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<b>DESCRIPTION</b>
TITLE SHEET
LEGEND
SITE PLAN
CROSS SECTIONS
BORE LOG REPORTS

# STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# GEOTECHNICAL ENGINEERING UNIT

# **STRUCTURE** SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO	R-2915A	34518.1.2	F.A. PRO.	J. STP-022I (139)
COUNTY WATAUGA				
PROJECT DESCRIPTION	US 221	FROM US	421 IN WATAUGA	со. то
	SR	1003 IN AS	HE CO.	

BRIDGE OVER US 421 AT STA. 11+18 SITE DESCRIPTION

DRAWN BY:

NOTE - 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.

STATE	STATE PROJECT	REFERENCE NO.	SHEET	TOTAL SHEETS
N.C.	R-2915A	34518.1.2	1	9

#### 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 FELD BORNIN LOGS, ROCK CORES, AND SOL TEST DATA AVAILABLE MAY BE REVEWED OR INSPECTED IN RALEDH BY CONTACTING THE N. COPPARTMENT OF TRANSPORTATION, CEOTECHNICAL HOMINERING UNIT AT 1999 JOSO-0408, NETHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GENERAL SOL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND NOT NECESSARLY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNOS OR BETWEEN SAMPLED STRATA WITHIN THE GORENULE. THE LABORATORY SAMPLE DATA AND THE IN SITU UN-PLACE TEST DATA CAN BE RELED ON ONLY TO THE DEGREE OF RELIABLITY INNERENT IN THE STANDARD TEST METHOD. THE OSSERVED WATER LEVELS OR SOL MOSTURE CONDITIONS BWUCATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE FALO OF THE INVESTIGATION. THESE WATER LEVELS OR SOL MOSTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEREBRIDGES BEREIGEVIEW AND INDO AND INDO. AN UNIT ON THE MACED FOTORS TEMPERATURES. PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ORE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DODWENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MODE, NOT INE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTACTOR IS CALITORED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS NED DEEMS NECESSARY TO SAILSY MINELE AS TO CONDITIONS TO BE ENCOUNTERED ON THIS FROMULET. THE CONTINCTOR SHALL HAVE NO CLAW FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR HAVE RESULTING FROM THE ACTUAL CONDITIONS TO BE ENCOUNTERED ON THIS FORDED.

PERSONNEL DC ELLIOTT

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CHECKED BY
SUBMITTED BYJC KURNE
DATE 12 6/2013
EAL 878 Jose Ulle

INVESTIGATED BY JC KUHNE

#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT 

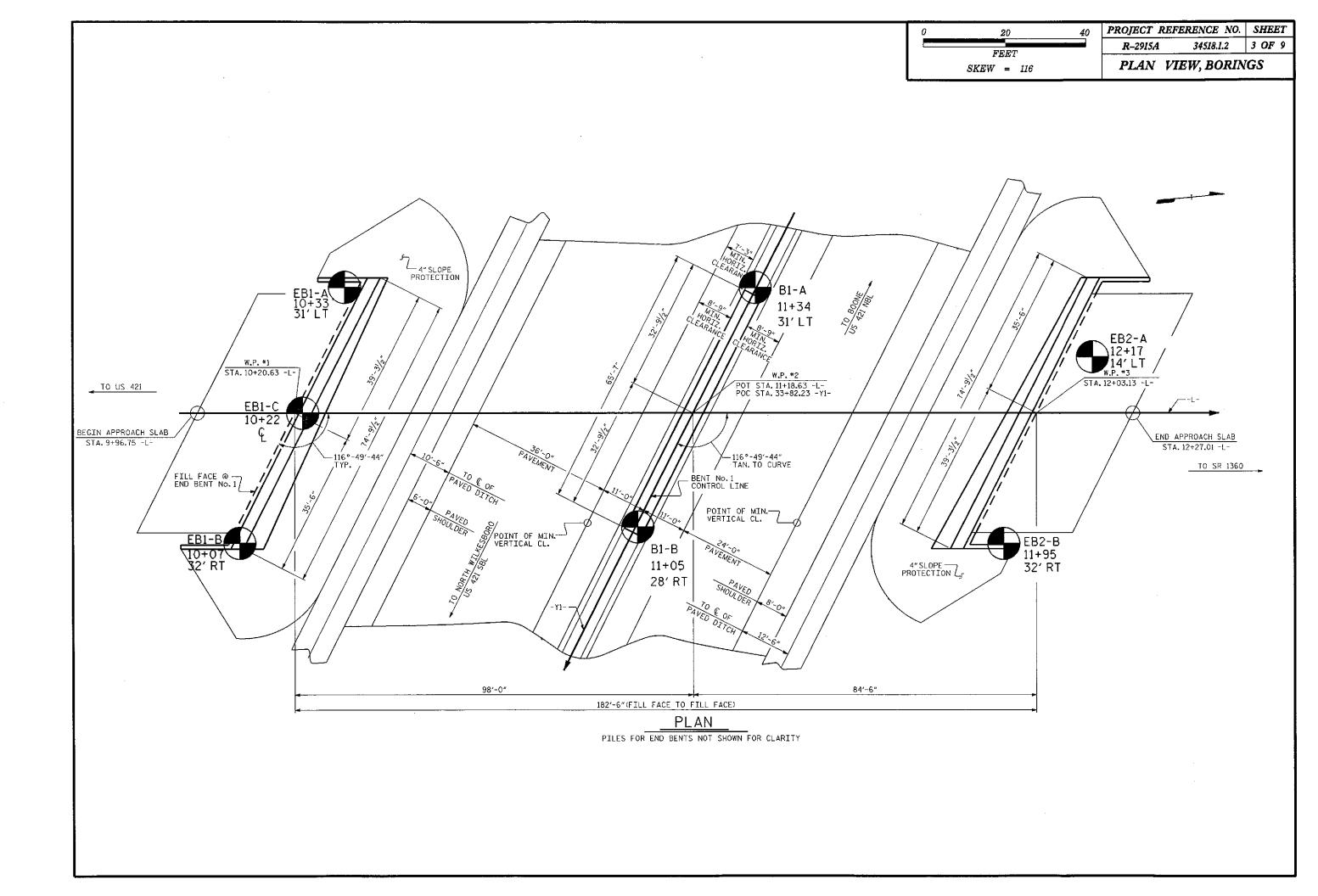
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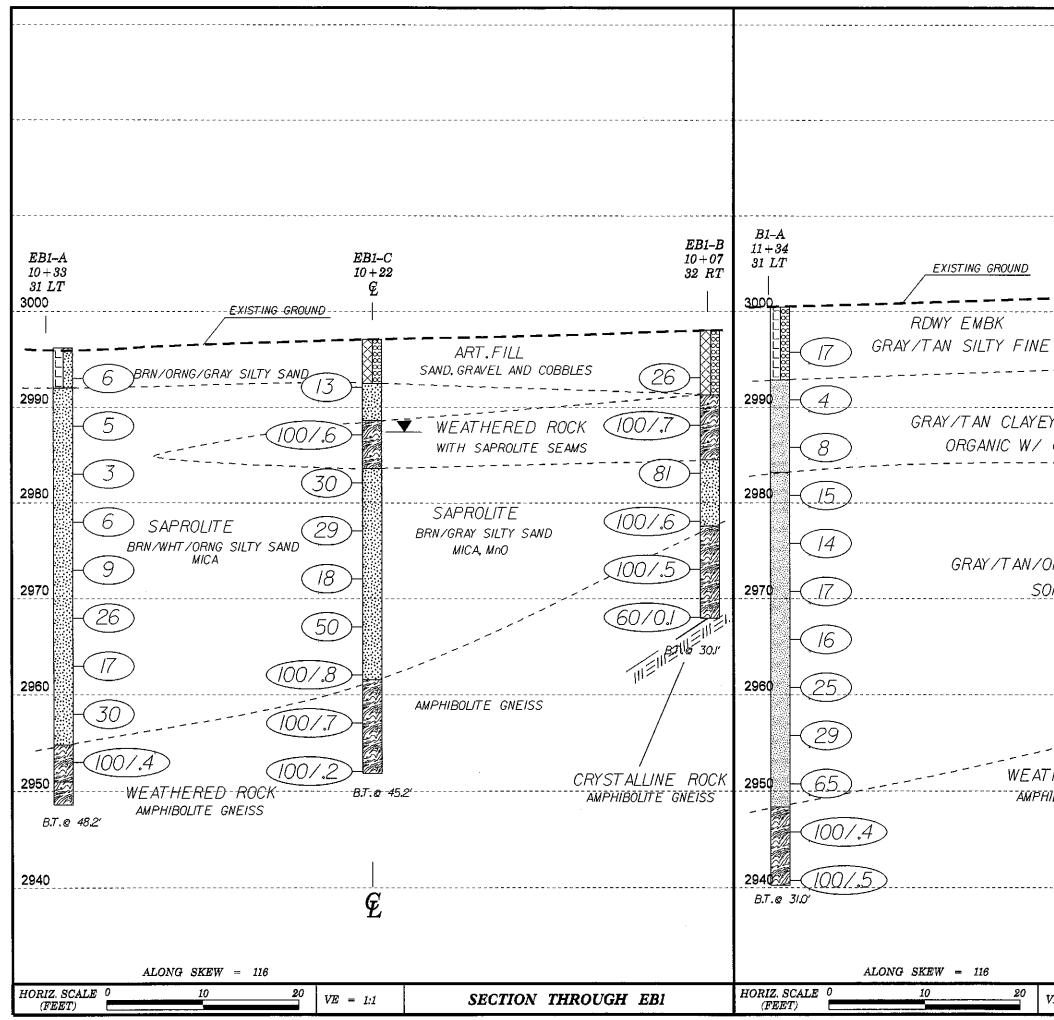
# SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND. TERMS. SYMBOLS, AND ABBREVIATIONS

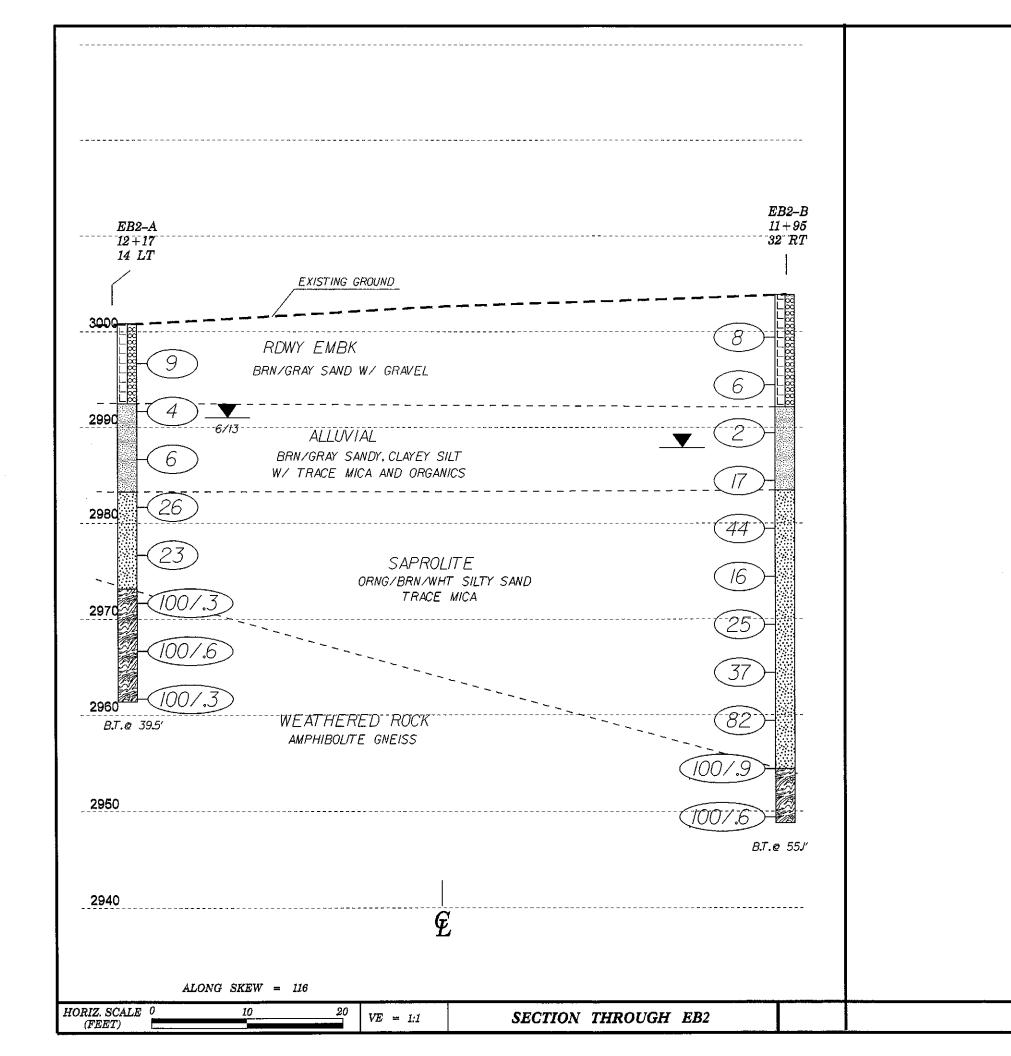
				SOIL AND ROO	CK LEGEND, TERM	s, symbo	OLS, AND ABBREV	VIATIONS		
	SOIL DESCRIPTI	ON		GRADATION				C DESCRIPTION		TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCON	NSOLIDATED, SEMI-CONSOLIDA	TED, OR WEATHERED EARTH MATERIALS	UNIFORM - INDICATES THAT SO	GOOD REPRESENTATION OF PARTICLE SIZES F DIL PARTICLES ARE ALL APPROXIMATELY THE	ROM FINE TO COARSE. SAME SIZE. (ALSD	ROCK LINE	INDICATES THE LEVEL AT WHICH NO	HAT IF TESTED, WOULD YIELD SPT א N-COASTAL PLAIN MATERIAL WOULD	YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
THAT CAN BE PENETRATED WITH A CONT 100 BLOWS PER FODT ACCORDING TO ST	NTINUDUS FLIGHT POWER AUG TANDARD PENETRATION TEST	er, and y1eld less than (AASHTO T206, ASTM D-1586), soll	POORLY GRADED) GAP-GRADED - INDICATES A MI	XTURE OF UNIFORM PARTICLES OF TWO OR M	IORE SIZES.			ION SAMPLER EDUAL TO OR LESS TH TION BETWEEN SOIL AND ROCK IS O		<u>AQUIFER</u> - A WATER BEARING FORMATION OR STRATA.
CLASSIFICATION IS BASED ON THE AASH CONSISTENCY, COLOR, TEXTURE, MOISTURE	SHTO SYSTEM, BASIC DESCRIP	TIONS GENERALLY SHALL INCLUDE:		ANGULARITY OF GRAINS		OF WEATHER				ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULA	ARITY, STRUCTURE, PLASTICIT	TY, ETC. EXAMPLE:		SS OF SOIL GRAINS IS DESIGNATED BY THE	TERMSI ANGULAR,	WEATHERED		. PLAIN MATERIAL THAT WOULD YIEL		ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, DR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
	CLN, MOIST WITH INTERBEDDED FINE SAM		SUBANGULAR, SUBROUNDED, OR			ROCK (WR)	BLOWS PER	FOOT IF TESTED.	U SMI N YALUES > 100	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
	ND AND AASHTO CI			MINERALOGICAL COMPOSITIO		CRYSTALLINE		RSE GRAIN IGNEOUS AND METAMORPH SPT REFUSAL IF TESTED, RDCK TYP		AT WHICH IT IS ENCOUNTERED, BUT WHICH DDES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
GENERAL     GRANULAR MATERI       CLASS.     (≤ 35% PASSING *)		MATERIALS DRGANIC MATERIALS	WHENEVER THEY ARE CONSIDER	ED OF SIGNIFICANCE.	SED IN DESCRIPTIONS	ROCK (CR)	GNEISS, GABB	RO, SCHIST, ETC.	-	CALCAREOUS (CALCA- SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3	A-2 A-4 A-5	A-6 A-7 A-1, A-2 A-4, A-5		COMPRESSIBILITY		NON-CRYSTALL	JNC SEDIMENTARY	RSE GRAIN METAMORPHIC AND NON-CO ROCK THAT WOULD YEILD SPT REFU		COLLUVIUM - ROCK FRAGMENTS NIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
CLASS. A-1-a A-1-b A-2-4 A-3	-2-5 A-2-6 A-2-7	A-7-5 A-7-5 A-3 A-6, A-7	SLIGHTLY COMPRESS MODERATELY COMPRE	IBLE LIQUID LIMIT	less than 31 Equal to 31-50	ROCK (NCR)	INCLUDES PH	YLLITE, SLATE, SANDSTONE, ETC.		OF SLOPE.
SYMBOL			HIGHLY COMPRESSIBL		GREATER THAN 50	SEDIMENTARY F	ROCK SPT REFUSAL	. ROCK TYPE INCLUDES LIMESTONE, S		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.
2 PASSING		SILT-		PERCENTAGE OF MATERIAL	_	- (CP)	SHELL BEDS,	ETC.		DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
■ 10 59 MX ■ 40 38 MX 50 MX 51 MN		GRANULAR CLAY MUCK, SOILS SOILS	ORGANIC MATERIAL	GRANULAR SILT - CLAY SOILS SOILS	DTHER MATERIAL	535011		i joint's may show slight staining		ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
■ 200 15 MX 25 MX 10 MX 35 MX 35	5 MX 35 MX 35 MX 36 MN 36 M	N 36 HN 36 HN SUILS	TRACE OF ORGANIC MATTER	2 - 3% 3 - 5% TRA 3 - 5% 5 - 12% L1T			HAMMER IF CRYSTALLINE.	JUINTS MAT SHOW SLIGHT STAINING	OL RUCK RINGS UNDER	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATORE IS INCLINED FROM THE HORIZONTAL.
	1 MN 48 MX 41 MN 48 MX 41 MN		MODERATELY ORGANIC	5 - 10% 12 - 20% SOM				AINED, SOME JOINTS MAY SHOW THIN		DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
	8 MX 11 MN 11 MN 18 MX 18 M)		HIGHLY ORGANIC		HLY 35% and above		OF A CRYSTALLINE NATURE.	FACE SHINE BRIGHTLY, ROCK RINGS	UNDER HAMMER BLOWS IF	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0	4 MX 8 MX 12 H)	AMOUNTS OF SOILS	$\overline{\nabla}$	GROUND WATER				AINED AND DISCOLORATION EXTENDS		FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
UF MAJUH URAYEL, AND CAND GROVE	Y DR CLAYEY SILTY EL AND SAND SOILS	CLAYEY ORGANIC SOILS MATTER		VEL IN BORE HOLE IMMEDIATELY AFTER D	HILLING			CLAY, IN GRANITOID ROCKS SOME DO ED, CRYSTALLINE ROCKS RING UNDER		FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND BRAVE	CC 400 0000 - 30103			ATER LEVEL AFTER 24 HOURS		MODERATE	SIGNIFICANT PORTIONS OF ROCK SH	OW DISCOLORATION AND WEATHERING	EFFECTS, IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
AS A EXCELLENT TO GO	ODD FAIR	TO POOR FAIR TO POOR UNSUITABLE	VPW PERCHED	WATER, SATURATED ZONE, OR WATER BEARIN	NG STRATA			ARE DULL AND DISCOLORED, SOME SE AND SHOWS SIGNIFICANT LOSS OF S		PARENT MATERIAL.
SUBGRADE			())))/- SPRING OF	R SEEP			WITH FRESH ROCK.			FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
	SISTENCY OR DEM	-7-6 SUBGROUP IS > LE - 30	5	MISCELLANEOUS SYMBOLS				RED OR STAINED. IN GRANITOID ROCK SHOW KAOLINIZATION. ROCK SHOWS S		FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
60404071	RANGE OF	STANDARD RANGE OF UNCONFINED	ROADWAY EMBANKI	- ERT CRT	- SAMPLE	(MOD, SEV.)		OLOGIST'S PICK. ROCK GIVES "CLUNK"		THE FIELD.
	STENCY (N-YA	RESISTENCE COMPRESSIVE STRENGTH LUE: (TONS/FT <sup>2</sup> )	WITH SOIL DESCR	IPTION UP OF TEST BORIN				<u>Sal</u> Red or stained. Rock Fabric Cleai	R AND EVIDENT BUT DEDUCED	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LO			ELI SDIL SYMBOL		S - BULK SAMPLE	(SEV.)	IN STRENGTH TO STRONG SOIL. IN	GRANITOID ROCKS ALL FELDSPARS AF		LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
GRANULAR LODSE				$\mathbb{U}$	SS - SPLIT SPOON SAMPLE		EXTENT. SOME FRAGMENTS OF STRO IF TESTED, YIELDS SPT N VALUES			LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
MATERIAL DENSE (NON-COHESIVE) VERY DE	SE 30 TC	0 50			ST - SHELBY TUBE	1		red or stained. Rock fabric elem	ients are discernible but	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN
VERT DE		50	INFERRED SOIL BO		SAMPLE			d to soll status, with only fragi PLE of Rock weathered to a degr		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
GENERALLY SOFT	r 2 TC	0 4 0.25 TO 0.50			-L RS - ROCK SAMPLE			ABRIC REMAIN. IF TESTED, YIELDS		INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY MEDJUM MATERIAL STIFF		0.5 TO 1.0	TTRES ALLUVIAL SOIL B		RT - RECOMPACTED TRIAXIAL			IC NOT DISCERNIBLE, OR DISCERNIBL		RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
(CDHESIVE) VERY SI	STIFF 15 TO	30 2 TD 4		SLOPE INDICATO	SAMPLE		SCATTERED CONCENTRATIONS. QUART ALSO AN EXAMPLE.	Z MAY BE PRESENT AS DIKES OR ST	IKINGERS, SAPROLITE IS	ROCK QUALITY 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 AND
HARD		30 >4	25/025 DIP & DIP DIRECT		CBR - CALIFORNIA BEARING RATIO SAMPLE			CK HARDNESS		EXPRESSED AS A PERCENTAGE.
	<u>EXTURE OR GRAIN</u>	512E		- SPT N-VALUE		VERY HARD	CANNOT BE SCRATCHED BY KNIFE	OR SHARP PICK. BREAKING OF HAND	SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
U.S. STD. SIEVE SIZE DPENING (MM)	4 10 40 4.76 2.00 0.42	60 200 270 0.25 0.075 0.053	SOUNDING ROD	REF- SPT REFUSAL			SEVERAL HARD BLOWS OF THE GEO	DLOGIST'S PICK.		PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF RPPROXIMATELY UNIFORM THICKNESS AND
	COARSE	FINE		ABBREVIATIONS		HARD	CAN BE SCRATCHED BY KNIFE OR I TO DETACH HAND SPECIMEN.	PICK ONLY WITH DIFFICULTY. HARD &	HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL
	GRAVEL SAND	SAND SILT CLAY	AR - AUGER REFUSAL BT - BORING TERMINATED	HI HIGHLY MED MEDIUM	₩ - MOISTURE CONTENT V - VERY	MODERATELY		PICK. GOUGES OR GROOVES TO 0.25	Inches deep can be	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
	1636, 300	(* 50.)	CL CLAY	MICA. ~ MICACEOUS	VST - VANE SHEAR TEST	HARD	EXCAVATED BY HARD BLOW OF A C	GEOLOGIST'S PICK. HAND SPECIMENS		SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 SIZE IN 12 3	2.0	0.25 0.05 0.005	CPT - CONE PENETRATION CSE COARSE	TEST MOD MODERATELY NP - NON PLASTIC	WEA WEATHERED $\gamma$ - UNIT WEIGHT	MEDIUM	BY MODERATE BLOWS. CAN BE GROOVED OR GOUGED 0.05	INCHES DEEP BY FIRM PRESSURE OF	F KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
	TURE - CORRELAT	ION OF TERMS	DMT - DILATOMETER TEST	ORG ORGANIC	$\gamma_{\rm d}$ - DRY UNIT WEIGHT	HARD	CAN BE EXCAVATED IN SMALL CHI	PS TO PEICES 1 INCH MAXIMUM SIZE		A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FODT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPDON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS
SOIL MOISTURE SCALE	FIELD MOISTURE	GUIDE FOR FIELD MOISTURE DESCRIPTION	DPT - DYNAMIC PENETRATIO + - VOID RATIO	DN TEST PMT - PRESSUREMETER TEST SAP SAPROLITIC	_	SOFT	POINT OF A GEOLOGIST'S PICK. CAN BE GROVED OR GOUGED READ	LY BY KNIFE OR PICK. CAN BE EXCA	WATED IN FRAGMENTS	THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS)	DESCRIPTION		F - FINE	SD SAND, SANDY			FROM CHIPS TO SEVERAL INCHES	IN SIZE BY MODERATE BLOWS OF A I	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.
	- Saturated - (Sat.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE	FOSS FOSSILIFERDUS FRAC FRACTURED, FRACTU	SL SILT, SILTY JRES SLI SLIGHTLY		VERY	PIECES CAN BE BROKEN BY FINGE	R PRESSURE. BE EXCAVATED READILY WITH POINT		STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY
	UPAL /	THOR BELOW THE ONUDRU WATER TABLE	FRAGS FRAGMENTS	TCR - TRICONE REFUSAL		SOFT		ROKEN BY FINGER PRESSURE. CAN BE		TOTAL LENGTH OF ROCK SEGMENTS NITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC RANGE <	- WET - (W)	SEMISOLID; REDUIRES DRYING TO	FOU	IDMENT LIGED ON CURTECT P		┝╍╍╍╴┍╒	FINGERNAIL.		INC	TOPSOL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(P) PLASTIC LIMIT	- +61 - (#/	ATTAIN OPTIMUM MOISTURE	EUU	IPMENT USED ON SUBJECT P		TERM		BEDD TERM	THICKNESS	
			DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:	VERY WIDE		VERY THICKLY BEDDED	> 4 FEET	BENCH MARK: -BL- 3 AT STA. 25+75.35
	- MOIST - (M)	SOLID: AT OR NEAR OPTIMUM MOISTURE	MOBILE B	CLAY BITS		WIDE	3 TO 10 FEET	THICKLY BEDDED THINLY BEDDED	1.5 - 4 FEET 0.16 - 1.5 FEET	ELEVATION: 2996.36 FT.
SL SHRINKAGE LIMIT .		REQUIRES ADDITIONAL WATER TO		6 CONTINUOUS FLIGHT AUGER	CORE SIZE:	- MODERATE	0.16 TO 1 FEET	VERY TRINLY BEDDED	0.03 - 0.16 FEET	NOTES:
	- DRY - (D)	ATTAIN OPTIMUM MOISTURE	ВК-51	B' HOLLOW AUGERS		VERY CLOS		THICKLY LAMINATED THINLY LAMINATED	0.00B - 0.03 FEET < 0.00B FEET	
	PLASTICITY		CME-45C				I	NDURATION		
	PLASTICITY INDEX (PI)	DRY STRENGTH	UME-400		<u></u> -∾	FOR SEDIMENT	ARY ROCKS, INDURATION IS THE HAR	DENING OF THE MATERIAL BY CEMENT	TING, HEAT, PRESSURE, ETC.	
NONPLASTIC	0-5	VERY LOW	X CME-550		H	FRI		ING WITH FINGER FREES NUMEROUS (		
LOW PLASTICITY MED. PLASTICITY	6-15 16-25	SLIGHT MEDIUM			HAND TODLS:	1	GENI	LE BLOW BY HAMMER DISINTEGRATES		
HIGH PLASTICITY	26 OR MORE	HIGH	PORTABLE HOIST		POST HOLE DIGGER	MOD		IS CAN BE SEPARATED FROM SAMPLE KS EASILY WHEN HIT WITH HAMMER.	WITH STEEL PROBE:	
	COLOR	····		TRICONE TUNGCARB.		1   )NR	OURATED GRAI	NS ARE DIFFICULT TO SEPARATE WIT	H STEEL PROBE	
		G (TAN, RED, YELLOW-BROWN, BLUE-GRAY).		CORE BIT	SOUNDING ROD VANE SHEAR TEST		DIFF	ICULT TO BREAK WITH HAMMER.		
MODIFIERS SUCH AS LIGHT, DAR	RK, STREAKED, ETC. ARE US	ED TO DESCRIBE APPEARANCE.	L	[_]		EXT		P HAMMER BLOWS REQUIRED TO BREA LE BREAKS ACROSS GRAINS,	AK SAMPLE;	
L		·	I	I	1	1	SHALL			

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		(16)-	
TO COARSE SAND	D W/ GRAVEL		- <u> X </u>
		$\overline{(5)}$	
		· · · · · · · · · · · · · · · · · · ·	
Y, SANDY SILT		(5)	
GRAVEL			
		(31)-	
		(26)-	
		207	
DRNG SANDY SILT		(24)-	
DME MICA			
		$\overline{(18)}$	
	$\langle$	100/.6-	
		100/.8	
	COL		46.5
HERED ROCK	(60/		
IBOLITE GNEISS		. 10.2	
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WBS	34518	3.1.2			·		R-2915	δA		co	UNTY	WAT	AUG	A & AS	HE		GEOLOG	IST Elliott,	D. C.			WBS	3451	8.1.2			ТІ	P R-291	5A	cou
SITE	DESCR		US 2	221 Fr	om U	5 441	in Wa	itaug	a Coui	nty to	SR 10	003 in /	Ashe (	County						GROU	ND WTR (ft)	SITE	DESCF		US	221 Fro	om US	441 in Wa	atauga Co	ounty to SI
BORIN	NG NO.	EB1-	۹		!	STAT	ION ·	10+3	3			OFFSE	ЕТ З	81 ft LT			ALIGNM	INT -L-		0 HR.	N/A	BOR	NG NO	. EB1-	B		ST		10+07	
COLL	AR EL	EV. 2,	995.9	ft		ΟΤΑ		тн	48.2 1	ît		NORTI	HING	914,1	71		EASTING	1,260,159		24 HR.	N/A	COL	LAR EL	EV. 2	,998.0	ft	т	DTAL DEP	<b>РТН</b> 30.	1 ft
DRILL	rig/hai	AMER EF	F./DAT	E AF	20071	CME-	550X 7:	2% 0	9/03/20	09						DH.	S. Augers		НАММ	ER TYPE	Automatic	DRILL	. RIG/HA	MMER E	FF./DAT	E AFC	00071 C	ME-550X 7	2% 09/03/	2009
		heek, D				STAR	T DAT		06/03/*			COMP	DAT	TE 06/		4	SURFAC	E WATER D	EPTH N/	Α		DRIL		Cheek, [				ART DA		
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (fi)	· · · · · · · · · · · · · · · · · · ·	0.5ft		0		25	LOWS	9ER 50		75 	100	SAMP NO.	MO		ELEV. (ft)	SOIL AND F	OCK DES	CRIPTIO	N DEPTH (ft)	ELEV (ft)	ELEV (ft)	DEPTI (ft)	-  0.5ft	0.5ft		0	BLOW 25	VS PER FC 50
3000	<b>.</b>	 																				3000		  -  -						
2995	-	+ + + +					[					· · ·					2,995.9	ROADW		KMENT	0.0 trace	2995							.   .   .	
2990	2,992.7	+ <u>3.2</u> + +	1	3	3		6		· · ·	-	· · · ·		• •				- 2,991.7 	S Brown-whit		ray slightly	4.2 y	2990	2,993.0	<u>- 50</u> - -	55	15	11	Cobb	es •26	· ·   · · ·
2985	2,987.7	+ - 8.2 -	2	3	2		5		· · · ·		· · · ·	· · · · · · · · · · · · · · · · · · ·	•••				- - -	micac	eous silty S	AND		2985	2,988.0	) <u>† 10.0</u> +	69	31/0.2		· · · · · · · ·	· · · · ·	
-	- 2, <u>9</u> 82.7	- - 13.2 -	wон	1	2		3		· · · ·		· · · ·	· · ·					-						2,983.0	<u>15.0</u>	24	33	48		· · · · ·	· · · · ·
2980	2,977.7	- - - 18.2 -	1	3	3		6		· · · ·		· · · ·		   				 - -					2980	2,978.0	+ <u>1 20.0</u>	9	24	76/0.1	· · · · · · · · · · · · · · · · · · ·	· · · · ·	· · · · ·
2975	- 2,972.7	- 23.2	2	4	5		1		· · · ·	· · ·	· · · ·	· · ·	 				- - - -					2975	2,973.0	+ 1-25.0	100/0.	Ē			· · · · ·	· · · · ·
2970	-	- 28.2		-			. • (? ] 		· · · · ·		· · · ·		· · ·				- - 					2970	2,968.0	<u> </u>				· · · ·		
2965	•	+ + + +	4	9	17			2	6 		· · · ·	· · ·					- - 							+	60/0.1	<u>Ч</u>		- 		
2960	<u>2,962.7</u> -	+ 33.2 + + +	4	8	9			17	· · · ·		· · · ·	· · ·	-				- - -													
2955	2,957.7	- <u>38.2</u>	27	12	18			- 1 4	130				· ·				- - -							-					·	
	2,952.7	- - 43.2 -	32	68/0.	1		· · · ·	.   .	· · · ·	.	· · · ·		t 1				2,953.9		FHERED R hibolite gne		42.0			+						
2950		+ + +					· · ·		· · · ·		· · ·		i	-			- - 2,947.7 - Bo			ams tion 2,947										
	-	+ + + + + + + + + + + + + + + + + + +																		-				┽╺╺╺╺╸╸╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴						

# NCDOT GEOTECHNICAL ENGINEERING UNIT

SHEET 6/9

NTY	WATAUG/	A & ASHE		GEOLOGIST Elliott, D. C.	
R 1	003 in Ashe (	County		·	GROUND WTR (ft)
	OFFSET 3	2 ft RT		ALIGNMENT -L-	0 HR. N/A
	NORTHING	914,144		EASTING 1,260,222	24 HR.Caved @ 5.7
	]	DRILL METHOD	H.S.	Augers H/	AMMER TYPE Automatic
	COMP. DAT	E 06/25/13		SURFACE WATER DEPTH	N/A
тос	·	SAMP.	L O	SOIL AND ROCK I	
	75 100	NO. MOI	G		
	73 100   			2,998.0 GROUND SI ARTIFICIA SAND, GRAVEL 2,991.2 WEATHERE with some sam 2,984.4 SAPROI Brown-gray silty SANE 2,977.5 VEATHERE (amphibolite 2,967.9 CRYSTALLII AMPHIBOLITI Boring Terminated at I On Crystalline Rock: <i>A</i>	L FILL & COBBLES 6.8 D ROCK dy saprolite 13.6 JITE 20 with mica & MnO 20.5 D ROCK -gneiss) 20.5 D ROCK -gneiss) 30.1 VE ROCK E-GNEISS Elevation 2,967.9 ft

#### **NCDOT GEOTECHNICAL ENGINEERING UNIT** BORELOG REPORT TIP R-2915A COUNTY WATAUGA & ASHE GEOLOGIST Elliott, D. C. WBS 34518.1.2 SITE DESCRIPTION US 221 From US 441 in Watauga County to SR 1003 in Ashe County GROUND WTR (ft) STATION 10+22 OFFSET CL ALIGNMENT -L-0 HR. BORING NO. EB1-C COLLAR ELEV. 2,997.0 ft NORTHING 914,160 EASTING 1,260,190 TOTAL DEPTH 45.2 ft 24 HR. DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009 DRILL METHOD H.S. Augers HAMMER TYPE Automatic

N/A

9.7

			Ē	MI 001	116172			DLOYA	O DEP	D E007		- I	CARAD		L			
LEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	W CO	UNT 0.5ft	0	2	BLOW 5	S PEI 50	R FOOT	75	100	SAMP. NO.		0		SOIL AND ROCK DESCRIPTION	
	(11)							I			1			<u>/ MOI</u>	9	ELEV. (ft)	DE	<u>-11-</u>
000		-														_		
	-	-														2,997.0	GROUND SURFACE	
	-	-				1.			•						X	•	ARTIFICIAL FILL	
995	-	-				÷.	.   .			 					8		GRAVEL & COBBLES	
	2.992.0	5.0				:	• [• •		:			::			X.	2,992.4	SAPROLITE	
990	-	-	10	7	6	•	• <b>1</b> 3		·	• • • -		•••				- 0	Drange-gray slightly micaceous silty SAND	
	-	-							.		+	· · · · ·		_		- 2,988.5		
-	2,987.0	10.0	72	28/0.1					:	· · · · ·		11		•		-	WEATHERED ROCK with sandy saprolite layers	
985	-		12	20/0.1			· · ·		÷	· · · ·	• 10	0/0.6			10	-		
	-					1			:	· · · ·					477	2,983.5	SAPROLITE	
ŀ	2,982.0	15.0	9	16	14				- ا- نه			•••				-	White-brown-gray slightly micaceous silty	
980	-	-						<b>9</b> 30								-	fine-coarse SAND	
		-				1:			:		1::				н. 1914 г.	-		
	2,977.0	20.0	9	7	22	1:		29	:	· · · ·		::				-		
975	-	-				-		<i>[</i>								-		
	2,972.0	25.0					/									-		
970		- 20.0	3	7	11	1:	• • • 18		:			::				-		
210	- -	-					 	<u> </u>			· ·	• • •				-		
	2,967.0	30.0				1:	· · ·			· · · ·		::				-		
965	-	-	13	30	20		• • •		. <b>`</b> ∳5	o · · ·						-		
	-	[				<b>—</b>										-		
	2,962.0	35.0	21	31	69/0.3	1:					1.5					- 2,961.5		
960	- 1	-	21		05/0.0	·	· · ·		·	· · · ·	i	0.00			1/2		WEATHERED ROCK (amphibolite-gneiss)	
	-						· · ·		:	 	::	::			1D	-	(antriadina girada)	
	2,957.0.	40.0	57	43/0.2					•			 00/0.7♥			10	-		
955	1	F									· "				10			
	2,952.0									· · · ·					11	-		
F	2,952.0	- 45.0	100/0.2			1 -			•	<u></u>	- <del></del> 11	00/0.2€				<u>2,951.8</u>	Boring Terminated at Elevation 2,951.8 ft In	
	-																Weathered Rock: (amphibolite-gneiss)	
	-	-														-		
	-	F .														-		
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34518	.1.2		Т	IP R-291	5A	COUN	NTY WAT	AUGA & A	ASHE		GEOLC	GIST Elliot	tt, D. C.			WBS	34518.1	.2		TIP	R-2915/	4	COUNT	Y WATAU	IGA & AS	HE	GEO	DLOGIST Elliott, D. C.	
DESCRI	PTION	US 221 F	From US	441 in Wa	atauga Co	unty to SF	R 1003 in A	she Cour	nty					GROUND	WTR (ft)	SITE	DESCRIP	TION U	JS 221 Fr	om US 4	441 in Wat	auga Cou	inty to SR	1003 in Ash	e County				GROUND WT
NG NO.	B1-A		s	TATION	11+34		OFFSE	T 31 ft I	LT		ALIGN	MENT -L-		0 HR.	N/A	BORIN	NG NO.	B1-B		ST	ATION 1	1+05		OFFSET	28 ft R1	Г	ALIO	GNMENT -L-	0 HR.
LAR ELE				OTAL DEF			NORTH	ING 91	,			IG 1,260,1		24 HR.	N/A	COLL	AR ELEV	. 3,002	2.3 ft	ТО	TAL DEPT	H 46.5	ft	NORTHIN	IG 914,:	242	EAS	TING 1,260,223	24 HR.
			·····	ME-550X 8							N Casing w/ /			MER TYPE A	utomatic					- 1	1E-550X 819			1			NW Casing		MER TYPE Autom
LER CI			I.a					DATE			SURFA	CE WATER	DEPTH	N/A			ER Che	•						COMP. D.				FACE WATER DEPTH	N/A
ELEV (ft)		BLOW C 0.5ft 0.5			25	S PER FO 50		100 N	- 1			SOIL ANI	D ROCK DE	ESCRIPTION		ELEV (ft)			BLOW CO		0	BLOWS 25	PER FOC	75 10	SAMF		0	SOIL AND ROCK D	ESCRIPTION
(11)											ELEV. (ft)				DEPTH (ft)				.on o.on			1	<u> </u>		- 110.		G		<u></u> ,
																3005													
-	-										-					3003	+												
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-	-		-				· · · · · ·				- 3,000.4	ROAD	NOUND SUF	ANKMENT	0.0	3000	Ŧ				- 1	+ • • •	· · · · · ·		_			GRAY/TAN SILTY FIN SAND, W/ GI	
	-												I SILTY FINI AND. W/ GR	E TO COARSE RAVEL	-	-	2,997.8		4 7	9	1 .			· · · · · · · · · · · · · · · · · · ·					
2,995.7-	- 4.7	11 9	8													2995	Ŧ		·   '	Ĭ	<b>●</b> 16						2,995		
-	-	.   9		· · /	17	· · ·		·			2.992.8				7.6		2,992.8	95			/						F	ALLUVIA GRAY/TAN/ORANGE (	CLAYEY, SANDY
- 2,990.7-	- 07							-				DK GRAV	ALLUVIA Y SANDY, C	NL CLAYEY SILT.			-,	<u></u>	2 2	3	<b>6</b> 5						E	SILT, GRAVELS ANI	D SOME MICA
-,220.1	- V	VOH 1	3	4						м	<b></b>	27. 91/1	ORGANI			2990	Ŧ					· · · ·					E		
-	-				.			:			F					-	2,987.8	14.5	3 2	3			.				E		
2,985.7-	- 14.7.	1 2	6					·		м	-					2985	Ī				<b>\$</b> 5'	· · ·					- 2,984	~	
-	-							·			2,983.1				17.3		2,982.8	19.5			· · · >						2,984.	SAPROLI	
2.980.7-	- 107										L ,	GRAY/TAN/O	SAPROLI RANGE SA	TE ANDY SILT. MK	CA		1	1	12 14	17		<b>0</b> 31						DK. GRAY/GRAY SAN MICA	DY SILL SOME
	-	5 9	6	]  1	5	· · · ·				м 🦉	 					2980	Ŧ					1	•   • • •						
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2,975.7-	- 24.7	5 7	7				1			м	<u>-</u>					2975	1					26					E		
-				¶ <sup>14</sup>    I	4 -   -	·   · ·		:			-						2,972.8	29.5	_		· · · · ·		·   · · · ·	:   : : : :					
2,970.7-	- 29.7			<b>i</b>   i		-		:			} F						1		3 8	16		24	· · · ·	:					
		6 8	9		17	·   · ·				M	<u>}</u>					2970	+				<u>  </u> ;	· · · -		<u>-  </u>					
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-					τί •			·			+						2,962.8+	39.5	1		۲	+÷÷:-			-		2,963. 777	4 WEATHERED	ROCK
- 2,960.7-	- 39.7	_			N : : :	· · · ·		•			+					2960	‡		71 29/0.1		· · · · ·	· · · ·	.   .		•			GRAY/TAN/WHT SILT	Y SAND. TRACE
-		7 9	16		25					м	  -						+ +								1				
-					· [] · · · ·						-						2,957.8+		21 37	63/0.3	· · · · ·		.   .		i l		in the second se		
2,955.7-	- 44.7	9 10	0 19		1 •29	· · ·	· ·   · · ·	·		м	<b>F</b>						<u>2.955.9</u>	<u>46.4</u> 60	/0.1		1 • • • •		<u>.  </u>	<u> </u>	Ĩ <mark>●</mark>		<u>///2,955.</u> 	Boring Terminated WI	
-								:			F						‡											PENETRATION TES Elevation 2,955.8 ft ON	CRYSTALLINE
2,950.7-	49.7	37 34	4 31		·   · · · ·			:			F						‡										F	ROCK, AMPHIBOL	ITE GNEISS
	F	J7   J2			• • • •		<b>6</b> 65.	<u>-</u>		M	2,948.3				52.1		7										F		
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2,945.7-	- 34./	0/0.4			· · · · ·			00+			-		MICA				Ŧ										[-		
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- 2,940.7-	- 59.7	0/0.5					[				2,940.2				60.2		Ī										ΙE		
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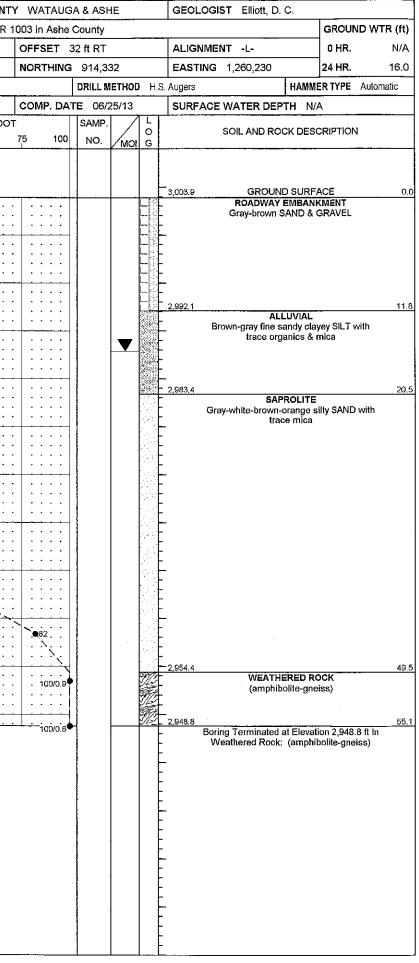
# sheet 819

																				<b>1</b>				34518					P R-291		COU
	DESCR	IPTION	US 2	21 Fro	- 1			_	ounty	/ to SR	1003	3 in Ashe	County	/						GRO	UND WTR	(ft)	SITE	DESCR		US	221 Fr	om US	441 in W	atauga Co	unty to S
BORIN	IG NO.	EB2-/	4		S	TATIO	N 12	+17			OF	FSET	14 ft L	ſ			ALIGNM	ENT -L-		Онг	R	N/A	BOR	NG NO.	EB2-	B		S7		11+95	
COLL	AR ELE	EV. 3,0	000.7 f	t	<u>т</u>	OTAL	DEPT	H 39.	.5 ft		NC	ORTHING	914,	355			EASTING	1,260,1	85	24 HI	R.	9.9	COLI	AR EL	EV. 3,	003.9	ft	т		PTH 55.	1 ft
DRILL	RIG/HAN	IMER EF	F./DATI	E AFO	0071 C	ME-550	X 72%	09/03/	2009					METHO		H.S. /	Augers		HAMM	IER TYP	E Automat	c	DRILL	RIG/HA	MMER EI	FFJDAT	E AFO	)0071 C	ME-550X	72% 09/03/2	2009
		heek, D					DATE					OMP. DA			3		SURFAC	E WATER	DEPTH N/	/A			DRIL	LER C				· · ·		TE 06/28	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)		W COU 0.5ft		0	2	BLOV 5	VS PI 5(	ER FOO )	۳ 75	100	SAMI	17	0 0		ELEV. (ft)	SOIL ANI	ROCK DES	CRIPTI	ON DEPT	H (ft)	ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	·	OW CO		o	BLOW 25	/S PER FC 50
3005								<u> </u>															3005								
0000																							0000		+  	<u> </u>					· · ·
3000	-	ŧ ŧ					• •			· · ·				-		<u>-</u>	3,000.7	ROAD	OUND SURF NAY EMBAN ray SAND & {	KMENT		0.0	3000	2,999.4	4.5	2	3	5		· · · · ·	· · · ·
1	2, <u>996 5</u>	42	4	5	4		••• •••	• • • • • •	•••	· · · ·	•	· · · · ·						Ū							ŧ				.•8 . .1 .1	· · · · ·	· · ·
2995	-	+		_			9 <u>.</u>	· · ·	· ·	· · · ·		· · · · ·		·			2,992.3					8.4	2995	2,994.4	9.5	2	3	3	•6	· · · ·	
<u>2990</u>	2,991_5	92	1	2	2	<b>4</b>	· · · ·	• •	· ·	· · · ·		· · · · ·						own sandt c	ALLUVIAL layey SILT w	ith trace	e mica &	_0.4	2990	2,989.4	+				[ [ [		
	2.986.5	+					· · · ·	•••	 	· · · ·		· · · · ·				×-			organics					_2.303.4	+	WOH	1	1		  	· · · ·
2985	- - -		2	2	4		· · · · ·	• • •	· · ·	· · · ·	·	· · · · ·		·		- - -	2.983.1					17.6	2985	_2,984.4	+ + 19.5	2	6	11		· · · · ·	
2980	2,981.5	+ + 19.2	7	12	14		$\langle \cdot \rangle$ $\cdot \rangle$	26	· · · ·	· · · · · ·		· · · · ·						Drange-brov	SAPROLITE m-white sligh silty SAND	i tly mica		11.0	2980		+						
	- -	<b>*</b> + 									-					·· =- • = • =			5my 0/ 440					2,979.4	<u>+</u> 24.5	26	21	23			•44
2975	2,976.5	T.24.2	8	10	13		]	23. <u></u>	 	· · · ·		· · · · ·				::							2975	2,974.4	29.5	3	7	9	 		
F	2,971.5	29.2	100/0.3				· · · · · · · · · · · · · · · · · · ·	· · · ·	· · ·	· · · ·		100/0.3	•		1		2,973.0		ATHERED R			27.7			ł			5		16  	
2970	-	+ + +					· · ·	· · ·	 	· · · ·	- - -	· · · · ·											2970	2,969.4	+ 34.5 -	7	10	15		25 .	· · ·
2965	2,966.5	+ 34.2 +	77	23/0.1				· · ·	· · ·	· · · ·		100/0.6											2965	2,964.4	+ + - 39.5				· · · ·	· \\ · · · ·	· · ·
	2,961.5	39.2	100/0.3									· · · · ·					2,961.2					39.5			Ī	9	18	19			
	-		100/0.3									100/0.3					Bo \	ring Termin Veathered F	ated at Eleva Rock: (amphi	tion 2,9 ibolite-g	61.2 ft In Ineiss)		2960	2,959.4	44.5	20	27	55		• • • •	<u> </u>
	_																						2955	0.054.6	+ + + 49.5			1		· · · ·	· · ·
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	-	+ + +				:																	2950	2,949.4	54.5	85	1//0.1		· · · ·	· · · · ·	· · · · · · · ·
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NCDOT GEOTECHNICAL ENGINEERING UNIT

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### SHEET 9(9



#### **CONTENTS** SHEET NO.

2

3-4

5-8

BORE LOGS

 $\sim$ 34518.1 REFERENCE

> 2915A Ż **PROJECT:**

**DESCRIPTION** TITLE SHEET LEGEND SITE PLAN AND PROFILE

## STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY WATAUGA

PROJECT DESCRIPTION US 221 FROM US 421 IN WATAUGA COUNTY TO SR 1003 IN ASHE COUNTY

SITE DESCRIPTION **RETAINING WALL #1** 

STATE N.C.

1

8

#### 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 SOLI TEST DATA AVAILABLE MAY BE REVEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991 707-680. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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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 WARANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPHIONO 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 SATISTY 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 CONDENSATION OR FOR AN THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:

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7/28/2015

# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

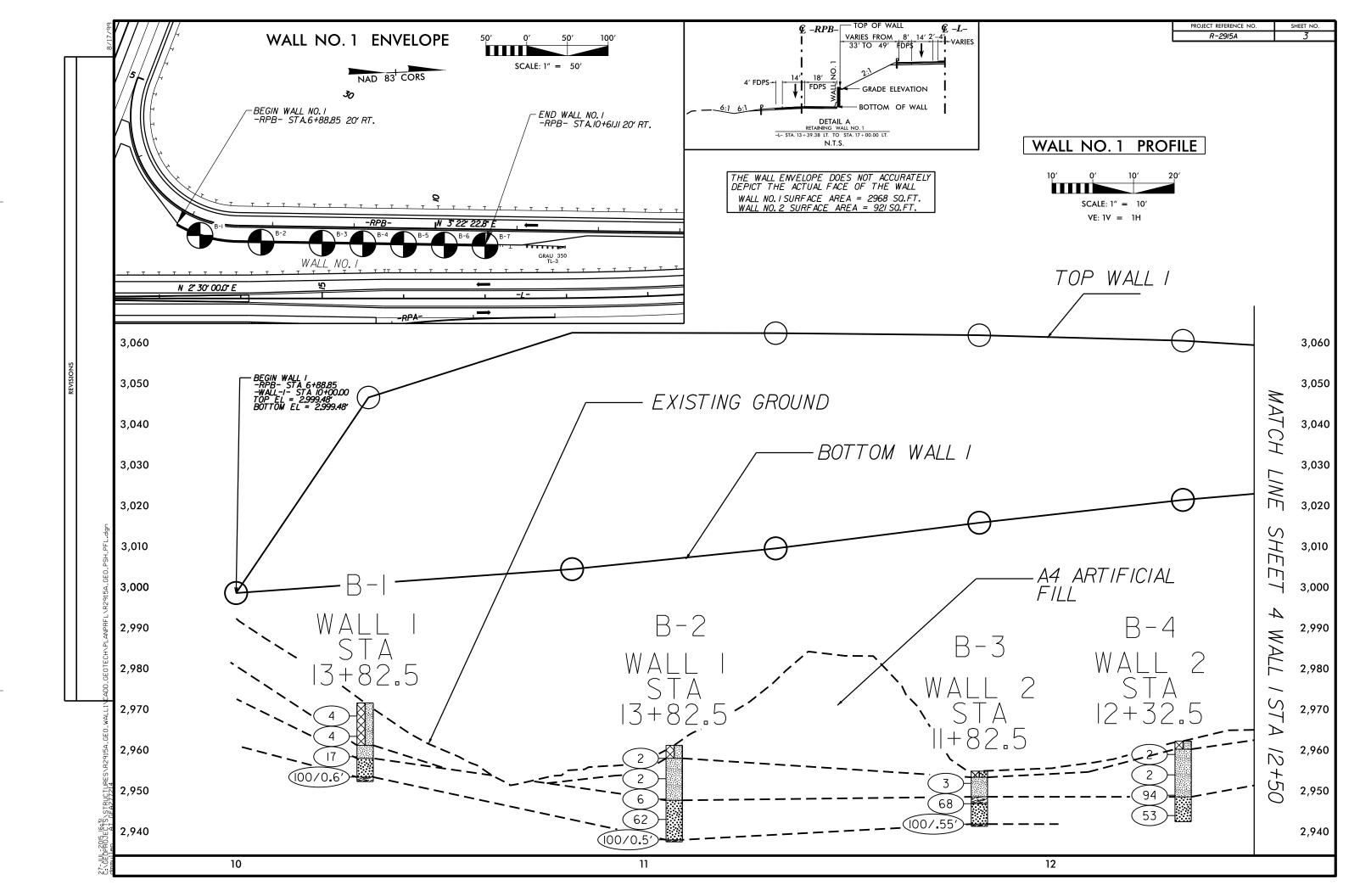
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

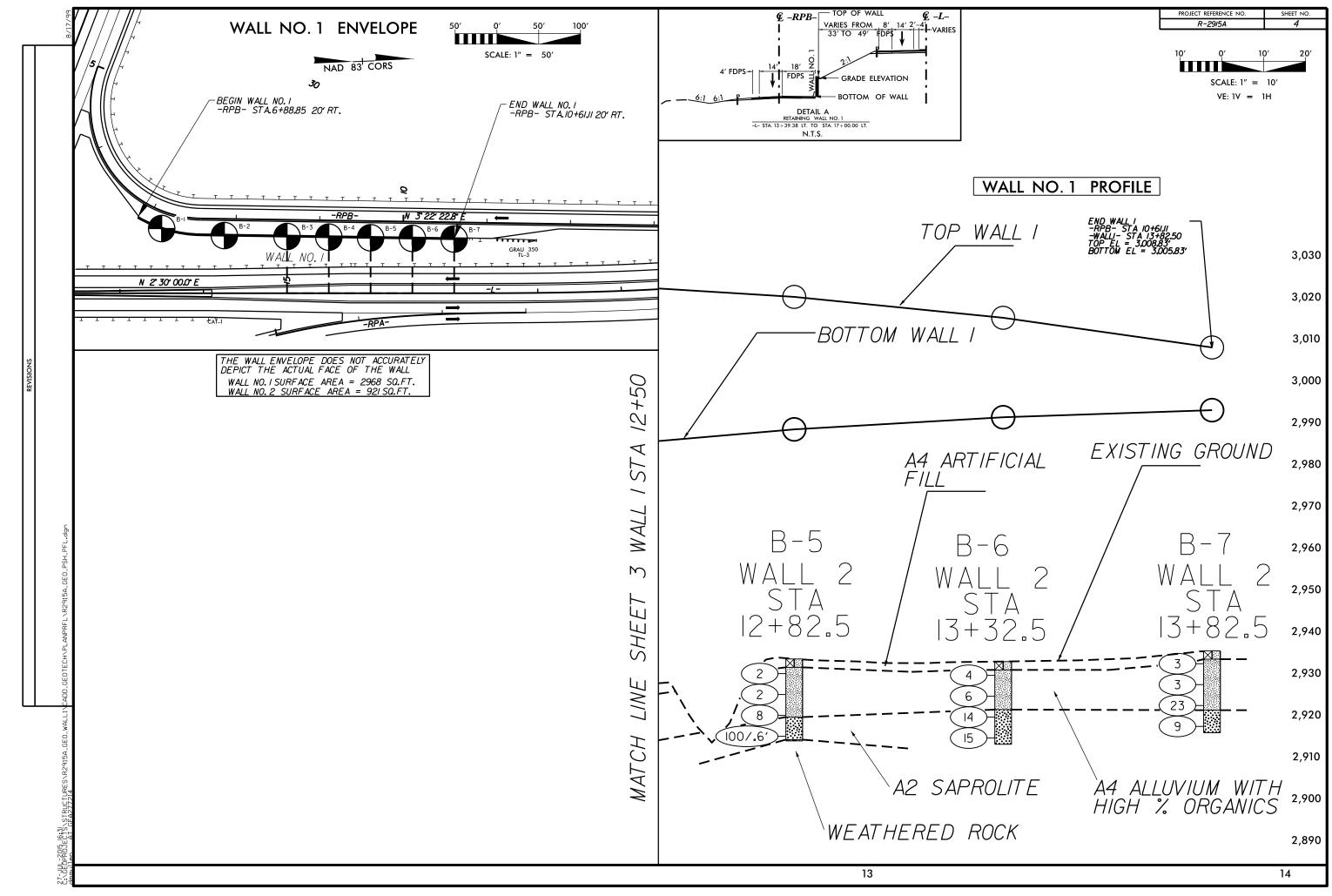
	SOIL DESCRIPTION		GRADATION	ROCK DESCRIPTION
SOIL IS CONSIDERED UNCONSOLIDATED BE PENETRATED WITH A CONTINUOUS I ACCORDING TO THE STANDARD PENET	SEMI-CONSOLIDATED, OR WEATHERED LIGHT POWER AUGER AND YIELD LES ATION TEST (AASHTO T 206, ASTM E	S THAN 100 BLOWS PER FOOT D1586). SOIL CLASSIFICATION	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SA GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZ	DARSE. HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTE SIZE. SPT REFUSAL IS PENETATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1
CONSISTENCY, COLOR, TEXTURE, MOISTU	<ol> <li>BASIC DESCRIPTIONS GENERALLY 1 E, AASHTO CLASSIFICATION, AND OTH N, ANGULARITY, STRUCTURE, PLASTICIT</li> </ol>	ER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:
	WITH INTERBEDDED FINE SAND LAYER		THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED,	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT ROCK (WR) 100 BLOWS PER FOOT IF TESTED.
GENERAL GRANULAR MATERIALS CLASS. ( ≤ 35% PASSING *200	SILT-CLAY MATERIALS (> 35% PASSING #200)	ORGANIC MATERIALS	MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARIZ, FELDSPAR, MICA, TALC, KADLIN, ETC.	CRYSTALLINE ROCK (CR) CRYSTALLINE ROCK (CR)
GROUP A-1 A-3 A CLASS. A-1-a A-1-b A-2-4 A-2-5		A-1, A-2 A-4, A-5 A-3 A-6, A-7	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	NON-CRYSTALLINE         File TO COARSE GRAIN METAMORPHIC AND NON-COASTA           ROCK (NCR)         SEDIMENTARY ROCK THAT WOULD SPT REFUSAL I
SYMBOL			SLIGHTLY COMPRESSIBLE         LL < 31           MODERATELY COMPRESSIBLE         LL = 31 - 50           HIGHLY COMPRESSIBLE         LL > 50	COASTAL PLAIN COK TYPE INCLUDES PHYLLITE, SLADSTONE, ETC COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDS
2 PASSING •10 50 MX		GRANULAR SILT- MUCK,	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.
*40 30 MX 50 MX 51 MN		SOILS CLAY PEAT	GRANULAR SILT - CLAY	WEATHERING
MATERIAL PASSING #40	35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	SOILS WITH	ORGANIC MATERIAL         SOILS         OTHER MATERIAL           TRACE OF ORGANIC MATTER         2 - 3%         3 - 5%         TRACE         1 - 10%           LITTLE ORGANIC MATTER         3 - 5%         5 - 12%         LITTLE         10 - 20%           MODERATELY ORGANIC         5 - 10%         12 - 20%         SOME         20 - 35%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK F HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY CO
PI 6 MX NP 10 MX 10 MX	40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN	LITTLE OR HIGHLY MODERATE ORGANIC	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND GROUND WATER	UF A LRYSTALLINE NATURE.
GROUP INDEX         Ø         Ø         Ø           USUAL TYPES         STONE FRAGS.         FINE         SILTY O           OF MAJOR         GRAVEL, AND         SAND         GRAVEL		AMOUNTS OF SOILS ORGANIC SOILS MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROC (SLI.) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANUTIOID ROCKS SOME OCCASIONAL CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER
MATERIALS SAND SHIND GRAVEL GEN. RATING AS SUBGRADE EXCELLENT TO GOOD	FAIR TO POOR	FAIR TO POOR UNSUITABLE	▼ STATIC WATER LEVEL AFTER <u>24</u> HOURS       ✓     PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH
PI OF A-7-5 SUBGROL	IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS		SPRING OR SEEP	WITH FRESH ROCK. MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL F
PRIMARY SOIL TYPE COMPACTNES	STENCY OR DENSENESS S OR RANGE OF STANDARD PENETRATION RESISTENCE	RANGE OF UNCONFINED		SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LC (MOD.SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND W IF TESTED, WOULD YIELD SPT REFUSAL
GENERALLY VERY LOOSE	CY (N-VALUE) GE < 4 4 TO 10	(TONS/FT <sup>2</sup> )	U WITH SOIL DESCRIPTION → OF ROCK STRUCTURES SOIL SYMBOL → SOIL SYMBOL → SOIL SYMBOL → SUPPE INC INSTALLAT	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EV CATOR (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS A TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.
MATERIAL MEDIOM DE (NON-COHESIVE) VERY DE	30 TO 50 6E > 50	N/A	ARTIFICIAL FILL (AF) OTHER HAUGER BORING ONE PENI THAN ROADWAY EMBANKMENT	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS AR SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF
GENERALLY SO GENERALLY SOFT SILT-CLAY MEDIUM S MATERIAL STIFF	2 TO 4	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2	INFERRED SOIL BOUNDARY     O     CORE BORING     SOUNDING     TEST BOR     WIN     MN     MN	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VI</u>
(COHESIVE) VERY ST HARD		2 TO 4 > 4	TTTTT ALLUVIAL SOIL BOUNDARY A PIEZOMETER OF SPT N-VAL	
TE>	TURE OR GRAIN SIZE		RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS
U.S. STD. SIEVE SIZE 4 OPENING (MM) 4.7	10 40 60 200 2.00 0.42 0.25 0.07		UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCA EXCAVATION UNSUITABLE WASTE UNCCEPTABLE, BUT N	ATION - SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
BOULDER COBBLE GRAV (BLDR.) (COB.) (GR			SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BA	
GRAIN MM 305 75	(CSE.SD.) (F SE 2.0 0.25	0.05 0.005	ABBRE VIATIONS           AR - AUGER REFUSAL         MED MEDIUM         VST - VANE SHEAR	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DE BY MODERATE BLOWS.
SIZE IN. 12 3 SOIL MOISTU	RE - CORRELATION OF	TERMS	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MODERATELY X - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC X - DRY UNIT WEI	MEDIUM CAN BE GROOVED OR GOUGED 0.45 INCHES DEEP BY FIRM PRESSURE OF KNIFE OF HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD POINT OF A GEOLOGIST'S PICK.
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION GUIDE FOR	FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC Z DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST <u>SAMPLE ABBREV</u> DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN
LL LIQUID LIMIT		OUID; VERY WET, USUALLY W THE GROUND WATER TABLE	e - VOID RATIO         SD SAND, SANDY         SS - SPLIT SPOON           F - FINE         SL SILT, SILTY         ST - SHELBY TUBE           FOSS FOSSILIFEROUS         SLIGHTY         RS - ROCK	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHI
PLASTIC RANGE < (PI)		REQUIRES DRYING TO IMUM MOISTURE	FRAC FRACTURED, FRACTURES         TCR - TRICONE REFUSAL         RT - RECOMPACTED           FRAGS FRAGMENTS         W - MOISTURE CONTENT         CBR - CALIFORNIA	EARING FRACTURE SPACING BEDDING
(PI) PL PLASTIC LIMIT	- MOIST - (M) SOLID; AT O	R NEAR OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO EQUIPMENT USED ON SUBJECT PROJECT ORILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	TERM         SPACING         TERM           VERY WIDE         MORE THAN 10 FEET         VERY THICKLY BEDDED           WIDE         3 TO 10 FEET         THICKLY BEDDED
SL SHRINKAGE LIMIT		DDITIONAL WATER TO IMUM MOISTURE	CME-45C CLAY BITS AUTOMATIC	MODERATELY CLOSE         I TO 3 FEET         THINLY BEDDED         0.1           MANUAL         CLOSE         0.16 TO I FOOT         VERY THINLY BEDDED         0.02           VERY CLOSE         LESS THAN 0.16 FEET         THICKLY LAMINATED         0.00           THINLY LAMINATED          CLOSE         0.16 TO I FOOT
	PLASTICITY		CME-55	
	PLASTICITY INDEX (PI)	DRY STRENGTH	CME-550 HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HE
NON PLASTIC SLIGHTLY PLASTIC	Ø-5 6-15	VERY LOW SLIGHT		FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY PLASTIC HIGHLY PLASTIC	16-25 26 OR MORE	MEDIUM HIGH	CASING ₩/ ADVANCER POST HOLE DIGGE     POST HOLE DIGGE     TRICONE STEEL TEETH HAND AUGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STE BREAKS EASILY WHEN HIT WITH HAMMER.
	COLOR		TRICONE TUNGCARB.	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL F DIFFICULT TO BREAK WITH HAMMER.
DESCRIPTIONS MAY INCLUDE COLOR MODIFIERS SUCH AS LIGHT, DA	R COLOR COMBINATIONS (TAN, RED, RK, STREAKED, ETC. ARE USED TO D		CORE BIT          VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE SAMPLE BREAKS ACROSS GRAINS.



2

TERMS AND DEFINITIONS D. AN INFERRED SPT REFUSAL. FOOT PER 60 IS OFTEN ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. N VALUES > 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 к тнат UDES GRANITE, SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. PLAIN TESTED. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. . MAY NOT YIELD TONE, CEMENTED 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. INGS UNDER DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. ATINGS IE OPEN. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. MMER BLOWS IF FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE UP TO SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FELDSPAR FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. BLOWS.  $\underline{\mathsf{FLOAT}}$  - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. ROCK HAS AS COMPARED FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.  $\underline{\textit{Formation}~(FM.)}$  - a mappable geologic unit that can be recognized and traced in the Field. ELDSPARS DULL SS OF STRENGTH HEN STRUCK. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO IDENT BUT ITS LATERAL EXTENT. E KAOLINIZED 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. DISCERNIBLE STRONG ROCK PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. ONLY MINOR LUES < 100 BPF  $\underline{\text{RESIDUAL}}$  (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. SMALL AND 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 SAPROLITE IS RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. REQUIRES <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 OWS REQUIRED THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.  $\underline{\text{SLICKENSIDE}}$  - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. P CAN BE TACHED 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 PICK POINT. LOWS OF THE 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. RAGMENTS SMALL, THIN 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. PIECES 1 INCH D READILY BY TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. BENCH MARK: HICKNESS 4 FEET ELEVATION: FEET - 4 FEET - 1.5 FEET NOTES: - 0.16 FEET 8 - 0.03 FEET 0.008 FEET T, PRESSURE, ETC. EL PROBE: ROBE; DATE: 8-15-14





										`	JG															
<b>WBS</b> 34518.1.2			Т	<b>P</b> R291	I5A		COU	NTY	WAT	AUGA	4			GEOLOGIST Elliott, D. C.			WBS	34518	8.1.2			Т	IP R291	5A	COUN	TY V
SITE DESCRIPTION	N/A														G	ROUND WTR (ft)	SITE D	ESCR	IPTION	N/A						
BORING NO. B-1			S	TATION	13+5	0		C	OFFSE	<b>T</b> 7	7 ft LT				0	<b>HR.</b> 12.4	BORIN	g no.	B-2			s	TATION	14+25		OF
COLLAR ELEV. N	/A		Т	OTAL DE	EPTH	19.3 ft		N	ORTH	HING	N/A			EASTING N/A	24	HR. N/A	COLLA	R ELI	E <b>V.</b> N/	Α		Т	OTAL DE	<b>PTH</b> 23.7	ft	NC
DRILL RIG/HAMMER E	FF./DAT	E AFO	9394 C	ME-45C 8	38% 05	/14/2014					DRILL M	NETHO	DH.	.S. Augers HAN	MMER	TYPE Automatic	DRILL R	IG/HAN	IMER EF	F./DAT	E AFC	09394 (	CME-45C 8	8% 05/14/20	14	
DRILLER Cheek, [	D. O.		S	TART DA	ATE (	)7/22/1	5	C	COMP	DAT	E 07/	22/15		SURFACE WATER DEPTH	N/A		DRILLE	ER C	heek, D	). O.		s	TART DA	TE 07/22	/15	cc
	H BLC	W COL				LOWSF		тос			SAMP					DTION	ELEV C		DEPTH	BLC	ow co	UNT		BLOWS	S PER FO	от
(ft) ELEV (ft)	0.5ft	0.5ft	0.5ft	0	25	5	50	75	5	100	NO.	мо	O I G	SOIL AND ROCK DI	ESCRI	DEPTH (ft)	(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 
														GROUND SU	FILL											<u> </u>
3.2	2	3	1									м	XX	Brown slightly micace artificial fill with a f	eous sa few pet	andy silt bbles			3.2	3	1	1				
				●4 																						
8.2	2	2	2									м				10.4			8.2	1	1	1	_ <b> </b> ∳2			
13.2														ALLUVIA Brown, highly organic, s	ightly r	10.4 micaceous			13.2							
	1	8	9	```	<b>€</b> 17		+	 i				м		clayey sa SAPROLI Brown slightly micace	TE ous silt	13.6 ty, fine to				2	2	4	]   • • •			
18.2	18	58	42/.01										In t	coarse sand with weath	ROCK	18.2			18.2	22	33	29		·		2
										•				Weathered Boring Terminated at WEATHERED		19.3 ft IN K										
																			23.2	100/.5	j				!-	

T١	WATAU	G/	4			GEOLOGIST Elliott, D. C	).			
						,		GROUN	ID W	/TR (ft)
	OFFSET	6	9 ft LT					0 HR.		6.3
	NORTHING		N/A			EASTING N/A		24 HR.		N/A
		Τ	DRILL M	ETHOD	H.S	. Augers	HAMME	R TYPE	Auto	matic
	COMP. DA	T	E 07/2	22/15		SURFACE WATER DEPT	H N/A	۹		
)T	75 100		SAMP. NO.	моі	L O G	SOIL AND ROCI	K DESC	RIPTION		
								05		
					X	GROUND ARTIFIC	IAL FIL	L		0.0
						Brown slightly mic artificial fill with	h a few	s sandy si pebbles	It	3.2
				М		ALLU Brown, highly organi claye	JVIAL ic, sight	ly micace	ous	
						claye	y sand			
				м						
				м		SAPR				13.5
						Brown slightly mic coarse sand with w	aceous eathere	silty, fine d rock lay	to ⁄ers	
2										
										23.2
		•				WEATHER Weathe	ered roc	k		$\int_{-23.7}^{-23.7}$
						Boring Terminated WEATHER	d at Dep RED RC	th 23.7 ft ICK	IN	_

W	<b>BS</b> 3	4518.1	.2			Т	I <b>P</b> R29	15A		COUN		WATAU	GA				GEOLOGIST Elliott, D. C.			WBS 345	518.1.2				TIF	P R29	15A		COUNT	Y WATAU	GA		(	GEOLOGIST Elliott, D.	D.	
S	TE DE	SCRIP	TION	N/A														GROUND WTR	(ft)	SITE DES	CRIPTI	ON N	/A					I					I		GROU	ND WTR (ft)
В	ORING	NO.	B-3			s	TATION	<b>I</b> 15+	-00		OF	FFSET	68 ft L	Т			ALIGNMENT L	0 HR. N	J/A	BORING N	<b>Ю.</b> В-	4			ST	ATION	<b>I</b> 15+50	)		OFFSET	67 ft LT		/	ALIGNMENT L	0 HR.	N/A
С	OLLAF		. N/A	4		Т	OTAL D	EPTH	I 13.6 fl	ť	NC	ORTHIN	G N/A				EASTING N/A	24 HR. 3	3.0	COLLAR E	ELEV.	N/A			то	DTAL D	EPTH <sup>·</sup>	19.8 ft		NORTHIN	G N/A		E	EASTING N/A	24 HR.	6.2
D	ILL RIG	HAMM	ER EFF	./DATE	E AFC	09394 (	ME-45C	88% 0	)5/14/2014	4			DRILI	METH	IOD	H.S. A	Augers HAMN	ER TYPE Automatic	<b>c</b>	DRILL RIG/H	AMMER	R EFF./D	ATE	AFO93	394 CN	ME-45C	88% 05/1	4/2014		•	DRILL N	IETHOD	H.S. Au	ugers	HAMMER TYPE	Automatic
D	RILLEF	Che	ek, D.	О.		S	TART D	ATE	07/21/1	15	CC	omp. D/	ATE 0	7/21/	5	:	SURFACE WATER DEPTH N	'A		DRILLER	Cheek	k, D. O.			ST	ART D	<b>ATE</b> 07	7/21/15		COMP. D	ATE 07/	21/15	5	SURFACE WATER DEP	'H N/A	
EL (1	EV DF EL	RIVE EV ft)	EPTH (ft)	BLO 0.5ft	W CO 0.5ft	UNT 0.5ft	0	25	BLOWS	PER FO 50	DOT 75	100		IP.	/  0		SOIL AND ROCK DES	CRIPTION		ELEV DRIV (ft) DRIV ELE (ft)	/E V DEF	РТН <sup>Е</sup> t) 0.{	BLOW	COUN	NT 0.5ft	0	BL) 25	OWS PI. 50	ER FOOT	T 75 100	SAMP.	моі		SOIL AND ROC	K DESCRIPTIO	N
		,																										I								
-							I						+	_		3	GROUND SURF ARTIFICIAL FI		0.0							- <u> </u>							8	ARTIFI	SURFACE	0.0
			3.0														Plow zone ALLUVIAL	/	1.5		3	3													cial fill UVIAL	2.0
				1	2	1	<b>•</b> 3							N	1		Brown, slightly micaceous clayey sandy silt to san	highly organic					oh '	1	1	2						м		Brown, slightly mica	ceous, hiahly or	ganic, tv clav
							'			-			$\left  \right $				SAPROLITE		6.3															variable clayey sand allu	ivium	ty ciay
			8.0	46	37	31	-				<b>•</b> co <b>-</b>		.				Buff to white / blue gray slig silty fine to coarse sand wi	htly micaceous			8.	.3		2	1							м				
											<b>4</b> 00						rock layer form 6.	3 to 8						-	.	●3 ┃										
			13.0																13.0		13															
		-	10.0	71	29/0.05								♦		_		Boring Terminated at De	pth 13.6 ft IN			13	2	2 3	31	63	'	+-	+			4	м			ROLITE	13.7
																	WEATHERED R	OCK																Blue - gray, slightly i coarse sand with a la	nicaceous, silty aver of weathere	fine to d rock
																					18	.3	2 3	20	14					<b>T-</b>					o to 16.7	
																							2 3	39	14				<b>•</b> 53			M		Boring Terminate	d at Depth 19.81	19.8 t IN
																																		SAPF	ROLITE	
5																																				
7/27/15																																				
DT 7																																				
DT.G																																				
о С																																				
L L																																				
SS.G																																				
15A_GE0_WALL1_BORELOGS																																				
BOR																																				
L_																																				
AN_																																				
GEO GEO																																				
15A																																				
R29																																				
JBLE																																				
DOL																																				
ORE																																				
OT B																																				
9																																				

v	/BS	34518.	1.2			TIP	R291	5A		COUNT	TY W	ATAUC	GA			GEOL	OGIST	Elliott,	D. C.				WBS	<b>3</b> 45 <sup>-</sup>	18.1.2				TIP	R291	5A		COUNT	Y WA	TAUGA	4			GEOLOGIST Elliott, D.	C.		
s	ITE D	ESCRI	PTION	N/A		1			I							1				GR	OUND W	/TR (ft)	SITE	DESC	RIPTIO	N N	/A		1											1		VTR (ft)
в	ORIN	g no.	B-5			STA	TION	16+00	)		OFF	FSET	66 ft LT			ALIG	NMENT	L		0	HR.	N/A	BOR	ING NO	<b>)</b> . В-6	;			STA	TION	16+50	)		OFFS	<b>ET</b> 66	6 ft LT					0 HR.	N/A
С	OLLA		<b>V.</b> N//	A		тот		PTH	19.6 ft		NO	RTHING	N/A			EAST	ING N/	/A		24	HR.	9.1	COL	LAR E	LEV.	N/A			тот	AL DE	PTH	19.8 ft		NORT	HING	N/A			EASTING N/A		4 HR.	8.3
D	RILL R	IG/HAM	MER EF	F./DATE	AFO93	94 CME	-45C 8	8% 05/1	14/2014				DRILL	METHO	D H.S	. Augers			HAI	MMER T	YPE Auto	omatic	DRILL	RIG/HA	AMMER	EFF./D	ATE /	AFO939	94 CME	-45C 8	8% 05/	14/2014				DRILL M	IETHO	D H.S	S. Augers	HAMMEF	RTYPE Au	omatic
D	RILLI	ER Ch	neek, D	. 0.		STA	RT DA	TE 0	7/21/15	5	CO	MP. DA	TE 07	/21/15		SURF	ACE WA	ATER D	EPTH	N/A			DRIL	LER.	Cheek,	D. O.			STA	RT DA	TE 0	7/21/15		COMF	. DAT	E 07/2	21/15		SURFACE WATER DEF	TH N/A		
EI	EV [		DEPTH	BLO	W COUN	т		BL	OWS F	PER FOC	)T		SAMF	P. 💙		1		DIL AND F					ELEV			тн в	BLOW	COUN	т		BL	OWS P	ER FOC	T		SAMP.	/		SOIL AND RO			
(	ft)	(ft)	(ft)	0.5ft	0.5ft 0	.5ft (	0	25	5	50	75	100	NO.	Имс	) G	ELEV. (ft				ESCRIF		DEPTH (ft)	(ft)	(ft)	′ (ft)	0.5	5ft 0.	5ft 0.	.5ft 0	0	25	50	0	75	100	NO.	Имо	i G	SOIL AND RO			
																			UND SU			0.0																		D SURFAC		0.0
															$\mathbf{X}$				TIFICIAL plow zor			2.0																		ICIAL FILL ificial fill		2.0
			3.5	woh	-1									М			Brow	n to blue	ALLUVIA	AL htly mic	aceous	- 			3.3	3		2 2	2								м			LUVIAL	hialy organi	, ,
				Won	.		2										highly	organic	sandy sil	ty clay v	aceous, arying to									•4 •									Dark gray slightly m variable clayey san	ly silt to sa	indy silty cla	y y
			8.5															oui	nay olaye	y one					83																	
			0.5	1	1	1	2							—м-												2	2 3	3 3	3	6							M					
																																							SAE	ROLITE		11.5
			13.5	3	4	4								М								13.9			13.:	3 4		6 8	8	L.							м		Buff white / blue o	ray slightly to coarse s	micaceous	
				Ŭ		·	₩8 										Buff wh	nite to blu	SAPROLI	slightly s	silty fine to									• • • •	14								Sitty, fille	J COarse S	anu	
			18.5															С	coarse sa	and					18 :	3				į												
			_10.5	5	86 14	/0.1	<u> </u>							<u>M</u>			. <u> </u>	WEA	THERED	ROCK		19.3				3	3 7	7 8	8		15						м				10.05.00	19.8
																	L	We	eathered	rock		]																	Boring Terminat SAF	ed at Deptr PROLITE	19.8 ft IN	
																	DOIII	ng Termir WEA	THERED	ROCK	9.0 IL IIN																					
5																																										
7/27/15																																										
LD1																																										
01.0																																										
2 V																																										
L L L L																																										
GS.G																																										
SELO																																										
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1 BOF																																										
ICDO.																																										

		ORE LOG		
<b>WBS</b> 34518.1.2	TIP R2915A COUNTY	WATAUGA	GEOLOGIST Elliott, D. C.	
SITE DESCRIPTION N/A				GROUND WTR (ft)
BORING NO. B-7	STATION 17+00	OFFSET 65 ft LT	ALIGNMENT L	0 HR. N/A
COLLAR ELEV. N/A	TOTAL DEPTH 19.6 ft	NORTHING N/A	EASTING N/A	<b>24 HR.</b> 10.4
DRILL RIG/HAMMER EFF./DATE AFO939	94 CME-45C 88% 05/14/2014	DRILL METHOD H.S	6. Augers HAMM	ER TYPE Automatic
DRILLER Cheek, D. O.	START DATE 07/21/15	COMP. DATE 07/21/15	SURFACE WATER DEPTH N//	A
ELEV DRIVE ELEV (ft) (ft) (ft) 0.5ft 0.5ft 0.		75 100 SAMP. V L O MOI G	SOIL AND ROCK DESC ELEV. (ft)	CRIPTION DEPTH (1
			ELEV. (II)	ACE 0 L 2. eous, highly v clay to clayey 14. micaceous silty and 19. 5th 19.6 ft IN

#### **CONTENTS** SHEET NO.

2

3

 $\sim$ 34518.1 REFERENCE

**DESCRIPTION** TITLE SHEET LEGEND SITE PLAN AND PROFILE BORE LOGS

## STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY WATAUGA

PROJECT DESCRIPTION US 221 FROM US 421 IN WATAUGA COUNTY TO SR 1003 IN ASHE COUNTY

SITE DESCRIPTION **RETAINING WALL #2** 

STATE N.C.

1

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#### 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 SOLI TEST DATA AVAILABLE MAY BE REVEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991 707-680. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARLY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BORCHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UNPLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLI MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOL MOISTURE CONDITIONS MAY YARY 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 WARANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPHIONO 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 SATISTY 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 CONDENSATION OR FOR AN THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:

- TES: 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 WAVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

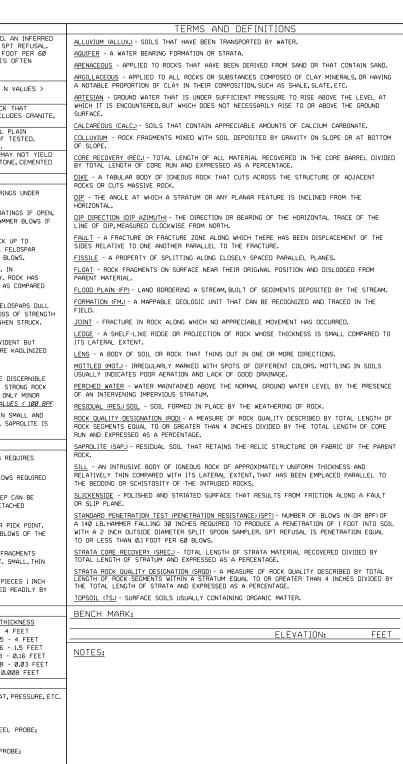
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SUBMITTED BY _JCK _J⊭
DATE
DERAL 029878 D. MG INE <sup>ER</sup> D. Mattuck Mullen 18909BD3CD5440C 7/28/2015

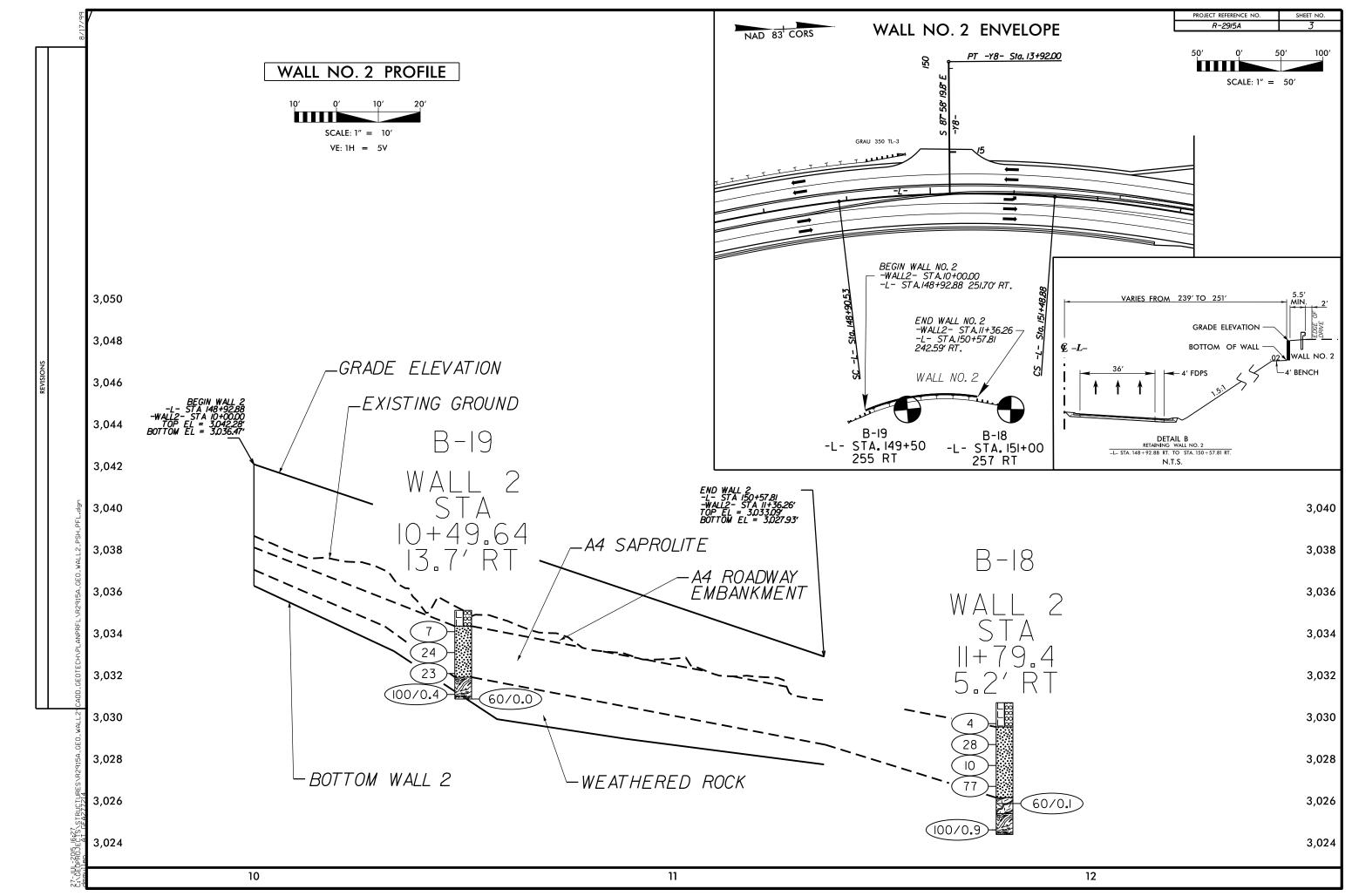
# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

		SOIL D	ESCF	IPTIO	N						GRADATION					ROCK DE	SCRIPTION
	CONSIDERED UNCONSOL								WELL GRADED - INDICAT	TES A GOOD REPP	ESENTATION OF PARTI	ICLE SIZES FF	ROM FINE TO COARSE.				WOULD YIELD SPT REFUSAL IF TESTED ASTAL PLAIN MATERIAL WOULD YIELD S
	RATED WITH A CONTIN NG TO THE STANDARD								UNIFORMLY GRADED - IN								AMPLER EQUAL TO OR LESS THAN 0.1 F
IS B4	ASED ON THE AASHTO	SYSTEM. BASIC [	DESCRIP	TIONS GE	NERALLY IN	ICLUDE THE	FOLLOWIN	IG:	GAP-GRADED - INDICATE				UR MURE SIZES.			N MATERIAL, THE TRA WEATHERED ROCK.	ANSITION BETWEEN SOIL AND ROCK I
	NCY,COLOR,TEXTURE, MINERALOGICAL COM							5 SULH			ARITY OF GRAI			ROCK MATERIAL	S ARE TYPICAL	LY DIVIDED AS FOLLOW	√S:
	ERY STIFF.GRAY.SILTY C									NGULAR, <u>SUBROUND</u>	OF SOIL GRAINS IS D	JESIGNATED B	Y THE TERMS:	WEATHERED	\$17.5\$1	NON-COASTAL PLAT	IN MATERIAL THAT WOULD YIELD SPT
	SOIL LE	GEND AND	AASH	TO CL	.ASSIFI	CATION					DGICAL COMPOS			ROCK (WR)		100 BLOWS PER FO	JOT IF TESTED.
GENERAL	GRANULAR M			T-CLAY M		ORGA	NIC MATERIA	ALS .	MINEDAL NAL				FTC	CRYSTALLINE	I.I.		GRAIN IGNEOUS AND METAMORPHIC ROC
CLASS.	(≤ 35% PASS			35% PASSI							ARTZ, FELDSPAR, MICA, WHEN THEY ARE CONSI			ROCK (CR)		GNEISS, GABBRO, SC	REFUSAL IF TESTED. ROCK TYPE INCL CHIST.ETC.
GROUP CLASS. A	A-1 A-3 A-1-a A-1-b A-2-	A-2 4 A-2-5 A-2-6 A-2-		A-5	A-6 A-7 A-7-5, A-7-6	A-1, A-2 A-3	A-4, A-5 A-6, A-7				MPRESSIBILITY			NON-CRYSTALL	NE		GRAIN METAMORPHIC AND NON-COASTAL
00			1		A-7-6				SLIG	HTLY COMPRESSIB		LL < 31		ROCK (NCR)		ROCK TYPE INCLUE	K THAT WOULD YEILD SPT REFUSAL IF DES PHYLLITE, SLATE, SANDSTONE, ETC.
SYMBOL				17.1					MODE	RATELY COMPRES	SIBLE	LL = 31 -	50	COASTAL PLAIN		COASTAL PLAIN SE	EDIMENTS CEMENTED INTO ROCK,BUT № CK TYPE INCLUDES LIMESTONE.SANDST
% PASSING							SILT-		HIGHL	LY COMPRESSIBLE		LL > 50		SEDIMENTARY F (CP)		SHELL BEDS, ETC.	.K ITPE INCLUDES LIMESTUNE, SANDST
	0 MX 0 MX 50 MX 51 MN					GRANULAR SOILS	CLAY	MUCK. PEAT			TAGE OF MATE	RIAL		-		WEATH	HERING
	5 MX 25 MX 10 MX 35 M	х 35 мх 35 мх 35 м	IX 36 MN	36 MN 3	6 MN 36 MN		SOILS		ORGANIC MATERIAL	GRANULA		OTHER	MATERIAL	FRESH F	OCK FRESH. CRY	STALS BRIGHT.FEW JOIN	TS MAY SHOW SLIGHT STAINING. ROCK R
MATERIAL									TRACE OF ORGANIC M			TRACE	1 - 10%		AMMER IF CRYS	TALLINE.	
PASSING #40 LL						SOILS V	WITH		LITTLE ORGANIC MATT MODERATELY ORGANIC			LITTLE SOME	10 - 20% 20 - 35%				SOME JOINTS MAY SHOW THIN CLAY COA
PI		X 41 MN 40 MX 41 M X 10 MX 11 MN 11 M				LITTLE		HIGHLY	HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE		F A CRYSTALLIN		SHINE BRIGHTLY. ROCK RINGS UNDER HAN
GROUP INDEX	0 0	Ø 4 MX	_		5 MX NO MX	MODER AMOUNT		ORGANIC		GI	ROUND WATER						AND DISCOLORATION EXTENDS INTO ROCH
	TONE ERACS		-			ORGAN	VIC	SOILS	$\nabla$	WATER   EVEL	IN BORE HOLE IMMEDI			(SLI.) 1	INCH. OPEN JOI	NTS MAY CONTAIN CLAY.	IN GRANITOID ROCKS SOME OCCASIONAL
	SRAVEL AND FINE	SILTY OR CLAYEY GRAVEL AND SAND		LTY ILS	CLAYEY SOILS	MATTI	ER						UNICENTO	(	RYSTALS ARE D	JLL AND DISCOLORED. CF	RYSTALLINE ROCKS RING UNDER HAMMER
MATERIALS	SAND	UNHVEE HIND SHIND	30	1123	30123				<b>▼</b>		LEVEL AFTER 24						SCOLORATION AND WEATHERING EFFECTS. DULL AND DISCOLORED.SOME SHOW CLAY.
GEN. RATING	EXCELLENT	TO 600D		FAIR TO	POOR	FAIR TO	POOR	UNSUITABLE	<u>VPW</u>	PERCHED WATE	R, SATURATED ZONE, O	R WATER BEAR	RING STRATA				SHOWS SIGNIFICANT LOSS OF STRENGTH (
AS SUBGRADE						POOR			- O-M-	SPRING OR SEE	EP				ITH FRESH ROCK		
		SUBGROUP IS ≤ LL				> LL - 30						<u>.</u>					R STAINED. IN GRANITOID ROCKS, ALL FE
	(	CONSISTENC				-				MISCEL	LANEOUS SYMB	OLS					KAOLINIZATION. ROCK SHOWS SEVERE LOS ST'S PICK. ROCK GIVES "CLUNK" SOUND WH
PRIMARY SO		ACTNESS OR		IGE OF S	TANDARD RESISTENCE		OF UNCO			ANKMENT (RE)	25/025 DIP & DIP DI	RECTION				<u>) YIELD SPT REFUSAL</u>	ST S FICK. NOCK SIVES CEDIK SOUND W
	col	NSISTENCY		(N-VAL			(TONS/FT	2 <sub>)</sub>	WITH SOIL DE		► OF ROCK STR			SEVERE 4	LL ROCK EXCEP	F QUARTZ DISCOLORED O	R STAINED. ROCK FABRIC CLEAR AND EVI
GENERALI	VE	RY LOOSE		< 4					SOIL SYMBOL		OPT DMT TEST BC		SLOPE INDICATOR	(SEV.) F	EDUCED IN STRE	NGTH TO STRONG SOIL.	IN GRANITOID ROCKS ALL FELDSPARS AR
GRANULA	R	LOOSE		4 TO							VST PMT		INSTALLATION			. SOME FRAGMENTS OF S ) YIELD SPT N VALUES :	STRONG ROCK USUALLY REMAIN.
MATERIAL	L	IUM DENSE DENSE		10 TO 30 TO			N/A		ARTIFICIAL F	ILL (AF) OTHER		5 🛆	CONE PENETROMETER TEST				R STAINED. ROCK FABRIC ELEMENTS ARE
(NON-COH	(ESIVE) VE	RY DENSE		> 50	0					T ENDHINKNENT	⊥ ⊥	$\bigcirc$	1231				SOIL STATUS, WITH ONLY FRAGMENTS OF
		RY SOFT		< 2			< 0.25		INFERRED SOI	L BOUNDARY	- CORE BORING	•	SOUNDING ROD				F ROCK WEATHERED TO A DEGREE THAT I IAIN. <u>IF TESTED,WOULD YIELD SPT N VA</u> I
GENERALI SILT-CLA		SOFT IUM STIFF		2 TO 4 TO			0.25 TO 0 0.5 TO 1.		INFERRED ROC		™◯ MONITORING W		TEST BORING				
MATERIAL		STIFF		8 TO	-		1 TO 2	0	SWEWE INCOMEDING	JK EINE	•	$\Psi$	WITH CORE				NT DISCERNIBLE, OR DISCERNIBLE ONLY IN Y BE PRESENT AS DIKES OR STRINGERS.
(COHESIV	E) VE	RY STIFF		15 TO			2 TO 4		TTTTT ALLUVIAL SOI	L BOUNDARY	△ PIEZOMETER INSTALLATION	$\rightarrow$	- SPT N-VALUE	4	LSO AN EXAMPL	Ξ.	
		HARD		> 30			> 4							_		ROCK H	ARDNESS
		TEXTURE	UR G	RAIN	SIZE						ENDATION SYME			VERY HARD (	ANNOT BE SCRA	TCHED BY KNIFE OR SHA	RP PICK. BREAKING OF HAND SPECIMENS
U.S. STD. SIE		4 10	40	-		270			UNDERCUT EXCAVATION		ED EXCAVATION -	ACCEP	SSIFIED EXCAVATION - TABLE, BUT NOT TO BE	9	EVERAL HARD BI	OWS OF THE GEOLOGIST	'S PICK.
OPENING (MM	0	4.76 2.00	0.4			0.053						USED 1	IN THE TOP 3 FEET OF				NLY WITH DIFFICULTY. HARD HAMMER BLC
BOULDER		GRAVEL	COAF SAN		F INE SAND	SI	LT	CLAY	UNDERCUT	ACCEPTABLE	ED EXCAVATION - E DEGRADABLE ROCK	EMBAN	KMENT OR BACKFILL		O DETACH HAND		
(BLDR.)	(COB.)	(GR.)	(CSE.		(F SD.		iL.)	(CL.)		AF	BREVIATIONS						OUGES OR GROOVES TO 0.25 INCHES DEE IST'S PICK. HAND SPECIMENS CAN BE DEI
GRAIN MM	305 75	2.0		Ø.:	25	0.05	0.005		AR - AUGER REFUSAL	ME	D, - MEDIUM	VST -	VANE SHEAR TEST		Y MODERATE BL		
SIZE IN.	12 3								BT - BORING TERMINATED		CA MICACEOUS		WEATHERED				5 DEEP BY FIRM PRESSURE OF KNIFE OR
	SOTI M	DISTURE - 0			ON OF	TERMS			CL CLAY CPT - CONE PENETRATION		D MODERATELY - NON PLASTIC	7-1 7-1	JNIT WEIGHT DRY UNIT WEIGHT		OINT OF A GEOL		PEICES 1 INCH MAXIMUM SIZE BY HARD B
SOIL N	MOISTURE SCALE	FIELD MO							CSE COARSE		G ORGANIC	ød "	SIT ONLY WEIGHT				KNIFE OR PICK. CAN BE EXCAVATED IN F
(ATTE	ERBERG LIMITS)	DESCRI		6	JIDE FOR F	IELD MOIS	IURE DESI	CRIPTION	DMT - DILATOMETER TES		T - PRESSUREMETER T		MPLE ABBREVIATIONS				BY MODERATE BLOWS OF A PICK POINT.
		- SATURA	TED -	119		UID; VERY	WET LISUA	ιιγ	DPT - DYNAMIC PENETRA e - VOID RATIO		P SAPROLITIC SAND, SANDY	S - B	ULK SPLIT SPOON	F	IECES CAN BE E	ROKEN BY FINGER PRESS	JURE.
		(SAT.)				THE GROU			F - FINE		- SILT, SILTY		SHELBY TUBE				AVATED READILY WITH POINT OF PICK. F BY FINGER PRESSURE. CAN BE SCRATCHE
PLASTIC	LIQUID LIMIT								FOSS FOSSILIFEROUS		I SLIGHTLY	RS -			INGERNAIL.	KNESS CAN BE BRUKEN D	31 FINGER PRESSURE. CAN BE SCRATCHE
RANGE <		- WET -	(W)			EQUIRES DE			FRAC FRACTURED, FRAC FRAGS FRAGMENTS		R - TRICONE REFUSAL - MOISTURE CONTENT		RECOMPACTED TRIAXIAL	FF	ACTURE S		BEDDING
(PI) PL	PLASTIC LIMIT			А	TTAIN UPTI	MUM MOIST	URE		HI HIGHLY		- VERY	CDIV	RATIO	TERM	THE FORLE D	SPACING	
									EQ'	UIPMENT US	ED ON SUBJEC	T PROJEC	T	VERY WIDE	МС	RE THAN 10 FEET	VERY THICKLY BEDDED
	ОРТІМИМ МОІЗТИ		- (M)	SI	DLID; AT OF	NEAR OPT	IMUM MOI	STURE	DRILL UNITS:	ADVANCING TOO	LS:	HAMMER 1	TYPE:	WIDE MODERATEL		3 TO 10 FEET 1 TO 3 FEET	THICKLY BEDDED 1.5 THINLY BEDDED 0.16
SL _	SHRINKAGE LIMIT								X CME-45C	CLAY BIT	S	X AUT	OMATIC MANUAL	CLOSE		0.16 TO 1 FOOT	VERY THINLY BEDDED 0.03
		- DRY -	(D)			DITIONAL N MUM MOIST					UOUS FLIGHT AUGER			VERY CLOSE	LES	SS THAN 0.16 FEET	THICKLY LAMINATED 0.008
					MIN OF H	1010101	ONE		CME-55			CORE SIZ	_			TNIDUC	THINLY LAMINATED < 0
		PLA	STIC	ITY								Ш-в	Ц-н				
		PLAST		NDEX (PI	<u>)</u>		STRENG	ГН	CME-550		ED FINGER BITS	N		FOR SEDIMENT	ARY ROCKS, INDU		NING OF MATERIAL BY CEMENTING, HEAT
	PLASTIC HTLY PLASTIC		Ø-5 6-15				ERY LOW SLIGHT		VANE SHEAR TEST	TUNGCAF	RBIDE INSERTS	HAND TOC	2.6	FRIABLE			FINGER FREES NUMEROUS GRAINS; BY HAMMER DISINTEGRATES SAMPLE.
	RATELY PLASTIC		16-25				MEDIUM			CASING	W/ ADVANCER		T HOLE DIGGER			CRAINS CAN BE	E SEPARATED FROM SAMPLE WITH STE
	LY PLASTIC	2	5 OR M				HIGH		PORTABLE HOIST		• STEEL TEETH		D AUGER	MODERA	ELY INDURATED		E SEPARATED FROM SAMPLE WITH STEL Y WHEN HIT WITH HAMMER.
		(	COLOR	7					1		TUNGCARB.					GRAINS ARE DI	IFFICULT TO SEPARATE WITH STEEL P
							_		🗆		Ono. Child.		NDING ROD	INDURAT	ED		BREAK WITH HAMMER.
	IONS MAY INCLUDE ( DIFIERS SUCH AS LI									CORE BIT			E SHEAR TEST			SHARP HAMMER	BLOWS REQUIRED TO BREAK SAMPLE;
MUL	DIFIERS SUCH AS LI	UNI, UHRK, SIREA	NEU, EI	C. HRE L	ISED IU UE	JUNIBE AP	- CHRANUE	•				.   📙 🗕		EXTREME	LY INDURATED		S ACROSS GRAINS.

PROJECT	REFERENCE	NO.
345	<b>18</b> .1	.2





NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WRS	34518					P R-2915		COLI	NTY W		A & ASI	HF		GEOLOGIST Elliott, D.	C			WBS	34518	312			TIP	R-2915A		COUNTY
			US 2	21 Frc												GROUND WTR	(ft)				US 2	21 From				nty to SR 10
SITE DESCRIPTION         US 221 From US 441 in Watauga County to S           BORING NO.         B-18         STATION         151+00							OFFSET 257 ft RT					ALIGNMENT -L-			V/A		NG NO.				_	ATION 14	-			
COLLAR ELEV.         N/A         TOTAL DEPTH         31.5 ft							NORTHING 926,885					EASTING 1,262,399		24 HR. N/A			COLLAR ELEV. N/A				_	TOTAL DEPTH 21.2 ft				
				E AFC		ME-550X 72							D H.S	S. Augers		RTYPE Automatio	с					AFOO		IE-550X 72%		
DRIL	LER C	offey, J	r., C.		ST		E 06/06/	/13	CON	/IP. DA	<b>FE</b> 06/	06/13		SURFACE WATER DEP					LER C				-	ART DATE		
ELEV	DRIVE	DEPTH	BLC	W COL	JNT		BLOWS	S PER FC	от		SAMP.	<b>V</b> /		SOIL AND ROC				ELEV	DRIVE ELEV	DEPTH	BLO	w cou	NT		BLOWS	PER FOOT
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75	100	NO.	мо	I G	ELEV. (ft)		DEPT	'H (ft)	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 2	5	50 7
														GROUNE			0.0								1	
														ROADWAY E SAND 8	GRAVE	I <b>men i</b> El										
		4.0	1	2	2												5.0			4.1	3	3	4			
													Lõ	SAPI Brown-orange slig	ROLITE	accous silty	5.8									
		9.0	4	10	18	``								SAND	with MnC	)				9.1	10	10	14			
				10			28																17	•	24	
		14.0																		14.1						
			3	4	6	•10															9	11	12	<b>•</b>	23 <b></b> .	
		19.0																		19.1						·
		19.0	17	37	40				-											21.2	13	00/0.4				
										`\				CRYSTAL			22.7				60/0.0					
		24.0	60/0.1							60/0.1				AMPHIBOL	LINE RO	EISS										
														WEATHE		CK	26.5									
		29.0	29	38	62/0.4									(amphibo	olite-gnei	ss)										
										100/0.9	• 		<u>I</u>	CRYSTAL	LINE RO		31.2 31.5									
														AMPHIBOI Boring Terminate	ed at Dep	oth 31.5 ft In										
														Crystalline Rock:	Amphib	olite-Gneiss										

WATAUG	A & ASH	IE		GEOLOGIST Elliott, D	. C.		
003 in Ashe (	County					GROUN	ID WTR (ft)
OFFSET 2	55 ft RT	-		ALIGNMENT -L-		0 HR.	N/A
NORTHING	926,76	62		<b>EASTING</b> 1,262,393		24 HR.	Dry
	DRILL M	ETHOD	H.S.	Augers	HAMME	R TYPE	Automatic
COMP. DAT	E 06/*	1/13		SURFACE WATER DE	PTH N/A	4	
75 100	SAMP. NO.	моі	LOG	SOIL AND RO	OCK DESC	RIPTION	l
_					ND SURFA		0.0
				ROADWAY SAND	& GRAVE		
				64	PROLITE		3.8
				Brown-gray slight	y micaceo	us silty S	AND
				W	ith MnO		
							16.0
					IERED RO bolite-gnei		
					-		20.7
100/0.4 60/0.0	-						20.7 21.2
				Boring Terminate	OLITE-GN ed by Aug	er Refusa	ll at
				Depth 21.2 ft	In Crystall bolite-Gne	ine Rock:	