

REFERENCE:

PROJECT: 17BP.8.R.75

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.8.R.75	1	11

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

**STRUCTURE
SUBSURFACE INVESTIGATION**

COUNTY RANDOLPH
PROJECT DESCRIPTION BRIDGE 45 ON SR 1350
(SUMMEY TOWN RD.) OVER JACKSON'S CREEK

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
I	TITLE SHEET
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PERSONNEL

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INVESTIGATED BY B. WORLEY, PG

DRAWN BY B. WORLEY, PG

CHECKED BY D. DEWEY, PE

SUBMITTED BY Summit Design and Engineering, PLLC

DATE OCTOBER, 2014

CAUTION NOTICE

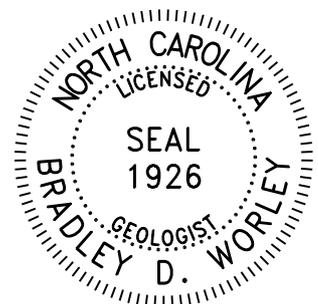
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING 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.

SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS. 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:

- 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.
- 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.



Bradley D. Worley
SIGNATURE

10-7-2014

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 (ASTM 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										THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.																																																																																							
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										MINERALOGICAL COMPOSITION																																																																																							
SYMBOL										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.																																																																																							
% PASSING #10 #40 #200										COMPRESSIBILITY																																																																																							
MATERIAL PASSING #40 LL PI										SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50																																																																																							
GROUP INDEX										PERCENTAGE OF MATERIAL																																																																																							
USUAL TYPES OF MAJOR MATERIALS										ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL																																																																																							
GEN. RATING AS SUBGRADE										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																																																																																							
CONSISTENCY OR DENSENESS										GROUND WATER																																																																																							
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/F.T ²)																																																																																																	
GENERALLY GRANULAR MATERIAL (NON-COHESIVE) VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE																																																																																																	
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BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)										RECOMMENDATION SYMBOLS																																																																																							
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SOIL MOISTURE - CORRELATION OF TERMS										ABBREVIATIONS																																																																																							
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										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 % - DRY UNIT WEIGHT CSE. - COARSE PMT - PRESSUREMETER TEST DMT - DILATOMETER TEST SAP. - SAPROLITIC DPT - DYNAMIC PENETRATION TEST SD. - SAND, SANDY e - VOID RATIO SL. - SILT, SILTY f - FINE SLI. - SLIGHTLY FOSS. - FOSSILIFEROUS TCR - TRICONE REFUSAL FRAC. - FRACTURED, FRACTURES w - MOISTURE CONTENT FRAGS. - FRAGMENTS v - VERY HI. - HIGHLY																																																																																							
LL LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE										EQUIPMENT USED ON SUBJECT PROJECT																																																																																							
PLASTIC RANGE (PI) PL PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE										<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">DRILL UNITS:</th> <th colspan="2">ADVANCING TOOLS:</th> <th colspan="2">HAMMER TYPE:</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td><td>CME-45C</td> <td><input type="checkbox"/></td><td>CLAY BITS</td> <td><input checked="" type="checkbox"/></td><td>AUTOMATIC</td> <td><input type="checkbox"/></td><td>MANUAL</td> </tr> <tr> <td><input type="checkbox"/></td><td>CME-55</td> <td><input type="checkbox"/></td><td>6' CONTINUOUS FLIGHT AUGER</td> <td colspan="4">CORE SIZE:</td> </tr> <tr> <td><input checked="" type="checkbox"/></td><td>CME-450</td> <td><input checked="" type="checkbox"/></td><td>6' HOLLOW AUGERS</td> <td><input type="checkbox"/></td><td>B</td> <td><input type="checkbox"/></td><td>H</td> </tr> <tr> <td><input type="checkbox"/></td><td>VANE SHEAR TEST</td> <td><input type="checkbox"/></td><td>HARD FACED FINGER BITS</td> <td colspan="4"><input checked="" type="checkbox"/> -N Q2</td> </tr> <tr> <td><input type="checkbox"/></td><td>PORTABLE HOIST</td> <td><input type="checkbox"/></td><td>TUNG.-CARBIDE INSERTS</td> <td colspan="4">HAND TOOLS:</td> </tr> <tr> <td><input type="checkbox"/></td><td></td> <td><input checked="" type="checkbox"/></td><td>CASING <input type="checkbox"/> W/ ADVANCER</td> <td><input type="checkbox"/></td><td>POST HOLE DIGGER</td> <td><input type="checkbox"/></td><td>HAND AUGER</td> </tr> <tr> <td><input type="checkbox"/></td><td></td> <td><input type="checkbox"/></td><td>TRICONE * STEEL TEETH</td> <td><input type="checkbox"/></td><td>SOUNDING ROD</td> <td><input type="checkbox"/></td><td>VANE SHEAR TEST</td> </tr> <tr> <td><input type="checkbox"/></td><td></td> <td><input type="checkbox"/></td><td>TRICONE * TUNG.-CARB.</td> <td><input type="checkbox"/></td><td></td> <td><input type="checkbox"/></td><td></td> </tr> <tr> <td><input type="checkbox"/></td><td></td> <td><input checked="" type="checkbox"/></td><td>CORE BIT</td> <td><input type="checkbox"/></td><td></td> <td><input type="checkbox"/></td><td></td> </tr> </tbody> </table>										DRILL UNITS:		ADVANCING TOOLS:		HAMMER TYPE:		<input type="checkbox"/>	CME-45C	<input type="checkbox"/>	CLAY BITS	<input checked="" type="checkbox"/>	AUTOMATIC	<input type="checkbox"/>	MANUAL	<input type="checkbox"/>	CME-55	<input type="checkbox"/>	6' CONTINUOUS FLIGHT AUGER	CORE SIZE:				<input checked="" type="checkbox"/>	CME-450	<input checked="" type="checkbox"/>	6' HOLLOW AUGERS	<input type="checkbox"/>	B	<input type="checkbox"/>	H	<input type="checkbox"/>	VANE SHEAR TEST	<input type="checkbox"/>	HARD FACED FINGER BITS	<input checked="" type="checkbox"/> -N Q2				<input type="checkbox"/>	PORTABLE HOIST	<input type="checkbox"/>	TUNG.-CARBIDE INSERTS	HAND TOOLS:				<input type="checkbox"/>		<input checked="" type="checkbox"/>	CASING <input type="checkbox"/> W/ ADVANCER	<input type="checkbox"/>	POST HOLE DIGGER	<input type="checkbox"/>	HAND AUGER	<input type="checkbox"/>		<input type="checkbox"/>	TRICONE * STEEL TEETH	<input type="checkbox"/>	SOUNDING ROD	<input type="checkbox"/>	VANE SHEAR TEST	<input type="checkbox"/>		<input type="checkbox"/>	TRICONE * TUNG.-CARB.	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input checked="" type="checkbox"/>	CORE BIT	<input type="checkbox"/>		<input type="checkbox"/>	
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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 (ROD) - 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 (SROD) - 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>	
WEATHERED ROCK (WR)		NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	
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.	
NON-CRYSTALLINE ROCK (ICR)		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.	
COASTAL PLAIN SEDIMENTARY ROCK (CP)		COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	
WEATHERING			
FRESH		ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	
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.	
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.	
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 > 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 < 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 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 FINGERNAIL.	
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: "SEE NOTE"	
		ELEVATION:	FEET
NOTES:			
Boring elevations determined using the TIN file. (750045_ls.tnl.tin)			



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.8.R.75	TIP 750045	COUNTY RANDOLPH	GEOLOGIST B. Worley, PG
SITE DESCRIPTION Bridge 45 on SR 1350 (Summey Town Rd) over Jackson's Creek			GROUND WTR (ft)
BORING NO. EB1-A	STATION 12+78	OFFSET 8 ft LT	ALIGNMENT -L-
COLLAR ELEV. 604.9 ft	TOTAL DEPTH 7.9 ft	NORTHING 716,899	EASTING 1,696,342
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 08/15/2013		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER L. Gonzalez-Castillo	START DATE 06/12/14	COMP. DATE 06/12/14	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					
605													604.9	GROUND SURFACE	0.0
600	601.3	3.6	3	4	4									ROADWAY EMBANKMENT Orange-brown, med. stiff to stiff, SILTY CLAY (A-7) w/ some fill cobbles	
	598.1	6.8											598.1	WEATHERED ROCK (felsic metavolcanic)	6.8
	597.1	7.8											597.1	CRYSTALLINE ROCK (felsic metavolcanic)	7.8
		60/0.1											597.0	Boring Terminated with Standard Penetration Test Refusal at Elevation 597.0 ft In Crystalline Rock (felsic metavolcanic)	7.9

NCDOT BORE SINGLE RANDOLPH_GEO_BRD0045_GINT.GPJ NC_DOT_GDT 6/20/14





NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.8.R.75	TIP 750045	COUNTY RANDOLPH	GEOLOGIST B. Worley, PG
SITE DESCRIPTION Bridge 45 on SR 1350 (Summey Town Rd) over Jackson's Creek			GROUND WTR (ft)
BORING NO. EB1-B	STATION 12+73	OFFSET 20 ft RT	ALIGNMENT -L-
COLLAR ELEV. 605.6 ft	TOTAL DEPTH 16.8 ft	NORTHING 716,899	EASTING 1,696,369
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 08/15/2013		DRILL METHOD NW Casing w/ Core	HAMMER TYPE Automatic
DRILLER L. Gonzalez-Castillo	START DATE 06/12/14	COMP. DATE 06/12/14	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						
610																
605														605.6	GROUND SURFACE	0.0
															ROADWAY EMBANKMENT Orange-brown, med. stiff, SILTY CLAY (A-7)	
600	602.3	3.3	3	4	4								M			
	597.3	8.3	2	33	45								M	598.1	RESIDUAL Dark gray-green, hard, silty SANDY CLAY (A-6) w/ some small crystalline rock fragments	7.5
595	593.8	11.8												594.1		11.5
															CRYSTALLINE ROCK (felsic metavolcanic)	
590														588.8		16.8
															Boring Terminated at Elevation 588.8 ft In Crystalline Rock (felsic metavolcanic)	

NCDOT BORE SINGLE RANDOLPH_GEO_BRD0045_GINT.GPJ NC_DOT_GDT 6/20/14





NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

WBS 17BP.8.R.75			TIP 750045			COUNTY RANDOLPH			GEOLOGIST B. Worley, PG		
SITE DESCRIPTION Bridge 45 on SR 1350 (Summey Town Rd) over Jackson's Creek										GROUND WTR (ft)	
BORING NO. EB1-B			STATION 12+73			OFFSET 20 ft RT			ALIGNMENT -L-		
COLLAR ELEV. 605.6 ft			TOTAL DEPTH 16.8 ft			NORTHING 716,899			EASTING 1,696,369		
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 08/15/2013						DRILL METHOD NW Casing w/ Core			HAMMER TYPE Automatic		
DRILLER L. Gonzalez-Castillo			START DATE 06/12/14			COMP. DATE 06/12/14			SURFACE WATER DEPTH N/A		
CORE SIZE N/A			TOTAL RUN 5.0 ft								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %	REC. (ft) %	RQD (ft) %			
593.8	593.8	11.8	5.0	N=60/0.0 2:25/1.0 2:31/1.0 3:09/1.0 3:01/1.0 3:26/1.0	(4.5) 90%	(4.1) 82%				Begin Coring @ 11.8 ft CRYSTALLINE ROCK Green-gray, fresh, hard, close-fractured, felsic metavolcanic	
590	588.8	16.8								588.8	16.8
										Boring Terminated at Elevation 588.8 ft In Crystalline Rock (felsic metavolcanic)	

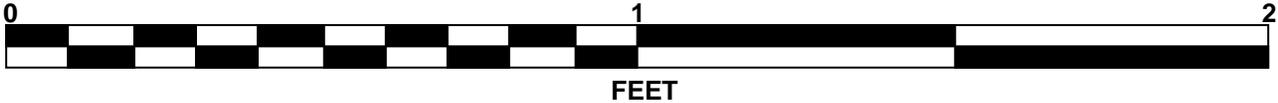
NCDOT CORE SINGLE RANDOLPH_GEO_BRDG0045_GINT.GPJ_NC_DOT.GDT 6/20/14



CORE PHOTOGRAPHS

EB1-B

BOX 1: 11.8 - 16.8 FEET





NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.8.R.75	TIP 750045	COUNTY RANDOLPH	GEOLOGIST B. Worley, PG
SITE DESCRIPTION Bridge 45 on SR 1350 (Summey Town Rd) over Jackson's Creek			GROUND WTR (ft)
BORING NO. EB2-A	STATION 13+28	OFFSET 4 ft LT	ALIGNMENT -L-
COLLAR ELEV. 605.1 ft	TOTAL DEPTH 16.8 ft	NORTHING 716,947	EASTING 1,696,357
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 08/15/2013		DRILL METHOD NW Casing w/ Advancer	HAMMER TYPE Automatic
DRILLER L. Gonzalez-Castillo	START DATE 06/11/14	COMP. DATE 06/11/14	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)
610																
605														605.1	GROUND SURFACE	0.0
600	600.9	4.2	1	1	2										ROADWAY EMBANKMENT Orange-tan, soft, CLAYEY SILT (A-5)	
595	596.6 595.8	8.5 9.3	100/0.3 60/0.1											596.6 595.8	WEATHERED ROCK (felsic metavolcanic)	8.5 9.3
590															CRYSTALLINE ROCK (felsic metavolcanic)	
														588.3	Boring Terminated at Elevation 588.3 ft In Crystalline Rock (felsic metavolcanic)	16.8

NCDOT BORE SINGLE RANDOLPH_GEO_BRD0045_GINT.GPJ NC_DOT_GDT 6/20/14





NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

WBS 17BP.8.R.75				TIP 750045		COUNTY RANDOLPH			GEOLOGIST B. Worley, PG			
SITE DESCRIPTION Bridge 45 on SR 1350 (Summey Town Rd) over Jackson's Creek										GROUND WTR (ft)		
BORING NO. EB2-A				STATION 13+28		OFFSET 4 ft LT		ALIGNMENT -L-			0 HR. FIAD	
COLLAR ELEV. 605.1 ft				TOTAL DEPTH 16.8 ft		NORTHING 716,947		EASTING 1,696,357			24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 08/15/2013						DRILL METHOD NW Casing w/ Advancer			HAMMER TYPE Automatic			
DRILLER L. Gonzalez-Castillo				START DATE 06/11/14		COMP. DATE 06/11/14		SURFACE WATER DEPTH N/A				
CORE SIZE N/A				TOTAL RUN 7.5 ft								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (ft) %	RQD (ft) %	REC. (ft) %	RQD (ft) %				
595.8										Begin Coring @ 9.3 ft		
595	595.8	9.3	2.5	2:05/1.0	(2.5)	(1.5)				595.8	9.3	
	593.3	11.8		N=60/0.7 2:05/1.0	100%	60%						
			5.0	2:35/1.0 1:12/0.5	100%	14%						
590				2:08/1.0 2:17/1.0 2:16/1.0 1:51/1.0 1:45/1.0								
	588.3	16.8								588.3	16.8	
Boring Terminated at Elevation 588.3 ft In Crystalline Rock (felsic metavolcanic)												

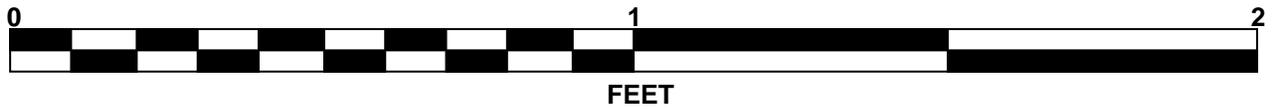
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CORE PHOTOGRAPHS

EB2-A

BOX 1: 9.3 - 16.8 FEET





NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.8.R.75	TIP 750045	COUNTY RANDOLPH	GEOLOGIST B. Worley, PG
SITE DESCRIPTION Bridge 45 on SR 1350 (Summey Town Rd) over Jackson's Creek			GROUND WTR (ft)
BORING NO. EB2-B	STATION 13+21	OFFSET 30 ft RT	ALIGNMENT -L-
COLLAR ELEV. 605.6 ft	TOTAL DEPTH 11.3 ft	NORTHING 716,934	EASTING 1,696,388
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 08/15/2013		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER L. Gonzalez-Castillo	START DATE 06/11/14	COMP. DATE 06/11/14	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					
610															
605														605.6	0.0
600	601.8	3.8	5	2	1										
595	596.8	8.8	WOH	WOH	60									595.8	9.8
	594.3	11.3	60/0.0											594.3	11.3



NCDOT BORE SINGLE RANDOLPH_GEO_BRD0045_GINT.GPJ NC_DOT_GDT 6/20/14