

REFERENCE: SF-840062

PROJECT: 17BP.9.R.90

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-840062	1	21

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

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**STRUCTURE**

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**SUBSURFACE INVESTIGATION**

COUNTY STOKES

PROJECT DESCRIPTION BRIDGE NO. 62 ON SR 1961  
(BOLEJACK RD.) OVER NEATMAN CREEK

SITE DESCRIPTION \_\_\_\_\_

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DATE NOVEMBER, 2017


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11/2/2017

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

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

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

SOIL DESCRIPTION
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (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, GRAV, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

GRADATION
WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.
ANGULARITY OF GRAINS
THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.
MINERALOGICAL COMPOSITION
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.
COMPRESSIBILITY
SLIGHTLY COMPRESSIBLE LL < 31
MODERATELY COMPRESSIBLE LL = 31 - 50
HIGHLY COMPRESSIBLE LL > 50
PERCENTAGE OF MATERIAL
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
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

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-2 A-4, A-5 A-6, A-7
SYMBOL
% PASSING #10 #40 #200
MATERIAL PASSING #40 LL PI
GROUP INDEX
USUAL TYPES OF MAJOR MATERIALS
GEN. RATING AS SUBGRADE

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 AND DIP DIRECTION OF ROCK STRUCTURES
TEST BORING
AUGER BORING
CORE BORING
MONITORING WELL
PIEZOMETER INSTALLATION
SLOPE INDICATOR INSTALLATION
CONE PENETROMETER TEST
SOUNDING ROD
TEST BORING WITH CORE
SPT N-VALUE

CONSISTENCY OR DENSENESS
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT^2)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)
GENERALLY SILT-CLAY MATERIAL (COHESIVE)

RECOMMENDATION SYMBOLS
UNDERCUT
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

TEXTURE OR GRAIN SIZE
U.S. STD. SIEVE SIZE OPENING (MM)
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
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
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
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
v - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
gamma - UNIT WEIGHT
gamma\_d - 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
PL PLASTIC LIMIT
OM OPTIMUM MOISTURE SHRINKAGE LIMIT
SL
- SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
- WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
- MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE
PLASTICITY
PLASTICITY INDEX (PI) DRY STRENGTH
NON PLASTIC 0-5 VERY LOW
SLIGHTLY PLASTIC 6-15 SLIGHT
MODERATELY PLASTIC 16-25 MEDIUM
HIGHLY PLASTIC 26 OR MORE HIGH
COLOR
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.

EQUIPMENT USED ON SUBJECT PROJECT
DRILL UNITS:
CME-45C
CME-55
CME-550
VANE SHEAR TEST
PORTABLE HOIST
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
HAMMER TYPE:
AUTOMATIC
MANUAL
CORE SIZE:
-B
-H
-N X
HAND TOOLS:
POST HOLE DIGGER
HAND AUGER
SOUNDING ROD
VANE SHEAR TEST





**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
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# 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
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

### BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

### 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.

### 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 (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.
<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: GPS B-5509.2 AT STATION I4+20.15**  
**OFFSET 13.4 FT RT, NORTHING 924,184,344.3, EASTING 1,629,436,164.0**  
**ELEVATION: 725.18 FEET**

### NOTES:

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

**SUBSURFACE INVESTIGATION**

**SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES  
 FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (PAGE 1 OF 2)**

AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

**GEOLOGICAL STRENGTH INDEX (GSI) FOR  
 JOINTED ROCKS (Hoek and Marinos, 2000)**

From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.

SURFACE CONDITIONS

**VERY GOOD**  
 Very rough, fresh unweathered surfaces

**GOOD**  
 Rough, slightly weathered, iron stained surfaces

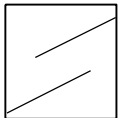
**FAIR**  
 Smooth, moderately weathered and altered surfaces

**POOR**  
 Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments

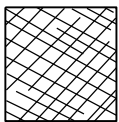
**VERY POOR**  
 Slickensided, highly weathered surfaces with soft clay coatings or fillings

DECREASING SURFACE QUALITY →

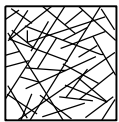
STRUCTURE



**INTACT OR MASSIVE** - intact rock specimens or massive in situ rock with few widely spaced discontinuities



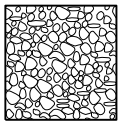
**BLOCKY** - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets



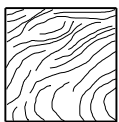
**VERY BLOCKY** - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets



**BLOCKY/DISTURBED/SEAMY** - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity



**DISINTEGRATED** - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces



**LAMINATED/SHEARED** - Lack of blockiness due to close spacing of weak schistosity or shear planes

DECREASING INTERLOCKING OF ROCK PIECES ↓

90				N/A	N/A
80					
	70				
	60				
		50			
		40			
			30		
			20		
				10	
N/A	N/A				

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

**SUBSURFACE INVESTIGATION**

**SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES  
 FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (PAGE 2 OF 2)**

AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)

From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.

SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)

VERY GOOD - Very Rough, fresh unweathered surfaces

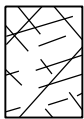
GOOD - Rough, slightly weathered surfaces

FAIR - Smooth, moderately weathered and altered surfaces

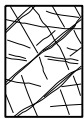
POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments

VERY POOR - Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings

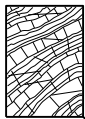
COMPOSITION AND STRUCTURE



**A.** Thick bedded, very blocky sandstone. The effect of peltic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.



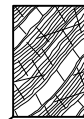
**B.** Sandstone with thin inter-layers of siltstone



**C.** Sandstone and siltstone in similar amounts

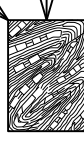


**D.** Siltstone or silty shale with sandstone layers



**E.** Weak siltstone or clayey shale with sandstone layers

**C, D, E, and G** - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to **F** and **H**.



**F.** Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure

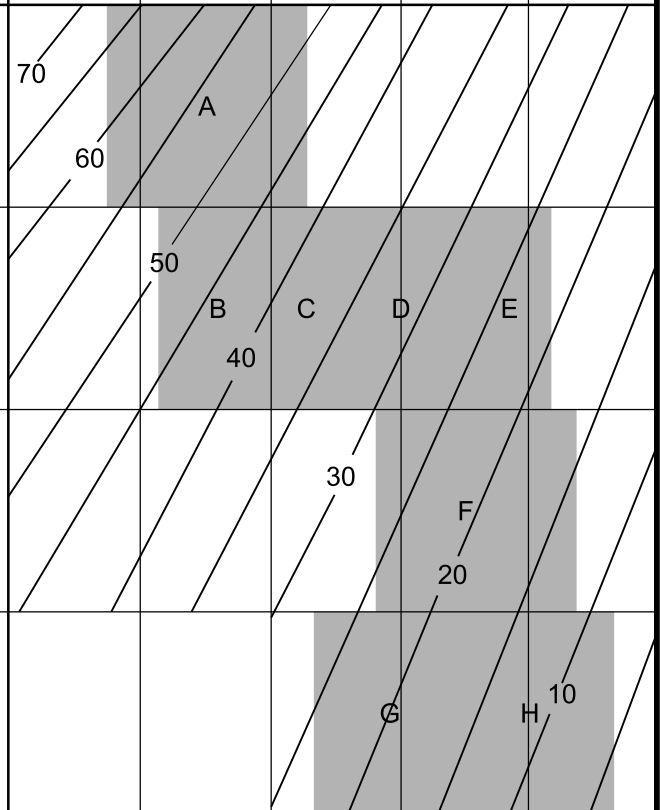


**G.** Undisturbed silty or clayey shale with or without a few very thin sandstone layers

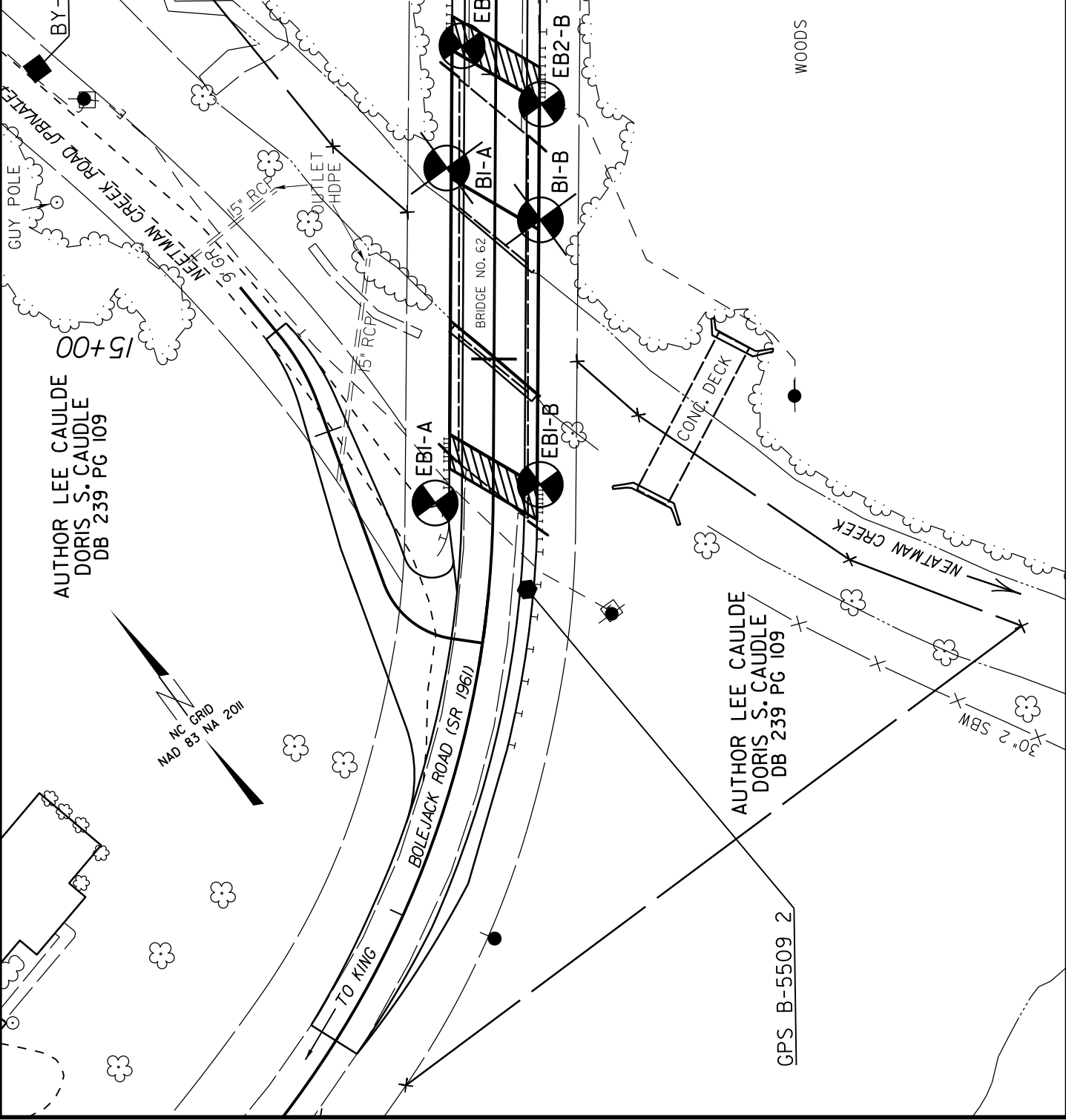


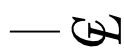
**H.** Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.

➔ Means deformation after tectonic disturbance



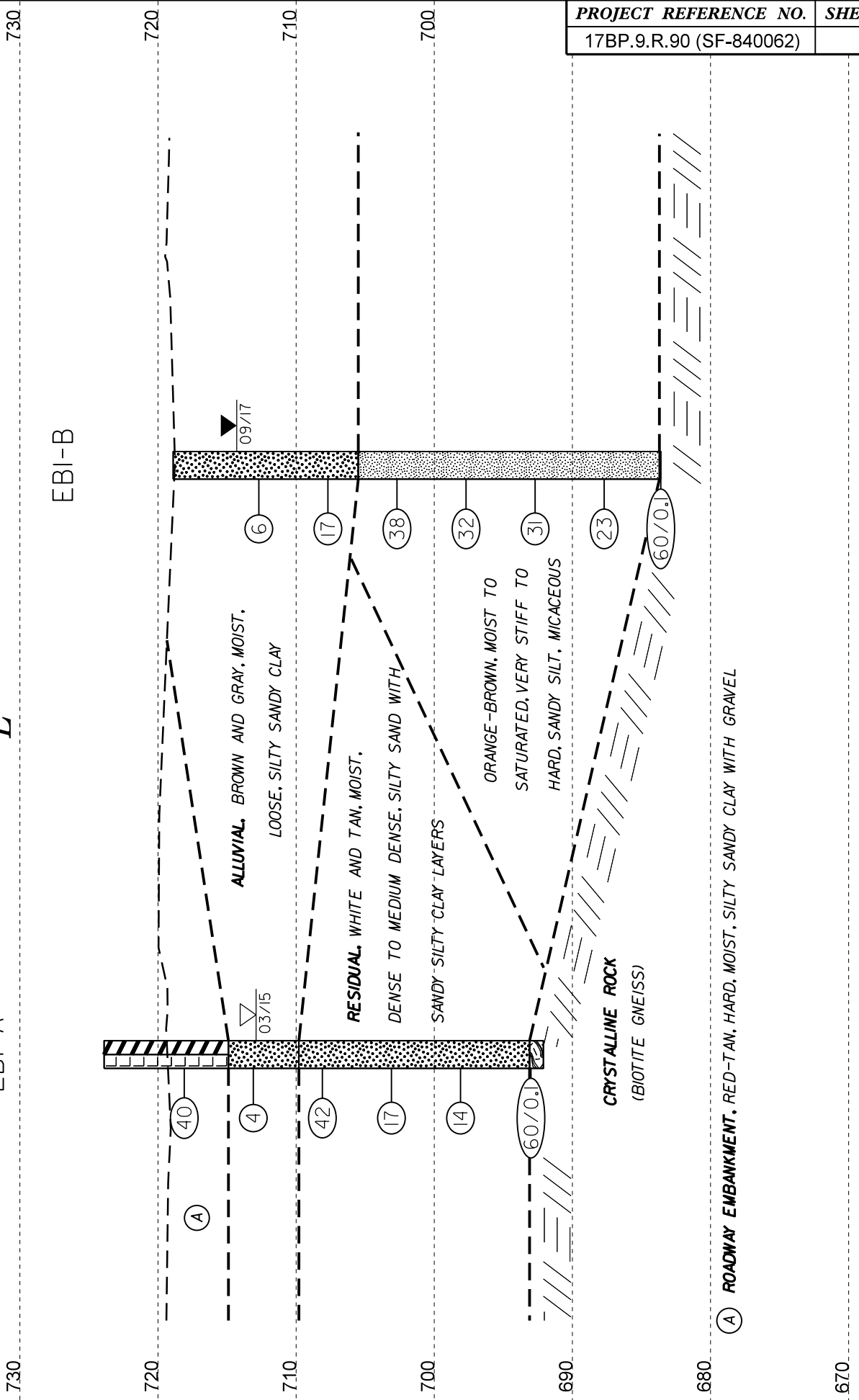
PROJECT REFERENCE NO. SHEET NO.  
 17BP.9.R.90 (SF-840062) 3  
**SITE PLAN**  
 0 50 100  
 FEET





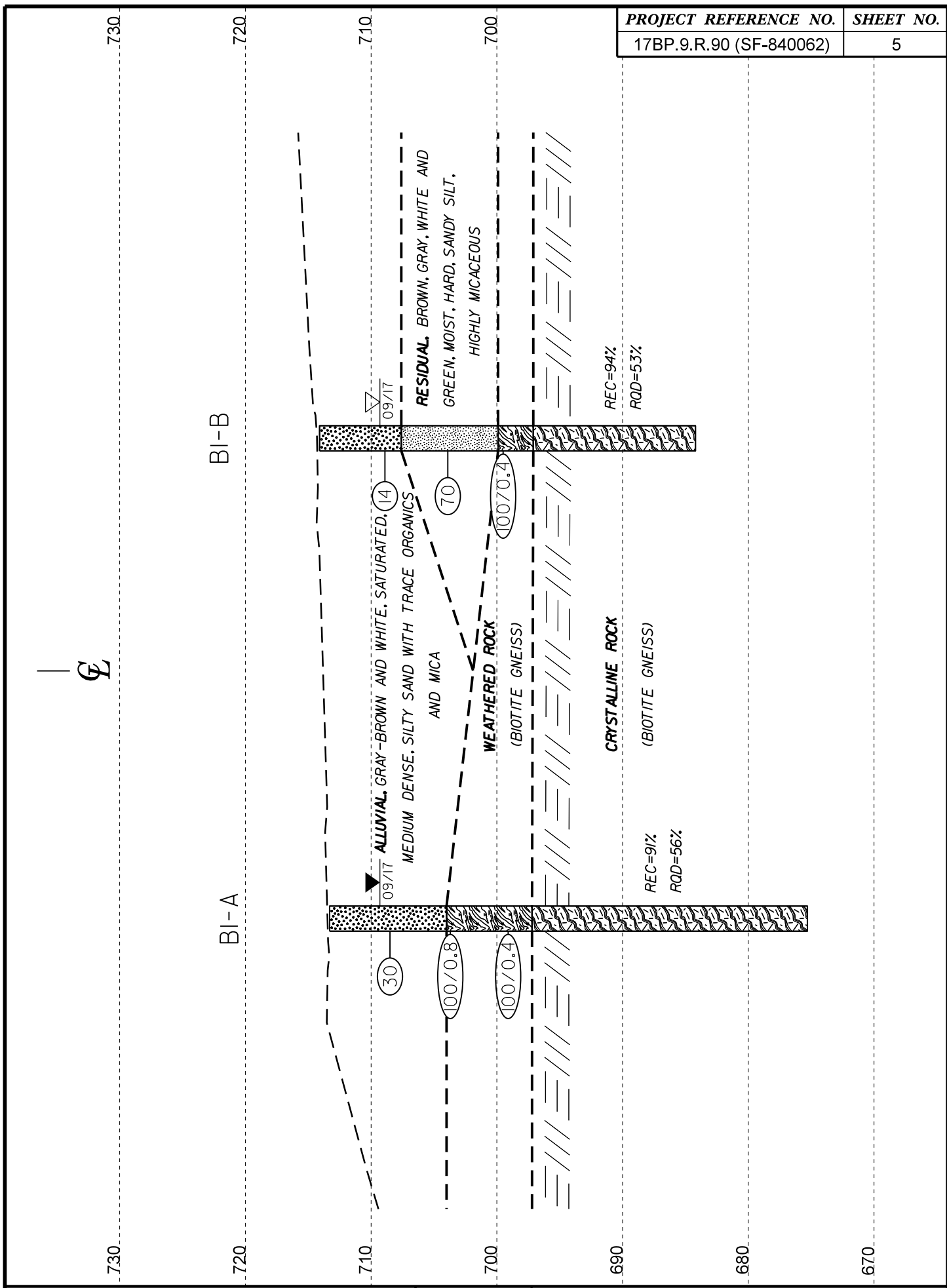
EBI-A

EBI-B



VE = 1:1

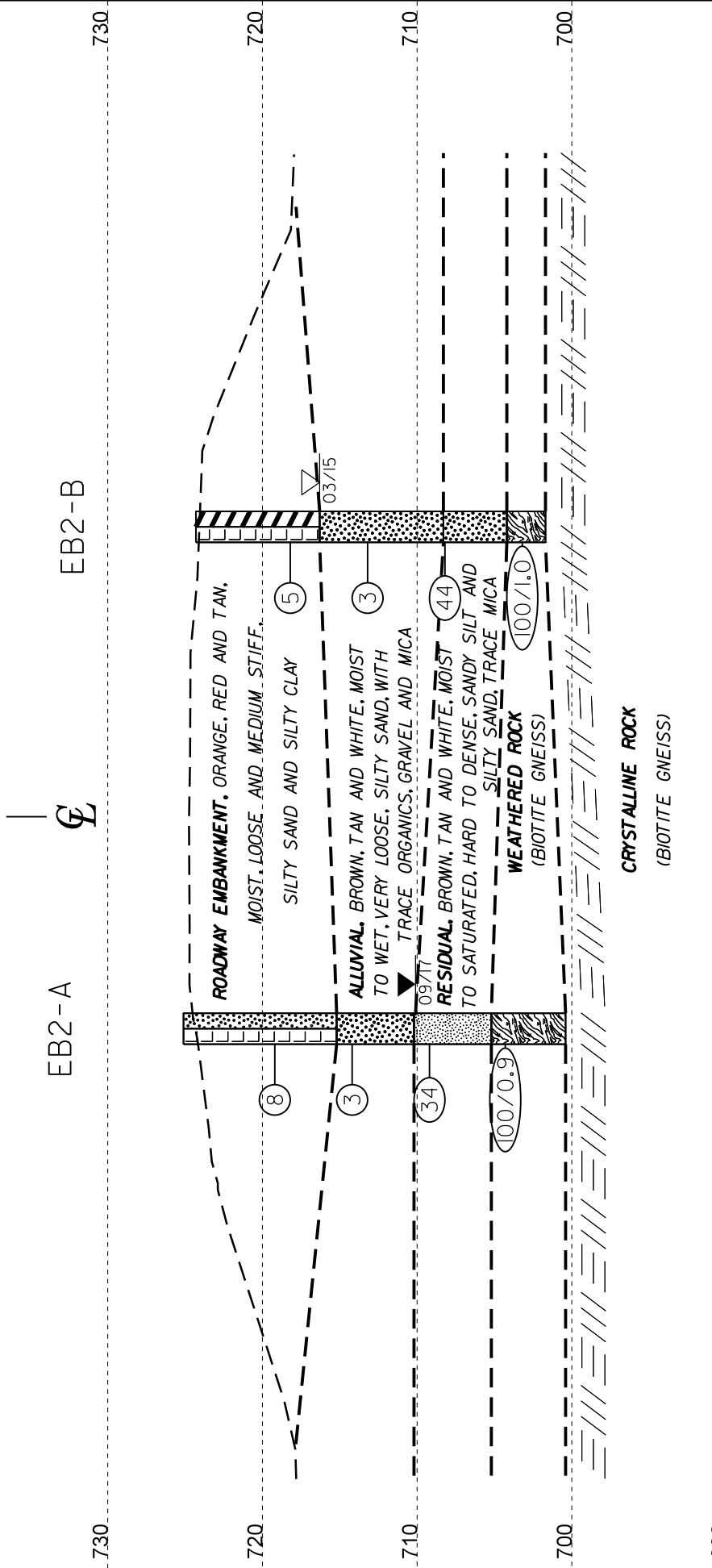
**END BENT 1 CROSS SECTION  
AT -L- 14+64.50 SKEW=120 DEG**



VE = 1:1

**BENT 1 CROSS SECTION  
AT -L- 15+54.50 SKEW=120 DEG**





EB2-B

EB2-A

HORIZ. SCALE 0 10 20 (FEET)

VE = 1:1

**END BENT 2 CROSS SECTION AT -L- 15+99.50 SKEW=120 DEG**

730  
720  
710  
700  
690  
680  
670

# GEOTECHNICAL BORING REPORT

## BORE LOG

<b>WBS</b> 17BP.9.R.90		<b>TIP</b> SF-840062		<b>COUNTY</b> STOKES		<b>GEOLOGIST</b> Murray, C. C.	
<b>SITE DESCRIPTION</b> Bridge No. 62 on SR 1961 (Bolejack Rd.) Over Neatman Creek							<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> EB1-A		<b>STATION</b> 14+49		<b>OFFSET</b> 20 ft LT		<b>ALIGNMENT</b> -L-	
<b>COLLAR ELEV.</b> 723.9 ft		<b>TOTAL DEPTH</b> 31.8 ft		<b>NORTHING</b> 924,228		<b>EASTING</b> 1,629,428	
<b>DRILL RIG/HAMMER EFF./DATE</b> HFO0066 CME-550 81% 03/19/2014				<b>DRILL METHOD</b> NW Casing w/ Advancer		<b>HAMMER TYPE</b> Automatic	
<b>DRILLER</b> Estep, J. E.		<b>START DATE</b> 03/03/15		<b>COMP. DATE</b> 03/03/15		<b>SURFACE WATER DEPTH</b> 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					
725														723.9	0.0
720	719.1	4.8	5	21	19								<b>ROADWAY EMBANKMENT</b> RED-TAN, HARD, MOIST, SILTY SANDY CLAY WITH GRAVEL		
715	714.1	9.8	2	2	2										
710	709.1	14.8	12	22	20									709.8	14.1
705	704.1	19.8	4	5	12										
700	699.1	24.8	5	8	6										
695	694.1	29.8	6	19	60/0.1									693.1	30.8
														692.1	31.8
														<b>CRYSTALLINE ROCK (BIOTITE GNEISS)</b> Boring Terminated with Casing Advancer Refusal at Elevation 692.1 ft In Crystalline Rock (Biotite Gneiss)	

NCDOT BORE SINGLE 84\_GEO\_BRDG0062\_BORELOGS.GPJ NC\_DOT.GDT 11/2/17

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.9.R.90		TIP SF-840062		COUNTY STOKES		GEOLOGIST Mefferd, P. V.										
SITE DESCRIPTION Bridge No. 62 on SR 1961 (Bolejack Rd.) Over Neatman Creek							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 14+56		OFFSET 17 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 718.9 ft		TOTAL DEPTH 35.3 ft		NORTHING 924,211		EASTING 1,629,462										
DRILL RIG/HAMMER EFF./DATE HFO0070 CME-550X 79% 05/23/2017				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 09/25/17		COMP. DATE 09/25/17		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						
720														718.9	GROUND SURFACE	0.0
715	713.7	5.2	2	2	4	6							M	ALLUVIAL BROWN, ORANGE AND WHITE, SILTY SAND, TRACE TO SOME MICA AND TRACE TO HIGH SUB ROUNDED GRAVELS		
710	708.7	10.2	7	7	10	17							Sat.			
705	703.7	15.2	30	22	16	38							Sat.	705.5	RESIDUAL ORANGE, BROWN AND WHITE, SANDY SILT, MICACEOUS	13.4
700	698.7	20.2	8	12	20	32							M			
695	693.7	25.2	11	15	16	31							M			
690	688.7	30.2	6	10	13	23							M			
685	683.7	35.2	60/0.1			60/0.1							D	683.7	CRYSTALLINE ROCK (BIOTITE GNEISS)	35.2
														683.6	Boring Terminated with Standard Penetration Test Refusal at Elevation 683.6 ft In Crystalline Rock (Biotite Gneiss)	35.3

NCDOT BORE SINGLE 84\_GEO\_BRDG0062\_BORELOGS.GPJ NC\_DOT.GDT 11/2/17

# GEOTECHNICAL BORING REPORT BORE LOG


WBS 17BP.9.R.90	TIP SF-840062	COUNTY STOKES	GEOLOGIST Mefferd, P. V.
SITE DESCRIPTION Bridge No. 62 on SR 1961 (Bolejack Rd.) Over Neatman Creek			GROUND WTR (ft)
BORING NO. B1-A	STATION 15+67	OFFSET 17 ft LT	ALIGNMENT -L-
COLLAR ELEV. 713.3 ft	TOTAL DEPTH 38.0 ft	NORTHING 924,321	EASTING 1,629,501
DRILL RIG/HAMMER EFF./DATE HFO0070 CME-550X 79% 05/23/2017		DRILL METHOD NW Casing w/ Core	HAMMER TYPE Automatic
DRILLER Smith, C. L.	START DATE 09/19/17	COMP. DATE 09/21/17	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							
715																	
														713.3	GROUND SURFACE	0.0	
710	709.5	3.8	9	13	17										ALLUVIAL GRAYISH BROWN, DENSE, STURATED, SILTY SAND, WITH TRACE ORGANICS AND MICA		
705	704.5	8.8	40	60/0.3										704.0			9.3
700	699.5	13.8	100/0.4												WEATHERED ROCK TAN, BROWN AND WHITE (BIOTITE GNEISS)		
695														697.2			16.1
690															CRYSTALLINE ROCK GRAY AND WHITE (BIOTITE GNEISS)		
685																	
680																	
														675.3			38.0
															Boring Terminated at Elevation 675.3 ft In Crystalline Rock (Biotite Gneiss)		

NCDOT BORE SINGLE 84\_GEO\_BRDG0062\_BORELOGS.GPJ NC\_DOT.GDT 11/2/17

# GEOTECHNICAL BORING REPORT

## CORE LOG

WBS 17BP.9.R.90				TIP SF-840062		COUNTY STOKES			GEOLOGIST Mefferd, P. V.		
SITE DESCRIPTION Bridge No. 62 on SR 1961 (Bolejack Rd.) Over Neatman Creek										GROUND WTR (ft)	
BORING NO. B1-A				STATION 15+67		OFFSET 17 ft LT			ALIGNMENT -L-		0 HR. 3.6
COLLAR ELEV. 713.3 ft				TOTAL DEPTH 38.0 ft		NORTHING 924,321			EASTING 1,629,501		24 HR. 4.0
DRILL RIG/HAMMER EFF./DATE HFO0070 CME-550X 79% 05/23/2017						DRILL METHOD NW Casing w/ Core			HAMMER TYPE Automatic		
DRILLER Smith, C. L.				START DATE 09/19/17		COMP. DATE 09/21/17			SURFACE WATER DEPTH N/A		
CORE SIZE NX				TOTAL RUN 21.9 ft							
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %		
697.2											Begin Coring @ 16.1 ft
695	697.2	16.1	3.5	NM/1.0 1:23/1.0	(2.5) 71%	(0.0) 0%		(20.0) 91%	(12.2) 56%		697.2
	693.7	19.6									16.1
			5.0	NM/1.5 1:18/1.0 1:18/1.0 1:28/1.0 1:43/1.0	(5.0) 100%	(2.4) 48%	RS-1				
690											
	688.7	24.6									
			5.0	1:30/1.0 1:18/1.0 1:36/1.0 1:18/1.0 1:19/1.0	(4.3) 86%	(2.3) 46%					
685											
	683.7	29.6									
			5.0	1:52/1.0 1:45/1.0 1:47/1.0 2:05/1.0 2:09/1.0	(4.8) 96%	(4.4) 88%					
680											
	678.7	34.6									
			3.4	2:02/1.0 2:08/1.0 1:55/1.0	(3.4) 100%	(3.1) 91%					
	675.3	38.0		1:51/1.4						675.3	
Boring Terminated at Elevation 675.3 ft In Crystalline Rock (Biotite Gneiss)											

NCDOT CORE SINGLE 84\_GEO\_BRD0062\_BORELOGS.GPJ NC\_DOT.GDT 11/2/17


# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.9.R.90		TIP SF-840062		COUNTY STOKES		GEOLOGIST Mefferd, P. V.										
SITE DESCRIPTION Bridge No. 62 on SR 1961 (Bolejack Rd.) Over Neatman Creek							GROUND WTR (ft)									
BORING NO. B1-B		STATION 15+49		OFFSET 16 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 714.1 ft		TOTAL DEPTH 29.9 ft		NORTHING 924,286		EASTING 1,629,517										
DRILL RIG/HAMMER EFF./DATE HFO0070 CME-550X 79% 05/23/2017				DRILL METHOD NW Casing w/ Core		HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 09/21/17		COMP. DATE 09/25/17		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						
715														714.1	GROUND SURFACE	0.0
710														707.6	<b>ALLUVIAL</b> GRAY AND WHITE, MEDIUM DENSE, SATURATED, SILTY SAND WITH ANGULAR QUARTZ GRAVEL	6.5
705	704.9	9.2		4	10										<b>RESIDUAL</b> BROWN, GRAY, WHITE AND GREEN, HARD, MOIST, SANDY SILT, MICACEOUS	
700	699.9	14.2	11	22	48									699.9		14.2
695			100/0.4											697.1	<b>WEATHERED ROCK</b> TAN, BROWN, WHITE (BIOTITE GNEISS)	17.0
690															<b>CRYSTALLINE ROCK</b> (BIOTITE GNEISS)	
685														684.2		29.9
Boring Terminated at Elevation 684.2 ft In Crystalline Rock (Biotite Gneiss)																
No Blows Recorded In First Interval At 4.2 Feet Due To Equipment Adjustment																

NCDOT BORE SINGLE 84\_GEO\_BRDG0062\_BORELOGS.GPJ NC\_DOT.GDT 11/2/17

# GEOTECHNICAL BORING REPORT CORE LOG

WBS 17BP.9.R.90			TIP SF-840062			COUNTY STOKES			GEOLOGIST Mefferd, P. V.		
SITE DESCRIPTION Bridge No. 62 on SR 1961 (Bolejack Rd.) Over Neatman Creek										GROUND WTR (ft)	
BORING NO. B1-B			STATION 15+49			OFFSET 16 ft RT			ALIGNMENT -L-		
COLLAR ELEV. 714.1 ft			TOTAL DEPTH 29.9 ft			NORTHING 924,286			EASTING 1,629,517		
DRILL RIG/HAMMER EFF./DATE HFO0070 CME-550X 79% 05/23/2017						DRILL METHOD NW Casing w/ Core			HAMMER TYPE Automatic		
DRILLER Smith, C. L.			START DATE 09/21/17			COMP. DATE 09/25/17			SURFACE WATER DEPTH N/A		
CORE SIZE NX			TOTAL RUN 12.9 ft								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %		
697.1											Begin Coring @ 17.0 ft
695	697.1	17.0	2.9	1:28/1.0	(2.2)	(0.7)		(12.1)	(6.9)		697.1
	694.2	19.9		1:29/1.0 NM/0.9	76%	24%		94%	53%		17.0
			5.0	1:25/1.0 1:20/1.0 1:15/1.0	(5.0)	(1.9)					17.0
690	689.2	24.9		1:11/1.0 1:15/1.0	100%	38%					17.0
			5.0	1:17/1.0 1:22/1.0 1:30/1.0 1:28/1.0 1:27/1.0	(4.9)	(4.3)	RS-2			17.0	
685	684.2	29.9								684.2	
Boring Terminated at Elevation 684.2 ft In Crystalline Rock (Biotite Gneiss)											
No Blows Recorded In First Interval At 4.2 Feet Due To Equipment Adjustment											

NCDOT CORE SINGLE 84\_GEO\_BRD0062\_BORELOGS.GPJ NC\_DOT.GDT 11/2/17

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 17BP.9.R.90		TIP SF-840062		COUNTY STOKES		GEOLOGIST Mefferd, P. V.										
SITE DESCRIPTION Bridge No. 62 on SR 1961 (Bolejack Rd.) Over Neatman Creek							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 16+10		OFFSET 12 ft LT		ALIGNMENT -L-	0 HR. FIAD									
COLLAR ELEV. 725.1 ft		TOTAL DEPTH 24.7 ft		NORTHING 924,352		EASTING 1,629,531	24 HR. 15.0									
DRILL RIG/HAMMER EFF./DATE HFO0070 CME-550X 79% 05/23/2017				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 09/25/17		COMP. DATE 09/25/17		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						
730																
725															725.1	0.0
720	720.2	4.9	3	3	5											
715	715.2	9.9	WOH	1	2										715.2	9.9
710	710.2	14.9													710.2	14.9
705	705.2	19.9													705.2	19.9
															700.4	24.7
															Boring Terminated with Casing Advancer Refusal at Elevation 700.4 ft On Crystalline Rock (Biotite Gneiss)	

NCDOT BORE SINGLE 84\_GEO\_BRDG0062\_BORELOGS.GPJ NC\_DOT.GDT 11/2/17



# GEOTECHNICAL BORING REPORT

## BORE LOG

<b>WBS</b> 17BP.9.R.90		<b>TIP</b> SF-840062		<b>COUNTY</b> STOKES		<b>GEOLOGIST</b> Murray, C. C.	
<b>SITE DESCRIPTION</b> Bridge No. 62 on SR 1961 (Bolejack Rd.) Over Neatman Creek							<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> EB2-B		<b>STATION</b> 15+90		<b>OFFSET</b> 16 ft RT		<b>ALIGNMENT</b> -L-	0 HR. 8.0
<b>COLLAR ELEV.</b> 724.3 ft		<b>TOTAL DEPTH</b> 22.6 ft		<b>NORTHING</b> 924,319		<b>EASTING</b> 1,629,541	24 HR. FIAD
<b>DRILL RIG/HAMMER EFF./DATE</b> HFO0066 CME-550 81% 03/19/2014				<b>DRILL METHOD</b> NW Casing w/ Advancer		<b>HAMMER TYPE</b> Automatic	
<b>DRILLER</b> Estep, J. E.		<b>START DATE</b> 03/04/15		<b>COMP. DATE</b> 03/04/15		<b>SURFACE WATER DEPTH</b> N/A	

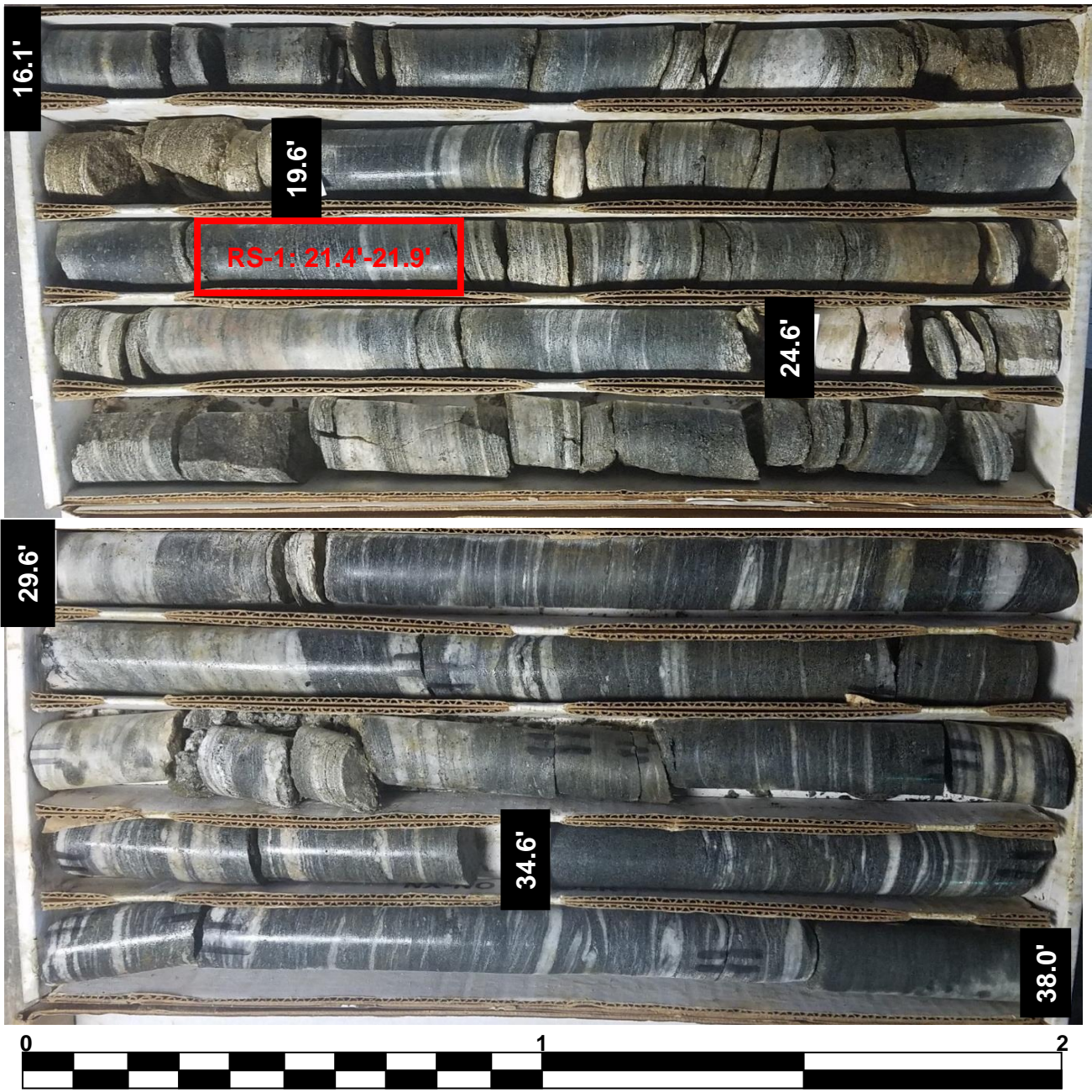
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
725														724.3	GROUND SURFACE	0.0
720	719.2	5.1	2	3	2								M	716.3	<b>ROADWAY EMBANKMENT</b> RED AND TAN, MEDIUM STIFF, MOIST, SANDY SILTY CLAY	8.0
715	714.2	10.1	3	2	1								W		<b>ALLUVIAL</b> TAN AND WHITE, VERY LOOSE TO VERY DENSE, WET, SILTY SAND, WITH WOOD & GRAVEL	
710	709.2	15.1	24	30	14								M	708.3	<b>RESIDUAL</b> TAN AND WHITE, DENSE, MOIST, SILTY SAND WITH TRACE MICA	16.0
705	704.2	20.1	50	50/0.5									M	704.2		20.1
														701.7	<b>WEATHERED ROCK</b> OLIVE, TAN AND WHITE (BIOTITE GNEISS)	22.6
Boring Terminated with Casing Advancer Refusal at Elevation 701.7 ft On Crystalline Rock (Biotite Gneiss)																

NCDOT BORE SINGLE 84\_GEO\_BRDG0062\_BORELOGS.GPJ NC\_DOT.GDT 11/2/17

# CORE PHOTOGRAPHS

## B1A

BOXES 1 & 2: 16.1 - 38.0 FEET



# CORE PHOTOGRAPHS

## B1B

BOX 1 & 2: 17.0 - 29.9 FEET



# SITE PHOTOGRAPH

Bridge No. 62 on SR 1961 (Bolejack Rd.) over Neatman Creek



Looking Northeast Towards End Bent 2

***ROCK TEST RESULTS***

SAMPLE NO.	OFFSET	STATION	BORING NO.	DEPTH INTERVAL	UNIT WT. lbs/cf	UNCONFINED COMPRESSIVE STRENGTH KSI	SEC MOD @ 40% MPSI
RS-1	17 LT	15+67	B1-A	20.4-20.9	169.6	9.11	3.55
RS-2	16 RT	15+48	B1-B	26.4-26.9	174.1	8.1	3.09