

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	14SP.20881.1	1	21

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

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**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 14SP.20881.1 F.A. PROJ. N/A  
 COUNTY Transylvania  
 PROJECT DESCRIPTION Bridge No. 870045 on SR 1127  
(Green Road) over French Broad River

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**PERSONNEL**

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- \_\_\_\_\_  
*C. Boyce*
- \_\_\_\_\_  
*J. McKay*
- \_\_\_\_\_  
*M. Brewer*
- \_\_\_\_\_  
*M. Grabski*
- \_\_\_\_\_  
*J. Fowler*
- \_\_\_\_\_  
*M. Walko*
- \_\_\_\_\_  
*M. Usery*

INVESTIGATED BY F&R, Inc.  
 CHECKED BY W. Edelen, P.E.  
 SUBMITTED BY F&R, Inc.  
 DATE August 29, 2016

**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) 707-6650. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

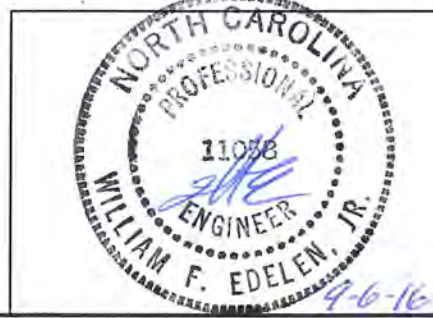
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND 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.

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: W. Edelen, P.E.



PROJECT REFERENCE NO.

SHEET NO.

14SP.20881.1

2

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

### SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:  
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-B

### GRADATION

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

### ANGULARITY OF GRAINS

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

### SOIL LEGEND AND AASHTO CLASSIFICATION

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-3	A-4, A-5		
SYMBOL														
% PASSING # 10	50 MX	50 MX	51 MN	35 MX	35 MX	35 MX	35 MN	36 MN	36 MN	36 MN	36 MN			
% PASSING # 40	30 MX	25 MX	10 MX	10 MX	10 MX	10 MX	10 MX	10 MX	10 MX	10 MX	10 MX			
% PASSING # 200	15 MX	10 MX	10 MX	10 MX	10 MX	10 MX	10 MX	10 MX	10 MX	10 MX	10 MX			
LIQUID LIMIT			40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN		
PLASTIC INDEX	5 MX	NP	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN	10 MX	11 MN		
GROUP INDEX	0	0	0	0	4 MX	8 MX	12 MX	15 MX	No MX					
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL, AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS		SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER			HIGHLY ORGANIC SOILS
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD						FAIR TO POOR			FAIR TO POOR	POOR	UNSATURABLE		

PI OF A-7-5 SUBGROUP IS <= LL - 30, PI OF A-7-6 SUBGROUP IS > LL - 30

### MINERALOGICAL COMPOSITION

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

### COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE  
MODERATELY COMPRESSIBLE  
HIGHLY COMPRESSIBLE

LIQUID LIMIT LESS THAN 31  
LIQUID LIMIT EQUAL TO 31-50  
LIQUID LIMIT GREATER THAN 50

### PERCENTAGE OF MATERIAL

	ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL
TRACE OF ORGANIC MATTER	< 2%	2 - 3%	3 - 5%	TRACE
LITTLE ORGANIC MATTER	2 - 3%	3 - 5%	5 - 12%	LITTLE
MODERATELY ORGANIC	3 - 5%	5 - 10%	12 - 20%	SOME
HIGHLY ORGANIC	> 10%	> 10%	> 20%	HIGHLY
				1 - 10%
				10 - 20%
				20 - 35%
				35% AND ABOVE

### GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

### CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

### MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- DIP & DIP DIRECTION OF ROCK STRUCTURES
- TEST BORING WITH SOIL PART
- TEST BORING W/ CORE
- SPT N-VALUE
- SPT REFUSAL
- AUGER BORING
- CORE BORING
- MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD

### TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270
	4.75	2.00	0.42	0.25	0.075	0.053
BOULDER (BLDR.)						
COBBLE (COB.)						
GRAVEL (GR.)						
COARSE SAND (CSE. SD.)						
FINE SAND (F SD.)						
SILT (SL.)						
CLAY (CL.)						
GRAIN SIZE	MM 305	75	2.0	0.25	0.05	0.005
	IN 12	3				

### ABBREVIATIONS

- AR - AUGER REFUSAL
- BT - BORING TERMINATED
- CL - CLAY
- CPT - CONE PENETRATION TEST
- CSE - COARSE
- CT - CORING TERMINATED
- DMT - DILATOMETER TEST
- DPT - DYNAMIC PENETRATION TEST
- e - VOID RATIO
- EMBANK - EMBANKMENT
- F - FINE
- FOSS - FOSSILIFEROUS
- FRAC. - FRACTURED, FRACTURES
- FRAGS. - FRAGMENTS
- HI. - HIGHLY
- MED. - MEDIUM
- MICA - MICACEOUS
- MOD. - MODERATELY
- NP - NON PLASTIC
- ORG. - ORGANIC
- PMT - PRESSUREMETER TEST
- SAP. - SAPROLITIC
- SDY. - SANDY
- SL. - SILT, SILTY
- SLI. - SLIGHTLY
- TCR - TRICONE REFUSAL
- MOISTURE CONTENT
- V - VERY
- WEA. - WEATHERED
- γ<sub>w</sub> - UNIT WEIGHT
- γ<sub>d</sub> - DRY UNIT WEIGHT
- SAMPLE ABBREVIATIONS
- S - BULK
- SS - SPLIT SPOON
- ST - SHELBY TUBE
- RS - ROCK
- RT - RECOMPACTED TRIAXIAL
- CBR - CALIFORNIA BEARING RATIO

### SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
PL - PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM - OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

### EQUIPMENT USED ON SUBJECT PROJECT

- | DRILL UNITS:                                 | ADVANCING TOOLS:   | HAMMER TYPE:  |
|--|--|---|
| <input type="checkbox"/> MOBILE B- _____     | <input type="checkbox"/> CLAY BITS                                   | <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL |
| <input type="checkbox"/> BK-51               | <input type="checkbox"/> 8" CONTINUOUS FLIGHT AUGER                  | CORE SIZE:  |
| <input checked="" type="checkbox"/> CME-550X | <input checked="" type="checkbox"/> 6" HOLLOW AUGERS                 | <input type="checkbox"/> B _____  |
| <input type="checkbox"/> CME-75              | <input type="checkbox"/> HARD FACED FINGER BITS                      | <input checked="" type="checkbox"/> N_Q2                                      |
| <input type="checkbox"/> PORTABLE HOIST      | <input type="checkbox"/> TUNG-CARBIDE INSERTS                        | <input type="checkbox"/> H _____  |
|  | <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER | HAND TOOLS:   |
|  | <input type="checkbox"/> TRICONE _____ " STEEL TEETH                 | <input type="checkbox"/> POST HOLE DIGGER                                     |
|  | <input type="checkbox"/> TRICONE _____ " TUNG-CARB.                  | <input type="checkbox"/> HAND AUGER   |
|  | <input type="checkbox"/> CORE BIT                                    | <input type="checkbox"/> SOUNDING ROD   |
|  |  | <input type="checkbox"/> VANE SHEAR TEST                                      |

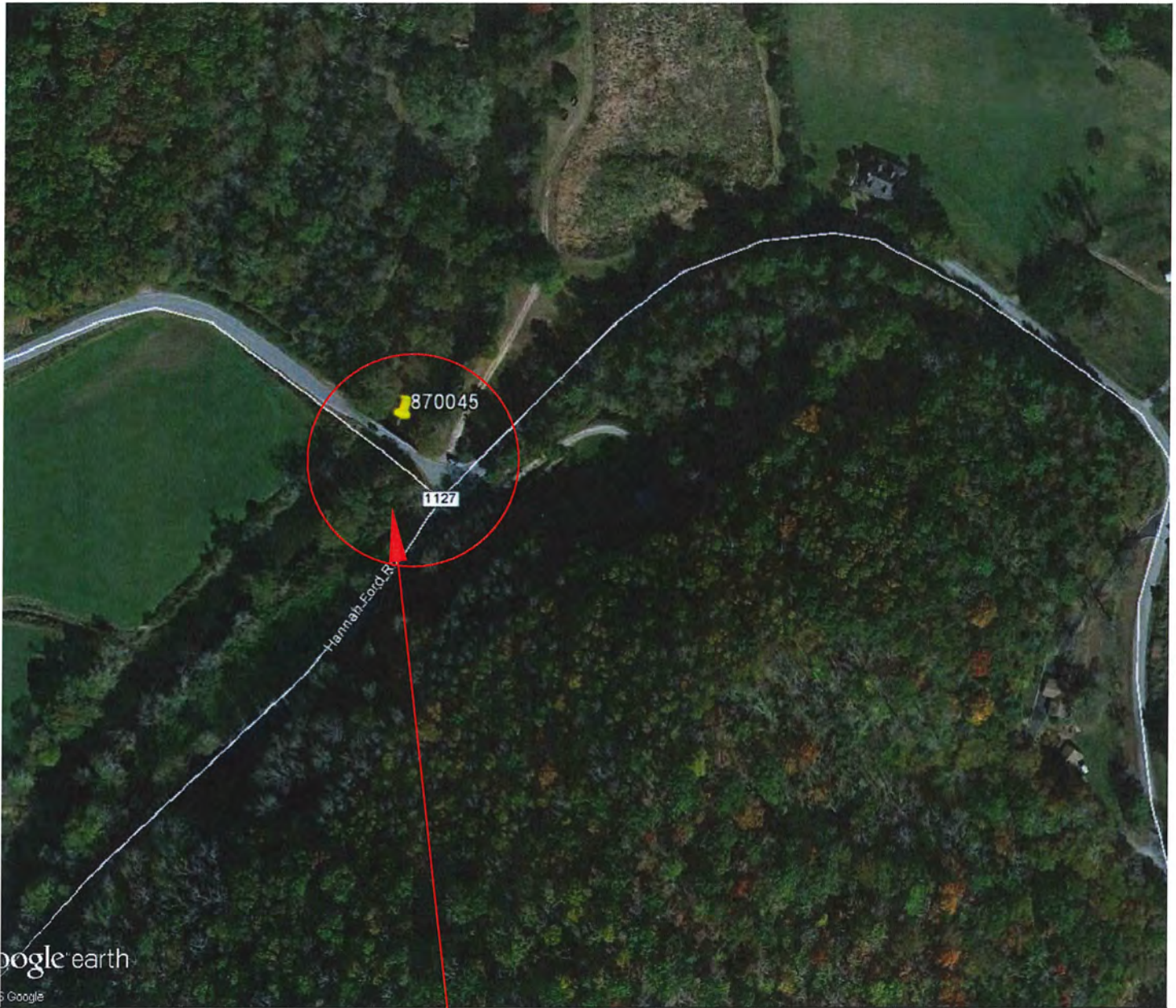
### PLASTICITY

NONPLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH
LOW PLASTICITY	0-5	VERY LOW
MED. PLASTICITY	6-15	SLIGHT
HIGH PLASTICITY	16-25	MEDIUM
	26 OR MORE	HIGH

### COLOR

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

ROCK DESCRIPTION		TERMS AND DEFINITIONS	
<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 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.</p> <p><b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.</p> <p><b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p><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.</p> <p><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.</p> <p><b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p><b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p><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.</p> <p><b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p><b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p><b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p><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.</p> <p><b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p><b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.</p> <p><b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p><b>FORMATION (FM.)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p><b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p><b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p><b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p><b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS; MOTTING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p><b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p><b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p><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.</p> <p><b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p><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.</p> <p><b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p><b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS (N 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.</p> <p><b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p><b>STRATA ROCK QUALITY DESIGNATION (SRQD)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.</p> <p><b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>	
<b>WEATHERED ROCK (WR)</b>		NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	
<b>CRYSTALLINE ROCK (CR)</b>		FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	
<b>NON-CRYSTALLINE ROCK (NCR)</b>		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.	
<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>		COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	
WEATHERING			
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	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.	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.	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.	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. IF TESTED, WOULD YIELD SPT REFUSAL.	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. IF TESTED, WOULD YIELD SPT REFUSAL.	
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BPF.	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BPF.	
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. IF TESTED, YIELDS SPT N VALUES < 100 BPF.	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. IF TESTED, YIELDS SPT N VALUES < 100 BPF.	
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	
ROCK HARDNESS			
VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	
SOFT	CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.	
FRACTURE SPACING		BEDDING	
<b>TERM</b>	<b>SPACING</b>	<b>TERM</b>	<b>THICKNESS</b>
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	> 4 FEET
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET
CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET
		THINLY LAMINATED	< 0.008 FEET
INDURATION			
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.			
FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	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.	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.	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.	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	
		<p><b>BENCH MARK:</b> Survey information provided by NCDOT.</p> <p><b>BM#2:</b> -BL- Station B+77.75 50.91 ft RT RR Spike in base of 18" poplar</p> <p style="text-align: right;">ELEVATION: 2144.72 FT.</p>	
NOTES:			



**SITE**

## SITE LOCATION PLAN

Bridge No. 870045  
on SR 1127 over French Broad River

Scale: N.T.S.

DR  
wfe

CHK

REV

Prepared For:

NCDOT WBS NO: 14SP.20881.1



Froehling & Robertson, Inc.  
2505 Hutchison-McDonald Road  
Charlotte, North Carolina

Proj.: 63S0081

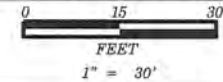
Date: August 2016

Sheet No. 3

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AND SHOULD ONLY BE USED IN CONJUNCTION WITH THE WRITTEN REPORT  
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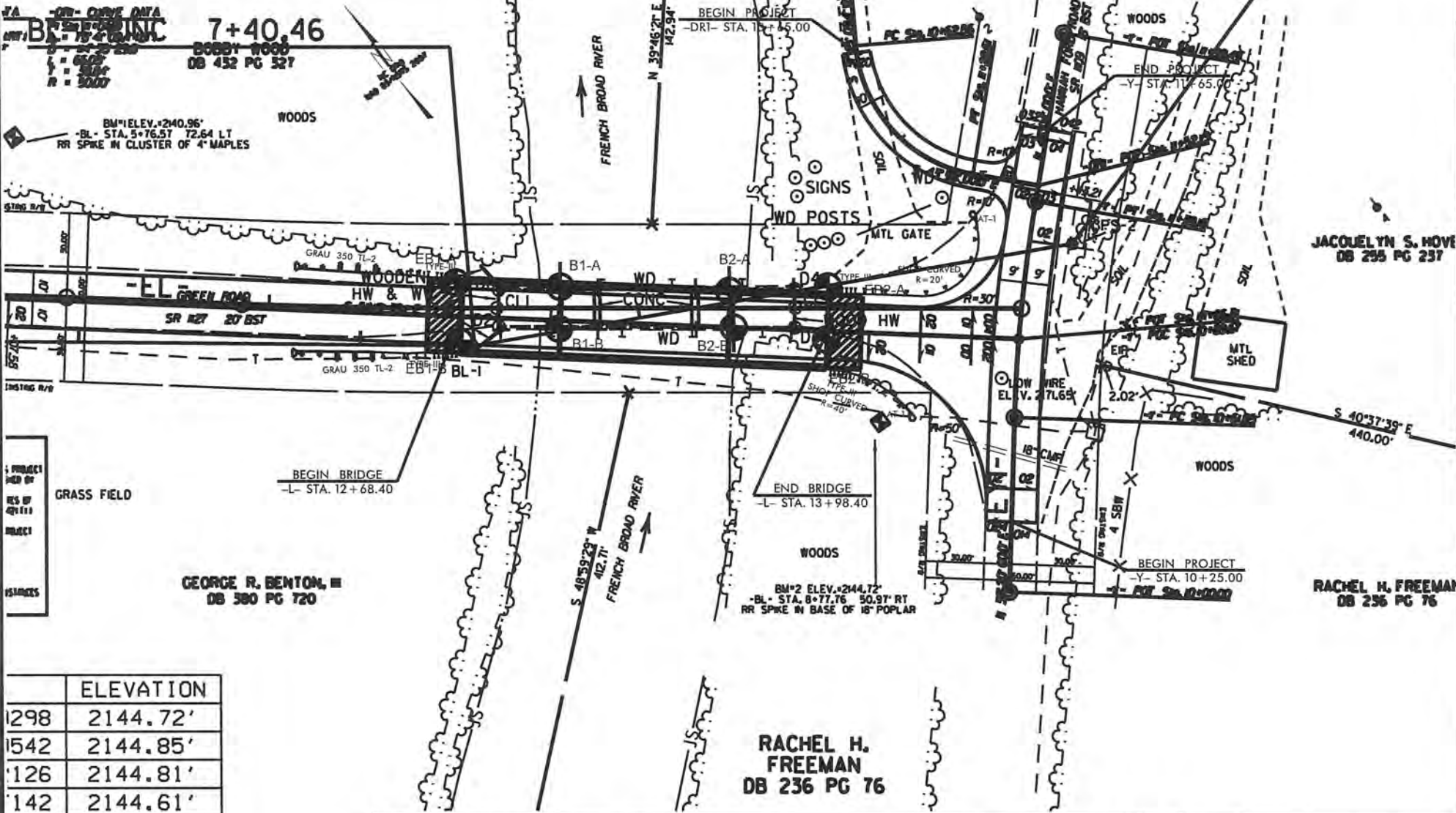


WITH COMPORIUM  
5/12/14



PROJECT REFERENCE NO.	SHEET
14SP.20881.1	4
TEST SITE PLAN	

GPS-2 PO



PROJECT  
RES OF  
PROJECT  
DISTRICTS

	ELEVATION
298	2144.72'
542	2144.85'
126	2144.81'
142	2144.61'
542	2144.85'
567	2144.45'

GEORGE R. BENTON, III  
DB 580 PG 720

RACHEL H. FREEMAN  
DB 236 PG 76

<p>SINCE 1881</p> <p>1881</p>	<b>FROEHLING &amp; ROBERTSON, INC.</b>		<b>TEST SITE PLAN</b>		
	Engineering Stability Since 1881		WBS NO.: 14SP.20881.1	PROJECT ID: N/A	F&R PROJECT NO.: 63S-0081
	2505 Hutchison-McDonald Road Charlotte, North Carolina 28269 USA T 704.596.2889 F 704.596.3741 www.fandr.com		TIP NO.: N/A	F.A. PROJECT NO.: N/A	Transylvania
	PROJECT DESCRIPTION: Bridge No. 870045 on SR 1127 (Green Road) over French Broad River				
			DRAWN BY: M. Brewer, E.I.	CHECKED BY: M. Walko, P.E.	
		DATE: July 2014	SCALE: 1"=50'		



# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 14SP.20881.1	TIP N/A	COUNTY TRANSYLVANIA	GEOLOGIST M. Brewer
SITE DESCRIPTION Bridge No. 870045 on SR			GROUND WTR (ft)
BORING NO. EB1-A	STATION 12+66	OFFSET 12 ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,143.5 ft	TOTAL DEPTH 34.2 ft	NORTHING 543,121	EASTING 872,238
DRILL RIG/HAMMER EFF./DATE F&R4637 CME-75 75% 02/22/2014		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER J. Fowler	START DATE 06/12/14	COMP. DATE 06/12/14	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						
2145																
	2,143.5	0.0												2,143.5	GROUND SURFACE	0.0
			3	1	3									2,141.5	<b>ROADWAY EMBANKMENT</b> Gray-brown-orange, silty fine to coarse SAND (A-2-4), with trace clay and little gravel. Brown, silty fine SAND (A-2-4), with trace mica and organics.	2.0
2140	2,140.0	3.5	1	1	1											
2135	2,135.0	8.5	WOH	WOH	WOH											
2130	2,130.0	13.5												2,131.5	<b>ALLUVIAL</b> Brown, silty fine to coarse sandy GRAVEL (A-1-a(0)).	12.0
2125	2,125.0	18.5	6	7	8						SS-1	17%		2,128.5	<b>RESIDUAL</b> Gray-brown-orange, silty fine to coarse SAND (A-2-4), with trace gravel-sized rock fragments.	17.0
2120	2,120.0	23.5	8	13	27									2,120.0		
2115	2,115.0	28.5	41	59/0.4												
			38	62/0.4												
2110	2,110.0	33.5	58	42/0.2												
														2,109.3		34.2
															Boring Terminated at Elevation 2,109.3 ft IN WEATHERED ROCK (HENDERSON GNEISS)	

NCDOT BORE SINGLE 65S-0081 TRANSYLVANIA 870045 BRIDGET.GPJ NC\_DOT\_GDT 8/29/16

# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 14SP.20881.1		TIP N/A		COUNTY TRANSYLVANIA		GEOLOGIST M. Brewer	
SITE DESCRIPTION Bridge No. 870045 on SR							GROUND WTR (ft)
BORING NO. EB1-B		STATION 12+68		OFFSET 9 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 2,144.1 ft		TOTAL DEPTH 38.8 ft		NORTHING 543,103		EASTING 872,227	
DRILL RIG/HAMMER EFF./DATE F&R4637 CME-75 75% 02/22/2014				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic	
DRILLER J. Fowler		START DATE 06/12/14		COMP. DATE 06/12/14		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					ELEV. (ft)	DEPTH (ft)
2145														2,144.1	0.0	GROUND SURFACE
	2,144.1	0.0	3	2	3								M	2,142.1	2.0	ROADWAY EMBANKMENT Brown-orange, silty fine to coarse SAND (A-2-4), with trace clay and gravel.
2140	2,140.6	3.5	WOH	1	1								M			Brown, silty fine SAND (A-2-4), with trace mica.
2135	2,135.6	8.5	WOH	WOH	1								M			
2130	2,130.6	13.5	1	3	5								Sat.	2,132.1	12.0	ALLUVIAL Gray-brown, silty fine SAND (A-2-4).
2125	2,125.6	18.5	9	11	14								W	2,127.1	17.0	RESIDUAL Gray-brown-orange, silty fine to coarse SAND (A-2-4), with trace gravel-sized rock fragments.
2120	2,120.6	23.5	25	24	32								M			
2115	2,115.6	28.5	23	48	52/0.4									2,115.1	29.0	WEATHERED ROCK Gray-brown-white, (HENDERSON GNEISS).
2110	2,110.6	33.5	38	44	56/0.3											
	2,105.6	38.5	100/0.3											2,105.3	38.8	Boring Terminated at Elevation 2,105.3 ft IN WEATHERED ROCK (HENDERSON GNEISS)

NCDOT BORE SINGLE 63S-0081 TRANSYLVANIA 870045 BRIDGET.GPJ NC\_DOT.GDT 8/29/16



# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 14SP.20881.1		TIP N/A		COUNTY TRANSYLVANIA		GEOLOGIST M. Brewer											
SITE DESCRIPTION Bridge No. 870045 on SR							GROUND WTR (ft)										
BORING NO. B1-A		STATION 13+03		OFFSET 12 ft LT		ALIGNMENT -L-											
COLLAR ELEV. 2,130.3 ft		TOTAL DEPTH 39.4 ft		NORTHING 543,098		EASTING 872,267											
DRILL RIG/HAMMER EFF./DATE F&R3673 CME-550X 76% 10/24/2013				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic											
DRILLER C. Boyce		START DATE 06/17/14		COMP. DATE 06/18/14		SURFACE WATER DEPTH 1.6ft											
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)		
2135																	
2130																	WATER SURFACE (06/17/14)
																	GROUND SURFACE 0.0
2125	2,126.8	3.5	12	5	4	9						SS-2	20%				ALLUVIAL Tan-brown, silty, fine to coarse sandy GRAVEL (A-1-b(0)).
																	2,123.3 7.0
2120	2,121.8	8.5	5	7	12	19						SS-3	27%				RESIDUAL Tan-orange, fine sandy SILT (A-4(0)), with trace gravel-sized rock fragments and mica.
																	2,118.3 12.0
2115	2,116.8	13.5	30	42	48	90						Sat.					Gray-white-brown, silty fine to coarse SAND (A-2-4), with trace gravel-sized rock fragments and mica.
																	2,113.3 17.0
2110	2,111.8 2,110.9	18.5 19.4	100/0.4 60/0.0			100/0.4 60/0.0											WEATHERED ROCK Gray-white-brown, (HENDERSON GNEISS).
																	2,110.9 19.4
2105																	CRYSTALLINE ROCK Gray-white-brown, (HENDERSON GNEISS).
2100																	
2095																	
																	2,090.9 39.4
																	Boring Terminated at Elevation 2,090.9 ft IN CRYSTALLINE ROCK (HENDERSON GNEISS)

NCDOT BORE SINGLE 63S-0081 TRANSYLVANIA 870045 BRIDGET.GPJ NC\_DOT\_GDT B/29/16





# NCDOT GEOTECHNICAL ENGINEERING UNIT

## CORE BORING REPORT

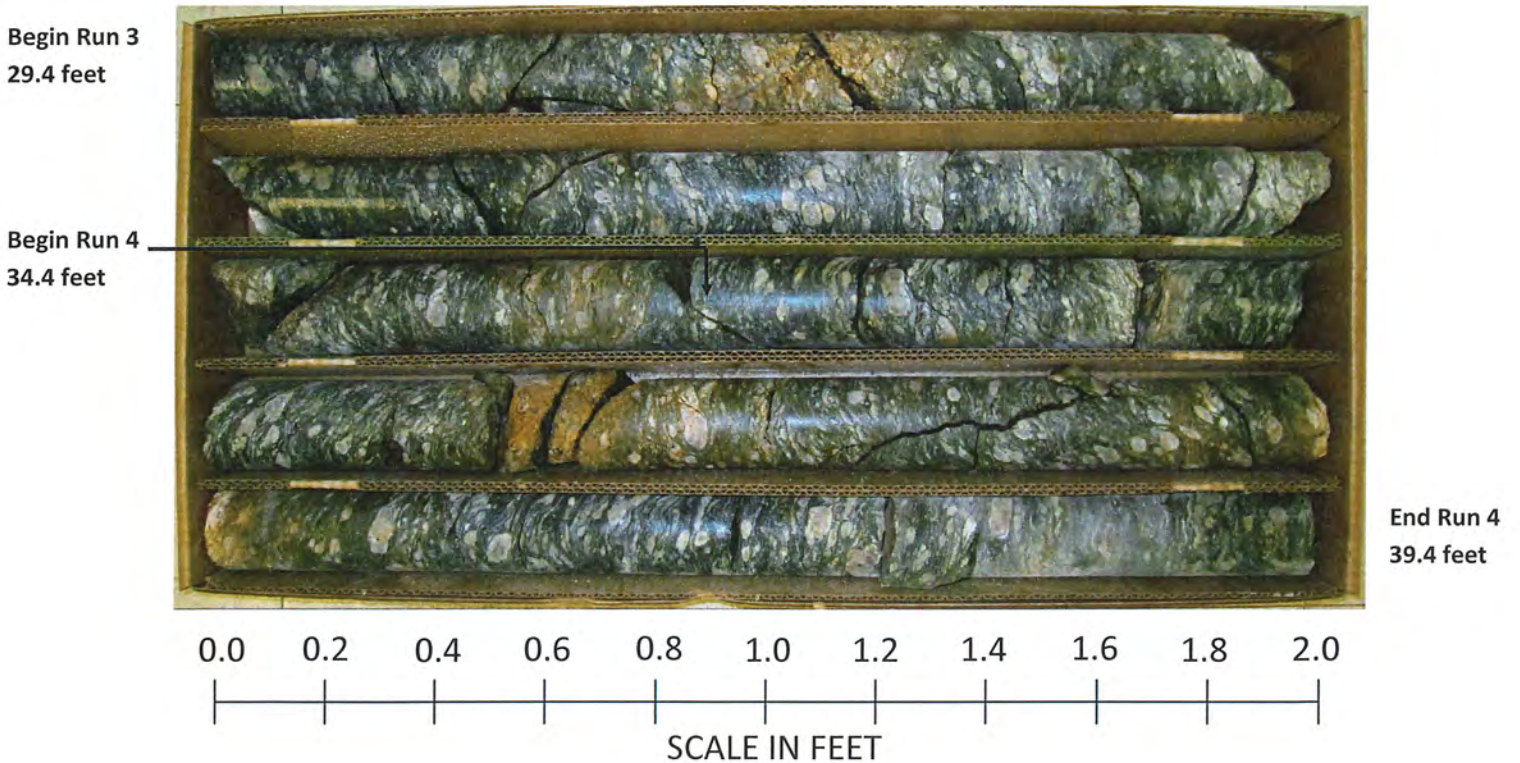
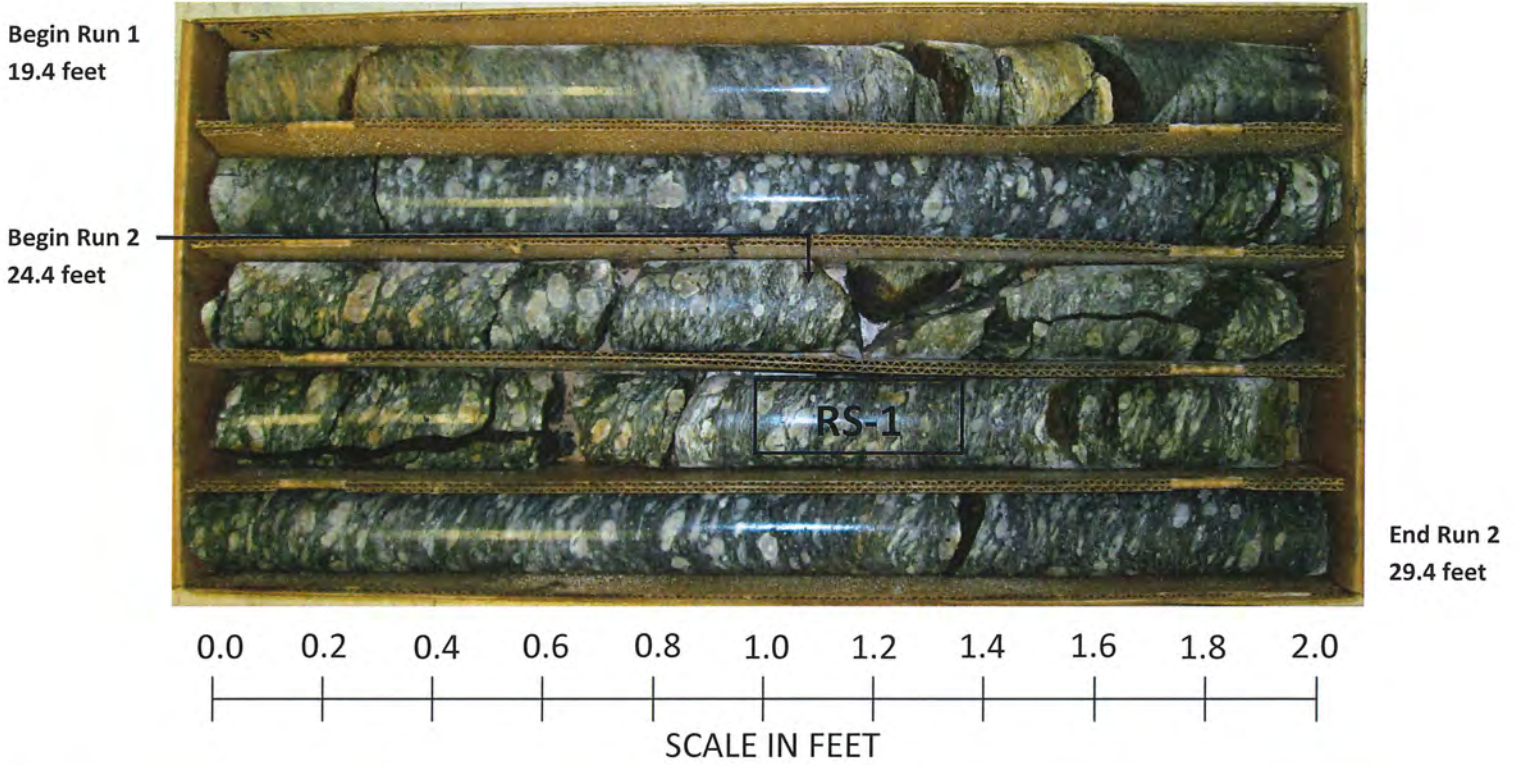
WBS 14SP.20881.1		TIP N/A		COUNTY TRANSYLVANIA		GEOLOGIST M. Brewer					
SITE DESCRIPTION Bridge No. 870045 on SR							GROUND WTR (ft)				
BORING NO. B1-A		STATION 13+03		OFFSET 12 ft LT		ALIGNMENT -L-	0 HR. N/A				
COLLAR ELEV. 2,130.3 ft		TOTAL DEPTH 39.4 ft		NORTHING 543,098		EASTING 872,267	24 HR. N/A				
DRILL RIG/HAMMER EFF./DATE F&R3673 CME-550X 76% 10/24/2013				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic					
DRILLER C. Boyce		START DATE 06/17/14		COMP. DATE 06/18/14		SURFACE WATER DEPTH 1.6ft					
CORE SIZE NQ2		TOTAL RUN 20.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	ROD (ft)	REC. (%)	ROD (ft)			
2110.9										Begin Coring @ 19.4 ft	
2110	2,110.9	19.4	5.0	N=60/0.0 2:51/1.0 2/1.0 2:23/1.0 2:17/1.0 1:27/1.0	(5.0) 100%	(3.9) 78%	(20.0) 100%	(10.9) 55%		2,110.9	19.4
										CRISTALLINE ROCK Slightly and moderately weathered, moderately hard, gray-white-brown, (HENDERSON GNEISS), with close and very close fracture spacing.	
2105	2,105.9	24.4	5.0	1:48/1.0 2:05/1.0 2:08/1.0 1:50/1.0 1:41/1.0	(5.0) 100%	(2.7) 54%					
2100	2,100.9	29.4	5.0	2:08/1.0 2:10/1.0 1:45/1.0 1:41/1.0	(5.0) 100%	(2.3) 46%				RS-1 = 28' - 28.5' q <sub>u</sub> = 6,093 psi RMR = 4+13+10+20+10-2 = 55	
2095	2,095.9	34.4	5.0	1:45/1.0	(5.0) 100%	(2.0) 40%					
	2,090.9	39.4								Boring Terminated at Elevation 2,090.9 ft IN CRISTALLINE ROCK (HENDERSON GNEISS)	39.4

NCDOT CORE SINGLE 63S-0081 TRANSYLVANIA 870045 BRIDGET GP.J NC\_DOT\_GDT 8/29/16



# Bridge No. 870045 on SR 1127 (Green Road)

## CORE PHOTOGRAPHS: B1-A: Station 13+03, 12' LT



# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 14SP.20881.1		TIP N/A		COUNTY TRANSYLVANIA		GEOLOGIST M. Brewer									
SITE DESCRIPTION Bridge No. 870045 on SR							GROUND WTR (ft)								
BORING NO. B1-B		STATION 13+03		OFFSET 3 ft RT		ALIGNMENT -L-	0 HR. N/A								
COLLAR ELEV. 2,129.9 ft		TOTAL DEPTH 38.5 ft		NORTHING 543,086		EASTING 872,258	24 HR. N/A								
DRILL RIG/HAMMER EFF./DATE F&R3673 CME-550X 76% 10/24/2013				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic									
DRILLER C. Boyce		START DATE 06/18/14		COMP. DATE 06/18/14		SURFACE WATER DEPTH 2.2ft									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)	
2130														WATER SURFACE (06/18/14)	
														2,129.9	0.0
	2,126.4	3.5	8	6	5								M	2,126.9	3.0
2125														RESIDUAL	
	2,121.4	8.5	5	11	17								M	2,122.9	7.0
2120														Gray-white-brown, silty fine to coarse SAND (A-2-4), with trace gravel-sized rock fragments and mica.	
	2,116.4	13.5	6	15	85/0.2									2,115.9	14.0
2115														WEATHERED ROCK	
	2,111.4	18.5												2,111.4	18.5
2110														CRYSTALLINE ROCK	
														Brown-tan-orange, (HENDERSON GNEISS).	
2105														Gray-white-brown, (HENDERSON GNEISS).	
2100															
2095															
														2,091.4	38.5
														Boring Terminated at Elevation 2,091.4 ft IN CRYSTALLINE ROCK (HENDERSON GNEISS)	

NCDOT BORE SINGLE 635-0081 TRANSYLVANIA 870045 BRIDGET.GPJ NC\_DOT.GDT 8/29/16



# NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

WBS 14SP.20881.1		TIP N/A		COUNTY TRANSYLVANIA		GEOLOGIST M. Brewer					
SITE DESCRIPTION Bridge No. 870045 on SR							GROUND WTR (ft)				
BORING NO. B1-B		STATION 13+03		OFFSET 3 ft RT		ALIGNMENT -L-					
COLLAR ELEV. 2,129.9 ft		TOTAL DEPTH 38.5 ft		NORTHING 543,086		EASTING 872,258					
DRILL RIG/HAMMER EFF./DATE F&R3673 CME-550X 76% 10/24/2013				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic					
DRILLER C. Boyce		START DATE 06/18/14		COMP. DATE 06/18/14		SURFACE WATER DEPTH 2.2ft					
CORE SIZE NQ2		TOTAL RUN 20.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %	REC. (ft) %	RQD (ft) %			
2111.4										Begin Coring @ 18.5 ft	
2110	2,111.4	18.5	5.0	N=60/0.0 1:30/1.0 1:33/1.0 1:35/1.0 1:40/1.0 1:46/1.0	(5.0) 100%	(1.9) 38%	(20.0) 100%	(8.4) 42%		CRystalline Rock Slightly and moderately weathered, moderately hard, gray-white-brown, (HENDERSON GNEISS), with close and very close fracture spacing.	18.5
2105	2,106.4	23.5	5.0	2:38/1.0 1:34/1.0 1:50/1.0 1:06/1.0 1:47/1.0	(5.0) 100%	(1.9) 38%					
2100	2,101.4	28.5	5.0	2:25/1.0 2:17/1.0 1:37/1.0 2:02/1.0 1:54/1.0	(5.0) 100%	(3.2) 64%					
2095	2,096.4	33.5	5.0	1:50/1.0 2:03/1.0 2:24/1.0 2:30/1.0 2:09/1.0	(5.0) 100%	(1.4) 28%					
	2,091.4	38.5									
										Boring Terminated at Elevation 2,091.4 ft IN CRYSTALLINE ROCK (HENDERSON GNEISS)	38.5

NCDOT CORE\_SINGLE\_63S-0061\_TRANSYLVANIA\_870045\_BRIDGET.GPJ\_NC\_DOT\_GDT\_8/29/16



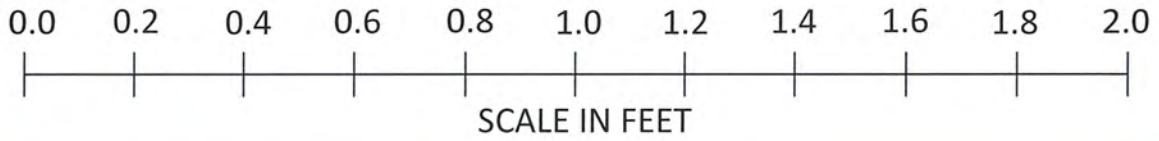
# Bridge No. 870045 on SR 1127 (Green Road)

## CORE PHOTOGRAPHS: B1-B: Station 13+03, 3' RT

Begin Run 1  
18.5 feet

Begin Run 2  
23.5 feet

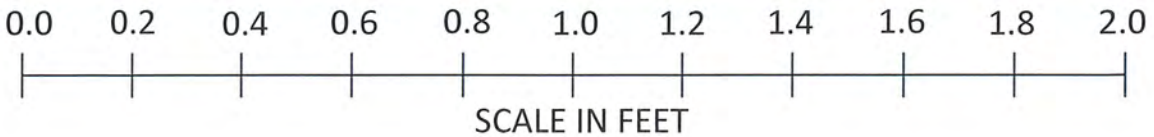
End Run 2  
28.5 feet



Begin Run 3  
28.5 feet

Begin Run 4  
33.5 feet

End Run 4  
38.5 feet





# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 14SP.20881.1	TIP N/A	COUNTY TRANSYLVANIA	GEOLOGIST M. Brewer
SITE DESCRIPTION Bridge No. 870045 on SR			GROUND WTR (ft)
BORING NO. B2-A	STATION 13+63	OFFSET 13 ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,130.3 ft	TOTAL DEPTH 53.0 ft	NORTHING 543,061	EASTING 872,315
DRILL RIG/HAMMER EFF./DATE F&R3673 CME-550X 76% 10/24/2013		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER C. Boyce	START DATE 06/17/14	COMP. DATE 06/17/14	SURFACE WATER DEPTH 1.8ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						ELEV. (ft)
2135																
2130															2,130.3	0.0
2125	2,126.8	3.5	29	32	9											
2120	2,122.3	8.0	26	74/0.5											2,122.3	8.0
2115	2,117.3	13.0	22	13	10										2,117.3	13.0
2110	2,112.3	18.0	100/0.2												2,112.3	18.0
2105	2,107.3	23.0	100/0.3													
2100	2,102.3	28.0	80	20/0.2												
2095	2,097.3	33.0	60/0.0												2,097.3	33.0
2090																
2085																
2080																
															2,077.3	53.0
															Boring Terminated at Elevation 2,077.3 ft IN CRYSTALLINE ROCK (HENDERSON GNEISS)	

NCDOT BORE SINGLE 635-0081 TRANSYLVANIA 870045 BRIDGET.GPJ NC\_DOT\_GDT 8/29/16



# NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

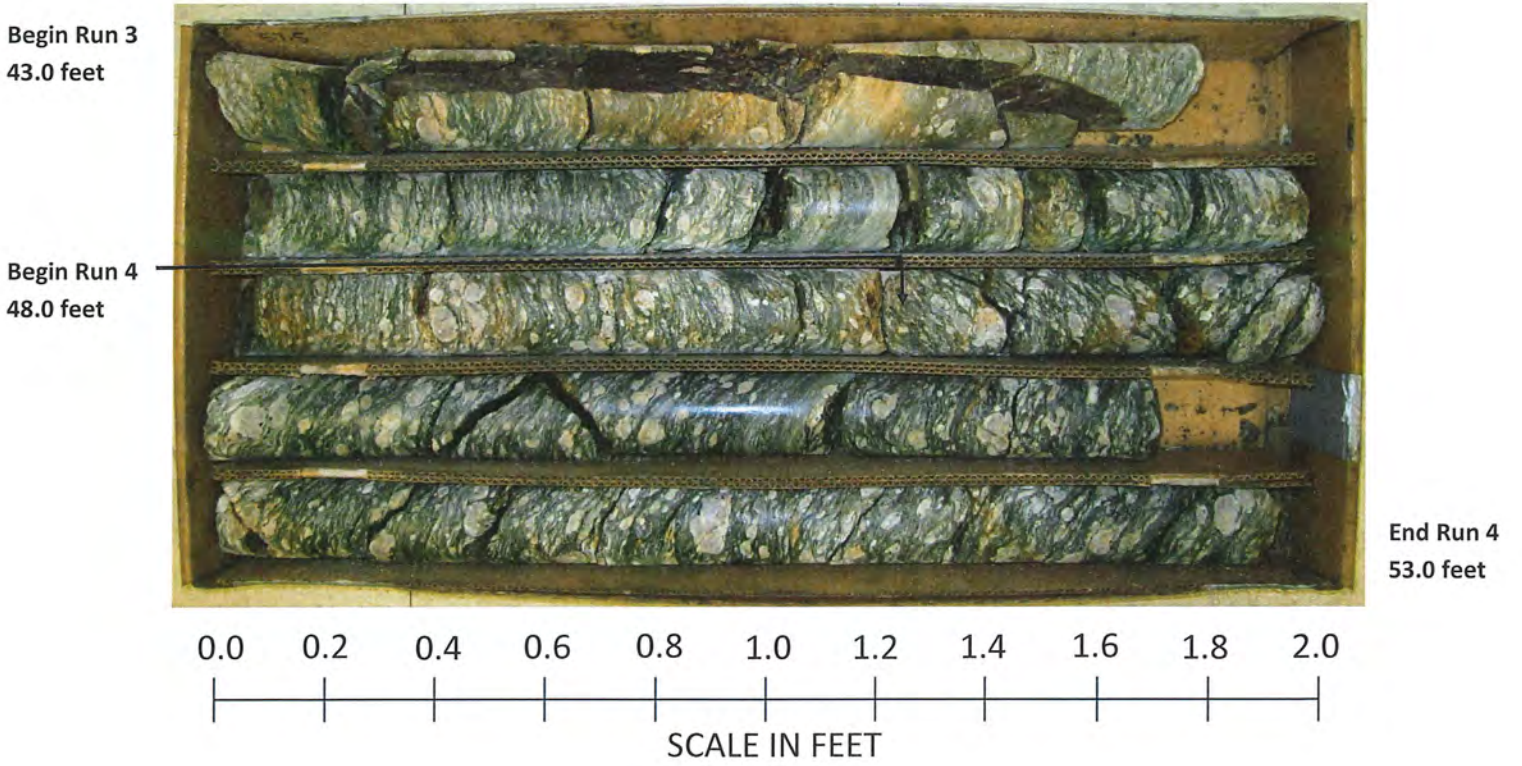
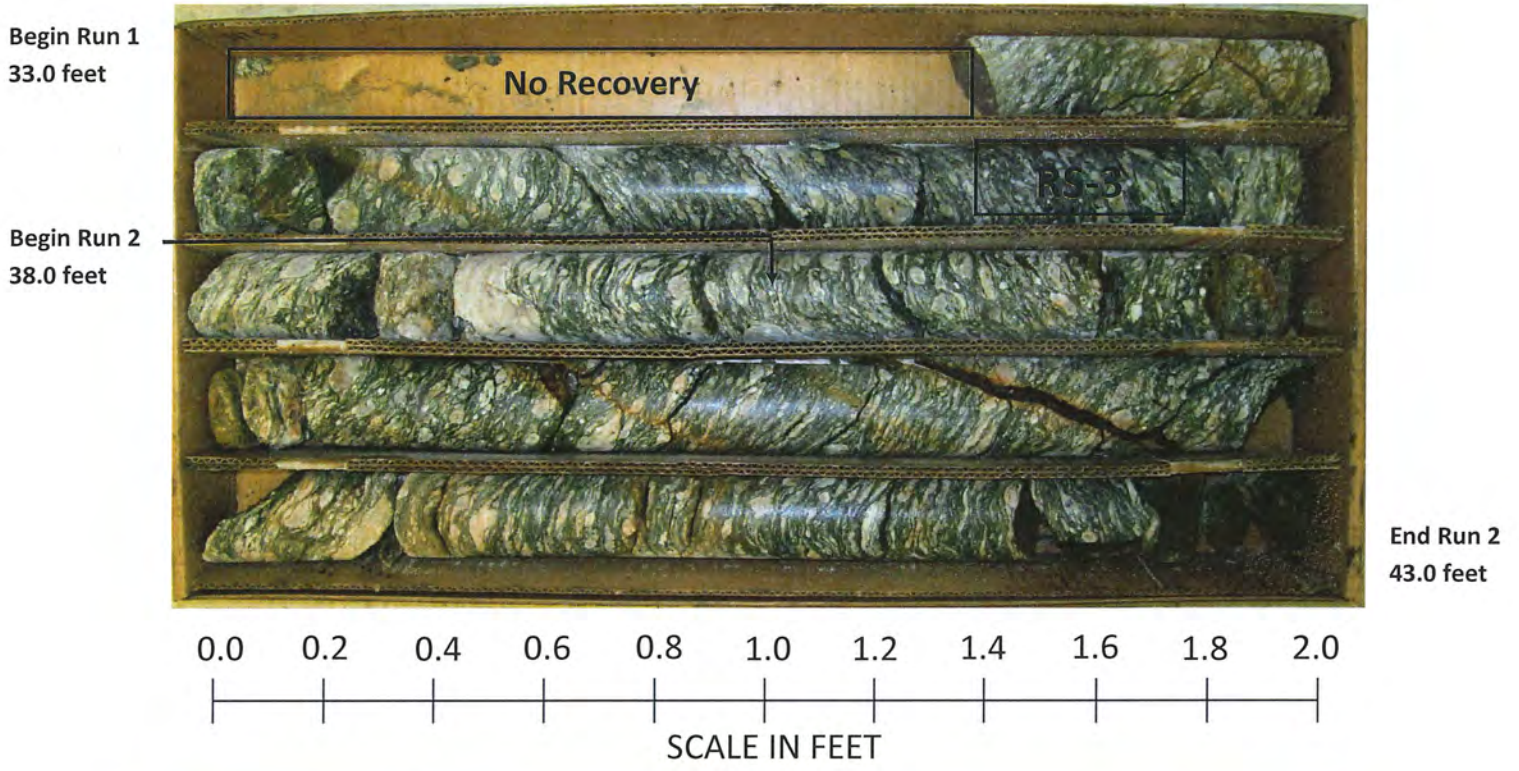
WBS 14SP.20881.1		TIP N/A		COUNTY TRANSYLVANIA		GEOLOGIST M. Brewer						
SITE DESCRIPTION Bridge No. 870045 on SR							GROUND WTR (ft)					
BORING NO. B2-A		STATION 13+63		OFFSET 13 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 2,130.3 ft		TOTAL DEPTH 53.0 ft		NORTHING 543,061		EASTING 872,315						
DRILL RIG/HAMMER EFF./DATE F&R3673 CME-550X 76% 10/24/2013				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic						
DRILLER C. Boyce		START DATE 06/17/14		COMP. DATE 06/17/14		SURFACE WATER DEPTH 1.8ft						
CORE SIZE NQ2		TOTAL RUN 20.0 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (%)	RQD (%)	REC. (%)	RQD (%)				
2097.3										Begin Coring @ 33.0 ft		
2095	2,097.3	33.0	5.0	N=60/0.0 0:50/1.0 1:00/1.0 1:45/1.0 1:58/1.0 2:04/1.0	(3.6) 72%	(0.9) 18%	(5.6) 28%			2,097.3 <b>CRYSTALLINE ROCK</b> Slightly and moderately weathered, moderately hard, gray-white-brown, (HENDERSON GNEISS), with close and very close fracture spacing RS-3 = 36' - 36.5' q <sub>u</sub> = 3,993 psi RMR = 2 + 3 + 10 + 20 + 10 - 7 = 38	33.0	
2090	2,092.3	38.0	5.0	1:42/1.0 1:32/1.0 1:27/1.0 1:17/1.0 2:02/1.0	(5.0) 100%	(1.1) 22%						
2085	2,087.3	43.0	5.0	2:01/1.0 1:13/1.0 1:46/1.0 1:25/1.0 1:41/1.0	(5.0) 100%	(1.4) 28%						
2080	2,082.3	48.0	5.0	1:40/1.0 1:31/1.0 1:31/1.0 1:27/1.0 1:24/1.0	(5.0) 100%	(1.5) 30%						
	2,077.3	53.0										2,077.3
Boring Terminated at Elevation 2,077.3 ft IN CRYSTALLINE ROCK (HENDERSON GNEISS)												

NCDOT CORE SINGLE 63S-0081 TRANSYLVANIA 870045 BRIDGET.GPJ NC\_DOT.GDT 8/29/16



# Bridge No. 870045 on SR 1127 (Green Road)

## CORE PHOTOGRAPHS: B2-A: Station 13+63, 13' LT







# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 14SP.20881.1	TIP N/A	COUNTY TRANSYLVANIA	GEOLOGIST M. Brewer
SITE DESCRIPTION Bridge No. 870045 on SR			GROUND WTR (ft)
BORING NO. B2-B	STATION 13+65	OFFSET CL	ALIGNMENT -L-
COLLAR ELEV. 2,130.5 ft	TOTAL DEPTH 53.5 ft	NORTHING 543,050	EASTING 872,309
DRILL RIG/HAMMER EFF./DATE F&R3673 CME-550X 76% 10/24/2013		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER C. Boyce	START DATE 06/16/14	COMP. DATE 06/16/14	SURFACE WATER DEPTH 1.4ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)
2135														
2130														WATER SURFACE (06/16/14) GROUND SURFACE 0.0
2125	2,127.0	3.5	36	25	17									ALLUVIAL Gray, silty fine to coarse sandy GRAVEL (A-1-a). 7.0
2120	2,122.0	8.5	13	19	24									RESIDUAL Gray-white to brown-orange, silty fine to coarse SAND (A-2-4), with trace gravel-sized rock fragments. 18.5
2115	2,117.0	13.5	6	16	40									
2110	2,112.0	18.5	100/0.5											WEATHERED ROCK Gray-tan-white-orange, (HENDERSON GNEISS). 33.5
2105	2,107.0	23.5	60/0.1											
2100	2,102.0	28.5	60/0.1											
2095	2,097.0	33.5	60/0.0											CRYSTALLINE ROCK Gray-white-brown, (HENDERSON GNEISS). 53.5
2090														
2085														
2080														Boring Terminated at Elevation 2,077.0 ft IN CRYSTALLINE ROCK (HENDERSON GNEISS)

NCDOT BORE SINGLE\_63S-0081 TRANSYLVANIA 870045 BRIDGET.GPJ NC\_DOT.GDT 8/29/16



# NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

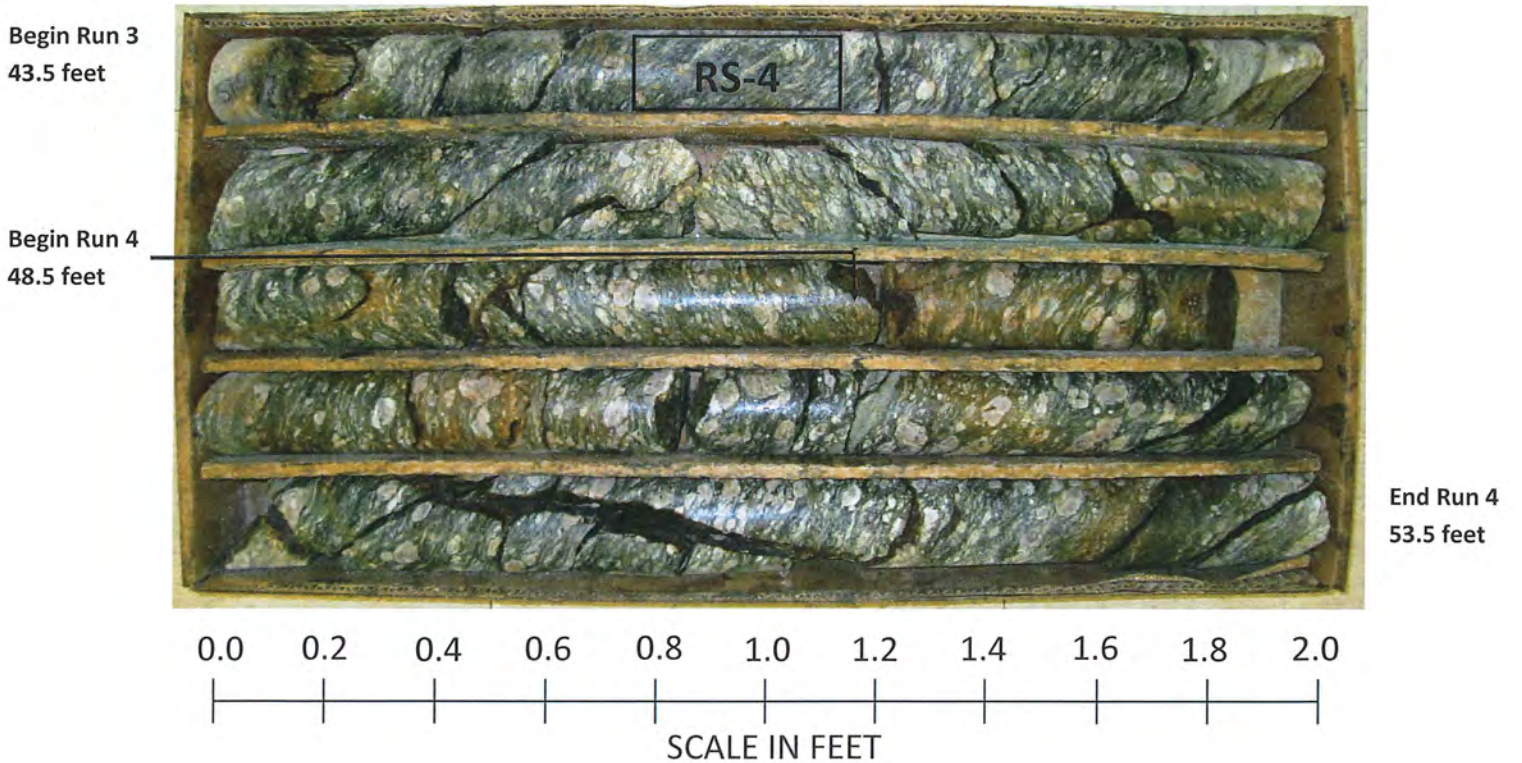
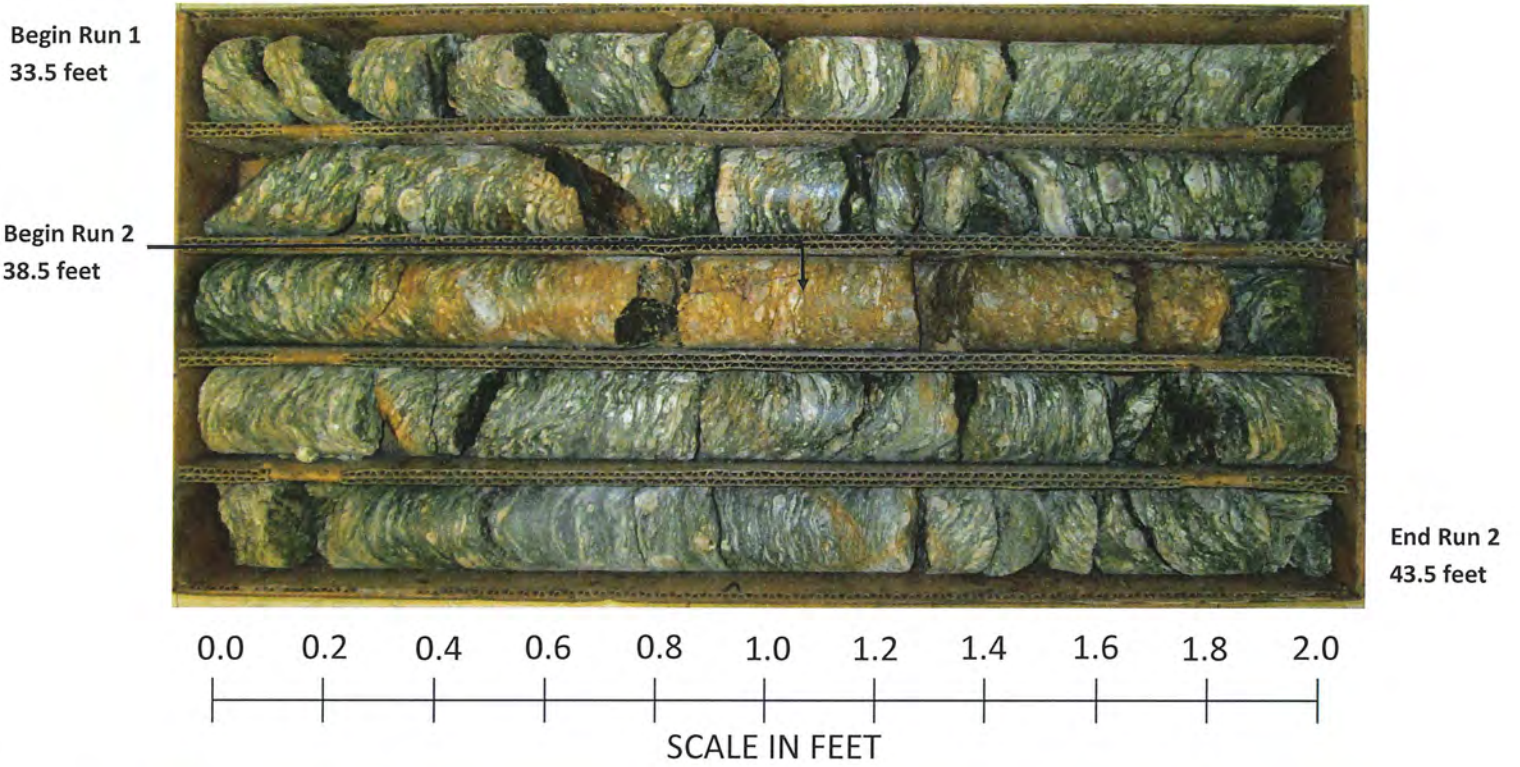
WBS 14SP.20881.1		TIP N/A		COUNTY TRANSYLVANIA		GEOLOGIST M. Brewer						
SITE DESCRIPTION Bridge No. 870045 on SR							GROUND WTR (ft)					
BORING NO. B2-B		STATION 13+65		OFFSET CL		ALIGNMENT -L-	0 HR. N/A					
COLLAR ELEV. 2,130.5 ft		TOTAL DEPTH 53.5 ft		NORTHING 543,050		EASTING 872,309	24 HR. N/A					
DRILL RIG/HAMMER EFF./DATE F&R3673 CME-550X 76% 10/24/2013				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic						
DRILLER C. Boyce		START DATE 06/16/14		COMP. DATE 06/16/14		SURFACE WATER DEPTH 1.4ft						
CORE SIZE NQ2		TOTAL RUN 20.0 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC (ft) %	RQD (ft) %	REC (ft) %	RQD (ft) %				
2097										Begin Coring @ 33.5 ft		
2095	2,097.0	33.5	5.0	N=60/0.0 1:07/1.0 1:43/1.0 2:12/1.0 2:49/1.0 2:32/1.0	(5.0) 100%	(1.3) 26%	(20.0) 100%	(5.0) 25%		2,097.0	33.5	
										CRYSTALLINE ROCK		
										Slightly and moderately weathered, moderately hard, gray-white-brown, (HENDERSON GNEISS), with close and very close fracture spacing		
2090	2,092.0	38.5	5.0	2:23/1.0 1:36/1.0 1:49/1.0 1:34/1.0 2:11/1.0	(5.0) 100%	(0.7) 14%						
2085	2,087.0	43.5	5.0	1:52/1.0 1:36/1.0 1:27/1.0 1:35/1.0 1:57/1.0	(5.0) 100%	(1.5) 30%				RS-4 = 44-44.5' q <sub>v</sub> = 752 psi RMR = 1 + 8 + 10 + 20 + 10 - 7 = 42		
2080	2,082.0	48.5	5.0	1:29/1.0 1:39/1.0 1:50/1.0 1:48/1.0	(5.0) 100%	(1.5) 30%						
	2,077.0	53.5									Boring Terminated at Elevation 2,077.0 ft IN CRYSTALLINE ROCK (HENDERSON GNEISS)	53.5

NCDOT CORE SINGLE 63S-0081 TRANSYLVANIA 870045 BRIDGET.GPJ NC\_DOT\_GDT 8/29/16



# Bridge No. 870045 on SR 1127 (Green Road)

## CORE PHOTOGRAPHS: B2-B: Station 13+65, CL





# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 14SP.20881.1	TIP N/A	COUNTY TRANSYLVANIA	GEOLOGIST M. Brewer
SITE DESCRIPTION Bridge No. 870045 on SR			GROUND WTR (ft)
BORING NO. EB2-A	STATION 13+98	OFFSET 16 ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,144.3 ft	TOTAL DEPTH 43.7 ft	NORTHING 543,041	EASTING 872,344
DRILL RIG/HAMMER EFF./DATE F&R4637 CME-75 75% 02/22/2014		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER J. Fowler	START DATE 06/11/14	COMP. DATE 06/11/14	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
2145	2,144.3	0.0												2,144.3	0.0	GROUND SURFACE
2140	2,140.8	3.5	4	4	5							M		2,142.3	2.0	ROADWAY EMBANKMENT Brown, silty fine to coarse SAND (A-2-4), with trace to little gravel and root fragments.
2135	2,135.8	8.5	WOH	WOH	WOH							M		2,137.3	7.0	Black-brown, fine sandy SILT (A-4), with trace mica and organics.
2130	2,130.8	13.5	1	1	5							M		2,132.3	12.0	Brown, silty fine SAND (A-2-4).
2125	2,125.8	18.5	3	3	5							Sat.		2,127.3	17.0	ALLUVIAL Gray-brown, silty fine to coarse SAND (A-2-4).
2120	2,120.8	23.5	4	6	13							W				RESIDUAL Tan-orange, fine to coarse sandy SILT (A-4), with trace gravel-sized rock fragments.
2115	2,115.8	28.5	9	11	13							W				
2110	2,110.8	33.5	69	31/0.4								M		2,110.8	33.5	WEATHERED ROCK Gray-brown-white, (HENDERSON GNEISS).
2105	2,105.8	38.5	100/0.2													
	2,100.8	43.5	100/0.2											2,100.6	43.7	Boring Terminated at Elevation 2,100.6 ft IN WEATHERED ROCK (HENDERSON GNEISS)

NCDOT BORE SINGLE\_63S-0081 TRANSYLVANIA 870045 BRIDGET.GPJ NC\_DOT\_GDT\_8/29/16

# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 14SP.20881.1	TIP N/A	COUNTY TRANSYLVANIA	GEOLOGIST M. Brewer
SITE DESCRIPTION Bridge No. 870045 on SR			GROUND WTR (ft)
BORING NO. EB2-B	STATION 13+98	OFFSET 3 ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,144.5 ft	TOTAL DEPTH 48.8 ft	NORTHING 543,027	EASTING 872,332
DRILL RIG/HAMMER EFF./DATE F&R4637 CME-75 75% 02/22/2014		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER J. Fowler	START DATE 06/11/14	COMP. DATE 06/11/14	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		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
2145	2,144.5	0.0	2	2	2									2,144.5	0.0	GROUND SURFACE
2140	2,141.0	3.5	1	1	1						SS-4	66%		2,141.0	3.5	ROADWAY EMBANKMENT Black-brown, fine sandy SILT (A-4(1)), with trace mica and little clay.
2135	2,136.0	8.5	WOH	WOH	1								Sat.	2,137.5	7.0	Black-brown, fine sandy CLAY (A-7-5), with trace gravel and mica.
2130	2,131.0	13.5	WOH	WOH	WOH								Sat.	2,131.0	13.5	
2125	2,126.0	18.5	5	12	3								W	2,127.5	17.0	ALLUVIAL Brown, silty fine SAND (A-2-4).
2120	2,121.0	23.5	3	5	10								M	2,122.5	22.0	RESIDUAL Tan-orange-brown, silty fine SAND (A-2-4), with trace gravel sized rock fragments and mica.
2115	2,116.0	28.5	3	6	12								M	2,117.5	27.0	Tan-orange-brown, fine sandy SILT (A-4), with trace gravel-sized rock fragments and mica.
2110	2,111.0	33.5	8	13	44								M	2,112.5	32.0	Brown-white-gray, silty fine to coarse SAND (A-2-4), with trace gravel-sized rock fragments.
2105	2,106.0	38.5	100/0.3											2,106.0	38.5	WEATHERED ROCK Brown-white-gray, (HENDERSON GNEISS).
2100	2,101.0	43.5	100/0.3											2,101.0	43.5	
	2,096.0	48.5	100/0.3											2,096.0	48.8	Boring Terminated at Elevation 2,095.7 ft IN WEATHERED ROCK (HENDERSON GNEISS)

NCDOT BORE SINGLE 63S-0081 TRANSYLVANIA 870045 BRIDGET.GPJ NC\_DOT.GDT 8/29/16



**North Carolina Department of Transportation  
Division of Highways  
Materials and Test Unit  
Soils Laboratory**

M&amp;T Form 503

WBS NO.:

REPORT ON SAMPLES OF: SOIL FOR QUALITY

PROJECT: Transylvanic 870045  
 DATE SAMPLED: 7-2-2014  
 SAMPLED FROM: On Site  
 SUBMITTED BY: Froehling & Robertson, Inc.

COUNTY: Transylvsnia  
 RECEIVED: 7-2-2014  
 REPORTED: 7-14-2014  
 BY: M. Grabski

**TEST RESULTS**

PROJ. SAMPLE NO.	EB1-A	B1-A	B1-A	EB2-B			
LAB SAMPLE NO.	SS-1	SS-2	SS-3	SS-4			
Retained #4 Sieve %	65.4	38.5	0.7	32.4			
Passing #10 Sieve %	30.8	53.5	95.8	66.1			
Passing #40 Sieve %	24.9	32.2	86.7	63.7			
Passing #200 Sieve %	4.8	9.5	59.4	36.9			

**MINUS #10 FRACTION**

SOIL MORTAR - 100%							
Coarse Sand Ret - #60 %	41.2	57.9	17.3	7.4			
Fine Sand Ret - #270 %	46.8	28.4	26.8	45.5			
Silt 0.053 - 0.010 mm %	8.5	11.2	45.4	30.6			
Clay < 0.010 mm %	3.5	2.5	10.5	16.5			
L.L.	26	21	36	39			
P.L.	NP	NP	34	36			
P.I.			2	3			
AASHTO Classification	A-1-a(0)	A-1-b(0)	A-4(0)	A-4(1)			
Station	12++66	13+03	13+03	13+93			
Offset from Outside Shoulder	12' LT	12' LT	12' LT	3' RT			
Depth (in.)	13.5	3.5	8.5	3.5			
to	15.0	5.0	10.0	5.0			
Moisture Content	17.4	19.9	27.4	65.7			
Organic Content	NT	NT	NT	NT			

NT = Not Tested  
 NP = Not Plastic  
 NA = Not Applicable

Michael J. Walko, P.E.  
 Soils Engineer