

REFERENCE: HB-0003

PROJECT: 55041

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY HAYWOOD
 PROJECT DESCRIPTION REPLACE BRIDGE NO. 239 ON
I-40 OVER INCINERATOR ROAD

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HB-0003	1	35

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

C. MOLONEY

J. LITTLE

INVESTIGATED BY S&ME, Inc.

DRAWN BY J. SWARTLEY

CHECKED BY J. DAILY

SUBMITTED BY S&ME, Inc.

DATE NOVEMBER 2022



3201 SPRING FOREST ROAD
 RALEIGH, NC 27616
 (919) 872-2660



DocuSigned by:

Thomas J. Daily

11/16/2022

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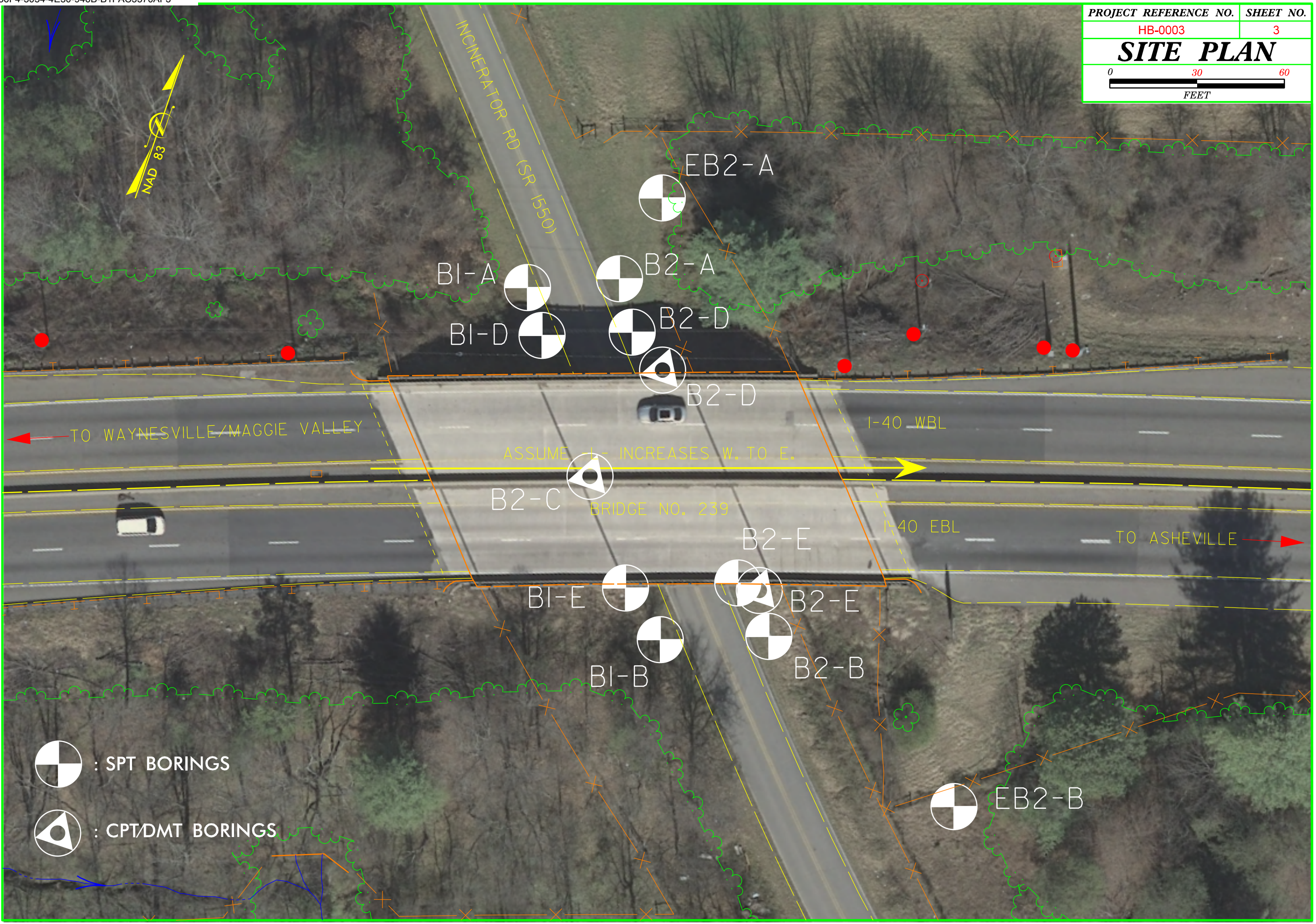
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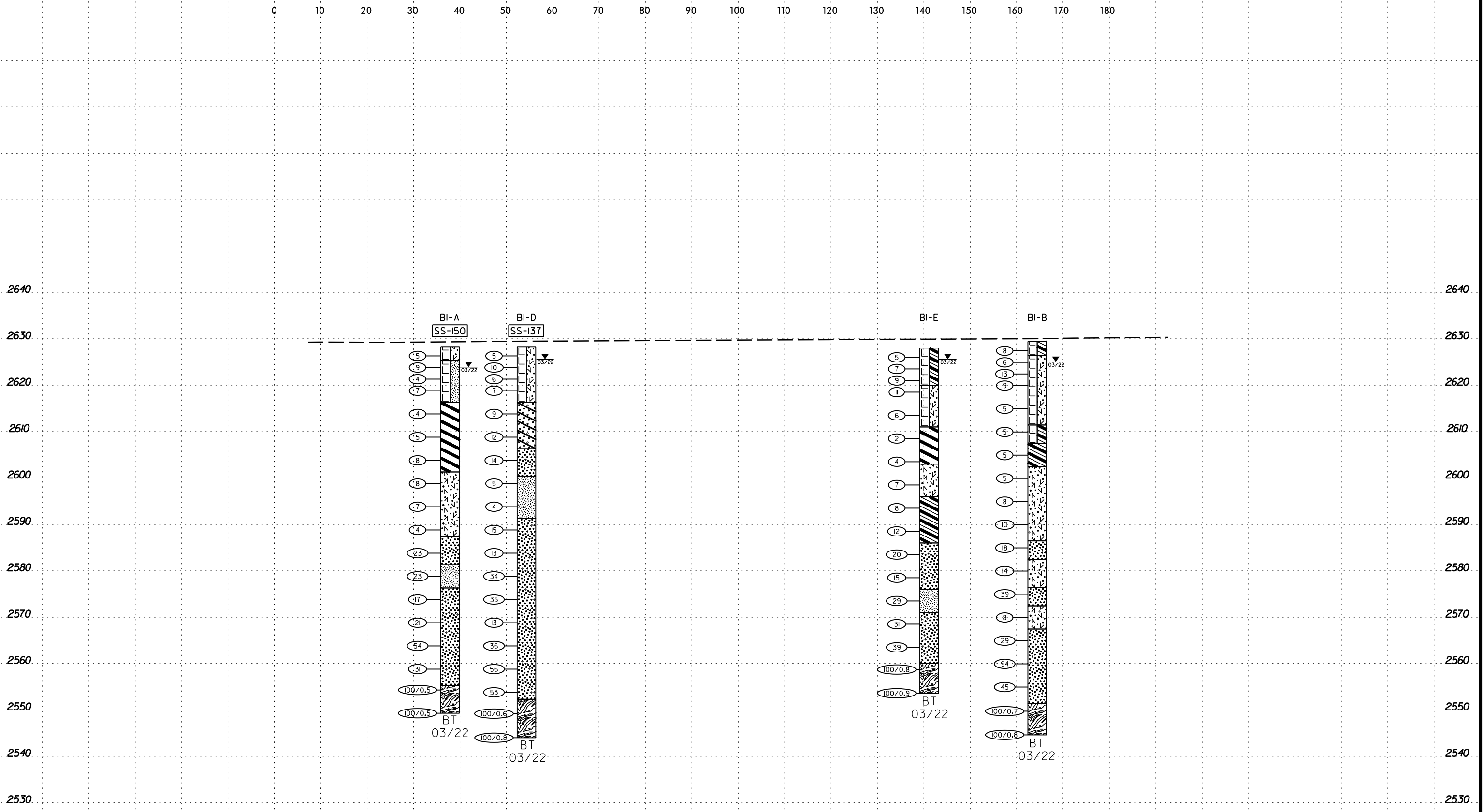
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION					ROCK DESCRIPTION			TERMS AND DEFINITIONS	
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.					HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:			ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA.	
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS					WEATHERED ROCK (WR)			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.	
GENERAL CLASS. GRANULAR MATERIALS (≤ 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										MINERALOGICAL COMPOSITION					CRYSTALLINE ROCK (CR)			CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.	
GROUP CLASS. A-1-a A-1-b A-2 A-2-4 A-2-5 A-2-6 A-2-7 A-4 A-5 A-6 A-7 A-7-5 A-7-6 A-1, A-2 A-3 A-4, A-5 A-6, A-7										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.					NON-CRYSTALLINE ROCK (NCR)			COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.	
SYMBOL										COMPRESSION					COASTAL PLAIN SEDIMENTARY ROCK (CP)			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.	
% PASSING #10 #40 #200										PERCENTAGE OF MATERIAL					WEATHERING			DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.	
MATERIAL PASSING #40 LL PI										ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL					FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.			DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.	
GROUP INDEX										GROUND WATER					VERY SLIGHT (V SLL)			DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.	
USUAL TYPES OF MAJOR MATERIALS										MISCELLANEOUS SYMBOLS					MODERATE (MOD.)			FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.	
GEN. RATING AS SUBGRADE										RECOMMENDATION SYMBOLS					SEVERE (SEV.)			FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.	
CONSISTENCY OR DENSENESS										ABBREVIATIONS					MODERATELY SEVERE (MOD. SEV.)			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.	
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)										EQUIPMENT USED ON SUBJECT PROJECT					SEVERE (SEV.)			JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.	
TEXTURE OR GRAIN SIZE										FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS					VERY (V)			LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.	
U.S. STD. SIEVE SIZE OPENING (MM)										UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK					SEVERE (SEV.)			LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.	
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)										AR - AUGER REFUSAL BT - BORING TERMINATED CL. - CLAY CPT - CONE PENETRATION TEST CSE. - COARSE DPT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY					VERY (V)			MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.	
GRAIN SIZE MM IN.										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					VERY (V)			PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.	
SOIL MOISTURE - CORRELATION OF TERMS										VST - VANE SHEAR TEST WE. - WEATHERED UNIT WEIGHT DRY UNIT WEIGHT SAMPLE ABBREVIATIONS					VERY (V)			RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.	
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO					VERY (V)			ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.	
LL PLASTIC RANGE (PI) LIQUID LIMIT - SATURATED - USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE										DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: CORE SIZE: HAND TOOLS:					VERY (V)			ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.	
OM OPTIMUM MOISTURE SHRINKAGE LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE										<input checked="" type="checkbox"/> CME-45C <input type="checkbox"/> CME-55 <input type="checkbox"/> CME-550 <input type="checkbox"/> VANE SHEAR TEST <input type="checkbox"/> PORTABLE HOIST					VERY (V)			SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.	
PLASTICITY										UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK					VERY (V)			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.	
NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC										AR - AUGER REFUSAL BT - BORING TERMINATED CL. - CLAY CPT - CONE PENETRATION TEST CSE. - COARSE DPT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY					VERY (V)			SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.	
COLOR										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					VERY (V)			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.	
DESCRIPTORS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.										FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS					VERY (V)			STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.	
FRACTURE SPACING										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					VERY (V)			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.	
BEDDING										VST - VANE SHEAR TEST WE. - WEATHERED UNIT WEIGHT DRY UNIT WEIGHT SAMPLE ABBREVIATIONS					VERY (V)			TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.	
BENCH MARK: BYI-24 N: 678544 E: 848241										DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: CORE SIZE: HAND TOOLS:					VERY (V)			ELEVATION: 2626.10 FEET	
NOTES: FIAD: FILLED IMMEDIATELY AFTER DRILLING										UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK					VERY (V)				

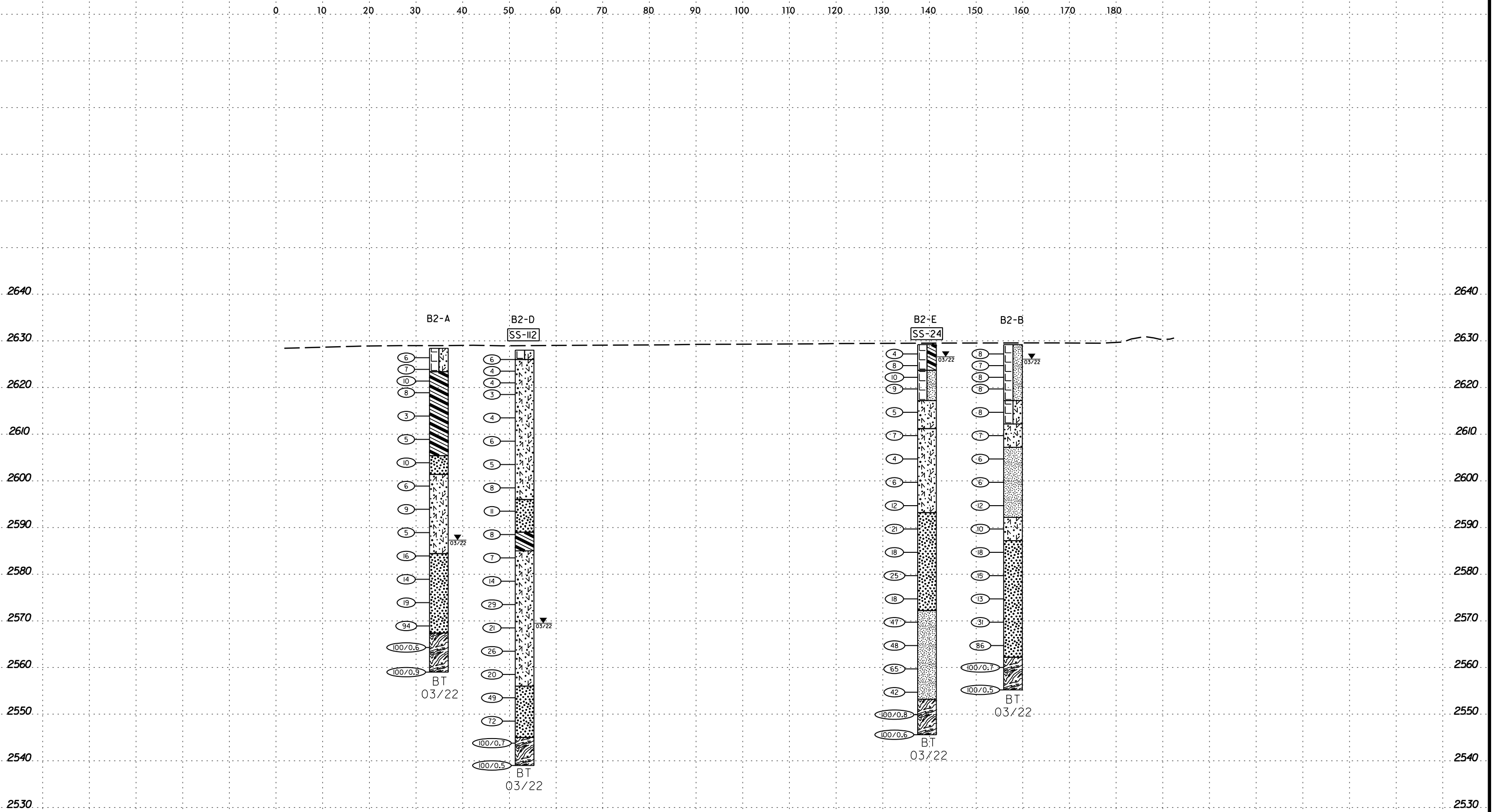


-  : SPT BORINGS
-  : CPT/DMT BORINGS



SECTION LINE FOR BI BORINGS

DATE: 6/23/16



SECTION LINE FOR B2 BORINGS

DATE: 6/23/16

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 55041.1.1		TIP HB-0003		COUNTY HAYWOOD		GEOLOGIST Moloney, C.										
SITE DESCRIPTION BRIDGE NO. 239 ON -L- (I-40) OVER SR 1550 (INCINERATOR RD)							GROUND WTR (ft)									
BORING NO. B1-A		STATION N/A		OFFSET N/A		ALIGNMENT N/A										
COLLAR ELEV. 2,628.3 ft		TOTAL DEPTH 79.0 ft		NORTHING 678,418		EASTING 848,359										
DRILL RIG/HAMMER EFF./DATE SME6573 CME-550X 82% 5/11/2022		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER Little, J.		START DATE 03/17/22		COMP. DATE 03/17/22		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						
2630																
	2,627.3	1.0	2	2	3											
2625	2,624.8	3.5	3	4	5											
	2,622.3	6.0	1	1	3											
2620	2,619.8	8.5	2	3	4											
	2,614.8	13.5	2	1	3											
2615	2,609.8	18.5	2	2	3											
2610	2,604.8	23.5	2	3	5											
2605	2,599.8	28.5	2	3	5											
2600	2,594.8	33.5	2	3	4											
2595	2,589.8	38.5	2	2	2											
2590	2,584.8	43.5	7	10	13											
2585	2,579.8	48.5	5	8	15											
2580	2,574.8	53.5	5	7	10											
2575	2,569.8	58.5	7	10	11											
2570	2,564.8	63.5	11	21	33											
2565	2,559.8	68.5	10	13	18											
2560	2,554.8	73.5	100/0.5													
2555																
2550																

NCDOT BORE DOUBLE HB-0003_GEO_BRDG0239.GPJ NC_DOT.GDT 9/13/22

WBS 55041.1.1		TIP HB-0003		COUNTY HAYWOOD		GEOLOGIST Moloney, C.										
SITE DESCRIPTION BRIDGE NO. 239 ON -L- (I-40) OVER SR 1550 (INCINERATOR RD)							GROUND WTR (ft)									
BORING NO. B1-A		STATION N/A		OFFSET N/A		ALIGNMENT N/A										
COLLAR ELEV. 2,628.3 ft		TOTAL DEPTH 79.0 ft		NORTHING 678,418		EASTING 848,359										
DRILL RIG/HAMMER EFF./DATE SME6573 CME-550X 82% 5/11/2022		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER Little, J.		START DATE 03/17/22		COMP. DATE 03/17/22		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						
2550	2,549.8	78.5	100/0.5													

Match Line

Boring Terminated at Elevation 2,549.3 ft IN WEATHERED ROCK (SCHIST)

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 55041.1.1		TIP HB-0003		COUNTY HAYWOOD			GEOLOGIST Moloney, C.									
SITE DESCRIPTION BRIDGE NO. 239 ON -L- (I-40) OVER SR 1550 (INCINERATOR RD)								GROUND WTR (ft)								
BORING NO. B1-D		STATION N/A		OFFSET N/A		ALIGNMENT N/A		0 HR. N/A	24 HR. N/A							
COLLAR ELEV. 2,628.3 ft		TOTAL DEPTH 84.3 ft		NORTHING 678,404		EASTING 848,369		24 HR. 2.7								
DRILL RIGHAMMER EFF./DATE SME6573 CME-550X 82% 5/11/2022					DRILL METHOD Mud Rotary			HAMMER TYPE Automatic								
DRILLER Little, J.		START DATE 03/17/22		COMP. DATE 03/17/22		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						
2630															2,628.3	
	2,627.3	1.0	3	2	3								M	GROUND SURFACE ROADWAY EMBANKMENT MED. STIFF TO STIFF, BROWN, SANDY AND CLAYEY SILT, A-5	0.0	
2625	2,624.8	3.5	3	4	6								M			
	2,622.3	6.0	2	2	4								M			
2620	2,619.8	8.5	2	3	4								M			
	2,614.8	13.5	8	3	6								M			
2615	2,614.8	13.5	8	3	6								M	RESIDUAL LOOSE TO MED. DENSE, BROWN AND ORANGE, CLAYEY SAND, A-2-6	12.0	
2610	2,609.8	18.5	4	6	6								M			
	2,606.3	22.0											M	MED. DENSE, BROWN, SILTY SAND, A-2-4	22.0	
2605	2,604.8	23.5	3	5	9								M			
	2,600.3	28.0											M	MED. STIFF, BROWN, SANDY AND CLAYEY SILT, A-4	28.0	
2600	2,599.8	28.5	2	2	3								M			
	2,594.8	33.5	2	2	2								SS-137	35%		
2595	2,594.8	33.5	2	2	2								M			
2590	2,589.8	38.5	3	6	9								M	MED. DENSE TO VERY DENSE, ORANGE, BROWN AND WHITE, SILTY SAND, A-2-4	37.0	
	2,584.8	43.5	3	5	8								M			
2585	2,584.8	43.5	3	5	8								M			
	2,579.8	48.5	10	14	20								M			
2580	2,579.8	48.5	10	14	20								M			
2575	2,574.8	53.5	10	13	22								M			
	2,569.8	58.5	7	6	7								M			
2570	2,569.8	58.5	7	6	7								M			
	2,564.8	63.5	10	18	18								M			
2565	2,564.8	63.5	10	18	18								M			
2560	2,559.8	68.5	17	24	32								M			
	2,554.8	73.5	12	20	33								M			
2555	2,554.8	73.5	12	20	33								M			
															2,552.3	
2550															WEATHERED ROCK (SCHIST)	76.0

NCDOT BORE DOUBLE HB-0003_GEO_BRDG0239.GPJ NC_DOT.GDT 9/13/22

WBS 55041.1.1		TIP HB-0003		COUNTY HAYWOOD			GEOLOGIST Moloney, C.								
SITE DESCRIPTION BRIDGE NO. 239 ON -L- (I-40) OVER SR 1550 (INCINERATOR RD)								GROUND WTR (ft)							
BORING NO. B1-D		STATION N/A		OFFSET N/A		ALIGNMENT N/A		0 HR. N/A	24 HR. N/A						
COLLAR ELEV. 2,628.3 ft		TOTAL DEPTH 84.3 ft		NORTHING 678,404		EASTING 848,369		24 HR. 2.7							
DRILL RIGHAMMER EFF./DATE SME6573 CME-550X 82% 5/11/2022					DRILL METHOD Mud Rotary			HAMMER TYPE Automatic							
DRILLER Little, J.		START DATE 03/17/22		COMP. DATE 03/17/22		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					
2550															
	2,549.8	78.5	86	14	0.1										100/0.6
Match Line															
	2,544.8	83.5	41	59	0.3										100/0.8
															2,544.0
															84.3
															Boring Terminated at Elevation 2,544.0 ft IN WEATHERED ROCK (SCHIST)

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 55041.1.1		TIP HB-0003		COUNTY HAYWOOD		GEOLOGIST Moloney, C.										
SITE DESCRIPTION BRIDGE NO. 239 ON -L- (I-40) OVER SR 1550 (INCINERATOR RD)							GROUND WTR (ft)									
BORING NO. B2-D		STATION N/A		OFFSET N/A		ALIGNMENT N/A										
COLLAR ELEV. 2,628.0 ft		TOTAL DEPTH 89.0 ft		NORTHING 678,415		EASTING 848,398										
DRILL RIG/HAMMER EFF./DATE SME6573 CME-550X 82% 5/11/2022		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER Little, J.		START DATE 03/15/22		COMP. DATE 03/15/22		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						
2630																
	2,627.0	1.0	3	3	3											
2625	2,624.5	3.5	2	2	2											
	2,622.0	6.0	2	2	2											
2620	2,619.5	8.5	2	1	2											
	2,614.5	13.5	1	2	2											
2615	2,609.5	18.5	1	3	3											
2610	2,604.5	23.5	2	2	3											
2605	2,599.5	28.5	2	3	5											
2600	2,594.5	33.5	2	4	7											
2595	2,589.5	38.5	2	3	5											
2590	2,584.5	43.5	2	3	4											
2585	2,579.5	48.5	3	5	9											
2580	2,574.5	53.5	5	11	18											
2575	2,569.5	58.5	5	7	14											
2570	2,564.5	63.5	5	10	16											
2565	2,559.5	68.5	5	8	12											
2560	2,554.5	73.5	11	18	31											
2555																
2550																

NCDOT BORE DOUBLE HB-0003_GEO_BRDG0239.GPJ NC_DOT.GDT 9/13/22

WBS 55041.1.1		TIP HB-0003		COUNTY HAYWOOD		GEOLOGIST Moloney, C.										
SITE DESCRIPTION BRIDGE NO. 239 ON -L- (I-40) OVER SR 1550 (INCINERATOR RD)							GROUND WTR (ft)									
BORING NO. B2-D		STATION N/A		OFFSET N/A		ALIGNMENT N/A										
COLLAR ELEV. 2,628.0 ft		TOTAL DEPTH 89.0 ft		NORTHING 678,415		EASTING 848,398										
DRILL RIG/HAMMER EFF./DATE SME6573 CME-550X 82% 5/11/2022		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER Little, J.		START DATE 03/15/22		COMP. DATE 03/15/22		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						
2550	2,549.5	78.5	23	32	40											
	2,544.5	83.5	55	45/0.2												
2545	2,539.5	88.5	100/0.5													
2540																

Match Line

DENSE TO VERY DENSE, BROWN, SILTY SAND, A-2-4 (continued)

WEATHERED ROCK (SCHIST)

Boring Terminated at Elevation 2,539.0 ft IN WEATHERED ROCK (SCHIST)

GROUND SURFACE 0.0
ROADWAY EMBANKMENT 2.0
MED. STIFF, BROWN, SANDY AND CLAYEY SILT, MICACEOUS, A-5

RESIDUAL SOFT TO MED. STIFF, ORANGE, CLAYEY SILT, A-5

2,596.0 MED. DENSE, BROWN AND WHITE, SILTY SAND, A-2-4 32.0

2,589.0 MED. STIFF, TAN, SANDY CLAY, A-6 39.0

2,585.0 MED. STIFF TO VERY STIFF, BROWN AND WHITE, SANDY AND CLAYEY SILT, A-5 43.0

2,556.0 DENSE TO VERY DENSE, BROWN, SILTY SAND, A-2-4 72.0

GEOTECHNICAL BORING REPORT BORE LOG

WBS 55041.1.1		TIP HB-0003		COUNTY HAYWOOD		GEOLOGIST Moloney, C.									
SITE DESCRIPTION BRIDGE NO. 239 ON -L- (I-40) OVER SR 1550 (INCINERATOR RD)							GROUND WTR (ft)								
BORING NO. B2-E		STATION N/A		OFFSET N/A		ALIGNMENT N/A									
COLLAR ELEV. 2,629.2 ft		TOTAL DEPTH 83.6 ft		NORTHING 678,345		EASTING 848,460									
DRILL RIGHAMMER EFF./DATE SME6573 CME-550X 82% 5/11/2022				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER Little, J.		START DATE 03/09/22		COMP. DATE 03/09/22		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2630															2,629.2 GROUND SURFACE 0.0
	2,628.2	1.0	3	2	2										ROADWAY EMBANKMENT
2625	2,625.7	3.5	2	4	4										MED. STIFF, ORANGE, SANDY CLAY, A-6
	2,623.7	6.0	3	4	6										2,623.7 STIFF, BROWN AND TAN, SANDY SILT, A-4 5.5
2620	2,620.7	8.5	3	4	5										
	2,617.2	13.5	2	2	3										2,617.2 ALLUVIAL 12.0
2615	2,615.7	18.5	2	3	4										MED. STIFF, GRAY, SANDY SILT, TRACE ROOTS, A-4
2610	2,610.7	23.5	2	2	2										2,611.2 RESIDUAL 18.0
	2,607.2	28.5	2	3	3										MED. STIFF TO STIFF, BROWN, SANDY AND CLAYEY SILT, A-5
2605	2,605.7	33.5	2	4	8										SS-24 32%
2600	2,600.7	38.5	6	10	11										
	2,597.2	43.5	6	8	10										2,593.2 MED. DENSE, BROWN, SILTY SAND, MICACEOUS, A-2-4 36.0
2595	2,595.7	48.5	7	10	15										
	2,585.7	53.5	5	9	9										2,572.2 HARD, BROWN AND WHITE, SANDY SILT, A-4 57.0
2590	2,590.7	58.5	11	21	26										
	2,580.7	63.5	9	19	29										
2585	2,585.7	68.5	10	28	37										
	2,575.7	73.5	7	16	26										2,553.2 WEATHERED ROCK (SCHIST) 76.0
2580	2,580.7	78.5													

NCDOT BORE DOUBLE HB-0003_GEO_BRDG0239.GPJ NC_DOT.GDT 9/13/22

WBS 55041.1.1		TIP HB-0003		COUNTY HAYWOOD		GEOLOGIST Moloney, C.									
SITE DESCRIPTION BRIDGE NO. 239 ON -L- (I-40) OVER SR 1550 (INCINERATOR RD)							GROUND WTR (ft)								
BORING NO. B2-E		STATION N/A		OFFSET N/A		ALIGNMENT N/A									
COLLAR ELEV. 2,629.2 ft		TOTAL DEPTH 83.6 ft		NORTHING 678,345		EASTING 848,460									
DRILL RIGHAMMER EFF./DATE SME6573 CME-550X 82% 5/11/2022				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER Little, J.		START DATE 03/09/22		COMP. DATE 03/09/22		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2550															2,553.2 WEATHERED ROCK (SCHIST) 76.0
	2,546.7	82.5	26	68	32/0.1										2,545.6 WEATHERED ROCK (SCHIST) (continued) 83.6

Match Line



Boring Terminated at Elevation 2,545.6 ft IN WEATHERED ROCK (SCHIST)

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 55041.1.1		TIP HB-0003		COUNTY HAYWOOD		GEOLOGIST Moloney, C.	
SITE DESCRIPTION BRIDGE NO. 239 ON -L- (I-40) OVER SR 1550 (INCINERATOR RD)							GROUND WTR (ft)
BORING NO. EB2-A		STATION N/A		OFFSET N/A		ALIGNMENT N/A	
COLLAR ELEV. 2,627.0 ft		TOTAL DEPTH 90.0 ft		NORTHING 678,462		EASTING 848,393	
DRILL RIGHAMMER EFF./DATE SME6573 CME-550X 82% 5/11/2022			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic		
DRILLER Little, J.		START DATE 03/10/22		COMP. DATE 03/11/22		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					ELEV. (ft)	DEPTH (ft)
2630														2,627.0	0.0	GROUND SURFACE
2625	2,626.0	1.0	2	4	3								M	2,627.0		ROADWAY EMBANKMENT
	2,623.5	3.5	8	4	4								M			MED. STIFF, BROWN, SANDY CLAY, A-6
2620	2,621.0	6.0	2	3	3								M	2,620.0	7.0	RESIDUAL
	2,618.5	8.5	2	3	3								M			MED. STIFF, TAN, CLAY, A-7-5
2615	2,613.5	13.5	2	2	3								M			
2610	2,608.5	18.5	2	1	2								M	2,610.0	17.0	SOFT TO VERY STIFF, BROWN, SANDY AND CLAYEY SILT, A-5
2605	2,603.5	23.5	1	1	2								M			
2600	2,598.5	28.5	2	2	4								M			
2595	2,593.5	33.5	2	2	5								M			
2590	2,588.5	38.5	3	6	10								M			
2585	2,583.5	43.5	3	6	8								M			
2580	2,578.5	48.5	7	11	13								M			
2575	2,573.5	53.5	14	28	46								M	2,576.0	51.0	DENSE TO VERY DENSE, GRAY AND TAN, SILTY SAND, A-2-4
2570	2,568.5	58.5	13	13	25								M			
2565	2,563.5	63.5	13	19	23								M			
2560	2,558.5	68.5	16	28	47								M			
2555	2,553.5	73.5	30	49	51/0.2								M	2,553.0	74.0	WEATHERED ROCK (SCHIST)
2550													M	2,550.0	77.0	

NCDOT BORE DOUBLE HB-0003_GEO_BRDG0239.GPJ NC_DOT.GDT 9/13/22

WBS 55041.1.1		TIP HB-0003		COUNTY HAYWOOD		GEOLOGIST Moloney, C.	
SITE DESCRIPTION BRIDGE NO. 239 ON -L- (I-40) OVER SR 1550 (INCINERATOR RD)							GROUND WTR (ft)
BORING NO. EB2-A		STATION N/A		OFFSET N/A		ALIGNMENT N/A	
COLLAR ELEV. 2,627.0 ft		TOTAL DEPTH 90.0 ft		NORTHING 678,462		EASTING 848,393	
DRILL RIGHAMMER EFF./DATE SME6573 CME-550X 82% 5/11/2022			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic		
DRILLER Little, J.		START DATE 03/10/22		COMP. DATE 03/11/22		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					ELEV. (ft)	DEPTH (ft)
2550																
2545	2,543.5	83.5	14	23	29								M			
2540	2,538.5	88.5	17	33	49								M			
2537.0													M	2,537.0	90.0	Boring Terminated at Elevation 2,537.0 ft IN VERY DENSE SILTY SAND (RESIDUAL)

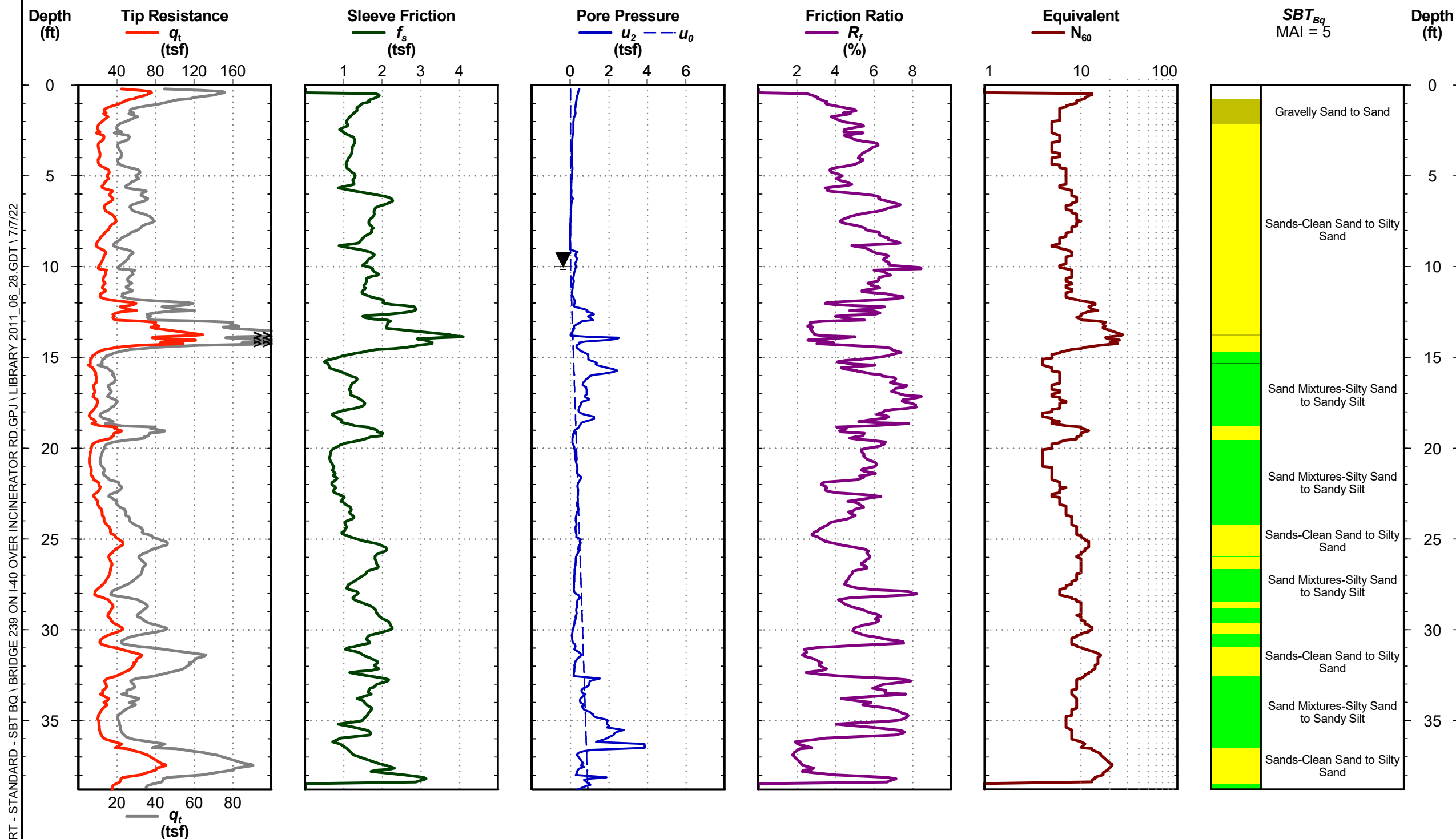


**Bridge 239 on I-40 over Incinerator Rd
Haywood County, North Carolina
S&ME Project No: 22350010**

Sounding ID: 239-B2-C

Date: Jun. 22, 2022
Estimated Water Depth: 10 ft
Rig/Operator: ATV/MW | TC

Total Depth: 38.8 ft
Termination Criteria: Maximum Reaction Force
Cone Size: 1.75



CPT REPORT - STANDARD - SBT BQ \ BRIDGE 239 ON I-40 OVER INCINERATOR RD.GPJ \ LIBRARY 2011_06_28.GDT \ 7/7/22

Cone Penetration Test

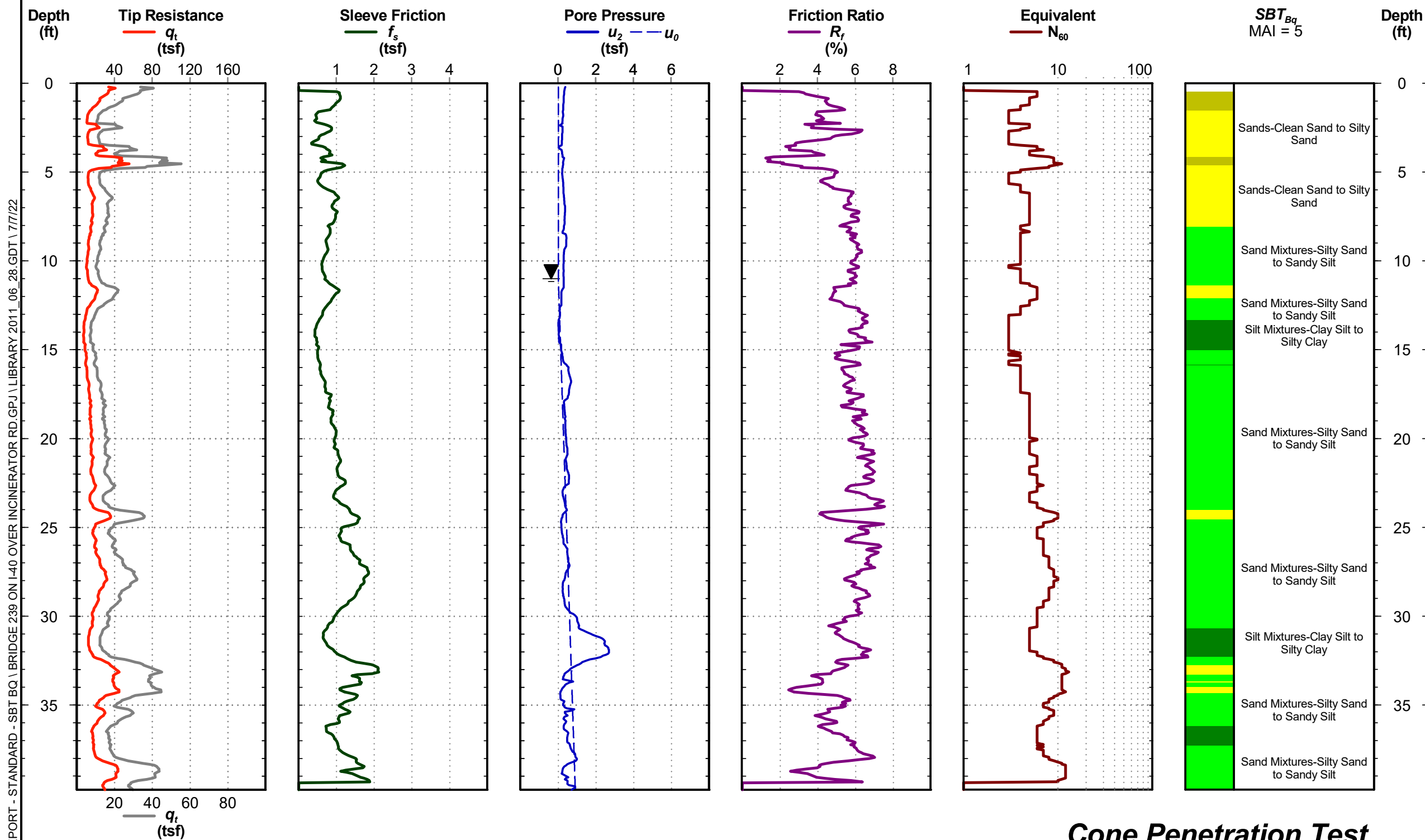


**Bridge 239 on I-40 over Incinerator Rd
Haywood County, North Carolina
S&ME Project No: 22350010**

Sounding ID: 239-B2-D

Date: Jun. 22, 2022
Estimated Water Depth: 11 ft
Rig/Operator: ATV/MW | TC

Total Depth: 39.8 ft
Termination Criteria: Maximum Reaction Force
Cone Size: 1.75



CPT REPORT - STANDARD - SBT BQ \ BRIDGE 239 ON I-40 OVER INCINERATOR RD.GPJ \ LIBRARY 2011_06_28.GDT \ 7/7/22

Cone Penetration Test

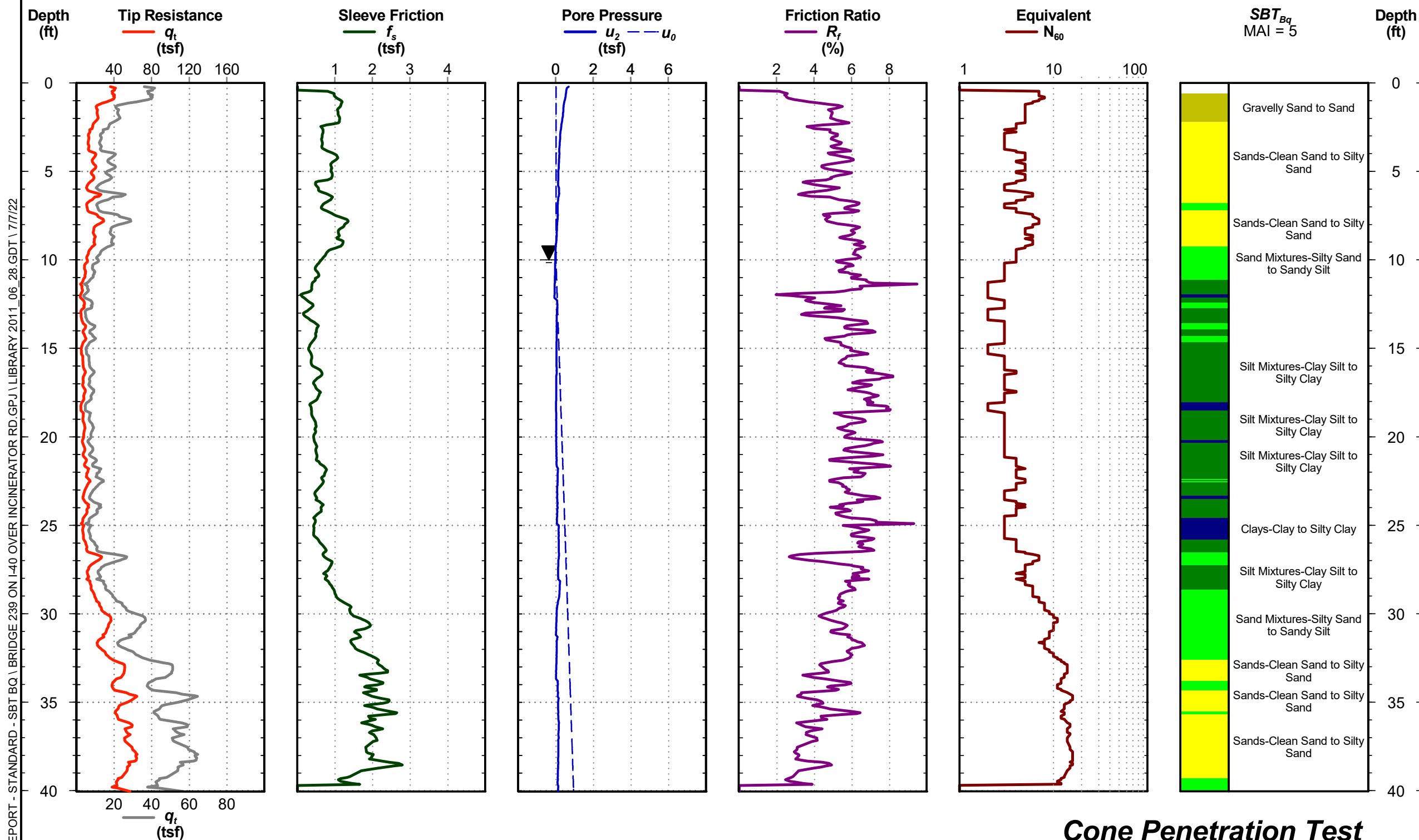


**Bridge 239 on I-40 over Incinerator Rd
Haywood County, North Carolina
S&ME Project No: 22350010**

Sounding ID: 239-B2-E

Date: Jun. 22, 2022
Estimated Water Depth: 10 ft
Rig/Operator: ATV/MW | TC

Total Depth: 40.0 ft
Termination Criteria: Target Depth
Cone Size: 1.75



CPT REPORT - STANDARD - SBT BQ \ BRIDGE 239 ON I-40 OVER INCINERATOR RD.GPJ \ LIBRARY 2011_06_28.GDT \ 7/7/22

Cone Penetration Test

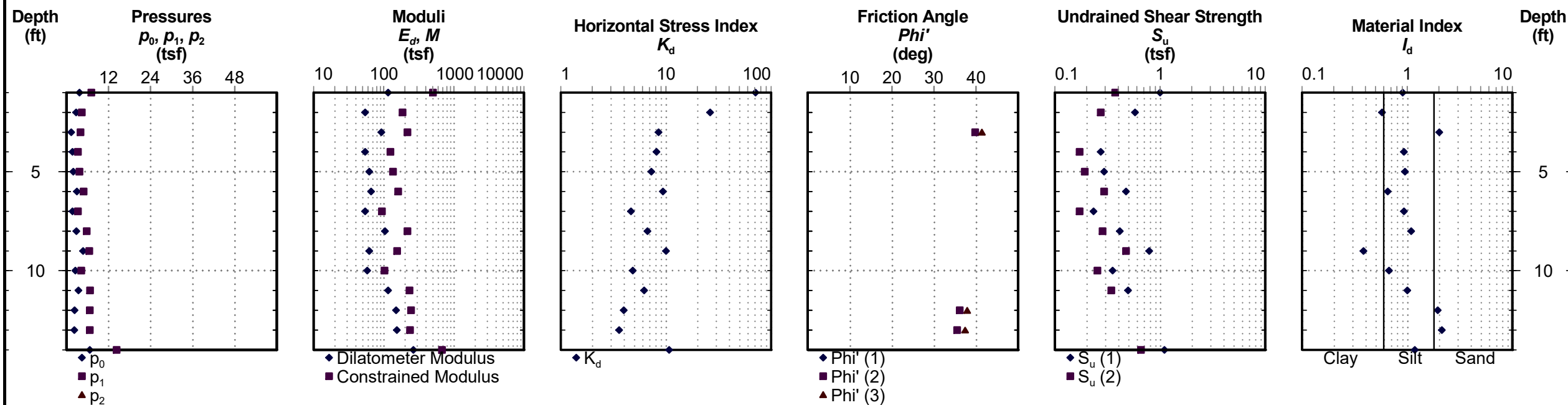


Bridge 239 on I-40 over Incinerator Rd
Haywood County, North Carolina
S&ME Project No: 22350010

Sounding ID: 239-B2-C

Date: Jun. 22, 2022
 Estimated Water Depth: 10 ft
 Rig/Operator: ATV/MW | TC

Total Depth: 14.0 ft
 Termination Criteria: Maximum Reaction Force
 Membrane Type: H-25



DMT REPORT - DYNAMIC | BRIDGE 239 ON I-40 OVER INCINERATOR RD.GPJ | S&ME.GDT | 7/8/22

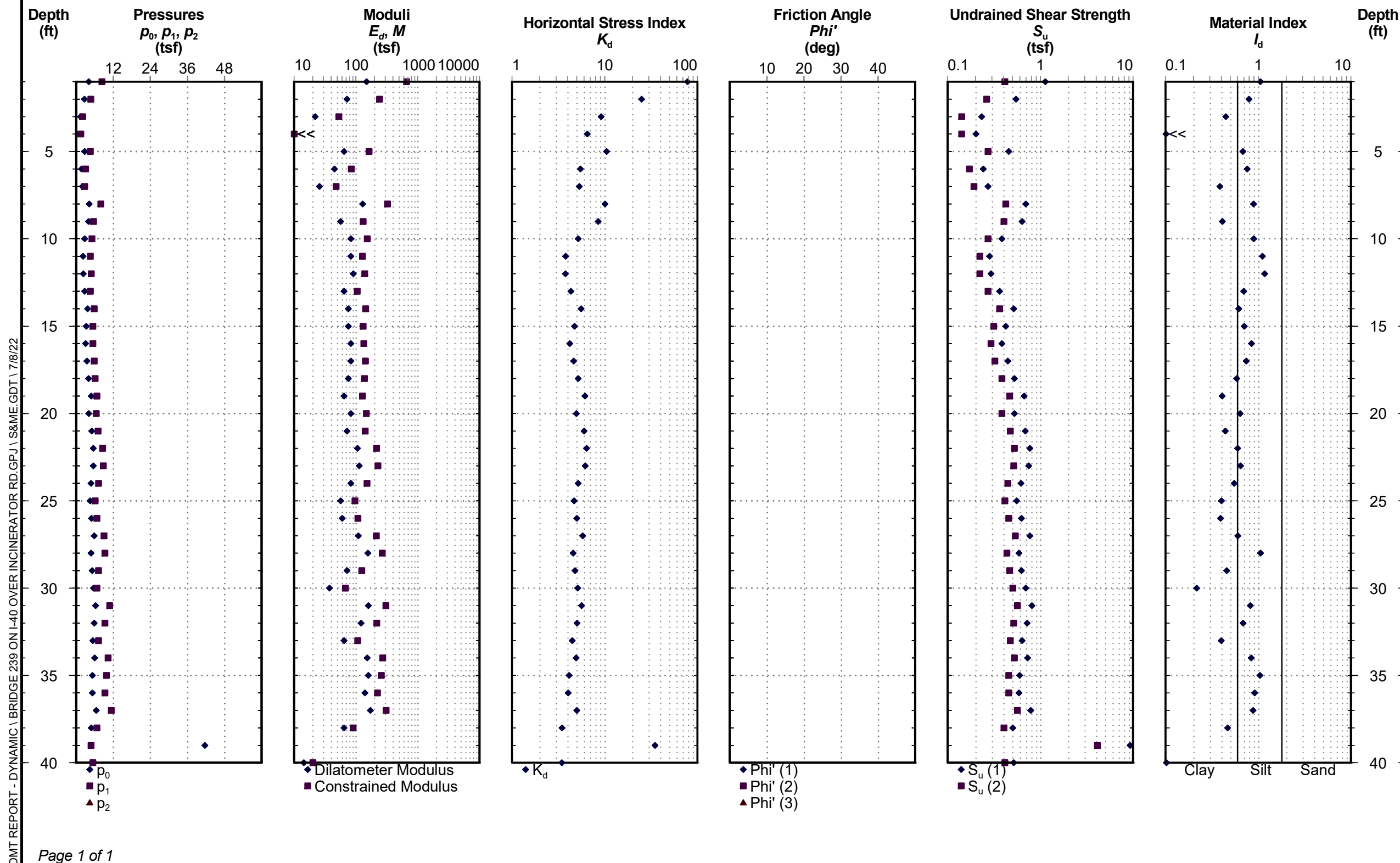


**Bridge 239 on I-40 over Incinerator Rd
Haywood County, North Carolina
S&ME Project No: 22350010**

Sounding ID: 239-B2-D

Date: Jun. 22, 2022
Estimated Water Depth: 11 ft
Rig/Operator: ATV/MW | TC

Total Depth: 40.0 ft
Termination Criteria: Maximum Reaction Force
Membrane Type: H-25



DMT REPORT - DYNAMIC | BRIDGE 239 ON I-40 OVER INCINERATOR RD.GPJ | S&ME.GDT | 7/8/22

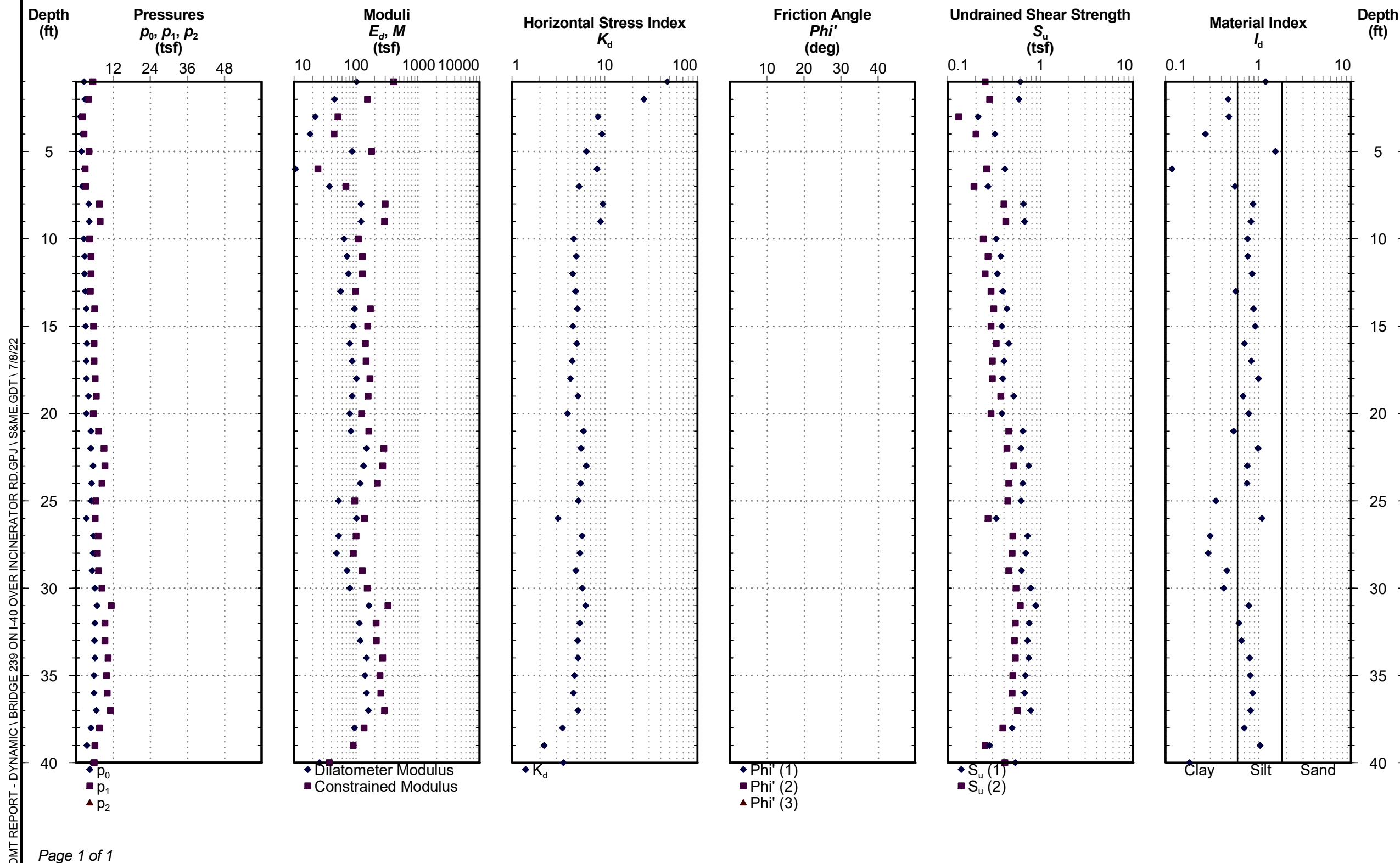


**Bridge 239 on I-40 over Incinerator Rd
Haywood County, North Carolina
S&ME Project No: 22350010**

Sounding ID: 239-B2-E

Date: Jun. 22, 2022
Estimated Water Depth: 10 ft
Rig/Operator: ATV/MW | TC

Total Depth: 40.0 ft
Termination Criteria: Target Depth
Membrane Type: H-25



DMT REPORT - DYNAMIC | BRIDGE 239 ON I-40 OVER INCINERATOR RD.GPJ | S&ME.GDT | 7/8/22



SUMMARY OF LABORATORY TEST DATA

Soil Classification and Gradation

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:	22350010	Date Report:	9/12/2022
State Project No.:	55041.1.1	County:	Haywood
Federal ID No.:	N/A	TIP No.:	HB-0003
Project Name:	Bridge No. 239 on I-40 over SR 1550		
Client Name:	NCDOT GEU	Client Address:	Raleigh, NC

Sample No.	Boring No.	Station	Offset	Alignment	Sample Depth (ft)	AASHTO Classification	Total % Passing				Total Mortar Fraction (%)				LL	PL	PI	Organic	Moist. %	
							Sieve #				Coarse Sand	Fine Sand	Silt	Clay						
							10	40	60	200										
SS-24	B2-E	-	-	-L-	23.5-25.0	A-5 (3)	99	99	88	56	11	40	38	11	41	34	7	-	32.2	
SS-57	EB2-A	-	-	-L-	8.5-10.0	A-7-5 (16)	99	99	97	93	2	6	48	44	46	33	13	-	39.8	
SS-112	B2-D	-	-	-L-	8.5-10.0	A-5 (5)	97	97	92	65	5	37	40	18	45	38	7	-	32.0	
SS-137	B1-D	-	-	-L-	33.5-35.0	A-4 (3)	99	99	92	70	7	28	46	19	38	34	4	-	34.5	
SS-150	B1-A	-	-	-L-	6.0-7.5	A-4 (6)	99	96	91	65	8	31	40	21	40	31	9	-	25.6	

References / Comments / Deviations: ND=Not Determined.

AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT
 AASHTO T89: Determining the Liquid Limit of Soils
 AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils
 AASHTO T265: Laboratory Determination of Moisture Content of Soils
 AASHTO M145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

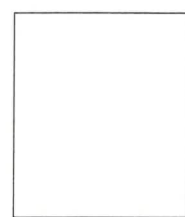
<u>Karen Warner</u>	_____	<u>NCDOT 118-06-0305</u>	<u>Joey Daily</u>	<u>Project Manager</u>
Technician Name:	Signature	Certification #	Technical Responsibility:	Position

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Oedometer Settlement Tests

Sample details

Sketch showing specimen location in original Sample



Depth: 18.5-20.0 ft.
Description: Tan-Brown Coarse to Fine Sandy Clayey SILT (A-5) (7)

Type: Undisturbed
Height H_0 (in): 0.997
Diameter D_0 (in): 2.501
Weight W_0 (gr): 149.2
Bulk Density ρ (PCF): 116.05
Particle Density ρ_s : 2.672 (measured)

Initial Conditions

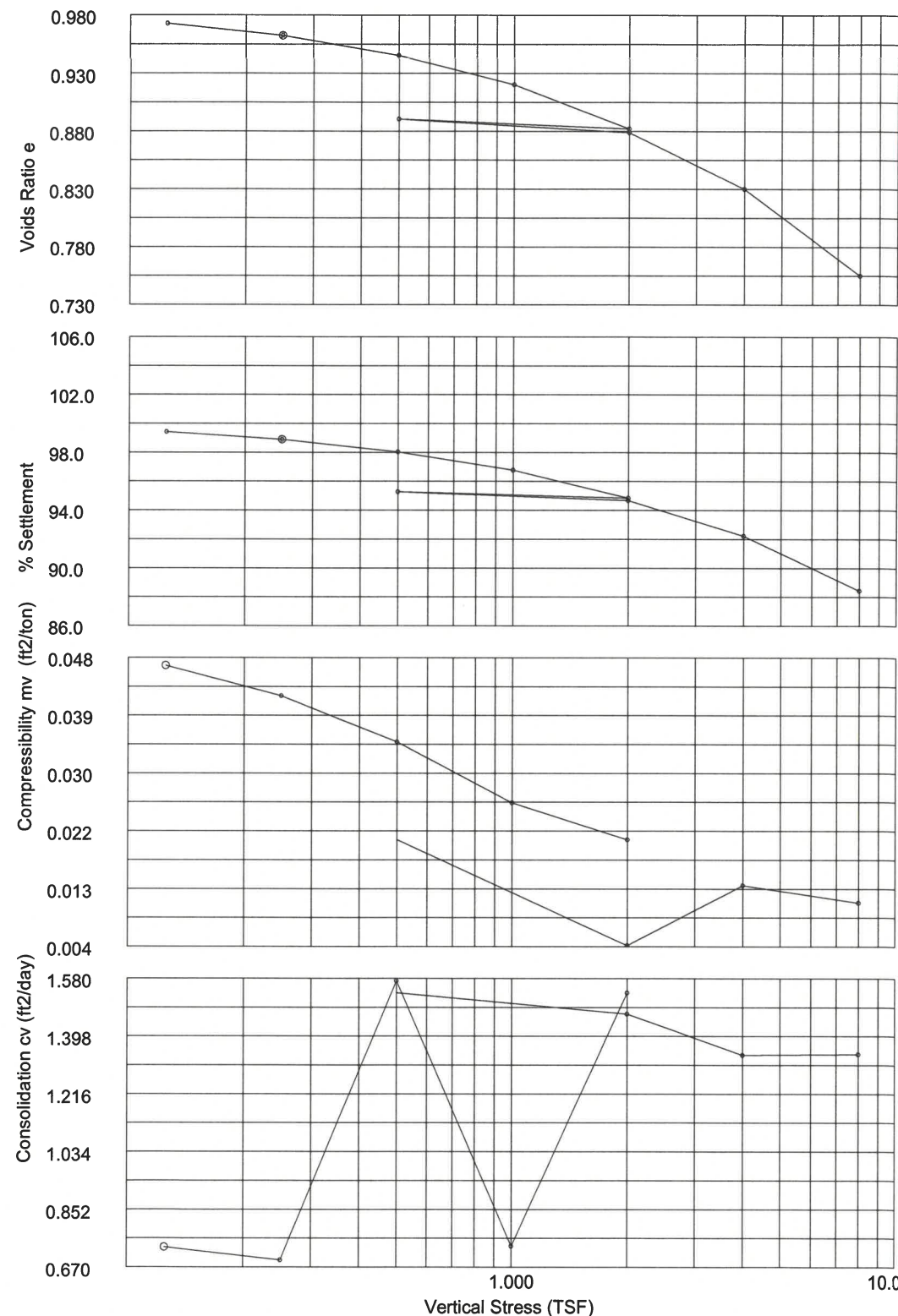
Settlement Channel: 1001
Moisture Content w_0 %: 38.1
Dry Density ρ_d (PCF): 84.03
Voids Ratio e_0 : 0.9842
Deg of Saturation S_0 %: 100.0
Swelling Pressure S_s (TSF): 0.000

Final Conditions

Moisture Content w_f %: 32.9
Dry Density ρ_d (PCF): 95.01
Voids Ratio e_f : 0.7550
Deg of Saturation S_f %: 100.00
Settlement: (in): 0.115
Compression Index C_c : 0.290

Notes: Test specimen taken from the mid portion of UD tube.

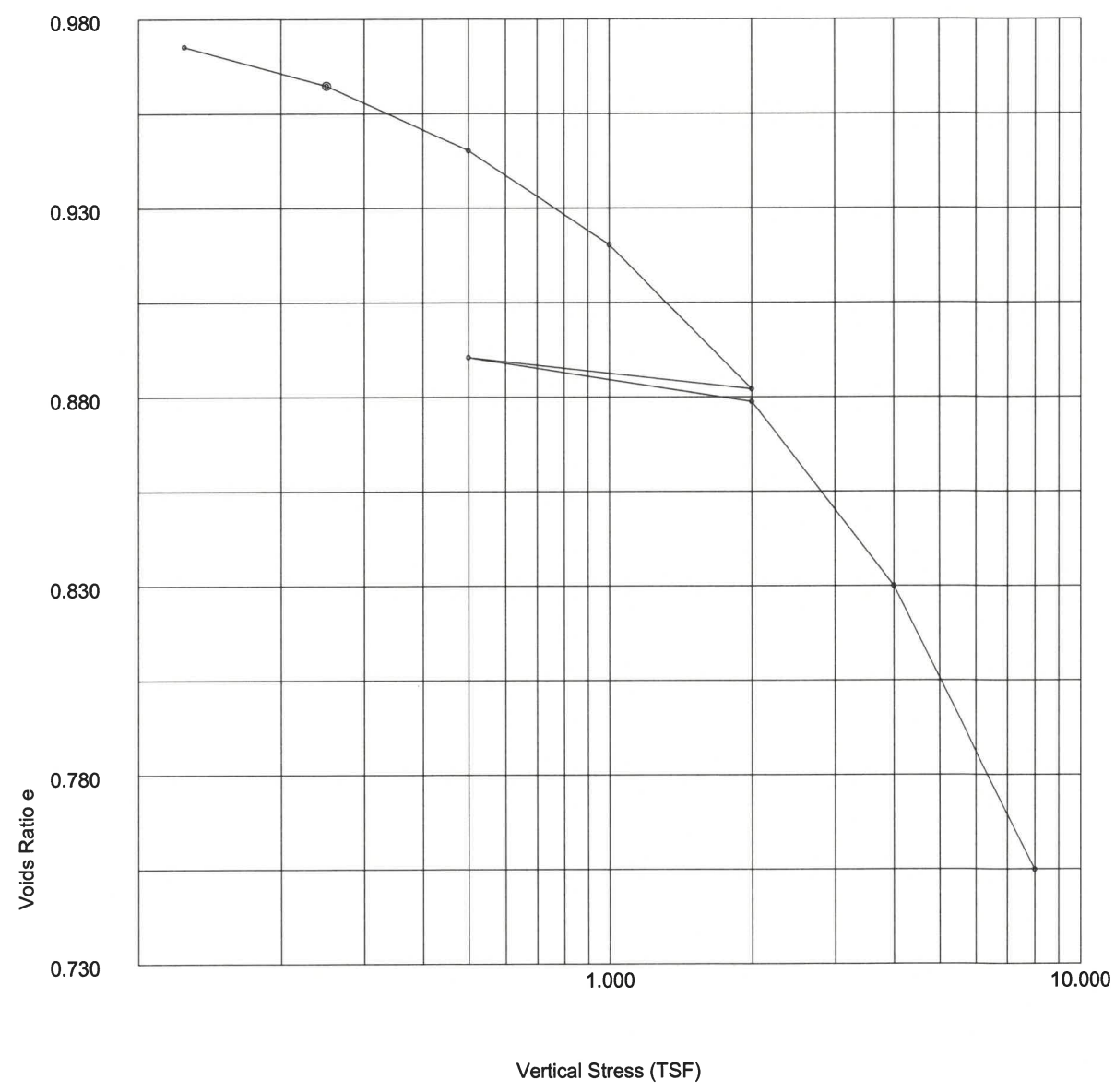
Oedometer Settlement Tests



	ASTM D2435-96	Test name: Consolidation
	Site Reference: Haywood Bridge No. 239	Date of Test: 10-22-22
	Jobfile: C:\WINCLISP\22350010.JOB	Sample: ST-1
Operator: <i>ML</i>	Checked: <i>ML</i>	Approved:

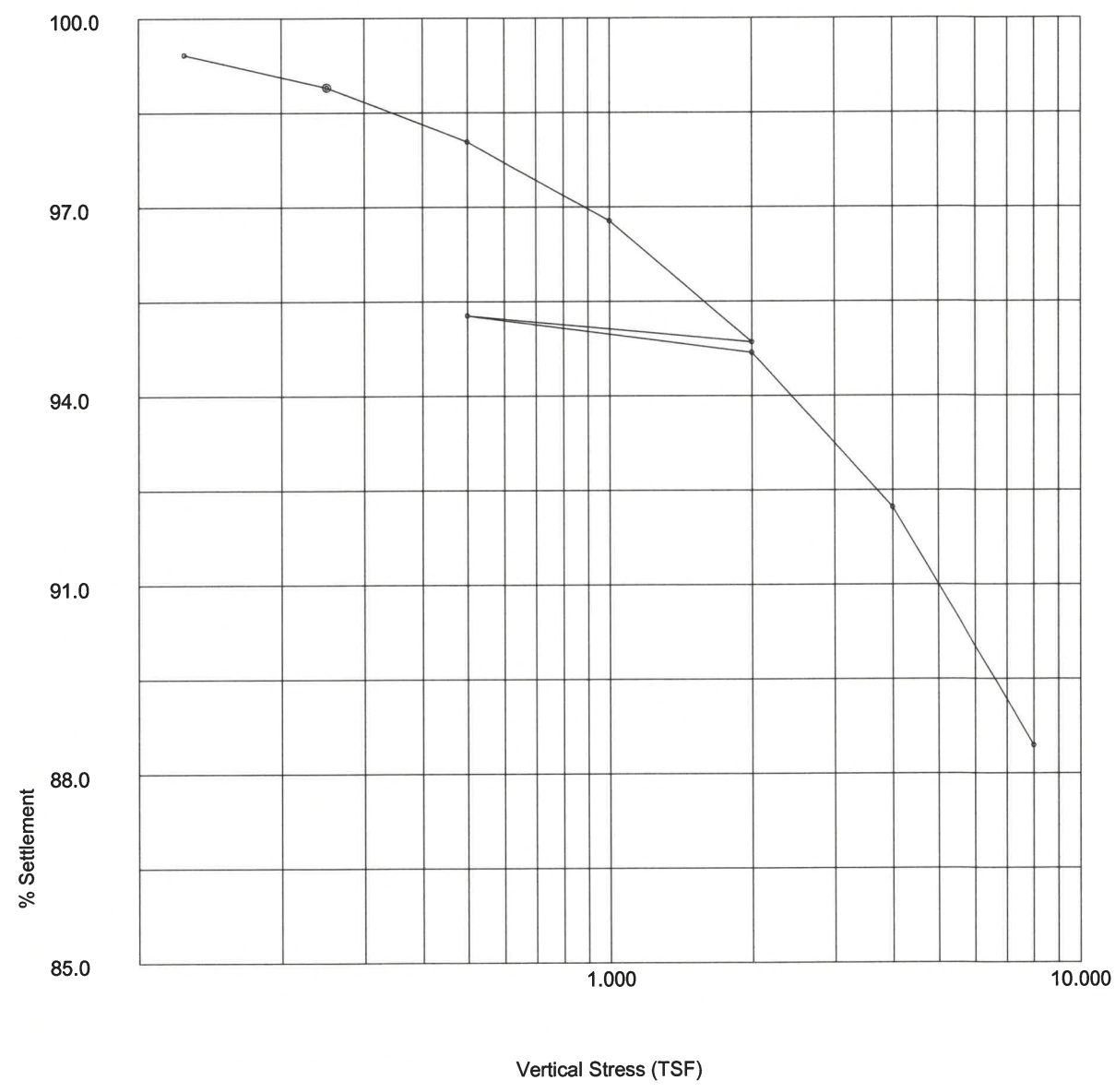
	ASTM D2435-96	Test name: Consolidation
	Site Reference: Haywood Bridge No. 239	Date of Test: 10-22-22
	Jobfile: C:\WINCLISP\22350010.JOB	Sample: ST-1
Operator: <i>ML</i>	Checked: <i>ML</i>	Approved:

Oedometer Settlement Tests



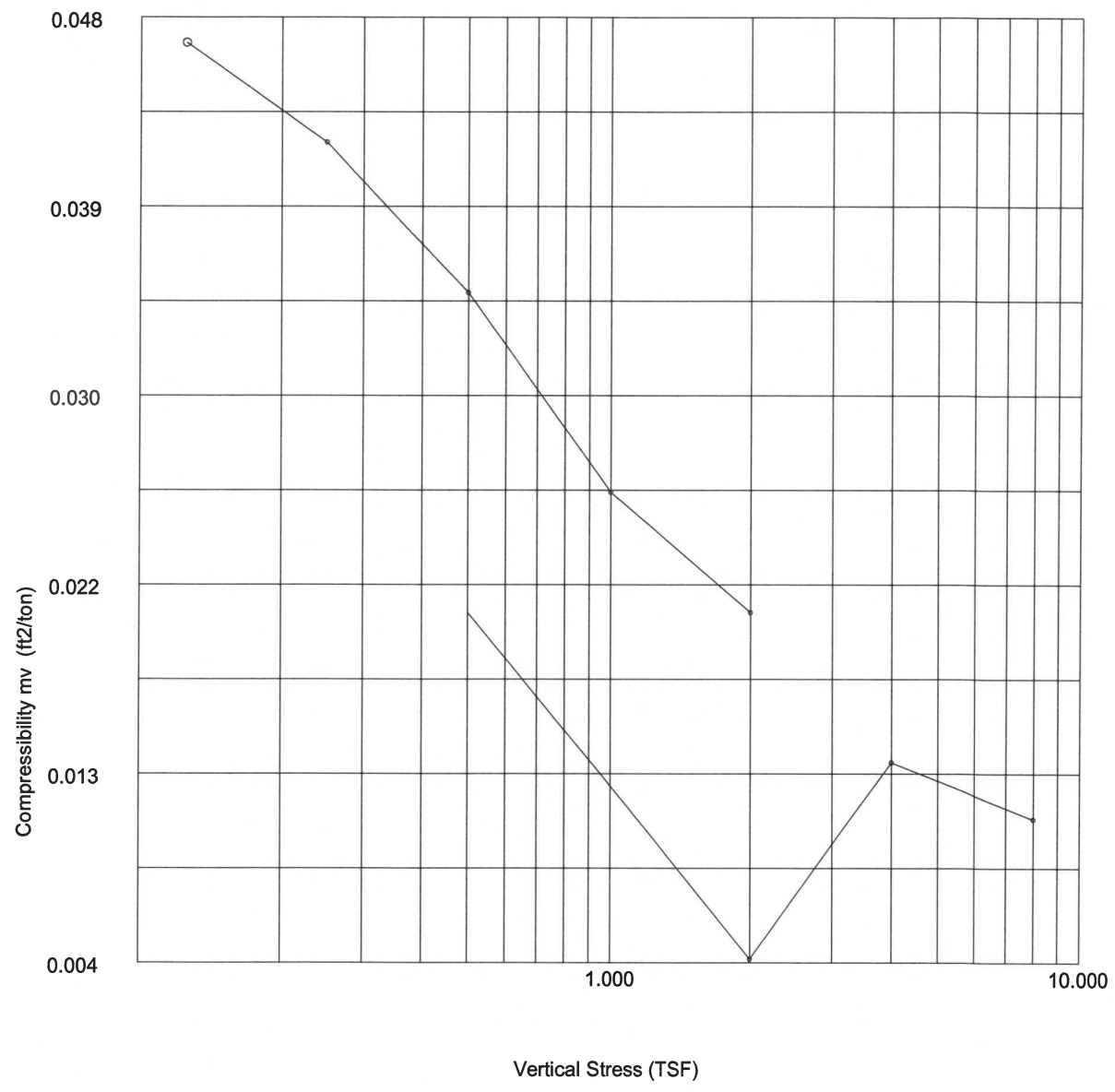
	ASTM D2435-96		Test name	Consolidation
			Date of Test:	10-22-22
	Site Reference:	Haywood Bridge No. 239	Sample:	ST-1
	Jobfile:	C:\WINCLISP\22350010.JOB	Borehole:	B1-E
Operator:	<i>mk</i>	Checked:	<i>mk</i>	Approved:

Oedometer Settlement Tests

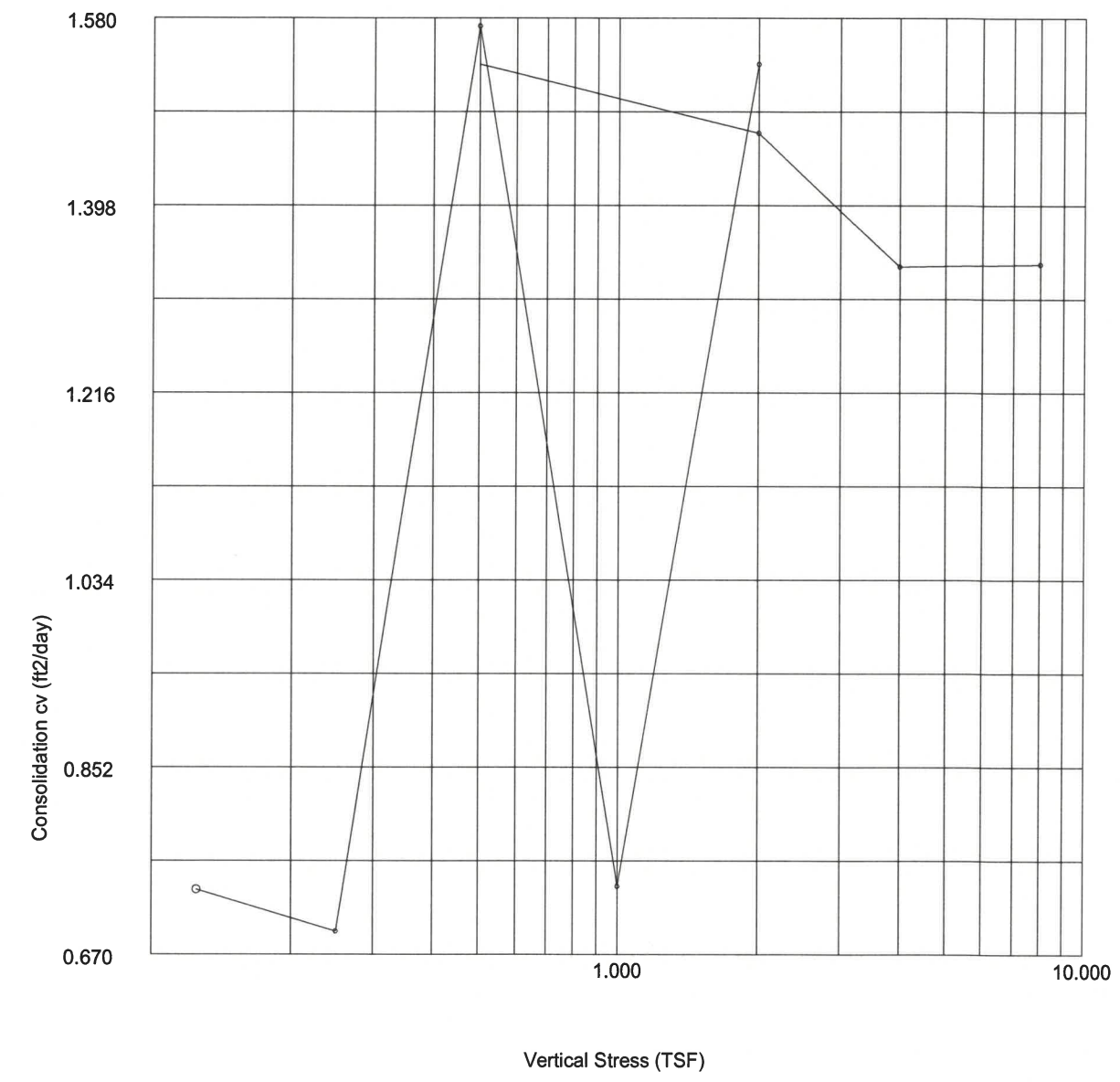


	ASTM D2435-96		Test name	Consolidation
			Date of Test:	10-22-22
	Site Reference:	Haywood Bridge No. 239	Sample:	ST-1
	Jobfile:	C:\WINCLISP\22350010.JOB	Borehole:	B1-E
Operator:	<i>mk</i>	Checked:	<i>mk</i>	Approved:

Oedometer Settlement Tests



Oedometer Settlement Tests



	ASTM D2435-96		Test name	Consolidation
			Date of Test:	10-22-22
	Site Reference:	Haywood Bridge No. 239	Sample:	ST-1
	Jobfile:	C:\WINCLISP\22350010.JOB	Borehole:	B1-E
Operator: <i>mlc</i>		Checked: <i>mlc</i>		Approved:


	ASTM D2435-96		Test name	Consolidation
			Date of Test:	10-22-22
	Site Reference:	Haywood Bridge No. 239	Sample:	ST-1
	Jobfile:	C:\WINCLISP\22350010.JOB	Borehole:	B1-E
Operator: <i>mlc</i>		Checked: <i>mlc</i>		Approved:


Oedometer Settlement Tests

Stress (TSF)	Initial Temp. oC	Settlement Total (in)	Cal Corr. (in)	Final Temp. oC	Voids Ratio e_f	t_{90} (mins)	Secondary Compr C_{sec}	c_v (ft ² /day)	m_v (ft ² /ton)
0.125	21.9	0.0058	0.0	21.9	0.9727	2.858	0.00	0.733	0.047
0.250	21.9	0.0110	0.0	21.9	0.9623	2.992	0.00	0.693	0.042
0.500	21.9	0.0196	0.0	21.9	0.9452	1.300	0.00	1.572	0.035
1.000	21.9	0.0321	0.0	21.9	0.9203	2.716	0.00	0.736	0.026
2.000	21.9	0.0513	0.0	21.9	0.8821	1.260	0.00	1.535	0.020
0.500	21.9	0.0471	0.0	21.9	0.8905				0.003
2.000	21.9	0.0530	0.0	21.9	0.8787	1.295	0.00	1.468	0.004
4.000	21.9	0.0775	0.0	21.9	0.8300	1.375	0.00	1.338	0.013
8.000	21.9	0.1152	0.0	21.9	0.7550	1.282	0.00	1.341	0.011

Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	0	0.0000	0.0000
2	0.017	1	0.0001	0.0001
3	0.167	25	0.0025	0.0025
4	0.417	39	0.0039	0.0039
5	0.917	48	0.0048	0.0048
6	1.970	53	0.0053	0.0053
7	3.917	55	0.0055	0.0055
8	7.917	56	0.0056	0.0056
9	14.917	56	0.0056	0.0056
10	29.917	57	0.0057	0.0057
11	69.333	58	0.0058	0.0058

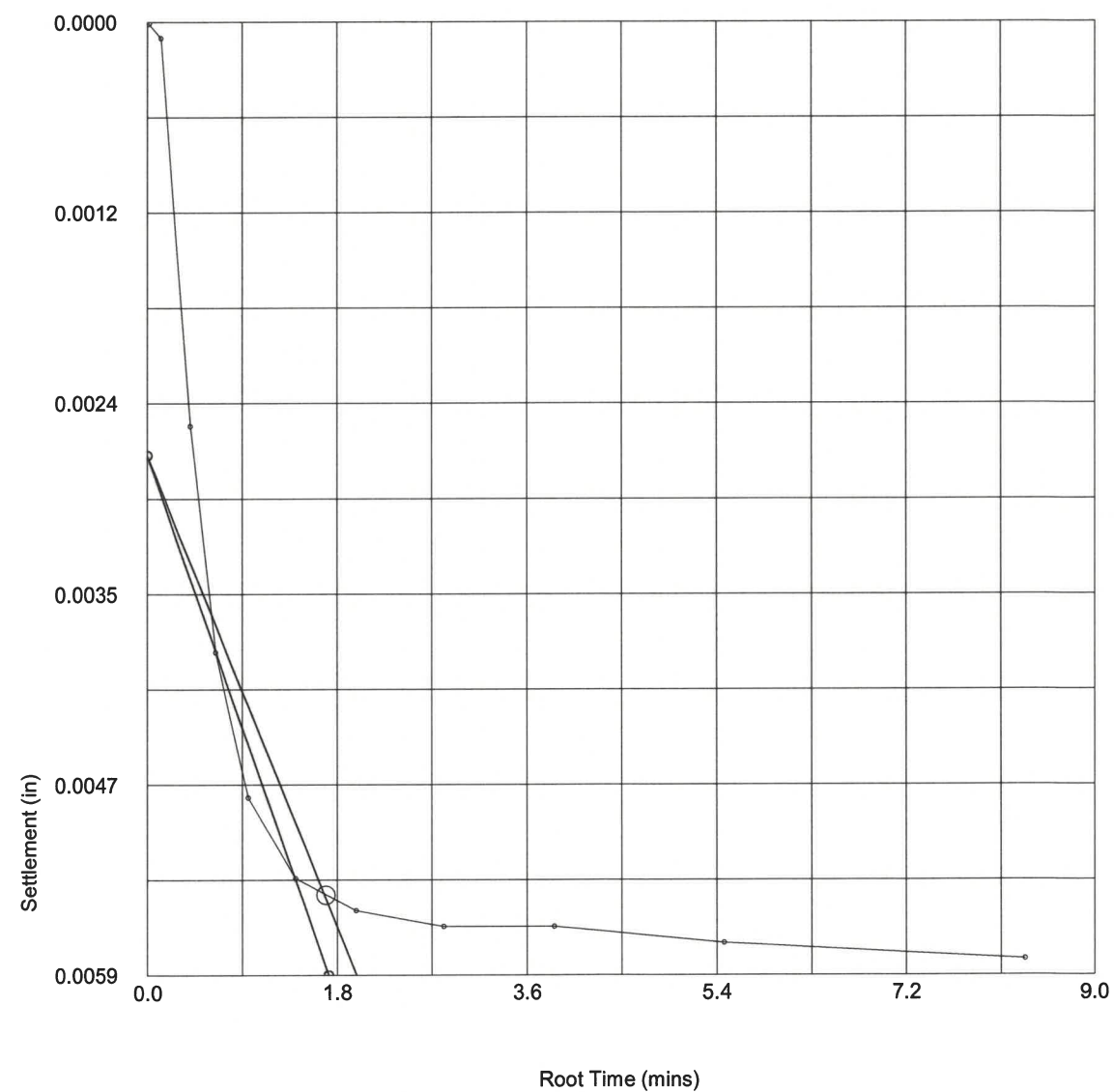
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		Date of Test:	10-22-22
	Site Reference: Haywood Bridge No. 239 Jobfile: C:\WINCLISP\22350010.JOB	Sample: ST-1 Borehole: B1-E	
Operator: <i>mm</i>	Checked: <i>mm</i>	Approved:	

	ASTM D2435-96	Test name	Consolidation Load: 0.125 (TSF)
		Date of Test:	10-22-22
	Site Reference: Haywood Bridge No. 239 Jobfile: C:\WINCLISP\22350010.JOB	Sample: ST-1 Borehole: B1-E	
Operator: <i>mm</i>	Checked: <i>mm</i>	Approved:	

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.125
Initial Temp oC	21.9
Correction (in)	0.0
Settlement (in)	0.0058
Voids Ratio e	0.9727
Final Temp oC	0.0
t ₉₀ (mins)	2.86
c _v (ft ² /day)	0.733
m _v (ft ² /ton)	0.047
Sec Compression C _{sec}	0.00



	ASTM D2435-96	Test name: Consolidation
		Date of Test: 10-22-22
	Site Reference: Haywood Bridge No. 239	Sample: ST-1
	Jobfile: C:\WINCLISP\22350010.JOB	Borehole: B1-E
Operator: <i>mlc</i>	Checked: <i>mlc</i>	Approved:

Oedometer Settlement Tests

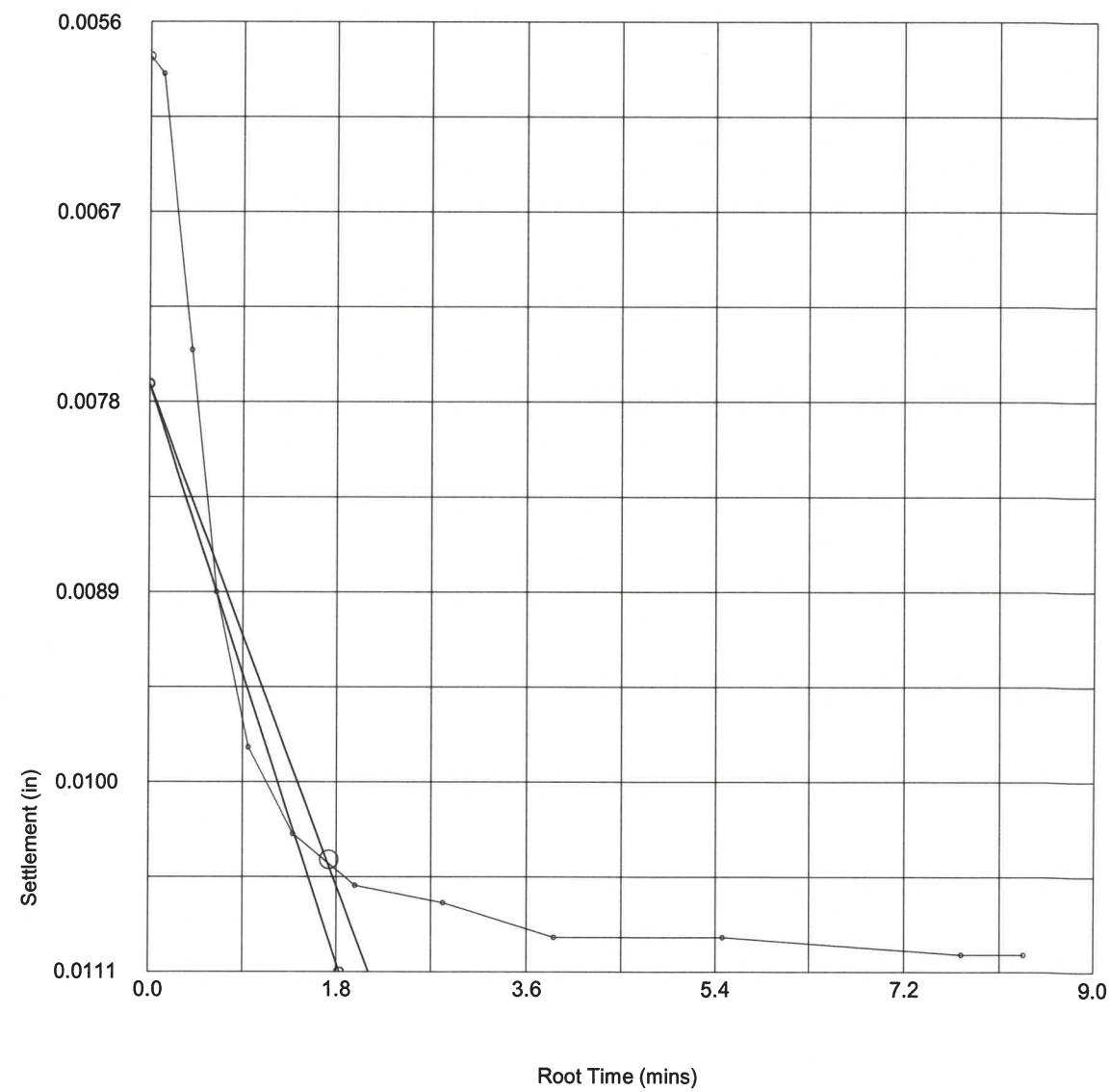
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	58	0.0058	0.0058
2	0.017	59	0.0059	0.0059
3	0.167	75	0.0075	0.0075
4	0.417	89	0.0089	0.0089
5	0.917	98	0.0098	0.0098
6	1.917	103	0.0103	0.0103
7	3.917	106	0.0106	0.0106
8	7.917	107	0.0107	0.0107
9	14.917	109	0.0109	0.0109
10	29.917	109	0.0109	0.0109
11	59.917	110	0.0110	0.0110
12	69.333	110	0.0110	0.0110

	ASTM D2435-96	Test name: Consolidation Load: 0.250 (TSF)
		Date of Test: 10-22-22
	Site Reference: Haywood Bridge No. 239	Sample: ST-1
	Jobfile: C:\WINCLISP\22350010.JOB	Borehole: B1-E
Operator: <i>mlc</i>	Checked: <i>mlc</i>	Approved:

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.250
Initial Temp oC	21.9
Correction (in)	0.0
Settlement (in)	0.0052
Voids Ratio e	0.9623
Final Temp oC	0.0
t ₉₀ (mins)	2.99
c _v (ft ² /day)	0.693
m _v (ft ² /ton)	0.042
Sec Compression C _{sec}	0.00



Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	110	0.0110	0.0110
2	0.017	111	0.0111	0.0111
3	0.167	149	0.0149	0.0149
4	0.417	167	0.0167	0.0167
5	0.917	179	0.0179	0.0179
6	1.917	184	0.0184	0.0184
7	3.917	187	0.0187	0.0187
8	7.917	190	0.0190	0.0190
9	14.917	191	0.0191	0.0191
10	29.917	193	0.0193	0.0193
11	59.917	194	0.0194	0.0194
12	101.017	196	0.0196	0.0196

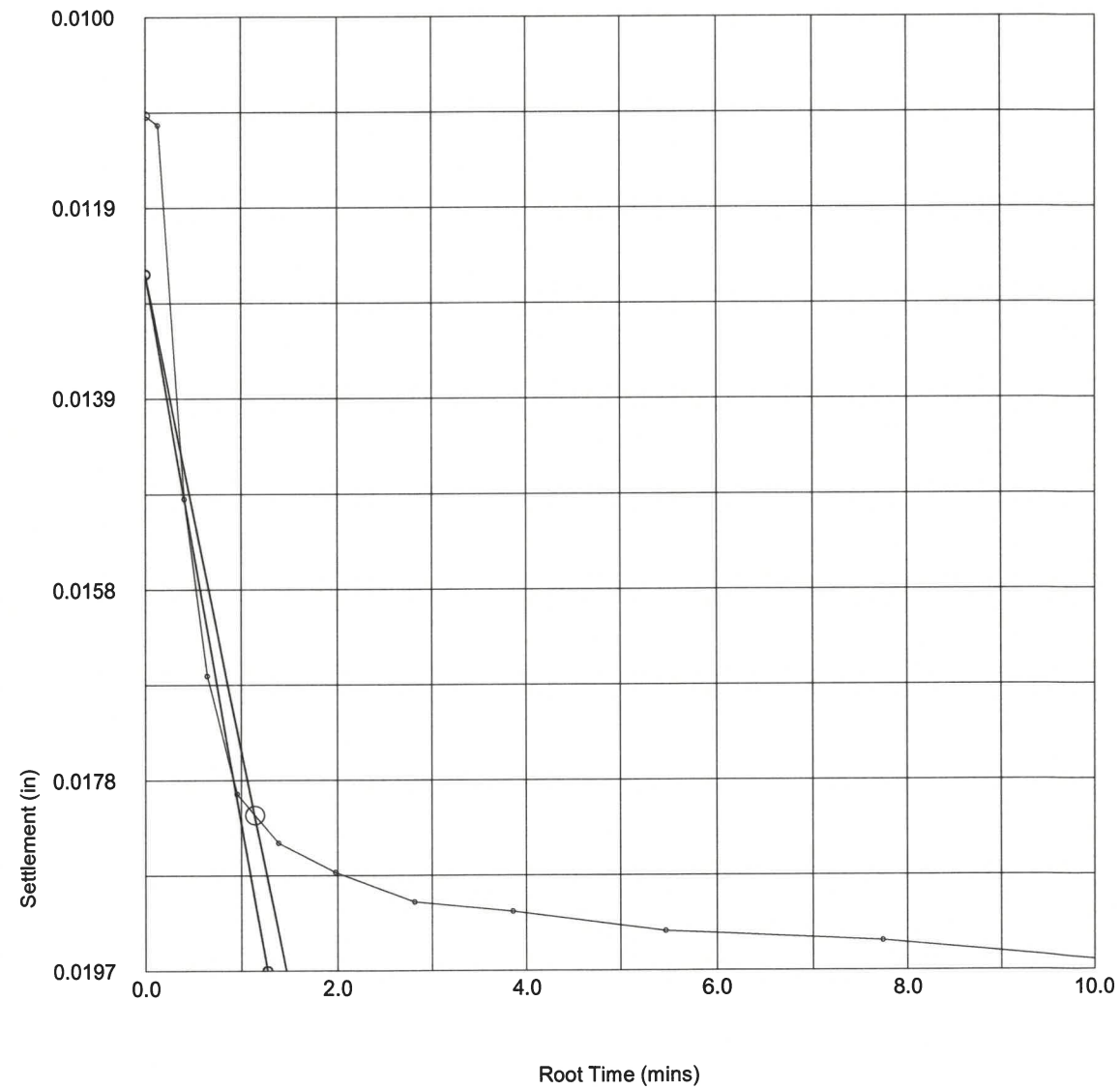
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	Site Reference: Haywood Bridge No. 239	Sample: ST-1	
	Jobfile: C:\WINCLISP\22350010.JOB	Borehole: B1-E	
	Operator: <i>mlc</i>	Checked: <i>mlc</i>	Approved:

	ASTM D2435-96	Test name: Consolidation Load: 0.500 (TSF)	Date of Test: 10-22-22
	Site Reference: Haywood Bridge No. 239	Sample: ST-1	
	Jobfile: C:\WINCLISP\22350010.JOB	Borehole: B1-E	
	Operator: <i>mlc</i>	Checked: <i>mlc</i>	Approved:

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	0.500
Initial Temp oC	21.9
Correction (in)	0.0
Settlement (in)	0.0086
Voids Ratio e	0.9452
Final Temp oC	0.0
t ₉₀ (mins)	1.30
c _v (ft ² /day)	1.572
m _v (ft ² /ton)	0.035
Sec Compression C _{sec}	0.00



	ASTM D2435-96	Test name: Consolidation
		Date of Test: 10-22-22
	Site Reference: Haywood Bridge No. 239	Sample: ST-1
	Jobfile: C:\WINCLISP\22350010.JOB	Borehole: B1-E
Operator: <i>me</i>	Checked: <i>me</i>	Approved:

Oedometer Settlement Tests

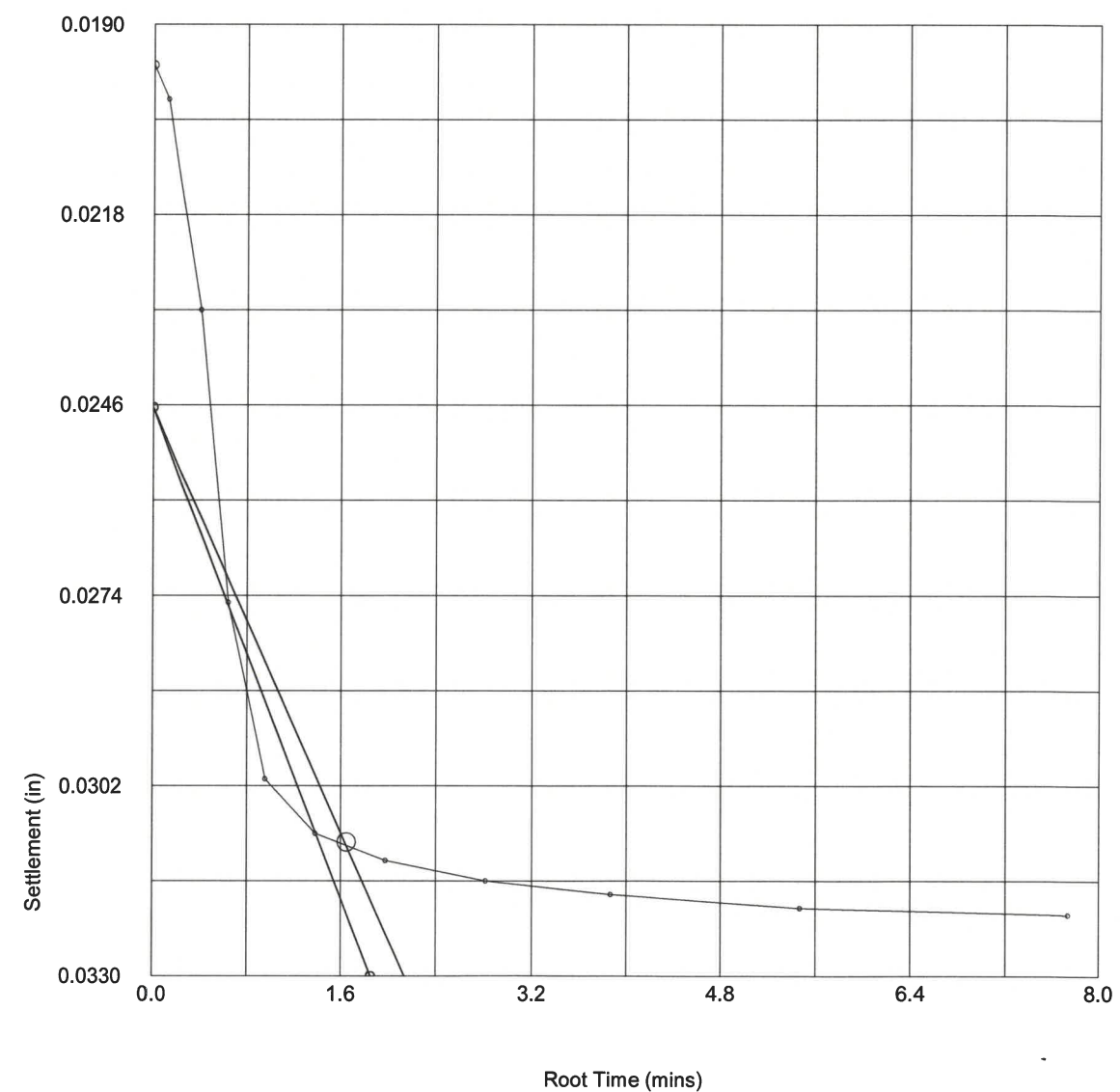
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	196	0.0196	0.0196
2	0.017	201	0.0201	0.0201
3	0.167	232	0.0232	0.0232
4	0.417	275	0.0275	0.0275
5	0.917	301	0.0301	0.0301
6	1.917	309	0.0309	0.0309
7	3.917	313	0.0313	0.0313
8	7.917	316	0.0316	0.0316
9	14.917	318	0.0318	0.0318
10	29.917	320	0.0320	0.0320
11	59.917	321	0.0321	0.0321

	ASTM D2435-96	Test name: Consolidation Load: 1.000 (TSF)
		Date of Test: 10-22-22
	Site Reference: Haywood Bridge No. 239	Sample: ST-1
	Jobfile: C:\WINCLISP\22350010.JOB	Borehole: B1-E
Operator: <i>me</i>	Checked: <i>me</i>	Approved:

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	1.000
Initial Temp oC	21.9
Correction (in)	0.0
Settlement (in)	0.0125
Voids Ratio e	0.9203
Final Temp oC	0.0
t ₉₀ (mins)	2.72
c _v (ft ² /day)	0.736
m _v (ft ² /ton)	0.026
Sec Compression C _{sec}	0.00



Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	321	0.0321	0.0321
2	0.017	322	0.0322	0.0322
3	0.167	422	0.0422	0.0422
4	0.417	461	0.0461	0.0461
5	0.917	481	0.0481	0.0481
6	1.917	490	0.0490	0.0490
7	3.917	495	0.0495	0.0495
8	7.917	499	0.0499	0.0499
9	14.917	502	0.0502	0.0502
10	29.917	504	0.0504	0.0504
11	59.917	510	0.0510	0.0510
12	119.917	513	0.0513	0.0513

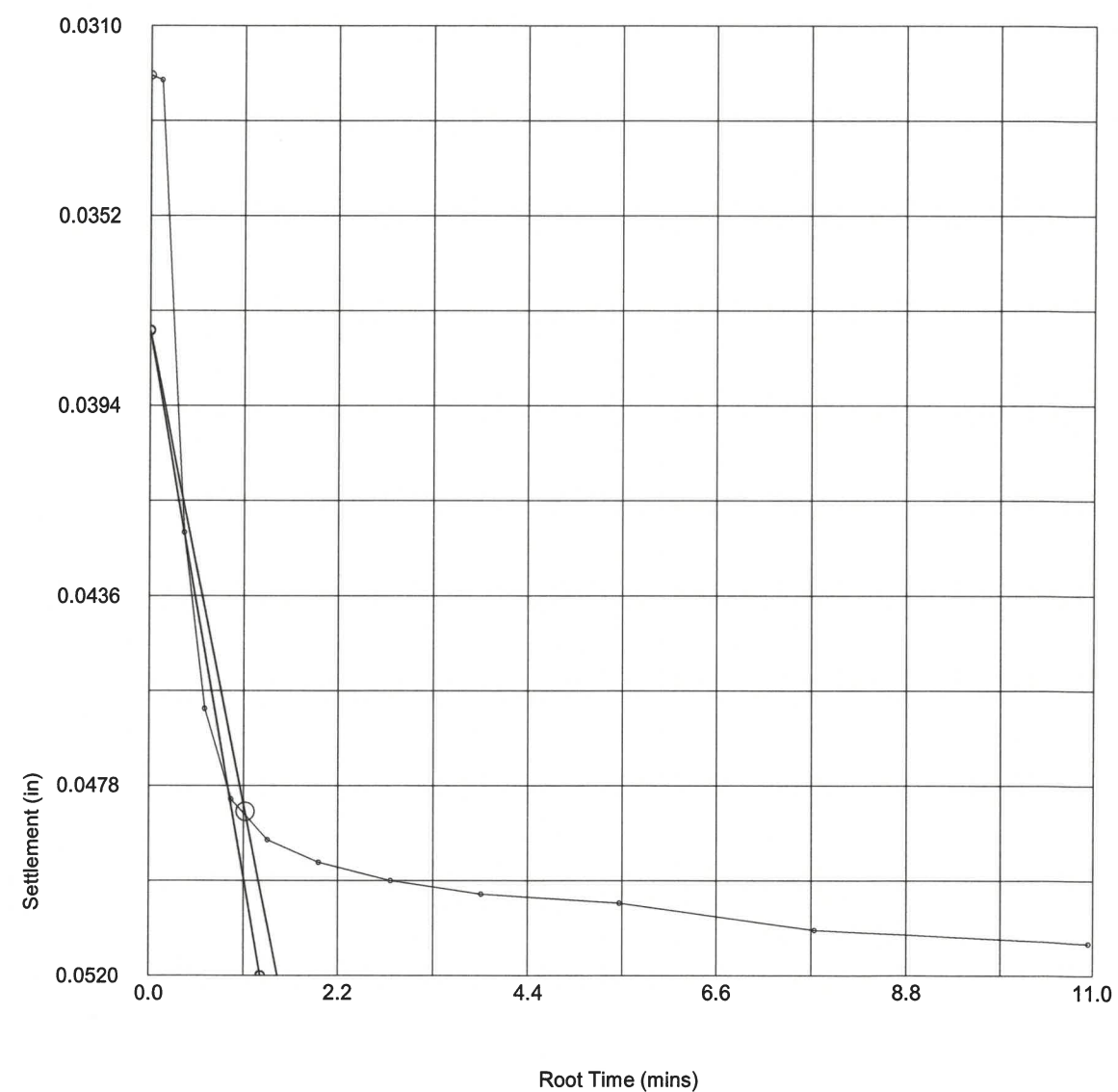
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		Date of Test: 10-22-22
	Site Reference: Haywood Bridge No. 239	Sample: ST-1
	Jobfile: C:\WINCLISP\22350010.JOB	Borehole: B1-E
Operator: <i>mu</i>	Checked: <i>mu</i>	Approved:

	ASTM D2435-96	Test name: Consolidation Load: 2.000 (TSF)
		Date of Test: 10-22-22
	Site Reference: Haywood Bridge No. 239	Sample: ST-1
	Jobfile: C:\WINCLISP\22350010.JOB	Borehole: B1-E
Operator: <i>mu</i>	Checked: <i>mu</i>	Approved:

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	2.000
Initial Temp oC	21.9
Correction (in)	0.0
Settlement (in)	0.0192
Voids Ratio e	0.8821
Final Temp oC	0.0
t ₉₀ (mins)	1.26
c _v (ft ² /day)	1.535
m _v (ft ² /ton)	0.02
Sec Compression C _{sec}	0.00



Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	513	0.0513	0.0513
2	0.017	512	0.0512	0.0512
3	0.167	482	0.0482	0.0482
4	0.417	477	0.0477	0.0477
5	0.917	475	0.0475	0.0475
6	1.917	474	0.0474	0.0474
7	3.917	473	0.0473	0.0473
8	7.917	473	0.0473	0.0473
9	14.917	472	0.0472	0.0472
10	29.917	472	0.0472	0.0472
11	36.517	471	0.0471	0.0471

	ASTM D2435-96	Test name	Consolidation
		Date of Test:	10-22-22
	Site Reference: Haywood Bridge No. 239	Sample:	ST-1
	Jobfile: C:\WINCLISP\22350010.JOB	Borehole:	B1-E
	Operator: <i>me</i>	Checked: <i>me</i>	Approved:

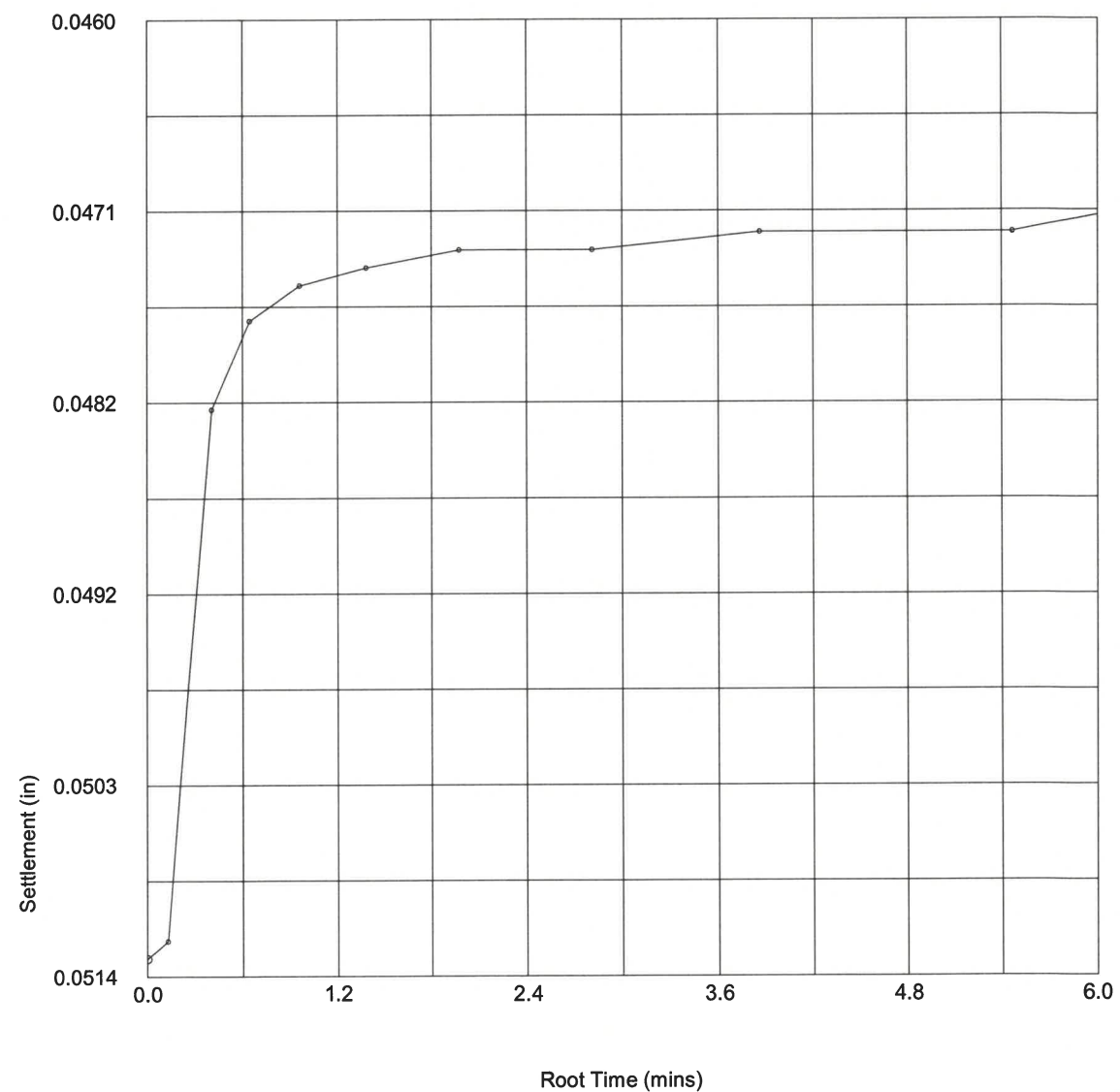
	ASTM D2435-96	Test name	Consolidation Load: 0.500 (TSF)
		Date of Test:	10-22-22
	Site Reference: Haywood Bridge No. 239	Sample:	ST-1
	Jobfile: C:\WINCLISP\22350010.JOB	Borehole:	B1-E
	Operator: <i>me</i>	Checked: <i>me</i>	Approved:

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF) 0.500
 Initial Temp oC 21.9
 Correction (in) 0.0
 Settlement (in) 0.0042
 Voids Ratio e 0.8905

Final Temp oC
 t₉₀ (mins)
 c_v (ft²/day)
 m_v (ft²/ton)
 Sec Compression C_{sec}



Oedometer Settlement Tests

No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	471	0.0471	0.0471
2	0.017	487	0.0487	0.0487
3	0.167	516	0.0516	0.0516
4	0.417	520	0.0520	0.0520
5	0.917	522	0.0522	0.0522
6	1.917	523	0.0523	0.0523
7	3.917	524	0.0524	0.0524
8	7.917	525	0.0525	0.0525
9	14.917	526	0.0526	0.0526
10	29.917	528	0.0528	0.0528
11	59.917	530	0.0530	0.0530
12	61.333	530	0.0530	0.0530

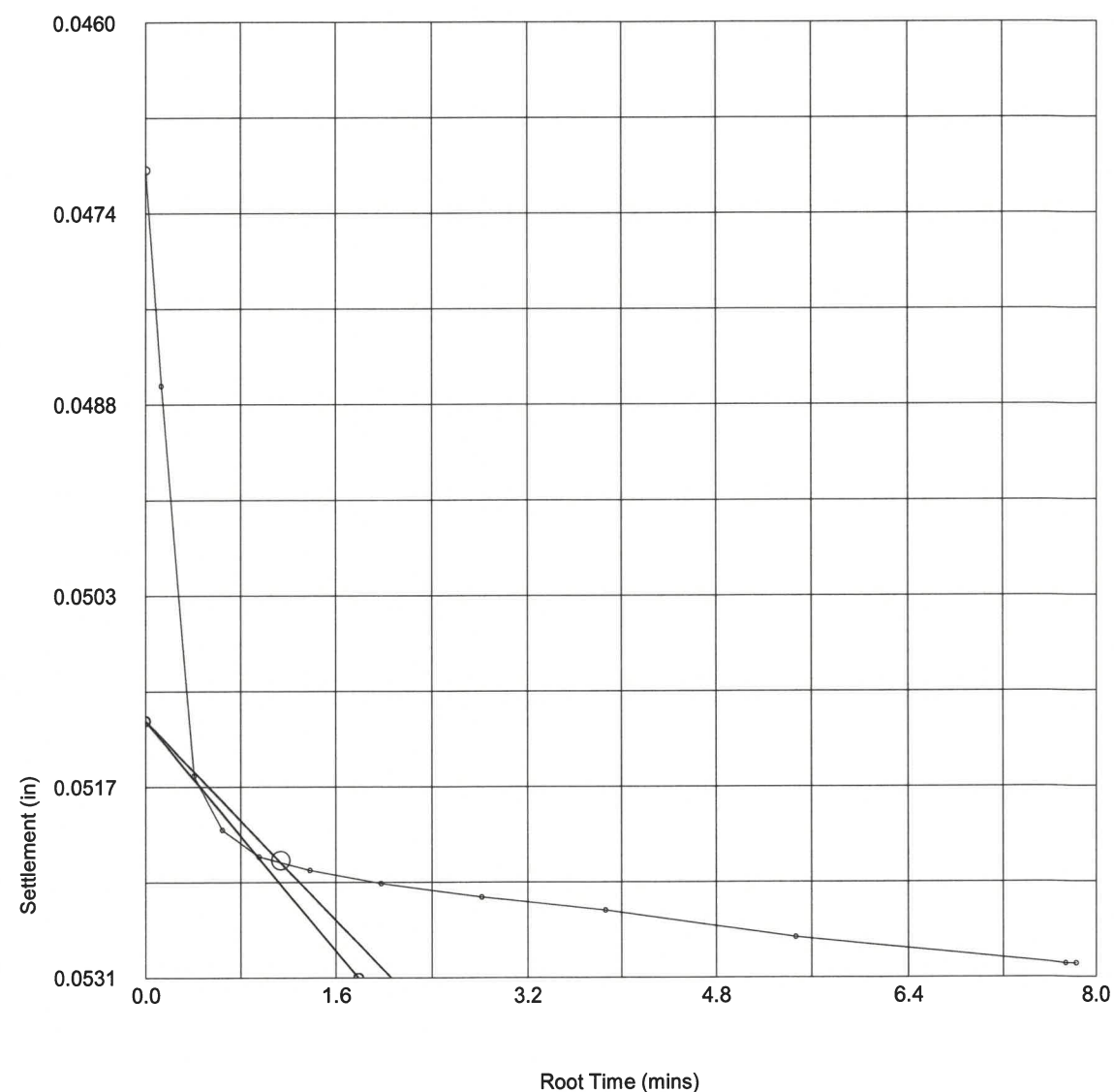
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		Date of Test: 10-22-22
	Site Reference: Haywood Bridge No. 239	Sample: ST-1
	Jobfile: C:\WINCLISP\22350010.JOB	Borehole: B1-E
Operator: <i>mu</i>	Checked: <i>mu</i>	Approved:

	ASTM D2435-96	Test name: Consolidation Load: 2.000 (TSF)
		Date of Test: 10-22-22
	Site Reference: Haywood Bridge No. 239	Sample: ST-1
	Jobfile: C:\WINCLISP\22350010.JOB	Borehole: B1-E
Operator: <i>mu</i>	Checked: <i>mu</i>	Approved:

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	2.000
Initial Temp oC	21.9
Correction (in)	0.0
Settlement (in)	0.0059
Voids Ratio e	0.8787
Final Temp oC	0.0
t ₉₀ (mins)	1.29
c _v (ft ² /day)	1.468
m _v (ft ² /ton)	0.004
Sec Compression C _{sec}	0.00



	ASTM D2435-96	Test name: Consolidation	Date of Test: 10-22-22
	Site Reference: Haywood Bridge No. 239	Sample: ST-1	
	Jobfile: C:\WINCLISP\22350010.JOB	Borehole: B1-E	
	Operator: <i>me</i>	Checked: <i>me</i>	Approved:

Oedometer Settlement Tests

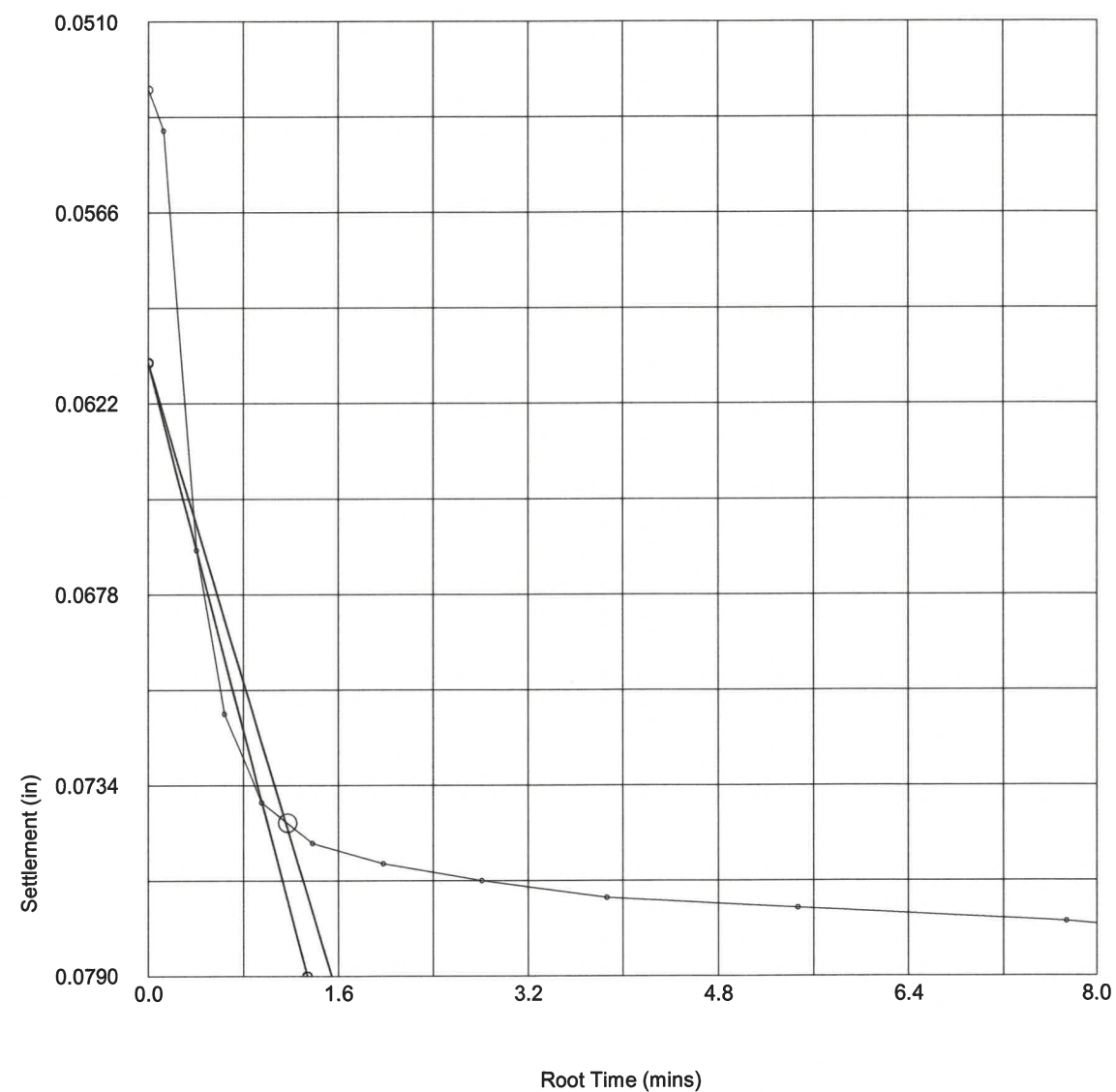
No.	Time (mins)	Disolacement (divs)	Displacement (in)	Settlement (in)
1	0.000	530	0.0530	0.0530
2	0.017	542	0.0542	0.0542
3	0.167	665	0.0665	0.0665
4	0.417	713	0.0713	0.0713
5	0.917	739	0.0739	0.0739
6	1.917	751	0.0751	0.0751
7	3.917	757	0.0757	0.0757
8	7.917	762	0.0762	0.0762
9	14.917	767	0.0767	0.0767
10	29.917	770	0.0770	0.0770
11	59.917	774	0.0774	0.0774
12	65.117	775	0.0775	0.0775

	ASTM D2435-96	Test name: Consolidation Load: 4.000 (TSF)	Date of Test: 10-22-22
	Site Reference: Haywood Bridge No. 239	Sample: ST-1	
	Jobfile: C:\WINCLISP\22350010.JOB	Borehole: B1-E	
	Operator: <i>me</i>	Checked: <i>me</i>	Approved:

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	4.000
Initial Temp oC	21.9
Correction (in)	0.0
Settlement (in)	0.0245
Voids Ratio e	0.8300
Final Temp oC	0.0
t ₉₀ (mins)	1.38
c _v (ft ² /day)	1.338
m _v (ft ² /ton)	0.013
Sec Compression C _{sec}	0.00



	ASTM D2435-96	Test name	Consolidation
		Date of Test:	10-22-22
	Site Reference: Haywood Bridge No. 239	Sample:	ST-1
	Jobfile: C:\WINCLISP\22350010.JOB	Borehole:	B1-E
	Operator: <i>me</i>	Checked: <i>me</i>	Approved:

Oedometer Settlement Tests

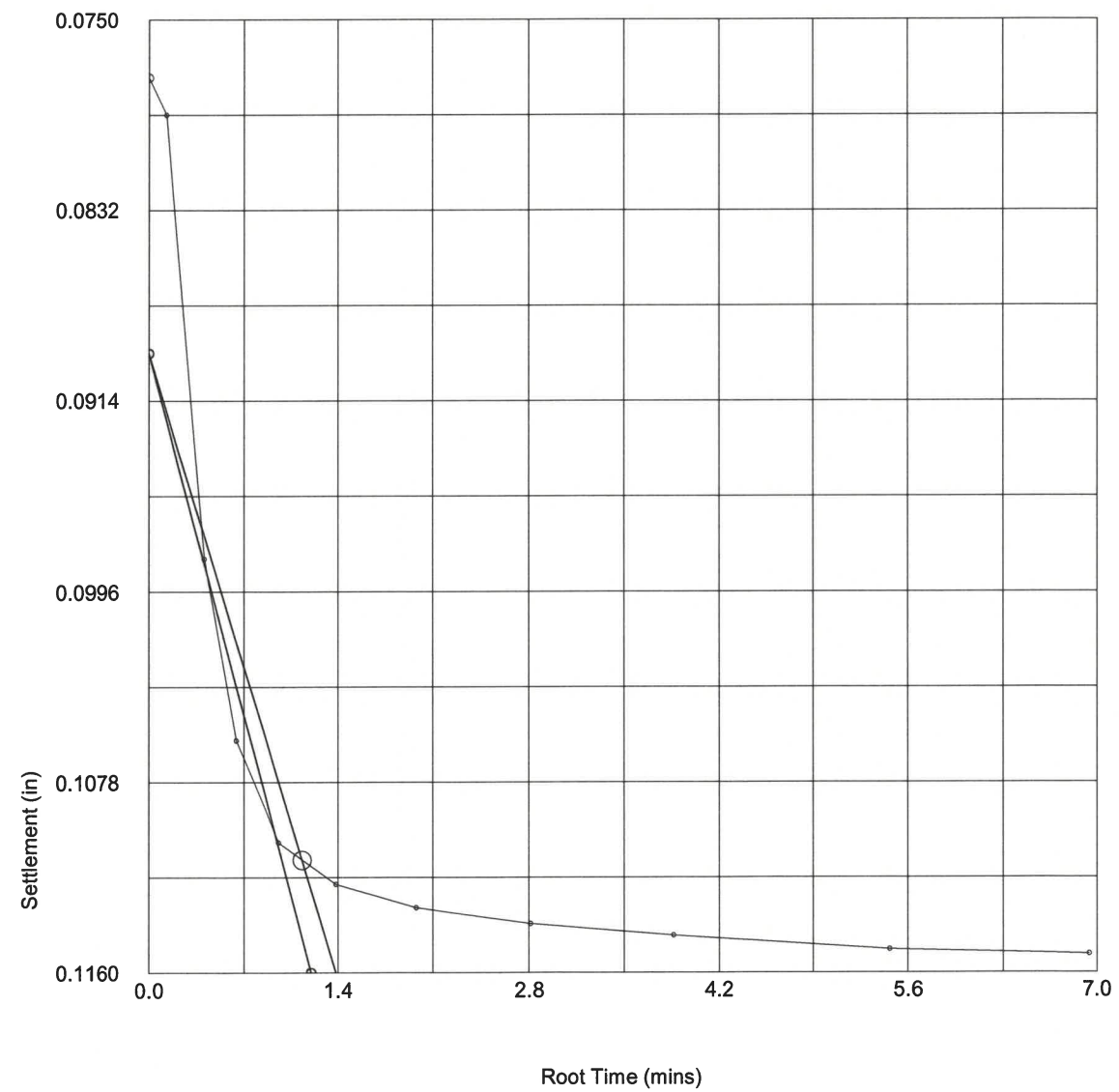
No.	Time (mins)	Displacement (divs)	Displacement (in)	Settlement (in)
1	0.000	775	0.0775	0.0775
2	0.017	791	0.0791	0.0791
3	0.167	982	0.0982	0.0982
4	0.417	1060	0.1060	0.1060
5	0.917	1104	0.1104	0.1104
6	1.917	1122	0.1122	0.1122
7	3.917	1132	0.1132	0.1132
8	7.917	1139	0.1139	0.1139
9	14.917	1144	0.1144	0.1144
10	29.917	1150	0.1150	0.1150
11	48.217	1152	0.1152	0.1152

	ASTM D2435-96	Test name	Consolidation Load: 8.000 (TSF)
		Date of Test:	10-22-22
	Site Reference: Haywood Bridge No. 239	Sample:	ST-1
	Jobfile: C:\WINCLISP\22350010.JOB	Borehole:	B1-E
	Operator: <i>me</i>	Checked: <i>me</i>	Approved:

Oedometer Settlement Tests

Settlement Stage Results

Vertical Stress (TSF)	8.000
Initial Temp oC	21.9
Correction (in)	0.0
Settlement (in)	0.0377
Voids Ratio e	0.7550
Final Temp oC	0.0
t ₉₀ (mins)	1.28
c _v (ft ² /day)	1.341
m _v (ft ² /ton)	0.011
Sec Compression C _{sec}	0.00



ASTM D2435-96
 Site Reference: Haywood Bridge No. 239
 Jobfile: C:\WINCLISP\22350010.JOB
 Operator: *[Signature]*

Test name: Consolidation
 Date of Test: 10-22-22
 Sample: ST-1
 Borehole: B1-E
 Checked: *[Signature]*
 Approved: *[Signature]*

SITE PHOTOGRAPH

Bridge No. 239 on -L- (I-40) over SR 1550 (Incinerator Rd.)



Looking North

REFERENCE: HB-0003

PROJECT: 55041

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HB-0003	1	5

STRUCTURE
SUBSURFACE INVESTIGATION

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	CROSS SECTION
5	BORE LOGS

COUNTY HAYWOOD
PROJECT DESCRIPTION REPLACE BRIDGE #239
ON I-40 OVER SR 1550

SITE DESCRIPTION CULVERT EXTENSION
-L- STA 188+00 - 189+00 OFFSET RT

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 1919 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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

PERSONNEL

CD JOHNSON

CE STEWMAN

CJ COFFEY

JD WORLEY

INVESTIGATED BY DMM

DRAWN BY DMM

CHECKED BY DCE

SUBMITTED BY DCE

DATE 7/17/2023



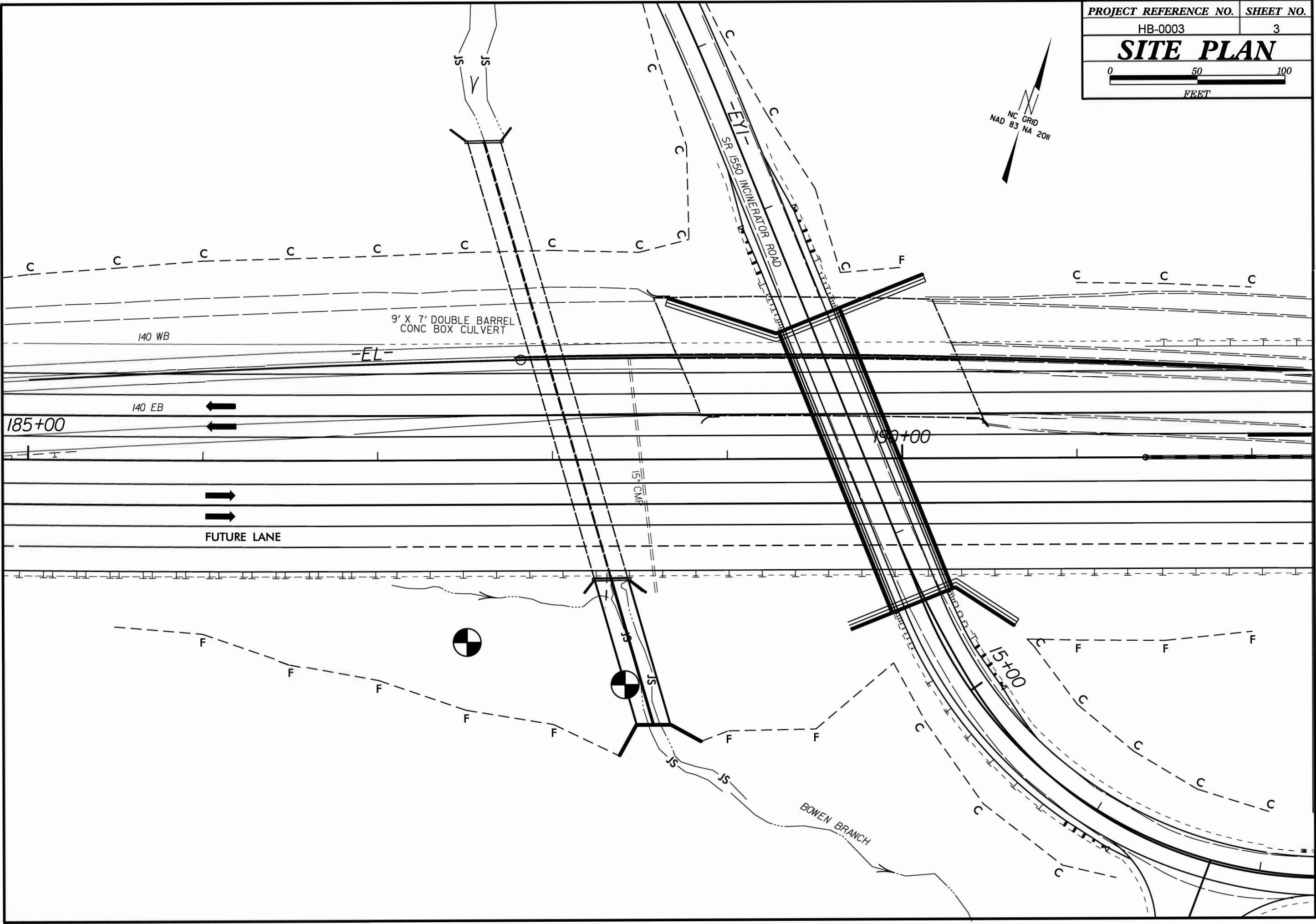
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D. Matt Mullen 07/20/2023

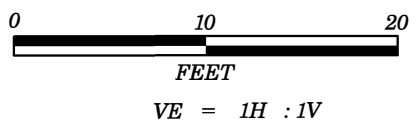
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**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

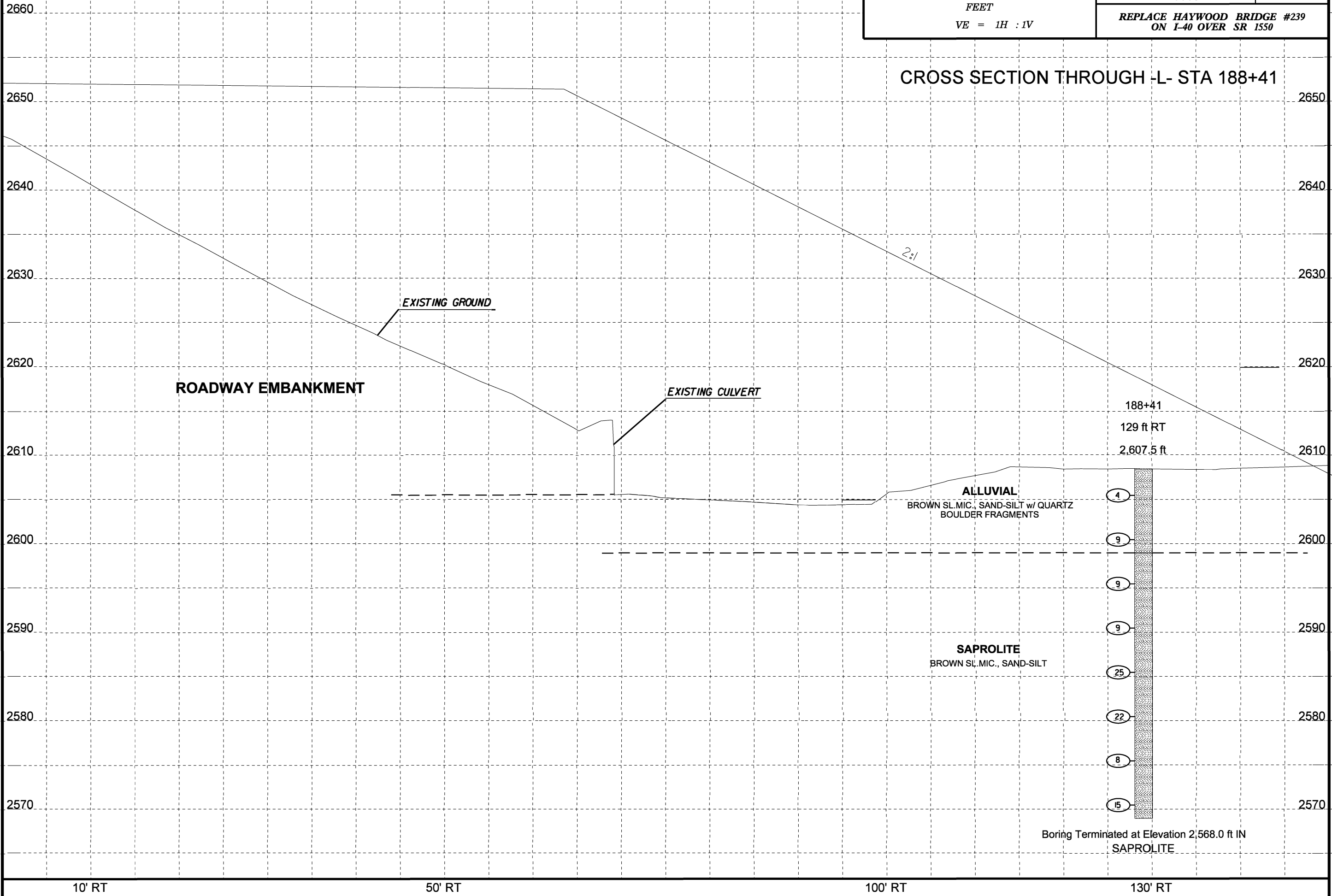
SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS									
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.										HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:										ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (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. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)										CRYSTALLINE ROCK (CR)									
MINERALOGICAL COMPOSITION										NON-CRYSTALLINE ROCK (NCR)										COASTAL PLAIN SEDIMENTARY ROCK (CP)										WEATHERING									
COMPRESSION										PERCENTAGE OF MATERIAL										GROUND WATER										MISCELLANEOUS SYMBOLS									
TEXTURE OR GRAIN SIZE										RECOMMENDATION SYMBOLS										ROCK HARDNESS										SOIL MOISTURE - CORRELATION OF TERMS									
PLASTICITY										ABBREVIATIONS										SOIL MOISTURE SCALE (ATTERBERG LIMITS)										EQUIPMENT USED ON SUBJECT PROJECT									
COLOR										FRACTURE SPACING										BEDDING										INDURATION									
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.										INDURATION										INDURATION										INDURATION									





PROJECT REFERENCE NO.	SHEET NO.
HB-0003	4
REPLACE HAYWOOD BRIDGE #239 ON I-40 OVER SR 1550	

CROSS SECTION THROUGH -L- STA 188+41



ROADWAY EMBANKMENT

EXISTING GROUND

EXISTING CULVERT

2:1

ALLUVIAL
BROWN SL. MIC., SAND-SILT w/ QUARTZ
BOULDER FRAGMENTS

SAPROLITE
BROWN SL. MIC., SAND-SILT

188+41
129 ft RT
2,607.5 ft

- 4
- 9
- 9
- 9
- 25
- 22
- 8
- 15

Boring Terminated at Elevation 2,568.0 ft IN
SAPROLITE

10' RT

50' RT

100' RT

130' RT

GEOTECHNICAL BORING REPORT BORE LOG

WBS 55041.1.1			TIP HB-0003			COUNTY HAYWOOD			GEOLOGIST Johnson, C. D.						
SITE DESCRIPTION REPLACE BRIDGE 239 ON I-40 OVER SR-1550 (INCINERATOR RD)									GROUND WTR (ft)						
BORING NO. STA 188+41			STATION 188+41			OFFSET 129 ft RT			ALIGNMENT -L-						
COLLAR ELEV. 2,607.5 ft			TOTAL DEPTH 39.5 ft			NORTHING 678,154			EASTING 848,373						
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 79% 04/11/2022						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic						
DRILLER Coffey, Jr., C.			START DATE 04/11/23			COMP. DATE 04/11/23			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)	
2610															
													2,607.5	0.0	GROUND SURFACE
2605	2,604.5	3.0	1	1	3										ALLUVIAL BROWN SL.MIC., SAND-SILT w/ QUARTZ BOULDER FRAGMENTS
2600	2,599.5	8.0	4	4	5										ALUV. BOULDERS
2595	2,594.5	13.0	6	3	6										
2590	2,589.5	18.0	1	4	5										
2585	2,584.5	23.0	8	11	14										
2580	2,579.5	28.0	5	10	12										
2575	2,574.5	33.0	1	2	6										
2570	2,569.5	38.0	7	8	7										
													2,568.0	39.5	Boring Terminated at Elevation 2,568.0 ft IN SAPROLITE

NCDOT BORE DOUBLE 43_GEO_BRD246_HAYWOOD_BH.GPJ NC_DOT.GDT 7/17/23