

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.14.R.22	1	8

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 17BP.14.R.22 F.A. PROJ. _____
COUNTY CHEROKEE
PROJECT DESCRIPTION DIVISION 14, GROUP 'S'
LOW IMPACT BRIDGE REPLACEMENTS
SITE DESCRIPTION BRIDGE NO. 22 ON SR 1507 OVER
PHILLIPS CREEK

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SUBMITTED BY TERRACON CONSULTANTS

DATE JULY 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.

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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: J. MANKE

Terracon

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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.									
										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, A-6, A-7										COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50									
SYMBOL (Grid patterns for soil classification)										PERCENTAGE OF MATERIAL ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL									
% PASSING: 10, 40, 200 (Grid patterns)										TRACE OF ORGANIC MATTER 2 - 3% LITTLE ORGANIC MATTER 3 - 5% MODERATELY ORGANIC 5 - 10% HIGHLY ORGANIC >10%									
LIQUID LIMIT PLASTIC INDEX (Grid patterns)										TRACE LITTLE SOME HIGHLY 1 - 10% 10 - 20% 20 - 35% 35% AND ABOVE									
GROUP INDEX (Grid patterns)										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									
USUAL TYPES OF MAJOR MATERIALS (STONE FRAGS., GRAVEL, AND SAND; FINE SAND; SILTY OR CLAYEY GRAVEL AND SAND; SILTY SOILS; CLAYEY SOILS)										MISCELLANEOUS SYMBOLS ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION; SOIL SYMBOL; ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT; INFERRED SOIL BOUNDARY; INFERRED ROCK LINE; ALLUVIAL SOIL BOUNDARY; DIP & DIP DIRECTION OF ROCK STRUCTURES; TEST BORING; AUGER BORING; CORE BORING; MONITORING WELL; PIEZOMETER INSTALLATION; SLOPE INDICATOR INSTALLATION; CONE PENETROMETER TEST; SOUNDING ROD									
GEN. RATING AS A SUBGRADE EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR POOR UNSUITABLE										P.I. OF A-7-5 SUBGROUP IS ≤ LL - 30 ; P.I. OF A-7-6 SUBGROUP IS > LL - 30									
CONSISTENCY OR DENSENESS										ABBREVIATIONS									
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/F ²)										AR - AUGER REFUSAL MED. - MEDIUM MICA. - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC DMT - DILATOMETER TEST PRT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS w - MOISTURE CONTENT HI. - HIGHLY VST - VANE SHEAR TEST WEA. - WEATHERED γ _u - UNIT WEIGHT γ _d - DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO									
GENERALLY GRANULAR MATERIAL (NON-COHESIVE) VERY LOOSE <4 4 TO 10 MEDIUM DENSE 10 TO 30 DENSE 30 TO 50 VERY DENSE >50										N/A									
GENERALLY SILT-CLAY MATERIAL (COHESIVE) VERY SOFT <2 2 TO 4 SOFT 4 TO 8 MEDIUM STIFF 8 TO 15 STIFF 15 TO 30 VERY STIFF >30 HARD										<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4									
TEXTURE OR GRAIN SIZE										EQUIPMENT USED ON SUBJECT PROJECT									
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053										DRILL UNITS: MOBILE B-___ BK-51 CME-45C CME-550 PORTABLE HOIST TER255 D-50									
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)										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 2-15/16" TUNG.-CARB. CORE BIT									
GRAIN SIZE MM 305 75 2.0 0.25 0.05 0.005 IN. 12 3										HAMMER TYPE: [X] AUTOMATIC [] MANUAL CORE SIZE: [] -B [] -N [] -H HAND TOOLS: [] POST HOLE DIGGER [] HAND AUGER [] SOUNDING ROD [] VANE SHEAR TEST									
SOIL MOISTURE - CORRELATION OF TERMS										PLASTICITY									
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										PLASTICITY INDEX (PI) DRY STRENGTH									
LL LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE										0-5 VERY LOW 6-15 SLIGHT 16-25 MEDIUM 26 OR MORE HIGH									
PL PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE										NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY									
OM OPTIMUM MOISTURE SHRINKAGE LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE										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.									
SL SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE										REVISED 09/23/09									

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

ROCK DESCRIPTION

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:

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 (NCR)		FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CPS)		COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

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. <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
		VERY 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.

TERMS AND DEFINITIONS

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 (RQD) - 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.

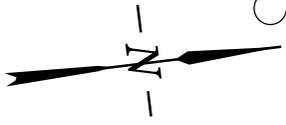
STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL-2 (N=551157.5202, E=557695.6643)

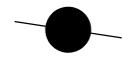
ELEVATION: 2071.28 FT.

NOTES:
 FIAD - FILLED IN AFTER DRILLING

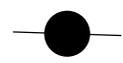


PHILLIPS CREEK

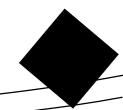
EBI-B



EB2-B



-BL-2



EBI-A

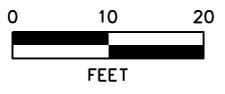


EB2-A



SR 1507

PISGAH ROAD



SCALE: 1 : 20	PROJ. REFERENCE NUMBER: 17BP.14.R.22
DATE: JULY 2012	TIP NUMBER: GROUP S
DRAWN BY: JPM	COUNTY: CHEROKEE
APPROVED BY: DJC	TERRACON PROJECT: 71125021



2020 STARITA ROAD, SUITE E CHARLOTTE, NC 28206
 PH. (704) 509-1777 FAX. (704) 509-1888

BORING LOCATION DIAGRAM

BRIDGE NO. 22 ON STATE ROUTE 1507 (PISGAH ROAD) OVER PHILLIPS CREEK

SHEET

3



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.14.R.22	TIP 17BP.14.R.22	COUNTY CHEROKEE	GEOLOGIST Briggs, C.R.
SITE DESCRIPTION Bridge No. 22 on State Route 1507 over Phillips Creek			GROUND WTR (ft)
BORING NO. EB1-B	STATION 12+75	OFFSET 5 ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,074.8 ft	TOTAL DEPTH 38.8 ft	NORTHING 551,039	EASTING 557,668
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Duggins, W.T.	START DATE 04/02/12	COMP. DATE 04/02/12	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)			
2075															2,074.8	GROUND SURFACE	0.0	
	2,073.8	1.0													2,074.3	Topsoil and Rootmat (Approximately 0.5 feet)	0.5	
	2,071.3	3.5	1	1	1										2,072.3	ROADWAY EMBANKMENT Dark brown, SILT, little sand, little organics	2.5	
2070	2,068.8	6.0	5	7	8											ALLUVIAL Brown, black, and tan, SAND, some gravel, some silt		
	2,066.3	8.5	5	3	6													
2065	2,066.3	8.5	20	12	14													
	2,061.3	13.5													2,062.8	RESIDUAL Tan and black, SILT, little sand	12.0	
2060	2,056.3	18.5	13	24	30										2,057.8	WEATHERED ROCK (Tan and black Schist)	17.0	
2055	2,051.3	23.5	46	54/0.2											2,052.8	RESIDUAL Tan, black, and orange, SILT, little sand	22.0	
2050	2,046.3	28.5	4	9	15										2,047.8	WEATHERED ROCK (Tan and black Schist)	27.0	
2045	2,041.3	33.5	20	58	42/0.3													
	2,036.3	38.5	14	48	52/0.4													
2040	100/0.3														2,036.0	Boring Terminated at Elevation 2,036.0 ft in Weathered Rock	38.8	

NCDOT BORE SINGLE 17BP.14.R.22 - 0022.GPJ NC_DOT.GDT 7/6/12



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.14.R.22		TIP 17BP.14.R.22		COUNTY CHEROKEE		GEOLOGIST Briggs, C.R.											
SITE DESCRIPTION Bridge No. 22 on State Route 1507 over Phillips Creek							GROUND WTR (ft)										
BORING NO. EB2-A		STATION 13+37		OFFSET 18 ft RT		ALIGNMENT -L-	0 HR. N/A										
COLLAR ELEV. 2,074.9 ft		TOTAL DEPTH 43.9 ft		NORTHING 551,089		EASTING 557,711	24 HR. FIAD										
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER Duggins, W.T.		START DATE 04/03/12		COMP. DATE 04/03/12		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
2075															2,074.9	GROUND SURFACE	0.0
	2,073.9	1.0	5	5	5										2,074.4	Topsoil (Approximately 0.5 feet)	0.5
	2,071.4	3.5	1	3	2										2,072.9	ROADWAY EMBANKMENT Orange, SILT, little sand	2.0
2070																Gray and tan, sandy GRAVEL, some silt	
	2,068.9	6.0	4	12	20										2,069.4	ALLUVIAL	5.5
	2,066.4	8.5	10	10	11											Gray, GRAVEL, some sand, little silt	
2065																	
	2,061.4	13.5	13	14	18										2,062.9	RESIDUAL	12.0
2060																Tan and black, SILT, little sand	
	2,056.4	18.5	17	13	30												
2055																	
	2,051.4	23.5	13	29	41												
2050																	
	2,046.4	28.5	48	52/0.3											2,047.9	WEATHERED ROCK (Tan, black and orange Schist)	27.0
2045																	
	2,041.4	33.5	13	30	52										2,042.9	RESIDUAL	32.0
2040																Tan, black, and orange, SILT, little sand	
	2,036.4	38.5	29	71/0.4											2,037.9	WEATHERED ROCK (Light tan and brown Schist)	37.0
2035																	
	2,031.4	43.5	100/0.4												2,031.0		43.9
Boring Terminated at Elevation 2,031.0 ft in Weathered Rock																	
1) Advanced 2-15/16" tricone carb. to 43.5 feet. 2) Casing placed to 15 feet. 3) Used creek water as drilling fluid																	

NCDOT BORE SINGLE 17BP.14.R.22 - 0022.GPJ NC_DOT.GDT 7/6/12



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 17BP.14.R.22	TIP 17BP.14.R.22	COUNTY CHEROKEE	GEOLOGIST Briggs, C.R.
SITE DESCRIPTION Bridge No. 22 on State Route 1507 over Phillips Creek			GROUND WTR (ft)
BORING NO. EB2-B	STATION 13+25	OFFSET 3 ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,074.3 ft	TOTAL DEPTH 45.0 ft	NORTHING 551,085	EASTING 557,687
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Duggins, W.T.	START DATE 04/03/12	COMP. DATE 04/03/12	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)			
2075															2,074.3	0.0	GROUND SURFACE	
	2,073.3	1.0	2	4	4										2,073.8	0.5	Topsoil and rootmat (Approximately 0.5')	
2070	2,070.8	3.5	2	1	2												ROADWAY EMBANKMENT	
	2,068.3	6.0	8	7	6												Tan and gray, sandy SILT, some gravel	
2065	2,065.8	8.5	6	12	20												RESIDUAL	
	2,062.3																	Tan and orange, sandy SILT, little gravel
2060	2,060.8	13.5	9	12	20													RESIDUAL
	2,055.8	18.5	10	25	25													Light tan, black, and orange, SILT, some sand, micaceous
2055	2,055.8	18.5	10	25	25													RESIDUAL
2050	2,050.8	23.5	11	13	59													Tan and orange, sandy SILT, little gravel
2045	2,045.8	28.5	15	31	36													RESIDUAL
	2,042.3																	Light tan, black, and orange, SILT, some sand, micaceous
2040	2,040.8	33.5	23	45	55/0.2													WEATHERED ROCK
	2,035.8	38.5	13	87/0.4														(Tan, orange, and black Schist)
2035	2,035.8	38.5	13	87/0.4														RESIDUAL
	2,032.3																	Tan, black, and orange, SILT, some sand, micaceous
2030	2,030.8	43.5	10	17	18													RESIDUAL
	2,029.3																	Tan, black, and orange, SILT, some sand, micaceous
																		Boring Terminated at Elevation 2,029.3 ft in Silt
																		1) Advanced 2-15/16" tricone carb. to 43.5 feet.
																		2) Casing placed to 15 feet.
																		3) Used creek water as drilling fluid

NCDOT BORE SINGLE 17BP.14.R.22 - 0022.GPJ NC_DOT.GDT 7/6/12

North Carolina Department of Transportation
 Geotechnical Unit
 Laboratory Test Results

<i>Project No.:</i> 17BP.14.R.22	<i>I.D. No.:</i> N/A	<i>County:</i> CHEROKEE
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Site Description: Bridge #22 ON STATE ROUTE 1507 OVER PHILLIPS CREEK

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	D50 (mm)
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-1	12 ft RT	12+86	EB1-A, 3.5-5	A-1-b	N.P.	N.P.	-	-	-	-	52	41	25	17	1.5399
SS-2	12 ft RT	12+86	EB1-A, 6-7.5	A-1-b	N.P.	N.P.	-	-	-	-	44	29	16	12	3.1364
SS-3	12 ft RT	12+86	EB1-A, 8.5-10	A-1-a	N.P.	N.P.	-	-	-	-	23	13	7	5	10.5979
SS-4	18 ft RT	13+37	EB2-A, 3.5-5	A-1-b	N.P.	N.P.	-	-	-	-	60	45	24	21	0.6892
SS-5	18 ft RT	13+37	EB2-A, 6-7.5	A-1-a	N.P.	N.P.	-	-	-	-	34	18	10	11	5.0767
SS-6	18 ft RT	13+37	EB2-A, 8.5-10	A-1-a	N.P.	N.P.	-	-	-	-	35	22	13	11	5.9512

N.P. = Not Performed