

REFERENCE: B-4929

PROJECT: 40233

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4929	1	13

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**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY PENDER

PROJECT DESCRIPTION BRIDGE OVER INTRACOASTAL WATERWAY ON HIGHWAY NC 50/210 BETWEEN US 17 AND TOPSAIL BEACH

SITE DESCRIPTION RETAINING WALL 1 ON -L2- FROM 18+37.17 TO 19+27.06, LEFT; RETAINING WALL 2 ON -L2- FROM 18+24.60 TO 19+27.06, RIGHT; RETAINING WALL 3 ON -L2- FROM 57+00.56 TO 57+36.29, LEFT; AND RETAINING WALL 4 ON -L2- FROM 57+00.56 TO 57+71.67, RIGHT

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

- D. RACEY
- C. WANG
- M. ELLIS
- D. TIGNOR
- T. SHARPE

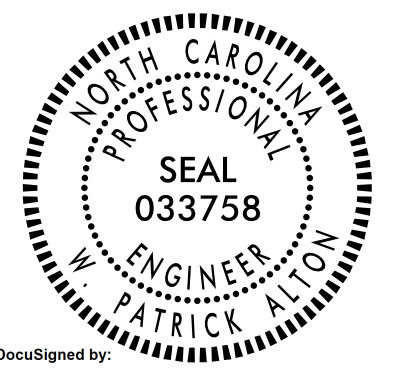
INVESTIGATED BY F&R, Inc.

DRAWN BY T.T. WALKER

CHECKED BY P. ALTON

SUBMITTED BY P. ALTON

DATE FEBRUARY 2016



DocuSigned by:  
W. Patrick Alton 3/18/2016

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SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL  
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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 FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (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
Table with columns for General Class., Group Class., Symbol, % Passing, Material Passing #40 LL PI, Group Index, Usual Types of Major Materials, and Gen. Rating as Subgrade.

CONSISTENCY OR DENSENESS
Table with columns for Primary Soil Type, Compactness or Consistency, Range of Standard Penetration Resistance (N-value), and Range of Unconfined Compressive Strength (tons/ft²).

TEXTURE OR GRAIN SIZE
Table with columns for U.S. Std. Sieve Size (mm), Boulder (BLDR.), Cobble (COB.), Gravel (GR.), Coarse Sand (CSE, SD.), Fine Sand (F SD.), Silt (SL.), and Clay (CL.).

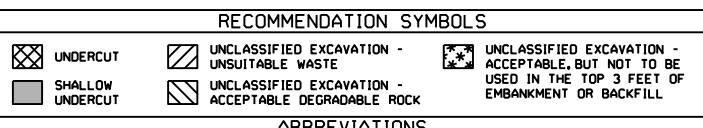
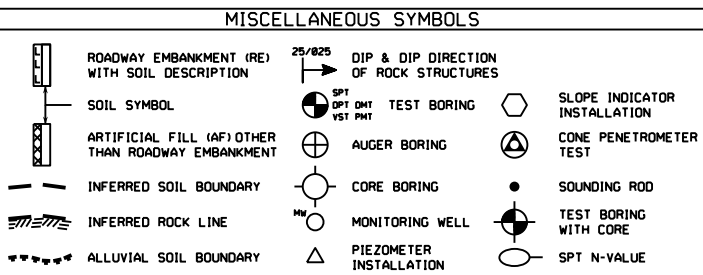
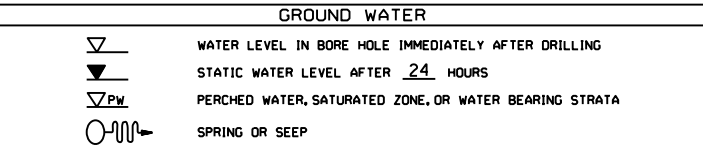
SOIL MOISTURE - CORRELATION OF TERMS
Table with columns for Soil Moisture Scale (Atterberg Limits), Field Moisture Description, and Guide for Field Moisture Description.

PLASTICITY
Table with columns for Plasticity Index (PI) and 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.

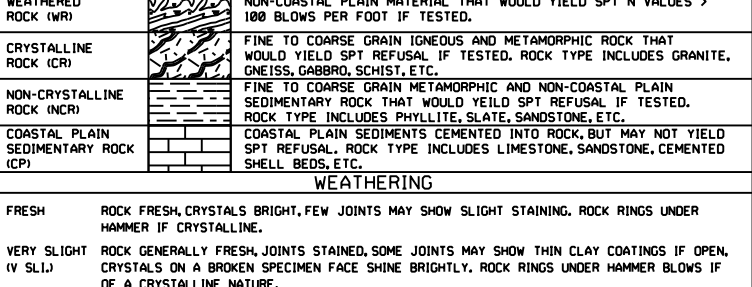
ANGULARITY OF GRAINS
MINERALOGICAL COMPOSITION
COMPRESSIBILITY
PERCENTAGE OF MATERIAL
GROUND WATER



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. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
UNIT WEIGHT
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.
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, DRAG 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 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:



WEATHERING
FRESH: ROCK FRESH, CRYSTALS BRIGHT, FINE 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, WOULD YIELD SPT N VALUES > 100 BPF.
VERY SEVERE (V SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD 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.

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 GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT: CAN BE GROUDED 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.

FRACTURE SPACING and BEDDING
Table with columns for Term, Spacing, and Thickness.

INDURATION
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF 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.

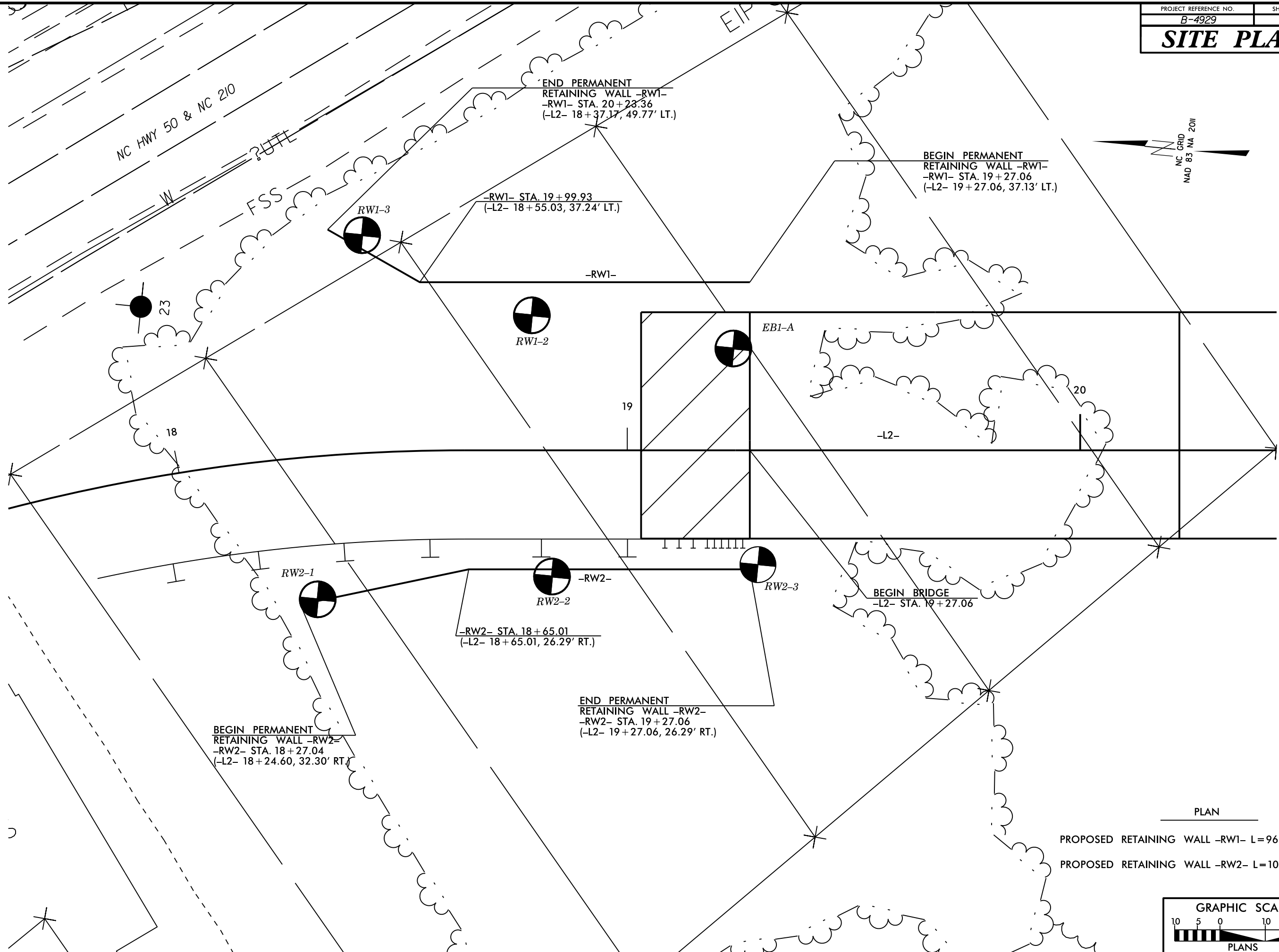
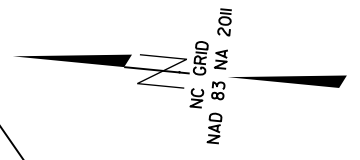
TERMS AND DEFINITIONS

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.
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 DISLOADED 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 (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.

BENCH MARK: N/A
ELEVATION: N/A FEET

NOTES:
RETAINING WALL STATION, OFFSET, AND ELEVATIONS OBTAINED USING A SURVEY GRADE GPS UNIT
FIAD= FILLED IMMEDIATELY AFTER DRILLING
NM= NOT MEASURED

# SITE PLAN



BEGIN PERMANENT  
RETAINING WALL -RW2-  
-RW2- STA. 18+27.04  
(-L2- 18+24.60, 32.30' RT.)

-RW2- STA. 18+65.01  
(-L2- 18+65.01, 26.29' RT.)

END PERMANENT  
RETAINING WALL -RW2-  
-RW2- STA. 19+27.06  
(-L2- 19+27.06, 26.29' RT.)

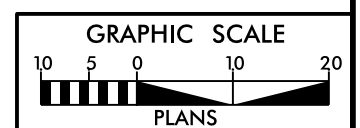
-RW1- STA. 19+99.93  
(-L2- 18+55.03, 37.24' LT.)

END PERMANENT  
RETAINING WALL -RW1-  
-RW1- STA. 20+23.36  
(-L2- 18+37.17, 49.77' LT.)

BEGIN PERMANENT  
RETAINING WALL -RW1-  
-RW1- STA. 19+27.06  
(-L2- 19+27.06, 37.13' LT.)

BEGIN BRIDGE  
-L2- STA. 19+27.06

PROPOSED RETAINING WALL -RW1- L=96.30'  
PROPOSED RETAINING WALL -RW2- L=100.02'



PLAN

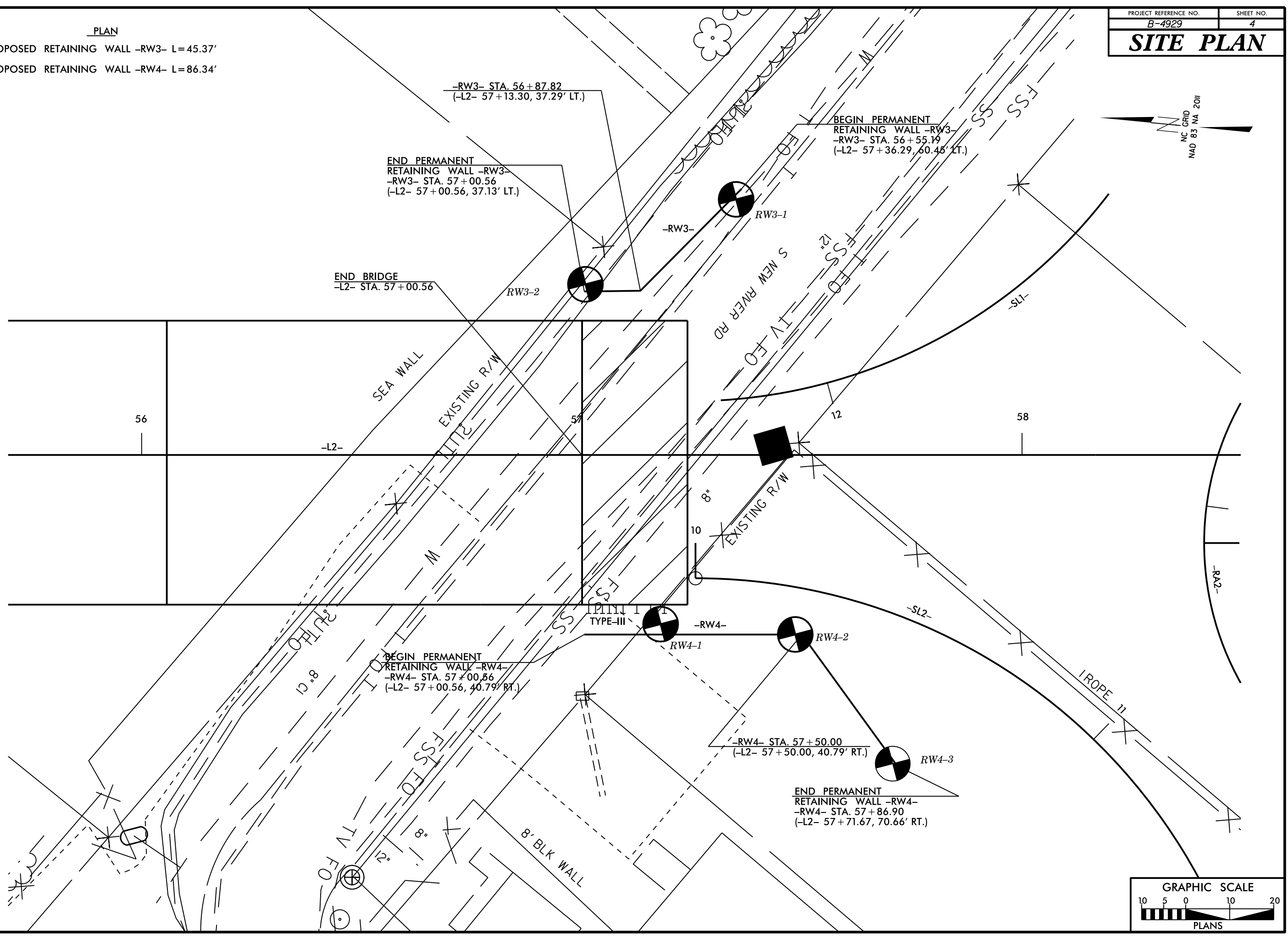
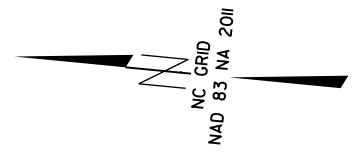
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 Walker - AT 66161068

# SITE PLAN

PLAN

PROPOSED RETAINING WALL -RW3- L=45.37'  
 PROPOSED RETAINING WALL -RW4- L=86.34'



-RW3- STA. 56+87.82  
 (-L2- 57+13.30, 37.29' LT.)

END PERMANENT  
 RETAINING WALL -RW3-  
 -RW3- STA. 57+00.56  
 (-L2- 57+00.56, 37.13' LT.)

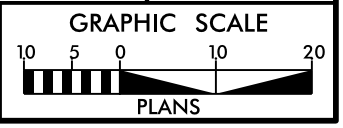
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 -RW3- STA. 56+55.19  
 (-L2- 57+36.29, 60.45' LT.)

END BRIDGE  
 -L2- STA. 57+00.56

BEGIN PERMANENT  
 RETAINING WALL -RW4-  
 -RW4- STA. 57+00.86  
 (-L2- 57+00.56, 40.79' RT.)

-RW4- STA. 57+50.00  
 (-L2- 57+50.00, 40.79' RT.)

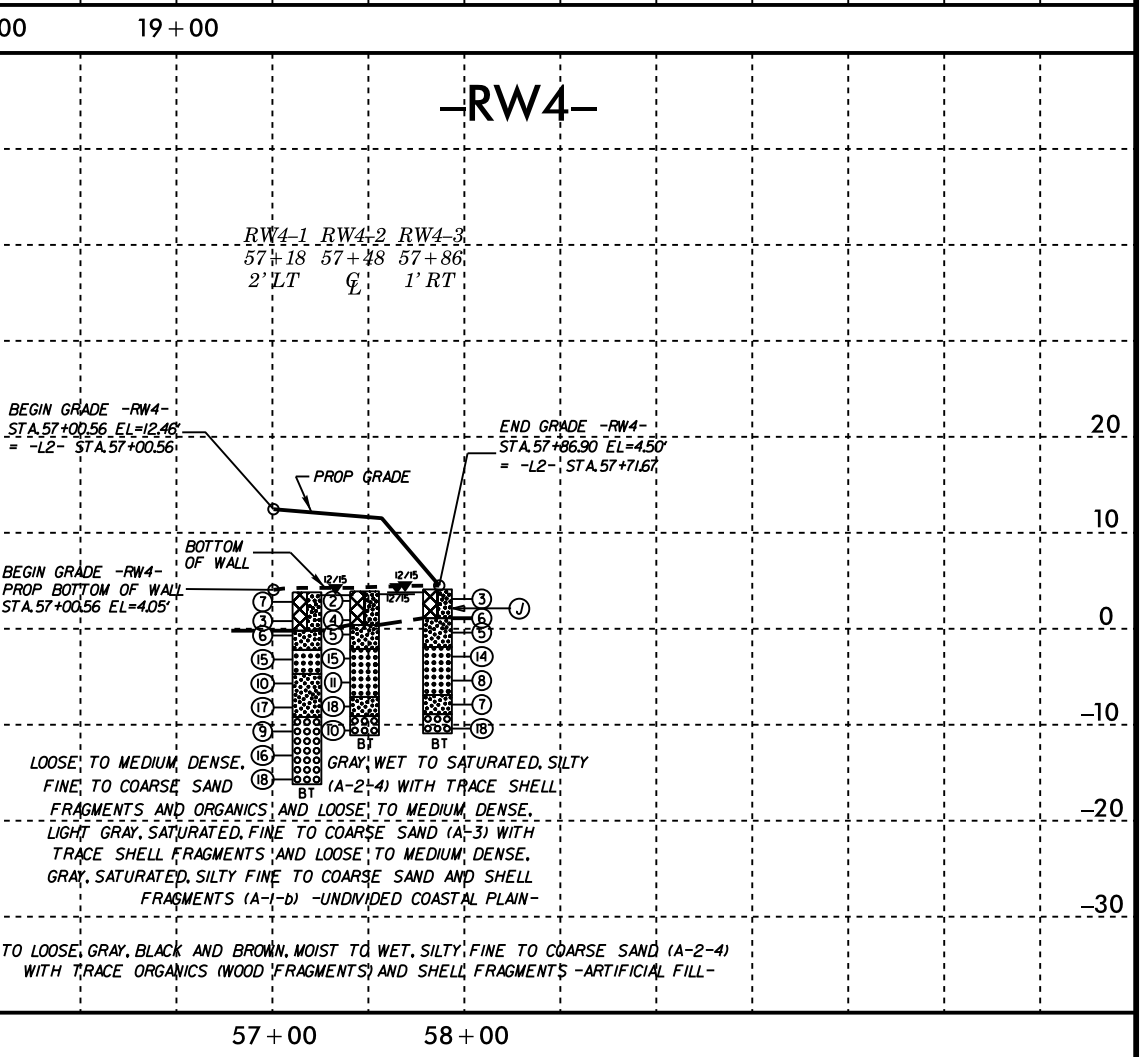
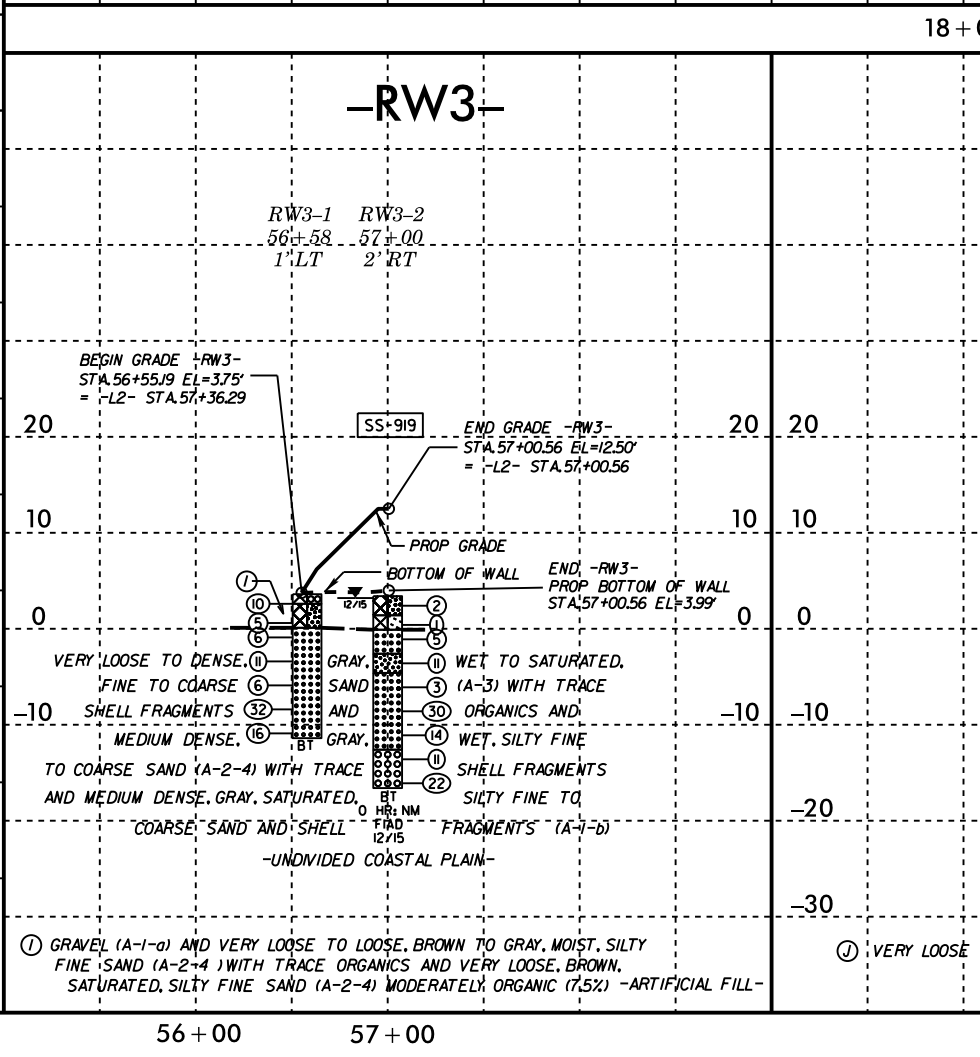
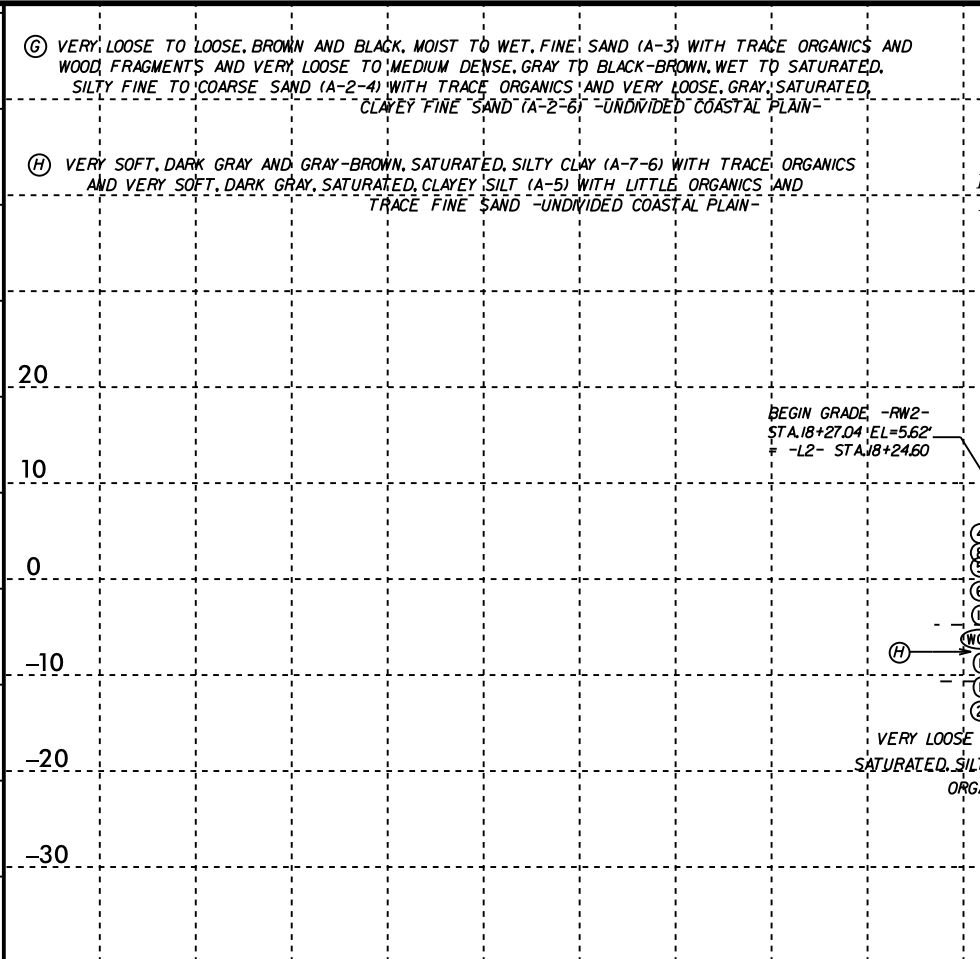
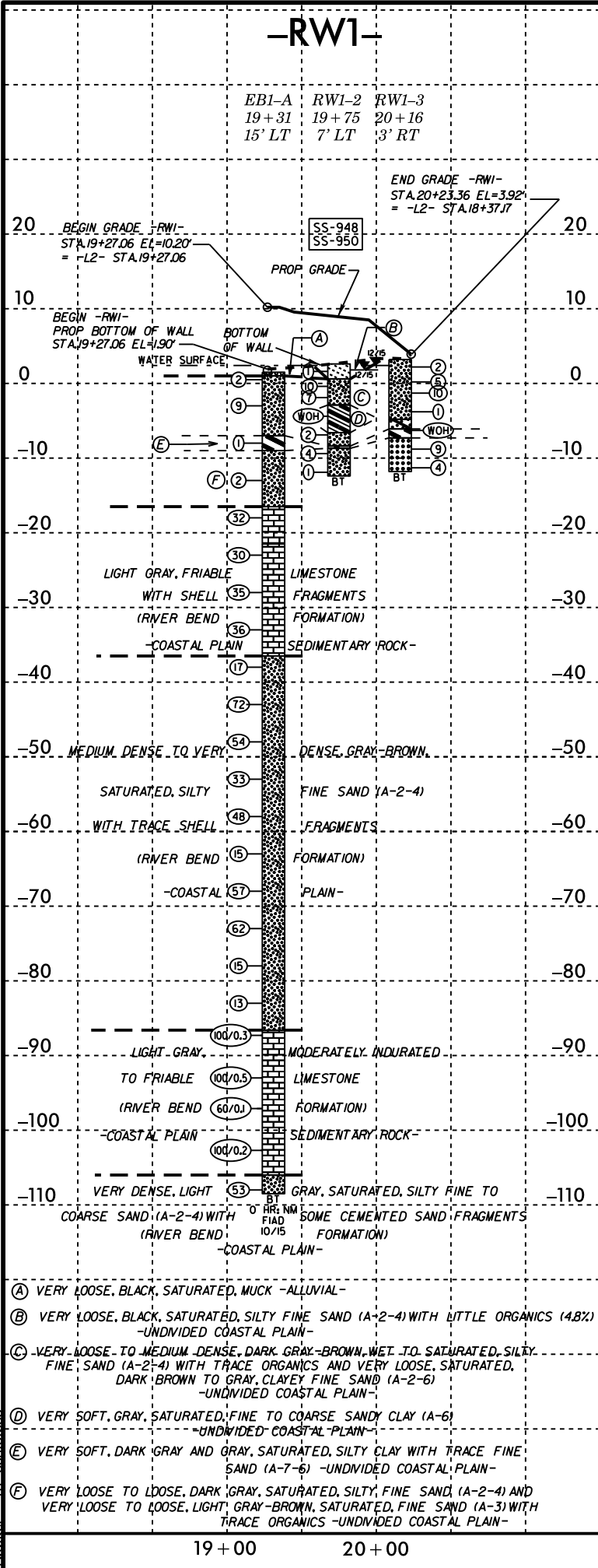
END PERMANENT  
 RETAINING WALL -RW4-  
 -RW4- STA. 57+86.90  
 (-L2- 57+71.67, 70.66' RT.)



REVISIONS

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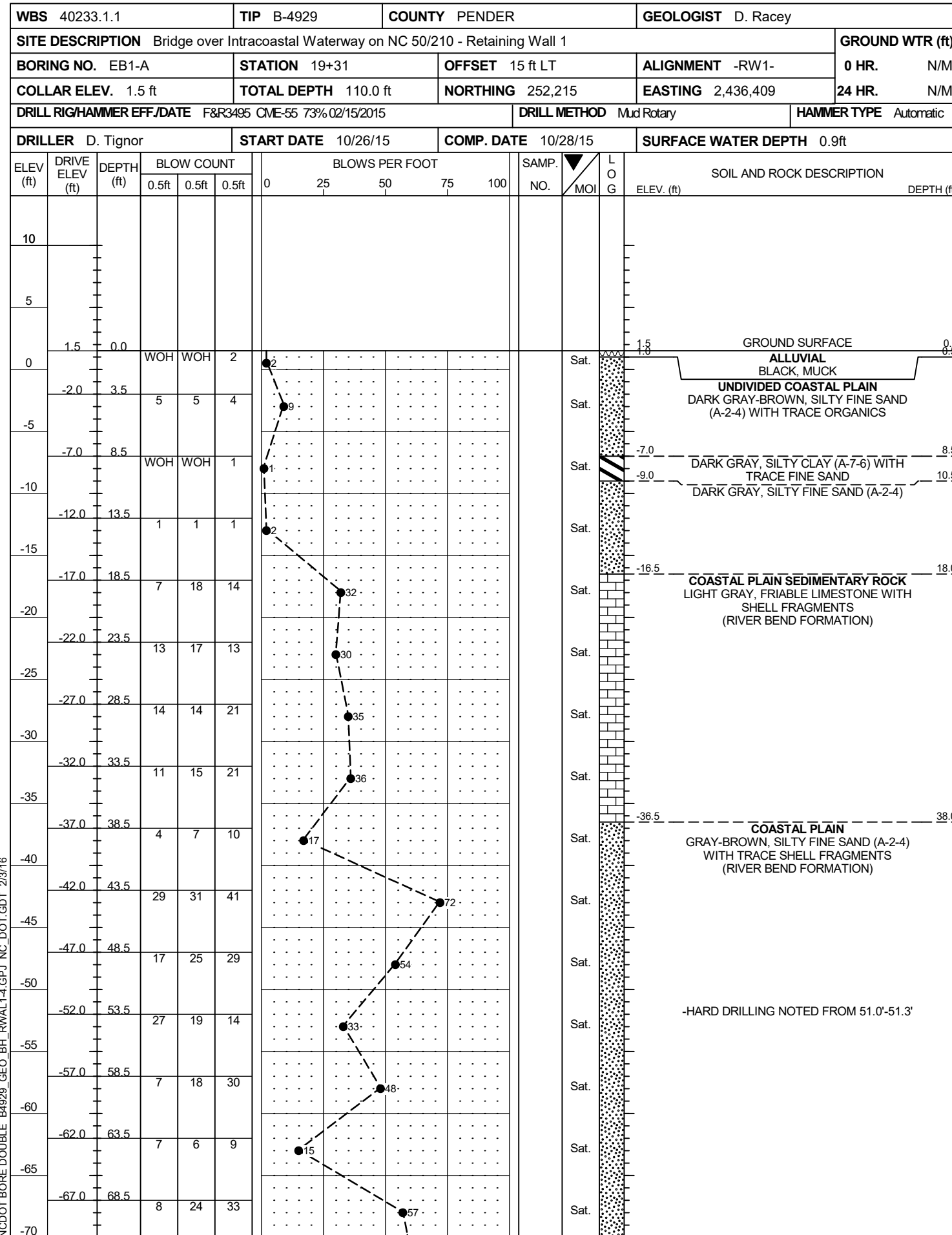
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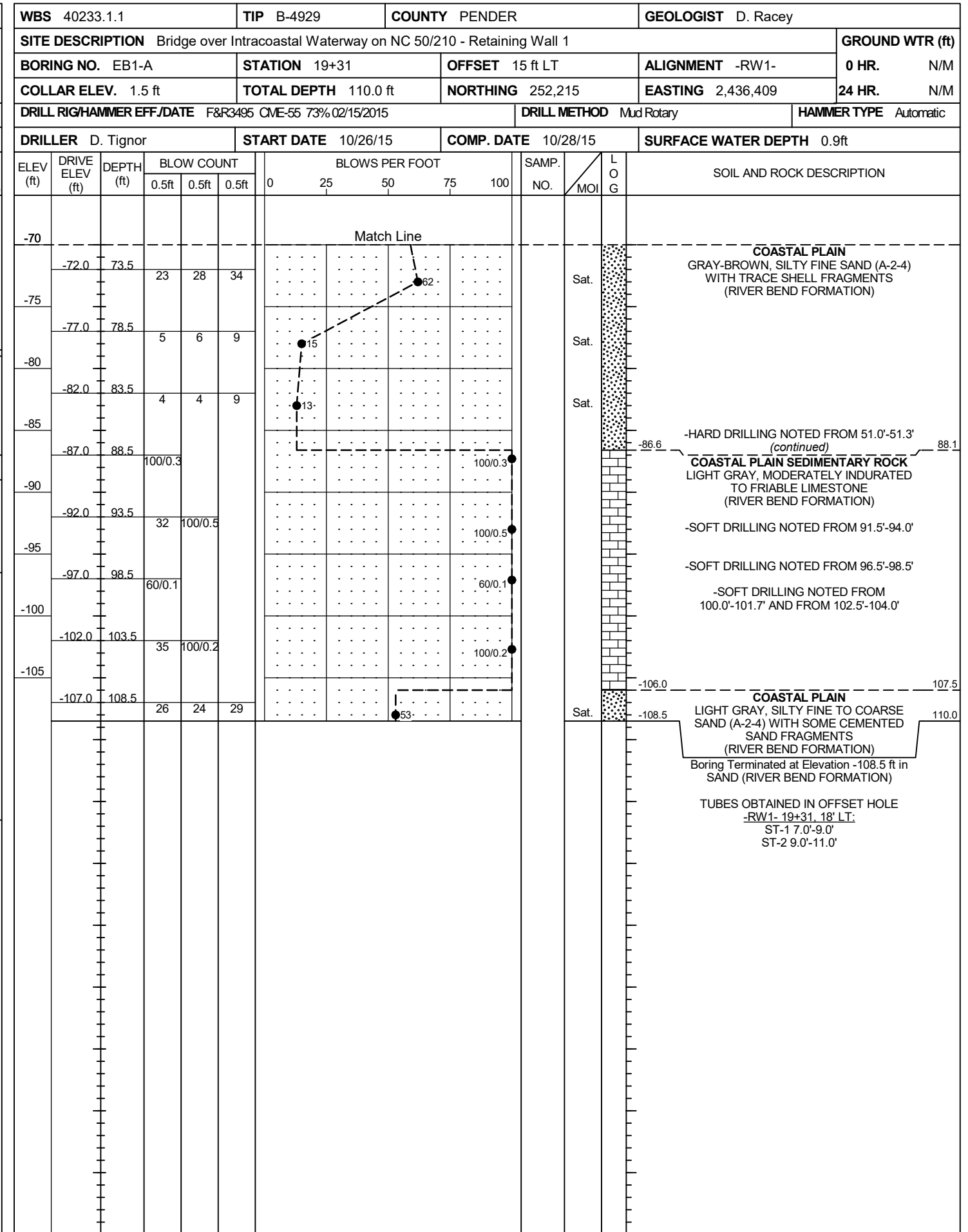
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# GEOTECHNICAL BORING REPORT

## BORE LOG



NCDOT BORE DOUBLE B4929\_GEO\_BH\_RWAL1-4.GPJ NC\_DOT.GDT 2/3/16



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 40233.1.1		TIP B-4929		COUNTY PENDER		GEOLOGIST M. Ellis										
SITE DESCRIPTION Bridge over Intracoastal Waterway on NC 50/210 - Retaining Wall 1							GROUND WTR (ft)									
BORING NO. RW1-2		STATION 19+75		OFFSET 7 ft LT		ALIGNMENT -RW1-										
COLLAR ELEV. 2.7 ft		TOTAL DEPTH 15.0 ft		NORTHING 252,260		EASTING 2,436,412										
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 73% 02/15/2015			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER D. Tignor		START DATE 12/10/15		COMP. DATE 12/10/15		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																
	2.7	0.0												2.7	GROUND SURFACE	0.0
	0.7	2.0	WOH	WOH	1									0.7	UNDIVIDED COASTAL PLAIN Black, silty fine SAND (A-2-4) with little organics (4.8%)	2.0
0	-0.8	3.5	6	5	5									-0.8	Dark brown, silty fine SAND (A-2-4) with trace organics	5.5
	-3.3	6.0	2	3	4									-2.8	Gray, fine to coarse sandy CLAY (A-6)	5.5
-5	-5.8	8.5	WOH	WOH	WOH									-6.5	Gray, silty fine SAND (A-2-4).	9.2
	-8.3	11.0	2	1	1									-8.3	Gray, silty CLAY (A-7-6).	11.0
-10	-10.8	13.5	2	2	2									-8.6	Dark gray, silty fine SAND (A-2-4).	11.3
			WOH	1	WOH									-12.3		15.0
Boring Terminated at Elevation -12.3 ft in SAND (UNDIVIDED COASTAL PLAIN)																
NOTES: 1) 0.0-0.5'=Surficial Organic Soils																

WBS 40233.1.1		TIP B-4929		COUNTY PENDER		GEOLOGIST M. Ellis										
SITE DESCRIPTION Bridge over Intracoastal Waterway on NC 50/210 - Retaining Wall 1							GROUND WTR (ft)									
BORING NO. RW1-3		STATION 20+16		OFFSET 3 ft RT		ALIGNMENT -RW1-										
COLLAR ELEV. 3.2 ft		TOTAL DEPTH 15.0 ft		NORTHING 252,299		EASTING 2,436,426										
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 73% 02/15/2015			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER D. Tignor		START DATE 12/10/15		COMP. DATE 12/10/15		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																
	3.2	0.0												3.2	GROUND SURFACE	0.0
	1.2	2.0	WOH	1	1									1.2	UNDIVIDED COASTAL PLAIN Black-gray-brown, silty fine SAND (A-2-4), with trace organic matter & clay.	2.0
0	-0.3	3.5	3	2	3									-0.3	Dark brown, silty fine SAND (A-2-4) with trace organics	5.5
	-2.8	6.0	3	4	6									-2.8	Gray, fine to coarse sandy CLAY (A-6)	5.5
-5	-5.3	8.5	WOH	WOH	1									-5.3	Gray, silty fine SAND (A-2-4).	9.2
	-7.8	11.0	2	WOH	WOH									-7.8	Gray, silty CLAY (A-7-6).	11.0
-10	-10.3	13.5	3	4	5									-10.3	Light gray-brown, fine SAND (A-3), with trace organics.	10.5
			2	2	2									-11.8		15.0
Boring Terminated at Elevation -11.8 ft in SAND (UNDIVIDED COASTAL PLAIN)																

NCDOT BORE DOUBLE B4929\_GEO\_BH\_RWAL1-4.GPJ NC\_DOT.GDT 1/12/16

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 40233.1.1		TIP B-4929		COUNTY PENDER		GEOLOGIST M. Ellis									
SITE DESCRIPTION Bridge over Intracoastal Waterway on NC 50/210 - Retaining Wall 2							GROUND WTR (ft)								
BORING NO. RW2-1		STATION 18+31		OFFSET CL		ALIGNMENT -RW2-									
COLLAR ELEV. 5.7 ft		TOTAL DEPTH 20.0 ft		NORTHING 252,301		EASTING 2,436,345									
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 73% 02/15/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER D. Tignor		START DATE 12/10/15		COMP. DATE 12/10/15		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					
10															
5	5.7	0.0													
	3.7	2.0	1	1	3										
	2.2	3.5	3	3	5										
0			4	3	2										
	-0.3	6.0	2	2	4										
	-2.8	8.5	4	6	5										
-5			WOH	WOH	WOH										
	-5.3	11.0													
	-7.8	13.5	WOH	WOH	1										
-10			3	WOH	1										
	-10.3	16.0	1	1	1										
	-12.8	18.5													

WBS 40233.1.1		TIP B-4929		COUNTY PENDER		GEOLOGIST C. Wang									
SITE DESCRIPTION Bridge over Intracoastal Waterway on NC 50/210 - Retaining Wall 2							GROUND WTR (ft)								
BORING NO. RW2-2		STATION 18+83		OFFSET 2 ft RT		ALIGNMENT -RW2-									
COLLAR ELEV. 2.5 ft		TOTAL DEPTH 15.0 ft		NORTHING 252,250		EASTING 2,436,355									
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 73% 02/15/2015				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER D. Tignor		START DATE 12/09/15		COMP. DATE 12/09/15		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															
	2.5	0.0													
0			WOH	1	1										
	0.5	2.0	3	3	2										
	-1.0	3.5	3	2	3										
	-3.5	6.0	1	2	WOH										
-5			1	1	0										
	-6.0	8.5													
	-8.5	11.0	WOH	WOH	1										
-10			1	1	WOH										
	-11.0	13.5													

NCDOT BORE DOUBLE\_B4929\_GEO\_BH\_RWAL1-4.GPJ NC\_DOT.GDT 1/12/16

**NOTES:**

1) 0.0-0.2'=Surficial Organic Soils

TUBES OBTAINED IN OFFSET HOLE  
18+30, 3' RT:  
ST-1a 7.0'-9.0'  
ST-2a 9.0'-11.0'

**NOTES:**

1) 0.0-0.5'=Surficial Organic Soils



WBS 40233.1.1		TIP B-4929		COUNTY PENDER		GEOLOGIST C. Wang								
SITE DESCRIPTION Bridge over Intracoastal Waterway on NC 50/210 - Retaining Wall 2							GROUND WTR (ft)							
BORING NO. RW2-3		STATION 19+29		OFFSET 1 ft LT		ALIGNMENT -RW2-	0 HR. 0.9							
COLLAR ELEV. 1.8 ft		TOTAL DEPTH 20.0 ft		NORTHING 252,205		EASTING 2,436,362	24 HR. 0.5							
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 73% 02/15/2015					DRILL METHOD Mud Rotary		HAMMER TYPE Automatic							
DRILLER D. Tignor		START DATE 12/09/15		COMP. DATE 12/09/15		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
5														
	1.8	0.0												1.8
0	-0.2	2.0	2	1	1	2							W	0.0
	-1.7	3.5	5	2	3	5							W	2.0
	-4.2	6.0	2	WOH	1	1							Sat.	2.0
-5	-6.7	8.5	WOH	WOH	1	1							Sat.	6.0
	-9.2	11.0	WOH	WOH	1	1							Sat.	9.0
-10	-11.7	13.5	WOH	1	1	1							Sat.	9.0
	-14.2	16.0	2	4	6	2							Sat.	16.0
-15	-16.7	18.5	2	5	11	2							Sat.	18.2
														20.0
<p>Boring Terminated at Elevation -18.2 ft in SAND (UNDIVIDED COASTAL PLAIN)</p> <p>NOTES:</p> <p>1) 0.0-0.5'=Surficial Organic Soils</p>														

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 40233.1.1		TIP B-4929		COUNTY PENDER		GEOLOGIST C. Wang	
SITE DESCRIPTION Bridge over Intracoastal Waterway on NC 50/210 - Retaining Wall 3							GROUND WTR (ft)
BORING NO. RW3-1		STATION 56+58		OFFSET 1 ft LT		ALIGNMENT -RW3-	
COLLAR ELEV. 3.6 ft		TOTAL DEPTH 15.0 ft		NORTHING 249,430		EASTING 2,438,196	
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 73% 02/15/2015				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic	
DRILLER D. Tignor		START DATE 12/08/15		COMP. DATE 12/08/15		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
5	3.6	0.0												GROUND SURFACE	0.0
	1.6	2.0	3	5	5									ARTIFICIAL FILL GRAVEL (A-1-a)	1.0
0	0.1	3.5	6	4	1									Brown to gray, silty fine SAND (A-2-4)	3.5
	-2.4	6.0	1	2	4									UNDIVIDED COASTAL PLAIN	
			6	6	5									Gray, fine to coarse SAND (A-3), with trace shell fragments & organics.	
-5	-4.9	8.5	4	4	2										
	-7.4	11.0	11	15	17										
-10	-9.9	13.5	7	7	9										
														Boring Terminated at Elevation -11.4 ft in SAND (UNDIVIDED COASTAL PLAIN)	15.0

WBS 40233.1.1		TIP B-4929		COUNTY PENDER		GEOLOGIST C. Wang	
SITE DESCRIPTION Bridge over Intracoastal Waterway on NC 50/210 - Retaining Wall 3							GROUND WTR (ft)
BORING NO. RW3-2		STATION 57+00		OFFSET 2 ft RT		ALIGNMENT -RW3-	
COLLAR ELEV. 3.4 ft		TOTAL DEPTH 20.0 ft		NORTHING 249,420		EASTING 2,438,158	
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 73% 02/15/2015				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic	
DRILLER D. Tignor		START DATE 12/08/15		COMP. DATE 12/08/15		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
5	3.4	0.0												GROUND SURFACE	0.0
	1.4	2.0	1	1										ARTIFICIAL FILL	2.0
0	-0.1	3.5	3	1	1									Brown, silty fine SAND (A-2-4), with trace organics.	3.5
	-2.6	6.0	1	1	4									Brown, silty fine SAND (A-2-4), moderately organic (7.5%)	6.0
			4	5	6									UNDIVIDED COASTAL PLAIN	
-5	-5.1	8.5	2	2	1									Gray, fine to coarse SAND (A-3), with trace shell fragments & organics.	8.0
	-7.6	11.0	10	17	13									Gray, silty fine to coarse SAND (A-2-4), with trace shell fragments.	
-10	-10.1	13.5	6	6	8									Gray, fine to coarse SAND (A-3), with trace to little shell fragments.	
	-12.6	16.0	5	5	6									Gray, silty fine to coarse SAND and shell fragments (A-1-b).	16.0
-15	-15.1	18.5	5	10	12										
														Boring Terminated at Elevation -16.6 ft in SAND (UNDIVIDED COASTAL PLAIN)	20.0

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 40233.1.1		TIP B-4929		COUNTY PENDER		GEOLOGIST C. Wang										
SITE DESCRIPTION Bridge over Intracoastal Waterway on NC 50/210 - Retaining Wall 4							GROUND WTR (ft)									
BORING NO. RW4-1		STATION 57+18		OFFSET 2 ft LT		ALIGNMENT -RW4-										
COLLAR ELEV. 3.8 ft		TOTAL DEPTH 20.0 ft		NORTHING 249,341		EASTING 2,438,155										
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 73% 02/15/2015				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER D. Tignor		START DATE 12/08/15		COMP. DATE 12/08/15		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	3.8	0.0	1	2	5									3.8	GROUND SURFACE	0.0
	1.8	2.0	2	2	1										<b>ARTIFICIAL FILL</b> Gray-black, silty fine SAND (A-2-4), with trace organics (wood fragments).	
0	0.3	3.5	1	2	4									-0.2	<b>UNDIVIDED COASTAL PLAIN</b> Gray, silty fine to coarse SAND (A-2-4), with trace shell fragments & organics.	4.0
	-2.2	6.0	3	8	7									-2.2	Light gray, fine to coarse SAND (A-3), with trace shell fragments.	6.0
-5	-4.7	8.5	4	5	5									-4.7	Gray, silty fine to coarse SAND (A-2-4), with trace shell fragments.	8.5
	-7.2	11.0	4	7	10									-9.2	Gray, silty fine to coarse SAND and shell fragments (A-1-b).	13.0
-10	-9.7	13.5	6	5	4									-9.2		
	-12.2	16.0	6	8	8									-16.2	Boring Terminated at Elevation -16.2 ft in SAND (UNDIVIDED COASTAL PLAIN)	20.0
-15	-14.7	18.5	6	9	9											

WBS 40233.1.1		TIP B-4929		COUNTY PENDER		GEOLOGIST C. Wang										
SITE DESCRIPTION Bridge over Intracoastal Waterway on NC 50/210 - Retaining Wall 4							GROUND WTR (ft)									
BORING NO. RW4-2		STATION 57+48		OFFSET CL		ALIGNMENT -RW4-										
COLLAR ELEV. 3.9 ft		TOTAL DEPTH 15.0 ft		NORTHING 249,331		EASTING 2,438,184										
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 73% 02/15/2015				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER D. Tignor		START DATE 12/08/15		COMP. DATE 12/08/15		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	3.9	0.0	1	1	1									3.9	GROUND SURFACE	0.0
	1.9	2.0	3	2	2										<b>ARTIFICIAL FILL</b> Dark brown to black, silty fine SAND (A-2-4), with trace organics (wood fragments).	
0	0.4	3.5	2	2	3									0.4	<b>UNDIVIDED COASTAL PLAIN</b> Dark gray, silty fine SAND (A-2-4), with trace organics & shell fragments.	3.5
	-2.1	6.0	5	8	7									-2.1	Light gray, fine to coarse SAND (A-3), with trace shell fragments.	6.0
-5	-4.6	8.5	4	4	7									-7.1	Gray, silty fine to coarse SAND (A-2-4), with trace shell fragments.	11.0
	-7.1	11.0	4	8	10									-9.1	Gray, silty fine to coarse SAND and shell fragments (A-1-b).	13.0
-10	-9.6	13.5	4	6	4									-11.1	Boring Terminated at Elevation -11.1 ft in SAND (UNDIVIDED COASTAL PLAIN)	15.0

WBS 40233.1.1		TIP B-4929		COUNTY PENDER		GEOLOGIST C. Wang								
SITE DESCRIPTION Bridge over Intracoastal Waterway on NC 50/210 - Retaining Wall 4							GROUND WTR (ft)							
BORING NO. RW4-3		STATION 57+86		OFFSET 1 ft RT		ALIGNMENT -RW4-	0 HR. 0.8							
COLLAR ELEV. 4.1 ft		TOTAL DEPTH 15.0 ft		NORTHING 249,297		EASTING 2,438,198	24 HR. 0.3							
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 73% 02/15/2015				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic								
DRILLER D. Tignor		START DATE 12/08/15		COMP. DATE 12/08/15		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
5	4.1	0.0												GROUND SURFACE 0.0
0	2.1	2.0	1	2	1	3						M		ARTIFICIAL FILL
	0.6	3.5	2	3	3	6						W		Dark brown to gray, silty fine to coarse SAND (A-2-4), with trace organics & shell fragments.
-5	-1.9	6.0	1	2	3	5						W		UNDIVIDED COASTAL PLAIN
	-4.4	8.5	3	8	6	14						Sat.		Gray, silty fine to coarse SAND (A-2-4), with trace shell fragments & organics.
-10	-6.9	11.0	3	3	5	8						Sat.		Light gray, fine to coarse SAND (A-3), with trace shell fragments.
	-9.4	13.5	2	1	6	7						Sat.		Gray, silty fine SAND (A-2-4), with trace shell fragments.
			3	8	10	18						Sat.		Gray, silty fine to coarse SAND and shell fragments (A-1-b).
Boring Terminated at Elevation -10.9 ft in SAND (UNDIVIDED COASTAL PLAIN)														

**North Carolina Department of Transportation  
Division of Highways  
Materials and Test Unit  
Soils Laboratory**

T.I.P. ID NO.: B-4929  
 DESCRIPTION: Bridge over Intracoastal Waterway on NC 50/210 between US 17 and Topsail Beach  
 Retaining Walls 1 through 4

REPORT ON SAMPLES OF: SOIL FOR QUALITY

PROJECT:	<u>40233.1.1</u>	COUNTY:	<u>Pender</u>
DATE SAMPLED:	<u>12/15</u>	RECEIVED:	<u>12/15</u>
SAMPLED FROM:	<u>-L2-</u>	REPORTED:	<u>1/16</u>
SUBMITTED BY:	<u>P. Alton, PE</u>	BY:	<u>M. Grabski</u> <u>53698</u>

**TEST RESULTS**

PROJ. SAMPLE NO.	ST-2	SS-948	SS-950	SS-919										
BORING NO.	EB1-A	RW1-2	RW1-2	RW3-2										
Retained #4 Sieve %	0.0	NT	0.0	NT										
Passing #10 Sieve %	100.0	NT	100.0	NT										
Passing #40 Sieve %	100.0	NT	93.3	NT										
Passing #200 Sieve %	92.3	NT	38.6	NT										

SOIL MORTAR - 100%														
Coarse Sand Ret - #60 %	0.2	NT	22.2	NT										
Fine Sand Ret - #270 %	8.4	NT	42.2	NT										
Silt 0.053 - 0.010 mm %	30.7	NT	12.1	NT										
Clay < 0.010 mm %	60.7	NT	23.5	NT										
L.L.	53	NT	29	NT										
P.L.	28	NT	15	NT										
P.I.	25	NT	14	NT										
AASHTO Classification	A-7-6 (26)	ND	A-6 (2)	ND										
Station	-RW1- 19+31	-RW1- 19+75	-RW1- 19+75	-RW3- 57+00										
Offset	18' Lt.	7' Lt.	7' Lt.	2' Rt.										
Depth (ft)	9.8	0.5	6.0	2.0										
to	10.4	1.5	7.5	3.5										
Moisture Content (%)	60.1	37.7	22.1	76.7										
Organic Content (%)	NT	4.8	NT	7.5										
Specific Gravity	NT	NT	NT	NT										

NP=Not plastic  
 NT=Not tested  
 ND = Not Determined  
 CL = Centerline

W.P. Alton, PE  
Soils Engineer