

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.11.R.89	1	8

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 17BP.11.R.89 F.A. PROJ. N/A
COUNTY SURRY
PROJECT DESCRIPTION BRIDGE NO. 213 ON SR 1600 (LUMBER
PLANT ROAD) OVER GULLY CREEK

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2-2A	LEGEND
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PERSONNEL

W. FELDER

W. WHICHARD

C. WEBB

INVESTIGATED BY D. GOODNIGHT

CHECKED BY T. WELLS

SUBMITTED BY KLEINFELDER

DATE OCTOBER 2013

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.

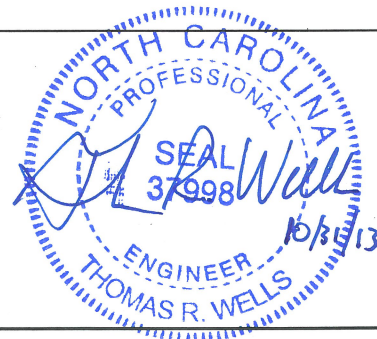
SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA, AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS 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 DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION 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.

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

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

DRAWN BY: W. FELDER

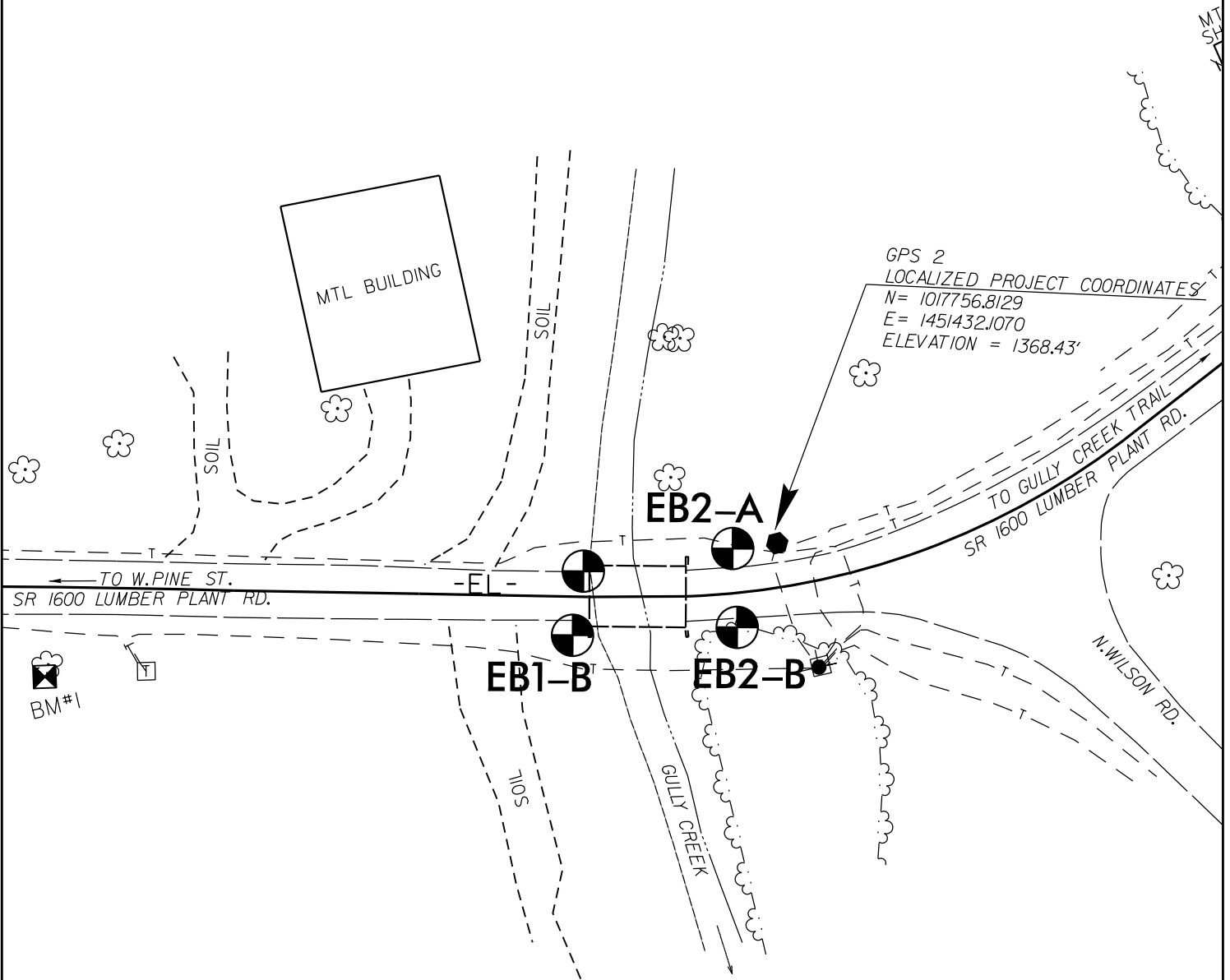
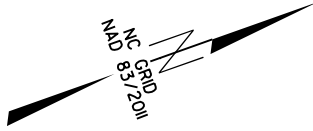


NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION									
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS									
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.										THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS ANGULAR , SUBANGULAR , SUBROUNDED , OR ROUNDED .									
SOIL LEGEND AND AASHTO CLASSIFICATION										MINERALOGICAL COMPOSITION									
GENERAL CLASS. GRANULAR MATERIALS ($\leq 35\%$ PASSING #200) SILT-CLAY MATERIALS ($> 35\%$ PASSING #200) ORGANIC MATERIALS										COMPRESSIBILITY									
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										SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50									
SYMBOL										PERCENTAGE OF MATERIAL									
% PASSING # 10 # 40 # 200										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									
LIQUID LIMIT PLASTIC INDEX										GROUP INDEX									
USUAL TYPES OF MAJOR MATERIALS										GEN. RATING AS A SUBGRADE									
EXCELLENT TO GOOD										FAIR TO POOR									
PI OF A-7-5 SUBGROUP IS $\leq$ LL - 30 ; PI OF A-7-6 SUBGROUP IS $>$ LL - 30										GROUND WATER									
WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING										STATIC WATER LEVEL AFTER 24 HOURS									
PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA										SPRING OR SEEP									
CONSISTENCY OR DENSENESS										MISCELLANEOUS SYMBOLS									
PRIMARY SOIL TYPE										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION									
COMPACTNESS OR CONSISTENCY										SOIL SYMBOL									
RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)										ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT									
RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)										INFERRED SOIL BOUNDARY									
N/A										INFERRED ROCK LINE									
ALLUVIAL SOIL BOUNDARY										DIP & DIP DIRECTION OF ROCK STRUCTURES									
SPT REFUSAL										SPT TEST BORING									
AUGER BORING										CORE BORING									
MONITORING WELL										PIEZOMETER INSTALLATION									
SLOPE INDICATOR INSTALLATION										CONE PENETROMETER TEST									
SOUNDING ROD										ABBREVIATIONS									
AR - AUGER REFUSAL										MED. - MEDIUM									
BT - BORING TERMINATED										MICA - MICACEOUS									
CL - CLAY										MOD. - MODERATELY									
CPT - CONE PENETRATION TEST										NP - NON PLASTIC									
COARSE										ORG. - ORGANIC									
DMT - DILATOMETER TEST										PMT - PRESSUREMETER TEST									
OPT - DYNAMIC PENETRATION TEST										SAP. - SAPROLITIC									
V - VOID RATIO										SD. - SAND, SANDY									
F - FINE										SL. - SILT, SILTY									
FOSS. - FOSSILIFEROUS										SLI. - SLIGHTLY									
FRAC. - FRACTURED, FRACTURES										TCR - TRICONE REFUSAL									
FRAGS. - FRAGMENTS										W - MOISTURE CONTENT									
HI. - HIGHLY										V - VERY									
SAMPLE ABBREVIATIONS										EQUIPMENT USED ON SUBJECT PROJECT									
S - BULK										DRILL UNITS:									
SS - SPLIT SPOON										ADVANCING TOOLS:									
ST - SHELBY TUBE										HAMMER TYPE:									
RS - ROCK										CORE SIZE:									
RT - RECOMPACTED TRIAXIAL										H - B									
CBR - CALIFORNIA BEARING RATIO										N									
H										H									
PLASTICITY										HAND TOOLS:									
PLASTICITY INDEX (PI)										POST HOLE DIGGER									
DRY STRENGTH										HAND AUGER									
VERY LOW										SOUNDING ROD									
SLIGHT										VANE SHEAR TEST									
MEDIUM										COLOR									
HIGH										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.									

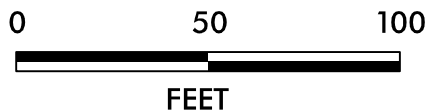
		PROJECT REFERENCE NO. 17BP.II.R.89	SHEET NO. 2A
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS			
ROCK DESCRIPTION		TERMS AND DEFINITIONS	
HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:		<u>ALLUVIUM (ALLUV.)</u> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <u>AQUIFER</u> - A WATER BEARING FORMATION OR STRATA. <u>ARENACEOUS</u> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. <u>ARGILLACEOUS</u> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. <u>ARTESIAN</u> - 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. <u>CALCAREOUS (CALC.)</u> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <u>COLLUVIUM</u> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. <u>CORE RECOVERY (REC.)</u> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <u>DIKE</u> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. <u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. <u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. <u>FAULT</u> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. <u>FISSILE</u> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. <u>FLOAT</u> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. <u>FLOOD PLAIN (FP)</u> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. <u>FORMATION (FM.)</u> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. <u>JOINT</u> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. <u>LEDGE</u> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. <u>LENS</u> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. <u>MOTTLED (MOT.)</u> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. <u>PERCHED WATER</u> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. <u>RESIDUAL (RES.) SOIL</u> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. <u>ROCK QUALITY DESIGNATION (RQD)</u> - 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. <u>SAPROLITE (SAP.)</u> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. <u>SILL</u> - 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. <u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. <u>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</u> - 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. <u>STRATA CORE RECOVERY (SRC.)</u> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. <u>STRATA ROCK QUALITY DESIGNATION (SRQD)</u> - 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. <u>TOPSOIL (TS.)</u> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.	
WEATHERED ROCK (WR) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)			
WEATHERING			
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.		
VERY SLIGHT (V SL.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.		
SLIGHT (SL.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.		
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.		
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i>		
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i>		
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i>		
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		
ROCK HARDNESS			
VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.		
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.		
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.		
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 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 FEET	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 THE 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: GPS 2 (1,017,757 FT N, 1,451,432 FT E)	
		ELEVATION: 1368.43 FT.	
NOTES: FIAD - FILLED IN AFTER DRILLING			

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.11.R.89	3	8



BRIDGE NO. 213

SCALE: 1" = 50'





SHEET 4

NC DOT BORE SINGLE 17BP.11.R.89 GEO BRDG 213 GINT.GPJ NC_DOT.GDT 10/31/13



WBS 17BP.11.R.89						TIP N/A				COUNTY SURRY				GEOLOGIST Goodnight, D. J.					
SITE DESCRIPTION Bridge No. 213 on SR 1600 (Lumber Plant Road) over Gully Creek														GROUND WTR (ft)					
BORING NO. EB1-B						STATION N/A				OFFSET N/A				ALIGNMENT N/A				0 HR. 5.3	
COLLAR ELEV. 1,369.4 ft						TOTAL DEPTH 42.5 ft				NORTHING 1,017,686				EASTING 1,451,438				24 HR. 6.0	
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 80% 02/15/2013										DRILL METHOD H.S. Augers				HAMMER TYPE Automatic					
DRILLER Whichard, S. W.						START DATE 09/12/13				COMP. DATE 09/12/13				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)				
1370																1,369.4	GROUND SURFACE	0.0	
	1,368.4	1.0	3	8	13									D		1,366.4	ROADWAY EMBANKMENT Brown, Silty, Coarse to Fine SAND with Some Gravel and Cobbles	3.0	
1365	1,365.9	3.5	20	17	15											1,364.4	ALLUVIAL Tan and Brown, Fine to Coarse SAND with Quartz Cobbles	5.0	
	1,363.4	6.0	4	2	2											1,361.4	RESIDUAL Tan-Brown, Micaceous, Silty, Coarse to Fine SAND with Trace Quartz Rock Fragments	8.0	
1360	1,360.9	8.5	2	3	3									M			Tan, Micaceous, Coarse to Fine Sandy SILT		
	1,355.9	13.5	5	4	6									M					
1355	1,350.9	18.5	4	7	10									M					
	1,345.9	23.5	5	11	19									M		1,347.4	Tan, Micaceous, Silty, Coarse to Fine SAND	22.0	
1345	1,340.9	28.5	23	45	55/0.2											1,341.4	WEATHERED ROCK Tan and Brown MICA SCHIST	28.0	
1340	1,335.9	33.5	9	91/0.4															
	1,330.9	38.5	100/0.3													1,332.4	Tan and White GNEISS	37.0	
1330	1,326.9	42.5	60/0.0													1,326.9	Boring Terminated with Standard Penetration Test Refusal at Elevation 1,326.9 ft on Crystalline Rock: GNEISS	42.5	
Notes: Topsoil (0.0 to 0.3 feet)																			



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

SHEET 6

WBS 17BP.11.R.89			TIP N/A		COUNTY SURRY		GEOLOGIST Goodnight, D. J.							
SITE DESCRIPTION Bridge No. 213 on SR 1600 (Lumber Plant Road) over Gully Creek							GROUND WTR (ft)							
BORING NO. EB2-A		STATION N/A		OFFSET N/A		ALIGNMENT N/A		0 HR. 11.0						
COLLAR ELEV. 1,368.7 ft		TOTAL DEPTH 46.7 ft		NORTHING 1,017,743		EASTING 1,451,429		24 HR. FIAD						
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 80% 02/15/2013				DRILL METHOD H.S. Augers			HAMMER TYPE Automatic							
DRILLER Whichard, S. W.		START DATE 09/13/13		COMP. DATE 09/13/13		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)
1370														
	1,367.7	1.0	7	17	7								1,368.7	0.0
1365	1,365.2	3.5	11	13	20							M	1,365.7	3.0
	1,362.7	6.0	2	3	2							D	1,363.2	5.5
1360	1,360.2	8.5	4	4	5							M		
1355	1,355.2	13.5	4	7	8									
1350	1,350.2	18.5	11	21	23							M	1,351.7	17.0
1345	1,345.2	23.5	6	8	17							M	1,346.7	22.0
1340	1,340.2	28.5	19	28	52							M	1,341.7	27.0
1335	1,335.2	33.5	11	16	22							M		
1330	1,330.2	38.5	17	27	43							M		
1325	1,325.2	43.5	30	70/0.3									1,326.7	42.0
	1,322.0	46.7	60/0.0										1,322.0	46.7
											</			

NCDOT BORE SINGLE 17BP.11.R.89_GEO_BRDG_213_GINT.GPJ NC_DOT.GDT 10/31/13



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

SHEET 7

WBS 17BP.11.R.89		TIP N/A		COUNTY SURRY		GEOLOGIST Goodnight, D. J.						
SITE DESCRIPTION Bridge No. 213 on SR 1600 (Lumber Plant Road) over Gully Creek						GROUND WTR (ft)						
BORING NO. EB2-B		STATION N/A		OFFSET N/A		ALIGNMENT N/A						
COLLAR ELEV. 1,369.1 ft		TOTAL DEPTH 43.5 ft		NORTHING 1,017,736		EASTING 1,451,453						
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 80% 02/15/2013						DRILL METHOD H.S. Augers						
DRILLER Whichard, S. W.						HAMMER TYPE Automatic						
START DATE 09/12/13		COMP. DATE 09/12/13		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	MOI	ELEV. (ft) DEPTH (ft)
1370												1,369.1 GROUND SURFACE 0.0
	1,368.1	1.0	3	2	2						M	ALLUVIAL
1365	1,365.6	3.5	12	35	14						D	Tan, Silty, Fine SAND with Some Cobbles and Boulders 3.0
	1,363.1	6.0	15	5	5							Tan and Brown, Silty, Fine to Coarse SAND with Some Quartz Cobbles and Boulders
1360	1,360.6	8.5	5	3	4						M	1,362.6 RESIDUAL 6.5
												Tan, Micaceous, Fine SANDY SILT with Trace Rock Fragments
1355	1,355.6	13.5	7	6	9						M	
1350	1,350.6	18.5	12	17	15						M	1,352.1 Tan and Brown, Micaceous, Silty, Coarse to Fine SAND 17.0
1345	1,345.6	23.5	18	29	31						M	
1340	1,340.6	28.5	23	32	33						M	
1335	1,335.6	33.5	12	24	33						M	1,337.1 Black and Tan, Micaceous, Coarse to Fine Sandy SILT 32.0
1330	1,330.6	38.5	13	26	24						M	
	1,325.6	43.5	60/0.0									1,328.1 WEATHERED ROCK 41.0
												1,325.6 Tan and Brown SCHIST 43.5
												Boring Terminated with Standard Penetration Test Refusal at Elevation 1,325.6 ft on Crystalline Rock: SCHIST
												Notes:
												Topsoil (0.0 to 0.3 feet)
												The 49 N-Value in the Roadway Embankment was influenced by the presence of Cobbles and Boulders.

NCDOT BORE SINGLE 17BP.11.R.89 GEO BRDG 213 GINT.GPJ NC_DOT.GDT 10/31/13