

**Structure Investigation Report Bridge No. 740200
Proposed Double Concrete Box Culvert
SR 1142 over Cove Creek
Polk County, North Carolina
Project No. 17BP.14.R.75
S&ME Project No. 1351-11-343Y**

Prepared For:

Michael Baker Engineering
5550 Seventy-Seven Center Drive, Suite 320
Charlotte, North Carolina 28217

Prepared By:



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NC PE Firm License No. F-0176

July 18, 2012



July 18, 2012

Michael Baker Engineering
5550 Seventy-Seven Center Drive, Suite 320
Charlotte, North Carolina 28217

Attention: Mr. Chad Rogers, PE

Reference: Structure Investigation Report Bridge No. 740200
Proposed Double Concrete Box Culvert
SR 1142 over Cove Creek
Polk County, North Carolina
Project No.: 17BP.14.R.75
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Dear Mr. Rogers:

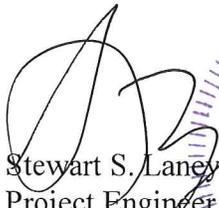
S&ME, Inc. has completed the subsurface exploration for the referenced project. The purpose of this study was to determine the subsurface conditions along the proposed new culvert alignment so that those conditions can be evaluated regarding the appropriate foundation conditioning and construction considerations for the double box culvert over Cove Creek. Authorization to proceed with this study was provided by execution of the Michael Baker Engineering Subconsultant Agreement for Professional Services dated February 1, 2012.

This report presents S&ME's findings of our investigation and foundation recommendations. Included in the Appendix are a Site Vicinity Map, Field Exploration Plan, Generalized Subsurface Cross Section, Boring Logs, Field Penetrometer Logs and Site Photographs.

S&ME appreciates the opportunity to assist you during this phase of the project. If you should have any questions concerning this report or if we may be of further assistance, please contact us.

Very truly yours,

S&ME, Inc.


Stewart S. Laney, PE 031013 7/18-12
Project Engineer
N.C. Registration No. 31013



SSL/KHH/cps


Kristen H. Hill, P.E., P.G.
Senior Geotechnical Engineer

S/1351/Project/2011/11-343Y

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SECTION 1000

GEOLOGIC INVENTORY REPORT

1010 Project Description

We understand that plans are to replace bridge structure no. 740200 in Polk County, North Carolina. The subject bridge structure site is located on SR 1142 at the Cove Creek crossing. The existing structure is a 19-foot long, single-span timber bridge with timber abutments. Based on the most recent information provided to us by Michael Baker Engineering, we understand that the structure will be replaced with a double concrete box culvert. The box culverts will be 8 feet x 5 feet and will be approximately 44 feet long with concrete endwalls. The culverts will be founded on conditioning material and the endwalls will have concrete footings. The culverts will have invert in elevations approximately between 1548.9 and 1548.7 feet and invert out elevations of approximately between 1548.4 and 1548.1 feet.

1020 Site Description & Geology

The project site is located in Polk County, North Carolina, at the crossing of Cove Creek on SR 1142 (Holbert Cove Road) to the east of Fox Paw Lane. At this crossing, Cove Creek runs approximately south to north and SR 1142 runs approximately east-west. The existing structure is approximately 19 feet in length with a width of approximately 20 feet and a height of approximately 5 feet. Grades are generally 3H:1V or flatter on both sides of SR 1142 and approximately 2H:1V at the end slopes on either side of the timber endwalls. The embankment slopes are covered grass.

The culvert site is located within the Inner Piedmont Belt of the Piedmont Physiographic and Geologic Province of North Carolina. The Piedmont Province generally consists of well-rounded hills and ridges, which are dissected by a well-developed system of draws and streams. The Piedmont Province is predominantly underlain by metamorphic rock (formed by heat, pressure and/or chemical action) and igneous rock (formed directly from molten material), which were initially formed during the Precambrian and Paleozoic eras. The volcanic and sedimentary rocks deposited in the Piedmont Province during the Precambrian eras were the host for the metamorphism and were changed to gneiss and schist. The more recent Paleozoic era had periods of igneous emplacement, with at least several episodes of regional metamorphism resulting in the majority of the rock types seen today.

The topography and relief of the Piedmont Province have developed from differential weathering of the igneous and metamorphic rock. Because of the continued chemical and physical weathering, the rocks in the Piedmont Province are now generally covered with a mantle of soil that has weathered in place from the parent bedrock. These soils have variable thicknesses and are referred to as residuum or residual soils. The residuum is typically finer grained and has a higher clay content near the surface because of the advanced weathering. Similarly, the soils typically become coarser grained with

increasing depth because of decreased weathering. As the degree of weathering decreases, the residual soils generally retain the overall appearance, texture, gradation and foliations of the parent rock. Alluvial soils, consisting of interbedded sands, silts, and clays, are common in the floodplain along rivers and creeks in the Piedmont.

1030 Field Testing

A combination of soil test borings and bridge rod soundings were used to determine the subsurface conditions in the vicinity of the proposed double box culvert. The field exploration methods were performed in accordance with the "NCDOT Geotechnical Unit Guidelines and Procedures Manual," revised March 1994.

The soil test boring and rod sounding locations were determined in the field by an S&ME staff professional. The test locations are presented relative to corresponding stations and offsets from the -L- survey line. Ground surface elevations indicated on the test logs were estimated with differential level measurements referenced to a benchmark (BM1) with a provided elevation of 1554.85 feet-MSL. The benchmark was provided to us by Michael Baker Engineering and was identified as a railroad spike set into a utility pole on the east side of Cove Creek and the south side of SR 1142.

1031 Soil Test Borings

Soil test borings were conducted on February 22, 2012. Four borings (designated EB1-A, EB1-B, EB2-A and EB2-B) were drilled by S&ME personnel along the existing roadway in the vicinity of the existing bridge, near the proposed culvert corners as shown on the Field Exploration Plan (Sheet No. 4). The borings were drilled with a CME-45B drill rig mounted on a truck carrier. The borings were advanced to depths ranging from 28.9 to 29.6 feet (elevations 1525.8 to 1526.9 feet-MSL).

All of the borings were penetrated using 2-1/4 inch hollow stem auger procedures into weathered rock. Standard penetration tests were performed in accordance with AASHTO T206-87 in all of the borings. No rock coring was performed as part of this study.

1032 Rod Soundings

On February 29, 2012, S&ME personnel performed three (3) rod soundings (designated RS-1 through RS-3) at the approximate locations shown on the Field Exploration Plan. The rod soundings were advanced to depths ranging between 5 and 12 feet (elevations 1544.6 to 1538.6 feet-MSL) below the existing ground surface.

1040 Laboratory Testing

No laboratory testing has been performed at this time.

1050 Subsurface Conditions

The test borings indicate relatively uniform subsurface conditions at the proposed culvert location as indicated on the attached Generalized Subsurface Cross Section (see Sheet No. 5). The descriptions of the subsurface conditions in the following paragraphs are based on conditions encountered in the soil test borings. The Generalized Subsurface Cross Section was developed by S&ME personnel utilizing surveying techniques

referencing the benchmark provided and existing site features. In addition, detailed descriptions of the conditions encountered at the individual test boring location are presented on the attached Boring Logs.

1051 Fill Materials

Roadway embankment fill materials were encountered in each of the borings to depths of approximately 5.5 feet (elevations 1550.3 to 1549.6 feet-MSL) beneath the collar elevations. The fill materials encountered consist of brown silty sand (A-2-4) and brown clay (A-6). Standard penetration test (SPT) N-values in the fill soils ranged from 2 to 16 blows per foot (bpf).

1052 Residuum

Residual soils were encountered beneath the roadway embankment fill materials in each boring. The residual soils generally consist of brown gravelly sand (A-1-b) and white and brown silty sand (A-2-4). The SPT N-values in the residuum ranged from 7 to 90 bpf.

Weathered rock was encountered beneath the residual soils in each boring. The surface of the weathered rock was encountered at depths of approximately 27 feet (elevations 1528.8 to 1528.1) feet beneath the collar elevations. The weathered rock materials were penetrated by the split-spoon sampler to depths of 28.9 to 29.6 feet (elevations 1526.9 to 1525.8 feet) beneath the collar elevations. The SPT N-values in the weathered rock materials ranged from 100 blows per 0.8 feet of penetration to 100 blows per 0.4 feet of penetration. All borings were terminated in the weathered rock.

1060 Groundwater

Groundwater was measured in Borings EB1-A, EB-1B, EB2-A and EB-2B at depths of 6, 6, 5, and 5 feet below the existing ground surface (approximate elevations of 1550.4 to 1549.6 feet-MSL) at the respective boring terminations. Water levels were measured after a waiting period of at least 24 hours in Borings EB1-A, EB-1B, EB2-A and EB-2B at depths of 6, 7.8, 5.9 and 6.5 feet below the existing ground surface (approximate elevations of 1549.6 to 1548 feet-MSL). All of the borings were backfilled with soil cuttings on February 23, 2012. Please note that groundwater levels tend to fluctuate with seasonal and climatic variations, as well as with some types of construction operations.

SECTION 2000

FOUNDATION RECOMMENDATIONS

2010 Foundation Support

We understand that the proposed culvert will consist of double 8 feet by 5 feet concrete box culverts with invert elevations ranging approximately between 1548.9 and 1548.1 feet. Based on our subsurface exploration, the average elevation of the top of residual materials is at an approximate elevation of 1550 feet along the proposed culvert alignment. The box culverts should be installed to bear on a minimum of 12 inches of foundation conditioning material in accordance with NCDOT Standard Specifications

Division 300. Foundation conditioning material for the box culverts should be placed on the loose to medium dense sandy residual soils. Alluvial soils, if encountered, are not suitable for conditioning material or endwall foundation support and should be undercut prior to conditioning material placement and endwall construction. The box culvert and headwall foundations shall be designed for a factored resistance of 1.0 ton per square (tsf) on residual sandy soils, which should be verified in the field.

Total and differential settlements along the proposed culvert alignment are anticipated to be less than 1 inch and 1/2 inch, respectively, if constructed on loose to medium dense residual sands. Total settlements for the head walls and wing walls are anticipated to be less than 1 inch if the undercut recommendations are implemented. Differential settlements between adjacent head walls and wing walls should be less than 1/2 inch.

Depending upon the creek level, dewatering of up to 5 feet may be required for installation of the box culverts and construction of the endwalls. Foundation construction should be performed on one side of the creek at a given time. The existing creek should be temporarily dammed and water pumped away from the construction area. Cased sumps with submersible pumps may be required within the excavation. As the excavation to adequate and level bearing materials for the foundation proceeds, pumping from the cased sumps should be maintained to dewater the excavation.

The proposed roadway construction will require up to approximately 7 feet of fill placement in the subject culvert area. Settlement resulting from the loading associated with fill placement is anticipated within newly placed embankment soils and underlying bearing soils where embankment construction will occur. It is anticipated that the majority of settlement of these materials will occur during placement of the new embankment fill. To reduce maintenance and repair of the approach fill, placement of roadway embankment shall be performed soon after construction has started to allow at least a 1-month waiting period for settlement of the embankment to occur prior to placement of the surface course. This will help to prevent delays in the completion of the project. It should be anticipated that undercutting of alluvial soils will be required prior to placement of new roadway embankment materials.

SECTION 3000

QUALIFICATIONS OF REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions contained in this report were based on the applicable standards of our profession at the time this report was prepared. No other warranty, expressed or implied, is made.

The conclusions submitted in this report are based, in part, upon the data obtained from the subsurface exploration. The nature and extent of subsurface variations between the borings may not become evident until construction. If variations appear evident, then the conclusions contained in this report may need to be re-evaluated. In the event that any

changes in the nature, design, or location of the structure are planned, the conclusions contained in this report will not be considered valid unless the changes are reviewed by S&ME, and the conclusions of the report are modified or verified in writing.

FOUNDATION RECOMMENDATION NOTES AND COMMENTS

Project No. 17BP.14.R.75

Description: Replace Bridge No. 740200 on SR 1142 over Cove Creek

County: Polk

Station: 13+08 -L- Double 8' x 5' Concrete Box Culvert @ 70° Skew

Design: LAC/SSL

Date: 7/18/2012

LOCATION NO.	STATION	FOUNDATION TYPE	FACTORED RESISTANCE	MISCELLANEOUS DETAILS
North Side of Culvert	13+08 -L-	Concrete Head Wall and Wing Wall Footing	1.0 tons/square ft.	Min. Bottom Elev.: 1547.1
Middle of Culvert	13+08 -L-	Concrete Double Box Culvert on Foundation Blanket	1.0 tons/square ft.	Min. Bottom Elev.: 1547.4
South Side of Culvert	13+08 -L-	Concrete Head Wall and Wing Wall Footing	1.0 tons/square ft.	Min. Bottom Elev.: 1547.7

FOUNDATION RECOMMENDATION NOTES

1. The scour critical elevation for the north side of the culvert is the bottom of footing elevation. Scour critical elevations are used to monitor possible scour problems during the life of the structure.
2. The Required Resistance for spread footings at the north side of the culvert is 2.2 tsf. Check field conditions for the required bearing capacity just before placing concrete.
3. The Factored Resistance for spread footings at the north side of the culvert is 1.0 tsf.
4. Key spread footings at the north side of the culvert at least 12" into residual material with minimum thickness as shown on the plans.

5. To provide protection from possible scour, do not construct spread footings at the north side of culvert at an elevation higher than shown on the plans.
6. Scour protection is required for spread footings at the north side of culvert. Do not place rip rap above the stream bed.
7. The scour critical elevation for the south side of the culvert is the bottom of footing elevation. Scour critical elevations are used to monitor possible scour problems during the life of the structure.
8. The Required Resistance for spread footings at the south side of the culvert is 2.2 tsf. Check field conditions for the required bearing capacity just before placing concrete.
9. The Factored Resistance for spread footings at the south side of the culvert is 1.0 tsf.
10. Key spread footings at the south side of the culvert at least 12" into residual material with minimum thickness as shown on the plans.
11. To provide protection from possible scour, do not construct spread footings at the south side of culvert at an elevation higher than shown on the plans.
12. Scour protection is required for spread footings at the south side of culvert. Do not place rip rap above the stream bed.
13. Backfill with select material, class VI meeting the requirements of section 1016 of the standard specifications.

SPECIAL FOUNDATION RECOMMENDATION NOTES

1. The spread footing elevations at the north side of the culvert may be lowered to satisfy the required resistance and minimum embedment in residual material.
2. No work shall be done at the north side of culvert until the undercut to residual / suitable material and proper disposal of the alluvial / unsuitable bearing material has been completed. The limits of this undercut elevation shall be to an elevation no greater than 1547.1 feet.
3. The spread footing elevations at the south side of the culvert may be lowered to satisfy the required resistance and minimum embedment in residual material.
4. No work shall be done at the south side of culvert until the undercut to rock / suitable material and proper disposal of the unsuitable bearing material has been completed. The limits of this undercut elevation shall be to an elevation no greater than 1547.7 feet.

5. The required resistance at the base of the culvert is 2.2 tsf. The required resistance shall be verified.
6. The concrete box culverts shall be placed on the standard 1.0 foot of foundation conditioning material.

GENERAL COMMENTS

1. Temporary shoring may be required for the culvert and wall construction.
2. Temporary cofferdams may be required for construction of culvert foundations.
3. Reinforced bridge approach fills are required at each approach.
4. No waiting period is required for culvert construction.
5. Settlement of the roadway approach embankment is anticipated. Placement of roadway embankment shall be done soon after construction has started to allow a one month waiting period for settlement within the embankment to occur prior to surface course construction so as not to delay the completion of the project.

APPENDIX

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
NC	17BP.14.R.75	1A	16

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

PROJECT 17BP.14.R.75
COUNTY POLK
PROJECT DESCRIPTION REPLACE BRIDGE
NO. 740200 ON SR 1142 OVER COVE CREEK
SITE DESCRIPTION PROPOSED DOUBLE
CONCRETE BOX CULVERT ON SR 1142 OVER
COVE CREEK

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.

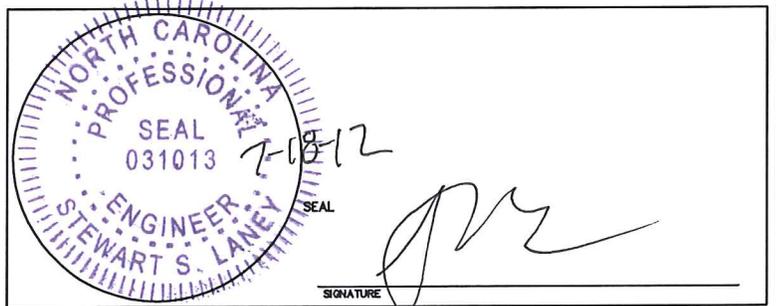
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (N-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

INVESTIGATED BY S&ME, INC. PERSONNEL J. WILLIAMSON
CHECKED BY STEWART S. LANEY N. PAGE
SUBMITTED BY S&ME, INC. L. CAMPOS
DATE 7/18/2012 K. HILL
C. ODOM
J. JACKSON



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
NC	17BP.14.R.75	1B	16

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STRUCTURE

SUBSURFACE INVESTIGATION

PROJECT 17BP.14.R.75

COUNTY POLK

PROJECT DESCRIPTION REPLACE BRIDGE
NO. 740200 ON SR 1142 OVER COVE CREEK

SITE DESCRIPTION PROPOSED DOUBLE
CONCRETE BOX CULVERT ON SR 1142 OVER
COVE CREEK

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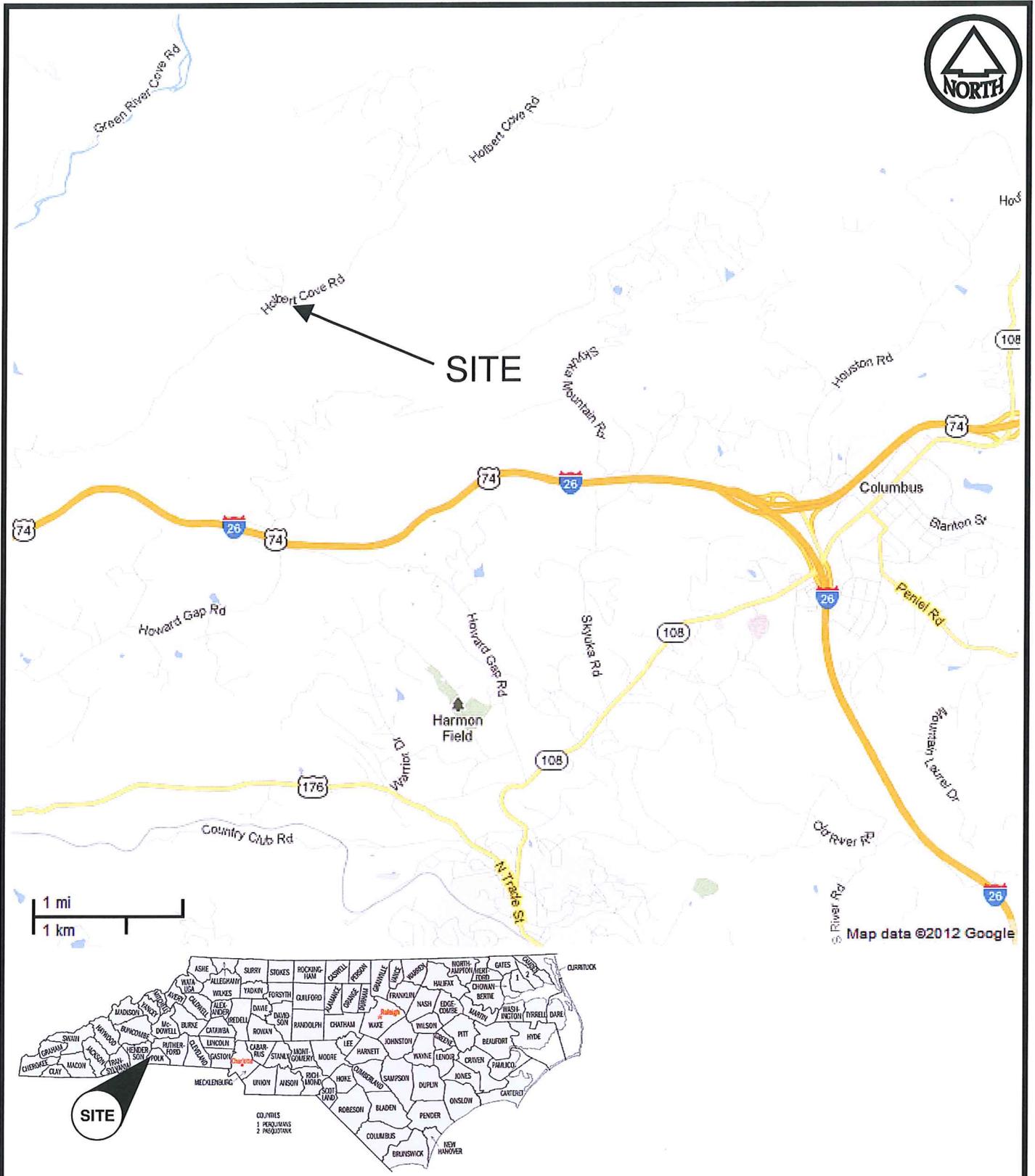
NCDOT Geotechnical Unit Soil and Rock Classification Sheet	Sheets 2A & 2B
Site Vicinity Map	Sheet 3
Field Exploration Plan	Sheet 4
Generalized Subsurface Cross Section STA 13+08 -L-	Sheet 5
Test Boring Logs	Sheets 6 - 12
Site Photographs	Sheets 13 - 16

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL 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 WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND 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, MOST 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.									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS									
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.										MINERALOGICAL COMPRESSION									
GENERAL CLASS. GRANULAR MATERIALS (<=35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										COMPRESSIONIBILITY									
GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7										SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30 MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50									
SYMBOL										PERCENTAGE OF MATERIAL									
% PASSING #10, #40, #200										ORGANIC MATERIAL GRANULAR SILT-CLAY OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% LITTLE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE									
LIQUID LIMIT PLASTIC INDEX GROUP INDEX										GROUND WATER									
USUAL TYPES OF MAJOR MATERIALS 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 HOLE CAVE SPRING OR SEEPAGE									
CONSISTENCY OR DENSENESS										MISCELLANEOUS SYMBOLS									
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/F12)										ROADWAY EMBANKMENT WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS INFERRED SOIL BOUNDARIES INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP/DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD									
U.S. STD. SIEVE SIZE OPENING (MM)										SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE									
TEXTURE OR GRAIN SIZE										ABBREVIATIONS									
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F. SD.) SILT (SL.) CLAY (CL.)										AR - AUGER REFUSAL BT - BORING TERMINATED CL. - CLAY CPT - CONE PENETRATION TEST CSE. - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F. - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED FRAGS. - FRAGMENTS MED. - MEDIUM PMT - PRESSUREMETER TEST SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL U - UNIT WEIGHT U _d - DRY UNIT WEIGHT W - MOISTURE CONTENT V. - VERY VST - VANE SHEAR TEST									
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: CORE SIZE: HAND TOOLS:									
LL LIQUID LIMIT PLASTIC RANGE (PI) PL PLASTIC LIMIT OW OPTIMUM MOISTURE SHRINKAGE LIMIT										<input type="checkbox"/> MOBILE B- <input type="checkbox"/> DIEDRICH D-50 <input type="checkbox"/> CME-550x <input type="checkbox"/> CME-750 <input type="checkbox"/> PORTABLE HOIST <input checked="" type="checkbox"/> OTHER CME-45B <input type="checkbox"/> OTHER									
PLASTICITY										<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG.-CARBIDE INSERTS <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE " STEEL TEETH <input type="checkbox"/> TRICONE " TUNG.-CARB. <input type="checkbox"/> CORE BIT <input checked="" type="checkbox"/> OTHER 2-1/4" H.S.A. <input type="checkbox"/> OTHER									
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY										<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL <input type="checkbox"/> -B <input type="checkbox"/> -N <input type="checkbox"/> -H <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input checked="" type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST <input type="checkbox"/> OTHER									
COLOR										REVISIONS									
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.										REVISED 10/08/2009									

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL UNIT SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

ROCK DESCRIPTION		TERMS AND DEFINITIONS	
<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>		<p>ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>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.</p> <p>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.</p> <p>CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>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.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSELE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>ROCK QUALITY DESIGNATION (R.Q.D.) - 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.</p> <p>SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p>SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.</p> <p>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR B.P.F.) 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 LESS THAN 0.1 FOOT PENETRATION WITH 60 BLOWS.</p> <p>STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - 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.</p> <p>TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>	
WEATHERED ROCK (WR)		NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER FOOT.	
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 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 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 0.16 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: BM1 RR SPIKE IN UTILITY POLE	
		ELEVATION: 1554.85'	
NOTES:			



SCALE:
AS SHOWN

DRAWN BY:
LAC

CHECKED BY:
SSL

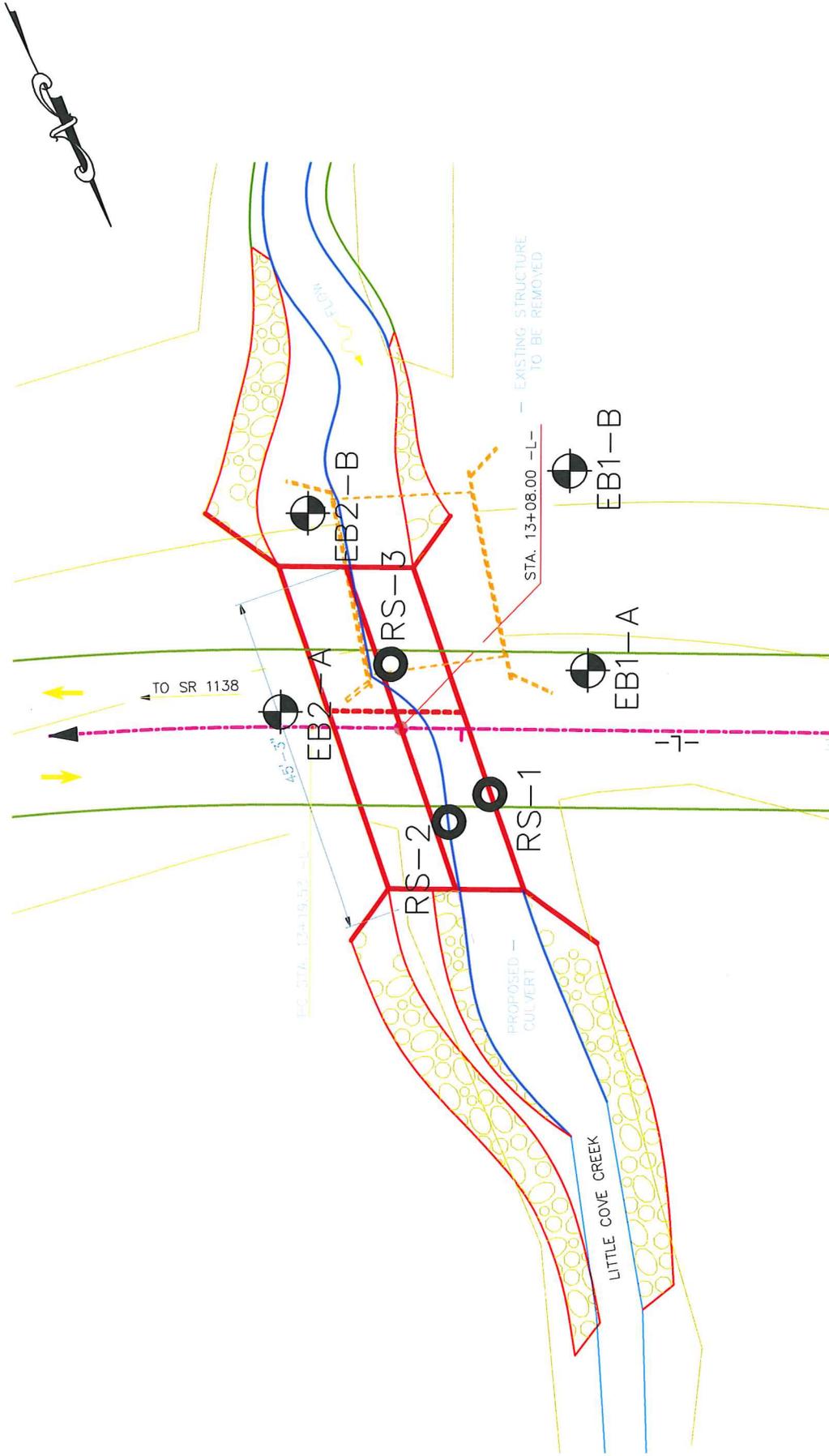
DATE:
7/18/2012

S&ME
ENGINEERING • TESTING
ENVIRONMENTAL SERVICES

SITE VICINITY MAP
REPLACE BRIDGE NO 740200
ON SR 1142 OVER COVE CREEK
POLK COUNTY, NORTH CAROLINA

PROJECT NO.: 17BP.14.R.75

SHEET NO.
3

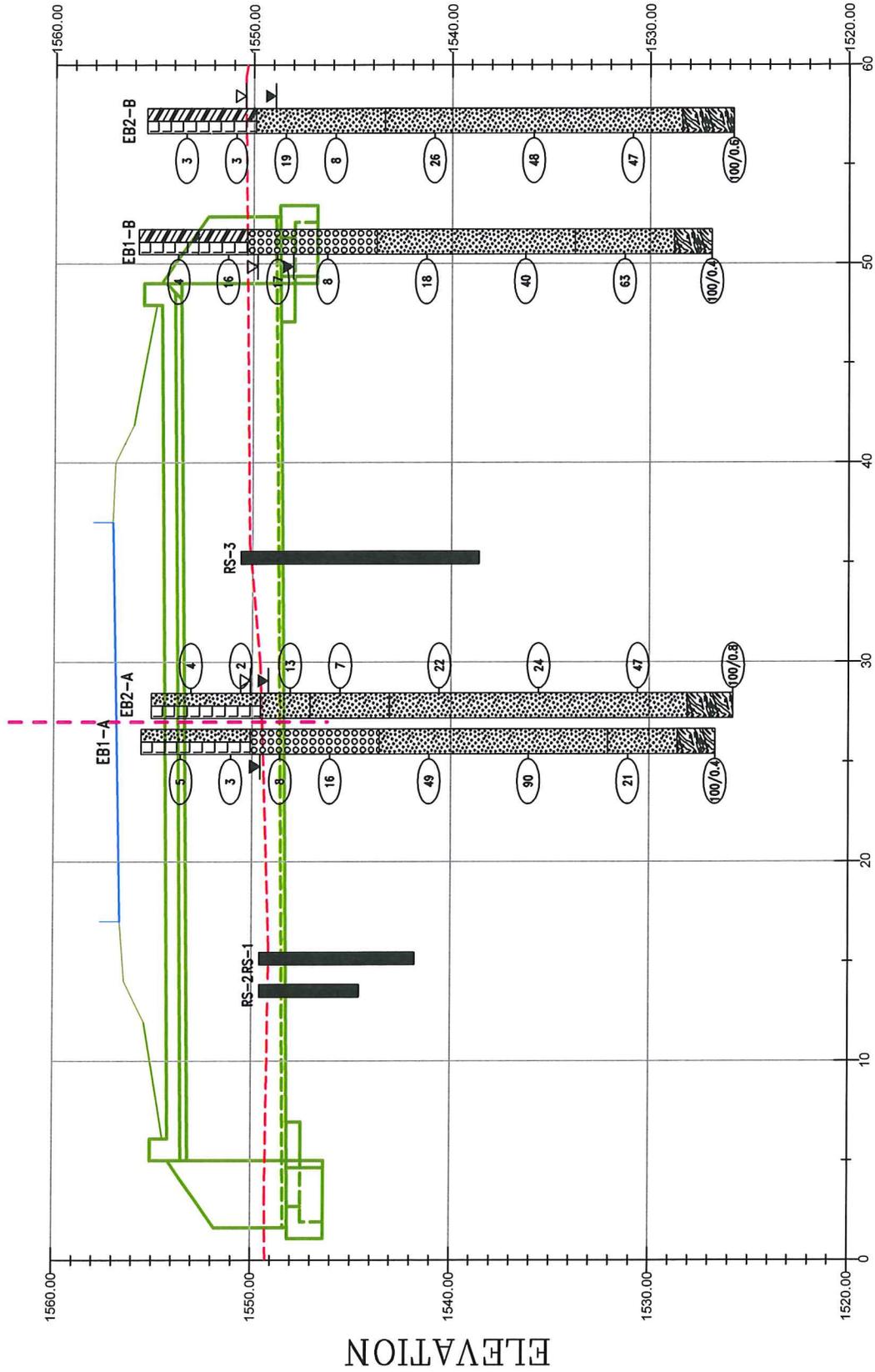


LEGEND

- APPROXIMATE BORING LOCATION
- APPROXIMATE ROD SOUNDING LOCATION

 S&ME WWW.SMEINC.COM		FIELD EXPLORATION PLAN		SHEET NO. <h1 style="font-size: 2em;">4</h1>
SCALE: 1" = 20'		DATE: 7/18/2012		REPLACE BRIDGE NO 740200 ON SR 1142 OVER COVE CREEK POLK COUNTY, NORTH CAROLINA
PROJECT NO. 17BP.14.R.75		DRAWN BY: LAC		
CHECKED BY: SSL		ENGINEERING LICENSE NO: F-0176		

DRAWING PATH:



Distance (feet)

SCALE: 1" = 8'
 PROJECT NO. 17BP.14.R.75
 CHECKED BY: SSL

DATE: 7/18/2012
 DRAWN BY: LAC



GENERALIZED SUBSURFACE CROSS SECTION

STA 13+08 -L-
 REPLACE BRIDGE NO 740200
 ON SR 1142 OVER COVE CREEK
 POLK COUNTY, NORTH CAROLINA

SHEET NO.

5



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.14.R.75	TIP N/A	COUNTY Polk	GEOLOGIST N. Page
SITE DESCRIPTION PROPOSED DOUBLE CONCRETE BOX CULVERT ON SR 1142 OVER COVE CREEK			GROUND WTR (ft)
BORING NO. EB1-A	STATION 12+84	OFFSET 8 ft RT	ALIGNMENT -L-
COLLAR ELEV. 1,555.6 ft	TOTAL DEPTH 28.9 ft	NORTHING 1,024,487	EASTING 569,838
DRILL RIG/HAMMER EFF./DATE CME-45B		DRILL METHOD 2-1/4" HSA	HAMMER TYPE Automatic
DRILLER C. Odom	START DATE 02/22/12	COMP. DATE 02/22/12	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
1560																	
1555	1,554.6	1.0	2	2	3										1,555.6	GROUND SURFACE	
	1,552.1	3.5	WOH	2	1												
1550	1,549.6	6.0	8	5	3										1,550.1	RESIDUAL	
	1,547.1	8.5	7	8	8												
1545																	
	1,542.1	13.5	24	25	24										1,543.6	RESIDUAL	
1540																	
	1,537.1	18.5	11	32	58												
1535																	
	1,532.1	23.5	10	11	10										1,532.1	RESIDUAL	
1530																	
	1,527.1	28.5	100/0.4												1,528.6	WEATHERED ROCK	
															1,526.7	WEATHERED ROCK	

NCDOT BORE SINGLE 51-343Y-BRIDGE #200.GPJ NC_DOT.GDT 7/18/12

Boring Terminated at Elevation 1,526.7 ft In Weathered Rock (Granitic Gneiss)

- 1) 2-1/4" Hollow Stem Augers Advanced to 28.9 Feet
- 2) Boring Terminated at 28.9 Feet



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.14.R.75	TIP N/A	COUNTY Polk	GEOLOGIST J. Williamson
SITE DESCRIPTION PROPOSED DOUBLE CONCRETE BOX CULVERT ON SR 1142 OVER COVE CREEK			GROUND WTR (ft)
BORING NO. EB1-B	STATION 12+87	OFFSET 33 ft RT	ALIGNMENT -L-
COLLAR ELEV. 1,555.8 ft	TOTAL DEPTH 28.9 ft	NORTHING 1,024,478	EASTING 569,813
DRILL RIG/HAMMER EFF./DATE CME-45B		DRILL METHOD 2-1/4" HSA	HAMMER TYPE Automatic
DRILLER C. Odom	START DATE 02/22/12	COMP. DATE 02/22/12	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
1560																	
															1,555.8	GROUND SURFACE	0.0
1555	1,554.8	1.0	2	2	2								M		ROADWAY EMBANKMENT Soft Brown Clay (A-6)		
	1,552.3	3.5	3	8	8								W		ROADWAY EMBANKMENT Very Stiff Brown Clay (A-6)	3.0	
1550	1,549.8	6.0	5	7	10								Sat.		RESIDUAL Medium Dense to Loose Brown Gravelly Sand (A-1-b), Fine to Coarse	5.5	
	1,547.3	8.5	13	4	4								Sat.				
1545																	
	1,542.3	13.5	6	8	10								M		RESIDUAL Medium Dense to Dense White and Brown Silty Sand (A-2-4), Micaceous	12.0	
1540																	
	1,537.3	18.5	17	18	22								M				
1535																	
	1,532.3	23.5	21	23	40								M		RESIDUAL Very Dense White and Brown Silty Sand (A-2-4), Micaceous	22.0	
1530																	
	1,527.3	28.5											M		WEATHERED ROCK (Granitic Gneiss)	27.0	
			100/0.4												1,526.9	Boring Terminated at Elevation 1,526.9 ft In Weathered Rock (Granitic Gneiss)	28.9
																1) 2-1/4" Hollow Stem Augers Advanced to 28.9 Feet 2) Boring Terminated at 28.9 Feet	

NCDOT BORE SINGLE 51-343Y-BRIDGE #200.GPJ NC_DOT_GDT 7/18/12



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.14.R.75	TIP N/A	COUNTY Polk	GEOLOGIST N. Page
SITE DESCRIPTION PROPOSED DOUBLE CONCRETE BOX CULVERT ON SR 1142 OVER COVE CREEK			GROUND WTR (ft)
BORING NO. EB2-B	STATION 13+20	OFFSET 28 ft RT	ALIGNMENT -L-
COLLAR ELEV. 1,555.4 ft	TOTAL DEPTH 29.6 ft	NORTHING 1,024,511	EASTING 569,803
DRILL RIG/HAMMER EFF./DATE CME-45B		DRILL METHOD 2-1/4" HSA	HAMMER TYPE Automatic
DRILLER C. Odom	START DATE 02/22/12	COMP. DATE 02/22/12	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
1560																	
1555	1,554.4	1.0	1	2	1										1,555.4	GROUND SURFACE	
																	ROADWAY EMBANKMENT Soft Brown Clay (A-6)
	1,551.9	3.5	2	1	2												
1550	1,549.4	6.0	6	8	11										1,549.9	5.5	RESIDUAL Medium Dense to Loose Brown Silty Sand (A-2-4), Some Amounts of Gravel
	1,546.9	8.5	6	4	4												
1545																	
	1,541.9	13.5	6	12	14										1,543.4	12.9	RESIDUAL Medium Dense to Dense Brown and White Silty Sand (A-2-4), Fine to Coarse, Micaceous
1540																	
	1,536.9	18.5	15	22	26												
1535																	
	1,531.9	23.5	15	24	23												
1530																	
	1,526.9	28.5	9	76	24/0.1										1,528.4	27.0	WEATHERED ROCK (Granitic Gneiss)
															1,525.8	29.6	Boring Terminated at Elevation 1,525.8 ft In Weathered Rock (Granitic Gneiss)
																	1) 2-1/4" Hollow Stem Augers Advanced to 29.6 Feet 2) Boring Terminated at 29.6 Feet

NCDOT BORE SINGLE 51-343Y- BRIDGE #200.GPJ_NC_DOT.GDT 7/18/12



NCDOT GEOTECHNICAL ENGINEERING UNIT
FIELD PENETROMETER LOG (ENGLISH)

PROJECT NUMBER	17.BP.14.R.75	ID		CO	POLK	GEO	J. WILLIAMSON	
SITE DESC	PROPOSED DOUBLE CONCRETE BOX CULVERT ON SR 1142 OVER COVE CREEK							
BORING NUMBER	RS-1	STA	12+96	OFFSET	8 FT	LT	ALIGNMENT -L-	
ELEVATION	1549.6 FT	TOTAL DEPTH	7.8 FT	NORTH	569,846	EAST	1,024,506	
DRILL METHOD	ROD SOUNDING						DRILLER	J. WILLIAMSON
START DATE	02/28/12	COMP DATE	02/28/12	SURFACE WTR DEPTH	0.4 FT	DEPTH TO ROCK	7.8 FT	

DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMPLE NO. & INTERVAL	MOI	ORIGIN	SOIL & ROCK DESCRIPTION <small>SOIL or ROCK NAME (w/ color, density/consistency, texture, plasticity, organics, other)</small>
	0.5 ft	0.5 ft	TOTAL	0	25	50	75				
0	2		2								
4	2		6								
4	7		11								
12	7		19								
9	11		20								
30	23		53								
28	33		61								
45	25/0.3	70/0.8									Rod Sounding Refusal at Elevation 1541.8
10											
15											
20											
25											
30											
35											

NOTES _____

SIGNATURE _____ DATE _____
 NOTES _____

DECK TO DATUM DISTANCE _____ FT



NCDOT GEOTECHNICAL ENGINEERING UNIT
FIELD PENETROMETER LOG (ENGLISH)

PROJECT NUMBER	17.BP.14.R.75	ID		CO	POLK	GEO	J. WILLIAMSON	
SITE DESC	PROPOSED DOUBLE CONCRETE BOX CULVERT ON SR 1142 OVER COVE CREEK							
BORING NUMBER	RS-2	STA	13+01	OFFSET	12 FT	LT	ALIGNMENT -L-	
ELEVATION	1549.6 FT	TOTAL DEPTH	5.0 FT	NORTH	569,847	EAST	1,024,512	
DRILL METHOD	ROD SOUNDING						DRILLER	J. WILLIAMSON
START DATE	02/28/12	COMP DATE	02/28/12	SURFACE WTR DEPTH	0.4 FT	DEPTH TO ROCK	5.0 FT	

DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMPLE NO. & INTERVAL	MOI	ORIGIN	SOIL & ROCK DESCRIPTION <small>SOIL or ROCK NAME (w/ color, density/consistency, texture, plasticity, organics, other)</small>
	0.5 ft	0.5 ft	TOTAL	0	25	50	75				
8	3		11								
5	7		12								
10	3		13								
11	14		25								
20	22/0.5	42/1.0									Rod Sounding Refusal at Elevation 1544.6
10											
15											
20											
25											
30											
35											

NOTES

SIGNATURE _____ DATE _____

NOTES

DECK TO DATUM DISTANCE _____ FT



Photograph No. 1:
View looking east up-station from west approach



Photograph No. 2:
View looking west down-station from east approach



Photograph No. 3:
View looking north downstream from bridge deck



Photograph No. 4:
View looking south upstream from bridge deck



Photograph No. 5:
View looking south across End Bent 1



Photograph No. 6:
View looking north across End Bent 1



Photograph No. 7:
View looking south across End Bent 2



Photograph No. 8:
View looking north across End Bent 2

