Hydraulic and Hydrological Study for I-575 Reversible lanes over Noonday Creek South

NH000-0575-01(028)
Cobb County, Georgia
PI No. 713640

November 2009

COMMUNITY COORDINATION ONLY REQUIRED
Cobb County, Community No. 130052

GEORGIA
REGISTERED
No. 27873
PROFESSIONAL
11-18-09
ENGINEER
JOHN K. McWHORTER III

Prepared by JBT for
Georgia Transportation Partners
Atlanta, Georgia

TABLE OF CONTENTS

Section I **Hydraulic/Hydrologic Report**
Introduction
Hydraulic Site Inspection
Procedure
General Modeling Considerations
Historic Drainage Patterns
Proposed Drainage Patterns
Summary
References
Engineering "No-Rise" Certification
Plots of Proposed Sections and Locations

Section II **Hydraulic Tables**
50-, 100- and 500-year Storms
Clearance Determination
FEMA Flood Elevation Table

Section III **Peak Flow Summary**
USGS Regression Equation Flows and Slope Calculation

Section IV **Hydraulic Engineering Field Data**
Hydraulic Engineering Field Report
Risk Assessment

Section V **HEC-RAS Computer Model Output**
Full Valley Model for 2, 50, 100, 500-year Storms
Existing/Proposed Bridge Model for 2, 50, 100, 500-year Storms

Section VI **FEMA Computer Model Output**
Duplicate Effective Model (DE) Floodway
Existing/Corrected Effective Model (CE)/Proposed Floodway

Section VII **Scour Summary and Riprap Calculations**
HEC-RAS Scour Results
Rip Rap Design

TABLE OF CONTENTS (continued)

Section VIII Appendix

Location Maps
Project Photographs
FEMA Data
Miscellaneous Project Data
- Correspondence
- BFI
- Existing Bridge Plans
- Bridge Survey Plots

Roadway Plan, Profile and Typical Sections
Preliminary Bridge Plan and Elevation Section

Section I
Hydraulic/Hydrologic Report

November 2009

NH000-0575-01(028) Cobb County
I-575 Reversible lanes over Noonday Creek South
PI# 713640

Introduction

J.B. Trimble, Inc.(JBT) prepared this report to provide engineering calculations showing that the proposed bridge widening at the crossing of I-575 over Noonday Creek in Cobb County, Georgia will meet the Georgia Department of Transportation's (GDOT) hydraulic and hydrologic requirements. Noonday Creek is a FEMA studied waterway with a regulatory floodway. The proposed widening will not encroach vertically or horizontally on the current regulatory floodway elevation or width. Therefore, the proposed construction is consistent with the regulatory floodway due to bridging and excluding fill from the floodway. In accordance with section NS 23 CFR 650A of the Federal Policy Guide, coordination with FEMA is not required. However, since this site is located in the developing area of Cobb County, a "no-rise" was obtained and coordination will be done with the community. The design storm is the 50-year storm per the GDOT Drainage Design Manual for an Interstate. The drainage area at the proposed crossing, delineated from the United States Geological Survey (USGS) quadrangle maps for the area, is 12.8 square miles with a 50-year storm flow of 6665 cfs and a 100-year storm flow of 7649 cfs. The flows are calculated using the USGS Region 1 Urban Regression equations for Georgia and an impervious area of 25%.

The existing bridges at this crossing consist of parallel 170 ft long bridges on concrete bents with spillthrough abutments. The existing bridge widths are 42 ft gutter to gutter. The proposed widening will join the north and south bound bridges to the inside to accommodate the proposed reversible lane. The resulting proposed out to out width will be 147'-4-1/2".

Incorporated in the hydraulic models is the latest research on expanded and contracted flow for locating exit and approach sections. These locations are based on channel slope, main channel and overbank Manning's "n" values and the ratio of the bridge opening to the floodplain width. This information is used to locate the exit and approach sections. This process is discussed in the *General Modeling Considerations* section in this report. HEC-RAS models were developed for this study and the WSPRO bridge routine was selected for the proposed model. HEC-RAS version, 4.0 was used for the study.

Hydraulic Site Inspection

A hydraulic site visit was made at the existing crossing of I-575 over Noonday Creek (south) on May 30, 2008. The upstream and downstream floodplains consist of some trees, underbrush and a thick layer of Kudzu. This crossing is located in a developed area of Cobb County and there are commercial developments located in the northeast and southwest quadrants. The Noonday Creek channel width varies from approximately 30-40 ft. The channel bottom of this urbanized stream has degraded resulting in a widening of the channel and banks that are generally unstable and approximately 6 ft high. Exposed rock was observed in the channel and along the banks in various places. The channel also meanders in the area downstream of the bridge and flows south and parallel to the existing embankment for approximately 600 ft before turning to the east.

The channel was realigned as part of the original construction in the late 70's. Currently, the channel crosses the alignment centerline on a skew such that there is little to no setback between the channel and the southern end of the southbound bridge and the northern end of the northbound bridge. The existing bridge is a three span PSC beam bridge on concrete bents and spillthrough abutments consisting of two 50 ft long end spans and one 70 ft long main span over the channel.

A sewer line was observed along the north bank of Noonday Creek. Also observed were two multi-conduit utilities attached to both the downstream side of the northbound bridge and the

upstream side of the southbound bridge. An access panel labeled "GaDOT Communications" was located on the ground near each bridge end.

Procedure

JBT Inc. personnel visited and photographed the site. A GDOT Hydraulic Engineering Field Report was completed. The drainage area and Manning's "n" values were determined and storm flows were calculated for this Region 1 site. HEC-RAS computer models were developed for the natural, existing and proposed conditions using survey data and proposed roadway improvements.

General Modeling Considerations

The FEMA discharges for this site are significantly higher that the USGS generated urbanized discharges for region 1. The Flood Insurance Study (FIS) for Cobb County has recently been revised and is scheduled to become the effective study in December of 2008. The 100-year FEMA flow in this FIS is 11917 cfs while the USGS flow is 7649 cfs. For the USGS flows, the urbanized equations are being used with an impervious area of 25% based on the current aerial photography. In an effort to resolve the differences in the two flow sources, the USGS was contacted along with a consultant with experience in the calculation of the FEMA flows for the Cobb County FIS. This email exchange is included in the Appendix for reference. The USGS recommends the use of the current urban regression equations, although a proposal to revise these equations using a multi-state approach is being developed. This direction, along with the calculated impervious area and engineering judgment, were used to make the determination for the discharges to be used for this study. The GDOT Office of Bridge Hydraulics was also consulted and concurred with the approach presented in this study.

Due to the location of the existing roadway embankment relative to the meandering floodplain/channel, an area of longitudinal floodplain encroachment occurs immediately downstream of the bridge crossing. To address this in the models, a portion of the right overbank

in the downstream bridge section is blocked for the existing and proposed models. This blocked obstruction is removed for the "Full Valley" model.

As previously stated, Noonday Creek is a FEMA studied floodway. The Flood Insurance Study (FIS) has recently been revised (December 2008.) This model was obtained through the consultant performing the revision (Dewberry) and is used for this study. The existing parallel bridges are modeled as one wide bridge. Since the proposed construction consists only of widening to the inside, there are no modifications needed to reflect the proposed widening in the model. As a result, the existing and proposed conditions are effectively the same. The results included in this study support a "no-rise" for this project.

In locating the approach and exit sections, new research detailed in the HEC-RAS Hydraulic Reference Manual, Version 3.1, dated November 2002, Appendix B is utilized. The expansion and contraction ratios used to locate the exit and approach sections are applicable to HEC-2, HEC-RAS and WSPRO models. The resulting coefficients are in the 1.3:1 to 2.0:1 range for expansion and 0.8:1 to 1.4:1 for contraction. These ranges were applied to the average floodplain constriction for both the proposed and existing conditions, yielding an expansion reach length range of 215 ft. to 330 ft. and a contraction reach length range of 132 ft. to 231 ft. The actual exit section is located at river station -520, approximately 480 ft. downstream of the roadway, and the actual approach section is located at river station 440, approximately 160 ft. upstream of the proposed bridge. The approach section is located within the calculated range and the exit section is located further downstream, and outside of the calculated range, due to the aforementioned floodplain/embankment geometry.

Historic Drainage Patterns

The existing channel velocities at the project site for the 50-year and 100-year storm flows are 15.51 ft/s and 16.40 ft/s, respectively. The existing backwater for the 50-year and 100-year storms 3.45 ft and 3.94 ft, respectively. The existing bridge provides little to no overbank area. Therefore, the vast majority of the flow is forced into the channel at the bridge and results in

these high velocity values. The Manning's "n" values for the project site were developed using methods described in the USGS publication, *Guide for Selecting Manning's Roughness Coefficients for Natural Channels and Flood Plains,* by George J. Arcement, Jr. and Verne R. Schneider.

Proposed Drainage Patterns

As previously discussed, the existing and proposed hydraulic models are the same due to the interior only widening. Therefore, the velocity and backwater values stated for the existing conditions apply here as well. Although the velocity and backwater values are considered high, no significant scour was observed at the project site. In addition, the maintenance files for the existing bridge show no history of past scour problems.

The maximum calculated contraction and local scour depth in the channel is 28.6 ft for the 500-year flood. The proposed bents are located both within and outside of the channel. Therefore, the channel scour depth was used for all of the bents to account for any local bank instability as was observed at the existing bridge. As noted in the Hydraulic Site Inspection, some rock was observed in the area. The results of the Bridge Foundation Investigation (BFI) are included in the Appendix and indicate that rock is near the surface. The existing bridges are founded on spread footings.

Riprap calculations were performed in accordance with the procedures outlined in Hydraulic Engineering Circular No. 23 *Bridge Scour and Stream Instability Countermeasures* the procedures detailed in the above named publication. GDOT Type I riprap 24-inches thick is specified here.

Summary

The appropriate hydraulic and hydrological procedures were used in this study's development. The proposed widening will not encroach vertically or horizontally on the current regulatory

floodway elevation or width for Noonday Creek. Therefore, the proposed construction is consistent with the regulatory floodway and coordination with FEMA is not required. However, since this site is located in the developing area of Cobb County, a "no-rise" certificate was obtained and coordination will be done with the community.

The results for velocity and backwater are considered high. However, there were no significant scour problems observed during the site visit or reported through the Bridge Maintenance Office. Since there is rock near the surface on which the proposed footings will be founded, these results are acceptable for this site.

References

JBT utilized the following for this study:

- The Current Georgia Department of Transportation Drainage Manual for Highways with Supplemental guidelines for Hydraulic and Hydrological Studies.

- The United States Geological Survey (USGS) publication, *Techniques for Estimating Magnitude and Frequency of Floods in Rural Basins of Georgia*--1993, Water Resources Investigations Report 93-4016.

- Hydrologic Engineering Center (HEC) River Analysis System (HEC-RAS), Water-Surface Computational Model Version 4.0, dated March 2008.

- Hydrologic Engineering Center (HEC) River Analysis System (HEC-RAS) Users Manual Version 3.1, dated November 2002.

- Hydrologic Engineering Center (HEC) River Analysis System (HEC-RAS) Hydraulic Reference Manual Version 3.1, dated November 2002.

- Hydraulic Engineering Circular No. 18 (HEC-18) *Evaluating Scour at Bridges,* (FHWA-NHI-01-001), dated May 2001, Fourth Edition.

- Hydraulic Engineering Circular No. 20 (HEC-20) *Stream Stability at Highway Structures* (FHWA-NHI-01-002) dated March 2001, Third Edition.

- Hydraulic Engineering Circular No. 23 (HEC-23) *Bridge Scour and Stream Instability Countermeasures* (FHWA-NHI-01-003) dated March 2001, Second Edition.

- The United States Geological Survey (USGS) publication, *Roughness Characteristics of Natural Channels,* Harry H. Barnes, Jr.—1987 (3rd Printing), Water-Supply Paper 1849.

- The United States Geological Survey (USGS) publication, *Guide for selecting Manning's Roughness Coefficients for Natural Channels and Flood Plains,* George J. Arcement, Jr., and Verne R. Schneider—1992 (2nd Printing); Water-Supply Paper 2339.

- *Computer Assisted Floodplain Hydrology & Hydraulics*, Daniel H. Hoggan, McGraw-Hill, New York, 1989.

Engineering "No-Rise" Certification

Proposed Bridge Widening over Noonday Creek

I-575 / GDOT NH000-0575-01(028)

Cobb County, Georgia

This is to certify that I am a duly qualified engineer licensed to practice in the State of Georgia. It is to further certify that the attached technical data supports the fact that the proposed construction of the proposed bridge widening over Noonday Creek will not create any increase to the 100-Year Regulatory flood elevations, Regulatory floodway elevations, and Regulatory floodway widths within acceptable tolerances on Noonday Creek at published sections in the Current Flood Insurance Study for Cobb County, Georgia, and will not create any increase in the Regulatory 100-Year flood and floodway elevations and floodway widths within acceptable tolerances at unpublished cross-sections in the vicinity of the project outside the GDOT R-O-W.

November 5, 2009
Date

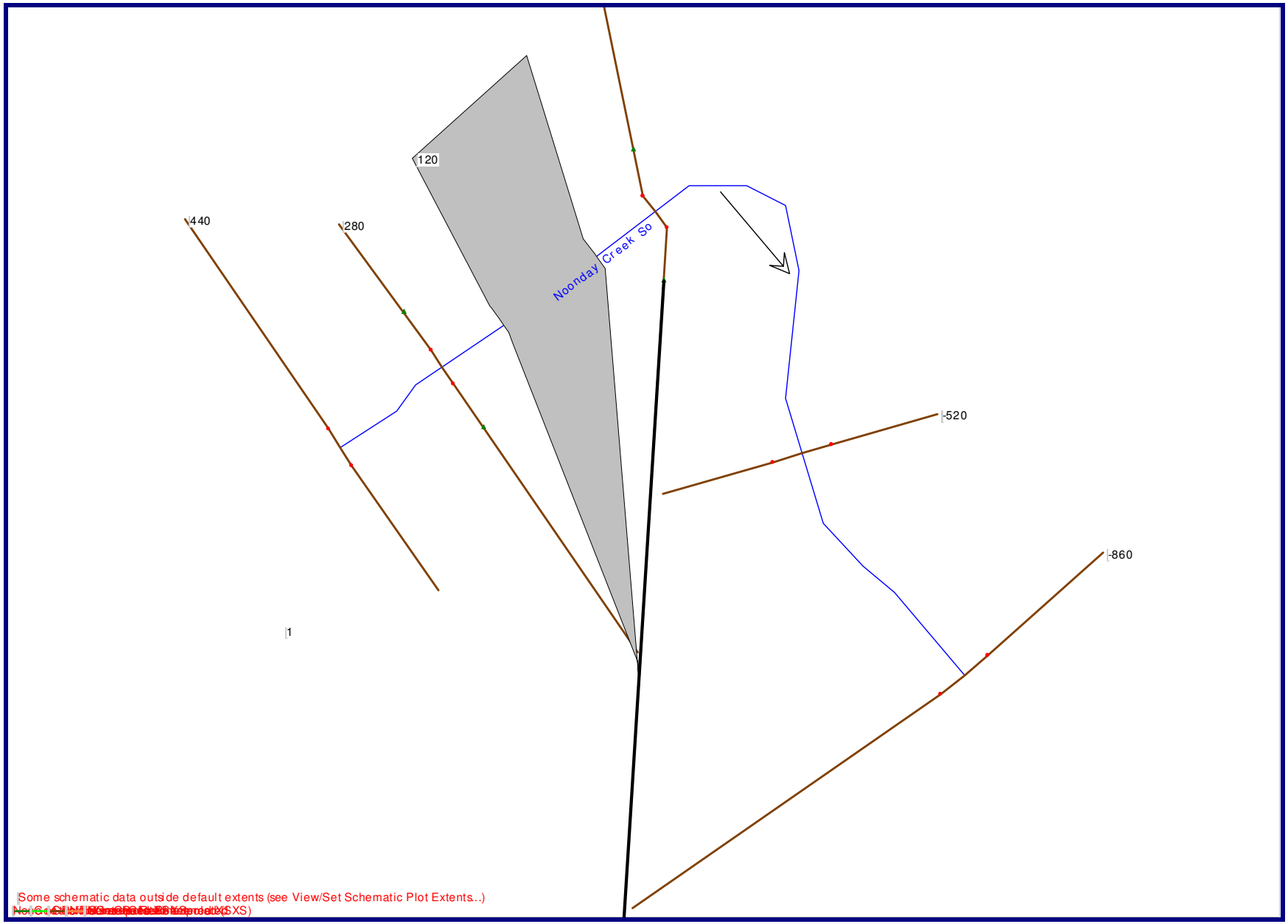
John K. McWhorter III
Signature

Seal:

John K. McWhorter III, P.E.
Senior Project Manager

J.B. Trimble, Inc.
2550 Heritage Court, SE
Suite 250
Atlanta, Georgia 30339-3062

HEC-RAS PLOTS


120
440
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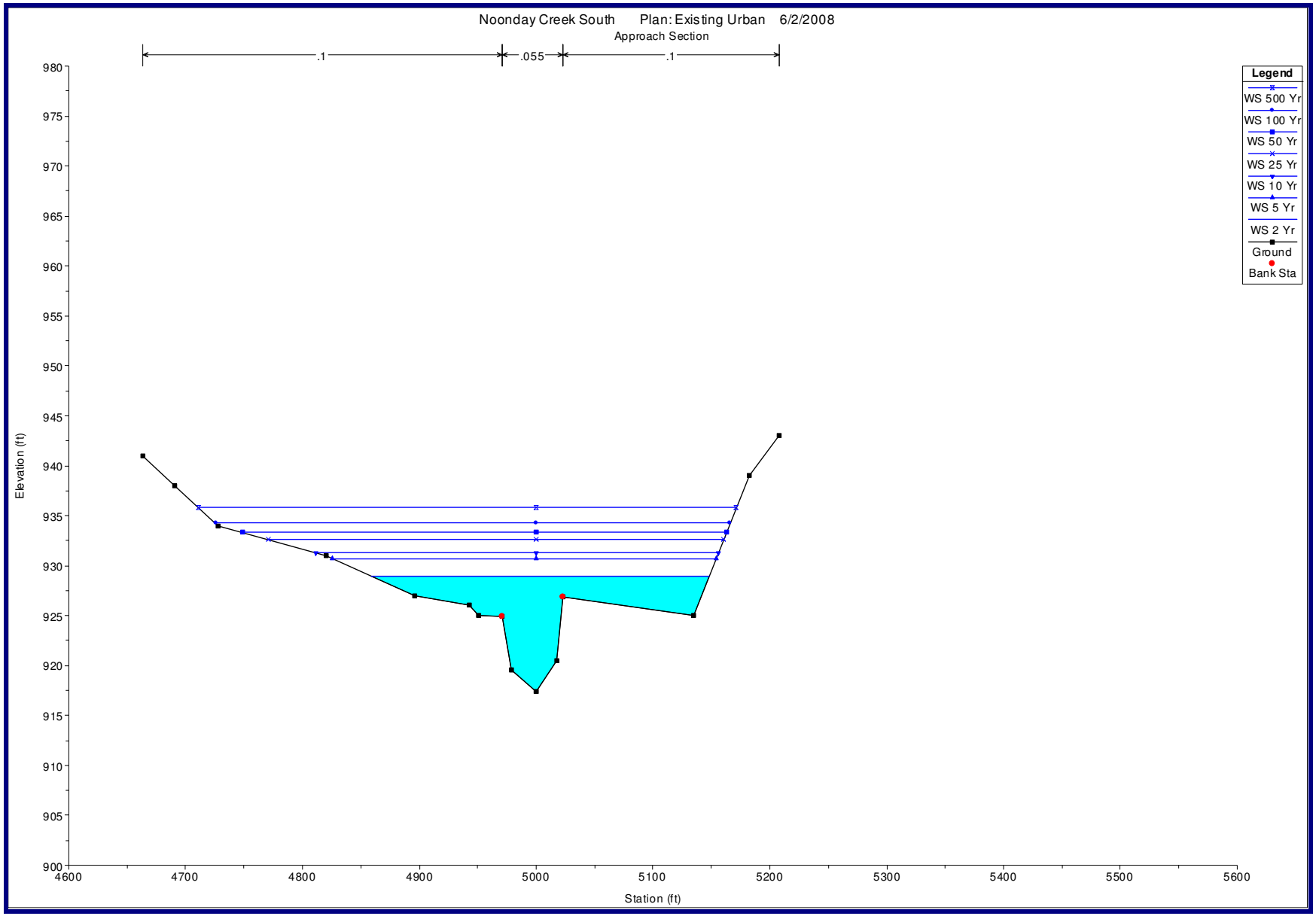
Noonday Creek So
-520
-860
1
Some schematic data outside default extents (see View/Set Schematic Plot Extents...)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Approach Section
.1
.055
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Legend
WS 500 Yr
WS 100 Yr
WS 50 Yr
WS 25 Yr
WS 10 Yr
WS 5 Yr
WS 2 Yr
Ground
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Elevation (ft)
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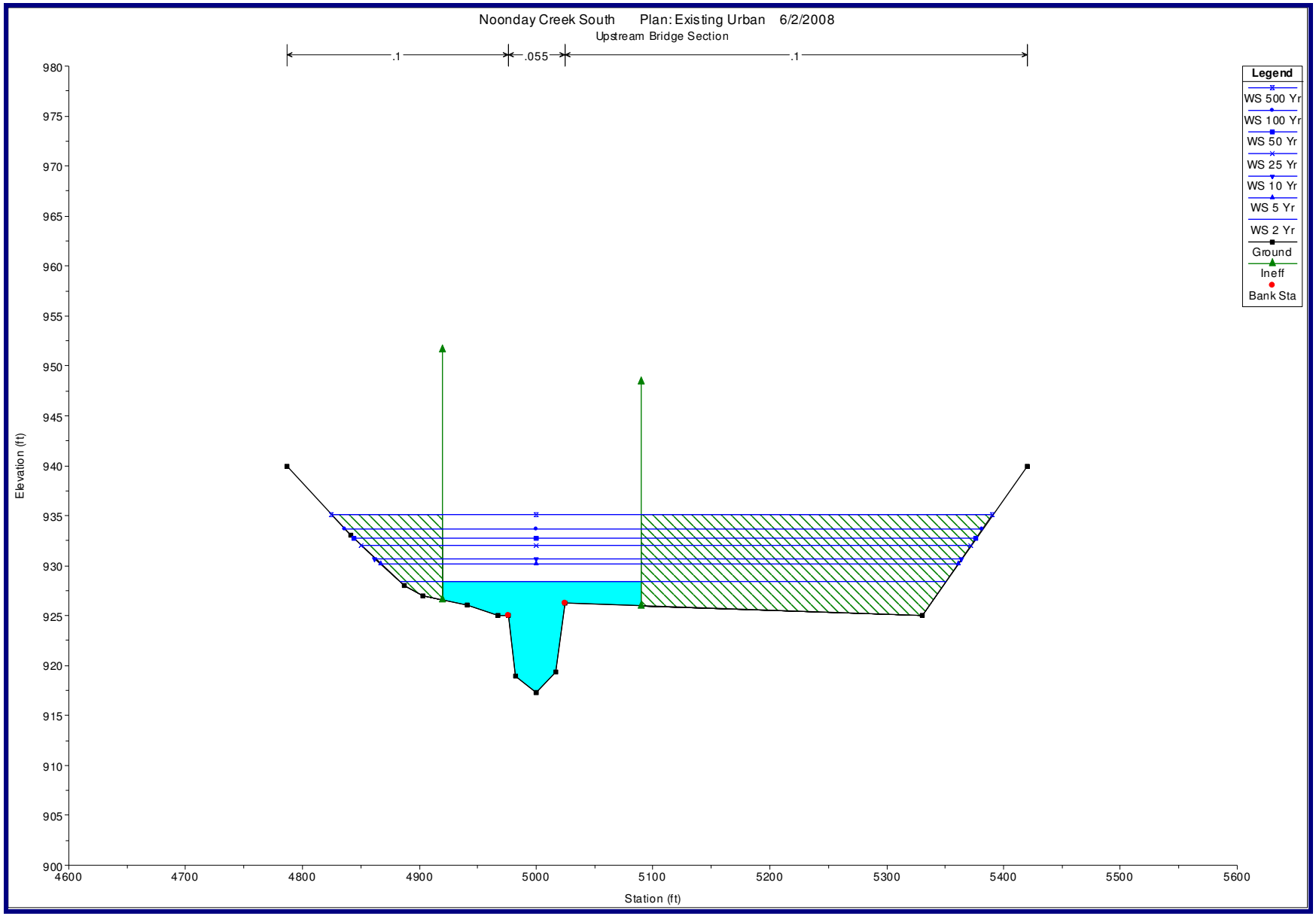
Station (ft)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Upstream Bridge Section
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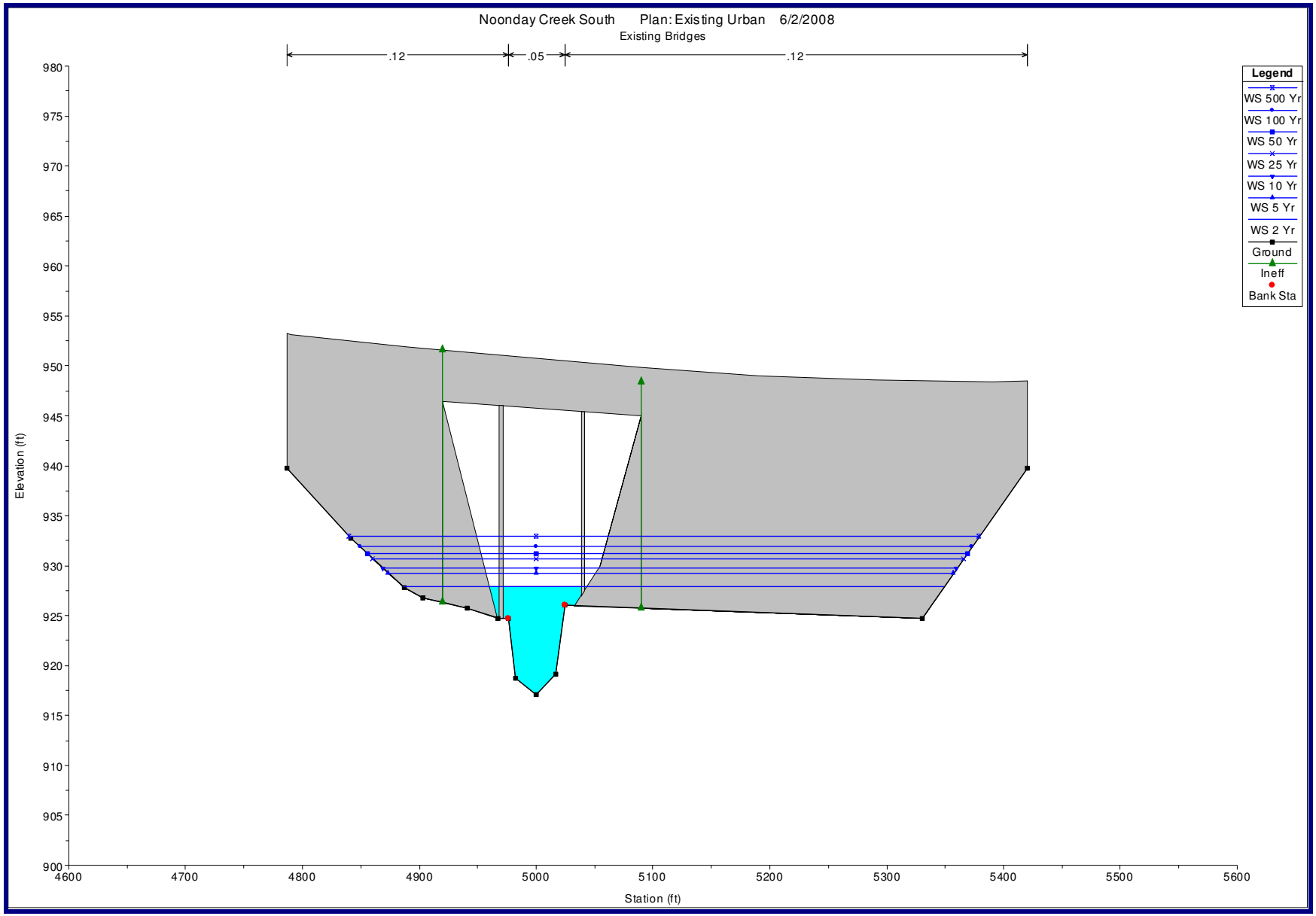
Station (ft)


Noonday Creek South Plan: Existing Urban 6/2/2008
Existing Bridges
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Legend
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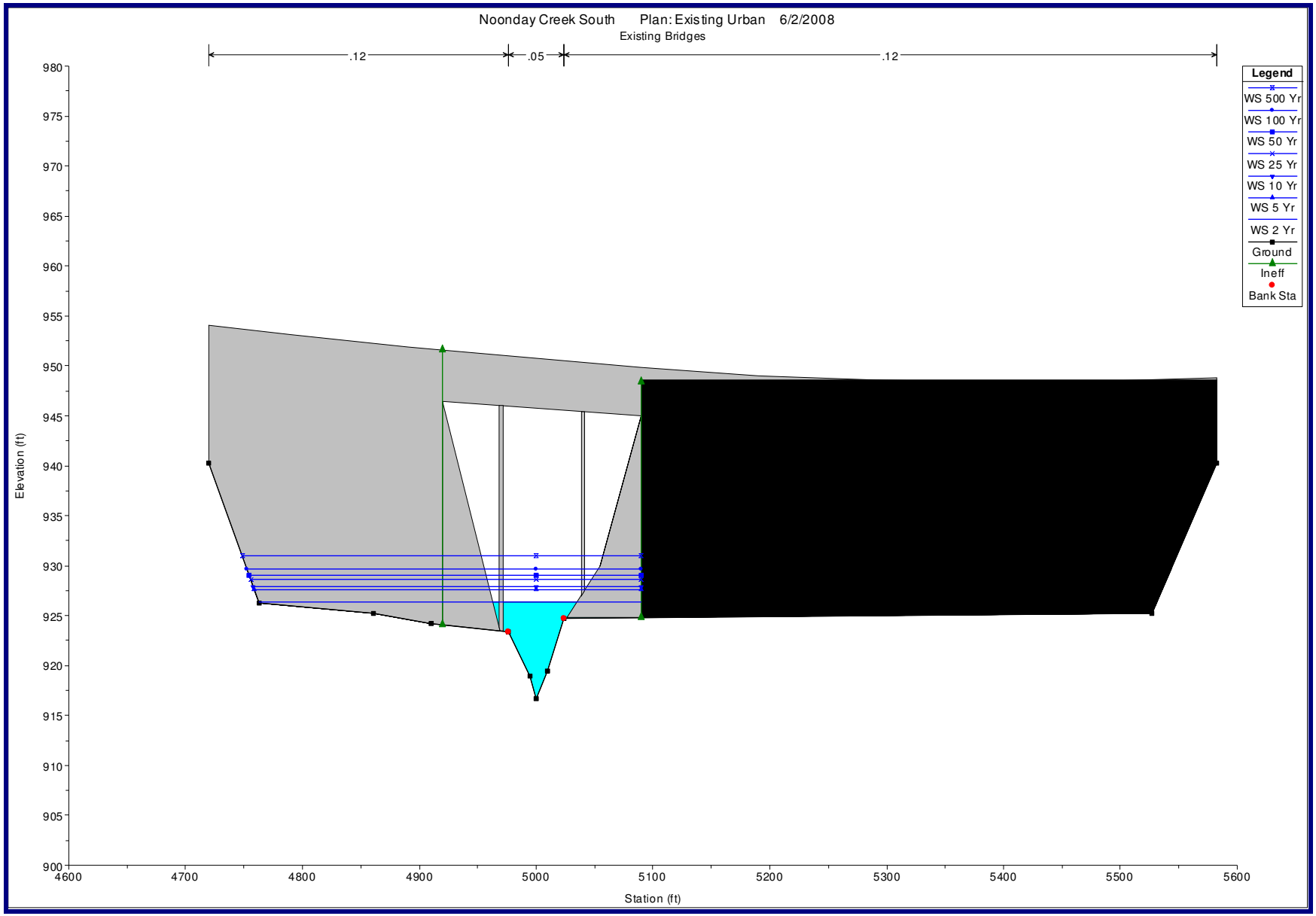
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Existing Bridges
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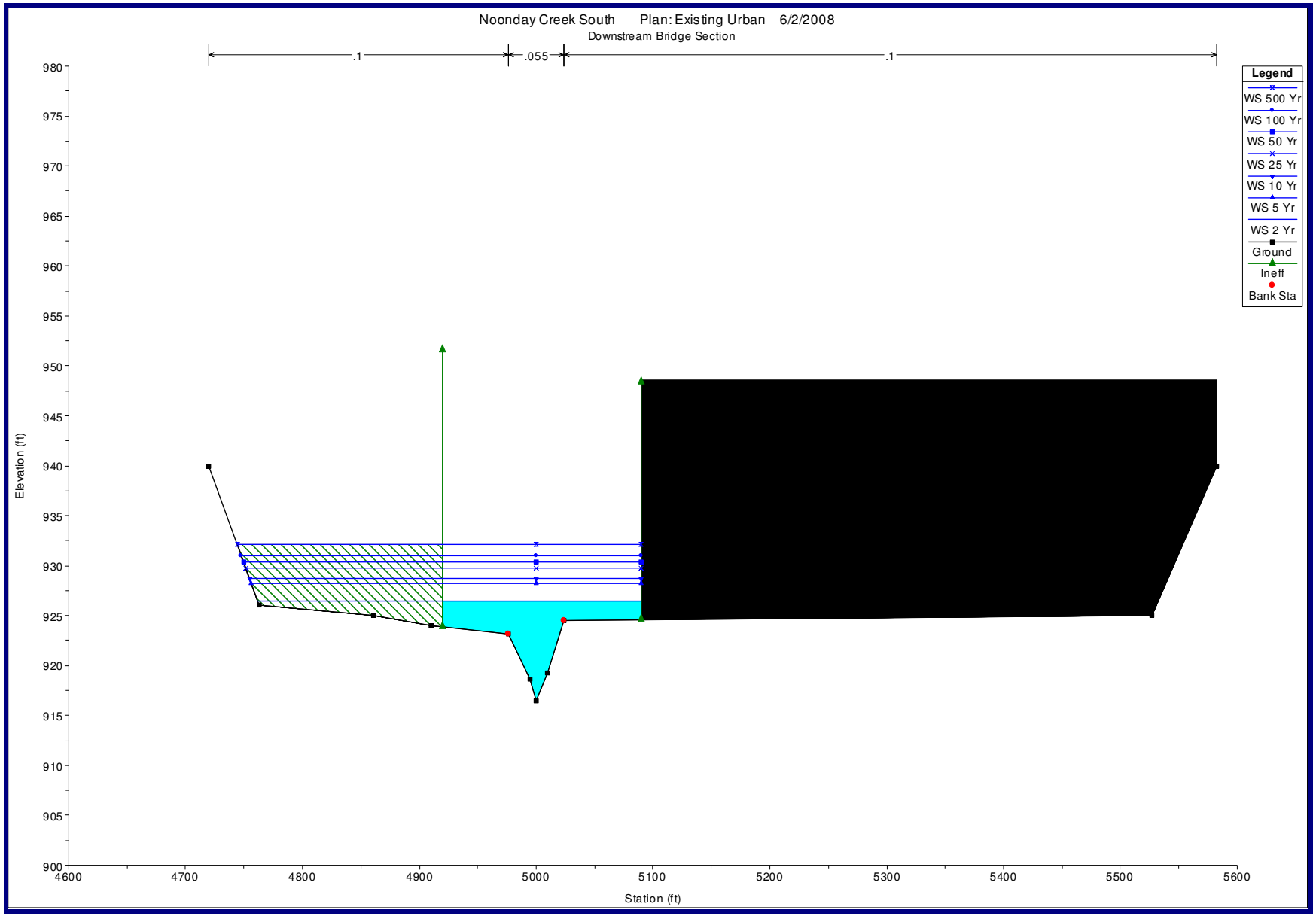
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Downstream Bridge Section
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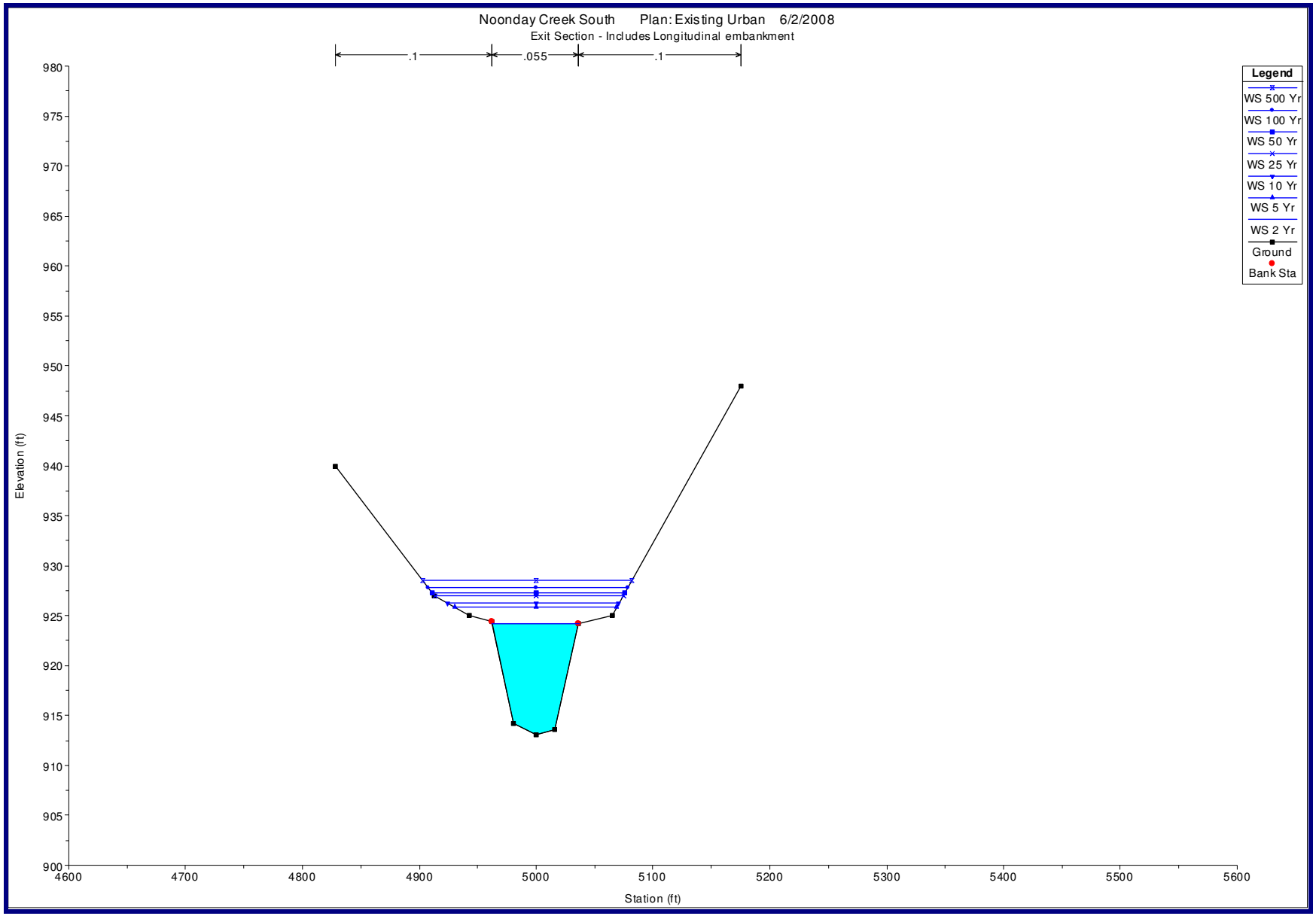
Noonday Creek South Plan: Existing Urban 6/2/2008
Exit Section - Includes Longitudinal embankment
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Legend
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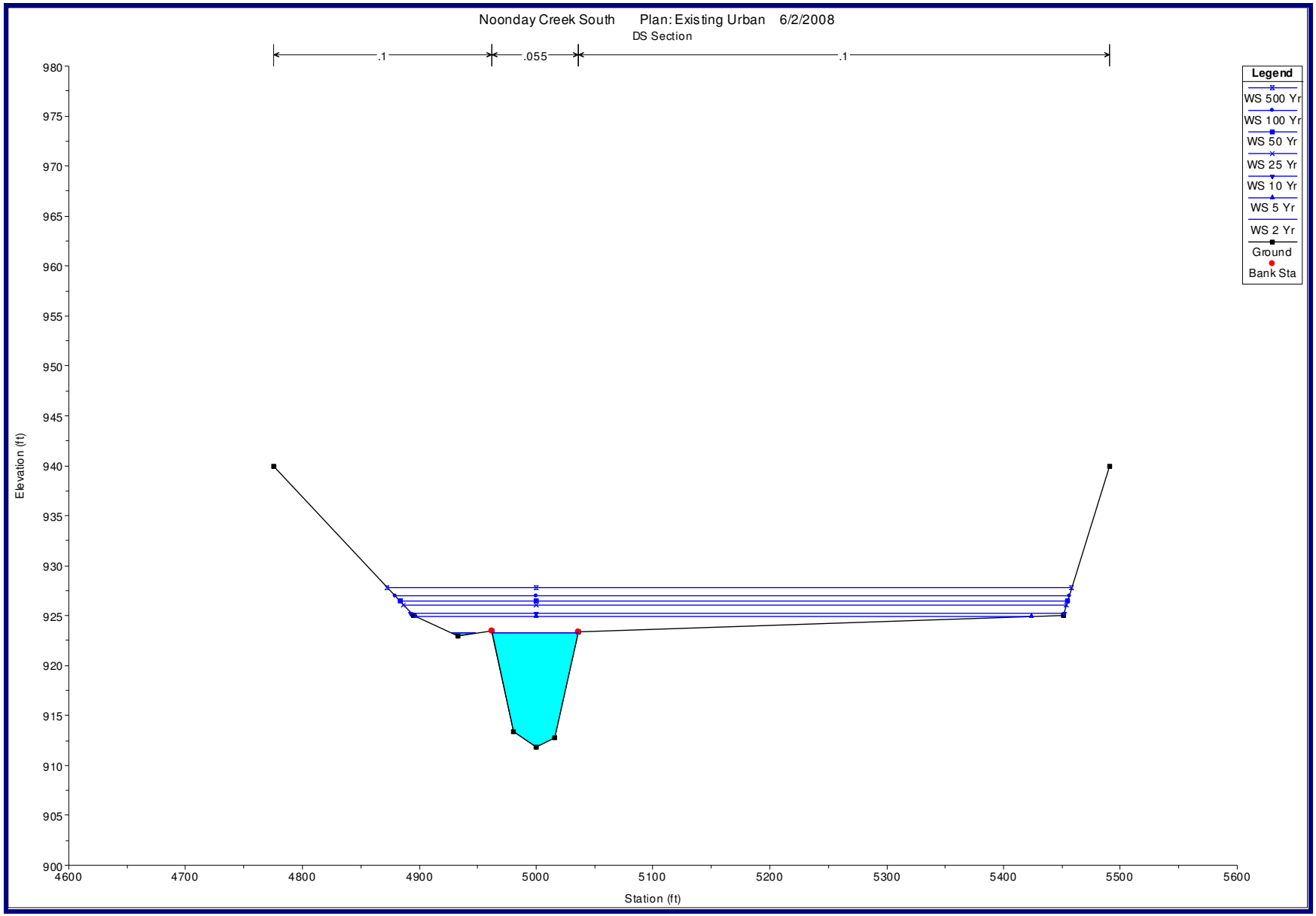
Noonday Creek South Plan: Existing Urban 6/2/2008
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Station (ft)

Section II
Hydraulic Tables

HYDRAULIC TABLE (50-YEAR STORM)

	UNCONSTRICTED SECTION	***EXISTING/ PROPOSED CONDITIONS***
FLOODSTAGE ELEVATION BRIDGE SECTION (ft)	928.94	930.36
FLOODSTAGE ELEVATION APPROACH SECTION (ft)	929.86	933.31
AREA OF OPENING UNDER FLOODSTAGE (ft^2)	**********	518
DISCHARGE THROUGH BRIDGE (cfs)	**********	6665
DISCHARGE OVER ROADWAY (cfs)	**********	0
CHANNEL VELOCITY (f/s)	4.53	15.51
MEAN VELOCITY (f/s)	**********	12.87
2-YEAR FLOODSTAGE ELEVATION BRIDGE SECTION (ft)	926.02	926.50
BACKWATER HEIGHT (ft)	**********	3.45

HYDRAULIC TABLE (100-YEAR STORM)

	UNCONSTRICTED SECTION	***EXISTING/ PROPOSED CONDITIONS***
FLOODSTAGE ELEVATION BRIDGE SECTION (ft)	929.46	931.04
FLOODSTAGE ELEVATION APPROACH SECTION (ft)	930.31	934.25
AREA OF OPENING UNDER FLOODSTAGE (ft^2)	**********	576
DISCHARGE THROUGH BRIDGE (cfs)	**********	7649
DISCHARGE OVER ROADWAY (cfs)	**********	0
CHANNEL VELOCITY (f/s)	4.58	16.40
MEAN VELOCITY (f/s)	**********	13.27
2-YEAR FLOODSTAGE ELEVATION BRIDGE SECTION (ft)	926.02	926.50
BACKWATER HEIGHT (ft)	**********	3.94

HYDRAULIC TABLE (500-YEAR STORM)

	UNCONSTRICTED SECTION	***EXISTING/ PROPOSED CONDITIONS***
FLOODSTAGE ELEVATION BRIDGE SECTION (ft)	930.30	932.09
FLOODSTAGE ELEVATION APPROACH SECTION (ft)	931.06	935.81
AREA OF OPENING UNDER FLOODSTAGE (ft^2)	**********	699
DISCHARGE THROUGH BRIDGE (cfs)	**********	9444
DISCHARGE OVER ROADWAY (cfs)	**********	0
CHANNEL VELOCITY (f/s)	4.70	17.49
MEAN VELOCITY (f/s)	**********	13.50
2-YEAR FLOODSTAGE ELEVATION BRIDGE SECTION (ft)	926.02	926.50
BACKWATER HEIGHT (ft)	**********	4.75

NH000-0575-01(028) Cobb County
I-575 over Noonday Creek - South

Proposed widened bridges

MIN PROFILE GRADE ELEVATION	949.88
DEPTH OF CROSS SLOPE	-0.10
DEPTH OF SLAB AND BEAM	4.60
BOTTOM OF BEAM ELEVATION	945.38
MINIMUM BOTTOM OF BEAM ELEVATION	945.38
50 YEAR FLOODSTAGE ELEVATION*	930.36
CLEARANCE	15.02
MINIMUM BOTTOM OF BEAM ELEVATION	945.38
100 YEAR FLOODSTAGE ELEVATION*	931.04
CLEARANCE	14.34

*Floodstage taken from proposed conditions model.

TABLE OF 100 YR FLOOD ELEVATIONS

NOONDAY CREEK - SOUTH COBB COUNTY, GA

	A	*B*	*C*	*D*	*E*	*F*
CROSS SECTION	PUBLISHED FIS ELEVATION*	DUPLICATE EFFECTIVE ELEVATION	CORRECTED EFFECTIVE ELEVATION	EXISTING ELEVATION	PROPOSED ELEVATION	DELTA ELEVATION (E-D)
20340.54 - L	**922.9**	**922.1**	**922.1**	**922.1**	**922.1**	**0.0**
20788.78		922.7	922.7	922.7	922.7	0.0
21440.00		923.7	923.7	923.7	923.7	0.0
22221.01		924.3	924.3	924.3	924.3	0.0
23217.96		924.0	924.0	924.0	924.0	0.0
23378.74BR D		925.6	925.6	925.6	925.6	0.0
23378.74BR U		926.5	926.5	926.5	926.5	0.0
23477.24		927.6	927.6	927.6	927.6	0.0
24584.31 - M	**929.6**	**929.1**	**929.1**	**929.1**	**929.1**	**0.0**
24776.87		929.2	929.2	929.2	929.2	0.0
24842.55BR D		929.1	929.1	929.1	929.1	0.0
24842.55BR U		929.3	929.3	929.3	929.3	0.0
24942.55		929.7	929.7	929.7	929.7	0.0
26158.34 - N	**931.2**	**930.7**	**930.7**	**930.7**	**930.7**	**0.0**
27163.80		931.8	931.8	931.8	931.8	0.0
27924.79		933.4	933.4	933.4	933.4	0.0
28138.58BR D		934.6	934.6	934.6	934.6	0.0
28138.58BR U		935.4	935.4	935.4	935.4	0.0
28275.58 - O	**935.3**	**934.9**	**934.9**	**934.9**	**934.9**	**0.0**
29014.22		939.4	939.4	939.4	939.4	0.0
29655.01 - P	**941.1**	**940.9**	**940.9**	**940.9**	**940.9**	**0.0**
30358.55		941.1	941.1	941.1	941.1	0.0
31128.08		940.6	940.6	940.6	940.6	0.0
31244.21BR D		942.2	942.2	942.2	942.2	0.0
31244.21BR U		942.6	942.6	942.6	942.6	0.0
31353.71		942.1	942.1	942.1	942.1	0.0
32008.58		945.8	945.8	945.8	945.8	0.0
32395.49BR D		946.1	946.1	946.1	946.1	0.0
32395.49BR U		946.1	946.1	946.1	946.1	0.0
32499.49		946.0	946.0	946.0	946.0	0.0
32836.11		946.2	946.2	946.2	946.2	0.0
32909.32		947.8	947.8	947.8	947.8	0.0
32976.16BR D		947.8	947.8	947.8	947.8	0.0
32976.16BR U		947.9	947.9	947.9	947.9	0.0
33155.58 - Q	**948.2**	**947.9**	**947.9**	**947.9**	**947.9**	**0.0**
34068.65		947.8	947.8	947.8	947.8	0.0
34164.15		949.7	949.7	949.7	949.7	0.0
34319.79 - R	**950.2**	**949.8**	**949.8**	**949.8**	**949.8**	**0.0**

NOTES:

1) **Bold rows indicate published cross-sections.**
2) **Hi-lighted rows indicate cross-sections within the R-O-W.**
3) **Elevations retrieved from Table 200 in Floodway Models**

*** The results are based on the latest model revision scheduled for an effective date of December '08.**

TABLE OF 100 YR FLOODWAY ELEVATIONS

NOONDAY CREEK - SOUTH COBB COUNTY, GA

	A	*B*	*C*	*D*	*E*	*F*
CROSS	PUBLISHED	DUPLICATE	CORRECTED	EXISTING	PROPOSED	DELTA
SECTION	FIS	EFFECTIVE	EFFECTIVE	ELEVATION	ELEVATION	ELEVATION
	ELEVATION*	ELEVATION	ELEVATION			(E-D)
20340.54 - L	**922.9**	**922.9**	**922.9**	**922.9**	**922.9**	**0.0**
20788.78		923.7	923.7	923.7	923.7	0.0
21440.00		924.7	924.7	924.7	924.7	0.0
22221.01		925.2	925.2	925.2	925.2	0.0
23217.96		925.0	925.0	925.0	925.0	0.0
23378.74BR D		926.4	926.4	926.4	926.4	0.0
23378.74BR U		927.3	927.3	927.3	927.3	0.0
23477.24		928.1	928.1	928.1	928.1	0.0
24584.31 - M	**929.6**	**929.6**	**929.6**	**929.6**	**929.6**	**0.0**
24776.87		929.9	929.9	929.9	929.9	0.0
24842.55BR D		929.8	929.8	929.8	929.8	0.0
24842.55BR U		929.9	929.9	929.9	929.9	0.0
24942.55		930.3	930.3	930.3	930.3	0.0
26158.34 - N	**931.2**	**931.2**	**931.2**	**931.2**	**931.2**	**0.0**
27163.80		932.2	932.2	932.2	932.2	0.0
27924.79		934.3	934.3	934.3	934.3	0.0
28138.58BR D		935.1	935.1	935.1	935.1	0.0
28138.58BR U		935.8	935.8	935.8	935.8	0.0
28275.58 - O	**935.3**	**935.3**	**935.3**	**935.3**	**935.3**	**0.0**
29014.22		939.5	939.5	939.5	939.5	0.0
29655.01 - P	**941.1**	**941.1**	**941.1**	**941.1**	**941.1**	**0.0**
30358.55		941.4	941.4	941.4	941.4	0.0
31128.08		941.3	941.3	941.3	941.3	0.0
31244.21BR D		942.5	942.5	942.5	942.5	0.0
31244.21BR U		942.8	942.8	942.8	942.8	0.0
31353.71		943.1	943.1	943.1	943.1	0.0
32008.58		946.6	946.6	946.6	946.6	0.0
32395.49BR D		946.8	946.8	946.8	946.8	0.0
32395.49BR U		946.8	946.8	946.8	946.8	0.0
32499.49		946.7	946.7	946.7	946.7	0.0
32836.11		946.9	946.9	946.9	946.9	0.0
32909.32		948.1	948.1	948.1	948.1	0.0
32976.16BR D		948.1	948.1	948.1	948.1	0.0
32976.16BR U		948.2	948.2	948.2	948.2	0.0
33155.58 - Q	**948.2**	**948.2**	**948.2**	**948.2**	**948.2**	**0.0**
34068.65		948.1	948.1	948.1	948.1	0.0
34164.15		950.1	950.1	950.1	950.1	0.0
34319.79 - R	**950.2**	**950.2**	**950.2**	**950.2**	**950.2**	**0.0**

NOTES:

1) Bold rows indicate published cross-sections.

2) Hi-lighted rows indicate cross-sections within the R-O-W.

3) Elevations retrieved from Table 200 in Floodway Models

*** The results are based on the latest model revision scheduled for an effective date of December '08.**

Section III
Peak Flow Summary

NH000-0575-01(028) Cobb County
I-575 over Noonday Creek - South
PI # 0008256

Drainage Area (sq. mi.)	12.8
Region No.	1
Impervious Area (%)	25
USGS Gage No.	N/A
Drainage Area @ Gage	

	FEMA Discharges
Q2	-
Q5	-
Q10	6659
Q25	8621
Q50	10230
Q100	11917
Q500	15274

Discharge (cfs)

	Regional	Urbanized	Qu(w) Weighted Discharge
Q2	1097	2913	0
Q5	1788	4248	0
Q10	2336	4743	0
Q25	3114	5976	0
Q50	3770	6665	0
Q100	4476	7649	0
Q500	6428	9444	0

Hydraulic Slope Calculation
Based on USGS quad

Upstream Elevation =	940
Downstream Elevation =	920
Horizontal Distance =	7025

Slope = 0.00285 ft/ft
15.03 ft/mi

NH000-0575-01(028) Cobb County
I-575 over Noonday Creek - South

Drainage Area (sq. mi.)	14.0	Downstream of
Region No.	1	Tributary Confluence
Impervious Area (%)	25	
USGS Gage No.	N/A	
Drainage Area @ Gage		
Q2		
Q5		
Q10		
Q25		
Q50		
Q100		
Q500		

Discharge (cfs)

	Regional	Urbanized	Qu(w) Weighted Discharge
Q2	1163	3110	0
Q5	1892	4527	0
Q10	2469	5050	0
Q25	3288	6363	0
Q50	3976	7090	0
Q100	4717	8136	0
Q500	6760	10037	0

Hydraulic Slope Calculation
Based on USGS quad

Upstream Elevation =	940
Downstream Elevation =	920
Horizontal Distance =	7025

Slope = 0.00285 ft/ft
15.03 ft/mi

NH000-0575-01(028) Cobb County
I-575 over Noonday Creek - South
PI # 661950

Impervious Area Calculation

Total Drainage Area (sq. mi.)	12.8
Region No.	1

Cover Type	Cover Area * (sq. mi.)	Percent Total Area	Average Percent ** Impervious Area	
Comercial / Retail	0.50	3.9%	85%	0.43
High Density Residential	0.50	3.9%	38%	0.19
Institutional / Public	0.80	6.3%	38%	0.30
Low Density Residential	7.29	57.0%	12%	0.87
Very Low density Residential	0.65	5.1%	8%	0.05
Medium Density Residential	0.36	2.8%	25%	0.09
Office / Distribution / Techonology	0.40	3.1%	85%	0.34
Office / Professional	0.50	3.9%	85%	0.43
Pavement	0.50	3.9%	100%	0.50
Park, Conservation & Recreation Areas	1.00	7.8%	0%	0.00
Rural Residential	0.00	0.0%	6%	0.00
Transportation / Communication / Utilities	0.30	2.3%	6%	0.02
			Total Impervious Area	3.22
	12.80		**Impervious Area (%)**	25.1%
			USE 25%	

* Aerial Photo

** Gwinnet County, Georgia. Storm Water Design Manual (October, 2001)

Expansion and Contraction Reach Length Computation

I-575 over Noonday Creek - South

Expansion Reach Length Computation

b - bridge opening width	170
B - floodplain width	500
b/B	**0.34**
(B-b)/2 avg. obs. Length	165
n(ob)	0.12
n(mc)	0.06
n(ob)/n(mc)	**2.18**
S (ft/ft)	0.0029
S (ft/mile)	**15.05**

Ranges of Expansion Ratios

		n(ob)/n(mc)=1	n(ob)/n(mc)=2	n(ob)/n(mc)=4
b/B=0.10	**S=1 ft/mile**	1.4-3.6	1.3-3.0	1.2-2.1
	5 ft/mile	1.0-2.5	0.8-2.0	0.8-2.0
	10 ft/mile	1.0-2.2	0.8-2.0	0.8-2.0
b/B=0.25	**S=1 ft/mile**	1.6-3.0	1.4-2.5	1.2-2.0
	5 ft/mile	1.5-2.5	1.3-2.0	1.3-2.0
	10 ft/mile	1.5-2.0	1.3-2.0	1.3-2.0
b/B=0.50	**S=1 ft/mile**	1.4-2.6	1.3-1.9	1.2-1.4
	5 ft/mile	1.3-2.1	1.2-1.6	1.0-1.4
	10 ft/mile	1.3-2.0	1.2-1.5	1.0-1.4

Er-Exp. rate from chart	1.3	2.0
Exp. Reach Length	**214.5**	**330**

Contraction Reach Length Computation

Ranges of Contraction Ratios

	n(ob)/n(mc)=1	n(ob)/n(mc)=2	n(ob)/n(mc)=4
S=1 ft/mile	1.0-2.3	0.8-1.7	0.7-1.3
5 ft/mile	1.0-1.9	0.8-1.5	0.7-1.2
10 ft/mile	1.0-1.9	0.8-1.4	0.7-1.2

Cr-Contr. rate from chart	0.8	1.4
Contr. Reach Length	**132**	**231**

Reference : Hydrologic Engineering Center (HEC) Research Document No. 42 ***Flow Transitions in Bridge Backwater Analysis*** , John H. Hunt and Gary Brunner, dated September 1995.

Section IV
Hydraulic Engineering Field Data

HYDRAULIC ENGINEERING FIELD REPORT

I. Hydraulic and Hydrologic Data Required for all Bridge Stream Crossing Projects.
See Appendix A of the Georgia DOT Drainage Manual for required survey information.

A. Project Location

Location Description:	**I-575 over Noonday Ck South**	Date:	**05-30-2008**
Reported by:	**JBT Personnel**	JBT Project No.:	***31-800902***
Client:	**PBS&J**	Project No.:	**NH000-0575-01(028)**
County:	**Cobb**	GDOT District:	**1**
Stream Name:	**Noonday Creek**	Route:	**I-575**

B. Site Location

Floodplain Description:
a) Flat, rolling, mountainous etc.: **Rolling**
b) Wooded, heavily vegetated, pasture, swampy etc.: **Vegetated to pasture**

Stream Channel Description:
a) Banks stable, unstable etc.: **well-defined; small instability at banks upstream and downstream**
b) Stream meandering, straight etc.: **Bend downstream of bridge**
c) Debris: **No debris witnessed**
d) Is there any fill in the upstream or downstream floodplains that will affect the natural drainage or limit floodplain width at this site? **Yes. Development exists upstream and downstream.**

C. Required Existing Bridge Data at Project Site

Bridge ID #:	**067-0113-0 & 067-0114-0**
Date Built:	**1980**
Skew angle of bridge or bents :	**90°**

Substructure Description:

a)	column type (concrete, steel, pile, etc.):	**Concrete**
b)	size of column:	**3'x3'**
c)	number of columns per bent:	**2**
d)	height of curb, parapet or barrier:	**2.67'**
	spurdike length:	**n/a**
	spurdike elevation:	**n/a**
	spurdike location:	**n/a**
e)	scour problems at intermediate bents:	**None observed**
f)	scour problems at abutments:	**None observed**

D. Normal Water Surface Data

a) Water Surface elevation 500 ft upstream of the survey centerline: **Not Obtained**
b) Water Surface elevation at the roadway centerline: **Not Obtained**
c) Water Surface elevation 500 ft downstream of the survey centerline: **Not Obtained**
d) Is site affected by tides: **No**
e) Normal high tide: **N/A** Normal low tide: **N/A**

E. Historical Flood Data

a) Extreme high-water elevation at Site: **Not Available** Date: **N/A**
b) Highest tide elevation observed at Site: **N/A** Date: **N/A**
c) Location where taken (upstream, downstream, centerline): **N/A**
c) Source of high-water information: **N/A**
e) Are there any houses that have been flooded: **No**
f) House location and floor elevation: **No**
g) Number of times house has been flooded, elevations and dates of floods: **No**
h) Additional houses that may be flooded? (with floor elevations within 2 ft of the flood of record): **No**

F. Miscellaneous Information

a) Are water surface elevations at the site affected by other factors such as high-water from other stream, reservoirs etc.: **No**

b) Length, width, and elevations of dam and spillway if applicable: N/A

Note: if the project site is affected by the above factors, additional floodplain cross sections may be required. The Engineer should be contacted during the survey phase to identify the additional cross sections required.

G. Upstream and Downstream Stream Crossings

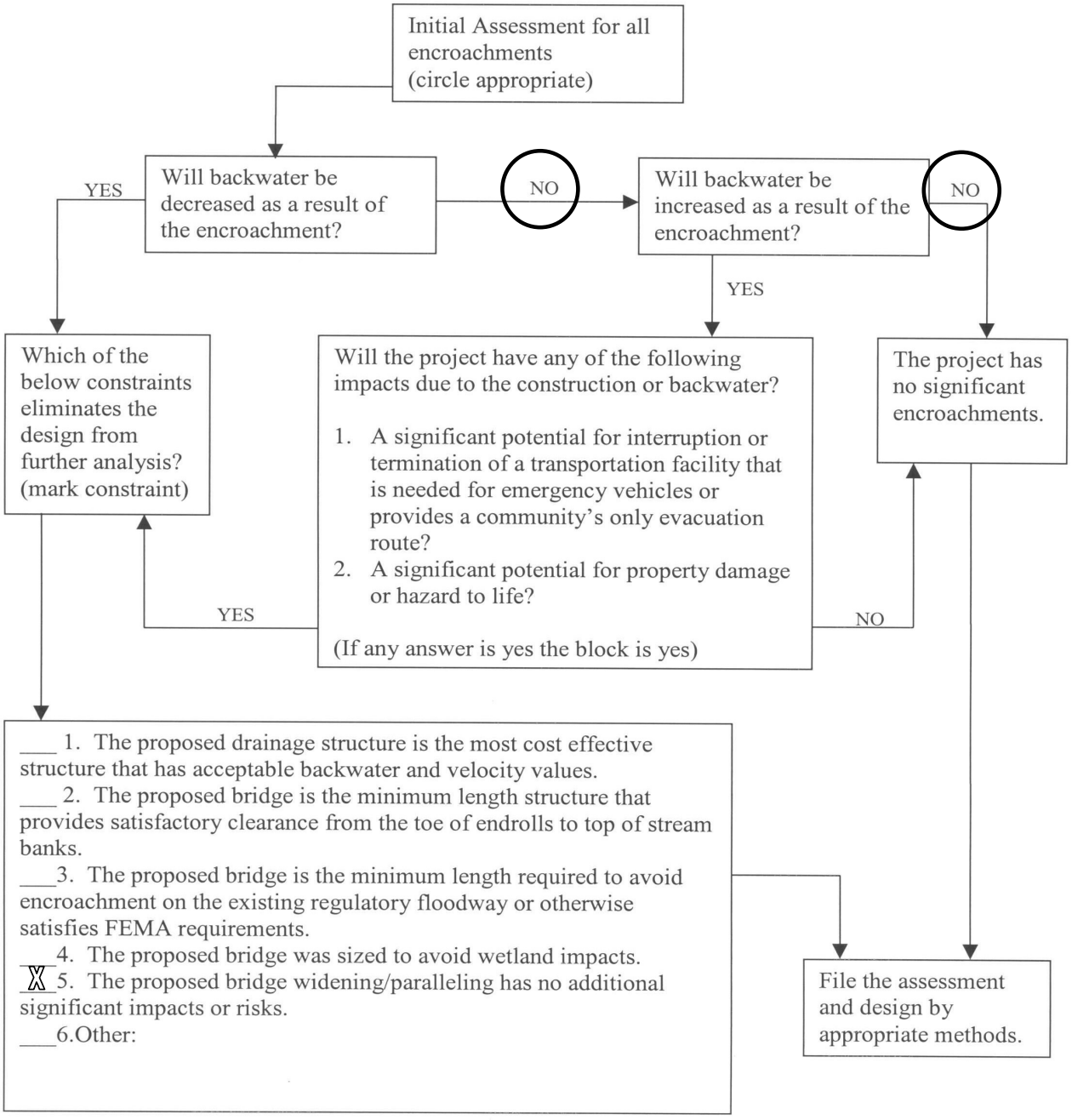
The below information is required for all bridges or box culverts within 1 mile upstream and downstream of the project site. Additional survey information is required for all hydraulic structures within 2000 ft of the project site.

Upstream Structure

Distance and direction from proposed structure:	**2800 ft**
Railroad or highway structure:	**Highway**
Route # if highway bridge:	**George Busbee Parkway**
Length of bridge or culvert size	**220' long**
Substructure Information:	
a) column type (concrete, steel, pile):	**Piles**
b) column size:	
c) number of columns of bent:	
d) length of over flow bridge or culvert size:	**N/A**

Downstream Structure

Distance and direction from proposed structure:	**2800 ft**
Railroad or highway structure:	**Highway**
Route # if highway bridge:	**Chastain Meadows Parkway**
Length of bridge or culvert size	**375' long**
Substructure Information:	
a) column type (concrete, steel, pile):	**Concrete**
b) column size:	
c) number of columns of bent:	
d) length of over flow bridge or culvert size:	**N/A**



Risk Assessment

NH000-0575-01(028) Cobb County

I-575 over Noonday Creek - South

PI # 0008256

BRIDGE INVENTORY DATA LISTING GEORGIA DEPARTMENT OF TRANSPORTATION

Structure ID: 067-0113-0 **Cobb** SUFF. RATING 67.09

Location & Geography

*	Structure I.D.No:	067-0113-0	
	200 Bridge Information	06	
*	6A Feature Int:	NOONDAY CREEK	
*	6B Critical Bridge:	0	
*	7A Route Number Carried:	SR00417	
*	7B Facility Carried:	I-575 (NBL)	
*	9 Location:	3 MI E OF KENNESAW	
	2 DOT District:	7	
	207 Year Photo:	2003	
*	91 Inspection Frequency:	24	Date: 03/09/2005
	92A Fract Crit Insp Freq:	00	Date: 02/01/1901
	92B Underwater Insp Freq:	00	Date: 02/01/1901
	92C Other Spc. Insp Freq:	00	Date: 02/01/1901
*	4 Place Code:	00000	
*	5 Inventory Route (O/U):	1	
	Type:	1	
	Designation:	1	
	Number:	00575	
	Direction:	0	
*	16 Latitude:	34-01.5	MMS Prefix: SR
*	17 Longitude:	084-33.6	MMS Suffix: 00 MP: 1.93
	98 Border Bridge:	000	%Shared: 00
	99 ID Number:	000000000000000	
*	100 STRAHNET:	1	
	12 Base Highway Network:	1	
	13A LRS Inventory Route:	671041700	
	13B Sub Inventory Route:	0	
*	101 Parallel Structure:	R	
*	102 Direction of Traffic:	1	
*	264 Road Inventory Mile Post:	018.84	
*	208 Inspection Area:	09	Initials: JMC
	Engineer's Initial:	jal	

* Location I.D. No.: 067-00417D-001.98N

*	104 Highway System:	1	
*	26 Functional Classification:	11	
*	204 Federal Route Type:	I	No.: 05751
	105 Federal Lands Highway:	0	
*	110 Truck Route:	1	
	206 School Bus Route:	0	
	217 Benchmark Elevation:	0000.00	
	218 Datum:	0	
*	19 Bypass Length:	01	
*	20 Toll:	3	
*	21 Maintenance:	01	
*	22 Owner:	01	
*	31 Design Load:	6	
	37 Historical Significance:	5	
	205 Congressional District:	06	
	27 Year Constructed:	1980	
	106 Year Reconstructed:	0000	
	33 Bridge Median:	1	
	34 Skew:	00	
	35 Structure Flared:	0	
	38 Navigation Control:	0	
	213 Special Steel Design:	0	
	267 Type of Paint:	0	
*	42 Type of Service on:	1	
		5	
	214 Movable Bridge:	0	
	203 Type Bridge:	O-O-O-O	
	259 Pile Encasement:	3	
*	43 Structure Type Main:	5	02
	45 No. Spans Main:	003	
	44 Structure Type Appr:	0	00
	46 No. Spans Appr:	0000	
	226 Bridge Curve Horz:	0	Vert: 0
	111 Pier Protection:	0	
	107 Deck Structure Type:	1	
	108 Wearing Surface Type:	1	
	Me	0	
	P	0	

Signs & Attachments

	225 Expansion Joint Type:	02	
	242 Deck Drains:	1	
	243 Parapet Location:	0	
	Height:	0.00	
	Width:	0.00	
	238 Curb:	0.00	0
	239 Handrail:	9	9
*	240 Median Barrier Rail:	0	
	241 Bridge Median Height:	0.00	
	Width:	0.00	
*	230 Guardrail Loc Dir Rear:	6	
	Fwrd:	5	
	Oppo Dir Rear:	0	
	Fwrd:	0	
	244 Approach Slab:	3	
	224 Retaining Wall:	0	
	233 Posted Speed Limit:	65	
	236 Warning Sign:	0	
	234 Delineator:	1	
	235 Hazard Boards:	0	
	237 Utilities Gas:	00	
	W	00	
	Ele	00	
	Telephone:	00	
	Se	00	
	247 Lighting Street:	0	
	Naviagtion:	0	
	Aerial:	0	
*	248 County Continuity No.:	01	

BRIDGE INVENTORY DATA LISTING GEORGIA DEPARTMENT OF TRANSPORTATION

Structure ID: 067-0113-0 **Cobb** SUFF. RATING 67.09

Programming Data

201 Project No.: I-575-1 (2) 00 CT.1
202 Plans Available: 1
249 Prop. Proj. No. 0000000000000000
250 Approval Status: 0000
251 P.I. No.: 0000000
252 Contract Date: 02/01/1901
260 Seismic No.: 00000
75 Type Work: 00 0
94 Bridge Imp. Cost: $ 0
95 Roadway Imp. Cost: $ 0
96 Total Imp Cost: $ 0
76 Imp. Length: 000000
97 Imp. Year: 0000
114 Future ADT: 111855 Year: 2024

Hydraulic Data

215 Waterway Data
Highwater Elev.: 0000.0 Year: 1900
Avg. Streambed Elev.: 0000.0 Freq.: 00
Drainage Area: 00000
Area Of Opening: 000000
113 Scour Critical: 5
216 Water Depth: 01.2 Br. Height: 30.6
222 Slope Protection: 1
221 Spur Dikes Rear: 0 Fwrd: 0
219 Fender System: 0
220 Dolphin: 0
223 Culvert Cover: 000
Type: 0
No. Barrels: 0
Width: 0.00 Height: 0.00
Length: 0 Apron: 0
* 265 U/W Insp. Area: 0 Diver: ZZZ

* Location I.D. No.: 067-00417D-001.98N

Measurements

* 29 ADT: 074570 Year: 2004
109 % Trucks: 11
* 28 Lanes On: 02 Under: 00
210 No. Tracks On: 00 Under: 00
* 48 Max. Span Length: 0070
* 49 Structure Length: 170
51 Br. Rwdy. Width: 40.50
52 Deck Width: 43.70
* 47 Tot. Horz. Cl: 40.50
50 Curb/Sdewlk Width: 0.00/0.00
32 Approach Rdwy Width: 038
* 229 Shoulder Width:
Rear Lt: 4.00 Type: 2 Rt: 10.00
Fwrd Lt: 4.00 Type: 2 Rt: 10.00
Pavement Width:
Rear: 24.00 Type: 2
Fwrd: 24.00 Type: 2
Intersection Rear: 0 Fwrd: 0
36 Safety Features Br. Rail: 1
Transition: 1
App. G. Rail: 1
App. Rail End: 1
53 Minimum Cl.Over: 99 ' 99 "
Under: N 00 ' 00 "
* 228 Min. Vertical Cl
Act. Odm Dir: 99 ' 99 "
Oppo. Dir: 99 ' 99 "
Posted Odm. Dir: 00 ' 00 "
Oppo. Dir: 00 ' 00 "
55 Lateral Undercl. Rt: N 99.90
56 Lateral Undercl. Lt: 0.00
* 10 Max Min Vert Cl: 99 ' 99 " Dir: 0
39 Nav Vert Cl: 000 Horz: 0000
116 Nav Vert Cl Closed: 000
245 Deck Thickness Main: 6.90
Deck Thick Approach: 0.00
246 Overlay Thickness: 0.00
212 Year Last Painted: Sup: 0000 Sub: 0000

Ratings

65 Inventory Rating Method: 1
63 Inventory Rating Method: 1
66 Inventory Type: 2 Rating: 18
64 Operating Type: 2 Rating: 58
231 Calculated Loads
H-Modified: 17 0
HS-Modified: 19 0
Type 3: 17 0
Type 3s2: 27 0
Timber: 21 0
Piggyback: 35 0
261 H Inventory Rating: 14
262 H Operating Rating: 54
67 Structural Evaluation: 4
58 Deck Condition: 6
59 Superstructure Condition: 8
* 227 Collision Damage: 0
60A Substructure Condition: 7
60B Scour Condition: 8
60C Underwater Condition: N
71 Waterway Adequacy: 9
61 Channel Protection Cond: 8
68 Deck Geometry: 7
69 UnderClr. Horz/Vert: N
72 Appr. Alignment: 8
62 Culvert: N

Posting Data

70 Bridge Posting Required: 5
41 Struct Open, Posted, Cl: A
* 103 Temporary Structure: 0
232 Posted Loads H-Modified: 00
HS-Modified: 00
Type 3: 00
Type3s2: 00
Timber: 00
Piggyback: 00
253 Notification Date 02/01/1901
253 Fed Notify Date: 02/01/1901 0

BRIDGE INVENTORY DATA LISTING GEORGIA DEPARTMENT OF TRANSPORTATION

Structure ID: 067-0114-0 **Cobb** SUFF. RATING 67.09

Location & Geography

*	Structure I.D.No:	067-0114-0	
200	Bridge Information	06	
* 6A	Feature Int:	NOONDAY CREEK	
* 6B	Critical Bridge:	0	
* 7A	Route Number Carried:	SR00417	
* 7B	Facility Carried:	I-575 (SBL)	
* 9	Location:	3 MI E OF KENNESAW	
2	DOT District:	7	
207	Year Photo:	2003	
* 91	Inspection Frequency:	24	Date: 03/09/2005
92A	Fract Crit Insp Freq:	00	Date: 02/01/1901
92B	Underwater Insp Freq:	00	Date: 02/01/1901
92C	Other Spc. Insp Freq:	00	Date: 02/01/1901
* 4	Place Code:	00000	
* 5	Inventory Route (O/U):	1	
	Type:	1	
	Designation:	1	
	Number:	00575	
	Direction:	0	
* 16	Latitude:	34-01.5	MMS Prefix: SR
* 17	Longitude:	084-33.6	MMS Suffix: 00 MP: 1.94
98	Border Bridge:	000	%Shared: 00
99	ID Number:	000000000000000	
* 100	STRAHNET:	1	
12	Base Highway Network:	1	
13A	LRS Inventory Route:	671041700	
13B	Sub Inventory Route:	0	
* 101	Parallel Structure:	L	
* 102	Direction of Traffic:	1	
* 264	Road Inventory Mile Post:	018.85	
* 208	Inspection Area:	09	Initials: JMC
	Engineer's Initial:	jal	

* Location I.D. No.: 067-00417D-001.99N

* 104	Highway System:	1	
* 26	Functional Classification:	11	
* 204	Federal Route Type:	I	No.: 05751
105	Federal Lands Highway:	0	
* 110	Truck Route:	1	
206	School Bus Route:	0	
217	Benchmark Elevation:	0000.00	
218	Datum:	0	
* 19	Bypass Length:	01	
* 20	Toll:	3	
* 21	Maintenance:	01	
* 22	Owner:	01	
* 31	Design Load:	6	
37	Historical Significance:	5	
205	Congressional District:	06	
27	Year Constructed:	1980	
106	Year Reconstructed:	0000	
33	Bridge Median:	1	
34	Skew:	00	
35	Structure Flared:	0	
38	Navigation Control:	0	
213	Special Steel Design:	0	
267	Type of Paint:	0	
* 42	Type of Service on:	1	
		5	
214	Movable Bridge:	0	
203	Type Bridge:	O-O-O-O	
259	Pile Encasement:	3	
* 43	Structure Type Main:	5	02
45	No. Spans Main:	003	
44	Structure Type Appr:	0	00
46	No. Spans Appr:	0000	
226	Bridge Curve Horz:	0	Vert: 0
111	Pier Protection:	0	
107	Deck Structure Type:	1	
108	Wearing Surface Type:	1	
	Me	0	
	P	0	

Signs & Attachments

225	Expansion Joint Type:	02	
242	Deck Drains:	1	
243	Parapet Location:	0	
	Height:		0.00
	Width:		0.00
238	Curb:		0.00 0
239	Handrail:	9	9
* 240	Median Barrier Rail:	0	
241	Bridge Median Height:		0.00
	Width:		0.00
* 230	Guardrail Loc Dir Rear:	6	
	Fwrd:	0	
	Oppo Dir Rear:	0	
	Fwrd:	0	
244	Approach Slab:	3	
224	Retaining Wall:	0	
233	Posted Speed Limit:	65	
236	Warning Sign:	0	
234	Delineator:	1	
235	Hazard Boards:	0	
237	Utilities Gas:	00	
	W	00	
	Ele	00	
	Telephone:	00	
	Se	00	
247	Lighting Street:	0	
	Naviagtion:	0	
	Aerial:	0	
* 248	County Continuity No.:	01	

BRIDGE INVENTORY DATA LISTING GEORGIA DEPARTMENT OF TRANSPORTATION

Structure ID: 067-0114-0 **Cobb** SUFF. RATING 67.09

Programming Data

201 Project No.: I-575-1 (2) 00 CT.1
202 Plans Available: 1
249 Prop. Proj. No. 0000000000000000
250 Approval Status: 0000
251 P.I. No.: 0000000
252 Contract Date: 02/01/1901
260 Seismic No.: 00000
75 Type Work: 00 0
94 Bridge Imp. Cost: $ 0
95 Roadway Imp. Cost: $ 0
96 Total Imp Cost: $ 0
76 Imp. Length: 000000
97 Imp. Year: 0000
114 Future ADT: 111855 Year: 2024

Hydraulic Data

215 Waterway Data
Highwater Elev.: 0000.0 Year: 1900
Avg. Streambed Elev.: 0000.0 Freq.: 00
Drainage Area: 00000
Area Of Opening: 000000
113 Scour Critical: 5
216 Water Depth: 01.0 Br. Height: 31.0
222 Slope Protection: 1
221 Spur Dikes Rear: 0 Fwrd: 0
219 Fender System: 0
220 Dolphin: 0
223 Culvert Cover: 000
Type: 0
No. Barrels: 0
Width: 0.00 Height: 0.00
Length: 0 Apron: 0
* 265 U/W Insp. Area: 0 Diver: ZZZ

* Location I.D. No.: 067-00417D-001.99N

Measurements

* 29 ADT: 074570 Year: 2004
109 % Trucks: 11
* 28 Lanes On: 02 Under: 00
210 No. Tracks On: 00 Under: 00
* 48 Max. Span Length: 0070
* 49 Structure Length: 170
51 Br. Rwdy. Width: 40.50
52 Deck Width: 43.70
* 47 Tot. Horz. Cl: 40.50
50 Curb/Sdewlk Width: 0.00/0.00
32 Approach Rdwy Width: 038
* 229 Shoulder Width:
Rear Lt: 4.00 Type: 2 Rt: 10.00
Fwrd Lt: 4.00 Type: 2 Rt: 10.00
Pavement Width:
Rear: 24.00 Type: 2
Fwrd: 24.00 Type: 2
Intersection Rear: 0 Fwrd: 0
36 Safety Features Br. Rail: 1
Transition: 1
App. G. Rail: 1
App. Rail End: 1
53 Minimum Cl.Over: 99 ' 99 "
Under: N 00 ' 00 "
* 228 Min. Vertical Cl
Act. Odm Dir: 99 ' 99 "
Oppo. Dir: 99 ' 99 "
Posted Odm. Dir: 00 ' 00 "
Oppo. Dir: 00 ' 00 "
55 Lateral Undercl. Rt: N 99.90
56 Lateral Undercl. Lt: 0.00
* 10 Max Min Vert Cl: 99 ' 99 " Dir: 0
39 Nav Vert Cl: 000 Horz: 0000
116 Nav Vert Cl Closed: 000
245 Deck Thickness Main: 6.90
Deck Thick Approach: 0.00
246 Overlay Thickness: 0.00
212 Year Last Painted: Sup: 0000 Sub: 0000

Ratings

65 Inventory Rating Method: 1
63 Inventory Rating Method: 1
66 Inventory Type: 2 Rating: 18
64 Operating Type: 2 Rating: 58
231 Calculated Loads
H-Modified: 17 0
HS-Modified: 19 0
Type 3: 17 0
Type 3s2: 27 0
Timber: 21 0
Piggyback: 35 0
261 H Inventory Rating: 14
262 H Operating Rating: 54
67 Structural Evaluation: 4
58 Deck Condition: 7
59 Superstructure Condition: 8
* 227 Collision Damage: 0
60A Substructure Condition: 7
60B Scour Condition: 8
60C Underwater Condition: N
71 Waterway Adequacy: 9
61 Channel Protection Cond: 8
68 Deck Geometry: 7
69 UnderClr. Horz/Vert: N
72 Appr. Alignment: 8
62 Culvert: N

Posting Data

70 Bridge Posting Required: 5
41 Struct Open, Posted, Cl: A
* 103 Temporary Structure: 0
232 Posted Loads H-Modified: 00
HS-Modified: 00
Type 3: 00
Type3s2: 00
Timber: 00
Piggyback: 00
253 Notification Date 02/01/1901
253 Fed Notify Date: 02/01/1901 0

GEORGIA DEPARTMENT OF TRANSPORTATION

Waterway Report

District: 7 **Inspection Date:** 3/9/2005 **Inspection Area:** 09

Bridge Inspector: Jerry Cooper **Over:** NOONDAY CREEK

Location ID: 067-00417D-001.99N **County:** Cobb **Skew:** 00

Structure ID: 067-0114-0 **Road Name:** I-575 (SBL)

Span #:	1	2	3
Length:	**50.0**	**70.0**	**50.0**

Upstream -

Upstream +		1	2	3	4
06/25/1997	BDH DEM		24.70	27.10	5.90
06/22/1999	JMC DEM		24.70	25.80	5.90
05/30/2001	JMC-WBR		24.70	25.80	0.00
07/02/2003	JMC-WBR		24.70	26.10	6.00
03/09/2005	JMC/WBR		24.80	26.20	6.00

Downstream -

Downstream +		1	2	3	4
06/25/1997	BDH DEM		21.20	26.20	6.10
06/22/1999	JMC DEM		22.00	25.80	6.10
05/30/2001	JMC-WBR		22.00	25.80	0.00
07/02/2003	JMC-WBR		22.00	25.80	6.00
03/09/2005	JMC/WBR		22.10	25.90	6.00

GEORGIA DEPARTMENT OF TRANSPORTATION

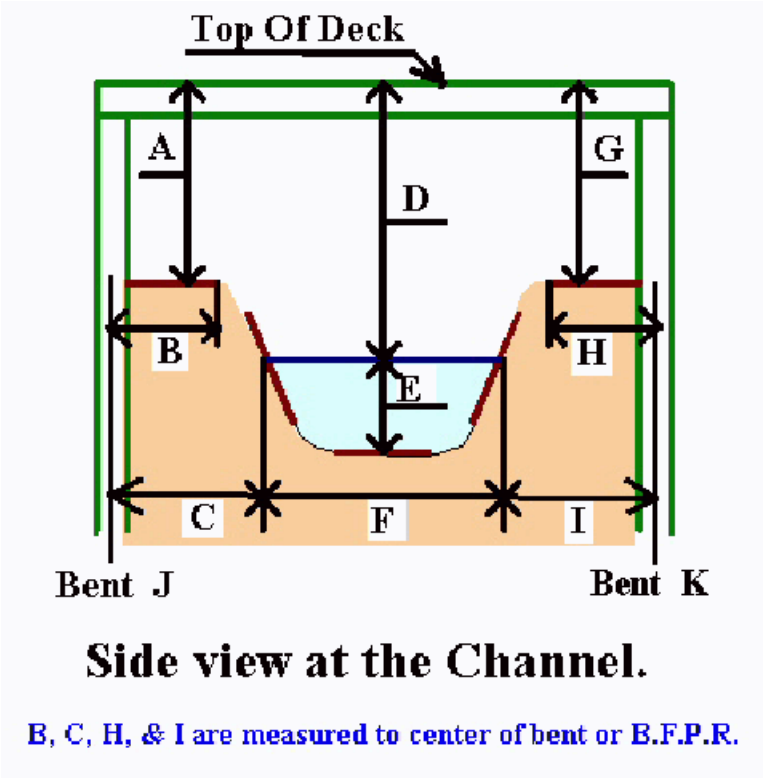
Waterway Report

District: 7 **Inspection Date:** 3/9/2005 **Inspection Area:** 09

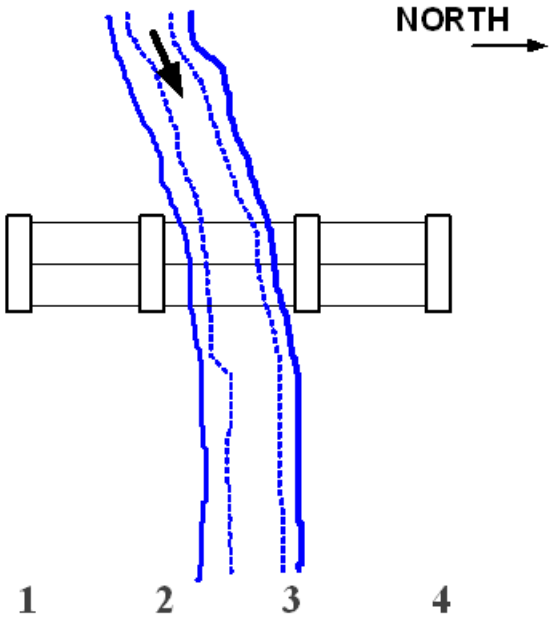
Bridge Inspector: Jerry Cooper **Over:** NOONDAY CREEK

Location ID: 067-00417D-001.99N **County:** Cobb **Skew:** 00

Structure ID: 067-0114-0 **Road Name:** I-575 (SBL)



A:	24
B:	11
C:	17
D:	31.0
E:	01.0
F:	33
G:	28
H:	15
I:	20
J:	2
K:	3



Location of Bridge Height -20' from bent #3

Scour Condition: 8 **Waterway Adequacy:** 9 **Channel Protection:** 8

0 = **SubStructure**

30 = **Channel Skew**

30 = **Stream Angle**

Comments:

No comments are required.

GEORGIA DEPARTMENT OF TRANSPORTATION

Bridge Inspection Report

District: 7 **Inspection Date:** 3/9/2005 **Inspection Area:** 09
Bridge Inspector: Jerry Cooper **Over:** NOONDAY CREEK **Bridge Status:** 06
Location ID: 067-00417D-001.99N **County:** Cobb
Structure ID: 067-0114-0 **Road Name:** I-575 (SBL)

EVALUATION & DEFICIENCIES

SubStructure: **Year Painted:** 0000

Concrete Caps At Both Abutments.
Abutments are founded on steel piling.
Minor cracking in both abutment caps.
Bents 2 And 3 Has Concrete Caps On 2 Concrete Columns And Founded On Spread Footings.
Very minor cracking in the caps at bent #2 and #3.
Bent #3 = H-32 Calculated 2004 by Central Office (Load Factor)

SuperStructure: **Year Painted:** 0000

3 Span P.S.C. "I" Beam (7 Type III Beams Per Span).
Neoprene Bearings.
All beams are in good condition at this time.
Span #2 = H-14 Calculated 2004 by Central Office (Load Factor).

Deck:

6 7/8" Concrete Slab Poured Continuous.
Metal S.I.P. Deck Forms.
Minor transverse cracking noted in the deck surface.
Deck: H-32 Calculated 2004 by Central Office (Load Factor).

General:

Built in 1980 Project # I-575-1 (2) 00 CT.1
Calculations for this structure were determined by the Central Office. - February, 2004
Hand tools and ladder used.

Condition Rating

Component	Material	Rating
Substructure	Concrete	7
Superstructure	Concrete	8
Deck	Concrete	7

Temp Shored: **No**

Truck Type	Gross/H-Mod	HSMod	Tand	3-S-2	Log	Piggy
Calculated Posting	17	19	17	27	21	35
Posting Required	No	No	No	No	No	No
Existing Posting	00	00	00	00	00	00

Not a School Bus Route.

Structure Does Not Require Posting

GEORGIA DEPARTMENT OF TRANSPORTATION

Bridge Component Report

District: 7 **Inspection Date:** 3/9/2005 **Inspection Area:** 09

Bridge Inspector: Jerry Cooper **Over:** NOONDAY CREEK

Location ID: 067-00417D-001.99N **County:** Cobb

Structure ID: 067-0114-0 **Road Name:** I-575 (SBL)

SubStructure Data

Bent#	Type	Foundation	Col	#Cols	Piling	#Piles	Sway	CAP	Remarks
1	A	DP		0		0		C	ONLY CAP EXPOSED
2	B	SF	C	2		0		C	
3	B	SF	C	2		0		C	
4	A	DP		0		0		C	ONLY CAP EXPOSED

SuperStructure Data

Span#	Beam Type	Spacing	Length	#Beams	Remarks
1	PSC "I" Beam	6.50	50.00	7	Type 3
2	PSC "I" Beam	6.50	70.00	7	Type 3
3	PSC "I" Beam	6.50	50.00	7	Type 3

Bearing Data

Span#	Rear Type Bearing	FWD Type Bearing	Remarks
1	03 - Elastomeric	03 - Elastomeric	
2	03 - Elastomeric	03 - Elastomeric	
3	03 - Elastomeric	03 - Elastomeric	

Section V
HEC-RAS Computer Model Output

HEC-RAS FULL VALLEY MODEL

HEC-RAS Plan: FullV Urb River: Noonday Creek So Reach: 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	-860	2 Yr	3110.00	911.88	923.26	918.27	923.72	0.002854	5.43	575.35	92.96	0.34
1	-860	50 Yr	7090.00	911.88	926.46	921.84	927.02	0.002853	6.79	1957.10	571.56	0.36
1	-860	100 Yr	8136.00	911.88	926.97	922.60	927.53	0.002852	7.00	2249.64	576.99	0.36
1	-860	500 Yr	10037.00	911.88	927.80	925.65	928.37	0.002853	7.34	2731.33	585.83	0.37
1	-520	2 Yr	3110.00	913.03	924.23		924.68	0.002831	5.41	575.32	74.40	0.34
1	-520	50 Yr	7090.00	913.03	927.46		928.10	0.003081	7.09	1707.34	448.32	0.38
1	-520	100 Yr	8136.00	913.03	927.97		928.64	0.003152	7.39	1939.19	452.80	0.38
1	-520	500 Yr	10037.00	913.03	928.81		929.52	0.003262	7.88	2320.46	460.08	0.40
1	-40	2 Yr	2913.00	916.43	926.02		926.38	0.005346	6.19	1202.14	767.80	0.45
1	-40	50 Yr	6665.00	916.43	928.94		929.06	0.001663	4.53	3475.47	787.50	0.27
1	-40	100 Yr	7649.00	916.43	929.46		929.57	0.001573	4.58	3880.30	790.96	0.27
1	-40	500 Yr	9444.00	916.43	930.30		930.42	0.001477	4.70	4550.89	796.65	0.26
1	280	2 Yr	2913.00	917.30	927.32		927.69	0.003213	5.67	1016.13	445.94	0.36
1	280	50 Yr	6665.00	917.30	929.48		929.91	0.003621	7.07	2023.56	483.43	0.39
1	280	100 Yr	7649.00	917.30	929.96		930.40	0.003602	7.27	2258.42	490.76	0.40
1	280	500 Yr	9444.00	917.30	930.77		931.22	0.003570	7.61	2659.85	503.04	0.40
1	440	2 Yr	2913.00	917.41	927.77	924.17	928.23	0.003364	5.91	777.36	262.94	0.37
1	440	50 Yr	6665.00	917.41	929.86	928.25	930.71	0.005395	8.73	1375.44	309.65	0.48
1	440	100 Yr	7649.00	917.41	930.31	928.66	931.23	0.005686	9.23	1517.17	319.71	0.50
1	440	500 Yr	9444.00	917.41	931.06	929.36	932.09	0.006109	10.01	1764.25	337.28	0.52

HEC-RAS Version 4.0.0 March 2008
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Noonday Creek South
Project File : NoondayCreekSouth.prj
Run Date and Time: 6/2/2008 8:01:48 PM

Project in English units

PLAN DATA

Plan Title: FullV Urbran
Plan File : m:\TRA\31-6036 02 I-575\Hydraulics\Noonday Creek South\HEC-RAS\Preliminary 3\NoondayCreekSouth.p02

Geometry Title: Full Valley
Geometry File : m:\TRA\31-6036 02 I-575\Hydraulics\Noonday Creek South\HEC-RAS\Preliminary 3\NoondayCreekSouth.g02

Flow Title : Urban Flows 25%
Flow File : m:\TRA\31-6036 02 I-575\Hydraulics\Noonday Creek South\HEC-RAS\Preliminary 3\NoondayCreekSouth.f01

Plan Summary Information:
Number of: Cross Sections = 5 Multiple Openings = 0
Culverts = 0 Inline Structures = 0
Bridges = 0 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Urban Flows 25%
Flow File : m:\TRA\31-6036 02 I-575\Hydraulics\Noonday Creek South\HEC-RAS\Preliminary 3\NoondayCreekSouth.f01

Flow Data (cfs)

River	Reach	RS	2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr	500 Yr
Noonday Creek	So1	440	2913	4248	4743	5976	6665	7649	9444
Noonday Creek	So1	-520	3110	4527	5050	6363	7090	8136	10037

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Noonday Creek So1		2 Yr	Normal S = 0.00285	Normal S = 0.00285
Noonday Creek So1		5 Yr	Normal S = 0.00285	Normal S = 0.00285
Noonday Creek So1		10 Yr	Normal S = 0.00285	Normal S = 0.00285
Noonday Creek So1		25 Yr	Normal S = 0.00285	Normal S = 0.00285
Noonday Creek So1		50 Yr	Normal S = 0.00285	Normal S = 0.00285
Noonday Creek So1		100 Yr	Normal S = 0.00285	Normal S = 0.00285
Noonday Creek So1		500 Yr	Normal S = 0.00285	Normal S = 0.00285

GEOMETRY DATA

Geometry Title: Full Valley
Geometry File : m:\TRA\31-6036 02 I-575\Hydraulics\Noonday Creek South\HEC-RAS\Preliminary 3\NoondayCreekSouth.g02

CROSS SECTION

RIVER: Noonday Creek So
REACH: 1 RS: 440

INPUT
Description: Approach Section
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4663	941	4691	938	4728	934	4820	931	4896	927
4943	926	4951	925	4971	924.92	4979	919.56	5000	917.41
5018	920.53	5023	926.85	5135	925	5182	939	5208	943

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4663	.1	4971	.055	5023	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4971	5023	150	160	140	.1	.3

CROSS SECTION

RIVER: Noonday Creek So
REACH: 1 RS: 280

INPUT
Description: Upstream Bridge Section
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4787	940	4841	933	4887	928	4903	927	4941	926
4967	925	4976	924.97	4982	918.97	5000	917.3	5017	919.36
5025	926.26	5330	925	5420	940				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4787	.1	4976	.055	5025	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4976	5025	320	320	320	.1	.3

CROSS SECTION

RIVER: Noonday Creek So

REACH: 1 RS: -40

INPUT
Description: Downstream Bridge Section
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4720	940	4763	926	4861	925	4910	924	4976	923.14
4995	918.67	5000	916.43	5010	919.24	5024	924.52	5527	925
5582	940								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4720	.1	4976	.055	5024	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4976	5024	460	480	270	.1 .3

CROSS SECTION

RIVER: Noonday Creek So
REACH: 1 RS: -520

INPUT
Description: Exit Section - Removed Longitudinal embankment
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4828	940	4913	927	4943	925	4962	924.38	4981	914.24
5000	913.03	5016	913.63	5036	924.21	5065	925	5353	925
5403	948								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4828	.1	4962	.055	5036	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4962	5036	240	340	440	.1 .3

CROSS SECTION

RIVER: Noonday Creek So
REACH: 1 RS: -860

INPUT
Description: DS Section
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4775	940	4895	925	4933	923	4962	923.51	4981	913.37
5000	911.88	5016	912.76	5036	923.34	5451	925	5491	940

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4775	.1	4962	.055	5036	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4962	5036	0	0	0	.1 .3

SUMMARY OF MANNING'S N VALUES

River:Noonday Creek So

Reach	River Sta.	n1	n2	n3
1	440	.1	.055	.1
1	280	.1	.055	.1
1	-40	.1	.055	.1
1	-520	.1	.055	.1
1	-860	.1	.055	.1

SUMMARY OF REACH LENGTHS

River: Noonday Creek So

Reach	River Sta.	Left	Channel	Right
1	440	150	160	140
1	280	320	320	320
1	-40	460	480	270
1	-520	240	340	440
1	-860	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Noonday Creek So

Reach	River Sta.	Contr.	Expan.
1	440	.1	.3
1	280	.1	.3
1	-40	.1	.3
1	-520	.1	.3
1	-860	.1	.3

HEC-RAS EXISTING/PROPOSED BRIDGE MODEL

HEC-RAS Plan: Exist Urb River: Noonday Creek So Reach: 1

Reach	River Sta	Profile	Q Total	E.G. Elev	W.S. Elev	Crit W.S.	Frctn Loss	C & E Loss	Top Width	Q Left	Q Channel	Q Right	Vel Chnl	Vel Total	Flow Area
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(sq ft)
1	-520	2 Yr	3110.00	924.68	924.23		0.97	0.00	74.40		3110.00	0.00	5.41	5.41	575.32
1	-520	50 Yr	7090.00	928.39	927.33		1.22	0.15	165.29	130.71	6801.54	157.75	8.45	7.18	987.05
1	-520	100 Yr	8136.00	929.03	927.78		1.29	0.21	170.40	196.93	7719.57	219.50	9.21	7.66	1062.77
1	-520	500 Yr	10037.00	930.09	928.48		1.41	0.31	178.32	335.52	9357.19	344.30	10.52	8.47	1184.75
1	-40	2 Yr	2913.00	927.00	926.50	925.34	1.95	0.29	328.52	429.50	2241.18	242.32	7.42	4.87	598.10
1	-40	50 Yr	6665.00	930.74	930.36	927.46	1.95	0.58	340.38	1401.68	4078.25	1185.07	8.37	5.31	1254.12
1	-40	100 Yr	7649.00	931.53	931.04	927.89	2.08	0.57	342.47	1651.59	4571.90	1425.52	8.79	5.58	1369.96
1	-40	500 Yr	9444.00	932.85	932.09	928.61	2.33	0.46	345.70	2107.38	5475.38	1861.24	9.60	6.10	1548.47
1	120 BR D	2 Yr	2913.00	927.67	926.33	925.34	0.81	0.00	68.73	33.39	2866.37	13.23	10.15	9.32	312.56
1	120 BR D	50 Yr	6665.00	931.59	928.99	928.88	0.79	0.00	86.06	137.23	6367.37	160.40	15.51	12.87	517.83
1	120 BR D	100 Yr	7649.00	932.46	929.65	929.65	0.80	0.00	91.09	173.74	7252.81	222.45	16.40	13.27	576.21
1	120 BR D	500 Yr	9444.00	933.93	930.95	930.95	0.80	0.00	97.99	253.31	8821.26	369.44	17.49	13.50	699.42
1	120 BR U	2 Yr	2913.00	928.55	927.85	923.80	0.87	0.00	77.36	29.12	2862.56	21.32	6.75	6.11	477.12
1	120 BR U	50 Yr	6665.00	932.92	931.22	927.70	1.33	0.00	99.20	145.92	6323.25	195.84	10.73	8.56	778.64
1	120 BR U	100 Yr	7649.00	933.85	931.89	928.50	1.39	0.00	102.19	184.80	7205.54	258.66	11.59	9.04	845.76
1	120 BR U	500 Yr	9444.00	935.40	932.90	929.84	1.46	0.00	106.74	260.52	8803.70	379.78	13.11	9.92	952.05
1	280	2 Yr	2913.00	928.82	928.39	924.04	0.27	0.00	466.85	224.22	2492.51	196.26	5.68	3.96	735.29
1	280	50 Yr	6665.00	933.25	932.70	928.33	0.33	0.00	532.46	1046.22	4522.47	1096.32	6.96	4.54	1469.06
1	280	100 Yr	7649.00	934.19	933.62	928.81	0.34	0.00	545.46	1275.63	5020.25	1353.13	7.22	4.71	1624.72
1	280	500 Yr	9444.00	935.76	935.12	929.62	0.36	0.00	566.10	1698.80	5916.36	1828.84	7.70	5.02	1880.59
1	440	2 Yr	2913.00	929.17	928.92	924.17	0.35	0.00	288.73	302.13	2165.25	445.61	4.53	2.66	1095.49
1	440	50 Yr	6665.00	933.52	933.31	928.25	0.28	0.00	413.78	1519.00	3432.64	1713.36	4.86	2.56	2608.60
1	440	100 Yr	7649.00	934.46	934.25	928.66	0.27	0.00	440.40	1918.44	3698.70	2031.86	4.90	2.54	3012.50
1	440	500 Yr	9444.00	936.01	935.81	929.36	0.25	0.00	460.06	2705.55	4147.29	2591.16	4.96	2.54	3714.64

Plan: Exist Urb Noonday Creek So 1 RS: 120 Profile: 50 Yr

E.G. US. (ft)	933.25	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	932.70	E.G. Elev (ft)	932.92	931.59
Q Total (cfs)	6665.00	W.S. Elev (ft)	931.22	928.99
Q Bridge (cfs)	6665.00	Crit W.S. (ft)	927.70	928.88
Q Weir (cfs)		Max Chl Dpth (ft)	14.16	12.32
Weir Sta Lft (ft)		Vel Total (ft/s)	8.56	12.87
Weir Sta Rgt (ft)		Flow Area (sq ft)	778.64	517.83
Weir Submerg		Froude # Chl	0.55	0.93
Weir Max Depth (ft)		Specif Force (cu ft)	6237.53	4744.11
Min El Weir Flow (ft)	948.61	Hydr Depth (ft)	7.85	6.02
Min El Prs (ft)	946.41	W.P. Total (ft)	127.31	104.06
Delta EG (ft)	2.51	Conv. Total (cfs)	90515.9	51734.0
Delta WS (ft)	2.35	Top Width (ft)	99.20	86.06
BR Open Area (sq ft)	2634.12	Frctn Loss (ft)	1.33	0.79
BR Open Vel (ft/s)	12.87	C & E Loss (ft)	0.00	0.00
Coef of Q	0.99	Shear Total (lb/sq ft)	2.07	5.16
Br Sel Method	WSPRO	Power Total (lb/ft s)	17.72	66.37

Plan: Exist Urb Noonday Creek So 1 RS: 120 Profile: 100 Yr

E.G. US. (ft)	934.19	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	933.62	E.G. Elev (ft)	933.85	932.46
Q Total (cfs)	7649.00	W.S. Elev (ft)	931.89	929.65
Q Bridge (cfs)	7649.00	Crit W.S. (ft)	928.50	929.65
Q Weir (cfs)		Max Chl Dpth (ft)	14.83	12.98
Weir Sta Lft (ft)		Vel Total (ft/s)	9.04	13.27
Weir Sta Rgt (ft)		Flow Area (sq ft)	845.76	576.21
Weir Submerg		Froude # Chl	0.57	0.95
Weir Max Depth (ft)		Specif Force (cu ft)	7272.35	5622.36
Min El Weir Flow (ft)	948.61	Hydr Depth (ft)	8.28	6.33
Min El Prs (ft)	946.41	W.P. Total (ft)	133.24	111.93
Delta EG (ft)	2.67	Conv. Total (cfs)	99735.8	58989.1
Delta WS (ft)	2.58	Top Width (ft)	102.19	91.09
BR Open Area (sq ft)	2634.12	Frctn Loss (ft)	1.39	0.80
BR Open Vel (ft/s)	13.27	C & E Loss (ft)	0.00	0.00
Coef of Q	0.99	Shear Total (lb/sq ft)	2.33	5.40
Br Sel Method	WSPRO	Power Total (lb/ft s)	21.08	71.74

Plan: Exist Urb Noonday Creek So 1 RS: 120 Profile: 500 Yr

E.G. US. (ft)	935.76	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	935.12	E.G. Elev (ft)	935.40	933.93
Q Total (cfs)	9444.00	W.S. Elev (ft)	932.90	930.95
Q Bridge (cfs)	9444.00	Crit W.S. (ft)	929.84	930.95
Q Weir (cfs)		Max Chl Dpth (ft)	15.84	14.28
Weir Sta Lft (ft)		Vel Total (ft/s)	9.92	13.50
Weir Sta Rgt (ft)		Flow Area (sq ft)	952.05	699.42
Weir Submerg		Froude # Chl	0.62	0.95
Weir Max Depth (ft)		Specif Force (cu ft)	9195.26	7319.06
Min El Weir Flow (ft)	948.61	Hydr Depth (ft)	8.92	7.14
Min El Prs (ft)	946.41	W.P. Total (ft)	142.30	124.54
Delta EG (ft)	2.91	Conv. Total (cfs)	114610.4	74593.0
Delta WS (ft)	3.04	Top Width (ft)	106.74	97.99
BR Open Area (sq ft)	2634.12	Frctn Loss (ft)	1.46	0.80
BR Open Vel (ft/s)	13.50	C & E Loss (ft)	0.00	0.00

Plan: Exist Urb Noonday Creek So 1 RS: 120 Profile: 500 Yr (Continued)

Coef of Q	0.97	Shear Total (lb/sq ft)	2.84	5.62
Br Sel Method	WSPRO	Power Total (lb/ft s)	28.13	75.89

HEC-RAS Version 4.0.0 March 2008
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Noonday Creek South
Project File : NoondayCreekSouth.prj
Run Date and Time: 6/2/2008 8:01:40 PM

Project in English units

PLAN DATA

Plan Title: Existing Urban
Plan File : m:\TRA\31-6036 02 I-575\Hydraulics\Noonday Creek South\HEC-RAS\Preliminary 3\NoondayCreekSouth.p01

Geometry Title: Existing Conditions
Geometry File : m:\TRA\31-6036 02 I-575\Hydraulics\Noonday Creek South\HEC-RAS\Preliminary 3\NoondayCreekSouth.g01

Flow Title : Urban Flows 25%
Flow File : m:\TRA\31-6036 02 I-575\Hydraulics\Noonday Creek South\HEC-RAS\Preliminary 3\NoondayCreekSouth.f01

Plan Summary Information:

Number of:	Cross Sections	= 5	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 1	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	= 0.01
Critical depth calculation tolerance	= 0.01
Maximum number of iterations	= 20
Maximum difference tolerance	= 0.3
Flow tolerance factor	= 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Urban Flows 25%
Flow File : m:\TRA\31-6036 02 I-575\Hydraulics\Noonday Creek South\HEC-RAS\Preliminary 3\NoondayCreekSouth.f01

Flow Data (cfs)

River	Reach	RS	2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr	500 Yr
Noonday Creek	So1	440	2913	4248	4743	5976	6665	7649	9444
Noonday Creek	So1	-520	3110	4527	5050	6363	7090	8136	10037

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Noonday Creek So1		2 Yr	Normal S = 0.00285	Normal S = 0.00285
Noonday Creek So1		5 Yr	Normal S = 0.00285	Normal S = 0.00285
Noonday Creek So1		10 Yr	Normal S = 0.00285	Normal S = 0.00285
Noonday Creek So1		25 Yr	Normal S = 0.00285	Normal S = 0.00285
Noonday Creek So1		50 Yr	Normal S = 0.00285	Normal S = 0.00285
Noonday Creek So1		100 Yr	Normal S = 0.00285	Normal S = 0.00285
Noonday Creek So1		500 Yr	Normal S = 0.00285	Normal S = 0.00285

GEOMETRY DATA

Geometry Title: Existing Conditions
Geometry File : m:\TRA\31-6036 02 I-575\Hydraulics\Noonday Creek South\HEC-RAS\Preliminary 3\NoondayCreekSouth.g01

CROSS SECTION

RIVER: Noonday Creek So
REACH: 1 RS: 440

INPUT
Description: Approach Section
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4663	941	4691	938	4728	934	4820	931	4896	927
4943	926	4951	925	4971	924.92	4979	919.56	5000	917.41
5018	920.53	5023	926.85	5135	925	5182	939	5208	943

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4663	.1	4971	.055	5023	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4971	5023	150	160	140	.3	.5

CROSS SECTION

RIVER: Noonday Creek So
REACH: 1 RS: 280

INPUT
Description: Upstream Bridge Section
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4787	940	4841	933	4887	928	4903	927	4941	926
4967	925	4976	924.97	4982	918.97	5000	917.3	5017	919.36
5025	926.26	5330	925	5420	940				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4787	.1	4976	.055	5025	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4976	5025	320	320	320	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4787	4920	951.57	T
5090	5420	948.43	T

BRIDGE

RIVER: Noonday Creek So
REACH: 1 RS: 120

INPUT
Description: Existing Bridges
Distance from Upstream XS = 90
Deck/Roadway Width = 140
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 13

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4590	955.76		4690	954.46		4790	953.16	
4890	951.86		4920	951.57	0	4920	951.57	946.41
5090	949.81	945.03	5090	949.81	0	5190	949.06	0
5290	948.62		5390	948.43		5490	948.49	
5590	948.79							

Upstream Bridge Cross Section Data
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4787	939.76	4841	932.76	4887	927.76	4903	926.76	4941	925.76
4967	924.76	4976	924.73	4982	918.73	5000	917.06	5017	919.12
5025	926.02	5330	924.76	5420	939.76				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4787	.12	4976	.05	5025	.12

Bank Sta: Left Right Coeff Contr. Expan.
4976 5025 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4787	4920	951.57	T
5090	5420	948.43	T

Downstream Deck/Roadway Coordinates
num= 13

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4590	955.76		4690	954.46		4790	953.16	
4890	951.86		4920	951.57	0	4920	951.57	946.41
5090	949.81	945.03	5090	949.81	0	5190	949.06	0
5290	948.62		5390	948.43		5490	948.49	
5590	948.79							

Downstream Bridge Cross Section Data
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4720	940.24	4763	926.24	4861	925.24	4910	924.24	4976	923.38
4995	918.91	5000	916.67	5010	919.48	5024	924.76	5527	925.24
5582	940.24								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4720	.12	4976	.05	5024	.12

Bank Sta: Left Right Coeff Contr. Expan.
4976 5024 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4720	4920	951.57	T
5090	5582	948.43	T

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5090	6000	948.6

Upstream Embankment side slope = 2 horiz. to 1.0 vertical
Downstream Embankment side slope = 2 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Abutments = 2

```
Abutment Data
Upstream     num=       2
     Sta    Elev     Sta    Elev
    4920  946.41    4970  923.14
Downstream     num=       2
     Sta    Elev     Sta    Elev
    4920  946.41    4970  923.14

Abutment Data
Upstream     num=       3
     Sta    Elev     Sta    Elev     Sta    Elev
    5025  924.52    5055     930    5090  945.03
Downstream     num=       3
     Sta    Elev     Sta    Elev     Sta    Elev
    5025  924.52    5055     930    5090  945.03

Number of Piers =  2

Pier Data
Pier Station     Upstream=    4970    Downstream=    4970
Upstream     num=       2
    Width   Elev    Width   Elev
       3       0       3     951
Downstream     num=       2
    Width   Elev    Width   Elev
       3       0       3     951

Pier Data
Pier Station     Upstream=    5040    Downstream=    5040
Upstream     num=       2
    Width   Elev    Width   Elev
       3       0       3     951
Downstream     num=       2
    Width   Elev    Width   Elev
       3       0       3     951

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       W.S. Pro Method

  W.S.Pro Data
    Left Embankment
       El of the top of the embankment = 951.1
       El of the toe of the abutment   = 923
    Right Embankment
       El of the top of the embankment = 949.8
       El of the toe of the abutment   = 924.8
    Abtument Type                      = 3 Sloping abutments and sloping embankments
    Slope of abutments                 = 2
    Top with of embankment             = 140
    Centroid station of bridge opening =
    Wing Wall Type                     = No wing walls present
       Width                           =
       Angle                           =
       Radius                          =
    Guide Banks Type                   = No Guide Bank present
       Length                          =
       Offset                          =
       Angle                           =

Selected Low Flow Methods = W.S.Pro Method

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line
```

CROSS SECTION

RIVER: Noonday Creek So
REACH: 1 RS: -40

INPUT
Description: Downstream Bridge Section
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4720	940	4763	926	4861	925	4910	924	4976	923.14
4995	918.67	5000	916.43	5010	919.24	5024	924.52	5527	925
5582	940								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4720	.1	4976	.055	5024	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4976	5024	460	480	270	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4720	4920	951.57	T
5090	5582	948.43	T

Blocked Obstructions num= 1

Sta L	Sta R	Elev
5090	6000	948.6

CROSS SECTION

RIVER: Noonday Creek So
REACH: 1 RS: -520

INPUT
Description: Exit Section - Includes Longitudinal embankment
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4828	940	4913	927	4943	925	4962	924.38	4981	914.24
5000	913.03	5016	913.63	5036	924.21	5065	925	5175	948

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4828	.1	4962	.055	5036	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4962	5036	240	340	440	.1	.3

CROSS SECTION

RIVER: Noonday Creek So
REACH: 1 RS: -860

INPUT
Description: DS Section
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4775	940	4895	925	4933	923	4962	923.51	4981	913.37
5000	911.88	5016	912.76	5036	923.34	5451	925	5491	940

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4775	.1	4962	.055	5036	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4962	5036	0	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

River:Noonday Creek So

Reach	River Sta.	n1	n2	n3
1	440	.1	.055	.1

1	280	.1	.055	.1
1	120	Bridge		
1	-40	.1	.055	.1
1	-520	.1	.055	.1
1	-860	.1	.055	.1

SUMMARY OF REACH LENGTHS

River: Noonday Creek So

Reach	River Sta.	Left	Channel	Right
1	440	150	160	140
1	280	320	320	320
1	120	Bridge		
1	-40	460	480	270
1	-520	240	340	440
1	-860	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Noonday Creek So

Reach	River Sta.	Contr.	Expan.
1	440	.3	.5
1	280	.3	.5
1	120	Bridge	
1	-40	.3	.5
1	-520	.1	.3
1	-860	.1	.3

Section VI
FEMA HEC-2 Computer Model Output

DUPLICATE EFFECTIVE (DE)MODEL FLOODWAY

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	203.92	Natural	893.21		894.29	340.19	3218.68	13578.56	111.75		1947.70	2057.80	
Reach-1	203.92	Floodway	893.21	-0.01	894.29	290.00	3213.37	13584.33	111.31	1790.00	1947.70	2057.80	2080.00
Reach-1	776.77 NEW	Natural	894.66		894.84	839.76	4319.40	6299.09	6290.51		990.80	1057.56	
Reach-1	776.77 NEW	Floodway	894.65	0.00	894.94	590.00	5246.90	7363.54	4298.55	724.00	990.80	1057.56	1314.00
Reach-1	1621.49	Natural	894.97		895.67	928.32	1314.46	7660.29	7934.25		1974.98	2023.08	
Reach-1	1621.49	Floodway	894.96	0.00	896.15	600.00	1635.12	9153.26	6120.61	1800.00	1974.98	2023.08	2400.00
Reach-1	3153.49	Natural	897.84		899.14	441.64	3493.10	12720.85	695.05		1954.50	2041.10	
Reach-1	3153.49	Floodway	898.59	0.75	899.77	330.00	3388.07	12742.21	778.71	1765.00	1954.50	2041.10	2095.00
Reach-1	4576.80	Natural	901.63		902.45	343.98	1204.04	9750.79	5879.17		970.00	1030.00	
Reach-1	4576.80	Floodway	901.92	0.29	902.78	225.00	1216.74	9956.63	5660.64	930.00	970.00	1030.00	1155.00
Reach-1	4753.78	Natural	901.97		903.21	172.13	296.63	16327.63	209.74		938.80	1064.20	
Reach-1	4753.78	Floodway	902.27	0.30	903.50	140.00	180.62	16556.91	96.47	930.00	938.80	1064.20	1070.00
Reach-1	4858.98 BR D	Natural	902.38		903.91	119.40		17271.00			938.80	1064.20	
Reach-1	4858.98 BR D	Floodway	902.69	0.30	904.15	119.40		17271.00		930.00	938.80	1064.20	1070.00
Reach-1	4858.98 BR U	Natural	902.79		904.23	119.40		17271.00			938.80	1064.20	
Reach-1	4858.98 BR U	Floodway	903.06	0.27	904.46	119.40		17271.00		857.80	938.80	1064.20	1145.20
Reach-1	4958.98	Natural	904.22		904.70	287.40	4468.73	9243.17	3559.10		975.00	1040.00	
Reach-1	4958.98	Floodway	904.41	0.19	904.91	287.40	4392.20	9398.81	3480.00	857.80	975.00	1040.00	1145.20
Reach-1	5486.69 NEW	Natural	904.98		905.02	1320.08	5923.16	3122.35	8225.49		934.25	985.00	
Reach-1	5486.69 NEW	Floodway	905.19	0.22	905.32	610.00	5030.40	4548.25	7692.35	700.00	934.25	985.00	1310.00
Reach-1	5940.21	Natural	905.05		905.10	1796.48	7448.19	4232.39	5590.43		1968.00	2043.00	
Reach-1	5940.21	Floodway	905.35	0.30	905.47	736.00	5216.93	5738.93	6315.14	1670.00	1968.00	2043.00	2406.00
Reach-1	7286.45	Natural	905.32		905.59	697.23	4399.64	6463.77	6407.59		1965.50	2023.80	
Reach-1	7286.45	Floodway	905.79	0.47	906.24	460.00	5142.20	7950.74	4178.07	1735.00	1965.50	2023.80	2195.00
Reach-1	8445.73	Natural	906.06		907.26	385.56	2217.95	11359.20	3693.84		1961.40	2026.30	
Reach-1	8445.73	Floodway	906.93	0.87	907.99	290.00	2449.53	11234.63	3586.85	1875.00	1961.40	2026.30	2165.00
Reach-1	9055.09	Natural	907.50		908.46	197.00	3474.21	10285.70	3511.09		972.00	1028.00	
Reach-1	9055.09	Floodway	908.06	0.56	909.02	197.00	3363.22	10540.85	3366.94	903.00	972.00	1028.00	1100.00
Reach-1	9202.15 BR D	Natural	905.98		910.36	50.00		14423.00			972.00	1028.00	
Reach-1	9202.15 BR D	Floodway	906.69	0.71	910.73	50.00		14423.00		903.00	972.00	1028.00	1100.00

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	9202.15 BR U	Natural	907.31		911.08	50.00		14423.00			972.00	1028.00	
Reach-1	9202.15 BR U	Floodway	907.77	0.46	911.36	50.00		14423.00		903.00	972.00	1028.00	1090.00
Reach-1	9298.15	Natural	911.07		912.11	194.69	3368.99	9355.54	1698.47		980.00	1028.00	
Reach-1	9298.15	Floodway	911.29	0.21	912.33	187.00	3195.78	9451.92	1775.30	903.00	980.00	1028.00	1090.00
Reach-1	10400.82	Natural	912.93		913.25	466.18	4685.10	6560.65	3177.26		1980.00	2030.00	
Reach-1	10400.82	Floodway	913.12	0.18	913.50	285.00	3925.44	7017.25	3480.31	1865.00	1980.00	2030.00	2150.00
Reach-1	10946.58 NEW	Natural	912.91		913.91	285.89	2256.55	7443.31	4723.14		291.88	325.08	
Reach-1	10946.58 NEW	Floodway	913.14	0.24	914.18	215.00	1883.86	7561.21	4977.93	235.00	291.88	325.08	450.00
Reach-1	11699.91	Natural	914.24		914.46	545.28	5486.30	8251.12	685.58		1927.10	2018.10	
Reach-1	11699.91	Floodway	914.49	0.25	914.78	297.00	4474.39	9173.72	774.89	1773.00	1927.10	2018.10	2070.00
Reach-1	12336.76 NEW	Natural	914.55		914.57	1244.73	7104.38	2702.02	4616.60		1262.92	1321.01	
Reach-1	12336.76 NEW	Floodway	914.88	0.33	915.01	470.00	6797.25	4958.02	2667.73	972.00	1262.92	1321.01	1442.00
Reach-1	13462.07	Natural	914.66		914.71	813.10	5038.36	2469.30	6915.34		1978.30	2022.20	
Reach-1	13462.07	Floodway	915.22	0.55	915.29	520.00	5100.03	3105.07	6217.90	1760.00	1978.30	2022.20	2280.00
Reach-1	14756.18	Natural	914.85		914.88	1480.52	5541.58	2073.37	6808.05		1970.20	2021.00	
Reach-1	14756.18	Floodway	915.52	0.67	915.60	680.00	4187.40	3405.07	6830.54	1666.00	1970.20	2021.00	2346.00
Reach-1	16295.42	Natural	915.13		915.17	1304.41	5255.01	2807.90	6360.09		1965.00	2030.00	
Reach-1	16295.42	Floodway	916.00	0.87	916.04	750.00	4562.77	2833.33	7026.90	1660.00	1965.00	2030.00	2410.00
Reach-1	17413.80	Natural	915.59		915.63	1897.15	5158.67	2815.72	6448.62		1970.00	2040.00	
Reach-1	17413.80	Floodway	916.49	0.91	916.65	700.00	4553.14	4730.10	5139.76	1655.00	1970.00	2040.00	2355.00
Reach-1	17515.47	Natural	915.64		915.68	1898.79	5265.64	2827.87	6558.50		1970.00	2040.00	
Reach-1	17515.47	Floodway	916.61	0.97	916.77	700.00	4654.13	4753.21	5244.66	1655.00	1970.00	2040.00	2355.00
Reach-1	17641.44BR D	Natural	918.15		918.17	1494.10	4430.40	6421.11	3783.50		1949.60	2050.40	
Reach-1	17641.44BR D	Floodway	918.23	0.08	918.90	700.00	4557.76	6911.21	3171.28	1655.00	1949.60	2050.40	2355.00
Reach-1	17641.44BR U	Natural	918.15		918.17	1494.10	4430.40	6421.11	3783.50		1949.60	2050.40	
Reach-1	17641.44BR U	Floodway	918.69	0.53	918.90	550.00	4832.45	6716.62	3091.18	1648.00	1949.60	2050.40	2198.00
Reach-1	17748.44 NEW	Natural	918.15		918.17	1802.78	7812.77	1744.54	5094.69		1967.33	2029.17	
Reach-1	17748.44 NEW	Floodway	918.69	0.53	918.90	550.00	6696.83	4609.30	3345.87	1648.00	1967.33	2029.17	2198.00
Reach-1	17813.61	Natural	918.12		918.28	1252.38	8560.92	4090.99	2000.08		1980.00	2027.00	
Reach-1	17813.61	Floodway	918.72	0.60	919.13	530.00	5765.47	5828.48	3058.05	1654.00	1980.00	2027.00	2184.00

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	18146.32	Natural	918.51		918.75	627.74	9171.43	5170.71	309.86		1972.00	2028.00	
Reach-1	18146.32	Floodway	919.45	0.93	919.76	400.00	8280.93	5984.26	386.81	1650.00	1972.00	2028.00	2050.00
Reach-1	18651.90	Natural	919.04		919.70	518.83	2087.53	7117.65	5446.83		1980.00	2030.00	
Reach-1	18651.90	Floodway	920.05	1.00	920.63	390.00	2667.03	7069.48	4915.49	1795.00	1980.00	2030.00	2185.00
Reach-1	20340.54	Natural	922.07		922.33	769.63	3718.54	4870.16	6063.30		1967.10	2022.10	
Reach-1	20340.54	Floodway	922.86	0.79	923.30	400.00	1949.49	6066.54	6635.97	1895.00	1967.10	2022.10	2295.00
Reach-1	20788.78 NEW	Natural	922.69		923.13	516.55	1300.58	5672.85	7678.57		673.37	725.69	
Reach-1	20788.78 NEW	Floodway	923.66	0.97	924.13	370.00	1655.37	6096.97	6899.66	600.00	673.37	725.69	970.00
Reach-1	21440.00	Natural	923.73		923.90	721.73	10105.46	4351.59	194.95		1975.00	2030.00	
Reach-1	21440.00	Floodway	924.67	0.94	924.90	437.00	9475.94	4908.56	267.50	1623.00	1975.00	2030.00	2060.00
Reach-1	22221.01 NEW	Natural	924.25		924.31	1144.61	5271.26	2911.43	2927.31		988.66	1050.16	
Reach-1	22221.01 NEW	Floodway	925.23	0.98	925.30	800.00	6029.48	3133.54	1946.98	500.00	988.66	1050.16	1300.00
Reach-1	23217.96	Natural	923.97		926.33	150.66	2488.08	8123.30	498.62		980.00	1020.00	
Reach-1	23217.96	Floodway	924.96	1.00	927.13	100.00	2384.77	8226.74	498.49	935.00	980.00	1020.00	1035.00
Reach-1	23378.74BR D	Natural	925.64		927.61	120.60	2914.64	8382.44	619.92		980.00	1020.00	
Reach-1	23378.74BR D	Floodway	926.44	0.81	928.25	100.00	2894.27	8358.25	664.48	935.00	980.00	1020.00	1035.00
Reach-1	23378.74BR U	Natural	926.52		927.92	146.88	2092.56	8777.83	1046.61		980.00	1028.00	
Reach-1	23378.74BR U	Floodway	927.31	0.79	928.53	145.78	2136.70	8643.95	1136.35	870.00	980.00	1028.00	1070.00
Reach-1	23477.24	Natural	927.63		928.28	227.41	4009.69	6998.17	909.14		980.00	1028.00	
Reach-1	23477.24	Floodway	928.10	0.47	928.82	200.00	3533.00	7373.31	1010.69	870.00	980.00	1028.00	1070.00
Reach-1	24584.31	Natural	929.08		929.36	361.31	4482.29	7108.54	326.17		557.00	635.19	
Reach-1	24584.31	Floodway	929.60	0.52	929.96	260.00	3714.58	7852.94	349.48	400.00	557.00	635.19	660.00
Reach-1	24776.87 NEW	Natural	929.22		929.52	383.27	2871.79	4521.22	4523.99		641.15	683.91	
Reach-1	24776.87 NEW	Floodway	929.86	0.65	930.14	375.00	2982.05	4461.02	4473.93	505.00	641.15	683.91	880.00
Reach-1	24842.55BR D	Natural	929.13		929.66	342.80	3703.69	5694.58	2518.74		650.00	695.00	
Reach-1	24842.55BR D	Floodway	929.79	0.66	930.26	325.00	3674.77	5619.84	2622.39	505.00	650.00	695.00	880.00
Reach-1	24842.55BR U	Natural	929.25		929.77	343.35	3708.80	5673.81	2534.39		650.00	695.00	
Reach-1	24842.55BR U	Floodway	929.90	0.65	930.35	345.43	3731.70	5564.77	2620.52	450.00	650.00	695.00	880.00
Reach-1	24942.55 NEW	Natural	929.69		929.91	430.00	4004.05	4007.60	3905.35		642.06	683.63	
Reach-1	24942.55 NEW	Floodway	930.27	0.58	930.47	430.00	4007.32	4003.00	3906.69	450.00	642.06	683.63	880.00

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	26158.34	Natural	930.71		931.03	488.67	1174.78	7647.13	3095.09		1975.20	2077.70	
Reach-1	26158.34	Floodway	931.19	0.48	931.54	345.00	1121.40	8004.47	2791.13	1900.00	1975.20	2077.70	2245.00
Reach-1	27163.80	Natural	931.75		932.27	577.53	1405.09	5475.63	5036.28		970.00	1020.00	
Reach-1	27163.80	Floodway	932.17	0.42	933.02	313.00	1807.49	6637.58	3471.93	862.00	970.00	1020.00	1175.00
Reach-1	27924.79	Natural	933.39		935.22	115.96		11917.00			910.00	1073.00	
Reach-1	27924.79	Floodway	934.30	0.91	935.82	115.90		11917.00		934.40	910.00	1073.00	1050.30
Reach-1	28138.58BR D	Natural	934.59		936.02	121.53		11917.00			910.00	1073.00	
Reach-1	28138.58BR D	Floodway	935.11	0.52	936.42	115.90		11917.00		934.40	910.00	1073.00	1050.30
Reach-1	28138.58BR U	Natural	935.37		936.60	125.16		11917.00			910.00	1073.00	
Reach-1	28138.58BR U	Floodway	935.77	0.40	936.91	127.02		11917.00		900.00	910.00	1073.00	1075.00
Reach-1	28275.58	Natural	934.88		937.63	245.39	1913.32	8886.01	1117.68		982.00	1020.00	
Reach-1	28275.58	Floodway	935.26	0.38	937.91	175.00	1785.69	8918.79	1212.52	900.00	982.00	1020.00	1075.00
Reach-1	29014.22	Natural	939.35		940.48	259.80	4644.36	5639.33	1633.31		989.00	1015.00	
Reach-1	29014.22	Floodway	939.46	0.11	940.68	195.00	4330.96	5784.89	1801.16	880.00	989.00	1015.00	1075.00
Reach-1	29655.01	Natural	940.86		940.96	739.58	742.54	4116.67	7057.79		1968.90	2031.70	
Reach-1	29655.01	Floodway	941.11	0.25	941.28	500.00	976.64	5057.29	5883.08	1860.00	1968.90	2031.70	2360.00
Reach-1	30358.55 NEW	Natural	941.05		941.08	859.26	6832.24	2427.05	2657.71		818.99	872.40	
Reach-1	30358.55 NEW	Floodway	941.40	0.35	941.50	416.00	6251.35	3668.71	1996.94	530.00	818.99	872.40	946.00
Reach-1	31128.08	Natural	940.63		942.13	238.13	3825.69	6323.38	1767.93		989.00	1020.00	
Reach-1	31128.08	Floodway	941.29	0.67	942.76	200.00	3558.12	6429.73	1929.15	883.00	989.00	1020.00	1083.00
Reach-1	31244.21BR D	Natural	942.18		942.71	24.60		11917.00			913.00	1133.00	
Reach-1	31244.21BR D	Floodway	942.50	0.32	943.28	0.13		11917.00		883.00	913.00	1133.00	1083.00
Reach-1	31244.21BR U	Natural	942.59		943.12			11917.00			913.00	1133.00	
Reach-1	31244.21BR U	Floodway	942.82	0.24	944.50			11917.00		945.00	913.00	1133.00	1045.00
Reach-1	31353.71	Natural	942.10		944.21	151.46	1878.08	8493.62	1545.30		980.00	1018.00	
Reach-1	31353.71	Floodway	943.09	0.98	945.12	100.00	1796.20	8704.25	1416.56	945.00	980.00	1018.00	1045.00
Reach-1	32008.58	Natural	945.83		946.04	262.24	2640.06	4124.20	583.74		980.00	1028.00	
Reach-1	32008.58	Floodway	946.57	0.74	946.77	190.00	2641.28	4113.30	593.42	870.00	980.00	1028.00	1060.00
Reach-1	32395.49BR D	Natural	946.08		946.23	196.97		7348.00			880.00	1121.00	
Reach-1	32395.49BR D	Floodway	946.77	0.70	946.92	166.35		7348.00		870.00	880.00	1121.00	1060.00

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	32395.49BR U	Natural	946.10		946.25	197.12		7348.00			880.00	1121.00	
Reach-1	32395.49BR U	Floodway	946.79	0.69	946.94	165.00		7348.00		918.00	880.00	1121.00	1083.00
Reach-1	32499.49	Natural	945.97		946.46	227.00	1497.60	4692.74	1157.66		985.00	1021.00	
Reach-1	32499.49	Floodway	946.69	0.72	947.11	165.00	1553.91	4580.74	1213.34	918.00	985.00	1021.00	1083.00
Reach-1	32836.11	Natural	946.16		947.55	124.55	840.46	5524.57	982.97		990.00	1020.00	
Reach-1	32836.11	Floodway	946.85	0.69	948.01	115.00	952.91	5328.87	1066.22	945.00	990.00	1020.00	1060.00
Reach-1	32909.32	Natural	947.77		948.02	184.54		7348.00			891.00	1109.00	
Reach-1	32909.32	Floodway	948.09	0.32	948.40	130.00		7348.00		930.00	891.00	1109.00	1060.00
Reach-1	32976.16BR D	Natural	947.80		948.05	184.77		7348.00			891.00	1109.00	
Reach-1	32976.16BR D	Floodway	948.12	0.32	948.43	130.00		7348.00		930.00	891.00	1109.00	1060.00
Reach-1	32976.16BR U	Natural	947.86		948.11	185.18		7348.00			891.00	1109.00	
Reach-1	32976.16BR U	Floodway	948.15	0.29	948.50	120.00		7348.00		932.00	891.00	1109.00	1052.00
Reach-1	33046.16	Natural	947.90		948.15	185.42		7348.00			891.00	1109.00	
Reach-1	33046.16	Floodway	948.19	0.29	948.54	120.00		7348.00		932.00	891.00	1109.00	1052.00
Reach-1	33155.58	Natural	947.79		948.54	168.41	1924.96	4708.75	714.29		982.00	1015.00	
Reach-1	33155.58	Floodway	948.11	0.31	948.95	110.00	1757.29	4947.93	642.79	930.00	982.00	1015.00	1040.00
Reach-1	34068.65	Natural	949.68		950.18	264.51	922.46	4776.00	1649.54		980.00	1020.00	
Reach-1	34068.65	Floodway	950.08	0.40	950.67	120.00	813.72	5119.36	1414.92	950.00	980.00	1020.00	1070.00
Reach-1	34164.15	Natural	949.79		950.40	99.00	498.88	7630.60	404.52		967.00	1030.00	
Reach-1	34164.15	Floodway	950.23	0.44	950.84	99.00	405.45	7787.36	341.19	948.50	967.00	1030.00	1047.50
Reach-1	34250.29		Culvert										
Reach-1	34319.79	Natural	952.31		952.54	334.79	2853.50	3890.83	1789.67		985.00	1022.00	
Reach-1	34319.79	Floodway	952.60	0.29	952.86	223.00	2899.80	4033.80	1600.40	855.00	985.00	1022.00	1078.00
Reach-1	34887.32 NEW	Natural	952.79		952.84	686.41	5599.83	2102.08	832.09		481.60	514.97	
Reach-1	34887.32 NEW	Floodway	953.10	0.31	953.25	262.00	4285.83	3000.10	1248.07	328.00	481.60	514.97	590.00
Reach-1	35731.12	Natural	953.08		953.18	579.96	3787.01	2676.89	2070.10		1971.90	2009.50	
Reach-1	35731.12	Floodway	953.60	0.52	953.71	390.00	3742.67	2782.72	2008.61	1740.00	1971.90	2009.50	2130.00
Reach-1	36431.22	Natural	953.36		953.42	494.22	2519.54	1996.72	963.74		980.00	1020.00	
Reach-1	36431.22	Floodway	953.88	0.52	953.94	320.00	2376.22	2065.72	1038.06	800.00	980.00	1020.00	1120.00
Reach-1	36570.11	Natural	953.39		953.45	543.51	1265.93	3002.29	1211.78		962.00	1044.00	

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	36570.11	Floodway	953.91	0.52	953.98	360.00	1074.64	3173.21	1232.15	820.00	962.00	1044.00	1180.00
Reach-1	36665.49		Culvert										
Reach-1	36721.49	Natural	954.08		954.26	445.67	409.57	4637.51	432.92		952.00	1040.00	
Reach-1	36721.49	Floodway	954.90	0.82	955.09	180.00	264.25	4881.69	334.06	915.00	952.00	1040.00	1095.00
Reach-1	36788.68	Natural	954.16		954.30	368.80	732.63	1708.44	3054.93		990.00	1012.00	
Reach-1	36788.68	Floodway	954.96	0.80	955.13	180.00	935.62	1814.34	2746.04	940.00	990.00	1012.00	1120.00
Reach-1	37048.76 NEW	Natural	954.27		954.61	168.82	171.40	2031.41	3293.19		153.22	174.49	
Reach-1	37048.76 NEW	Floodway	955.05	0.78	955.43	135.00	205.78	2211.82	3078.40	138.00	153.22	174.49	273.00
Reach-1	37465.78	Natural	954.83		955.29	204.35	979.67	2615.95	1900.38		1992.00	2018.00	
Reach-1	37465.78	Floodway	955.59	0.75	956.13	125.00	1167.41	2857.96	1470.63	1945.00	1992.00	2018.00	2070.00
Reach-1	37664.34 NEW	Natural	955.36		955.60	217.78	628.73	1619.99	3247.28		155.62	172.96	
Reach-1	37664.34 NEW	Floodway	956.17	0.80	956.44	170.00	704.27	1748.87	3042.86	120.00	155.62	172.96	290.00
Reach-1	38162.53	Natural	955.77		955.79	729.36	396.79	812.97	4286.25		1990.00	2016.00	
Reach-1	38162.53	Floodway	956.61	0.83	956.63	470.00	481.75	916.39	4097.87	1930.00	1990.00	2016.00	2400.00
Reach-1	39106.84 NEW	Natural	955.93		956.19	345.09	1422.27	2188.70	1885.03		296.65	329.21	
Reach-1	39106.84 NEW	Floodway	956.74	0.81	957.04	230.00	1642.58	2429.02	1424.41	200.00	296.65	329.21	430.00
Reach-1	39458.26	Natural	955.84		957.47	123.71	1106.66	4016.97	372.37		980.00	1012.00	
Reach-1	39458.26	Floodway	956.77	0.92	958.17	100.00	990.22	4029.60	476.18	945.00	980.00	1012.00	1045.00
Reach-1	39777.89 NEW	Natural	957.97		958.20	176.62	483.47	4783.91	228.62		945.74	1033.93	
Reach-1	39777.89 NEW	Floodway	958.53	0.56	958.80	110.00	56.90	5231.65	207.45	940.00	945.74	1033.93	1050.00
Reach-1	40471.23		Culvert										
Reach-1	41077.23 NEW	Natural	959.93		960.06	184.34	230.28	5239.28	26.44		947.86	1061.88	
Reach-1	41077.23 NEW	Floodway	960.49	0.56	960.63	130.00	38.04	5432.64	25.32	940.00	947.86	1061.88	1070.00
Reach-1	41269.88	Natural	960.03		960.15	527.21	3428.12	1580.99	486.90		923.00	948.00	
Reach-1	41269.88	Floodway	960.56	0.53	960.71	380.00	3191.01	1734.74	570.25	605.00	923.00	948.00	985.00
Reach-1	42211.00	Natural	960.66		960.74	717.49	1073.75	1463.93	2958.32		1982.90	2017.60	
Reach-1	42211.00	Floodway	961.24	0.57	961.34	390.00	1353.47	1647.28	2495.26	1850.00	1982.90	2017.60	2240.00
Reach-1	42778.44	Natural	961.11		961.28	562.48	3435.08	1675.35	385.57		1986.00	2014.00	
Reach-1	42778.44	Floodway	961.69	0.58	962.00	300.00	2836.62	2113.56	545.82	1760.00	1986.00	2014.00	2060.00

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	43468.18	Natural	962.16		962.26	744.03	3145.22	1138.96	1211.82		1985.00	2009.00	
Reach-1	43468.18	Floodway	963.00	0.85	963.16	400.00	3137.52	1341.76	1016.72	1700.00	1985.00	2009.00	2100.00
Reach-1	44309.29	Natural	963.54		964.26	574.21	690.69	2230.15	1393.17		985.00	1015.00	
Reach-1	44309.29	Floodway	964.31	0.77	965.25	150.00	689.66	2572.49	1051.85	930.00	985.00	1015.00	1080.00
Reach-1	44436.54 NEW	Natural	965.10		966.82	184.00	587.05	2585.15	1559.80		994.06	1016.95	
Reach-1	44436.54 NEW	Floodway	965.10	-0.01	966.86	184.00	585.23	2613.29	1533.47	907.00	994.06	1016.95	1091.00
Reach-1	44531.77BR D	Natural	969.82		969.84	203.87	22.15	4704.32	7.65		969.00	1032.00	
Reach-1	44531.77BR D	Floodway	969.81	-0.02	969.83	179.98	19.35	4708.45	5.58	907.00	969.00	1032.00	1091.00
Reach-1	44531.77BR U	Natural	969.82		969.84	203.87	22.15	4704.32	7.65		969.00	1032.00	
Reach-1	44531.77BR U	Floodway	969.81	-0.02	969.83	189.63	18.63	4709.17	5.58	670.00	969.00	1032.00	1280.00
Reach-1	44631.27 NEW	Natural	969.82		969.83	686.58	1826.62	959.94	1945.44		978.99	1021.09	
Reach-1	44631.27 NEW	Floodway	969.81	-0.02	969.82	610.00	1777.19	1026.10	1928.71	670.00	978.99	1021.09	1280.00
Reach-1	44700.35	Natural	969.83		969.86	660.01	1682.00	1023.88	2026.13		985.00	1015.00	
Reach-1	44700.35	Floodway	969.81	-0.01	969.85	580.00	1746.67	1012.59	1972.74	700.00	985.00	1015.00	1280.00
Reach-1	45406.89	Natural	969.95		969.96	720.94	1950.43	727.78	87.79		977.00	1019.00	
Reach-1	45406.89	Floodway	969.93	-0.02	969.95	608.00	1969.11	730.12	66.77	430.00	977.00	1019.00	1038.00
Reach-1	45689.70 NEW	Natural	969.91		970.14	121.00	914.21	725.59	1126.20		1995.75	2005.59	
Reach-1	45689.70 NEW	Floodway	969.89	-0.02	970.13	121.00	915.76	756.08	1094.16	1939.00	1995.75	2005.59	2060.00
Reach-1	45777 BR D	Natural	967.40		970.14		0.62	2764.77	0.61		1978.50	2021.50	
Reach-1	45777 BR D	Floodway	967.40	0.00	970.13		0.62	2764.77	0.61	1939.00	1978.50	2021.50	2060.00
Reach-1	45777 BR U	Natural	967.40		971.33	40.00		2766.00			1978.50	2021.50	
Reach-1	45777 BR U	Floodway	967.40	0.00	971.31	40.00		2766.00		1935.00	1978.50	2021.50	2060.00
Reach-1	45868.71 NEW	Natural	971.06		971.34	121.00	724.16	1309.36	732.49		1987.98	2014.36	
Reach-1	45868.71 NEW	Floodway	971.02	-0.04	971.32	121.00	738.00	1338.47	689.54	1935.00	1987.98	2014.36	2060.00
Reach-1	46058.02	Natural	971.43		971.43	1274.48	1833.52	356.53	575.95		1005.50	1040.36	
Reach-1	46058.02	Floodway	971.45	0.02	971.50	300.00	970.51	1018.65	776.85	853.00	1005.50	1040.36	1153.00
Reach-1	46186.37	Natural	971.36		971.49	425.37	1588.00	1008.56	479.44		397.11	425.64	
Reach-1	46186.37	Floodway	971.45	0.09	971.62	240.00	1609.49	1128.45	338.06	240.00	397.11	425.64	480.00
Reach-1	46509.26	Natural	971.75		972.38	262.25	249.82	2408.10	418.08		980.00	1020.00	
Reach-1	46509.26	Floodway	971.92	0.18	972.52	170.00	286.02	2395.47	394.52	909.00	980.00	1020.00	1079.00

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	46728.27BR D	Natural	973.27		973.81	229.70	1810.76	597.55	665.29		992.00	1009.00	
Reach-1	46728.27BR D	Floodway	973.43	0.15	974.46	170.00	1531.91	455.53	1089.22	909.00	992.00	1009.00	1079.00
Reach-1	46728.27BR U	Natural	973.32		973.81	228.22	1799.10	612.18	662.32		992.00	1009.00	
Reach-1	46728.27BR U	Floodway	974.13	0.81	974.54	130.00	1528.69	441.65	1106.32	925.00	992.00	1009.00	1055.00
Reach-1	46822.27	Natural	973.32		973.81	228.26	688.97	2124.28	262.75		988.00	1022.00	
Reach-1	46822.27	Floodway	974.13	0.81	974.54	130.00	680.81	2091.52	303.67	925.00	988.00	1022.00	1055.00
Reach-1	47675.67	Natural	975.77		976.56	292.45	1126.82	1715.95	233.23		990.00	1010.00	
Reach-1	47675.67	Floodway	976.05	0.27	976.86	130.00	1068.24	1748.57	259.19	900.00	990.00	1010.00	1030.00
Reach-1	47926.60BR D	Natural	976.05		976.58	366.30	2614.09	259.12	103.64		992.00	1009.00	
Reach-1	47926.60BR D	Floodway	976.59	0.54	976.92	130.00	2538.80	376.61	98.81	900.00	992.00	1009.00	1030.00
Reach-1	47926.60BR U	Natural	976.17		976.58	410.12	2701.04	173.10	102.71		992.00	1009.00	
Reach-1	47926.60BR U	Floodway	976.59	0.43	976.92	218.59	2687.81	240.92	85.49	820.00	992.00	1009.00	1080.00
Reach-1	48121.10	Natural	976.17		976.58	376.93	760.73	2084.78	230.49		980.00	1020.00	
Reach-1	48121.10	Floodway	976.59	0.43	976.92	260.00	842.81	1973.68	259.51	820.00	980.00	1020.00	1080.00
Reach-1	48220.77	Natural	976.39		977.10	175.86	548.66	2301.98	225.37		980.00	1020.00	
Reach-1	48220.77	Floodway	976.75	0.36	977.35	167.00	578.01	2232.91	265.08	899.00	980.00	1020.00	1066.00
Reach-1	48358.25BR D	Natural	975.74		979.03	32.00		3076.00			980.00	1020.00	
Reach-1	48358.25BR D	Floodway	975.78	0.05	979.03	32.00		3076.00		899.00	980.00	1020.00	1066.00
Reach-1	48358.25BR U	Natural	980.41		981.40	38.00		3076.00			980.00	1026.00	
Reach-1	48358.25BR U	Floodway	980.39	-0.02	981.38	38.00		3076.00		899.00	980.00	1026.00	1107.00
Reach-1	48524.75	Natural	981.67		981.74	208.00	805.63	1449.88	820.49		980.00	1026.00	
Reach-1	48524.75	Floodway	981.65	-0.02	981.72	208.00	783.00	1500.03	792.97	899.00	980.00	1026.00	1107.00
Reach-1	48778.94	Natural	981.78		981.80	519.75	810.70	1060.55	1204.75		980.00	1026.00	
Reach-1	48778.94	Floodway	981.74	-0.03	981.80	250.00	690.01	1360.67	1025.32	900.00	980.00	1026.00	1150.00
Reach-1	49005.34 NEW	Natural	981.81		981.85	396.63	69.67	852.29	1512.03		986.57	1016.40	
Reach-1	49005.34 NEW	Floodway	981.81	-0.01	981.86	233.00	85.51	984.96	1363.53	967.00	986.57	1016.40	1200.00
Reach-1	49069		Culvert										
Reach-1	49133.73 NEW	Natural	982.36		982.39	368.50	53.21	1268.27	1112.53		980.14	1037.69	
Reach-1	49133.73 NEW	Floodway	982.40	0.05	982.46	185.00	25.99	1557.13	850.87	974.00	980.14	1037.69	1159.00
Reach-1	49234.85	Natural	982.37		982.40	344.69	146.15	912.85	1375.00		980.00	1020.00	

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	49234.85	Floodway	982.42	0.05	982.48	195.00	166.33	1155.47	1112.20	945.00	980.00	1020.00	1140.00
Reach-1	49847.50 NEW	Natural	982.52		982.59	260.52	285.74	514.03	1634.23		278.08	294.74	
Reach-1	49847.50 NEW	Floodway	982.65	0.13	982.72	220.00	299.83	522.37	1611.79	230.00	278.08	294.74	450.00
Reach-1	50185.30	Natural	982.79		982.89	338.68	747.39	974.57	712.05		374.16	407.90	
Reach-1	50185.30	Floodway	982.91	0.13	983.10	200.00	382.53	1199.03	852.43	331.00	374.16	407.90	531.00
Reach-1	51158.38 AD	Natural	984.42		985.02	305.21	518.39	1883.87	31.74		745.43	789.74	
Reach-1	51158.38 AD	Floodway	985.06	0.64	985.67	116.00	369.84	2011.25	52.92	688.00	745.43	789.74	804.00
Reach-1	51636.06 NEW	Natural	986.76		987.15	276.19	603.57	1771.70	58.73		329.93	377.67	
Reach-1	51636.06 NEW	Floodway	987.15	0.39	987.61	150.00	413.92	1945.38	74.70	245.00	329.93	377.67	395.00
Reach-1	52150.00	Natural	989.12		989.94	226.72	1040.75	1266.31	126.94		1984.00	2008.00	
Reach-1	52150.00	Floodway	989.41	0.29	990.43	150.00	836.77	1413.18	184.05	1900.00	1984.00	2008.00	2050.00
Reach-1	53057.03	Natural	993.30		993.51	359.83	439.57	1181.86	812.57		985.00	1020.00	
Reach-1	53057.03	Floodway	993.83	0.54	994.11	150.00	409.71	1359.83	664.46	940.00	985.00	1020.00	1090.00
Reach-1	53908.67	Natural	994.86		994.95	286.32	93.11	488.66	165.24		979.00	1020.00	
Reach-1	53908.67	Floodway	995.48	0.62	995.65	60.00	30.94	673.56	42.50	970.00	979.00	1020.00	1030.00
Reach-1	54001.22 NEW	Natural	997.28		998.40	67.00	29.35	652.27	65.38		991.57	1008.72	
Reach-1	54001.22 NEW	Floodway	997.29	0.00	998.41	67.00	29.48	653.91	63.60	966.00	991.57	1008.72	1033.00
Reach-1	54194.68		Culvert										
Reach-1	54469.68 AF	Natural	1014.62		1014.63	67.00	66.20	603.92	76.88		977.57	1019.12	
Reach-1	54469.68 AF	Floodway	1014.62	0.00	1014.63	67.00	40.19	656.48	50.33	966.00	977.57	1019.12	1033.00
Reach-1	54818.60	Natural	1014.63		1014.63	489.84	835.88	707.88	917.24		1980.00	2020.00	
Reach-1	54818.60	Floodway	1014.63	0.00	1014.63	360.00	834.91	718.28	907.81	1835.00	1980.00	2020.00	2195.00
Reach-1	54941.18		Culvert										
Reach-1	55057.68	Natural	1014.66		1014.66	837.95	1295.49	266.37	899.14		1990.00	2010.00	
Reach-1	55057.68	Floodway	1014.64	-0.02	1014.65	240.00	695.13	498.91	1266.95	1914.00	1990.00	2010.00	2154.00
Reach-1	55096.61	Natural	1014.66		1014.66	800.81	1233.71	620.67	606.61		1977.10	2026.90	
Reach-1	55096.61	Floodway	1014.64	-0.02	1014.66	160.00	598.12	1302.86	560.02	1920.00	1977.10	2026.90	2080.00
Reach-1	55342.61	Natural	1014.66		1014.67	766.09	1148.86	690.22	621.92		1977.10	2026.90	
Reach-1	55342.61	Floodway	1014.67	0.01	1014.68	260.00	767.29	955.27	738.44	1872.00	1977.10	2026.90	2132.00

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	55522.33		Culvert										
Reach-1	55668.33	Natural	1014.67		1014.68	755.26	1148.21	565.12	747.67		1977.10	2011.70	
Reach-1	55668.33	Floodway	1014.69	0.02	1014.70	319.00	1034.17	672.46	754.37	1805.00	1977.10	2011.70	2124.00
Reach-1	55788.73	Natural	1014.68		1014.70	317.78	1161.60	1241.44	57.96		1972.00	2028.00	
Reach-1	55788.73	Floodway	1014.70	0.02	1014.72	220.00	1106.99	1292.90	61.11	1828.00	1972.00	2028.00	2048.00
Reach-1	56569.00 NEW	Natural	1014.77		1014.93	122.66	729.53	1496.94	234.52		438.96	473.32	
Reach-1	56569.00 NEW	Floodway	1014.80	0.03	1014.96	120.00	687.41	1525.89	247.71	390.00	438.96	473.32	510.00
Reach-1	56629.59		Culvert										
Reach-1	56726.59 NEW	Natural	1018.40		1018.42	409.63	1172.71	889.39	398.90		436.30	474.36	
Reach-1	56726.59 NEW	Floodway	1018.86	0.46	1018.95	115.00	610.89	1550.69	299.42	390.00	436.30	474.36	505.00
Reach-1	56849.09	Natural	1018.43		1018.44	477.11	1853.95	425.99	181.06		1990.00	2010.00	
Reach-1	56849.09	Floodway	1018.98	0.56	1019.00	310.00	1786.59	458.73	215.69	1756.00	1990.00	2010.00	2066.00
Reach-1	57643.30	Natural	1018.69		1018.82	378.92	1002.39	952.83	505.78		1986.00	2011.00	
Reach-1	57643.30	Floodway	1019.22	0.53	1019.39	150.00	959.81	1061.93	439.26	1910.00	1986.00	2011.00	2060.00
Reach-1	57934.79	Natural	1019.18		1019.57	375.44	420.60	1505.29	535.10		990.00	1020.00	
Reach-1	57934.79	Floodway	1019.71	0.53	1020.10	130.00	392.05	1568.62	500.33	935.00	990.00	1020.00	1065.00
Reach-1	58289.38 NEW	Natural	1020.64		1021.71	92.49	237.00	2136.26	87.75		990.16	1024.66	
Reach-1	58289.38 NEW	Floodway	1020.98	0.35	1021.91	85.00	255.33	2100.13	105.54	951.00	990.16	1024.66	1036.00
Reach-1	58351.73BR D	Natural	1022.98		1023.15	347.91	645.19	1315.79	499.85		990.00	1013.00	
Reach-1	58351.73BR D	Floodway	1023.41	0.42	1023.92	85.00	424.25	1657.44	376.89	951.00	990.00	1013.00	1036.00
Reach-1	58351.73BR U	Natural	1022.98		1023.15	376.66	631.27	1315.89	513.67		990.00	1013.00	
Reach-1	58351.73BR U	Floodway	1023.41	0.42	1023.92	101.00	413.85	1618.96	425.78	951.00	990.00	1013.00	1052.00
Reach-1	58415.23	Natural	1022.98		1023.15	418.54	918.72	985.51	556.77		993.10	1012.70	
Reach-1	58415.23	Floodway	1023.41	0.42	1023.92	101.00	514.43	1489.17	457.41	951.00	993.10	1012.70	1052.00
Reach-1	58519.71	Natural	1023.03		1023.90	142.20	376.76	1422.36	661.88		294.42	311.84	
Reach-1	58519.71	Floodway	1023.88	0.85	1024.50	100.00	426.10	1332.89	702.01	260.00	294.42	311.84	360.00
Reach-1	58693.98 NEW	Natural	1025.03		1025.36	273.78	632.02	677.16	1151.82		363.74	373.51	
Reach-1	58693.98 NEW	Floodway	1025.18	0.15	1026.02	100.00	635.25	946.14	879.61	330.00	363.74	373.51	430.00

CORRECTED EFFECTIVE (CE) –
EXISTING/PROPOSED CONDITIONS MODEL
FLOODWAY

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	203.92	Natural	893.21		894.29	340.19	3218.68	13578.56	111.75		1947.70	2057.80	
Reach-1	203.92	Floodway	893.21	-0.01	894.29	290.00	3213.37	13584.33	111.31	1790.00	1947.70	2057.80	2080.00
Reach-1	776.77 NEW	Natural	894.66		894.84	839.76	4319.40	6299.09	6290.51		990.80	1057.56	
Reach-1	776.77 NEW	Floodway	894.65	0.00	894.94	590.00	5246.90	7363.54	4298.55	724.00	990.80	1057.56	1314.00
Reach-1	1621.49	Natural	894.97		895.67	928.32	1314.46	7660.29	7934.25		1974.98	2023.08	
Reach-1	1621.49	Floodway	894.96	0.00	896.15	600.00	1635.12	9153.26	6120.61	1800.00	1974.98	2023.08	2400.00
Reach-1	3153.49	Natural	897.84		899.14	441.64	3493.10	12720.85	695.05		1954.50	2041.10	
Reach-1	3153.49	Floodway	898.59	0.75	899.77	330.00	3388.07	12742.21	778.71	1765.00	1954.50	2041.10	2095.00
Reach-1	4576.80	Natural	901.63		902.45	343.98	1204.04	9750.79	5879.17		970.00	1030.00	
Reach-1	4576.80	Floodway	901.92	0.29	902.78	225.00	1216.74	9956.63	5660.64	930.00	970.00	1030.00	1155.00
Reach-1	4753.78	Natural	901.97		903.21	172.13	296.63	16327.63	209.74		938.80	1064.20	
Reach-1	4753.78	Floodway	902.27	0.30	903.50	140.00	180.62	16556.91	96.47	930.00	938.80	1064.20	1070.00
Reach-1	4858.98 BR D	Natural	902.38		903.91	119.40		17271.00			938.80	1064.20	
Reach-1	4858.98 BR D	Floodway	902.69	0.30	904.15	119.40		17271.00		930.00	938.80	1064.20	1070.00
Reach-1	4858.98 BR U	Natural	902.79		904.23	119.40		17271.00			938.80	1064.20	
Reach-1	4858.98 BR U	Floodway	903.06	0.27	904.46	119.40		17271.00		857.80	938.80	1064.20	1145.20
Reach-1	4958.98	Natural	904.22		904.70	287.40	4468.73	9243.17	3559.10		975.00	1040.00	
Reach-1	4958.98	Floodway	904.41	0.19	904.91	287.40	4392.20	9398.81	3480.00	857.80	975.00	1040.00	1145.20
Reach-1	5486.69 NEW	Natural	904.98		905.02	1320.08	5923.16	3122.35	8225.49		934.25	985.00	
Reach-1	5486.69 NEW	Floodway	905.19	0.22	905.32	610.00	5030.40	4548.25	7692.35	700.00	934.25	985.00	1310.00
Reach-1	5940.21	Natural	905.05		905.10	1796.48	7448.19	4232.39	5590.43		1968.00	2043.00	
Reach-1	5940.21	Floodway	905.35	0.30	905.47	736.00	5216.93	5738.93	6315.14	1670.00	1968.00	2043.00	2406.00
Reach-1	7286.45	Natural	905.32		905.59	697.23	4399.64	6463.77	6407.59		1965.50	2023.80	
Reach-1	7286.45	Floodway	905.79	0.47	906.24	460.00	5142.20	7950.74	4178.07	1735.00	1965.50	2023.80	2195.00
Reach-1	8445.73	Natural	906.06		907.26	385.56	2217.95	11359.20	3693.84		1961.40	2026.30	
Reach-1	8445.73	Floodway	906.93	0.87	907.99	290.00	2449.53	11234.63	3586.85	1875.00	1961.40	2026.30	2165.00
Reach-1	9055.09	Natural	907.50		908.46	197.00	3474.21	10285.70	3511.09		972.00	1028.00	
Reach-1	9055.09	Floodway	908.06	0.56	909.02	197.00	3363.22	10540.85	3366.94	903.00	972.00	1028.00	1100.00
Reach-1	9202.15 BR D	Natural	905.98		910.36	50.00		14423.00			972.00	1028.00	
Reach-1	9202.15 BR D	Floodway	906.69	0.71	910.73	50.00		14423.00		903.00	972.00	1028.00	1100.00

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	9202.15 BR U	Natural	907.31		911.08	50.00		14423.00			972.00	1028.00	
Reach-1	9202.15 BR U	Floodway	907.77	0.46	911.36	50.00		14423.00		903.00	972.00	1028.00	1090.00
Reach-1	9298.15	Natural	911.07		912.11	194.69	3368.99	9355.54	1698.47		980.00	1028.00	
Reach-1	9298.15	Floodway	911.29	0.21	912.33	187.00	3195.78	9451.92	1775.30	903.00	980.00	1028.00	1090.00
Reach-1	10400.82	Natural	912.93		913.25	466.18	4685.10	6560.65	3177.26		1980.00	2030.00	
Reach-1	10400.82	Floodway	913.12	0.18	913.50	285.00	3925.44	7017.25	3480.31	1865.00	1980.00	2030.00	2150.00
Reach-1	10946.58 NEW	Natural	912.91		913.91	285.89	2256.55	7443.31	4723.14		291.88	325.08	
Reach-1	10946.58 NEW	Floodway	913.14	0.24	914.18	215.00	1883.86	7561.21	4977.93	235.00	291.88	325.08	450.00
Reach-1	11699.91	Natural	914.24		914.46	545.28	5486.30	8251.12	685.58		1927.10	2018.10	
Reach-1	11699.91	Floodway	914.49	0.25	914.78	297.00	4474.39	9173.72	774.89	1773.00	1927.10	2018.10	2070.00
Reach-1	12336.76 NEW	Natural	914.55		914.57	1244.73	7104.38	2702.02	4616.60		1262.92	1321.01	
Reach-1	12336.76 NEW	Floodway	914.88	0.33	915.01	470.00	6797.25	4958.02	2667.73	972.00	1262.92	1321.01	1442.00
Reach-1	13462.07	Natural	914.66		914.71	813.10	5038.36	2469.30	6915.34		1978.30	2022.20	
Reach-1	13462.07	Floodway	915.22	0.55	915.29	520.00	5100.03	3105.07	6217.90	1760.00	1978.30	2022.20	2280.00
Reach-1	14756.18	Natural	914.85		914.88	1480.52	5541.58	2073.37	6808.05		1970.20	2021.00	
Reach-1	14756.18	Floodway	915.52	0.67	915.60	680.00	4187.40	3405.07	6830.54	1666.00	1970.20	2021.00	2346.00
Reach-1	16295.42	Natural	915.13		915.17	1304.41	5255.01	2807.90	6360.09		1965.00	2030.00	
Reach-1	16295.42	Floodway	916.00	0.87	916.04	750.00	4562.77	2833.33	7026.90	1660.00	1965.00	2030.00	2410.00
Reach-1	17413.80	Natural	915.59		915.63	1897.15	5158.67	2815.72	6448.62		1970.00	2040.00	
Reach-1	17413.80	Floodway	916.49	0.91	916.65	700.00	4553.14	4730.10	5139.76	1655.00	1970.00	2040.00	2355.00
Reach-1	17515.47	Natural	915.64		915.68	1898.79	5265.64	2827.87	6558.50		1970.00	2040.00	
Reach-1	17515.47	Floodway	916.61	0.97	916.77	700.00	4654.13	4753.21	5244.66	1655.00	1970.00	2040.00	2355.00
Reach-1	17641.44BR D	Natural	918.15		918.17	1494.10	4430.40	6421.11	3783.50		1949.60	2050.40	
Reach-1	17641.44BR D	Floodway	918.23	0.08	918.90	700.00	4557.76	6911.21	3171.28	1655.00	1949.60	2050.40	2355.00
Reach-1	17641.44BR U	Natural	918.15		918.17	1494.10	4430.40	6421.11	3783.50		1949.60	2050.40	
Reach-1	17641.44BR U	Floodway	918.69	0.53	918.90	550.00	4832.45	6716.62	3091.18	1648.00	1949.60	2050.40	2198.00
Reach-1	17748.44 NEW	Natural	918.15		918.17	1802.78	7812.77	1744.54	5094.69		1967.33	2029.17	
Reach-1	17748.44 NEW	Floodway	918.69	0.53	918.90	550.00	6696.83	4609.30	3345.87	1648.00	1967.33	2029.17	2198.00
Reach-1	17813.61	Natural	918.12		918.28	1252.38	8560.92	4090.99	2000.08		1980.00	2027.00	
Reach-1	17813.61	Floodway	918.72	0.60	919.13	530.00	5765.47	5828.48	3058.05	1654.00	1980.00	2027.00	2184.00

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	18146.32	Natural	918.51		918.75	627.74	9171.43	5170.71	309.86		1972.00	2028.00	
Reach-1	18146.32	Floodway	919.45	0.93	919.76	400.00	8280.93	5984.26	386.81	1650.00	1972.00	2028.00	2050.00
Reach-1	18651.90	Natural	919.04		919.70	518.83	2087.53	7117.65	5446.83		1980.00	2030.00	
Reach-1	18651.90	Floodway	920.05	1.00	920.63	390.00	2667.03	7069.48	4915.49	1795.00	1980.00	2030.00	2185.00
Reach-1	20340.54	Natural	922.07		922.33	769.63	3718.54	4870.16	6063.30		1967.10	2022.10	
Reach-1	20340.54	Floodway	922.86	0.79	923.30	400.00	1949.49	6066.54	6635.97	1895.00	1967.10	2022.10	2295.00
Reach-1	20788.78 NEW	Natural	922.69		923.13	516.55	1300.58	5672.85	7678.57		673.37	725.69	
Reach-1	20788.78 NEW	Floodway	923.66	0.97	924.13	370.00	1655.37	6096.97	6899.66	600.00	673.37	725.69	970.00
Reach-1	21440.00	Natural	923.73		923.90	721.73	10105.46	4351.59	194.95		1975.00	2030.00	
Reach-1	21440.00	Floodway	924.67	0.94	924.90	437.00	9475.94	4908.56	267.50	1623.00	1975.00	2030.00	2060.00
Reach-1	22221.01 NEW	Natural	924.25		924.31	1144.61	5271.26	2911.43	2927.31		988.66	1050.16	
Reach-1	22221.01 NEW	Floodway	925.23	0.98	925.30	800.00	6029.48	3133.54	1946.98	500.00	988.66	1050.16	1300.00
Reach-1	23217.96	Natural	923.97		926.33	150.66	2488.08	8123.30	498.62		980.00	1020.00	
Reach-1	23217.96	Floodway	924.96	1.00	927.13	100.00	2384.77	8226.74	498.49	935.00	980.00	1020.00	1035.00
Reach-1	23378.74BR D	Natural	925.64		927.61	120.60	2914.64	8382.44	619.92		980.00	1020.00	
Reach-1	23378.74BR D	Floodway	926.44	0.81	928.25	100.00	2894.27	8358.25	664.48	935.00	980.00	1020.00	1035.00
Reach-1	23378.74BR U	Natural	926.52		927.92	146.88	2092.56	8777.83	1046.61		980.00	1028.00	
Reach-1	23378.74BR U	Floodway	927.31	0.79	928.53	145.78	2136.70	8643.95	1136.35	870.00	980.00	1028.00	1070.00
Reach-1	23477.24	Natural	927.63		928.28	227.41	4009.69	6998.17	909.14		980.00	1028.00	
Reach-1	23477.24	Floodway	928.10	0.47	928.82	200.00	3533.00	7373.31	1010.69	870.00	980.00	1028.00	1070.00
Reach-1	24584.31	Natural	929.08		929.36	361.31	4482.29	7108.54	326.17		557.00	635.19	
Reach-1	24584.31	Floodway	929.60	0.52	929.96	260.00	3714.58	7852.94	349.48	400.00	557.00	635.19	660.00
Reach-1	24776.87 NEW	Natural	929.22		929.52	383.27	2871.79	4521.22	4523.99		641.15	683.91	
Reach-1	24776.87 NEW	Floodway	929.86	0.65	930.14	375.00	2982.05	4461.02	4473.93	505.00	641.15	683.91	880.00
Reach-1	24842.55BR D	Natural	929.13		929.66	342.80	3703.69	5694.58	2518.74		650.00	695.00	
Reach-1	24842.55BR D	Floodway	929.79	0.66	930.26	325.00	3674.77	5619.84	2622.39	505.00	650.00	695.00	880.00
Reach-1	24842.55BR U	Natural	929.25		929.77	343.35	3708.80	5673.81	2534.39		650.00	695.00	
Reach-1	24842.55BR U	Floodway	929.90	0.65	930.35	345.43	3731.70	5564.77	2620.52	450.00	650.00	695.00	880.00
Reach-1	24942.55 NEW	Natural	929.69		929.91	430.00	4004.05	4007.60	3905.35		642.06	683.63	
Reach-1	24942.55 NEW	Floodway	930.27	0.58	930.47	430.00	4007.32	4003.00	3906.69	450.00	642.06	683.63	880.00

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	26158.34	Natural	930.71		931.03	488.67	1174.78	7647.13	3095.09		1975.20	2077.70	
Reach-1	26158.34	Floodway	931.19	0.48	931.54	345.00	1121.40	8004.47	2791.13	1900.00	1975.20	2077.70	2245.00
Reach-1	27163.80	Natural	931.75		932.27	577.53	1405.09	5475.63	5036.28		970.00	1020.00	
Reach-1	27163.80	Floodway	932.17	0.42	933.02	313.00	1807.49	6637.58	3471.93	862.00	970.00	1020.00	1175.00
Reach-1	27924.79	Natural	933.39		935.22	115.96		11917.00			910.00	1073.00	
Reach-1	27924.79	Floodway	934.30	0.91	935.82	115.90		11917.00		934.40	910.00	1073.00	1050.30
Reach-1	28138.58BR D	Natural	934.59		936.02	121.53		11917.00			910.00	1073.00	
Reach-1	28138.58BR D	Floodway	935.11	0.52	936.42	115.90		11917.00		934.40	910.00	1073.00	1050.30
Reach-1	28138.58BR U	Natural	935.37		936.60	125.16		11917.00			910.00	1073.00	
Reach-1	28138.58BR U	Floodway	935.77	0.40	936.91	127.02		11917.00		900.00	910.00	1073.00	1075.00
Reach-1	28275.58	Natural	934.88		937.63	245.39	1913.32	8886.01	1117.68		982.00	1020.00	
Reach-1	28275.58	Floodway	935.26	0.38	937.91	175.00	1785.69	8918.79	1212.52	900.00	982.00	1020.00	1075.00
Reach-1	29014.22	Natural	939.35		940.48	259.80	4644.36	5639.33	1633.31		989.00	1015.00	
Reach-1	29014.22	Floodway	939.46	0.11	940.68	195.00	4330.96	5784.89	1801.16	880.00	989.00	1015.00	1075.00
Reach-1	29655.01	Natural	940.86		940.96	739.58	742.54	4116.67	7057.79		1968.90	2031.70	
Reach-1	29655.01	Floodway	941.11	0.25	941.28	500.00	976.64	5057.29	5883.08	1860.00	1968.90	2031.70	2360.00
Reach-1	30358.55 NEW	Natural	941.05		941.08	859.26	6832.24	2427.05	2657.71		818.99	872.40	
Reach-1	30358.55 NEW	Floodway	941.40	0.35	941.50	416.00	6251.35	3668.71	1996.94	530.00	818.99	872.40	946.00
Reach-1	31128.08	Natural	940.63		942.13	238.13	3825.69	6323.38	1767.93		989.00	1020.00	
Reach-1	31128.08	Floodway	941.29	0.67	942.76	200.00	3558.12	6429.73	1929.15	883.00	989.00	1020.00	1083.00
Reach-1	31244.21BR D	Natural	942.18		942.71	24.60		11917.00			913.00	1133.00	
Reach-1	31244.21BR D	Floodway	942.50	0.32	943.28	0.13		11917.00		883.00	913.00	1133.00	1083.00
Reach-1	31244.21BR U	Natural	942.59		943.12			11917.00			913.00	1133.00	
Reach-1	31244.21BR U	Floodway	942.82	0.24	944.50			11917.00		945.00	913.00	1133.00	1045.00
Reach-1	31353.71	Natural	942.10		944.21	151.46	1878.08	8493.62	1545.30		980.00	1018.00	
Reach-1	31353.71	Floodway	943.09	0.98	945.12	100.00	1796.20	8704.25	1416.56	945.00	980.00	1018.00	1045.00
Reach-1	32008.58	Natural	945.83		946.04	262.24	2640.06	4124.20	583.74		980.00	1028.00	
Reach-1	32008.58	Floodway	946.57	0.74	946.77	190.00	2641.28	4113.30	593.42	870.00	980.00	1028.00	1060.00
Reach-1	32395.49BR D	Natural	946.08		946.23	196.97		7348.00			880.00	1121.00	
Reach-1	32395.49BR D	Floodway	946.77	0.70	946.92	166.35		7348.00		870.00	880.00	1121.00	1060.00

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	32395.49BR U	Natural	946.10		946.25	197.12		7348.00			880.00	1121.00	
Reach-1	32395.49BR U	Floodway	946.79	0.69	946.94	165.00		7348.00		918.00	880.00	1121.00	1083.00
Reach-1	32499.49	Natural	945.97		946.46	227.00	1497.60	4692.74	1157.66		985.00	1021.00	
Reach-1	32499.49	Floodway	946.69	0.72	947.11	165.00	1553.91	4580.74	1213.34	918.00	985.00	1021.00	1083.00
Reach-1	32836.11	Natural	946.16		947.55	124.55	840.46	5524.57	982.97		990.00	1020.00	
Reach-1	32836.11	Floodway	946.85	0.69	948.01	115.00	952.91	5328.87	1066.22	945.00	990.00	1020.00	1060.00
Reach-1	32909.32	Natural	947.77		948.02	184.54		7348.00			891.00	1109.00	
Reach-1	32909.32	Floodway	948.09	0.32	948.40	130.00		7348.00		930.00	891.00	1109.00	1060.00
Reach-1	32976.16BR D	Natural	947.80		948.05	184.77		7348.00			891.00	1109.00	
Reach-1	32976.16BR D	Floodway	948.12	0.32	948.43	130.00		7348.00		930.00	891.00	1109.00	1060.00
Reach-1	32976.16BR U	Natural	947.86		948.11	185.18		7348.00			891.00	1109.00	
Reach-1	32976.16BR U	Floodway	948.15	0.29	948.50	120.00		7348.00		932.00	891.00	1109.00	1052.00
Reach-1	33046.16	Natural	947.90		948.15	185.42		7348.00			891.00	1109.00	
Reach-1	33046.16	Floodway	948.19	0.29	948.54	120.00		7348.00		932.00	891.00	1109.00	1052.00
Reach-1	33155.58	Natural	947.79		948.54	168.41	1924.96	4708.75	714.29		982.00	1015.00	
Reach-1	33155.58	Floodway	948.11	0.31	948.95	110.00	1757.29	4947.93	642.79	930.00	982.00	1015.00	1040.00
Reach-1	34068.65	Natural	949.68		950.18	264.51	922.46	4776.00	1649.54		980.00	1020.00	
Reach-1	34068.65	Floodway	950.08	0.40	950.67	120.00	813.72	5119.36	1414.92	950.00	980.00	1020.00	1070.00
Reach-1	34164.15	Natural	949.79		950.40	99.00	498.88	7630.60	404.52		967.00	1030.00	
Reach-1	34164.15	Floodway	950.23	0.44	950.84	99.00	405.45	7787.36	341.19	948.50	967.00	1030.00	1047.50
Reach-1	34250.29		Culvert										
Reach-1	34319.79	Natural	952.31		952.54	334.79	2853.50	3890.83	1789.67		985.00	1022.00	
Reach-1	34319.79	Floodway	952.60	0.29	952.86	223.00	2899.80	4033.80	1600.40	855.00	985.00	1022.00	1078.00
Reach-1	34887.32 NEW	Natural	952.79		952.84	686.41	5599.83	2102.08	832.09		481.60	514.97	
Reach-1	34887.32 NEW	Floodway	953.10	0.31	953.25	262.00	4285.83	3000.10	1248.07	328.00	481.60	514.97	590.00
Reach-1	35731.12	Natural	953.08		953.18	579.96	3787.01	2676.89	2070.10		1971.90	2009.50	
Reach-1	35731.12	Floodway	953.60	0.52	953.71	390.00	3742.67	2782.72	2008.61	1740.00	1971.90	2009.50	2130.00
Reach-1	36431.22	Natural	953.36		953.42	494.22	2519.54	1996.72	963.74		980.00	1020.00	
Reach-1	36431.22	Floodway	953.88	0.52	953.94	320.00	2376.22	2065.72	1038.06	800.00	980.00	1020.00	1120.00
Reach-1	36570.11	Natural	953.39		953.45	543.51	1265.93	3002.29	1211.78		962.00	1044.00	

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	36570.11	Floodway	953.91	0.52	953.98	360.00	1074.64	3173.21	1232.15	820.00	962.00	1044.00	1180.00
Reach-1	36665.49		Culvert										
Reach-1	36721.49	Natural	954.08		954.26	445.67	409.57	4637.51	432.92		952.00	1040.00	
Reach-1	36721.49	Floodway	954.90	0.82	955.09	180.00	264.25	4881.69	334.06	915.00	952.00	1040.00	1095.00
Reach-1	36788.68	Natural	954.16		954.30	368.80	732.63	1708.44	3054.93		990.00	1012.00	
Reach-1	36788.68	Floodway	954.96	0.80	955.13	180.00	935.62	1814.34	2746.04	940.00	990.00	1012.00	1120.00
Reach-1	37048.76 NEW	Natural	954.27		954.61	168.82	171.40	2031.41	3293.19		153.22	174.49	
Reach-1	37048.76 NEW	Floodway	955.05	0.78	955.43	135.00	205.78	2211.82	3078.40	138.00	153.22	174.49	273.00
Reach-1	37465.78	Natural	954.83		955.29	204.35	979.67	2615.95	1900.38		1992.00	2018.00	
Reach-1	37465.78	Floodway	955.59	0.75	956.13	125.00	1167.41	2857.96	1470.63	1945.00	1992.00	2018.00	2070.00
Reach-1	37664.34 NEW	Natural	955.36		955.60	217.78	628.73	1619.99	3247.28		155.62	172.96	
Reach-1	37664.34 NEW	Floodway	956.17	0.80	956.44	170.00	704.27	1748.87	3042.86	120.00	155.62	172.96	290.00
Reach-1	38162.53	Natural	955.77		955.79	729.36	396.79	812.97	4286.25		1990.00	2016.00	
Reach-1	38162.53	Floodway	956.61	0.83	956.63	470.00	481.75	916.39	4097.87	1930.00	1990.00	2016.00	2400.00
Reach-1	39106.84 NEW	Natural	955.93		956.19	345.09	1422.27	2188.70	1885.03		296.65	329.21	
Reach-1	39106.84 NEW	Floodway	956.74	0.81	957.04	230.00	1642.58	2429.02	1424.41	200.00	296.65	329.21	430.00
Reach-1	39458.26	Natural	955.84		957.47	123.71	1106.66	4016.97	372.37		980.00	1012.00	
Reach-1	39458.26	Floodway	956.77	0.92	958.17	100.00	990.22	4029.60	476.18	945.00	980.00	1012.00	1045.00
Reach-1	39777.89 NEW	Natural	957.97		958.20	176.62	483.47	4783.91	228.62		945.74	1033.93	
Reach-1	39777.89 NEW	Floodway	958.53	0.56	958.80	110.00	56.90	5231.65	207.45	940.00	945.74	1033.93	1050.00
Reach-1	40471.23		Culvert										
Reach-1	41077.23 NEW	Natural	959.93		960.06	184.34	230.28	5239.28	26.44		947.86	1061.88	
Reach-1	41077.23 NEW	Floodway	960.49	0.56	960.63	130.00	38.04	5432.64	25.32	940.00	947.86	1061.88	1070.00
Reach-1	41269.88	Natural	960.03		960.15	527.21	3428.12	1580.99	486.90		923.00	948.00	
Reach-1	41269.88	Floodway	960.56	0.53	960.71	380.00	3191.01	1734.74	570.25	605.00	923.00	948.00	985.00
Reach-1	42211.00	Natural	960.66		960.74	717.49	1073.75	1463.93	2958.32		1982.90	2017.60	
Reach-1	42211.00	Floodway	961.24	0.57	961.34	390.00	1353.47	1647.28	2495.26	1850.00	1982.90	2017.60	2240.00
Reach-1	42778.44	Natural	961.11		961.28	562.48	3435.08	1675.35	385.57		1986.00	2014.00	
Reach-1	42778.44	Floodway	961.69	0.58	962.00	300.00	2836.62	2113.56	545.82	1760.00	1986.00	2014.00	2060.00

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	43468.18	Natural	962.16		962.26	744.03	3145.22	1138.96	1211.82		1985.00	2009.00	
Reach-1	43468.18	Floodway	963.00	0.85	963.16	400.00	3137.52	1341.76	1016.72	1700.00	1985.00	2009.00	2100.00
Reach-1	44309.29	Natural	963.54		964.26	574.21	690.69	2230.15	1393.17		985.00	1015.00	
Reach-1	44309.29	Floodway	964.31	0.77	965.25	150.00	689.66	2572.49	1051.85	930.00	985.00	1015.00	1080.00
Reach-1	44436.54 NEW	Natural	965.10		966.82	184.00	587.05	2585.15	1559.80		994.06	1016.95	
Reach-1	44436.54 NEW	Floodway	965.10	-0.01	966.86	184.00	585.23	2613.29	1533.47	907.00	994.06	1016.95	1091.00
Reach-1	44531.77BR D	Natural	969.82		969.84	203.87	22.15	4704.32	7.65		969.00	1032.00	
Reach-1	44531.77BR D	Floodway	969.81	-0.02	969.83	179.98	19.35	4708.45	5.58	907.00	969.00	1032.00	1091.00
Reach-1	44531.77BR U	Natural	969.82		969.84	203.87	22.15	4704.32	7.65		969.00	1032.00	
Reach-1	44531.77BR U	Floodway	969.81	-0.02	969.83	189.63	18.63	4709.17	5.58	670.00	969.00	1032.00	1280.00
Reach-1	44631.27 NEW	Natural	969.82		969.83	686.58	1826.62	959.94	1945.44		978.99	1021.09	
Reach-1	44631.27 NEW	Floodway	969.81	-0.02	969.82	610.00	1777.19	1026.10	1928.71	670.00	978.99	1021.09	1280.00
Reach-1	44700.35	Natural	969.83		969.86	660.01	1682.00	1023.88	2026.13		985.00	1015.00	
Reach-1	44700.35	Floodway	969.81	-0.01	969.85	580.00	1746.67	1012.59	1972.74	700.00	985.00	1015.00	1280.00
Reach-1	45406.89	Natural	969.95		969.96	720.94	1950.43	727.78	87.79		977.00	1019.00	
Reach-1	45406.89	Floodway	969.93	-0.02	969.95	608.00	1969.11	730.12	66.77	430.00	977.00	1019.00	1038.00
Reach-1	45689.70 NEW	Natural	969.91		970.14	121.00	914.21	725.59	1126.20		1995.75	2005.59	
Reach-1	45689.70 NEW	Floodway	969.89	-0.02	970.13	121.00	915.76	756.08	1094.16	1939.00	1995.75	2005.59	2060.00
Reach-1	45777 BR D	Natural	967.40		970.14		0.62	2764.77	0.61		1978.50	2021.50	
Reach-1	45777 BR D	Floodway	967.40	0.00	970.13		0.62	2764.77	0.61	1939.00	1978.50	2021.50	2060.00
Reach-1	45777 BR U	Natural	967.40		971.33	40.00		2766.00			1978.50	2021.50	
Reach-1	45777 BR U	Floodway	967.40	0.00	971.31	40.00		2766.00		1935.00	1978.50	2021.50	2060.00
Reach-1	45868.71 NEW	Natural	971.06		971.34	121.00	724.16	1309.36	732.49		1987.98	2014.36	
Reach-1	45868.71 NEW	Floodway	971.02	-0.04	971.32	121.00	738.00	1338.47	689.54	1935.00	1987.98	2014.36	2060.00
Reach-1	46058.02	Natural	971.43		971.43	1274.48	1833.52	356.53	575.95		1005.50	1040.36	
Reach-1	46058.02	Floodway	971.45	0.02	971.50	300.00	970.51	1018.65	776.85	853.00	1005.50	1040.36	1153.00
Reach-1	46186.37	Natural	971.36		971.49	425.37	1588.00	1008.56	479.44		397.11	425.64	
Reach-1	46186.37	Floodway	971.45	0.09	971.62	240.00	1609.49	1128.45	338.06	240.00	397.11	425.64	480.00
Reach-1	46509.26	Natural	971.75		972.38	262.25	249.82	2408.10	418.08		980.00	1020.00	
Reach-1	46509.26	Floodway	971.92	0.18	972.52	170.00	286.02	2395.47	394.52	909.00	980.00	1020.00	1079.00

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	46728.27BR D	Natural	973.27		973.81	229.70	1810.76	597.55	665.29		992.00	1009.00	
Reach-1	46728.27BR D	Floodway	973.43	0.15	974.46	170.00	1531.91	455.53	1089.22	909.00	992.00	1009.00	1079.00
Reach-1	46728.27BR U	Natural	973.32		973.81	228.22	1799.10	612.18	662.32		992.00	1009.00	
Reach-1	46728.27BR U	Floodway	974.13	0.81	974.54	130.00	1528.69	441.65	1106.32	925.00	992.00	1009.00	1055.00
Reach-1	46822.27	Natural	973.32		973.81	228.26	688.97	2124.28	262.75		988.00	1022.00	
Reach-1	46822.27	Floodway	974.13	0.81	974.54	130.00	680.81	2091.52	303.67	925.00	988.00	1022.00	1055.00
Reach-1	47675.67	Natural	975.77		976.56	292.45	1126.82	1715.95	233.23		990.00	1010.00	
Reach-1	47675.67	Floodway	976.05	0.27	976.86	130.00	1068.24	1748.57	259.19	900.00	990.00	1010.00	1030.00
Reach-1	47926.60BR D	Natural	976.05		976.58	366.30	2614.09	259.12	103.64		992.00	1009.00	
Reach-1	47926.60BR D	Floodway	976.59	0.54	976.92	130.00	2538.80	376.61	98.81	900.00	992.00	1009.00	1030.00
Reach-1	47926.60BR U	Natural	976.17		976.58	410.12	2701.04	173.10	102.71		992.00	1009.00	
Reach-1	47926.60BR U	Floodway	976.59	0.43	976.92	218.59	2687.81	240.92	85.49	820.00	992.00	1009.00	1080.00
Reach-1	48121.10	Natural	976.17		976.58	376.93	760.73	2084.78	230.49		980.00	1020.00	
Reach-1	48121.10	Floodway	976.59	0.43	976.92	260.00	842.81	1973.68	259.51	820.00	980.00	1020.00	1080.00
Reach-1	48220.77	Natural	976.39		977.10	175.86	548.66	2301.98	225.37		980.00	1020.00	
Reach-1	48220.77	Floodway	976.75	0.36	977.35	167.00	578.01	2232.91	265.08	899.00	980.00	1020.00	1066.00
Reach-1	48358.25BR D	Natural	975.74		979.03	32.00		3076.00			980.00	1020.00	
Reach-1	48358.25BR D	Floodway	975.78	0.05	979.03	32.00		3076.00		899.00	980.00	1020.00	1066.00
Reach-1	48358.25BR U	Natural	980.41		981.40	38.00		3076.00			980.00	1026.00	
Reach-1	48358.25BR U	Floodway	980.39	-0.02	981.38	38.00		3076.00		899.00	980.00	1026.00	1107.00
Reach-1	48524.75	Natural	981.67		981.74	208.00	805.63	1449.88	820.49		980.00	1026.00	
Reach-1	48524.75	Floodway	981.65	-0.02	981.72	208.00	783.00	1500.03	792.97	899.00	980.00	1026.00	1107.00
Reach-1	48778.94	Natural	981.78		981.80	519.75	810.70	1060.55	1204.75		980.00	1026.00	
Reach-1	48778.94	Floodway	981.74	-0.03	981.80	250.00	690.01	1360.67	1025.32	900.00	980.00	1026.00	1150.00
Reach-1	49005.34 NEW	Natural	981.81		981.85	396.63	69.67	852.29	1512.03		986.57	1016.40	
Reach-1	49005.34 NEW	Floodway	981.81	-0.01	981.86	233.00	85.51	984.96	1363.53	967.00	986.57	1016.40	1200.00
Reach-1	49069		Culvert										
Reach-1	49133.73 NEW	Natural	982.36		982.39	368.50	53.21	1268.27	1112.53		980.14	1037.69	
Reach-1	49133.73 NEW	Floodway	982.40	0.05	982.46	185.00	25.99	1557.13	850.87	974.00	980.14	1037.69	1159.00
Reach-1	49234.85	Natural	982.37		982.40	344.69	146.15	912.85	1375.00		980.00	1020.00	

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

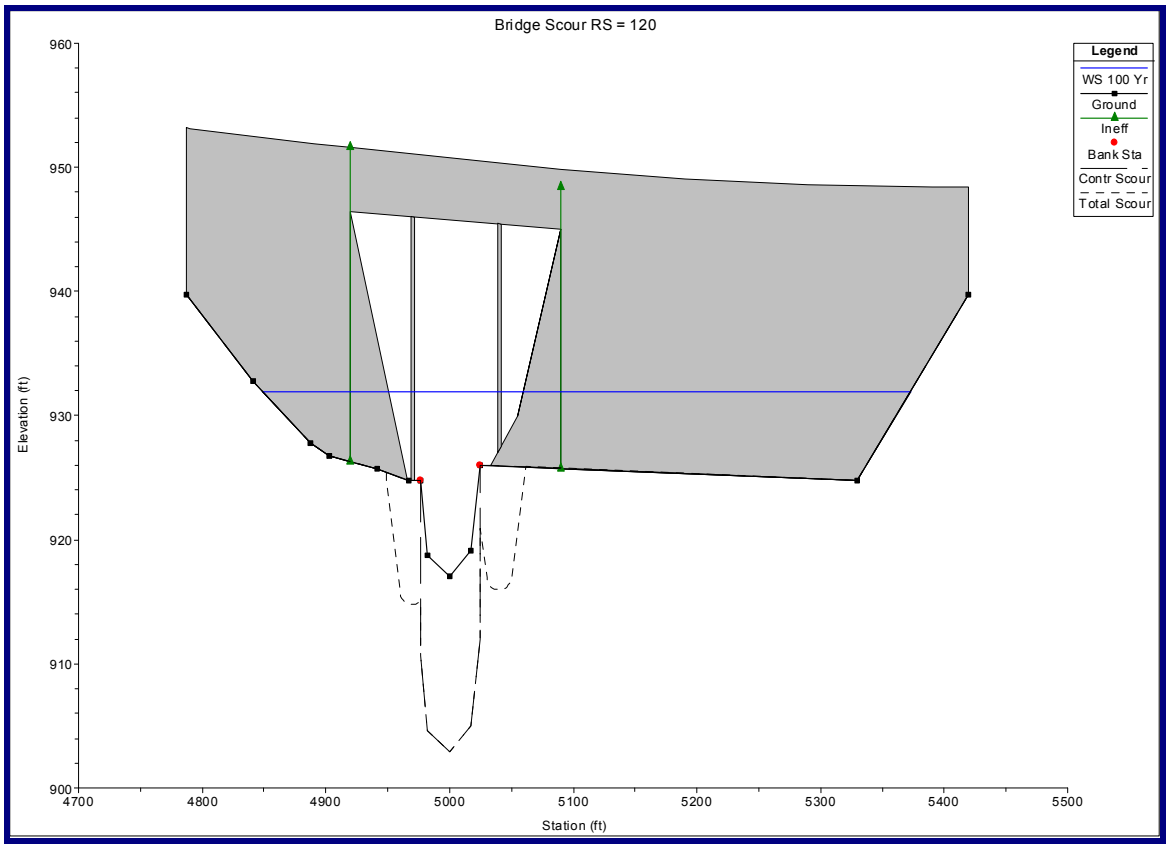
Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	49234.85	Floodway	982.42	0.05	982.48	195.00	166.33	1155.47	1112.20	945.00	980.00	1020.00	1140.00
Reach-1	49847.50 NEW	Natural	982.52		982.59	260.52	285.74	514.03	1634.23		278.08	294.74	
Reach-1	49847.50 NEW	Floodway	982.65	0.13	982.72	220.00	299.83	522.37	1611.79	230.00	278.08	294.74	450.00
Reach-1	50185.30	Natural	982.79		982.89	338.68	747.39	974.57	712.05		374.16	407.90	
Reach-1	50185.30	Floodway	982.91	0.13	983.10	200.00	382.53	1199.03	852.43	331.00	374.16	407.90	531.00
Reach-1	51158.38 AD	Natural	984.42		985.02	305.21	518.39	1883.87	31.74		745.43	789.74	
Reach-1	51158.38 AD	Floodway	985.06	0.64	985.67	116.00	369.84	2011.25	52.92	688.00	745.43	789.74	804.00
Reach-1	51636.06 NEW	Natural	986.76		987.15	276.19	603.57	1771.70	58.73		329.93	377.67	
Reach-1	51636.06 NEW	Floodway	987.15	0.39	987.61	150.00	413.92	1945.38	74.70	245.00	329.93	377.67	395.00
Reach-1	52150.00	Natural	989.12		989.94	226.72	1040.75	1266.31	126.94		1984.00	2008.00	
Reach-1	52150.00	Floodway	989.41	0.29	990.43	150.00	836.77	1413.18	184.05	1900.00	1984.00	2008.00	2050.00
Reach-1	53057.03	Natural	993.30		993.51	359.83	439.57	1181.86	812.57		985.00	1020.00	
Reach-1	53057.03	Floodway	993.83	0.54	994.11	150.00	409.71	1359.83	664.46	940.00	985.00	1020.00	1090.00
Reach-1	53908.67	Natural	994.86		994.95	286.32	93.11	488.66	165.24		979.00	1020.00	
Reach-1	53908.67	Floodway	995.48	0.62	995.65	60.00	30.94	673.56	42.50	970.00	979.00	1020.00	1030.00
Reach-1	54001.22 NEW	Natural	997.28		998.40	67.00	29.35	652.27	65.38		991.57	1008.72	
Reach-1	54001.22 NEW	Floodway	997.29	0.00	998.41	67.00	29.48	653.91	63.60	966.00	991.57	1008.72	1033.00
Reach-1	54194.68		Culvert										
Reach-1	54469.68 AF	Natural	1014.62		1014.63	67.00	66.20	603.92	76.88		977.57	1019.12	
Reach-1	54469.68 AF	Floodway	1014.62	0.00	1014.63	67.00	40.19	656.48	50.33	966.00	977.57	1019.12	1033.00
Reach-1	54818.60	Natural	1014.63		1014.63	489.84	835.88	707.88	917.24		1980.00	2020.00	
Reach-1	54818.60	Floodway	1014.63	0.00	1014.63	360.00	834.91	718.28	907.81	1835.00	1980.00	2020.00	2195.00
Reach-1	54941.18		Culvert										
Reach-1	55057.68	Natural	1014.66		1014.66	837.95	1295.49	266.37	899.14		1990.00	2010.00	
Reach-1	55057.68	Floodway	1014.64	-0.02	1014.65	240.00	695.13	498.91	1266.95	1914.00	1990.00	2010.00	2154.00
Reach-1	55096.61	Natural	1014.66		1014.66	800.81	1233.71	620.67	606.61		1977.10	2026.90	
Reach-1	55096.61	Floodway	1014.64	-0.02	1014.66	160.00	598.12	1302.86	560.02	1920.00	1977.10	2026.90	2080.00
Reach-1	55342.61	Natural	1014.66		1014.67	766.09	1148.86	690.22	621.92		1977.10	2026.90	
Reach-1	55342.61	Floodway	1014.67	0.01	1014.68	260.00	767.29	955.27	738.44	1872.00	1977.10	2026.90	2132.00

HEC-RAS Plan: FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	55522.33		Culvert										
Reach-1	55668.33	Natural	1014.67		1014.68	755.26	1148.21	565.12	747.67		1977.10	2011.70	
Reach-1	55668.33	Floodway	1014.69	0.02	1014.70	319.00	1034.17	672.46	754.37	1805.00	1977.10	2011.70	2124.00
Reach-1	55788.73	Natural	1014.68		1014.70	317.78	1161.60	1241.44	57.96		1972.00	2028.00	
Reach-1	55788.73	Floodway	1014.70	0.02	1014.72	220.00	1106.99	1292.90	61.11	1828.00	1972.00	2028.00	2048.00
Reach-1	56569.00 NEW	Natural	1014.77		1014.93	122.66	729.53	1496.94	234.52		438.96	473.32	
Reach-1	56569.00 NEW	Floodway	1014.80	0.03	1014.96	120.00	687.41	1525.89	247.71	390.00	438.96	473.32	510.00
Reach-1	56629.59		Culvert										
Reach-1	56726.59 NEW	Natural	1018.40		1018.42	409.63	1172.71	889.39	398.90		436.30	474.36	
Reach-1	56726.59 NEW	Floodway	1018.86	0.46	1018.95	115.00	610.89	1550.69	299.42	390.00	436.30	474.36	505.00
Reach-1	56849.09	Natural	1018.43		1018.44	477.11	1853.95	425.99	181.06		1990.00	2010.00	
Reach-1	56849.09	Floodway	1018.98	0.56	1019.00	310.00	1786.59	458.73	215.69	1756.00	1990.00	2010.00	2066.00
Reach-1	57643.30	Natural	1018.69		1018.82	378.92	1002.39	952.83	505.78		1986.00	2011.00	
Reach-1	57643.30	Floodway	1019.22	0.53	1019.39	150.00	959.81	1061.93	439.26	1910.00	1986.00	2011.00	2060.00
Reach-1	57934.79	Natural	1019.18		1019.57	375.44	420.60	1505.29	535.10		990.00	1020.00	
Reach-1	57934.79	Floodway	1019.71	0.53	1020.10	130.00	392.05	1568.62	500.33	935.00	990.00	1020.00	1065.00
Reach-1	58289.38 NEW	Natural	1020.64		1021.71	92.49	237.00	2136.26	87.75		990.16	1024.66	
Reach-1	58289.38 NEW	Floodway	1020.98	0.35	1021.91	85.00	255.33	2100.13	105.54	951.00	990.16	1024.66	1036.00
Reach-1	58351.73BR D	Natural	1022.98		1023.15	347.91	645.19	1315.79	499.85		990.00	1013.00	
Reach-1	58351.73BR D	Floodway	1023.41	0.42	1023.92	85.00	424.25	1657.44	376.89	951.00	990.00	1013.00	1036.00
Reach-1	58351.73BR U	Natural	1022.98		1023.15	376.66	631.27	1315.89	513.67		990.00	1013.00	
Reach-1	58351.73BR U	Floodway	1023.41	0.42	1023.92	101.00	413.85	1618.96	425.78	951.00	990.00	1013.00	1052.00
Reach-1	58415.23	Natural	1022.98		1023.15	418.54	918.72	985.51	556.77		993.10	1012.70	
Reach-1	58415.23	Floodway	1023.41	0.42	1023.92	101.00	514.43	1489.17	457.41	951.00	993.10	1012.70	1052.00
Reach-1	58519.71	Natural	1023.03		1023.90	142.20	376.76	1422.36	661.88		294.42	311.84	
Reach-1	58519.71	Floodway	1023.88	0.85	1024.50	100.00	426.10	1332.89	702.01	260.00	294.42	311.84	360.00
Reach-1	58693.98 NEW	Natural	1025.03		1025.36	273.78	632.02	677.16	1151.82		363.74	373.51	
Reach-1	58693.98 NEW	Floodway	1025.18	0.15	1026.02	100.00	635.25	946.14	879.61	330.00	363.74	373.51	430.00

Section VII
Scour Summary and Additional Calculations

Proposed 100-yr



Hydraulic Design Data
Contraction Scour

	Left	Channel	Right
Input Data			
Average Depth (ft):	4.81	14.52	7.52
Approach Velocity (ft/s):	1.62	4.90	1.89
Br Average Depth (ft):	4.63	12.69	3.92
BR Opening Flow (cfs):	184.80	7205.54	258.66
BR Top WD (ft):	21.79	49.00	31.39
Grain Size D50 (mm):	0.38	0.38	0.38
Approach Flow (cfs):	1918.44	3698.70	2031.86
Approach Top WD (ft):	245.34	52.00	143.06
K1 Coefficient:	0.690	0.690	0.690
Results			
Scour Depth Ys (ft):	0.00	14.10	0.00 **USE 1.0 ft minimum**
Critical Velocity (ft/s):	1.57	1.88	1.69
Equation:	Live	Live	Live

Pier Scour

All piers have the same scour depth

Input Data

Pier Shape:	Square nose
Pier Width (ft):	3.00
Grain Size D50 (mm):	0.38000
Depth Upstream (ft):	14.18
Velocity Upstream (ft/s):	7.22
K1 Nose Shape:	1.00
Pier Angle:	10.00
Pier Length (ft):	12.00
K2 Angle Coef:	1.40
K3 Bed Cond Coef:	1.10
Grain Size D90 (mm):	0.48000
K4 Armouring Coef:	1.00

Set K1 value to 1.0 because angle > 5 degrees

Results

Scour Depth Ys (ft):	9.98
Froude #:	0.34
Equation:	CSU equation

Combined Scour Depths

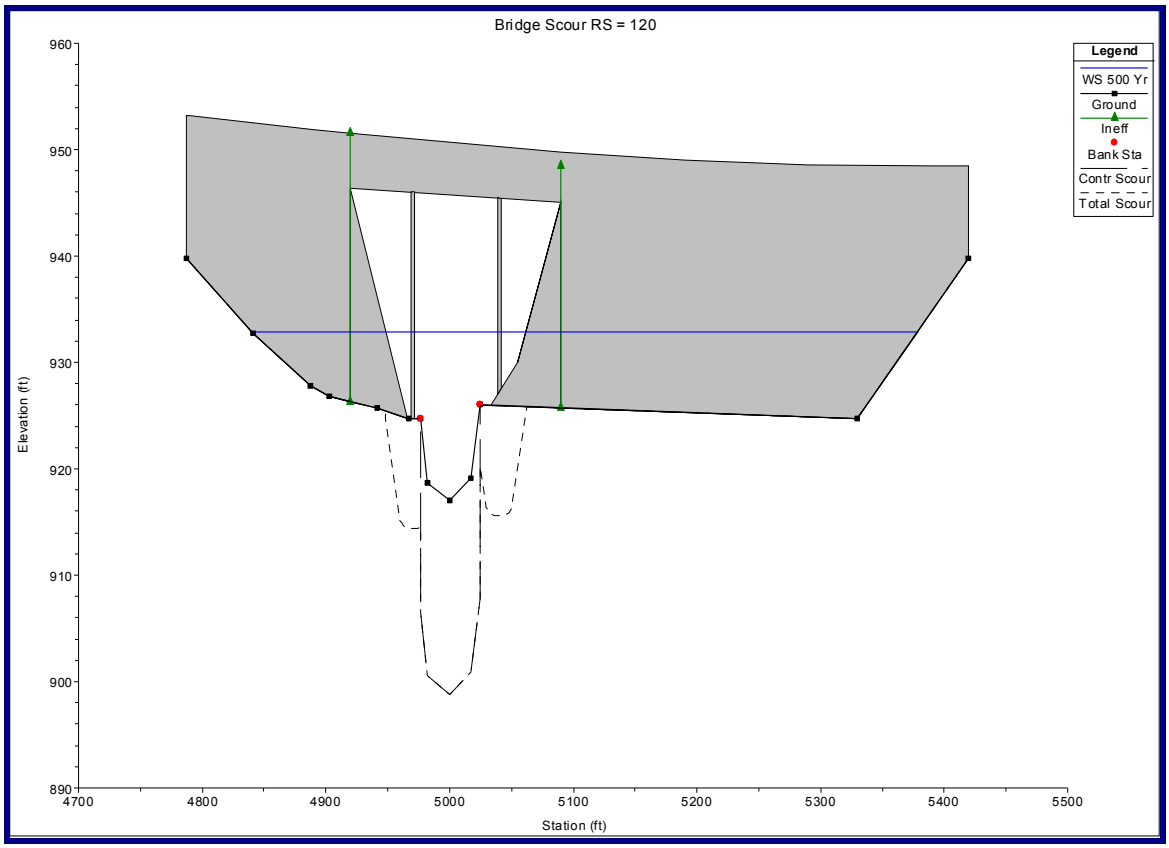
Pier Scour + Contraction Scour (ft):

Left Bank:	9.98
Right Bank:	9.98

Bent 2 = 11.0

Bent 3 = 24.1

Proposed 500-yr



Hydraulic Design Data
Contraction Scour

	Left	Channel	Right
Input Data			
Average Depth (ft):	6.06	16.08	8.79
Approach Velocity (ft/s):	1.72	4.96	1.99
Br Average Depth (ft):	5.18	13.71	4.63
BR Opening Flow (cfs):	260.52	8803.70	379.78
BR Top WD (ft):	23.98	49.00	33.76
Grain Size D50 (mm):	0.38	0.38	0.38
Approach Flow (cfs):	2705.55	4147.29	2591.16
Approach Top WD (ft):	259.76	52.00	148.30
K1 Coefficient:	0.690	0.690	0.690
Results			
Scour Depth Ys (ft):	0.00	18.22	0.08 **USE 1.0 ft minimum**
Critical Velocity (ft/s):	1.63	1.92	1.73
Equation:	Live	Live	Live

Pier Scour

All piers have the same scour depth

Input Data

Pier Shape:	Square nose
Pier Width (ft):	3.00
Grain Size D50 (mm):	0.38000
Depth Upstream (ft):	15.69
Velocity Upstream (ft/s):	7.70
K1 Nose Shape:	1.00
Pier Angle:	10.00
Pier Length (ft):	12.00
K2 Angle Coef:	1.40
K3 Bed Cond Coef:	1.10
Grain Size D90 (mm):	0.48000
K4 Armouring Coef:	1.00

Set K1 value to 1.0 because angle > 5 degrees

Results

Scour Depth Ys (ft):	10.40
Froude #:	0.34
Equation:	CSU equation

Combined Scour Depths

Pier Scour + Contraction Scour (ft):

Left Bank:	10.40
Right Bank:	10.48

Bent 2 = 11.4

Bent 3 = 28.6

RIPRAP CALCULATIONS

NH000-0575-01(028) Cobb County
I-575 over Noonday Creek - South
PI # 0008256

ENDROLL RIPRAP CALCULATIONS (100 YEAR STORM)
METHOD IN HEC-18,"EVALUATING SCOUR AT BRIDGES"

BRIDGE ABUTMENT LOCATION	122+07.24	123+77.24
SET BACK LENGTH =	0	0
MAIN CHANNEL AREA @ BRIDGE =	356	356
TOP WIDTH OF MAIN CHANNEL @ BRIDGE =	27	27
AVERAGE DEPTH OF MAIN CHANNEL @ BR =	7.8	7.8
SET BACK RATIO =	0.000	0.000
CHARACTERISTIC AVG VELOCITY CALCULATIONS (SEE PAGES 120,121)		
DISCHARGE @ ABUTMENT =	7649	7649
AREA @ ABUTMENT =	576	576
AVERAGE VELOCITY, V =	13.28	13.28
AREA OF OVERBANK FLOW @ BRIDGE =	80.28	71.22
LENGTH OF OVERBANK FLOW @ BRIDGE =	28.1	17.83
AVERAGE DEPTH OF OVERBANK FLOW =	2.86	3.99
FROUDE NUMBER =	1.385	1.171
IF FROUDE NUMBER <= 0.80, THEN D50 =	2.954	2.954
IF FROUDE NUMBER > 0.80, THEN D50 =	1.157	1.543
MEDIAN STONE DIAMETER REQUIRED, D50 =	1.157	1.543
TYPE OF RIPRAP REQUIRED =	TYPE 1	TYPE 1

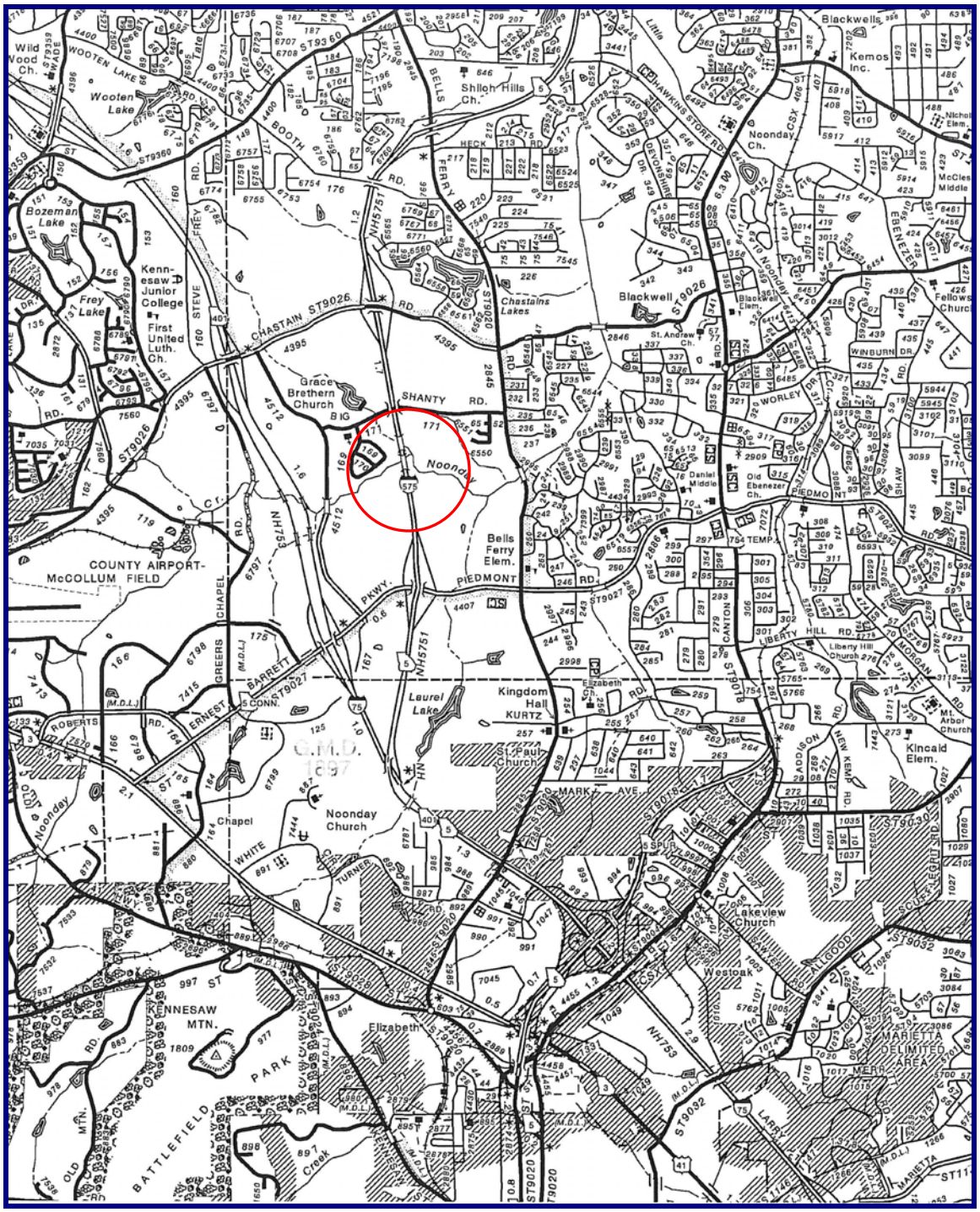
Note : Type I Riprap will be used at this site.

HEC-RAS Plan: Prop Urb River: Noonday Creek So Reach: 1 Profile: 100 Yr

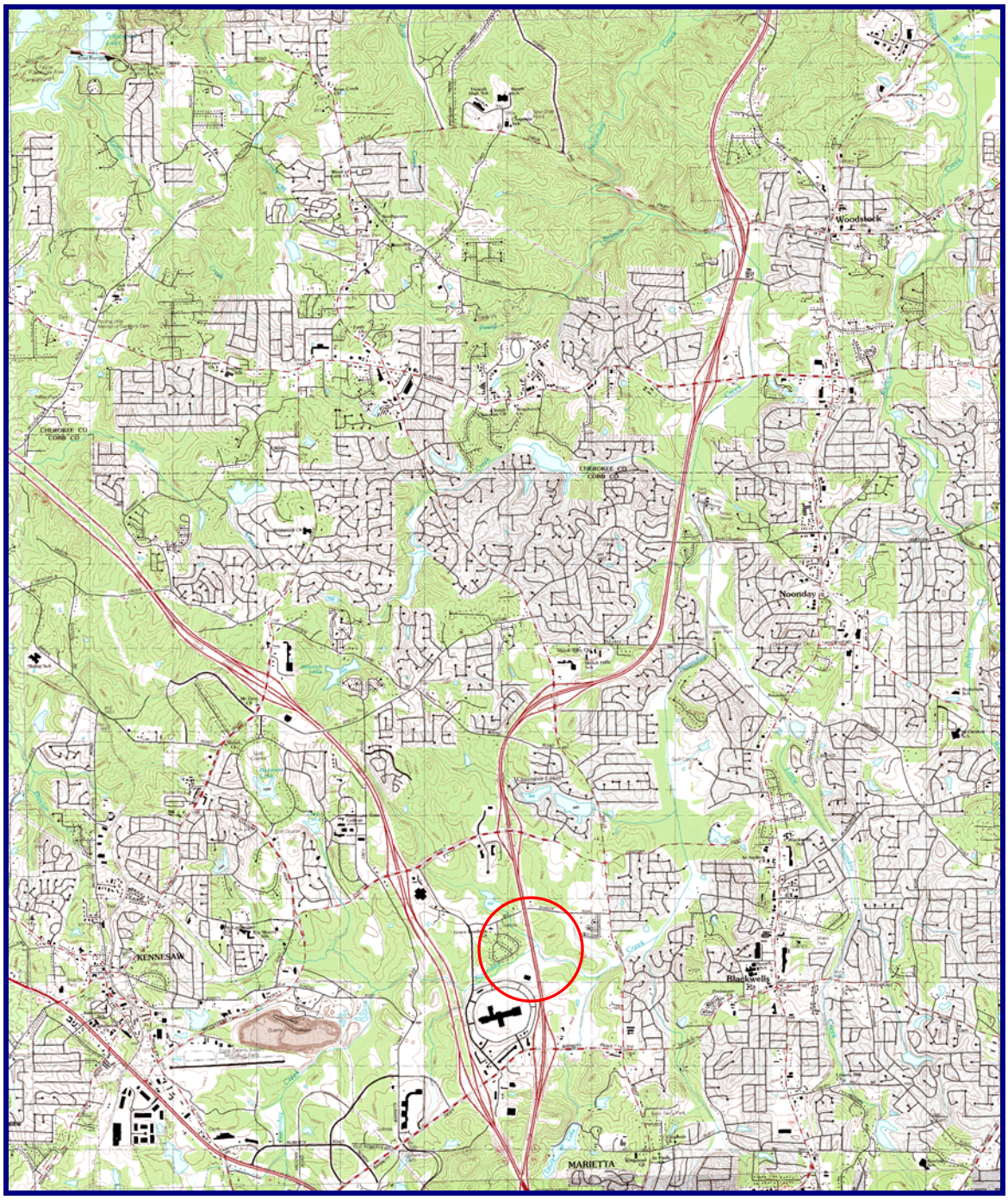
Reach	River Sta	Profile	W.S. Elev	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Top W Left	Top W Chnl	Top W Right	Flow Area L	Flow Area Ch	Flow Area R
			(ft)	(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(ft)	(ft)	(ft)	(sq ft)	(sq ft)	(sq ft)
1	-520	100 Yr	927.78	196.93	7719.57	219.50	1.73	9.21	1.99	54.10	74.00	42.30	114.11	838.10	110.56
1	-40	100 Yr	930.96	2403.56	4005.16	1240.28	3.34	7.75	2.93	228.25	48.00	66.00	719.29	516.68	423.26
1	120 BR D	100 Yr	929.65	173.74	7252.81	222.45	2.70	16.40	3.19	16.99	48.00	26.09	64.41	442.16	69.65
1	120 BR U	100 Yr	932.12	190.80	7188.09	270.11	1.80	11.35	2.07	22.29	49.00	31.93	105.96	633.22	130.38
1	280	100 Yr	933.86	1144.25	4403.52	2101.23	2.51	6.23	2.44	141.66	49.00	358.18	456.67	706.95	861.33
1	440	100 Yr	934.27	1921.44	3694.84	2032.72	1.62	4.89	1.88	245.48	52.00	143.12	1184.85	755.94	1078.65

Section VIII
Appendix

LOCATION MAPS



NH000-0575-01(028) Cobb County
I-575 over Noonday Creek South



NH000-0575-01(028) Cobb County
I-575 over Noonday Creek South

NH000-0575-01(028) Cobb County
I-575 over Noonday Creek South

PROJECT PHOTOGRAPHS

Looking north along the downstream side of the northbound bridge.

Looking upstream at the downstream side of the northbound bridge.

Looking upstream at the downstream side of the northbound bridge.

Looking downstream along the south bank; downstream of the northbound bridge.

Looking downstream/south along the northbound side of I-575.

Looking downstream from the northbound bridge. Note Manhole.

Looking straight down from bent three of the northbound bridge (downstream).

Looking downstream from the northbound bridge.

Looking at the south bank from the north end of the northbound bridge.

Looking upstream at the downstream side of the southbound bridge.

Looking south between the northbound and southbound bridges.

Looking upstream along the centerline of the proposed middle section of bent three.

Looking upstream from bent one of the southbound bridge.

Looking straight down from bent two of the southbound bridge (upstream).

Looking upstream from bent one of the southbound bridge.

Looking north along the upstream side of the southbound bridge.

Access panel located near bent one of the southbound bridge (upstream).

Looking downstream at bent two of the southbound bridge.

Looking downstream under span one of the southbound bridge.

Looking upstream from the downstream structure on Chastain Meadows Parkway.

Looking downstream from the downstream structure on Chastain Meadows Parkway.

Looking south along the upstream side of the downstream bridge.

Looking upstream from the upstream structure on George Busbee Parkway.

Looking downstream from the upstream bridge on George Busbee Parkway.

Looking north along the upstream side of the upstream bridge.

Looking south along George Busbee Parkway (upstream bridge).

FEMA DATA

NOTES TO USERS

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

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

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

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

The **projection** used in the preparation of this map was NAD 1983 StatePlane Georgia West FIPS 1002 Feet. The **horizontal datum** was GCS North American 1983. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

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

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

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

Base map information shown on this FIRM was derived from Cobb County aerial photography produced at a scale of 1:600 from photography dated 2006.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables for Harmony Grove Creek and Noonday Creek Tributary No. 6 in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

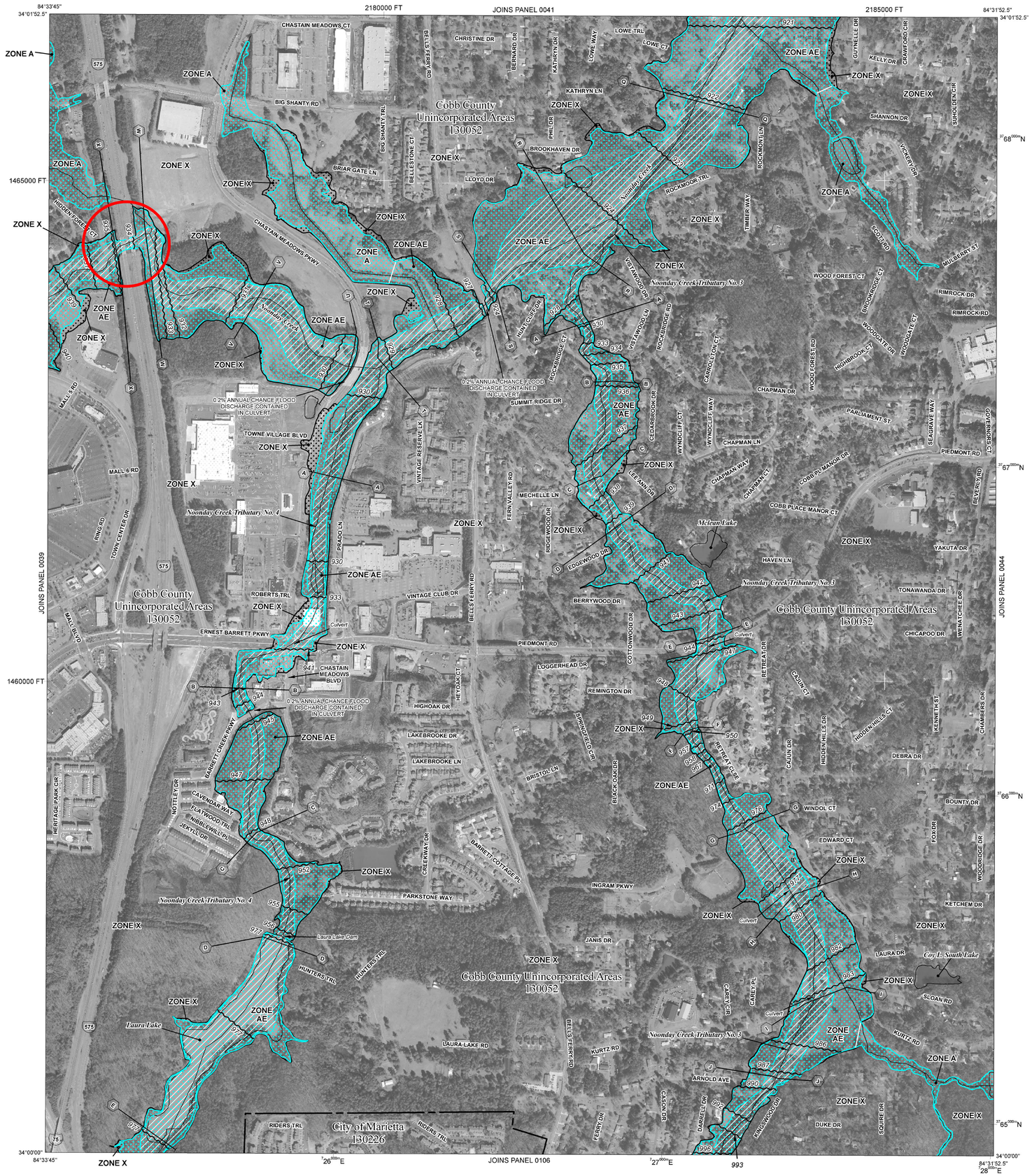
Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

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

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

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

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



LEGEND

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

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

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

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

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

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 3776 000mN — 1000-meter Universal Transverse Mercator grid values, zone 16
- 600000 FT — 5000-foot grid ticks: Georgia State Plane coordinate system, West zone (FIPSZONE 1002), Transverse Mercator projection
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- ●M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
August 18, 1992

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
December 16, 2008 - to change Base Flood Elevations and Special Flood Hazard Areas

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

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

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0043G

FIRM

FLOOD INSURANCE RATE MAP

COBB COUNTY, GEORGIA
AND INCORPORATED AREAS

PANEL 43 OF 252

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COBB COUNTY	130052	0043	G
MARIETTA, CITY OF	130226	0043	G

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

MAP NUMBER
13067C0043G

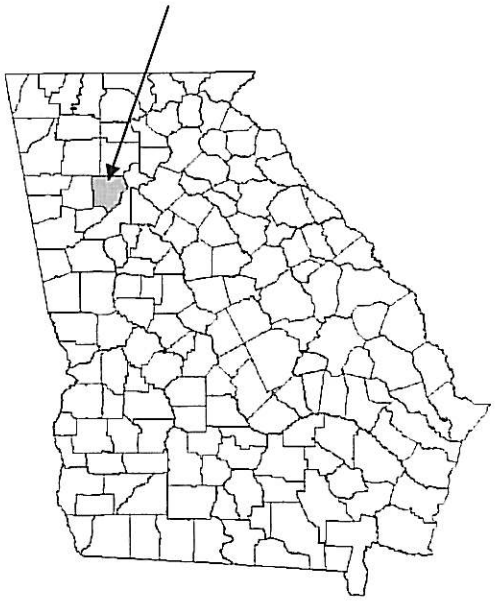
MAP REVISED
DECEMBER 16, 2008

Federal Emergency Management Agency

FLOOD INSURANCE STUDY

VOLUME 1 OF 4

Cobb County



COBB COUNTY, GEORGIA

AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
ACWORTH, CITY OF	130053
AUSTELL, CITY OF	130054
COBB COUNTY (UNINCORPORATED AREAS)	130052
KENNESAW, CITY OF	130055
MARIETTA, CITY OF	130226
POWDER SPRINGS, CITY OF	130056
SMYRNA, CITY OF	130057

REVISED:
DECEMBER 16, 2008

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
13067CV001A

TABLE 2 - SUMMARY OF DISCHARGES (continued)

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance		0.2-Percent-Annual-Chance
				Existing	Future	
MUD CREEK (continued)						
At Villa Rica Road	6.80	2,728	4,177	4,628	5,154	5,960
At West Sandtown Road Southwest	5.30	1,869	3,101	3,485	3,815	4,327
At Old Dallas Road Southwest	4.40	1,869	3,101	3,485	3,815	4,327
At Burnt Hickory Road Southwest	1.50	908	1,402	1,608	1,828	2,049
NICKAJACK CREEK						
At confluence with Chattahoochee River	35.9	10,520	17,320	20,640	21,650	28,910
Approximately 190 feet upstream of Old Cooper Lake Road Southeast	20.78	8,160	13,690	16,298	16,970	23,060
Approximately 220 feet upstream of Concord Road	14.56	6,370	10,100	11,840	12,250	16,400
Approximately 1,330 feet upstream of Hurt Road Southeast	8.44	5,160	7,810	8,880	9,020	11,720
Approximately 250 feet upstream of Church Road Southeast	5.99	4,770	6,970	7,830	7,950	10,250
Approximately 550 feet upstream of Smyrna Powder Springs Road Southeast	2.68	2,520	3,940	4,580	4,700	6,170
Approximately 220 feet upstream of South Cobb Drive Southeast/State Highway 280	0.62	440	650	740	740	970
NOONDAY CREEK						
At Shallowford Road Northeast (Downstream)	34.40	9,842	14,758	16,834	16,834	21406
At Hawkins Store Road Northeast (Upstream)	25.20	8,668	12,720	14,423	14,423	17,723
At New Chastain Road Northeast	22.40	8,843	12,834	14,652	14,652	17,605
At Bells Ferry Road Northeast	17.60	6,430	9,681	11,110	11,110	12,936
At Barrett Lakes Boulevard Northwest	10.80	5,365	7,471	8,534	8,534	10,964
At Duncan Road	7.80	3,507	4,917	5,480	5,480	6,451
At Roberts Boulevard Northwest	5.80	2,804	4,290	4,732	4,732	5,823

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Noonday Creek								
A	3,153	330	2,919	5.8	897.8	897.8	898.6	0.8
B	4,577	225	3,026	5.6	901.6	901.6	901.9	0.3
C	4,754	140	1,950	8.6	902.0	902.0	902.3	0.3
D	4,959	287	4,129	4.2	904.2	904.2	904.4	0.2
E	5,487	610	8,290	2.1	905.0	905.0	905.2	0.2
F	5,940	736	9,115	1.9	905.1	905.1	905.4	0.3
G	7,286	460	5,008	3.5	905.3	905.3	905.8	0.5
H	8,446	290	3,171	5.5	906.1	906.1	906.9	0.8
I	9,298	187	2,565	5.6	911.1	911.1	911.3	0.2
J	10,401	285	4,318	3.3	912.9	912.9	913.1	0.2
K	11,700	297	4,642	3.1	914.2	914.2	914.5	0.3
L	13,462	520	8,347	1.7	914.7	914.7	915.2	0.5
M	14,756	680	8,455	1.7	914.9	914.9	915.5	0.6
N	16,295	750	10,243	1.4	915.1	915.1	916.0	0.9
O	17,748	550	5,140	2.9	918.2	918.2	918.7	0.5
P	18,652	390	3,760	3.9	919.0	919.0	920.0	1.0
Q	20,341	400	3,886	3.8	922.1	922.1	922.9	0.8
R	22,221	800	7,381	1.5	924.3	924.3	925.2	0.9
S	23,477	200	2,520	4.7	927.6	927.6	928.1	0.5
T	24,584	260	3,414	3.5	929.1	929.1	929.6	0.5
U	24,943	430	4,820	2.5	929.7	929.7	930.3	0.6
V	26,158	345	3,525	3.4	930.7	930.7	931.2	0.5
W	27,925	116	1,206	9.9	933.4	933.4	934.3	0.9
X	28,276	175	1,446	8.2	934.9	934.9	935.3	0.4
Y	29,655	500	5,332	2.2	940.9	940.9	941.1	0.2
Z	31,354	100	1,323	9.0	942.1	942.1	943.1	1.0

[1]1,965 feet below county boundary

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

COBB COUNTY, GA AND INCORPORATED AREAS

FLOODWAY DATA

NOONDAY CREEK

FLOOD PROFILES

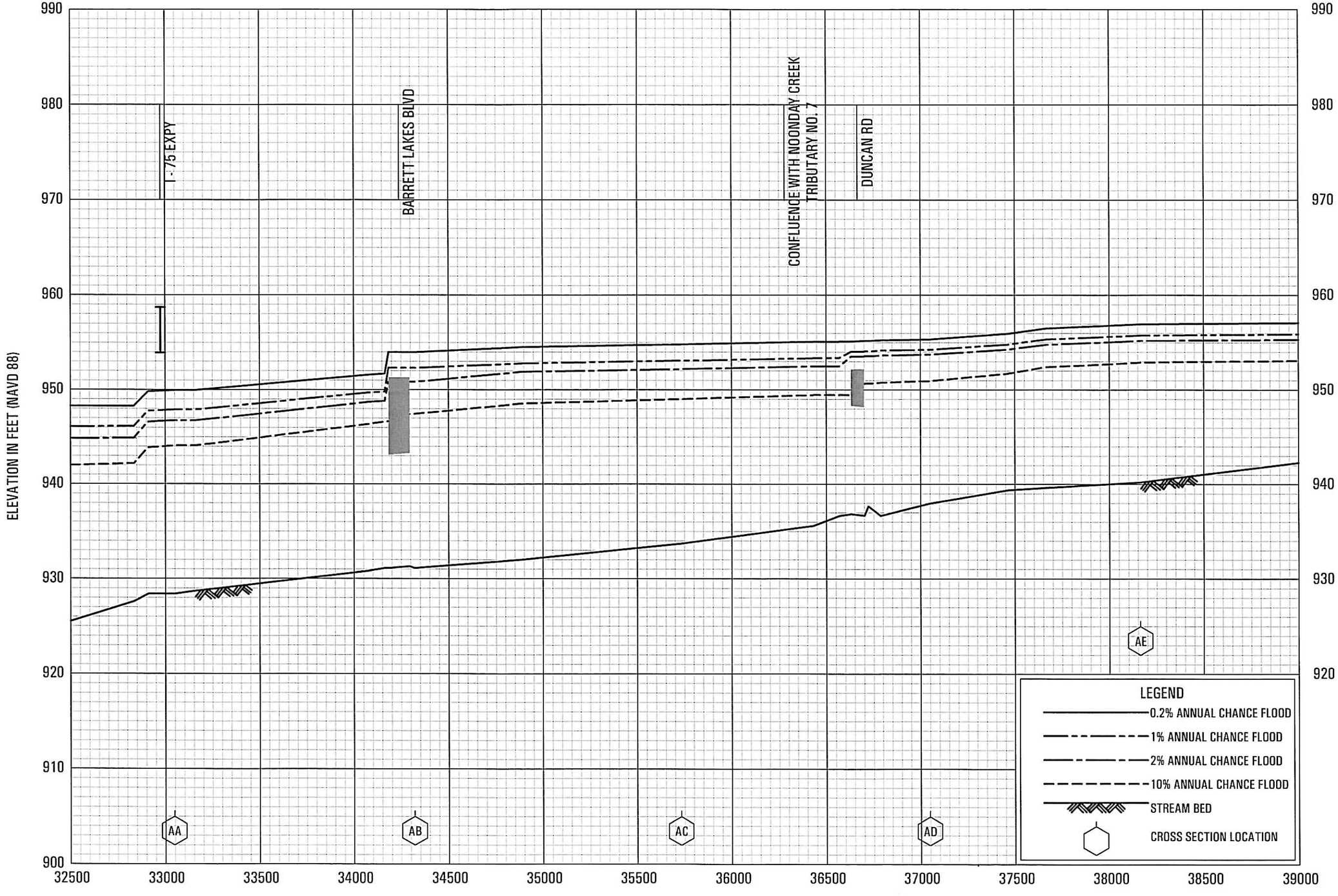
NOONDAY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

COBB COUNTY, GA

AND INCORPORATED AREAS

105P



FLOOD PROFILES

NOONDAY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

COBB COUNTY, GA

AND INCORPORATED AREAS

106P

MISCELLANEOUS PROJECT DATA

John McWhorter

From: Dick.Horen [Dick.Horen@kiewit.com]
Sent: Tuesday, June 10, 2008 2:37 PM
To: John McWhorter; Curtis, Steven
Cc: Garrick L. Edwards; Robbie Frizzell; Moseley, Michael R
Subject: RE: I-575 progress
Attachments: Noonday Creek Sanitary Sewers .pdf

Please find attached the SUE database drawing 24-05 just submitted by Phoenix Solutions. The two "parallel" sanitary systems are shown. The most southern 30" line adjacent to the creek channel is part of the Cobb County information supplied a few months back (they identify it as a 30" DIP), this was also identified in our original database of 2006. The second sanitary line at the north end of the bridge has not been previously identified or located , the GDOT plan shows it as a 21" and Phoenix's QL-C record research has it listed as a 30 ".

Dick Horen
GTP
Cell 404-867-0350

From: John McWhorter [mailto:jmcwhorter@JBTrimble.com]
Sent: Tuesday, June 10, 2008 1:55 PM
To: Dick.Horen; Curtis, Steven
Cc: Garrick L. Edwards; Robbie Frizzell; Moseley, Michael R
Subject: RE: I-575 progress

Dick/Steve,

I noticed on the existing bridge plans for the south Noonday Creek Bridge that there is a sanitary sewer line in a different location than the line discussed below. The size for this line is called out as 21". Do you have any record of it's existence?
I've included pdf's of the line identified below and the P&E for the existing bridge.

Thanks,

John McWhorter, P.E.
J.B. Trimble, Inc.
770-200-1713 direct
770-952-1022 office
770-952-1041 fax
jmcwhorter@jbtrimble.com

From: Dick.Horen [mailto:Dick.Horen@kiewit.com]
Sent: Monday, June 09, 2008 8:23 AM
To: Curtis, Steven
Cc: John McWhorter
Subject: RE: I-575 progress

The line size is a 30" DIP according to records. The outside diameter should be considered 32"

Dick Horen
GTP
Cell 404-867-0350

From: Curtis, Steven [mailto:sacurtis@bechtel.com]
Sent: Saturday, June 07, 2008 2:14 PM
To: Dick.Horen
Cc: jmcwhorter@jbtrimble.com

Subject: FW: I-575 progress

Dick

Do we know the size of the sewer line that John is referring too?

Thanks

Steve

From: John McWhorter [mailto:jmcwhorter@JBTrimble.com]
Sent: Friday, June 06, 2008 8:55 AM
To: Curtis, Steven
Cc: Garrick L. Edwards; Robbie Frizzell
Subject: FW: I-575 progress

Good morning Steve. We are in the process of evaluating a conflict with the sewer line that passes under the southern Noonday Creek bridge. To develop a solution, we need to know the outer diameter of the sewer line. I checked with Mike Moseley and he suggested that GTP may have this data. Can you provide the size? We will keep you posted of any action required to avoid this sewer line.

Thanks,

John

From: Moseley, Michael R [mailto:mrmoseley@pbsj.com]
Sent: Friday, June 06, 2008 8:43 AM
To: John McWhorter
Cc: Garrick L. Edwards; Robbie Frizzell; Larry Cook; John Rosslow
Subject: RE: I-575 progress

A diameter is not shown for the sewer line. GTP is currently working to update the SUE for both I-575 and I-75. Please contact Steve Curtis and he might be able to get this information.

Michael R. Moseley Jr., PE
PBS&J
5665 New Northside Dr., Suite 400
Atlanta, GA 30328
770 933-0280

From: John McWhorter [mailto:jmcwhorter@JBTrimble.com]
Sent: Thursday, June 05, 2008 5:34 PM
To: Moseley, Michael R
Cc: Garrick L. Edwards; Robbie Frizzell; Larry Cook; John Rosslow
Subject: RE: I-575 progress

Thanks Mike. It looks like our utility location/reference was correct. If we are to keep the current bent configuration, we'll need to straddle this sewer line. Can you provide the outside diameter of the line?

Thanks for the help,

John

From: Moseley, Michael R [mailto:mrmoseley@pbsj.com]
Sent: Thursday, June 05, 2008 4:04 PM
To: John McWhorter
Cc: Garrick L. Edwards; Robbie Frizzell; John Rosslow
Subject: RE: I-575 progress

See attached.

Michael R. Moseley Jr., PE
PBS&J
5665 New Northside Dr., Suite 400
Atlanta, GA 30328
770 933-0280

From: John McWhorter [mailto:jmcwhorter@JBTrimble.com]
Sent: Thursday, June 05, 2008 3:36 PM
To: Moseley, Michael R
Cc: Garrick L. Edwards; Robbie Frizzell; John Rosslow
Subject: FW: I-575 progress

Mike,

When we bring in the utility at south Noonday Creek, it looks like a section of the line goes right through the middle of the channel. It may be there and the downstream manhole location *does* look reasonable. As a check, if you could send us a file with the coordinates for these manholes, we could place the points and verify the location and rule out a problem with the referencing.

Garrick, If the location we have is in fact correct, the sewer line crosses at the middle of the widened bent 3 (outside NB). Because of the sharp skew between them, a drilled shaft is probably needed to avoid the conflict.

Thanks,

John

From: John McWhorter
Sent: Monday, June 02, 2008 3:07 PM
To: 'Moseley, Michael R'
Subject: RE: I-575 progress

Great. Thanks Mike for the fast response.....

John

From: Moseley, Michael R [mailto:mrmoseley@pbsj.com]
Sent: Monday, June 02, 2008 3:02 PM
To: John McWhorter
Subject: RE: I-575 progress

John,

As requested. Please let me know if you need anything else. I can send you the entire xsec file if you need it.

Thanks,
Mike

Michael R. Moseley Jr., PE
PBS&J
5665 New Northside Dr., Suite 400
Atlanta, GA 30328
770 933-0280

From: John McWhorter [mailto:jmcwhorter@JBTrimble.com]
Sent: Monday, June 02, 2008 2:15 PM
To: Moseley, Michael R
Cc: Garrick L. Edwards; Robbie Frizzell
Subject: FW: I-575 progress

Mike,

Thanks for the info. If it's not too much trouble, can you provide cross sections around station 120+00? This is where the Noonday Creek channel is closet to the existing embankment.

Thanks again,

John

From: Garrick L. Edwards
Sent: Monday, June 02, 2008 12:42 PM
To: John McWhorter
Subject: FW: I-575 progress

Garrick L. Edwards
JBT
2550 Heritage Court, SE, Suite 250
Atlanta, Georgia 30339-3062
Cell: 404-925-8385

From: Moseley, Michael R [mailto:mrmoseley@pbsj.com]
Sent: Monday, June 02, 2008 11:55 AM
To: Garrick L. Edwards
Subject: RE: I-575 progress

Garrick,

I have attached the updated limits using a 2:1 slope at Noonday Creek South. The limits around the endrolls are our best estimate. I have also attached the utilities we show at both Noonday Creek bridges and Little River along with the utility file. Let me know if you need anything else.

Thanks,
Mike

Michael R. Moseley Jr., PE
PBS&J
5665 New Northside Dr., Suite 400
Atlanta, GA 30328
770 933-0280

From: Garrick L. Edwards [mailto:gledwards@JBTrimble.com]
Sent: Monday, June 02, 2008 11:13 AM
To: Moseley, Michael R
Subject: RE: I-575 progress

JBT Status:

I-575 over Noonday Creek - South

To date:

- developed the existing hydraulic model in HEC-RAS
- developed the existing and proposed FEMA models
- visited and photographed the site
- organized the study binder
- started the report text

Look ahead:

- Complete the proposed HEC-RAS model
- review and finalize the FEMA model

I-575 over Noonday Creek - North

To date:

- coordinated with USGS on the variability in the USGS and FEMA discharges
- developed the existing hydraulic model in HEC-RAS
- developed the existing and proposed FEMA models
- visited and photographed the site
- organized the study binder

Look ahead:

- finalize the discharges to be used for the HEC-RAS model
- complete the proposed HEC-RAS model
- Through coordination with the Bridge Office, determine the required clearance and resulting jacking
- review and finalize the FEMA model

I-575 over Little River

To date:

- developed the existing hydraulic model in HEC-RAS
- visited and photographed the site
- organized the study binder

Look ahead:

- complete the proposed HEC-RAS model
- begin the scour analysis
- begin writing the report text

I-575 over Barrett and Town Lake Parkway

To date:

- Continue QA the Plans of Barrett
- Continue QA the Design of Town Lake

Look ahead:

- Assist PBS&J will wall plans

Issues

1. Status of Bridge Condition Survey & Maintenance Recommendation request.
2. There are sewer lines along the north bank of the Noonday Creek (south) bridge crossing as well as along the southern bank of Little River. The location of these manholes and the orientation/direction of the connecting lines cannot be confirmed with our CAiCE file. These lines will need to be shown on the preliminary layouts. If this data is not available, additional survey is needed.
3. A multi-conduit line has recently been added to the outside of both the northbound and southbound bridges at the Noonday Creek (south) crossing.
4. As previously discussed with Mike Moseley, the Noonday Creek channel meanders very close to the existing embankment at the southern Noonday Creek crossing. The slope is very flat in this area. Mike agreed that a 2:1 slope could be used here. We need the proposed fill limits plotted on the roadway plans in this area for us to determine whether or not a wall is needed.

From: Moseley, Michael R [mailto:mrmoseley@pbsj.com]
Sent: Monday, June 02, 2008 6:57 AM
To: Garrick L. Edwards; Brown, Barry L
Subject: I-575 progress

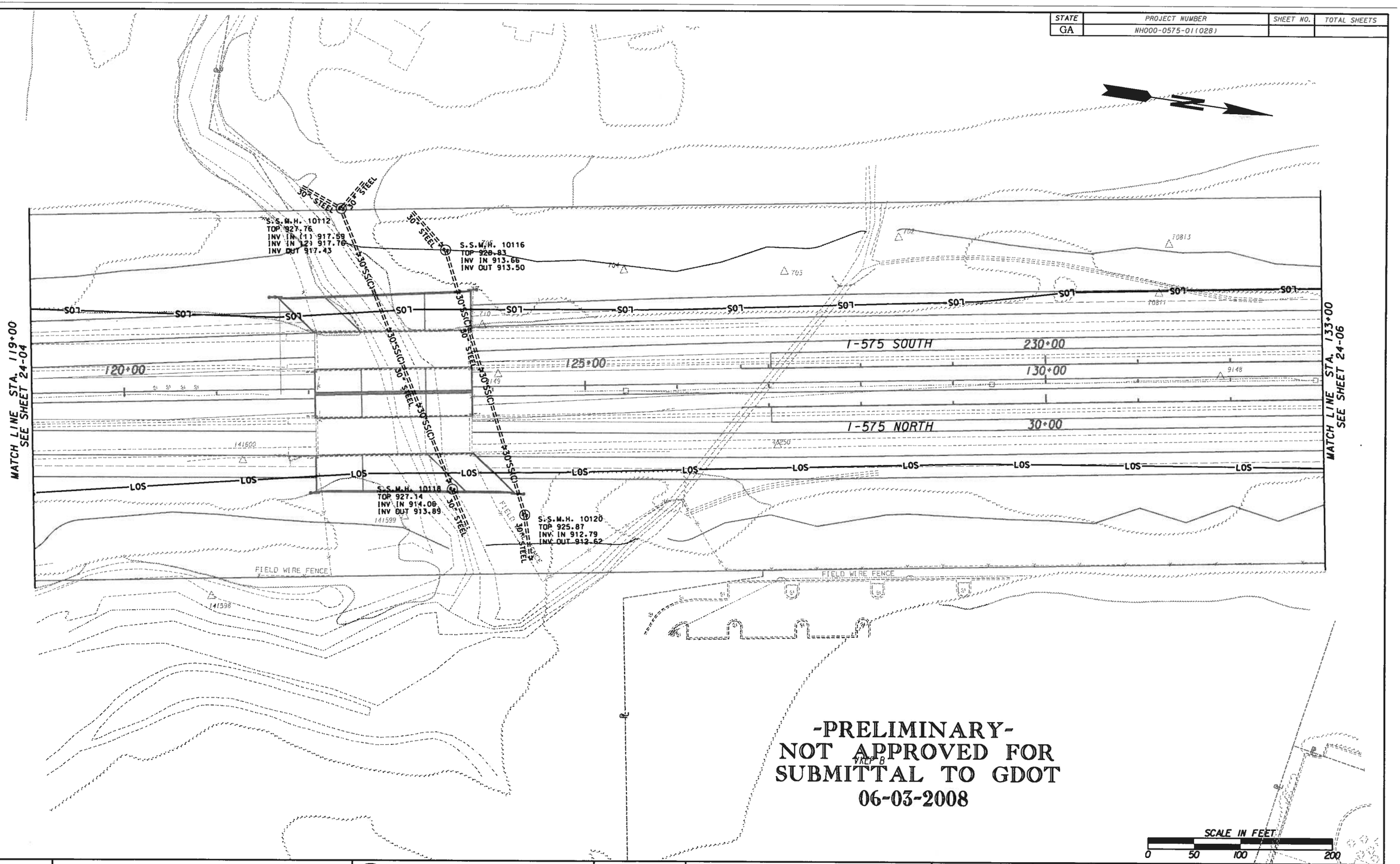
Barry/Garrick,

Please update the status report for tomorrow's meeting.

Thanks,
Mike

Michael R. Moseley Jr., PE
PBS&J
5665 New Northside Dr., Suite 400
Atlanta, GA 30328
770 933-0280

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	NH000-0575-01(028)		



-PRELIMINARY-
NOT APPROVED FOR
SUBMITTAL TO GDOT
06-03-2008

PHOENIX SOLUTIONS, INC.
LOGANVILLE, GEORGIA
(770)466-0466 FAX (770)466-0471

GTP Georgia Transportation Partners

NORTHWEST I-75/I-575 CORRIDOR

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

PBS&J

GEORGIA
DEPARTMENT OF TRANSPORTATION

UTILITY PLANS

PROJECT NH000-0575-01(028)
P. I. 713640-

DRAWING No. 24-05

$FILENAME$ $DATE$ $TIME$

John McWhorter

From: Crampton, Sam [scrampton@Dewberry.com]
Sent: Tuesday, April 29, 2008 6:09 PM
To: John McWhorter
Subject: RE: Cobb and Cherokee FEMA models

Thanks for the surveys. I will keep them handy for any updates we do. I will take a look at the USGS comments. The problem we find with the regression flows is that they are out of date and do not do well for urbanized area or for future flows. I certainly would not rule out the models over estimating. Unfortunately there has not been the funding for us to revise the hydrology completely on any studies except Pitner Creek and so they are all old HEC1 models that have simply had the curve numbers updated.

The next few weeks is really busy but after that we could meet for lunch.

Sam Crampton
Water Resources Engineer
Dewberry
2872 Woodcock Blvd, Suite 230
Atlanta, Ga 30341
678-530-0022 x203
678-530-0044 (fax)

From: John McWhorter [mailto:jmcwhorter@JBTrimble.com]
Sent: Tuesday, April 29, 2008 2:45 PM
To: Crampton, Sam
Cc: Robbie Frizzell; Beck, Susan
Subject: RE: Cobb and Cherokee FEMA models

Sam,

Here are the recent bridge surveys for the I-575 over Noonday Creek crossings. Hopefully this will be of use to you.

I noticed that there is a large difference between the FEMA discharges and the USGS regression flows. Since we will model the proposed construction with the FEMA model and our own HEC-RAS model using the project survey and our calculated discharges, I'm in the process of trying to resolve this difference. I presented this info to the USGS and asked for guidance. I've attached that email exchange here with hopes that you would read this over and comment as well.

Our May calendar is pretty full but Robbie and I want to take you to lunch soon to talk about projects and to say thanks for all your help over the past year or so.

Thanks again for you help!

John

From: Crampton, Sam [mailto:scrampton@Dewberry.com]
Sent: Friday, April 18, 2008 8:41 AM
To: John McWhorter
Subject: RE: Cobb and Cherokee FEMA models

I hope you got some sleep, I see the email was sent at 2:52AM!

I have the new model for Noonday which will become effective Dec26 08. We have a project in the vicinity of I-575 and 75 on Noonday Creek and will likely be making a FEMA submnittal. I know that the bridge survey in that area is very old and poor quality and really does need to be updated. If you have existing conditions survey for any of them structures around there, please could you provide us with them to update the model.

DEC08 Hydrology HEC1 model that will become effective for Noonday Creek in DEC 08
DEC08 Model RAS model for Noonday creek that will become effective in DEC08
Effective 92 Models These should be the Noonday and Tate models that went effective in 92. Check carefully to ensure that they are the models if you need to use them.
Incomplete Tate Revisions This model is one that we tried to use (performed by another consultant) but we found problems with

it and had to stick with the effective data for Tate Creek. We made some changes to this but gave up half way through because it would have cost too much to redo the model (I think it was mainly hydrology issues). There may be things you could use from this.

The zip with these files in can be downloaded from our ftp.
ftp.dewberry.com
Login: CobbGA
Pswd: S4RRWQ

Sam Crampton
Water Resources Engineer
Dewberry
2872 Woodcock Blvd, Suite 230
Atlanta, Ga 30341
678-530-0022 x203
678-530-0044 (fax)

From: John McWhorter [mailto:jmcwhorter@JBTrimble.com]
Sent: Friday, April 18, 2008 2:52 AM
To: Crampton, Sam
Cc: Robbie Frizzell
Subject: Cobb and Cherokee FEMA models

Sam,

Once again, I'm coming to you for some FEMA models. We are working on costing plans for a major construction project along I-575 in Cobb and Cherokee Counties. The floodways encountered along this corridor are Noonday Creek, Tate Creek and Little River. I've requested the data through Michael Baker also, but the Cobb County data has an effective date of August 18, 1992. I know there is a preliminary revised DFIRM for Cobb County. We want to get the latest data, especially if the revised effective data is imminent.

Any information you can provide along these streams in Cobb and Cherokee Counties will be much appreciated.

Thanks,

John McWhorter, P.E.
J.B. Trimble, Inc.
770-200-1713 direct
770-952-1022 office
770-952-1041 fax
jmcwhorter@jbtrimble.com

John McWhorter

From: Anthony J Gotvald [agotvald@usgs.gov]
Sent: Monday, April 28, 2008 9:57 AM
To: John McWhorter
Cc: Garrick L. Edwards; Larry Cook; Robbie Frizzell; Curtis, Steven; Beck, Susan
Subject: RE: Noonday Creek Discharges - I-575

John,

Do you know of any websites that explain the FEMA modeling in general. I am not very familiar with the FEMA modeling and would like to learn more. I am more familiar with the HEC modeling, and I would not mind looking at the HEC-1 model if it is not too much trouble to put it on an ftp site. As a rule of thumb, the rural equations can be used for sites that have impervious area less than 10 percent. 10-15% is kind of a grey area, and anything above 15% is definitely affected by urbanization and the urban equations should be used. If there is anyway you can calculate the impervious area for these sites, then I strongly recommend doing so. With the information that is available, I would recommend using the urban equations for both the 12.8 and 43.2 sq. mi sites. The impervious area is more than likely greater than 10 % and is only going to increase, so the urban equations would be more applicable. Of course, the 43.2 sq miles is out of the range of the urban equations, but if the impervious area is above 10% then this site is beyond the limitations of the rural equations as well. We are actually in the process of putting together a proposal to update the urban equations. We plan to use a multi-state approach where we would pool together urban sites from VA, TN, NC, SC, GA, AL, and FL. This way the ranges in drainage areas would increase for the urban equations. We are finishing up a similar multi-state approach for the rural equations. The new rural equations will be out at the end of the calendar year. As for the 2005 peaks for both 02392975 and 02392950, keep in mind those peaks have an accuracy of +/- 5 percent. So this is the reason for the slight difference (-2 percent). These sites are very close together and there is no major inflows between them, so the values of the two peaks are almost the same value if you consider the 10 percent uncertainty range.

Tony Gotvald, Hydrologist
USGS Georgia Water Science Center
3039 Amwiler Road, Suite 130
Atlanta, GA 30360
(770) 903-9310

"John McWhorter" <jmcwhorter@JBTrimble.com>

04/26/2008 09:57 PM

To "Anthony J Gotvald" <agotvald@usgs.gov>
cc "Garrick L. Edwards" <gledwards@JBTrimble.com>, "Larry Cook" <lcook@JBTrimble.com>, "Robbie Frizzell" <rfrizzell@JBTrimble.com>, "Curtis, Steven" <sacurtis@bechtel.com>, "Beck, Susan" <sbeck@dot.ga.gov>
Subject RE: Noonday Creek Discharges - I-575

Thanks Tony. I agree that the FEMA flows seem high for the 12.8 square mile area. Since they are in the regulatory model, we are probably stuck with them for the FEMA modeling. However, for projects that are reviewed by GDOT, we develop a separate HEC-RAS model using the project survey and our calculated discharges.

Using an impervious area of 15% for the Southern Noonday Creek crossing (12.8 sq mi) the Q100 = 7012 cfs, which equates to about 60% of the FEMA flow. For the northern Noonday crossing (43.2 sq mi), the 15% impervious area generates a Q100 = 16232 cfs, which is much greater than the FEMA flow. As you know, this drainage area size is outside of the range of use for the urban equations. Although Tim Stamey once told me that the urban equations could be used outside of their recommended range (standard error just won't apply), they may be excessive in this case. The rural equations here produce a Q100 = 9108 cfs.

Based on a 15% impervious area at the Hawkins Store Road gage (02392950), the 2005 event (6470 cfs) produced a 10 year storm along Noonday Creek (10 yr @ 15% imp = 6674 cfs). An interesting point to note is that the downstream Shallowford Road gage (02392975, DA = 33.6 sq mi) recorded a lower discharge for the same flood event in 2005.

Would you agree that using 15% +/- impervious and the urban equations for the 12.8 square mile site and just the rural equations for the 43.2 square mile site is a reasonable approach to the discharges for these sites?

There is a HEC-1 model. I can provide this to you if you would like. It's probably too big for email (5 meg) so let me know and I'll post it to our ftp site.

I really appreciate your help with this. This is a hot project and determining reasonable discharges for these sites is critical. This is particularly the case with the northern Noonday crossing since that bridge will likely be jacked to address a clearance issue.

Thanks again,

John

From: Anthony J Gotvald [mailto:agotvald@usgs.gov]
Sent: Fri 4/25/2008 2:44 PM
To: John McWhorter
Cc: Garrick L. Edwards; Larry Cook; Robbie Frizzell; Curtis, Steven; Beck, Susan
Subject: Re: Noonday Creek Discharges - I-575

John,

The Q100 values of 11,917 and 12,874 cfs at the I-575 crossing seem high for a drainage area of only 12.8 square miles. Are the data used for these FEMA analyses available? It would be interesting to see the data that were used in the analysis. I am a little confused on the study dates you mentioned. Cherokee County had a study done in 1988 and then 2006, and Cobb County had a study done in 1992 and then in 2008. Is this correct? Do any of these recent studies include the large event that occurred in July of 2005? I would estimate that the % impervious area for the Noonday Creek watershed is somewhere between 5-15%. Between the rural and urban equations, the urban equations would serve as a better estimate of the Q100 for this site. However, these FEMA studies may have additional information that would lead to a better estimate of the Q100 for this site.

Tony Gotvald, Hydrologist
USGS Georgia Water Science Center
3039 Amwiler Road, Suite 130
Atlanta, GA 30360
(770) 903-9310

"John McWhorter" <jmcwhorter@JBTrimble.com>

04/25/2008 11:38 AM

To <agotvald@usgs.gov>
cc "Robbie Frizzell" <rfrizzell@JBTrimble.com>, "Beck, Susan" <sbeck@dot.ga.gov>, "Garrick L. Edwards" <gledwards@JBTrimble.com>, "Larry Cook" <lcook@JBTrimble.com>, "Curtis, Steven" <sacurtis@bechtel.com>
Subject Noonday Creek Discharges - I-575

Tony,

We are working on plans to widen I-575 over two crossings of Noonday Creek, which flows from south to north in Cobb and Cherokee Counties. The southern crossing is in Cobb County and the northern crossing is in Cherokee county. Since Noonday Creek is a FEMA studied stream, I was comparing discharges between the regression equations and FEMA and due to the large differences, I would like to get your comments.

The Cherokee County FEMA study is dated September 29, 2006. It appears that the discharges used for Noonday Creek in this study remain unchanged from the original study done in 1988. There is a "preliminary" study for Cobb County that is slated for a December 2008 effective date. This study includes new hydrology for Noonday Creek and the discharges are ~2.5 times the rural regression equations. This area is certainly urbanized and the use of the urban regression equations is easily warranted. However, even an impervious area of 100% will not approach the FEMA flows. At the southern (Cobb County) crossing of I-575 over Noonday Creek, the drainage area is 12.8 square miles. The USGS rural Q100 = 4468 cfs and the Dec. '08 FEMA flow is 11917 cfs. With an impervious area of 100%, the USGS urban regression Q100 = 9681cfs. For reference, the previous 100 year FEMA flow from the 1992 study = 12874 cfs.

There are gages on Noonday Creek at Shallowford Road (02392975) and Hawkins Store Road (02392950), which are in the area at 33.6 and 24.3 square miles, respectively. However, these gages only have about seven years of record.

The northern I-575 crossing over Noonday Creek in Cherokee County has a drainage area of 43.2 square miles. The current 2006 Flood Insurance Study for Cherokee County has a 100 year discharge of 9372 cfs at the confluence with Little River (drainage area 49.3 square miles). The 100 year rural discharge is 9108 cfs at the bridge site (43.2 sq mi) and 9839 cfs at the confluence (49.2 sq mi). In this case, the discharges correlate fairly well between USGS and FEMA except that some urbanization should be considered.

As you can see, the downstream crossing has ~3.4 times the drainage area (43.2 vs. 12.8) and approximately 75% of the discharge based on the FEMA flows. There appears to be some storage available between the two I-575 crossings over Noonday Creek that could partially explain the reduction. If you would, please comment on this issue and provide your recommendations for the discharge calculations for both the north and south crossings of I-575 over Noonday Creek. I've attached an excerpt from the quad map for your use.

Thank you for your time.

John McWhorter, P.E.
J.B. Trimble, Inc.
770-200-1713 direct
770-952-1022 office
770-952-1041 fax
jmcwhorter@jbtrimble.com

BRIDGE AND RETAINING WALL
FOUNDATION INVESTIGATION REPORT
(Revised December 4, 2007)
I-575 over Noonday Creek (South)
Northwest Corridor Project
GDOT Project No. CSNHS-0008-00(256), PI No. 0008256
Cobb County, Georgia

WILLMER ENGINEERING INC.
Project No. ATL-171-3099B

Prepared For

GEORGIA TRANSPORTATION PARTNERS
Atlanta, Georgia

Prepared By

WILLMER ENGINEERING INC.
3772 Pleasantdale Road
Suite 165
Atlanta, Georgia 30340-4270

770.939.0089

WILLMER ENGINEERING INC. | WE

November 19, 2007
(Revised December 4, 2007)

VIA COURIER

Pete M. McMahon, PE
Georgia Transportation Partners
c/o PBS&J
5665 New Northside Drive
Suite 400
Atlanta, Georgia 30328

SUBJECT: **Bridge and Retaining Wall Foundation Investigation Report**
I-575 over Noonday Creek (South)
Northwest Corridor Project
GDOT Project No. CSNHS-0008-00(256), PI No. 0008256
Cobb County, Georgia
Willmer Project No. ATL-171-3099B

Dear Mr. McMahon:

Willmer Engineering Inc. (Willmer) is pleased to provide this Bridge and Retaining Wall Foundation Investigation (BFI and WFI) report for the proposed widening of I-575 bridge over Noonday Creek (South) in Cobb County, Georgia. The BFI and WFI were performed in general accordance with our contract with Georgia Transportation Partners (GTP), dated May 12, 2007. The objective of this investigation was to gather enough geotechnical information to support the costing plans to be developed by GTP. Additional borings will be performed in the design/build phase of the project to provide additional information as required. This report was prepared in general accordance with Georgia Department of Transportation (GDOT) guidance documents for bridge and retaining wall foundation investigation.

The attached summary presents the site and subsurface conditions along the proposed bridge and retaining wall alignments, and our geotechnical recommendations related to foundation design and construction.

We appreciate the opportunity to be of service to you on this project and look forward to a continuing relationship. Please contact us if you have any questions concerning this report or require further assistance.

Sincerely,

WILLMER ENGINEERING INC.

Murthy S. Kotha
Project Engineer

James L. Willmer, PE
Vice President/Principal Consultant

Sujit K. Bhowmik, PhD, PE
Principal Geotechnical Consultant

GEORGIA REGISTERED No. 029802 PROFESSIONAL ENGINEER SUJIT K. BHOWMIK

12/4/07

MSK/SKB/JLW:ks
I:\Word Processing\Projects\171-GEO\171-3099 Northwest Corridor Project (Bechtel)\171-3099B REVISED BFI Report - I-575 over Noonday Creek (South) 12-04-07.doc

3772 Pleasantdale Road
Suite 165
Atlanta, GA 30340-4270
P: 770.939.0089
F: 770.939.4299
www.willmerengineering.com

Attachments: **Bridge and Retaining Wall Foundation Investigations**

Figures

Figure 1 Project Location Map
Figure 2 Boring Location Plan
Figure 3 Generalized Subsurface Profile (Bridge)
Figure 4 Generalized Subsurface Profile (MSE Wall)

Appendix

Boring Record Legend
Unified Soil Classification System Reference Sheet
Engineering Description of Rock Hardness
Boring Records: BB-1 through BB-4, and W-1
Laboratory Test Results

BRIDGE FOUNDATION INVESTIGATION	
Willmer Project Number	ATL-171-3099B
GDOT Project Number	CSNHS-0008-00(256)
Project P.I. Number	0008256
Location	I-575 Bridge over Noonday Creek (South), Cobb County, Georgia (see Figure 1)

GENERAL INFORMATION	
Project Description	Three new parallel bridges (one in the center median area and one each on the left and right sides of existing bridges) are planned for the proposed I-575 widening over Noonday Creek (South). The bridges will be three-span, 170 feet long reinforced concrete structures. The design lengths for the three spans from south to north are 50, 70 and 50 feet, respectively. The existing bridges are supported on H-piles at the end bents and spread footings at the intermediate bents. No BFI report is available for the existing bridges.
Geologic Information	The project alignment is geologically sited within the Piedmont Physiographic Province of Georgia, and is underlain by Metamorphosed Maffic Rock Formations which include amphibolite, mica schist and biotite gneiss.
Subsurface Features	The subsurface profile is generally comprised of fill, alluvium and residuum underlain by partially weathered rock (PWR) and parent bedrock, except at BB-2 where no fill or alluvium was encountered. The fill material consists of loose to medium dense silty fine sand or stiff sandy silt/sandy clay. The alluvial soils consist of very loose to loose silty/clayey sand, and the residual soils consist of medium dense to dense silty sand. Groundwater was encountered at all boring locations and the groundwater elevation ranged from about 912 to 923 feet.

PWR AND AUGER REFUSAL ELEVATIONS (feet)

Bridge	Bent No.	Reference Boring No.	Top of PWR	Auger Refusal
Left	1	BB-1	909	905
	2	--	--	--
	3	BB-3	901	900
	4	--	--	--
Center	1	--	--	--
	2	BB-2	917	916
	3	--	--	--
	4	--	--	--
Right	1	--	--	--
	2	--	--	--
	3	--	--	--
	4	BB-4	891	890

MAXIMUM PILE DESIGN LOADS			
Pile Type	**Load Transfer (%)**		**Design Load**
	Friction	**End Bearing**	
H-Piles	20	80	10 BP 42 = 55 Tons
			12 BP 53 = 70 Tons
			14 BP 73 = 96 Tons
			14 BP 89 = 117 Tons

FOUNDATION RECOMMENDATIONS				
Bridge	**Bent No.**	**Drilled Shaft (Bearing)**	**Spread Footing (Bearing)**	**Pile Bent (Type)**
Left	1			H
	2	100 ksf on rock	20 ksf on rock *	
	3	100 ksf on rock		
	4			H
Center	1			H
	2	100 ksf on rock		
	3	100 ksf on rock	20 ksf on rock *	
	4			H
Right	1			H
	2	100 ksf on rock	20 ksf on rock *	
	3	100 ksf on rock	20 ksf on rock *	
	4			H

ELEVATIONS (feet)						
Bridge	**Bent No.**	**Reference Boring No.**	**Bottom of Drilled Shaft**	**Bottom of Spread Footing**	**H-Pile Tip Elevations**	
					Minimum Tip	**Estimated Tip**
Left	1	BB-1			908±	906±
	2	BB-2	911 or below	*		
	3	BB-3	895 or below			
	4	BB-4			890±	890±
Center	1	BB-1			908±	906±
	2	BB-2	911 or below			
	3	BB-3	895 or below	*		
	4	BB-4			890±	890±
Right	1	BB-1			908±	906±
	2	BB-2	911 or below	*		
	3	BB-3	895 or below	*		
	4	BB-4			890±	890±

* No borings were performed at these bent locations. The drilled shaft recommendations at these bents are based on borings BB-2 and BB-3 performed at Bents 2 and 3 of the center and left bridges, respectively. Since Bents 2 and 3 of the existing bridges are supported on spread footings, shallow rock may be encountered at these bent locations. Borings should be performed at these locations during the design/build phase to determine the depth to rock. Spread footings should be used in lieu of drilled shafts if rock is encountered within 10 feet below final grade. Bottom elevations of spread footings will depend on the depth to rock.

NOTES: GENERAL	
Elevations	All elevations referenced in this report are based on Control Point No. 507 (5/8" rebar, EL. 929.37 feet) established by the surveyors.
Theoretical Scour	Hydraulic study for this project has not been completed yet and, therefore, theoretical scour line is not available at this time.
Erosion	We recommend the use of 24 inches of Type I riprap and filter fabric.
As-built Information	As-built information should be forwarded to the Geotechnical Engineering Bureau upon completion of the foundation system.
NOTES: SPREAD FOOTINGS	
Embedment	Spread footings (if used) should be embedded a minimum of one foot into hard rock to protect the footing from scour.
Temporary Shoring	Temporary shoring may be required to construct spread footings (if used) at Bents 2 and 3. Care should be exercised not to undermine the spread footings for the existing bridges. Because groundwater was encountered above the possible footing bottom elevations (i.e., above rock), dewatering of the excavations will also be required.
Cofferdams	Cofferdams will be needed to construct the spread footings (if used) in some portions of Bents 2 and 3 where the footing excavation will extend into the water area of the creek. Seal concrete and dewatering of the excavations will also be required.
NOTES: PILE BENTS	
PDO	Driving resistance after Minimum Tip Elevations are achieved.
Waiting Period	None required (see MSE wall recommendations).
Down-drag Protection	To avoid inducing down-drag loads onto the piles from potential settlement of the loose and very loose silty sand layers during construction of the MSE wall, we recommend that the piles at Bent 4 that fall within the MSE wall area be protected from down-drag by using Jackets or other approved measures.
NOTES: DRILLED SHAFTS	
Drilled Shaft Special Provision	The drilled shafts should be constructed as per Special Provision 524: Drilled Caisson Foundations.
Rock Socket	A minimum 5-foot socket into sound rock will be required for all drilled shafts at this site.

Downhole Inspection	The drilled shaft excavations must be inspected by a geotechnical engineer to ensure that the bearing materials will provide suitable vertical and lateral foundation support, and to verify that all unsuitable materials are removed. A minimum shaft diameter of 48 inches shall be used, and the shaft excavations shall be dewatered to allow for the inspection. A minimum test hole depth of 6 feet will be required to insure that there are no weak seams under the shaft. It is critical that the drilled shafts be embedded below any weak layers.
Temporary Casing	Temporary steel casing will be required at all drilled shaft locations to provide for inspection of the rock bearing surface and test hole. The casing should be extended below the top of the bedrock surface if the bedrock is fractured and/or broken. The casing should be of sufficient strength to withstand handling stresses, concrete pressure, and surrounding earth and/or fluid pressures.
Permanent Casing	We do not anticipate needing permanent casing to install drilled shafts at this site.
Ground Water	At locations adjacent to the creek, groundwater should be expected at or slightly above the creek water level. Thus, seepage into the shaft excavations should be expected. It is anticipated that this seepage can be handled by pumping from the shaft excavations. Also, if the soil-bedrock interface becomes a conduit for groundwater infiltration or if fractures and/or voids in the rock produce groundwater seepage into the drilled shaft excavation, the temporary steel casing should be extended into the rock to seal off the groundwater flow.
Special Problems	If possible, all concrete for foundations should be poured the same day the excavation is made. If this is not practical, the foundation excavation should be adequately protected against any detrimental change in conditions such as from disturbance, sloughing, ground water and rainfall. Surface run off water must be drained away from all drilled shaft excavations and not allowed to pond.

RETAINING WALL INVESTIGATION	
Location	The proposed MSE Wall (Wall No. 1) extends from Station 123+44 to Station 124+59 and is located about 115 feet to the right of the proposed project centerline (i.e., near the northeast end of the proposed northbound bridge widening) . The total length of the wall is 115 feet (see Figure 2) and the maximum height of the wall is about 29 feet. The top elevation of the wall is about 949 feet and the bottom elevation of the wall ranges from about 920 to 943 feet.
Subsurface Features	The subsurface profile (see Figure 4 and boring logs for BB-4 and W-1) along the proposed MSE wall is comprised of fill, alluvium and residuum underlain by partially weathered rock (PWR) and parent bedrock. The fill consists of loose silty sand and/or stiff sandy silt/clay. The alluvium consists of very loose to loose silty sand and/or medium dense clayey sand. The residual soils consist of very loose to medium dense silty sand underlain by partially weathered rock. Auger refusal was encountered at both the borings. Groundwater was encountered at the borings between elevations 912 and 916 feet.
Soil Parameters	The following soil design parameters are recommended for use for the proposed MSE wall: Soil Unit Weight γ = 125 pcf Cohesion c = 0 psf Angle of Internal Friction ϕ = 32 degrees Coefficient of Sliding Friction μ = 0.40 The above design parameters assume the backfill material behind the MSE wall fill to consist of silty sand compacted to the specified density, and the subgrade prepared as recommended below.

Recommendations	We recommend that the MSE wall be constructed in stages to minimize differential settlement along the wall. The following steps are recommended for the MSE wall: (i) Any soft/loose soils from beneath the MSE wall should be over-excavated and replaced with compacted wall backfill material. The depth and extent of any over-excavation should be determined by the project Geotechnical Engineer. (ii) The maximum allowable bearing pressure for the soil encountered along the MSE wall is 3,000 psf. However, at the location of maximum wall height, the design bearing pressure will likely exceed the above maximum allowable bearing pressure. Therefore, we recommend that the MSE wall be constructed in two stages. In the first stage, the wall should be constructed to half of its final height. A minimum 45-day waiting period should be allowed after the first stage before beginning the second stage of construction. Settlement of the MSE wall should be monitored upon completion of the first stage of construction. The length of the waiting period may be increased or decreased based on the settlement monitoring data, at the discretion of the project Geotechnical Engineer. (iii) After the waiting period, the MSE wall should be constructed to the final height. (iv) The MSE wall backfill material and drainage measures should conform to GDOT standard specifications.
Prepared By	Murthy S. Kotha / Sujit K. Bhowmik, PhD, PE
Senior Review By	James L. Willmer, PE

Revised: November 9, 2006

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SPECIAL PROVISION

PROJECT NO. CSNHS-0008-00(256), Cobb County
P.I. NO. 0008256

SECTION 524 – DRILLED CAISSON FOUNDATIONS

524.1 General Description

This Work consists of furnishing all labor, materials, equipment, tools and services necessary for construction of drilled caisson foundations and includes all incidentals and additional work in conjunction therewith. Adhere to the Department's Plans, Special Provisions and Standard and Supplemental Specifications for all Work.

524.2 Materials

Use materials that meet the requirements of the Standard Specifications with the following exceptions:

- Use non-air-entrained Class AA concrete with a coarse aggregate size of No. 67 stone and a slump at time of placement of between 7 and 9 inches (178 mm and 229 mm). Use 10 percent additional cement and a retarder or water reducing agent in all concrete.
- Use Grade 60 (Grade 420) reinforcing bars that conform to ASTM 615 (ASTM A 615M). If wire spirals are used, use spirals that conform to ASTM A 82.
- Use Grade 2 steel casing that conforms to ASTM A 252.

524.3 Construction Requirements

524.3.01 Personnel

Construct drilled caissons and supervise the work with personnel who are experienced in this type work. Visit and examine the work site and all conditions, and take into consideration all such

conditions that may affect the work. At least 30 days prior to beginning drilled caisson work, submit to the Engineer for review and approval the following proof of the ability of the personnel to construct drilled caisson foundations:

1. Evidence of the successful completion of at least five projects similar in concept and scope to the proposed foundation. Include names, addresses and telephone numbers of the owners' representatives for verification.

2. Résumés of foreman and drilling operators to be employed on this project. Provide evidence showing that the drill operator has experience and knowledge of the drill rig to be used on the project. The Department will be sole judge of the qualifications of the foreman and drill rig operator.

3. A detailed sequence of construction for drilled caisson work that describes all materials, methods and equipment to be used, including, but not limited to the following:

    - casing sizes with proposed top and tip elevations
    - drilling equipment including the manufacturer's specifications on the drill rig
    - methods and equipment for stabilizing and cleaning shaft excavations
    - methods of materials handling and disposal
    - methods and equipment for placing concrete
    - details of tremie and sealing methods, if required
    - details of reinforcement placement, including support and centralization methods

Do not begin drilled caisson construction until the qualifications, construction plan and methods have been approved in writing by the Engineer.

524.3.02 Equipment

Use excavation and drilling equipment with a rated capacity (including power, torque and downward thrust) to excavate a caisson of the maximum specified diameter to a depth of 30 feet (9.1 meters) or 20 percent deeper than the deepest caisson indicated on the Plans, as measured from the ground or water surface elevation, whichever is higher.

524.3.03 Casing

Use casing that is a metal shell of a thickness to withstand handling, internal and external pressures, and that is watertight, smooth and clean. If the elevation of the top of the caisson is below ground level or water level at the time of concrete placement, use an oversize casing from ground elevation to a point below the top of the caisson to prevent caving into the fresh concrete. Do not allow the top of the permanent casing, if required, to extend above the top of the drilled caisson. Use casing in all

materials that do not have sufficient strength to safely remain open and stable during and after excavation.

When casing is used, do not use casing with an outside diameter less than the specified diameter of the caisson. That portion of the caisson below the casing may be slightly smaller than the normal outside diameter of the caisson. However, use drilling tools to excavate the caisson below the casing that are no smaller than the outside diameter of the casing minus 2 inches (51 mm). Do not leave casing in place unless permitted by the Engineer, and cut off any permanent casing as shown on the Plans.

Provide adequate equipment during concrete placement to prevent pulling up the reinforcing cage during casing extraction. The casing may be pulled in partial stages. Maintain a sufficient head of concrete above the bottom of the casing to overcome hydrostatic pressure. Extract the casing at a slow uniform rate with pull in line with the center of the caisson.

524.3.04 Protection of Existing Structures

Monitor structures for settlement that are within a distance of ten shaft diameters or the estimated shaft depth, whichever is greater, in a manner approved by the Engineer. Record elevations to an accuracy of 0.01 foot (3 mm). Record elevations before construction begins, during the driving of any required casings, during excavation or blasting, or as directed by the Engineer.

Document thoroughly the condition of the structures with descriptions and photographs made both before and after drilled caissons are constructed. Document all existing cracks, and provide copies of all documentation to the Engineer.

At any time settlement of 0.05 foot (15 mm) or damage to the structure is detected, immediately stop the source of vibrations, backfill any open drilled shaft excavations and contact the Engineer for instructions.

524.3.05 Excavation

Drill and excavate all caissons through whatever substances and to the elevations required. Excavate near the tip elevation in the presence of the Engineer. The Engineer may adjust the tip elevations depending on the quality of the bearing material found. Embed the caisson tips 5 feet (1.5 meters) into and on top of sound rock in accordance with Plan requirements and as determined by the Engineer. Sound rock is indicated by material that cannot be drilled with a conventional earth auger, and requires the use of special rock augers, core barrels, air tools, blasting and/or other methods of hand excavation. Sound rock is defined as material on which the rock auger penetration is equal to or less than 2 inches (51 mm) per five minutes of drilling with the auger subjected to a torque of 600,000 inch-pounds (67,791 kN-m) with a down thrust of 37,000 pounds (165 kN). There will be no additional compensation for removal of rock.

The Engineer will inspect the bottom of each caisson prior to setting the reinforcing cage and placing concrete. Obtain the Engineer's approval prior to placing the reinforcing cage. Remove water, sediment and debris from the bottom of the caissons to allow for a down-hole inspection. Bore the bottom of the caisson excavation a minimum of 6 feet (1.8 meters) into rock as outlined in

Specification 211.3.05.C, "Boring of Foundations and Seals". The Engineer will make a determination of the soundness and consistency of the rock and may adjust the tips of the caissons based on this information.

Where drilled caissons are located in other than open water areas, use casings or other methods approved by the Engineer to stabilize the excavation and control the hole size. When casing is not specifically required on the plans, fill in any over-excavations with Class AA concrete at no additional cost to the Department. Dispose of excess concrete, grout, displaced water and materials removed from the caisson excavation in areas approved by the Engineer, and in accordance with any Federal, State, or local code or ordinance. Verify the accuracy and existence of all applicable codes, ordinances or other regulations prior to disposing materials.

524.3.06 Reinforcing Steel

Assemble a cage of reinforcing steel and place it as a unit immediately prior to concrete placement. Assemble the cage so that the clearance between the cage and side of the caisson will be at least 5 inches (127 mm), and the clearance between the cage and bottom of the caisson will be 3 inches (76 mm).

If the caisson is lengthened, extend all reinforcement to within 3 inches (76 mm) of the bottom. If a splice is required, place it in the lower one-third of the caisson, or as shown on the Plans. Tie hoops or spirals to the caisson and column steel (vertical bars) at 100% of the junctions with double wire figure-eight ties. Do not weld the reinforcing steel. Support the cage from the top in a concentric manner to minimize its slumping downward during concrete placement and/or extracting the casing.

Check the elevation of the top of the steel cage before and after casing extraction. Any upward movement of the steel not exceeding 2 inches (51 mm) or any downward movement thereof not exceeding 6 inches (152 mm) will be acceptable. Any upward movement of the concrete or displacement of the steel beyond the above limits will be cause for rejection. Tie and support the reinforcing steel in the caisson so that the reinforcing steel will remain within allowable tolerances. In uncased caissons, use only heavy-duty plastic rollers (wheels). In cased caissons, use heavy-duty non-corrosive plastic rollers (wheels) or steel chairs. Place rollers at maximum intervals of 8 feet (2.4 meters) along the cage to ensure concentric spacing for the entire cage length. Use one roller for each one foot (305 mm) of diameter of the cage, with a minimum of four rollers at each interval. Do not use concrete spacer blocks. Use rollers that are constructed of a material approved by the Engineer and that have sufficient bearing surface to provide lateral support to the reinforcing cage.

Use rollers of adequate dimension to provide the annular spacing between the outside of the reinforcing cage and the side of the excavated hole or casing as shown on the Plans. If an oversize casing is used, use rollers that will provide concentric spacing. Use pre-cast concrete or heavy-duty plastic bottom supports (feet/boots) to provide a spacing of 3 inches (76 mm) between the cage and caisson bottom.

524.3.07 Concrete

Mix and place all concrete in accordance with Section 500 of the Specifications where applicable and the requirements herein stated.

Place concrete as soon as possible after all excavation is completed and reinforcing placed and supported. Place concrete continuously in the caisson to the top elevation of the caisson. The Engineer may allow free falling of concrete to a maximum of 60 feet (18.3 meters), if satisfactory methods are demonstrated.

If ground water is encountered and the hole can not be pumped dry, or if the Engineer does not approve free fall of concrete, place concrete using a gravity feed watertight tremie. Use a tremie pipe of at least 8 inches (203 mm) in diameter with a concrete hopper at the top. The Engineer may allow concrete to be placed by pumping through a supply line if satisfactory methods are demonstrated. If this method is allowed, use pump supply lines with watertight couplings. Seal the end of the pump line with a foam plug or other device approved by the Engineer to prevent concrete within the tremie or pump supply line from mixing with fluid in the excavation.

If a tremie is used, place it on the bottom of the excavation at the beginning of concrete placement, and keep it there until the tremie pipe and hopper are filled with concrete. Then raise the tremie only enough to induce concrete flow and do not lift the tremie further until the discharge end is immersed at least 10 feet (3.1 meters) into the deposited concrete. If concrete placement by pumping is used, secure the supply line in place so that the discharge end will not lift off the bottom of the excavation more than 6 inches (152 mm) until at least 10 feet (3.1 meters) of concrete has been placed. Embed the discharge end of the tremie or pump supply line a minimum of 10 feet (3.1 meters) in the concrete throughout the remainder of the concrete pour.

Complete the placement of all concrete in the caisson in two hours. Adjusted the retarder or water reducing agent as approved by the Engineer for the conditions encountered on the job so the concrete remains in a workable plastic state throughout the pour.

Prepare and cure the top surface of the construction joint in accordance with the requirements of Section 500. Locate construction joints as indicated on the Plans.

Do not place concrete under water in the caisson excavation without the permission of the Engineer. When permission is granted, place the concrete in accordance with the requirements of Section 500. Provide a sump to channel displaced water away from the caisson. Contain all displaced water to prevent water from entering into any body of water.

During the twenty-four hour period immediately following the completion of the placement of concrete in the caisson, do not install or extract casing within 50 feet (15.2 meters) of the completed caisson, and do not excavate any caissons within 15 feet (4.6 meters) of the completed caisson. If the Engineer determines that any construction adversely affects the recently constructed caisson, cease such activities immediately.

Protect any portion of drilled caissons exposed to a body of water from the action of water by leaving the forms in place for a minimum of seven days after pouring the concrete. Remove the forms prior to 7 days only if the concrete strength has reached 3000 psi (20.7 Mpa) or greater as tested by cylinder breaks.

524.3.08 Inspection and Safety

1. Check the dimensions and alignment of the caisson excavation under the observation of the Engineer.

2. Provide, use and maintain in good working order the following safety devices for the purpose of entering the caisson excavation for cleaning or inspection work:

    a. A safety harness attached to a separate safety line.

    b. OSHA-approved personnel lifting devices. Do not suspend any crane weights, blocks or other heavy weights above the head of any person entering the caisson excavation.

    c. Approved gas-testing equipment that tests for both oxygen level and percent explosion level. Provide and use an approved blower for fresh air if the testing equipment indicates the need.

    d. Casing of adequate thickness, size and depth to safely support the excavation.

    e. Non-electric pump(s) to adequately remove water from the excavation.

In addition, prior to entering the excavation, remove all loose and unnecessary objects from around the top of the caisson. Secure any caissons that will not be immediately poured after inspection and approval to prevent persons or objects from falling into the excavation.

524.3.08 Tolerances

Adhere to the following construction tolerances for drilled caissons:

1. Construct the drilled caisson to within 3 inches (76 mm) of the plan position plane, at the top-of-caisson elevation. Adhere to a vertical alignment tolerance of ¼-inch per 12 inches (6 mm per 305 mm) of depth.

2. Place reinforcement in accordance with the requirements of Section 511 of the Standard Specifications and Sub-section 524.3.06. Tie column steel (vertical bars) to hoops and spirals at 100% of the junctions with double wire figure-eight ties.

3. Placed vertical caisson reinforcing bars, including bars extending into columns or footings to within ½-inch (13 mm) of plan location. Place hoops or spirals to within 1 inch (25 mm) of their specified location. Adhere to a side form clearance of within ¼-inch (6 mm) of plan requirements.

4. Place the construction joint of the top of caissons used as caisson/column intermediate bents to within a tolerance of plus or minus 3 inches (76 mm) of the plan elevation.

524.4 Acceptability

In the event that significant voids are suspected in the concrete that were created during placement, verify the integrity of the caisson using a method that has been approved by the Engineer. If the caisson in question is found to be structurally deficient or out of tolerance in any way, the caisson will not be accepted unless corrective measures as approved by the Engineer are accomplished. Furnish additional materials and work necessary to effect corrections at no cost to the Department and with no increase in contract time.

524.5 Measurement

The length of accepted caisson foundation is measured in linear feet (meters) of caisson in place in the completed work. The length is measured from the final approved bottom elevation to 1 foot (305 mm) above the bottom of the footing cap where caissons are used in a footing or to the top of the caisson elevation detailed in the plans.

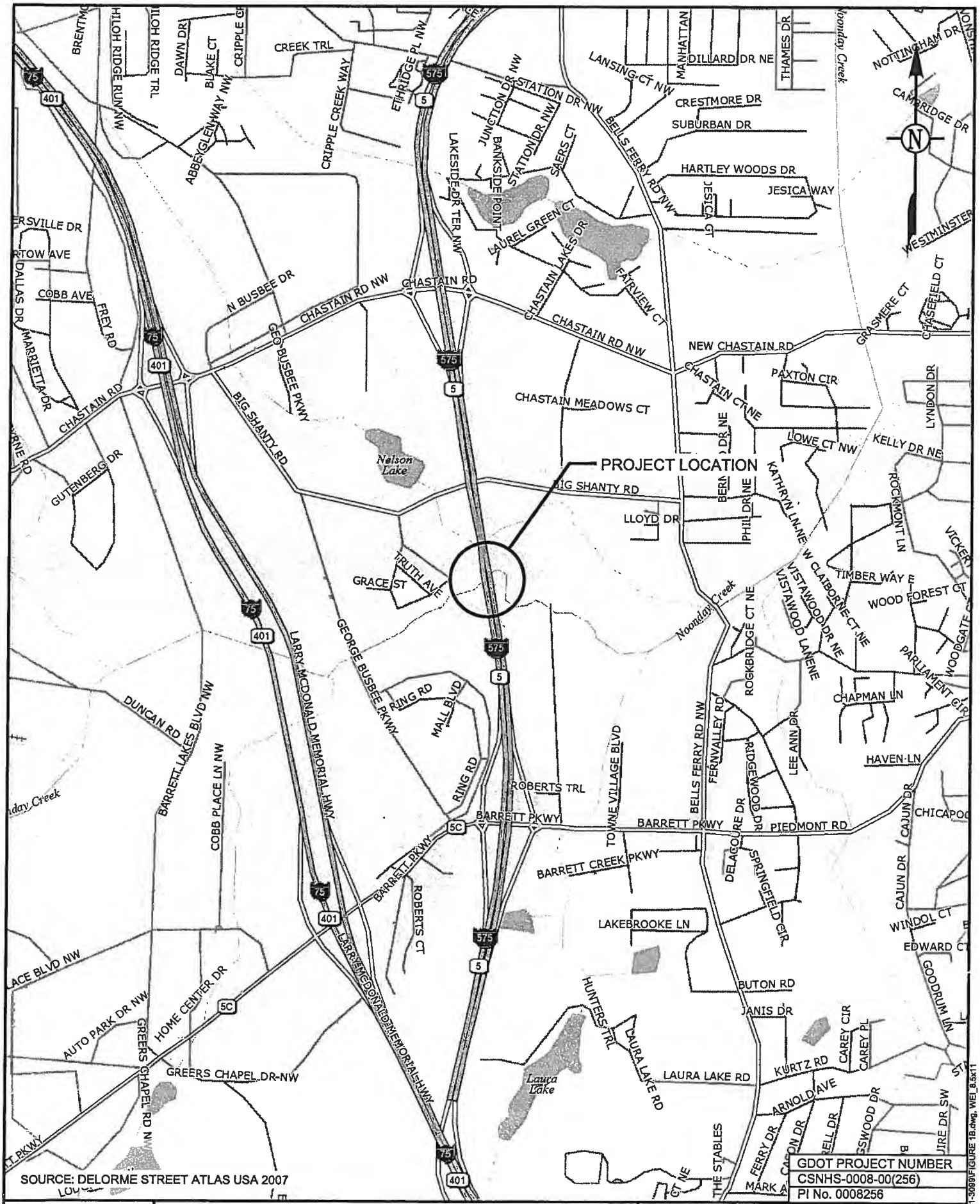
524.6 Payment

Drilled in place caisson foundations is paid for at the unit price bid per linear feet (meters) complete and in place as specified. The payment is full compensation for all excavation, furnishing and placement of reinforcing steel and concrete in the caisson, all temporary and permanent casing, disposal of excavated materials, and the cost of furnishing all tools, safety devices, labor, equipment and all other necessary items to complete the work.

Payment will be made under:

Item No. 524 DRILLED CAISSON_____INCHES (mm) DIA.....PER LINEAR FOOT (METER)

FIGURES



SOURCE: DELORME STREET ATLAS USA 2007

SCALE: 1" = 2000'	
DATE: 10/26/2007	
DRAWN BY: MDB	
REVIEWED BY: MK	

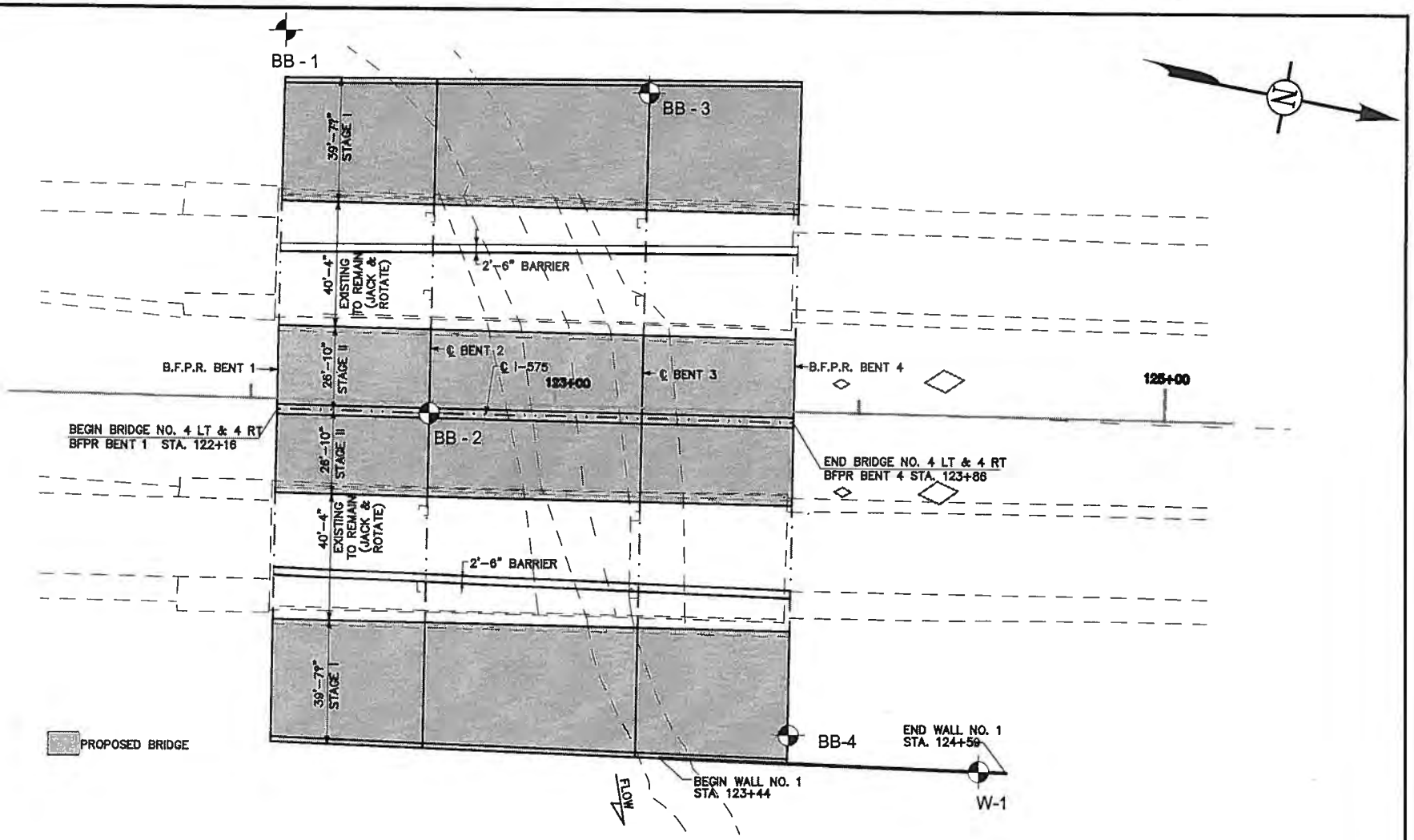
WILLMER ENGINEERING INC. WE

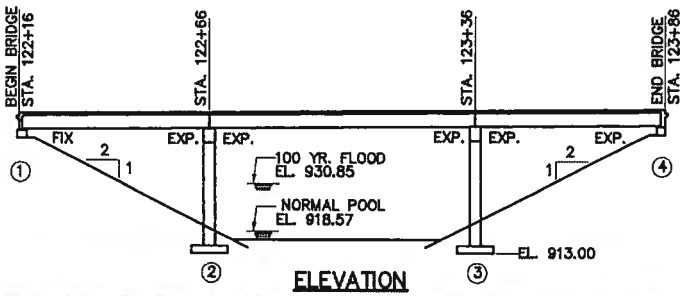
GEOTECHNICAL ENGINEERING
CONSTRUCTION SERVICES
ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD - SUITE 165
ATLANTA, GA 30340-4270

GDOT PROJECT NUMBER
CSNHS-0008-00(256)
PI No. 0008256

FIGURE 1
PROJECT LOCATION MAP
I-575 OVER NOONDAY CREEK (SOUTH)
NORTHWEST CORRIDOR PROJECT
COBB COUNTY, GEORGIA
WILLMER PROJECT No. ATL-171-3099B

AutoCAD\171-GEO\171-3099\FIGURE 1B.dwg, WEI_8.5x11





ELEVATION

LEGEND:

BORING LOCATION
BB - 1

GDOT PROJECT NUMBER
CSNHS-0008-00(256)
PI No. 0008256

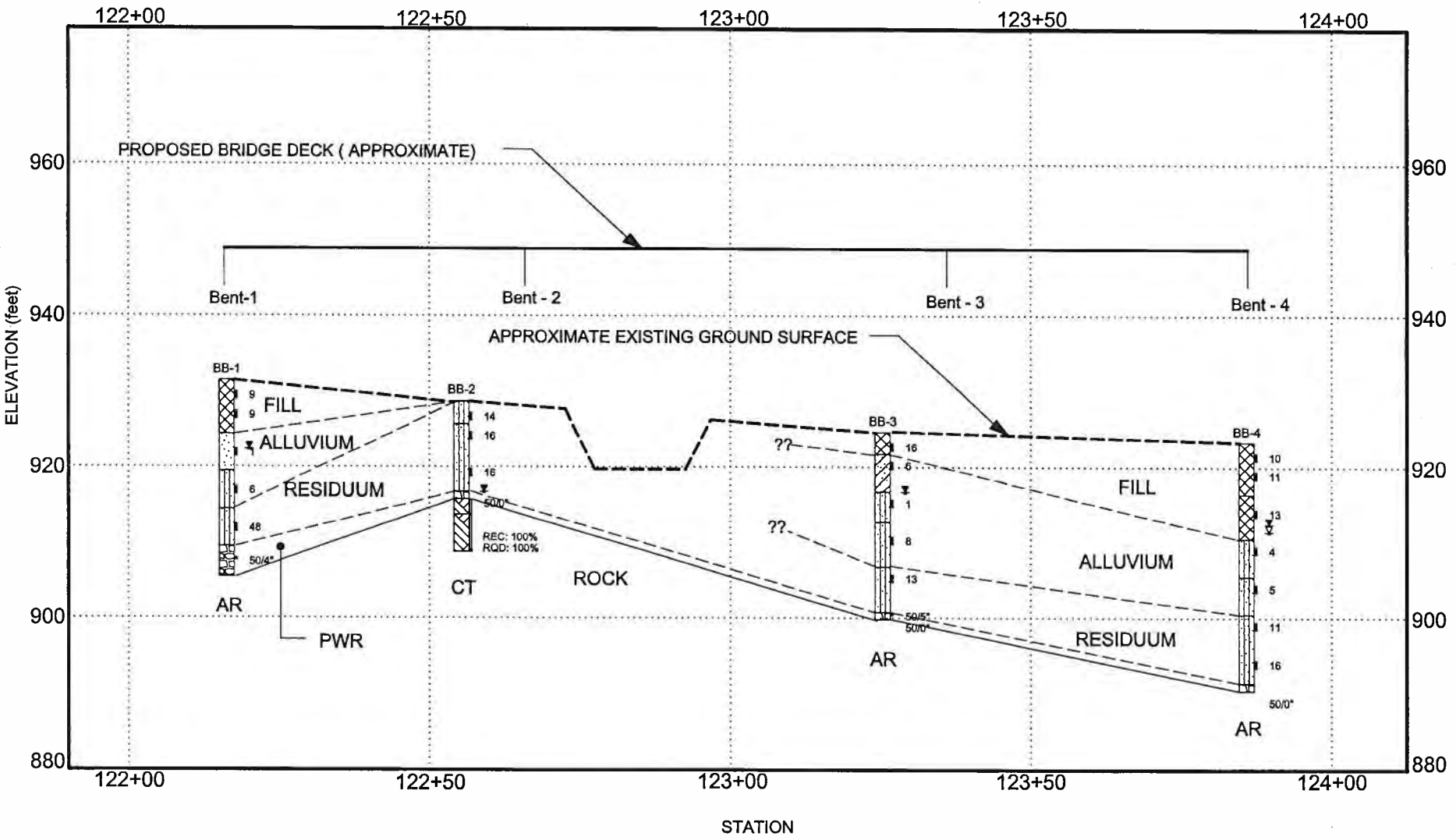
SCALE: 1" = 50'
DATE: 11/29/2007
DRAWN BY: MDB
REVIEWED BY: MK

WILLMER ENGINEERING INC.

GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES
ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD - SUITE 165
ATLANTA, GA 30340-4270

FIGURE 2
BORING LOCATION PLAN
I-575 OVER NOONDAY CREEK (SOUTH)
NORTHWEST CORRIDOR PROJECT
COBB COUNTY, GEORGIA
WILLMER PROJECT No. ATL-171-3099B

I:\AutoCAD\171-GEO\171-3099\NoonDayCreekSouth_PE.dwg, WEL_11x8.5



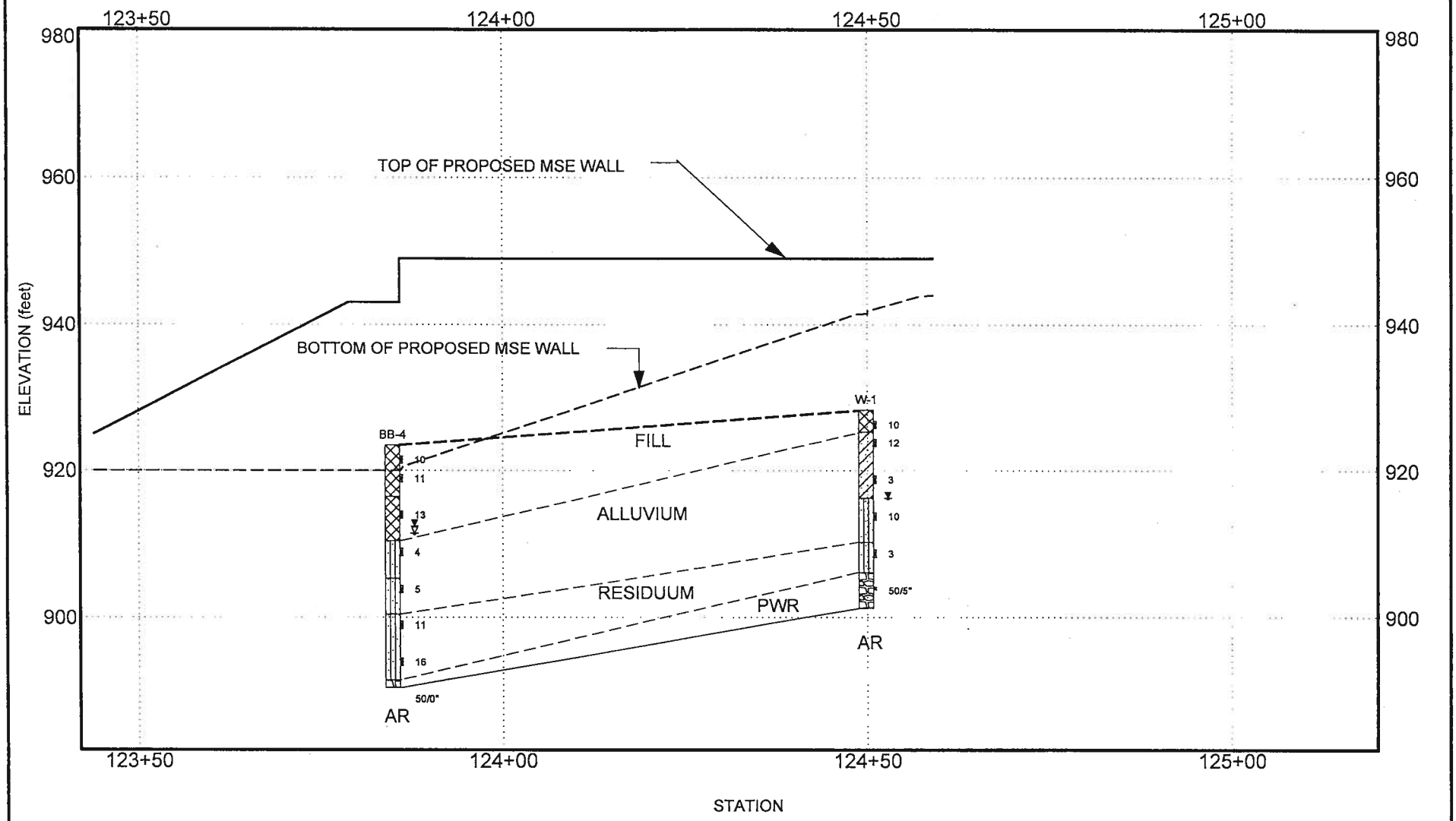
LEGEND:
- Groundwater Table @ 24 hours
- Groundwater Table @ Time of Boring
AR - Auger Refusal
CT - Coring Terminated
PWR - Partially Weathered Rock
REC - Recovery
RQD - Rock Quality Description

SCALE : 1 inch = 20 feet (vertical)
1 inch = 25 feet (horizontal)

GENERALIZED SUBSURFACE PROFILE (BRIDGE)

I-575 Over Noonday Creek (South)
GDOT Project No.: CSNHS-0008-00(256)
PI No.: 0008256
Cobb County, Georgia

PROJECT #	DATE	FIGURE
171-3099B	Nov 14, 2007	3



LEGEND:
- ▼ - Groundwater Table @ 24 hours
- ▽ - Groundwater Table @ Time of Boring
- AR - Auger Refusal
- PWR - Partially Weathered Rock

SCALE : 1 inch = 20 feet (vertical)
1 inch = 20 feet (horizontal)

GENERALIZED SUBSURFACE PROFILE (MSE WALL)

I-575 Over Noonday Creek (South)
GDOT Project No.: CSNHS-0008-00(256)
PI No.: 0008256
Cobb County, Georgia

PROJECT #	DATE	FIGURE
171-3099B	Nov 12, 2007	4

APPENDIX

WILLMER ENGINEERING INC. WE

BORING RECORD LEGEND

SM, CL, etc: - GROUP SYMBOL based on Unified Soil Classification System.
(Refer to ASTM D-2488 and Table 1 of D-2487)

N-VALUE: BLOWS PER FOOT- Standard Penetration Resistance (SPT) blow count , the sum of the second and third 6-inch increments of the SPT test.
(Refer to ASTM D-1586)

CONSISTENCY / RELATIVE DENSITY Correlated with SPT Blow Count, N:

SILTS AND CLAYS

N (blows per foot)	Consistency
0 - 2	Very Soft
3 - 4	Soft
5 - 8	Firm
9 - 15	Stiff
16 - 30	Very Stiff
31 - 50	Hard
> 50	Very Hard

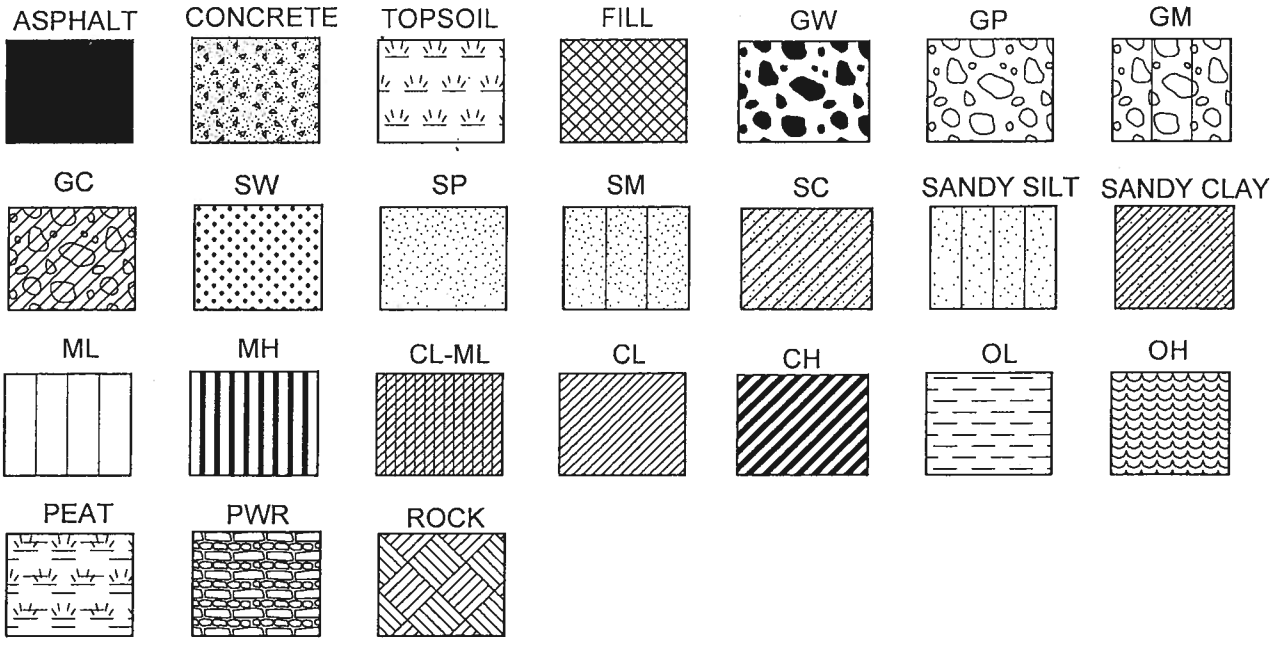
SANDS

N (blows per foot)	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
> 50	Very Dense

NOTES:

Groundwater Measurements:

- ▼ Water level at time of backfilling
- ▽ Water level at time of boring
- ▩ Caved level at 24 hours



Willmer Engineering Inc.
3772 Pleasantdale Road, Suite 165
Atlanta, Georgia 30340

UNIFIED SOIL CLASSIFICATION SYSTEM REFERENCE SHEET

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN #200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED #4 SIEVE	CLEAN GRAVELS LITTLE OR NO FINES	(GW)	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			(GP)	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES APPRECIABLE AMOUNT OF FINES	(GM)	SILTY GRAVELS and GRAVEL-SAND-SILT MIXTURES
			(GC)	CLAYEY GRAVELS and GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING #4 SIEVE	CLEAN SAND LITTLE OR NO FINES	(SW)	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			(SP)	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES APPRECIABLE AMOUNT OF FINES	(SM)	SILTY SANDS and SAND-SILT MIXTURES
			(SC)	CLAYEY SANDS and SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		(ML)	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR VERY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			(CL)	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			(OL)	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		(MH)	INORGANIC ELASTIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS
			(CH)	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			(OH)	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			(PT)	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

WILLMER ENGINEERING INC. | WE

ENGINEERING DESCRIPTION
OF
ROCK HARDNESS

Hardness	Description
Very hard	Cannot be scratched with knife or sharp pick. Breaking of hand specimens requires several hard blows of geologist's pick.
Hard	Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen.
Moderately hard	Can be scratched with knife or pick. can be excavated by hard blow of point of a geologist's pick. Hand specimens can be detached by moderate blow.
Medium	Can be grooved or gouged 1/16 inch deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1 inch maximum size by hard blows of the point of a geologist's pick.
Soft	Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure.
Very soft	Can be carved with knife. Can be excavated readily with point of pick. Pieces 1 inch or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.
Partially Weathered Rock	For engineering purposes, partially weathered rock (PWR) is locally defined as residual soils exhibiting Standard Penetration Test N-values in excess of 50 blows for 6 inches of penetration.

WILLMER ENGINEERING INC. | WE

Project: **I-575 Over Noonday Creek (South)**
Location: **Cobb County, Georgia**
Project Number: **171-3099B; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256**

HOLE No. BB-1
Sheet 1 of 1
Location: **BENT -1, LT Bridge**

Azimuth: -- Angle from Horizontal: **90** Surface Elevation (ft): **931.43** Station: **ST 122+16, 120' LT. of CL**
Drilling Equipment: **CME 550** Drilling Method: **HSA Auto Hammer**
Core Boxes: -- Samples: **6** Overburden (ft): **26** Rock (ft): -- Total Depth (ft): **26.0**
Logged By: **MK** Date Drilled: **9/25/07**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
		SS			FILL : Loose orange brown clayey medium to fine **SAND** with rock fragments (slightly micaceous)	FILL	931.4	
5		SS					930	9
								9
							925	
		SS			ALLUVIUM : Very loose tan and brown coarse to fine **SAND**	SP		1
10							920	
		SS			Loose gray coarse to fine **SAND** (slightly micaceous)	SM		6
15							915	
		SS			RESIDUUM : Dense gray, black and brown silty medium to fine **SAND**	SM		48
20							910	
		SS			PARTIALLY WEATHERED ROCK : Sampled as very dense gray, black and brown silty medium to fine **SAND**	PWR		50/4"
25								

Auger refusal encountered @ 26 feet below existing ground surface.

Groundwater was encountered @ 9 feet below existing ground surface @ time of boring and 24 hours after completion of boring.

STANDARD PENETRATION TEST DATA (blows/foot)
5 10 20 40 60 80

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. BB-1

PTN 171-3099B.GPJ 11/14/07

WILLMER ENGINEERING INC. | WE

Project: **I-575 Over Noonday Creek (South)**
Location: **Cobb County, Georgia**
Project Number: **171-3099B; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256**

HOLE No. BB-2

Sheet 1 of 1
Location: **BENT -2 , CNTR Bridge**

Azimuth: -- Angle from Horizontal: **90** Surface Elevation (ft): **928.72** Station: **ST 122+66, CL**
Drilling Equipment: **CME 550** Drilling Method: **HSA Auto Hammer**
Core Boxes: **1** Samples: **4** Overburden (ft): **13** Rock (ft): **7** Total Depth (ft): **20.0**
Logged By: **MK** Date Drilled: **9/24/07**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
0					TOPSOIL - 1 inch	928.7	
		SS			RESIDUUM : Medium dense brown and orange silty medium to fine **SAND** (slightly micaceous)	SM	14
		SS			Medium dense black and brown silty medium to fine **SAND** (micaceous)	SM	16
10		SS				920	16
		SS			PARTIALLY WEATHERED ROCK : No recovery	PWR	
15		NQ	100	100	ROCK CORE : Very hard gray, black and white **GNEISS**	915	50/0"
		NQ	100	100			
20						910	

STANDARD PENETRATION TEST DATA (blows/foot)
5 10 20 40 60 80

Auger refusal encountered @ 13 feet below existing ground surface.

Coring terminated @ 20 feet below existing ground surface.

Groundwater was encountered @ 12 feet below existing ground surface @ time of boring and 24 hours after completion of boring.

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. BB-2

PTN 171-3099B.GPJ 11/14/07

I-575 over Noonday
Creek (South)
PI No. 0008256
WEI No. 171-3099B
BB-2
13' to 20'
PROJECT_____HOLE NO._____
FROM____TO____BOX NO._____
TOP
13'
15'
End
20'
PROJECT_____HOLE NO._____
FROM____TO____BOX NO._____

WILLMER ENGINEERING INC. | WE

Project: **I-575 Over Noonday Creek (South)**
Location: **Cobb County, Georgia**
Project Number: **171-3099B; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256**

HOLE No. BB-3
Sheet 1 of 1
Location: **BENT -3, LT Bridge**

Azimuth: -- Angle from Horizontal: **90** Surface Elevation (ft): **924.76** Station: **ST 123+35, 107' LT.of CL**

Drilling Equipment: **CME 550** Drilling Method: **HSA Auto Hammer**

Core Boxes: -- Samples: **7** Overburden (ft): **25** Rock (ft): -- Total Depth (ft): **25.0**

Logged By: **MK** Date Drilled: **9/25/07**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
		SS			TOPSOIL - 1 inch / FILL : Medium dense brown silty medium to fine **SAND**	924.8	16
5		SS			ALLUVIUM : Loose brown and gray clayey medium to fine **SAND** (SC)	920	6
10		SS			Very loose black, tan and brown silty medium to fine **SAND** (SM)	915	1
15		SS			Loose gray and tan silty coarse to fine **SAND** with fine gravel (slightly micaceous) (SM)	910	8
20		SS			RESIDUUM : Medium dense white, brown and black medium to fine **SAND** with silt (micaceous) (SM)	905	13
25		SS SS			PARTIALLY WEATHERED ROCK : Sampled as very dense brown, black and white silty medium to fine **SAND** with rock fragments (slightly micaceous) (PWR)	900	50/5" 50/0"

Auger refusal encountered @ 25 feet below existing ground surface.

Groundwater was encountered @ 8 feet below existing ground surface @ time of boring and 24 hours after completion of boring.

STANDARD PENETRATION TEST DATA (blows/foot)
5 10 20 40 60 80

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NO - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. BB-3

PTN 171-3099B.GPJ 11/14/07

WILLMER ENGINEERING INC. | WE

Project: **I-575 Over Noonday Creek (South)**
Location: **Cobb County, Georgia**
Project Number: **171-3099B; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256**

HOLE No. BB-4
Sheet 1 of 1
Location: **BENT -4, RT Bridge**

Azimuth: -- Angle from Horizontal: **90** Surface Elevation (ft): **923.44** Station: **ST 123+86, 105' RT. of CL**
Drilling Equipment: **CME 550** Drilling Method: **HSA Auto Hammer**
Core Boxes: -- Samples: **8** Overburden (ft): **33** Rock (ft): -- Total Depth (ft): **33.0**
Logged By: **PT** Date Drilled: **10/8/07**

VERTICAL DEPTH (ft)	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)
0	SS			FILL : Stiff reddish brown medium to fine sandy **CLAY**	FILL	923.4
5	SS					920
				Stiff reddish brown medium to fine sandy **SILT** with organic odor (micaceous)	FILL	
10	SS					915
				ALLUVIUM: Very loose gray silty medium to fine **SAND**	SM	910
15	SS					
				Loose gray silty coarse to fine **SAND** (slightly micaceous)	SM	905
20	SS					
				RESIDUUM : Medium dense gray and white silty medium to fine **SAND** (slightly micaceous)	SM	900
25	SS					
30	SS					895
				PARTIALLY WEATHERED ROCK : No recovery	PWR	
	SS					

Auger refusal encountered @ 33 feet below existing ground surface.

Groundwater was encountered @ 12 feet below existing ground surface @ time of boring and 24 hours after completion of boring.

Hole caved in to 15 feet below the existing ground surface @ 24 hours after completion of boring.

STANDARD PENETRATION TEST DATA (blows/foot)

5 10 20 40 60 80

Bottom of MSE Wall

N-VALUE
10
11
13
4
5
11
16
50/0"

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. BB-4

171-3099B.GPJ 11/14/07

WILLMER ENGINEERING INC. | WE

Project: **I-575 Over Noonday Creek (South)**
Location: **Cobb County, Georgia**
Project Number: **171-3099B; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256**

HOLE No. W-1
Sheet 1 of 1
Location: **MSE Wall No. 1**

Azimuth: -- Angle from Horizontal: **90** Surface Elevation (ft): **928.30** Station: **ST 124+50, 117' Rt. of CL**
Drilling Equipment: **CME 550** Drilling Method: **HSA Auto Hammer**
Core Boxes: -- Samples: **6** Overburden (ft): **27** Rock (ft): -- Total Depth (ft): **27.0**
Logged By: **PT** Date Drilled: **10/8/07**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)
0		SS			FILL : Loose orange and reddish brown silty medium to fine **SAND** (slightly micaceous)	FILL	928.3
5		SS			ALLUVIUM : Medium dense to very loose brown and orange brown clayey medium to fine **SAND** with organic odor	SC	925
10		SS					920
15		SS			Loose gray and tan silty coarse to fine **SAND** with medium to fine gravel	SM	915
20		SS			RESIDUUM: Very loose gray and brown silty medium to fine **SAND** (slightly micaceous)	SM	910
25		SS			PARTIALLY WEATHERED ROCK : Very dense black, gray and brown silty medium to fine **SAND** (slightly micaceous)	PWR	905

Auger refusal encountered @ 27 feet below existing ground surface.

Groundwater was encountered @ 12 feet below existing ground surface @ time of boring and @ 11 feet below existing ground surface @ 24 hours after completion of boring.

STANDARD PENETRATION TEST DATA (blows/foot)

5 10 20 40 60 80

Bottom of MSE Wall El 941.5

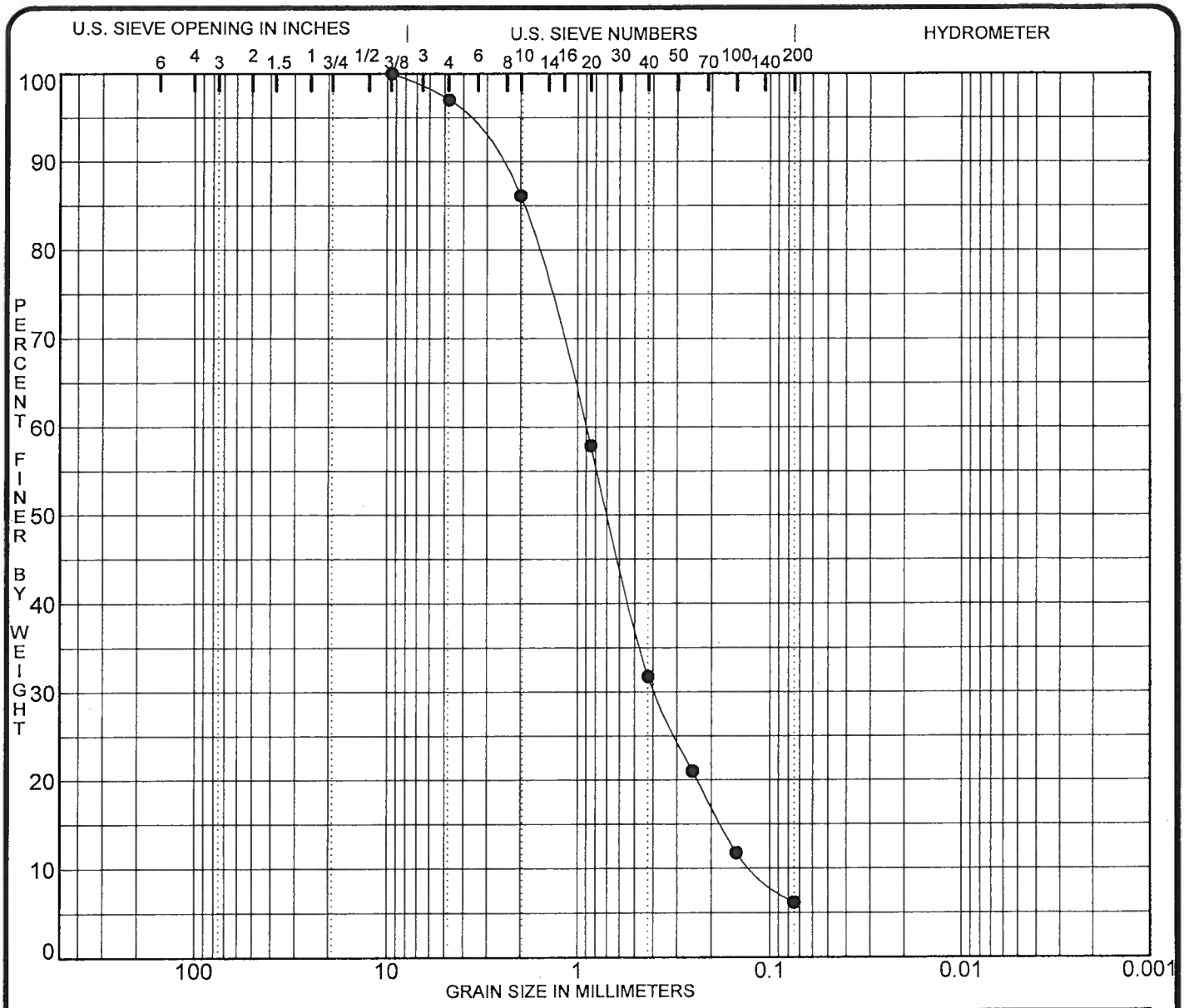
N-VALUE
10
12
3
10
3
50/5"

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. W-1

GTN 171-3099B.GPJ 11/14/07



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Soil Description	MC%	LL	PL	PI	Cc	Cu
● **BB-1 (S-4) (13.5-15 ft)**	**Gray coarse to fine SAND (slightly micaceous)**					**1.39**	**7.5**

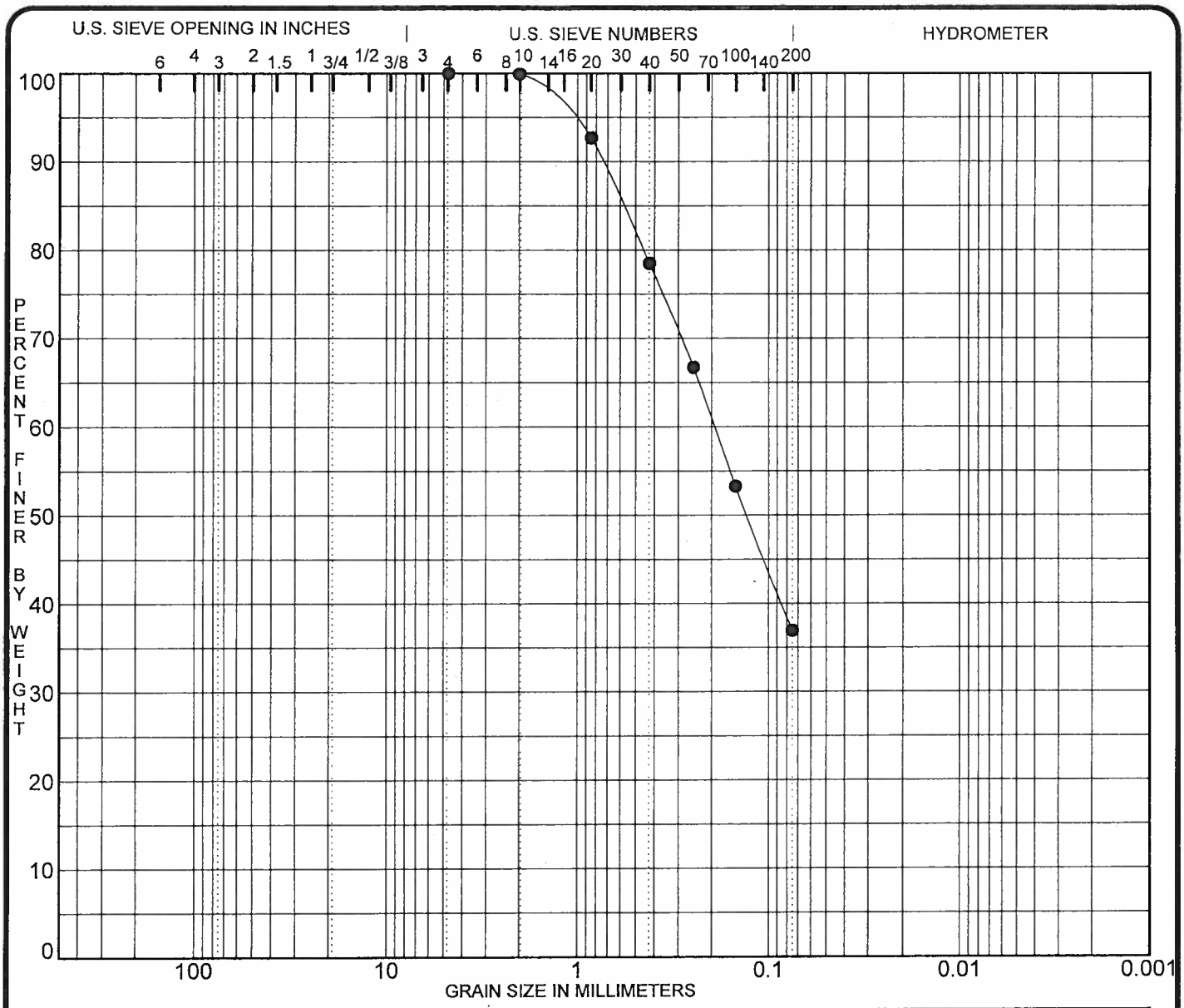
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **3509**	**9.50**	**0.91**	**0.390**	**0.1208**	**3.0**	**90.9**	**6.1**	

PROJECT I - 575 over Noonday Creek (South), Cobb Co., GA
GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256

JOB NO. 171-3099 B
DATE 11/16/07

WILMER ENGINEERING, INC. WE

GRADATION CURVE



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Soil Description	MC%	LL	PL	PI	Cc	Cu
● BB-2 (S-2) (3-5 ft)	Black and brown silty medium to fine SAND (micaceous)						

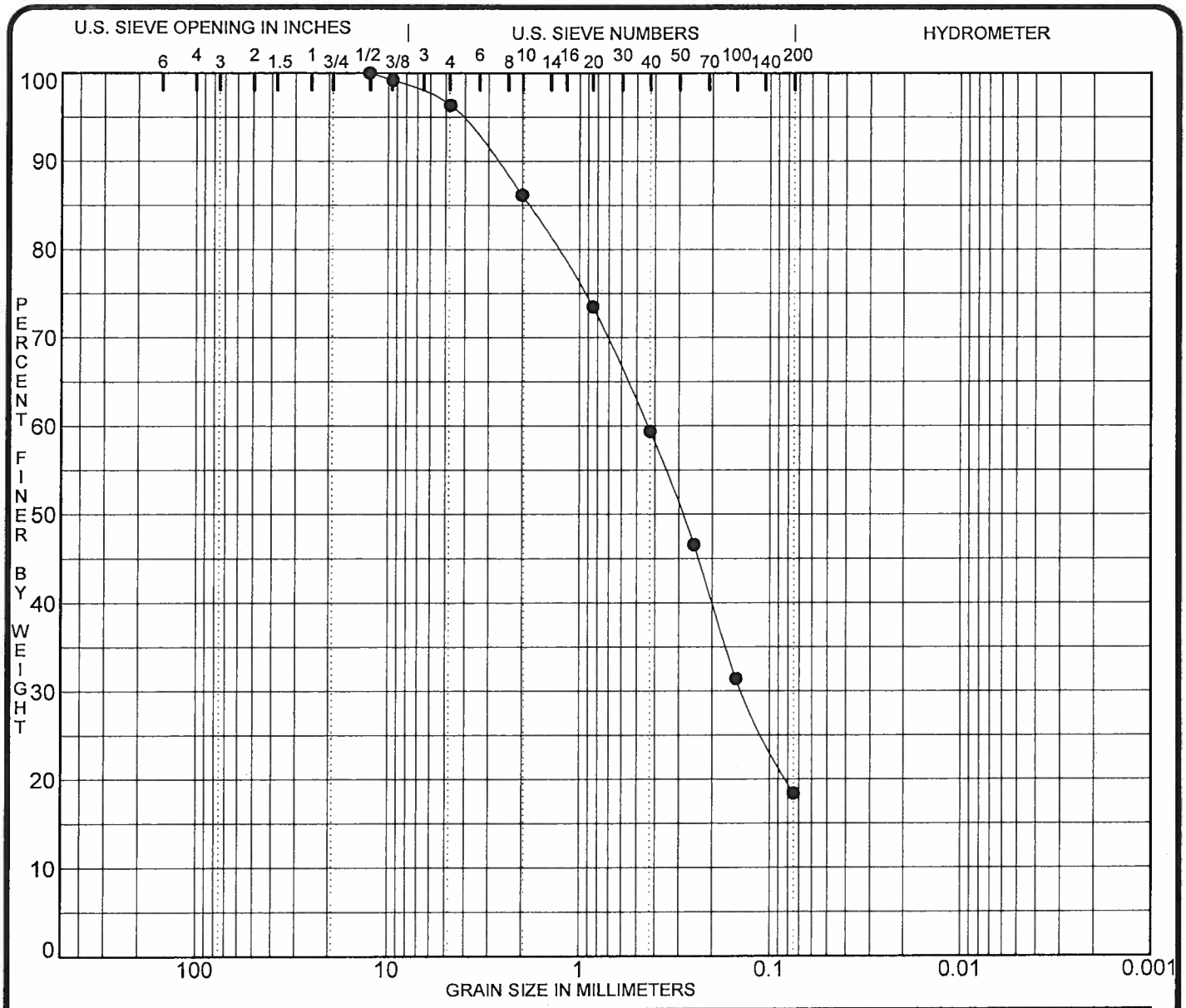
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● 3510	4.75	0.19			0.0	63.1	36.9	

PROJECT I - 575 over Noonday Creek (South), Cobb Co., GA
GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256

JOB NO. 171-3099 B
DATE 11/16/07

WILLMER ENGINEERING, INC. WE

GRADATION CURVE



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Soil Description	MC%	LL	PL	PI	Cc	Cu
● **BB-3 (S-5) (18.5-20 ft)**	**White, black and brown medium to fine SAND with silt (micaceous)**						

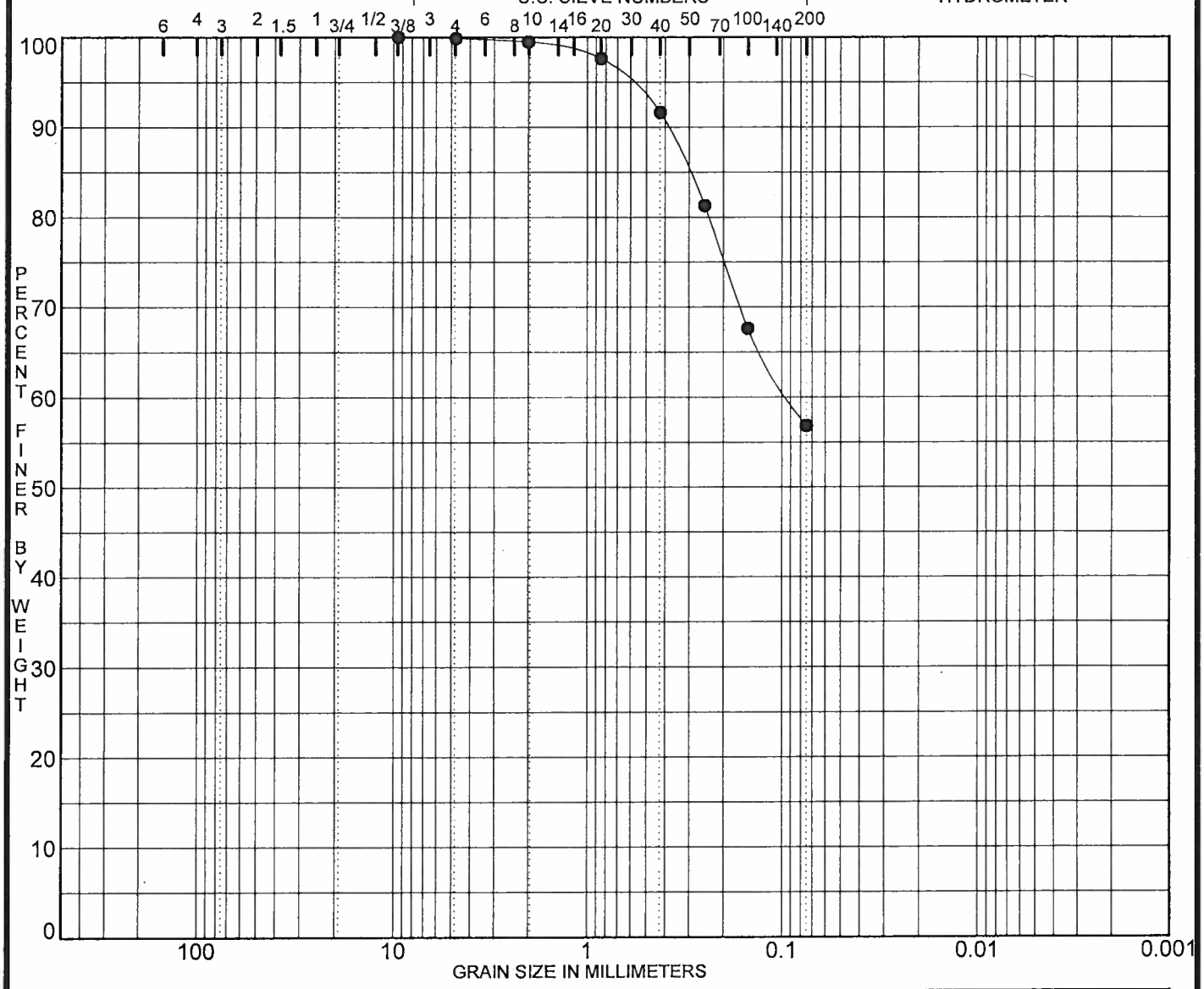
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **3511**	**12.50**	**0.44**	**0.139**		**3.6**	**78.0**	**18.4**	

PROJECT I - 575 over Noonday Creek (South), Cobb Co., GA
GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256

JOB NO. 171-3099 B
DATE 11/16/07

WILLMER ENGINEERING INC. WE

GRADATION CURVE



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Soil Description	MC%	LL	PL	PI	Cc	Cu
● **BB-4 (S-3) (8.5-10 ft)**	**Reddish brown medium to fine sandy SILT (micaceous)**						

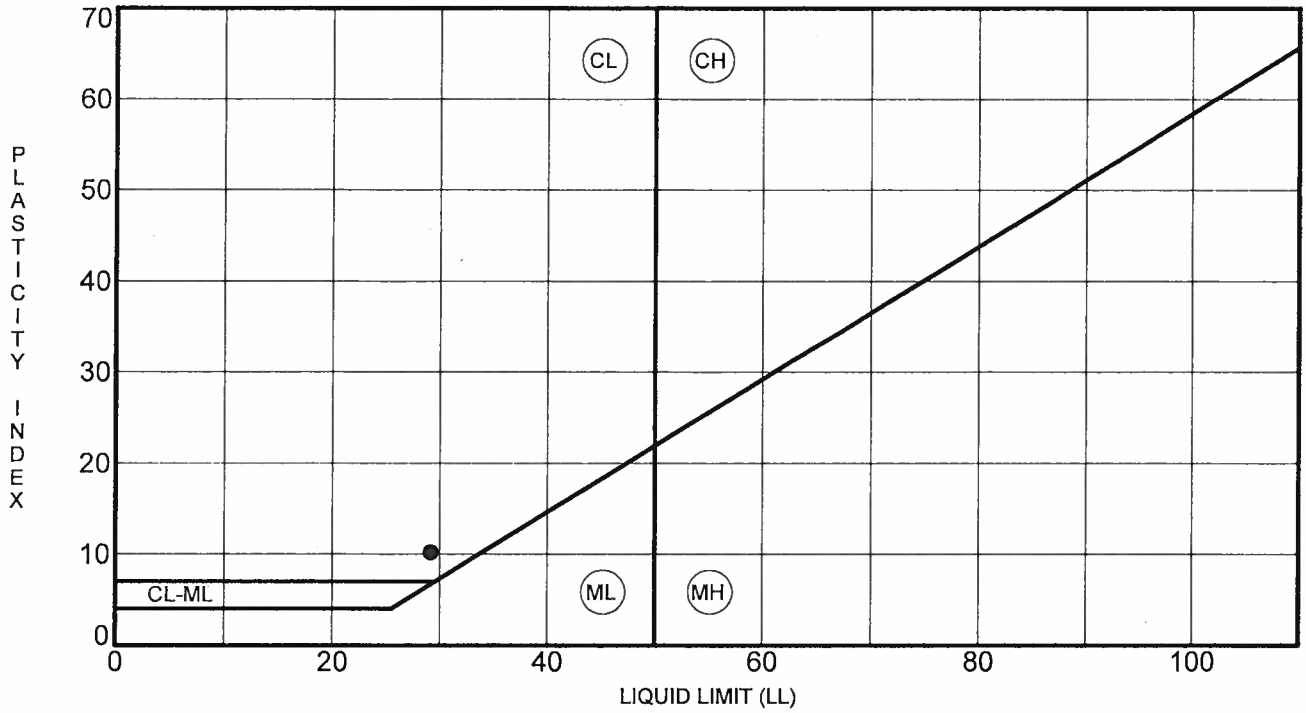
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **3512**	**9.50**	**0.09**			**0.1**	**43.0**	**56.8**	

PROJECT I - 575 over Noonday Creek (South), Cobb Co., GA
GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256

JOB NO. 171-3099 B
DATE 11/16/07

WILLMER ENGINEERING INC. WE

GRADATION CURVE



Specimen Identification	LL	PL	PI	Fines	Classification
● BB-4 (S-2)	29	19	10		Reddish brown medium to fine sandy CLAY (CL); NMC = 16.9%

PROJECT I - 575 over Noonday Creek (South), Cobb Co., GA
GDOT Proj # :CSNHS-0008-00(256); PI # : 0008256

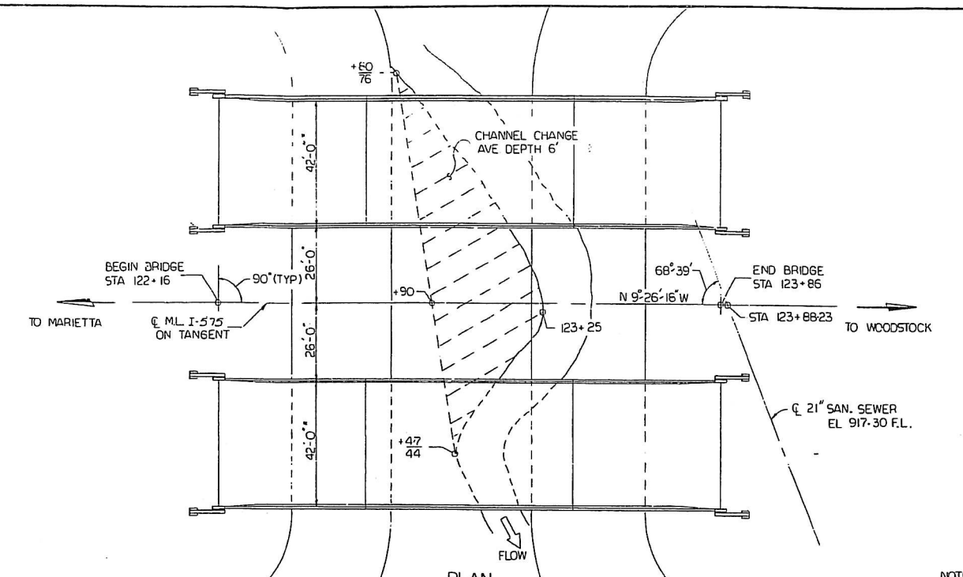
JOB NO. 171-3099 B
DATE 11/19/07

WILLMER ENGINEERING, INC. WE

ATTERBERG LIMIT RESULTS

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.	I-575-1(2)00	187	437

REV. 11-18-77



N

PVI STA 119+00
EL 945.77
-1.11%
+1.05%
1000' VC

GRADE DATA

NOTE: ALL BENTS ARE PARALLEL
END BENT PILES NOT SKEW
* INSIDE FACE TOP OF BARRIER TO INSIDE FACE TOP OF BARRIER.
** RIP RAP FROM END BENTS TO 1' ABOVE HIGHWATER ELEV. RIP RAP 20 FT. BEYOND EB

BRIDGE CONSISTS OF

1 - 50'-0" - 70'-0" - 50'-0" PSC BEAM CONTINUOUS UNIT ---------- SPECIAL DESIGN
(SIMPLE SPAN FOR DEAD LOAD - CONTINUOUS FOR LIVE LOAD)

1 - STEEL H PILE END BENT ---------- SPECIAL DESIGN

1 - STEEL H PILE END ABUTMENT ---------- SPECIAL DESIGN

2 - CONCRETE INTERMEDIATE BENTS ---------- SPECIAL DESIGN

END POST & END POST GUARDRAIL ATTACHMENT DETAILS ------ GA. STD. NO.3053(2-1-75)
L = 4'-0"; W = 1'-1"; H = 2'-8"

BAR BENDING DETAILS ---------- GA. STD. NO.3901

TYPICAL FILL DETAILS AT END OF BRIDGE ---------- GA. STD. NO.9037(9-1-70)

REINFORCED CONCRETE APPROACH SLAB ---------- GA. STD. NO.9017H(5-12-76)

GENERAL NOTES

SPECIFICATIONS - GEORGIA STANDARD DATED 1972.

WAITING PERIOD - NO WORK SHALL BE STARTED AT BENTS 1 AND 4 UNTIL THE COMPLETED END FILLS HAVE BEEN IN PLACE FOR AN ESTIMATED PERIOD OF 30 DAYS.

CHAMFER - ALL EXPOSED EDGES SHALL BE CHAMFERED 3/4 INCH UNLESS OTHERWISE NOTED.

PROTECTIVE SURFACE TREATMENT - PER SECTION 500.13C WILL BE REQUIRED AT THIS SITE.

REINFORCEMENT - ALL REINFORCEMENT SHALL BE PLACED AND TIED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. WELDING OF REINFORCEMENT WILL NOT BE PERMITTED, EXCEPT AS SHOWN ON THE PLANS.

DRIVING DATA PILES - ONE REQUIRED AT BENTS 1 AND 4.

PILE DRIVING OBJECTIVE - SEE SUBSTRUCTURE DETAILS.

STONE DUMPED RIP RAP SHALL BE TYPE I. SEE SPEC. PROV. SECT. 805 - RIP RAP AND CURBING STONE, DATED APRIL 22, 1974.

APPROACH SLAB - THE VOLUME OF CONCRETE, PREFORMED ELASTIC SEAL, AND LBS. BAR REINF. STEEL IN THE APPROACH SLAB ARE TO BE CONSTRUCTED AND PAID FOR AS ROADWAY ITEMS. GP. STD. NO.9017-H SHOWN FOR INFORMATION PURPOSE AT BRIDGE ENDS ONLY.

⚠ Pilot Holes - 15"ϕ Pilot Holes will be required at Bent 1 Rt.

SUMMARY OF QUANTITIES

195	195	CU YD BR EXCAV, STREAM CROSS
LUMP	---	SUPERSTR CONC (CL AA) - BR NO 3 LT
---	LUMP	SUPERSTR CONC (CL AA) - BR NO 3 RT
116	116	CU YD CL A CONC
LUMP	---	PSC BEAMS, AASHO TYPE 3-12, BR NO 3 LT
---	LUMP	PSC BEAMS, AASHO TYPE 3-12, BR NO 3 RT
LUMP	---	PSC BEAMS, AASHO TYPE 3-20, BR NO 3 LT
---	LUMP	PSC BEAMS, AASHO TYPE 3-20, BR NO 3 RT
29,661	29,661	LB BAR REINF STEEL
LUMP	---	SUPERSTR REINF STEEL - BR NO 3 LT
---	LUMP	SUPERSTR REINF STEEL - BR NO 3 RT
524	569	LIN FT PILING IN PLACE, STEEL H, 14 BP 73
1	1	EACH LOAD TEST, STEEL H, 14 BP 73 (IF REQD)
3,000		SQ YD STN DUMPED RIP RAP, 12 IN
LUMP	---	EPOXY COATED SUPERSTRUCTURE REINFORCEMENT STEEL - BR NO 3 LT.
---	LUMP	EPOXY COATED SUPERSTRUCTURE REINFORCEMENT STEEL - BR NO 3 RT.
---	⚠ 108	Lin. Ft. Pilot Holes

DESIGN DATA

SPECIFICATIONS - A.A.S.H.T.O., 1973; INT. '74, '75, '76

TYPICAL HS20-44 AND/OR MILITARY LOADING - IMPACT ALLOWED

FUTURE PAVING ALLOWANCE = 15 LBS. PER SQ. FT.

CONCRETE: f'c = 3,000 PSI (ALLOWABLE fc = 1,200 PSI)

REINFORCING STEEL: GRADE 40 (fy = 40,000 PSI)
ALLOWABLE fs = 20,000 PSI

UTILITIES

NONE

BRIDGE NO. 3 LT. ℄ RT.

GEORGIA
DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION-BRIDGE DESIGN

PLAN AND ELEVATION
I-575 OVER NOONDAY CREEK
COBB CO. I-575-1(2)00 CTI

SCALE 1" = 20'-0"

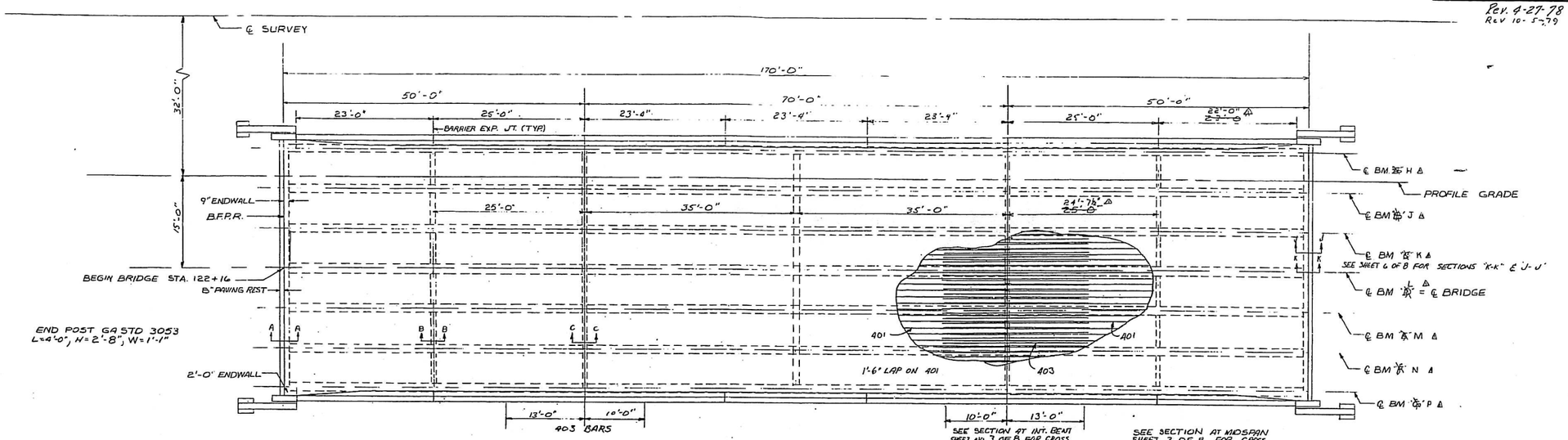
BY	REVISIONS	DATE
JWW	⚠ LIN FT PILOT HOLES	11/10/77
JWW	⚠ PILOT HOLES NOTE	11/21/77

DESIGNED RLH
DRAWN JWW
TRACED
CHECKED
REVIEWED
APPROVED

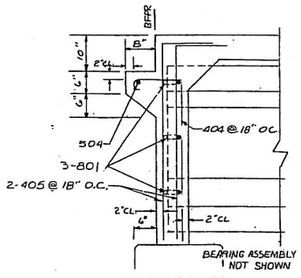
BRIDGE SHEET 1 OF 8

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	GA.	I-575-1(2)00	188	437

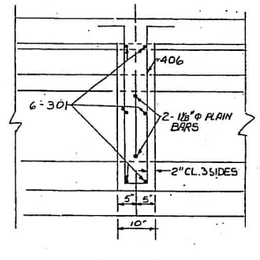
Rev. 4-27-78
Rev 10-5-79



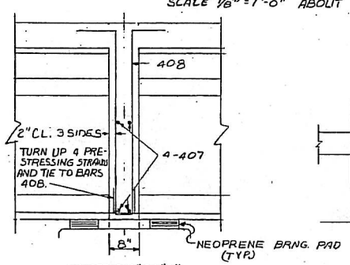
PLAN - RT BRIDGE LT. BRIDGE SYMMETRICAL
SCALE 1/8" = 1'-0" ABOUT ℄ SURVEY.



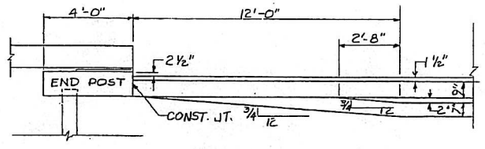
SECTION "A-A"
SCALE 3/4" = 1'-0"



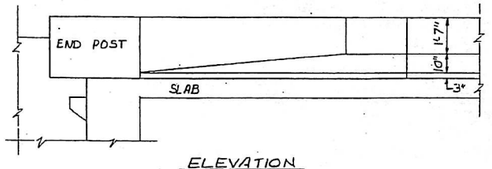
SECTION "B-B"
SCALE 3/4" = 1'-0"



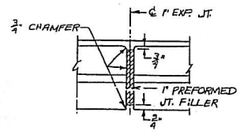
SECTION "C-C"
SCALE 3/4" = 1'-0"



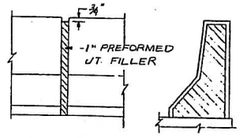
PLAN
BARRIER TAPER DETAIL



ELEVATION
BARRIER TAPER DETAIL

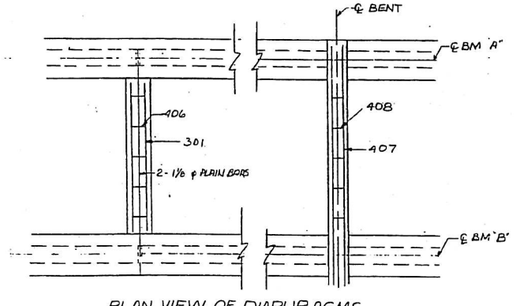


PLAN



ELEVATION SIDE ELEV.

DETAILS OF 1" EXPANSION JOINT IN BARRIER



PLAN VIEW OF DIAPHRAGMS
SCALE: ½" = 1'-0"

QUANTITIES				
ITEM \ SPAN	SPAN 1	SPAN 2	SPAN 3	TOTAL
CU YDS. CLASS "A-A" CONCRETE	71.26	84.61	65.12	220.99
LBS. BAR REINF. STEEL	~~7800~~ 8002	~~9120~~ 9408	~~7064~~ 7259	~~23984~~ 24,669
LBS. BAR REINF. STEEL EPOXY COATED	6987	8571	6987	22545

BRIDGE NO 3 LT & RT

GEORGIA
DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION - BRIDGE DESIGN

DECK PLAN
I-575 OVER NOONDAY CREEK
COBB COUNTY I-575-1(2)00 CT 1
SCALE: AS SHOWN FEBRUARY, 1977

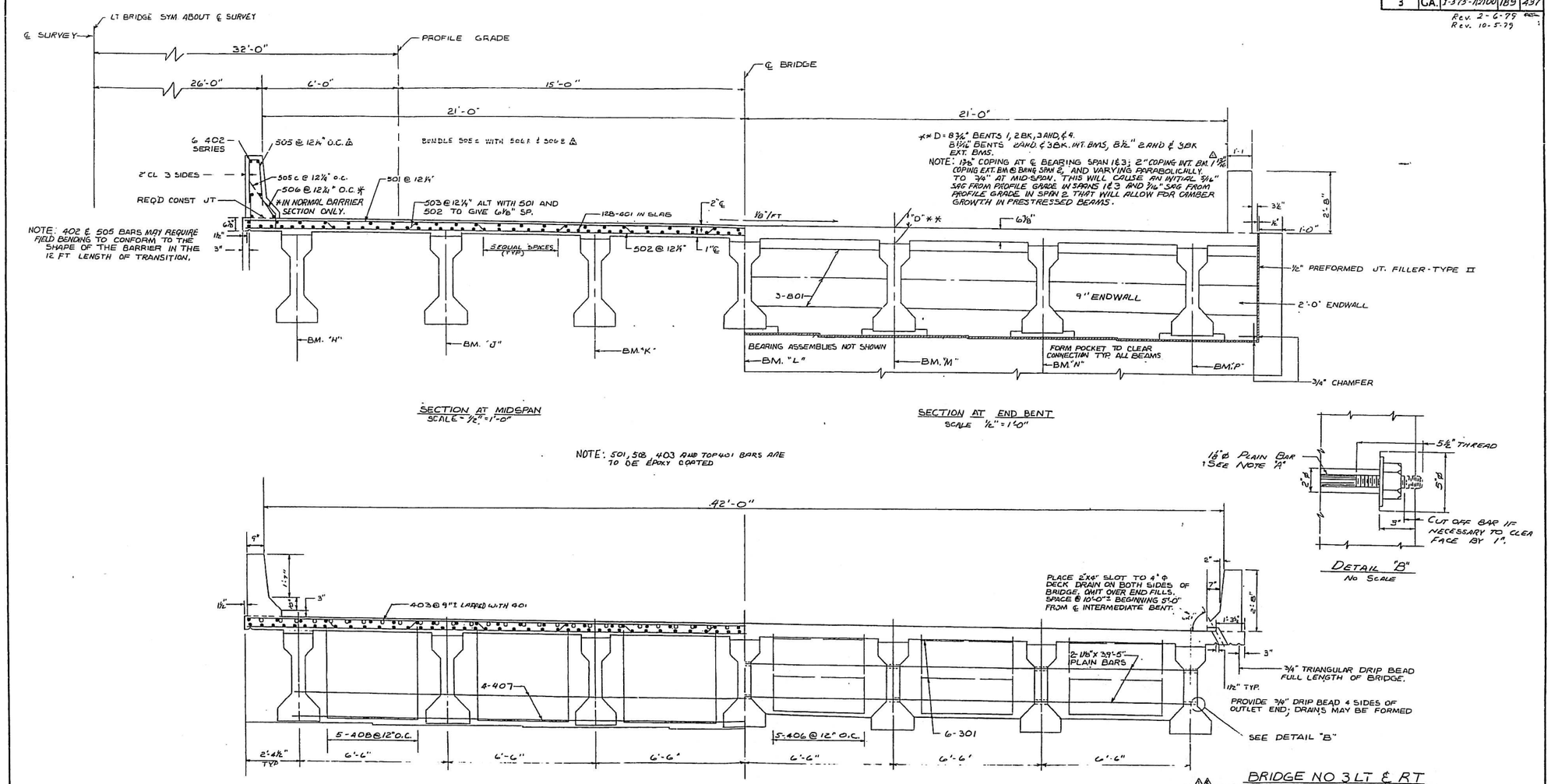
REVISIONS		DATE
REV. DIM. & BEAMS		4-27-78
REV. RAIL QUANT. FOR 50 SC BRG		10-5-79

BRIDGE SHEET 2 OF 8

DESIGNED BDM TRACED REVIEWED LRP
DRAWN RHS CHECKED BDM APPROVED

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
3	GA.	I-575-1(2)00		189	437

Rev. 2-6-79
Rev. 10-5-79



BRIDGE NO 3 LT & RT

NOTE "A"
PAINT ENTIRE BAR, NUTS, AND WASHERS IN ACCORDANCE WITH SECTION 535.04C USING TWO COATS OF PAINT IP. NUT SHALL BE BROUGHT TO A SNUG FIT AGAINST OUTSIDE OF BEAM BEFORE DIAPHRAGM IS POURED. AFTER DIAPHRAGMS HAVE BEEN POURED A MINIMUM OF 5 DAYS AND CONCRETE HAS REACHED A MINIMUM STRENGTH OF 1500 P.S.I. NUTS SHALL BE FULLY TORQUED TO 180 FT-LB AFTER WHICH THE RECESS SHALL BE GROUTED AND DRESSED TO ASSURE A NEAT APPEARANCE.

REVISIONS	BY	DATE
CHANGED COPING	R.D.M.	2-6-79
ADDED NOTE & SPEC. BAR	D.E.M.	10-5-79

GEORGIA
DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION - BRIDGE DESIGN

SUPERSTRUCTURE

I-575 OVER NOONDAY CREEK

COBB, COUNTY I-575-1(2)00 CT 1

SCALE: AS NOTED AUGUST, 1976

BRIDGE SHEET 3 OF 8

DESIGNED BDM TRACED REVIEWED LRF
DRAWN RHS CHECKED BDM APPROVED

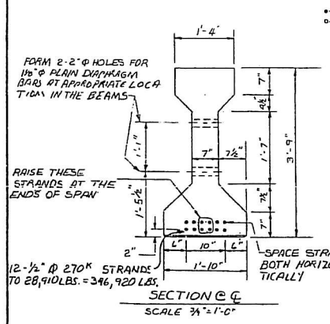
STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.	I-575-1(2)00	190	437

Rev. 10/11/77 Rev. 4-27-78

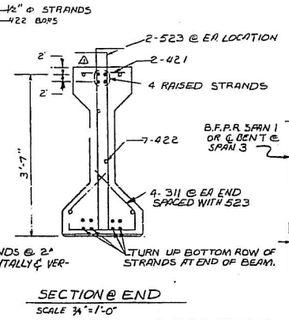
NOTE: TYPE 3 RUBBED FINISHED OR APPROVED COATING) REQ'D BY STD. SPECIFICATIONS SECTION 500.13 SHALL NOT BE REQ'D FOR PSC BEAMS.

COVER EXPOSED PRESTRESSED STRANDS WITH MIN. ½" EPOXY MORTAR AT BEAM ENDS, EXCEPT WHERE STRA. S EXTEND INTO END DIAPHRAGMS.

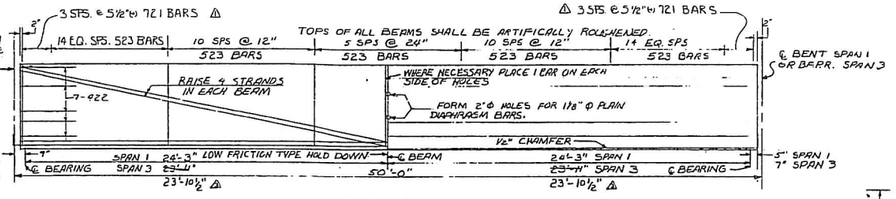
BAR DETAILS				
BAR	TYPE	LENGTH	NO. PER BEAM SPAN 1 & 3	NO. PER BEAM SPAN 2
421	I	10"	4	4
523	II	Δ 4'-8"-6'-0"	44	84 Δ
311	III	5'-3"	8	8
422	I	4'-6"	14	14
721	II	6'-0"	16	16



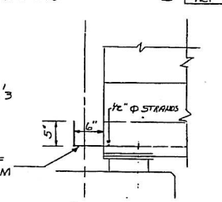
SECTION @ ℄
SCALE ¾"=1'-0"



SECTION @ END
SCALE ¾"=1'-0"

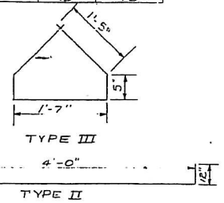


ELEVATION SPAN 1 & 3
SCALE ¼"=1'-0 HORZ.

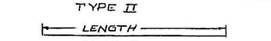


TURN UP BOTTOM ROW OF STRANDS AT END OF BEAM

DETAIL "A"

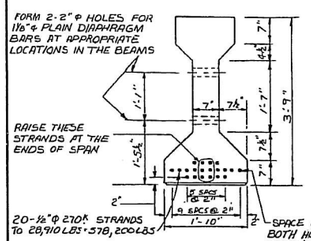


TYPE III

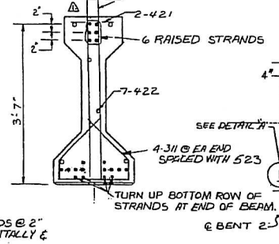


TYPE II

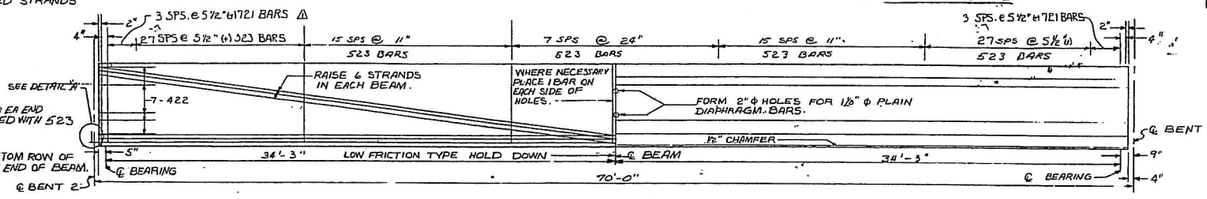
LENGTH
TYPE I



SECTION @ ℄
SCALE ¾"=1'-0"



SECTION @ END
SCALE ¾"=1'-0"



ELEVATION SPAN 2
SCALE ¼"=1'-0" HORZ.

NOTES

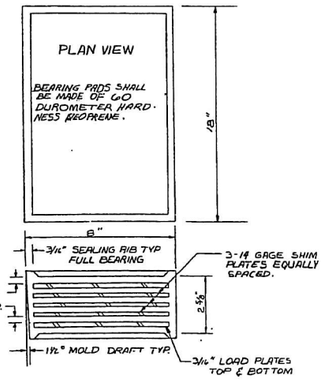
ALL COMPONENTS OF BEARING ASSEMBLIES EXCEPT SHIM PLATES SHALL BE A-36 STEEL. 14 GA. SHIM PLATES SHALL BE HOT ROLLED PLATE, ASTM A-570.

AFTER ALL WELDING AND ERECTION IS COMPLETE, THE EXPOSED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH SEC. 648.

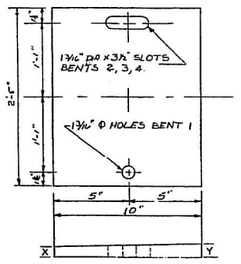
NEOPRENE PADS SHALL BE BONDED TO THE BASE PLATES WITH EITHER H.B. FULLER CO.'S NO 934 SYNTHETIC RUBBER CONTACT BOND CEMENT OR MINNESOTA MINING AND MFG. CO 3M SCOTCH RUBBER ADHESIVE 1711 OR EQUAL. BONDING SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

PLATES SHALL BE GALVANIZED AS PER A 123. ANCHOR BOLTS NUTS AND WASHERS SHALL BE GALVANIZED AS PER ASTM A 153.

PSC BEAMS SHALL BE CAST 1" LONGER THAN SHOWN AT THE TIME OF STRAND RELEASE. CONCRETE MUST HAVE A MINIMUM STRENGTH OF 4500 PSI.

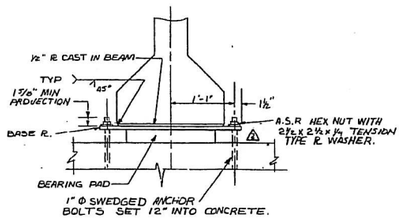


BEARING PAD DETAILS
NO SCALE

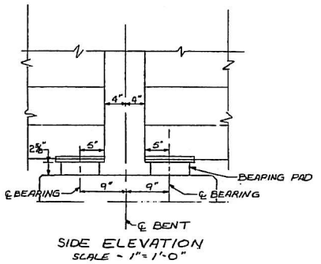


BASE PLATE DETAILS
NO SCALE

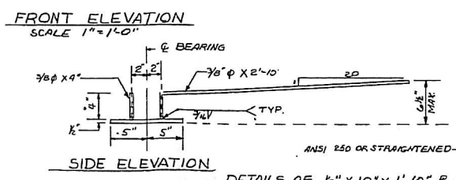
X & Y DIMENSIONS								
BEAM		P	N	M	L	K	J	H
BT 1	X	½"						→
	Y	7/16"						→
BT 2BK	X	7/8"	7/8"	7/8"	13/16"	13/16"	7/8"	5/8"
	Y	4½"	5¾"	5¾"	7/8"	1"	15/16"	1¼"
BT 2AH	X	½"						→
	Y	5/8"						→
BT 3BK	X	½"						→
	Y	5/8"						→
BT 3AH	X	1"	1¾"	1 3/16"	1 3/16"	1½"	1¼"	15/16"
	Y	1⅝	1 5/16"	1 5/16"	1 3/16"	1¼	1 3/16"	1¼"
BT 4	X	½"						→
	Y	5/8"						→



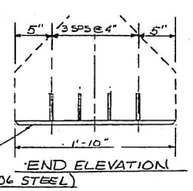
FRONT ELEVATION
SCALE 1"=1'-0"



SIDE ELEVATION
SCALE ~ 1"=1'-0"



SIDE ELEVATION



END ELEVATION

DETAILS OF ½" X 10" X 1'-10" R (A-36 STEEL)
SCALE 1½"=1'-0"

NOTE AT THE OPTION OF THE CONTRACTOR, ⅞"Φ X 6" WELDED STUDS MAY BE USED IN LIEU OF NO. 4 BARS WELDED TO PLATES CAST INTO GIRDERS. BASE PLATES MAY BE ATTACHED TO PLATES CAST INTO GIRDERS BY 3-3¾"Φ X 1⅛" LONG H.S. FH MACHINE SCREWS IN LIEU OF WELDED OR PINTLES. STUDS SHALL SHALL CONFORM TO SECTION 512 OF THE STANDARD SPECIFICATIONS. STUDS SHALL BE GALVANIZED. ASTM A-123.

ESTIMATED QUANTITIES PER BEAM			
ITEM	SPAN 1	SPAN 2	SPAN 3
CU. YDS. CLASS AAA CONC.	7.11	7.02	9.99
LBS. BAR REINF. STEEL	471.0	667.0	471.0 Δ
LIN FT. ½" Φ 270K PRETEN STEEL	4144.0	9,707.0	4095.0
LBS. STRUCTURAL STEEL	1498.0	1407.0	1765.0

BRIDGE NO 3 LT & RT.

GEORGIA DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION - BRIDGE DESIGN

PRESTRESSED BEAM DETAILS
I-575 OVER NOONDAY CREEK
COBB COUNTY I-575-1(2)00 CT 1
SCALE: AS SHOWN MARCH 1977

REVISIONS	BY	DATE
ADDED REINF. DETAILS	GDOT	11/10/77
CHANGED HOLE DIA.	GDOT	4-27-78
CHANGED STRAND PATTERN	GDOT	4-27-78

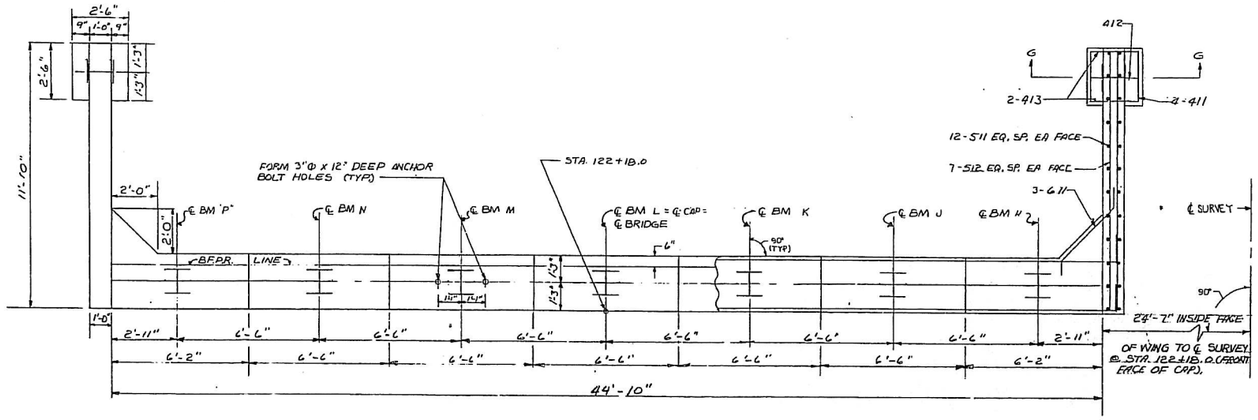
BRIDGE SHEET 4 OF 8

DESIGNED BDM DRAWN RHS TRACED CHECKED BDM REVIEWED LRP APPROVED

FORM NO. D-1

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.	I-575-1(2)00	191	437

REV. 11-18-77

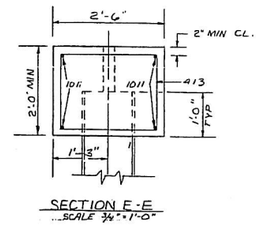


BENT 1 RT. BRIDGE LOOKING BACK
LT. BRIDGE SYMMETRICAL ABOUT ℄ OF SURVEY.

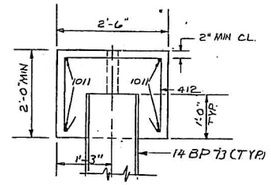
PLAN
SCALE 3/8" = 1'-0"

NOTE: BAR REINFORCEMENT SYMMETRICAL ABOUT ℄ BENT. MAINTAIN 2" CL. TO REINFORCEMENT EXCEPT WHERE NOTED. POUR CAP AND WINGS MONOLITHICALLY.

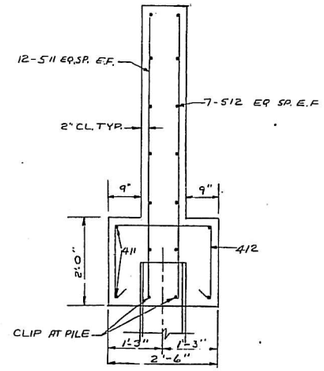
QUANTITIES	
ITEM / BENT	1 LT OR RT
CU. YDS. "A" CONC.	16.01
LBS BAR REINF. STEEL	1990



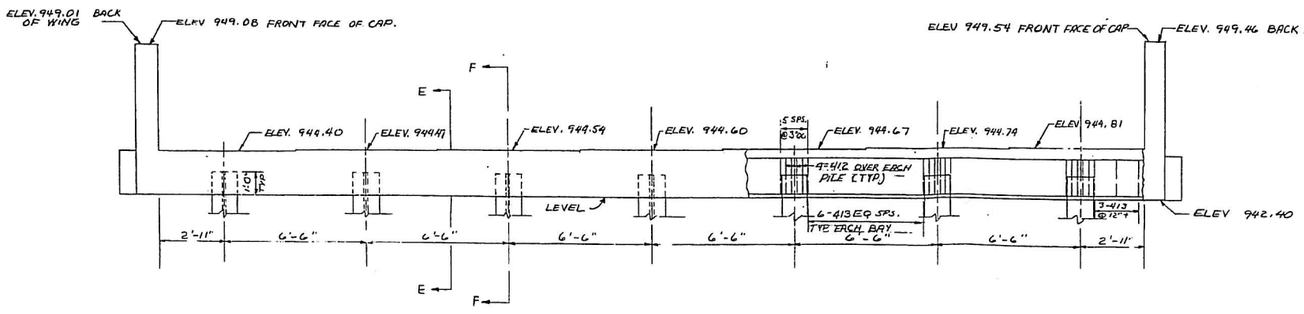
SECTION E-E
SCALE 3/4" = 1'-0"



SECTION F-F
SCALE 3/4" = 1'-0"



SECTION G-G
SCALE 3/4" = 1'-0"



BENT 1 LOOKING BACK
ELEVATION
SCALE 3/8" = 1'-0"

PLAN DRIVING OBJECTIVE
⚠ DRIVE ALL PILES TO A DRIVING RESISTANCE OF 83 TONS AFTER A MINIMUM TIP ELEVATION OF 930 IS ACHIEVED.

BRIDGE NO. 3 LT & RT

GEORGIA
DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION - BRIDGE DESIGN

END BENT 1
I-575 OVER NOONDAY CREEK
COBB COUNTY, I-575-1(2)00
SCALE AS SHOWN MARCH 1977

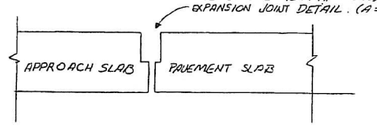
BY	REVISIONS	DATE
JMW	Revised Note	11/10/77

BRIDGE SHEET 5 OF 8

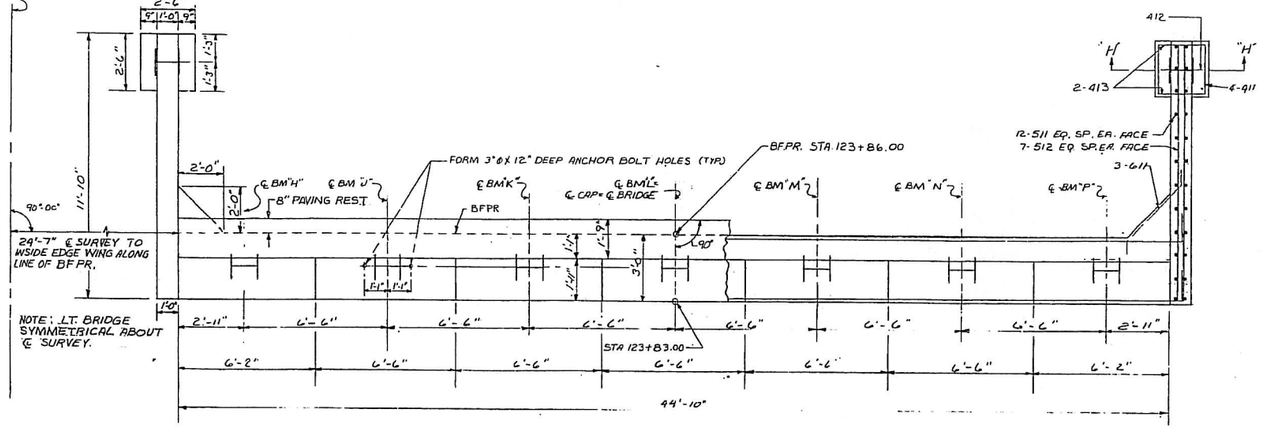
DESIGNED BDM | TRACED | REVIEWED LRP
DRAWN RHB | CHECKED BDM | APPROVED

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.	I-575-1(2)00	192	437

SEE GA STD. 9017 H (5-12-76) FOR EXPANSION JOINT DETAIL. (H = 2 1/8" @ 60°F.)

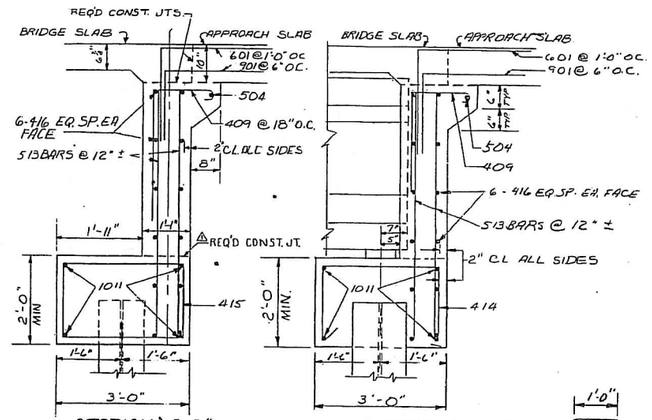


PLACEMENT OF EXPANSION JOINT



NOTE: BAR REINFORCEMENT SYMMETRICAL ABOUT ℄ BENT. MAINTAIN 2" CL TO REINFORCEMENT EXCEPT WHERE NOTED. FOUR CAP WINGS AND BACKWALL MONOLITHICALLY.

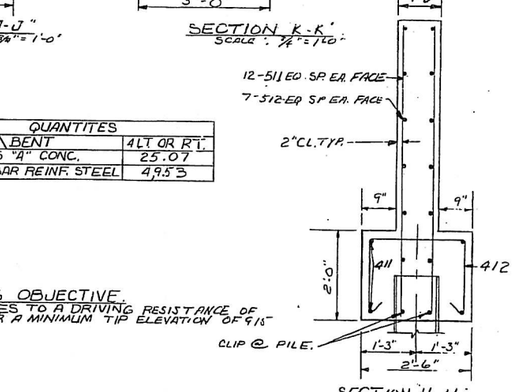
PLAN BENT 4 RT BRIDGE LOOKING AHEAD.
SCALE 3/8" = 1'-0"



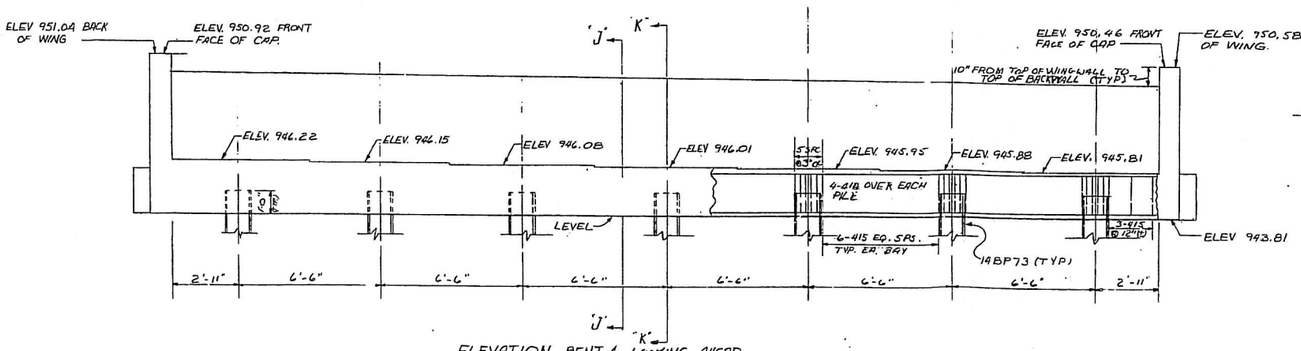
SECTION "J-J"
SCALE: 3/4" = 1'-0"

SECTION "K-K"
SCALE: 3/4" = 1'-0"

QUANTITIES	
ITEM \ BENT	4 LT OR RT.
CU. YDS "A" CONC.	25.07
LBS. BAR REINF. STEEL	4,953



SECTION "H-H"
SCALE 3/4" = 1'-0"



ELEVATION BENT 4 LOOKING AHEAD.
SCALE 3/8" = 1'-0"

PLAN DRIVING OBJECTIVE
DRIVE ALL PILES TO A DRIVING RESISTANCE OF 83 TONS AFTER A MINIMUM TIP ELEVATION OF 913' IS ACHIEVED

BRIDGE NO. 3 LT & 3 RT.

GEORGIA
DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION - BRIDGE DESIGN

END BENT 4
I-575 OVER NOONDAY CREEK
COBB COUNTY I-575-1(2)00 CT 1
SCALE AS SHOWN APRIL 1977

REVISIONS	DATE
REVISED CONST. JT.	1/15/77

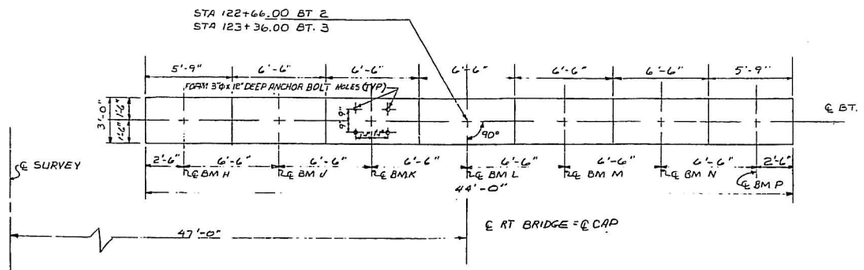
BRIDGE SHEET NO. 4 OF 4 SHEETS

DESIGNED JMS DRAWN JMS CHECKED JT. TRACED JT. REVIEWED LRP APPROVED

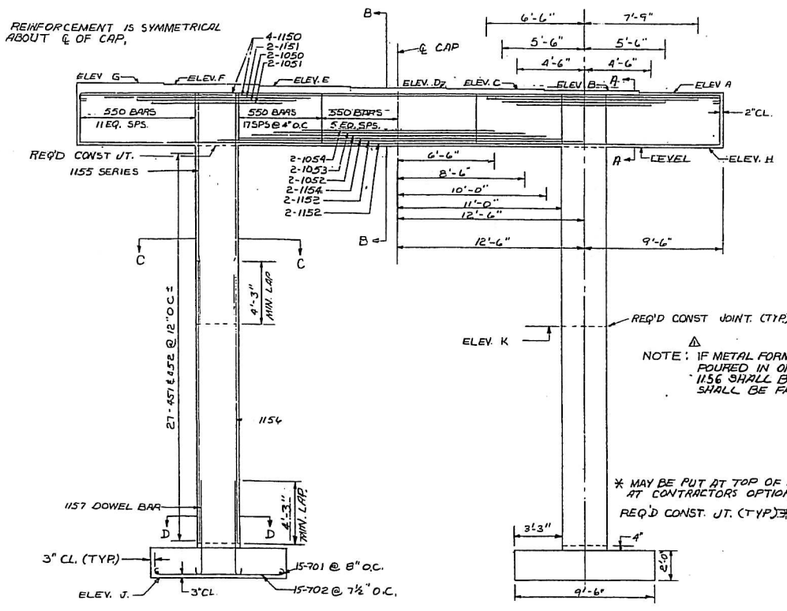
FORM NO. 11-2

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.	I-575-1(2)00	193	437

REV. 11-18-77

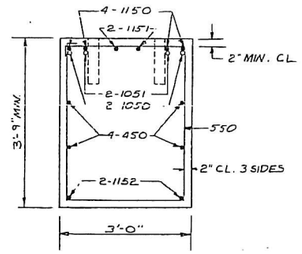


PLAN RT. BRIDGE - LT. BRIDGE IS SYMMETRICAL ABOUT ℄ SURVEY
SCALE 1/4" = 1'-0"

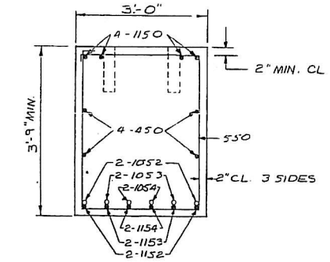


NOTE: IF METAL FORMS ARE USED, COLUMNS MAY BE POURED IN ONE LIFT. IN THIS EVENT BARS 1156 SHALL BE OMITTED AND BARS 1155 SHALL BE FABRICATED FULL LENGTH.

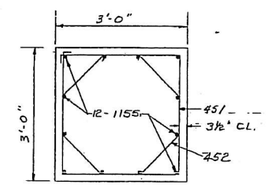
ELEVATION
SCALE 1/4" = 1'-0"



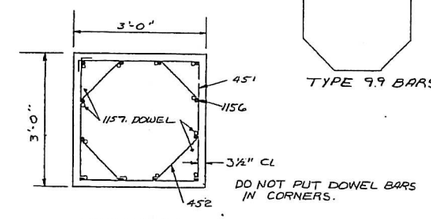
SECTION "A-A"
SCALE 3/4" = 1'-0"



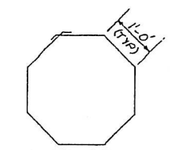
SECTION "B-B"
SCALE 3/4" = 1'-0"



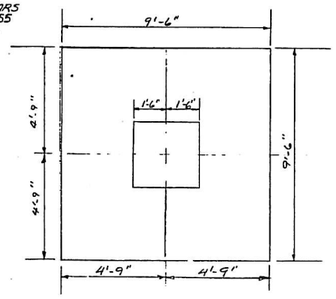
SECTION "C-C"
SCALE 3/4" = 1'-0"



SECTION "D-D"
SCALE 3/4" = 1'-0"



TYPE 9.9 BARS



FOOTING PLAN
SCALE 3/8" = 1'-0"

QUANTITIES		
ITEM \ BENT	2	3
CU. YDS. "A" CONC.	49.95	50.34
LBS. BAR REINF. STEEL	11322	11396

NOTE: SOIL MAXIMUM DESIGN BEARING CAPACITY = 4 Tons/Sq FT.

ELEVATIONS										
BENT	A	B	C	D	E	F	G	H	J	K
2	944.73	944.78	944.85	944.92	944.98	945.05	945.14	940.98	913.00±	928.50
3	945.30	945.35	945.42	945.49	945.56	945.62	945.71	941.55	913.00±	928.50

BRIDGE NO. 3 LT. & RT.

GEORGIA
DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION - BRIDGE DESIGN

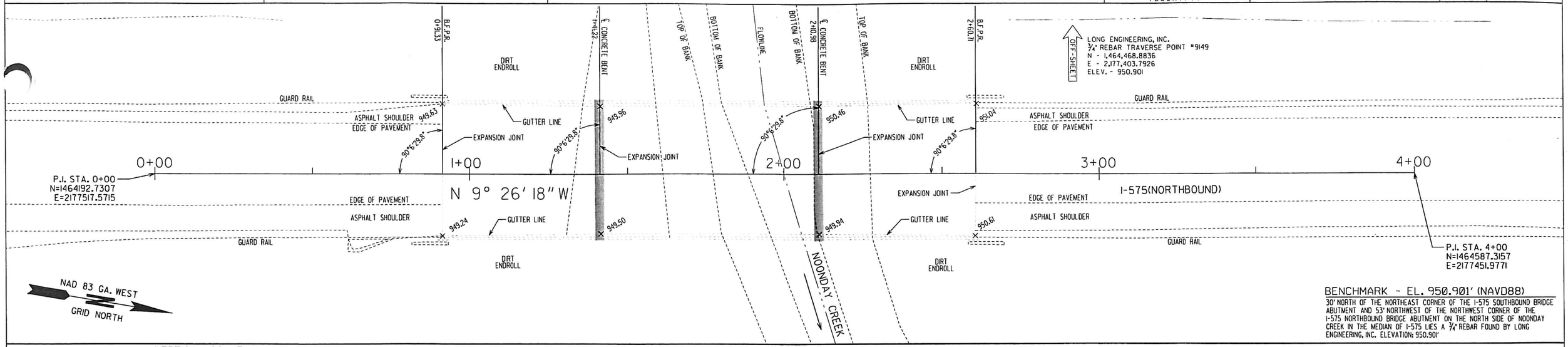
INTERMEDIATE BENTS
I-575 OVER NOONDAY CREEK
COBB COUNTY I-575-1(2)00 CT. 1
SCALE: AS SHOWN MARCH 1977

REVISIONS: DATE 11/10/77 — REVISED NOTE

BRIDGE SHEET 7 OF 8

DESIGNED BDM — TRACED — REVIEWED LRP
DRAWN RHS — CHECKED BDM — APPROVED

DATE$$$	TIME$$$	PRF	DGN	COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
$USER$		$$PENTABLE$$		$COUNTY1$	$PROJECT$	$BR03$	SH

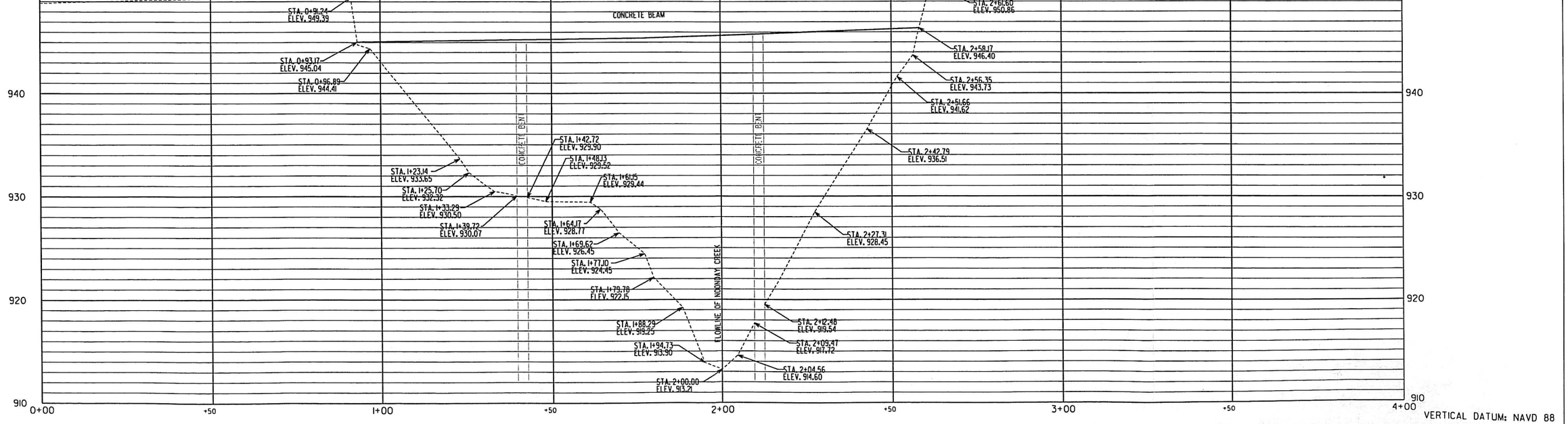


BENCHMARK - EL. 950.901' (NAVD88)

30' NORTH OF THE NORTHEAST CORNER OF THE I-575 SOUTHBOUND BRIDGE ABUTMENT AND 53' NORTHWEST OF THE NORTHWEST CORNER OF THE I-575 NORTHBOUND BRIDGE ABUTMENT ON THE NORTH SIDE OF NOONDAY CREEK IN THE MEDIAN OF I-575 LIES A ¾" REBAR FOUND BY LONG ENGINEERING, INC. ELEVATION: 950.901'

VERTICAL SCALE: 1" = 10'
HORIZONTAL SCALE: 1" = 30'

I-575 (NORTHBOUND) OVER NOONDAY CREEK #1 (VIEWING WEST)



VERTICAL DATUM: NAVD 88

NOTE: THIS PROFILE INDICATES ELEVATIONS ALONG THE CENTERLINE OF I-575 (NORTHBOUND).

P. I. NO. $PROJECT$	LONG JOB NO. $LEI JOB$
DRAWN BY $DRAWN$	DATE DATE$$$
CHECKED BY $CHECKED$	SCALE 1" = 30'

LONG ENGINEERING, INC.
1780 Corporate Drive
Suite 400
Norcross, Georgia 30093
Tel 770.931.8005
Fax 770.931.8555
www.longeng.com

SCALE IN FEET
0 15 30 60

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION

BRIDGE DETAIL

I-575 FROM BARRETT PARKWAY TO SIXES ROAD

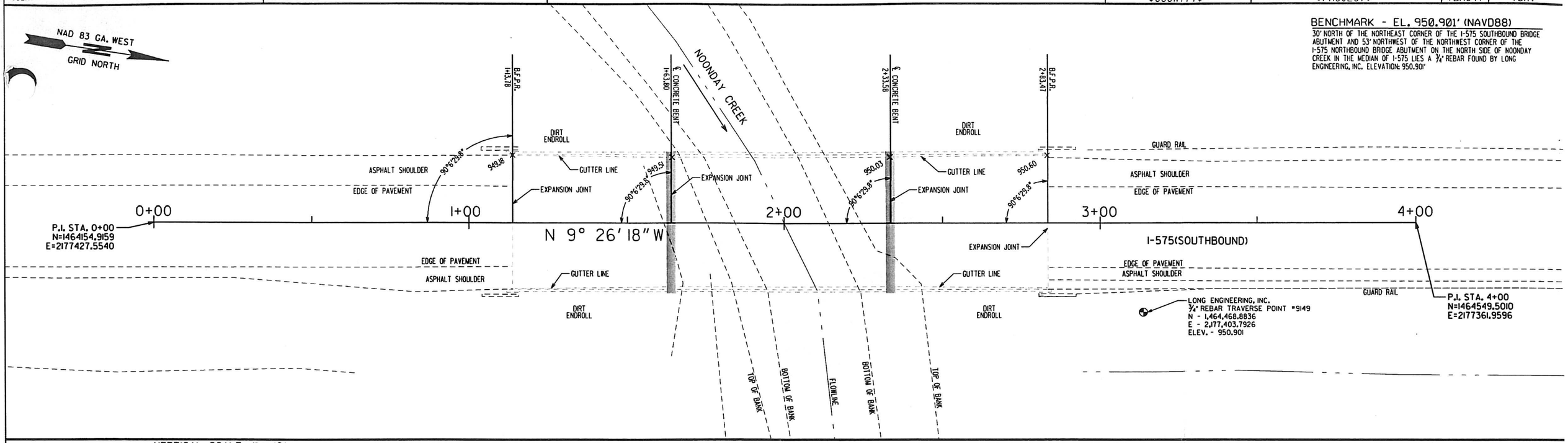
I-575(NORTHBOUND) OVER NOONDAY CREEK #1

DRAWING No. $BR03$

DATE$$$	TIME$$$	PRF	DGN	COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
$USER$		$$PENTABLE$		$COUNTY1$	$PROJECT$	$BR04$	SH

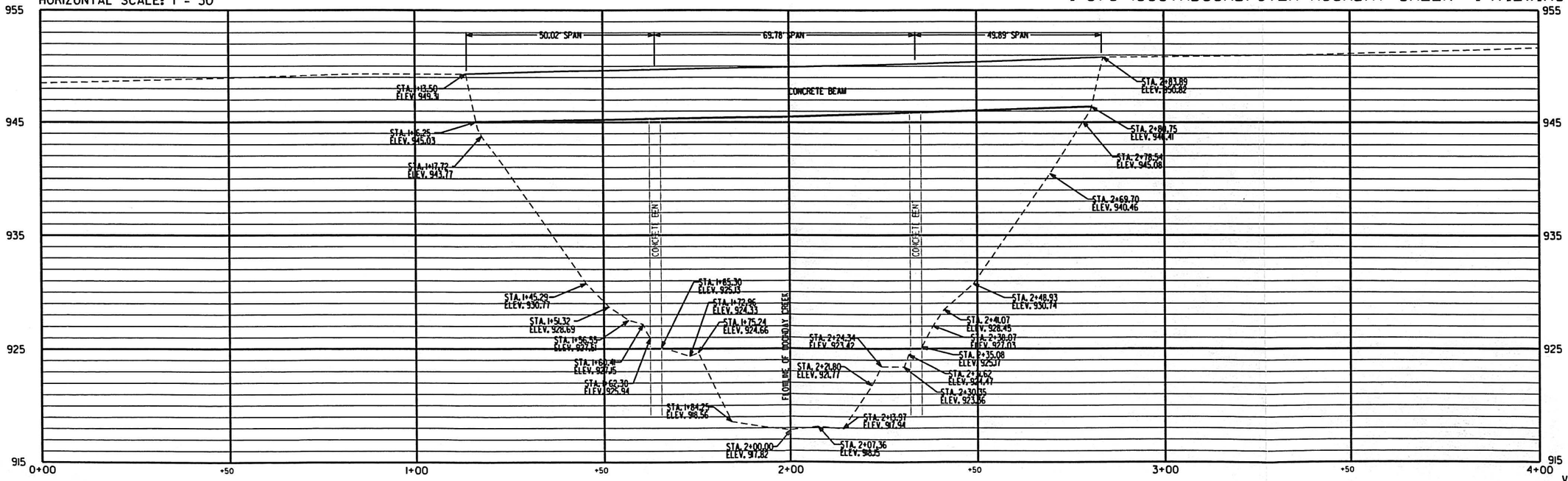
NAD 83 GA. WEST
GRID NORTH

BENCHMARK - EL. 950.901' (NAVD88)
30' NORTH OF THE NORTHEAST CORNER OF THE I-575 SOUTHBOUND BRIDGE ABUTMENT AND 53' NORTHWEST OF THE NORTHWEST CORNER OF THE I-575 NORTHBOUND BRIDGE ABUTMENT ON THE NORTH SIDE OF NOONDAY CREEK IN THE MEDIAN OF I-575 LIES A ¾" REBAR FOUND BY LONG ENGINEERING, INC. ELEVATION: 950.901'



VERTICAL SCALE: 1" = 10'
HORIZONTAL SCALE: 1" = 30'

I-575 (SOUTHBOUND) OVER NOONDAY CREEK #1 (VIEWING WEST)



VERTICAL DATUM: NAVD 88

E: THIS PROFILE INDICATES ELEVATIONS ALONG THE CENTERLINE OF I-575 (SOUTHBOUND).

P. I. NO. $PROJECT$	LONG JOB NO. $LEI JOB$
DRAWN BY $DRAWN$	DATE DATE$$$
CHECKED BY $CHECKED$	SCALE 1" = 30'

LONG ENGINEERING, INC.
1780 Corporate Drive
Suite 400
Norcross, Georgia 30093
Tel 770.931.8005
Fax 770.931.8555
www.longeng.com

SCALE IN FEET
0 15 30 60

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION

BRIDGE DETAIL

I-575 FROM BARRETT PARKWAY TO SIXES ROAD

I-575(SOUTHBOUND) OVER NOONDAY CREEK #1

DRAWING No. $BR04$

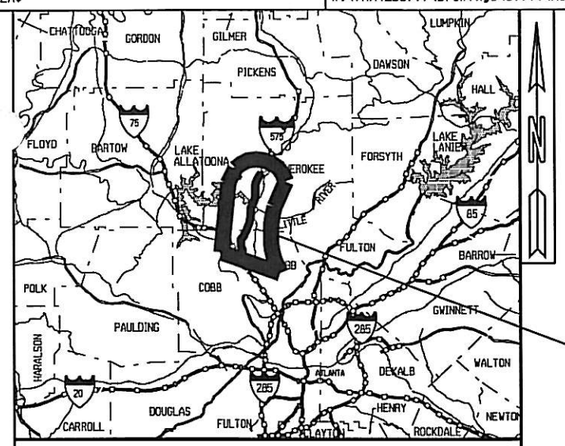
ROADWAY PLAN AND PROFILE

DATE$$$ $USER$	PRF	DGN	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
	N:\TRA\255717\Drawings\Civil\Rdy\I75.pen	GRWCOV	GA	NH000-0575-01(028)		

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

PLAN AND PROFILE OF PROPOSED

I-575 REVERSIBLE LANES
NH000-0575-01(028)



LOCATION SKETCH

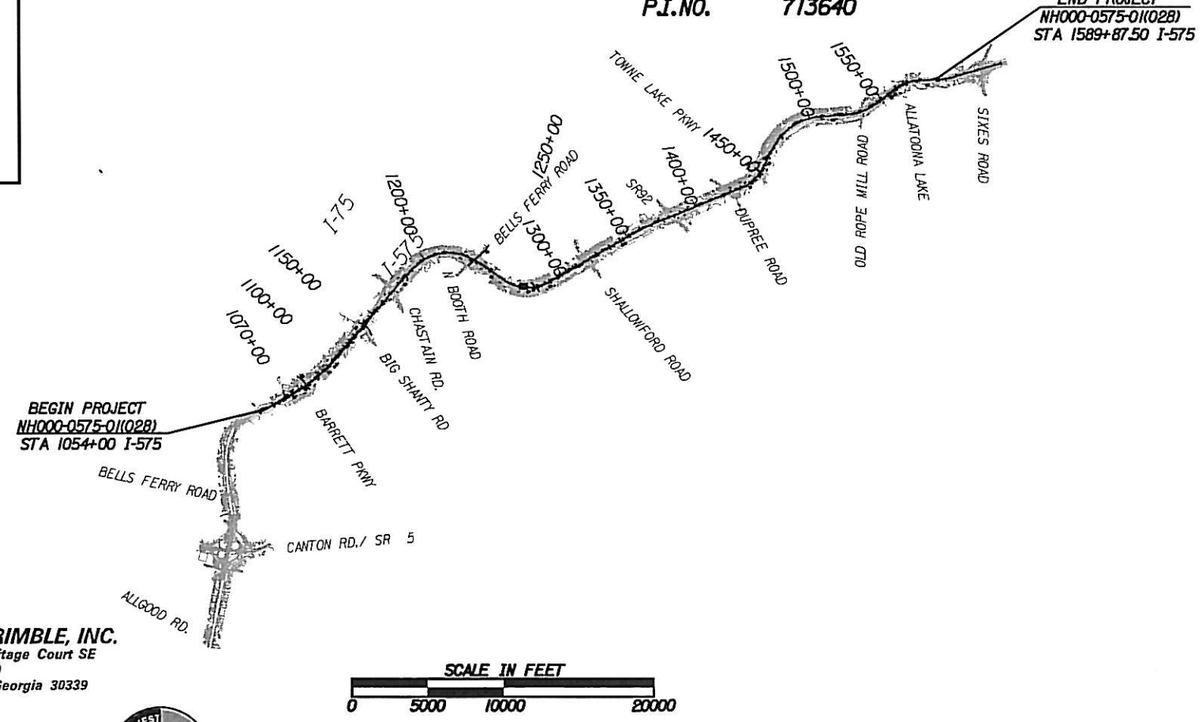
I-575 PROJECT NH000-0575-01(028),PI 713640
COBB/CHEROKEE COUNTIES

COBB/CHEROKEE COUNTIES
FEDERAL AID PROJECT

FEDERAL ROUTE * I-575

STATE ROUTE * 5

P.I.NO. 713640



SCALE IN FEET
0 5000 10000 20000

NOTE :
ALL REFERENCES IN THIS DOCUMENT,WHICH INCLUDES ALL PAPERS,WRITINGS, DOCUMENTS,DRAWINGS,OR PHOTOGRAPHS USED,OR TO BE USED IN CONNECTION WITH THIS DOCUMENT,TO "STATE HIGHWAY DEPARTMENT OF GEORGIA","STATE HIGHWAY DEPARTMENT","GEORGIA STATE HIGHWAY DEPARTMENT","HIGHWAY DEPARTMENT",OR "DEPARTMENT "WHEN THE CONTEXT THEREOF MEANS THE STATE HIGHWAY DEPARTMENT OF GEORGIA,AND SHALL BE DEEMED TO MEAN THE DEPARTMENT OF TRANSPORTATION.

DESIGN DATA:
TRAFFIC A.D.T.:
TRAFFIC A.D.T.:
TRAFFIC D.H.V.:
DIRECTIONAL DIST:
% TRUCKS:
24 HR.TRUCKS %:
SPEED DESIGN: 70 MPH

LOCATION & DESIGN
APPROVAL DATE:

FUNCTIONAL CLASS:
INTERSTATE PRINCIPAL ARTERIAL

THIS PROJECT IS 55% IN COBB COUNTY AND 45% IN CHEROKEE COUNTY AND IS
55 % IN CONG.DIST.NO. 11 ,
45 % IN CONG.DIST.NO.6

PROJECT DESIGNATION: EXEMPT
DESIGNED IN ENGLISH UNITS.

PREPARED BY: _____
DESIGN

RECOMMENDED FOR SUBMISSION BY: _____
DESIGN

SUBMITTED BY: _____
STATE DESIGN ENGINEER

DATE CHIEF ENGINEER

J.B. TRIMBLE, INC.
2550 Heritage Court SE
Suite 250
Atlanta, Georgia 30339

GTP Georgia Transportation Partners

NORTHWEST I-75/I-575 CORRIDOR

THIS PROJECT HAS BEEN PREPARED USING THE HORIZONTAL GEORGIA COORDINATE SYSTEM OF 1994 (NAD 1983)/94 WEST ZONE,AND THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.

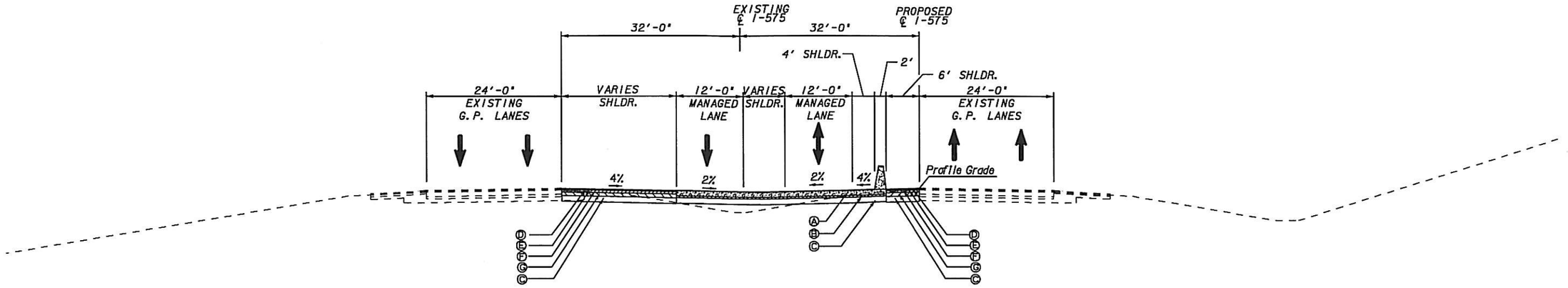
THE DATA,TOGETHER WITH ALL OTHER INFORMATION SHOWN ON THESE PLANS OR IN ANYWAY INDICATED THEREBY,WHETHER BY DRAWINGS OR NOTES,OR IN ANY OTHER MANNER,ARE BASED UPON FIELD INVESTIGATIONS AND ARE BELIEVED TO BE INDICATIVE OF ACTUAL CONDITIONS. HOWEVER, THE SAME ARE SHOWN AS INFORMATION ONLY,ARE NOT GUARANTEED,AND DO NOT BIND THE DEPARTMENT OF TRANSPORTATION IN ANY WAY. THE ATTENTION OF BIDDER IS SPECIFICALLY DIRECTED TO SUBSECTIONS 102.04,102.05,AND 104.03 OF THE SPECIFICATIONS.

LENGTH OF PROJECT	COBB COUNTY COUNTY NO. 067	CHEROKEE COUNTY COUNTY NO. 057	TOTAL
	MILES	MILES	MILES
NET LENGTH OF ROADWAY	5.384	4.402	9.786
NET LENGTH OF BRIDGES	0.189	0.174	0.363
NET LENGTH OF PROJECT	5.573	4.576	10.149
NET LENGTH OF EXCEPTIONS	0.000	0.000	0.000
GROSS LENGTH OF PROJECT	5.573	4.576	10.149

PLANS COMPLETED –

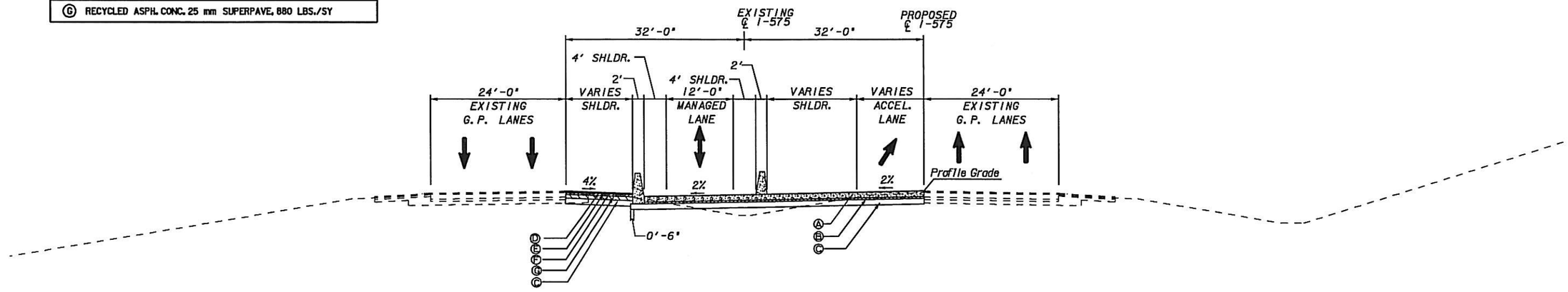
REVISIONS	FIRST UTILITY SUBMISSION

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	NH-000-0073-03(242)		



TS-12 - I-575 TANGENT SECTION
ONE-LANE REVERSIBLE
APPLIES TO: STA. 1295+32 TO STA. 1296+12

PAVEMENT MATERIAL SCHEDULE
(A) PLAIN PORTLAND CEMENT CONTRETE WITH DOWELS, 12 INCH
(B) 19 MM SUPERPAVE, MIX DESIGN LEVEL A, 330 LBS./SY
(C) GRADED AGGREGATE BASE, 12 INCH
(D) RECYCLED ASPH. CONC. 12.5 mm PEM, 135 LBS./SY
(E) RECYCLED ASPH. CONC. 12.5 mm SMA, 165 LBS./SY
(F) RECYCLED ASPH. CONC. 19 mm SUPERPAVE, 660 LBS./SY
(G) RECYCLED ASPH. CONC. 25 mm SUPERPAVE, 880 LBS./SY



TS-11 - I-575 TANGENT SECTION
ONE-LANE REVERSIBLE
APPLIES TO: STA. 1118+00 TO STA. 1147+50

N:\TRA\255717\Drawings\Civil\Rdy\714130TYP.dgn 30-SEP-2009 01:41

REF. FILES:

WINDY SANDERS	DRAWN BY	9/23/09 DATE
STEVE LINLEY	CHECKED BY	9/23/09 DATE
STEVE LINLEY	SUPERVISOR	9/23/09 DATE
LARRY COOK	APPROVED	9/23/09 DATE

TRACKING

NO	DATE	DESCRIPTION	ORIG	CHKR	SUPV	APPR
A	6/30/09	PROGRESS DRAWINGS (ROLL PLOTS)	CEC	PCT	MRM	RHM
B	9/25/09	50% SUBMITTAL	WHS	SJL	SJL	LFC

GTP Georgia Transportation Partners

SCALE IN FEET
0 10 20 40

NORTHWEST I-75/I-575 CORRIDOR

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

JBT J.B. TRIMBLE, INC.
2550 Heritage Court SE
Suite 250
Atlanta, Georgia 30339

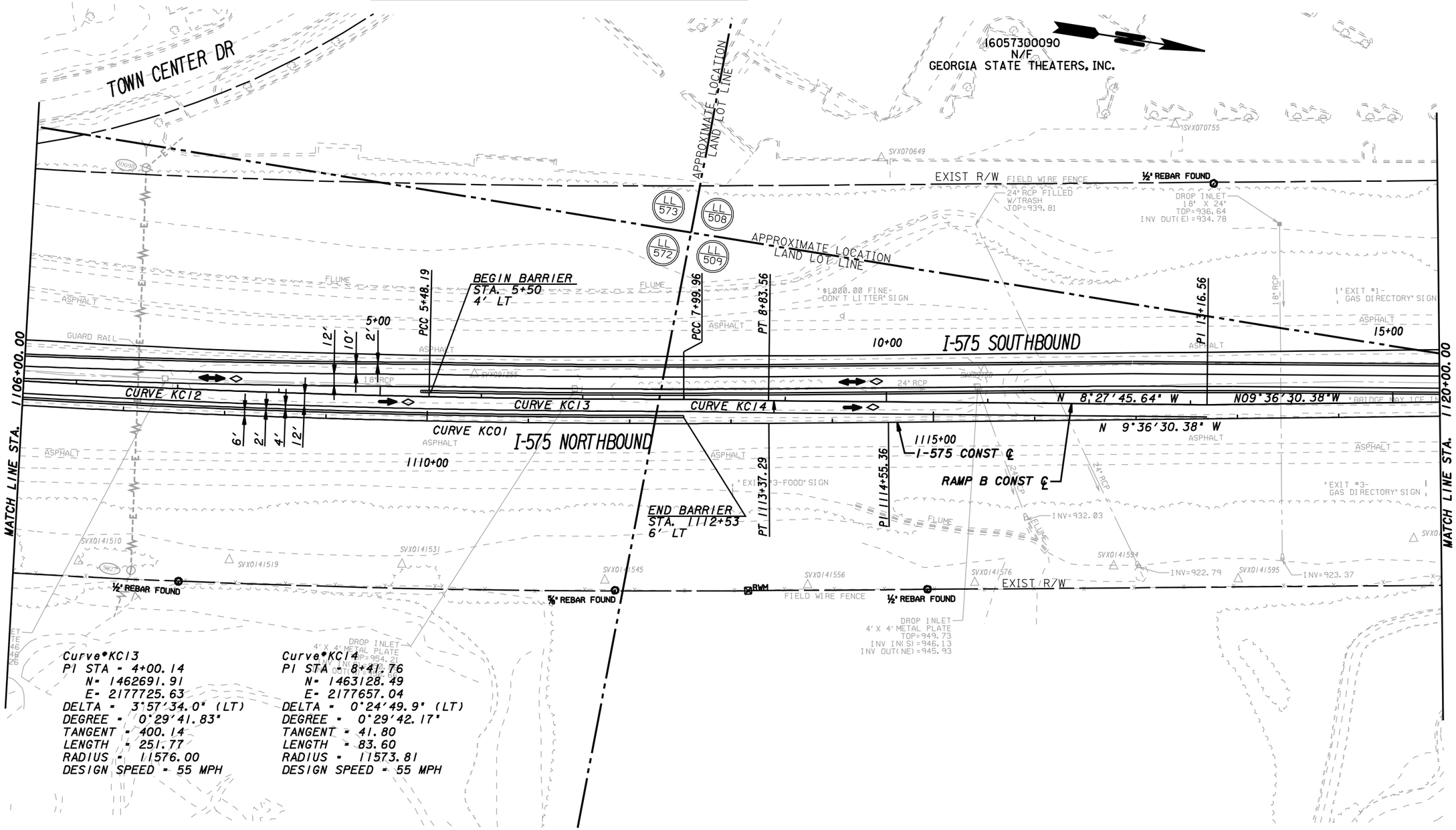
I-75 / I-575 NORTHWEST CORRIDOR

TYPICAL SECTIONS
I-575 REVERSIBLE MANAGED LANES

DRAWING No. 05-06

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	NH000-0575-01(028)		

Note 1: IMPORTANT NOTICE:
This drawing is an incomplete work-in-progress and its use is subject to Note 1 on Drawing No. 1-01.



Curve KC13
PI STA - 4+00.14
N- 1462691.91
E- 2177725.63
DELTA - 3°57'34.0" (LT)
DEGREE - 0°29'41.83"
TANGENT - 400.14
LENGTH - 251.77
RADIUS - 11576.00
DESIGN SPEED - 55 MPH

Curve KC14
PI STA - 8+41.76
N- 1463128.49
E- 2177657.04
DELTA - 0°24'49.9" (LT)
DEGREE - 0°29'42.17"
TANGENT - 41.80
LENGTH - 83.60
RADIUS - 11573.81
DESIGN SPEED - 55 MPH

REF FILES:
T13100_3.dgn
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NoRTRAN255717d0r-civilPlotSet01v1d65p91f141300TLE.dgn
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N:\TRA\255717\Drawings\Civil\Rdy\I-575 Plotfiles\713640CP05.dgn 20-NOV-2009 13:34

REVISIONS						
NO	DATE	DESCRIPTION	ORIG	CHKR	SUPV	APPR
A	6/30/09	PROGRESS DRAWINGS (ROLL PLOTS)	MHS	SJL	SJL	LFC
B	9/25/09	50% SUBMITTAL	MHS	SJL	SJL	LFC
C	11/30/09	PLOTTED PER GDOT'S TERMINATION FOR CONVENIENCE DIRECTION	MHS			

MINDY SANDERS — DRAWN BY — 11/12/09 DATE
CHECKED BY — DATE
SUPERVISOR — DATE
APPROVED — DATE

GTP Georgia Transportation Partners

SCALE IN FEET
0 50 100 200

NORTHWEST I-75/I-575 CORRIDOR

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

JBT J.B. TRIMBLE, INC.
2550 Heritage Court SE
Suite 250
Atlanta, Georgia 30339

I-75 / I-575 NORTHWEST CORRIDOR

CONSTRUCTION PLAN

I-575 REVERSIBLE MANAGED LANES

DRAWING No. 13-05

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	NH000-0575-01(028)		

Note 1: IMPORTANT NOTICE:
This drawing is an incomplete work-in-progress and its use is subject to Note 1 on Drawing No. 1-01.

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REF FILES: T14130LIMT.dgn; N:\TRA\255717\Drawings\Civil\Rdy\714130PROP.dgn; N:\TRA\255717\Drawings\Civil\Rdy\714130UTLE.dgn; N:\TRA\255717\Drawings\Civil\Rdy\714130TOPO.dgn; N:\TRA\255717\Drawings\Civil\Rdy\714130MAIN.dgn; N:\TRA\255717\Drawings\Civil\Rdy\I-575 Plotfiles\BORDER_PLN_I-575.dgn

MINDY SANDERS	11/12/09
DRAWN BY	DATE
CHECKED BY	DATE
SUPERVISOR	DATE
APPROVED	DATE

REVISIONS

NO	DATE	DESCRIPTION	ORIG	CHKR	SUPV	APPR
A	6/30/09	PROGRESS DRAWINGS (ROLL PLOTS)	MHS	SJL	SJL	LFC
B	9/25/09	50% SUBMITTAL	MHS	SJL	SJL	LFC
C	11/30/09	PLOTTED PER GDOT'S TERMINATION FOR CONVENIENCE DIRECTION	MHS			

Georgia Transportation Partners

SCALE IN FEET
0 50 100 200

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

J.B. TRIMBLE, INC.
2550 Heritage Court SE
Suite 250
Atlanta, Georgia 30339

I-75 / I-575 NORTHWEST CORRIDOR

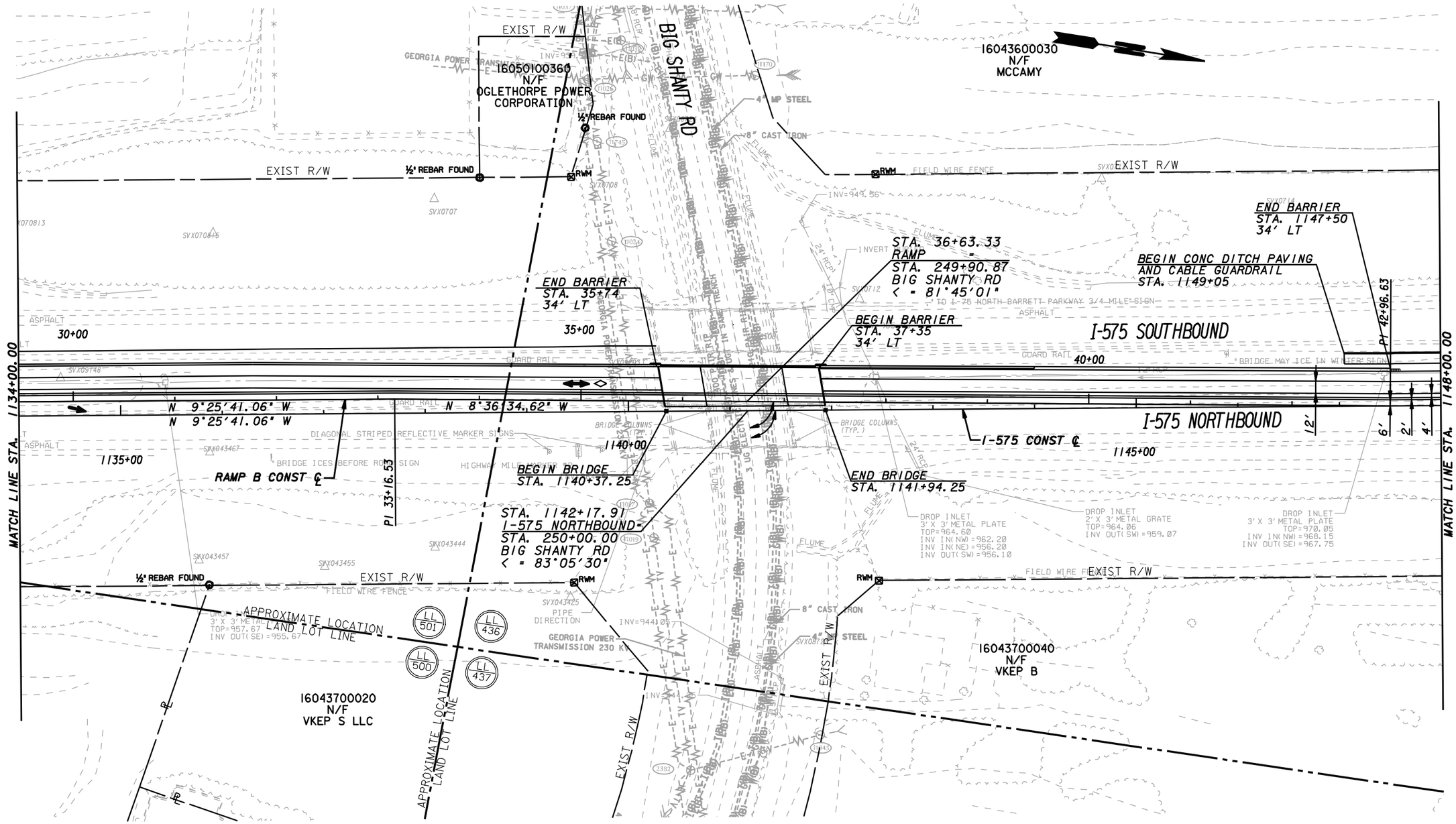
CONSTRUCTION PLAN

I-575 REVERSIBLE MANAGED LANES

DRAWING No. 13-06

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	NH000-0575-01(028)		

Note 1: IMPORTANT NOTICE:
This drawing is an incomplete work-in-progress and its use is subject to Note 1 on Drawing No. 1-01.



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REF FILES:

MINDY SANDERS	11/12/09
DRAWN BY	DATE
CHECKED BY	DATE
SUPERVISOR	DATE
APPROVED	DATE

REVISIONS

NO	DATE	DESCRIPTION	ORIG	CHKR	SUPV	APPR
A	6/30/09	PROGRESS DRAWINGS (ROLL PLOTS)	MHS	SJL	SJL	LFC
B	9/25/09	50% SUBMITTAL	MHS	SJL	SJL	LFC
C	11/30/09	PLOTTED PER GDOT'S TERMINATION FOR CONVENIENCE DIRECTION	MHS			

GTP Georgia Transportation Partners

SCALE IN FEET
0 50 100 200

NORTHWEST I-75/I-575 CORRIDOR

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

JBT J.B. TRIMBLE, INC.
2550 Heritage Court SE
Suite 250
Atlanta, Georgia 30339

I-75 / I-575 NORTHWEST CORRIDOR

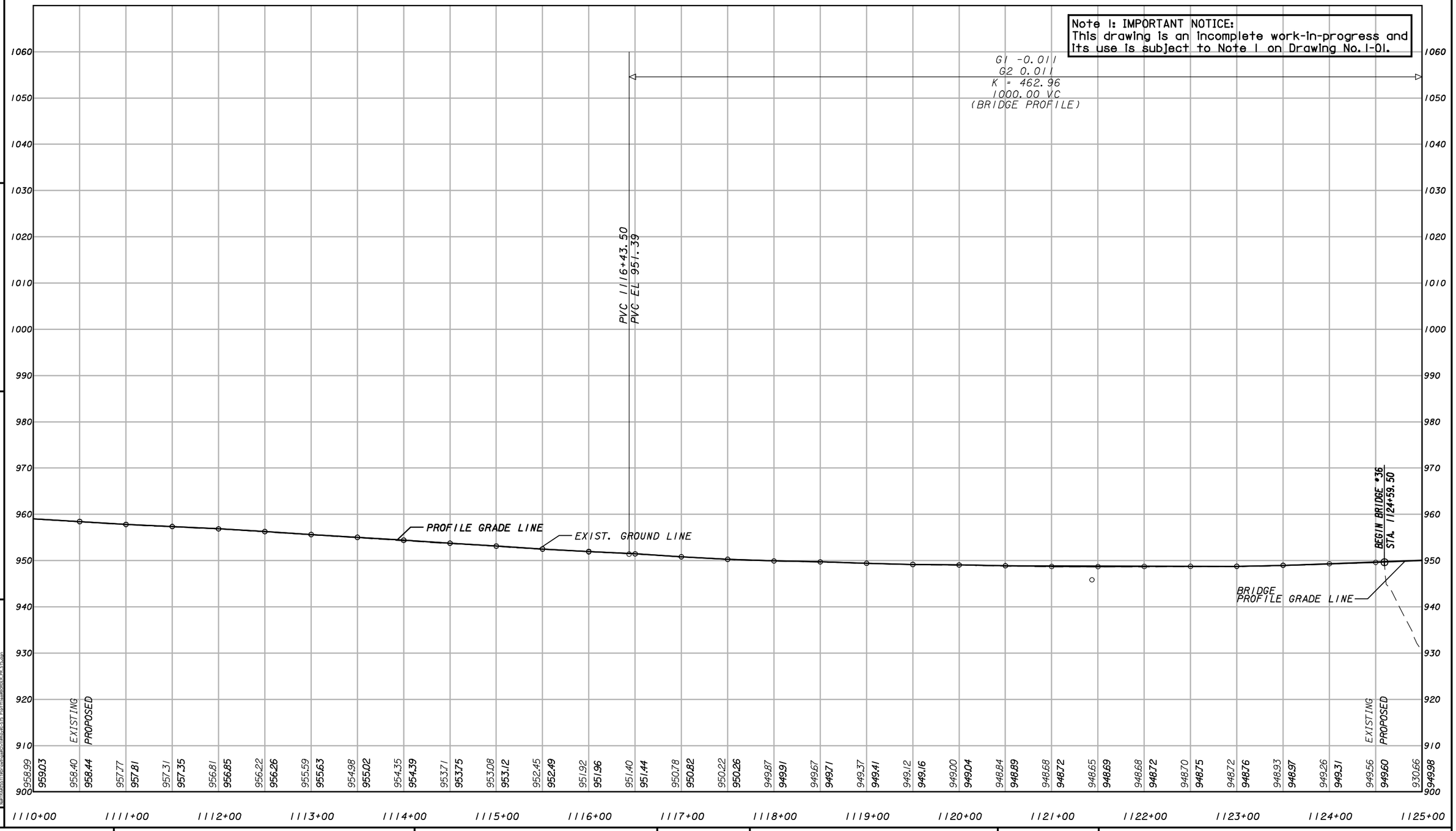
CONSTRUCTION PLAN

I-575 REVERSIBLE MANAGED LANES

DRAWING No. 13-07

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	NH000-0575-01(028)		

Note 1: IMPORTANT NOTICE:
This drawing is an incomplete work-in-progress and its use is subject to Note 1 on Drawing No. 1-01.



13:36
20-NOV-2009
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7136405PR_1575.dgn

MINDY SANDERS — DRAWN BY — 11/12/09 DATE
CHECKED BY — DATE
SUPERVISOR — DATE
APPROVED — DATE

REVISIONS

NO	DATE	DESCRIPTION	ORIG	CHKR	SUPV	APPR
A	6/30/09	PROGRESS DRAWINGS (ROLL PLOTS)	MHS	SJL	SJL	LFC
B	9/25/09	50% SUBMITTAL	MHS	SJL	SJL	LFC
C	11/30/09	PLOTTED PER GDOT'S TERMINATION FOR CONVENIENCE DIRECTION	MHS			

GTP Georgia Transportation Partners

SCALE: 1" = 50' HORIZ.
1" = 10' VERT.

NORTHWEST I-75/I-575 CORRIDOR

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

JBT J.B. TRIMBLE, INC.
2550 Heritage Court SE
Suite 250
Atlanta, Georgia 30339

I-75 / I-575 NORTHWEST CORRIDOR

MAINLINE PROFILE

I-575 REVERSIBLE MANAGED LANES

DRAWING No. 15-05

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	NH000-0575-01(028)		

Note 1: IMPORTANT NOTICE:
This drawing is an incomplete work-in-progress and its use is subject to Note 1 on Drawing No. 1-01.

G1 -0.011
G2 0.011
K = 462.96
1000.00 VC
(BRIDGE PROFILE)

PVT 1126+43.50
EL= 951.09

℄ NOONDAY CK SOUTH

END BRIDGE •36
STA. 1126+29.50

BRIDGE PROFILE GRADE LINE

PROFILE GRADE LINE

EXIST. GROUND LINE

PVI 1139+00.00
PVI EL 964.40

	1125+00	1126+00	1127+00	1128+00	1129+00	1130+00	1131+00	1132+00	1133+00	1134+00	1135+00	1136+00	1137+00	1138+00	1139+00	1140+00
EXISTING	930.66	919.49	931.58	951.09	951.43	951.91	952.46	953.02	953.61	954.19	954.89	955.44	955.96	956.47	957.04	957.54
PROPOSED	949.98	950.37	950.75	951.13	951.47	951.96	952.50	953.06	953.65	954.23	954.93	955.49	956.00	956.51	957.08	957.58
EXISTING	958.05	958.09	958.58	958.62	959.11	959.15	959.68	959.72	960.25	960.29	960.74	960.79	961.27	961.32	961.81	961.85
PROPOSED	962.25	962.30	962.80	962.84	963.29	963.33	963.73	963.77	964.24	964.28	964.75	964.79	965.29	965.33		

REF FILES:

MINDY SANDERS — DRAWN BY — 11/12/09 DATE
CHECKED BY — DATE
SUPERVISOR — DATE
APPROVED — DATE

REVISIONS

NO	DATE	DESCRIPTION	ORIG	CHKR	SUPV	APPR
A	6/30/09	PROGRESS DRAWINGS (ROLL PLOTS)	MHS	SJL	SJL	LFC
B	9/25/09	50% SUBMITTAL	MHS	SJL	SJL	LFC
C	11/30/09	PLOTTED PER GDOT'S TERMINATION FOR CONVENIENCE DIRECTION	MHS			

Georgia Transportation Partners

SCALE: 1" = 50' HORIZ.
1" = 10' VERT.

NORTHWEST I-75/I-575 CORRIDOR

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

J.B. TRIMBLE, INC.
2550 Heritage Court SE
Suite 250
Atlanta, Georgia 30339

I-75 / I-575 NORTHWEST CORRIDOR

MAINLINE PROFILE

I-575 REVERSIBLE MANAGED LANES

DRAWING No. 15-06

713640PR_I575.dgn
20-NOV-2009 13:35

McWhorter III, John K

From: Moseley, Michael R [mrmoseley@pbsj.com]
nt: Friday, February 06, 2009 11:00 AM
To: McWhorter III, John K
Cc: Curtis, Steven
Subject: RE: I-575 Hydro reports
Attachments: DOC.PDF

John,

Use these traffic numbers for the preliminary layouts. Let me know if you need anything else.

Thanks,
Mike

Michael R. Moseley Jr., PE
Sr. Engineer II | PBS&J
770 933-0280

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From: McWhorter III, John K [mailto:John.McWhorter@hatchmott.com]
S : Friday, February 06, 2009 9:36 AM
To: Navarro, Hernan R
Cc: Moseley, Michael R; Curtis, Steven; Frizzell, Robbie L
Subject: RE: I-575 Hydro reports

Ricardo,

Would you please do me a quick favor and email Mike Moseley at PBS&J pdf's of the latest bridge layouts for the Noonday South, Noonday North and Little River bridges on I-575?

Thanks!

John

-----Original Message-----
From: Moseley, Michael R [mailto:mrmoseley@pbsj.com]
Sent: Fri 2/6/2009 9:02 AM
To: McWhorter III, John K
Cc: Curtis, Steven
Subject: I-575 Hydro reports

John,

C J you send me the preliminary layouts that you need traffic information on? Pdfs would be great.

Thanks,
Mike

Michael R. Moseley Jr., PE

PBS&J

1600 RiverEdge Pkwy NW, Suite 600

Atlanta, GA 30328

770 933-0280

mrmoseley@pbsj.com

www.pbsj.com

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NOONDAY SOUTH

TRAFFIC - - - - ADT = 72,700 (2005)
ADT = 108,032 (2025)

DESIGN SPEED - - - 65 MPH

TRUCKS - - - - 3%

24 HR TRUCKS - - 10%

DIRECTIONAL - - - 58%

NOONDAY NORTH

TRAFFIC - - - ADT = 85,100 (2005)
ADT = 126,459 (2025)

DESIGN SPEED - - - 65 MPH

TRUCKS - - - - 3%

24 HR TRUCKS - - - 10%

DIRECTIONAL - - - 58%

LITTLE RIVER

TRAFFIC - - - ADT = 93,740 (2005)
ADT = 139,298 (2025)

DESIGN SPEED - 65 MPH

TRUCKS - - - 3%

24 HR TRUCKS - - - 10%

DIRECTIONAL - - - 58%

McWhorter III, John K

From: Curtis, Steven [sacurtis@bechtel.com]
Sent: Friday, February 13, 2009 7:53 AM
To: McWhorter III, John K
Cc: Powell-Kent, Maxine
Subject: RE: I-575 Hydro reports

John

Monday is OK for submittal.

I don't think Mike showed any traffic data on the plans. We are just doing Costing Plans (which aren't really identified in the GDOT PPG.

In terms of title block, You can say the title block is consistent with the Costing Plans set title block prepared by GTP as part of the PPI (Public Private Initiative).

Steve

From: McWhorter III, John K [mailto:John.McWhorter@hatchmott.com]
Sent: Friday, February 13, 2009 7:46 AM
To: Moseley, Michael R; Curtis, Steven
Cc: Frizzell, Robbie L; Powell-Kent, Maxine
Subject: RE: I-575 Hydro reports
Importance: Low

Mike,

Thanks for the traffic info. Have you added this info to your cover sheet? The Bridge Office typically compares the traffic data on the bridge layout with that shown on the roadway cover sheet. I can include the data you provided with the plans, but I can't guarantee that it would eliminate the comment.

Steve,

One comment was to use the GDOT title block, which we are not doing. How would you like me to respond to this? Also, I know I mentioned Friday (today) and Monday at the latest for the schedule to resubmit these studies. Would it be OK if it ends up being on Monday?

Thanks,

John

From: Moseley, Michael R [mailto:mrmoseley@pbsj.com]
Sent: Friday, February 06, 2009 11:00 AM
To: McWhorter III, John K
Cc: Curtis, Steven
Subject: RE: I-575 Hydro reports

Use these traffic numbers for the preliminary layouts. Let me know if you need anything else.

Thanks,

Mike

Michael R. Moseley Jr., PE
Sr Engineer II | PBS&J
7 033-0280

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From: McWhorter III, John K [mailto:John.McWhorter@hatchmott.com]
Sent: Friday, February 06, 2009 9:36 AM
To: Navarro, Hernan R
Cc: Moseley, Michael R; Curtis, Steven; Frizzell, Robbie L
Subject: RE: I-575 Hydro reports

Ricardo,

Would you please do me a quick favor and email Mike Moseley at PBS&J pdf's of the latest bridge layouts for the Noonday South, Noonday North and Little River bridges on I-575?

Thanks!

John

-----Original Message-----
Fr m: Moseley, Michael R [mailto:mrmoseley@pbsj.com]
S Fri 2/6/2009 9:02 AM
To: McWhorter III, John K
Cc: Curtis, Steven
Subject: I-575 Hydro reports

John,

Could you send me the preliminary layouts that you need traffic information on? Pdfs would be great.

Thanks,
Mike

Michael R. Moseley Jr., PE

PBS&J

1600 RiverEdge Pkwy NW, Suite 600

A ta, GA 30328

770 933-0280

mrmoseley@pbsj.com

www.pbsj.com

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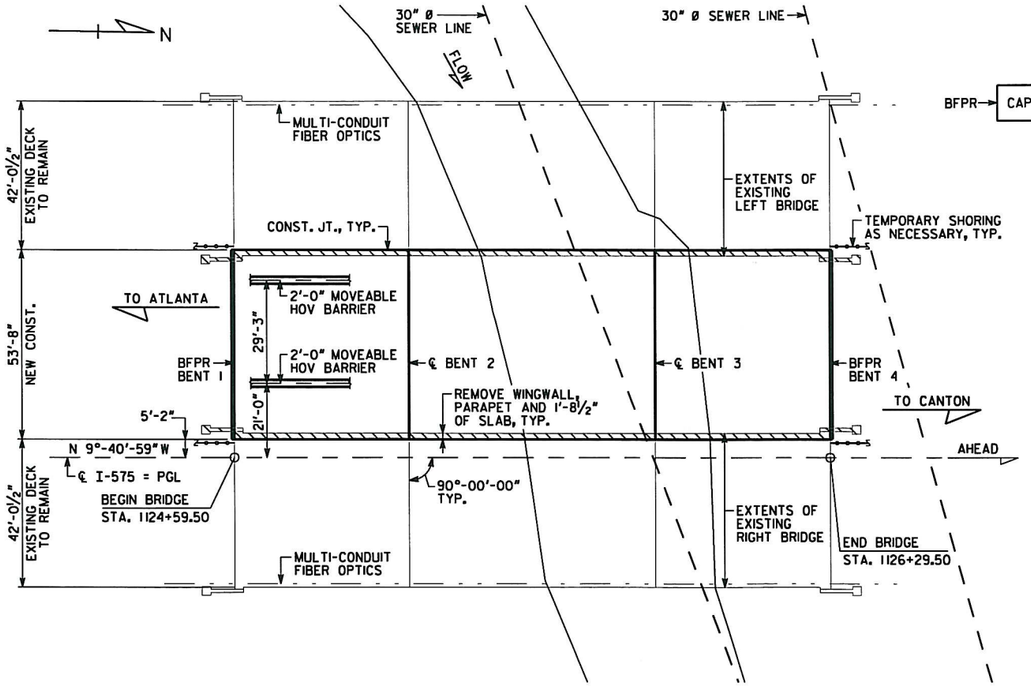
PRELIMINARY BRIDGE PLAN AND ELEVATION SECTION

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	NH000-0575-01(028)		



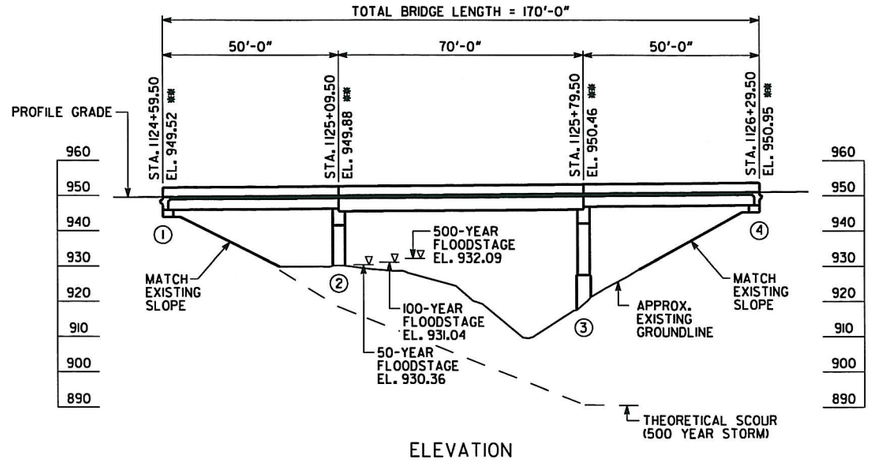
PLAN
SCALE: 1" = 20'-0"

BERM ELEVATIONS ⊛		
BENT	LEFT	RIGHT
1	942.40	942.40
4	943.81	943.81

⊛NOTE: FOR BRIDGE ENDROLL STAKING PURPOSES ONLY.

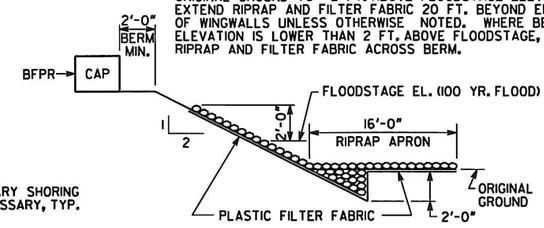
NOTES:

1. *** STATIONS ARE ALONG ℄ I-575 AT THE INTERSECTION OF ℄ I-575 AND BFPR OR ℄ BENT. ELEVATIONS ARE ALONG PGL.
2. END BENT PILES NOT SHOWN.
3. SEE SHEET 3 FOR PROPOSED DECK CROSS SLOPE.
4. REPAIR AND REPLACE EXISTING RIPRAP AS NEEDED. EXTEND APRON ACROSS TOE OF EXISTING SLOPES.
5. THE MINIMUM BOTTOM OF BEAM ELEVATION FOR THE PROPOSED BRIDGE SHALL BE NO LOWER THAN ELEVATION 932.36
6. THE PROPOSED BRIDGE BOTTOM OF BEAM ELEVATION IS 945.38
7. CONTRACTOR TO LOCATE EXISTING SEWER LINE PRIOR TO DRIVING PILES. INSTALL PILES TO ACCOMMODATE EXISTING SEWER LINE. PROTECT SEWER LINE AT ALL TIMES DURING CONSTRUCTION.

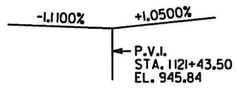


ELEVATION
SCALE: 1" = 20'-0"

PLACE RIPRAP AND FILTER FABRIC FROM 2 FT. BELOW ORIGINAL GROUND TO 2 FT. ABOVE FLOODSTAGE ELEVATION. EXTEND RIPRAP AND FILTER FABRIC 20 FT. BEYOND END OF WINGWALLS UNLESS OTHERWISE NOTED. WHERE BERM ELEVATION IS LOWER THAN 2 FT. ABOVE FLOODSTAGE, EXTEND RIPRAP AND FILTER FABRIC ACROSS BERM.



RIPRAP DETAIL
NO SCALE



1000 FT V.C.

I-575
GRADE DATA

DESIGN DATA

SPECIFICATIONS ---------- AASHTO 17TH EDITION, 2002
(DESIGNED FOR SEISMIC PERFORMANCE CATEGORY A)
TYPICAL HS20-44 AND/OR MILITARY LOADING --- IMPACT ALLOWED
FUTURE PAVING ALLOWANCE ---------- 30 LBS PER SQ FT

WIDENED BRIDGE CONSISTS OF

2 - 50'-0" TYPE II PSC BEAM SPANS ---------- SPECIAL DESIGN
1 - 70'-0" TYPE III PSC BEAM SPAN---------- SPECIAL DESIGN
2 - PILE END BENTS ---------- SPECIAL DESIGN
2 - CONCRETE INTERMEDIATE BENTS ---------- SPECIAL DESIGN
24" TYPE I RIP RAP

EXISTING UTILITIES ON BRIDGE

MULTI-CONDUIT FIBER OPTIC LINE

EXISTING UTILITIES UNDER BRIDGE

2 - 30" STEEL SANITARY SEWER LINES

DRAINAGE DATA

DRAINAGE AREA ---------- 12.8 SQ MI

FLOOD FREQUENCY	DISCHARGE THRU BRIDGE	MEAN VELOCITY	AREA OF OPENING UNDER FLOODSTAGE	BACKWATER
50 YEAR	6,665 CFS	12.87 FPS	518 SQ FT	3.45 FT
100 YEAR	7,649 CFS	13.27 FPS	576 SQ FT	3.94 FT
500 YEAR	9,444 CFS	13.50 FPS	699 SQ FT	4.75 FT

THEORETICAL SCOUR DEPTHS (FT)						
	100 YEAR STORM			500 YEAR STORM		
BENT LOCATION	GENERAL	LOCAL	TOTAL	GENERAL	LOCAL	TOTAL
BENT 2	1.0	10.0	11.0	1.0	10.4	11.4
BENT 3	14.1	10.0	24.1	18.2	10.4	28.6

EXISTING LEFT BRIDGE SERIAL NO. 067-0114-0
EXISTING LEFT BRIDGE I.D. NO. 067-00417D-001.99N
EXISTING RIGHT BRIDGE SERIAL NO. 067-0113-0
EXISTING RIGHT BRIDGE I.D. NO. 067-00417D-001.98N
PROJECT P.I. NO. 713640

BRIDGE NO. 36

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ABBAS ESHAGIEH-MEYBODI	11/20/09
DRAWN BY	DATE
CHECKED BY	DATE
SUPERVISOR	DATE
APPROVED	DATE

REVISIONS

NO	DATE	DESCRIPTION	ORIG	CHKR	SUPV	APPR
A	6/30/09	Progress Drawings (SO 11 Revision 2)	AEM	JCR	GLE	SJL
B	9/25/09	50% SUBMISSION	AEM	JCR	GLE	SJL
C	11/20/09	HYDRAULIC STUDY SUBMISSION	AEM	JCR	GLE	SJL

GTP Georgia Transportation Partners

NORTHWEST I-75/I-575 CORRIDOR

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

JBT J.B. Trimble, Inc.
2550 Heritage Ct, SE Suite 250
Atlanta GA 30339-3062
(770) 952-1022

GEORGIA REGISTERED PROFESSIONAL ENGINEER JOHN W. McWHORTER 27873 11-25-09

BRIDGE SHEET
1 OF 2

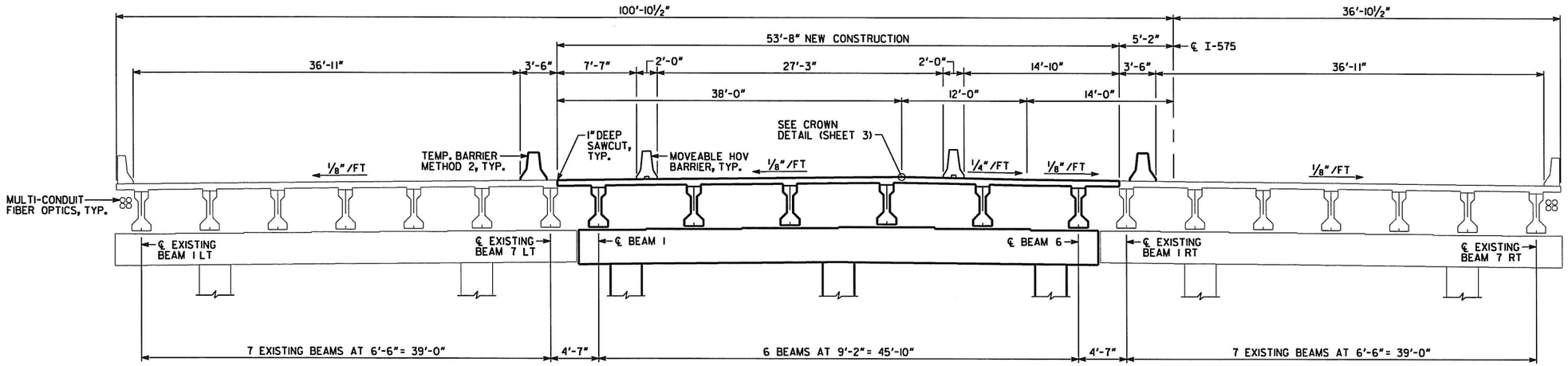
I-75 / I-575 NORTHWEST CORRIDOR

I-575 REVERSIBLE OVER NOONDAY CREEK SOUTH

PLAN AND ELEVATION

COBB COUNTY NH000-0575-01(028)

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	NH000-0575-01(028)		



TYPICAL SECTION
(LOOKING AHEAD)

CONSTRUCTION SEQUENCE

1. PLACE TEMPORARY BARRIER. MAINTAIN TWO 12'-0" LANES OF TRAFFIC IN EACH DIRECTION ON EXISTING BRIDGES.
2. REMOVE PORTIONS OF EXISTING BRIDGES AS NECESSARY FOR NEW CONSTRUCTION.
3. CONSTRUCT NEW SUBSTRUCTURE.
4. CONSTRUCT NEW SUPERSTRUCTURE.

BRIDGE NO. 36

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ABBAS ESHAGIEH-MEYBODI	11/20/09
DRAWN BY	DATE
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SUPERVISOR	DATE
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BRIDGE SHEET
2 OF 2

I-75 / I-575 NORTHWEST CORRIDOR

I-575 REVERSIBLE OVER NOONDAY CREEK SOUTH
CONSTRUCTION SEQUENCE

COBB COUNTY NH000-0575-01(028)