

REFERENCE: I-2513AC

PROJECT: 34165

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-8	BORE LOGS
9	SOIL TEST RESULTS

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY BUNCOMBE

PROJECT DESCRIPTION I-26I-40I-240 INTERCHANGE
TO SR 3548 (HAYWOOD ROAD)

SITE DESCRIPTION RETAINING WALL NO.12
-WALL12- STA. 10 + 75.00 (-Y2A- 17 + 25.00) TO
-WALL12- STA. 14 + 01.73 (-Y2A- 14 + 38.02)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-2513AC	1	9

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

PERSONNEL

A. BLACKMORE

GEOLOGIC EXPLORATION

INVESTIGATED BY ECS SOUTHEAST, LLC

DRAWN BY A. SUTTLE, P.G.

CHECKED BY S. HUDSON, P.G.

SUBMITTED BY ECS SOUTHEAST, LLC

DATE APRIL 2025

Prepared in the Office of:



ECS SOUTHEAST, LLC
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1519



Signed by:

Amanda R. Suttle P.G. 6/30/2026

399DBE429 SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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 (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,
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		
GROUP CLASS.	A-1	A-3	A-2		A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	
SYMBOL											
% PASSING	50 MX	30 MX	50 MX	51 MN	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN
*10											
*40											
*200											
MATERIAL PASSING #40 LL PI	-	6 MX	-	NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX
GROUP INDEX	0	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX		
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL, AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS	CLAYEY SOILS					
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD				FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270
	4.76	2.00	0.42	0.25	0.075	0.053
BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. 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
LL LIQUID RANGE (PI) PL	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
OM SL	- SHRINKAGE LIMIT	
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

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

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	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY

GROUND WATER

WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING

STATIC WATER LEVEL AFTER 24 HOURS

PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA

SPRING OR SEEP

MISCELLANEOUS SYMBOLS

ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION

SOIL SYMBOL

ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT

INFERRED SOIL BOUNDARY

INFERRED ROCK LINE

ALLUVIAL SOIL BOUNDARY

DIP & DIP DIRECTION OF ROCK STRUCTURES

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

UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE

UNCLASSIFIED EXCAVATION - ACCEPTABLE, 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
HL - HIGHLY

MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY

VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_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

☒ DIEDRICH D50

☐

ADVANCING TOOLS:

☐ CLAY BITS

☐ 6" CONTINUOUS FLIGHT AUGER

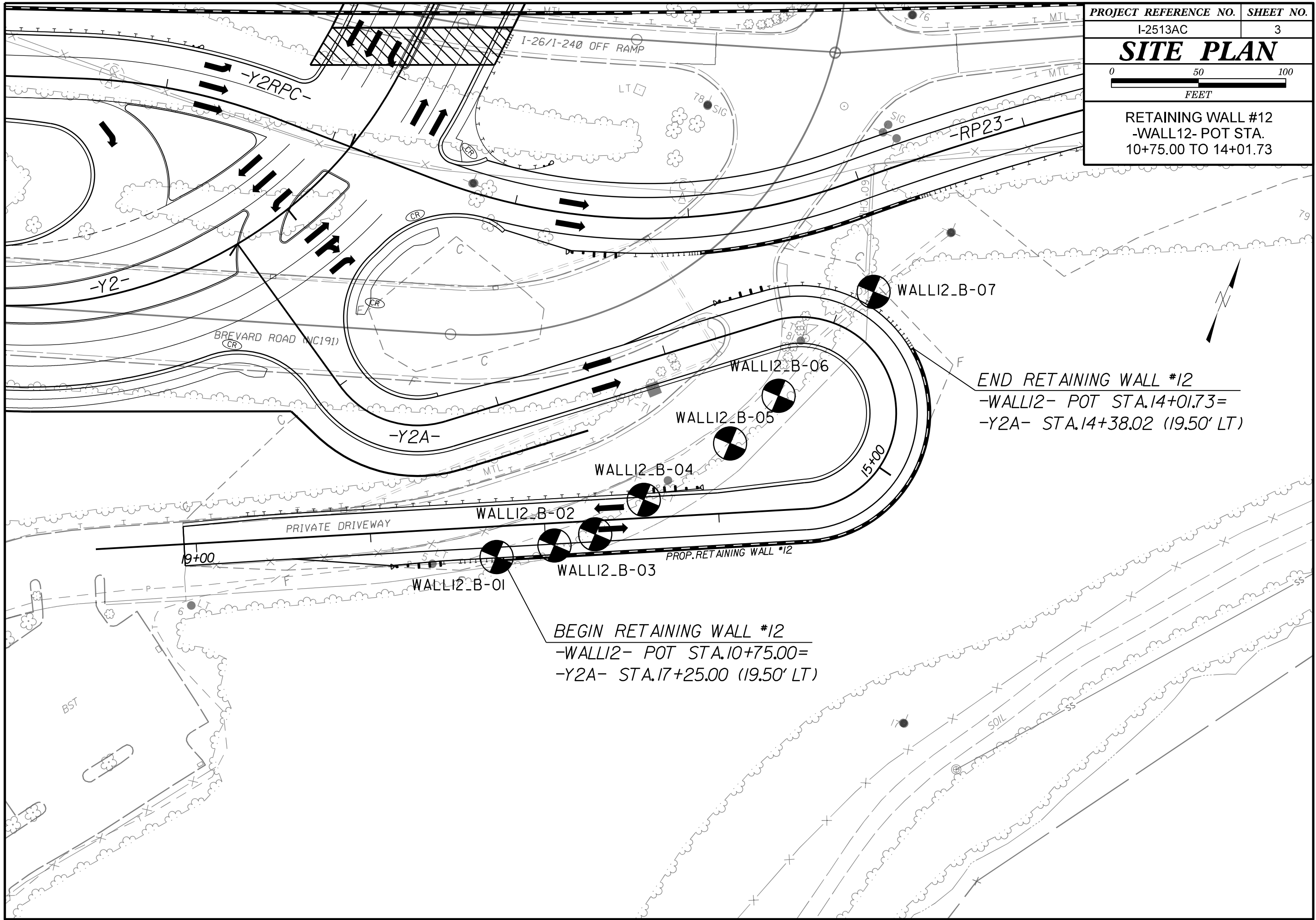
☒ 8" HOLLOW AUGERS

☐ HARD FACED FINGER BITS

☐ TUNG.-CARBIDE INSERTS

☐ CAS

PROJECT REFERENCE NO.	SHEET NO.
I-2513AC	3
SITE PLAN	
0 50 100 FEET	
RETAINING WALL #12 -WALL12- POT STA. 10+75.00 TO 14+01.73	



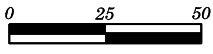
0-AUG-2024 17:24
C:\Users\j\OneDrive - ECS Corporate Services\31-4489 I-2513AC 1/2
Structures\CADD\GEOTECH\Site&Sub\I2513AC_GEO_RWAL12_PFI.dgn

-WALL12- PROFILE ALONG EXISTING GROUND LINE FROM ROADWAY
DESIGN FILES, PROVIDED BY AECOM JULY 2024 AND I2513 Is tnl.tin. INFERRED
STRATIGRAPHY IS DRAWN THROUGH THE BORING, PROJECTED ON THE PROFILE.

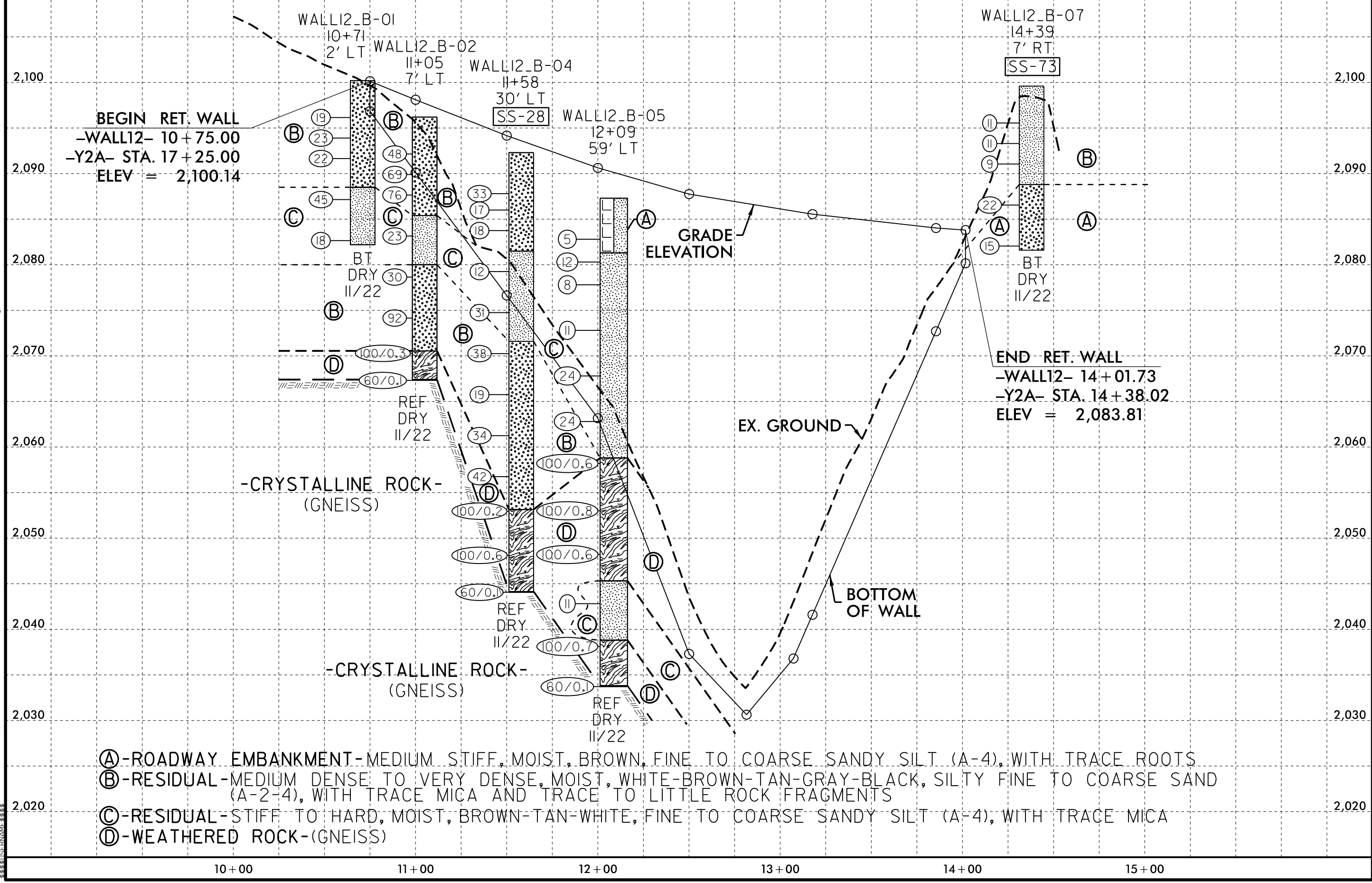
-WALL12-

Prepared in the Office of:

ECS SOUTHEAST, LLC
1815 CENTRE STREET, SUITE 200
CHESAPEAKE, VA 23022
(703) 575-1313 (PHONE)
(703) 575-1314 (FAX)
EC REGISTERED
ENGINEERING
FIRM #1-3519


VE = 5:1

PROJECT REFERENCE NO.	SHEET NO.
I-2513AC	4
PROFILE BORINGS PROJECTED ON -WALL12- ALONG WALL NO. 12	



- (A)-ROADWAY EMBANKMENT-MEDIUM STIFF, MOIST, BROWN, FINE TO COARSE SANDY SILT (A-4), WITH TRACE ROOTS
- (B)-RESIDUAL-MEDIUM DENSE TO VERY DENSE, MOIST, WHITE-BROWN-TAN-GRAY-BLACK, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE MICA AND TRACE TO LITTLE ROCK FRAGMENTS
- (C)-RESIDUAL-STIFF TO HARD, MOIST, BROWN-TAN-WHITE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA
- (D)-WEATHERED ROCK-(GNEISS)

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 8/1/24

WBS 34165.1.13		TIP I-2513AC		COUNTY BUNCOMBE		GEOLOGIST A. Blackmore								
SITE DESCRIPTION RETAINING WALL NO. 12, STA. -Y2A- to 17+25.00 TO -Y2A- 14+38.02								GROUND WTR (ft)						
BORING NO. WALL12_B-02		STATION 11+05		OFFSET 7 ft LT		ALIGNMENT -WALL12-		0 HR.	Dry					
COLLAR ELEV. 2,096.2 ft		TOTAL DEPTH 32.1 ft		NORTHING 679,078		EASTING 931,406		24 HR.	Dry					
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D-50 80% 03/18/2022				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic								
DRILLER J. Messick			START DATE 11/10/22		COMP. DATE 11/10/22		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				
2100														
2095														2,096.2 GROUND SURFACE 0.0
2090	2,092.7	3.5	10	24	24									RESIDUAL Dense to Very Dense, Brown-Tan-Gray, Silty Fine to Coarse SAND (A-2-4), with trace to little rock fragments
	2,090.2	6.0	10	26	43									
2085	2,087.7	8.5	34	34	42									2,084.2 Very Stiff, Brown-Tan, Fine to Coarse Sandy SILT (A-4), with trace mica 12.0
	2,082.7	13.5	13	11	12									
2080	2,077.7	18.5	17	14	16									2,078.2 Medium Dense to Very Dense, Brown-Tan-Black, Silty Fine to Coarse SAND (A-2-4), with trace mica 18.0
	2,072.7	23.5	22	48	44									
2075	2,067.7	28.5	100/0.3											2,067.7 WEATHERED ROCK 28.5
2065	2,064.2	32.0	60/0.1											2,064.2 32.0
														2,064.1 32.1
														CRYSTALLINE ROCK (GNEISS)
														Boring Terminated with Standard Penetration Test Refusal at Elevation 2,064.1 ft In Crystalline Rock (GNEISS)
														Surficial Organic Soil from 0.0 to 0.1 foot.
														Hand Auger Probe from 0.0 to 3.0 feet due to close proximity to underground utilities.

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 8/1/24

WBS		34165.1.13		TIP		I-2513AC		GROUND		BUNCOMBE		GEOLOGIST		A. Blackmore																																			
SITE DESCRIPTION													RETAINING WALL NO. 12, STA. -Y2A- to 17+25.00 TO -Y2A- 14+38.02			GROUND WTR (ft)																																	
BORING NO.			WALL12_B-04			STATION			11+58			OFFSET			30 ft LT			ALIGNMENT			-WALL12-			0 HR.		Dry																							
COLLAR ELEV.			2,092.3 ft			TOTAL DEPTH			53.6 ft			NORTHING			679,122			EASTING			931,443			24 HR.		Dry																							
DRILL RIG/HAMMER EFF./DATE										GEO366 Diedrich D-50 80% 03/18/2022										DRILL METHOD					H.S. Augers					HAMMER TYPE					Automatic														
DRILLER					J. Messick					START DATE					11/09/22					COMP. DATE					11/09/22					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																																							
2095																																																	
2090																																																	
	2,088.3	4.0																																															
	2,086.3	6.0																																															
2085																																																	
	2,083.8	8.5																																															
2080																																																	
	2,078.8	13.5																																															
2075																																																	
	2,073.8	18.5																																															
2070																																																	
	2,068.8	23.5																																															
2065																																																	
	2,063.8	28.5																																															
2060																																																	
	2,058.8	33.5																																															
2055																																																	
	2,053.8	38.5																																															
2050																																																	
	2,048.8	43.5																																															
2045																																																	
	2,043.8	48.5																																															
2040																																																	
	2,038.8	53.5																																															

GEOTECHNICAL BORING REPORT

BORE LOG

WBS		34165.1.13		TIP		I-2513AC		COUNTY		BUNCOMBE		GEOLOGIST		A. Blackmore																																			
SITE DESCRIPTION													RETAINING WALL NO. 12, STA. -Y2A- to 17+25.00 TO -Y2A- 14+38.02			GROUND WTR (ft)																																	
BORING NO.			WALL12_B-05			STATION			12+09			OFFSET			59 ft LT			ALIGNMENT			-WALL12-			0 HR.		Dry																							
COLLAR ELEV.			2,087.4 ft			TOTAL DEPTH			53.6 ft			NORTHING			679,171			EASTING			931,476			24 HR.		Dry																							
DRILL RIG/HAMMER EFF./DATE										GEO366 Diedrich D-50 80% 03/18/2022										DRILL METHOD					H.S. Augers					HAMMER TYPE					Automatic														
DRILLER					J. Messick					START DATE					11/09/22					COMP. DATE					11/09/22					SURFACE WATER DEPTH										N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	L O G	SOIL AND ROCK DESCRIPTION										DEPTH (ft)																									
			0.5ft	0.5ft	0.5ft	0	25	50	75	100																																							
2090																																																	
2085																																																	
	2,083.9	3.5		5	3	2							M		GROUND SURFACE										0.0																								
														ROADWAY EMBANKMENT																																			
	2,081.4	6.0		4	5	7							M		Medium Stiff, Brown, Fine to Coarse Sandy SILT (A-4), with trace roots																																		
2080	2,078.9	8.5		4	3	5							M		RESIDUAL										6.0																								
														Medium Stiff to Very Stiff,																																			
	2,073.9	13.5		7	6	5							M		Brown-White-Gray-Orange, Fine to Coarse Sandy SILT (A-4), with trace mica and rock fragments																																		
2075																																																	
	2,068.9	18.5		10	10	14							M																																				
2065																																																	
	2,063.9	23.5		5	6	18							M																																				
2060																																																	
	2,058.9	28.5	52	48/0.1										WEATHERED ROCK										28.5																									
2055														Gray-Brown (GNEISS)																																			
	2,053.9	33.5		29	71/0.3																																												
2050																																																	
	2,048.9	38.5	62	38/0.1																																													
2045																																																	
	2,043.9	43.5	5	9	2							M		RESIDUAL										42.0																									
2040														Stiff, Black-Brown, Fine to Coarse Sandy SILT (A-4), with trace mica																																			
	2,038.9	48.5	83	17/0.2																				48.5																									
2035														WEATHERED ROCK																																			
														Brown (GNEISS)																																			
	2,033.9	53.5	60/0.1											CRYSTALLINE ROCK										53.5																									
														(GNEISS)										53.5																									
														Boring Terminated with Standard Penetration Test Refusal at Elevation 2,033.8 ft In Crystalline Rock (GNEISS)																																			
														Surficial Organic Soil from 0.0 to 0.2 feet.																																			
														Hand Auger Probe from 0.0 to 3.0 feet due to close proximity to underground utilities.																																			

WBS		34165.1.13		TIP		I-2513AC		COUNTY		BUNCOMBE		GEOLOGIST		A. Blackmore						
SITE DESCRIPTION													RETAINING WALL NO. 12, STA. -Y2A- to 17+25.00 TO -Y2A- 14+38.02			GROUND WTR (ft)				
BORING NO.		WALL12_B-06		STATION		12+38		OFFSET		85 ft LT		ALIGNMENT		-WALL12-		0 HR.	Dry			
COLLAR ELEV.		2,084.9 ft		TOTAL DEPTH		65.5 ft		NORTHING		679,207		EASTING		931,491		24 HR.	Dry			
DRILL RIG/HAMMER EFF./DATE								GEO366 Diedrich D-50 80% 03/18/2022				DRILL METHOD			H.S. Augers		HAMMER TYPE		Automatic	
DRILLER				J. Messick		START DATE		11/08/22		COMP. DATE		11/08/22		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										
2085														2,084.9 GROUND SURFACE 0.0						
	2,081.4	3.5	8	6	6									ROADWAY EMBANKMENT						
2080	2,078.9	6.0	3	3	4									Medium Stiff to Stiff, Brown-Red, Fine to Coarse Sandy SILT (A-4), with trace mica						
	2,076.4	8.5	10	8	11									2,075.9						
2075	2,071.4	13.5	44	28	8									RESIDUAL						
	2,066.4	18.5	10	12	14									Medium Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4), with trace mica						
2070	2,061.4	23.5	16	13	17									2,071.9 13.0						
	2,056.4	28.5	52	28	8									Very Stiff to Hard, Brown-White-Gray, Fine to Coarse Sandy SILT (A-4), with trace mica						
2065	2,051.4	33.5	14	12	16									2,046.9						
	2,046.4	38.5	14	20	24									Hard, Brown, Fine to Coarse Sandy SILT (A-4), with trace mica						
2060	2,041.4	43.5	55	30	50									2,042.9 42.0						
	2,036.4	48.5	25	25	28									Very Dense, Gray-Brown, Silty Fine to Coarse SAND (A-2-4), with trace mica						
2035	2,031.4	53.5	74	26/0.2										2,031.4 53.5						
	2,026.4	58.5	100/0.4											WEATHERED ROCK						
2025	2,021.4	63.5	100/0.4											Gray-Brown (GNEISS)						
	2,019.4	65.5	60/0.0											2,019.4 65.5						
														Boring Terminated with Standard Penetration Test Refusal at Elevation 2,019.4 ft On Crystalline Rock (GNEISS)						
														Surficial Organic Soil from 0.0 to 0.1 foot.						
														Hand Auger Probe from 0.0 to 3.0 feet due to close proximity to underground utilities.						

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore						
SITE DESCRIPTION RETAINING WALL NO. 12, STA. -Y2A- to 17+25.00 TO -Y2A- 14+38.02											GROUND WTR (ft)				
BORING NO. WALL12_B-07			STATION 14+39			OFFSET 7 ft RT			ALIGNMENT -WALL12-			0 HR. Dry			
COLLAR ELEV. 2,099.6 ft			TOTAL DEPTH 20.0 ft			NORTHING 679,283			EASTING 931,518			24 HR. Dry			
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D-50 80% 03/18/2022						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic						
DRILLER J. Messick			START DATE 11/10/22			COMP. DATE 11/10/22			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				ELEV. (ft)	
2100															
														2,099.6	0.0
														GROUND SURFACE	
														RESIDUAL	
														Stiff, Brown-Tan, Fine to Coarse Sandy SILT (A-4(0)), with trace mica	
2095	2,096.1	3.5	4	5	6						SS-73	15%			
	2,093.6	6.0	4	5	6										
	2,091.1	8.5	4	4	5							M			
2090												M			
	2,086.1	13.5	12	11	11							M		2,087.6	12.0
2085														Medium Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4)	
	2,081.1	18.5	6	7	8							M			
2080												M		2,079.6	20.0
														Boring Terminated at Elevation 2,079.6 ft In Residual Silty SAND (A-2-4)	
														Surficial Organic Soil from 0.0 to 0.2 feet.	
														Hand Auger Probe from 0.0 to 3.0 feet due to close proximity to underground utilities.	

NCDOT BORE DOUBLE I2513AC_GEO_GTM.GPJ NC_DOT.GDT 8/1/24

SOIL TEST RESULTS																
BORING NO.	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		
WALL12_B-03	SS-39	12' LT	11+29 -WALL12-	3.5 - 5.0	A-4(2)	31	8	22.6	28.6	16.6	32.2	95.6	82.4	51.7	11.7	-
WALL12_B-04	SS-28	30' LT	11+58 -WALL12-	6.0 - 7.5	A-2-4(0)	25	NP	29.8	41.8	13.0	15.4	96.0	77.3	35.5	9.2	-
WALL12_B-07	SS-73	7' RT	14+39 -WALL12-	3.5 - 5.0	A-4(0)	39	NP	31.6	36.3	19.7	12.4	96.3	75.6	40.1	14.9	-

LAB TECHNICIAN: DANIEL REEVE

NCDOT CERTIFICATION NO. 135-03-0816