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SITE PHOTOS

## STATE OF NORTH CAROLINA

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

## **STRUCTURE** SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 38363.1.1 (B-4436) F.A. PROJ. **BRZ-1700(8)** COUNTY **BLADEN** PROJECT DESCRIPTION Bridge No. 31 on SR 1700 (Mercer Mill Rd) over Brown's Creek

N.C. 38363.1.1 (B-4436) 1

#### **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 LOCS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. CEPERTMENT OF TRANSPORTATION, CEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOCS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNOS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU IN-PLACED TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS MOICATED IN THE SUBSURFACE WINESTIGATIONS 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 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 DES NOT WARRANT OR GUARANTEE THE SUFFICIECY OR ACCURACY OF THE INVESTICATION 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 THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OF 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.

PERSONNEL D C 1.7

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#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROJECT REFERENCE NO. 38363.I.I (B-4436)

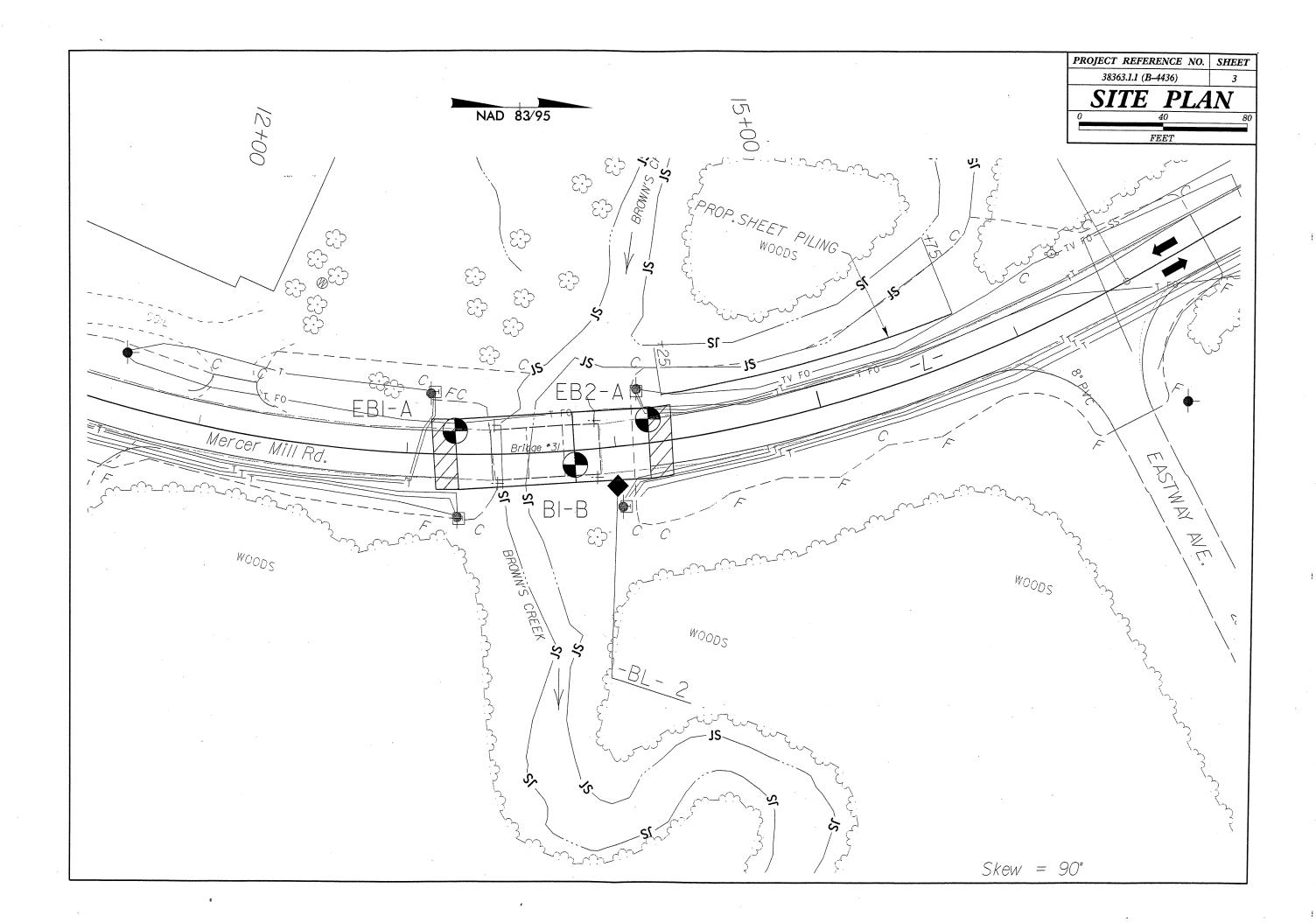
#### DIVISION OF HIGHWAYS

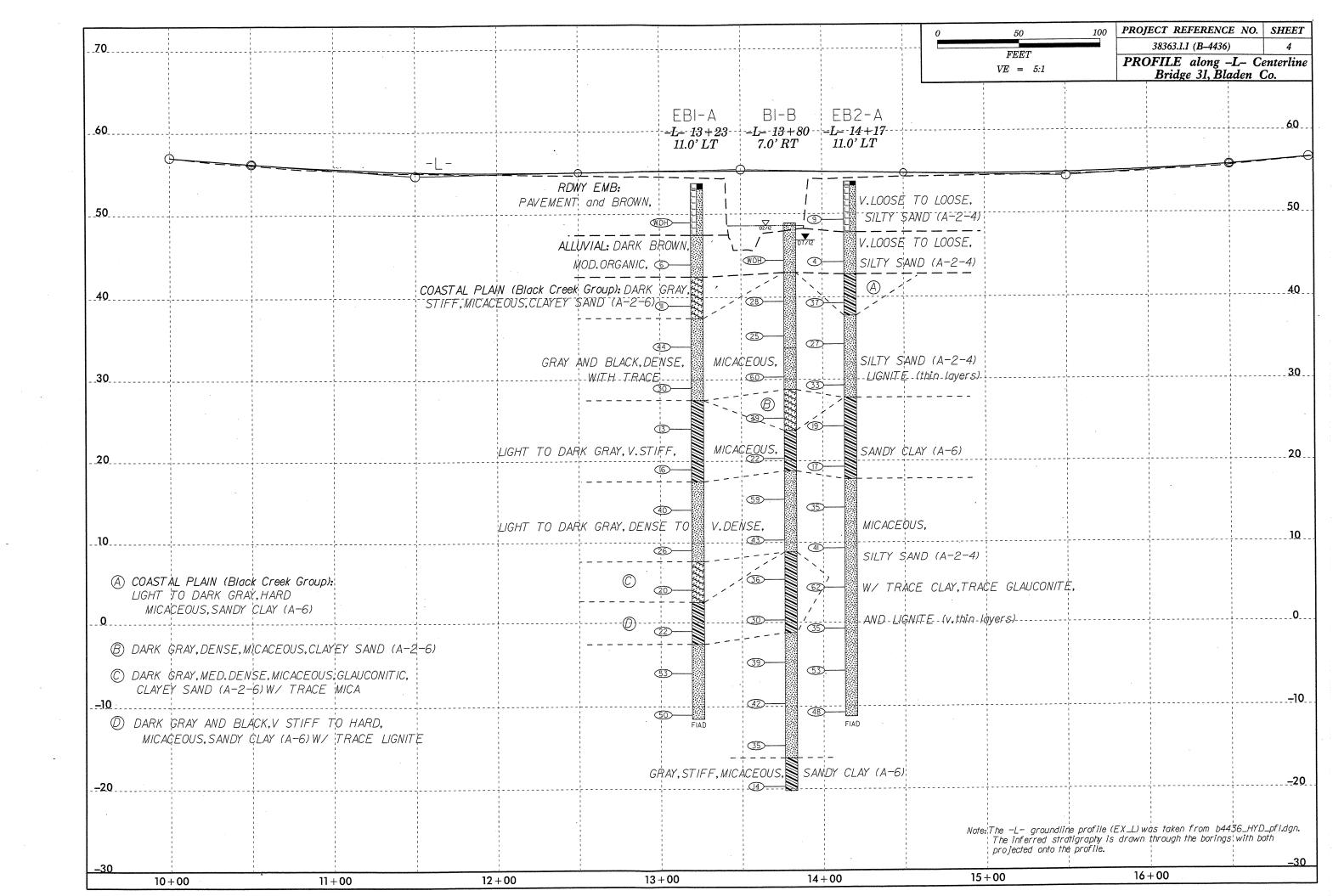
GEOTECHNICAL ENGINEERING UNIT

### SUBSURFACE INVESTIGATION

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

	•••	DOCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL DESCRIPTION	GRADATION  WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	ROCK DESCRIPTION  HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.  UNITORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)	ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.  SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.	AQUIFER - A WATER BEARING FORMATION OR STRATA.
100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM D-1586). SOIL	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.	IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS  THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR.	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS,
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:  VERY STIFF, GRAY, SUTY CLAY, MOIST WITH INTERBEDDED FINE SAID LAYERS, HIGHLY PUSTIC, 4-7-6	THE ANGULARITY OR ROUNDINGS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED,	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.  ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEYEL
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS CLASS. (≤ 35% PASSING "200) (> 35% PASSING "200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOOLD THEED ST REPOSHE IN TESTED. HOCK THE INCEODES SHAMETE,	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. (≤ 35% PASSING "200) (> 35% PASSING "200) (  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-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELD SPT REFUSAL IF TESTED. ROCK TYPE	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31	ROCK (NCR)  INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.  COASTAL PLAIN  COASTAL PLAIN  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.
SYMBOL 000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LIOUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIOUID LIMIT GREATER THAN 50	SEDIMENTARY ROCK  SEDIMENTARY ROCK  SPET REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANOSTONE, CEMENTED  (CP)  SHELL BEDS, ETC.	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.
/ PASSING SILT- MUCK,	PERCENTAGE OF MATERIAL	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
# 40 30 MX 50 MX 51 MN SOILS SOILS SOILS PEAT	ORGANIC MATERIAL GRANULAR SILT - CLAY SOILS SOILS OTHER MATERIAL	FRESH 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
= 2000 13 MX 23 MX 10 MX 33 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	HAMMER IF CRYSTALLINE.	HORIZONTAL.
40 MX   41 MN   SOILS WITH   LASTIC INDEX   6 MX   NP   10 MX   10 MX   11 MN   10 MX   10 MX   11 MN   LITTLE OR   HIGHLY	MODERATÉLY ORGANIC	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, 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	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX No MX MODERATE ORGANIC	GROUND WATER	OF A CRYSTALLINE NATURE.  SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC SOILS	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
OF MAJOR GRAVEL AND SAND GRAVEL AND SAND SOILS SOILS MATTER	▼ STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.  MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGED FROM
GEN. RATING AS A EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR UNSUITABLE	<u>∇PW</u> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) 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	PARENT MATERIAL.
SUBCRADE	SPRING OR SEEP	WITH FRESH ROCK.	FLOOD 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  CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT OUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
COMPOCTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED	TECT DODING	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES CLUNK SOUND WHEN STRUCK.	THE FIELD.  JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE (COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT2 )	WITH SOIL DESCRIPTION VST PMT W/ CORE	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
GENERALLY VERY LOOSE (4 LOOSE 4 TO 10	SOIL SYMBOL AUGER BORING SPT N-VALUE	(SEY.) IN STRENGTH TO STRONG SDIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KADLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	ITS LATERAL EXTENT.
MATERIAL MEDIUM DENSE 10 TO 30 N/A	ARTIFICIAL FILL (AF) OTHER - CORE BORING REF- SPT REFUSAL	IF TESTED, YIELDS SPT N VALUES > 100 BPF	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
DENSE   30 TO 50   VERY DENSE   >50	THAN ROADWAY EMBANKMENT	VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT (V SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY SOFT (2 (0.25	MONITORING WELL	REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY         SOFT         2 TO 4         0.25 TO 0.50           SILT-CLAY         MEDIUM STIFF         4 TO 8         0.5 TO 1.0	INFERRED ROCK LINE  A PIEZOMETER INSTALLATION	COMPLETE 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.
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	SLOPE INDICATOR  SLOPE INDICATOR  INSTALLATION	SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ALSO AN EXAMPLE.	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 AND
HARD >30 >4	25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES  CONE PENETROMETER TEST	ROCK HARDNESS	EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE		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 PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SOUNDING ROD	- SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.  HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL
COARSE FINE	ABBREVIATIONS  AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	TO DETACH HAND SPECIMEN.	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER         COBBLE         GRAVEL         SAND         SAND         SILT         CLAY           (BLDR.)         (COB.)         (GR.)         (CSE. SD.)         (F SD.)         (SL.)         (CL.)	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 - DRY UNIT WEIGHT	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SOIL MOISTURE - CORRELATION OF TERMS	CSE COARSE ORG DRGANIC  DMT - DILATOMETER TEST. PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REDUIRED 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
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	POINT OF A GEOLOGIST'S PICK.  SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS) DESCRIPTION DOLDE FOR FIELD MOISTORE DESCRIPTION	F - FINE SL SILT, SILTY ST - SHELBY TUBE	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.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXION	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	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
LL_ LIOUID LIMIT	FRAGS - FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING HI - HIGHLY V - VERY RATIO		TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC   SEMISOLIO; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING	<u>IOPSOIL (TS.)</u> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PL PLASTIC LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	TERM SPACING TERM THICKNESS  VERY THICKLY BEDDED > 4 FEET	BENCH MARK: BL #2
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	X AUTOMATIC MANUAL	VERY WIDE MORE THAN 10 FEET THICKLY BEDDED 1.5 - 4 FEET	N 314117 E 2120529 ELEVATION: 54.91 FT.
SL SHRINKAGE LIMIT	MORITE R.	MODERATELY CLOSE 1 TO 3 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET	
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6 CONTINUOUS FLIGHT AUGER CORE SIZE:  8 HOLLOW AUGERS -B	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET  THINLY LAMINATED < 0.008 FEET	NOTES:
PLASTICITY	1 10220 100210	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	- CA CITE 400	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	•
NONPLASTIC 0-5 VERY LOW	CME-550	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS:  GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
LOW PLASTICITY         6-15         SLIGHT           MED. PLASTICITY         16-25         MEDIUM	CASING W/ ADVANCER HAND TOOLS:  PORTABLE HOIST TRICONE STEEL TEETH POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
HIGH PLASTICITY 26 OR MORE HIGH	TRICONE TUNGCARB. HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE TUNG, -LARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT VANE SHEAR TEST		
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X Muo Nordi y	EXTREMELY INDURATED SHARP HAMMER BLOWS REDUIRED TO BREAK SAMPLE;  SAMPLE BREAKS ACROSS GRAINS.	
6			REVISED 09/23/09





# NCDOT GEOTECHNICAL ENGINEERING UNIT

WBS	38363						REPC -4436		COUNT	Y BLADE	1				GEOLOGIST Brett Smith		
			Brid	ge No				ercer M		over Brown		k				GROUN	ND WTR (ft)
	NG NO.						ON 13+2			OFFSET					ALIGNMENT -L-	0 HR.	N/A
	AR ELE				TO	OTAL	. DEPTH	65.2 ff		NORTHIN	G 314	,039			EASTING 2,120,504	24 HR.	FIAD
				TE SI			450 87% 0			L	DRIL	L MET	HOD	Mu	1	MMER TYPE	Automatic
	LER L						DATE			COMP. DA					SURFACE WATER DEPTH	N/A	
LEV	DRIVE	DEPTH		w co	UNT	П		BLOWS F	PER FOOT	·	SAM	P. <b>V</b>	7		SOIL AND ROCK D	ESCRIPTION	
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	:	50	75 100	NC.	. /	/OI G		ELEV. (ft)	LOOKII MOIT	DEPTH (f
55																	
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		[				[ •							L		Paveme light brown, SIL		
50	50.0	3.7	1	1	WOH				·		1		L		- ng// 5/5/11, 5/2	. , 0,2	
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45	45.0	8.7				1			• • • •					:: -	light to dark brown, SILT	Y SAND with	trace
		ł	2	3	3	•	6							**	42.5		11.
		ł		1		:'	. 						//.	1	COASTAL I dark gray, micaceous Cl	LAYEY SAND	with
40	40.0	13.7	5	5	6	<del> </del>	111		<del> </del>		-		/-/		some lignite (Black	Creek Group)	)
		Ŧ											<u>``</u>	$\frac{1}{2}$	37.5 gray, micaceous, clayey,	SILTY SAND	16 (Black
35	35.0	18.7				<u>ll</u>		<u> </u>						±	Creek Gro	oup)	`
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30	30.0	23.7	14	13	17	$\left\{ \right\} $		<u>/</u> <b>∠</b> 30 · ·	<del> </del>						<del>-</del>		
		<u> </u>					/							4	27.5 light to dark gray, micace	eous SANDY	CLAY 26
25	25.0	28.7				<u>                                     </u>	/							3	(Black Creek	Group)	
		<u> </u>	4	6	7	:	13-			:   : : : :					•		
		‡				:	:   :			:   : : : :					•		
20	20.0	33.7	5	8	8	11:	. 16		<del> </del>		11			3	<del>-</del> ,		
		‡				:				:   : : : :					gray to dark gray, micac	eous, clayey,	SILTY 36
15	15.0	38.7	11	10	21	<u>  -</u>		<del>/ · · ·</del>	ļ : · ·	-	-				- SAND (Black Cr	eek Group)	
		‡	''	19	21	:		40		:   : : : :					- -		
10	40.0	‡ .,, ,				:		<i>;/</i> . : :		:   : : : :					- -		
10	10.0	43.7	9	12	14	1 -	6	26	1		1				<del>-</del> - -		46
		‡					:::/		: : :					$\overline{\mathbb{N}}$	dark green and black, g	lauconitic CL	AYEY
5	5.0	48.7	8	9	11	<u> </u>			1:::				\ .% .	//	SAND with trace mica (	Black Creek G	roup)
		‡			''	:	20						, °, °,	$\geq$	- <u>2.5</u>		NDV 5
0		‡					4		: : :						dark gray and black, n CLAY with some lignite	ncaceous SA (Black Creek	Group)
U	0.0	53.7	8	10	12	11.		2	1		11				<del>-</del> -		£
		‡					: : : : [`		: : :				7		gray, micaceous, clayey	, SILTY SAN	D with 50
-5	-5.0	58.7	11	24	29	41:		·· <i>`</i>	<u> </u>		_				trace lignite (Black	Creek Group	")
		‡	''	24	23				53-		.						
40		‡							: : :						-		
-10	-10.0	63.7	15	20	30				50								6
		‡											T		Boring Terminated at I Coastal Plain (micaceo	us CLAYEY,	5 π in SILTY
		‡										-			- SANI	<b>D</b> )	
		‡		1			a <sup>n</sup>						-		Boring drilled in roadwa utility cor	y due to acce iflicts.	ss and
1		‡															
		‡								•					F		٠
		‡							_						<b>_</b>		
		<b>†</b>							•				1		<b>-</b>		

NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

SHEET 5

OCLLA ORILLE DRILLE LEV (fft) 50	G NO. AR ELE RIG/HAM ER C	B1-B E <b>V</b> . 48	.9 ft FF./DA* sketh BLC 0.5ft	re sun	STA   TO   M3359 (   STA   STA   O.5ft	SR 1700 (Merc ATION 13+80 TAL DEPTH 6 CME-450 87% 07/2 ART DATE 07/2 0 25	9.1 ft 2/2011	OFFSET 7 NORTHING	7 ft RT 314,0 DRILL M	ETHOD !	ALIGNMENT -L-  EASTING 2,120,520  Aud Rotary HAI  SURFACE WATER DEPTH  SOIL AND ROCK D  ELEV. (ft)	
BORING COLLA DRILL R DRILLE LEV (ft) 50	G NO. AR ELE RIG/HAM ER C DRIVE ELEV (ft)  45.5	B1-B EV. 48 MMER EI raig Hu DEPTH (ft)	.9 ft FF./DA* sketh BLC 0.5ft	W COUI	STA   TO   M3359 (   STA   STA   O.5ft	ATION 13+80 PTAL DEPTH 6 CME-450 87% 07/2 PART DATE 07/	9.1 ft 2/2011 18/12 WS PER FOOT	OFFSET 7 NORTHING COMP. DA	7 ft RT 314,0 DRILL M TE 07/ SAMP.	8/12 L 0	EASTING 2,120,520  Aud Rotary HA  SURFACE WATER DEPTH  SOIL AND ROCK D	24 HR. 2.0  MMER TYPE Automatic  N/A  ESCRIPTION
DRILL R DRILLE  (ft)  50  45	RIG/HAM ER CI DRIVE ELEV (ft) 45.5	MMER El raig Hu DEPTH (ft)	sketh BLC 0.5ft	W COUI	M3359 (ST. NT O.5ft	CME-450 87% 07/2  ART DATE 07/2  BLC	2/2011 118/12 DWS PER FOOT	COMP. DA	DRILL M TE 07/1	8/12 L 0	Aud Rotary HAI SURFACE WATER DEPTH SOIL AND ROCK D	MMER TYPE Automatic  N/A  ESCRIPTION
DRILL R DRILLE  (ft)  50  45	RIG/HAM ER CI DRIVE ELEV (ft) 45.5	MMER El raig Hu DEPTH (ft)	sketh BLC 0.5ft	W COUI	ST. NT 0.5ft	BLC	18/12 WS PER FOOT	г	TE 07/	18/12 V L O	SURFACE WATER DEPTH SOIL AND ROCK D	N/A ESCRIPTION
DRILLE LEV (ft) 50	PRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft WOH	W COUI	ST. NT 0.5ft	BLC	18/12 WS PER FOOT	г	SAMP.	L	SOIL AND ROCK D	ESCRIPTION
LEV (ft) 50	DRIVE ELEV (ft) 45.5 -	DEPTH (ft)	BLC 0.5ft WOH	0.5ft	NT 0.5ft	BLC	WS PER FOOT	1	1 1	/ 0		
50 45	45.5	(ft)	WOH			0 25	50	75 100	NO.			
45	40.5			WOH \	woh							
45	40.5			WOH \	woh							
45	40.5			WOH \	wон							
45	40.5			WOH \	wон				-	_ ::::	48.9 GROUND SU ALLUVIA	
45	40.5			WOH \	WOH	1					dark brown, moderately o	rganic SILTY SAND
40	-	8.4			- 1	0						
40	-	8.4		1		T		:   : : : :			43.0 COASTAL F	PLAIN 5.9
40	-	-			1			:   : : : :			gray to dark gray, micace SAND (Black Cre	eous, clayey, SILTY
	36.3	1	7	11	17	28					- O, I, ID (Black of	on Group)
	36.3	12.6				: : : :   : :					-	·
35		12.8	5	8	17	25					-	15.1
	-	ł				: : : :   : : :					dark gray and black, mi	icaceous SILTY f.
_	31.3	17.6	15	30	30 .						SAND with some lignite (	Black Creek Group)
30	_	<u> </u>	15	30	30		60_				28.8	20.1
	-	Ŧ					::/:::			//	dark gray, micaceous CL Creek Gro	AYEY SAND (Black oup)
25	26.3	22.6	6	19	20		39	.		//	<u></u>	
	-	Ŧ			l	/	· :   : : :				23.8 light to dark gray, micace	eous SANDY CLAY
	21.3	27.6				//					(Black Creek	Group)
20	-	‡	6	8	14	22					18.8	30.1
	:	‡									gray to dark gray, micace f. SAND (Black C	
15	16.3	32.6	10	23	36		50				- 1. 5/ 1.12 (5.115)	,,,,,,
13	-	‡					1.7.				F	
	11.3	+ 37.6									<b>-</b>	
10	-	+	9	18	25		43				8.8	40.1
		‡					7: :::				gray to dark gray, micac with some lignite (Bla	eous SANDY CLAY
5	6.3	42.6	9	15	21		loc				- With Colling Inglitte (212	on oroun croup)
5	-	‡							11		<del>}</del>	,
	1.3	± 47.6				$ \cdot ::::: :j $					<b>\$</b>	
0		<del>T 47.6</del>	13	14	16	430	· · · · · · ·				<b>1</b>	50.1
		±				$\ell::::\mid i$		:			light to dark gray, micac	eous, clayey, SILTY
	-3.7	52.6	<u> </u>	<u>                                     </u>	30		\. :   : : :				SAND with little lignite a (Black Creel	ind trace glauconite Group)
-5	-	$\frac{1}{1}$	9	9	30		39		1		<b>⊹</b> -	
		Ŧ										
-10	-8.7	<del>† 57.6</del>	11	17	25						<u>-</u>	
	-	Ŧ					. [					
	-13.7	† <sub>62.6</sub>					j $ $					
-15		‡	10	15	20	· · · ·   ·	35				-16.2	65.
		‡				: : : :   / .			-		gray, micaceous SAND) Grou	Y CLAY (Black Creek
20	-18.7	<u>‡ 67.6</u>	6	7	7						-20.2	P) 69.1
-20		‡—	+-	$\vdash$	Ė	₩14			=-		Boring Terminated at Coastal Plain (micace	Elevation -20.2 ft in
		‡					÷ ,				-	
		<u> </u>									<ul> <li>Boring drilled through be from advancing casing</li> </ul>	to mud rotary after
	•	<u>†</u>									second SPT, this change interv	ied the sample depth ral.
		+									<b>L</b> .	

NCDOT GEOTECHNICAL ENGINEERING UNIT

SHEET 6

BORING COLL	NG NO.	IPTION	Bric	iae No	21.00	SR 1700 (Mercer M	<u> </u>						1	
BORII COLL DRILL	NG NO.						lill Road)	over Brown's	Creek				GROUI	ND WTR (fi
COLL		FR2-	A			ATION 14+17	/	OFFSET				ALIGNMENT -L-	0 HR.	N/A
DRILL	ADELE					TAL DEPTH 65.1	<del></del>	NORTHING		31		<b>EASTING</b> 2,120,498	24 HR.	FIAD
				TE SI		CME-450 87% 07/22/20					D Mu	ud Rotary	HAMMER TYPE	Automatic
ווופח	ER L					ART DATE 07/19/		COMP. DA	L			SURFACE WATER DEP	TH N/A	
	DDIVE	DEPTH		ow co			PER FOOT	L	SAMP.	<b>V</b> /	L	· · · · · · · · · · · · · · · · · · ·		
(ft)	ELEV (ft)	(ft)	0.5ft	<del></del>		0 25	50	75 100	NO.	MOI	0 G	SOIL AND RO	CK DESCRIPTION	DEPTH
55														
	-	<u> </u>		ļ	-	<del>                                     </del>	Т		-				D SURFACE EMBANKMENT	
	-	F											vement brown, SILTY SAN	ND ND
50	50.3	3.6	5	5	4	9	+						2,0,1,1,0,2,1,0,0	
	-	Ŧ				<i>T</i>						<u>. 47.8</u> <b>AL</b> I	LUVIAL	6
45	45.3	8.6				1							n, moderately orga 'Y SAND	inic
	-	Ŧ	2	2	2	•4						. 42.8		11
	-	‡						.					TAL PLAIN	
40	40.3	13.6	9	21	16	37						– (Black C	reek Group)	
	-	‡				:::: ://**		.				37.8 gray, micaceous, cl	avev SILTY SAND	
35	35.3 -	18.6				:::: /;:::						trace lignite (B	lack Creek Group)	)
-55	-	ļ	9	12	15	•27						•		,
	-	‡				: : : :         : : : :	: : :	.						
30	30.3	23.6	12	16	17	1	<del>  : : :</del>					- -		
		‡	'-			33						27.8	SANDY	CI AV 20
		+				: : : : / : : : :				l		light to dark gray, m (Black C	reek Group)	CLAT
25	25.3	28.6	8	9	10	• 19						<del>-</del> -		
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Ī						:   : : : :				<u>.</u> -		
20.	20.3	33.6	6	7	10							<del>.</del>		
		İ	°	'	10	17						17.8		3
		± .				: : : : <b>\;</b> : : :						<ul> <li>SILTY SAND with li</li> </ul>		
15	15.3	38.6	10	17	18							— (Black 0	Creek Group)	
	,	Ŧ				. \.						<b>-</b>		
10	10.3	43.6		<u> </u>										
	-	Ŧ	10	17	24		1					_	,	
		Ŧ										_		
5	5.3	48.6	9	19	43		62		1			<u> </u>		
		Ŧ					/::					_		
0	0.3	T 53.6				: : : :   : : : /						-		
7	-	Ŧ	10	15	20	<b>d</b> 35						_		
		I										-		
-5	-4.7	58.6	14	23	30	1	53.	:	1			-		
		Ŧ					. /					_		
-10	-9.7	† 63.6												
		‡	14	23	25	<u> </u>	. 48		Ц	-	#**	-11.2 Boring Terminate	d at Elevation -11.	2 ft in
		‡										Coastal Plain (C	LAYEY, SILTY SA	ND)
		‡											roadway due to u	tility
		‡										- - -		
	-	Ŧ										-		

# **SITE PHOTOGRAPHS**

Bridge No. 31 on SR 1700 (Mercer Mill Rd) over Brown's Creek



Looking North towards End Bent 1



Looking South towards End Bent 2