

COORD. 34.57874, -78.5919

Project# B-5701
TIP# _____
Let Date _____
WBS# _____

PREDESIGN-PRESURVEY REPORT

County BLADEN

Bridge# 08 0032
Road# SR 1700
Stream HAMMOND CREEK

Type Of Request: POC Force Account TIP NCMA POT. DES/BUILD
Date 11-2015 Name JLL Assigned To _____
Checked By _____

Prior Survey Date 12 SEPT 1961 (attach copy of prior survey) BSR NOT FOUND - PARTIAL NOTES ATTACHED
Study By Scour Section ATTACHED

Flood Zone NO Detail Study _____ Date 1-5-07 Panel# 1320

B.M. Info N/A

Quad Map ELIZABETH TOWN ^{Swath} Drainage Area 7.5 SQ. MI. From STREAM STATS (8.0 on old notes)
Q25 850 CFS Q50 1050 CFS Q100 1250 CFS Method USGS ST. REPORT 2009-5158

EXISTING BRIDGE INFORMATION

Location 0.2 mi. N. Jct. SR 1708

Average Daily Traffic 2000 2013

Length 90' Bed-To Crown 13' Water Depth 4'

Type Structure PRESTRESSED CONCRETE CHANNEL

Type Spans 3 @ 30'

Upstream Structure NOT IN INVENTORY UNDER US 701 - NOT comparable DTA.

Location _____

Bed-To Crown _____ Prior Survey _____

Downstream Structure BR. 154 3 @ 30' STEEL PLATE FLOR ON I-BEAMS

Location DNSTREAM UNDER SR 1709

Bed-To Crown 13' Prior Survey NONE.

SCS Watershed _____

ENVIRONMENTAL

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

DENR River Basin Info. CAPE FEAR

OFFICE ESTIMATE 90' BRIDGE



NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE MANAGEMENT UNIT

ATTENTION: TEMPORARY REPAIRS / PM ISSUED

Structure Safety Report

Routine Element Inspection

COUNTY: BLADEN STRUCTURE NUMBER: 080032 FREQUENCY: 24 MONTHS

FACILITY CARRIED: SR1700 MILE POST:

LOCATION: 0.2 MI.N.JCT.SR1708

FEATURE INTERSECTED: HAMMOND CREEK

LATITUDE: 34° 34' 43.41" LONGITUDE: 78° 35' 30.81"

34.6032

78.5919

SUPERSTRUCTURE: PRESTRESSED CONCRETE CHANNELS, STD.BMD-13

SUBSTRUCTURE: E.BTS&BTS:PRESTR.CONC.CAPS ON TIM.PILES@5"6CTS

SPANS: 1@30"6,1@30",1@30"6

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

PRESENT CONDITION: Fair INSPECTION DATE: 06/02/2015

POSTED SV: 22 POSTED TTST: 25

OTHER SIGNS PRESENT: 3 DELINEATORS



Sign noticed issued for		Number Required
<u>NO</u>	WEIGHT LIMIT	<u>0</u>
<u>YES</u>	DELINEATORS	<u>1</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>

LOOKING NORTH (MERCER MILL / BROWN MARSH ROAD)

INSPECTED BY Ray L. Kisner	SIGNATURE <i>Ray L. Kisner</i>	ASSISTED BY R.D. Heath
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BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE

Run Date: 07/14/2015

COUNTY :	DIVISION :	DISTRICT :	STRUCTURE NUMBER :	LENGTH :	
BLADEN	6	3	080032	91	FEET

ROUTE CARRIED :	FEATURE INTERSECTED :
SR1700	HAMMOND CREEK

LOCATED :	BRIDGE NAME :	CITY :
0.2 MI.N.JCT.SR1708		

FUNC. CLASS :	SYST.ON :	SYST.UNDER :	ADT & YR :	RAIL TYPE :
08	NFA	NFA	2000 2013	LT 233 RT 233

BUILT :	BY :	PROJ :	FED.AID PROJ :	DESIGN LOAD :
1975	DOH	5216		H 15

REHAB :	BY :	PROJ :	ALIGNMENT :	SKEW :	LANES :	UNDER :
	DBM		TAN.	90	ON 2	0

NAVIGATION :	HT. CRN. TO BED :	WATER DEPTH :
VC 0 FT HC 0 FT 13 FT		4 FT

SUPERSTRUCTURE : PRESTRESSED CONCRETE CHANNELS, STD.BMD-13

SUBSTRUCTURE : E.BTS&BTS:PRESTR.CONC.CAPS ON TIM.PILES@5'6CTS

SPANS : 1@30'6,1@30',1@30'6

BEAMS OR GIRDERS : 12 PRESTRESSED CONCRETE CHANNEL SECTIONS

FLOOR :	ENCROACHMENT :	DECK (OUT TO OUT) :
PPC.CH./4AWS		30.5 FT

CLEAR ROADWAY :	BETWEEN RAILS :	SIDEWALK OR CURB :
29 FT	30 FT	LT .5 FT RT .5 FT

VERT.CL.OVER :
999.9 FT

INV.RTG. :	OPE.RTG. :	CONTR.MEMBER :	POSTED :	TTST	DATE
HS-1	HS-1	Pile	SV 22	25	08/12/2009

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

UNDER ROUTES AND CLEARANCES

REMARKS :

Stream Bed Soundings

(See next sheet for profile sketch)

Bridge No: 080032 County: BLADEN Date: _____ By: RLK

Record sounding from top of rail. Other location if needed: TOP OF RAIL

Distance from Highwater Mark to top of rail: 8 Location of Highwater Mark: ON PILES

DOWNSTREAM			UPSTREAM		
Distance (Station) (ft)	Sounding (ft)	Description	Distance (Station) (ft)	Sounding (ft)	Description
0	2.8	TOP OF BULKHEAD			
1	4.4	Top of Cap			
3	5.3	GROUND AT CAP	3	6.1	GROUND AT CAP
15	9.6				
26.5	12.5	WSWE (WEST)			
27	15.6				
30.5	15	BENT 1	30.5	14.1	BENT 1
45.5	16	C/L OF STREAM			
60.7	14.9	BENT 2	60.7	14.6	BENT 2
64.5	12.5	WSWE			
80	7.3				
89	6.8	GROUND AT CAP	89	5.7	GROUND AT CAP
90	4.4	Top of Cap			
91	2.8	TOP OF BULKHEAD			

$$\begin{array}{r}
 16.0 \\
 4.7 \\
 \hline
 11.6 \times 1.5 \times 2 = 34.5 + 20 = 54.8 + 38 = 93
 \end{array}$$

say 90' #6

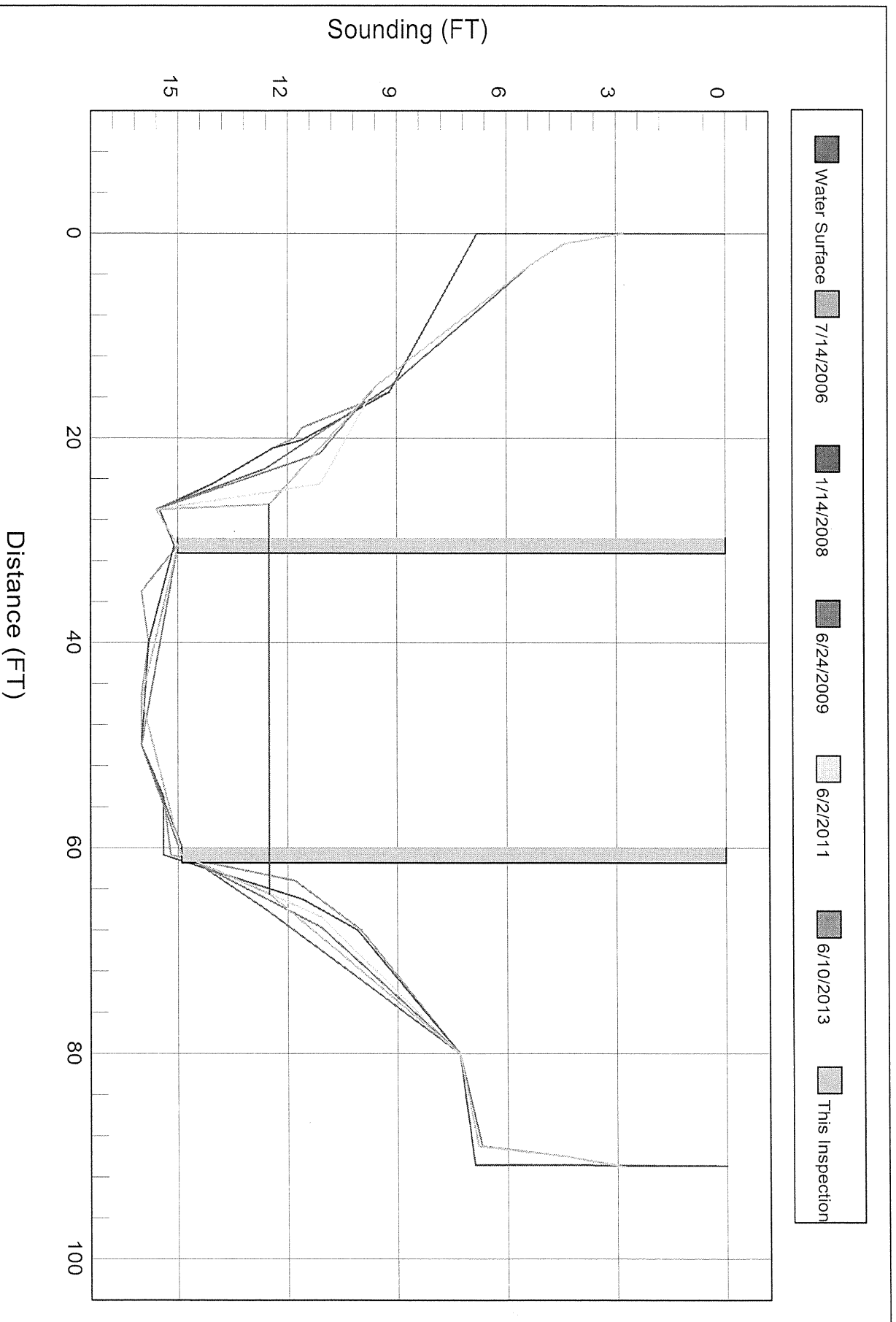
Bridge: 080032

County: BLADEN

Date:

Top of Rail = 0 FT (Sounding)

STREAMBED PROFILE (Downstream)



Partial NOTES

BLADEN COUNTY

BRIDGE NO. 32

ON S.R. # 1700

OVER HAMMOND CREEK.

DA. 859 MI.

H.B.M.

K.D.H.

W.C.C.

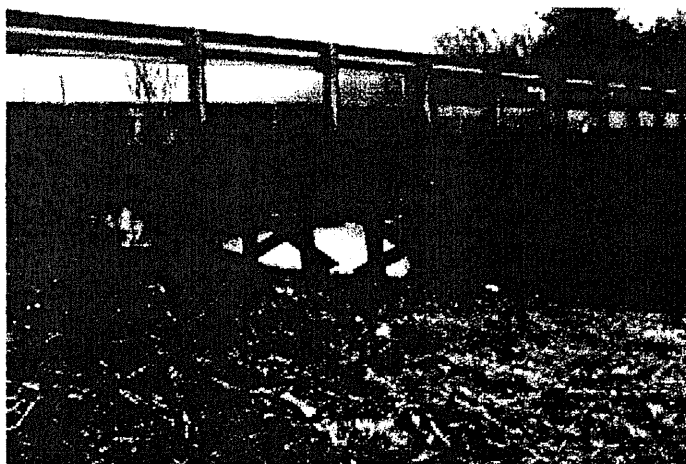
12300 1961



Unknown Foundation Determination

Substructure Report

Bladen County #080032
SR 1700 over Hammond Creek



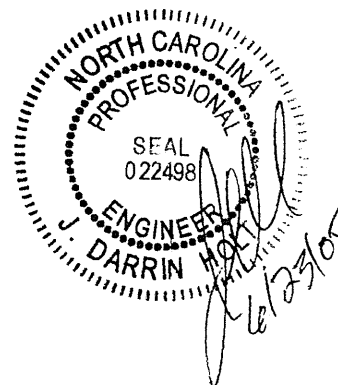
FDH Project # 04-0101E(304)

Submitted by:

J. Darrin Holt, Ph.D., P.E.
President

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T: (919) 755-1012 F: (919) 755-1031
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info@fdh-inc.com

February 18, 2005



Report Submitted to: Mr. Jerry Beard. PE
NCDOT Hydraulics Unit
1590 Mail Service Station
Raleigh, NC 27695-1590

Facility Carried: SR 1700

Feature: Hammond Creek

Original Construction: 1975 **Year Reconstructed:** N/A **ADT:** 2500 (2001)

Work Performed: Site visit, records search, Dispersive Wave Propagation Testing, Sounding

Substructure Type: Timber Piles

No. of Interior Bents: Two (2)

Piles per Bent: 6 timber piles at the interior bents and both end bents.

Reference Document(s):

No bridge plans were found at Bridge Maintenance.

Field Work Performed and Comments / Field Observations:

Creek had no flow the day of our visit. Evidence suggests water line does get to the bottom of the pile cap during high water events. No noticeable settlement was apparent.

Information used for evaluating the foundation

- Dispersive wave propagation testing and site visit, sounding data.

Summary of Findings:

Computed Pile length from the Dispersive Wave Propagation Testing

Notations used in the Table of Results

Pile ID / Location : An identifier assigned to a particular pile by FDH Engineering. See the CAD schematic in the **Appendix** for a description of this location.

Compute Pile Length : The computed total length of pile from pile top, where it touches the pile cap, to the pile tip, in feet; or it may be from the pile top to the location from an area of complete corrosion or major bend in the pile's cross section which caused the wave energy to reflect prior top reaching the pile tip.

Top of Rail to Pile Tip : The measured distance from top of bridge rail to the bottom of pile cap, in feet, PLUS the computed total pile length from the testing.

Thalweg : The measured distance from top of rail to Thalweg, in feet. Thalweg determined by soundings in the field or from most recent Thalweg data in Bridge Maintenance Files.

Embedment Below Thalweg: The embedded length of a pile, in feet, below Thalweg, in feet.

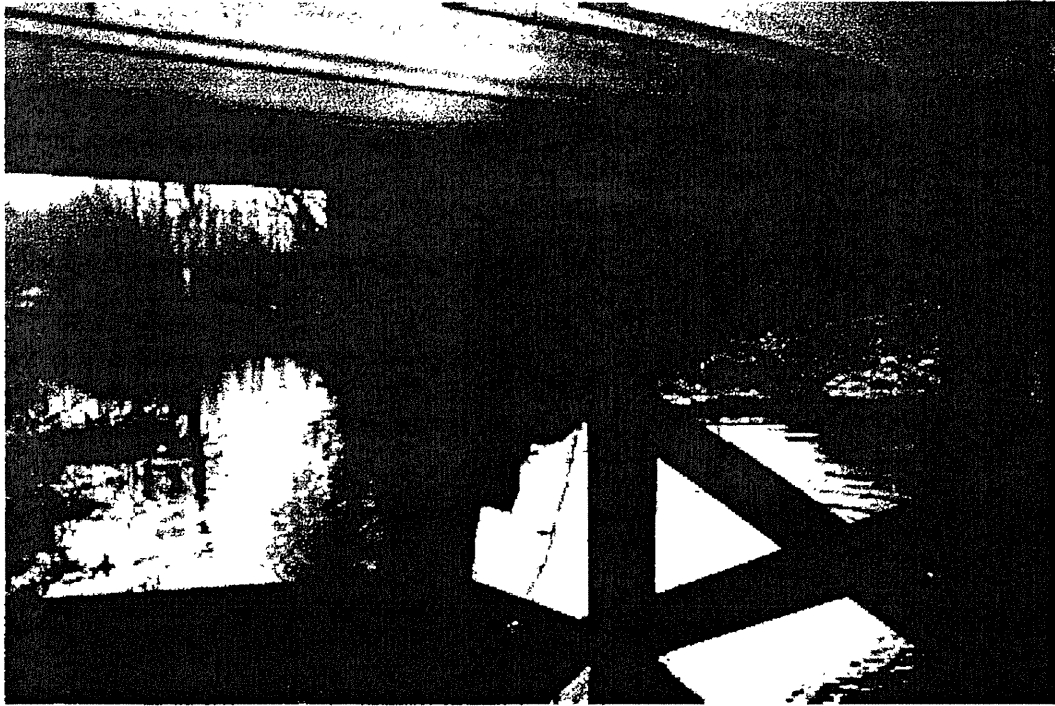
Pile ID / Location	Computed Total Pile Length (ft)	Top of Rail to Pile Tip (ft)	Thalweg (ft)	Embedment below Thalweg (ft)
Bent 1 Pile 2	25.7	31.0	16.0 (1/7/04)	15.0
Bent 2 Pile 3	21.5	26.8		10.8
Bent 2 Pile 6	21.5	26.8		10.8

Sounding Data:

Location	Depth from Top of Rail (ft)	Blows per Foot (BPF)
Between Bent 2 and End Bent 2	18.3	60
	19.5	82
	21.5	150+

Conclusions

The Dispersive Wave Propagation data from the timber piles tested resulted in similar pile tip elevations of 26.8 ft and 31.0 ft, as measured from top of bridge rail. This translates to embedments below Thalweg of 10.8 and 15.0 ft. Sounding data taken at the site found high blow count material at a depth of 21.5 ft from top of rail. This suggests the timber piles are tipped into this high blow count material.

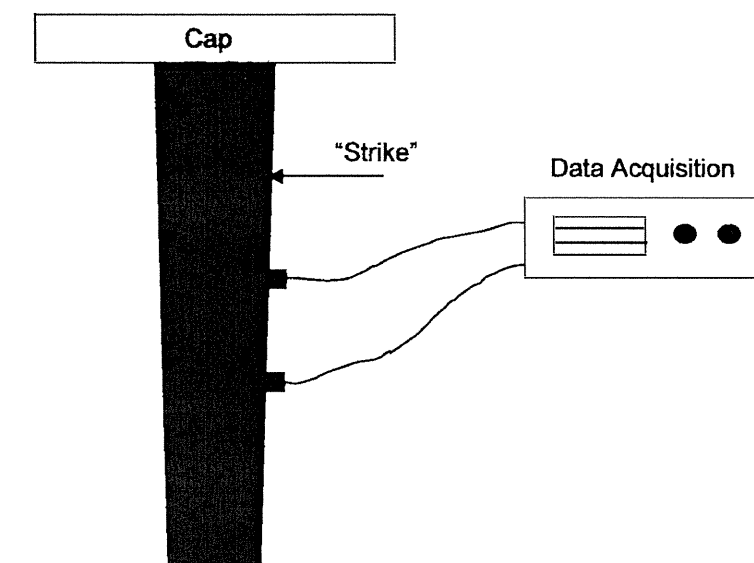


FDH Technician performing a Dispersive Wave Propagation Test for pile length

General Comments

Dispersive Flexural Wave Propagation Method

FDH's methods of Dispersive Wave Propagation are conducted by temporarily mounting accelerometers (gages) on a pile's side and then striking the pile with a variety of hand-held hammers (Schematic 1). The waves created by the blow, rich in spectral content, propagate up and down the pile's length with the reflections being recorded and stored on a digital storage oscilloscope each time they pass the gages. The data then is analyzed by digital signal processing techniques using cross correlation procedures. This analysis permits computation of the time needed for a select group of frequencies to travel from the gages to the bottom of the pile and back. The pile's length then is computed by knowing the distance from the pile cap to the gages and from the product of frequency velocity and the corresponding time required for wave travel.



Schematic 1: General Set-Up for Flexural Wave Tests

The pile length determined is considered to be from its top, where it enters or touches the pile cap, to its tip. If there exists a break, fracture, deterioration, mushrooming of the pile tips, or some other significant material anomaly a wave reflection would be found on the data record at the approximate location of the anomaly. The computed pile length then would be the distance from its top to the location of such a material anomaly. With no prior knowledge of pile lengths, and without sampling a large portion of the piles present in the structure, interpreting whether the computed length is most likely the distance to the pile tip or to an area of damage is difficult. Previous work has determined this method to compute pile lengths to within approximately +/-10%.

At present it is not practical to determine the quantitative value, or percent loss in cross section, that may have occurred from breaks, fractures, or deterioration/corrosion. Only a qualitative assessment is possible.

References

- Holt, J.D., and Douglas, R.A., "A Field Test Procedure for Finding the Overall Lengths of Installed Timber Piles", Report for: NCDOT - ITRE, Number NC/R&D/94-001, University of North Carolina, March 1994.

- Douglas, R.A. and Holt, J.D., "Determining Lengths of Installed Timber Pilings by Dispersive Wave Propagation Methods", Report for: Center for Transportation Engineering Studies, NC State University, June 1993.
- Holt, J.D., "Dispersive Wave Methods for Unknown Pile Lengths", Water Resources Engineering Conference, 1998, Volume 1, Memphis, TN

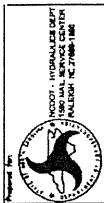
Sounding Rods

Sounding rods driven at a site are 1/2" in diameter and vary in segment length from 5 ft to 10 ft. Coupling devices are used for extending the rods to depths greater than the individual rod lengths. The driving head weighs 16 lbs. Determining blow counts involves dropping the 16 lb hammer and counting the actual number of blows required to drive the rod 1 ft into the material.

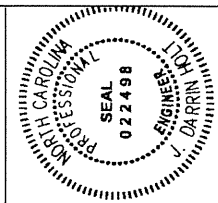
Reference

- Chen, Shunyi and Abar, Nariman, "Finding Unknown Installed Pile Lengths by Wave Propagation", Paper presented at the 78th Annual Transportation Research Board Meeting, January 10-14, 1999, Washington, DC
- Standard practices used by the Hydraulics Unit of the North Carolina Department of Transportation.

Professional judgments are incorporated into this report. These are based on our evaluations of field information gathered, on our understanding of the characteristics of the project, and on our experience and capabilities with the topic of unknown foundations. We guarantee only that our work and judgments rendered meet the standard of care of our profession.



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RALEIGH, NC 27606
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FAX (919) 752-1001



SITE D. 080032
DRAWN BY B.G.
CHECKED BY J.H.
JOB NO. 04-0101E (2011)

SUBMITTALS	
DATE	DESCRIPTION
10/10/11	AS BUILT DRAWING

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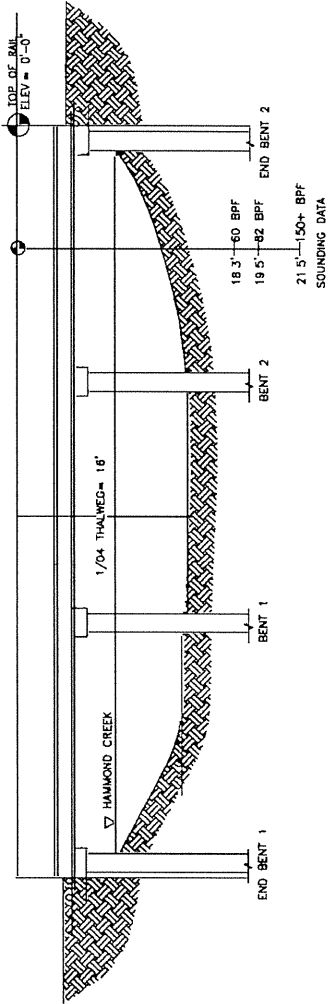
SITE NAME
BLADEN
COUNTY

SITE NUMBER:
080032

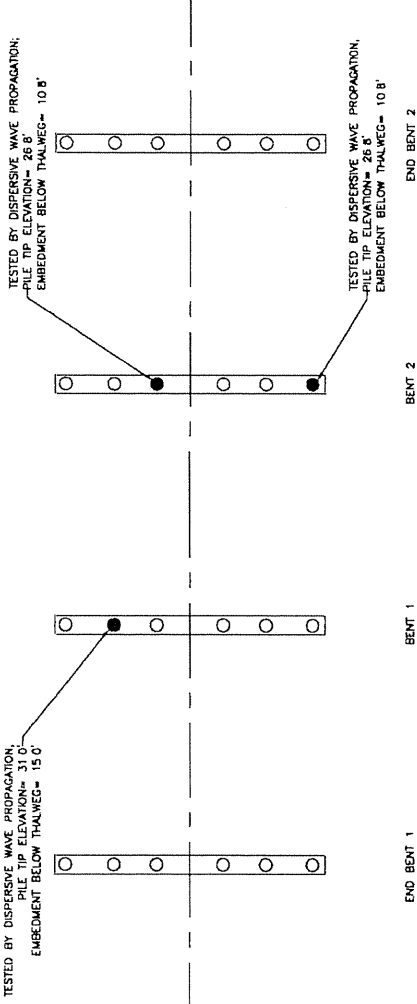
SITE ADDRESS:
BLADEN COUNTY
NORTH CAROLINA

SHEET TITLE
FOUNDATION
PLANS

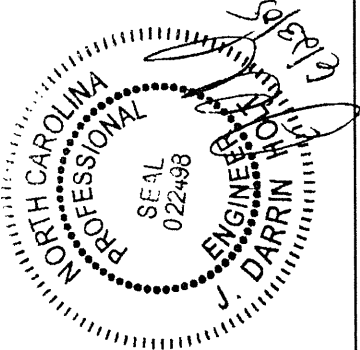
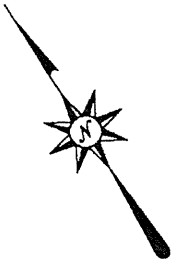
SHEET NUMBER
S-1



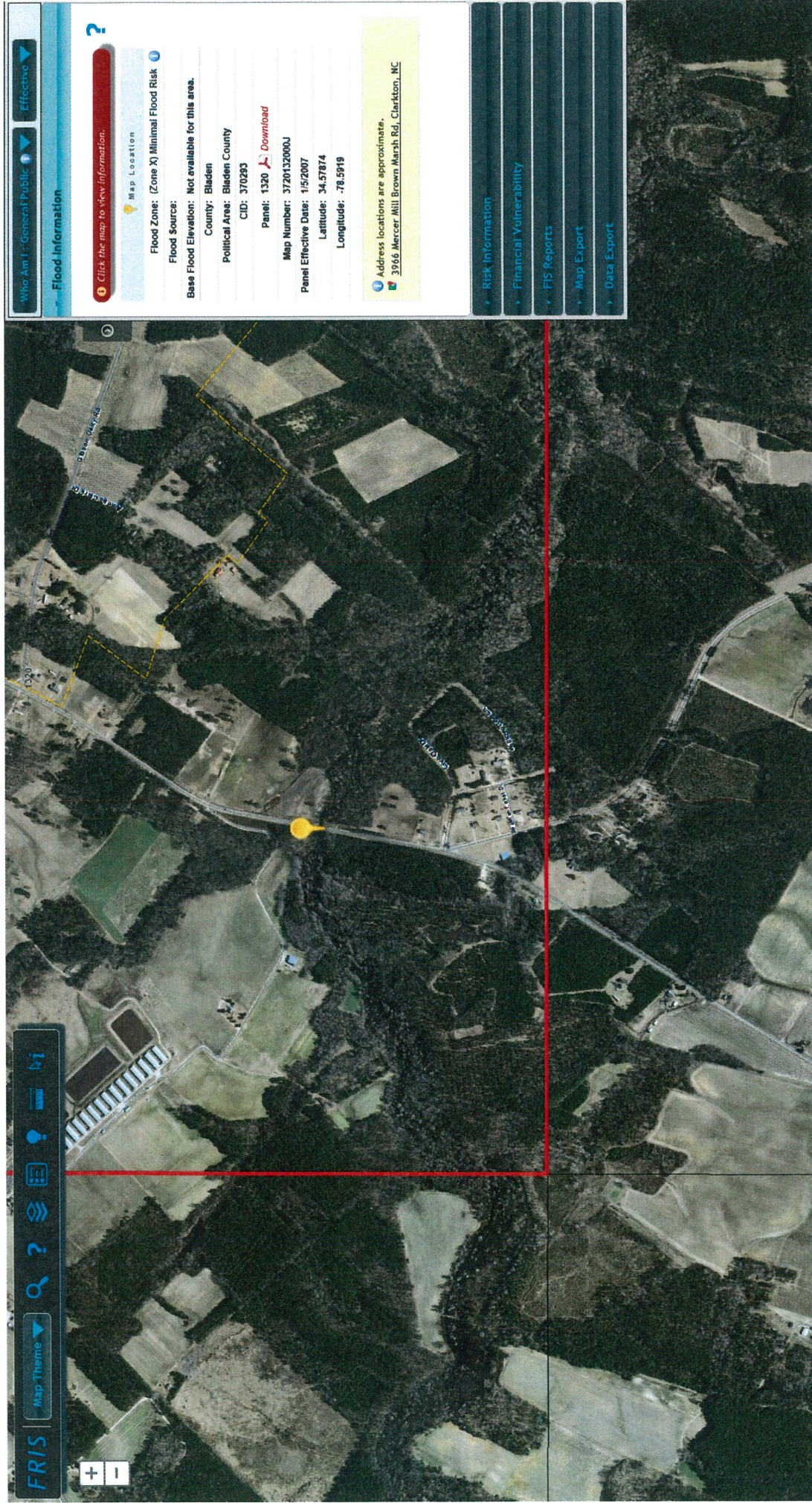
ELEVATION
NTS



FOUNDATION PLAN
NTS



BLADEN 32



StreamStats Version 3 Beta**Basin Characteristics Ungaged Site Report**

Date: Wed Nov 25, 2015 2:32:49 PM GMT-5

NAD 1983 Latitude: 34.5787 (34 34 43)

NAD 1983 Longitude: -78.5918 (-78 35 31)

Label	Value	Units	Definition
DRNAREA	7.46	square miles	Area that drains to a point on a stream
LC06IMP	0.54	percent	Percentage of impervious area determined from NLCD 2006 impervious dataset
LC11IMP	0.58	percent	Percentage of impervious area determined from NLCD 2011 impervious dataset

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U.S. Department of the Interior | U.S. Geological Survey

URL: http://streamstatsags.cr.usgs.gov/v3_beta/BCreport.htmPage Contact Information: [StreamStats Help](#)[Streamstats Status](#)[News](#)

Page Last Modified: 08/24/2015 15:42:48 (Web2)



NORTH CAROLINA RURAL FLOOD-FREQUENCY EQUATIONS (USGS SI Report 2009-5158)

Project: 80032

Designer: _____

Date: 11/30/2015

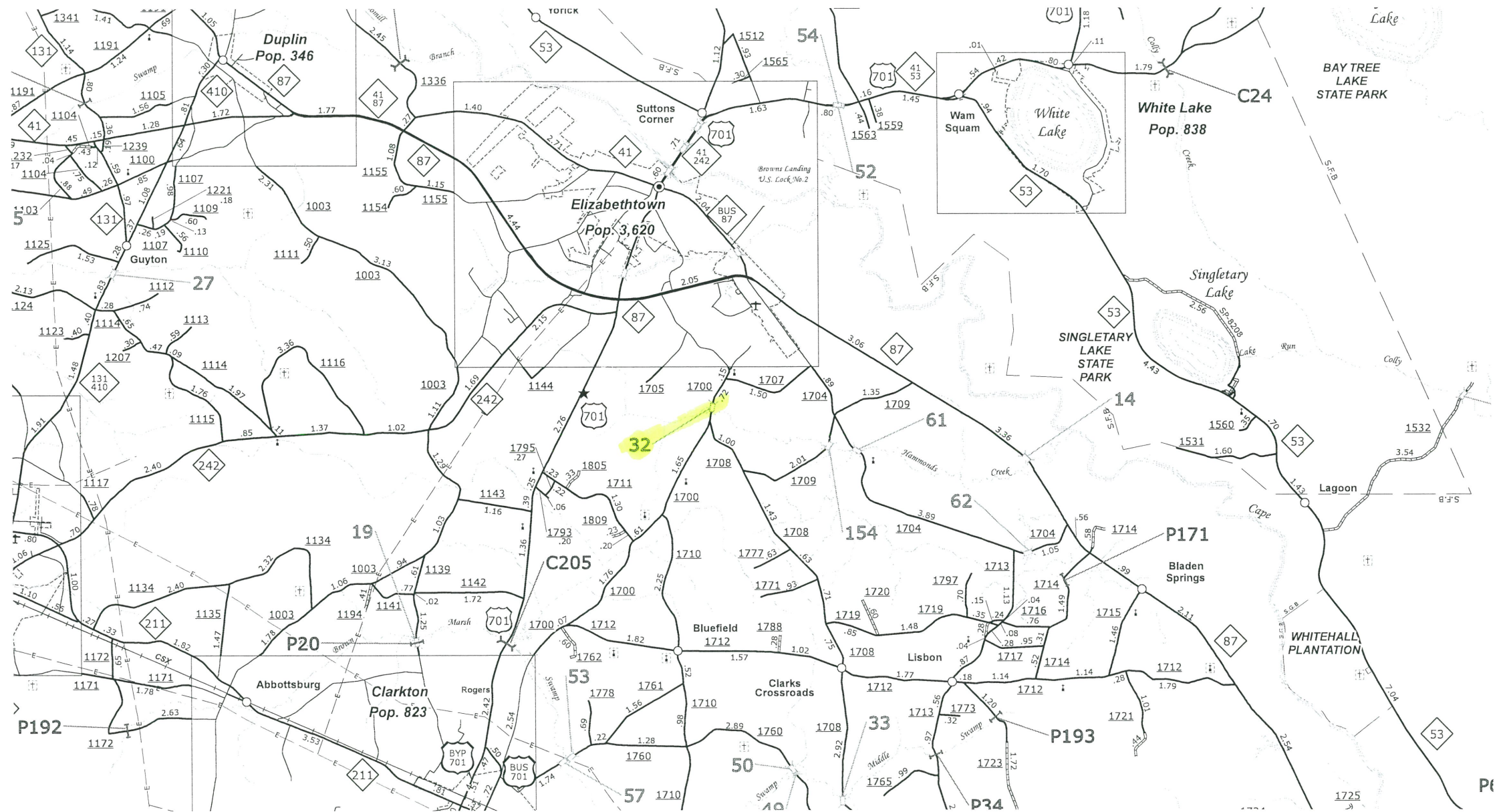
Note:
Round results to proper significant digits.
Use for areas greater than 1 square mile.
Use for Rural drainage areas only.

RURAL

DRAINAGE AREA:		7.5 (SQ. MI.)				
RECURRENCE INTERVAL	Region 1 Ridge & Valley Q (cfs)	Region 2 Blue Ridge Q (cfs)	Region 3 Sand Hills Q (cfs)	Region 4 Coastal Plain Q (cfs)	FEMA Q (cfs)	
2	158 DA^ 0.649 584	110 DA^ 0.779 529	25.7 DA^ 0.758 118	60.3 DA^ 0.649 223		
5	295 DA^ 0.627 1043	209 DA^ 0.749 945	44.7 DA^ 0.744 200	123 DA^ 0.627 435		
10	398 DA^ 0.617 1380	288 DA^ 0.736 1269	58.9 DA^ 0.740 262	174 DA^ 0.617 603		
25	537 DA^ 0.606 1821	398 DA^ 0.724 1712	77.6 DA^ 0.736 342	245 DA^ 0.606 831		
50	661 DA^ 0.600 2214	479 DA^ 0.718 2035	91.2 DA^ 0.735 401	309 DA^ 0.600 1035		
100	776 DA^ 0.594 2568	575 DA^ 0.713 2419	105 DA^ 0.733 460	380 DA^ 0.594 1258		
200	891 DA^ 0.589 2919	661 DA^ 0.709 2758	120 DA^ 0.733 526	447 DA^ 0.589 1465		
500	1072 DA^ 0.583 3470	794 DA^ 0.704 3280	138 DA^ 0.732 603	550 DA^ 0.583 1780		

Rounding:

cfs	cfs
100 to 500	10
500 to 1000	50
1,000 to 10,000	100
10,000 to 100,000	1000
Over 100,000	10000



BLADEN 32



BLADEN 32

