

PROJECT: 33184.1.1 ID: B-3636

# STATE OF NORTH CAROLINA

## DEPARTMENT OF TRANSPORTATION

### DIVISION OF HIGHWAYS

### GEOTECHNICAL UNIT

# STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 33184.1.1 I.D. NO. B-3636  
 F.A. PROJECT BRZ-1222(5)  
 COUNTY CHOWAN  
 PROJECT DESCRIPTION REPLACEMENT OF BRIDGE  
No. 16 OVER ROCKYHOCK CREEK ON SR 1222

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3636	1	16
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33184.1.1	BRZ-1222(5)	P.E.	
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### 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 (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 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.

## For Letting

INVESTIGATED BY <u>S&amp;ME, INC.</u>	PERSONNEL <u>S. JOHNSON</u>
CHECKED BY <u>A.F. RIGGS, JR.</u>	<u>M. MOSELEY</u>
SUBMITTED BY <u>S&amp;ME, INC.</u>	<u>J. WHITE</u>
DATE <u>AUGUST 12, 2005</u>	<u>P. PHELPS</u>
	<u>T. PEREZ</u>



*A. F. Riggs, Jr.*  
SIGNATURE

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

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

DRAWN BY: T. PEREZ

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

**SUBSURFACE INVESTIGATION**

**SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

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SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																									
<p>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 T208, 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:</p> <p style="text-align: center;"><i>VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i></p>	<p><b>WELL GRADED:</b> INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE  <b>UNIFORM:</b> INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)  <b>GAP-GRADED:</b> INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p style="text-align: center;"><b>ANGULARITY OF GRAINS</b></p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: <b>ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</b></p>	<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><b>ALLUVIUM (ALLUV.)</b> - SOILS WHICH 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 IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.  <b>CALCAREOUS (CALC.)</b> - SOILS WHICH 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 DISLODGED FROM PARENT MATERIAL.  <b>FLOOD PLAIN (F.P.)</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 SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  <b>ROCK QUALITY DESIGNATION (R.Q.D.)</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 WHICH 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, WHICH 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 (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.  <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 (S.R.Q.D.)</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 (T.S.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																									
<p style="text-align: center;"><b>SOIL LEGEND AND AASHTO CLASSIFICATION</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>GENERAL CLASS.</th> <th>GRANULAR MATERIALS (&gt;85% PASSING #200)</th> <th>SILT-CLAY MATERIALS (&gt;85% PASSING #200)</th> <th>ORGANIC MATERIALS</th> </tr> </thead> <tbody> <tr> <td>GROUP CLASS.</td> <td>A-1, A-1-b, A-2, A-2-4, A-2-5, A-2-6, A-2-7</td> <td>A-4, A-5, A-6, A-7, A-7-5, A-7-6</td> <td>A-4, A-5, A-6, A-7</td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING</td> <td>10, 40, 200</td> <td>10, 40, 200</td> <td>10, 40, 200</td> </tr> <tr> <td>LIQUID LIMIT PLASTIC INDEX</td> <td>6, 0</td> <td>4, 8, 12, 16, 18, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> <td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100</td> <td>HIGHLY ORGANIC SOILS</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS, GRAVEL AND SAND</td> <td>FINE SAND, SILTY OR CLAYEY GRAVEL AND SAND, SILTY SOILS, CLAYEY SOILS</td> <td></td> </tr> <tr> <td>GEN. 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A-1, A-1-b, A-2, A-2-4, A-2-5, A-2-6, A-2-7	A-4, A-5, A-6, A-7, A-7-5, A-7-6	A-4, A-5, A-6, A-7	SYMBOL				% PASSING	10, 40, 200	10, 40, 200	10, 40, 200	LIQUID LIMIT PLASTIC INDEX	6, 0	4, 8, 12, 16, 18, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	GROUP INDEX	0	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	HIGHLY ORGANIC SOILS	USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL AND SAND	FINE SAND, SILTY OR CLAYEY GRAVEL AND SAND, SILTY SOILS, CLAYEY SOILS		GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD	FAIR TO POOR	FAIR TO POOR, POOR, UNSUITABLE	<p style="text-align: center;"><b>MINERALOGICAL COMPOSITION</b></p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p style="text-align: center;"><b>COMPRESSIBILITY</b></p> <p>SLIGHTLY COMPRESSIBLE          MODERATELY COMPRESSIBLE          HIGHLY COMPRESSIBLE</p> <p style="text-align: center;"><b>PERCENTAGE OF MATERIAL</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT-CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> </thead> <tbody> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt;10%</td> <td>&gt;20%</td> <td>&gt;20%</td> <td>HIGHLY</td> </tr> </tbody> </table> <p style="text-align: center;"><b>GROUND WATER</b></p> <p> 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</p>		ORGANIC MATERIAL	GRANULAR SOILS	SILT-CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	>20%	HIGHLY	<p style="text-align: center;"><b>WEATHERING</b></p> <p>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 ROCKS 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.</p>																																	
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GRAIN SIZE	75	75	2.0	0.25	0.075	0.005	<p style="text-align: center;"><b>ABBREVIATIONS</b></p> <p>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</p> <p>PMT - PRESSUREMETER TEST          SD. - SAND, SANDY          SL. - SILT, SILTY          SLI. - SLIGHTLY          TCR - TRICONE REFUSAL          γ - UNIT WEIGHT          γ<sub>d</sub> - DRY UNIT WEIGHT          W - MOISTURE CONTENT          V - VERY          VST - VANE SHEAR TEST</p>	<p style="text-align: center;"><b>EQUIPMENT USED ON SUBJECT PROJECT</b></p> <p>DRILL UNITS:  <input checked="" type="checkbox"/> MOBILE B-57  <input type="checkbox"/> BK-51  <input type="checkbox"/> CME-45  <input type="checkbox"/> CME-750  <input type="checkbox"/> PORTABLE HOIST  <input type="checkbox"/> OTHER _____  <input type="checkbox"/> OTHER _____</p> <p>ADVANCING TOOLS:  <input type="checkbox"/> DRAG BITS _____  <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER  <input checked="" type="checkbox"/> 3-1/4" HOLLOW AUGERS  <input type="checkbox"/> HARD FACED FINGER BITS  <input type="checkbox"/> TUNG-CARBIDE INSERTS  <input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER  <input checked="" type="checkbox"/> TRICONE 2-7/8" STEEL TEETH  <input type="checkbox"/> TRICONE _____ TUNG-CARB.  <input type="checkbox"/> CORE BIT  <input type="checkbox"/> OTHER _____</p> <p>HAMMER TYPE:  <input type="checkbox"/> AUTOMATIC <input checked="" type="checkbox"/> MANUAL</p> <p>CORE SIZE:  <input type="checkbox"/> B _____  <input type="checkbox"/> N _____  <input type="checkbox"/> H _____</p> <p>HAND TOOLS:  <input type="checkbox"/> POST HOLE DIGGER  <input type="checkbox"/> HAND AUGER  <input type="checkbox"/> SOUNDING ROD  <input type="checkbox"/> VANE SHEAR TEST  <input type="checkbox"/> OTHER _____</p>	<p style="text-align: center;"><b>FRACTURE SPACING</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <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 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </tbody> </table> <p style="text-align: center;"><b>BEDDING</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> </thead> <tbody> <tr> <td>VERY THICKLY BEDDED</td> <td>&gt; 4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY 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 style="text-align: center;"><b>INDURATION</b></p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>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.</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 FEET	VERY CLOSE	LESS THAN 0.16 FEET	TERM	THICKNESS	VERY THICKLY BEDDED	> 4 FEET	THICKLY BEDDED	1.5 - 4 FEET	THINLY 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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STATE PROJECT NO.: 33184.1.1  
 I.D. NO.: B-3636  
 FEDERAL PROJECT NO.: BRZ-1222(5)  
 COUNTY: Chowan

DESCRIPTION: Bridge No. 16 over Rockyhock Creek on SR 1222

SUBJECT: Structure Subsurface Investigation – Inventory Report

#### Project Description

The project site is located on SR 1222 approximately one-half mile west of its intersection with NC Highway 32 in Chowan County, North Carolina at the crossing of Rockyhock Creek (See Site Vicinity Map, Sheet 5). The proposed project consists of a replacement bridge structure. Based on the Bridge Survey and Hydraulic Design Report, the center of the structure will be at Station 18+19.00 along the -L- survey line. The new bridge structure will have a clear roadway width of 36 feet. The new bridge structure will be approximately 98 feet long with the bents constructed on a skew angle of 90° to the -L- survey line. The new bridge structure will consist of two spans with lengths of 56 and 42 feet. The structure will have three bents (two end bents and one interior bent).

Based upon the structural drawings provided by NCDOT, the finished grade elevations for the new bridge structure, at the approaches, will be approximately 7 feet. The finished grade elevations for the replacement bridge structure, at the approaches, will not change significantly. However, the replacement bridge structure will be widened approximately 6 feet on each side of the existing structure. Although minimal earthwork is anticipated at the approaches, the existing shoulders will be benched into the existing embankment. Fill depths on the order of 6 to 7 feet are anticipated, above the flood plain, along the shoulders at the northwest and southeast approaches. In addition, the existing fill slopes will be cut back and reworked at the end bents to a slope of 2:1 (horizontal to vertical) and Class II Rip-Rap erosion protection will be placed.

A geotechnical investigation was conducted between August 2 and August 3, 2005. Borings EB1-B and EB2-A were drilled within the roadway shoulder on roadway embankment fill at the northwest and southeast approaches and boring B1-B was drilled from the existing bridge deck in the creek channel (See Site Plan, Sheet 4). A 4 inch hole was cored through the existing bridge deck in the location of boring B1-B with a thin wall diamond core bit. All borings were performed with a Mobile B-57 drill rig mounted on an all-terrain carrier. Representative soil samples were collected for visual classification in the field and for laboratory classification analysis by the NCDOT accredited S&ME soil testing laboratory. S&ME attempted to obtain a Shelby tube at boring B1-B in the creek channel to provide to NCDOT for Erosion Function Apparatus testing. No sample was obtained due to non-cohesive material (A-3). NCDOT Bridge Maintenance patched the hole in the bridge deck after our field work was complete. Traffic Control Safety Services provided traffic control during drilling operations.

#### Physiography and Geology

The project site is located on SR 1222 approximately one-half mile west of its intersection with NC Highway 32 in Chowan County, North Carolina at the crossing of Rockyhock Creek. The existing bridge

structure is approximately 66 feet long and approximately 24 feet wide. The existing bridge is situated within the flood plain of Rockyhock Creek along a two lane paved road (SR 1222) and consists of a reinforced concrete deck overlain with asphalt on steel girders supported on reinforced concrete pile caps, timber abutments and timber piles. SR 1222 runs approximately northwest and southeast and has roadway embankment shoulders. The flood plain extends approximately 1000 feet on the northwest side of the creek and approximately 500 feet on the southeast side of the creek and is covered with large to small trees, dense undergrowth and wooded swamp land. A natural gas line was bored beneath the creek bed approximately 10 feet north of the existing bridge. Overhead power lines and overhead telephone cross the creek just south of the existing bridge.

The site is located within the eastern portion of the Coastal Plain Physiographic and Geologic Province of North Carolina in Chowan County. The Coastal Plain Province is typically characterized by marine and eolian sediments that were deposited during the transgressive and regressive depositional sequences of the oceans moving into and out of North Carolina. As such, the Coastal Plain Province is characterized by subdued topographic features and flat, low-lying terrain. The geology of the central quadrant of Chowan County, near the project site, primarily consists of recent alluvial sediments underlain by Undifferentiated Coastal Plain Deposits and the Yorktown Formation. Typically, the alluvium consists of gray coarse to fine silty sands and highly organic silty sands. These deposits are underlain by the Yorktown Formation of the Middle Tertiary Age. The Yorktown Formation consists of green-gray to gray silty clays and green-gray to gray silty sands with varying amounts of shell material and cemented sands.

#### Foundation Materials

The borings were advanced to depths ranging from 59.7 to 64.5 feet (elevations -53.3 to -63.3 feet) at collar elevations ranging from 6.7 to -1.5 feet.

Roadway embankment fill materials were encountered in borings EB1-B and EB2-A to depths of about 11 feet (elevations -4.3 to -4.6 feet) below the collar elevation. The fill material encountered in these borings consists of very loose to medium dense gray and orange silty coarse to fine sand (A-2-4) with trace of clay. Standard penetration test (SPT) N-values in the fill materials ranged from 3 to 12 blows per foot (bpf).

Alluvial deposits were encountered beneath the embankment fill materials in borings EB1-B and EB2-A and in the creek channel in boring B1-B to depths ranging from about 16.0 to 22.0 feet (elevations -9.3 to -20.0 feet) beneath collar elevations. Typically, alluvial deposits encountered consist of loose gray coarse to fine sands (A-3) with trace amounts of silt, clay, organic material and wood debris and very loose dark brown highly organic silty fine sand (MUCK) with trace of wood debris. Based on boring B1-B, the creek channel typically consists of loose gray coarse to fine sand (A-3) with trace amounts of silt, clay, organic material and wood debris. The standard penetration test (SPT) N-values for the alluvial deposits range from 1 to 8 bpf.

Undifferentiated Coastal Plain deposits were encountered beneath the alluvial deposits in borings EB1-B and EB2-A to depths ranging from about 22.0 to 26.5 feet (elevations -15.3 to -20.1 feet) beneath collar elevations. Typically, Undifferentiated Coastal Plain deposits consist of medium dense gray silty fine sands (A-2-4) in boring EB1-B and soft gray-brown fine sandy silty clay (A-7-6) with trace of coarse sand in boring EB2-A. The standard penetration test (SPT) N-values for the Undifferentiated Coastal Plain deposits range from 4 to 16 bpf.

Beneath the alluvium in boring B1-B and beneath the Undifferentiated Coastal Plain deposits in borings EB1-B and EB2-A, soils common to the Yorktown Formation were encountered and extended to the termination of borings. The Yorktown Formation was encountered at depths ranging from about 18.5 to 26.5 feet (elevations -15.3 to -20.1 feet) beneath the collar elevations. Borings were advanced to termination depths ranging from 59.7 to 64.5 feet (elevations -53.3 to -63.3 feet) below the collar elevations.

Near the top of the Yorktown Formation, loose to medium dense green-gray slightly clayey silty fine to coarse sands (A-2-4) with little to trace of shell material and trace of cemented sands was encountered at depths ranging from approximately 18.5 to 27.0 feet (elevations -20.0 to -20.3 feet) beneath the collar elevation and extends to depths ranging from about 29.0 to 37.0 feet (elevations -30.3 to -30.6 feet) beneath collar elevations. A medium stiff green-gray silty clay (A-7-6) with little shell material was encountered from depths of about 22.0 to 27.0 feet (elevations -15.3 to -20.3 feet) beneath the collar elevation in boring EB2-A. Beneath the upper silty sands, medium dense to very dense gray slightly clayey silty fine to coarse sands (A-2-4, A-3) with trace of cemented sands and shell material were encountered to boring termination depths in all of the borings. The N-values in the upper silty sands and silty clays ranged from 7 to 23 bpf and the N-values in the lower silty sands ranged from 23 to 63 bpf.

#### Notes to Designer

The Mobile B-57 drill rig is equipped with a manual hammer. Standard Penetration tests were performed with a traditional rope, cathead and Safety Hammer.

#### Groundwater

Groundwater depths were not measured at the time of drilling operations since mud rotary drilling procedures were used. Stabilized groundwater depths were measured in the borings EB1-B and EB2-A. A stabilized groundwater level of about 6.5 feet (elevation 0.2 feet) below the collar elevation was measured in boring EB2-A approximately 24 hours after drilling operations. The borehole for boring EB1-B was observed to cave dry at a depth of about 4.0 feet (elevation 2.4 feet) below the collar elevation. The creek level at the time of our field investigation was elevation 0.4 feet on August 3, 2005.

#### 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.

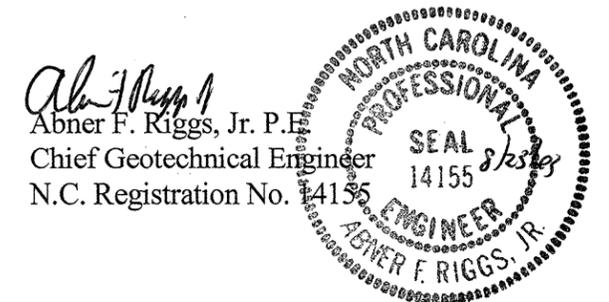
The conclusions submitted in this report are based, in part, upon the data obtained from the subsurface exploration. The nature and extent of subsurface variations between the borings may not become evident until construction. If variations appear evident, then the conclusions contained in this report 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.

S&ME appreciates the opportunity to be your geotechnical consultant on this project. If you have any questions or need additional information in regard to this report, please contact us.

Very truly yours,  
S&ME, Inc.

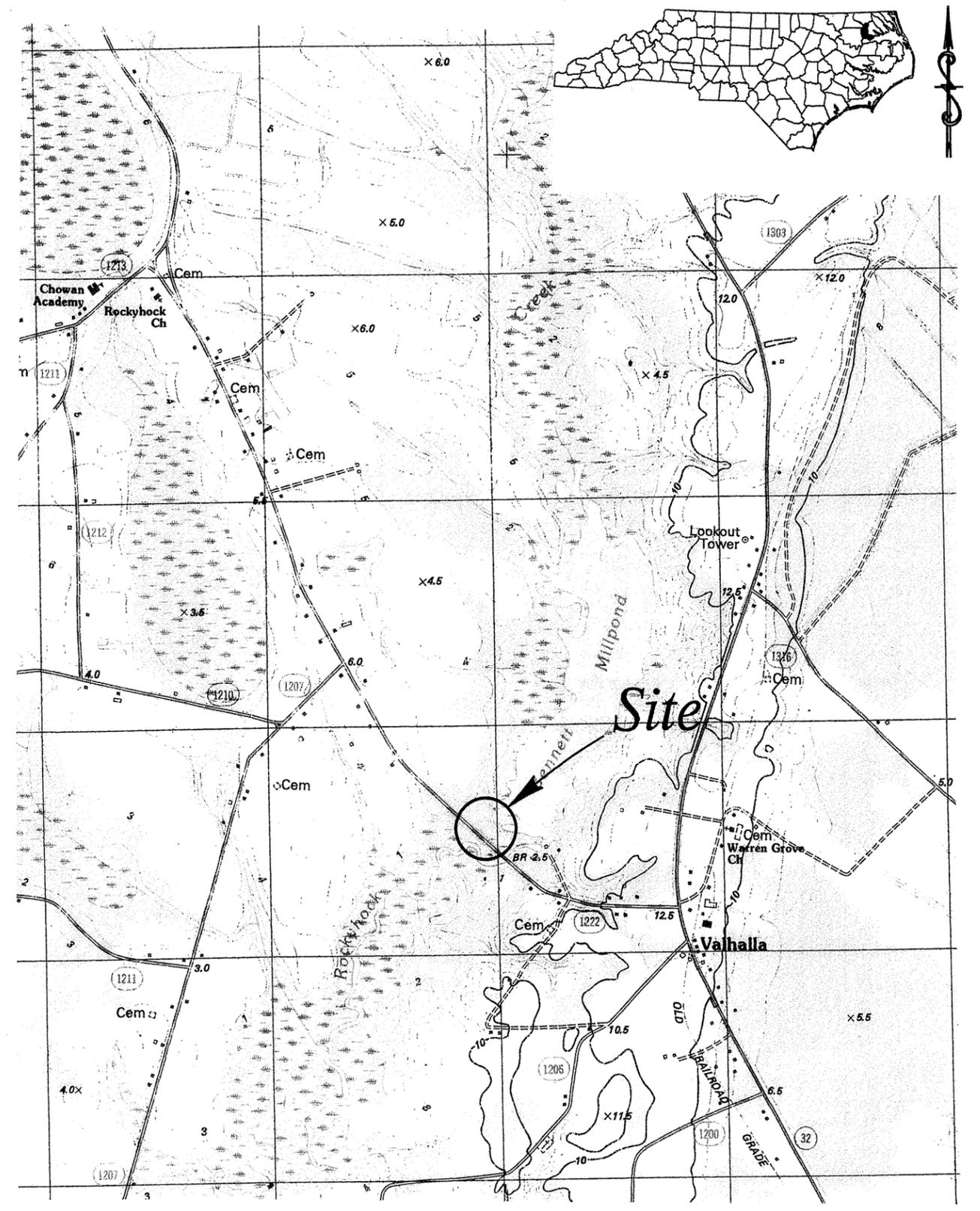
  
J. Shane Johnson, P.G.  
Project Geologist  
N.C. Registration No. 1753

Attachments



**PROJECT: 33184.1.1 ID: B-3636**

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
B-3636	33184.1.1	5	16



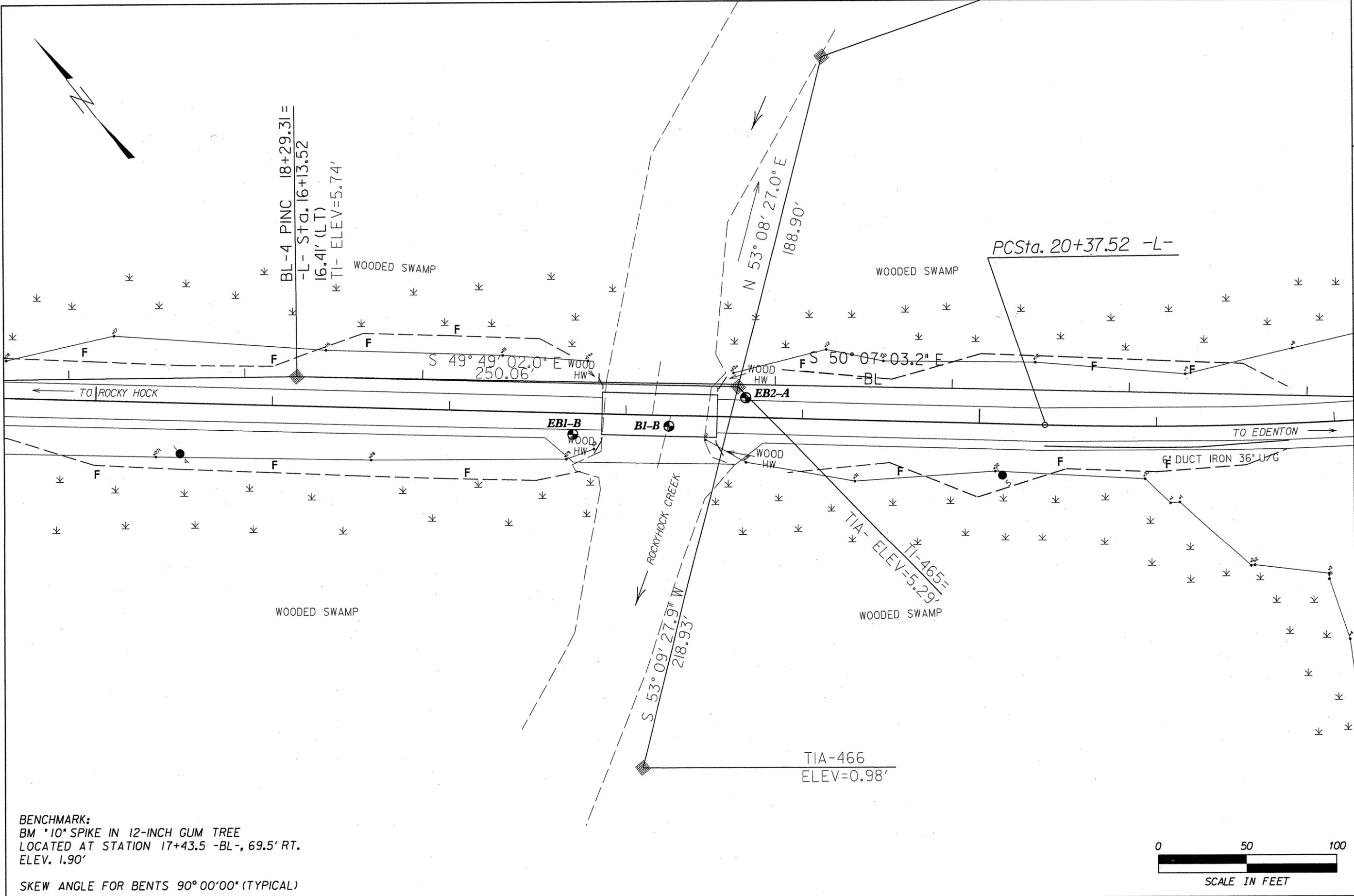
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SCALE:	1:24,000
CHECKED BY:	AFR
DRAWN BY:	TRP
DATE:	AUGUST 2005
JOB NO.	105 1-05-283



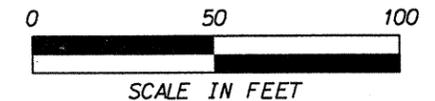
**SITE VICINITY MAP**  
REPLACEMENT OF BRIDGE No. 16  
ON SR 1222 OVER ROCKYHOCK CREEK  
STATE PROJECT NO. 33184.1.1 TIP NO. B-3636  
FEDERAL I.D. NO. BRZ-1222 (5)  
CHOWAN COUNTY, NORTH CAROLINA

S:\PROJECTS\2005\05-152\GEOTECH\CADD\B-42.15 SITEPLAN



**BENCHMARK:**  
 BM \*10" SPIKE IN 12-INCH GUM TREE  
 LOCATED AT STATION 17+43.5 -BL-, 69.5' RT.  
 ELEV. 1.90'

SKREW ANGLE FOR BENTS 90° 00' 00" (TYPICAL)

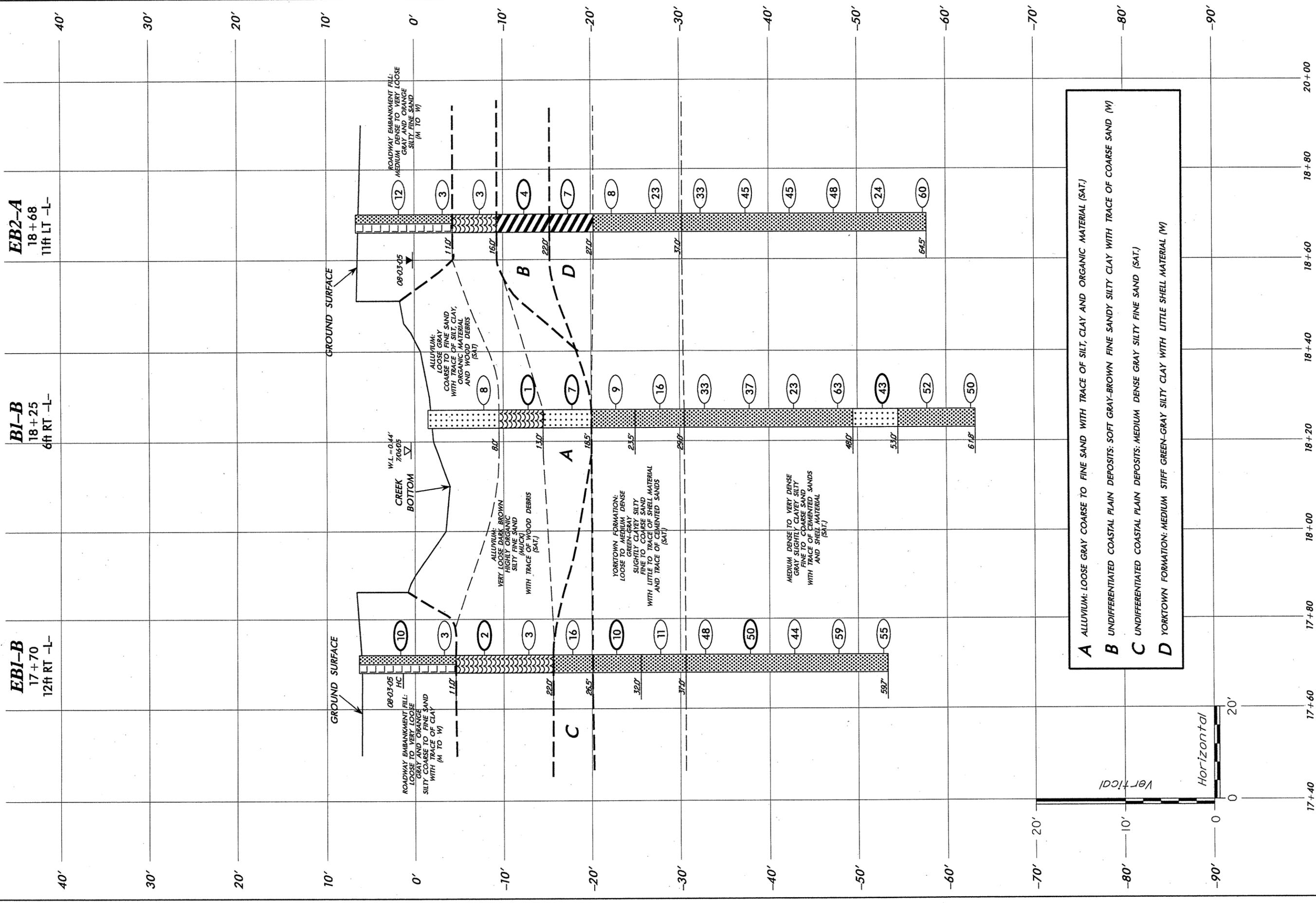


**BORING LOCATION PLAN**

REPLACEMENT OF BRIDGE No. 16  
 OVER ROCKYHOCK CREEK ON SR 1222  
 STATE PROJECT No. 33184.1.1 FEDERAL I.D. BRZ-1222(15)  
 TIP No. B-3636 CHOWAN COUNTY, NORTH CAROLINA



SCALE:	1" = 50'	APPROVED BY:	AFR
DATE:	AUGUST 2005	DRAWN BY:	TRP
JOB NO.	1051-05-283	SHEET	6 OF 16



GENERALIZED SUBSURFACE PROFILE 14.0' RIGHT OF -L- FROM STA. 17+50 TO STA. 18+90

REPLACEMENT OF BRIDGE No. 16 ON SR 1222 OVER ROCKYHOCK CREEK STATE PROJECT No. 33184.1.I FEDERAL I.D. BRZ-1222(5) CHOWAN COUNTY, NORTH CAROLINA

SCALE:	(V) 1" = 10' (H) 1" = 20'	APPROVED BY:	AFR
DATE:	AUGUST 2005	DRAWN BY:	TRP
JOB NO.:	105 I-05-283	SHEET	7 OF 16





PROJECT NO. 33184.1.1		ID. B-3636		COUNTY Chowan		GEOLOGIST S. JOHNSON							
SITE DESCRIPTION Bridge 16 over Rockyhock Creek on SR 1222						GROUND WATER (ft)							
BORING NO. EB1-B		BORING LOCATION 17+70		OFFSET 12.0 ft RT		ALIGNMENT -L-							
COLLAR ELEV. 6.4 ft		NORTHING 877,553.2		EASTING 2,689,019.3		0 HR. N/A							
TOTAL DEPTH 59.7 ft		DRILL MACHINE Mobile B-57		DRILL METHOD 3-1/4" HSA/Rotary Wash w/2-7/8" Tricone Roller		HAMMER TYPE MANUAL							
DATE STARTED 8/2/05		COMPLETED 8/2/05		SURFACE WATER DEPTH N/A									
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
6.4													GROUND SURFACE
2.7	3.7	4	5	5							SS-1	M	ROADWAY EMBANKMENT FILL: LOOSE TO VERY LOOSE GRAY AND ORANGE SILTY COARSE TO FINE SAND (A-2-4) WITH TRACE OF CLAY
-2.3	8.7	3	2	1								W	
-6.8	13.2	1	1	1							SS-2	Sat.	ALLUVIUM: VERY LOOSE DARK BROWN HIGHLY ORGANIC SILTY FINE SAND (MUCK) WITH TRACE OF WOOD DEBRIS (ORGANIC CONTENT = 18.7%)
-11.8	18.2	3	2	1								Sat.	
-16.8	23.2	10	10	6								Sat.	UNDIFFERENTIATED COASTAL PLAIN DEPOSITS: MEDIUM DENSE GRAY SILTY FINE SAND (A-2-4)
-21.8	28.2	3	4	6							SS-3	Sat.	YORKTOWN FORMATION: LOOSE GREEN-GRAY SLIGHTLY CLAYEY SILTY COARSE TO FINE SAND (A-2-4) WITH LITTLE SHELL MATERIAL
-26.8	33.2	7	7	4								Sat.	MEDIUM DENSE GREEN-GRAY SLIGHTLY CLAYEY SILTY FINE TO COARSE SAND (A-2-4) WITH TRACE OF SHELL MATERIAL
-31.8	38.2	18	24	24								Sat.	DENSE TO VERY DENSE GRAY SLIGHTLY CLAYEY SILTY FINE TO COARSE SAND (A-2-4) WITH TRACE OF CEMENTED SANDS
-36.8	43.2	15	21	29							SS-4	Sat.	
-41.8	48.2	16	25	19								Sat.	
-46.8	53.2	8	34	25								Sat.	
-51.8	58.2	8	23	32								Sat.	
													BORING TERMINATED AT ELEV. -53.3 FEET IN VERY DENSE SILTY SAND
													1) ADVANCED 3-1/4" HSA TO 8.7 FEET. 2) ADVANCED 2-7/8" TRICONE ROLLER TO 58.2 FEET. 3) CREEK WATER WITH QUICKGEL USED AS DRILLING FLUID. 4) APPROXIMATE DRILLING FLUID DENSITY 64 PCF. 5) NO LOSS OF DRILLING FLUID OBSERVED.

NCDOT BORE SINGLE 05-283.GPJ NCDOT.GDT 8/11/05



PROJECT NO. 33184.1.1		ID. B-3636		COUNTY Chowan		GEOLOGIST S. JOHNSON								
SITE DESCRIPTION Bridge 16 over Rockyhock Creek on SR 1222						GROUND WATER (ft)								
BORING NO. B1-B		BORING LOCATION 18+25		OFFSET 6.0 ft RT		ALIGNMENT -L-								
COLLAR ELEV. -1.5 ft		NORTHING 877,522.2		EASTING 2,689,065.2		0 HR. N/A								
TOTAL DEPTH 61.8 ft		DRILL MACHINE Mobile B-57		DRILL METHOD Rotary Wash w/NW Casing & 2-7/8" Tricone Roller		HAMMER TYPE MANUAL								
DATE STARTED 8/3/05		COMPLETED 8/3/05		SURFACE WATER DEPTH 1.9 ft										
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION		
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100	
0.4													CREEK LEVEL	
-1.5													CREEK BOTTOM	
-6.8	5.3	6	6	2								Sat.	ALLUVIUM: LOOSE GRAY COARSE TO FINE SAND (A-3) WITH TRACE OF SILT, CLAY, ORGANIC MATERIAL AND WOOD DEBRIS	
-11.8	10.3	1	WOH	1								SS-5	Sat.	VERY LOOSE DARK BROWN HIGHLY ORGANIC SILTY FINE SAND (MUCK) (ORGANIC CONTENT = 25.6%)
-16.8	15.3	5	2	5								SS-6	Sat.	LOOSE GRAY COARSE TO FINE SAND (A-3) WITH TRACE OF SILT, CLAY AND ORGANIC MATERIAL
-21.8	20.3	2	4	5								Sat.	YORKTOWN FORMATION: LOOSE GREEN-GRAY SLIGHTLY CLAYEY SILTY FINE SAND (A-2-4) WITH TRACE OF SHELL MATERIAL	
-26.8	25.3	5	8	8								Sat.	MEDIUM DENSE GREEN-GRAY SILTY FINE TO COARSE SAND (A-2-4) WITH TRACE OF SHELL MATERIAL AND CEMENTED SANDS	
-31.8	30.3	13	17	16								Sat.	MEDIUM DENSE TO VERY DENSE GRAY SILTY COARSE TO FINE SAND (A-2-4) WITH TRACE OF CEMENTED SANDS	
-36.8	35.3	14	19	18								Sat.		
-41.8	40.3	11	9	14								Sat.		
-46.8	45.3	26	34	29								Sat.		
-51.8	50.3	42	25	18								SS-7	Sat.	DENSE GRAY FINE TO COARSE SAND (A-3) WITH TRACE OF SILT AND CLAY
-56.8	55.3	11	23	29								Sat.	VERY DENSE TO DENSE GRAY SILTY COARSE TO FINE SAND (A-2-4)	
-61.8	60.3	21	22	28								Sat.		
													BORING TERMINATED AT ELEV. -63.3 FEET IN DENSE SILTY FINE SAND	
													1) SET 15.3 FEET OF NW CASING (8.3 FEET TEMPORARY CASING). 2) ADVANCED 2-7/8" TRICONE ROLLER TO 60.3 FEET. 3) CREEK WATER WITH QUICKGEL USED AS DRILLING FLUID. 4) APPROXIMATE DRILLING FLUID DENSITY 64 PCF. 5) NO LOSS OF DRILLING FLUID OBSERVED.	

NCDOT BORE SINGLE 05-283.GPJ NCDOT.GDT 8/10/05



**SUMMARY OF LABORATORY TEST DATA**

Soil Classification and Gradation

Boring No.	Sample No.	Sample Depth Feet	AASHTO Classification		% Passing Sieve #				Coarse Sand	Fine Sand	Silt	Clay	LL	PL	PI	Organic Content %	Moisture Content %
					10	40	60	200									
EB1-B	SS-1	3.7-5.2	A-2-4	(0)	100	87	67	18	33	53	6	8	17	N.P.	N.P.	N.A.	N.A.
EB1-B	SS-2	13.2-14.7	N.A.	N.A.	67	39	29	4	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	18.7	N.A.
EB1-B	SS-3	28.2-29.7	A-2-4	(0)	97	89	80	23	18	60	10	12	24	N.P.	N.P.	N.A.	N.A.
EB1-B	SS-4	43.2-44.7	A-2-4	(0)	83	68	36	16	57	26	9	8	15	N.P.	N.P.	N.A.	N.A.
B1-B	SS-5	10.3-11.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	25.6	N.A.
B1-B	SS-6	15.3-16.8	A-3	(0)	97	88	67	8	31	63	3	3	23	N.P.	N.P.	N.A.	N.A.
B1-B	SS-7	50.3-51.8	A-3	(0)	96	88	47	8	50	43	4	3	12	N.P.	N.P.	N.A.	N.A.
EB2-A	SS-8	18.1-19.6	A-7-6	(20)	100	100	99	63	1	45	18	36	55	19	36	N.A.	37.0
EB2-A	SS-9	23.1-24.6	N.A.	N.A.	76	67	62	39	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	51.9

Project Name: Bridge No.16 Over Rockyhock Creek on SR 1222

State Project No.: 33184.1.1

Federal ID No.: BRZ-1222(5)

S&ME Job No.: 1051-05-283

County.: Chowan

TIP No.: B-3636

Checked By: JSJ/AFR

**NOTES:**

N.P. - NONPLASTIC

N.A. - NOT ANALYZED FOR

GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: 33184.1.1 ID: B-3636 COUNTY: Chowan

DESCRIPTION(1): Replacement of Bridge No. 16 over Rockyhock Creek on SR 1222

INFORMATION ON EXISTING BRIDGES Information obtained from:  field inspection  
 microfilm(Reel: \_\_\_\_\_ Pos: \_\_\_\_\_)  
 other Bridge Survey and Hydraulic Design Report

COUNTY BRIDGE NO. 16 BRIDGE LENGTH 66' NO. BENTS IN: CHANNEL 1 FLOOD PLAIN 2

FOUNDATION TYPE: Timber Piles

**EVIDENCE OF SCOUR(2):**

ABUTMENTS OR END BENT SLOPES: Minor evidence of erosion was observed at the abutments of End Bent No. 1 and End Bent No. 2.

INTERIOR BENTS: None observed at the Interior Bent due to the bent being located in the channel.

Concrete has been cast in-place to protect interior timber piles at Interior Bent No. 1. One timber pile exposed at each end of bent.

CHANNEL BED: None observed

CHANNEL BANKS: None observed

**EXISTING SCOUR PROTECTION:**

TYPE(3): Timber abutments with timber wingwalls. Concrete has been cast in-place in front of both end bents.

EXTENT(4): Timber wingwalls extend beyond the timber abutments.

EFFECTIVENESS(5): Relatively effective with some minor erosion at both abutments.

OBSTRUCTIONS(6) (DAMS,DEBRIS,ETC.): Old timber piles cut off and exposed in front of End Bent No. 2.

**DESIGN INFORMATION:**

CHANNEL BED MATERIAL(7) (SAMPLE RESULTS ATTACHED): Gray coarse to fine sand (A-3) with trace of silt, clay, organic material and wood debris.

CHANNEL BANK MATERIAL(8) (SAMPLE RESULTS ATTACHED): Gray coarse to fine sand (A-3) with trace of silt, clay, organic material and wood debris and dark brown highly organic silty fine sand (MUCK) with trace of wood debris

CHANNEL BANK COVER(9): Trees, underbrush and wooded swamp

FLOOD PLAIN WIDTH(10): 1000 +/- feet on northwest side of creek and 500 +/- feet on southeast side of creek

FLOOD PLAIN COVER(11): Trees, underbrush and wooded swamp

DESIGN INFORMATION CONT.

STREAM IS  DEGRADING  AGGRADING (12)

OTHER OBSERVATIONS AND COMMENTS: A natural gas line is buried beneath the creek bottom approximately 10 feet north of the existing bridge. Overhead telephone and overhead power lines exist on south side of bridge.

Earthen Dam and Bennett Millpond located upstream northeast of bridge.

CHANNEL MIGRATION TENDENCY (13): Migration tendency to the northwest

REPORTED BY: J. Shane Johnson *J. Shane Johnson* DATE: 8/2/2005  
 S&ME, Inc.

GEOTECHNICALLY ADJUSTED SCOUR ELEVATION (14):

Location	100 yr	OT
Bent 1	-29.7 ft	-34.1 ft

REPORTED BY: *Chad m wddy* DATE: 8/23/2005

INSTRUCTIONS

- (1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED.
- (2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS, DEGRADATIONS, ETC.)
- (3) NOTE ANY EXISTING SCOUR PROTECTION (RIP RAP, ETC.)
- (4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.
- (5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING.
- (6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC.
- (7) DESCRIBE THE CHANNEL BED MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (8) DESCRIBE THE CHANNEL BANK MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (9) DESCRIBE THE BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC.)
- (10) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
- (11) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
- (12) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING
- (13) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE Laterally DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
- (14) GIVE THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE; PERCENTAGE RQD; DIFFERENTIAL WEATHERING, SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.

PROJECT #: 33184.1.1

COUNTY: Chowan

DESCRIPTION: Replacement of Bridge No.16 Over Rockyhock Creek on SR 1222

SAMPLE #	CHANNEL BED MATERIAL		CHANNEL BANK MATERIAL			
	SS-6					
RETAINED #4	2					
PASSING #10	97					
PASSING #40	88					
PASSING #200	8					
COARSE SAND	31					
FINE SAND	63					
SILT	3					
CLAY	3					
LL	23					
PL	N.P.					
AASHTO CLASSIFICATION	A-3(0)					
STATION	18+25					
OFFSET	6 RT					
DEPTH	15.3-16.8					





**Photograph No. 1:**  
This photograph was taken from the northwest approach along the centerline of the -L- alignment, looking southeast.



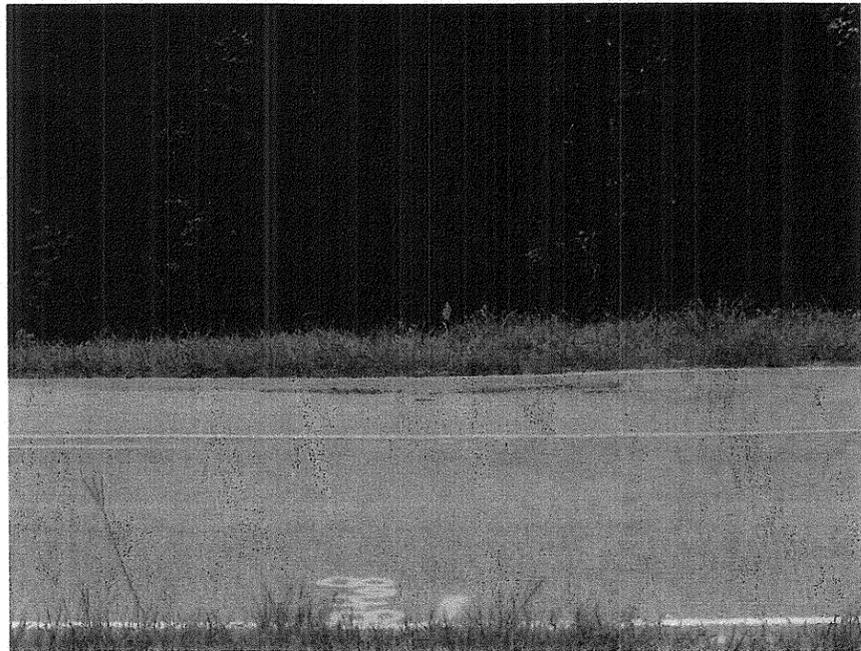
**Photograph No. 3:**  
This photograph was taken from the right side of the -L- alignment, looking northeast, across proposed End Bent No. 1.



**Photograph No. 2:**  
This photograph was taken from the left side of the -L- alignment, looking southwest, across proposed End Bent No. 1.



**Photograph No. 4:**  
This photograph was taken from the right side of the -L- alignment, looking northwest at existing Interior Bent No. 1 and at proposed Interior Bent No. 1.



**Photograph No. 5:**  
This photograph was taken from the left side of the -L- alignment, looking southwest, across proposed End Bent No. 2.



**Photograph No. 7:**  
This photograph was taken from the right side of the -L- alignment, looking southeast at existing End Bent No. 2.



**Photograph No. 6:**  
This photograph was taken from the right side of the -L- alignment, looking northeast, across proposed End Bent No. 2.



**Photograph No. 8:**  
This photograph was taken from the left side of the -L- alignment, looking northwest at existing End Bent No. 1.



**Photograph No. 9:**  
This photograph was taken from the right side of the -L- alignment, looking northwest at existing End Bent No. 1.



**Photograph No. 11:**  
This photograph was taken from the existing bridge, looking southwest (downstream).



**Photograph No. 10:**  
This photograph was taken from the existing bridge, looking northeast (upstream).



**Photograph No. 12:**  
This photograph was taken from the southeast approach along the centerline of the -L- alignment, looking northwest.