

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION



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

BRIDGE SCOUR REPORT

COUNTY: BUNCOMBE BRIDGE: 203 ROUTE: SR 2416 STREAM CROSSED: BEE TREE CR

ASSESSMENT YES EVALUATION BY: JJB DATE 2/18/2009

FHWA STRUCTURE INVENTORY & APPRAISAL CODES:

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

MONITORING:

PLAN REQUIRED? YES NO [checked]

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 DEPTHS(UPSTREAM FACE, FROM TOP OF RAIL):

REQUIRED ACTION:

INCREASE UNDERWATER INSPECTION CYCLE? YES [ ] NO [checked] FREQUENCY

COUNTERMEASURES:

PLAN REQUIRED? YES [checked] NO [ ]

SUMMARY OF PLAN: PLACE CONCRETE & CLASS II RIP RAP @ EB2 TO REPAIR SCOUR SEE ATTACHED PLAN

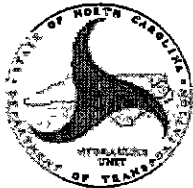
CONSTRUCTION COMPLETED DATE

FINAL CODING AFTER WORK IS COMPLETED (ITEM 113) 7 DATE

BRIDGE MAINTENANCE COMMENTS:

CODE BRIDGE 7 AFTER REPAIRS ARE COMPLETE.

# BRIDGE SCOUR EVALUATION ASSESSMENT AND DATA SUMMARY REPORT



ASSESSED	<u>2/18/2009</u>
BY:	<u>JJB</u>
CODE	<u>4</u>
CLASSIFIED	<u>LOW RISK</u>

## SITE IDENTIFICATION

COUNTY BUNCOMBE CITY/TOWN \_\_\_\_\_ BRIDGE NO 203  
 ROUTE SR 2416 STREAM BEE TREE CR ROAD MILE \_\_\_\_\_  
 DUAL BRIDGE NO. \_\_\_ IS US/DS \_\_\_\_\_  
 ORIG. PROJECT NO. \_\_\_\_\_ YEAR BUILT 1928  
 REHAB. PROJECT NO. \_\_\_\_\_ YEAR REHAB. \_\_\_\_\_  
 CURRENT ADT 3600 YEAR 2002 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/DN STREAM )
- BRIDGE INSPECTION REPORT ( DATE ) 4/2005
- UNDERWATER INSPECTION ( DATE, CYCLE )
- STRUCTURE DATA FILE ( DATE ) 4/2005

## HYDRAULIC DATA:

DRAINAGE AREA \_\_\_\_\_ SQ. MI. SOURCE \_\_\_\_\_  
 100 YR. WATERWAY OPENING ( NORMAL TO FLOW ) \_\_\_\_\_ SQ. FT.

### HISTORICAL FLOODS

DATE	ELEV.(FT.)	APPROX. FREQ. (YRS.)	APPROX. DISCH.	ADJUSTED TO SITE
Nov. 1977	3 5' below			
Sept. 2004	top of rail			

SOURCE DOT Personal  
 FLOOD FREQUENCY (YRS.) \_\_\_\_\_  
 ELEVATION (FT.) \_\_\_\_\_  
 DISCHARGE (CFS) \_\_\_\_\_  
 AVG. VELOCITY (Q/A) \_\_\_\_\_  
 SOURCE: \_\_\_\_\_

Q	Q	Q	Q
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

COMMENTS: \_\_\_\_\_  
 \_\_\_\_\_

**STRUCTURE DATA**

BRIDGE LENGTH: 85  
 SUFFICIENCY RATING 54 DATE: 2/18/2009  
 NO. OF SPANS. 2 EST REMAINING LIFE YRS  
 BED TO CROWN 17.0 SPAN LENGTHS 42.4 SIMPLE OR CONTINUOUS \_\_\_\_\_

TOP OF RAIL ELEV. 0.0 [DIST. MEAS. DOWN] THALWEG ELEVATION 21.1

BENT NO. [W-E], [S-N]	EB1	BENT1	EB2			
TYPE	CONC ABUT	CONC PIER	CONC ABUT			
SKEW.						
FTG / FOUNDATION TYPE	CONC FTG	CONC FTG	CONC FTG.			
FOOTING THICKNESS	3.5	1.7	5.4			
TOP FTG. ELEV						
LT						
CTR	15.0	18.2	15.3			
RT						
BOT FTG ELEV						
LT						
CTR	18.5	19.9	20.7			
RT						
TOP SILL ELEV						
LT						
CTR						
RT						
CONC / RIP RAP PROTECTION						
PILE TYPE						
PILE LENGTH [AVERAGE]						
PILE TIP ELEV. [AVERAGE]						
PILE EMBED BELOW THALWEG						
FTG. EMBED. BELOW THALWEG						

COMMENTS \_\_\_\_\_

**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)	<input checked="" type="checkbox"/>			
DEBRIS	<input checked="" type="checkbox"/>			
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. NO
- 2) POTENTIAL FOR SLOW CHANGE OVER TIME. NOT PRONE TO A MAJOR ONE-EVENT CHANGE. NO
- 3) UNSTABLE. SUBJECT TO RAPID EVOLUTIONARY CHANGE. YES

rev. 3/97

**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.  
GEOTECHNICAL CONCURRENCE BY: \_\_\_\_\_
- 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 OF TOTAL PILE LENGTH AND INDICATED BY: BORING LOGS, PILE DRIVE RECORDS, OR ROD SOUNDINGS TO BE TIPPED INTO POINT BEARING MATERIAL. a) \_\_\_\_\_  
b) \_\_\_\_\_
- 4) CONCRETE OR TIMBER PILE 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 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. N/A
- 6) THE BRIDGE HAS EXPERIENCED A FLOOD OF GREATER THAN A 50-YEAR MAGNITUDE WITH NO REPORTED OR APPARENT SCOUR PROBLEM. N/A
- 7) THE BOTTOMS OF THE CHANNEL PIER SPREAD FOOTINGS ARE GREATER THAN 7 FEET BELOW THE STREAM BED. N/A
- 8) THE APPROACH ROADWAY OR BRIDGE IS OVERTOPPED DURING MINOR FLOODS (< 10-YEAR EVENT) REQUIRING CLOSURE AND INSPECTION BEFORE REOPENING. N/A

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

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. NO

**COMMENTS**

EB1 below 100 blow/1" & 100 blow/6" material. B1 on 50 blow/1' material.

EB2 on weight of hammer material & 100 blow/4" & 100 blow/6" material.

## ASSESSMENT DATA

County: Buncombe  
 Brdge No: 203

Assessment Date: 2/18/2009

YES or No

## INSPECTION REPORTS:

DATE OF INSPECTION REPORT	April 2005	
EXISTING SCOUR HOLES PRESENT		Y
UNDERMINING OF FOOTINGS		Y
72 FIELD SCOUR EVALUATION-SCOUR HAS OCCURRED		N/A

## HYDRAULIC DATA:

HIGH WATER-OVERTOP BRIDGE DECK		N
CHANNEL SHIFTING OR DEGRADING		Y
STREAM CONTRACTED AT BRIDGE-NO RELIEF		N/A
BAD ANGLE OF ATTACK-STREAM CURVES AT BRIDGE		N/A
DEBRIS PROBLEM @ BRIDGE-LEANING TREES ON BANK		N/A

## GEOTECHNICAL DATA.

FOUNDATION MATERIAL IS SCOURABLE		Y
STREAMBED IS SAND W/ NO ARMOR MATERIAL		N/A

## STRUCTURAL DATA:

SMALL ABUTMENTS (NOT MASSIVE) -EASY TO DAMAGE		N
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 ERODED		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 recoding of Item 113.

**DECISION:**

CLASSIFIED AS:	SCOUR CRITICAL UNKNOWN FOUNDATION LOW RISK	_____ _____ _____✓_____
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RECOMMENDED SCOUR CODE 4

ASSESSMENT COMMENTS: \_\_\_\_\_

EB1 bottom of footing 18.5' below Top of Rail below 100 blow/1" & 100 blow/6" material

B1 bottom of footing 19.9' below TOR on 50 blow/1' material.

EB2 bottom of footing 20.7' below TOR on weight of hammer material & 100 blow/4" & 100 blow/6" material.

SCHEDULE FOR DETAILED STUDY \_\_\_\_\_

SCHEDULE FOR FURTHER IN-HOUSE STUDY \_\_\_\_\_

ASSESSED BY: JJB  
 FIRM: NCDOT  
 DATE: 2/18/2009

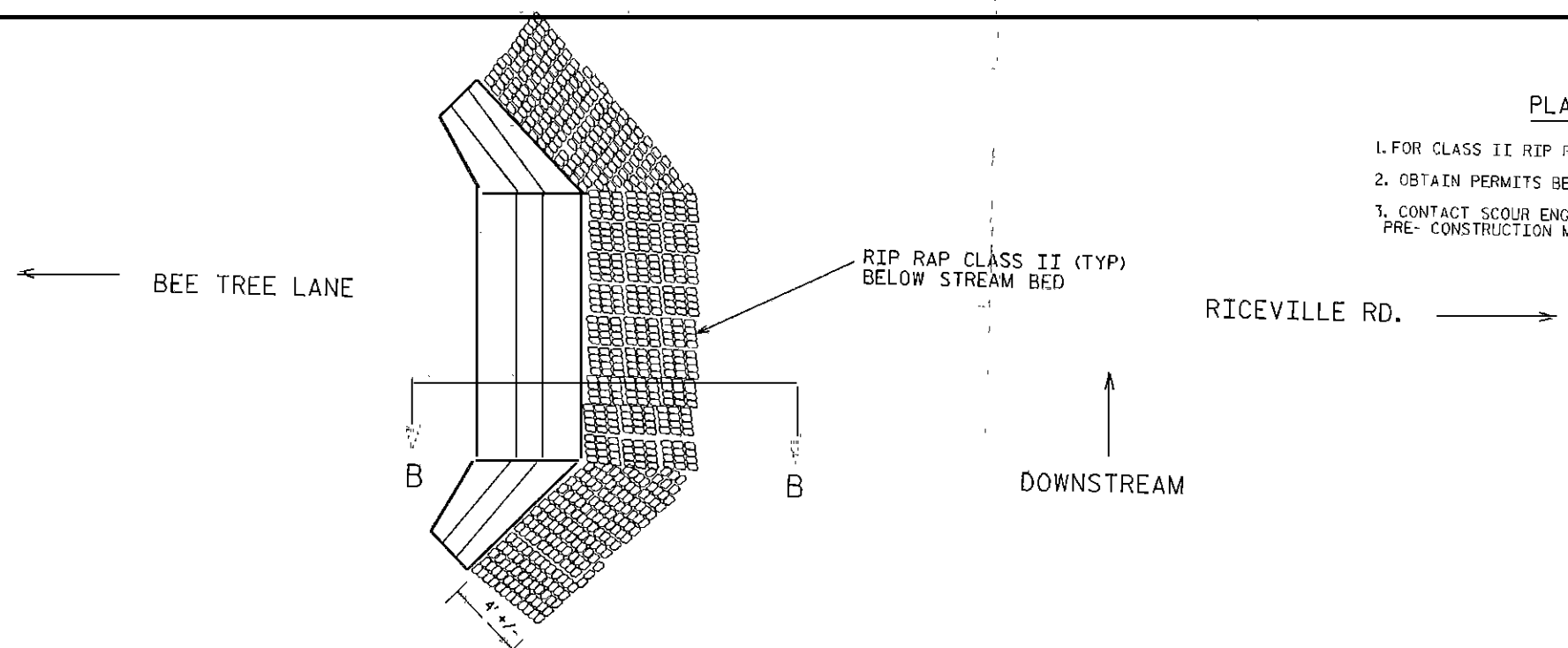
APPROVED BY: JLL  
 DATE: 2/18/2009

CHECKED BY: \_\_\_\_\_  
 FIRM: \_\_\_\_\_  
 DATE: \_\_\_\_\_

FINAL COMMENTS : THE SCOUR COMMITTEE RECOMMENDS CODE 4, SEE REPORT BY FHD DATED MARCH 23,2009.

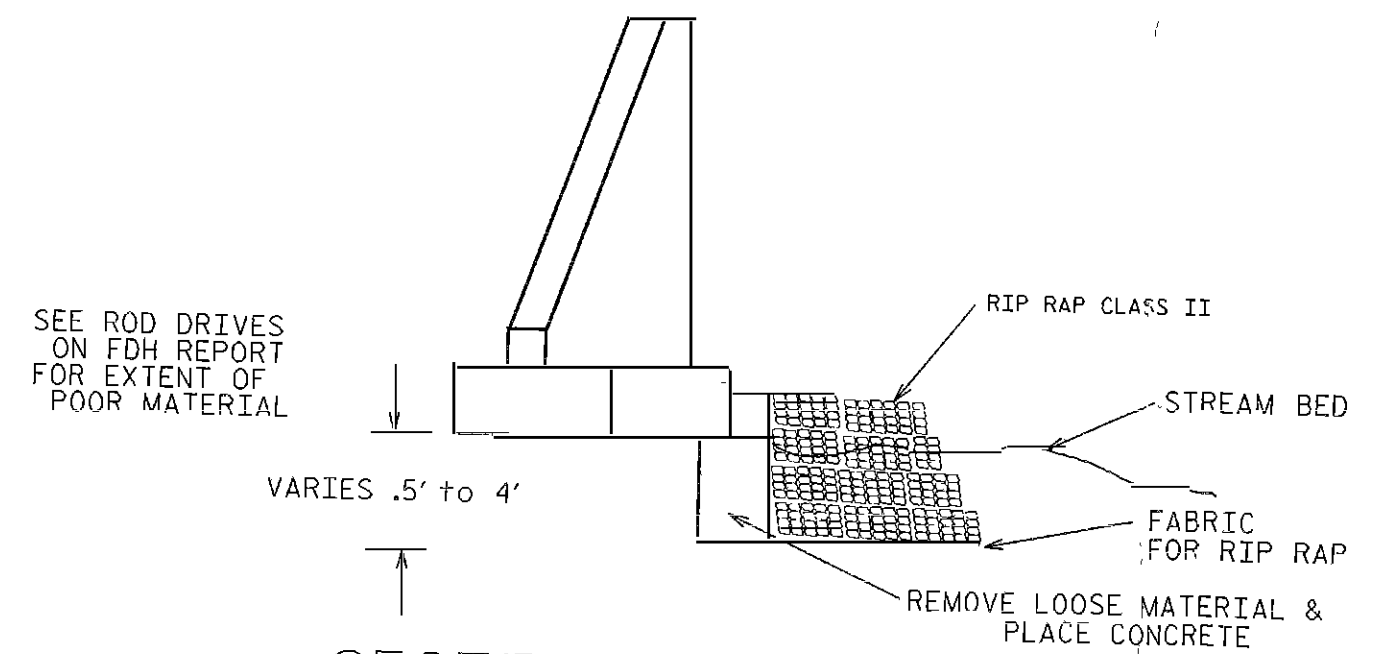
PLACE CONCRETE & CLASS II RIP RAP @ EB2 TO REPAIR SCOUR. SEE ATTACHED PLAN.

CODE BRIDGE 7 AFTER REPAIRS ARE COMPLETE.



- PLAN NOTES:**
1. FOR CLASS II RIP RAP TYPE SEE NCDOT STANDARD SPECIFICATIONS
  2. OBTAIN PERMITS BEFORE CONSTRUCTION.
  3. CONTACT SCOUR ENGINEER IN HYDRAULICS UNIT FOR PRE- CONSTRUCTION MEETING BEFORE CONSTRUCTION BEGINS.

PLAN VIEW AT END BENT 2



SECTION B-B AT END BENT 2

BRIDGE NO. BUNCOMBE 203  
 LOCATION: SR 2416  
 STREAM: BEE TREE CREEK

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SCOUR REPAIR @ END BENT 2 RIP RAP					
REVISIONS					SHEET NO
NO.	BY	DATE	NO.	BY	DATE
1			3		
					1074

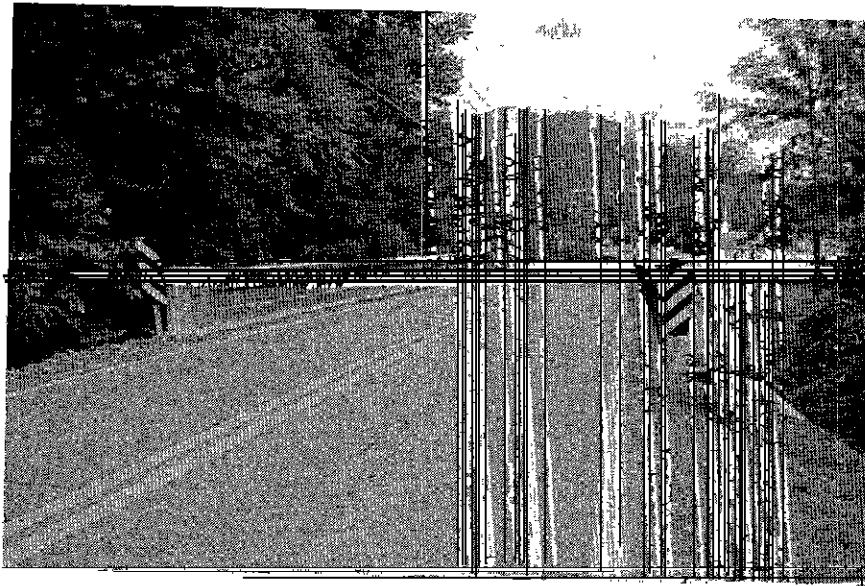
DRAWN BY: JJR DATE: 3/2/09  
 CHECKED BY: \_\_\_\_\_ DATE: \_\_\_\_\_





NC DOT - HYDRAULICS DEPT  
1590 MAIL SERVICE CENTER  
RALEIGH - NC 27684-3500

**Unknown Foundation Determination**  
**Substructure Report**  
**Buncombe 100203**  
**Warren Wilson College Rd. over Bee Tree Creek**



FDH Project # 08-06077E

Submitted by

A handwritten signature in cursive script, reading "J. Darrin Holt".

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

**FDH Engineering, Inc.**  
2730 Rowland Rd , Raleigh, NC 27615  
T (919) 755-1012 F. (919) 755-1031  
www fdh-inc com  
holt@fdh-inc com

March 23, 2009

Buncombe 100203

2  
3/23/2009

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

**Facility Carried:** Warren Wilson College Rd

**Feature:** Over Bee Tree Creek

**Substructure Type:** Reinforced Concrete Abutments and Pier

**No. of Interior Bents:** One (1)

**Piles per Bent:** Zero (0)

**Reference Document(s):** Bridge maintenance plans on file. Bridge Inspection Report and Structure Data File from April 2005 found.

**Comments:** Slight scouring has occurred at the footer of end bent two.

**Field Work Performed:**

- Sounding rods were driven next to the abutments to determine the depth to high blow count material.
- Dispersive wave propagation testing was conducted on abutment footers.

**Bridge Information From April 2005 Inspection Report:**

Substructure Condition 7  
Channel and Channel Protection 8  
Waterway Adequacy 8  
Bridge Length: 85.0'  
Sufficiency Rating: 54.0  
Number of Spans 2                      Span Lengths: 2@42'-4"  
Underclearance 10'-0"  
List of Scour Problems and Repairs: NA  
Original Construction 1928      Year Reconstructed: 0000  
Current ADT. 003600      Year: 2002  
Bed to Crown: 17'-0"

**Summary of Findings:****Hydraulic Data: NA****Maintenance Personal :**

Reference to top rail 3.5'

Date of high water: Nov 1977 and Sept 2004

Does bridge overtop during minor floods (&lt;10 year event): No

**Requiring closure and inspection before reopening? No**

Has bridge experienced a flood &gt;50 year magnitude with no reported scour problem? No

**Reported of apparent scour problem? No**List any major events: Hurricanes or storms and year of event and high water (reference to TOR)  
Hurricane Hugo 1989, Hurricane Isabel 2003, Hurricane Ivan 2004.**Field Observations:**

Any Scouring Noted Scour at EB2

Angle of Stream Attack Straight

Debris: Large Trees Leaning on Bank? No

Debris Piled up on Bents? No

Has Thalweg Shifted? No

Field Testing Results.

TABLE 1/2" ROD DRIVES					
EB1		B1		EB2	
DEPTH FROM TOP OF RAIL	BLOWS/FT	DEPTH (TOR)	BLOWS/FT	DEPTH (TOR)	BLOWS/FT
13.7'-14.7'	12	15.3'-16.3'	5	20.9'-21.9'	W.O.H.
14.7'-15.7'	12	16.3'-17.3'	5	21.9'-22.9'	W.O.H.
15.7'-16.7'	20	17.3'-18.3'	10	22.9'-23.9'	W.O.H.
16.7'-17.7'	50	18.3'-19.3'	30	23.9'-24.9'	30
-	-	19.3'-20.3'	50	24.9'-25.9'	50
-	-	-	-	25.9'-26.9'	50
-	-	-	-	26.9'-27.9'	50

Sounding Rods:

Sounding rods were driven at EB1, B1, and EB2

Dispersive Wave Testing

Dispersive wave propagation testing was conducted on footers of EB1 and B1 that had been installed during the 1928 construction. The results indicated the footer on end bent 1 is 3.5 ft from the top of the footer to the bottom of the footer. The footer on bent 1 is 1.7 ft from the top of footer to the bottom of the footer.

**Conclusions**

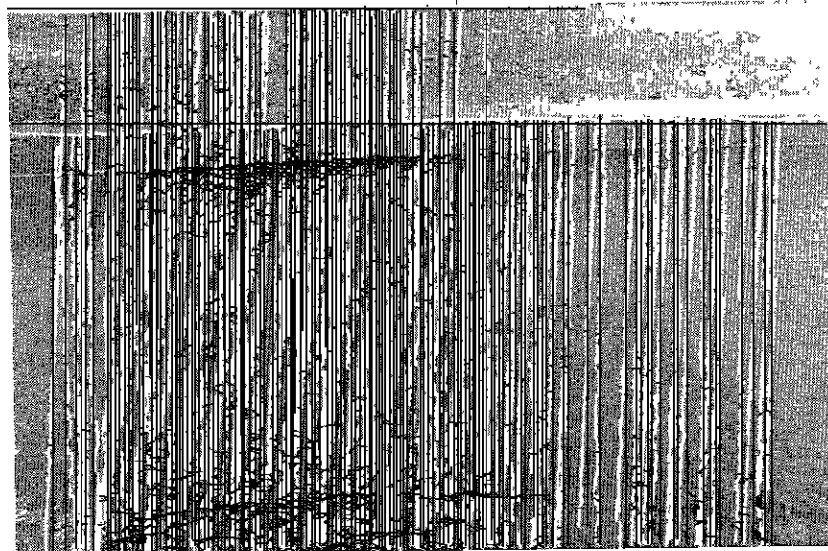
Foundation consists of concrete abutments with concrete footers. EB1 elevation was 18.5 ft and B1 elevation is 19.9 ft, EB2 elevation was 20.7 ft from top of rail to the bottom of footers. Sounding data indicates EB1 is resting on material too hard to penetrate with a sounding rod at BC1, BC2 and BC3. B1 is resting on material of 50 BPF. EB2 is resting on material soft enough to penetrate with on sounding rod using only the weight of the hammer (W.O.H) at BC5, 100/4" BPF at BC6 and 100/6" BPF at BC7. Sounding rods were inserted under EB2 at BC5, hard material was reached 2.0 ft below the bottom of footer. Possible slight scouring of 3"-6" has occurred at the bottom of the footer of EB2. The scour hole runs the length of the footer and begins sloping all the way across the water channel down to the edge of the footer, which would be 12 feet across.

PILE TIP AND BOTTOM OF FOOTING			
Pile and Footing Location	Test Method	Top of Rail to Bottom of Footing or Pile Tip (FT)	Embedment Below Thalweg (FT)
EB1	DW/ROD	18.5	2.9
B1	DW/ROD	19.9	1.2 above thalweg
EB2	DW/ROD	20.7	0.5 above thalweg

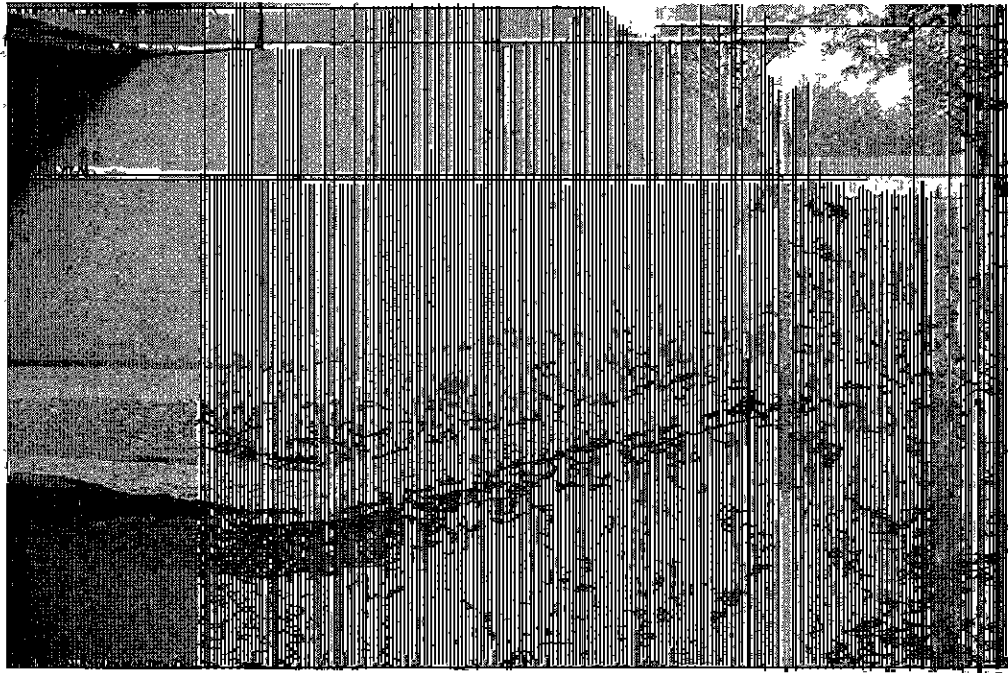
*Sounding Rods*

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 with a 2 foot drop and counting the actual number of blows required to drive the rod 1 ft into the material.

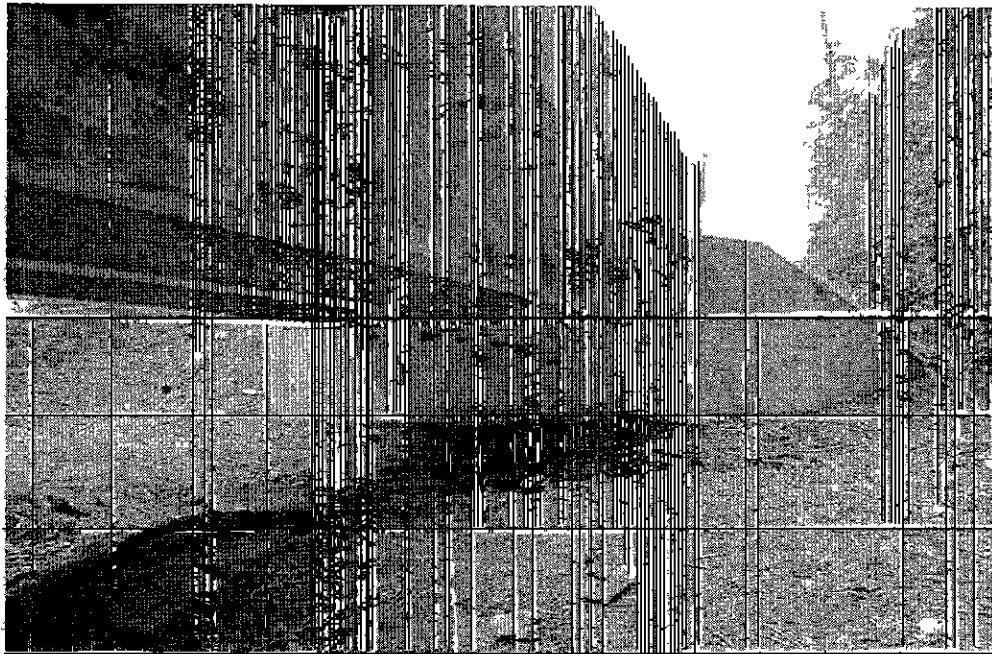
Professional judgments are incorporated into this report. These are based on our evaluations of field information gathered, on our understanding of the characteristics of the project, and on our experience and capabilities with the topic of unknown foundations. We guarantee only that our work and judgments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



**Scouring has occurred along EB2.**

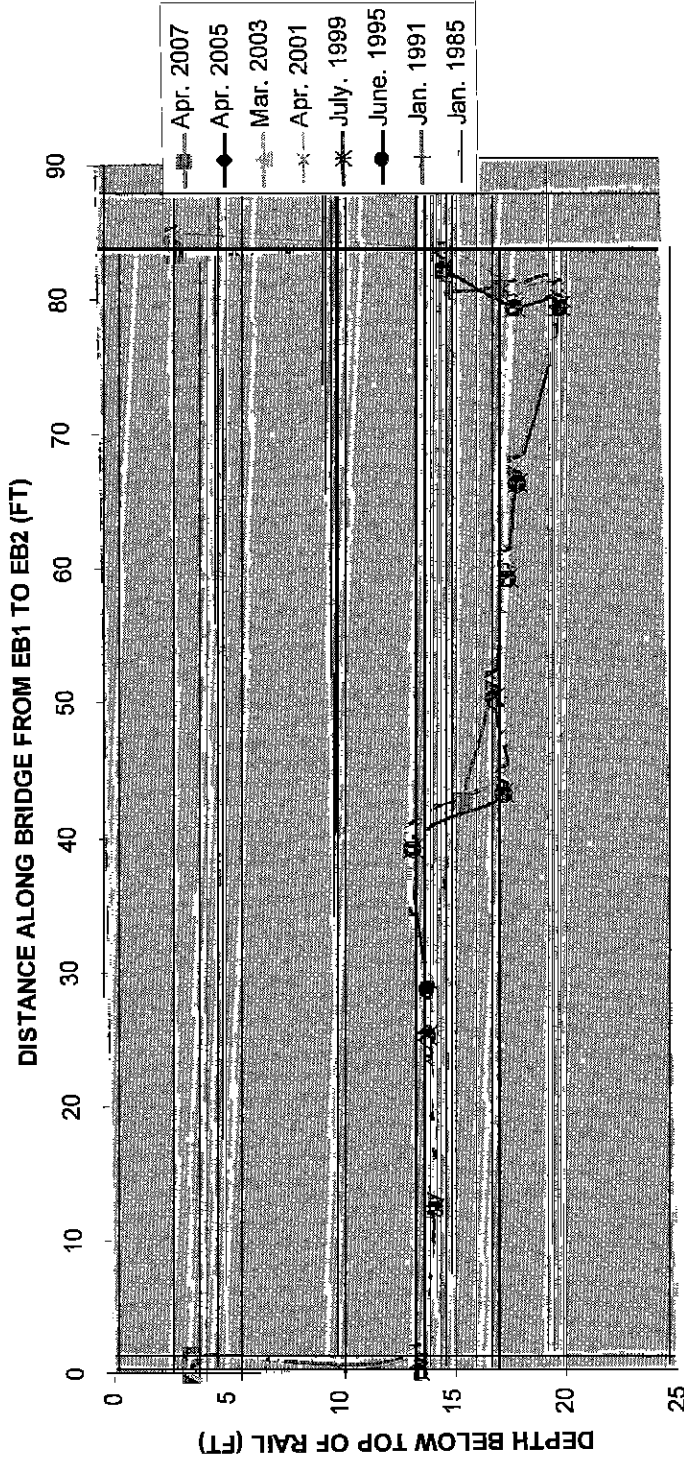


**EB2**

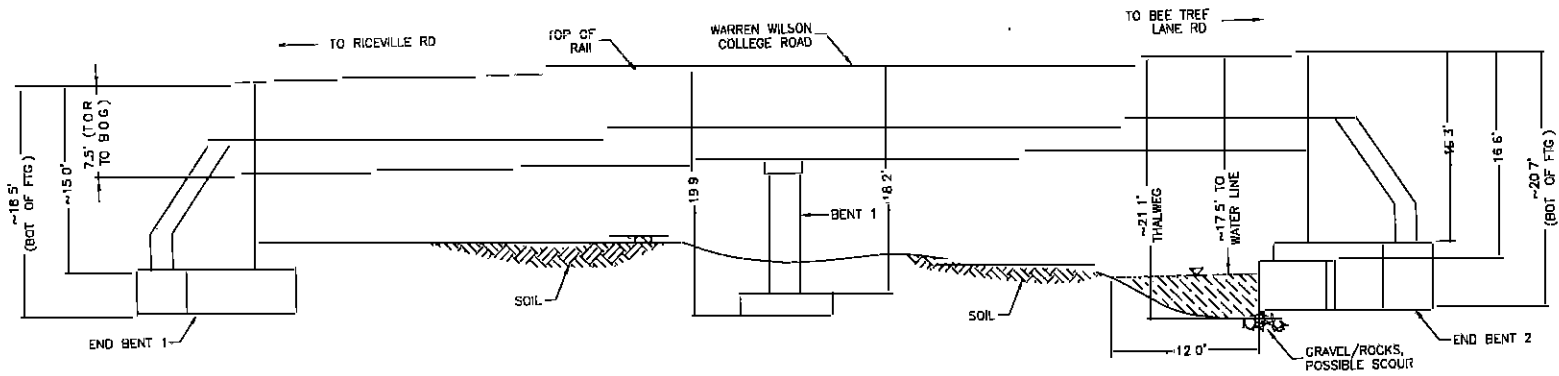


**EB1**

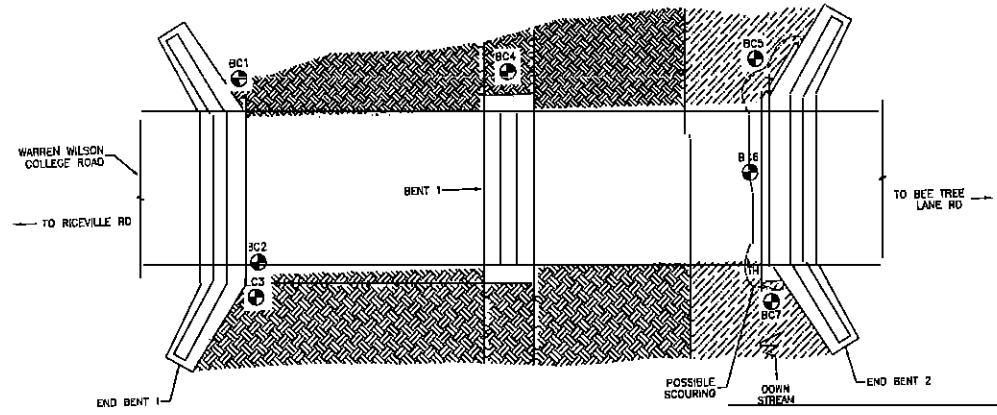
### DOWN STREAM BED SOUNDINGS



FDH Engineering, Inc. 2730 Rowland Rd., Raleigh, NC 27615  
T: (919) 755-1012 F: (919) 755-1031



1 BRIDGE - ELEVATION  
A-1 NTS



2 BRIDGE - PLAN VIEW  
A-1 NTS

BLOW COUNT CHART

BC1		BC2		BC3		BC4		BC5		BC6		BC7	
DEPTH (T.O.R)	BPF	DEPTH (T.O.R)	BPF	DEPTH (T.O.R)	BPF	DEPTH (T.O.R)	BPF	DEPTH (T.O.R)	BPF	DEPTH (T.O.R)	BPF	DEPTH (T.O.R)	BPF
13.7'-14.7'	12	13.8'-14.8'	4	13.6'-14.5'	6	15.3'-16.3'	5	20.9'-21.9'	W.O.H.	19.6'-20.6'	17	20.7'-21.7'	100/0*
14.7'-15.7'	12	14.8'-15.8'	86	14.5'-15.0'	100/6*	16.3'-17.3'	5	21.9'-22.9'	W.O.H.	20.6'-20.9'	100/4*		
15.7'-16.7'	20	15.8'-16.8'	90			17.3'-18.3'	30	22.9'-23.9'	W.O.H.				
16.7'-17.7'	50	16.8'-16.9'	100/1*			19.3'-20.3'	50	23.9'-24.9'	30				
								24.9'-25.9'	50				
								25.9'-26.9'	50				
								26.9'-27.9'	50				

\* INDICATES BOTTOM OF FOOTER AT LOCATION OF BLOW COUNT

REGISTERED PROFESSIONAL ENGINEERS  
1500 MAIN SERVICE CENTER  
RALEIGH, NC 27605-1500

Prepared by:  
**FDH**  
ENGINEERS ARCHITECTS  
2730 ROWLAND DRIVE  
SUITE 100  
RALEIGH, NC 27615  
PHONE (919) 755-1011  
FAX (919) 755-1031

NORTH CAROLINA  
PROFESSIONAL  
SEAL  
022498  
ENGINEERS  
J. DARRIN HOLT

SITE ID: # 100203  
DRAWN BY: BLS  
CHECKED BY: JDH  
JOB NO: QB-0607E

SUBMITTALS		
DATE	DESCRIPTION	REV
02/23/09		A

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SITE NAME:  
BUNCOMBE 203

SITE NUMBER:  
#100203

SITE ADDRESS:  
SR 2418  
BUNCOMBE COUNTY

SHEET TITLE:  
FOUNDATION  
PLANS

SHEET NUMBER:  
A-1

**BRIDGES BUILT AND REPAIRED**

DURING THE MONTH OF April, 1978

DIVISION 13

COUNTY	BRIDGE NUMBER	ROAD NUMBER	REPAIRED	DESCRIPTION	CAP. TO BE POSTED
Buncombe	568	SR 1382	Flood Repair	WO 4.5845323 - Site C-1, File 3279: Replaced bridge with two (2) 50' lines 117" x 79" CM pipe arch with reinforced concrete end wall upstream end; outlet end 1½ : 1 fill slope BMD-PA 114-90 (Don Henderson's crew did this work).	
Buncombe	Unposted culvert	SR 1781	Flood Repair	WO 4.5845123 - Site K-35, File 3214: Repaired end wall.	
Buncombe	203	SR 2416	Flood Repair	WO 8.1904603 - Site K-31, File 3221: Poured sub-footing under abutment.	
Buncombe	17	SR 1607	Flood Repair	WO 4.5845123 - Site K-28, File 3292: Replaced damaged riprap with Class 11 riprap.	