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V Ò REFERENCE

46015

STATE OF NORTH CAROLINA

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

CONTENTS

HEET NO.	DESCRIPTION
1	TITLE SHEET
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STRUCTURE SUBSURFACE INVESTIGATION

COUNTY PITT
PROJECT DESCRIPTION REPLACE BRIDGE NO. 730087
OVER NORFOLK SOUTHERN RAILROAD
ON NC 33
SITE DESCRIPTION BRIDGE NO. 730087 ON
(-L- Sta. 25 + 98.05, -Y- Sta. 15 + 79.73) OVER NORFOLK
SOUTHERN RAILROAD

STATE PROJECT REFERENCE NO. B-5301 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 707-680. 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 BOREHOLE. 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 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 DOES NOT WARRAYT OR CUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS FOOD THE FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- 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 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.

_	GET SOLUTIONS
_	GOODNIGHT, D.W.
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INVESTIGATED BY	GOODNIGHT, D.W.
DRAWN BYHI	LL, M.J.
CHECKED BY	HAMM, J.R.
SUBMITTED BY _	FALCON ENG.
	ST 2019

PERSONNEL



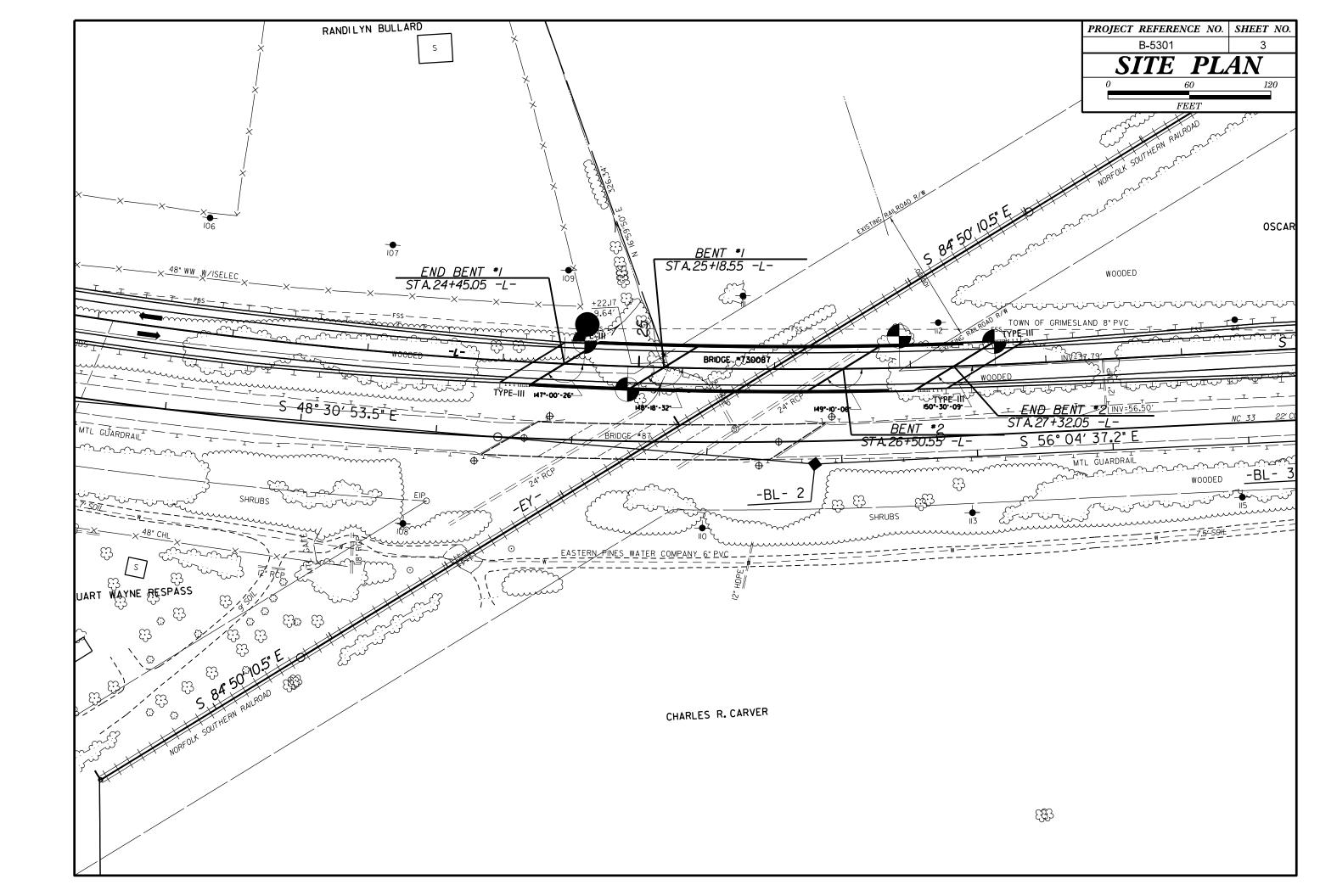
PROJECT REFERENCE NO. SHEET NO. 2

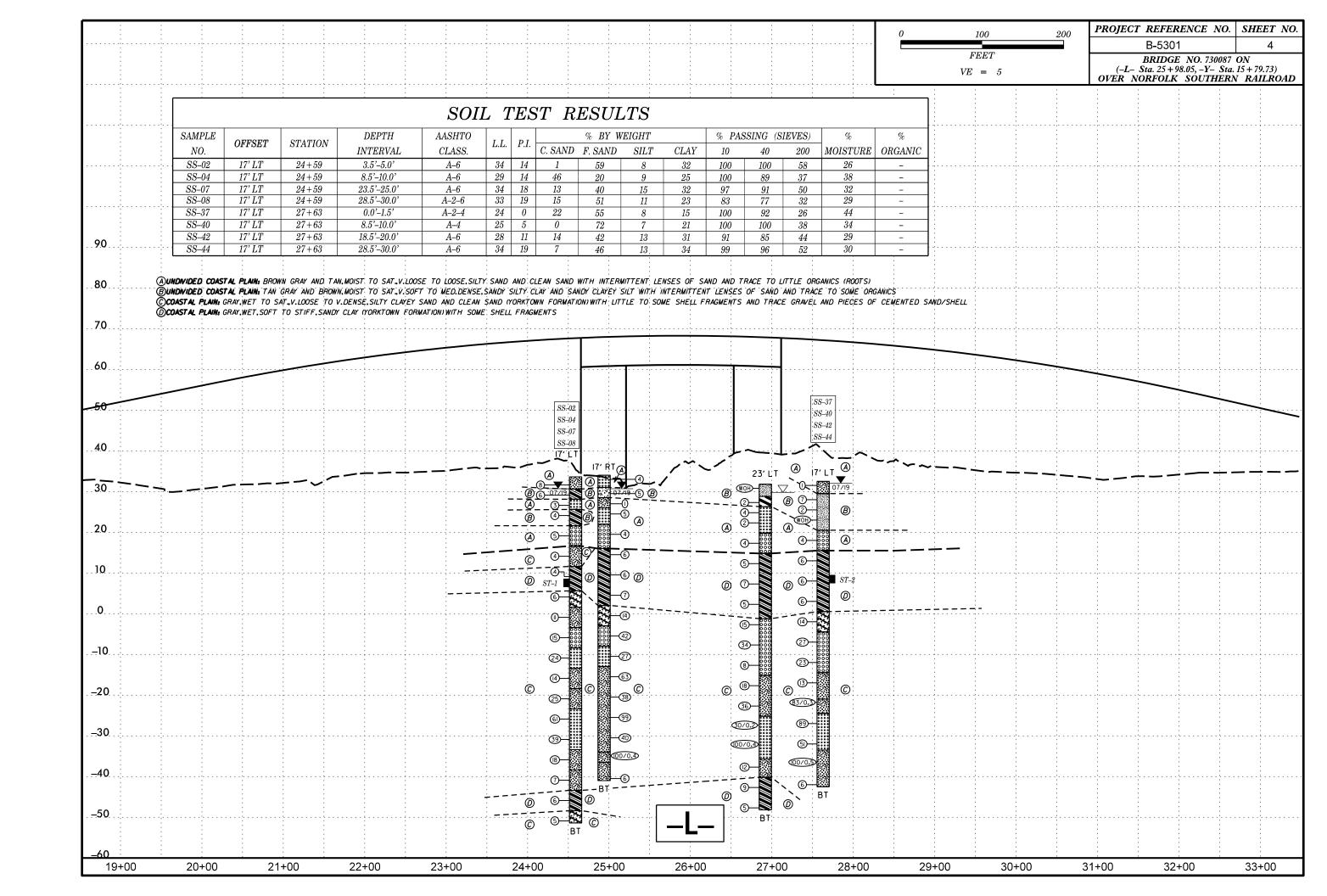
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

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.	UNEISS, OHBBRU, 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-7-5 A-3 A-6, A-7	COMPRESSIBILITY	NON-CATSTALLINE SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 0000 d00000	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 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.
*10 50 MX GRANULAR CLAY MUCK, *40 30 MX 50 MX 51 MN SOILS CRAY PEAT	PERCENTAGE OF MATERIAL	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	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 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 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 48 MX 41 MN LITTLE OR PI 6 MX NP 18 MX 18 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11 MN MODERATE 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.
CODIE INDEX A A A AMY S MY 12 MY NO MY AMOUNTS DE UKUANIL	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, FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	✓ 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 GADYS AND SAND SOILS SOILS	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	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SANU	→ PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(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 FAIR TO POOR POOR UNSUITABLE	<u> </u>	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED 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	SPRING OR SEEP	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR PANGE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK, IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (TONS/FT ²)	WITH SOIL DESCRIPTION OF ROCK STRUCTURES	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.
GENERALLY VERY LOOSE < 4	SOIL SYMBOL SPT DAT TEST BORING SLOPE INDICATOR INSTALLATION	(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.
GRANULAR LUUSE 4 10 100	VST PMT INSTRICTION	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 DENSE 30 TO 50	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.
VERT DENSE 2 300	CODE DODING A COUNDING DOD	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	- INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
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	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
MATERIAL STIFF 8 TO 15 1 TO 2	→ → → → → → ALLUVIAL SOIL BOUNDARY \(\triangle \) PIEZOMETER INSTALLATION \(\triangle \)— SPT N-VALUE	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	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	INSTREETION	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - EXCAVATION - UNSUITABLE WASTE ACCEPTABLE, BUT NOT TO BE	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	USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL SAND SAND SILT CLAY	UNDERCOT LESS ACCEPTABLE DEGRADABLE ROCK	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(CSE. SD.) (F SD.)	ABBREVIATIONS	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	BY MODERATE BLOWS. MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	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
	CL CLAY MOD MODERATELY γ - UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL
SOIL MOISTURE - CORRELATION OF TERMS	_ CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{ m d}$ - DRY UNIT WEIGHT	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN Ø.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION (ATTERBERG LIMITS) DESCRIPTION	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; YERY WET, USUALLY	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
(SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES I INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	TENGTH 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.
PLASTIC LIQUID LIMIT	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
■ RANGE / SEMISULID; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK:
(PI) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	BL-2, -YI- Sta 26+29.37, 69.95 ft RT N: 667080.4IE: 2534I62.II
- MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: 62.36 FEET
OM OPTIMUM MOISTURE SL SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED Ø.16 - 1.5 FEET	NOTES:
PEGUIDEC ADDITIONAL MATER TO	X CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
- DRY - (D) ATTAIN OPTIMUM MOISTURE	CME-55 6° CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED < 0.008 FEET	THE THEED WINDLEST AT LESS DISCLISED
PLASTICITY	8" HOLLOW AUGERS	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST CASING W/ ADVANCER HAND TOOLS: CASING POST HOLE DIGGER	CDAING CAN BE CERARATED FROM CAMPLE WITH CIFEL BRORE.	
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST X TRICONE 25% STEEL TEETH HAND AUGER	MODERATELY INDURATED ORMINS CHIN BE SEPHANTED FROM SHIPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE TUNGCARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT SOONDING NOD VANE SHEAR TEST	DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X MUD ROTARY	EXTREMELY INDURATED SHAPP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1-
HOSE IERO SOCI AS EIGHT BANK STREAKES, ETC. AND OSED TO BESCHIED AT EARANCE			■ UAIE: 8-15-1-





GEOTECHNICAL BORING REPORT BORE LOG

									URE L	UG				1
WBS	46015	5.1.1			Т	IP B - 5301		COUNT	Y PITT				GEOLOGIST GOODNIGHT, D). J.
SITE	DESCF	RIPTIO	N REF	PLACE	BRI	DGE NO. 87	OVER N	ORFOLK	SOUTHERN	N RAILR	OAD	ON N	C 33	GROUND WTR (ft)
BOR	ING NO	. EB1			S	TATION 2	4+59		OFFSET 1	17 ft LT			ALIGNMENT -L-	0 HR . 5.2
COL	LAR EL	EV. 33	3.6 ft		Т	OTAL DEP	TH 85.0 fr		NORTHING	667.2	54		EASTING 2,534,080	24 HR 2.9
				TE C		CME-45C 81						D M:		ER TYPE Automatic
												U IVIC		
DRIL	LER C	ontract	1			TART DAT			COMP. DA			1	SURFACE WATER DEPTH N/	<u> </u>
ELEV	DRIVE ELEV	DEPTH	·	W COL		. I		PER FOOT		SAMP.	lacksquare	L	SOIL AND ROCK DESC	CRIPTION
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 2	25 5	50	75 100	NO.	/MO	G	ELEV. (ft)	DEPTH (ft)
35														
													33.6	0.0
	32.6	1.0	3	3	5	<u> </u>					<u> </u>	-	UNDIVIDED COASTA BROWN AND GRAY, LOC	
30	30.1	3.5			_	68					*	₩	_30.6 SAND (A-2-4)	3.0
		Ŧ	3	3	3	6				SS-2	26%		TAN AND GRAY, MED. ST 28.1 SILTY CLAY (A	
	27.6	6.0	1	2	1	{					Sat.	0000	LIGHT GRAY, V. LOOSE, I	
25	25.1	8.5		_		•3					Sal.	-	25.6 - LIGHT GRAY, SOFT TO M	8.0
			WOH	1	3	•4				SS-4	38%		SANDY SILTY CLAY (A	4-6) WITH
		‡									Sat.		INTERMITTENT LENSES	S OF SAND
20	20.1	13.5] { · · · ·						000	GRAY, LOOSE, F. TO CSE.	. SAND (A-1-b)
		F	3	2	3	●5					Sat.	000		
		‡										000	_16.6	17.0
15	15.1	18.5] } · · ·						-	COASTAL PLA GRAY, LOOSE, SILTY CL	AIN .
	_	F	2	2	2	-4					Sat.	_	(A-2-5) WITH SOME SHELL	. FRAGMENTS
	-	‡										_	11.6 (YORKTOWN FORM	22.0
10	10.1	23.5] }							GRAY, SOFT TO MED. S - CLAY (A-6) WITH SOM	TIFF, SANDY
		Ŧ	2	2	2	4				SS-7	32% W		FRAGMENTS	
	-	‡									l vv			
5	5.1	28.5											5.6 GRAY, LOOSE, CLAYEY	28.0
	-	F	4	2	4	•6				SS-8	29%	///	WITH SOME SHELL FR	
	-	‡										\	1.6	32.0
0	0.1	33.5				',						_	GRAY, MED. DENSE, SILTY WITH SOME SHELL FR	Y SAND (A-2-4)
	-	Ŧ	4	6	5	11					Sat.	_	- WITH SOME SHEEL FR	AGWLN13
	-	‡				: : : :						_	-3.4	37.0
- 5	4.9	38.5										000	LIGHT GRAY, MED. DENSE - (A-1-b) WITH TRACE	
	-	-	/	7	8	15					Sat.	000	(A 1 b) WITH TRACE	OTAVEE
		‡				\						000	-8.4	42.0
-10	-9.9	43.5				· · · · · · · · · · · · · · · · · · ·						0000	GRAY, MED. DENSE, F.	SAND (A-3)
	-	ŧ	7	9	15	• • • • •	24				W	0000		
	-	Ī										0000	-13.4	47.0
-15	14.9	48.5	20	7	7	/.						- -	GRAY, MED. DENSE, CL SAND (A-2-5) WITH SO	
	-	t	20	7	,	€14					W	-	FRAGMENTS	
	-	+											-18.4	52.0
-20	-19.9	53.5	14	12	13	│		ļ · · · · ·	<u> </u>		C.,	_	GRAY, MED. DENSE, SILTY WITH LITTLE SHELL FR	
	-	ţ	14	12	13		25				Sat.	-		
	-	-					1.35					0000	-23.4 	57.0
-25	24.9	58.5	18	24	37	· · · · ·		\			,,,	0000	GRAY, V. DENSE, SAND CEMENTED SANDS	
	-	<u> </u>	10	2-7	01) ●61			W	0000		, ,
	-	-						<i> </i>				0000		
-30	29.9	63.5	10	19	20		/	ļ				0000	_	
		‡	10	שו	20		≠ 39				Sat.	0000		
	-	+										0 0 0 0	-33.4	67.0
-35	-34.9	68.5	10	10	8	 	1	<u> </u>	<u> </u>		\ ,. <i>,</i>		GRAY, MED. DENSE, SILTY	r SAND (A-2-4)
		<u> </u>	10	10	o	∮ 18					W	-		
	-	+				/							-38.4	72.0
-4 0	39.9	73.5	2	3	4	/						_	DARK GRAY, LOOSE, CLA - SAND (A-2-5)	
	-	t		J	4	∮ 7					W	_	-: (
	-	+										<u> </u>	_43.4	77.0
- 45	44.9	78.5					<u> </u>	<u> </u>	1	1			GRAY, MED. STIFF, SAND	JT CLAY (A-6)

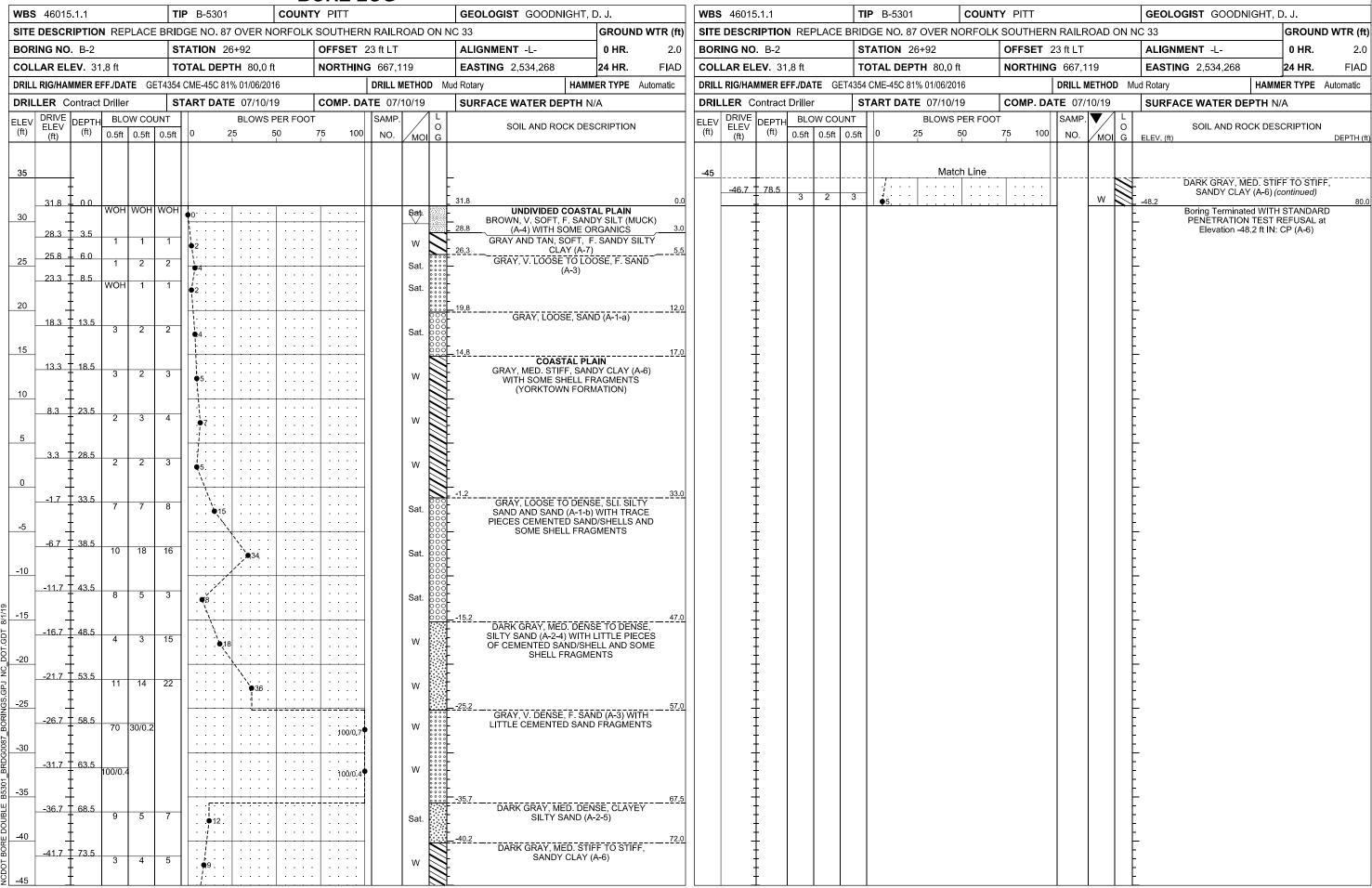
WBS	S 46015.1.1			TI	P B - 5301	COUNT	ry Pitt				GEOLOGIST GOODN	IIGHT, I	D. J.	
SITE	DESCRIPT	ION RE	PLACE	BRID	GE NO. 87 OVER N	NORFOLK	SOUTHER	N RAILF	ROAD	ON N	C 33		GROUN	ID WTR (ft)
BOF	RING NO. E	31		S	FATION 24+59		OFFSET	17 ft LT			ALIGNMENT -L-		0 HR.	5.2
COLLAR ELEV. 33.6 ft					OTAL DEPTH 85.0	ft	NORTHIN	G 667,2	254		EASTING 2,534,080		24 HR.	2.9
DRIL	L RIG/HAMME	R EFF./D/	ATE GI	ET4354	CME-45C 81% 01/06/20)16		DRILL I	/ETHO	D Mu	d Rotary	HAMM	ER TYPE	Automatic
DRII	LLER Contr	act Drille	er	S	TART DATE 07/08/	19	COMP. DA	TE 07/	08/19		SURFACE WATER DE	PTH N	/A	
ELEV (ft)	DRIVE DEF	· · · 	OW CO	UNT 0.5ft	BLOWS 0 25	PER FOO ⁻ 50	T 75 100	SAMP.	MOI	L O G	SOIL AND RO	CK DES	CRIPTION	N .
_45 _50	49.9	5 3	2	3	Mat				w		_48.4 	ntinued) DSE, CL, A-2-6) ed WITH I TEST F 4 ft IN: C	AYEY F. S STANDAI REFUSAL	82.0 AND 85.0 RD at

GEOTECHNICAL BORING REPORT BORE LOG

							UKE L				1	1
	46015						ry pitt				GEOLOGIST GOODNIGHT,	
SITE	DESCR	RIPTIO	N REI	PLACE	BRID	DGE NO. 87 OVER NORFOL	SOUTHERN	RAILR	OAD	ON N	C 33	GROUND WTR (ft)
BOR	ING NO	. B-1			S	TATION 24+94	OFFSET 1	7 ft RT			ALIGNMENT -L-	0 HR. 3.5
COL	LAR EL	EV . 34	1.0 ft		T	OTAL DEPTH 75.0 ft	NORTHING	667,2	07		EASTING 2,534,084	24 HR . 3.3
DRILL	_ RIG/HAI	MMER E	FF./DA	TE GE	T4354	4 CME-45C 81% 01/06/2016		DRILL M	ETHO	D Mu	d Rotary HAMN	IER TYPE Automatic
DRIL	LER C	ontract	Drille	r	S	TART DATE 07/09/19	COMP. DAT	TE 07/0	9/19		SURFACE WATER DEPTH N	/A
ELEV	DDIVE	DEPTH	T	OW COU		BLOWS PER FOO	1	SAMP.	V /	1 L T		
(ft)	ELEV (ft)	(ft)	' ——		0.5ft	41.	75 100	NO.	, MOI	O G	SOIL AND ROCK DES	CRIPTION DEPTH (ft)
	(11)								/ 10101	G	ELEV. (II)	DEPTH (III
35	34.0	0.0								-	34.0	0.0
	_		1	2	2	4			М	0000	UNDIVIDED COASTA TAN, LOOSE, F. SAND (A-	
30	30.5	3.5						-		0000	31.0 ROOTS	3.0
		-	2	2	3	•5			М	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	GRAY AND TAN, MED. ST 28.5 CLAYEY SILT (A-5) WITH	
	28.0	6.0	2	WOH	1	1 /			Sat.	_	LIGHT GRAY, V. LOOSE,	SILTY F. SAND
25	25.5	8.5	1	2	3					0000	26.0 (A-2-4) TAN AND GRAY, LOOSE,	F. SAND (A-3)
	_		'		J	•5			Sat.	0000		,
	-	-								000	22.0 GRAY, LOOSE, SILTY S	12.0
20	20.5	13.5	3	2	2	1 2			Sat.	000-	. GIVAT, LOOSE, SILTT C	MID (A-1-0)
	-	_				$\left \begin{array}{c c} \bullet 4 & \dots & \vdots & \vdots & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots$			oat.	000		
	455-	40.5								000	16.0	18.0
15	15.5	18.5 -	WOH	3	3	66			W		COASTAL PLA GRAY, MED. STIFF, SAN	
	-										WITH SOME SHELL FR	RAGMENTS
10	10.5	- 23.5									(YORKTOWN FORM	/IATION)
10	- 10.0		2	2	4	6			W			
	-	_										
5	5.5	28.5										
	1 -		3	3	4	•7			W		•	
	-	_									2.0	32.0
0	0.5	33.5	3	6	8					/ ///	GRAY, MED. DENSE, CI (A-2-6) WITH SOME SHEL	
	-	_	3		U	14			Sat.	///	,	
	_	Ī								000	-3.0 GRAY, DENSE, SAND (A-1-	57.0
-5	-4.5	38.5	18	17	25				Sat.	000-	SHELL FRAGME	
	-	_				•42			ou.	000		
	-9.5	- 43.5									-8.0 GRAY, MED. DENSE, F. SA	AND (A-3) WITH
-10	-9.5	43.5 _	8	12	15	1 2 7			Sat.	0000	TRACE CEMENTED SA	ND/SHELLS
	_	Ī								0000	-13.0	47.0
-15	-14.5 -	48.5									GRAY, MED. DENSE TO V	DENSE, SILTY
10		<u> </u>	3	3	60	• • • • • • • • • • • • • • • • • • • •			W	-	F. SAND (A-2-4) WITH TRA SAND/SHELLS AND LI	TEL SHELL
	-	}					.				FRAGMENT	S
-20	-19.5	53.5	10	10	20		.					
] -	Ī	16	18	20	€38			Sat.		•	
	-	<u> </u>								-		
-25	-24.5	- 58.5 -	40	59	40	1		[W	_		
	-	<u> </u>					9	9	vv	_		
	-									_		
-30	-29.5	63.5	16	18	22	•40			W	_		
	-	-								_		
0.5	-34.5	- - 68.5					.				-34.0	68.0
-35		- 50.5	100/0.4	4			100/0:4		W	_	GRAY, V. DENSE, SILTY 36.5 WITH LENSES OF CEMB	
	-	L				{					DARK GRAY, LOOSE, CL	AYEY SILTY F.
-4 0	-39.5	- 73.5								-	SAND (A-2-5)
-+0	_		3	2	4	•6			Sat.		-41.0	75.0
	-	<u> </u>								<u> </u>	Boring Terminated WITH PENETRATION TEST F	REFUSAL at
		<u></u>	L							<u> </u>	Elevation -41.0 ft IN: 0	CP (A-2-5)

SHEET 6

GEOTECHNICAL BORING REPORT BORE LOG



0.5

0.5

GEOTECHNICAL BORING REPORT **BORE LOG**

