

STATE	STATE PROJECT REFERENCE NO.	SHEET	TOTAL
N.C.	42608.1JA14 (M-0423)	1	8

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 42608.1JA14 (M-0423) F.A. PROJ. \_\_\_\_\_  
 COUNTY JACKSON  
 PROJECT DESCRIPTION ARRA BRIDGES - DIVISION 14

SITE DESCRIPTION BRIDGE NO. 144 ON SR-1397  
OVER NATIONS CREEK

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PERSONNEL

A. RIGGS

N. BRADLEY

B. RATTI

L. ENNIS

L. MORRISON

INVESTIGATED BY SG&ME, INC.

CHECKED BY A.F. RIGGS, JR.

SUBMITTED BY SG&ME, INC.

DATE APRIL 2, 2010

**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 BORING ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA, AND BORING 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 IS IT 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: B. RATTI



*Albert F. Riggs, Jr.*





PROJECT REFERENCE NO. 42608.I.JA14 (M-0423)	SHEET NO. 2
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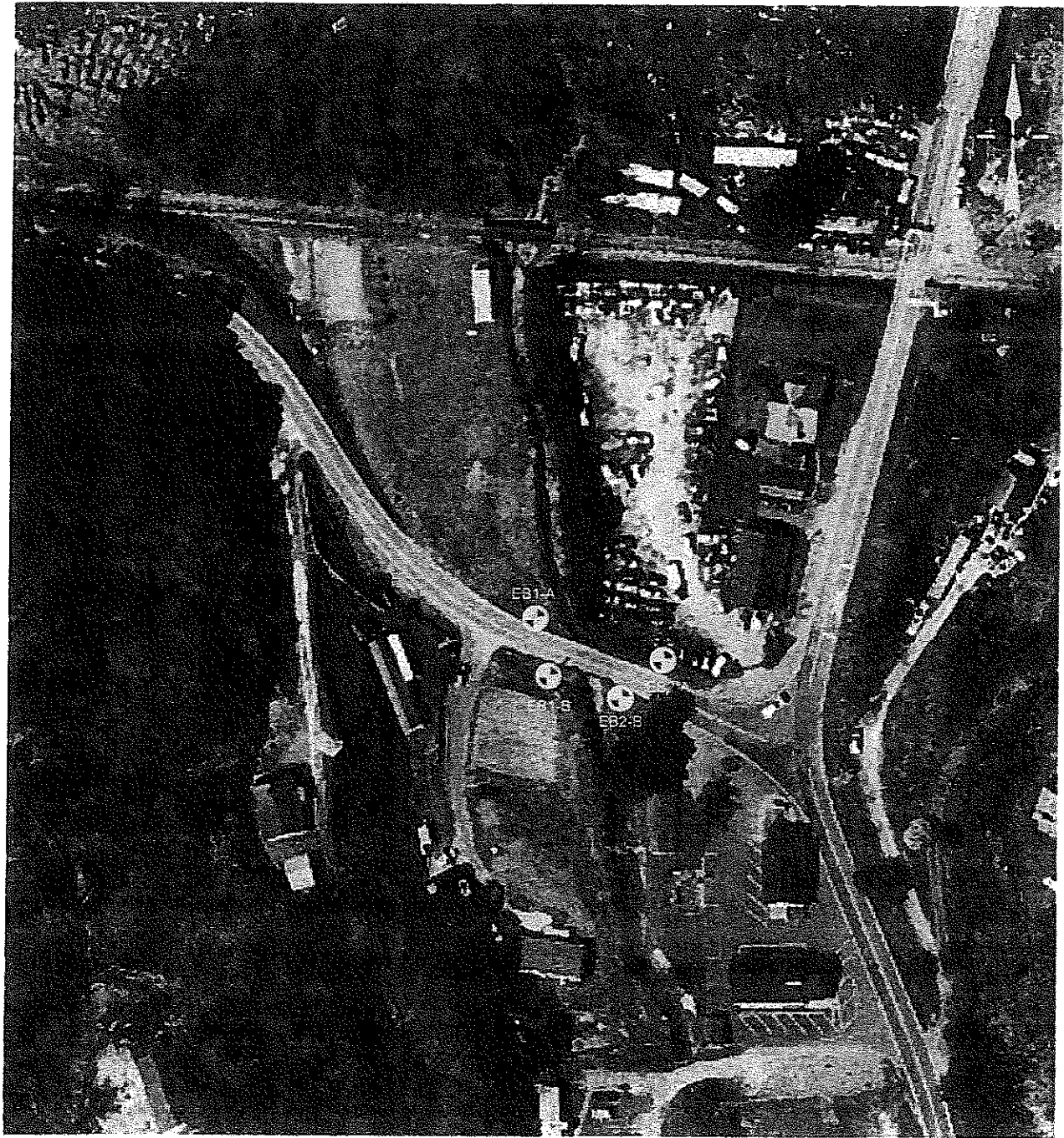
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT  
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

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 (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 SOFT, DARK SILTY CLAY, MOST WITH INTERBEDDED FINE SAND UNDESIRABLY PLASTIC, A-1-G</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. DUAL 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.										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										MINERALOGICAL COMPOSITION																
GENERAL CLASS.					GRANULAR MATERIALS (≤ 35% PASSING #200)					SILT-CLAY MATERIALS (> 35% PASSING #200)					ORGANIC MATERIALS											
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					
SYMBOL		[Pattern]		[Pattern]		[Pattern]			[Pattern]		[Pattern]		[Pattern]		[Pattern]		[Pattern]		[Pattern]		[Pattern]					
% PASSING		#10		#40		#200			GRANULAR SOILS		SILT-CLAY SOILS		MUCK, PEAT		SLIGHTLY COMPRESSIBLE		MODERATELY COMPRESSIBLE		HIGHLY COMPRESSIBLE		LIQUID LIMIT LESS THAN 20		LIQUID LIMIT EQUAL TO 20-50		LIQUID LIMIT GREATER THAN 50	
USUAL TYPES OF MAJOR MATERIALS										PERCENTAGE OF MATERIAL																
STONE FRAGS. OF GRAVEL AND SAND										ORGANIC MATERIAL																
FINE SAND										GRANULAR SOILS																
SILTY OR CLAYEY GRAVEL AND SAND										SILT-CLAY SOILS																
SILTY SOILS										TRACE OF ORGANIC MATTER																
CLAYEY SOILS										LITTLE ORGANIC MATTER																
FAIR TO POOR										MODERATELY ORGANIC																
POOR										HIGHLY ORGANIC																
UNSATURABLE										GROUND WATER																
EXCELLENT TO GOOD										WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING																
FAIR TO POOR										STATIC WATER LEVEL AFTER 24 HOURS																
POOR										PERCHED WATER SATURATED ZONE, OR WATER BEARING STRATA																
UNSATURABLE										SPRING OR SEEP																
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30										MISCELLANEOUS SYMBOLS																
CONSISTENCY OR DENSENESS										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION																
PRIMARY SOIL TYPE		COMPACTNESS OR CONSISTENCY		RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)			RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )			TEST BORING		TEST BORING W/ CORE		TEST BORING SPT N-VALUE		TEST BORING SPT REFUSAL										
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)		VERY LOOSE		< 4			N/A			[Symbol]		[Symbol]		[Symbol]		[Symbol]										
		LOOSE		4 TO 10						[Symbol]		[Symbol]		[Symbol]		[Symbol]										
		MEDIUM DENSE		10 TO 30						[Symbol]		[Symbol]		[Symbol]		[Symbol]										
		DENSE		30 TO 50						[Symbol]		[Symbol]		[Symbol]		[Symbol]										
		VERY DENSE		> 50						[Symbol]		[Symbol]		[Symbol]		[Symbol]										
GENERALLY SILT-CLAY MATERIAL (COHESIVE)		VERY SOFT		< 2			< 0.25			[Symbol]		[Symbol]		[Symbol]		[Symbol]										
		SOFT		2 TO 4			0.25 TO 0.50			[Symbol]		[Symbol]		[Symbol]		[Symbol]										
		MEDIUM STIFF		4 TO 8			0.5 TO 1.0			[Symbol]		[Symbol]		[Symbol]		[Symbol]										
		STIFF		8 TO 15			1 TO 2			[Symbol]		[Symbol]		[Symbol]		[Symbol]										
		VERY STIFF		15 TO 30			2 TO 4			[Symbol]		[Symbol]		[Symbol]		[Symbol]										
		HARD		> 30			> 4			[Symbol]		[Symbol]		[Symbol]		[Symbol]										
TEXTURE OR GRAIN SIZE										ABBREVIATIONS																
U.S. STD. SIEVE SIZE (OPENING MM)										AR - AUGER REFUSAL																
4										BT - BORING TERMINATED																
10										CL - CLAY																
4.75										CPT - CONE PENETRATION TEST																
2.00										CSE - COARSE																
0.42										DMT - DILATOMETER TEST																
0.25										DPT - DYNAMIC PENETRATION TEST																
0.075										V - VOID RATIO																
0.075										F - FINE																
0.005										FOSS. - FOSSILIFEROUS																
										FRAG. - FRACTURED, FRACTURES																
										FRAGS. - FRAGMENTS																
										HL - HIGHLY																
										MED. - MEDIUM																
										MICA - MICACEOUS																
										MOD. - MODERATELY																
										NP - NON PLASTIC																
										ORG. - ORGANIC																
										PMT - PRESSUREMETER TEST																
										SAP. - SAPROLITIC																
										SD. - SAND, SANDY																
										SL. - SILT, SILTY																
										SLL - SLIGHTLY																
										TCR - TRICONE REFUSAL																
										w - MOISTURE CONTENT																
										V - VERY																
										VST - VANE SHEAR TEST																
										WEA - WEATHERED																
										W - UNIT WEIGHT																
										W <sub>d</sub> - DRY UNIT WEIGHT																
										SAMPLE ABBREVIATIONS																
										S - BULK																
										SS - SPLIT SPDM																
										ST - SHELBY TUBE																
										RS - ROCK																
										RT - RECOMPACTED TRIAXIAL																
										CBR - CALIFORNIA BEARING RATIO																
SOIL MOISTURE - CORRELATION OF TERMS										EQUIPMENT USED ON SUBJECT PROJECT																
SOIL MOISTURE SCALE (ATTERBERG LIMITS)		FIELD MOISTURE DESCRIPTION		GUIDE FOR FIELD MOISTURE DESCRIPTION						DRILL UNITS:		ADVANCING TOOLS:		HAMMER TYPE:												
LL - LIQUID LIMIT		SATURATED (SAT.)		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE						MOBILE B-___		CLAY BITS		[X] AUTOMATIC [ ] MANUAL												
PL - PLASTIC LIMIT		WET - (W)		SEMI-SOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE						BK-51		6" CONTINUOUS FLIGHT AUGER		CORE SIZE:												
OM - OPTIMUM MOISTURE		MOIST - (M)		SOLID; AT OR NEAR OPTIMUM MOISTURE						CME-45C		6" HOLLOW AUGERS		[ ] 6" [ ] 8" [ ] 12"												
SL - SHRINKAGE LIMIT		DRY - (D)		REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE						CME-55B		HARD FACED FINGER BITS		[ ] 12"												
PLASTICITY										PORTABLE MOIST		TUNG-CARBIDE INSERTS		HAND TOOLS:												
NONPLASTIC					PLASTICITY INDEX (PI)					DRY STRENGTH		CASING [ ] W/ ADVANCER		POST HOLE DIGGER												
LOW PLASTICITY					0-5					VERY LOW		TRICONE [ ] STEEL TEETH		HARD AUGER												
MED. PLASTICITY					6-15					SLIGHT		TRICONE [ ] TUNG-CARB.		SOUNDING ROD												
HIGH PLASTICITY					16-25					MEDIUM		CORE BIT		VANE SHEAR TEST												
					26 OR MORE					HIGH		[X] 3 1/2" H.S.A.														
COLOR										REVISIONS																
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 8.1 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><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.  <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  <b>ARGILLACEOUS</b> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.  <b>ARTESIAN</b> - 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.  <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  <b>CORE RECOVERY (RECY)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.  <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.  <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.  <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.  <b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.  <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.  <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.  <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  <b>MOTTLED (MOT)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.  <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  <b>ROCK QUALITY DESIGNATION (RQD)</b> - 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.  <b>SAPROLITE (SAP)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.  <b>SILL</b> - 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.  <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.  <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS IN DR 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 8.1 FOOT PER 60 BLOWS.  <b>STRATA CORE RECOVERY (RECY)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  <b>STRATA ROCK QUALITY DESIGNATION (SRQD)</b> - 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.  <b>TOPSOIL (TS)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>	
<p><b>WEATHERED ROCK (WR)</b></p> 	<p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</p>		
<p><b>CRYSTALLINE ROCK (CR)</b></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><b>NON-CRYSTALLINE ROCK (NCR)</b></p> 	<p>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.</p>		
<p><b>COASTAL PLAIN SEDIMENTARY ROCK (CPS)</b></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 &gt; 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 &lt; 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 0.85 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT, CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 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	0.003 - 0.03 FEET
		THINLY LAMINATED	< 0.003 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: NCDOT TRAVERSE STATION REBAR & CAP STAMPED (BL-2) CARSONITE POST NO. 2490144		ELEVATION: 100.0 FT.	
NOTES: <i>Elevations obtained from survey file provided by Vaugh + Melton.</i>			



SCALE: 1" = 100'  
DATE: APRIL 2010  
DRAWN BY: BTR  
PROJECT NO: 1051-10-057

**S&ME**  
WWW.SMEINC.COM  
NC ENGINEER LICENSE #F-0176  
3201 SPRING FOREST RD, RALEIGH, NC 27616

**BORING LOCATION MAP**  
BRIDGE NO. 144  
ON SR-1397 OVER NATIONS CREEK  
TIP NO. M-0423 STATE PROJ NO. 42608.1.JA14  
JACKSON COUNTY, NORTH CAROLINA

FIGURE NO.  
**3**



# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

PROJECT NO. 42608.1.JA14		ID. M-0423		COUNTY Jackson		GEOLOGIST L. Ennis								
SITE DESCRIPTION Bridge No. 144 on SR 1397 over Nations Creek							GROUND WTR (ft)							
BORING NO. EB1-A		STATION <i>N/A 12+15</i>		OFFSET <i>N/A 15' LT</i>		ALIGNMENT <i>N/A L</i>								
COLLAR ELEV. 98.5 ft <i>1,866.0</i>		TOTAL DEPTH 19.1 ft		NORTHING 629,355		EASTING 714,884								
DRILL MACHINE D-50		DRILL METHOD 3-1/4" HSA				HAMMER TYPE Automatic								
DRILLER Lynn		START DATE 03/25/10		COMP. DATE 03/25/10		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)
100														
	97.5	1.0	3	2	2								98.5	0.0
	95.0	3.5	3	1	2								94.5	4.0
	92.5	6.0	5	6	10								92.5	6.0
	90.0	8.5	9	7	10								90.5	8.0
	85.0	13.5	10	50	50/0.3								84.0	14.5
	80.0	18.5	38	62/0.1					100/0.5				79.4	19.1
75														
70														
65														
60														
55														
50														
45														
40														
35														
30														
25														
20														

NCDOT BORE SINGLE 0508000\_GEO\_BRD00144\_SME\_10-057V.GPJ NC\_DOT.GDT 4/14/10

Boring Terminated at Elevation 79.4 ft in Weathered Rock (Biotite Gneiss)  
1) Advanced 3-1/4" HSA to 18.5 feet

**NCDOT GEOTECHNICAL ENGINEERING UNIT**  
**BORELOG REPORT**

PROJECT NO. 42608.1.JA14	ID. M-0423	COUNTY Jackson	GEOLOGIST L. Ennis
SITE DESCRIPTION Bridge No. 144 on SR 1397 over Nations Creek			GROUND WTR (ft)
BORING NO. EB1-B	STATION <i>N/A 12+37</i>	OFFSET <i>N/A 20' RT</i>	ALIGNMENT <i>N/A L</i>
COLLAR ELEV. <i>96.7 ft 1863.0</i>	TOTAL DEPTH 31.8 ft	NORTHING 629,315	EASTING 714,893
DRILL MACHINE D-50	DRILL METHOD 3-1/4" HSA	HAMMER TYPE Automatic	
DRILLER Lynn	START DATE 03/25/10	COMP. DATE 03/25/10	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																
95	95.7	1.0													96.7	0.0
			1	1	2										94.2	2.5
	93.2	3.5	1	12	10										91.2	5.5
90	90.2	6.5	8	6	5										88.7	8.0
	88.2	8.5	8	10	14										84.7	12.0
85																
	83.2	13.5	3	4	6											
80																
	78.2	18.5	12	18	30											
75																
	73.2	23.5	8	7	6											
70																
	68.2	28.5	85	15/0.1											68.2	28.5
65	65.0	31.7													64.9	31.8
			50/0.1													
60																
55																
50																
45																
40																
35																
30																
25																
20																

NCDOT BORE SINGLE 050&000\_GEO\_BRDG0144\_SME\_10-057V.GPJ\_NC\_DOT.GDT\_4/14/10

Boring Terminated with Standard Penetration Test Refusal at Elevation 64.9 ft on Crystalline Rock: (Biotite Gneiss)

1) Advanced 3-1/4" HSA to 31.7 feet  
 2) N-Value at 9.5 feet inflated due to gravel

**NCDOT GEOTECHNICAL ENGINEERING UNIT**  
**BORELOG REPORT**

PROJECT NO. 42608.1.JA14	ID. M-0423	COUNTY Jackson	GEOLOGIST L. Ennis
SITE DESCRIPTION Bridge No. 144 on SR 1397 over Nations Creek			GROUND WTR (ft)
BORING NO. EB2-A	STATION <i>MA 13+07</i>	OFFSET <i>MA -20 LT</i>	ALIGNMENT <i>MA L</i>
COLLAR ELEV. <i>100.0 ft 1863.8</i>	TOTAL DEPTH 32.6 ft	NORTHING 629,327	EASTING 714,972
DRILL MACHINE D-50	DRILL METHOD 3-1/4" HSA	HAMMER TYPE Automatic	
DRILLER Lynn	START DATE 03/25/10	COMP. DATE 03/25/10	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	0.5R	0.5R	0	25	50	75	100						
100														100.0	GROUND SURFACE	0.0
	99.0	1.0	2	WOH	1										ROADWAY EMBANKMENT Brown Clayey Fine Sand with Trace of Organics	
	96.5	3.5	4	2	1											
95	94.0	6.0	6	12	17											
	91.5	8.5	7	20	45										ALLUVIAL Brown Fine to Coarse Sand with Some Gravel	6.0
90															RESIDUAL Brown Silt with Some Mica	9.0
	86.5	13.5	35	25	40											
85																
	81.5	18.5	16	9	40										Brown Silty Fine Sand	17.5
80																
	76.5	23.5	16	27	73/0.5											
75																
	71.5	28.5	75	25/0.1											WEATHERED ROCK (Biotite Gneiss)	24.5
70																
	67.5	32.5	80/0.1													
65																
60																
55																
50																
45																
40																
35																
30																
25																
20																

NCDOT BORE SINGLE 0508000\_GEO\_BRD60144\_SME\_10-057V.GPJ NC\_DOT.GDT 4/14/10

Boring Terminated with Standard Penetration Test Refusal at Elevation 67.4 ft on Crystalline Rock (Biotite Gneiss)  
 1) Advanced 3-1/4" HSA to 32.5 feet  
 2) N-Value at 7.0 feet inflated due to gravel

**NCDOT GEOTECHNICAL ENGINEERING UNIT**  
**BORELOG REPORT**

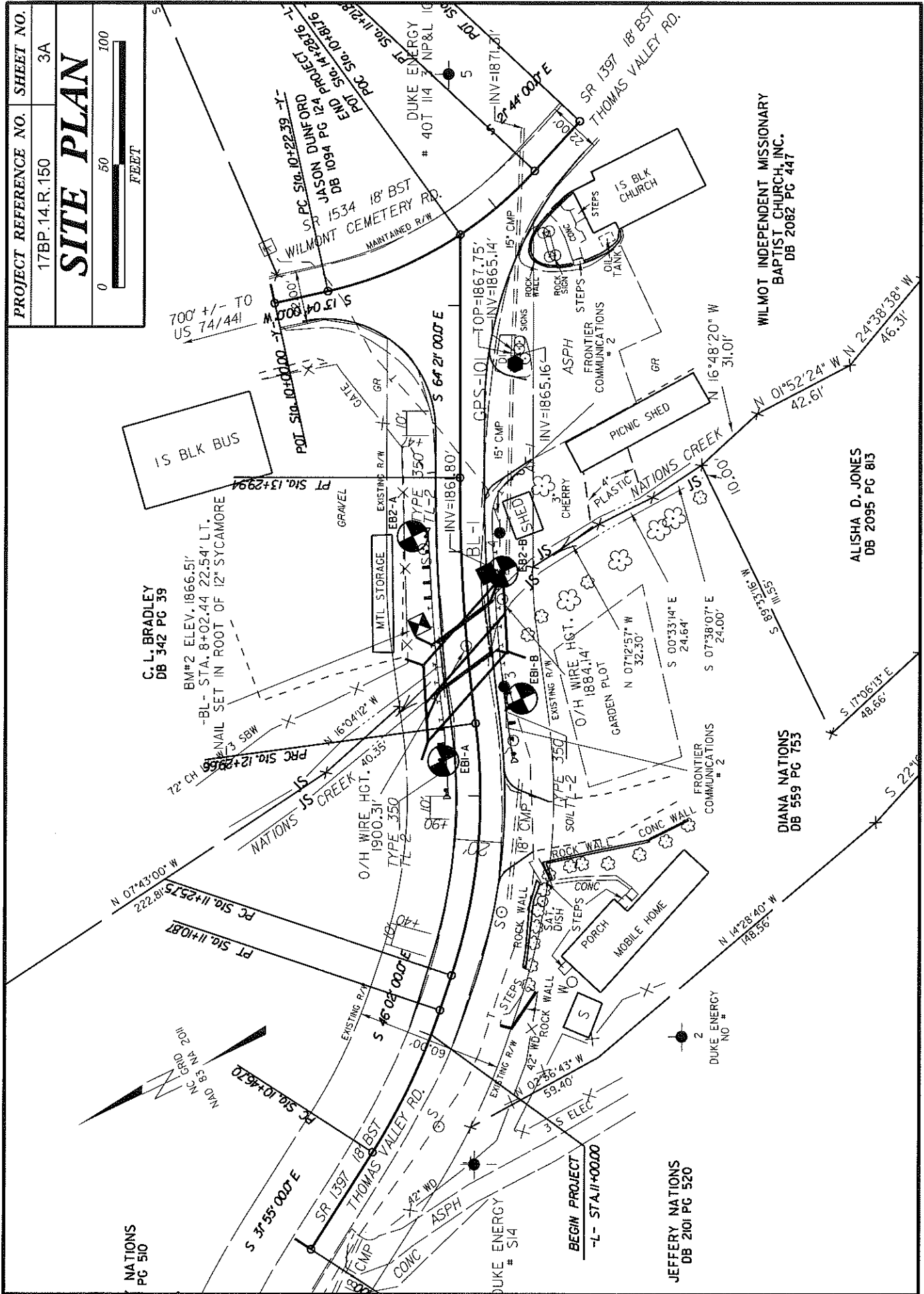
PROJECT NO. 42608.1.JA14	ID. M-0423	COUNTY Jackson	GEOLOGIST L. Ennis
SITE DESCRIPTION Bridge No. 144 on SR 1397 over Nations Creek			GROUND WTR (ft)
BORING NO. EB2-B	STATION <i>N/A 12+91</i>	OFFSET <i>N/A 17' RT</i>	ALIGNMENT <i>N/A -L-</i>
COLLAR ELEV. <i>98.9 ft 1864.4</i>	TOTAL DEPTH 27.6 ft	NORTHING 629,300	EASTING 714,943
DRILL MACHINE D-50	DRILL METHOD 3-1/4" HSA	HAMMER TYPE Automatic	
DRILLER Lynn	START DATE 03/25/10	COMP. DATE 03/25/10	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					ELEV. (ft)	
100																
	97.9	1.0												98.9	GROUND SURFACE	0.0
														96.4	ROADWAY EMBANKMENT Brown Silty Clay	2.5
95	95.4	3.5	1	1	1									93.4	Brown Clayey Fine Sand with Little Mica	5.5
	92.9	6.0	3	1	4									90.9	ALLUVIAL Brown Silty Fine Sand with Some Mica	8.0
90	90.4	8.5	9	9	4									86.9	Brown Fine to Coarse Sand with Some Gravel	12.0
			8	5	5											
85	85.4	13.5	8	4	4										RESIDUAL Brown Silt with Some Mica	
80	80.4	18.5	10	55	45/0.4									79.4	WEATHERED ROCK (Biotite Gneiss)	19.5
75	75.4	23.5	35	65/0.5												
70	71.4	27.5	60/0.1											71.3	Boring Terminated with Standard Penetration Test Refusal at Elevation 71.3 ft on Crystalline Rock (Biotite Gneiss)	27.6
65																
60																
55																
50																
45																
40																
35																
30																
25																
20																

NCDOT BORE SINGLE 050&000\_GEO\_BRD0144\_SME\_10-057V.GPJ NC\_DOT.GDT 4/14/10



PROJECT REFERENCE NO.	SHEET NO.
17BP.14.R.150	3A
<b>SITE PLAN</b>	



NATIONS PG 510

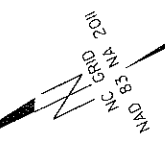
C. L. BRADLEY DB 342 PG 39

JEFFERY NATIONS DB 2101 PG 520

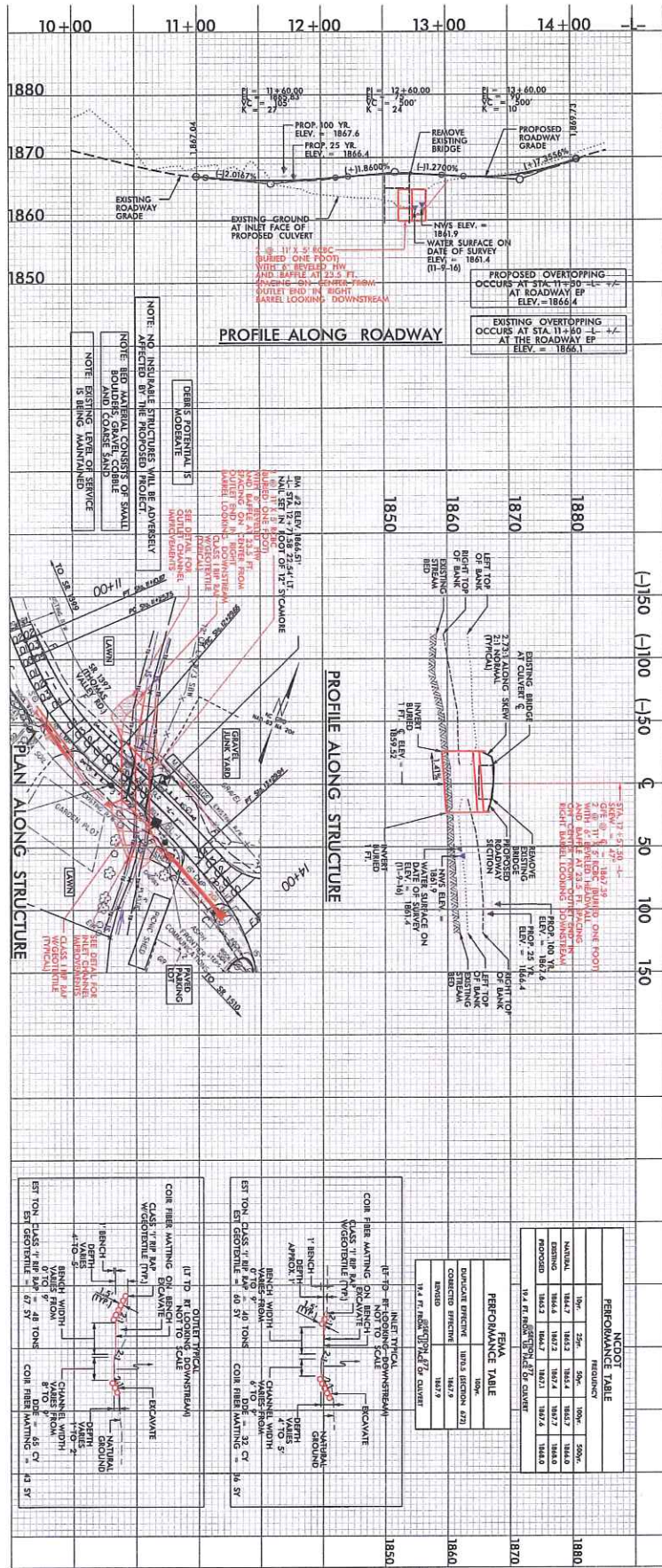
WILMOT INDEPENDENT MISSIONARY BAPTIST CHURCH, INC. DB 2082 PG 447

ALISHA D. JONES DB 2095 PG 813

DIANA NATIONS DB 559 PG 753



**17BP.14.R.150 - JACKSON COUNTY STRUCTURE 144  
CULVERT FOUNDATION RECOMMENDATIONS  
SUPPORTING DOCUMENTATION**



### CULVERT SURVEY & HYDRAULIC DESIGN REPORT

N. C. DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
HYDRAULICS UNIT  
RALEIGH, N. C.

Project No. 1787-14-150  
Proj. Station 17+52.50 - 17+57.50

County JACKSON Stream NATIONS CREEK Sra. No. 49014

On Highway (THOMAS VALLEY ROAD, Between S.R. 1377 and S.R. 1379)

Recommended Structure 2 @ 11' x 5' RCCE, JURRED, ONE FOOT WITH 6" BREWED HEADWALL AND BAPLE AT 23.5 FT. SPACING ON CENTER FROM OUTLET END IN RIGHT BARREL LOOKING DOWNSTREAM.

Recommended Width of Roadway: SHOULDER 11.0' TO SHOULDER 11.0' Sewer 4' 7"

Recommended Location to (Up, At, Down)-Stream-from Existing Crossing Sub-Regional Tier

Shoulder Mark is 100' (BENCHMARK IN 17+53.00) FROM 17.11 OF -5.5' STA. 17+71.58

Temporary Crossing NONE REQUIRED - OFFSITE DETOUR

Temporarily Closing N. 6793.0 E. 7149.3 Elev. 1866.5 ft. Datum NAMD 89

Designed by: MATHIEV, HARVEY  
Assisted by: KEVIN B. ALFORD, PE  
Reviewed by: [Signature] 7/1/16

#### SITE DATA

Drainage Area 21.50 sq. mi. Source USGS QUAD: WHITTIER  
River Basin LITTLE TENNESSEE Character RURAL RESIDENTIAL  
Stream Classification (such as Trout, High Quality Water, etc.) C  
Date on Existing Structure 1879, 1887, 1917, 1927, 1937, 1947, 1957, 1967, 1977, 1987, 1997, 2007, 2017  
Total Waterway Opening 33.0 cfs  
Dobbs Potential: Low c Moderate High c  
Date on Structures Up and Down Stream UPTHEAM: NO. COMPARABLE STRUCTURE  
DOWNSTREAM: NO. COMPARABLE STRUCTURE (INDICATE SOUTHERN BARROAD 330 FEET DOWNSTREAM)

#### Historical Flood Information:

Max. Discharge: NONE Date of Records: NONE Frequency: NONE  
Date: 2007 Elev. 1865.5 ft. Est. Freq. 10-yr. Source DOWNSTREAM LOCAL RESIDENT Period of Record 30 yrs.  
Allowable HW Elev. 1863.0 ft. Est. Freq. 10-yr. Source UPTHEAM LOCAL RESIDENT Knowledge 50 yrs.  
Manning's n: 1 Left 0.05 Channel 0.045 Right 0.05 1863.9 ft. Normal Water Surface Elev. 1861.9 ft.  
Flood Study/Status LIMITED STUDY (P.S. DATED 2-19-10) Observed From FEMA MOORE  
Flood Study 100 yr. Discharge 1212 cfs. WS Elev.-Non-encroachment 1870.5 ft. Non-encroachment 1870.5 ft. YES  
Flood Study 100 yr. Discharge 1212 cfs. WS Elev.-Non-encroachment 1870.5 ft. Non-encroachment 1870.5 ft. YES  
@ River Station 672

#### DESIGN DATA

Hydraulic Design Method HEC-2 REGION 2  
Design Discharge 700 cfs  
Design Flood Discharge 800 cfs  
Design Overtopping Discharge 700 cfs  
Design Velocity 5.0 f.p.s.  
Design Water Surface Elevation 1864.2 ft.  
Design Water Surface Elevation 1864.2 ft.  
Design Water Surface Elevation 1864.2 ft.

Size & Type	Q (cfs)	H (ft.)	W (ft.)	L (ft.)	H.W. (ft.)	Remarks
SEE HEC-2AS FOR ANALYSIS						

Information to be shown on plans: Required Outlet Protection, Class 1 RR PAV W/ GEOTECH (BANKS ONLY), Required Outlet Protection, Class 1 RR PAV W/ GEOTECH (BANKS ONLY), River Station 677

#### ADDITIONAL INFORMATION AND COMPUTATIONS

DA = 21.50 MI.  
FROM USGS RURAL REGRESSION EQUATIONS FOR DISCHARGES (USED FOR DESIGN COMPLIANCE):  
Q<sub>100</sub> = 2880 cfs  
Q<sub>50</sub> = 1980 cfs  
Q<sub>25</sub> = 1480 cfs  
Q<sub>10</sub> = 1080 cfs  
Q<sub>5</sub> = 780 cfs  
Q<sub>2</sub> = 580 cfs

#### PERFORMANCE TABLE

Frequency	10%	25%	50%	100%
NATURAL	1847	1843	1843	1843
DESIGNED	1843	1843	1843	1843
PROPOSED	1843	1843	1843	1843

#### DETAIL

### MULTI-BARREL CULVERT LOW FLOW CHANNELS/SILLS AND FLOOD PLAIN BENCH

**NOTES:**

- 1) NATIVE MATERIAL BETWEEN SUBSAMPLES CONTIGUOUS LOW FLOW CHANNELS, NATIVE MATERIAL TO BE EXCAVATED FROM THE STREAM BED TO EXPOSE THE SUBSAMPLES. ONLY MATERIAL BEING EXCAVATED FROM THE STREAM BED IS TO BE USED TO FILL THE LOW FLOW CHANNELS. THE NATIVE MATERIAL IN THE HIGH FLOOD CHANNELS IS TO BE EXCAVATED TO EXPOSE THE SUBSAMPLES. THE NATIVE MATERIAL IS TO BE EXCAVATED TO EXPOSE THE SUBSAMPLES. THE NATIVE MATERIAL IS TO BE EXCAVATED TO EXPOSE THE SUBSAMPLES.
- 2) SUBSAMPLES ARE TO BE 1.0' WIDE, CAST IN PLACE CONCRETE. SUBSAMPLES SHOULD BE CAST IN PLACE AT ALTERNATE LOW FLOOD CHANNELS TO BE EXCAVATED TO EXPOSE THE SUBSAMPLES. SUBSAMPLES ARE TO BE 1.0' WIDE, CAST IN PLACE CONCRETE. SUBSAMPLES SHOULD BE CAST IN PLACE AT ALTERNATE LOW FLOOD CHANNELS TO BE EXCAVATED TO EXPOSE THE SUBSAMPLES.
- 3) NOT SET ELEVATION OF HIGH SUBSAMPLES ABOVE BANK FULL.
- 4) NUMBER OF SUBSAMPLES DETERMINED BY THE NUMBER OF CHANNELS.



# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

PROJECT NO. 42608.1JA14	ID. M-0423	COUNTY Jackson	GEOLOGIST L. Ennis
SITE DESCRIPTION Bridge No. 144 on SR 1397 over Nations Creek			
BORING NO. EB1-A	STATION <i>N/A 12+15</i>	OFFSET <i>N/A 15' LT</i>	ALIGNMENT <i>N/A L</i>
COLLAR ELEV. 98.5 ft <i>1,866.0</i>	TOTAL DEPTH 19.1 ft	NORTHING 629,355	EASTING 714,884
DRILL MACHINE D-50	DRILL METHOD 3-1/4" HSA		HAMMER TYPE Automatic
DRILLER Lynn	START DATE 03/25/10	COMP. DATE 03/25/10	SURFACE WATER DEPTH N/A

GROUND WTR (ft)	0 HR. 5.0
	24 HR. N/M

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5R	0.5R	0	25	50	75	100					
1866.0															
	97.5	1.0	3	2	2									98.5	0.0
	95.0	3.5	3	1	2							M		94.5	4.0
1858.5	92.5	6.0	5	6	10							W		92.5	6.0
	90.0	8.5	9	7	10							Sal.		90.5	8.0
	85.0	13.5	10	50	50/0.3							M		84.0	14.5
	80.0	18.5	38	82/0.1										79.4	19.1

⊕ @ Invert = 1859.5'

culvert is Approx 6.5 ft  
Below Existing Grade.

Bottom of Excavation  
for Fdts Conditioning  
Material is 1858.5 ft.  
N=16 bpf. No  
undercut Anticipated.

NCDOT BORE SINGLE 0508000\_GEO\_BRDGG144\_SME\_10-057V.GPJ NC\_DOT.GDT 4/14/10



# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

PROJECT NO. 42608.1.JA14	ID. M-0423	COUNTY Jackson	GEOLOGIST L. Ennis
SITE DESCRIPTION Bridge No. 144 on SR 1397 over Nations Creek			
BORING NO. EB1-B	STATION <i>N/A 12+37</i>	OFFSET <i>N/A 20' RT</i>	ALIGNMENT <i>N/A L</i>
COLLAR ELEV. <del>96.7</del> <i>1863.0</i>	TOTAL DEPTH 31.8 ft	NORTHING 629,315	EASTING 714,893
DRILL MACHINE D-50	DRILL METHOD 3-1/4" HSA	HAMMER TYPE Automatic	
DRILLER Lynn	START DATE 03/25/10	COMP. DATE 03/25/10	SURFACE WATER DEPTH N/A

GROUND WTR (ft)	
0 HR.	3.8
24 HR.	N/M

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5R	0.5R	0.5R	0	25	50	75	100					
<del>100</del>															
<i>1863.0</i>															
95.7	95.7	1.0													
93.2	93.2	3.5	1	1	2										
90.2	90.2	6.5		12	10										
88.2	88.2	8.5	8	6	5										
83.2	83.2	13.5	8	10	14										
78.2	78.2	18.5	3	4	6										
73.2	73.2	23.5	12	18	30										
68.2	68.2	28.5	8	7	6										
65.0	65.0	31.7	85	15/0.1						100/0.6					

⊕ @ Invert = 1859.5'

⊕ Culvert is Approx 3.5 ft below Existing grade.

⊕ Bottom of Excavation For Fdtn Conditioning Material is 1859.5 ft.

⊕ N=22 bpf. No undercut Anticipated.

NCDOT BORE SINGLE 050&000\_GEO\_BRD0144\_SME\_10-057V.GPJ NC\_DOT.GDT 4/14/10

Boring Terminated with Standard Penetration Test Refusal at Elevation 64.9 ft on Crystalline Rock (Biotite Gneiss)

- 1) Advanced 3-1/4" HSA to 31.7 feet
- 2) N-Value at 9.5 feet inflated due to gravel



# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

PROJECT NO. 42608.1.JA14	ID. M-0423	COUNTY Jackson	GEOLOGIST L. Ennis
SITE DESCRIPTION Bridge No. 144 on SR 1397 over Nations Creek			GROUND WTR (ft)
BORING NO. EB2-A	STATION <i>N/A 13+07</i>	OFFSET <i>N/A -20 LT</i>	ALIGNMENT <i>N/A L</i>
COLLAR ELEV. <i>100.0 ft 1863.8</i>	TOTAL DEPTH 32.6 ft	NORTHING 629,327	EASTING 714,972
DRILL MACHINE D-50	DRILL METHOD 3-1/4" HSA	HAMMER TYPE Automatic	
DRILLER Lynn	START DATE 03/25/10	COMP. DATE 03/25/10	SURFACE WATER DEPTH N/A

1863.8  
1858.5

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	99.0	1.0													100.0	GROUND SURFACE	0.0
	96.5	3.5	2	WOH	1											ROADWAY EMBANKMENT Brown Clayey Fine Sand with Trace of Organics	
	94.0	6.0	4	2	1												
	91.5	8.5	6	12	17											ALLUVIAL Brown Fine to Coarse Sand with Some Gravel	9.0
	86.5	13.5	7	20	45											RESIDUAL Brown Silt with Some Mica	
	81.5	18.5	35	25	40												
	76.5	23.5	16	9	40											Brown Silty Fine Sand	17.5
	71.5	28.5	16	27	73/0.5												
	67.5	32.5	75	25/0.1												WEATHERED ROCK (Biotite Gneiss)	24.5

⊕ @ Invert = 1859.5'

Culvert is Approx 4.3 ft below existing grade.

Bottom of EXCAVATION For Fdtn Conditioning Material is 1858.5 Ft.  
N=3 bpf. Due to loose Foundation soils, include a contingency of 10 yd<sup>3</sup>.

For Contingency:  
 $22' \times 50' \times 1' = 41 \text{ cyd}$   
27  
At boring, Assume 25% of Area to be undercut = 10 cyd.

NCDOT BORE SINGLE 050&000\_GEO\_BRD00144\_SME\_10-057V.GPJ\_NC\_DOT.GDT 4/14/10

# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

PROJECT NO. 42608.1.JA14	ID. M-0423	COUNTY Jackson	GEOLOGIST L. Ennis
SITE DESCRIPTION Bridge No. 144 on SR 1397 over Nations Creek			GROUND WTR (ft)
BORING NO. EB2-B	STATION <i>N/A 12+91</i>	OFFSET <i>N/A 17' RT</i>	ALIGNMENT <i>N/A -L-</i>
COLLAR ELEV. <i>98.9 ft 1864.4</i>	TOTAL DEPTH 27.6 ft	NORTHING 629,300	EASTING 714,943
DRILL MACHINE D-50	DRILL METHOD 3-1/4" HSA	HAMMER TYPE Automatic	
DRILLER Lynn	START DATE 03/25/10	COMP. DATE 03/25/10	SURFACE WATER DEPTH N/A

1864.4

1858.5

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															98.9	GROUND SURFACE	0.0	
	97.9	1.0	1	1	1									M	96.4	ROADWAY EMBANKMENT Brown Silty Clay	2.5	
-85	95.4	3.5	3	1	4									Sal	93.4	Brown Clayey Fine Sand with Little Mica	5.5	
	92.9	6.0	9	9	4									Sal	90.9	ALLUVIAL Brown Silty Fine Sand with Some Mica	8.0	
80	90.4	8.5	8	5	5									Sal	86.9	Brown Fine to Coarse Sand with Some Gravel	12.0	
	85.4	13.5	8	4	4									W	79.4	RESIDUAL Brown Silt with Some Mica	19.5	
-80	80.4	18.5	10	55	45/0.4										79.4	WEATHERED ROCK (Biotite Gneiss)	19.5	
	75.4	23.5	35	65/0.5					100/0.9									
	71.4	27.5	60/0.1						100/1.0									
-70									60/0.1						71.3	Boring Terminated with Standard Penetration Test Refusal at Elevation 71.3 ft on Crystalline Rock (Biotite Gneiss)	27.6	
																1) Advanced 3-1/4" HSA to 27.5 feet		

@ Invert = 1859.5'

Culvert is Approx 4.9 ft below Existing Grade.

Bottom of Excavation for Fdn Conditioning Material is 1858.5 ft.

N=13 bpf. No undercut Anticipated.

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