

REFERENCE: U-4751

PROJECT: 40191

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY New Hanover
PROJECT DESCRIPTION SR 1409 (Military Cutoff Rd.) to
US 17 in Wilmington
SITE DESCRIPTION Noise Wall 1A at -L- Sta. 12+00 Right

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5-12	BORE LOG REPORTS
13	SITE PHOTOGRAPHS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4751	1	13

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) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT 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 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.

PERSONNEL

D. Racey

S. Davis

M. Renza

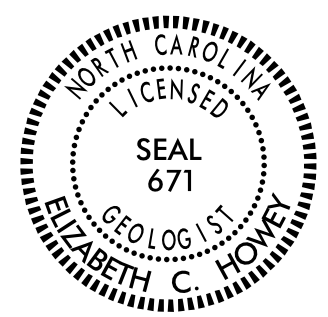
INVESTIGATED BY F&R, Inc.

DRAWN BY D. Racey

CHECKED BY B. Howey, PG, PE

SUBMITTED BY HDR, Inc.

DATE March 2015

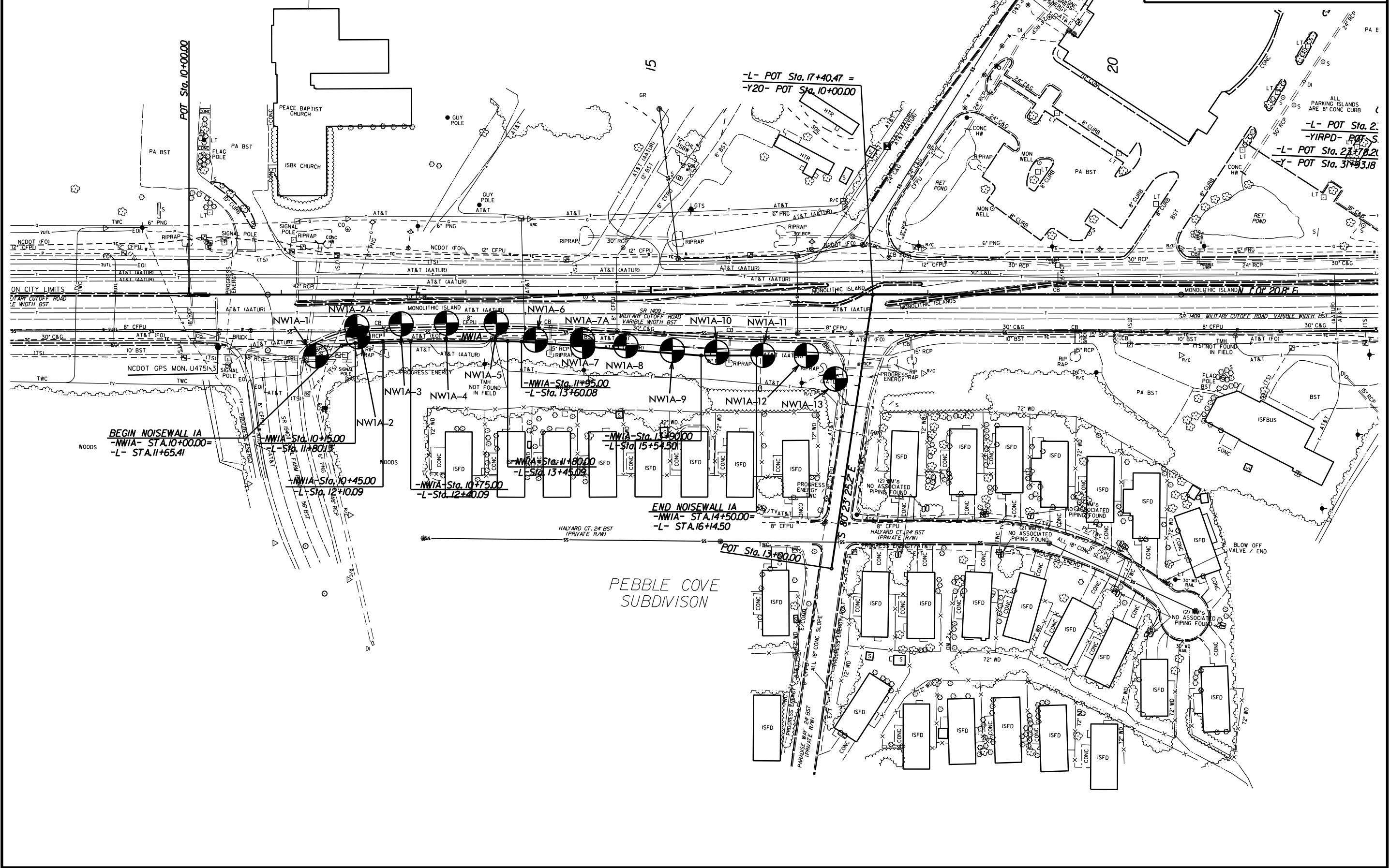


DocuSigned by:
Elizabeth C. Howey 6/25/2015

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SIGNATURE DATE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																																				
<p>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 (ASHTO 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</p>																																																																																																							
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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.</p> <p style="text-align: center;">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <u>ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</u></p> <p style="text-align: center;">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p style="text-align: center;">COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50</p> <p style="text-align: center;">PERCENTAGE OF MATERIAL</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>> 10%</td> <td>> 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table> <p style="text-align: center;">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p> STATIC WATER LEVEL AFTER 24 HOURS</p> <p> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p> SPRING OR SEEP</p> <p style="text-align: center;">MISCELLANEOUS SYMBOLS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</td> <td> DIP & DIP DIRECTION OF ROCK STRUCTURES</td> <td> SLOPE INDICATOR INSTALLATION</td> </tr> <tr> <td> SOIL SYMBOL</td> <td> TEST BORING</td> <td> CONE PENETROMETER TEST</td> </tr> <tr> <td> ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</td> <td> AUGER BORING</td> <td> SOUNDING ROD</td> </tr> <tr> <td> INFERRERD SOIL BOUNDARY</td> <td> CORE BORING</td> <td> MONITORING WELL</td> </tr> <tr> <td> INFERRERD ROCK LINE</td> <td> PIEZOMETER INSTALLATION</td> <td> SPT N-VALUE</td> </tr> <tr> <td> ALLUVIAL SOIL BOUNDARY</td> <td></td> <td></td> </tr> </table>		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	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION	DIP & DIP DIRECTION OF ROCK STRUCTURES	SLOPE INDICATOR INSTALLATION	SOIL SYMBOL	TEST BORING	CONE PENETROMETER TEST	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT	AUGER BORING	SOUNDING ROD	INFERRERD SOIL BOUNDARY	CORE BORING	MONITORING WELL	INFERRERD ROCK LINE	PIEZOMETER INSTALLATION	SPT N-VALUE	ALLUVIAL SOIL BOUNDARY			<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRERD 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>WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p> <p>CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p> <p>NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CPS) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p> <p style="text-align: center;">WEATHERING</p> <p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SLI.) 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.</p> <p>SLIGHT (SLI.) 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.</p> <p>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.</p> <p>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></p> <p>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></p> <p>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></p> <p>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.</p> <p style="text-align: center;">ROCK HARDNESS</p> <p>VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>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.</p> <p>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 PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p>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.</p> <p>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.</p>	
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<p>AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HL. - HIGHLY</p>		<p>MED. - MEDIUM MICA. - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY</p> <p>VST - VANE SHEAR TEST WEA. - WEATHERED W - UNIT WEIGHT W_d - DRY UNIT WEIGHT</p> <p style="text-align: center;">SAMPLE ABBREVIATIONS</p> <p>S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO</p>																																																																																																					
EQUIPMENT USED ON SUBJECT PROJECT																																																																																																							
<p>DRILL UNITS:</p> <p><input type="checkbox"/> CME-45C</p> <p><input type="checkbox"/> CME-55</p> <p><input checked="" type="checkbox"/> CME-550</p> <p><input type="checkbox"/> VANE SHEAR TEST</p> <p><input type="checkbox"/> PORTABLE HOIST</p>		<p>ADVANCING TOOLS:</p> <p><input type="checkbox"/> CLAY BITS</p> <p><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</p> <p><input checked="" type="checkbox"/> 8" HOLLOW AUGERS</p> <p><input type="checkbox"/> HARD FACED FINGER BITS</p> <p><input type="checkbox"/> TUNG-CARBIDE INSERTS</p> <p><input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</p> <p><input type="checkbox"/> TRICONE * STEEL TEETH</p> <p><input type="checkbox"/> TRICONE * TUNG-CARB.</p> <p><input type="checkbox"/> CORE BIT</p> <p><input checked="" type="checkbox"/> 2 1/4" DRAG BIT</p>																																																																																																					
<p>HAMMER TYPE:</p> <p><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</p> <p>CORE SIZE:</p> <p><input type="checkbox"/> -B <input type="checkbox"/> -H <input type="checkbox"/> -N</p> <p>HAND TOOLS:</p> <p><input type="checkbox"/> POST HOLE DIGGER</p> <p><input type="checkbox"/> HAND AUGER</p> <p><input type="checkbox"/> SOUNDING ROD</p> <p><input type="checkbox"/> VANE SHEAR TEST</p>		<p style="text-align: center;">FRACTURE SPACING</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TERM</th> <th>SPACING</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </table> <p style="text-align: center;">BEDDING</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table>		TERM	SPACING	VERY WIDE	MORE THAN 10 FEET	WIDE	3 TO 10 FEET	MODERATELY CLOSE	1 TO 3 FEET	CLOSE	0.16 TO 1 FOOT	VERY CLOSE	LESS THAN 0.16 FEET	TERM	THICKNESS	VERY THICKLY BEDDED	4 FEET	THICKLY BEDDED	1.5 - 4 FEET	THINLY BEDDED	0.16 - 1.5 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET	THINLY LAMINATED	< 0.008 FEET																																																																										
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<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>																																																																																																							
SOIL MOISTURE - CORRELATION OF TERMS																																																																																																							
<p>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</p> <p>FIELD MOISTURE DESCRIPTION</p> <p>GUIDE FOR FIELD MOISTURE DESCRIPTION</p>		<p>- SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</p> <p>- WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</p> <p>- MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE</p> <p>- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</p>																																																																																																					
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<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>																																																																																																							
NOTES:																																																																																																							
BORING AND GROUND SURFACE ELEVATIONS OBTAINED FROM NCDOT-PROVIDED DTM FILE																																																																																																							
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BENCH MARK: N/A																																																																																																							
ELEVATION: N/A FEET																																																																																																							
DATE: 8-15-14																																																																																																							



BEGIN NOISEWALL 1A
 -NWIA- STA.10+00.00=
 -L- STA.11+65.41

-NWIA- Sta. 10+15.00
 -L- Sta. 11+80.13

-NWIA- Sta. 10+45.00
 -L- Sta. 12+10.09

-NWIA- Sta. 10+75.00
 -L- Sta. 12+40.09

-NWIA- Sta. 11+95.00
 -L- Sta. 13+60.08

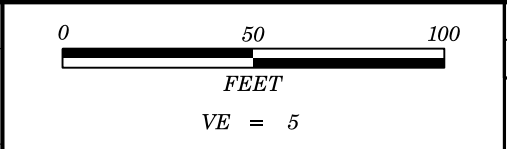
-NWIA- Sta. 13+90.00
 -L- Sta. 15+54.50

END NOISEWALL 1A
 -NWIA- STA.14+50.00=
 -L- STA.16+14.50

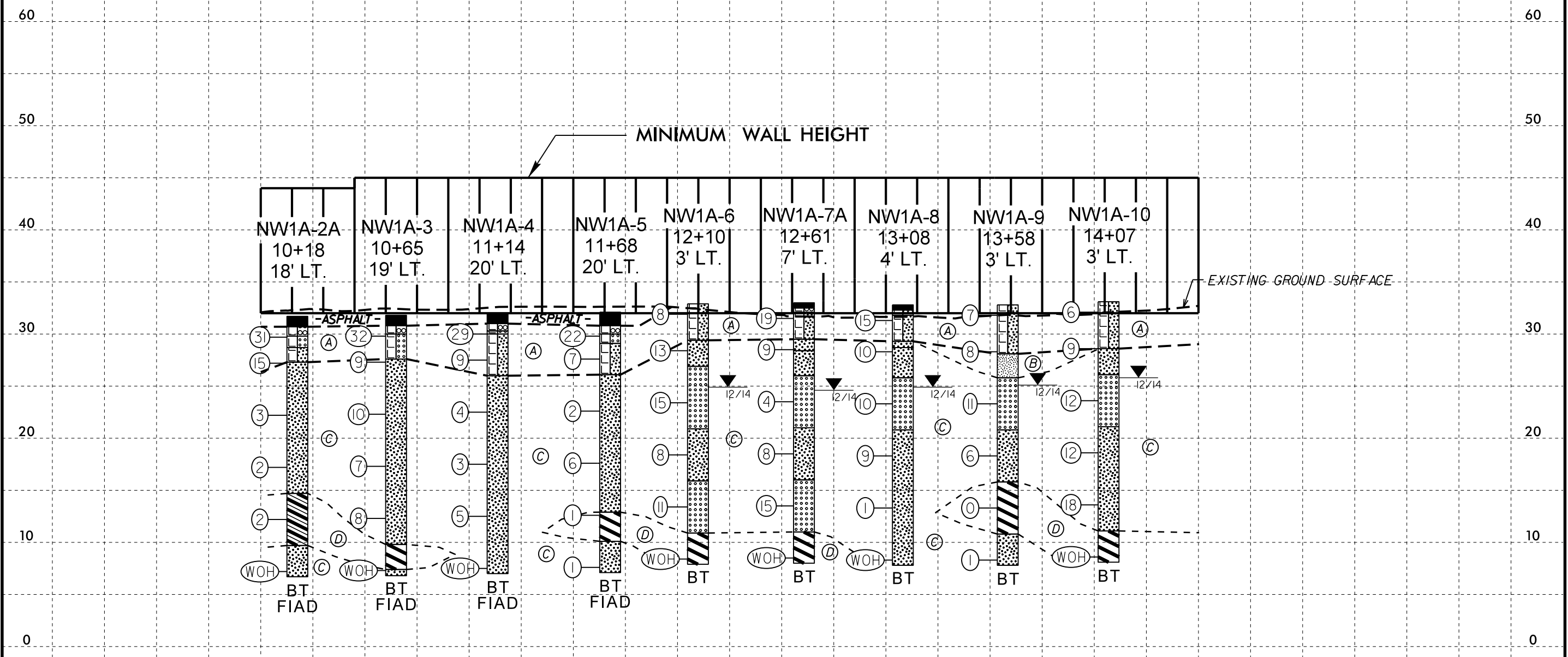
-L- POT Sta. 17+40.47 =
 -Y20- POT Sta. 10+00.00

-L- POT Sta. 2,
 -YIRPD- POT Sta. 5,
 -L- POT Sta. 21+70.21
 -Y- POT Sta. 31+93.18

PEBBLE COVE
 SUBDIVISION



PROFILE ALONG -NW1A-



- (A) Tan, gray-tan & black, loose to dense, silty fine SAND (A-1-b, A-3, A-2-4), with trace to some gravel, moist -ROADWAY EMBANKMENT-
- (B) Black, fine sandy SILT (A-4), wet -COASTAL PLAIN-
- (C) Red, tan, brown, gray & black, very loose to medium dense, silty fine SAND (A-2-4) and fine SAND (A-3), moist to saturated -COASTAL PLAIN-
- (D) Gray, very soft to soft, fine sandy silty CLAY (A-6) and silty CLAY (A-7-6), saturated -COASTAL PLAIN-

-NW1A- GROUNDLINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NC DEPARTMENT OF TRANSPORTATION, DATED 1/29/15. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE PROFILE.

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 40191.1.2	TIP U-4751	COUNTY NEW HANOVER	GEOLOGIST D. Racey
SITE DESCRIPTION SR 1409 (Military Cutoff Rd.) to US 17 in Wilmington - Noise Wall 1A at -L- Sta. 12+00 Right			GROUND WTR (ft)
BORING NO. NW1A-1	STATION 11+37	OFFSET 66 ft RT	ALIGNMENT -L-
COLLAR ELEV. 31.0 ft	TOTAL DEPTH 28.5 ft	NORTHING 186,826	EASTING 2,354,702
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 76% 02/22/2014		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 12/08/14	COMP. DATE 12/08/14	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
35														
30	30.5	0.5	7	6	5									GROUND SURFACE 31.0 ASPHALT 29.9
25	27.5	3.5	2	1	2									ROADWAY EMBANKMENT Tan, silty SAND & GRAVEL (A-1-b). Black, silty fine SAND (A-2-4), with trace gravel.
20	22.5	8.5	3	2	2									COASTAL PLAIN Gray-brown to light gray, silty fine SAND (A-2-4), with some clay.
15	17.5	13.5	WOH	1	1									
10	12.5	18.5	WOH	WOH	1									Light gray, fine sandy silty CLAY (A-6).
5	7.5	23.5	4	8	10									Gray-tan, fine SAND (A-3).
														Boring Terminated at Elevation 2.5 ft in SAND (COASTAL PLAIN)

NOTES:
1) Boring located on asphalt walkway.
2) Drilled to 28.5', unable to obtain SPT due to hole caving in, terminated boring.
3) 0-hr water level not measured due to drilling water introduction.

WBS 40191.1.2	TIP U-4751	COUNTY NEW HANOVER	GEOLOGIST D. Racey
SITE DESCRIPTION SR 1409 (Military Cutoff Rd.) to US 17 in Wilmington - Noise Wall 1A at -L- Sta. 12+00 Right			GROUND WTR (ft)
BORING NO. NW1A-2	STATION 10+18	OFFSET 7 ft LT	ALIGNMENT -NW1A-
COLLAR ELEV. 32.3 ft	TOTAL DEPTH 2.3 ft	NORTHING 186,872	EASTING 2,354,682
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 76% 02/22/2014		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 12/08/14	COMP. DATE 12/08/14	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
35														
30	31.8	0.5	8	7	9									GROUND SURFACE 32.3 ASPHALT 31.8 ROADWAY EMBANKMENT Tan, silty SAND & GRAVEL (A-1-b). Black, silty fine SAND (A-2-4), with trace gravel.
														Boring Terminated at Elevation 30.0 ft in SAND (ROADWAY EMBANKMENT)

NOTES:
1) Boring located on asphalt walkway.
2) Boring struck underground utility, terminated at 2.3', offset to NW 1A-2A.

NCDOT BORE DOUBLE U4751_GEO_SWAL1A_BORELOGS.GPJ NC_DOT.GDT 3/5/15



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 40191.1.2	TIP U-4751	COUNTY NEW HANOVER	GEOLOGIST D. Racey
SITE DESCRIPTION SR 1409 (Military Cutoff Rd.) to US 17 in Wilmington - Noise Wall 1A at -L- Sta. 12+00 Right			GROUND WTR (ft)
BORING NO. NW1A-2A	STATION 10+18	OFFSET 18 ft LT	ALIGNMENT -NW1A-
COLLAR ELEV. 31.7 ft	TOTAL DEPTH 25.0 ft	NORTHING 186,871	EASTING 2,354,671
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 76% 02/22/2014		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 12/11/14	COMP. DATE 12/11/14	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
35														
30.7	30.7	1.0	16	18	13									31.7 GROUND SURFACE 0.0
28.2	28.2	3.5	7	7	8									30.7 ASPHALT 1.0 29.8 ROADWAY EMBANKMENT 1.9 28.7 Tan, silty fine SAND (A-1-b), with some gravel. 3.0 27.3 Gray-tan, fine SAND (A-3), with trace silt. 4.4 Black, silty fine SAND (A-2-4).
23.2	23.2	8.5	1	1	2									COASTAL PLAIN Gray-brown, silty fine SAND (A-2-4), with trace shell fragments.
18.2	18.2	13.5	1	1	1									
13.2	13.2	18.5	3	2	0									14.7 Light gray, fine sandy silty CLAY (A-6). 17.0
8.2	8.2	23.5	WOH	WOH	WOH									9.7 Gray, silty fine SAND (A-2-4). 22.0
														6.7 Boring Terminated at Elevation 6.7 ft in SAND (COASTAL PLAIN) 25.0

NOTES:

- 1) Boring located in roadway.
- 2) 0-hr water level not measured due to mud rotary drilling techniques.

WBS 40191.1.2	TIP U-4751	COUNTY NEW HANOVER	GEOLOGIST D. Racey
SITE DESCRIPTION SR 1409 (Military Cutoff Rd.) to US 17 in Wilmington - Noise Wall 1A at -L- Sta. 12+00 Right			GROUND WTR (ft)
BORING NO. NW1A-3	STATION 10+65	OFFSET 19 ft LT	ALIGNMENT -NW1A-
COLLAR ELEV. 31.8 ft	TOTAL DEPTH 25.0 ft	NORTHING 186,919	EASTING 2,354,669
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 76% 02/22/2014		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 12/10/14	COMP. DATE 12/10/14	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
35														
30.8	30.8	1.0	16	18	14									31.8 GROUND SURFACE 0.0
28.3	28.3	3.5	4	4	5									30.8 ASPHALT 1.0 30.0 ROADWAY EMBANKMENT 1.8 27.6 Tan, silty fine SAND (A-1-b), with some gravel. 4.2 Gray-brown, fine SAND (A-3), with trace silt.
23.3	23.3	8.5	3	5	5									COASTAL PLAIN Red, tan & brown to gray, silty fine SAND (A-2-4), with trace roots from 4.2'-5.0'.
18.3	18.3	13.5	2	3	4									
13.3	13.3	18.5	7	4	4									9.8 Gray, silty CLAY (A-7-6), with trace fine sand. 22.0
8.3	8.3	23.5	WOH	WOH	WOH									7.4 Gray, silty fine SAND (A-2-4). 24.4 6.8 Boring Terminated at Elevation 6.8 ft in SAND (COASTAL PLAIN) 25.0

NOTES:

- 1) Boring located in roadway.
- 2) 0-hr water level not measured due to mud rotary drilling techniques.

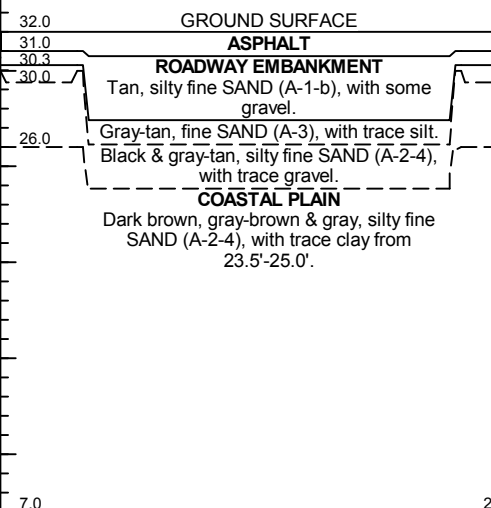


NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 40191.1.2	TIP U-4751	COUNTY NEW HANOVER	GEOLOGIST D. Racey
SITE DESCRIPTION SR 1409 (Military Cutoff Rd.) to US 17 in Wilmington - Noise Wall 1A at -L- Sta. 12+00 Right			GROUND WTR (ft)
BORING NO. NW1A-4	STATION 11+14	OFFSET 20 ft LT	ALIGNMENT -NW1A-
COLLAR ELEV. 32.0 ft	TOTAL DEPTH 25.0 ft	NORTHING 186,968	EASTING 2,354,669
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 76% 02/22/2014		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 12/10/14	COMP. DATE 12/10/14	SURFACE WATER DEPTH N/A

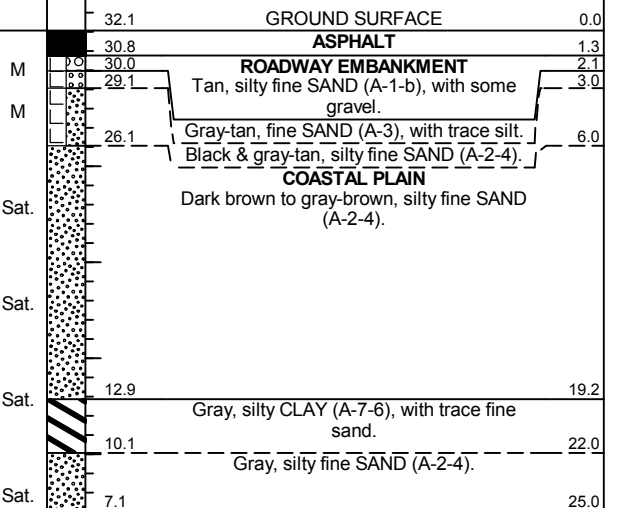
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
35																
	31.0	1.0		15	14	15										
30	28.5	3.5		5	5	4										
25	23.5	8.5		2	2	2										
20	18.5	13.5		1	1	2										
15	13.5	18.5		4	3	2										
10	8.5	23.5		WOH	WOH	WOH										



NOTES:
 1) Boring located in roadway.
 2) 0-hr water level not measured due to mud rotary drilling techniques.

WBS 40191.1.2	TIP U-4751	COUNTY NEW HANOVER	GEOLOGIST D. Racey
SITE DESCRIPTION SR 1409 (Military Cutoff Rd.) to US 17 in Wilmington - Noise Wall 1A at -L- Sta. 12+00 Right			GROUND WTR (ft)
BORING NO. NW1A-5	STATION 11+68	OFFSET 20 ft LT	ALIGNMENT -NW1A-
COLLAR ELEV. 32.1 ft	TOTAL DEPTH 25.0 ft	NORTHING 187,022	EASTING 2,354,670
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 76% 02/22/2014		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 12/10/14	COMP. DATE 12/10/14	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						
35																
	30.8	1.3		9	12	10										
30	28.6	3.5		5	3	4										
25	23.6	8.5		2	1	1										
20	18.6	13.5		3	3	3										
15	13.6	18.5		2	1	0										
10	8.6	23.5		1	0	1										



NOTES:
 1) Boring located in roadway.
 2) 0-hr water level not measured due to mud rotary drilling techniques.

NCDOT BORE DOUBLE U4751_GEO_SWAL1A_BORELOGS.GPJ NC_DOT.GDT 3/5/15



**NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT**

WBS 40191.1.2	TIP U-4751	COUNTY NEW HANOVER	GEOLOGIST D. Racey
SITE DESCRIPTION SR 1409 (Military Cutoff Rd.) to US 17 in Wilmington - Noise Wall 1A at -L- Sta. 12+00 Right			GROUND WTR (ft)
BORING NO. NW1A-6	STATION 12+10	OFFSET 3 ft LT	ALIGNMENT -NW1A-
COLLAR ELEV. 32.9 ft	TOTAL DEPTH 25.0 ft	NORTHING 187,064	EASTING 2,354,689
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 76% 02/22/2014		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 12/08/14	COMP. DATE 12/09/14	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					
35															
	32.9	0.0											32.9	GROUND SURFACE	0.0
			2	4	4							M	ROADWAY EMBANKMENT		
30	29.4	3.5											29.4	Black, silty fine SAND (A-2-4), with trace gravel & roots.	3.5
			6	5	8							M	COASTAL PLAIN		
													26.9	Black & gray-tan, silty fine SAND (A-2-4), with trace organics.	6.0
25	24.4	8.5										Sat.	Dark red-brown, fine SAND (A-3), with trace silt.		
			8	8	7								20.9	Brown, silty fine SAND (A-2-4).	12.0
20	19.4	13.5										Sat.			
			2	4	4								15.9	Gray-tan, fine SAND (A-3), with trace silt.	17.0
15	14.4	18.5										Sat.			
			4	4	7								10.9	Gray, silty CLAY (A-7-6), with trace fine sand.	22.0
10	9.4	23.5										Sat.			
			WOH	WOH	WOH								7.9	Boring Terminated at Elevation 7.9 ft in CLAY (COASTAL PLAIN)	25.0
NOTES: 1) 0.0-0.2' = Surficial organic soils 2) 0-hr water level not measured due to mud rotary drilling techniques.															

WBS 40191.1.2	TIP U-4751	COUNTY NEW HANOVER	GEOLOGIST D. Racey
SITE DESCRIPTION SR 1409 (Military Cutoff Rd.) to US 17 in Wilmington - Noise Wall 1A at -L- Sta. 12+00 Right			GROUND WTR (ft)
BORING NO. NW1A-7	STATION 12+61	OFFSET CL	ALIGNMENT -NW1A-
COLLAR ELEV. 31.6 ft	TOTAL DEPTH 5.0 ft	NORTHING 187,115	EASTING 2,354,697
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 76% 02/22/2014		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 12/09/14	COMP. DATE 12/09/14	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					
35															
	31.6	0.0											31.6	GROUND SURFACE	0.0
			1	2	5							M	ROADWAY EMBANKMENT		
30	28.1	3.5											28.1	Black, silty fine SAND (A-2-4).	3.5
			5	7	5							M	COASTAL PLAIN		
													26.6	Black & gray-tan, silty fine SAND (A-2-4).	5.0
Boring Terminated at Elevation 26.6 ft in SAND (COASTAL PLAIN)															
NOTES: 1) 0.0-0.2' = Surficial organic soils 2) Boring struck underground phone line, terminated at 5.0', offset to NW 1A-7A.															

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WBS 40191.1.2	TIP U-4751	COUNTY NEW HANOVER	GEOLOGIST D. Racey
SITE DESCRIPTION SR 1409 (Military Cutoff Rd.) to US 17 in Wilmington - Noise Wall 1A at -L- Sta. 12+00 Right			GROUND WTR (ft)
BORING NO. NW1A-7A	STATION 12+61	OFFSET 7 ft LT	ALIGNMENT -NW1A-
COLLAR ELEV. 33.0 ft	TOTAL DEPTH 25.0 ft	NORTHING 187,115	EASTING 2,354,690
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 76% 02/22/2014		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 12/09/14	COMP. DATE 12/09/14	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					
35															
	32.5	0.5	10	8	11									33.0	GROUND SURFACE
														32.1	ASPHALT
														29.5	ROADWAY EMBANKMENT
	29.5	3.5	6	5	4									28.4	Tan, silty SAND & GRAVEL (A-1-b).
														26.0	Black, silty fine SAND (A-2-4), with trace gravel.
														21.0	COASTAL PLAIN
														16.0	Tan & brown, silty fine SAND (A-2-4).
														11.0	Black, silty fine SAND (A-2-4), with trace shell fragments.
														8.0	Dark red-brown, fine SAND (A-3), with trace silt.
															Brown, silty fine SAND (A-2-4).
															Gray-tan, fine SAND (A-3), with trace silt.
															Gray, silty CLAY (A-7-6), with trace fine sand.
															8.0

NOTES:

- 1) Boring located on asphalt walkway, offset due to utility conflicts.
- 2) 0-hr water level not measured due to mud rotary drilling techniques.

Boring Terminated at Elevation 8.0 ft in CLAY (COASTAL PLAIN)

WBS 40191.1.2	TIP U-4751	COUNTY NEW HANOVER	GEOLOGIST D. Racey
SITE DESCRIPTION SR 1409 (Military Cutoff Rd.) to US 17 in Wilmington - Noise Wall 1A at -L- Sta. 12+00 Right			GROUND WTR (ft)
BORING NO. NW1A-8	STATION 13+08	OFFSET 4 ft LT	ALIGNMENT -NW1A-
COLLAR ELEV. 32.8 ft	TOTAL DEPTH 25.0 ft	NORTHING 187,162	EASTING 2,354,697
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 76% 02/22/2014		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 12/09/14	COMP. DATE 12/09/14	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					
35															
	32.3	0.5	8	9	6									32.8	GROUND SURFACE
														31.8	ASPHALT
														29.3	ROADWAY EMBANKMENT
	29.3	3.5	9	6	4									28.7	Tan, silty SAND & GRAVEL (A-1-b).
														25.8	Black, silty fine SAND (A-2-4), with trace gravel.
														20.8	COASTAL PLAIN
														14.3	Tan & brown, silty fine SAND (A-2-4).
														9.3	Black, silty fine SAND (A-2-4), with trace shell fragments.
															Dark red-brown, fine SAND (A-3), with trace silt.
															Brown to gray, silty fine SAND (A-2-4), with trace to some clay.
															7.8

NOTES:

- 1) Boring located on asphalt walkway.
- 2) 0-hr water level not measured due to mud rotary drilling techniques.

Boring Terminated at Elevation 7.8 ft in SAND (COASTAL PLAIN)

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WBS 40191.1.2	TIP U-4751	COUNTY NEW HANOVER	GEOLOGIST D. Racey
SITE DESCRIPTION SR 1409 (Military Cutoff Rd.) to US 17 in Wilmington - Noise Wall 1A at -L- Sta. 12+00 Right			GROUND WTR (ft)
BORING NO. NW1A-9	STATION 13+58	OFFSET 3 ft LT	ALIGNMENT -NW1A-
COLLAR ELEV. 32.8 ft	TOTAL DEPTH 25.0 ft	NORTHING 187,212	EASTING 2,354,703
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 76% 02/22/2014		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 12/09/14	COMP. DATE 12/09/14	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					
35															
	32.8	0.0	1	3	4									32.8	GROUND SURFACE
30	29.3	3.5	8	4	4									28.1	ROADWAY EMBANKMENT Black & gray, silty fine SAND (A-2-4), with trace gravel from 0.0-1.5'.
25	24.3	8.5	5	6	5									25.8	COASTAL PLAIN Black, fine sandy SILT (A-4), with trace organics. Dark red-brown, fine SAND (A-3), with trace silt.
20	19.3	13.5	2	2	4									20.8	Brown, silty fine SAND (A-2-4).
15	14.3	18.5	1	0	0									15.8	Gray, silty CLAY (A-7-6), with trace fine sand.
10	9.3	23.5	1	0	1									10.8	Gray-brown, silty fine SAND (A-2-4), with trace clay.
														7.8	Boring Terminated at Elevation 7.8 ft in SAND (COASTAL PLAIN)

NOTES:

- 1) 0.0-0.1' = Surficial organic soils
- 2) 0-hr water level not measured due to mud rotary drilling techniques.

WBS 40191.1.2	TIP U-4751	COUNTY NEW HANOVER	GEOLOGIST D. Racey
SITE DESCRIPTION SR 1409 (Military Cutoff Rd.) to US 17 in Wilmington - Noise Wall 1A at -L- Sta. 12+00 Right			GROUND WTR (ft)
BORING NO. NW1A-10	STATION 14+07	OFFSET 3 ft LT	ALIGNMENT -NW1A-
COLLAR ELEV. 33.1 ft	TOTAL DEPTH 25.0 ft	NORTHING 187,260	EASTING 2,354,706
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 76% 02/22/2014		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 12/09/14	COMP. DATE 12/09/14	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					
35															
	33.1	0.0	2	3	3									33.1	GROUND SURFACE
30	29.6	3.5	8	6	3									28.6	ROADWAY EMBANKMENT Black & tan, silty fine SAND (A-2-4).
25	24.6	8.5	5	6	6									26.1	COASTAL PLAIN Black, silty fine SAND (A-2-4), with trace organics. Red-brown, fine SAND (A-3), with trace silt.
20	19.6	13.5	4	5	7									21.1	Gray, silty fine SAND (A-2-4).
15	14.6	18.5	6	9	9									11.1	Gray, silty CLAY (A-7-6), with trace fine sand.
10	9.6	23.5	WOH	WOH	WOH									8.1	Boring Terminated at Elevation 8.1 ft in CLAY (COASTAL PLAIN)

NOTES:

- 1) 0.0-0.2' = Surficial organic soils
- 2) 0-hr water level not measured due to mud rotary drilling techniques.

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WBS 40191.1.2	TIP U-4751	COUNTY NEW HANOVER	GEOLOGIST D. Racey
SITE DESCRIPTION SR 1409 (Military Cutoff Rd.) to US 17 in Wilmington - Noise Wall 1A at -L- Sta. 12+00 Right			GROUND WTR (ft)
BORING NO. NW1A-11	STATION 16+21	OFFSET 66 ft RT	ALIGNMENT -L-
COLLAR ELEV. 32.9 ft	TOTAL DEPTH 25.0 ft	NORTHING 187,310	EASTING 2,354,710
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 76% 02/22/2014		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 12/11/14	COMP. DATE 12/11/14	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					
35															
	32.9	0.0		2	3	3								32.9	GROUND SURFACE
30	29.4	3.5		10	5	5								29.1	ROADWAY EMBANKMENT Black & tan, silty fine SAND (A-2-4), with trace gravel.
25	24.4	8.5		15	19	18								25.9	COASTAL PLAIN Black, silty fine SAND (A-2-4), with trace organics.
20	19.4	13.5		5	7	9								20.9	Red-brown, fine SAND (A-3), with trace silt.
15	14.4	18.5		5	8	9								10.9	Gray-tan to gray, silty fine SAND (A-2-4).
10	9.4	23.5												7.9	Gray, silty CLAY (A-7-6), with trace fine sand.
			WOH	WOH	WOH										

NOTES:
 1) 0.0-0.2' = Surficial organic soils
 2) 0-hr water level not measured due to mud rotary drilling techniques.

WBS 40191.1.2	TIP U-4751	COUNTY NEW HANOVER	GEOLOGIST D. Racey
SITE DESCRIPTION SR 1409 (Military Cutoff Rd.) to US 17 in Wilmington - Noise Wall 1A at -L- Sta. 12+00 Right			GROUND WTR (ft)
BORING NO. NW1A-12	STATION 16+68	OFFSET 66 ft RT	ALIGNMENT -L-
COLLAR ELEV. 33.3 ft	TOTAL DEPTH 25.0 ft	NORTHING 187,357	EASTING 2,354,711
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 76% 02/22/2014		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 12/11/14	COMP. DATE 12/11/14	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					
35															
	33.3	0.0		1	5	3								33.3	GROUND SURFACE
30	29.8	3.5		3	2	2								29.2	ROADWAY EMBANKMENT Black & tan, silty fine SAND (A-2-4), with trace gravel.
25	24.8	8.5		4	5	5								21.3	COASTAL PLAIN Red-brown, fine SAND (A-3), with trace silt.
20	19.8	13.5		3	4	4								12.0	Gray-tan to gray, silty fine SAND (A-2-4).
15	14.8	18.5		4	5	6								11.3	Gray, silty CLAY (A-7-6), with trace fine sand.
10	9.8	23.5												8.3	Gray, silty CLAY (A-7-6), with trace fine sand.
			WOH	WOH	WOH										

NOTES:
 1) 0.0-0.2' = Surficial organic soils
 2) 0-hr water level not measured due to mud rotary drilling techniques.

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 40191.1.2		TIP U-4751		COUNTY NEW HANOVER		GEOLOGIST D. Racey								
SITE DESCRIPTION SR 1409 (Military Cutoff Rd.) to US 17 in Wilmington - Noise Wall 1A at -L- Sta. 12+00 Right							GROUND WTR (ft)							
BORING NO. NW1A-13		STATION 17+00		OFFSET 91 ft RT		ALIGNMENT -L-								
COLLAR ELEV. 30.8 ft		TOTAL DEPTH 25.0 ft		NORTHING 187,388		EASTING 2,354,737								
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 76% 02/22/2014				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic								
DRILLER S. Davis		START DATE 12/11/14		COMP. DATE 12/11/14		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)
35														
30	30.8	0.0	2	3	4									30.8 GROUND SURFACE 0.0
	27.3	3.5	5	5	16									28.8 ROADWAY EMBANKMENT 2.0 Black & tan, silty fine SAND (A-2-4), with trace gravel.
25														COASTAL PLAIN Red-brown, fine SAND (A-3), with trace silt.
	22.3	8.5	2	2	4									21.8 Sat. 9.0 Gray-tan to gray, silty fine SAND (A-2-4), with trace to some clay.
20														
	17.3	13.5	2	4	5									
15														
	12.3	18.5	5	3	2									
10														
	7.3	23.5	WOH	WOH	WOH									
														5.8 Sat. 25.0 Boring Terminated at Elevation 5.8 ft in SAND (COASTAL PLAIN)
<p>NOTES:</p> <p>1) 0.0-0.2' = Surficial organic soils</p> <p>2) 0-hr water level not measured due to mud rotary drilling techniques.</p>														

NCDOT BORE DOUBLE U4751_GEO_SWAL1A_BORELOGS.GPJ NC_DOT.GDT 3/5/15



SITE PHOTOGRAPHS



Photograph No. 1: View looking South along Military Cutoff Rd from Paradise Way



Photograph No. 3: View looking North along Military Cutoff Road near beginning of NW1A



Photograph No. 2: View looking North along Military Cutoff Road