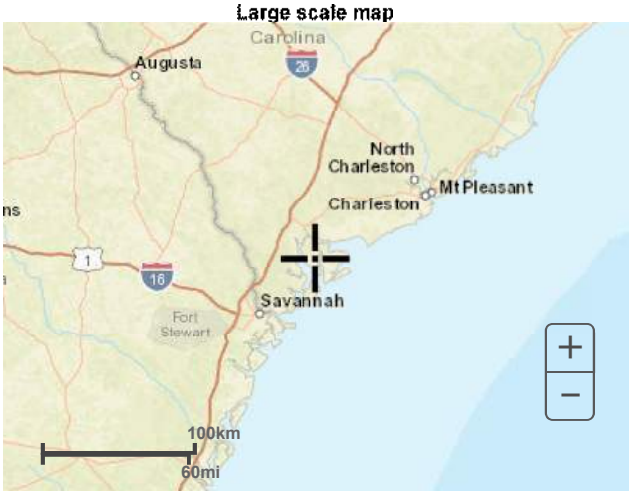
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

Back to Top

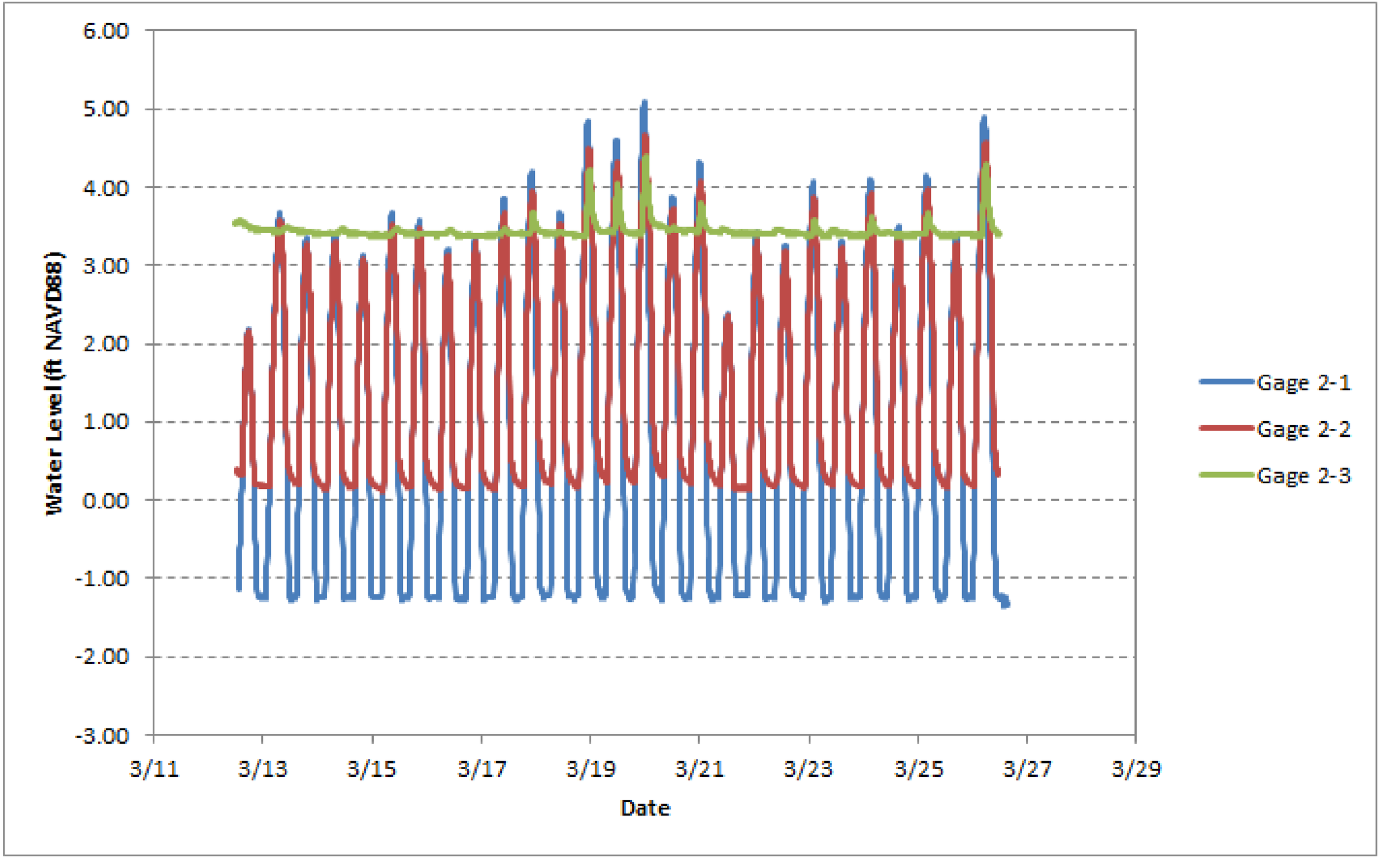
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

APPENDIX C

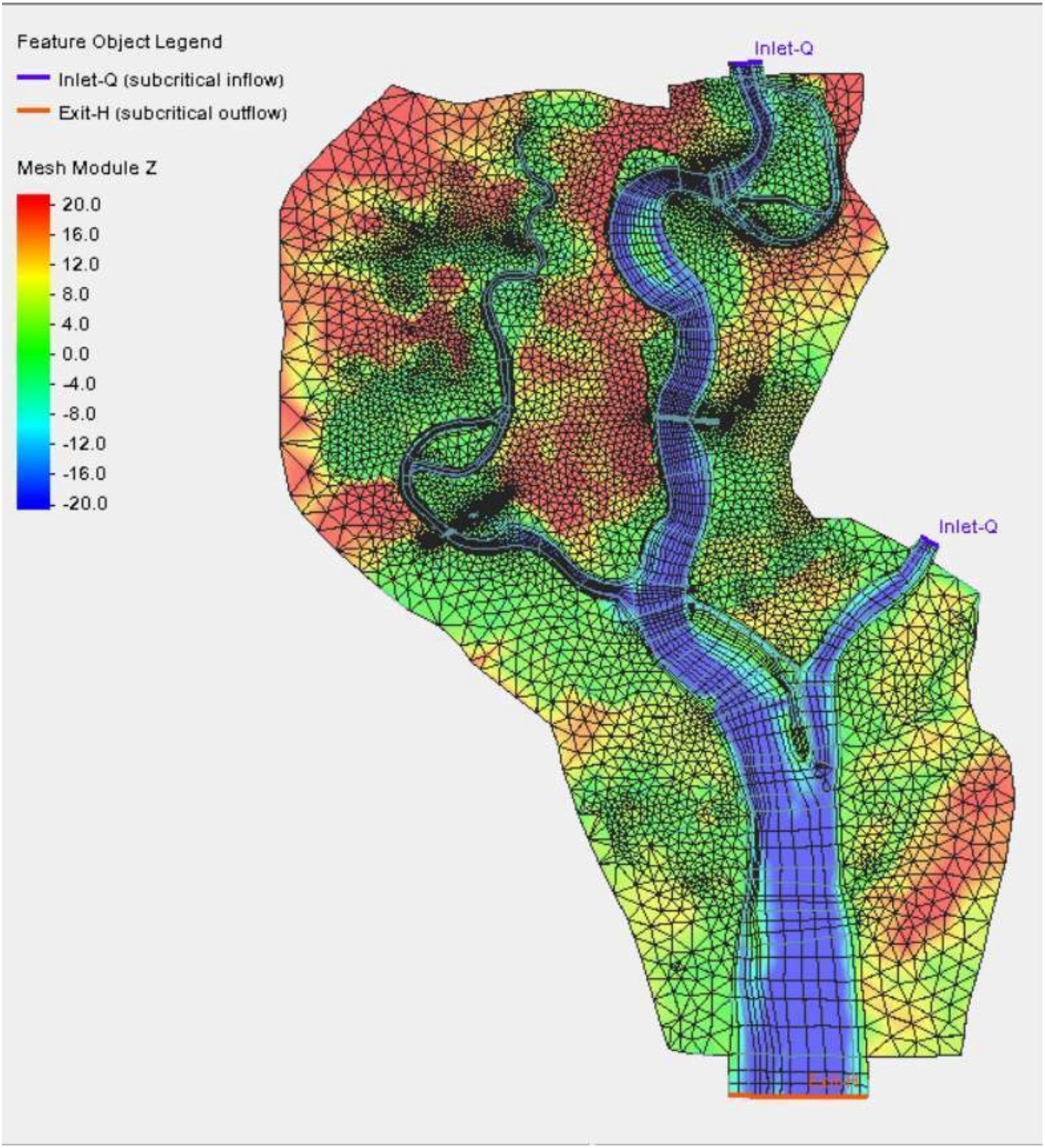
WEC, INC. TEMPORARY TIDAL GAGE RECORDS

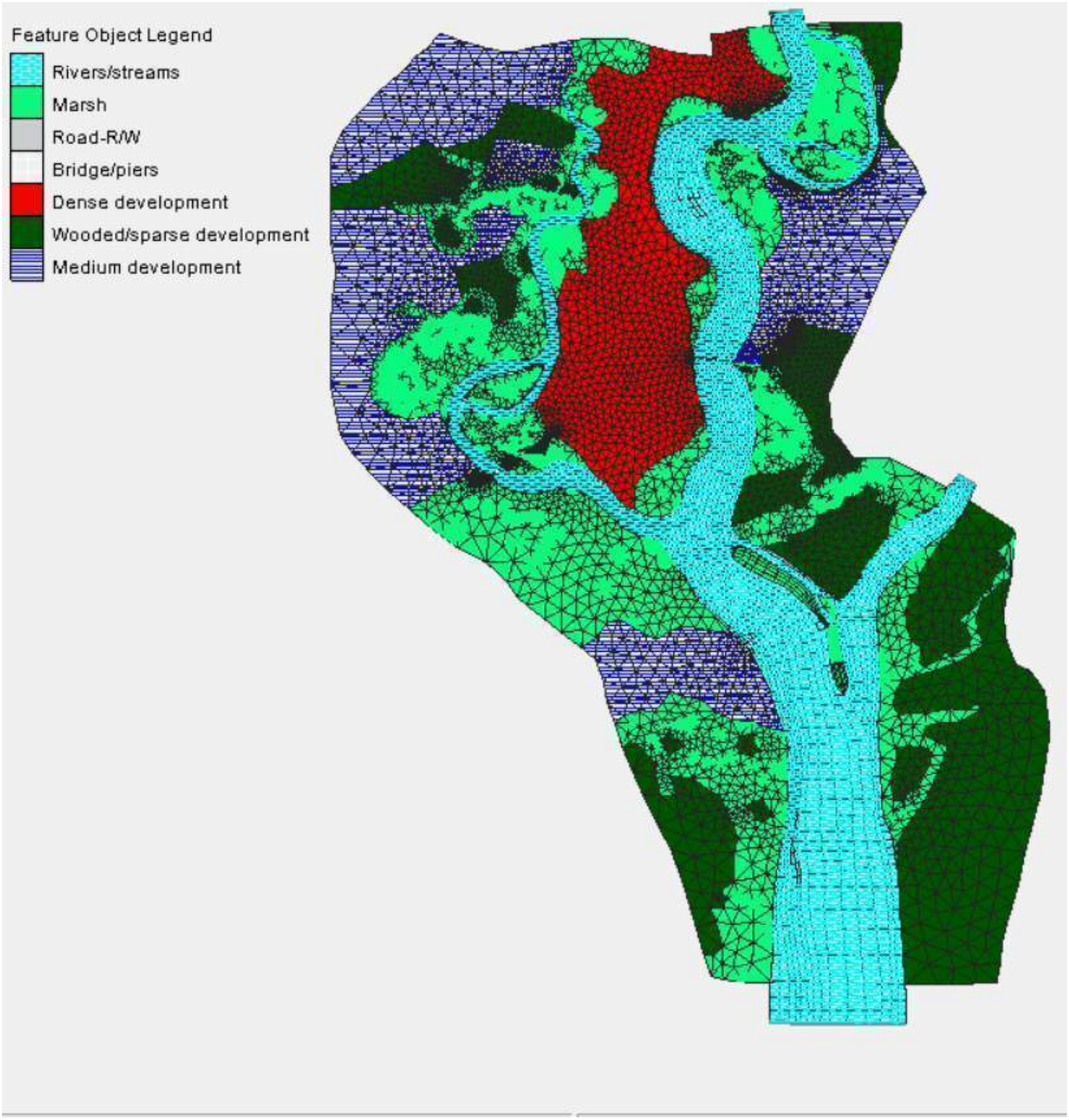

Tide gage 1
Tide gage 2
Tide gage 3


6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
Water Level (ft NAVD88)
3/11
3/13
3/15
3/17
3/19
3/21
3/23
3/25
3/27
3/29
Date
Gage 2-1
Gage 2-2
Gage 2-3

APPENDIX D

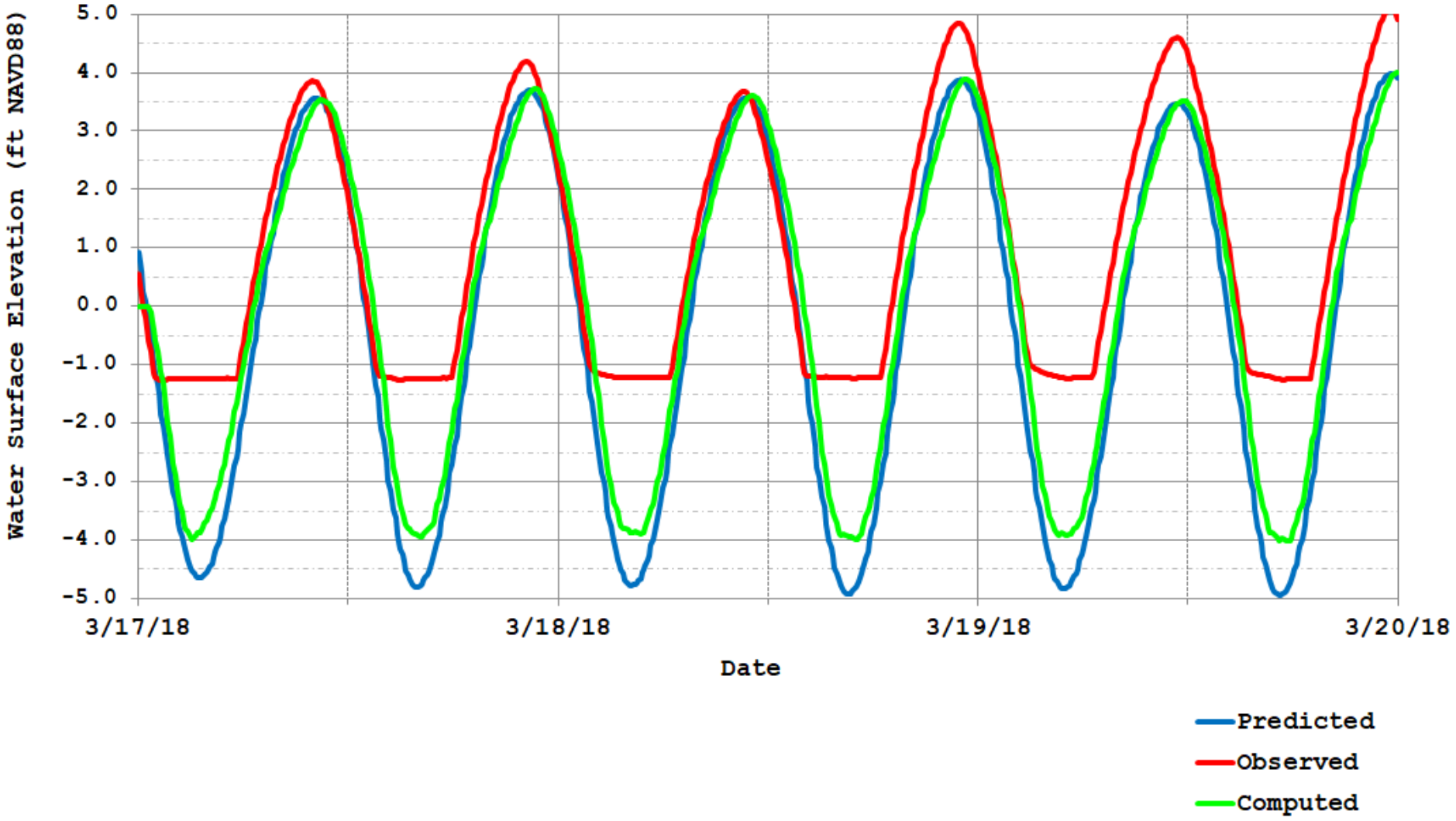
SURFACE WATER MODELING SYSTEM (SMS) RESULTS


Feature Object Legend
Inlet-Q (subcritical inflow)
Exit-H (subcritical outflow)
Mesh Module Z
20.0
16.0
12.0
8.0
4.0
0.0
-4.0
-8.0
-12.0
-16.0
-20.0
Inlet-Q
Inlet-Q

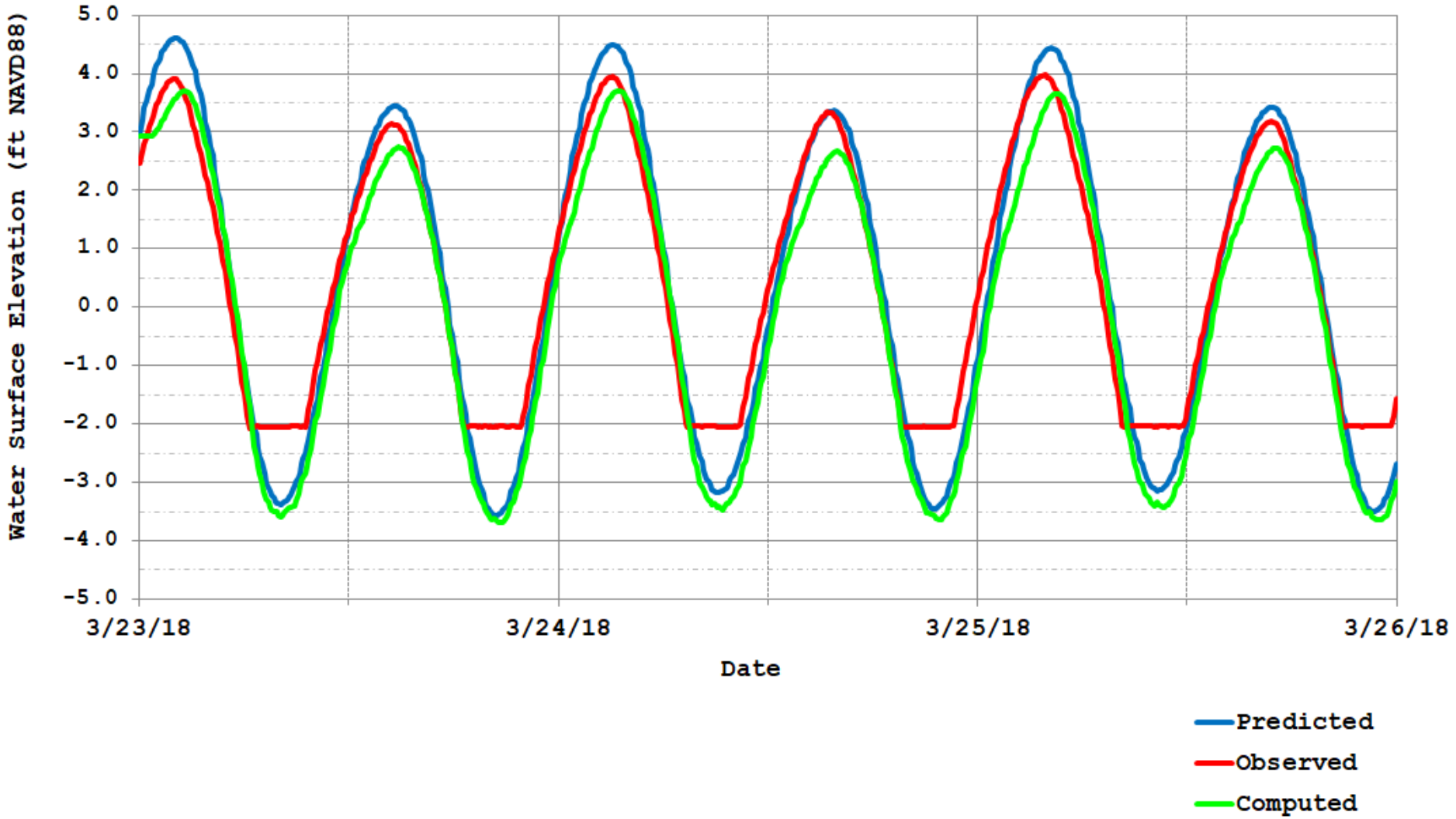

Feature Object Legend
Rivers/streams
Marsh
Road-R/W
Bridge/piers
Dense development
Wooded/sparse development
Medium development

SMS Calibration Results Computed Astronomical Tides vs. WEC Gage Records

Daily Tide Elevations
Battery Creek at Basin #2 Outfall
March 17th - 20th, 2018

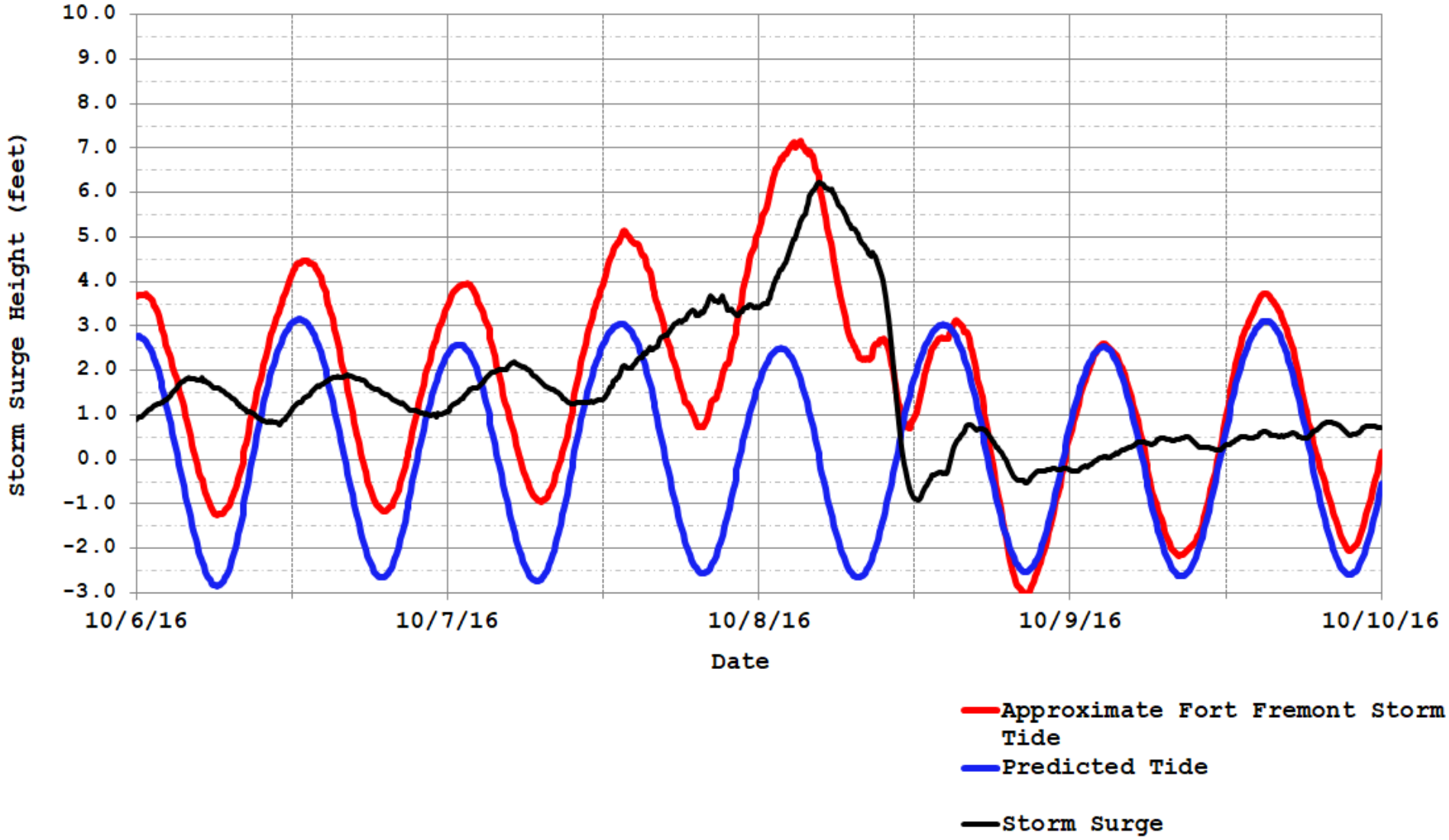


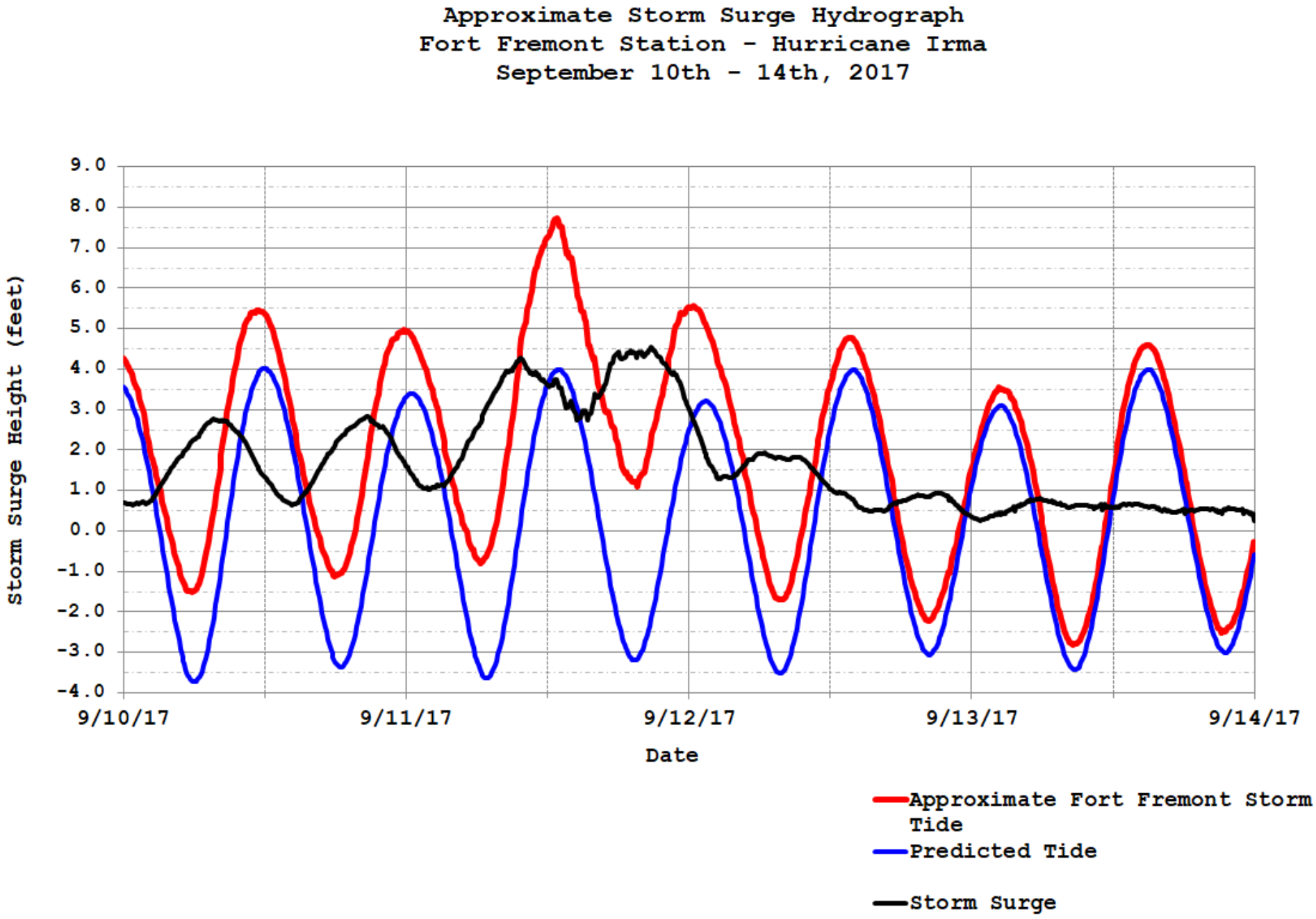
Daily Tide Elevations
Battery Creek at Basin #2 Outfall
March 23th - 26th, 2018



Storm Surge Analyses:
Hurricane Matthew (10/6 - 10/10/16)
Tropical Storm Irma (9/10 - 9/14/17)

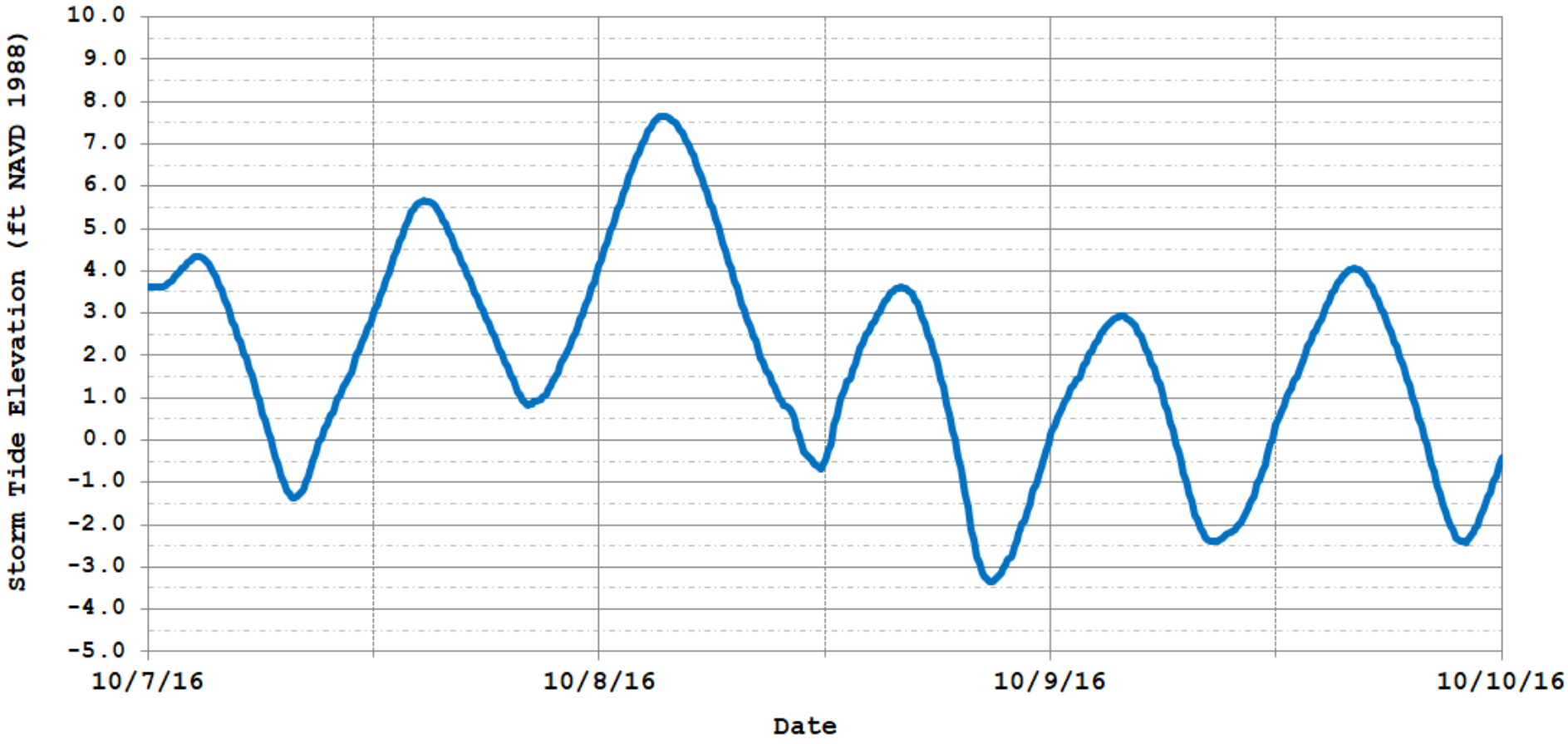
Approximate Storm Surge Hydrograph
Fort Fremont Station - Hurricane Matthew
October 6th - 10th, 2016



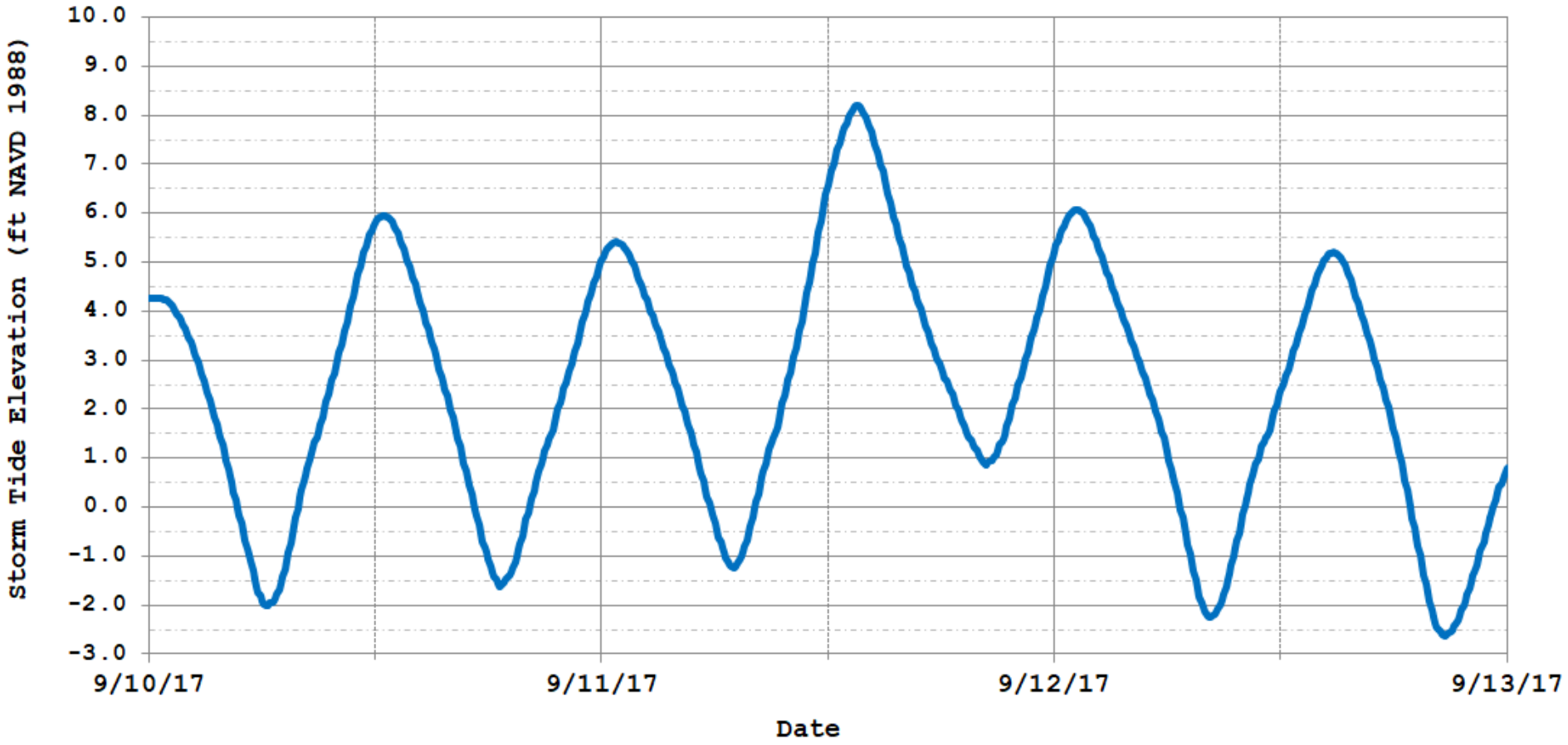

Approximate Storm Surge Hydrograph
Fort Fremont Station - Hurricane Irma
September 10th - 14th, 2017
Storm Surge Height (feet)
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
9/10/17
9/11/17
9/12/17
9/13/17
9/14/17
Date
Approximate Fort Fremont Storm Tide
Predicted Tide
Storm Surge

Synthetic Design Storm Tide Hydrographs on Battery Creek at Mossy Oaks Basin #1

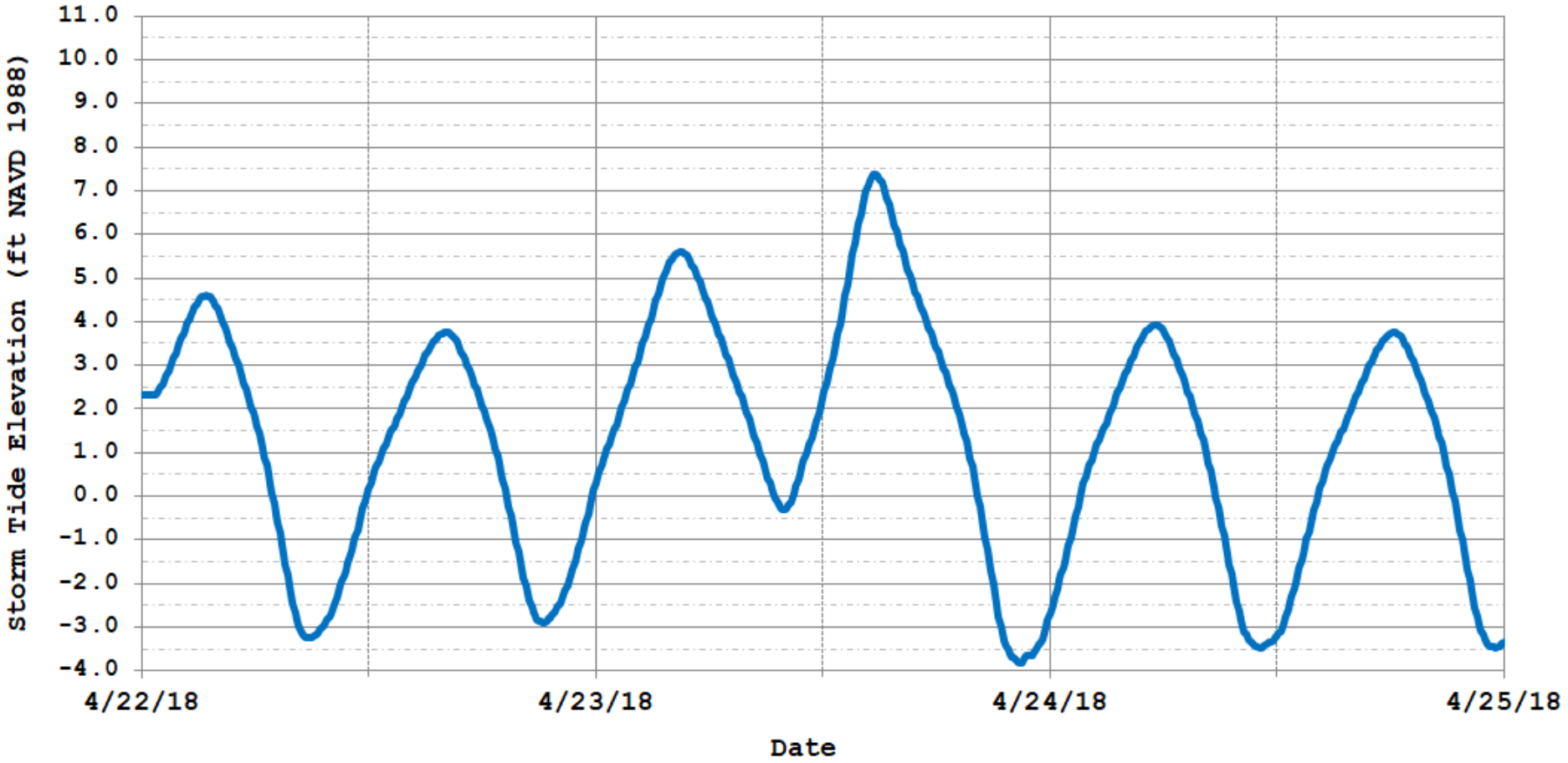
Approximate Storm Surge Hydrograph
Basin #2 OFD - Hurricane Matthew
October 7th - 10th, 2016



Approximate Storm Surge Hydrograph
Basin #2 OFD - Hurricane Irma
September 10th - 13th, 2017

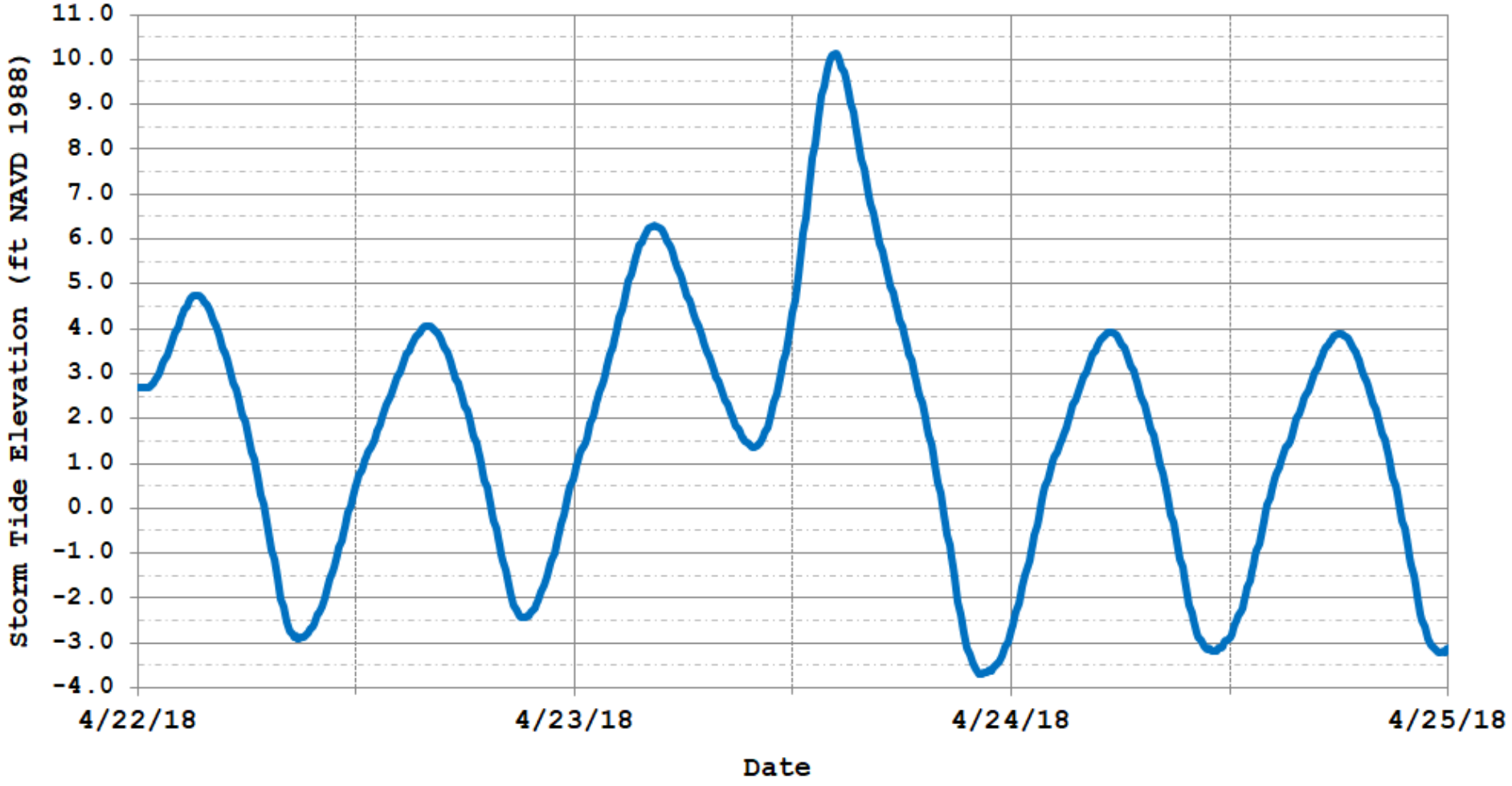


10-year Design Storm Tide Hydrograph
Battery Creek - Basin #2 OFD



Note: recent tidal data was selected for the tidal storm surge simulation; dates and times are insignificant.

25-year Design Storm Tide Hydrograph
Battery Creek - Basin #2 OFD

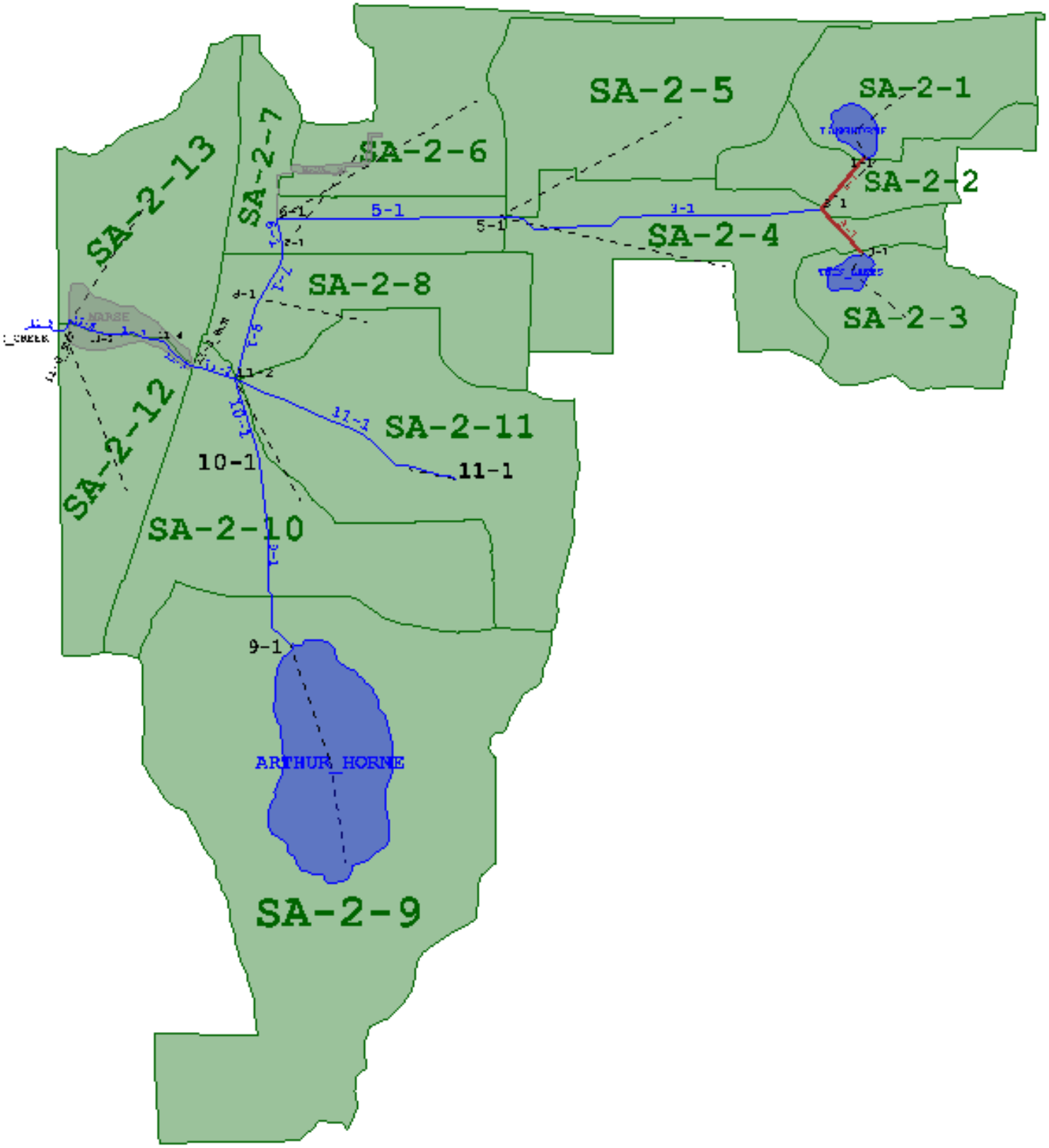


Note: recent tidal data was selected for the tidal storm surge simulation; dates and times are insignificant.

APPENDIX E

CIVILSTORM RESULTS

EXISTING CONDITIONS
CIVILSTORM RESULTS


SA-2-5
SA-2-1
SA-2-6
SA-2-7
SA-2-13
SA-2-2
SA-2-4
SA-2-8
SA-2-3
SA-2-12
SA-2-11
SA-2-10
SA-2-9
5-1
3-1
10-1
11-1
9-1
ARTHUR HORNE

SA-2-1

<General>			
ID	212	Notes	
Label	SA-2-1	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	17.881 acres	Area (User Defined)	17.900 acres
Use Scaled Area?	False		

Active Topology	
Is Active?	True

Catchment			
Outflow Element	LANGHORNE		

Inflow (Wet) Collection

Rainfall			
Use Local Rainfall?	False		

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.530 hours
SCS CN	83.000	Time of Concentration (Composite)	0.530 hours
SCS CN (Composite)	83.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	50.17 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 25-YEAR	64.48 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 50-YEAR	75.7 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 100-YEAR	88.92 cfs	Time (Maximum Flow)	12.350 hours

Results			
Area (Unified)	17.900 acres	Volume (Total Runoff)	2,799,277.7 gal

Calculation Messages

Time (hours)	Message

SA-2-2

<General>			
ID	28	Notes	
Label	SA-2-2	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	11.105 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment	
Outflow Element	3-1

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.480 hours
SCS CN	60.000	Time of Concentration (Composite)	0.480 hours
SCS CN (Composite)	60.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	15.47 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 25-YEAR	23.16 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 50-YEAR	29.57 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 100-YEAR	37.45 cfs	Time (Maximum Flow)	12.350 hours

Results			
Area (Unified)	11.105 acres	Volume (Total Runoff)	1,517,737.5 gal

Calculation Messages

Time (hours)	Message

SA-2-3

<General>			
ID	211	Notes	
Label	SA-2-3	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	16.728 acres	Area (User Defined)	16.700 acres
Use Scaled Area?	False		

Active Topology	
Is Active?	True

Catchment			
Outflow Element	TWIN_LAKES		

Inflow (Wet) Collection

Rainfall			
Use Local Rainfall?	False		

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.630 hours
SCS CN	69.000	Time of Concentration (Composite)	0.630 hours
SCS CN (Composite)	69.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	29.44 cfs	Time (Maximum Flow)	12.450 hours
Flow (Maximum) - 25-YEAR	40.88 cfs	Time (Maximum Flow)	12.450 hours
Flow (Maximum) - 50-YEAR	50.18 cfs	Time (Maximum Flow)	12.450 hours
Flow (Maximum) - 100-YEAR	61.27 cfs	Time (Maximum Flow)	12.450 hours

Results			
Area (Unified)	16.700 acres	Volume (Total Runoff)	1,363,077.8 gal

Calculation Messages

Time (hours)	Message

SA-2-4

<General>			
ID	33	Notes	
Label	SA-2-4	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	27.320 acres	Area (User Defined)	27.300 acres
Use Scaled Area?	False		

Active Topology	
Is Active?	True

Catchment	
Outflow Element	5-1

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.730 hours
SCS CN	58.000	Time of Concentration (Composite)	0.730 hours
SCS CN (Composite)	58.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	28.12 cfs	Time (Maximum Flow)	12.550 hours
Flow (Maximum) - 25-YEAR	42.91 cfs	Time (Maximum Flow)	12.550 hours
Flow (Maximum) - 50-YEAR	55.33 cfs	Time (Maximum Flow)	12.550 hours
Flow (Maximum) - 100-YEAR	70.66 cfs	Time (Maximum Flow)	12.550 hours

Results			
Area (Unified)	27.300 acres	Volume (Total Runoff)	3,519,719.0 gal

Calculation Messages

Time (hours)	Message

SA-2-5

<General>			
ID	32	Notes	
Label	SA-2-5	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	29.925 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment	
Outflow Element	5-1

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.570 hours
SCS CN	65.000	Time of Concentration (Composite)	0.570 hours
SCS CN (Composite)	65.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	47.69 cfs	Time (Maximum Flow)	12.400 hours
Flow (Maximum) - 25-YEAR	68.29 cfs	Time (Maximum Flow)	12.400 hours
Flow (Maximum) - 50-YEAR	85.18 cfs	Time (Maximum Flow)	12.400 hours
Flow (Maximum) - 100-YEAR	105.66 cfs	Time (Maximum Flow)	12.400 hours

Results			
Area (Unified)	29.925 acres	Volume (Total Runoff)	2,134,648.5 gal

Calculation Messages

Time (hours)	Message

SA-2-6

<General>			
ID	34	Notes	
Label	SA-2-6	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	20.964 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment	
Outflow Element	6-1

Inflow (Wet) Collection

Rainfall			
Use Local Rainfall?	False		

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.490 hours
SCS CN	64.000	Time of Concentration (Composite)	0.490 hours
SCS CN (Composite)	64.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	20.96 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 25-YEAR	49.86 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 50-YEAR	62.44 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 100-YEAR	77.74 cfs	Time (Maximum Flow)	12.350 hours

Results			
Area (Unified)	20.964 acres	Volume (Total Runoff)	3,172,331.2 gal

Calculation Messages

Time (hours)	Message

SA-2-7

<General>			
ID	113	Notes	
Label	SA-2-7	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	15.356 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment	
Outflow Element	7-1

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.530 hours
SCS CN	57.000	Time of Concentration (Composite)	0.530 hours
SCS CN (Composite)	57.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	17.46 cfs	Time (Maximum Flow)	12.400 hours
Flow (Maximum) - 25-YEAR	26.94 cfs	Time (Maximum Flow)	12.400 hours
Flow (Maximum) - 50-YEAR	34.97 cfs	Time (Maximum Flow)	12.400 hours
Flow (Maximum) - 100-YEAR	44.90 cfs	Time (Maximum Flow)	12.400 hours

Results			
Area (Unified)	15.356 acres	Volume (Total Runoff)	1,927,744.8 gal

Calculation Messages

SA-2-8

<General>			
ID	39	Notes	
Label	SA-2-8	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	19.823 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment	
Outflow Element	8-1

Inflow (Wet) Collection

Rainfall			
Use Local Rainfall?	False		

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.850 hours
SCS CN	60.000	Time of Concentration (Composite)	0.850 hours
SCS CN (Composite)	60.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	20.66 cfs	Time (Maximum Flow)	12.400 hours
Flow (Maximum) - 25-YEAR	30.98 cfs	Time (Maximum Flow)	12.400 hours
Flow (Maximum) - 50-YEAR	39.6 cfs	Time (Maximum Flow)	12.400 hours
Flow (Maximum) - 100-YEAR	50.19 cfs	Time (Maximum Flow)	12.400 hours

Results			
Area (Unified)	19.823 acres	Volume (Total Runoff)	2,697,161.1 gal

Calculation Messages

Time (hours)	Message

SA-2-9

<General>			
ID	35	Notes	
Label	SA-2-9	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	95.343 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment			
Outflow Element	ARTHUR_HORNE		

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.980 hours
SCS CN	65.000	Time of Concentration (Composite)	0.980 hours
SCS CN (Composite)	65.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	114.25 cfs	Time (Maximum Flow)	12.700 hours
Flow (Maximum) - 25-YEAR	163.48 cfs	Time (Maximum Flow)	12.700 hours
Flow (Maximum) - 50-YEAR	203.85 cfs	Time (Maximum Flow)	12.700 hours
Flow (Maximum) - 100-YEAR	252.82 cfs	Time (Maximum Flow)	12.700 hours

Results			
Area (Unified)	95.343 acres	Volume (Total Runoff)	6,763,676.1 gal

Calculation Messages

Time (hours)	Message

SA-2-10

<General>			
ID	36	Notes	
Label	SA-2-10	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	32.546 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment	
Outflow Element	11-2

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.980 hours
SCS CN	66.000	Time of Concentration (Composite)	0.980 hours
SCS CN (Composite)	66.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	40.56 cfs	Time (Maximum Flow)	12.700 hours
Flow (Maximum) - 25-YEAR	57.58 cfs	Time (Maximum Flow)	12.700 hours
Flow (Maximum) - 50-YEAR	71.49 cfs	Time (Maximum Flow)	12.700 hours
Flow (Maximum) - 100-YEAR	88.34 cfs	Time (Maximum Flow)	12.700 hours

Results			
Area (Unified)	32.546 acres	Volume (Total Runoff)	2,391,656.7 gal

Calculation Messages

Time (hours)	Message

SA-2-11

<General>			
ID	37	Notes	
Label	SA-2-11	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	38.540 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment	
Outflow Element	11-1

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.950 hours
SCS CN	53.000	Time of Concentration (Composite)	0.950 hours
SCS CN (Composite)	53.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	25.24 cfs	Time (Maximum Flow)	12.700 hours
Flow (Maximum) - 25-YEAR	41.29 cfs	Time (Maximum Flow)	12.700 hours
Flow (Maximum) - 50-YEAR	55.19 cfs	Time (Maximum Flow)	12.700 hours
Flow (Maximum) - 100-YEAR	72.62 cfs	Time (Maximum Flow)	12.700 hours

Results			
Area (Unified)	38.540 acres	Volume (Total Runoff)	1,633,992.3 gal

Calculation Messages

Time (hours)	Message

SA-2-12

<General>			
ID	38	Notes	
Label	SA-2-12	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	18.820 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment	
Outflow Element	11-6_SMT

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.750 hours
SCS CN	77.000	Time of Concentration (Composite)	0.750 hours
SCS CN (Composite)	77.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	39.12 cfs	Time (Maximum Flow)	12.500 hours
Flow (Maximum) - 25-YEAR	51.85 cfs	Time (Maximum Flow)	12.500 hours
Flow (Maximum) - 50-YEAR	61.94 cfs	Time (Maximum Flow)	12.500 hours
Flow (Maximum) - 100-YEAR	73.91 cfs	Time (Maximum Flow)	12.500 hours

Results			
Area (Unified)	18.820 acres	Volume (Total Runoff)	3,716,860.6 gal

Calculation Messages

Time (hours)	Message

SA-2-13

<General>			
ID	40	Notes	
Label	SA-2-13	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	25.201 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment	
Outflow Element	11-6_SMT

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.660 hours
SCS CN	74.000	Time of Concentration (Composite)	0.660 hours
SCS CN (Composite)	74.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

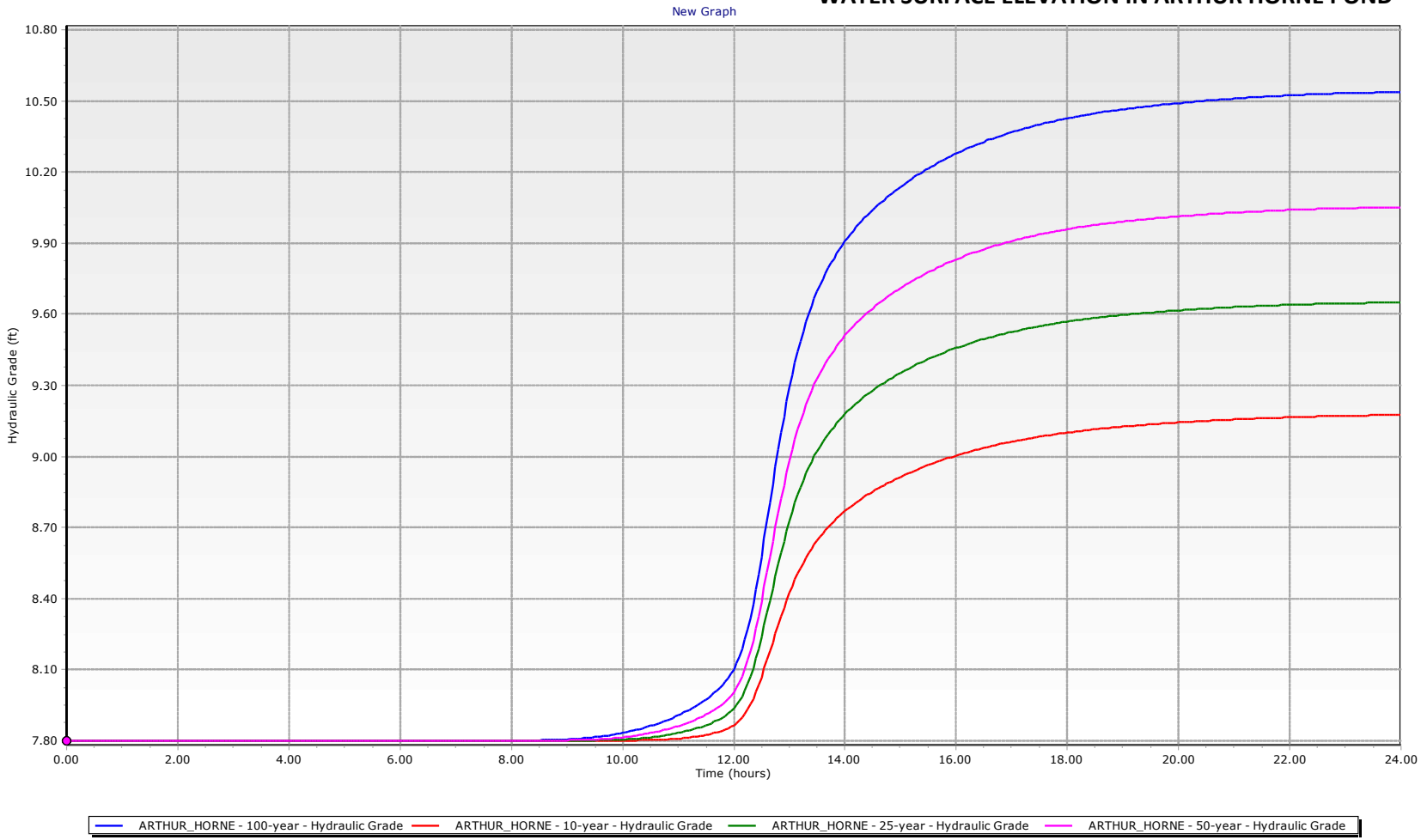
Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	50.91 cfs	Time (Maximum Flow)	12.500 hours
Flow (Maximum) - 25-YEAR	68.38 cfs	Time (Maximum Flow)	12.500 hours
Flow (Maximum) - 50-YEAR	82.39 cfs	Time (Maximum Flow)	12.500 hours
Flow (Maximum) - 100-YEAR	99.14 cfs	Time (Maximum Flow)	12.500 hours

Results			
Area (Unified)	25.201 acres	Volume (Total Runoff)	4,713,894.2 gal

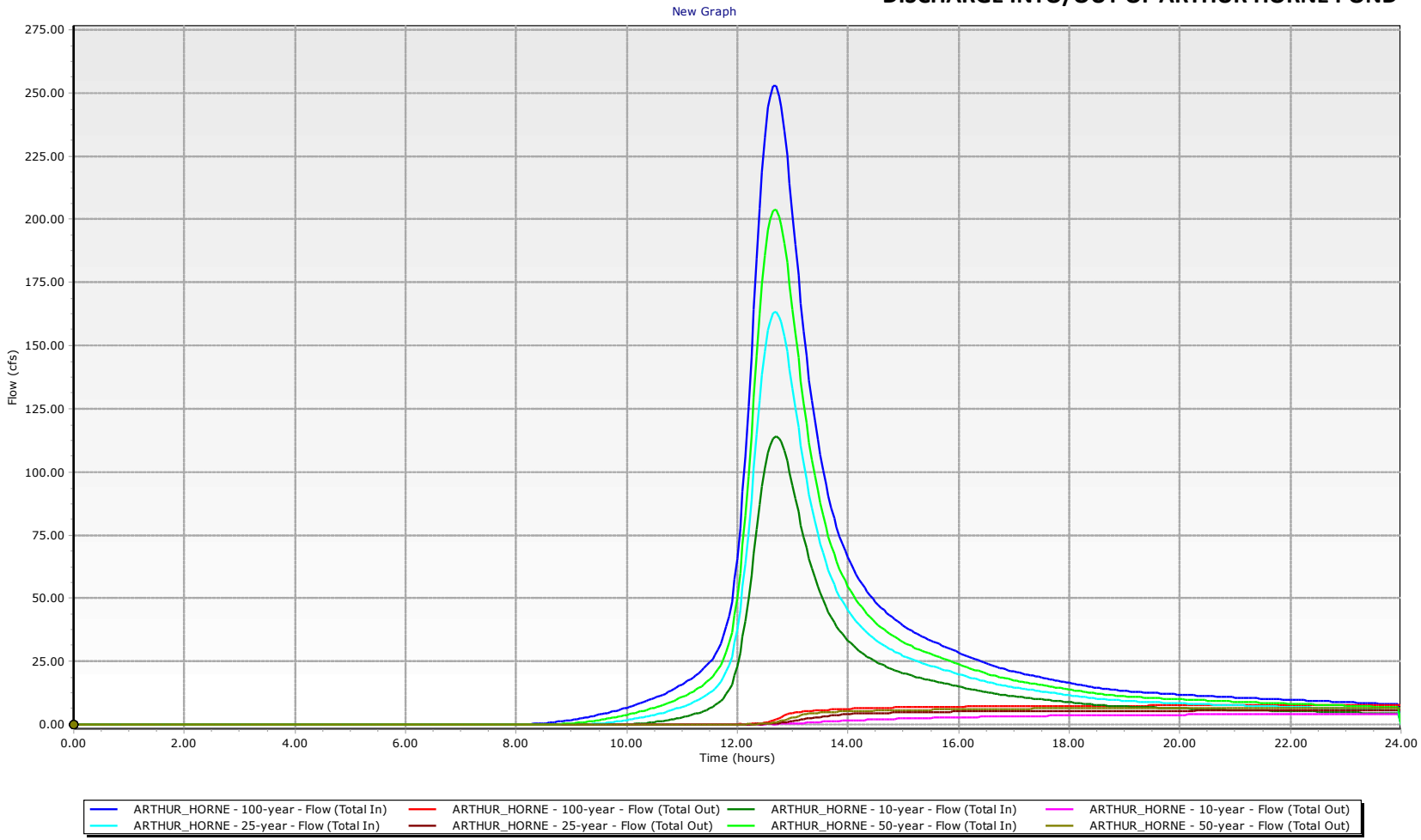
Calculation Messages

Time (hours)	Message

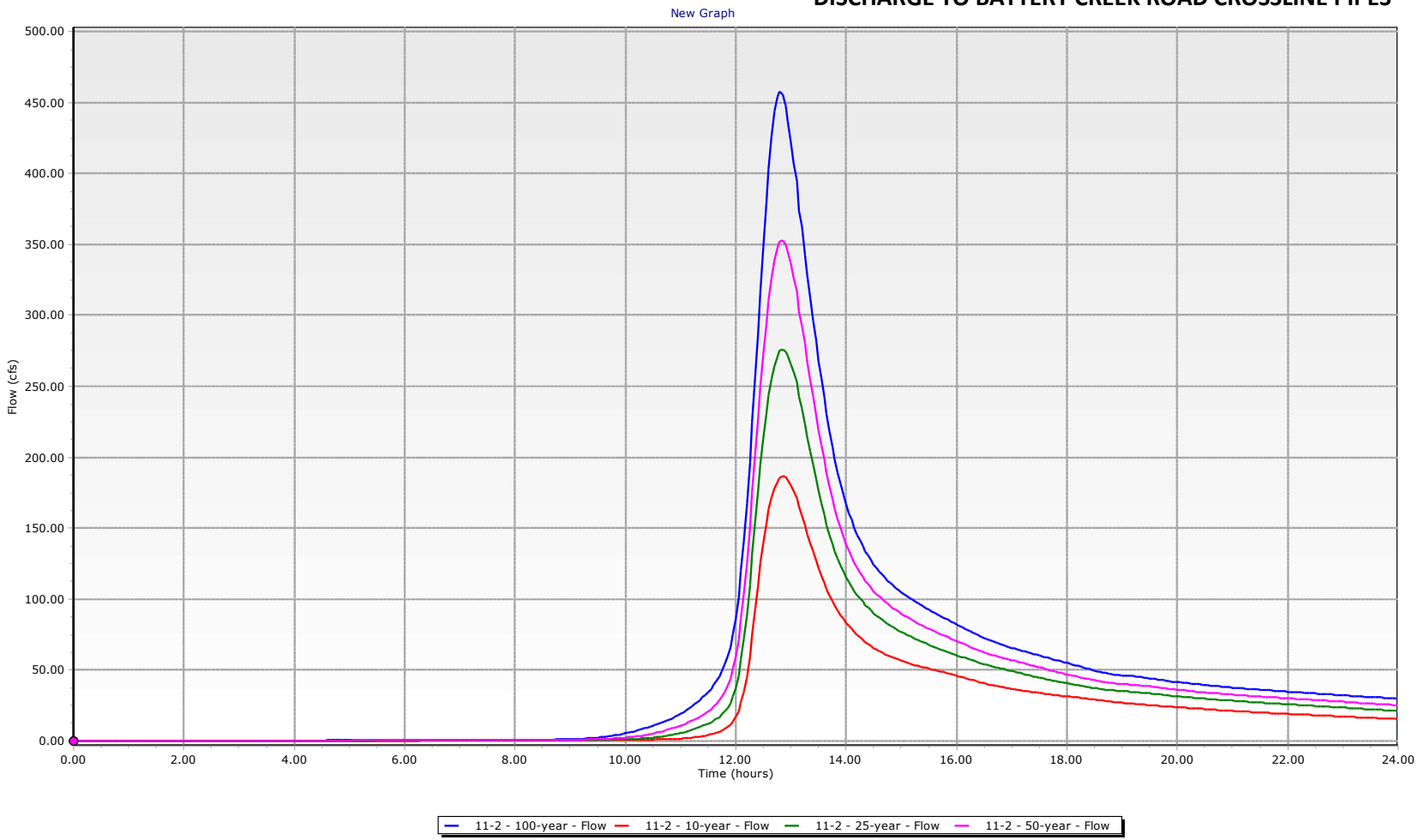
WATER SURFACE ELEVATION IN ARTHUR HORNE POND



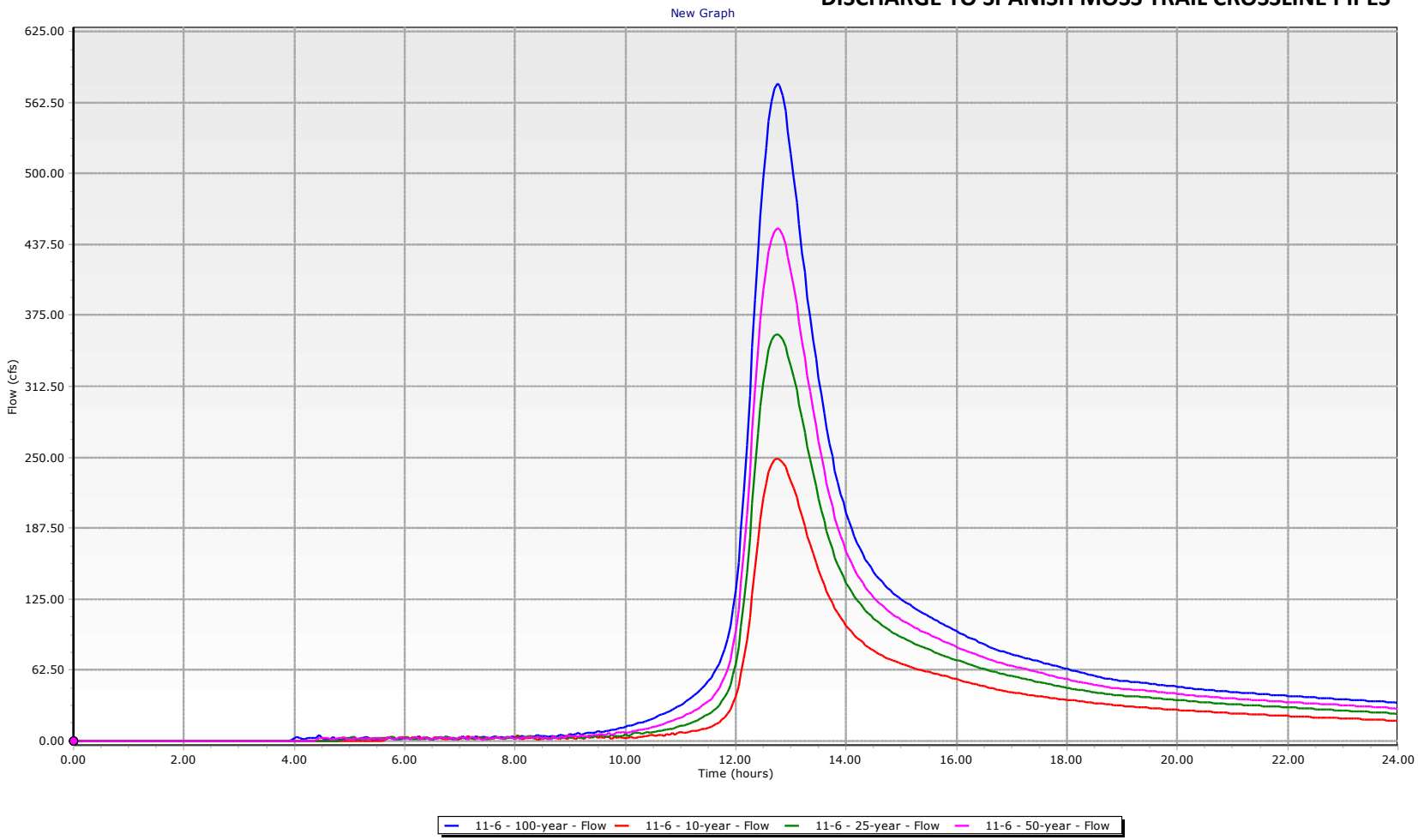
DISCHARGE INTO/OUT OF ARTHUR HORNE POND



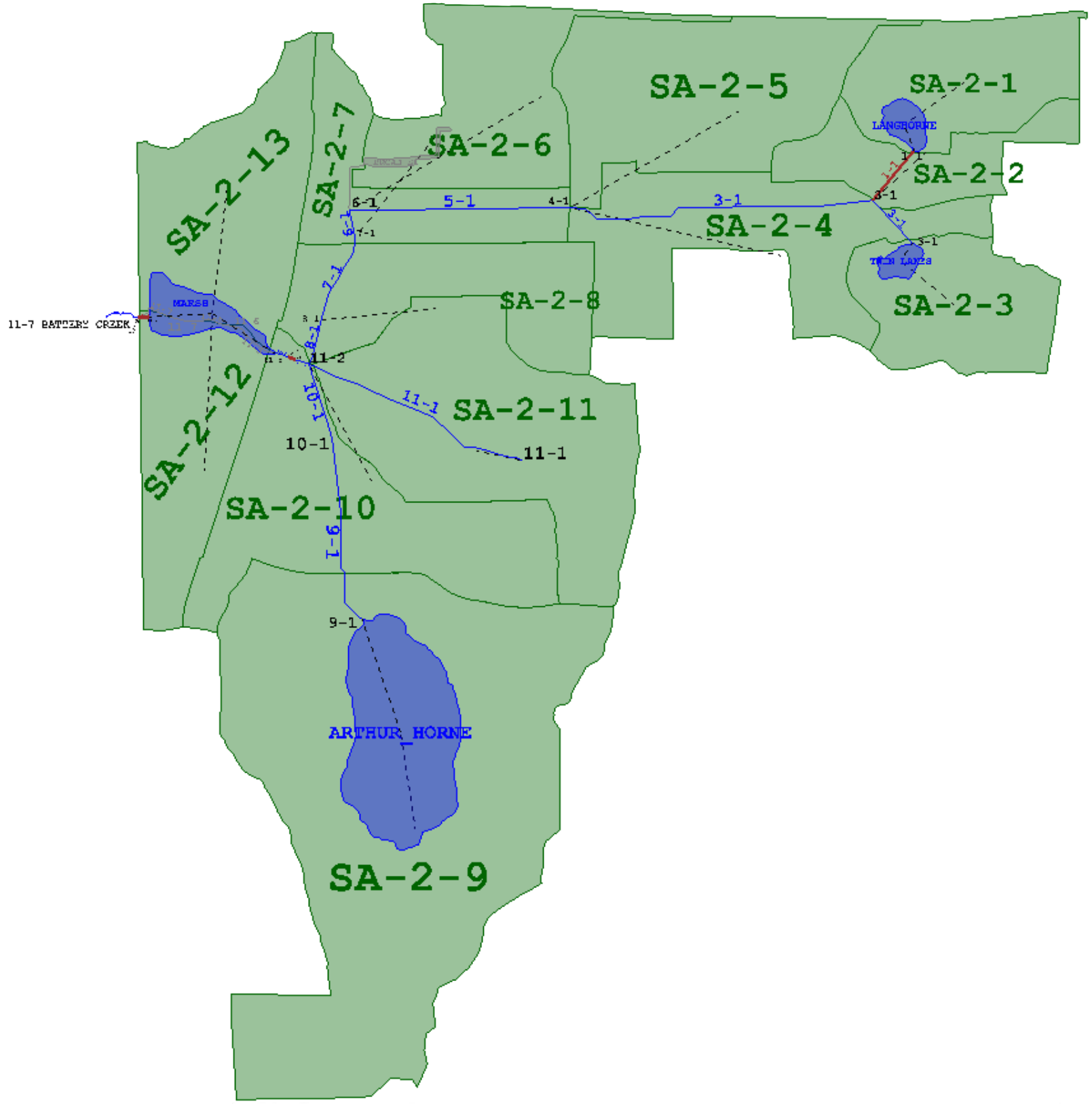
DISCHARGE TO BATTERY CREEK ROAD CROSSLINE PIPES



DISCHARGE TO SPANISH MOSS TRAIL CROSSLINE PIPES



PROPOSED CONDITIONS
CIVILSTORM RESULTS


SA-2-5
SA-2-1
SA-2-6
SA-2-7
SA-2-13
SA-2-2
SA-2-4
SA-2-8
SA-2-3
SA-2-12
SA-2-11
SA-2-10
SA-2-9
LANGHORNE
TWIN LAKES
MARSH
ARTHUR HORNE
11-7 BATTERY CREEK
6-1
5-1
4-1
3-1
7-1
8-1
11-2
10-1
11-1
9-1

SA-2-1

<General>			
ID	212	Notes	
Label	SA-2-1	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	17.881 acres	Area (User Defined)	17.900 acres
Use Scaled Area?	False		

Active Topology	
Is Active?	True

Catchment	
Outflow Element	LANGHORNE

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.530 hours
SCS CN	83.000	Time of Concentration (Composite)	0.530 hours
SCS CN (Composite)	83.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	50.17 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 25-YEAR	64.48 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 50-YEAR	75.5 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 100-YEAR	88.92 cfs	Time (Maximum Flow)	12.350 hours

Results			
Area (Unified)	17.900 acres	Volume (Total Runoff)	3,917,592.9 gal

Calculation Messages

Time (hours)	Message

SA-2-2

<General>			
ID	28	Notes	
Label	SA-2-2	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	11.105 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment			
Outflow Element	3-1		

Inflow (Wet) Collection

Rainfall			
Use Local Rainfall?	False		

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.480 hours
SCS CN	60.000	Time of Concentration (Composite)	0.480 hours
SCS CN (Composite)	60.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum)	37.45 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 10-YEAR	15.47 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 25-YEAR	23.16 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 50-YEAR	29.57 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 100-YEAR	37.45 cfs	Time (Maximum Flow)	12.350 hours

Results			
Area (Unified)	11.105 acres	Volume (Total Runoff)	1,517,737.5 gal

Calculation Messages

Time (hours)	Message

SA-2-3

<General>			
ID	211	Notes	
Label	SA-2-3	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	16.728 acres	Area (User Defined)	16.700 acres
Use Scaled Area?	False		

Active Topology	
Is Active?	True

Catchment	
Outflow Element	TWIN_LAKES

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.630 hours
SCS CN	69.000	Time of Concentration (Composite)	0.630 hours
SCS CN (Composite)	69.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum)	61.27 cfs	Time (Maximum Flow)	12.450 hours
Flow (Maximum) - 10-YEAR	29.44 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 25-YEAR	40.88 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 50-YEAR	50.15 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 100-YEAR	61.27 cfs	Time (Maximum Flow)	12.350 hours

Results			
Area (Unified)	16.700 acres	Volume (Total Runoff)	2,825,960.7 gal

Calculation Messages

Time (hours)	Message

SA-2-4

<General>			
ID	33	Notes	
Label	SA-2-4	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	27.320 acres	Area (User Defined)	27.300 acres
Use Scaled Area?	False		

Active Topology	
Is Active?	True

Catchment	
Outflow Element	4-1

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.730 hours
SCS CN	58.000	Time of Concentration (Composite)	0.730 hours
SCS CN (Composite)	58.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum)	70.66 cfs	Time (Maximum Flow)	12.550 hours
Flow (Maximum) - 10-YEAR	28.12 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 25-YEAR	42.91 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 50-YEAR	55.33 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 100-YEAR	70.66 cfs	Time (Maximum Flow)	12.350 hours

Results			
Area (Unified)	27.300 acres	Volume (Total Runoff)	3,519,719.0 gal

Calculation Messages

Time (hours)	Message

SA-2-5

<General>			
ID	32	Notes	
Label	SA-2-5	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	29.925 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment	
Outflow Element	4-1

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.570 hours
SCS CN	65.000	Time of Concentration (Composite)	0.570 hours
SCS CN (Composite)	65.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	47.69 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 25-YEAR	68.29 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 50-YEAR	85.18 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 100-YEAR	105.66 cfs	Time (Maximum Flow)	12.350 hours

Results			
Area (Unified)	29.925 acres	Volume (Total Runoff)	4,632,947.5 gal

Calculation Messages

Time (hours)	Message

SA-2-6

<General>			
ID	34	Notes	
Label	SA-2-6	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	20.964 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment			
Outflow Element	6-1		

Inflow (Wet) Collection

Rainfall			
Use Local Rainfall?	False		

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.490 hours
SCS CN	64.000	Time of Concentration (Composite)	0.490 hours
SCS CN (Composite)	64.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	34.55 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 25-YEAR	49.86 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 50-YEAR	62.44 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 100-YEAR	77.74 cfs	Time (Maximum Flow)	12.350 hours

Results			
Area (Unified)	20.964 acres	Volume (Total Runoff)	3,172,331.2 gal

Calculation Messages

Time (hours)	Message

SA-2-7

<General>			
ID	113	Notes	
Label	SA-2-7	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	15.356 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment	
Outflow Element	7-1

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.530 hours
SCS CN	57.000	Time of Concentration (Composite)	0.530 hours
SCS CN (Composite)	57.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum)	44.90 cfs	Time (Maximum Flow)	12.400 hours
Flow (Maximum) - 10-YEAR	17.46 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 25-YEAR	26.94 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 50-YEAR	34.97 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 100-YEAR	44.9 cfs	Time (Maximum Flow)	12.350 hours

Results			
Area (Unified)	15.356 acres	Volume (Total Runoff)	1,927,744.8 gal

Calculation Messages

Time (hours)	Message

SA-2-8

<General>			
ID	39	Notes	
Label	SA-2-8	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	19.823 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment	
Outflow Element	8-1

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.850 hours
SCS CN	60.000	Time of Concentration (Composite)	0.850 hours
SCS CN (Composite)	60.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	20.66 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 25-YEAR	30.98 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 50-YEAR	39.6 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 100-YEAR	50.19 cfs	Time (Maximum Flow)	12.350 hours

Results			
Area (Unified)	19.823 acres	Volume (Total Runoff)	2,697,161.1 gal

Calculation Messages

Time (hours)	Message

SA-2-9

<General>			
ID	35	Notes	
Label	SA-2-9	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	95.343 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment	
Outflow Element	ARTHUR_HORNE

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.980 hours
SCS CN	65.000	Time of Concentration (Composite)	0.980 hours
SCS CN (Composite)	65.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	114.25 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 25-YEAR	163.48 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 50-YEAR	203.85 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 100-YEAR	252.82 cfs	Time (Maximum Flow)	12.350 hours

Results			
Area (Unified)	95.343 acres	Volume (Total Runoff)	14,692,039.2 gal

Calculation Messages

Time (hours)	Message

SA-2-10

<General>			
ID	36	Notes	
Label	SA-2-10	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	32.546 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment	
Outflow Element	11-2

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.980 hours
SCS CN	66.000	Time of Concentration (Composite)	0.980 hours
SCS CN (Composite)	66.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	40.56 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 25-YEAR	57.58 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 50-YEAR	71.49 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 100-YEAR	88.34 cfs	Time (Maximum Flow)	12.350 hours

Results			
Area (Unified)	32.546 acres	Volume (Total Runoff)	5,133,409.2 gal

Calculation Messages

Time (hours)	Message

SA-2-11

<General>			
ID	37	Notes	
Label	SA-2-11	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	38.540 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment	
Outflow Element	11-1

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.950 hours
SCS CN	53.000	Time of Concentration (Composite)	0.950 hours
SCS CN (Composite)	53.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	25.24 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 25-YEAR	41.29 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 50-YEAR	55.19 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 100-YEAR	72.62 cfs	Time (Maximum Flow)	12.350 hours

Results			
Area (Unified)	38.540 acres	Volume (Total Runoff)	4,242,943.1 gal

Calculation Messages

Time (hours)	Message

SA-2-12

<General>			
ID	38	Notes	
Label	SA-2-12	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	18.820 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment	
Outflow Element	11-6_SMT

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.750 hours
SCS CN	77.000	Time of Concentration (Composite)	0.750 hours
SCS CN (Composite)	77.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	39.12 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 25-YEAR	51.85 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 50-YEAR	61.94 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 100-YEAR	73.91 cfs	Time (Maximum Flow)	12.350 hours

Results			
Area (Unified)	18.820 acres	Volume (Total Runoff)	3,716,860.6 gal

Calculation Messages

Time (hours)	Message

SA-2-13

<General>			
ID	40	Notes	
Label	SA-2-13	Hyperlinks	<Collection: 0 items>

GIS-IDs

GIS-ID

<Geometry>			
Scaled Area	25.201 acres	Use Scaled Area?	True

Active Topology	
Is Active?	True

Catchment			
Outflow Element	11-6_SMT		

Inflow (Wet) Collection

Rainfall	
Use Local Rainfall?	False

Runoff			
Runoff Method	Unit Hydrograph	Unit Hydrograph Method	SCS Unit Hydrograph
Area Defined By	Single Area	Tc Input Type	User Defined Tc
Loss Method	SCS CN	Time of Concentration	0.660 hours
SCS CN	74.000	Time of Concentration (Composite)	0.660 hours
SCS CN (Composite)	74.000	SCS Unit Hydrograph Method	Default Curvilinear

Results (Extended Catchment)			
Precipitation (Cumulative)	0.0 in	Precipitation (Incremental)	0.0 in

Results (Flow)			
Flow (Total Out)	0.00 cfs	Flow (Local from Inflow Collection)	0.00 cfs
Local Inflow?	False		

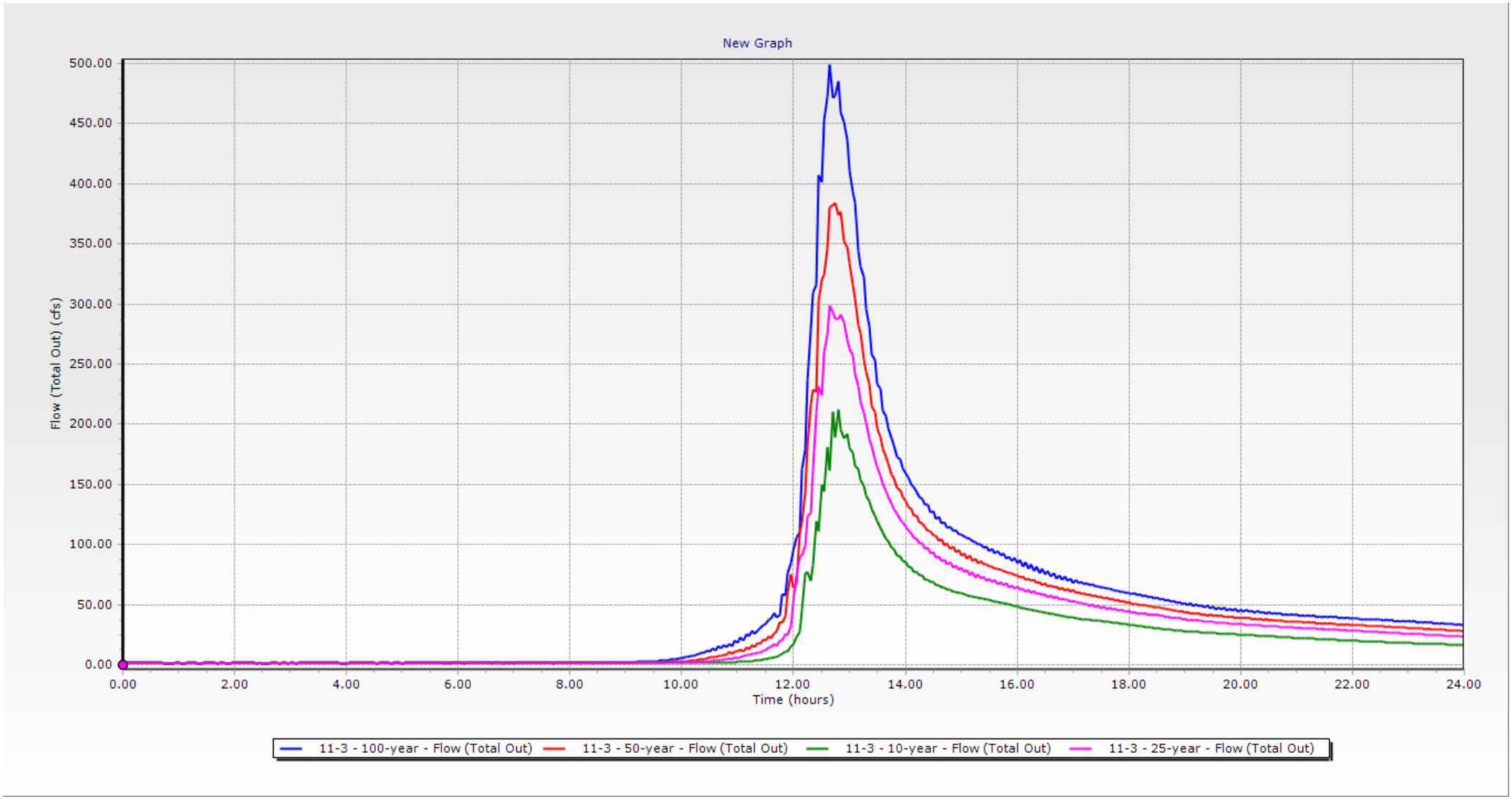
Results (Maximum Values)			
Flow (Maximum) - 10-YEAR	50.91 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 25-YEAR	68.38 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 50-YEAR	82.39 cfs	Time (Maximum Flow)	12.350 hours
Flow (Maximum) - 100-YEAR	99.14 cfs	Time (Maximum Flow)	12.350 hours

Results			
Area (Unified)	25.201 acres	Volume (Total Runoff)	4,713,894.2 gal

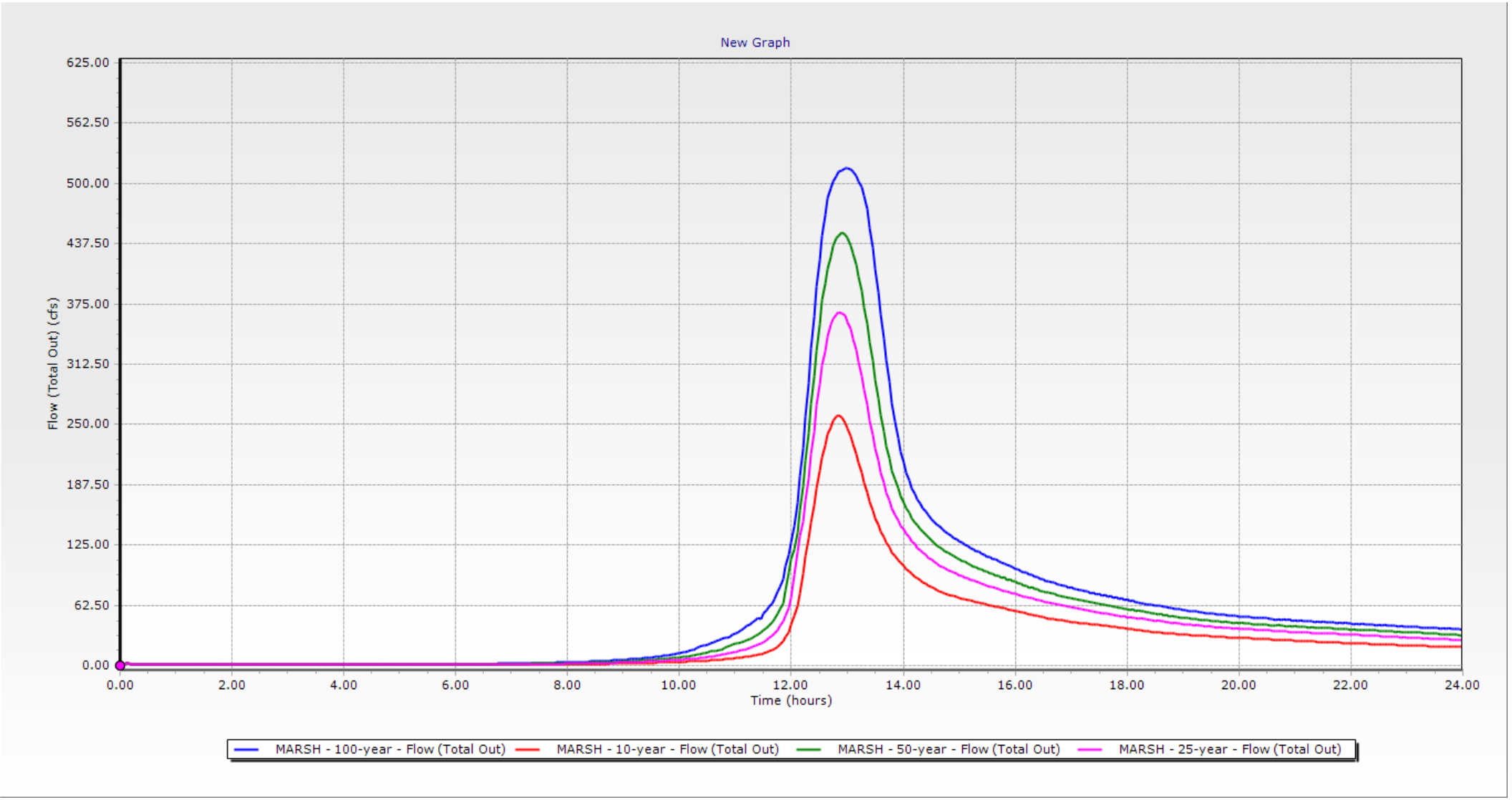
Calculation Messages

Time (hours)	Message

10- through 100-year hydrographs just upstream of Battery Creek Road



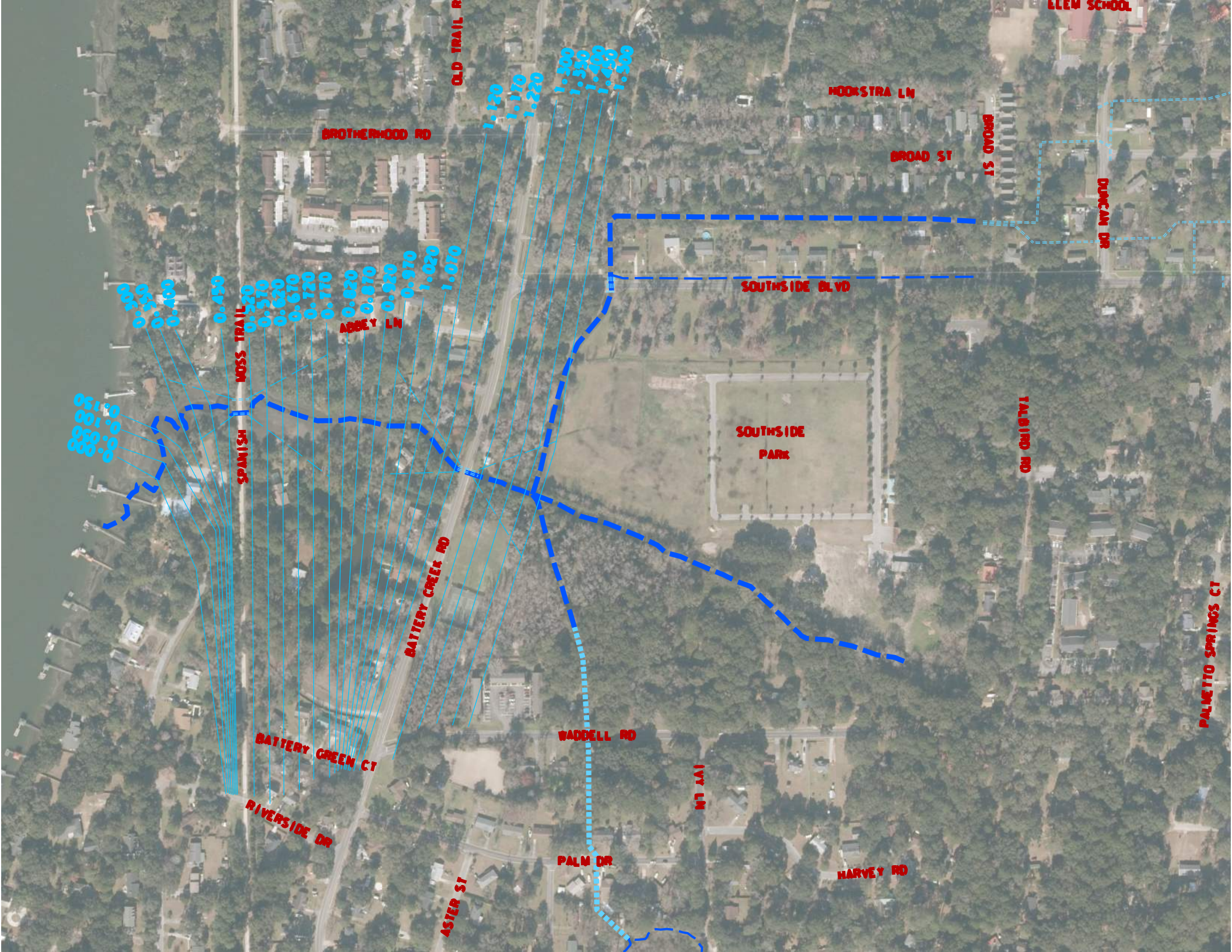
10- through 100-year hydrographs just upstream of Spanish Moss Trail



APPENDIX F

HEC-RAS UNSTEADY FLOW MODEL RESULTS

(EXISTING AND PROPOSED CONDITIONS)


BROTHERHOOD RD
OLD TRAIL RD
HOOKSTRA LN
BROAD ST
BROAD ST
DUNCAN DR
ELEM SCHOOL
SOUTHSIDE BLVD
ABBEY LN
VOSS TRAIL
SPANISH
SOUTHSIDE
PARK
TALBIRD RD
BATTERY CREEK RD
BATTERY GREEN CT
RIVERSIDE DR
WADDELL RD
IVY LN
PALM DR
HARVEY RD
ASTER ST
PALMETTO SPRINGS CT

Existing Conditions - Mean Low Water

10- through 100-year rainfall events

Hydraulic results at time of maximum water surface elevation

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)
Basin_#2	0.000	-7.89	-2.81	3.4	-2.25	3.4	0	-0.02	475.69	185.61
Basin_#2	0.000	-7.53	-2.81	3.4	-2.27	3.4	0	-0.02	475.69	185.61
Basin_#2	0.000	-7.53	-2.81	3.4	-2.27	3.4	0	-0.02	475.69	185.61
Basin_#2	0.000	-6.26	-2.81	3.4	-2.32	3.4	0	-0.02	475.69	185.61
Basin_#2	0.050	19.77	-2.4	3.4		3.4	0	0.06	490.7	214.42
Basin_#2	0.050	45.34	-2.4	3.4		3.4	0.000001	0.14	490.7	214.42
Basin_#2	0.050	80.74	-2.4	3.4		3.4	0.000002	0.25	490.7	214.42
Basin_#2	0.050	115.13	-2.4	3.4		3.4	0.000004	0.36	490.72	214.43
Basin_#2	0.100	19.78	-2.14	3.4		3.4	0	0.04	566.04	198.67
Basin_#2	0.100	45.94	-2.14	3.4		3.4	0	0.1	566.05	198.67
Basin_#2	0.100	81.34	-2.14	3.4		3.4	0.000001	0.17	566.11	198.68
Basin_#2	0.100	115.72	-2.14	3.4		3.4	0.000002	0.24	566.19	198.68
Basin_#2	0.150	20.41	-2.07	3.4		3.4	0	0.04	615.69	223.99
Basin_#2	0.150	45.95	-2.07	3.4		3.4	0	0.1	615.71	224
Basin_#2	0.150	81.36	-2.07	3.4		3.4	0.000001	0.17	615.78	224
Basin_#2	0.150	115.74	-2.07	3.4		3.4	0.000002	0.24	615.89	224.01
Basin_#2	0.300	20.99	-1.63	3.4		3.4	0	0.05	513.27	168.27
Basin_#2	0.300	46.48	-1.63	3.4		3.4	0	0.1	513.28	168.27
Basin_#2	0.300	81.91	-1.63	3.4		3.4	0.000001	0.18	513.35	168.28
Basin_#2	0.300	116.32	-1.63	3.4		3.4	0.000003	0.25	513.46	168.28
Basin_#2	0.350	21.03	-1.5	3.4		3.4	0	0.08	360.7	155.86
Basin_#2	0.350	-3.15	-1.5	3.4		3.4	0	-0.01	360.69	155.86
Basin_#2	0.350	81.97	-1.5	3.4		3.4	0.000004	0.29	360.73	155.86
Basin_#2	0.350	116.38	-1.5	3.4		3.4	0.000008	0.42	360.8	155.87
Basin_#2	0.400	21.11	-1.39	3.4		3.4	0	0.1	294.74	144.28
Basin_#2	0.400	-2.84	-1.39	3.4		3.4	0	-0.01	294.74	144.28
Basin_#2	0.400	82.05	-1.39	3.4		3.4	0.000006	0.38	294.75	144.28
Basin_#2	0.400	116.47	-1.39	3.4		3.41	0.000013	0.54	294.79	144.29
Basin_#2	0.450	21.25	-0.9	3.4		3.4	0	0.05	396.73	185.08
Basin_#2	0.450	46.76	-0.9	3.4		3.4	0.000001	0.12	396.75	185.09
Basin_#2	0.450	82.18	-0.9	3.4		3.4	0.000002	0.21	396.86	185.11
Basin_#2	0.450	116.62	-0.9	3.41		3.41	0.000004	0.29	397.03	185.14
Basin_#2	0.485	Culvert								
Basin_#2	0.520	112.82	-0.7	6.53		6.53	0.000001	0.15	766.08	537.61

Basin_#2	0.520	125.81	-0.7	7.48	7.48	0.000001	0.14	898.68	901.48
Basin_#2	0.520	131.92	-0.7	7.96	7.96	0.000001	0.14	965.95	1043.78
Basin_#2	0.520	140.64	-0.7	8.69	8.69	0.000001	0.13	1067.84	1123.9
Basin_#2	0.570	105.04	-0.5	6.53	6.53	0.000003	0.23	592.35	491.41
Basin_#2	0.570	117.49	-0.5	7.48	7.48	0.000002	0.21	715.47	851.99
Basin_#2	0.570	124.4	-0.5	7.96	7.96	0.000002	0.2	777.93	1040.25
Basin_#2	0.570	131.52	-0.5	8.69	8.69	0.000001	0.19	872.56	1166.53
Basin_#2	0.620	95.88	-0.3	6.53	6.53	0.000002	0.16	767.94	323.16
Basin_#2	0.620	107.41	-0.3	7.48	7.48	0.000001	0.15	957.35	587.66
Basin_#2	0.620	115.18	-0.3	7.96	7.96	0.000001	0.14	1053.43	974.14
Basin_#2	0.620	120	-0.3	8.69	8.69	0.000001	0.13	1198.97	1149.13
Basin_#2	0.670	95.89	0	6.53	6.53	0.000002	0.19	797.73	381.55
Basin_#2	0.670	107.41	0	7.48	7.48	0.000001	0.16	1043.69	678.66
Basin_#2	0.670	115.18	0	7.96	7.96	0.000001	0.16	1168.59	884.61
Basin_#2	0.670	120.01	0	8.69	8.69	0.000001	0.14	1357.8	1073.24
Basin_#2	0.720	95.9	0.4	6.53	6.53	0.000002	0.19	778.28	330.14
Basin_#2	0.720	107.43	0.4	7.48	7.48	0.000001	0.16	1092.84	800.13
Basin_#2	0.720	115.18	0.4	7.96	7.96	0.000001	0.15	1268.95	912.58
Basin_#2	0.720	120	0.4	8.69	8.69	0.000001	0.14	1554.87	1130.49
Basin_#2	0.770	95.9	0.5	6.53	6.53	0.000003	0.24	712.33	346.77
Basin_#2	0.770	107.41	0.5	7.48	7.48	0.000002	0.2	1180.02	860
Basin_#2	0.770	115.21	0.5	7.96	7.96	0.000001	0.18	1627.47	1000.54
Basin_#2	0.770	120.01	0.5	8.69	8.69	0.000001	0.14	2388.02	1070.94
Basin_#2	0.820	95.91	0.6	6.53	6.53	0.000002	0.2	801.4	464.16
Basin_#2	0.820	107.42	0.6	7.48	7.48	0.000001	0.16	1332.98	742.59
Basin_#2	0.820	115.21	0.6	7.96	7.96	0.000001	0.15	1741.98	903
Basin_#2	0.820	120.04	0.6	8.69	8.69	0.000001	0.12	2444.37	1040.01
Basin_#2	0.870	95.91	0.9	6.53	6.53	0.000004	0.23	713.89	482.92
Basin_#2	0.870	107.45	0.9	7.48	7.48	0.000002	0.18	1331.41	748.72
Basin_#2	0.870	115.22	0.9	7.96	7.96	0.000001	0.16	1708.94	828.79
Basin_#2	0.870	119.99	0.9	8.69	8.69	0.000001	0.13	2381.33	1005.99
Basin_#2	0.920	95.92	1	6.53	6.53	0.000003	0.21	896.61	642.03
Basin_#2	0.920	107.42	1	7.48	7.48	0.000001	0.15	1537.2	723.89
Basin_#2	0.920	115.23	1	7.96	7.96	0.000001	0.13	1895.5	775.82
Basin_#2	0.920	119.95	1	8.69	8.69	0	0.11	2519.4	947.66
Basin_#2	0.970	95.93	1.2	6.53	6.53	0.000009	0.35	620.56	388.28
Basin_#2	0.970	107.47	1.2	7.48	7.48	0.000004	0.25	1026.56	461.84
Basin_#2	0.970	115.19	1.2	7.96	7.96	0.000003	0.22	1271.13	580.5
Basin_#2	0.970	119.99	1.2	8.69	8.69	0.000002	0.18	1784.51	848.68

Basin_#2	1.020	95.93	1.4	6.53	6.54	0.000008	0.35	558.51	386.98
Basin_#2	1.020	107.42	1.4	7.48	7.48	0.000003	0.25	1094.27	638.18
Basin_#2	1.020	115.24	1.4	7.96	7.96	0.000002	0.22	1421.98	719.05
Basin_#2	1.020	120	1.4	8.69	8.69	0.000001	0.17	1983.19	833.8
Basin_#2	1.070	95.94	1.6	6.53	6.54	0.000007	0.3	651.98	499.2
Basin_#2	1.070	107.49	1.6	7.48	7.48	0.000003	0.21	1267.63	753.19
Basin_#2	1.070	115.24	1.6	7.96	7.96	0.000002	0.18	1631.61	762.93
Basin_#2	1.070	120	1.6	8.69	8.69	0.000001	0.14	2197.73	811.37
Basin_#2	1.120	95.94	1.7	6.53	6.54	0.000007	0.24	616.15	452.9
Basin_#2	1.120	107.43	1.7	7.48	7.48	0.000003	0.19	1090.13	591.67
Basin_#2	1.120	115.25	1.7	7.96	7.96	0.000002	0.17	1402.23	696.9
Basin_#2	1.120	120.01	1.7	8.69	8.69	0.000001	0.14	1936.4	768.72
Basin_#2	1.170	95.95	1.7	6.53	6.54	0.000044	0.66	347.73	325.63
Basin_#2	1.170	107.43	1.7	7.48	7.48	0.000015	0.44	760.37	572.81
Basin_#2	1.170	115.31	1.7	7.96	7.96	0.000009	0.35	1064.06	691.64
Basin_#2	1.170	120.02	1.7	8.69	8.69	0.000004	0.24	1680.62	1006.6
Basin_#2	1.220	96.16	1.8	6.54	6.54	0.00003	0.46	382.84	417
Basin_#2	1.220	107.57	1.8	7.48	7.48	0.000009	0.29	953.08	809.26
Basin_#2	1.220	115.25	1.8	7.96	7.96	0.000005	0.24	1397.36	1018.47
Basin_#2	1.220	120.03	1.8	8.69	8.69	0.000002	0.16	2211.02	1222.23
Basin_#2	1.260	Culvert							
Basin_#2	1.300	175.82	2	6.7	6.71	0.000318	0.97	452.35	488.07
Basin_#2	1.300	107.95	2	7.49	7.49	0.000025	0.31	974.94	930.21
Basin_#2	1.300	115.58	2	7.97	7.97	0.000011	0.22	1515.02	1245.11
Basin_#2	1.300	120.16	2	8.69	8.69	0.000003	0.12	2462.24	1355.65
Basin_#2	1.350	175.88	2	6.72	6.72	0.000398	0.84	424.08	481.49
Basin_#2	1.350	108.11	2	7.49	7.49	0.000026	0.24	882.08	741.75
Basin_#2	1.350	115.59	2	7.97	7.97	0.000011	0.17	1312.07	1088.69
Basin_#2	1.350	120.24	2	8.69	8.69	0.000003	0.1	2197.5	1309.33
Basin_#2	1.400	175.89	2.1	6.73	6.74	0.000119	0.75	511.34	495.83
Basin_#2	1.400	108.2	2.1	7.49	7.49	0.000011	0.25	956.3	732.43
Basin_#2	1.400	115.67	2.1	7.97	7.97	0.000006	0.19	1368.97	970.34
Basin_#2	1.400	120.17	2.1	8.69	8.69	0.000002	0.12	2198.4	1282.6
Basin_#2	1.450	176	2.2	6.73	6.75	0.000178	0.97	384.27	501.23
Basin_#2	1.450	108.29	2.2	7.49	7.49	0.000019	0.37	837.53	767.57
Basin_#2	1.450	115.67	2.2	7.97	7.97	0.00001	0.3	1268.19	1025.97
Basin_#2	1.450	120.09	2.2	8.69	8.69	0.000004	0.22	2169.72	1462.88
Basin_#2	1.500	176.16	2.5	6.74	6.75	0.000062	0.68	1061.23	772.38
Basin_#2	1.500	108.39	2.5	7.49	7.49	0.000007	0.27	1679.16	918.97

Basin_#2	1.500	115.77	2.5	7.97		7.97	0.000004	0.22	2178.36	1208.07
Basin_#2	1.500	120.17	2.5	8.69		8.69	0.000002	0.17	3179.16	1548.46

Proposed Conditions - Mean Low Water

10- through 100-year rainfall events

Hydraulic results at time of maximum water surface elevation

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)
Basin_#2	0.000	208.08	-2.81	1.48	-1.07	1.5	0.0001	1.06	211.07	83.67
Basin_#2	0.000	319.1	-2.81	2.38	-0.8	2.4	0.000101	1.26	302.89	137.07
Basin_#2	0.000	380.16	-2.81	2.81	-0.68	2.83	0.0001	1.34	370.13	169.09
Basin_#2	0.000	491.6	-2.81	3.48	-0.46	3.51	0.0001	1.47	490.3	186.82
Basin_#2	0.050	208.18	-2.4	1.48		1.51	0.000157	1.3	172.09	73.11
Basin_#2	0.050	319.1	-2.4	2.38		2.41	0.000149	1.5	290.5	165.77
Basin_#2	0.050	380.16	-2.4	2.81		2.84	0.000144	1.58	367.91	198.93
Basin_#2	0.050	491.87	-2.4	3.48		3.52	0.000138	1.69	507.85	217.64
Basin_#2	0.100	208.26	-2.14	1.5		1.51	0.000055	0.76	281.04	103.59
Basin_#2	0.100	319.1	-2.14	2.4		2.41	0.000054	0.89	384.82	144.91
Basin_#2	0.100	380.16	-2.14	2.83		2.84	0.000053	0.95	455.32	183.39
Basin_#2	0.100	492.15	-2.14	3.5		3.52	0.000054	1.05	585.72	200.05
Basin_#2	0.150	208.43	-2.07	1.5		1.51	0.000056	0.78	292.84	117.3
Basin_#2	0.150	319.11	-2.07	2.4		2.41	0.000055	0.92	415.49	173.85
Basin_#2	0.150	380.16	-2.07	2.83		2.84	0.000054	0.97	494.64	194.98
Basin_#2	0.150	492.43	-2.07	3.5		3.52	0.000055	1.08	638.47	225.85
Basin_#2	0.300	208.56	-1.63	1.52		1.53	0.000131	0.92	232.56	121.36
Basin_#2	0.300	319.12	-1.63	2.41		2.42	0.000092	0.98	354.15	155.6
Basin_#2	0.300	380.18	-1.63	2.84		2.86	0.000082	1.01	421.86	159.28
Basin_#2	0.300	493.18	-1.63	3.51		3.53	0.000075	1.09	531.85	169.58
Basin_#2	0.350	208.61	-1.5	1.51		1.55	0.000454	1.66	130.53	75.21
Basin_#2	0.350	319.08	-1.5	2.4		2.45	0.0003	1.72	219.08	124.3
Basin_#2	0.350	380.11	-1.5	2.83		2.88	0.00026	1.76	275.79	139.31
Basin_#2	0.350	493.41	-1.5	3.5		3.55	0.000225	1.85	376.01	157.25
Basin_#2	0.400	209	-1.39	1.53		1.6	0.000612	2.11	99.99	55.12
Basin_#2	0.400	319.09	-1.39	2.4		2.48	0.00047	2.29	172.36	109.83
Basin_#2	0.400	380.08	-1.39	2.83		2.91	0.000421	2.36	222.96	134.25
Basin_#2	0.400	493.62	-1.39	3.49		3.58	0.000375	2.49	306.63	145.82
Basin_#2	0.450	209.72	-0.9	1.62		1.63	0.000133	0.96	218.35	110.72
Basin_#2	0.450	319.48	-0.9	2.49		2.5	0.000101	1.05	305.22	156.31
Basin_#2	0.450	380.58	-0.9	2.9		2.92	0.000094	1.1	346.93	174.93
Basin_#2	0.450	493.83	-0.9	3.56		3.59	0.000089	1.2	413.01	188.43
Basin_#2	0.485	Inl Struct								
Basin_#2	0.520	213.35	-0.7	2.95	0.54	2.96	0.000153	0.81	264.56	154.18
Basin_#2	0.520	323.44	-0.7	3.92	0.83	3.93	0.00009	0.81	399.79	269.25
Basin_#2	0.520	384.87	-0.7	4.44	0.97	4.45	0.000073	0.81	473.16	313
Basin_#2	0.520	499.72	-0.7	5.22	1.21	5.23	0.000061	0.86	582.36	495.02
Basin_#2	0.570	190.73	-0.2	2.96		3.03	0.000727	2.14	121.71	167.64
Basin_#2	0.570	293.51	-0.2	3.92		3.95	0.000305	1.7	246.23	225.99

Basin_#2	0.570	354.45	-0.2	4.45		4.47	0.000218	1.58	314.18	249.17
Basin_#2	0.570	464.77	-0.2	5.22		5.25	0.00016	1.51	415.46	264.56
Basin_#2	0.620	190.84	0	3.02		3.05	0.000501	1.49	147.76	126.66
Basin_#2	0.620	259.41	0	3.96		3.97	0.000177	1.14	285.22	174.7
Basin_#2	0.620	320.04	0	4.47		4.49	0.000131	1.1	372.61	210.95
Basin_#2	0.620	425	0	5.25		5.26	0.000095	1.07	511.16	248.16
Basin_#2	0.670	191.15	0	3.04		3.09	0.000658	2.05	136.04	116.91
Basin_#2	0.670	259.48	0	3.96		3.99	0.000238	1.51	261.37	145.9
Basin_#2	0.670	320.07	0	4.48		4.5	0.000174	1.41	340.08	164.37
Basin_#2	0.670	425.14	0	5.25		5.27	0.000123	1.32	485.95	235.66
Basin_#2	0.720	191.45	0.6	3.08		3.11	0.000654	1.73	137.62	108.45
Basin_#2	0.720	259.59	0.6	3.98		4	0.000242	1.35	250.1	133.56
Basin_#2	0.720	320.12	0.6	4.49		4.51	0.000179	1.29	320.12	145.48
Basin_#2	0.720	425.27	0.6	5.26		5.27	0.000129	1.25	454.72	201.87
Basin_#2	0.770	192.06	1	3.12		3.19	0.001412	2.44	101.68	79.87
Basin_#2	0.770	259.69	1	3.99		4.03	0.000537	1.93	177.36	94.7
Basin_#2	0.770	320.15	1	4.49		4.53	0.000402	1.87	228.43	106.94
Basin_#2	0.770	425.38	1	5.26		5.29	0.000273	1.77	338.57	225.75
Basin_#2	0.820	192.63	0.75	3.19		3.25	0.001191	2.33	119.52	119.41
Basin_#2	0.820	259.9	0.75	4.03		4.05	0.000395	1.68	229.13	145
Basin_#2	0.820	320.23	0.75	4.52		4.55	0.000264	1.53	302.78	149.98
Basin_#2	0.820	425.48	0.75	5.28		5.3	0.000174	1.42	425.98	189.98
Basin_#2	0.870	195.1	1.7	3.34		3.53	0.005531	3.6	64.03	101.13
Basin_#2	0.870	260.01	1.7	4.04		4.11	0.001294	2.36	140.57	115.66
Basin_#2	0.870	320.25	1.7	4.53		4.58	0.000724	2.05	198.17	121.14
Basin_#2	0.870	425.55	1.7	5.29		5.32	0.000398	1.82	303.86	186
Basin_#2	0.920	196.73	1.9	3.59		3.71	0.003773	3.48	86.05	114.99
Basin_#2	0.920	260.27	1.9	4.12		4.18	0.001495	2.66	155.52	168.95
Basin_#2	0.920	320.31	1.9	4.58		4.62	0.000723	2.12	242.28	199.95
Basin_#2	0.920	425.59	1.9	5.32		5.34	0.00031	1.64	413.64	284.89
Basin_#2	0.970	189.27	1.9	3.9	3.84	4.24	0.007132	5.1	50.17	66.36
Basin_#2	0.970	260.36	1.9	4.18		4.51	0.006398	5.32	69.69	75.82
Basin_#2	0.970	320.32	1.9	4.61		4.82	0.003666	4.55	103.17	94.28
Basin_#2	0.970	425.63	1.9	5.32		5.44	0.001694	3.65	197.46	261.08
Basin_#2	1.020	177.49	2.4	4.17		4.23	0.001518	2.1	94.56	79.42
Basin_#2	1.020	260.8	2.4	4.59		4.66	0.001254	2.27	128.32	81.2
Basin_#2	1.020	320.33	2.4	4.85		4.93	0.001169	2.39	149.55	84.39
Basin_#2	1.020	429.96	2.4	5.42		5.49	0.000875	2.42	212.89	204.03
Basin_#2	1.070	184.5	1.6	4.25		4.3	0.000649	1.82	120.41	87.03
Basin_#2	1.070	260.8	1.6	4.66		4.71	0.000636	2.02	157.14	99.7
Basin_#2	1.070	320.33	1.6	4.92		4.98	0.000645	2.17	181.58	119.72
Basin_#2	1.070	434.16	1.6	5.47		5.53	0.00056	2.27	239.65	226.32
Basin_#2	1.120	187.83	2.4	4.4		4.48	0.005864	2.2	85.84	92.65
Basin_#2	1.120	260.81	2.4	4.76		4.84	0.003872	2.21	119.52	95.75

Basin_#2	1.120	320.35	2.4	5.01	5.09	0.003274	2.28	143.28	98.3
Basin_#2	1.120	438.41	2.4	5.53	5.61	0.002282	2.31	199.2	193.44
Basin_#2	1.145*	190.08	3.1	4.58	4.7	0.009198	2.88	66.42	68.02
Basin_#2	1.145*	260.82	3.1	4.87	5.01	0.007456	3.06	85.9	69.54
Basin_#2	1.145*	320.37	3.1	5.09	5.25	0.00658	3.2	101.25	70.73
Basin_#2	1.145*	442.45	3.1	5.58	5.75	0.004978	3.35	134.75	97.98
Basin_#2	1.170	190.58	2.4	4.76	4.89	0.004293	3.22	76.38	50.87
Basin_#2	1.170	260.83	2.4	5	5.19	0.005316	3.84	88.78	52.32
Basin_#2	1.170	320.4	2.4	5.2	5.43	0.005832	4.25	99.58	53.55
Basin_#2	1.170	446.04	2.4	5.65	5.93	0.00608	4.82	126.57	83.57
Basin_#2	1.220	190.62	1.7	4.98	5.04	0.00129	1.83	104.3	45.38
Basin_#2	1.220	260.84	1.7	5.29	5.37	0.001659	2.2	118.65	51.61
Basin_#2	1.220	320.45	1.7	5.54	5.63	0.001929	2.46	130.34	57.77
Basin_#2	1.220	450.46	1.7	6.01	6.14	0.002258	2.94	153.45	268.12
Basin_#2	1.260	Culvert							
Basin_#2	1.300	190.63	2	6.05	6.13	0.001051	2.19	86.91	278.5
Basin_#2	1.300	260.85	2	6.88	6.98	0.000988	2.44	106.89	553.69
Basin_#2	1.300	320.47	2	7.61	7.62	0.000144	1.03	1099.23	1050.07
Basin_#2	1.300	453.06	2	7.94	7.94	0.000162	1.14	1478.44	1240.48
Basin_#2	1.350	190.6	1.4	6.16	6.2	0.000678	1.9	184.69	262.5
Basin_#2	1.350	260.84	1.4	7.01	7.05	0.000468	1.8	312.5	551.51
Basin_#2	1.350	320.48	1.4	7.63	7.63	0.000125	1	996.65	789.77
Basin_#2	1.350	454.11	1.4	7.94	7.95	0.000146	1.12	1297.18	1073.81
Basin_#2	1.400	190.59	1.7	6.2	6.23	0.000608	1.78	234.74	344.29
Basin_#2	1.400	260.89	1.7	7.04	7.06	0.00031	1.44	416.14	561.25
Basin_#2	1.400	320.55	1.7	7.63	7.64	0.000081	0.8	1074.35	823.89
Basin_#2	1.400	455	1.7	7.95	7.96	0.000095	0.9	1359.76	964.17
Basin_#2	1.450	190.7	2.2	6.23	6.27	0.000668	1.72	183.43	250.92
Basin_#2	1.450	260.96	2.2	7.06	7.08	0.000364	1.47	423.78	569.82
Basin_#2	1.450	320.66	2.2	7.64	7.65	0.000188	1.15	957.41	850.45
Basin_#2	1.450	455.86	2.2	7.96	7.97	0.000227	1.32	1256.9	1021.16
Basin_#2	1.500	191.21	2.9	6.27	6.27	0.000239	0.93	709.36	681.5
Basin_#2	1.500	261.28	2.9	7.08	7.08	0.000092	0.67	1319.78	817.08
Basin_#2	1.500	321.09	2.9	7.65	7.65	0.000059	0.6	1821.1	979.23
Basin_#2	1.500	456.58	2.9	7.97	7.97	0.000078	0.72	2172.08	1208.02

Existing Conditions - Mean Tide Level (rising)

10- through 100-year rainfall events

Hydraulic results at time of maximum water surface elevation

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)
Basin_#2	0.000	-8.65	-2.81	3.4	-2.24	3.4	0	-0.02	475.69	185.61
Basin_#2	0.000	-8.65	-2.81	3.4	-2.24	3.4	0	-0.02	475.69	185.61
Basin_#2	0.000	-8.65	-2.81	3.4	-2.24	3.4	0	-0.02	475.69	185.61
Basin_#2	0.000	-8.65	-2.81	3.4	-2.24	3.4	0	-0.02	475.69	185.61
Basin_#2	0.050	78.9	-2.4	3.4		3.4	0.000002	0.24	490.7	214.42
Basin_#2	0.050	111.11	-2.4	3.4		3.4	0.000004	0.34	490.72	214.43
Basin_#2	0.050	124.11	-2.4	3.4		3.4	0.000005	0.39	490.72	214.43
Basin_#2	0.050	134.51	-2.4	3.4		3.4	0.000006	0.42	490.73	214.43
Basin_#2	0.100	79.51	-2.14	3.4		3.4	0.000001	0.17	566.1	198.68
Basin_#2	0.100	111.71	-2.14	3.4		3.4	0.000002	0.24	566.18	198.68
Basin_#2	0.100	124.7	-2.14	3.4		3.4	0.000002	0.26	566.21	198.68
Basin_#2	0.100	135.11	-2.14	3.4		3.4	0.000003	0.29	566.25	198.69
Basin_#2	0.150	79.53	-2.07	3.4		3.4	0.000001	0.17	615.78	224
Basin_#2	0.150	111.73	-2.07	3.4		3.4	0.000002	0.23	615.88	224.01
Basin_#2	0.150	124.73	-2.07	3.4		3.4	0.000002	0.26	615.93	224.01
Basin_#2	0.150	135.13	-2.07	3.4		3.4	0.000003	0.28	615.97	224.02
Basin_#2	0.300	80.09	-1.63	3.4		3.4	0.000001	0.18	513.35	168.28
Basin_#2	0.300	112.31	-1.63	3.4		3.4	0.000003	0.25	513.45	168.28
Basin_#2	0.300	125.31	-1.63	3.4		3.4	0.000003	0.27	513.49	168.29
Basin_#2	0.300	135.72	-1.63	3.4		3.4	0.000004	0.3	513.54	168.29
Basin_#2	0.350	80.14	-1.5	3.4		3.4	0.000004	0.29	360.74	155.86
Basin_#2	0.350	112.37	-1.5	3.4		3.4	0.000008	0.4	360.79	155.87
Basin_#2	0.350	125.37	-1.5	3.4		3.41	0.000009	0.45	360.82	155.87
Basin_#2	0.350	135.79	-1.5	3.4		3.41	0.000011	0.49	360.85	155.87
Basin_#2	0.400	80.23	-1.39	3.4		3.4	0.000006	0.38	294.76	144.28
Basin_#2	0.400	112.46	-1.39	3.4		3.41	0.000012	0.53	294.79	144.29
Basin_#2	0.400	125.61	-1.39	3.4		3.41	0.000015	0.59	294.81	144.29
Basin_#2	0.400	136.02	-1.39	3.4		3.41	0.000017	0.64	294.83	144.29
Basin_#2	0.450	80.36	-0.9	3.4		3.4	0.000002	0.2	396.86	185.11
Basin_#2	0.450	112.61	-0.9	3.4		3.41	0.000004	0.28	397.01	185.14
Basin_#2	0.450	125.63	-0.9	3.41		3.41	0.000005	0.32	397.09	185.16
Basin_#2	0.450	136.05	-0.9	3.41		3.41	0.000005	0.34	397.15	185.17
Basin_#2	0.485	Culvert								
Basin_#2	0.520	111.7	-0.7	6.53		6.53	0.000001	0.15	766.19	537.68
Basin_#2	0.520	125.81	-0.7	7.48		7.48	0.000001	0.14	898.68	901.48
Basin_#2	0.520	133.15	-0.7	8.06		8.06	0.000001	0.14	980.04	1058.27
Basin_#2	0.520	140.63	-0.7	8.69		8.69	0.000001	0.13	1067.75	1123.87

Basin_#2	0.570	104.01	-0.5	6.53	6.53	0.000003	0.23	592.44	491.72
Basin_#2	0.570	117.49	-0.5	7.48	7.48	0.000002	0.21	715.47	851.98
Basin_#2	0.570	124.46	-0.5	8.06	8.06	0.000001	0.2	791.02	1055.13
Basin_#2	0.570	131.52	-0.5	8.69	8.69	0.000001	0.19	872.48	1166.32
Basin_#2	0.620	94.93	-0.3	6.53	6.53	0.000001	0.16	768.1	323.17
Basin_#2	0.620	107.41	-0.3	7.48	7.48	0.000001	0.15	957.35	587.65
Basin_#2	0.620	113.73	-0.3	8.06	8.06	0.000001	0.14	1073.57	1046.59
Basin_#2	0.620	119.99	-0.3	8.69	8.69	0.000001	0.13	1198.84	1149.03
Basin_#2	0.670	94.93	0	6.53	6.53	0.000002	0.19	797.92	381.66
Basin_#2	0.670	107.42	0	7.48	7.48	0.000001	0.16	1043.68	678.65
Basin_#2	0.670	113.74	0	8.06	8.06	0.000001	0.15	1194.77	939.69
Basin_#2	0.670	120	0	8.69	8.69	0.000001	0.14	1357.63	1073.15
Basin_#2	0.720	94.94	0.4	6.53	6.53	0.000002	0.18	778.52	330.35
Basin_#2	0.720	107.43	0.4	7.48	7.48	0.000001	0.16	1092.83	800.12
Basin_#2	0.720	113.73	0.4	8.06	8.06	0.000001	0.15	1307.5	929.77
Basin_#2	0.720	120	0.4	8.69	8.69	0.000001	0.14	1554.61	1130.37
Basin_#2	0.770	94.94	0.5	6.53	6.53	0.000003	0.24	712.59	346.82
Basin_#2	0.770	107.44	0.5	7.48	7.48	0.000002	0.2	1180.01	859.99
Basin_#2	0.770	113.76	0.5	8.06	8.06	0.000001	0.17	1728.91	1015.29
Basin_#2	0.770	119.98	0.5	8.69	8.69	0.000001	0.14	2387.32	1070.92
Basin_#2	0.820	94.94	0.6	6.53	6.53	0.000002	0.2	801.73	464.18
Basin_#2	0.820	107.41	0.6	7.48	7.48	0.000001	0.16	1332.97	742.59
Basin_#2	0.820	113.72	0.6	8.06	8.06	0.000001	0.14	1833.33	913.37
Basin_#2	0.820	120.02	0.6	8.69	8.69	0.000001	0.12	2443.69	1039.97
Basin_#2	0.870	94.99	0.9	6.53	6.53	0.000004	0.23	714.24	483.24
Basin_#2	0.870	107.42	0.9	7.48	7.48	0.000002	0.18	1331.4	748.71
Basin_#2	0.870	113.75	0.9	8.06	8.06	0.000001	0.15	1793.19	848.66
Basin_#2	0.870	120.06	0.9	8.69	8.69	0.000001	0.13	2380.67	1005.93
Basin_#2	0.920	95	1	6.53	6.53	0.000003	0.2	897.07	642.12
Basin_#2	0.920	107.46	1	7.48	7.48	0.000001	0.15	1537.19	723.89
Basin_#2	0.920	113.76	1	8.06	8.06	0.000001	0.13	1974.31	791.42
Basin_#2	0.920	120.03	1	8.69	8.69	0	0.11	2518.78	947.4
Basin_#2	0.970	95.01	1.2	6.53	6.54	0.000009	0.35	620.83	388.33
Basin_#2	0.970	107.42	1.2	7.48	7.48	0.000004	0.25	1026.55	461.84
Basin_#2	0.970	113.77	1.2	8.06	8.06	0.000002	0.21	1330.96	608.04
Basin_#2	0.970	120	1.2	8.69	8.69	0.000002	0.18	1783.96	848.4
Basin_#2	1.020	95.01	1.4	6.53	6.54	0.000008	0.34	558.78	387.17
Basin_#2	1.020	107.48	1.4	7.48	7.48	0.000003	0.25	1094.26	638.17
Basin_#2	1.020	113.73	1.4	8.06	8.06	0.000002	0.21	1494.92	730.14
Basin_#2	1.020	120	1.4	8.69	8.69	0.000001	0.17	1982.65	833.62
Basin_#2	1.070	95.1	1.6	6.54	6.54	0.000006	0.29	652.32	499.28

Basin_#2	1.070	107.48	1.6	7.48	7.48	0.000003	0.21	1267.62	753.19
Basin_#2	1.070	113.78	1.6	8.06	8.06	0.000002	0.17	1708.49	765.09
Basin_#2	1.070	119.96	1.6	8.69	8.69	0.000001	0.14	2197.2	811.23
Basin_#2	1.120	95.11	1.7	6.54	6.54	0.000007	0.24	616.46	452.93
Basin_#2	1.120	107.43	1.7	7.48	7.48	0.000003	0.19	1090.12	591.67
Basin_#2	1.120	113.78	1.7	8.06	8.06	0.000002	0.16	1473.08	709.98
Basin_#2	1.120	119.96	1.7	8.69	8.69	0.000001	0.14	1935.9	768.68
Basin_#2	1.170	95.12	1.7	6.54	6.54	0.000043	0.65	347.96	325.7
Basin_#2	1.170	107.43	1.7	7.48	7.48	0.000015	0.44	760.36	572.8
Basin_#2	1.170	113.79	1.7	8.06	8.06	0.000008	0.34	1135.77	731.39
Basin_#2	1.170	120.02	1.7	8.69	8.69	0.000004	0.24	1679.97	1006.28
Basin_#2	1.220	95.34	1.8	6.54	6.54	0.000029	0.45	383.11	417.13
Basin_#2	1.220	107.5	1.8	7.48	7.48	0.000009	0.29	953.07	809.25
Basin_#2	1.220	113.8	1.8	8.06	8.06	0.000004	0.22	1501.44	1052.44
Basin_#2	1.220	119.96	1.8	8.69	8.69	0.000002	0.16	2210.22	1221.99
Basin_#2	1.260	Culvert							
Basin_#2	1.300	175.81	2	6.7	6.71	0.000318	0.97	452.34	488.07
Basin_#2	1.300	107.94	2	7.49	7.49	0.000025	0.31	974.92	930.19
Basin_#2	1.300	113.92	2	8.07	8.07	0.000009	0.2	1640.62	1265.78
Basin_#2	1.300	120.16	2	8.69	8.69	0.000003	0.12	2461.36	1355.48
Basin_#2	1.350	175.83	2	6.72	6.72	0.000398	0.84	424.07	481.49
Basin_#2	1.350	108.11	2	7.49	7.49	0.000026	0.24	882.07	741.74
Basin_#2	1.350	114	2	8.07	8.07	0.000009	0.16	1423.45	1138.68
Basin_#2	1.350	120.17	2	8.69	8.69	0.000003	0.1	2196.65	1309.21
Basin_#2	1.400	175.89	2.1	6.73	6.74	0.000119	0.75	511.34	495.82
Basin_#2	1.400	108.19	2.1	7.49	7.49	0.000011	0.25	956.29	732.42
Basin_#2	1.400	114.08	2.1	8.07	8.07	0.000005	0.17	1468.22	1025.01
Basin_#2	1.400	120.25	2.1	8.69	8.69	0.000002	0.12	2197.57	1282.4
Basin_#2	1.450	176	2.2	6.73	6.75	0.000178	0.97	384.27	501.23
Basin_#2	1.450	108.2	2.2	7.49	7.49	0.000019	0.37	837.51	767.55
Basin_#2	1.450	114.09	2.2	8.07	8.07	0.000008	0.28	1373.79	1085.01
Basin_#2	1.450	120.26	2.2	8.69	8.69	0.000004	0.22	2168.76	1462.38
Basin_#2	1.500	176.16	2.5	6.74	6.75	0.000062	0.68	1061.22	772.38
Basin_#2	1.500	108.39	2.5	7.49	7.49	0.000007	0.27	1679.14	918.96
Basin_#2	1.500	114.19	2.5	8.07	8.07	0.000004	0.21	2300.12	1245.66
Basin_#2	1.500	120.35	2.5	8.69	8.69	0.000002	0.17	3178.16	1548.22

Proposed Conditions - Mean Tide Level (Rising)

10- through 100-year rainfall events

Hydraulic results at time of maximum water surface elevation

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)
Basin_#2	0.000	-6.91	-2.81	3.4	-2.31	3.4	0	-0.02	475.69	185.61
Basin_#2	0.000	-6.91	-2.81	3.4	-2.31	3.4	0	-0.02	475.69	185.61
Basin_#2	0.000	-6.8	-2.81	3.4	-2.31	3.4	0	-0.02	475.69	185.61
Basin_#2	0.000	-6.8	-2.81	3.4	-2.31	3.4	0	-0.02	475.69	185.61
Basin_#2	0.050	54.95	-2.4	3.4		3.4	0.000002	0.19	490.75	214.43
Basin_#2	0.050	60.28	-2.4	3.4		3.4	0.000002	0.21	490.7	214.42
Basin_#2	0.050	70.6	-2.4	3.4		3.4	0.000003	0.25	490.69	214.42
Basin_#2	0.050	83.09	-2.4	3.4		3.4	0.000004	0.29	490.7	214.42
Basin_#2	0.100	55.1	-2.14	3.4		3.4	0.000001	0.12	566.17	198.68
Basin_#2	0.100	60.87	-2.14	3.4		3.4	0.000001	0.13	566.09	198.68
Basin_#2	0.100	71.16	-2.14	3.4		3.4	0.000001	0.16	566.11	198.68
Basin_#2	0.100	83.66	-2.14	3.4		3.4	0.000002	0.18	566.15	198.68
Basin_#2	0.150	55.22	-2.07	3.4		3.4	0.000001	0.12	615.84	224.01
Basin_#2	0.150	60.88	-2.07	3.4		3.4	0.000001	0.14	615.76	224
Basin_#2	0.150	71.19	-2.07	3.4		3.4	0.000001	0.16	615.78	224
Basin_#2	0.150	83.67	-2.07	3.4		3.4	0.000002	0.19	615.83	224.01
Basin_#2	0.300	46.81	-1.63	3.4		3.4	0.000001	0.11	513.41	168.28
Basin_#2	0.300	61.46	-1.63	3.4		3.4	0.000001	0.14	513.34	168.28
Basin_#2	0.300	71.76	-1.63	3.4		3.4	0.000002	0.16	513.36	168.28
Basin_#2	0.300	84.19	-1.63	3.4		3.4	0.000002	0.19	513.41	168.28
Basin_#2	0.350	47.36	-1.5	3.4		3.4	0.000002	0.18	360.9	155.88
Basin_#2	0.350	61.52	-1.5	3.4		3.4	0.000004	0.24	360.73	155.86
Basin_#2	0.350	72.1	-1.5	3.4		3.4	0.000005	0.28	360.73	155.86
Basin_#2	0.350	84.24	-1.5	3.4		3.4	0.000007	0.33	360.77	155.86
Basin_#2	0.400	48.02	-1.39	3.4		3.41	0.000004	0.25	295.1	144.33
Basin_#2	0.400	-1.58	-1.39	3.4		3.4	0	-0.01	294.82	144.29
Basin_#2	0.400	-1.2	-1.39	3.4		3.4	0	-0.01	294.82	144.29
Basin_#2	0.400	-1.2	-1.39	3.4		3.4	0	-0.01	294.82	144.29
Basin_#2	0.450	22.05	-0.9	3.42		3.42	0	0.06	398.43	185.43
Basin_#2	0.450	22.05	-0.9	3.42		3.42	0	0.06	398.43	185.43
Basin_#2	0.450	21.98	-0.9	3.42		3.42	0	0.06	398.43	185.43
Basin_#2	0.450	21.98	-0.9	3.42		3.42	0	0.06	398.43	185.43
Basin_#2	0.485	Inl Struct								
Basin_#2	0.520	-25.75	-0.7	3.45	-0.31	3.45	0.000001	0.08	334.29	207.48
Basin_#2	0.520	323.99	-0.7	3.92	0.84	3.93	0.00009	0.81	400.78	270.76
Basin_#2	0.520	386.39	-0.7	4.43	0.97	4.44	0.000074	0.82	471.14	311.27
Basin_#2	0.520	498.28	-0.7	5.37	1.2	5.38	0.000054	0.83	603.16	509.34

Basin_#2	0.570	41.15	-0.2	3.43		3.43	0.000013	0.32	182.62	206.66
Basin_#2	0.570	293.65	-0.2	3.93		3.96	0.000302	1.7	247.15	226.55
Basin_#2	0.570	355.37	-0.2	4.43		4.46	0.000224	1.59	312.32	248.96
Basin_#2	0.570	463.55	-0.2	5.37		5.39	0.000138	1.44	434.72	266.66
Basin_#2	0.620	39.46	0	3.43		3.43	0.00001	0.23	203.73	144.82
Basin_#2	0.620	259.07	0	3.96		3.98	0.000174	1.14	286.37	175.62
Basin_#2	0.620	320.18	0	4.46		4.47	0.000134	1.11	370.28	209.75
Basin_#2	0.620	424.13	0	5.39		5.41	0.000082	1.02	538.28	251.82
Basin_#2	0.670	40.31	0	3.43		3.44	0.000014	0.33	186.3	136.78
Basin_#2	0.670	259.22	0	3.97		3.99	0.000235	1.5	262.37	146.01
Basin_#2	0.670	320.32	0	4.46		4.48	0.000178	1.42	337.86	163.71
Basin_#2	0.670	424.17	0	5.4		5.41	0.000104	1.25	516.56	268.34
Basin_#2	0.720	40.77	0.6	3.44		3.44	0.000015	0.29	179.71	125.04
Basin_#2	0.720	259.35	0.6	3.98		4	0.000239	1.34	251.01	133.64
Basin_#2	0.720	320.32	0.6	4.47		4.49	0.000183	1.3	318.19	145.05
Basin_#2	0.720	424.22	0.6	5.4		5.42	0.00011	1.19	484.48	212.39
Basin_#2	0.770	41.48	1	3.44		3.44	0.000034	0.42	128.04	84.71
Basin_#2	0.770	259.46	1	3.99		4.03	0.000531	1.92	177.98	94.85
Basin_#2	0.770	320.33	1	4.48		4.52	0.000409	1.88	227.02	106.68
Basin_#2	0.770	424.26	1	5.41		5.43	0.000231	1.67	372.25	240.32
Basin_#2	0.820	41.69	0.75	3.44		3.44	0.000031	0.41	150.15	126.51
Basin_#2	0.820	259.66	0.75	4.03		4.06	0.000389	1.67	230.04	145.07
Basin_#2	0.820	320.52	0.75	4.51		4.53	0.00027	1.54	300.88	149.88
Basin_#2	0.820	424.29	0.75	5.42		5.44	0.000148	1.34	455.03	220.66
Basin_#2	0.870	190.46	1.7	3.46		3.59	0.00349	3.05	76.35	104.18
Basin_#2	0.870	259.75	1.7	4.05		4.12	0.001274	2.34	141.26	115.69
Basin_#2	0.870	320.53	1.7	4.52		4.57	0.000742	2.07	196.67	120.91
Basin_#2	0.870	424.33	1.7	5.43		5.46	0.000328	1.7	331.84	222.54
Basin_#2	0.920	190.47	1.9	3.64		3.74	0.002958	3.15	91.81	115.73
Basin_#2	0.920	260.07	1.9	4.12		4.19	0.001472	2.65	156.35	169.43
Basin_#2	0.920	320.65	1.9	4.57		4.61	0.000744	2.14	240.02	199.66
Basin_#2	0.920	424.64	1.9	5.45		5.47	0.000248	1.5	452.92	294.41
Basin_#2	0.970	190.49	1.9	3.77	3.84	4.25	0.010351	5.87	42.09	63.58
Basin_#2	0.970	260.21	1.9	4.18		4.51	0.006326	5.29	69.99	76.25
Basin_#2	0.970	320.69	1.9	4.59		4.82	0.003754	4.59	102.3	93.52
Basin_#2	0.970	424.69	1.9	5.46		5.55	0.001301	3.29	224.94	279.67
Basin_#2	1.020	190.56	2.4	4.38		4.43	0.001054	1.91	111.11	80.3
Basin_#2	1.020	260.79	2.4	4.59		4.66	0.001254	2.26	128.32	81.2
Basin_#2	1.020	320.74	2.4	4.85		4.92	0.00118	2.39	149.2	84.2
Basin_#2	1.020	425.91	2.4	5.52		5.59	0.000739	2.28	230.02	213.47
Basin_#2	1.070	190.56	1.6	4.43		4.47	0.000497	1.68	136.5	89.67

Basin_#2	1.070	260.79	1.6	4.66	4.71	0.000636	2.02	157.14	99.7
Basin_#2	1.070	320.74	1.6	4.92	4.98	0.00065	2.18	181.23	119.53
Basin_#2	1.070	426.77	1.6	5.56	5.62	0.000481	2.14	252.8	249.29
Basin_#2	1.120	190.56	2.4	4.53	4.59	0.003969	1.96	97.65	93.75
Basin_#2	1.120	260.8	2.4	4.76	4.84	0.003872	2.21	119.52	95.75
Basin_#2	1.120	320.75	2.4	5	5.09	0.003302	2.28	143	98.13
Basin_#2	1.120	428.62	2.4	5.61	5.68	0.0019	2.16	209.59	221.29
Basin_#2	1.145*	190.57	3.1	4.64	4.76	0.00745	2.7	70.94	68.37
Basin_#2	1.145*	260.8	3.1	4.87	5.01	0.007456	3.06	85.9	69.54
Basin_#2	1.145*	320.77	3.1	5.09	5.25	0.006626	3.21	101.12	70.71
Basin_#2	1.145*	430.51	3.1	5.65	5.8	0.004174	3.14	140.31	116.58
Basin_#2	1.170	190.57	2.4	4.78	4.91	0.004094	3.17	77.72	51.03
Basin_#2	1.170	260.81	2.4	5	5.19	0.005316	3.84	88.78	52.32
Basin_#2	1.170	320.79	2.4	5.2	5.43	0.005857	4.26	99.52	53.54
Basin_#2	1.170	433.81	2.4	5.71	5.96	0.005311	4.57	130.98	99.04
Basin_#2	1.220	190.58	1.7	5	5.05	0.00126	1.81	105.18	45.54
Basin_#2	1.220	260.82	1.7	5.29	5.37	0.001658	2.2	118.64	51.61
Basin_#2	1.220	320.81	1.7	5.54	5.63	0.001933	2.46	130.35	57.78
Basin_#2	1.220	448.28	1.7	6.03	6.16	0.002182	2.9	154.62	273.43
Basin_#2	1.260	Culvert							
Basin_#2	1.300	190.59	2	6.05	6.13	0.001051	2.19	86.9	278.19
Basin_#2	1.300	260.83	2	6.88	6.98	0.000988	2.44	106.88	553.65
Basin_#2	1.300	320.84	2	7.61	7.62	0.000144	1.03	1101.16	1051.64
Basin_#2	1.300	454.28	2	7.94	7.95	0.000162	1.14	1481.07	1240.59
Basin_#2	1.350	190.56	1.4	6.15	6.2	0.000678	1.9	184.63	262.22
Basin_#2	1.350	260.84	1.4	7.01	7.05	0.000469	1.8	312.46	551.44
Basin_#2	1.350	320.9	1.4	7.63	7.63	0.000125	1	998.01	790.42
Basin_#2	1.350	454.32	1.4	7.95	7.95	0.000146	1.12	1299.47	1074.77
Basin_#2	1.400	190.66	1.7	6.2	6.23	0.000609	1.78	234.65	344.13
Basin_#2	1.400	260.87	1.7	7.04	7.06	0.00031	1.44	416.09	561.22
Basin_#2	1.400	320.95	1.7	7.63	7.64	0.000081	0.8	1075.75	824.45
Basin_#2	1.400	454.75	1.7	7.95	7.96	0.000094	0.89	1361.83	964.97
Basin_#2	1.450	190.7	2.2	6.22	6.27	0.000668	1.72	183.32	250.75
Basin_#2	1.450	261.01	2.2	7.06	7.08	0.000364	1.47	423.7	569.77
Basin_#2	1.450	321.26	2.2	7.64	7.65	0.000188	1.15	958.84	851.18
Basin_#2	1.450	454.9	2.2	7.96	7.97	0.000226	1.32	1259.14	1022.12
Basin_#2	1.500	191.44	2.9	6.27	6.27	0.00024	0.93	709.13	681.45
Basin_#2	1.500	261.38	2.9	7.08	7.08	0.000092	0.68	1319.59	817.06
Basin_#2	1.500	321.68	2.9	7.65	7.65	0.000059	0.6	1822.75	979.83
Basin_#2	1.500	455.72	2.9	7.97	7.97	0.000077	0.71	2174.6	1208.54

Existing Conditions - Mean Tide Level (falling)

10- through 100-year rainfall events

Hydraulic results at time of maximum water surface elevation

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)
Basin_#2	0.000	-4.77	-2.81	3.4	-2.37	3.4	0	-0.01	475.69	185.61
Basin_#2	0.000	-1.9	-2.81	3.4	-2.5	3.4	0	-0.01	475.69	185.61
Basin_#2	0.000	1.74	-2.81	3.4	-2.52	3.4	0	0	475.69	185.61
Basin_#2	0.000	6.81	-2.81	3.4	-2.31	3.4	0	0.02	475.69	185.61
Basin_#2	0.050	13.82	-2.4	3.4		3.4	0	0.04	490.7	214.42
Basin_#2	0.050	20.57	-2.4	3.4		3.4	0	0.06	490.7	214.42
Basin_#2	0.050	4.92	-2.4	3.4		3.4	0	0.02	490.7	214.42
Basin_#2	0.050	81.28	-2.4	3.4		3.4	0.000002	0.25	490.7	214.42
Basin_#2	0.100	13.84	-2.14	3.4		3.4	0	0.03	566.04	198.67
Basin_#2	0.100	20.59	-2.14	3.4		3.4	0	0.04	566.04	198.67
Basin_#2	0.100	31.12	-2.14	3.4		3.4	0	0.07	566.04	198.67
Basin_#2	0.100	81.87	-2.14	3.4		3.4	0.000001	0.17	566.11	198.68
Basin_#2	0.150	14.47	-2.07	3.4		3.4	0	0.03	615.69	223.99
Basin_#2	0.150	21.22	-2.07	3.4		3.4	0	0.04	615.69	223.99
Basin_#2	0.150	31.13	-2.07	3.4		3.4	0	0.07	615.69	223.99
Basin_#2	0.150	81.89	-2.07	3.4		3.4	0.000001	0.17	615.78	224
Basin_#2	0.300	15.05	-1.63	3.4		3.4	0	0.03	513.27	168.27
Basin_#2	0.300	21.79	-1.63	3.4		3.4	0	0.05	513.27	168.27
Basin_#2	0.300	31.69	-1.63	3.4		3.4	0	0.07	513.27	168.27
Basin_#2	0.300	82.45	-1.63	3.4		3.4	0.000001	0.18	513.35	168.28
Basin_#2	0.350	15.1	-1.5	3.4		3.4	0	0.05	360.7	155.86
Basin_#2	0.350	21.84	-1.5	3.4		3.4	0	0.08	360.7	155.86
Basin_#2	0.350	6.21	-1.5	3.4		3.4	0	0.02	360.7	155.86
Basin_#2	0.350	82.5	-1.5	3.4		3.4	0.000004	0.29	360.73	155.86
Basin_#2	0.400	15.18	-1.39	3.4		3.4	0	0.07	294.74	144.28
Basin_#2	0.400	2.87	-1.39	3.4		3.4	0	0.01	294.75	144.28
Basin_#2	0.400	6.55	-1.39	3.4		3.4	0	0.03	294.75	144.28
Basin_#2	0.400	82.59	-1.39	3.4		3.4	0.000006	0.39	294.75	144.28
Basin_#2	0.450	15.38	-0.9	3.4		3.4	0	0.04	396.73	185.08
Basin_#2	0.450	2.91	-0.9	3.4		3.4	0	0.01	396.74	185.08
Basin_#2	0.450	6.59	-0.9	3.4		3.4	0	0.02	396.74	185.09
Basin_#2	0.450	82.71	-0.9	3.4		3.4	0.000002	0.21	396.87	185.11
Basin_#2	0.485	Culvert								
Basin_#2	0.520	113.64	-0.7	6.59		6.59	0.000001	0.15	773.91	544.62
Basin_#2	0.520	126.3	-0.7	7.52		7.52	0.000001	0.14	903.93	912.43
Basin_#2	0.520	133.58	-0.7	8.1		8.1	0.000001	0.14	984.92	1061.01
Basin_#2	0.520	141.02	-0.7	8.72		8.72	0.000001	0.13	1072.48	1125.89

Basin_#2	0.570	105.75	-0.5	6.59	6.59	0.000003	0.23	599.61	507.96
Basin_#2	0.570	117.95	-0.5	7.52	7.52	0.000002	0.21	720.34	883.16
Basin_#2	0.570	124.86	-0.5	8.1	8.1	0.000001	0.2	795.55	1059.79
Basin_#2	0.570	131.89	-0.5	8.72	8.72	0.000001	0.19	876.87	1179.39
Basin_#2	0.620	96.47	-0.3	6.59	6.59	0.000001	0.16	779.12	324.26
Basin_#2	0.620	107.84	-0.3	7.52	7.52	0.000001	0.15	964.85	613.22
Basin_#2	0.620	114.09	-0.3	8.1	8.1	0.000001	0.14	1080.54	1061.24
Basin_#2	0.620	120.34	-0.3	8.72	8.72	0.000001	0.13	1205.6	1153.99
Basin_#2	0.670	96.48	0	6.59	6.59	0.000002	0.19	812.12	390.18
Basin_#2	0.670	107.84	0	7.52	7.52	0.000001	0.16	1053.43	696.96
Basin_#2	0.670	114.09	0	8.1	8.1	0.000001	0.15	1203.83	959.15
Basin_#2	0.670	120.36	0	8.72	8.72	0.000001	0.14	1366.41	1079.67
Basin_#2	0.720	96.49	0.4	6.59	6.59	0.000002	0.18	796.08	345.45
Basin_#2	0.720	107.86	0.4	7.52	7.52	0.000001	0.16	1106.01	822.61
Basin_#2	0.720	114.1	0.4	8.1	8.1	0.000001	0.15	1320.91	936.93
Basin_#2	0.720	120.37	0.4	8.72	8.72	0.000001	0.13	1568.13	1137.89
Basin_#2	0.770	96.5	0.5	6.59	6.59	0.000003	0.24	735.59	461.37
Basin_#2	0.770	107.84	0.5	7.52	7.52	0.000002	0.19	1212.37	866.48
Basin_#2	0.770	114.1	0.5	8.1	8.1	0.000001	0.17	1764.38	1021.29
Basin_#2	0.770	120.35	0.5	8.72	8.72	0.000001	0.14	2423.51	1071.85
Basin_#2	0.820	96.5	0.6	6.59	6.59	0.000002	0.2	827.39	466.21
Basin_#2	0.820	107.88	0.6	7.52	7.52	0.000001	0.16	1361.23	765.11
Basin_#2	0.820	114.09	0.6	8.1	8.1	0.000001	0.14	1865.22	918.29
Basin_#2	0.820	120.39	0.6	8.72	8.72	0.000001	0.12	2478.85	1043.05
Basin_#2	0.870	96.51	0.9	6.59	6.59	0.000003	0.23	741.57	508.28
Basin_#2	0.870	107.89	0.9	7.52	7.52	0.000002	0.18	1359.6	755.65
Basin_#2	0.870	114.12	0.9	8.1	8.1	0.000001	0.15	1822.86	854.9
Basin_#2	0.870	120.36	0.9	8.72	8.72	0.000001	0.13	2414.71	1009.39
Basin_#2	0.920	96.51	1	6.59	6.59	0.000003	0.2	932.65	646.3
Basin_#2	0.920	107.89	1	7.52	7.52	0.000001	0.15	1564.43	727.7
Basin_#2	0.920	114.12	1	8.1	8.1	0.000001	0.13	2001.97	796.8
Basin_#2	0.920	120.36	1	8.72	8.72	0	0.11	2550.95	958.66
Basin_#2	0.970	96.52	1.2	6.59	6.59	0.000009	0.34	642.36	392.1
Basin_#2	0.970	107.85	1.2	7.52	7.52	0.000004	0.24	1043.91	463.94
Basin_#2	0.970	114.13	1.2	8.1	8.1	0.000002	0.21	1352.3	617.3
Basin_#2	0.970	120.32	1.2	8.72	8.72	0.000002	0.18	1812.86	863.07
Basin_#2	1.020	96.52	1.4	6.59	6.59	0.000008	0.34	580.88	420.46
Basin_#2	1.020	107.91	1.4	7.52	7.52	0.000003	0.25	1118.33	645.72
Basin_#2	1.020	114.13	1.4	8.1	8.1	0.000002	0.2	1520.41	733.59
Basin_#2	1.020	120.38	1.4	8.72	8.72	0.000001	0.17	2010.98	843.95
Basin_#2	1.070	96.53	1.6	6.59	6.59	0.000006	0.29	680.18	513.45

Basin_#2	1.070	107.91	1.6	7.52	7.52	0.000003	0.21	1295.86	753.89
Basin_#2	1.070	114.09	1.6	8.1	8.1	0.000001	0.17	1735.14	765.71
Basin_#2	1.070	120.38	1.6	8.72	8.72	0.000001	0.14	2224.67	815.79
Basin_#2	1.120	96.61	1.7	6.59	6.59	0.000007	0.24	641.51	455.51
Basin_#2	1.120	107.92	1.7	7.52	7.52	0.000003	0.18	1112.39	597.96
Basin_#2	1.120	114.15	1.7	8.1	8.1	0.000002	0.16	1497.85	712.55
Basin_#2	1.120	120.44	1.7	8.72	8.72	0.000001	0.13	1961.9	770.94
Basin_#2	1.170	96.53	1.7	6.59	6.6	0.000042	0.65	366.09	331.84
Basin_#2	1.170	107.99	1.7	7.52	7.52	0.000014	0.43	781.96	580.3
Basin_#2	1.170	114.16	1.7	8.1	8.1	0.000008	0.33	1161.4	740.87
Basin_#2	1.170	120.39	1.7	8.72	8.72	0.000003	0.24	1714.17	1018.26
Basin_#2	1.220	96.71	1.8	6.59	6.6	0.000027	0.44	406.47	430.96
Basin_#2	1.220	108.06	1.8	7.52	7.52	0.000008	0.29	983.91	835.09
Basin_#2	1.220	114.17	1.8	8.1	8.1	0.000004	0.22	1538.29	1064.87
Basin_#2	1.220	120.33	1.8	8.72	8.72	0.000002	0.16	2251.78	1247.14
Basin_#2	1.260	Culvert							
Basin_#2	1.300	175.66	2	6.71	6.72	0.000313	0.96	455.9	490.67
Basin_#2	1.300	108.35	2	7.52	7.53	0.000023	0.3	1010.21	967.6
Basin_#2	1.300	114.3	2	8.1	8.1	0.000008	0.19	1684.51	1270.31
Basin_#2	1.300	120.6	2	8.72	8.72	0.000003	0.12	2507.16	1363.15
Basin_#2	1.350	176.26	2	6.72	6.73	0.000393	0.83	427.44	483.83
Basin_#2	1.350	108.5	2	7.53	7.53	0.000024	0.24	909.78	753.42
Basin_#2	1.350	114.45	2	8.1	8.1	0.000009	0.15	1463.08	1152.75
Basin_#2	1.350	120.68	2	8.72	8.72	0.000003	0.1	2240.86	1315.38
Basin_#2	1.400	177.34	2.1	6.74	6.74	0.000119	0.75	514.77	496.64
Basin_#2	1.400	108.59	2.1	7.53	7.53	0.00001	0.24	983.98	762.2
Basin_#2	1.400	114.38	2.1	8.1	8.1	0.000004	0.17	1504	1045.24
Basin_#2	1.400	120.61	2.1	8.72	8.72	0.000002	0.12	2240.96	1295.22
Basin_#2	1.450	177.47	2.2	6.74	6.75	0.000179	0.97	387.73	503
Basin_#2	1.450	108.59	2.2	7.53	7.53	0.000018	0.36	866.42	792.53
Basin_#2	1.450	114.38	2.2	8.1	8.1	0.000008	0.27	1411.68	1105.94
Basin_#2	1.450	120.62	2.2	8.72	8.72	0.000004	0.21	2218.4	1481.93
Basin_#2	1.500	178.7	2.5	6.75	6.75	0.000063	0.69	1066.63	773.01
Basin_#2	1.500	108.79	2.5	7.53	7.53	0.000007	0.26	1713.22	926.06
Basin_#2	1.500	114.56	2.5	8.1	8.1	0.000004	0.21	2343.48	1270.29
Basin_#2	1.500	120.8	2.5	8.72	8.72	0.000002	0.16	3230.45	1557.31

Proposed Conditions - Mean Tide Level (falling)

10- through 100-year rainfall events

Hydraulic results at time of maximum water surface elevation

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)
Basin_#2	0.000	-1.79	-2.81	3.4	-2.51	3.4	0	-0.01	475.69	185.61
Basin_#2	0.000	0.07	-2.81	3.4	-2.72	3.4	0	0	475.69	185.61
Basin_#2	0.000	-2.69	-2.81	3.4	-2.46	3.4	0	-0.01	475.69	185.61
Basin_#2	0.000	-2.93	-2.81	3.4	-2.44	3.4	0	-0.01	475.69	185.61
Basin_#2	0.050	34.3	-2.4	3.4		3.4	0.000001	0.12	491.18	214.51
Basin_#2	0.050	28.23	-2.4	3.4		3.4	0	0.1	490.99	214.48
Basin_#2	0.050	32.34	-2.4	3.4		3.4	0.000001	0.11	491.12	214.5
Basin_#2	0.050	35.79	-2.4	3.4		3.4	0.000001	0.13	491.18	214.51
Basin_#2	0.100	34.56	-2.14	3.4		3.41	0	0.08	566.89	198.73
Basin_#2	0.100	28.39	-2.14	3.4		3.4	0	0.06	566.55	198.71
Basin_#2	0.100	32.5	-2.14	3.4		3.4	0	0.07	566.79	198.72
Basin_#2	0.100	36.01	-2.14	3.4		3.41	0	0.08	566.89	198.73
Basin_#2	0.150	34.94	-2.07	3.41		3.41	0	0.08	617	224.1
Basin_#2	0.150	26.12	-2.07	3.4		3.4	0	0.06	616.48	224.06
Basin_#2	0.150	32.67	-2.07	3.41		3.41	0	0.07	616.85	224.09
Basin_#2	0.150	36.33	-2.07	3.41		3.41	0	0.08	617.01	224.1
Basin_#2	0.300	32.99	-1.63	3.41		3.41	0	0.07	514.89	168.39
Basin_#2	0.300	25.64	-1.63	3.41		3.41	0	0.06	514.25	168.34
Basin_#2	0.300	30.54	-1.63	3.41		3.41	0	0.07	514.68	168.37
Basin_#2	0.300	34.21	-1.63	3.41		3.41	0	0.08	514.9	168.39
Basin_#2	0.350	31	-1.5	3.41		3.41	0.000001	0.12	362.41	156.01
Basin_#2	0.350	26.37	-1.5	3.41		3.41	0.000001	0.1	361.77	155.95
Basin_#2	0.350	29.23	-1.5	3.41		3.41	0.000001	0.11	362.18	155.99
Basin_#2	0.350	32.14	-1.5	3.41		3.41	0.000001	0.12	362.43	156.01
Basin_#2	0.400	29.06	-1.39	3.41		3.42	0.000001	0.15	296.41	144.5
Basin_#2	0.400	26.9	-1.39	3.41		3.41	0.000001	0.14	295.79	144.42
Basin_#2	0.400	23.44	-1.39	3.41		3.41	0.000001	0.12	296.18	144.47
Basin_#2	0.400	30	-1.39	3.42		3.42	0.000001	0.16	296.42	144.5
Basin_#2	0.450	20.74	-0.9	3.44		3.44	0	0.05	400.56	185.86
Basin_#2	0.450	26.11	-0.9	3.42		3.42	0	0.07	398.39	185.42
Basin_#2	0.450	20.93	-0.9	3.42		3.42	0	0.05	398.83	185.51
Basin_#2	0.450	23.13	-0.9	3.43		3.43	0	0.06	399.04	185.55
Basin_#2	0.485	Inl Struct								
Basin_#2	0.520	-19.55	-0.7	3.46	-0.37	3.46	0.000001	0.06	335.68	208.56
Basin_#2	0.520	323.7	-0.7	3.92	0.84	3.93	0.00009	0.81	400.06	269.65
Basin_#2	0.520	386.19	-0.7	4.42	0.97	4.43	0.000074	0.82	470.81	310.98
Basin_#2	0.520	499.15	-0.7	5.37	1.2	5.39	0.000054	0.83	603.94	509.61

Basin_#2	0.570	6.07	-0.2	3.44		3.44	0	0.05	184.03	207.42
Basin_#2	0.570	293.54	-0.2	3.92		3.96	0.000304	1.7	246.48	226.14
Basin_#2	0.570	355.26	-0.2	4.43		4.46	0.000224	1.59	312.01	248.93
Basin_#2	0.570	464.3	-0.2	5.38		5.4	0.000138	1.44	435.46	266.74
Basin_#2	0.620	8.9	0	3.44		3.44	0	0.05	205.19	145.26
Basin_#2	0.620	259.18	0	3.96		3.97	0.000176	1.14	285.54	174.78
Basin_#2	0.620	320.18	0	4.46		4.47	0.000134	1.11	369.88	209.55
Basin_#2	0.620	424.76	0	5.4		5.41	0.000082	1.02	539.33	251.91
Basin_#2	0.670	9.62	0	3.45		3.45	0.000001	0.08	187.83	137.18
Basin_#2	0.670	259.33	0	3.97		3.99	0.000237	1.5	261.64	145.93
Basin_#2	0.670	320.32	0	4.46		4.48	0.000178	1.42	337.48	163.59
Basin_#2	0.670	424.8	0	5.4		5.42	0.000104	1.25	517.81	270.53
Basin_#2	0.720	11.29	0.6	3.45		3.45	0.000001	0.08	181.2	125.39
Basin_#2	0.720	259.45	0.6	3.98		4	0.000241	1.35	250.35	133.58
Basin_#2	0.720	320.33	0.6	4.47		4.49	0.000183	1.3	317.85	144.98
Basin_#2	0.720	424.83	0.6	5.41		5.42	0.00011	1.18	485.68	213.07
Basin_#2	0.770	12.82	1	3.45		3.45	0.000003	0.13	129.12	84.9
Basin_#2	0.770	259.56	1	3.99		4.03	0.000535	1.93	177.53	94.74
Basin_#2	0.770	320.44	1	4.48		4.51	0.00041	1.88	226.78	106.63
Basin_#2	0.770	424.87	1	5.41		5.44	0.00023	1.67	373.6	240.42
Basin_#2	0.820	14.39	0.75	3.45		3.45	0.000004	0.14	151.75	126.86
Basin_#2	0.820	259.75	0.75	4.03		4.05	0.000393	1.68	229.37	145.02
Basin_#2	0.820	320.53	0.75	4.51		4.53	0.000271	1.54	300.55	149.87
Basin_#2	0.820	424.9	0.75	5.43		5.45	0.000148	1.34	456.26	220.9
Basin_#2	0.870	190.45	1.7	3.45		3.59	0.003567	3.07	75.65	104.01
Basin_#2	0.870	259.84	1.7	4.04		4.11	0.001288	2.35	140.76	115.67
Basin_#2	0.870	320.54	1.7	4.52		4.57	0.000745	2.07	196.41	120.87
Basin_#2	0.870	424.93	1.7	5.43		5.46	0.000326	1.7	333.08	223.4
Basin_#2	0.920	190.44	1.9	3.63		3.73	0.002987	3.16	91.48	115.69
Basin_#2	0.920	260.15	1.9	4.12		4.18	0.001488	2.66	155.74	169.08
Basin_#2	0.920	320.66	1.9	4.57		4.61	0.000747	2.14	239.62	199.6
Basin_#2	0.920	425.23	1.9	5.46		5.48	0.000246	1.5	454.51	294.72
Basin_#2	0.970	190.47	1.9	3.77	3.84	4.25	0.0104	5.88	41.99	63.56
Basin_#2	0.970	260.28	1.9	4.18		4.51	0.006377	5.31	69.77	76.02
Basin_#2	0.970	320.69	1.9	4.59		4.82	0.003768	4.6	102.15	93.39
Basin_#2	0.970	425.28	1.9	5.46		5.55	0.001292	3.28	226.05	280.21
Basin_#2	1.020	190.56	2.4	4.38		4.43	0.001052	1.91	111.19	80.3
Basin_#2	1.020	260.78	2.4	4.59		4.66	0.001254	2.26	128.32	81.2
Basin_#2	1.020	320.73	2.4	4.85		4.92	0.001182	2.4	149.12	84.16
Basin_#2	1.020	426.47	2.4	5.53		5.59	0.000736	2.28	230.81	214.03
Basin_#2	1.070	190.56	1.6	4.43		4.47	0.000496	1.68	136.58	89.75

Basin_#2	1.070	260.78	1.6	4.66	4.71	0.000636	2.02	157.14	99.7
Basin_#2	1.070	320.73	1.6	4.91	4.98	0.000651	2.18	181.16	119.49
Basin_#2	1.070	427.32	1.6	5.57	5.62	0.00048	2.14	253.46	250.09
Basin_#2	1.120	190.56	2.4	4.53	4.59	0.003961	1.96	97.71	93.75
Basin_#2	1.120	260.79	2.4	4.76	4.84	0.003872	2.21	119.51	95.75
Basin_#2	1.120	320.74	2.4	5	5.09	0.003306	2.29	142.94	98.08
Basin_#2	1.120	429.14	2.4	5.62	5.69	0.001891	2.16	210.12	223.33
Basin_#2	1.145*	190.57	3.1	4.64	4.76	0.00744	2.7	70.97	68.37
Basin_#2	1.145*	260.8	3.1	4.87	5.01	0.007456	3.06	85.9	69.54
Basin_#2	1.145*	320.75	3.1	5.09	5.25	0.006633	3.21	101.08	70.71
Basin_#2	1.145*	431	3.1	5.66	5.81	0.004157	3.14	140.62	118.43
Basin_#2	1.170	190.57	2.4	4.78	4.91	0.004093	3.17	77.73	51.03
Basin_#2	1.170	260.81	2.4	5	5.19	0.005316	3.84	88.78	52.32
Basin_#2	1.170	320.79	2.4	5.2	5.43	0.00586	4.26	99.5	53.54
Basin_#2	1.170	434.3	2.4	5.71	5.97	0.005298	4.56	131.26	100.7
Basin_#2	1.220	190.58	1.7	5	5.05	0.00126	1.81	105.19	45.54
Basin_#2	1.220	260.82	1.7	5.29	5.37	0.001658	2.2	118.64	51.61
Basin_#2	1.220	320.81	1.7	5.54	5.63	0.001934	2.46	130.34	57.77
Basin_#2	1.220	448.56	1.7	6.03	6.16	0.002179	2.9	154.74	274.08
Basin_#2	1.260	Culvert							
Basin_#2	1.300	190.59	2	6.05	6.13	0.001051	2.19	86.9	278.19
Basin_#2	1.300	260.83	2	6.88	6.98	0.000988	2.44	106.88	553.65
Basin_#2	1.300	320.84	2	7.61	7.62	0.000144	1.03	1101.16	1051.64
Basin_#2	1.300	454.28	2	7.94	7.95	0.000162	1.14	1481.07	1240.59
Basin_#2	1.350	190.56	1.4	6.15	6.2	0.000678	1.9	184.63	262.22
Basin_#2	1.350	260.84	1.4	7.01	7.05	0.000469	1.8	312.46	551.44
Basin_#2	1.350	320.9	1.4	7.63	7.63	0.000125	1	998.01	790.42
Basin_#2	1.350	454.32	1.4	7.95	7.95	0.000146	1.12	1299.47	1074.77
Basin_#2	1.400	190.66	1.7	6.2	6.23	0.000609	1.78	234.65	344.13
Basin_#2	1.400	260.87	1.7	7.04	7.06	0.00031	1.44	416.09	561.22
Basin_#2	1.400	320.95	1.7	7.63	7.64	0.000081	0.8	1075.75	824.45
Basin_#2	1.400	454.75	1.7	7.95	7.96	0.000094	0.89	1361.83	964.97
Basin_#2	1.450	190.7	2.2	6.22	6.27	0.000668	1.72	183.32	250.75
Basin_#2	1.450	261.01	2.2	7.06	7.08	0.000364	1.47	423.7	569.77
Basin_#2	1.450	320.96	2.2	7.64	7.65	0.000188	1.15	958.84	851.18
Basin_#2	1.450	454.9	2.2	7.96	7.97	0.000226	1.32	1259.14	1022.12
Basin_#2	1.500	191.44	2.9	6.27	6.27	0.00024	0.93	709.13	681.45
Basin_#2	1.500	261.38	2.9	7.08	7.08	0.000092	0.68	1319.59	817.06
Basin_#2	1.500	321.68	2.9	7.65	7.65	0.000059	0.6	1822.75	979.83
Basin_#2	1.500	455.72	2.9	7.97	7.97	0.000077	0.71	2174.6	1208.54

Existing Conditions - Mean High Water

10- through 100-year rainfall events

Hydraulic results at time of maximum water surface elevation

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)
Basin_#2	0.000	-8.63	-2.81	3.4	-2.24	3.4	0	-0.02	475.69	185.61
Basin_#2	0.000	-8.63	-2.81	3.4	-2.24	3.4	0	-0.02	475.69	185.61
Basin_#2	0.000	-8.63	-2.81	3.4	-2.24	3.4	0	-0.02	475.69	185.61
Basin_#2	0.000	-8.63	-2.81	3.4	-2.24	3.4	0	-0.02	475.69	185.61
Basin_#2	0.050	93.41	-2.4	3.4		3.4	0.000003	0.29	490.73	214.43
Basin_#2	0.050	109.71	-2.4	3.4		3.4	0.000004	0.34	490.73	214.43
Basin_#2	0.050	117.5	-2.4	3.4		3.4	0.000005	0.36	490.73	214.43
Basin_#2	0.050	124.97	-2.4	3.4		3.4	0.000005	0.39	490.73	214.43
Basin_#2	0.100	94.17	-2.14	3.4		3.4	0.000001	0.2	566.16	198.68
Basin_#2	0.100	110.37	-2.14	3.4		3.4	0.000002	0.23	566.19	198.68
Basin_#2	0.100	118.16	-2.14	3.4		3.4	0.000002	0.25	566.21	198.68
Basin_#2	0.100	125.61	-2.14	3.4		3.4	0.000002	0.27	566.23	198.68
Basin_#2	0.150	94.2	-2.07	3.4		3.4	0.000001	0.2	615.87	224.01
Basin_#2	0.150	110.39	-2.07	3.4		3.4	0.000002	0.23	615.9	224.01
Basin_#2	0.150	118.18	-2.07	3.4		3.4	0.000002	0.25	615.92	224.01
Basin_#2	0.150	125.63	-2.07	3.4		3.4	0.000002	0.26	615.95	224.02
Basin_#2	0.300	94.93	-1.63	3.4		3.4	0.000002	0.21	513.46	168.28
Basin_#2	0.300	111.01	-1.63	3.4		3.4	0.000003	0.24	513.47	168.29
Basin_#2	0.300	118.81	-1.63	3.4		3.4	0.000003	0.26	513.5	168.29
Basin_#2	0.300	126.26	-1.63	3.4		3.4	0.000003	0.28	513.52	168.29
Basin_#2	0.350	95	-1.5	3.4		3.4	0.000005	0.34	360.84	155.87
Basin_#2	0.350	111.06	-1.5	3.4		3.4	0.000007	0.4	360.83	155.87
Basin_#2	0.350	118.88	-1.5	3.4		3.41	0.000008	0.42	360.84	155.87
Basin_#2	0.350	126.32	-1.5	3.4		3.41	0.00001	0.45	360.85	155.87
Basin_#2	0.400	95.09	-1.39	3.4		3.41	0.000009	0.44	294.85	144.3
Basin_#2	0.400	111.15	-1.39	3.4		3.41	0.000012	0.52	294.83	144.29
Basin_#2	0.400	118.97	-1.39	3.4		3.41	0.000013	0.56	294.83	144.29
Basin_#2	0.400	126.61	-1.39	3.4		3.41	0.000015	0.59	294.84	144.29
Basin_#2	0.450	95.36	-0.9	3.4		3.41	0.000003	0.24	396.99	185.14
Basin_#2	0.450	111.38	-0.9	3.41		3.41	0.000004	0.28	397.04	185.15
Basin_#2	0.450	119.19	-0.9	3.41		3.41	0.000004	0.3	397.08	185.15
Basin_#2	0.450	126.63	-0.9	3.41		3.41	0.000005	0.32	397.12	185.16
Basin_#2	0.485	Culvert								
Basin_#2	0.520	110.74	-0.7	6.71		6.71	0.000001	0.14	790.44	563.98
Basin_#2	0.520	126.84	-0.7	7.56		7.56	0.000001	0.14	909.78	933.59
Basin_#2	0.520	133.82	-0.7	8.12		8.12	0.000001	0.14	987.71	1062.64
Basin_#2	0.520	141.1	-0.7	8.73		8.73	0.000001	0.13	1073.42	1126.59

Basin_#2	0.570	102.95	-0.5	6.71	6.71	0.000002	0.22	614.96	534.64
Basin_#2	0.570	118.46	-0.5	7.56	7.56	0.000002	0.21	725.78	920.67
Basin_#2	0.570	125.09	-0.5	8.12	8.12	0.000001	0.2	798.14	1061.71
Basin_#2	0.570	131.96	-0.5	8.73	8.73	0.000001	0.19	877.75	1181.31
Basin_#2	0.620	93.78	-0.3	6.71	6.71	0.000001	0.15	802.73	327.49
Basin_#2	0.620	108.31	-0.3	7.56	7.56	0.000001	0.15	973.21	649.25
Basin_#2	0.620	114.3	-0.3	8.12	8.12	0.000001	0.14	1084.52	1067.92
Basin_#2	0.620	120.41	-0.3	8.73	8.73	0.000001	0.13	1206.95	1154.83
Basin_#2	0.670	93.79	0	6.71	6.71	0.000002	0.18	842.68	420.74
Basin_#2	0.670	108.32	0	7.56	7.56	0.000001	0.16	1064.3	708.99
Basin_#2	0.670	114.31	0	8.12	8.12	0.000001	0.15	1209.01	967.69
Basin_#2	0.670	120.42	0	8.73	8.73	0.000001	0.14	1368.17	1081.93
Basin_#2	0.720	93.79	0.4	6.71	6.71	0.000002	0.17	834.03	381.32
Basin_#2	0.720	108.33	0.4	7.56	7.56	0.000001	0.16	1120.77	837.44
Basin_#2	0.720	114.31	0.4	8.12	8.12	0.000001	0.15	1328.61	944.82
Basin_#2	0.720	120.44	0.4	8.73	8.73	0.000001	0.13	1570.83	1139.82
Basin_#2	0.770	93.8	0.5	6.71	6.71	0.000003	0.23	790.73	472.99
Basin_#2	0.770	108.33	0.5	7.56	7.56	0.000002	0.19	1248.77	875.33
Basin_#2	0.770	114.33	0.5	8.12	8.12	0.000001	0.17	1784.78	1025.37
Basin_#2	0.770	120.46	0.5	8.73	8.73	0.000001	0.14	2430.76	1072.04
Basin_#2	0.820	93.8	0.6	6.71	6.71	0.000002	0.18	884.15	495.26
Basin_#2	0.820	108.34	0.6	7.56	7.56	0.000001	0.16	1393.73	789.44
Basin_#2	0.820	114.32	0.6	8.12	8.12	0.000001	0.14	1883.57	923.51
Basin_#2	0.820	120.47	0.6	8.73	8.73	0.000001	0.12	2485.91	1047.22
Basin_#2	0.870	93.81	0.9	6.71	6.71	0.000003	0.21	804.92	564.44
Basin_#2	0.870	108.35	0.9	7.56	7.56	0.000002	0.18	1391.37	764.62
Basin_#2	0.870	114.29	0.9	8.12	8.12	0.000001	0.15	1839.94	858.83
Basin_#2	0.870	120.44	0.9	8.73	8.73	0.000001	0.13	2421.53	1010.12
Basin_#2	0.920	93.82	1	6.71	6.71	0.000002	0.18	1009.06	649.73
Basin_#2	0.920	108.35	1	7.56	7.56	0.000001	0.15	1594.88	729.51
Basin_#2	0.920	114.33	1	8.12	8.12	0.000001	0.13	2017.88	799.88
Basin_#2	0.920	120.45	1	8.73	8.73	0	0.11	2557.44	962.05
Basin_#2	0.970	93.83	1.2	6.71	6.71	0.000007	0.31	689.1	400.8
Basin_#2	0.970	108.35	1.2	7.56	7.56	0.000003	0.24	1063.35	467.16
Basin_#2	0.970	114.33	1.2	8.12	8.12	0.000002	0.21	1364.66	623.91
Basin_#2	0.970	120.45	1.2	8.73	8.73	0.000002	0.18	1818.7	866.08
Basin_#2	1.020	93.83	1.4	6.71	6.71	0.000006	0.32	634.61	483.66
Basin_#2	1.020	108.4	1.4	7.56	7.56	0.000003	0.25	1145.5	654.04
Basin_#2	1.020	114.29	1.4	8.12	8.12	0.000002	0.2	1535.05	735.56
Basin_#2	1.020	120.46	1.4	8.73	8.73	0.000001	0.17	2016.69	845.96
Basin_#2	1.070	93.84	1.6	6.71	6.71	0.000005	0.27	743.55	565.55

Basin_#2	1.070	108.41	1.6	7.56	7.56	0.000002	0.21	1327.38	754.67
Basin_#2	1.070	114.29	1.6	8.12	8.12	0.000001	0.17	1750.4	766.04
Basin_#2	1.070	120.46	1.6	8.73	8.73	0.000001	0.14	2230.19	816.66
Basin_#2	1.120	93.85	1.7	6.71	6.71	0.000005	0.22	695.46	461.02
Basin_#2	1.120	108.41	1.7	7.56	7.56	0.000003	0.18	1137.62	612.62
Basin_#2	1.120	114.35	1.7	8.12	8.12	0.000002	0.16	1512.06	713.92
Basin_#2	1.120	120.47	1.7	8.73	8.73	0.000001	0.13	1967.11	771.45
Basin_#2	1.170	93.85	1.7	6.71	6.71	0.000033	0.59	406.3	349.78
Basin_#2	1.170	108.47	1.7	7.56	7.56	0.000014	0.42	806.38	587.32
Basin_#2	1.170	114.36	1.7	8.12	8.12	0.000007	0.33	1176.22	747.42
Basin_#2	1.170	120.48	1.7	8.73	8.73	0.000003	0.24	1721.05	1020.31
Basin_#2	1.220	93.94	1.8	6.71	6.71	0.000022	0.4	458.99	465.46
Basin_#2	1.220	108.55	1.8	7.56	7.56	0.000008	0.28	1019.35	858.46
Basin_#2	1.220	114.36	1.8	8.12	8.12	0.000004	0.21	1559.57	1073.74
Basin_#2	1.220	120.42	1.8	8.73	8.73	0.000002	0.16	2260.22	1251.88
Basin_#2	1.260	Culvert							
Basin_#2	1.300	96.84	2	6.73	6.74	0.00009	0.52	469.5	502.14
Basin_#2	1.300	108.82	2	7.57	7.57	0.000022	0.29	1051.22	1004.83
Basin_#2	1.300	114.63	2	8.12	8.12	0.000008	0.19	1709.85	1272.91
Basin_#2	1.300	120.69	2	8.73	8.73	0.000003	0.12	2516.35	1364.6
Basin_#2	1.350	97.64	2	6.74	6.74	0.000117	0.45	434.62	487.11
Basin_#2	1.350	108.9	2	7.57	7.57	0.000022	0.23	941.37	767.79
Basin_#2	1.350	114.57	2	8.12	8.12	0.000008	0.15	1486.11	1160.41
Basin_#2	1.350	120.77	2	8.73	8.73	0.000003	0.1	2249.72	1316.44
Basin_#2	1.400	177.03	2.1	6.75	6.75	0.000116	0.74	520.38	497.98
Basin_#2	1.400	108.98	2.1	7.57	7.57	0.00001	0.24	1016.02	783.11
Basin_#2	1.400	114.65	2.1	8.12	8.12	0.000004	0.17	1524.92	1056.65
Basin_#2	1.400	120.78	2.1	8.73	8.73	0.000002	0.12	2249.7	1297.97
Basin_#2	1.450	177.04	2.2	6.75	6.76	0.000174	0.96	393.37	505.12
Basin_#2	1.450	108.99	2.2	7.57	7.57	0.000017	0.35	899.71	814.22
Basin_#2	1.450	114.57	2.2	8.12	8.12	0.000008	0.27	1433.78	1115.53
Basin_#2	1.450	120.62	2.2	8.73	8.73	0.000004	0.21	2228.39	1484.9
Basin_#2	1.500	177.57	2.5	6.76	6.77	0.000061	0.68	1075.06	774
Basin_#2	1.500	109.19	2.5	7.57	7.57	0.000007	0.26	1751.79	937.25
Basin_#2	1.500	114.66	2.5	8.12	8.12	0.000004	0.21	2368.78	1273.83
Basin_#2	1.500	120.71	2.5	8.73	8.73	0.000002	0.16	3240.95	1558.57

Proposed Conditions - Mean High Water

10- through 100-year rainfall events

Hydraulic results at time of maximum water surface elevation

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)
Basin_#2	0.000	-5.88	-2.81	3.4	-2.33	3.4	0	-0.02	475.69	185.61
Basin_#2	0.000	-5.88	-2.81	3.4	-2.33	3.4	0	-0.02	475.69	185.61
Basin_#2	0.000	-5.29	-2.81	3.4	-2.35	3.4	0	-0.02	475.69	185.61
Basin_#2	0.000	-5.29	-2.81	3.4	-2.35	3.4	0	-0.02	475.69	185.61
Basin_#2	0.050	242.36	-2.4	3.4		3.41	0.000036	0.85	490.75	214.43
Basin_#2	0.050	323.55	-2.4	3.4		3.42	0.000063	1.14	490.81	214.44
Basin_#2	0.050	385.17	-2.4	3.4		3.43	0.00009	1.35	490.88	214.46
Basin_#2	0.050	495.2	-2.4	3.4		3.44	0.000148	1.74	491.03	214.48
Basin_#2	0.100	243.28	-2.14	3.41		3.41	0.000014	0.53	567.08	198.74
Basin_#2	0.100	324.98	-2.14	3.41		3.42	0.000025	0.71	567.94	198.8
Basin_#2	0.100	386.95	-2.14	3.41		3.43	0.000035	0.84	568.77	198.86
Basin_#2	0.100	511.41	-2.14	3.42		3.44	0.000061	1.11	570.74	199
Basin_#2	0.150	243.29	-2.07	3.41		3.41	0.000014	0.54	617.01	224.1
Basin_#2	0.150	324.99	-2.07	3.41		3.42	0.000026	0.73	618.1	224.19
Basin_#2	0.150	386.96	-2.07	3.42		3.43	0.000036	0.86	619.17	224.28
Basin_#2	0.150	511.29	-2.07	3.43		3.45	0.000062	1.14	621.65	224.48
Basin_#2	0.300	243.65	-1.63	3.41		3.41	0.00002	0.55	514.65	168.37
Basin_#2	0.300	325.04	-1.63	3.42		3.42	0.000035	0.74	515.81	168.45
Basin_#2	0.300	387.43	-1.63	3.42		3.43	0.00005	0.88	516.94	168.53
Basin_#2	0.300	511.01	-1.63	3.44		3.46	0.000085	1.15	519.51	168.71
Basin_#2	0.350	243.66	-1.5	3.41		3.42	0.00006	0.94	361.49	155.93
Basin_#2	0.350	325.08	-1.5	3.41		3.43	0.000106	1.25	362.21	155.99
Basin_#2	0.350	387.45	-1.5	3.42		3.45	0.00015	1.49	362.91	156.06
Basin_#2	0.350	498.57	-1.5	3.43		3.48	0.000246	1.91	364.5	156.2
Basin_#2	0.400	243.7	-1.39	3.41		3.43	0.000099	1.26	295.25	144.35
Basin_#2	0.400	325.14	-1.39	3.41		3.45	0.000175	1.68	295.73	144.41
Basin_#2	0.400	387.5	-1.39	3.41		3.47	0.000248	2	296.21	144.47
Basin_#2	0.400	498.6	-1.39	3.42		3.52	0.000408	2.57	297.3	144.61
Basin_#2	0.450	243.76	-0.9	3.42		3.43	0.000024	0.61	398.94	185.53
Basin_#2	0.450	325.29	-0.9	3.44		3.45	0.000042	0.81	400.74	185.9
Basin_#2	0.450	387.72	-0.9	3.46		3.47	0.000059	0.97	402.48	186.26
Basin_#2	0.450	511.31	-0.9	3.5		3.53	0.0001	1.26	406.61	187.1
Basin_#2	0.485	Inl Struct								
Basin_#2	0.520	243.79	-0.7	3.83	0.63	3.84	0.000056	0.63	388.24	253.44
Basin_#2	0.520	325.75	-0.7	4.13	0.84	4.14	0.000072	0.76	429.31	297.98
Basin_#2	0.520	390.65	-0.7	4.42	0.98	4.43	0.000077	0.83	469.88	310.39
Basin_#2	0.520	511.6	-0.7	5.26	1.23	5.28	0.000062	0.87	588.54	502.92

Basin_#2	0.570	218.75	-0.2	3.84	3.86	0.000193	1.33	235.21	219.41
Basin_#2	0.570	294.25	-0.2	4.13	4.16	0.000227	1.52	273.51	238.48
Basin_#2	0.570	357.87	-0.2	4.42	4.45	0.000229	1.61	311.18	248.83
Basin_#2	0.570	475.02	-0.2	5.27	5.29	0.00016	1.52	421.23	265.19
Basin_#2	0.620	190.35	0	3.86	3.87	0.000111	0.89	269.16	170.67
Basin_#2	0.620	257.98	0	4.16	4.17	0.00013	1.03	319.34	191.9
Basin_#2	0.620	320.26	0	4.45	4.47	0.000135	1.11	368.96	209.09
Basin_#2	0.620	433.43	0	5.29	5.31	0.000095	1.08	519.44	250.23
Basin_#2	0.670	190.35	0	3.86	3.88	0.00015	1.17	246.81	144.33
Basin_#2	0.670	258.18	0	4.16	4.18	0.000174	1.33	291.07	150.22
Basin_#2	0.670	320.43	0	4.46	4.48	0.00018	1.42	336.61	163.33
Basin_#2	0.670	433.48	0	5.3	5.31	0.000121	1.33	495.2	240.32
Basin_#2	0.720	190.39	0.6	3.87	3.88	0.000153	1.05	236.13	132.22
Basin_#2	0.720	258.35	0.6	4.17	4.19	0.000179	1.21	276.64	135.8
Basin_#2	0.720	320.44	0.6	4.47	4.48	0.000184	1.3	317.09	144.82
Basin_#2	0.720	433.49	0.6	5.3	5.32	0.000128	1.26	463.83	204.15
Basin_#2	0.770	190.39	1	3.88	3.9	0.000339	1.49	167.18	92.23
Basin_#2	0.770	258.51	1	4.18	4.21	0.0004	1.74	196.18	99.77
Basin_#2	0.770	320.59	1	4.47	4.51	0.000414	1.89	226.23	106.53
Basin_#2	0.770	433.5	1	5.31	5.34	0.00027	1.77	348.85	230.11
Basin_#2	0.820	190.39	0.75	3.9	3.92	0.000259	1.32	211.64	139.14
Basin_#2	0.820	258.92	0.75	4.21	4.23	0.000283	1.48	256.14	146.97
Basin_#2	0.820	320.97	0.75	4.5	4.53	0.000273	1.55	299.83	149.83
Basin_#2	0.820	433.66	0.75	5.33	5.35	0.000172	1.42	434.78	203.34
Basin_#2	0.870	190.4	1.7	3.91	3.96	0.000944	1.92	125.89	113.69
Basin_#2	0.870	259.04	1.7	4.22	4.27	0.000865	2.05	161.35	116.74
Basin_#2	0.870	320.97	1.7	4.51	4.56	0.000753	2.08	195.84	120.78
Basin_#2	0.870	433.5	1.7	5.33	5.37	0.000389	1.82	312.29	190.54
Basin_#2	0.920	190.41	1.9	3.97	4.01	0.001076	2.15	131.54	130.05
Basin_#2	0.920	259.43	1.9	4.28	4.32	0.00097	2.25	183.05	182.3
Basin_#2	0.920	321.35	1.9	4.56	4.6	0.000757	2.15	238.81	199.49
Basin_#2	0.920	433.74	1.9	5.36	5.38	0.000299	1.63	426.42	289.58
Basin_#2	0.970	190.42	1.9	4.06	4.29	0.004613	4.35	61.36	70.34
Basin_#2	0.970	259.65	1.9	4.31	4.56	0.004574	4.69	79.87	81.27
Basin_#2	0.970	321.43	1.9	4.59	4.82	0.003813	4.62	101.86	93.13
Basin_#2	0.970	433.77	1.9	5.37	5.48	0.001611	3.59	206.57	265.32
Basin_#2	1.020	190.43	2.4	4.32	4.37	0.001218	2	106.08	80.03
Basin_#2	1.020	260.72	2.4	4.62	4.69	0.001189	2.23	130.48	81.31
Basin_#2	1.020	321.9	2.4	4.85	4.92	0.00119	2.4	149.14	84.17
Basin_#2	1.020	435.2	2.4	5.45	5.53	0.000851	2.41	218.66	207.2
Basin_#2	1.070	190.43	1.6	4.38	4.42	0.000548	1.74	131.54	88.73

Basin_#2	1.070	260.78	1.6	4.68	4.74	0.000613	2	159.3	101.03
Basin_#2	1.070	321.92	1.6	4.92	4.98	0.000655	2.19	181.23	119.53
Basin_#2	1.070	436.76	1.6	5.5	5.56	0.000544	2.25	244.05	236.38
Basin_#2	1.120	190.48	2.4	4.49	4.56	0.004515	2.04	93.82	93.39
Basin_#2	1.120	260.79	2.4	4.78	4.85	0.003689	2.18	121.33	95.91
Basin_#2	1.120	321.93	2.4	5.01	5.09	0.003322	2.29	143.06	98.16
Basin_#2	1.120	438.8	2.4	5.56	5.64	0.002173	2.27	202.93	206.8
Basin_#2	1.145*	190.52	3.1	4.62	4.74	0.007952	2.76	69.53	68.26
Basin_#2	1.145*	260.81	3.1	4.88	5.02	0.007187	3.03	86.87	69.61
Basin_#2	1.145*	321.94	3.1	5.09	5.25	0.006658	3.22	101.19	70.72
Basin_#2	1.145*	440.47	3.1	5.61	5.77	0.004712	3.28	136.82	103.68
Basin_#2	1.170	190.55	2.4	4.77	4.91	0.004158	3.18	77.27	50.98
Basin_#2	1.170	260.82	2.4	5	5.19	0.005242	3.82	89.23	52.37
Basin_#2	1.170	321.94	2.4	5.2	5.43	0.005885	4.27	99.6	53.55
Basin_#2	1.170	443.38	2.4	5.67	5.95	0.005824	4.74	128.25	86.59
Basin_#2	1.220	190.57	1.7	5	5.05	0.001272	1.82	104.81	45.47
Basin_#2	1.220	260.83	1.7	5.3	5.37	0.00165	2.19	118.86	51.74
Basin_#2	1.220	321.94	1.7	5.54	5.64	0.00194	2.47	130.51	57.95
Basin_#2	1.220	450.03	1.7	6.02	6.15	0.002228	2.92	153.98	270.12
Basin_#2	1.260	Culvert							
Basin_#2	1.300	190.58	2	6.05	6.13	0.001051	2.19	86.9	278.11
Basin_#2	1.300	260.83	2	6.88	6.98	0.000988	2.44	106.88	553.65
Basin_#2	1.300	332.44	2	7.74	7.75	0.000118	0.95	1242.29	1160.16
Basin_#2	1.300	454.28	2	7.94	7.95	0.000162	1.14	1481.08	1240.59
Basin_#2	1.350	190.55	1.4	6.15	6.2	0.000678	1.9	184.6	262.07
Basin_#2	1.350	260.84	1.4	7.01	7.05	0.000469	1.8	312.46	551.45
Basin_#2	1.350	-121.39	1.4	7.64	7.64	0.000018	-0.38	1006.11	793.79
Basin_#2	1.350	454.32	1.4	7.95	7.95	0.000146	1.12	1299.47	1074.78
Basin_#2	1.400	190.56	1.7	6.2	6.23	0.000609	1.78	234.6	344.04
Basin_#2	1.400	260.87	1.7	7.04	7.06	0.00031	1.44	416.09	561.23
Basin_#2	1.400	322.09	1.7	7.64	7.64	0.000081	0.8	1080.05	826.18
Basin_#2	1.400	454.75	1.7	7.95	7.96	0.000094	0.89	1361.83	964.97
Basin_#2	1.450	190.69	2.2	6.22	6.27	0.000668	1.72	183.27	250.68
Basin_#2	1.450	261.01	2.2	7.06	7.08	0.000364	1.47	423.71	569.77
Basin_#2	1.450	322.13	2.2	7.64	7.66	0.000187	1.15	963.26	853.66
Basin_#2	1.450	454.9	2.2	7.96	7.97	0.000226	1.32	1259.14	1022.12
Basin_#2	1.500	191.21	2.9	6.27	6.27	0.00024	0.93	708.95	681.4
Basin_#2	1.500	261.38	2.9	7.08	7.08	0.000092	0.67	1319.61	817.06
Basin_#2	1.500	322.86	2.9	7.65	7.66	0.000059	0.6	1827.79	981.65
Basin_#2	1.500	455.72	2.9	7.97	7.97	0.000077	0.71	2174.6	1208.55

Existing Conditions - Spring/King Tide

10- through 100-year rainfall events

Hydraulic results at time of maximum water surface elevation

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)
Basin_#2	0.000	16.79	-2.81	5.8	-2.1	5.8	0	0.03	969.51	247.55
Basin_#2	0.000	29.32	-2.81	5.8	-1.95	5.8	0	0.05	969.51	247.55
Basin_#2	0.000	37.58	-2.81	5.8	-1.88	5.8	0	0.06	969.51	247.55
Basin_#2	0.000	48.58	-2.81	5.8	-1.8	5.8	0	0.08	969.51	247.55
Basin_#2	0.050	20.54	-2.4	5.8		5.8	0	0.03	1048.11	250.86
Basin_#2	0.050	33.23	-2.4	5.8		5.8	0	0.05	1048.11	250.86
Basin_#2	0.050	42.47	-2.4	5.8		5.8	0	0.07	1048.11	250.86
Basin_#2	0.050	52.52	-2.4	5.8		5.8	0	0.08	1048.12	250.86
Basin_#2	0.100	21.73	-2.14	5.8		5.8	0	0.03	1109.99	263.35
Basin_#2	0.100	34.5	-2.14	5.8		5.8	0	0.04	1110	263.35
Basin_#2	0.100	42.49	-2.14	5.8		5.8	0	0.05	1110	263.35
Basin_#2	0.100	53.79	-2.14	5.8		5.8	0	0.07	1110.01	263.35
Basin_#2	0.150	21.78	-2.07	5.8		5.8	0	0.03	1220.02	280.29
Basin_#2	0.150	34.54	-2.07	5.8		5.8	0	0.04	1220.04	280.29
Basin_#2	0.150	43.64	-2.07	5.8		5.8	0	0.05	1220.03	280.29
Basin_#2	0.150	53.84	-2.07	5.8		5.8	0	0.06	1220.05	280.29
Basin_#2	0.300	22.97	-1.63	5.8		5.8	0	0.03	944.74	207.92
Basin_#2	0.300	35.8	-1.63	5.8		5.8	0	0.05	944.75	207.92
Basin_#2	0.300	44.73	-1.63	5.8		5.8	0	0.06	944.75	207.92
Basin_#2	0.300	55.06	-1.63	5.8		5.8	0	0.07	944.76	207.92
Basin_#2	0.350	23.82	-1.5	5.8		5.8	0	0.04	774.42	219.29
Basin_#2	0.350	36.69	-1.5	5.8		5.8	0	0.07	774.43	219.3
Basin_#2	0.350	44.8	-1.5	5.8		5.8	0	0.08	774.43	219.3
Basin_#2	0.350	55.89	-1.5	5.8		5.8	0	0.1	774.43	219.3
Basin_#2	0.400	23.92	-1.39	5.8		5.8	0	0.06	618.74	248.44
Basin_#2	0.400	36.79	-1.39	5.8		5.8	0	0.09	618.76	248.47
Basin_#2	0.400	44.94	-1.39	5.8		5.8	0	0.11	618.76	248.46
Basin_#2	0.400	55.96	-1.39	5.8		5.8	0	0.13	618.75	248.46
Basin_#2	0.450	24.19	-0.9	5.8		5.8	0	0.04	636.73	445.36
Basin_#2	0.450	37.05	-0.9	5.8		5.8	0	0.06	636.74	445.4
Basin_#2	0.450	45.51	-0.9	5.8		5.8	0	0.07	636.74	445.4
Basin_#2	0.450	56.16	-0.9	5.8		5.8	0	0.09	636.74	445.39
Basin_#2	0.485	Culvert								
Basin_#2	0.520	106.84	-0.7	7.48		7.48	0.000001	0.12	898.26	900.51
Basin_#2	0.520	123.65	-0.7	8.13		8.13	0.000001	0.12	990.2	1064.1
Basin_#2	0.520	134.01	-0.7	8.61		8.61	0.000001	0.13	1057.01	1118.22
Basin_#2	0.520	145.68	-0.7	9.15		9.15	0	0.08	3467.63	1231.59

Basin_#2	0.570	99.26	-0.5	7.48	7.48	0.000001	0.18	715.08	849.74
Basin_#2	0.570	115.46	-0.5	8.13	8.13	0.000001	0.18	800.45	1063.43
Basin_#2	0.570	125.27	-0.5	8.61	8.61	0.000001	0.18	862.5	1132.78
Basin_#2	0.570	136.14	-0.5	9.15	9.15	0	0.1	3059.98	1275.17
Basin_#2	0.620	90.3	-0.3	7.48	7.48	0.000001	0.12	956.73	585.7
Basin_#2	0.620	105.56	-0.3	8.13	8.13	0.000001	0.13	1088.08	1072.41
Basin_#2	0.620	114.46	-0.3	8.61	8.61	0.000001	0.13	1183.5	1134.52
Basin_#2	0.620	124.17	-0.3	9.15	9.15	0	0.1	2817.97	1227.85
Basin_#2	0.670	90.31	0	7.48	7.48	0.000001	0.14	1042.87	676.81
Basin_#2	0.670	105.54	0	8.13	8.13	0.000001	0.14	1213.63	974.18
Basin_#2	0.670	114.49	0	8.61	8.61	0.000001	0.14	1337.69	1065.32
Basin_#2	0.670	124.32	0	9.15	9.15	0	0.11	2909.52	1259.89
Basin_#2	0.720	90.32	0.4	7.48	7.48	0.000001	0.14	1091.73	798.4
Basin_#2	0.720	105.55	0.4	8.13	8.13	0.000001	0.14	1335.49	951.37
Basin_#2	0.720	114.5	0.4	8.61	8.61	0.000001	0.13	1523.94	1103.45
Basin_#2	0.720	124.46	0.4	9.15	9.15	0	0.11	2968.15	1259.47
Basin_#2	0.770	90.34	0.5	7.48	7.48	0.000001	0.17	1177.29	859.35
Basin_#2	0.770	105.56	0.5	8.13	8.13	0.000001	0.15	1803.01	1029.05
Basin_#2	0.770	114.5	0.5	8.61	8.61	0.000001	0.14	2305.3	1068.95
Basin_#2	0.770	124.59	0.5	9.15	9.15	0.000001	0.13	2889.06	1117.81
Basin_#2	0.820	90.34	0.6	7.48	7.48	0.000001	0.13	1330.6	740.67
Basin_#2	0.820	105.57	0.6	8.13	8.13	0.000001	0.13	1899.99	927.13
Basin_#2	0.820	114.51	0.6	8.61	8.61	0.000001	0.12	2364.47	1024.01
Basin_#2	0.820	124.61	0.6	9.15	9.15	0	0.11	2938.58	1103.24
Basin_#2	0.870	90.34	0.9	7.48	7.48	0.000001	0.15	1329.01	748.12
Basin_#2	0.870	105.58	0.9	8.13	8.13	0.000001	0.14	1855.21	862.32
Basin_#2	0.870	114.5	0.9	8.61	8.61	0.000001	0.13	2303.92	994.05
Basin_#2	0.870	124.71	0.9	9.15	9.15	0.000001	0.12	2856.99	1065.9
Basin_#2	0.920	90.34	1	7.48	7.48	0.000001	0.13	1534.86	723.15
Basin_#2	0.920	105.58	1	8.13	8.13	0.000001	0.12	2032.09	802.97
Basin_#2	0.920	114.51	1	8.61	8.61	0	0.11	2446.98	930.22
Basin_#2	0.920	124.8	1	9.15	9.15	0	0.1	2999.21	1097.97
Basin_#2	0.970	90.34	1.2	7.48	7.48	0.000003	0.21	1025.06	461.66
Basin_#2	0.970	105.6	1.2	8.13	8.13	0.000002	0.19	1375.79	632.13
Basin_#2	0.970	114.53	1.2	8.61	8.61	0.000002	0.18	1720.3	808.56
Basin_#2	0.970	124.87	1.2	9.15	9.15	0.000001	0.16	2236.44	1092.94
Basin_#2	1.020	90.35	1.4	7.48	7.48	0.000002	0.21	1092.18	637.23
Basin_#2	1.020	105.58	1.4	8.13	8.13	0.000002	0.19	1548.1	737.31
Basin_#2	1.020	114.54	1.4	8.61	8.61	0.000001	0.17	1919.41	817.72
Basin_#2	1.020	124.88	1.4	9.15	9.15	0.000001	0.15	2402.79	1038.21
Basin_#2	1.070	90.35	1.6	7.48	7.48	0.000002	0.18	1265.12	753.12

Basin_#2	1.070	105.59	1.6	8.13	8.13	0.000001	0.16	1763.97	766.33
Basin_#2	1.070	114.55	1.6	8.61	8.61	0.000001	0.14	2135.53	799.65
Basin_#2	1.070	124.92	1.6	9.15	9.15	0.000001	0.13	2590.67	912.79
Basin_#2	1.120	90.36	1.7	7.48	7.48	0.000002	0.16	1088.15	591.26
Basin_#2	1.120	105.63	1.7	8.13	8.13	0.000002	0.14	1524.71	715.13
Basin_#2	1.120	114.52	1.7	8.61	8.61	0.000001	0.13	1877.18	763.57
Basin_#2	1.120	124.94	1.7	9.15	9.15	0.000001	0.12	2308.71	868.11
Basin_#2	1.170	90.36	1.7	7.48	7.48	0.000011	0.37	758.43	572.15
Basin_#2	1.170	105.59	1.7	8.13	8.14	0.000006	0.3	1189.51	755.56
Basin_#2	1.170	114.57	1.7	8.61	8.61	0.000004	0.24	1603.9	979.09
Basin_#2	1.170	124.97	1.7	9.15	9.15	0.000002	0.21	2199.54	1273.89
Basin_#2	1.220	90.37	1.8	7.48	7.48	0.000006	0.25	950.16	806.38
Basin_#2	1.220	105.65	1.8	8.13	8.14	0.000003	0.2	1578.56	1080.72
Basin_#2	1.220	114.52	1.8	8.61	8.61	0.000002	0.16	2117.66	1192.63
Basin_#2	1.220	124.99	1.8	9.15	9.15	0.000001	0.14	2856.58	1547.62
Basin_#2	1.260	Culvert							
Basin_#2	1.300	90.56	2	7.48	7.48	0.000018	0.26	970.78	925.58
Basin_#2	1.300	105.71	2	8.14	8.14	0.000007	0.17	1732.22	1275.03
Basin_#2	1.300	114.64	2	8.61	8.61	0.000003	0.12	2358.02	1342.9
Basin_#2	1.300	125	2	9.15	9.15	0.000002	0.09	3128	1526.62
Basin_#2	1.350	90.64	2	7.48	7.48	0.000018	0.21	878.47	740.21
Basin_#2	1.350	105.71	2	8.14	8.14	0.000007	0.14	1506.46	1167.09
Basin_#2	1.350	114.64	2	8.61	8.61	0.000003	0.1	2096.8	1294.89
Basin_#2	1.350	125	2	9.15	9.15	0.000002	0.08	2822.43	1411.7
Basin_#2	1.400	90.73	2.1	7.48	7.48	0.000008	0.21	952.56	728.67
Basin_#2	1.400	105.79	2.1	8.14	8.14	0.000004	0.15	1543.43	1066.15
Basin_#2	1.400	114.72	2.1	8.61	8.61	0.000002	0.12	2100.13	1259.61
Basin_#2	1.400	125.01	2.1	9.15	9.15	0.000001	0.1	2819.14	1403.75
Basin_#2	1.450	90.74	2.2	7.48	7.49	0.000013	0.31	833.53	763.36
Basin_#2	1.450	105.8	2.2	8.14	8.14	0.000007	0.24	1453.29	1124.16
Basin_#2	1.450	114.65	2.2	8.61	8.61	0.000004	0.21	2058.62	1411.71
Basin_#2	1.450	124.96	2.2	9.15	9.15	0.000002	0.17	2883.31	1620.64
Basin_#2	1.500	90.84	2.5	7.49	7.49	0.000005	0.22	1674.07	916.75
Basin_#2	1.500	105.9	2.5	8.14	8.14	0.000003	0.19	2390.89	1277.72
Basin_#2	1.500	114.75	2.5	8.61	8.61	0.000002	0.16	3060.67	1520.43
Basin_#2	1.500	124.96	2.5	9.15	9.15	0.000001	0.14	3917.32	1679.14

Proposed Conditions - Spring/King Tide

10- through 100-year rainfall events

Hydraulic results at time of maximum water surface elevation

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)
Basin_#2	0.000	-6.69	-2.81	5.8	-2.32	5.8	0	-0.01	969.51	247.55
Basin_#2	0.000	123.16	-2.81	5.8	-1.39	5.8	0.000002	0.23	969.51	247.55
Basin_#2	0.000	168.34	-2.81	5.8	-1.18	5.8	0.000003	0.32	969.51	247.55
Basin_#2	0.000	220.9	-2.81	5.8	-1.04	5.8	0.000005	0.41	969.51	247.55
Basin_#2	0.050	-0.86	-2.4	5.8		5.8	0	0	1048.07	250.85
Basin_#2	0.050	142.06	-2.4	5.8		5.8	0.000002	0.29	1048.14	250.87
Basin_#2	0.050	177.04	-2.4	5.8		5.8	0.000004	0.36	1048.17	250.87
Basin_#2	0.050	289.97	-2.4	5.8		5.81	0.00001	0.6	1048.22	250.88
Basin_#2	0.100	-0.81	-2.14	5.8		5.8	0	0	1109.9	263.34
Basin_#2	0.100	142.08	-2.14	5.8		5.8	0.000001	0.2	1110.13	263.36
Basin_#2	0.100	226.14	-2.14	5.8		5.8	0.000003	0.31	1110.21	263.37
Basin_#2	0.100	290.01	-2.14	5.8		5.8	0.000005	0.4	1110.45	263.4
Basin_#2	0.150	-0.74	-2.07	5.8		5.8	0	0	1219.89	280.28
Basin_#2	0.150	142.11	-2.07	5.8		5.8	0.000001	0.2	1220.21	280.3
Basin_#2	0.150	184.43	-2.07	5.8		5.8	0.000002	0.26	1220.31	280.3
Basin_#2	0.150	290.08	-2.07	5.8		5.81	0.000005	0.41	1220.62	280.31
Basin_#2	0.300	-0.5	-1.63	5.8		5.8	0	0	944.57	207.88
Basin_#2	0.300	142.25	-1.63	5.8		5.8	0.000001	0.19	944.95	207.97
Basin_#2	0.300	184.49	-1.63	5.8		5.8	0.000002	0.25	945.05	207.99
Basin_#2	0.300	290.34	-1.63	5.8		5.81	0.000006	0.4	945.35	208.06
Basin_#2	0.350	-0.37	-1.5	5.8		5.8	0	0	774.23	219.18
Basin_#2	0.350	142.32	-1.5	5.8		5.8	0.000003	0.31	774.6	219.39
Basin_#2	0.350	184.54	-1.5	5.8		5.81	0.000006	0.4	774.66	219.43
Basin_#2	0.350	290.47	-1.5	5.8		5.81	0.000014	0.63	774.86	219.54
Basin_#2	0.400	-0.21	-1.39	5.8		5.8	0	0	618.57	248.11
Basin_#2	0.400	142.42	-1.39	5.8		5.81	0.000006	0.42	618.89	248.73
Basin_#2	0.400	184.6	-1.39	5.8		5.81	0.00001	0.55	618.92	248.79
Basin_#2	0.400	290.63	-1.39	5.8		5.81	0.000025	0.86	619.05	249.03
Basin_#2	0.450	80.63	-0.9	5.8		5.8	0.000001	0.13	636.63	445.1
Basin_#2	0.450	142.61	-0.9	5.8		5.81	0.000002	0.22	636.98	446.06
Basin_#2	0.450	184.75	-0.9	5.81		5.81	0.000003	0.29	637.08	446.34
Basin_#2	0.450	290.94	-0.9	5.81		5.81	0.000007	0.46	637.45	447.37
Basin_#2	0.485	Inl Struct								
Basin_#2	0.520	234.57	-0.7	6.02	0.6	6.03	0.000007	0.34	694.88	522.24
Basin_#2	0.520	331.99	-0.7	6.28	0.86	6.28	0.000013	0.45	730.81	524.09
Basin_#2	0.520	413.62	-0.7	6.49	1.03	6.5	0.000017	0.54	760.27	532.38
Basin_#2	0.520	512.61	-0.7	6.86	1.23	6.87	0.000021	0.63	812.58	585.3

Basin_#2	0.570	205.43	-0.2	6.03	6.03	0.000015	0.52	519.55	324.94
Basin_#2	0.570	294.57	-0.2	6.28	6.29	0.000026	0.7	552.98	378.7
Basin_#2	0.570	378.23	-0.2	6.49	6.5	0.000037	0.85	580.35	482.86
Basin_#2	0.570	475.45	-0.2	6.87	6.88	0.000045	0.97	628.95	589.87
Basin_#2	0.620	171.19	0	6.03	6.03	0.000008	0.34	660.14	289.95
Basin_#2	0.620	251.02	0	6.29	6.29	0.000013	0.46	712.06	312.71
Basin_#2	0.620	337.87	0	6.5	6.5	0.00002	0.59	754.58	322.52
Basin_#2	0.620	433.13	0	6.88	6.88	0.000025	0.69	829.76	345.77
Basin_#2	0.670	171.95	0	6.03	6.03	0.000009	0.4	670.36	324.77
Basin_#2	0.670	251.1	0	6.29	6.29	0.000016	0.54	735.62	348.25
Basin_#2	0.670	337.91	0	6.5	6.51	0.000024	0.68	789.82	376.78
Basin_#2	0.670	433.29	0	6.88	6.88	0.000029	0.78	887.3	494.66
Basin_#2	0.720	172.71	0.6	6.03	6.03	0.00001	0.39	630.22	259.74
Basin_#2	0.720	251.19	0.6	6.29	6.29	0.000017	0.53	700.8	275.49
Basin_#2	0.720	337.96	0.6	6.5	6.51	0.000026	0.67	763.12	321.97
Basin_#2	0.720	433.49	0.6	6.88	6.89	0.000031	0.76	884.82	403.29
Basin_#2	0.770	173.46	1	6.03	6.03	0.00002	0.53	538.88	298.56
Basin_#2	0.770	251.27	1	6.29	6.29	0.000031	0.7	619.46	321.69
Basin_#2	0.770	338.03	1	6.5	6.51	0.000046	0.87	692.12	345.99
Basin_#2	0.770	433.67	1	6.88	6.89	0.000054	0.99	863.89	484.43
Basin_#2	0.820	174.16	0.75	6.03	6.03	0.000013	0.44	612.71	311.35
Basin_#2	0.820	251.36	0.75	6.29	6.3	0.000021	0.57	696.05	349.24
Basin_#2	0.820	338.09	0.75	6.51	6.51	0.000031	0.71	786.38	463.2
Basin_#2	0.820	433.81	0.75	6.88	6.89	0.000036	0.8	972.42	531.92
Basin_#2	0.870	181.9	1.7	6.03	6.04	0.000028	0.56	497.07	311.53
Basin_#2	0.870	253.58	1.7	6.29	6.3	0.00004	0.7	586.73	391.59
Basin_#2	0.870	338.18	1.7	6.51	6.52	0.000056	0.85	679.76	472.92
Basin_#2	0.870	433.98	1.7	6.89	6.89	0.00006	0.93	889.89	632.22
Basin_#2	0.920	181.94	1.9	6.03	6.04	0.00002	0.47	646.8	373.06
Basin_#2	0.920	253.61	1.9	6.3	6.3	0.000027	0.58	749.74	460.48
Basin_#2	0.920	338.32	1.9	6.51	6.52	0.000039	0.71	867.96	629.24
Basin_#2	0.920	434.24	1.9	6.89	6.9	0.00004	0.76	1113.33	658.88
Basin_#2	0.970	182.05	1.9	6.04	6.04	0.00009	0.96	351.54	327.85
Basin_#2	0.970	253.65	1.9	6.3	6.31	0.000118	1.15	415.2	359.13
Basin_#2	0.970	338.44	1.9	6.51	6.53	0.000157	1.37	472.19	386.93
Basin_#2	0.970	434.47	1.9	6.89	6.91	0.000161	1.46	578.32	422.5
Basin_#2	1.020	182.22	2.4	6.04	6.05	0.000068	0.78	326.85	299.79
Basin_#2	1.020	253.71	2.4	6.3	6.31	0.000096	0.97	385.34	335.1
Basin_#2	1.020	338.57	2.4	6.52	6.54	0.000132	1.18	436.56	381.9
Basin_#2	1.020	434.65	2.4	6.9	6.92	0.000143	1.31	545.9	578.72
Basin_#2	1.070	182.52	1.6	6.04	6.05	0.00005	0.75	333.9	345.61

Basin_#2	1.070	253.83	1.6	6.31	6.32	0.000072	0.94	387.37	450.65
Basin_#2	1.070	338.76	1.6	6.53	6.54	0.000101	1.15	433.34	498.14
Basin_#2	1.070	434.85	1.6	6.9	6.92	0.000113	1.29	512.51	621.85
Basin_#2	1.120	182.9	2.4	6.05	6.06	0.00018	0.75	267.48	320.88
Basin_#2	1.120	255.32	2.4	6.31	6.33	0.000247	0.94	304.76	413.13
Basin_#2	1.120	338.97	2.4	6.54	6.55	0.000333	1.15	336.91	452.91
Basin_#2	1.120	435.06	2.4	6.91	6.94	0.000356	1.28	393.46	470.35
Basin_#2	1.145*	183.1	3.1	6.05	6.07	0.000414	1.11	179.05	301.93
Basin_#2	1.145*	255.35	3.1	6.32	6.35	0.000552	1.37	210.83	356.15
Basin_#2	1.145*	339.42	3.1	6.54	6.58	0.000727	1.66	237.34	391.44
Basin_#2	1.145*	435.14	3.1	6.92	6.97	0.000751	1.83	283.16	442.34
Basin_#2	1.170	183.29	2.4	6.06	6.09	0.000643	1.71	169.62	241.19
Basin_#2	1.170	256.56	2.4	6.32	6.37	0.000867	2.08	213.3	303.68
Basin_#2	1.170	339.43	2.4	6.55	6.62	0.00109	2.43	256.08	327.33
Basin_#2	1.170	435.2	2.4	6.93	6.99	0.001062	2.55	334.12	391.58
Basin_#2	1.220	183.69	1.7	6.09	6.11	0.000345	1.17	157.58	295.72
Basin_#2	1.220	258.58	1.7	6.37	6.41	0.000518	1.51	171.76	371.29
Basin_#2	1.220	339.48	1.7	6.61	6.67	0.000722	1.85	183.89	435.87
Basin_#2	1.220	444.43	1.7	6.98	7.05	0.000902	2.2	202.18	579.83
Basin_#2	1.260	Culvert							
Basin_#2	1.300	188.44	2	6.58	6.63	0.000654	1.89	99.54	446.44
Basin_#2	1.300	264.21	2	7.28	7.36	0.000763	2.27	116.37	774.77
Basin_#2	1.300	339.48	2	7.83	7.83	0.00011	0.93	1346.74	1234.58
Basin_#2	1.300	455.96	2	8.11	8.11	0.000114	0.98	1693.09	1271.19
Basin_#2	1.350	188.86	1.4	6.65	6.68	0.000366	1.51	258.9	447.65
Basin_#2	1.350	264.32	1.4	7.38	7.41	0.000328	1.58	368.28	714
Basin_#2	1.350	339.53	1.4	7.84	7.84	0.000099	0.91	1184.18	1011.86
Basin_#2	1.350	458.37	1.4	8.11	8.12	0.00011	1	1485.84	1157.35
Basin_#2	1.400	188.83	1.7	6.68	6.69	0.00028	1.3	335.89	489.6
Basin_#2	1.400	264.34	1.7	7.39	7.4	0.0002	1.22	493.07	666.44
Basin_#2	1.400	339.57	1.7	7.84	7.84	0.000065	0.73	1254.91	935.12
Basin_#2	1.400	460.56	1.7	8.12	8.12	0.000074	0.81	1527.74	1054.92
Basin_#2	1.450	190.18	2.2	6.69	6.71	0.000335	1.33	313.85	490.7
Basin_#2	1.450	265.13	2.2	7.4	7.42	0.000236	1.25	526.74	698.82
Basin_#2	1.450	341.6	2.2	7.84	7.85	0.000152	1.06	1145.69	966.46
Basin_#2	1.450	462.84	2.2	8.12	8.13	0.00018	1.2	1434.68	1115.94
Basin_#2	1.500	190.99	2.9	6.71	6.71	0.000095	0.64	1027.99	757.25
Basin_#2	1.500	265.43	2.9	7.41	7.41	0.000056	0.56	1602.4	880.98
Basin_#2	1.500	342.25	2.9	7.85	7.85	0.000051	0.57	2034.83	1139.78
Basin_#2	1.500	465.2	2.9	8.13	8.13	0.000068	0.69	2374.76	1275.9

Existing Conditions - 10-year Storm Tide

10- through 100-year rainfall events

Hydraulic results at time of maximum water surface elevation

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)
Basin_#2	0.000	-48.46	-2.81	7.37	-1.79	7.37	0	-0.06	1569.39	560.77
Basin_#2	0.000	-46.51	-2.81	7.37	-1.81	7.37	0	-0.05	1569.39	560.77
Basin_#2	0.000	-21.51	-2.81	7.37	-2.05	7.37	0	-0.02	1569.39	560.77
Basin_#2	0.000	4.11	-2.81	7.37	-2.4	7.37	0	0	1569.39	560.77
Basin_#2	0.050	-47.7	-2.4	7.37		7.37	0	-0.05	1655.49	558.18
Basin_#2	0.050	-45.75	-2.4	7.37		7.37	0	-0.05	1655.49	558.18
Basin_#2	0.050	-20.75	-2.4	7.37		7.37	0	-0.02	1655.54	558.24
Basin_#2	0.050	4.9	-2.4	7.37		7.37	0	0.01	1655.55	558.24
Basin_#2	0.100	-47.26	-2.14	7.37		7.37	0	-0.04	1774.49	745.03
Basin_#2	0.100	-45.3	-2.14	7.37		7.37	0	-0.04	1774.49	745.03
Basin_#2	0.100	-19.8	-2.14	7.37		7.37	0	-0.02	1774.61	745.06
Basin_#2	0.100	6.09	-2.14	7.37		7.37	0	0.01	1774.64	745.07
Basin_#2	0.150	-46.85	-2.07	7.37		7.37	0	-0.04	1978.97	860.91
Basin_#2	0.150	-44.88	-2.07	7.37		7.37	0	-0.04	1978.97	860.91
Basin_#2	0.150	-19.46	-2.07	7.37		7.37	0	-0.02	1979.18	860.97
Basin_#2	0.150	7.24	-2.07	7.37		7.37	0	0.01	1979.23	860.99
Basin_#2	0.300	-46.13	-1.63	7.37		7.37	0	-0.05	1256.05	936.42
Basin_#2	0.300	-44.08	-1.63	7.37		7.37	0	-0.04	1256.05	936.43
Basin_#2	0.300	-17.82	-1.63	7.37		7.37	0	-0.02	1256.13	936.52
Basin_#2	0.300	9.58	-1.63	7.37		7.37	0	0.01	1256.19	936.59
Basin_#2	0.350	-45.25	-1.5	7.37		7.37	0	-0.06	1067.64	864.27
Basin_#2	0.350	-43.18	-1.5	7.37		7.37	0	-0.06	1067.64	864.28
Basin_#2	0.350	-16.8	-1.5	7.37		7.37	0	-0.02	1067.73	864.49
Basin_#2	0.350	11.04	-1.5	7.37		7.37	0	0.01	1067.79	864.64
Basin_#2	0.400	-44.18	-1.39	7.37		7.37	0	-0.08	838.26	835.03
Basin_#2	0.400	-42.12	-1.39	7.37		7.37	0	-0.07	838.27	835.03
Basin_#2	0.400	-15.59	-1.39	7.37		7.37	0	-0.03	838.34	835.14
Basin_#2	0.400	12.46	-1.39	7.37		7.37	0	0.02	838.39	835.22
Basin_#2	0.450	-43.35	-0.9	7.37		7.37	0	-0.05	793.53	835.44
Basin_#2	0.450	-41.32	-0.9	7.37		7.37	0	-0.05	793.53	835.44
Basin_#2	0.450	-15.14	-0.9	7.37		7.37	0	-0.02	793.59	835.51
Basin_#2	0.450	13.51	-0.9	7.37		7.37	0	0.02	793.62	835.55
Basin_#2	0.485	Culvert								
Basin_#2	0.520	99.39	-0.7	8.01		8.01	0	0.1	973.32	1052.81
Basin_#2	0.520	109.71	-0.7	8.32		8.32	0	0.11	1015.87	1092.55
Basin_#2	0.520	126.36	-0.7	9		9	0	0.08	3310.52	1192.74
Basin_#2	0.520	157.12	-0.7	9.46		9.46	0	0.08	3823.95	1301.96

Basin_#2	0.570	91.04	-0.5	8.01	8.01	0.000001	0.15	784.78	1047.95
Basin_#2	0.570	101.81	-0.5	8.32	8.32	0.000001	0.16	824.29	1089.41
Basin_#2	0.570	118.12	-0.5	9	9	0	0.09	2898.65	1242.35
Basin_#2	0.570	146.96	-0.5	9.46	9.46	0	0.1	3430.06	1352.9
Basin_#2	0.620	82.74	-0.3	8.01	8.01	0	0.1	1063.94	1019.36
Basin_#2	0.620	101.81	-0.3	8.32	8.32	0.000001	0.12	1124.72	1109.39
Basin_#2	0.620	107.89	-0.3	9	9	0	0.09	2659.49	1195.76
Basin_#2	0.620	134.28	-0.3	9.46	9.46	0	0.1	3176.24	1288.18
Basin_#2	0.670	82.78	0	8.01	8.01	0	0.11	1182.24	911.51
Basin_#2	0.670	101.85	0	8.32	8.32	0.000001	0.13	1261.26	1005.73
Basin_#2	0.670	107.9	0	9	9	0	0.1	2745.68	1204.84
Basin_#2	0.670	134.34	0	9.46	9.46	0	0.11	3287.21	1340.09
Basin_#2	0.720	82.76	0.4	8.01	8.01	0	0.11	1289.01	922.33
Basin_#2	0.720	101.88	0.4	8.32	8.32	0.000001	0.13	1407	1006.66
Basin_#2	0.720	107.88	0.4	9	9	0	0.1	2804.02	1204.47
Basin_#2	0.720	134.32	0.4	9.46	9.46	0	0.11	3338.52	1309.42
Basin_#2	0.770	82.79	0.5	8.01	8.01	0.000001	0.12	1680.13	1007.67
Basin_#2	0.770	101.87	0.5	8.32	8.32	0.000001	0.14	1993.9	1048.22
Basin_#2	0.770	107.9	0.5	9	9	0	0.11	2729.4	1095.72
Basin_#2	0.770	134.34	0.5	9.46	9.46	0	0.12	3250.26	1193.54
Basin_#2	0.820	82.79	0.6	8.01	8.01	0	0.1	1789.39	907.4
Basin_#2	0.820	101.88	0.6	8.32	8.32	0.000001	0.12	2072.87	959.18
Basin_#2	0.820	107.91	0.6	9	9	0	0.1	2780.68	1083.53
Basin_#2	0.820	134.35	0.6	9.46	9.46	0	0.11	3290.06	1144.67
Basin_#2	0.870	82.8	0.9	8.01	8.01	0.000001	0.11	1752.53	835.17
Basin_#2	0.870	101.89	0.9	8.32	8.32	0.000001	0.12	2019.44	933.58
Basin_#2	0.870	107.92	0.9	9	9	0	0.1	2704.71	1044.29
Basin_#2	0.870	134.36	0.9	9.46	9.46	0	0.11	3198.46	1125.08
Basin_#2	0.920	82.8	1	8.01	8.01	0	0.09	1936.3	782.73
Basin_#2	0.920	101.9	1	8.32	8.32	0	0.1	2183.56	854.94
Basin_#2	0.920	107.92	1	9	9	0	0.09	2842.72	1071.61
Basin_#2	0.920	134.37	1	9.46	9.46	0	0.1	3355.91	1207.98
Basin_#2	0.970	82.82	1.2	8.01	8.01	0.000001	0.16	1301.9	595.19
Basin_#2	0.970	101.89	1.2	8.32	8.32	0.000002	0.18	1497.96	708.16
Basin_#2	0.970	107.95	1.2	9	9	0.000001	0.15	2082.02	1039.59
Basin_#2	0.970	134.36	1.2	9.46	9.46	0.000001	0.16	2584.7	1124.56
Basin_#2	1.020	82.81	1.4	8.01	8.01	0.000001	0.15	1459.74	725.09
Basin_#2	1.020	101.9	1.4	8.32	8.32	0.000001	0.17	1685.54	774
Basin_#2	1.020	107.94	1.4	9	9	0.000001	0.14	2259.12	932.72
Basin_#2	1.020	134.37	1.4	9.46	9.46	0.000001	0.16	2743.52	1115.51
Basin_#2	1.070	82.81	1.6	8.01	8.01	0.000001	0.13	1671.49	764.05

Basin_#2	1.070	101.9	1.6	8.32	8.32	0.000001	0.14	1904.59	769.96
Basin_#2	1.070	107.96	1.6	9	9	0.000001	0.12	2462.1	871.82
Basin_#2	1.070	134.38	1.6	9.46	9.46	0.000001	0.13	2895.24	1025.28
Basin_#2	1.120	82.82	1.7	8.01	8.01	0.000001	0.12	1438.82	704.27
Basin_#2	1.120	101.88	1.7	8.32	8.32	0.000001	0.13	1656.93	731.16
Basin_#2	1.120	107.97	1.7	9	9	0.000001	0.11	2186.97	821.94
Basin_#2	1.120	134.4	1.7	9.46	9.46	0.000001	0.12	2623.28	1153.03
Basin_#2	1.170	82.79	1.7	8.01	8.01	0.000004	0.25	1100.7	714.42
Basin_#2	1.170	101.88	1.7	8.32	8.32	0.000004	0.26	1334.26	836.69
Basin_#2	1.170	107.98	1.7	9	9	0.000002	0.19	2021.47	1181.08
Basin_#2	1.170	134.41	1.7	9.46	9.46	0.000002	0.19	2627.37	1435.73
Basin_#2	1.220	82.88	1.8	8.01	8.01	0.000002	0.17	1450.67	1035.11
Basin_#2	1.220	101.93	1.8	8.32	8.32	0.000002	0.17	1779.73	1113.44
Basin_#2	1.220	108.03	1.8	9	9	0.000001	0.13	2638.39	1471.53
Basin_#2	1.220	134.36	1.8	9.46	9.46	0.000001	0.13	3349.61	1615.49
Basin_#2	1.260	Culvert							
Basin_#2	1.300	82.92	2	8.02	8.02	0.000005	0.15	1578.47	1259.11
Basin_#2	1.300	102.01	2	8.32	8.32	0.000004	0.14	1970.09	1308.22
Basin_#2	1.300	108.07	2	9.01	9.01	0.000001	0.09	2909.55	1493.99
Basin_#2	1.300	134.44	2	9.46	9.46	0.000001	0.08	3617.47	1595.07
Basin_#2	1.350	82.93	2	8.02	8.02	0.000005	0.12	1367.73	1118.13
Basin_#2	1.350	102.02	2	8.32	8.32	0.000004	0.11	1727.58	1230.17
Basin_#2	1.350	108.08	2	9.01	9.01	0.000002	0.08	2620.81	1382.1
Basin_#2	1.350	134.52	2	9.46	9.46	0.000001	0.07	3276.66	1537.22
Basin_#2	1.400	82.88	2.1	8.02	8.02	0.000003	0.13	1418.24	994.57
Basin_#2	1.400	102.08	2.1	8.32	8.32	0.000003	0.13	1748	1153
Basin_#2	1.400	108.09	2.1	9.01	9.01	0.000001	0.09	2617.86	1378.26
Basin_#2	1.400	134.54	2.1	9.46	9.46	0.000001	0.09	3273.88	1516.58
Basin_#2	1.450	82.95	2.2	8.02	8.02	0.000005	0.21	1320.51	1063.16
Basin_#2	1.450	102.03	2.2	8.32	8.32	0.000005	0.21	1671.46	1252.28
Basin_#2	1.450	108.1	2.2	9.01	9.01	0.000002	0.16	2652.16	1582.21
Basin_#2	1.450	134.44	2.2	9.46	9.46	0.000002	0.16	3398.51	1660.57
Basin_#2	1.500	82.96	2.5	8.02	8.02	0.000002	0.16	2238.81	1221.15
Basin_#2	1.500	102.11	2.5	8.32	8.32	0.000002	0.17	2632.93	1375.91
Basin_#2	1.500	108.04	2.5	9.01	9.01	0.000001	0.13	3677.33	1644.63
Basin_#2	1.500	134.69	2.5	9.46	9.46	0.000001	0.13	4454.51	1764

Proposed Conditions - 10-year Storm Tide

10- through 100-year rainfall events

Hydraulic results at time of maximum water surface elevation

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)
Basin_#2	0.000	-10.19	-2.81	7.37	-2.22	7.37	0	-0.01	1569.39	560.77
Basin_#2	0.000	8.05	-2.81	7.37	-2.25	7.37	0	0.01	1569.39	560.77
Basin_#2	0.000	-9.25	-2.81	7.37	-2.23	7.37	0	-0.01	1569.39	560.77
Basin_#2	0.000	-8.07	-2.81	7.37	-2.25	7.37	0	-0.01	1569.39	560.77
Basin_#2	0.050	-9.25	-2.4	7.37		7.37	0	-0.01	1655.57	558.27
Basin_#2	0.050	8.51	-2.4	7.37		7.37	0	0.01	1655.6	558.32
Basin_#2	0.050	-8.31	-2.4	7.37		7.37	0	-0.01	1655.58	558.29
Basin_#2	0.050	-7.15	-2.4	7.37		7.37	0	-0.01	1655.57	558.28
Basin_#2	0.100	-8.16	-2.14	7.37		7.37	0	-0.01	1774.66	745.07
Basin_#2	0.100	8.66	-2.14	7.37		7.37	0	0.01	1774.69	745.08
Basin_#2	0.100	-7.27	-2.14	7.37		7.37	0	-0.01	1774.68	745.08
Basin_#2	0.100	-6.16	-2.14	7.37		7.37	0	-0.01	1774.66	745.07
Basin_#2	0.150	-7.05	-2.07	7.37		7.37	0	-0.01	1979.23	860.99
Basin_#2	0.150	3.37	-2.07	7.37		7.37	0	0	1979.43	861.05
Basin_#2	0.150	-6.22	-2.07	7.37		7.37	0	-0.01	1979.27	861
Basin_#2	0.150	-5.2	-2.07	7.37		7.37	0	-0.01	1979.24	860.99
Basin_#2	0.300	-3.69	-1.63	7.37		7.37	0	0	1256.12	936.51
Basin_#2	0.300	0.26	-1.63	7.37		7.37	0	0	1256.37	936.8
Basin_#2	0.300	-3.19	-1.63	7.37		7.37	0	0	1256.14	936.53
Basin_#2	0.300	-0.82	-1.63	7.37		7.37	0	0	1256.13	936.52
Basin_#2	0.350	-2.32	-1.5	7.37		7.37	0	0	1067.69	864.4
Basin_#2	0.350	-0.02	-1.5	7.37		7.37	0	0	1067.95	865.05
Basin_#2	0.350	-1.99	-1.5	7.37		7.37	0	0	1067.71	864.45
Basin_#2	0.350	-0.65	-1.5	7.37		7.37	0	0	1067.72	864.47
Basin_#2	0.400	-1.23	-1.39	7.37		7.37	0	0	838.28	835.06
Basin_#2	0.400	-0.14	-1.39	7.37		7.37	0	0	838.5	835.39
Basin_#2	0.400	-1.05	-1.39	7.37		7.37	0	0	838.3	835.08
Basin_#2	0.400	-0.38	-1.39	7.37		7.37	0	0	838.31	835.1
Basin_#2	0.450	0	-0.9	7.37		7.37	0	0	793.53	835.44
Basin_#2	0.450	0	-0.9	7.37		7.37	0	0	793.69	835.63
Basin_#2	0.450	0	-0.9	7.37		7.37	0	0	793.54	835.46
Basin_#2	0.450	0	-0.9	7.37		7.37	0	0	793.55	835.47
Basin_#2	0.485	Inl Struct								
Basin_#2	0.520	193.42	-0.7	7.07	0.49	7.07	0.000003	0.23	841.06	631.79
Basin_#2	0.520	815.31	-0.7	10.48	1.72	10.48	0.000011	0.62	1318.37	1405.31
Basin_#2	0.520	401.06	-0.7	7.69	1.01	7.7	0.000008	0.43	928.65	963.06
Basin_#2	0.520	485.59	-0.7	8.09	1.18	8.09	0.00001	0.49	983.48	1060.24

Basin_#2	0.570	172.69	-0.2	7.07		7.07	0.000005	0.34	655.23	649.01
Basin_#2	0.570	15461.37	-0.2	7.72	9.87	15.13	0.028042	26.42	739.26	989.73
Basin_#2	0.570	369.56	-0.2	7.69		7.7	0.000016	0.63	736.61	986.02
Basin_#2	0.570	449.23	-0.2	8.09		8.09	0.000019	0.72	787.55	1058.75
Basin_#2	0.620	149.12	0	7.07		7.07	0.000003	0.23	868.48	373.44
Basin_#2	0.620	-58.2	0	7.2		7.2	0	-0.09	893.63	420.39
Basin_#2	0.620	333.95	0	7.7		7.7	0.000009	0.44	994.29	765.32
Basin_#2	0.620	407.97	0	8.09		8.1	0.00001	0.5	1072.89	1059.15
Basin_#2	0.670	149.58	0	7.07		7.07	0.000003	0.25	937.2	531.53
Basin_#2	0.670	-41.39	0	7.2		7.2	0	-0.07	969.85	573.2
Basin_#2	0.670	334.1	0	7.7		7.7	0.000009	0.48	1100.91	751.3
Basin_#2	0.670	409.66	0	8.09		8.1	0.000011	0.54	1203.16	957.94
Basin_#2	0.720	149.93	0.6	7.07		7.07	0.000003	0.25	947.59	670.12
Basin_#2	0.720	5062.11	0.6	8.44		8.73	0.001413	6.04	1449.56	1058.44
Basin_#2	0.720	334.28	0.6	7.7		7.7	0.00001	0.47	1166.03	877.7
Basin_#2	0.720	409.71	0.6	8.09		8.1	0.000012	0.53	1314.52	936.47
Basin_#2	0.770	150.16	1	7.07		7.07	0.000005	0.32	957.11	495.13
Basin_#2	0.770	1.99	1	7.2		7.2	0	0	1019.4	499.26
Basin_#2	0.770	334.5	1	7.7		7.7	0.000015	0.56	1367.04	928.3
Basin_#2	0.770	409.77	1	8.1		8.1	0.000015	0.6	1753.58	1021.2
Basin_#2	0.820	150.26	0.75	7.07		7.07	0.000004	0.26	1073.8	547.75
Basin_#2	0.820	391.53	0.75	7.29		7.29	0.00002	0.62	1201.73	628.35
Basin_#2	0.820	334.64	0.75	7.7		7.7	0.00001	0.46	1509.75	869.38
Basin_#2	0.820	409.83	0.75	8.1		8.1	0.000011	0.5	1862.03	918.23
Basin_#2	0.870	146.53	1.7	7.07		7.07	0.000006	0.29	1013.56	701.39
Basin_#2	0.870	30.83	1.7	7.2		7.2	0	0.06	1101.57	715.89
Basin_#2	0.870	334.79	1.7	7.7		7.71	0.000015	0.52	1480.32	778.7
Basin_#2	0.870	409.89	1.7	8.1		8.1	0.000015	0.54	1802.08	855.26
Basin_#2	0.920	132.72	1.9	7.07		7.07	0.000003	0.21	1234.45	676.94
Basin_#2	0.920	1552.64	1.9	7.42		7.45	0.000279	2.16	1480.4	713.27
Basin_#2	0.920	335.01	1.9	7.71		7.71	0.00001	0.42	1685.82	741.49
Basin_#2	0.920	409.98	1.9	8.1		8.1	0.00001	0.44	1988.43	797.25
Basin_#2	0.970	133.4	1.9	7.07		7.07	0.00001	0.37	832.88	440.03
Basin_#2	0.970	74.69	1.9	7.2		7.2	0.000003	0.19	887.04	446.67
Basin_#2	0.970	335.2	1.9	7.71		7.71	0.000029	0.69	1122.83	494.98
Basin_#2	0.970	410.06	1.9	8.1		8.1	0.000032	0.76	1343.88	618.13
Basin_#2	1.020	134.01	2.4	7.08		7.08	0.000009	0.34	823.59	610.62
Basin_#2	1.020	-1767.81	2.4	7.24		7.4	0.001303	-4.17	925.03	620.64
Basin_#2	1.020	335.38	2.4	7.71		7.71	0.000028	0.65	1224.85	681.21
Basin_#2	1.020	410.15	2.4	8.1		8.1	0.000027	0.67	1505.03	734.01
Basin_#2	1.070	134.84	1.6	7.08		7.08	0.000007	0.32	970.71	674.94

Basin_#2	1.070	-1849.32	1.6	7.29	7.42	0.001007	-4.05	1122.74	738.73
Basin_#2	1.070	335.61	1.6	7.71	7.71	0.00002	0.6	1439.27	757.51
Basin_#2	1.070	410.25	1.6	8.1	8.1	0.000019	0.62	1739.57	765.8
Basin_#2	1.120	135.67	2.4	7.08	7.08	0.000017	0.29	795.3	486.9
Basin_#2	1.120	-389.11	2.4	8.1	8.11	0.00004	-0.52	1428.78	713.03
Basin_#2	1.120	335.82	2.4	7.71	7.71	0.000047	0.53	1157.66	651.99
Basin_#2	1.120	410.34	2.4	8.1	8.11	0.000045	0.55	1428.9	713.04
Basin_#2	1.145*	136.07	3.1	7.08	7.08	0.000033	0.4	635.72	457.53
Basin_#2	1.145*	145.2	3.1	7.2	7.2	0.000032	0.4	691.67	502.3
Basin_#2	1.145*	335.92	3.1	7.71	7.72	0.000083	0.7	983.13	629.89
Basin_#2	1.145*	410.39	3.1	8.1	8.11	0.000074	0.7	1248.26	709.64
Basin_#2	1.170	136.48	2.4	7.08	7.08	0.000062	0.63	537.52	450.04
Basin_#2	1.170	153.5	2.4	7.2	7.2	0.000064	0.65	593.91	508.65
Basin_#2	1.170	336.02	2.4	7.71	7.72	0.000151	1.07	885.75	642.09
Basin_#2	1.170	410.43	2.4	8.11	8.11	0.000125	1.03	1155.6	743.57
Basin_#2	1.220	137.59	1.7	7.08	7.09	0.000035	0.44	665.56	634.26
Basin_#2	1.220	171.03	1.7	7.2	7.2	0.000046	0.51	742.16	686.62
Basin_#2	1.220	336.23	1.7	7.72	7.72	0.000074	0.7	1162.12	926.98
Basin_#2	1.220	410.47	1.7	8.11	8.12	0.000063	0.68	1557.01	1071.7
Basin_#2	1.260	Culvert							
Basin_#2	1.300	161.62	2	7.38	7.41	0.000266	1.36	118.85	831.56
Basin_#2	1.300	171.03	2	7.57	7.57	0.000044	0.57	1051.79	1005.26
Basin_#2	1.300	348.71	2	8.09	8.09	0.000069	0.76	1674.3	1269.25
Basin_#2	1.300	464.36	2	8.26	8.27	0.000086	0.86	1895.74	1298.39
Basin_#2	1.350	163.31	1.4	7.42	7.43	0.000121	0.96	373.72	724.37
Basin_#2	1.350	122.33	1.4	7.59	7.59	0.000019	0.39	970.29	776.96
Basin_#2	1.350	349	1.4	8.1	8.1	0.000066	0.77	1466.19	1150.66
Basin_#2	1.350	464.73	1.4	8.27	8.27	0.000084	0.88	1671.63	1217.96
Basin_#2	1.400	163.71	1.7	7.42	7.43	0.000074	0.74	499.77	691.37
Basin_#2	1.400	195.81	1.7	7.59	7.59	0.000033	0.5	1038.67	795.64
Basin_#2	1.400	349.24	1.7	8.1	8.1	0.000044	0.62	1507.64	1044.06
Basin_#2	1.400	465	1.7	8.27	8.28	0.000061	0.75	1697.49	1136.2
Basin_#2	1.450	164.2	2.2	7.43	7.43	0.000087	0.76	534.51	720.51
Basin_#2	1.450	266.88	2.2	7.59	7.6	0.00014	0.99	920.42	829.94
Basin_#2	1.450	349.46	2.2	8.1	8.11	0.000106	0.92	1411.64	1105.92
Basin_#2	1.450	465.17	2.2	8.28	8.28	0.000146	1.1	1614.68	1212.34
Basin_#2	1.500	164.77	2.9	7.43	7.43	0.000021	0.34	1618.05	887.83
Basin_#2	1.500	296.27	2.9	7.61	7.61	0.000054	0.56	1782.22	958.2
Basin_#2	1.500	349.63	2.9	8.11	8.11	0.00004	0.52	2343.58	1271.14
Basin_#2	1.500	468.07	2.9	8.28	8.28	0.000056	0.64	2573.65	1351.22

Existing Conditions - 25-year Storm Tide

10- through 100-year rainfall events

Hydraulic results at time of maximum water surface elevation

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)
Basin_#2	0.000	-1151.7	-2.81	10.25	0.54	10.25	0.000006	-0.75	4392.61	1170.29
Basin_#2	0.000	-1151.33	-2.81	10.25	0.55	10.25	0.000006	-0.75	4392.61	1170.29
Basin_#2	0.000	-1152.38	-2.81	10.25	0.55	10.25	0.000006	-0.75	4392.61	1170.29
Basin_#2	0.000	-1153.14	-2.81	10.25	0.55	10.25	0.000006	-0.75	4392.61	1170.29
Basin_#2	0.050	-1093.33	-2.4	10.25		10.25	0.000005	-0.68	4713.03	1238.46
Basin_#2	0.050	-1093.06	-2.4	10.25		10.25	0.000005	-0.68	4713.03	1238.46
Basin_#2	0.050	-1092.67	-2.4	10.25		10.25	0.000005	-0.68	4713.06	1238.46
Basin_#2	0.050	-1093.45	-2.4	10.25		10.25	0.000005	-0.68	4713.06	1238.46
Basin_#2	0.100	-1078.42	-2.14	10.25		10.25	0.000004	-0.57	4996.79	1299.67
Basin_#2	0.100	-1078.22	-2.14	10.25		10.25	0.000004	-0.57	4996.79	1299.67
Basin_#2	0.100	-1077.6	-2.14	10.25		10.25	0.000004	-0.57	4996.82	1299.67
Basin_#2	0.100	-1078.25	-2.14	10.25		10.25	0.000004	-0.57	4996.84	1299.67
Basin_#2	0.150	-1077.9	-2.07	10.25		10.25	0.000003	-0.55	5286.56	1345.86
Basin_#2	0.150	-1077.71	-2.07	10.25		10.25	0.000003	-0.55	5286.55	1345.86
Basin_#2	0.150	-1077.17	-2.07	10.25		10.25	0.000003	-0.54	5286.62	1345.86
Basin_#2	0.150	-1077.77	-2.07	10.25		10.25	0.000003	-0.55	5286.63	1345.86
Basin_#2	0.300	-1061.96	-1.63	10.25		10.26	0.000004	-0.56	4927.19	1475.69
Basin_#2	0.300	-1061.86	-1.63	10.25		10.26	0.000004	-0.56	4927.18	1475.69
Basin_#2	0.300	-1061.49	-1.63	10.25		10.26	0.000004	-0.56	4927.24	1475.69
Basin_#2	0.300	-1061.81	-1.63	10.25		10.26	0.000004	-0.56	4927.28	1475.69
Basin_#2	0.350	-1059.93	-1.5	10.25		10.26	0.000006	-0.7	4670.71	1471.18
Basin_#2	0.350	-1059.85	-1.5	10.25		10.26	0.000006	-0.7	4670.69	1471.17
Basin_#2	0.350	-1059.68	-1.5	10.25		10.26	0.000006	-0.7	4670.76	1471.18
Basin_#2	0.350	-1059.9	-1.5	10.25		10.26	0.000006	-0.7	4670.8	1471.18
Basin_#2	0.400	-1057.41	-1.39	10.25		10.26	0.000008	-0.83	4405.31	1465.1
Basin_#2	0.400	-1057.36	-1.39	10.25		10.26	0.000008	-0.83	4405.3	1465.1
Basin_#2	0.400	-1057.37	-1.39	10.25		10.26	0.000008	-0.83	4405.38	1465.11
Basin_#2	0.400	-1057.5	-1.39	10.25		10.26	0.000008	-0.83	4405.41	1465.11
Basin_#2	0.450	-1054.13	-0.9	10.25		10.26	0.000004	-0.59	4765.14	1429.59
Basin_#2	0.450	-1054.1	-0.9	10.25		10.26	0.000004	-0.59	4765.11	1429.58
Basin_#2	0.450	-1054.31	-0.9	10.25		10.26	0.000004	-0.59	4765.2	1429.59
Basin_#2	0.450	-1054.35	-0.9	10.25		10.26	0.000004	-0.59	4765.24	1429.59
Basin_#2	0.485	Culvert								
Basin_#2	0.520	250.04	-0.7	9.9		9.9	0	0.12	4356.21	1363.23
Basin_#2	0.520	372.9	-0.7	10.01		10.01	0.000001	0.18	4482.06	1382.74
Basin_#2	0.520	441.66	-0.7	10.08		10.08	0.000001	0.21	4573.98	1389.85
Basin_#2	0.520	561.31	-0.7	10.16		10.16	0.000002	0.26	4673.16	1393.83

Basin_#2	0.570	222.81	-0.5	9.9	9.9	0.000001	0.14	3981.68	1404.34
Basin_#2	0.570	338.32	-0.5	10.01	10.01	0.000001	0.21	4109.65	1406.3
Basin_#2	0.570	400.55	-0.5	10.08	10.08	0.000002	0.24	4202.13	1407.56
Basin_#2	0.570	508.01	-0.5	10.16	10.16	0.000002	0.3	4301.82	1408.92
Basin_#2	0.620	195.4	-0.3	9.9	9.9	0.000001	0.13	3715.27	1382.82
Basin_#2	0.620	298.07	-0.3	10.01	10.01	0.000001	0.2	3845.59	1404.43
Basin_#2	0.620	352.71	-0.3	10.08	10.08	0.000002	0.23	3940.12	1405.79
Basin_#2	0.620	444.97	-0.3	10.16	10.16	0.000002	0.28	4042.27	1407.26
Basin_#2	0.670	196.02	0	9.9	9.9	0.000001	0.14	3844.46	1366.92
Basin_#2	0.670	298.9	0	10.01	10.01	0.000001	0.2	3973.67	1368.36
Basin_#2	0.670	353.01	0	10.08	10.08	0.000002	0.24	4067.16	1369.39
Basin_#2	0.670	445.08	0	10.16	10.16	0.000002	0.29	4168.26	1370.51
Basin_#2	0.720	196.43	0.4	9.9	9.9	0.000001	0.14	3886.21	1379.6
Basin_#2	0.720	299.53	0.4	10.01	10.01	0.000001	0.2	4016.08	1386.45
Basin_#2	0.720	353.21	0.4	10.08	10.08	0.000002	0.24	4110.38	1388.85
Basin_#2	0.720	445.14	0.4	10.16	10.16	0.000002	0.29	4212.52	1391.44
Basin_#2	0.770	196.62	0.5	9.9	9.9	0.000001	0.16	3800.94	1304.05
Basin_#2	0.770	299.94	0.5	10.01	10.01	0.000002	0.23	3935.04	1326.36
Basin_#2	0.770	353.29	0.5	10.08	10.08	0.000002	0.27	4033.32	1333.99
Basin_#2	0.770	445.19	0.5	10.16	10.16	0.000003	0.33	4140.28	1349.33
Basin_#2	0.820	201.22	0.6	9.9	9.9	0.000001	0.14	3820.46	1276
Basin_#2	0.820	300.14	0.6	10.01	10.01	0.000001	0.2	3951.24	1300.89
Basin_#2	0.820	356.66	0.6	10.08	10.08	0.000002	0.23	4048.26	1316.63
Basin_#2	0.820	445.26	0.6	10.16	10.16	0.000002	0.28	4154.26	1331.47
Basin_#2	0.870	201.61	0.9	9.9	9.9	0.000001	0.15	3730.84	1277.31
Basin_#2	0.870	308.09	0.9	10	10.01	0.000002	0.22	3861.13	1290.03
Basin_#2	0.870	356.97	0.9	10.08	10.08	0.000002	0.25	3957.51	1301.76
Basin_#2	0.870	445.39	0.9	10.16	10.16	0.000003	0.31	4062.42	1315.63
Basin_#2	0.920	207.15	1	9.9	9.9	0.000001	0.13	3912.69	1291.53
Basin_#2	0.920	308.84	1	10	10	0.000001	0.19	4044.52	1311.87
Basin_#2	0.920	357.17	1	10.08	10.08	0.000002	0.22	4143.14	1325.2
Basin_#2	0.920	443.67	1	10.16	10.16	0.000002	0.27	4250.03	1334.66
Basin_#2	0.970	212.68	1.2	9.9	9.9	0.000002	0.21	3110.51	1279.9
Basin_#2	0.970	309.16	1.2	10	10	0.000003	0.29	3241.67	1313.76
Basin_#2	0.970	357.27	1.2	10.08	10.08	0.000004	0.34	3341.55	1349.54
Basin_#2	0.970	440.73	1.2	10.16	10.16	0.000006	0.41	3450.66	1358.05
Basin_#2	1.020	225.45	1.4	9.9	9.9	0.000002	0.22	3246.97	1193.39
Basin_#2	1.020	281.39	1.4	10	10	0.000002	0.27	3370.73	1243.31
Basin_#2	1.020	335.56	1.4	10.08	10.08	0.000003	0.31	3464.83	1284.28
Basin_#2	1.020	440.71	1.4	10.16	10.16	0.000005	0.4	3571.91	1350.67
Basin_#2	1.070	189.54	1.6	9.9	9.9	0.000001	0.16	3379	1178.26

Basin_#2	1.070	266.01	1.6	10.01	10.01	0.000002	0.22	3501.82	1212.77
Basin_#2	1.070	358.59	1.6	10.08	10.08	0.000003	0.29	3592.33	1246.58
Basin_#2	1.070	444.08	1.6	10.16	10.16	0.000004	0.35	3695.05	1296.88
Basin_#2	1.120	189.79	1.7	9.9	9.9	0.000001	0.15	3189.72	1408.94
Basin_#2	1.120	266.9	1.7	10.01	10.01	0.000002	0.2	3338.48	1488.57
Basin_#2	1.120	352.13	1.7	10.08	10.08	0.000003	0.26	3448.89	1530.68
Basin_#2	1.120	449.04	1.7	10.16	10.16	0.000005	0.32	3573.02	1555.43
Basin_#2	1.170	180.26	1.7	9.9	9.9	0.000002	0.21	3307.28	1649.24
Basin_#2	1.170	267.84	1.7	10.01	10.01	0.000004	0.29	3481.15	1701.53
Basin_#2	1.170	352.38	1.7	10.08	10.08	0.000007	0.37	3605.39	1722
Basin_#2	1.170	451.77	1.7	10.16	10.16	0.00001	0.46	3744.46	1743.25
Basin_#2	1.220	181.33	1.8	9.91	9.91	0.000001	0.14	4094.59	1736.17
Basin_#2	1.220	269.08	1.8	10.01	10.01	0.000002	0.2	4275.66	1758.81
Basin_#2	1.220	352.54	1.8	10.08	10.08	0.000004	0.25	4403.22	1771.34
Basin_#2	1.220	454.21	1.8	10.16	10.16	0.000006	0.32	4546.07	1788.54
Basin_#2	1.260	Culvert							
Basin_#2	1.300	181.33	2	9.91	9.91	0.000001	0.08	4345.07	1692.57
Basin_#2	1.300	269.08	2	10.01	10.01	0.000002	0.12	4522.63	1726.35
Basin_#2	1.300	352.54	2	10.08	10.08	0.000003	0.15	4649.06	1751.68
Basin_#2	1.300	454.21	2	10.16	10.16	0.000005	0.19	4791.88	1780.35
Basin_#2	1.350	182.56	2	9.91	9.91	0.000001	0.08	4009.79	1722.57
Basin_#2	1.350	270.48	2	10.01	10.01	0.000003	0.11	4190.07	1737.43
Basin_#2	1.350	352.63	2	10.08	10.08	0.000004	0.13	4316.7	1755.55
Basin_#2	1.350	454.3	2	10.17	10.17	0.000006	0.17	4459.25	1778.58
Basin_#2	1.400	183.74	2.1	9.91	9.91	0.000001	0.1	4014.76	1811.45
Basin_#2	1.400	272.01	2.1	10.01	10.01	0.000002	0.14	4205.79	1844.2
Basin_#2	1.400	349.94	2.1	10.08	10.08	0.000003	0.17	4339.74	1857.39
Basin_#2	1.400	454.56	2.1	10.17	10.17	0.000005	0.21	4490.32	1876.72
Basin_#2	1.450	184.91	2.2	9.91	9.91	0.000002	0.18	4147.85	1730.71
Basin_#2	1.450	273.67	2.2	10.01	10.01	0.000004	0.26	4329.72	1755.24
Basin_#2	1.450	351.22	2.2	10.08	10.09	0.000007	0.32	4457.33	1780.41
Basin_#2	1.450	454.94	2.2	10.17	10.17	0.00001	0.4	4602.58	1816.91
Basin_#2	1.500	186.1	2.5	9.91	9.91	0.000002	0.17	5255.45	1821.61
Basin_#2	1.500	275.46	2.5	10.01	10.01	0.000003	0.24	5446.43	1831.33
Basin_#2	1.500	352.56	2.5	10.09	10.09	0.000005	0.29	5579.24	1838.06
Basin_#2	1.500	455.39	2.5	10.17	10.17	0.000007	0.37	5728.18	1844.03

Proposed Conditions - 25-year Storm Tide

10- through 100-year rainfall events

Hydraulic results at time of maximum water surface elevation

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)
Basin_#2	0.000	-111.01	-2.81	10.25	-1.44	10.25	0	-0.09	4392.61	1170.29
Basin_#2	0.000	-126.89	-2.81	10.25	-1.37	10.25	0	-0.1	4392.61	1170.29
Basin_#2	0.000	-146.87	-2.81	10.25	-1.25	10.25	0	-0.11	4392.61	1170.29
Basin_#2	0.000	-111.01	-2.81	10.25	-1.44	10.25	0	-0.09	4392.61	1170.29
Basin_#2	0.050	-60.92	-2.4	10.25		10.25	0	-0.05	4712.71	1238.46
Basin_#2	0.050	-50.44	-2.4	10.25		10.25	0	-0.04	4712.92	1238.46
Basin_#2	0.050	-15.93	-2.4	10.25		10.25	0	-0.01	4713.17	1238.47
Basin_#2	0.050	-60.93	-2.4	10.25		10.25	0	-0.05	4712.71	1238.46
Basin_#2	0.100	-19.64	-2.14	10.25		10.25	0	-0.01	4996.73	1299.67
Basin_#2	0.100	-34.38	-2.14	10.25		10.25	0	-0.02	4997.27	1299.67
Basin_#2	0.100	-15.87	-2.14	10.25		10.25	0	-0.01	4997.77	1299.67
Basin_#2	0.100	-19.64	-2.14	10.25		10.25	0	-0.01	4996.73	1299.67
Basin_#2	0.150	-19.23	-2.07	10.25		10.25	0	-0.01	5286.22	1345.85
Basin_#2	0.150	-34.18	-2.07	10.25		10.25	0	-0.02	5287.09	1345.87
Basin_#2	0.150	-15.76	-2.07	10.25		10.25	0	-0.01	5287.87	1345.88
Basin_#2	0.150	-19.23	-2.07	10.25		10.25	0	-0.01	5286.22	1345.85
Basin_#2	0.300	-14.36	-1.63	10.25		10.25	0	-0.01	1919.33	1475.71
Basin_#2	0.300	-17.16	-1.63	10.26		10.26	0	-0.01	1919.73	1475.81
Basin_#2	0.300	-5.29	-1.63	10.26		10.26	0	0	1920.07	1475.89
Basin_#2	0.300	-14.36	-1.63	10.25		10.25	0	-0.01	1919.33	1475.71
Basin_#2	0.350	-10.45	-1.5	10.25		10.25	0	-0.01	1615.68	1471.21
Basin_#2	0.350	-5.05	-1.5	10.26		10.26	0	-0.01	1616.17	1471.28
Basin_#2	0.350	-3.98	-1.5	10.26		10.26	0	0	1616.58	1471.35
Basin_#2	0.350	-10.45	-1.5	10.25		10.25	0	-0.01	1615.68	1471.21
Basin_#2	0.400	-5.79	-1.39	10.25		10.25	0	-0.01	1242.14	1465.2
Basin_#2	0.400	-3.31	-1.39	10.26		10.26	0	-0.01	1242.6	1465.39
Basin_#2	0.400	-2.2	-1.39	10.26		10.26	0	0	1242.99	1465.54
Basin_#2	0.400	-5.79	-1.39	10.25		10.25	0	-0.01	1242.14	1465.2
Basin_#2	0.450	0	-0.9	10.25		10.25	0	0	1082.01	1429.72
Basin_#2	0.450	0	-0.9	10.26		10.26	0	0	1082.39	1429.95
Basin_#2	0.450	0	-0.9	10.26		10.26	0	0	1082.69	1430.14
Basin_#2	0.450	0	-0.9	10.25		10.25	0	0	1082.01	1429.72
Basin_#2	0.485	Inl Struct								
Basin_#2	0.520	0	-0.7	7.62	-0.67	7.62	0	0	918.82	947.9
Basin_#2	0.520	160.57	-0.7	8.52	0.37	8.52	0.000001	0.15	1044.32	1115.04
Basin_#2	0.520	227.03	-0.7	8.81	0.58	8.81	0.000002	0.21	1085.18	1142.94
Basin_#2	0.520	297.39	-0.7	9.26	0.77	9.26	0.000002	0.26	1148.17	1249.04

Basin_#2	0.570	-0.47	-0.2	7.62	7.62	0	0	727.36	956.62
Basin_#2	0.570	149.05	-0.2	8.52	8.52	0.000002	0.22	843.96	1108.08
Basin_#2	0.570	212.12	-0.2	8.81	8.81	0.000003	0.3	881.89	1199.03
Basin_#2	0.570	277.04	-0.2	9.26	9.26	0.000004	0.36	940.39	1319
Basin_#2	0.620	43.88	0	7.62	7.62	0	0.06	979.28	694.95
Basin_#2	0.620	135.66	0	8.52	8.52	0.000001	0.15	1158.68	1126.14
Basin_#2	0.620	195.27	0	8.81	8.81	0.000002	0.21	1217.11	1165.09
Basin_#2	0.620	253.75	0	9.26	9.26	0.000002	0.25	1307.21	1255.83
Basin_#2	0.670	44.24	0	7.63	7.63	0	0.07	1081.4	738.05
Basin_#2	0.670	136.63	0	8.52	8.52	0.000001	0.16	1314.42	1057.42
Basin_#2	0.670	195.06	0	8.81	8.81	0.000002	0.22	1390.41	1118.39
Basin_#2	0.670	254.08	0	9.26	9.26	0.000002	0.27	1507.57	1295.73
Basin_#2	0.720	44.71	0.6	7.63	7.63	0	0.06	1138.88	864.43
Basin_#2	0.720	136.86	0.6	8.52	8.52	0.000001	0.16	1482.5	1077.68
Basin_#2	0.720	195.13	0.6	8.81	8.81	0.000002	0.21	1599.42	1163.81
Basin_#2	0.720	254.42	0.6	9.26	9.27	0.000002	0.25	1779.73	1276.78
Basin_#2	0.770	45.49	1	7.63	7.63	0	0.08	1298.24	904.74
Basin_#2	0.770	137.21	1	8.52	8.52	0.000001	0.17	2199.72	1064.04
Basin_#2	0.770	195.08	1	8.81	8.81	0.000002	0.22	2512.88	1078.55
Basin_#2	0.770	254.74	1	9.27	9.27	0.000002	0.24	3010.36	1140.29
Basin_#2	0.820	46.15	0.75	7.63	7.63	0	0.07	1445.73	832.56
Basin_#2	0.820	137.35	0.75	8.52	8.52	0.000001	0.14	2270.76	1004.5
Basin_#2	0.820	194.95	0.75	8.81	8.81	0.000001	0.19	2573.71	1060.8
Basin_#2	0.820	254.93	0.75	9.27	9.27	0.000002	0.21	3064.88	1117.72
Basin_#2	0.870	58.66	1.7	7.63	7.63	0	0.09	1421.56	771.06
Basin_#2	0.870	137.66	1.7	8.52	8.52	0.000001	0.15	2193.7	978.36
Basin_#2	0.870	194.58	1.7	8.81	8.81	0.000002	0.2	2486.77	1020.07
Basin_#2	0.870	255.1	1.7	9.27	9.27	0.000002	0.23	2960.63	1083.58
Basin_#2	0.920	58.85	1.9	7.63	7.63	0	0.08	1629.47	734.71
Basin_#2	0.920	138.09	1.9	8.52	8.52	0.000001	0.13	2349.15	906.49
Basin_#2	0.920	194.26	1.9	8.81	8.81	0.000001	0.17	2627.52	1018.57
Basin_#2	0.920	255.39	1.9	9.27	9.27	0.000002	0.2	3113.62	1120.18
Basin_#2	0.970	59.2	1.9	7.63	7.63	0.000001	0.13	1085.82	478.07
Basin_#2	0.970	138.59	1.9	8.52	8.52	0.000003	0.22	1639.72	774.64
Basin_#2	0.970	193.71	1.9	8.81	8.82	0.000004	0.28	1885.17	912.74
Basin_#2	0.970	255.67	1.9	9.27	9.27	0.000005	0.33	2355.72	1113.22
Basin_#2	1.020	59.79	2.4	7.63	7.63	0.000001	0.12	1173.18	668.18
Basin_#2	1.020	139.2	2.4	8.52	8.52	0.000002	0.19	1828.79	803.89
Basin_#2	1.020	192.97	2.4	8.82	8.82	0.000003	0.24	2072.38	863.96
Basin_#2	1.020	255.92	2.4	9.27	9.27	0.000003	0.27	2509.27	1090.15
Basin_#2	1.070	60.78	1.6	7.63	7.63	0.000001	0.11	1380.4	755.98

Basin_#2	1.070	139.89	1.6	8.52	8.52	0.000001	0.18	2064.94	790.06
Basin_#2	1.070	191.99	1.6	8.82	8.82	0.000002	0.22	2301.65	828.51
Basin_#2	1.070	256.14	1.6	9.27	9.27	0.000003	0.25	2701.1	965.2
Basin_#2	1.120	61.94	2.4	7.63	7.63	0.000002	0.1	1107.24	627.32
Basin_#2	1.120	140.61	2.4	8.52	8.52	0.000003	0.16	1735.73	757.66
Basin_#2	1.120	191.22	2.4	8.82	8.82	0.000004	0.19	1960.72	785.82
Basin_#2	1.120	256.37	2.4	9.27	9.27	0.000005	0.22	2340.51	970.18
Basin_#2	1.145*	62.54	3.1	7.63	7.63	0.000003	0.13	933.88	608.25
Basin_#2	1.145*	141.34	3.1	8.52	8.52	0.000005	0.2	1560.69	783.87
Basin_#2	1.145*	190.83	3.1	8.82	8.82	0.000007	0.23	1799.37	847.09
Basin_#2	1.145*	256.49	3.1	9.27	9.27	0.000008	0.27	2260.61	1213.95
Basin_#2	1.170	63.19	2.4	7.63	7.63	0.000006	0.21	835.13	602.49
Basin_#2	1.170	141.39	2.4	8.52	8.52	0.000008	0.27	1505.46	948.25
Basin_#2	1.170	190.45	2.4	8.82	8.82	0.000009	0.3	1798.98	1060.31
Basin_#2	1.170	256.62	2.4	9.27	9.27	0.000011	0.34	2341.62	1351.44
Basin_#2	1.220	67.3	1.7	7.63	7.63	0.000003	0.15	1082.95	881.11
Basin_#2	1.220	142.22	1.7	8.52	8.52	0.000004	0.18	2015.85	1167.38
Basin_#2	1.220	190.15	1.7	8.82	8.82	0.000005	0.21	2375.52	1335.61
Basin_#2	1.220	256.92	1.7	9.27	9.27	0.000006	0.24	3043.15	1562.42
Basin_#2	1.260	Culvert							
Basin_#2	1.300	80.86	2	7.7	7.7	0.000008	0.24	1191.03	1109.41
Basin_#2	1.300	142.9	2	8.53	8.53	0.000005	0.21	2249.7	1334.25
Basin_#2	1.300	190.71	2	8.83	8.83	0.000006	0.23	2650	1406.65
Basin_#2	1.300	256.92	2	9.28	9.28	0.000005	0.23	3326.43	1562.57
Basin_#2	1.350	81.15	1.4	7.7	7.7	0.000007	0.24	1054.18	823.93
Basin_#2	1.350	143.74	1.4	8.53	8.53	0.000005	0.22	2001.64	1281.63
Basin_#2	1.350	190.78	1.4	8.83	8.83	0.000006	0.25	2386.62	1335.71
Basin_#2	1.350	256.95	1.4	9.28	9.28	0.000006	0.25	3013.56	1434.42
Basin_#2	1.400	81.4	1.7	7.7	7.7	0.000005	0.19	1129.18	846.01
Basin_#2	1.400	144.39	1.7	8.53	8.53	0.000004	0.2	2005.67	1237.1
Basin_#2	1.400	190.78	1.7	8.83	8.83	0.000005	0.22	2382.4	1324.74
Basin_#2	1.400	256.97	1.7	9.28	9.28	0.000005	0.24	3008.11	1447.1
Basin_#2	1.450	81.61	2.2	7.7	7.7	0.000011	0.28	1011.07	894.92
Basin_#2	1.450	144.48	2.2	8.53	8.53	0.00001	0.3	1947.45	1355.27
Basin_#2	1.450	190.88	2.2	8.83	8.83	0.000012	0.34	2374.55	1534.79
Basin_#2	1.450	258.44	2.2	9.28	9.28	0.000012	0.36	3093.82	1648.86
Basin_#2	1.500	81.83	2.9	7.7	7.7	0.000004	0.15	1872.38	1008.92
Basin_#2	1.500	144.67	2.9	8.53	8.53	0.000004	0.18	2933.87	1494.06
Basin_#2	1.500	190.97	2.9	8.83	8.83	0.000005	0.2	3387.12	1571.61
Basin_#2	1.500	258.87	2.9	9.28	9.28	0.000005	0.22	4130.41	1713.28

APPENDIX G

HY-8 CULVERT ANALYSIS RESULTS

HY-8 Culvert Analysis Report
Battery Creek Road (Existing Crossline)

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 210 cfs

Design Flow: 300 cfs

Maximum Flow: 480 cfs

Table 1 - Summary of Culvert Flows at Crossing: Battery Creek Rd Existing

Headwater Elevation (ft)	Total Discharge (cfs)	Existing Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
6.42	210.00	34.42	177.61	11
6.68	237.00	46.39	190.22	10
6.95	264.00	56.23	207.71	10
7.21	291.00	64.40	226.59	8
7.29	300.00	66.81	232.92	6
7.72	345.00	77.78	267.20	11
7.97	372.00	83.67	288.20	10
8.23	399.00	89.17	309.83	11
8.48	426.00	94.36	331.29	12
8.71	453.00	98.73	354.24	6
8.71	480.00	98.73	4053.74	2
6.00	1.55	1.55	0.00	Overtopping

Rating Curve Plot for Crossing: Battery Creek Rd Existing

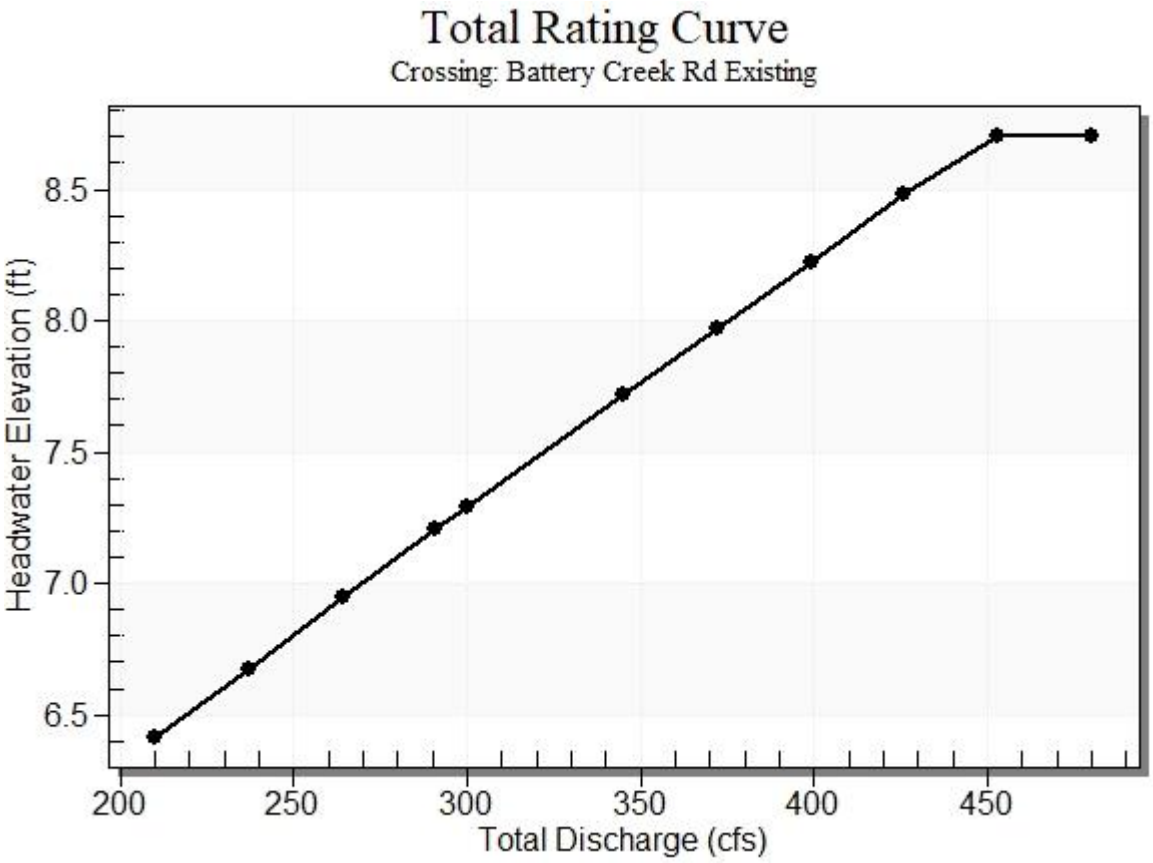


Table 2 - Culvert Summary Table: Existing Culvert

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
210.00	34.42	6.42	2.026	4.717	4-FFf	1.870	1.397	2.500	4.500	3.506	0.000
237.00	46.39	6.68	2.423	5.245	4-FFf	2.500	1.636	2.500	4.770	4.726	0.000
264.00	56.23	6.95	2.768	5.785	4-FFf	2.500	1.806	2.500	5.040	5.728	0.000
291.00	64.40	7.21	3.088	6.312	4-FFf	2.500	1.930	2.500	5.304	6.560	0.000
300.00	66.81	7.29	3.190	6.481	4-FFf	2.500	1.964	2.500	4.200	6.805	0.000
345.00	77.78	7.72	3.704	7.328	4-FFf	2.500	2.103	2.500	5.812	7.923	0.000
372.00	83.67	7.97	4.015	7.836	4-FFf	2.500	2.166	2.500	6.066	8.522	0.000
399.00	89.17	8.23	4.329	8.345	4-FFf	2.500	2.218	2.500	6.320	9.083	0.000
426.00	94.36	8.48	4.646	8.853	4-FFf	2.500	2.261	2.500	6.574	9.611	0.000
453.00	98.73	8.71	4.928	9.305	4-FFf	2.500	2.292	2.500	6.800	10.057	0.000
480.00	98.73	8.71	4.928	6.705	4-FFf	2.500	2.292	2.500	6.800	10.057	0.000

****

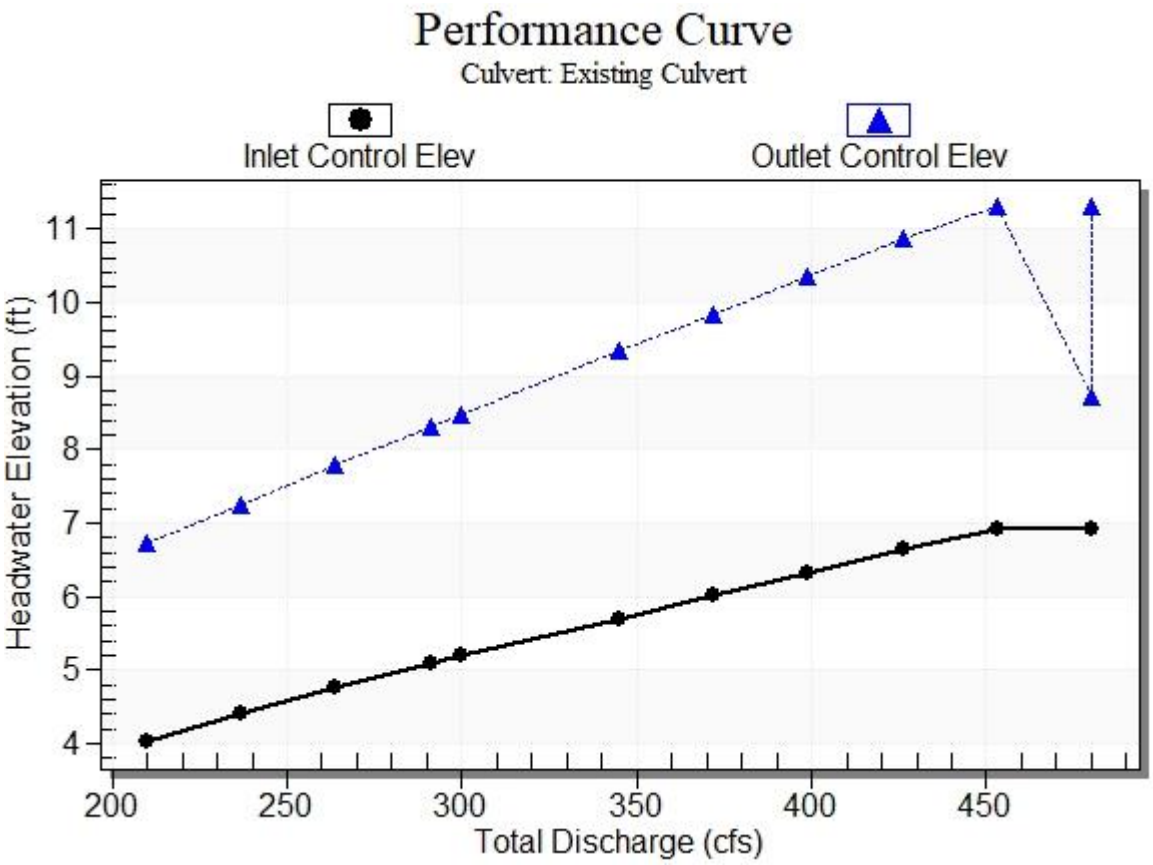
Straight Culvert

Inlet Elevation (invert): 2.00 ft, Outlet Elevation (invert): 1.90 ft

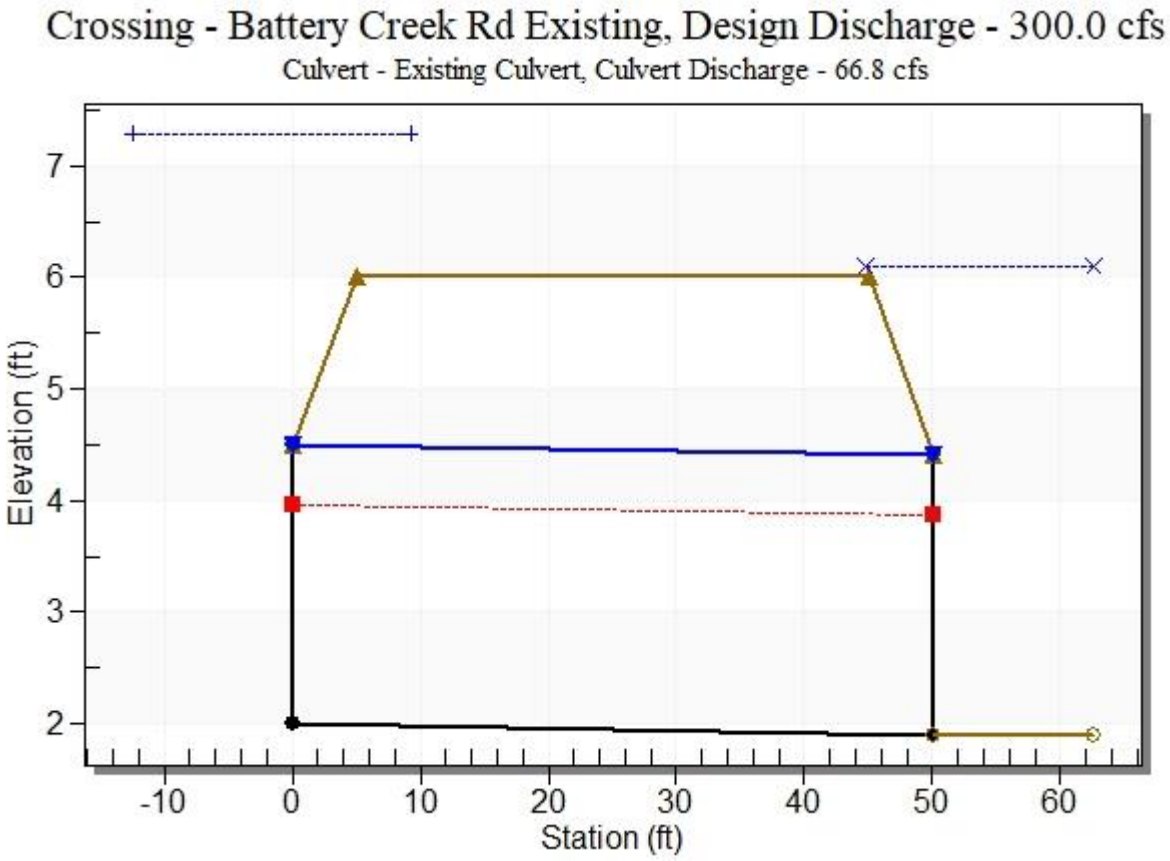
Culvert Length: 50.00 ft, Culvert Slope: 0.0020

****

Culvert Performance Curve Plot: Existing Culvert



Water Surface Profile Plot for Culvert: Existing Culvert



Site Data - Existing Culvert

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 2.00 ft

Outlet Station: 50.00 ft

Outlet Elevation: 1.90 ft

Number of Barrels: 2

Culvert Data Summary - Existing Culvert

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0130

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Battery Creek Rd Existing)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)
180.00	6.10	6.10	0.00
280.00	7.10	7.10	0.00
450.00	8.70	8.70	0.00

Tailwater Channel Data - Battery Creek Rd Existing

Tailwater Channel Option: Enter Rating Curve

Channel Invert Elevation: 1.90 ft

Roadway Data for Crossing: Battery Creek Rd Existing

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 300.00 ft

Crest Elevation: 6.00 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

HY-8 Culvert Analysis Report
Battery Creek Road (Proposed Culvert)

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 210 cfs

Design Flow: 300 cfs

Maximum Flow: 480 cfs

Table 4 - Summary of Culvert Flows at Crossing: Battery Creek Rd Proposed

Headwater Elevation (ft)	Total Discharge (cfs)	Proposed Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
6.23	210.00	210.00	0.00	1
6.72	237.00	237.00	0.00	1
7.18	264.00	264.00	0.00	1
7.73	291.00	291.00	0.00	1
7.94	300.00	300.00	0.00	1
8.44	345.00	345.00	0.00	1
8.54	372.00	365.05	6.30	10
8.60	399.00	371.13	27.27	6
8.65	426.00	375.77	49.73	5
8.69	453.00	379.72	72.44	4
8.73	480.00	383.36	96.10	4
8.50	361.36	361.36	0.00	Overtopping

Rating Curve Plot for Crossing: Battery Creek Rd Proposed

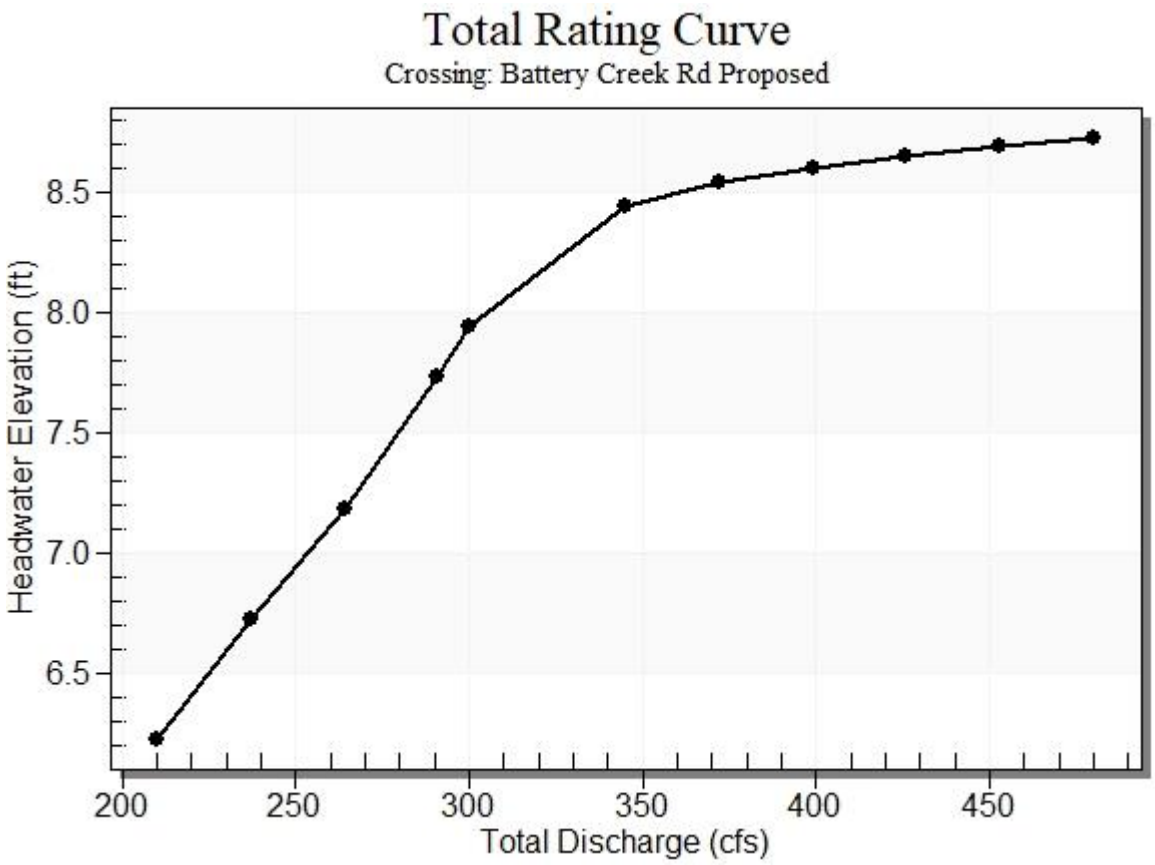


Table 5 - Culvert Summary Table: Proposed Culvert

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
210.00	210.00	6.23	4.229	2.975	1-JS1t	2.780	2.917	3.175	3.075	7.749	0.000
237.00	237.00	6.72	4.544	4.724	1-S1t	3.008	3.105	3.692	3.592	7.422	0.000
264.00	264.00	7.18	4.861	5.184	1-S1t	3.240	3.286	4.210	4.110	7.320	0.000
291.00	291.00	7.73	5.188	5.729	7-M1t	3.486	3.453	4.728	4.627	7.571	0.000
300.00	300.00	7.94	5.300	5.941	7-M1t	3.573	3.507	4.900	4.800	7.676	0.000
345.00	345.00	8.44	5.896	6.438	7-M2t	5.000	3.759	4.900	4.800	8.827	0.000
372.00	365.05	8.54	6.184	6.537	3-M2t	5.000	3.867	4.900	4.800	9.341	0.000
399.00	371.13	8.60	6.274	6.599	3-M2t	5.000	3.897	4.900	4.800	9.496	0.000
426.00	375.77	8.65	6.343	6.647	3-M2t	5.000	3.920	4.900	4.800	9.615	0.000
453.00	379.72	8.69	6.404	6.688	3-M2t	5.000	3.940	4.900	4.800	9.716	0.000
480.00	383.36	8.73	6.460	6.727	3-M2t	5.000	3.957	4.900	4.800	9.809	0.000

****

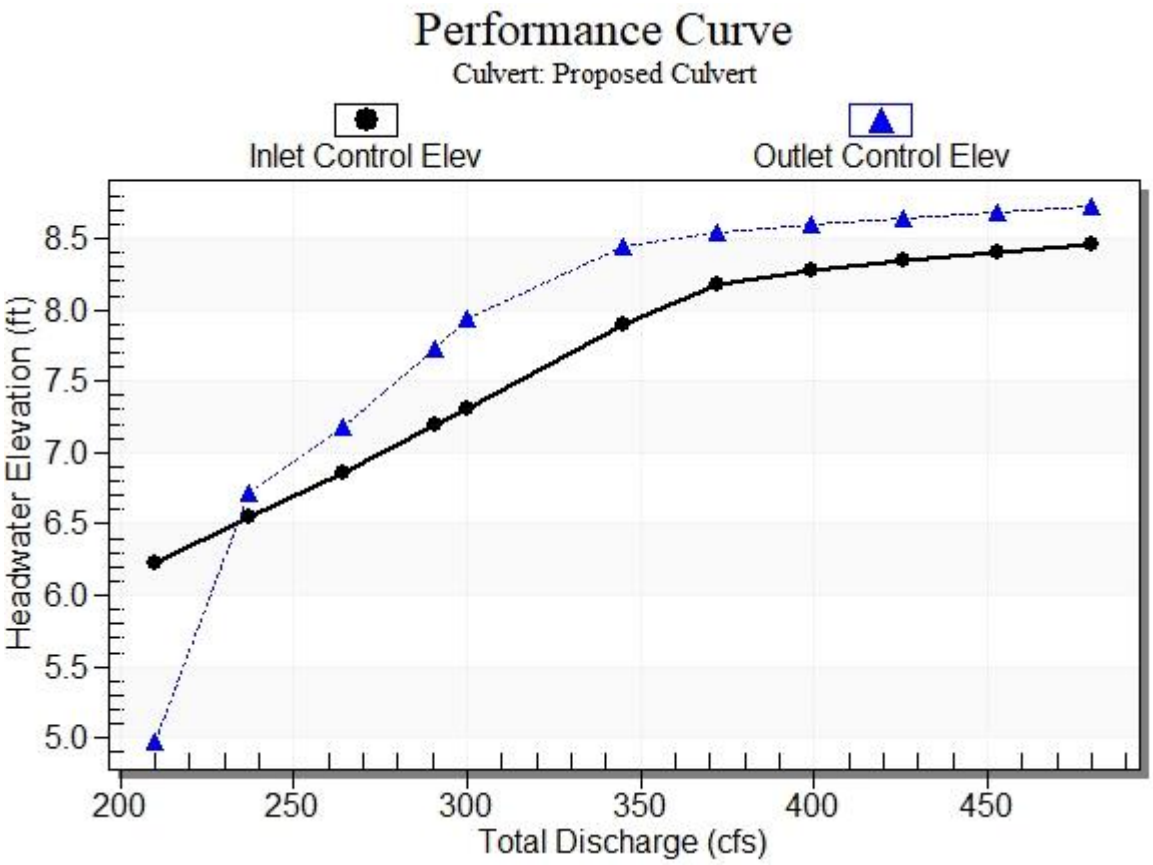
Straight Culvert

Inlet Elevation (invert): 2.00 ft, Outlet Elevation (invert): 1.80 ft

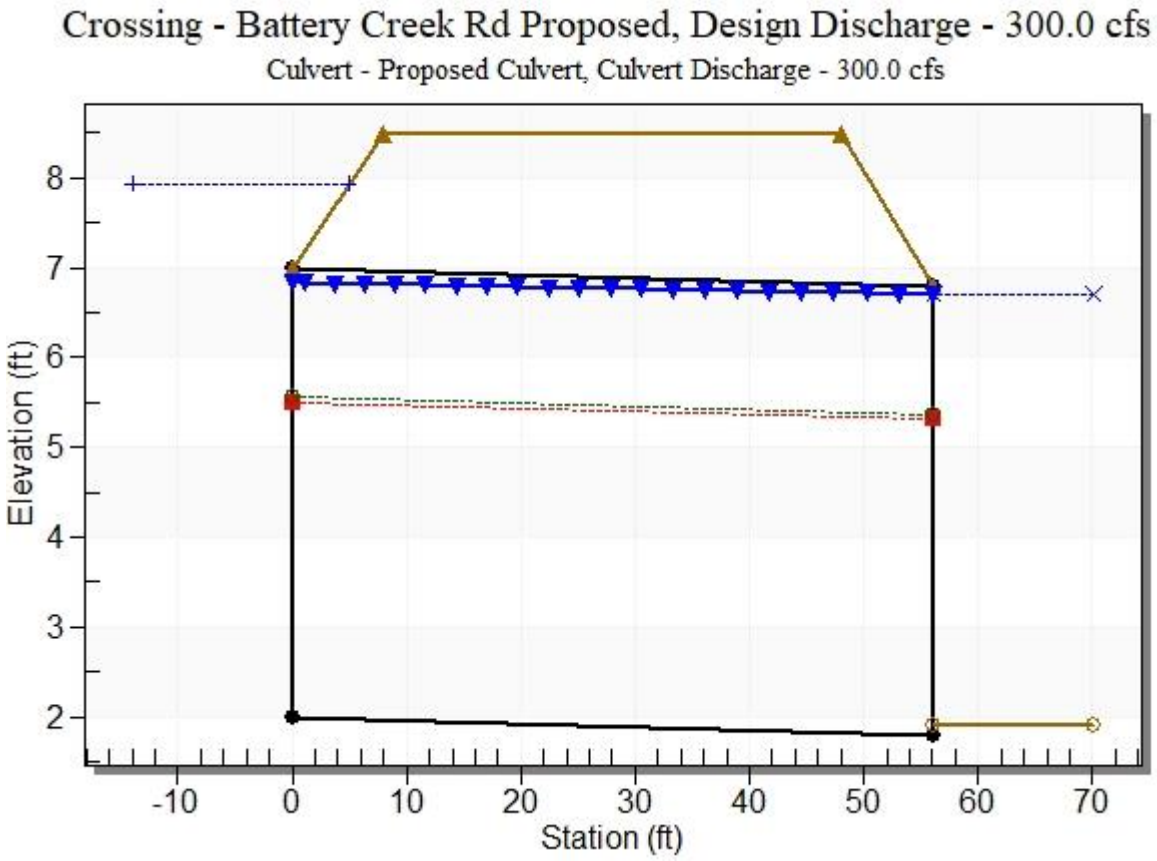
Culvert Length: 56.00 ft, Culvert Slope: 0.0036

****

Culvert Performance Curve Plot: Proposed Culvert



Water Surface Profile Plot for Culvert: Proposed Culvert



Site Data - Proposed Culvert

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 2.00 ft

Outlet Station: 56.00 ft

Outlet Elevation: 1.80 ft

Number of Barrels: 2

Culvert Data Summary - Proposed Culvert

Barrel Shape: Circular

Barrel Diameter: 5.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: None

Table 6 - Downstream Channel Rating Curve (Crossing: Battery Creek Rd Proposed)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)
120.00	3.90	3.90	0.00
180.00	4.40	4.40	0.00
300.00	6.70	6.70	0.00

Tailwater Channel Data - Battery Creek Rd Proposed

Tailwater Channel Option: Enter Rating Curve

Channel Invert Elevation: 1.90 ft

Roadway Data for Crossing: Battery Creek Rd Proposed

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 300.00 ft

Crest Elevation: 8.50 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

HY-8 Culvert Analysis Report
Spanish Moss Trail (Existing Crossline)

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 260 cfs

Design Flow: 370 cfs

Maximum Flow: 520 cfs

Table 7 - Summary of Culvert Flows at Crossing: Spanish Moss Trail Existing

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Culvert 2 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
9.19	260.00	96.99	41.81	120.22	12
9.21	286.00	97.20	41.90	146.53	4
9.24	312.00	97.39	41.99	171.49	3
9.26	338.00	97.57	42.07	197.37	3
9.28	364.00	97.75	42.15	223.36	3
9.29	370.00	97.79	42.17	229.81	3
9.32	416.00	98.08	42.29	275.01	3
9.34	442.00	98.24	42.37	301.12	3
9.36	468.00	98.38	42.43	327.00	3
9.38	494.00	98.53	42.50	352.85	3
9.40	520.00	98.67	42.56	377.29	2
9.00	136.60	95.47	41.12	0.00	Overtopping

Rating Curve Plot for Crossing: Spanish Moss Trail Existing

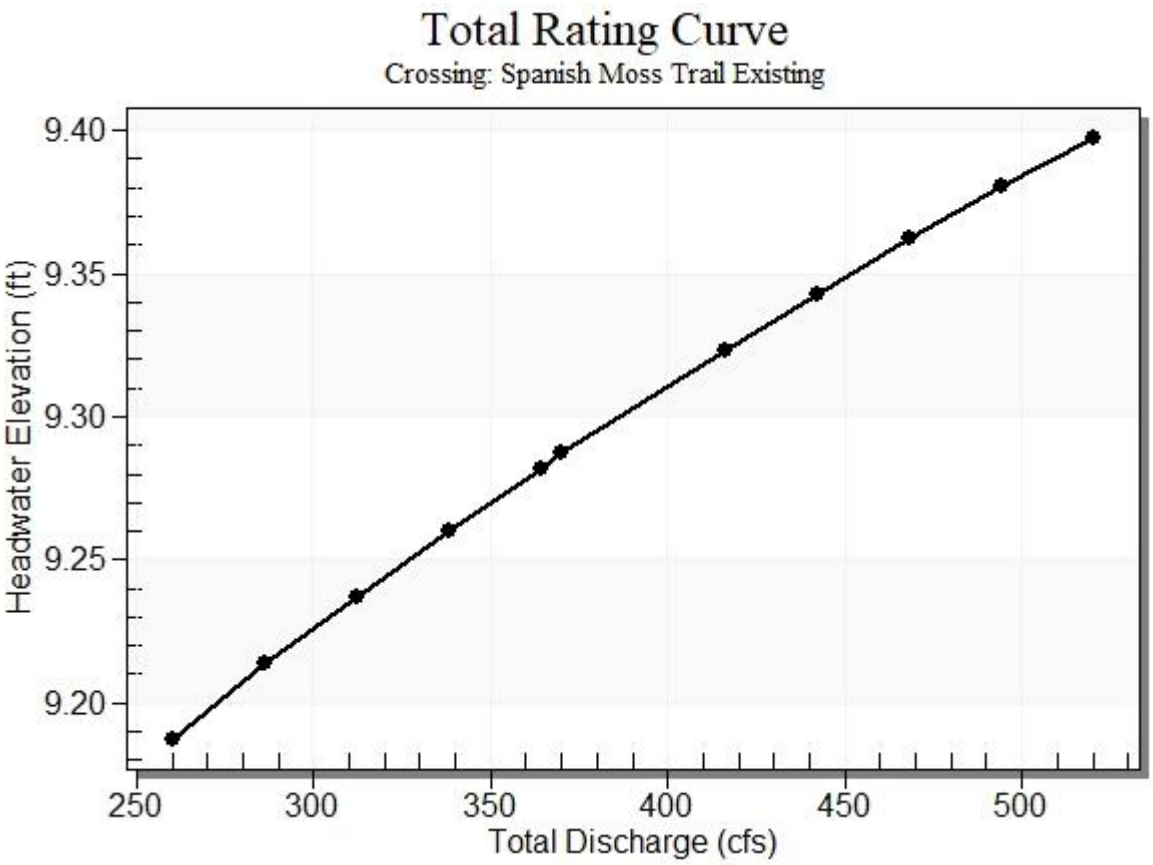


Table 8 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
260.00	96.99	9.19	8.017	7.166	5-JS1f	2.122	2.754	3.000	4.800	13.722	0.000
286.00	97.20	9.21	8.043	7.187	5-JS1f	2.126	2.749	3.000	4.800	13.751	0.000
312.00	97.39	9.24	8.067	7.206	4-FFf	2.129	2.745	4.170	4.800	13.778	0.000
338.00	97.57	9.26	8.089	7.225	4-FFf	2.133	2.741	4.170	4.800	13.804	0.000
364.00	97.75	9.28	8.111	7.243	4-FFf	2.136	2.737	4.170	4.800	13.829	0.000
370.00	97.79	9.29	8.117	7.248	4-FFf	2.136	2.736	4.170	4.800	13.835	0.000
416.00	98.08	9.32	8.153	7.277	4-FFf	2.142	2.730	4.170	4.800	13.875	0.000
442.00	98.24	9.34	8.172	7.293	4-FFf	2.144	2.727	4.170	4.800	13.898	0.000
468.00	98.38	9.36	8.191	7.309	4-FFf	2.147	2.724	4.170	4.800	13.919	0.000
494.00	98.53	9.38	8.210	7.324	4-FFf	2.149	2.721	4.170	4.800	13.939	0.000
520.00	98.67	9.40	8.227	7.338	4-FFf	2.152	2.719	4.170	4.800	13.959	0.000

****

Straight Culvert

Inlet Elevation (invert): 1.17 ft, Outlet Elevation (invert): -0.69 ft

Culvert Length: 51.03 ft, Culvert Slope: 0.0365

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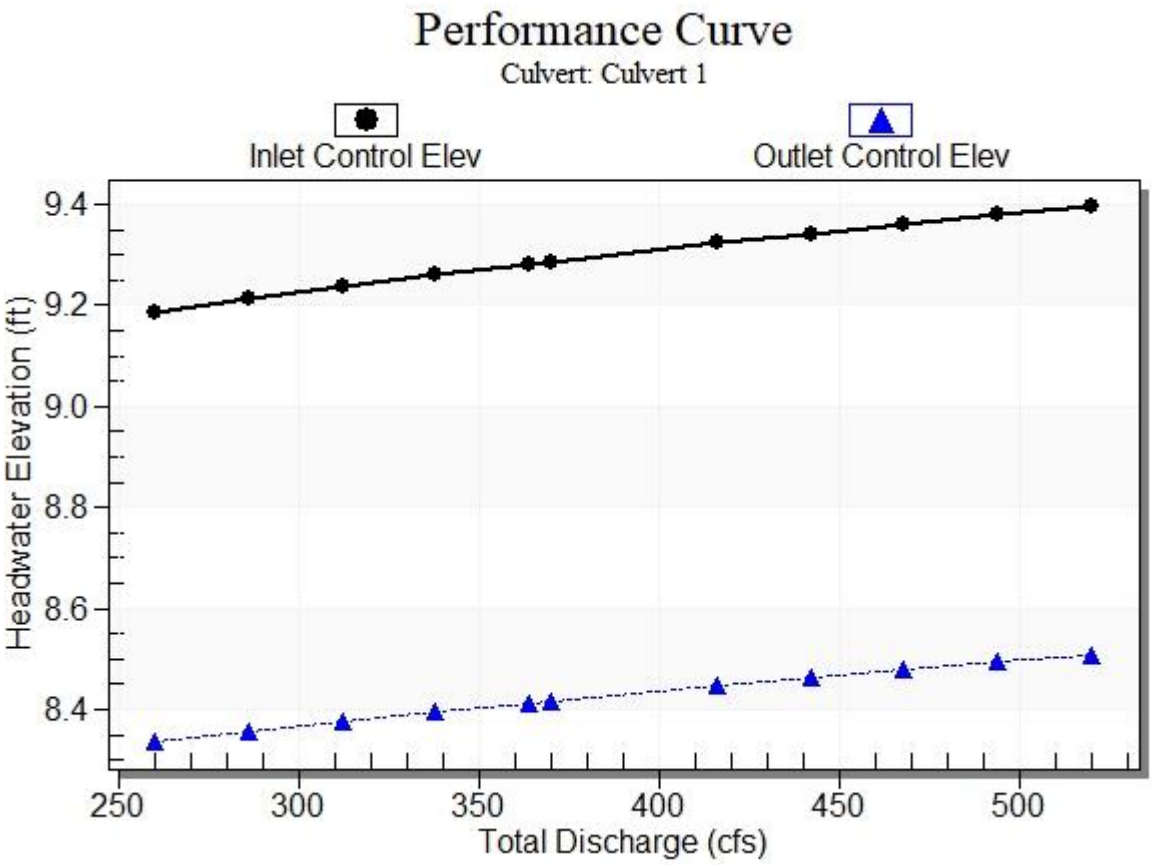
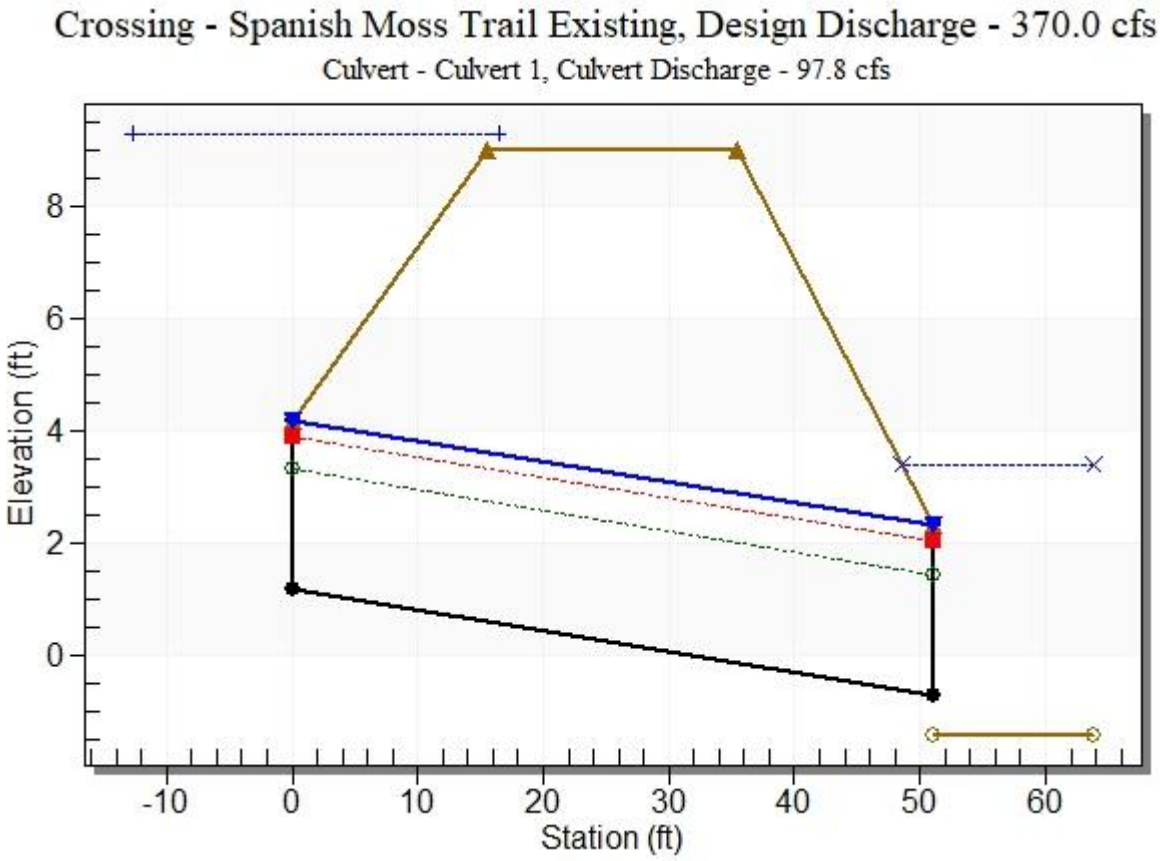
Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1.17 ft

Outlet Station: 51.00 ft

Outlet Elevation: -0.69 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0150

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: None

Table 9 - Culvert Summary Table: Culvert 2

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
260.00	41.81	9.19	7.110	9.897	4-FFf	2.000	2.000	2.000	4.800	13.308	0.000
286.00	41.90	9.21	7.138	9.923	4-FFf	2.000	2.000	2.000	4.800	13.338	0.000
312.00	41.99	9.24	7.162	9.946	4-FFf	2.000	2.000	2.000	4.800	13.365	0.000
338.00	42.07	9.26	7.187	9.969	4-FFf	2.000	2.000	2.000	4.800	13.391	0.000
364.00	42.15	9.28	7.210	9.991	4-FFf	2.000	2.000	2.000	4.800	13.416	0.000
370.00	42.17	9.29	7.215	9.997	4-FFf	2.000	2.000	2.000	4.800	13.422	0.000
416.00	42.29	9.32	7.253	10.032	4-FFf	2.000	2.000	2.000	4.800	13.463	0.000
442.00	42.37	9.34	7.274	10.052	4-FFf	2.000	2.000	2.000	4.800	13.485	0.000
468.00	42.43	9.36	7.294	10.071	4-FFf	2.000	2.000	2.000	4.800	13.507	0.000
494.00	42.50	9.38	7.314	10.090	4-FFf	2.000	2.000	2.000	4.800	13.528	0.000
520.00	42.56	9.40	7.332	10.107	4-FFf	2.000	2.000	2.000	4.800	13.547	0.000

****

Straight Culvert

Inlet Elevation (invert): -0.71 ft, Outlet Elevation (invert): -0.88 ft

Culvert Length: 55.00 ft, Culvert Slope: 0.0031

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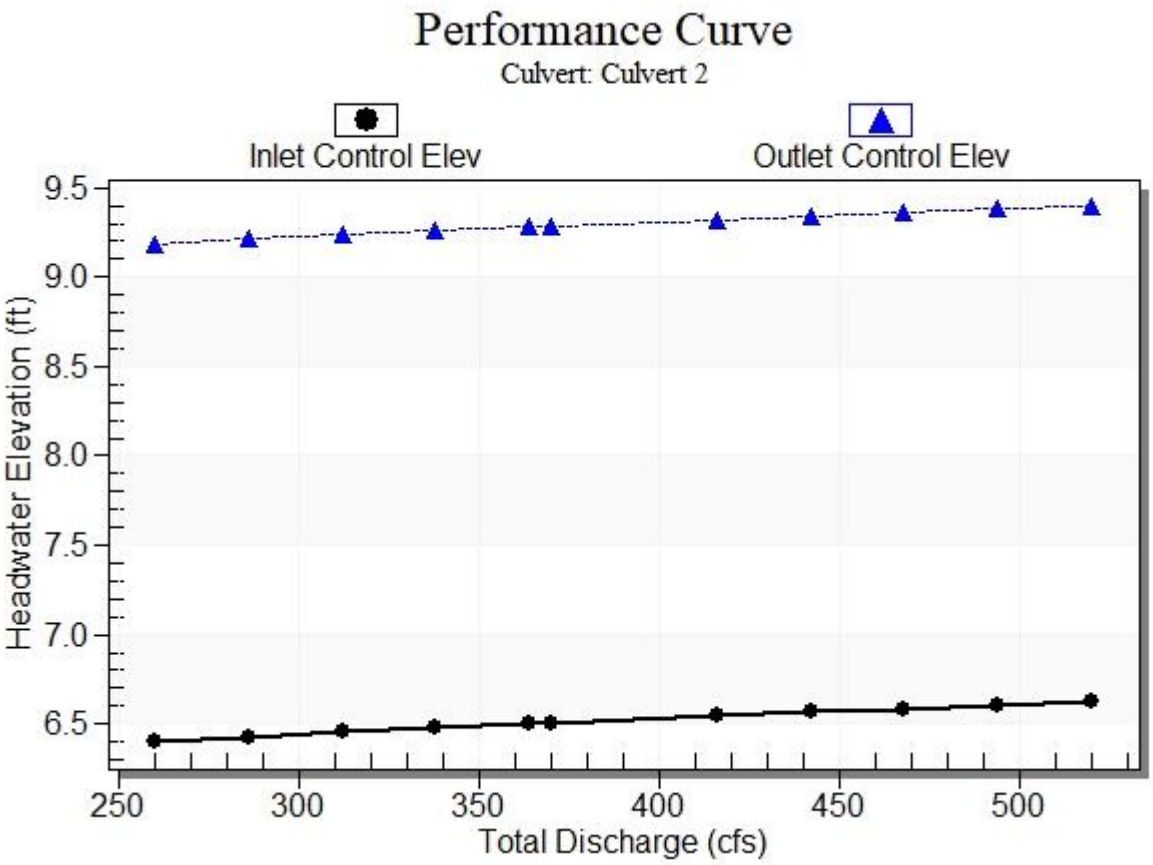
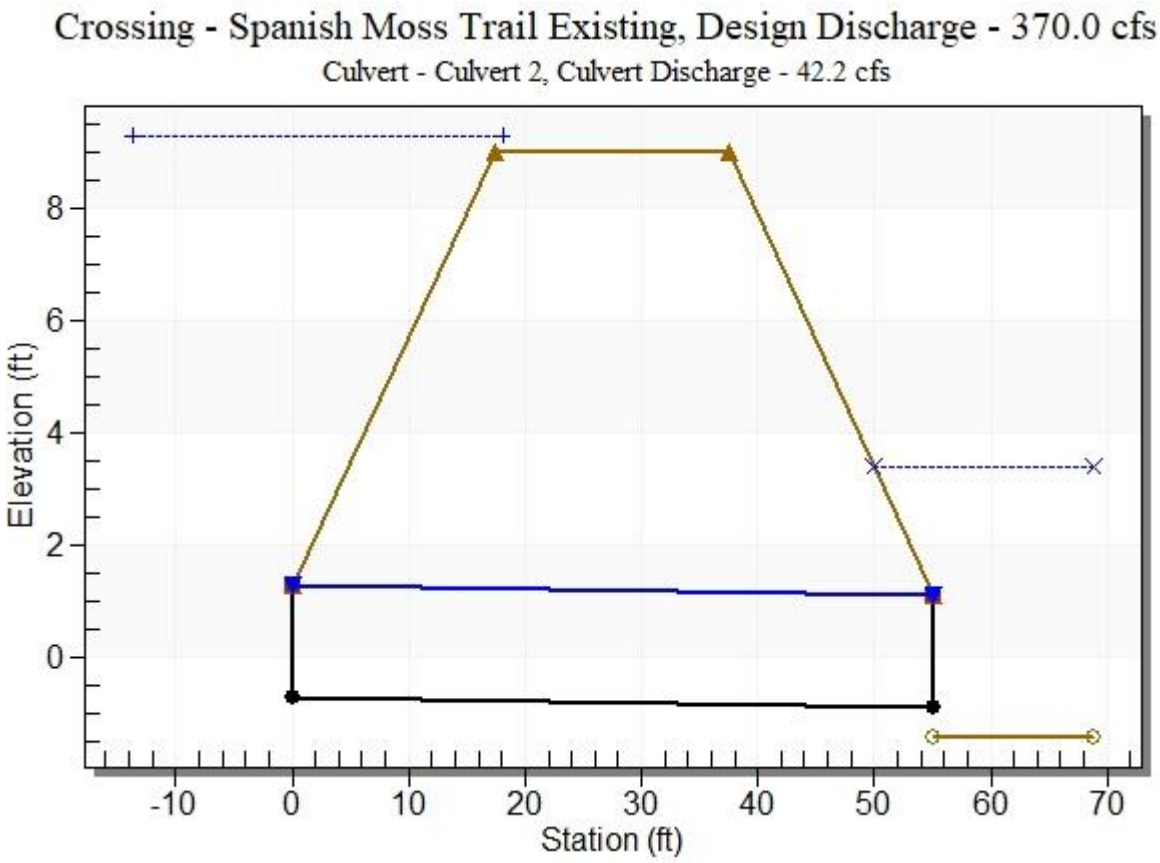
Culvert Performance Curve Plot: Culvert 2



Water Surface Profile Plot for Culvert: Culvert 2



Site Data - Culvert 2

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: -0.71 ft

Outlet Station: 55.00 ft

Outlet Elevation: -0.88 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 2

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0150

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: None

Table 10 - Downstream Channel Rating Curve (Crossing: Spanish Moss Trail Existing)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
260.00	3.40	4.80
286.00	3.40	4.80
312.00	3.40	4.80
338.00	3.40	4.80
364.00	3.40	4.80
370.00	3.40	4.80
416.00	3.40	4.80
442.00	3.40	4.80
468.00	3.40	4.80
494.00	3.40	4.80
520.00	3.40	4.80

Tailwater Channel Data - Spanish Moss Trail Existing

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 3.40 ft

Roadway Data for Crossing: Spanish Moss Trail Existing

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 500.00 ft

Crest Elevation: 9.00 ft

Roadway Surface: Paved

Roadway Top Width: 20.00 ft

HY-8 Culvert Analysis Report
Spanish Moss Trail (Proposed Culvert)

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 260 cfs

Design Flow: 370 cfs

Maximum Flow: 520 cfs

Table 11 - Summary of Culvert Flows at Crossing: Spanish Moss Trail Proposed

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
3.89	260.00	260.00	0.00	1
3.99	286.00	286.00	0.00	1
4.11	312.00	312.00	0.00	1
4.23	338.00	338.00	0.00	1
4.37	364.00	364.00	0.00	1
4.40	370.00	370.00	0.00	1
4.68	416.00	416.00	0.00	1
4.72	442.00	442.00	0.00	1
4.94	468.00	468.00	0.00	1
5.17	494.00	494.00	0.00	1
5.41	520.00	520.00	0.00	1
10.00	879.20	879.20	0.00	Overtopping

Rating Curve Plot for Crossing: Spanish Moss Trail Proposed

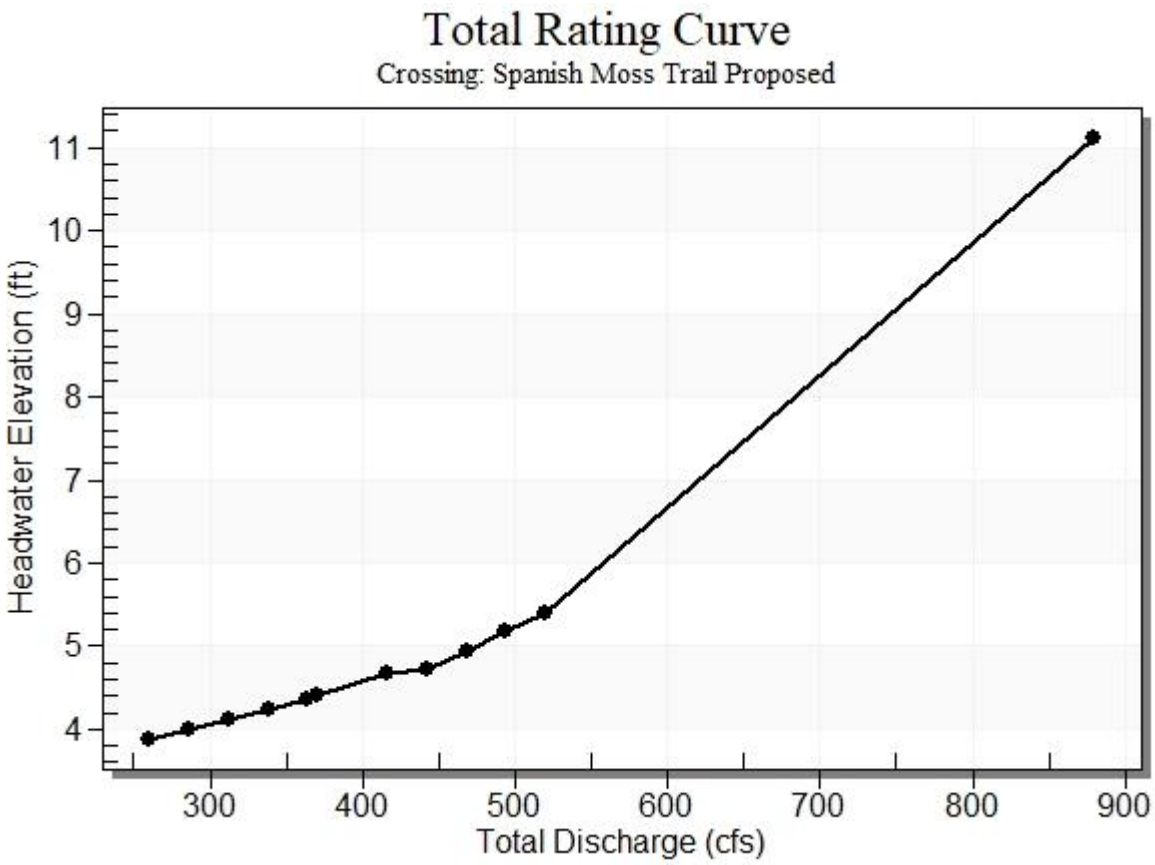


Table 12 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
260.00	260.00	3.89	3.774	4.389	1-S1t	1.908	2.637	4.400	4.800	4.642	0.000
286.00	286.00	3.99	3.986	4.493	1-S1t	2.011	2.772	4.400	4.800	5.106	0.000
312.00	312.00	4.11	4.192	4.607	1-S1t	2.110	2.903	4.400	4.800	5.571	0.000
338.00	338.00	4.23	4.394	4.731	1-S1t	2.208	3.025	4.400	4.800	6.035	0.000
364.00	364.00	4.37	4.596	4.867	1-S1t	2.303	3.143	4.400	4.800	6.499	0.000
370.00	370.00	4.40	4.643	4.900	1-S1t	2.325	3.169	4.400	4.800	6.606	0.000
416.00	416.00	4.68	5.007	5.177	1-S1t	2.490	3.370	4.400	4.800	7.428	0.000
442.00	442.00	4.72	5.220	5.101	5-S2n	2.583	3.475	2.966	4.800	11.771	0.000
468.00	468.00	4.94	5.440	5.246	5-JS1t	2.675	3.577	4.400	4.800	8.356	0.000
494.00	494.00	5.17	5.668	5.400	5-S2n	2.766	3.674	3.168	4.800	12.182	0.000
520.00	520.00	5.41	5.906	5.562	5-S2n	2.858	3.768	3.266	4.800	12.387	0.000

****

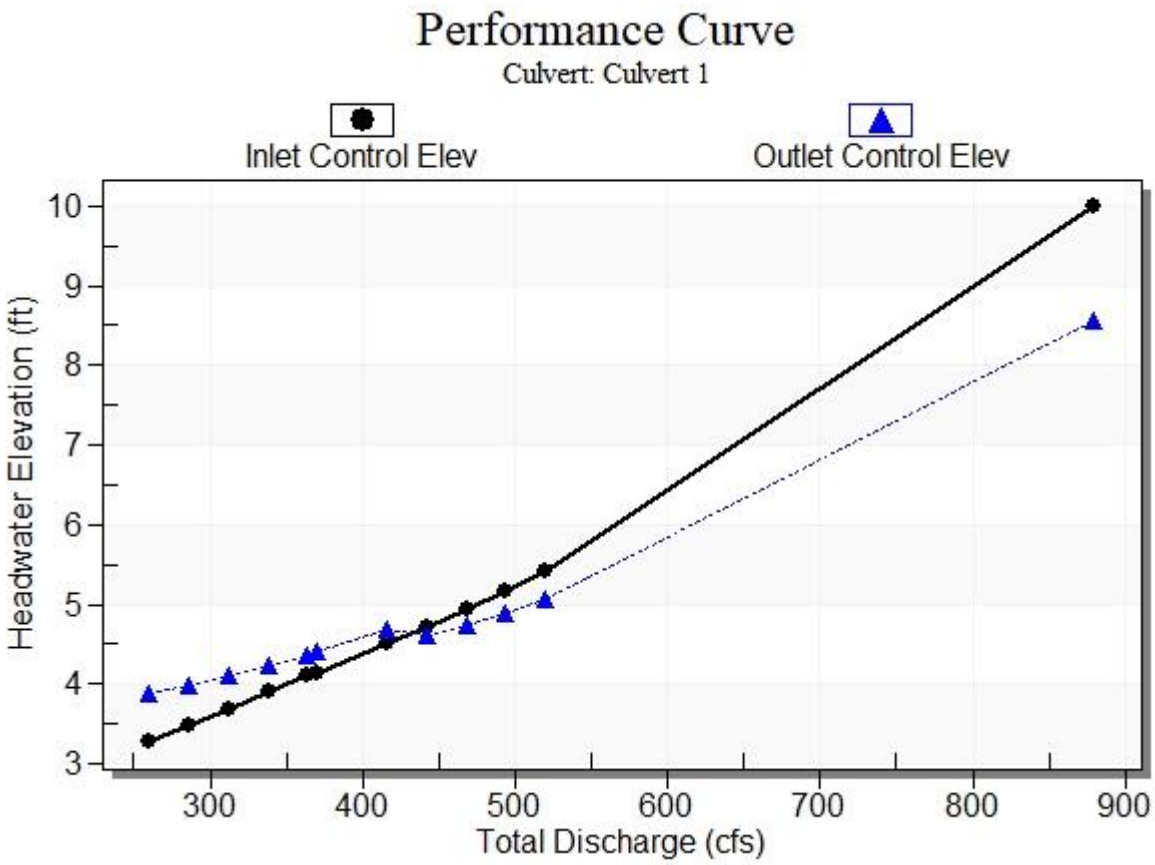
Straight Culvert

Inlet Elevation (invert): -0.50 ft, Outlet Elevation (invert): -1.00 ft

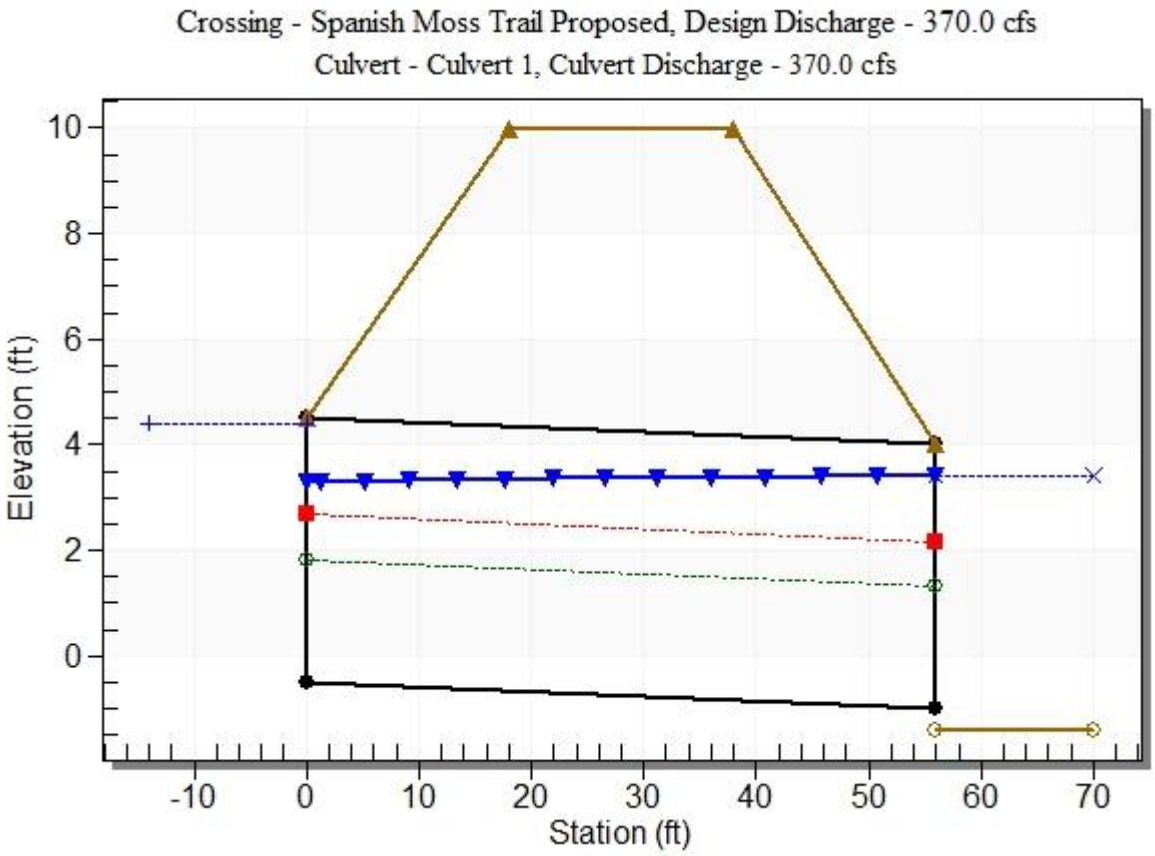
Culvert Length: 56.00 ft, Culvert Slope: 0.0089

****

Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: -0.50 ft

Outlet Station: 56.00 ft

Outlet Elevation: -1.00 ft

Number of Barrels: 3

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 5.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: None

Table 13 - Downstream Channel Rating Curve (Crossing: Spanish Moss Trail

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
260.00	3.40	4.80
286.00	3.40	4.80
312.00	3.40	4.80
338.00	3.40	4.80
364.00	3.40	4.80
370.00	3.40	4.80
416.00	3.40	4.80
442.00	3.40	4.80
468.00	3.40	4.80
494.00	3.40	4.80
520.00	3.40	4.80

Proposed)

Tailwater Channel Data - Spanish Moss Trail Proposed

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 3.40 ft

Roadway Data for Crossing: Spanish Moss Trail Proposed

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 500.00 ft

Crest Elevation: 10.00 ft

Roadway Surface: Paved

Roadway Top Width: 20.00 ft

HY-8 Culvert Analysis Report
Southside Boulevard
(Existing Crossline with Proposed Discharges)

SOUTHSIDE BLVD CROSSLINE DISCHARGES

7-1

<General>			
ID	223	Hyperlinks	<Collection: 0 items>
Label	7-1	Start Node	7-1
Notes		Stop Node	8-1

GIS-IDs

GIS-ID

Active Topology	
Is Active?	True

Output	
Output Options	Summary Results

Physical			
Set Invert to Start?	True	Has User Defined Length?	False
Invert (Start)	2.80 ft	Length (Scaled)	305.1 ft
Set Invert to Stop?	True	Length (Unified)	305.1 ft
Invert (Stop)	2.40 ft	Slope (Calculated)	0.001 ft/ft

Physical (Control Structure)			
Flap Gate?	False	Has Stop Control Structure?	False
Has Start Control Structure?	False		

Results (Engine Parsing)	
Branch	2

Results (Flow)	
Flow	0.00 cfs

Results (Hydraulic Summary)			
Velocity	0.00 ft/s	Area (Full Flow)	(N/A) ft²

Results (Maximum Values)	
Flow (Maximum) - 10-YEAR	50.92 cfs
Flow (Maximum) - 25-YEAR	75.35 cfs
Flow (Maximum) - 100-YEAR	119.58 cfs

Results (Profile)			
Depth (In)	0.00 ft	Energy Grade Line (Out)	2.40 ft
Depth (Middle)	0.00 ft	Hydraulic Grade Line (In)	2.80 ft
Depth (Out)	0.00 ft	Hydraulic Grade	2.60 ft
Energy Grade Line (In)	2.80 ft	Hydraulic Grade Line (Out)	2.40 ft
Energy Grade Line (Middle)	2.60 ft	Headloss	0.40 ft

Results			
Time to Maximum Hydraulic Grade	12.450 hours	Flow-Area (Start)	0.0 ft²

Hydraulic Grade (Maximum)	5.02 ft	Flow-Area (Middle)	0.0 ft²
Depth/Rise	0.0 %	Flow-Area (Stop)	0.0 ft²
Rise (Unified)	10.00 ft	Flow-Width (Start)	8.0 ft
Velocity (In)	0.00 ft/s	Flow-Width (Middle)	12.0 ft
Velocity (Middle)	0.00 ft/s	Flow-Width (Stop)	16.0 ft
Velocity (Out)	0.00 ft/s	Flow (Start)	0.00 cfs
Froude (Start)	0.000	Flow (Middle)	0.00 cfs
Froude Number	0.000	Flow (Stop)	0.00 cfs
Froude (Stop)	0.000		

Calculation Messages

Time (hours)	Message

Sections Results

Section Distance (ft)	Section Velocity (ft/s)	Section Flow (cfs)	Section Hydraulic Grade (ft)
0.00	0.00	0.00	2.80
152.53	0.00	0.00	2.60
305.06	0.00	0.00	2.40

Section Depth (ft)	Section Flow-Width (ft)	Section Flow-Area (ft²)	Section Is Overflowing?
0.00	8.0	0.0	False
0.00	12.0	0.0	False
0.00	16.0	0.0	False

Section Froude Number
0.000
0.000
0.000

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 50 cfs

Design Flow: 75 cfs

Maximum Flow: 120 cfs

Table 14 - Summary of Culvert Flows at Crossing: Southside_Blvd

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
4.98	50.00	50.00	0.00	1
5.29	57.00	57.00	0.00	1
5.61	64.00	64.00	0.00	1
5.94	71.00	71.00	0.00	1
6.13	75.00	75.00	0.00	1
6.60	85.00	85.00	0.00	1
6.94	92.00	92.00	0.00	1
7.29	99.00	99.00	0.00	1
7.66	106.00	106.00	0.00	1
7.92	113.00	110.97	1.70	23
7.96	120.00	111.65	8.15	6
7.90	110.58	110.58	0.00	Overtopping

Rating Curve Plot for Crossing: Southside_Blvd

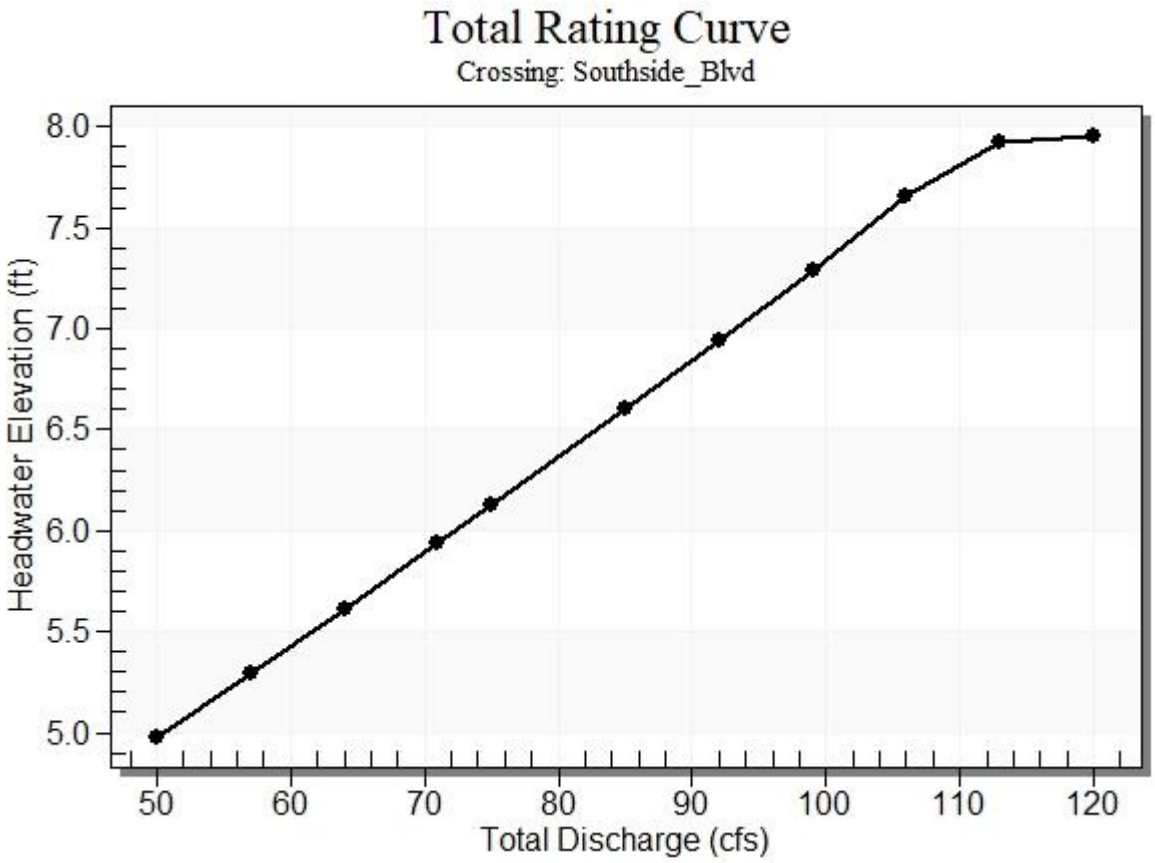


Table 15 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
50.00	50.00	4.98	1.979	2.980	4-FFf	1.080	1.375	2.500	3.100	3.395	0.000
57.00	57.00	5.29	2.135	3.288	4-FFf	1.163	1.474	2.500	3.324	3.871	0.000
64.00	64.00	5.61	2.289	3.608	4-FFf	1.245	1.567	2.500	3.548	4.346	0.000
71.00	71.00	5.94	2.445	3.938	4-FFf	1.326	1.652	2.500	3.772	4.821	0.000
75.00	75.00	6.13	2.536	4.131	4-FFf	1.372	1.699	2.500	3.900	5.093	0.000
85.00	85.00	6.60	2.774	4.599	4-FFf	1.487	1.813	2.500	4.189	5.772	0.000
92.00	92.00	6.94	2.954	4.941	4-FFf	1.569	1.885	2.500	4.391	6.247	0.000
99.00	99.00	7.29	3.146	5.293	4-FFf	1.653	1.953	2.500	4.593	6.723	0.000
106.00	106.00	7.66	3.351	5.656	4-FFf	1.741	2.016	2.500	4.796	7.198	0.000
113.00	110.97	7.92	3.506	5.979	4-FFf	1.807	2.058	2.500	4.998	7.535	0.000
120.00	111.65	7.96	3.528	5.958	4-FFf	1.816	2.063	2.500	5.200	7.582	0.000

****

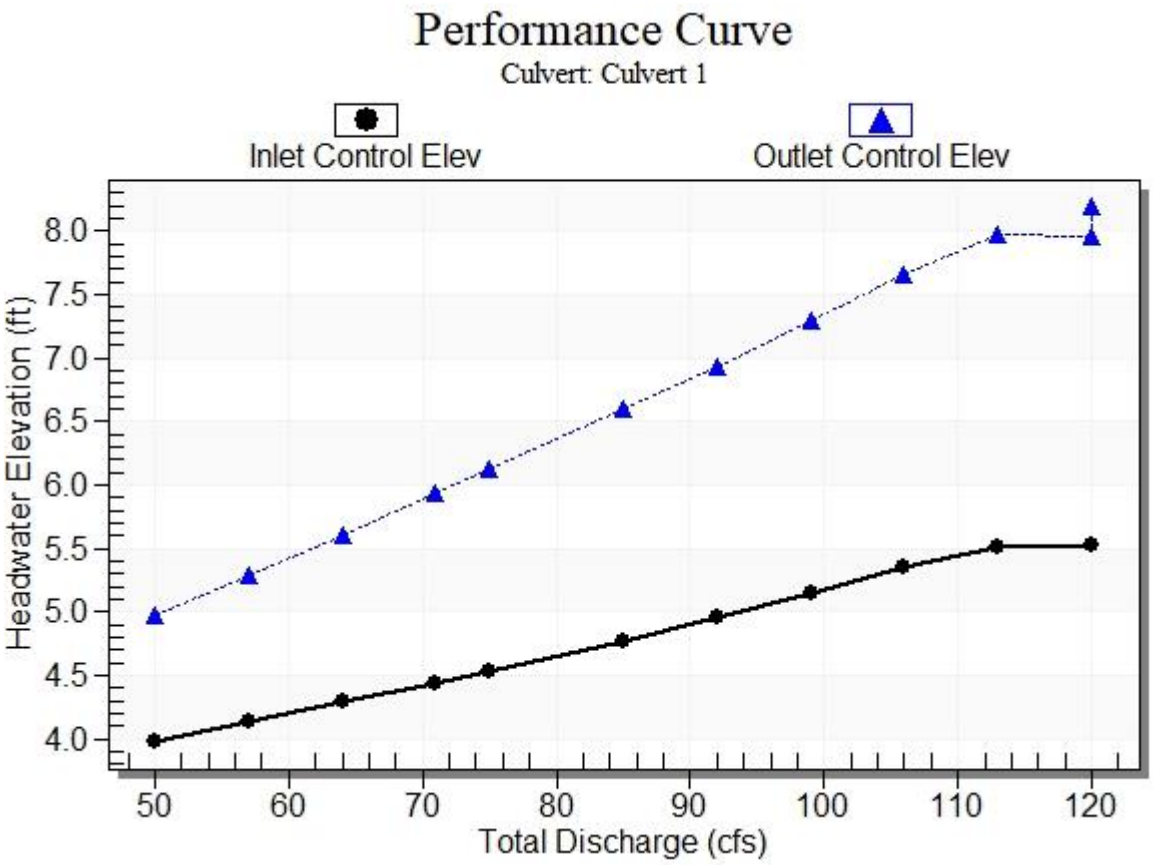
Straight Culvert

Inlet Elevation (invert): 2.00 ft, Outlet Elevation (invert): 1.60 ft

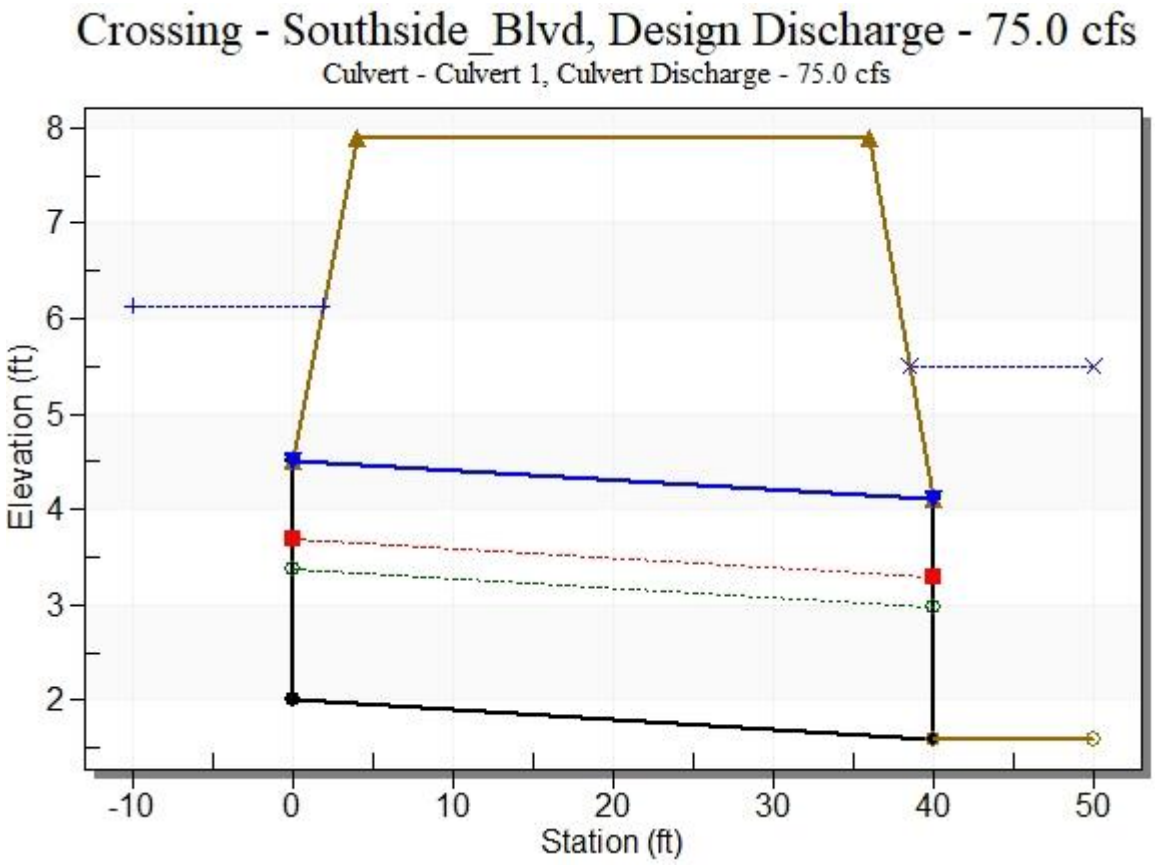
Culvert Length: 40.00 ft, Culvert Slope: 0.0100

****

Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 2.00 ft

Outlet Station: 40.00 ft

Outlet Elevation: 1.60 ft

Number of Barrels: 3

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0130

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: None

Table 16 - Downstream Channel Rating Curve (Crossing: Southside_Blvd)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)
50.00	4.70	4.70	0.00
75.00	5.50	5.50	0.00
120.00	6.80	6.80	0.00

Tailwater Channel Data - Southside_Blvd

Tailwater Channel Option: Enter Rating Curve

Channel Invert Elevation: 1.60 ft

Roadway Data for Crossing: Southside_Blvd

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 200.00 ft

Crest Elevation: 7.90 ft

Roadway Surface: Paved

Roadway Top Width: 32.00 ft

APPENDIX H

BASIN #2 PHOTOS

Downstream of Spanish Moss Trail (Battery Creek in background)

Downstream (Battery Creek) end of Spanish Moss Trail 36-in crossline pipe

Inlet end of Spanish Moss Trail 36-in crossline pipe

Inlet end of Spanish Moss Trail 24-in crossline pipe

Downstream end of Spanish Moss Trail 24-in crossline pipe

Marsh upstream of Spanish Moss Trail

Main ditch downstream of Battery Creek Road crossline pipes

Main ditch upstream of Battery Creek Road crossline pipes

Southside Boulevard triple 30-inch crossline pipes

Southside Park ditch

Broad Street canal

Battery Creek Road near Southside Park