

Hydraulics Unit Pre-Design Report (Pre-Scoping) for Structure #: 850310

PDR

Date: 07/19/2016

County: Surry Stream: STONEY CRK
Road #: SR 1774 Road Name: REEVES MILL RD
Division: 11 Location: 150' N JCT SR 1818
Latitude: 36.45576 Longitude: 80.54129 Decimal degrees, a min of 5 decimal points

Assigned to:
Prepared By: wsh
Hydro Mgr: PFF Hydro Reviewer: MTS
Project Type: 174BP.11.R.128

Existing Structure

Structure Type: Steel Deck/I Beams Yr Built: 1968
Span Arrangement: 1@ 40' 8" OAL (ft): Skew: Abutment Type: Vertical -Timber
Number of Barrels: @ Span (ft): x Rise (ft):
Bed to Crown (ft): 12.0 Clear Roadway (ft): Water Depth (ft): 1.0 Superstructure Depth:
ADT: 2200 Year ADT: 2012 Scour Code (item113): Prior Survey Completed: Survey Date:
Drainage Area: 2.4 Sq. Mi. Drainage Area Source: Sel.-Sites Roadway Overtops at Q100:
Discharge Method: USGS Regression Equations USGS Region: 1- Piedmont Stream Gage Number(if applicable): 211383286
Q10 (cfs): Q25 (cfs): 1,000 Q50 (cfs): 1,300 Q100 (cfs): 1,500 QBFE (cfs):
☐ Structure in Flood Hazard Zone Panel #: 5948 Panel Date: 08/18/2009 Type of FIS: LIMITED Date of FIS:

Enviromental

Quad Map: MOUNT AIRY SOUTH, NC River Basin: Yadkin-Pee Dee Buffer Rule:
Primary Stream Classification
☐ Class B ☒ Class C ☐ SA ☐ SB
☐ SC ☐ SWL ☐ WL ☐ WS I
☐ WS II ☐ WS III ☐ WS IV ☐ WS V
Supplemental Stream Classification
☐ FWS ☐ HQW ☐ NSW ☐ ORW
☐ Sw ☐ Tr ☐ UWL ☐ w/in 0.5mi. of CA
Other Stream Classification
☐ Anadromous Fish ☐ Area of Environmental Concern
☐ CAMA County ☐ Federal Wild & Scenic Rivers
☐ HSB Required ☐ NC Natural & Scenic Rivers
☐ Impaired [303d] ☐ Primary Nursery Area
☐ TVA ☐ Designated Shellfish Harvesting Area
☐ Designated Public Mountain Trout Waters

Up/Down Stream Features

Upstream Feature: CULVERT? HEADWALL APPARENT
Location: 0.65 MILES UPSTREAM ON MILLS RD
Structure #: Route:
Latitude: 36.46174 Longitude: 80.53677
Prior Survey Completed: Survey Date: Bed to Crown (ft): Year Built: ?
Structure Type: UNKNOWN
Span Arrangement: OAL (ft):
Number of Barrels: @ Span (ft): x Rise (ft):
Downstream Feature: Culvert
Location: 8 MILES N JCT SR 1774
Structure #: 850177 Route: us 52
Latitude: 36.45184 Longitude: 80.55167
Prior Survey Completed: Survey Date: Bed to Crown (ft): 35.0 Year Built: 1953
Structure Type: RCBC
Span Arrangement: OAL (ft):
Number of Barrels: 3 @ Span (ft): 9.0 x Rise (ft): 11.0

Preliminary Structure Estimate [Office Estimate]

Structure Type: Cored Slab Skew: 90
Dimensions/Spans: 1 @ 70'

Notes

Stream # 03-07-03

OFFICE ESTIMATE:

PREDESIGN-SCOPING REPORT

Project# 17BP.11.R.128

TIP#

Let Date

WBS#

County

SURRY

DIV.

11Bridge# 850310Road# SR 1774 (Reeves Mill Rd)Stream STONEY CREEK

Type Of Request: POC Force Account TIP NCMA

Date 7-7-16 Name WOKAssigned To PFF/MTSChecked By wsh 7-18-16BRN: No ☒ Co FILE No ☒Prior Survey Date No (attach copy of prior survey)Study By Scour Section Yes, AttachedFlood Zone AE Detail Study LIMITED Date 8/18/09 Panel# 5948 ☒B.M. Info N/A ESM DA = 2.3 Sq MilesQuad Map Mount Airy South Drainage Area 2.35 SQ Miles From DASS Sta #: 211383286 ☒Q25 1000 cfs Q50 1300 cfs Q100 1500 cfs Method REG. EQUATIONS ☒LONG: -80.541285LAT: 36.455761REGION ONEI.A. = 1.08%

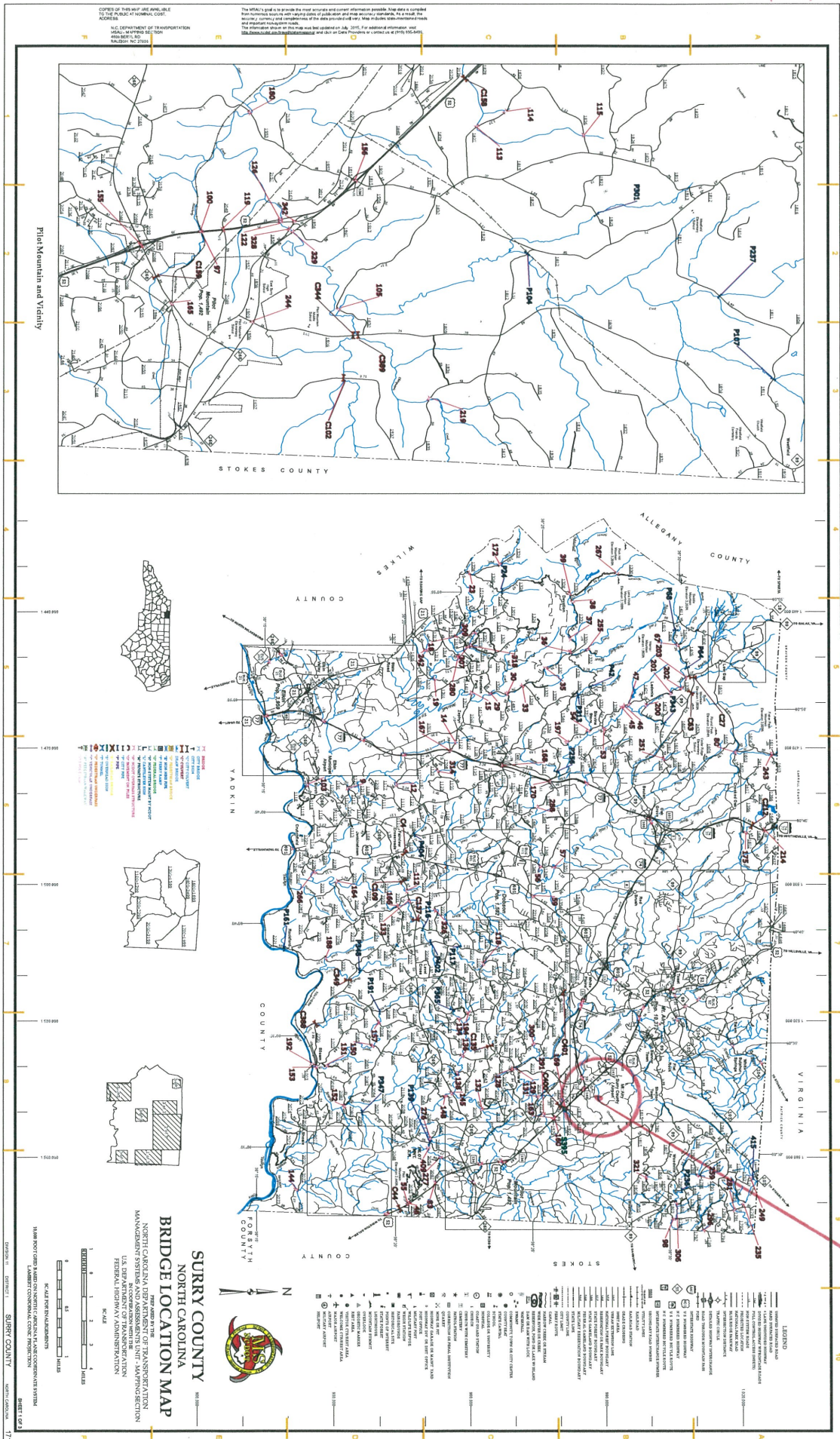
EXISTING BRIDGE INFORMATION

Location 150 Ft N. Jct. SR 1818Average Daily Traffic 2200 (2012) 6% TRKYEAR BUILT: 1968Length 41 Ft Bed-To Crown 12 Ft Water Depth 1 FtType Structure Steel plank floor on I-beams E-Bts: Timber Caps / Tim. Piles @ 6' Ctrs.Type Spans 1 @ 40'-8"Upstream Structure Culvert? HEADWALLYR. BUILT: 1953Location 0.65 miles U/S on Mills Rd (0.6 miles U/S) LONG: -80.536769Bed-To Crown N/A Prior Survey N/ALAT: 36.461739Downstream Structure 850177 Triple 9'x11' RCBC ☒ YR. BUILT: 1953 ☒Location 8 miles N. Jct. SR 1774 ☒ (ON US 52) (0.8 miles D/S) LONG: -80.551670 ☒Bed-To Crown 35 Ft ☒ Prior Survey N/ALAT: 36.451843 ☒SCS Watershed N/A

ENVIRONMENTAL

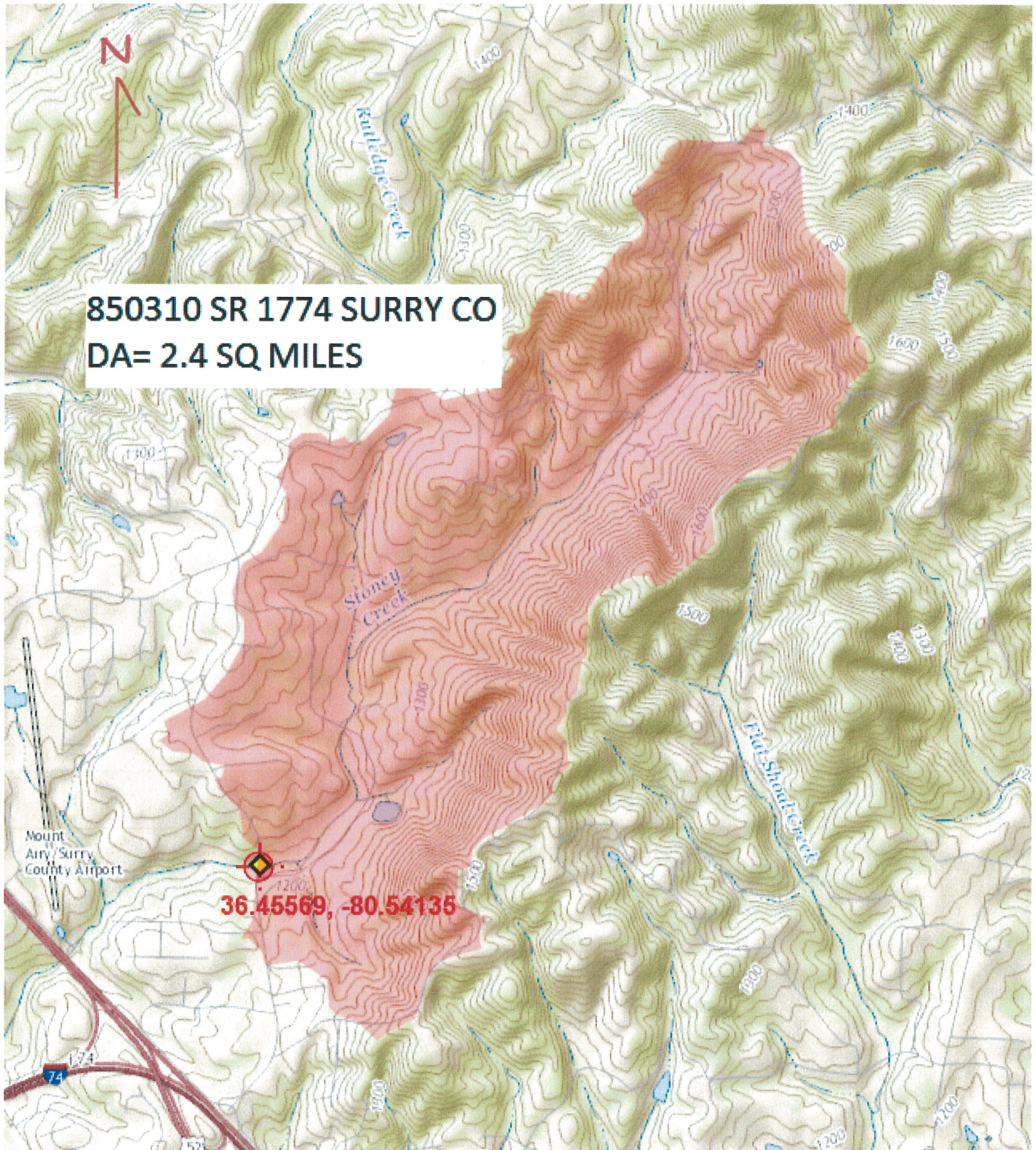
TVA: No ☒Trout Stream No ☒Anadromous Fish No ☒ Primary Nursery Area No ☒High Quality Waters No ☒Nutrient Sensitive Waters No ☒Near Water Supply Intake No ☒CAMA County NO ☒Stream Classification C ☒STREAM #: 03-07-03DENR River Basin Info. (Yadkin - PEE-DEE) ☒12-72-12

SITE



SITE # 310

850310



StreamStats Version 3.0**Flow Statistics Ungaged Site Report**

Date: Mon July 18, 2016 10:21:33 AM GMT-4

Study Area: North Carolina

NAD 1983 Latitude: 36.4558 (36 27 21)

NAD 1983 Longitude: -80.5412 (-80 32 29)

Drainage Area: 2.4 mi²

Peak Flows Region Grid Basin Characteristics			
100% Peak Southeast US over 1 sqmi 2009 5158 (2.4 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	2.4	1	9000
Percent Area in Region 1 (percent)	100.000	0	100
Percent Area in Region 2 (percent)	0.000	0	100
Percent Area in Region 3 (percent)	0.000	0	100
Percent Area in Region 4 (percent)	0.000	0	100
Percent Area in Region 5 (percent)	0.000	0	100

Urban Flows Region Grid Basin Characteristics			
Area in square miles=2.4			
Percent imperviousness of basin area 2006 NLCD=1.08			
100% Region 1 Urban under 3 sqmi 2014 5030 (2.4 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	2.4	0.1	3
Percent Impervious NLCD2006 (percent)	1.08	0	47.9

Peak Flows Region Grid Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
PK2	280	ft ³ /s	35		161	487
PK5	511	ft ³ /s	34		296	883
PK10	683	ft ³ /s	35		389	1200
PK25	913	ft ³ /s	38		502	1660
PK50	1120	ft ³ /s	40		595	2100
PK100	1310	ft ³ /s	42		672	2540
PK200	1490	ft ³ /s	44		742	3000
PK500	1790	ft ³ /s	48		845	3770

<http://pubs.usgs.gov/sir/2009/5158/> (<http://pubs.usgs.gov/sir/2009/5158/>)

Weaver, J.C., Feaster, T.D., and Gotvald, A.J., 2009. Magnitude and frequency of rural floods in the Southeastern United States through 2006—Volume 2. North Carolina: U.S. Geological Survey Scientific Investigations Report 2009-5158, 111 p.

Urban Flows Region Grid Statistics			

850310

Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
PK2U	313	ft ³ /s	32		168	585
PK5U	554	ft ³ /s	25		334	918
PK10U	751	ft ³ /s	25		462	1220
PK25U	1030	ft ³ /s	27		607	1760
PK50U	1270	ft ³ /s	29		716	2270
PK100U	1530	ft ³ /s	32		812	2890
PK200U	1810	ft ³ /s	35		913	3610
PK500U	2130	ft ³ /s	38		1030	4420

<http://pubs.usgs.gov/sir/2014/5030/> (<http://pubs.usgs.gov/sir/2014/5030/>)

Feaster, T.D., Gotvald, A.J., and Weaver, J.C., 2014. Methods for estimating the magnitude and frequency of floods for urban and small rural streams in Georgia, South Carolina, and North Carolina, 2011 (ver. 1.1, March 2014): U.S. Geological Survey Scientific Investigations Report 2014-5030, 104 p.

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URL: http://streamstatsags.cr.usgs.gov/v3_beta/FTreport.htm

Page Contact Information: StreamStats Help

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850310



NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE MANAGEMENT UNIT

ATTENTION: **PRIORITY MAINTENANCE TEMPORARY SHORING**

Structure Safety Report

Routine Element Inspection - Contract

COUNTY: SURRY STRUCTURE NUMBER: 850310 FREQUENCY: 24 MONTHS

FACILITY CARRIED: SR1774 MILE POST: _____

LOCATION: 150 FT.N.JCT.SR1818

FEATURE INTERSECTED: STONEY CREEK

LATITUDE: 36° 27' 20.52" LONGITUDE: 80° 32' 28.84"

SUPERSTRUCTURE: STEEL PLANK FLOOR ON I-BEAMS

SUBSTRUCTURE: E.BTS:TIM.CAPS/TIM.PILES 6'CTS.

SPANS: 1@40'-8"

☐ FRACTURE CRITICAL ☐ TEMPORARY SHORING ☐ SCOUR CRITICAL ☐ SCOUR PLAN OF ACTION

PRESENT CONDITION: Poor INSPECTION DATE: 08/11/2015

POSTED SV: 25 POSTED TTST: 32

OTHER SIGNS PRESENT: (4) DELINEATORS



Looking north

Sign noticed issued for		Number Required
<u>NO</u>	WEIGHT LIMIT	<u>0</u>
<u>NO</u>	DELINEATORS	<u>0</u>
<u>NO</u>	NARROW BRIDGE	<u>0</u>
<u>NO</u>	ONE LANE BRIDGE	<u>0</u>
<u>NO</u>	LOW CLEARANCE	<u>0</u>

INSPECTED BY
MATTHEW TOM

SIGNATURE

Matthew Tom

ASSISTED BY KYLE COMPTON

850310

Structure: 850310

County: SURRY

Date: 08/11/2015

Structure Photos



Downstream structure profile



End bent 1

850310

Structure: 850310

County: SURRY

Date: 08/11/2015

Structure Photos



Southwest wingwall



Upstream profile

850310

BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE

Update Date: 03/09/2016

COUNTY : SURRY DIVISION : 11 DISTRICT : 1 STRUCTURE NUMBER : 850310 LENGTH : 41 FEET

ROUTE CARRIED : SR1774 FEATURE INTERSECTED : STONEY CREEK

LOCATED : 150 FT.N.JCT.SR1818 BRIDGE NAME : CITY :

FUNC. CLASS : 09 SYST.ON : NFA SYST.UNDER : NFA ADT & YR : 2200 2012 RAIL TYPE : LT 233 RT 233

BUILT : 1968 BY : BMU PROJ : FED.AID PROJ : DESIGN LOAD : Unknown

REHAB : BY : PROJ : ALIGNMENT : TAN SKEW : 70 LANES : ON 2 UNDER 0

NAVIGATION : VC 0 FT HC 0 FT HT. CRN. TO BED : 12 FT WATER DEPTH : 1 FT

SUPERSTRUCTURE : STEEL PLANK FLOOR ON I-BEAMS

SUBSTRUCTURE : E.BTS:TIM.CAPS/TIM.PILES 6'CTS.

SPANS : 1@40'-8

BEAMS OR GIRDERS : 10 LINES 18 I-BEAMS@ 2'-6.75 CENTERS

FLOOR : STL.PLK/3 AWS ENCROACHMENT : DECK (OUT TO OUT) : 24.083 FT

CLEAR ROADWAY : 24.083 FT BETWEEN RAILS : 24.667 FT SIDEWALK OR CURB : LT .3 FT RT .3 FT

VERT.CL.OVER : 999.9 FT

INV.RTG. : HS-12 OPE.RTG. : HS-21 CONTR.MEMBER : int bm POSTED : SV 31 TTST 36 DATE 02/10/2016

SYSTEM : Secondary S.R. Route GREEN LINE ROUTE : N

UNDER ROUTES AND CLEARANCES

REMARKS :

850310

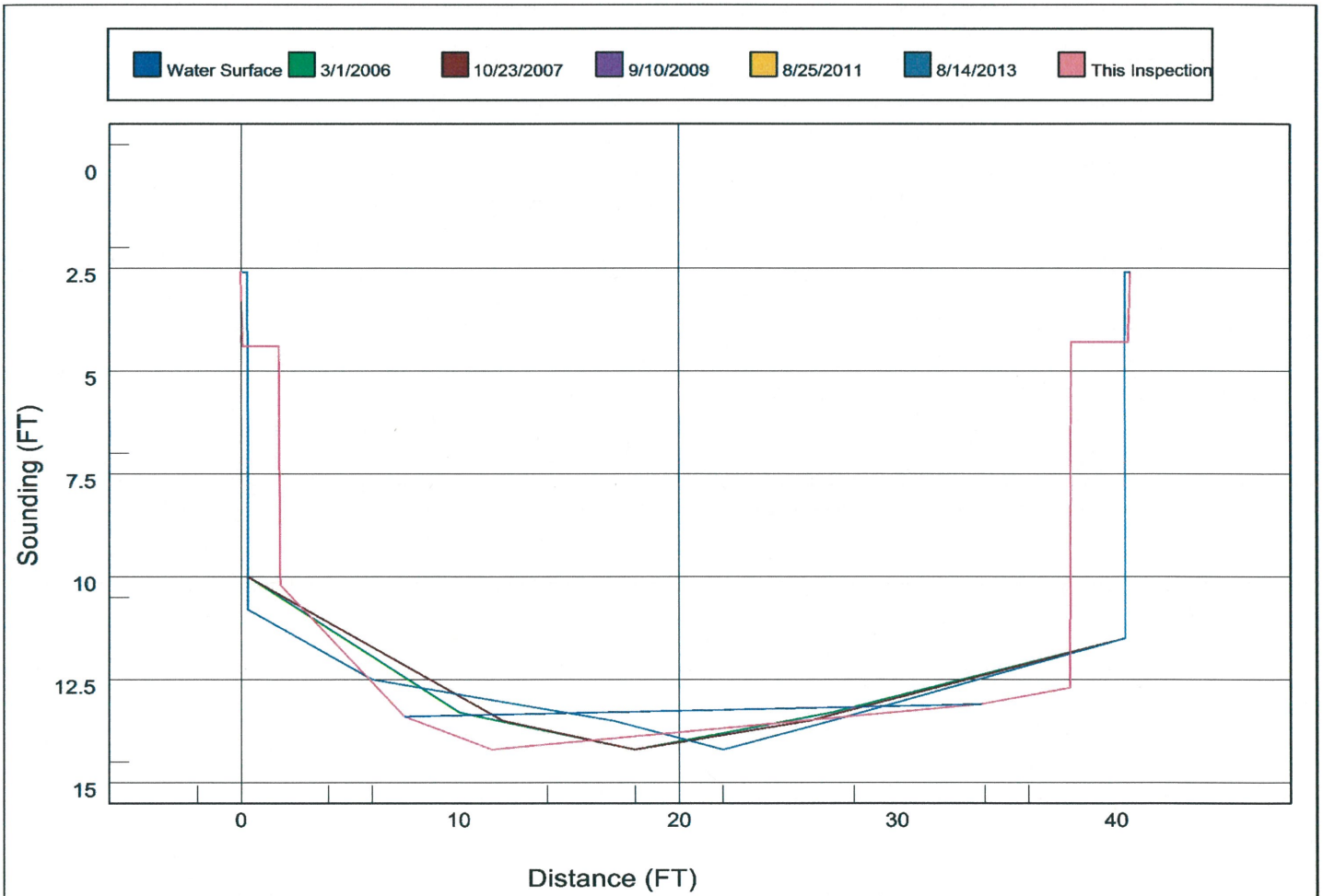
Bridge: 850310

County SURRY

Date:

STREAMBED PROFILE (Downstream)

Top of Rail = 0 FT (Sounding)



* DOWNSTREAM STR *

850310

Structure: 850177

County: SURRY

Date: 09/23/2015

Structure Photos



INLET



OUTLET

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION



NCDOT UNITS:
BRIDGE MAINTENANCE UNIT
HYDRAULIC DESIGN UNIT
GEOTECHNICAL UNIT
STRUCTURE DESIGN UNIT
SOILS AND FOUNDATION UNIT

BRIDGE SCOUR REPORT

COUNTY: SURRY BRIDGE: 850310 ROUTE: SR 1774 STREAM CROSSED: STONY CREEK

ASSESSMENT: YES EVALUATION: _____ BY: JJB DATE: 8/3/11

FHWA STRUCTURE INVENTORY & APPRAISAL CODES:

SUBSTRUCTURE CONDITION (ITEM 60)
CHANNEL AND CHANNEL PROTECTION (ITEM 61)
WATERWAY ADEQUACY (ITEM 71)
SCOUR CRITICAL BRIDGE (ITEM 113)

MONITORING:

PLAN REQUIRED? YES _____ NO ✓

- FLOOD MONITORING EVENT (UPSTREAM FACE, FROM TOP OF RAIL):

REQUIRED ACTION: _____

- CRITICAL MONITORING DEPTH (UPSTREAM FACE, FROM TOP OF RAIL):

REQUIRED ACTION: _____

- CRITICAL HIGH WATER DEPTH (UPSTREAM FACE, FROM TOP OF RAIL):

REQUIRED ACTION: _____

- SCOUR CRITICAL DEPTH (UPSTREAM FACE, FROM TOP OF RAIL):

REQUIRED ACTION: _____

INCREASE UNDERWATER INSPECTION CYCLE? YES _____ NO ✓ FREQUENCY _____

COUNTER MEASURES:

PLAN REQUIRED?
SUMMARY OF PLAN:

YES _____ NO ✓

CONSTRUCTION COMPLETE DATE: _____
FINAL CODING AFTER WORK IS COMPLETED (ITEM 113) _____ DATE: _____

BRIDGE MAINTENANCE COMMENTS:



BRIDGE SCOUR EVALUATION ASSESSMENT

AND DATA SUMMARY REPORT

ASSESSED: 8/3/11

BY: JJB

CODE: 5

CLASSIFIED: LOW RISK

SITE IDENTIFICATION:

COUNTY SURRY CITY/TOWN _____ BRIDGE NO. 850310
 ROUTE SR 1774 STREAM STONY CREEK ROAD MILE _____
 DUAL BRIDGE NO. ____ IS US/DS _____
 ORIGINAL PROJECT NO. _____ YEAR BUILT 1968
 REHAB PROJECT NO. _____ YEAR BUILT _____
 CURRENT ADT 1400 YEAR 2008 FUTURE ADT _____ YEAR _____

INFORMATION RESOURCES AVAILABLE:

HYDRAULIC STUDY REPORT (DATE): _____

AS-BUILT CONSTRUCTION PLANS (DATE): _____

FOUNDATION REPORT (DATE): _____

OTHER AGENCY STUDIES (DATE): _____

(FEMA, CORPS, T.V.A., SCS)

QUAD MAPS (NAME & DATE): _____

AERIAL PHOTOGRAPHY (DATE): _____

GAGE DATA (TYPE, NO., DRAINAGE AREA): _____

DISTANCE TO SITE (UP/DOWN STREAM): _____

BRIDGE INSPECTION REPORT (DATE): _____

9/10/09

UNDERWATER INSPECTION (DATE, CYCLE): _____

STRUCTURE DATA FILE (DATE): _____

OTHER _____ (DATE): _____

HYDRAULIC DATA:

DRAINAGE AREA _____ SQ. MILE SOURCE _____

100 YR. WATERWAY OPENING (NORMAL TO FLOW) _____

HISTORICAL FLOODS

DATE	ELEV. (FT BELOW TOP OF RAIL)	APPROX. FREQ. (YEARS)	APPROX. DISCH.	ADJUSTED TO SITE
UNKNOWN				

SOURCE 2003 SOUNDING SHEET

FLOOD FREQUENCY (YRS)	Q	Q	Q	Q
ELEVATION (FT)				
DISCHARGE (CFS)				
AVG. VELOCITY (Q/A)				

SOURCE _____

COMMENTS: _____

STRUCTURE DATA:

BRIDGE LENGTH: 41'
 SUFFICIENCY RATING: 23.2
 NO. OF SPANS: 1
 BED TO CROWN: _____

EST. REMAINING LIFE YRS: _____ DATE: _____
 SPAN LENGTHS: 1@40.8"
 SIMPLE OR CONTINUOUS _____
 TOP OF RAIL ELEVATION: 0' T HALWEG ELEVATION: 14.2'

BENT NO. (W-E, N-S)	EB1	EB2						
TYPE	TIMBER CAPS	TIMBER CAPS						
SKEW	TIMBER PILES	TIMBER PILES						
FTG./FOUNDATION TYPE								
FOOTING THICKNESS								
TOP FTG. ELEV.	LT							
	CTR							
	RT							
BOTTOM FTG. ELEV.	LT							
	CTR							
	RT							
TOP SILL ELEV.	LT							
	CTR							
	RT							
BOTTOM SILL ELEV.	LT							
	CTR							
	RT							
CONC./ RIP RAP PROTECTION								
PILE TYPE	TIMBER PILES	TIMBER PILES						
PILE LENGTH (AVERAGE)		15.4'						
PILE TIP ELEV. (AVERAGE)	Not Tested	21.7'						
PILE EMBED BELOW THALWEG		7.5'						
FTG. EMBED BELOW THALWEG								

COMMENTS: EB2-P3 pile length is from a Sonic Echo (SE) test (See Schnabel Report Dated 10/7/11).

GEOMORPHIC DATA: (LOOKING DOWNSTREAM)**CHANNEL (NORMAL TO FLOW):**

AVG. BASE WIDTH _____ AVG. TOP WIDTH _____ AVG. DEPTH _____

AT CROSSING:STRAIGHT ☒ MILD CURVE _____ SHARP BEND _____**FLOW ANGLE OF APPROACH:**LOW ☒ MILD _____ HIGH _____
(0°-5°) (5°-20°) (20°+)**CROSSING WIDTH COMPARED TO:**

UPSTREAM: WIDER _____ SAME _____ NARROWER _____

DOWNSTREAM: WIDER _____ SAME _____ NARROWER _____

BASED ON COMPARISON OF SECTIONS TAKEN AT DATES _____

CHANNEL HAS:

WIDENED _____ FT SAME _____ NARROWED _____ FT

AGGRADATED _____ FT SAME _____ DEGRADATED _____ FT

SHIFTED LT _____ FT SAME _____ SHIFTED RT. _____ FT

THALWEG HAS:

SHIFTED LT _____ FT SAME _____ SHIFTED RT. _____ FT

REPORTED SITE SCOUR PROBLEM:

	MINOR	MODERATE	SEVERE	UNKNOWN
LT. BANK	☒			
RT. BANK	☒			
LT. SPILL SLOPE				
RT. SPILL SLOPE				
PIER(S)	☒			
DEBRIS	☒			
CHANNEL BED	☒			
OTHER _____				

IS REPORTED PROBLEM CHANNEL FLOW ASSOCIATED? N/A

BASED ON THE AVAILABLE GEOMORPHIC DATA, THE CHANNEL STABILITY POTENTIAL OVER THE LIFETIME OF THE EXISTING STRUCTURE CAN BEST BE DESCRIBED AS:

1. RELATIVELY STABLE WITH LITTLE EXPECTED CHANGE N/A
2. POTENTIAL FOR SLOW CHANGE OVER TIME. NOT PRONE
TO A MAJOR ONE-EVENT CHANGE. N/A
3. UNSTABLE SUBJECT TO RAPID EVOLUTIONARY CHANGE N/A

ASSESSMENT CRITERIA:

- 1) SPREAD FOOTINGS WITHIN THE POTENTIAL CHANNEL SCOUR AREA ARE INDICATED BY FIELD INVESTIGATION OR BORING LOG ANALYSIS TO BE ON SCOUR RESISTANT MATERIAL.
GEOTECHNICAL CONCURRENCE BY: _____
- 2) AS-BUILT PLANS INDICATE THE SPREAD FOOTINGS WITHIN THE POTENTIAL CHANNEL SCOUR AREA TO BE KEYED AT LEAST 6" INTO ROCK. _____
- 3) STEEL PILE BENTS WITHIN THE POTENTIAL CHANNEL SCOUR AREA HAVE a) AVERAGE PILE TIPS THAT PENETRATE A MINIMUM OF 12 FEET BELOW STREAM BED OR b) HAVE LESS THAN 22 +/- FEET (LONGER IF BRACING CONSIDERED)OF TOTAL PILE LENGTH AND INDICATED BY: BORINGS LOGS, PILE DRIVE RECORDS, OR ROD SOUNDINGS TO BE TIPPED INTO POINT BEARING MATERIAL. a) _____ b) _____
- 4) CONCRETE OR TIMBER BENTS WITHIN THE POTENTIAL CHANNEL SCOUR AREA HAVE a) AVERAGE PILE TIPS THAT PENETRATE A MINIMUM OF 15 FEET BELOW THE STREAM BED OR b) HAVE LESS THAN 18 FEET +/- (LONGER IF BRACING CONSIDERED)OF TOTAL PILE LENGTH AND INDICATED BY BORING LOGS OR ROD SOUNDINGS TO BE TIPPED INTO POINT BEARING MATERIAL. a) _____ b) ☒ _____
- 5) ALL PIERS AND ABUTMENTS ARE OUTSIDE THE NORMAL CHANNEL SECTION. _____
- 6) THE BRIDGE HAS EXPERIENCED A FLOOD GREATER THAN A 50-YEAR MAGNITUDE WITH NO REPORTED OR APPARENT SCOUR PROBLEM. _____
- 7) THE BOTTOMS OF THE CHANNEL PIER SPREAD FOOTINGS ARE GREATER THAN 7 FEET BELOW THE STREAM BED. _____
- 8) THE APPROACH ROADWAY OR BRIDGE IS OVERTOPPED DURING MINOR FLOODS (<10-YEAR EVENT) REQUIRING CLOSURE AND INSPECTION BEFORE REOPENING. _____
- 9) DRILLED PIERS WITHIN THE POTENTIAL CHANNEL SCOUR AREA ARE INDICATED BY FIELD INVESTIGATION OR BORING LOG ANALYSIS TO BE IN SCOUR RESISTANT MATERIAL _____

THIS STRUCTURE MEETS WHICH OF THE ABOVE LISTED ITEMS FOR CLASSIFICATION AS A LOW RISK STRUCTURE?

4b

BASED ON AN ENGINEERING EVALUATION OF THE AVAILABLE DATA AND REPORTS, THE LOW RISK CLASSIFICATION OF THIS STRUCTURE FOR THE REASON(S) LISTED ABOVE APPEARS REASONABLE.

YES

COMMENTS:

The rod drives encountered refusal (two consecutive feet with blows per foot greater than 100, or 150 blows per foot or more) at 21.7 and 23.2 feet below top of rail at EB1 and EB2, respectively (See Schnabel Report 9/27/11).

ASSESSMENT DATA:

COUNTY: SURRY
BRIDGE NO.: 850310

ASSESSMENT DATE: 8/3/11

	YES OR NO
INSPECTION REPORTS:	
DATE OF INSPECTION REPORT 9/10/09	
EXISTING SCOUR HOLES PRESENT	N/A
UNDERMINING OF FOOTINGS	N/A
72 FIELD SCOUR EVALUATION- SCOUR HAS OCCURRED	N/A
HYDRAULIC DATA:	
HIGH WATER- OVERTOP OF BRIDGE DECK	NO
CHANNEL SHIFTING OR DEGRADING	NO
BAD ANGLE OF ATTACK- STREAM CURVES AT BRIDGE	NO
DEBRIS PROBLEM AT BRIDGE- LEANING TREES ON BANK	NO
GEOTECHNICAL DATA:	
FOUNDATION MATERIAL IS SCOURABLE	N/A
STREAMBED IS SAND W/ NO ARMOR MATERIAL	N/A
STRUCTURAL DATA:	
SMALL ABUTMENTS (NOT MASSIVE)- EASY TO DAMAGE	N/A
WIDE WEBS- ADVERSE ANGLE- CREATES PIER SCOUR	N/A
ROTATION OR SETTLEMENT OF PIERS OR ABUTMENTS	N/A
ADDITIONAL CONSIDERATIONS:	
DAM-UPSTREAM/ DOWNSTREAM	N/A
PREVIOUS COUNTERMEASURES DAMAGED	N/A
RIP RAP ERODE	N/A
SAND OR GRAVEL MINING IN VICINITY OF BRIDGE	N/A

THIS ASSESSMENT WAS CONDUCTED BY AN INTERDISCIPLINARY TEAM OF HYDRAULIC, GEOTECHNICAL, STRUCTURAL, BRIDGE MAINTENANCE, AND FHWA ENGINEERS BASED UPON INFORMATION PROVIDED AND ENGINEERING JUDGMENT.

NOTE:

BRIDGE INSPECTORS TO NOTIFY THE HYDRAULICS UNIT IF ANY OF THE ABOVE CONDITIONS CHANGE ENOUGH TO WARRANT RECORDING OF ITEM 113.

DECISION:**CLASSIFIED AS:**~~SCOUR CRITICAL~~ _____~~UNKNOWN FOUNDATION~~ _____LOW RISK ✓**RECOMMENDED SCOUR CODE: 5** _____**ASSESSMENT COMMENTS:**

EB1 Timber piles depth not tested

EB2 Timber piles 21.7' below Top of rail embedded 10.2' below ground.

SCHEDULE FOR DETAILED STUDY _____**SCHEDULE FOR FURTHER IN-HOUSE STUDY** _____**ASSESSED BY:** JJB _____**FIRM:** NCDOT _____**DATE:** 8/3/11 _____**CHECKED BY:** _____**DATE:** _____**FIRM:** _____**APPROVED BY:** JLI _____**DATE:** 8/3/11 _____**FINAL COMMENTS:**

SCOUR COMMITTEE RECOMMENDS CODE 5

SEE SCHNABEL REPORT DATED 10/7/11

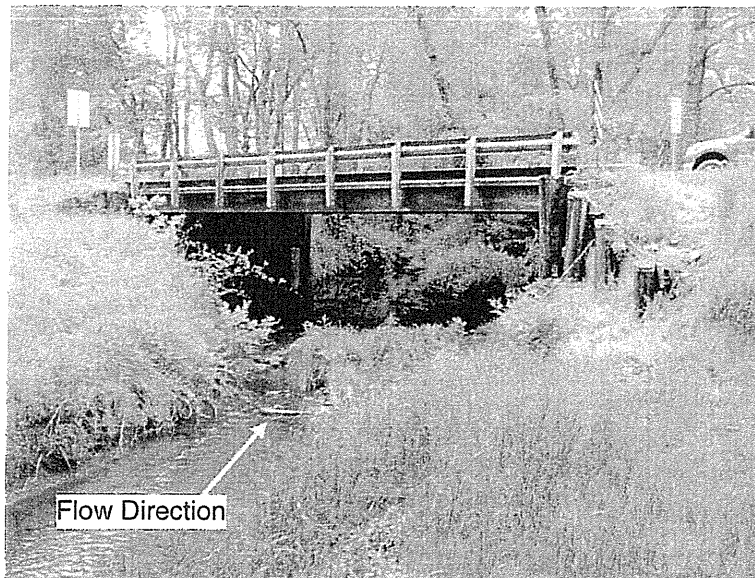


Schnabel Engineering South, PC
Greensboro, NC
Phone: 336-274-9456
www.schnabel-eng.com

850310

Page 1
October 7, 2011

**FINAL REPORT OF UNKNOWN BRIDGE FOUNDATION INVESTIGATION
BRIDGE NO. 850310
SURRY COUNTY
SR 1774
STONY CREEK**

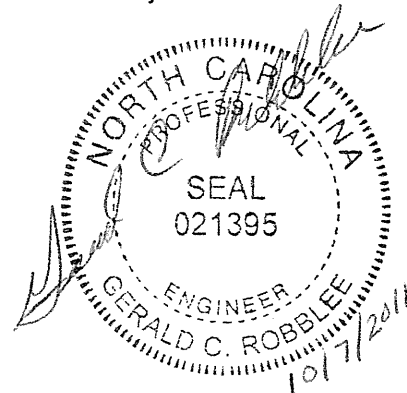


SUBMITTED TO:

Jerry Beard, P.E.
North Carolina Dept. of Transportation
Hydraulics Unit
1590 Mail Service Center
Raleigh, NC 27699-1590

AUTHORED BY:

Edward D. Billington, P.G.
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NC P.E. Registration No. 21395
Schnabel Project 09210013.16



1.0 INTRODUCTION

This report provides a summary of the results of field testing and records search for Bridge 850310 in Surry County. The purpose of the work was to help determine the bridge foundation depth to allow the Scour Committee to assess the scour potential of the bridge.

Bridge 850310 is a one-span bridge built in 1968. The present condition is Fair, according to the 9/10/09 Inspection Report. The superstructure is listed as STEEL PLANK FLOOR ON I-BEAMS. The substructure is listed as E.BTS: TIM. CAPS/ TIM. PILES 6' CTS.

2.0 RECORDS SEARCH

The records search was performed by the Geotechnical Engineering Unit (GEU) and included reviewing the Raleigh Bridge Maintenance Unit records. The GEU also sent letters to the Division Bridge Maintenance Offices requesting pile records and other relevant information. Folders containing applicable information were provided for most bridges to Schnabel by the GEU.

Bridge Inspection Reports: 9/10/09
Soundings: 2003, 2006, 2007, 2009

3.0 BRIDGE INFORMATION

Latest Inspection Report	9/10/09	Year Built	1968
Substructure Condition	5	Year Rehab	None
Channel & Channel Condition	6	Current ADT	1400
Scour Code	7	Year	2008
Waterway Adequacy	7		
Bridge Length	41	EB1 & EB2 Foundations	TIM. CAPS/TIM. PILES 6' CTS.
Sufficiency Rating	23.2		
# of Spans	1		
Span Lengths	1 @ 40'8"		

No additional information was found regarding the foundation. No plans are available.

4.0 HYDRAULIC DATA

Source of High Water Information	2003 Sounding Sheet
High Water*	Unknown
Date	Unknown
Q25	Unknown
Q50	Unknown
Q100	Unknown

*referenced to top of rail

5.0 FIELD OBSERVATIONS

Scour noted: No evidence of scour was observed during our field investigation, or mentioned in the inspection report.

Angle of Stream Attack: Straight

Debris: No debris noted.

Has Thalweg Shifted: The soundings show that the thalweg has shifted by 4 feet between 2007 and 2009, but there has been very little change in channel depth since the 2003 sounding.

6.0 FIELD TESTING

We conducted a Sonic Echo (SE) test on EB2-P3 and calculated a pile length of 15.4 feet. The velocity used for these analyses was 12,500 feet per second and was calculated from a velocity test conducted on EB2-P3. A data plot for this test is attached. Results of the testing are shown in the following table and on the attached cross-section.

PILE TIP OR BOTTOM OF FOUNDATION FROM TESTING			
Location	Computed Length	Top of Rail to Bottom of Foundation	Embedment Below Thalweg
EB1	Not Tested		
EB2 – P3	15.4 feet	21.7	7.5

Thalweg: 14.2 feet below top of rail (9/10/09)

We drove half-inch diameter steel rods with a 16-pound hammer at EB1 and EB2, as shown in the following table.

Foundation Element and Reference Location (feet)	Depth Below Reference (feet)	Depth Below Top of Rail (feet)	Blows per Foot	Comment
EB1	1	14.7	11	
	2	15.7	19	
TOR to Ref. =	3	16.7	33	
13.7	4	17.7	17	
	5	18.7	21	
	6	19.7	53	
	7	20.7	107	
	8	21.7	138	
EB2	1	14.7	5	
TOR to Ref. =	2	15.7	28	
13.7	3	16.7	82	
	4	17.7	17	
	5	18.7	26	
	6	19.7	47	
	7	20.7	74	
	8	21.7	62	
	9	22.7	102	
	9.5	23.2	150	

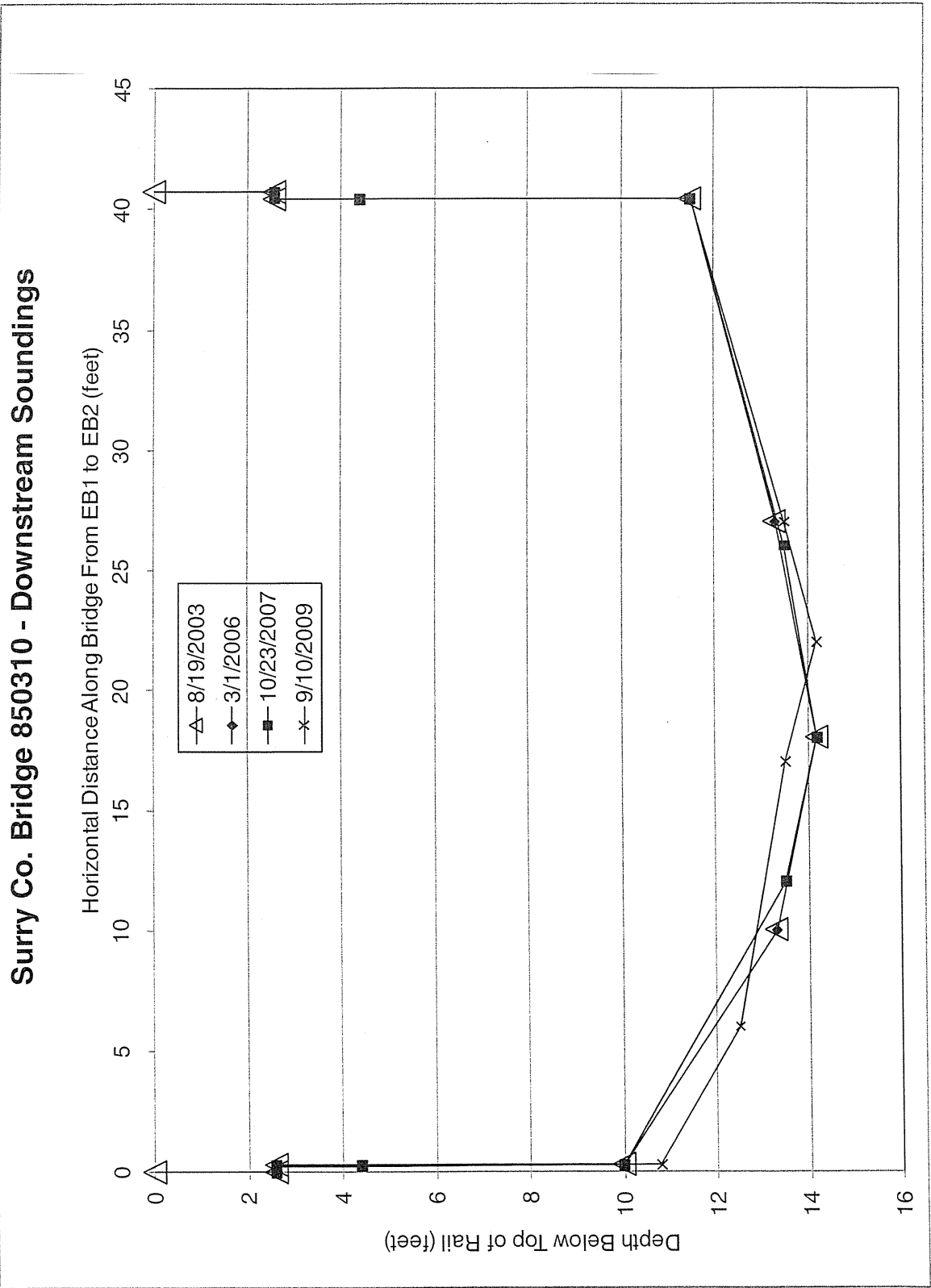
7.0 CONCLUSIONS

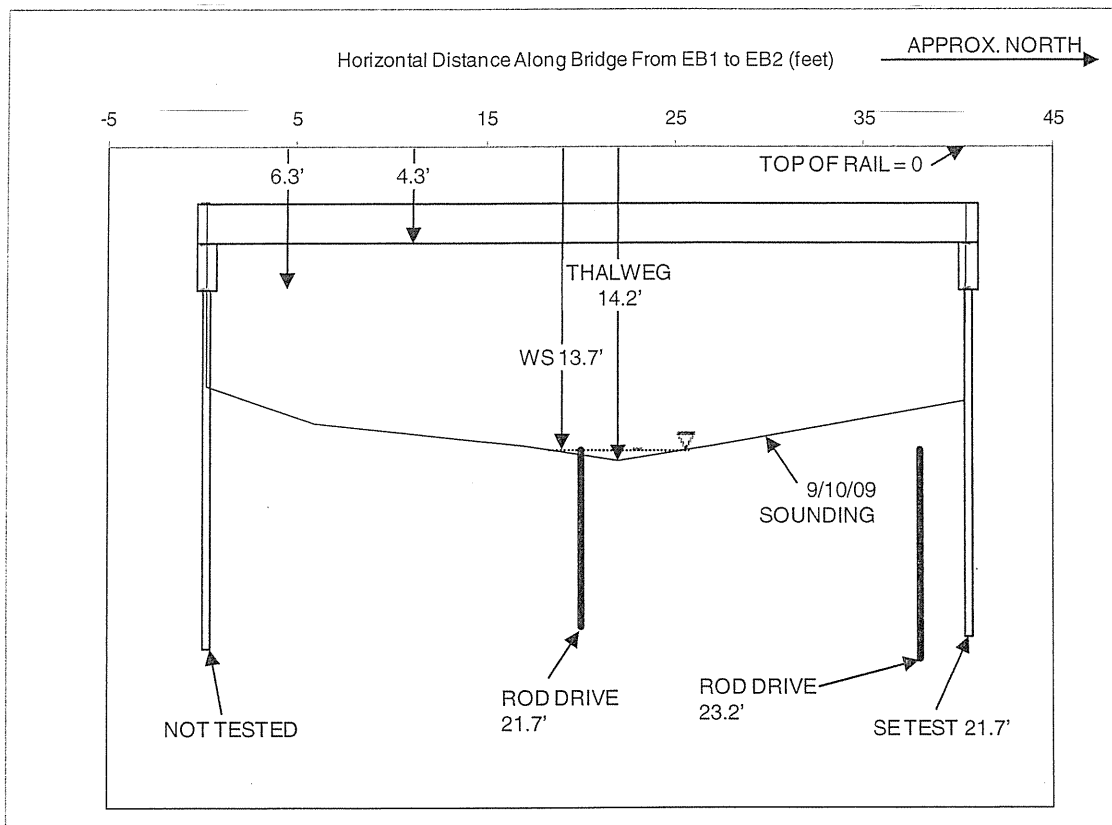
The results of the research, testing, and rod drives performed on Bridge 850310 in Surry County indicate the following:

- There were no observations of scour during our field investigation.
- The rod drives encountered refusal (two consecutive feet with blows per foot greater than 100, or 150 blows per foot or more) at 21.7 and 23.2 feet below top of rail at EB1 and EB2, respectively.
- We calculated a pile tip elevation of 21.7 feet below top of rail from the SE test on EB2-P3, which is 7.5 feet below thalweg.

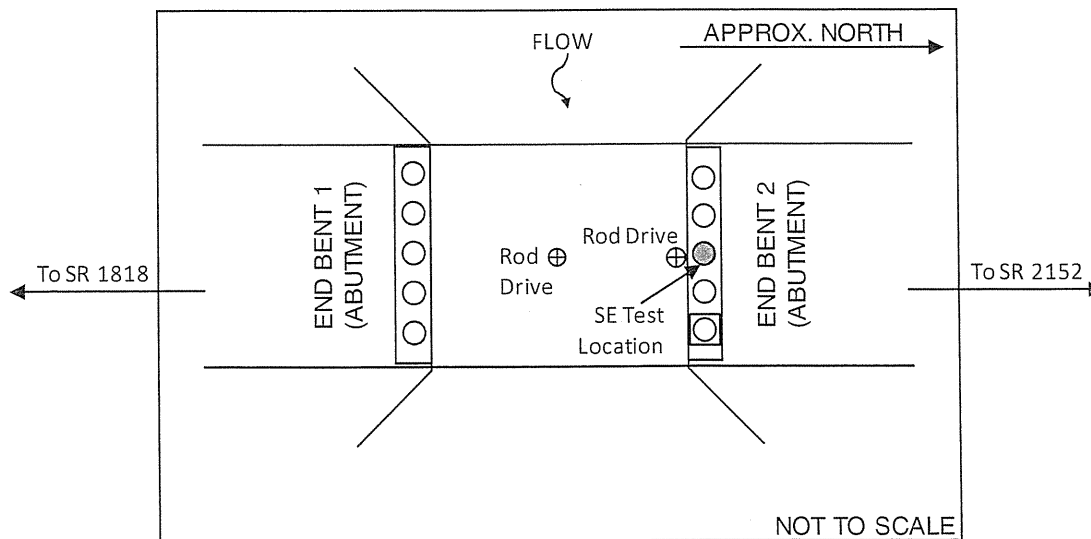
8.0 LIMITATIONS

The work presented herein is based on non-destructive evaluation techniques that require interpretation of the results. We have endeavored to complete the services identified herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions as this project. No other representation, express or implied, is included or intended, and no warranty or guarantee is included or intended in this report, or any other instrument of service.



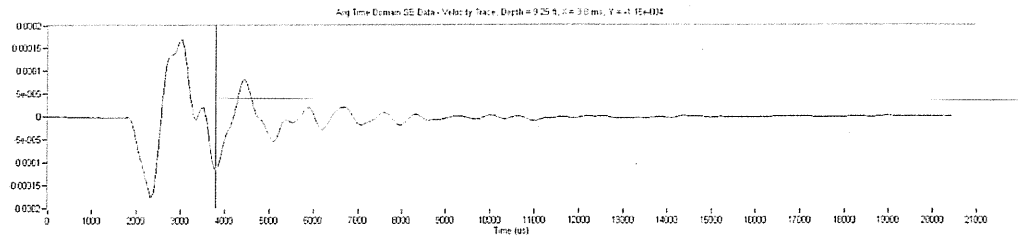


CROSS SECTION



PLAN VIEW

Sonic Echo (SE) Test on EB2-P3



The results of the SE test on EB2-P3 indicate a pile length of 9.3 feet below the test location, using a velocity of 12,500 feet/second. The test location was 6.1 feet below the top of the pile, giving a total calculated pile length of 15.4 feet.

TOR to top of pile = 6.3 feet, therefore

TOR to bottom of pile = $15.4 + 6.3 = 21.7$ feet.

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(1 of 2)

SITE



This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of North Carolina and the Federal Emergency Management Agency (FEMA). The State of North Carolina has implemented a program to ensure that flood insurance maps are accurate and up-to-date. This map is the result of a joint effort by the State and FEMA to improve the accuracy of flood insurance maps in North Carolina. As a part of this effort, the State of North Carolina has agreed to provide technical data to FEMA to produce and maintain this digital FIRM.

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING
DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
[HTTP://FIS.NC.GOV/FIS](http://FIS.NC.GOV/FIS)

- SPECIAL FLOOD HAZARD AREAS**
 - Without Base Flood Elevation (BFE) Zone AE, AO, AH, VE, AR
 - Regulatory Floodway
 - 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with Average Depth Less Than One Foot or With Drainage Areas of Less Than One Square Mile Zone X
 - Future Conditions 1% Annual Chance Flood Hazard Zone X
 - Area with Reduced Flood Risk due to Levee See Notes, Zone X
 - Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- OTHER AREAS**
 - Channel, Culvert, or Storm Sewer
 - Accreted or Provisionally Accreted Levee, Dike, or Floodwall
 - Non-accreted Levee, Dike, or Floodwall
- GENERAL STRUCTURES**
 - North Carolina Geodetic Survey bench mark
 - National Geodetic Survey bench mark
 - Contractor Est. NCMP Survey bench mark
 - Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
 - Coastal Transect
 - Coastal Transverse Baseline
 - Profile Baseline
 - Hydrographic Feature
 - Limit of Study
 - Jurisdiction Boundary
- OTHER FEATURES**

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, please refer to the National Flood Insurance Program in general, please visit the FEMA Map Information Exchange at 1-877-FEMA-MAP (1-877-368-6277) or visit the FEMA Map Service Center website at <http://www.fema.gov> for downloading Flood Insurance Study reports. Letter of Map Revision (LOR) or Letter of Map Amendment (LOMA) reviewing portions of this panel, and digital versions of this FIRM may be available. Visit the North Carolina Floodplain Mapping Program website at <http://www.ncfloodplainmapping.com> or contact the FEMA Map Service Center.

Continuous entering land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM index. These may be obtained directly from the Map Service Center at the number listed above.

For community and outgrowth map data refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-442-6247.

Base map information shown on this FIRM was provided in digital format by the North Carolina Floodplain Mapping Program (NCFPMP). The source of this information can be determined from the metadata available in the digital FIRM database and the Technical Support Data (TSD).

ACCREDITED LEVEE NOTES TO USERS: If an accreted levee note appears on this panel check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at <http://www.fema.gov/business/hydrologic.htm>.

PROVISIONALLY ACCREDITED LEVEE NOTES TO USERS: If a Provisionally Accreted Levee (PAL) note appears on this panel, check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection. To maintain accreditation, the levee owner or community is required to submit the data and documentation necessary to comply with Section 65.12 of the NFIP regulations. If the community or owner does not provide the necessary data and documentation or if the data and documentation provided indicates the levee system does not comply with Section 65.12 requirements, FEMA will remove the flood hazard and the information for this area to reflect the accreditation of the levee system. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at <http://www.fema.gov/business/hydrologic.htm>.

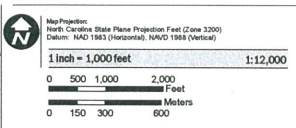
LIMIT OF MODERATE WAVE ACTION NOTES TO USERS: For some coastal flooding zones the AE Zone category has been defined by a Limit of Moderate Wave Action (LMWA). The LMWA represents the approximate landward limit of the 1.5 foot limiting wave. The effects of wave hazards between the VE Zone and the LMWA, (or between the LMWA and the LOMW for areas where VE Zones are not identified), will be similar to, but less severe than those in the VE Zone.

Limit of Moderate Wave Action (LMWA)

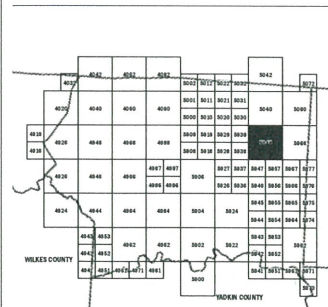
COASTAL BARRIER RESOURCES SYSTEM (CBRS) NOTE
This map may include approximate boundaries of the CBRS for informational purposes only. Flood insurance is not available within CBRS areas for structures that are newly built or substantially improved on or after the date(s) of the FIRM. For more information visit <http://www.fema.gov/business/hydrologic.htm>. Under Item, the FIS Report, or call the U.S. Fish and Wildlife Service Customer Service at 1-800-344-3962.

Legend:
CBRS Area
Otherwise Protected Area

SCALE



PANEL LOCATOR



National Flood Insurance Program

NORTH CAROLINA FLOODPLAIN MAPPING PROGRAM
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
NORTH CAROLINA
Panel 5948

Panel Contains:
COMMUNITY
MOUNT AIRY CITY OF
SURRY COUNTY

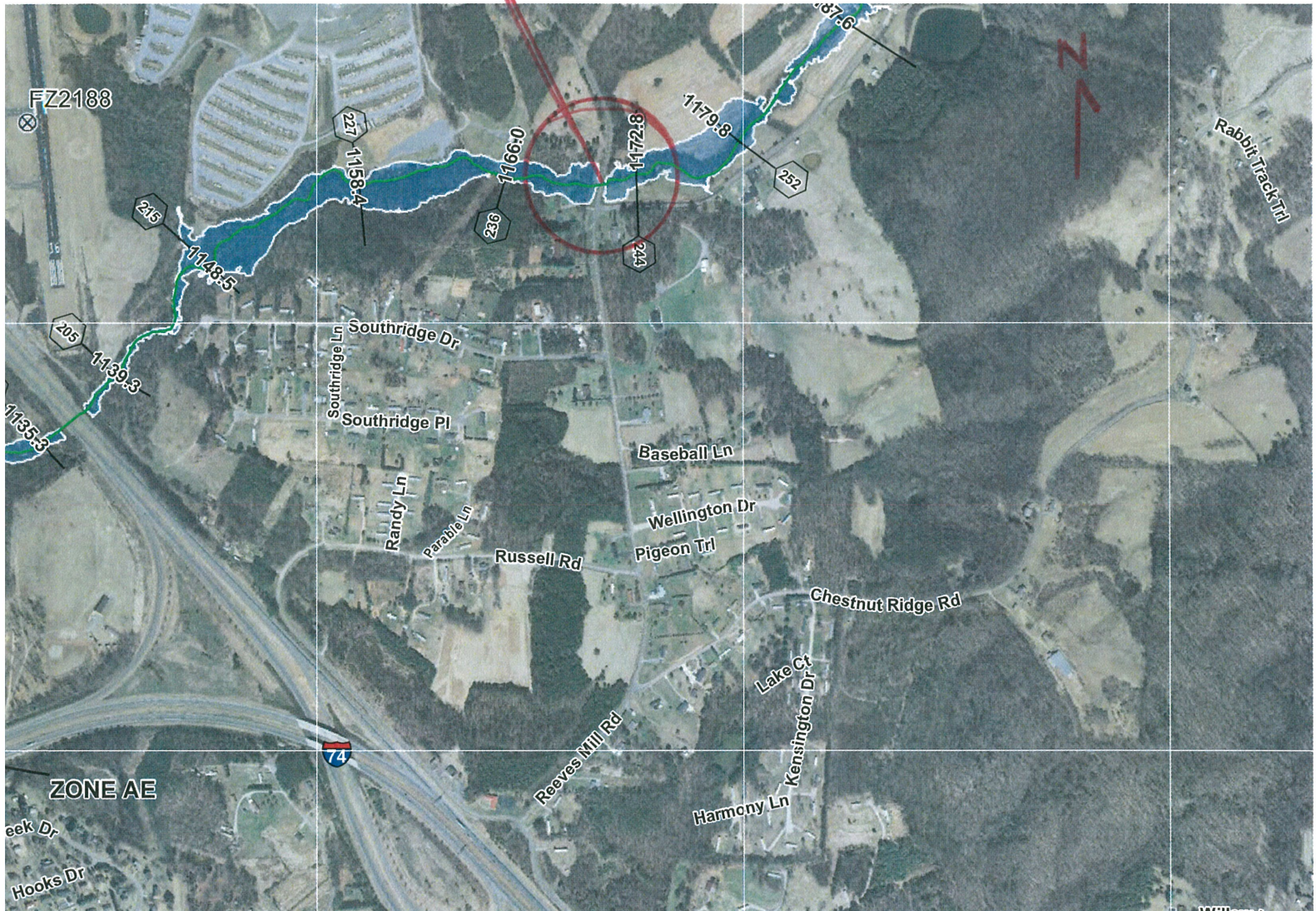
CID PANEL SUFFIX
370226 5948 J
370364 5948 J

MAP NUMBER
3710594800J
MAP REVISED
8/18/2009

850310
(2 of 2)

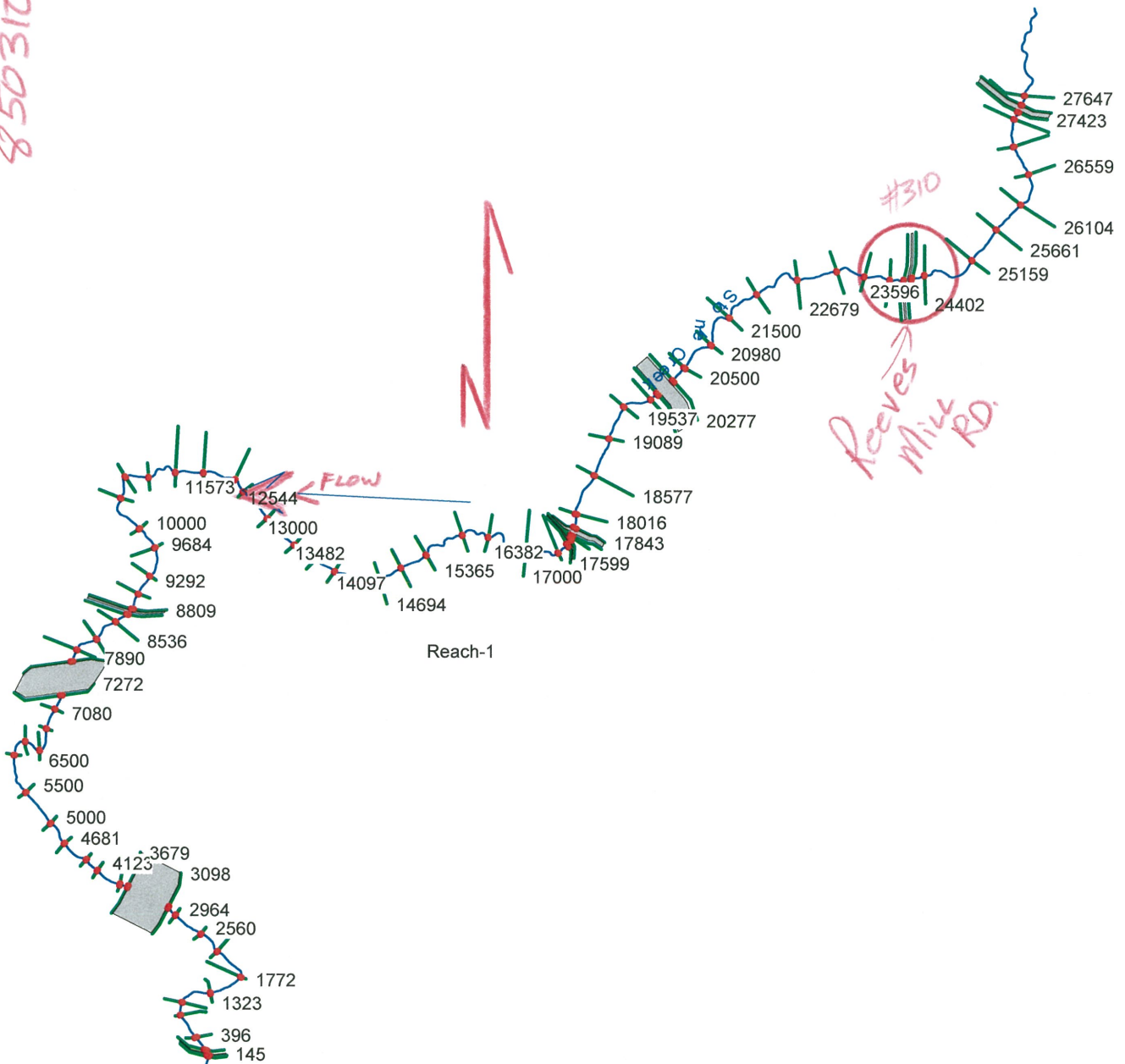
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