STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5899	1	18

REFERENCE: U-5899

PROJECT: 44689

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *FORSYTH*

PROJECT DESCRIPTION *FORUM PARKWAY CONNECTOR FROM SR 3955 (FORUM PARKWAY) TO NC 66 (UNIVERSITY PARKWAY) IN RURAL HALL*

SITE DESCRIPTION *BRIDGE NO. 747 ON SR 3955 OVER GRASSY CREEK*

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2	LEGEND (SOIL & ROCK)
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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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NOTES:

1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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RED DOG DRILLING

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DATE *February 2022*

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SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
U-5899	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									GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
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	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	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 / CPT / 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:
- [X] CME-45C
- [ ] 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
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

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

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 204: N898203.1760, E1619929.9670

ELEVATION: 858.32 FEET

NOTES:

F.I.A.D. FILLED IN AFTER DRILLING

TIN FILE "U5899_Merged.tin" WAS USED TO DETERMINE GROUND ELEVATION FOR ALL RETAINING WALL BORINGS

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
U-5899	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

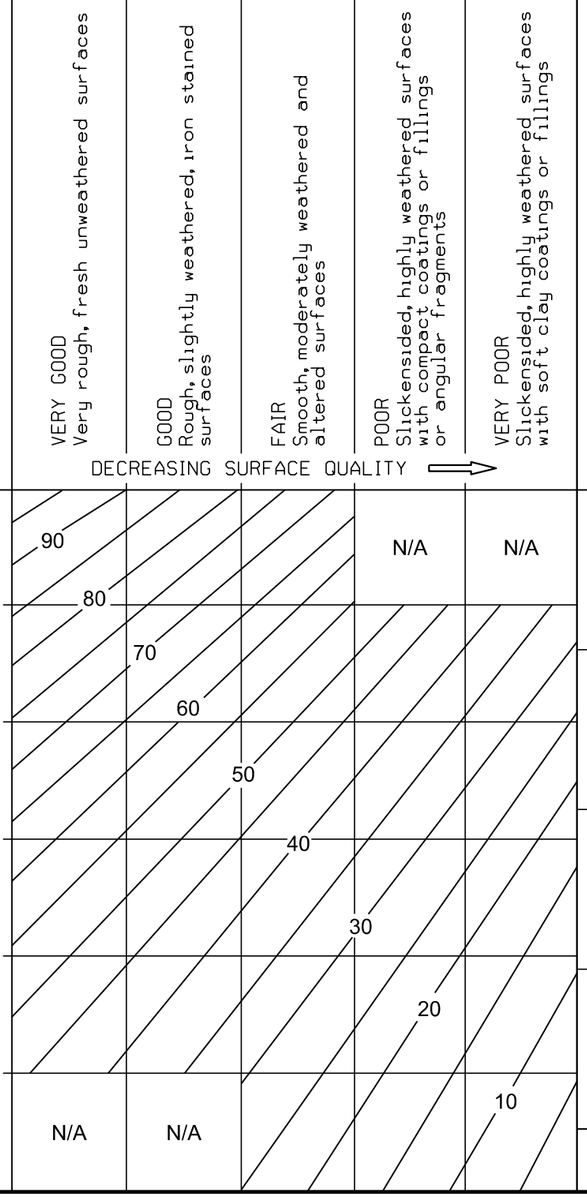
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

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

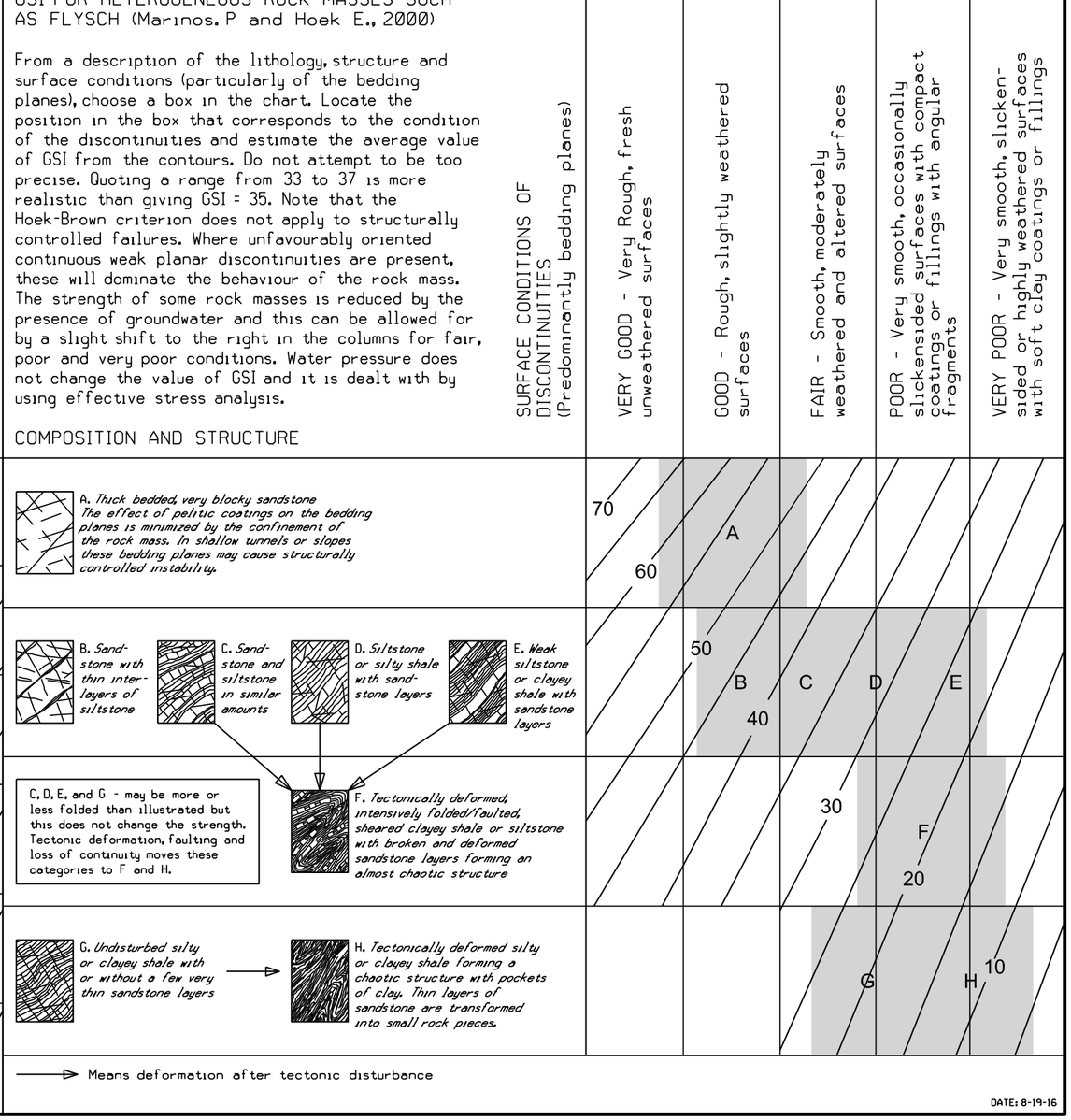


AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

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-5899	3

SITE PLAN

0 40 80
FEET

BRIDGE NO. 747 ON SR 3955
OVER GRASSY CREEK
SKEW = 85°

-Y2- PCC Sta. 15+09.06
-Y5- PT Sta. 19+54.58
-L- PC Sta. 34+50.42
PT Sta. 30+72.53
RW1-1
TYPE III
EB1-A
BI-A
RW2-1
EB2-A
TYPE III
GREU TL-
BRIDGE NO. 747
TYPE III
EB1-B
BI-B
EB2-B
TYPE III
RW2-2
-L- Sta. 33+14.61 =
-Y5- Sta. 19+98.24
△ = 85°46'19.4"
-L- Sta. 31+95.90
-Y2- Sta. 15+72.12
△ = 85°45'13.3"
END OVERLAY
END CONSTRUCTION
-Y2- POC Sta. 16+62.35
NC GRID
NAD 83/95

PROJECT REFERENCE NO.	SHEET NO.
U-5899	4

BRIDGE PROFILE BORINGS PROJECTED ALONG –L–

0 20 40
FEET
VE = 1.0

PROPOSED BRIDGE ℄ STA. 32+73.75 –L–
54" MBT PRESTRESSED CONCRETE GIRDERS
1 @ 116'-6", 1 @ 89'-0" W/4.0' DEEP CAPS
SKEW = 85 DEGREES
–L– GP ELEV. = 890.5'

RW1-1
31+48
35' LT

EB1-A
31+83
31' LT

B1-A
32+86
24' LT

EB2-A
33+75
26' LT

INTERIOR BENT ℄
STA. 32+87.5 –L–

℄ –Y5–

EXIST. RAILROAD ℄
STA. 33+14.6 –L–

25 YR WS
ELEV. = 852.2

100 YR WS
ELEV. = 853.8

PROPOSED MSE WALL

PROPOSED MSE WALL

RW1-1

WATER SURFACE 01/19

RESIDUAL: Red to Yellow to Gray, Medium

Red-Brown to Dark Brown to Gray and Stiff to Stiff, Silty CLAY (A-7-6) and Coarse to Fine Sandy CLAY (A-6), Little Mica, Moist to Wet

RESIDUAL: Tan-White

RESIDUAL: Red-Brown and Brown-Gray, Medium Stiff to Stiff, Silty CLAY (A-6), Trace Mica and Rock Fragments, Moist to Tan-Black and Red-Brown to Tan-Brown, Soft to Very Stiff, Coarse to Fine Sandy SILT (A-4), Moist to Wet

(A-7-6) and Coarse to Fine Sandy

RESIDUAL: Tan-Brown to Tan and Black, Very Coarse to Fine SAND (A-2-6),

Loose to Medium Dense, Clayey Moist to Wet

WEATHERED ROCK: BIOTITE GNEISS

CRYSTALLINE ROCK: GRANITIC GNEISS and BIOTITE GNEISS

CRYSTALLINE ROCK: Brown, White, and Black, Moderately GRANITIC GNEISS and BIOTITE GNEISS with Very

CRYSTALLINE ROCK: Brown, White, Gray, and Black, Moderately Interlayered GRANITIC GNEISS and BIOTITE GNEISS

WEATHERED ROCK: BIOTITE GNEISS Severely to Slightly Weathered, Soft to Hard, Interlayered Close to Close Fracture Spacing

Severely to Slightly Weathered, Soft to Very Hard, with Very Close to Close Fracture Spacing

BT

BT
FIAD
7/19

BT

BT

Ⓐ ROADWAY EMBANKMENT: 0.2' to 0.3' ASPHALT over 0.2' to 0.7' ABC STONE
Ⓑ RESIDUAL: Black to Gray, Dense, Silty Coarse to Fine SAND (A-2-4), Moist
Ⓒ WEATHERED ROCK: BIOTITE GNEISS

DEPTH	REC	RQD	GSI
23.8' to 26.1'	0%	0%	10–30
26.1' to 31.1'	100%	8%	20–40
31.1' to 32.2'	55%	0%	0–20
32.2' to 33.5'	100%	0%	40–60
33.5' to 37.7'	0%	0%	10–30
37.7' to 43.7'	100%	0%	20–40
43.7' to 47.7'	0%	0%	10–20
47.7' to 52.7'	100%	14%	30–50

– ***GROUNDLINE TAKEN FROM "u5899_hyd_bsr_report.dgn" FILE PROVIDED BY NCDOT DATED 10/06/2021.***

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

-L-

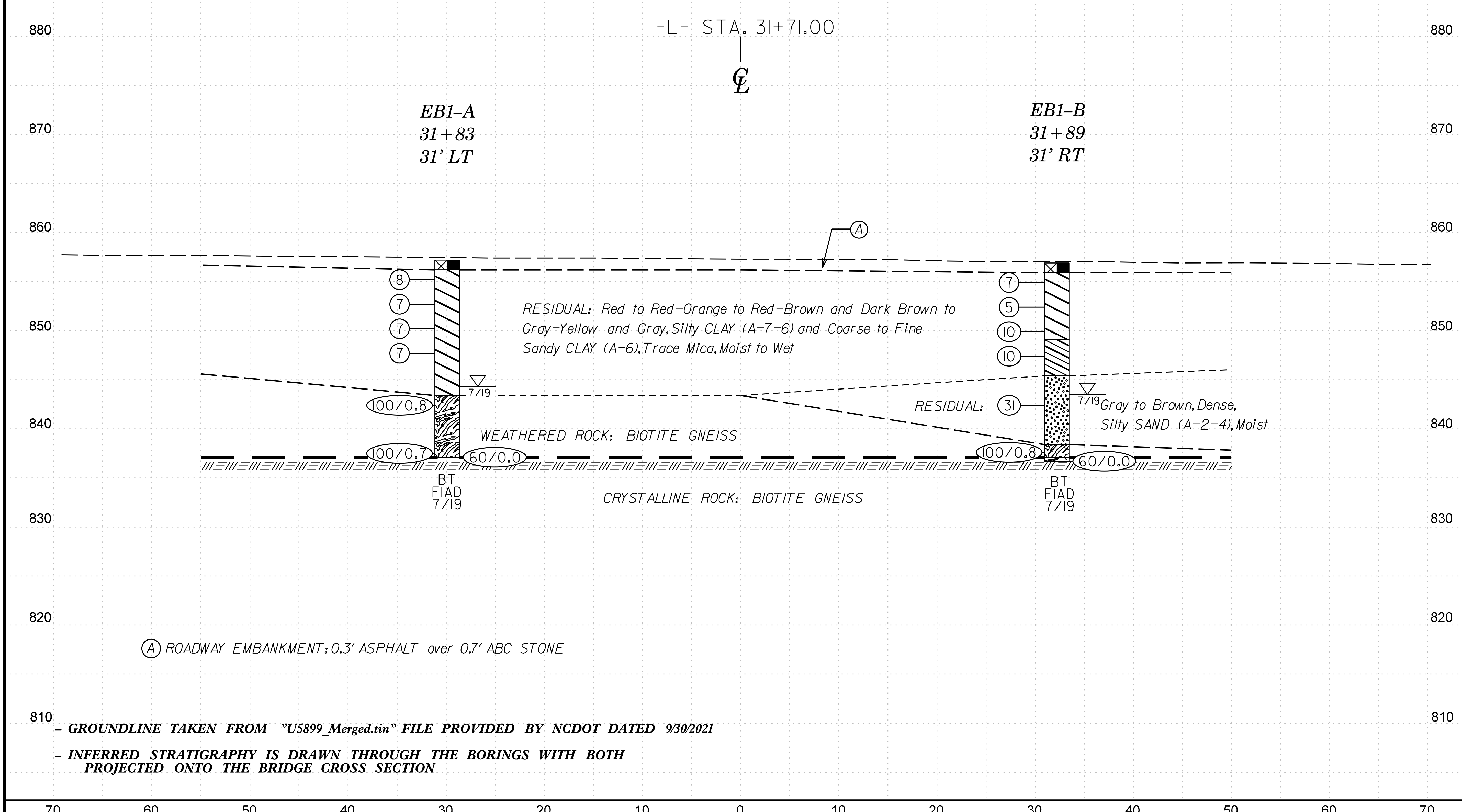
920 910 900 890 880 870 860 850 840 830 820 810 800 790 780 770

31+50 32+00 32+50 33+00 33+50 34+00

PROJECT REFERENCE NO.	SHEET NO.
U-5899	5

END BENT 1 AT -L- STA. 31+71.00
SKEW = 85°

0 10 20
FEET
VE = 1.0



-L- STA. 31+71.00
CL
EB1-A
31+83
31' LT
EB1-B
31+89
31' RT
A
RESIDUAL: Red to Red-Orange to Red-Brown and Dark Brown to Gray-Yellow and Gray, Silty CLAY (A-7-6) and Coarse to Fine Sandy CLAY (A-6), Trace Mica, Moist to Wet
RESIDUAL: Gray to Brown, Dense, Silty SAND (A-2-4), Moist
WEATHERED ROCK: BIOTITE GNEISS
CRYSTALLINE ROCK: BIOTITE GNEISS
8
7
7
7
7
5
10
10
31
100/0.8
100/0.7
60/0.0
100/0.8
60/0.0
7/19
7/19
BT
FIAD
7/19
BT
FIAD
7/19
880
870
860
850
840
830
820
810
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
A ROADWAY EMBANKMENT: 0.3' ASPHALT over 0.7' ABC STONE
- GROUNDLINE TAKEN FROM "U5899_Merged.tin" FILE PROVIDED BY NCDOT DATED 9/30/2021
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE BRIDGE CROSS SECTION

PROJECT REFERENCE NO.	SHEET NO.
U-5899	6

0 10 20
FEET
VE = 1.0

BENT 1 AT -L- STA. 32+87.50
SKEW = 85°

-L- STA. 32+87.50

℄

B1–A
32+86
24' LT

B1–B
32+90
24' RT

860
850
840
830
820
810
800
790

10
RESIDUAL: Brown-Gray and Red-Brown, Stiff, Silty CLAY (A-7-6), Trace Mica, Little Rock Fragments, Moist
14

6
RESIDUAL: Tan-White to Tan-Black to White and Black, Medium Stiff to Very Stiff, Coarse to Fine Sandy SILT (A-4), Trace to Little Mica, Trace Rock Fragments, Moist
5

28
27

100/0.9
WEATHERED ROCK: GRANITIC GNEISS
100/0.4

60/0.0
09/19
60/0.0
09/19

Ⓒ

CRYSTALLINE ROCK: Brown, Black, Gray, and White, Moderately Severely Weathered to Very Slightly Weathered, Soft to Hard, Interlayered GRANITIC GNEISS and BIOTITE GNEISS with Very Close to Close Fracture Spacing

BT
BT

B1–A

DEPTH	REC	RQD	GSI
23.8' to 26.1'	0%	0%	10–30
26.1' to 31.1'	100%	8%	20–40
31.1' to 32.2'	55%	0%	0–20
32.2' to 33.5'	100%	0%	40–60
33.5' to 37.7'	0%	0%	10–30
37.7' to 43.7'	100%	0%	20–40
43.7' to 47.7'	0%	0%	10–20
47.7' to 52.7'	100%	14%	30–50

B1–B

DEPTH	REC	RQD	GSI
23.8' to 25.1'	100%	100%	60–80
25.1' to 35.9'	83%	13%	20–40
35.9' to 38.1'	100%	0%	30–50
38.1' to 41.0'	100%	0%	20–40
41.0' to 42.2'	100%	0%	40–60
42.2' to 51.3'	100%	0%	20–40

– GROUNDLINE TAKEN FROM "U5899_Merged.tin" FILE PROVIDED BY NCDOT DATED 9/30/2021

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

Ⓒ WEATHERED ROCK: BIOTITE GNEISS

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

PROJECT REFERENCE NO.	SHEET NO.
U-5899	7

END BENT 2 AT -L- STA. 33+76.50
SKEW = 85°

0 10 20
FEET
VE = 1.0

-L- STA. 33+76.50

RW2-1
33+65
61' LT

EB2-A
33+75
26' LT

EB2-B
33+79
26' RT

RW2-2
33+75
61' RT

RESIDUAL: Red-Brown, Medium Stiff to Very Stiff, Coarse to Fine Sandy CLAY (A-6), Trace Mica, Moist

RESIDUAL: Red-Tan to Tan-Brown, Soft to Hard Coarse to Fine Sandy SILT (A-4), Trace Mica, Moist to Wet

RESIDUAL: Tan-Brown to Red-Brown to Tan-Red to Tan Clayey Coarse to Fine SAND (A-2-6), Trace to Little Mica, Trace Mica, Moist

RESIDUAL: Tan-Brown, Soft to Stiff, Coarse to Fine Sandy SILT (A-4), Trace Mica, Moist to Wet

and Black, Very Loose to Medium Dense, Trace Rock Fragments, Moist to Wet

WEATHERED ROCK: BIOTITE GNEISS

CRYSTALLINE ROCK: BIOTITE GNEISS

- GROUNDLINE TAKEN FROM "U5899_Merged.tin" FILE PROVIDED BY NCDOT DATED 9/30/2021
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE BRIDGE CROSS SECTION

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44689.1.1	**TIP** U-5899	**COUNTY** FORSYTH	**GEOLOGIST** Tinson, D.	
SITE DESCRIPTION New Route for Forum Pkwy Connector from SR 3955 (Forum Pkwy) to NC 66 (University Pkwy)				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 31+83	**OFFSET** 31 ft LT	**ALIGNMENT** -L-	**0 HR.** 12.9
COLLAR ELEV. 857.2 ft	**TOTAL DEPTH** 20.1 ft	**NORTHING** 898,072	**EASTING** 1,619,910	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE RED5584 CME-45C 84% 03/13/2019		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Seiler, M.	**START DATE** 07/16/19	**COMP. DATE** 07/16/19	**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)
860											
										857.2	0.0
	856.2	1.0	3	3	5	8		M		GROUND SURFACE 856.2 0.3' Asphalt over 0.7' ABC Stone	1.0
855										**RESIDUAL** Red to Gray-Yellow to Gray and Dark Brown, Silty CLAY	
	853.7	3.5	3	3	4	7	SS-1	28%			
	851.2	6.0	3	3	4	7		M			
850											
	848.7	8.5	3	3	4	7		M			
845											
	843.7	13.5	10	20	80/0.3	100/0.8				843.4	13.8
840										**WEATHERED ROCK** BIOTITE GNEISS	
	838.7	18.5	22	34	66/0.2	100/0.7				837.1	20.1
	837.1	20.1	60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 837.1 ft on Crystalline Rock: BIOTITE GNEISS	
										Other Samples: ST-1 (3.5 - 5.5)	

WBS 44689.1.1	**TIP** U-5899	**COUNTY** FORSYTH	**GEOLOGIST** Tinson, D.	
SITE DESCRIPTION New Route for Forum Pkwy Connector from SR 3955 (Forum Pkwy) to NC 66 (University Pkwy)				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 31+89	**OFFSET** 31 ft RT	**ALIGNMENT** -L-	**0 HR.** 13.4
COLLAR ELEV. 856.9 ft	**TOTAL DEPTH** 20.2 ft	**NORTHING** 898,010	**EASTING** 1,619,916	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE RED5584 CME-45C 84% 03/13/2019		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Seiler, M.	**START DATE** 07/16/19	**COMP. DATE** 07/16/19	**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
860										
										856.9 GROUND SURFACE 0.0
	855.9	1.0	3	3	4	7		M		855.9 0.3' Asphalt over 0.7' ABC Stone 1.0
855										**RESIDUAL** Red-Orange to Red-Brown and Gray, Silty CLAY, Trace Mica
	853.4	3.5	2	2	3	5		M		
	850.9	6.0	3	4	6	10		M		849.1 7.8
850										Blue-Gray to Brown, Coarse to Fine Sandy CLAY
	848.4	8.5	2	3	7	10	SS-2	30%		
845										845.4 11.5
	843.4	13.5	20	16	15	31		M		Gray to Brown, Silty Coarse to Fine SAND. Trace Mica Note: Hard at 16.9' and Soft at 17.9'
840										
	838.4	18.5	26	74/0.3		100/0.8				838.4 18.5
	836.7	20.2	60/0.0			60/0.0				837.1 **WEATHERED ROCK** BIOTITE GNEISS 19.8
										836.7 **CRYSTALLINE ROCK** BIOTITE GNEISS 20.2
										Boring Terminated with Standard Penetration Test Refusal at Elevation 836.7 ft in Crystalline Rock: BIOTITE GNEISS

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44689.1.1	**TIP** U-5899	**COUNTY** FORSYTH	**GEOLOGIST** Tinson, D.	
SITE DESCRIPTION New Route for Forum Pkwy Connector from SR 3955 (Forum Pkwy) to NC 66 (University Pkwy)				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 32+86	**OFFSET** 24 ft LT	**ALIGNMENT** -L-	**0 HR.** 12.9
COLLAR ELEV. 855.7 ft	**TOTAL DEPTH** 52.7 ft	**NORTHING** 898,061	**EASTING** 1,620,013	**24 HR.** 23.6
DRILL RIG/HAMMER EFF./DATE RED5584 CME-45C 84% 03/13/2019		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Seiler, M.	**START DATE** 09/24/19	**COMP. DATE** 09/24/19	**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)
										855.7 GROUND SURFACE	0.0
	852.2	3.5	4	5	5	10		M		**RESIDUAL** Brown-Gray, Silty CLAY, Trace Rock Fragments, Trace Mica	
	847.2	8.5	2	3	3	6		M		847.8 Tan-White to Tan-Black, Coarse to Fine Sandy SILT, Little Mica Note: Hard at 15.5'	7.9
	842.2	13.5	9	14	14	28		M		840.1 **WEATHERED ROCK** GRANITIC GNEISS	15.6
	837.2	18.5	33	64	37/0.4	100/0.9				833.6 **CRYSTALLINE ROCK** GRANITIC GNEISS	22.1
	832.2	23.5	60/0.0			60/0.0				831.9 **CRYSTALLINE ROCK** Moderately Severely Weathered GRANITIC GNEISS REC=0% RQD=0% GSI=10-30	23.8
										829.6 **CRYSTALLINE ROCK** Brown, White, Gray and Black, Interlayered Moderately to Slightly Weathered, Hard GRANITIC GNEISS and Moderately Severely to Moderately Weathered, Soft to Moderately Hard BIOTITE GNEISS with Close to Very Close Fracture Spacing REC=100% RQD=8% GSI=20-40	26.1
										824.6	31.1
										823.5	32.2
										822.2	33.5
										818.0 **WEATHERED ROCK** Black and Dark Brown, Severely Weathered, Very Soft to Soft BIOTITE GNEISS with Very Close Fracture Spacing REC=55% RQD=0% GSI=0-20	37.7
										812.0 **CRYSTALLINE ROCK** Brown, White and Gray with Black, Moderately to Slightly Weathered, Hard to Very Hard GRANITIC GNEISS with Very Close to Close Fracture Spacing REC=100% RQD=0% GSI=40-60	43.7
										808.0 **CRYSTALLINE ROCK** Moderately Severely Weathered BIOTITE GNEISS REC=0% RQD=0% GSI=10-30	47.7
										803.0 **CRYSTALLINE ROCK** Brown, White, Gray and Black, Interlayered Moderately to Slightly Weathered, Hard GRANITIC GNEISS and Moderately Severely to Moderately Weathered, Soft to Moderately Hard BIOTITE GNEISS with Close to Very Close Fracture Spacing REC=100% RQD=0% GSI=20-40	52.7
										CRYSTALLINE ROCK Moderately Severely Weathered BIOTITE GNEISS REC=0% RQD=0% GSI=10-20	
										CRYSTALLINE ROCK Brown, White and Gray, Moderately to Slightly Weathered, Medium Hard to Hard GRANITIC GNEISS with Very Close to Close Fracture Spacing REC=100% RQD=14% GSI=30-50	
										Boring Terminated at Elevation 803.0 ft in Crystalline Rock: GRANITIC GNEISS	

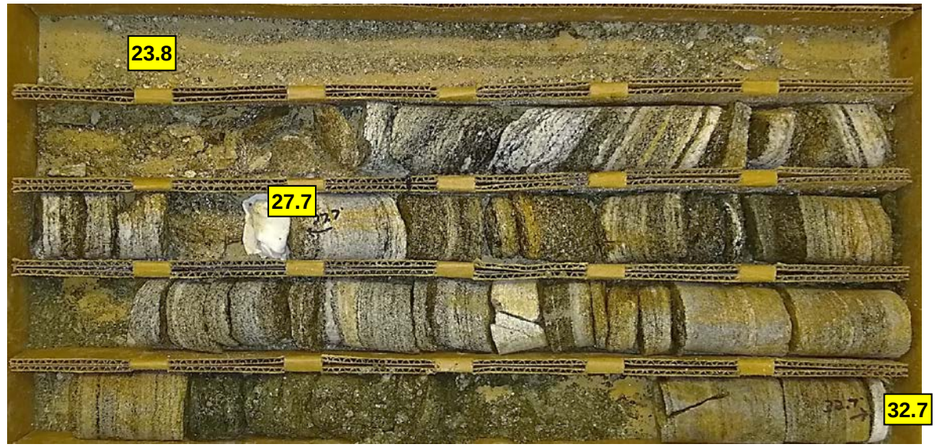
GEOTECHNICAL BORING REPORT
CORE LOG

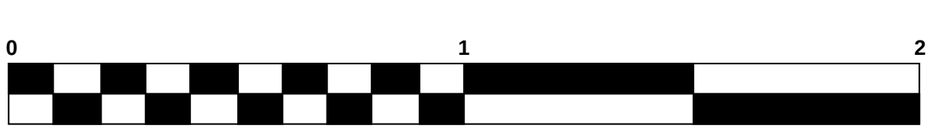
WBS 44689.1.1	**TIP** U-5899	**COUNTY** FORSYTH	**GEOLOGIST** Tinson, D.	
SITE DESCRIPTION New Route for Forum Pkwy Connector from SR 3955 (Forum Pkwy) to NC 66 (University Pkwy)				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 32+86	**OFFSET** 24 ft LT	**ALIGNMENT** -L-	**0 HR.** 12.9
COLLAR ELEV. 855.7 ft	**TOTAL DEPTH** 52.7 ft	**NORTHING** 898,061	**EASTING** 1,620,013	**24 HR.** 23.6
DRILL RIG/HAMMER EFF./DATE RED5584 CME-45C 84% 03/13/2019		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Seiler, M.	**START DATE** 09/24/19	**COMP. DATE** 09/24/19	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 28.9 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)
831.9											Begin Coring @ 23.8 ft	
830	831.9	23.8	3.9	:17/1.0 1:13/1.0 1:17/1.0 :56/0.9	(1.6) 41%	(0.4) 10%		(0.0) 0%	(0.0) 0%		831.9 **CRYSTALLINE ROCK** Moderately Severely Weathered GRANITIC GNEISS GSI=10-30	23.8
	828.0	27.7						(5.0) 100%	(0.4) 8%		829.6	26.1
825			5.0	:42/1.0 :50/1.0 :55/1.0 :53/1.0 1:14/1.0	(4.5) 90%	(0.0) 0%					**CRYSTALLINE ROCK** Brown, White, Gray and Black, Interlayered Moderately to Slightly Weathered, Hard GRANITIC GNEISS and Moderately Severely to Moderately Weathered, Soft to Moderately Hard BIOTITE GNEISS with Close to Very Close Fracture Spacing Foliation and joints at 10 to 30 degrees with iron staining of most joint and some fabric GSI=20-40	
	823.0	32.7						(0.6) 55%	(0.0) 0%		824.6	31.1
											823.5	32.2
820			5.0	1:26/1.0 1:14/1.0 1:04/1.0 :59/1.0 1:19/1.0	(0.8) 16%	(0.0) 0%		(1.3) 100%	(0.0) 0%		822.2	33.5
	818.0	37.7						(0.0) 0%	(0.0) 0%		818.0 **WEATHERED ROCK** Black and Dark Brown, Severely Weathered, Very Soft to Soft BIOTITE GNEISS with Very Close Fracture Spacing GSI=0-20	37.7
815			5.0	1:18/1.0 1:09/1.0 1:15/1.0 1:01/1.0 1:35/1.0	(5.0) 100%	(0.0) 0%		(6.0) 100%	(0.0) 0%		**CRYSTALLINE ROCK** Brown, White and Gray with Black, Moderately to Slightly Weathered, Hard to Very Hard GRANITIC GNEISS with Very Close to Close Fracture Spacing Foliation and joint at 0 to 10 degrees GSI=40-60	
	813.0	42.7									812.0	43.7
810			5.0	1:07/1.0 1:24/1.0 :58/1.0 1:09/1.0 1:11/1.0	(1.0) 20%	(0.0) 0%		(0.0) 0%	(0.0) 0%		**CRYSTALLINE ROCK** Moderately Severely Weathered BIOTITE GNEISS GSI=10-30	
	808.0	47.7									808.0	47.7
805			5.0	1:23/1.0 1:13/1.0 1:16/1.0 1:34/1.0 1:18/1.0	(5.0) 100%	(0.7) 14%		(5.0) 100%	(0.7) 14%		**CRYSTALLINE ROCK** Brown, White, Gray and Black, Interlayered Moderately to Slightly Weathered, Hard GRANITIC GNEISS and Moderately Severely to Moderately Weathered, Soft to Moderately Hard BIOTITE GNEISS with Close to Very Close Fracture Spacing Foliation and joints at 10 to 30 degrees with iron staining of most joints and some fabric GSI=20-40	
	803.0	52.7									803.0	52.7
											CRYSTALLINE ROCK Moderately Severely Weathered BIOTITE GNEISS GSI=10-20	
											CRYSTALLINE ROCK Brown, White and Gray, Moderately to Slightly Weathered, Medium Hard to Hard GRANITIC GNEISS with Very Close to Close Fracture Spacing Foliation at 0 to 10 degrees, iron staining of most joints and signficant portion of fabric GSI=30-50	
											Boring Terminated at Elevation 803.0 ft in Crystalline Rock: GRANITIC GNEISS	

CORE PHOTOGRAPHS

B1-A
BOX 1of 3: 23.8 - 32.7 FEET

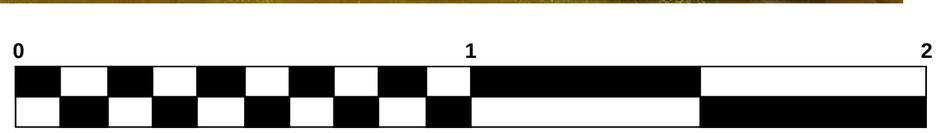




FEET

B1-A
BOX 2 of 3: 32.7 - 42.7 FEET

B1-A
BOX 3 of 3: 42.7 - 52.7 FEET



FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44689.1.1	**TIP** U-5899	**COUNTY** FORSYTH	**GEOLOGIST** Tinson, D.	
SITE DESCRIPTION New Route for Forum Pkwy Connector from SR 3955 (Forum Pkwy) to NC 66 (University Pkwy)				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 32+90	**OFFSET** 24 ft RT	**ALIGNMENT** -L-	**0 HR.** 12.8
COLLAR ELEV. 855.8 ft	**TOTAL DEPTH** 51.3 ft	**NORTHING** 898,021	**EASTING** 1,620,017	**24 HR.** 23.4
DRILL RIG/HAMMER EFF./DATE RED5584 CME-45C 84% 03/13/2019		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Seiler, M.	**START DATE** 09/24/19	**COMP. DATE** 09/24/19	**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)
860											
										855.8 GROUND SURFACE	0.0
855										**RESIDUAL** Red-Brown, Silty CLAY, Trace Mica, Little Rock Fragments	
	852.3	3.5	5	6	8	14		M			
850										847.9	7.9
	847.3	8.5	2	2	3	5		M		Tan-White to White-Black, Coarse to Fine Sandy SILT, Trace Rock Fragments, Trace Mica Note: Hard at 17.0'	
845											
	842.3	13.5	12	13	14	27		M			
840										839.0	16.8
	837.3	18.5	100/0.4			100/0.4				**WEATHERED ROCK** GRANITIC GNEISS	
835										833.0	22.8
	832.3	23.5	60/0.0			60/0.0				832.0 **CRYSTALLINE ROCK** GRANITIC GNEISS	23.8
830										830.7	25.1
										CRYSTALLINE ROCK Black and White, Very Slightly Weathered, Hard GRANITIC GNEISS with Moderately Close Fracture Spacing REC=100% RQD=100% GSI=60-80	
825										**CRYSTALLINE ROCK** Brown, White, and Black, Interlayered Moderately Severely to Moderately Weathered, Soft to Moderately Hard BIOTITE GNEISS and Moderately to Slightly Weathered Hard GRANITIC GNEISS with Close to Very Close Fracture Spacing REC=83% RQD=13% GSI=20-40	
820										819.9	35.9
										817.7	38.1
815										**CRYSTALLINE ROCK** Gray, Black and White, Slightly to Very Slightly Weathered, Hard GRANITIC GNEISS with Very Close Fracture Spacing REC=100% RQD=0% GSI=30-50	
										814.8	41.0
810										813.6	42.2
										CRYSTALLINE ROCK Brown, Black, and White, Interlayered Moderately Severely to Moderately Weathered, Soft to Moderately Hard BIOTITE GNEISS and Moderately to Slightly Weathered Hard GRANITIC GNEISS with Very Close Fracture Spacing REC=100% RQD=0% GSI=20-40	
805										804.5	51.3
										CRYSTALLINE ROCK White and Gray, Very Slightly Weathered, Hard GRANITIC GNEISS with Very Close to Close Fracture Spacing REC=100% RQD=0% GSI=40-60	
										CRYSTALLINE ROCK Brown, White, and Black, Interlayered Moderately Severely to Moderately Weathered, Soft to Moderately Hard BIOTITE GNEISS and Moderately to Slightly Weathered Hard GRANITIC GNEISS with Close to Very Close Fracture Spacing REC=100% RQD=0% GSI=20-40	
										Boring Terminated at Elevation 804.5 ft in Crystalline Rock: GRANITIC GNEISS	

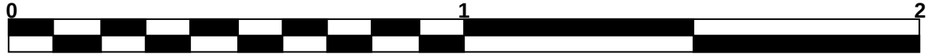
GEOTECHNICAL BORING REPORT
CORE LOG

WBS 44689.1.1	**TIP** U-5899	**COUNTY** FORSYTH	**GEOLOGIST** Tinson, D.	
SITE DESCRIPTION New Route for Forum Pkwy Connector from SR 3955 (Forum Pkwy) to NC 66 (University Pkwy)				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 32+90	**OFFSET** 24 ft RT	**ALIGNMENT** -L-	**0 HR.** 12.8
COLLAR ELEV. 855.8 ft	**TOTAL DEPTH** 51.3 ft	**NORTHING** 898,021	**EASTING** 1,620,017	**24 HR.** 23.4
DRILL RIG/HAMMER EFF./DATE RED5584 CME-45C 84% 03/13/2019		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Seiler, M.	**START DATE** 09/24/19	**COMP. DATE** 09/24/19	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 27.5 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)
832											Begin Coring @ 23.8 ft	
830	832.0	23.8	2.5	1:12/1.0 1:09/1.0 :51/0.5	(2.5) 100%	(1.3) 52%		(1.3) 100%	(1.3) 100%		832.0 **CRYSTALLINE ROCK**	23.8
	829.5	26.3	5.0	:55/1.0 1:06/1.0 1:12/1.0 :56/1.0 :38/1.0	(3.5) 70%	(1.4) 28%		(9.0) 83%	(1.4) 13%		830.7 Black and White, Very Slightly Weathered, Hard GRANITIC GNEISS with Moderately Close Fracture Spacing GSI=60-80	25.1
825	824.5	31.3	5.0	1:13/1.0 1:46/1.0 1:18/1.0 1:08/1.0 1:50/1.0	(4.7) 94%	(0.0) 0%					**CRYSTALLINE ROCK** Brown, White, and Black, Interlayered Moderately Severely to Moderately Weathered, Soft to Moderately Hard BIOTITE GNEISS and Moderately to Slightly Weathered, Hard GRANITIC GNEISS with Close to Very Close Fracture Spacing Foliation and joints at 0 to 10 degrees with abundant iron staining of joint and some fabric, thin WR Zones GSI=20-40	
820	819.5	36.3	5.0	1:49/1.0 1:18/1.0 1:09/1.0 1:27/1.0 :59/1.0	(5.0) 100%	(0.0) 0%		(2.2) 100%	(0.0) 0%		819.9	35.9
								(2.9) 100%	(0.0) 0%		817.7 **CRYSTALLINE ROCK** Gray, Black and White, Slightly to Very Slightly Weathered, Hard GRANITIC GNEISS with Very Close Fracture Spacing GSI=30-50	38.1
815	814.5	41.3	5.0	1:24/1.0 1:25/1.0 1:09/1.0 1:09/1.0 1:12/1.0	(5.0) 100%	(0.0) 0%		(1.2) 100%	(0.0) 0%		814.8	41.0
								(9.1) 100%	(0.0) 0%		813.6 **CRYSTALLINE ROCK** Brown, Black, and White, Interlayered Moderately Severely to Moderately Weathered, Soft to Moderately Hard BIOTITE GNEISS and Moderately to Slightly Weathered Hard GRANITIC GNEISS with Very Close Fracture Spacing Foliation and joints at 0 to 10 degrees with abundant iron staining of joint and some fabric, thin WR Zones GSI=20-40	42.2
810	809.5	46.3	5.0	1:14/1.0 1:11/1.0 1:09/1.0 1:24/1.0 1:09/1.0	(5.0) 100%	(0.0) 0%					**CRYSTALLINE ROCK** White and Gray, Very Slightly Weathered, Hard GRANITIC GNEISS with Very Close to Close Fracture Spacing GSI=40-60	
805	804.5	51.3									804.5 **CRYSTALLINE ROCK** Brown, White, and Black, Interlayered Moderately Severely to Moderately Weathered, Soft to Moderately Hard BIOTITE GNEISS and Moderately to Slightly Weathered Hard GRANITIC GNEISS with Close to Very Close Fracture Spacing Foliation and joints at 0 to 10 degrees with abundant iron staining of joint and some fabric, thin WR Zones GSI=20-40	51.3
											Boring Terminated at Elevation 804.5 ft in Crystalline Rock: GRANITIC GNEISS	

CORE PHOTOGRAPHS

B1-B
BOX 1of 3: 23.8 - 33.3 FEET



B1-B
BOX 2 of 3: 33.3 - 42.2 FEET

B1-B
BOX 3 of 3: 42.2 - 51.3 FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44689.1.1	**TIP** U-5899	**COUNTY** FORSYTH	**GEOLOGIST** Tinson, D.	
SITE DESCRIPTION New Route for Forum Pkwy Connector from SR 3955 (Forum Pkwy) to NC 66 (University Pkwy)				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 33+75	**OFFSET** 26 ft LT	**ALIGNMENT** -L-	**0 HR.** 10.6
COLLAR ELEV. 858.2 ft	**TOTAL DEPTH** 44.3 ft	**NORTHING** 898,067	**EASTING** 1,620,102	**24 HR.** 8.9
DRILL RIG/HAMMER EFF./DATE RED5584 CME-45C 84% 03/13/2019		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Seiler, M.	**START DATE** 07/22/19	**COMP. DATE** 07/22/19	**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)
860											
	857.2	1.0								858.2 GROUND SURFACE	0.0
855	854.7	3.5	3	3	3	6	SS-3	17%		**RESIDUAL** Red-Brown, Coarse to Fine Sandy CLAY, Trace Mica	
	852.2	6.0	5	5	6	11		M		852.7 Red-Tan to Tan-Brown, Coarse to Fine Sandy SILT, Trace Mica	5.5
850	849.7	8.5	5	5	5	10		M			
			2	1	1	2				846.3 Tan-Brown to Tan and Black, Clayey Coarse to Fine SAND, Trace to Little Mica	11.9
845	844.7	13.5									
			1	1	2	3		W			
840	839.7	18.5									
			2	2	3	5		M			
835	834.7	23.5									
			2	5	6	11		M			
830	829.7	28.5									
			3	5	9	14		M			
825	824.7	33.5								825.7 **WEATHERED ROCK** BIOTITE GNEISS	32.5
			30	70/0.3		100/0.8					
820	819.7	38.5									
			74	26/0.1		100/0.6					
815	814.7	43.5									
			68	32/0.3		100/0.8				813.9 Boring Terminated at Elevation 813.9 ft in Weathered Rock: BIOTITE GNEISS	44.3

WBS 44689.1.1	**TIP** U-5899	**COUNTY** FORSYTH	**GEOLOGIST** Tinson, D.	
SITE DESCRIPTION New Route for Forum Pkwy Connector from SR 3955 (Forum Pkwy) to NC 66 (University Pkwy)				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 33+79	**OFFSET** 26 ft RT	**ALIGNMENT** -L-	**0 HR.** 7.9
COLLAR ELEV. 858.0 ft	**TOTAL DEPTH** 49.3 ft	**NORTHING** 898,015	**EASTING** 1,620,106	**24 HR.** 10.9
DRILL RIG/HAMMER EFF./DATE RED5584 CME-45C 84% 03/13/2019		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Seiler, M.	**START DATE** 07/22/19	**COMP. DATE** 07/24/19	**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)
860											
	857.0	1.0								858.0 GROUND SURFACE	0.0
855	854.5	3.5	5	5	5	10		M		**RESIDUAL** Red-Brown, Coarse to Fine Sandy CLAY	
	852.0	6.0	2	3	3	6		M			
850	849.5	8.5	4	5	4	9		M		848.5 Tan-Brown to Red-Brown to Tan-Red, Clayey Coarse to Fine SAND, Trace Rock Fragments, Little Mica	9.5
			5	3	1	4					
845	844.5	13.5									
			1	1	2	3		W			
840	839.5	18.5									
			2	3	4	7		M			
835	834.5	23.5									
			2	4	5	9	SS-4	37%			
830	829.5	28.5									
			6	4	4	8		M			
825	824.5	33.5									
			7	9	8	17		W			
820	819.5	38.5								820.5 **WEATHERED ROCK** BIOTITE GNEISS	37.5
			78	22/0.1		100/0.6					
815	814.5	43.5									
			68	32/0.2		100/0.7					
810	809.5	48.5									
			63	37/0.3		100/0.8				808.7 Boring Terminated at Elevation 808.7 ft In Weathered Rock: BIOTITE GNEISS	49.3

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44689.1.1	**TIP** U-5899	**COUNTY** FORSYTH	**GEOLOGIST** Tinson, D.	
SITE DESCRIPTION New Route for Forum Pkwy Connector from SR 3955 (Forum Pkwy) to NC 66 (University Pkwy)				**GROUND WTR (ft)**
BORING NO. RW1-1	**STATION** 31+48	**OFFSET** 35 ft LT	**ALIGNMENT** -L-	**0 HR.** 12.9
COLLAR ELEV. 858.1 ft	**TOTAL DEPTH** 23.5 ft	**NORTHING** 898,076	**EASTING** 1,619,875	**24 HR.** 11.5
DRILL RIG/HAMMER EFF./DATE RED5584 CME-45C 84% 03/13/2019		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER Seiler, M.	**START DATE** 07/16/19	**COMP. DATE** 07/16/19	**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)
860											
	857.1	1.0	2	2	3	5		M		858.1 GROUND SURFACE	0.0
										857.7 0.2' Asphalt over 0.2' ABC Stone	0.4
855	854.6	3.5	3	3	4	7		M		**RESIDUAL** Red-Brown to Gray, Silty CLAY, Little Mica	
	852.1	6.0	2	2	3	5		M			
850	849.6	8.5	3	3	4	7		W		848.6	9.5
										Gray, Coarse to Fine Sandy CLAY	
845	844.6	13.5	7	12	22	34		M		845.6	12.5
										Black to Gray, Silty Coarse to Fine SAND, Trace Rock Fragments	
840	839.6	18.5	76	24/0.1		100/0.6				841.6 **WEATHERED ROCK** BIOTITE GNEISS	16.5
835	834.6	23.5	60/0.0			60/0.0				835.7	22.4
										834.6 **CRYSTALLINE ROCK** BIOTITE GNEISS	23.5
										Boring Terminated with Standard Penetration Test Refusal at Elevation 834.6 ft in Crystalline Rock: BIOTITE GNEISS	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44689.1.1	**TIP** U-5899	**COUNTY** FORSYTH	**GEOLOGIST** Tinson, D.	
SITE DESCRIPTION New Route for Forum Pkwy Connector from SR 3955 (Forum Pkwy) to NC 66 (University Pkwy)				**GROUND WTR (ft)**
BORING NO. RW2-1	**STATION** 33+65	**OFFSET** 61 ft LT	**ALIGNMENT** -L-	**0 HR.** 10.5
COLLAR ELEV. 858.0 ft	**TOTAL DEPTH** 28.5 ft	**NORTHING** 898,102	**EASTING** 1,620,092	**24 HR.** 8.8
DRILL RIG/HAMMER EFF./DATE RED5584 CME-45C 84% 03/13/2019		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Seiler, M.	**START DATE** 07/19/19	**COMP. DATE** 07/19/19	**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)
860										
	857.0	1.0	4	4	5	9		M		858.0 GROUND SURFACE 0.0 **RESIDUAL** Red-Brown, Coarse to Fine Sandy CLAY
855	854.5	3.5	5	5	6	11		M		
	852.0	6.0	23	17	7	24		M		852.2 5.8 Tan-Brown, Coarse to Fine Sandy SILT, Trace Mica
850	849.5	8.5	1	2	1	3	SS-5	43%		
845	844.5	13.5	4	4	4	8		W		
840	839.5	18.5	2	3	4	7	SS-6	32%		
835	834.5	23.5	10	21	14	35		M		830.9 27.1 829.5 28.5 **WEATHERED ROCK** BIOTITE GNESS Boring Terminated with Standard Penetration Test Refusal at Elevation 829.5 ft on Crystalline Rock: BIOTITE GNEISS Other Samples: ST-2 (8.0 - 10.0)
830	829.5	28.5	60/0.0			60/0.0				

WBS 44689.1.1	**TIP** U-5899	**COUNTY** FORSYTH	**GEOLOGIST** Tinson, D.	
SITE DESCRIPTION New Route for Forum Pkwy Connector from SR 3955 (Forum Pkwy) to NC 66 (University Pkwy)				**GROUND WTR (ft)**
BORING NO. RW2-2	**STATION** 33+75	**OFFSET** 61 ft RT	**ALIGNMENT** -L-	**0 HR.** 7.9
COLLAR ELEV. 857.2 ft	**TOTAL DEPTH** 48.6 ft	**NORTHING** 897,980	**EASTING** 1,620,102	**24 HR.** 8.6
DRILL RIG/HAMMER EFF./DATE RED5584 CME-45C 84% 03/13/2019		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Seiler, M.	**START DATE** 07/24/19	**COMP. DATE** 07/24/19	**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
860										
	856.2	1.0	5	4	6	10		M		857.2 GROUND SURFACE 0.0 **RESIDUAL** Red-Brown, Coarse to Fine Sandy CLAY, Trace Roots, Trace Mica
855	853.7	3.5	4	7	8	15		M		
	851.2	6.0	9	7	3	10		M		851.7 5.5 Tan-Brown, Coarse to Fine Sandy SILT, Trace Mica
850	848.7	8.5	2	1	2	3	SS-7	59%		
845	843.7	13.5	1	2	2	4		W		
840	838.7	18.5	1	5	7	12		M		838.1 19.1 Tan-Brown, Clayey Coarse to Fine SAND, Trace Mica
835	833.7	23.5	4	5	6	11		M		
830	828.7	28.5	4	6	10	16		M		
825	823.7	33.5	5	11	13	24		M		819.7 37.5 **WEATHERED ROCK** BIOTITE GNEISS
820	818.7	38.5	65	35/0.2		100/0.7				
815	813.7	43.5	31	69/0.4		100/0.9				
810	808.7	48.5	60/0.1			60/0.1				810.0 47.2 808.6 48.6 **CRYSTALLINE ROCK** BIOTITE GNEISS Boring Terminated at Elevation 808.6 ft in Crystalline Rock: BIOTITE GNEISS

SOILS LABORATORY TESTS RESULTS

WBS NO.: 44689.1.1

TIP NO.: U-5899

COUNTY: Forsyth

SITE DESCRIPTION: Forum Parkway Connector from SR 3955 (Forum Parkway) to NC 66 (University Parkway) in Rural Hall - Bridge No. 747

BORING NO.	SAMPLE NO.	BORING LOCATION	DEPTH INTERVAL (FT)	AASHTO CLASS	N	L.L	P.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
								CSE. SAND	F. SAND	SILT	CLAY	10	40	200		
EB1-A	SS-1	-L- STA. 31+83, 31' LT	3.5-5.0	A-7-6 (17)	7	53	25	11	25	15	49	99	94	68	27.5	-
EB1-B	SS-2	-L- STA. 31+89, 31' RT	8.5-10.0	A-6 (6)	10	39	21	16	40	14	30	99	92	49	30.4	-
EB2-A	SS-3	-L- STA. 33+75, 26' LT	1.0-2.5	A-6 (9)	6	37	18	16	23	16	45	99	91	64	16.5	-
EB2-B	SS-4	-L- STA. 33+79, 26' RT	23.5-25.0	A-2-6 (0)	9	37	11	26	48	18	8	95	83	33	37.1	-
RW2-1	SS-5	-L- STA. 33+65, 61' LT	8.5-10.0	A-4 (1)	3	33	8	23	42	23	12	100	89	40	43.0	-
RW2-1	SS-6	-L- STA. 33+65, 61' LT	18.5-20.0	A-4 (1)	7	37	9	32	36	26	6	99	80	40	31.9	-
RW2-2	SS-7	-L- STA. 33+75, 61' RT	13.5-15.0	A-4 (0)	3	NP	NP	19	49	24	8	100	91	42	59.0	-

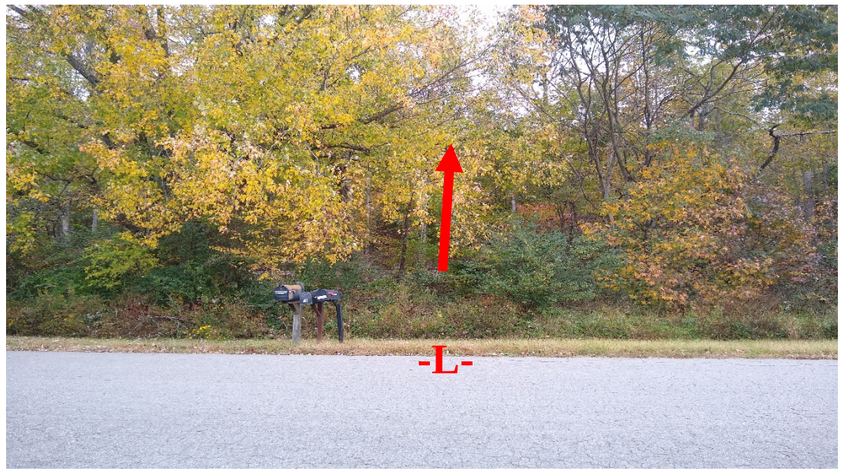
Tony Dumoulin

Certification No. 121-01-1108

SITE PHOTOGRAPHS

Bridge No. 747 on SR 3955 (Forum Parkway Connector) over Grassy Creek

View of Looking Upstation from End Bent 1



View Looking Upstream from Approximately Bridge CL

View of Looking Downstation from End Bent 2

View Looking Downstream from Approximately Bridge CL