STATE	OF	<i>NORTH</i>	CAROLINA

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

CONTENTS DESCRIPTION

Title Sheet NCDOT Geotechnical Unit Soil and Rock Classification Sheet	STRUCTURE SUBSURFACE INVESTIGATION
Boring Location Plan	
Generalized Subsurface Profile Along -Y-	PROJ. REFERENCE NO. 34845.1.1 (U-2707) F.A. PROJ. STP-3000(1) COUNTY FORSYTH
Generalized Subsurface Cross Section Through End Bent No.1	PROJECT DESCRIPTION <u>CLEMMONS - (SR3000 (IDOLS ROAD))</u>

SITE DESCRIPTION BRIDGE NO. 109 ON -Y- (SR2999 (HAMPTON ROAD)) OVER NORFOLK SOUTHERN RAILROAD

FROM (SR2999 (HAMPTON ROAD)) TO (US-158 (CLEMMONS ROAD))

INVENTORY

N.C. 34845.1.1 (U-2707) 1 15

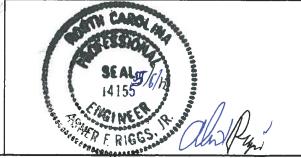
CAUTION NOTICE

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 BORNING LOGS, ROCK CORES, AMD SOL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991/01-6850, NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOCS. ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOR, AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVALABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNOS OR BETWEEN SAMPLED STRATA WITHIN THE BORENOLE, THE LABORATORY SAMPLE DATA AND THE IN SITU UN-PLACELITEST DATA CAN BE RELIED ON DNLY TO THE DEGREE OF RELIBBLITY INHERENT IN THE STANDARD TEST METHOD. THE DISSERVE WATER LEVELS OR SOIL MOISTURE COMPITIONS INDICATED BY THE SUBSURFACE RIVESTICATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE COMPITIONS INCLODITIONS MOLICITY AND SUBSEMPACE THE DESCRIPTION OF THE DESCRIPTION OF THE STRATAGE OR SOIL MOISTURE COMPITIONS OF COUNTRIES WATER LEVELS OR SOIL MOISTURE COMPITIONS OF COUNTRIES WATER LEVELS OR SOIL MOISTURE COMPITIONS OF THE NEWSTRATAGE OF COMPITIONS MICLIONING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BODER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELAMBARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT, FOR BIDDING AND CONSTRUCTION PURPOSES, REPERT TO THE CONSTRUCTION PLANS AND GOCUMENTS FOR FINAL DESIGN REFORMATION ON THIS PROJECT. THE OEPARTMENT GOES NOT WARRANT OR GUARANTIES THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE OPPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH NIGERICATION TO SUBSURFACE INVESTIGATIONS AS HE DEEMS MECESSARY TO SATISFY MANSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DEFERNING FROM THOSE MODICATEON IN THE SUBSURFACE INFORMATION.

	PERSONNEL
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_	
_	J. WILLIAMSON
_	B. RATTI
_	C. ODEM
_	J. JACKSON
INVESTIGATED B	Y S&ME, INC.
CHECKED BY	A.F. RIGGS, JR.
	S&ME, INC.
DATE	



SHEET

8 - 14

15

Title

Generalized Subsurface Cross Section Through Interior Bent No. I

Generalized Subsurface Cross Section Through Interior Bent No. 2

Test Boring Logs

Site Photographs

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

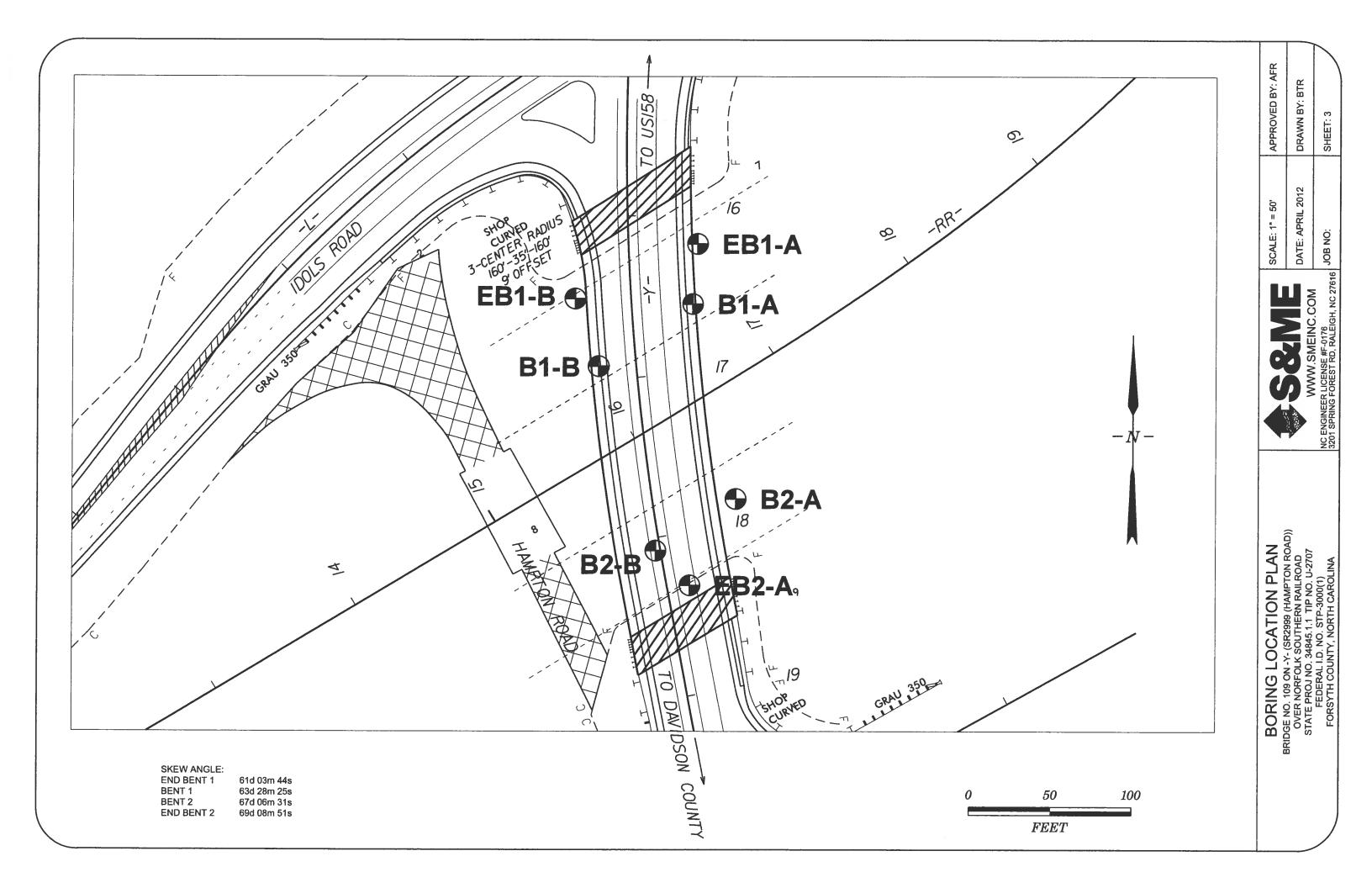
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

	SOIL AND ROCK LEGEND, TI	RMS, SYMBOLS, AND ABBREVIATIONS	
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND VIELD LESS THAN 188 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AGAPTIO TZ06, ASTM 0-1586), SOIL CLASSIFICATION IS BREED ON THE AGAPTIO SYSTEM ASSIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AGAPTIO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERAL OGICAL, COMPOSITION, AGRICALRITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS; ANGULAR,	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL SPT REFUSAL. SPT REFUSAL SPT REFUSAL SPT REFUSAL TO BE LEST THAN 81 FRODT 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:	ALLUYIUM (ALLUY,) - SOILS THAT HAYE BEEN TRANSPORTED BY WATER, AQUIFER - A WATER BEARING FORMATION OR STRATA.
YER STIFF, GRAY, SULY CLAY, MOIST WITH INTERBEDGED FINE SAID LAVERS, MICHLY PLISTIC, A-7-6	SUBANGULAR, SUBROUNDED, OR ROUNDED.	MEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 188 ROCK INR) ROCK INR)	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS CLASS. (≤ 35% PASSING *200) CRGANIC MATERIALS (> 35% PASSING *200) CRGANIC MATERIALS	MINERAL DGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELOSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	CRYSTALLINE ROCK ICR) FINE TO CDARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOLLD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE. GMEISS, GABBRD, SCHIST, 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 DR ABOVE THE GROUND SURFACE, CALCAREOUS (CALC.) - SDILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE,
GROUP A-I A-3 A-2 A-4 A-5 A-6 A-7 A-I, A-2 A-4, A-5	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SCOMENTARY ROCK THAT WOULD YELLO SPT REFUSAL IF TESTED. ROCK TYPE	COLLUYIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-3 A-6. A-7 SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50 PERCENTAGE OF MATERIAL	COASTAL PLAIN COASTAL PLAIN COASTAL PLAIN SEDIMENTARY ROCK LIP SEDIMENTARY ROCK SEDIMENTARY ROCK SEDIMENTARY ROCK SEDIMENTARY ROCK SEDIMENTARY ROCK SHELL BEDS, ETC. SHELL BEDS, ETC.	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.
* 10 50 MX GRANULAR SILT- MUCK.	ORCANIC MATERIAL GRANULAR SILT - CLAY	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
200 JS MX 25 MX (8 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 56	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE I - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	$\overline{ ext{DIP}}$ - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
PLASTIC DIDEX 6 MX MP 18 9KX 13 89KX 13 16N (1) 19N 18 9KX 18 16KX 10 16N (1) 19N 10 16N 1	MODERATELY ORGANIC 5 - 18% 12 - 28% SOME 29 - 35% HIGHLY ORGANIC >18% >28% HIGHLY 35% AND ABOVE GROUND WATER	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINEO, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE,	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
USUAL TYPES STONE FRACS. OF MAJOR GRAYEL, AND MATERIALS SAND GRAYEL AND SAND SOILS SOILS AMOUNTS OF ORGANIC MATTER	▼ WATER LEVEL IN 80RE HOLE IMMEDIATELY AFTER ORILLING STATIC WATER LEVEL AFTER 24 HOURS	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO SLI.) INCH. DEN JOINTS MAY CONTAIN CLAY, IN GRANITION ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE OULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
GEN. RATING AS A EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR UNSUITABLE SURGRADE POOR UNSUITABLE	PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA OMne Spring or seep	MODERATE MODIJ MOD	FLOOT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGED FROM PARENT MATERIAL. FLOOD PLAIN IFPI - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY
PI OF A-7-5 SUBGROUP IS \$\leq \text{LL} - 30 : PI OF A-7-6 SUBGROUP IS \$\req \text{LL} - 30 \\ \text{CONSISTENCY OR DENSENESS} \\ \text{PRIMARY SOIL TYPE} \text{COMPACTNESS OR PENETRATION RESISTREF COMPRESSIVE STRENGTH} \\ \text{PRIMARY SOIL TYPE} \text{COMPACTNESS OR PENETRATION RESISTREF COMPRESSIVE STRENGTH} \\ \text{PRIMARY SOIL TYPE} \text{COMPACTNESS OR PENETRATION RESISTREF COMPRESSIVE STRENGTH} \\ \text{PRIMARY SOIL TYPE} \text{COMPACTNESS OR PENETRATION RESISTREF COMPRESSIVE STRENGTH} \\ align*	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLOREO OR STAINEO. IN GRANITOID ROCKS, ALL FELOSPARS OULL SEVERE AND DISCOLOREO AND A MAJORITY SHOW KADLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEDL	THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACEO IN THE FIELD.
CONSISTENCY (N-VALUE) (TONS/FT2)	ROADWAY EMBANKMENT (RE) OF DATE OF TEST BORING TEST BORING W/ CORE	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LOOSE (4 GRANULAR LOOSE 4 TO 10	SOIL SYMBOL AUGER BORING SPT N-VAI		LEDGE - A SMELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
MATERIAL MEDIUM DENSE 10 TO 30 N/A	ARTIFICIAL FILL (AF) DTHER CORE BORING CEF SPT REFU THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY MONITORING WELL PIEZOMETER A PIEZOMETER		LENS - A BODY OF SDIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPDTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD ORAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE INSTALLATION SLOPE INDICATOR INSTALLATION INSTALLATION	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.	RESIDUAL (RES.) SDIL - SDIL FORMED IN PLACE BY THE WEATHERING OF ROCK, ROCK QUALITY DESIGNATION (RDD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
HARD 330 34 TEXTURE OR GRAIN SIZE	25/025 OIP & OIP DIRECTION OF ROCK STRUCTURES CONE PENETROMETER TEST	ROCK HARDNESS	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
U.S. STO, SIEVE SIZE 4 10 40 60 200 270 PENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SOUNDING RDD	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	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
BOULDER COBBLE GRAYEL COARSE FINE SILT CLAY	ABBREVIATIONS AR - AUGER REFUSAL MEO MEDIUM VST - VANE SHEAR TES BT - BORING TERMINATEO MICA MICACEDUS WEA, - WEATHERED	HARO CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, MARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, COUGES OR GROOVES TO 0,25 INCHES DEEP CAN BE	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
GRAIN MM 385 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	CL CLAY CPT - COME PENETRATION TEST NP - NON PLASTIC CSE CDARSE ORG ORGANIC WER, "MEATHERED "MICH MICH.ELOUS WER, "MEATHERED 7 - UNIT WEIGHT CPT - COME PENETRATION TEST NP - NON PLASTIC ORG ORGANIC	1455	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
SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	OMT - OILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATION OPT - OYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK O - VOIO RATIO SD SAND, SANDY SS - SPLIT SPOON		A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PEMETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EDUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
- SATURATED - USUALLY LIDUID; VERY WET, USUALLY	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTUREO, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRI	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	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
PLASTIC SEMISOLID; REDUIRES DRYING TO	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEAF HI HIGHLY V - VERY RATIO	NG SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	TOTAL LENGTH OF ROCK SECMENTS WITHIN A STRATUM COURL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSDIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING TERM SPACING IERM THICKNESS	
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: X AUTOMATIC MAN	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	BENCH MARK: NCDOT TRAVERSE STATION REBAR AND CAP STAMPED (BYI-33) LOCATED AT STA 96+63,39, -BL- N 822249 E I594531,4 ELEVATION: 829.60 FT.
- ORY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	X BK-51 G* CONTINUOUS FLIGHT AUGER CORE SIZE:	MODERATELY CLOSE 1 TO 3 FEET	NOTES:
PLASTICITY	CME-45C HARD FACED FINGER BITS -N	INDURATION	
PLASTICITY INDEX (PI) ORY STRENGTH	TUNG,-CARBIDE INSERTS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NONPLASTIC 9-5 YERY LOW LOW PLASTICITY 6-15 SLIGHT	CASING W/ ADVANCER HAND TOOLS:	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS: GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MED. PLASTICITY I6-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH COLLOD	PORTABLE HOIST TRICONE STEEL TEETH POST HOLE DIGGER TRICONE TUNGCARB. HAND AUGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE: BREAKS EASILY WHEN HIT WITH HAMMER.	
CQLOR DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, REO, YELLOW-BROWN, BLUE-GRAY).	CORE BIT SOUNDING ROD	INDURATEO GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE: OFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, OARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X 31/4° H.S.A. VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	

PROJECT REFERENCE NO. 34845.I.I (U-2707)

SHEET NO.



840 830 820 810 800 790 780 770 760 750 740 730 720 19+50 FINE (DRY) NOTES: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE PROFILE. GROUND LINE AND -Y- PROFILE TAKEN FROM ROADWAY DESIGN PLANS AS OF APRIL 2012. TO CLEMENTINE DRIVE DENSE BROWN SOME GRAVEL **ROCK** 19+00 FILL MEDIUM SAND WITH EB2-A 18+33 1 ft L 18 + 50SUBSURFACE PROFILE ALONG -Y 4 ARTIFICIAL I RT 18+00 B2-B 18+08 f+ R (2) (<u>-</u>) 0 BED 17 + 50WEATHERED (GRANITE) (DRY) 17 + 00BROWN BI-B (a GENERALIZED 16 + 50EBI-B OLIVE-BROWN S, SOME MICA TAN-ORANGE AY WITH SOME (S)-8 (4) (2) MOIST) 34 20 TO IDOLS ROAD IFF TO HARD OLN'I H CLAY SEAMS,SOM 'GANESE STAINING MOIST) MEDIUM STIFF TO STIFF TAN-ORANGE CLAYEY SIL HIGHLY MICACEOUS (DRY 50 GROUND **NEKLICYT** 720 840 830 820 810 800 780 770 760 750 740 730

GENERALIZED SUBSURFACE PROFILE ALONG -Y-BRIDGE NO. 109 ON -Y- (SR2999 (HAMPTON ROAD)) OVER NORFOLK SOUTHERN RAILROAD STATE PROJ NO. 34845.1.1 TIP NO. U-2707 FEDERAL ID. NO. STD-300043



0' APPROVED BY: AFR	DRAWN BY: BTR	7 11110
SCALE: VERT. 1" = 10" HOR. 1" = 50"	DATE: APRIL 2012	0400

840 830 820 810 800 790 780 760 750 740 730 720 APPROVED BY: AFR 80 DRAWN BY: BTR **TO SOUTHWEST** 9 SCALE: VERT. 1" = 10' HOR. 1" = 20' EB)-B 16#49-(8) (3) (3) (0) (8) 9 (8) (3) 3 (0) **6 6** (2) ⊜ 6 20 CL -Y-@STA. 16+27.88 WEATHERED C7/1 GENERALIZED SUBSURFACE XS THROUGH END BENT 1 BRIDGE NO. 109 ON -Y- (SR2999 (HAMPTON ROAD)) OVER NORFOLK SOUTHERN RAILROAD STATE PROJ NO. 34845.1.1 TIP NO. U-2707 FEDERAL I.D. NO. STP-3000(1) FORSYTH COUNTY, NORTH CAROLINA 43 (8) **(a)** (9) (2) **(a)** (6) **6 a** ⓓ TO NORTHEAST HERED **NEKLICYT** 840 830 820 810 800 790 780 770 760 750 740 720 730

SUBSURFACE CROSS SECTION (XS) THROUGH END BENT

GENERALIZED

830 790 740 810 800 780 760 750 720 APPROVED BY: AFR 80 SUBSURFACE CROSS SECTION (XS) THROUGH INTERIOR BENT TO SOUTHWEST 9 SCALE: VERT. 1" = 10' HOR. 1" = 20' DATE: APRIL 2012 WEATHERED JOB NO: 40 **NEKLICYT** 20 00/00 (8) **a** 8 **(a)** 9 TAN-BROWN SILTY FINE TO SOME MICA AND WANGANESE CL -Y-@STA. 16+88.88 GENERALIZED SUBSURFACE XS THROUGH INT. BENT 1 BRIDGE NO. 109 ON -Y- (SR2999 (HAMPTON ROAD)) OVER NORFOLK SOUTHERN RAILROAD STATE PROJ NO. 34845.1.1 TIP NO. U-2707 SURF GROUND 40 BI-A 16+57 1 ft 38 (2) (Q) (3) 9 TO NORTHEAST GENERALIZED -80 -100 830 820 810 800 790 780 740 730 720 760 750

APPROVED BY: AFR WKMENT FILL GENERALIZED SUBSURFACE CROSS SECTION (XS) THROUGH INTERIOR BENT TO SOUTHWEST WEATHERED ROCK (GRANITE) VERTICAL B2-B 18+08 f+ RT CL -Y-@STA. 17 + 80.88 (3) @ **(a)** (2) <u>@</u> (2) ⊜ B2-A 17+84 51 f† L **®** TO NORTHEAST -100

GENERALIZED SUBSURFACE XS THROUGH INT. BENT 2 BRIDGE NO. 109 ON -Y- (SR2999 (HAMPTON ROAD)) OVER NORFOLK SOUTHERN RAILROAD STATE PROJ NO. 34845.1.1 TIP NO. U-2707

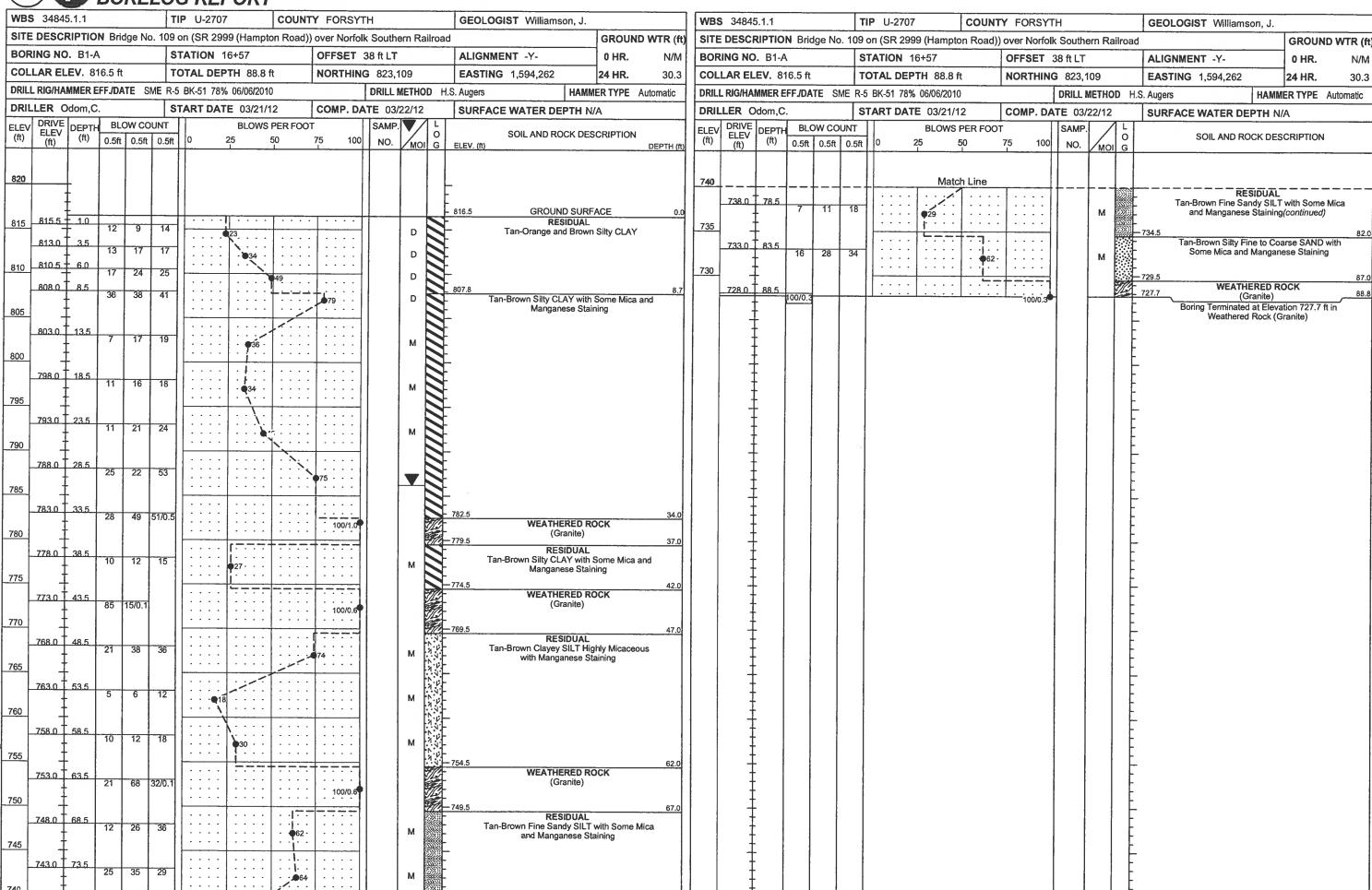


HOK 1" = 20	
DATE: APRIL 2012	DRAWN BY: BTR
OB NO:	SHEFT: 7

6	V		SUK		UG	REI	POR																											
W	BS 34845	.1.1			TIP	U-270	7	COL	JNTY	FORSY	TH			GEOLOGIST Williamso	n, J.			WB	S 3484	15.1.1			TI	IP U-2707		COUNT	Y FORSY	ГН			GEOLOG	IST Williamso	on, J.	
SI	TE DESCR	IPTION	Bridge	e No. 1	09 or	(SR 29	99 (Hamp	ton Ro	ad)) ov	er Norfo	lk Sout	nem R	ailroad			GROUN	D WTR (fi	SIT	E DESC	RIPTIO	N Brid	lge No.	. 109 (on (SR 2999	(Hampto	n Road))	over Norfol	k South	ern Ra	ailroad				JND WTR (f
ВС	DRING NO	EB1-A	4		STA	ATION	6+19		0	FFSET	43 ft L	Г		ALIGNMENT -Y-		0 HR.	67.0			O. EB1			$\overline{}$	TATION 16			OFFSET				ALIGNME	ENT -Y-	0 HR	
CC	LLAR EL	EV. 815	5.2 ft		TO	TAL DEF	TH 80.0) ft	N	ORTHIN	IG 823	,149		EASTING 1,594,303		24 HR.	22.0	CO	LLAR E	LEV. 8	15.2 ft		TO	OTAL DEPT	H 80.0 f	1	NORTHIN	G 823,	149			1,594,303	24 HR	
DR	ILL RIG/HAI	IMER EF	F/DATE	SME	R-5 E	3K-51 78%	6 06/06/20	10			DRILL	METH	D H.S	S. Augers	HAMME	R TYPE	Automatic	DRIL	L RIG/H	AMMER E	FF/DA	TE SM	ME R-5	BK-51 78%	06/06/2010			DRILL	METHO	DD H.	S. Augers		HAMMER TYPI	
DF	ILLER O				STA	ART DAT	E 03/19	/12	C	OMP. D	ATE 0	3/20/12		SURFACE WATER DEP	TH N//	Ą		DR	LLER	Odom,C	; .		S	TART DATE	03/19/1	2	COMP. DA	TE 03	/20/12	:	SURFACE	E WATER DEP	PTH N/A	
ELE (ft	DRIVE ELEV (ft)	DEPTH (ft)	BLOW 0.5ft 0			0	BLOW 25	S PER F 50	:ООТ 75	100	11	MC MC	0	SOIL AND ROC	CK DES	CRIPTION	DEPTH (ff	ELE\	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	0.5ft		0 25		PER FOOT	75 100	SAMP NO.	1/	0 0	-	SOIL AND ROO	CK DESCRIPTION	NC
DF	BILLER O FV DRIVE ELEV (ft) B11.7 - B09.2 - B09.2 - B09.7 - B09.7 - T96.7 - T76.7 - T77.7 -	1.0 3.5 6.0 8.5 33.5 38.5 43.5 48.5	BLOW 0.5ft 0 0 4 4 7 5 1 1 7 3 3 8 4 6 1 1 7 3 2 4 76 /	7 COUN 0.5ft 0 0 0 0 0 0 0 0 0	ST/A	0 0	BLOW 25	/12 S PER F 50	OOT 75		ATE 03	D D D D M M M M M M		SURFACE WATER DEP SOIL AND ROCELEV. (ft) 815.2 GROUND	SURFADUAL CA With Carlot Carlo	CRIPTION ACE The Some Minimum	0.0 doca 32.0 ne 44.0	DRI ELE	DRIVE ELEV (ft)	Odom,C	BLC 0.5ft	ow cou	UNT 0.5ft	TART DATE	03/19/1 BLOWS	2 PER F001	75 100	TE 03	/20/12	L O G	SURFACE Ta Mic 735.2	E WATER DEP	PTH N/A CK DESCRIPTION DUAL Bandy SILT with se Staining/conti	Some inued)
80RE DOUBLE 12-089A.GPJ NC_D 242 222 229	751.7	63.5	25 75/v 31 3: 25 2:	2 4					70	100/0.9		M		756.2 WEATHER (Grai 753.2 RESIL 7an-Orange Fine Sa Mica and Mang	nite) DUAL andy SIL	T with sorr	62.0 ne		-															
8 CDOJ 740		73.5	16 10	6 17			. 333.	1::				М	E																	-				

NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 34845.1.1		ITY FORSYTH	GEOLOGIST Williamson, J.		1A/P	S 3484	15 1 1			TIP	11 2707	COUNT	V FORM	ш		050101	NOT MEN'			
SITE DESCRIPTION Bridge No.	. 1			GROUND WTR (ft)				M Delal-	ao Na		U-2707		Y FORSYT		en Delli		SIST Williams		CBOUNT	D Mars (
BORING NO. EB1-B	STATION 16+49	OFFSET 34 ft RT	ALIGNMENT -Y-	0 HR. 36.0	_	RING NO			уе 140.		(SR 2999 (Hampte	un Koad)	OFFSET 3		m Kaliro		ENT V			D WTR (
COLLAR ELEV. 817.1 ft	TOTAL DEPTH 89.4 ft	NORTHING 823,116	EASTING 1,594,227	24 HR. 23.0		LLAR EI					TAL DEPTH 89.41	F4	NORTHING		16	ALIGNM	ENI -Y-		0 HR.	36.
DRILL RIG/HAMMER EFF./DATE SME		DRILL METHOD H		IER TYPE Automatic					E CM		BK-51 78% 06/06/2010		L			H.S. Augers	1,594,22/		4 HR.	23.
DRILLER Odom,C.	START DATE 03/16/12	COMP. DATE 03/19/12	SURFACE WATER DEPTH N	I/A	DBI	LIED (Odom C		E SIVIE		ART DATE 03/16/		COMP. DA				E WATER DE			Automatic
ELEV DRIVE DEPTH BLOW COUN				/A	E C	DRIVE	DEDTI	BLOV	w cou			PER FOO		SAMP.	19/12	SURFAC	E WATER DE	EPIH N/A		
(ft) ELEV (ft) 0.5ft 0.5ft 0		75 100 NO. MOI G	SOIL AND ROCK DES	SCRIPTION DEPTH (ft)	(ft)	DRIVE ELEV (ft)	(ft)	0.5ft				50	75 100	1 1	MOI		SOIL AND RO	OCK DESC	RIPTION	
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816.1 1.0 7 4	4		817.1 GROUND SURF		705		‡			11	35				М	E	(00	ontinued)		ŭ
813.6 + 3.5	*	P	Tan-Brown Silty CLAY wi	ith Some Mica	735		+ 83.5									-				
811.1 6.0	7						‡	35	54 4	16/0.3	. L	† -	100/0.8			733.1	WEATH	ERED RO	СК	84
810	10 20		-		730	7 .	‡										(0	Granite)		
808.6 + 8.5	15					728.6	+ 88.5 +	51 4	49/0.4				100/0.9] [9		<u> </u>			8
805			805.1	12.0			‡						100/0.3			j B	oring Terminated Weathered	d at Elevati d Rock (Gra	on 727.7 f inite)	tin
803.6 - 13.5 6 5	6 .]		Tan-Orange Clayey SILT H			-	†									F				
	911						Ī									E				
798.6 + 18.5			-			-	<u> </u>									F				
	4 . 8	M 1					<u>†</u>									[
795	1		-			-	‡]		<u> </u>				
793.6 + 23.5 3 3	3						‡									ţ				
790			790.1	27.0			‡									ļ.				
788 6 7 28 5			Tan-Orange Silty CLAY with Manganese Stai	27.0 Some Mica and		-	‡									-				
2 2	3	: : : : : w S	manganese Stall	riing			‡									ļ				
785		· ····	785.1 Tan-Orange Fine Sandy S	II T with Some		-	‡									Ļ				
783.6 + 33.5 3 4	5	: : : : : w	Mica and Manganese	Staining			‡									ļ				
780							‡									ļ.				
778.6 - 38.5						-	‡									F				
_	9 17	: : : : :					†									F				
773.6 + 43.5			_			-]									F				
773.0 7 43.5 5 26 4	10	66 M					Ŧ									E				
770			770.1	47.0			£									E				
768.6 + 48.5 17 35 3	33		Tan-Brown Silty Fine to Coa Some Mica and Mangan	arse SAND with lese Staining			‡									E				
765		***	765.1	50.5			‡									ŧ				
763 6 + 53 5			Olive-Brown Fine Sandy S	52.0 SILT with Clay		-	‡									F				
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<u> 740 </u>					Į	1	T I							1 1	1	T				



BORELOG REPORT						
WBS 34845.1.1 TIP U-2707	COUNTY FORSYTH	GEOLOGIST Williamson, J.	WB\$ 34845.1.1	TIP U-2707 COUNTY FORSY	TH	GEOLOGIST Williamson, J.
SITE DESCRIPTION Bridge No. 109 on (SR 2999 (Hampi	ton Road)) over Norfolk Southern Railroad	GROUND WTR (ft)	SITE DESCRIPTION Bridge No. 1	09 on (SR 2999 (Hampton Road)) over Norfo	olk Southern Railroad	GROUND WTR (f
BORING NO. B1-B STATION 16+91	OFFSET 23 ft RT	ALIGNMENT -Y- 0 HR. N/A	BORING NO. B1-B	STATION 16+91 OFFSET	23 ft RT	ALIGNMENT -Y- 0 HR. N/A
COLLAR ELEV. 817.7 ft TOTAL DEPTH 74.3	ft NORTHING 823,074	EASTING 1,594,242 24 HR . 23.0	COLLAR ELEV. 817.7 ft	TOTAL DEPTH 74.3 ft NORTHIN	IG 823,074	EASTING 1,594,242 24 HR. 23.0
DRILL RIG/HAMMER EFF./DATE SME R-5 BK-51 78% 06/06/201	0 DRILL METHOD H.	S. Augers HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE SME	R-5 BK-51 78% 06/06/2010	DRILL METHOD H.S	<u> </u>
DRILLER Odom,C. START DATE 03/20/		SURFACE WATER DEPTH N/A	DRILLER Odom,C.	START DATE 03/20/12 COMP. DA	ATE 03/21/12	SURFACE WATER DEPTH N/A
I (a) ELEV (a)	50 75 100 NO. MOI G	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)	ELEV CRIVE C		SAMP. L O O NO. MOI G	SOIL AND ROCK DESCRIPTION
830 816.7 1.0 9 11 12 815 814.2 3.5 18 19 30 811.7 6.0 10 12 15 809.2 8.5 23 29 34 805 804.2 13.5 3 5 7 800 799.2 18.5 15 28 68 795 794.2 23.5 3 4 6 790 789.2 28.5 8 17 27 785 784.2 33.5 8 15 25 780 775 774.2 43.5	D D D D D D D D D D D D D D D D D D D		750	Match Line Match Line	NO. MOI G	
770	100/0.7 100/0.8 100/0.7	Brown Fine Sandy SILT with Some Mica and Manganese Staining 770.7 47.0 WEATHERED ROCK (Granite)				

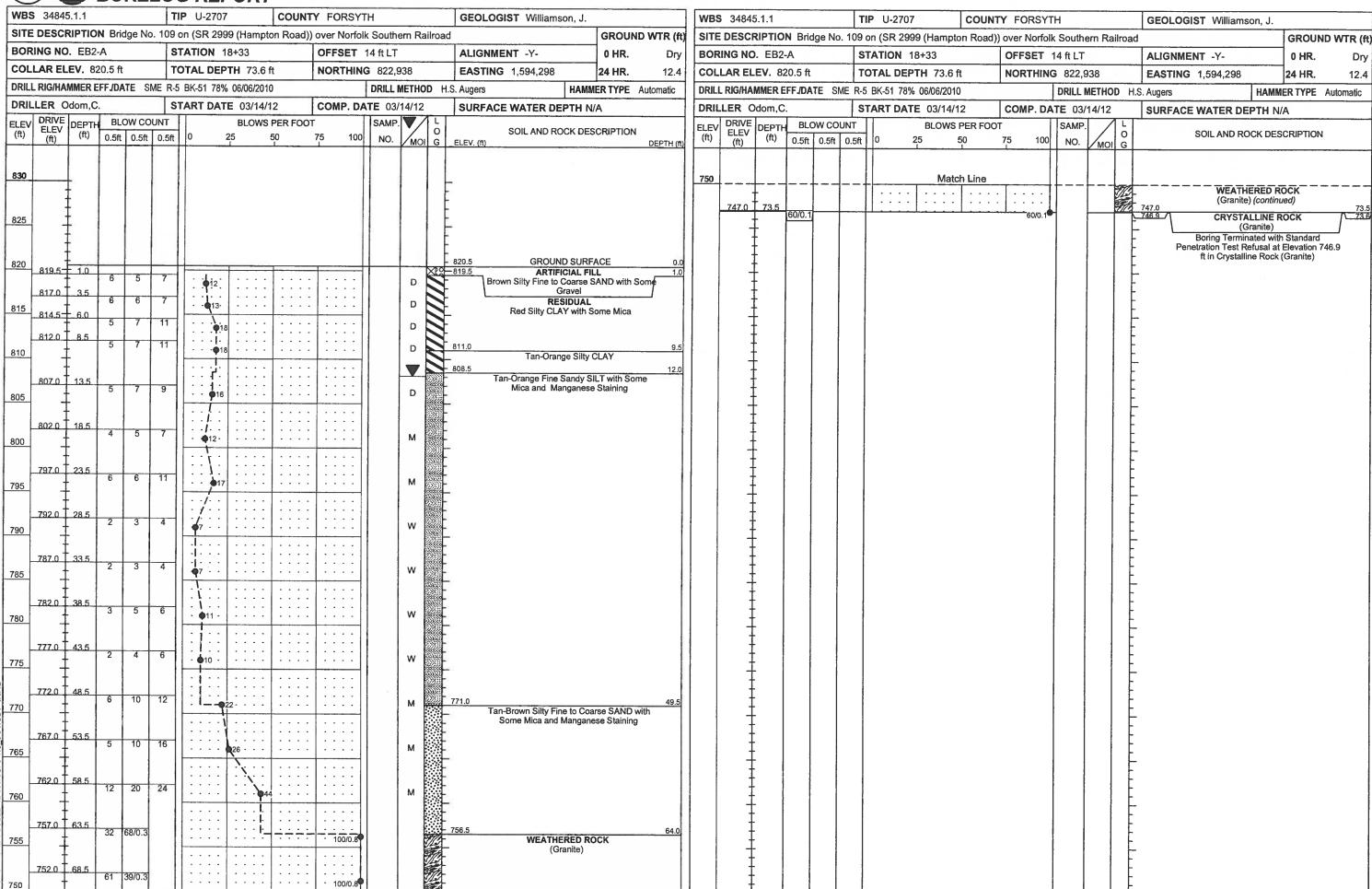
GROUND WTR (ft)

N/A

23.5

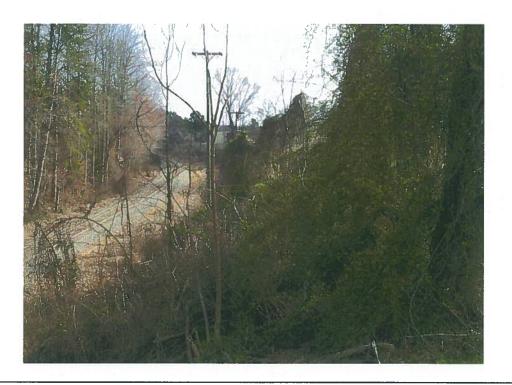
MAINTENNESS	Y	y B	ORE	ELO	G REI	PORT	<u> </u>																						
STATISTIC Column														WB	3 S 3	34845.1.1				TIP U-270	7	COUNT	Y FORSY	TH			GEOLOGIST Williamso	n, J.	
Column C			Bridge N				ton Road)				ilroad		GROUND WTR (ft)	SIT	E DE	ESCRIPTI	ON B	ridge N	lo. 10	9 on (SR 29	99 (Hamp	oton Road))	over Norfol	lk South	nern Ra	ailroad		GROUND V	WTR
MAIL STATE OF SEASON See No. 1981 (2015) SEASON S				_								ALIGNMENT -Y-	0 HR. N/A	ВО	RING	3 NO . B2	-A			STATION '	17+84		OFFSET	51 ft LT			ALIGNMENT -Y-	0 HR.	N
Second S								NORTHIN				I		- I									NORTHIN	G 822,	983		EASTING 1,594,276	24 HR.	23
Section Sect			/DATE											DRII	LL RIC	G/HAMMER	EFF/D	DATE	SME F	R-5 BK-51 78%	6 06/06/20	110		DRILL	METHO	DD H.S	S. Augers	HAMMER TYPE Aut	tomati
10 10 10 10 10 10 10 10					TART DAT			L		_		SURFACE WATER DEPTH N	I/A	1 —											_		SURFACE WATER DEP	TH N/A	
Section Sect	(ft) ELEV	DEPTH								17	0				V EL	LEV DEP	TH B							11			SOIL AND ROO	CK DESCRIPTION	
### 15	(11)		.01.0.01	0.51		<u> </u>	<u></u>	70 100	NO.	MOI	G	ELEV. (ft)	DEPTH (ft)		((ft) (11)	0.5	π 0.5π	1 0.5	m O	25		75 100	NO.	MO	I G			
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## 150 10	816.5	- 1			13.			II.		D		Red-Brown and Red-Orang Some Mica	e Silty CLAY with		73	+ 36.5 + 83.5						: !					738.0 WEATHE		
## 150 10	815	- 60	7 8	9	17	7		1		D		•		735		+	83	17/0.	.2				100/0.7				(Gra	anite)	
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10			3 4	6						l	-	Tan-Orange Fine Sandy S Mica and Manganese	GILT with Some			Ŧ										F	Penetration Test Ref	usal at Elevation 731.4	4
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740 + 125 23 32] ‡					: : : :										‡										<u> </u>			
	741.5 +		5 23	32	: : : :	: : : :	55			м	#	Tan-Orange Silty Fine SAI	ND with Some			‡										<u> </u>			

BORELOG REPORT						
WBS 34845.1.1 TIP U-2707	COUNTY FORSYTH GE	DLOGIST Williamson, J.	WBS 34845.1.1	TIP U-2707 COUNTY	Y FORSYTH	GEOLOGIST Williamson, J.
SITE DESCRIPTION Bridge No. 109 on (SR 2999 (Hampto	on Road)) over Norfolk Southern Railroad	GROUND WTR (ft)	SITE DESCRIPTION Bridge No.	109 on (SR 2999 (Hampton Road))	over Norfolk Southern Railroad	GROUND WTR
BORING NO. B2-B STATION 18+08	OFFSET 3 ft RT ALI	33.0 OHR. 33.0	BORING NO. B2-B	STATION 18+08	OFFSET 3 ft RT	ALIGNMENT -Y- 0 HR. 33
COLLAR ELEV. 821.1 ft TOTAL DEPTH 83.5 ft	t NORTHING 822,959 EAS	TING 1,594,277 24 HR . 25.5	COLLAR ELEV. 821.1 ft	TOTAL DEPTH 83.5 ft	NORTHING 822,959	EASTING 1,594,277 24 HR. 25
DRILL RIG/HAMMER EFF./DATE SME R-5 BK-51 78% 06/06/2010	DRILL METHOD H.S. Auge	rs HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE SME	E R-5 BK-51 78% 06/06/2010	DRILL METHOD H.	- L
DRILLER Odom,C. START DATE 03/13/1	2 COMP. DATE 03/14/12 SUF	FACE WATER DEPTH N/A	DRILLER Odom,C.	START DATE 03/13/12	COMP. DATE 03/14/12	SURFACE WATER DEPTH N/A
CONTRACTOR OF THE PROPERTY OF	PER FOOT SAMP.	SOIL AND ROCK DESCRIPTION	ELEV DRIVE DEPTH BLOW COUN		SAMP. L	SOIL AND ROCK DESCRIPTION
(ft) (ft) (ft) 0.5ft 0.5ft 0.5ft 0	50 75 100 NO. MOI G ELEV.	(ft) DEPTH (ft)	(ft) (ft) (ft) 0.5ft 0.5ft 0	0.5ft 0 25 50	75 100 NO. MOI G	SOIL AND ROOK DESCRIPTION
825			745	Match Line		
			742.6 + 78.5			WEATHERED ROCK
820 820.1 1.0	821.1	GROUND SURFACE 0.0 RESIDUAL	740 60 40/0.2		100/0.7	(Granite)
817.6 + 3.5	D	Brown Clayey SILT			100/0.7	-
6 10 10	· · · ·		737.6 + 83.5 60/0.0		60/0.0	Bonng Terminated with Standard
815 815.1 6.0 4 5 7	815.1	Red-Brown Silty CLAY	‡			Penetration Test Refusal at Elevation 737.6 ft on Crystalline Rock (Granite)
812.6 + 8.5 14 44 36	h					
810	•80 M					
807.6 + 13.5	809.1	Tan-Orange Fine Sandy SILT with Some			F	-
805	: : : : : : : : M	Mica and Manganese Staining			[
+						-
802.6 + 18.5	: : : : : : : :					
800						_
797.6 + 23.5						
795						
						-
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787.6 + 33.5 5 5 12						
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777.6 + 43.5 7 8 16	: : : : : : : : _M					
775	<u> </u>				E	
772.6 48.5	: : : : : : : :					
770	: : : : : : : :				[
T						
767.6 + 53.5 3 5 6	: : : : : : : :					
765	• • • • • • • • • • • • • • • • • • •					
762.6 - 58.5 6 10 12	: : : : : : : :					
760 +	: : : : : : : : M				‡	
757.6 - 63.5 8 12 20	[:::: [::::]					•
	: : : : : : : : м [
755	754.1	67.0				
752.6 + 68.5	50 · · · · · · · M	Tan-Brown Silty Fine to Coarse SAND with Some Mica and Manganese Staining				
750	50 · · · · · · · · · · · · · · · · · · ·	_				
747.6 + 73.5					F	
752.6 - 68.5 15 21 29	M					
[170]						





Photograph No. 1: This photograph was taken right of the center line of –Y- alignment, looking East along the railroad tracks.



Photograph No.2: This photograph was taken from the right side of the –Y- alignment looking East across proposed Interior Bent No. 2.

ID: U-270

CONTENTS

DESCRIPTION

Bore Logs, Core Logs and Core Photos

Title Sheet

Cross Sections

SoilTest Results

Rock Test Results Site Photographs

Legend

Profile

Site Plan

SHEET

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ROJECT: 34845.1.1

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34845.1.1 (U-2707)

COUNTY FORSYTH

PROJECT DESCRIPTION CLEMMONS - (SR3000 (IDOLS ROAD EXTENSION))

FROM (SR2999 (HAMPTON ROAD)) TO US-158 (CLEMMONS ROAD)

SITE DESCRIPTION BRIDGE NO. 656 ON -L- (SR3000 (IDOLS ROAD EXTENSION)) OVER MUDDY CREEK

INVENTORY

N.C. 34845.1.1 (U-2707) 1 37

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF SYUDY, PLANNING, AND DESIGNA AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE YARROUS FELO BORNING LOGS, ROCK CORES, AND SOU TEST OATA AVALABLE WAY BE REVEWED OR INSPECTED IN RALEDH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, CEOTECHNICAL ENGINEERING UNIT AT 1989 107-6850, NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FELD BORING LOGS, ROCK CORES, OR SDIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVALABLE SUBSURFACE OATA AND MAY NOT NECESSARLY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNOS OR BETWEEN SAMPLED STRATA CAN BE RELED ON ONLY TO THE DECREE OF RELABILITY NHEREMY IN THE SYAMDARD TEST METHOD. THE OBSCRIVED WATER LEVELS OR SOIL MOSTUME CONDITIONS MODICATED IN THE SUBSURFACE INVESTICATIONS ARE AS RECORDED AT THE TIME OF THE INVESTICATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS WOCATED OCUMENTS CONDITIONS AND WATER CHAPTED AND THE SYAMDARD TEST METHOD.

THE BODER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL OESIGN DETAILS ARE OFFERENT, FOR BIDDING AND CONSTRUCTION PLANS AND DOCUMENTS FOR FRAIL OESIGN HOFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT MARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INVERPRETATIONS MADE, OR OPINION OF THE OPPARTMENT AS YO THE TYPE OF MATERIALS AND CONDITIONS YO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY YOU SATISFY HAWEELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT, THE CONTRACTOR SHALL HAVE NO CLAMA FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS TO BE

	J. BRANDSEN
	E. MAYR
	B. RATTI
	M.B. MOSELEY
	M.G. MOSELEY
INVESTIGATED	BY S&ME, INC.
CHECKED BY_	A.F. RIGGS, JR.
SUBMITTED BY	S&ME, INC.
DATE	

PERSONNEL

141556/4

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED TERMS AND DEFINITIONS WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COA UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO MANU NULK IS MUNT-UNSITE FLAIM MATERIAL THAT IT ESTEU, WOLD TIELD ST. ACT GOME HAT THE UNITED AT REFUSAL.

SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0,1 FOOT PER 60 BLOWS.

IN NON-COASTAL PLAIM MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS ALLUYIUM (ALLUY.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER, SOIL IS CONSIDERED TO BE THE UNCONSDICIOTED, SEMI-CONSDICIOTED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER MAGER, AMY DIELD LESS THAN 188 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE; CONSISTENCY, COLOR, TEXTURE, MOSTIVER, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: ADUIFER - A WATER BEARING FORMATION OR STRATA. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. ARENACEDUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND, ANGULARITY OF GRAINS ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: RGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS. THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTEO. YERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LIVERS, HIGHLY PLASTIC, A-7-ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL SOIL LEGEND AND AASHTO CLASSIFICATION MINERALOGICAL COMPOSITION FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT AT WHICH IT IS ENCOUNTERED, BUT WHICH ODES NOT NECESSARILY RISE TO OR ABOVE THE MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE. GROUND SURFACE. WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE. SILT-CLAY MATERIALS ORGANIC MATERIALS WOULD TIELD STRETUSH IT TESTED, ROCK TYPE INLLODES GRANITE,

GINEISS, GABBRO, SCHIST, ETC.

FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN

SEDIMENTARY ROCK THAT WOULD YELLO SPT REFUSAL IF TESTED. ROCK TYPE

INCLUDES PYHLLITE, SLATE, SANDSTOME, ETC.

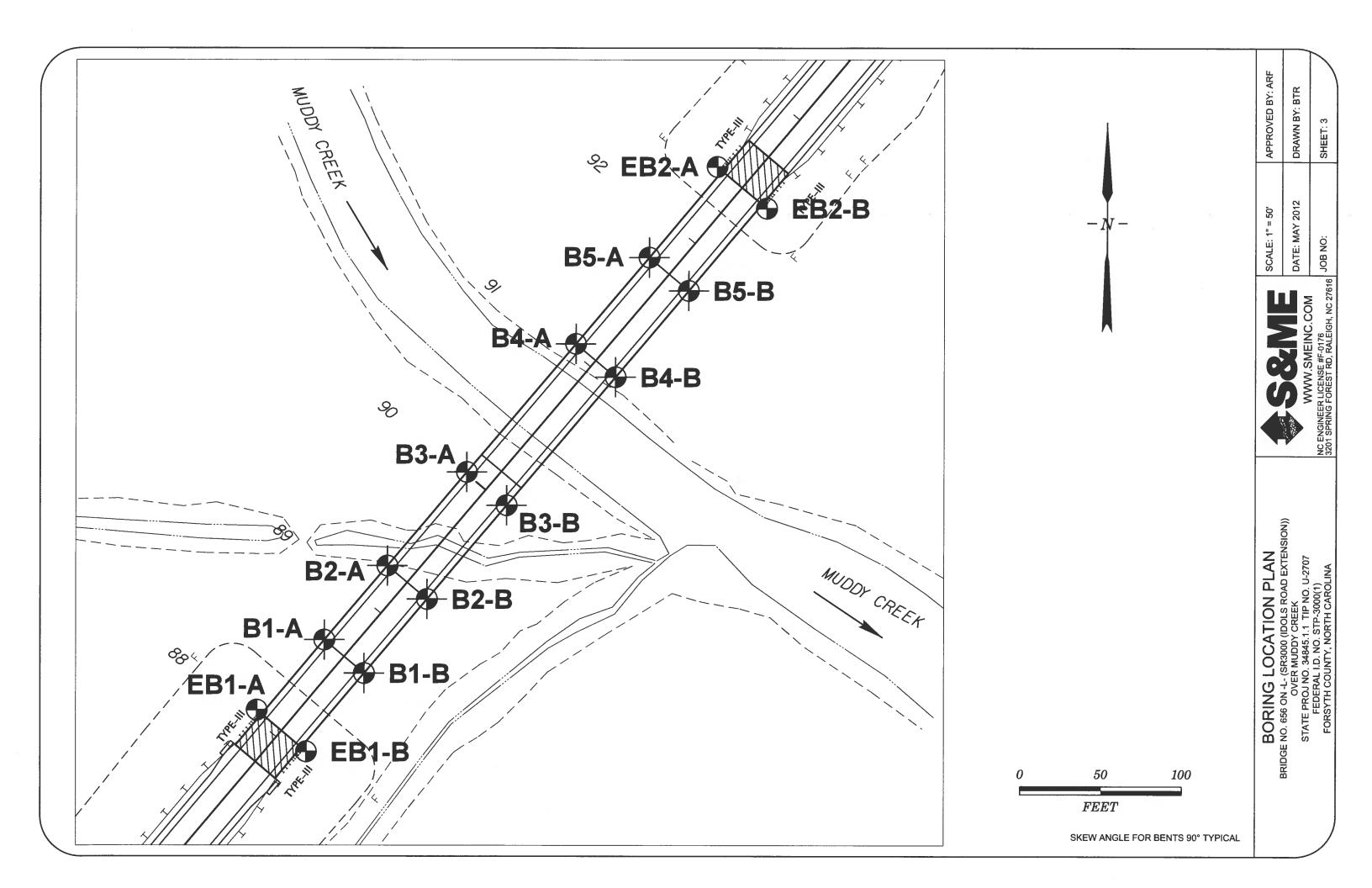
COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD CLASS. (≤ 35% PASSING *200 (> 35% PASSING *200) CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. NON-CRYSTALL INE ROCK INCRI A-4 A-5 A-6 A-7 GROUP A-1. A-2 A-4. A-COLLUYIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM CLASS. A-3 A-6, A-7 SLIGHTLY COMPRESSIBLE LIDUID LIMIT LESS THAN 31 LIDUID LIMIT EDUAL TO 31-50 MODERATELY COMPRESSIBLE SYMBOL 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, HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50 SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED NTAGE OF MATERIAL PASSING DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT WEATHERING SILT - CLA CLAY ORGANIC MATERIAL ROCKS OR CUTS MASSIVE ROCK. SOILS PEAT SOILS SOILS OTHER MATERIAL SOILS RESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE 2 - 3% 3 - 5% TRACE 1 - 10% 10 - 20% HAMMER IF CRYSTALLINE. ITTLE ORGANIC MATTER 5 - 12% MODERATELY ORGANIC FRY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF SOME 20 - 35% ASTIC INDEX 6 MX NP 18 MX 18 MX 13 MN 31 MN 38 MX 18 MX 33 MN 3 CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF V SLIJ LITTLE OR HIGHLY ORGANIC >10% >20% 35% AND ABOVE THE LINE OF OIP, MEASURED CLOCKWISE FROM NORTH. DF A CRYSTALLINE NATURE. GROUP INDEX 0 8 4 MX B MX 12 MX 16 MX No M GROUND WATER FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO AMOUNTS OF SOILS SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. USUAL TYPES STONE FRAGS 1 INCH. OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAF WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER ORILLING (SLI.) OF MAJOR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. GRAVEL AND SAND SOILS SOILS **Y**... MATERIALS. SAND STATIC WATER LEVEL AFTER 24 HOURS SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN MODERATE $\begin{array}{l} {\tt FLOAT} \ - \ {\tt ROCK} \ {\tt FRAGMENTS} \ \ {\tt ON} \ \ {\tt SURFACE} \ \ {\tt NEAR} \ \ {\tt THEIR} \ \ {\tt ORIGINAL} \ \ {\tt POSITION} \ \ {\tt AND} \ \ {\tt OISLODGED} \ \ {\tt FROM} \\ {\tt PARENT} \ \ {\tt MATERIAL}. \end{array}$ GEN, RATIN **∇**P₩ GRANITOIO ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS PERCHEO WATER, SATURATED ZONE, OR WATER BEARING STRATA EXCELLENT TO GOOD POOR INSUITABL DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COM-SUBGRADE CLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM, PI OF A-7-5 SUBGROUP IS ≤ LL - 30 : PI OF A-7-6 SUBGROUP IS > LL - 30 ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELOSPARS DULL (DOERATELY CONSISTENCY OR DENSENES LANEOUS SYMBOL 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, FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. MOD. SEV. COMPACTNESS OR TEST BORING ROADWAY EMBANKMENT (RE) PRIMARY SOIL TYPE ENETRATION RESISTENCE COMPRESSIVE STRENGTH DPT DMT TEST BORING IF TESTED, WOULD YIELD SPT REFUSAL JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. WITH SOIL DESCRIPTION (TONS/FT2) (N-VALUE) 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 LEGGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO VERY LOOSE -- SPT N-VALUE SOIL SYMBOL ITS LATERAL EXTENT. 4 TO 10 EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. MEDIUM DENSE 10 TO 30 30 TO 50 LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS ARTIFICIAL FILL (AF) OTHER IF TESTED, YIELDS SPT N VALUES > 100 BPF MATERIAL CORE BORING (REF)-- SPT REFUSAL DENSE MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. (NON-COHESIVE) THAN ROADWAY EMBANKMENT VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT VERY DENSE >50 THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MI **"**O MONITORING WELL INFERRED SOTI ROUNDARY VERY SOFT <u> PERCHEO WATER</u> - WATER MAINTAINED ABOVE THE NORMAL GROWND WATER LEVEL BY THE PRESENCE OF AN (0.25 TERVENING IMPERVIOUS STRATUM. 0.25 TO 0.50 0.5 TO 1.0 GENERALLY TETTE INFERRED ROCK LINE PIEZOMETER VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF Δ STI T-CLAY MEDIUM STIFF 4 TO B INSTALLATION ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. 1 TO 2 ALLUVIAL SOIL BOUNDARY SLOPE INDICATOR \bigcirc SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ROCK DUALITY DESIGNATION (ROD) - 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 AN VERY STIFF (COHESIVE) 15 TO 30 INSTALLATION DIP & DIP DIRECTION OF ROCK HARDNESS XPRESSED AS A PERCENTAGE. ROCK STRUCTURES CONE PENETROMETER TEST TEXTURE OR GRAIN SIZ SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SOUNDING ROD U.S. STO. SIEVE SIZE SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AN CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED **ABBREVIATIONS** RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL COARSE FINE TO DETACH HAND SPECIMEN. GRAVEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. CORRLE VST - VANE SHEAR TEST MEO. - MEDIUM CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE (COB.) (GR.) (SL.) (CL.) BT - BORING TERMINATED MICA. - MICACEDUS WEA. - WEATHERED SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED MOO. - MODERATELY - UNIT WEIGHT 0.25 0.05 2.0 0.005 CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 - DRY UNIT WEIGHT STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPT) - NUMBER OF BLOWS (N OR BPF) OF A 148 LB, HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF I FOOT INTO SOIL WITH CAN BE GROOVED OR GOUGED 8.85 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.
CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE DILATOMETER TEST SOIL MOISTURE - CORRELATION OF TERMS PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS POINT OF A GEOLOGIST'S PICK. SOIL MOISTURE SCALE GUIDE FOR FIELD MOISTURE DESCRIPTION - VOIO RATIO SO. - SAND, SANDY SS - SPLIT SPOON SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS (ATTERBERG LIMITS) DESCRIPTION SILT, SILT ST - SHELBY TUBE CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN <u>Strata core recovery (srec.)</u> - total length of strata material recovered divided by total length OF stratum and expressed as a percentage. FOSS. - FOSSILIFEROUS SLI. - SLIGHTLY RS - ROCK PIECES CAN BE BROKEN BY FINGER PRESSURE. SATURATED STRATA ROCK <u>QUALITY DESIGNATION (SROD) -</u> A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL 10 OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. FRAC. - FRACTURED, FRACTURES TCR - TRICONE REFUSA - RECOMPACTED TRIAXIAL CAN BE CARYED 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 (SAT.) FROM BELOW THE GROUND WATER TABLE VERY FRAGS. - FRAGMENTS LIQUIO LIMIT w - MOISTURE CONTENT CBR - CALIFORNIA BEARING SOFT HI. - HIGHLY V - VERY ASTIC FINGERNAIL SEMISOLID: REQUIRES DRYING TO - WET - (W TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. EQUIPMENT USED ON SUBJECT PROJECT FRACTURE SPACING PLASTIC LIMIT TERM THICKNESS TERM SPACING BENCH MARK: NCDOT TRAVERSE STATION REBAR AND CAP (SEE BELOW) ORILL UNITS: ADVANCING TOOLS VERY THICKLY BEDDED > 4 FEET VERY WIDE MORE THAN 18 FEET - MDIST - (M) SOLIO: AT OR NEAR OPTIMUM MOISTUR X AUTOMATIC MANUAL THICKLY BEDDED OPTIMUM MOISTURE 1.5 - 4 FFFT 3 TO 10 FEET MOBILE 8-ELEVATION: SHRINKAGE LIMIT MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED VERY THINLY BEDDED 0.03 - 0.16 FEET 6' CONTINUOUS FLIGHT AUGER CORE SIZE: CLOSE 0.16 TO 1 FEET REDUIRES ADDITIONAL WATER TO 0.00B - 0.03 FEET BK-51 - DRY - (D) VERY CLOSE LESS THAN 0.16 FEET ATTAIN DPTIMUM MDISTURE B" HOLLOW AUGERS FIAD - FILLED IN AFTER DRILLING THINLY LAMINATED < 0.00B FEET INDURATION PLASTICIT CME-45C HARD FACED FINGER BITS X -N NO NCDOT TRAVERSE STATION REBAR AND CAP: FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC IBL-24) LOCATED AT STA 90+05.76 22.15 RT -L-N 827577 E 1599302 ELEV 698.79 (BL-25) LOCATED AT STA 94+16.45 35.36 RT -L-PLASTICITY INDEX (PI) DRY STRENGTH TUNG.-CARBIDE INSERTS NONPLASTIC 0-5 VERY LOW CME-550 RUBBING WITH FINGER FREES NUMEROUS GRAINS FRIABLE SLIGHT CASING W/ ADVANCER GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. HAND TOOLS: N 827882 E 1599576 ELEV 705.52 MEDIUM MEO. PLASTICITY 16-25 PORTABLE HOIST TRICONE _____ STEEL TEETH POST HOLE DIGGER GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE HIGH PLASTICITY MODERATELY INDURATED BREAKS EASILY WHEN HIT WITH HAMMER. X TRICONE 2 15/16 TUNG.-CARB. HAND AUGER SHELBY TUBE COLOR X Diedrich D-50 GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE-INDURATED SOUNDING ROD CORE BIT DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). DIFFICULT TO BREAK WITH HAMMER VANE SHEAR TEST X 3-1/4" H.S.A MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE. EXTREMELY INDURATED SAMPLE BREAKS ACROSS GRAINS.

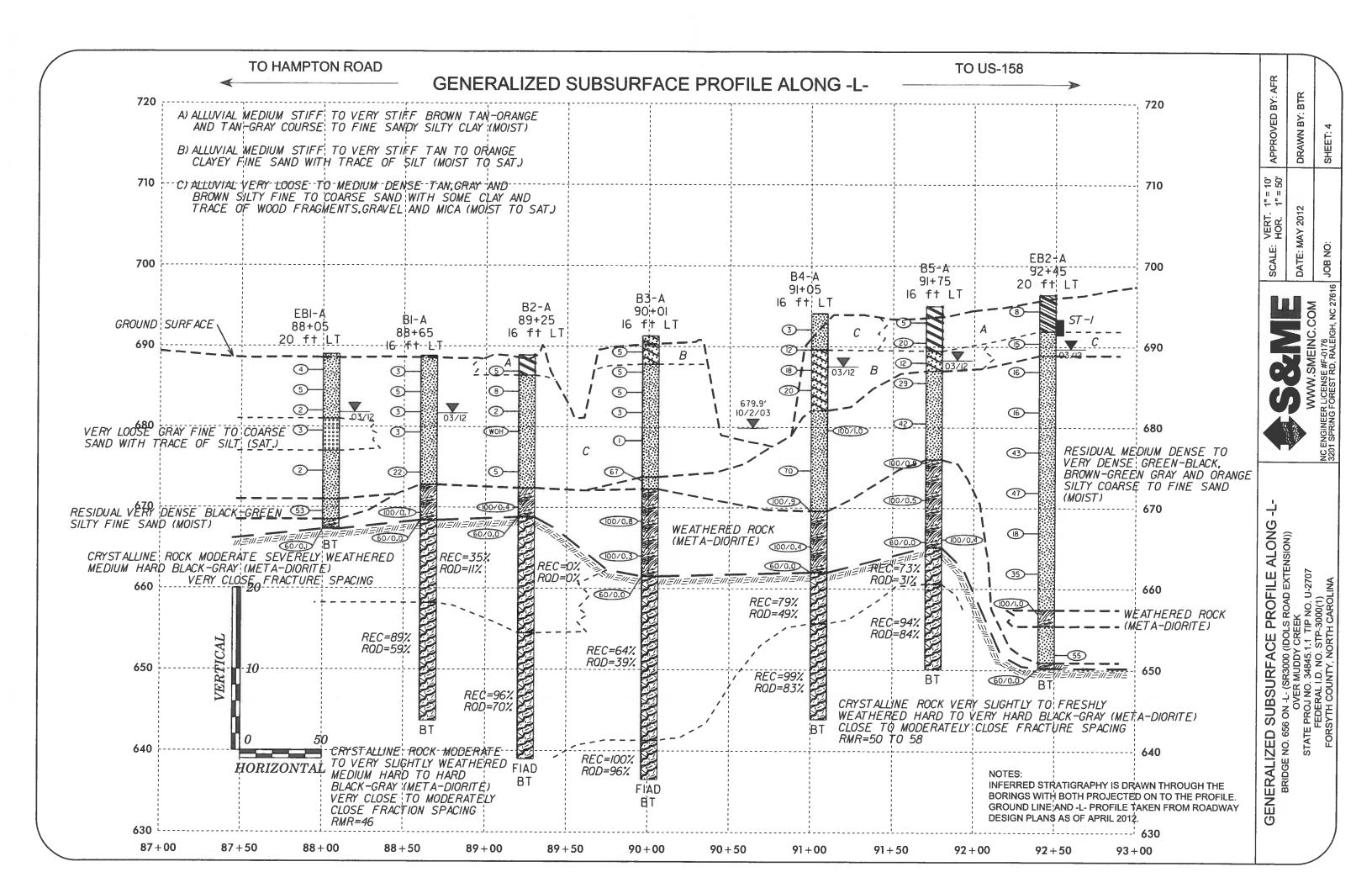
PROJECT REFERENCE NO.

34845.1.1(11-2707)

SHEET NO.

2





SAND (MOST) 710 700 680 406X0 999 650 910 900 280 APPROVED BY: AFR 80 TO SOUTHEAST SCALE: VERT. 1" = 10' DATE: MAY 2012 JOB NO: **CROSS SECTION THROUGH END BENT** (0) <u>@</u> CL EBI-A 88+05 20.-fit._L NOTE: GROUND LINE TAKEN FROM TIN FILE "u2707_Is_tin_110418.dgn" **@ @** CROSS SECTION THROUGH END BENT 1 BRIDGE NO. 656 ON -L- (SR3000 (IDOLS ROAD EXTENSION)) TO NORTHWEST **NEKLICYT** 700 9 710 680 670 999 650 630 620 910 900 280

APPROVED BY: AFR DRAWN BY: BTR SAND MODERATELY WE'ATHERED TO FRESH HARD TO MEDIUM HARD BLACK-GRAY (META-DIORITE) RMR=46 **TO SOUTHEAST DATE: MAY 2012** CROSS SECTION THROUGH INTERIOR BENT BI-B 88+65 16-£‡--ŘŢ-REC=100% ROD=85% CL -L-@STA. 88+65 C BI-A 88+65 -16--f± REC=89%, RQD=59%, NOTE: GROUND LINE TAKEN FROM TIN FILE "u2707_Is_tin_110418.dgn" 6 6 CROSS SECTION THROUGH INTERIOR BENT 1 BRIDGE NO. 656 ON -L- (SR3000 (IDOLS ROAD EXTENSION)) TO NORTHWEST **VERTICAL**

(META-DIORITE) 650 FRACTURE SPACING APPROVED BY: AFR SOUTHEAST r SILTY FINE TO COARS AGMENTS AND LITTLE (F MICA (MOIST TO SAT. DATE: MAY 2012 6 6 NOTE: GROUND LINE TAKEN FROM TIN FILE "u2707_Is_tin_110418.dgn" CROSS SECTION THROUGH INTERIOR BENT 2 BRIDGE NO. 656 ON -L- (SR3000 (IDOLS ROAD EXTENSION)) TO NORTHWEST **NEKLICYT**

CROSS SECTION THROUGH INTERIOR BENT

710 700 9 680 999 670 650 630 620 910 900 590 DIORITE) 80 DIORITE) GRAY SILTY (\$AT.) TO VERY TO SOUTHEAST LOOSE TO LOOSE VERY LODSE TO LOOSE FINE TO COARSE SAND 3 CROSS SECTION THROUGH INTERIOR BENT B3-B 90+0f IG f† RT FIAD REC=42% ROD=18% (2) CL -L-@STA. 90+15 (9) (b) NOTES: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE CROSS SECTION. GROUND LINE AND -L- CROSS SECTION TAKEN FROM TIN FILE "u2707_Is_tin_110418.dgn" 9 REC=100% ROD=96% REC=64% ROD=39% (0) WEATHERED ROCK (META-DIORITE) 9 TO NORTHWEST 80 **NEKLICYT** -100 700 9 710 680 670 999 920 640 630 900 590 620 910

APPROVED BY: AFR

SCALE: VERT. 1" = 10' HOR. 1" = 20'

DRAWN BY: BTR

DATE: MAY 2012

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CROSS SECTION THROUGH INTERIOR BENT 3
BRIDGE NO. 656 ON -L- (SR3000 (IDOLS ROAD EXTENSION))
OVER MUDDY CREEK
STATE PROJ NO. 34845.1.1 TIP NO. U-2707
FEDERAL I.D. NO. STP-3000(1)

STATE PROJ NO. FEDERAL I. FORSYTH COUI

NC ENGINEER LICENSE #F-0176 3201 SPRING FOREST RD, RALE

JOB NO:

700 069 099 710 680 4C/NG 650 640 630 620 910 280 900 80 ALLUVIAL VERY LOOSE TO LOOSE TAN-BROWN SILTY FINE SAND (MOIST TO SOUTHEAST 9 40 **CROSS SECTION THROUGH INTERIOR BENT 4** 84-8 91+05 16 f† R1 REC=73% RQD=39% \Box B4-A 91+05 16 ft 1 NOTE: GROUND LINE TAKEN FROM TIN FILE "u2707_Is_tin_110418.dgn" REC=79% ROD=49% REC=99% ROD=83% MEDIUM DENSE TAN CLAYEY FINE SAND (MOIST TO SAT.) 9 TO NORTHWEST GROUND SURF 8 VERTICAL 700 9 650 640 590 680 670 999 630 620 610 900

APPROVED BY: AFR

SCALE: VERT. 1" = 10' HOR. 1" = 20'

CROSS SECTION THROUGH INTERIOR BENT 4
BRIDGE NO. 656 ON -L- (SR3000 (IDOLS ROAD EXTENSION))
OVER MUDDY CREEK

DATE: MAY 2012

JOB NO:

700 710 9 680 999 650 640 630 620 280 610 ACING 80 TO VERY SUGHTLY TO SOUTHEAST 2 CROSS SECTION THROUGH INTERIOR BENT REC=98% ROD=90% $C\Gamma$ (g) NOTE: GROUND LINE TAKEN FROM TIN FILE "u2707_Is_tin_110418.dgn" WEATHERED ROCK 9 TO NORTHWEST **NEKLICYT** 710 700 929 099 920 640 630 620 900 590 610

APPROVED BY: AFR

SCALE: VERT. 1" = 10' HOR. 1" = 20'

CROSS SECTION THROUGH INTERIOR BENT 5
BRIDGE NO. 656 ON -L- (SR3000 (IDOLS ROAD EXTENSION))

DATE: MAY 2012

WWW.SMEINC.COM NC ENGINEER LICENSE #F-0176 3201 SPRING FOREST RD, RALEIGH, NC 27616

700 710 9 099 680 670 650 640 630 620 910 900 590 APPROVED BY: AFR 80 DIORITE) TO SOUTHEAST ROCK (META-SCALE: VERT. 1" = 10' HOR. 1" = 20' **DATE: MAY 2012** WEATHERED EB2-B 92+45 20 ft R 20 0/00 (8) (4) 4 CL -L-@STA. 92+45 CEB2-A 92+45 20 ft L -20 NOTE: GROUND LINE TAKEN FROM TIN FILE "u2707_Is_tin_110418.dgn" 0007.0 (8) (9) (2) (<u>a</u>) (4) l CROSS SECTION THROUGH END BENT 2 BRIDGE NO. 656 ON -L- (SR3000 (IDOLS ROAD EXTENSION)) OVER MUDDY CREEK CRYSTALLINE (META-DIORITE ALLUVIAL WEDIUM DENSE ORANGE-TAN SILTY COARSE TO FINE SAND WITH TRACE OF GRAVEL (WOIST TO SAT.) 9 WEATHERED ROCK TO NORTHWEST STATE PROJ **VERTICAL** 700 710 9 680 999 670 920 640 630 620 910 900 590

2

CROSS SECTION THROUGH END BENT

JOB NO:

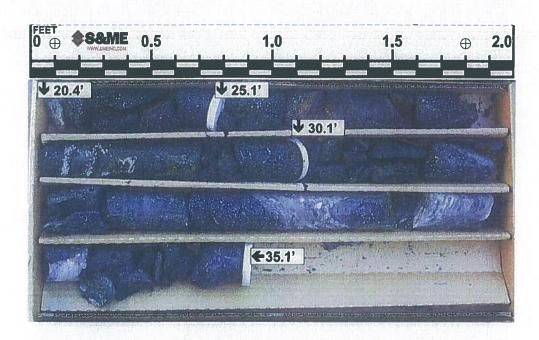
	UNTY FORSYTH	GEOLOGIST Brandsen, J.				TY FORSYTH	GEOLOGIST Brandsen, J.	
SITE DESCRIPTION Bridge No. 656 on SR 3000 (Idols Road			GROUND WTR (ft)	SITE DESCRIPTION Bridge No. 656		er Muddy Creek		GROUND WTR (ft
BORING NO. EB1-A STATION 88+05	OFFSET 20 ft LT	ALIGNMENT -L-	0 HR. N/A		STATION 88+05	OFFSET 20 ft RT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 689.0 ft TOTAL DEPTH 21.7 ft	NORTHING 827,450	EASTING 1,599,140	24 HR. 7.2		TOTAL DEPTH 25.2 ft	NORTHING 827,425	EASTING 1,599,171	24 HR. 7.3
DRILL RIG/HAMMER EFF./DATE SME R-2 DIEDRICH D-50 87% 6/2/2			MER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE SME R-2		DRILL METHOD	H.S. Augers HA	MMER TYPE Automatic
DRILLER Moseley, M. START DATE 03/23/12	COMP. DATE 03/23/12	SURFACE WATER DEPTH	N/A		START DATE 03/23/12	COMP. DATE 03/23/12	SURFACE WATER DEPTH	N/A
DRIVE ELEV (ft)	75 100 NO. MOI G	SOIL AND ROCK DES	SCRIPTION DEPTH (ft)	ELEV (ft) DEPTH BLOW COUNT (ft) 0.5ft 0.5ft 0.5ft	BLOWS PER FOO 25 50	75 100 NO. MOI G		ESCRIPTION
680 688.0 1.0 2 2 2 6 4	75 100 NO. MOI G M M Sat.	689.0 GROUND SURF ALLUVIAL Tan and Gray Silty Fine St Clay 681.0 Gray Fine to Coarse SAND 677.0 Gray Silty Fine S 671.0 RESIDUAL Black-Green Silty Fine	DEPTH (ft) FACE 0.0 AND with Some with Trace of Silt 12.0 SAND 18.0 ne SAND 20.5 ROCK 21.6 2) ROCK 21.6 c) ROCK c) h Standard Elevation 667.3		0 25 50	75 100 NO. MOI G MOI G M M Sat. Sat.	SOIL AND ROCK D GROUND SU ALLUVI Tan Clayey Fire with Some Wood Fragm Mica 667.0 Tan-White Sity Fine SAN Fragments and Tr 667.0 WEATHERED (Metadior Penetration Test Refusal ft on Crystalline Rock	RFACE 0. AL e SAND 3.0 to Coarse SAND ents and Trace of AL D with Some Rock ace of Mica 22.0 ROCK te) 25.2 with Standard at Elevation 663.8

	3484		N 2005		-		P U-2							DRSY					GEOLOG	IST	Brandse	en, J.	,	
	DESC			dge N		_				s Ro	ad) (Over	_						T				-{	ID WTR (
	LAR EL						TATION			5 4 S				SET	-				ALIGNME				0 HR.	N/
	L RIG/HA						DIEDDI	-	-				NOF	RTHIN	_			an er	EASTING PT Core Boring		599,182	LIAMS	24 HR.	7. Automatic
	LER N			112			ART D					<u>'</u>	CON	AP. DA					SURFACI		TED DE			Automatic
ELEV	DDN/E			OW C		Ť		A1_		WS F		OOT				SAMP.	30/12 \bar{\bar{\bar{\bar{\bar{\bar{\bar{	11	SORFACI					
(ft)	(ft)	(ft)	0.5ft	0.5f	t 0.51	ft	0	2	5	5	0		75	100		NO.	MC	0 11 G	ELEV. (ft)	SO	IL AND RO	OCK DES	CRIPTION	DEPTH
690		ļ																	688.8		CROUN	ID SURF	ACE	
	687.8	10	2	1	2	+	1								\parallel		-				AL	LUVIAL		ha.
685	685.3	3.5					•3 ·										W	F		Co:	arse SAND) with Tra	Silty Fine ce of Clay	(0
	682.8	6.0	2	2	3		9 5.	: :		: :	<i>i</i> -	: :	:				W	E	-					
		+	1	1	2	1	9 3 ·										V							
680	680.3	8.5	1	1	2	1	3.						 				Sat.							
		‡							: :	: :			: :					1						
675	675.3	13.5	1	15	7	\dashv			• •								C-4		-					
	-	‡					: : :		2 		· ·	· ·		· ·			Sat.		672.8					16
670	670.3	18.5					: : :		: :	::		: :		: :								ERED RO ta-diorite)		
-	668.4	t	48	77	33/0	2								00/0.7					668.4					20
	-		60/0.0								: :			60/0.0							CRYSTA (Met	LLINE Ro a-diorite)	OCK	
665	_																				V	,		
	-											: :	::											
660	-												: :											
		-				П												E	658.2					30
											: :	: :									(Met	a-diorite)		
655	-							+					-											
]														F	RS-1								
650	1	-						·																
	‡	-									: :	: :	: :	::										
645	1	:									: :	: :	::											
1						Ш		-											643.7					45
	7															1		F	Boi	nng T Cry	erminated /stalline Ro	at Elevati ock (Meta	ion 643.7 ft -diorite)	in
	\exists	-																ŀ	. 1	Adv	anced 3-1/	4" HSA to	20.4 Feet	• _
	Ŧ																	F	2) A 3) Ad	dvano Ivano	ed N Casir	ng to 20.4	e to 20.4 Fe ft, 22.0 ft	eet. :otal
	<u> </u>																	F	4) A	dvanc		sed. re From 2	20.4 to 45.	1 ft.
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NCDOT GEOTECHNICAL ENGINEERING UNIT

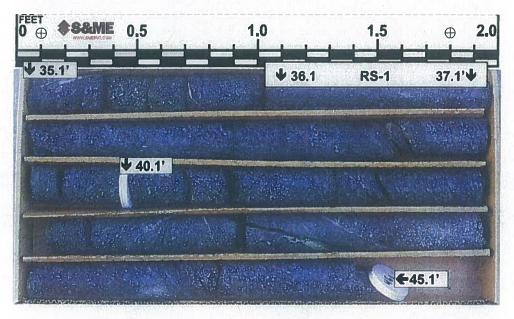
WBS	34845			RE B		U-270				Y F	ORSYT	Н	GEOLOGIST Brandse	n .l		
			L Brid	lge No. 6									DESERVED BIRINGS	, 0,	GROUN	D WTR (f
	NG NO.			190 110. 0	T		88+65	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		100	FSET		ALIGNMENT -L-		0 HR.	N//
	AR ELE						PTH 45	1 ft				827,494	EASTING 1,599,182		24 HR.	7.
				TE SME	<u></u>)11	1		DRILL METHOD SE		HAMB	MER TYPE	
	LER M						TE 03/2			co	MP. DA	TE 03/30/12	SURFACE WATER DE			7.00071040
	E SIZE						N 24.71						OOM AGE WATER DE			
ELEV	RUN ELEV	DEPTH		DRILL RATE	REC.	JN RQD	SAMP.	STR REC.	RQD	L O			DESCRIPTION AND REMARK	cs.		
(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft) %	Ğ	ELEV. (f					DEPTH
668.4	668.4 -	20.4	4.7	N=60/0.0	(0.8)	(0.0)		(3.6)	(1.1)	Ties	668.4		Begin Coring @ 20.4 ft CRYSTALLINE ROCK			20
665				0:10/0.7 1:00/1.0	17%	0%		35%	(1.1) 11%		-		Moderate Severely Weather Medium Hard Black-Gray	ed		
000	663.7 -	25.1		N=60/0.0 0:10/0.7 1:00/1.0 1:00/1.0 1:00/1.0 1:00/1.0		44.40					-	(Meta- with	diorite) with Very Close Fractu 1 joint @ 25° and 3 joints at 5	re Spacir	ng	
			5.0	1:00/1.0	(2.3) 46%	(1.1) 22%					-	******	. John @ 20 and 0 John at t			*
660	_	-		1:00/1.0							_					
	658.7 -	30.1	5.0	1:00/1.0	(3.7)	(1.2)		(12.0)	(0.6)		658.2	-	ery Slightly to Moderately Wea			30
	-	ŧ		1:30/1.0 1:30/1.0	74%	24%		(12.9) 89%	(8.6) 59%		_		Medium Hard to Hard Black-0	Gray		
655	653.7	_ _ 35,1		1:30/1.0 1:30/1.0							_	(Meta-diori) with 4 joints @	te) with Close to Very Close Fr 15 to 30°, 6 joints @ 60 to 75°	acture S _i , and 8 jc	pacing pints @ 90°	
		-	5.0	1:35/1.0 1:35/1.0	(4.7) 94%	(3.4) 68%	RS-1	-			-	R1=7,	qu=1288 KSF Axial R2=13, R3=10, R4=12, R5=4	RMR=4	16	
650	-	-		1:35/1.0 1:35/1.0	0470	00%		1			_		Rock Type E			
	648.7 -	40.1	5.0	1:35/1.0	(5.0)	(4.0)					-					
	-	-	3.0	1:45/1.0	100%						-					
645	640.7	454		1:45/1.0 1:45/1.0						1	- - 643.7					4.6
	643.7 -	<u>45.1</u>		1:45/1.0							- 643.7	Boring Terminated	at Elevation 643.7 ft in Crystal	ine Rock	(Meta-dion	(e)
	-	-									-	1)	Advanced 3-1/4" HSA to 20.4	Feet.		
	_								Ш		-	3) Advar	tvanced 2-15/16" Tricone to 20 need N Casing to 20.4 ft, 22.0	ft total us	sed.	
	-	<u> </u>									-	4) Ad	Ivanced NQ Core From 20.4 t	o 45.1 ft.		
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Project No.:34845.1.1	ID No.: U-2707	Location: Clemmons, NC	Boring No.: B1-A
Site Description: Bridge N	No. 656 on SR 3000 (Idols R	load) over Muddy Creek	Driller. M. Moseley
Collar Elev.: 688.8 ft.	Core Size: NQ	Equipment: D-50	Geologist: J. Brandsen
Elev. at T.D.: 643.7 ft.	Total Depth: 45.1 ft.	Total Run: 24.7 ft.	Date: 3/30/12



Box 1 of 2

Top of Box @ 20.4 feet; Bottom of Box @ 35.1 feet



Box 2 of 2 Top of Box @ 35.1 feet; Bottom of Box @ 45.1 feet

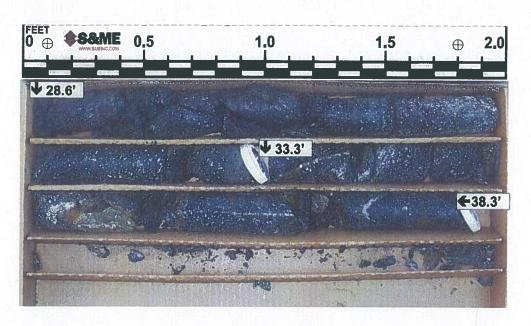
NCDOT GEOTECHNICAL ENGINEERING UNIT

G NO R EL IG/HA	EV. 6 MMER Mosele	B 888.8 f EFF./D/ y, M.	t	S	STATION OTAL DE	00 (Idols Ro 88+65 PTH 48.3	oad) Over	Muddy Cre		r		ALIGNMENT -L-	GROUND W	TR (
R ELIG/HAIR N	MMER Mosele	88.8 f EFF./D/ y, M.		Т	OTAL DE			OFFSET	16 ft R	Г		ALIGNMENT -L-		
IG/HA	MMER flosele	EFF./D/ y, M.				PTH 48.3	_			'			U FIR.	N
RIVE	fosele:	y, M.	ATE S	SME R-2			t	NORTHIN	G 827,	473		EASTING 1,599,206	24 HR.	7
RIVE LEV	DEPTI				2 DIEDRICH	1 D-50 87% 6	2/2011		DRILL	METHO	D S	PT Core Boring HAM	MER TYPE Auto	matic
RIVE LEV	DEPTI			s	TART DA	TE 03/27/1	2	COMP. D				SURFACE WATER DEPTH		
		네_ BL	ow co		П		PER FOOT		SAMP	V /	1		X-3-	
	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	MOI	O G	SOIL AND ROCK DE		EPTH
87.8 -	10	-	+				T							
-		2	4	4	86.		: : : :			М		686.3 Tan Clayey Fine SAND	with Trace Silt	:
85.3_	3.5	1	2	1	1					M		Tan-Brown and Gray Silty SAND	Fine to Coarse	
82.8	6.0		1-4-	-	1									
30.3	85	'	'	"	4		,			W				
-	-	2	2	2	4			1		Sat.				
1	-	İ									t			
75.3	13.5	-		12	\			<u> </u>			ŀ			
f	_	-	"	12		18				Sat.	-			
+											F			
0.3	18.5	20	49	51/0.3								_669.8	2001	1
7	-							- 100/0.8						
5.3	23.5													
-	-	40	53	47/0.3				- 100/0.8				<u>-</u> 11		
‡											1			
0.3	28.5	60/0.1						60/0.15				660.2		28
1		00/0.1	ĺ											
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Ŧ														
‡					: : : :							651.1 (Meta digite	,	37
+												(INIELA-CIONLE)	
‡														
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ł												040.5		
+						1		1 1			F	Boring Terminated at Eleva	tion 640.5 ft in	48
Ŧ											F	Crystalline Rock (Met	a-diorite)	
Ŧ	i										F	Advanced 3-1/4" HSA Advanced 2-15/16" Trico	to 28.5 Feet. ne to 28 6 Feet	
Ŧ											F	 3) Advanced N Casing to 28. 	6 ft, 32.0 ft total	
‡											E		28.6 to 48.3 ft.	
8 8 3 7 7 9 7 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	2.8 -	5.3 3.5 2.8 6.0 0.3 8.5 5.3 13.5 13.5 18.5	5.3 3.5 1 2.8 6.0 1 0.3 8.5 2 5.3 13.5 2 1.3 18.5 20 1.3 23.5 40	5.3	2 4 4 28 6.0 1 2 1 28 6.0 1 1 3 0.3 85 2 2 2 5.3 13.5 2 6 12 13 18.5 20 49 51/0.3 13 23.5 40 53 47/0.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3 3.5 2 4 4 4 4 4 4 4 4 4	7.8	7.8

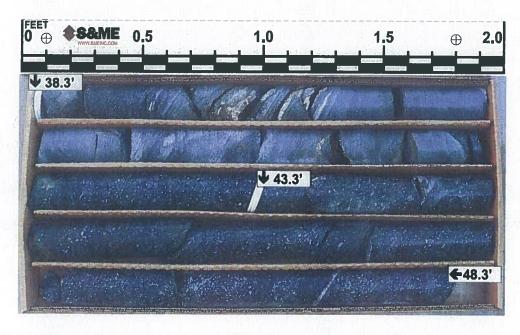
NCDOT GEOTECHNICAL ENGINEERING UNIT

WBS	34845	.1.1			TIP	U-270)7	C	DUNT	Y F	ORSYTH GEOLOGIST Brandsen, J.	
SITE	DESCR	IPTION	Brid	ge No. 6	56 on	SR 30	00 (Idols	Road)	Over	Muc	ddy Creek GROUND	WTR (ft
BOR	NG NO.	B1-B			STA	TION	88+65			OF	FSET 16 ft RT ALIGNMENT -L- 0 HR.	N/A
COLI	AR ELE	EV. 68	8.8 ft		TOT	AL DE	PTH 48.	3 ft		NO	RTHING 827,473 EASTING 1,599,206 24 HR.	7.3
DRILL	RIG/HAI	VMER E	FF/DA	TE SME	R-2 DI	EDRICH	ID-50 87%	6/2/20	111		DRILL METHOD SPT Core Boring HAMMER TYPE A	utomatic
DRIL	LER M	oseley	, M.		STAI	RT DA	TE 03/2	7/12		CO	MP. DATE 03/28/12 SURFACE WATER DEPTH N/A	
COR	E SIZE	NQ					N 19.7 f					
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft)	SAMP. NO.	STR REC. (ft) %	RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (
66902 655	655.5	28.6	4.7	1:35/0.7 1:35/1.0 1:35/1.0 1:35/1.0 1:35/1.0 1:40/1.0	(2.8)	(1.7) 36% (1.0)		(5.2) 57%	(2.1) 23%	15.05.05	Begin Coring @ 28.6 ft CRYSTALLINE ROCK Very Slight to Moderate Severely Weathered Hard to Medium Hard Black-Gray (Meta-diorite) with Close Fracture Spacing with 3 joints @ 20 to 25°, 2 joint @ 40°, 1 @ 60°, 7 joints @ 90°	28
	- - 650.5 -	38.3		1:40/1.0 1:40/1.0 1:40/1.0 1:40/1.0	56%	20%					651.1	37
650 645	-	43.3	5.0	2:00/1.0 2:00/1.0 2:00/1.0 2:00/1.0 2:00/1.0	(5.0) 100%			(10.6) 100%	(9.0) 85%		Fresh to Very Slightly Weathered Hard Black-Gray (Meta-diorite) with Close to Moderately Close Fracture Spacing with 7 joints @ 90° and 6 joints @ 60°	
	640.5	40.2	5.0	2:00/1.0 2:00/1.0 2:00/1.0 2:00/1.0	100%	(3.8) 76%				1	540.5	40
	640.5 -	48.3		2:00/1.0							Boring Terminated at Elevation 640.5 ft in Crystalline Rock (Meta-diorite)	48
											1) Advanced 3-1/4" HSA to 28.5 Feet. 2) Advanced 2-15/16" Tricone to 28.6 Feet. 3) Advanced N Casing to 28.6 ft, 32.0 ft total used. 4) Advanced NQ Core from 28.6 to 48.3 ft.	

Project No.:34845.1.1	ID No.: U-2707	Location: Clemmons, NC	Boring No.: B1-B
Site Description: Bridge N	lo. 656 on SR 3000 (idols R	oad) over Muddy Creek	Driller: M. Moseley
Collar Elev.: 688.8 ft.	Core Size: NQ	Equipment: D-50	Geologist: J. Brandsen
Elev. at T.D.: 640.5 ft.	Total Depth: 48.3 ft.	Total Run: 19.7 ft.	Date: 3/28/12



Box 1 of 2
Top of Box @ 28.6 feet; Bottom of Box @ 38.3 feet



Box 2 of 2
Top of Box @ 38.3 feet; Bottom of Box @ 48.3 feet

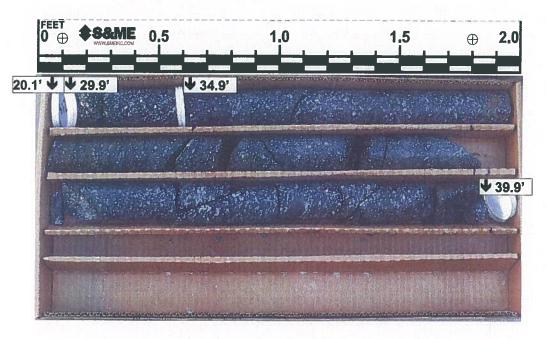
NCDOT GEOTECHNICAL ENGINEERING UNIT

	3484						J-270			TY FORS				GEOLOGIST Brandsen, J.		
SITE	DESCF	RIPTIO	N Bri	dge N	o. 656	on S	R 300	00 (Idols R	oad) Ove	r Muddy Cr	eek				GROUN	D WTR (f
BOR	ING NO	. B2-	A		s	TAT	ON 8	89+25		OFFSET	16 ft L	Т		ALIGNMENT -L-	0 HR.	N/A
COL	LAR EL	EV. 6	88.9 ft	t	Т	OTA	L DEP	TH 49.9	ft	NORTHI	NG 827	,540		EASTING 1,599,220	24 HR.	FIA
DRIL	L RIG/HA	MMERI	EFF/D/	ATE S	ME R-	2 DIE	DRICH	D-50 87% 6	/2/2011		DRILL	. METH	OD S	PT Core Boring HAM	MER TYPE	Automatic
DRIL	LER M	loseley	, M.		s	TAR	F DAT	E 04/02/	12	COMP. D	ATE 0	4/03/12	2	SURFACE WATER DEPTH	I/A	
LEV	DRIVE ELEV	DEPTI	BL	ow co	UNT			BLOWS	PER FOO	т	SAM	P. V	L	SOIL AND DOOK DES	COIDTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0		25	50	75 10	00 NO.	MC		SOIL AND ROCK DES	SCRIPTION	DEPTH (
			1													
690					1									_		
	687.9	1.0				-		T	T		+	+-		688.9 GROUND SURF		0
	685.4	3.5	1	2	3				: : :			M		- 686.4 Brown Silty CL		2
85	585.4	3.5	2	4	4		8	+	1		\dashv	м		Tan-Brown and Gray Silty SAND with Trace of	Fine to Coar of Mica	se
	682.9	6.0	1	1	1	1						Sat.				
80	680.4	8.5			10/6/	72		: : : :	: : :			Sat.				
	-	-	1	WOH	WOH	•0.					11	Sat.				
	1	-				11:										
75	675.4	13.5	2	2	3	Ĭ,		1				Sat.		-		
		-				• 5						J Cat.		672.4		16
70	670.4	18.5				=				77777		1	1/1	WEATHERED R		
/	668.8	20.1	100/0.4	l i						100/0.4			7/2	(Meta-diorite	,	20
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10	‡					: :							7			
<u> </u>											1	<u></u>	5	639.0		49.9
	‡		ĺ									1		Boring Terminated at Eleva Crystalline Rock (Meta	tion 639.0 ft a-diorite)	ın
													E	1) Advanced 3-1/4" HSA t	o 20.1 Feet.	
	İ										0.0	1	ŀ	 Advanced 2-15/16" Tricor Advanced N Casing to 20. 	e to 20.1 Fe	et.
	±												F	used. 4) Advanced NQ Core from		
	Ŧ			1									F	+) Advanced NQ Core from	∠u. i to 49.9	it.
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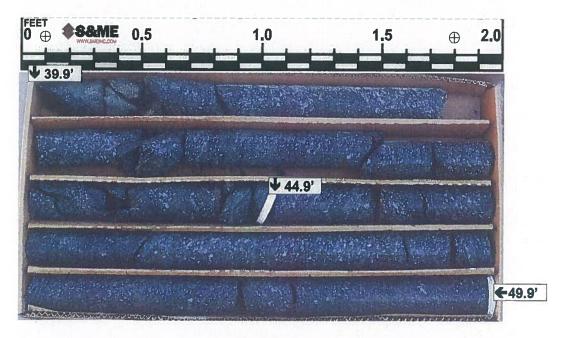
NCDOT GEOTECHNICAL ENGINEERING UNIT

WBS	34845.	.1.1			TIP	U-270	7	C	OUNT	Y F	RSYTH GEOLOGIST Brandsen, J.
SITE	DESCRI	PTION	Brid	ge No. 6	56 on	SR 30	00 (Idols	Road)	Over	Muc	Creek GROUND WTR (ft)
BOR	NG NO.	B2-A			STAT	LION	89+25			OF	ET 16 ft LT ALIGNMENT -L- O HR. N/A
COLI	AR ELE	V. 68	8.9 ft		TOT	AL DEI	PTH 49	.9 ft		NO	HING 827,540 EASTING 1,599,220 24 HR. FIAD
DRILL	RIG/HAN	MER E	FF./DAT	TE SME	R-2 DI	EDRICH	D-50 879	6/2/20	11		DRILL METHOD SPT Core Boring HAMMER TYPE Automatic
DRIL	LER M	oseley,	M.		STAI	RT DA	TE 04/0	2/12		CO	2. DATE 04/03/12 SURFACE WATER DEPTH N/A
COR	E SIZE	NQ			TOTA	AL RUI	N 29.81	t			
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft)	SAMP. NO.	STR REC. (ft) %	ATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS LEV. (ft) DEPTH (f
68.8											Begin Coring @ 20.1 ft
665	668.8	20.1	4.8	N=60/0.0 0:30/0.8 0:45/1.0 0:45/1.0 0:45/1.0	(0.0) 0%	(0.0) 0%		(0.0) 0%	(0.0) 0%	1	68.8 CRYSTALLINE ROCK 20. No Recovery
-	664.0	24.9	5.0	0:30/1.0	(0.0) 0%	(0.0) 0%					
660	659.0	29.9	5,0	0:30/1.0 0:30/1.0 0:30/1.0 0:30/1.0	(0.5)	(0.3)					
655	654.0	34.9		0:30/1.0 0:30/1.0 0:30/1.0 0:30/1.0	10%	6%					54.5 34.4
	654.0	34.5	5.0	1:55/1.0 1:55/1.0 1:55/1.0	(4.6) 92%	(3.3) 66%		(14.9) 96%	(10.8) 70%		Moderate to Very Slightly Weathered Medium Hard to Hard Black-Gray (Meta-diorite) with Close to Moderately Close Fracture Spacing with 4 joints @ 50 to 60°. 4 @ 60 to 70° and 11 joints @ 90°
650	649.0	39.9	5.0	1:55/1.0 1:55/1.0 2:30/1.0 2:30/1.0	(4.8) 96%	(3.0)					with 4 Joints @ 50 to 60 , 4 @ 60 to 70 and 11 Joints @ 90
645	644.0	44.9		2:30/1.0 2:30/1.0 2:30/1.0							
640			5.0	4:30/1.0 4:30/1.0 4:30/1.0 4:30/1.0	(5.0) 100%	(4.2) 84%					
	639.0	49.9		4:30/1.0				 		7.7	39.0 49.9 Boring Terminated at Elevation 639.0 ft in Crystalline Rock (Meta-diorite)
											1) Advanced 3-1/4" HSA to 20.1 Feet. 2) Advanced 2-15/16" Tricone to 20.1 Feet. 3) Advanced N Casing to 20.1 ft, 22.0 ft total used. 4) Advanced NQ Core from 20.1 to 49.9 ft.

Project No.:34845.1.1	ID No.: U-2707	Location: Clemmons, NC	Boring No.: B2-A
Site Description: Bridge N	lo. 656 on SR 3000 (Idols R	Road) over Muddy Creek	Driller: M. Moseley
Collar Elev.: 688.9 ft.	Core Size: NQ	Equipment: D-50	Geologist: J. Brandsen
Elev. at T.D.: 639.0 ft.	Total Depth: 49.9 ft.	Total Run: 29.8 ft.	Date: 4/03/12



Box 1 of 2
Top of Box @ 20.1 feet; Bottom of Box @ 39.9 feet



Box 2 of 2 Top of Box @ 39.9 feet; Bottom of Box @ 49.9 feet

NCDOT GEOTECHNICAL ENGINEERING UNIT

WB:	3484	5.1.1			Ĩ	IP U-27	07	COUNT	Y FORSY	TH			GEOLOGIST Brandsen, J.	
SITE	DESC	RIPTIO	N Bri	dge N	lo. 656	on SR 30	000 (Idols F	Road) Over	Muddy Cre	ek				GROUND WTR
BOF	RING NO). B2-	В		S	TATION	89+25		OFFSET	16 ft RT	-		ALIGNMENT -L-	0 HR. N
COL	LAR EL	EV . 6	88.9 fl	t	Т	OTAL DE	PTH 50.1	ft	NORTHIN	G 827,	519		EASTING 1,599,245	24 HR. FIA
DRIL	L RIG/HA	MMER	EFF./D/	ATE S	SME R-	2 DIEDRIC	H D-50 87%	6/2/2011		DRILL	METHO	D SI	PT Core Boring HAMI	MER TYPE Automatic
DRIL	LER N	Mosele	y, M.		s	TART DA	TE 04/03	/12	COMP. DA				SURFACE WATER DEPTH N	
LEV	DRIVE	DEPTI	BL	ow co	DUNT	1.0	BLOWS	S PER FOOT		SAMP.	V /	1 4		
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ff	0.5ft	0	25	50	75 100	NO.	MO	O G	SOIL AND ROCK DES	SCRIPTION DEPTH
														507111
90														
	687.9	1		↓	-	 							688.9 GROUND SURF	
	687.9	1.0	4	4	3	7					м		ALLUVIAL Brown and Gray Silty Fine to	to Coarse SAND
85	685.4	3.5	4	3	4	1 1			• • • •	1	м		with Some Wood Fragme Quartz Grave	ents and Little el
	682.9	60			<u> </u>						101			
00	680.4	1 05	3	3	4	77 :					Sat.	1		
80	000.4		1	1	3	64.			+		Sat.			
		+										F		
75	675.4	13.5										F		
	-	Ŧ	3	2	4	9 6 .		1			Sat.	Ŧ	9	
	-	‡				1 1 : :						ţ		
70	670.4	18.5	23	35	65/0.3			1	1				669.9	19
	-	ţ				:::	: : : : :	: : : :	- 100/0.8				WEATHERED R (Meta-diorite	
_	- CCE 4 =	22.5					: [: : : :					4		•
55	665.4	-	56	49	51/0.3				100/0.8			//		_
	663.5	25.4	60/0.0						60/0.0			7	663.5 CRYSTALLINE R	
30	=	-											(Meta-diorite))
	658.8 -	30.1	60/0.1						60/0.1					
	1		00/0.1		li			: : : :						
55		-						1						
1	653.8 -	- 35.1 -	60/0.1				·	: : : :	60/0.1				653.8 (Meta-diorite)	35
	1	-						1::::	1::::					
0	-	_						 	-					
	1	-												
5	7	-												
	7	-								RS-2				
	‡	-												
0		-									Į.			
ŀ						<u> </u>		<u></u>	 				638.8 Boring Terminated at Eleva	50 tion 638.8 ft in
	1											t	Crystalline Rock (Meta	a-diorite)
Ì	‡											E	1) Advanced 3-1/4" HSA t 2) Advanced 2-15/16" Tricon 3) Advanced N Casing to 25.	ne to 25.4 Feet.
-	İ											E	used.	
	7	.									1	F	4) Advanced NQ Core from	25.4 to 50.1 ft.
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NCDOT GEOTECHNICAL ENGINEERING UNIT

ELEV

660

655

650

645

640

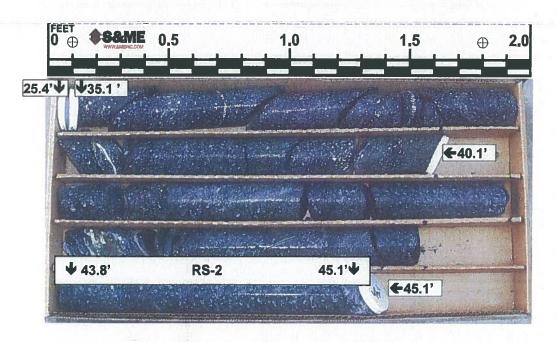
SHEET 19 **CORE BORING REPORT** GEOLOGIST Brandsen, J. TIP U-2707 COUNTY FORSYTH WBS 34845.1.1 **GROUND WTR (ft)** SITE DESCRIPTION Bridge No. 656 on SR 3000 (Idols Road) Over Muddy Creek BORING NO. B2-B STATION 89+25 OFFSET 16 ft RT ALIGNMENT -L-0 HR. N/A TOTAL DEPTH 50.1 ft **NORTHING** 827,519 **EASTING** 1,599,245 COLLAR ELEV. 688.9 ft 24 HR. FIAD DRILL RIG/HAMMER EFF./DATE SME R-2 DIEDRICH D-50 87% 6/2/2011 DRILL METHOD SPT Core Boring HAMMER TYPE Automatic **COMP. DATE** 04/03/12 DRILLER Moseley, M. **START DATE 04/03/12** SURFACE WATER DEPTH N/A CORE SIZE NQ TOTAL RUN 24.7 ft RUN REC. RQD (ft) (ft) % DRILL RATE STRATA

REC. RQD

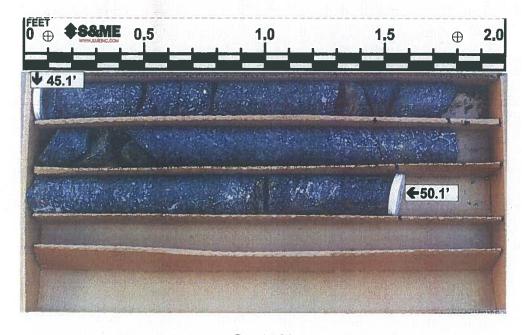
(ft) (ft)

% DEPTH RUN (ft) (ft) SAMP. ELEV **DESCRIPTION AND REMARKS** NO. (Min/ft) (ft) DEPTH (ft) Begin Coring @ 25.4 ft CRYSTALLINE ROCK (0.0) N=60/0.0 (0.0) (0.0) 0:30/0.7 0% 0% 0:35/1.0 0:35/1.0 663.5 25.4 No Recovery 5.0 N=60/0.1 (0.0) (0.0) 0.45/1.0 0% 0% 0.45/1.0 0% 0% 0.45/1.0 0.45/1.0 0.45/1.0 0.45/1.0 0.56/1.0 70% 58% 1.35/1.0 70% 58% 1.35/1.0 1.35/1.0 1.35/1.0 1.35/1.0 1.35/1.0 1.35/1.0 5.0 (3.9) 658.8 4 30.1 653.8 35.1 653.8 Very Slight to Moderately Weathered Hard to Moderately Hard Black-Gray (Meta-diorite) with Close to Moderately Close Fracture Spacing with 2 joints @ 50°, 3 joints @ 60 to 70°, 5 joints @ 70 to 80°, 8 joints @ 90° 648.8 7 40.1 2:00/1.0 (5.0) (3.9) 2:00/1.0 100% 78% qu=2515 KSF Axial R1=12, R2=17, R3=10, R4=12, R5=4 RMR=55 5.0 Rock Type E 2:00/1.0 RS-2 643.8 45.1 2:00/1.0 | 2:00/1.0 | (5.0) | (3.9) 2:00/1.0 | 100% | 78% 5.0 2:00/1.0 2:00/1.0 2:00/1.0 638,8 1 50.1 Boring Terminated at Elevation 638.8 ft in Crystalline Rock (Meta-diorite) 1) Advanced 3-1/4" HSA to 23.5 Feet. 2) Advanced 2-15/16" Tricone to 25.4 Feet.
3) Advanced N Casing to 25.4 ft, 27.0 ft total used.
4) Advanced NQ Core from 25.4 to 50.1 ft.

Project No.: 34845.1.1	ID No.: U-2707	Location: Clemmons, NC	Boring No.: B2-B
Site Description: Bridge	No. 656 on SR 3000 (Idols F	Road) over Muddy Creek	Driller: M. Moseley
Collar Elev.: 688.9 ft.	Core Size: NQ	Equipment: D-50	Geologist: J. Brandsen
Elev. at T.D.: 638.8 ft.	Total Depth: 50.1 ft.	Total Run: 24.7 ft.	Date: 4/03/12



Box 1 of 2
Top of Box @ 25.4 feet; Bottom of Box @ 45.1 feet



Box 2 of 2

Top of Box @ 45.1 feet; Bottom of Box @ 50.1 feet

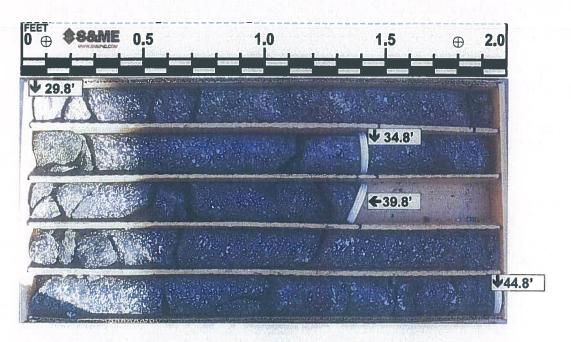
NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 34845.1.1 TIP U-2707 COUNTY FORS							Y FORSYT	YTH			GEOLOGIST Brandsen, J.			
SITE	DESC	RIPTIO	N Bri	dge N	o. 656	on	n SR 3000 (Idols R	oad) Over	Muddy Cree	ek .				GROUND WTR
BOF	NO DAIR). B3-/	A		S	STA	ATION 90+01		OFFSET	16 ft LT			ALIGNMENT -L-	O HR. N
COLLAR ELEV. 691.3 ft TOTAL DEPTH 54.8 ft								ft	NORTHING 827,598				EASTING 1,599,269	24 HR. FIA
DRIL	L RIG/HA	MMER	EFF/D/	ATE S	ME R-	2 D	DIEDRICH D-50 87% 6	/2/2011		DRILL	METHO	D S	PT Core Boring HAI	MMER TYPE Automati
DRILLER Moseley, M. START DATE 03/29/12								12	COMP. DATE 03/29/12				SURFACE WATER DEPTH	
ELEV	DRIVE	DEPTI	BL	ow co	DUNT	T	BLOWS	PER FOOT		SAMP.	V /			
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft		0 25	50	75 100	NO.	MO	0 I G	SOIL AND ROCK DI	ESCRIPTION DEPTI
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695											İ			
	~	Ŧ							1					
		<u> </u>		<u> </u>		Ц							691.3 GROUND SUF	
690	690.3	1.0	1	2	3	1 -	6 5	ļ · · · ·	1		м		ALLUVIA Tan Clayey Fine SAND w	
	687.8	3.5	2	2	3			: : : :			ĺ		687.8	
85	685.3	6.0			İ		\$ 5				М		Tan-Brown and Gray Silf SAND	y Fine to Coarse
		F	2	2	3		9 5				М			
	682.8	8.5	2	1	2	ا	6 ₃				w			
80	679.3	12.0				'	[<u>. </u>	
		- 121	1	WOH	1	4	i : : : : : : : : :				Sat.			
						li			: : :					
75	674.3	17.0	4	16	51	-							673,8	1
			-	"	51						М		672.3 RESIDUA Green-Black Silty F	L
70	-	-						: : : :					WEATHERED	ROCK
	669.3	22.0	47	49	51/0.3								(Meta-diori	te)
	-							: : : :	- 100/0.8			4		
65	664.3	- 27 0						1					•••	
		-	100/0.3						100/0.3					
	661.5	29.8	60/0.0						- 60/0.0				661.5 CRYSTALLINE	POCK
60	-					\vdash							(Meta-diori	
	-	-												
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40													641.3 (Meta-diorit	e) — — — — <u>5</u>
	7													
1	- 1							: : : :		RS-3			636.5	5
	-											-	Boring Terminated at Elec Crystalline Rock (Me	vation 636.5 ft in eta-diorite)
	‡											ţ	1) Advanced 3-1/4" HSA	
	‡				1							t	2) Advanced 2-15/16" Tric 3) Advanced N Casing to 2	one to 29.8 Feet.
	1											-	used.	
	1											E	4) Advanced NQ Core Fro	m ∠9.8 t0 54.8 ft.
	1											F		
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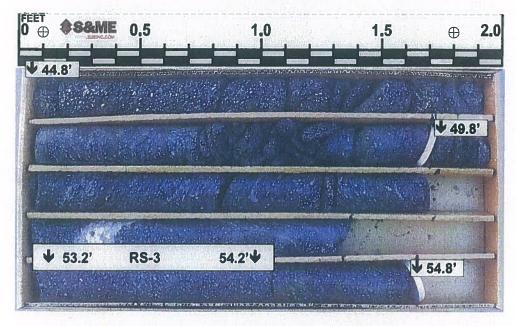


WBS	34845	.1.1			TIP	U-270	7	C	OUNT	ΥF	ORSYTH	GEOLOGIST Brandsen, J.			
SITE	DESCR	IPTION	Brid	ge No. 6	56 on	SR 30	00 (Idols	Road)	Over	Mud	dy Creek		GROUND WTR (f		
BOR	NG NO.	ВЗ-А			STAT	ΓΙΟΝ	90+01			OF	SET 16 ft LT	ALIGNMENT -L-	0 HR. N//		
COLLAR ELEV. 691.3 ft						TOTAL DEPTH 54.8 ft					RTHING 827,598	EASTING 1,599,269	24 HR. FIAI		
DRILL	RIG/HAI	MMER E	FF./DA	TE SME	R-2 DIEDRICH D-50 87% 6/2/2011						DRILL METHOD SPT	Core Boring HAN	IMER TYPE Automatic		
DRIL	LER M	oseley,	М.		STAF	RT DA	TE 03/2	9/12		СО	MP. DATE 03/29/12	SURFACE WATER DEPTH	N/A		
COR	E SIZE	NQ			TOTA	AL RUI	25.0	ft							
LEV	RUN ELEV	DEPTH		DRILL RATE	RUN SAMP. STRATA REC. RQD (ft) (ft) NO. (ft) (ft) (ft)					L					
(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft) %	G	ELEV. (ft)		DEPTH (
61.5	661.5 -	- 29.8	5.0	N=60/0.0	(3.3)	(2.3)		(12.9)	(7.9)		661.5	Begin Coring @ 29.8 ft CRYSTALLINE ROCK			
660	-	-	0.0	N=60/0.0 1:15/1.0 1:15/1.0 1:15/1.0 1:15/1.0 1:15/1.0	66%	46%		64%	(7.9) 39%	NAME OF THE PERSON OF THE PERS	- Ve	ry Slight to Moderately Weathered Hard to Medium Hard Black-Gray I-diorite) with Close Fracture Spacing	29		
655	656.5 -	- 34.8 -	5.0	1:15/1.0	(1.8)	(1.0)				7	Moderately 5	Severely Weathered between 48.9' 50°, 3 joints @ 60° and 19 joints @	to 49.8'		
,55	-	-		1:30/1.0 1:30/1.0	36%	20%						oo , o jonka @ oo ana 10 jonka @	73 10 90		
	651.5 -	- 39.8		1:30/1.0 1:30/1.0											
350	_		5.0	1:15/1.0 1:15/1.0	(4.0) 80%	(2.8) 56%				12	_				
		-		1:15/1.0 1:15/1.0						7					
345	646.5 -	- 44.8 -	5.0	1:15/1.0 1:30/1.0	(3.6)	(1.8)				7					
743	-	-		1:30/1.0 1:30/1.0	72%	36%									
	641.5 -	- - 49.8		1:30/1.0 1:30/1.0						7	641.3		50		
640		-	5.0	1:45/1.0 1:45/1.0	(5.0) (4.6) 100% 92%			(4.8) 100%	(4.6) 96%			Very Slight to Freshly Weathered Hard to Very Hard Black-Gray			
	1	-		1:45/1.0 1:45/1.0			RS-3	10070			(Meta	(Meta-diorite) with Close Fracture Spacing			
	636.5 -	- 54.8 -		1:45/1.0			110-0	1			636.5	qu=2425 KSF Axial R2=20, R3=10, R4=12, R5=4 RMR:	-50		
	-										1				
	 									- Boring Terminated at Elevation 636.5 ft in Crystalline Rock (Meta-diorite) - 1) Advanced 3-1/4" HSA to 29.8 Feet 2) Advanced 2-15/16" Tricone to 29.8 Feet.					
		1	-			1						anoca 11g coro 11cm 20.0 (0 07.0 f)			
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Project No.:34845.1.1	ID No.: U-2707	Location: Clemmons, NC	Boring No.: B3-A
Site Description: Bridge N	lo. 656 on SR 3000 (Idols R	load) over Muddy Creek	Driller: M. Moseley
Collar Elev.: 691.3 ft.	Core Size: NQ	Equipment: D-50	Geologist: J. Brandsen
Elev. at T.D.: 636.5 ft.	Total Depth: 54.8 ft.	Total Run: 25.0 ft.	Date: 3/29/12



Box 1 of 2
Top of Box @ 29.8 feet; Bottom of Box @ 44.8 feet

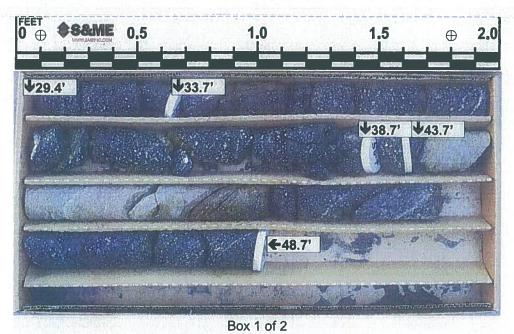


Box 2 of 2 Top of Box @ 44.8 feet; Bottom of Box @ 54.8 feet

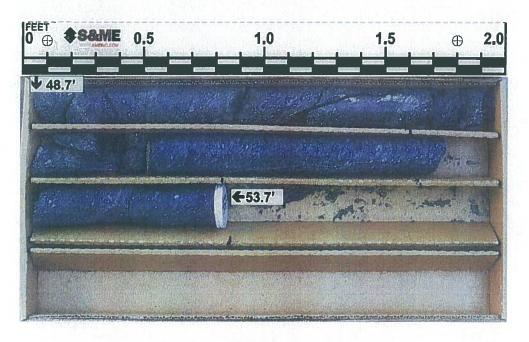
D. B3-I LEV. 6	B 93.0 ft EFF./DA y, M.	TE S	ME R-2	TATION OTAL DEF DIEDRICH TART DAT O O O O O O O O O O O O O	PTH 53.7 ft I D-50 87% 6/2 TE 03/28/1 BLOWS F	t 2/2011 2 PER FOOT	Muddy Cree OFFSET NORTHING COMP. DA 75 100	16 ft RT 3 827,5 DRILL	577 METHOD 28/12	SPT Co	JRFACE W S V. (ft)	,599,294 ATER DEF OIL AND RO GROUN ALI Brown and Gr	0 HR. 24 HR. HAMMER TYPE	DEPTH (I
Moseley DEPTI (ff) 1.0 3.5 6.0 8.5	93.0 ft EFF.IDA y, M. H BLC 0.5ft 1 1 2 2	OW CO 0.5ft 1 2 3 1 1	ME R-2 S' UNT 0.5ft	OTAL DEF	PTH 53.7 ft I D-50 87% 6/2 TE 03/28/1 BLOWS F	2/2011 2 PER FOOT	COMP. DA	DRILL I	METHOD 28/12 MOI	SPT Co	ASTING 1 re Boring JRFACE W S V. (ft)	,599,294 ATER DEF OIL AND RO GROUN ALI Brown and Gr	HAMMER TYPE PTH N/A DCK DESCRIPTION DD SURFACE LUVIAL Tay Sity Fine to Coars	FIAD Automatic DEPTH (
DEPTH (ff)	y, M. H BLC 0.5ft	OW CO 0.5ft 1 2 3 1 1	ME R-2 S UNT 0.5ft 1 2 2 2 4	DIEDRICH TART DAT 0 4 4 5 7 7 7	TE 03/28/1 BLOWS F	2/2011 2 PER FOOT	COMP. DA	DRILL I	METHOD 28/12 MOI C	SPT Co	JRFACE W S V. (ft)	GROUN ALI Strown and Gr	HAMMER TYPE PTH N/A DCK DESCRIPTION D SURFACE LUVIAL ray Sitty Fine to Coars	Automatic DEPTH (
DEPTH (ff) 1.0 3.5 6.0 8.5	y, M. H BLC 0.5ft 1 1 2 2	0.5ft	0.5ft 0.5ft 2 2 2 4	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	TE 03/28/1 BLOWS F	2 PER FOOT		TE 03/	28/12 MOI C	SL	JRFACE W S V. (ft)	GROUN ALI Irown and Gr	PTH N/A DCK DESCRIPTION DD SURFACE LUVIAL Tay Sitty Fine to Coars	DEPTH (
DEPTH (ff) 1.0 3.5 6.0 8.5	1 1 2 2 1 1	0.5ft	0.5ft 1 2 2 2 4	0 •4 •5 •3	BLOWS F	PER FOOT		SAMP.	MOI C	ELE	S V. (ft)	GROUN ALI Irown and Gr	D SURFACE LUVIAL ray Sity Fine to Coars	0
1.0	0.5ft	0.5ft	0.5ft	\$4\$5\$95\$97\$1			75 100		MOI C	ELE	V. (ft)	GROUN ALi	ID SURFACE LUVIAL ray Sity Fine to Coars	0
3.5	2	3	2 2 2	\$5					M M		0	ALI Frown and Gr	LUVIAL ray Silty Fine to Coan	0
3.5	2	3	2 2 2	\$5					M M	693.1		ALI Frown and Gr	LUVIAL ray Silty Fine to Coan	
3.5	2	3	2 2 2	\$5					M M	693.		ALI Frown and Gr	LUVIAL ray Silty Fine to Coan	
3.5	2	3	2 2 2	\$5					M M		Tan-E	rown and Gr	ray Silty Fine to Coan	se
6.0 8.5 13.5	2 2	3	2 2	•3 · · · · · · · · · · · · · · · · · · ·					м			Š	SAND	
8.5	1	3	4	•3 · · · · · · · · · · · · · · · · · · ·										
13.5	1	3	4	•3 · · · · · · · · · · · · · · · · · · ·						- - - - - - -				
18.5	1	3	4	φ3					M	[- -				
18.5	1			φ7 · · · · · · · · · · · · · · · · · · ·						L				
18.5	1			φ7										
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23.5	19		1	∮ 10	1				Sat	-				
23.5	19		- 1							671.0				22.
-	1 12 1	80	20/0.1		7-1					669,0			SIDUAL Silty Fine SAND	24.
]	00	20/0.1				- 100/0.6	59	7/	1		WEATHE	ERED ROCK a-diorite)	
28.5										E		(ivieta	a-dionte)	
70.5	60/0.0						. 60/0.0			- 663.6		CRYSTAL	LINE ROCK	29.
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			1	: : : :	: : :					641.3				51.
-									1	639.3				53
											Boring C	Terminated a rystalline Ro	at Elevation 639.3 ft i ck (Meta-diorite)	n
										E	1) Ad	vanced 3-1/4	4" HSA to 28.5 Feet.	
											2) Advar 3) Advar	ced N Casin	ng to 29.4 ft, 32.0 ft to	et. otal
:										È	4) Adva			ft.
												- 639.3 Boring C C C 1) Ad 2) Advar 3) Advar	(Meta Series Ser	(Meta-digrite)

NP°	34845			RE B		U-270				Y F	ORSYT	'H	GEOLOGIST Bran	dsen I		
			D-:-	lge No. 6									OLOLOGIST Bran	uocii, J.	GPOU	ID WTR (fi
	NG NO.			ige No. o			90+01		0401	1		16 ft RT	ALIGNMENT -L-		0 HR.	N/A
	AR ELE						PTH 53	7 ft				827,577	EASTING 1,599,29		24 HR.	FIA
				TE SME					11	110	***************************************	,	T Core Boring		MER TYPE	
	LER M			TE OWIE			TE 03/2			CO	MP DA	TE 03/28/12	SURFACE WATER			Adomato
	E SIZE		, IVI.		-		24.3					12 00/20/12	OUT AUE WATER	JE1 111 1	W//\	
LEV	RUN	DEPTH	RUN	DRILL	RI	JN	SAMP.	STR REC.	ATA RQD	Ļ				· · · · · · · · · · · · · · · · · · ·		
(ft)	ELEV (ft)	(ft)	(ft)	RATE (Min/ft)	REC. (ft)	RQD (ft) %	NO.	(ft) %	(ft) %	O G	ELEV. (ESCRIPTION AND REM	ARKS		DEPTH
63.6													Begin Coring @ 29.	l ft		
	663.6 -	29.4	4.3	1:00/1.0 1:00/1.0	(0.7) 16%	(0.0) 0%		(9.4) 42%	(4.1) 18%		663.6	Mo	CRYSTALLINE ROC oderate to Very Slightly V	eathered		29
660	659.3	33.7		1:00/1.0 1:00/1.0							<u>-</u>		oderately Hard to Hard B e) with Close to Very Clos		Spacing	
			5.0	0:25/0.3 1:30/1.0	(2.8) 56%	(1.0) 20%						with 6 j	oints @ 30 to 40°, 11 join	s @ 80 to 9	90°	
655	-			1:30/1.0 1:30/1.0 1:30/1.0 1:30/1.0												
000	654.3	38.7	5.0	1:30/1.0	(0.3)	(0.0)										
	-	ļ		1:30/1.0 1:30/1.0	6%	`0%		1								
650	649.3	43.7		1:30/1.0 1:30/1.0				1			-					
			5.0	1:30/1.0 1:00/1.0	(3.1) 62%	(1.5) 30%										
645	_	F		1:35/1.0 1:00/1.0												
	644.3	48.7	5.0	1:00/1.0 2:10/1.0	(4.5)	(3.6)										
		E		2:10/1.0 2:10/1.0	90%	72%		(0.0)	(0.0)		641.3					5
640	639.3	53.7		2:10/1.0 2:10/1.0				(2.0) 100%	(2.0) 100%		639.3	_	Very Slight to Slightly We Hard to Very Hard Black	-Gray		5:
												with 1 joir	a-diorite) with Close Fract nt @ 10°, 2 joints @ 70° a	nd 1 joint @	90°	
										{		Boring Terminated a	t Elevation 639.3 ft in Cry	stalline Roc	k (Meta-dior	ite)
		[1111									1) <i>i</i> 2) Ad	Advanced 3-1/4" HSA to a vanced 2-15/16" Tricone	8.5 Feet. o 29.4 Feet		
	-											3) Advan	ced N Casing to 29.4 ft, 3 vanced NQ Core From 29	2.0 ft total u	ised.	
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Project No. 34845.1.1	ID No.: U-2707	Location: Clemmons, NC	Boring No.: B3-B
Site Description: Bridge	No. 656 on SR 3000 (Idols R	load) over Muddy Creek	Driller: M. Moseley
Collar Elev.: 693.0 ft.	Core Size: NQ	Equipment: D-50	Geologist: J. Brandsen
Elev. at T.D.: 639.3 ft.	Total Depth: 53.7 ft.	Total Run: 24.3 ft.	Date: 3/28/12



Top of Box @ 29.4 feet; Bottom of Box @ 48.7 feet



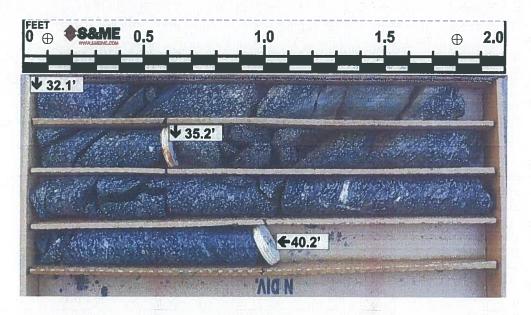
Box 2 of 2
Top of Box @ 48.7 feet; Bottom of Box @ 53.7 feet

WBS	3484	15.1.1				TIP	U-2707	200	COUNT	Y FOR	SYT	Ή			GEOLOGIST Brandsen,	J.		
SITE	DESC	RIPTIC	N Br	idge N	No. 656	3 on	n SR 3000 (lde	ols Ro	ad) Over	Muddy (Cree	k					GROUN	D WTR (ft
BOR	RING NO). B4-	Α		5	STA	ATION 91+05	5		OFFSE	т '	16 ft LT			ALIGNMENT -L-		0 HR.	N/A
COL	LAR EL	EV. 6	94.1 f	t	1	TOT	TAL DEPTH	50.2 f	t	NORTH	HNG	827,	677		EASTING 1,599,336		24 HR.	6.6
DRIL	L RIG/H/	AMMER	EFF./D	ATE	SME R-	-2 D	DIEDRICH D-50	87% 6/2	2/2011			DRILL	METHO	D S	PT Core Boring	IAMME	R TYPE	Automatic
DRIL	LER I	Vlosele	y, M.		18	STA	ART DATE 0	3/21/1	2	COMP.	DA	11.000			SURFACE WATER DEPT			
ELEV	DRIVE	DEPT	H BL	OW C	OUNT		BL	OWS F	PER FOOT			SAMP.	V	11	** ***********************************	·		
(ft)	ELEV (ft)	(ft)	0.5ft	0.5f	t 0.5ft		0 25	ŧ	50	75	100	NO.	MO	O G	SOIL AND ROCK	DESC	RIPTION	DEPTH (
		T																
695	1																	
	693.1	1.0	-	-	-	+	1		1		-	ļ. <u>.</u>		12.552	694.1 GROUND S		CE	0
		T	1	1	2	7],	4 3		: : : :	: : :			М		Tan Silty F		ND	
90	690.6	3.5	3	5	7	1	1			1	_		м		689.6			4
	688.1	6.0				11	12			1:::			-		Tan Clayey	ine SA	ND	
	685.6	8.5	5	7	11		• 18			1 : : :	-		_					
85	- 000.0	+ "	7	10	10	11-	20			1			Sat.		-:			
ĺ		Ŧ			1						-				682.1			12.
80	680.6	13.5	105	<u> </u>		\parallel					-1				RESID Brown-Green Si		CAND	
	-	‡	25	55	45					. 100/	1.0		М		_ Blown-Green Si	ty Fine	SAND	
		‡						::		1:/								
75	675.6	18.5	8	29	41	1				1	•		м		ē			
		t				П			1	7	:		IVI	-				
	670.6 ·	1 22 5		1	-									-				
70	_ 6/0.6 -	73.5	14	20	80/0.4	1				100					- 669,6			24.
		‡	1							1	9				WEATHERI (Meta-d		CK	
65	665.6 -	28.5							2000						,	,		
03	-	†	100/0.4	1		$\parallel \parallel$				100/0	0.4							
	662.0	32.1						::			•			10	662.0			32.
60	-	-	60/0.0			П				60/0	0.0				CRYSTALLI (Meta-di		CK	
		F				П					.]				(110000 0	51110)		
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55	_	-	ĺ			\Vdash					_				655.7 (Meta-di	orite)		38.
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45	-										-	RS-4						
-						止				1	긔				643.9	1- ·	0/25	50.2
	1													F	Boring Terminated at E Crystalline Rock	levation Meta-d	n 643.9 ft i liorite)	in
	1										-			Ŀ	1) Advanced 3-1/4" i	ISA to :	32.1 Feet.	
	1													E	2) Advanced 2-15/16" T	ricone t	to 32.1 Fe	
	+											- [F	Advanced N Casing to used			
	7													F	4) Advanced NQ Core F	rom 32	2.1 to 50.2	ft.
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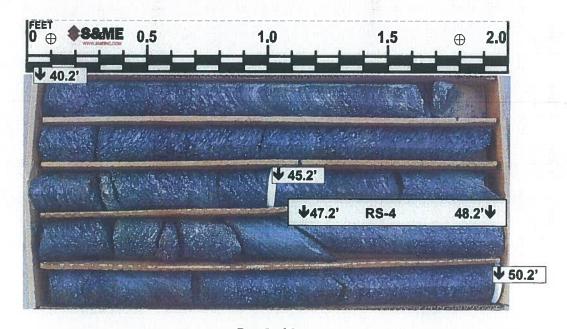
NCDOT GEOTECHNICAL ENGINEERING UNIT

WBS	34845			RE B		U-270				Y F	FORSYTH GEOLOGIST Brandsen, J.	
	DESCR		Brid	ae No. 6							ddy Creek GROUND WTR	(ft)
	ING NO.						91+05					N/A
	LAR ELI						PTH 50.	2 ft		-		6.6
				TE SME					111	1	DRILL METHOD SPT Core Boring HAMMER TYPE Automa	
	LER N			TE OME			TE 03/2			CC	OMP. DATE 03/21/12 SURFACE WATER DEPTH N/A	
	E SIZE		, IVI.		-		N 18.1 f			 	JAN DATE GOZINE GON AGE WATER DEFTIT N/A	
	RUN			DRILL	RI	ŪN		STR	ATA	L	T	
LEV (ft)	ELEV (ft)	DEPTH (ft)	RUN (ft)	RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %	RQD (ft) %	O G	DESCRIPTION AND REMARKS ELEV. (ft) DEPT	TH (fi
62	662.0	32.1	3.1	N=60/0 0	(2.4)	(1.3)		(5.0)	(3.1)		Begin Coring @ 32.1 ft CRYSTALLINE ROCK	32.
660	658.9	İ		N=60/0.0 0:15/0.1 1:05/1.0 1:05/1.0 1:05/1.0	77%	(1.3) 42%		(5.0) 79%	(3.1) 49%		Moderately to Slightly Weathered Moderately Hard to Hard Black-Gray	-
	030.9	- 35.2	5.0	1:05/1.0	(4.4)	(3.6)					(Meta-diorite) with Close Fracture Spacing	
		ţ		1:15/1.0 1:15/1.0 1:15/1.0 1:15/1.0 1:15/1.0	88%	72%					with 3 joints @ 70° & 4 joints @ 40 to 50°	38.
<u> </u>	653.9	40.2		1:15/1:0				(11.7) 99%	(9.8) 83%		Very Slight to Freshly Weathered Hard to Very Hard Black-Gray	
		<u> </u>	5.0	1:45/1.0	(4.9) 98%	(4.0) 80%					(Meta-diorite) with Close to Moderately Close Fracture Spacing with 1 joint @50°, 5 joints @ 60 to 70°, 9 @ 80 to 90°	
350		‡		1:45/1.0							qu=2128 KSF Axial R1=7, R2=17, R3=10, R4=12, R5=4 RMR=50	
	648.9	45.2	5.0	1:45/1.0 1:45/1.0		(4.0)					Rock Type E	
		ł		1:45/1.0 1:45/1.0		(4.0) 80%	RS-4	1			<u> </u>	
34 <u>5</u>	643.9	50.2		1:45/1.0 1:45/1.0						1	643.9	50.:
		-									Boring Terminated at Elevation 643.9 ft in Crystalline Rock (Meta-dionte)	
		ļ									1) Advanced 3-1/4" HSA to 32.1 Feet.	
	-	‡									2) Advanced 2-15/16" Tricone to 32.1 Feet. 3) Advanced N Casing to 32.0 ft, 33.0 ft total used.	
		‡									4) Advanced NQ Core From 32.1 to 50.2 ft.	
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Project No.:34845.1.1	ID No.: U-2707	Location: Clemmons, NC	Boring No.: B4-A
Site Description: Bridge N	lo. 656 on SR 3000 (Idols F	Road) over Muddy Creek	Driller: M. Moseley
Collar Elev.: 694.1 ft.	Core Size: NQ	Equipment: D-50	Geologist: J. Brandsen
Elev. at T.D.: 643.9 ft.	Total Depth: 54.8 ft.	Total Run: 18.1 ft.	Date: 3/21/12



Box 1 of 2
Top of Box @ 32.1 feet; Bottom of Box @ 40.2 feet



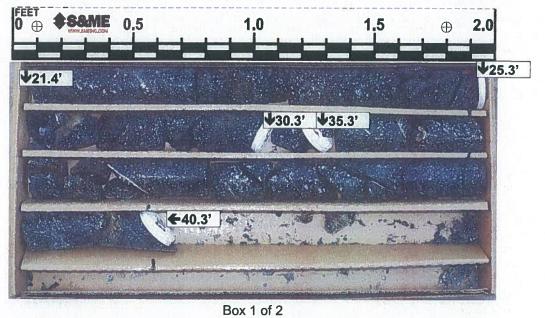
Box 2 of 2 Top of Box @ 40.2 feet; Bottom of Box @ 50.2 feet

WBS	3484	5.1.1			T	1P	P U-2707		COL	JNT	/ FORSY	TH			GEOLOGIST Brandser	n, J.		
SITE	DESC	RIPTIO	V Bri	dge N	o. 656	OI	n SR 3000	0 (Idols I	Road) C	ver	Muddy Cre	ek					GROUN	D WTR (f
BOR	ING NO	. B4-E	3		S	T	ATION 9	1+05			OFFSET	16 ft R1	-		ALIGNMENT -L-		0 HR.	N/a
COL	LAR EL	EV . 6	93.1 ft		Т	0	TAL DEP	TH 50.	3 ft		NORTHIN	G 827,	657		EASTING 1,599,361		24 HR.	6.
DRIL	L RIG/HA	MMER E	FF./DA	TE S	ME R-2	2 [DIEDRICH [D-50 87%	6/2/2011			DRILL	METHO	D S	PT Core Boring	HAMM	ER TYPE	Automatic
DRIL	LER A	/loseley	, M.		S	T	ART DATE	E 03/21	/12		COMP. DA	TE 03	/22/12		SURFACE WATER DEP	TH N	/A	
ELEV	DRIVE ELEV	DEPTH	BLO	ow co	UNT	Τ		BLOW	S PER F	тос		SAMP	V/	1 [COIL AND DO		COURTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft		0 :	25	50		75 10 0	NO.	МО	0 G	SOIL AND ROO ELEV. (ft)	LK DESI	CRIPTION	DEPTH
695		L																
		<u> </u>													693.1 GROUNI		ACE	
	692.1	1.0	1	WOH	1	П	1						М		ALL Tan-Brown S	UVIAL Bilty Fine	SAND	
90	689.6-	3.5	2	2	4		V								<u>-</u>	·		
	687.1	6.0					6						M		- 687.6	IDUAL		
85		Į	6	8	12		• • • • 2	0			: : : :		-		- Brown-Green-Bla		Fine SAND	
	684.6	8.5	6	16	24			4	0				M		- ·			
		+						-						9777	682.1 WEATHE	RFD RC	CK	1
088	679.6	13.5	- (5		50/0-/								ļ			-diorite)	, or	
			48	50	50/0.4						. 100/0.9							
375	-									: :								
,,,	674.6	- 18.5 -	52	74	26/0.2										- n •			
	- 671.7 -	- 21.4									. 100/0.7				671.7			21
70	_		60/0.0								60/0.0				CRYSTAL (Meta	LINE RO -diorite)	OCK	
	-														, , , , , , , , , , , , , , , , , , , ,	<i></i>		
	-	-									::::				i.			
65	_					-									-			
60	-	-	ļ															
	-	-																35
	7	-													(Meta	-diorite)		
55	4	-				-	• • • •		1						-			
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50	1																	
30	1	- [ı											•			
Ì	‡	:								: :								
45		-	Ì	1							• • • •				9			
										: :					642.8			50
	1													E	Boring Terminated a Crystalline Roo			in
	1	.													- 1) Advanced 3-1/4	`	,	
	Ì													F	2) Advanced 2-15/16	"Tricone	to 21.4 Fe	et.
Ì	+													F	3) Advanced N Casing us	ed.	*	
	7													F	4) Advanced NQ Cor	e From 2	21.4 to 50.3	ft.
	7													ļ				
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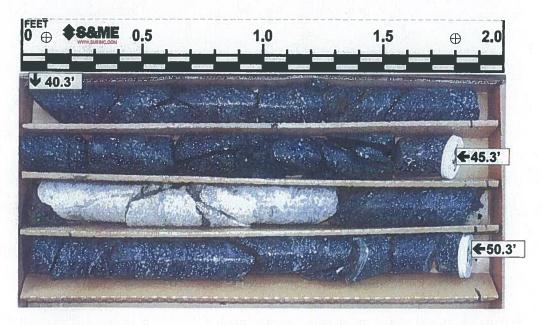
NCDOT GEOTECHNICAL ENGINEERING UNIT

CORE BORING REPORT TIP U-2707 WBS 34845.1.1 COUNTY FORSYTH GEOLOGIST Brandsen, J. SITE DESCRIPTION Bridge No. 656 on SR 3000 (Idols Road) Over Muddy Creek GROUND WTR (ft) OFFSET 16 ft RT BORING NO. B4-B **STATION** 91+05 ALIGNMENT -L-0 HR. N/A COLLAR ELEV. 693.1 ft TOTAL DEPTH 50.3 ft **NORTHING 827.657 EASTING** 1,599,361 24 HR. 6.7 DRILL RIG/HAMMER EFF./DATE SME R-2 DIEDRICH D-50 87% 6/2/2011 DRILL METHOD SPT Core Boring HAMMER TYPE Automatic DRILLER Moseley, M. **START DATE** 03/21/12 **COMP. DATE** 03/22/12 SURFACE WATER DEPTH N/A CORE SIZE NQ TOTAL RUN 28.9 ft RUN REC. RQD (ft) (ft) % % RUN DRILL DEPTH RUN (ft) (ft) REC. ROD (ft) (ft) SAMP. NO. ELEV ELEV RATE DESCRIPTION AND REMARKS (ft) (ft) ELEV. (ft) DEPTH (ft (10.9) (5.8) (1.4) (5.8) Begin Coring @ 21.4 ft CRYSTALLINE ROCK 0 (2.0) (1.0) 51% 26% 21.4 670 Moderate to Slightly Weathered Moderately Hard to Hard Black-Gray 667.8 1 25.3 (Meta-diorite) with Close Fracture Spacing with 1 joint @ 50°,1 joint @ 70° and 3 joints @ 80 to 90° 0:45/1.0 (1.0) (0.4) 0:45/1.0 20% 8% 5.0 665 0:45/1.0 662.8 1 30.3 0:45/1.0 | 5.0 | 0:30/1.0 | (0.3) | (0.0) | 0:30/1.0 | 6% | 0% 660 0:30/1.0 0:30/1.0 0:30/1.0 1:15/1.0 (3.3) (1.9) 35.3 Slightly to Very Slightly Weathered Moderately Hard to Hard Black-Gray 1:15/1.0 | 66% | 38% 655 1:15/1.0 (Meta-diorite) with Very Close to Close Fracture Spacing 1:15/1.0 Quartzite Between 45.4' and 46.6' 1:15/1.0 5.0 2:00/1.0 (3.8) (2.0) 2:00/1.0 76% 40% 652.8 **I** 40.3 with 4 joints @40°, 3 joints @ 55 to 60° and 10 joints @ 80 to 90° 650 2:00/1.0 2:00/1.0 647.8 I 45.3 2:00/1.0 5.0 1:45/1.0 (3.8) (1.9) 1:45/1.0 76% 38% 645 1:45/1.0 1:45/1 0 642.8 1 50.3 1:45/1.0 Boring Terminated at Elevation 642.8 ft in Crystalline Rock (Meta-diorite) 1) Advanced 3-1/4" HSA to 21.4 Feet. 2) Advanced 2-15/16" Tricone to 21.4 Feet. Advanced N Casing to 21.4 ft, 22.0 ft total used.
 Advanced NQ Core From 21.4 to 50.3 ft.

Project No.: 34845.1.1	ID No.: U-2707	Location: Clemmons, NC	Boring No.: B4-B
Site Description: Bridge	No. 656 on SR 3000 (Idols R	Road) over Muddy Creek	Driller: M. Moseley
Collar Elev.: 693.1 ft.	Core Size: NQ	Equipment: D-50	Geologist: J. Brandsen
Elev. at T.D.: 642.8 ft.	Total Depth: 50.3 ft.	Total Run: 28.9 ft.	Date: 3/22/12



Top of Box @ 21.4 feet; Bottom of Box @ 40.3 feet



Box 2 of 2
Top of Box @ 40.3 feet; Bottom of Box @ 50.3 feet

WBS	3484	5.1.1			Т	IP U-270	07	COUNT	Y FORSY	ГН			GEOLOGIST Brandsen, J.	
SITE	DESC	RIPTIO	N Bri	dge N	o. 656	on SR 30	00 (Idols R	oad) Over	Muddy Cre	ek				GROUND WTR (
BOR	ING NO). B5-	A	- New York	s	TATION	91+75		OFFSET	16 ft LT			ALIGNMENT -L-	OHR. N
COL	LAR EL	EV. 6	95.0 ft		Т	OTAL DE	PTH 44.9	ft	NORTHING	3 827,	731	- 22	EASTING 1,599,382	24 HR. 6
DRIL	L RIG/HA	MMER	EFF/D/	ATE S	ME R-2	DIEDRICH	1 D-50 87% 6	/2/2011		DRILL	METHO	D S	PT Core Boring HAM	MER TYPE Automatic
DRIL	LER N	/losele	y, M.		S	TART DA	TE 03/15/	12	COMP. DA	TE 03	/19/12		SURFACE WATER DEPTH	N/A
LEV	DRIVE	DEPTI	BL	ow co	TNU		BLOWS	PER FOOT		SAMP	∇	11		
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	МО	0 G	SOIL AND ROCK DE ELEV. (ft)	SCRIPTION DEPTH
695													695.0 GROUND SUR	FACE
	694.0	1.0	3	2	3	1 I					М		ALLUVIAL Tan-Orange Fine Sand	
	691.5	3.5	_			45		: : : :			"		- Tan Olange i me can	iy only ob (
90	689.0	6.0	5	8	12		20	1	1		M		-689.5	
	. 009.0	+	5	6	6	· • • 12	: : : : :						Tan-Orange Clayey I 687.0	Fine SAND
85	686.5	8.5	15	16	13	: :	1.20				м		RESIDUAL	
00	-	‡		}			\						Gray-Orange Silty Coarse	to Fine SAND
	681.5 ⁻	13.5						: : : :						
80			11	15	27		42		1		М		-	
	-													
	676.5	18.5	40	60/0.4			1 : :L:				Į		676.0	19
5	_								100/0.9		ĺ		WEATHERED F (Meta-diorite	
1	074.5													
₇₀	671.5	23.5	100/0.5				1	1	100/0.5					
	-	F												
	666.5 665.8	28.5												
65	665.8 -	- 29.2	100/0.4 60/0.0				1		100/0.4				665.1 CRYSTALLINE I	29
Ì	-	-				1 : : :		: : : :					(Meta-diorite	
30	1												_660.6	34
	7												(Meta-dionite	e)
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5	-	_												
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1								<u> </u>	L				650.1 Boring Terminated at Elevi	ation 650.1 ft in
1		-			- 1							Ŀ	Crystalline Rock (Me	· ·
	1											E	1) Advanced 3-1/4" HSA 2) Advanced 2-15/16" Trico	ne to 29.9 Feet.
1	1											E	Advanced N Casing to 3 used.	0.0, 32.0 ft total
1	1											F	4) Advanced NQ CoreFrom	1 29.9 to 44.9 ft.
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NCDOT GEOTECHNICAL ENGINEERING UNIT

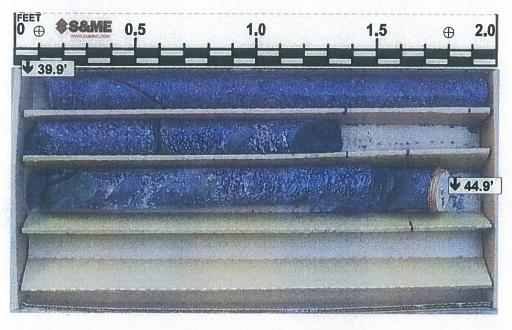
WBS	34845.1.1	TIP U-2707	COUNT	Y FORSYTH	GEOLOGIST Brandsen, J.	
SITE	DESCRIPTION Bridge	No. 656 on SR 3000 (Idols	Road) Over	Muddy Creek		GROUND WTR (ft)
BOR	RING NO. B5-A	STATION 91+75		OFFSET 16 ft LT	ALIGNMENT -L-	0 HR. N/A
COL	LAR ELEV. 695.0 ft	TOTAL DEPTH 44	9 ft	NORTHING 827,731	EASTING 1,599,382	24 HR . 6.7
DRIL	L RIG/HAMMER EFF./DATE	SME R-2 DIEDRICH D-50 879	6 6/2/2011	DRILL METHOD SPT	Core Boring HAMM	ER TYPE Automatic
DRIL	LER Moseley, M.	START DATE 03/1	5/12	COMP. DATE 03/19/12	SURFACE WATER DEPTH N	/A
COR	RESIZE NQ	TOTAL RUN 15.01				
ELEV (ft)	ELEV DEPTH RUN F	RILL RUN ATE REC. RQD (ft) (ft) (ft) NO.	STRATA REC. RQD (ft) (ft) % %	L O DI	ESCRIPTION AND REMARKS	DEPTH (f
(ft) 6660 655	(ft) (ii) (ii) (h	in/ft) (W) (W) NO. 5/1.0 (3.0) (1.0) 5/1.0 60% 20% 5/1.0 0/1.0 (4.5) (3.9) 0/1.0 0/1.0 0/1.0 0/1.0 5/1.0 5/1.0 5/1.0 5/1.0 5/1.0 5/1.0 5/1.0 5/1.0 5/1.0 5/1.0 5/1.0 5/1.0 1/1.0 5/1.0 5/1.0 5/1.0 1/	(%) (%) (%) (%) (%) (%) (%) (%) (%) (%)	G ELEV. (ft) 665.1 660.6 (Meta-diorite) with 4 Vi (Meta-diorite with 1 joint with 1 joint with 1 joint at 2) Advan 3) Advan	Begin Coring @ 29.9 ft CRYSTALLINE ROCK Slight to Very Slightly Weathered Hard Gray-Black ith Close to Moderately Close Fracture joints @ 60 to 70° and 1 joint @ 90° ery Slightly to Freshly Weathered Very Hard Gray-Black e) with Moderately Close Fracture Spate (a) 30°, 2 joints @ 50° and 5 joints @ Elevation 650.1 ft in Crystalline Rock advanced 3-1/4" HSA to 29.2 Feet. anced 2-15/16" Tricone to 29.9 Feet. ced N Casing to 30.0, 32.0 ft total use vanced NQ CoreFrom 29.9 to 44.9 ft.	e Spacing 34. acing 90° (Meta-diorite)

Project No.:34845.1.1	ID No.: U-2707	Location: Clemmons, NC	Boring No.: B5-A
Site Description: Bridge No	o. 656 on SR 3000 (Idols R	load) over Muddy Creek	Driller: M. Moseley
Collar Elev.: 695.0 ft.	Core Size: NQ	Equipment: D-50	Geologist: J. Brandsen
Elev. at T.D.: 650.1 ft.	Total Depth: 54.8 ft.	Total Run: 44.9 ft.	Date: 3/15/12



Box 1 of 2

Top of Box @ 29.9 feet; Bottom of Box @ 39.9 feet



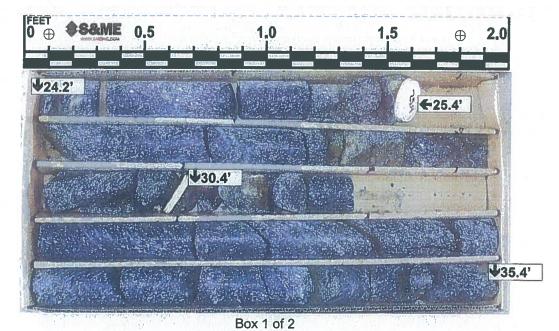
Box 2 of 2 Top of Box @ 39.9 feet; Bottom of Box @ 44.9 feet

	DESCF	NOTION									19		GEOLOGIST Brandsen, J.	
3OR		KIP HOP	1 Brid	ige N	o. <u>6</u> 56	on	n SR 3000 (Idols Ro	ad) Over	Muddy Cree	k				GROUND WTR (
_	ING NO	. B5-E	3		S	STA	ATION 91+75		OFFSET	16 ft RT			ALIGNMENT -L-	O HR. N
COL	LAR EL	EV . 69	94.5 ft		Т	101	TAL DEPTH 45.4 ft		NORTHING	827,	710		EASTING 1,599,406	24 HR. 7
RILI	L RIG/HA	MMER E	FF./DA	TE S	ME R-	2 [DIEDRICH D-50 87% 6/2	2/2011		DRILL	METHO	D S	T Core Boring HAMI	MER TYPE Automatic
PRIL	LER N	loseley	, M.		S	STA	ART DATE 03/20/1	2	COMP. DA				SURFACE WATER DEPTH N	
LEV	DRIVE	DEPTH		ow co	UNT	П	BLOWS F	ER FOOT		SAMP.	V /	1 4		C30700000000000000000000000000000000000
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft		0 25 5	įo	75 100	NO.	MOI	O G	SOIL AND ROCK DES	SCRIPTION DEPTH
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395 i				l									ODOLIND GLIDT	
	693.5	1.0				#			1	70.00	┼─		-694.5 GROUND SURF 693.0 ALLUVIAL	
	-	1	4	25	40			• 65			М		Tan-Orange Clayey F	ine SAND
90	691.0	3.5	23	33	32	11		65			м		Gray-White-Tan Silty I	Fine SAND
Ì	688.5	6.0	7	9	14	11			: : : :			V	Tan-Gray-White-Brown Cla with Some Rock Fragment	yey Fine SAND
	686.0	8.5					23				-		with Some Rock Fragment Mica	ts and Trace of
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								<u>- </u>					677.5 WEATHERED R	17
5	676.0	18.5	50	88	12/0.1	$\ \cdot \ $							(Meta-diorite	
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_	671.0 670.3		100/0.3						100/0.3				670.3	24
1	+	- [60/0.0						60/0.0				CRYSTALLINE R (Meta-diorite	
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-	1 1 1	-				止							649.1 Boring Terminated at Eleva	45
1	1											t	Bonng Terminated at Eleva Crystalline Rock (Meta	
	1											Ŀ	1) Advanced 3-1/4" HSA	to 24.2 Feet.
1	+			1	İ							-	 Advanced 2-15/16" Tricor Advanced N Casing to 24. 	ne to 24.2 Feet.
	- ‡			ı								F	used.	
												E	Advanced NQ Core From	24.2to 45.4 ft.
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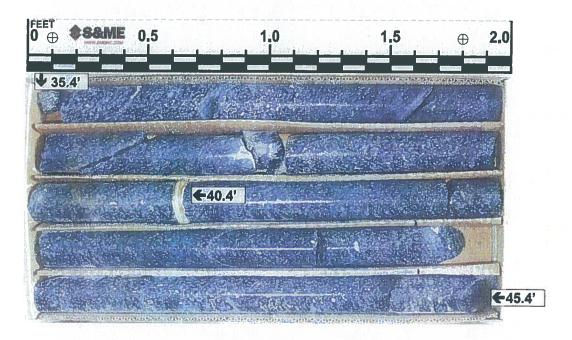
NCDOT GEOTECHNICAL ENGINEERING UNIT

WBS	34845	.1.1			TIP	U-270)7	C	OUNT	Y F	FORSYTH GEOLOGIST Brandsen, J.
SITE	DESCR	IPTION	Brid	ge No. 6	56 on	SR 30	00 (Idols	Road)	Over	Muc	ddy Creek GROUND WTR (ft)
BOR	ING NO.	B5-B			STA	TION	91+75			OF	FSET 16 ft RT ALIGNMENT -L- 0 HR. N/A
COL	AR ELI	EV. 69	4.5 ft		TOT	AL DE	PTH 45.	.4 ft		NC	ORTHING 827,710 EASTING 1,599,406 24 HR. 7.2
DRILL	RIG/HAI	MMER E	FF/DA	TE SME	R-2 DI	EDRICH	D-50 879	6 6/2/20	11	•	DRILL METHOD SPT Core Boring HAMMER TYPE Automatic
DRIL	LER M	oseley	, M.		STAI	RT DA	TE 03/2	0/12		CC	OMP. DATE 03/21/12 SURFACE WATER DEPTH N/A
	E SIZE				1		N 21.2 f				
LEV	RUN	DEPTH	RIIN	DRILL	RI	UN	SAMP.	STR	ATA RQD	L	
(ft)	ELEV (ft)	(ft)	(ft)	RATE (Min/ft)	REC. (ft) %	RQD (ft) %	NO.	REC. (ft) %	(f) %	O	DESCRIPTION AND REMARKS ELEV. (ft) DEPTH (ft
6 79 63											Begin Coring @ 24.2 ft
-07-0-	670.3 - 669.1	24.2 25.4	1.2 5.0	N=60/0.0 0:15/0.2 1:10/1.0	(0.6) 50%	(0.8) 67%		(8.8) 79%	(4.2) 38%	1	670.3 CRYSTALLINE ROCK 24.2 Moderately to Very Slightly Weathered
		ţ	5.0	1:10/1.0	(3.4)	(1.5)		, , , ,	0070		Moderately Hard to Hard Black-Gray (Meta-diorite) with Moderately Close To Very Close Fracture Spacing
665	-	20.4		1:10/1.0 1:10/1.0 1:10/1.0 1:10/1.0 1:10/1.0 1:10/1.0 1:15/1.0 1:15/1.0	68%	30%					with 1 joint @ 30°, 4 joint @ 50 to 60°, 15 joints @ 80 to 90°
	664.1	30.4	5.0	1:10/1.0	(4.8)	(1.9)					}
		ŀ		1:15/1.0 1:15/1.0	96%	38%					
660	659.1	35.4		11. 19/.1.0	L	1				7	659.1 35.4
			5.0	2:05/1.0 2:15/1.0	(4.8) 96%	(4.3) 86%		(9.8) 98%	(9.0) 90%		Very Slightly to Freshly Weathered Hard to Very Hard Black-Gray
655		F		1:15/1.0 2:30/1.0							(Meta-diorite) with Moderately Close Fracture Spacing with 2 joints @ 30 to 40°, 1 joint @ 60°, 5 joints @ 90°
	654.1	40.4	5.0	2:30/1.0	(5.0)	(4.7)					
		F		2:05/1.0 2:05/1.0	100%						
650	649.1			2:05/1.0 2:05/1.0							649.1 45.4
											Boring Terminated at Elevation 649.1 ft in Crystalline Rock (Meta-diorite)
		ļ									1) Advanced 3-1/4" HSA to 24.2 Feet. 2) Advanced 2-15/16" Tricone to 24.2 Feet.
	-	t									3) Advanced N Casing to 24.2 ft, 25.0 ft total used.
		t									4) Advanced NQ Core From 24.2to 45.4 ft.
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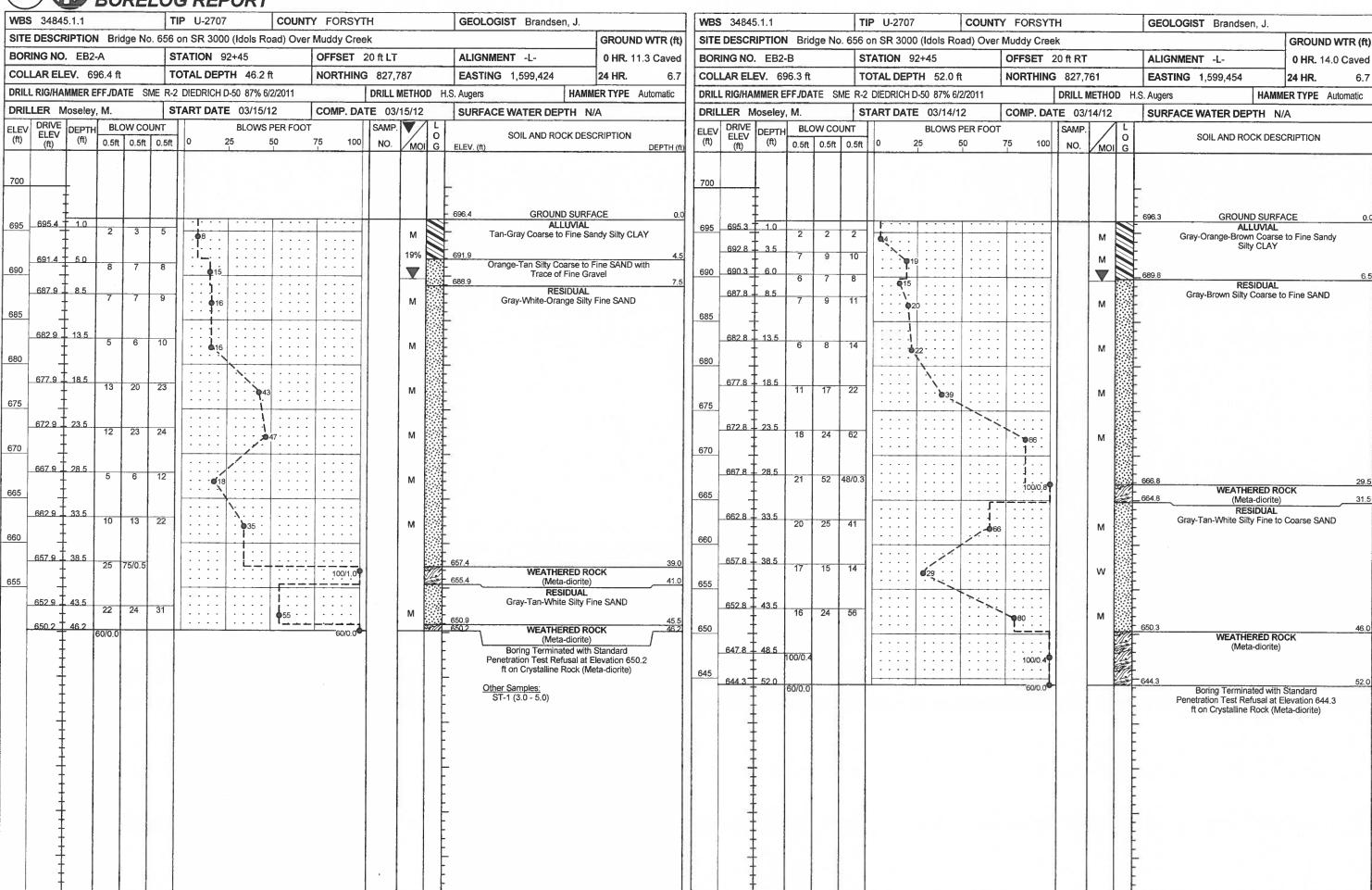
Project No.: 34845.1.1	ID No.: U-2707	Location: Clemmons, NC	Boring No.: B5-B
Site Description: Bridge	No. 656 on SR 3000 (Idols I	Road) over Muddy Creek	Driller: M. Moseley
Collar Elev.: 694.5 ft.	Core Size: NQ	Equipment: D-50	Geologist: J. Brandsen
Elev. at T.D.: 649.1 ft.	Total Depth: 45.4 ft.	Total Run: 21.2 ft.	Date: 3/20/12



Top of Box @ 24.2 feet; Bottom of Box @ 35.4 feet



Box 2 of 2
Top of Box @ 35.4 feet; Bottom of Box @ 45.4 feet



SUMMARY OF LABORATORY TEST DATA



Soil Classification and Gradation

																Quali	ty Assuran	ce	
				THE THE PARTY NAMED IN	STREET, SQUARE	c. Raleig	h, 3201	Spring I	orest R	load, Ra	leigh, No	orth Ca	rolina 2	7616					
S&ME Pi			1051-12										Date	Report:		4.	/13/2012		
State Proj	·		34845.			County: Forsyth							Date Tested:			4/11 - 4/13/12			
Federal II			STP-30	_ ` _				. U-2707											
Project N		31			on -L-	SR 3000	(Idols R												
Client Na	me:		NCDO	DECEMBER OF THE OWNER, OR WHEN			and the state of t	and the same of th	Raleigh	n, North	THE RESERVE THE PARTY OF THE PA	the later was a second				0.00			
		Sample	AASI			Tot	al % Pas	HEROTOPIC PROPERTY.		-	l Mortar	Fraction	1 (%)				Organic		
Boring	Sample	Depth	Classifi	cation			The same of the sa	Sieve #			Fine			LL	PL	PI		Moisture	
No.	No.	(ft)			10	40	60	200	270	Sand	Sand	Silt	Clay				%	Content %	
EB2-A	ST-1	3 - 5 ft.	A-6	(13)	100	99	97	68.8	56.8	3	40	18	39	39	18	21	ND	19.4	
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0 -6	/ Cana	/ D === 1 = 1 =		NID: 37	AD.	- Al - Olec - 2						-							
		/ Deviations			t Detemin														
		Size Analysi								ermining th	=			4465	*1.				
		ning the Plas			/	100	For Uichwa			aboratory I	Jeterminat	ion oi Mo	isture Cor	ntent of So	IIS				
WISHIO W	1143. I II 6 C	iassincation	or solls all	A SOII A	regice are	INITATION CS I	oi riigiiwa	y Construc	mon rurp	0362						-			
	Mal Kra	jan, ET		N/	1		10	4-01-070)3	Abn	er F. Rig	ggs, Jr l	P.E.		S	enior E	ngineer		
	Technicia	-			Signature		A	ertification											
	Technicia	n Name:		/	Dignature			erigication	п	Te	echnical Res	sponsibility	; :			Positi	on		

UNCONFINED COMPRESSION (ASTM D7012 Method C)



S&ME, Inc. - Knoxville 1413 Topside Road, Louisville, TN 37777

Project: 34845.1.1, TIP No. U-2707

Description: Bridge No. 656 on - L - (SR3000) Idols Road over Muddy Creek

County: Forsyth County, North Carolina

Federal ID No.: STP-3000(1)

S&ME Job No.: 1051-12-089B

Date: 4/13/2012

Tested By: Jason B. Burgess

Rock Type: Meta-diorite

Sample	Boring	Depth	Specimen I	Dimension, in.	Area	Bulk Density	Loading Rate	Max. Load	Strength	Moisture	
No.	Location	(ft)	Length	Diameter	(in ²)	(lb/ft ³)	(psi/sec)	(lb)	(psi)	(%)	
RS-1	B1-A	36.1 - 37.1	4.35	1.98	3.08	181.3	94	27,550	8,945	0.1	
RS-2	B2-B	43.8 - 45.1	4.35	1.97	3.05	182.9	89	53,260	17,462	0.1	

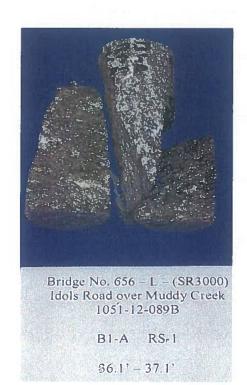
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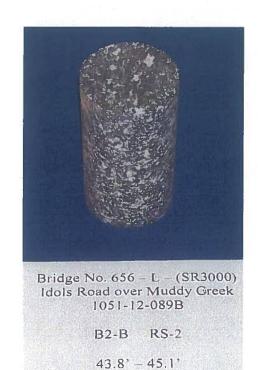
Bulk Density includes any moisture that is within the specimen.



Bridge No. 656 - L - (SR3000) Idols Road over Muddy Creek 1051-12-089B B1-A RS-1

36.1' - 37.1'







UNCONFINED COMPRESSION (ASTM D7012 Method C)



S&ME, Inc. - Knoxville 1413 Topside Road, Louisville, TN 37777

Project: 34845.1.1, TIP No. U-2707

Description: Bridge No. 656 on - L - (SR3000) Idols Road over Muddy Creek

County: Forsyth County, North Carolina

Federal ID No.: STP-3000(1)

S&ME Job No.: 1051-12-089B

Date: 4/13/2012

Tested By: Jason B. Burgess

Rock Type: Meta-diorite

Sample	Boring	Depth	Specimen I	Dimension, in.	Area	Bulk Density	Loading Rate	Max. Load	Strength	Moisture
No.	Location	(ft)	Length	Diameter	(in ²)	(lb/ft ³)	(psi/sec)	(lb)	(psi)	(%)
RS-3	В3-А	53.2 - 55.2	4.39	1.99	3.11	182.3	94	52,380	16,842	0.1
RS-4	B4-A	47.2 - 48.2	4.27	1.98	3.08	177.1	92	45,510	14,776	0.1

NOTES: Bulk Density includes any moisture that is within the specimen.



Bridge No. 656 - L - (\$R3000) Idols Road over Muddy Creek 1051-12-089B B3-A RS-3

53.2' - 55.2'



B3-A RS-3

53.2' - 55/2'





PHOTOGRAPHIC RECORD Bridge No. 656 on SR 3000 (Idols Road) over Muddy Creek



Photograph No. 1: This photograph was taken from the South approach along the centerline of the -L- alignment looking Northeast.



Photograph No. 2: This photograph was taken from the North approach along the centerline of the –L- alignment looking Southwest.

REFERENCE:

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2707	1	5

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY Forsyth	
PROJECT DESCRIPTION	Bridge No. 656 on SR 3000
_(Idols Rd.) over Mude	dy Creek
SITE DESCRIPTION	

CONTENTS

ADDENDUM

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	CROSS SECTION
4 - 5	BORE LOG(S)

C.L. Smith	
M.R. Moore	
INVESTIGATED BY	
DRAWN BY	
CHECKED BY C.B. Little	
SUBMITTED BY C.B. Little	

PERSONNEL

J.K. Stickney CI Smith

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 1999 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CEMERAL 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 (IMP-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOL. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS NDICATED IN THE SUBSURFACE OR INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION, THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:

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

 BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.



DATE September 2015

PROJECT REFERENCE NO.	SHEET NO.
U-2707	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

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

											(PA	4GE	l OF 2)						
													GRADATION						
BE PENE ACCORD IS I	TRATED WITH ING TO THE BASED ON TH	A CO STAND E AAS	NTINUOUS ARD PENE HTO SYST	FLIGHT TRATION EM. BAS	POWE TEST SIC DE	R AUGE (AASH SCRIPT)	R AND TO T IONS) YIELD 206, AS GENERAL	LESS M D15 LY INC	THAN 100 86). SOIL LUDE THE	BLOWS PE CLASSIFI FOLLOWI	ER FOOT CATION NG:	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. ANICIJI APITY OF CRAINE						
4	ENCY, COLOR, S MINERALOC <i>VERY STIFF.GR</i>	SICAL	COMPOSITI	ON, ANG	ULARI1	TY, STR	UCTUR	E, PLAS	ICITY.	ETC. FOR	EXAMPLE.		ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:						
			LEGEN										ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.						
GENERAL CLASS.			AR MATERIAL PASSING #20					MATERIAL SING #20		ORC	GANIC MATERI	IALS	MINERAL OGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.						
GROUP		A-3		A-2		A-4	A-5	A-6	4-7	A-1, A-2	A-4, A-5		ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.						
CLASS.	A-1-a A-1-b		A-2-4 A-2-		A-2-7				7-5 -7-6	A-3	A-6, A-7	***********	COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LL < 31						
	000000000			~	2		۸ ٦٠٨						MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50						
	50 MX								G	GRANULAR	SILT- CLAY	MUCK,	PERCENTAGE OF MATERIAL						
	30 MX 50 MX 15 MX 25 MX 1		35 MX 35 M	X 35 MX	35 MX	36 MN	36 MN	36 MN 3	MN	SOILS	SOILS	PEAT	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL						
MATERIAL PASSING #40													TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%						
LL PI	_ 6 MX		40 MX 41 M 10 MX 10 M					40 MX 4		SOILS LITTL	E OR	HIGHLY	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE						
GROUP INDEX	0	0	0	4	_			16 MX N	_	Mode Amoun	TS OF	ORGANIC SOILS	GROUND WATER						
OF MAJOR	STONE FRAGS. GRAVEL, AND	FINE SAND		OR CLAYE		SIL1 SOIL		CLAYE		ORGA MAT		30123	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS						
MATERIALS GEN. RATING	SAND			_						FAIR TO			∇PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA						
AS SUBGRADE			ENT TO GOOD				FAIR TI			POOR	POOR	UNSUITABLE	O→MI► SPRING OR SEEP						
	Р	PIOF A	7-5 SUBGRO	UP IS ≤						LL - 30			MISCELLANEOUS SYMBOLS						
DDIMADY	SOIL TYPE	С	OMPACTNE	SS OR	Ī	RANC	GE OF	STANDA	RD		E OF UNC		ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION						
TATIFIER	SOIL THE		CONSIST			LINE	(N-VA	LUE)	INCL	COMPRESSIVE STRENGTH (TONS/FT ²)			WITH SOIL DESCRIPTION → OF ROCK STRUCTURES						
GENERA GRANUL			VERY LO	Ε			4 TI	10					SOIL SYMBOL OPT OMT TEST BORING SLOPE INDICATOR INSTALLATION						
MATERI (NON-CO	AL IHESIVE)		MEDIUM C DENS	E			10 T 30 T	0 50			N/A		ARTIFICIAL FILL (AF) OTHER AUGER BORING OONE PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING TEST						
			VERY DE				>				< 0.25	<u> </u>	— INFERRED SOIL BOUNDARY → CORE BORING • SOUNDING ROD						
GENERA SILT-CL			SOFT MEDIUM S				2 T 4 T	0 4			0.25 TO 1	0.5	TEST BORING MONITORING WELL TEST BORING						
MATERI (COHESI	4L		STIFF VERY ST	=			8 TI	15			1 TO 2 2 TO 4	?	WITH CURE WITH CURE WITH CURE WITH CURE OF THE VALUE						
			HARE)		D CE	>	30			> 4		INSTALLATION						
				XTUR						070			RECOMMENDATION SYMBOLS [XX] UNDERCUT [7] UNCLASSIFIED EXCAVATION - [7] UNCLASSIFIED EXCAVATION -						
U.S. STD. SI OPENING (M			4.		10 2.00	40 0.42 COARS			200 3.075 FINE	270 0.053			EXCAVATION UNSUITABLE WASTE ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF SHALLOW UNCLASSIFIED EXCAVATION -						
BOULDE (BLDR.		BBLE	GRA (G		Ι.	SAND CSE. S)		SAND SD.)		SILT SL.)	(CL.)	UNDERCUT ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OF BALKFILL ABBREVIATIONS						
GRAIN MN			75		2.0			0.25	000	0.05	0.005	5	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST						
SIZE IN		<u> </u>	3					7011	\ 				BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT						
SOIL	MOISTURE 9	OIL SCALE	MOIST		<u>- נו</u> MOI9 כ								CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{ m d}$ - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC						
(AT	TERBERG LIM	1ITS)		DES	CRIPT	ION		COIDE	OK FI	ELD MOIS	STURE DES	SCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK						
					TURATI SAT.)	ED -					WET, USU		e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE						
PLASTIC RANGE	LIQUID	LIMIT	_	- WF	T - (W	")					DRYING TO)	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL						
(PI) PL	PLASTIC	LIMI	т _					ATTAIN	OPTIM	UM MOIS	TURE		FRAGS FRAGMENTS ω - MOISTURE CONTENT CBR - CALIFORNIA BEARING HI HIGHLY V - VERY RATIO						
ОМ	_ OPTIMUN			- MO	IST -	(M)		SOLID;	T OR	NEAR OPTIMUM MOISTURE			EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:						
SL	+ SHRINKA	AGE L	IMIT	- DR	Y - (D)					WATER TO	0	CME-45C CLAY BITS X AUTOMATIC MANUAL						
						TICI		HITAIN	Ur I IM	MUM MOISTURE			CME-55 X 8*HOLLOW AUGERS CORE SIZE: -B -H						
						ITY IN		<u>PI)</u>			Y STRENG		X CME-550 HARD FACED FINGER BITS						
	I PLASTIC GHTLY PLAS	TIC				0-5 6-15					VERY LOW SLIGHT	1	VANE SHEAR TEST TUNGCARBIDE INSERTS						
MOE	ERATELY PL	.ASTIC	:			16-25 MEDIUM					CASING W/ ADVANCER POST HOLE DIGGER PORTABLE HOIST TRICONE 'STEEL TEETH WAS AUGUST								
	COLOR											TRICONE TRICONE SOUNDING ROD							
DESCRIP	TIONS MAY I	NCLUE	DE COLOR	OR CO	LOR C	OMBINA	NOITE	 6 (TAN,	RED, YE	ELLOW-BF	ROWN, BLUE	E-GRAY).	CORE BIT SOUNDING HOD VANE SHEAR TEST						
M(DIFIERS SU	CH AS	LIGHT, D	ARK, ST	REAKE	D, ETC	. ARE	USED	O DES	CRIBE A	PPEARANCE	Ε							

U-2707 2A

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

SUBSURFACE INVESTIGATION

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

SURFACE.

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 I.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: NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES 3 $100~\mathrm{BLOWS}$ PER FOOT IF TESTED. FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT FINE TO COARSE GRAIN IONEQUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.

FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.

COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC. CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR)

WEATHERING

ERESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER

VERY SLIGHT 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 II OF A CRYSTALLINE NATURE. (V SLI.)

ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO SLIGHT

1 INCH, OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.

SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN MODERATE

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

COASTAL PLAIN SEDIMENTARY ROCK

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 SEVERE (MOD, SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL

ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT SEVERE REDUCED IN STRENOTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. (SEV.)

IF TESTED. WOULD YIELD SPT N VALUES > 100 BPF

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 VERY SEVERE (V SEV.) 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

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.

CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED HARD

TO DETACH HAND SPECIMEN.

MODERATELY 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.

FINGERNAIL.

CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. MEDILIM CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE HARD POINT OF A GEOLOGIST'S PICK.

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. SOFT

VERY 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

FRACTURE SPACING BEDDING

TERM TERM THICKNESS SPACING VERY WIDE MORE THAN 10 FEET 3 TO 10 FEET VERY THICKLY BEDDED THICKLY BEDDED 4 FEET 1.5 - 4 FEET 0.16 - 1.5 FEET WIDE THINLY BEDDED
VERY THINLY BEDDED
THICKLY LAMINATED MODERATELY CLOSE 1 TO 3 FEET 0.03 - 0.16 FEET 0.008 - 0.03 FEET VERY CLOSE LESS THAN 0.16 FEET

THINLY LAMINATED INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. RUBBING WITH FINGER FREES NUMEROUS GRAINS. GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.

GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. MODERATELY INDURATED

GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; INDURATED DIFFICULT TO BREAK WITH HAMMER.

SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE: EXTREMELY INDURATED SAMPLE BREAKS ACROSS GRAINS.

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

TERMS AND DEFINITIONS

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.

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

AQUIFER - A WATER BEARING FORMATION OR STRATA

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM

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.

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

- 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.

 $\underline{\mathsf{FLOAT}}$ - 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, $\underline{\mathsf{FORMATION}}$ - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

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

 $\underline{\mathsf{LEOGE}}$ - 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 IMPERVINIS STRATIM 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.

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

<u>SILL</u> - 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 - I - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT

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 (SROD) - 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.

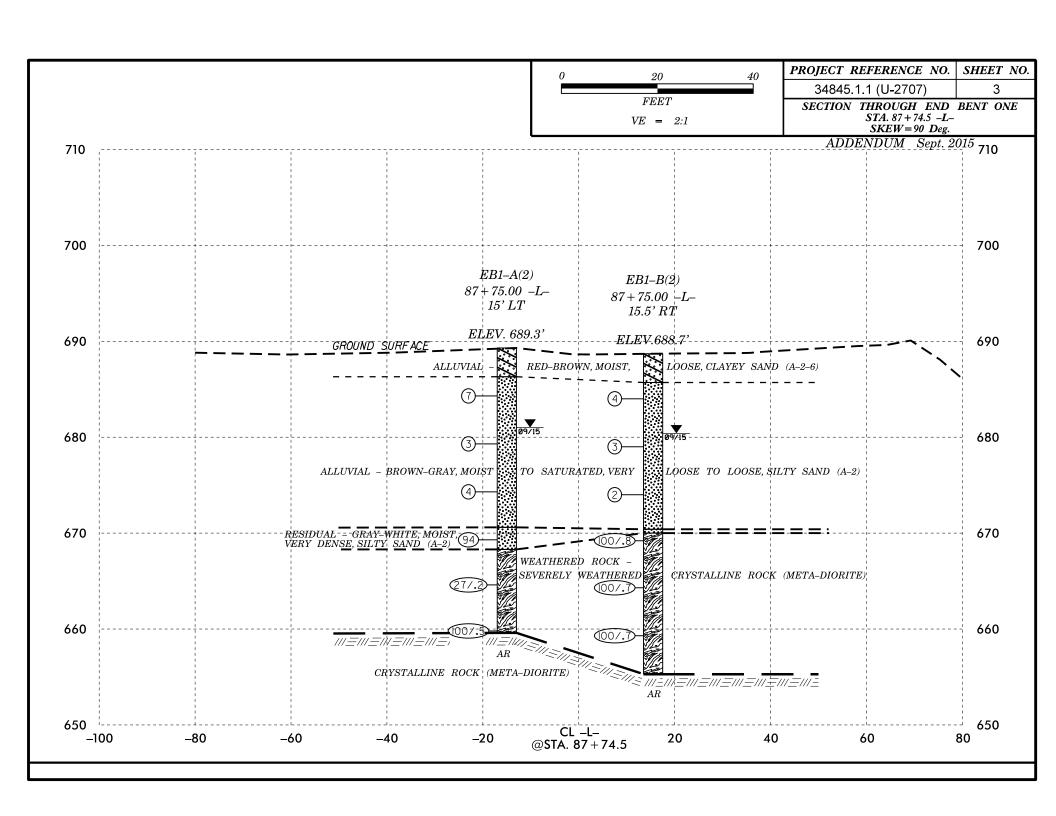
BORING ELEVATIONS AND LOCATIONS SURVEYED BENCH MARK: BY DIVISION 9 LOCATION AND SURVEYS UNIT FEET

ELEVATION:

< 0.008 FEET

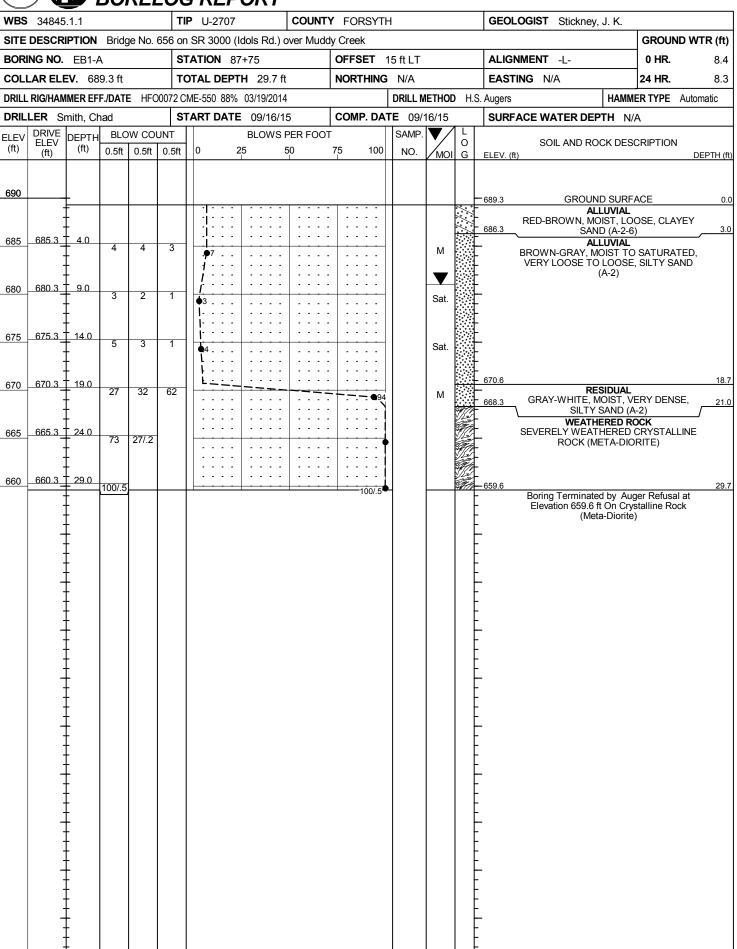
SOIL STRATIGRAPHY IS THROUGH THE BORINGS FOR CROSS SECTIONS

DATE: 8-15-14



GEO_BRDG0656.GINT_ADDENDUM.GPJ NC_DOT.GDT 9/28/15

NCDOT BORE SINGLE U2707



GEO BRDG0656.GINT ADDENDUM.GPJ NC DOT.GDT 9/28/15

NCDOT BORE SINGLE U2707

TIP U-2707 **COUNTY** FORSYTH GEOLOGIST WBS 34845.1.1 Stickney, J. K. SITE DESCRIPTION Bridge No. 656 on SR 3000 (Idols Rd.) over Muddy Creek **GROUND WTR (ft)** BORING NO. EB1-B OFFSET **STATION** 87+75 ALIGNMENT 0 HR. 16 ft RT 8.0 COLLAR ELEV. 688.7 ft TOTAL DEPTH 33.4 ft **NORTHING** N/A **EASTING** N/A 24 HR. 8.3 DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014 DRILL METHOD H.S. Augers HAMMER TYPE Automatic DRILLER Smith, Chad **START DATE** 09/16/15 **COMP. DATE** 09/16/15 **SURFACE WATER DEPTH** N/A DRIVE **BLOW COUNT BLOWS PER FOOT** SAMP. DEPTH FI FV ELEV 0 SOIL AND ROCK DESCRIPTION (ft) (ft) 100 0.5ft 0.5ft 0.5ft 25 50 75 NO MOI G ELEV. (ft) DEPTH (ft) 690 **GROUND SURFACE** ALLUVIAL RED-BROWN, MOIST, LOOSE, CLAYEY SAND (A-2-6) 685.7 685 685.0 3.7 ALLUVIAL 2 М BROWN-GRAY, MOIST TO SATURATED, VERY LOOSE, SILTY SAND (A-2) 680.0 I 8.7 2 Sat. 675.0 13.7 Sat. 670 670.0 📘 18.7 М RESIDUAL 60/.3 40 100/.8 GRAY-WHITE, MOIST, VERY DENSE, SILTY SAND (A-2) WEATHERED ROCK 665 665.0 I 23.7 SEVERELY WEATHERED CRYSTALLINE 12 36 64/.2 ROCK (META-DIORITE) -100/.7 660 | 660.0 \(\frac{1}{28.7}\) 35 65/.2 - -100/.7 655.3 33.4 Boring Terminated by Auger Refusal at Elevation 655.3 ft On Crystalline Rock (Meta-Diorité)