

PROJECT: 34165

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-10	BORE LOGS
11	SOIL TEST RESULTS

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY **BUNCOMBE**
PROJECT DESCRIPTION **I-26/I-40/I-240 INTERCHANGE
TO SR 3548 (HAYWOOD ROAD)**

SITE DESCRIPTION **RETAINING WALL NO. 11**
-WALL11- STA. 10+70.04 (-Y2- STA. 29+00.00) TO
-WALL11- STA. 16+50.04 (-Y2A- STA. 12+45.00)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-2513AC	1	11

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. 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 TO DETERMINE THE ACTUAL SUBSURFACE CONDITIONS. ANY EXTENSION OF TIME INCURRED ON THIS PROJECT, THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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 THIS 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

A. BLACKMORE

M. EUBANK

GEOLOGIC EXPLORATION

INVESTIGATED BY **ECS SOUTHEAST, LLC**DRAWN BY **A. SUTTLE, P.G.**

CHECKED BY **M. MULLA, P.E.**

SUBMITTED BY ECS SOUTHEAST, LLCDATE **AUGUST 2024**

Prepared by
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Signed by:

Amanda R. Suttle PG 6/30/2026

399DBE42974A494

DATE _____

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

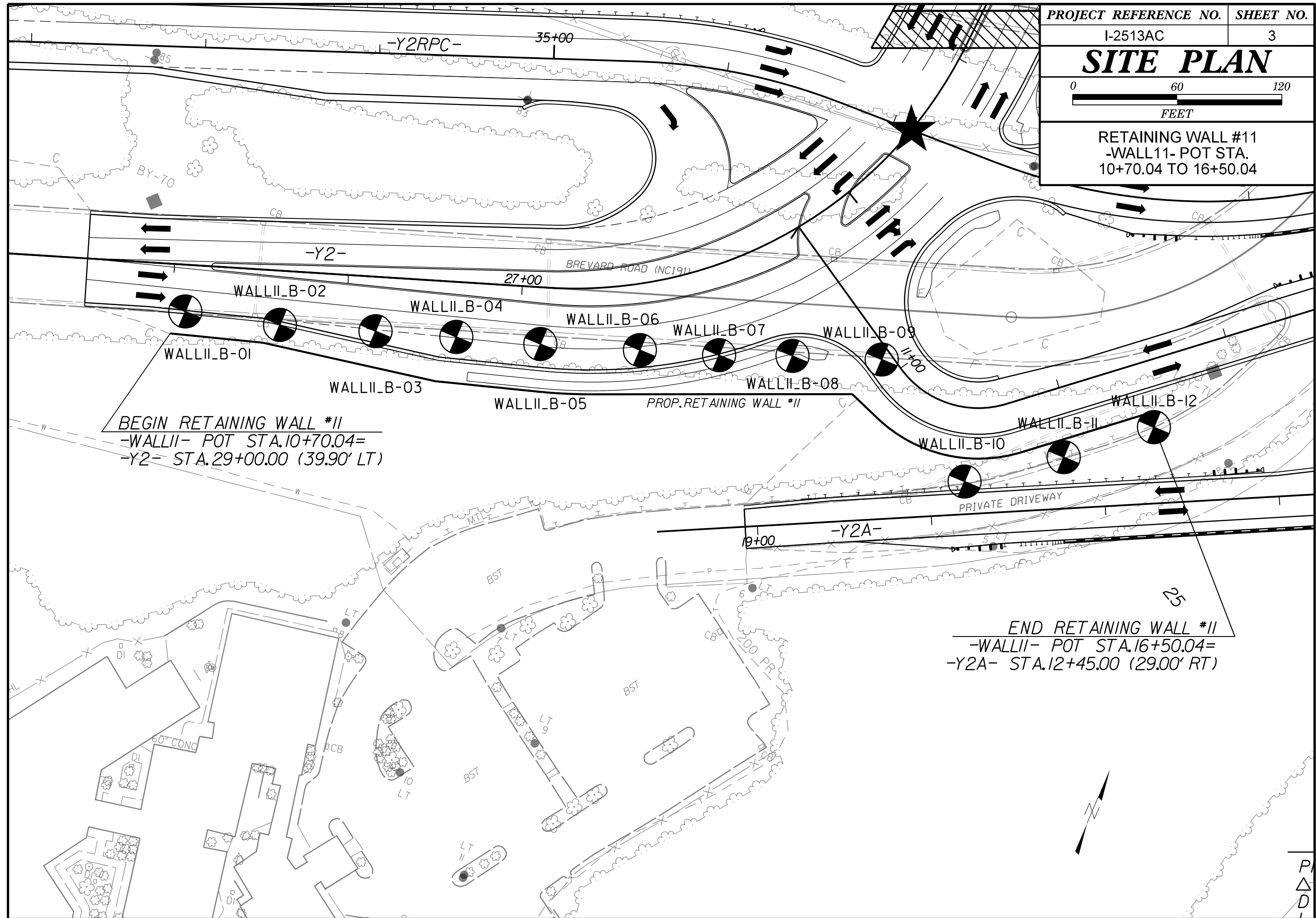
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

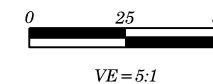
SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS									
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE 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 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 (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 MATERIAL.									
SOIL LEGEND AND AASHTO CLASSIFICATION										MINERALOGICAL COMPOSITION										WEATHERING																			
GENERAL CLASS.										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.										FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.																			
GROUP CLASS.										COMPRESSIBILITY										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.																			
SYMBOL										PERCENTAGE OF MATERIAL										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.																			
%										GROUND WATER										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.																			
MATERIAL PASSING #40 LL PI										MISCELLANEOUS SYMBOLS										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																			
GROUP INDEX										RECOMMENDATION SYMBOLS										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																			
USUAL TYPES OF MAJOR MATERIALS										ABBREVIATIONS										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																			
GEN. RATING AS SUBGRADE										EQUIPMENT USED ON SUBJECT PROJECT										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.																			
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30																				ROCK HARDNESS																			
CONSISTENCY OR DENSENESS																				VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.																			
PRIMARY SOIL TYPE																				HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.																			
COMPACTNESS OR CONSISTENCY																				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.																			
RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)																				MEDIUM HARD 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.																			
RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)																				SOFT 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 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.																			
TEXTURE OR GRAIN SIZE																				FRACTURE SPACING																			
U.S. STD. SIEVE SIZE OPENING (MM)																				BEDDING																			
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)																				TERM THICKNESS																			
GRAIN SIZE MM IN.																				VERY WIDE MORE THAN 10 FEET 4 FEET																			
																				WIDE 3 TO 10 FEET 1.5 - 4 FEET																			
																				MODERATELY CLOSE 1 TO 3 FEET 0.16 - 1.5 FEET																			
																				CLOSE 0.16 TO 1 FOOT 0.03 - 0.16 FEET																			
																				VERY CLOSE LESS THAN 0.16 FEET < 0.03 FEET																			
SOIL MOISTURE - CORRELATION OF TERMS																																							
SOIL MOISTURE SCALE (ATTERBERG LIMITS)																																							
FIELD MOISTURE DESCRIPTION																																							
GUIDE FOR FIELD MOISTURE DESCRIPTION																																							
LL - LIQUID LIMIT																																							
PLASTIC RANGE (PI)																																							
PL - PLASTIC LIMIT																																							
OM - OPTIMUM MOISTURE SHRINKAGE LIMIT																																							
SL - SHRINKAGE LIMIT																																							
PLASTICITY																																							
NON PLASTIC																																							
SLIGHTLY PLASTIC																																							
MODERATELY PLASTIC																																							
HIGHLY PLASTIC																																							
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.																																							

PROJECT REFERENCE NO.	SHEET NO.
I-2513AC	3
SITE PLAN	
0 60 120 FEET	
RETAINING WALL #11 -WALL11- POT STA. 10+70.04 TO 16+50.04	



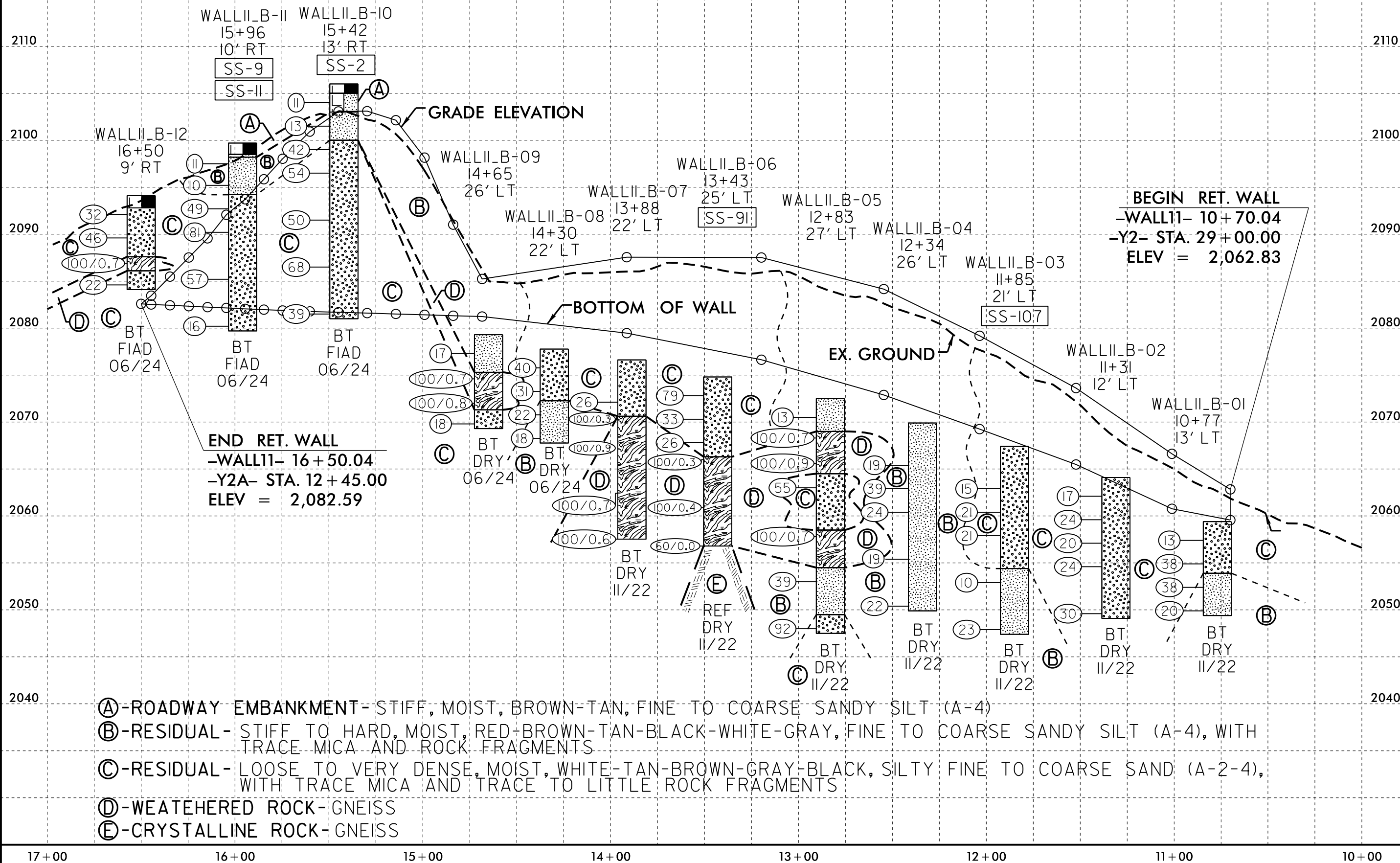
BEGIN RETAINING WALL #11
-WALL11- POT STA. 10+70.04=
-Y2- STA. 29+00.00 (39.90' LT)

END RETAINING WALL #11
-WALL11- POT STA. 16+50.04=
-Y2A- STA. 12+45.00 (29.00' RT)



2120 -WALL11- PROFILE ALONG EXISTING GROUND LINE FROM ROADWAY
DESIGN FILES, PROVIDED BY AECOM, JULY 2024 AND I2513 Is tnI.tin. INFERRED
STRATIGRAPHY IS DRAWN THROUGH THE BORING, PROJECTED ON THE PROFILE.

-WALLII-



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

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore							
SITE DESCRIPTION RETAINING WALL NO. 11, STA. -Y2- to 29+00.00 TO -Y2A- 12+45.00											GROUND WTR (ft)					
BORING NO. WALL11_B-01			STATION 10+77			OFFSET 13 ft LT			ALIGNMENT -WALL11-			0 HR.	Dry			
COLLAR ELEV. 2,059.4 ft			TOTAL DEPTH 10.0 ft			NORTHING 678,985			EASTING 930,866			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 11/16/22			COMP. DATE 11/16/22			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				ELEV. (ft)	DEPTH (ft)	
2060														2,059.4	GROUND SURFACE 0.0	
2055	2,058.4	1.0	6	6	7							M		RESIDUAL Medium Dense to Dense, White-Tan, Silty Fine to Coarse SAND (A-2-4)		
	2,055.9	3.5	8	17	21							M				
	2,053.4	6.0	8	16	22							M				
2050	2,050.9	8.5	6	8	12							M		2,053.9	Very Stiff to Hard, Brown-Tan-White, Fine to Coarse Sandy SILT (A-4) 5.5	
														2,049.4	Boring Terminated at Elevation 2,049.4 ft In Residual Sandy SILT (A-4) 10.0	
																Surficial Organic Soil from 0.0 to 0.3 feet.

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 11, STA. -Y2- to 29+00.00 TO -Y2A- 12+45.00									GROUND WTR (ft)					
BORING NO. WALL11_B-02			STATION 11+31			OFFSET 12 ft LT			ALIGNMENT -WALL11-			0 HR.	Dry	
COLLAR ELEV. 2,064.1 ft			TOTAL DEPTH 15.0 ft			NORTHING 678,999			EASTING 930,919			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 11/15/22			COMP. DATE 11/15/22			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				
2065														
	2,063.1	1.0	6	8	9						M			2,064.1 GROUND SURFACE 0.0
2060	2,060.6	3.5	8	9	15						M			RESIDUAL Medium Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4), with trace mica
	2,058.1	6.0	8	8	12						M			
2055	2,055.6	8.5	9	12	12						M			
2050	2,050.6	13.5	18	18	12						M			2,049.1 15.0
														Boring Terminated at Elevation 2,049.1 ft In Residual Silty SAND (A-2-4) Surficial Organic Soil from 0.0 to 0.3 feet.

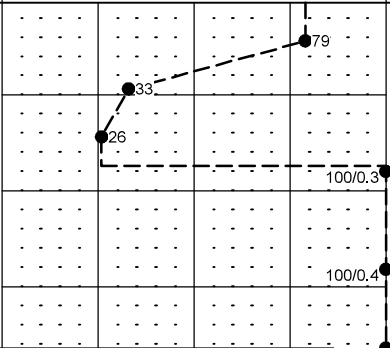
NCDOT BORE DOUBLE I2513AC_GEO_GTM.GPJ NC_DOT.GDT 8/5/24

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 8/5/24

WBS 34165.1.13		TIP I-2513AC		COUNTY BUNCOMBE		GEOLOGIST A. Blackmore									
SITE DESCRIPTION RETAINING WALL NO. 11, STA. -Y2- to 29+00.00 TO -Y2A- 12+45.00								GROUND WTR (ft)							
BORING NO. WALL11_B-04		STATION 12+34		OFFSET 26 ft LT		ALIGNMENT -WALL11-		0 HR.	Dry						
COLLAR ELEV. 2,069.9 ft		TOTAL DEPTH 20.0 ft		NORTHING 679,032		EASTING 931,015		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 11/14/22		COMP. DATE 11/14/22		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					
2070														2,069.9 GROUND SURFACE 0.0	
2065	2,066.4	3.5	7	7	12						M		Very Stiff to Hard, Brown-Black-White-Tan, Fine to Coarse Sandy SILT (A-4), with trace mica and rock fragments		
2063.9	6.0	15	18	21											
2060	2,061.4	8.5	15	14	10										
2055	2,056.4	13.5	9	8	11										
2050	2,051.4	18.5	4	10	12										
														2,049.9 20.0	
														Boring Terminated at Elevation 2,049.9 ft In Residual Sandy SILT (A-4)	
														Surficial Organic Soil from 0.0 to 0.3 feet.	
														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. 11, STA. -Y2- to 29+00.00 TO -Y2A- 12+45.00												GROUND WTR (ft)				
BORING NO. WALL11_B-05			STATION 12+83			OFFSET 27 ft LT			ALIGNMENT -WALL11-			0 HR.	Dry			
COLLAR ELEV. 2,072.5 ft			TOTAL DEPTH 25.0 ft			NORTHING 679,047			EASTING 931,061			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 11/14/22			COMP. DATE 11/14/22			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				ELEV. (ft)	DEPTH (ft)	
2075																
2070	2,071.5	1.0	4	5	8									2,072.5	0.0	
	2,069.0	3.5	81	19/0.2								M		Stiff, White-Gray, Fine to Coarse Sandy SILT (A-4)	3.5	
2065	2,066.5	6.0	38	62/0.4							100/0.7			2,069.0		
	2,064.0	8.5	54	30	25						100/0.9			2,064.5	8.0	
2060													M		Very Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4)	
	2,059.0	13.5	34	56	44/0.2						100/0.7			2,058.5	14.0	
2055	2,054.0	18.5	21	11	28								M		Hard, Brown-Tan, Fine to Coarse Sandy SILT (A-4), with trace mica	18.0
2050	2,049.0	23.5	31	30	62								M		Very Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4), with trace rock fragments	23.0
														2,047.5	25.0	
												Boring Terminated at Elevation 2,047.5 ft In Residual Silty SAND (A-2-4)				
												Surficial Organic Soil from 0.0 to 0.2 feet.				

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 11, STA. -Y2- to 29+00.00 TO -Y2A- 12+45.00									GROUND WTR (ft)					
BORING NO. WALL11_B-06			STATION 13+43			OFFSET 25 ft LT			ALIGNMENT -WALL11-			0 HR. Dry		
COLLAR ELEV. 2,074.8 ft			TOTAL DEPTH 18.0 ft			NORTHING 679,066			EASTING 931,115			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 11/14/22			COMP. DATE 11/14/22			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				
2075														2,074.8 GROUND SURFACE 0.0
2070	2,073.8	1.0	18	43	36							M		RESIDUAL Medium Dense to Very Dense, Brown-Gray-Tan-White, Silty Fine to Coarse SAND (A-2-4(0)), with trace to little rock fragments
	2,071.3	3.5	24	20	13							SS-91		
2065	2,068.8	6.0	4	8	18							M		2,066.3 8.5
	2,066.3	8.5	100/0.3											WEATHERED ROCK White (GNEISS)
2060	2,061.3	13.5	100/0.4											
	2,056.8	18.0	60/0.0											2,056.8 18.0
Boring Terminated with Standard Penetration Test Refusal at Elevation 2,056.8 ft On Crystalline Rock (GNEISS)														
Surficial Organic Soil from 0.0 to 0.3 feet.														

NCDOT BORE DOUBLE I2513AC_GEO_GTM.GPJ NC_DOT.GDT 8/5/24

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 8/5/24

WBS 34165.1.13		TIP I-2513AC		COUNTY BUNCOMBE		GEOLOGIST A. Blackmore							
SITE DESCRIPTION RETAINING WALL NO. 11, STA. -Y2- to 29+00.00 TO -Y2A- 12+45.00							GROUND WTR (ft)						
BORING NO. WALL11_B-08		STATION 14+30		OFFSET 22 ft LT		ALIGNMENT -WALL11-		0 HR. Dry					
COLLAR ELEV. 2,077.7 ft		TOTAL DEPTH 10.0 ft		NORTHING 679,097		EASTING 931,197		24 HR. Dry					
DRILL RIG/HAMMER EFF./DATE ECS052Diedrich D-70 86% 07/08/2024				DRILL METHOD H.S. Augers			HAMMER TYPE Automatic						
DRILLER M. Eubank			START DATE 06/27/24		COMP. DATE 06/27/24		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			
2080													
	2,076.7	1.0	17	23	17								2,077.7 GROUND SURFACE 0.0
2075	2,074.2	3.5	11	16	15						M		RESIDUAL Dense, Brown-Black, Silty Fine to Coarse SAND (A-2-4)
	2,071.7	6.0	8	9	13						M		2,072.2 5.5
2070	2,069.2	8.5	12	9	9						M		Very Stiff, Brown-Black, Fine to Coarse Sandy SILT (A-4), with trace mica
											M		2,067.7 10.0
													Boring Terminated at Elevation 2,067.7 ft In Residual Sandy SILT (A-4)
													Surficial Organic Soil from 0.0 to 0.2 feet.

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 8/5/24

WBS 34165.1.13		TIP I-2513AC		COUNTY BUNCOMBE		GEOLOGIST A. Blackmore									
SITE DESCRIPTION RETAINING WALL NO. 11, STA. -Y2- to 29+00.00 TO -Y2A- 12+45.00								GROUND WTR (ft)							
BORING NO. WALL11_B-10		STATION 15+42		OFFSET 13 ft RT		ALIGNMENT -WALL11-		0 HR.	Dry						
COLLAR ELEV. 2,106.0 ft		TOTAL DEPTH 25.0 ft		NORTHING 679,069		EASTING 931,316		24 HR.	FIAD						
DRILL RIG/HAMMER EFF./DATE ECS052Diedrich D-70 86% 07/08/2024				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER M. Eubank		START DATE 06/27/24		COMP. DATE 06/27/24		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					
2110															
2105	2,105.0	1.0	5	5	6									2,106.0 GROUND SURFACE 0.0'	
														2,105.0 ROADWAY EMBANKMENT 1.0'	
	2,102.5	3.5	3	5	8									2,103.0 Asphalt (0.4'), Stonebase (0.6') 3.0'	
2100	2,100.0	6.0	22	27	15									2,103.0 Stiff, Brown-Tan, Fine to Coarse Sandy SILT (A-4) 3.0'	
														2,100.0 RESIDUAL 6.0'	
	2,097.5	8.5	21	22	32									Stiff, Red-Brown, Fine to Coarse Sandy SILT (A-4(0)), with trace mica	
2095														Dense to Very Dense, Tan-Gray-White, Silty Fine to Coarse SAND (A-2-4), with trace mica and rock fragments	
	2,092.5	13.5	8	18	32										
2090															
	2,087.5	18.5	11	32	36										
2085															
	2,082.5	23.5	18	23	16										
														Boring Terminated at Elevation 2,081.0 ft In Residual Silty SAND (A-2-4)	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore						
SITE DESCRIPTION RETAINING WALL NO. 11, STA. -Y2- to 29+00.00 TO -Y2A- 12+45.00									GROUND WTR (ft)						
BORING NO. WALL11_B-11			STATION 15+96			OFFSET 10 ft RT			ALIGNMENT -WALL11-			0 HR. Dry			
COLLAR ELEV. 2,099.7 ft			TOTAL DEPTH 20.0 ft			NORTHING 679,104			EASTING 931,363			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE ECS052Diedrich D-70 86% 07/08/2024						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic						
DRILLER M. Eubank			START DATE 06/27/24			COMP. DATE 06/27/24			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)
2100															
2095	2,098.5	1.2	5	5	6										
	2,096.2	3.5	6	5	5						SS-9	16%		2,098.2	1.5
2090	2,093.7	6.0	11	19	30										
	2,091.2	8.5	35	42	39	SS-11	7%	2,094.2	5.5						
2085	2,086.2	13.5	20	22	35										
	2,081.2	18.5	10	9	7									2,079.7	20.0
2080														Boring Terminated at Elevation 2,079.7 ft In Residual Silty SAND (A-2-4)	

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 11, STA. -Y2- to 29+00.00 TO -Y2A- 12+45.00									GROUND WTR (ft)					
BORING NO. WALL11_B-12			STATION 16+50			OFFSET 9 ft RT			ALIGNMENT -WALL11-			0 HR. Dry		
COLLAR ELEV. 2,094.1 ft			TOTAL DEPTH 10.0 ft			NORTHING 679,140			EASTING 931,404			24 HR. FIAD		
DRILL RIG/HAMMER EFF./DATE ECS052Diedrich D-70 86% 07/08/2024						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic					
DRILLER M. Eubank			START DATE 06/27/24			COMP. DATE 06/27/24			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														
	2,093.1	1.0	20	15	17									2,094.1 GROUND SURFACE 0.0
														2,092.8 ROADWAY EMBANKMENT 1.3
2090	2,090.6	3.5	11	15	31									Asphalt (0.6'), Stonebase (0.7')
														RESIDUAL
	2,088.1	6.0	23	63	37/0.2									Dense, Gray-Tan, Silty Fine to Coarse Silty SAND (A-2-4), with some rock fragments
														2,087.6 6.5
2085	2,085.6	8.5	11	11	11									WEATHERED ROCK
														Tan-Gray (GNEISS)
														2,086.1 8.0
														RESIDUAL
														2,084.1 10.0
														Medium Dense, Tan-Brown, Silty Fine to Coarse SAND (A-2-4)
														Boring Terminated at Elevation 2,084.1 ft In Residual Silty SAND (A-2-4)

NCDOT BORE DOUBLE 12513AC_GEO_GTM.GPJ NC_DOT.GDT 8/5/24

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:
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
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
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NC REGISTERED
ENGINEERING
FIRM # F-1519



Signed by: Amanda R. Suttle P.G. 6/30/2026

399DBE429 SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

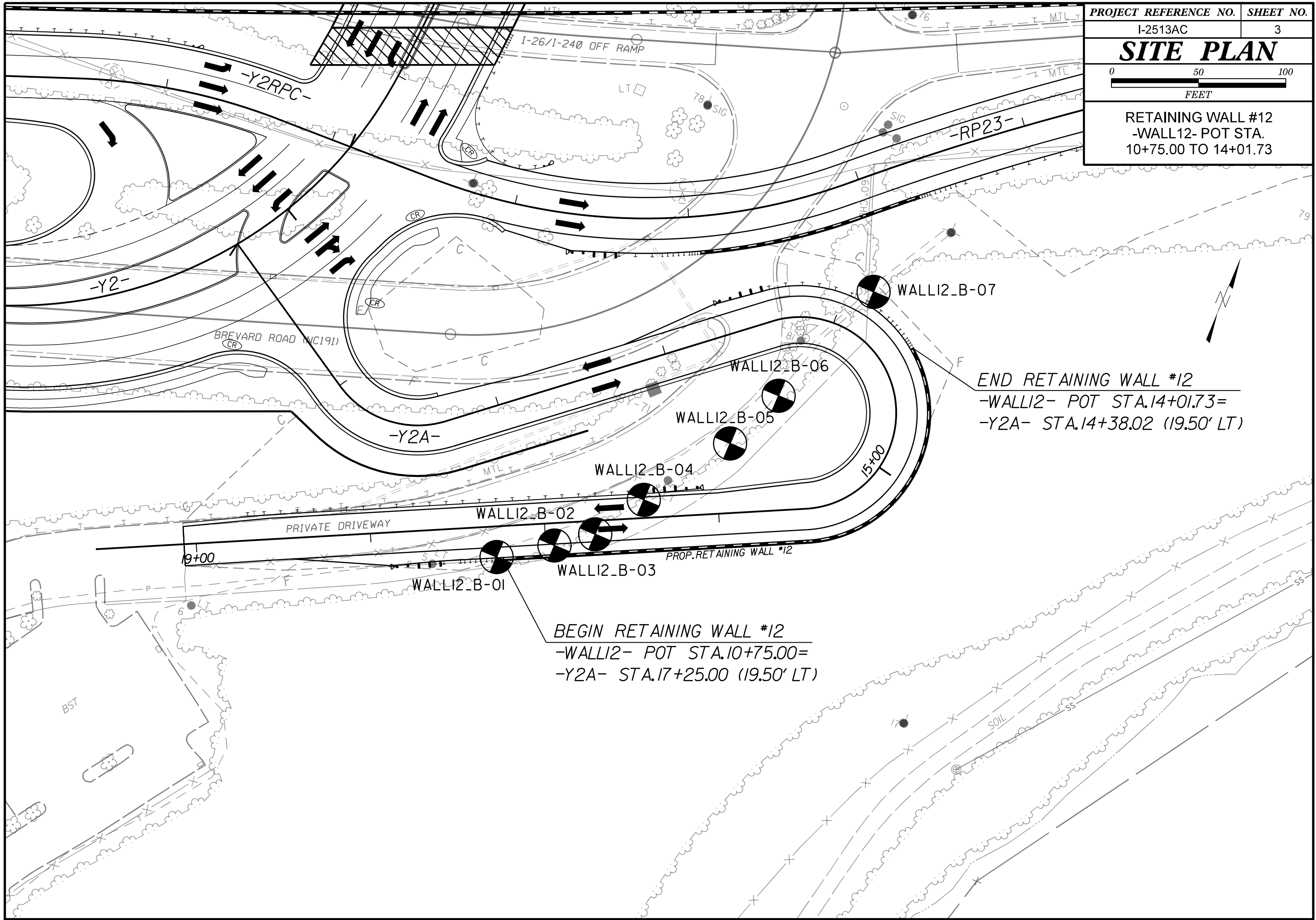
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										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 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 (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 MATERIAL.									
SOIL LEGEND AND AASHTO CLASSIFICATION										MINERALOGICAL COMPOSITION										WEATHERING																			
GENERAL CLASS.										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.										FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.																			
GROUP CLASS.										COMPRESSIBILITY										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.																			
SYMBOL										PERCENTAGE OF MATERIAL										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.																			
%										GROUND WATER										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.																			
MATERIAL PASSING #40 LL PI										MISCELLANEOUS SYMBOLS										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																			
GROUP INDEX										RECOMMENDATION SYMBOLS										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																			
USUAL TYPES OF MAJOR MATERIALS										ABBREVIATIONS										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																			
GEN. RATING AS SUBGRADE										EQUIPMENT USED ON SUBJECT PROJECT										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.																			
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30																				ROCK HARDNESS																			
CONSISTENCY OR DENSENESS																				VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.																			
PRIMARY SOIL TYPE																				HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.																			
COMPACTNESS OR CONSISTENCY																				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.																			
RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)																				MEDIUM HARD 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.																			
RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)																				SOFT 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 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.																			
TEXTURE OR GRAIN SIZE																				FRACTURE SPACING																			
U.S. STD. SIEVE SIZE OPENING (MM)																				BEDDING																			
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)																				TERM THICKNESS																			
GRAIN SIZE MM IN.																				VERY WIDE MORE THAN 10 FEET 4 FEET																			
																				WIDE 3 TO 10 FEET 1.5 - 4 FEET																			
																				MODERATELY CLOSE 1 TO 3 FEET 0.16 - 1.5 FEET																			
																				CLOSE 0.16 TO 1 FOOT 0.03 - 0.16 FEET																			
																				VERY CLOSE LESS THAN 0.16 FEET < 0.03 FEET																			
SOIL MOISTURE - CORRELATION OF TERMS																				INDURATION																			
SOIL MOISTURE SCALE (ATTERBERG LIMITS)																				FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.																			
FIELD MOISTURE DESCRIPTION																				FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.																			
GUIDE FOR FIELD MOISTURE DESCRIPTION																				MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.																			
LL LIQUID LIMIT																				INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.																			
PLASTIC RANGE (PI)																				EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																			
PL																																							
OM OPTIMUM MOISTURE SHRINKAGE LIMIT																																							
SL																																							
PLASTICITY																																							
NON PLASTIC																																							
SLIGHTLY PLASTIC																																							
MODERATELY PLASTIC																																							
HIGHLY PLASTIC																																							
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.																																							

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	



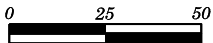
0-AUG-2024 17:24
C:\Users\j\OneDrive - ECS Corporate Services\31-4489 I-2513AC 1/2
Structures\CADD\GEOTECH\Site&Sub\I2513AC_GEO_RWAL12_PFI.dgn

-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.

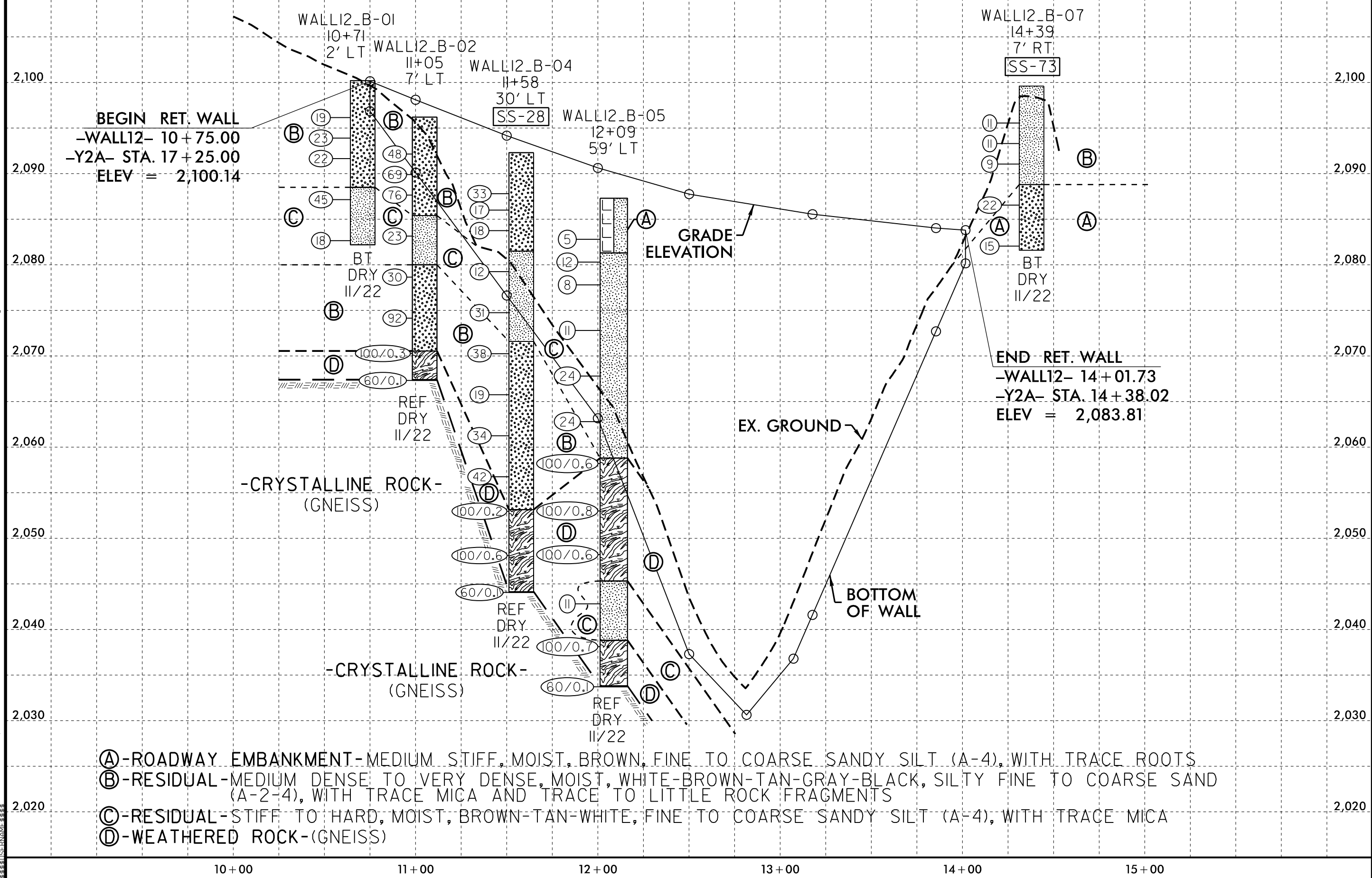
-WALL12-

Prepared in the Office of:

ECS SOUTHEAST, LLC
1815 CENTRE STREET, SUITE 200
CHESAPEAKE, VA 23022
(703) 575-1313 (PHONE)
(703) 575-1314 (FAX)
NOT REGISTERED
ENGINEERING
EXPIRATION 12/31/25


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

[illegible]

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	LOG	SOIL AND ROCK DESCRIPTION										DEPTH (ft)																									
			0.5ft 0.5ft 0.5ft			0 25 50 75 100																																											
2090																																																	
2085														GROUND SURFACE										0.0																									
	2,083.9	3.5	5 3 2											ROADWAY EMBANKMENT																																			
														Medium Stiff, Brown, Fine to Coarse Sandy SILT (A-4), with trace roots																																			
2080	2,081.4	6.0	4 5 7											RESIDUAL										6.0																									
	2,078.9	8.5	4 3 5											Medium Stiff to Very Stiff, Brown-White-Gray-Orange, Fine to Coarse Sandy SILT (A-4), with trace mica and rock fragments																																			
2075																																																	
	2,073.9	13.5	7 6 5																																														
2070																																																	
	2,068.9	18.5	10 10 14																																														
2065																																																	
	2,063.9	23.5	5 6 18																																														
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											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																																														
2035														WEATHERED ROCK										48.5																									
														Brown (GNEISS)																																			
	2,033.9	53.5	60/0.1											CRYSTALLINE ROCK										53.5																									
														(GNEISS)										53.6																									
														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									Medium Dense, Brown-White, Silty Fine to Coarse SAND (A-2-4), with trace mica and rock fragments											
2060	2,041.4	43.5	55	30	50									2,052.9 32.0											
	2,036.4	48.5	25	25	28									Hard, Brown, Fine to Coarse Sandy SILT (A-4), with trace mica											
2055	2,031.4	53.5	74	26/0.2										2,046.9 38.0											
	2,026.4	58.5	100/0.4											2,042.9 42.0											
2050	2,021.4	63.5	100/0.4											Very Dense, Gray-Brown, Silty Fine to Coarse SAND (A-2-4), with trace mica											
	2,019.4	65.5	60/0.0											2,031.4 53.5											
														WEATHERED ROCK											
														Gray-Brown (GNEISS)											
														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.											

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

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	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
2100														2,099.6	GROUND SURFACE 0.0
2095	2,096.1	3.5	4	5	6	11					SS-73	15%		RESIDUAL Stiff, Brown-Tan, Fine to Coarse Sandy SILT (A-4(0)), with trace mica	
	2,093.6	6.0	4	5	6	11									
	2,091.1	8.5	4	4	5	9									
2090														2,087.6	12.0
2085	2,086.1	13.5	12	11	11	22								Medium Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4)	
	2,081.1	18.5	6	7	8	15								2,079.6	20.0
2080														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

REFERENCE: I-2513AC

PROJECT: 34165

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-6	BORE LOGS
7	SOIL TEST RESULTS

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY BUNCOMBE

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

SITE DESCRIPTION RETAINING WALL NO.13
-WALL13- STA. 10 + 96.11 (-RP23- STA. 12 + 05.00) TO
-WALL13- STA. 12 + 26.24 (-RP23- STA. 13 + 29.02)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-2513AC	1	7

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

T. COOK

GEOLOGIC EXPLORATION

INVESTIGATED BY ECS SOUTHEAST, LLC

DRAWN BY A. SUTTLE, P.G.

CHECKED BY S.V. HUDSON, P.G.

SUBMITTED BY ECS SOUTHEAST, LLC

DATE JUNE 2025

Prepared in the Office of:



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ENGINEERING
FIRM # F-1519



Signed by:

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

399DBE429 SIGNATURE

DATE

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

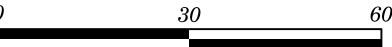
DIVISION OF HIGHWAYS

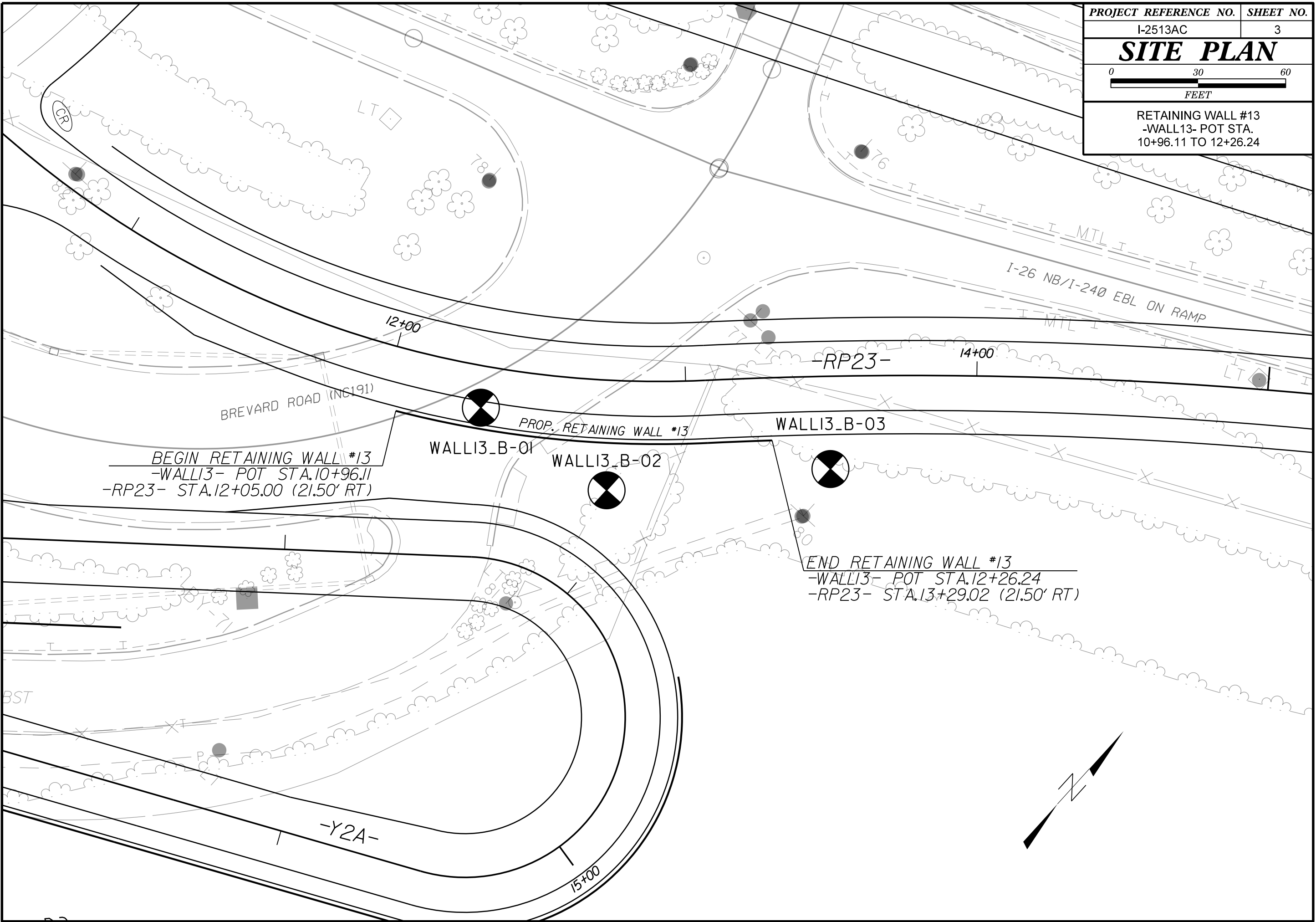
GEOTECHNICAL ENGINEERING UNIT

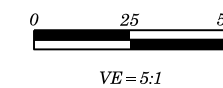
SUBSURFACE INVESTIGATION

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 DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)										CRISTALLINE ROCK (CR)									
GENERAL CLASS.		GRANULAR MATERIALS (≤ 35% PASSING #200)				SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS				A-1, A-2		A-4, A-5				A-1, A-2		A-4, A-5																	
GROUP CLASS.		A-1	A-3	A-2		A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7																										
SYMBOL		A-1-a A-1-b	A-3	A-2-4	A-2-5	A-2-6	A-2-7																																
% PASSING #10 #40 #200		50 MX 30 MX 15 MX	50 MX 25 MX	51 MN																																			
MATERIAL PASSING #40 LL PI		-	-	40 MX 18 MX	41 MN 10 MX	40 MX 18 MX	41 MN 11 MN	40 MX 10 MX	41 MN 18 MX	40 MX 10 MX	41 MN 11 MN																												
GROUP INDEX		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																											
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS ≤ LL - 30																																							
CONSISTENCY OR DENSENESS										MISCELLANEOUS SYMBOLS										WEATHERING																			
PRIMARY SOIL TYPE		COMPACTNESS OR CONSISTENCY		RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)		RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)																																	
GENERAL		VERY LOOSE		< 4		< 0.25																																	
GRANULAR MATERIAL (NON-COHESIVE)		LOOSE		4 TO 10		0.25 TO 0.5																																	
		MEDIUM DENSE		10 TO 30		0.5 TO 1.0																																	
		DENSE		30 TO 50		1 TO 2																																	
		VERY DENSE		> 50		> 4																																	
GENERAL		VERY SOFT		2 TO 4		0.25 TO 0.5																																	
SILT-CLAY MATERIAL (COHESIVE)		SOFT		4 TO 8		0.5 TO 1.0																																	
		MEDIUM STIFF		8 TO 15		1 TO 2																																	
		STIFF		15 TO 30		2 TO 4																																	
		VERY STIFF		> 30		> 4																																	
		HARD																																					
TEXTURE OR GRAIN SIZE										RECOMMENDATION SYMBOLS										ROCK HARDNESS																			
U.S. STD. SIEVE SIZE OPENING (MM)		4		10		40		60		200		270																											
		2.00		0.42		0.25		0.075		0.05		0.005																											
BOULDER (BLDR.)		COBBLE (COB.)		GRAVEL (GR.)		COARSE SAND (CSE, SD.)		FINE SAND (F SD.)		SILT (SL.)		CLAY (CL.)																											
GRAIN SIZE		305 IN.		75 IN.		2.0		0.25		0.05		0.005																											
SOIL MOISTURE - CORRELATION OF TERMS										ABBREVIATIONS										FRACURE SPACING																			
SOIL MOISTURE SCALE (ATTERBERG LIMITS)		FIELD MOISTURE DESCRIPTION		GUIDE FOR FIELD MOISTURE DESCRIPTION		AR - AUGER REFUSAL		MED. - MEDIUM		VST - VANE SHEAR TEST																													
		- SATURATED - (SAT.)		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE		BT - BORING TERMINATED		MICA. - MICACEOUS		WEA. - WEATHERED																													
						CL. - CLAY		MOD. - MODERATELY		UNIT WEIGHT																													
						CPT - CONE PENETRATION TEST		NP - NON PLASTIC		DRY UNIT WEIGHT																													
						CSE. - COARSE		ORG. - ORGANIC		SAMPLE ABBREVIATIONS																													
						DMT - DILATOMETER TEST		PMT - PRESSUREMETER TEST		S - BULK																													
						DPT - DYNAMIC PENETRATION TEST		SAP. - SAPROLITIC		SS - SPLIT SPOON																													
						e - VOID RATIO		SD. - SAND, SANDY		ST - SHELBY TUBE																													
						F - FINE		SL. - SILT, SILTY		RS - ROCK																													
						FOSS. - FOSSILIFEROUS		SLI. - SLIGHTLY		RT - RECOMPACTED TRIAXIAL																													
						FRAC. - FRACTURED, FRACTURES		TRC - TRICONE REFUSAL		CALIFORNIA BEARING																													
						FRAGS. - FRAGMENTS		w - MOISTURE CONTENT		RATIO																													
						HI. - HIGHLY		V - VERY																															
EQUIPMENT USED ON SUBJECT PROJECT										INDURATION										BEDDING																			
DRILL UNITS:		ADVANCING TOOLS:		HAMMER TYPE:																																			
☐ CME-45C		☐ CLAY BITS		☒ AUTOMATIC ☐ MANUAL																																			
☐ CME-55		☐ 6" CONTINUOUS FLIGHT AUGER																																					
☒ CME-750		☒ 8" HOLLOW AUGERS																																					
		☐ HARD FACED FINGER BITS																																					
		☐ TUNG.-CARBIDE INSERTS																																					
		CASING ☐ W/ ADVANCER																																					
☐ PORTABLE HOIST		TRICONE _____ * STEEL TEETH																																					
		TRICONE _____ * TUNG.-CARB.																																					
☒ DIEDRICH D-50		☐ CORE BIT																																					
☐ _____		☐ _____																																					
ELEVATION: _____ FEET										NOTES:										ELEVATION: _____ FEET																			
ROADWAY DESIGN FILES, .TIN FILE, AND GPK FILE PROVIDED BY AECOM										NORTHING AND EASTINGS OBTAINED USING A TRIMBLE GEO7X. BORING ELEVATIONS FOR WALL BORINGS WERE OBTAINED USING THE PROVIDED .TIN FILE										FIAD = FILLED IMMEDIATELY AFTER DRILLING																			
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.										SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																													

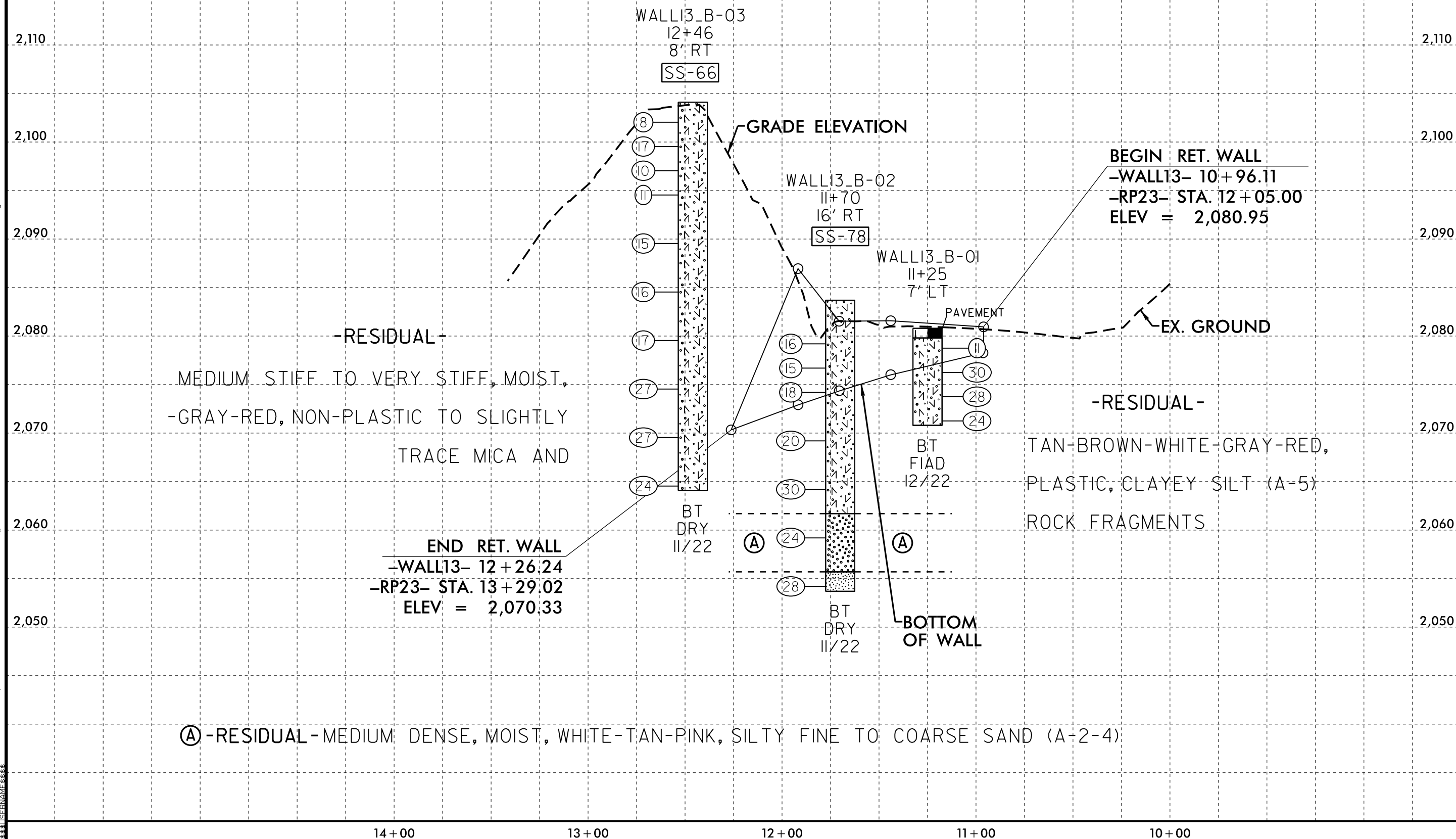
PROJECT REFERENCE NO.	SHEET NO.
I-2513AC	3
SITE PLAN	
	
RETAINING WALL #13 -WALL13- POT STA. 10+96.11 TO 12+26.24	





-WALL13- PROFILE ALONG EXISTING GROUND LINE FROM ROADWAY DESIGN FILES, PROVIDED BY AECOM, MAY 2025 AND 12513 ls tnl.tin. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, PROJECTED ON THE PROFILE.

-WALL13-



① -RESIDUAL - MEDIUM DENSE, MOIST, WHITE-TAN-PINK, SILTY FINE TO COARSE SAND (A-2-4)

T-2513AC



SHEET

I-2513AC

5

WBS: 34165.1.13	TIP: I-2513AC	COUNTY: BUNCOMBE	GEOLOGIST: A. Blackmore	
SITE DESCRIPTION: RETAINING WALL NO. 13, STA. -RP23- TO 12+05.00 TO -RP23- 12+26.24				GROUND WTR (ft) 0 HR. Dry 24 HR. Dry
BORING NO.: WALL13_B-02	STATION: 11+70	OFFSET: 16 ft RT	ALIGNMENT: -WALL 13-	
COLLAR ELEV.: 2,083.7 ft	TOTAL DEPTH: 30.0 ft	NORTHING: 679,293	EASTING: 931,490	
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	L O G	SOIL AND ROCK DESCRIPTION
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
2085														
														2,083.7 LAND SURFACE 0.0
2080	2,080.2	3.5	5	7	9						SS-78	20%		RESIDUAL Stiff to Very Stiff, Brown-Tan, Non Plastic Clayey SILT (A-5(2)), with trace mica
	2,077.7	6.0	6	7	8									
2075	2,075.2	8.5	6	8	10							M		
2070	2,070.2	13.5	10	10	10							M		
2065	2,065.2	18.5	8	13	17							M		
2060	2,060.2	23.5	10	13	11							M		2,061.7 22.0 Medium Dense, White-Tan-Pink, Silty Fine to Coarse SAND (A-2-4)
2055	2,055.2	28.5	9	11	17							M		2,055.7 28.0 Very Stiff, Gray-Brown, Fine to Coarse Sandy SILT (A-4), with trace mica
														2,053.7 30.0 Boring Terminated at Elevation 2,053.7 ft In Residual Sandy SILT (A-4)
														Surficial Organic Soil from 0.0 to 0.3 feet.
														Hand Auger Probe from 0.0 to 3.0 feet due to close proximity to underground utilities.

T-2513AC



SHEET

I-2513AC

6

NCDOT BORE DOUBLE 52.GPJ ECS GINT DATA-TEMPLATE GDT 6/10/25

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		
WALL13_B-02	SS-78	16' RT	11+70 -WALL13-	3.5 - 5.0	A-5(2)	41	5	22.0	35.2	25.4	17.3	98.0	83.0	52.0	19.6	-
WALL13_B-03	SS-66	8' RT	12+46 -WALL13-	8.5 - 10.0	A-5(0)	43	7	29.7	38.6	3.0	28.7	92.0	74.0	38.0	14.6	-

LAB TECHNICIAN: DANIEL REEVE

NCDOT CERTIFICATION NO. 135-03-0816

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.14
-WALL14- STA. 10 + 63.70 (-Y3- STA. 23 + 12.36) TO
-WALL14- STA. 14 + 41.88 (-Y3- STA. 26 + 79.84)

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 M. MULLA, P.E.

SUBMITTED BY ECS SOUTHEAST, LLC

DATE AUGUST 2024

Prepared in the Office of:



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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 (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		A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7		A-7-5, A-7-6	A-3	A-6, A-7
% PASSING #10	50 MX										
% PASSING #40	30 MX										
% PASSING #200	15 MX										
MATERIAL PASSING #40 LL	6 MX										
GROUP INDEX	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	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER					
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD				FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30											
PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)								
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								
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.)					
MM	305	75	2.0	0.25	0.05	0.005					
IN.	12	3									
SOIL MOISTURE SCALE (ATTERBERG LIMITS)		FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION								
LL PLASTIC RANGE (PI) PL	LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								
	PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE								
	OM SL	OPTIMUM MOISTURE SHRINKAGE LIMIT	- MOIST - (M) - DRY - (D)	SOLID; AT OR NEAR OPTIMUM MOISTURE REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE							
	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									

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	> 10%	12 - 20%	SOME
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY

GROUND WATER

▽

STATIC WATER LEVEL AFTER 24 HOURS

▽PW

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

SHALLOW UNDERCUT

UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE

UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK

UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

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:
<

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:

WEATHERED ROCK (WR)

NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.

CRYSTALLINE ROCK (CR)

FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.

NON-CRYSTALLINE ROCK (NCR)

FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.

COASTAL PLAIN SEDIMENTARY ROCK (CP)

COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH

ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.

VERY SLIGHT (V SLI.)

ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.

SLIGHT (SLI.)

ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH, OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.

MODERATE (MOD.)

SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.

MODERATELY SEVERE (MOD. SEV.)

ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.
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 GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.

SOFT

CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.

VERY SOFT

CAN BE CARVED WITH KNIFE. 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

TERM

SPACING

VERY WIDE

MORE THAN 10 FEET

WIDE

3 TO 10 FEET

MODERATELY CLOSE

1 TO 3 FEET

CLOSE

0.16 TO 1 FOOT

VERY CLOSE

LESS THAN 0.16 FEET

BEDDING

TERM

THICKNESS

VERY THICKLY BEDDED

4 FEET

THICKLY BEDDED

1.5 - 4 FEET

THINLY BEDDED

0.16 - 1.5 FEET

VERY THINLY BEDDED

0.03 - 0.16 FEET

THICKLY LAMINATED

0.008 - 0.03 FEET

THINLY LAMINATED

< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF 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 DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: N/A

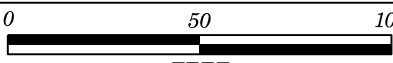
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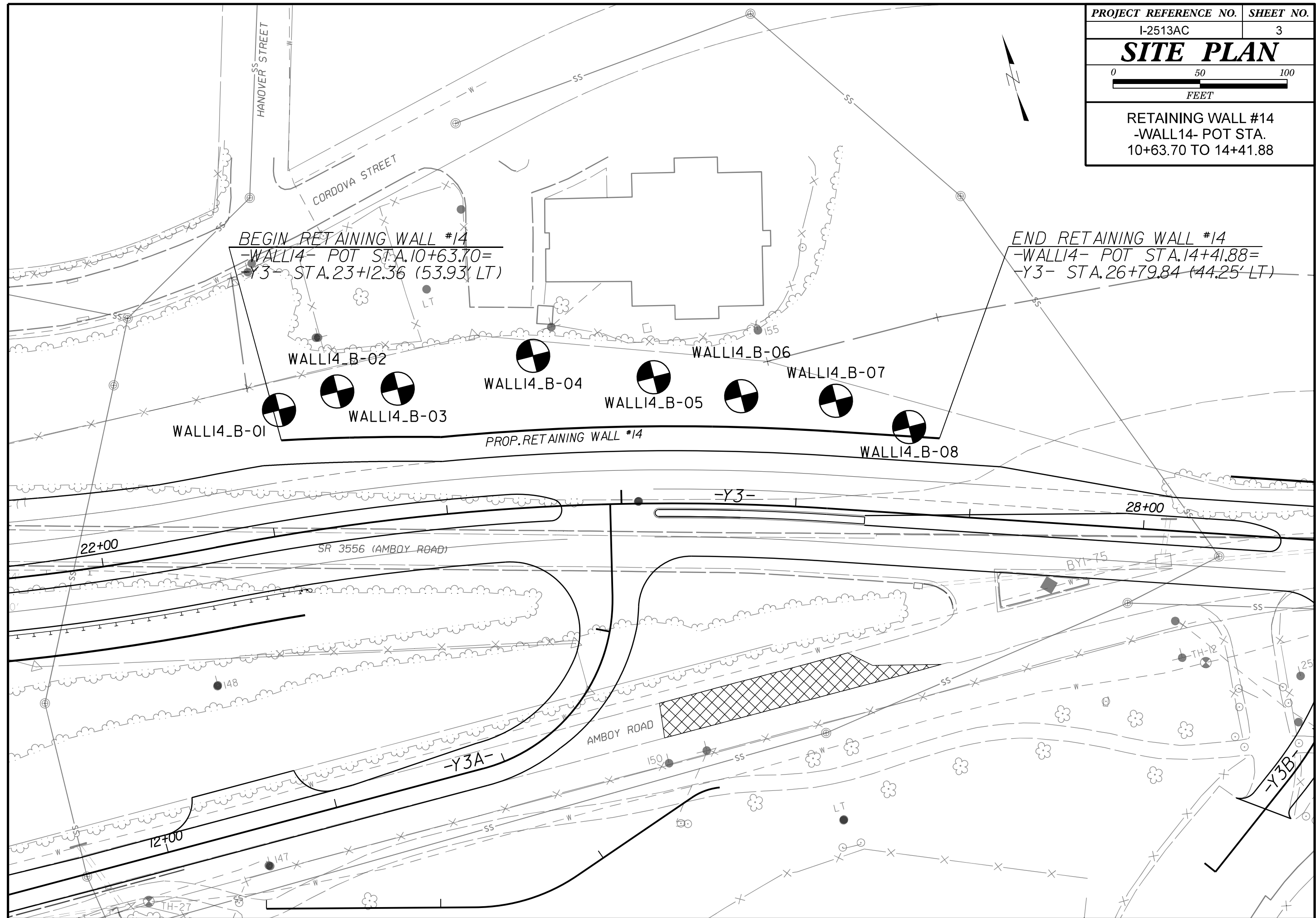
NOTES:
ROADWAY DESIGN FILES. .TIN FILE, AND GPK FILE PROVIDED BY AECOM

NORTHING AND EASTINGS OBTAINED USING A TRIMBLE GEO7X. BORING ELEVATIONS FOR WALL BORINGS WERE OBTAINED USING THE PROVIDED .TIN FILE

FIAD = FILLED IMMEDIATELY AFTER DRILLING

DATE: 8-15-2024

PROJECT REFERENCE NO.	SHEET NO.
I-2513AC	3
SITE PLAN	
	
RETAINING WALL #14 -WALL14- POT STA. 10+63.70 TO 14+41.88	



5/14/99

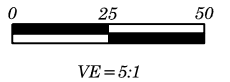
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12-AUG-2024 15:14
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ECS Corporate Services\31-4489 I-25I3AC 1/2

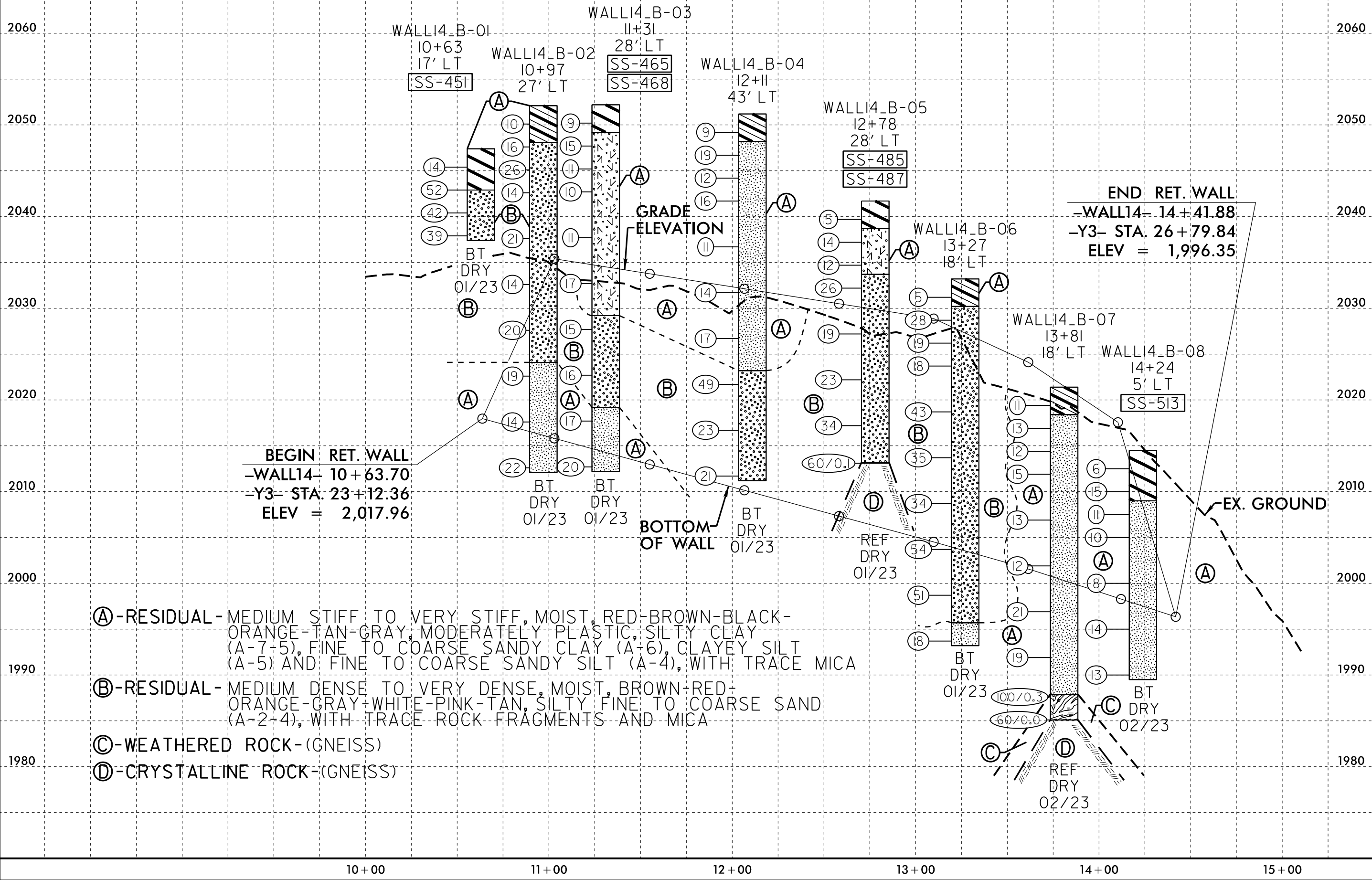
-WALL14- PROFILE ALONG EXISTING GROUND LINE FROM ROADWAY
DESIGN FILES PROVIDED BY AECOM JULY 2024 AND I25I3 Is.tnl.tin. INFERRED
STRATIGRAPHY IS DRAWN THROUGH THE BORING, PROJECTED ON THE PROFILE.

-WALL14-

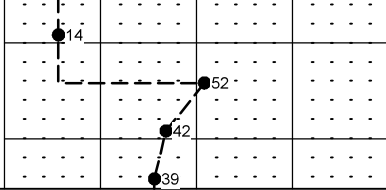
Prepared in the Office of:



PROJECT REFERENCE NO.	SHEET NO.
I-25I3AC	4
PROFILE BORINGS PROJECTED ON -WALL14- ALONG WALL NO. 14	



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore										
SITE DESCRIPTION RETAINING WALL NO. 14, -Y3- STA. 23+12.36 TO -Y3- STA. 26+79.84											GROUND WTR (ft)								
BORING NO. WALL14_B-01			STATION 10+63			OFFSET 17 ft LT			ALIGNMENT -WALL14-		0 HR.	Dry							
COLLAR ELEV. 2,047.4 ft			TOTAL DEPTH 10.0 ft			NORTHING 680,699			EASTING 934,516		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 01/30/23			COMP. DATE 01/30/23			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)				
2050																			
2045	2,046.4	1.0	3	5	9						SS-451	33%		2,047.4	GROUND SURFACE	0.0			
	2,043.9	3.5	17	24	28												M	2,042.9	4.5
	2,041.4	6.0	7	20	22												M		
2040	2,038.9	8.5	19	20	19							M		2,037.4	10.0				
Boring Terminated at Elevation 2,037.4 ft In Residual Silty SAND (A-2-4)																			
Surficial Organic Soil from 0.0 to 0.3 feet.																			

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 14, -Y3- STA. 23+12.36 TO -Y3- STA. 26+79.84									GROUND WTR (ft)					
BORING NO. WALL14_B-02			STATION 10+97			OFFSET 27 ft LT			ALIGNMENT -WALL14-			0 HR.	Dry	
COLLAR ELEV. 2,052.1 ft			TOTAL DEPTH 40.0 ft			NORTHING 680,701			EASTING 934,551			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 01/30/23			COMP. DATE 01/30/23			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				
2055														
	2,051.1	1.0	3	4	6									2,052.1 GROUND SURFACE 0.0
2050	2,048.6	3.5	7	8	8									
	2,046.1	6.0	7	14	12									
2045	2,043.6	8.5	6	7	7									
2040	2,038.6	13.5	7	11	10									
2035	2,033.6	18.5	9	8	6									
2030	2,028.6	23.5	22	10	10									
2025	2,023.6	28.5	23	8	11									2,024.1 28.0
2020	2,018.6	33.5	7	7	7									
2015	2,013.6	38.5	8	11	11									2,012.1 40.0

NCDOT BORE DOUBLE I2513AC_GEO_GTM.GPJ NC_DOT.GDT 8/12/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore						
SITE DESCRIPTION RETAINING WALL NO. 14, -Y3- STA. 23+12.36 TO -Y3- STA. 26+79.84										GROUND WTR (ft)					
BORING NO. WALL14_B-03			STATION 11+31			OFFSET 28 ft LT			ALIGNMENT -WALL14-		0 HR. Dry				
COLLAR ELEV. 2,052.2 ft			TOTAL DEPTH 40.0 ft			NORTHING 680,694			EASTING 934,585		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 01/30/23			COMP. DATE 01/30/23			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)
2055															
2050	2,051.2	1.0	3	4	5	9					SS-465	25%		2,052.2	GROUND SURFACE 0.0
	2,048.7	3.5	7	8	7	15						M		2,049.2	RESIDUAL Stiff, Red-Brown, Moderately Plastic Silty CLAY (A-7-5(12)) 3.0
	2,046.2	6.0				11						M			Stiff to Very Stiff, Red-Brown-Tan-Orange, Clayey SILT (A-5(0)), with trace mica
2045	2,043.7	8.5	4	5	5	10					SS-468	21%			
													M		
2040													M		
													M		
2035													M		
													M		
2030	2,038.7	13.5	5	5	6	11							M		
													M		
2025	2,033.7	18.5	7	7	10	17							M		
													M		
2020	2,028.7	23.5	8	7	8	15							M	2,029.2	Medium Dense, Orange-Red, Silty Fine to Coarse SAND (A-2-4) 23.0
													M		
2015	2,023.7	28.5	9	8	8	16							M		
													M		
	2,018.7	33.5	7	9	8	17							M	2,019.2	Very Stiff, Black-Tan-Gray, Fine to Coarse Sandy SILT (A-4), with trace mica 33.0
													M		
	2,013.7	38.5	7	10	10	20							M	2,012.2	Boring Terminated at Elevation 2,012.2 ft In Residual Sandy SILT (A-4) 40.0
															Surficial Organic Soil from 0.0 to 0.3 feet.

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 14, -Y3- STA. 23+12.36 TO -Y3- STA. 26+79.84									GROUND WTR (ft)					
BORING NO. WALL14_B-04			STATION 12+11			OFFSET 43 ft LT			ALIGNMENT -WALL14-			0 HR. Dry		
COLLAR ELEV. 2,051.2 ft			TOTAL DEPTH 40.0 ft			NORTHING 680,693			EASTING 934,665			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 01/31/23			COMP. DATE 01/31/23			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				
2055														
2050	2,050.2	1.0												2,051.2 GROUND SURFACE 0.0
			4	5	4									
	2,047.7	3.5	8	9	10							M		2,048.2 RESIDUAL Stiff, Red-Brown, Fine to Coarse Sandy CLAY (A-6) 3.0
	2,045.2	6.0	4	6	6							M		
2045	2,042.7	8.5	6	6	10							M		Stiff to Very Stiff, Brown-Tan-Black-Red, Fine to Coarse Sandy SILT (A-4), with trace mica
												M		
2040												M		
	2,037.7	13.5	6	5	6							M		
2035	2,032.7	18.5	9	5	9							M		
2030	2,027.7	23.5	6	7	10							M		
2025	2,022.7	28.5	20	23	26							M		2,023.2 Medium Dense to Dense, Gray-Brown-White, Silty Fine to Coarse SAND (A-2-4), with trace rock fragments 28.0
2020	2,017.7	33.5	21	11	12							M		
2015	2,012.7	38.5	11	10	11							M		2,011.2 Boring Terminated at Elevation 2,011.2 ft In Residual Silty SAND (A-2-4) 40.0
														Surficial Organic Soil from 0.0 to 0.3 feet.

NCDOT BORE DOUBLE I2513AC_GEO_GTM.GPJ NC_DOT.GDT 8/12/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore						
SITE DESCRIPTION RETAINING WALL NO. 14, -Y3- STA. 23+12.36 TO -Y3- STA. 26+79.84												GROUND WTR (ft)			
BORING NO. WALL14_B-05			STATION 12+78			OFFSET 28 ft LT			ALIGNMENT -WALL 14-			0 HR.	Dry		
COLLAR ELEV. 2,041.7 ft			TOTAL DEPTH 28.6 ft			NORTHING 680,664			EASTING 934,729			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 01/31/23			COMP. DATE 01/31/23			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)
2045															
2040	2,040.7	1.0												2,041.7	GROUND SURFACE 0.0
											SS-485	29%		RESIDUAL	
	2,038.2	3.5	3	2	3									2,038.7	Medium Stiff, Red-Brown, Moderately Plastic Silty CLAY (A-7-5(16)) 3.0
	2,038.2											M		Stiff, Red-Brown-Tan, Clayey SILT (A-5(0)), with trace mica	
2035	2,035.7	6.0	7	8	6									2,033.7	8.0
	2,035.7										SS-487	17%		Medium Dense to Dense, Tan-Brown-Pink, Silty Fine to Coarse SAND (A-2-4), with trace mica	
	2,033.2	8.5	5	6	6							M		2,033.7	8.0
2030	2,033.2		7	12	14							M			
	2,028.2	13.5	8	10	9							M			
2025															
	2,023.2	18.5	9	10	13							M			
2020	2,023.2											M			
	2,018.2	23.5	11	16	18							M			
2015															
	2,018.2													2,013.2	28.5
	2,013.2	28.5	60/0.1			60/0.1								2,013.1	28.6
														CRYSTALLINE ROCK (GNEISS)	
														Boring Terminated with Standard Penetration Test Refusal at Elevation 2,013.1 ft In Crystalline Rock (GNEISS)	
														Surficial Organic Soil from 0.0 to 0.3 feet.	

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 14, -Y3- STA. 23+12.36 TO -Y3- STA. 26+79.84									GROUND WTR (ft)					
BORING NO. WALL14_B-06			STATION 13+27			OFFSET 18 ft LT			ALIGNMENT -WALL14-			0 HR. Dry		
COLLAR ELEV. 2,033.2 ft			TOTAL DEPTH 40.0 ft			NORTHING 680,641			EASTING 934,775			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 01/31/23			COMP. DATE 01/31/23			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				
2035														
	2,032.2	1.0												2,033.2 GROUND SURFACE 0.0
2030	2,029.7	3.5	2	2	3	5						M		2,030.2 RESIDUAL Medium Stiff, Red-Brown, Fine to Coarse Sandy CLAY (A-6) 3.0
	2,027.2	6.0	12	13	15	28						M		
	2,024.7	8.5	8	10	9	19						M		Medium Dense to Very Dense, Orange-Brown-Pink-White-Tan, Silty Fine to Coarse SAND (A-2-4)
2025	2,024.7		11	10	8	18						M		
2020	2,019.7	13.5	25	18	25	43						M		
2015	2,014.7	18.5	19	19	16	35						M		
2010	2,009.7	23.5	18	15	19	34						M		
2005	2,004.7	28.5	16	19	35	54						M		
2000	1,999.7	33.5	20	22	29	51						M		
1995	1,994.7	38.5	8	9	9	18						M		1,995.7 37.5 Very Stiff, Brown-Black, Fine to Coarse Sandy SILT (A-4), with trace mica 40.0
														Boring Terminated at Elevation 1,993.2 ft In Residual Sandy SILT (A-4)
														Surficial Organic Soil from 0.0 to 0.3 feet.

NCDOT BORE DOUBLE I2513AC_GEO_GTM.GPJ NC_DOT.GDT 8/12/24

WBS 34165.1.13		TIP I-2513AC		COUNTY BUNCOMBE		GEOLOGIST A. Blackmore								
SITE DESCRIPTION RETAINING WALL NO. 14, -Y3- STA. 23+12.36 TO -Y3- STA. 26+79.84								GROUND WTR (ft)						
BORING NO. WALL14_B-08		STATION 14+24		OFFSET 5 ft LT		ALIGNMENT -WALL 14-		0 HR.	Dry					
COLLAR ELEV. 2,014.5 ft		TOTAL DEPTH 25.0 ft		NORTHING 680,600		EASTING 934,864		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 02/02/23		COMP. DATE 02/02/23		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				
2015														
	2,013.5	1.0												2,014.5 GROUND SURFACE 0.0
	2,011.0	3.5	4	2	4									RESIDUAL Medium Stiff to Stiff, Red-Brown-Black, Moderately Plastic Silty CLAY (A-7-5(8)), with trace mica
2010	2,008.5	6.0	5	6	9						SS-513	27%		
	2,006.0	8.5	5	5	6									2,009.0 5.5
2005			5	5	5									Medium Stiff to Stiff, Tan-Brown-Black, Fine to Coarse Sandy SILT (A-4), with trace mica
	2,001.0	13.5	5	4	4									
2000														
	1,996.0	18.5	5	7	7									
1995														
	1,991.0	23.5	5	6	7									
1990														1,989.5 25.0
														Boring Terminated at Elevation 1,989.5 ft In Residual Sandy SILT (A-4)
														Surficial Organic Soil from 0.0 to 0.3 feet.

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		
WALL14_B-01	SS-451	17' LT	10+63 -WALL14-	1.0 - 2.5	A-7-5(16)	56	20	15.8	16.2	22.8	45.2	99.0	88.0	72.0	33.3	-
WALL14_B-03	SS-465	28' LT	11+31 -WALL14-	1.0 - 2.5	A-7-5(12)	59	20	24.4	19.8	22.6	33.2	99.0	82.0	60.0	25.3	-
WALL14_B-03	SS-468	28' LT	11+31 -WALL14-	8.5 - 10.0	A-5(0)	54	NP	31.4	30.0	21.3	17.4	95.0	77.0	45.0	20.6	-
WALL14_B-05	SS-485	28' LT	12+78 -WALL14-	1.0 - 2.5	A-7-5(16)	61	22	20.5	14.4	17.2	47.9	98.0	83.0	68.0	28.7	-
WALL14_B-05	SS-487	28' LT	12+78 -WALL14-	6.0 - 7.5	A-5(0)	47	NP	26.3	28.1	24.2	21.4	99.0	81.0	52.0	16.8	-
WALL14_B-08	SS-513	5' LT	14+24 -WALL14-	3.5 - 5.0	A-7-5(8)	59	21	33.3	16.5	14.4	35.8	92.0	67.0	49.0	27.0	-

LAB TECHNICIAN: DANIEL REEVE

NCDOT CERTIFICATION NO.135-03-0816

REFERENCE: I-2513AC

PROJECT: 34165

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4-5	PROFILE
6-18	BORE LOGS
19	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.15
-WALL15- STA. 10 + 73.43 (-Y3RPA- STA. 22 + 48.19) TO
-WALL15- STA. 23 + 45.91 (-L- STA. 98 + 25.00)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-2513AC	1	19

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

A. WEST

C. OSBORNE

TOTAL DEPTH DRILLING

INVESTIGATED BY ECS SOUHEAST, LLC

DRAWN BY A. SUTTLE, P.G.

CHECKED BY M. MULLA, P.E.

SUBMITTED BY ECS SOUTHEAST, LLC

DATE SEPTEMBER 2024

Prepared in the Office of:



ECS SOUTHEAST, LLC
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
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NC REGISTERED
ENGINEERING
FIRM # F-1519



Signed by: Amanda R. Suttle, P.G. 6/30/2026
BDAF14CEC SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

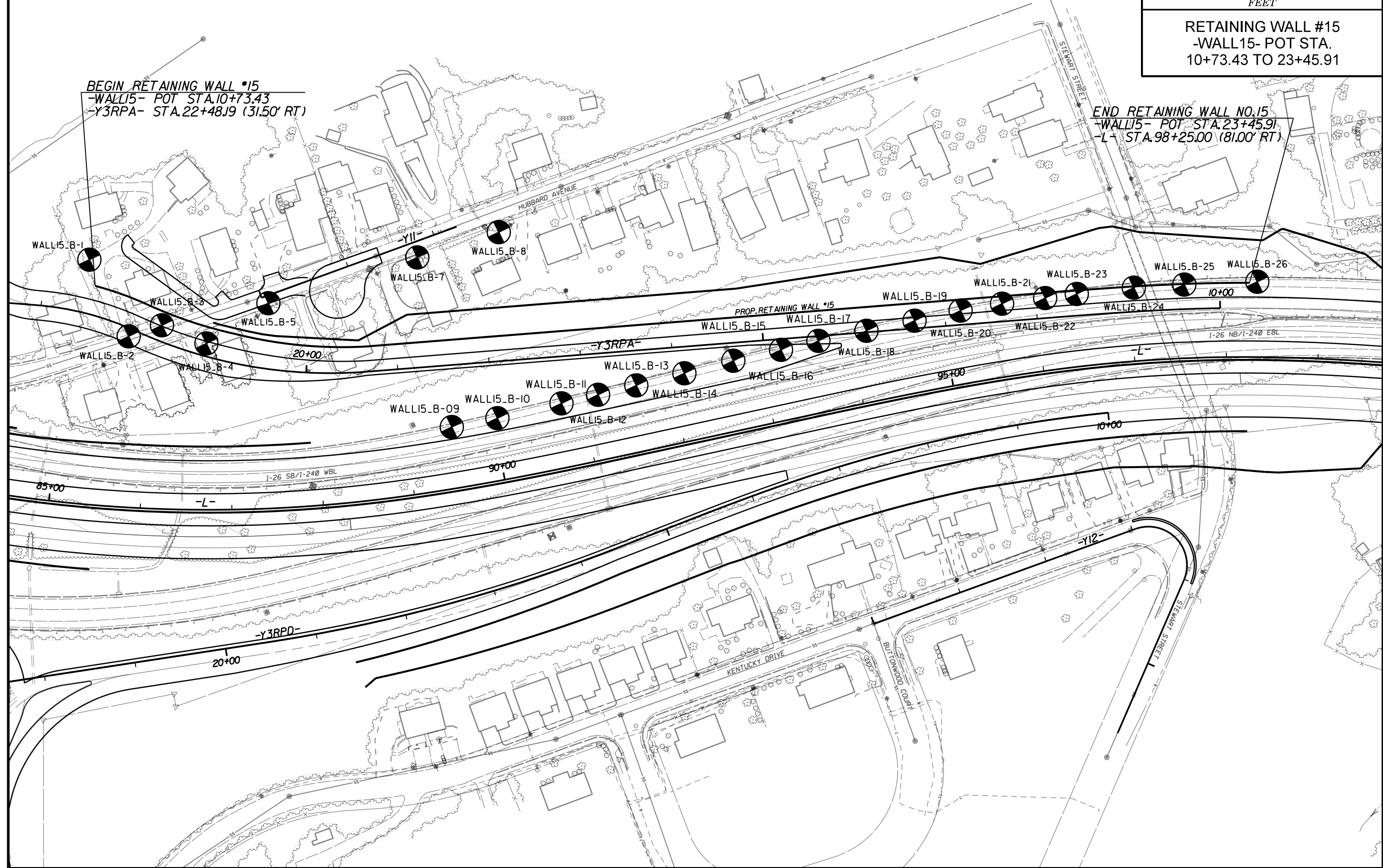
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

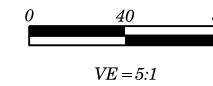
SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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					FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.		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.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
GROUP CLASS.	A-1-a	A-1-b	A-3	A-2-4	A-2	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						

PROJECT REFERENCE NO.	SHEET NO.
I-2513AC	3
SITE PLAN	
0 100 200 FEET	
RETAINING WALL #15 -WALL15- POT STA. 10+73.43 TO 23+45.91	

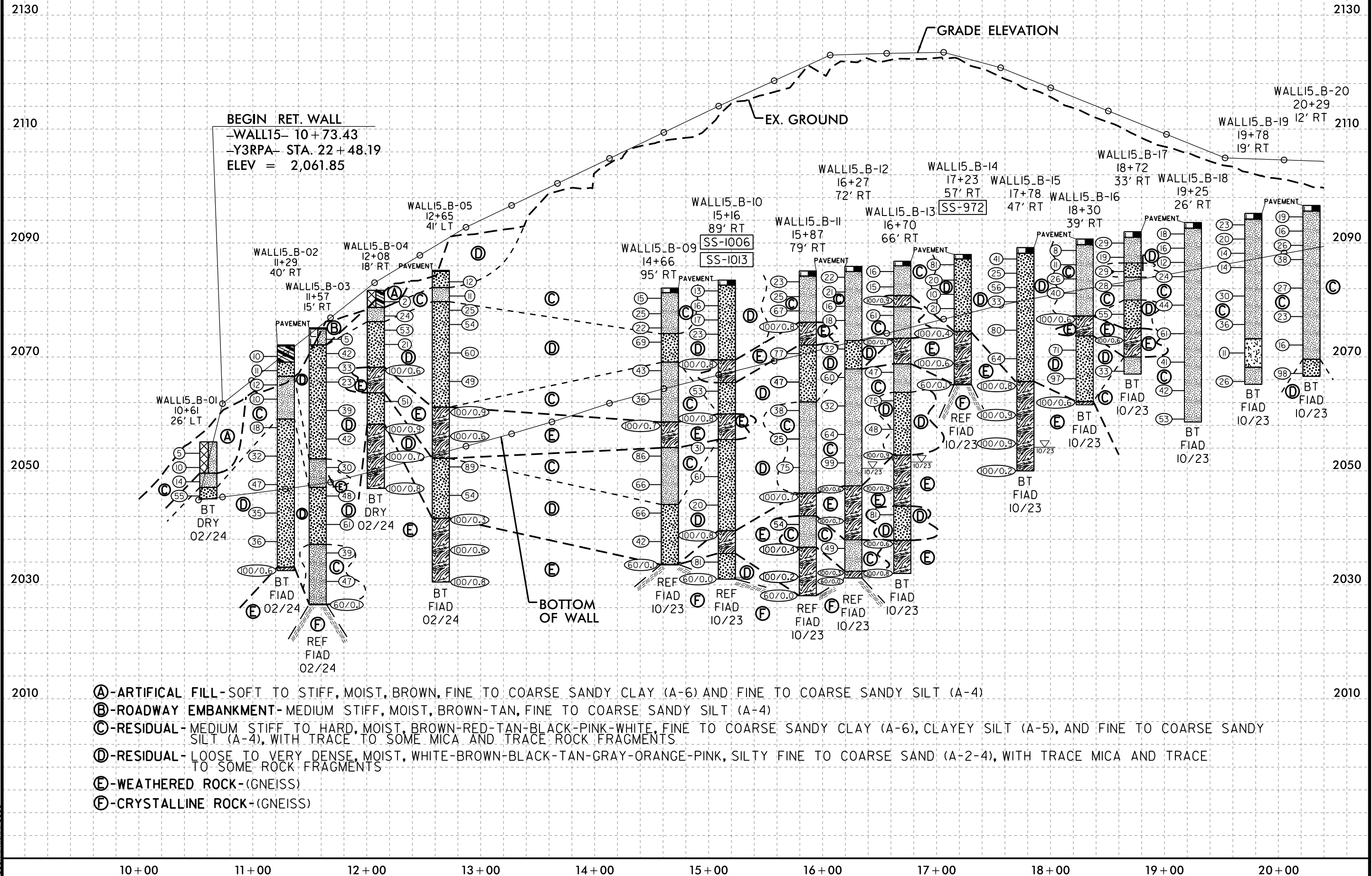
BEGIN RETAINING WALL #15
-WALL15- POT STA.10+73.43
-Y3RPA- STA.22+48.19 (31.50' RT)

END RETAINING WALL NO.15
-WALL15- POT STA.23+45.91
-L- STA.98+25.00 (81.00' RT)

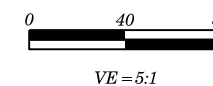




-WALL15-

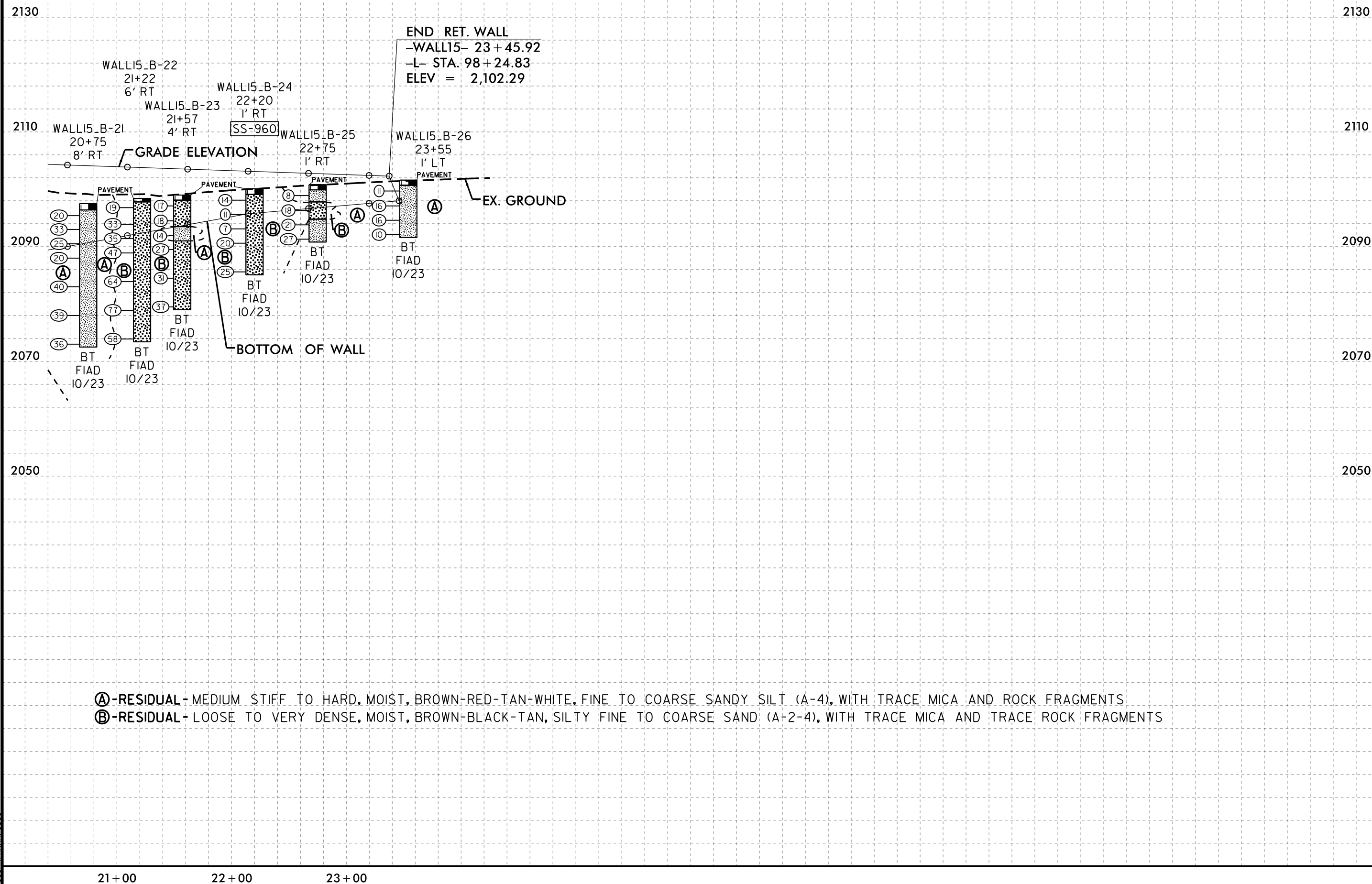


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C:\Users\rothOneDrive - ECS Corporate Services\31-4489 I-25I3AC 1\ Structures\CADD_GEOTECH\Sites&Sub\I25I3AC_GEO_PWAL\5_PFL.dgn



-WALL15- PROFILE ALONG EXISTING GROUND LINE FROM ROADWAY
DESIGN FILES PROVIDED BY AECOM JULY 2024 AND 12513 ls tnl.tif. INFERRED
STRATIGRAPHY IS DRAWN THROUGH THE BORING, PROJECTED ON THE PROFILE.

-WALL15-



①-RESIDUAL - MEDIUM STIFF TO HARD, MOIST, BROWN-RED-TAN-WHITE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND ROCK FRAGMENTS

②-RESIDUAL - LOOSE TO VERY DENSE, MOIST, BROWN-BLACK-TAN, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE MICA AND TRACE ROCK FRAGMENTS

WBS		34165.1.13		TIP		I-2513AC		COUNTY		BUNCOMBE		GEOLOGIST		A. Blackmore																																	
SITE DESCRIPTION													RETAINING WALL NO. 15, -Y3RPA- STA. 22+48.19 TO -L- STA. 98+25.00			GROUND WTR (ft)																															
BORING NO.			WALL15_B-02			STATION			11+29			OFFSET			40 ft RT			ALIGNMENT			-WALL15-			0 HR.		Dry																					
COLLAR ELEV.			2,072.1 ft			TOTAL DEPTH			39.6 ft			NORTHING			681,110			EASTING			933,684			24 HR.		FIAD																					
DRILL RIG/HAMMER EFF./DATE									TDD417 CME75 82.7% 06/15/2021									DRILL METHOD						H.S. Augers						HAMMER TYPE						Automatic											
DRILLER						D. Hamilton						START DATE						02/23/24						COMP. DATE						02/23/24						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																																	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100																																					
2075																																															
2070	2,071.1	1.0				3	5	5																																							
	2,068.6	3.5				4	5	6																																							
	2,066.1	6.0				5	6	6																																							
2065	2,063.6	8.5				5	5	5																																							
2060	2,058.6	13.5				6	10	8																																							
2055	2,053.6	18.5				14	18	14																																							
2050	2,048.6	23.5				15	20	27																																							
2045	2,043.6	28.5				17	16	19																																							
2040	2,038.6	33.5				35	21	15																																							
2035	2,033.6	38.5				27	62	38/0.1																																							
											100/0.6																																				

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 10/1/24

WBS 34165.1.13		TIP I-2513AC		COUNTY BUNCOMBE		GEOLOGIST A. Blackmore								
SITE DESCRIPTION RETAINING WALL NO. 15, -Y3RPA- STA. 22+48.19 TO -L- STA. 98+25.00								GROUND WTR (ft)						
BORING NO. WALL15_B-04		STATION 12+08		OFFSET 18 ft RT		ALIGNMENT -WALL15-		0 HR.	Dry					
COLLAR ELEV. 2,081.7 ft		TOTAL DEPTH 34.8 ft		NORTHING 681,183		EASTING 933,728		24 HR.	Dry					
DRILL RIG/HAMMER EFF./DATE TDD417 CME75 82.7% 06/15/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic								
DRILLER D. Hamilton		START DATE 02/26/24		COMP. DATE 02/26/24		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														
2080	2,080.7	1.0												2,081.7 GROUND SURFACE 0.0
2075	2,078.2	3.5	1	1	1									ARTIFICIAL FILL Soft, Brown, Fine to Coarse Sandy CLAY (A-6) 3.0
	2,075.7	6.0	5	13	11									RESIDUAL Very Stiff, Red-Brown, Fine to Coarse Sandy SILT (A-4) 5.5
	2,073.2	8.5	4	15	38									Medium Dense to Very Dense, Tan-Brown, Silty Fine to Coarse SAND (A-2-4), with trace rock fragments
2070	2,068.2	13.5	8	12	9									2,076.2
			40	60/0.1										2,068.2 WEATHERED ROCK 13.5 Gray (GNEISS)
2065	2,063.2	18.5	27	21	30									2,063.7 RESIDUAL 18.0 Very Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4), with trace rock fragments
2060	2,058.2	23.5	45	55/0.4										2,058.2 WEATHERED ROCK 23.5 Gray (GNEISS)
2055	2,053.2	28.5	75	25/0.2										
	2,048.2	33.5	23	49	51/0.3									2,046.9 Boring Terminated at Elevation 2,046.9 ft In Weathered Rock (GNEISS) 34.8
2050														Surficial Organic Soil from 0.0 to 0.1 feet.

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore						
SITE DESCRIPTION RETAINING WALL NO. 15, -Y3RPA- STA. 22+48.19 TO -L- STA. 98+25.00												GROUND WTR (ft)			
BORING NO. WALL15_B-05			STATION 12+65			OFFSET 41 ft LT			ALIGNMENT -WALL15-			0 HR. Dry			
COLLAR ELEV. 2,085.2 ft			TOTAL DEPTH 54.7 ft			NORTHING 681,263			EASTING 933,718			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE TDD417 CME75 82.7% 06/15/2021						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic						
DRILLER D. Hamilton			START DATE 02/27/24			COMP. DATE 02/27/24			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		MOI		ELEV. (ft)	DEPTH (ft)
2090															
2085														2,885.2	0.0
2080	2,084.2	1.0		3	4	8						M		GROUND SURFACE	
														ROADWAY EMBANKMENT	
	2,081.7	3.5		2	5	6						M		Asphalt (0.2')	
2075	2,079.2	6.0		8	12	13						M		RESIDUAL	
	2,076.7	8.5		5	20	34						M		Medium Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4)	
2070	2,071.7	13.5		13	27	33						M		Stiff, Red-Brown, Fine to Coarse Sandy SILT (A-4)	
	2,066.7	18.5		20	21	28						M		Medium Dense to Very Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4)	
2065												M			
2060	2,061.7	23.5		31	49	51/0.4								2,061.2	24.0
	2,056.7	28.5		72	28/0.1									WEATHERED ROCK	
2055														Tan (GNEISS)	
	2,051.7	33.5		19	43	46						M		2,052.2	33.0
2050	2,046.7	38.5		29	28	26						M		RESIDUAL	
	2,041.7	43.5		100/0.3										Very Dense, Tan-White, Silty Fine to Coarse SAND (A-2-4)	
2045	2,041.7	43.5		100/0.3										2,041.7	43.5
	2,036.7	48.5		82	18/0.1									WEATHERED ROCK	
2040														Gray-Tan (GNEISS)	
	2,031.7	53.5		22	39	61/0.2								2,030.5	54.7
2035														Boring Terminated at Elevation 2,030.5 ft In Weathered Rock (GNEISS)	

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NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 10/1/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 15, -Y3RPA- STA. 22+48.19 TO -L- STA. 98+25.00											GROUND WTR (ft)			
BORING NO. WALL15_B-08			STATION 15+33			OFFSET 113 ft LT			ALIGNMENT -WALL15-			0 HR. Dry		
COLLAR ELEV. 2,102.2 ft			TOTAL DEPTH 34.1 ft			NORTHING 681,523			EASTING 933,758			24 HR. FIAD		
DRILL RIG/HAMMER EFF./DATE TDD417 CME75 82.7% 06/15/2021						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic					
DRILLER D. Hamilton			START DATE 02/27/24			COMP. DATE 02/27/24			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			ELEV. (ft)	DEPTH (ft)
2105														
2100	2,101.2	1.0	13	9	9								2,102.2	0.0
2095	2,098.7	3.5	8	15	15							M	ROADWAY EMBANKMENT Asphalt (0.2')	
	2,096.2	6.0	7	12	12							M	RESIDUAL Very Stiff, Brown-Tan, Fine to Coarse Sandy SILT (A-4), with trace mica	
	2,093.7	8.5	9	23	34							M	2,094.2	
2090												M	Very Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4), with trace mica	
2085	2,088.7	13.5	8	57	43/0.2								2,088.2	14.0
2080	2,083.7	18.5	15	14	13								2,084.2	18.0
2075	2,078.7	23.5	22	70	30/0.1							M	RESIDUAL Medium Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4)	
2070	2,073.7	28.5	75	25/0.1									2,078.2	24.0
	2,068.7	33.5	45	55/0.1									2,068.1	34.1
													Boring Terminated at Elevation 2,068.1 ft In Weathered Rock (GNEISS)	

NCDOT BORE DOUBLE I2513AC_GEO_GTM.GPJ NC_DOT.GDT 10/1/24

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore						
SITE DESCRIPTION RETAINING WALL NO. 15, -Y3RPA- STA. 22+48.19 TO -L- STA. 98+25.00									GROUND WTR (ft)						
BORING NO. WALL15_B-09			STATION 14+66			OFFSET 95 ft RT			ALIGNMENT -WALL15-			0 HR. Dry			
COLLAR ELEV. 2,082.1 ft			TOTAL DEPTH 48.6 ft			NORTHING 681,384			EASTING 933,927			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE TDD417 CME75 82.7% 06/15/2021						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic						
DRILLER D. Hamilton			START DATE 10/11/23			COMP. DATE 10/11/23			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															
	2,081.3	0.8	10	7	8										2,082.1 GROUND SURFACE 0.0
2080													M		2,081.3 ROADWAY EMBANKMENT 0.8
	2,078.6	3.5	7	10	15								M		Asphalt (0.4'), Stonebase (0.4')
	2,076.1	6.0	4	8	14								M		RESIDUAL
2075													M		Stiff to Very Stiff, Brown-Tan, Fine to Coarse Sandy SILT (A-4), with trace rock fragments
	2,073.6	8.5	23	30	39								M		2,074.1 Very Dense, Tan-Brown, Silty Fine to Coarse SAND (A-2-4), with trace rock fragments 8.0
2070													M		2,069.1 Hard, Brown-Tan, Fine to Coarse Sandy SILT (A-4), with trace mica 13.0
	2,068.6	13.5	13	24	19								M		
2065													M		
	2,063.6	18.5	8	10	26								M		
2060															
	2,058.6	23.5	92	8/0.2											2,058.6 WEATHERED ROCK 23.5
2055															Tan (GNEISS)
	2,053.6	28.5	15	26	60								M		2,054.1 RESIDUAL 28.0
2050													M		Hard, Black-Brown, Fine to Coarse Sandy SILT (A-4), with trace mica and rock fragments
	2,048.6	33.5	16	36	45								M		
2045													M		2,044.1 Dense to Very Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4), with trace mica and rock fragments 38.0
	2,043.6	38.5	11	26	40								M		
2040													M		
	2,038.6	43.5	36	19	23								M		
2035															
	2,033.6	48.5	60/0.1												2,033.6 CRYSTALLINE ROCK 48.5
															2,033.5 (GNEISS) 48.6
															Boring Terminated with Standard Penetration Test Refusal at Elevation 2,033.5 ft In Crystalline Rock (GNEISS)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore						
SITE DESCRIPTION RETAINING WALL NO. 15, -Y3RPA- STA. 22+48.19 TO -L- STA. 98+25.00												GROUND WTR (ft)			
BORING NO. WALL15_B-10			STATION 15+16			OFFSET 89 ft RT			ALIGNMENT -WALL15-			0 HR.	Dry		
COLLAR ELEV. 2,083.5 ft			TOTAL DEPTH 52.5 ft			NORTHING 681,433			EASTING 933,940			24 HR.	FIAD		
DRILL RIG/HAMMER EFF./DATE TDD417 CME75 82.7% 06/15/2021						DRILL METHOD H.S. Augers				HAMMER TYPE Automatic					
DRILLER D. Hamilton			START DATE 10/11/23			COMP. DATE 10/11/23			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)
2085															
	2,082.6	0.9	7	7	6									2,083.5 GROUND SURFACE 0.0	
2080	2,080.0	3.5	4	7	9									2,082.6 ROADWAY EMBANKMENT 0.9	
	2,077.5	6.0	5	6	11									RESIDUAL	
2075	2,075.0	8.5	5	11	12						SS-1006	14%		Medium Dense, Brown-Tan-Orange, Silty Fine to Coarse SAND (A-2-4(0)), with trace mica	
2070	2,070.0	13.5	19	34	66/0.3									2,069.5 WEATHERED ROCK 14.0	
														Brown (GNEISS)	
2065	2,065.0	18.5	5	20	33									2,065.5 RESIDUAL 18.0	
														Very Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4)	
2060	2,060.0	23.5	12	88/0.3										2,060.0 WEATHERED ROCK 23.5	
														Brown-Black (GNEISS)	
2055	2,055.0	28.5	8	16	15									2,055.5 RESIDUAL 28.0	
														Medium Dense to Very Dense, Brown, Silty Fine to Coarse SAND (A-2-4(0)), with trace mica	
2050	2,050.0	33.5	5	12	49										
2045	2,045.0	38.5	2	9	11						SS-1013	20%			
2040	2,040.0	43.5	19	44	56/0.3									2,039.5 WEATHERED ROCK 44.0	
														Brown-Black (GNEISS)	
2035	2,035.0	48.5	6	23	58									2,035.5 RESIDUAL 48.0	
														Very Dense, Black-Brown, Silty Fine to Coarse SAND (A-2-4), with trace mica	
	2,031.0	52.5	60/0.0											2,031.0 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,031.0 ft On Crystalline Rock (GNEISS) 52.5	

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 15, -Y3RPA- STA. 22+48.19 TO -L- STA. 98+25.00									GROUND WTR (ft)					
BORING NO. WALL15_B-11			STATION 15+87			OFFSET 79 ft RT			ALIGNMENT -WALL15-			0 HR. Dry		
COLLAR ELEV. 2,085.1 ft			TOTAL DEPTH 57.0 ft			NORTHING 681,503			EASTING 933,956			24 HR. FIAD		
DRILL RIG/HAMMER EFF./DATE TDD417 CME75 82.7% 06/15/2021						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic					
DRILLER D. Hamilton			START DATE 10/10/23			COMP. DATE 10/11/23			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				
2090														
2085														
2080	2,084.2	0.9	6	10	13									2,085.1 GROUND SURFACE 0.0
														2,084.2 ROADWAY EMBANKMENT 0.9
	2,081.6	3.5	7	11	14									RESIDUAL
2075	2,079.1	6.0	11	22	45									Very Stiff to Hard, Brown-Tan, Fine to Coarse Sandy SILT (A-4)
	2,076.6	8.5	16	46	54/0.3									
2070														2,076.1 WEATHERED ROCK 9.0
	2,071.6	13.5	9	19	58									Tan-Gray (GNEISS)
2065														2,072.1 RESIDUAL 13.0
	2,066.6	18.5	8	18	29									Dense to Very Dense, Tan-Brown, Silty Fine to Coarse SAND (A-2-4)
2060														
	2,061.6	23.5	11	16	22									2,062.1 Very Stiff to Hard, Brown, Fine to Coarse Sandy SILT (A-4), with trace mica and rock fragments 23.0
2055														
	2,056.6	28.5	9	14	11									
2050														
	2,051.6	33.5	16	25	50									
2045														
	2,046.6	38.5	15	25	75/0.2									2,046.1 WEATHERED ROCK 39.0
2040														Orange-Brown (GNEISS)
	2,041.6	43.5	11	20	34									2,042.1 RESIDUAL 43.0
2035														Hard, Black-Brown, Fine to Coarse Sandy SILT (A-4), with trace mica
	2,036.6	48.5	100/0.4											2,036.6 WEATHERED ROCK 48.5
2030														Brown (GNEISS)
	2,031.6	53.5	100/0.2											
	2,028.1	57.0	60/0.0											2,028.1 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,028.1 ft On Crystalline Rock (GNEISS) 57.0

NCDOT BORE DOUBLE I2513AC_GEO_GTM.GPJ NC_DOT.GDT 10/1/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13				TIP I-2513AC				COUNTY BUNCOMBE				GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 15, -Y3RPA- STA. 22+48.19 TO -L- STA. 98+25.00												GROUND WTR (ft)					
BORING NO. WALL15_B-12				STATION 16+27				OFFSET 72 ft RT				ALIGNMENT -WALL15-				0 HR. 35.4	
COLLAR ELEV. 2,085.9 ft				TOTAL DEPTH 54.7 ft				NORTHING 681,543				EASTING 933,965				24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE TDD417 CME75 82.7% 06/15/2021								DRILL METHOD H.S. Augers				HAMMER TYPE Automatic					
DRILLER D. Hamilton				START DATE 10/10/23				COMP. DATE 10/10/23				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)		
2090																	
2085	2,085.0	0.9	9	11	11									2,085.9 GROUND SURFACE 0.0			
														2,085.0 ROADWAY EMBANKMENT 0.9			
	2,082.4	3.5	4	11	10												
2080	2,079.9	6.0	4	7	9												
	2,077.4	8.5	5	9	9												
2075																	
	2,072.4	13.5	5	17	15									2,072.9 Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4) 13.0			
2070																	
	2,067.4	18.5	10	24	36									2,067.9 Hard, Brown-Tan, Fine to Coarse Sandy SILT (A-4) 18.0			
2065																	
	2,062.4	23.5	16	15	17												
2060																	
	2,057.4	28.5	16	28	36												
2055																	
	2,052.4	33.5	15	31	68												
2050																	
	2,047.4	38.5	49	51/0.1										2,047.4 WEATHERED ROCK 38.5			
2045														Gray-Tan (GNEISS)			
	2,042.4	43.5	32	45	55/0.2												
2040																	
	2,037.4	48.5	16	18	31									2,037.9 RESIDUAL 48.0			
2035														Hard, Brown, Fine to Coarse Sandy SILT (A-4), with trace mica			
	2,032.4	53.5	100/0.3											2,032.4 WEATHERED ROCK 53.5			
	2,031.2	54.7	60/0.0											2,031.2 Brown (GNEISS) 54.7			
														Boring Terminated with Standard Penetration Test Refusal at Elevation 2,031.2 ft On Crystalline Rock (GNEISS)			

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 15, -Y3RPA- STA. 22+48.19 TO -L- STA. 98+25.00									GROUND WTR (ft)					
BORING NO. WALL15_B-13			STATION 16+70			OFFSET 66 ft RT			ALIGNMENT -WALL15-			0 HR.	35.2	
COLLAR ELEV. 2,086.8 ft			TOTAL DEPTH 54.8 ft			NORTHING 681,585			EASTING 933,974			24 HR.	FIAD	
DRILL RIG/HAMMER EFF./DATE TDD417 CME75 82.7% 06/15/2021						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic					
DRILLER D. Hamilton			START DATE 10/10/23			COMP. DATE 10/10/23			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				
2090														
	2,086.0	0.8	10	8	8									
2085														
	2,083.3	3.5	3	7	8									
2080														
	2,080.8	6.0	24	76/0.4										
	2,078.3	8.5	24	22	39									
2075														
	2,073.3	13.5	35	65/0.2										
2070														
	2,068.3	18.5	16	22	25									
2065														
	2,063.3	23.5	11	31	44									
2060														
	2,058.3	28.5	5	17	31									
2055														
	2,053.3	33.5	29	44	56/0.4									
2050														
	2,048.3	38.5	21	28	72/0.4									
2045														
	2,043.3	43.5	36	38	43									
2040														
	2,038.3	48.5	22	69	31/0.1									
2035														
	2,033.3	53.5	16	40	60/0.3									

NCDOT BORE DOUBLE I2513AC_GEO_GTM.GPJ NC_DOT.GDT 10/1/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13				TIP I-2513AC				COUNTY BUNCOMBE				GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 15, -Y3RPA- STA. 22+48.19 TO -L- STA. 98+25.00												GROUND WTR (ft)					
BORING NO. WALL15_B-14				STATION 17+23				OFFSET 57 ft RT				ALIGNMENT -WALL15-				0 HR. Dry	
COLLAR ELEV. 2,088.0 ft				TOTAL DEPTH 22.9 ft				NORTHING 681,638				EASTING 933,985				24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE TDD417 CME75 82.7% 06/15/2021								DRILL METHOD H.S. Augers				HAMMER TYPE Automatic					
DRILLER D. Hamilton				START DATE 10/09/23				COMP. DATE 10/09/23				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				ELEV. (ft)	DEPTH (ft)		
2090																	
	2,087.2	0.8												2,088.0	GROUND SURFACE 0.0		
														2,087.2	ROADWAY EMBANKMENT 0.8		
2085	2,084.5	3.5	11	35	46							M		Asphalt (0.4'), Stonebase (0.4')			
	2,084.5		3	10	10							M		RESIDUAL			
	2,082.0	6.0	2	3	7									Loose to Very Dense, Tan-Brown, Silty Fine to Coarse SAND (A-2-4(0)), with trace mica			
2080	2,079.5	8.5	6	9	12						SS-972	18%					
												M					
2075	2,074.5	13.5	100/0.4											2,074.5	WEATHERED ROCK 13.5		
														Tan-Brown (GNEISS)			
2070	2,069.5	18.5	48	52/0.1													
	2,065.2	22.8	60/0.1											2,065.2	CRYSTALLINE ROCK 22.8		
														2,065.1	22.9		
														Boring Terminated with Standard Penetration Test Refusal at Elevation 2,065.1 ft In Crystalline Rock (GNEISS)			

WBS 34165.1.13		TIP I-2513AC		COUNTY BUNCOMBE		GEOLOGIST A. West								
SITE DESCRIPTION RETAINING WALL NO. 15, -Y3RPA- STA. 22+48.19 TO -L- STA. 98+25.00							GROUND WTR (ft)							
BORING NO. WALL15_B-15		STATION 17+78		OFFSET 47 ft RT		ALIGNMENT -WALL15-		0 HR. 35.0						
COLLAR ELEV. 2,089.2 ft		TOTAL DEPTH 39.2 ft		NORTHING 681,692		EASTING 933,996		24 HR. FIAD						
DRILL RIG/HAMMER EFF./DATE ECS1390 AMS PowerProbe 94197% 12/20/2022				DRILL METHOD H.S. Augers			HAMMER TYPE Automatic							
DRILLER C. Osborne		START DATE 10/10/23		COMP. DATE 10/10/23		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		MOI		
2090														
	2,088.2	1.0	19	21	20									2,089.2 GROUND SURFACE 0.0
														2,088.2 ROADWAY EMBANKMENT 1.0
2085	2,085.7	3.5	13	13	12							M		
	2,083.2	6.0	13	28	28							M		
2080	2,080.7	8.5	8	16	17							M		
2075	2,075.7	13.5	32	40	40							M		
2070	2,070.7	18.5	20	32	32							M		
2065	2,065.7	23.5	38	62/0.3										2,065.7 WEATHERED ROCK 23.5
2060	2,060.7	28.5	47	53/0.4										
2055	2,055.7	33.5	52	48/0.4										
2050	2,050.7	38.5	55	45/0.2										2,050.0 Boring Terminated at Elevation 2,050.0 ft In Weathered Rock (GNEISS) 39.2

NCDOT BORE DOUBLE I2513AC_GEO_GTM.GPJ NC_DOT.GDT 10/1/24

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 10/1/24

[illegible]

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 10/1/24

WBS 34165.1.13		TIP I-2513AC		COUNTY BUNCOMBE		GEOLOGIST A. West								
SITE DESCRIPTION RETAINING WALL NO. 15, -Y3RPA- STA. 22+48.19 TO -L- STA. 98+25.00								GROUND WTR (ft)						
BORING NO. WALL15_B-19		STATION 19+78		OFFSET 19 ft RT		ALIGNMENT -WALL15-		0 HR.	Dry					
COLLAR ELEV. 2,095.2 ft		TOTAL DEPTH 30.0 ft		NORTHING 681,889		EASTING 934,043		24 HR.	FIAD					
DRILL RIG/HAMMER EFF./DATE ECS1390 AMS PowerProbe 94107% 12/20/2022				DRILL METHOD H.S. Augers			HAMMER TYPE Automatic							
DRILLER C. Osborne			START DATE 10/09/23		COMP. DATE 10/09/23		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														
	2,094.2	1.0	4	11	12									2,095.2 GROUND SURFACE 0.0
														2,094.2 ROADWAY EMBANKMENT 1.0
	2,091.7	3.5	8	9	11									
2090	2,089.2	6.0	4	6	8									
	2,086.7	8.5	17	11	13									
2085														
	2,081.7	13.5	10	12	18									
2080														
	2,076.7	18.5	12	18	18									
2075														
	2,071.7	23.5	4	4	7									2,073.2 Stiff, Pink-Tan-White, Clayey SILT (A-5), 22.0
2070														
	2,066.7	28.5	11	12	14									2,068.2 Very Stiff, Brown-Black, Fine to Coarse Sandy SILT (A-4), with trace mica and rock fragments 27.0
														2,065.2 Boring Terminated at Elevation 2,065.2 ft In Residual Sandy SILT (A-4) 30.0

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 10/1/24

[illegible]

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 10/1/24

[illegible]

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 10/1/24

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 15, -Y3RPA- STA. 22+48.19 TO -L- STA. 98+25.00									GROUND WTR (ft)					
BORING NO. WALL15_B-25			STATION 22+75			OFFSET 1 ft RT			ALIGNMENT -WALL15-			0 HR. Dry		
COLLAR ELEV. 2,100.8 ft			TOTAL DEPTH 10.0 ft			NORTHING 682,171			EASTING 934,136			24 HR. FIAD		
DRILL RIG/HAMMER EFF./DATE TDD417 CME75 82.7% 06/15/2021						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic					
DRILLER D. Hamilton			START DATE 10/09/23			COMP. DATE 10/09/23			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				
2105														
2100	2,099.9	0.9	5	4	4									2,100.8 GROUND SURFACE 0.0
2095	2,097.3	3.5	3	8	10						M			2,099.9 ROADWAY EMBANKMENT 0.9
	2,094.8	6.0	7	8	13						M			2,097.8 Asphalt (0.5'), Stonebase (0.4') 3.0
	2,092.3	8.5	5	15	12						M			2,097.8 RESIDUAL 3.0
											M			2,094.8 Medium Stiff, Brown-Tan, Fine to Coarse Sandy SILT (A-4), with trace mica 6.0
											M			2,094.8 Medium Dense, Brown, Silty Fine to Coarse SAND (A-2-4), with trace mica 6.0
											M			2,094.8 Very Stiff, Brown-Tan, Fine to Coarse Sandy SILT (A-4) 10.0
														2,090.8 Boring Terminated at Elevation 2,090.8 ft In Residual Sandy SILT (A-4)

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 15, -Y3RPA- STA. 22+48.19 TO -L- STA. 98+25.00									GROUND WTR (ft)					
BORING NO. WALL15_B-26			STATION 23+55			OFFSET 1 ft LT			ALIGNMENT -WALL15-			0 HR. Dry		
COLLAR ELEV. 2,101.6 ft			TOTAL DEPTH 10.0 ft			NORTHING 682,244			EASTING 934,168			24 HR. FIAD		
DRILL RIG/HAMMER EFF./DATE TDD417 CME75 82.7% 06/15/2021						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic					
DRILLER D. Hamilton			START DATE 10/09/23			COMP. DATE 10/09/23			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				
2105														
2100	2,100.7	0.9	9	5	6								2,101.6 GROUND SURFACE 0.0	
	2,098.1	3.5	3	7	9						M		2,100.7 ROADWAY EMBANKMENT 0.9	
2095	2,095.6	6.0	5	7	9						M		Asphalt (0.5'), Stonebase (0.4')	
	2,093.1	8.5	3	5	5						M		RESIDUAL	
											M		Stiff to Very Stiff, Tan-Brown, Fine to Coarse Sandy SILT (A-4), with trace mica	
													2,091.6 Boring Terminated at Elevation 2,091.6 ft In Residual Sandy SILT (A-4) 10.0	

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		
WALL15 B-10	SS-1006	89' RT	15+16 -WALL15-	6.0-7.5	A-2-4(0)	34	2	42.0	26.1	23.2	8.6	89.5	62.1	34.0	14.1	-
WALL15 B-10	SS-1013	89' RT	15+16 -WALL15-	38.5-40.0	A-2-4(0)	36	4	38.7	33.2	19.5	8.7	90.1	68.1	31.5	19.6	-
WALL15 B-14	SS-972	57' RT	17+23 -WALL15-	6.0-7.5	A-2-4(0)	36	2	41.1	31.7	16.5	10.6	96.3	70.8	32.1	17.6	-
WALL15 B-24	SS-960	1' RT	22+20 -WALL15-	1.0-2.5	A-2-4(0)	37	5	37.6	34.4	21.5	6.6	93.5	71.3	33.0	13.1	-

LAB TECHNICIAN: DANIEL REEVE

NCDOT CERTIFICATION NO. 135-03-0816

REFERENCE: I-2513AC

PROJECT: 34165

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-16	BORE LOGS
17	SOIL TEST RESULTS

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

STRUCTURE
SUBSURFACE INVESTIGATION

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

SITE DESCRIPTION RETAINING WALL NO. 16
-WALL 16- STA. 10 + 67.97 (-Y3RPD- STA. 18 + 63.77) TO
-WALL 16- STA. 20 + 79.26 (-L- STA. 98 + 22.91)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-2513AC	1	17

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

TOTAL DEPTH DRILLING

TERRACON CONSULTANTS

INVESTIGATED BY ECS SOUTHEAST, LLC

DRAWN BY A. SUTTLE, P.G.

CHECKED BY M. MULLA, P.E.

SUBMITTED BY ECS SOUTHEAST, LLC

DATE AUGUST 2024

Prepared in the Office of:



ECS SOUTHEAST, LLC
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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
BDAF14C SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

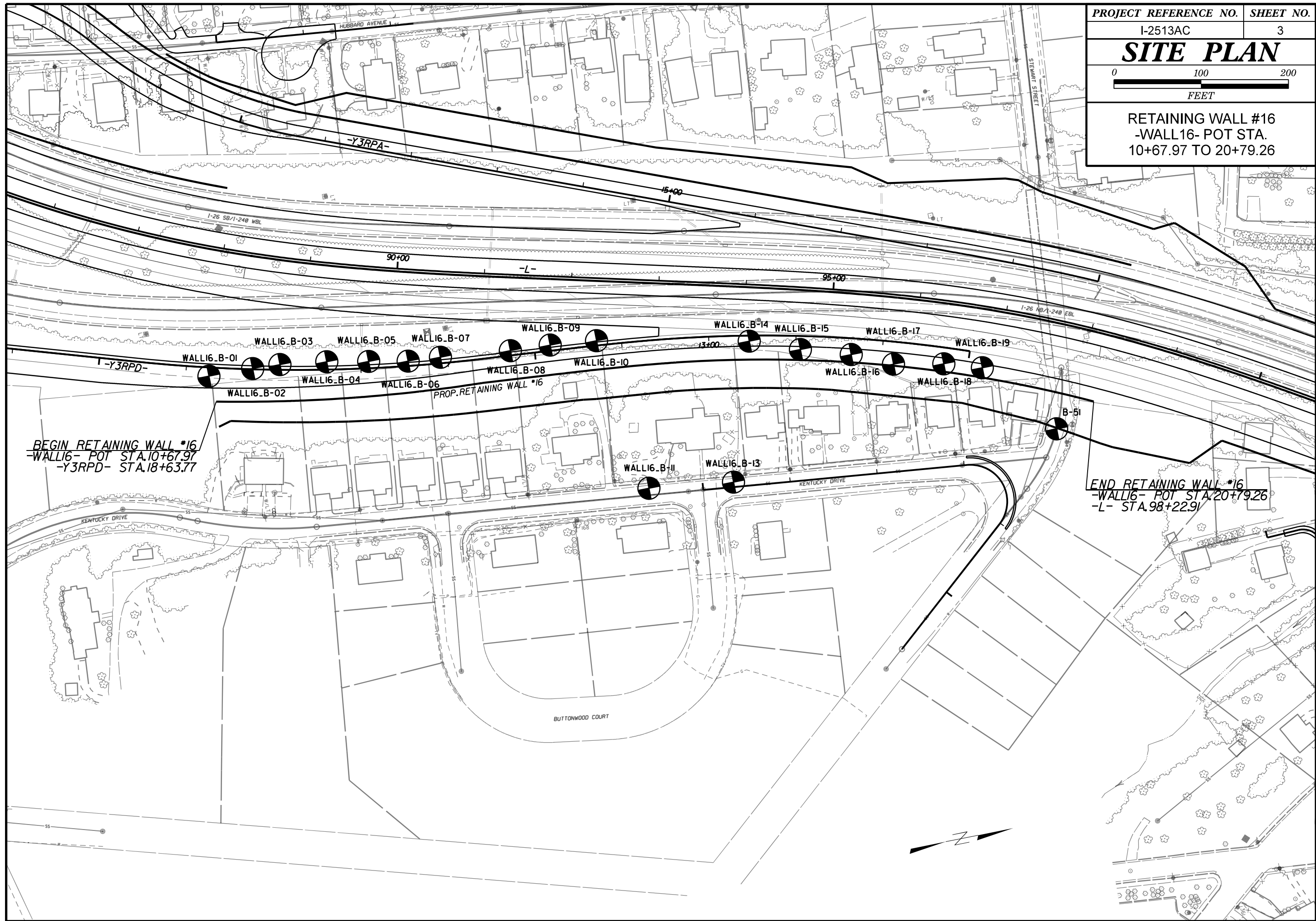
GEOTECHNICAL ENGINEERING UNIT

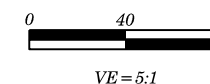
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION												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 DISLOOGED 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						CRYSTALLINE ROCK (CR)		NON-CRYSTALLINE ROCK (NCR)										COASTAL PLAIN SEDIMENTARY ROCK (CP)																																																																																																																																																																																																																																																																																																																																																																																																						
GROUP CLASS.	A-1-a	A-1-b	A-3	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5	A-6, A-7	A-1-A-2	A-3	A-4, A-5

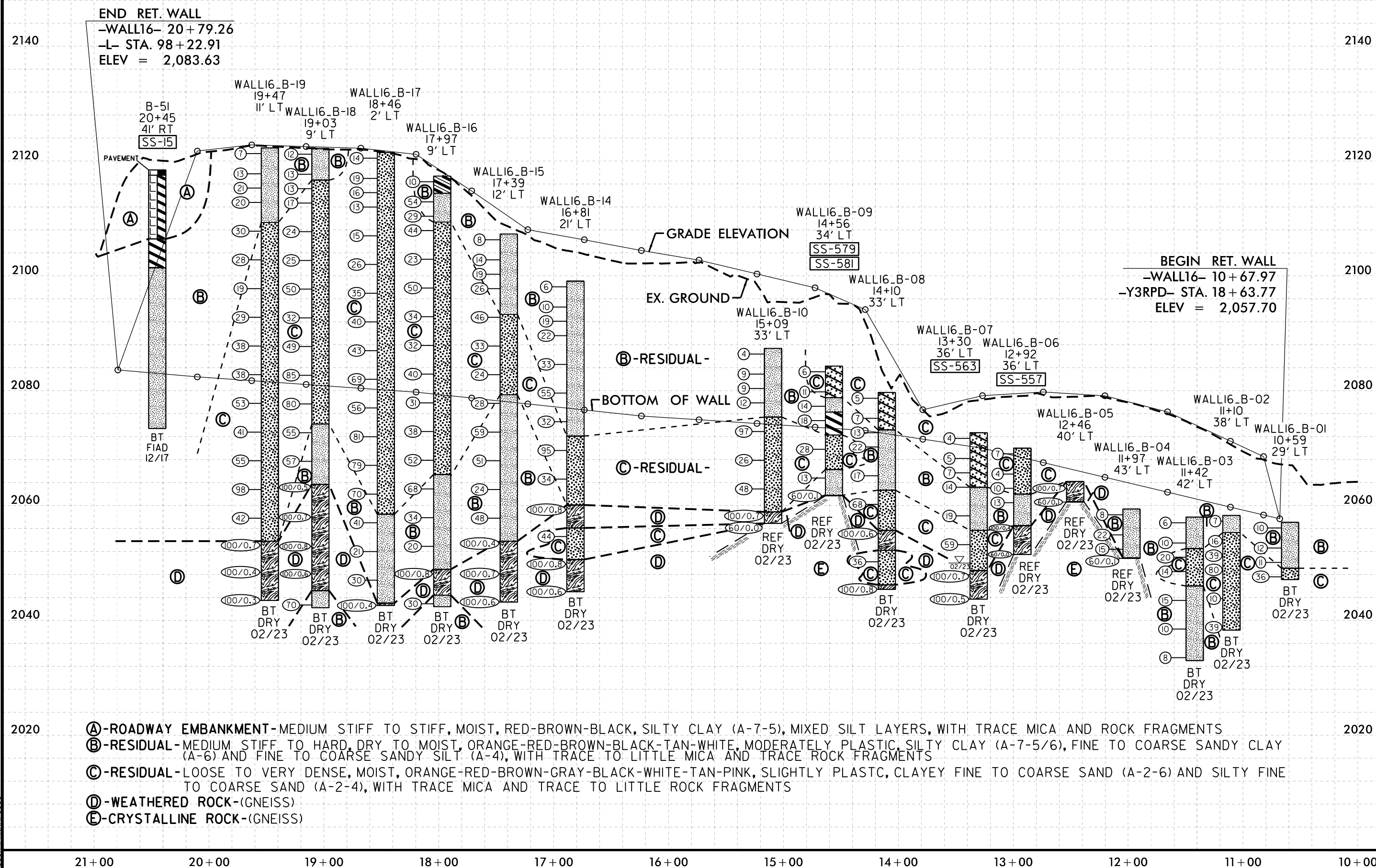
PROJECT REFERENCE NO.	SHEET NO.
I-2513AC	3
SITE PLAN	
0 100 200 FEET	
RETAINING WALL #16 -WALL16- POT STA. 10+67.97 TO 20+79.26	





-WALL16- PROFILE ALONG EXISTING GROUND LINE FROM ROADWAY
DESIGN FILES, PROVIDED BY AECOM JULY 2024 AND I2513 ls.tn.inferred
STRATIGRAPHY IS DRAWN THROUGH THE BORING, PROJECTED ON THE PROFILE.

-WALL16-



GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91									GROUND WTR (ft)					
BORING NO. WALL16_B-01			STATION 10+59			OFFSET 29 ft LT			ALIGNMENT -WALL16-			0 HR.	Dry	
COLLAR ELEV. 2,057.1 ft			TOTAL DEPTH 10.0 ft			NORTHING 681,175			EASTING 934,082			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 02/20/23			COMP. DATE 02/20/23			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			ELEV. (ft)	DEPTH (ft)
2060														
	2,057.1	0.0											2,057.1	0.0
2055			3	4	6	10	-	-	-	-	M			
	2,053.6	3.5	6	5	7	12	-	-	-	-	M			
2050	2,051.1	6.0	5	5	6	11	-	-	-	-	M			
	2,048.6	8.5	11	18	18	36	-	-	-	-	M			
													2,049.1	8.0
													2,047.1	10.0
													Boring Terminated at Elevation 2,047.1 ft In Residual Silty SAND (A-2-4)	
													Surficial Organic Soil from 0.0 to 0.3 feet.	

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore				
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91									GROUND WTR (ft)				
BORING NO. WALL16_B-02			STATION 11+10			OFFSET 38 ft LT			ALIGNMENT -WALL16-			0 HR. Dry	
COLLAR ELEV. 2,058.3 ft			TOTAL DEPTH 20.0 ft			NORTHING 681,226			EASTING 934,084			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 02/20/23			COMP. DATE 02/20/23			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			
2060													
	2,058.3	0.0	2	3	4								2,058.3 GROUND SURFACE 0.0
2055	2,054.8	3.5	5	7	9						M		RESIDUAL Medium Stiff, Brown, Fine to Coarse Sandy SILT (A-4) 3.0
	2,052.3	6.0	5	16	23						M		Loose to Very Dense, Orange-Brown-Gray-Black-Tan, Silty Fine to Coarse SAND (A-2-4), with trace rock fragments and trace mica
2050	2,049.8	8.5	26	33	47						M		
2045	2,044.8	13.5	10	4	6						M		
2040	2,039.8	18.5	16	23	16						M		2,038.3 20.0
													Boring Terminated at Elevation 2,038.3 ft In Residual Silty SAND (A-2-4)
													Surficial Organic Soil from 0.0 to 0.3 feet.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore							
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91											GROUND WTR (ft)					
BORING NO. WALL16_B-03			STATION 11+42			OFFSET 42 ft LT			ALIGNMENT -WALL16-			0 HR.	Dry			
COLLAR ELEV. 2,058.0 ft			TOTAL DEPTH 25.0 ft			NORTHING 681,258			EASTING 934,085			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 02/21/23			COMP. DATE 02/21/23			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)	
2060																
	2,058.0	0.0		2	3	3									2,058.0	0.0
2055	2,054.5	3.5		3	5	5							M		RESIDUAL Medium Stiff to Stiff, Brown-Black, Fine to Coarse Sandy SILT (A-4), with trace mica	
	2,052.0	6.0		7	10	10							M		2,052.5	5.5
2050	2,049.5	8.5		5	7	7							M		Medium Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4), with trace mica	
	2,046.0	12.0		6	7	8							M		2,046.0	12.0
2045	2,044.5	13.5											M		Medium Stiff to Stiff, Tan-Brown, Fine to Coarse Sandy SILT (A-4), with trace mica	
2040	2,039.5	18.5		3	5	5							M			
2035	2,034.5	23.5		2	3	5							M		2,033.0	25.0
														Boring Terminated at Elevation 2,033.0 ft In Residual Sandy SILT (A-4)		
														Surficial Organic Soil from 0.0 to 0.3 feet.		

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore												
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91									GROUND WTR (ft)												
BORING NO. WALL16_B-04			STATION 11+97			OFFSET 43 ft LT			ALIGNMENT -WALL16-			0 HR.	Dry								
COLLAR ELEV. 2,059.4 ft			TOTAL DEPTH 8.6 ft			NORTHING 681,311			EASTING 934,093			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 02/21/23			COMP. DATE 02/21/23			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											
2060	2,059.4	0.0	2	4	4									2,059.4	GROUND SURFACE	0.0					
	2,055.9	3.5	14	12	10						M										
2055	2,053.4	6.0	6	8	7						M										
	2,050.9	8.5									M										
			60/0.1			60/0.1									2,050.9		8.5				
															2,050.8		8.6				
														CRYSTALLINE ROCK (GNEISS)							
														Boring Terminated with Standard Penetration Test Refusal at Elevation 2,050.8 ft In Crystalline Rock (GNEISS)							
														Surficial Organic Soil from 0.0 to 0.3 feet.							
														Several offset borings performed in the vicinity with similar refusal depth results.							

NCDOT BORE DOUBLE I2513AC_GEO_GTM.GPJ NC_DOT.GDT 8/13/24

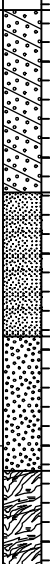
GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore						
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91											GROUND WTR (ft)				
BORING NO. WALL16_B-05			STATION 12+46			OFFSET 40 ft LT			ALIGNMENT -WALL16-			0 HR.	Dry		
COLLAR ELEV. 2,064.2 ft			TOTAL DEPTH 3.6 ft			NORTHING 681,358			EASTING 934,102			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 02/21/23			COMP. DATE 02/21/23			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)
2065	2,064.2	0.0												2,064.2	0.0
	2,060.7	3.5	5	14	86/0.2									2,060.7	3.5
			60/0.1											2,060.6	3.6
GROUND SURFACE															
WEATHERED ROCK															
Brown (GNEISS)															
CRYSTALLINE ROCK															
(GNEISS)															
Boring Terminated with Standard Penetration Test Refusal at Elevation 2,060.6 ft In Crystalline Rock (GNEISS)															
Surficial Organic Soil from 0.0 to 0.3 feet.															
Several offset borings performed in the vicinity with similar refusal depth results.															

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore							
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91											GROUND WTR (ft)					
BORING NO. WALL16_B-06			STATION 12+92			OFFSET 36 ft LT			ALIGNMENT -WALL16-			0 HR.	Dry			
COLLAR ELEV. 2,070.0 ft			TOTAL DEPTH 18.5 ft			NORTHING 681,402			EASTING 934,110			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 02/21/23			COMP. DATE 02/21/23			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						
2070																
	2,070.0	0.0	5	4	3									2,070.0	GROUND SURFACE	0.0
	2,066.5	3.5										M			RESIDUAL Loose, Brown-Red, Silty Fine to Coarse SAND (A-2-4)	
2065	2,064.0	6.0	3	2	2						SS-557	18%				
	2,064.0	6.0	4	4	6							M				
	2,061.5	8.5										M			2,062.0	8.0
2060			6	5	8										Stiff, Brown-Black, Fine to Coarse Sandy SILT (A-4), with trace mica	
	2,056.5	13.5													2,056.5	13.5
2055			100/0.4												WEATHERED ROCK Brown (GNEISS)	
	2,051.5	18.5													2,051.5	18.5
			60/0.0												Boring Terminated with Standard Penetration Test Refusal at Elevation 2,051.5 ft On Crystalline Rock (GNEISS)	
															Surficial Organic Soil from 0.0 to 0.3 feet.	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91											GROUND WTR (ft)			
BORING NO. WALL16_B-07			STATION 13+30			OFFSET 36 ft LT			ALIGNMENT -WALL16-			0 HR.	22.7	
COLLAR ELEV. 2,072.7 ft			TOTAL DEPTH 29.0 ft			NORTHING 681,439			EASTING 934,113			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 02/21/23			COMP. DATE 02/21/23			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			ELEV. (ft)	DEPTH (ft)
2075														
	2,072.7	0.0											2,072.7	GROUND SURFACE 0.0
2070	2,069.2	3.5	3	3	1	4					M			
	2,069.2										M			
	2,066.7	6.0	2	2	3	5								
2065	2,066.7		2	3	4	7					SS-563	18%	2,063.2	9.5
	2,064.2	8.5	7	7	7	14					M			
2060	2,059.2	13.5	8	9	10	19					M		2,055.7	17.0
2055	2,054.2	18.5	12	31	28	59					M			
2050	2,049.2	23.5	11	52	48/0.2								2,048.7	24.0
2045	2,044.2	28.5								100/0.7				
										100/0.5			2,043.7	29.0
													Boring Terminated at Elevation 2,043.7 ft In Weathered Rock (GNEISS)	
													Surficial Organic Soil from 0.0 to 0.3 feet.	

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore									
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91									GROUND WTR (ft)									
BORING NO. WALL16_B-08			STATION 14+10			OFFSET 33 ft LT			ALIGNMENT -WALL16-			0 HR.	Dry					
COLLAR ELEV. 2,079.7 ft			TOTAL DEPTH 34.3 ft			NORTHING 681,519			EASTING 934,122			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 02/21/23			COMP. DATE 02/21/23			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								
2080	2,079.7	0.0	2	3	2													
	2,076.2	3.5	2	4	3													
2075	2,073.7	6.0	4	5	8													
	2,071.2	8.5	7	9	13													
2070			8	8	9													
2065	2,066.2	13.5	17	23	45													
	2,061.2	18.5	12	28	72/0.1													
2060	2,056.2	23.5	21	19	17													
	2,051.2	28.5	33	67/0.3														
2055	2,046.2	33.5																
2050																		

NCDOT BORE DOUBLE I2513AC_GEO_GTM.GPJ NC_DOT.GDT 8/13/24

GEOTECHNICAL BORING REPORT
BORE LOG

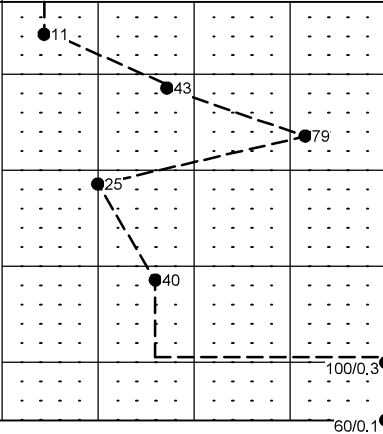
WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore						
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91												GROUND WTR (ft)			
BORING NO. WALL16_B-09			STATION 14+56			OFFSET 34 ft LT			ALIGNMENT -WALL16-			0 HR.	Dry		
COLLAR ELEV. 2,084.3 ft			TOTAL DEPTH 22.6 ft			NORTHING 681,565			EASTING 934,124			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 02/21/23			COMP. DATE 02/21/23			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)
2085	2,084.3	0.0												2,084.3	0.0
2080	2,080.8	3.5	2	2	4							M		RESIDUAL Loose to Medium Dense, Brown, Slightly Plastic, Clayey Fine to Coarse SAND (A-2-6(0))	
	2,078.3	6.0	4	6	5						SS-579	20%		2,078.8	5.5
2075	2,078.3	6.0	5	6	8							M		Stiff, Brown, Fine to Coarse Sandy SILT (A-4)	
	2,075.8	8.5	7	9	9						SS-581	17%		2,076.3	8.0
2070	2,070.8	13.5	9	10	18							M		Very Stiff, Red-Brown, Moderately Plastic Silty CLAY (A-7-6(6))	
	2,065.8	18.5	5	5	8							M		2,072.3	12.0
2065	2,065.8	18.5										M		Medium Dense, Tan-Brown, Silty Fine to Coarse SAND (A-2-4)	
	2,061.8	22.5										M		2,066.3	18.0
														2,061.8	22.5
														2,061.7	22.6
														CRYSTALLINE ROCK (GNEISS)	
														Boring Terminated with Standard Penetration Test Refusal at Elevation 2,061.7 ft In Crystalline Rock (GNEISS)	
														Surficial Organic Soil from 0.0 to 0.2 feet.	

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91									GROUND WTR (ft)					
BORING NO. WALL16_B-10			STATION 15+09			OFFSET 33 ft LT			ALIGNMENT -WALL16-			0 HR. Dry		
COLLAR ELEV. 2,087.4 ft			TOTAL DEPTH 30.5 ft			NORTHING 681,618			EASTING 934,130			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 02/22/23			COMP. DATE 02/22/23			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				
2090														
	2,087.4	0.0	3	2	2	4						M		2,087.4 GROUND SURFACE 0.0
2085	2,083.9	3.5	4	4	5	9						M		RESIDUAL Medium Stiff to Stiff, Red-Brown-Black, Fine to Coarse Sandy SILT (A-4), with trace mica and rock fragments
	2,081.4	6.0	4	5	4	9						M		
2080	2,078.9	8.5	5	6	6	12						M		
2075	2,073.9	13.5	15	47	50						97	M		2,075.4 Medium Dense to Very Dense, Tan-Gray-Brown, Silty Fine to Coarse SAND (A-2-4), with trace rock fragments 12.0
2070	2,068.9	18.5	17	13	13						26	M		
2065	2,063.9	23.5	18	19	29						48	M		
2060	2,058.9	28.5	11	89/0.2										2,058.9 28.5
	2,056.9	30.5									100/0.7			2,056.9 WEATHERED ROCK Brown-Gray (GNEISS) 30.5
			60/0.0								60/0.0			Boring Terminated with Standard Penetration Test Refusal at Elevation 2,056.9 ft On Crystalline Rock (GNEISS)
														Surficial Organic Soil from 0.0 to 0.3 feet.

NCDOT BORE DOUBLE I2513AC_GEO_GTM.GPJ NC_DOT.GDT 8/13/24

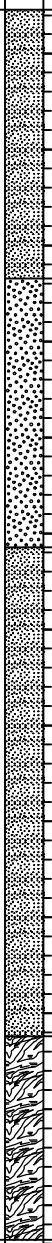
GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore						
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91												GROUND WTR (ft)			
BORING NO. WALL16_B-11			STATION 15+53			OFFSET 141 ft RT			ALIGNMENT -WALL16-			0 HR. Dry			
COLLAR ELEV. 2,113.0 ft			TOTAL DEPTH 35.4 ft			NORTHING 681,644			EASTING 934,307			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE TDD417 CME75 82.7% 06/15/2021						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic						
DRILLER D. Hamilton			START DATE 11/28/23			COMP. DATE 11/28/23			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)
2115															
	2,112.2	0.8												2,113.0	0.0
2110	2,109.5	3.5	5	4	4	8						M		2,112.2	0.8
	2,107.0	6.0	3	4	5	9						M			
2105	2,107.0	6.0	3	5	6	11						M			
	2,104.5	8.5	4	5	5	10						M			
2100	2,099.5	13.5				15						M			
	2,094.5	18.5	3	7	8							M		2,095.0	18.0
2095	2,094.5	18.5	15	22	18	40						M			
	2,089.5	23.5												2,089.0	24.0
2090	2,089.5	23.5	38	52	48/0.2					100/0.7					
	2,084.5	28.5	61	39/0.3						100/0.8					
2085	2,084.5	28.5													
	2,079.5	33.5	100/0.4							100/0.4				2,077.7	35.3
2080	2,077.7	35.3	60/0.1							60/0.1				2,077.6	35.4
</															

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91									GROUND WTR (ft)					
BORING NO. WALL16_B-13			STATION 16+59			OFFSET 140 ft RT			ALIGNMENT -WALL16-			0 HR. Dry		
COLLAR ELEV. 2,113.8 ft			TOTAL DEPTH 21.8 ft			NORTHING 681,740			EASTING 934,319			24 HR. FIAD		
DRILL RIG/HAMMER EFF./DATE TDD417 CME75 82.7% 06/15/2021						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic					
DRILLER D. Hamilton			START DATE 11/28/23			COMP. DATE 11/28/23			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				
2115														
	2,113.1	0.7	2	4	7									2,113.8 GROUND SURFACE 0.0 2,113.1 ROADWAY EMBANKMENT 0.7 0.2' Asphalt 0.5' Concrete
2110	2,110.3	3.5	4	19	24							M		
	2,107.8	6.0	13	31	48							M		RESIDUAL Medium Dense to Very Dense, Brown-Black-Gray-Tan, Silty Fine to Coarse SAND (A-2-4), with trace mica
2105	2,105.3	8.5	14	12	13							M		
												M		
2100	2,100.3	13.5	11	21	19							M		
2095	2,095.3	18.5	100/0.3											2,095.3 WEATHERED ROCK 18.5 Gray (GNEISS)
	2,092.1	21.7	60/0.1											2,092.1 CRYSTALLINE ROCK 21.7 2,092.0 (GNEISS) 21.8 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,092.0 ft In Crystalline Rock (GNEISS) Boring offset along residential road due to inaccessibility on private property along wall alignment.

NCDOT BORE DOUBLE 12513AC_GEO_GTM.GPJ NC_DOT.GDT 8/13/24

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 8/13/24

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore								
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91											GROUND WTR (ft)						
BORING NO. WALL16_B-15			STATION 17+39			OFFSET 12 ft LT			ALIGNMENT -WALL16-			0 HR.	Dry				
COLLAR ELEV. 2,107.3 ft			TOTAL DEPTH 64.1 ft			NORTHING 681,845			EASTING 934,185			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 02/22/23			COMP. DATE 02/22/23			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							
2110																	
	2,107.3	0.0												2,107.3	GROUND SURFACE	0.0	
2105			4	4	4							M		RESIDUAL Medium Stiff to Very Stiff, Red-Brown-Tan, Fine to Coarse Sandy SILT (A-4), with trace mica			
	2,103.8	3.5		4	6	8								M			
2100				8	8	11								M			
	2,101.3	6.0		8	8	11								M			
	2,098.8	8.5		8	10	16							M				
2095																	
	2,093.8	13.5		7	21	25							M		2,093.3	14.0	
2090															Medium Dense to Dense, White-Brown-Red, Silty Fine to Coarse SAND (A-2-4), with trace mica		
	2,088.8	18.5		15	17	16							M				
2085																	
	2,083.8	23.5		18	12	12							M				
2080																	
	2,078.8	28.5		9	12	16							M		2,079.3	28.0	
2075															Very Stiff to Hard, Brown-Tan, Fine to Coarse Sandy SILT (A-4), with trace mica		
	2,073.8	33.5		13	23	36							M				
2070																	
	2,068.8	38.5		17	21	30							M				
2065																	
	2,063.8	43.5		8	9	15							M				
2060																	
	2,058.8	48.5		9	14	34							M				
2055																	
	2,053.8	53.5													2,053.8	53.5	
2050															WEATHERED ROCK Gray-Brown (GNEISS)		
	2,048.8	58.5		52	48/0.2										100/0.7		
2045																	
	2,043.8	63.5		66	34/0.1										100/0.6		
															Boring Terminated at Elevation 2,043.2 ft In Weathered Rock (GNEISS)		
															Surficial Organic Soil from 0.0 to 0.3 feet.		

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 8/13/24

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NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 8/13/24

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore				
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91									GROUND WTR (ft)				
BORING NO. WALL16_B-17			STATION 18+46			OFFSET 2 ft LT			ALIGNMENT -WALL16-			0 HR. Dry	
COLLAR ELEV. 2,121.5 ft			TOTAL DEPTH 78.9 ft			NORTHING 681,947			EASTING 934,223			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 02/23/23			COMP. DATE 02/23/23			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	MOI		
2045						Match Line							
	2,043.0	78.5											2,043.0 78.5
			100/0.4							100/0.4			2,042.6 78.9
WEATHERED ROCK Brown (GNEISS) Boring Terminated at Elevation 2,042.6 ft In Weathered Rock (GNEISS) Surficial Organic Soil from 0.0 to 0.3 feet.													

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 8/13/24

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91									GROUND WTR (ft)					
BORING NO. WALL16_B-18			STATION 19+03			OFFSET 9 ft LT			ALIGNMENT -WALL16-			0 HR. Dry		
COLLAR ELEV. 2,122.2 ft			TOTAL DEPTH 80.0 ft			NORTHING 682,003			EASTING 934,234			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 02/24/23			COMP. DATE 02/24/23			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	MOI			
2045						Match Line								
	2,043.7	78.5									M	RESIDUAL		
			26	22	48							2,042.2	Hard, Brown-White, Fine to Coarse Sandy SILT (A-4) (continued)	80.0
													Boring Terminated at Elevation 2,042.2 ft In Residual Sandy SILT (A-4)	

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 8/13/24

WBS 34165.1.13				TIP I-2513AC				COUNTY BUNCOMBE				GEOLOGIST A. Blackmore						
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91												GROUND WTR (ft)						
BORING NO. WALL16_B-19				STATION 19+47				OFFSET 11 ft LT				ALIGNMENT -WALL16-				0 HR. Dry		
COLLAR ELEV. 2,122.3 ft				TOTAL DEPTH 78.8 ft				NORTHING 682,045				EASTING 934,247				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 02/24/23				COMP. DATE 02/24/23				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								
2045						Match Line												
	2,043.8	78.5													2,043.5		78.8	
			100/0.3							100/0.3					Boring Terminated at Elevation 2,043.5 ft In Weathered Rock (GNEISS)			

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.2			TIP I-2513A			COUNTY BUNCOMBE			GEOLOGIST SCHLEMM, T.S.						
SITE DESCRIPTION NEW ROUTE FROM I-26 TO US 19-23-70									GROUND WTR (ft)						
BORING NO. B-51			STATION 20+45			OFFSET 41 ft RT			ALIGNMENT -WALL16-			0 HR. Caved			
COLLAR ELEV. 2,118.4 ft			TOTAL DEPTH 45.0 ft			NORTHING 682,115			EASTING 934,332			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE TER1974 CME-45B 93% 08/10/2017						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic						
DRILLER TURNAGE, J.R.			START DATE 12/16/17			COMP. DATE 12/16/17			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)
2120															
	2,117.4	1.0	8	9	6	15						M		2,118.4 PAVEMENT SURFACE 0.0	
2115	2,114.9	3.5	3	2	3	5						M		2,117.5 PAVEMENT 0.9	
	2,112.4	6.0	2	2	3	5						M		ROADWAY EMBANKMENT	
2110	2,109.9	8.5	3	3	3	6						M		RED-BROWN, BROWN, AND BLACK, SILTY CLAY, TRACE MICA, TRACE ROCK FRAGMENTS, MIXED SILT LAYERS	
2105	2,104.9	13.5	7	7	8	15								2,106.4 12.0	
											SS-15	17%		RESIDUAL	
2100	2,099.9	18.5	3	4	4	8						M		2,101.4 17.0	
														RED-BROWN, BROWN, AND BLACK, FINE TO COARSE SANDY SILT, TRACE TO LITTLE MICA, TRACE QUARTZ FRAGMENTS	
2095	2,094.9	23.5	12	15	24							M			
2090	2,089.9	28.5	12	19	28							M			
2085	2,084.9	33.5	13	14	21							M			
2080	2,079.9	38.5	14	34	39							D			
2075	2,074.9	43.5	20	36	38							M		2,073.4 45.0	
														Boring Terminated at Elevation 2,073.4 ft IN RESIDUAL SANDY SILT	
														WATER LEVEL 0 HR CAVED DRY AT 32.2 FEET	

NCDOT BORE DOUBLE I2513A_GEO_RDWY.GPJ NC_DOT.GDT 8/13/24

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		
WALL16_B-06	SS-557	36' LT	12+92 -WALL16-	3.5 - 5.0	A-2-4(0)	30	8	28.0	31.2	17.1	23.6	69.6	57.5	32.0	18.2	-
WALL16_B-07	SS-563	36' LT	13+30 -WALL16-	6.0 - 7.5	A-2-6(1)	36	13	33.7	24.4	12.3	29.6	74.1	57.9	34.1	17.9	-
WALL16_B-09	SS-579	34' LT	14+56 -WALL16-	3.5 - 5.0	A-2-6(0)	36	11	30.2	23.6	22.6	23.6	64.1	54.0	32.9	20.4	-
WALL16_B-09	SS-581	34' LT	14+56 -WALL16-	8.5 - 10.0	A-7-6(6)	43	17	25.2	25.0	16.0	33.7	91.1	76.3	49.7	16.6	-
B-51*	SS-15	41' RT	20+45 -WALL16-	13.5 - 15.0	A-7-5(3)	50	15	32.9	28.3	13.2	25.6	99.0	90.0	71.0	29.0	-

LAB TECHNICIAN: DANIEL REEVE

LAB TECHNICIAN: STEPHANIE H. HUFFMAN

NCDOT CERTIFICATION NO. 135-03-0816

NCDOT CERTIFICATION NO. 114-01-1203

*LAB TESTING FOR B-51 WAS PERFORMED BY OTHERS DURING A PREVIOUS EXPLORATION.

REFERENCE: I-2513AC

PROJECT: 34165

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-12	BORE LOGS
13	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.18
-WALL18- STA. 10 + 41.68 (-RP23- STA. 39 + 44.93) TO
-WALL18- STA. 17 + 61.92 (-Y3- STA. 23 + 10.00)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-2513AC	1	13

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

J. MESSICK

GEOLOGIC EXPLORATION

INVESTIGATED BY ECS SOUHTEAST, LLC

DRAWN BY A. SUTTLE, P.G.

CHECKED BY M. MULLA, P.E.

SUBMITTED BY ECS SOUTHEAST, LLC

DATE AUGUST 2024

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
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

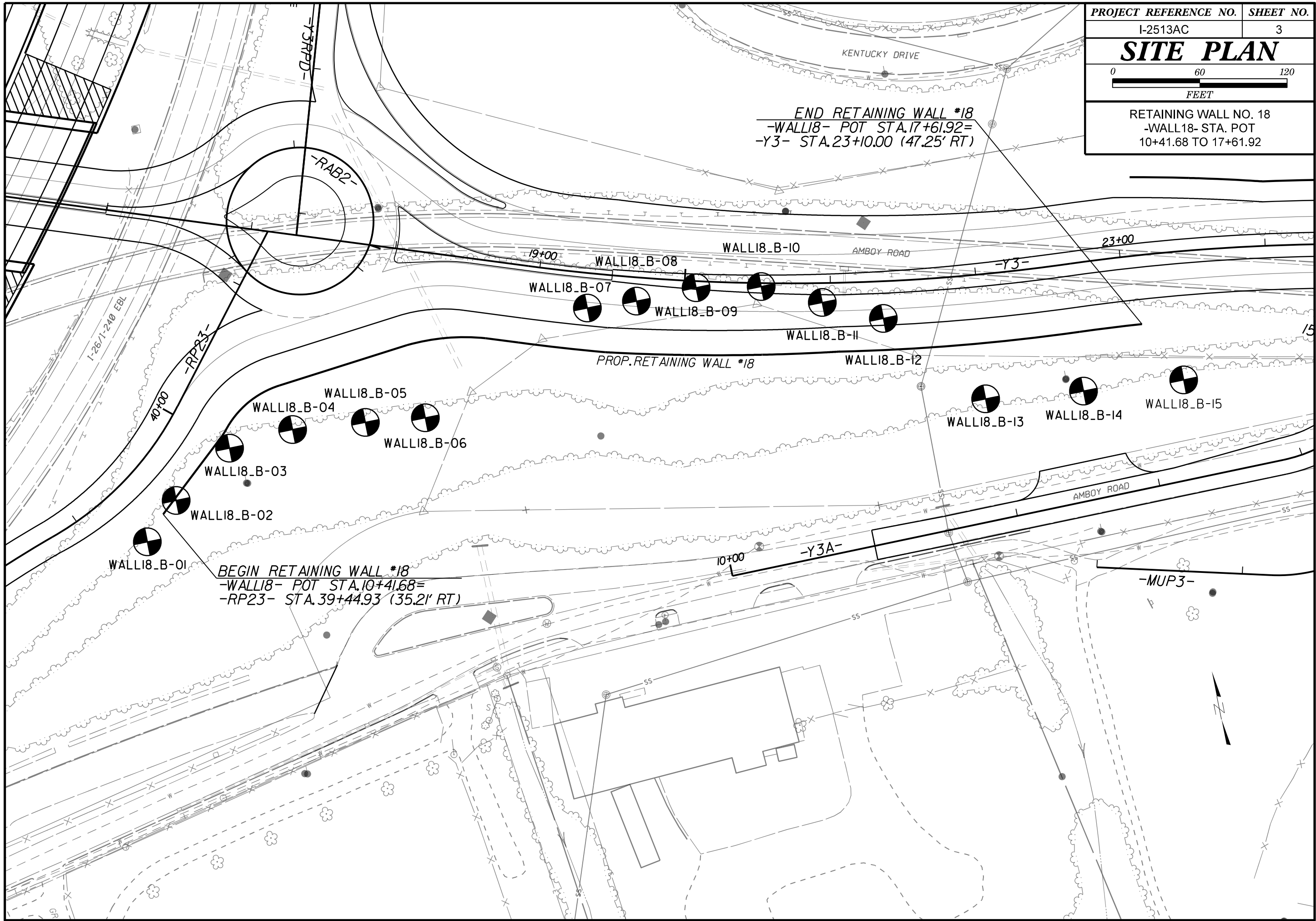
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

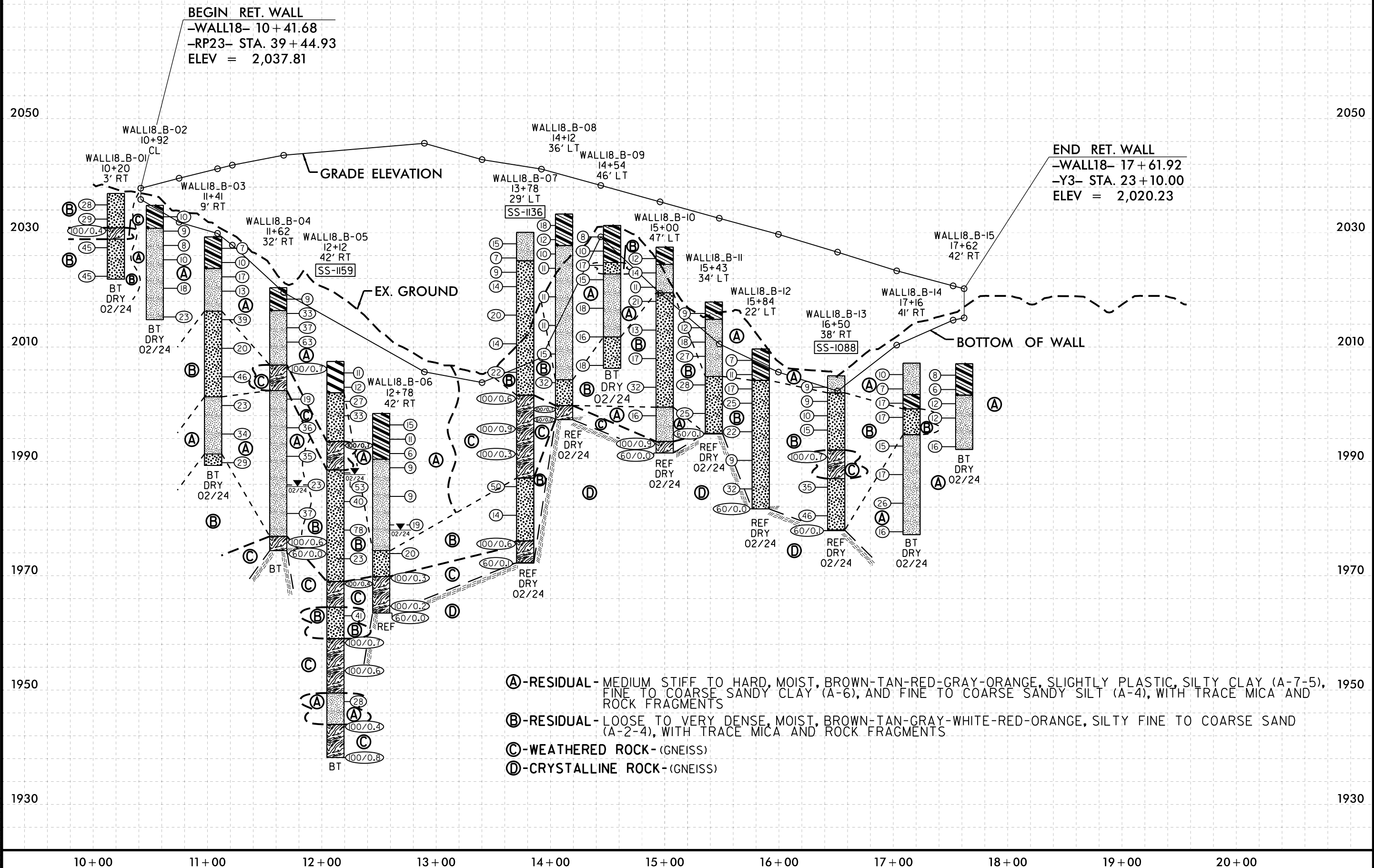
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PROJECT REFERENCE NO.	SHEET NO.
I-2513AC	3
SITE PLAN	
0 60 120 FEET	
RETAINING WALL NO. 18 -WALL18- STA. POT 10+41.68 TO 17+61.92	



~~—WALL18— PROFILE ALONG EXISTING GROUND LINE FROM ROADWAY
DESIGN FILES, PROVIDED BY AECOM JULY 2024 AND I2513 Is tn1.tin. INFERRED
STRATIGRAPHY IS DRAWN THROUGH THE BORING, PROJECTED ON THE PROFILE.~~

-WALL18-



NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 8/13/24

WBS 34165.1.13		TIP I-2513AC		COUNTY BUNCOMBE		GEOLOGIST A. Blackmore								
SITE DESCRIPTION RETAINING WALL NO. 18, -RP23- STA. 39+44.93 TO -Y3- STA. 23+10.00							GROUND WTR (ft)							
BORING NO. WALL18_B-02		STATION 10+54		OFFSET 1 ft RT		ALIGNMENT -WALL18-		0 HR. Dry						
COLLAR ELEV. 2,034.8 ft		TOTAL DEPTH 20.0 ft		NORTHING 680,593		EASTING 933,827		24 HR. Dry						
DRILL RIG/HAMMER EFF./DATE GEO047 Diedrich D-70 90% 02/09/2024				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic								
DRILLER J. Messick		START DATE 02/07/24		COMP. DATE 02/07/24		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				
2035														
	2,033.8	1.0		4	4	6								2,034.8 GROUND SURFACE 0.0
	2,031.3	3.5		6	4	5								
2030	2,028.8	6.0		4	4	4								2,030.8 RESIDUAL 4.0
	2,026.3	8.5		4	4	6								Stiff, Red-Brown, Fine to Coarse Sandy CLAY (A-6)
2025														Medium Stiff to Very Stiff, Brown-Tan, Fine to Coarse Sandy SILT (A-4), with trace mica
	2,021.3	13.5		4	7	11								
2020														
	2,016.3	18.5		6	10	13								
2015														2,014.8 Boring Terminated at Elevation 2,014.8 ft In Residual Sandy SILT (A-4) 20.0

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 8/13/24

WBS 34165.1.13		TIP I-2513AC		COUNTY BUNCOMBE		GEOLOGIST A. Blackmore							
SITE DESCRIPTION RETAINING WALL NO. 18, -RP23- STA. 39+44.93 TO -Y3- STA. 23+10.00								GROUND WTR (ft)					
BORING NO. WALL18_B-04		STATION 11+62		OFFSET 32 ft RT		ALIGNMENT -WALL18-		0 HR.	36.4				
COLLAR ELEV. 2,020.4 ft		TOTAL DEPTH 46.0 ft		NORTHING 680,625		EASTING 933,915		24 HR.	34.8				
DRILL RIG/HAMMER EFF./DATE GEO047 Diedrich D-70 90% 02/09/2024				DRILL METHOD H.S. Augers			HAMMER TYPE Automatic						
DRILLER J. Messick			START DATE 02/07/24		COMP. DATE 02/07/24		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	MOI		
2025													
2020													
2015	2,019.4	1.0	3	3	6								2,020.4 GROUND SURFACE 0.0
	2,016.9	3.5	7	12	21								RESIDUAL Stiff, Red-Brown, Fine to Coarse Sandy CLAY (A-6)
2010	2,014.4	6.0	10	14	23								2,016.4 4.0
	2,011.9	8.5	12	30	33								Hard, Brown-Tan, Fine to Coarse Sandy SILT (A-4), with trace mica
2005	2,006.9	13.5	30	70/0.2									2,006.9 13.5
	2,001.9	18.5	21	10	9								WEATHERED ROCK Brown (GNEISS)
2000	1,996.9	23.5	18	15	21								2,002.4 18.0
	1,991.9	28.5	63	19	16								RESIDUAL Very Stiff to Hard, Brown-Tan-Gray, Fine to Coarse Sandy SILT (A-4), with trace mica
1995	1,986.9	33.5	14	8	15								
	1,981.9	38.5	12	11	26								
1985	1,976.9	43.5	15	85/0.1									1,976.9 43.5
	1,974.4	46.0	60/0.0										WEATHERED ROCK Gray (GNEISS)
													1,974.4 46.0
													Boring Terminated with Standard Penetration Test Refusal at Elevation 1,974.4 ft On Crystalline Rock (GNEISS)

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 8/13/24

WBS 34165.1.13		TIP I-2513AC		COUNTY BUNCOMBE		GEOLOGIST A. Blackmore								
SITE DESCRIPTION RETAINING WALL NO. 18, -RP23- STA. 39+44.93 TO -Y3- STA. 23+10.00								GROUND WTR (ft)						
BORING NO. WALL18_B-06		STATION 12+52		OFFSET 51 ft RT		ALIGNMENT -WALL18-		0 HR.	22.1					
COLLAR ELEV. 1,998.4 ft		TOTAL DEPTH 34.9 ft		NORTHING 680,615		EASTING 934,006		24 HR.	20.4					
DRILL RIG/HAMMER EFF./DATE GEO047 Diedrich D-70 90% 02/09/2024				DRILL METHOD H.S. Augers			HAMMER TYPE Automatic							
DRILLER J. Messick			START DATE 02/06/24		COMP. DATE 02/06/24		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	MOI			
2000														
	1,997.4	1.0	5	7	8								1,998.4 GROUND SURFACE 0.0	
1995	1,994.9	3.5	5	5	6									
	1,992.4	6.0	3	3	3									
1990	1,989.9	8.5	2	3	6									1,990.4 8.0
	1,984.9	13.5	3	4	5									
1985	1,979.9	18.5	4	7	12									
1980	1,974.9	23.5	3	10	10								1,974.4 24.0	
1975	1,969.9	28.5	100/0.3										1,969.9 28.5	
1970	1,964.9	33.5	100/0.2										1,963.5 34.9	
1965	1,963.5	34.9	60/0.0										1,963.5 34.9	
													Boring Terminated with Standard Penetration Test Refusal at Elevation 1,963.5 ft On Crystalline Rock (GNEISS)	

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 8/13/24

WBS 34165.1.13		TIP I-2513AC		COUNTY BUNCOMBE		GEOLOGIST A. Blackmore								
SITE DESCRIPTION RETAINING WALL NO. 18, -RP23- STA. 39+44.93 TO -Y3- STA. 23+10.00								GROUND WTR (ft)						
BORING NO. WALL18_B-08		STATION 14+12		OFFSET 36 ft LT		ALIGNMENT -WALL18-		0 HR.	Dry					
COLLAR ELEV. 2,033.3 ft		TOTAL DEPTH 36.0 ft		NORTHING 680,665		EASTING 934,164		24 HR.	Dry					
DRILL RIG/HAMMER EFF./DATE GEO047 Diedrich D-70 90% 02/09/2024				DRILL METHOD H.S. Augers			HAMMER TYPE Automatic							
DRILLER J. Messick			START DATE 02/05/24		COMP. DATE 02/06/24		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				
2035														
	2,032.3	1.0												2,033.3 GROUND SURFACE 0.0
2030	2,029.8	3.5	7	9	9							M		RESIDUAL Stiff to Very Stiff, Red-Brown, Fine to Coarse Sandy CLAY (A-6)
	2,027.3	6.0	5	5	7							M		
2025	2,024.8	8.5	6	6	4							M		2,027.8 Stiff, Brown-Tan-White-Gray, Fine to Coarse Sandy SILT (A-4), with trace mica 5.5
			5	5	6							M		
2020	2,019.8	13.5	4	6	5							M		
			7	5	6							M		
2015	2,014.8	18.5										M		
			6	6	9							M		
2010	2,009.8	23.5										M		
			5	12	20							M		
2005	2,004.8	28.5										M		2,004.3 Dense, Tan-Brown, Silty Fine to Coarse SAND (A-2-4), with trace mica 29.0
			23	77/0.2										
2000	1,999.8	33.5												1,999.8 WEATHERED ROCK Tan-White (GNEISS) 33.5
	1,997.3	36.0												1,997.3 Boring Terminated with Standard Penetration Test Refusal at Elevation 1,997.3 ft On Crystalline Rock (GNEISS) 36.0
			60/0.0											

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 8/13/24

WBS 34165.1.13		TIP I-2513AC		COUNTY BUNCOMBE		GEOLOGIST A. Blackmore								
SITE DESCRIPTION RETAINING WALL NO. 18, -RP23- STA. 39+44.93 TO -Y3- STA. 23+10.00								GROUND WTR (ft)						
BORING NO. WALL18_B-10		STATION 15+00		OFFSET 47 ft LT		ALIGNMENT -WALL18-		0 HR.	Dry					
COLLAR ELEV. 2,027.5 ft		TOTAL DEPTH 36.0 ft		NORTHING 680,658		EASTING 934,250		24 HR.	Dry					
DRILL RIG/HAMMER EFF./DATE GEO047 Diedrich D-70 90% 02/09/2024				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic								
DRILLER J. Messick		START DATE 02/02/24		COMP. DATE 02/02/24		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				
2030														
	2,026.5	1.0	6	5	7									2,027.5 GROUND SURFACE 0.0
2025	2,024.0	3.5	7	6	8									2,024.5 RESIDUAL Stiff, Brown-Red, Fine to Coarse Sandy CLAY (A-6) 3.0
	2,021.5	6.0	5	5	6									Stiff, Brown-Red, Fine to Coarse Sandy SILT (A-4)
2020	2,019.0	8.5	7	9	12									2,019.5 Medium Dense to Dense, Orange-Brown-Tan, Silty Fine to Coarse SAND (A-2-4) 8.0
	2,014.0	13.5	6	6	7									
2015														
2010	2,009.0	18.5	10	8	9									
	2,004.0	23.5	11	16	16									
2005														
	1,999.0	28.5	11	7	9									1,999.5 Very Stiff, White-Brown, Fine to Coarse Sandy SILT (A-4) 28.0
2000														
	1,994.0	33.5	33	42	68/0.4									1,993.5 WEATHERED ROCK Tan (GNEISS) 34.0
1995														1,991.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 1,991.5 ft On Crystalline Rock (GNEISS) 36.0
	1,991.5	36.0	60/0.0											

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore							
SITE DESCRIPTION RETAINING WALL NO. 18, -RP23- STA. 39+44.93 TO -Y3- STA. 23+10.00											GROUND WTR (ft)					
BORING NO. WALL18_B-11			STATION 15+43			OFFSET 34 ft LT			ALIGNMENT -WALL18-			0 HR.	Dry			
COLLAR ELEV. 2,017.9 ft			TOTAL DEPTH 23.1 ft			NORTHING 680,639			EASTING 934,289			24 HR.	Dry			
DRILL RIG/HAMMER EFF./DATE GEO047 Diedrich D-70 90% 02/09/2024						DRILL METHOD H.S. Augers				HAMMER TYPE Automatic						
DRILLER J. Messick			START DATE 02/01/24			COMP. DATE 02/01/24			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)	
2020																
2015	2,016.9	1.0												2,017.9	0.0	
	2,014.4	3.5	4	3	6									RESIDUAL Stiff, Brown, Fine to Coarse Sandy CLAY (A-6)	3.0	
	2,014.4	3.5	4	4	8											
2,011.9	6.0	6	9	9									Stiff to Very Stiff, Brown-Tan, Fine to Coarse Sandy SILT (A-4), with trace mica			
2010	2,009.4	8.5														
	2,009.4	8.5	11	12	15											
2005	2,004.4	13.5												2,004.9	13.0	
	2,004.4	13.5	8	13	15											Medium Dense, Tan-Brown, Silty Fine to Coarse SAND (A-2-4), with trace rock fragments
2000	1,999.4	18.5														
	1,999.4	18.5	8	8	17											
1995	1,994.9	23.0												1,994.9	23.0	
														1,994.8	23.1	
			60/0.1											CRYSTALLINE ROCK (GNEISS)		
Boring Terminated with Standard Penetration Test Refusal at Elevation 1,994.8 ft In Crystalline Rock (GNEISS)																

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 18, -RP23- STA. 39+44.93 TO -Y3- STA. 23+10.00									GROUND WTR (ft)					
BORING NO. WALL18_B-12			STATION 15+84			OFFSET 22 ft LT			ALIGNMENT -WALL18-			0 HR. Dry		
COLLAR ELEV. 2,009.7 ft			TOTAL DEPTH 28.0 ft			NORTHING 680,620			EASTING 934,328			24 HR. Dry		
DRILL RIG/HAMMER EFF./DATE GEO047 Diedrich D-70 90% 02/09/2024						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic					
DRILLER J. Messick			START DATE 02/01/24			COMP. DATE 02/01/24			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				
2010														
	2,008.7	1.0												2,009.7 GROUND SURFACE 0.0
			3	3	4									RESIDUAL
	2,006.2	3.5	5	5	6									Medium Stiff to Stiff, Brown, Fine to Coarse Sandy CLAY (A-6), with trace mica
2005														
	2,003.7	6.0	5	9	8									2,004.2
														Loose to Dense, Tan-Brown, Silty Fine to Coarse SAND (A-2-4)
	2,001.2	8.5	5	8	17									
2000														
	1,996.2	13.5	9	14	8									
1995														
	1,991.2	18.5	7	6	3									
1990														
	1,986.2	23.5	21	19	13									
1985														
	1,981.7	28.0												1,981.7 28.0
		60/0.0												Boring Terminated with Standard Penetration Test Refusal at Elevation 1,981.7 ft On Crystalline Rock (GNEISS)

NCDOT BORE DOUBLE I2513AC_GEO_GTM.GPJ NC_DOT.GDT 8/13/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore							
SITE DESCRIPTION RETAINING WALL NO. 18, -RP23- STA. 39+44.93 TO -Y3- STA. 23+10.00												GROUND WTR (ft)				
BORING NO. WALL18_B-13			STATION 16+50			OFFSET 38 ft RT			ALIGNMENT -WALL18-			0 HR.	Dry			
COLLAR ELEV. 2,005.0 ft			TOTAL DEPTH 27.1 ft			NORTHING 680,552			EASTING 934,386			24 HR.	Dry			
DRILL RIG/HAMMER EFF./DATE GEO047 Diedrich D-70 90% 02/09/2024						DRILL METHOD H.S. Augers				HAMMER TYPE Automatic						
DRILLER J. Messick			START DATE 02/01/24			COMP. DATE 02/01/24			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)	
2005														2,005.0	GROUND SURFACE 0.0	
2000	2,004.0	1.0		3	4	5						SS-1088	28%		2,002.0	RESIDUAL Medium Stiff, Brown, Fine to Coarse Sandy SILT (A-4), with trace mica 3.0
	2,001.5	3.5		4	5	4									2,002.0	Loose to Medium Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-5(0)), with trace mica
1995	1,999.0	6.0		5	5	5							M			
	1,996.5	8.5		9	7	8										
1990	1,991.5	13.5		73	27/0.2							M		1,992.0	WEATHERED ROCK 13.0	
	1,986.5	18.5		15	17	18								1,987.0	Gray-Tan (GNEISS)	
1985	1,981.5	23.5		8	13	33							M			RESIDUAL Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4) 18.0
1980	1,978.0	27.0		60/0.1						60/0.1					1,978.0	27.0
															1,977.9	CRYSTALLINE ROCK (GNEISS) 27.1
																Boring Terminated with Standard Penetration Test Refusal at Elevation 1,977.9 ft In Crystalline Rock (GNEISS)

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION RETAINING WALL NO. 18, -RP23- STA. 39+44.93 TO -Y3- STA. 23+10.00									GROUND WTR (ft)					
BORING NO. WALL18_B-14			STATION 17+16			OFFSET 41 ft RT			ALIGNMENT -WALL18-			0 HR. Dry		
COLLAR ELEV. 2,007.2 ft			TOTAL DEPTH 30.0 ft			NORTHING 680,544			EASTING 934,453			24 HR. Dry		
DRILL RIG/HAMMER EFF./DATE GEO047 Diedrich D-70 90% 02/09/2024						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic					
DRILLER J. Messick			START DATE 02/01/24			COMP. DATE 02/01/24			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				
2010														
	2,006.2	1.0	2	3	7	10	.	.	.	.		M		2,007.2 GROUND SURFACE 0.0
2005	2,003.7	3.5	4	3	4	7	.	.	.	.		M		RESIDUAL Medium Stiff to Stiff, Brown, Fine to Coarse Sandy SILT (A-4), with trace mica and rock fragments
	2,001.2	6.0	6	8	9	17	.	.	.	.		M		2,001.7 Very Stiff, Red-Brown, Fine to Coarse Sandy CLAY (A-6) 5.5
2000	1,998.7	8.5	12	9	8	17	.	.	.	.		M		1,999.2 Medium Dense, Tan-Brown, Silty Fine to Coarse SAND (A-2-4) 8.0
1995	1,993.7	13.5	6	6	9	15	.	.	.	.		M		1,994.7 Stiff to Very Stiff, Tan-Brown-White, Fine to Coarse Sandy SILT (A-4) 12.5
1990	1,988.7	18.5	5	6	11	17	.	.	.	.		M		
1985	1,983.7	23.5	3	6	20	26	.	.	.	.		M		
1980	1,978.7	28.5	3	10	6	16	.	.	.	.		M		1,977.2 Boring Terminated at Elevation 1,977.2 ft In Residual Sandy SILT (A-4) 30.0

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore						
SITE DESCRIPTION RETAINING WALL NO. 18, -RP23- STA. 39+44.93 TO -Y3- STA. 23+10.00											GROUND WTR (ft)				
BORING NO. WALL18_B-15			STATION 17+62			OFFSET 42 ft RT			ALIGNMENT -WALL18-			0 HR.	Dry		
COLLAR ELEV. 2,007.1 ft			TOTAL DEPTH 15.0 ft			NORTHING 680,538			EASTING 934,522			24 HR.	Dry		
DRILL RIG/HAMMER EFF./DATE GEO047 Diedrich D-70 90% 02/09/2024						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic						
DRILLER J. Messick			START DATE 02/01/24			COMP. DATE 02/01/24			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)
2010															
	2,006.1	1.0	3	4	4									2,007.1	0.0
2005															
	2,003.6	3.5	4	3	3										
	2,001.1	6.0	4	6	6										
2000															
	1,998.6	8.5	8	6	6										
1995															
	1,993.6	13.5	6	7	9										
		</													

NCDOT BORE DOUBLE I2513AC_GEO_GTM.GPJ NC_DOT.GDT 8/13/24

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		
WALL18 B-05	SS-1159	42' RT	-WALL18- 12+12	3.5-5.0	A-7-5(4)	49	13	19.5	33.5	29.7	17.3	87.2	76.2	47.7	20.8	-
WALL18 B-07	SS-1136	29' LT	-WALL18- 13+78	6.0-7.5	A-2-5(0)	44	10	46.3	22.3	20.1	11.3	92.2	57.5	33.6	30.4	-
WALL18 B-13	SS-1088	38' RT	-WALL18- 16+50	3.5-5.0	A-2-5(0)	45	3	48.1	25.3	19.3	7.3	94.6	59.4	30.1	27.9	-

LAB TECHNICIAN: DANIEL REEVE

NCDOT CERTIFICATION NO. 135-03-0816