

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.1.R.28 (650038)	1	11

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

**STRUCTURE
SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 17BP.1.R.28 F.A. PROJ. NA
 COUNTY NORTHAMPTON
 PROJECT DESCRIPTION BRIDGE NO. 650038 ON SR 1536 OVER BRANCH OF
 POTECASI CREEK

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PERSONNEL

S. CROCKETT

J. HVOZDIK

TRIGON LLC

INVESTIGATED BY D. CARR

CHECKED BY P. ZHANG

SUBMITTED BY P. ZHANG

DATE SEPTEMBER 2012

CAUTION NOTICE

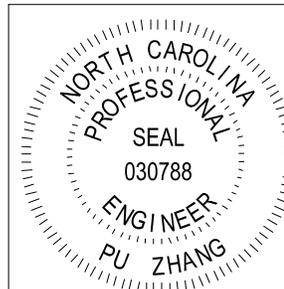
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 THIS 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.



[Signature]
9-10-12
SIGNATURE

DRAWN BY: S. CROCKETT

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, MOIST 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.
	ANGULARITY OF GRAINS 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 (≤ 35% PASSING #200)				SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.			
GROUP CLASS.	A-1	A-3	A-2		A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5				
SYMBOL														
% PASSING	# 10 # 40 # 200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX 35 MX	35 MX 35 MX	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT	
LIQUID LIMIT PLASTIC INDEX	6 MX	NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 11 MN	40 MX 10 MX	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS	
GROUP INDEX	0	0	0	0	4 MX	8 MX	12 MX	16 MX	No MX	No MX				
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL, AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS	CLAYEY SOILS								
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD				FAIR TO POOR				FAIR TO POOR	POOR	UNSATURABLE			
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30													COMPRESSIBILITY SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 LIQUID LIMIT EQUAL TO 31-50 LIQUID LIMIT GREATER THAN 50	

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 ²)		WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING								
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A		STATIC WATER LEVEL AFTER 24 HOURS								
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4		PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA								
					SPRING OR SEEP								
TEXTURE OR GRAIN SIZE				MISCELLANEOUS SYMBOLS									
U.S. STD. SIEVE SIZE OPENING (MM)	4 4.76	10 2.00	40 0.42	60 0.25	200 0.075	270 0.053			ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION		TEST BORING		TEST BORING W/ CORE
BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE, SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)			SOIL SYMBOL		AUGER BORING		SPT N-VALUE
GRAIN SIZE	MM IN.	305 12	75 3	2.0	0.25	0.05 0.005			ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT		CORE BORING		SPT REFUSAL
					INFERRED SOIL BOUNDARY					MONITORING WELL		PIEZOMETER INSTALLATION	
					INFERRED ROCK LINE					SLOPE INDICATOR INSTALLATION		CONE PENETROMETER TEST	
					ALLUVIAL SOIL BOUNDARY					SOUNDING ROD			
					DIP & DIP DIRECTION OF ROCK STRUCTURES								

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				
LL - LIQUID LIMIT PL - PLASTIC LIMIT OM - OPTIMUM MOISTURE SL - SHRINKAGE LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE	BT - BORING TERMINATED	MICA - MICACEOUS	WEA. - WEATHERED				
	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	CL - CLAY	MOD. - MODERATELY	γ _u - UNIT WEIGHT				
	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE	CPT - CONE PENETRATION TEST	NP - NON PLASTIC	γ _d - DRY UNIT WEIGHT				
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	CSE - COARSE	ORG. - ORGANIC	SAMPLE ABBREVIATIONS				
			DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST	S - BULK				
			DPT - DYNAMIC PENETRATION TEST	SAP. - SAPROLITIC	SS - SPLIT SPOON				
			e - VOID RATIO	SD. - SAND, SANDY	ST - SHELBY TUBE				
			F - FINE	SL. - SILT, SILTY	RS - ROCK				
			FOSS. - FOSSILIFEROUS	SLI. - SLIGHTLY	RT - RECOMPACTED TRIAXIAL				
			FRAC. - FRACTURED, FRACTURES	TCR - TRICONE REFUSAL	CBR - CALIFORNIA BEARING RATIO				
			FRAGS. - FRAGMENTS	w - MOISTURE CONTENT					
			HI. - HIGHLY	v - VERY					

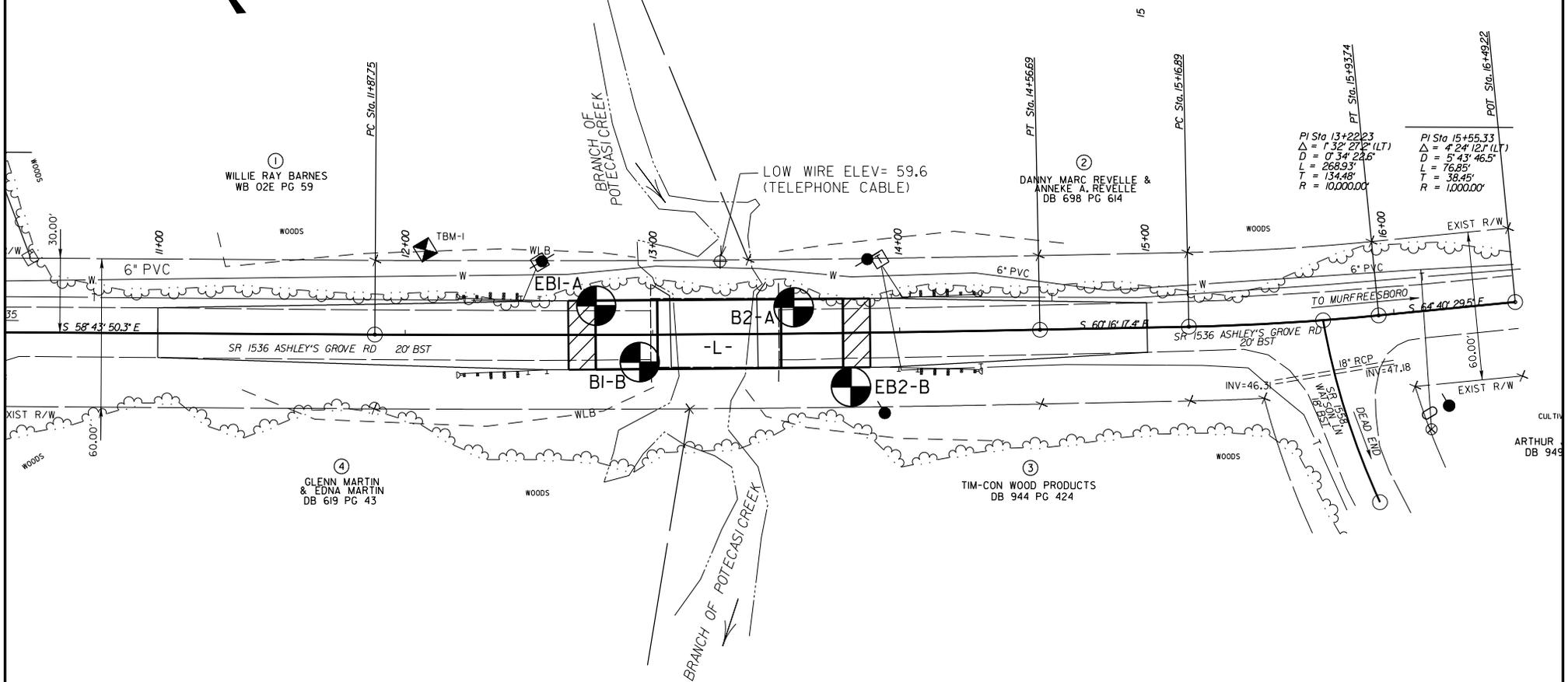
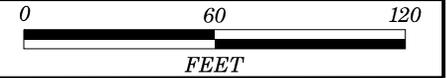
EQUIPMENT USED ON SUBJECT PROJECT		
DRILL UNITS: <input type="checkbox"/> MOBILE B-____ <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST <input checked="" type="checkbox"/> CME-55	ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG.-CARBIDE INSERTS <input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE _____ ' STEEL TEETH <input type="checkbox"/> TRICONE _____ ' TUNG.-CARB. <input type="checkbox"/> CORE BIT <input checked="" type="checkbox"/> MUD ROTARY	HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL CORE SIZE: <input type="checkbox"/> -B____ <input type="checkbox"/> -N____ <input type="checkbox"/> -H____ HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST

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**

ROCK DESCRIPTION		TERMS AND DEFINITIONS	
<p>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:</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, 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 (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. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>	
<p>WEATHERED ROCK (WR)</p> 	<p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p>		
<p>CRYSTALLINE ROCK (CR)</p> 	<p>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)</p> 	<p>FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLITE, SLATE, SANDSTONE, ETC.</p>		
<p>COASTAL PLAIN SEDIMENTARY ROCK (CP)</p> 	<p>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. <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 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 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.		
<p>BENCH MARK: TBM-1, RAILROAD SPIKE IN BASE OF 12" SWEET GUM, STA. 12+08, 34' LEFT, N 960513, E 2526949 ELEVATION: 49.71 FT.</p>			
<p>NOTES: ADDITIONAL ABBREVIATIONS: CASREF - CASING REFUSAL FIAD - BORING FILLED IN AFTER DRILLING CV - CAVED</p>			

SITE PLAN



CULT. TN
ARTHUR
DB 943



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.1.R.28	TIP 650038	COUNTY NORTHAMPTON	GEOLOGIST J. HVOZDIK
SITE DESCRIPTION BRIDGE NO. 650038 OVER BRANCH OF POTECASI CREEK			GROUND WTR (ft)
BORING NO. EB1-A	STATION 12+77	OFFSET 12 ft LT	ALIGNMENT -L-
COLLAR ELEV. 51.5 ft	TOTAL DEPTH 80.0 ft	NORTHING 960,458	EASTING 2,526,997
DRILL RIG/HAMMER EFF./DATE CME-55		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER WHICHARD, W.	START DATE 08/16/12	COMP. DATE 08/16/12	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)		
55															51.5	GROUND SURFACE	0.0
50	50.5	1.0	3	4	5											ROADWAY EMBANKMENT GRAY, BROWN, AND ORANGE, LOOSE, CLAYEY SAND (A-2-6) W/ TRACE ORGANICS AND GRAVEL	5.5
	48.0	3.5	4	3	5												
45	45.5	6.0	12	9	3											ALLUVIAL GRAY, MED. DENSE, SILTY SAND (A-2-4) W/ TRACE ORGANICS AND GRAVEL	8.0
	43.0	8.5	WOH	WOH	WOH											ALLUVIAL GRAY, V. LOOSE, CLAYEY SAND (A-2-6) W/ TRACE ORGANICS	12.0
40																COASTAL PLAIN LIGHT GRAY AND DARK BROWN, SOFT TO STIFF, CLAYEY SILT (A-5) W/ SHELL FRAGMENTS	
	38.0	13.5	2	1	2												
35																	
	33.0	18.5	2	2	3												
30																	
	28.0	23.5	3	3	4												
25																	
	23.0	28.5	3	3	7												
20																	
	18.0	33.5	2	2	4											COASTAL PLAIN DARK GRAY, MED. STIFF, SANDY CLAY (A-6) W/ SHELL FRAGMENTS	32.0
15																	
	13.0	38.5	4	5	4											COASTAL PLAIN DARK GRAY, LOOSE, CLAYEY SILTY SAND (A-2-4) W/ SHELL FRAGMENTS	37.0
10																	
	8.0	43.5	4	4	5											COASTAL PLAIN DARK GRAY, STIFF, SANDY CLAY (A-6)	42.0
5																	
	3.0	48.5	8	7	6											COASTAL PLAIN DARK GRAY, MED. DENSE TO V. DENSE, CLAYEY SAND (A-2-6)	47.0
0																	
	-2.0	53.5	9	29	27												
-5																	
	-7.0	58.5	6	6	10											COASTAL PLAIN LIGHT BLUE AND GRAY, V. STIFF, SILTY SANDY CLAY (A-6), MICACEOUS	56.0
-10																	
	-12.0	63.5	5	7	9											COASTAL PLAIN LIGHT GRAY, MED. DENSE, SILTY SAND (A-2-4), MICACEOUS	63.0
-15																	
	-17.0	68.5	10	16	14												
-20																	
	-22.0	73.5	4	10	12											COASTAL PLAIN LIGHT GRAY, V. STIFF TO HARD, SANDY CLAY (A-6)	73.0
-25																	

NCDOT BORE SINGLE NORTHAMPTON GEO_BRDG0038.GPJ NC_DOT_GDT_8/29/12



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 17BP.1.R.28			TIP 650038			COUNTY NORTHAMPTON			GEOLOGIST J. HVOZDIK							
SITE DESCRIPTION BRIDGE NO. 650038 OVER BRANCH OF POTECASI CREEK										GROUND WTR (ft)						
BORING NO. EB1-A			STATION 12+77			OFFSET 12 ft LT			ALIGNMENT -L-							
COLLAR ELEV. 51.5 ft			TOTAL DEPTH 80.0 ft			NORTHING 960,458			EASTING 2,526,997							
DRILL RIG/HAMMER EFF./DATE CME-55						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic							
DRILLER WHICHARD, W.			START DATE 08/16/12			COMP. DATE 08/16/12			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)
-25																
						Match Line										
	-27.0	78.5	11	13	19						SS-18	W			-28.5	80.0
															COASTAL PLAIN LIGHT GRAY, V. STIFF TO HARD, SANDY CLAY (A-6) (continued) Boring Terminated at Elevation -28.5 ft BY BT IN CP: SANDY CLAY	



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 17BP.1.R.28	TIP 650038	COUNTY NORTHAMPTON	GEOLOGIST S. CROCKETT
SITE DESCRIPTION BRIDGE NO. 650038 OVER BRANCH OF POTECASI CREEK			GROUND WTR (ft)
BORING NO. B1-B	STATION 12+95	OFFSET 11 ft RT	ALIGNMENT -L-
COLLAR ELEV. 51.5 ft	TOTAL DEPTH 80.0 ft	NORTHING 960,429	EASTING 2,527,000
DRILL RIG/HAMMER EFF./DATE CME-55		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER WHICHARD, W.	START DATE 08/21/12	COMP. DATE 08/21/12	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					

-25

Match Line

-27.0	78.5	9	13	23	36	SS-18	W	-28.5	80.0
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COASTAL PLAIN
 LIGHT GRAY, STIFF TO HARD, SANDY CLAY (A-6) (continued)
 Boring Terminated at Elevation -28.5 ft BY BT IN CP: SANDY CLAY

NCDOT BORE SINGLE NORTHAMPTON GEO_BRDG0038.GPJ NC_DOT.GDT 8/29/12



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.1.R.28	TIP 650038	COUNTY NORTHAMPTON	GEOLOGIST J. HVOZDIK
SITE DESCRIPTION BRIDGE NO. 650038 OVER BRANCH OF POTECASI CREEK			GROUND WTR (ft)
BORING NO. B2-A	STATION 13+57	OFFSET 11 ft LT	ALIGNMENT -L-
COLLAR ELEV. 51.5 ft	TOTAL DEPTH 80.0 ft	NORTHING 960,416	EASTING 2,527,065
DRILL RIG/HAMMER EFF./DATE CME-55		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER WHICHARD, W.	START DATE 08/17/12	COMP. DATE 08/17/12	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				
55													GROUND SURFACE	0.0
50	50.5	1.0	3	2	7						SS-1	M	ROADWAY EMBANKMENT ORANGE AND BROWN, LOOSE, SILTY SAND (A-2-4) W/ TRACE ORGANICS AND GRAVEL	
	48.0	3.5	2	2	2						SS-2	M		
45	45.5	6.0	17	24	30						SS-3	W	ALLUVIAL LIGHT BROWN AND GRAY, V. DENSE TO LOOSE, SILTY SAND (A-2-4) W/ GRAVEL	6.0
	43.0	8.5	6	3	1						SS-4	W	COASTAL PLAIN DARK GRAY, SOFT TO STIFF, CLAYEY SILT (A-5) W/ SHELL FRAGMENTS	9.0
40	38.0	13.5	1	1	1						SS-5	W		
35	33.0	18.5	2	2	4						SS-6	W		
30	28.0	23.5	2	2	4						SS-7	W		
25	23.0	28.5	2	6	7						SS-8	W		
20	18.0	33.5	2	6	13						SS-9	W	COASTAL PLAIN GREEN AND GRAY, V. STIFF, SANDY CLAY (A-6) W/ SHELL FRAGMENTS	32.0
15	13.0	38.5	6	6	7						SS-10	W	COASTAL PLAIN LIGHT GRAY, MED. DENSE, SILTY SAND (A-2-4) W/ SHELL FRAGMENTS	34.5
10	8.0	43.5	3	3	6						SS-11	W	COASTAL PLAIN GREEN AND GRAY, STIFF, SANDY CLAY (A-6)	40.5
5	3.0	48.5	9	7	4						SS-12	W	COASTAL PLAIN GREEN AND GRAY, MED. DENSE, CLAYEY SAND (A-2-6) W/ GRAVEL	46.0
0	-2.0	53.5	5	7	8						SS-13	W	COASTAL PLAIN BLUE AND GRAY, STIFF TO V. STIFF, SANDY CLAY (A-6), MICACEOUS	52.5
-5	-7.0	58.5	8	10	12						SS-14	W		
-10	-12.0	63.5	10	13	15						SS-15	W	COASTAL PLAIN LIGHT GRAY, MED. DENSE TO DENSE, SILTY SAND (A-2-4), MICACEOUS	62.0
-15	-17.0	68.5	17	22	22						SS-16	W		
-20	-22.0	73.5	6	9	12						SS-17	W	COASTAL PLAIN GREEN, BLUE, AND GRAY, V. STIFF, SANDY CLAY (A-6)	72.0

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NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 17BP.1.R.28		TIP 650038		COUNTY NORTHAMPTON		GEOLOGIST J. HVOZDIK									
SITE DESCRIPTION BRIDGE NO. 650038 OVER BRANCH OF POTECASI CREEK							GROUND WTR (ft)								
BORING NO. B2-A		STATION 13+57		OFFSET 11 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 51.5 ft		TOTAL DEPTH 80.0 ft		NORTHING 960,416		EASTING 2,527,065									
DRILL RIG/HAMMER EFF./DATE CME-55				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER WHICHARD, W.		START DATE 08/17/12		COMP. DATE 08/17/12		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					
-25						Match Line									
	-27.0	78.5	9	12	17	•	•	•	•	•	SS-18	W	/ / / / /	COASTAL PLAIN GREEN, BLUE, AND GRAY, V. STIFF, SANDY CLAY (A-6) (continued)	80.0
						Boring Terminated at Elevation -28.5 ft BY BT IN CP: SANDY CLAY									



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BORELOG REPORT

WBS 17BP.1.R.28	TIP 650038	COUNTY NORTHAMPTON	GEOLOGIST S. CROCKETT
SITE DESCRIPTION BRIDGE NO. 650038 OVER BRANCH OF POTECASI CREEK			GROUND WTR (ft)
BORING NO. EB2-B	STATION 13+80	OFFSET 22 ft RT	ALIGNMENT -L-
COLLAR ELEV. 50.3 ft	TOTAL DEPTH 80.0 ft	NORTHING 960,377	EASTING 2,527,068
DRILL RIG/HAMMER EFF./DATE CME-55		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER WHICHARD, W.	START DATE 08/22/12	COMP. DATE 08/22/12	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)		
55																	
															50.3	GROUND SURFACE	0.0
	49.3	1.0	2	1	1										47.3	ROADWAY EMBANKMENT RED AND BROWN, SOFT, SANDY CLAY (A-6)	3.0
	46.8	3.5	WOH	1	1												
	44.3	6.0	WOH	1	2												
	41.8	8.5															
	36.8	13.5															
	31.8	18.5															
	26.8	23.5															
	21.8	28.5															
	16.8	33.5															
	11.8	38.5															
	6.8	43.5															
	1.8	48.5															
	-3.2	53.5															
	-8.2	58.5															
	-13.2	63.5															
	-18.2	68.5															
	-23.2	73.5															

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NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.1.R.28			TIP 650038			COUNTY NORTHAMPTON			GEOLOGIST S. CROCKETT							
SITE DESCRIPTION BRIDGE NO. 650038 OVER BRANCH OF POTECASI CREEK										GROUND WTR (ft)						
BORING NO. EB2-B			STATION 13+80			OFFSET 22 ft RT			ALIGNMENT -L-							
COLLAR ELEV. 50.3 ft			TOTAL DEPTH 80.0 ft			NORTHING 960,377			EASTING 2,527,068							
DRILL RIG/HAMMER EFF./DATE CME-55						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic							
DRILLER WHICHARD, W.			START DATE 08/22/12			COMP. DATE 08/22/12			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)
-25																
	-28.2	78.5	7	10	13	Match Line										
											SS-18	W			-29.7	80.0
														COASTAL PLAIN LIGHT GRAY, V. STIFF, SANDY CLAY (A-6) <i>(continued)</i> Boring Terminated at Elevation -29.7 ft BY BT IN CP: SANDY CLAY		