STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.12.R.78	1	20

REFERENCE:

PROJECT: 17BP.12.R.78

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *IREDELL*

PROJECT DESCRIPTION *BRIDGE NO. 480254 OVER THIRD CREEK ON SR 1512*

SITE DESCRIPTION *STRUCTURE AT -L- STATION 13+72.50*

CONTENTS

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. 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.

SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS. 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.

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PERSONNEL

P.M. WEAVER

P. BARRERA

TRIGON EXPLORATION

INVESTIGATED BY *ESP Associates, Inc.*

DRAWN BY *C.R. PASTRANA*

CHECKED BY *P.M. WEAVER*

SUBMITTED BY *ESP Associates, Inc.*

DATE *September 2021*

ESP

ESP ASSOCIATES, INC.
7011 ALBERT PICK RD
SUITE E
GREENSBORO, NC 27409
FIRM # C-0587
WWW.ESPASSOCIATES.COM

NORTH CAROLINA LICENSED SEAL 1500 GEOLOGIST PAUL M. WEAVER

SIGNATURE DATE

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PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.78	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

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, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

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-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10	50 MX													
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40														
LL	—		—	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PI	6 MX		NP	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 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				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	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				

SOIL MOISTURE - CORRELATION OF TERMS

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

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
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

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
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

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

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
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [X] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 15/16" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B [ ] -H _____
- [X] -N NQ

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

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 YEILD 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 SLI.)	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 (SLI.)	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. *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, WOULD YIELD SPT N VALUES > 100 BPF*
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. *IF TESTED, WOULD YIELD 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 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 PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED 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

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - 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.

ARTESIAN - 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.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - 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.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - 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.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - 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.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - 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.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL-2: STA. 14+35.52, 18.30 RT, N 752841.4778, E 1414456.0700
ELEVATION: 863.75 FEET

NOTES:
F.I.A.D = FILLED IMMEDIATELY AFTER DRILLING

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.78	2A

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

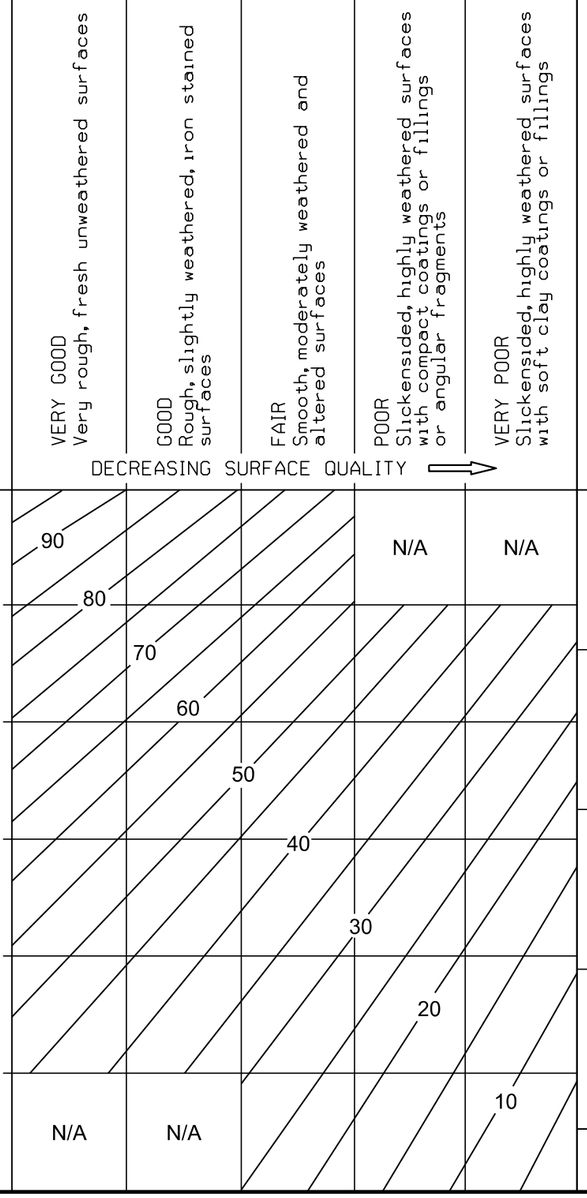
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

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.

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

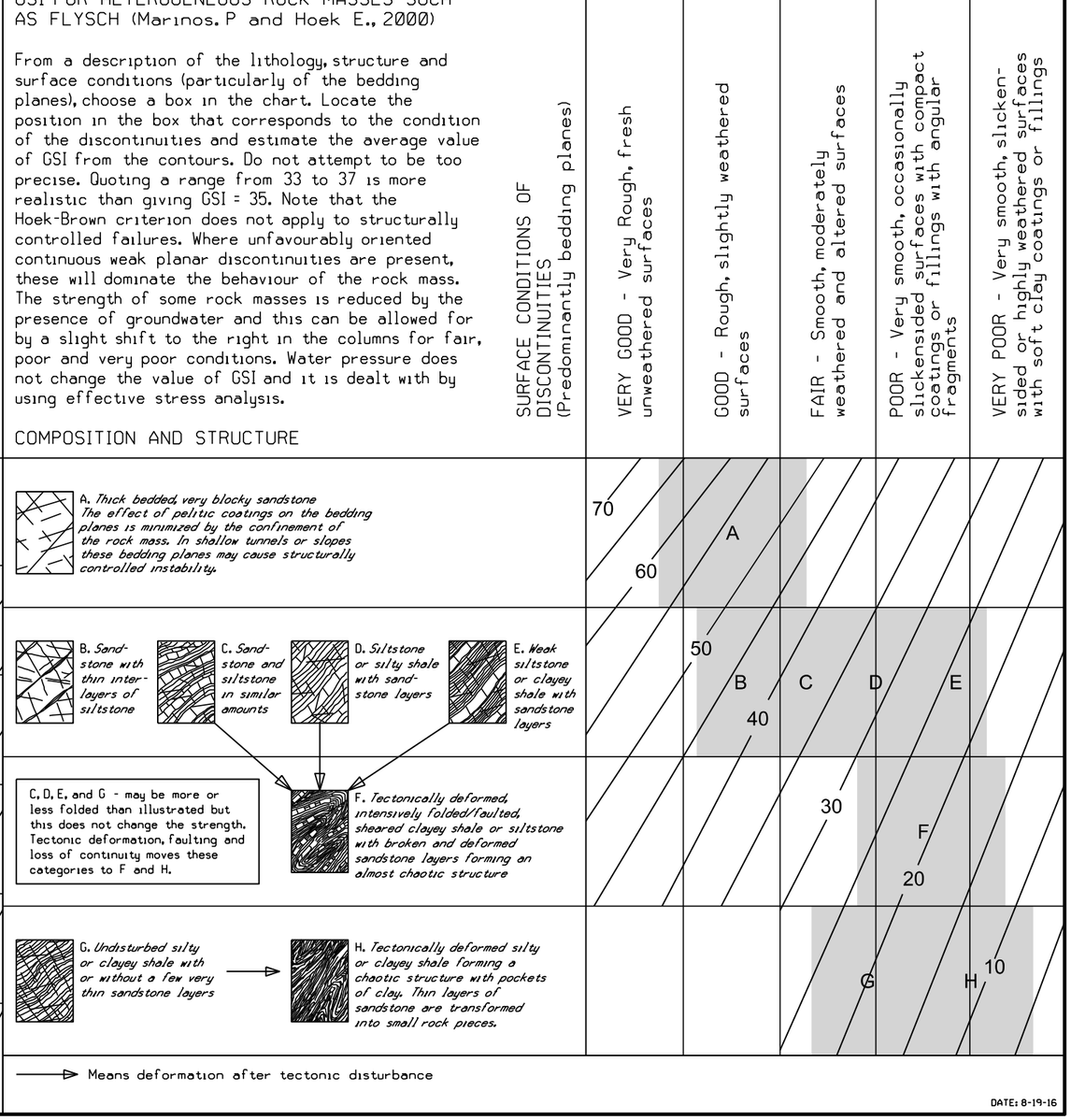


AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

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.

COMPOSITION AND STRUCTURE



DATE: 8-19-16

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.78	3

SITE PLAN

0 50 100

FEET

Bridge No. 480254 on SR 1512 (Wood Bridge Road) over Third Creek
Skew = 90°

NAD 83 NC GRID NA 2011

BEGIN PROJECT 17BP.12.R.78
BEGIN CONSTRUCTION
-L- POT Sta. 11+95.00

END PROJECT 17BP.12.R.78
END CONSTRUCTION
-L- POC Sta. 16+80.00

-L-
SR 1512
(WOOD BRIDGE RD)
N 5° 56' 46.9" W

0.36 MI +/- TO
SR 1517 CANNON RD
SR 1519 DELAWARE RD

20' BST SR 1512 WOOD BRIDGE RD

0.20 MI +/- TO
SR 1728 LORAY RD

Bridge No.0254

60' TAPER

70' TAPER

80' TAPER

INC 25'

THIRD CREEK

EBI-A
EBI-B
BI-A
BI-B
B2-A
B2-B
EB2-B
EB2-A

20' R
18' DR
2' PS
MTL GATE
EXISTING R/W
EXISTING R/W PER PB 52 PG 106 & PB 53 PG 123

ALLISON G. GOARD
DORTHY M. GOARD
DB 2199 PG 1097

OLA M. LEWIS
REGINALD R. HOLLEY
DB 1675 PG 2077

JEFFREY L. RUMPLE
LISA R. RUMPLE
DB 1952 PG 1745
PB 53 PG 123

WOODS
GRASS
SECONDARY GROWTH

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.78	4

PROFILE BORINGS PROJECTED ALONG –L–

0 10 20
FEET
VE = 1:1

(A) ROADWAY EMBANKMENT: Orange and Brown, Soft, Fine Sandy SILT (A-4), Little Mica and Gravel, Moist

(B) ROADWAY EMBANKMENT: Red, Orange and Brown, Soft to Medium Stiff, Clayey SILT (A-5), Trace Mica, Moist to Wet

(C) ALLUVIAL: Brown, Soft to Medium Stiff, Silty CLAY (A-7-5), Trace Mica, Wet

(D) RESIDUAL: Brown and Orange with Black, Very Stiff, Fine Sandy SILT (A-4), Micaceous, Moist

(E) CRYSTALLINE ROCK: White and Dark Red, Moderately Severely Weathered, BIOTITE GNEISS

(F) CRYSTALLINE ROCK: White with Gray, Moderately to Slightly Weathered, Very Hard, Quartz-Rich, Granite Intrusion, Very Close to Close Fracture Spacing, GSI=50-60

EB1-B
13+09
5' RT

B1-B
13+45
8' RT

B2-B
14+00
8' RT

EB2-B
14+36
6' RT

EXISTING GROUND

WATER SURFACE 03/21

RESIDUAL: Brown, Black, Orange and Red, Little to Trace Mica, Rock Fragments in

08/21

ALLUVIAL: Orange, Brown and Red, Very Loose to Loose, Silty Coarse to Fine SAND (A-2-6), Micaceous to Trace

Soft to Very Stiff, Coarse to Fine Sandy SILT (A-4), B1-B, Moist to Wet

Orange and Brown, Loose to Dense, Silty Coarse to Fine SAND (A-2-4), Moist to Wet

to Fine SAND (A-2-4) and Clayey Coarse to Mica, Moist to Saturated

RESIDUAL: Gray, White, Black,

WEATHERED ROCK: White, Brown, and Dark Gray, BIOTITE GNEISS Moderately to Very Slightly Weathered, Hard to Very Hard, BIOTITE GNEISS, Very Close to Moderately Close Fracture Spacing, GSI=50-80

REC: 95% RQD: 67%

REC: 76% RQD: 71%

REC: 100% RQD: 60%

REC: 79% RQD: 69%

WEATHERED ROCK: Gray and Black with White, CRYSTALLINE ROCK: Gray and Brown, BIOTITE GNEISS

REC: 63% RQD: 75%

REC: 92% RQD: 88%

CRYSTALLINE ROCK: Gray and Very Dark Green With White, Slightly Weathered to Fresh, Hard to Very Hard, AMPHIBOLITE with Garnet, Close to Moderately Close Fracture Spacing, GSI=60-90

CRYSTALLINE ROCK: Gray with Black and White, Fresh, Very Hard, BIOTITE GNEISS with Wide Fracture Spacing, GSI=80-90

REC: 100% RQD: 100%

BT
FIAD
9/21

BT

BT

BT

880
870
860
850
840
830
820
810
800

– INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE BRIDGE PROFILE

-L-

13+00 13+50 14+00 14+40

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.78	5

CROSS SECTION THROUGH END BENT 1 AT –L– STATION 13+08.75 SKEW=90°

0 10 20
FEET
VE = 1:1

–L– Sta. 13+08.75

EB1–A
13+09
16' LT

EB1–B
13+09
5' RT

ROADWAY EMBANKMENT: Red, Orange, and Brown, Soft to Medium Stiff, Clayey SILT (A-5) and Fine Sandy SILT (A-4), Little Mica and Gravel, Moist

EXISTING GROUND

RESIDUAL: Red, Brown, and Coarse Black, and Orange, Stiff to Medium Stiff, Clayey SILT (A-5) to Fine Sandy SILT (A-4), Little to Trace Mica, Moist

RESIDUAL: Orange, Red, Clayey Coarse to Micaceous to Trace Mica, White, Black, and Dark Gray, Fine SAND (A-2-6) Moist to Saturated

Loose to Dense, and Silty Coarse to Fine SAND (A-2-4),

RESIDUAL: Brown and Orange with Black, Very Stiff, Fine Sandy SILT (A-4), Micaceous Moist

WEATHERED ROCK: White and Brown, BIOTITE GNEISS

CRYSTALLINE ROCK: BIOTITE GNEISS

	EB1–A	EB1–B
	5	3
	4	4
09/21	7	5
08/21		
	6	4
	10	6
	21	11
	34	19
	29	47
	60/0.0	100/0.8
	BT	60/0.0
		BT
		FIAD 8/21

880 870 860 850 840 830 820 810 800

60 50 40 30 20 10 0 10 20 30 40 50 60

– INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE BRIDGE CROSS SECTION

0	10	20

FEET

VE = 1:1

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.78	6

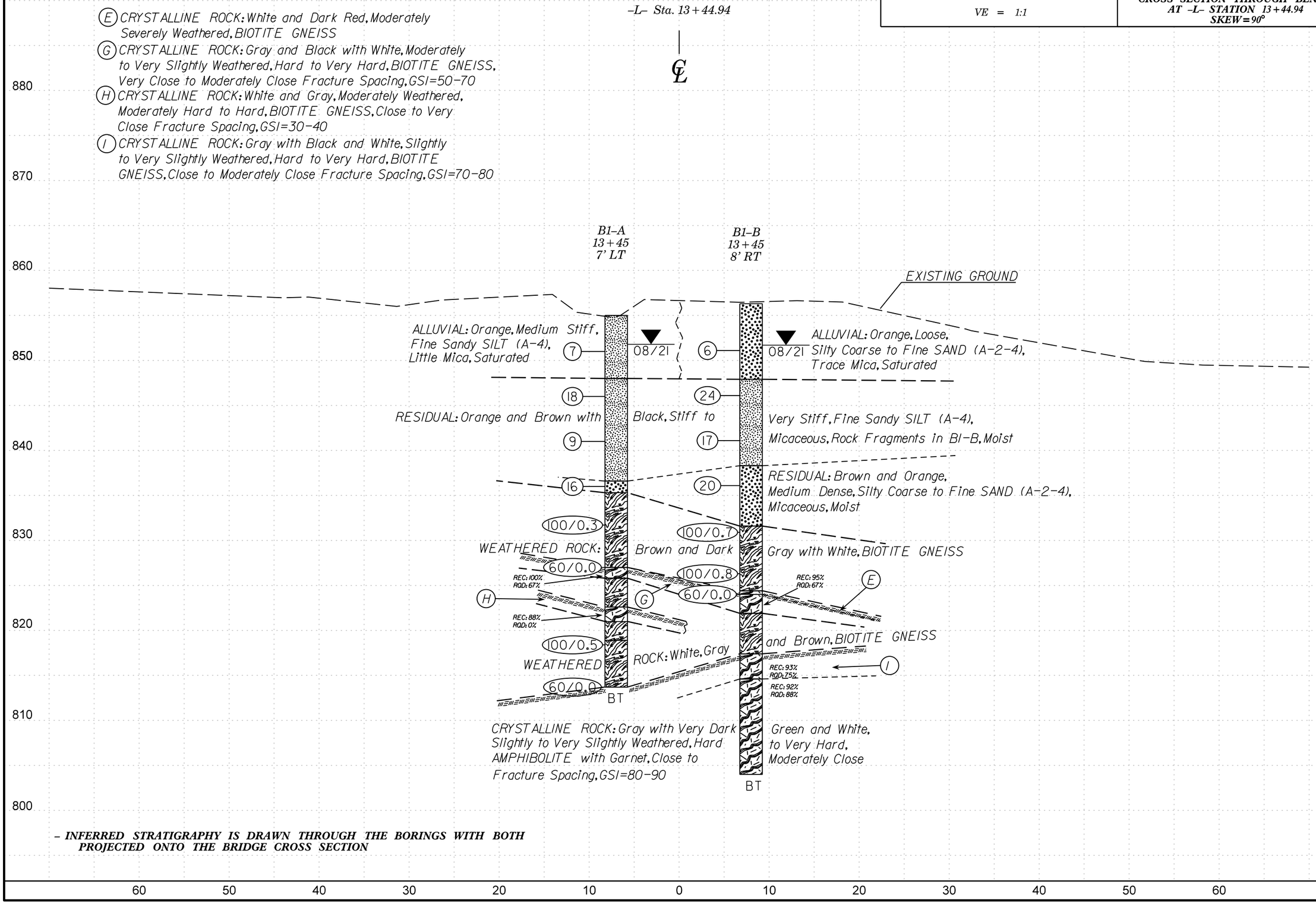
CROSS SECTION THROUGH BENT 1 AT –L– STATION 13+44.94 SKEW=90°

(E) CRYSTALLINE ROCK: White and Dark Red, Moderately Severely Weathered, BIOTITE GNEISS

(G) CRYSTALLINE ROCK: Gray and Black with White, Moderately to Very Slightly Weathered, Hard to Very Hard, BIOTITE GNEISS, Very Close to Moderately Close Fracture Spacing, GSI=50–70

(H) CRYSTALLINE ROCK: White and Gray, Moderately Weathered, Moderately Hard to Hard, BIOTITE GNEISS, Close to Very Close Fracture Spacing, GSI=30–40

(I) CRYSTALLINE ROCK: Gray with Black and White, Slightly to Very Slightly Weathered, Hard to Very Hard, BIOTITE GNEISS, Close to Moderately Close Fracture Spacing, GSI=70–80



– *INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE BRIDGE CROSS SECTION*

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.78	7

CROSS SECTION THROUGH BENT 2
AT –L– STATION 14+00.06
SKEW=90°

0 10 20
FEET
VE = 1:1

–L– Sta. 14+00.06

B2–A
14+00
8' LT

B2–B
14+00
8' RT

EXISTING GROUND

880 870 860 850 840 830 820 810 800

(2) 08/21 — ALLUVIAL: Red and Orange, Very Loose, Silty
(J) (I)

WOH 08/21 — (I) Coarse to Fine SAND (A-2-4) and SAND and GRAVEL (A-1-b), Micaceous, Saturated

(9) — RESIDUAL: Gray, Brown and Orange, Loose
100/0.7 — WEATHERED ROCK: Brown and Gray, BIOTITE GNEISS
100/0.5
60/0.0
REC: 76% RQD: 65%

(11) — to Medium Dense, Silty Coarse to Fine SAND (A-2-4), with Rock Fragments in B2-B, Micaceous, Saturated to Wet
29
60/0.0 — CRYSTALLINE ROCK: Black with White, Very Slightly Weathered, Hard to Very Hard, BIOTITE GNEISS, Close to Moderately Close Fracture Spacing, GSI=70-80
REC: 76% RQD: 71%
REC: 100% RQD: 60%
CRYSTALLINE ROCK: White and Gray, Moderately to Very Slightly Weathered, Very Hard, Quartz-Rich GRANITIC ROCK Intrusion, Very Close to Close Fracture Spacing, GSI=50-60

CRYSTALLINE ROCK: with Garnet, Dark Green and Close to Moderately
REC: 98% RQD: 98%
Gray with White, Slightly Weathered to Fresh, Hard to Very Hard, AMPHIBOLITE Close Fracture Spacing, GSI=60-80
REC: 79% RQD: 69%

CRYSTALLINE ROCK: White, Very Slightly Weathered to Very Hard, BIOTITE GNEISS, Black and Gray, Fresh, Hard to Wide Fracture Spacing, GSI=80-90
REC: 100% RQD: 100%

BT BT

(J) ALLUVIAL: Dark Brown, Very Soft, Fine Sandy SILT (A-4), Micaceous, Trace Organics, Saturated

– INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE BRIDGE CROSS SECTION

60 50 40 30 20 10 0 10 20 30 40 50 60

PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.78	8

CROSS SECTION THROUGH END BENT 2
AT –L– STATION 14+36.25
SKEW=90°

0 10 20
FEET
VE = 1:1

–L– Sta. 14+36.25

EB2–A
14+36
6' LT

EB2–B
14+36
6' RT

EXISTING GROUND

ROADWAY EMBANKMENT: Red, Orange, and Brown, Soft to Medium Stiff, Clayey SILT (A-5), Trace Mica, Moist

ALLUVIAL: Brown, Soft to Medium Stiff, Silty CLAY (A-7-5), Trace Mica, Moist to Wet

09/21

ALLUVIAL: Brown and Red, Very Loose, Clayey Coarse to Fine SAND (A-2-6), Little Mica, Wet

RESIDUAL: Gray and Brown, Silty Coarse to Fine SAND (A-2-4),

WEATHERED ROCK: White, Dark Gray, and Brown, BIOTITE GNEISS

CRYSTALLINE ROCK: BIOTITE GNEISS

BT FIAD 9/21

BT FIAD 9/21

(K) ALLUVIAL: Red, Orange, and Brown, Fine to Coarse SAND and GRAVEL (A-1-b) (Old Stream Bed Material), Wet
Note: Blow Count Influenced by Gravel

– INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE BRIDGE CROSS SECTION

880 870 860 850 840 830 820 810 800

60 50 40 30 20 10 0 10 20 30 40 50 60

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 17BP.12.R.78	**TIP** N/A	**COUNTY** IREDELL	**GEOLOGIST** Barrera, P.	
SITE DESCRIPTION Bridge No. 254 on SR 1512 (Wood Bridge Road) over Third Creek				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 13+09	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** 13.5
COLLAR ELEV. 864.7 ft	**TOTAL DEPTH** 43.0 ft	**NORTHING** 752,712	**EASTING** 1,414,435	**24 HR.** 14.1
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 82% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 08/31/21	**COMP. DATE** 09/02/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
865										864.7 GROUND SURFACE	0.0
	861.7	3.0						M		**ROADWAY EMBANKMENT** Red, Clayey SILT	
860			2	2	3	5				858.7	6.0
	856.7	8.0						M		**RESIDUAL** Red and Brown, Clayey SILT, Trace Mica	
855			2	2	2	4					
	851.7	13.0								851.3	13.4
850			2	3	4	7		▼		Orange-Red and Light Brown, Clayey Coarse to Fine SAND	
	846.7	18.0								848.6	16.1
845			2	3	3	6		M		Orange to Brown, White, and Dark Gray, Silty Coarse to Fine SAND, Micaceous to Trace Mica	
	841.7	23.0									
840			5	4	6	10		M			
	836.7	28.0									
835			2	7	14	21		M			
	831.7	33.0									
830			12	15	19	34		M			
	826.7	38.0									
825			14	14	15	29		M			
	821.7	43.0								821.7	43.0
			60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 821.7 ft on Crystalline Rock: BIOTITE GNEISS	

NCDOT BORE SINGLE BRIDGE 254 GINT LOGS.GPJ NC_DOT.GDT 9/15/21

SHEET 9

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 17BP.12.R.78	**TIP** N/A	**COUNTY** IREDELL	**GEOLOGIST** Barrera, P.	
SITE DESCRIPTION Bridge No. 254 on SR 1512 (Wood Bridge Road) over Third Creek				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 13+09	**OFFSET** 5 ft RT	**ALIGNMENT** -L-	**0 HR.** 15.4
COLLAR ELEV. 865.6 ft	**TOTAL DEPTH** 48.5 ft	**NORTHING** 752,714	**EASTING** 1,414,456	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 82% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 08/31/21	**COMP. DATE** 08/31/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
870										865.6 GROUND SURFACE	0.0
865										**ROADWAY EMBANKMENT** Orange and Brown, Fine Sandy SILT, Little Mica and Gravel	
	862.1	3.5						M		857.6	8.0
860			1	2	1	3				**RESIDUAL** Brown, Black, Orange, and Red, Coarse to Fine Sandy SILT, Little to Trace Mica	
	857.1	8.5						M			
855			2	2	2	4					
	852.1	13.5						▽			
850			2	2	3	5					
	847.1	18.5						Sat.		846.5	19.1
845			4	2	2	4				Orange, Brown, and Black to Dark Gray, Silty Coarse to Fine SAND, Micaceous	
	842.1	23.5						M			
840			5	3	3	6					
	837.1	28.5						M			
835			3	4	7	11					
	832.1	33.5						M		833.2	32.4
830			6	7	12	19				Brown and Orange with Black, Fine Sandy SILT, Micaceous	
	827.1	38.5						M		827.9	37.7
825			19	21	26	47				Brown, Orange, and White, Silty Fine to Coarse SAND with Rock Fragments, Trace Mica	
	822.1	43.5								821.6	44.0
820			13	28	72/0.3	100/0.8				**WEATHERED ROCK** White and Brown BIOTITE GNEISS	
	817.1	48.5								817.1	48.5
			60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 817.1 ft on Crystalline Rock: BIOTITE GNEISS	

NCDOT BORE SINGLE BRIDGE 254 GINT LOGS.GPJ NC_DOT.GDT 9/15/21

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 17BP.12.R.78	**TIP** N/A	**COUNTY** IREDELL	**GEOLOGIST** Barrera, P.	
SITE DESCRIPTION Bridge No. 254 on SR 1512 (Wood Bridge Road) over Third Creek				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 13+45	**OFFSET** 7 ft LT	**ALIGNMENT** -L-	**0 HR.** 3.1
COLLAR ELEV. 855.0 ft	**TOTAL DEPTH** 41.3 ft	**NORTHING** 752,749	**EASTING** 1,414,440	**24 HR.** 3.2
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 82% 04/23/2021		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 08/26/21	**COMP. DATE** 08/27/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
855										855.0 GROUND SURFACE	0.0
	852.0	3.0	4	3	4	7		Sat.		**ALLUVIAL** Orange, Fine Sandy SILT, Little Mica	
850										848.0	7.0
	847.0	8.0	8	7	11	18		M		**RESIDUAL** Orange, Brown, and Black, Fine Sandy SILT, Micaceous	
845											
	842.0	13.0	2	4	5	9		M			
840											
	837.0	18.0	4	7	9	16		M		836.6	18.4
835										835.3 Brown and Orange, Silty Coarse to Fine SAND with Rock Fragments, Micaceous	19.7
	832.0	23.0	100/0.3			100/0.3				**WEATHERED ROCK** Brown and White, BIOTITE GNEISS	
830											
	827.0	28.0	60/0.0			60/0.0				827.0	28.0
825										825.8 **CRYSTALLINE ROCK** Gray and Black with White, Very Slightly Weathered, Hard, BIOTITE GNEISS, Moderately Close Fracture Spacing	29.2
										822.6	32.4
820										821.0 **WEATHERED ROCK** Brown with White and Red, BIOTITE GNEISS	34.0
	818.9	36.1	100/0.5			100/0.5				818.9 **CRYSTALLINE ROCK** White and Gray, Moderately Weathered, Moderately Hard to Hard, BIOTITE GNEISS, Close to Very Close Fracture Spacing	36.1
815											
	813.7	41.3	60/0.0			60/0.0				813.7 **WEATHERED ROCK** White and Gray with Brown, BIOTITE GNEISS	41.3
										White and Gray with Brown, BIOTITE GNEISS	

Boring Terminated at Elevation 813.7 ft on Crystalline Rock: BIOTITE GNEISS

Sand flowing into borehole during coring. Casing could not be extended past top of weathered rock. Flowing sand prevented coring past 36.1'.

NCDOT BORE SINGLE BRIDGE 254 GINT LOGS.GPJ NC_DOT.GDT 9/15/21

SHEET 10

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 17BP.12.R.78	**TIP** N/A	**COUNTY** IREDELL	**GEOLOGIST** Barrera, P.	
SITE DESCRIPTION Bridge No. 254 on SR 1512 (Wood Bridge Road) over Third Creek				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 13+45	**OFFSET** 7 ft LT	**ALIGNMENT** -L-	**0 HR.** 3.1
COLLAR ELEV. 855.0 ft	**TOTAL DEPTH** 41.3 ft	**NORTHING** 752,749	**EASTING** 1,414,440	**24 HR.** 3.2
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 82% 04/23/2021		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 08/26/21	**COMP. DATE** 08/27/21	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 8.1 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
827											Begin Coring @ 28.0 ft	
825	827.0	28.0	3.1	0:18/0.1 2:16/1.0 1:53/1.0 3:55/1.0	(1.5) 48%	(0.8) 26%		(1.2) 100%	(0.8) 67%		827.0 **CRYSTALLINE ROCK** Gray and Black with White, Very Slightly Weathered, Hard, BIOTITE GNEISS, Moderately Close Fracture Spacing 1 joint at 90 degress in the first 0.6' GSI=60-70	28.0
	823.9	31.1	5.0	1:33/1.0 2:42/1.0 1:04/1.0 0:55/1.0 1:53/1.0	(1.4) 28%	(0.0) 0%		(0.3) 9% (1.4) 88%	(0.0) 0% (0.0) 0%		825.8	29.2
820	818.9	36.1		*N=100/0.5*				(0.0) 0%	(0.0) 0%		822.6 821.0 **WEATHERED ROCK** Brown with White and Red, BIOTITE GNEISS 818.9 **CRYSTALLINE ROCK** White and Gray, Moderately Weathered, Moderately Hard to Hard, BIOTITE GNEISS, Close to Very Close Fracture Spacing 2 joints at 90 degrees with iron staining, remaining joints at 0 degrees to 10 degrees GSI=30-40	32.4 34.0 36.1
815				*N=60/0.0*							813.7 **WEATHERED ROCK** White and Gray with Brown, BIOTITE GNEISS White and Gray with Brown, BIOTITE GNEISS	41.3

Boring Terminated at Elevation 813.7 ft on Crystalline Rock: BIOTITE GNEISS

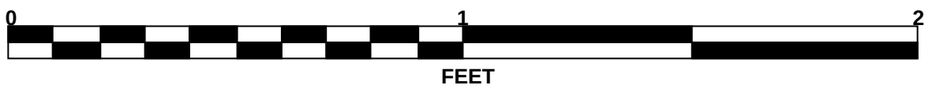
Sand flowing into borehole during coring. Casing could not be extended past top of weathered rock. Flowing sand prevented coring past 36.1'.

NCDOT CORE SINGLE BRIDGE 254 GINT LOGS.GPJ NC_DOT.GDT 9/15/21

CORE PHOTOGRAPHS

B1-A

BOX 1: 28.0 - 36.1 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 17BP.12.R.78	**TIP** N/A	**COUNTY** IREDELL	**GEOLOGIST** Barrera, P.	
SITE DESCRIPTION Bridge No. 254 on SR 1512 (Wood Bridge Road) over Third Creek				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 13+45	**OFFSET** 8 ft RT	**ALIGNMENT** -L-	**0 HR.** 5.5
COLLAR ELEV. 856.3 ft	**TOTAL DEPTH** 52.3 ft	**NORTHING** 752,750	**EASTING** 1,414,455	**24 HR.** 4.6
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 82% 04/23/2021		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 08/27/21	**COMP. DATE** 08/30/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
860										
										856.3 GROUND SURFACE 0.0
855										**ALLUVIAL** Orange, Silty Coarse to Fine SAND, Trace Mica
	852.1	4.2	3	3	3	6				
850										
	847.1	9.2								847.9 8.4
845			5	11	13	24		M		**RESIDUAL** Brown with Black, Fine Sandy SILT, Micaceous. with Rock Fragments
	842.1	14.2								
840			7	7	10	17		M		
	837.1	19.2								838.3 18.0
835			6	9	11	20		M		Brown, Silty Coarse to Fine SAND, Micaceous
	832.1	24.2								831.6 24.7
830			11	12	88/0.2	100/0.7				**WEATHERED ROCK** Brown and Dark Gray, BIOTITE GNEISS
	827.1	29.2	67	33/0.3		100/0.8				
825										824.4 31.9
	824.0	32.3	60/0.0			60/0.0				824.0 32.3 **CRYSTALLINE ROCK** White and Dark Red, Moderately Severely Weathered, BIOTITE GNEISS
820										821.9 34.4 Gray and Black with White, Moderately to Slightly Weathered, Hard to Very Hard, BIOTITE GNEISS, Very Close to Close Fracture Spacing
										817.4 38.9 **WEATHERED ROCK** Gray and Brown, BIOTITE GNEISS
815										814.6 41.7 **CRYSTALLINE ROCK** Gray with Black and White, Slightly to Very Slightly Weathered, Hard to Very Hard, BIOTITE GNEISS, Close to Moderately Close Fracture Spacing
										Gray with Very Dark Green and White, Slightly to Very Slightly Weathered, Hard to Very Hard, AMPHIBOLITE with Garnet, Close to Moderately Close Fracture Spacing
810										
										804.0 52.3 Boring Terminated at Elevation 804.0 ft in Crystalline Rock: AMPHIBOLITE
805										

NCDOT BORE SINGLE BRIDGE 254 GINT LOGS.GPJ NC_DOT.GDT 9/15/21

SHEET 12

GEOTECHNICAL BORING REPORT
CORE LOG

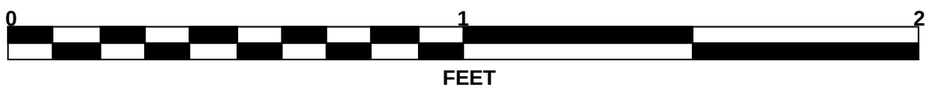
WBS 17BP.12.R.78	**TIP** N/A	**COUNTY** IREDELL	**GEOLOGIST** Barrera, P.	
SITE DESCRIPTION Bridge No. 254 on SR 1512 (Wood Bridge Road) over Third Creek				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 13+45	**OFFSET** 8 ft RT	**ALIGNMENT** -L-	**0 HR.** 5.5
COLLAR ELEV. 856.3 ft	**TOTAL DEPTH** 52.3 ft	**NORTHING** 752,750	**EASTING** 1,414,455	**24 HR.** 4.6
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 82% 04/23/2021		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 08/27/21	**COMP. DATE** 08/30/21	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 20.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
824											Begin Coring @ 32.3 ft
	824.0	32.3	5.0	2:49/1.0 2:07/1.0 3:47/1.0 1:08/1.0 2:19/1.0	(2.2) 44%	(1.4) 28%		(2.0) 95%	(1.4) 67%	824.0 821.9	Gray and Black with White, Moderately to Slightly Weathered, Hard to Very Hard, BIOTITE GNEISS, Very Close to Close Fracture Spacing 32.3 34.4
820	819.0	37.3						(0.6) 13%	(0.0) 0%		Joints generally at 10 degrees to 20 degrees 1 vertical joint 0.3' long with heavy iron staining GSI=50-60
			5.0	1:14/1.0 5:42/1.0 4:26/1.0 3:58/1.0 2:22/1.0	(3.6) 72%	(2.5) 50%				817.4	**WEATHERED ROCK** Gray and Brown, BIOTITE GNEISS 38.9
815	814.0	42.3						(2.6) 93%	(2.1) 75%		
			5.0	2:33/1.0 3:31/1.0 3:33/1.0 3:31/1.0 3:18/1.0	(4.5) 90%	(4.4) 88%		(9.8) 92%	(9.3) 88%	814.6	**CRYSTALLINE ROCK** Gray with Black and White, Slightly to Very Slightly Weathered, Hard to Very Hard, BIOTITE GNEISS, Close to Moderately Close Fracture Spacing 41.7 Joints at 20 degrees to 60 degrees GSI=70-80
810	809.0	47.3									Gray with Very Dark Green and White, Slightly to Very Slightly Weathered, Hard to Very Hard, AMPHIBOLITE with Garnet, Close to Moderately Close Fracture Spacing Joints at 10 degrees to 20 degrees GSI=80-90
			5.0	4:02/1.0 7:38/1.0 4:17/1.0 3:45/1.0 4:48/1.0	(4.7) 94%	(4.5) 90%					
805	804.0	52.3								804.0	52.3 Boring Terminated at Elevation 804.0 ft in Crystalline Rock: AMPHIBOLITE

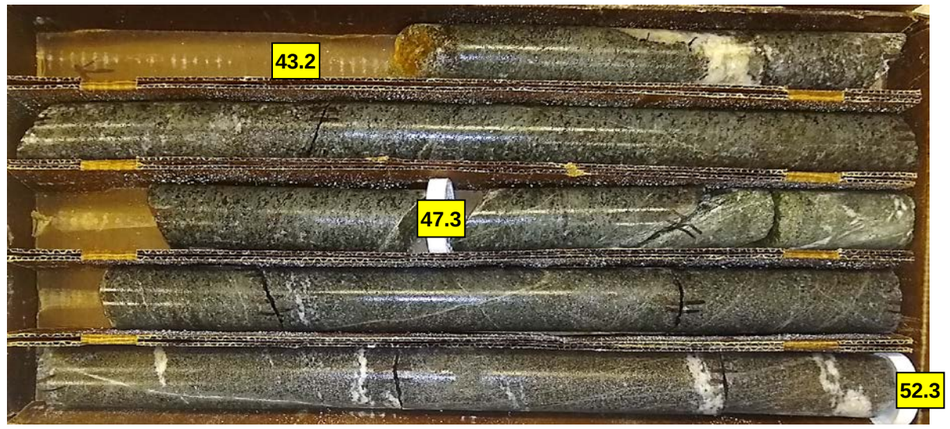
NCDOT CORE SINGLE BRIDGE 254 GINT LOGS.GPJ NC_DOT.GDT 9/15/21

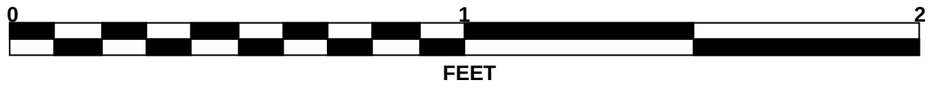
CORE PHOTOGRAPHS

B1-B
BOX 1: 32.3 - 43.2 FEET



B1-B
BOX 2: 43.2 - 52.3 FEET





GEOTECHNICAL BORING REPORT
BORE LOG

WBS 17BP.12.R.78	**TIP** N/A	**COUNTY** IREDELL	**GEOLOGIST** Barrera, P.	
SITE DESCRIPTION Bridge No. 254 on SR 1512 (Wood Bridge Road) over Third Creek				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 14+00	**OFFSET** 8 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 854.8 ft	**TOTAL DEPTH** 45.6 ft	**NORTHING** 752,804	**EASTING** 1,414,434	**24 HR.** 3.2
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 82% 04/23/2021		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 08/23/21	**COMP. DATE** 08/24/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) / DEPTH (ft)
855										854.8 GROUND SURFACE 0.0
	852.0	2.8	3	1	1	2		Sat.		**ALLUVIAL** Red, Silty Coarse to Fine SAND, Micaceous
850										846.7 8.1
	847.0	7.8	2	WOH	1	1		Sat.		Dark Brown, Fine Sandy SILT, Micaceous, Trace Organics
845										844.0 10.8
	842.0	12.8	12	5	4	9		Sat.		842.6 Brown and Tan SAND and GRAVEL (Old Stream Bed Material) 12.2 **RESIDUAL** Gray and Brown, Silty Coarse to Fine SAND, Micaceous
840										836.5 18.3
	837.0	17.8	13	28	72/0.2	100/0.7				**WEATHERED ROCK** Gray and Brown, BIOTITE GNEISS
835										
	832.0	22.8	100/0.5			100/0.5				
830										
	827.0	27.8	60/0.0			60/0.0				827.0 27.8 **CRYSTALLINE ROCK** Very Dark Green and Gray with White, Slightly to Very Slightly Weathered, Hard, AMPHIBOLITE, with Garnet, Close Fracture Spacing
825										
820										819.2 35.6 White, Black, and Gray, Very Slightly Weathered to Fresh, Hard to Very Hard, BIOTITE GNEISS, Wide Fracture Spacing
815										
810										809.2 45.6 Boring Terminated at Elevation 809.2 ft in Crystalline Rock: BIOTITE GNEISS

NCDOT BORE SINGLE BRIDGE 254 GINT LOGS.GPJ NC_DOT.GDT 9/15/21

SHEET 14

GEOTECHNICAL BORING REPORT
CORE LOG

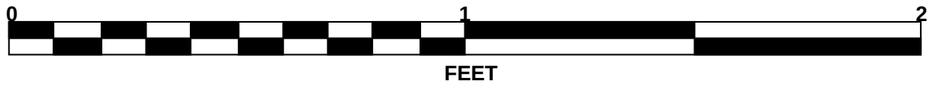
WBS 17BP.12.R.78	**TIP** N/A	**COUNTY** IREDELL	**GEOLOGIST** Barrera, P.	
SITE DESCRIPTION Bridge No. 254 on SR 1512 (Wood Bridge Road) over Third Creek				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 14+00	**OFFSET** 8 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 854.8 ft	**TOTAL DEPTH** 45.6 ft	**NORTHING** 752,804	**EASTING** 1,414,434	**24 HR.** 3.2
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 82% 04/23/2021		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 08/23/21	**COMP. DATE** 08/24/21	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 17.8 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft) / DEPTH (ft)
827											Begin Coring @ 27.8 ft
825	827.0	27.8	2.8	3:28/0.8 3:18/1.0 2:37/1.0	(2.1) 75%	(1.4) 50%		(5.9) 76%	(5.1) 65%		827.0 **CRYSTALLINE ROCK** 27.8 Very Dark Green and Gray with White, Slightly to Very Slightly Weathered, Hard, AMPHIBOLITE, with Garnet, Close Fracture Spacing Joints at 10 degrees to 20 degrees GSI=70-80
	824.2	30.6	5.0	2:14/1.0 1:59/1.0 2:16/1.0 3:16/1.0 3:58/1.0	(3.8) 76%	(3.7) 74%					
820	819.2	35.6	5.0	3:13/1.0 2:59/1.0 3:30/1.0 3:27/1.0 3:52/1.0	(4.8) 96%	(4.8) 96%		(9.8) 98%	(9.8) 98%		819.2 35.6 White, Black, and Gray, Very Slightly Weathered to Fresh, Hard to Very Hard, BIOTITE GNEISS, Wide Fracture Spacing No natural fractures GSI=80-90
815	814.2	40.6	5.0	2:53/1.0 3:25/1.0 3:09/1.0 3:16/1.0 3:15/1.0	(5.0) 100%	(5.0) 100%					
810	809.2	45.6									809.2 45.6 Boring Terminated at Elevation 809.2 ft in Crystalline Rock: BIOTITE GNEISS

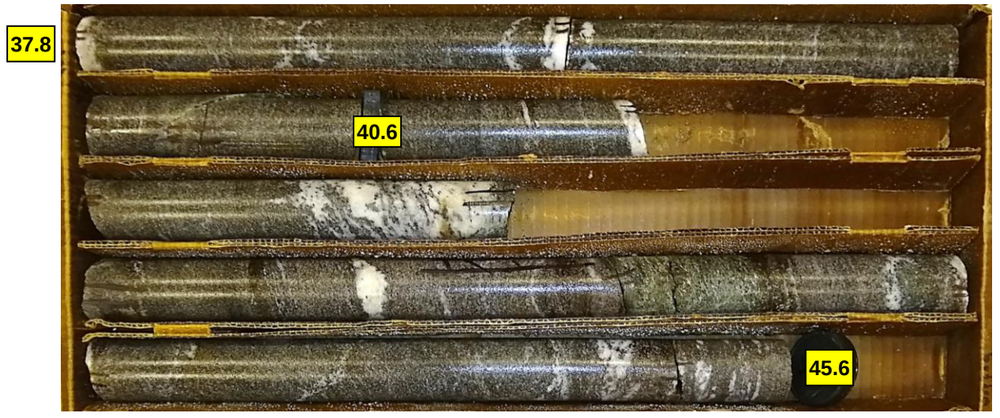
NCDOT CORE SINGLE BRIDGE 254 GINT LOGS.GPJ NC_DOT.GDT 9/15/21

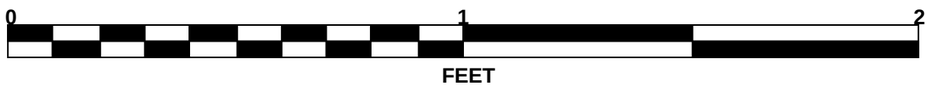
CORE PHOTOGRAPHS

B2-A
BOX 1: 27.8 - 37.8 FEET



B2-A
BOX 2: 37.8 - 45.6 FEET





GEOTECHNICAL BORING REPORT
BORE LOG

WBS 17BP.12.R.78	**TIP** N/A	**COUNTY** IREDELL	**GEOLOGIST** Barrera, P.	
SITE DESCRIPTION Bridge No. 254 on SR 1512 (Wood Bridge Road) over Third Creek				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 14+00	**OFFSET** 8 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 855.1 ft	**TOTAL DEPTH** 46.6 ft	**NORTHING** 752,805	**EASTING** 1,414,449	**24 HR.** 3.5
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 82% 04/23/2021		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 08/24/21	**COMP. DATE** 08/25/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) / DEPTH (ft)
										855.1 GROUND SURFACE 0.0
	852.1	3.0	WOH	WOH	WOH	0		Sat.		**ALLUVIAL** Orange, Silty Fine to Coarse SAND, Micaceous
	847.1	8.0	2	WOH	1	1		Sat.		844.8 10.3 SAND and Gravel (Old Stream Bed Material)
	842.1	13.0	6	5	6	11		W		842.6 12.5 **RESIDUAL** Gray, Brown, and Orange, Silty Coarse to Fine SAND with Rock Fragments, Micaceous
	837.1	18.0	16	16	13	29		M		833.6 21.5 **WEATHERED ROCK**
	832.1	23.0	60/0.0			60/0.0				832.1 23.0 Brown and Gray, BIOTITE GNEISS **CRYSTALLINE ROCK** Black with White, Very Slightly Weathered, Hard to Very Hard, BIOTITE GNEISS, Close to Moderately Close Fracture Spacing
										828.7 26.4 White with Gray, Moderately to Very Slightly Weathered, Very Hard, Quartz-Rich GRANITIC ROCK Intrusion, Very Close to Close Fracture Spacing
										824.4 30.7 Very Dark Green with White, Very Slightly Weathered to Fresh, Hard to Very Hard, AMPHIBOLITE with Garnet, Close to Moderately Close Fracture Spacing
										813.9 41.2 Gray with Black and White, Fresh, Very Hard, BIOTITE GNEISS, Wide Fracture Spacing
										808.5 46.6 Boring Terminated at Elevation 808.5 ft in Crystalline Rock: BIOTITE GNEISS

NCDOT BORE SINGLE BRIDGE 254 GINT LOGS.GPJ NC_DOT.GDT 9/15/21

SHEET 16

GEOTECHNICAL BORING REPORT
CORE LOG

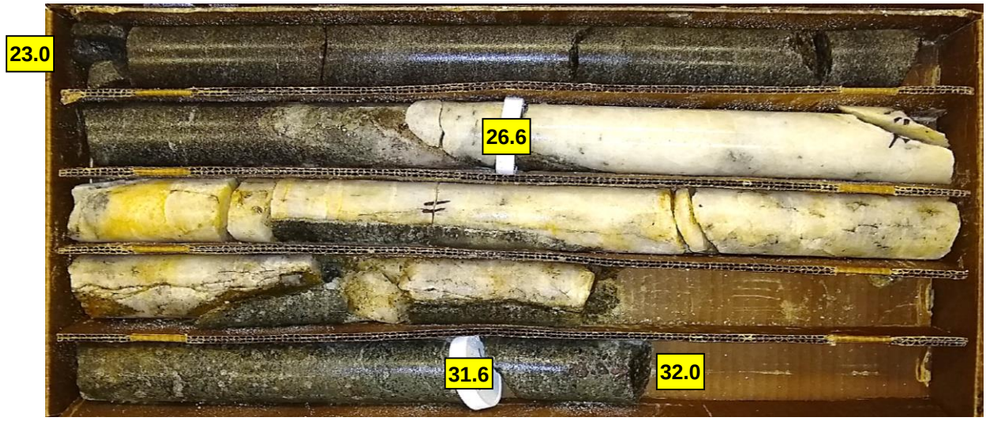
WBS 17BP.12.R.78	**TIP** N/A	**COUNTY** IREDELL	**GEOLOGIST** Barrera, P.	
SITE DESCRIPTION Bridge No. 254 on SR 1512 (Wood Bridge Road) over Third Creek				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 14+00	**OFFSET** 8 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 855.1 ft	**TOTAL DEPTH** 46.6 ft	**NORTHING** 752,805	**EASTING** 1,414,449	**24 HR.** 3.5
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 82% 04/23/2021		**DRILL METHOD** SPT Core Boring	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 08/24/21	**COMP. DATE** 08/25/21	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 23.6 ft			

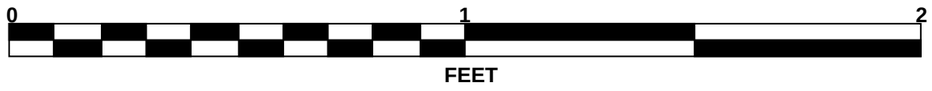
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft) / DEPTH (ft)
832.1											Begin Coring @ 23.0 ft
	832.1	23.0	3.6	0:54/0.6 2:07/1.0 2:41/1.0 2:55/1.0	(2.8) 78%	(2.3) 64%		(2.6) 76%	(2.4) 71%		832.1 **CRYSTALLINE ROCK** 23.0 Black with White, Very Slightly Weathered, Hard to Very Hard, BIOTITE GNEISS, Close to Moderately Close Fracture Spacing Joints at 10 degrees to 20 degrees GSI=70-80
	828.5	26.6	5.0	2:49/1.0 3:32/1.0 4:02/1.0 5:28/1.0 3:20/1.0	(5.0) 100%	(3.6) 72%		(4.3) 100%	(2.6) 60%		828.7 26.4 White with Gray, Moderately to Very Slightly Weathered, Very Hard, Quartz-Rich GRANITIC ROCK Intrusion, Very Close to Close Fracture Spacing 824.4 30.7
	823.5	31.6	5.0	2:37/1.0 3:40/1.0 3:09/1.0 2:21/1.0 3:14/1.0	(2.8) 56%	(2.4) 48%		(8.3) 79%	(7.2) 69%		Note: AMPHIBOLITE comprises half of core in last 0.9' Majority of joints at 10 degrees to 20 degrees One near vertical joint in last 0.9' GSI=50-60
	818.5	36.6	5.0	3:33/1.0 3:15/1.0 3:00/1.0 3:43/1.0 4:21/1.0	(5.0) 100%	(4.3) 86%					Very Dark Green and White, Very Slightly Weathered to Fresh, Hard to Very Hard, AMPHIBOLITE with Garnet, Close to Moderately Close Fracture Spacing Joints at 10 degrees to 20 degrees GSI=60-70
	813.5	41.6	5.0	3:58/1.0 5:09/1.0 2:40/1.0 2:49/1.0 3:02/1.0	(5.0) 100%	(5.0) 100%		(5.4) 100%	(5.4) 100%		813.9 41.2 Gray with Black and White, Fresh, Very Hard, BIOTITE GNEISS, Wide Fracture Spacing No natural fractures GSI=80-90
	808.5	46.6									808.5 46.6 Boring Terminated at Elevation 808.5 ft in Crystalline Rock: BIOTITE GNEISS

NCDOT CORE SINGLE BRIDGE 254 GINT LOGS.GPJ NC_DOT.GDT 9/15/21

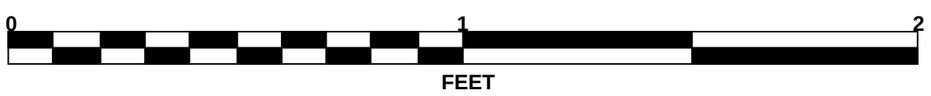
CORE PHOTOGRAPHS

B2-B
BOXES 1 & 2: 23.0 - 41.6 FEET





B2-B
BOX 3: 41.6 - 46.6 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 17BP.12.R.78	**TIP** N/A	**COUNTY** IREDELL	**GEOLOGIST** Barrera, P.	
SITE DESCRIPTION Bridge No. 254 on SR 1512 (Wood Bridge Road) over Third Creek				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 14+36	**OFFSET** 6 ft LT	**ALIGNMENT** -L-	**0 HR.** 12.6
COLLAR ELEV. 865.5 ft	**TOTAL DEPTH** 28.4 ft	**NORTHING** 752,840	**EASTING** 1,414,432	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 82% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 09/02/21	**COMP. DATE** 09/02/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
870										ELEV. (ft) DEPTH (ft)
865										865.5 GROUND SURFACE 0.0
										ROADWAY EMBANKMENT
										Orange and Red, Clayey SILT, Trace Mica
860	862.0	3.5	2	2	3	5		M		
	857.0	8.5	2	2	2	4		M		
855										
	852.0	13.5	1	1	3	4		M		851.6 13.9
850										**ALLUVIAL**
	847.0	18.5	WOH	1	1	2		W		Dark Brown, Silty CLAY, Trace Mica
845										848.1 17.4
										Dark Brown, Clayey Coarse to Fine SAND, Little Mica
	842.0	23.5	2	2	6	8		W		842.0 23.5
840										Red, Orange, and Brown, Fine to Coarse SAND and Gravel (Old Stream Bed Material)
	839.2	26.3	100/0.3			100/0.3				Note: Blow Count Influenced by Gravel 840.0 25.5
	837.1	28.4	60/0.0			60/0.0				**WEATHERED ROCK**
										Dark Gray and Brown, BIOTITE GNEISS 837.1 28.4
										Boring Terminated with Standard Penetration Test Refusal at Elevation 837.1 ft on Crystalline Rock: BIOTITE GNEISS

SHEET 18

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 17BP.12.R.78	**TIP** N/A	**COUNTY** IREDELL	**GEOLOGIST** Barrera, P.	
SITE DESCRIPTION Bridge No. 254 on SR 1512 (Wood Bridge Road) over Third Creek				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 14+36	**OFFSET** 6 ft RT	**ALIGNMENT** -L-	**0 HR.** 14.1
COLLAR ELEV. 865.4 ft	**TOTAL DEPTH** 29.0 ft	**NORTHING** 752,841	**EASTING** 1,414,444	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 82% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 09/03/21	**COMP. DATE** 09/03/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
870										ELEV. (ft) DEPTH (ft)
865										865.4 GROUND SURFACE 0.0
										ROADWAY EMBANKMENT
										Red, Orange, and Brown, Clayey SILT, Trace Mica
860	861.9	3.5	1	2	2	4		M		
	856.9	8.5	2	2	2	4		M		
855										
	851.9	13.5	1	2	2	4		W		851.6 13.8
850										**ALLUVIAL**
	846.9	18.5	WOH	1	1	2		W		Brown, Silty CLAY, Trace Mica
845										848.2 17.2
										Brown and Red, Clayey Coarse to Fine SAND
	841.9	23.5	44	21	79/0.4	100/0.9				843.9 21.5
840										**RESIDUAL**
	836.9	28.5	100/0.3			100/0.3				Gray and Brown, Silty Coarse to Fine SAND 841.4 24.0
	836.4	29.0	60/0.0			60/0.0				**WEATHERED ROCK**
										Dark Gray with White, BIOTITE GNEISS 836.4 29.0
										Boring Terminated with Standard Penetration Test Refusal at Elevation 836.4 ft on Crystalline Rock: BIOTITE GNEISS

SITE PHOTOGRAPHS

Bridge No. 254 on SR 1512 (Wood Bridge Road) over Third Creek

View of Bridge 254 Looking Upstation

View Looking Upstream from Bridge 254

View of Bridge 254 Looking Downstation

View Looking Downstream from Bridge 254