79B REFERENCE **CONTENTS**

TITLE SHEET

SITE PLAN

LEGEND (SOIL & ROCK)

SUPPLEMENTAL LEGEND (GSI)

BORE LOGS, CORE REPORTS, & CORE PHOTOGRAPHS

-NWL5- SECTION I PROFILE

SHEET NO.

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4839 M

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** GEOTECHNICAL ENGINEERING UNIT

DESCRIPTION

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY FORSYTH PROJECT DESCRIPTION <u>I-74 FROM</u> EAST OF WALKERTOWN GUTHRIE ROAD TO WEST OF W. **MOUNTAIN STREET** SITE DESCRIPTION NOISE WALL -NWL5- SECI

STATE PROJECT REFERENCE NO. 8 U-2579BB

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INVESTIGATED BY ESP Associates, Inc.

DRAWN BY _P. BARRERA

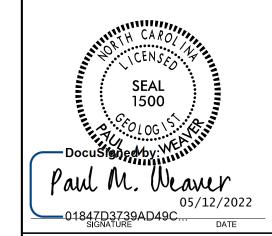
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DATE <u>May</u> 2022



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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	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.	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.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
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:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	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	AQUIFER - A WATER BEARING FORMATION OR STRATA.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
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	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	WEATHERED WALLES AND THE THE CONTROL OF THE CONTROL	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.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
LLASS. (\$\(\sigma\) 7ASSINU *200) (> 354 PASSINU *200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-0 A-1-0 A-2-4 A-2-5 A-2-6 A-2-7 A-2-6 A-2-7 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
Z PASSING	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SEDIMENTARY ROC	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.
■10 50 MX GRANULAR SILI- MUCK,	PERCENTAGE OF MATERIAL	CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*40 30 MX 50 MX 51 MN PEAT SOILS SOILS	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.
MATERIAL	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
PASSING "40 SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
LL 48 MX 41 MN 48 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN LITTLE OR LITTLE OR HIGHLY PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN MODERATE HIGHLY	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOLIS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
CEN RATING FAIR TO		(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	PARENT MATERIAL.
AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	SPRING OR SEEP	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
(N-VALUE) (TUNS/FT-)	WITH SOIL DESCRIPTION OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.
GENERALLY VERY LOOSE	SOIL SYMBOL SOIL SYMBOL SOIT ONT TEST BORING SLOPE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR MEDIUM DENSE 10 TO 30 N/A MATERIAL DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT TEST	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE > 50	THAN ROADWAY EMBANKMENT TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25	— INFERRED SOIL BOUNDARY — CORE BORING ■ SOUNDING ROD	(V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MONITORING WELL TEST BORING	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BFF</u> COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2	A PIFTOMETER	SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	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
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4	TTTT ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY INSTALLATION SPT N-VALUE	ALSO AN EXAMPLE.	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIF	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SHALLOW STILLINGLASSIEIFD EXCAVATION - USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	UNDERCUT ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN. MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	BY MODERATE BLOWS.	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
SIZE IN. 12 3	CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL
SOIL MOISTURE - CORRELATION OF TERMS	CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 _d - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN Ø.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST <u>SAMPLE ABBREVIATIONS</u>	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
(SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC PLOUID LIMIT	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE - WET - (W) SEMISULIDE REQUIRES DRING TO	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: PAINT MARK ON TOP OF WING WALL SET BY NCDOT
(P) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	IERM SPACING IERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	LOCATION AND SURVEYS
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	■ WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: 894.00 FEET
SL _ SHRINKAGE LIMIT	CME-45C CLAY BITS X AUTOMATIC MANUAL	MODERATELY CLOSE	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6: CONTINUOUS ELICHT AUGER	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	F.I.A.D = FILLED IMMEDIATELY AFTER DRILLING
	CME-55	THINLY LAMINATED < 0.008 FEET INDURATION	1
PLASTICITY	-	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	1
PLASTICITY INDEX (PI) DRY STRENGTH NON PLASTIC 0-5 VERY LOW	TUNG-CARRIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST CASING WY ADVANCER HAND TOOLS:	GENILE BLUW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	BORTARIE HOICT TRICONE STEEL TEETH POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TOTAL	CRAINC ARE DISCIONATE WITH STEEL PROPE.	
		INDURATED DIFFICULT TO BREAK WITH HAMMER.	
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.	X CORE BIT VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
		SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1

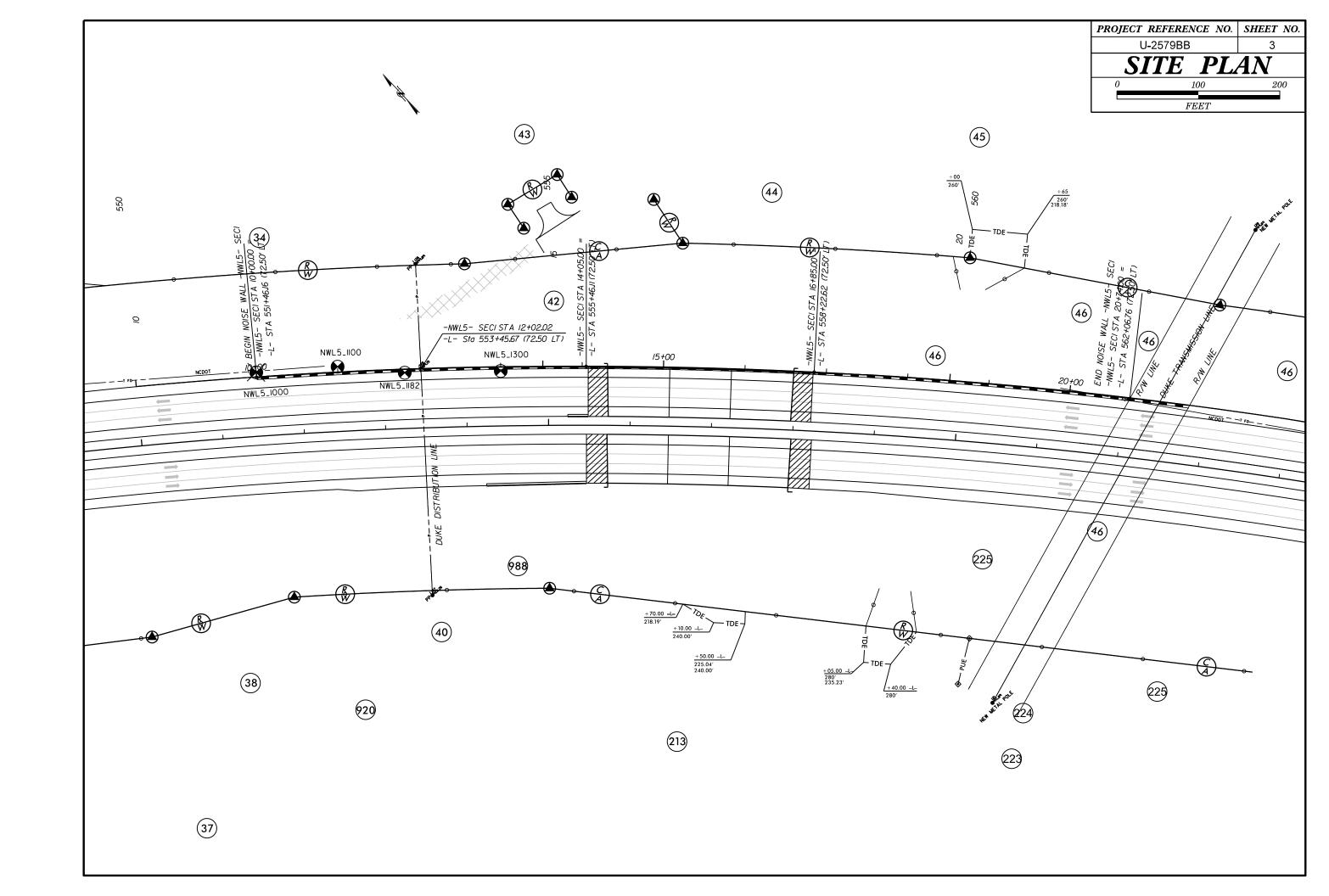
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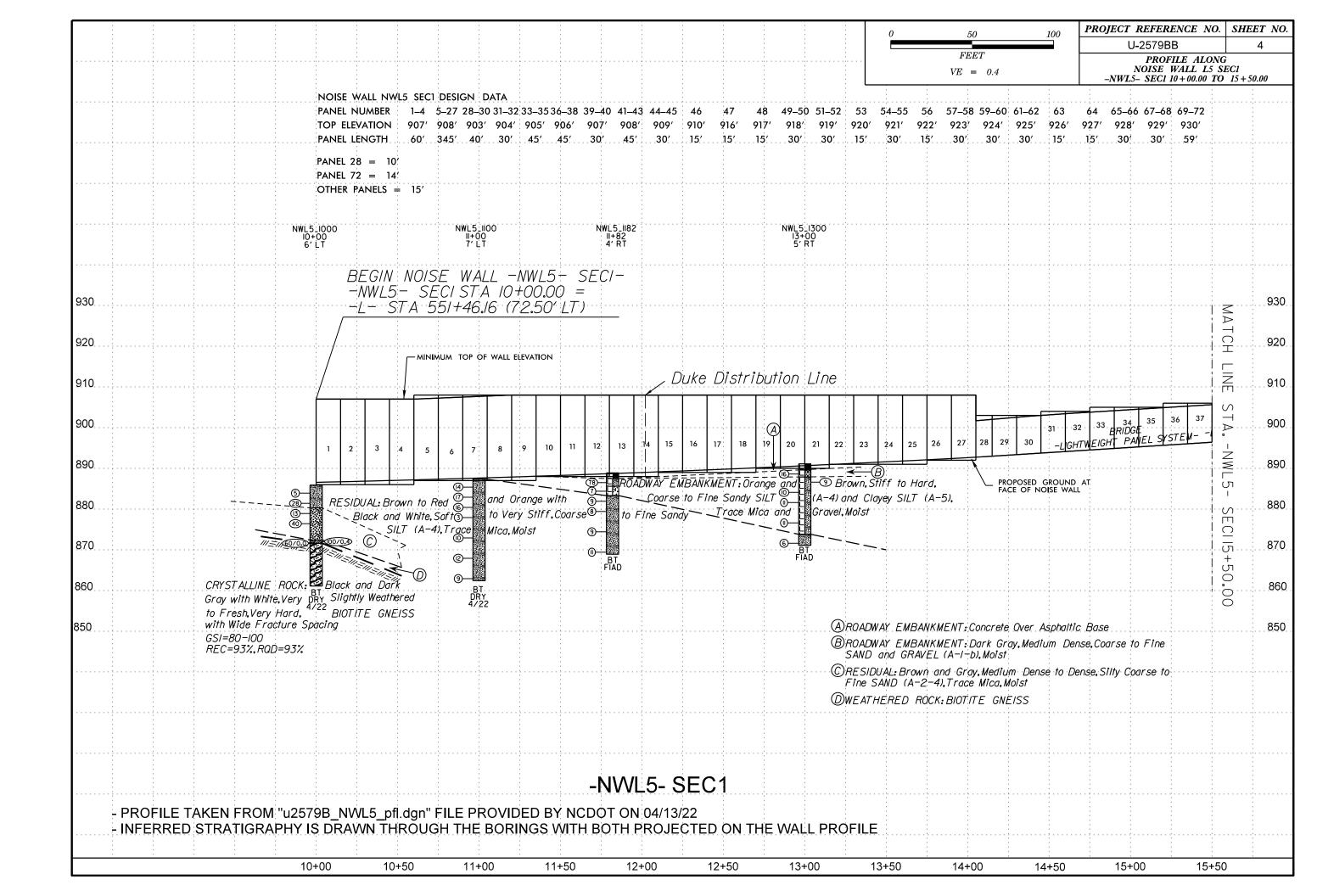
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES

AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Join	ed Rock Mass (Marın	os and Hoek, 200	00)			AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)
GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000) From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.	SURFACE CONDITIONS VERY GOOD Very rough, fresh unweathered surfaces	GOOD Rough, slightly weathered, iron stained surfaces	FAIR Smooth, moderately weathered and altered surfaces	POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments	VERY POOR Slickensided, highly weathered surfaces with soft clay coatings or fillings	GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000) From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving of the semily controlled failures. Where undavourably oriented continuous weak planer discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor the continuous was the value of criping soft to the right in the columns for fair, poor and very poor the control of the cost of the control of the rock mass. NERY POOR - Very sought, sought, sought, sought, so the control of the rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor the control of the rock masses in the columns for fair, poor and very poor the control of the rock masses in the columns for fair, poor and very poor the control of the rock masses in the columns for fair, poor and very poor the columns for fair, poor and very poor the columns for fair.
STRUCTURE				JALITY —		COMPOSITION AND STRUCTURE
INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities BLOCKY - well interlocked undisturbed rock mass consisting	K PIECES	70		N/A	N/A	A. Thick bedded, very blocky sandstone The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass, in shallow tunnels or slopes these bedding planes may cause structurally controlled instability. 60
of cubical blocks formed by three intersecting discontinuity sets VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets	OCKING OF ROCI	60				B. Sand- stone with stone and siltstone in similar amounts C. Sand- stone and siltstone or silty shale with sand- stone layers stone layers stone layers Stone layers stone layers stone layers stone layers
BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity	ASING INTERL		40	30		C. D. E. and G - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to F and H. F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure
DISINTEGRATED - poorly inter- locked, heavily broken rock mass with mixture of angular and rounded rock pieces	DECRE			20	10 /	G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.
LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes	V N/A	N/A	//	$\langle \ / \ \rangle$	/10 /	─────────────────────────────────────





GEOTECHNICAL BORING REPORT

SHEET 5 **BORE LOG**

NES RERECTO	TIP U-2579E	B COLINT	r FORSYTH		GEOLOGIST Gonzales, F	P B
VBS 34839.1.11	-74 from East of Walkertow			in Street - No		GROUND WTR (ft)
BORING NO. NWL5_1	1		OFFSET 6 ft LT	1100000	ALIGNMENT -NWL5-	0 HR. N/A
COLLAR ELEV. 885.9			NORTHING 870.	429	EASTING 1,664,466	24 HR. Dry
	/DATE SUM3123 CME-550X 86			METHOD SP	<u> </u>	AMMER TYPE Automatic
DRILLER Moseley, M.			COMP. DATE 04		SURFACE WATER DEPTH	
ELEV PERSON	BLOW COUNT 0 2:	BLOWS PER FOOT	75 100 NO.	MOI G	SOIL AND ROCK	DESCRIPTION DEPTH (1
390				_		
885 884.9 1.0				<u> </u>	885.9 GROUND S	
1.0	3 2 3			мБЕ	Brown with Gray and W Sandy SILT,	/hite, Coarse to Fine
882.4 + 3.5	5 14 14	28		м 🖺	•	
380 879.9 - 6.0	4 5 8		 · · · · 	l _ຑ 🔛	880.3 Brown and Gray, Silty C	coarse to Fine SAND,
877.4 7 8.5		.[:::: :::::		"	Trace I	Mica
375	11 16 24	. •40		M		
\neg \mp \bot					•	
872.4 † 13.5 871.6 † 14.3 100/		:: <u> -:</u>	100/0.4		872.4 871.6 WEATHERE	
70 + 60/0	/0.0		60/0.0		BIOTITE C	
					Black and Dark Gray Slightly Weathered to	with White, Very
365					BIOTITE GNEISS w Spaci	ith Wide Fracture
			1		. Орасі	ng .
‡					861.1	24
+		,			Boring Terminated at I Crystalline Rock: B	Elevation 861.1 ft in

GEOTECHNICAL BORING REPORT CORE LOG

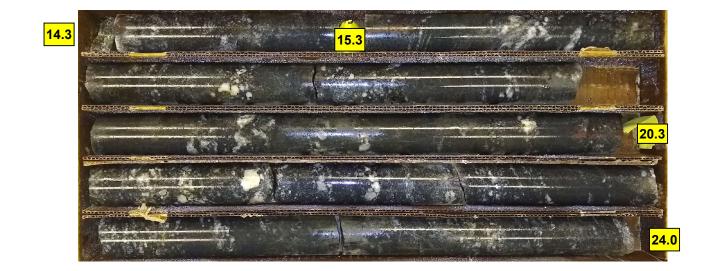
SHEET 5

											KE LUG				
WBS	3483	9.1.11			TIP	U-257	'9BB	С	OUNT	Y F	ORSYTH	GEOLOGIST Gonzales,	P.B.		
SITE	DESC	RIPTION	I 1-74	from Ea				nrie Ro	oad to	Wes	t of W. Mountain Street - No	oise Wall Inventory		GROUN	D WTR (ft)
BOR	NG NO	. NWL	.5_100	00	STAT	ΓΙΟΝ	10+00			OF	FSET 6 ft LT	ALIGNMENT -NWL5-		0 HR.	N/A
COLI	AR EL	EV . 88	35.9 ft		TOTA	AL DE	PTH 24	.8 ft		NO	RTHING 870,429	EASTING 1,664,466		24 HR.	Dry
DRILL	. RIG/HA	MMER E	FF./DA	TE SUM	3123 CM	1E-550×	86% 11/2	/2021			DRILL METHOD SP	Core Boring H	HAMME	R TYPE	Automatic
DRIL	LER N	/loseley	, M.		STAF	RT DA	TE 04/2	7/22		CO	MP. DATE 04/27/22	SURFACE WATER DEPTH	H N/A	١	
COR	E SIZE	NQ					N 10.5 f								
LEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP NO	REC. (ft)	ATA RQD (ft) %	L O G	ELEV. (ft)	ESCRIPTION AND REMARKS			DEPTH (fl
71.6	074.6	14.2			(2.2)	(2.5)		(2.2)	(0.0)			Begin Coring @ 14.3 ft			
870 865	865.6	20.3	1.0 5.0 4.5	4:48/1.0 3:59/1.0 3:51/1.0 3:08/1.0 2:38/1.0 2:07/1.0 3:12/1.0 3:21/1.0 3:06/1.0 2:58/1.0	(0.8) (80% / (4.5) 90% (4.5) 100%	(0.8) (80%) (4.5) 90% (4.5) 100%		(9.8) 93%	(9.8) 93%		Hard BIO [*]	CRYSTALLINE ROCK with White, Very Slightly Weath ITTE GNEISS with Wide Fracture Fractures at 10 degrees GSI = 80-100	nered to e Spacii	Fresh, V ng	
	861.1	24.8		1:47/0.5							Boring Terminated Boring Terminated Boring Terminated	at Elevation 861.1 ft in Crystallin GNEISS	ne Rock	BIOTIT	24.'E

CORE PHOTOGRAPHS

STA. 10+00, 6' Left BOX 1: 14.3 - 24.0 FEET

STA. 10+00, 6' Left BOX 2: 24.0 - 24.8 FEET









GEOTECHNICAL BORING REPORT BORE LOG

BORE LOG			
WBS 34839.1.11 TIP U-2579BB COUNTY FORSYTH	GEOLOGIST Gonzales, P.B.	WBS 34839.1.11 TIP U-2579BB COUNT	TY FORSYTH GEOLOGIST Gonzales, P.B.
SITE DESCRIPTION I-74 from East of Walkertown Guthrie Road to West of W. Mountain Street	Noise Wall Inventory GROUND WTR (ft)	SITE DESCRIPTION I-74 from East of Walkertown Guthrie Road to	o West of W. Mountain Street - Noise Wall Inventory GROUND WTR (ft)
BORING NO. NWL5_1100 STATION 11+00 OFFSET 7 ft LT	ALIGNMENT -NWL5- 0 HR. Dry	BORING NO. NWL5_1182 STATION 11+82	OFFSET 4 ft RT ALIGNMENT -NWL5- 0 HR. Dry
COLLAR ELEV. 887.4 ft TOTAL DEPTH 25.0 ft NORTHING 870,366	EASTING 1,664,543 24 HR. Dry	COLLAR ELEV. 888.9 ft TOTAL DEPTH 20.0 ft	NORTHING 870,304 EASTING 1,664,598 24 HR. FIAD
DRILL RIG/HAMMER EFF./DATESUM3123 CME-550X 86% 11/2/2021DRILL METHOD	H.S. Augers HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE SUM3123 CME-550X 86% 11/2/2021	DRILL METHOD H.S. Augers HAMMER TYPE Automatic
DRILLER Moseley, M. START DATE 04/27/22 COMP. DATE 04/27/22	SURFACE WATER DEPTH N/A	DRILLER Moseley, M. START DATE 04/27/22	COMP. DATE 04/27/22 SURFACE WATER DEPTH N/A
ELEV (ft) DRIVE (LEV (ft) O.5ft O.5ft	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)	DRIVE DEPTH BLOW COUNT BLOWS PER FOOT	OT SAMP. L O SOIL AND ROCK DESCRIPTION MOI G
890 886.4 1.0 6 7 7 · k.; · · · · · · · · · · · · · · · · · · ·	- 887.4 GROUND SURFACE 0.0 RESIDUAL	890 887.5 1.4 28 42 36	888.9 GROUND SURFACE 0.0 ROADWAY EMBANKMENT 1.4 - 887.5 ROADWAY EMBANKMENT 1.4 - 1.1' Concrete over 0.3' Asphaltic Base 5 - 885.6 Brown with Orange, Coarse to Fine Sandy 3.3
885 6 7 7 1 14 1 1 1 1 M M M	Brown and Orange with White, Coarse to Fine Sandy SILT, Trace Mica	885 4 3.5 5 3 4 7	M LN SILT, Trace Mica SILT, Trace Mica 5.6
881.4 + 6.0		880 880.4 8.5	RESIDUAL Brown to Red and Orange with White and
880 10 8 8 1 16 1 1 1 M M M M M M M M M M M M M M		3 4 4	Black, Coarse to Fine Sandy SILT
875		875 875.4 13.5	
873.9 13.5 4 4 6 M	-	3 4 5	· · · · ·
870	-	870 870.4 18.5 3 5 6	
868.9 18.5 6 6 6 0 0 0 12.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		<u> </u>	Boring Terminated at Elevation 868.9 ft in Residual Soil: Sandy SILT
865	-		
6 5 4 . • 9	862.4 25.0 Boring Terminated at Elevation 862.4 ft in		
	Residual Soil: Sandy SILT		
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Total			
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GEOTECHNICAL BORING REPORT BORE LOG

VBS 348										UG							
	839.1.11			TI	P U-257	79BB	COUNT	Y FOF	RSYT	Н			GEOLOG	IST Gonzale	s, P.B.		
SITE DES	CRIPTIO	N I-74	from	East o	f Walkert	own Guth	rie Road to	West o	f W. I	Mountaiı	n Stre	et - N	oise Wall In	ventory		GROUN	D WTR (ft
BORING N	NO. NW	'L5_13	00	S	TATION	13+00		OFFSI	ET 5	ft RT			ALIGNME	NT -NWL5-		0 HR.	Dry
OLLAR E	ELEV. 8	891.1 ft		TO	OTAL DE	PTH 20.0) ft	NORT	HING	870,2	24		EASTING	1,664,685		24 HR.	FIAD
RILL RIG/I	HAMMER	EFF./DA	TE SI	JM3123	3 CME-550	(86% 11/2/2	2021	•		DRILL N	ETHO	D H.S	S. Augers		HAMM	ER TYPE	Automatic
RILLER	Mosele	y, M.		S	TART DA	TE 04/27	//22	СОМР	. DA	TE 04/2	27/22		SURFACE	WATER DEF	PTH N	/A	
LEV ELE (ft)		0.5ft	0.5ft	UNT 0.5ft	0	BLOW 25	S PER FOOT 50	75	100	SAMP. NO.	MOI	L O G	ELEV. (ft)	SOIL AND RC	CK DES	CRIPTION	DEPTH (i
395	<u> </u>											-	891.1	GROUN ROADWAY	D SURF		0
889.	+	13	10	6		16		1			М			1.2' Concrete ov	er 0.3' As	sphaltic Bas	
887.	7.6 + 3.5	4	5	4							М			Dark Gray, Coar G	RAVEL		í
885 885.	6.0	4	5	5	1 1 1			+			М	L L	Ora -	ange and Brown Sandy SILT, Tr	, to Red, ace Mica	Coarse to land Grave	Fine I
882.	2.6 + 8.5	5	6	5	. ● 10												
380	Ŧ	5	"	5	11						М	F					
077	T 7.6 + 13.5											E	•				
	. 6 T 13.5	8	6	5	1 11						М	EÆ					
375	Ŧ											L	873.8				17.
872.	18.5	3	3	3	1						М	E		RE ange with Browr	SIDUAL	to Fine Sa	ndv
	\pm	+ •	<u> </u>		●6					1	IVI	******* 	07 1.1	SILT, oring Terminated	Trace Mi	ca	

SHEET 8