

REFERENCE: B-5125

PROJECT: 42271

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	42271	1	26

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
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**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY MACON  
 PROJECT DESCRIPTION BRIDGE NO. 22 OVER LITTLE  
TENNESSEE RIVER ON US441 BUSINESS

**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.

PERSONNEL

- N. PAGE
- J. WELLS
- M. KEATTS
- R. NORWOOD
- S. HARDEE
- M.G. MOSELEY
- M.B. MOSELEY

INVESTIGATED BY S&ME, INC.  
 DRAWN BY B. RATTI  
 CHECKED BY A.F. RIGGS JR, P.E.  
 SUBMITTED BY S&ME, INC.  
 DATE DECEMBER 2015



DocuSign by: Abner F. Riggs, Jr.  
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2/8/2016

SIGNATURE DATE

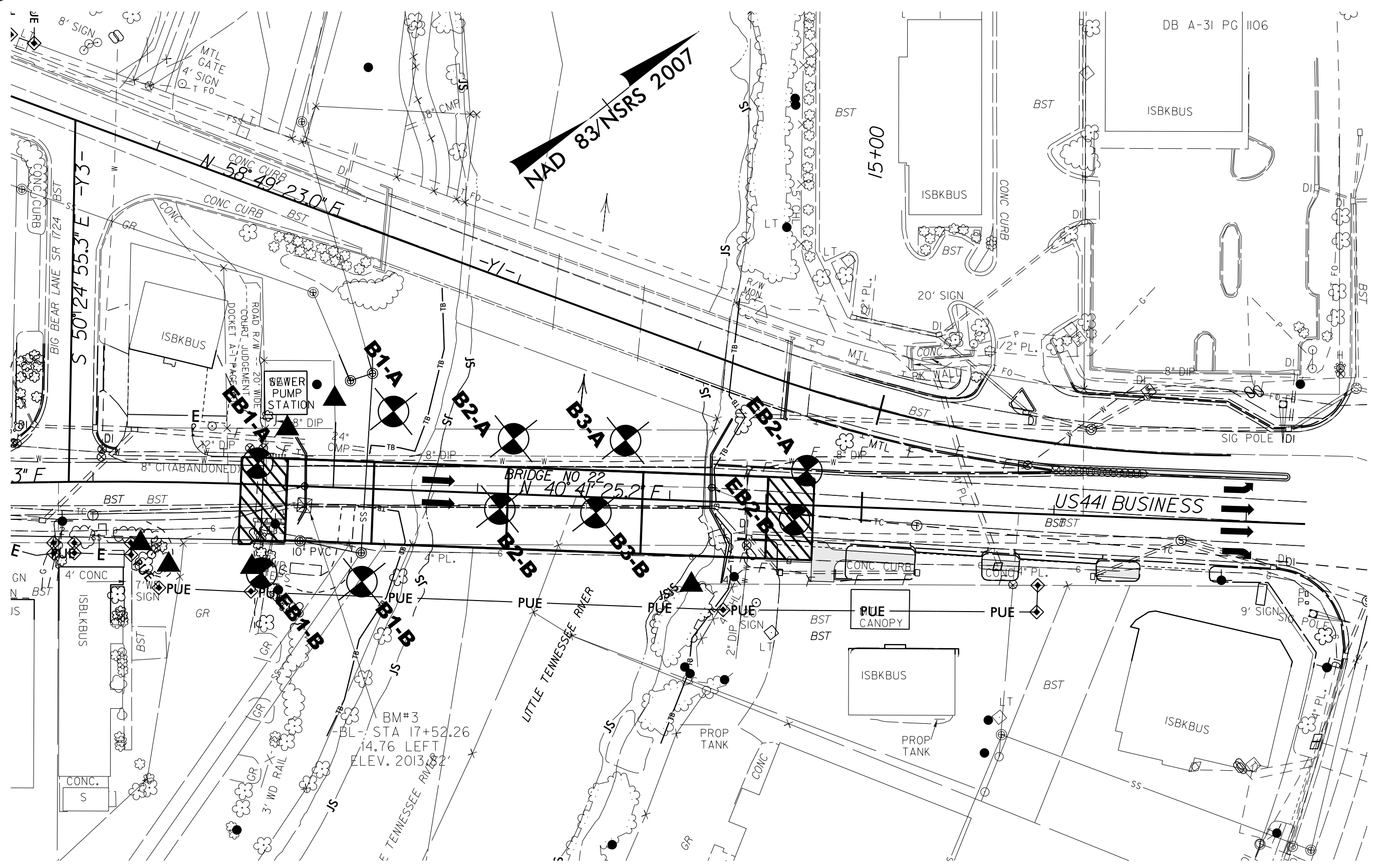
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**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
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GEOTECHNICAL ENGINEERING UNIT**

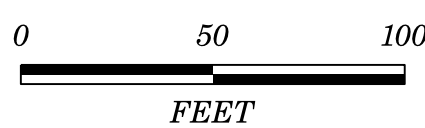
# SUBSURFACE INVESTIGATION

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

SOIL DESCRIPTION					GRADATION					ROCK DESCRIPTION					TERMS AND DEFINITIONS																																																																																																																																												
<p>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 (AASHTO T 206, 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, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>					<p><b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.  <b>UNIFORMLY GRADED</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.  <b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>					<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 OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>					<p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.  <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  <b>ARGILLACEOUS</b> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, 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>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  <b>CORE RECOVERY (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 (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 (SROD)</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>																																																																																																																																												
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>					<b>ANGULARITY OF GRAINS</b>					<b>WEATHERING</b>					<b>ROCK HARDNESS</b>																																																																																																																																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>GENERAL CLASS.</th> <th colspan="7">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="7">SILT-CLAY MATERIALS (&gt; 35% PASSING #200)</th> <th colspan="7">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th colspan="2">A-1</th> <th colspan="2">A-3</th> <th colspan="2">A-2</th> <th colspan="3">A-4</th> <th colspan="2">A-5</th> <th colspan="2">A-6</th> <th colspan="3">A-7</th> <th colspan="2">A-1, A-2</th> <th colspan="2">A-4, A-5</th> <th colspan="3">A-6, A-7</th> </tr> <tr> <th>SYMBOL</th> <td colspan="2">○○○○○○○○○○</td> <td colspan="2">○○○○○○○○○○</td> <td colspan="2">○○○○○○○○○○</td> <td colspan="3">○○○○○○○○○○</td> <td colspan="2">○○○○○○○○○○</td> <td colspan="3">○○○○○○○○○○</td> <td colspan="2">○○○○○○○○○○</td> <td colspan="2">○○○○○○○○○○</td> <td colspan="3">○○○○○○○○○○</td> </tr> <tr> <th>% PASSING #10 #40 #200</th> <td>50 MX</td> <td>30 MX</td> <td>15 MX</td> <td>25 MX</td> <td>10 MX</td> <td>5 MN</td> <td>35 MX</td> <td>35 MX</td> <td>35 MX</td> <td>35 MX</td> <td>35 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> </tr> </thead> </table>					GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)							ORGANIC MATERIALS							GROUP CLASS.	A-1		A-3		A-2		A-4			A-5		A-6		A-7			A-1, A-2		A-4, A-5		A-6, A-7			SYMBOL	○○○○○○○○○○		○○○○○○○○○○		○○○○○○○○○○		○○○○○○○○○○			○○○○○○○○○○		○○○○○○○○○○			○○○○○○○○○○		○○○○○○○○○○		○○○○○○○○○○			% PASSING #10 #40 #200	50 MX	30 MX	15 MX	25 MX	10 MX	5 MN	35 MX	35 MX	35 MX	35 MX	35 MN	36 MN	36 MN	36 MN	36 MN	36 MN	36 MN	36 MN	36 MN	36 MN	36 MN	36 MN	<p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <b>ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</b></p>					<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>					<p>CRISTALLINE 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.</p>					<p>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.</p>																																												
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<p><b>COMPRESSIONIBILITY</b></p> <p>SLIGHTLY COMPRESSIBLE LL &lt; 31          MODERATELY COMPRESSIBLE LL = 31 - 50          HIGHLY COMPRESSIBLE LL &gt; 50</p>					<p><b>PERCENTAGE OF MATERIAL</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <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>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt; 10%</td> <td>&gt; 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </tbody> </table>					ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 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	<p><b>GROUND WATER</b></p> <p>▽ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING          ▽ STATIC WATER LEVEL AFTER 24 HOURS          ▽ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA          ○ SPRING OR SEEP</p>					<p><b>MISCELLANEOUS SYMBOLS</b></p> <p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION          SOIL SYMBOL          ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT          INFERRED SOIL BOUNDARY          INFERRED ROCK LINE          ALLUVIAL SOIL BOUNDARY</p> <p>DIP &amp; DIP DIRECTION OF ROCK STRUCTURES          SPT DMT TEST BORE          AUGER BORING          CORE BORING          MONITORING WELL          PIEZOMETER INSTALLATION          SLOPE INDICATOR INSTALLATION          CONE PENETROMETER TEST          SOUNDING ROD          TEST BORING WITH CORE          SPT N-VALUE</p>					<p><b>RECOMMENDATION SYMBOLS</b></p> <p>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</p>					<p><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, FRACTURES          FRAGS. - FRAGMENTS          HI. - HIGHLY</p> <p>MED. - MEDIUM          MICA - MICACEOUS          MOD. - MODERATELY          NP - NON PLASTIC          ORG. - ORGANIC          PMT - PRESSUREMETER TEST          SAP. - SAPROLITIC          SD. - SAND, SANDY          SL. - SILT, SILTY          SLI. - SLIGHTLY          TCR - TRIAXIAL REFUSAL          w - MOISTURE CONTENT          V - VERY</p> <p>VST - VANE SHEAR TEST          WEA. - WEATHERED          γ<sub>u</sub> - UNIT WEIGHT          γ<sub>d</sub> - DRY UNIT WEIGHT</p> <p><b>SAMPLE ABBREVIATIONS</b></p> <p>S - BULK          SS - SPLIT SPOON          ST - SHELBY TUBE          RS - ROCK          RT - RECOMPACTED TRIAXIAL          CBR - CALIFORNIA BEARING RATIO</p>					<p><b>TEXTURE OR GRAIN SIZE</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>U.S. STD. 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MM 305	75	2.0	0.25	0.05	0.005		IN. 12	3						<p><b>SOIL MOISTURE - CORRELATION OF TERMS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PLASTIC RANGE (PI)</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </tbody> </table>					SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION	LL - LIQUID LIMIT	- SATURATED - (SAT.)	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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>					<p><b>NOTES:</b>          FIAD - FILLED IN AFTER DRILLING</p>				
ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL																																																																																																																																																								
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<p>BENCH MARK: BYI-12 E 294263.2 N 551619.1</p> <p style="text-align: right;">ELEVATION: 2013.92 FEET</p>																																																																																																																																																											
<p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>																																																																																																																																																											



NAD 83/NSRS 2007



SKREW ANGLE FOR BENTS 90° TYPICAL

APPROVED BY: ARF	SCALE: 1" = 50'
DRAWN BY: BTR	DATE: DEC 2015
SHEET: 3	JOB NO:

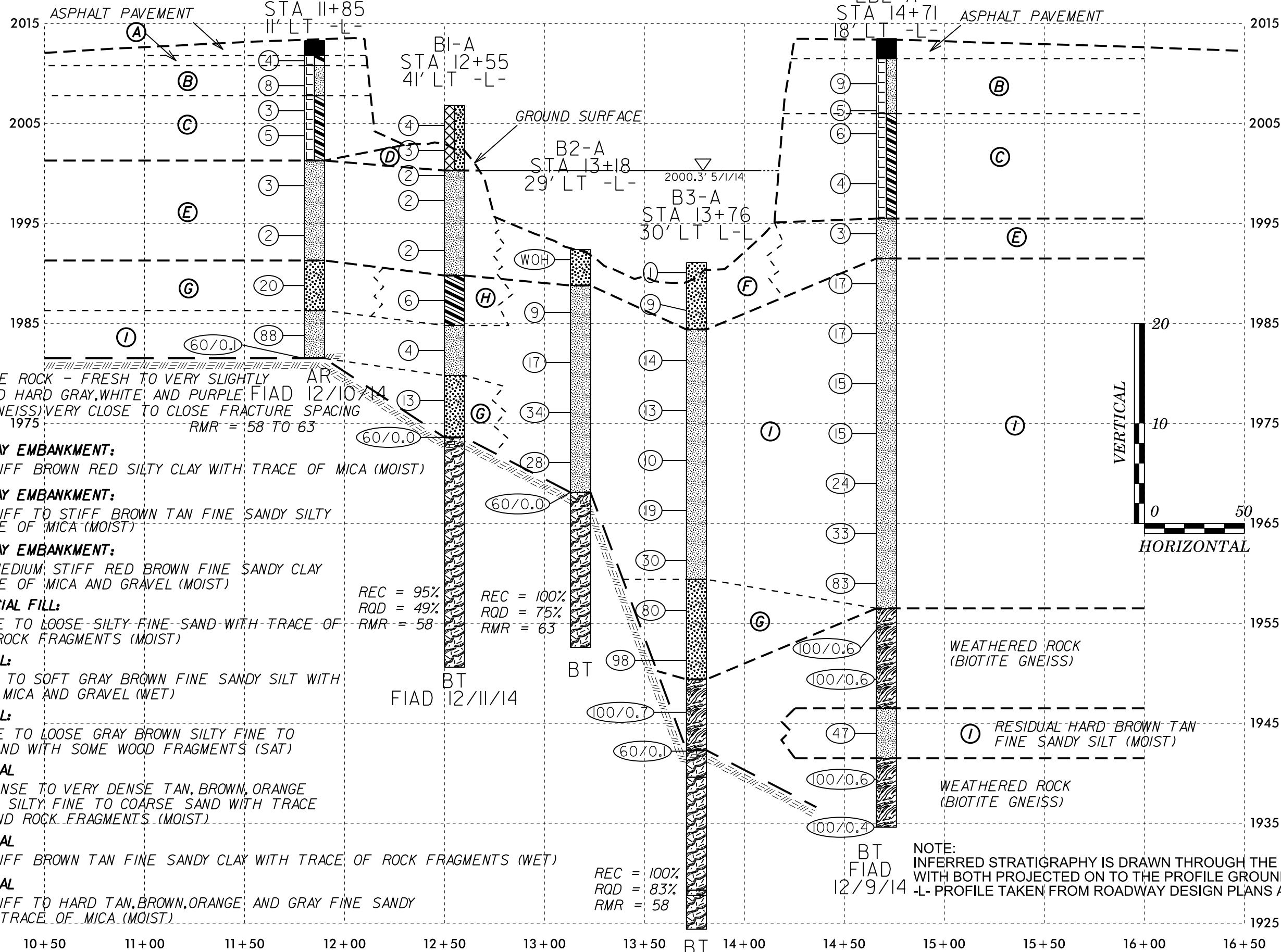
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 NC ENGINEER LICENSE #0176  
 3201 SPRING FOREST RD, RALEIGH, NC 27616

**BORING LOCATION PLAN**  
 BRIDGE NO. 22  
 OVER LITTLE TENNESSEE RIVER ON -L- (US441 BUSINESS)  
 STATE PROJ NO. 42271 TIP NO. B-5125  
 MACON COUNTY, NORTH CAROLINA

TO BIG BEAR LN (SR1724)

# GENERALIZED SUBSURFACE PROFILE ALONG -L-

TO LAKESIDE DR (SR1324)



CRYSTALLINE ROCK - FRESH TO VERY SLIGHTLY WEATHERED HARD GRAY, WHITE AND PURPLE FIAD 12/10/14 (BIOTITE GNEISS) VERY CLOSE TO CLOSE FRACTURE SPACING 1975

- (A) ROADWAY EMBANKMENT:**  
MEDIUM STIFF BROWN RED SILTY CLAY WITH TRACE OF MICA (MOIST)
- (B) ROADWAY EMBANKMENT:**  
MEDIUM STIFF TO STIFF BROWN TAN FINE SANDY SILTY WITH TRACE OF MICA (MOIST)
- (C) ROADWAY EMBANKMENT:**  
SOFT TO MEDIUM STIFF RED BROWN FINE SANDY CLAY WITH TRACE OF MICA AND GRAVEL (MOIST)
- (D) ARTIFICIAL FILL:**  
VERY LOOSE TO LOOSE SILTY FINE SAND WITH TRACE OF MICA AND ROCK FRAGMENTS (MOIST)
- (E) ALLUVIAL:**  
VERY SOFT TO SOFT GRAY BROWN FINE SANDY SILT WITH TRACE OF MICA AND GRAVEL (WET)
- (F) ALLUVIAL:**  
VERY LOOSE TO LOOSE GRAY BROWN SILTY FINE TO COARSE SAND WITH SOME WOOD FRAGMENTS (SAT)
- (G) RESIDUAL:**  
MEDIUM DENSE TO VERY DENSE TAN, BROWN, ORANGE AND WHITE SILTY FINE TO COARSE SAND WITH TRACE OF MICA AND ROCK FRAGMENTS (MOIST)
- (H) RESIDUAL:**  
MEDIUM STIFF BROWN TAN FINE SANDY CLAY WITH TRACE OF ROCK FRAGMENTS (WET)
- (I) RESIDUAL:**  
MEDIUM STIFF TO HARD TAN, BROWN, ORANGE AND GRAY FINE SANDY SILT WITH TRACE OF MICA (MOIST)

NOTE:  
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE PROFILE GROUND LINE AND -L- PROFILE TAKEN FROM ROADWAY DESIGN PLANS AS OF JAN 2015

GENERALIZED SUBSURFACE PROFILE ALONG -L-

BRIDGE NO. 22  
OVER LITTLE TENNESSEE RIVER ON -L- (US441 BUSINESS)  
STATE PROJ NO. 42271 TIP NO. B-5125  
MACON COUNTY, NORTH CAROLINA



WWW.SMEINC.COM  
NC ENGINEER LICENSE #0176

3201 SPRING FOREST RD, RALEIGH, NC 27616

APPROVED BY: AFR

DRAWN BY: BTR

SHEET: 4

SCALE: VERT. 1" = 10'  
HOR. 1" = 50'

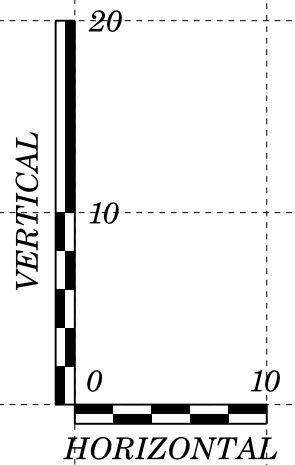
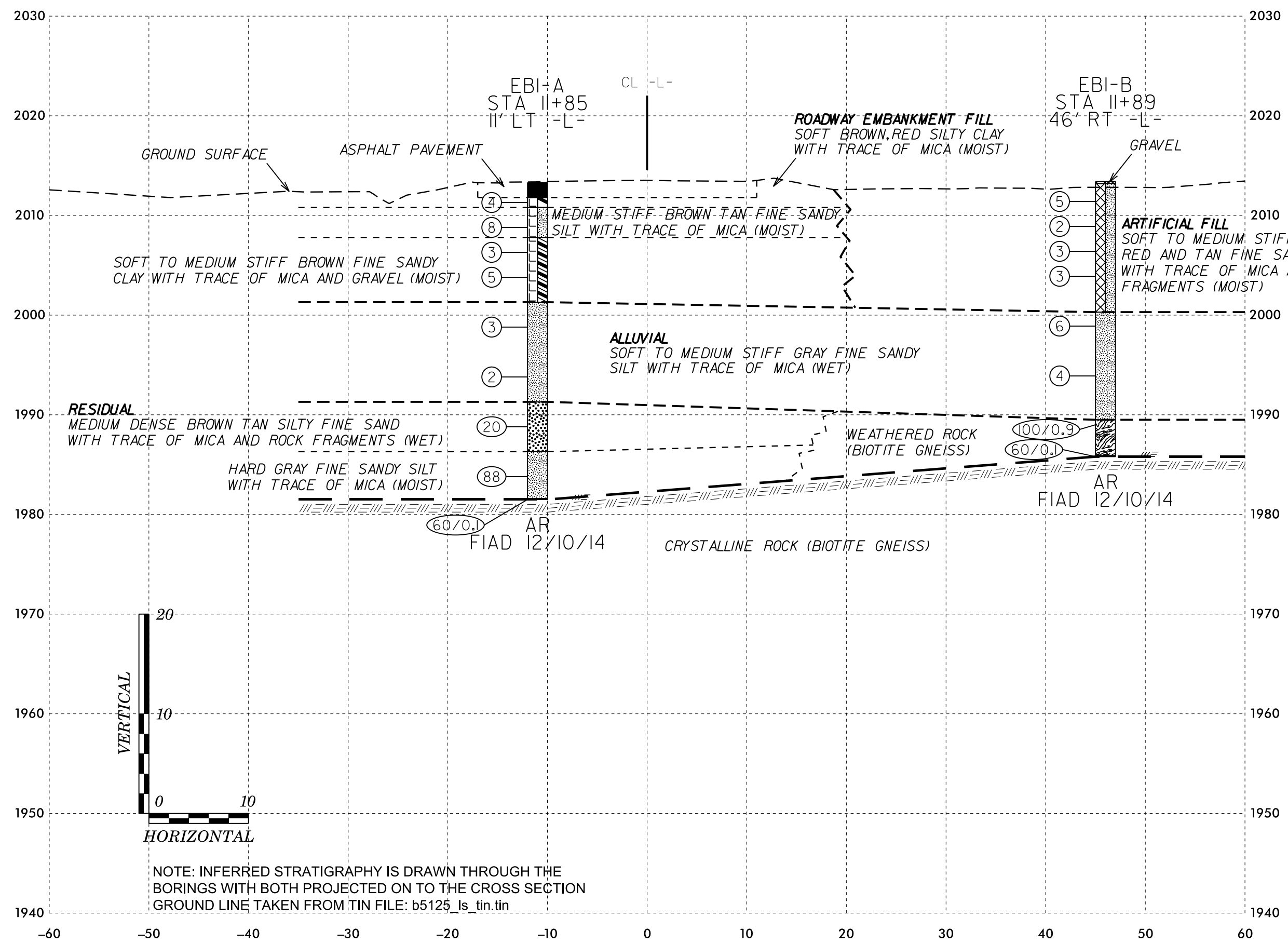
DATE: DEC 2015

JOB NO:

← TO NORTHWEST

# CROSS SECTION THROUGH (STA 12+00.89)

→ TO SOUTHEAST



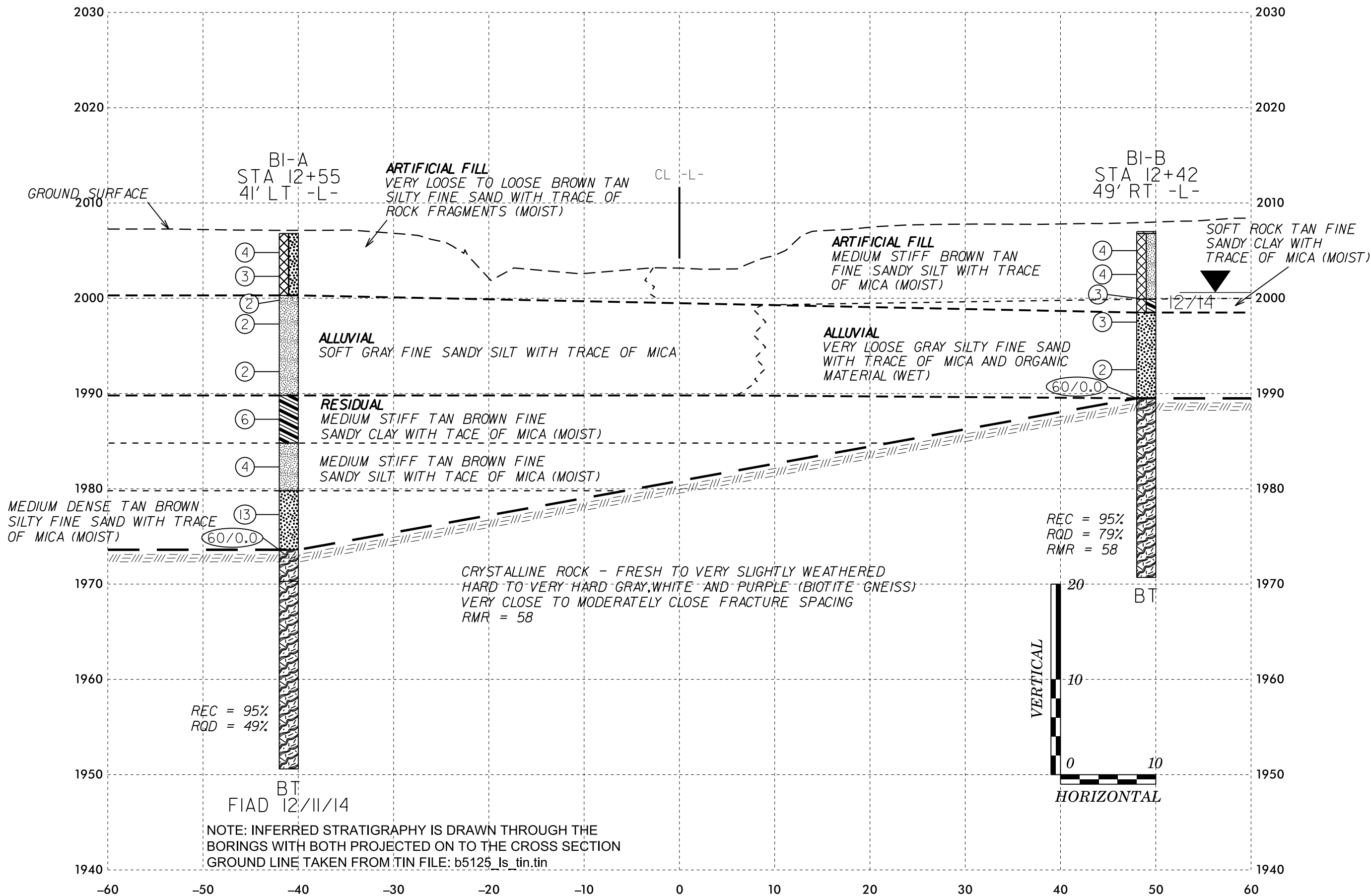
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE CROSS SECTION GROUND LINE TAKEN FROM TIN FILE: b5125\_ls\_tin.tin

APPROVED BY: AFR	VERT. 1" = 10'	
DRAWN BY: BTR	HOR. 1" = 10'	
DATE: DEC 2015	WWW.SMEINC.COM	<p>CROSS SECTION THROUGH (STA 12+00.89)</p> <p>BRIDGE NO. 22</p> <p>OVER LITTLE TENNESSEE RIVER ON -L- (US441 BUSINESS)</p> <p>STATE PROJ NO. 42271 TIP NO. B-5125</p> <p>MACON COUNTY, NORTH CAROLINA</p>
JOB NO:	NC ENGINEER LICENSE #F-0176	
	3201 SPRING FOREST RD, RALEIGH, NC 27616	

TO NORTHWEST

# CROSS SECTION THROUGH (STA 12+45.89)

TO SOUTHEAST



APPROVED BY: AFR

SCALE: VERT. 1" = 10'  
HOR. 1" = 10'

DRAWN BY: BTR

DATE: DEC 2015

SHEET: 6



WWW.SMEINC.COM

NC ENGINEER LICENSE #F-0176  
3201 SPRING FOREST RD., RALEIGH, NC 27616

## CROSS SECTION THROUGH (STA 12+45.89)

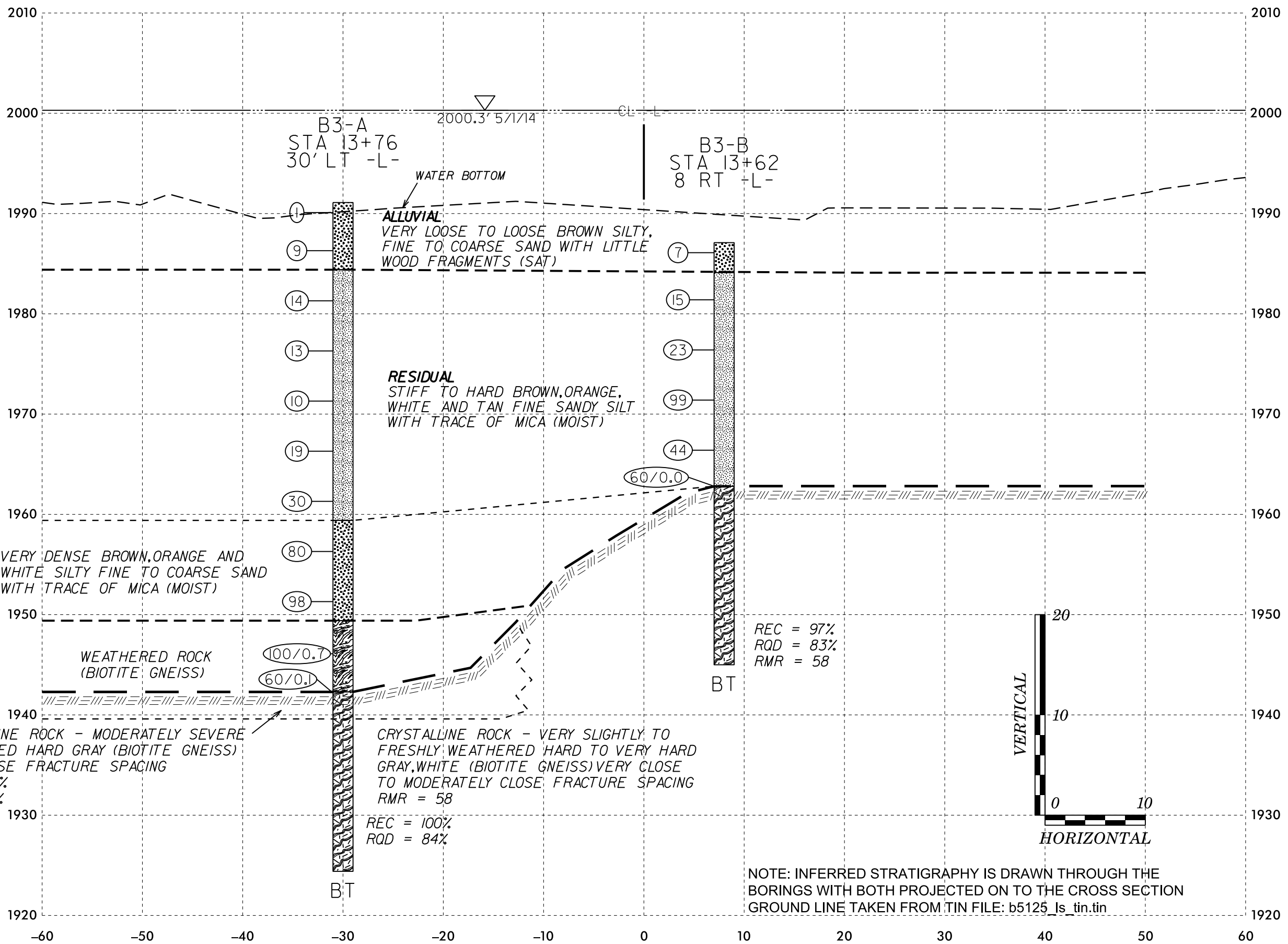
BRIDGE NO. 22  
OVER LITTLE TENNESSEE RIVER ON -L- (US441 BUSINESS)  
STATE PROJ NO. 42271 TIP NO. B-5125  
MACON COUNTY, NORTH CAROLINA



← TO NORTHWEST

### CROSS SECTION THROUGH (STA 13+85.89)

→ TO SOUTHEAST



APPROVED BY: AFR	DRAWN BY: BTR
SCALE: VERT. 1" = 10' HOR. 1" = 10'	JOB NO:
DATE: DEC 2015	SHEET: 8

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3201 SPRING FOREST RD, RALEIGH, NC 27616

CROSS SECTION THROUGH (STA 13+85.89)

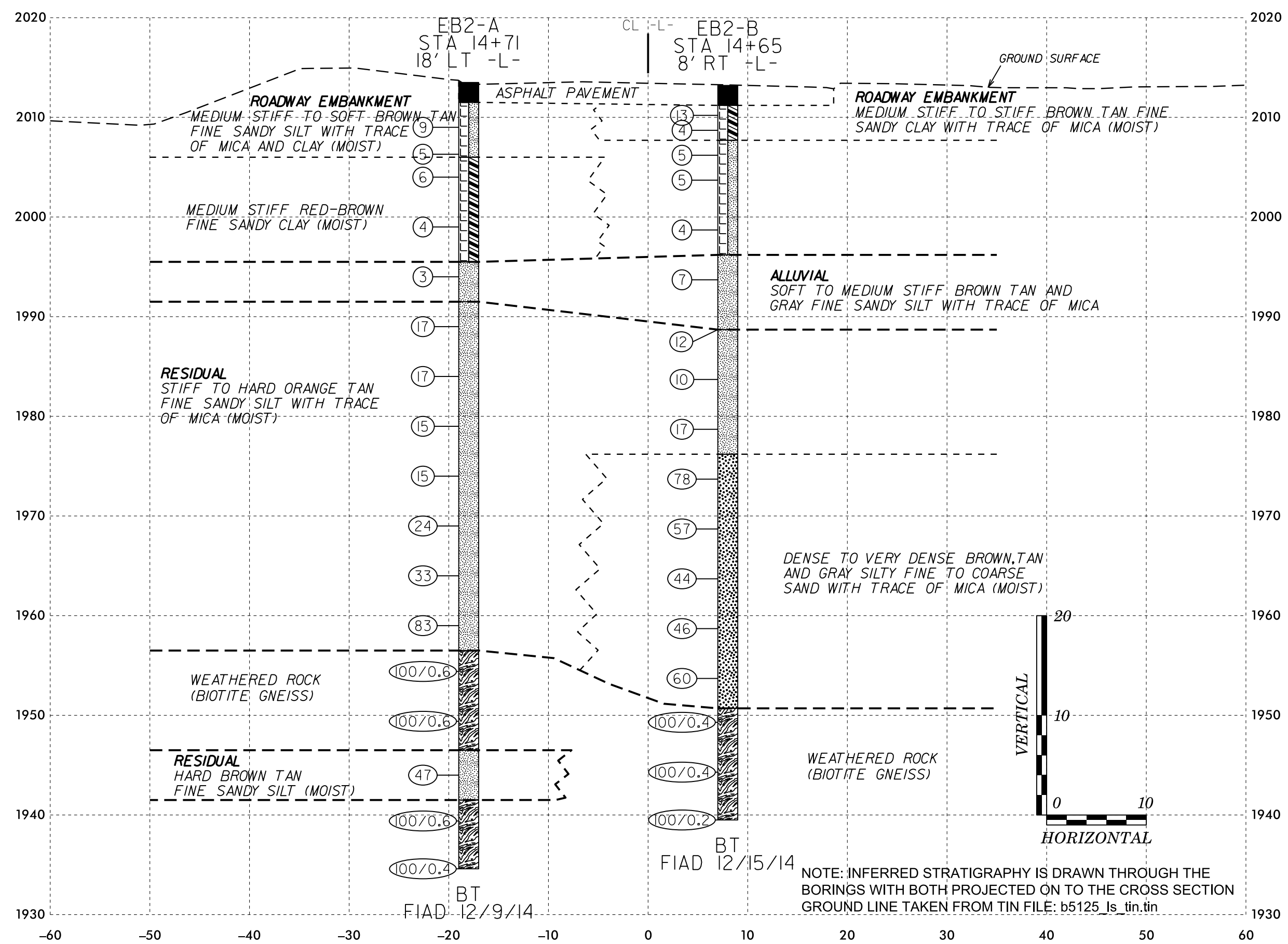
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STATE PROJ NO. 42271 TIP NO. B-5125  
MACON COUNTY, NORTH CAROLINA



← TO NORTHWEST

### CROSS SECTION THROUGH (STA 14+50.89)

→ TO SOUTHEAST



APPROVED BY: AFR	DRAWN BY: BTR
SCALE: VERT. 1" = 10' HOR. 1" = 10'	DATE: DEC 2015
JOB NO:	SHEET: 9

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 3201 SPRING FOREST RD, RALEIGH, NC 27616

CROSS SECTION THROUGH (STA 14+50.89)  
 BRIDGE NO. 22  
 OVER LITTLE TENNESSEE RIVER ON -L- (US441 BUSINESS)  
 STATE PROJ NO. 42271 TIP NO. B-5125  
 MACON COUNTY, NORTH CAROLINA

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE CROSS SECTION GROUND LINE TAKEN FROM TIN FILE: b5125\_ls\_tin.tin

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

WBS B-5125	TIP 42271	COUNTY MACON	GEOLOGIST Wells, J.
SITE DESCRIPTION Bridge No. 22 over Little Tennessee River on US 441 (Business)			GROUND WTR (ft)
BORING NO. EB1-A	STATION 11+85	OFFSET 11 ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,013.3 ft	TOTAL DEPTH 31.8 ft	NORTHING 551,342	EASTING 694,045
DRILL RIG/HAMMER EFF./DATE SME9403 CME-550X 88% 12/19/2014		DRILL METHOD Wash Boring	HAMMER TYPE Automatic
DRILLER R. Norwood	START DATE 12/10/14	COMP. DATE 12/10/14	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2015																
	2,012.3	1.0	3	1	3									2,013.3	0.0	PAVEMENT SURFACE
														2,011.8	1.5	Asphalt (10 inches) ABC Stone (8 inches)
														2,010.8	2.5	ROADWAY EMBANKMENT
2010	2,009.8	3.5	4	4	4									2,007.8	5.5	Brown Red Silty CLAY with Trace of Mica
														2,007.8	5.5	Brown Tan Fine Sandy SILT with Trace of Mica
	2,007.3	6.0	2	1	2											Brown Fine Sandy CLAY with Trace of Mica and Gravel
2005	2,004.8	8.5	3	2	3											
														2,001.3	12.0	ALLUVIAL
2000	1,999.8	13.5	3	2	1											Gray Fine Sandy SILT with Trace of Mica
1995	1,994.8	18.5	2	1	1											
1990	1,989.8	23.5	18	11	9									1,991.3	22.0	RESIDUAL
																Brown Tan Silty Fine SAND with Trace of Mica and Rock Fragments
														1,986.3	27.0	Gray Fine Sandy SILT with Trace of Mica
1985	1,984.8	28.5	26	39	49											
	1,981.6	31.7	60/0.1											1,981.6	31.7	CRYSTALLINE ROCK (Biotite Gneiss)
														1,981.5	31.8	Boring Terminated with Standard Penetration Test Refusal at Elevation 1,981.5 ft in Crystalline Rock (Biotite Gneiss)

- 1) Advanced 2-15/16" Tricone roller bit to 31.7 feet.
- 2) NW casing advanced to 28 feet (30 feet).
- 3) Bentonite mud used as drilling fluid.

WBS B-5125	TIP 42271	COUNTY MACON	GEOLOGIST Wells, J.
SITE DESCRIPTION Bridge No. 22 over Little Tennessee River on US 441 (Business)			GROUND WTR (ft)
BORING NO. EB1-B	STATION 11+89	OFFSET 46 ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,013.4 ft	TOTAL DEPTH 27.6 ft	NORTHING 551,308	EASTING 694,091
DRILL RIG/HAMMER EFF./DATE SME9403 CME-550X 88% 12/19/2014		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER R. Norwood	START DATE 12/10/14	COMP. DATE 12/10/14	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
2015																	
														2,013.4	0.0	GROUND SURFACE	
	2,012.4	1.0	3	2	3											ARTIFICIAL FILL	
																Gravel (2 inches)	
2010	2,009.9	3.5	2	1	1											Brown Red Tan Fine Sandy SILT with Trace of Mica and Rock Fragments	
	2,007.4	6.0	2	1	2												
2005	2,004.9	8.5	2	1	2												
2000	1,999.9	13.5	2	4	2											ALLUVIAL	
																	Gray Fine Sandy SILT with Trace of Mica
1995	1,994.9	18.5	2	2	2												
1990	1,989.9	23.5	26	74/0.4													
	1,985.9	27.5	60/0.1											1,985.9	27.5	WEATHERED ROCK (Biotite Gneiss)	
														1,985.8	27.6	CRYSTALLINE ROCK (Biotite Gneiss)	
																Boring Terminated with Standard Penetration Test Refusal at Elevation 1,985.8 ft in Crystalline Rock (Biotite Gneiss)	

- 1) Advanced 3-1/4" HSA to 27.5 feet.

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

WBS B-5125		TIP 42271		COUNTY MACON		GEOLOGIST Wells, J.										
SITE DESCRIPTION Bridge No. 22 over Little Tennessee River on US 441 (Business)							GROUND WTR (ft)									
BORING NO. B1-A		STATION 12+55		OFFSET 41 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 2,006.8 ft		TOTAL DEPTH 56.2 ft		NORTHING 551,414		EASTING 694,068										
DRILL RIG/HAMMER EFF./DATE SME9403 CME-550X 88% 12/19/2014		DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic												
DRILLER R. Norwood		START DATE 12/11/14		COMP. DATE 12/12/14		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)	
2015																
2010																
2005	2,005.8	1.0	3	2	2										2,006.8	0.0
	2,003.3	3.5	3	2	1											
2000	2,000.8	6.0	2	1	1										2,000.3	6.5
	1,998.3	8.5	1	1	1											
1995	1,993.3	13.5	1	1	1											
	1,988.3	18.5	3	2	4										1,989.8	17.0
1985	1,983.3	23.5	3	2	2										1,984.8	22.0
	1,978.3	28.5	10	6	7										1,979.8	27.0
1980	1,973.6	33.2	60/0.0												1,973.6	33.2
1975																
1970																
1965																
1960																
1955																
															1,950.6	56.2
Boring Terminated at Elevation 1,950.6 ft in Crystalline Rock (Biotite Gneiss)																
1) Advanced 2-15/16" Tricone roller bit to 33.2 feet. 2) NW casing advanced to 33.2 feet (35 feet). 3) SPT refusal encountered at 33.2 feet. 4) Water used as drilling fluid. 5) Advanced NQ2 core barrel from 33.2 feet to 56.2 feet.																

NCDOT BORE SINGLE B5125\_GEO\_BRDG0022\_GINT.GPJ NC\_DOT.GDT 12/9/15

**NCDOT GEOTECHNICAL ENGINEERING UNIT**  
**CORE BORING REPORT**

WBS B-5125		TIP 42271		COUNTY MACON		GEOLOGIST Wells, J.					
SITE DESCRIPTION Bridge No. 22 over Little Tennessee River on US 441 (Business)							GROUND WTR (ft)				
BORING NO. B1-A		STATION 12+55		OFFSET 41 ft LT		ALIGNMENT -L-					
COLLAR ELEV. 2,006.8 ft		TOTAL DEPTH 56.2 ft		NORTHING 551,414		EASTING 694,068					
DRILL RIG/HAMMER EFF./DATE SME9403 CME-550X 88% 12/19/2014		DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic							
DRILLER R. Norwood		START DATE 12/11/14		COMP. DATE 12/12/14		SURFACE WATER DEPTH N/A					
CORE SIZE NQ2		TOTAL RUN 23.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS
					REC (ft)	RQD (ft)		REC (ft)	RQD (ft)		
1973.6	1,973.6	33.2	3.3	2:30/0.3 5:00/1.0 7:00/1.0 4:30/1.0	(2.9) 88%	(1.2) 36%					Begin Coring @ 33.2 ft
1970	1,970.3	36.5	5.0	4:15/1.0 4:00/1.0 3:30/1.0 3:00/1.0 3:15/1.0	(4.9) 98%	(1.3) 26%					CRSTALLINE ROCK Fresh to Very Slightly Weathered Hard Gray White Purple (Biotite Gneiss) Very Close to Close Fracture Spacing with 1 joint at 10°-20°, 5 joints at 30°, 9 joints at 45°, 7 joints at 60°, 10 joints at 80° and 5 joints at 90° (continued)
1965	1,965.3	41.5	5.0	3:45/1.0 3:15/1.0 3:00/1.0 3:15/1.0	(4.8) 96%	(4.1) 82%					
1960	1,960.3	46.5	5.0	4:30/1.0 3:30/1.0 4:15/1.0 4:00/1.0 3:15/1.0	(4.8) 96%	(2.9) 58%					
1955	1,955.3	51.5	4.7	4:00/1.0 3:00/1.0 4:00/1.0 4:15/1.0 3:00/0.7	(4.5) 96%	(1.8) 38%					
	1,950.6	56.2									
Boring Terminated at Elevation 1,950.6 ft in Crystalline Rock (Biotite Gneiss)											
1) Advanced 2-15/16" Tricone roller bit to 33.2 feet. 2) NW casing advanced to 33.2 feet (35 feet). 3) SPT refusal encountered at 33.2 feet. 4) Water used as drilling fluid. 5) Advanced NQ2 core barrel from 33.2 feet to 56.2 feet.											

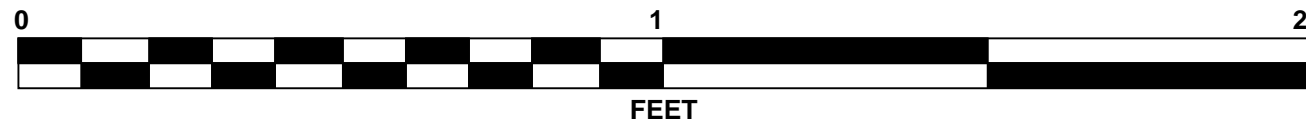
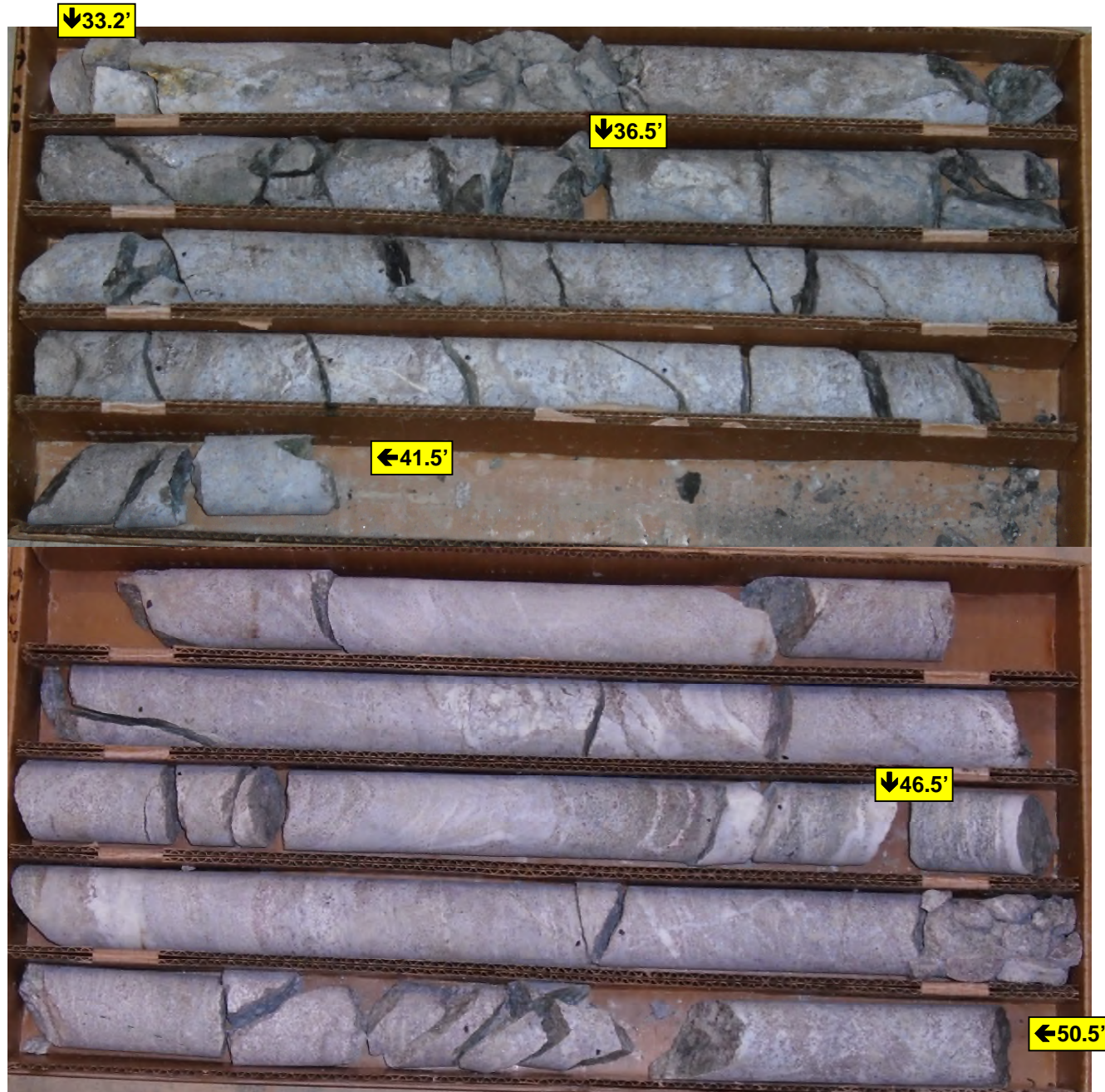
NCDOT CORE SINGLE B5125\_GEO\_BRDG0022\_GINT.GPJ NC\_DOT.GDT 12/9/15

Project No. 42271  
Bridge No. 22 over Little Tennessee River on US 441 Business (B-5125)

# CORE PHOTOGRAPHS

## B1-A

BOX 1: 33.2 to 41.5 FEET and BOX 2: 41.5 to 50.5 FEET

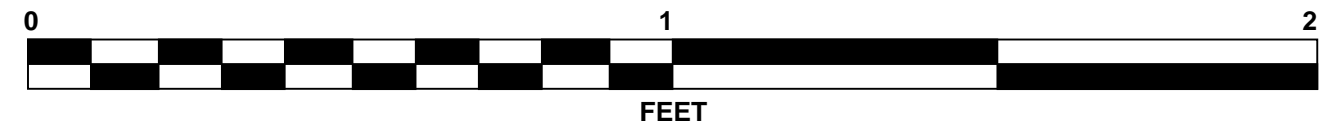
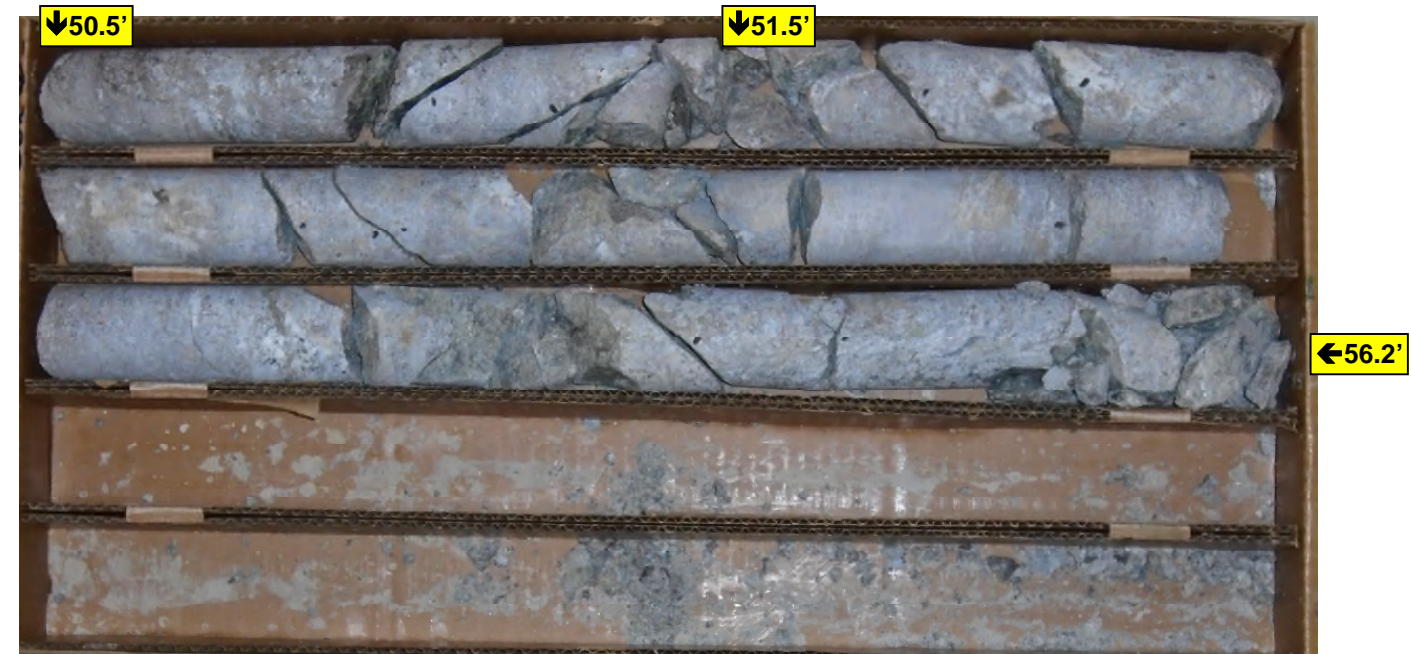


Project No. 42271  
Bridge No. 22 over Little Tennessee River on US 441 Business (B-5125)

# CORE PHOTOGRAPHS

## B1-A

BOX 3: 50.5 to 56.2 FEET



WBS B-5125	TIP 42271	COUNTY MACON	GEOLOGIST Wells, J.
SITE DESCRIPTION Bridge No. 22 over Little Tennessee River on US 441 (Business)			GROUND WTR (ft)
BORING NO. B1-B	STATION 12+42	OFFSET 49 ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,007.0 ft	TOTAL DEPTH 36.3 ft	NORTHING 551,346	EASTING 694,127
DRILL RIG/HAMMER EFF./DATE SME9403 CME-550X 88% 12/19/2014		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER R. Norwood	START DATE 12/10/14	COMP. DATE 12/11/14	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	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2015															
2010															
2005	2,006.0	1.0	3	2	2									2,007.0	GROUND SURFACE
	2,003.5	3.5	2	2	2										ARTIFICIAL FILL Brown Tan Fine Sandy SILT with Trace of Mica
2000	2,001.0	6.0	1	2	1									1,999.9	
	1,998.5	8.5	2	2	1									1,998.5	Red Tan Fine Sandy CLAY with Trace of Mica
1995	1,993.5	13.5	1	1	1										ALLUVIAL Gray Silty Fine SAND with Trace of Mica and Organic Material (Grass)
1990	1,989.5	17.5	60/0.0											1,989.5	CRYSTALLINE ROCK (Biotite Gneiss)
1985															
1980															
1975															
														1,970.7	36.3
Boring Terminated at Elevation 1,970.7 ft in Crystalline Rock (Biotite Gneiss) 1) Advanced 2-15/16" Tricone roller bit to 17.5 feet. 2) NW casing advanced to 17.5 feet (20 feet). 3) SPT refusal encountered at 17.5 feet. 4) Bentonite mud used as drilling fluid. 5) Advanced NQ2 core barrel from 17.5 feet to 36.3 feet.															

WBS B-5125	TIP 42271	COUNTY MACON	GEOLOGIST Wells, J.
SITE DESCRIPTION Bridge No. 22 over Little Tennessee River on US 441 (Business)			GROUND WTR (ft)
BORING NO. B1-B	STATION 12+42	OFFSET 49 ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,007.0 ft	TOTAL DEPTH 36.3 ft	NORTHING 551,346	EASTING 694,127
DRILL RIG/HAMMER EFF./DATE SME9403 CME-550X 88% 12/19/2014		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER R. Norwood	START DATE 12/10/14	COMP. DATE 12/11/14	SURFACE WATER DEPTH N/A

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
1989.5	1,989.5	17.5	3.8	1:30/0.8 3:15/1.0 3:00/1.0	(3.3) 87%	(2.7) 71%						1989.5
1985	1,985.7	21.3	5.0	2:45/1.0 2:30/1.0 3:00/1.0 3:00/1.0	(4.8) 96%	(4.6) 92%						1985
1980	1,980.7	26.3	5.0	3:30/1.0 3:00/1.0 3:45/1.0 3:45/1.0	(4.9) 98%	(3.3) 66%	RS-1					1980
1975	1,975.7	31.3	5.0	5:30/1.0 3:30/1.0 4:00/1.0 4:15/1.0	(4.9) 98%	(4.3) 86%						1975
	1,970.7	36.3		5:30/1.0								1,970.7
Boring Terminated at Elevation 1,970.7 ft in Crystalline Rock (Biotite Gneiss) 1) Advanced 2-15/16" Tricone roller bit to 17.5 feet. 2) NW casing advanced to 17.5 feet (20 feet). 3) SPT refusal encountered at 17.5 feet. 4) Bentonite mud used as drilling fluid. 5) Advanced NQ2 core barrel from 17.5 feet to 36.3 feet.												

NCDOT BORE SINGLE B5125\_GEO\_BRDG0022\_GINT.GPJ NC\_DOT.GDT 12/9/15

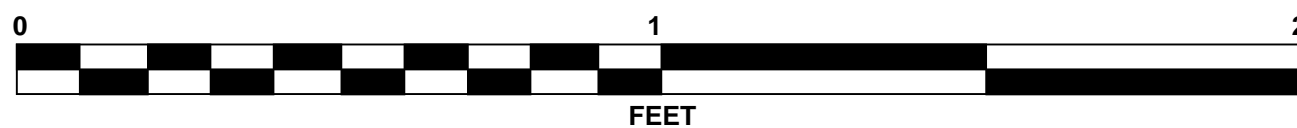
NCDOT CORE SINGLE B5125\_GEO\_BRDG0022\_GINT.GPJ NC\_DOT.GDT 12/9/15

Project No. 42271  
Bridge No. 22 over Little Tennessee River on US 441 Business (B-5125)

# CORE PHOTOGRAPHS

## B1-B

BOX 1: 17.5 to 25.3 FEET, BOX 2: 25.3 TO 34.5 FEET and BOX 3: 34.5 to 36.3 FEET



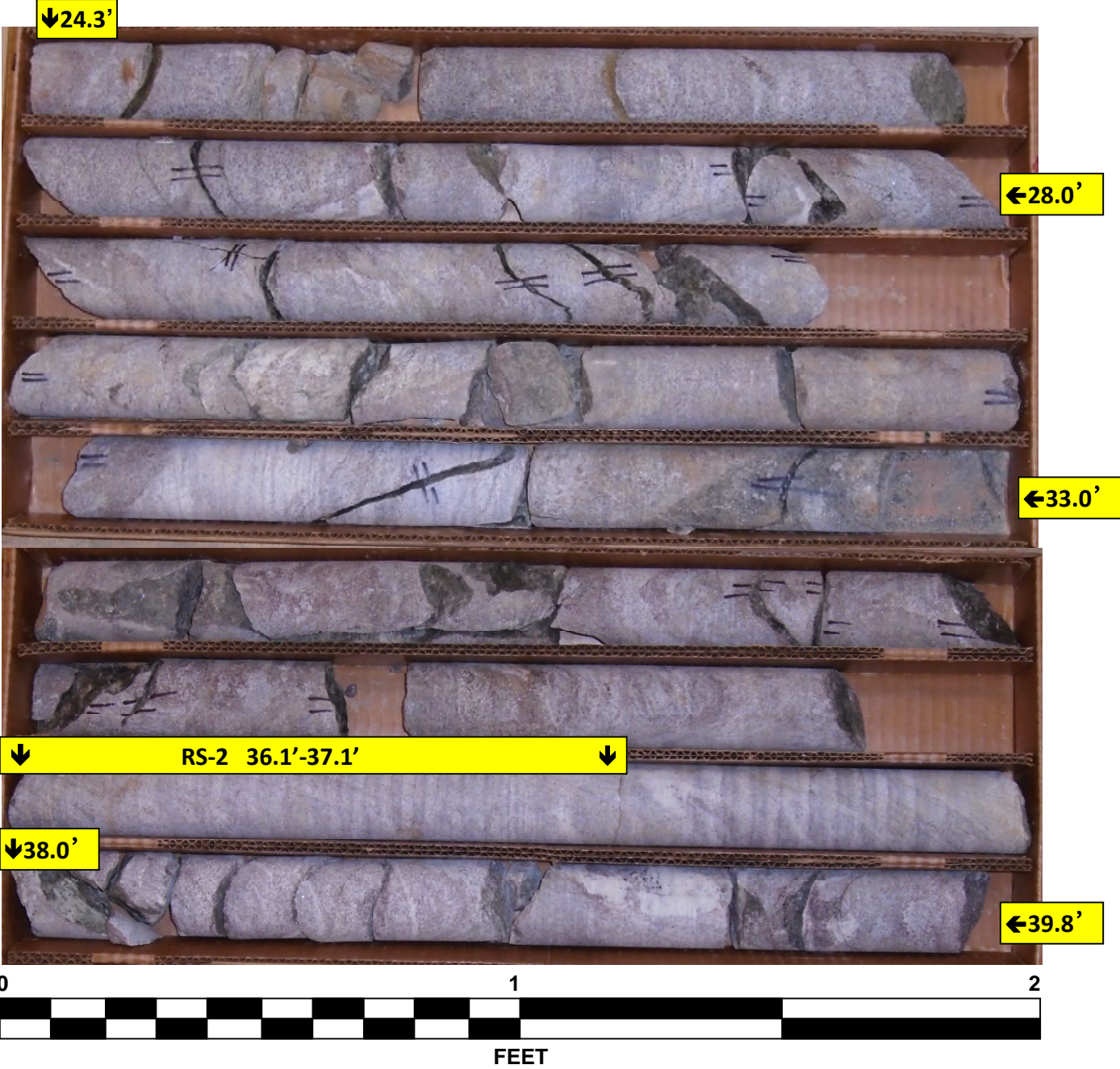


Project No. 42271  
Bridge No. 22 over Little Tennessee River on US 441 Business (B-5125)

# CORE PHOTOGRAPHS

## B2-A

BOX 1: 24.3 to 33.0 FEET and BOX 2: 33.0 to 39.8 FEET







# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS		TIP		COUNTY		GEOLOGIST						
B-5125		42271		MACON		Keatts, M.						
SITE DESCRIPTION							GROUND WTR (ft)					
Bridge No. 22 over Little Tennessee River on US 441 (Business)												
BORING NO.		STATION		OFFSET		ALIGNMENT						
B2-B		13+12		8 ft RT		-L-						
COLLAR ELEV.		TOTAL DEPTH		NORTHING		EASTING						
1,992.8 ft		28.6 ft		551,426		694,142						
DRILL RIG/HAMMER EFF./DATE		DRILL METHOD		HAMMER TYPE								
SME2204 CME-45C 89% 12/19/2014		SPT Core Boring		Automatic								
DRILLER		START DATE		COMP. DATE		SURFACE WATER DEPTH						
M. Moseley		12/12/14		12/12/14		7.1ft						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25					
2000												
										WATER SURFACE (12/12/14)		
1995												
	1,992.8	0.0	2	1	1					1,992.8 WATER BOTTOM	0.0	
1990									Sat.	ALLUVIAL Brown Silty Fine to Coarse SAND		
	1,987.4	5.4								1,989.8 Brown White Fine to coarse SAND with Gravel and Boulders	3.0	
1985			24	15	13				Sat.			
	1,982.4	10.4								1,983.8	9.0	
1980			80	20	0.1					1,981.6 WEATHERED ROCK (Biotite Gneiss)	11.2	
	1,981.6	11.2								1,981.6 CRYSTALLINE ROCK (Biotite Gneiss)		
1975												
1970												
1965												
										1,964.2	28.6	
										Boring Terminated at Elevation 1,964.2 ft in Crystalline Rock (Biotite Gneiss) 1) Advanced 2-15/16" Tricone roller bit to 11.2 feet. 2) NW casing advanced to 11.2 feet. 3) SPT refusal encountered at 11.2 feet. 4) Water used as drilling fluid. 5) Advanced NQ core barrel from 11.2 feet to 28.6 feet.		

NCDOT BORE SINGLE B5125\_GEO\_BRDG0022\_GINT.GPJ NC\_DOT.GDT 12/9/15



# NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

WBS		TIP		COUNTY		GEOLOGIST						
B-5125		42271		MACON		Keatts, M.						
SITE DESCRIPTION							GROUND WTR (ft)					
Bridge No. 22 over Little Tennessee River on US 441 (Business)												
BORING NO.		STATION		OFFSET		ALIGNMENT						
B2-B		13+12		8 ft RT		-L-						
COLLAR ELEV.		TOTAL DEPTH		NORTHING		EASTING						
1,992.8 ft		28.6 ft		551,426		694,142						
DRILL RIG/HAMMER EFF./DATE		DRILL METHOD		HAMMER TYPE								
SME2204 CME-45C 89% 12/19/2014		SPT Core Boring		Automatic								
DRILLER		START DATE		COMP. DATE		SURFACE WATER DEPTH						
M. Moseley		12/12/14		12/12/14		7.1ft						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC (ft)	RQD (ft)		REC (%)	RQD (%)			
1981.6	1,981.6	11.2	2.4	1:00/0.4	(2.2)	(1.5)		(17.2)	(11.4)		Begin Coring @ 11.2 ft	11.2
1980	1,979.2	13.6	5.0	2:30/1.0	92%	63%					CRYSTALLINE ROCK Gray (Biotite Gneiss) Moderately Close to Close Fracture Spacing with 6 Joints at 10°-20°, 5 Joints at 30°, 3 Joints at 45°, 2 Joints at 60°-75°, and 1 Joint at 90°	1981.6
			2.30/1.0	(5.0)	(2.0)							
			2:15/1.0	100%	40%							
1975	1,974.2	18.6	5.0	2:30/1.0								
			5.0	2:15/1.0	(5.0)	(3.9)						
				2:15/1.0								
				2:30/1.0								
				4:15/1.0								
1970	1,969.2	23.6	5.0	3:45/1.0								
				2:15/1.0	(5.0)	(4.0)						
				2:15/1.0	100%	80%						
				2:30/1.0								
1965	1,964.2	28.6		2:15/1.0								28.6
											Boring Terminated at Elevation 1,964.2 ft in Crystalline Rock (Biotite Gneiss) 1) Advanced 2-15/16" Tricone roller bit to 11.2 feet. 2) NW casing advanced to 11.2 feet. 3) SPT refusal encountered at 11.2 feet. 4) Water used as drilling fluid. 5) Advanced NQ core barrel from 11.2 feet to 28.6 feet.	

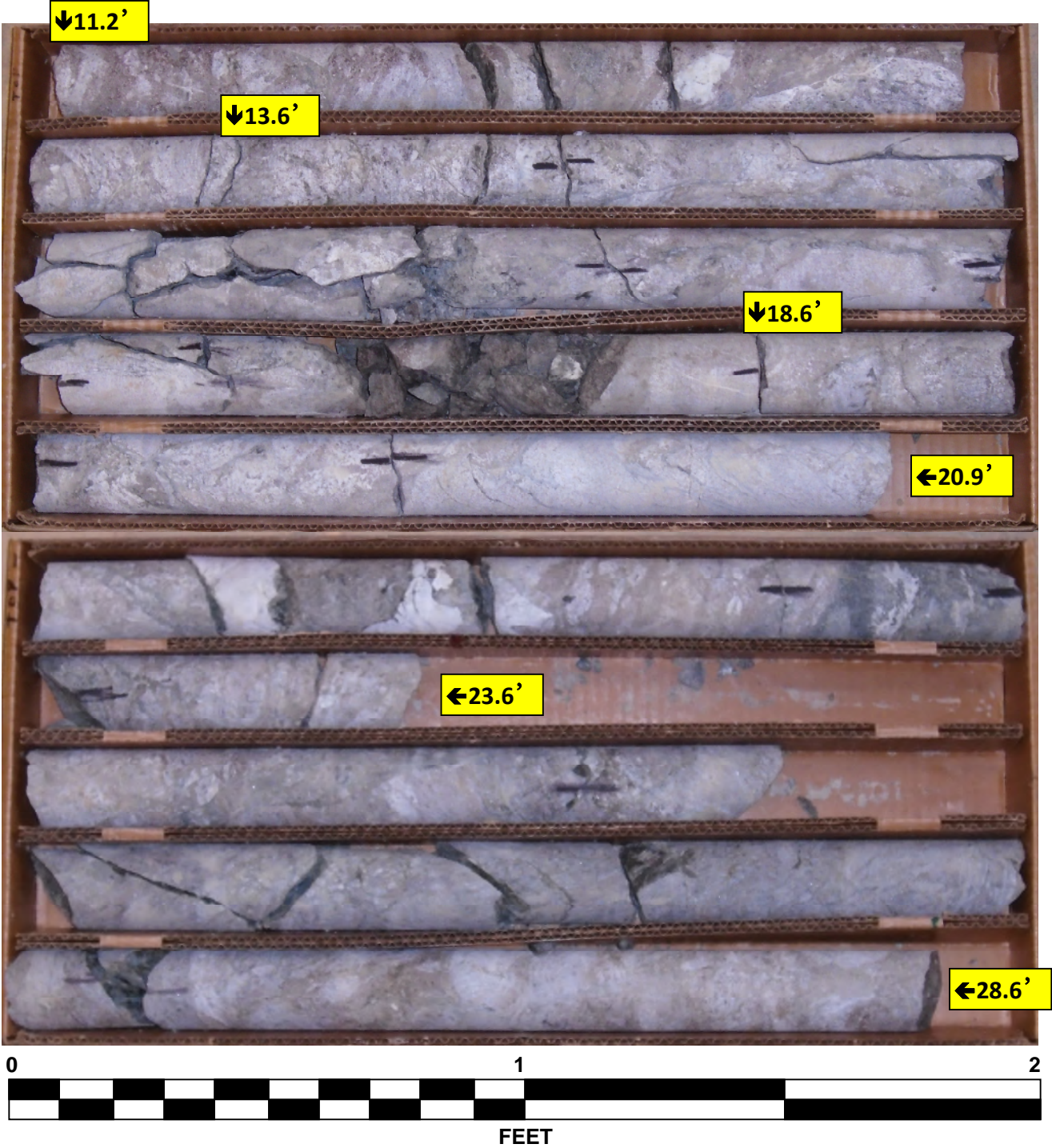
NCDOT CORE SINGLE B5125\_GEO\_BRDG0022\_GINT.GPJ NC\_DOT.GDT 12/9/15

Project No. 42271  
Bridge No. 22 over Little Tennessee River on US 441 Business (B-5125)

# CORE PHOTOGRAPHS

## B2-B

BOX 1: 11.2 to 20.9 FEET and BOX 2: 20.9 to 28.6 FEET








# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS B-5125		TIP 42271		COUNTY MACON		GEOLOGIST Page, N.											
SITE DESCRIPTION Bridge No. 22 over Little Tennessee River on US 441 (Business)							GROUND WTR (ft)										
BORING NO. B3-A		STATION 13+76		OFFSET 30 ft LT		ALIGNMENT -L-											
COLLAR ELEV. 1,991.1 ft		TOTAL DEPTH 66.7 ft		NORTHING 551,499		EASTING 694,155											
DRILL RIG/HAMMER EFF./DATE SME2204 CME-45C 89% 12/19/2014				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic											
DRILLER M. Moseley		START DATE 12/10/14		COMP. DATE 12/11/14		SURFACE WATER DEPTH 8.8ft											
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							
2000																	WATER SURFACE (12/10/14)
1995																	
1990	1,991.1	0.0	1	WOH	1												1,991.1 WATER BOTTOM 0.0
1985	1,987.3	3.8	18	6	3												1,984.4 ALLUVIAL Gray Brown Silty Fine to Coarse SAND with Some Wood Fragments 6.7
1980	1,982.3	8.8	11	8	6												1,984.4 RESIDUAL Brown Orange Fine Sandy SILT with Trace of Mica 6.7
1975	1,977.3	13.8	5	5	8												
1970	1,972.3	18.8	4	4	6												
1965	1,967.3	23.8	4	5	14												
1960	1,962.3	28.8	9	13	17												
1955	1,957.3	33.8	11	30	50												1,959.4 Brown Orange White Silty Fine to Coarse SAND with Trace of Mica 31.7
1950	1,952.3	38.8	13	26	72												1,949.4 WEATHERED ROCK (Biotite Gneiss) 41.7
1945	1,947.3	43.8	20	57	43/0.2												1,942.3 CRYSTALLINE ROCK (Biotite Gneiss) 48.8
1940	1,942.3	48.8	60/0.1														1,939.6 CRYSTALLINE ROCK (Biotite Gneiss) 51.5
1935																	
1930																	
1925																	1,924.4 Boring Terminated at Elevation 1,924.4 ft in Crystalline Rock (Biotite Gneiss) 66.7

NCDOT BORE DOUBLE B5125\_GEO\_BRDG0022\_GINT.GPJ NC\_DOT.GDT 12/9/15

WBS B-5125		TIP 42271		COUNTY MACON		GEOLOGIST Page, N.											
SITE DESCRIPTION Bridge No. 22 over Little Tennessee River on US 441 (Business)							GROUND WTR (ft)										
BORING NO. B3-A		STATION 13+76		OFFSET 30 ft LT		ALIGNMENT -L-											
COLLAR ELEV. 1,991.1 ft		TOTAL DEPTH 66.7 ft		NORTHING 551,499		EASTING 694,155											
DRILL RIG/HAMMER EFF./DATE SME2204 CME-45C 89% 12/19/2014				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic											
DRILLER M. Moseley		START DATE 12/10/14		COMP. DATE 12/11/14		SURFACE WATER DEPTH 8.8ft											
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							
1920																	Match Line
																	48.4 feet.
																	2) NW casing advanced to 44 feet.
																	3) SPT refusal encountered at 48.8 feet.
																	4) Water used as drilling fluid.
																	5) Advanced NQ core barrel from 48.8 feet to 66.7 feet.

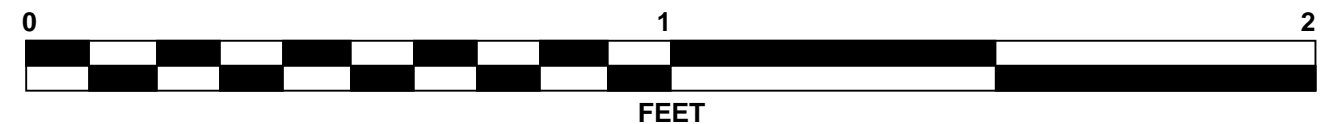
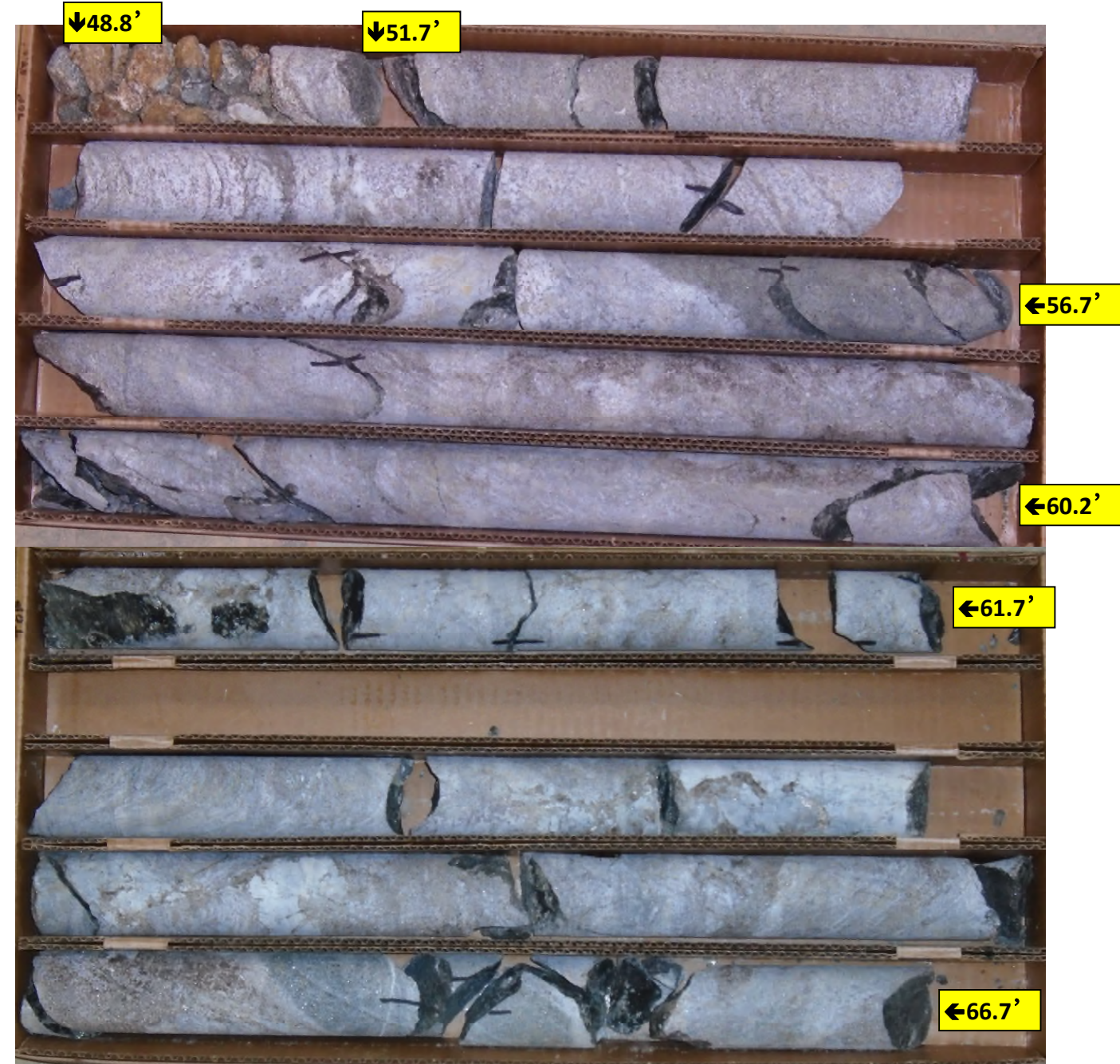
WBS B-5125		TIP 42271		COUNTY MACON		GEOLOGIST Page, N.						
SITE DESCRIPTION Bridge No. 22 over Little Tennessee River on US 441 (Business)							GROUND WTR (ft)					
BORING NO. B3-A		STATION 13+76		OFFSET 30 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 1,991.1 ft		TOTAL DEPTH 66.7 ft		NORTHING 551,499		EASTING 694,155						
DRILL RIG/HAMMER EFF./DATE SME2204 CME-45C 89% 12/19/2014				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic						
DRILLER M. Moseley		START DATE 12/10/14		COMP. DATE 12/11/14		SURFACE WATER DEPTH 8.8ft						
CORE SIZE NQ2		TOTAL RUN 17.9 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC (ft) %	RQD (ft) %		REC (ft) %	RQD (ft) %			
1942.3	1,942.3	48.8	2.9	1:00/0.9 1:15/1.0 1:15/1.0	(0.6) 21%	(0.0) 0%		(0.4) 15%	(0.0) 0%		Begin Coring @ 48.8 ft <b>CRYSTALLINE ROCK</b> Moderately Severe Weathering Hard Gray (Biotite Gneiss) Very Close Fracture Spacing (Undistinguishable Angles)	48.8
1940	1,939.4	51.7	5.0	2:30/1.0 2:45/1.0 3:00/1.0 4:00/1.0	(4.7) 94%	(3.8) 76%		(15.2) 100%	(12.7) 84%			Fresh to Very Slightly Weathered Very Hard Gray (Biotite Gneiss) Quartz Vein Between 62.8 and 63.3 feet Very Close to Moderately Close Fracture Spacing with 10 Joints at 10°-20°, 4 Joints at 30°-45°
1935	1,934.4	56.7	5.0	2:45/1.0 4:00/1.0 3:15/1.0 4:30/1.0	(5.0) 100%	(4.4) 88%						Boring Terminated at Elevation 1,924.4 ft in Crystalline Rock (Biotite Gneiss)
1930	1,929.4	61.7	5.0	3:00/1.0 5:00/1.0 2:30/1.0 3:15/1.0	(5.0) 100%	(4.5) 90%						<ol style="list-style-type: none"> <li>1) Advanced 2-15/16" Tricone roller bit to 48.4 feet.</li> <li>2) NW casing advanced to 44 feet.</li> <li>3) SPT refusal encountered at 48.8 feet.</li> <li>4) Water used as drilling fluid.</li> <li>5) Advanced NQ core barrel from 48.8 feet to 66.7 feet.</li> </ol>
1925	1,924.4	66.7		3:00/1.0								

Project No. 42271  
 Bridge No. 22 over Little Tennessee River on US 441 Business (B-5125)

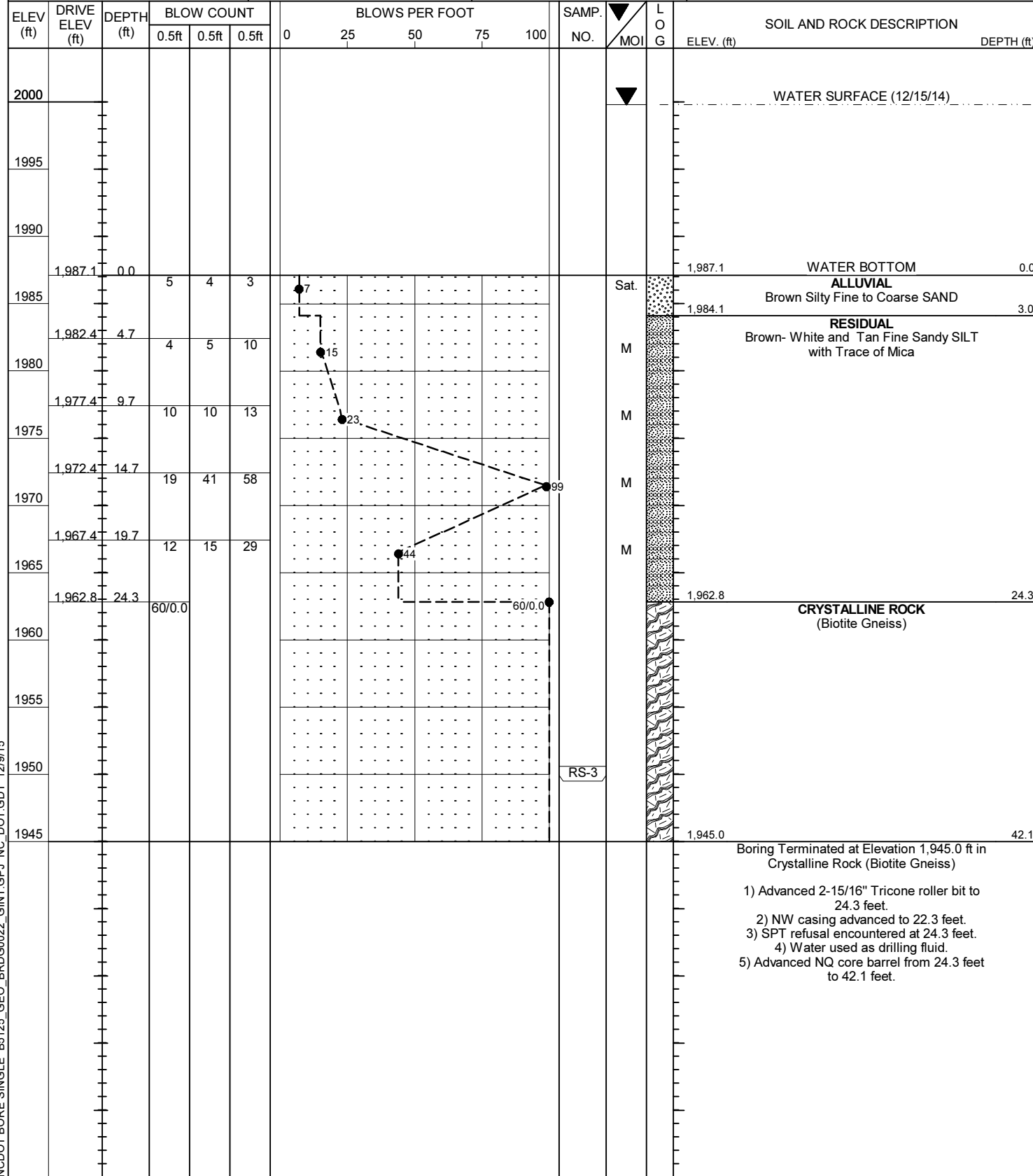
# CORE PHOTOGRAPHS

## B3-A

BOX 1: 48.8 to 60.2 FEET and BOX 2: 60.2 to 66.7 FEET

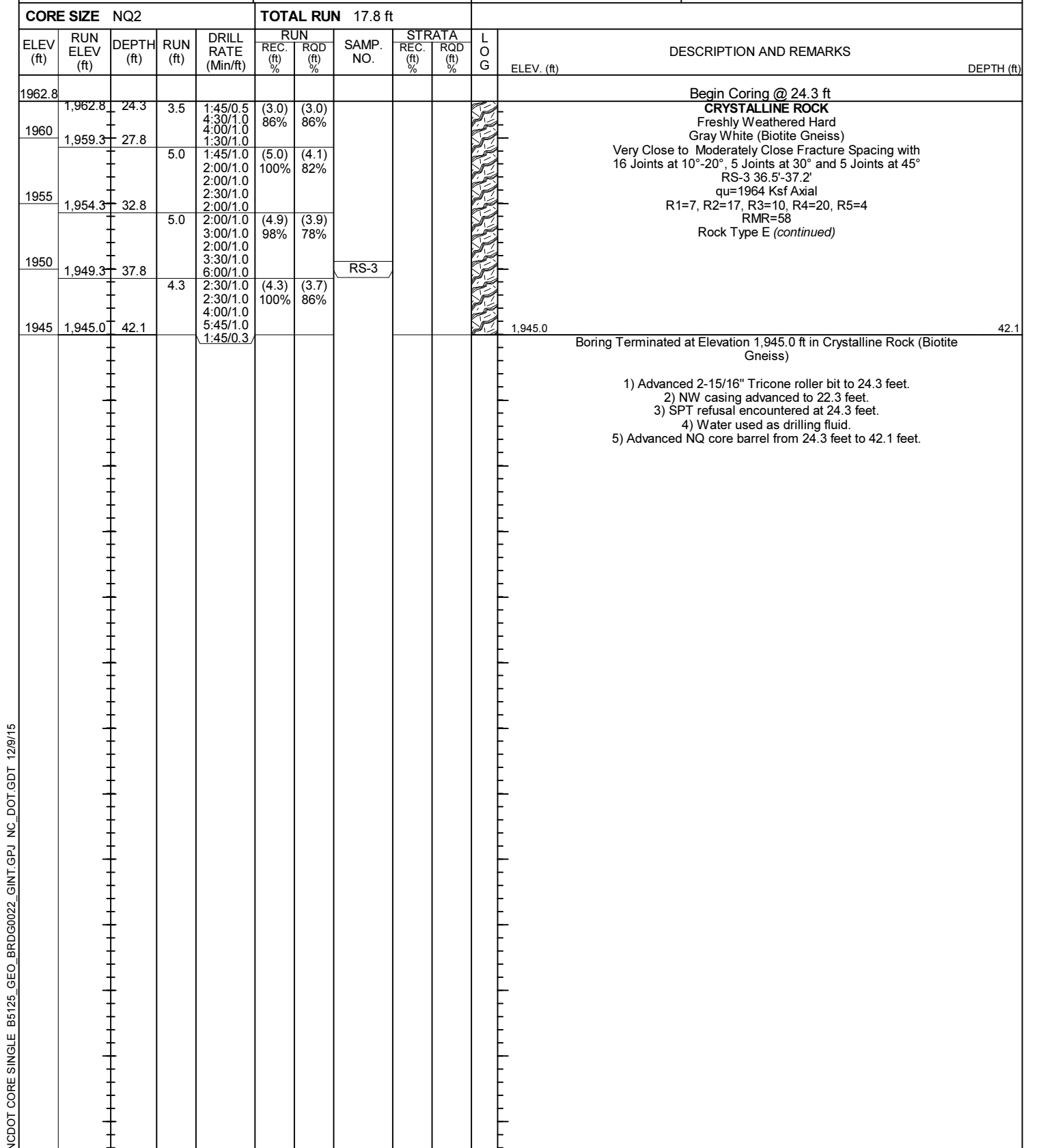


WBS B-5125	TIP 42271	COUNTY MACON	GEOLOGIST Page, N.
SITE DESCRIPTION Bridge No. 22 over Little Tennessee River on US 441 (Business)			GROUND WTR (ft)
BORING NO. B3-B	STATION 13+62	OFFSET 8 ft RT	ALIGNMENT -L-
COLLAR ELEV. 1,987.1 ft	TOTAL DEPTH 42.1 ft	NORTHING 551,464	EASTING 694,174
DRILL RIG/HAMMER EFF./DATE SME2204 CME-45C 89% 12/19/2014		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER M. Moseley	START DATE 12/15/14	COMP. DATE 12/16/14	SURFACE WATER DEPTH 12.7ft



NCDOT BORE SINGLE B5125\_GEO\_BRD0022\_GINT.GPJ NC\_DOT.GDT 12/9/15

WBS B-5125	TIP 42271	COUNTY MACON	GEOLOGIST Page, N.
SITE DESCRIPTION Bridge No. 22 over Little Tennessee River on US 441 (Business)			GROUND WTR (ft)
BORING NO. B3-B	STATION 13+62	OFFSET 8 ft RT	ALIGNMENT -L-
COLLAR ELEV. 1,987.1 ft	TOTAL DEPTH 42.1 ft	NORTHING 551,464	EASTING 694,174
DRILL RIG/HAMMER EFF./DATE SME2204 CME-45C 89% 12/19/2014		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER M. Moseley	START DATE 12/15/14	COMP. DATE 12/16/14	SURFACE WATER DEPTH 12.7ft



NCDOT CORE SINGLE B5125\_GEO\_BRD0022\_GINT.GPJ NC\_DOT.GDT 12/9/15

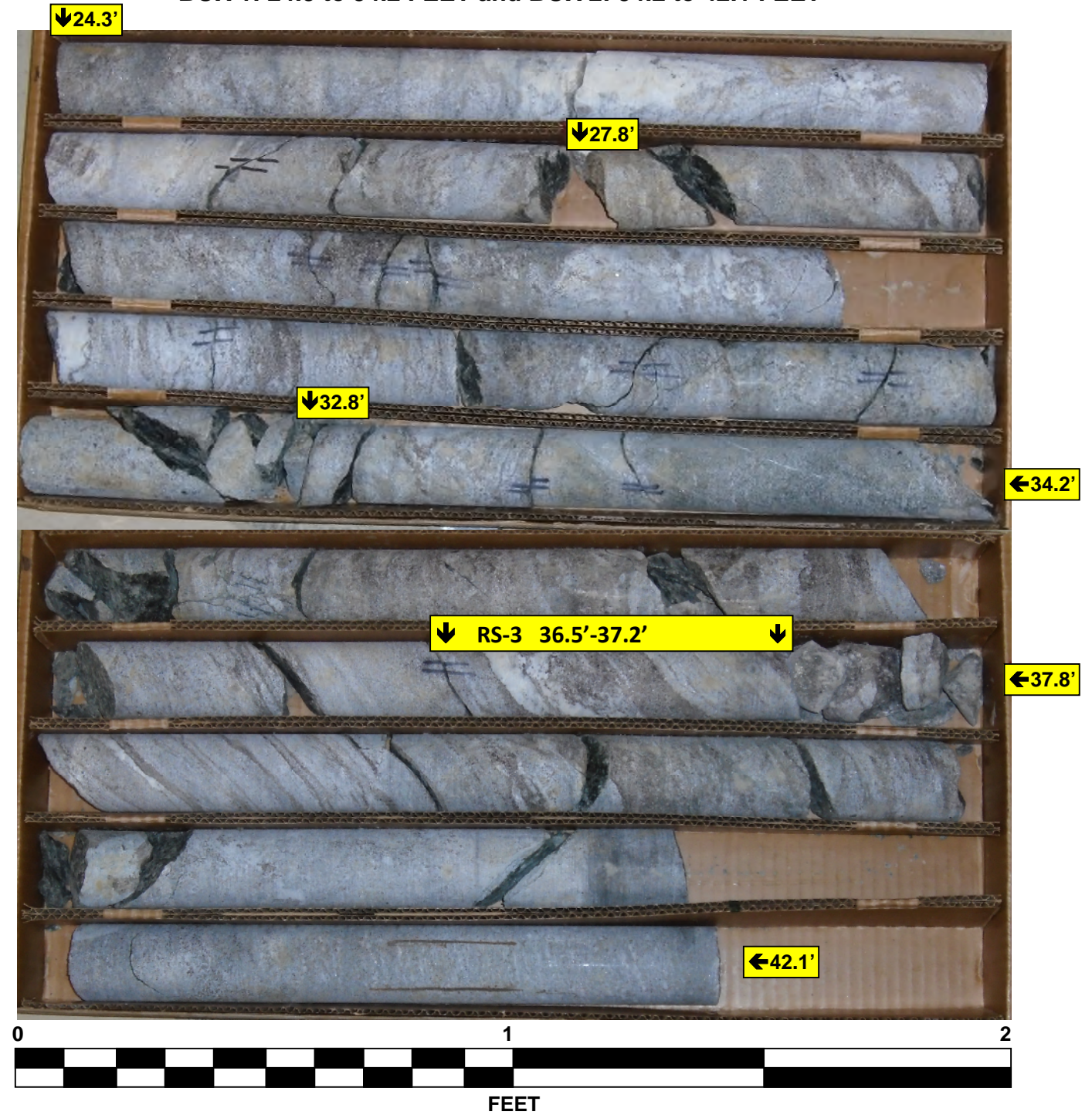
Project No. 42271

Bridge No. 22 over Little Tennessee River on US 441 Business (B-5125)

# CORE PHOTOGRAPHS

## B3-B

BOX 1: 24.3 to 34.2 FEET and BOX 2: 34.2 to 42.1 FEET



WBS B-5125	TIP 42271	COUNTY MACON	GEOLOGIST Wells, J.
SITE DESCRIPTION Bridge No. 22 over Little Tennessee River on US 441 (Business)			GROUND WTR (ft)
BORING NO. EB2-A	STATION 14+71	OFFSET 18 ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,013.5 ft	TOTAL DEPTH 78.9 ft	NORTHING 551,563	EASTING 694,226
DRILL RIG/HAMMER EFF./DATE SME9403 CME-550X 88% 12/19/2014		DRILL METHOD Wash Boring	HAMMER TYPE Automatic
DRILLER R. Norwood	START DATE 12/09/14	COMP. DATE 12/09/14	SURFACE WATER DEPTH N/A

WBS B-5125	TIP 42271	COUNTY MACON	GEOLOGIST Wells, J.
SITE DESCRIPTION Bridge No. 22 over Little Tennessee River on US 441 (Business)			GROUND WTR (ft)
BORING NO. EB2-A	STATION 14+71	OFFSET 18 ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,013.5 ft	TOTAL DEPTH 78.9 ft	NORTHING 551,563	EASTING 694,226
DRILL RIG/HAMMER EFF./DATE SME9403 CME-550X 88% 12/19/2014		DRILL METHOD Wash Boring	HAMMER TYPE Automatic
DRILLER R. Norwood	START DATE 12/09/14	COMP. DATE 12/09/14	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2015														2,013.5	PAVEMENT SURFACE	0.0
														2,011.5	Asphalt (11 inches) ABC Stone (13 inches)	2.0
2010	2,010.0	3.5	3	2	7							M		2,006.0	<b>ROADWAY EMBANKMENT</b> Brown Tan Fine Sandy SILT with Trace of Mica and Clay Pockets	7.5
	2,007.3	6.2	3	3	2							M			Red Brown Fine Sandy CLAY	
2005	2,005.0	8.5	3	2	4							M				
2000	2,000.0	13.5	2	1	3							M				
1995	1,995.0	18.5	2	1	2							W		1,991.5	<b>ALLUVIAL</b> Brown Gray Fine Sandy SILT with Trace of Gravel	22.0
1990	1,990.0	23.5	13	9	8							M			<b>RESIDUAL</b> Orange Tan Fine Sandy SILT with Trace of Mica	
1985	1,985.0	28.5	7	8	9							M				
1980	1,980.0	33.5	7	7	8							M				
1975	1,975.0	38.5	5	6	9							M				
1970	1,970.0	43.5	8	12	12							M				
1965	1,965.0	48.5	13	15	18							M				
1960	1,960.0	53.5	15	31	52							M				
1955	1,955.0	58.5	96	4/0.1										100/0.6	<b>WEATHERED ROCK</b> (Biotite Gneiss)	57.0
1950	1,950.0	63.5	64	36/0.1										100/0.6		
1945	1,945.0	68.5	14	15	32							M		1,941.5	<b>RESIDUAL</b> Brown Tan Fine Sandy SILT	72.0
1940	1,940.0	73.5	72	28/0.1											<b>WEATHERED ROCK</b> (Biotite Gneiss)	
1935	1,935.0	78.5														

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1935														1,934.6	Boring Terminated at Elevation 1,934.6 ft in Weathered Rock (Biotite Gneiss)	78.9

- 1) Advanced 2-15/16" Tricone roller bit to 78.5 feet.
- 2) NW casing advanced to 23.1 feet.
- 3) Bentonite mud used as drilling fluid.

NCDOT BORE DOUBLE B5125\_GEO\_BRDG0022\_GINT.GPJ NC\_DOT.GDT 12/9/15



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

WBS B-5125		TIP 42271		COUNTY MACON		GEOLOGIST Wells, J.										
SITE DESCRIPTION Bridge No. 22 over Little Tennessee River on US 441 (Business)							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 14+65		OFFSET 8 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 2,013.2 ft		TOTAL DEPTH 73.7 ft		NORTHING 551,542		EASTING 694,242										
DRILL RIG/HAMMER EFF./DATE SME9403 CME-550X 88% 12/19/2014			DRILL METHOD Wash Boring		HAMMER TYPE Automatic											
DRILLER R. Norwood		START DATE 12/15/14		COMP. DATE 12/15/14		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2015															2.013.2 PAVEMENT SURFACE 0.0	
	2,011.2	2.0													2.011.2 Asphalt (13 inches) ABC Stone (11 inches) 2.0	
2010	2,009.7	3.5	9	6	7										ROADWAY EMBANKMENT	
	2,007.2	6.0	3	2	2										Brown Fine Sandy CLAY with Trace of Mica	
	2,004.7	8.5	3	3	2										Brown Tan Fine Sandy SILT with Trace of Mica and Clay Pockets	
2005																
	1,999.7	13.5	2	2	3											
2000																
	1,994.7	18.5	1	2	2											
1995																
	1,989.7	23.5	4	3	4											
1990																
	1,984.7	28.5	8	6	6											
1985																
	1,979.7	33.5	5	4	6											
1980																
	1,974.7	38.5	8	8	9											
1975																
	1,969.7	43.5	33	43	35											
1970																
	1,964.7	48.5	20	19	38											
1965																
	1,959.7	53.5	19	21	23											
1960																
	1,954.7	58.5	21	22	24											
1955																
	1,949.7	63.5	13	20	40											
1950																
	1,944.7	68.5	100/0.4													
1945																
	1,939.7	73.5	100/0.4													
1940																

WBS B-5125		TIP 42271		COUNTY MACON		GEOLOGIST Wells, J.										
SITE DESCRIPTION Bridge No. 22 over Little Tennessee River on US 441 (Business)							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 14+65		OFFSET 8 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 2,013.2 ft		TOTAL DEPTH 73.7 ft		NORTHING 551,542		EASTING 694,242										
DRILL RIG/HAMMER EFF./DATE SME9403 CME-550X 88% 12/19/2014			DRILL METHOD Wash Boring		HAMMER TYPE Automatic											
DRILLER R. Norwood		START DATE 12/15/14		COMP. DATE 12/15/14		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1935															Match Line	
																73.5 feet.
																2) Advanced HS Auger to 23.5 feet .
																3) Bentonite mud used as drilling fluid.

NCDOT BORE DOUBLE B5125\_GEO\_BRD0022\_GINT.GPJ NC\_DOT.GDT 12/9/15



## UNCONFINED COMPRESSION (ASTM D7012 Method C)



S&ME, Inc. - Knoxville 1413 Topside Road, Louisville, TN 37777

Project: WBS No.: 42271, Tip No.: B-5125  
 Description: Bridge No. 22 over Little Tennessee River on US 441 Business  
 County: Macon, North Carolina  
 F. A. ID No.: BRNHS-0441 (8)

S&ME Project No.: 1305-14-126  
 Tested By: Tommy J. Webb  
 Reviewed By: Jason B. Burgess  
 Report Date: January 16, 2015

Sample No.	Sample Id	Depth (ft)	Dimensions, in.		Shape (See Key)	Area (in <sup>2</sup> )	Unit Weight (lbs/ft <sup>3</sup> )	Loading Rate (psi/sec)	Maximum Load (lbs)	Strength (psi)	Moisture (%)	Rock Type
			Length	Diameter								
RS-1	B1-B	27.7 - 28.8	3.95	1.85	D	2.69	199.0	87	21,300	7,918	0.1	Rock Type E (Biotite Gneiss)
RS-2	B2-A	36.1 - 37.1	4.33	1.98	A	3.08	183.6	83	90,090	29,250	0.0	
RS-3	B3-B	36.5 - 37.2	4.44	1.98	A	3.08	187.7	84	42,000	13,636	0.1	

NOTES: Effective (as received) unit weight as determined by RTH 109-93.  
 Loading rates were selected to target reaching failure between 2 and 15 minutes.


SHAPE KEY

ASTM D4543-08 *Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance* Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content and chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For these and other rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial that this is not possible, prepare the rock specimen to the closest tolerances practicable and consider this to be the best effort and report it as such and if allowable or necessary for the intended test, capping the ends of the specimen as discussed in this practice is permitted."

- A Test specimen measurements met the desired shape tolerances of ASTM D4543-08 (side straightness, end flatness & parallelism, and end perpendicularity to axis)
- B Test specimen measurements met the desired shape tolerances of ASTM D4543-08 for end flatness & parallelism, and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness. Specimen prepared to closest tolerances practicable.
- C Test specimen measurements met the desired shape tolerances of ASTM D4543-08 for end flatness & parallelism. Specimen did not meet the desired tolerances for side straightness and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.
- D Test specimen measurements met the desired shape tolerances of ASTM D4543-08 for end flatness. Specimen did not meet the desired tolerances for side straightness, parallelism and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.
- E Test specimen measurements met the desired shape tolerances of ASTM D4543-08 for end flatness and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness and parallelism. Specimen prepared to closest tolerances practicable.



<b>1</b>	B1-B, RS-1 (27.7' - 28.8')
	Comments:



<b>2</b>	B2-A, RS-2 (36.1' - 37.1')
	Comments:



<b>3</b>	B3-B, RS-3 (36.5'-37.2')
	Comments:



Photograph No. 1: This photograph was taken from proposed End Bent No. 1 right of the US 441 -L- alignment, looking North along proposed bridge alignment



Photograph No. 2: This photograph was taken from proposed End Bent No. 2 right of the US 441 -L- alignment, looking South along the proposed bridge alignment



Photograph No. 3: This photograph was taken from the South side of the Little Tennessee River East of the US 441 -L- alignment, looking North



Photograph No. 4: This photograph was taken from the South side of the Little Tennessee River West of the US 441 -L- alignment, looking East