

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	38587.1.1 (B-4817)	1	11

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 38587.1.1 (B-4817) F.A. PROJ. BRNHS-74(71)
COUNTY SCOTLAND
PROJECT DESCRIPTION BRIDGE NO. 23 ON -L- (US 74WB) OVER
GUM SWAMP CREEK

CONTENTS

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CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

J.K. STICKNEY

M.L. SMITH

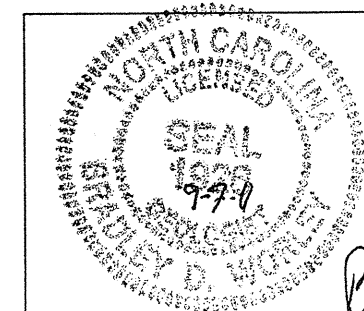
C.L. SMITH

INVESTIGATED BY B.D. WORLEY

CHECKED BY C.A. YOUNGBLOOD

SUBMITTED BY K.B. MILLER

DATE SEPTEMBER, 2011



Bradley D. Worley

PROJECT: 38587.1.1 ID: B-4817

DRAWN BY: K.B. MILLER and B.D. WORLEY

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

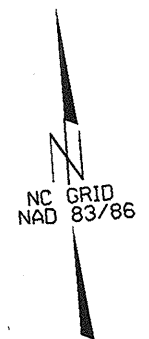
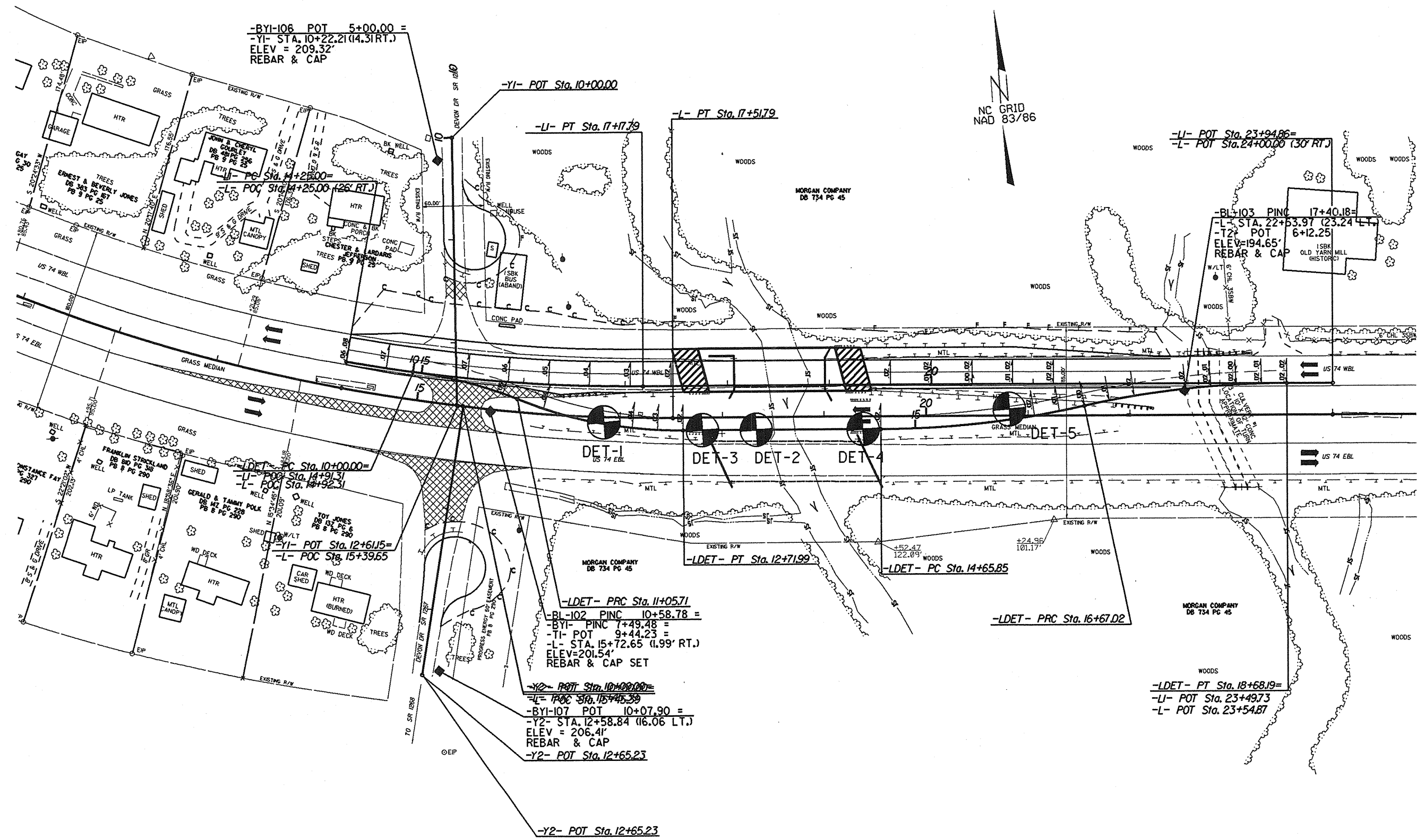
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO.
38587.11(B-4B17) SHEET NO.
2

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS			
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p>VERY STIFF, GRAY, SCLT CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</p>		<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)</p> <p>POORLY GRADED</p> <p>GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>		<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.</p> <p>ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>		<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.</p> <p>ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.</p> <p>CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOT.) - IRRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p>			
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING					
<p>GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS</p> <p>GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7</p> <p>SYMBOL</p> <p>% PASSING</p> <p>LIQUID LIMIT</p> <p>PLASTIC INDEX</p> <p>GROUP INDEX</p> <p>USUAL TYPES OF MAJOR MATERIALS</p> <p>GEN. RATING AS A SUBGRADE</p>		<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p>COMPRESSIBILITY</p> <p>PERCENTAGE OF MATERIAL</p> <p>GROUND WATER</p> <p>MISCELLANEOUS SYMBOLS</p>		<p>WEATHERED ROCK (WR)</p> <p>CRYSTALLINE ROCK (CR)</p> <p>NON-CRYSTALLINE ROCK (NCR)</p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CP)</p> <p>FRESH</p> <p>VERY SLIGHT (V SL.)</p> <p>SLIGHT (SL.)</p> <p>MODERATE (MOD.)</p> <p>SEVERE (SEV.)</p> <p>VERY SEVERE (V SEV.)</p> <p>COMPLETE</p>		<p>ROCK HARDNESS</p> <p>VERY HARD</p> <p>HARD</p> <p>MODERATELY HARD</p> <p>MEDIUM HARD</p> <p>SOFT</p> <p>VERY SOFT</p>			
TEXTURE OR GRAIN SIZE		ABBREVIATIONS		EQUIPMENT USED ON SUBJECT PROJECT		FRACTURE SPACING			
<p>U.S. STD. SIEVE SIZE OPENING (MM)</p> <p>BOULDER (BLDR.)</p> <p>COBBLE (COB.)</p> <p>GRAVEL (GR.)</p> <p>COARSE SAND (CSE, SD.)</p> <p>FINE SAND (F SD.)</p> <p>SILT (SL.)</p> <p>CLAY (CL.)</p>		<p>AR - AUGER REFUSAL</p> <p>BT - BORING TERMINATED</p> <p>CL - CLAY</p> <p>CPT - CONE PENETRATION TEST</p> <p>CSE - COARSE</p> <p>DMT - DILATOMETER TEST</p> <p>DPT - DYNAMIC PENETRATION TEST</p> <p>o - VOID RATIO</p> <p>F - FINE</p> <p>FOSS. - FOSSILIFEROUS</p> <p>FRAC. - FRACTURED, FRACTURES</p> <p>FRAGS. - FRAGMENTS</p> <p>HL - HIGHLY</p>		<p>DRILL UNITS:</p> <p>MOBILE B-</p> <p>BK-51</p> <p>CME-45C</p> <p>CME-55B</p> <p>PORTABLE HOIST</p>		<p>ADVANCING TOOLS:</p> <p>CLAY BITS</p> <p>6" CONTINUOUS FLIGHT AUGER</p> <p>8" HOLLOW AUGERS</p> <p>HARD FACED FINGER BITS</p> <p>TUNG-CARBIDE INSERTS</p> <p>CASING w/ ADVANCER</p> <p>TRICONE 2 1/2" * STEEL TEETH</p> <p>TRICONE * TUNG-CARB.</p> <p>CORE BIT</p>		<p>HAMMER TYPE:</p> <p>AUTOMATIC</p> <p>MANUAL</p> <p>CORE SIZE:</p> <p>B</p> <p>N</p> <p>H</p> <p>HAND TOOLS:</p> <p>POST HOLE DIGGER</p> <p>HAND AUGER</p> <p>SOUNDING ROD</p> <p>VANE SHEAR TEST</p>	
SOIL MOISTURE - CORRELATION OF TERMS		EQUIPMENT USED ON SUBJECT PROJECT		FRACTURE SPACING		BEDDING			
<p>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</p> <p>FIELD MOISTURE DESCRIPTION</p> <p>GUIDE FOR FIELD MOISTURE DESCRIPTION</p> <p>LL - LIQUID LIMIT</p> <p>PL - PLASTIC LIMIT</p> <p>OM - OPTIMUM MOISTURE</p> <p>SL - SHRINKAGE LIMIT</p>		<p>DRILL UNITS:</p> <p>MOBILE B-</p> <p>BK-51</p> <p>CME-45C</p> <p>CME-55B</p> <p>PORTABLE HOIST</p>		<p>ADVANCING TOOLS:</p> <p>CLAY BITS</p> <p>6" CONTINUOUS FLIGHT AUGER</p> <p>8" HOLLOW AUGERS</p> <p>HARD FACED FINGER BITS</p> <p>TUNG-CARBIDE INSERTS</p> <p>CASING w/ ADVANCER</p> <p>TRICONE 2 1/2" * STEEL TEETH</p> <p>TRICONE * TUNG-CARB.</p> <p>CORE BIT</p>		<p>TERM</p> <p>VERY WIDE</p> <p>WIDE</p> <p>MODERATELY CLOSE</p> <p>CLOSE</p> <p>VERY CLOSE</p>		<p>TERM</p> <p>VERY THICKLY BEDDED</p> <p>THICKLY BEDDED</p> <p>THINLY BEDDED</p> <p>VERY THINLY BEDDED</p> <p>THICKLY LAMINATED</p> <p>THINLY LAMINATED</p>	
PLASTICITY		EQUIPMENT USED ON SUBJECT PROJECT		INDURATION		BENCH MARK			
<p>NONPLASTIC</p> <p>LOW PLASTICITY</p> <p>MED. PLASTICITY</p> <p>HIGH PLASTICITY</p>		<p>DRILL UNITS:</p> <p>MOBILE B-</p> <p>BK-51</p> <p>CME-45C</p> <p>CME-55B</p> <p>PORTABLE HOIST</p>		<p>INDURATION</p> <p>FRIABLE</p> <p>MODERATELY INDURATED</p> <p>INDURATED</p> <p>EXTREMELY INDURATED</p>		<p>BENCH MARK: BM #2 'X' MARK IN NE WINGWALL ON EAST BOUND</p> <p>BRIDGE ON US 74</p> <p>N 382405 E 1840336 ELEVATION: 197.2 FT.</p>			
COLOR		EQUIPMENT USED ON SUBJECT PROJECT		INDURATION		NOTES			
<p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>		<p>DRILL UNITS:</p> <p>MOBILE B-</p> <p>BK-51</p> <p>CME-45C</p> <p>CME-55B</p> <p>PORTABLE HOIST</p>		<p>INDURATION</p> <p>FRIABLE</p> <p>MODERATELY INDURATED</p> <p>INDURATED</p> <p>EXTREMELY INDURATED</p>		<p>NOTES:</p> <p>BORINGS USED IN THIS INVENTORY WERE DRILLED ON -LDET- ALIGNMENT</p>			



-YI-106 POT 5+00.00 =
 -YI- STA. 10+22.21 (14.31 RT.)
 ELEV = 209.32'
 REBAR & CAP

-YI- POT Sta. 10+00.00

-LI- PT Sta. 17+17.79

-L- PT Sta. 17+51.79

-LI- POT Sta. 23+94.86=
 -L- POT Sta. 24+00.00 (30' RT.)

-BI-103 PINC 17+40.18=
 -L- STA. 22+53.97 (23.24 LT.)
 -T1- POT 6+12.25
 ELEV=194.65'
 REBAR & CAP
 ISBK OLD YARN MILL (HISTORIC)

DET-1
 US 74 EBL

DET-3

DET-2

DET-4

DET-5

-LDET- PRC Sta. 11+05.71
 -BI-102 PINC 10+58.78 =
 -BYI- PINC 7+49.48 =
 -T1- POT 9+44.23 =
 -L- STA. 15+72.65 (1.99' RT.)
 ELEV=201.54'
 REBAR & CAP SET

-Y2- POT Sta. 10+00.00=
 -L- POC Sta. 15+45.39
 -BYI-107 POT 10+07.90 =
 -Y2- STA. 12+58.84 (16.06 LT.)
 ELEV = 206.41'
 REBAR & CAP
 -Y2- POT Sta. 12+65.23

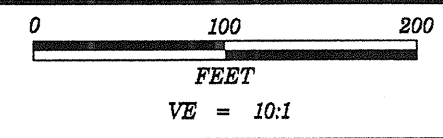
-LDET- PT Sta. 14+65.85

-LDET- PRC Sta. 16+67.02

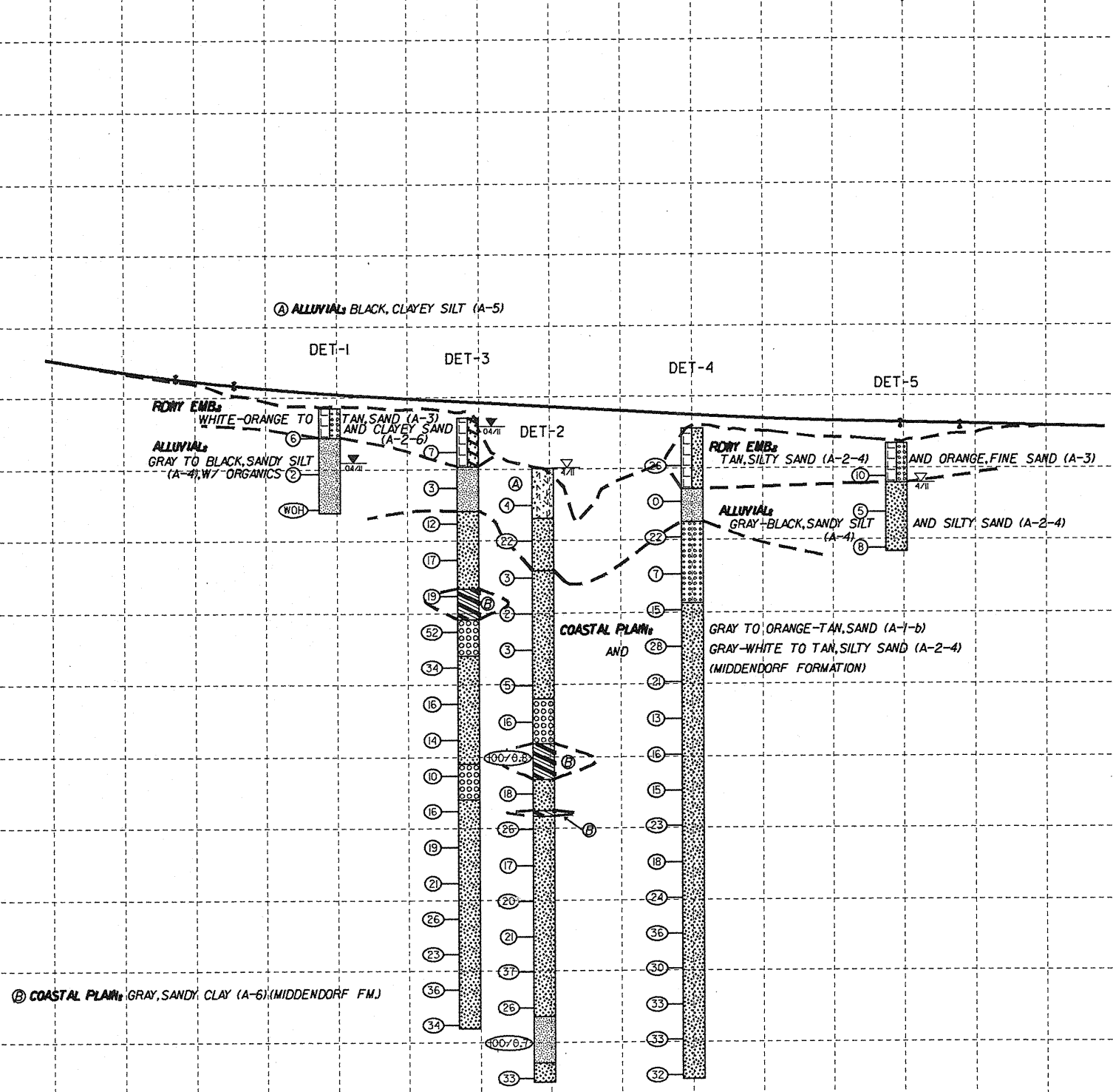
-LDET- PT Sta. 18+68.19=
 -LI- POT Sta. 23+49.73
 -L- POT Sta. 23+54.87

280
270
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250
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230
220
210
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180
170
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10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00



PROJECT REFERENCE NO.	SHEET
38587.1.1 (B-4817)	4
SUBSURFACE PROFILE	



NOTE: Borings are projected onto the -LDET- profile with stratigraphy drawn/interpreted through the borings.

NC DOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 38587.1.1	TIP B-4817	COUNTY SCOTLAND	GEOLOGIST Stickney, J. K.	
SITE DESCRIPTION Bridge No. 23 on US 74 WBL over Gum Swamp Creek				GROUND WTR (ft)
BORING NO. DET-1	STATION 12+00	OFFSET 1 ft LT	ALIGNMENT -LDET-	0 HR. Dry
COLLAR ELEV. 198.6 ft	TOTAL DEPTH 14.6 ft	NORTHING 382,440	EASTING 1,840,088	24 HR. 7.6
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 89% 09/02/2009		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
DRILLER Smith, M. L.	START DATE 04/06/11	COMP. DATE 04/06/11	SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
200														198.6	GROUND SURFACE	0.0
															ROADWAY EMBANKMENT	
														194.5	White-orange, fine SAND (A-3)	4.1
195	195.5	3.1	4	4	2										ALLUVIAL	
															Black-gray to white gray, SANDY SILT (A-4)	
190	190.5	8.1	2	1	1											
185	185.5	13.1	WOH	WOH	WOH											
															Boring Terminated at Elevation 184.0 ft in Alluvial SANDY SILT (A-4)	14.6

WBS 38587.1.1	TIP B-4817	COUNTY SCOTLAND	GEOLOGIST Stickney, J. K.	
SITE DESCRIPTION Bridge No. 23 on US 74 WBL over Gum Swamp Creek				GROUND WTR (ft)
BORING NO. DET-2	STATION 13+50	OFFSET CL	ALIGNMENT -LDET-	0 HR. 0.0
COLLAR ELEV. 190.1 ft	TOTAL DEPTH 85.7 ft	NORTHING 382,419	EASTING 1,840,236	24 HR. Artesian
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 89% 09/02/2009		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Smith, M. L.	START DATE 04/07/11	COMP. DATE 04/07/11	SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
195														190.1	GROUND SURFACE	0.0
190															ALLUVIAL	
															Black, CLAYEY SILT (A-5), w/ organics	
185	185.9	4.2	WOH	3	1											
															White, SILTY SAND (A-2-4)	7.0
180	180.9	9.2	9	11	11											
175	175.9	14.2	1	2	1										COASTAL PLAIN	14.2
															Tan-orange, SILTY SAND (A-2-4) (Middendorf Fm.)	
170	170.9	19.2	1	1	1											
165	165.9	24.2	1	2	1											
160	160.9	29.2	2	2	3											
155	155.9	34.2	5	7	9											
150	150.9	39.2	33	60	40/0.3											
145	145.9	44.2	6	7	11											
140	140.9	49.2	16	12	14											
135	135.9	54.2	5	6	11											
130	130.9	59.2	9	9	11											
125	125.9	64.2	7	11	10											
120	120.9	69.2	8	12	25											
115	115.9	74.2	7	11	15											

NC DOT BORE DOUBLE B4817 GEO ROWY.GPJ NC_DOT.GDT 9/7/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 38587.1.1	TIP B-4817	COUNTY SCOTLAND	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION Bridge No. 23 on US 74 WBL over Gum Swamp Creek			GROUND WTR (ft)
BORING NO. DET-2	STATION 13+50	OFFSET CL	ALIGNMENT -LDET-
COLLAR ELEV. 190.1 ft	TOTAL DEPTH 85.7 ft	NORTHING 382,419	EASTING 1,840,236
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 89% 09/02/2009		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Smith, M. L.	START DATE 04/07/11	COMP. DATE 04/07/11	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
115															
110	110.9	79.2	45	55/0.2									SS-18	100/0.7	
105	105.9	84.2	11	14	19									33	
Boring Terminated at Elevation 104.4 ft in Coastal Plain SILTY SAND (A-2-4) (Middendorf Fm.)															

WBS 38587.1.1	TIP B-4817	COUNTY SCOTLAND	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION Bridge No. 23 on US 74 WBL over Gum Swamp Creek			GROUND WTR (ft)
BORING NO. DET-3	STATION 12+97	OFFSET CL	ALIGNMENT -LDET-
COLLAR ELEV. 197.1 ft	TOTAL DEPTH 85.2 ft	NORTHING 382,425	EASTING 1,840,183
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 89% 09/02/2009		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Smith, M. L.	START DATE 04/08/11	COMP. DATE 04/08/11	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
200															
195	193.4	3.7	3	4	3								SS-9	197.1	GROUND SURFACE
190	188.4	8.7	2	1	2									190.3	ROADWAY EMBANKMENT Tan-brown, CLAYEY SAND (A-2-6)
185	183.4	13.7	8	6	6									184.1	ALLUVIAL Black, SANDY SILT (A-4), w/ organics
180	178.4	18.7	9	10	7									173.4	COASTAL PLAIN Gray-white, SILTY SAND (A-2-4) (Middendorf Fm.)
175	173.4	23.7	3	6	13								SS-10	169.1	Tan-orange, SANDY CLAY (A-6) (Middendorf Fm.)
170	168.4	28.7	12	25	27								SS-11	164.1	Tan-orange to gray-white, SAND (A-1-b) (Middendorf Fm.)
165	163.4	33.7	12	17	17								SS-12	149.1	Gray-white, SILTY SAND (A-2-4) (Middendorf Fm.)
160	158.4	38.7	5	7	9									144.1	Tan-orange to gray-white, SAND (A-1-b) (Middendorf Fm.)
155	153.4	43.7	5	6	8									53.0	Gray-white, SILTY SAND (A-2-4) (Middendorf Fm.)
150	148.4	48.7	4	4	6										
145	143.4	53.7	6	7	9										
140	138.4	58.7	9	9	10										
135	133.4	63.7	9	11	10										
130	128.4	68.7	10	13	13										
125	123.4	73.7	11	11	12										
120															

NCDOT BORE DOUBLE B4817_GEO_RDWY.GPJ NC_DOT.GDT 9/7/11

DET-1

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	L3 LT	12+00	3.6-4.6	A-3(0)	19	NP	69.4	22.6	3.9	4.0	93	55	10	-	-
SS-2	L3 LT	12+00	8.6-9.6	A-4(0)	33	6	56.4	7.9	21.6	14.1	97	75	40	-	-

DET-3

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-9	CL	12+97	3.7-4.7	A-2-6(1)	28	14	53.3	18.8	5.7	22.2	98	67	29	-	-
SS-10	CL	12+97	23.7-24.7	A-6(3)	29	12	24.8	30.3	16.6	28.3	99	90	48	-	-
SS-11	CL	12+97	28.7-29.7	A-1-b(0)	19	NP	80.7	9.0	1.2	9.1	99	42	11	-	-
SS-12	CL	12+97	33.7-34.7	A-2-4(0)	23	NP	58.6	30.8	1.5	9.1	100	82	11	-	-

DET-2

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-3	CL	13+50	4.7-5.7	A-5(6)	54	9	12.9	36.2	30.7	20.2	99	91	58	-	-
SS-4	CL	13+50	9.7-10.7	A-2-4(0)	23	NP	8.7	80.9	6.4	4.0	100	100	16	-	-
SS-5	CL	13+50	14.7-15.7	A-2-4(0)	23	4	33.2	47.1	5.6	14.1	96	75	21	-	-
SS-6	CL	13+50	24.7-25.7	A-2-4(0)	24	9	67.9	14.1	5.9	12.1	93	42	18	-	-
SS-7	CL	13+50	34.7-35.7	A-1-b(0)	20	5	68.5	13.5	3.8	14.1	89	46	17	-	-
SS-8	CL	13+50	39.2-40.7	A-6(3)	29	14	37.0	23.0	11.7	28.3	100	79	45	-	-
SS-18	CL	13+50	79.2-80.4	A-4(1)	23	10	31.3	31.7	14.7	22.2	99	81	43	-	-

DET-4

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-13	CL	14+55	4.8-5.8	A-2-4(0)	15	NP	45.7	35.4	8.9	10.1	97	71	23	-	-
SS-14	CL	14+55	9.8-10.8	A-4(0)	37	4	11.9	50.5	23.4	14.1	100	93	48	-	-
SS-15	CL	14+55	14.8-15.9	A-3(0)	23	NP	55.3	39.3	2.4	3.0	100	78	7	-	-
SS-16	CL	14+55	24.8-25.8	A-2-4(0)	19	NP	71.7	15.2	3.0	10.1	98	55	14	-	-
SS-17	CL	14+55	34.8-35.8	A-2-4(0)	19	NP	72.2	12.7	1.9	13.1	99	59	16	-	-



**FIELD
 SCOUR REPORT**

WBS: 38587.1.1 TIP: B-4817 COUNTY: Scotland

DESCRIPTION(1): Bridge No. 23 over Gum Swamp Creek on US 74 Westbound

EXISTING BRIDGE

Information from: Field Inspection Microfilm _____ (reel _____ pos: _____)
 Other (explain) Routine Inspection Report (2011)

Bridge No.: 23 Length: 90' Total Bents: 3 Bents in Channel: 1 Bents in Floodplain: 2
 Foundation Type: Abutments: reinforced concrete on pile footings. Int. Bents: reinforced concrete on pile footings.

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: Some very minor scour present at end bent abutments due to prior creek overtopping/flooding.

Interior Bents: Scour pockets visible around existing interior bent.

Channel Bed: Very minor scour in the channel bed away from the existing interior bent.

Channel Bank: Creek bank erosion (undercutting scour) is visible on both east and west banks.

EXISTING SCOUR PROTECTION

Type(3): n/a

Extent(4): n/a

Effectiveness(5): n/a

Obstructions(6): Drift debris upstream (50') of existing structure

INSTRUCTIONS

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoretical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

DESIGN INFORMATION

Channel Bed Material(7): Dark brown to black, clayey silt (A-5) and gray-black silty sand (A-2-4)

Channel Bank Material(8): Gray-black sandy silt (A-4)

Channel Bank Cover(9): Grass, brush, trees

Floodplain Width(10): Over 3000 ft. (approx. width Gum Swamp)

Floodplain Cover(11): Grass, brush, trees

Stream is(12): Aggrading Degrading _____ Static _____

Channel Migration Tendency(13): Slightly to the west.

Observations and Other Comments: _____

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

		BENTS											
		B1	B2										
DSE	185 ft.	171 ft.											

Comparison of DSE to Hydraulics Unit theoretical scour:
 The Geotechnical Engineering Unit agrees with the Hydraulic Unit's theoretical scour elevations as described in the Bridge Survey and Hydraulic Design Report dated May 1, 2011.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank									
Sample No.									
Retained #4	See Sheet 9 for Soil Test Results.								
Passed #10									
Passed #40									
Passed #200									
Coarse Sand									
Fine Sand									
Silt									
Clay									
LL									
PI									
AASHTO									
Station									
Offset									
Depth									

Reported by: Bradley Wesley Date: 9-7-11

Site Photographs



North side of existing, looking east -southeast



South side of existing, looking east - northeast



View looking west (down station)