

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.11.R.81	1	9

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 17BP.11.R.81 F.A. PROJ. N/A
COUNTY ASHE
PROJECT DESCRIPTION BRIDGE NO. 61 ON SR 1352
OVER LITTLE HORSE CREEK

CONTENTS

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1	TITLE SHEET
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PERSONNEL

D. RACEY (F&R)

D. TIGNOR (F&R)

S. DAVIS (F&R)

INVESTIGATED BY B. WORLEY, PG

CHECKED BY D. DEWEY, PE

SUBMITTED BY Summit Design and Engineering Services, PLLC

DATE NOVEMBER, 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.

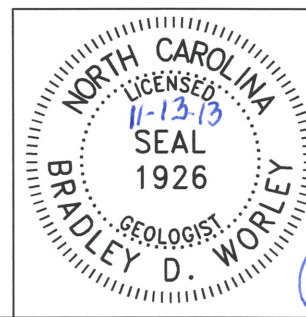
SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA, AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS 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: M. BRANDON, PLS and B. WORLEY, PG



Bradley D. Worley

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: 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. 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 ROUNDNES OF SOIL GRAINS IS DESIGNATED BY THE TERMS ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.													
SOIL LEGEND AND AASHTO CLASSIFICATION														MINERALOGICAL COMPOSITION													
GENERAL CLASS.														MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.													
GROUP CLASS.														COMPRESSIBILITY													
SYMBOL														SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE													
PERCENTAGE OF MATERIAL														PERCENTAGE OF MATERIAL													
ORGANIC MATERIAL														OTHER MATERIAL													
TRACE OF ORGANIC MATTER														TRACE													
LITTLE ORGANIC MATTER														LITTLE													
MODERATELY ORGANIC														SOME													
HIGHLY ORGANIC														HIGHLY													
GROUND WATER														GROUND WATER													
WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING														WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING													
STATIC WATER LEVEL AFTER 24 HOURS														STATIC WATER LEVEL AFTER 24 HOURS													
PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA														PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA													
SPRING OR SEEP														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													
<0.25														ALLUVIAL SOIL BOUNDARY													
0.25 TO 0.50														DIP & DIP DIRECTION OF ROCK STRUCTURES													
0.5 TO 1.0														SPT - TEST BORING													
1 TO 2														AUGER BORING													
2 TO 4														CORE BORING													
>4														MONITORING WELL													
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30														PIEZOMETER INSTALLATION													
TEXTURE OR GRAIN SIZE														SLOPE INDICATOR INSTALLATION													
U.S. STD. SIEVE SIZE														CONE PENETROMETER TEST													
OPENING (MM)														SOUNDING ROD													
BOULDER (BLDR.)														ABBREVIATIONS													
COBBLE (COB.)														AR - AUGER REFUSAL													
GRAVEL (GR.)														BT - BORING TERMINATED													
COARSE SAND (CSE, SD.)														CL - CLAY													
FINE SAND (F SD.)														CPT - CONE PENETRATION TEST													
SILT (SL.)														CSE - COARSE													
CLAY (CL.)														DMT - DILATOMETER TEST													
GRAIN SIZE														DPT - DYNAMIC PENETRATION TEST													
305														F - FINE													
12														FOSS - FOSSILIFEROUS													
75														FRAC. - FRACTURED, FRACTURES													
3														FRAGS. - FRAGMENTS													
2.0														HI. - HIGHLY													
0.25														MED. - MEDIUM													
0.05														MICA - MICACEOUS													
0.005														MOD. - MODERATELY													
SOIL MOISTURE - CORRELATION OF TERMS														NP - NON PLASTIC													
SOIL MOISTURE SCALE (ATTERBERG LIMITS)														ORG. - ORGANIC													
FIELD MOISTURE DESCRIPTION														PMT - PRESSUREMETER TEST													
GUIDE FOR FIELD MOISTURE DESCRIPTION														SAP. - SAPROLITIC													
- SATURATED - (SAT.)														SD. - SAND, SANDY													
USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE														SL. - SILT, SILTY													
- WET - (W)														SLI. - SLIGHTLY													
SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE														TCR - TRICONE REFUSAL													
- MOIST - (M)														w - MOISTURE CONTENT													
SOLID; AT OR NEAR OPTIMUM MOISTURE														V - VERY													
- DRY - (D)														SAMPLE ABBREVIATIONS													
REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE														S - BULK													
PLASTICITY														SS - SPLIT SPOON													
PLASTICITY INDEX (PI)														ST - SHELBY TUBE													
DRY STRENGTH														RS - ROCK													
VERY LOW														RT - RECOMPACTED TRIAXIAL													
SLIGHT														CBR - CALIFORNIA BEARING RATIO													
MEDIUM														EQUIPMENT USED ON SUBJECT PROJECT													
HIGH														DRILL UNITS:													
NONPLASTIC														ADVANCING TOOLS:													
LOW PLASTICITY														HAMMER TYPE:													
MED. PLASTICITY														CORE SIZE:													
HIGH PLASTICITY														HAND TOOLS:													
COLOR														POST HOLE DIGGER													
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.														HAND AUGER													
														SOUNDING ROD													
														VANE SHEAR TEST													

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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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:			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 (ROQ) - 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 (SROQ) - 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.	
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 (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 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: Established TBM "G" on NE corner existing bridge.	
			ELEVATION: 100	FT.
NOTES:				



BORING LOCATION DIAGRAM
BRIDGE #61 ON SR 1352
OVER LITTLE HORSE CR
ASHE COUNTY, NC

PROJECT: I7BP.II.R.8I

DRAWN BY: MTB

CHECKED BY: BW

DATE: OCTOBER 2013

SCALE: 50:1



FIRM NO. P-0339 and C-487

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WBS 17BP.11.R.81				TIP N/A				COUNTY ASHE				GEOLOGIST Racey, D.					
SITE DESCRIPTION Bridge No. 61 on SR 1352 over Little Horse Creek												GROUND WTR (ft)					
BORING NO. EB1-A				STATION N/A				OFFSET N/A				ALIGNMENT N/A				0 HR. Dry	
COLLAR ELEV. 100.8 ft				TOTAL DEPTH 8.9 ft				NORTHING 1,012,915				EASTING 1,259,030				24 HR. Dry	
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 84% 12/14/2012								DRILL METHOD H.S. Augers				HAMMER TYPE Automatic					
DRILLER Tignor, D.				START DATE 09/26/13				COMP. DATE 09/26/13				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)		
105																	
100	100.8	0.0															
			2	5	4												
	97.3	3.5															
			WOH	1	0												
95																	
	92.3	8.5															
	91.9	8.9	60/0.0														
			60/0.0														



WBS 17BP.11.R.81				TIP N/A				COUNTY ASHE				GEOLOGIST Racey, D.					
SITE DESCRIPTION Bridge No. 61 on SR 1352 over Little Horse Creek												GROUND WTR (ft)					
BORING NO. EB1-A (1)				STATION N/A				OFFSET N/A				ALIGNMENT N/A				0 HR. Dry	
COLLAR ELEV. 100.8 ft				TOTAL DEPTH 13.6 ft				NORTHING 1,012,926				EASTING 1,259,034				24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 84% 12/14/2012								DRILL METHOD H.S. Augers				HAMMER TYPE Automatic					
DRILLER Tignor, D.				START DATE 09/30/13				COMP. DATE 09/30/13				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)		
105																	
100	100.2	0.6												100.8	0.0		
			10	10	5									99.0	1.8		
	97.3	3.5	1	1	2												
95																	
	92.3	8.5	4	2	3												
90																	
	87.3	13.5												87.6	13.2		
			60/0.1							60/0.1				87.2	13.6		



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

SHEET 6

WBS 17BP.11.R.81			TIP N/A			COUNTY ASHE			GEOLOGIST Racey, D.			
SITE DESCRIPTION Bridge No. 61 on SR 1352 over Little Horse Creek										GROUND WTR (ft)		
BORING NO. EB1-B			STATION N/A			OFFSET N/A			ALIGNMENT N/A			
COLLAR ELEV. 100.7 ft			TOTAL DEPTH 12.9 ft			NORTHING 1,012,935			EASTING 1,259,058			
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 84% 12/14/2012										DRILL METHOD H.S. Augers		HAMMER TYPE Automatic
DRILLER Tignor, D.			START DATE 09/26/13			COMP. DATE 09/26/13			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	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
105																	
100	100.7	0.0	5	4	3										100.7	GROUND SURFACE	0.0
															99.6	ROADWAY EMBANKMENT	1.1
	97.2	3.5	1	1	1											Gray, f. to cse. SANDY SILT (A-4) w/ trace gravel	
95																Brown, CLAYEY SILT (A-5) w/ trace f. sand	
	92.2	8.5	20	80/0.2											92.2	WEATHERED ROCK	8.5
90															90.3	(amphibolite)	10.4
	87.8	12.9	60/0.0												87.8	CRYSTALLINE ROCK	12.9
																Driller indicates much harder drilling at 10.4 ft.	
																(granitic gneiss)	
																Boring Terminated with Standard Penetration Test Refusal at Elevation 87.8 ft in Crystalline Rock (granitic gneiss)	



WBS 17BP.11.R.81			TIP N/A			COUNTY ASHE			GEOLOGIST Racey, D.					
SITE DESCRIPTION Bridge No. 61 on SR 1352 over Little Horse Creek									GROUND WTR (ft)					
BORING NO. EB2-A			STATION N/A			OFFSET N/A			ALIGNMENT N/A					
COLLAR ELEV. 100.2 ft			TOTAL DEPTH 15.0 ft			NORTHING 1,012,984			EASTING 1,259,022					
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 84% 12/14/2012						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic					
DRILLER Tignor, D.			START DATE 09/26/13			COMP. DATE 09/26/13			SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
105														
100	100.2	0.0											100.2	GROUND SURFACE 0.0
			2	13	8								98.7	ROADWAY EMBANKMENT 1.5
	96.7	3.5	1	0	1									Brow, f. SANDY SILT (A-4) w/ high amount of asphalt fragments
95														Brown, CLAYEY SILT (A-5) w/ trace of f. sand
	91.7	8.5	3	1	2								90.6	ALLUVIAL 9.6
90														Dark gray, SILTY CLAY (A-7-5) w/ trace f. sand and wood fragments
	86.7	13.5	33	67/0.3									86.7	WEATHERED ROCK 13.5
	85.2	15.0	60/0.0										85.2	CRYSTALLINE ROCK 14.0
														Driller indicates much harder drilling at 14 ft. (granitic gneiss)
														Boring Terminated with Standard Penetration Test Refusal at Elevation 85.2 ft in Crystalline Rock (granitic gneiss)



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SHEET 8

WBS 17BP.11.R.81		TIP N/A		COUNTY ASHE		GEOLOGIST Racey, D.					
SITE DESCRIPTION Bridge No. 61 on SR 1352 over Little Horse Creek						GROUND WTR (ft)					
BORING NO. EB2-B		STATION N/A		OFFSET N/A		ALIGNMENT N/A					
COLLAR ELEV. 99.2 ft		TOTAL DEPTH 15.1 ft		NORTHING 1,013,007		EASTING 1,259,045					
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 84% 12/14/2012				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic					
DRILLER Tignor, D.		START DATE 09/26/13		COMP. DATE 09/26/13		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)	
100									99.2	GROUND SURFACE	0.0
	98.1	1.1	2	2	3				88.7	ROADWAY EMBANKMENT	0.5
										Asphalt	
95	95.7	3.5	1	2	2				96.2	Brown, f. SANDY SILT (A-4) w/ trace gravel	3.0
										Brown, CLAYEY SILT (A-5) w/ trace f. sand	
									91.2	ALLUVIAL	8.0
90	90.7	8.5	1	7	17					Dark gray, SILTY CLAY (A-7-5) w/ some f. sand	
	89.1	10.1	6	3	2						
	85.7	13.5	100/0.4							WEATHERED ROCK	13.0
85	84.1	15.1	60/0.0							(amphibolite gneiss)	14.3
										CRYSTALLINE ROCK	15.1
										Driller indicates harder drilling at 14.3 ft. (granitic gneiss)	
										Boring Terminated with Standard Penetration Test Refusal at Elevation 84.1 ft in Crystalline Rock (granitic gneiss)	