

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.12.R.51	1	11

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY IREDELL  
PROJECT DESCRIPTION REPLACE BRIDGE NO. 480219  
OVER OLIN CREEK ON SR 1892 (JENNINGS ROAD)

**REFERENCE: N/A**

**PROJECT: 17BP.12.R.51**

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2, 2A	LEGEND (SOIL & ROCK)
3	SITE PLAN
4 - II	BORE LOGS

PERSONNEL

<u>SCHLEMM, T. S.</u>
<u>EKLUND, M. A.</u>
<u>STUDNICKY, R. T.</u>
<u>NASH, A. A.</u>
_____
_____

INVESTIGATED BY TERRACON CONSULTANTS  
DRAWN BY ALEXANDER, M. J.  
CHECKED BY NASH, A. A.  
SUBMITTED BY TERRACON CONSULTANTS  
DATE SEPTEMBER 2017

**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.

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

**Terracon**  
Consulting Engineers & Scientists  
2401 BRENTWOOD ROAD, SUITE 107  
RALEIGH, NORTH CAROLINA 27604  
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NC REGISTERED FIRM: F-0869



SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

**SUBSURFACE INVESTIGATION**

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

SOIL DESCRIPTION										GRADATION									
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, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS									
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										MINERALOGICAL COMPOSITION									
GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1-A2, A-3, A-4, A-5, A-6, A-7										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.									
SYMBOL										COMPRESSIBILITY									
% PASSING #10, #40, #200										SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50									
MATERIAL PASSING #40 LL, PI										PERCENTAGE OF MATERIAL									
GROUP INDEX										ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL									
USUAL TYPES OF MAJOR MATERIALS										GROUND WATER									
GEN. RATING AS SUBGRADE										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										MISCELLANEOUS SYMBOLS									
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY									
TEXTURE OR GRAIN SIZE										RECOMMENDATION SYMBOLS									
U.S. STD. SIEVE SIZE OPENING (MM)										UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK									
GRAIN SIZE										ABBREVIATIONS									
SOIL MOISTURE - CORRELATION OF TERMS										EQUIPMENT USED ON SUBJECT PROJECT									
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										DRILL UNITS: CME-45C, CME-55, CME-550, VANE SHEAR TEST, PORTABLE HOIST, DIEDRICH D-50									
PLASTICITY										ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING W/ ADVANCER, TRICONE STEEL TEETH, TRICONE TUNG-CARB., CORE BIT									
COLOR										HAMMER TYPE: AUTOMATIC, MANUAL CORE SIZE: B, H, N HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST									
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.																			





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

# SUBSURFACE INVESTIGATION

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

### ROCK DESCRIPTION

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:

WEATHERED ROCK (WR)		NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)		FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)		FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)		COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

### WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SL.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SL.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i>
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</i>
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</i>
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

### ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO 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.
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 FINGERNAIL.

### FRACTURE SPACING

TERM	SPACING	TERM	THICKNESS
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET
CLOSE	0.16 TO 1 FOOT	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

### BEDDING

### TERMS AND DEFINITIONS

<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 (ROD)</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.

BENCH MARK: USGS 351 JAS (N: 803765.27; E: 1447146.03)

ELEVATION: 838.74 FEET

### NOTES:

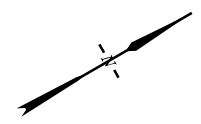
FIAD - FILLED IMMEDIATELY AFTER DRILLING

### INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
17BP.12.R.51	3
<b>SITE PLAN</b>	
FEET	

SKEW = 120°



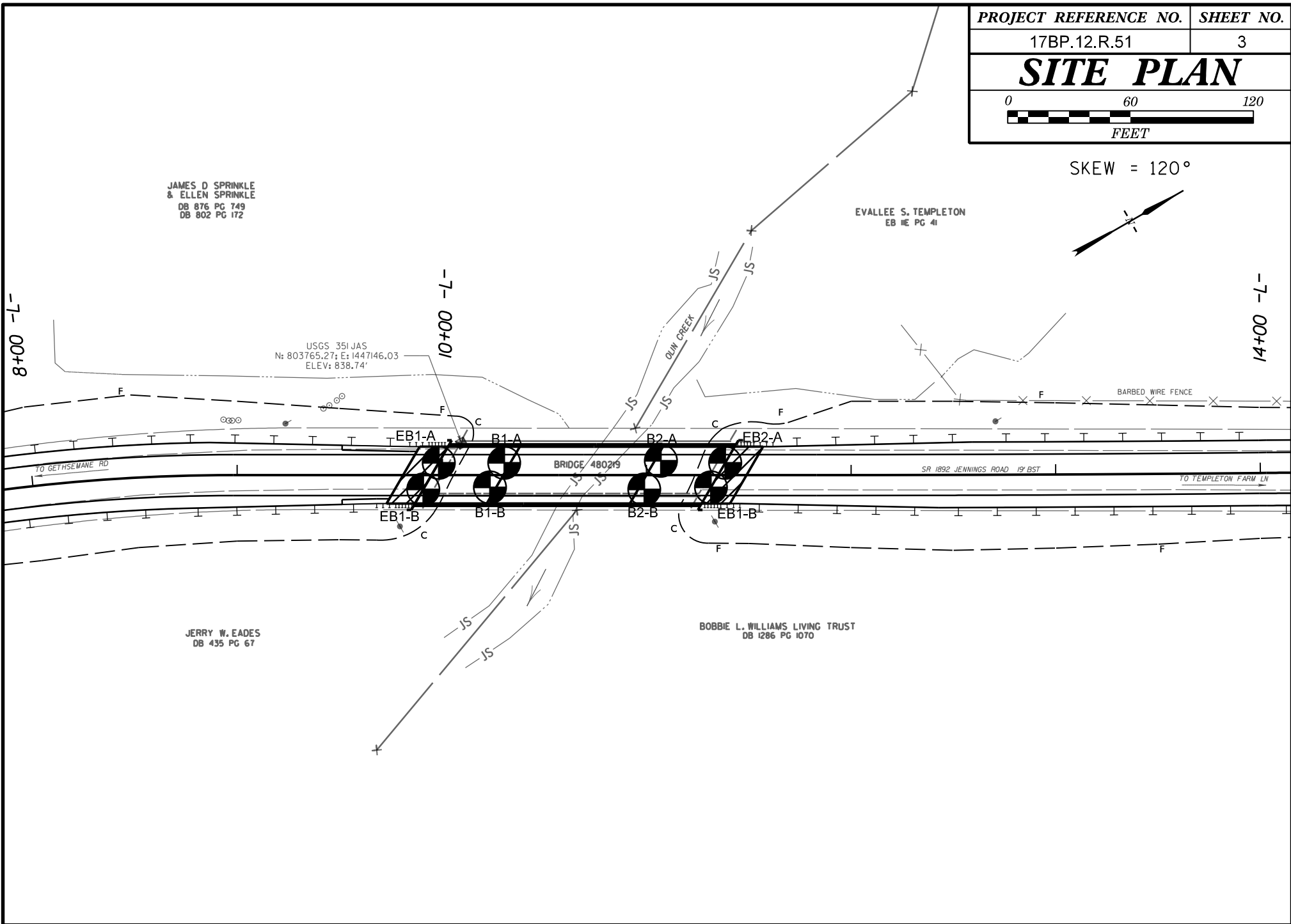
JAMES D SPRINKLE  
& ELLEN SPRINKLE  
DB 876 PG 749  
DB 802 PG 172

EVALLEE S. TEMPLETON  
EB 1E PG 41

USGS 35I JAS  
N: 803765.27; E: 1447146.03  
ELEV: 838.74'

JERRY W. EADES  
DB 435 PG 67

BOBBIE L. WILLIAMS LIVING TRUST  
DB 1286 PG 1070



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.12.R.51				TIP N/A				COUNTY IREDELL				GEOLOGIST SCHLEMM, T. S.			
SITE DESCRIPTION BRIDGE 480219 OVER OLIN CREEK ON SR 1892 (JENNINGS ROAD)												GROUND WTR (ft)			
BORING NO. EB1-A				STATION 9+98				OFFSET 6 ft LT				ALIGNMENT -L-			
COLLAR ELEV. 839.4 ft				TOTAL DEPTH 73.7 ft				NORTHING 803,751				EASTING 1,447,149			
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 91% 03/10/2017								DRILL METHOD Mud Rotary				HAMMER TYPE Automatic			
DRILLER EKLUND, M. A.				START DATE 08/16/17				COMP. DATE 08/16/17				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					
840														GROUND SURFACE 0.0	
														ASPHALT 10-INCHES 0.8	
835	835.9	3.5	4	5	5								W	<b>ROADWAY EMBANKMENT</b> RED-BROWN & BROWN, SILTY CLAY, TRACE OF QUARTZ GRAVEL	
830	830.9	8.5	1	3	2								W		
825	825.9	13.5	3	4	5								W	<b>ALLUVIAL</b> GREEN, HIGHLY PLASTIC, SILTY CLAY, WITH SAND LAYERS	11.0
820	820.9	18.5	WOH	WOH	WOH								W	DARK GRAY & BROWN, SILTY CLAY, TRACE MICA AND TRACE ORGANICS	16.0
815	815.9	23.5	2	2	2								M	<b>RESIDUAL</b> BROWN, WHITE & BLACK, SAPROLITIC, SANDY SILT, SOME MICA	21.0
810	810.9	28.5	2	6	3								M		
805	805.9	33.5	4	4	6								M		
800	800.9	38.5	3	11	17								M		
795	795.9	43.5	6	11	16								M		
790	790.9	48.5	6	10	12								M		
785	785.9	53.5	11	15	20								M		
780	780.9	58.5	41	59/0.5						100/1.0			M		
775	775.9	63.5	25	30	70/0.4										
770	770.9	68.5	35	65/0.4						100/0.9					
	765.9	73.5								100/0.2					
														782.4	57.0
														<b>WEATHERED ROCK</b> (BROWN & WHITE, GRANITE)	
														765.7	73.7
														Boring Terminated at Elevation 765.7 ft IN WEATHERED ROCK (GRANITE)	

NCDOT BORE SINGLE 17BP.12.R.51\_GEO\_BH.GPJ\_NC\_DOT.GDT 9/27/17

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.12.R.51		TIP N/A		COUNTY IREDELL		GEOLOGIST SCHLEMM, T. S.										
SITE DESCRIPTION BRIDGE 480219 OVER OLIN CREEK ON SR 1892 (JENNINGS ROAD)							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 9+91		OFFSET 7 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 839.3 ft		TOTAL DEPTH 73.6 ft		NORTHING 803,738		EASTING 1,447,156										
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 91% 03/10/2017				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER EKLUND, M. A.		START DATE 08/15/17		COMP. DATE 08/15/17		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						
840															839.3 GROUND SURFACE 0.0	
															838.5 ASPHALT 10-INCHES 0.8	
	835.8	3.5	4	10	8								M		ROADWAY EMBANKMENT BROWN & RED BROWN, SILTY CLAY	
	830.8	8.5	1	4	3											
	829.8														9.5	
	827.3														12.0	
	825.8	13.5	3	4	3								W		ALLUVIAL GRAY BROWN, SILTY FINE SAND	
	820.8	18.5	WOH	WOH	WOH								W		RESIDUAL GRAY, HIGHLY PLASTIC, SILTY CLAY	
	815.8	23.5	3	4	3								M			
	810.8	28.5	3	3	4								M			
	805.8	33.5	3	4	6								M			
	800.8	38.5	5	9	11								M			
	795.8	43.5	9	11	11								M			
	790.8	48.5	20	21	12								M			
	785.8	53.5	11	14	21								M			
	780.8	58.5	28	38	32								M			
	775.8	63.5	13	22	28								M			
	770.8	68.5	100/0.3										M			
	765.8	73.5	60/0.1												68.5	
															770.8 WEATHERED ROCK (WHITE, BROWN & BLACK, GRANITE)	
															765.8	
															765.7	
															73.5	
															73.6	
															CRYSTALLINE ROCK WHITE, BROWN & BLACK, GRANITE Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 765.7 ft IN CRYSTALLINE ROCK (GRANITE)	

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# GEOTECHNICAL BORING REPORT BORE LOG

WBS 17BP.12.R.51		TIP N/A		COUNTY IREDELL		GEOLOGIST SCHLEMM, T. S.	
SITE DESCRIPTION BRIDGE 480219 OVER OLIN CREEK ON SR 1892 (JENNINGS ROAD)							GROUND WTR (ft)
BORING NO. B1-A		STATION 10+30		OFFSET 6 ft LT		ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 832.4 ft		TOTAL DEPTH 42.8 ft		NORTHING 803,779		EASTING 1,447,165	24 HR. FIAD
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 91% 03/10/2017				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic	
DRILLER EKLUND, M. A.		START DATE 08/17/17		COMP. DATE 08/17/17		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)		
835																	
832.4	832.4	0.0	WOH	WOH	WOH	0									832.4	GROUND SURFACE	0.0
830						0							Sat.		829.4	<b>ALLUVIAL</b> BROWN & WHITE, FINE TO COARSE SAND	3.0
825	826.1	6.3	2	1	1								W			BROWN TO GRAY, HIGHLY PLASTIC, SILTY CLAY, WITH SAND LAYERS	
820	821.1	11.3	WOH	WOH	WOH	0							W				
815	816.1	16.3	10	5	6								W		818.4	<b>RESIDUAL</b> WHITE & LIGHT BROWN, SAPROLITIC, FINE SANDY SILT, LITTLE MICA	14.0
810	811.1	21.3	10	16	22								M		812.4	ORANGE BROWN, SILTY FINE SAND, TRACE MICA	20.0
805	806.1	26.3	83	17/0.1						100/0.6			M		808.4	<b>WEATHERED ROCK</b> (ORANGE-BROWN, GRANITE)	24.0
800	801.1	31.3	18	37	58								M		803.4	<b>RESIDUAL</b> DARK TO LIGHT BROWN, CLAYEY SAND	29.0
795	796.1	36.3	15	32	34								M				
790	791.1	41.3	24	20	35								M		789.6		42.8
															Boring Terminated at Elevation 789.6 ft IN RESIDUAL CLAYEY SAND		

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# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.12.R.51	TIP N/A	COUNTY IREDELL	GEOLOGIST SCHLEMM, T. S.
SITE DESCRIPTION BRIDGE 480219 OVER OLIN CREEK ON SR 1892 (JENNINGS ROAD)			GROUND WTR (ft)
BORING NO. B2-A	STATION 11+07	OFFSET 7 ft LT	ALIGNMENT -L-
COLLAR ELEV. 829.3 ft	TOTAL DEPTH 59.4 ft	NORTHING 803,845	EASTING 1,447,202
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 91% 03/10/2017		DRILL METHOD Wash Boring	HAMMER TYPE Automatic
DRILLER EKLUND, M. A.	START DATE 08/17/17	COMP. DATE 08/17/17	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					
830	829.3	0.0	WOH	WOH	WOH	0								GROUND SURFACE	0.0
825	824.9	4.4	WOH	WOH	WOH	0								ALLUVIAL BROWN, SANDY SILT, TRACE MICA, WITH CLAY LAYERS	
820	820.0	9.3	2	2	2	4									
815	815.0	14.3	7	3	3	6								RESIDUAL RED BROWN AND LIGHT BROWN, SAPOLITIC, FINE SANDY SILT, LITTLE MICA	
810	810.0	19.3	4	3	4	7									
805	805.0	24.3	3	3	5	8								WEATHERED ROCK (BROWN, WHITE & BLACK, SCHIST)	
800	800.0	29.3	8	10	27	37									
795	795.0	34.3	30	42	58					100/1.0					
790	790.0	39.3	27	73/0.4						100/0.9				WEATHERED ROCK (BROWN, WHITE & RED, GRANITE)	37.0
785	785.0	44.3	12	88/0.5						100/0.5					
780	780.0	49.3	39	61/0.4						100/0.9					
775	775.0	54.3	35	65/0.2						100/0.7					
770	770.0	59.3	60/0.1							60/0.1				CRYSTALLINE ROCK BROWN & WHITE, GRANITE Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 769.9 ft IN CRYSTALLINE ROCK (GRANITE)	59.3

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# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.12.R.51	TIP N/A	COUNTY IREDELL	GEOLOGIST SCHLEMM, T. S.
SITE DESCRIPTION BRIDGE 480219 OVER OLIN CREEK ON SR 1892 (JENNINGS ROAD)			GROUND WTR (ft)
BORING NO. B2-B	STATION 10+99	OFFSET 7 ft RT	ALIGNMENT -L-
COLLAR ELEV. 829.8 ft	TOTAL DEPTH 40.1 ft	NORTHING 803,831	EASTING 1,447,210
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 91% 03/10/2017		DRILL METHOD Wash Boring	HAMMER TYPE Automatic
DRILLER EKLUND, M. A.	START DATE 08/18/17	COMP. DATE 08/18/17	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
830	829.8	0.0	4	5	2								GROUND SURFACE	0.0
825	825.5	4.3	WOH	WOH	WOH								ALLUVIAL BROWN TO RED BROWN, SILTY CLAY, TRACE GRAVEL	5.0
820	821.1	8.7	2	2	4								BROWN & GRAY, FINE SANDY SILT, LITTLE MICA LAYERS	12.0
815	816.1	13.7	3	2	1								RESIDUAL BROWN, WHITE & RED BROWN, SAPROLITIC, FINE SANDY SILT, TRACE MICA	24.2
810	811.1	18.7	6	7	8									27.0
805	806.1	23.7	16	65	35/0.3								WEATHERED ROCK (BROWN & WHITE, GRANITE)	27.0
800	801.1	28.7	20	36	55								RESIDUAL BROWN & WHITE, SAPROLITIC, SILTY FINE SAND, TRACE MICA	39.0
795	796.1	33.7	9	25	70									40.1
790	791.1	38.7	30	50	50/0.4								WEATHERED ROCK (BROWN & WHITE, GRANITE)	40.1
													Boring Terminated at Elevation 789.7 ft IN WEATHERED ROCK (GRANITE)	

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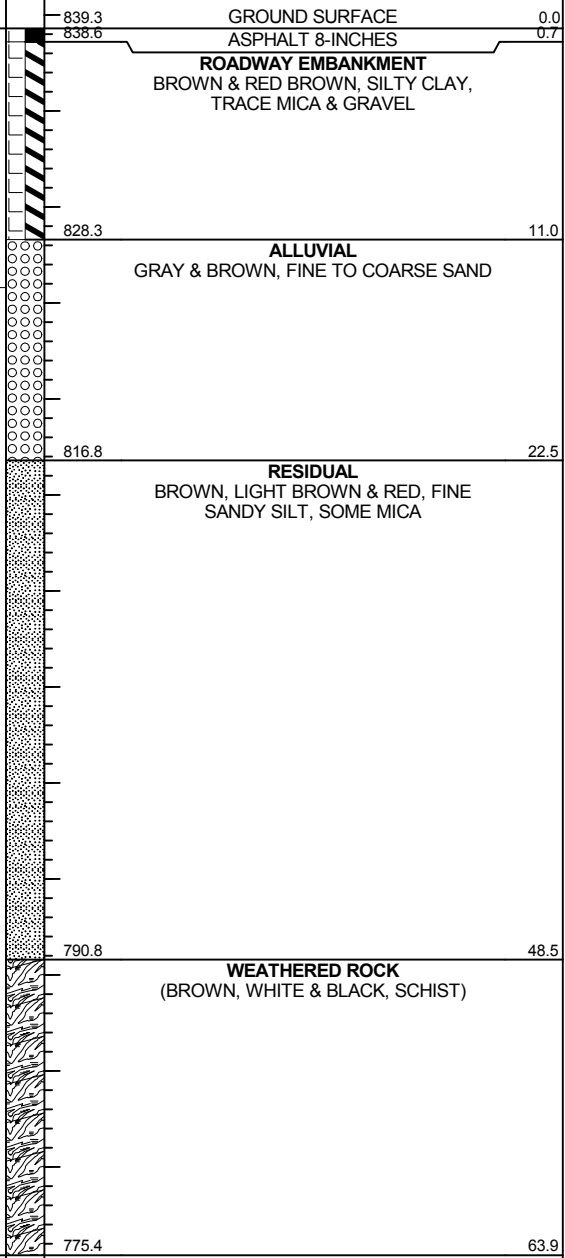
# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.12.R.51	TIP N/A	COUNTY IREDELL	GEOLOGIST SCHLEMM, T. S.
SITE DESCRIPTION BRIDGE 480219 OVER OLIN CREEK ON SR 1892 (JENNINGS ROAD)			GROUND WTR (ft)
BORING NO. EB2-A	STATION 11+38	OFFSET 6 ft LT	ALIGNMENT -L-
COLLAR ELEV. 839.3 ft	TOTAL DEPTH 63.9 ft	NORTHING 803,872	EASTING 1,447,219
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 91% 03/10/2017		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER EKLUND, M. A.	START DATE 08/14/17	COMP. DATE 08/14/17	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						
840																
835	835.8	3.5	9	5	8											
	833.3	6.0	4	3	2											
830	830.8	8.5	1	1	2											
	825.8	13.5	2	2	2											
825	820.8	18.5	5	6	7											
	815.8	23.5	3	4	6											
815	810.8	28.5	5	5	7											
	805.8	33.5	8	7	8											
805	800.8	38.5	10	11	13											
	795.8	43.5	10	16	44											
795	790.8	48.5	34	66/0.5												
	785.8	53.5	55	45/0.2												
785	780.8	58.5	20	80/0.4												
	775.8	63.5	100/0.4													
775																

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# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.12.R.51	TIP N/A	COUNTY IREDELL	GEOLOGIST SCHLEMM, T. S.
SITE DESCRIPTION BRIDGE 480219 OVER OLIN CREEK ON SR 1892 (JENNINGS ROAD)			GROUND WTR (ft)
BORING NO. EB2-B	STATION 11+32	OFFSET 6 ft RT	ALIGNMENT -L-
COLLAR ELEV. 839.3 ft	TOTAL DEPTH 55.0 ft	NORTHING 803,860	EASTING 1,447,226
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 91% 03/10/2017		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER EKLUND, M. A.	START DATE 08/15/17	COMP. DATE 08/17/17	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						
840																
	835.8	3.5	5	11	22											
	830.8	8.5	2	1	2											
	825.8	13.5	2	1	3											
	820.8	18.5	6	6	6											
	815.8	23.5	5	4	3											
	810.8	28.5	6	7	8											
	805.8	33.5	11	7	11											
	800.8	38.5	34	66/0.5												
	795.8	43.5	40	55	45/0.2											
	790.8	48.5	44	56/0.3												
	785.8	53.5	10	7	26											

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