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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34528.1.1 (R-3307) F.A. PROJ. STPNHF-70(43)
 COUNTY CARTERET
 PROJECT DESCRIPTION US 70 FROM EXISTING FOUR LANES AT RADIO ISLAND TO US 70 NORTH OF SR 1429 (OLGA ROAD)
 SITE DESCRIPTION BRIDGE ON SR 1174 OVER TOWN CREEK AT -Y2- STA. 16+05.50

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34528.1.1 (R-3307)	1	16
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34528.1.1	STPNHF-70(43)	P.E. RAW & UTIL.	

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 1931 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, 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 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 INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

PERSONNEL

JRS

RES

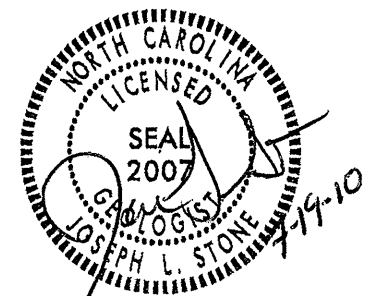
JME

INVESTIGATED BY J.L. STONE

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE JULY 2010



PROJECT: ID: R-3307

DRAWN BY: C.R. SUMNER

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

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.

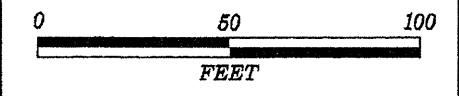
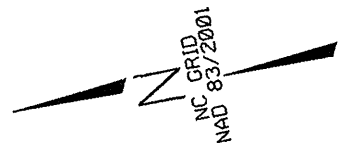
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
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PROJECT REFERENCE NO. R-3307
SHEET NO. 2 OF 16

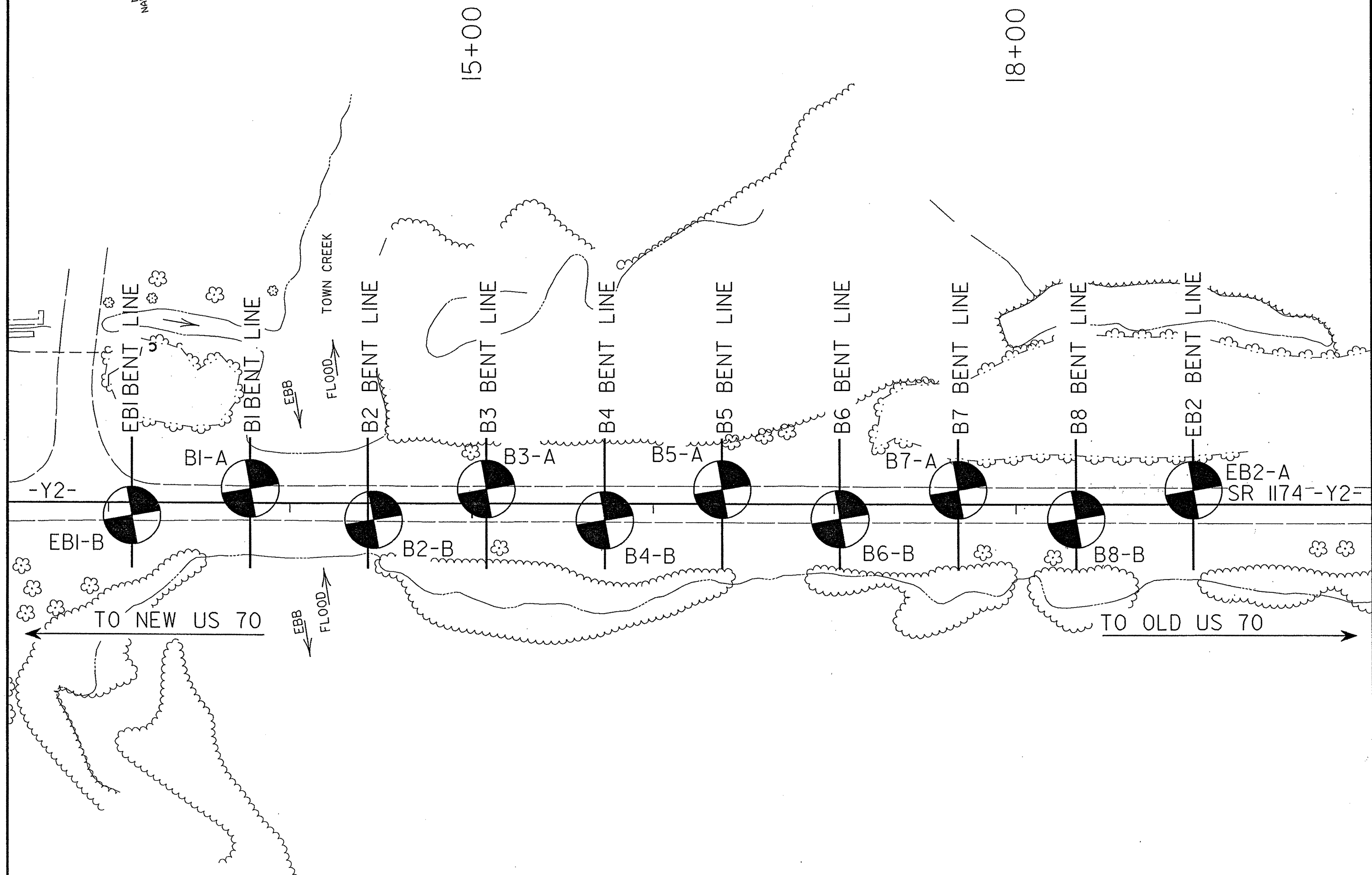
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																																																																																																																																																																																																																															
<p>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 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p style="text-align: center;"><i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i></p>	<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)</p> <p>GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p style="text-align: center;">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>	<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 60 BLOWS PER FOOT IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p> <p>WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p> <p>CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p> <p>NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLITE, SLATE, SANDSTONE, ETC.</p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CPS) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>	<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.</p> <p>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 SURFACE.</p> <p>CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>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.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p>SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p>SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.</p> <p>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 60 BLOWS PER FOOT.</p> <p>STRATA CORE RECOVERY (SCREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>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 THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.</p> <p>TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																																																																																																																																															
<p style="text-align: center;">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="7">GRANULAR MATERIALS (< 35% PASSING #200)</th> <th colspan="7">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th><th>A-1-b</th><th>A-3</th><th>A-2</th><th>A-2-4</th><th>A-2-5</th><th>A-2-6</th><th>A-2-7</th><th>A-4</th><th>A-5</th><th>A-6</th><th>A-7</th><th>A-1, A-2</th><th>A-3</th><th>A-4, A-5</th><th>A-6, A-7</th><th>A-7-5</th><th>A-7-6</th></tr> </thead> <tbody> <tr> <td>GROUP CLASS.</td> <td colspan="7">A-1-a</td><td colspan="7">A-2-a</td><td colspan="3">A-7-a</td><td colspan="3">A-7-b</td></tr> <tr> <td>SYMBOL</td> <td colspan="7"></td><td colspan="7"></td><td colspan="3"></td><td colspan="3"></td></tr> <tr> <td>% PASSING</td> <td colspan="7">50 40 30 25 20</td><td colspan="7">40 35 30 25 20 15 10</td><td colspan="3">10 5 0</td><td colspan="3">10 5 0</td></tr> <tr> <td>LIQUID LIMIT</td> <td colspan="7">60 50 40 30 20</td><td colspan="7">40 35 30 25 20 15 10</td><td colspan="3">10 5 0</td><td colspan="3">10 5 0</td></tr> <tr> <td>PLASTIC INDEX</td> <td colspan="7">6 5 4 3 2 1 0</td><td colspan="7">4 3 2 1 0</td><td colspan="3">0 0 0</td><td colspan="3">0 0 0</td></tr> <tr> <td>GROUP INDEX</td> <td colspan="7">0 0 0 0 0 0 0</td><td colspan="7">0 0 0 0 0 0 0</td><td colspan="3">0 0 0</td><td colspan="3">0 0 0</td></tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td colspan="7">STONE FRAGS, GRAVEL, AND SAND</td><td colspan="7">FINE SAND, SILTY OR CLAYEY GRAVEL AND SAND</td><td colspan="3">SILTY SOILS</td><td colspan="3">CLAYEY SOILS</td></tr> <tr> <td>GENERATING AS A SUBGRADE</td> <td colspan="7">EXCELLENT TO GOOD</td><td colspan="7">FAIR TO POOR</td><td colspan="3">POOR</td><td colspan="3">UNSATURABLE</td></tr> </tbody> </table> <p style="text-align: center;">PI OF A-1-A-7 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</p>	GENERAL CLASS.	GRANULAR MATERIALS (< 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)							ORGANIC MATERIALS			A-1	A-1-b	A-3	A-2	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7	A-7-5	A-7-6	GROUP CLASS.	A-1-a							A-2-a							A-7-a			A-7-b			SYMBOL																					% PASSING	50 40 30 25 20							40 35 30 25 20 15 10							10 5 0			10 5 0			LIQUID LIMIT	60 50 40 30 20							40 35 30 25 20 15 10							10 5 0			10 5 0			PLASTIC INDEX	6 5 4 3 2 1 0							4 3 2 1 0							0 0 0			0 0 0			GROUP INDEX	0 0 0 0 0 0 0							0 0 0 0 0 0 0							0 0 0			0 0 0			USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL, AND SAND							FINE SAND, SILTY OR CLAYEY GRAVEL AND SAND							SILTY SOILS			CLAYEY SOILS			GENERATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR							POOR			UNSATURABLE			<p style="text-align: center;">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p style="text-align: center;">COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50</p> <p style="text-align: center;">PERCENTAGE OF MATERIAL</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> </thead> <tbody> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>>20%</td> <td>HIGHLY</td> </tr> </tbody> </table> <p style="text-align: center;">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p> STATIC WATER LEVEL AFTER 24 HOURS</p> <p> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p> SPRING OR SEEP</p> <p style="text-align: center;">MISCELLANEOUS SYMBOLS</p> <p> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</p> <p> SOIL SYMBOL</p> <p> ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</p> <p> INFERRED SOIL BOUNDARY</p> <p> INFERRED ROCK LINE</p> <p> ALLUVIAL SOIL BOUNDARY</p> <p> DIP & DIP DIRECTION OF ROCK STRUCTURES</p> <p> SPT TEST BORING</p> <p> AUGER BORING</p> <p> CORE BORING</p> <p> MONITORING WELL</p> <p> PIEZOMETER INSTALLATION</p> <p> SLOPE INDICATOR INSTALLATION</p> <p> CONE PENETROMETER TEST</p> <p> SOUNDING ROD</p>		ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	>20%	HIGHLY	<p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SL.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p> <p>SLIGHT (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p>MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p> <p>MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL.</i></p> <p>SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF.</i></p> <p>VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF.</i></p> <p>COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p> <p style="text-align: center;">ROCK HARDNESS</p> <p>VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</p> <p>MEDIUM HARD CAN BE GROVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p>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 PIECES CAN BE BROKEN BY FINGER PRESSURE.</p> <p>VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.</p>	<p style="text-align: center;">TEXTURE OR GRAIN SIZE</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>U.S. STD. SIEVE SIZE (OPENING (MM))</th> <th>4</th><th>10</th><th>40</th><th>60</th><th>200</th><th>270</th> </tr> </thead> <tbody> <tr> <td></td> <td>4.76</td><td>2.00</td><td>0.42</td><td>0.25</td><td>0.075</td><td>0.053</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>BOULDER (BLDR.)</th> <th>COBBLE (COB.)</th> <th>GRAVEL (GR.)</th> <th>COARSE SAND (CSE. 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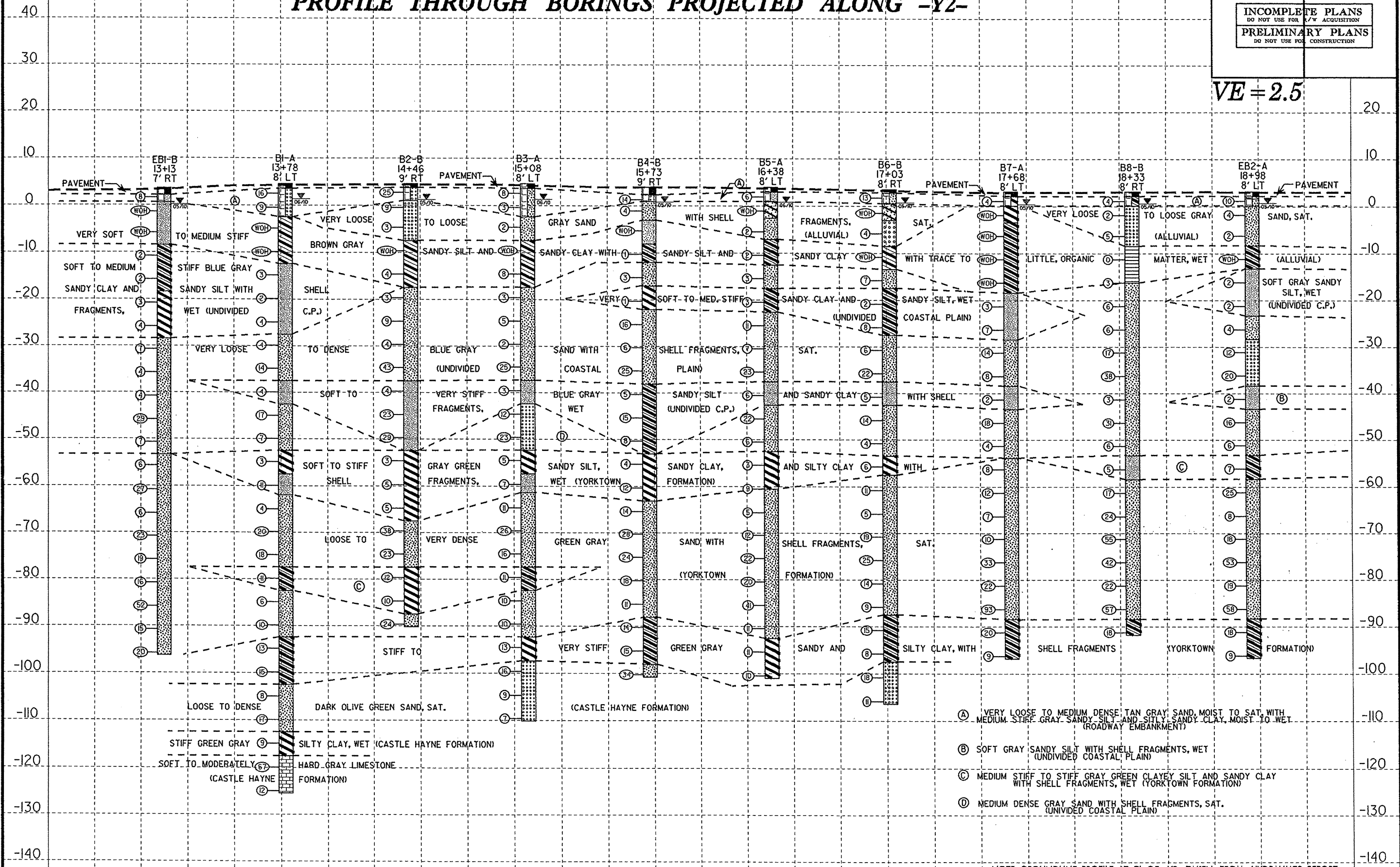


PROJECT REFERENCE NO.	SHEET
R-3307	3 OF 16
SKEW = 90°	



PROFILE THROUGH BORINGS PROJECTED ALONG -Y2-

VE = 2.5



- (A) VERY LOOSE TO MEDIUM DENSE TAN GRAY SAND, MOIST TO SAT. WITH MEDIUM STIFF GRAY SANDY SILT AND SILTY SANDY CLAY, MOIST TO WET (ROADWAY EMBANKMENT)
- (B) SOFT GRAY SANDY SILT WITH SHELL FRAGMENTS, WET (UNDIVIDED COASTAL PLAIN)
- (C) MEDIUM STIFF TO STIFF GRAY GREEN CLAYEY SILT AND SANDY CLAY WITH SHELL FRAGMENTS, WET (YORKTOWN FORMATION)
- (D) MEDIUM DENSE GRAY SAND WITH SHELL FRAGMENTS, SAT. (UNDIVIDED COASTAL PLAIN)

NOTE: GROUNDLINE PROFILE AT CL OF -Y2- TAKEN FROM HYDRAULICS REPORT AS OF 6/3/10
 NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34528.1.1		TIP R-3307		COUNTY CARTERET		GEOLOGIST Swartley, J. R.							
SITE DESCRIPTION BRIDGE ON -Y2- (SR 1174) OVER TOWN CREEK							GROUND WTR (ft)						
BORING NO. B1-A	STATION 13+78	OFFSET 8 ft LT	ALIGNMENT -Y2-			0 HR.	N/A						
COLLAR ELEV. 4.5 ft		TOTAL DEPTH 129.9 ft	NORTHING 361,352	EASTING 2,702,825	24 HR.		3.2						
DRILL RIG/HAMMER EFF./DATE CME-45B			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic								
DRILLER Smith, R. E.		START DATE 06/10/10	COMP. DATE 06/10/10	SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG MOI	LOG SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75				
5													
	3.5	1.0	6	8	8								4.5
													3.5
0	0.5	4.0	2	5	4								ROADWAY EMBANKMENT TAN SAND, MOIST TO SAT.
													2.5
-5	-3.9	8.4	WOH	WOH	WOH								ALLUVIAL BROWN SANDY CLAY WITH TRACE ORGANIC MATTER, WET
													7.0
-10	-8.9	13.4	WOH	WOH	WOH								UNDIVIDED COASTAL PLAIN GRAY SANDY SILT WITH SHELL FRAGMENTS, WET
													17.0
-15	-13.9	18.4	WOH	1	2								SS-92
													32.0
-20	-18.9	23.4	1	1	1								SS-93
													47.0
-25	-23.9	28.4	1	2	2								SS-94
													42.0
-30	-28.9	33.4	1	1	3								SS-95
													47.0
-35	-33.9	38.4	1	4	10								SS-96
													57.0
-40	-38.9	43.4	2	1	3								SS-97
													62.0
-45	-43.9	48.4	2	8	9								SS-98
													66.5
-50	-48.9	53.4	4	3	4								SS-99
													82.0
-55	-53.9	58.4	1	2	1								
													82.0
-60	-58.9	63.4	3	4	7								
													82.0
-65	-63.9	68.4	2	1	3								
													82.0
-70	-68.9	73.4	6	9	11								
													82.0
-75	-73.9	78.4	5	9	9								
													82.0

WBS 34528.1.1		TIP R-3307		COUNTY CARTERET		GEOLOGIST Swartley, J. R.							
SITE DESCRIPTION BRIDGE ON -Y2- (SR 1174) OVER TOWN CREEK							GROUND WTR (ft)						
BORING NO. B1-A	STATION 13+78	OFFSET 8 ft LT	ALIGNMENT -Y2-			0 HR.	N/A						
COLLAR ELEV. 4.5 ft		TOTAL DEPTH 129.9 ft	NORTHING 361,352	EASTING 2,702,825	24 HR.		3.2						
DRILL RIG/HAMMER EFF./DATE CME-45B			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic								
DRILLER Smith, R. E.		START DATE 06/10/10	COMP. DATE 06/10/10	SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG MOI	LOG SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75				
													Match Line
-75													
	-78.9	83.4	3	5	6								SS-100
													82.0
-80													
	-83.9	88.4	3	3	3								SS-101
													87.0
-85													
	-88.9	93.4	4	6	4								SS-102
													92.0
-90													
	-93.9	98.4	5	6	7								SS-103
													97.0
-95													
	-98.9	103.4	3	6	9								SS-104
													102.0
-100													
	-103.9	108.4	2	3	5								SS-105
													107.0
-105													
	-108.9	113.4	4	7	10								SS-106
													112.0
-110													
	-113.9	118.4	3	4	5								SS-107
													117.0
-115													
	-118.9	123.4	15	35	32								SS-108
													122.0
-120													
	-123.9	128.4	6	6	6								SS-109
													127.0
-125													
													129.9
													Boring Terminated at Elevation -125.4 ft IN SOFT LIMESTONE

NCDOT BORE DOUBLE R3307 GEO_SPT BORINGS.GPJ NC_DOT.GDT 11/1/11



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34528.1.1		TIP R-3307		COUNTY CARTERET		GEOLOGIST Stone, J. L.									
SITE DESCRIPTION BRIDGE ON -Y2- (SR 1174) OVER TOWN CREEK							GROUND WTR (ft)								
BORING NO. B2-B		STATION 14+46		OFFSET 9 ft RT		ALIGNMENT -Y2-									
COLLAR ELEV. 4.5 ft		TOTAL DEPTH 94.7 ft		NORTHING 361,288		EASTING 2,702,797									
DRILL RIG/HAMMER EFF./DATE CME-45B		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER Smith, R. E.		START DATE 05/19/10		COMP. DATE 05/19/10		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75					100	
5	3.7	0.8	12	13	12								4.5	GROUND SURFACE	0.0
													3.7	PAVEMENT	0.8
0	0.5	4.0	3	4	5								1.0	ROADWAY EMBANKMENT TAN SAND, MOIST TO SAT.	3.5
														ALLUVIAL TAN AND GRAY SAND WITH SHELLS, SAT.	
-5	-3.7	8.2	1	2	1								-7.5		12.0
														ALLUVIAL GRAY SANDY CLAY WITH TRACE ORGANIC MATTER, WET	
-10	-8.7	13.2	WOH	WOH	WOH								-17.5		22.0
														UNDIVIDED COASTAL PLAIN GRAY SAND WITH SHELL FRAGMENTS, SAT.	
-15	-13.7	18.2	1	1	3								-37.5		42.0
														UNDIVIDED COASTAL PLAIN GRAY SANDY SILT WITH SHELL FRAGMENTS, WET	
-20	-18.7	23.2	2	2	1								-52.5		57.0
														COASTAL PLAIN GRAY GREEN SILTY CLAY WITH SHELL FRAGMENTS, WET (YORKTOWN FORMATION)	
-25	-23.7	28.2	2	4	5								-67.5		72.0
														COASTAL PLAIN GRAY GREEN SAND, SAT. (YORKTOWN FORMATION)	
-30	-28.7	33.2	1	1	3										
-35	-33.7	38.2	5	19	24										
-40	-38.7	43.2	1	1	3										
-45	-43.7	48.2	3	5	18										
-50	-48.7	53.2	16	17	12										
-55	-53.7	58.2	WOH	1	2										
-60	-58.7	63.2	1	3	2										
-65	-63.7	68.2	2	2	3										
-70	-68.7	73.2	5	19	19										
-75	-73.7	78.2	5	11	12										

WBS 34528.1.1		TIP R-3307		COUNTY CARTERET		GEOLOGIST Stone, J. L.									
SITE DESCRIPTION BRIDGE ON -Y2- (SR 1174) OVER TOWN CREEK							GROUND WTR (ft)								
BORING NO. B2-B		STATION 14+46		OFFSET 9 ft RT		ALIGNMENT -Y2-									
COLLAR ELEV. 4.5 ft		TOTAL DEPTH 94.7 ft		NORTHING 361,288		EASTING 2,702,797									
DRILL RIG/HAMMER EFF./DATE CME-45B		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER Smith, R. E.		START DATE 05/19/10		COMP. DATE 05/19/10		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75					100	
-75															
-80	-78.7	83.2	3	5	7										
-85	-83.7	88.2	3	4	6										
-90	-88.7	93.2	6	11	13										

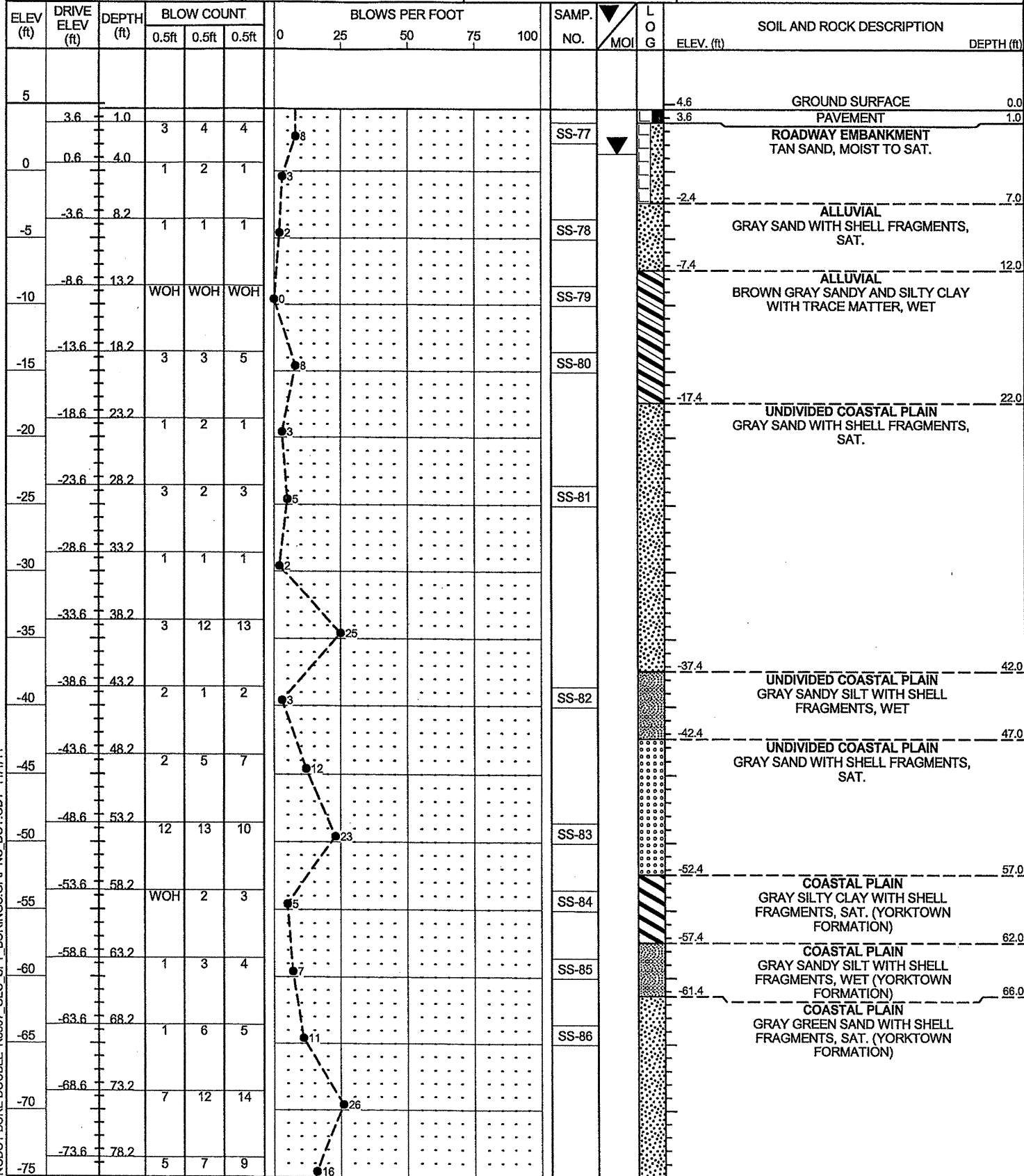
NCDOT BORE DOUBLE R3307 GEO SPT BORINGS.GPJ NC DOT.GDT 11/1/11



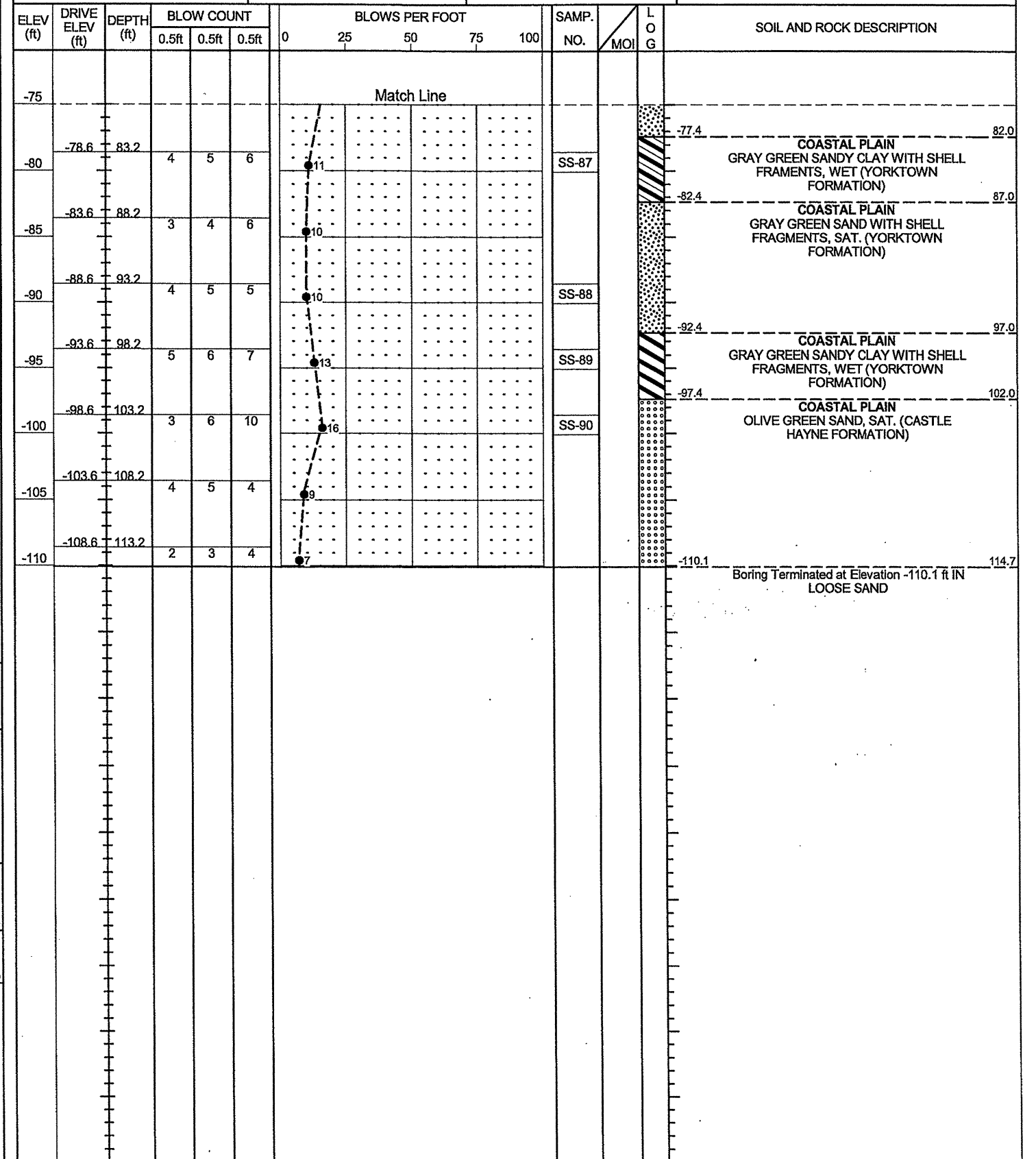
NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34528.1.1	TIP R-3307	COUNTY CARTERET	GEOLOGIST Swartley, J. R.
SITE DESCRIPTION BRIDGE ON -Y2- (SR 1174) OVER TOWN CREEK			GROUND WTR (ft)
BORING NO. B3-A	STATION 15+08	OFFSET 8 ft LT	ALIGNMENT -Y2-
COLLAR ELEV. 4.6 ft	TOTAL DEPTH 114.7 ft	NORTHING 361,224	EASTING 2,702,803
DRILL RIG/HAMMER EFF./DATE CME-45B		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Smith, R. E.	START DATE 06/09/10	COMP. DATE 06/10/10	SURFACE WATER DEPTH N/A



WBS 34528.1.1	TIP R-3307	COUNTY CARTERET	GEOLOGIST Swartley, J. R.
SITE DESCRIPTION BRIDGE ON -Y2- (SR 1174) OVER TOWN CREEK			GROUND WTR (ft)
BORING NO. B3-A	STATION 15+08	OFFSET 8 ft LT	ALIGNMENT -Y2-
COLLAR ELEV. 4.6 ft	TOTAL DEPTH 114.7 ft	NORTHING 361,224	EASTING 2,702,803
DRILL RIG/HAMMER EFF./DATE CME-45B		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Smith, R. E.	START DATE 06/09/10	COMP. DATE 06/10/10	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE R3307 GEO_SPT BORINGS.GPJ NC_DOT.GDT 11/1/11



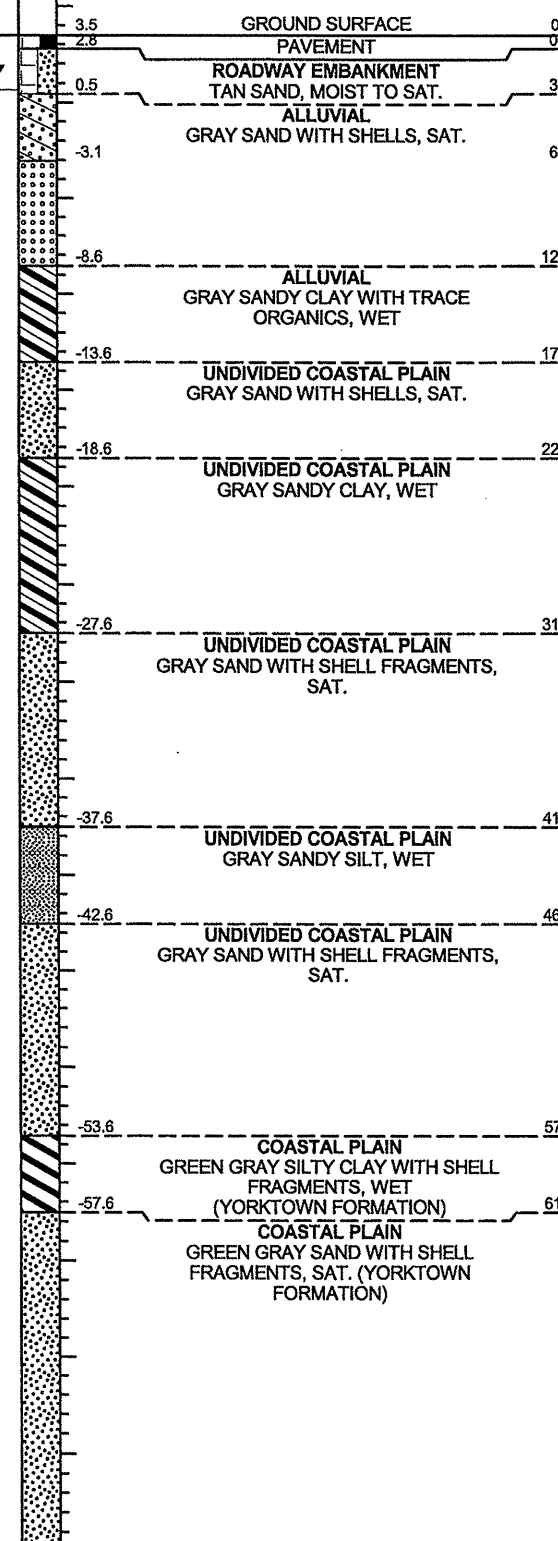
NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

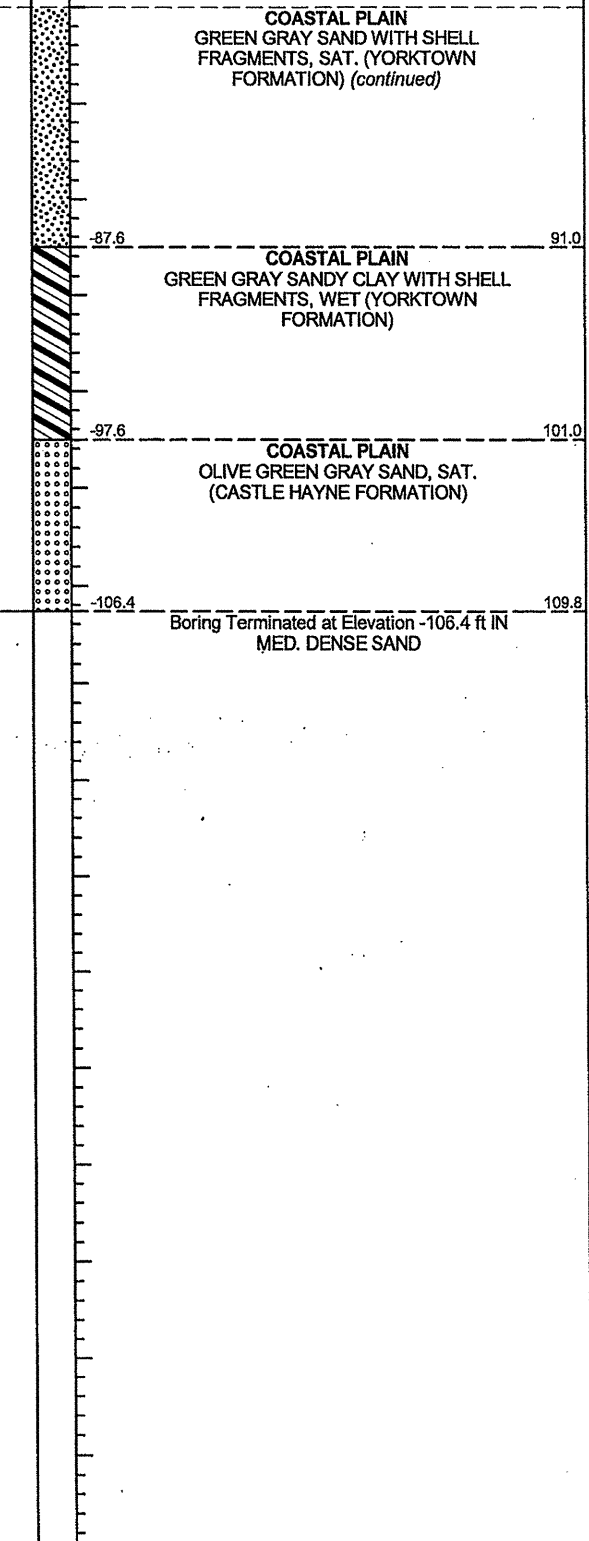
WBS 34528.1.1		TIP R-3307		COUNTY CARTERET		GEOLOGIST Stone, J. L.										
SITE DESCRIPTION BRIDGE ON -Y2- (SR 1174) OVER TOWN CREEK							GROUND WTR (ft)									
BORING NO. B6-B		STATION 17+03		OFFSET 8 ft RT		ALIGNMENT -Y2-										
COLLAR ELEV. 3.5 ft		TOTAL DEPTH 109.8 ft		NORTHING 361,035		EASTING 2,702,753										
DRILL RIG/HAMMER EFF./DATE CME-45B		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER Smith, R. E.		START DATE 05/20/10		COMP. DATE 05/24/10		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
5																
	2.8	0.7	7	5	8											
0	-0.6	4.0	WOH	WOH	WOH											
-5	-4.9	8.3	1	2	2											
-10	-9.9	13.3	WOH	WOH	WOH											
-15	-14.9	18.3	1	3	4											
-20	-19.9	23.3	WOH	WOH	2											
-25	-24.9	28.3	4	1	7											
-30	-29.9	33.3	2	2	4											
-35	-34.9	38.3	7	5	17											
-40	-39.9	43.3	2	3	2											
-45	-44.9	48.3	3	4	10											
-50	-49.9	53.3	2	2	2											
-55	-54.9	58.3	WOH	3	3											
-60	-59.9	63.3	3	5	6											
-65	-64.9	68.3	1	2	3											
-70	-69.9	73.3	3	7	12											
-75	-74.9	78.3														

WBS 34528.1.1		TIP R-3307		COUNTY CARTERET		GEOLOGIST Stone, J. L.										
SITE DESCRIPTION BRIDGE ON -Y2- (SR 1174) OVER TOWN CREEK							GROUND WTR (ft)									
BORING NO. B6-B		STATION 17+03		OFFSET 8 ft RT		ALIGNMENT -Y2-										
COLLAR ELEV. 3.5 ft		TOTAL DEPTH 109.8 ft		NORTHING 361,035		EASTING 2,702,753										
DRILL RIG/HAMMER EFF./DATE CME-45B		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER Smith, R. E.		START DATE 05/20/10		COMP. DATE 05/24/10		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
-75			4	10	15											
	-79.9	83.3	3	5	9											
-80																
-85	-84.9	88.3	2	3	6											
-90	-89.9	93.3	5	7	8											
-95	-94.9	98.3	2	3	5											
-100	-99.9	103.3	5	8	10											
-105	-104.9	108.3	4	6	5											

NCDOT BORE DOUBLE R3307_GEO_SPT_BORINGS.GPJ NC_DOT.GDT 11/1/11



Match Line





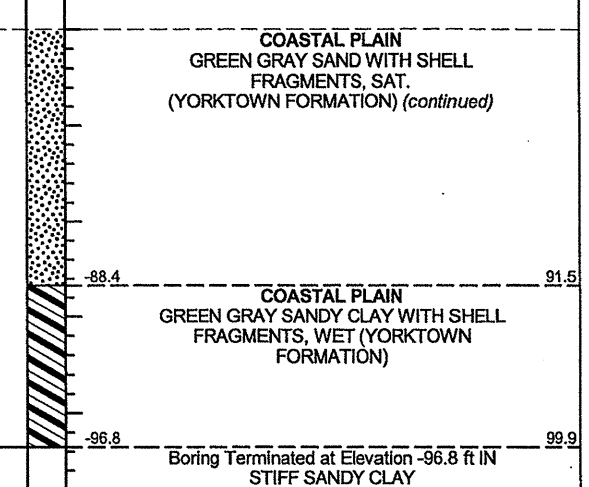
NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34528.1.1		TIP R-3307		COUNTY CARTERET		GEOLOGIST Swartley, J. R.										
SITE DESCRIPTION BRIDGE ON -Y2- (SR 1174) OVER TOWN CREEK							GROUND WTR (ft)									
BORING NO. B7-A	STATION 17+68	OFFSET 8 ft LT	ALIGNMENT -Y2-				0 HR. N/A									
COLLAR ELEV. 3.1 ft	TOTAL DEPTH 99.9 ft	NORTHING 360,968	EASTING 2,702,757				24 HR. 2.7									
DRILL RIG/HAMMER EFF./DATE CME-45B			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER Smith, R. E.		START DATE 05/27/10	COMP. DATE 05/27/10	SURFACE WATER DEPTH N/A												
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
5																
	2.1	1.0	4	2	2										3.1	GROUND SURFACE
															2.1	PAVEMENT
0	-0.9	4.0	WOH	WOH	WOH										0.1	ROADWAY EMBANKMENT GRAY SILTY CLAY WITH SHELL FRAGMENTS, MOIST TO WET
															-3.4	ALLUVIAL GRAY SILTY CLAY WITH SHELL FRAGMENTS, WET
-5	-5.3	8.4	WOH	WOH	WOH											ALLUVIAL GRAY SANDY CLAY WITH A TRACE OF ORGANICS, WET
-10	-10.3	13.4	WOH	WOH	WOH											
-15	-15.3	18.4	WOH	WOH	WOH											
-20	-20.3	23.4		1	1	2										
-25	-25.3	28.4		2	4	3										
-30	-30.3	33.4		3	4	10										
-35	-35.3	38.4	WOH	4	4											
-40	-40.3	43.4	WOH	1	1											
-45	-45.3	48.4		4	5	13										
-50	-50.3	53.4		2	2	2										
-55	-55.3	58.4	WOR	3	5											
-60	-60.3	63.4		5	4	8										
-65	-65.3	68.4		3	3	4										
-70	-70.3	73.4		2	4	6										
-75																

WBS 34528.1.1		TIP R-3307		COUNTY CARTERET		GEOLOGIST Swartley, J. R.										
SITE DESCRIPTION BRIDGE ON -Y2- (SR 1174) OVER TOWN CREEK							GROUND WTR (ft)									
BORING NO. B7-A	STATION 17+68	OFFSET 8 ft LT	ALIGNMENT -Y2-				0 HR. N/A									
COLLAR ELEV. 3.1 ft	TOTAL DEPTH 99.9 ft	NORTHING 360,968	EASTING 2,702,757				24 HR. 2.7									
DRILL RIG/HAMMER EFF./DATE CME-45B			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER Smith, R. E.		START DATE 05/27/10	COMP. DATE 05/27/10	SURFACE WATER DEPTH N/A												
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
	-75.3	78.4	7	13	20											
-80	-80.3	83.4	6	9	13											
-85	-85.3	88.4	8	42	51											
-90	-90.3	93.4	6	8	12											
-95	-95.3	98.4	5	4	5											

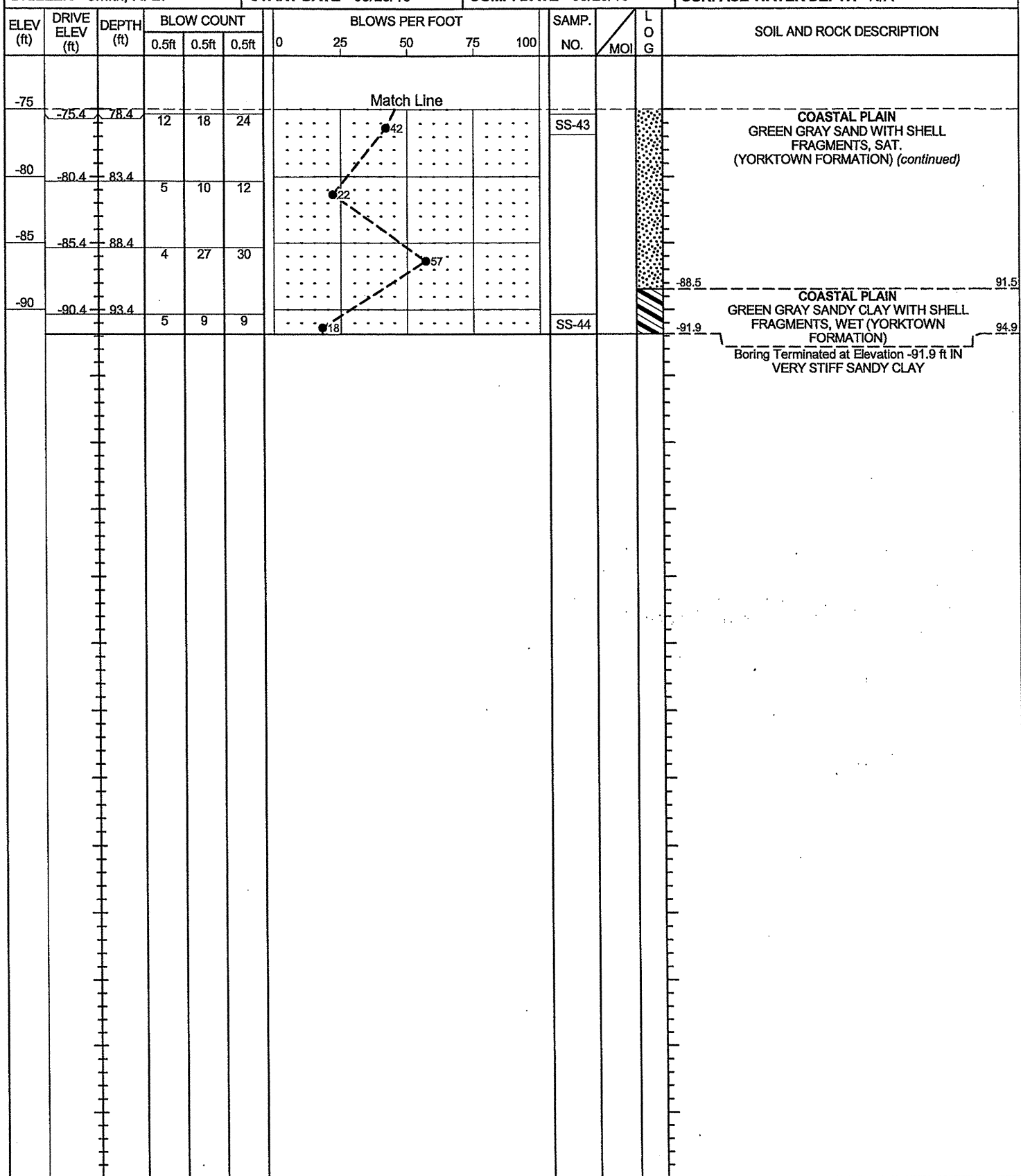
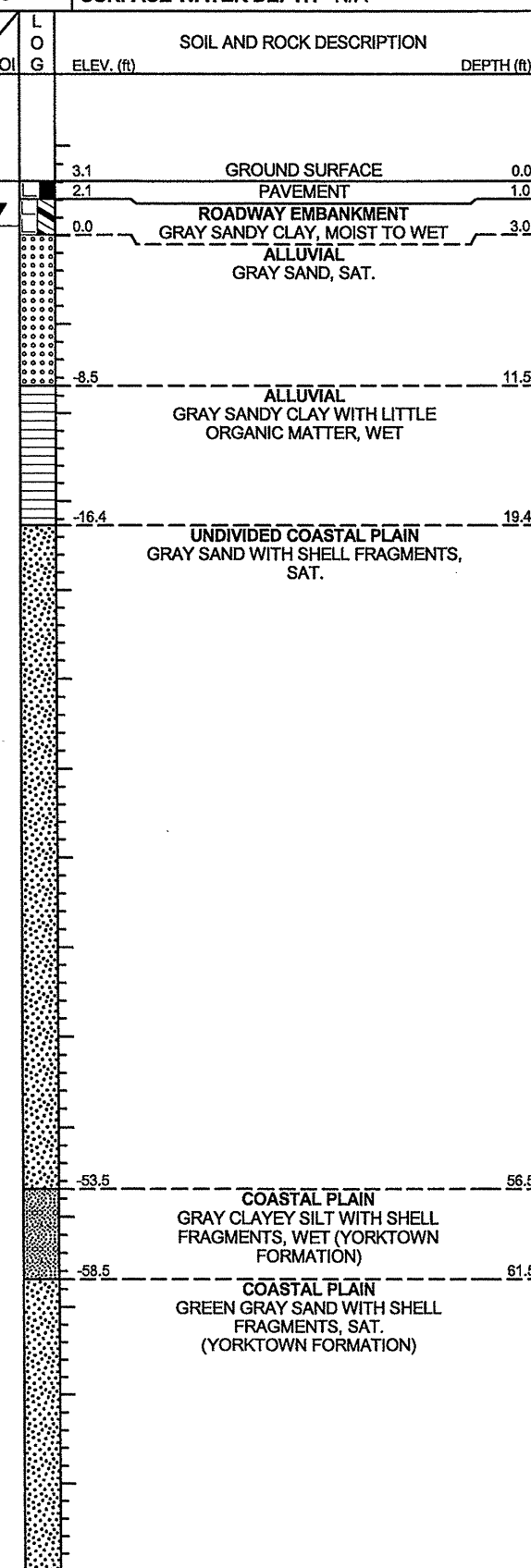
NCDOT BORE DOUBLE R3307_GEO_SPT BORINGS.GPJ NC DOT.GDT 11/11/11



WBS 34528.1.1		TIP R-3307		COUNTY CARTERET		GEOLOGIST Swartley, J. R.										
SITE DESCRIPTION BRIDGE ON -Y2- (SR 1174) OVER TOWN CREEK							GROUND WTR (ft)									
BORING NO.	STATION	OFFSET	ALIGNMENT			0 HR.	N/A									
B8-B	18+33	8 ft RT	-Y2-													
COLLAR ELEV.	TOTAL DEPTH	NORTHING	EASTING			24 HR.	2.5									
3.1 ft	94.9 ft	360,907	2,702,730													
DRILL RIG/HAMMER EFF./DATE CME-45B		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER Smith, R. E.		START DATE 05/25/10	COMP. DATE 05/25/10	SURFACE WATER DEPTH N/A												
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
5																
	2.1	1.0	5	3	1											
0	-1.0	4.0	WOH	1	1											
-5	-5.4	8.4		2	3											
-10	-10.4	13.4		1	0											
-15	-15.4	18.4		1	1											
-20	-20.4	23.4		3	3											
-25	-25.4	28.4		2	3											
-30	-30.4	33.4		2	5											
-35	-35.4	38.4		10	17											
-40	-40.4	43.4		1	2											
-45	-45.4	48.4		9	13											
-50	-50.4	53.4		3	3											
-55	-55.4	58.4		1	2											
-60	-60.4	63.4		5	9											
-65	-65.4	68.4		6	9											
-70	-70.4	73.4		11	22											
-75																

WBS 34528.1.1		TIP R-3307		COUNTY CARTERET		GEOLOGIST Swartley, J. R.										
SITE DESCRIPTION BRIDGE ON -Y2- (SR 1174) OVER TOWN CREEK							GROUND WTR (ft)									
BORING NO.	STATION	OFFSET	ALIGNMENT			0 HR.	N/A									
B8-B	18+33	8 ft RT	-Y2-													
COLLAR ELEV.	TOTAL DEPTH	NORTHING	EASTING			24 HR.	2.5									
3.1 ft	94.9 ft	360,907	2,702,730													
DRILL RIG/HAMMER EFF./DATE CME-45B		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER Smith, R. E.		START DATE 05/25/10	COMP. DATE 05/25/10	SURFACE WATER DEPTH N/A												
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
-75	-75.4	78.4	12	18	24											
-80	-80.4	83.4	5	10	12											
-85	-85.4	88.4	4	27	30											
-90	-90.4	93.4	5	9	9											

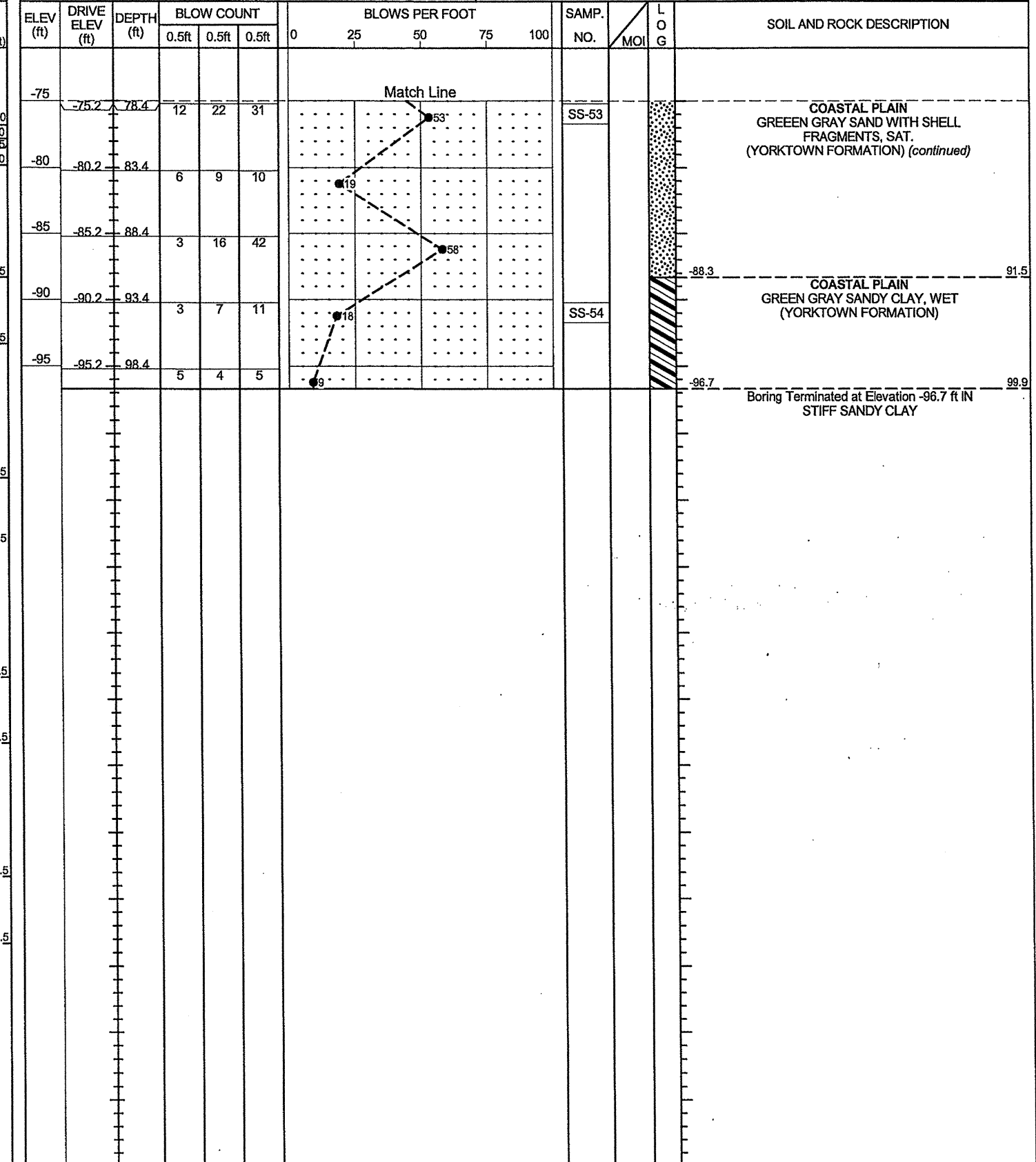
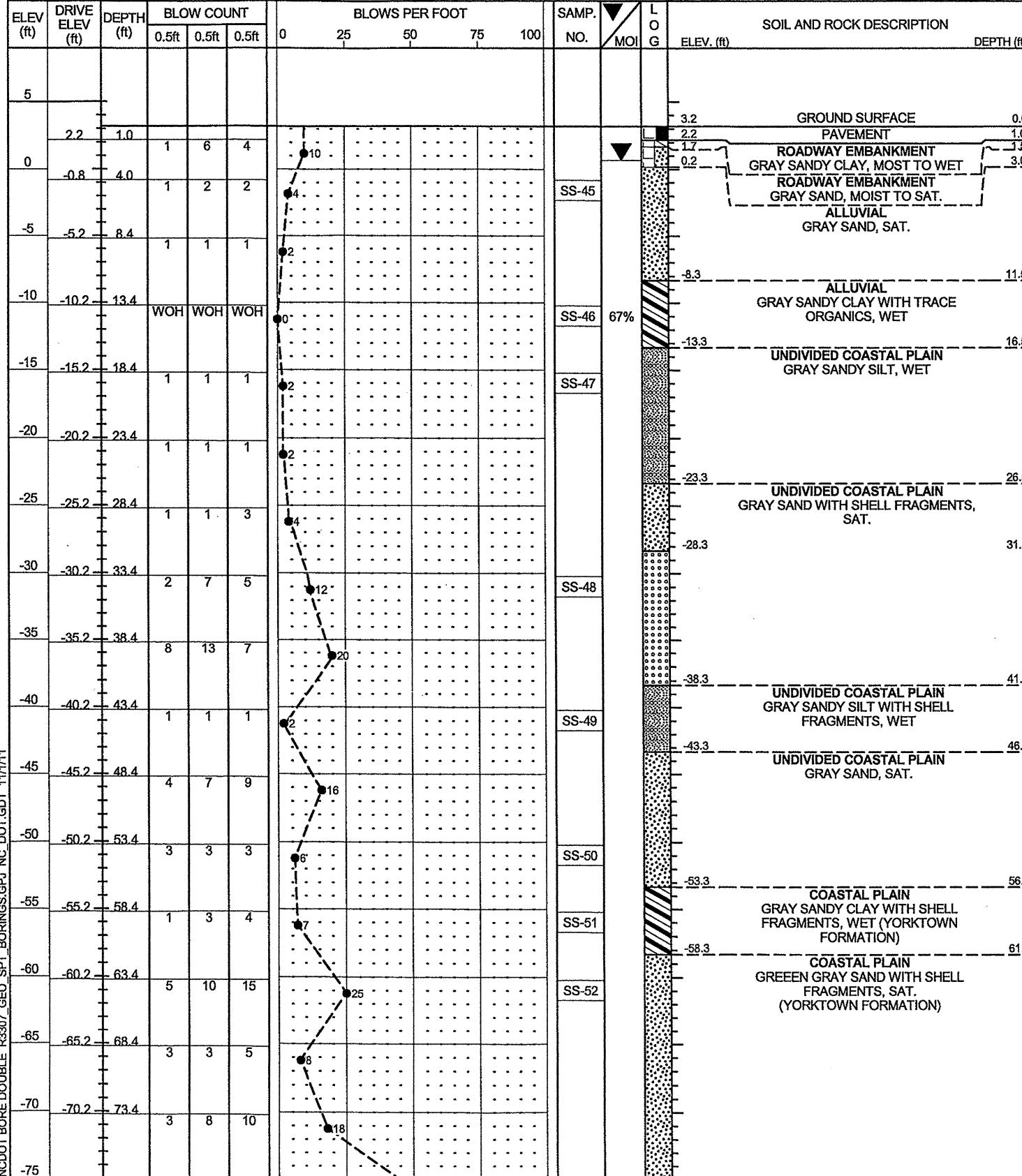
NCDOT BORE DOUBLE R3307 GEO SPT BORINGS.GPJ NC_DOT_GDT_11/1/11





WBS 34528.1.1	TIP R-3307	COUNTY CARTERET	GEOLOGIST Swartley, J. R.
SITE DESCRIPTION BRIDGE ON -Y2- (SR 1174) OVER TOWN CREEK			GROUND WTR (ft)
BORING NO. EB2-A	STATION 18+98	OFFSET 8 ft LT	ALIGNMENT -Y2-
COLLAR ELEV. 3.2 ft	TOTAL DEPTH 99.9 ft	NORTHING 360,840	EASTING 2,702,735
DRILL RIG/HAMMER EFF./DATE CME-45B		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Smith, R. E.	START DATE 05/26/10	COMP. DATE 05/26/10	SURFACE WATER DEPTH N/A

WBS 34528.1.1	TIP R-3307	COUNTY CARTERET	GEOLOGIST Swartley, J. R.
SITE DESCRIPTION BRIDGE ON -Y2- (SR 1174) OVER TOWN CREEK			GROUND WTR (ft)
BORING NO. EB2-A	STATION 18+98	OFFSET 8 ft LT	ALIGNMENT -Y2-
COLLAR ELEV. 3.2 ft	TOTAL DEPTH 99.9 ft	NORTHING 360,840	EASTING 2,702,735
DRILL RIG/HAMMER EFF./DATE CME-45B		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Smith, R. E.	START DATE 05/26/10	COMP. DATE 05/26/10	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE R3307_GEO_SPT_BORINGS.GPJ NC_DOT.GDT 11/11/11

BRIDGE ON SR1174 OVER TOWN CREEK STA. 16+05.50

SOIL TEST RESULTS EB1-B table with columns for sample no., offset, station, depth interval, ashoto class, l.l., p.i., % by weight (C.Sand, F.Sand, Silt, Clay), % passing (sieves), moisture, and organic content.

SOIL TEST RESULTS B5-A table with columns for sample no., offset, station, depth interval, ashoto class, l.l., p.i., % by weight (C.Sand, F.Sand, Silt, Clay), % passing (sieves), moisture, and organic content.

SOIL TEST RESULTS B1-A table with columns for sample no., offset, station, depth interval, ashoto class, l.l., p.i., % by weight (C.Sand, F.Sand, Silt, Clay), % passing (sieves), moisture, and organic content.

SOIL TEST RESULTS B6-B table with columns for sample no., offset, station, depth interval, ashoto class, l.l., p.i., % by weight (C.Sand, F.Sand, Silt, Clay), % passing (sieves), moisture, and organic content.

SOIL TEST RESULTS B2-B table with columns for sample no., offset, station, depth interval, ashoto class, l.l., p.i., % by weight (C.Sand, F.Sand, Silt, Clay), % passing (sieves), moisture, and organic content.

SOIL TEST RESULTS B7-A table with columns for sample no., offset, station, depth interval, ashoto class, l.l., p.i., % by weight (C.Sand, F.Sand, Silt, Clay), % passing (sieves), moisture, and organic content.

SOIL TEST RESULTS B3-A table with columns for sample no., offset, station, depth interval, ashoto class, l.l., p.i., % by weight (C.Sand, F.Sand, Silt, Clay), % passing (sieves), moisture, and organic content.

SOIL TEST RESULTS B8-B table with columns for sample no., offset, station, depth interval, ashoto class, l.l., p.i., % by weight (C.Sand, F.Sand, Silt, Clay), % passing (sieves), moisture, and organic content.

SOIL TEST RESULTS B4-B table with columns for sample no., offset, station, depth interval, ashoto class, l.l., p.i., % by weight (C.Sand, F.Sand, Silt, Clay), % passing (sieves), moisture, and organic content.

SOIL TEST RESULTS EB2-A table with columns for sample no., offset, station, depth interval, ashoto class, l.l., p.i., % by weight (C.Sand, F.Sand, Silt, Clay), % passing (sieves), moisture, and organic content.



**FIELD
 SCOUR REPORT**

WBS: 34528.1.1 TIP: R-3307 COUNTY: CARTERET

DESCRIPTION(1): BRIDGE ON -Y2- OVER TOWN CREEK

EXISTING BRIDGE

Information from: Field Inspection Microfilm _____ (reel _____ pos: _____)
 Other (explain) BSR REPORT

Bridge No.: NA Length: _____ Total Bents: _____ Bents in Channel: _____ Bents in Floodplain: _____
 Foundation Type: NA

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: NA

Interior Bents: NA

Channel Bed: NONE NOTED

Channel Bank: NONE NOTED

EXISTING SCOUR PROTECTION

Type(3): RIP RAP SLOPE PROTECTION ALONG SIDE SLOPES

Extent(4): LEFT AND RIGHT SIDE AT EXISTING CULVERT OPENINGS

Effectiveness(5): EFFECTIVE

Obstructions(6): NONE NOTED

INSTRUCTIONS

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoretical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

DESIGN INFORMATION

Channel Bed Material(7): SAND

Channel Bank Material(8): CLAY AND SILT WITH TRACE ORGANIC MATERIAL

Channel Bank Cover(9): MARSH GRASS

Floodplain Width(10): 1000'±

Floodplain Cover(11): MARSH GRASS

Stream is(12): Aggrading _____ Degrading _____ Static

Channel Migration Tendency(13): SLIGHT TO THE NORTH (TOWARD EB1)

Observations and Other Comments: _____

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

BENTS

B1	B2	B3	B4	B4	B5	B6	B7	B8		
-7.0	-7.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0		

Comparison of DSE to Hydraulics Unit theoretical scour:
 THE GEU AGREES WITH ALL OF THE MAXIMUM THEORETICAL SOUR ELEVATIONS AS
 OUTLINED IN THE BSR REPORT DATED 6/3/10.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank									
Sample No.									
Retained #4									
Passed #10									
Passed #40									
Passed #200									
Coarse Sand									
Fine Sand									
Silt									
Clay									
LL									
PI									
AASHTO									
Station									
Offset									
Depth									

See Sheet 15
 "Soil Test Results",
 for samples:
 (CHANNEL BED) SS-10
 (CHANNEL BANK) SS-2

Reported by: [Signature]

Date: 7/19/2010

PROJECT: 34528.1.1 ID: R-3307

CONTENTS:

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5	SAMPLE RESULTS

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34528.1.1 (R-3307) F.A. PROJ. STPNHF-70(43)
 COUNTY CARTERET
 PROJECT DESCRIPTION US 70 FROM EXISTING 4 LANES
AT RADIO ISLAND TO NORTH OF SR 1429 (OLGA RD)
 SITE DESCRIPTION RETAINING WALL RIGHT OF -L- STA.
63+50

RETAINING WALL INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET	TOTAL SHEETS
N.C.	R-3307	1	5
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34528.1.1	STPNHF-70(43)	P.E.	
		RW & UTIL.	

CAUTION NOTICE

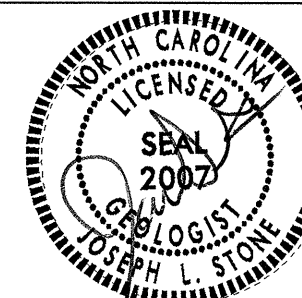
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919)250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, 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 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 INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

PERSONNEL
CMW
S&ME PERSONNEL
RES
JME

INVESTIGATED BY J.L. STONE
 CHECKED BY D.N. ARGENBIRGHT
 SUBMITTED BY D.N. ARGENBRIGHT
 DATE JUNE, 2008



DRAWN BY: J.L. STONE

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

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.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO. R-3307	SHEET NO. 2
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SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS																																																																																																																
<p>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 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLES:</p> <p style="text-align: center;"><i>VERY STIFF, GRAY, SAT. MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>		<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)</p> <p>GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>		<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.</p> <p>ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>		<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.</p> <p>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 SURFACE.</p> <p>CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>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.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOTJ) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p>SAPROLITE (SAP) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p>SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.</p> <p>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.</p> <p>STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>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 THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.</p> <p>TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																
<p>SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>GENERAL CLASS.</th> <th colspan="4">GRANULAR MATERIALS (< 35% PASSING #200)</th> <th colspan="4">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="4">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-4, A-5</th> <th>A-3</th> <th>A-6, A-7</th> <th colspan="2"></th> </tr> <tr> <th>SYMBOL</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td colspan="2"></td> </tr> <tr> <th>% PASSING</th> <td>10 20</td> <td>10 20</td> <td>10 20</td> <td>10 20</td> <td>10 20</td> <td>10 20</td> <td>10 20</td> <td>10 20</td> <td>10 20</td> <td>10 20</td> <td>10 20</td> <td colspan="2"></td> </tr> <tr> <th>LIQUID LIMIT</th> <td>6 MX</td> <td>NP</td> <td>10 MX</td> <td>10 MX</td> <td>11 MX</td> <td>11 MX</td> <td>10 MX</td> <td>10 MX</td> <td>11 MX</td> <td>11 MX</td> <td>11 MX</td> <td colspan="2"></td> </tr> <tr> <th>GROUP INDEX</th> <td>0</td> <td>0</td> <td>0</td> <td>4 MX</td> <td>8 MX</td> <td>12 MX</td> <td>16 MX</td> <td>16 MX</td> <td>11 MX</td> <td>11 MX</td> <td>11 MX</td> <td colspan="2"></td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td>STONE FRAGS. GRAVEL AND SAND</td> <td>FINE SAND</td> <td>SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS</td> <td>SILTY SOILS</td> <td>CLAYEY SOILS</td> <td>CLAYEY SOILS</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td colspan="2"></td> </tr> <tr> <th>GEN. RATING AS A SUBGRADE</th> <td colspan="3">EXCELLENT TO GOOD</td> <td colspan="3">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td>UNSATURABLE</td> <td colspan="4"></td> </tr> </table> <p>PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</p>		GENERAL CLASS.	GRANULAR MATERIALS (< 35% PASSING #200)				SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS				GROUP CLASS.	A-1	A-3	A-2	A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-3	A-6, A-7			SYMBOL														% PASSING	10 20	10 20	10 20	10 20	10 20	10 20	10 20	10 20	10 20	10 20	10 20			LIQUID LIMIT	6 MX	NP	10 MX	10 MX	11 MX	11 MX	10 MX	10 MX	11 MX	11 MX	11 MX			GROUP INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	16 MX	11 MX	11 MX	11 MX			USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	SILTY SOILS	CLAYEY SOILS	CLAYEY SOILS	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER			GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD			FAIR TO POOR			FAIR TO POOR	POOR	UNSATURABLE					<p>MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p>		<p>WEATHERING</p> <p>FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SL) - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p> <p>SLIGHT (SL) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p>MODERATE (MOD) - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p> <p>MODERATELY SEVERE (MOD. SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>SEVERE (SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i></p> <p>VERY SEVERE (V SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i></p> <p>COMPLETE - ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p>		<p>GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p> STATIC WATER LEVEL AFTER 24 HOURS</p> <p> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p> SPRING OR SEEP</p>	
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THICKLY LAMINATED	0.008 - 0.03 FEET																																																																																																																					
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<p>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.</p>		<p>BENCH MARK:</p> <p style="text-align: right;">ELEVATION: _____ FT.</p>																																																																																																																				
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34528.1.1

RETAINING WALL AT -L- STA. 63+50

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-75	CL	63+50	1.0-2.0	A-2-4(0)	19	NP	6.1	70.0	15.8	8.1	98	96	27	-	3
S-76	CL	63+50	2.0-6.0	A-4(0)	21	5	5.5	61.5	10.8	22.3	100	99	36	-	-
S-74	CL	64+00	1.0-2.0	A-2-4(0)	18	NP	4.5	67.1	16.2	12.2	100	99	32	-	-
SS-37	25' RT	66+50	1.0-1.5	A-3(0)	16	NP	51.4	46.0	0.6	2.0	95	79	3	-	-
SS-38	25' RT	66+50	8.3-9.8	A-2-4(0)	17	NP	0.4	88.2	1.4	10.0	100	100	15	-	-
SS-39	25' RT	66+00	1.0-1.5	A-2-4(0)	16	NP	19.6	58.0	10.4	12.0	73	66	19	-	-
SS-40	25' RT	66+00	3.1-4.6	A-4(0)	23	1	5.6	55.6	2.8	36.0	100	99	44	-	-
SS-41	25' RT	66+00	8.1-9.6	A-2-4(0)	19	NP	0.8	81.0	8.2	10.0	100	100	22	-	-
SS-42	CL	65+50	1.0-1.5	A-2-4(0)	17	NP	14.8	68.4	4.8	12.0	94	88	19	-	-
SS-43	CL	65+50	2.9-4.4	A-6(2)	32	12	4.8	55.4	9.8	30.0	100	99	46	43.0	-
SS-44	CL	65+50	7.9-9.4	A-2-4(0)	38	NP	0.8	89.2	4.0	6.0	100	100	13	-	-
SS-45	CL	65+50	12.9-14.4	A-4(0)	25	NP	1.0	46.4	36.6	16.0	100	100	60	-	-
SS-46	CL	65+00	1.0-1.5	A-4(0)	22	4	6.6	59.6	11.8	22.0	100	99	39	-	-
SS-47	CL	65+00	7.9-9.4	A-2-4(0)	17	NP	0.4	88.8	6.8	4.0	100	100	14	-	-
SS-48	CL	65+00	12.9-14.4	A-4(0)	25	NP	0.8	48.6	32.6	18.0	100	100	56	27.6	-
SS-49	CL	64+50	1.0-1.5	A-2-4(0)	17	NP	17.4	59.4	11.2	12.0	74	67	21	-	-
SS-50	CL	64+50	8.3-9.8	A-2-4(0)	15	NP	3.0	85.6	5.4	6.0	100	99	15	-	-
SS-51	CL	64+50	13.3-14.8	A-4(0)	20	NP	0.4	64.4	23.2	12.0	100	100	42	-	-

PROJECT: 34528.1.1 ID: R-3307

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34528.1.1 (R-3307) F.A. PROJ. STPNHF-70(43)
 COUNTY CARTERET
 PROJECT DESCRIPTION US 70 FROM EXISTING 4 LANES
AT RADIO ISLAND TO NORTH OF SR 1429 (OLGA RD)
 SITE DESCRIPTION RETAINING WALL RIGHT OF -L- STA.
63+00

RETAINING WALL INVENTORY - REVISED

CONTENTS:

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5	SOIL TEST RESULTS

APPENDIX

CPT LOGS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3307	1	5
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34528.1.1	STPNHF-70(43)	P.E.	
		RAW & UTIL.	

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 1919 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, 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 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 INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

PERSONNEL

CMW

SG&ME PERSONNEL

RES

JME

DGP

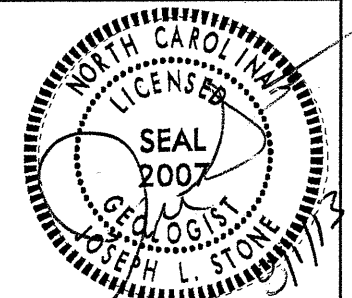
GATLIN PERSONNEL

INVESTIGATED BY J.L. STONE

CHECKED BY D.N. ARGENBIRGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE AUGUST 2013



DRAWN BY: J.L. STONE, C.P. TURNER

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

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.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

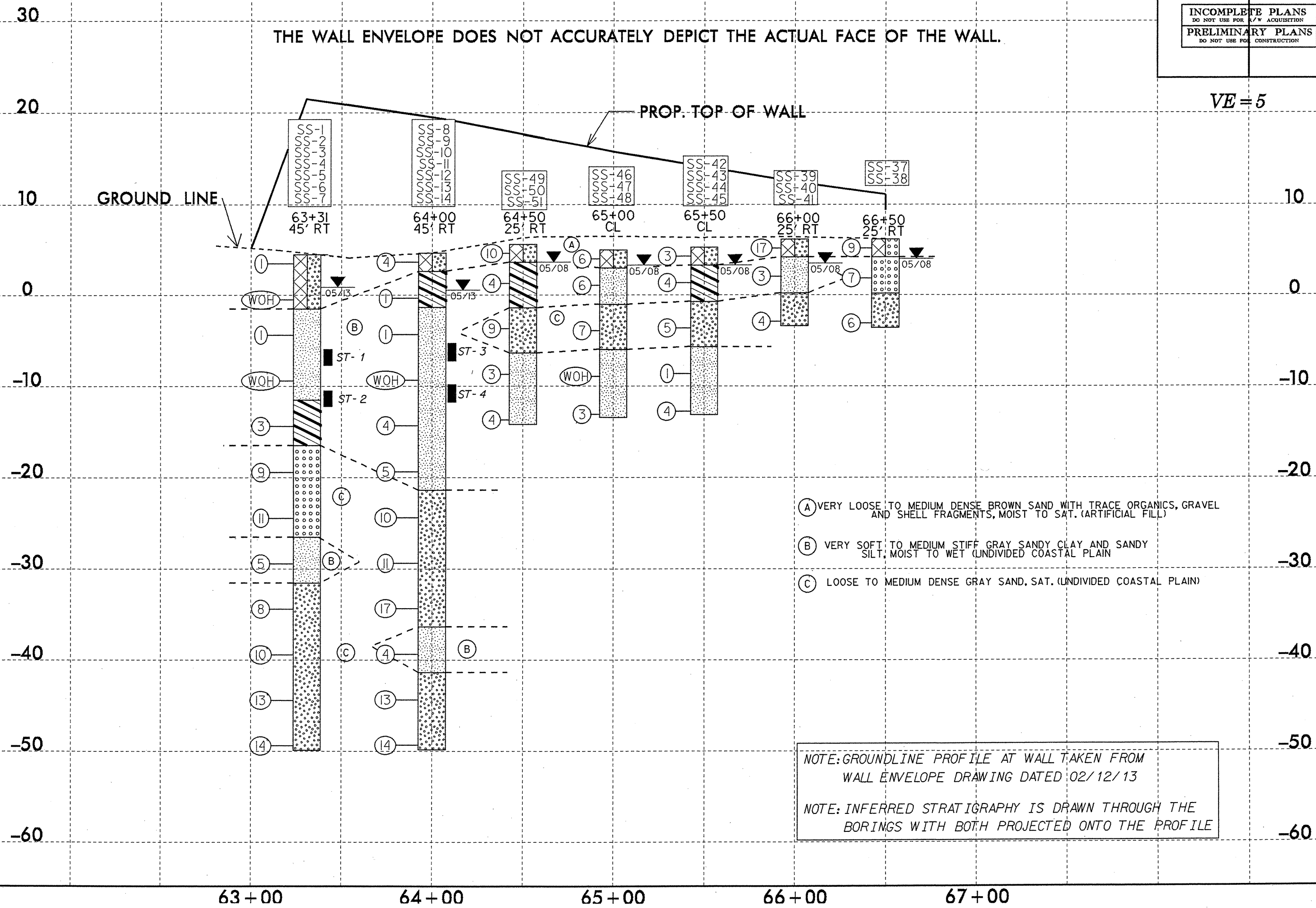
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																																																																												
<p>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 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p style="text-align: center;"><i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-5</i></p>	<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p style="text-align: center;">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p> <p style="text-align: center;">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p>	<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p> <p>WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p> <p>CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p> <p>NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLITE, SLATE, SANDSTONE, ETC.</p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CP) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>	<p>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, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. 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 ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SCRC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																												
<p style="text-align: center;">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>GENERAL CLASS.</th> <th>GRANULAR MATERIALS (<= 35% PASSING #200)</th> <th>SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th>ORGANIC MATERIALS</th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1, A-1-b, A-3, A-2, A-2-4, A-2-5, A-2-6, A-2-7</td> <td>A-4, A-5, A-6, A-7, A-7-5, A-7-6</td> <td>A-1, A-2, A-3, A-4, A-5, A-6, A-7</td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING</td> <td>10, 40, 200</td> <td>10, 40, 200</td> <td>10, 40, 200</td> </tr> <tr> <td>LIQUID LIMIT</td> <td>6 MX</td> <td>10 MX, 15 MX, 20 MX, 25 MX, 30 MX, 35 MX, 40 MX, 45 MX, 50 MX, 55 MX, 60 MX, 65 MX, 70 MX, 75 MX, 80 MX, 85 MX, 90 MX, 95 MX, 100 MX</td> <td>10 MX, 15 MX, 20 MX, 25 MX, 30 MX, 35 MX, 40 MX, 45 MX, 50 MX, 55 MX, 60 MX, 65 MX, 70 MX, 75 MX, 80 MX, 85 MX, 90 MX, 95 MX, 100 MX</td> </tr> <tr> <td>GROUP INDEX</td> <td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100</td> <td></td> <td></td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS, GRAVEL, SAND</td> <td>FINE SAND, SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS, CLAYEY SOILS</td> </tr> <tr> <td>GEN. RATING AS A SUBGRADE</td> <td>EXCELLENT TO GOOD</td> <td>FAIR TO POOR</td> <td>FAIR TO POOR, POOR, UNSUITABLE</td> </tr> </table> <p style="text-align: center;">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</p>	GENERAL CLASS.	GRANULAR MATERIALS (<= 35% PASSING #200)	SILT-CLAY MATERIALS (> 35% PASSING #200)	ORGANIC MATERIALS	GROUP CLASS.	A-1, A-1-b, A-3, A-2, A-2-4, A-2-5, A-2-6, A-2-7	A-4, 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	SYMBOL				% PASSING	10, 40, 200	10, 40, 200	10, 40, 200	LIQUID LIMIT	6 MX	10 MX, 15 MX, 20 MX, 25 MX, 30 MX, 35 MX, 40 MX, 45 MX, 50 MX, 55 MX, 60 MX, 65 MX, 70 MX, 75 MX, 80 MX, 85 MX, 90 MX, 95 MX, 100 MX	10 MX, 15 MX, 20 MX, 25 MX, 30 MX, 35 MX, 40 MX, 45 MX, 50 MX, 55 MX, 60 MX, 65 MX, 70 MX, 75 MX, 80 MX, 85 MX, 90 MX, 95 MX, 100 MX	GROUP INDEX	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100			USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL, SAND	FINE SAND, SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS, CLAYEY SOILS	GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD	FAIR TO POOR	FAIR TO POOR, POOR, UNSUITABLE	<p style="text-align: center;">COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50</p> <p style="text-align: center;">PERCENTAGE OF MATERIAL</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table> <p style="text-align: center;">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP</p>	ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY 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%	HIGHLY ORGANIC	>10%	>20%	HIGHLY 35% AND ABOVE	<p style="text-align: center;">WEATHERING</p> <p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SLI.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SLI.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i> VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i> COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p> <p style="text-align: center;">ROCK HARDNESS</p> <p>VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. 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 PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. 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BT - BORING TERMINATED	MICA - MICACEOUS	WEA - WEATHERED																																																																																																																																													
CL - CLAY	MOD. - MODERATELY	UNIT WEIGHT																																																																																																																																													
CPT - CONE PENETRATION TEST	NP - NON PLASTIC	γ _d - DRY UNIT WEIGHT																																																																																																																																													
CSE - COARSE	ORG. - ORGANIC																																																																																																																																														
DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST																																																																																																																																														
DPT - DYNAMIC PENETRATION TEST	SAP. - SAPROLITIC																																																																																																																																														
e - VOID RATIO	SD. - SAND, SANDY																																																																																																																																														
F - FINE	SL. - SILT, SILTY																																																																																																																																														
FOSS. - FOSSILIFEROUS	SLI. - SLIGHTLY																																																																																																																																														
FRAC. - FRACTURED, FRACTURES	TCR - TRICONE REFUSAL																																																																																																																																														
FRAGS. - FRAGMENTS	w - MOISTURE CONTENT																																																																																																																																														
HI. - HIGHLY	v - VERY																																																																																																																																														
<p>DRILL UNITS:</p> <input type="checkbox"/> MOBILE B- _____ <input type="checkbox"/> BK-51 <input checked="" type="checkbox"/> CME-750 <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST <input type="checkbox"/> _____ <input type="checkbox"/> _____	<p>ADVANCING TOOLS:</p> <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input checked="" type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG.-CARBIDE INSERTS <input checked="" type="checkbox"/> CASING <input type="checkbox"/> w/ ADVANCER <input checked="" type="checkbox"/> TRICONE 2 15/16" STEEL TEETH <input type="checkbox"/> TRICONE _____ TUNG.-CARB. <input type="checkbox"/> CORE BIT <input type="checkbox"/> _____	<p>HAMMER TYPE:</p> <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL <p>CORE SIZE:</p> <input type="checkbox"/> -B _____ <input type="checkbox"/> -N _____ <input type="checkbox"/> -H _____ <p>HAND TOOLS:</p> <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST																																																																																																																																													
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION																																																																																																																																													
LL PLASTIC RANGE (PI) PL	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE																																																																																																																																													
	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE																																																																																																																																													
	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE																																																																																																																																													
OM SL	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE																																																																																																																																													
NONPLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH																																																																																																																																													
LOW PLASTICITY	0-5	VERY LOW																																																																																																																																													
MED. PLASTICITY	6-15	SLIGHT																																																																																																																																													
HIGH PLASTICITY	16-25	MEDIUM																																																																																																																																													
	26 OR MORE	HIGH																																																																																																																																													
TERM	SPACING																																																																																																																																														
VERY WIDE	MORE THAN 10 FEET																																																																																																																																														
WIDE	3 TO 10 FEET																																																																																																																																														
MODERATELY CLOSE	1 TO 3 FEET																																																																																																																																														
CLOSE	0.16 TO 1 FEET																																																																																																																																														
VERY CLOSE	LESS THAN 0.16 FEET																																																																																																																																														
TERM	THICKNESS																																																																																																																																														
VERY THICKLY BEDDED	> 4 FEET																																																																																																																																														
THICKLY BEDDED	1.5 - 4 FEET																																																																																																																																														
THINLY BEDDED	0.16 - 1.5 FEET																																																																																																																																														
VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																																																																																														
THICKLY LAMINATED	0.008 - 0.03 FEET																																																																																																																																														
THINLY LAMINATED	< 0.008 FEET																																																																																																																																														
FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.																																																																																																																																														
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.																																																																																																																																														
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.																																																																																																																																														
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																																																																																																																																														
<p style="text-align: center;">PLASTICITY</p>																																																																																																																																															

THE WALL ENVELOPE DOES NOT ACCURATELY DEPICT THE ACTUAL FACE OF THE WALL.

VE = 5



- (A) VERY LOOSE TO MEDIUM DENSE BROWN SAND WITH TRACE ORGANICS, GRAVEL AND SHELL FRAGMENTS, MOIST TO SAT. (ARTIFICIAL FILL)
- (B) VERY SOFT TO MEDIUM STIFF GRAY SANDY CLAY AND SANDY SILT, MOIST TO WET (UNDIVIDED COASTAL PLAIN)
- (C) LOOSE TO MEDIUM DENSE GRAY SAND, SAT. (UNDIVIDED COASTAL PLAIN)

NOTE: GROUNDLINE PROFILE AT WALL TAKEN FROM WALL ENVELOPE DRAWING DATED 02/12/13

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE

5/14/99
 3-JUL-2013 09:23
 C:\PROJ\3307\3307\GEO\RETWALL_REV\CADD\GEO\TECH\Plan\Prof\3307_rdy_pfl_wall.dgn

34528.1.1

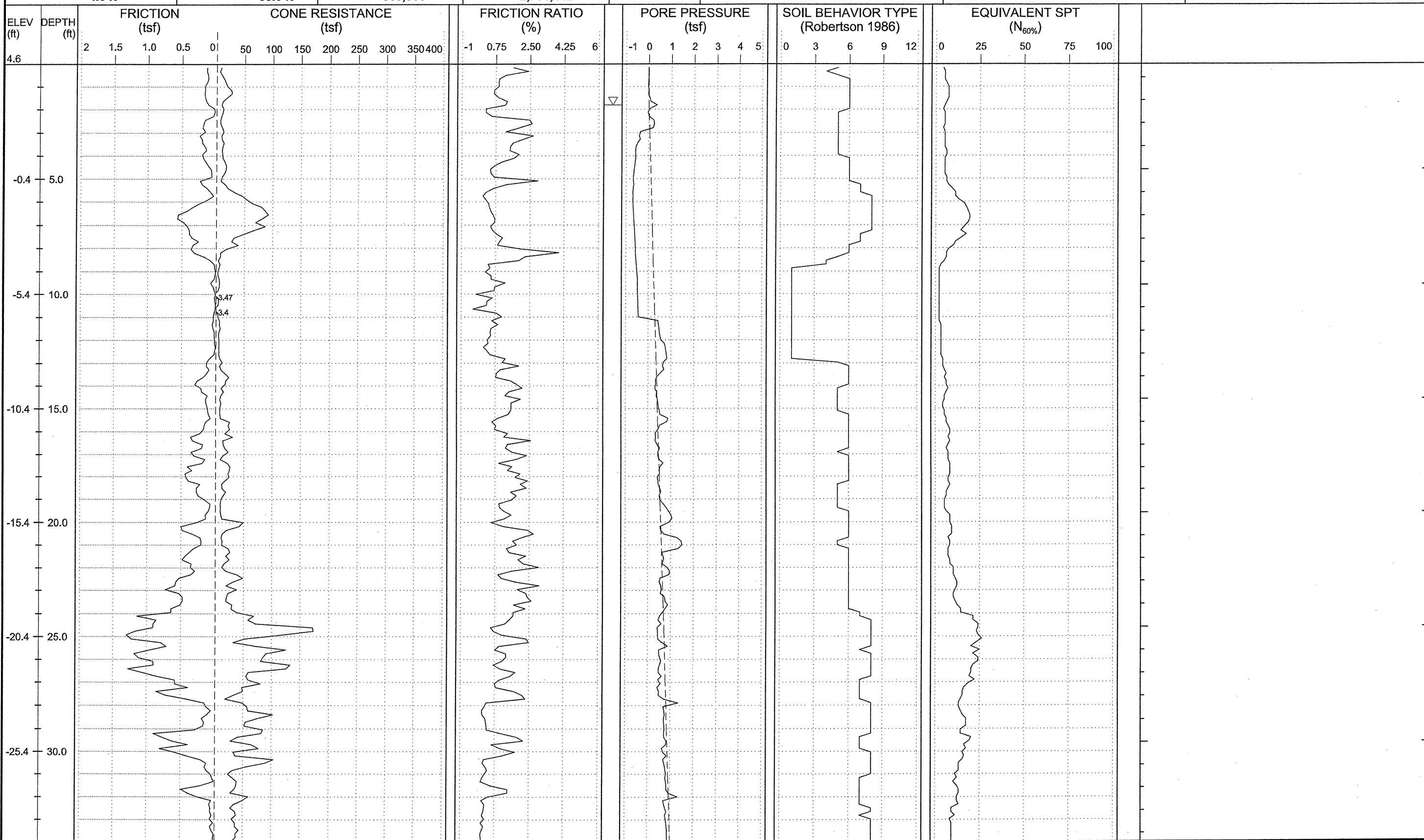
RETAINING WALL AT -L- STA. 63+00

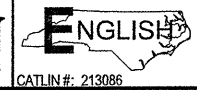
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS- 1	45 RT	63+31	0.0- 1.5	A- 2- 4(0)	22	NP	3.5	80.6	8.8	7.1	100	99	19	-	-
SS- 2	45 RT	63+31	7.9- 9.4	A- 4(0)	23	4	1.6	51.6	32.7	14.1	100	100	52	62.1	-
SS- 3	45 RT	63+31	17.9- 19.4	A- 6(5)	33	14	0.6	48.6	32.7	18.1	100	100	54	62.4	-
SS- 4	45 RT	63+31	22.9- 24.4	A- 3(0)	19	NP	77.0	14.5	3.4	5.0	94	54	9	-	-
SS- 5	45 RT	63+31	32.9- 34.4	A- 4(1)	25	4	1.6	54.1	26.1	18.1	100	99	62	-	-
SS- 6	45 RT	63+31	37.9- 39.4	A- 2- 4(0)	31	NP	4.8	62.5	18.5	14.1	100	99	34	-	-
SS- 7	45 RT	63+31	47.9- 49.4	A- 2- 4(0)	22	NP	9.8	70.1	7.1	13.1	99	93	23	-	-
SS- 8	45 RT	64+00	0.0- 1.5	A- 2- 4(0)	21	NP	5.4	66.1	16.3	12.1	97	96	32	-	-
SS- 9	45 RT	64+00	4.0- 5.5	A- 6(4)	35	18	5.4	53.6	13.7	27.2	100	99	45	-	-
SS- 10	45 RT	64+00	8.0- 9.5	A- 4(0)	23	NP	0.6	58.5	26.8	14.1	100	100	46	44.9	-
SS- 11	45 RT	64+00	18.0- 19.5	A- 4(0)	25	NP	0.6	55.4	29.8	14.1	100	100	64	-	-
SS- 12	45 RT	64+00	28.0- 29.5	A- 2- 4(0)	19	NP	45.9	44.1	4.0	6.0	100	86	11	-	-
SS- 13	45 RT	64+00	43.0- 44.5	A- 4(2)	30	10	0.4	54.2	29.2	16.1	100	100	48	-	-
SS- 14	45 RT	64+00	48.0- 49.5	A- 2- 4(0)	21	NP	17.2	68.9	5.8	8.1	99	90	16	-	-
SS- 49	CL	64+50	1.0- 1.5	A- 2- 4(0)	17	NP	17.4	59.4	11.2	12.0	74	67	21	-	-
SS- 50	CL	64+50	8.3- 9.8	A- 2- 4(0)	15	NP	3.0	85.6	5.4	6.0	100	99	15	-	-
SS- 51	CL	64+50	13.3- 14.8	A- 4(0)	20	NP	0.4	64.4	23.2	12.0	100	100	42	-	-
SS- 46	CL	65+00	1.0- 1.5	A- 4(0)	22	4	6.6	59.6	11.8	22.0	100	99	39	-	-
SS- 47	CL	65+00	7.9- 9.4	A- 2- 4(0)	17	NP	0.4	88.8	6.8	4.0	100	100	14	-	-
SS- 48	CL	65+00	12.9- 14.4	A- 4(0)	25	NP	0.8	48.6	32.6	18.0	100	100	56	27.6	-
SS- 42	CL	65+50	1.0- 1.5	A- 2- 4(0)	17	NP	14.8	68.4	4.8	12.0	94	88	19	-	-
SS- 43	CL	65+50	2.9- 4.4	A- 6(2)	32	12	4.8	55.4	9.8	30.0	100	99	46	43.0	-
SS- 44	CL	65+50	7.9- 9.4	A- 2- 4(0)	38	NP	0.8	89.2	4.0	6.0	100	100	13	-	-
SS- 45	CL	65+50	12.9- 14.4	A- 4(0)	25	NP	1.0	46.4	36.6	16.0	100	100	60	-	-
SS- 37	25 RT	66+50	1.0- 1.5	A- 3(0)	16	NP	51.4	46.0	0.6	2.0	95	79	3	-	-
SS- 38	25 RT	66+50	8.3- 9.8	A- 2- 4(0)	17	NP	0.4	88.2	1.4	10.0	100	100	15	-	-
SS- 39	25 RT	66+00	1.0- 1.5	A- 2- 4(0)	16	NP	19.6	58.0	10.4	12.0	73	66	19	-	-
SS- 40	25 RT	66+00	3.1- 4.6	A- 4(0)	23	1	5.6	55.6	2.8	36.0	100	99	44	-	-
SS- 41	25 RT	66+00	8.1- 9.6	A- 2- 4(0)	19	NP	0.8	81.0	8.2	10.0	100	100	22	-	-

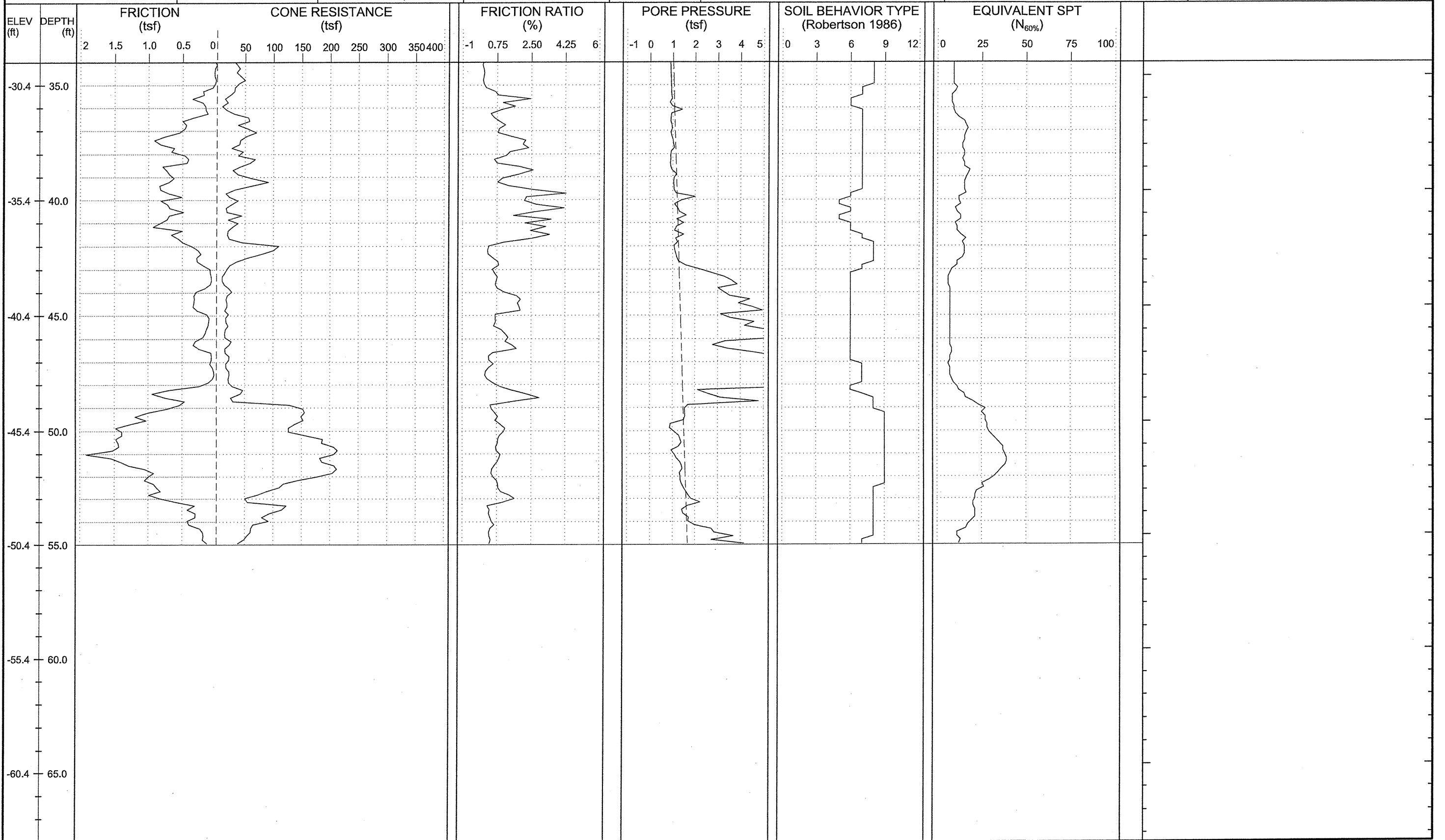


PROJECT NO.: 34528.1.1	ID.: R-3307	COUNTY: Carteret	GEOLOGIST: Hudson, S.V.	DRILL MACHINE: Hogentogler Track	MAX. DOWN PRESSURE: 10 Ton	PAGE 1 of 2
SITE DESCRIPTION: MSE Retaining Wall from Station 63+00 Right to Station 66+50 Right -L-				GROUND WTR (ft)	DRILL METHOD: CPT / DPT	CONE TYPE: Type 1 Piezo.
BORING NO.: CPT-01	STATION: 63+29	OFFSET: 61ft RT	ALIGNMENT: -L-	0 HR. 1.8	ROD TYPE: Pre-Strung	CONE ID: DDG1195
COLLAR ELEV.: 4.6 ft	TOTAL DEPTH: 55.0 ft	NORTHING: 363,866	EASTING: 2,701,442	24 HR. N/A	START DATE: 07/16/13	COMP. DATE: 07/16/13
						DRILLER: Robeson, C.
						TECHNICIAN: M.A.D.
						SURFACE WATER DEPTH: N/A



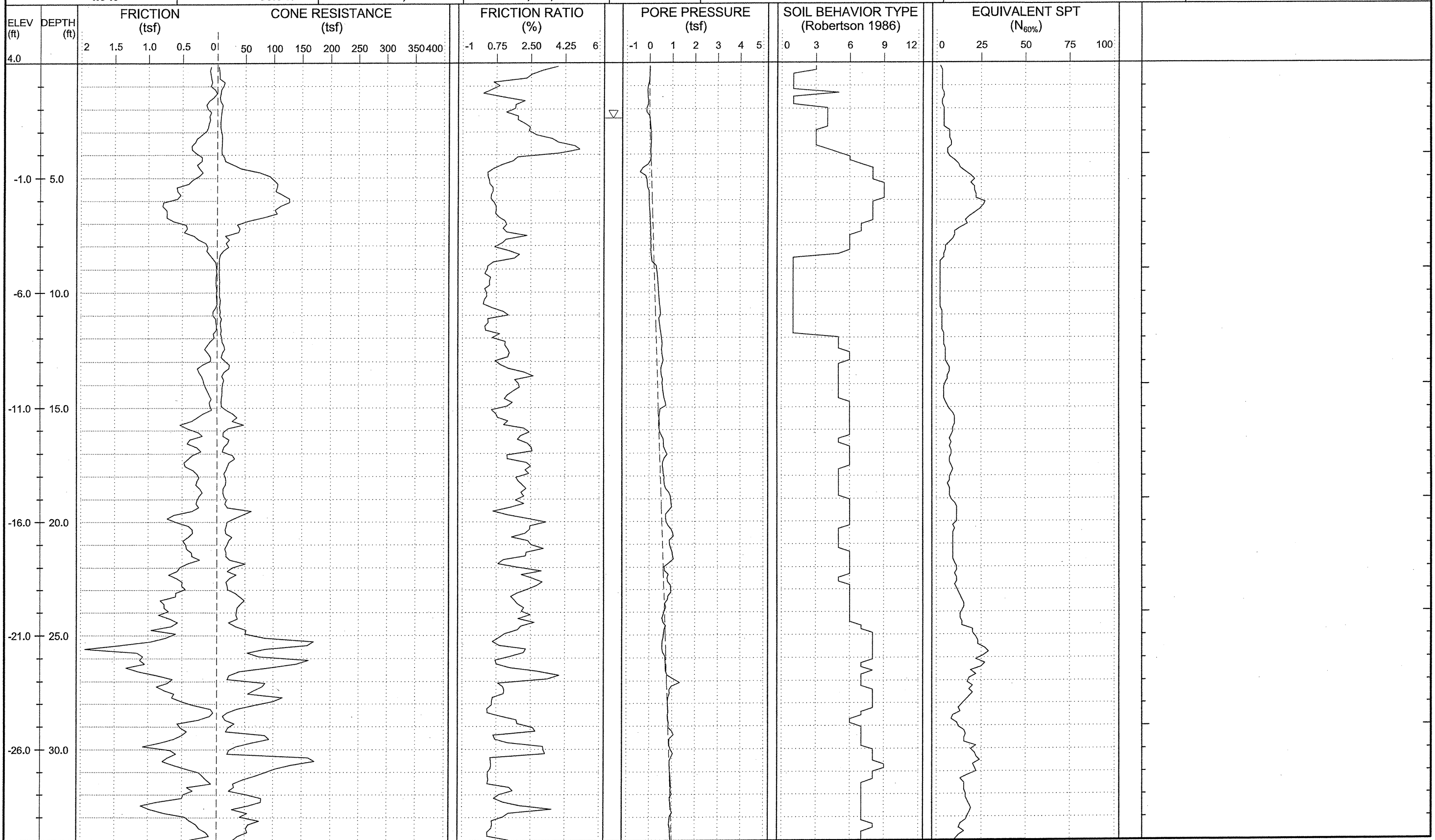


PROJECT NO.: 34528.1.1	ID: R-3307	COUNTY: Carteret	GEOLOGIST: Hudson, S.V.	DRILL MACHINE: Hogentogler Track	MAX. DOWN PRESSURE: 10 Ton	PAGE 2 of 2
SITE DESCRIPTION: MSE Retaining Wall from Station 63+00 Right to Station 66+50 Right -L-				GROUND WTR (ft): 0 HR. 1.8, 24 HR. N/A	DRILL METHOD: CPT / DPT	CONE TYPE: Type 1 Piezo.
BORING NO.: CPT-01	STATION: 63+29	OFFSET: 61ft RT	ALIGNMENT: -L-	ROD TYPE: Pre-Strung	CONE ID: DDG1195	DRILLER: Robeson, C.
COLLAR ELEV.: 4.6 ft	TOTAL DEPTH: 55.0 ft	NORTHING: 363,866	EASTING: 2,701,442	START DATE: 07/16/13	COMP. DATE: 07/16/13	TECHNICIAN: M.A.D.
						SURFACE WATER DEPTH: N/A



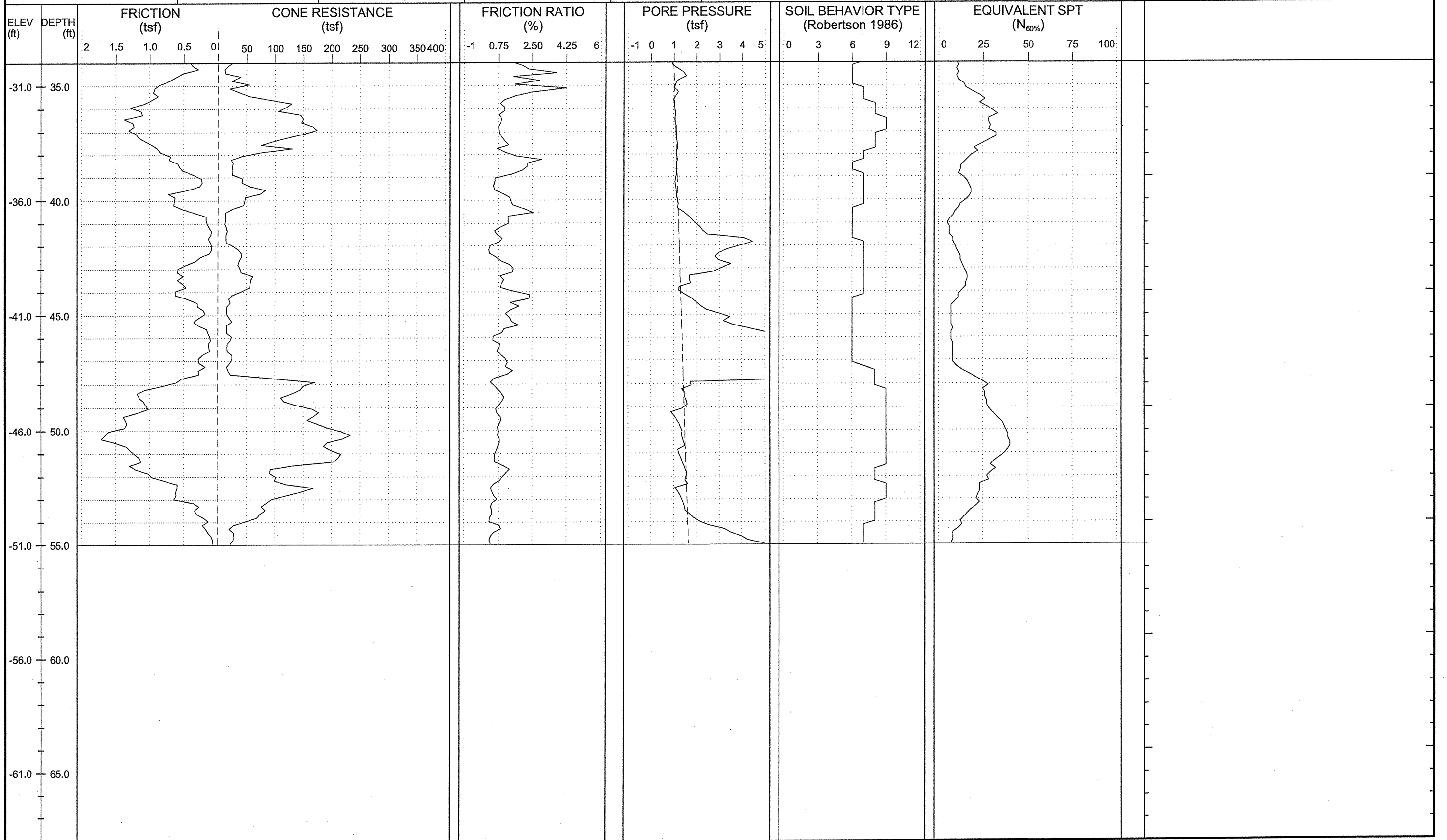


PROJECT NO.: 34528.1.1	ID.: R-3307	COUNTY: Carteret	GEOLOGIST: Hudson, S.V.	DRILL MACHINE: Hogentogler Track	MAX. DOWN PRESSURE: 10 Ton	PAGE 1 of 2
SITE DESCRIPTION: MSE Retaining Wall from Station 63+00 Right to Station 66+50 Right -L-				GROUND WTR (ft): 0 HR. 2.4	DRILL METHOD: CPT / DPT	CONE TYPE: Type 1 Piezo.
BORING NO.: CPT-02	STATION: 63+68	OFFSET: 39ft RT	ALIGNMENT: -L-	24 HR. N/A	ROD TYPE: Pre-Strung	CONE ID: DDG1195
COLLAR ELEV.: 4.0 ft	TOTAL DEPTH: 55.0 ft	NORTHING: 363,879	EASTING: 2,701,485	START DATE: 07/16/13	COMP. DATE: 07/16/13	DRILLER: Robeson, C.
						TECHNICIAN: M.A.D.
						SURFACE WATER DEPTH: N/A



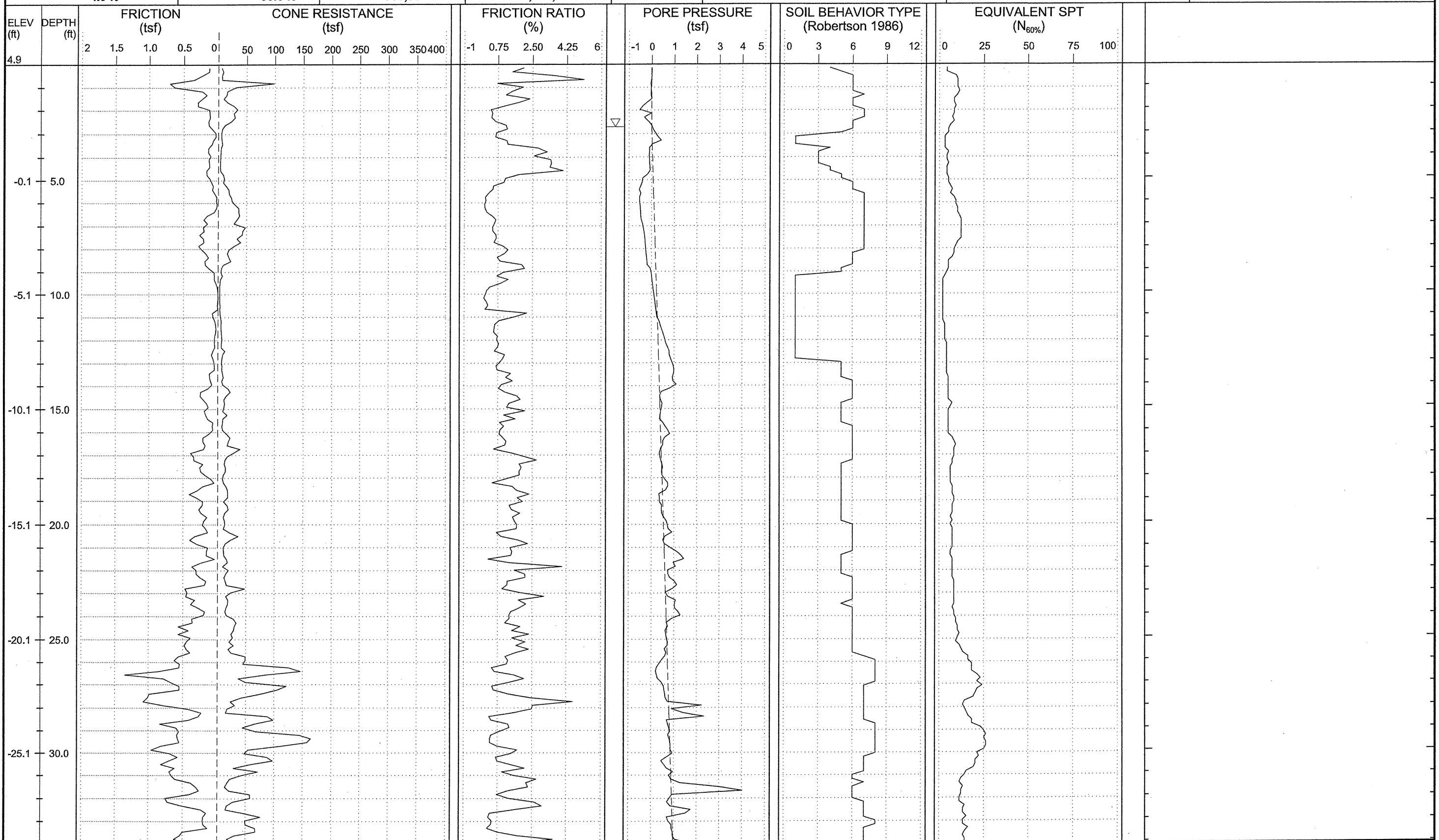


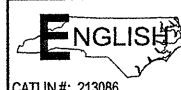
PROJECT NO.: 34528.1.1	ID.: R-3307	COUNTY: Carteret	GEOLOGIST: Hudson, S.V.	DRILL MACHINE: Hogentogler Track	MAX. DOWN PRESSURE: 10 Ton	PAGE 2 of 2
SITE DESCRIPTION: MSE Retaining Wall from Station 63+00 Right to Station 66+50 Right -L-				GROUND WTR (ft)	DRILL METHOD: CPT / DPT	CONE TYPE: Type 1 Piezo.
BORING NO.: CPT-02	STATION: 63+68	OFFSET: 39ft RT	ALIGNMENT: -L-	0 HR. 2.4	ROD TYPE: Pre-Strung	CONE ID: DDG1195
COLLAR ELEV.: 4.0 ft	TOTAL DEPTH: 55.0 ft	NORTHING: 363,879	EASTING: 2,701,485	24 HR. N/A	START DATE: 07/16/13	COMP. DATE: 07/16/13
						DRILLER: Robeson, C.
						TECHNICIAN: M.A.D.
						SURFACE WATER DEPTH: N/A



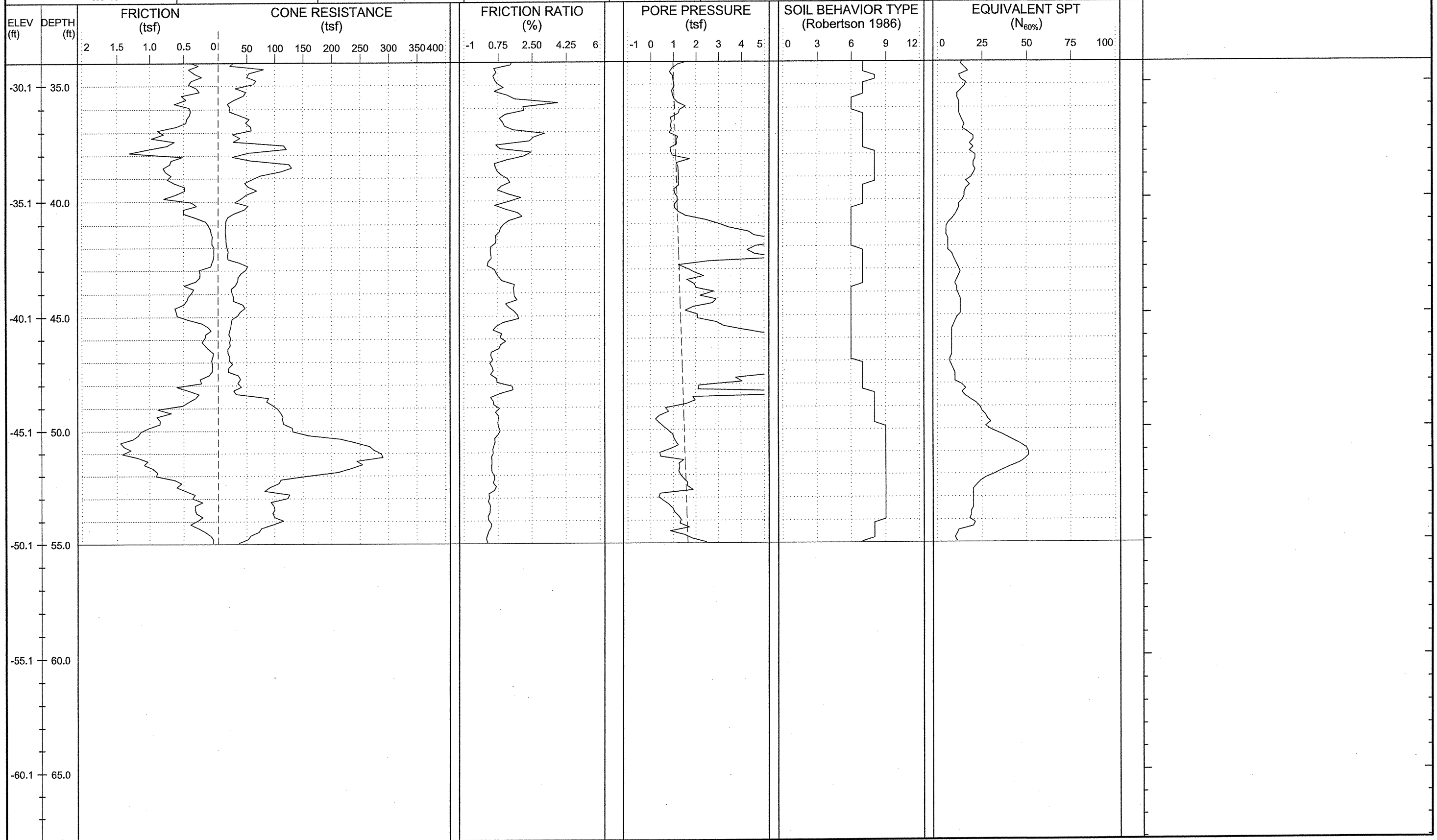


PROJECT NO.: 34528.1.1	ID.: R-3307	COUNTY: Carteret	GEOLOGIST: Hudson, S.V.	DRILL MACHINE: Hogentogler Track	MAX. DOWN PRESSURE: 10 Ton	PAGE 1 of 2
SITE DESCRIPTION: MSE Retaining Wall from Station 63+00 Right to Station 66+50 Right -L-				GROUND WTR (ft): 0 HR. 2.7	DRILL METHOD: CPT / DPT	CONE TYPE: Type 1 Piezo.
BORING NO.: CPT-03	STATION: 64+10	OFFSET: 47ft RT	ALIGNMENT: -L-	24 HR. N/A	ROD TYPE: Pre-Strung	CONE ID: DDG1195
COLLAR ELEV.: 4.9 ft	TOTAL DEPTH: 55.0 ft	NORTHING: 363,864	EASTING: 2,701,524	START DATE: 07/16/13	COMP. DATE: 07/16/13	DRILLER: Robeson, C.
						TECHNICIAN: M.A.D.
						SURFACE WATER DEPTH: N/A



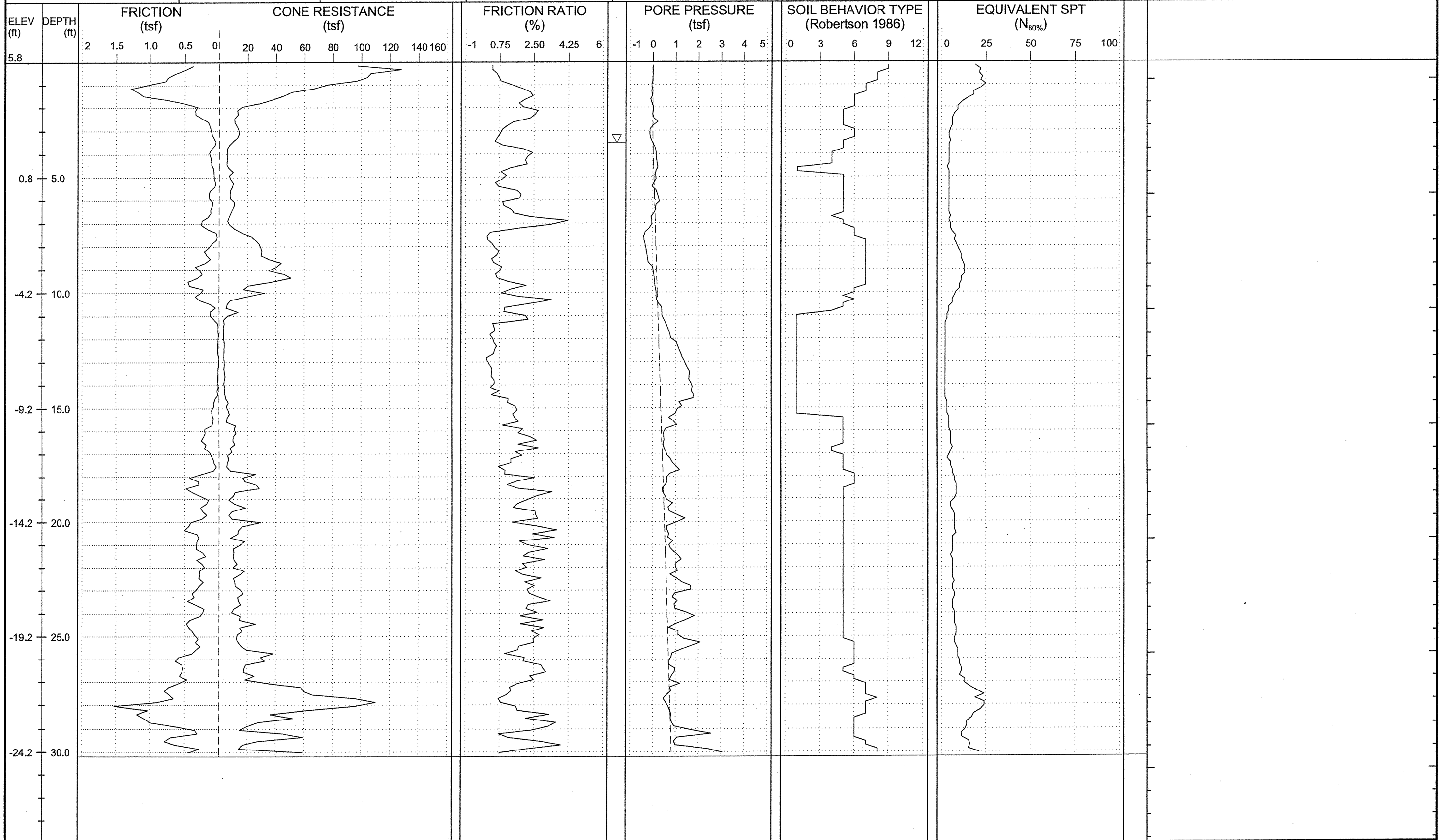


PROJECT NO.: 34528.1.1	ID.: R-3307	COUNTY: Carteret	GEOLOGIST: Hudson, S.V.	DRILL MACHINE: Hogentogler Track	MAX. DOWN PRESSURE: 10 Ton	PAGE 2 of 2
SITE DESCRIPTION: MSE Retaining Wall from Station 63+00 Right to Station 66+50 Right -L-				GROUND WTR (ft): 0 HR. 2.7, 24 HR. N/A	DRILL METHOD: CPT / DPT	CONE TYPE: Type 1 Piezo.
BORING NO.: CPT-03	STATION: 64+10	OFFSET: 47ft RT	ALIGNMENT: -L-	ROD TYPE: Pre-Strung	CONE ID: DDG1195	DRILLER: Robeson, C.
COLLAR ELEV.: 4.9 ft	TOTAL DEPTH: 55.0 ft	NORTHING: 363,864	EASTING: 2,701,524	START DATE: 07/16/13	COMP. DATE: 07/16/13	TECHNICIAN: M.A.D.
						SURFACE WATER DEPTH: N/A



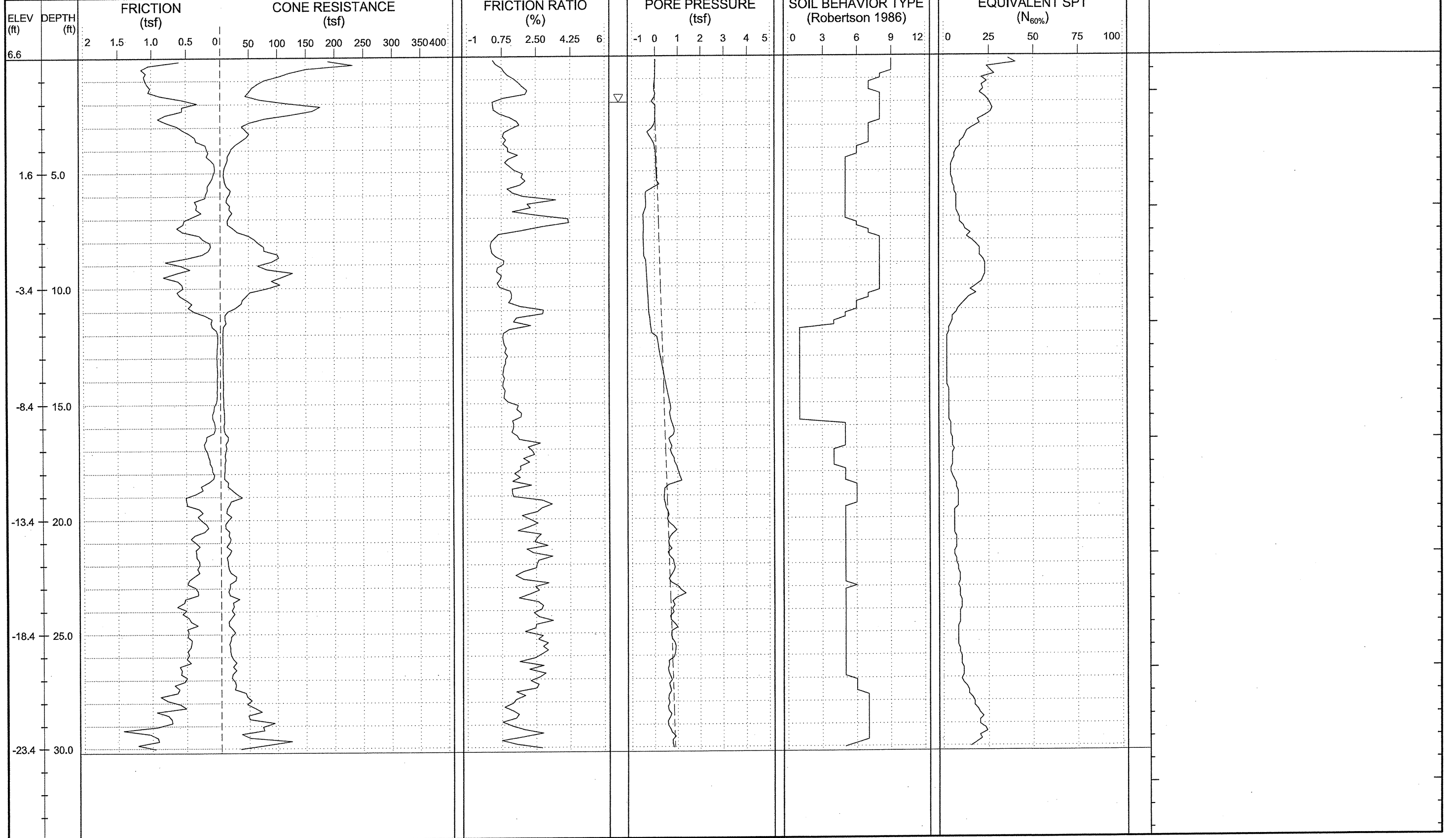


PROJECT NO.: 34528.1.1	ID: R-3307	COUNTY: Carteret	GEOLOGIST: Hudson, S.V.	DRILL MACHINE: Hogentogler Track	MAX. DOWN PRESSURE: 10 Ton	PAGE 1 of 1
SITE DESCRIPTION: MSE Retaining Wall from Station 63+00 Right to Station 66+50 Right -L-				GROUND WTR (ft): 0 HR. 3.5, 24 HR. N/A	DRILL METHOD: CPT / DPT	CONE TYPE: Type 1 Piezo.
BORING NO.: CPT-04	STATION: 64+54	OFFSET: 31ft RT	ALIGNMENT: -L-	ROD TYPE: Pre-Strung	CONE ID: DDG1195	DRILLER: Robeson, C.
COLLAR ELEV.: 5.8 ft	TOTAL DEPTH: 30.2 ft	NORTHING: 363,869	EASTING: 2,701,571	START DATE: 07/15/13	COMP. DATE: 07/15/13	TECHNICIAN: M.A.D.
						SURFACE WATER DEPTH: N/A



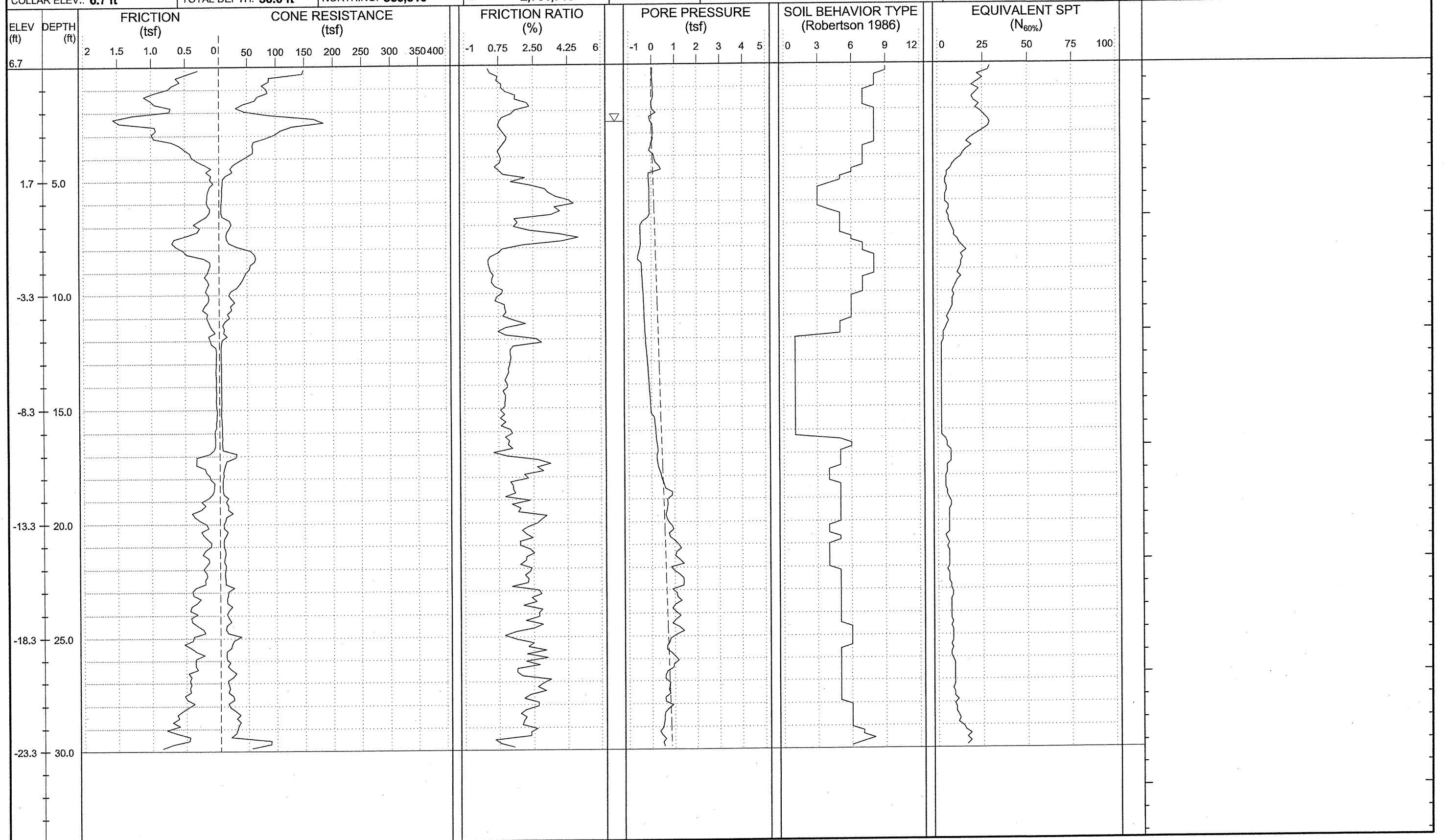


PROJECT NO.: 34528.1.1	ID.: R-3307	COUNTY: Carteret	GEOLOGIST: Hudson, S.V.	DRILL MACHINE: Hogentogler Track	MAX. DOWN PRESSURE: 10 Ton	PAGE 1 of 1
SITE DESCRIPTION: MSE Retaining Wall from Station 63+00 Right to Station 66+50 Right -L-				GROUND WTR (ft): 0 HR. 2.0, 24 HR. N/A	DRILL METHOD: CPT / DPT	CONE TYPE: Type 1 Piezo.
BORING NO.: CPT-05	STATION: 65+00	OFFSET: 51ft RT	ALIGNMENT: -L-	ROD TYPE: Pre-Strung	CONE ID: DDG1195	DRILLER: Robeson, C.
COLLAR ELEV.: 6.6 ft	TOTAL DEPTH: 30.2 ft	NORTHING: 363,841	EASTING: 2,701,612	START DATE: 07/16/13	COMP. DATE: 07/16/13	TECHNICIAN: M.A.D.
						SURFACE WATER DEPTH: N/A





PROJECT NO.: 34528.1.1	ID.: R-3307	COUNTY: Carteret	GEOLOGIST: Hudson, S.V.	DRILL MACHINE: Hogentogler Track	MAX. DOWN PRESSURE: 10 Ton	PAGE 1 of 1
SITE DESCRIPTION: MSE Retaining Wall from Station 63+00 Right to Station 66+50 Right -L-				GROUND WTR (ft): 0 HR. 2.5	DRILL METHOD: CPT / DPT	CONE TYPE: Type 1 Piezo.
BORING NO.: CPT-06	STATION: 66+01	OFFSET: 56ft RT	ALIGNMENT: -L-	24 HR. N/A	ROD TYPE: Pre-Strung	CONE ID: DDG1195
COLLAR ELEV.: 6.7 ft	TOTAL DEPTH: 30.0 ft	NORTHING: 363,816	EASTING: 2,701,710		START DATE: 07/15/13	COMP. DATE: 07/15/13
						DRILLER: Robeson, C.
						TECHNICIAN: M.A.D.
						SURFACE WATER DEPTH: N/A



PROJECT: 34528.1.1 ID: R-3307

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3307	1	7
STATE PROJECT NO.	FA PROJECT NO.	DESCRIPTION	
34528.1.1	STPNHF-70(43)	P.E.	
		R/W & UTILITIES	

CONTENTS

SHEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3-4	SITE PLAN
5-7	PROFILES

SHEET	ATTACHMENTS
1-22	CPT LOGS

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34528.1.1 (R-3307) F.A. PROJ. STPNHF-70(43)

COUNTY CARTERET

PROJECT DESCRIPTION US 70 FROM EXISTING FOUR LANES AT
RADIO ISLAND TO US 70 NORTH OF SR 1429 (OLGA ROAD)

SITE DESCRIPTION NOISE WALL RIGHT OF -L- STA. 147+00

CAUTION NOTICE

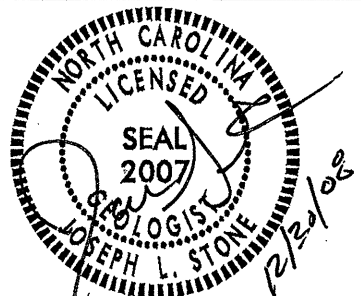
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, 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 BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (ON-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 MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

PERSONNEL
CATLIN PERSONNEL

INVESTIGATED BY J.L. STONE
CHECKED BY D.N. ARGENBRIGHT
SUBMITTED BY D.N. ARGENBRIGHT
DATE DECEMBER 2008



DRAWN BY: C.P. TURNER

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

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.






NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

PROJECT REFERENCE NO. R-3307 SHEET NO. 2 OF 7

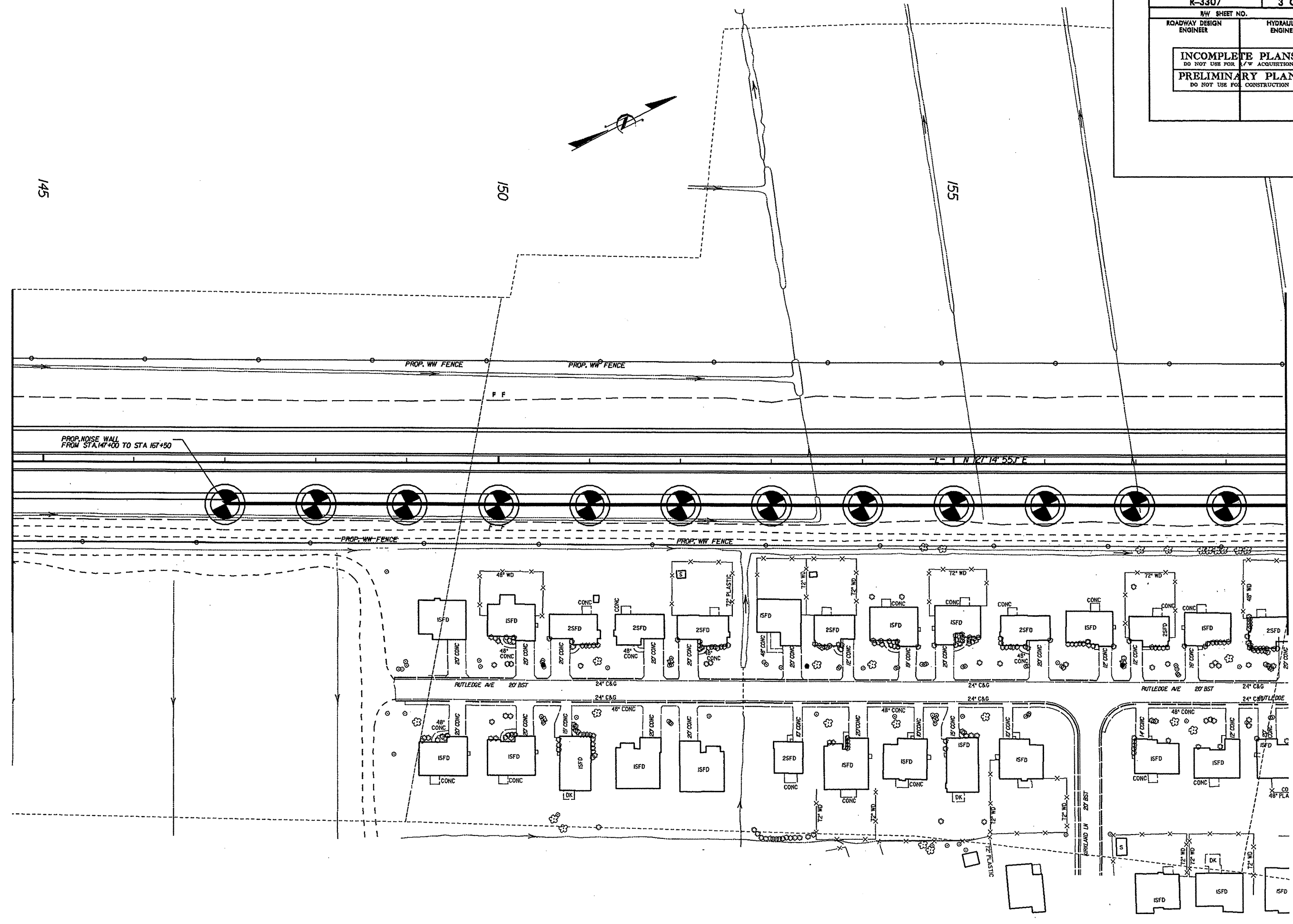
SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS					
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASHTO T208, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE ASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, ASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRN, SKTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i>		WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. ALSO POORLY GRADED. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.		HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:  WEATHERED ROCK (WR) - NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.  CRYSTALLINE ROCK (CR) - FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.  NON-CRYSTALLINE ROCK (NCR) - FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.  COASTAL PLAIN SEDIMENTARY ROCK (CPS) - COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.		ALLOVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. ADUFER - 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, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. 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 ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (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 THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.					
SOIL LEGEND AND ASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING							
GENERAL CLASS. GRANULAR MATERIALS (< 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS		MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SL.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL. SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF. VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF. COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		COMPRESSIONIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50		WEATHERING			
GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7		PERCENTAGE OF MATERIAL ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY 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% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE		GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP							
SYMBOL		ROADWAY EMBANKMENT (RED WITH SOIL DESCRIPTION) SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD		SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL							
% PASSING #10 #40 #200		CONSISTENCY OR DENSENESS PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)		ABBREVIATIONS AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS - FOSSILIFEROUS FRAC - FRACTURED, FRACTURES FRAGS - FRAGMENTS HL - HIGHLY MED - MEDIUM MICA - MICACEOUS MOD - MODERATELY NP - NON PLASTIC ORG - ORGANIC PMT - PRESSUREMETER TEST SAP - SAPROLITIC SD - SAND, SANDY SL - SILT, SILTY SLI - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT v - VERY VST - VANE SHEAR TEST WEA - WEATHERED % - UNIT WEIGHT % _d - DRY UNIT WEIGHT							
LIQUID LIMIT PLASTIC INDEX		TEXTURE OR GRAIN SIZE U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.75 2.00 0.42 0.25 0.075 0.053		EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST CPT TRACK UNIT ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE STEEL TEETH TRICONE TUNG-CARB. CORE BIT DIRECT PUSH HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST		ROCK HARDNESS VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.		FRACURE SPACING TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET BEDDING TERM THICKNESS VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.			
USUAL TYPES OF MAJOR MATERIALS		SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION LL - LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE PL - PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE OM - OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL - SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE		FRACURE SPACING		INDURATION					
GEN. RATINGS AS A SUBGRADE		PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH		INDURATION		BENCH MARK: ELEVATION: FT. NOTES:  CPT BORING					
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30		COLOR 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.									

8/17/99

PROJECT REFERENCE NO. R-3307	SHEET NO. 3 OF 7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

REVISIONS

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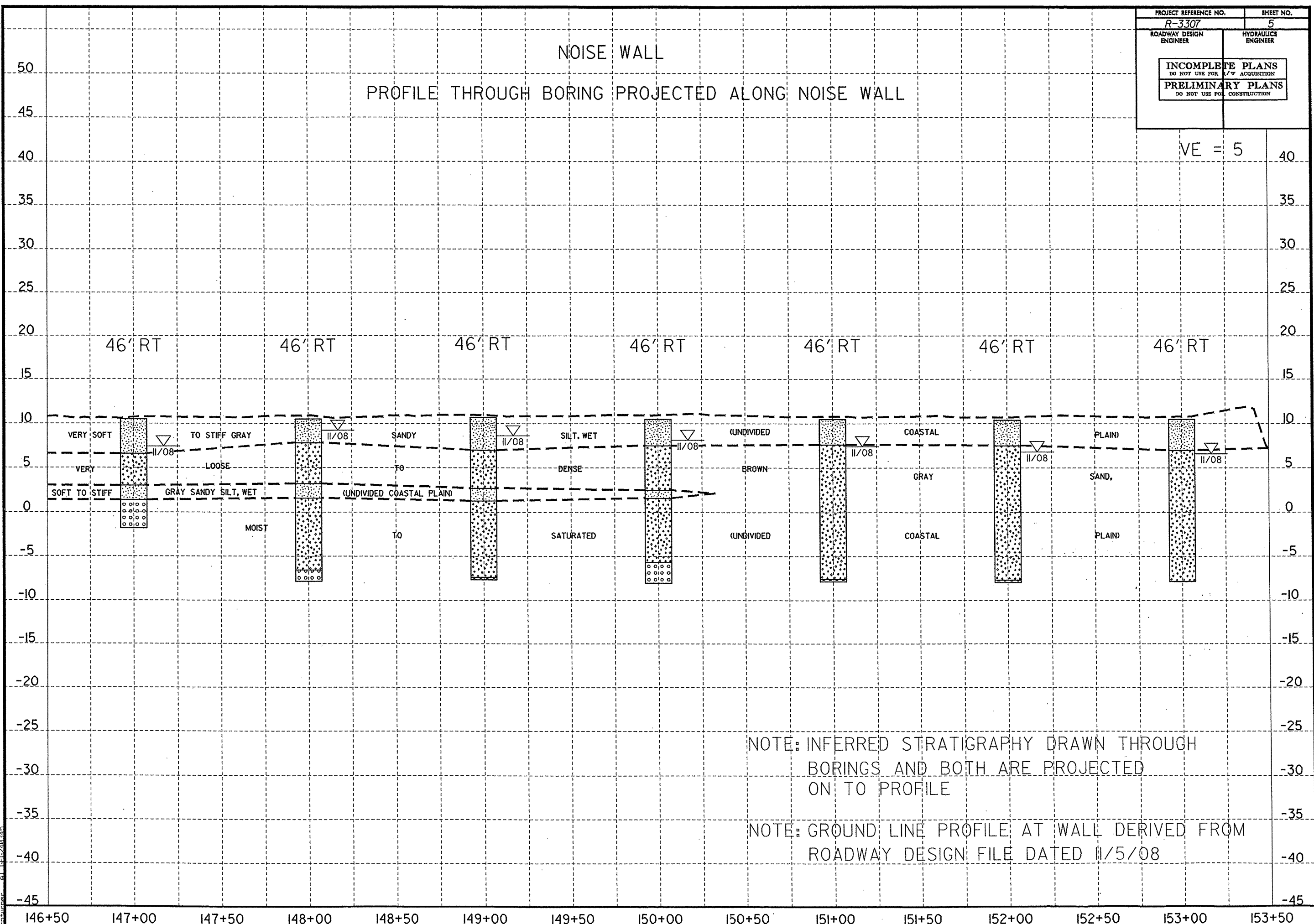
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PROJECT REFERENCE NO. R-3307	SHEET NO. 5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

NOISE WALL

PROFILE THROUGH BORING PROJECTED ALONG NOISE WALL

VE = 5 40



NOTE: INFERRED STRATIGRAPHY DRAWN THROUGH BORINGS AND BOTH ARE PROJECTED ON TO PROFILE

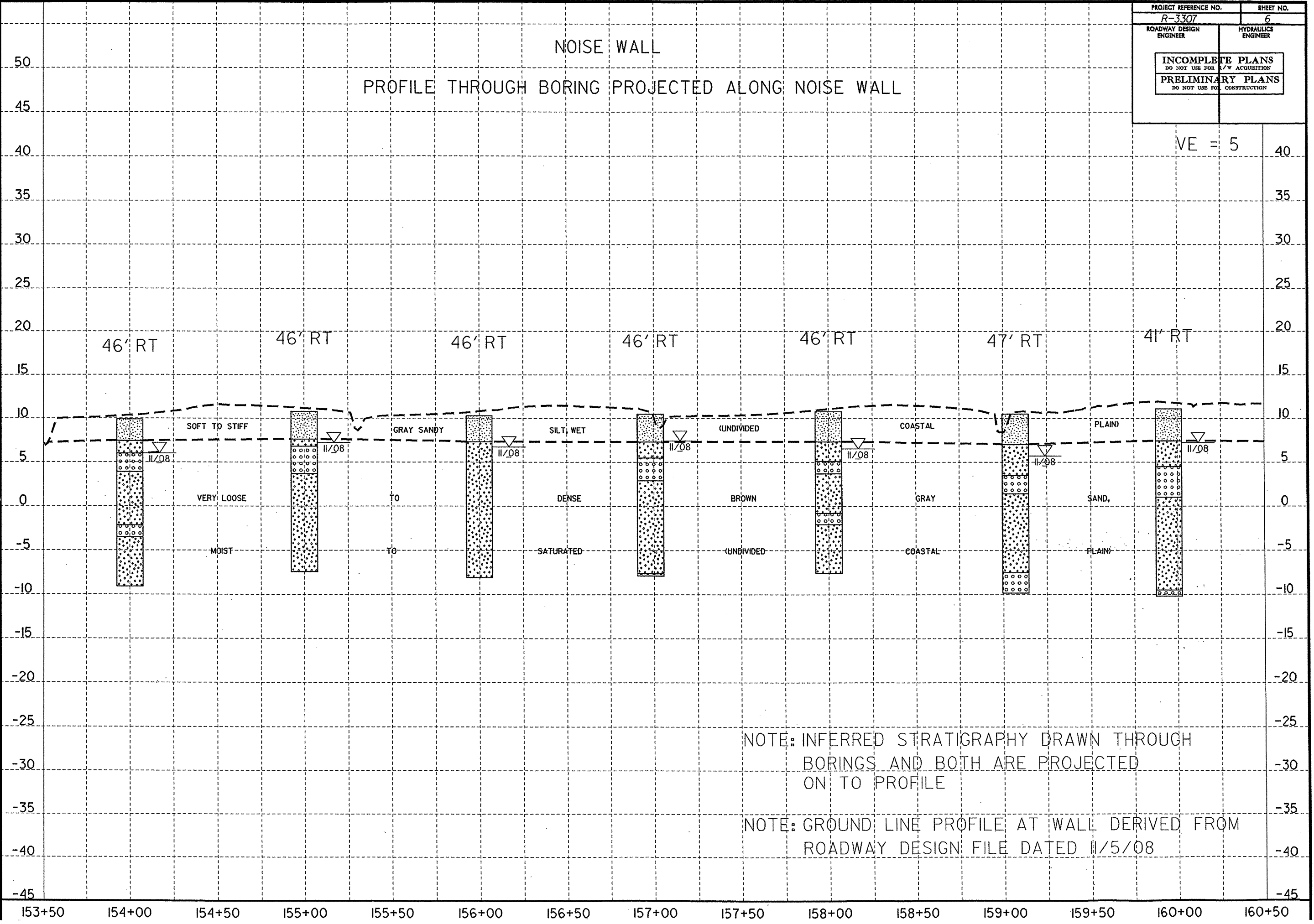
NOTE: GROUND LINE PROFILE AT WALL DERIVED FROM ROADWAY DESIGN FILE DATED 11/5/08

146+50 147+00 147+50 148+00 148+50 149+00 149+50 150+00 150+50 151+00 151+50 152+00 152+50 153+00 153+50

5/14/99

PROJECT REFERENCE NO. R-3307	SHEET NO. 6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

NOISE WALL
PROFILE THROUGH BORING PROJECTED ALONG NOISE WALL



VE = 5

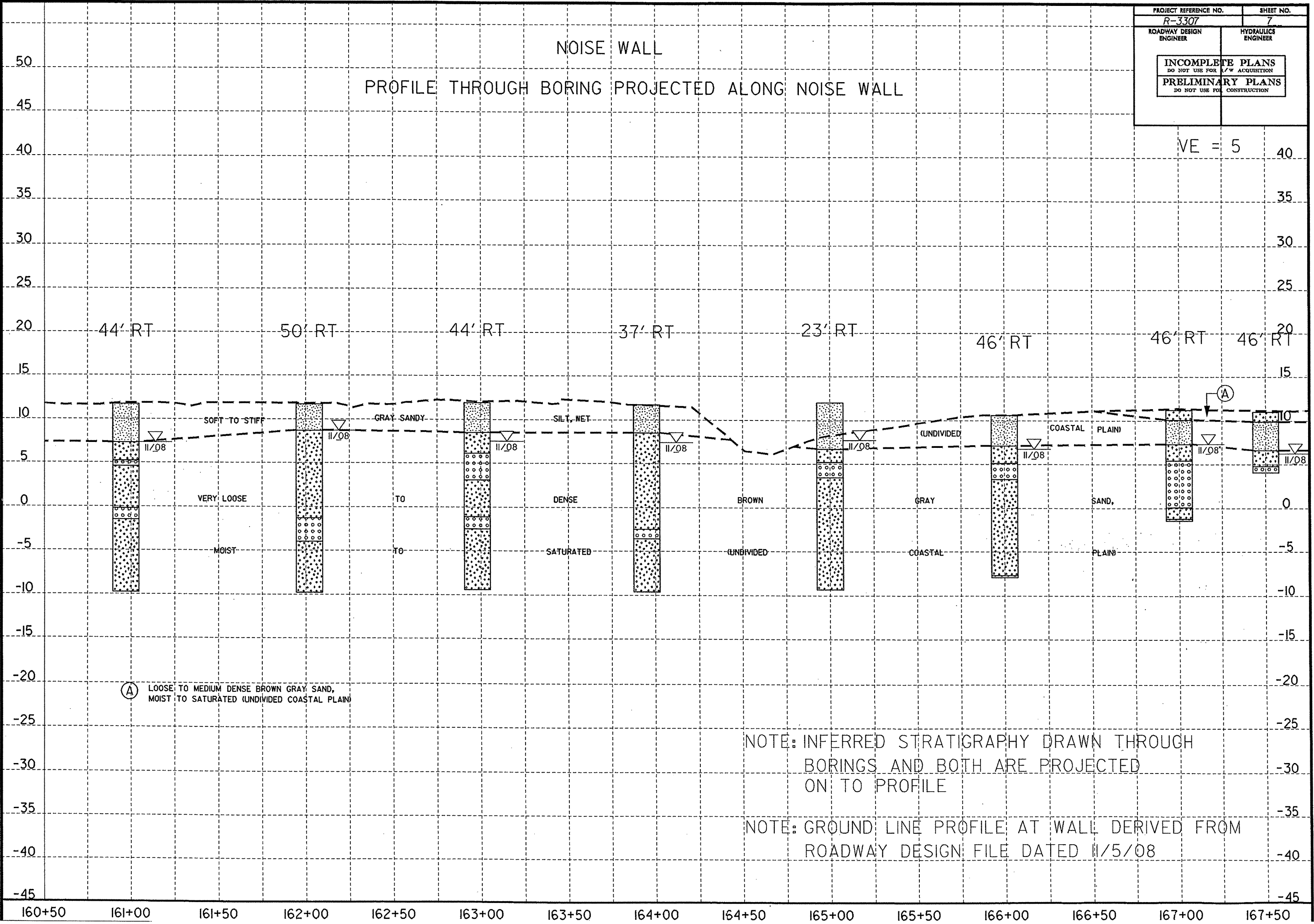
NOTE: INFERRED STRATIGRAPHY DRAWN THROUGH BORINGS AND BOTH ARE PROJECTED ON TO PROFILE

NOTE: GROUND LINE PROFILE AT WALL DERIVED FROM ROADWAY DESIGN FILE DATED 11/5/08

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 11/12/08

PROJECT REFERENCE NO. R-3307	SHEET NO. 7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



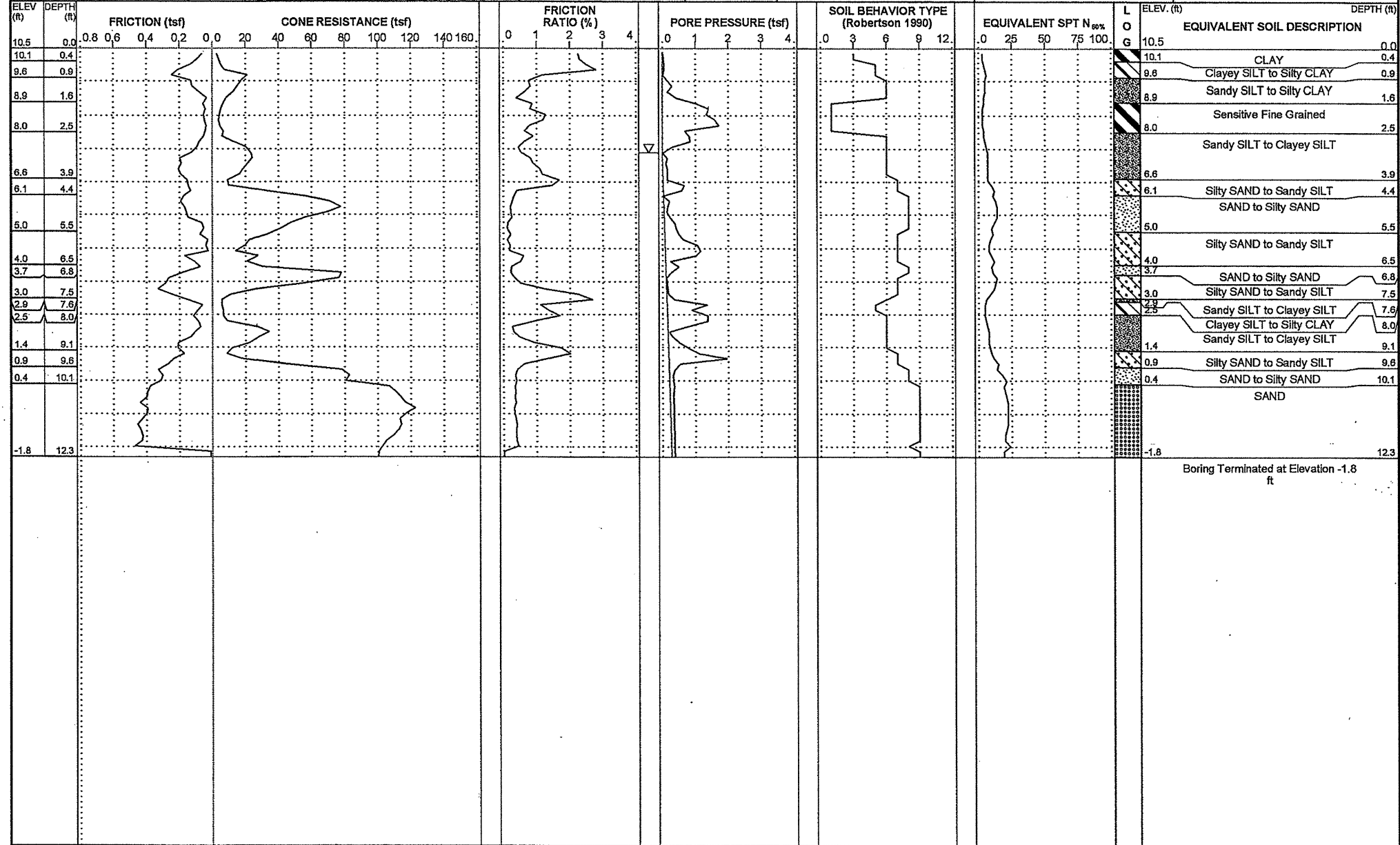


NCDOT GEOTECHNICAL ENGINEERING UNIT
CONE PENETRATION TESTING LOG



ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	01	22

PROJECT NO.: 345281.1	ID.: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft) 0 HR. 3.1 24 HR. N/A	DRILL METHOD: Direct Push
BORING NO.: CPT-01	STATION: 147+00	OFFSET: 46ft RT	ALIGNMENT: -L-	HAMMER TYPE: N/A	CONE TYPE: Piezocone
COLLAR ELEV.: 10.5 ft	TOTAL DEPTH: 12.3 ft	NORTHING: 368,128	EASTING: 2,707,895	START DATE: 11/06/08	COMP. DATE: 11/06/08
					DRILLER: Donald B Coogan
					TECHNICIAN: Mid-Atlantic
					SURFACE WATER DEPTH: N/A





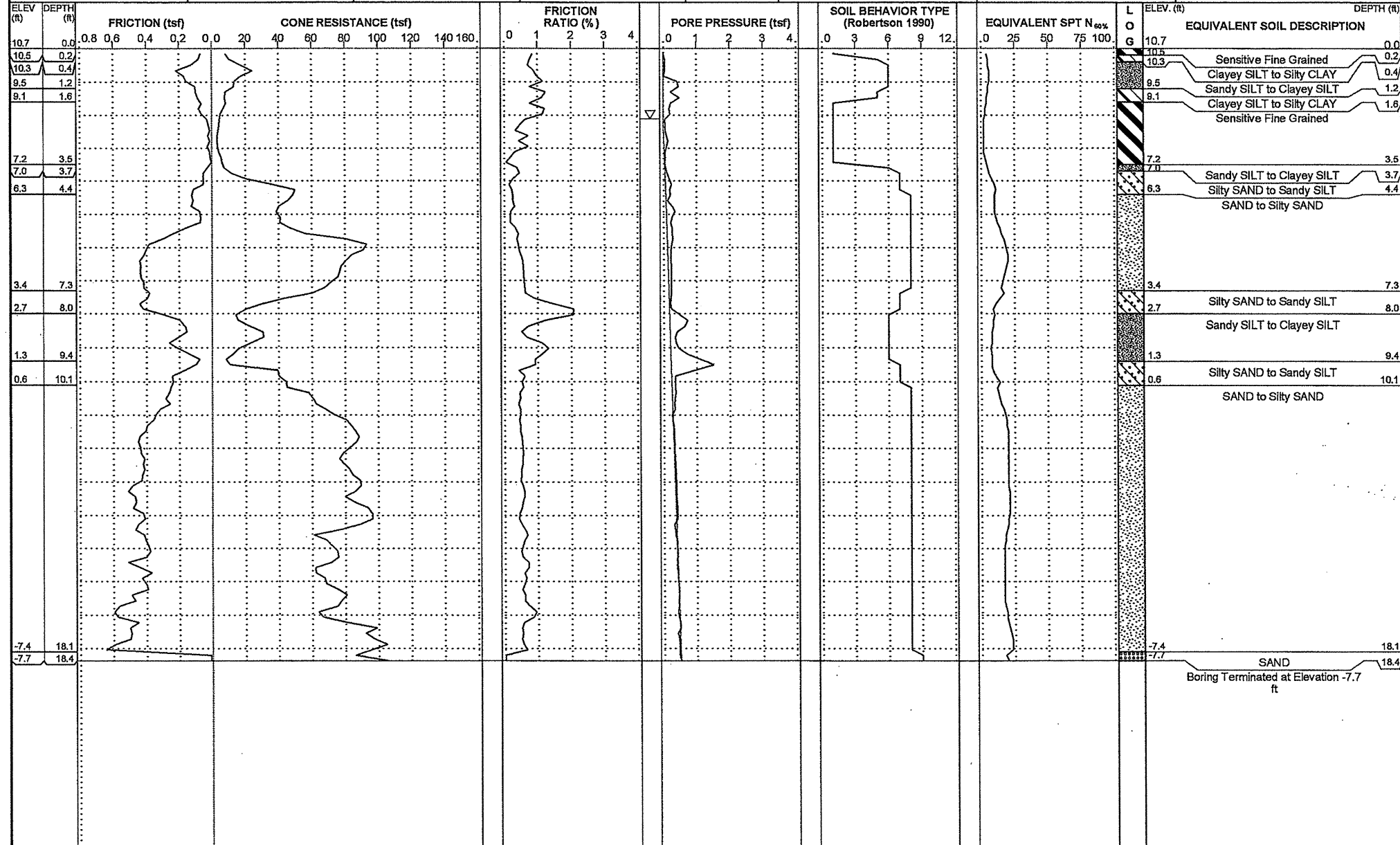
NCDOT GEOTECHNICAL ENGINEERING UNIT
CONE PENETRATION TESTING LOG



ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	03	22

CATLIN # 208-066 SHEET 1 of 1

PROJECT NO.: 345281.1	ID.: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft): 0 HR. 2.1	DRILL METHOD: Direct Push
BORING NO.: CPT-03	STATION: 149+00	OFFSET: 46ft RT	ALIGNMENT: -L-	HAMMER TYPE: N/A	CONE TYPE: Piezocone
COLLAR ELEV.: 10.7 ft	TOTAL DEPTH: 18.4 ft	NORTHING: 368,306	EASTING: 2,707,986	24 HR. N/A	DRILLER: Donald B Coogan
			START DATE: 11/06/08	COMP. DATE: 11/06/08	TECHNICIAN: Mid-Atlantic
			SURFACE WATER DEPTH: N/A		





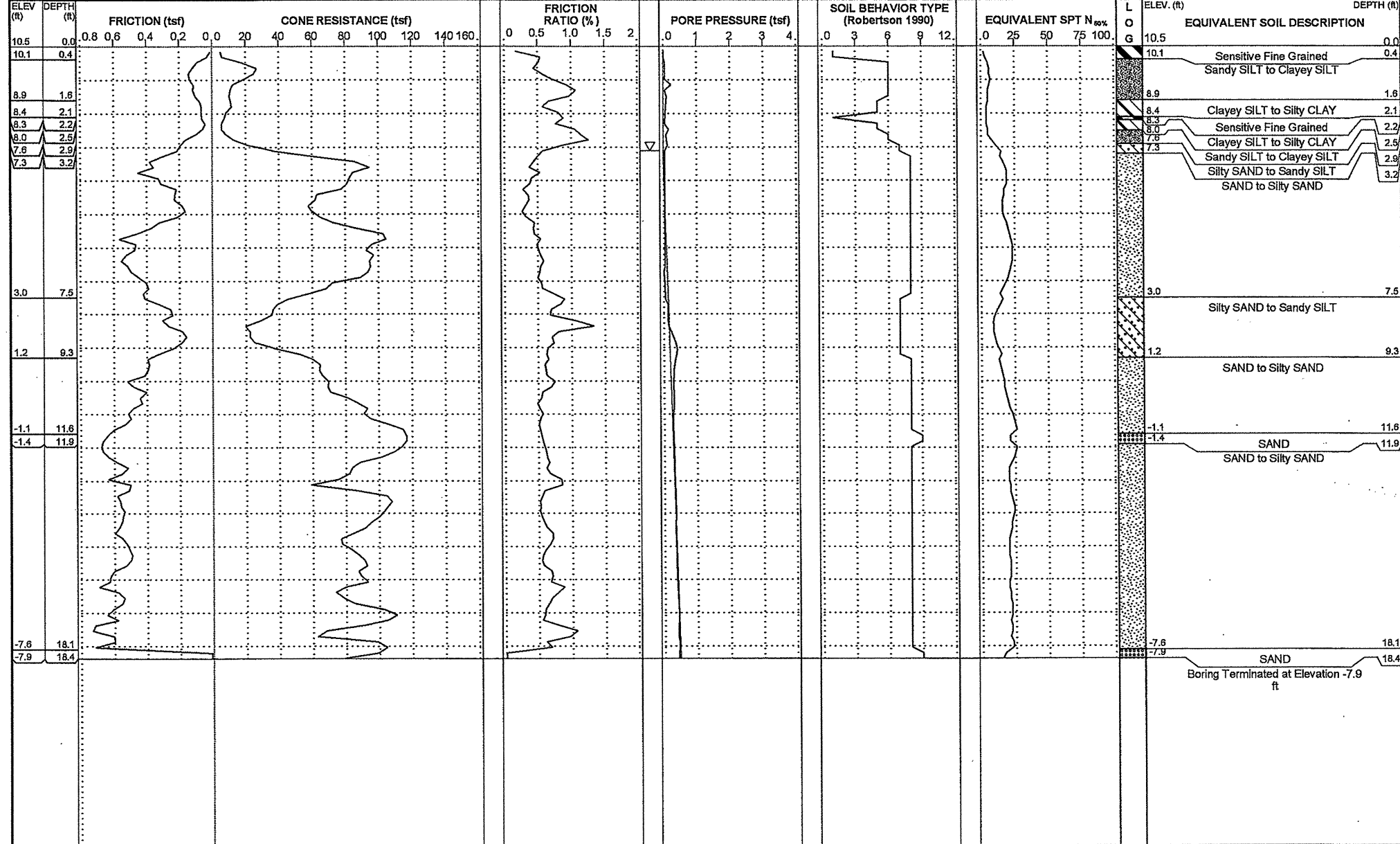
NCDOT GEOTECHNICAL ENGINEERING UNIT
CONE PENETRATION TESTING LOG



ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	05	22

CATLIN # 208-066 SHEET 1 of 1

PROJECT NO.: 345281.1	ID.: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft): 0 HR. 3.1	DRILL METHOD: Direct Push
BORING NO.: CPT-05	STATION: 151+00	OFFSET: 46ft RT	ALIGNMENT: -L-	HAMMER TYPE: N/A	CONE TYPE: Piezocone
COLLAR ELEV.: 10.5 ft	TOTAL DEPTH: 18.4 ft	NORTHING: 368,484	EASTING: 2,708,078	24 HR. N/A	DRILLER: Donald B Coogan
			START DATE: 11/06/08	COMP. DATE: 11/06/08	TECHNICIAN: Mid-Atlantic
			SURFACE WATER DEPTH: N/A		



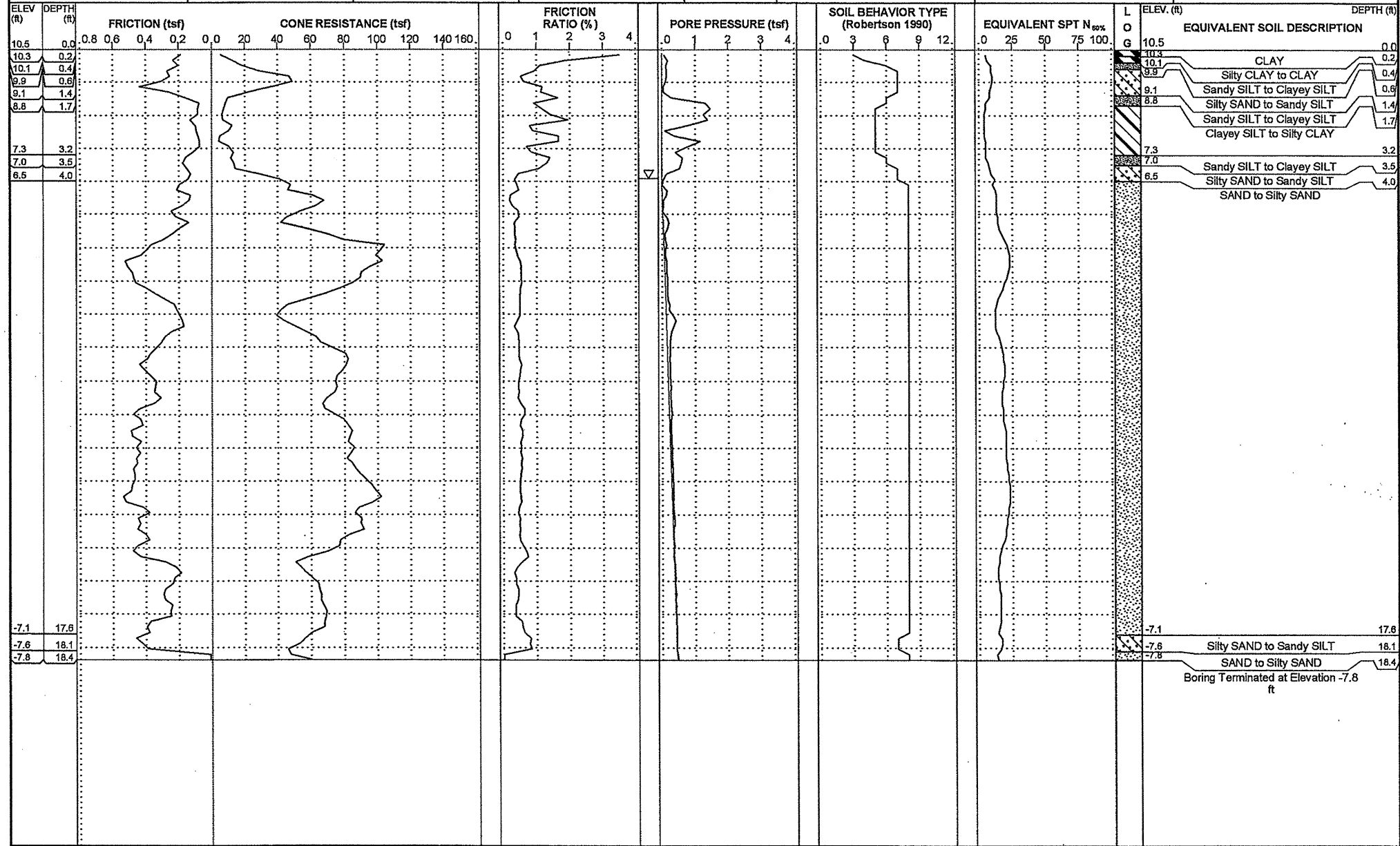


NCDOT GEOTECHNICAL ENGINEERING UNIT
CONE PENETRATION TESTING LOG



ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	07	22

PROJECT NO.: 345281.1	ID: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft): 0 HR. 3.9	DRILL METHOD: Direct Push
BORING NO.: CPT-07	STATION: 153+00	OFFSET: 46ft RT	ALIGNMENT: -L-	HAMMER TYPE: N/A	CONE TYPE: Piezocone
COLLAR ELEV.: 10.5 ft	TOTAL DEPTH: 18.4 ft	NORTHING: 368,662	EASTING: 2,708,170	24 HR. N/A	ROD TYPE: N/A
			START DATE: 11/06/08	COMP. DATE: 11/06/08	TECHNICIAN: Mid-Atlantic
					SURFACE WATER DEPTH: N/A





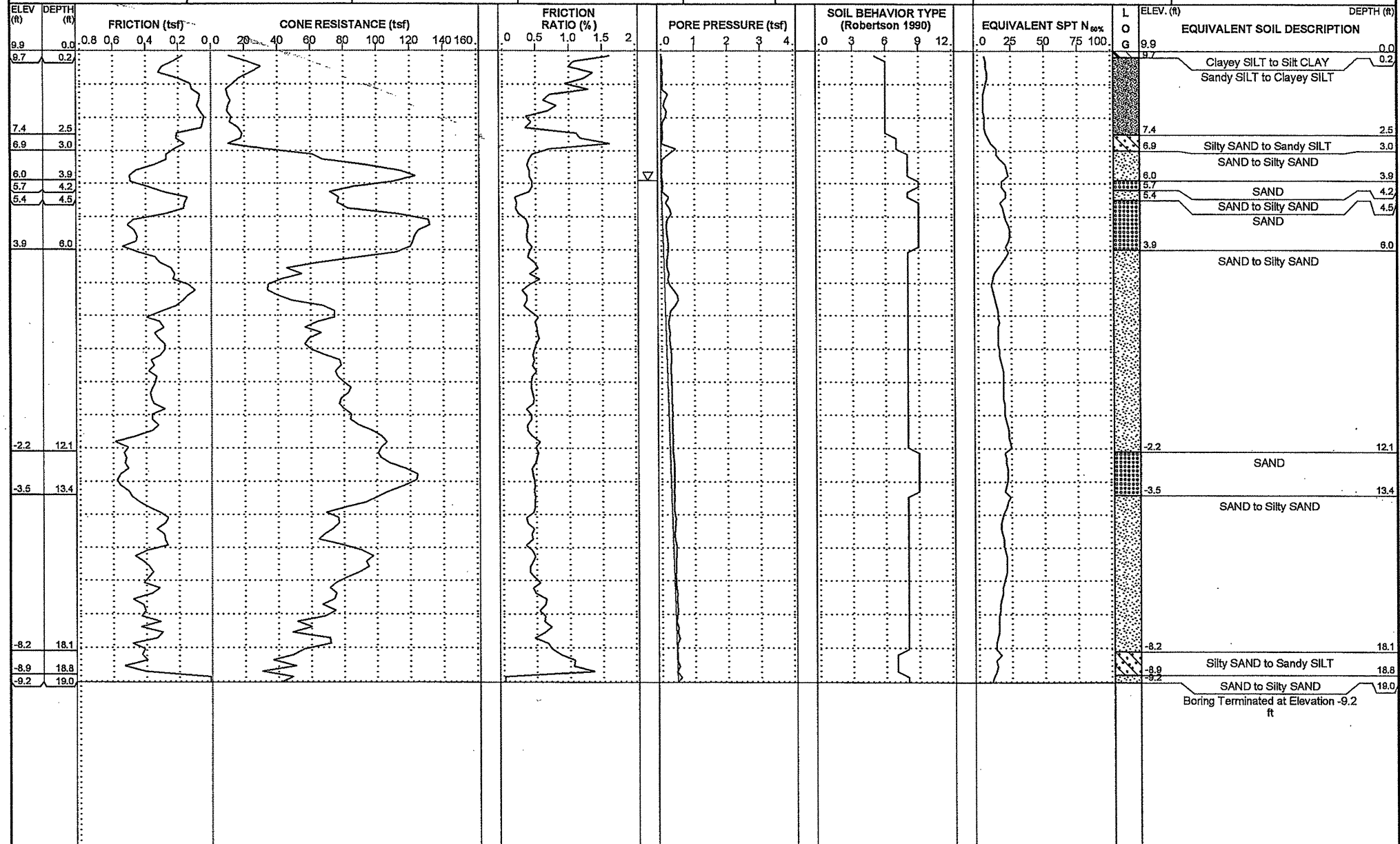
NCDOT GEOTECHNICAL ENGINEERING UNIT
CONE PENETRATION TESTING LOG



ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	08	22

CATLIN # 208-066 SHEET 1 of 1

PROJECT NO.: 345281.1	ID: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft)	DRILL METHOD: Direct Push
BORING NO.: CPT-08	STATION: 154+00	OFFSET: 46ft RT	ALIGNMENT: -L-	0 HR. 3.9	CONE TYPE: Piezocone
COLLAR ELEV.: 9.9 ft		TOTAL DEPTH: 19.0 ft	NORTHING: 368,751	EASTING: 2,708,215	24 HR. N/A
			START DATE: 11/06/08	COMP. DATE: 11/06/08	DRILLER: Donald B Coogan
					TECHNICIAN: Mid-Atlantic
					SURFACE WATER DEPTH: N/A

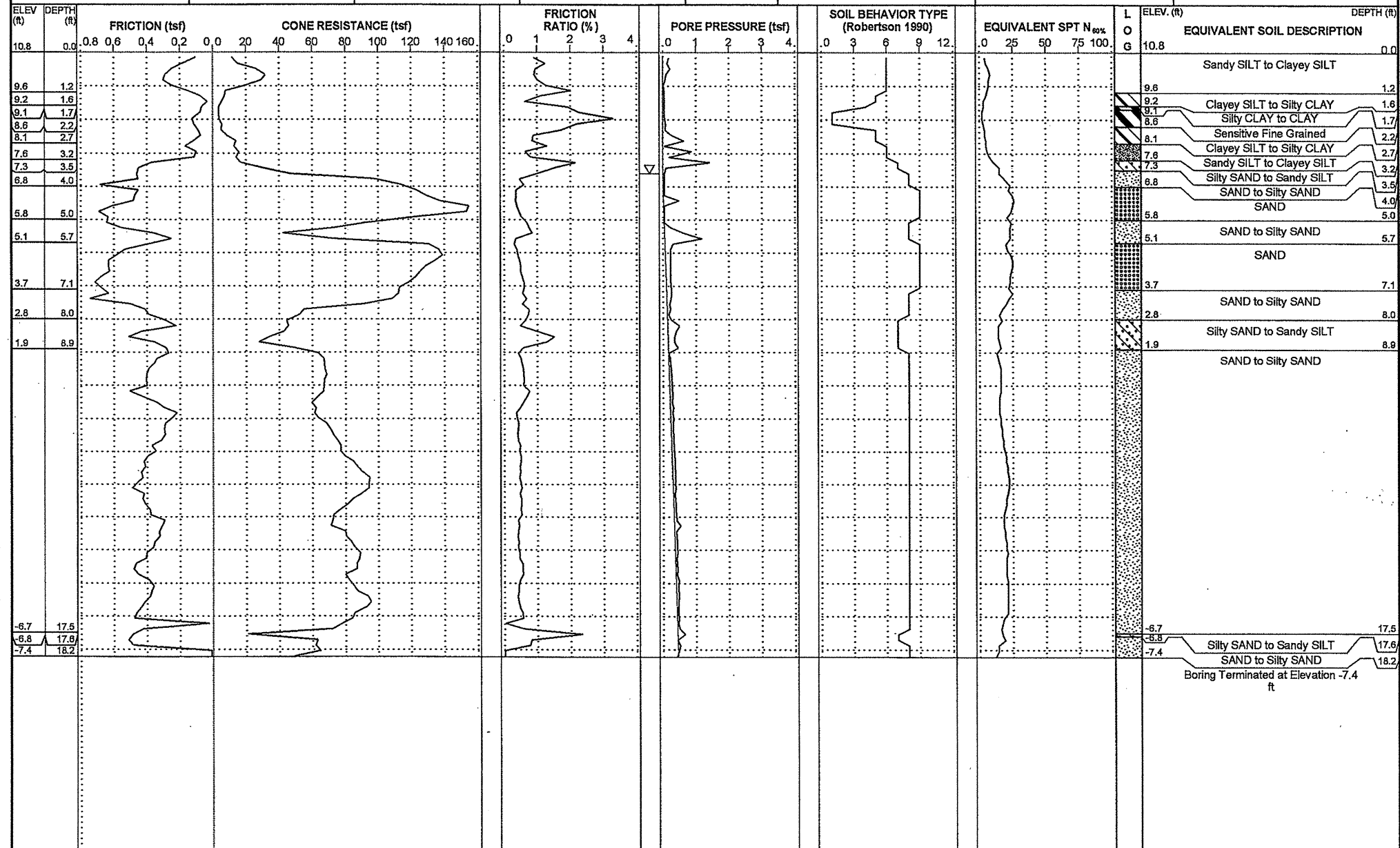




NCDOT GEOTECHNICAL ENGINEERING UNIT
CONE PENETRATION TESTING LOG

ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	09	22
CATLIN #: 208-066		SHEET 1 of 1	

PROJECT NO.: 345281.1	ID: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft): 0 HR. 3.6	DRILL METHOD: Direct Push
BORING NO.: CPT-09	STATION: 155+00	OFFSET: 46ft RT	ALIGNMENT: -L-	HAMMER TYPE: N/A	ROD TYPE: N/A
COLLAR ELEV.: 10.8 ft	TOTAL DEPTH: 18.2 ft	NORTHING: 368,839	EASTING: 2,708,261	24 HR. N/A	START DATE: 11/06/08
			COMP. DATE: 11/06/08	SURFACE WATER DEPTH: N/A	





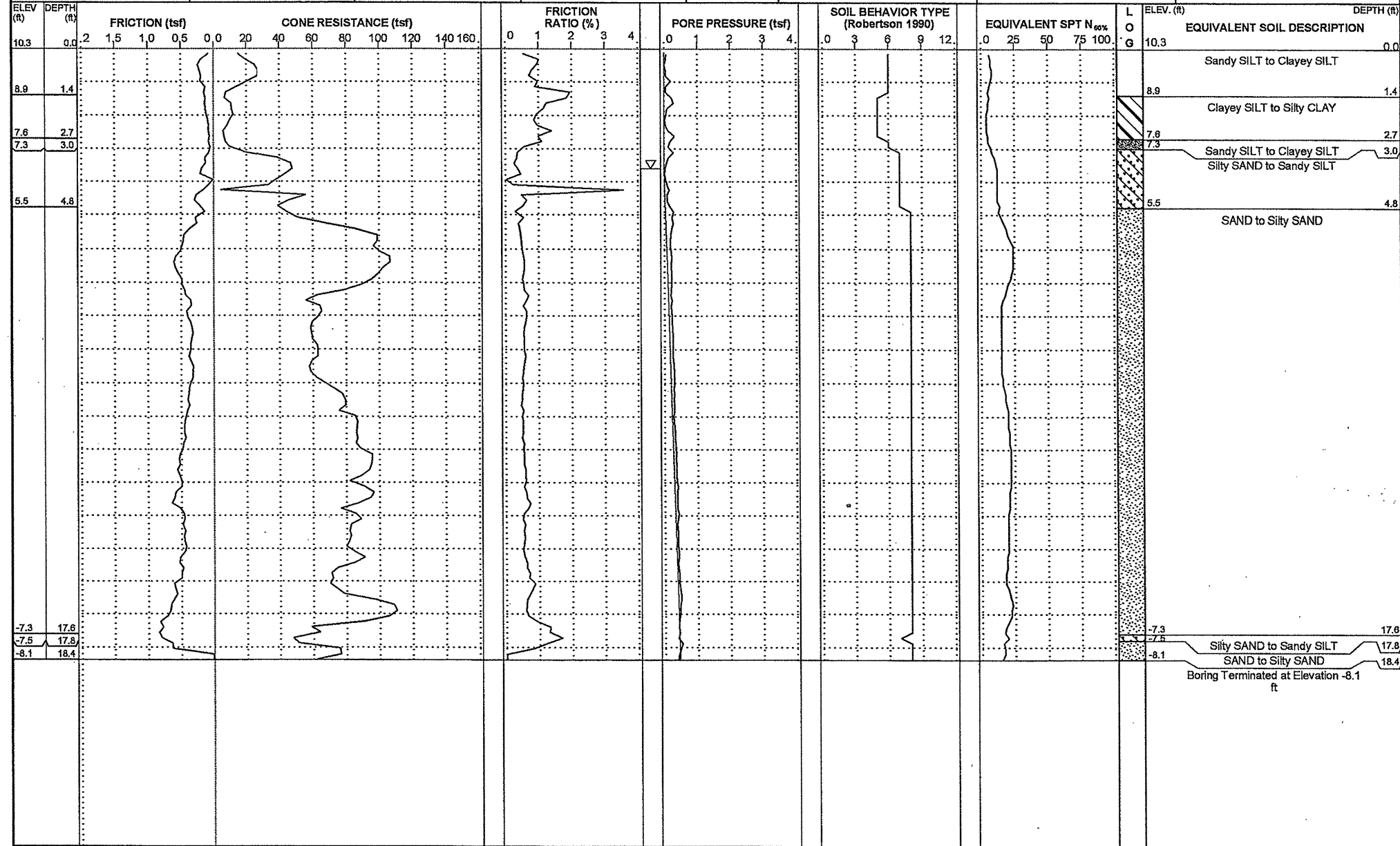
NCDOT GEOTECHNICAL ENGINEERING UNIT
CONE PENETRATION TESTING LOG



ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	10	22

CATLIN # 208-066 SHEET 1 of 1

PROJECT NO.: 345281.1	ID: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft): 0 HR. 3.6	DRILL METHOD: Direct Push
BORING NO.: CPT-10	STATION: 156+00	OFFSET: 46ft RT	ALIGNMENT: -L-	HAMMER TYPE: N/A	CONE TYPE: Piezocone
COLLAR ELEV.: 10.3 ft	TOTAL DEPTH: 18.4 ft	NORTHING: 368,928	EASTING: 2,708,307	24 HR. N/A	DRILLER: Donald B Coogan
			START DATE: 11/06/08	COMP. DATE: 11/06/08	TECHNICIAN: Mid-Atlantic
					SURFACE WATER DEPTH: N/A





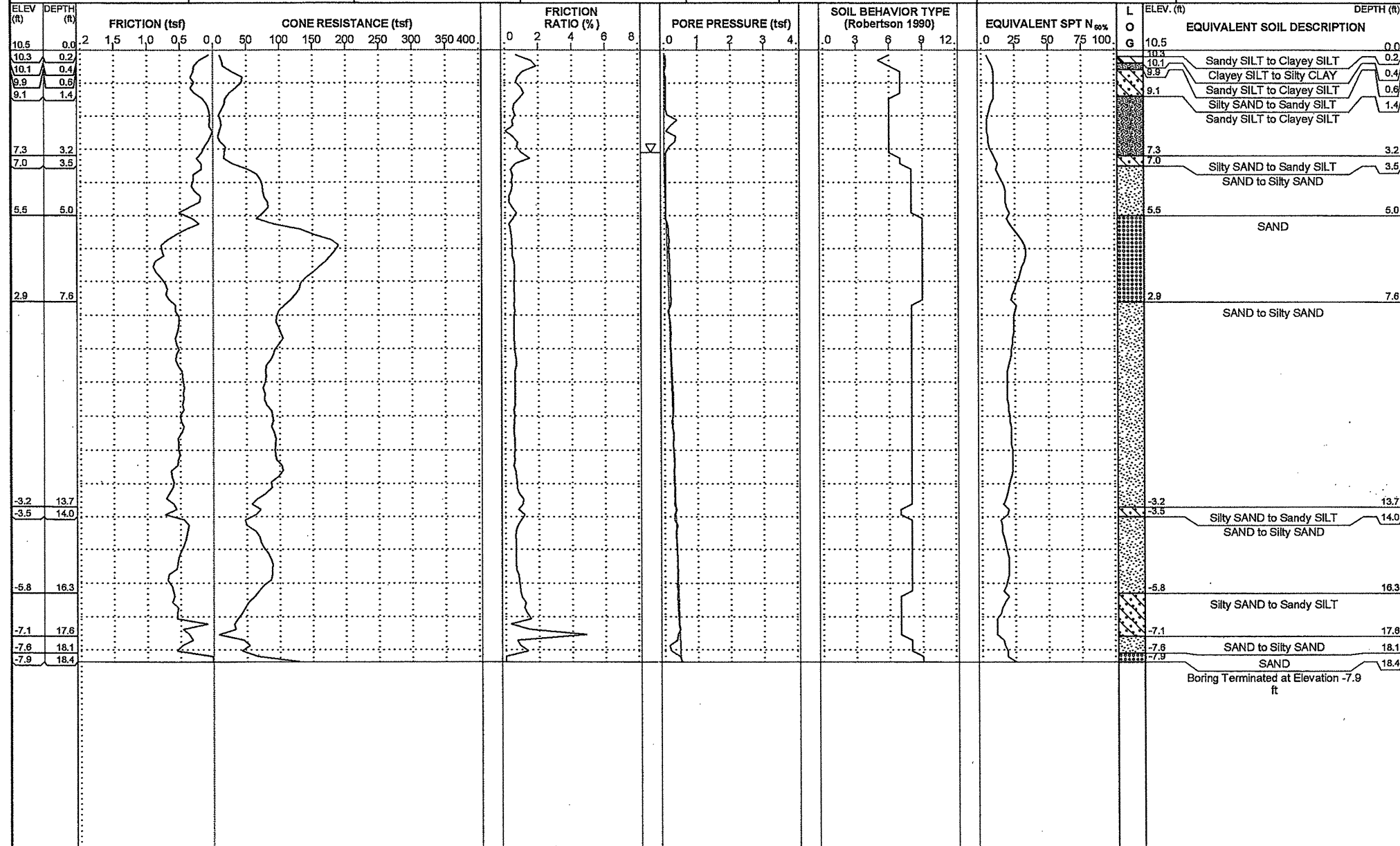
NCDOT GEOTECHNICAL ENGINEERING UNIT

CONE PENETRATION TESTING LOG

ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	11	22

CATLIN #: 208-066 SHEET 1 of 1

PROJECT NO.: 345281.1	ID.: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft): 0 HR. 3.1	DRILLER: Donald B Coogan
BORING NO.: CPT-11	STATION: 156+98	OFFSET: 46ft RT	ALIGNMENT: -L-	HAMMER TYPE: N/A	ROD TYPE: N/A
COLLAR ELEV.: 10.5 ft	TOTAL DEPTH: 18.4 ft	NORTHING: 369,016	EASTING: 2,708,351	START DATE: 11/06/08	COMP. DATE: 11/06/08
					SURFACE WATER DEPTH: N/A



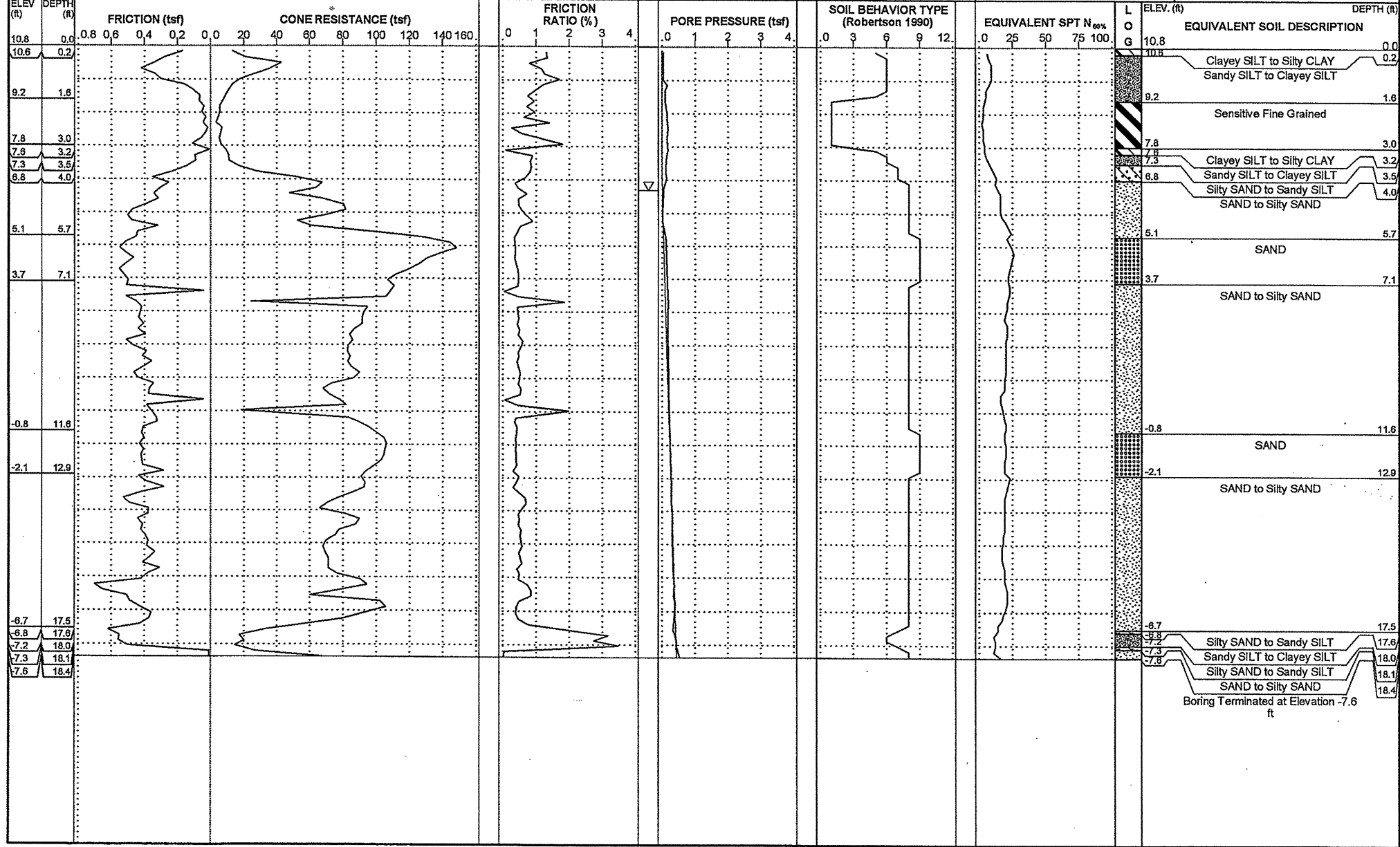


NCDOT GEOTECHNICAL ENGINEERING UNIT
CONE PENETRATION TESTING LOG



ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	12	22
CATLIN # 208-066		SHEET 1 of 1	

PROJECT NO.: 345281.1	ID.: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft): 0 HR. 4.3	24 HR. N/A
BORING NO.: CPT-12	STATION: 158+00	OFFSET: 46ft RT	ALIGNMENT: -L-	DRILL METHOD: Direct Push	CONE TYPE: Piezocone
COLLAR ELEV.: 10.8 ft	TOTAL DEPTH: 18.4 ft	NORTHING: 369,106	EASTING: 2,708,398	HAMMER TYPE: N/A	ROD TYPE: N/A
				START DATE: 11/06/08	COMP. DATE: 11/06/08
				DRILLER: Donald B Coogan	
				TECHNICIAN: Mid-Atlantic	
				SURFACE WATER DEPTH: N/A	



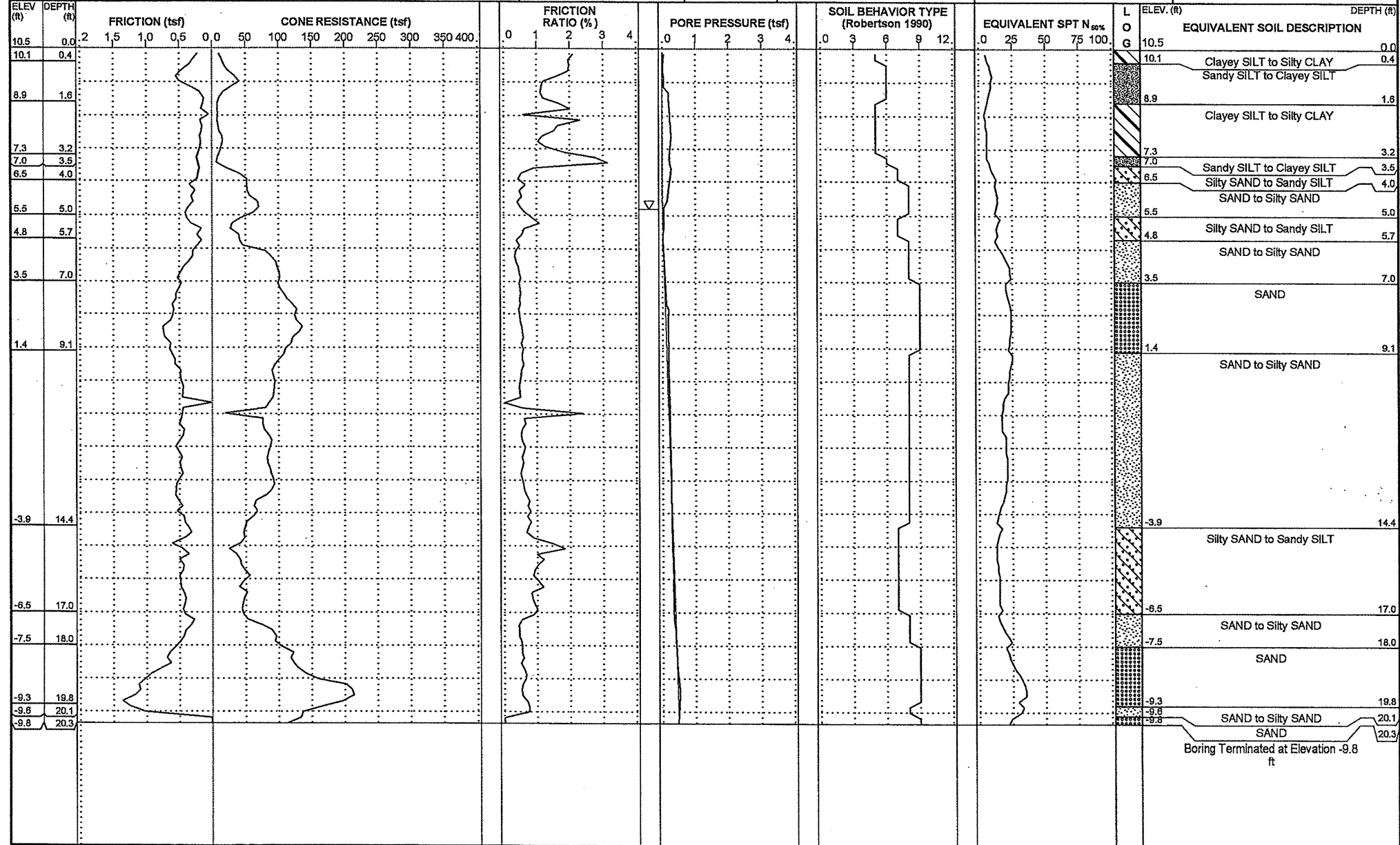


NCDOT GEOTECHNICAL ENGINEERING UNIT
CONE PENETRATION TESTING LOG

ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	13	22

CATLIN #: 208-066 SHEET 1 of 1

PROJECT NO.: 345281.1	ID: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft)	DRILL METHOD: Direct Push
BORING NO.: CPT-13	STATION: 159+07	OFFSET: 47ft RT	ALIGNMENT: -L-	0 HR. 4.8	CONE TYPE: Piezocone
COLLAR ELEV.: 10.5 ft	TOTAL DEPTH: 20.3 ft	NORTHING: 369,200	EASTING: 2,708,449	24 HR. N/A	DRILLER: Donald B Coogan
				START DATE: 11/06/08	TECHNICIAN: Mid-Atlantic
				COMP. DATE: 11/06/08	SURFACE WATER DEPTH: N/A





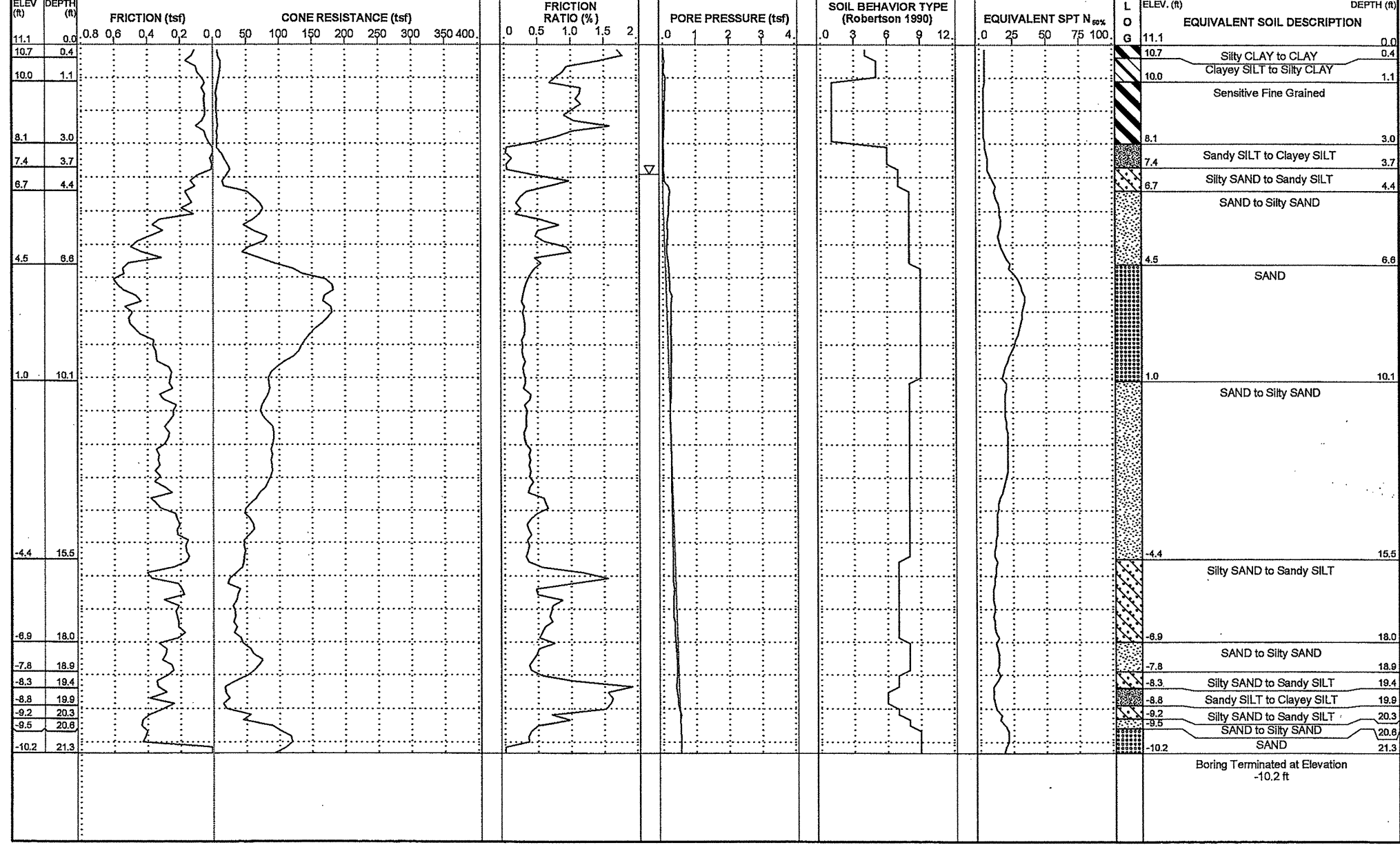
NCDOT GEOTECHNICAL ENGINEERING UNIT
CONE PENETRATION TESTING LOG



ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	14	22

CATLIN # 208-066 SHEET 1 of 1

PROJECT NO.: 345281.1	ID.: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft): 0 HR. 3.9	DRILL METHOD: Direct Push
BORING NO.: CPT-14	STATION: 159+95	OFFSET: 41ft RT	ALIGNMENT: -L-	HAMMER TYPE: N/A	ROD TYPE: N/A
COLLAR ELEV.: 11.1 ft	TOTAL DEPTH: 21.3 ft	NORTHING: 369,282	EASTING: 2,708,484	24 HR. N/A	START DATE: 11/06/08
			COMP. DATE: 11/06/08		SURFACE WATER DEPTH: N/A



Boring Terminated at Elevation -10.2 ft

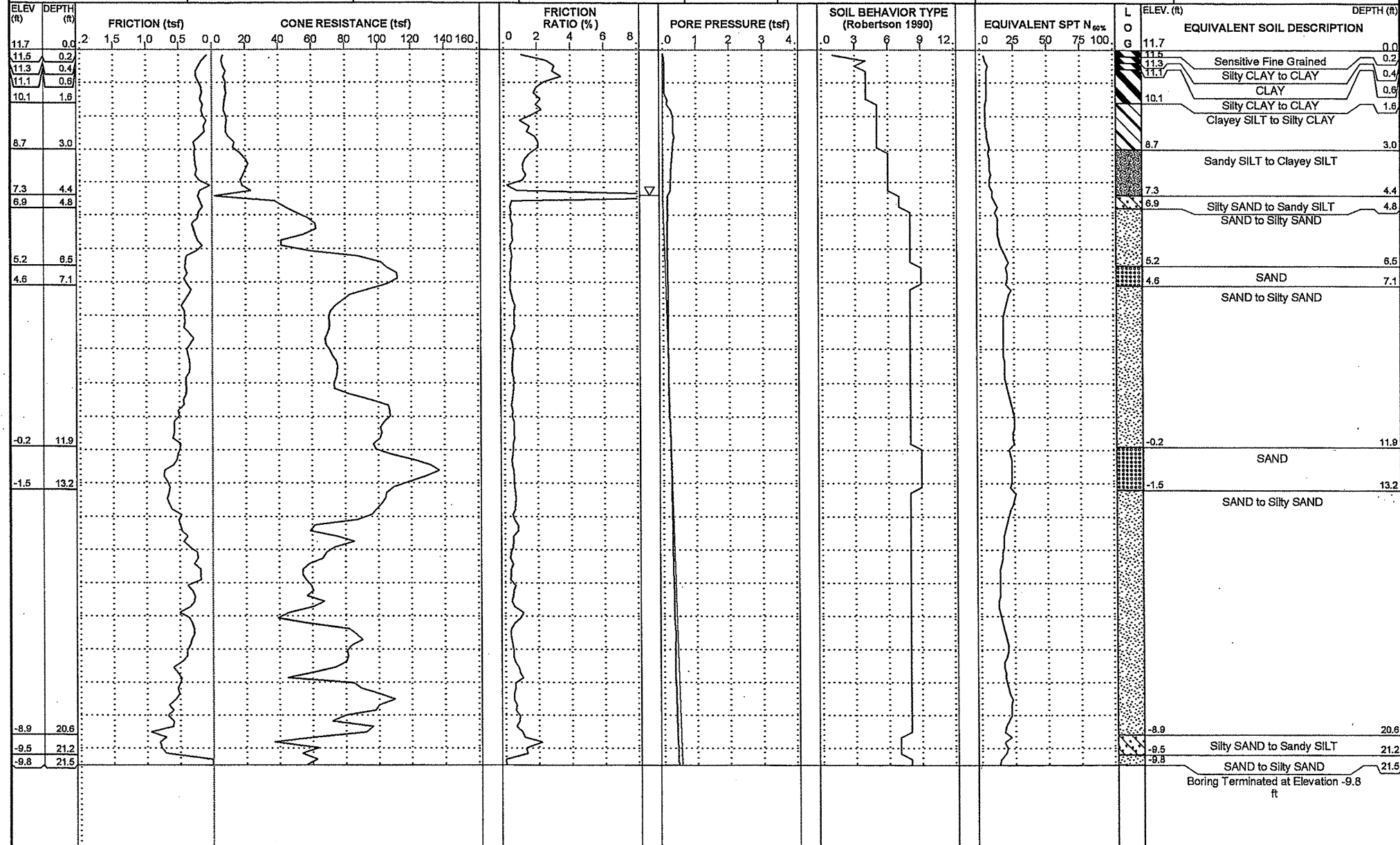


NCDOT GEOTECHNICAL ENGINEERING UNIT
CONE PENETRATION TESTING LOG



ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	15	22
CATLIN # 208-066		SHEET 1 of 1	

PROJECT NO.: 345281.1	ID.: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft): 0 HR. 4.4	DRILL METHOD: Direct Push
BORING NO.: CPT-15	STATION: 160+97	OFFSET: 44ft RT	ALIGNMENT: -L-	HAMMER TYPE: N/A	ROD TYPE: N/A
COLLAR ELEV.: 11.7 ft	TOTAL DEPTH: 21.5 ft	NORTHING: 369,369	EASTING: 2,708,534	24 HR. N/A	START DATE: 11/06/08
			COMP. DATE: 11/06/08	SURFACE WATER DEPTH: N/A	





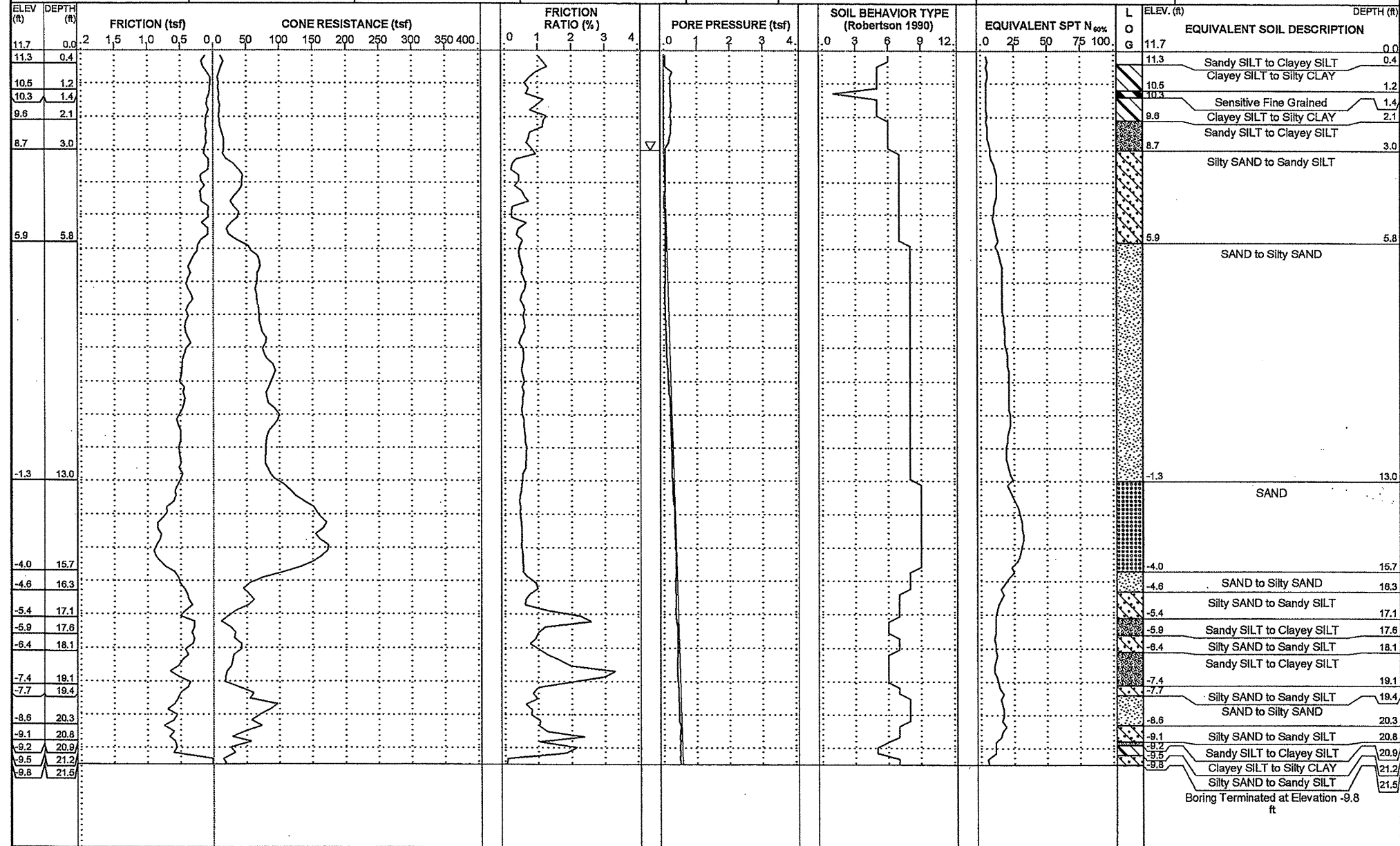
NCDOT GEOTECHNICAL ENGINEERING UNIT

CONE PENETRATION TESTING LOG

ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	16	22

CATLIN # 208-066 SHEET 1 of 1

PROJECT NO.: 345281.1	ID: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft): 0 HR. 3.0	DRILL METHOD: Direct Push
BORING NO.: CPT-16		STATION: 162+02	OFFSET: 50ft RT	ALIGNMENT: -L-	CONE TYPE: Piezocone
COLLAR ELEV.: 11.7 ft		TOTAL DEPTH: 21.5 ft	NORTHING: 369,454	EASTING: 2,708,592	24 HR. N/A
			HAMMER TYPE: N/A	ROD TYPE: N/A	DRILLER: Donald B Coogan
			START DATE: 11/06/08	COMP. DATE: 11/06/08	TECHNICIAN: Mid-Atlantic
			SURFACE WATER DEPTH: N/A		





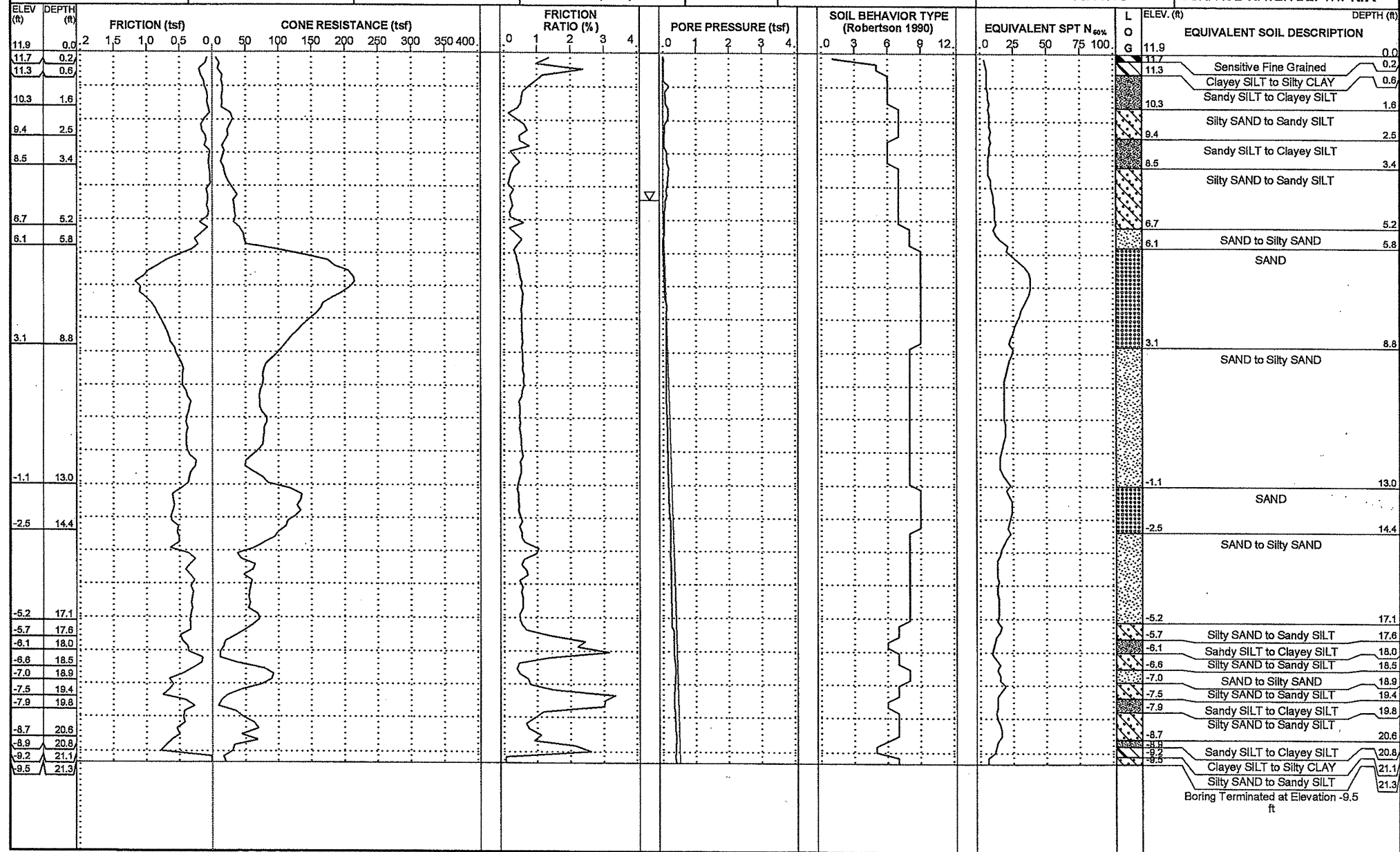
NCDOT GEOTECHNICAL ENGINEERING UNIT
CONE PENETRATION TESTING LOG



ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	17	22

CATLIN # 208-066 SHEET 1 of 1

PROJECT NO.: 345281.1	ID: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft): 0 HR. 4.4	DRILL METHOD: Direct Push
BORING NO.: CPT-17	STATION: 162+98	OFFSET: 44ft RT	ALIGNMENT: -L-	HAMMER TYPE: N/A	CONE TYPE: Piezocone
COLLAR ELEV.: 11.9 ft	TOTAL DEPTH: 21.3 ft	NORTHING: 369,534	EASTING: 2,708,639	24 HR. N/A	DRILLER: Donald B Coogan
			START DATE: 11/06/08	COMP. DATE: 11/06/08	TECHNICIAN: Mid-Atlantic
					SURFACE WATER DEPTH: N/A

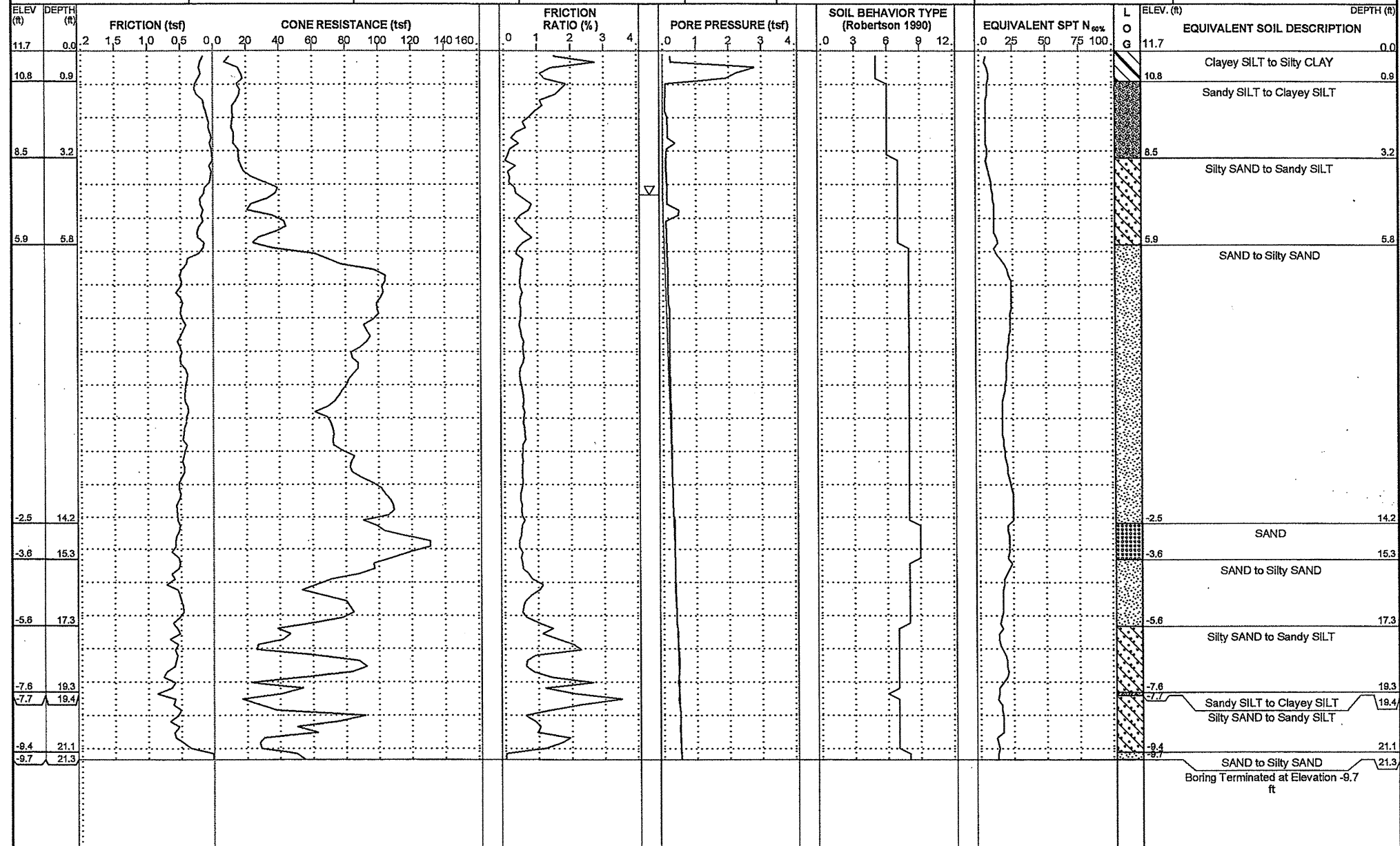




NCDOT GEOTECHNICAL ENGINEERING UNIT
CONE PENETRATION TESTING LOG

ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	18	22
CATLIN # 208-066		SHEET 1 of 1	

PROJECT NO.: 345281.1	ID.: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft)	DRILL METHOD: Direct Push
BORING NO.: CPT-18	STATION: 163+95	OFFSET: 37ft RT	ALIGNMENT: -L-	0 HR. 4.3	CONE TYPE: Piezocone
COLLAR ELEV.: 11.7 ft	TOTAL DEPTH: 21.3 ft	NORTHING: 369,612	EASTING: 2,708,691	24 HR. N/A	DRILLER: Donald B Coogan
				START DATE: 11/06/08	TECHNICIAN: Mid-Atlantic
				COMP. DATE: 11/06/08	SURFACE WATER DEPTH: N/A





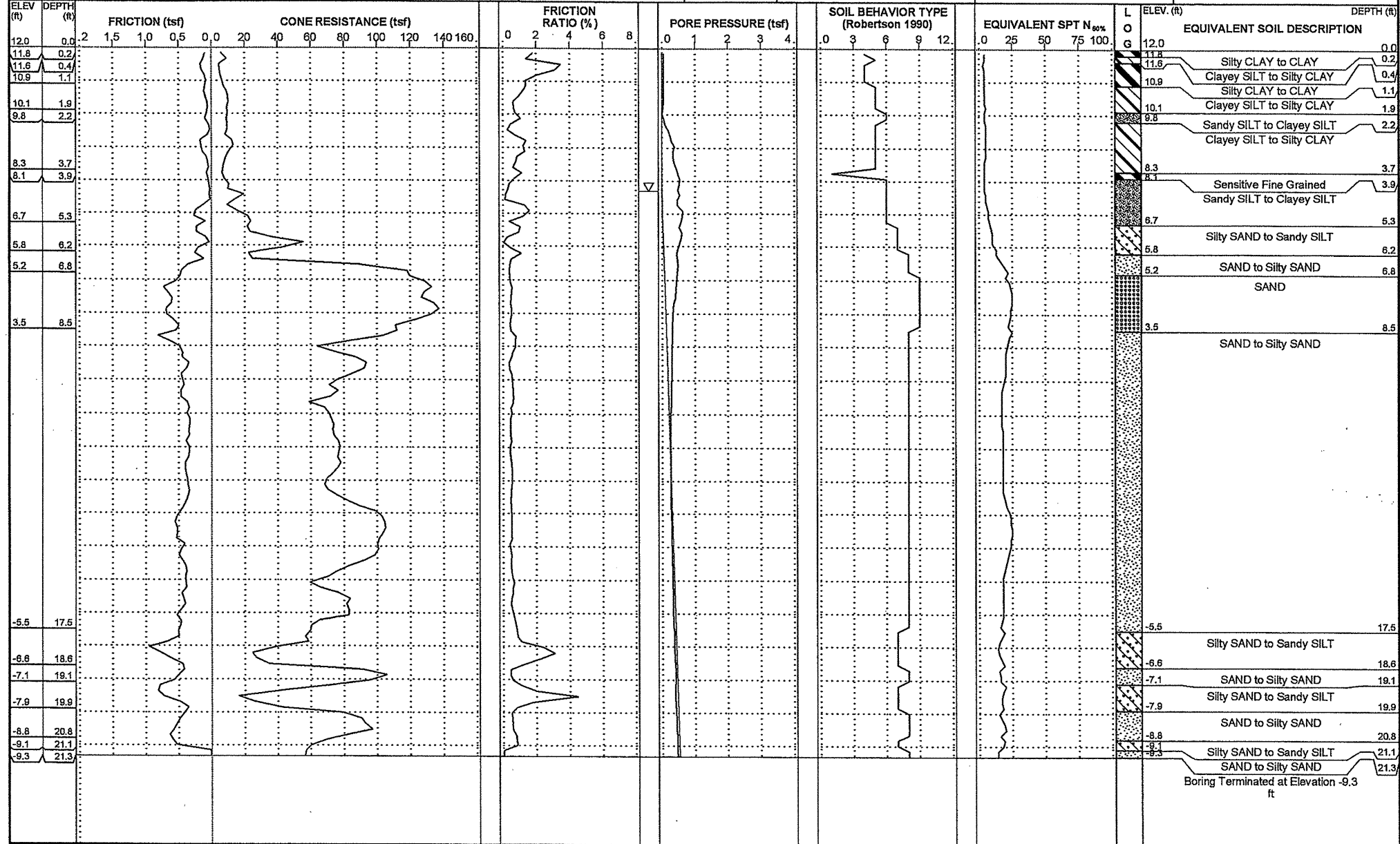
NCDOT GEOTECHNICAL ENGINEERING UNIT
CONE PENETRATION TESTING LOG



ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	19	22

CATLIN # 208-066 SHEET 1 of 1

PROJECT NO.: 345281.1	ID: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft)	DRILL METHOD: Direct Push
				0 HR. 4.3	CONE TYPE: Piezocone
BORING NO.: CPT-19	STATION: 165+00	OFFSET: 23ft RT	ALIGNMENT: -L-	HAMMER TYPE: N/A	ROD TYPE: N/A
				24 HR. N/A	TECHNICIAN: Mid-Atlantic
COLLAR ELEV.: 12.0 ft	TOTAL DEPTH: 21.3 ft	NORTHING: 369,697	EASTING: 2,708,751	START DATE: 11/06/08	COMP. DATE: 11/06/08
					SURFACE WATER DEPTH: N/A



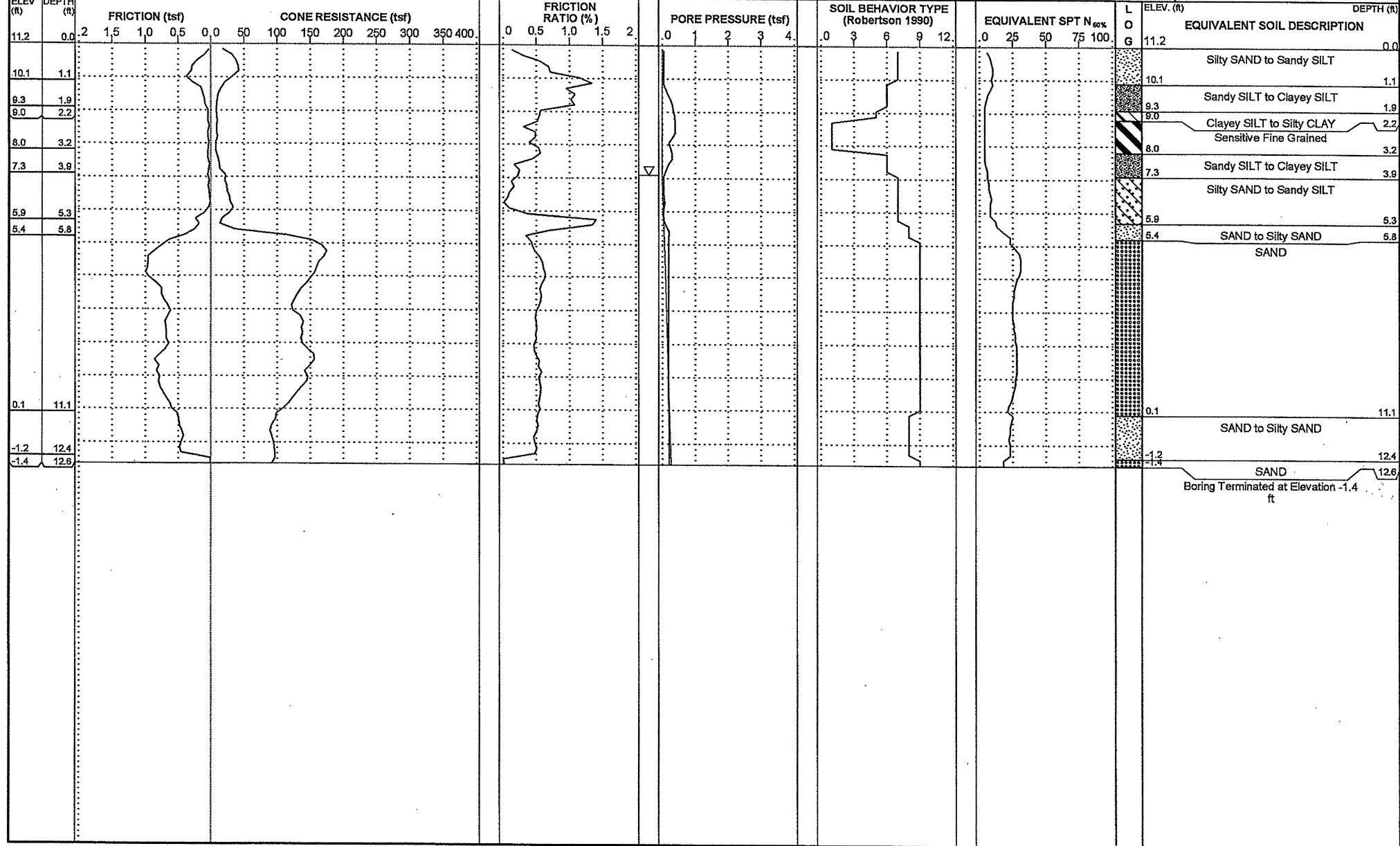


NCDOT GEOTECHNICAL ENGINEERING UNIT
CONE PENETRATION TESTING LOG



ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	21	22

PROJECT NO.: 345281.1	ID: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft)	DRILL METHOD: Direct Push
BORING NO.: CPT-21	STATION: 167+00	OFFSET: 46ft RT	ALIGNMENT: -L-	0 HR. 3.9	CONE TYPE: Piezocone
COLLAR ELEV.: 11.2 ft	TOTAL DEPTH: 12.6 ft	NORTHING: 369,810	EASTING: 2,708,911	24 HR. N/A	HAMMER TYPE: N/A
			START DATE: 11/06/08		COMP. DATE: 11/06/08
					DRILLER: Donald B Coogan
					TECHNICIAN: Mid-Atlantic
					SURFACE WATER DEPTH: N/A





NCDOT GEOTECHNICAL ENGINEERING UNIT
CONE PENETRATION TESTING LOG

ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-3307	345281.1	22	22
CATLIN # 208-066		SHEET 1 of 1	

PROJECT NO.: 345281.1	ID: R-3307	COUNTY: Carteret	GEOLOGIST: Steven Hudson	DRILL MACHINE: Hogentogler Track Mount	MAX. DOWN PRESSURE: 20 Ton
SITE DESCRIPTION: US 70 from Existing Four Lanes at Radio Island to US 70 from N. of SR 1429				GROUND WATER (ft): 0 HR. 4.8	DRILL METHOD: Direct Push
BORING NO.: CPT-22	STATION: 167+50	OFFSET: 46ft RT	ALIGNMENT: -L-	HAMMER TYPE: N/A	ROD TYPE: N/A
COLLAR ELEV.: 11.0 ft	TOTAL DEPTH: 6.9 ft	NORTHING: 369,839	EASTING: 2,708,950	24 HR. N/A	START DATE: 11/06/08
				COMP. DATE: 11/06/08	SURFACE WATER DEPTH: N/A

