

REFERENCE: U-5824

PROJECT: 44395

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-6	BORE LOGS

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY FORSYTH  
 PROJECT DESCRIPTION NC 66 (OLD HOLLOW ROAD)  
WIDENING FROM HARLEY DRIVE TO US 158

SITE DESCRIPTION RETAINING WALL ALONG -L-  
-RET WALL 100T- STA = 100+08.65 - 101+00.00 (CL)  
-L- STA = 100+08.65 - 101+00.00 (51.25' - 50.25' RT)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5824	1	6

**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 MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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

PERSONNEL

M. SHIPMAN, EI

H. FISCHER, GIT

M.G. MOSELEY

J. MOSELEY

INVESTIGATED BY B. SMITH, PG

DRAWN BY B. SMITH, PG

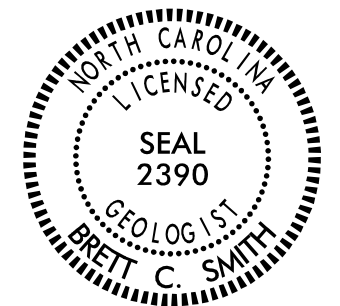
CHECKED BY B. WORLEY, PG

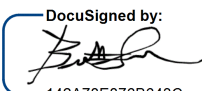
SUBMITTED BY B. SMITH, PG

DATE JULY, 2022

Prepared in the Office of:

 **SUMMIT** DESIGN AND ENGINEERING SERVICES  
 2715 Ashton Drive, Ste 104  
 Wilmington, NC 28412  
 Phone: (910) 475-1208  
 www.summitde.com  
 FIRM NO. P-0339 and C-487



DocuSigned by:  
  
 142A78E878B643C...  
 SIGNATURE DATE 2/10/2023

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

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

## SUBSURFACE INVESTIGATION

### SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

**SOIL DESCRIPTION**  
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 208, 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			
	A-1	A-3	A-2	A-2-6	A-2-7	A-4	A-5	A-6	A-7		A-1, A-2	A-4, A-5	A-6, A-7
GROUP CLASS.	A-1-a	A-1-b	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-4, A-5	A-6, A-7
SYMBOL	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX 35 MX	35 MX 35 MX	36 MN 36 MX	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 41 MN 10 MX 11 MN	40 MX 41 MN 11 MN 11 MN	40 MX 41 MN 11 MN 11 MN	40 MX 41 MN 11 MN 11 MN	40 MX 41 MN 11 MN 11 MN	40 MX 41 MN 11 MN 11 MN	40 MX 41 MN 11 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	HIGHLY ORGANIC SOILS		
GROUP INDEX	0	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX				
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS								
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD						FAIR TO POOR			FAIR TO POOR	POOR	UNSATURABLE	
	PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30												

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

TEXTURE OR GRAIN SIZE						
U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270
	4.75	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.)
GRAIN SIZE	MM	305	75	2.0	0.25	0.05
	IN.	12	3			0.005

SOIL MOISTURE - CORRELATION OF TERMS		
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
PL - PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM - OPTIMUM MOISTURE SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY		
NON PLASTIC	PLASTICITY INDEX (PI) 0-5	DRY STRENGTH VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH
COLOR		
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		

**GRADATION**  
**WELL GRADED** - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.  
**UNIFORMLY GRADED** - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.  
**GAP-GRADED** - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

**ANGULARITY OF GRAINS**  
THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

**MINERALOGICAL COMPOSITION**  
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

**COMPRESSIBILITY**  
SLIGHTLY COMPRESSIBLE LL < 31  
MODERATELY COMPRESSIBLE LL = 31 - 50  
HIGHLY COMPRESSIBLE LL > 50

PERCENTAGE OF MATERIAL			
ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE
GROUND WATER			
[Symbol]	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING		
[Symbol]	STATIC WATER LEVEL AFTER 24 HOURS		
[Symbol]	PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA		
[Symbol]	SPRING OR SEEP		

**MISCELLANEOUS SYMBOLS**

[Symbol]	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION	[Symbol]	DIP & DIP DIRECTION OF ROCK STRUCTURES
[Symbol]	SOIL SYMBOL	[Symbol]	TEST BORING
[Symbol]	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT	[Symbol]	AUGER BORING
[Symbol]	INFERRED SOIL BOUNDARY	[Symbol]	CORE BORING
[Symbol]	INFERRED ROCK LINE	[Symbol]	MONITORING WELL
[Symbol]	ALLUVIAL SOIL BOUNDARY	[Symbol]	PIEZOMETER INSTALLATION
[Symbol]		[Symbol]	SLOPE INDICATOR INSTALLATION
[Symbol]		[Symbol]	CONE PENETROMETER TEST
[Symbol]		[Symbol]	SOUNDING ROD
[Symbol]		[Symbol]	TEST BORING WITH CORE
[Symbol]		[Symbol]	SPT N-VALUE

**RECOMMENDATION SYMBOLS**

[Symbol]	UNDERCUT	[Symbol]	UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE	[Symbol]	UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL
[Symbol]	SHALLOW UNDERCUT	[Symbol]	UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK		

**ABBREVIATIONS**

AR - AUGER REFUSAL	MED. - MEDIUM	VST - VANE SHEAR TEST
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	<b>SAMPLE ABBREVIATIONS</b>
DPT - 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. - SILTY, SILTY	RS - ROCK
FOSS. - FOSSILIFEROUS	SLI. - SLIGHTLY	RT - RECOMPACTED TRIAXIAL
FRAC. - FRACTURED, FRACTURES	TCR - TRICONE REFUSAL	CBR - CALIFORNIA BEARING RATIO
FRAGS. - FRAGMENTS	w - MOISTURE CONTENT	
HI. - HIGHLY	V - VERY	

**EQUIPMENT USED ON SUBJECT PROJECT**

DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:
<input type="checkbox"/> CME-45C	<input type="checkbox"/> CLAY BITS	<input type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL
<input type="checkbox"/> CME-55	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER	CORE SIZE:
<input type="checkbox"/> CME-550X	<input type="checkbox"/> 3.25" HOLLOW STEM AUGERS	<input type="checkbox"/> -B <input type="checkbox"/> -H
<input type="checkbox"/> VANE SHEAR TEST	<input type="checkbox"/> HARD FACED FINGER BITS	<input type="checkbox"/> -N
<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> TUNG-CARBIDE INSERTS	HAND TOOLS:
<input type="checkbox"/>	<input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER	<input type="checkbox"/> POST HOLE DIGGER
<input type="checkbox"/>	<input type="checkbox"/> TRICONE _____ *STEEL TEETH	<input checked="" type="checkbox"/> HAND AUGER
<input type="checkbox"/>	<input type="checkbox"/> TRICONE _____ *TUNG-CARB.	<input type="checkbox"/> SOUNDING ROD
<input type="checkbox"/>	<input type="checkbox"/> CORE BIT	<input type="checkbox"/> VANE SHEAR TEST
<input type="checkbox"/>		

**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 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 (IV 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 (IV 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 GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROUDED 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		BEDDING	
TERM	SPACING	TERM	THICKNESS
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET
VERY CLOSE	LESS THAN 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 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.

BENCH MARK: N/A		
ELEVATIONS OBTAINED FROM THE TIN FILE		
(U5824_LS_DTM_TIN_DOT_2022-01-10.tin)	ELEVATION: N/A	FEET

**NOTES:**  
MnO = MANGANESE OXIDE

VE = VERTICAL EXAGGERATION  
A PRELIMINARY RETAINING WALL ENVELOPE WAS DRAWN AT I:IVE USING THE ROADWAY PROFILE FILE (U5824.Rdy.pfi) AS A GUIDE. IT SHOULD BE NOTED THAT THIS IS NOT AN OFFICIAL RETAINING WALL ENVELOPE. SUMMIT ELECTED TO DRAW THE WALL AT A I:IVE TO BETTER PRESENT THE SUBSURFACE DETAILS ALONG THE LENGTH OF THE WALL PROFILE.

PROJECT REFERENCE NO.	SHEET NO.
U-5824	3
<b>SITE PLAN</b>	
FEET	

BEGIN RETAINING WALL  
 -RET WALL 100T - STA = 100+08.65 (CL)  
 -L- STA = 100+08.65 (51.25'RT)

US 158 (REIDSVILLE ROAD)

NC 66 (OLD HOLLOW ROAD)

BL-15

RWAL 10009

RWAL 10050

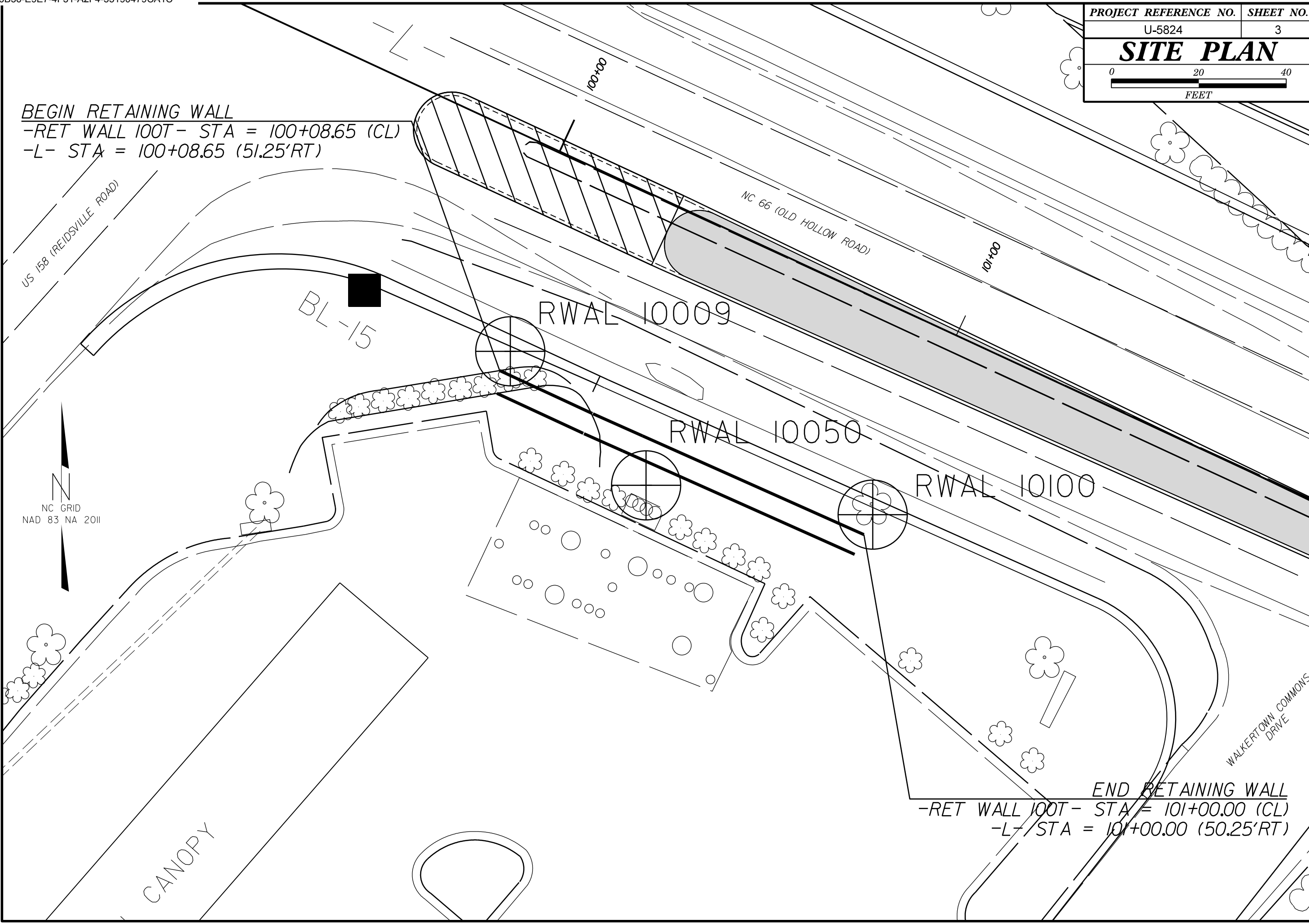
RWAL 10100

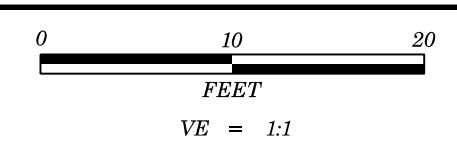


CANOPY

WALKERTOWN COMMONS DRIVE

END RETAINING WALL  
 -RET WALL 100T - STA = 101+00.00 (CL)  
 -L- STA = 101+00.00 (50.25'RT)





<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
U-5824	4
<b>RETAINING WALL PROFILE</b>	

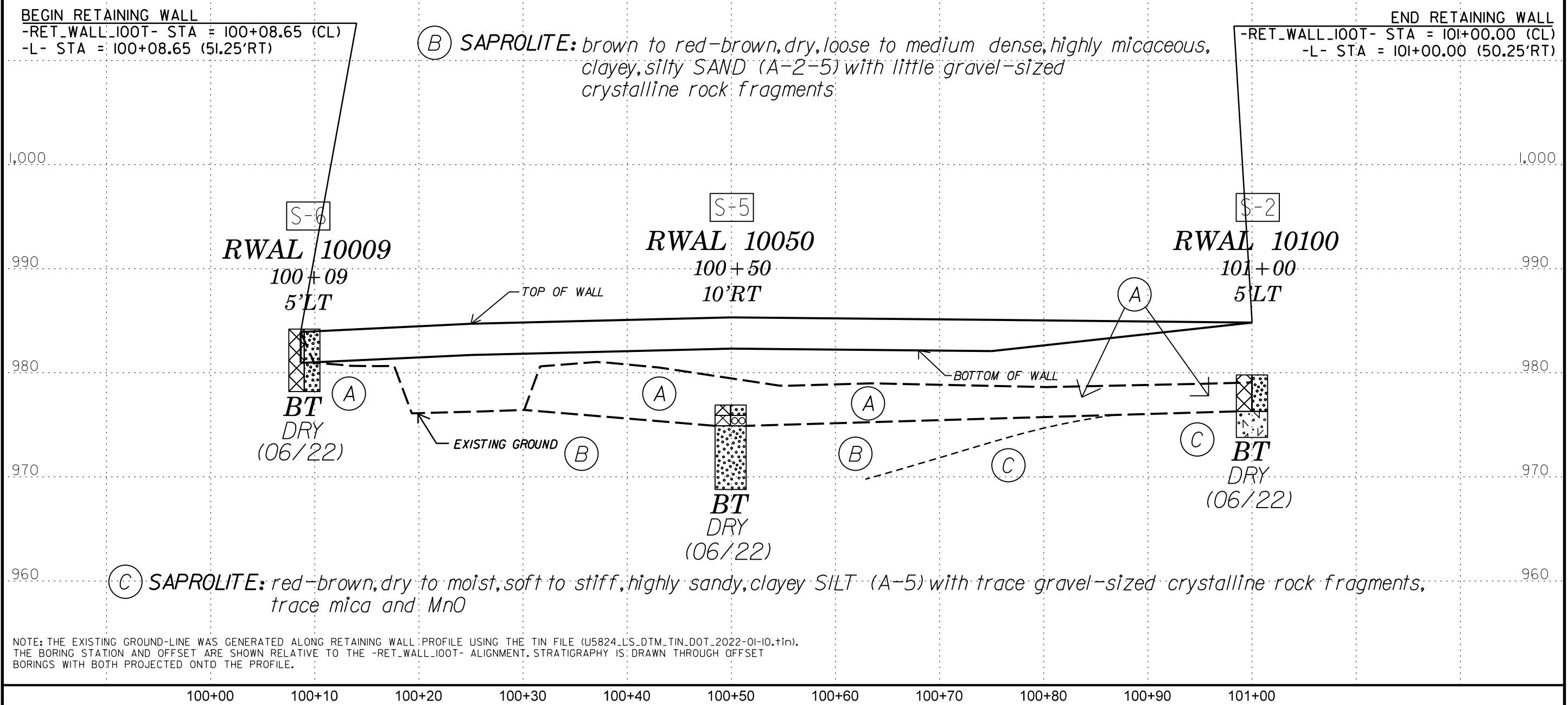
# PRELIMINARY RETAINING WALL ENVELOPE

NOTE: THE WALL ENVELOPE PRESENTED DOES NOT ACCURATELY DEPICT THE PROPOSED FACE OF THE WALL

SOIL TEST RESULTS															
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		
S-6	5'LT	100+09	3.5' - 4.5'	A-2-5(3)	50	3	33.1	31.5	13.3	22.1	81	65	34	15.4	N/A
S-5	10'RT	100+50	2.0' - 3.0'	A-2-5(0)	51	4	37.8	35.4	11.6	15.2	68	54	22	17.2	N/A
S-2	5'LT	101+00	4.0' - 5.0'	A-5(2)	52	7	31.4	27.3	11.8	29.5	96	77	45	21.3	N/A

(A) **ARTIFICIAL FILL:** brown to red-brown, dry to moist, very loose to medium dense, clayey, silty SAND (A-2-5) and fine to coarse SAND (A-1-b) with some to little gravel, little to trace mica, and trace trash (plastic)

(B) **SAPROLITE:** brown to red-brown, dry, loose to medium dense, highly micaceous, clayey, silty SAND (A-2-5) with little gravel-sized crystalline rock fragments



(C) **SAPROLITE:** red-brown, dry to moist, soft to stiff, highly sandy, clayey SILT (A-5) with trace gravel-sized crystalline rock fragments, trace mica and MnO

NOTE: THE EXISTING GROUND-LINE WAS GENERATED ALONG RETAINING WALL PROFILE USING THE TIN FILE (U5824.LS.DTM.TIN.DOT.2022-01-10.tin). THE BORING STATION AND OFFSET ARE SHOWN RELATIVE TO THE -RET\_WALL\_I00T- ALIGNMENT. STRATIGRAPHY IS DRAWN THROUGH OFFSET BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Shipman, M.											
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)										
BORING NO. RWAL_10009		STATION 100+09		OFFSET 5 ft LT		ALIGNMENT RET_WALL_100											
COLLAR ELEV. 984.2 ft		TOTAL DEPTH 6.0 ft		NORTHING 880,805		EASTING 1,664,382											
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Hand Auger		HAMMER TYPE N/A											
DRILLER Fischer, H.		START DATE 06/13/22		COMP. DATE 06/13/22		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							
985															984.2	GROUND SURFACE	0.0
980															978.2	<b>ARTIFICIAL FILL</b> brown to red-brown, loose to medium dense, clayey, silty SAND (A-2-5) with little gravel, trace mica, and trace trash (plastic)	6.0
Boring Terminated at Elevation 978.2 ft in Artificial Fill (clayey, silty SAND) - Soil densities estimated. -- Artificial fill likely related to the construction of a nearby gas station and associated retaining wall.																	

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Shipman, M.											
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)										
BORING NO. RWAL_10050		STATION 100+50		OFFSET 5 ft RT		ALIGNMENT RET_WALL_100											
COLLAR ELEV. 976.9 ft		TOTAL DEPTH 8.1 ft		NORTHING 880,774		EASTING 1,664,413											
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Hand Auger		HAMMER TYPE N/A											
DRILLER Fischer, H.		START DATE 06/13/22		COMP. DATE 06/13/22		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							
980															976.9	GROUND SURFACE	0.0
975															974.9	<b>ARTIFICIAL FILL</b> red-brown, very loose to loose, clayey, silty SAND (A-2-5) with little mica, trace gravel and trash (plastic)	1.0
															974.9	gray, loose to medium dense, fine to coarse SAND (A-1-b) with some gravel	2.0
970															968.8	<b>SAPROLITE</b> brown to red-brown, loose to medium dense, highly micaceous, clayey, silty SAND (A-2-5) with little gravel-sized crystalline rock fragments	8.1
Boring Terminated at Elevation 968.8 ft in Saprolite (clayey, silty SAND) - Soil densities estimated. - Artificial fill likely related to the construction of a nearby gas station and associated retaining wall.																	

NCDOT BORE DOUBLE U5824\_GEO\_RWAL\_100T-100B.GPJ NC\_DOT.GDT 7/21/22

# GEOTECHNICAL BORING REPORT BORE LOG

<b>WBS</b> 44395.1.1		<b>TIP</b> U-5824		<b>COUNTY</b> FORSYTH		<b>GEOLOGIST</b> Shipman, M.											
<b>SITE DESCRIPTION</b> NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							<b>GROUND WTR (ft)</b>										
<b>BORING NO.</b> RWAL_10100		<b>STATION</b> 101+00		<b>OFFSET</b> 5 ft LT		<b>ALIGNMENT</b> RET_WALL_100											
<b>COLLAR ELEV.</b> 979.8 ft		<b>TOTAL DEPTH</b> 6.0 ft		<b>NORTHING</b> 880,767		<b>EASTING</b> 1,664,465											
<b>DRILL RIG/HAMMER EFF./DATE</b> N/A				<b>DRILL METHOD</b> Hand Auger		<b>HAMMER TYPE</b> N/A											
<b>DRILLER</b> Fischer, H.		<b>START DATE</b> 06/13/22		<b>COMP. DATE</b> 06/13/22		<b>SURFACE WATER DEPTH</b> 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)		
980															979.8	0.0	GROUND SURFACE
975												D	21%		976.3	3.5	<b>ARTIFICIAL FILL</b> red-brown, very loose to loose, clayey, silty SAND (A-2-5) with trace gravel, mica, and trash (plastic)
															973.8	6.0	<b>SAPROLITE</b> red-brown, soft to stiff, highly sandy, clayey SILT (A-5) with trace gravel-sized crystalline rock fragments, trace mica and MnO Boring Terminated at Elevation 973.8 ft in Saprolite (clayey SILT)  - Soil densities estimated.  - Artificial fill likely related to the construction of a nearby gas station and associated retaining wall.

NCDOT BORE DOUBLE U5824\_GEO\_RWAL\_100T-100B.GPJ NC\_DOT.GDT 7/21/22

REFERENCE: U-5824

PROJECT: 44395

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-6	BORE LOGS

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY FORSYTH  
 PROJECT DESCRIPTION NC 66 (OLD HOLLOW ROAD)  
WIDENING FROM HARLEY DRIVE TO US 158

SITE DESCRIPTION RETAINING WALL ALONG -L-  
-RET WALL 100B- STA = 100+10.29 - 101+00.00 (CL)  
-L- STA = 100+10.29 - 101+00.00 (56.25' - 55.25' RT)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5824	1	6

**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 MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
- 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

M. SHIPMAN, EI

H. FISCHER, GIT

M.G. MOSELEY

J. MOSELEY

INVESTIGATED BY B. SMITH, PG

DRAWN BY B. SMITH, PG

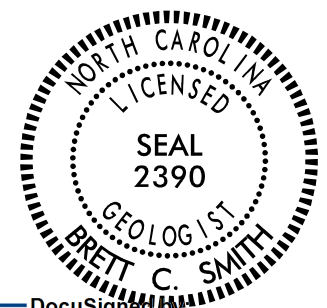
CHECKED BY B. WORLEY, PG

SUBMITTED BY B. SMITH, PG

DATE JULY, 2022

Prepared in the Office of:

**SUMMIT** 2715 Ashton Drive, Ste 104  
 Wilmington, NC 28412  
 Phone: (910) 475-1208  
 www.summitde.com  
DESIGN AND ENGINEERING SERVICES  
 FIRM NO. P-0339 and C-487



DocuSigned by:

*[Signature]*  
 2/10/2023  
 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**

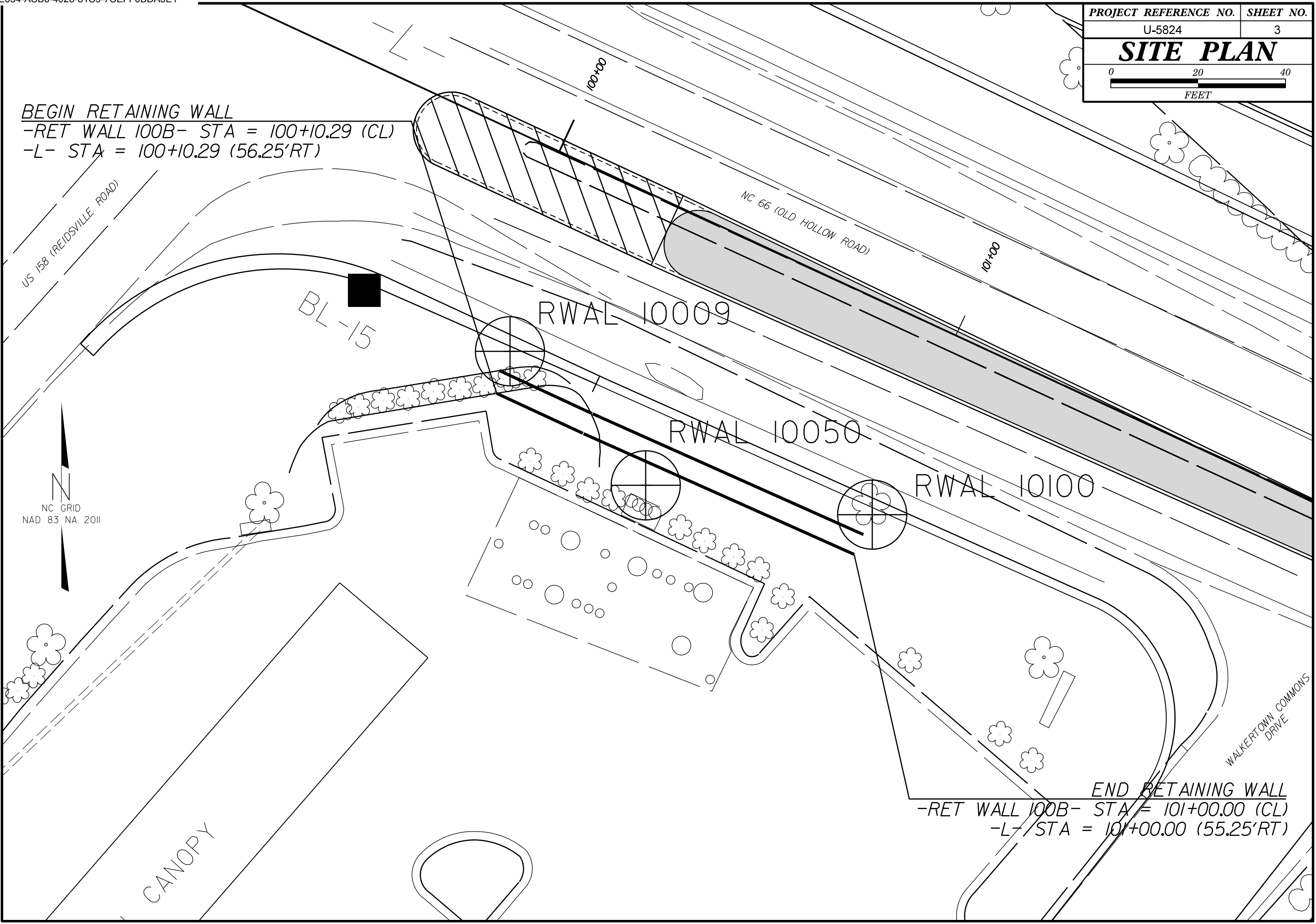
Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. Includes sub-sections like SOIL LEGEND AND AASHTO CLASSIFICATION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS.

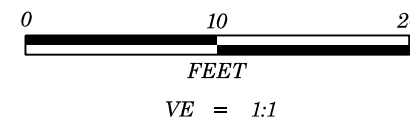


PROJECT REFERENCE NO.	SHEET NO.
U-5824	3
<b>SITE PLAN</b>	
FEET	

**BEGIN RETAINING WALL**  
 -RET WALL 100B- STA = 100+10.29 (CL)  
 -L- STA = 100+10.29 (56.25'RT)

**END RETAINING WALL**  
 -RET WALL 100B- STA = 101+00.00 (CL)  
 -L- STA = 101+00.00 (55.25'RT)





<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
U-5824	4
<b>RETAINING WALL PROFILE</b>	

# PRELIMINARY RETAINING WALL ENVELOPE

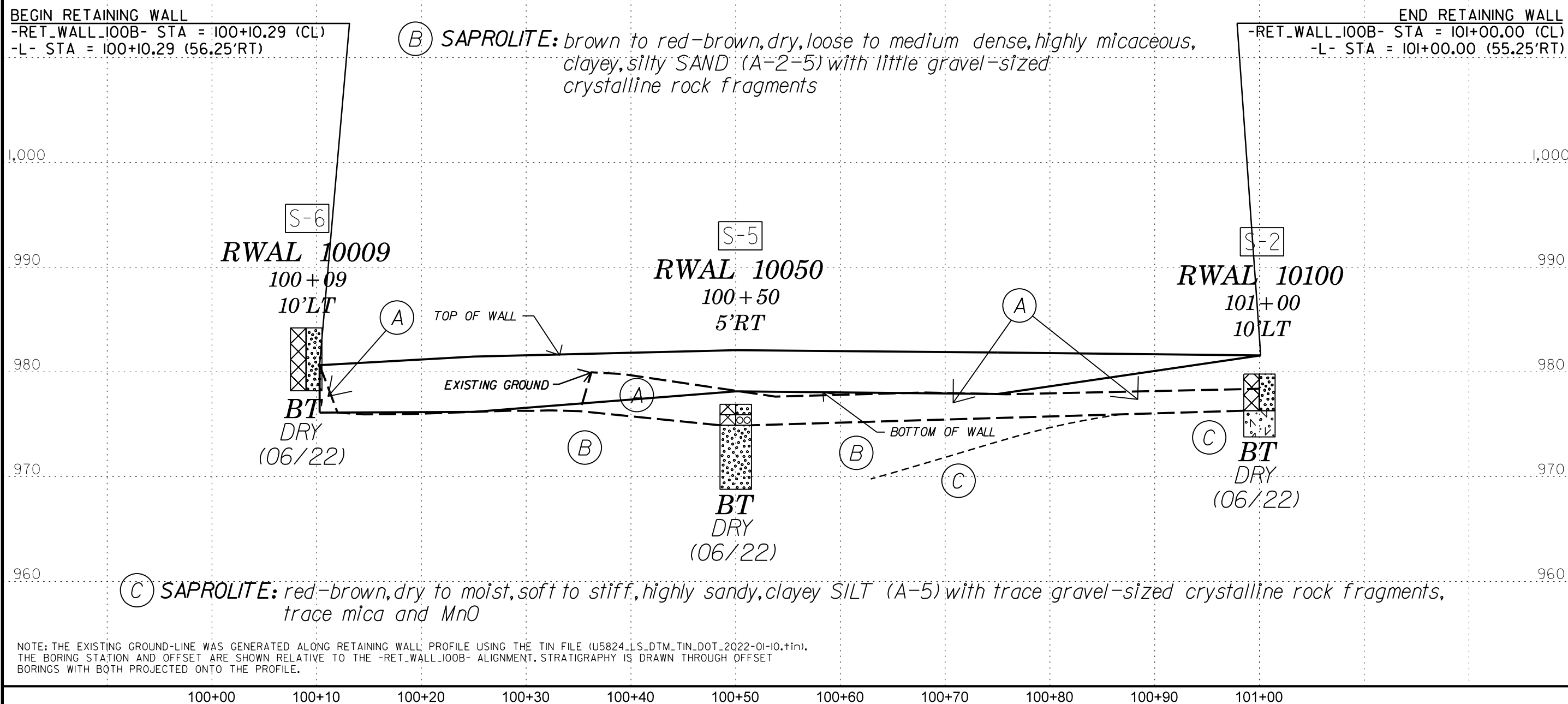
NOTE: THE WALL ENVELOPE PRESENTED DOES NOT ACCURATELY DEPICT THE PROPOSED FACE OF THE WALL

SOIL TEST RESULTS															
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		
S-6	10'LT	100+09	3.5' - 4.5'	A-2-5(3)	50	3	33.1	31.5	13.3	22.1	81	65	34	15.4	NA
S-5	5'RT	100+50	2.0' - 3.0'	A-2-5(0)	51	4	37.8	35.4	11.6	15.2	68	54	22	17.2	NA
S-2	10'LT	101+00	4.0' - 5.0'	A-5(2)	52	7	31.4	27.3	11.8	29.5	96	77	45	21.3	NA

Ⓐ **ARTIFICIAL FILL:** brown to red-brown, dry to moist, very loose to medium dense, clayey, silty SAND (A-2-5) and fine to coarse SAND (A-1-b) with some to little gravel, little to trace mica, and trace trash (plastic)

Ⓑ **SAPROLITE:** brown to red-brown, dry, loose to medium dense, highly micaceous, clayey, silty SAND (A-2-5) with little gravel-sized crystalline rock fragments

Ⓒ **SAPROLITE:** red-brown, dry to moist, soft to stiff, highly sandy, clayey SILT (A-5) with trace gravel-sized crystalline rock fragments, trace mica and MnO



NOTE: THE EXISTING GROUND-LINE WAS GENERATED ALONG RETAINING WALL PROFILE USING THE TIN FILE (U5824\_LS\_DTM\_TIN.DOT\_2022-01-10.tin). THE BORING STATION AND OFFSET ARE SHOWN RELATIVE TO THE -RET\_WALL\_100B- ALIGNMENT. STRATIGRAPHY IS DRAWN THROUGH OFFSET BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

100+00    100+10    100+20    100+30    100+40    100+50    100+60    100+70    100+80    100+90    101+00

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Shipman, M.											
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)										
BORING NO. RWAL_10009		STATION 100+09		OFFSET 5 ft LT		ALIGNMENT RET_WALL_100											
COLLAR ELEV. 984.2 ft		TOTAL DEPTH 6.0 ft		NORTHING 880,805		EASTING 1,664,382											
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Hand Auger		HAMMER TYPE N/A											
DRILLER Fischer, H.		START DATE 06/13/22		COMP. DATE 06/13/22		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							
985															984.2	GROUND SURFACE	0.0
980															978.2	<b>ARTIFICIAL FILL</b> brown to red-brown, loose to medium dense, clayey, silty SAND (A-2-5) with little gravel, trace mica, and trace trash (plastic)  Boring Terminated at Elevation 978.2 ft in Artificial Fill (clayey, silty SAND)  - Soil densities estimated.  -- Artificial fill likely related to the construction of a nearby gas station and associated retaining wall.	6.0

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Shipman, M.											
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)										
BORING NO. RWAL_10050		STATION 100+50		OFFSET 5 ft RT		ALIGNMENT RET_WALL_100											
COLLAR ELEV. 976.9 ft		TOTAL DEPTH 8.1 ft		NORTHING 880,774		EASTING 1,664,413											
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Hand Auger		HAMMER TYPE N/A											
DRILLER Fischer, H.		START DATE 06/13/22		COMP. DATE 06/13/22		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							
980															976.9	GROUND SURFACE	0.0
975															974.9	<b>ARTIFICIAL FILL</b> red-brown, very loose to loose, clayey, silty SAND (A-2-5) with little mica, trace gravel and trash (plastic)  gray, loose to medium dense, fine to coarse SAND (A-1-b) with some gravel	2.0
970															968.8	<b>SAPROLITE</b> brown to red-brown, loose to medium dense, highly micaceous, clayey, silty SAND (A-2-5) with little gravel-sized crystalline rock fragments  Boring Terminated at Elevation 968.8 ft in Saprolite (clayey, silty SAND)  - Soil densities estimated.  - Artificial fill likely related to the construction of a nearby gas station and associated retaining wall.	8.1

NCDOT BORE DOUBLE\_U5824\_GEO\_RWAL\_100T-100B.GPJ\_NC\_DOT.GDT 7/21/22

# GEOTECHNICAL BORING REPORT

## BORE LOG

<b>WBS</b> 44395.1.1		<b>TIP</b> U-5824		<b>COUNTY</b> FORSYTH		<b>GEOLOGIST</b> Shipman, M.											
<b>SITE DESCRIPTION</b> NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							<b>GROUND WTR (ft)</b>										
<b>BORING NO.</b> RWAL_10100		<b>STATION</b> 101+00		<b>OFFSET</b> 5 ft LT		<b>ALIGNMENT</b> RET_WALL_100											
<b>COLLAR ELEV.</b> 979.8 ft		<b>TOTAL DEPTH</b> 6.0 ft		<b>NORTHING</b> 880,767		<b>EASTING</b> 1,664,465											
<b>DRILL RIG/HAMMER EFF./DATE</b> N/A				<b>DRILL METHOD</b> Hand Auger		<b>HAMMER TYPE</b> N/A											
<b>DRILLER</b> Fischer, H.		<b>START DATE</b> 06/13/22		<b>COMP. DATE</b> 06/13/22		<b>SURFACE WATER DEPTH</b> 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)		
980															979.8	GROUND SURFACE	0.0
															976.3	<b>ARTIFICIAL FILL</b> red-brown, very loose to loose, clayey, silty SAND (A-2-5) with trace gravel, mica, and trash (plastic)	3.5
975															973.8	<b>SAPROLITE</b> red-brown, soft to stiff, highly sandy, clayey SILT (A-5) with trace gravel-sized crystalline rock fragments, trace mica and MnO Boring Terminated at Elevation 973.8 ft in Saprolite (clayey SILT)  - Soil densities estimated.  - Artificial fill likely related to the construction of a nearby gas station and associated retaining wall.	6.0

NCDOT BORE DOUBLE U5824\_GEO\_RWAL\_100T-100B.GPJ NC\_DOT.GDT 7/21/22

REFERENCE: U-5824

PROJECT: 44395

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4-6	PROFILES
7-10	BORE LOGS

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY FORSYTH  
 PROJECT DESCRIPTION NC 66 (OLD HOLLOW ROAD)  
WIDENING FROM HARLEY DRIVE TO US 158

SITE DESCRIPTION RETAINING WALL ALONG -L-  
-RET WALL 1023- STA = 102+30.00 - 105+58.12 (CL)  
-L- STA = 102+30.00 - 105+50.00 (65.0' - 44.0' RT)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5824	1	10

**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 MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
- 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

M. SHIPMAN, EI

H. FISCHER, GIT

M.G. MOSELEY

J. MOSELEY

INVESTIGATED BY B. SMITH, PG

DRAWN BY B. SMITH, PG

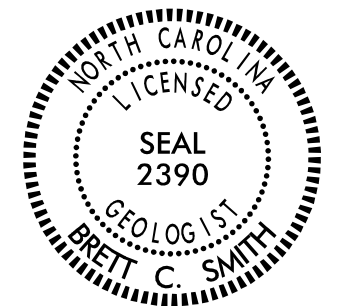
CHECKED BY B. WORLEY, PG

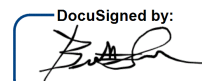
SUBMITTED BY B. SMITH, PG

DATE JULY, 2022

Prepared in the Office of:

**SUMMIT** 2715 Ashton Drive, Ste 104  
 Wilmington, NC 28412  
 Phone: (910) 475-1208  
 www.summitde.com  
DESIGN AND ENGINEERING SERVICES  
 FIRM NO. P-0339 and C-487



DocuSigned by:  
  
 142A78E870B643C...  
 SIGNATURE DATE 2/10/2023

**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

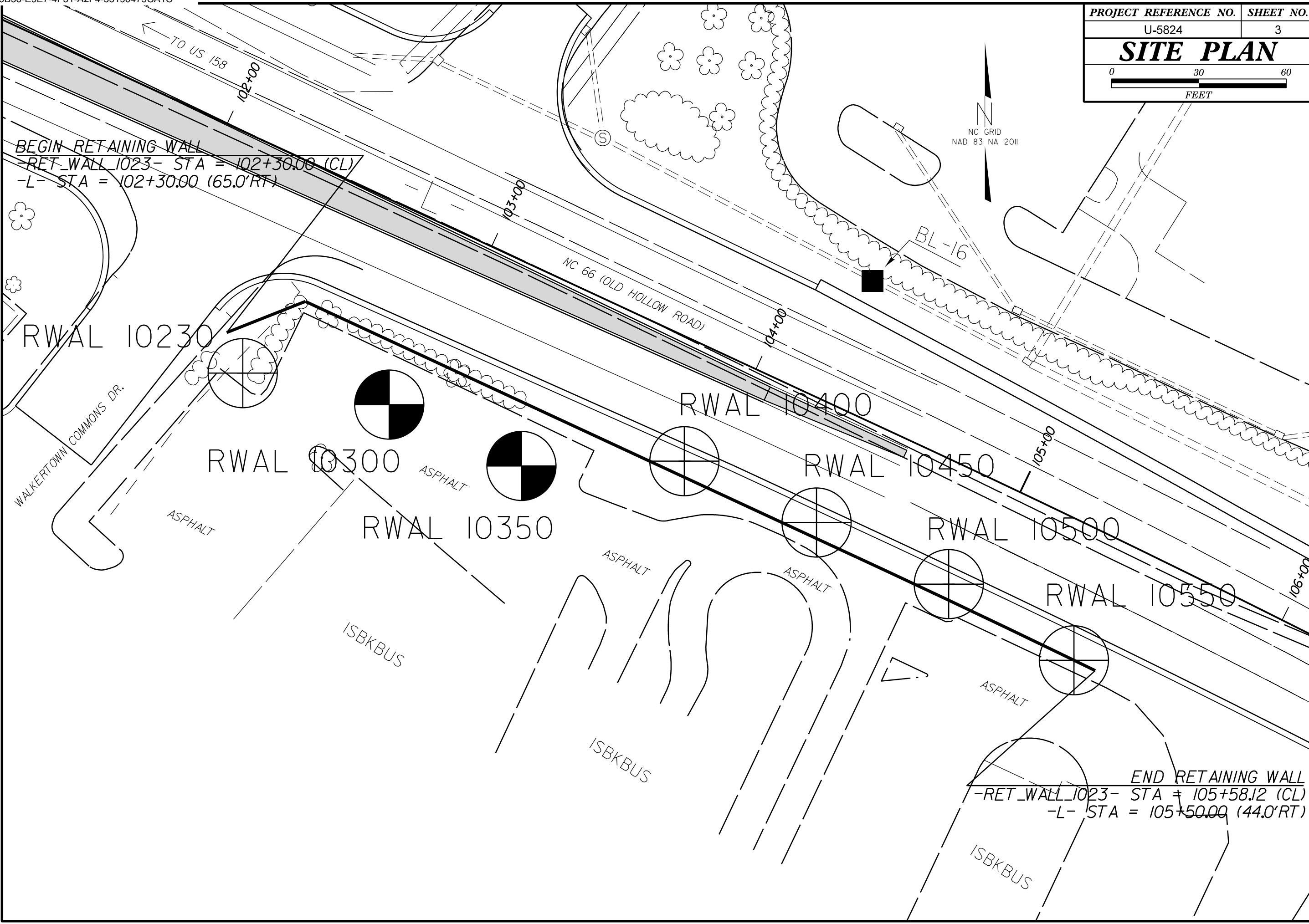
SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																														
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT 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></p>										<p><b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.  <b>UNIFORMLY GRADED</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.  <b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>										<p>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:</p>										<p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.  <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  <b>ARGILLACEOUS</b> - 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.  <b>ARTESIAN</b> - 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.  <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.  <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.  <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.  <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.  <b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.  <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.  <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.  <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.  <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  <b>ROCK QUALITY DESIGNATION (RQD)</b> - 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.  <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.  <b>SILL</b> - 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.  <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.  <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - 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.  <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  <b>STRATA ROCK QUALITY DESIGNATION (SROD)</b> - 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.  <b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																														
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>										<b>ANGULARITY OF GRAINS</b>										<b>WEATHERED ROCK (WR)</b>										<b>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</b>																																																																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="5">GRANULAR MATERIALS (&lt;= 35% PASSING #200)</th> <th colspan="5">SILT-CLAY MATERIALS (&gt; 35% PASSING #200)</th> <th colspan="5">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-7</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> <th colspan="5"></th> </tr> <tr> <th>SYMBOL</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td colspan="5"></td> </tr> <tr> <th>% PASSING #10 #40 #200</th> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td colspan="5"></td> </tr> </table>										GRANULAR MATERIALS (<= 35% PASSING #200)					SILT-CLAY MATERIALS (> 35% PASSING #200)					ORGANIC MATERIALS					GROUP CLASS.	A-1	A-3	A-2	A-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7						SYMBOL																		% PASSING #10 #40 #200	50 30 15	50 30 15	50 30 15	50 30 15	50 30 15	50 30 15	50 30 15	50 30 15	50 30 15	50 30 15	50 30 15	50 30 15						<p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <b>ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</b></p>										<p>CRISTALLINE ROCK (CR)</p> <p>NON-CRYSTALLINE ROCK (NCR)</p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CP)</p>										<p><b>CRISTALLINE ROCK (CR)</b> - FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p> <p><b>NON-CRYSTALLINE ROCK (NCR)</b> - 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.</p> <p><b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b> - COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>									
GRANULAR MATERIALS (<= 35% PASSING #200)					SILT-CLAY MATERIALS (> 35% PASSING #200)					ORGANIC MATERIALS																																																																																																		
GROUP CLASS.	A-1	A-3	A-2	A-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7																																																																																																
SYMBOL																																																																																																												
% PASSING #10 #40 #200	50 30 15	50 30 15	50 30 15	50 30 15	50 30 15	50 30 15	50 30 15	50 30 15	50 30 15	50 30 15	50 30 15	50 30 15																																																																																																
<b>MINERALOGICAL COMPOSITION</b>										<b>COMPRESSION</b>										<b>WEATHERING</b>										<b>WEATHERING</b>																																																																														
<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p>SLIGHTLY COMPRESSIBLE LL &lt; 31                  MODERATELY COMPRESSIBLE LL = 31 - 50                  HIGHLY COMPRESSIBLE LL &gt; 50</p>										<p>FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (IV 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.</p> <p>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.</p> <p>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.</p> <p>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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>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. <i>IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</i></p> <p>VERY SEVERE (IV 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. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</i></p> <p>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.</p>										<p><b>PERCENTAGE OF MATERIAL</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt; 10%</td> <td>&gt; 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table>										ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%	HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE																																																	
ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL																																																																																																									
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%																																																																																																									
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%																																																																																																									
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%																																																																																																									
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE																																																																																																									
<b>GROUND WATER</b>										<b>MISCELLANEOUS SYMBOLS</b>										<b>ROCK HARDNESS</b>										<b>RECOMMENDATION SYMBOLS</b>																																																																														
<p>WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p>STATIC WATER LEVEL AFTER 24 HOURS</p> <p>PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p>SPRING OR SEEP</p>										<p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</p> <p>SOIL SYMBOL</p> <p>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</p> <p>INFERRED SOIL BOUNDARY</p> <p>INFERRED ROCK LINE</p> <p>ALLUVIAL SOIL BOUNDARY</p> <p>DIP &amp; DIP DIRECTION OF ROCK STRUCTURES</p> <p>SPT TEST BORING</p> <p>AUGER BORING</p> <p>CORE BORING</p> <p>MONITORING WELL</p> <p>PIEZOMETER INSTALLATION</p> <p>SLOPE INDICATOR INSTALLATION</p> <p>CONE PENETROMETER TEST</p> <p>SOUNDING ROD</p> <p>TEST BORING WITH CORE</p> <p>SPT N-VALUE</p>										<p>VERY HARD - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>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.</p> <p>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 PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p>SOFT - CAN BE GROOVED 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.</p> <p>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.</p>										<p>UNDERCUT</p> <p>SHALLOW UNDERCUT</p> <p>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</p> <p>UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</p>																																																																														
<b>TEXTURE OR GRAIN SIZE</b>										<b>ABBREVIATIONS</b>										<b>FRACTURE SPACING</b>										<b>BEDDING</b>																																																																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> <tr> <td></td> <td>4.75</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> </table>										U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270		4.75	2.00	0.42	0.25	0.075	0.053	<p>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                  HI. - HIGHLY</p> <p>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</p> <p>VST - VANE SHEAR TEST                  WEA. - WEATHERED                  UG - UNIT WEIGHT                  UG - DRY UNIT WEIGHT</p> <p><b>SAMPLE ABBREVIATIONS</b></p> <p>S - BULK                  SS - SPLIT SPOON                  ST - SHELBY TUBE                  RS - ROCK                  RT - RECOMPACTED TRIAXIAL                  CBR - CALIFORNIA BEARING RATIO</p>										<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TERM</th> <th>SPACING</th> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED</td> <td>&lt; 0.008 FEET</td> </tr> </table>										TERM	SPACING	TERM	THICKNESS	VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET	WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET	MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET	CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET	VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET			THINLY LAMINATED	< 0.008 FEET	<p>NON PLASTIC 0-5 VERY LOW                  SLIGHTLY PLASTIC 6-15 SLIGHT                  MODERATELY PLASTIC 16-25 MEDIUM                  HIGHLY PLASTIC 26 OR MORE HIGH</p>																																				
U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270																																																																																																						
	4.75	2.00	0.42	0.25	0.075	0.053																																																																																																						
TERM	SPACING	TERM	THICKNESS																																																																																																									
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET																																																																																																									
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET																																																																																																									
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET																																																																																																									
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																																																									
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET																																																																																																									
		THINLY LAMINATED	< 0.008 FEET																																																																																																									
<b>PLASTICITY</b>										<b>EQUIPMENT USED ON SUBJECT PROJECT</b>										<b>INDURATION</b>										<b>NOTES:</b>																																																																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL - PLASTIC LIMIT</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE SHRINKAGE LIMIT</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table>										SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION	LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE	PL - PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	OM - OPTIMUM MOISTURE SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE	SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	<p>DRILL UNITS:</p> <p><input type="checkbox"/> CME-45C</p> <p><input type="checkbox"/> CME-55</p> <p><input checked="" type="checkbox"/> CME-550X</p> <p><input type="checkbox"/> VANE SHEAR TEST</p> <p><input type="checkbox"/> PORTABLE HOIST</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>ADVANCING TOOLS:</p> <p><input type="checkbox"/> CLAY BITS</p> <p><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</p> <p><input checked="" type="checkbox"/> 3.25" HOLLOW STEM AUGERS</p> <p><input type="checkbox"/> HARD FACED FINGER BITS</p> <p><input type="checkbox"/> TUNG-CARBIDE INSERTS</p> <p><input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</p> <p><input type="checkbox"/> TRICONE *STEEL TEETH</p> <p><input type="checkbox"/> TRICONE *TUNG-CARB.</p> <p><input type="checkbox"/> CORE BIT</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>HAMMER TYPE:</p> <p><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</p> <p>CORE SIZE:</p> <p><input type="checkbox"/> -B <input type="checkbox"/> -H <input type="checkbox"/> -N</p> <p>HAND TOOLS:</p> <p><input type="checkbox"/> POST HOLE DIGGER</p> <p><input checked="" type="checkbox"/> HAND AUGER</p> <p><input type="checkbox"/> SOUNDING ROD</p> <p><input type="checkbox"/> VANE SHEAR TEST</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>										<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE - RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>MODERATELY INDURATED - GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>INDURATED - GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>EXTREMELY INDURATED - SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>										<p><b>BENCH MARK: N/A</b></p> <p>ELEVATIONS OBTAINED FROM THE TIN FILE (U5824_LS_DTM_TIN_DOT_2022-01-10.tin) ELEVATION: N/A FEET</p> <p>MnO = MANGANESE OXIDE</p> <p>FIAD = FILLED IMMEDIATELY AFTER DRILLING</p> <p>VE = VERTICAL EXAGGERATION</p> <p>A PRELIMINARY RETAINING WALL ENVELOPE WAS DRAWN AT 1:1VE USING THE ROADWAY PROFILE FILE (U5824_Rdy.pfi) AS A GUIDE. IT SHOULD BE NOTED THAT THIS IS NOT AN OFFICIAL RETAINING WALL ENVELOPE. SUMMIT ELECTED TO DRAW THE WALL AT A 1:1VE TO BETTER PRESENT THE SUBSURFACE DETAILS ALONG THE LENGTH OF THE WALL PROFILE.</p>																																																															
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION																																																																																																										
LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE																																																																																																										
PL - PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE																																																																																																										
OM - OPTIMUM MOISTURE SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE																																																																																																										
SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE																																																																																																										
<b>COLOR</b>										<b>INDURATION</b>										<b>INDURATION</b>										<b>INDURATION</b>																																																																														
<p>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.</p>										<p>FRAGILE</p> <p>MODERATELY INDURATED</p> <p>INDURATED</p> <p>EXTREMELY INDURATED</p>										<p>FRAGILE</p> <p>MODERATELY INDURATED</p> <p>INDURATED</p> <p>EXTREMELY INDURATED</p>										<p>FRAGILE</p> <p>MODERATELY INDURATED</p> <p>INDURATED</p> <p>EXTREMELY INDURATED</p>																																																																														

PROJECT REFERENCE NO.	SHEET NO.
U-5824	3
<b>SITE PLAN</b>	

NC GRID  
NAD 83 NA 2011

BEGIN RETAINING WALL  
 -RET\_WALL\_1023- STA = 102+30.00 (CL)  
 -L- STA = 102+30.00 (65.0'RT)

END RETAINING WALL  
 -RET\_WALL\_1023- STA = 105+58.12 (CL)  
 -L- STA = 105+50.00 (44.0'RT)



RWAL 10230

RWAL 10300

RWAL 10350

RWAL 10400

RWAL 10450

RWAL 10500

RWAL 10550

WALKERTOWN COMMONS DR.

NC 66 (OLD HOLLOW ROAD)

ASPHALT

ASPHALT

ASPHALT

ASPHALT

ASPHALT

ISBKBUS

ISBKBUS

ISBKBUS

TO US 158

BL-16

102+00

103+00

104+00

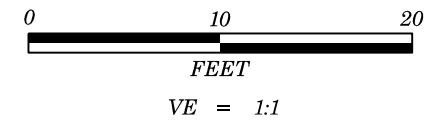
105+00

106+00



# PRELIMINARY RETAINING WALL ENVELOPE

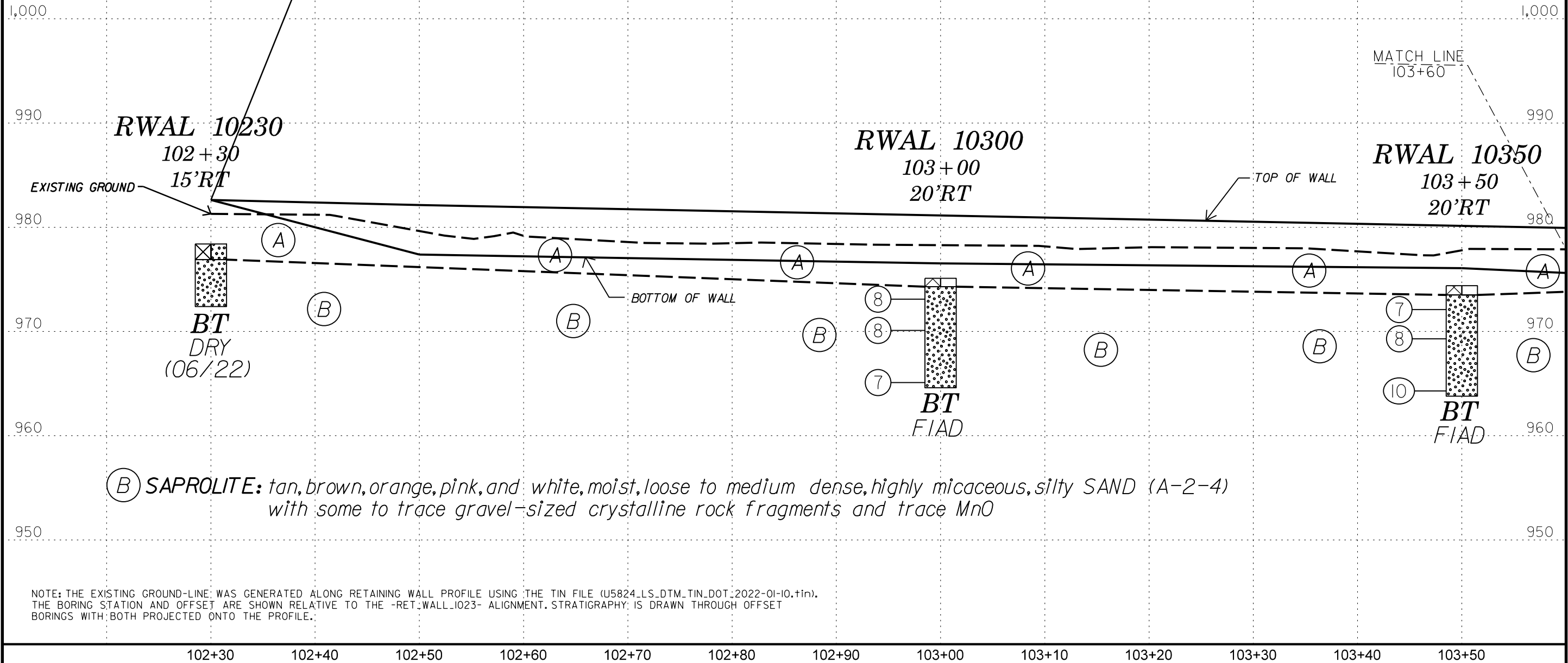
NOTE: THE WALL ENVELOPE PRESENTED DOES NOT ACCURATELY DEPICT THE PROPOSED FACE OF THE WALL



PROJECT REFERENCE NO.	SHEET NO.
U-5824	4
<b>RETAINING WALL PROFILE</b>	

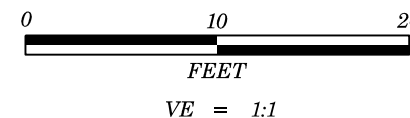
BEGIN RETAINING WALL  
 -RET\_WALL\_1023- STA = 102+30.00 (CL)  
 -L- STA = 102+30.00 (65.0'RT)

(A) **ARTIFICIAL FILL:** brown, orange-brown, and gray, moist, loose to medium dense, silty SAND (A-2-4) with little gravel and trace mica



(B) **SAPROLITE:** tan, brown, orange, pink, and white, moist, loose to medium dense, highly micaceous, silty SAND (A-2-4) with some to trace gravel-sized crystalline rock fragments and trace MnO

NOTE: THE EXISTING GROUND-LINE WAS GENERATED ALONG RETAINING WALL PROFILE USING THE TIN FILE (U5824\_LS\_DTM\_TIN\_DOT\_2022-01-10.tin). THE BORING STATION AND OFFSET ARE SHOWN RELATIVE TO THE -RET\_WALL\_1023- ALIGNMENT. STRATIGRAPHY IS DRAWN THROUGH OFFSET BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.



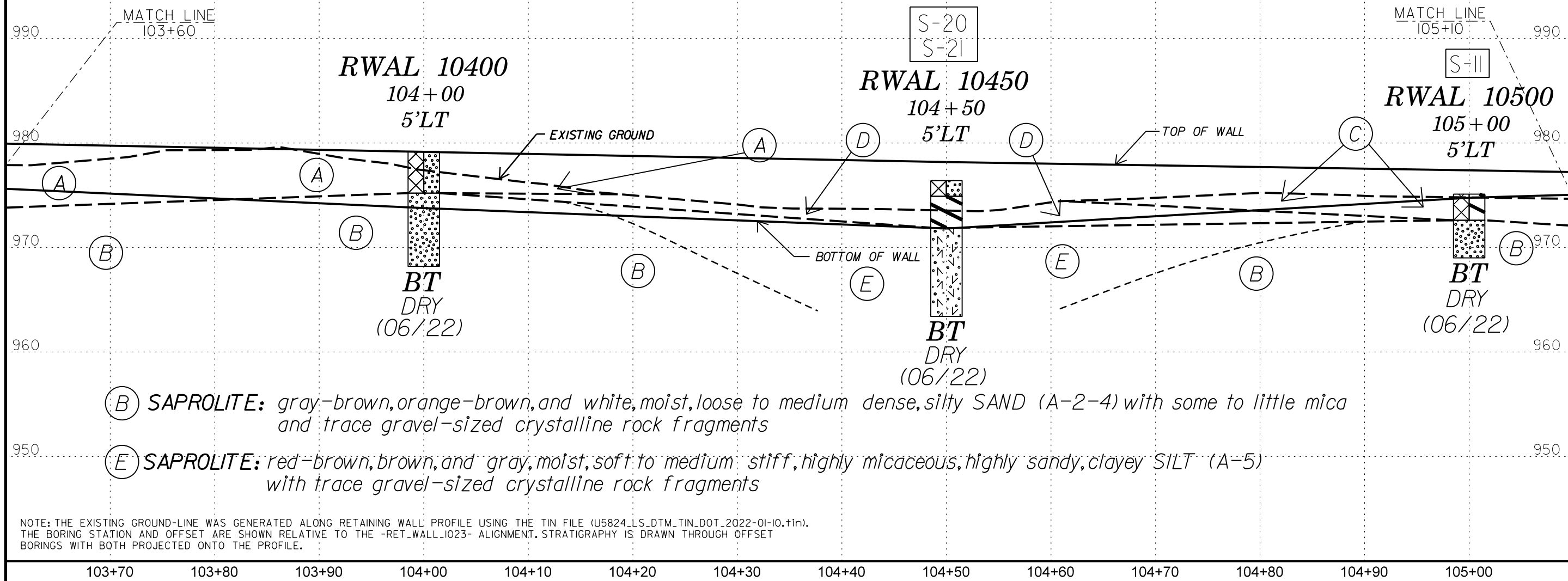
<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
U-5824	5
<b>RETAINING WALL PROFILE</b>	

# PRELIMINARY RETAINING WALL ENVELOPE

NOTE: THE WALL ENVELOPE PRESENTED DOES NOT ACCURATELY DEPICT THE PROPOSED FACE OF THE WALL

SOIL TEST RESULTS															
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		
S-20	5'LT	104+50	2.5' - 4.0'	A-7-5(6)	64	14	30.9	23.7	11.4	34.0	99	78	50	28.0	NA
S-21	5'LT	104+50	10.0' - 11.5'	A-5(0)	54	3	34.9	30.7	13.7	20.7	99	75	41	29.5	NA
S-11	5'LT	105+00	0.0' - 2.5'	A-7-5(4)	51	20	32.9	22.5	16.5	28.1	81	63	40	17.9	NA

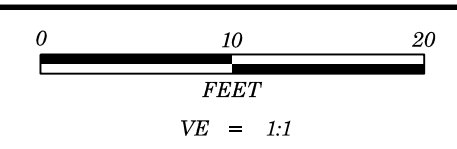
- (A) **ARTIFICIAL FILL:** brown to orange-brown, moist, loose to medium dense, silty SAND (A-2-4) with little to trace gravel, trace mica, and trace trash (plastic)
- (C) **ARTIFICIAL FILL:** brown to orange-brown, moist, soft to medium stiff, moderately plastic, highly sandy, silty CLAY (A-7-5) with little gravel, trace mica and trash (plastic)
- (D) **RESIDUAL:** orange-brown and red-brown, moist, soft to medium stiff, slightly plastic, highly sandy, silty CLAY (A-7-5) with trace gravel-sized crystalline rock fragments and mica



- (B) **SAPROLITE:** gray-brown, orange-brown, and white, moist, loose to medium dense, silty SAND (A-2-4) with some to little mica and trace gravel-sized crystalline rock fragments
- (E) **SAPROLITE:** red-brown, brown, and gray, moist, soft to medium stiff, highly micaceous, highly sandy, clayey SILT (A-5) with trace gravel-sized crystalline rock fragments

NOTE: THE EXISTING GROUND-LINE WAS GENERATED ALONG RETAINING WALL PROFILE USING THE TIN FILE (U5824\_LS\_DTM\_TIN\_DOT\_2022-01-10.tin). THE BORING STATION AND OFFSET ARE SHOWN RELATIVE TO THE -RET\_WALL\_1023- ALIGNMENT. STRATIGRAPHY IS DRAWN THROUGH OFFSET BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

103+70    103+80    103+90    104+00    104+10    104+20    104+30    104+40    104+50    104+60    104+70    104+80    104+90    105+00



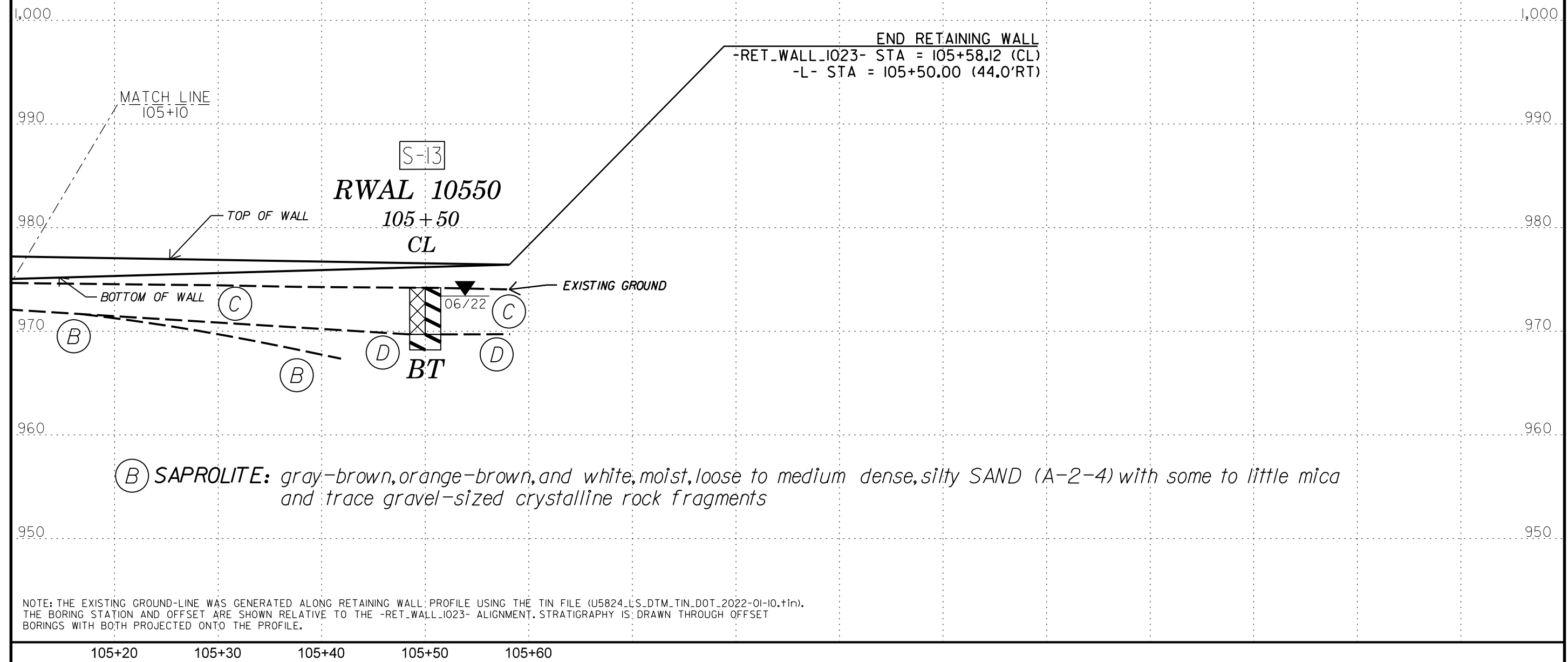
<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
U-5824	6
<b>RETAINING WALL PROFILE</b>	

# PRELIMINARY RETAINING WALL ENVELOPE

NOTE: THE WALL ENVELOPE PRESENTED DOES NOT ACCURATELY DEPICT THE PROPOSED FACE OF THE WALL

SOIL TEST RESULTS															
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		
S-13	CL	105+50	1.0' - 2.6'	A-7-5(3)	48	18	34.0	22.4	12.8	30.8	85	65	41	21.2	N/A

- (C) **ARTIFICIAL FILL:** gray, moist, soft to medium stiff, moderately plastic, highly sandy, silty CLAY (A-7-5) with little gravel, trace mica and organics
- (D) **RESIDUAL:** gray-brown, blue-green, and orange-brown, moist, soft to medium stiff, silty CLAY (A-7) with trace mica



- (B) **SAPROLITE:** gray-brown, orange-brown, and white, moist, loose to medium dense, silty SAND (A-2-4) with some to little mica and trace gravel-sized crystalline rock fragments

NOTE: THE EXISTING GROUND-LINE WAS GENERATED ALONG RETAINING WALL PROFILE USING THE TIN FILE (U5824\_LS\_DTM\_TIN\_DOT\_2022-01-10.tin). THE BORING STATION AND OFFSET ARE SHOWN RELATIVE TO THE -RET\_WALL\_I023- ALIGNMENT. STRATIGRAPHY IS DRAWN THROUGH OFFSET BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

105+20      105+30      105+40      105+50      105+60

# GEOTECHNICAL BORING REPORT

## BORE LOG

<b>WBS</b> 44395.1.1		<b>TIP</b> U-5824		<b>COUNTY</b> FORSYTH		<b>GEOLOGIST</b> Shipman, M.	
<b>SITE DESCRIPTION</b> NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> RWAL_10230		<b>STATION</b> 102+30		<b>OFFSET</b> 15 ft RT		<b>ALIGNMENT</b> RET_WALL_10230	
<b>COLLAR ELEV.</b> 978.4 ft		<b>TOTAL DEPTH</b> 6.0 ft		<b>NORTHING</b> 880,681		<b>EASTING</b> 1,664,580	
<b>DRILL RIG/HAMMER EFF./DATE</b> N/A				<b>DRILL METHOD</b> Hand Auger		<b>HAMMER TYPE</b> N/A	
<b>DRILLER</b> Fischer, H.		<b>START DATE</b> 06/13/22		<b>COMP. DATE</b> 06/13/22		<b>SURFACE WATER DEPTH</b> 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						
980																
															978.4	0.0
															976.9	1.5
															972.4	6.0
975																

**GROUND SURFACE**  
**ARTIFICIAL FILL**  
 brown, orange-brown, and gray, loose to medium dense, silty SAND (A-2-4) with little gravel and trace mica  
**SAPROLITE**  
 brown and white, loose to medium dense, highly micaceous, silty SAND (A-2-4) with trace gravel-sized crystalline rock fragments  
 Boring Terminated at Elevation 972.4 ft in Saprolite (silty SAND)  
  
 - Soil densities estimated.  
  
 - Artificial Fill associated with landscaped area of the shopping center.

<b>WBS</b> 44395.1.1		<b>TIP</b> U-5824		<b>COUNTY</b> FORSYTH		<b>GEOLOGIST</b> Fischer, H.	
<b>SITE DESCRIPTION</b> NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> RWAL_10300		<b>STATION</b> 103+00		<b>OFFSET</b> 20 ft RT		<b>ALIGNMENT</b> RET_WALL_10230	
<b>COLLAR ELEV.</b> 975.1 ft		<b>TOTAL DEPTH</b> 10.5 ft		<b>NORTHING</b> 880,670		<b>EASTING</b> 1,664,631	
<b>DRILL RIG/HAMMER EFF./DATE</b> SUM2603 CME-550X 83% 11/12/2021				<b>DRILL METHOD</b> H.S. Augers		<b>HAMMER TYPE</b> Automatic	
<b>DRILLER</b> Moseley, M.G.		<b>START DATE</b> 06/27/22		<b>COMP. DATE</b> 06/27/22		<b>SURFACE WATER DEPTH</b> 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						
980																
															975.1	0.0
															974.3	0.8
															972.4	6.0
975																
															974.1	1.0
															971.1	4.0
															966.1	9.0
970																
965																

**GROUND SURFACE**  
**ARTIFICIAL FILL (ENGINEERED)**  
 ASPHALT  
**SAPROLITE**  
 tan, brown, orange, pink, and white, loose, silty SAND (A-2-4) with some mica, little to trace gravel-sized crystalline rock fragments, and trace MnO  
  
 Boring Terminated at Elevation 964.6 ft in Saprolite (silty SAND)  
  
 - FIAD due to location in a parking lot.

NCDOT BORE DOUBLE U5824\_GEO\_RWAL\_102+30.GPJ NC\_DOT.GDT 7/20/22

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Fischer, H.									
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)								
BORING NO. RWAL_10350		STATION 103+50		OFFSET 20 ft RT		ALIGNMENT RET_WALL_10230 HR. Dry									
COLLAR ELEV. 974.4 ft		TOTAL DEPTH 10.6 ft		NORTHING 880,649		EASTING 1,664,676									
DRILL RIG/HAMMER EFF./DATE SUM2603 CME-550X 83% 11/12/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER Moseley, M.G.		START DATE 06/27/22		COMP. DATE 06/27/22		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
975															974.4 GROUND SURFACE 0.0
	973.1	1.3	2	3	4							M		973.5 ARTIFICIAL FILL (ENGINEERED) ASPHALT 0.9	
970	970.3	4.1	4	4	4							M		SAPROLITE tan, pink, orange, and white, loose to medium dense, silty SAND (A-2-4) with some to little mica and some to trace gravel-sized crystalline rock fragments	
965	965.3	9.1	5	5	5							M		963.8 Boring Terminated at Elevation 963.8 ft in Saprolite (silty SAND) 10.6	
															- FIAD due to location in a parking lot.

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Shipman, M.									
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)								
BORING NO. RWAL_10400		STATION 104+00		OFFSET 5 ft LT		ALIGNMENT RET_WALL_10230 HR. Dry									
COLLAR ELEV. 979.2 ft		TOTAL DEPTH 11.0 ft		NORTHING 880,650		EASTING 1,664,732									
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Hand Auger		HAMMER TYPE N/A									
DRILLER Fischer, H.		START DATE 06/13/22		COMP. DATE 06/13/22		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
980															979.2 GROUND SURFACE 0.0
												M		975.2 ARTIFICIAL FILL brown to orange-brown, loose to medium dense, silty SAND (A-2-4) with little gravel, trace mica, and trace trash (plastic) 4.0	
975												M		975.2 SAPROLITE gray-brown and white, loose to medium dense, silty SAND (A-2-4) with little mica 4.0	
970												M		968.2 Boring Terminated at Elevation 968.2 ft in Saprolite (silty SAND) 11.0	
															- Soil densities estimated.
															- Artificial Fill associated with landscaped area of the shopping center.

NCDOT BORE DOUBLE U5824\_GEO\_RWAL\_102+30.GPJ NC\_DOT.GDT 7/20/22

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Shipman, M.										
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)									
BORING NO. RWAL_10450		STATION 104+50		OFFSET 5 ft LT		ALIGNMENT RET_WALL_10230 HR. Dry										
COLLAR ELEV. 976.4 ft		TOTAL DEPTH 13.0 ft		NORTHING 880,629		EASTING 1,664,777										
DRILL RIG/HAMMER EFF./DATE N/A		DRILL METHOD Hand Auger		HAMMER TYPE N/A												
DRILLER Shipman, M.		START DATE 06/15/22		COMP. DATE 06/15/22		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
980																
975																
970																
965																

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Shipman, M.										
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)									
BORING NO. RWAL_10500		STATION 105+00		OFFSET 5 ft LT		ALIGNMENT RET_WALL_10230 HR. Dry										
COLLAR ELEV. 975.1 ft		TOTAL DEPTH 6.1 ft		NORTHING 880,608		EASTING 1,664,823										
DRILL RIG/HAMMER EFF./DATE N/A		DRILL METHOD Hand Auger		HAMMER TYPE N/A												
DRILLER Shipman, M.		START DATE 06/13/22		COMP. DATE 06/13/22		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						
980																
975																
970																

NCDOT BORE DOUBLE U5824\_GEO\_RWAL\_102+30.GPJ NC\_DOT.GDT 7/20/22

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Shipman, M.										
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)									
BORING NO. RWAL_10550		STATION 105+50		OFFSET CL		ALIGNMENT RET_WALL_10230										
COLLAR ELEV. 974.2 ft		TOTAL DEPTH 6.0 ft		NORTHING 880,582		EASTING 1,664,866										
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Hand Auger		HAMMER TYPE N/A										
DRILLER Shipman, M.		START DATE 06/13/22		COMP. DATE 06/13/22		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
975														974.2	GROUND SURFACE	0.0
970											S-13	21%	M	969.7	ARTIFICIAL FILL gray, soft to medium stiff, moderately plastic, highly sandy, silty CLAY (A-7-5) with little gravel, trace mica and organics	4.5
														968.2	RESIDUAL gray-brown, blue-green, and orange-brown, soft to medium stiff, silty CLAY (A-7) with trace mica	6.0
<p>Boring Terminated at Elevation 968.2 ft in Residual (silty CLAY)</p> <p>- Soil densities estimated.</p> <p>- Artificial Fill associated with landscaped area of the shopping center.</p>																

NCDOT BORE DOUBLE U5824\_GEO\_RWAL\_102+30.GPJ NC\_DOT.GDT 7/20/22



REFERENCE: U-5824

PROJECT: 44395

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4-5	PROFILES
6-7	BORE LOGS

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY FORSYTH  
 PROJECT DESCRIPTION NC 66 (OLD HOLLOW ROAD)  
WIDENING FROM HARLEY DRIVE TO US 158

SITE DESCRIPTION RETAINING WALL ALONG -L-  
-RET WALL 5300- STA = 53+00.00 - 54+52.13 (CL)  
-L- STA = 53+00.00 - 54+50.00 (52.5' LT)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5824	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 MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
- 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

M. SHIPMAN, EI

H. FISCHER, GIT

M.G. MOSELEY

J. MOSELEY

INVESTIGATED BY B. SMITH, PG

DRAWN BY B. SMITH, PG

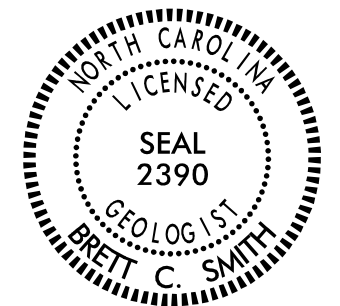
CHECKED BY B. WORLEY, PG

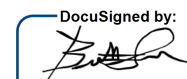
SUBMITTED BY B. SMITH, PG

DATE JULY, 2022

Prepared in the Office of:

 **SUMMIT**  
 DESIGN AND ENGINEERING SERVICES  
 FIRM NO. P-0339 and C-487  
 2715 Ashton Drive, Ste 104  
 Wilmington, NC 28412  
 Phone: (910) 475-1208  
 www.summitde.com



DocuSigned by:  
  
 142278E876B643C...  
 SIGNATURE DATE 2/10/2023

**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 208, 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 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:				<b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA. <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. <b>ARGILLACEOUS</b> - 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. <b>ARTESIAN</b> - 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. <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. <b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIUS STRATUM. <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. <b>ROCK QUALITY DESIGNATION (RQD)</b> - 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. <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. <b>SILL</b> - 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. <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS IN 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. <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. <b>STRATA ROCK QUALITY DESIGNATION (SROD)</b> - 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. <b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.																																																					
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>							<b>ANGULARITY OF GRAINS</b>				<b>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</b>																																																									
<table border="1" style="width: 100%; text-align: center;"> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="5">GRANULAR MATERIALS (<math>\leq 35\%</math> PASSING #200)</th> <th colspan="3">SILT-CLAY MATERIALS (<math>&gt; 35\%</math> PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-2-6</th> <th>A-2-7</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-4, A-5</th> <th>A-6, A-7</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1-a</th> <th>A-1-b</th> <th>A-2-4</th> <th>A-2-5</th> <th>A-2-7</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-4, A-5</th> <th>A-6, A-7</th> </tr> <tr> <th>SYMBOL</th> <td colspan="5">[Pattern]</td> <td>[Pattern]</td> <td>[Pattern]</td> <td>[Pattern]</td> <td>[Pattern]</td> <td>[Pattern]</td> <td>[Pattern]</td> <td>[Pattern]</td> </tr> </table>							GENERAL CLASS.	GRANULAR MATERIALS ( $\leq 35\%$ PASSING #200)					SILT-CLAY MATERIALS ( $> 35\%$ PASSING #200)			ORGANIC MATERIALS			A-1	A-3	A-2	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-6, A-7	GROUP CLASS.	A-1-a	A-1-b	A-2-4	A-2-5	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-6, A-7	SYMBOL	[Pattern]					[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	<b>MINERALOGICAL COMPOSITION</b>				<b>CRISTALLINE ROCK (CR)</b>				<b>WEATHERING</b>			
GENERAL CLASS.	GRANULAR MATERIALS ( $\leq 35\%$ PASSING #200)					SILT-CLAY MATERIALS ( $> 35\%$ PASSING #200)			ORGANIC MATERIALS																																																											
	A-1	A-3	A-2	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-6, A-7																																																								
GROUP CLASS.	A-1-a	A-1-b	A-2-4	A-2-5	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-6, A-7																																																								
SYMBOL	[Pattern]					[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]																																																								
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.							<b>COMPRESSIONIBILITY</b>				<b>NON-CRISTALLINE ROCK (NCR)</b>				<b>CRISTALLINE ROCK (CR)</b>																																																					
SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50							<b>PERCENTAGE OF MATERIAL</b>				<b>WEATHERED ROCK (WR)</b>				<b>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</b>																																																					
<table border="1" style="width: 100%;"> <tr> <th></th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt; 10%</td> <td>&gt; 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table>								GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%	HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE	<b>GROUND WATER</b>				<b>WEATHERED ROCK (WR)</b>				<b>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</b>																																	
	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL																																																																	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%																																																																	
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%																																																																	
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%																																																																	
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE																																																																	
<div style="display: flex; justify-content: space-between;"> <div> <p><math>\nabla</math> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p><math>\nabla_{24}</math> STATIC WATER LEVEL AFTER 24 HOURS</p> <p><math>\nabla_{PW}</math> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p><math>\bigcirc</math> SPRING OR SEEP</p> </div> <div> <p><b>MISCELLANEOUS SYMBOLS</b></p> <div style="display: grid; grid-template-columns: 1fr 1fr; gap: 10px;"> <div> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</div> <div> SOIL SYMBOL</div> <div> ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</div> <div> INFERRERD SOIL BOUNDARY</div> <div> INFERRERD ROCK LINE</div> <div> ALLUVIAL SOIL BOUNDARY</div> <div> DIP &amp; DIP DIRECTION OF ROCK STRUCTURES</div> <div> SPT TEST BORING</div> <div> AUGER BORING</div> <div> CORE BORING</div> <div> MONITORING WELL</div> <div> PIEZOMETER INSTALLATION</div> <div> SLOPE INDICATOR INSTALLATION</div> <div> CONE PENETROMETER TEST</div> <div> SOUNDING ROD</div> <div> TEST BORING WITH CORE</div> <div> SPT N-VALUE</div> </div> </div> </div>							<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>				<b>WEATHERING</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																																					
<table border="1" style="width: 100%;"> <tr> <th>GENERAL RATING AS SUBGRADE</th> <td>EXCELLENT TO GOOD</td> <td>FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td>UNSATURABLE</td> </tr> </table>							GENERAL RATING AS SUBGRADE	EXCELLENT TO GOOD	FAIR TO POOR	FAIR TO POOR	POOR	UNSATURABLE	<b>COMPRESSIONIBILITY</b>				<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																															
GENERAL RATING AS SUBGRADE	EXCELLENT TO GOOD	FAIR TO POOR	FAIR TO POOR	POOR	UNSATURABLE																																																															
PI OF A-7-5 SUBGROUP IS $\leq$ LL - 30; PI OF A-7-6 SUBGROUP IS $>$ LL - 30							<b>PERCENTAGE OF MATERIAL</b>				<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																																					
<b>CONSISTENCY OR DENSENESS</b>							<b>PERCENTAGE OF MATERIAL</b>				<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																																					
<table border="1" style="width: 100%;"> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT<sup>2</sup>)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE</td> <td>&lt; 4 4 TO 10 10 TO 30 30 TO 50 &gt; 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD</td> <td>&lt; 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 &gt; 30</td> <td>&lt; 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 &gt; 4</td> </tr> </table>							PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )	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	<b>PERCENTAGE OF MATERIAL</b>				<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																									
PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )																																																																	
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																																																																	
<b>TEXTURE OR GRAIN SIZE</b>							<b>PERCENTAGE OF MATERIAL</b>				<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																																					
<table border="1" style="width: 100%;"> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <td>4</td> <td>10</td> <td>40</td> <td>60</td> <td>200</td> <td>270</td> </tr> <tr> <th>BOULDER (BLDR.)</th> <td>COBBLE (COB.)</td> <td>GRAVEL (GR.)</td> <td>COARSE SAND (CSE. SD.)</td> <td>FINE SAND (F SD.)</td> <td>SILT (SL.)</td> <td>CLAY (CL.)</td> </tr> </table>							U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270	BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)	<b>PERCENTAGE OF MATERIAL</b>				<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																							
U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270																																																														
BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)																																																														
GRAIN SIZE: 305 IN. 12, 75 IN. 3, 2.0, 0.25, 0.05, 0.005							<b>PERCENTAGE OF MATERIAL</b>				<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																																					
<b>SOIL MOISTURE - CORRELATION OF TERMS</b>							<b>PERCENTAGE OF MATERIAL</b>				<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																																					
<table border="1" style="width: 100%;"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td rowspan="2">LL PLASTIC RANGE (PI) PL</td> <td>LIQUID LIMIT</td> <td>- SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PLASTIC LIMIT</td> <td>- WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td rowspan="2">OM SL SHRINKAGE LIMIT</td> <td>OPTIMUM MOISTURE</td> <td>- MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SHRINKAGE LIMIT</td> <td>- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table>							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 SHRINKAGE LIMIT	OPTIMUM MOISTURE	- MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	SHRINKAGE LIMIT	- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	<b>PERCENTAGE OF MATERIAL</b>				<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																								
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 SHRINKAGE LIMIT	OPTIMUM MOISTURE	- MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE																																																																		
	SHRINKAGE LIMIT	- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE																																																																		
<b>PLASTICITY</b>							<b>PERCENTAGE OF MATERIAL</b>				<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																																					
<table border="1" style="width: 100%;"> <tr> <th>NON PLASTIC</th> <th colspan="2">PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> <tr> <td>SLIGHTLY PLASTIC</td> <td>0-5</td> <td></td> <td>VERY LOW</td> </tr> <tr> <td>MODERATELY PLASTIC</td> <td>6-15</td> <td></td> <td>SLIGHT</td> </tr> <tr> <td>HIGHLY PLASTIC</td> <td>16-25</td> <td></td> <td>MEDIUM</td> </tr> <tr> <td></td> <td>26 OR MORE</td> <td></td> <td>HIGH</td> </tr> </table>							NON PLASTIC	PLASTICITY INDEX (PI)		DRY STRENGTH	SLIGHTLY PLASTIC	0-5		VERY LOW	MODERATELY PLASTIC	6-15		SLIGHT	HIGHLY PLASTIC	16-25		MEDIUM		26 OR MORE		HIGH	<b>PERCENTAGE OF MATERIAL</b>				<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																	
NON PLASTIC	PLASTICITY INDEX (PI)		DRY STRENGTH																																																																	
SLIGHTLY PLASTIC	0-5		VERY LOW																																																																	
MODERATELY PLASTIC	6-15		SLIGHT																																																																	
HIGHLY PLASTIC	16-25		MEDIUM																																																																	
	26 OR MORE		HIGH																																																																	
<b>COLOR</b>							<b>PERCENTAGE OF MATERIAL</b>				<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																																					
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.							<b>PERCENTAGE OF MATERIAL</b>				<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																																					
							<b>RECOMMENDATION SYMBOLS</b>				<b>ROCK HARDNESS</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																																					
							<div style="display: grid; grid-template-columns: 1fr 1fr; gap: 5px;"> <div> UNDERCUT</div> <div> SHALLOW UNDERCUT</div> <div> UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</div> <div> UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</div> </div>				<table border="1" style="width: 100%;"> <tr> <th>VERY HARD</th> <td>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</td> </tr> <tr> <th>HARD</th> <td>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</td> </tr> <tr> <th>MODERATELY HARD</th> <td>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.</td> </tr> <tr> <th>MEDIUM HARD</th> <td>CAN BE GROUDED OR GOUGED 0.25 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.</td> </tr> <tr> <th>SOFT</th> <td>CAN BE GROUDED 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.</td> </tr> <tr> <th>VERY SOFT</th> <td>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.</td> </tr> </table>				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 GROUDED OR GOUGED 0.25 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	SOFT	CAN BE GROUDED 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.	<b>ROCK HARDNESS</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																					
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 GROUDED OR GOUGED 0.25 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.																																																																			
SOFT	CAN BE GROUDED 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.																																																																			
							<b>ABBREVIATIONS</b>				<b>ROCK HARDNESS</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																																																					
							<table border="1" style="width: 100%;"> <tr> <td>AR - AUGER REFUSAL</td> <td>MEC. - MEDIUM MICA - MICACEOUS</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>MOD. - MODERATELY NON PLASTIC</td> <td>WEA. - WEATHERED</td> </tr> <tr> <td>CL - CLAY</td> <td>ORG. - ORGANIC</td> <td>UW - UNIT WEIGHT</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>PMT - PRESSUREMETER TEST</td> <td>W<sub>d</sub> - DRY UNIT WEIGHT</td> </tr> <tr> <td>CSE - COARSE</td> <td>SAP. - SAPROLITIC</td> <td></td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>SD. - SAND, SANDY</td> <td><b>SAMPLE ABBREVIATIONS</b></td> </tr> <tr> <td>e - VOID RATIO</td> <td>SL. - SILT, SILTY</td> <td>S - BULK</td> </tr> <tr> <td>F - FINE</td> <td>SLI. - SLIGHTLY</td> <td>SS - SPLIT SPOON</td> </tr> <tr> <td>FOSS. - FOSSILIFEROUS</td> <td>TCR - TRICONE REFUSAL</td> <td>ST - SHELBY TUBE</td> </tr> <tr> <td>FRAC. - FRACTURED, FRACTURES</td> <td>w - MOISTURE CONTENT</td> <td>RS - ROCK</td> </tr> <tr> <td>FRAGS. - FRAGMENTS</td> <td>V - VERY</td> <td>RT - RECOMPACTED TRIAXIAL</td> </tr> <tr> <td>HI. - HIGHLY</td> <td></td> <td>CBR - CALIFORNIA BEARING RATIO</td> </tr> </table>				AR - AUGER REFUSAL	MEC. - MEDIUM MICA - MICACEOUS	VST - VANE SHEAR TEST	BT - BORING TERMINATED	MOD. - MODERATELY NON PLASTIC	WEA. - WEATHERED	CL - CLAY	ORG. - ORGANIC	UW - UNIT WEIGHT	CPT - CONE PENETRATION TEST	PMT - PRESSUREMETER TEST	W <sub>d</sub> - DRY UNIT WEIGHT	CSE - COARSE	SAP. - SAPROLITIC		DPT - DYNAMIC PENETRATION TEST	SD. - SAND, SANDY	<b>SAMPLE ABBREVIATIONS</b>	e - VOID RATIO	SL. - SILT, SILTY	S - BULK	F - FINE	SLI. - SLIGHTLY	SS - SPLIT SPOON	FOSS. - FOSSILIFEROUS	TCR - TRICONE REFUSAL	ST - SHELBY TUBE	FRAC. - FRACTURED, FRACTURES	w - MOISTURE CONTENT	RS - ROCK	FRAGS. - FRAGMENTS	V - VERY	RT - RECOMPACTED TRIAXIAL	HI. - HIGHLY		CBR - CALIFORNIA BEARING RATIO	<b>ROCK HARDNESS</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																	
AR - AUGER REFUSAL	MEC. - MEDIUM MICA - MICACEOUS	VST - VANE SHEAR TEST																																																																		
BT - BORING TERMINATED	MOD. - MODERATELY NON PLASTIC	WEA. - WEATHERED																																																																		
CL - CLAY	ORG. - ORGANIC	UW - UNIT WEIGHT																																																																		
CPT - CONE PENETRATION TEST	PMT - PRESSUREMETER TEST	W <sub>d</sub> - DRY UNIT WEIGHT																																																																		
CSE - COARSE	SAP. - SAPROLITIC																																																																			
DPT - DYNAMIC PENETRATION TEST	SD. - SAND, SANDY	<b>SAMPLE ABBREVIATIONS</b>																																																																		
e - VOID RATIO	SL. - SILT, SILTY	S - BULK																																																																		
F - FINE	SLI. - SLIGHTLY	SS - SPLIT SPOON																																																																		
FOSS. - FOSSILIFEROUS	TCR - TRICONE REFUSAL	ST - SHELBY TUBE																																																																		
FRAC. - FRACTURED, FRACTURES	w - MOISTURE CONTENT	RS - ROCK																																																																		
FRAGS. - FRAGMENTS	V - VERY	RT - RECOMPACTED TRIAXIAL																																																																		
HI. - HIGHLY		CBR - CALIFORNIA BEARING RATIO																																																																		
							<b>EQUIPMENT USED ON SUBJECT PROJECT</b>				<b>FRACUTURE SPACING</b>				<b>BEDDING</b>																																																					
							<table border="1" style="width: 100%;"> <tr> <th>DRILL UNITS:</th> <th>ADVANCING TOOLS:</th> <th>HAMMER TYPE:</th> </tr> <tr> <td><input type="checkbox"/> CME-45C</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> CME-55</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td></td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-550X</td> <td><input checked="" type="checkbox"/> 3.25" HOLLOW STEM AUGERS</td> <td>CORE SIZE:</td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td><input type="checkbox"/> -B <input type="checkbox"/> -H <input type="checkbox"/> -N</td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td> <td>HAND TOOLS:</td> </tr> <tr> <td></td> <td><input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</td> <td><input type="checkbox"/> POST HOLE DIGGER</td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE *STEEL TEETH</td> <td><input checked="" type="checkbox"/> HAND AUGER</td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE *TUNG-CARB.</td> <td><input type="checkbox"/> SOUNDING ROD</td> </tr> <tr> <td></td> <td><input type="checkbox"/> CORE BIT</td> <td><input type="checkbox"/> VANE SHEAR TEST</td> </tr> </table>				DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:	<input type="checkbox"/> CME-45C	<input type="checkbox"/> CLAY BITS	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL	<input type="checkbox"/> CME-55	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER		<input checked="" type="checkbox"/> CME-550X	<input checked="" type="checkbox"/> 3.25" HOLLOW STEM AUGERS	CORE SIZE:	<input type="checkbox"/> VANE SHEAR TEST	<input type="checkbox"/> HARD FACED FINGER BITS	<input type="checkbox"/> -B <input type="checkbox"/> -H <input type="checkbox"/> -N	<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> TUNG-CARBIDE INSERTS	HAND TOOLS:		<input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER	<input type="checkbox"/> POST HOLE DIGGER		<input type="checkbox"/> TRICONE *STEEL TEETH	<input checked="" type="checkbox"/> HAND AUGER		<input type="checkbox"/> TRICONE *TUNG-CARB.	<input type="checkbox"/> SOUNDING ROD		<input type="checkbox"/> CORE BIT	<input type="checkbox"/> VANE SHEAR TEST	<b>FRACUTURE SPACING</b>				<b>BEDDING</b>				<b>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</b>																			
DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:																																																																		
<input type="checkbox"/> CME-45C	<input type="checkbox"/> CLAY BITS	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL																																																																		
<input type="checkbox"/> CME-55	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER																																																																			
<input checked="" type="checkbox"/> CME-550X	<input checked="" type="checkbox"/> 3.25" HOLLOW STEM AUGERS	CORE SIZE:																																																																		
<input type="checkbox"/> VANE SHEAR TEST	<input type="checkbox"/> HARD FACED FINGER BITS	<input type="checkbox"/> -B <input type="checkbox"/> -H <input type="checkbox"/> -N																																																																		
<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> TUNG-CARBIDE INSERTS	HAND TOOLS:																																																																		
	<input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER	<input type="checkbox"/> POST HOLE DIGGER																																																																		
	<input type="checkbox"/> TRICONE *STEEL TEETH	<input checked="" type="checkbox"/> HAND AUGER																																																																		
	<input type="checkbox"/> TRICONE *TUNG-CARB.	<input type="checkbox"/> SOUNDING ROD																																																																		
	<input type="checkbox"/> CORE BIT	<input type="checkbox"/> VANE SHEAR TEST																																																																		
							<b>INDURATION</b>				<b>FRACUTURE SPACING</b>				<b>BEDDING</b>																																																					
							<table border="1" style="width: 100%;"> <tr> <th>TERM</th> <th>SPACING</th> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED</td> <td>&lt; 0.008 FEET</td> </tr> </table>				TERM	SPACING	TERM	THICKNESS	VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET	WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET	MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET	CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET	VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET			THINLY LAMINATED	< 0.008 FEET	<b>INDURATION</b>				<b>FRACUTURE SPACING</b>				<b>BEDDING</b>																					
TERM	SPACING	TERM	THICKNESS																																																																	
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET																																																																	
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET																																																																	
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET																																																																	
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																	
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET																																																																	
		THINLY LAMINATED	< 0.008 FEET																																																																	
							<b>INDURATION</b>				<b>FRACUTURE SPACING</b>				<b>BEDDING</b>																																																					
							<table border="1" style="width: 100%;"> <tr> <td>FRIABLE</td> <td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <td>MODERATELY INDURATED</td> <td>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <td>INDURATED</td> <td>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <td>EXTREMELY INDURATED</td> <td>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> </table>				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.	<b>INDURATION</b>				<b>FRACUTURE SPACING</b>				<b>BEDDING</b>																																									
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.																																																																			
							<b>BENCH MARK: N/A</b>				<b>INDURATION</b>				<b>FRACUTURE SPACING</b>																																																					
							<b>ELEVATIONS OBTAINED FROM THE TIN FILE (U5824_LS_DTM_TIN_DOT_2022-01-10.tin)</b>				<b>INDURATION</b>				<b>FRACUTURE SPACING</b>																																																					
							<b>ELEVATION: N/A FEET</b>				<b>INDURATION</b>				<b>FRACUTURE SPACING</b>																																																					
							<b>NOTES:</b>				<b>INDURATION</b>				<b>FRACUTURE SPACING</b>																																																					
							<b>MnO = MANGANESE OXIDE</b>				<b>INDURATION</b>				<b>FRACUTURE SPACING</b>																																																					
							<b>VE = VERTICAL EXAGGERATION</b>				<b>INDURATION</b>				<b>FRACUTURE SPACING</b>																																																					
							<p>A PRELIMINARY RETAINING WALL ENVELOPE WAS DRAWN AT 1:1 VE USING THE ROADWAY PROFILE FILE (U5824.Rdy.pfi) AS A GUIDE. IT SHOULD BE NOTED THAT THIS IS NOT AN OFFICIAL RETAINING WALL ENVELOPE. SUMMIT ELECTED TO DRAW THE WALL AT A 1:1 VE TO BETTER PRESENT THE SUBSURFACE DETAILS ALONG THE LENGTH OF THE WALL PROFILE.</p>				<b>INDURATION</b>				<b>FRACUTURE SPACING</b>																																																					

<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
U-5824	3
<b>SITE PLAN</b>	

NC GRID  
NAD 83 NA 2011

BEGIN RETAINING WALL  
 -RET WALL 5300- STA = 53+00.00 (CL)  
 -L- STA = 53+00.00 (52.5' LT)

END RETAINING WALL  
 -RET WALL 5300- STA = 54+52.13 (CL)  
 -L- STA = 54+50.00 (52.5' LT)

RWAL 5300

RWAL 5350

RWAL 5400

RWAL 5450

ASPHALT

TO HARLEY DRIVE

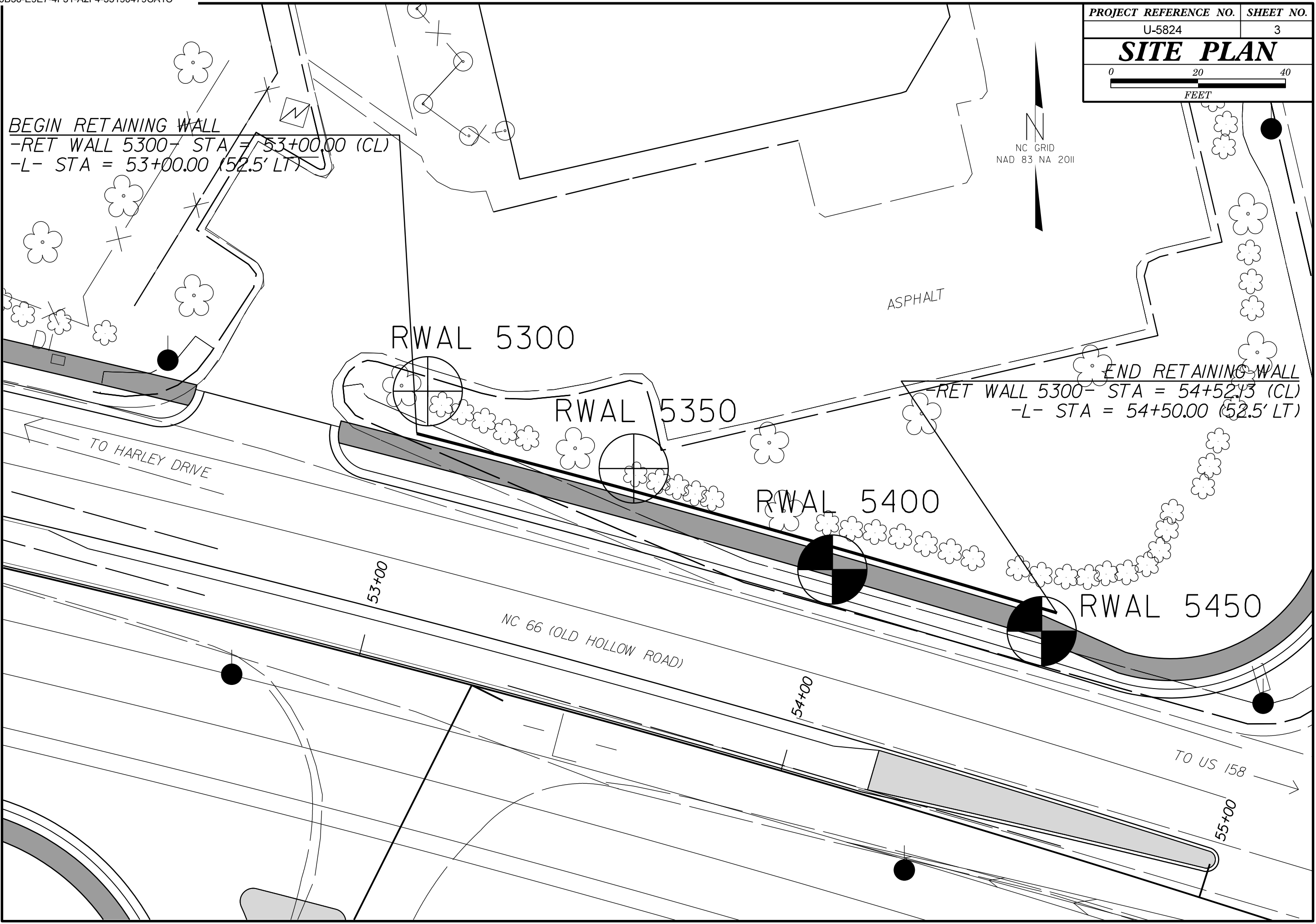
NC 66 (OLD HOLLOW ROAD)

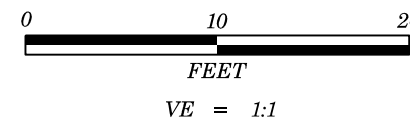
TO US 158

53+00

54+00

55+00





<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
U-5824	4
<b>RETAINING WALL PROFILE</b>	

# PRELIMINARY RETAINING WALL ENVELOPE

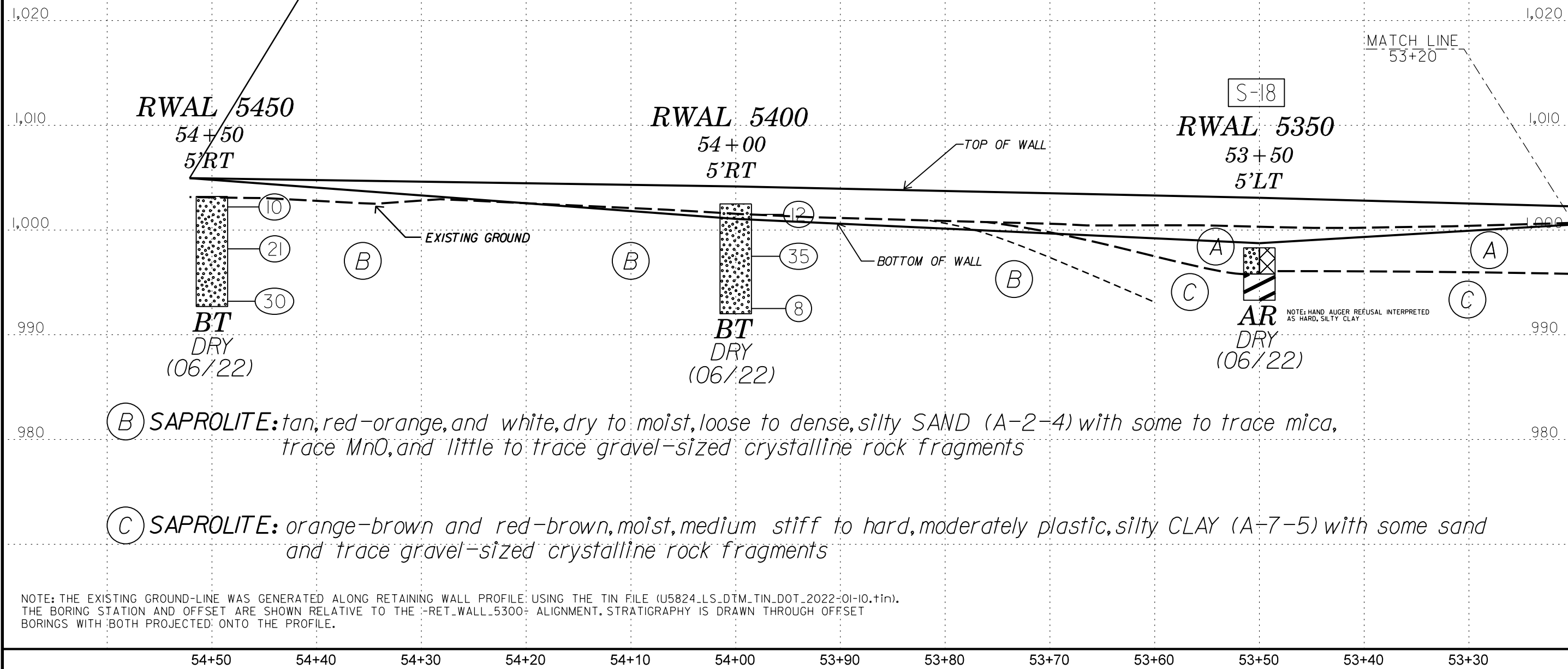
NOTE: THE WALL ENVELOPE PRESENTED DOES NOT ACCURATELY DEPICT THE PROPOSED FACE OF THE WALL

<b>SOIL TEST RESULTS</b>															
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		
S-18	5'LT	53+50	3.5' - 5.0'	A-7-5(14)	69	25	14.6	14.7	15.2	55.5	78	70	58	30.8	N/A

END RETAINING WALL

-RET\_WALL\_5300- STA = 54+52.13 (CL)  
-L- STA = 54+50.00 (52.5' LT)

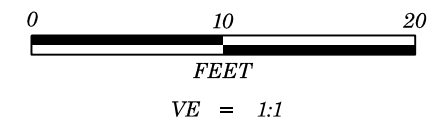
(A) **ARTIFICIAL FILL:** brown to orange-brown, moist, loose to medium dense, silty SAND (A-2-4) with trace gravel, mica, and trash (plastic)



(B) **SAPROLITE:** tan, red-orange, and white, dry to moist, loose to dense, silty SAND (A-2-4) with some to trace mica, trace MnO, and little to trace gravel-sized crystalline rock fragments

(C) **SAPROLITE:** orange-brown and red-brown, moist, medium stiff to hard, moderately plastic, silty CLAY (A-7-5) with some sand and trace gravel-sized crystalline rock fragments

NOTE: THE EXISTING GROUND-LINE WAS GENERATED ALONG RETAINING WALL PROFILE USING THE TIN FILE (U5824\_LS\_DTM\_TIN\_DOT\_2022-01-10.tin). THE BORING STATION AND OFFSET ARE SHOWN RELATIVE TO THE -RET\_WALL\_5300- ALIGNMENT. STRATIGRAPHY IS DRAWN THROUGH OFFSET BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.



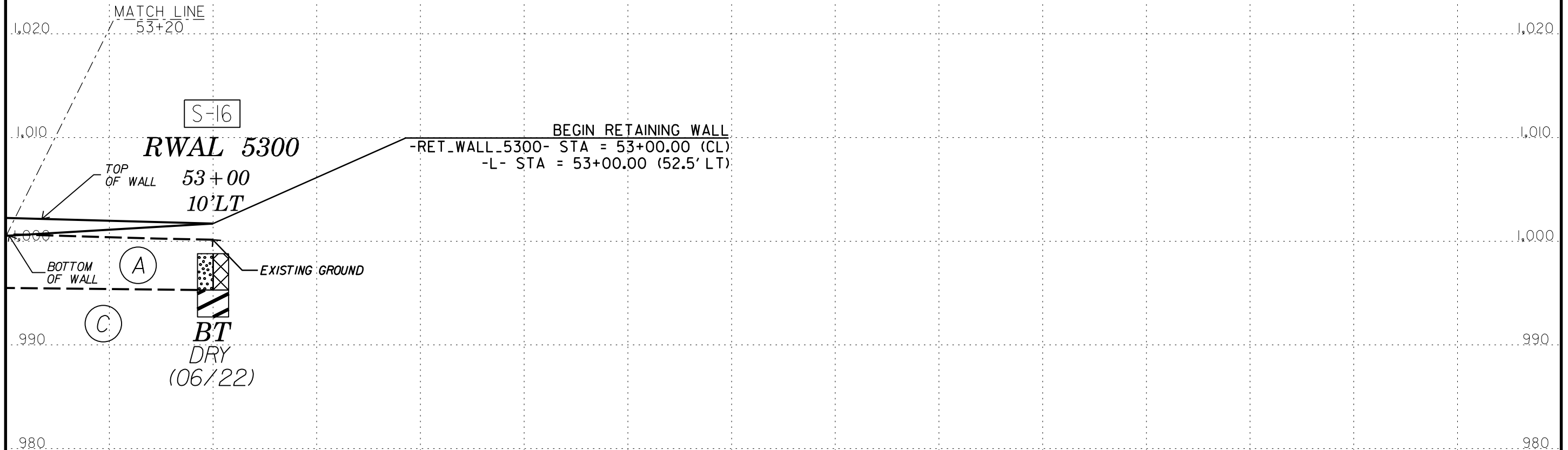
<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
U-5824	5
<b>RETAINING WALL PROFILE</b>	

# PRELIMINARY RETAINING WALL ENVELOPE

NOTE: THE WALL ENVELOPE PRESENTED DOES NOT ACCURATELY DEPICT THE PROPOSED FACE OF THE WALL

SOIL TEST RESULTS															
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		
S-16	10'LT	53+00	4.5' - 6.0'	A-7-6(18)	57	29	21.7	15.5	11.2	51.6	99	85	66	24.2	NA

(A) **ARTIFICIAL FILL:** orange-brown, red-brown, brown, and tan, moist, loose to medium dense, silty SAND (A-2-4) with some gravel, trace mica, and trace amounts of trash (plastic)



(C) **SAPROLITE:** orange-brown and red-brown, moist, medium stiff to stiff, highly plastic, silty CLAY (A-7-6) with some sand

NOTE: THE EXISTING GROUND-LINE WAS GENERATED ALONG RETAINING WALL PROFILE USING THE TIN FILE (U5824\_LS\_DTM\_TIN\_DOT\_2022-01-10.tin). THE BORING STATION AND OFFSET ARE SHOWN RELATIVE TO THE -RET\_WALL\_5300- ALIGNMENT. STRATIGRAPHY IS DRAWN THROUGH OFFSET BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Shipman, M.										
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening From Harley Drive to US 158							GROUND WTR (ft)									
BORING NO. RWAL_5300		STATION 53+00		OFFSET 10 ft LT		ALIGNMENT RET_WALL_5300										
COLLAR ELEV. 998.8 ft		TOTAL DEPTH 6.1 ft		NORTHING 882,480		EASTING 1,659,983										
DRILL RIG/HAMMER EFF./DATE N/A			DRILL METHOD Hand Auger			HAMMER TYPE N/A										
DRILLER Shipman, M.		START DATE 06/14/22		COMP. DATE 06/14/22		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1000															998.8	0.0
															995.3	3.5
995												S-16	24%		992.7	6.1

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Shipman, M.										
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening From Harley Drive to US 158							GROUND WTR (ft)									
BORING NO. RWAL_5350		STATION 53+50		OFFSET 5 ft LT		ALIGNMENT RET_WALL_5300										
COLLAR ELEV. 998.3 ft		TOTAL DEPTH 5.0 ft		NORTHING 882,462		EASTING 1,660,030										
DRILL RIG/HAMMER EFF./DATE N/A			DRILL METHOD Hand Auger			HAMMER TYPE N/A										
DRILLER Fischer, H.		START DATE 06/14/22		COMP. DATE 06/14/22		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1000															998.3	0.0
															995.8	2.5
995												S-18	31%		993.3	5.0

NCDOT BORE DOUBLE U5824\_GEO\_RWAL\_53+00.GPJ NC\_DOT.GDT 7/14/22





REFERENCE: U-5824

PROJECT: 44395

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4-5	PROFILES
6-8	BORE LOGS

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY FORSYTH  
 PROJECT DESCRIPTION NC 66 (OLD HOLLOW ROAD)  
WIDENING FROM HARLEY DRIVE TO US 158

SITE DESCRIPTION RETAINING WALL ALONG -L-  
-RET WALL 5370- STA = 53+70.00 - 55+50.00 (CL)  
-L- STA = 53+70.00 - 55+39.79 (64.50' - 100.16' RT)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5824	1	8

**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 MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
- 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

M. SHIPMAN, EI

H. FISCHER, GIT

M.G. MOSELEY

J. MOSELEY

INVESTIGATED BY B. SMITH, PG

DRAWN BY B. SMITH, PG

CHECKED BY B. WORLEY, PG

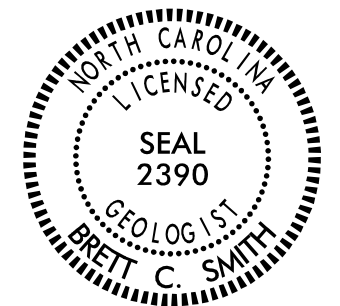
SUBMITTED BY B. SMITH, PG

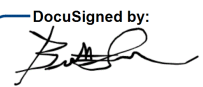
DATE JULY, 2022

Prepared in the Office of:

 **SUMMIT**  
 DESIGN AND ENGINEERING SERVICES  
 FIRM NO. P-0339 and C-487

2715 Ashton Drive, Ste 104  
 Wilmington, NC 28412  
 Phone: (910) 475-1208  
 www.summitde.com



DocuSigned by:  
  
 148748678843C... DATE 2/10/2023

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

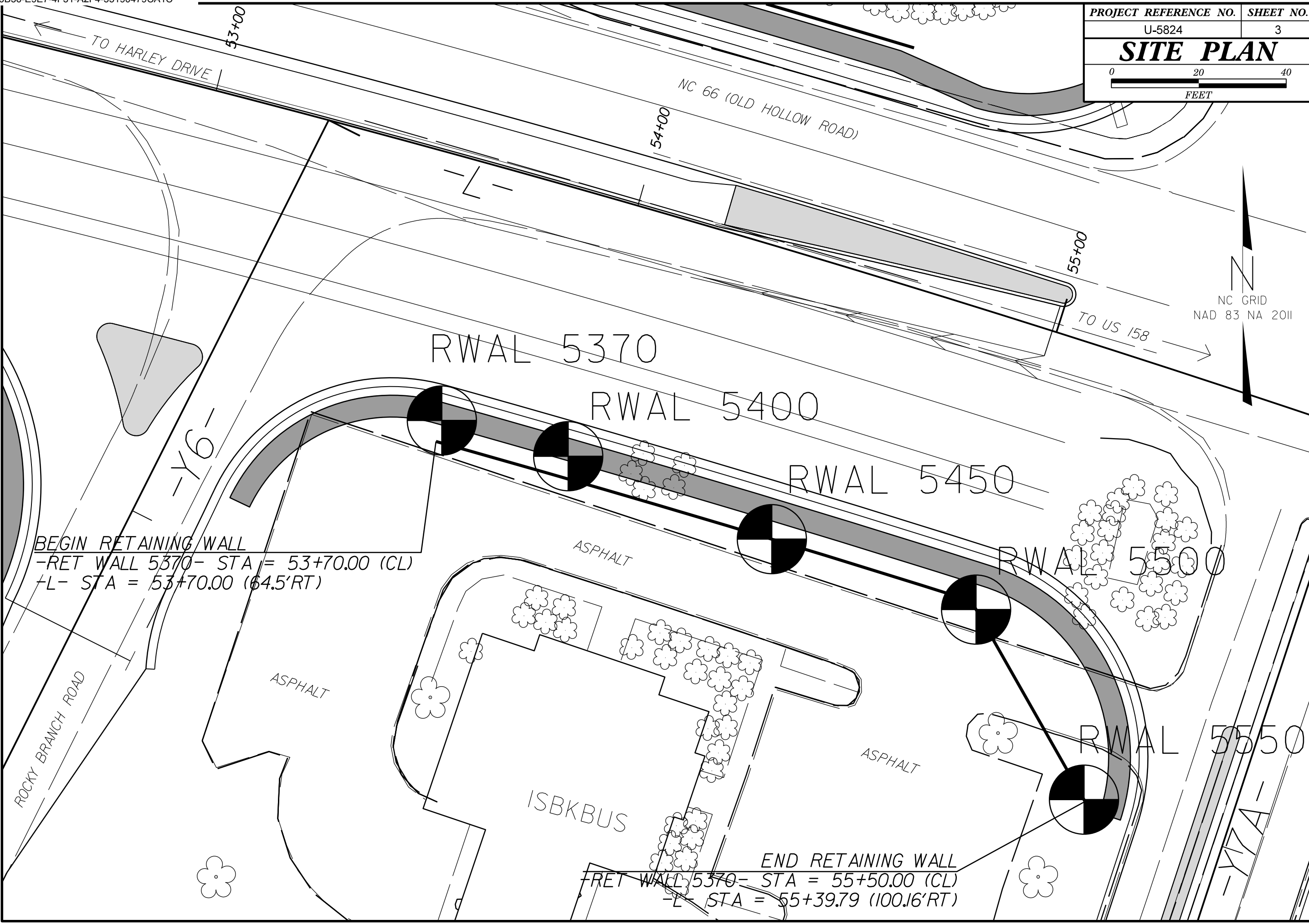
# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

## SUBSURFACE INVESTIGATION

### SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																																																																																																																																																																																					
<p>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</p>										<p>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.</p>										<p>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 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:</p>										<p>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.</p>																																																																																																																																																																																																																																					
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)																																																																																																																																																																																																																																															
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>GENERAL CLASS.</th> <th colspan="5">GRANULAR MATERIALS (&lt;= 35% PASSING #200)</th> <th colspan="5">SILT-CLAY MATERIALS (&gt; 35% PASSING #200)</th> <th colspan="5">ORGANIC MATERIALS</th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1</td> <td>A-3</td> <td>A-2</td> <td>A-4</td> <td>A-5</td> <td>A-6</td> <td>A-7</td> <td>A-1, A-2</td> <td>A-3</td> <td>A-4, A-5</td> <td>A-6, A-7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>SYMBOL</td> <td colspan="5">[Pattern]</td> <td colspan="5">[Pattern]</td> <td colspan="5">[Pattern]</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING #10 #40 #200</td> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX</td> <td>51 MN 35 MX 35 MX</td> <td>35 MX 35 MX</td> <td>35 MX 35 MX</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>MATERIAL PASSING #40 LL PI</td> <td colspan="5"></td> <td colspan="5"></td> <td colspan="5"></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GROUP INDEX</td> <td colspan="5"></td> <td colspan="5"></td> <td colspan="5"></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td colspan="5">FINE SAND</td> <td colspan="5">SILTY OR CLAYEY GRAVEL AND SAND</td> <td colspan="5">SILTY SOILS</td> <td colspan="5">CLAYEY SOILS</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GEN. RATING AS SUBGRADE</td> <td colspan="5">EXCELLENT TO GOOD</td> <td colspan="5">FAIR TO POOR</td> <td colspan="5">FAIR TO POOR</td> <td colspan="5">POOR</td> <td colspan="5">UNSATURABLE</td> </tr> <tr> <td colspan="10">PI OF A-7-5 SUBGROUP IS &lt;= LL - 30 ; PI OF A-7-6 SUBGROUP IS &gt; LL - 30</td> <td colspan="10"></td> <td colspan="10"></td> <td colspan="10"></td> </tr> </table>										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-3	A-4, A-5	A-6, A-7										SYMBOL	[Pattern]					[Pattern]					[Pattern]												% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 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													MATERIAL PASSING #40 LL PI																							GROUP INDEX																							USUAL TYPES OF MAJOR MATERIALS	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					UNSATURABLE					PI OF A-7-5 SUBGROUP IS <= LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30																																								<p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>										<p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</p>																			
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-3	A-4, A-5	A-6, A-7																																																																																																																																																																																																																																																								
SYMBOL	[Pattern]					[Pattern]					[Pattern]																																																																																																																																																																																																																																																								
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 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																																																																																																																																																																																																																																																										
MATERIAL PASSING #40 LL PI																																																																																																																																																																																																																																																																			
GROUP INDEX																																																																																																																																																																																																																																																																			
USUAL TYPES OF MAJOR MATERIALS	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					UNSATURABLE																																																																																																																																																																																																																																														
PI OF A-7-5 SUBGROUP IS <= LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30																																																																																																																																																																																																																																																																			
CONSISTENCY OR DENSENESS										MINERALOGICAL COMPOSITION										NON-CRYSTALLINE ROCK (NCR)																																																																																																																																																																																																																																															
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT<sup>2</sup>)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE</td> <td>&lt; 4 4 TO 10 10 TO 30 30 TO 50 &gt; 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD</td> <td>&lt; 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 &gt; 30</td> <td>&lt; 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 &gt; 4</td> </tr> </table>										PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )	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	<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p>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.</p>																																																																																																																																																																																																																																			
PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )																																																																																																																																																																																																																																																																
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A																																																																																																																																																																																																																																																																
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4																																																																																																																																																																																																																																																																
TEXTURE OR GRAIN SIZE										COMPRESSION										COASTAL PLAIN SEDIMENTARY ROCK (CP)																																																																																																																																																																																																																																															
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> <tr> <td></td> <td>4.76</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> <tr> <th>BOULDER (BLDR.)</th> <th>COBBLE (COB.)</th> <th>GRAVEL (GR.)</th> <th>COARSE SAND (CSE. SD.)</th> <th>FINE SAND (F SD.)</th> <th>SILT (SL.)</th> <th>CLAY (CL.)</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>GRAIN SIZE</th> <th>MM</th> <th>305</th> <th>75</th> <th>2.0</th> <th>0.25</th> <th>0.05</th> <th>0.005</th> </tr> <tr> <td></td> <td>IN.</td> <td>12</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>										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.)								GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005		IN.	12	3					<p>SLIGHTLY COMPRESSIBLE LL &lt; 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL &gt; 50</p>										<p>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>																																																																																																																																																																																																			
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.)																																																																																																																																																																																																																																																													
GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005																																																																																																																																																																																																																																																												
	IN.	12	3																																																																																																																																																																																																																																																																
SOIL MOISTURE - CORRELATION OF TERMS										PERCENTAGE OF MATERIAL										WEATHERING																																																																																																																																																																																																																																															
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PLASTIC RANGE (PI)</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table>										SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION	LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE	PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	OM - OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE	SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	<p>ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC &gt; 10% &gt; 20% HIGHLY 35% AND ABOVE</p>										<p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (IV 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 &gt; 100 BPF VERY SEVERE (IV 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 &lt; 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.</p>																																																																																																																																																																																																																																
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION																																																																																																																																																																																																																																																																	
LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE																																																																																																																																																																																																																																																																	
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE																																																																																																																																																																																																																																																																	
OM - OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE																																																																																																																																																																																																																																																																	
SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE																																																																																																																																																																																																																																																																	
PLASTICITY										GROUND WATER										MISCELLANEOUS SYMBOLS																																																																																																																																																																																																																																															
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NON PLASTIC</th> <th colspan="2">PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> <tr> <td>SLIGHTLY PLASTIC</td> <td>0-5</td> <td></td> <td>VERY LOW</td> </tr> <tr> <td>MODERATELY PLASTIC</td> <td>6-15</td> <td></td> <td>SLIGHT</td> </tr> <tr> <td>HIGHLY PLASTIC</td> <td>16-25</td> <td></td> <td>MEDIUM</td> </tr> <tr> <td></td> <td>26 OR MORE</td> <td></td> <td>HIGH</td> </tr> </table>										NON PLASTIC	PLASTICITY INDEX (PI)		DRY STRENGTH	SLIGHTLY PLASTIC	0-5		VERY LOW	MODERATELY PLASTIC	6-15		SLIGHT	HIGHLY PLASTIC	16-25		MEDIUM		26 OR MORE		HIGH	<p>WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP</p>										<p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY</p>																																																																																																																																																																																																																											
NON PLASTIC	PLASTICITY INDEX (PI)		DRY STRENGTH																																																																																																																																																																																																																																																																
SLIGHTLY PLASTIC	0-5		VERY LOW																																																																																																																																																																																																																																																																
MODERATELY PLASTIC	6-15		SLIGHT																																																																																																																																																																																																																																																																
HIGHLY PLASTIC	16-25		MEDIUM																																																																																																																																																																																																																																																																
	26 OR MORE		HIGH																																																																																																																																																																																																																																																																
COLOR										RECOMMENDATION SYMBOLS										ROCK HARDNESS																																																																																																																																																																																																																																															
<p>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.</p>										<p>UNDERCUT SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</p>										<p>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 GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROUDED 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.</p>																																																																																																																																																																																																																																															
EQUIPMENT USED ON SUBJECT PROJECT										FRACTURE SPACING										BEDDING																																																																																																																																																																																																																																															
<p>DRILL UNITS: <input type="checkbox"/> CME-45C <input type="checkbox"/> CME-55 <input checked="" type="checkbox"/> CME-550X <input type="checkbox"/> VANE SHEAR TEST <input type="checkbox"/> PORTABLE HOIST</p>										<p>ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input checked="" type="checkbox"/> 3.25" HOLLOW STEM AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE * STEEL TEETH <input type="checkbox"/> TRICONE * TUNG-CARB. <input type="checkbox"/> CORE BIT</p>										<p>HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL CORE SIZE: <input type="checkbox"/> -B <input type="checkbox"/> -H <input type="checkbox"/> -N HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST</p>										<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TERM</th> <th>SPACING</th> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED</td> <td>&lt; 0.008 FEET</td> </tr> </table>										TERM	SPACING	TERM	THICKNESS	VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET	WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET	MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET	CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET	VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET			THINLY LAMINATED	< 0.008 FEET																																																																																																																																																																																																
TERM	SPACING	TERM	THICKNESS																																																																																																																																																																																																																																																																
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET																																																																																																																																																																																																																																																																
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET																																																																																																																																																																																																																																																																
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET																																																																																																																																																																																																																																																																
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																																																																																																																																																																																																																
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET																																																																																																																																																																																																																																																																
		THINLY LAMINATED	< 0.008 FEET																																																																																																																																																																																																																																																																
INDURATION										FRACURE SPACING										BEDDING																																																																																																																																																																																																																																															
<p>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.</p>																																																																																																																																																																																																																																																																			
BENCH MARK: N/A										ELEVATIONS OBTAINED FROM THE TIN FILE (U5824_LS_DTM_TIN_DOT_2022-01-10.tin)										ELEVATION: N/A										FEET																																																																																																																																																																																																																																					
NOTES:										MnO = MANGANESE OXIDE										VE = VERTICAL EXAGGERATION										A PRELIMINARY RETAINING WALL ENVELOPE WAS DRAWN AT 1:1 VE USING THE ROADWAY PROFILE FILE (U5824.Rdy.pfi) AS A GUIDE. IT SHOULD BE NOTED THAT THIS IS NOT AN OFFICIAL RETAINING WALL ENVELOPE. SUMMIT ELECTED TO DRAW THE WALL AT A 1:1 VE TO BETTER PRESENT THE SUBSURFACE DETAILS ALONG THE LENGTH OF THE WALL PROFILE.																																																																																																																																																																																																																																					

PROJECT REFERENCE NO.	SHEET NO.
U-5824	3
<b>SITE PLAN</b>	



BEGIN RETAINING WALL  
 -RET WALL 5370- STA = 53+70.00 (CL)  
 -L- STA = 53+70.00 (64.5'RT)

END RETAINING WALL  
 -RET WALL 5370- STA = 55+50.00 (CL)  
 -L- STA = 55+39.79 (100.16'RT)

RWAL 5370

RWAL 5400

RWAL 5450

RWAL 5500

RWAL 5550

ASPHALT

ASPHALT

ASPHALT

ISBKBUS

ROCKY BRANCH ROAD

NC 66 (OLD HOLLOW ROAD)

TO US 158

TO HARLEY DRIVE

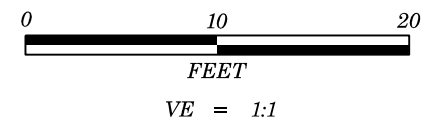
53+00

54+00

55+00

16'-

16'-



<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
U-5824	4
<b>RETAINING WALL PROFILE</b>	

# PRELIMINARY RETAINING WALL ENVELOPE

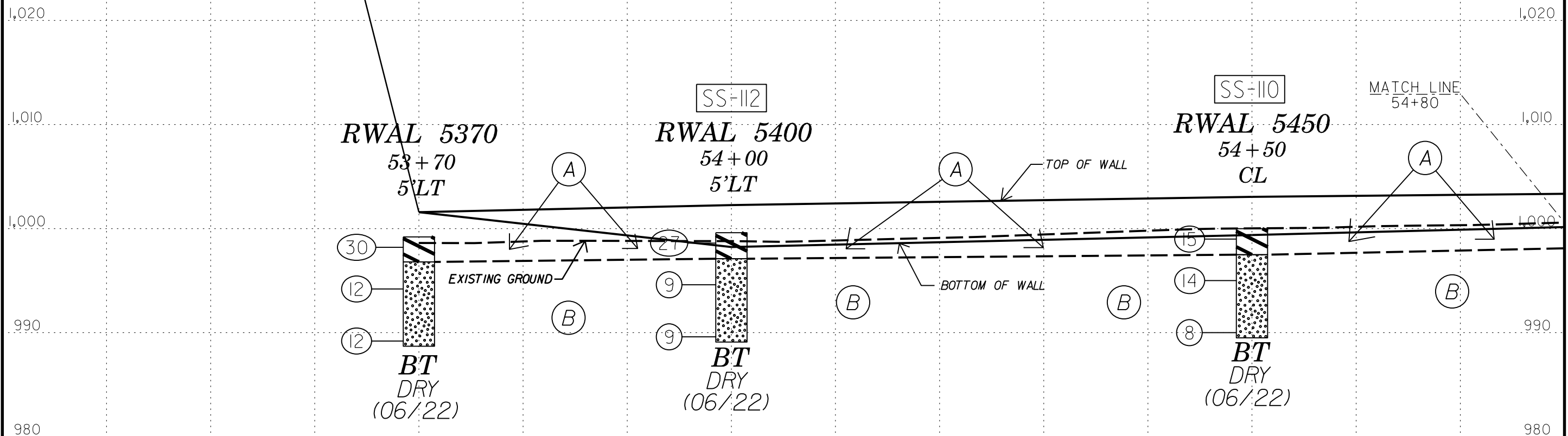
NOTE: THE WALL ENVELOPE PRESENTED DOES NOT ACCURATELY DEPICT THE PROPOSED FACE OF THE WALL

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-112	5'LT	54+00	0.0' - 1.5'	A-7-5(31)	70	35	14.8	8.3	9.3	67.6	99	89	78	27.6	N/A
SS-110	CL	54+50	4.0' - 5.5'	A-2-5(0)	54	9	65.6	3.8	13.3	17.3	96	40	30	15.5	N/A

**BEGIN RETAINING WALL**

-RET\_WALL\_5370- STA = 53+70.00 (CL)  
 -L- STA = 53+70.00 (64.50'RT)

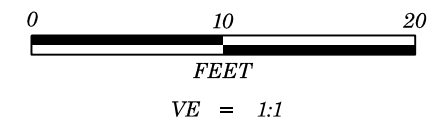
**(A) RESIDUAL:** red and tan, dry to moist, stiff to hard, highly plastic, silty CLAY (A-7-5) with some sand, trace gravel-sized crystalline rock fragments and mica



**(B) SAPROLITE:** red, orange, brown, and white, dry to moist, loose to medium dense, clayey, silty SAND (A-2-5) and silty SAND (A-2-4) with some mica and little to trace gravel-sized crystalline rock fragments, trace MnO

NOTE: THE EXISTING GROUND-LINE WAS GENERATED ALONG RETAINING WALL PROFILE USING THE TIN FILE (U5824\_LS\_DTM\_TIN.DOT\_2022-01-10.tin). THE BORING STATION AND OFFSET ARE SHOWN RELATIVE TO THE -RET\_WALL\_5370- ALIGNMENT. STRATIGRAPHY IS DRAWN THROUGH OFFSET BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

53+70    53+80    53+90    54+00    54+10    54+20    54+30    54+40    54+50    54+60    54+70



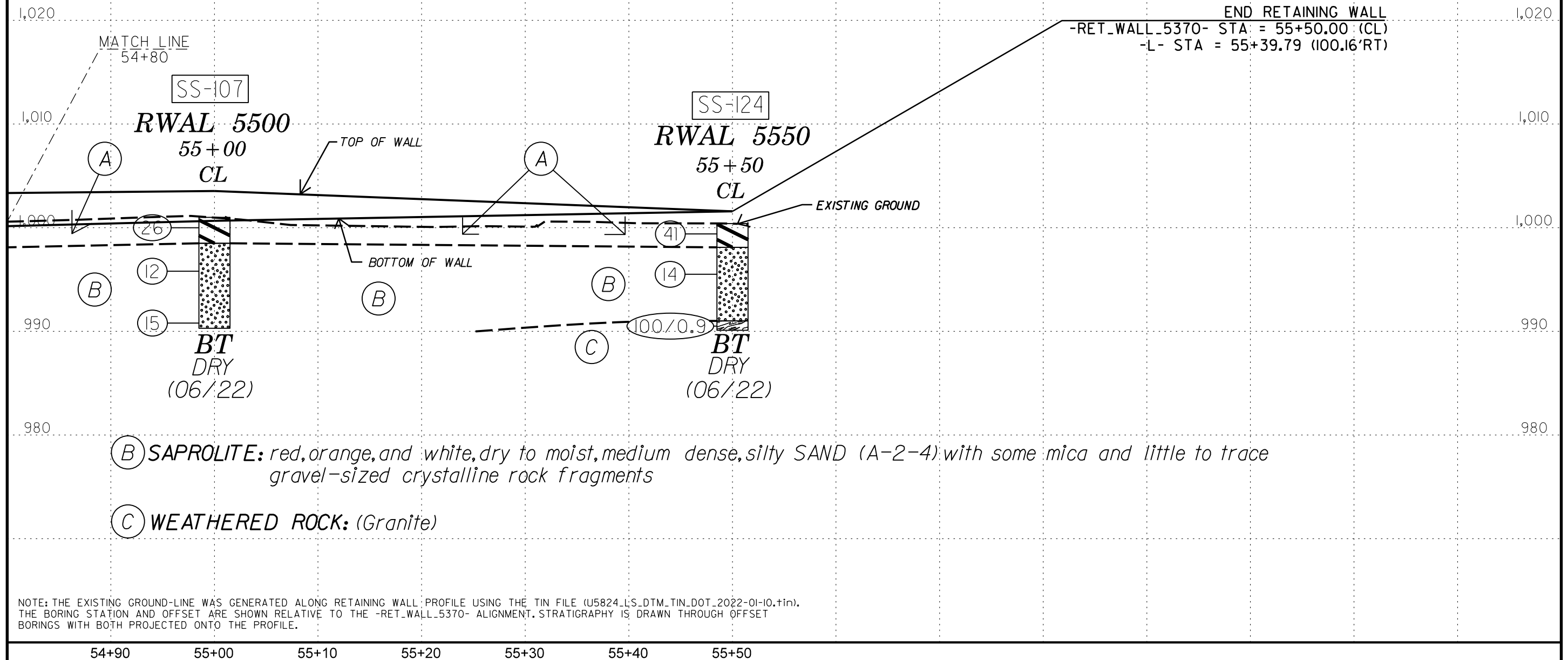
<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
U-5824	5
<b>RETAINING WALL PROFILE</b>	

# PRELIMINARY RETAINING WALL ENVELOPE

NOTE: THE WALL ENVELOPE PRESENTED DOES NOT ACCURATELY DEPICT THE PROPOSED FACE OF THE WALL

SOIL TEST RESULTS															
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		
SS-107	CL	55+00	4.2' - 5.7'	A-2-4(0)	38	7	59.6	18.9	8.5	13.0	94	51	23	13.6	NA
SS-124	CL	55+50	0.0' - 1.5'	A-7-6(4)	45	22	29.2	18.8	12.3	39.7	71	58	39	13.0	NA

**(A) RESIDUAL:** red-orange, dry, very stiff to hard, moderately plastic, highly sandy, silty CLAY (A-7-6) with some to little gravel-sized crystalline rock fragments, trace mica



**(B) SAPROLITE:** red, orange, and white, dry to moist, medium dense, silty SAND (A-2-4) with some mica and little to trace gravel-sized crystalline rock fragments

**(C) WEATHERED ROCK:** (Granite)

NOTE: THE EXISTING GROUND-LINE WAS GENERATED ALONG RETAINING WALL PROFILE USING THE TIN FILE (U5824.L\5.DTM.TIN.DOT.2022-01-10.tin). THE BORING STATION AND OFFSET ARE SHOWN RELATIVE TO THE -RET\_WALL\_5370- ALIGNMENT. STRATIGRAPHY IS DRAWN THROUGH OFFSET BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

54+90      55+00      55+10      55+20      55+30      55+40      55+50

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Fischer, H.										
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)									
BORING NO. RWAL_5370		STATION 53+70		OFFSET 5 ft LT		ALIGNMENT RET_WALL_5370										
COLLAR ELEV. 999.2 ft		TOTAL DEPTH 10.5 ft		NORTHING 882,344		EASTING 1,660,018										
DRILL RIG/HAMMER EFF./DATE SUM2603 CME-550X 83% 11/12/2021			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Moseley, M.G.		START DATE 06/28/22		COMP. DATE 06/28/22		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1000	999.2	0.0												999.2	0.0	GROUND SURFACE
			8	13	17											
995	995.2	4.0	7	6	6									996.8	2.4	RESIDUAL red and tan, hard, highly plastic, silty CLAY (A-7-5) with trace gravel-sized crystalline rock fragments and mica
990	990.2	9.0	5	6	6									988.7	10.5	SAPROLITE red, orange, brown, and white, medium dense, clayey, silty SAND (A-2-5) and silty SAND (A-2-4) with some mica, little gravel-sized crystalline rock fragments, and trace MnO
																Boring Terminated at Elevation 988.7 ft in Saprolite (silty SAND)

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Fischer, H.										
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)									
BORING NO. RWAL_5400		STATION 54+00		OFFSET 5 ft LT		ALIGNMENT RET_WALL_5370										
COLLAR ELEV. 999.6 ft		TOTAL DEPTH 10.5 ft		NORTHING 882,336		EASTING 1,660,047										
DRILL RIG/HAMMER EFF./DATE SUM2603 CME-550X 83% 11/12/2021			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Moseley, M.G.		START DATE 06/28/22		COMP. DATE 06/28/22		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1000	999.6	0.0												999.6	0.0	GROUND SURFACE
			8	12	15											
995	995.6	4.0	5	4	5									997.1	2.5	RESIDUAL red, very stiff, highly plastic, silty CLAY (A-7-5) with some sand and trace gravel-sized crystalline rock fragments
990	990.6	9.0	5	5	4									989.1	10.5	SAPROLITE red, brown, and white, loose, clayey, silty SAND (A-2-5) and silty SAND (A-2-4) with some mica, little gravel-sized crystalline rock fragments, and trace MnO
																Boring Terminated at Elevation 989.1 ft in Saprolite (silty SAND)

NCDOT BORE DOUBLE U5824\_GEO\_RWAL\_53+70.GPJ NC\_DOT\_GDT 7/19/22

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Fischer, H.									
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)								
BORING NO. RWAL_5450		STATION 54+50		OFFSET CL		ALIGNMENT RET_WALL_537									
COLLAR ELEV. 1,000.0 ft		TOTAL DEPTH 10.5 ft		NORTHING 882,317		EASTING 1,660,094									
DRILL RIG/HAMMER EFF./DATE SUM2603 CME-550X 83% 11/12/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER Moseley, M.G.		START DATE 06/28/22		COMP. DATE 06/28/22		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
1005															
1000	1,000.0	0.0												1,000.0	0.0
995	996.0	4.0	8	7	8								D	997.5	2.5
990	991.0	9.0	6	5	9								SS-110	16%	989.5
			4	3	5								M		10.5
Boring Terminated at Elevation 989.5 ft in Saprolite (silty SAND)															

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Fischer, H.									
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)								
BORING NO. RWAL_5500		STATION 55+00		OFFSET CL		ALIGNMENT RET_WALL_537									
COLLAR ELEV. 1,001.0 ft		TOTAL DEPTH 10.7 ft		NORTHING 882,301		EASTING 1,660,141									
DRILL RIG/HAMMER EFF./DATE SUM2603 CME-550X 83% 11/12/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER Moseley, M.G.		START DATE 06/28/22		COMP. DATE 06/28/22		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
1005															
1000	1,001.0	0.0												1,001.0	0.0
995	996.8	4.2	9	6	6								D	998.5	2.5
	991.8	9.2	10	8	7								SS-107	14%	990.3
													M		10.7
Boring Terminated at Elevation 990.3 ft in Saprolite (silty SAND)															

NCDOT BORE DOUBLE U5824\_GEO\_RWAL\_53+70.GPJ NC\_DOT\_GDT 7/19/22

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Fischer, H.											
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)										
BORING NO. RWAL_5550		STATION 55+50		OFFSET CL		ALIGNMENT RET_WALL_537											
COLLAR ELEV. 1,000.4 ft		TOTAL DEPTH 10.3 ft		NORTHING 882,257		EASTING 1,660,165											
DRILL RIG/HAMMER EFF./DATE SUM2603 CME-550X 83% 11/12/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Moseley, M.G.		START DATE 06/28/22		COMP. DATE 06/28/22		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)		
1005																	
1000	1,000.4	0.0	12	21	20										1,000.4	GROUND SURFACE	0.0
995	996.5	3.9	7	6	8										998.1	<b>RESIDUAL</b> red-orange, hard, moderately plastic, highly sandy, silty CLAY (A-7-6) with some gravel-sized crystalline rock fragments	2.3
	991.5	8.9	29	57	43/0.4										991.0	<b>SAPROLITE</b> red and orange, medium dense, silty SAND (A-2-4) with trace gravel-sized rock fragments and mica	9.4
															990.1	<b>WEATHERED ROCK</b> (Granite)	10.3
																Boring Terminated at Elevation 990.1 ft in Weathered Rock (Granite)	
																- The top few feet of Residual soil may have been disturbed during the construction of the nearby bank.	

NCDOT BORE DOUBLE U5824\_GEO\_RWAL\_53+70.GPJ NC\_DOT.GDT 7/19/22



REFERENCE: U-5824

PROJECT: 44395

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4-6	PROFILES
7-9	BORE LOGS

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY FORSYTH  
 PROJECT DESCRIPTION NC 66 (OLD HOLLOW ROAD)  
WIDENING FROM HARLEY DRIVE TO US 158

SITE DESCRIPTION RETAINING WALL ALONG -L-  
-RET WALL 5617- STA = 56+17.20 - 59+07.56 (CL)  
-L- STA = 56+17.20 - 59+00.00 (74.33' - 52.5' RT)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5824	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 MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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

PERSONNEL

M. SHIPMAN, EI

H. FISCHER, GIT

M.G. MOSELEY

J. MOSELEY

INVESTIGATED BY B. SMITH, PG

DRAWN BY B. SMITH, PG

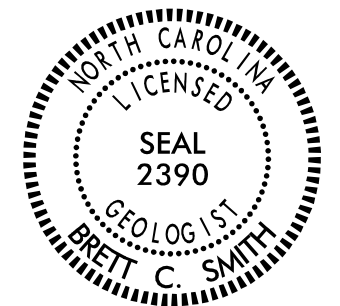
CHECKED BY B. WORLEY, PG

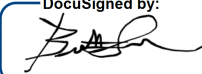
SUBMITTED BY B. SMITH, PG

DATE JULY, 2022

Prepared in the Office of:

 **SUMMIT**  
 DESIGN AND ENGINEERING SERVICES  
 FIRM NO. P-0339 and C-487  
 2715 Ashton Drive, Ste 104  
 Wilmington, NC 28412  
 Phone: (910) 475-1208  
 www.summitde.com



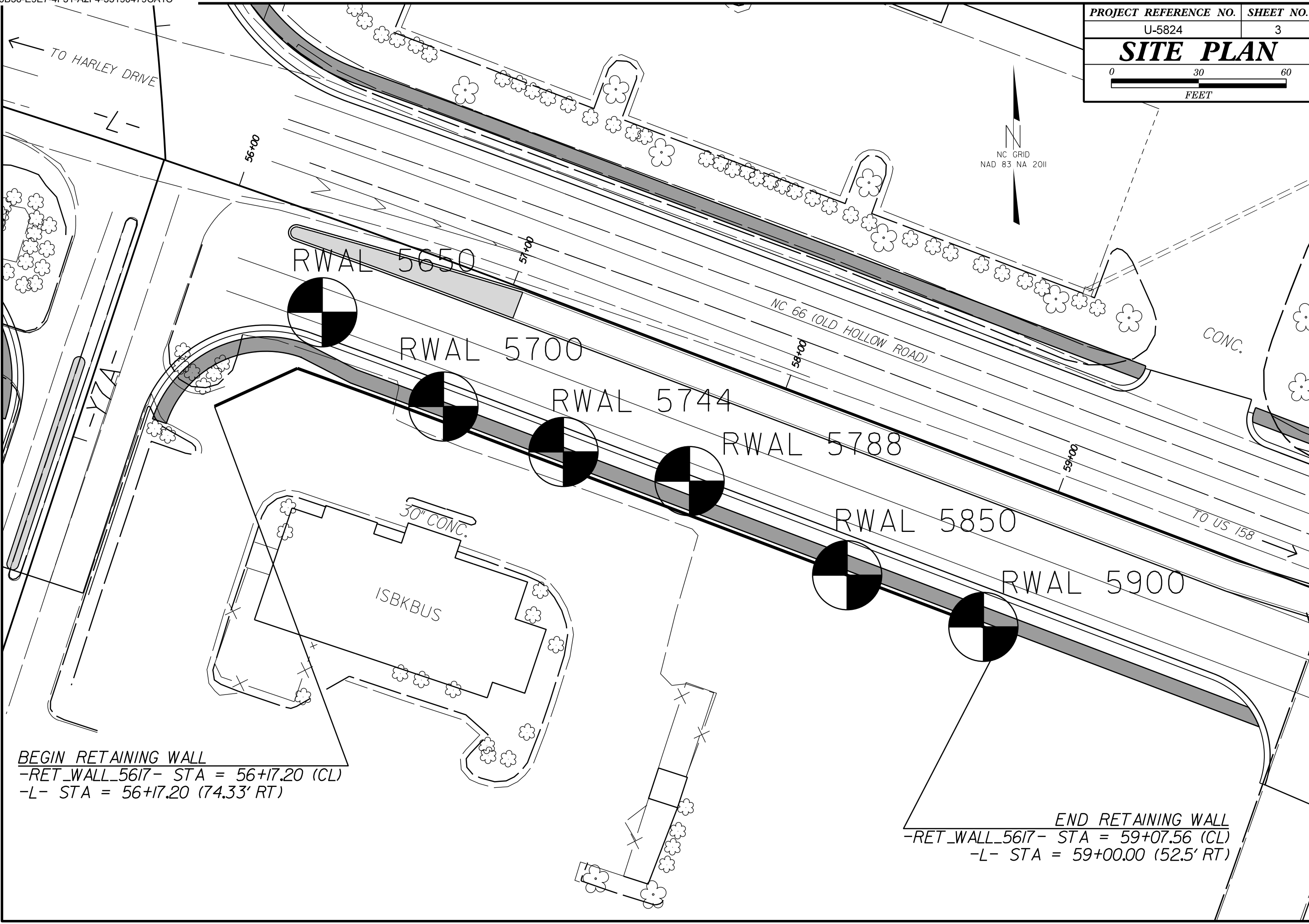
DocuSigned by:  
  
 2/10/2023  
 SIGNATURE DATE

**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**

<b>SOIL DESCRIPTION</b>				<b>GRADATION</b>				<b>ROCK DESCRIPTION</b>				<b>TERMS AND DEFINITIONS</b>																																																															
<p>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></p>				<p><b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.  <b>UNIFORMLY GRADED</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.  <b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>				<p>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:</p>				<p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.  <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  <b>ARGILLACEOUS</b> - 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.  <b>ARTESIAN</b> - 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.  <b>CALCREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.  <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.  <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOADED FROM PARENT MATERIAL.  <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.  <b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.  <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.  <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.  <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIUS STRATUM.  <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  <b>ROCK QUALITY DESIGNATION (RQD)</b> - 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.  <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.  <b>SILL</b> - 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.  <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.  <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS (IN 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.  <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  <b>STRATA ROCK QUALITY DESIGNATION (SROD)</b> - 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.  <b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																															
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>				<b>MINERALOGICAL COMPOSITION</b>				<b>WEATHERING</b>																																																																			
<p><b>GENERAL CLASS.</b></p> <table border="1" style="width: 100%; text-align: center;"> <tr> <th colspan="2">GRANULAR MATERIALS (&lt;= 35% PASSING #200)</th> <th colspan="5">SILT-CLAY MATERIALS (&gt; 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-4, A-5</th> <th>A-6, A-7</th> <th></th> <th></th> <th></th> </tr> <tr> <td>SYMBOL</td> <td>A-1-a</td> <td>A-1-b</td> <td>A-2-4</td> <td>A-2-5</td> <td>A-2-6</td> <td>A-2-7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>				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	A-6, A-7				SYMBOL	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7								<p><b>MINERAL NAMES</b> SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>				<p><b>FRESH</b> - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.  <b>VERY SLIGHT (IV SL.)</b> - 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.  <b>SLIGHT (SL.)</b> - 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.  <b>MODERATE (MOD.)</b> - 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.  <b>MODERATELY SEVERE (MOD. SEV.)</b> - 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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i>  <b>SEVERE (SEV.)</b> - 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. <i>IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</i>  <b>VERY SEVERE (IV SEV.)</b> - 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. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</i>  <b>COMPLETE</b> - 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.</p>																													
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	A-6, A-7																																																																	
SYMBOL	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7																																																																					
<b>COMPRESSIBILITY</b>				<b>PERCENTAGE OF MATERIAL</b>				<b>GROUND WATER</b>																																																																			
<p>SLIGHTLY COMPRESSIBLE LL &lt; 31                  MODERATELY COMPRESSIBLE LL = 31 - 50                  HIGHLY COMPRESSIBLE LL &gt; 50</p>				<table border="1" style="width: 100%; text-align: center;"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt; 10%</td> <td>&gt; 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table>				ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%	HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE	<p>▽ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING                  ▽ STATIC WATER LEVEL AFTER 24 HOURS                  ▽ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA                  ◯ SPRING OR SEEP</p>																																															
ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL																																																																								
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%																																																																								
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%																																																																								
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%																																																																								
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE																																																																								
<b>GROUND WATER</b>				<b>MISCELLANEOUS SYMBOLS</b>				<b>RECOMMENDATION SYMBOLS</b>				<b>ABBREVIATIONS</b>																																																															
<p>PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS &gt; LL - 30</p>				<p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</p> <p>SOIL SYMBOL</p> <p>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</p> <p>INFERRED SOIL BOUNDARY</p> <p>INFERRED ROCK LINE</p> <p>ALLUVIAL SOIL BOUNDARY</p>				<p>DIP &amp; DIP DIRECTION OF ROCK STRUCTURES</p> <p>SPT SPT DMT TEST BORING</p> <p>AUGER BORING</p> <p>CORE BORING</p> <p>MONITORING WELL</p> <p>PIEZOMETER INSTALLATION</p> <p>SLOPE INDICATOR INSTALLATION</p> <p>CONE PENETROMETER TEST</p> <p>SOUNDING ROD</p> <p>TEST BORING WITH CORE</p> <p>SPT N-VALUE</p>				<p>UNDERCUT</p> <p>SHALLOW UNDERCUT</p> <p>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</p> <p>UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</p>				<p>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                  HI. - HIGHLY</p> <p>MED. - MEDIUM                  MICA - MICACEOUS                  MOD. - MODERATELY                  NP - NON PLASTIC                  ORG. - ORGANIC                  PMT - PRESSUREMETER TEST                  SAP. - SAPROLITIC                  SD. - SAND, SANDY                  SL. - SILTY, SILTY                  SLI. - SLIGHTLY                  TCR - TRICONE REFUSAL                  w - MOISTURE CONTENT                  V - VERY</p> <p>VST - VANE SHEAR TEST                  WEA. - WEATHERED                  U - UNIT WEIGHT                  Ug - DRY UNIT WEIGHT</p> <p>SAMPLE ABBREVIATIONS</p> <p>S - BULK                  SS - SPLIT SPOON                  ST - SHELBY TUBE                  RS - ROCK                  RT - RECOMPACTED TRIAXIAL                  CBR - CALIFORNIA BEARING RATIO</p>																																																											
<b>TEXTURE OR GRAIN SIZE</b>				<b>SOIL MOISTURE - CORRELATION OF TERMS</b>				<b>EQUIPMENT USED ON SUBJECT PROJECT</b>				<b>FRACATURE SPACING</b>				<b>BEDDING</b>																																																											
<table border="1" style="width: 100%; text-align: center;"> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> <tr> <td></td> <td>4.75</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> </table>				U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270		4.75	2.00	0.42	0.25	0.075	0.053	<table border="1" style="width: 100%; text-align: center;"> <tr> <th>Boulder (Bldr.)</th> <th>Cobble (Cob.)</th> <th>Gravel (Gr.)</th> <th>Coarse Sand (Cse. Sd.)</th> <th>Fine Sand (F Sd.)</th> <th>Silt (Sl.)</th> <th>Clay (Cl.)</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>				Boulder (Bldr.)	Cobble (Cob.)	Gravel (Gr.)	Coarse Sand (Cse. Sd.)	Fine Sand (F Sd.)	Silt (Sl.)	Clay (Cl.)								<p>DRILL UNITS:  <input type="checkbox"/> CME-45C  <input type="checkbox"/> CME-55  <input checked="" type="checkbox"/> CME-550X  <input type="checkbox"/> VANE SHEAR TEST  <input type="checkbox"/> PORTABLE HOIST</p>				<p>ADVANCING TOOLS:  <input type="checkbox"/> CLAY BITS  <input type="checkbox"/> 6' CONTINUOUS FLIGHT AUGER  <input checked="" type="checkbox"/> 3.25" HOLLOW STEM AUGERS  <input type="checkbox"/> HARD FACED FINGER BITS  <input type="checkbox"/> TUNG-CARBIDE INSERTS  <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER  <input type="checkbox"/> TRICONE *STEEL TEETH  <input type="checkbox"/> TRICONE *TUNG-CARB.  <input type="checkbox"/> CORE BIT</p>				<table border="1" style="width: 100%; text-align: center;"> <tr> <th>TERM</th> <th>SPACING</th> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED</td> <td>&lt; 0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED</td> <td>&lt; 0.008 FEET</td> </tr> </table>				TERM	SPACING	TERM	THICKNESS	VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET	WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET	MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET	CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET	VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	< 0.008 - 0.03 FEET			THINLY LAMINATED	< 0.008 FEET
U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270																																																																					
	4.75	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.)																																																																					
TERM	SPACING	TERM	THICKNESS																																																																								
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET																																																																								
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET																																																																								
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET																																																																								
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																								
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	< 0.008 - 0.03 FEET																																																																								
		THINLY LAMINATED	< 0.008 FEET																																																																								
<b>PLASTICITY</b>				<b>FRACATURE SPACING</b>				<b>BEDDING</b>				<b>INDURATION</b>																																																															
<table border="1" style="width: 100%; text-align: center;"> <tr> <th colspan="2">PLASTICITY INDEX (PI)</th> <th colspan="2">DRY STRENGTH</th> </tr> <tr> <td>NON PLASTIC</td> <td>0-5</td> <td colspan="2">VERY LOW</td> </tr> <tr> <td>SLIGHTLY PLASTIC</td> <td>6-15</td> <td colspan="2">SLIGHT</td> </tr> <tr> <td>MODERATELY PLASTIC</td> <td>16-25</td> <td colspan="2">MEDIUM</td> </tr> <tr> <td>HIGHLY PLASTIC</td> <td>26 OR MORE</td> <td colspan="2">HIGH</td> </tr> </table>				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		<p><b>DRILL UNITS:</b>  <input type="checkbox"/> CME-45C  <input type="checkbox"/> CME-55  <input checked="" type="checkbox"/> CME-550X  <input type="checkbox"/> VANE SHEAR TEST  <input type="checkbox"/> PORTABLE HOIST</p>				<p><b>ADVANCING TOOLS:</b>  <input type="checkbox"/> CLAY BITS  <input type="checkbox"/> 6' CONTINUOUS FLIGHT AUGER  <input checked="" type="checkbox"/> 3.25" HOLLOW STEM AUGERS  <input type="checkbox"/> HARD FACED FINGER BITS  <input type="checkbox"/> TUNG-CARBIDE INSERTS  <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER  <input type="checkbox"/> TRICONE *STEEL TEETH  <input type="checkbox"/> TRICONE *TUNG-CARB.  <input type="checkbox"/> CORE BIT</p>				<p><b>HAMMER TYPE:</b>  <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</p> <p><b>CORE SIZE:</b>  <input type="checkbox"/> -B <input type="checkbox"/> -H</p> <p><b>HAND TOOLS:</b>  <input type="checkbox"/> POST HOLE DIGGER  <input type="checkbox"/> HAND AUGER  <input type="checkbox"/> SOUNDING ROD  <input type="checkbox"/> VANE SHEAR TEST</p>				<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>																																							
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																																																																									
<b>COLOR</b>				<b>FRACATURE SPACING</b>				<b>BEDDING</b>				<b>INDURATION</b>																																																															
<p>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.</p>				<p><b>FRACATURE SPACING</b></p>				<p><b>BEDDING</b></p>				<p><b>INDURATION</b></p>																																																															
				<b>FRACATURE SPACING</b>				<b>BEDDING</b>				<b>INDURATION</b>																																																															
				<p><b>FRACATURE SPACING</b></p>				<p><b>BEDDING</b></p>				<p><b>INDURATION</b></p>																																																															

PROJECT REFERENCE NO.	SHEET NO.
U-5824	3
<b>SITE PLAN</b>	
FEET	

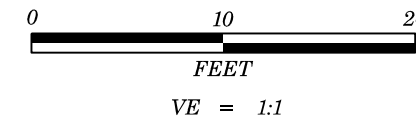


**BEGIN RETAINING WALL**  
 -RET\_WALL\_5617- STA = 56+17.20 (CL)  
 -L- STA = 56+17.20 (74.33' RT)

**END RETAINING WALL**  
 -RET\_WALL\_5617- STA = 59+07.56 (CL)  
 -L- STA = 59+00.00 (52.5' RT)

# PRELIMINARY RETAINING WALL ENVELOPE

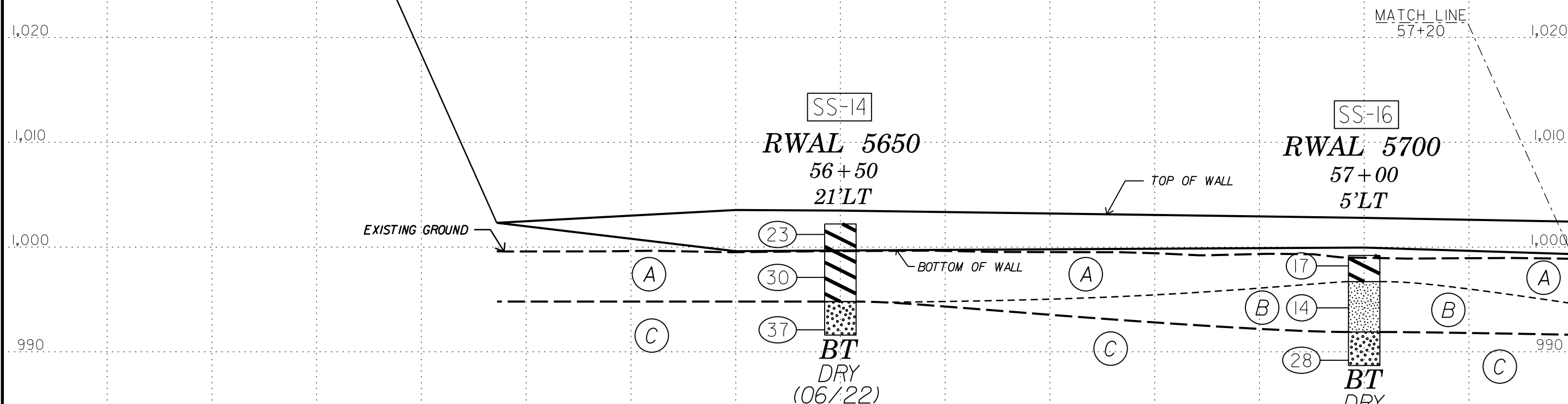
NOTE: THE WALL ENVELOPE PRESENTED DOES NOT ACCURATELY DEPICT THE PROPOSED FACE OF THE WALL



<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
U-5824	4
<b>RETAINING WALL PROFILE</b>	

BEGIN RETAINING WALL  
 -RET\_WALL\_5617- STA = 56+17.20 (CL)  
 -L- STA = 56+17.20 (74.33' RT)

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-14	21'LT	56+50	4.1' - 5.6'	A-7-5(6)	51	16	32.7	18.5	10.6	38.2	99	77	51	16.5	N/A
SS-16	5'LT	57+00	0.0' - 1.5'	A-7-5(16)	59	26	23.4	15.7	12.7	48.2	98	84	63	23.1	N/A



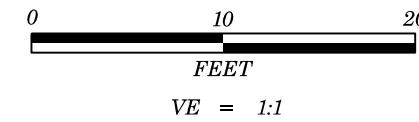
- (A) **RESIDUAL:** brown, tan-brown, orange-brown, and red-brown, dry to moist, very stiff to hard, moderately to highly plastic, highly sandy, silty CLAY (A-7-5) with little to trace mica
- (B) **RESIDUAL:** red-brown, moist, stiff, sandy SILT (A-4) with trace mica
- (C) **SAPROLITE:** orange-brown, red-brown, and white, moist, medium dense to dense, silty SAND (A-2-4) with trace some to mica

NOTE: THE EXISTING GROUND-LINE WAS GENERATED ALONG RETAINING WALL PROFILE USING THE TIN FILE (U5824\_LS\_DTM\_TIN\_DOT\_2022-01-10.tin). THE BORING STATION AND OFFSET ARE SHOWN RELATIVE TO THE -RET\_WALL\_5617- ALIGNMENT. STRATIGRAPHY IS DRAWN THROUGH OFFSET BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

56+20    56+30    56+40    56+50    56+60    56+70    56+80    56+90    57+00    57+10

# PRELIMINARY RETAINING WALL ENVELOPE

NOTE: THE WALL ENVELOPE PRESENTED DOES NOT ACCURATELY DEPICT THE PROPOSED FACE OF THE WALL

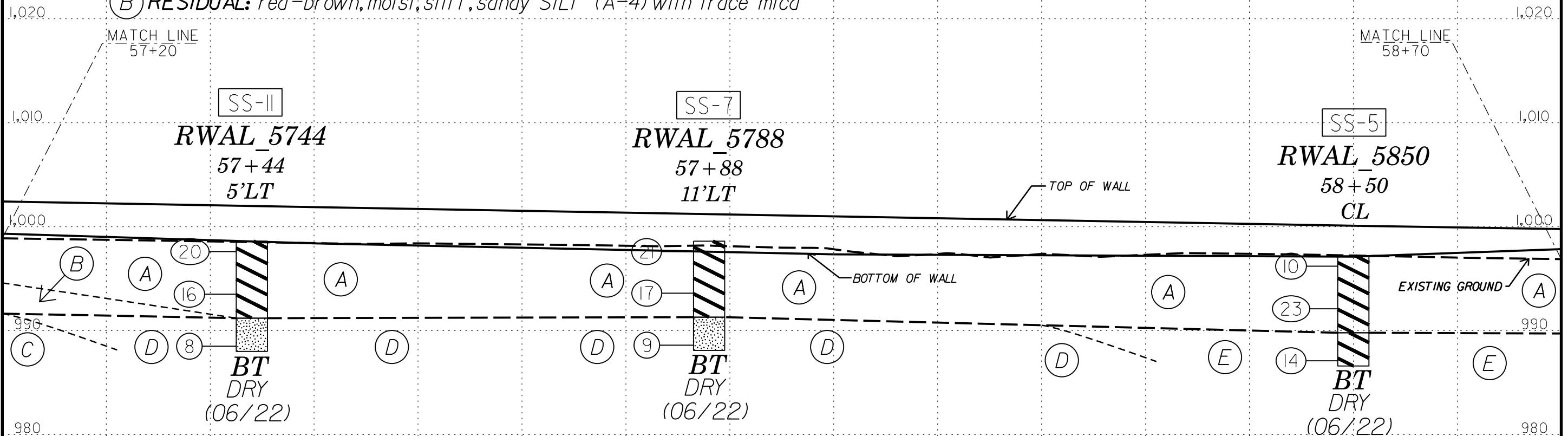


<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
U-5824	5
<b>RETAINING WALL PROFILE</b>	

SOIL TEST RESULTS															
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		
SS-11	5'LT	57+44	4.1' - 5.6'	A-7-5(6)	65	15	26.5	32.8	14.5	26.2	100	83	49	29.8	NA
SS-7	11'LT	57+88	0.0' - 1.5'	A-7-6(8)	43	20	31.5	16.6	14.2	37.7	97	75	53	11.8	NA
SS-5	CL	58+50	4.1' - 5.6'	A-7-5(35)	75	26	2.1	5.2	24.6	68.1	100	99	95	38.0	NA

(A) **RESIDUAL:** brown, red-brown, and orange-brown, dry to moist, stiff to very stiff, slightly to highly plastic, highly sandy to trace sand, silty CLAY (A-7-5/A-7-6) with trace gravel-sized crystalline rock fragments, trace mica and MnO

(B) **RESIDUAL:** red-brown, moist, stiff, sandy SILT (A-4) with trace mica



(C) **SAPROLITE:** orange-brown, red-brown, and white, moist, medium dense to dense, silty SAND (A-2-4) with trace some to mica

(D) **SAPROLITE:** red-brown and orange-brown, moist, stiff, sandy SILT (A-4) with little mica

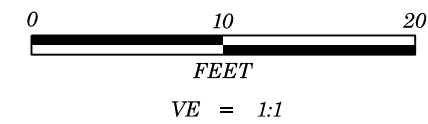
(E) **SAPROLITE:** red-brown and orange-brown, moist, stiff, silty CLAY (A-7) with trace mica and MnO

NOTE: THE EXISTING GROUND-LINE WAS GENERATED ALONG RETAINING WALL PROFILE USING THE TIN FILE (U5824\_LS\_DTM\_TIN\_DOT\_2022-01-10.tin). THE BORING STATION AND OFFSET ARE SHOWN RELATIVE TO THE -RET\_WALL\_5617- ALIGNMENT. STRATIGRAPHY IS DRAWN THROUGH OFFSET BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

57+30    57+40    57+50    57+60    57+70    57+80    57+90    58+00    58+10    58+20    58+30    58+40    58+50    58+60

# PRELIMINARY RETAINING WALL ENVELOPE

NOTE: THE WALL ENVELOPE PRESENTED DOES NOT ACCURATELY DEPICT THE PROPOSED FACE OF THE WALL

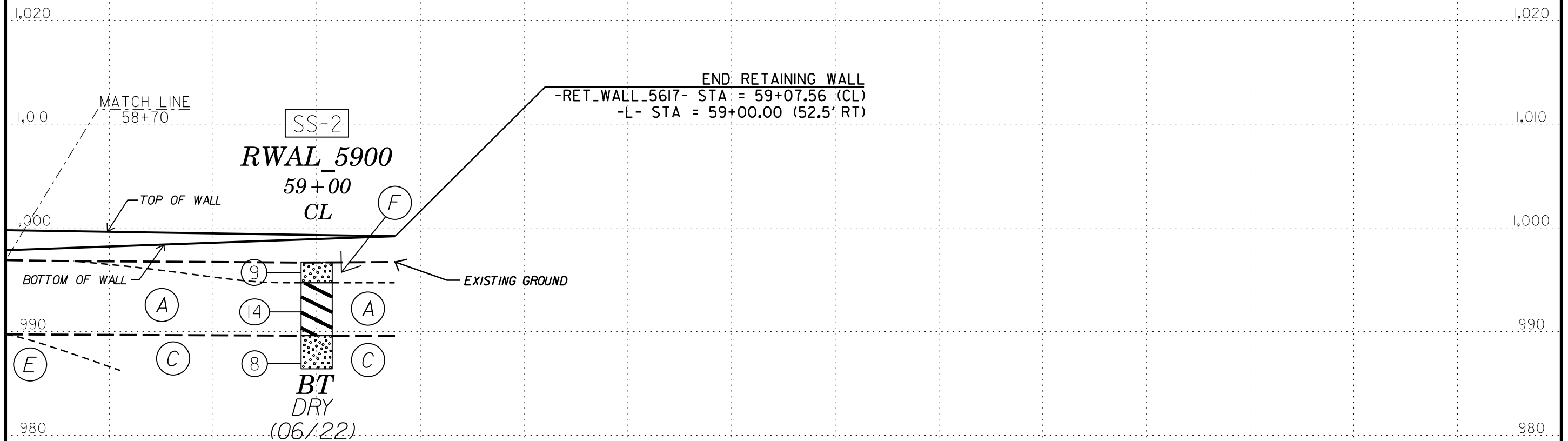


<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
U-5824	6
<b>RETAINING WALL PROFILE</b>	

<b>SOIL TEST RESULTS</b>															
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		
SS-2	CL	59+00	3.8' - 5.3'	A-7-5(18)	68	29	26.0	15.2	12.9	45.9	98	79	61	22.0	N/A

(A) **RESIDUAL:** red-brown and orange-brown, moist, stiff, highly plastic, highly sandy, silty CLAY (A-7-5) with trace mica

(F) **RESIDUAL:** brown, dry, loose, silty SAND (A-2-4) with trace gravel-sized crystalline rock fragments



(C) **SAPROLITE:** red-brown and white, moist, loose, silty SAND (A-2-4) with trace gravel-sized crystalline rock fragments and mica

(E) **SAPROLITE:** red-brown and orange-brown, moist, stiff, silty CLAY (A-7) with trace mica and MnO

NOTE: THE EXISTING GROUND-LINE WAS GENERATED ALONG RETAINING WALL PROFILE USING THE TIN FILE (U5824\_LS\_DTM\_TIN\_DOT\_2022-01-10.tin). THE BORING STATION AND OFFSET ARE SHOWN RELATIVE TO THE -RET\_WALL\_5617- ALIGNMENT. STRATIGRAPHY IS DRAWN THROUGH OFFSET BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

58+80      58+90      59+00      59+10

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Shipman, M.										
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)									
BORING NO. RWAL_5650		STATION 56+50		OFFSET 21 ft LT		ALIGNMENT RET_WALL_56										
COLLAR ELEV. 1,002.2 ft		TOTAL DEPTH 10.6 ft		NORTHING 882,289		EASTING 1,660,282										
DRILL RIG/HAMMER EFF./DATE SUM2603 CME-550X 83% 11/12/2021			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Moseley, M.G.		START DATE 06/15/22		COMP. DATE 06/15/22		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1005																
	1,002.2	0.0													1,002.2	0.0
			9	9	14											
1000	998.1	4.1														
			10	13	17											
995	993.1	9.1														
			10	18	19											

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Shipman, M.										
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)									
BORING NO. RWAL_5700		STATION 57+00		OFFSET 5 ft LT		ALIGNMENT RET_WALL_56										
COLLAR ELEV. 999.2 ft		TOTAL DEPTH 10.5 ft		NORTHING 882,257		EASTING 1,660,324										
DRILL RIG/HAMMER EFF./DATE SUM2603 CME-550X 83% 11/12/2021			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Moseley, M.G.		START DATE 06/15/22		COMP. DATE 06/15/22		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1000																
	999.2	0.0													999.2	0.0
			7	7	10											
995	995.2	4.0														
			7	7	7											
990	990.2	9.0														
			10	8	20											

NCDOT BORE DOUBLE U5824\_GEO\_RWAL\_56+17.GPJ NC\_DOT.GDT 7/18/22

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Shipman, M.											
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)										
BORING NO. RWAL_5744		STATION 57+44		OFFSET 5 ft LT		ALIGNMENT RET_WALL_561											
COLLAR ELEV. 998.6 ft		TOTAL DEPTH 10.6 ft		NORTHING 882,241		EASTING 1,660,365											
DRILL RIG/HAMMER EFF./DATE SUM2603 CME-550X 83% 11/12/2021			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER Moseley, M.G.		START DATE 06/15/22		COMP. DATE 06/15/22		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				ELEV. (ft)	DEPTH (ft)		
1000	998.6	0.0	10	8	12										998.6	0.0	GROUND SURFACE
995	994.5	4.1	7	7	9										991.2	7.4	<b>RESIDUAL</b> brown to red-brown, very stiff, slightly plastic, highly sandy, silty CLAY (A-7-5) with trace mica and MnO
990	989.5	9.1	3	4	4										988.0	10.6	<b>SAPROLITE</b> red-brown and orange-brown, stiff, sandy SILT (A-4) with little mica Boring Terminated at Elevation 988.0 ft in Saprolite (sandy SILT)

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Shipman, M.											
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)										
BORING NO. RWAL_5788		STATION 57+88		OFFSET 11 ft LT		ALIGNMENT RET_WALL_561											
COLLAR ELEV. 998.6 ft		TOTAL DEPTH 10.5 ft		NORTHING 882,231		EASTING 1,660,408											
DRILL RIG/HAMMER EFF./DATE SUM2603 CME-550X 83% 11/12/2021			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER Moseley, M.G.		START DATE 06/15/22		COMP. DATE 06/15/22		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				ELEV. (ft)	DEPTH (ft)		
1000	998.6	0.0	6	11	10										998.6	0.0	GROUND SURFACE
995	994.6	4.0	7	7	10										991.3	7.3	<b>RESIDUAL</b> red-brown and brown, very stiff, moderately plastic, highly sandy, silty CLAY (A-7-6) with trace gravel-sized crystalline rock fragments and mica
990	989.6	9.0	4	4	5										988.1	10.5	<b>SAPROLITE</b> red-brown and orange-brown, stiff, sandy SILT (A-4) with little mica Boring Terminated at Elevation 988.1 ft in Saprolite (sandy SILT)

NCDOT BORE DOUBLE U5824\_GEO\_RWAL\_56+17.GPJ NC\_DOT\_GDT 7/18/22



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Shipman, M.										
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)									
BORING NO. RWAL_5850		STATION 58+50		OFFSET CL		ALIGNMENT RET_WALL_561										
COLLAR ELEV. 997.2 ft		TOTAL DEPTH 10.6 ft		NORTHING 882,199		EASTING 1,660,462										
DRILL RIG/HAMMER EFF./DATE SUM2603 CME-550X 83% 11/12/2021			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Moseley, M.G.		START DATE 06/15/22		COMP. DATE 06/15/22		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1000																
	997.2	0.0	6	5	5										997.2	0.0
995																
	993.1	4.1	8	10	13											
990																
	988.1	9.1	4	6	8											

WBS 44395.1.1		TIP U-5824		COUNTY FORSYTH		GEOLOGIST Shipman, M.										
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley Drive to US 158							GROUND WTR (ft)									
BORING NO. RWAL_5900		STATION 59+00		OFFSET CL		ALIGNMENT RET_WALL_561										
COLLAR ELEV. 996.7 ft		TOTAL DEPTH 10.3 ft		NORTHING 882,181		EASTING 1,660,509										
DRILL RIG/HAMMER EFF./DATE SUM2603 CME-550X 83% 11/12/2021			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Moseley, M.G.		START DATE 06/15/22		COMP. DATE 06/15/22		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1000																
	996.7	0.0	5	4	5										996.7	0.0
995																
	992.9	3.8	5	6	8											
990																
	987.9	8.8	4	4	4											

NCDOT BORE DOUBLE U5824\_GEO\_RWAL\_56+17.GPJ NC\_DOT\_GDT 7/18/22