

REFERENCE: SF-970113

PROJECT: 17BP.4.R.109

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-970113	1	8

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY WILSON

PROJECT DESCRIPTION BRIDGE NO. 113 ON SR 1514
(HOLDENS CROSS RD.) OVER WHITE OAK
SWAMP

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2, 2A	LEGEND (SOIL & ROCK)
3	SITE PLAN
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5-8	BORE LOGS

PERSONNEL

<u>S. WOODS</u>	
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INVESTIGATED BY F&R, Inc.

DRAWN BY T.T. WALKER

CHECKED BY C. WANG

SUBMITTED BY P. ALTON, P.E.

DATE DECEMBER 2018

CAUTION NOTICE

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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 THE 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.

NOTES:

1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. 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.

SINCE *Prepared in the Office of:*

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1881

Patrick Alton
Dec 7 2018 12:09 PM

SIGNATURE
DATE

**DOCUMENT NOT CONSIDERED FINAL
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS
(PAGE 1 OF 2)

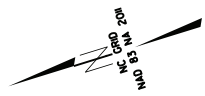
SOIL DESCRIPTION										GRADATION									
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS									
THE ANGULARITY OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.										MINERALOGICAL COMPOSITION									
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.										COMPRESSIBILITY									
SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50										PERCENTAGE OF MATERIAL									
ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE										GROUND WATER									
WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP										MISCELLANEOUS SYMBOLS									
ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY										DIP & DIP DIRECTION OF ROCK STRUCTURES TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE									
CONSISTENCY OR DENSENESS										RECOMMENDATION SYMBOLS									
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²) GENERALLY GRANULAR MATERIAL (NON-COHESIVE) VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE < 4 4 TO 10 10 TO 30 30 TO 50 > 50 N/A GENERALLY SILT-CLAY MATERIAL (COHESIVE) VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD < 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30 < 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4										UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK									
TEXTURE OR GRAIN SIZE										ABBREVIATIONS									
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053										AR - AUGER REFUSAL MED. - MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA - MICACEOUS WEA - WEATHERED CL - CLAY MOD. - MODERATELY UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC D _u - DRY UNIT WEIGHT CSE. - COARSE ORG. - ORGANIC PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DMT - DILATOMETER TEST SAP. - SAPROLITIC S - BULK DPT - DYNAMIC PENETRATION TEST SD. - SAND, SANDY SL. - SILT, SILTY SS - SPLIT SPOON e - VOID RATIO SAND, SANDY SL. - SILT, SILTY ST - SHELBY TUBE FOSS. - FOSSILIFEROUS SLL. - SLIGHTLY TCR - TRICONE REFUSAL RS - ROCK FRAC. - FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS. - FRAGMENTS w - MOISTURE CONTENT CBR - CALIFORNIA BEARING RATIO HI. - HIGHLY V - VEGETY									
GRAIN SIZE MM 305 75 2.0 0.25 0.05 0.005 IN. 12 3										EQUIPMENT USED ON SUBJECT PROJECT									
SOIL MOISTURE - CORRELATION OF TERMS										DRILL UNITS: CME-45C CME-55 CME-550 VANE SHEAR TEST PORTABLE HOIST ADVANCING TOOLS: CLAY BITS 6' CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG.-CARBIDE INSERTS CASING W/ ADVANCER TRICONE STEEL TEETH TRICONE TUNG.-CARB. CORE BIT 2 1/2" DRAG BIT HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: -B -H -N HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST									
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										LL - LIQUID LIMIT LIQUID LIMIT SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE PL - PLASTIC LIMIT WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE OM - OPTIMUM MOISTURE SHRINKAGE LIMIT MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE									
PLASTICITY										PLASTICITY INDEX (PI) DRY STRENGTH NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH									
COLOR										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.									

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SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS (PAGE 2 OF 2)

ROCK DESCRIPTION		TERMS AND DEFINITIONS	
<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. 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. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>		<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. 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. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. 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. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. 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. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>	
	WEATHERING		
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.		
VERY SLIGHT (V SL.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.		
SLIGHT (SL.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.		
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.		
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL.</i>		
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i>		
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i>		
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		
ROCK HARDNESS			
VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.		
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.		
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.		
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.		
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.		
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.		
FRACTURE SPACING		BEDDING	
TERM	SPACING	TERM	THICKNESS
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET
		THINLY LAMINATED	< 0.008 FEET
INDURATION			
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.			
FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.		
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.		
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.		
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.		
		BENCH MARK: BL -101= NORTHING: 714572.8329, EASTING: 2369833.9634 BL STA. 16+56.81 <p style="text-align: right;">ELEVATION: 99.672 FEET</p>	
		NOTES: FIAD= FILLED IMMEDIATELY AFTER DRILLING	
		DATE: 8-15-14	



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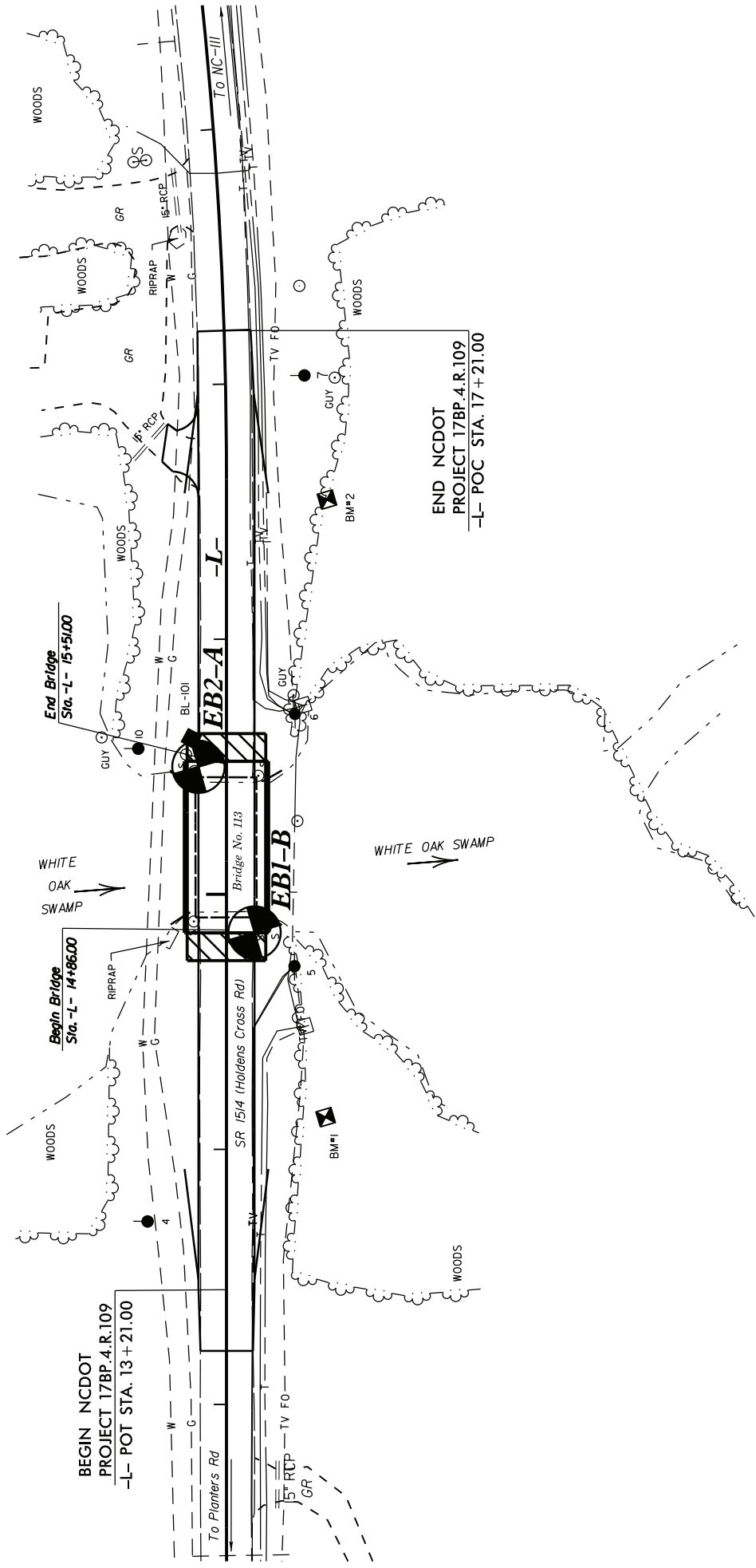
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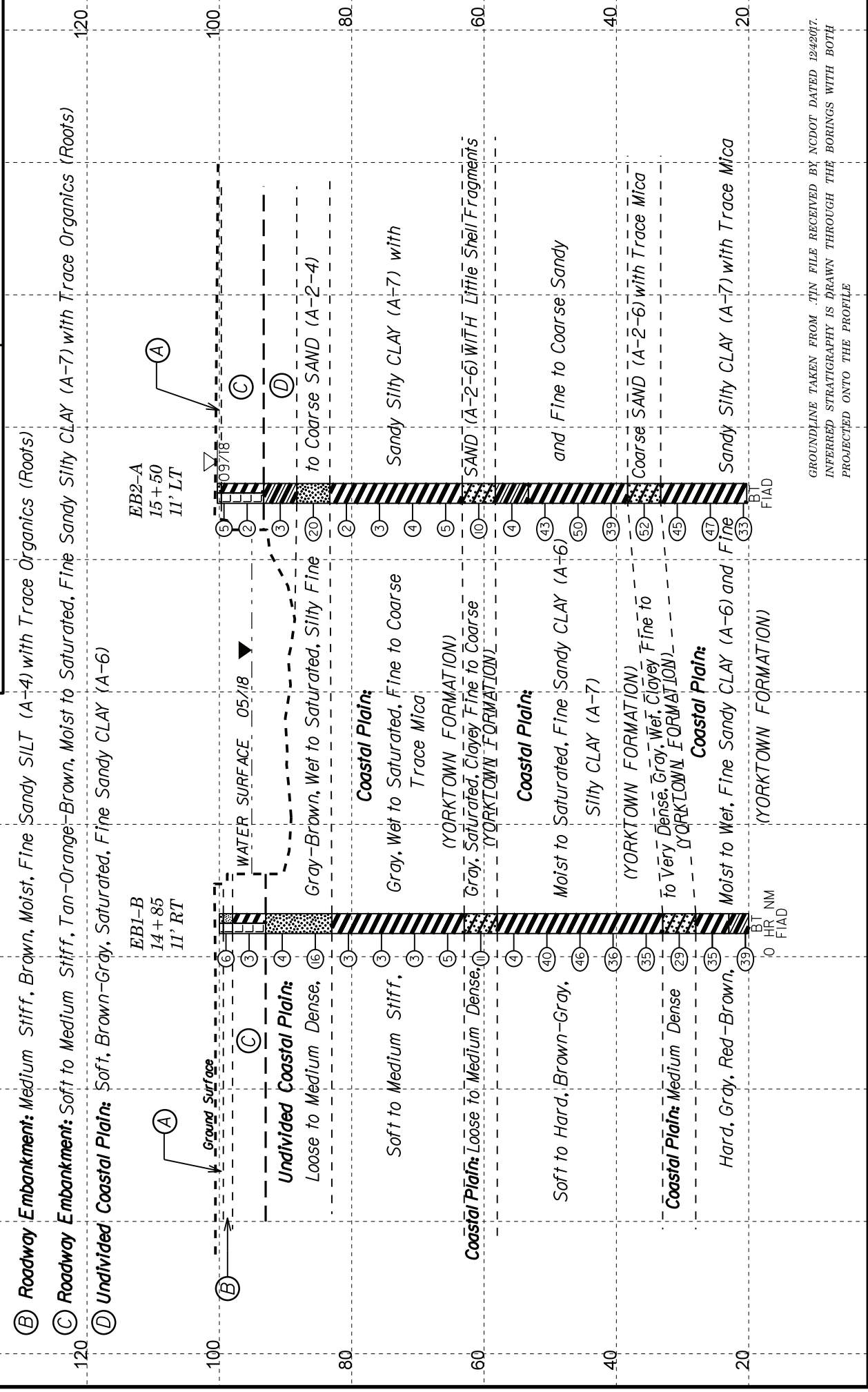
BEGIN NCDOT
PROJECT 17BP.4.R.109
-L- POT STA. 13+21.00

WHITE
OAK
SWAMP

End Bridge
Sta.-L- 15+51.00

END NCDOT
PROJECT 17BP.4.R.109
-L- POC STA. 17+21.00





GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 12/4/2017.
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
 PROJECTED ONTO THE PROFILE

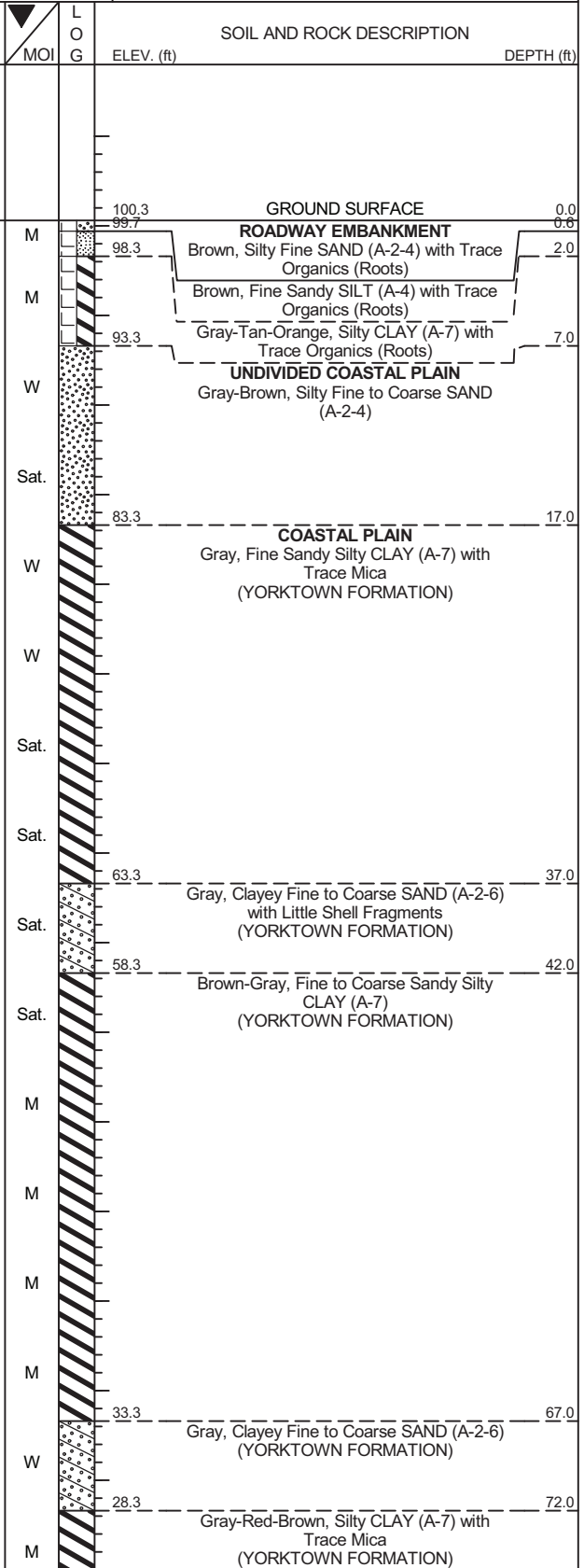
GEOTECHNICAL BORING REPORT

BORE LOG

WBS 17BP.4.R.109		TIP SF-970113		COUNTY WILSON		GEOLOGIST S. Woods	
SITE DESCRIPTION Bridge 113 on SR 1514 (Holdens Cross Road) Over White Oak Swamp							GROUND WTR (ft)
BORING NO. EB1-B		STATION 14+85		OFFSET 11 ft RT		ALIGNMENT -L-	0 HR. NM
COLLAR ELEV. 100.3 ft		TOTAL DEPTH 80.0 ft		NORTHING 714,571		EASTING 2,369,754	24 HR. FIAD
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 82% 02/20/2018				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic	
DRILLER S. Davis		START DATE 09/12/18		COMP. DATE 09/12/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
105																
100	100.3	0.0													100.3	0.0
			1	3	3										99.7	0.6
															98.3	2.0
95	96.8	3.5	2	1	2											
90	91.8	8.5	2	2	2											
85	86.8	13.5	5	8	8											
80	81.8	18.5	1	1	2											
75	76.8	23.5	1	1	2											
70	71.8	28.5	1	2	1											
65	66.8	33.5	2	2	3											
60	61.8	38.5	5	5	6											
55	56.8	43.5	2	2	2											
50	51.8	48.5	12	18	22											
45	46.8	53.5	14	23	23											
40	41.8	58.5	12	14	22											
35	36.8	63.5	10	16	19											
30	31.8	68.5	11	12	17											
25	26.8	73.5	13	16	19											

NCDOT BORE SINGLE 66V-0237-0001 BORELOGS.GPJ NC_DOT.GDT 12/3/18



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 17BP.4.R.109			TIP SF-970113			COUNTY WILSON			GEOLOGIST S. Woods						
SITE DESCRIPTION Bridge 113 on SR 1514 (Holdens Cross Road) Over White Oak Swamp									GROUND WTR (ft)						
BORING NO. EB1-B			STATION 14+85			OFFSET 11 ft RT			ALIGNMENT -L-						
COLLAR ELEV. 100.3 ft			TOTAL DEPTH 80.0 ft			NORTHING 714,571			EASTING 2,369,754						
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 82% 02/20/2018						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic						
DRILLER S. Davis			START DATE 09/12/18			COMP. DATE 09/12/18			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
25															
	21.8	78.5	12	16	23	Match Line									
						● 39							W	23.3	77.0
														20.3	80.0
														Boring Terminated at Elevation 20.3 ft in CLAY (COASTAL PLAIN) (YORKTOWN FORMATION)	

NCDOT BORE SINGLE 66V-0237-0001 BORELOGS.GPJ NC_DOT.GDT 12/3/18

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 17BP.4.R.109	TIP SF-970113	COUNTY WILSON	GEOLOGIST S. Woods
SITE DESCRIPTION Bridge 113 on SR 1514 (Holdens Cross Road) Over White Oak Swamp			GROUND WTR (ft)
BORING NO. EB2-A	STATION 15+50	OFFSET 11 ft LT	ALIGNMENT -L-
COLLAR ELEV. 100.3 ft	TOTAL DEPTH 80.0 ft	NORTHING 714,573	EASTING 2,369,823
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 82% 02/20/2018		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 09/18/18	COMP. DATE 09/18/18	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				
105														
100	100.3	0.0											GROUND SURFACE	0.0
95	96.8	3.5	1	3	2	5						W	ROADWAY EMBANKMENT Dark Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Organics (Roots), and Gravel	6.6
90	91.8	8.5	2	1	1	2						Sat.	Brown-Orange-Tan, Fine Sandy Silty CLAY (A-7) with Trace Organics (Roots)	7.0
85	86.8	13.5	1	1	2	3						Sat.	UNDIVIDED COASTAL PLAIN Brown-Gray, Fine Sandy CLAY (A-6)	7.0
80	81.8	18.5	11	11	9	20						Sat.	Brown-Gray, Silty Fine to Coarse SAND (A-2-4)	12.0
75	76.8	23.5	1	1	1	2						Sat.	COASTAL PLAIN Gray, Fine to Coarse Sandy Silty CLAY (A-7) with Trace Mica (YORKTOWN FORMATION)	17.0
70	71.8	28.5	1	2	1	3						Sat.		
65	66.8	33.5	1	2	3	4						Sat.		
60	61.8	38.5	6	5	5	10						Sat.	Gray, Clayey Fine to Coarse SAND (A-2-6) with Little Shell Fragments (YORKTOWN FORMATION)	37.0
55	56.8	43.5	2	2	2	4						W	Dark Gray, Fine Sandy CLAY (A-6) (YORKTOWN FORMATION)	42.0
50	51.8	48.5	13	21	22	43						M	Gray-Brown, Silty CLAY (A-7) with Trace Mica (YORKTOWN FORMATION)	47.0
45	46.8	53.5	18	22	28	50						M		
40	41.8	58.5	9	16	23	39						M		
35	36.8	63.5	10	24	28	52						W	Gray, Clayey Fine to Coarse SAND (A-2-6) with Trace Mica (YORKTOWN FORMATION)	62.0
30	31.8	68.5	10	16	29	45						W	Gray-Red-Brown, Fine Sandy Silty CLAY (A-7) with Trace Mica (YORKTOWN FORMATION)	67.0
25	26.8	73.5	11	16	31	47						M		

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GEOTECHNICAL BORING REPORT

BORE LOG

WBS 17BP.4.R.109			TIP SF-970113			COUNTY WILSON			GEOLOGIST S. Woods							
SITE DESCRIPTION Bridge 113 on SR 1514 (Holdens Cross Road) Over White Oak Swamp										GROUND WTR (ft)						
BORING NO. EB2-A			STATION 15+50			OFFSET 11 ft LT			ALIGNMENT -L-							
COLLAR ELEV. 100.3 ft			TOTAL DEPTH 80.0 ft			NORTHING 714,573			EASTING 2,369,823							
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 82% 02/20/2018						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic							
DRILLER S. Davis			START DATE 09/18/18			COMP. DATE 09/18/18			SURFACE WATER DEPTH N/A							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						ELEV. (ft)
25																
	21.8	78.5	11	15	18	Match Line										
						•	•	•	•	•				Gray-Red-Brown, Fine Sandy Silty CLAY (A-7) with Trace Mica (YORKTOWN FORMATION) (continued)		
															20.3	80.0
														Boring Terminated at Elevation 20.3 ft in CLAY (COASTAL PLAIN) (YORKTOWN FORMATION)		

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