X REFERENCE

CONTENTS

DESCRIPTION

LEGEND (SOIL & ROCK)

TITLE SHEET

SITE PLAN

BORE LOGS SOIL TEST RESULTS

PROFILE CROSS SECTIONS

SHEET NO.

6-7

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY BRUNSWICK PROJECT DESCRIPTION NC 211 FROM SR 1500

(MIDWAY ROAD) TO NC 87

SITE DESCRIPTION BRIDGE ON -Y14A- (NC 133) OVER -L- (NC 211) AT -Y14A- STA. 39 + 52.37

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5021	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 SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (1991) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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

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

- NOTES:

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

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

LINDSAY PUGH

MICHAEL D. MASON

T. SPENCER

INVESTIGATED BY J. L. STONE, LG

DRAWN BY S. V. HUDSON, LG

CHECKED BY __J. L. STONE, LG

SUBMITTED BY S. V. HUDSON, LG

DATE __DECEMBER 2017





DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

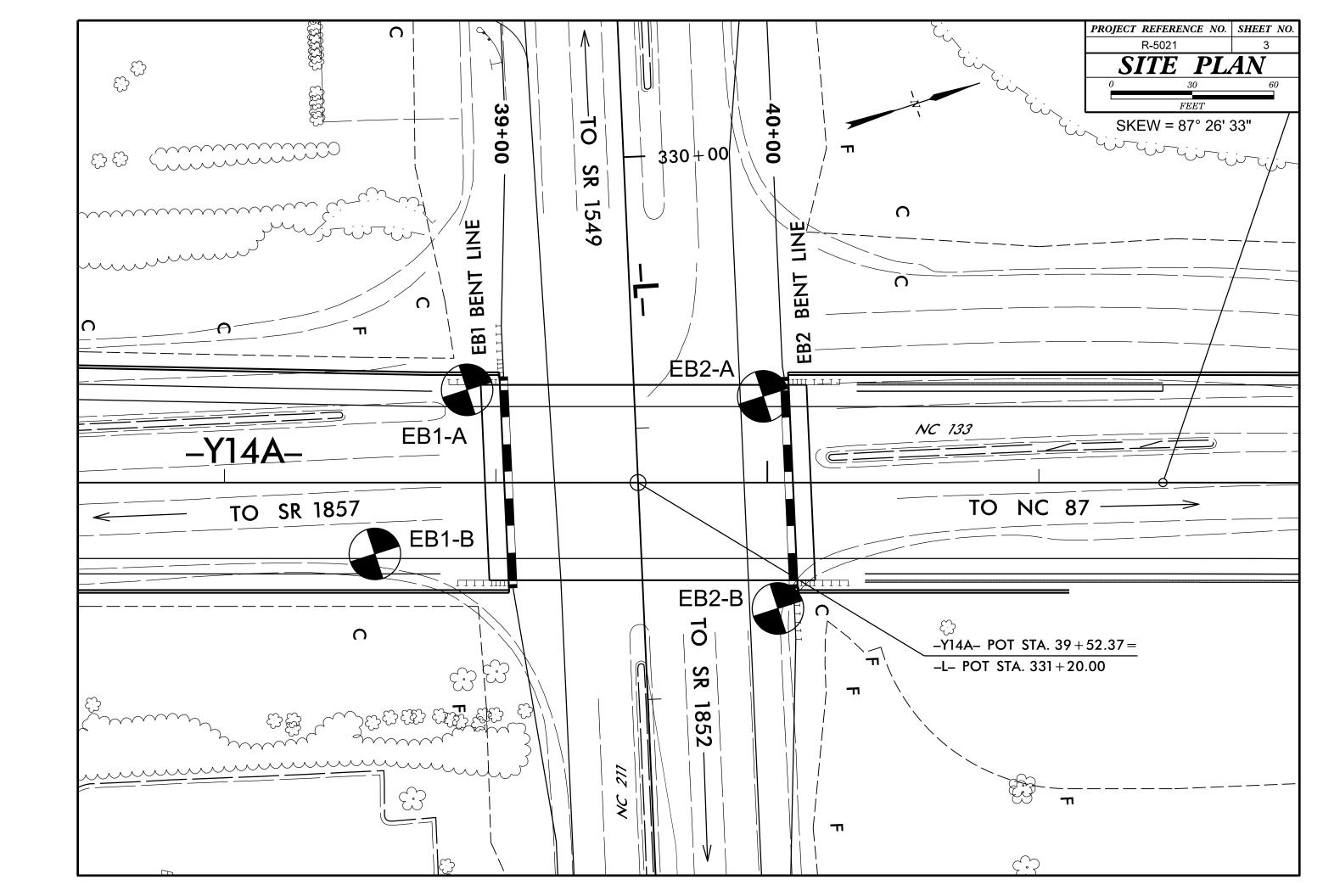
PROJECT REFERENCE NO. SHEET NO. $R-5021 \qquad \qquad 2$

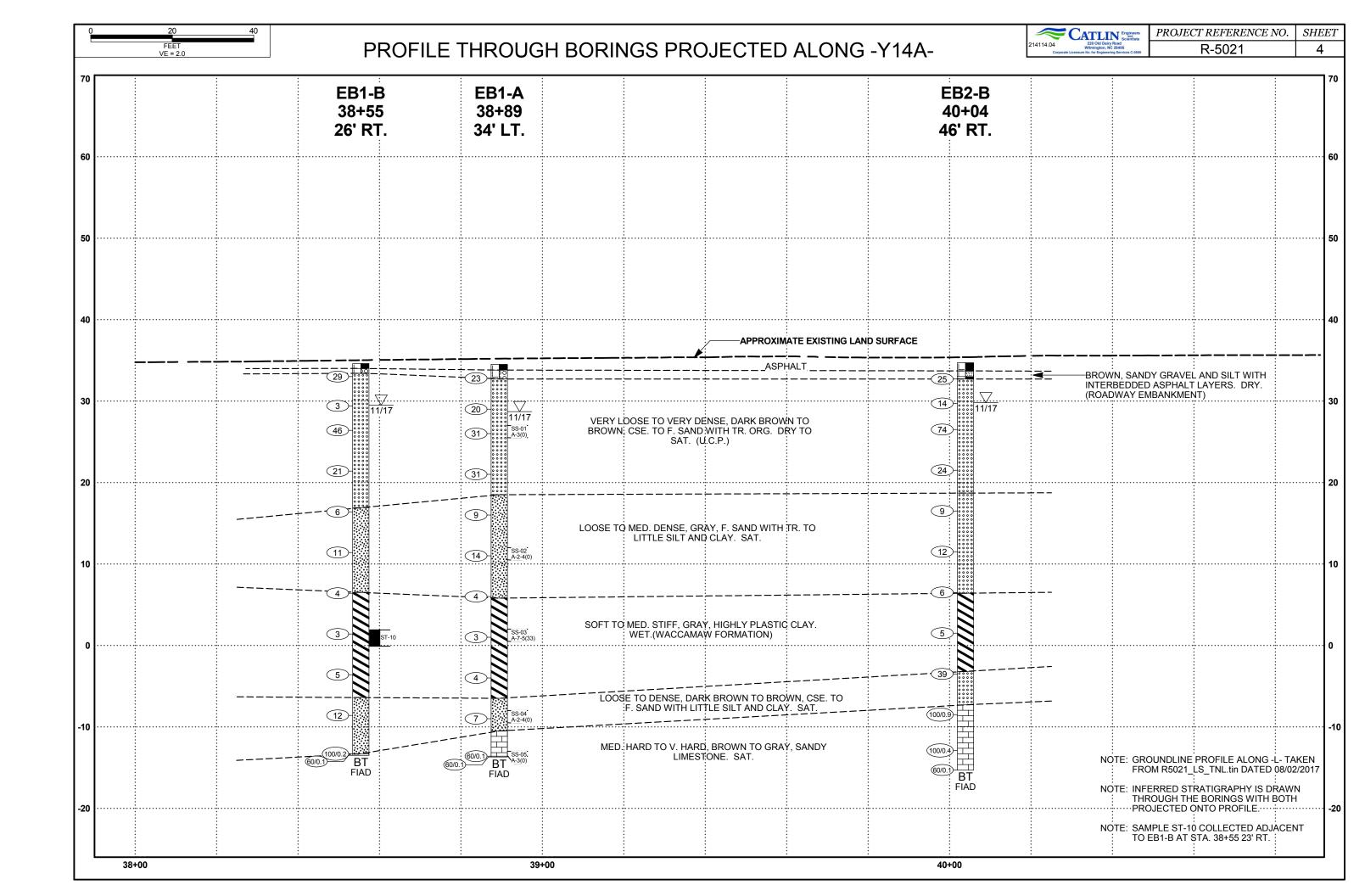
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

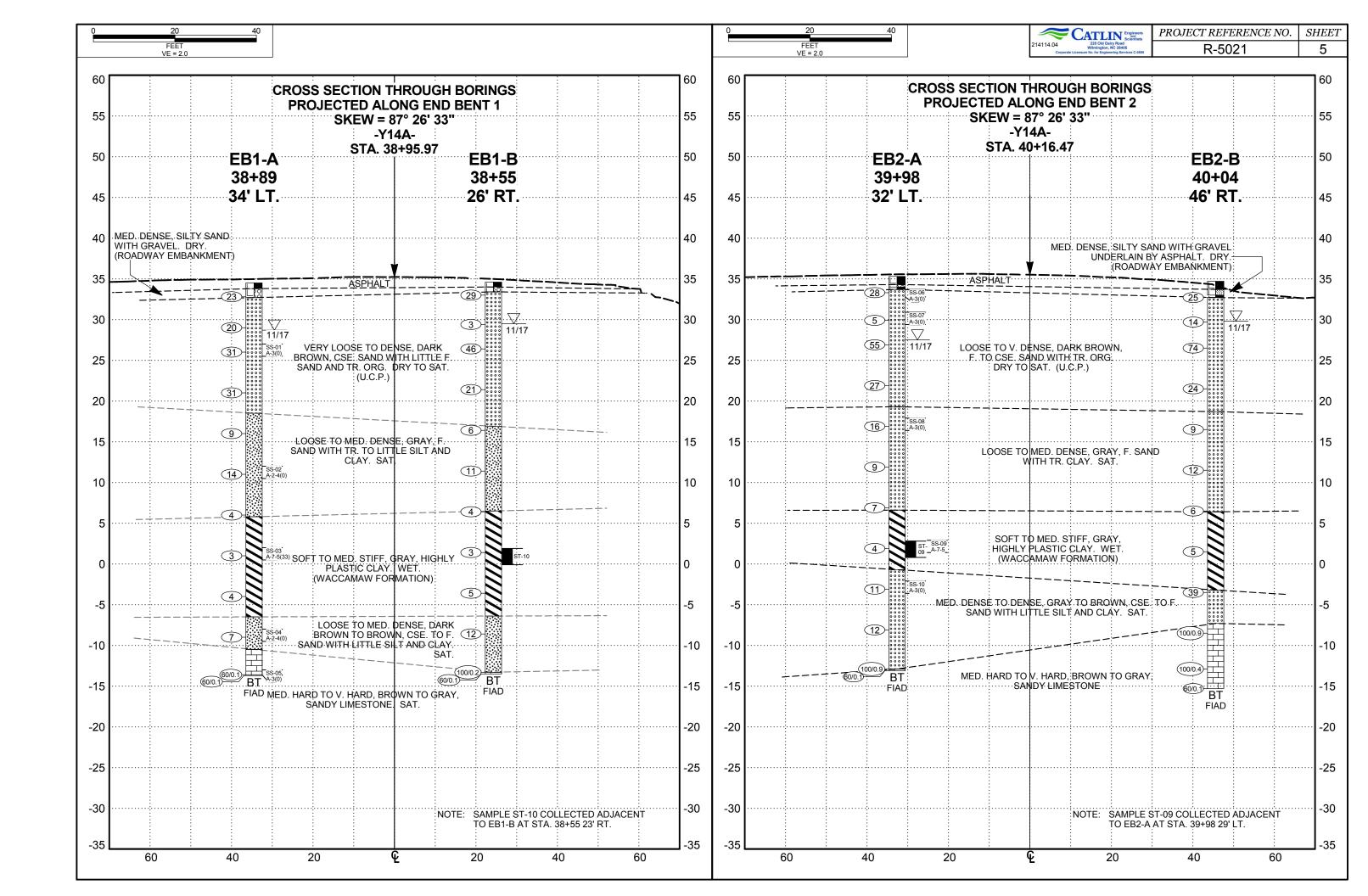
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS			
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.			
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	<u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.			
IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	BLOWS 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.			
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING			
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.			
SOIL LEGEND AND AASHTO CLASSIFICATION GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	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			
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS CLASS. (≤35% PASSING *200) (>35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE.	SURFACE.			
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	UNELSS, OHBERU, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.			
CLASS. A-1-0 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-3 A-6, A-7	COMPRESSIBILITY	NON-CATSTALLINE SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM			
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.			
7. PASSING	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, 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.			
*10 50 MX GRANULAR SIL1-	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT			
*40 30 MX 50 MX 51 MN PEAT SOILS SOILS SOILS SOILS PEAT PE	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.			
MATERIAL	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.			
PASSING *40 SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE			
LL — — 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN LITTLE OR HIGHLY	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.			
CERTIE INTEX A A A A A WY A MY 12 MY 16 MY NO MY AMPLIANTS OF	GROUND WATER	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			
USUAL TYPES STONE FRACS ORGANIC	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.			
OF MAJOR GRAVEL, AND SAND GAND SOLIS SOLIS	▼ STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.			
MATERIALS SANU	<u> </u>	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.			
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	<u> </u>	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	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	→ SPRING OR SEEP	WITH FRESH ROCK.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE			
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELO.			
COMPACTNIESS OF RANGE OF STANDARD RANGE OF UNCONFINED	I∏ 25./025	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.			
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTANCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) OF ROCK STRUCTURES	IF TESTED, WOULD YIELD SPT REFUSAL SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.			
VERY LOOSE 4.4	SPT C SLOPE INDICATOR	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.			
CRANIII AP LOOSE 4 TO 10	SOIL SYMBOL SYMBOL STEST BORING SECTION INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS			
MATERIAL MEDIUM DENSE 10 10 30 N/A	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT AUGER BORING CONE PENETROMETER	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.			
(NON-COHESIVE) VERY DENSE > 50	THE TOPONE CHORICKIENT	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE			
VERY SOFT < 2 < 0.25	— INFERRED SOIL BOUNDARY — CORE BORING SOUNDING ROD	(V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	OF AN INTERVENING IMPERVIOUS STRATUM.			
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE	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	A DIETOMETER	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. 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 EXPRESSED AS A PERCENTAGE.			
HARD > 30 > 4	TTTTT ALLUVIAL SOIL BOUNDARY A INSTALLATION SPT N-VALUE	ALSO AN EXAMPLE.				
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	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	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIF	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND			
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	LICED IN THE TOP 2 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO			
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNCLASSIFIED EXCAVATION - EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.			
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	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 0.005 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF			
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	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			
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY 7 - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 - DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.			
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY			
(ATTERBERG LIMITS) DESCRIPTION GOIDE FOR FIELD HOLSTONE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.			
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY			
LL _ LIQUID LIMIT	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.			
PLASTIC SEMISOLID: REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.			
(PI) PL PLASTIC LIMIT	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING	BENCH MARK: BORING ELEVATIONS OBTAINED WITH RTK SURVEY GRADE			
	EQUIPMENT USED ON SUBJECT PROJECT	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	GLOBAL POSITIONING SYSTEM. ELEVATION: FEET			
OM _ OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE	<u> </u>			
SL SHRINKAGE LIMIT	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:			
- DRY - (D) REOUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6° CONTINUOUS FLIGHT AUGER CORE SIZE:	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	FIAD = FILLED IMMEDIATELY AFTER DRILLING UCP = UNDIVIDED COASTAL PLAIN			
	CME-55 8" HOLLOW AUGERS CURE SIZE:	INDURATION	S. S			
PLASTICITY	-	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.				
PLASTICITY INDEX (PI) DRY STRENGTH NON PLASTIC 0-5 VERY LOW	CME-550 HARD FACED FINGER BITS TUNGCARBIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS;				
SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST X CASING W/ ADVANCER HAND TOOLS:	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.				
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.				
COLOR	TOUGHT AUGER	CDAING ADE DIEETCH T TO SEPARATE WITH STEEL DROPE.				
	X DIEDRICH D-50 TRICONE TUNGCARB. SOUNDING ROD	INDURATED DIFFICULT TO BREAK WITH HAMMER.				
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	CORE BIT VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;				
THE SECOND STATE OF THE SECOND TO SECONDE THE EMPHREE		SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1-			







GEOTECHNICAL BORING REPORT BORE LOG																				2	14114.04	220 Old Dairy R Wilmington, NC 2 Licensure No. for Engineering	28405	PROJECT REFE		. <i>SHEE</i>		
WBS:	41582.1	.1		TI	P : R-502	1		TY: BRUNS			GEOLOGIS	ST: L.PUGH			WBS	S : 41582	2.1.1		Т	IP : R-5021	COUN	NTY: BRUN	NSWICK		GEO	LOGIST: L.PUGH		
SITE D	ESCRIPT	ION BE	RIDGE (ON -Y	14A- (NC 1	33) OVE	R -L- (NC	211) AT -Y1	4A- STA	A. 39+52	•		GROUN	ID WTR (ft)	SITE	E DESCR	IPTION	BRIDGI	E ON -Y	14A- (NC 133)	OVER -L- (NO	C 211) AT -\	/14A- ST	A. 39+52			GROUN	ND WTR (f
BORIN	G NO.:	EB1-A		S	TATION:	38+89		OFFSET:	34 ft L	Γ	ALIGNMEN	NT: -Y14A-	0 HR.	5.8	BOF	RING NO.	: EB1-	-B	S	TATION : 38+5	5	OFFSET	: 26 ft R	T.	ALIG	NMENT: -Y14A-	0 HR.	5.
COLLA	R ELEV.	34.5 ft	t	T	OTAL DEP	TH: 48.	2 ft	NORTHIN	G: 75,1	72	EASTING:	2,287,962	24 HR.	FIAD	COL	LAR ELE	V .: 34	1.6 ft	T	OTAL DEPTH:	48.1 ft	NORTHI	NG : 75,	121	EAS1	ΓΙΝG : 2,288,009	24 HR.	FIAD
DRILL R	IG/HAMMI	R EFF./D	ATE: C	CATOO7	1 DIEDRICH [D-50 89.0%	6 07/19/2017		DRILL	METHOD:	Mud Rotary	Н	IAMMER TYPE:	AUTOMATIC	DRIL	L RIG/HAI	MER EI	FF./DATE:	CAT007	1 DIEDRICH D-50 8	39.0% 07/19/201	17	DRILL	METHOD:	Mud Rotar	y F	IAMMER TYPE:	AUTOMAT
DRILLE	ER : Tho	mas Spe	encer	S	TART DAT	E: 11/1	6/17	COMP. DA	TE: 11	/16/17	SURFACE	WATER DEPTH	H: N/A		DRII	LLER: T	homas	Spencer	S	TART DATE:	11/14/17	COMP. I	DATE: 1	1/15/17	SURF	FACE WATER DEPTH	H: N/A	
ELEV [OW CO			BLOW	S PER FOO					SOIL AND ROCK	DESCRIPTION			DRIVE ELEV				-	OWS PER FO	ОТ		L		SOIL AND ROCK	DESCRIPTION	
(ft)	(ft)	ft) 0.5f	t 0.5ft	0.5ft	0	25	50	75 100			G ELEV. (ft)			DEPTH (ft)	(ft)	(ft)	(ft)	0.5ft 0.5	5ft 0.5ft	0 25	50	75 1	00	MOI G		00.2711.211.00.11		
40											_ - -				40	-	- - -								_ - -			
35	33.8	0.7				II		.			- 34.5 33.8	GROUND S ASPH		0.0 0.7	35	34.0	- - - 0.6			 - 			.		- -34.6 -34.0	GROUND S		
	‡	11	12	11		23				D L	32.7	ROADWAY EN	/IBANKMENT	1.8		_	-	12 12	2 17	· · · · · . • 2	9	· · · · · ·	1 1	D	33.4	ROADWAY EN	IBANKMENT	
30	30.0 + 4	5		ļ	$ \cdot \cdot \cdot \cdot '$					000		BROWN, SAN	ASTAL PLAIN		30	30.4	4.2	1 2	1					0000	_	BROWN, SAN UNDIVIDED CO	ASTAL PLAIN	
	ł	3	9	11	: : : •	20 · · · N · · ·				Sat.	DAR	K BROWN, CSE. F. SAND AND		TLE		-		1 2	' '	6 3~ ∴ ∴		: : : : :	:	Sat.		DARK BROWN, CSE. F. SAND ANI		TTLE
	27.0 7	7.5	15	16		\			SS-01	Sat.						27.4	7.2	9 20	26	1	46		:	Sat.				
25	Ŧ					131 .			A-3(0)						25		-							0000				
	22.0 I 1	2.5				1				000	::-					22.4	12.2	9 10) 11	:::: /			-	0000				
20		10	15	16		31 .				Sat.					20		-	9 10) 11	21 .			:	Sat.	:			
	Ŧ				,	1			1	000	18.5			16.0] -	-			,			-	0000	-			
	17.0 ‡ 1	7.5	4	5	:://:					Sat.	GR	AY, F. SAND WITI CLA		AND		17.4	17.2	3 2	: 4	: / : : :			1 1	Sat.	16.9	GRAY, F. SAND WIT	LI ITTI E QII T A	ND 17
15	‡				9	ļ · · · ·			4	Sal.					15		-			1 7					-	CLA		AND
	12.0 + 2	2.5			::/:::			: : : : :								12.4	- - 22.2] :;;:: :			-					
10	12.0 + 2	4	5	9	14				SS-02	Sat.	∵- ∴-				10	-	-	4 5	6] [) 11 [[1 1	Sat.	<u>.</u>			
	‡				. /	1			A-2-4(0	1	☆ ∴ -				10	-	-						-					
	7.0 ‡ 2	7.5] :/::::						- -					7.4	27.2	3 2	: 2	-{ <i>j</i> '::: :			1 1	Sat.	6.5			28
5		4	2	2	∮ 4 · · ·					Sat.	<u></u>	COASTAI	L PLAIN	28.7	5		_	-		Q 4			<u>.</u>]	Sal.	-	COASTAI GRAY, HIGHLY I		
	‡										<u>}</u>	GRAY, HIGHLY I				24	32 2			:::: :			1 1		\	(WACCAMAW	FORMATION)	
	2.0 3	2.5	1	2	j				SS-03	Sat.	}	(2.4	- 32.2 -	1 1	2				:	Sat.	ŧ			
0	+				 	 			A-7-5(33		<u>}</u>				0	-	-			-					-			
	-3.0 3	7.5			: : : :						}					-2.6	37.2	1 2		<u> </u>			11		\			
-5 -5	土	2	1	3	4 · · ·					Sat.	<u> </u>				-5	_	-	' '		♦ 5				Sat.	Ł			
12/06	Ŧ										-6.5	RK BROWN, CSE.	TOT CANDAI	41.0]				1 .\			-		- <u>6.</u> 4	DARK BROWN, CSE.	TO E SAND W	<u> </u>
	-8.0] 4	2.5	3	4	1 1				SS-04	Sat.	DAI	LITTLE SILT		""		-7.6	42.2	5 5	7	12			.	Sat.		LITTLE SILT	AND CLAY	
<u>z -10</u>	Ŧ				• • • • • • • • • • • • • • • • • •				A-2-4(0	. 1 10 70	-10.5			45.0	-10	-	-											
5	-13.0 T 4	7.5					I	_]			Ŧ ",	GRAY, SANDY	LIMESTONE	40.4		-12.6	47.2	11 100/	/O. O				-	Sat.	-13.3			47
	13.6 1	3.1 23 60/0	60/0.1	}—	11	1		60/0.1	SS-05 A-3(0)	Sat.		RING TERMINATE				-13.4 -	- 48.0 -	60/0.1	0.2	 	<u></u>	100/0 60/0	.2 - .1	Sat.	-13.5	LIMES		
OT BORE DOUBLE R5021_GEO_BRDG_Y14AOVRL.GPJ NCI	+ + + + + + + + + + + + + + + + + + + +	60/0	.11					60/0.1	(A-3(U)	,	F F	PENETRATION TE PATION -13.7 ft IN (WACCAMAW)	ST REFUSAL AT SANDY LIMEST	T				00.0.1				607.0				BORING TERMINATE PENETRATION TE ELEVATION -13.5 fi IN (WACCAMAW SAMPLE ST-10 COLL TO EB1-B AT ST/ Other Samples: ST-10 (32.7 - 34.7)	ST REFUSAL AT SANDY LIMEST FORMATION) .ECTED ADJACE	T ΓΟΝΕ ENT

GEOTECHNICAL BO BORE LO			CATLIN Engineers and Societies 200 Old Dairy Road Societies Societ					
WBS : 41582.1.1 TIP : R-5021 COUNTY : BRUNSW		WBS : 41582.1.1 TIP : R-5021 COUNTY	BRUNSWICK GEOLOGIST: L.PUGH					
SITE DESCRIPTION BRIDGE ON -Y14A- (NC 133) OVER -L- (NC 211) AT -Y14A	A- STA. 39+52 GROUND WTR (ft)	SITE DESCRIPTION BRIDGE ON -Y14A- (NC 133) OVER -L- (NC 2						
BORING NO.: EB2-A STATION: 39+98 OFFSET: 3	2 ft LT ALIGNMENT : -Y14A- 0 HR. 7.8	BORING NO.: EB2-B STATION: 40+04	OFFSET: 46 ft RT ALIGNMENT: -Y14A- 0 HR. 4.9					
COLLAR ELEV.: 35.3 ft TOTAL DEPTH: 48.4 ft NORTHING:	75,275 EASTING : 2,287,998 24 HR . FIAD	COLLAR ELEV.: 34.7 ft TOTAL DEPTH: 50.0 ft	NORTHING: 75,256					
DRILL RIG/HAMMER EFF./DATE: CAT0071 DIEDRICH D-50 89.0% 07/19/2017	DRILL METHOD: Mud Rotary HAMMER TYPE: AUTOMATIC	DRILL RIG/HAMMER EFF./DATE: CAT0071 DIEDRICH D-50 89.0% 07/19/2017	DRILL METHOD: Mud Rotary HAMMER TYPE: AUTOMATIC					
	E: 11/16/17 SURFACE WATER DEPTH: N/A	DRILLER: Thomas Spencer START DATE: 11/13/17	COMP. DATE: 11/14/17 SURFACE WATER DEPTH: N/A					
ELEV DRIVE DEPTH BLOW COUNT BLOWS PER FOOT	L SOIL AND ROCK DESCRIPTION	ELEV DRIVE ELEV DEPTH BLOW COUNT BLOWS PER FOOT	L O SOIL AND ROCK DESCRIPTION					
(ft) (ft) (ft) 0.5ft 0.5ft 0.5ft 0 25 50 75 100	MOI G ELEV. (ft) DEPTH (ft)	(ft) (ft) (ft) 0.5ft 0.5ft 0.5ft 0 25 50 7	75 100 MOI G					
		40						
35 34.3 7 1.0	- 35.3 GROUND SURFACE 0.0 - 34.3 ASPHALT 1.0	35	34.7 GROUND SURFACE 0.0					
11 13 15	SS-06 D 33.7 ROADWAY EMBANKMENT BROWN, SANDY GRAVEL	33.7 + 1.0	D 33.7 ASPHALT 1.0 1.7 1.0 1.7 1.7 1.0 1.7 1.7 1.0 1.7 1.7 1.0 1.7 1.7 1.0 1.7 1.7 1.0 1.7 1.7 1.0 1.7 1.7 1.0 1.7 1.7 1.0 1.7 1.7 1.0 1.0 1					
30 30.9 4.4 3 3 3 2	10000	30 30.7 4.0 4 6 8	BROWN, SILT WITH SOME GRAVEL					
	A-3(0) DARK BROWN, F. TO CSE. SAND WITH	14. 14. 14. 14. 14. 14. 14. 14. 14. 14.	ASPHALT UNDIVIDED COASTAL PLAIN					
10 25 30	Sat. Sat. Sat. Sat. Sat. Sat. Sat. Sat.	27.5 + 7.2	74 Sat.					
25	0 0 0 0 0 0 0 0 0 0 0 0	25	0000					
22.9 12.4 10 12 15		22.5 12.2	· · · ·					
20	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	20 7 11 13	· · · ·					
17.9 17.4	9000 19.3 GRAY, F. SAND WITH TR. CLAY	Ţ /						
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	SS-08 Sat.	17.5 + 17.2	Sat. Sat.					
15	0000	15	0000					
12.9 22.4 3 4 5	0000	12.5 + 22.2	· · · ·					
10 10 10 10 10 10 10 10 10 10 10 10 10 1	Sat. Sat. Sat. Sat. Sat. Sat. Sat. Sat.	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	· · · ·					
7.9 1 27.4	0 0 0 0	Ţ <i>i.j.</i>	0000					
1.3 + 27.4 4 3 4 •7 · · · · · · · · · · · · · · · · · ·	Sat. 28.7	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Sat. Sat. 28.3					
5 † 1	COASTAL PLAIN GRAY, HIGHLY PLASTIC CLAY	5 †	COASTAL PLAIN GRAY, HIGHLY PLASTIC CLAY					
2.9 32.4 2 2 2	(WACCAMAW FORMATION)	2.5 + 32.2	(WACCAMAW FORMATION)					
	SS-09 M A-7-5(36)		Sat.					
-2.1 1 37.4	-0.7	<u> </u>	<u>8</u> -					
3 4 7	SS-10 Sat	-2.5 + 37.2	Sat. Sat. BROWN, F. TO CSE, SAND					
171 -5	(A-3(0))	_5						
7.1 42.4 2 4 8	0000- 0000- 0000- 0000-	-7.5 +42.2	0000 0000					
$\begin{bmatrix} 2 \\ 0 \\ z \end{bmatrix}_{-10} = \begin{bmatrix} 2 \\ 1 \end{bmatrix} \begin{bmatrix} 2 \\ 1 \end{bmatrix} \begin{bmatrix} 4 \\ 1 \end{bmatrix} \begin{bmatrix} $	Sat.	-10	Sat. GRAY, SANDY LIMESTONE					
12.1 47.4	10000 0	T						
-7.1 42.4 2 4 8 -112	12.9 48.2 -13.1 \ LIMESTONE \ 48.4	-12.5 + 47.2 + 100/0.4	Sat. Sat.					
60/0.1	BORING TERMINATED WITH STANDARD PENETRATION TEST REFUSAL AT	-15 -15.2 + 49.9 · · · · · · · · · · · · · · · · · ·	60/0.1 Sat15.3 50.0					
[] 다 다 다 다 다 다 다 다 다 다 다 다 다 다 다 다 다 다 다	ELEVATION -13.1 ft IN SANDY LIMESTONE	00/0.1	BORING TERMINATED WITH STANDARD PENETRATION TEST REFUSAL AT					
	- (WACCAMAW FORMATION) - SAMPLE ST-09 COLLECTED ADJACENT		ELEVATION -15.3 ft IN SANDY LIMESTONE (WACCAMAW FORMATION)					
	TO EB2-A AT STA. 39+98 29' LT. Other Samples:							
	ST-09 (32.5 - 34.5)							

CATLIN Engineers and Scientists 220 Old Dairy Roscientists 4114.04 Willimitgton, NC 28405 Corporate Licensure lon of Engineering Services C-085

PROJECT REFERENCE NO. SHEET R-5021

8

LABORATORY SUMMARY SHEET

AASHTO Standard Specifications

(As modified by NCDOT, Material and Tests Unit, 2000.)

						Т	EST RESU	JLTS				
Proj. Sample Number	SS-01	SS-02	SS-03	SS-04	SS-05	SS-06	SS-07	SS-08	SS-09	SS-10		
Lab Sample Number	SS-01	SS-02	SS-03	SS-04	SS-05	SS-06	SS-07	SS-08	SS-09	SS-10		
Retained #4 Sieve %	0	0	0	0	0	0.3	0	0.2	0	0		
Passing #10 Sieve %	99.5	100	100	99.3	99.4	99.6	99.9	99.8	100	100		
Passing #40 Sieve %	54	100	99	83	68	86	79	99	99	94		
Passing #200 Sieve %	9	23	97	15	5	5	10	8	95	9		
						MINUS	NUMBER 10	FRACTION				
SOIL MORTAR - 100%												
Coarse Sand Ret#60 %	74.6	0.7	1.5	37.3	68.2	55.6	60.1	1.6	2.6	29.3		
Fine Sand Ret#270 %	17.2	89.9	1.8	48.5	27.7	39.8	31.0	92.4	2.2	62.7		
Silt 0.05 - 0.005mm %	5.2	5.4	54.9	6.1	2.1	1.7	4.1	1.0	38.3	1.0		
Clay <0.005mm %	3.0	4.0	41.8	8.2	2.0	3.0	4.8	5.0	56.9	7.0		
		•							•		 ·	
Liquid Limit (LL)	10	16	60	20	7	11	16	13	63	10		
Plasticity Index (PI)	NP	NP	27	NP	NP	NP	NP	NP	31	NP		
AASHTO Classification /Group Index	A-3(0)	A-2-4(0)	A-7-5(33)	A-2-4(0)	A-3(0)	A-3(0)	A-3(0)	A-3(0)	A-7-5(36)	A-3(0)		
Organic Content %	2.2	N/A	N/A	N/A	N/A	1.8	N/A	N/A	N/A	N/A		
Station	38+89	38+89	38+89	38+89	38+89	39+98	39+98	39+98	39+98	39+98		
Offset	34ft LT	34ft LT	34ft LT	34ft LT	34ft LT	32ft LT	32ft LT	32ft LT	32ft LT	32ft LT		
Alignment	-Y14A-	-Y14A-	-Y14A-	-Y14A-	-Y14A-	-Y14A-	-Y14A-	-Y14A-	-Y14A-	-Y14A-		
Boring Identification	EB1-A	EB1-A	EB1-A	EB1-A	EB1-A	EB2-A	EB2-A	EB2-A	EB2-A	EB2-A		
Depth (FT)	7.5	22.5	32.5	42.5	47.5	1.6	4.4	17.4	32.4	37.4		
to	9.0	24.0	34.0	44.0	48.1	2.5	5.9	18.9	33.9	38.9		
Field Moist. Content %												
Tested By	MDMASON	MDMASON	MDMASON	MDMASON	MDMASON	MDMASON	MDMASON	MDMASON	MDMASON	MDMASON		
Submitted By	L. PUGH	L. PUGH	L. PUGH	L. PUGH	L. PUGH	L. PUGH	L. PUGH	L. PUGH	L. PUGH	L. PUGH		
Date Submitted	11/17/17	11/17/17	11/17/17	11/17/17	11/17/17	11/17/17	11/17/17	11/17/17	11/17/17	11/17/17		

NP = Non-Plastic

N/A = Not Applicable / Not Analyzed

Laboratory Manager

Report Date: 12/4/2017

Laboratory Report Page 1 of 1