

REFERENCE: SF-750416

PROJECT: 17BP.8.R.76

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-750416	1	10

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

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**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY RANDOLPH

PROJECT DESCRIPTION BRIDGE 416 ON SR 1911  
(ASHLAND ST.) OVER DALE CREEK

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SITE DESCRIPTION CULVERT  
2 @ 10'x6' RCBC  
SKEW=90 DEG.

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	CROSS SECTION(S)
6-9	BORE LOG(S) & CORE REPORT(S)
10	SITE PHOTOGRAPHS)

PERSONNEL

J.K. STICKNEY

C.L. SMITH

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INVESTIGATED BY J.E. BEVERLY

DRAWN BY J.K. McCLURE

CHECKED BY C.B. LITTLE

SUBMITTED BY C.B. LITTLE

DATE OCTOBER 2014

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT 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 (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 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 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.

NOTES:  
 1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.  
 2. 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.



DocuSigned by:  
Clinton B. Little 28/2014

SIGNATURE DATE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS
(PAGE 1 OF 2)

SOIL DESCRIPTION

SOIL IS CONSIDERED 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 THE STANDARD PENETRATION TEST (ASTM 1286, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

SOIL LEGEND AND AASHTO CLASSIFICATION

Table with columns for General Class, Group Class, Symbol, % Passing, Material Passing #40, #100, #200, and Group Index. It details soil classification based on granular materials, silt-clay materials, and organic materials.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE LL < 31
MODERATELY COMPRESSIBLE LL + 31 - 50
HIGHLY COMPRESSIBLE LL > 50

PERCENTAGE OF MATERIAL

Table showing percentages for Organic Material, Granular Soils, Silt-Clay Soils, and Other Material across various categories like Trace of Organic Matter, Little Organic Matter, etc.

GROUND WATER

Water level in bore hole immediately after drilling
Static water level after 24 hours
Perched water, saturated zone, or water bearing strata
Spring or seep

CONSISTENCY OR DENSENESS

Table correlating Primary Soil Type, Compactness or Consistency, Range of Standard Penetration Resistance (N-value), and Range of Unconfined Compressive Strength (tons/ft2).

MISCELLANEOUS SYMBOLS

Diagrammatic symbols for Roadway Embankment, Soil Symbol, Artificial Fill, Inferred Soil Boundary, Inferred Rock Line, Alluvial Soil Boundary, Dip and Dip Direction, Test Boring, Auger Boring, Core Boring, Monitoring Well, Piezometer Installation, Slope Indicator, Cone Penetrometer Test, Sounding Rod, Test Boring with Core, SPT N-value.

TEXTURE OR GRAIN SIZE

Table showing U.S. Std. Sieve Size (mm) and corresponding grain size ranges for Boulder, Cobble, Gravel, Coarse Sand, Fine Sand, Silt, and Clay.

RECOMMENDATION SYMBOLS

Symbols for Undercut Excavation, Shallow Undercut, Unclassified Excavation - Unsuitable Waste, Unclassified Excavation - Acceptable Degradable Rock, Unclassified Excavation - Acceptable, but not to be used in the top 3 feet of embankment or backfill.

SOIL MOISTURE - CORRELATION OF TERMS

Table correlating Soil Moisture Scale (Atterberg Limits), Field Moisture Description, and Guide for Field Moisture Description (Liquid Limit, Plastic Limit, Optimum Moisture, Shrinkage Limit).

Table of Abbreviations for soil types (AR, BT, CL, etc.), test methods (CPT, CSE, etc.), and sample abbreviations (S, SS, ST, etc.).

PLASTICITY

Table showing Plasticity Index (PI) and Dry Strength for Non-Plastic, Slightly Plastic, Moderately Plastic, and Highly Plastic soils.




COLOR

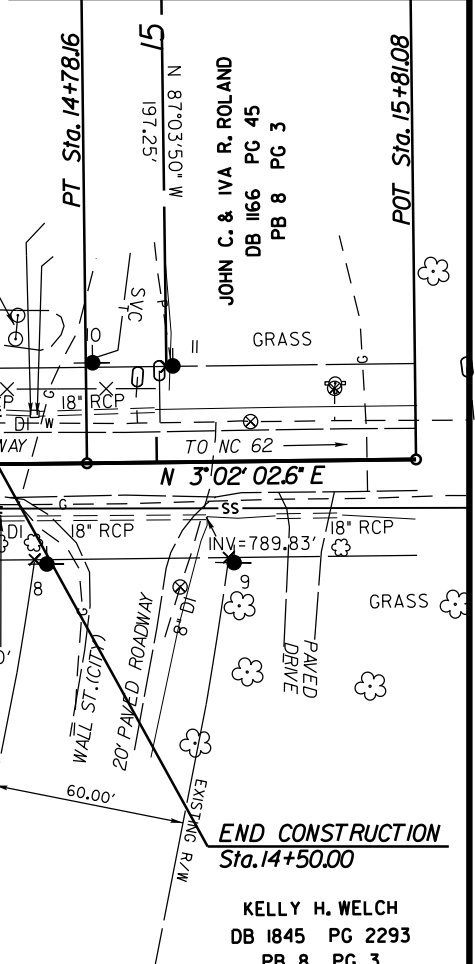
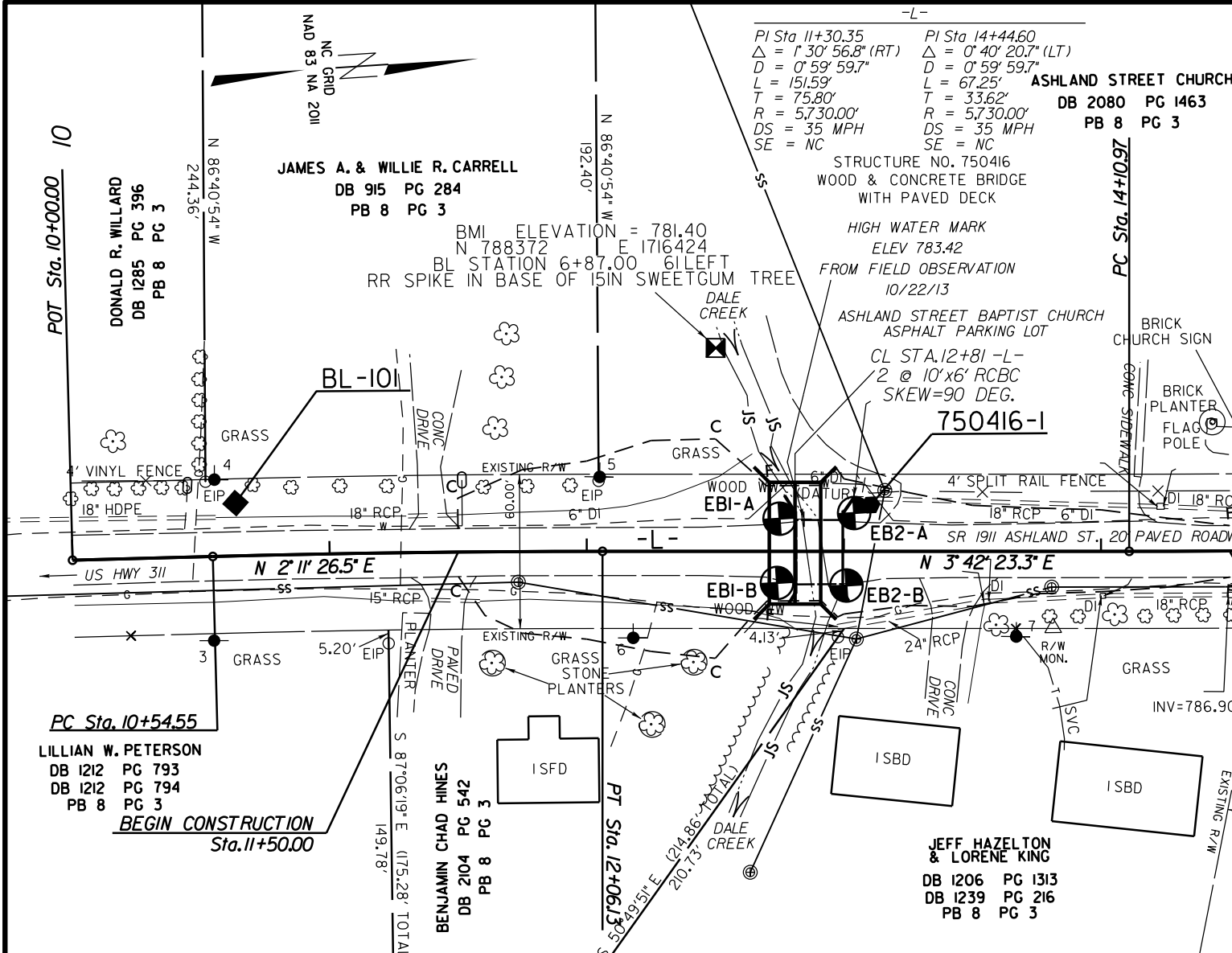
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

EQUIPMENT USED ON SUBJECT PROJECT

Checklist for equipment used on the project, including Drill Units (CME-45C, CME-55, CME-550), Advancing Tools (Clay Bits, Augers, Bits, Inserts), Hammer Type (Automatic/Manual), Core Size (B, N, H), and Hand Tools (Post Hole Digger, Auger, Sounding Rod, Vane Shear Test).

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**SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**  
**(PAGE 2 OF 2)**

ROCK DESCRIPTION		TERMS AND DEFINITIONS																											
<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL, THAT WOULD YIELD SPT REFUSAL, IF TESTED, 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 OBTEN 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, SUCH 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>CALCARCEOUS (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 (REC.)</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 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.  <b>STRATA CORE RECOVERY (SREC)</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 (CP)</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>																										
<p><b>WEATHERING</b></p> <p><b>FRESH</b> - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p><b>VERY SLIGHT (V SL)</b> - 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.</p> <p><b>SLIGHT (SL)</b> - 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.</p> <p><b>MODERATE (MOD)</b> - 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.</p> <p><b>MODERATELY SEVERE (MOD. SEV.)</b> - 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 N VALUES &gt; 100 BPF.</i></p> <p><b>SEVERE (SEV.)</b> - 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, WOULD YIELD SPT N VALUES &gt; 100 BPF.</i></p> <p><b>VERY SEVERE (V SEV.)</b> - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF.</i></p> <p><b>COMPLETE</b> - 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.</p>		<p><b>ROCK HARDNESS</b></p> <p><b>VERY HARD</b> - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p><b>HARD</b> - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p><b>MODERATELY HARD</b> - 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.</p> <p><b>MEDIUM HARD</b> - CAN BE GROVED OR GOUGED 0.05 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.</p> <p><b>SOFT</b> - 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.</p> <p><b>VERY SOFT</b> - 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.</p>																											
<p><b>INDURATION</b></p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p><b>FRIABLE</b> - RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p><b>MODERATELY INDURATED</b> - GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p><b>INDURATED</b> - GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p><b>EXTREMELY INDURATED</b> - SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>		<p><b>FRACATURE SPACING</b></p> <table border="1"> <thead> <tr> <th>TERM</th> <th>SPACING</th> </tr> </thead> <tbody> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </tbody> </table> <p><b>BEDDING</b></p> <table border="1"> <thead> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> </thead> <tbody> <tr> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>&lt; 0.008 FEET</td> </tr> </tbody> </table> <p><b>BENCH MARK; BM; RR SPIKE IN BASE OF 15' SWEETGUM TREE</b>  <b>STA. 6+87 -BL- 61LT. = I2+50 -L- 79 LT.</b>  <b>N 788372 E 176424 ELEVATION: 781.40 FEET</b></p> <p><b>NOTES:</b>  BORING STRATIGRAPHY IS THROUGH THE BORINGS FOR CROSS-SECTIONS.</p>		TERM	SPACING	VERY WIDE	MORE THAN 10 FEET	WIDE	3 TO 10 FEET	MODERATELY CLOSE	1 TO 3 FEET	CLOSE	0.16 TO 1 FOOT	VERY CLOSE	LESS THAN 0.16 FEET	TERM	THICKNESS	VERY THICKLY BEDDED	4 FEET	THICKLY BEDDED	1.5 - 4 FEET	MODERATELY BEDDED	0.16 - 1.5 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET	THINLY LAMINATED	< 0.008 FEET
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**DATUM DESCRIPTION**

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "750416-1" WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 788427.7840(±) EASTING: 1716488.8950(±) ELEVATION: 783.149(±)

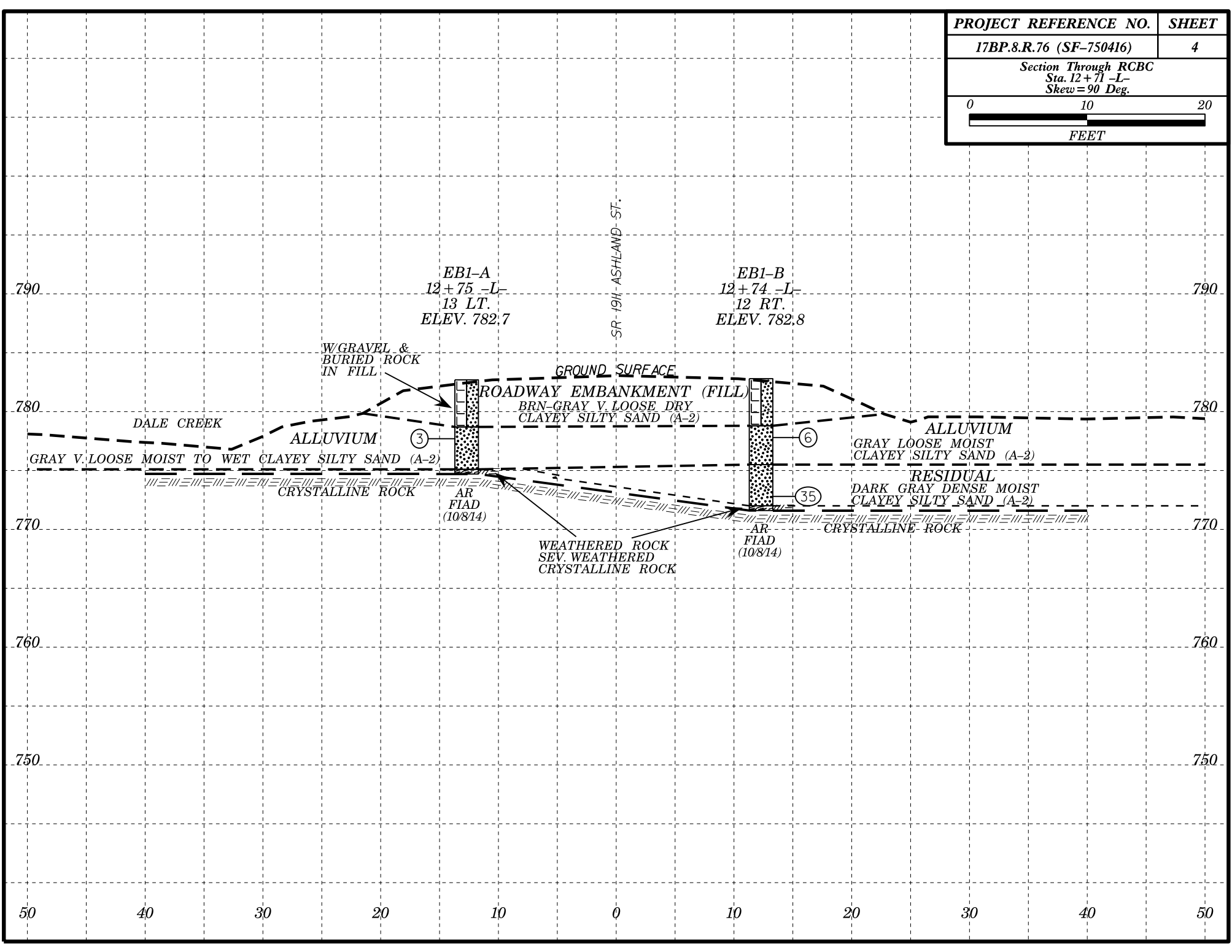
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999064220

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "750416-1" TO -L- STATION IS

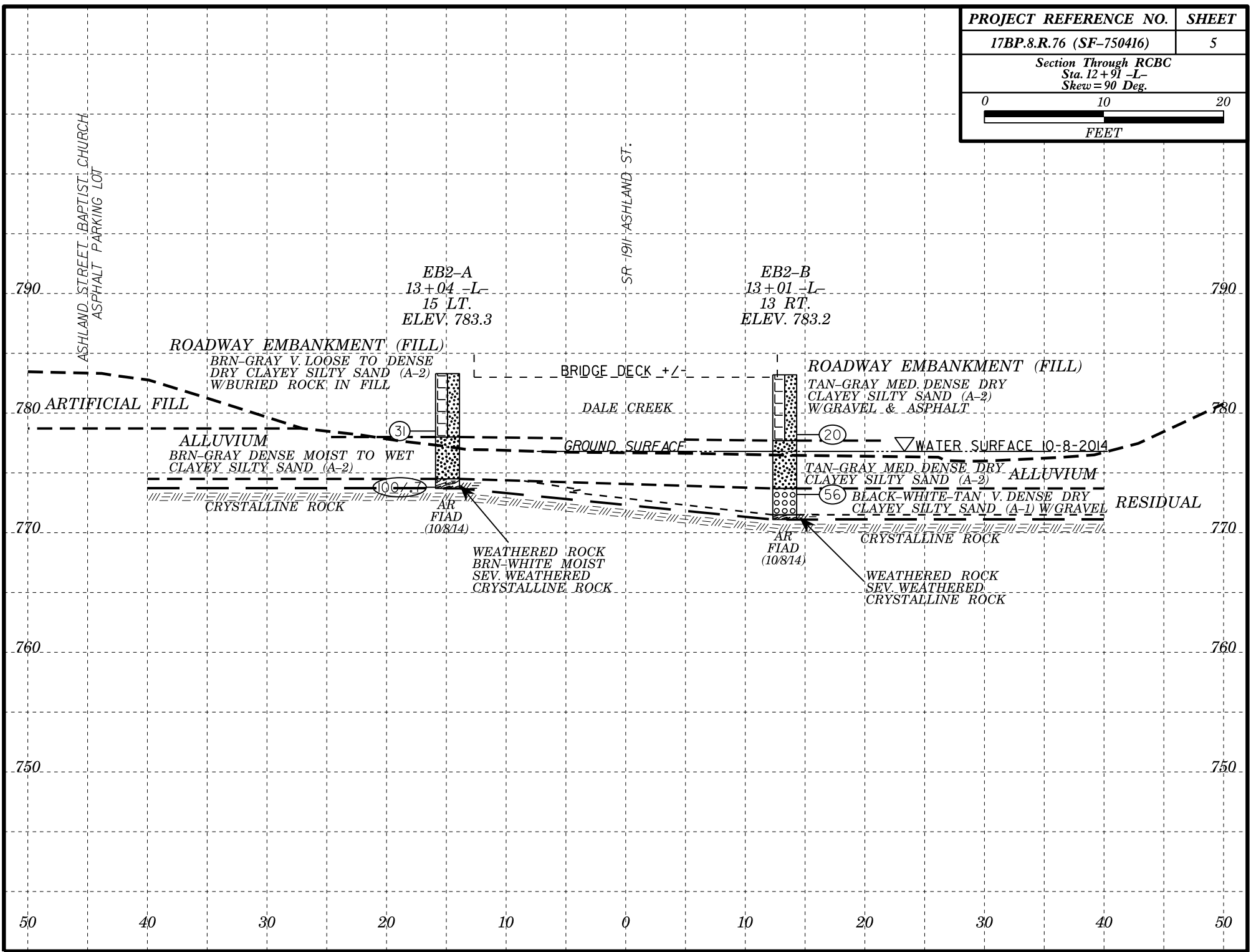
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

POINT	DESC.	NORTH	EAST	ELEVATION	EL STATION	OFFSET
BM1	ELEVATION = 781.40					
	N 788372	E 1716424				
	EL STATION 12+50.00 79 LEFT					
	RR SPIKE IN BASE OF 15" SWEETGUM TREE					
101	BL-101	788181.2500	1716472.1820	782.65	10+63.89	20.55 LT
1	750416-1	788427.7840	1716488.8950	783.15	13+10.49	18.03 LT
2	750416-2	788893.0300	1716546.4210	800.22		OUTSIDE PROJECT LIMITS

<b>PROJECT REFERENCE NO.</b>	<b>SHEET</b>
17BP.8.R.76 (SF-750416)	4
Section Through RCBC Sta. 12+71 -L- Skew=90 Deg.	
0 10 20 FEET	



<b>PROJECT REFERENCE NO.</b>	<b>SHEET</b>
17BP.8.R.76 (SF-750416)	5
Section Through RCBC Sta. 12+91 -L- Skew=90 Deg.	
0 10 20 FEET	







# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 17BP.8.R.76	TIP SF-750416	COUNTY RANDOLPH	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE 416 ON SR 1911 (ASHLAND ST.) OVER DALE CREEK (CULVERT: 2 @ 10'x6' RCBC)			GROUND WTR (ft)
BORING NO. EB1-B	STATION 12+74	OFFSET 12 ft RT	ALIGNMENT -L-
COLLAR ELEV. 782.8 ft	TOTAL DEPTH 11.2 ft	NORTHING 788,389	EASTING 1,716,517
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Smith, C. L.	START DATE 10/08/14	COMP. DATE 10/08/14	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)	
785															GROUND SURFACE	0.0
780	778.8	4.0													<b>ROADWAY EMBANKMENT</b> BRN-GRAY V. LOOSE DRY CLAYEY SILTY SAND (A-2)	4.0
775	773.8	9.0	2	4	2								M		<b>ALLUVIAL</b> GRAY LOOSE MOIST CLAYEY SILTY SAND (A-2)	7.3
			10	15	20								M		<b>RESIDUAL</b> DARK GRAY DENSE MOIST CLAYEY SILTY SAND (A-2)	10.8
															<b>WEATHERED ROCK</b> SEV. WEATH. CRYSTALLINE ROCK	11.2
															Boring Terminated BY AUGER REFUSAL at Elevation 771.6 ft ON CRYSTALLINE ROCK	





# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 17BP.8.R.76		TIP SF-750416		COUNTY RANDOLPH		GEOLOGIST Stickney, J. K.									
SITE DESCRIPTION BRIDGE 416 ON SR 1911 (ASHLAND ST.) OVER DALE CREEK (CULVERT: 2 @ 10'x6' RCBC)							GROUND WTR (ft)								
BORING NO. EB2-A		STATION 13+04		OFFSET 15 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 783.3 ft		TOTAL DEPTH 9.6 ft		NORTHING 788,421		EASTING 1,716,492									
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER Smith, C. L.		START DATE 10/08/14		COMP. DATE 10/08/14		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
785															
780	779.5	3.8	1	18	13										
775	774.5	8.8	44	56/0.2											
															100/7

	783.3		GROUND SURFACE		0.0
D			<b>ROADWAY EMBANKMENT</b>		
			BRN-GRAY V. LOOSE TO DENSE DRY CLAYEY SILTY SAND (A-2) W/ BURIED ROCK IN FILL		
	778.0				5.3
MW			<b>ALLUVIAL</b>		
			BRN-GRAY DENSE MOIST TO WET CLAYEY SILTY SAND (A-2)		
	774.5				8.8
	773.7		<b>WEATHERED ROCK</b>		9.6
			BRN-WHITE MOIST SEV. WEATH. CRYSTALLINE ROCK		
			Boring Terminated BY AUGER REFUSAL at Elevation 773.7 ft ON CRYSTALLINE ROCK		



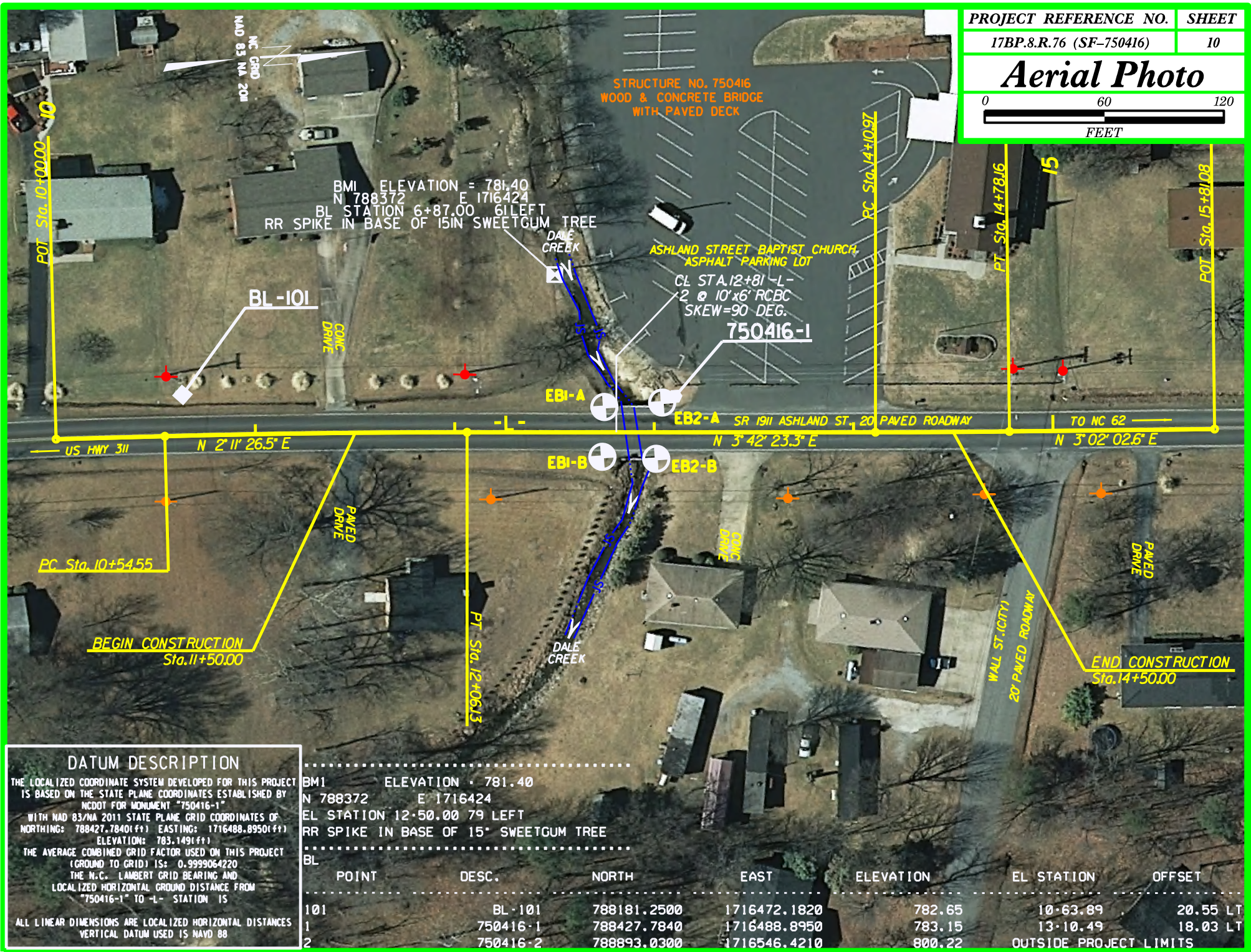
# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

<b>WBS</b> 17BP.8.R.76	<b>TIP</b> SF-750416	<b>COUNTY</b> RANDOLPH	<b>GEOLOGIST</b> Stickney, J. K.
<b>SITE DESCRIPTION</b> BRIDGE 416 ON SR 1911 (ASHLAND ST.) OVER DALE CREEK (CULVERT: 2 @ 10'x6' RCBC)			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> EB2-B	<b>STATION</b> 13+01	<b>OFFSET</b> 13 ft RT	<b>ALIGNMENT</b> -L-
<b>COLLAR ELEV.</b> 783.2 ft	<b>TOTAL DEPTH</b> 12.1 ft	<b>NORTHING</b> 788,416	<b>EASTING</b> 1,716,520
<b>DRILL RIG/HAMMER EFF./DATE</b> HFO0072 CME-550 88% 03/19/2014		<b>DRILL METHOD</b> H.S. Augers	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> Smith, C. L.	<b>START DATE</b> 10/08/14	<b>COMP. DATE</b> 10/08/14	<b>SURFACE WATER DEPTH</b> N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					ELEV. (ft)	
785														783.2	0.0	
780	779.2	4.0	8	12	8									777.7	5.5	
775	774.2	9.0	8	16	40									773.7	9.5	
														771.5	11.7	
														771.1	12.1	

<b>PROJECT REFERENCE NO.</b>	<b>SHEET</b>
17BP.8.R.76 (SF-750416)	10
<h1>Aerial Photo</h1>	



**DATUM DESCRIPTION**

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "750416-1" WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 788427.7840(±) EASTING: 1716488.8950(±) ELEVATION: 783.149(±) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999064220 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "750416-1" TO -L- STATION IS

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

BM1 ELEVATION = 781.40  
 N 788372 E 1716424  
 EL STATION 12+50.00 79 LEFT  
 RR SPIKE IN BASE OF 15' SWEETGUM TREE

POINT	DESC.	NORTH	EAST	ELEVATION	EL STATION	OFFSET
101	BL-101	788181.2500	1716472.1820	782.65	10+63.89	20.55 LT
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