REFERENCE: U-4758

PROJECT: 40251

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4758	1	29

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY GUILFORD

PROJECT DESCRIPTION SR 1818 (JOHNSON ST)/ SR 1850 (SANDY RIDGE RD) FROM SR 1820 (SKEET CLUB RD) TO I-40

SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER

CONTENTS

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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PERSONNEL

S&ME PERSONNEL

GEU/ERO PERSONNEL

INVESTIGATED BY S&ME/NCDOT GEU

DRAWN BY C. BRUINSMA, LG

CHECKED BY C. YOUNGBLOOD, LG

SUBMITTED BY C. YOUNGBLOOD, LG

DATE APRIL 2021

NORTH CAROLINA LICENSED SEAL 2031 GEOLOGIST CHRISTINA M BRUINSMA

DocuSigned by:

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4/30/2021 DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
U-4758	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	N/A
	DENSE	30 TO 50	
	VERY DENSE	> 50	
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
OPT - 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
- [X] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] BK-51 (1993)
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

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

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-9 N:837378 E 1700145 ELEV. 813.01 FT (NCDOT 2020)
BM 4 N:837320, E:1700472 ELEV:808.64 FT. (S&ME 2019)
ELEVATION: N/A FEET

NOTES:

F.I.A.D. - FILLED IMMEDIATELY AFTER DRILLING

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
U-4758	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

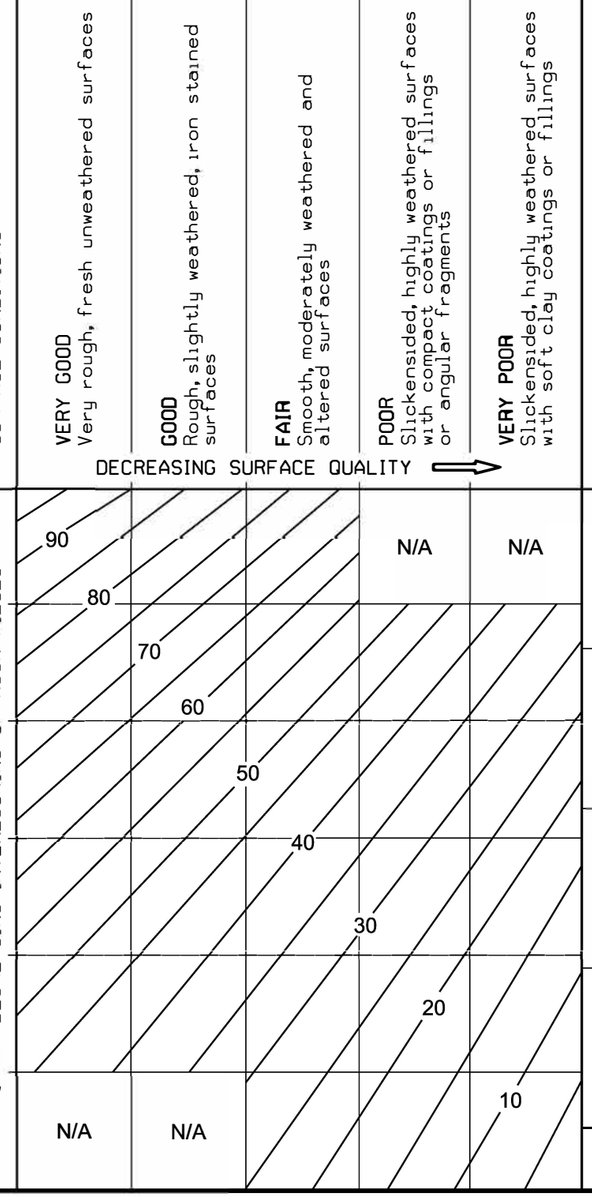
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

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

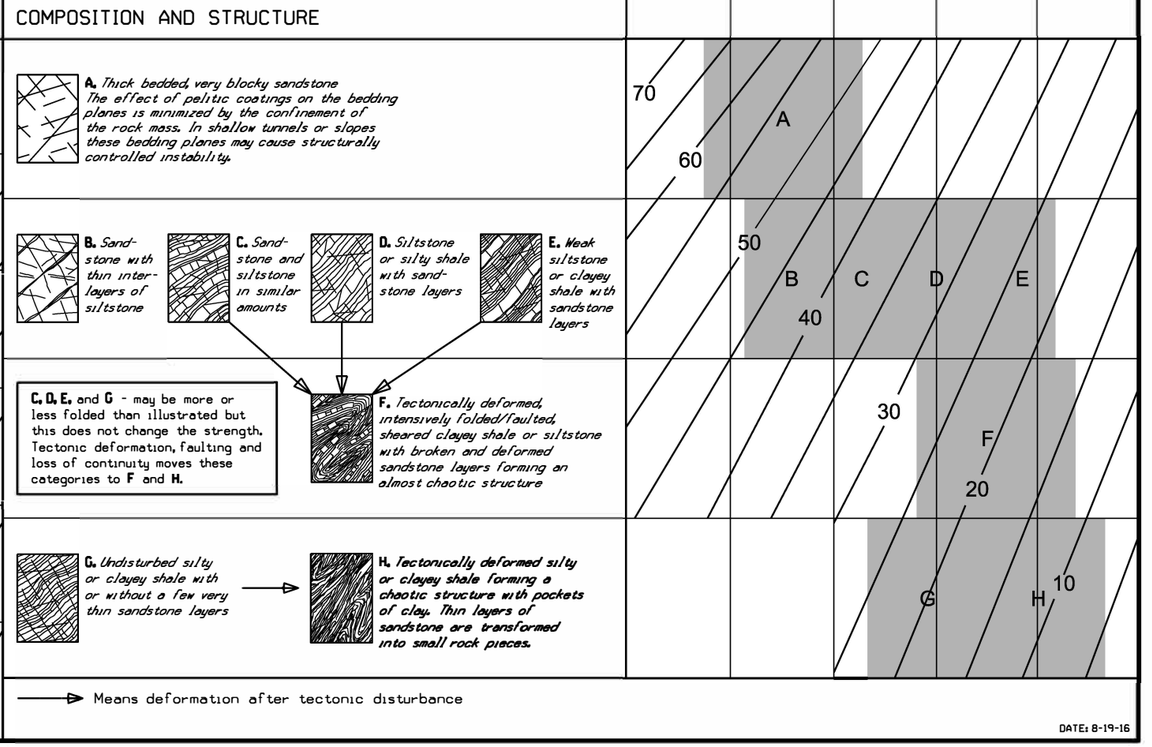


AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

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.
U-4758	3

SITE PLAN

0 60 120

FEET

52

55

WOODS

10' PUBLIC WALKWAY EASEMENT REF PB 139 PG 48

10.00'

60' BST

MEADOW CREEK SUBDIVISION OWNERS' ASSOCIATION, INC.

15' ELECTRIC UTILITY EASEMENT REF PB 139 PG 48

15.00'

EXISTING R/W

DILAPIDATED WW FENCE

EIP

68

69

70

MTL

-EL-

94.00'

60.00'

EB1-A

B1-A

B2-A

-BL- 9

EB2-A

BRIDGE NO 309

EB1-C

B1-C

B2-C

EB2-C

N 47°03' 33.4" E 147.03'

EB1-B

B1-B

B2-B

EB2-B

WEST FORK DEEP RIVER

-BL- 9 PINC 58+72.65

-L- PC Sta. 58+73.25

HIGH POINT CITY LIMITS (IN)

(OUT)

15" VC

MTL GATE

48" WW

EXISTING R/W

16" DI

VARIES

71

72

ABANDONED NO UTILITIES

20.00'

20' UTILITY EASEMENT REF PB 77 PG 55

ALANNA ALEXANDER ZAMBRANO
ROBERT BRANDWOOD

MICHAEL E. O'BRIEN
PARALEE O'BRIEN

BEGIN BRIDGE APPROACH
-L- STA. 54+34.00

BEGIN BRIDGE -L- STA. 54+59.00

END BRIDGE APPROACH
-L- STA. 56+14.00

END BRIDGE -L- STA. 55+89.00

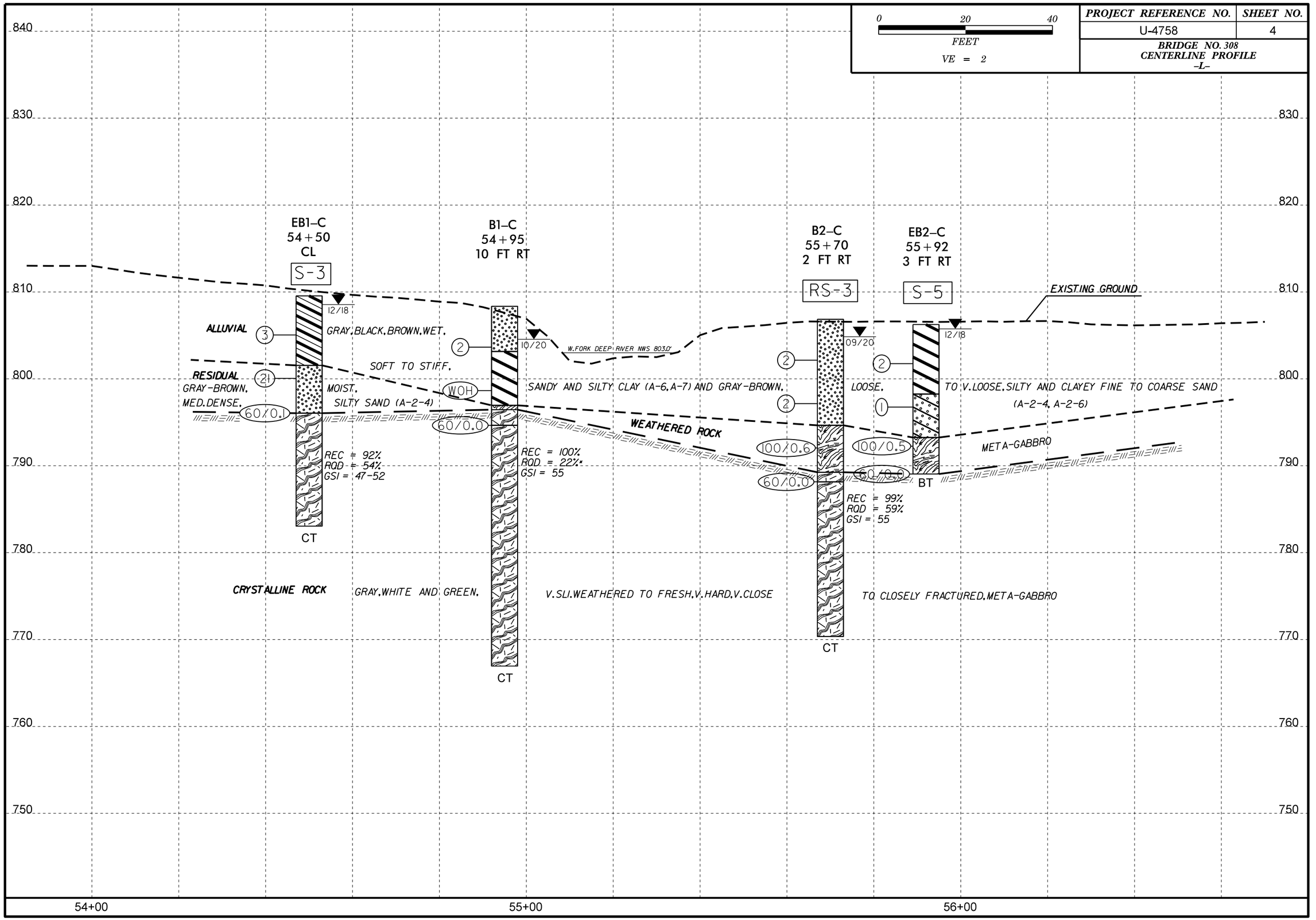
BM4

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
U-4758	4

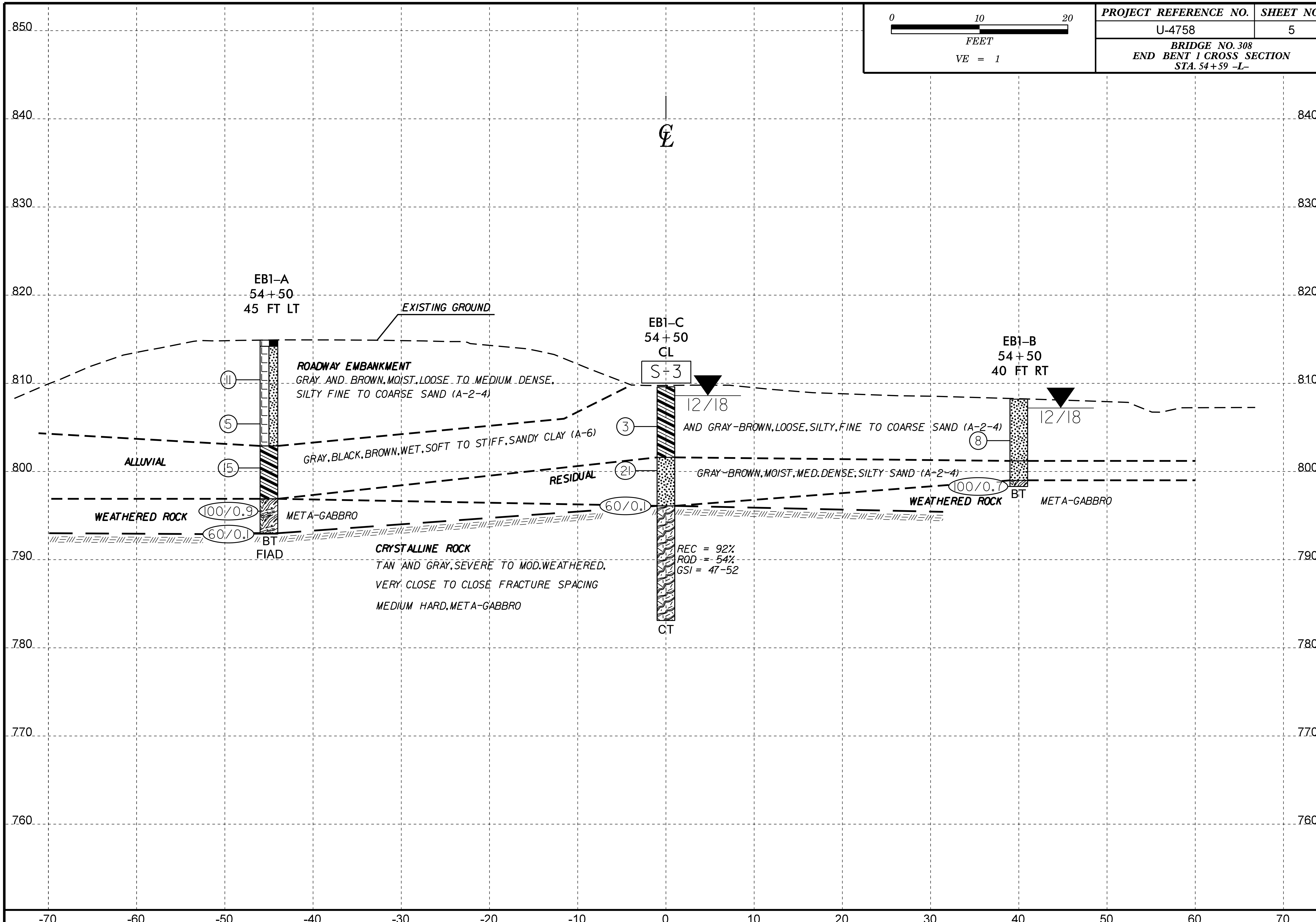
BRIDGE NO. 308
CENTERLINE PROFILE
-L-

0 20 40
FEET
VE = 2



PROJECT REFERENCE NO.	SHEET NO.
U-4758	5

BRIDGE NO. 308
END BENT 1 CROSS SECTION
STA. 54+59 -L-



0 10 20
FEET
VE = 1
EB1-A
54+50
45 FT LT
EB1-C
54+50
CL
EB1-B
54+50
40 FT RT
EXISTING GROUND
S-3
12/18
ROADWAY EMBANKMENT
GRAY AND BROWN,MOIST,LOOSE TO MEDIUM DENSE,
SILTY FINE TO COARSE SAND (A-2-4)
AND GRAY-BROWN,LOOSE,SILTY,FINE TO COARSE SAND (A-2-4)
ALLUVIAL
GRAY,BLACK,BROWN,WET,SOFT TO STIFF,SANDY CLAY (A-6)
RESIDUAL
GRAY-BROWN,MOIST,MED.DENSE,SILTY SAND (A-2-4)
WEATHERED ROCK
META-GABBRO
100/0.9
60/0.1
100/0.7
BT
FIAD
CRYSTALLINE ROCK
TAN AND GRAY,SEVERE TO MOD.WEATHERED,
VERY CLOSE TO CLOSE FRACTURE SPACING
MEDIUM HARD,META-GABBRO
REC = 92%
RQD = 54%
GSI = 47-52
CT
11
5
15
3
21
8
850
840
830
820
810
800
790
780
770
760
-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70

PROJECT REFERENCE NO.	SHEET NO.
U-4758	6

BRIDGE NO. 308
BENT 1 CROSS SECTION
STA. 54+94 -L-

0 10 20
FEET
VE = 1

B1-A
55+08
44 FT LT

B1-C
54+95
10 FT RT

B1-B
54+78
41 FT RT

RS-1

EXISTING GROUND

ALLUVIAL BROWN TO GRAY, WET, COARSE SAND WITH SOME GRAVEL (A-1),

DARK GRAY, WET, V. SOFT, SILTY CLAY (A-7-6)

AND WET, VERY LOOSE, SILTY SAND (A-2-4)

W/ TRACE MICA AND ORGANICS

RESIDUAL GRAY-BROWN, LOOSE, SILTY SAND (A-2-4)

WEATHERED ROCK META-GABBRO

CRYSTALLINE ROCK

GRAY AND WHITE, V. SLI. WEATHERING TO FRESH,

HARD TO V. HARD,

META-GABBRO

V. CLOSE TO MOD. CLOSELY FRACTURED,

*LOW RQD FROM 16.4 TO 26.4 FT DUE TO HORIZONTAL EXPANSION CRACKING

	B1-A	B1-C	B1-B
	1	2	2
	40	10/20	WOH
	100/0.8	WOH	09/20
	100/0.3	60/0.0	6
	100/0.5		60/0.0

REC = 100%
RQD = 22%*
GSI = 55

REC = 96%
RQD = 71%
GSI = 70

BT
FIAD

CT

CT

850 840 830 820 810 800 790 780 770 760

-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70

PROJECT REFERENCE NO.	SHEET NO.
U-4758	7

BRIDGE NO. 308
BENT 2 CROSS SECTION
STA. 54+94 -L-

0 10 20
FEET
VE = 1

850 840 830 820 810 800 790 780 770 760

℄

B2-A
55+43
31 FT LT

B2-C
55+70
2 FT RT
RS-3

B2-B
55+43
26 FT RT
RS-2

EXISTING GROUND

ALLUVIAL
BROWN, SANDY SILT AND SILTY CLAY (A-4, A-7)
AND BROWN COARSE SAND

WITH TRACE MICA AND ORGANICS,
WITH SOME GRAVEL (A-1)

ALLUVIAL
GRAY-BROWN,
WET, LOOSE, SILTY, FINE TO COARSE SAND (A-2-4)

09/20
09/20

0
2
3
54
63
100/0.2

2
2

5
2

RESIDUAL
GRAY, HARD, SANDY SILT (A-4)

SAPROLITIC

WEATHERED ROCK
100/0.6
60/0.0

META-GABBRO
60/0.0

CRYSTALLINE ROCK

RESIDUAL
GRAY-BROWN, HARD,
SANDY SILT (A-4)

CRYSTALLINE ROCK

REC = 99%
RQD = 59%
GSI = 55

CRYSTALLINE ROCK
GRAY, WHITE AND GREEN,
V. SLI. WEATHERED TO FRESH, V. HARD, V. CLOSE
TO CLOSELY FRACTURED, META-GABBRO

REC = 99%
RQD = 76%
GSI = 60

BT
FIAD

CT

CT

-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70

PROJECT REFERENCE NO.	SHEET NO.
U-4758	8

BRIDGE NO. 308
END BENT 2 CROSS SECTION
STA. 55+89 -L-

0 10 20
FEET
VE = 1

850
840
830
820
810
800
790
780
770
760

℄

EB2–A
56+00
45 FT LT

EB2–C
55+92
3 FT RT

EB2–B
56+00
40 FT RT

EXISTING GROUND

ROADWAY EMBANKMENT
GRAY AND RED, MOIST, MEDIUM STIFF, SANDY CLAY (A-6)

S-5
12/18

S-4
12/18

ALLUVIAL
BROWN, MOIST, VERY SOFT TO MEDIUM STIFF,
SANDY CLAY (A-6) WITH TRACE ORGANIC MATTER
GRAY, WET, MEDIUM DENSE, CLAYEY FINE TO COARSE SAND (A-2-6)
TRACE GRAVEL, TRACE ORGANIC MATTER

RESIDUAL
GRAY, MOIST, VERY DENSE, FINE TO
COARSE SAND (A-3) WITH TRACE ROCK FRAG.

WEATHERED ROCK
META-GABBRO

RESIDUAL
GRAY, MOIST, VERY DENSE, FINE
TO COARSE, SILTY SAND (A-2-4)
WITH ROCK FRAG.

BT
FIAD

CT

WEATHERED ROCK

CRYSTALLINE ROCK
TAN AND GRAY, SLIGHTLY TO MOD. WEATHERED,
CLOSE TO MOD. CLOSE FRACTURE SPACING,
MEDIUM HARD, META-GABBRO

REC = 91%
RQD = 72%
GSI = 49-54

BT

CRYSTALLINE ROCK
META-GABBRO

-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Bhuiyan, A.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 54+50	**OFFSET** 45 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 814.9 ft	**TOTAL DEPTH** 22.0 ft	**NORTHING** 837,278	**EASTING** 1,700,054	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME9978 CME-750 74% 12/19/2018		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Marlowe, J.	**START DATE** 12/12/18	**COMP. DATE** 12/12/18	**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)
815										814.9 GROUND SURFACE 0.0
										814.2 **ROADWAY EMBANKMENT** (PAVEMENT) 0.7
810	811.4	3.5	7	6	5	11		M		LOOSE TO MED. DENSE, GRAY AND BROWN, SILTY FINE TO COARSE SAND, A-2-4
805	806.4	8.5	2	3	2	5		M		802.9 12.0
800	801.4	13.5	1	6	9	15		W		**ALLUVIAL** STIFF, GRAY AND BLACK, SANDY CLAY, A-6
795	796.4	18.5	44	56/0.4		100/0.9				796.9 18.0 **WEATHERED ROCK** (META-GABBRO)
	793.0	21.9	60/0.1			60/0.1				793.0 21.9 792.9 22.0 **CRYSTALLINE ROCK** (META-GABBRO) Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 792.9 ft IN CRYSTALLINE ROCK (META-GABBRO)

NCDOT BORE DOUBLE U4758_GEO_BRDG0308.GPJ NC_DOT.GDT 4/22/21

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Bhuiyan, A.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. EB1-C	**STATION** 54+50	**OFFSET** CL	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 809.6 ft	**TOTAL DEPTH** 26.5 ft	**NORTHING** 837,245	**EASTING** 1,700,085	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE SME0593 CME-550X 86% 05/01/2019		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Marlowe, J.	**START DATE** 12/18/18	**COMP. DATE** 12/18/18	**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)
810										809.6 GROUND SURFACE	0.0
	806.1	3.5	1	2	1	3	S-3	27%		**ALLUVIAL** SOFT, RED AND BROWN, SANDY CLAY, A-6	
805											
	801.1	8.5	2	4	17	21		M		801.6 **RESIDUAL** MEDIUM DENSE, BROWN, SILTY FINE TO COARSE SAND, A-2-4	8.0
800											
	796.2	13.4	60/0.1			60/0.1				796.1 **CRYSTALLINE ROCK** TAN AND GRAY , META-GABBRO REC = 92% RQD = 54% GSI = 47-52	13.5
795											
790											
785										783.1 Boring Terminated at Elevation 783.1 ft IN CRYSTALLINE ROCK (META-GABBRO)	26.5

GEOTECHNICAL BORING REPORT
CORE LOG

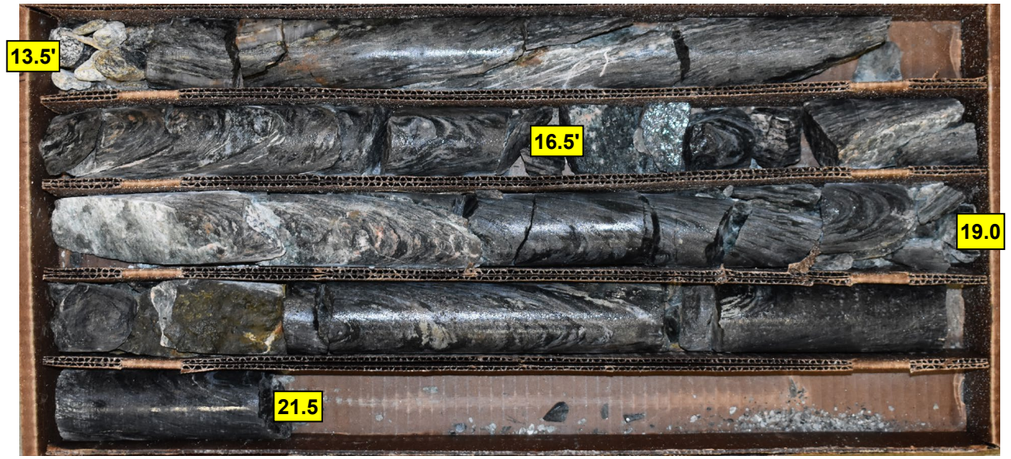
WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Bhuiyan, A.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. EB1-C	**STATION** 54+50	**OFFSET** CL	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 809.6 ft	**TOTAL DEPTH** 26.5 ft	**NORTHING** 837,245	**EASTING** 1,700,085	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE SME0593 CME-550X 86% 05/01/2019		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Marlowe, J.	**START DATE** 12/18/18	**COMP. DATE** 12/18/18	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 13.0 ft			

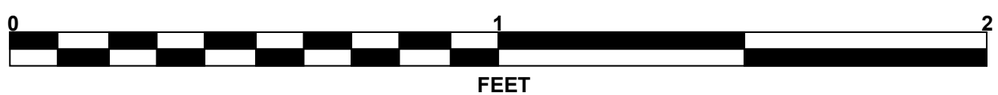
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
796.1											Begin Coring @ 13.5 ft	
795	796.1	13.5	3.0	3:56/1.0 2:32/1.0 2:41/1.0	(2.6) 87%	(1.1) 37%		(11.9) 92%	(7.0) 54%		796.1 **CRYSTALLINE ROCK** TAN AND GRAY, SEVERE TO MODERATELY WEATHERED, VERY CLOSE TO CLOSE FRACTURE SPACING, MEDIUM HARD, META-GABBRO REC = 92% RQD = 54% GSI = 47-52	13.5
	793.1	16.5	5.0	2:15/1.0 1:57/1.0 2:25/1.0 2:18/1.0 2:01/1.0	(4.8) 96%	(1.7) 34%						
790	788.1	21.5	5.0	2:01/1.0 2:42/1.0 2:02/1.0 2:14/1.0 2:25/1.0	(4.5) 90%	(4.2) 84%						
785	783.1	26.5									783.1 Boring Terminated at Elevation 783.1 ft IN CRYSTALLINE ROCK (META-GABBRO)	26.5

CORE PHOTOGRAPHS

EB1-C

BOXES 1 & 2: 13.5 - 26.5 FEET





GEOTECHNICAL BORING REPORT
BORE LOG

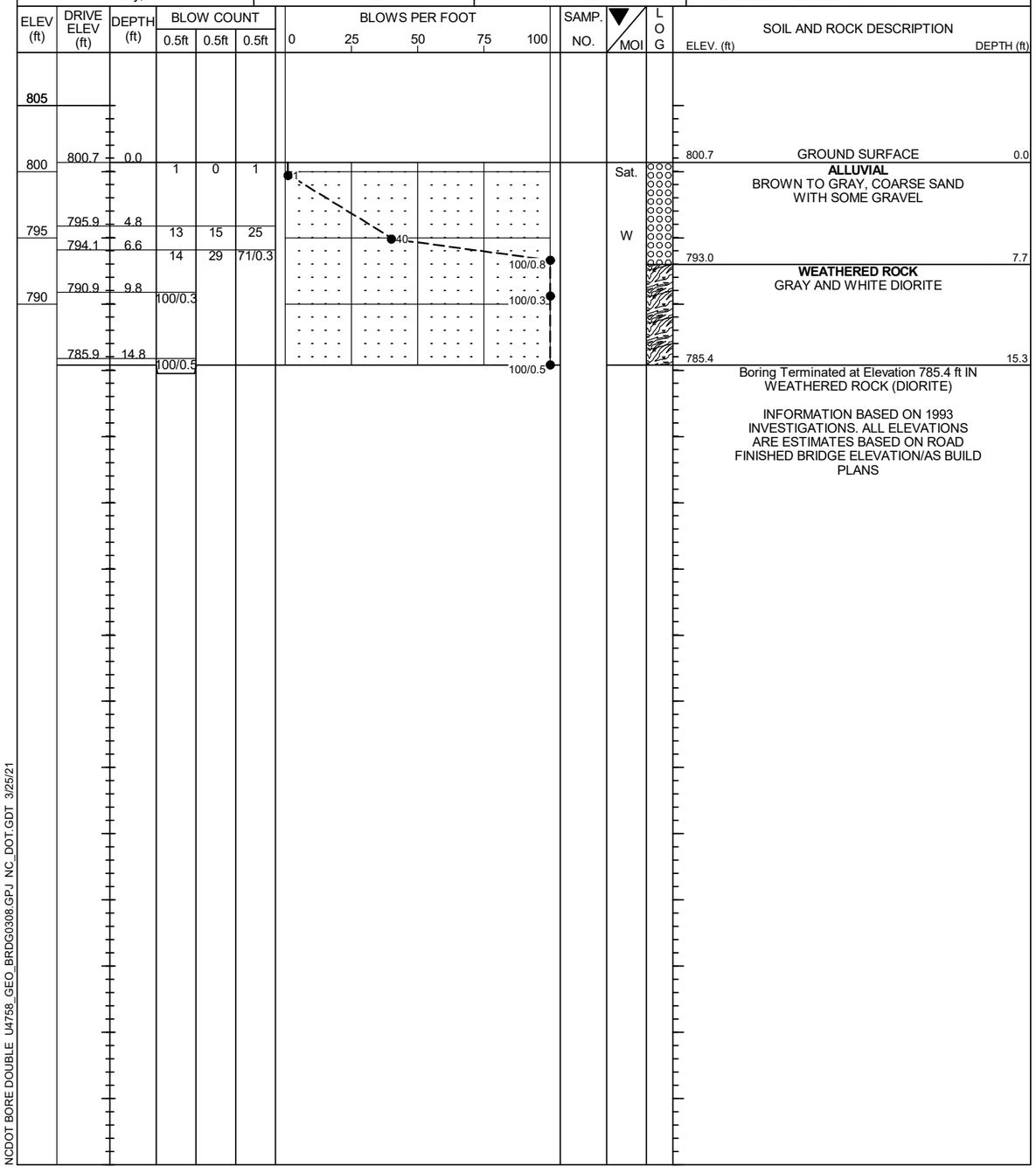
WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Bhuiyan, A.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 54+50	**OFFSET** 40 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 808.2 ft	**TOTAL DEPTH** 9.8 ft	**NORTHING** 837,216	**EASTING** 1,700,112	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE SME0593 CME-550X 86% 05/01/2019		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER Marlowe, J.	**START DATE** 12/19/18	**COMP. DATE** 12/19/18	**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)
810											
										808.2 GROUND SURFACE	0.0
										ALLUVIAL LOOSE, GRAY AND BROWN, SILTY FINE TO COARSE SAND, A-2-4	
805	804.5	3.7	1	3	5	8		Sat.		801.2	7.0
800	799.5	8.7	12	11	89/0.2	100/0.7				**RESIDUAL** 799.0 LOOSE, GRAY AND BROWN, SILTY SAND, A-2-4 798.3	9.2 9.9
										WEATHERED ROCK (META-GABBRO) Boring Terminated at Elevation 798.4 ft IN WEATHERED ROCK (META-GABBRO)	

NCDOT BORE DOUBLE U4758_GEO_BRDG0308.GPJ NC_DOT.GDT 3/25/21

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Sanderson, A.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 55+08	**OFFSET** 44 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 800.7 ft	**TOTAL DEPTH** 15.3 ft	**NORTHING** 837,317	**EASTING** 1,700,098	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE GEU BK-51 1993		**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic
DRILLER Conley, H	**START DATE** 02/03/93	**COMP. DATE** 02/03/93	**SURFACE WATER DEPTH** N/A	



NCDOT BORE DOUBLE U4758_GEO_BRDG0308.GPJ NC_DOT.GDT 3/25/21

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Jones, A. N.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. B1-C	**STATION** 54+95	**OFFSET** 10 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 808.4 ft	**TOTAL DEPTH** 41.4 ft	**NORTHING** 387,268	**EASTING** 1,700,125	**24 HR.** 3.8
DRILL RIG/HAMMER EFF./DATE RFC0074 CME-55 80% 03/08/2019		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Pinter, D. G.	**START DATE** 09/03/20	**COMP. DATE** 09/30/20	**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)
810											
										808.4 GROUND SURFACE	0.0
										ALLUVIAL BROWN AND GRAY, VERY LOOSE, SILTY SAND (A-2-4) W/ TRACE MICA	
805	804.7	3.7	1	1	1	2		Sat.		803.2	5.2
										DARK GRAY, V. SOFT, SILTY CLAY (A-7-6)	
800	799.7	8.7	WOH	WOH	WOH	WOH		W			
										797.0	11.4
										796.5 **WEATHERED ROCK**	11.9
795	794.7	13.7	60/0.0							794.7 GNEISS/META-GABBRO	13.7
										CRYSTALLINE ROCK GRAY, WHITE, BLACK, GNEISS	
790										**CRYSTALLINE ROCK** GRAY AND WHITE, META-GABBRO	
										REC=100% RQD=22% GSI = 55	
785											
780											
775											
770										767.0	41.4
										Boring Terminated at Elevation 767.0 ft IN CRYSTALLINE ROCK (META-GABBRO)	

NCDOT BORE DOUBLE U4758_GEO_BRDG0308.GPJ NC_DOT.GDT 3/25/21

GEOTECHNICAL BORING REPORT
CORE LOG

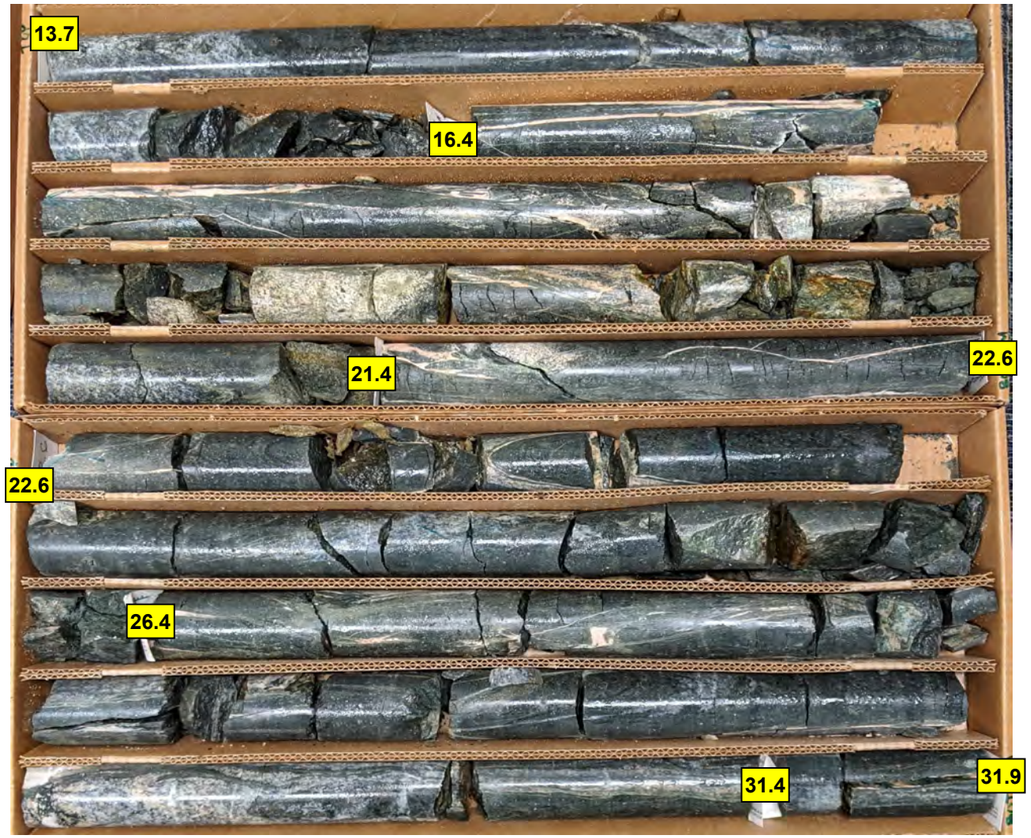
WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Jones, A. N.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. B1-C	**STATION** 54+95	**OFFSET** 10 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 808.4 ft	**TOTAL DEPTH** 41.4 ft	**NORTHING** 387,268	**EASTING** 1,700,125	**24 HR.** 3.8
DRILL RIG/HAMMER EFF./DATE RFC0074 CME-55 80% 03/08/2019		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Pinter, D. G.	**START DATE** 09/03/20	**COMP. DATE** 09/30/20	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 27.7 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)
794.66											Begin Coring @ 13.7 ft	
	794.7	13.7	2.7	*N=60/0.0* 1:32/0.7 2:01/1.0 1:44/1.0	(2.7) 100%	(2.2) 81%		(27.7) 100%	(6.1) 22%		794.7 **CRYSTALLINE ROCK** GRAY AND WHITE, V. SLI. WEATHERING TO FRESH, HARD TO V. HARD,V. CLOSE TO MOD. CLOSELY FRACTURED, META-GABBRO	13.7
	792.0	16.4	5.0	2:15/1.0 2:10/1.0 2:25/1.0 2:22/1.0 2:48/1.0	(5.0) 100%	(0.0) 0% EXPANSION JOINTS					LOW RQD FROM 16.4 TO 26.4 FT DUE TO HORIZONTAL EXPANSION CRACKING	
790	787.0	21.4	5.0	2:00/1.0 2:32/1.0 2:28/1.0 2:36/1.0 2:26/1.0	(5.0) 100%	(0.0) 0% EXPANSION JOINTS					GSI = 55	
785	782.0	26.4	5.0	2:06/1.0 2:19/1.0 2:17/1.0 2:28/1.0 2:14/1.0	(5.0) 100%	(0.0) 0% EXPANSION JOINTS						
780	777.0	31.4	5.0	2:06/1.0 2:18/1.0 1:48/1.0 1:46/1.0 2:14/1.0	(5.0) 100%	(0.0) 0%						
775	772.0	36.4	5.0	2:18/1.0 1:49/1.0 2:09/1.0 2:30/1.0 2:18/1.0	(5.0) 100%	(4.1) 82%						
770	767.0	41.4									767.0 Boring Terminated at Elevation 767.0 ft IN CRYSTALLINE ROCK (META-GABBRO)	41.4

NCDOT CORE SINGLE U4758_GEO_BRDG0308.GPJ NC_DOT.GDT 3/25/21

CORE PHOTOGRAPHS

B1-C
BOXES 1 & 2: 13.7 - 31.9 FEET



0 1 2
FEET

B1-C
BOXES 3: 31.9 - 41.4 FEET

0 1 2
FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Jones, A. N.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 54+78	**OFFSET** 41 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 807.9 ft	**TOTAL DEPTH** 31.6 ft	**NORTHING** 837,234	**EASTING** 1,700,134	**24 HR.** 2.8
DRILL RIG/HAMMER EFF./DATE RFC0074 CME-55 80% 03/08/2019		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Pinter, D. G.	**START DATE** 09/02/20	**COMP. DATE** 09/03/20	**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)
810										
	807.9	0.0	WOH	1	1	2		M		807.9 / 0.0 GROUND SURFACE
805										**ALLUVIAL** BROWN TO GRAY, V. LOOSE TO LOOSE, SILTY SAND (A-2-4) W/ TRACE MICA AND ORGANICS
	804.1	3.8	WOH	WOH	WOH	0		Sat.		
800										800.4 / 7.5 **RESIDUAL** GRAY, LOOSE, SILTY SAND (A-2-4) W/ TRACE MICA, SAPROLITIC
	799.1	8.8	1	3	3	6		Sat.		
795										795.9 / 12.0 **CRYSTALLINE ROCK** META-GABBRO GRAY, BLACK AND WHITE, META-GABBRO REC = 95% RQD = 71% GSI = 70
	794.1	13.8	60/0.0			60/0.0				794.1 / 13.8
790										
785							RS-1			
780										776.3 / 31.6 Boring Terminated at Elevation 776.3 ft IN CRYSTALLINE ROCK (GNEISS)

NCDOT BORE DOUBLE U4758_GEO_BRDG0308.GPJ NC_DOT.GDT 4/29/21

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Jones, A. N.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 54+78	**OFFSET** 41 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 807.9 ft	**TOTAL DEPTH** 31.5 ft	**NORTHING** 837,234	**EASTING** 1,700,134	**24 HR.** 2.8
DRILL RIG/HAMMER EFF./DATE RFC0074 CME-55 80% 03/08/2019		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Pinter, D. G.	**START DATE** 09/02/20	**COMP. DATE** 09/03/20	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 17.8 ft			

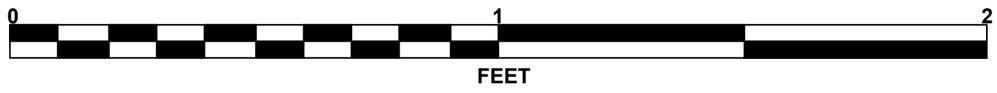
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft) / DEPTH (ft)
794.08											Begin Coring @ 13.8 ft
	794.1	13.8	2.8	*N=60/0.0* 0:55/0.8 1:17/1.0 1:36/1.0	(2.6) 93%	(2.0) 71%		(17.0) 96%	(12.7) 71%		794.1 / 13.8 GRAY, BLACK, WHITE, V. SLIGHT WEATHERING TO FRESH, HARD TO VERY HARD, CLOSE TO MOD. CLOSELY FRACTURED, META-GABBRO W/ WEATHERED ZONE FROM 20.5-21.5 FEET GSI=70
790	791.3	16.6	5.0	1:25/1.0 1:58/1.0 1:50/1.0 1:39/1.0 1:43/1.0	(4.4) 88%	(2.0) 40%					
	786.3	21.6	5.0	1:24/1.0 2:29/1.0 1:31/1.0 1:59/1.0 1:37/1.0	(5.0) 100%	(4.6) 92%	RS-1				
785	781.3	26.6	5.0	2:35/1.0 2:13/1.0 2:16/1.0 2:32/1.0 2:41/1.0	(5.0) 100%	(4.1) 82%					
780	776.3	31.6									776.3 / 31.6 Boring Terminated at Elevation 776.4 ft IN CRYSTALLINE ROCK (GNEISS)

NCDOT CORE SINGLE U4758_GEO_BRDG0308.GPJ NC_DOT.GDT 3/25/21

CORE PHOTOGRAPHS

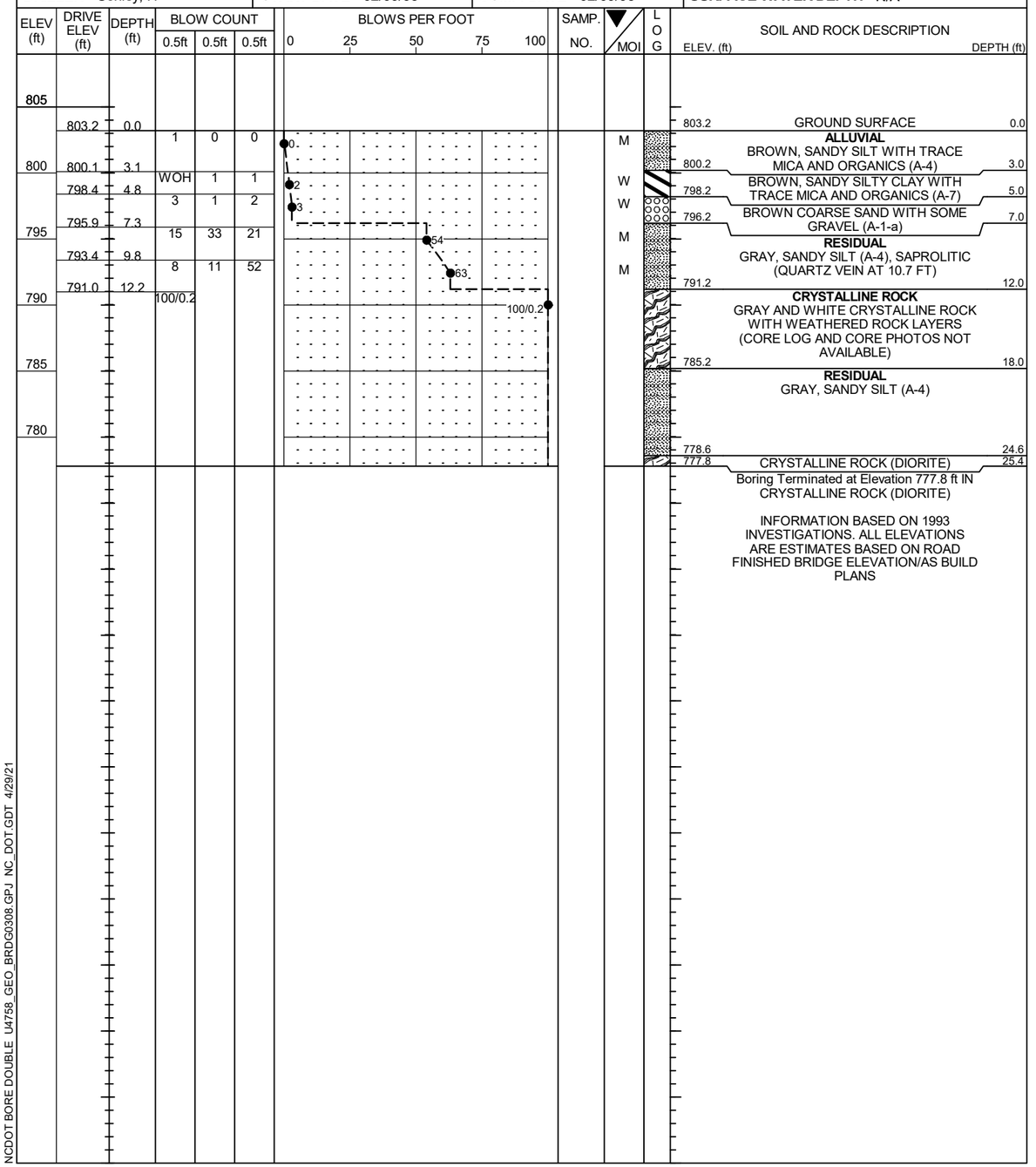
B1-B

BOXES 1 & 2: 13.8 - 31.5 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Sanderson, A.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 55+43	**OFFSET** 31 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 803.2 ft	**TOTAL DEPTH** 25.4 ft	**NORTHING** 837,331	**EASTING** 1,700,132	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE GEU BK-51 1993		**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic
DRILLER Conley, H	**START DATE** 02/09/93	**COMP. DATE** 02/09/93	**SURFACE WATER DEPTH** N/A	



NCDOT BORE DOUBLE U4758_GEO_BRDG0308.GPJ NC_DOT.GDT 4/29/21

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Jones, A. N.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. B2-C	**STATION** 55+70	**OFFSET** 2 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 806.9 ft	**TOTAL DEPTH** 36.5 ft	**NORTHING** 837,325	**EASTING** 1,700,174	**24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE RFC0074 CME-55 80% 03/08/2019		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Pinter, D. G.	**START DATE** 09/08/20	**COMP. DATE** 09/08/20	**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)
										806.9	0.0
										ALLUVIAL GRAY-TAN, V. LOOSE, SILTY SAND (A-2-4) W. TRACE MICA AND ORGANICS	
	803.2	3.7	1	1	1	2		M			
	798.2	8.7	1	1	1	2		Sat.			
										794.7	12.2
	793.2	13.7	36	42	58/0.1	100/0.6				**WEATHERED ROCK** GRAY AND WHITE,META-GABBRO	
										789.3	17.6
	788.2	18.7	60/0.0			60/0.0				788.2 **CRYSTALLINE ROCK** META-GABBRO GRAY, GREEN AND WHITE, META-GABBRO REC = 99% RQD = 59% GSI = 55	18.7
							RS-3				
										770.4	36.5
										Boring Terminated at Elevation 770.4 ft IN CRYSTALLINE ROCK (META-GABBRO)	

NCDOT BORE DOUBLE U4758_GEO_BRDG0308.GPJ NC_DOT.GDT 4/29/21

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Jones, A. N.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. B2-C	**STATION** 55+70	**OFFSET** 2 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 806.9 ft	**TOTAL DEPTH** 36.5 ft	**NORTHING** 837,325	**EASTING** 1,700,174	**24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE RFC0074 CME-55 80% 03/08/2019		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Pinter, D. G.	**START DATE** 09/08/20	**COMP. DATE** 09/08/20	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 17.8 ft			

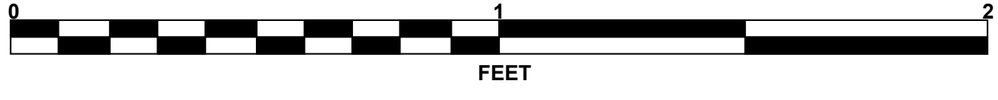
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
788.21											Begin Coring @ 18.7 ft	
	788.2	18.7	2.8	*N=60/0.0* 1:19/0.8 1:20/1.0 1:28/1.0	(2.6) 93%	(0.4) 14%		(17.6) 99%	(10.5) 59%		788.2 GRAY, GREEN AND WHITE, V. SLIGHTLY WEATHERED TO FRESH, CLOSELY FRACTURED, META-GABBRO	18.7
785	785.4	21.5	5.0	1:02/1.0 1:37/1.0 1:05/1.0 1:28/1.0 1:55/1.0	(5.0) 100%	(0.6) 12%					GSI = 55	
780	780.4	26.5	5.0	1:19/1.0 1:06/1.0 1:14/1.0 1:17/1.0 1:13/1.0	(5.0) 100%	(5.0) 100%						
775	775.4	31.5	5.0	1:31/1.0 1:10/1.0 1:14/1.0 1:18/1.0 1:18/1.0	(5.0) 100%	(4.5) 90%	RS-3					
	770.4	36.5									770.4 Boring Terminated at Elevation 770.4 ft IN CRYSTALLINE ROCK (META-GABBRO)	36.5

NCDOT CORE SINGLE U4758_GEO_BRDG0308.GPJ NC_DOT.GDT 3/25/21

CORE PHOTOGRAPHS

B2-C

BOXES 1 & 2: 18.7 - 36.5 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Jones, A. N.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 55+43	**OFFSET** 26 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 807.9 ft	**TOTAL DEPTH** 32.1 ft	**NORTHING** 837,289	**EASTING** 1,700,171	**24 HR.** 3.4
DRILL RIG/HAMMER EFF./DATE RFC0074 CME-55 80% 03/08/2019		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Pinter, D. G.	**START DATE** 09/09/20	**COMP. DATE** 09/09/20	**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)
810											
										807.9 GROUND SURFACE	0.0
										806.9 **ALLUVIAL** BROWN, V. SOFT, SANDY SILT (A-4) (TOPSOIL)	1.0
805	803.8	4.1	2	2	3	5		M		GRAY, LOOSE TO V. LOOSE, SILTY SAND (A-2-4) W/ TRACE MICA AND ORGANICS	
800	798.8	9.1	WOH	1	1	2		W			
795	793.8	14.1	60/0.0			60/0.0				794.4	13.5
										793.8 **CRYSTALLINE ROCK** GRAY AND WHITE, GNEISS GRAY AND WHITE, META-GABBRO STRATA REC = 99% STRATA RQD = 76% GSI = 60	14.1
790											
785							RS-2				
780										775.8	32.1
										Boring Terminated at Elevation 775.8 ft IN CRYSTALLINE ROCK (META-GABBRO)	

NCDOT BORE DOUBLE U4758_GEO_BRDG0308.GPJ NC_DOT.GDT 4/29/21

GEOTECHNICAL BORING REPORT
CORE LOG

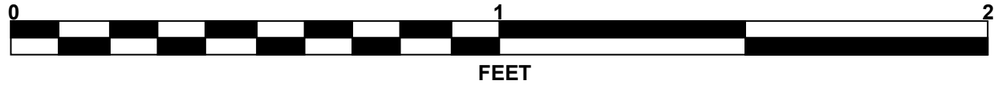
WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Jones, A. N.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 55+43	**OFFSET** 26 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 807.9 ft	**TOTAL DEPTH** 32.1 ft	**NORTHING** 837,289	**EASTING** 1,700,171	**24 HR.** 3.4
DRILL RIG/HAMMER EFF./DATE RFC0074 CME-55 80% 03/08/2019		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Pinter, D. G.	**START DATE** 09/09/20	**COMP. DATE** 09/09/20	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 18.0 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)
793.82											Begin Coring @ 14.1 ft	
	793.8	14.1	3.0	1:33/1.0 N=60/0.0	(2.8) 93%	(1.8) 60%		(17.8) 99%	(13.7) 76%		793.8 GRAY, WHITE AND GREEN, V. SLI. WEATHERED TO FRESH, V. HARD, V. CLOSE TO MOC. CLOSELY FRACTURED, META-GABBRO	14.1
790	790.8	17.1	5.0	1:33/1.0 1:08/1.0 1:36/1.0 1:09/1.0 1:09/1.0 1:18/1.0 1:33/1.0 1:14/1.0	(5.0) 100%	(3.0) 60%					GSI = 60	
785	785.8	22.1	5.0	1:22/1.0 1:16/1.0 1:02/1.0 1:09/1.0 1:13/1.0	(5.0) 100%	(3.9) 78%	RS-2					
780	780.8	27.1	5.0	1:33/1.0 2:06/1.0 2:11/1.0 2:14/1.0 2:03/1.0	(5.0) 100%	(5.0) 100%						
	775.8	32.1									775.8 Boring Terminated at Elevation 775.8 ft IN CRYSTALLINE ROCK (META-GABBRO)	32.1

NCDOT CORE SINGLE U4758_GEO_BRDG0308.GPJ NC_DOT.GDT 3/25/21

B2-B

BOXES 1 & 2: 14.1 - 32.1 FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Bhuiyan, A.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 56+00	**OFFSET** 45 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 814.1 ft	**TOTAL DEPTH** 38.1 ft	**NORTHING** 837,380	**EASTING** 1,700,164	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME0593 CME-550X 86% 05/01/2019		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Marlowe, J.	**START DATE** 12/13/19	**COMP. DATE** 12/13/19	**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)
815										814.1 GROUND SURFACE	0.0
										813.4 **ROADWAY EMBANKMENT** (PAVEMENT)	0.7
										ROADWAY EMBANKMENT MEDIUM STIFF, GRAY AND RED, SANDY CLAY, A-6	
810	811.1	3.0	3	2	3	5		M		806.6 **ALLUVIAL** VERY SOFT TO MEDIUM STIFF, SANDY CLAY WITH TRACE ORGANIC MATTER, A-6	7.5
805	806.1	8.0	1	1	1	2		W			
800	801.1	13.0	1	4	2	6		W		798.1 MEDIUM DENSE, GRAY, CLAYEY FINE TO COARSE SAND, TRACE GRAVEL, TRACE ORGANIC MATTER, A-2-6	16.0
795	796.1	18.0	3	11	18	29		W			
790	791.1	23.0	26	40	33	73		W		792.1 **RESIDUAL** VERY DENSE, GRAY, FINE TO COARSE SAND WITH TRACE ROCK FRAG., A-3	22.0
785	786.1	28.0	52	48/0.4		100/0.9				787.1 **WEATHERED ROCK** (META-GABBRO)	27.0
780	781.1	33.0	24	17	22	39		W		784.6 **RESIDUAL** DENSE, GRAY, SILTY FINE TO COARSE SAND WITH TRACE ROCK FRAG., A-2-4	29.5
	776.1	38.0	60/0.1			60/0.1				776.1 776.0 **CRYSTALLINE ROCK** (META-GABBRO)	38.0 38.1
										Boring Terminated at Elevation 776.0 ft IN CRYSTALLINE ROCK (META-GABBRO)	

WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Bhuiyan, A.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. EB2-C	**STATION** 55+92	**OFFSET** 3 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 806.3 ft	**TOTAL DEPTH** 17.2 ft	**NORTHING** 837,340	**EASTING** 1,700,191	**24 HR.** 0.5
DRILL RIG/HAMMER EFF./DATE SME0593 CME-550X 86% 05/01/2019		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Marlowe, J.	**START DATE** 12/19/18	**COMP. DATE** 12/19/18	**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)
810										806.3 GROUND SURFACE	0.0
										ALLUVIAL VERY SOFT, GRAY, SILTY CLAY, A-7-6	
805	802.8	3.5	1	1	1	2	S-5	33%			
800	797.8	8.5	WOH	WOH	1	1		W		798.3 VERY LOOSE, GRAY, CLAYEY FINE TO COARSE SAND, A-2-6	8.0
795	792.8	13.5	100/0.5			100/0.5				793.3 **WEATHERED ROCK** (META-GABBRO)	13.0
790	789.1	17.2	60/0.0			60/0.0				789.1 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 789.1 ft ON CRYSTALLINE ROCK (META-GABBRO)	17.2

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Bhuiyan, A.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 56+00	**OFFSET** 40 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 805.8 ft	**TOTAL DEPTH** 22.5 ft	**NORTHING** 837,318	**EASTING** 1,700,222	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE SME0593 CME-550X 86% 05/01/2019		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Marlowe, J.	**START DATE** 12/19/18	**COMP. DATE** 12/19/18	**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)
810											
805										805.8 GROUND SURFACE	0.0
	802.3	3.5	1	1	1	2	S-4	37%		**ALLUVIAL** VERY SOFT, GRAY, SILTY CLAY, A-7-6	
800											
	797.3	8.5	WOH	WOH	WOH	0		W		797.8 VERY LOOSE, GRAY, CLAYEY FINE TO COARSE SAND, A-2-6	8.0
795											
	792.9	12.9	60/0.1			60/0.1				792.9	12.9
790										792.8 **CRYSTALLINE ROCK** TAN AND GRAY, META-GABBRO REC = 91% RQD = 72% GSI = 49-54	13.0
785										783.3 Boring Terminated at Elevation 783.3 ft IN CRYSTALLINE ROCK (META-GABBRO)	22.5

NCDOT BORE DOUBLE U4758_GEO_BRDG0308.GPJ NC_DOT.GDT 3/25/21

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 40251.1.1	**TIP** U-4758	**COUNTY** GUILFORD	**GEOLOGIST** Bhuiyan, A.	
SITE DESCRIPTION BRIDGE NO. 308 ON SR 1818 (-L-) OVER WEST FORK DEEP RIVER				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 56+00	**OFFSET** 40 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 805.8 ft	**TOTAL DEPTH** 22.5 ft	**NORTHING** 837,318	**EASTING** 1,700,222	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE SME0593 CME-550X 86% 05/01/2019		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Marlowe, J.	**START DATE** 12/19/18	**COMP. DATE** 12/19/18	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 9.5 ft			

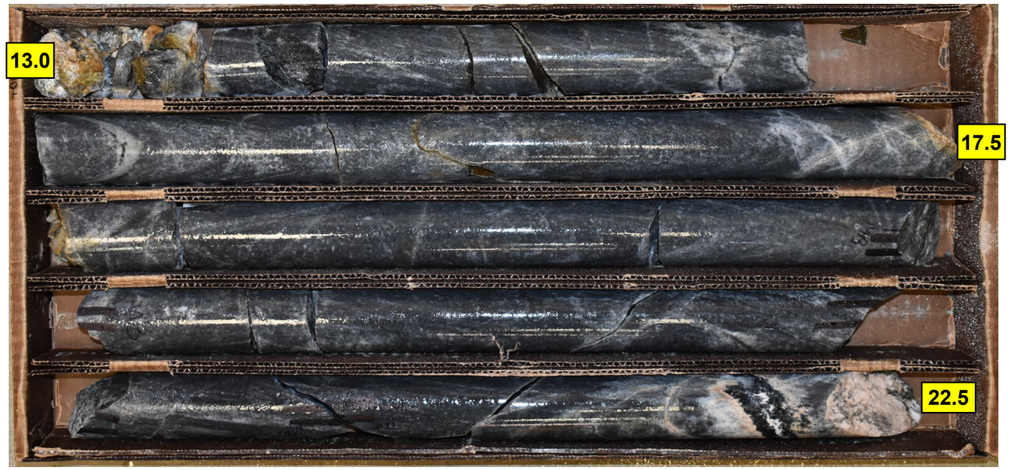
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
792.8											Begin Coring @ 13.0 ft	
790	792.8	13.0	4.5	1:15/0.5 2:50/1.0 3:29/1.0 3:56/1.0 2:29/1.0	(3.6) 80%	(2.2) 49%		(8.6) 91%	(6.8) 72%		792.8 **CRYSTALLINE ROCK** TAN AND GRAY, SLIGHTLY TO MODERTELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, MEDIUM HARD, META-GABBRO REC = 91% RQD = 72% GSI = 49-54	13.0
	788.3	17.5	5.0	4:49/1.0 6:16/1.0 4:26/1.0 4:28/1.0 6:25/1.0	(5.0) 100%	(4.6) 92%						
785	783.3	22.5									783.3 Boring Terminated at Elevation 783.3 ft IN CRYSTALLINE ROCK (META-GABBRO)	22.5

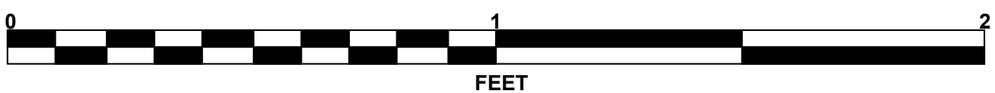
NCDOT CORE SINGLE U4758_GEO_BRDG0308.GPJ NC_DOT.GDT 3/25/21

CORE PHOTOGRAPHS

EB2-B

BOX 1: 13.0 - 22.5 FEET





SUMMARY OF LABORATORY TEST DATA

Soil Classification and Gradation

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:	6235-18-015			Date Report:	2/26/2019
State Project No.:	40251.1.1	County:	Guilford	Date Tested:	2/5-2/19
Federal ID No.:	N/A	TIP No.:	U-4758		
Project Name:	Bridge No. 308 on SR 1818 (Johnson St.) over West Fork Deep River				
Client Name:	ATKINS			Client Address:	Raleigh, NC

Sample No.	Station	Offset	Alignment	Sample Depth (ft)	AASHTO Classification		Total % Passing Sieve #					Total Mortar Fraction (%)				LL	PL	PI	Moist. %
							10	40	60	200	270	Coarse Sand	Fine Sand	Silt	Clay				
S-3	54+50	CL	-L-	2.0-3.0	A-6	(5)	98	89	83	60	-	15	34	31	20	32	19	13	26.8
S-4	56+00	40' RT	-L-	2.0-3.0	A-7-6	(24)	100	99	98	90	-	2	12	41	45	51	28	23	36.7
S-5	55+92	3' RT	-L-	2.0-3.0	A-7-6	(14)	100	96	93	80	-	7	19	35	39	42	25	17	33.2

References / Comments / Deviations: ND=Not Detemined. NP=Non-Plastic.

AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO M145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Mal Krajan, ET		104-01-0703	Stacie Mitchell, PE	Project Manager
Technician Name:	Signature	Certification #	Technical Responsibility:	Position

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAY
MATERIALS & TESTS UNIT
PHYSICAL TESTING LABORATORY

T. I. P. No. U-4758

REPORT ON SAMPLES OF ROCK COMPRESSION

Project	40251.1.1	**County**	Guilford	**Owner**	C.M. Bruinsma
Date: Sampled	9/23/2020	**Received**	10/1/2020	**Reported**	11/5/2020
Sampled from	BR#308 onSR 1818 over West Fork Deep R.		**By**	C. M. Bruinsma	
Submitted by	C. M. Bruinsma			**Standard Specifications**	
Tested By	Michael Dubeau			**Date Tested**	11/5/2020

TEST RESULTS

Proj. Sample No.		RS-1	RS-2	RS-3			
Boring Sample No.		B1-B	B2-B	B2-C			
Diameter	in	1.984	1.984	1.984			
Specimen Height	in	3.681	3.564	3.681			
Area	in^2	3.092	3.092	3.092			
H/D Ratio		1.86	1.80	1.86			
Weight	lbf	1.21	1.08	1.23			
Unit Weight	lbf/ft^3	183.7	169.4	186.8			
Ultimate	lbf	50100	26400	18610			
Ultimate	ksi	16.20	8.55	6.02			
Ultimate Corrected	ksi	16.05	8.43	5.97			
Sec Mod @ 40%	Mpsi	11.43	8.52	11.86			
Station							
Offset							
Alignment							
Depth (ft)		22.30	22.10	31.50			
	to	22.90	23.40	32.30			

cc:

Joshua Law
Physical Testing Engineer

North Carolina Dept. of Transportation
Division of Highways
Materials and Tests
Physical Testing Laboratory

Rock Compression

Lab Number: 0
Project #: 40251.1.1
County: Guilford
Tip ID: U-4758

Structure Description: Br No 308 SR 1818 over..
Test Date: 11/05/2020

Sample No.	Diameter in	Specimen Height in	Area in^2	H/D Ratio	Weight lbf	Unit Weight lbf/ft3	Ultimate lbf	Ultimate ksi	Ultimate (corrected) ksi	40% Ult. Load lbf	Sec Mod @ 40% Mpsi
RS-1	1.9840	3.681	3.0915	1.855	1.21	183.7	50100	16.2	16.05	20000	11.43
RS-2	1.9840	3.564	3.0915	1.796	1.08	169.4	26400	8.55	8.43	10570	8.52
RS-3	1.9840	3.721	3.0915	1.876	1.23	184.8	18610	6.02	5.97	7450	11.86

SITE PHOTOGRAPH

Bridge No. 308 on –L– (SR 1818) over West Fork Deep River

Looking Northeast towards End Bent 2