

REFERENCE: I-25I3AC

PROJECT: 34I65

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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 NOISE WALL NO. 5A, FROM
STA. 10 + 00 (-RP32- STA. 11 + 52.05) TO STA. 20 + 85.00
(-RP32- STA. 22 + 43.5I)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-25I3AC	1	11

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. 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.

SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS. 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

R. BLACKSTOCK

C. OSBORNE

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 JULY 2024

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

BDAP14CEC 34I65
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 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 MATTER.									
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 #200										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 0.008 - 0.03 FEET																			
																				THINLY LAMINATED < 0.008 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.																			
PL - PLASTIC LIMIT																				EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																			
OM - OPTIMUM MOISTURE SHRINKAGE LIMIT																																							
SL - SHRINKAGE LIMIT																																							
PLASTICITY																																							
NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC																																							
PLASTICITY INDEX (PI)																																							
DRY STRENGTH																																							
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.																																							

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 7/24/24

WBS		34165.1.13		TIP		I-2513AC		COUNTY		BUNCOMBE		GEOLOGIST		A. Blackmore								
SITE DESCRIPTION												I-26/I-40/I-240 Interchange to SR 3548 (Haywood Road)				GROUND WTR (ft)						
BORING NO.		NW-5A_B-02		STATION		10+52		OFFSET		39 ft LT		ALIGNMENT		-NW5A-		0 HR.	Dry					
COLLAR ELEV.		2,074.2 ft		TOTAL DEPTH		25.0 ft		NORTHING		679,744		EASTING		931,422		24 HR.	Dry					
DRILL RIG/HAMMER EFF./DATE								ECS049Diedrich D-70 94% 04/24/2024				DRILL METHOD				H.S. Augers		HAMMER TYPE	Automatic			
DRILLER				R. Blackstock				START DATE				04/16/24		COMP. DATE				04/16/24		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														GROUND SURFACE 0.0								
	2,073.2	1.0	2	2	4	6						M	2,074.2	ROADWAY EMBANKMENT								
2070	2,070.7	3.5	4	7	9	16						M	2,071.2	Medium Stiff, Brown, Fine to Coarse Sandy SILT (A-4) 3.0								
	2,068.2	6.0	6	7	10	17						M		Stiff to Very Stiff, Tan-Brown, Fine to Coarse Sandy SILT (A-4), with trace mica								
2065	2,065.7	8.5	4	6	8	14						M										
2060	2,060.7	13.5	3	6	8	14						M										
2055	2,055.7	18.5	5	8	11	19						M										
2050	2,050.7	23.5	8	10	16	26						M	2,049.2	25.0								
														Boring Terminated at Elevation 2,049.2 ft In Residual Sandy SILT (A-4)								
														Surficial Organic Soil 0.0 to 0.3 feet								

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 7/24/24

WBS		34165.1.13		TIP		I-2513AC		COUNTY		BUNCOMBE		GEOLOGIST		A. Blackmore																								
SITE DESCRIPTION													I-26/I-40/I-240 Interchange to SR 3548 (Haywood Road)			GROUND WTR (ft)																						
BORING NO.				NW-5A_B-04				STATION				12+67		OFFSET		15 ft LT		ALIGNMENT		-NW5A-		0 HR.		Dry														
COLLAR ELEV.				2,061.2 ft				TOTAL DEPTH				25.0 ft		NORTHING		679,772		EASTING		931,635		24 HR.		Dry														
DRILL RIG/HAMMER EFF./DATE										ECS049Diedrich D-70 94% 04/24/2024					DRILL METHOD					H.S. Augers			HAMMER TYPE			Automatic												
DRILLER					R. Blackstock					START DATE					04/16/24			COMP. DATE					04/16/24			SURFACE WATER DEPTH										N/A		
ELEV (ft)		DRIVE ELEV (ft)		DEPTH (ft)		BLOW COUNT			BLOWS PER FOOT					SAMP. NO.				L O G		SOIL AND ROCK DESCRIPTION																		
						0.5ft 0.5ft 0.5ft			0 25 50 75 100																													
2065																																						
2060		2,060.2		1.0																2,061.2 GROUND SURFACE 0.0																		
						4 4 5														ROADWAY EMBANKMENT																		
		2,057.7		3.5		4 4 5														Medium Stiff to Stiff, Brown, Fine to Coarse Sandy SILT (A-4), with trace gravel																		
2055		2,055.2		6.0		3 4 4																																
		2,052.7		8.5		2 4 4																																
2050																																						
		2,047.7		13.5		7 7 7																																
2045																																						
		2,042.7		18.5		2 3 4																																
2040																																						
		2,037.7		23.5		5 4 6														2,038.2 23.0																		
																				2,036.2 25.0																		
																				Stiff, Brown, Fine to Coarse Sandy CLAY (A-6)																		
																				Boring Terminated at Elevation 2,036.2 ft In Roadway Embankment Sandy CLAY (A-6)																		
																				Surficial Organic Soil 0.0 to 0.3 feet																		

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 7/24/24

WBS 34165.1.13		TIP I-2513AC		COUNTY BUNCOMBE		GEOLOGIST A. Blackmore								
SITE DESCRIPTION I-26/I-40/I-240 Interchange to SR 3548 (Haywood Road)								GROUND WTR (ft)						
BORING NO. NW-5A_B-06		STATION 14+49		OFFSET 26 ft LT		ALIGNMENT -NW5A-		0 HR.	Dry					
COLLAR ELEV. 2,041.3 ft		TOTAL DEPTH 25.0 ft		NORTHING 679,851		EASTING 931,797		24 HR.	Dry					
DRILL RIG/HAMMER EFF./DATE ECS049Diedrich D-70 94% 04/24/2024				DRILL METHOD H.S. Augers			HAMMER TYPE Automatic							
DRILLER C. Osborne			START DATE 04/16/24		COMP. DATE 04/16/24		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				
2045														
2040	2,040.3	1.0												2,041.3 GROUND SURFACE 0.0
2035	2,037.8	3.5	2	2	3							M		ROADWAY EMBANKMENT Soft to Very Stiff, Brown, Fine to Coarse Sandy SILT (A-4), with trace asphalt
	2,035.3	6.0	4	2	2							M		
2030	2,032.8	8.5	2	6	15							M		RESIDUAL Stiff to Very Stiff, White-Tan-Brown-Black, Fine to Coarse Sandy SILT (A-4), with trace mica
	2,027.8	13.5	5	5	6							M		
2025	2,022.8	18.5	4	8	4							M		Boring Terminated at Elevation 2,016.3 ft In Residual Sandy SILT (A-4) Surficial Organic Soil 0.0 to 0.2 feet
2020	2,017.8	23.5	6	8	10							M		
			6	7	10							M		2,016.3 25.0

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 7/24/24

WBS 34165.1.13		TIP I-2513AC		COUNTY BUNCOMBE		GEOLOGIST A. Blackmore							
SITE DESCRIPTION I-26/I-40/I-240 Interchange to SR 3548 (Haywood Road)							GROUND WTR (ft)						
BORING NO. WALL04_B-02		STATION 16+23		OFFSET 7 ft LT		ALIGNMENT -NW5A-		0 HR. Dry					
COLLAR ELEV. 2,024.3 ft		TOTAL DEPTH 30.0 ft		NORTHING 679,911		EASTING 931,961		24 HR. FIAD					
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 01/24/23		COMP. DATE 01/24/23		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		
2025													
													GROUND SURFACE 2,024.3 0.0
													ROADWAY EMBANKMENT 2,023.4 0.9
													Asphalt (0.4'), Stonebase (0.5')
													RESIDUAL
													Medium Stiff to Very Stiff,
													Brown-Orange-Gray-Tan, Fine to Coarse
													Sandy SILT (A-4), with trace mica and rock
													fragments
2020	2,019.3	5.0	5	6	10							M	
2015	2,015.8	8.5	6	7	7							M	
2010	2,010.8	13.5	3	4	6							M	
2005	2,005.8	18.5	5	3	5							M	
2000	2,000.8	23.5	4	4	5							W	
1995	1,995.8	28.5	100/0.3										1,995.8 28.5
	1,994.3	30.0	60/0.0										WEATHERED ROCK 1,994.3 30.0
													Gray-White (GNEISS)
													Boring Terminated with Standard
													Penetration Test Refusal at Elevation
													1,994.3 ft On Crystalline Rock (GNEISS)
													Hand Auger Probe from 0.0 to 5.0 feet due
													to close proximity to underground utilities
													and drill rig access.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore							
SITE DESCRIPTION I-26/I-40/I-240 Interchange to SR 3548 (Haywood Road)									GROUND WTR (ft)							
BORING NO. WALL04_B-03			STATION 16+77			OFFSET 35 ft LT			ALIGNMENT -NW5A-			0 HR. Dry				
COLLAR ELEV. 2,026.0 ft			TOTAL DEPTH 33.4 ft			NORTHING 679,960			EASTING 931,996			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 01/25/23			COMP. DATE 01/25/23			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)	
2030																
2025	2,025.0	1.0	1	2	2									2,026.0	GROUND SURFACE 0.0	
2020	2,022.5	3.5	3	4	3						SS-395	26%		2,023.0	RESIDUAL Soft, Red-Brown, Moderately Plastic Silty CLAY (A-7-6(10)), with trace mica	3.0
	2,020.0	6.0	3	4	5							M		Medium Stiff to Stiff, Red-Orange-Brown-Black, Fine to Coarse Sandy SILT (A-4), with trace mica		
2015	2,017.5	8.5	4	3	2							M				
	2,012.5	13.5	33	27	34							M		2,013.0	Medium Dense to Very Dense, Brown-Tan-Black, Silty Fine to Coarse SAND (A-2-4), with trace mica and rock fragments	13.0
2010	2,007.5	18.5	22	45	37							M				
2005	2,002.5	23.5	12	11	11											
2000	1,997.5	28.5	100/0.4											1,997.5	WEATHERED ROCK 28.5	
1995	1,992.6	33.4	60/0.0											1,992.6	Boring Terminated with Standard Penetration Test Refusal at Elevation 1,992.6 ft On Crystalline Rock (GNEISS)	33.4
															Surficial Organic Soil from 0.0 to 0.2 feet.	

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore					
SITE DESCRIPTION I-26/I-40/I-240 Interchange to SR 3548 (Haywood Road)									GROUND WTR (ft)					
BORING NO. WALL04_B-04			STATION 17+30			OFFSET 19 ft LT			ALIGNMENT -NW5A-			0 HR. Dry		
COLLAR ELEV. 2,017.2 ft			TOTAL DEPTH 6.5 ft			NORTHING 679,970			EASTING 932,050			24 HR. FIAD		
DRILL RIG/HAMMER EFF./DATE G. Sowers Dynamic Cone Penetrometer						DRILL METHOD Hand Auger/DCP			HAMMER TYPE N/A					
DRILLER N/A			START DATE 02/13/23			COMP. DATE 02/13/23			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				
2020														
	2,017.2	0.0	0	0	4	4	-	-	-	-				2,017.2 GROUND SURFACE 0.0
	2,016.2	1.0	0	0	3	3	-	-	-	-				
2015	2,015.2	2.0	0	0	6	6	-	-	-	-				
	2,014.2	3.0	0	0	6	6	-	-	-	-				
	2,013.2	4.0	0	0	7	7	-	-	-	-				
	2,012.2	5.0	0	0	7	7	-	-	-	-				
	2,011.2	6.0	0	0	9	9	-	-	-	-				

NCDOT BORE DOUBLE I2513AC_GEO_GTM.GPJ NC_DOT.GDT 7/24/24

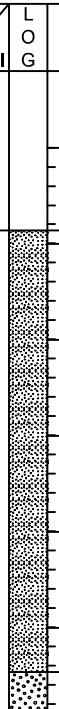
GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore							
SITE DESCRIPTION I-26/I-40/I-240 Interchange to SR 3548 (Haywood Road)									GROUND WTR (ft)							
BORING NO. WALL04_B-05			STATION 17+74			OFFSET 4 ft LT			ALIGNMENT -NW5A-			0 HR. Dry				
COLLAR ELEV. 2,007.4 ft			TOTAL DEPTH 8.5 ft			NORTHING 679,977			EASTING 932,096			24 HR. FIAD				
DRILL RIG/HAMMER EFF./DATE G. Sowers Dynamic Cone Penetrometer						DRILL METHOD Hand Auger/DCP			HAMMER TYPE N/A							
DRILLER N/A			START DATE 02/13/23			COMP. DATE 02/13/23			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)	
2010																
2005	2,007.4	0.0												2,007.4	0.0	
	2,006.4	1.0	0	0	2	2	- - -	- - - -	- - - -	- - - -				GROUND SURFACE		
	2,006.4	1.0		0	0	4	4	- - -	- - - -	- - - -	- - - -			RESIDUAL		
	2,005.4	2.0		0	0	5	5	- - -	- - - -	- - - -	- - - -			Soft to Medium Stiff, Red-Brown, Fine to Coarse Sandy CLAY (A-6)		
	2,004.4	3.0		0	0	6	6	- - -	- - - -	- - - -	- - - -		M		2,002.4	5.0
	2,003.4	4.0		0	0	7	7	- - -	- - - -	- - - -	- - - -					
	2,002.4	5.0		0	0	5	5	- - -	- - - -	- - - -	- - - -					
	2,001.4	6.0		0	0	10	10	- - -	- - - -	- - - -	- - - -		M			
2000	2,000.4	7.0		0	0	8	8	- - -	- - - -	- - - -	- - - -			Medium Stiff to Stiff, Brown-Tan-Orange, Fine to Coarse Sandy SILT (A-4)		
1,999.4	8.0		0	0	9	9	- - -	- - - -	- - - -	- - - -			1,998.9	8.5		
														Boring Terminated at Elevation 1,998.9 ft In Residual Sandy SILT (A-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 I-26/I-40/I-240 Interchange to SR 3548 (Haywood Road)									GROUND WTR (ft)				
BORING NO. WALL04_B-07			STATION 18+99			OFFSET 16 ft RT			ALIGNMENT -NW5A-				
COLLAR ELEV. 2,023.5 ft			TOTAL DEPTH 10.0 ft			NORTHING 680,017			EASTING 932,216				
									0 HR. Dry				
									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 01/27/23			COMP. DATE 01/27/23			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	
2025													
	2,022.5	1.0											2,023.5 GROUND SURFACE 0.0
2020	2,020.0	3.5	2	1	2						M		RESIDUAL Soft to Very Stiff, Brown-Tan, Fine to Coarse Sandy SILT (A-4), with trace rock fragments
	2,017.5	6.0	1	1	1						M		
2015	2,015.0	8.5	7	7	4						M		
			9	7	9						M		
													2,013.5 Boring Terminated at Elevation 2,013.5 ft In Residual Sandy SILT (A-4) 10.0
													Boring location appears to be along an old abandoned roadbed.

NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 7/24/24

WBS 34165.1.13		TIP I-2513AC		COUNTY BUNCOMBE		GEOLOGIST A. Blackmore							
SITE DESCRIPTION I-26/I-40/I-240 Interchange to SR 3548 (Haywood Road)							GROUND WTR (ft)						
BORING NO. NW-5A_B-12		STATION 20+70		OFFSET 16 ft RT		ALIGNMENT -NW5A-		0 HR. Dry					
COLLAR ELEV. 2,050.7 ft		TOTAL DEPTH 25.0 ft		NORTHING 680,098		EASTING 932,372		24 HR. Dry					
DRILL RIG/HAMMER EFF./DATE ECS049 Diedrich D-70 94% 04/24/2024				DRILL METHOD H.S. Augers			HAMMER TYPE Automatic						
DRILLER R. Blackstock		START DATE 04/16/24		COMP. DATE 04/16/24		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
2055													
2050	2,049.7	1.0	5	5	4							2,050.7 GROUND SURFACE 0.0	
2045	2,047.2	3.5	7	5	5					M			
	2,044.7	6.0	4	5	6					M			
2040	2,042.2	8.5	5	7	8					M			
	2,037.2	13.5	6	9	11					M			
2035	2,032.2	18.5	5	7	11					M			
2030	2,027.2	23.5	5	13	24					M			
													2,027.7 23.0
													2,025.7 Dense, Tan-Brown, Silty Fine to Coarse SAND (A-2-4) 25.0
												Boring Terminated at Elevation 2,025.7 ft In Residual Silty SAND (A-2-4)	
												Surficial Organic Soil 0.0 to 0.1 feet	

