

REFERENCE: I-2513AC

PROJECT: 34165

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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-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.

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DATE AUGUST 2024

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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

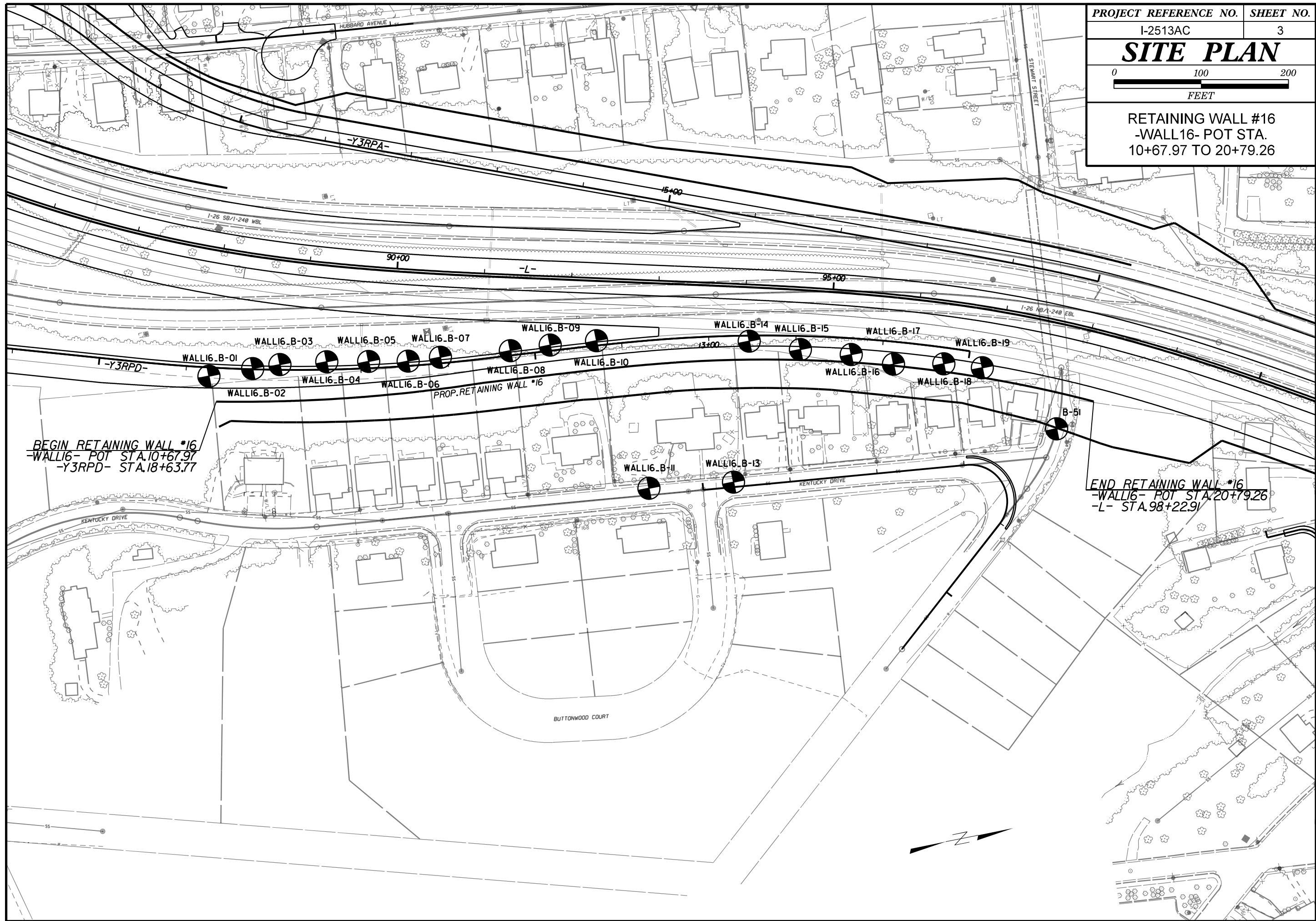
GEOTECHNICAL ENGINEERING UNIT

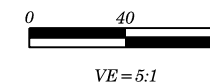
SUBSURFACE INVESTIGATION

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 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												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.																									
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			NON-CRYSTALLINE ROCK (NCR)		COASTAL PLAIN SEDIMENTARY ROCK (CP)																													
SYMBOL																																															
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX 10 MX	51 MN 10 MX	35 MX 35 MX	35 MX 35 MX	35 MX 35 MX	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN		GRANULAR SOILS		SILT-CLAY SOILS		MUCK, PEAT																															
MATERIAL PASSING #40 LL PI	— 6 MX		— NP		40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS																																	
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		SILT SOILS		CLAYEY SOILS																																						
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD						FAIR TO POOR						FAIR TO POOR		POOR		UNSATISFACTORY																														
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30																																															
CONSISTENCY OR DENSENESS												MISCELLANEOUS SYMBOLS												ROCK HARDNESS												FRACTURE SPACING											
PRIMARY SOIL TYPE		COMPACTNESS OR CONSISTENCY		RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)				RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)				ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION		25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES		SLOPE INDICATOR INSTALLATION		SEVERE (SEV.)		VERY SEVERE (V SEV.)		COMPLETE		VERY HARD		HARD		MODERATELY HARD		MEDIUM HARD		SOFT		VERY SOFT													
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				SOIL SYMBOL		TEST BORING		CONE PENETROMETER TEST		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		ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF		ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.		CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.		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.		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.		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.		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.													
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				INFERRED SOIL BOUNDARY		CORE BORING		SOUNDING ROD		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		ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF		ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.		CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.		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.		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.		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.		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												RECOMMENDATION SYMBOLS												ROCK HARDNESS												FRACTURE SPACING											
U.S. STD. SIEVE SIZE OPENING (MM)		4 4.76		10 2.00		40 0.42		60 0.25		200 0.075		270 0.053		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		SHALLOW UNDERCUT		UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK		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															
BOULDER (BLDR.)		COBBLE (COB.)		GRAVEL (GR.)		COARSE SAND (CSE, SD.)		FINE SAND (F SD.)		SILT (SL.)		CLAY (CL.)		SHALLOW UNDERCUT		UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK		UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK		UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL		SHALLOW UNDERCUT		UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK		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															
GRAIN SIZE		305 12		75 3		2.0		0.25		0.05		0.005		SHALLOW UNDERCUT		UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK		UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK		UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL		SHALLOW UNDERCUT		UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK		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															
SOIL MOISTURE - CORRELATION OF TERMS												ABBREVIATIONS												ROCK HARDNESS												FRACTURE SPACING											
SOIL MOISTURE SCALE (ATTERBERG LIMITS)		FIELD MOISTURE DESCRIPTION		GUIDE FOR FIELD MOISTURE DESCRIPTION								AR - AUGER REFUSAL		MED. - MEDIUM MICA. - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST		VST - VANE SHEAR TEST		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT															
LL - LIQUID LIMIT		SATURATED - (SAT.)		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								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		VST - VANE SHEAR TEST		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT																	
PL - PLASTIC LIMIT		WET - (W)		SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE								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		VST - VANE SHEAR TEST		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT																	
OM - OPTIMUM MOISTURE SHRINKAGE LIMIT		MOIST - (M)		SOLID; AT OR NEAR OPTIMUM MOISTURE								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		VST - VANE SHEAR TEST		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT																	
SL - SHRINKAGE LIMIT		DRY - (D)		REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE								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		VST - VANE SHEAR TEST		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT		WEA. - WEATHERED UNIT WEIGHT																	
PLASTICITY												EQUIPMENT USED ON SUBJECT PROJECT												ROCK HARDNESS												FRACTURE SPACING											
NON PLASTIC		SLIGHTLY PLASTIC		MODERATELY PLASTIC		HIGHLY PLASTIC		PLASTICITY INDEX (PI)				DRY STRENGTH				DRILL UNITS:		ADVANCING TOOLS:		HAMMER TYPE:		CORE SIZE:		HAND TOOLS:		FRIABLE		MODERATELY INDURATED		INDURATED		EXTREMELY INDURATED															
0-5		6-15		16-25		26 OR MORE		VERY LOW SLIGHT MEDIUM HIGH				CME-45B		CLAY BITS		CLAY BITS		AUTOMATIC		8		POST HOLE DIGGER		RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.		GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.		GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.		SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																	
SLIGHTLY PLASTIC		MODERATELY PLASTIC		HIGHLY PLASTIC		26 OR MORE		VERY LOW SLIGHT MEDIUM HIGH				CME-75		6" CONTINUOUS FLIGHT AUGER		6" HOLLOW AUGERS		AUTOMATIC		8		POST HOLE DIGGER		RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.		GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.		GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.		SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																	
SLIGHTLY PLASTIC		MODERATELY PLASTIC		HIGHLY PLASTIC		26 OR MORE		VERY LOW SLIGHT MEDIUM HIGH				CME-550		HARD FACED FINGER BITS		HARD FACED FINGER BITS		AUTOMATIC		8		POST HOLE DIGGER		RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.		GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.		GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.		SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																	
SLIGHTLY PLASTIC		MODERATELY PLASTIC		HIGHLY PLASTIC		26 OR MORE		VERY LOW SLIGHT MEDIUM HIGH				VANE SHEAR TEST		TUNG.-CARBIDE INSERTS		TUNG.-CARBIDE INSERTS		AUTOMATIC		8		POST HOLE DIGGER		RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.		GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.		GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.		SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																	
SLIGHTLY PLASTIC		MODERATELY PLASTIC		HIGHLY PLASTIC		26 OR MORE		VERY LOW SLIGHT MEDIUM HIGH				PORTABLE HOIST		CASING		CASING		AUTOMATIC		8		POST HOLE DIGGER		RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.		GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.		GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.		SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																	
SLIGHTLY PLASTIC		MODERATELY PLASTIC		HIGHLY PLASTIC		26 OR MORE		VERY LOW SLIGHT MEDIUM HIGH				DIEDRICH D50		TRICONE		TRICONE		AUTOMATIC		8		POST HOLE DIGGER		RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.		GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.		GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.		SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																	
SLIGHTLY PLASTIC		MODERATELY PLASTIC		HIGHLY PLASTIC		26 OR MORE		VERY LOW SLIGHT MEDIUM HIGH						CORE BIT		CORE BIT		AUTOMATIC		8		POST HOLE DIGGER		RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.		GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.		GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.		SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																	
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.																																															

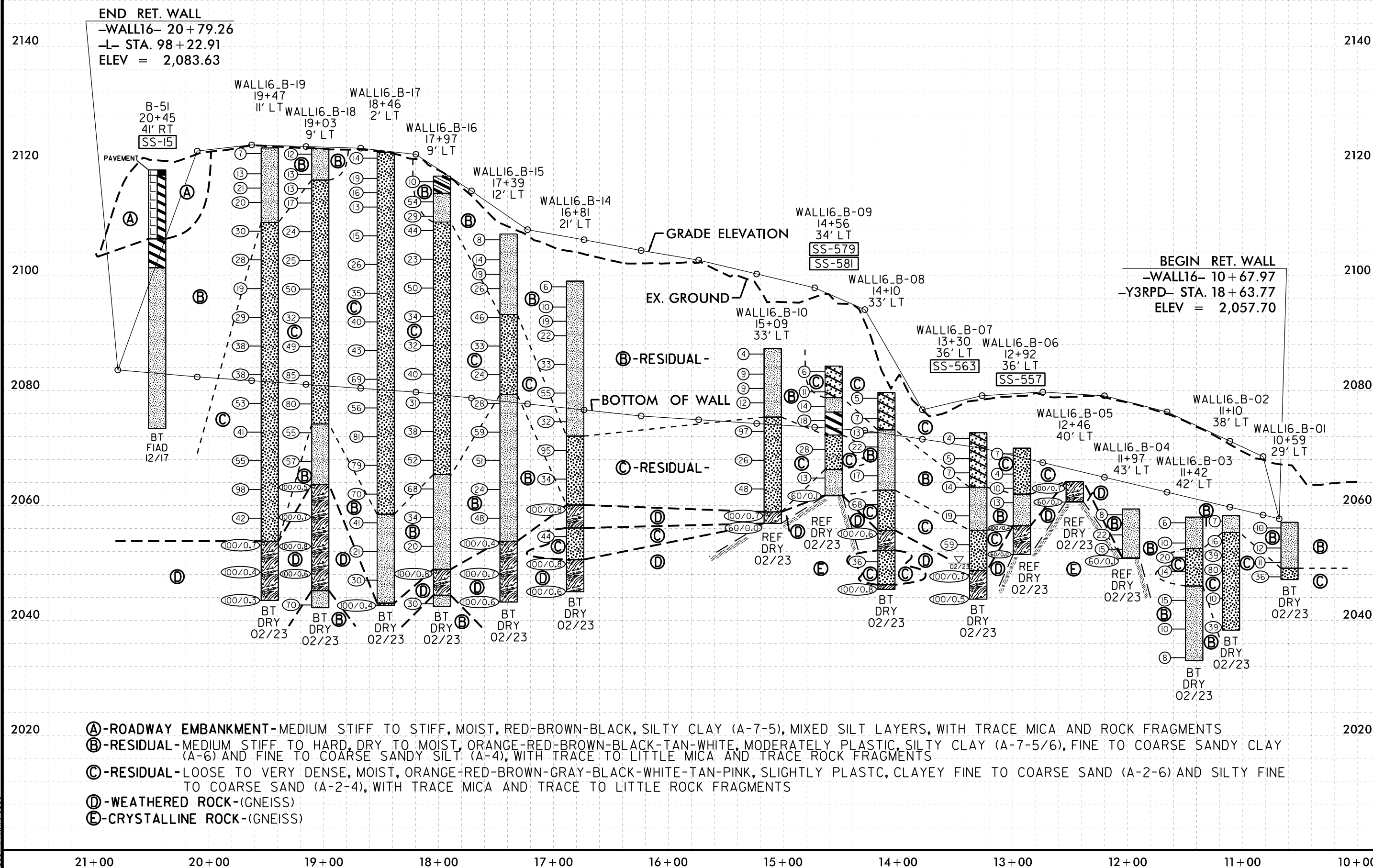
PROJECT REFERENCE NO.	SHEET NO.
I-2513AC	3
SITE PLAN	
0 100 200 FEET	
RETAINING WALL #16 -WALL16- POT STA. 10+67.97 TO 20+79.26	





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

-WALL16-



5/14/99

Structures\CADD_GEOTECH\Site&Sub\I25I3AC_GEO_RWAL16_PFI.dgn

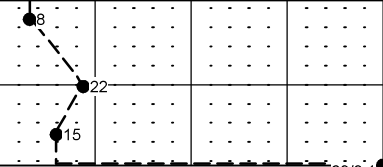
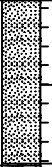
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NCDOT BORE DOUBLE I2513AC GEO GTM.GPJ NC DOT.GDT 8/13/24

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-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.	MOI	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		2,055.3 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		
	2,044.8	13.5	10	4	6							M		
2045														
2040	2,039.8	18.5	16	23	16							M		2,038.3 Boring Terminated at Elevation 2,038.3 ft In Residual Silty SAND (A-2-4) 20.0
														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												2,058.0	0.0	
2055	2,054.5	3.5	2	3	3	6	.	.	.	.	M			GROUND SURFACE		
	2,054.5	3.5	3	5	5	10	.	.	.	.	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	20	.	.	.	.	M			2,052.5	5.5	
2050	2,049.5	8.5	5	7	7	14	.	.	.	.	M			Medium Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4), with trace mica		
											M			2,046.0	12.0	
2045	2,044.5	13.5	6	7	8	15	.	.	.	.	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	10	.	.	.	.	M					
2035	2,034.5	23.5	2	3	5	8	.	.	.	.	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.	

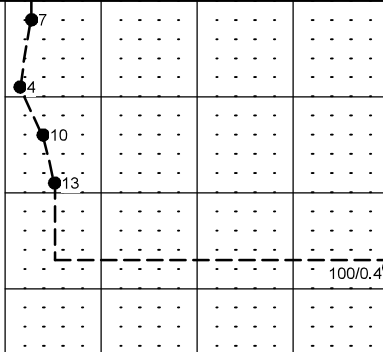
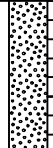
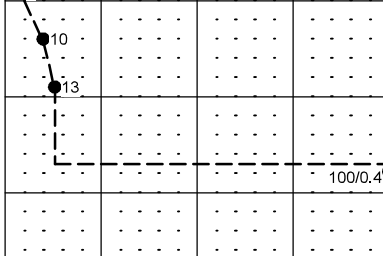
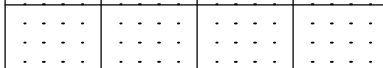
WBS 34165.1.13			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST A. Blackmore							
SITE DESCRIPTION RETAINING WALL NO. 16, -Y3RPD- STA. 18+63.77 TO -L- STA. 98+22.91									GROUND WTR (ft)							
BORING NO. WALL16_B-04			STATION 11+97			OFFSET 43 ft LT			ALIGNMENT -WALL16-			0 HR.	Dry			
COLLAR ELEV. 2,059.4 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		RESIDUAL Medium Stiff to Very Stiff, Brown-Black, Fine to Coarse Sandy SILT (A-4), with trace mica and rock fragments		
2055	2,053.4	6.0	6	8	7							M				
	2,050.9	8.5	60/0.1			60/0.1						M				
														2,050.9	CRYSTALLINE ROCK (GNEISS)	8.5
														2,050.8	Boring Terminated with Standard Penetration Test Refusal at Elevation 2,050.8 ft In Crystalline Rock (GNEISS)	8.6
															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

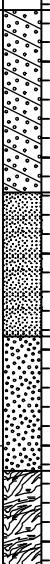
GEOTECHNICAL BORING REPORT

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							M		2,070.0	GROUND SURFACE	0.0		
	2,066.5	3.5																RESIDUAL Loose, Brown-Red, Silty Fine to Coarse SAND (A-2-4)
2065	2,064.0	6.0	3	2	2											SS-557	18%	
	2,061.5	8.5	4	4	6												M	
2060			6	5	8							M		Stiff, Brown-Black, Fine to Coarse Sandy SILT (A-4), with trace mica				
	2,056.5	13.5																
2055			100/0.4											WEATHERED ROCK Brown (GNEISS)				
	2,051.5	18.5																
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		Stiff to Very Stiff, Brown-Black, Fine to Coarse Sandy SILT (A-4), with little mica and trace rock fragments
2060	2,059.2	13.5	8	9	10	19						M	2,055.7	17.0
	2,054.2	18.5	12	31	28	59						M		Very Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4), with little rock fragments
2050	2,049.2	23.5	11	52	48/0.2								2,048.7	24.0
	2,044.2	28.5								100/0.7				WEATHERED ROCK Brown (GNEISS)
2045													2,043.7	29.0
			100/0.5							100/0.5				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													2,073.2	6.5
2075	2,073.7	6.0	4	5	8														
	2,071.2	8.5	7	9	13														
2070	2,066.2	13.5	8	8	9														
	2,061.2	18.5	17	23	45														
2065	2,056.2	23.5	12	28	72/0.1														
	2,051.2	28.5	21	19	17														
2060	2,046.2	33.5	33	67/0.3															

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	2,075.8	8.5												Very Stiff, Red-Brown, Moderately Plastic Silty CLAY (A-7-6(6))		
	2,070.8	13.5	9	10	18							M		2,072.3	12.0	
2065	2,070.8	13.5												Medium Dense, Tan-Brown, Silty Fine to Coarse SAND (A-2-4)		
	2,065.8	18.5	5	5	8							M		2,066.3	18.0	
	2,065.8	18.5												Stiff, Red-Brown, Fine to Coarse Sandy SILT (A-4)		
	2,061.8	22.5												2,061.8	22.5	
		60/0.1												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												
2085			3	2	2							M		2,087.4 GROUND SURFACE 0.0
	2,083.9	3.5												
	2,083.9	3.5	4	4	5							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												
2080			4	5	4							M		
	2,078.9	8.5												
	2,078.9	8.5	5	6	6							M		
2075														
	2,073.9	13.5	15	47	50							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							M		
2065														
	2,063.9	23.5	18	19	29							M		
2060														
	2,058.9	28.5	11	89/0.2										2,058.9 28.5
	2,056.9	30.5												
			60/0.0											2,056.9 WEATHERED ROCK Brown-Gray (GNEISS) 30.5
														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.

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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	5	4	4									2,113.0	0.0
2110	2,109.5	3.5	3	4	5							M		2,112.2	0.8
	2,107.0	6.0	3	5	6							M			
2105	2,104.5	8.5	4	5	5							M			
												M			
2100	2,099.5	13.5	3	7	8							M			
												M			
2095	2,094.5	18.5	15	22	18							M		2,095.0	18.0
2090	2,089.5	23.5	38	52	48/0.2									2,089.0	24.0
2085	2,084.5	28.5	61	39/0.3											
2080	2,079.5	33.5	100/0.4											2,077.7	35.3
	2,077.7	35.3	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									GROUND SURFACE 2,113.8 0.0
2110	2,110.3	3.5	4	19	24									ROADWAY EMBANKMENT 2,113.1 0.7
	2,107.8	6.0	13	31	48									RESIDUAL
2105	2,105.3	8.5	14	12	13									Medium Dense to Very Dense, Brown-Black-Gray-Tan, Silty Fine to Coarse SAND (A-2-4), with trace mica
2100	2,100.3	13.5	11	21	19									
2095	2,095.3	18.5	100/0.3											WEATHERED ROCK 2,095.3 18.5
	2,092.1	21.7	60/0.1											CRYSTALLINE ROCK 2,092.1 21.7
														Gray (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 I2513AC_GEO_GTM.GPJ NC_DOT.GDT 8/13/24

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

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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										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

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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-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	Boring Terminated at Elevation 2,043.5 ft In Weathered Rock (GNEISS)	
			100/0.3								100/0.3						

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																
2115	2,117.4	1.0	8	9	6									2,118.4 PAVEMENT SURFACE 0.0		
	2,114.9	3.5	3	2	3								M	2,117.5 PAVEMENT 0.9		
2110	2,112.4	6.0	2	2	3								M	ROADWAY EMBANKMENT RED-BROWN, BROWN, AND BLACK, SILTY CLAY, TRACE MICA, TRACE ROCK FRAGMENTS, MIXED SILT LAYERS		
	2,109.9	8.5	3	3	3								M			
2105	2,104.9	13.5	7	7	8								M	2,106.4	12.0	
2100	2,099.9	18.5	3	4	4								SS-15	17%	RESIDUAL RED-BROWN, SILTY CLAY, TRACE MICA	
	2,094.9	23.5	12	15	24								M	2,101.4	17.0	
2095	2,089.9	28.5	12	19	28								M	RED-BROWN, BROWN, AND BLACK, FINE TO COARSE SANDY SILT, TRACE TO LITTLE MICA, TRACE QUARTZ FRAGMENTS		
2090	2,084.9	33.5	13	14	21								M			
2085	2,079.9	38.5	14	34	39								M			
2080	2,074.9	43.5	20	36	38								D			
2075													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																

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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.