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REFERENCE: B-5166

PROJECT: 42342

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5166	1	10

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

**ROADWAY  
SUBSURFACE INVESTIGATION**

COUNTY GRANVILLE  
PROJECT DESCRIPTION BRIDGE NO. 138 ON -L-  
(SR 1300) OVER GRASSY CREEK

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PERSONNEL

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O. B. OTI  
D. G. PINTER

INVESTIGATED BY J. L. PEDRO  
DRAWN BY J. L. PEDRO  
CHECKED BY N. T. ROBERSON  
SUBMITTED BY N. T. ROBERSON  
DATE JULY 2015

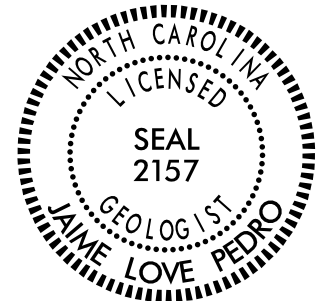
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Jaime Love Pedro 7/20/2015  
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SIGNATURE DATE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

**SUBSURFACE INVESTIGATION**

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS  
(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									
GENERAL CLASS. GRANULAR MATERIALS (≤ 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										MINERALOGICAL COMPOSITION									
GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1-A-2, A-4, A-5, A-6, A-7										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.									
SYMBOL										COMPRESSIBILITY									
% PASSING #10, #40, #200										SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50									
MATERIAL PASSING #40 LL, PI										PERCENTAGE OF MATERIAL									
GROUP INDEX										ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL									
USUAL TYPES OF MAJOR MATERIALS										GROUND WATER									
GEN. RATING AS SUBGRADE										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									
CONSISTENCY OR DENSENESS										MISCELLANEOUS SYMBOLS									
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY									
TEXTURE OR GRAIN SIZE										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									
U.S. STD. SIEVE SIZE OPENING (MM)										RECOMMENDATION SYMBOLS									
BOULDER (BLDR.), COBBLE (COB.), GRAVEL (GR.), COARSE SAND (CSE. SD.), FINE SAND (F SD.), SILT (SL.), CLAY (CL.)										UNDERCUT EXCAVATION SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL									
GRAIN SIZE										ABBREVIATIONS									
SOIL MOISTURE - CORRELATION OF TERMS										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 HI. - HIGHLY 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 VST - VANE SHEAR TEST WEA. - WEATHERED γ - UNIT WEIGHT γ <sub>d</sub> - DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO									
PLASTICITY										EQUIPMENT USED ON SUBJECT PROJECT									
NON PLASTIC, SLIGHTLY PLASTIC, MODERATELY PLASTIC, HIGHLY PLASTIC										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 HAMMER TOPICT: AUTOMATIC, MANUAL CORE SIZE: -B, -H, -N HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST									
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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**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT**

# SUBSURFACE INVESTIGATION

## 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><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p><b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.</p> <p><b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p><b>ARGILLACEOUS</b> - 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.</p> <p><b>ARTESIAN</b> - 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><b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p><b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p><b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p><b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p><b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p><b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p><b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p><b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p><b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.</p> <p><b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p><b>FORMATION (FM.)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p><b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p><b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p><b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p><b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p><b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p><b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p><b>ROCK QUALITY DESIGNATION (ROD)</b> - 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> <p><b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p><b>SILL</b> - 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.</p> <p><b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p><b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS (N 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.</p> <p><b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p><b>STRATA ROCK QUALITY DESIGNATION (SROD)</b> - 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.</p> <p><b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>
		<p><b>WEATHERED ROCK (WR)</b> - NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</p>
		<p><b>CRYSTALLINE ROCK (CR)</b> - 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><b>NON-CRYSTALLINE ROCK (NCR)</b> - 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><b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b> - COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</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. <u>IF TESTED, WOULD YIELD SPT REFUSAL</u>	
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. <u>IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</u>	
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. <u>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</u>	
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 GROOVED 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		
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.	
<b>BENCH MARK:</b>		
		ELEVATION:      FEET
<b>NOTES:</b>		



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY  
GOVERNOR

ANTHONY J. TATA  
SECRETARY

July 15, 2015

STATE PROJECT: 42342.1.1 (B-5166)  
COUNTY: Granville  
DESCRIPTION: Bridge No. 138 on -L- (SR 1300) over Grassy Creek  
SUBJECT: Geotechnical Report – Inventory

The Geotechnical Engineering Unit has completed a subsurface investigation for this project and presents the following inventory. No plans, profiles, or cross-sections will be submitted for this roadway project.

#### **Project Description**

The project consists of the replacement of Bridge No. 138 on SR 1300 (Cornwall Rd.) over Grassy Creek. The total length of the roadway portion of the project is 0.17 miles. The proposed grade will be raised just slightly compared to the existing grade. Hand auger borings were performed in July 2015 along with a literature review of nearby projects. Representative soil samples were collected for visual classification in the field.

#### **Physiography & Geology**

The project is located 6.0 miles northwest of the town of Stovall in the gently rolling terrain of the Piedmont Physiographic province. A mixture of woods, farmland, and some scattered single-family dwellings are located along the project corridor. Geologically the site is underlain by felsic metavolcanic rock from the Carolina Slate belt.

#### **Soil Properties**

Soils within the project are roadway embankment, alluvial, and residual soils.

Roadway embankment soils consist of red, orange, and brown, soft to medium stiff, moist, silty and sandy clay (A-7-6, A-6). This material varies in depth from 4.0 to 10.0 feet. Alluvial soils consist primarily of tan, brown, and gray, soft to stiff, moist to saturated, sandy silt and silty clay (A-4 and A-7-6) with some silty sand, coarse sand, and gravel (A-2-4 and A-1-b). Residual soils consist of tan-brown, red, and orange-brown, medium stiff to hard, moist, silty clay and sandy silt (A-7-6, and A-4). Residual soils are underlain by weathered rock.

**MAILING ADDRESS:**  
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[connect.ncdot.gov/resources/Geological](http://connect.ncdot.gov/resources/Geological)

**LOCATION:**  
CENTURY CENTER COMPLEX  
ENTRANCE B-2  
1020 BIRCH RIDGE DRIVE  
RALEIGH NC 27610

**Rock Properties**

Weathered and crystalline rock is approximately 15.0 to 25.0 feet below the ground surface and consists of green and gray, severely weathered to fresh, hard to very hard, metavolcanic rock. Crystalline rock is not anticipated to cause problems during construction.

**Groundwater**

The groundwater level is anticipated to be at elevations similar to Grassy Creek. Seasonal fluctuations in the water table can be expected. Groundwater is not anticipated to cause problems during construction.

JLP/NTR/jlp

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 42342.1.1			TIP B-5166			COUNTY GRANVILLE			GEOLOGIST Oti, O. B.								
SITE DESCRIPTION BRIDGE NO. 138 ON -L- (SR 1300) OVER GRASSY CREEK									GROUND WTR (ft)								
BORING NO. B1			STATION 14+00			OFFSET 35 ft LT			ALIGNMENT -L-								
COLLAR ELEV. 374.3 ft			TOTAL DEPTH 5.0 ft			NORTHING 990,859			EASTING 2,098,708								
DRILL RIG/HAMMER EFF./DATE N/A						DRILL METHOD Hand Auger			HAMMER TYPE N/A								
DRILLER Pinter, D. G.			START DATE 07/01/15			COMP. DATE 07/01/15			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	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						ELEV. (ft)	
375															374.3	GROUND SURFACE	0.0
370												M			369.3	<b>RESIDUAL</b> ORANGE-BROWN, SANDY SILT WITH SOME ROCK FRAGMENTS	5.0
																Boring Terminated at Elevation 369.3 ft IN RESIDUAL (SANDY SILT)	

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# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 42342.1.1		TIP B-5166		COUNTY GRANVILLE		GEOLOGIST Oti, O. B.										
SITE DESCRIPTION BRIDGE NO. 138 ON -L- (SR 1300) OVER GRASSY CREEK							GROUND WTR (ft)									
BORING NO. B2		STATION 15+50		OFFSET 17 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 382.0 ft		TOTAL DEPTH 5.0 ft		NORTHING 991,008		EASTING 2,098,764										
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Hand Auger		HAMMER TYPE N/A										
DRILLER Pinter, D. G.		START DATE 07/01/15		COMP. DATE 07/01/15		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						ELEV. (ft)
385																
														382.0	GROUND SURFACE	0.0
380															ROADWAY EMBANKMENT ORANGE-BROWN, SILTY CLAY	
														377.0	Boring Terminated at Elevation 377.0 ft IN ROADWAY EMBANKMENT (SILTY CLAY)	5.0

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# GEOTECHNICAL BORING REPORT BORE LOG

WBS 42342.1.1			TIP B-5166			COUNTY GRANVILLE			GEOLOGIST Oti, O. B.						
SITE DESCRIPTION BRIDGE NO. 138 ON -L- (SR 1300) OVER GRASSY CREEK									GROUND WTR (ft)						
BORING NO. B3			STATION 15+50			OFFSET 40 ft RT			ALIGNMENT -L-						
COLLAR ELEV. 371.5 ft			TOTAL DEPTH 5.0 ft			NORTHING 991,007			EASTING 2,098,787						
DRILL RIG/HAMMER EFF./DATE N/A						DRILL METHOD Hand Auger			HAMMER TYPE N/A						
DRILLER Pinter, D. G.			START DATE 07/01/15			COMP. DATE 07/01/15			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					ELEV. (ft)
375															
370														371.5	GROUND SURFACE 0.0
											M			366.5	<b>RESIDUAL</b> ORANGE AND TAN-BROWN, SANDY SILT 5.0
															Boring Terminated at Elevation 366.5 ft IN RESIDUAL (SANDY SILT)

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# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 42342.1.1		TIP B-5166		COUNTY GRANVILLE		GEOLOGIST Oti, O. B.											
SITE DESCRIPTION BRIDGE NO. 138 ON -L- (SR 1300) OVER GRASSY CREEK							GROUND WTR (ft)										
BORING NO. B4		STATION 18+00		OFFSET 20 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 388.0 ft		TOTAL DEPTH 6.0 ft		NORTHING 991,258		EASTING 2,098,774											
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Hand Auger		HAMMER TYPE N/A											
DRILLER Pinter, D. G.		START DATE 07/01/15		COMP. DATE 07/01/15		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)		
390															388.0	GROUND SURFACE	0.0
385						.....	.....	.....	.....			M			382.0	RESIDUAL TAN-BROWN, SAPROLITIC, SANDY SILT	6.0
																Boring Terminated at Elevation 382.0 ft IN RESIDUAL (SANDY SILT)	

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# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 42342.1.1			TIP B-5166			COUNTY GRANVILLE			GEOLOGIST Oti, O. B.							
SITE DESCRIPTION BRIDGE NO. 138 ON -L- (SR 1300) OVER GRASSY CREEK									GROUND WTR (ft)							
BORING NO. B5			STATION 18+00			OFFSET 40 ft RT			ALIGNMENT -L-							
COLLAR ELEV. 399.5 ft			TOTAL DEPTH 10.0 ft			NORTHING 991,257			EASTING 2,098,794							
DRILL RIG/HAMMER EFF./DATE N/A						DRILL METHOD Hand Auger			HAMMER TYPE N/A							
DRILLER Pinter, D. G.			START DATE 07/01/15			COMP. DATE 07/01/15			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)	DEPTH (ft)		
400														399.5	GROUND SURFACE	0.0
395												M		392.5	RESIDUAL RED-BROWN, SILTY CLAY	7.0
390												M		389.5	ORANGE AND TAN-BROWN, SANDY SILT	10.0
														Boring Terminated at Elevation 389.5 ft IN RESIDUAL (SANDY SILT)		

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