

REFERENCE: U-4751

PROJECT: 40191

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY NEW HANOVER
PROJECT DESCRIPTION SR 1409 (MILITARY CUTOFF ROAD) TO US 17 IN WILMINGTON
SITE DESCRIPTION BRIDGE NO. 202 ON -L- (PROPOSED SR 1409) OVER -Y2- (OGDEN PARK DRIVE) AT -L- STA. 62 + 99.10

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4751	1	14

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) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE 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 THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

- M. BAHIRADHAN
- J. WHITT
- J. DANIEL
- S. BUCHANAN
- S. KITTS
- A. PAISLEY
- MID-ATLANTIC DR.

INVESTIGATED BY M. BAHIRADHAN
 DRAWN BY S. BUCHANAN
 CHECKED BY M. BAHIRADHAN
 SUBMITTED BY SCHNABEL ENG.
 DATE FEBRUARY 2015



DocuSigned by:
Mahalingam Bahiradhan
 3/16/2015
 4DEAD345C9264A2 SIGNATURE DATE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS LIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 209, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION
GENERAL CLASS., GRANULAR MATERIALS (≤ 35% PASSING #200), SILT-CLAY MATERIALS (> 35% PASSING #200), ORGANIC MATERIALS. Includes tables for Group Class., Symbol, % Passing #10, #40, #200, and Material Passing #40.

CONSISTENCY OR DENSENESS
PRIMARY SOIL TYPE, COMPACTNESS OR CONSISTENCY, RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE), RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TENS./FT²)

TEXTURE OR GRAIN SIZE
U.S. STD. SIEVE SIZE, BOULDER (BLDR.), COBBLE (COB.), GRAVEL (GR.), COARSE SAND (CS, SD.), FINE SAND (F SD.), SILT (SL.), CLAY (CL.)

SOIL MOISTURE - CORRELATION OF TERMS
SOIL MOISTURE SCALE (ATTERBERG LIMITS), FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION. Includes plasticity range (PI) and optimum moisture shrinkage limit.

PLASTICITY
PLASTICITY INDEX (PI), DRY STRENGTH

COLOR
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION
WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES 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.

MINERALOGICAL COMPOSITION
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY
SLIGHTLY COMPRESSIBLE, MODERATELY COMPRESSIBLE, HIGHLY COMPRESSIBLE. Includes tables for Percentage of Material (Organic, Granular, Silty-Clay, Other) and Ground Water (Water Level, Static, Perched, Spring).

MISCELLANEOUS SYMBOLS
ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION, SOIL SYMBOL, ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT, INFERRERD SOIL BOUNDARY, INFERRERD ROCK LINE, ALLUVIAL SOIL BOUNDARY. Includes symbols for Dip and Dip Direction, Test Boring, Auger Boring, Core Boring, Monitoring Well, Piezometer Installation, Slope Indicator Installation, Cone Penetrometer Test, Sounding Rod, Test Boring With Core, SPT N-VALUE.

RECOMMENDATION SYMBOLS
UNDERCUT EXCAVATION, UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE, UNCLASSIFIED EXCAVATION - UNSUITABLE BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL, SHALLOW UNDERCUT, UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK

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, HI. - HIGHLY, MED. - MEDIUM, MICA - MICACEOUS, MOD. - MODERATELY, NP - NON PLASTIC, ORG. - ORGANIC, PMT - PRESSUREMETER TEST, SAP. - SAPROLITIC, SD. - SAND, SANDY, SL. - SILTY, SILTY, SLI. - SLIGHTLY, TCR - TRICONE REFUSAL, w - MOISTURE CONTENT, v - VERY, VST - VANE SHEAR TEST, WEA. - WEATHERED, u - UNIT WEIGHT, d - DRY UNIT WEIGHT, SAMPLE ABBREVIATIONS: S - BULK, SS - SPLIT SPOON, ST - SHELBY TUBE, RS - ROCK, RT - RECOMPACTED TRIAXIAL, CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT
DRILL UNITS: CME-45C, CME-55, CME-550, VANE SHEAR TEST, PORTABLE HOIST, CME 45B
ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE 2.94" STEEL TEETH, TRICONE * TUNG-CARB., CORE BIT
HAMMER TYPE: AUTOMATIC, MANUAL
CORE SIZE: -B, -H, -N
HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST

ROCK DESCRIPTION
HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRERD 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), CRYSTALLINE ROCK (CR), NON-CRYSTALLINE ROCK (NCR), COASTAL PLAIN SEDIMENTARY ROCK (CP)

WEATHERING
FRESH, VERY SLIGHT (V SLI), SLIGHT (SLI), MODERATE (MOD), MODERATELY SEVERE (MOD. SEV.), SEVERE (SEV.), VERY SEVERE (V SEV.), COMPLETE. Includes descriptions of rock conditions and testing procedures.

ROCK HARDNESS
VERY HARD, HARD, MODERATELY HARD, MEDIUM HARD, SOFT, VERY SOFT. Includes descriptions of rock hardness and testing procedures.

FRACTURE SPACING, BEDDING
TERMS, SPACING, THICKNESS. Includes tables for Fracture Spacing and Bedding characteristics.

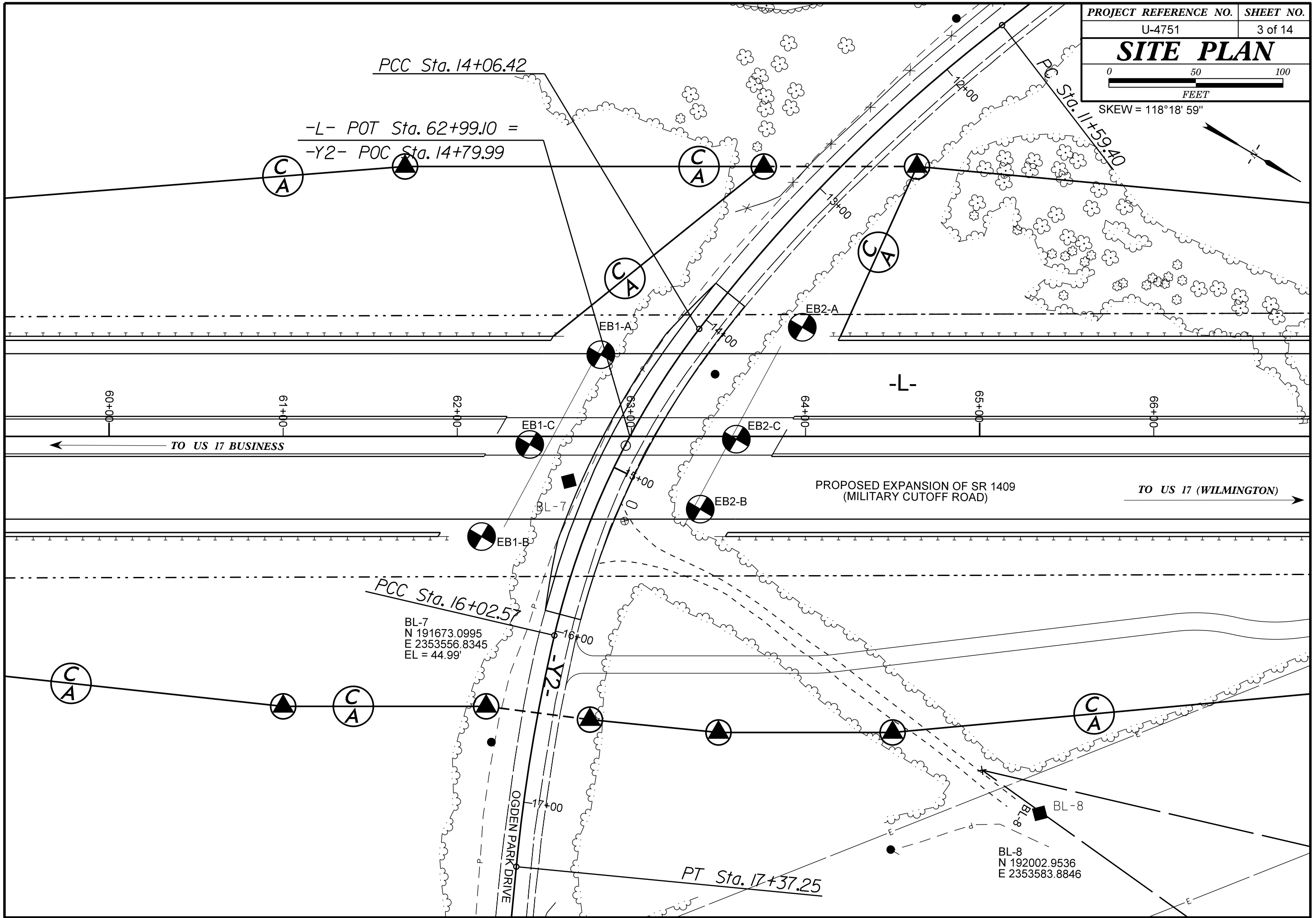
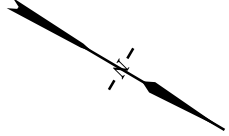
INDURATION
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. Includes descriptions of friable, moderately indurated, indurated, and extremely indurated rock types.

TERMS AND DEFINITIONS
ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. 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.

TERMS AND DEFINITIONS (continued)
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 DISLODGED 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 (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. 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 (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

ELEVATION: 44.99 FEET

NOTES:
NM = NOT MEASURED



PCC Sta. 14+06.42
 -L- POT Sta. 62+99.10 =
 -Y2- POC Sta. 14+79.99

60+00 61+00 62+00
 ← TO US 17 BUSINESS

PROPOSED EXPANSION OF SR 1409
 (MILITARY CUTOFF ROAD) TO US 17 (WILMINGTON) →

PCC Sta. 16+02.57
 BL-7
 N 191673.0995
 E 2353556.8345
 EL = 44.99'

BL-8
 N 192002.9536
 E 2353583.8846

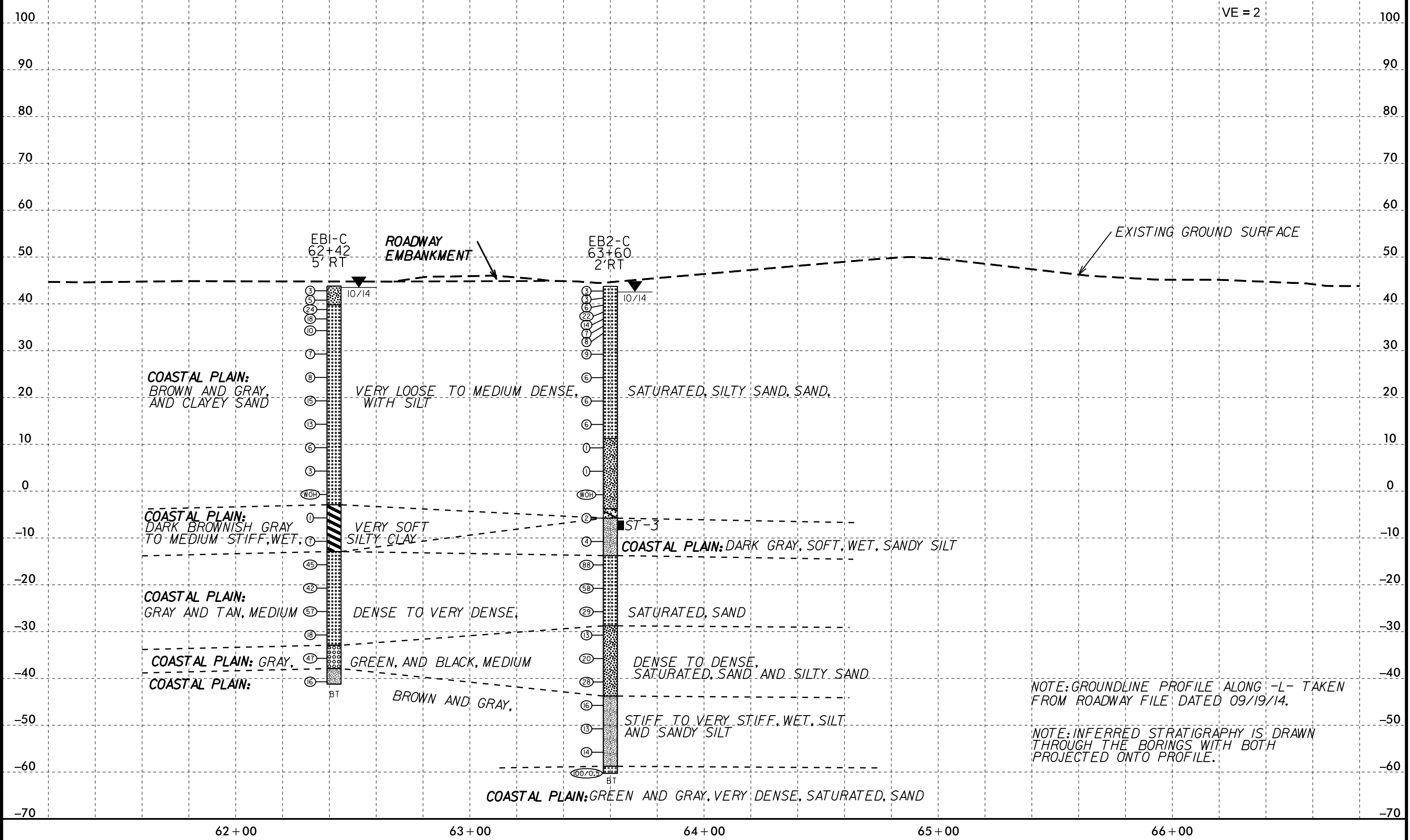
PT Sta. 17+37.25

OGDEN PARK DRIVE

PROFILE THROUGH BORINGS PROJECTED ALONG -L-

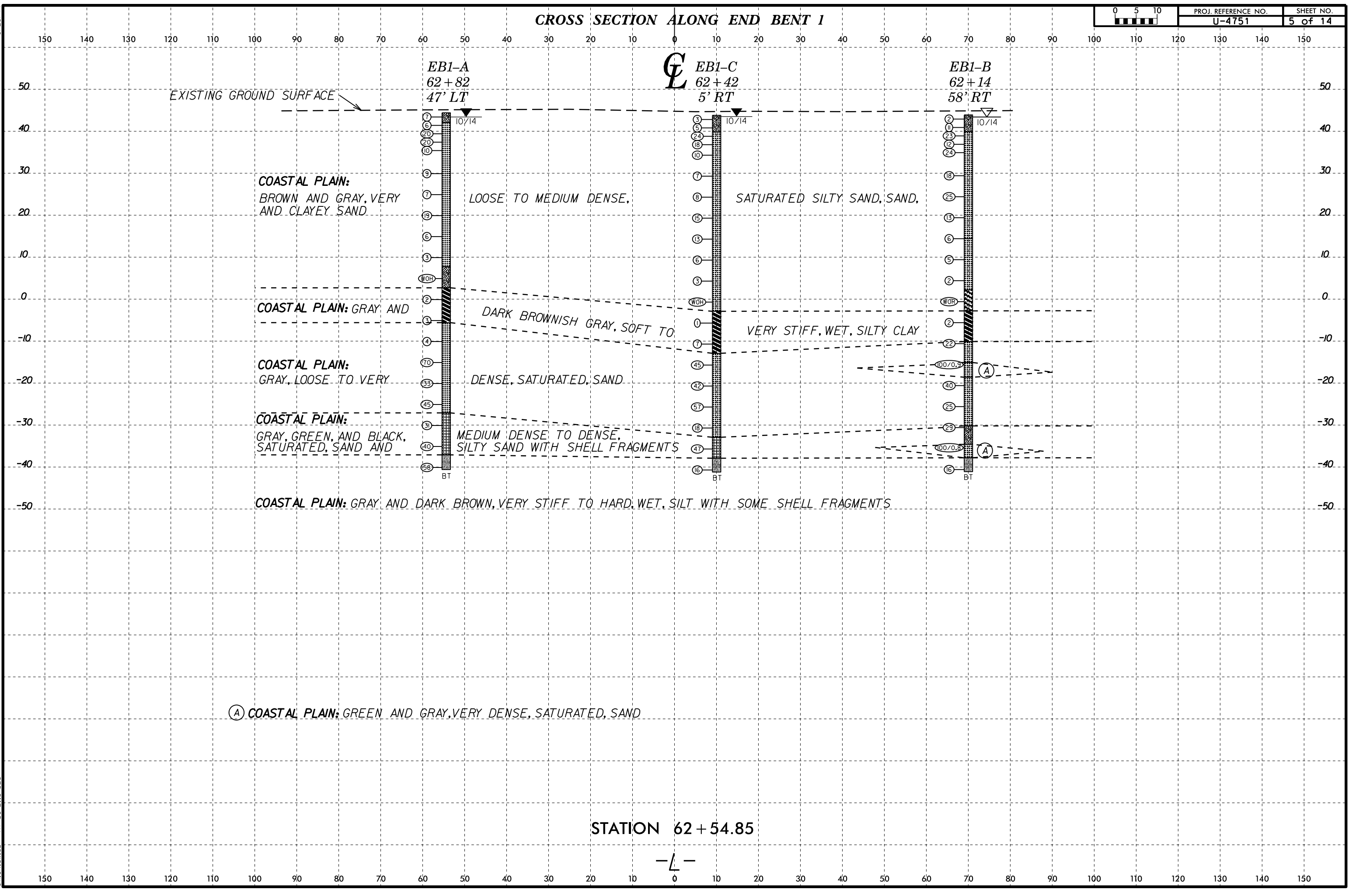
PROJECT REFERENCE NO. U-4751	SHEET NO. 4 OF 14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

VE = 2



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CROSS SECTION ALONG END BENT 1



EB1-A
62+82
47' LT

EB1-C
62+42
5' RT

EB1-B
62+14
58' RT

EXISTING GROUND SURFACE

COASTAL PLAIN:
BROWN AND GRAY, VERY
AND CLAYEY SAND

LOOSE TO MEDIUM DENSE,

SATURATED SILTY SAND, SAND,

COASTAL PLAIN: GRAY AND

DARK BROWNISH GRAY, SOFT TO

VERY STIFF, WET, SILTY CLAY

COASTAL PLAIN:
GRAY, LOOSE TO VERY

DENSE, SATURATED, SAND

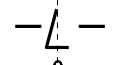
COASTAL PLAIN:
GRAY, GREEN, AND BLACK,
SATURATED, SAND AND

MEDIUM DENSE TO DENSE,
SILTY SAND WITH SHELL FRAGMENTS

COASTAL PLAIN: GRAY AND DARK BROWN, VERY STIFF TO HARD, WET, SILT WITH SOME SHELL FRAGMENTS

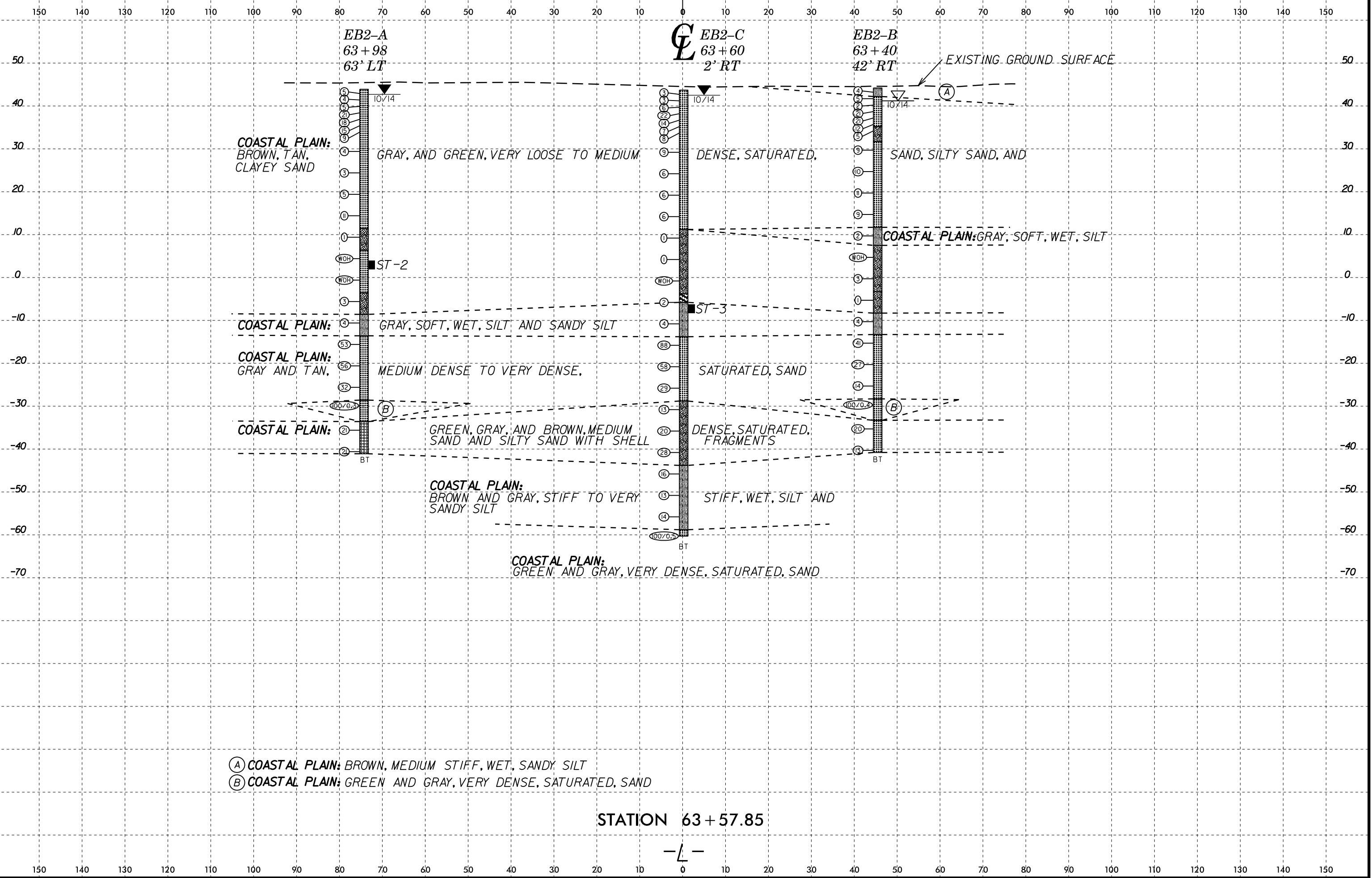
(A) COASTAL PLAIN: GREEN AND GRAY, VERY DENSE, SATURATED, SAND

STATION 62+54.85



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CROSS SECTION ALONG END BENT 2

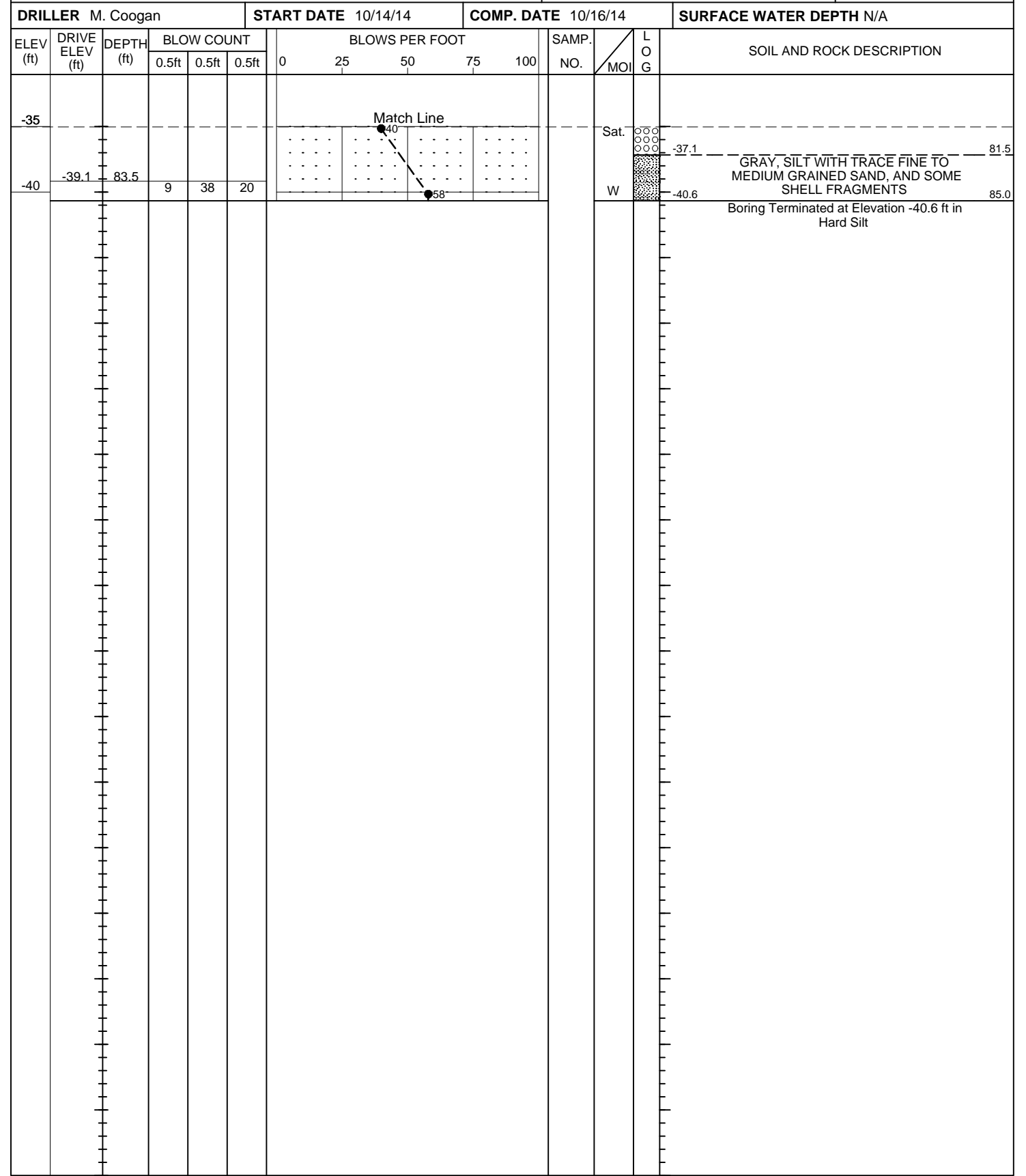
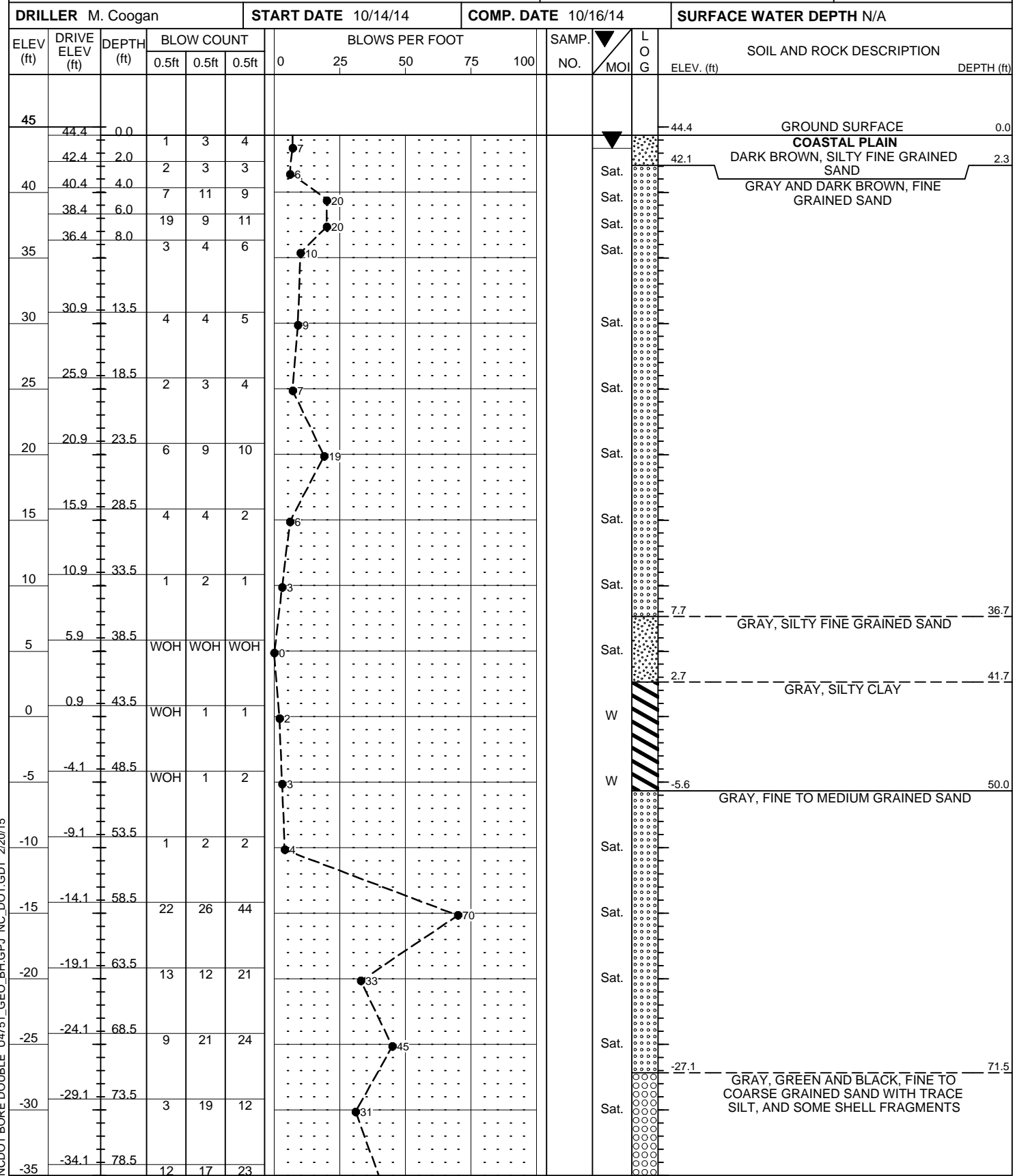


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 smckiewicz AT 08-210-026

NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

Table with 4 columns: WBS 40191, TIP U-4751, COUNTY NEW HANOVER, GEOLOGIST J. Whitt. Includes SITE DESCRIPTION, BORING NO. EB1-A, STATION 62+82, OFFSET 47 ft LT, ALIGNMENT -L-, GROUND WTR (ft), COLLAR ELEV. 44.4 ft, TOTAL DEPTH 85.0 ft, NORTHING 191,652, EASTING 2,353,485, 24 HR. 1.0, DRILL RIG/HAMMER EFF./DATE, DRILL METHOD, HAMMER TYPE, DRILLER M. Coogan, START DATE 10/14/14, COMP. DATE 10/16/14, SURFACE WATER DEPTH N/A.

Table with 4 columns: WBS 40191, TIP U-4751, COUNTY NEW HANOVER, GEOLOGIST J. Whitt. Includes SITE DESCRIPTION, BORING NO. EB1-A, STATION 62+82, OFFSET 47 ft LT, ALIGNMENT -L-, GROUND WTR (ft), COLLAR ELEV. 44.4 ft, TOTAL DEPTH 85.0 ft, NORTHING 191,652, EASTING 2,353,485, 24 HR. 1.0, DRILL RIG/HAMMER EFF./DATE, DRILL METHOD, HAMMER TYPE, DRILLER M. Coogan, START DATE 10/14/14, COMP. DATE 10/16/14, SURFACE WATER DEPTH N/A.



NCDOT BORE DOUBLE U4751_GEO_BH.GPJ NC_DOT.GDT 2/20/15



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 40191		TIP U-4751		COUNTY NEW HANOVER		GEOLOGIST J. Whitt											
SITE DESCRIPTION Bridge No. 202 on -L- (Military Cutoff Road) over -Y2- (Ogden Park Drive)							GROUND WTR (ft)										
BORING NO. EB1-B		STATION 62+14		OFFSET 58 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 43.9 ft		TOTAL DEPTH 85.0 ft		NORTHING 191,646		EASTING 2,353,610											
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 80% 10/22/2014				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER M. Coogan		START DATE 10/13/14		COMP. DATE 10/14/14		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
45																	
	43.9	0.0	WOH	1	1											43.9	GROUND SURFACE
	41.9	2.0		2	4												COASTAL PLAIN
	39.9	4.0		9	12												DARK BROWN, SILTY FINE GRAINED SAND
	37.9	6.0		6	6												LIGHT BROWN, FINE GRAINED SAND
	35.9	8.0		8	11												
	30.4	13.5		4	7												
	25.4	18.5		6	10												
	20.4	23.5		4	6												
	15.4	28.5		4	3												
	10.4	33.5		2	2												
	5.4	38.5		1	WOH												
	0.4	43.5	WOR	WOR	WOR												
	-4.6	48.5	WOH	WOH	2												
	-9.6	53.5		9	8												
	-14.6	58.5		21	31												
	-19.6	63.5		11	16												
	-24.6	68.5		14	11												
	-29.6	73.5		2	3												
	-34.6	78.5															

WBS 40191		TIP U-4751		COUNTY NEW HANOVER		GEOLOGIST J. Whitt											
SITE DESCRIPTION Bridge No. 202 on -L- (Military Cutoff Road) over -Y2- (Ogden Park Drive)							GROUND WTR (ft)										
BORING NO. EB1-B		STATION 62+14		OFFSET 58 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 43.9 ft		TOTAL DEPTH 85.0 ft		NORTHING 191,646		EASTING 2,353,610											
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 80% 10/22/2014				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER M. Coogan		START DATE 10/13/14		COMP. DATE 10/14/14		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
-35																	
			45	55	0.3												Match Line
																	GREEN AND GRAY, SAND (continued)
																	DARK BROWN, SILT
																	Boring Terminated at Elevation -41.1 ft in Very Stiff Silt

NCDOT BORE DOUBLE U4751_GEO_BH.GPJ NC_DOT.GDT 2/20/15

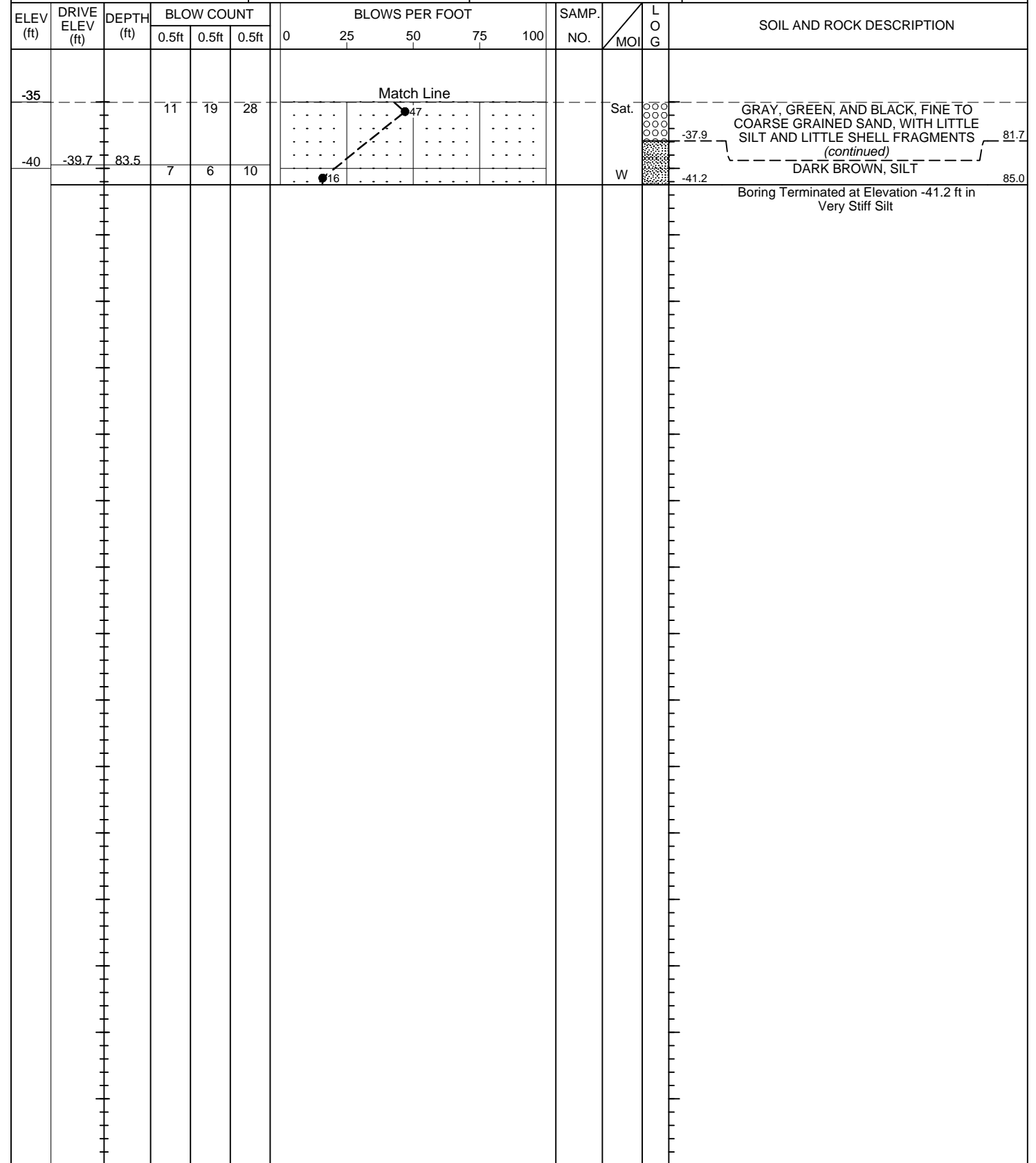
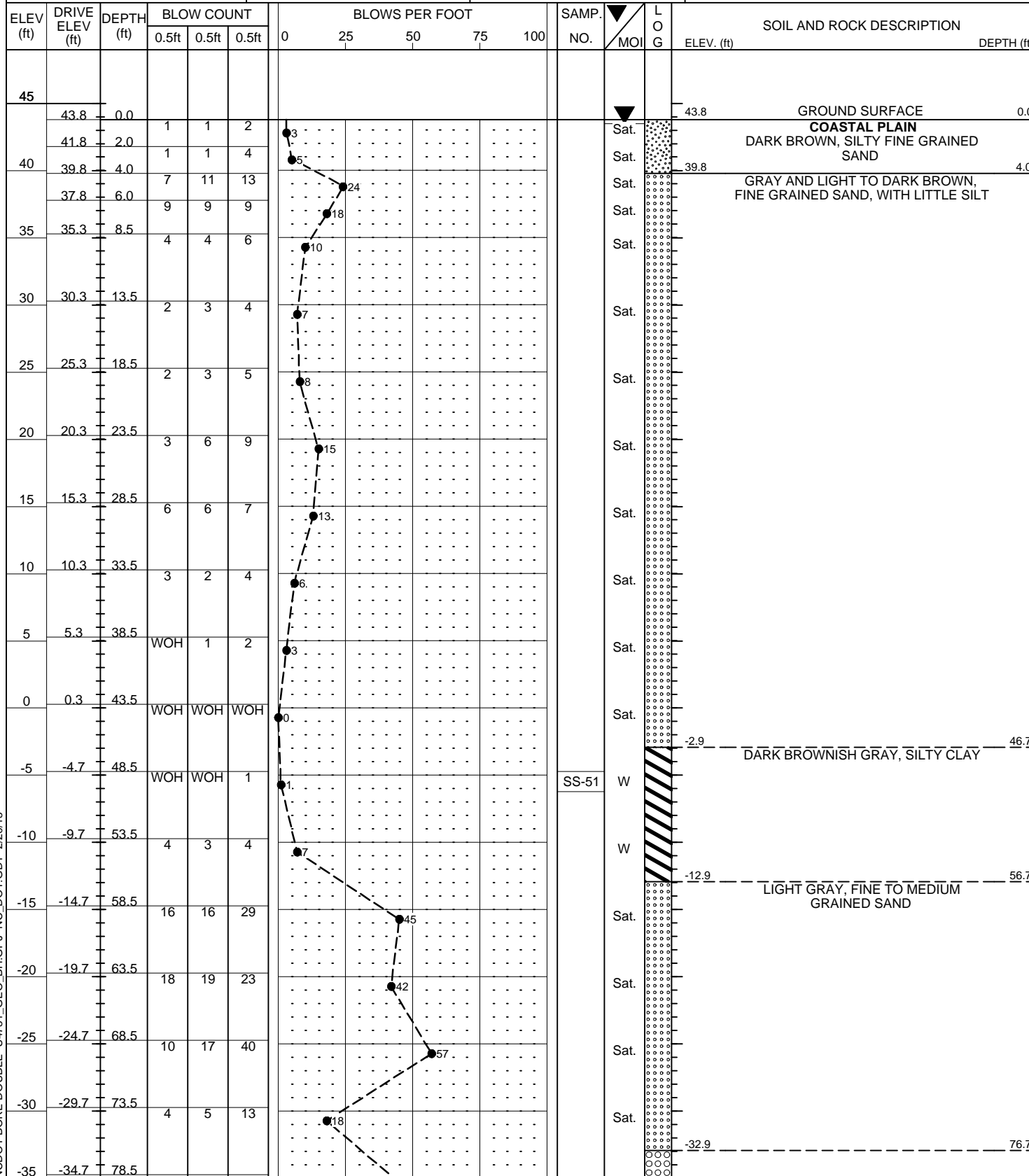


NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 40191	TIP U-4751	COUNTY NEW HANOVER	GEOLOGIST J. Whitt
SITE DESCRIPTION Bridge No. 202 on -L- (Military Cutoff Road) over -Y2- (Ogden Park Drive)			GROUND WTR (ft)
BORING NO. EB1-C	STATION 62+42	OFFSET 5 ft RT	ALIGNMENT -L-
COLLAR ELEV. 43.8 ft	TOTAL DEPTH 85.0 ft	NORTHING 191,643	EASTING 2,353,550
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 80% 10/22/2014		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER M. Coogan	START DATE 10/13/14	COMP. DATE 10/13/14	SURFACE WATER DEPTH N/A

WBS 40191	TIP U-4751	COUNTY NEW HANOVER	GEOLOGIST J. Whitt
SITE DESCRIPTION Bridge No. 202 on -L- (Military Cutoff Road) over -Y2- (Ogden Park Drive)			GROUND WTR (ft)
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DRILLER M. Coogan	START DATE 10/13/14	COMP. DATE 10/13/14	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE U4751_GEO_BH.GPJ NC_DOT.GDT 2/20/15



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 40191				TIP U-4751		COUNTY NEW HANOVER		GEOLOGIST J. Daniel									
SITE DESCRIPTION Bridge No. 202 on -L- (Military Cutoff Road) over -Y2- (Ogden Park Drive)								GROUND WTR (ft)									
BORING NO. EB2-B		STATION 63+40		OFFSET 42 ft RT		ALIGNMENT -L-		0 HR.		3.0							
COLLAR ELEV. 44.2 ft		TOTAL DEPTH 85.0 ft		NORTHING 191,746		EASTING 2,353,532		24 HR.		NM							
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 80% 10/22/2014						DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER M. Wiggins		START DATE 10/20/14		COMP. DATE 10/20/14		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							
45	44.2	0.0													44.2	GROUND SURFACE	0.0
	42.7	1.5	1	2	2								W	COASTAL PLAIN			
	41.2	3.0	2	2	3									BROWN, FINE GRAINED SANDY SILT	2.0		
	39.7	4.5	1	1	1							Sat.		BROWN, FINE GRAINED SAND WITH SOME SILT			
	38.2	6.0	4	9	12							Sat.					
	36.7	7.5	4	11	10							Sat.					
	35.2	9.0	3	6	6							Sat.					
35	35.2	9.0	3	3	2							Sat.		GRAY, SILTY FINE GRAINED SAND	9.0		
	31.7	12.5										Sat.		TAN, FINE GRAINED SAND	12.5		
30	30.7	13.5	2	4	5							Sat.					
25	25.7	18.5	2	3	7							Sat.					
20	20.7	23.5	4	5	6							Sat.					
15	15.7	28.5	5	5	4							Sat.					
10	10.7	33.5	WOH	1	1							W		GRAY, FINE GRAINED SANDY SILT	32.5		
5	5.7	38.5	WOH	WOH	WOH							Sat.		GRAY, FINE GRAINED SAND WITH SOME SILT AND CLAY	36.7		
0	0.7	43.5	4	2	1							Sat.	SS-92				
-5	-4.3	48.5	WOH	WOH	1							Sat.		DARK GRAY, SILTY FINE GRAINED SAND	47.5		
-10	-9.3	53.5	WOH	2	2							W		GRAY, SILT WITH SOME FINE GRAINED SAND	52.5		
-15	-14.3	58.5	8	17	24							Sat.		TAN, FINE TO MEDIUM GRAINED SAND	57.5		
-20	-19.3	63.5	5	11	16							Sat.					
-25	-24.3	68.5	5	7	7							Sat.					
-30	-29.3	73.5	100/0.4											GREEN AND GRAY, SAND	72.5		
-35	-34.3	78.5													77.5		

NCDOT BORE DOUBLE U4751_GEO_BH.GPJ NC_DOT.GDT 2/20/15

WBS 40191				TIP U-4751		COUNTY NEW HANOVER		GEOLOGIST J. Daniel							
SITE DESCRIPTION Bridge No. 202 on -L- (Military Cutoff Road) over -Y2- (Ogden Park Drive)								GROUND WTR (ft)							
BORING NO. EB2-B		STATION 63+40		OFFSET 42 ft RT		ALIGNMENT -L-		0 HR.		3.0					
COLLAR ELEV. 44.2 ft		TOTAL DEPTH 85.0 ft		NORTHING 191,746		EASTING 2,353,532		24 HR.		NM					
DRILL RIG/HAMMER EFF./DATE MID1904 CME-45B 80% 10/22/2014						DRILL METHOD Mud Rotary		HAMMER TYPE Automatic							
DRILLER M. Wiggins		START DATE 10/20/14		COMP. DATE 10/20/14		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					
-35															
			10	10	10										
	-39.3	83.5	5	6	7										
-40												Sat.		GREEN AND GRAY, MEDIUM GRAINED SAND, WITH TRACE SILT (continued)	
												Sat.		Boring Terminated at Elevation -40.8 ft in Medium Dense Sand	85.0

U-4751

40191

BRIDGE NO. 202 ON -L- (MILITARY CUTOFF ROAD) OVER -Y2- (OGDEN PARK DRIVE)

EB1-C

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-51	5 RT	62+42	48.5 - 50.0	A-7-5	62	19	1	3	33	63	100	99	97	62.3	-

EB2-A

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		
ST-2	63 LT	63+98	40.0 - 42.0	A-3	NP	NP	0	95	2	3	100	100	7	22.1	-

NP- Non Plastic

EB2-B

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-92	42 RT	63+40	38.5 - 40.0	A-2-4	NP	NP	1	87	4	8	100	100	16	19.4	-

NP- Non Plastic

EB2-C

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-123	2 RT	63+60	88.5 - 90.0	A-4	27	4	1	67	24	9	100	100	54	26.5	-
ST-3	2 RT	63+60	50.0 - 52.0	A-4	24	4	0	68	15	16	100	100	38	19.7	-

SITE PHOTOGRAPHS
BRIDGE NO. 202 ON -L- (MILITARY CUTOFF ROAD) OVER -Y2- (OGDEN PARK DRIVE)



View of -Y2- (Ogden Park Drive), looking west.



View of path in woods between boreholes along End Bent 2, looking to the east.
-Y2- (Ogden Park Drive) is located to the right of the photograph.