

REFERENCE: R-2707C

PROJECT: 34497

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-2707C	1	20

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	PROFILES
6-19	BORE LOGS, CORE REPORTS, AND ROCK CORE PHOTOS
20	SOIL TEST RESULTS

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY CLEVELAND
PROJECT DESCRIPTION US 74 SHELBY BYPASS FROM EAST OF NC 226 TO EAST OF NC 150

SITE DESCRIPTION MSE RETAINING WALLS AT DUAL BRIDGES NO. 472 AND 473 ON -L- (US 74) OVER -YIIEV2- (NC 180) AND -YI3- (CSX RR)

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 T07-6850. 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.

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DATE SEPTEMBER 2016



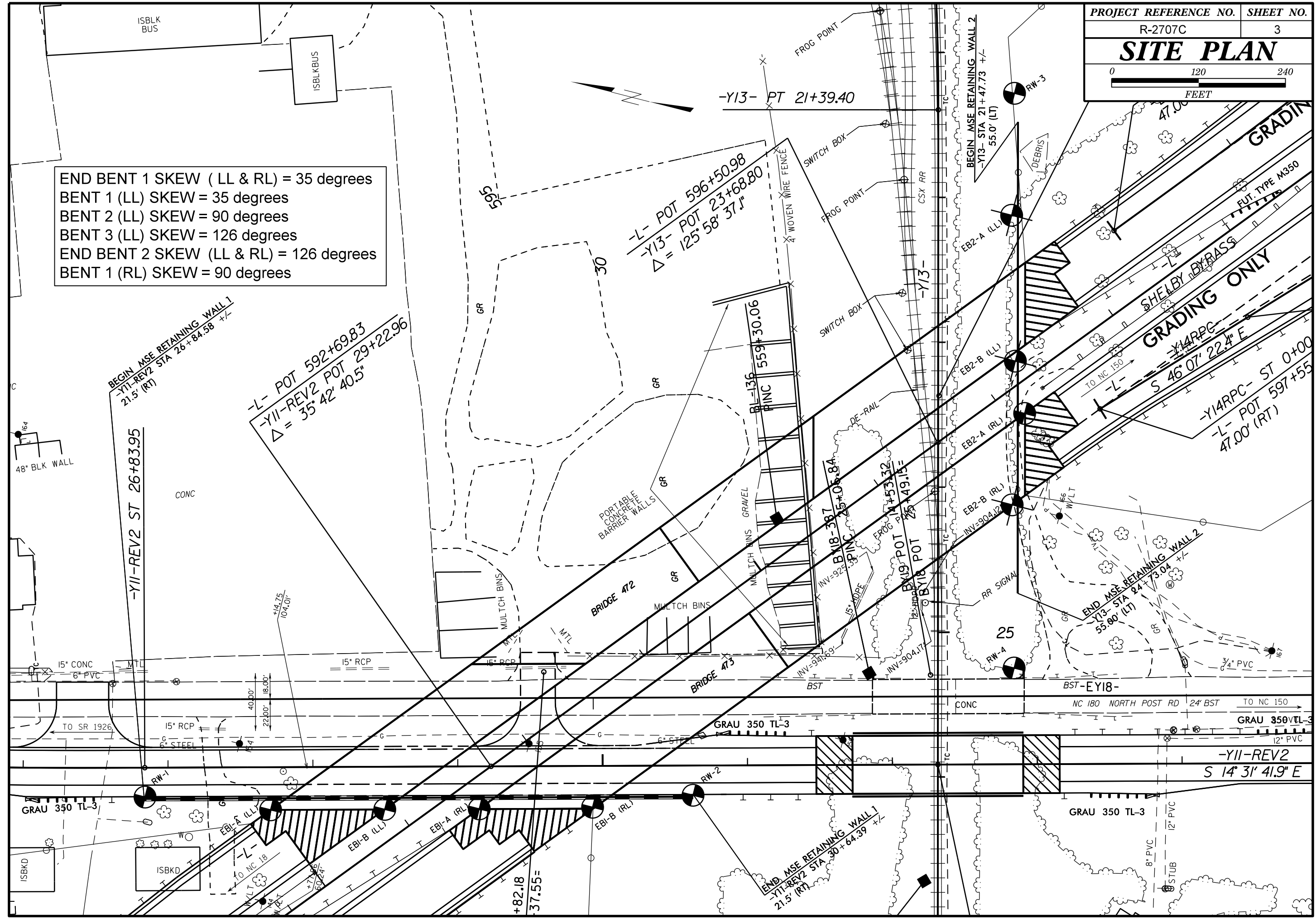
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9/13/2016

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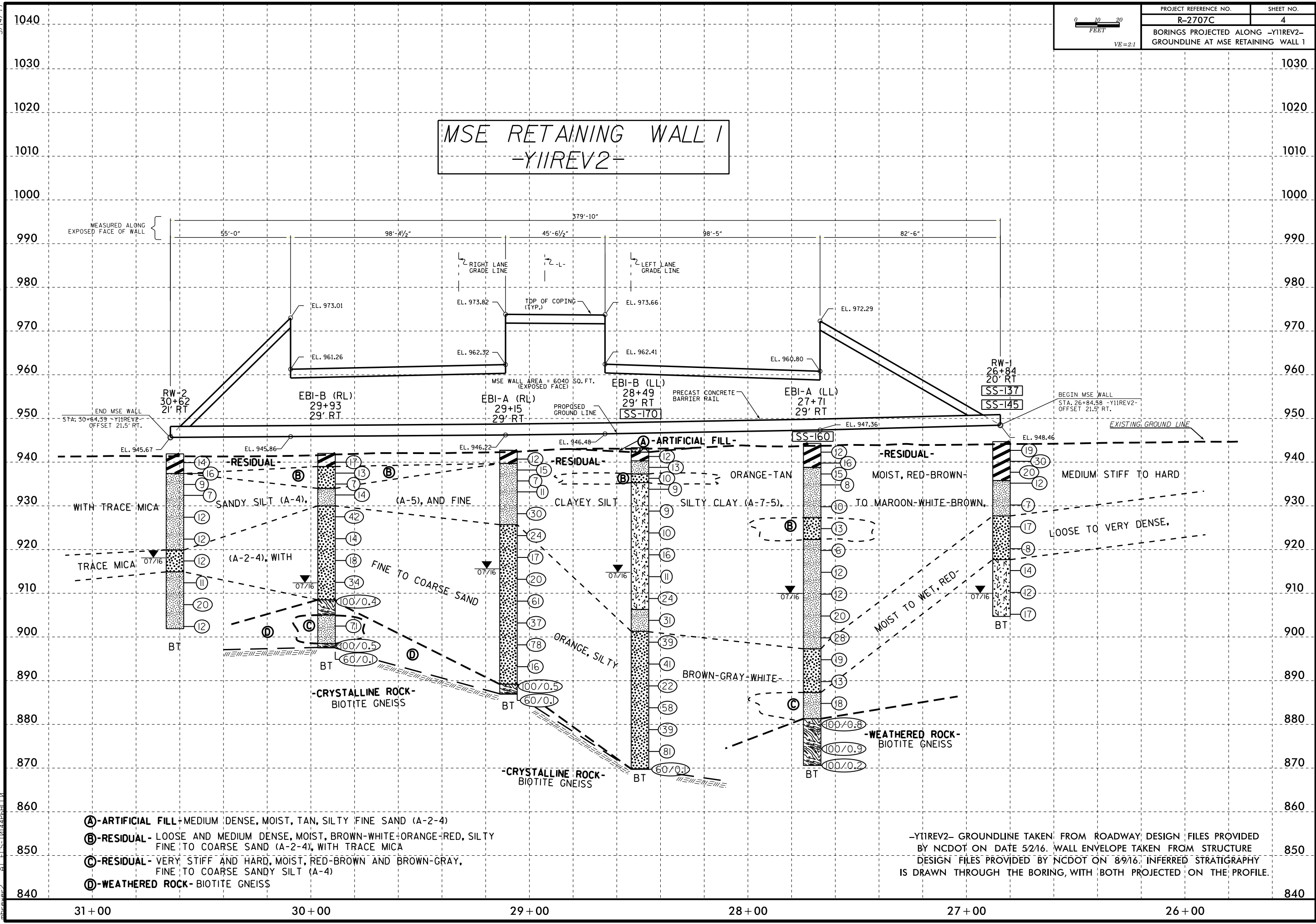
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																			
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, 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, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>										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.										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:										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 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 (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.																			
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)										CRYSTALLINE ROCK (CR)																			
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.										NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.										FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.																			
MINERALOGICAL COMPOSITION										NON-CRYSTALLINE ROCK (NCR)										COASTAL PLAIN SEDIMENTARY ROCK (CP)										WEATHERING																			
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.										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 SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.										FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.																			
COMPRESSION										PERCENTAGE OF MATERIAL										VERY SLIGHT (V SLI)										SLIGHT (SLI)																			
SLIGHTLY COMPRESSIBLE LL < 31										ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL										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.										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.																			
MODERATELY COMPRESSIBLE LL = 31 - 50										TRACE OF ORGANIC MATTER 2 - 3% LITTLE ORGANIC MATTER 3 - 5% MODERATELY ORGANIC 5 - 10% HIGHLY ORGANIC > 10%										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.										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.																			
HIGHLY COMPRESSIBLE LL > 50										GROUND WATER										MODERATE (MOD.)										MODERATELY SEVERE (MOD. SEV.)																			
										WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING										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										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																			
										STATIC WATER LEVEL AFTER 24 HOURS										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										ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. FABRIC MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.																			
										PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA										SEVERE (SEV.)										VERY SEVERE (V SEV.)																			
										SPRING OR SEEP										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										ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. FABRIC MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.																			
MISCELLANEOUS SYMBOLS										RECOMMENDATION SYMBOLS										ROCK HARDNESS										VERY HARD																			
ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION										UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE										CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.										HARD																			
SOIL SYMBOL										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.										MODERATELY HARD																			
ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										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																			
INFERRED SOIL BOUNDARY										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										CAN BE GROUVED 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																			
INFERRED ROCK LINE										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										CAN BE GROUVED 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																			
ALLUVIAL SOIL BOUNDARY										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										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.										COMPLETE																			
										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										FRACURE SPACING										BEDDING																			
										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										TERM SPACING										TERM THICKNESS																			
										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										VERY WIDE MORE THAN 10 FEET										VERY THICKLY BEDDED 4 FEET																			
										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										WIDE 3 TO 10 FEET										THICKLY BEDDED 1.5 - 4 FEET																			
										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										MODERATELY CLOSE 1 TO 3 FEET										THINLY BEDDED 0.16 - 1.5 FEET																			
										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										CLOSE 0.16 TO 1 FOOT										VERY THINLY BEDDED 0.03 - 0.16 FEET																			
										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										VERY CLOSE LESS THAN 0.16 FEET										THICKLY LAMINATED 0.008 - 0.03 FEET																			
										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK																				THINLY LAMINATED < 0.008 FEET																			
SOIL MOISTURE - CORRELATION OF TERMS										ABBREVIATIONS										INDURATION										NOTES:																			
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										AR - AUGER REFUSAL MED. - MEDIUM VST - VANE SHEAR TEST										FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.										NORTHINGS AND EASTINGS OBTAINED WITH A TRIMBLE GEO 7X WITH SUB-FOOT ACCURACY.																			
LL - LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE										BT - BORING TERMINATED MICA - MICACEOUS WEA. - WEATHERED										FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.										THE SOIL BORING LOGS, CORELOGS, AND ROCK CORE PHOTOS FOR BORINGS EB2-A (LL), EB2-B (LL), AND EB2-B (RL) (FORMERLY B-1, B-2, AND B-3) WERE PERFORMED BY NCDOT AND ARE INCLUDED IN THIS REPORT.																			
PL - PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE										CL - CLAY NP - NON PLASTIC										MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.																													
OM - OPTIMUM MOISTURE SHRINKAGE LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE										CPT - CONE PENETRATION TEST CSE - COARSE										INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.																													
										DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST										EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																													
										DPT - DYNAMIC PENETRATION TEST SD. - SAND, SANDY SL. - SILT, SILTY																																							
										e - VOID RATIO FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAG. - FRAGMENTS HI. - HIGHLY																																							
										F - FINE TCR - TRICONE REFUSAL w - MOISTURE CONTENT v - VERY																																							
PLASTICITY										EQUIPMENT USED ON SUBJECT PROJECT																																							
NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC										DRILL UNITS: CME-45C CME-55 CME-550X VANE SHEAR TEST PORTABLE HOIST DIEDRICH D-50 DIEDRICH D-120										ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 6" HOLLOW AUGERS 8" HOLLOW AUGERS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE *STEEL TEETH TRICONE *TUNG-CARB. CORE BIT										HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: -B -H -N XWL HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST																			
PLASTICITY INDEX (PI) DRY STRENGTH																																																	
0-5 VERY LOW																																																	
6-15 SLIGHT																																																	
16-25 MEDIUM																																																	
26 OR MORE HIGH																																																	
COLOR																																																	
DESCRIPTORS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.																																																	

END BENT 1 SKEW (LL & RL) = 35 degrees
 BENT 1 (LL) SKEW = 35 degrees
 BENT 2 (LL) SKEW = 90 degrees
 BENT 3 (LL) SKEW = 126 degrees
 END BENT 2 SKEW (LL & RL) = 126 degrees
 BENT 1 (RL) SKEW = 90 degrees



MSE RETAINING WALL 1 -YIIREV2-

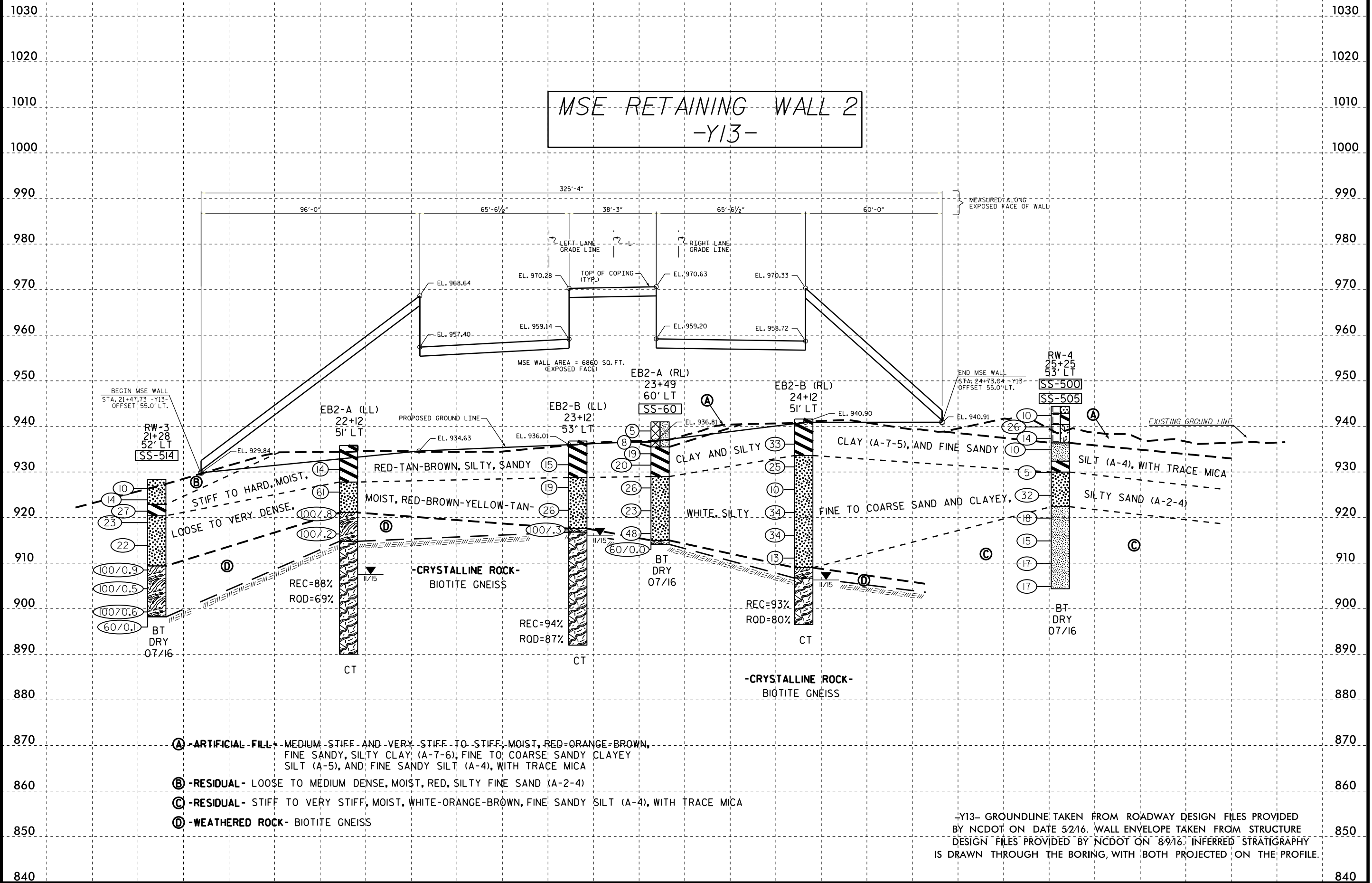


- Ⓐ-ARTIFICIAL FILL-MEDIUM DENSE, MOIST, TAN, SILTY FINE SAND (A-2-4)
- Ⓑ-RESIDUAL- LOOSE AND MEDIUM DENSE, MOIST, BROWN-WHITE-ORANGE-RED, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE MICA
- Ⓒ-RESIDUAL- VERY STIFF AND HARD, MOIST, RED-BROWN AND BROWN-GRAY, FINE TO COARSE SANDY SILT (A-4)
- Ⓓ-WEATHERED ROCK- BIOTITE GNEISS

-YIIREV2- GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 5/21/16. WALL ENVELOPE TAKEN FROM STRUCTURE DESIGN FILES PROVIDED BY NCDOT ON 8/9/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE PROFILE.

07-SEP-2016 10:02 PROJECTS\11000-11999\11700\11717-A - R-2707C - Site 6 Dual Bridges - MSE Wall\CAADD_GEO\TECH\Site\Sub\Y-2707c_Geo_BRD0472&472_RWAL_PFI_4.dgn
 5/14/19

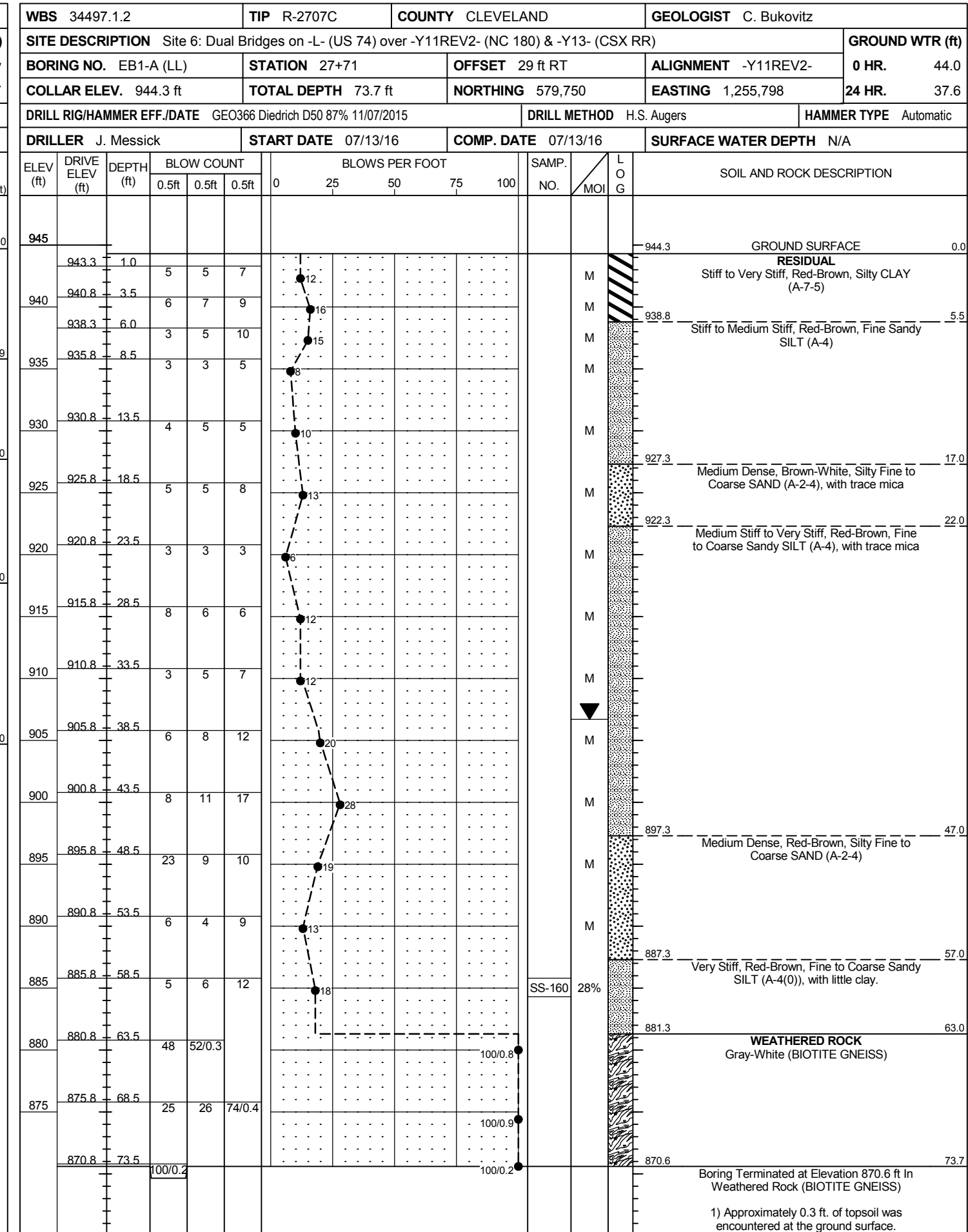
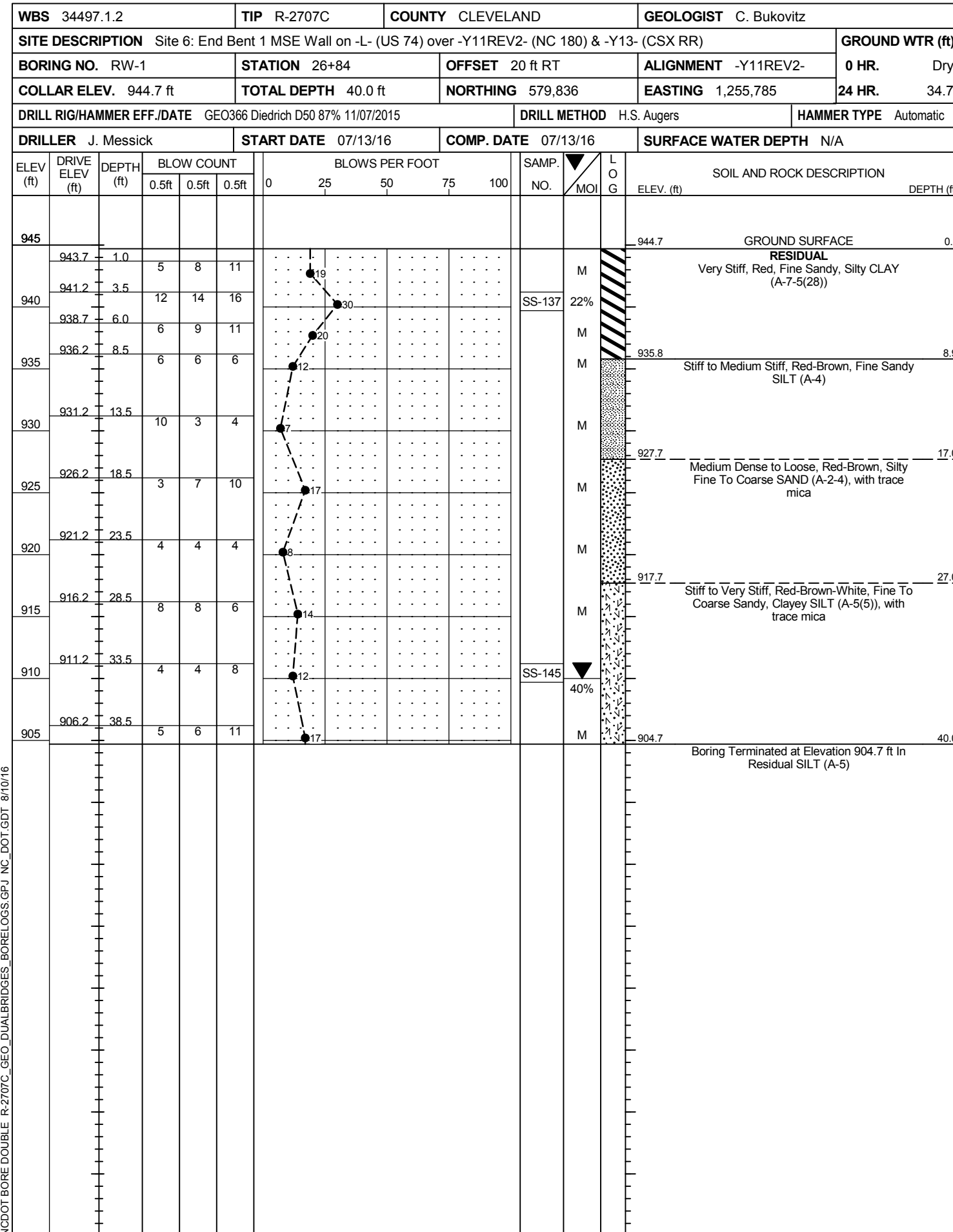
MSE RETAINING WALL 2 -Y13-



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 5/14/99

-Y13- GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 5/2/16. WALL ENVELOPE TAKEN FROM STRUCTURE DESIGN FILES PROVIDED BY NCDOT ON 8/9/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE PROFILE.

**GEOTECHNICAL BORING REPORT
BORE LOG**



NCDOT BORE DOUBLE R-2707C_GEO_DUALBRIDGES_BORELOGS.GPJ NC_DOT.GDT 8/10/16

1) Approximately 0.3 ft. of topsoil was encountered at the ground surface.

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST C. Bukovitz										
SITE DESCRIPTION Site 6: Dual Bridges on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)									
BORING NO. EB1-A (RL)		STATION 29+15		OFFSET 19 ft RT		ALIGNMENT -Y11REV2-										
COLLAR ELEV. 942.7 ft		TOTAL DEPTH 55.8 ft		NORTHING 579,611		EASTING 1,255,834										
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. Messick		START DATE 07/14/16		COMP. DATE 07/14/16		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						
945														942.7	0.0	GROUND SURFACE
940	941.7	1.0	4	5	7	12						M	RESIDUAL	939.7	3.0	Stiff, Red, Silty CLAY (A-7-5)
	939.2	3.5	6	7	8	15						M	Medium Stiff to Very Stiff, Red-Brown, Fine Sandy SILT (A-4)			
	936.7	6.0	4	3	4	7						M				
935	934.2	8.5	9	5	6	11						M				
	929.2	13.5	4	11	19	30						M				
925	924.2	18.5	10	13	11	24						M	Medium Dense to Very Dense, Red-Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with little to some gravel-sized rock fragments	925.7	17.0	
	919.2	23.5	9	6	11	17						M				
915	914.2	28.5	14	13	7	20						M				
	909.2	33.5	8	31	30	61						M				
905	904.2	38.5	52	22	15	37						M				
	899.2	43.5	21	61	17	78						M				
890	894.2	48.5	7	6	10	16						M				
	889.2	53.5	100/0.5											889.2	53.5	WEATHERED ROCK
	887.0	55.7	60/0.1											887.0	55.7	Gray-Brown (BIOTITE GNEISS)
														886.9	55.8	CRYSTALLINE ROCK (BIOTITE GNEISS)
																Boring Terminated with Standard Penetration Test Refusal at Elevation 886.9 ft In Crystalline Rock (BIOTITE GNEISS)

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST C. Bukovitz										
SITE DESCRIPTION Site 6: Dual Bridges on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)									
BORING NO. EB1-B (RL)		STATION 29+93		OFFSET 29 ft RT		ALIGNMENT -Y11REV2-										
COLLAR ELEV. 942.0 ft		TOTAL DEPTH 44.5 ft		NORTHING 579,674		EASTING 1,255,818										
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. Messick		START DATE 07/14/16		COMP. DATE 07/14/16		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						
945														942.0	0.0	GROUND SURFACE
940	941.0	1.0	4	7	10	17						M	RESIDUAL	939.0	3.0	Very Stiff, Red, Silty CLAY (A-7-5)
	938.5	3.5	7	7	6	13						M	Medium Dense to Loose, Red-White-Brown, Silty Fine to Coarse SAND (A-2-4)			
	936.0	6.0	5	4	3	7						M				
935	933.5	8.5	3	3	11	14						M	Stiff, Red-Brown, Fine Sandy SILT (A-4)	934.0	8.0	
	928.5	13.5	16	23	19	42						M	Medium Dense to Dense, Red-Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel sized rock fragments	930.0	12.0	
	923.5	18.5	4	6	8	14						M				
920	918.5	23.5	6	7	11	18						M				
	913.5	28.5	8	18	16	34						M				
910	908.5	33.5	100/0.4									M				
905	903.5	38.5	66	14	57	71						M				
	898.5	43.5												898.5	43.5	WEATHERED ROCK
	897.6	44.4	100/0.5											897.6	44.4	Brown-Gray (BIOTITE GNEISS)
			60/0.1											897.5	44.5	CRYSTALLINE ROCK (BIOTITE GNEISS)
																Boring Terminated with Standard Penetration Test Refusal at Elevation 897.5 ft In Crystalline Rock (BIOTITE GNEISS)
																1) Approximately 0.3 ft. of topsoil was encountered at the ground surface.

NCDOT BORE DOUBLE R-2707C_GEO_DUALBRIDGES_BORELOGS.GPJ_NC_DOT.GDT 8/10/16

GEOTECHNICAL BORING REPORT BORE LOG

WBS 34497.1.2	TIP R-2707C	COUNTY CLEVELAND	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION Site 6: Dual Bridges on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)			GROUND WTR (ft)
BORING NO. EB2-A (LL)	STATION 22+12	OFFSET 51 ft LT	ALIGNMENT -Y13-
COLLAR ELEV. 935.8 ft	TOTAL DEPTH 45.8 ft	NORTHING 579,355	EASTING 1,256,322
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD NW Casing w/ Core	HAMMER TYPE Automatic
DRILLER Smith, C.L.	START DATE 11/12/15	COMP. DATE 11/12/15	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		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
940																
935															935.8	GROUND SURFACE 0.0
930	931.6	4.2	3	6	8	14							M		927.8	RESIDUAL RED-TAN-BROWN STIFF MOIST SILTY SANDY CLAY (A-7) 8.0
925	926.6	9.2	67	30	31	61							M		921.1	RESIDUAL TAN-BROWN-WHITE HARD MOIST CLAYEY SILTY SAND (A-2) 14.7
920	921.6	14.2	25	75/3						100/8					914.8	WEATHERED ROCK SEVERELY WEATHERED BIOTITE GNEISS 21.0
915	916.6	19.2	100/2							100/2						
910																
905																
900																
895																
890															890.0	Boring Terminated at Elevation 890.0 ft In Crystalline Rock (Biotite Gneiss) 45.8

NCDOT BORE DOUBLE R2707C_BORELOGS.BY_NCDOT.GPJ NC_DOT.GDT 8/10/16

GEOTECHNICAL BORING REPORT CORE LOG

WBS 34497.1.2	TIP R-2707C	COUNTY CLEVELAND	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION Site 6: Dual Bridges on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)			GROUND WTR (ft)
BORING NO. EB2-A (LL)	STATION 22+12	OFFSET 51 ft LT	ALIGNMENT -Y13-
COLLAR ELEV. 935.8 ft	TOTAL DEPTH 45.8 ft	NORTHING 579,355	EASTING 1,256,322
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD NW Casing w/ Core	HAMMER TYPE Automatic
DRILLER Smith, C.L.	START DATE 11/12/15	COMP. DATE 11/12/15	SURFACE WATER DEPTH N/A

CORE SIZE NW	TOTAL RUN 23.8 ft
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ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %			
914.8	914.8	21.0	3.8		(2.7) 71%	(0.0) 0%		(21.8) 88%	(17.2) 69%	L O G	Begin Coring @ 21.0 ft	21.0
	911.0	24.8	5.0	1:18/1.0	(4.4) 88%	(3.1) 62%					BROWN-GRAY-WHITE BANDED, SEVERELY WEATHERED TO FRESH, MODERATELY HARD TO HARD BIOTITE GNEISS WITH VERY CLOSE TO WIDE FRACTURE SPACING R1=12, R2=17, R3=15, R4=20, R5=7, RMR=71 ROCK TYPE E	
910												
	906.0	29.8	5.0	1:26/1.0	(5.0) 100%	(4.4) 88%						
905												
	901.0	34.8	5.0	1:42/1.0	(4.8) 96%	(4.8) 96%						
	896.0	39.8	5.0	1:48/1.0	(4.9) 98%	(4.9) 98%						
895												
	891.0	44.8									Boring Terminated at Elevation 890.0 ft In Crystalline Rock (Biotite Gneiss)	45.8
890												

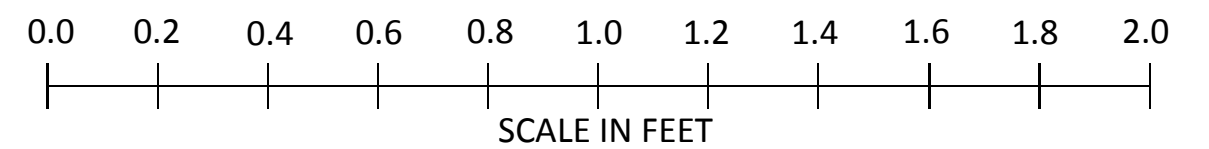
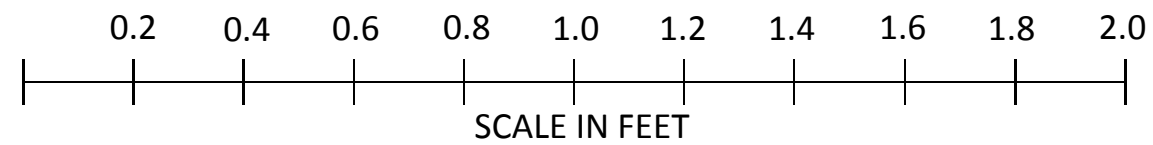
NCDOT CORE DOUBLE R2707C_BORELOGS_BY_NCDOT.GPJ NC_DOT.GDT 8/10/16



MSE Retaining Wall 2 (-Y13-)
WBS - 34497.1.2 TIP No. - R-2707C
ECS Carolinas Project No. 08:11717-A

Rock Core Photographs: Boring - EB2-A (LL) — Station: 22+12 Offset: 51' LT

*Core Photos Provided By NCDOT



GEOTECHNICAL BORING REPORT CORE LOG

WBS 34497.1.2	TIP R-2707C	COUNTY CLEVELAND	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION Site 6: Dual Bridges on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)			GROUND WTR (ft)
BORING NO. EB2-B (LL)	STATION 23+12	OFFSET 53 ft LT	ALIGNMENT -Y13-
COLLAR ELEV. 936.8 ft	TOTAL DEPTH 44.8 ft	NORTHING 579,329	EASTING 1,256,226
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD NW Casing w/ Core	HAMMER TYPE Automatic
DRILLER Smith, C.L.	START DATE 11/10/15	COMP. DATE 11/10/15	SURFACE WATER DEPTH N/A
CORE SIZE NW	TOTAL RUN 24.8 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %			
916.8											Begin Coring @ 20.0 ft	
915	916.8	20.0	4.8	1:48/1.0	(4.6) 96%	(3.2) 67%		(23.4) 94%	(21.6) 87%	916.8	20.0	
	912.0	24.8									WHITE-BLACK-BROWN BANDED, SLIGHTLY WEATHERED TO FRESH, HARD BIOTITE GNEISS WITH ZONES OF GRANITE, AND VERY CLOSE TO WIDE FRACTURE SPACING R1=15, R2=17, R3=20, R4=20, R5=7, RMR=79 ROCK TYPE E	
910			5.0	1:43/1.0	(5.0) 100%	(5.0) 100%						
	907.0	29.8										
905			5.0	2:00/1.0	(5.0) 100%	(5.0) 100%						
	902.0	34.8										
900			5.0	1:51/1.0	(4.6) 92%	(4.6) 92%						
	897.0	39.8										
895			5.0	1:55/1.0	(4.2) 84%	(3.8) 76%						
	892.0	44.8								892.0	44.8	
											Boring Terminated at Elevation 892.0 ft In Crystalline Rock (Biotite Gneiss)	

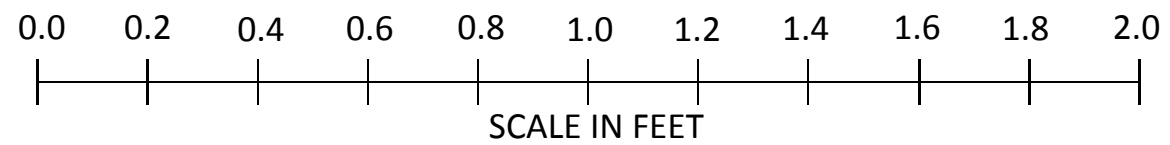
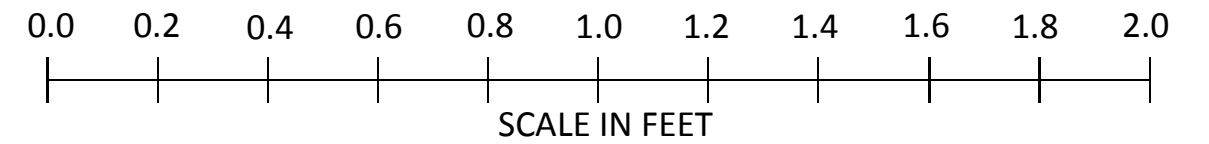
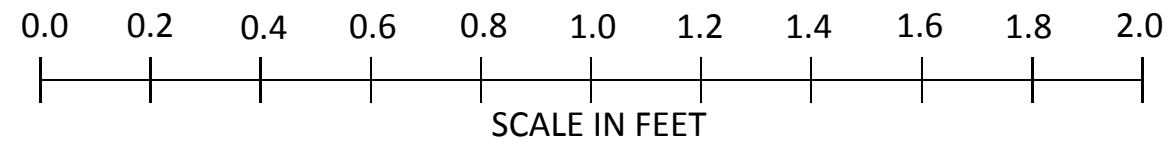
NCDOT CORE DOUBLE R2707C_BORELOGS_BY_NCDOT.GPJ NC_DOT.GDT 8/10/16



MSE Retaining Wall 2 (-Y13-)
WBS - 34497.1.2 TIP No. - R-2707C
ECS Carolinas Project No. 08:11717-A

Rock Core Photographs: Boring - EB2-B (LL) — Station: 23+12 Offset: 53' LT

*Core Photos Provided By NCDOT



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST C. Bukovitz										
SITE DESCRIPTION Site 6: Dual Bridges on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)									
BORING NO. EB2-A (RL)		STATION 23+49		OFFSET 60 ft LT		ALIGNMENT -Y13-										
COLLAR ELEV. 941.0 ft		TOTAL DEPTH 26.9 ft		NORTHING 579,313		EASTING 1,256,192										
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. Messick		START DATE 07/11/16		COMP. DATE 07/11/16		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	100						
945																
940	940.0	1.0	2	3	2								M	ARTIFICIAL FILL Medium Stiff, Red, Fine Sandy SILT (A-4), with trace gravel	0.0	
	937.5	3.5	4	4	4								M			
935	935.0	6.0	6	7	12								M	RESIDUAL Very Stiff, Red, Silty CLAY (A-7-5(25))	5.5	
	932.5	8.5	7	9	11								M			
930	927.5	13.5	10	12	14								M	Medium Dense to Dense, Red-Brown-White, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments	12.0	
925	922.5	18.5	7	12	11								M			
920	917.5	23.5	10	18	30								M			
915	914.1	26.9											M	WEATHERED ROCK (BIOTITE GNEISS) Boring Terminated with Standard Penetration Test Refusal at Elevation 914.1 ft On Crystalline Rock (BIOTITE GNEISS) 1) Approximately 0.2 ft. of topsoil was encountered at the ground surface.	26.0 26.9	

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION Site 6: Dual Bridges on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)									
BORING NO. EB2-B (RL)		STATION 24+12		OFFSET 51 ft LT		ALIGNMENT -Y13-										
COLLAR ELEV. 941.6 ft		TOTAL DEPTH 45.1 ft		NORTHING 579,305		EASTING 1,256,129										
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014			DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic											
DRILLER Smith, C.L.		START DATE 11/04/15		COMP. DATE 11/04/15		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	100						
945																
940													M	GROUND SURFACE	0.0	
	937.1	4.5	7	14	19								M	RESIDUAL RED-BROWN HARD MOIST SILTY SANDY CLAY (A-7)		
935	935.0	6.0	6	7	12								M		8.0	
	932.1	9.5	5	11	14								M	RESIDUAL RED-BROWN LOOSE TO DENSE MOIST CLAYEY SILTY SAND (A-2) WITH SOME MICA		
930	927.1	14.5	3	4	6								M			
925	922.1	19.5	5	7	27								M			
920	917.1	24.5	14	17	17								M			
915	912.1	29.5	16	6	7								M			
910													M			
905													M	WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK (BIOTITE GNEISS)	32.6 34.9	
900													M	CRYSTALLINE ROCK GRAY-BLACK-WHITE BIOTITE GNEISS		
													M		45.1	
														Boring Terminated at Elevation 896.5 ft In Crystalline Rock (Biotite Gneiss)		

NCDOT BORE DOUBLE R-2707C_GEO_DUALBRIDGES_BORELOGS.GPJ NC_DOT_GDT 8/10/16

GEOTECHNICAL BORING REPORT CORE LOG

WBS 34497.1.2	TIP R-2707C	COUNTY CLEVELAND	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION Site 6: Dual Bridges on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)			GROUND WTR (ft)
BORING NO. EB2-B (RL)	STATION 24+12	OFFSET 51 ft LT	ALIGNMENT -Y13-
COLLAR ELEV. 941.6 ft	TOTAL DEPTH 45.1 ft	NORTHING 579,305	EASTING 1,256,129
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD NW Casing w/ Advancer	HAMMER TYPE Automatic
DRILLER Smith, C.L.	START DATE 11/04/15	COMP. DATE 11/04/15	SURFACE WATER DEPTH N/A

CORE SIZE NW				TOTAL RUN 10.2 ft				STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	REC. (ft) %	RQD (ft) %			
906.7												
	906.7	34.9	0.2		(0.2)	(0.0)		(9.5)	(8.2)		906.7	34.9
905	906.5	35.1	5.0		100%	0%		93%	80%			
	901.5	40.1			(4.9)	(3.8)						
900			5.0		98%	76%						
	896.5	45.1			(4.4)	(4.4)					896.5	45.1
Boring Terminated at Elevation 896.5 ft In Crystalline Rock (Biotite Gneiss)												

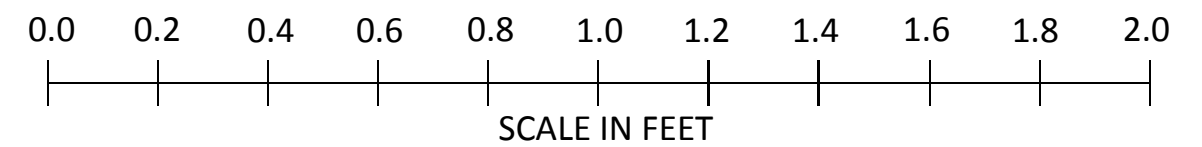
NCDOT CORE DOUBLE R2707C_BORELOGS_BY_NCDOT.GPJ NC_DOT.GDT 8/10/16



MSE Retaining Wall 2 (-Y13-)
WBS - 34497.1.2 TIP No. - R-2707C
ECS Carolinas Project No. 08:11717-A

Rock Core Photographs: Boring - EB2-B (RL) — Station: 24+12 Offset: 51' LT

*Core Photos Provided By NCDOT



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34497.1.2	TIP R-2707C	COUNTY CLEVELAND	GEOLOGIST M. Brewer
SITE DESCRIPTION Site 6: End Bent 2 MSE Wall on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)			GROUND WTR (ft)
BORING NO. RW-4	STATION 25+25	OFFSET 53 ft LT	ALIGNMENT -Y13-
COLLAR ELEV. 944.4 ft	TOTAL DEPTH 40.0 ft	NORTHING 579,277	EASTING 1,256,020
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER J. Messick	START DATE 07/11/16	COMP. DATE 07/11/16	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			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
945															944.4	GROUND SURFACE	0.0
	943.4	1.0	4	5	5										942.9	ROADWAY EMBANKMENT	1.5
	940.9	3.5	8	11	15										940.4	Loose, Tan-Brown, Silty Fine SAND (A-2-4), with trace roots	4.0
940	938.4	6.0	5	7	7										936.4	Very Stiff, Red-Orange-Brown, Fine Sandy, Silty CLAY (A-7-6(11))	8.0
	935.9	8.5	4	5	5											RESIDUAL	
935	930.9	13.5	4	2	3										932.4	Stiff, Red-Brown-White, Fine Sandy SILT (A-4), with trace mica	12.0
	925.9	18.5	15	19	13										930.0	Medium Stiff, Tan-Brown-Orange, Fine Sandy, Silty, CLAY (A-7-6(11)), with trace mica	14.4
925	920.9	23.5	8	8	10										922.4	Loose to Dense, White-Orange-Brown, Silty Fine To Coarse SAND (A-2-4), with trace gravel-sized rock fragments and trace mica	22.0
	915.9	28.5	5	7	8												
915	910.9	33.5	11	8	9												
	905.9	38.5	4	5	12												
905															904.4	Boring Terminated at Elevation 904.4 ft In Residual SILT (A-4)	40.0

NCDOT BORE DOUBLE R-2707C_GEO_DUALBRIDGES_BORELOGS.GPJ NC_DOT.GDT 8/10/16

SOIL TEST RESULTS

BORING NO.	SAMPLE NO.	OFFSET	STATION -Y11REV2-	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
								C. SAND	F. SAND	SILT	CLAY	10	40	200		
EB1-A (LL)	SS-160	29' RT	27+71	58.5 - 60.0'	A-4(0)	34	6	26.2	37.7	26.5	9.7	99.0	83.0	45.0	27.9	-
EB1-B (LL)	SS-170	29' RT	28+49	28.5 - 30.0'	A-5(5)	48	8	16.3	33.4	41.1	9.2	99.0	91.0	59.0	36.7	-
RW-1	SS-137	20' RT	26+84	3.5 - 5.0'	A-7-5(28)	69	33	9.5	19.4	13.3	57.8	100.0	95.0	75.0	21.8	-
RW-1	SS-145	20' RT	26+84	33.5 - 35.0'	A-5(5)	43	9	21.2	22.4	41.5	14.9	99.0	86.0	62.0	40.1	-
BORING NO.	SAMPLE NO.	OFFSET	STATION -Y13-	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
								C. SAND	F. SAND	SILT	CLAY	10	40	200		
EB2-A (RL)	SS-60	60' LT	23+49	6.0 - 7.5'	A-7-5(25)	68	29	10.5	18.2	13.1	58.3	99.0	93.0	75.0	25.7	-
RW-3	SS-514	52' LT	21+28	6.0 - 7.5'	A-7-5(30)	72	33	8.2	17.2	14.3	60.3	99.0	94.0	78.0	23.4	-
RW-4	SS-500	53' LT	25+25	1.5 - 2.5'	A-7-6(15)	48	24	11.9	24.3	11.8	51.9	98.0	92.0	67.0	18.0	-
RW-4	SS-505	53' LT	25+25	13.5 - 14.4'	A-7-6(11)	45	16	10.9	23.8	24.6	40.6	98.0	93.0	70.0	26.5	-

LAB TECHNICIAN: AMANDA R. ROTH

NCDOT CERTIFICATION NO. 112-09-1003

SIGNATURE: 