

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	WBS NO. 17BP.14.R.82	1	12

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. WBS NO. 17BP.14.R.82 F.A. PROJ. _____
COUNTY HAYWOOD
PROJECT DESCRIPTION DIVISION 14
LOW IMPACT BRIDGE REPLACEMENT

SITE DESCRIPTION BRIDGE NO. 317 ON SR 1346
(STEPHENS CREEK ROAD) ACROSS STEPHENS CREEK

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2, 2A	LEGEND
3	BORING LOCATION MAP
4-II	BORE LOG & CORE REPORTS WITH CORE PHOTOGRAPHS

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INVESTIGATED BY F&H

CHECKED BY S. PROVANCE

SUBMITTED BY F&H

DATE 10/12/2011

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) 250-4088. 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: T. RIDEOUT



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 T205, 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 ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS <u>ANGULAR</u> , <u>SUBANGULAR</u> , <u>SUBROUNDED</u> , OR <u>ROUNDED</u> .									
										MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.									
SOIL LEGEND AND AASHTO CLASSIFICATION										COMPRESSIONIBILITY									
GENERAL CLASS.										SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE									
GROUP CLASS.										LIQUID LIMIT LESS THAN 31 LIQUID LIMIT EQUAL TO 31-50 LIQUID LIMIT GREATER THAN 50									
SYMBOL										PERCENTAGE OF MATERIAL									
%										ORGANIC MATERIAL TRACE OF ORGANIC MATTER LITTLE ORGANIC MATTER MODERATELY ORGANIC HIGHLY ORGANIC									
LIQUID LIMIT										GRANULAR SOILS 2 - 3% 3 - 5% 5 - 10% >10%									
PLASTIC INDEX										SILT-CLAY SOILS 3 - 5% 5 - 12% 12 - 20% >20%									
GROUP INDEX										OTHER MATERIAL TRACE LITTLE SOME HIGHLY									
USUAL TYPES OF MAJOR MATERIALS										GROUND WATER									
GEN. RATING AS A SUBGRADE										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									
PI OF A-7-5 SUBGROUP IS $\leq$ LL - 30 ; PI OF A-7-6 SUBGROUP IS $>$ LL - 30										MISCELLANEOUS SYMBOLS									
CONSISTENCY OR DENSENESS										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									
PRIMARY SOIL TYPE										TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD									
TEXTURE OR GRAIN SIZE										ABBREVIATIONS									
U.S. STD. SIEVE SIZE OPENING (MM)										AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HL - HIGHLY									
BOULDER (BLDR.)										MED. - MEDIUM MICA - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL - SILT, SILTY SLI - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY									
GRAIN MM 305										VST - VANE SHEAR TEST WEA. - WEATHERED γ - UNIT WEIGHT γ _d - DRY UNIT WEIGHT									
SOIL MOISTURE - CORRELATION OF TERMS										SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO									
SOIL MOISTURE SCALE (ATTERBERG LIMITS)										EQUIPMENT USED ON SUBJECT PROJECT									
FIELD MOISTURE DESCRIPTION										DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST CME-55ATV									
GUIDE FOR FIELD MOISTURE DESCRIPTION										ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG.-CARBIDE INSERTS CASING TRICONE CORE BIT 2 1/2" HOLLOW AUGERS									
HAMMER TYPE: AUTOMATIC MANUAL										CORE SIZE: B N 02 H									
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY										HAMMO TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST									
PLASTICITY																			
COLOR																			
DESCRIPTORS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.																			

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:		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.	
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. IF TESTED, WOULD YIELD SPT REFUSAL.	
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. IF TESTED, YIELDS SPT N VALUES > 100 BPF.	
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. IF TESTED, YIELDS SPT N VALUES < 100 BPF.	
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 FINGER NAIL.	
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 0.15 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: ORANGE PAINT CIRCLE LABELED G
SE CORNER OF BRIDGE DECK (NEAREST EB-1-B)
ELEVATION: 100 FT.

NOTES:

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N.C.	WBS NO. 17BP.14.R.82	3	12



BORING LOCATION MAP
BRIDGE NO. 317
ON SR 1346
(STEPHENS CREEK ROAD)
ACROSS STEPHENS CREEK
WBS NO. 17BP.14.R.82
 HAYWOOD COUNTY, NORTH CAROLINA

DRAWN BY: _____ T. RIDEOUT



WBS 17BP.14.R.82			TIP 17BP.14.R.82			COUNTY HAYWOOD			GEOLOGIST Smith, B. C.							
SITE DESCRIPTION Bridge No. 317 on -L- (SR 1346, Stephens Creek Road) over Stephens Creek									GROUND WTR (ft)							
BORING NO. EB1-A			STATION N/A			OFFSET N/A			ALIGNMENT -L-							
COLLAR ELEV. 105.1 ft			TOTAL DEPTH 6.0 ft			NORTHING 715,620			EASTING 801,155							
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 82% 10/5/2010						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic							
DRILLER Whichard, W.			START DATE 10/04/11			COMP. DATE 10/04/11			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)	
110																
105																
	104.1	1.0	9	10	10						M				105.1	GROUND SURFACE
	101.6	3.5	9	9	8						W					COLLUVIAL Brown, med. dense, silty, f. to cse. grain sand and rock frags. (A-1-b).
100	99.1	6.0	60/0.0			60/0.0									99.1	6.0
															Boring Terminated with Auger & Standard Penetration Test Refusal at Elevation 99.1 ft on Crystalline Rock (Metagraywacke). Outcrop observed in stream bed.	



WBS 17BP.14.R.82			TIP 17BP.14.R.82			COUNTY HAYWOOD			GEOLOGIST Smith, B. C.				
SITE DESCRIPTION Bridge No. 317 on -L- (SR 1346, Stephens Creek Road) over Stephens Creek								GROUND WTR (ft)					
BORING NO. EB1-B			STATION N/A			OFFSET N/A			ALIGNMENT -L-				
COLLAR ELEV. 104.3 ft			TOTAL DEPTH 12.0 ft			NORTHING 715,651			EASTING 801,151				
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 82% 10/5/2010								DRILL METHOD NW Casing w/ Core			HAMMER TYPE Automatic		
DRILLER Whichard, W.			START DATE 10/04/11			COMP. DATE 10/04/11			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													
	103.3	1.0										104.3	0.0
			17	12	13							GROUND SURFACE	
100	100.8	3.5										COLLUVIAL	
			12	9	6							Brown, med. dense, silty, f. to cse. grain sand and rock frags. (A-1-b).	
	97.3	7.0										97.3	7.0
			60/0.0									CRYSTALLINE ROCK	
95												Auger refusal, set casing, begin core in crystalline rock (Metagraywacke).	
												92.3	12.0
												Boring Terminated at Elevation 92.3 ft in Crystalline Rock (Metagraywacke).	



NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

SHEET 6 OF 11

WBS 17BP.14.R.82				TIP 17BP.14.R.82				COUNTY HAYWOOD				GEOLOGIST Smith, B. C.					
SITE DESCRIPTION Bridge No. 317 on -L- (SR 1346, Stephens Creek Road) over Stephens Creek												GROUND WTR (ft)					
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DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 82% 10/5/2010												DRILL METHOD NW Casing w/ Core				HAMMER TYPE Automatic	
DRILLER Whichard, W.				START DATE 10/04/11				COMP. DATE 10/04/11				SURFACE WATER DEPTH N/A					
CORE SIZE NQ2				TOTAL RUN 5.0 ft													
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)					
					REC. (ft) %	RQD (ft) %		REC. (ft) %	ROD (ft) %								
97.3																	
	97.3	7.0	5.0	N=60/0.0 4.40/1.0 4.38/1.0 4.35/1.0 4.35/1.0 4.22/1.0	(4.8) 96%	(2.9) 58%		(4.8) 96%	(2.9) 58%		Begin Coring @ 7.0 ft CRYSTALLINE ROCK Gray w/some orange-brown staining, sli. to mod. weathered, mod. hard to hard, clase frac. spacing, indurated, Metagraywacke. Predominately quartz w/some feldspar and sericite, modest amount of iron-oxide staining. ADS=0.35'	7.0					
95	92.3	12.0									Boring Terminated at Elevation 92.3 ft in Crystalline Rock (Metagraywacke).	12.0					

CORE PHOTOGRAPHIC RECORD
Bridge No. 317 on SR 1346 (Stephens Creek Rd.)
Over Stephens Creek



Boring EB1-B – Box 1 of 1



WBS 17BP.14.R.82			TIP 17BP.14.R.82			COUNTY HAYWOOD			GEOLOGIST Smith, B. C.							
SITE DESCRIPTION Bridge No. 317 on -L- (SR 1346, Stephens Creek Road) over Stephens Creek								GROUND WTR (ft)								
BORING NO. EB2-A			STATION N/A			OFFSET N/A			ALIGNMENT -L-			0 HR. 2.0				
COLLAR ELEV. 97.1 ft			TOTAL DEPTH 15.5 ft			NORTHING 715,566			EASTING 801,148			24 HR. FIAD				
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 82% 10/5/2010						DRILL METHOD NW Casing w/ Core			HAMMER TYPE Automatic							
DRILLER Whichard, W.			START DATE 10/05/11			COMP. DATE 10/05/11			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)		
100																
	96.1	1.0												97.1	GROUND SURFACE	0.0
95																
	93.6	3.5	17	19	5											
	91.6	5.5	32	23	24											
90			60/0.0													
85																



NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

SHEET 9 OF 11

WBS 17BP.14.R.82		TIP 17BP.14.R.82		COUNTY HAYWOOD		GEOLOGIST Smith, B. C.					
SITE DESCRIPTION Bridge No. 317 on -L- (SR 1346, Stephens Creek Road) over Stephens Creek							GROUND WTR (ft)				
BORING NO. EB2-A		STATION N/A		OFFSET N/A		ALIGNMENT -L-					
COLLAR ELEV. 97.1 ft		TOTAL DEPTH 15.5 ft		NORTHING 715,566		EASTING 801,148					
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 82% 10/5/2010		DRILL METHOD NW Casing w/ Core		HAMMER TYPE Automatic		0 HR. 2.0 24 HR. FIAD					
DRILLER Whichard, W.		START DATE 10/05/11		COMP. DATE 10/05/11		SURFACE WATER DEPTH N/A					
CORE SIZE NQ2		TOTAL RUN 10.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %			
91.6											
90	91.6	5.5	5.0	N=60/0.0 5:00/1.0 1:31/1.0 0:43/1.0 4:49/1.0 6:49/1.0	(2.7) 54%	(2.0) 40%		(7.4) 74%	(5.9) 59%		91.6
	86.6	10.5									5.5
85			5.0	7:33/1.0 7:40/1.0 10:11/1.0 13:06/1.0 13:41/1.0	(4.7) 94%	(3.9) 78%					
	81.6	15.5									81.6
Boring Terminated at Elevation 81.6 ft in Crystalline Rock (Metagraywacke).											15.5
100% water loss at 10.5'											

CORE PHOTOGRAPHIC RECORD
Bridge No. 317 on SR 1346 (Stephens Creek Rd.)
Over Stephens Creek



Boring EB2-A – Box 1 of 1



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

SHEET 11 OF 11

WBS 17BP.14.R.82			TIP 17BP.14.R.82			COUNTY HAYWOOD			GEOLOGIST Smith, B. C.								
SITE DESCRIPTION Bridge No. 317 on -L- (SR 1346, Stephens Creek Road) over Stephens Creek									GROUND WTR (ft)								
BORING NO. EB2-B			STATION N/A			OFFSET N/A			ALIGNMENT -L-								
COLLAR ELEV. 99.2 ft			TOTAL DEPTH 3.5 ft			NORTHING 715,573			EASTING 801,133								
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 82% 10/5/2010									DRILL METHOD H.S. Augers			HAMMER TYPE Automatic					
DRILLER Whichard, W.			START DATE 10/04/11			COMP. DATE 10/04/11			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)		
100																	
	98.2	1.0	7	8	30										99.2	GROUND SURFACE	0.0
	95.7	3.5													95.7	COLLUVIAL Brown, dense, clayey, f. to cse. grain sand and rock frags. (A-1-b).	3.5
			60/0.0													Boring Terminated with Auger & Standard Penetration Test Refusal at Elevation 95.7 ft on Crystalline Rock (Metagraywacke).	