REFERENCE: HB-0002

PROJECT: 55041

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HB-0002	1	18

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *HAYWOOD*

PROJECT DESCRIPTION *REPLACE BRIDGE NOS. 248 & 249 ON I-40 OVER SR 1613*

CONTENTS

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.

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NOTES:
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PERSONNEL

D. KUBINSKI

B. NEUNSINGER

TRIGON EXPLORATION

INVESTIGATED BY *S&ME, Inc.*
Kleinfelder, Inc.

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DATE *SEPTEMBER 2022*

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DocuSigned by:
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F29CA6BB83F449F...

9/7/2022

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	2

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 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

SOIL LEGEND AND AASHTO CLASSIFICATION

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	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10	50 MX													
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL	—		—	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PI	6 MX		NP	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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 RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
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	4	10	40	60	200	270
OPENING (MM)	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

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

PLASTICITY

	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

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

- 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

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT / CPT / DMT / VST / PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

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

ABBREVIATIONS

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
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
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] MOBILE B-57
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [X] TRICONE 2-7/8 " TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

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. 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 YEILD 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 (V 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 (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
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 GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
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 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 FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 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 DISLODGED 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 (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.

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 (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 THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: N/A

ELEVATION: N/A FEET

NOTES:

FIAD: FILLED IMMEDIATLEY AFTER DRILLING

BORING ELEVATIONS SURVEYED BY SEPI, INC. USING A GPS WITH SUB-CENTIMETER ACCURACY

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	3

SITE PLAN

0 30 60
FEET

NAD 83

BEAVERDAM RD (SR 1613)

FREEDOM RD

EB1-A

EB2-A

B1-A

B2-A

B2-D (SPT)

B1-D

B2-D

B2-C (SPT)

I-40 WBL

TO MAGGIE VALLEY/
WAYNESVILLE

BRIDGE NO. 249

B1-C

B2-C

ASSUME -L- INCREASES W. TO E.

I-40 EBL

BRIDGE NO. 248

B2-E

B2-E (SPT)

TO ASHEVILLE

B1-E

B2-B

B1-B

: SPT BORINGS

: CPT/DMT BORINGS

EB1-B

SILKWOOD RD

EB2-B

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** D. Kubinski	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** -L-	**0 HR.** 10.0
COLLAR ELEV. 2,639.5 ft	**TOTAL DEPTH** 68.9 ft	**NORTHING** 679,273	**EASTING** 860,743	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER E. Estep	**START DATE** 01/25/22	**COMP. DATE** 01/25/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
2640	2,639.5	0.0	2	1	3	4		M		2,639.5 GROUND SURFACE 0.0 **RESIDUAL** Brown to Gray and Yellowish Brown, Silty CLAY
2635	2,636.0	3.5	2	2	4	6		M		
2630	2,631.0	8.5	WOH	WOH	1	1	SS-1	W		2,632.5 7.0 Olive Brown to Olive Yellow, Silty, Coarse to Fine SAND with Highly to Trace Mica
2625	2,626.0	13.5	1	1	1	2		W		
2620	2,621.0	18.5	2	2	4	6		W		
2615	2,616.0	23.5	2	2	4	6		W		
2610	2,611.0	28.5	2	2	3	5		W		
2605	2,606.0	33.5	3	4	5	9		W		
2600	2,601.0	38.5	5	8	12	20		W		
2595	2,596.0	43.5	4	9	14	23		W		
2590	2,591.0	48.5	2	6	9	15		W		
2585	2,586.0	53.5	6	9	17	26		W		
2580	2,581.0	58.5	26	69	31/0.3	100/0.8				2,582.5 57.0 **WEATHERED ROCK** Olive Yellow, Black, and White, MICA SCHIST
2575	2,576.0	63.5	10	26	74/0.3	100/0.8				
	2,571.0	68.5	100/0.4			100/0.4				2,570.6 68.9 Boring Terminated at Elevation 2,570.6 ft in WEATHERED ROCK: MICA SCHIST

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** -L-	**0 HR.** 9.0
COLLAR ELEV. 2,636.5 ft	**TOTAL DEPTH** 48.4 ft	**NORTHING** 679,069	**EASTING** 860,841	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		**DRILL METHOD** HSA/Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER E. Estep	**START DATE** 01/26/22	**COMP. DATE** 01/27/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2640										2,636.5 GROUND SURFACE 0.0 2,636.1 **ROADWAY EMBANKMENT** 0.4 Asphalt: 0.0 - 0.4 ft Red to Yellowish Brown, Silty CLAY with Trace Mica
2635	2,635.5	1.0	3	3	4	7		M		
	2,633.4	3.1	2	2	2	4		M		
2630	2,628.4	8.1	1	2	2	4		M		2,625.5 11.0 **RESIDUAL** Grayish Brown, Coarse to Fine Sandy SILT
2625	2,623.4	13.1	1	2	2	4		M		
2620	2,618.4	18.1	3	4	6	10		M		2,619.5 17.0 Orange to Black to Olive Brown, Silty, Coarse to Fine SAND with Trace Mica and Rock Fragments
2615	2,613.2	23.3	4	5	7	12		W		
2610	2,608.2	28.3	8	16	31	47		W		
2605	2,603.2	33.3	10	13	14	27		W		
2600	2,598.2	38.3	20	32	41	73	SS-2	W		
2595	2,593.2	43.3	44	56/0.4		100/0.9				2,595.0 41.5 **WEATHERED ROCK** Olive Brown, MICA SCHIST
2590	2,588.2	48.3	60/0.1			60/0.1				2,588.2 48.3 2,588.1 48.4 **CRYSTALLINE ROCK** MICA SCHIST Boring Terminated with Standard Penetration Test Refusal at Elevation 2,588.1 ft in CRYSTALLINE ROCK: MICA SCHIST

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,636.1 ft	**TOTAL DEPTH** 70.3 ft	**NORTHING** 679,234	**EASTING** 860,822	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER E. Estep	**START DATE** 02/08/22	**COMP. DATE** 02/08/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
2640											
	2,636.1	0.0	3	3	3	6		M		2,636.1 GROUND SURFACE	0.0
2635										**ROADWAY EMBANKMENT** Olive to Olive Yellow, Silty CLAY with Trace Mica	
	2,632.3	3.8	3	3	2	5				2,633.1	3.0
2630								M		Light Olive Yellow, Clayey SAND with Trace Mica, Some Rock Fragments	
	2,627.3	8.8	1	1	3	4				2,629.1	7.0
2625								M		**RESIDUAL** Olive Yellow to Black to Dark Reddish Brown to Light Brownish Gray to White, Silty, Coarse to Fine SAND with Trace Mica, Little Quartz	
	2,622.3	13.8	1	3	3	6					
2620								M			
	2,617.3	18.8	2	3	4	7					
2615								M			
	2,612.3	23.8	4	8	11	19					
2610								W			
	2,607.3	28.8	10	12	15	27					
2605								W			
	2,602.3	33.8	5	8	8	16					
2600								W			
	2,597.3	38.8	3	5	8	13					
2595								W			
	2,592.3	43.8	3	6	8	14					
2590								W			
	2,587.3	48.8	53	47/0.3		100/0.8				2,588.1 **WEATHERED ROCK** Light Brownish Gray to White, MICA SCHIST	48.0
2585											
	2,582.3	53.8	29	24	74	98		W		2,583.6 **RESIDUAL** Light Brownish Gray to Black to White, Silty, Coarse to Fine SAND with Trace Mica, Some Quartz	52.5
2580										2,578.6 **WEATHERED ROCK** Light Brownish Gray to White to Black to Reddish Brown MICA SCHIST	57.5
	2,577.3	58.8	43	57/0.3		100/0.8					
2575											
	2,572.3	63.8	57	43/0.2		100/0.7					
2570										2,569.1 **RESIDUAL** White, Black, Reddish Brown, Silty, Coarse to Fine SAND with Trace Mica and Some Quartz	67.0
	2,567.3	68.8	36	35	65	100/1.0		W		2,565.8 Boring Terminated at Elevation 2,565.8 ft in RESIDUAL: Silty SAND	70.3

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613				**GROUND WTR (ft)**
BORING NO. B1-D	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,635.6 ft	**TOTAL DEPTH** 69.3 ft	**NORTHING** 679,223	**EASTING** 860,825	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER E. Estep	**START DATE** 02/10/22	**COMP. DATE** 02/11/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2640										
	2,635.6	0.0	1	1	2	3		M		2,635.6 GROUND SURFACE 0.0
2635										**ROADWAY EMBANKMENT** Yellowish Brown, Coarse to Fine Sandy CLAY with Trace Mica
	2,632.0	3.6	1	2	2	4		M		
2630										2,628.1 7.5
	2,627.0	8.6	2	4	4	8		W		**RESIDUAL** Olive Yellow to Olive Gray to Olive Brown to Light Olive Gray to Light Brownish Gray to Greenish Black to White, Silty, Coarse to Fine SAND with Little to Trace Mica
2625										
	2,622.0	13.6	2	2	4	6		W		
2620										
	2,617.0	18.6	2	4	5	9		W		
2615										
	2,612.0	23.6	2	3	4	7		W		
2610										
	2,607.0	28.6	5	5	6	11		W		
2605										
	2,602.0	33.6	5	7	9	16		W		
2600										
	2,597.0	38.6	4	5	7	12		W		
2595										
	2,592.0	43.6	3	9	14	23		W		
2590										
	2,587.0	48.6	10	12	13	25		W		
2585										
	2,582.0	53.6	16	35	56	91		W		
2580										2,578.6 57.0
	2,577.0	58.6	100/0.4			100/0.4				**WEATHERED ROCK** White to Yellowish Brown to Black, MICA SCHIST
2575										
	2,572.0	63.6	65	35/0.2		100/0.7				
2570										
	2,567.3	68.3	66	34/0.2		100/0.7				2,566.3 69.3
										Boring Terminated at Elevation 2,566.3 ft in WEATHERED ROCK: MICA SCHIST

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613				**GROUND WTR (ft)**
BORING NO. B1-C	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,635.2 ft	**TOTAL DEPTH** 65.5 ft	**NORTHING** 679,181	**EASTING** 860,844	**24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER E. Estep	**START DATE** 02/09/22	**COMP. DATE** 02/09/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) — DEPTH (ft)
2640										
2635	2,635.2	0.0	1	3	7	10		M		2,635.2 GROUND SURFACE 0.0 **RESIDUAL** Olive Gray to Dark Brown to Olive Yellow to Dark Reddish Brown to Yellowish Brown to Reddish Black to Olive Gray to Light Brownish Gray to Black to White to Olive, Silty, Coarse to Fine SAND with Little to Trace Mica, Some to Highly Quartz
	2,631.2	4.0								
2630			WOH	1	2	3		M		
	2,626.2	9.0								
2625			1	1	3	4		M		
	2,621.2	14.0								
2620			1	2	3	5		M		
	2,616.2	19.0								
2615			1	2	3	5		W		
	2,611.2	24.0								
2610			1	1	2	3		W		
	2,606.2	29.0								
2605			3	7	8	15		W		
	2,601.2	34.0								
2600			19	21	34	55		W		
	2,596.2	39.0								
2595			23	40	54	94		W		
	2,591.2	44.0								
2590			27	53	47/0.3	100/0.8		W		
	2,586.2	49.0								
2585			64	36/0.2		100/0.7		W		
	2,581.2	54.0								2,592.7 — 42.5 **WEATHERED ROCK** White to Black to Olive Yellow, MICA SCHIST
2580			7	7	13	20	SS-3	W		
	2,576.2	59.0								2,582.7 — 52.5 **RESIDUAL** Black to White to Olive Yellow, Silty, Fine to Coarse SAND, with Little Mica, Some Quartz
2575			100/0.4			100/0.4		W		2,577.2 — 58.0 **WEATHERED ROCK** White to Black to Olive Yellow, MICA SCHIST
	2,571.2	64.0								2,573.7 — 61.5 **RESIDUAL** Black, White, Olive Yellow, Silty, Coarse to Fine SAND, Little Mica, Some Quartz
2570			30	30	53	83		W		2,569.7 — 65.5 Boring Terminated at Elevation 2,569.7 ft in RESIDUAL: Silty SAND

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613				**GROUND WTR (ft)**
BORING NO. B1-E	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,634.9 ft	**TOTAL DEPTH** 69.2 ft	**NORTHING** 679,138	**EASTING** 860,871	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		**DRILL METHOD** HSA/Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER E. Estep	**START DATE** 02/09/22	**COMP. DATE** 02/10/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2635										
	2,634.9	0.0	3	4	5	9		M		2,634.9 GROUND SURFACE 0.0 **ROADWAY EMBANKMENT** Reddish Brown, Clayey SAND
	2,631.2	3.7								2,632.4 — 2.5 **RESIDUAL** Pink to White to Light Olive Yellow to Red, Gravelly, Coarse SAND with Quartz Fragments
2630			13	8	9	17		M		2,627.4 — 7.5 Reddish Yellow to Olive Gray to Olive to Yellowish Brown to Light Brownish Gray to White to Pink to Olive Yellow, Silty, Coarse to Fine SAND with Trace to Little Mica, with Little to Some Quartz
	2,626.2	8.7								
2625			1	2	3	5		W		
	2,621.2	13.7								
2620			4	7	8	15		W		
	2,616.2	18.7								
2615			10	12	15	27		W		
	2,611.2	23.7								
2610			12	19	28	47		W		
	2,606.2	28.7								
2605			20	23	25	48		W		
	2,601.2	33.7								
2600			16	21	27	48		W		
	2,596.2	38.7								
2595			38	47	53	100/1.0	SS-4	W		
	2,591.2	43.7								
2590			15	20	20	40		W		
	2,586.2	48.7								
2585			10	12	10	22		W		
	2,581.2	53.7								
2580			12	17	23	40		W		
	2,576.2	58.7								2,577.9 — 57.0 **WEATHERED ROCK** White to Black, BIOTITE MICA SCHIST
2575			55	45/0.3		100/0.8		W		
	2,571.2	63.7								
2570			33	67/0.4		100/0.9		W		
	2,566.2	68.7	100/0.5			100/0.5		W		2,565.7 — 69.2 Boring Terminated at Elevation 2,565.7 ft in WEATHERED ROCK: BIOTITE MICA SCHIST

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** -L-	**0 HR.** 6.0
COLLAR ELEV. 2,634.4 ft	**TOTAL DEPTH** 75.3 ft	**NORTHING** 679,117	**EASTING** 860,876	**24 HR.** 6.0
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER E. Estep	**START DATE** 01/27/22	**COMP. DATE** 01/28/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
2635											
	2,634.4	0.0	1	4	5	9		M		2,634.4 GROUND SURFACE	0.0
										ROADWAY EMBANKMENT Red, Silty CLAY with Trace Mica	
2630	2,630.2	4.2	1	1	2	3				2,630.9 **RESIDUAL** Olive Yellow, Silty CLAY	3.5
2625	2,625.2	9.2	1	1	2	3		M		2,627.4 Gray to Light Brownish Gray to Olive to Yellowish Brown to Brown and Gray, Silty, Coarse to Fine SAND with Little to Some Rock Fragments, Little to Trace Mica	7.0
2620	2,620.2	14.2	1	2	3	5		M			
2615	2,615.2	19.2	2	4	6	10		M			
2610	2,610.2	24.2	4	5	7	12		M			
2605	2,605.2	29.2	3	8	9	17		M			
2600	2,600.2	34.2	6	7	9	16		M			
2595	2,595.2	39.2	10	13	15	28		W			
2590	2,590.2	44.2	4	10	12	22		W			
2585	2,585.2	49.2	15	26	30	56		W			
2580	2,580.2	54.2	10	16	21	37		W			
2575	2,575.2	59.2	8	15	31	46		W			
2570	2,570.2	64.2	54	46/0.2		100/0.7				2,571.9 **WEATHERED ROCK** Black and White, MICA SCHIST	62.5
2565	2,565.2	69.2	100/0.2			100/0.2					
2560	2,560.2	74.2	14	78	22/0.1	100/0.6				2,559.1 Boring Terminated at Elevation 2,559.1 ft in WEATHERED ROCK: MICA SCHIST	75.3

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,633.2 ft	**TOTAL DEPTH** 69.3 ft	**NORTHING** 679,243	**EASTING** 860,885	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER E. Estep	**START DATE** 02/07/22	**COMP. DATE** 02/08/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
2635											
	2,633.2	0.0	1	3	10	13		W		2,633.2 GROUND SURFACE	0.0
										2,632.2 **ROADWAY EMBANKMENT** Brown to Gray, Silty CLAY with Trace Mica	1.0
2630	2,629.2	4.0	1	1	1	2		W		2,629.7 **RESIDUAL** White, Coarse SAND Light Brownish Gray to Olive Yellow, Clayey, Coarse to Fine SAND	3.5
2625	2,624.2	9.0	WOH	1	2	3		W			
2620	2,619.2	14.0	1	4	5	9		W		2,620.2 Olive Yellow to Dark Reddish Brown to Light Brownish Gray to White Silty, Coarse to Fine SAND with Little to Trace Mica, Some to Trace Quartz	13.0
2615	2,614.2	19.0	2	4	4	8		W			
2610	2,609.2	24.0	2	3	6	9		W			
2605	2,604.2	29.0	2	6	8	14		W			
2600	2,599.2	34.0	5	5	8	13		W			
2595	2,594.2	39.0	7	8	12	20		W			
2590	2,589.2	44.0	13	27	28	55		W			
2585	2,584.2	49.0	9	17	18	35		W			
2580	2,579.2	54.0	15	15	24	39		W			
2575	2,574.2	59.0	100/0.5			100/0.5				2,575.7 **WEATHERED ROCK** Olive Yellow to Black to White, MICA SCHIST	57.5
2570	2,569.2	64.0	100/0.2			100/0.2					
2565	2,564.2	69.0	100/0.3			100/0.3				2,563.9 Boring Terminated at Elevation 2,563.9 ft in WEATHERED ROCK: MICA SCHIST	69.3

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613				**GROUND WTR (ft)**
BORING NO. B2-D	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,633.5 ft	**TOTAL DEPTH** 69.3 ft	**NORTHING** 679,226	**EASTING** 860,888	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER E. Estep	**START DATE** 02/11/22	**COMP. DATE** 02/11/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
2635										
	2,633.5	0.0	1	3	8	11		M		2,633.5 / 0.0 GROUND SURFACE **ROADWAY EMBANKMENT** Brown to Reddish Brown, Clayey SILT
2630	2,629.5	4.0	WOH	1	3	4		M		2,630.5 / 3.0 **RESIDUAL** Olive Yellow to Brown to Reddish Brown to Olive to White, Silty, Coarse to Fine SAND with Trace Mica
2625	2,624.5	9.0	2	3	5	8		M		
2620	2,619.5	14.0	2	2	3	5		M		
2615	2,614.5	19.0	1	1	3	4		W		2,616.0 / 17.5 Olive Brown to Light Brownish Gray, Sandy SILT with Trace Mica
2610	2,609.5	24.0	2	4	8	12		W		2,610.5 / 23.0 Brown to Olive Brown to Olive to White to Olive Yellow to White to Black, Silty, Coarse to Fine SAND
2605	2,604.5	29.0	5	6	7	13		W		
2600	2,599.5	34.0	8	10	10	20		W		
2595	2,594.5	39.0	5	12	53	65		W		
2590	2,589.5	44.0	16	84/0.4		100/0.9		W		2,591.5 / 42.0 **WEATHERED ROCK** Black to White, MICA GNEISS
2585	2,584.5	49.0	8	13	28	41		W		2,586.5 / 47.0 **RESIDUAL** Black to White to Olive, Silty, Coarse to Fine SAND with Trace Mica
2580	2,579.5	54.0	9	11	14	25		W		
2575	2,574.5	59.0	100/0.3			100/0.3				2,576.0 / 57.5 **WEATHERED ROCK** Black to White, MICA GNEISS
2570	2,569.5	64.0	100/0.4			100/0.4				
2565	2,564.5	69.0	100/0.3			100/0.3				2,564.2 / 69.3 Boring Terminated at Elevation 2,564.2 ft in WEATHERED ROCK: MICA GNEISS

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613				**GROUND WTR (ft)**
BORING NO. B2-C	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,632.9 ft	**TOTAL DEPTH** 53.8 ft	**NORTHING** 679,187	**EASTING** 860,899	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER E. Estep	**START DATE** 02/02/22	**COMP. DATE** 02/07/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
2635										
	2,632.9	0.0	1	2	2	4		M		2,632.9 / 0.0 GROUND SURFACE **ROADWAY EMBANKMENT** Silty, Coarse to Fine SAND with Trace Mica, Organics, Rock Fragments
2630	2,629.2	3.7	1	1	1	2		M		2,629.9 / 3.0 Reddish Yellowish Brown, Clayey SILT with Trace Mica
2625	2,624.2	8.7	1	1	2	3		M		2,625.4 / 7.5 **RESIDUAL** Reddish Yellow, Silty, Coarse to Fine SAND with Trace Mica
2620	2,619.2	13.7	2	2	5	7		M		2,619.9 / 13.0 Olive Yellow, Fine Sandy SILT with Trace Mica
2615	2,614.2	18.7	3	5	5	10		M		
2610	2,609.2	23.7	9	8	9	17		M		2,610.9 / 22.0 Olive Yellow to White to Black, Silty, Coarse to Fine SAND with Trace Mica and Trace to Little Quartz
2605	2,604.2	28.7	8	10	13	23		M		
2600	2,599.2	33.7	8	10	13	23		M		
2595	2,594.2	38.7	6	7	9	16		W		
2590	2,589.2	43.7	51	47	53/0.3	100/0.8		W		2,590.4 / 42.5 **WEATHERED ROCK** Brown to White, MICA GNEISS
2585	2,584.2	48.7	34	26	8	34		W		2,585.4 / 47.5 **RESIDUAL** Olive Yellow, Silty, Coarse to Fine SAND with Trace Mica, Some Quartz
2580	2,579.2	53.7	60/0.1			60/0.1		W		2,579.2 / 53.7 2,579.1 / 53.8 **CRYSTALLINE ROCK** MICA GNEISS Boring Terminated with Standard Penetration Test Refusal at Elevation 2,579.1 ft in CRYSTALLINE ROCK: MICA GNEISS

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613				**GROUND WTR (ft)**
BORING NO. B2-E	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,632.1 ft	**TOTAL DEPTH** 79.4 ft	**NORTHING** 679,139	**EASTING** 860,928	**24 HR.** 6.0
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER E. Estep	**START DATE** 02/01/22	**COMP. DATE** 02/02/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
2635										
	2,632.1	0.0	1	2	2	4		M		2,632.1 / 0.0 GROUND SURFACE
2630										**ROADWAY EMBANKMENT** Yellowish Brown and Reddish Brown, Sandy SILT with Trace Mica
	2,628.1	4.0	2	1	2	3				2,627.6 / 4.5
2625										**RESIDUAL** Yellowish Brown to Gray, Clayey SILT with Trace Mica
	2,623.1	9.0	WOH	1	2	3		M		2,622.6 / 9.5
2620										Olive, White and Gray, Silty, Coarse to Fine SAND with Trace Mica and Trace to Some Quartz
	2,618.1	14.0	3	3	6	9		W		
2615										
	2,613.1	19.0	4	8	9	17		W		
2610										
	2,608.1	24.0	3	7	8	15		W		
2605										
	2,603.1	29.0	5	13	12	25		W		
2600										
	2,598.1	34.0	31	69/0.2		100/0.7				2,598.1 / 34.0 **WEATHERED ROCK** Brown, Gray, White, Black, MICA SCHIST
2595										
	2,593.1	39.0	11	24	22	46		W		2,593.6 / 38.5 **RESIDUAL** Olive Brown to Light Brown, Gray, White, Reddish Yellow to Orange, Silty, Coarse to Fine SAND, with Trace Mica and Little to High Quartz
2590										
	2,588.1	44.0	28	37	50	87		W		
2585										
	2,583.1	49.0	19	22	23	45		W		
2580										
	2,578.1	54.0	26	35	35	70		W		
2575										
	2,573.1	59.0	18	25	43	68		W		
2570										
	2,568.1	64.0	9	8	9	17		W		
2565										
	2,563.1	69.0	29	50	50/0.4	100/0.9				2,563.6 / 68.5 **WEATHERED ROCK** Light Orangish Gray to Dark Reddish Brown, MICA SCHIST
2560										
	2,558.1	74.0	26	49	51/0.4	100/0.9				
2555										

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613				**GROUND WTR (ft)**
BORING NO. B2-E	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,632.1 ft	**TOTAL DEPTH** 79.4 ft	**NORTHING** 679,139	**EASTING** 860,928	**24 HR.** 6.0
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER E. Estep	**START DATE** 02/01/22	**COMP. DATE** 02/02/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2555						Match Line				
	2,553.1	79.0			100/0.4	100/0.4				2,552.7 / 79.4 Boring Terminated at Elevation 2,552.7 ft in WEATHERED ROCK: MICA SCHIST

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,631.3 ft	**TOTAL DEPTH** 65.0 ft	**NORTHING** 679,128	**EASTING** 860,934	**24 HR.** 7.0
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER E. Estep	**START DATE** 02/01/22	**COMP. DATE** 02/01/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
2635										
	2,631.3	0.0	2	3	2	5		M		2,631.3 GROUND SURFACE 0.0
2630										**ROADWAY EMBANKMENT** Yellowish Brown, Sandy SILT with Trace Mica
	2,627.2	4.1	1	2	2	4		M		2,627.8 3.5
2625										**RESIDUAL** Light Brownish Gray to Olive Yellow to Reddish Brown, Dark Brown to Olive, Silty, Coarse to Fine SAND with Trace Organic Matter, Trace to Little Quartz, Little Mica
	2,622.2	9.1	4	5	5	10		M		
2620										
	2,617.2	14.1	4	6	7	13		M		
2615										
	2,612.2	19.1	10	10	9	19		M		
2610										
	2,607.2	24.1	5	8	8	16	SS-5	W		
2605										
	2,602.2	29.1	10	19	47	66		W		
2600										
	2,597.2	34.1	14	23	24	47		W		
2595										
	2,592.2	39.1	15	38	27	65		W		
2590										
	2,587.2	44.1	10	22	18	40		W		
2585										
	2,582.2	49.1	12	16	21	37		W		
2580										
	2,577.2	54.1	43	57/0.1		100/0.6		W		2,577.8 53.5
2575										**WEATHERED ROCK** Olive to Dark Brown, MICA SCHIST
	2,572.2	59.1	41	59/0.3		100/0.8		W		
2570										
	2,567.2	64.1	29	71/0.4		100/0.9		W		2,566.3 65.0
										Boring Terminated at Elevation 2,566.3 ft in WEATHERED ROCK: MICA SCHIST

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** D. Kubinski	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,634.2 ft	**TOTAL DEPTH** 59.4 ft	**NORTHING** 679,279	**EASTING** 860,902	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER E. Estep	**START DATE** 01/26/22	**COMP. DATE** 01/26/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2635										
	2,633.2	1.0	5	3	3	6		M		2,634.2 GROUND SURFACE 0.0
2630	2,630.6	3.6	3	1	1	2		M		**ROADWAY EMBANKMENT** Asphalt: 0.0 - 0.3 ft 2,632.5 1.7
2625	2,625.6	8.6	1	1	2	3		W		ABC Stone: 0.3 - 1.7 ft 2,631.2 3.0
2620	2,620.6	13.6	2	1	2	3		W		**RESIDUAL** Red, Clayey SILT with Trace Mica Olive Yellow to Orangish Brown, Silty, Coarse to Fine SAND with Trace Mica
2615	2,615.6	18.6	1	2	3	5	SS-6	W		2,617.2 17.0
2610	2,610.6	23.6	2	5	9	14		W		Yellowish Brown, Coarse to Fine Sandy SILT, Trace Mica
2605	2,605.6	28.6	2	2	4	6		W		2,607.2 27.0
2600	2,600.6	33.6	4	6	8	14		W		Yellowish Brown, Silty, Coarse to Fine SAND, Trace Mica
2595	2,595.6	38.6	3	9	13	22		W		
2590	2,590.6	43.6	5	15	18	33		W		
2585	2,585.6	48.6	25	75/0.4		100/0.9		W		2,587.2 47.0
2580	2,580.6	53.6	100/0.3			100/0.3		W		**WEATHERED ROCK** Red-Orange MICA SCHIST
2575	2,575.6	58.6	30	70/0.3		100/0.8		W		2,574.8 59.4
										Boring Terminated at Elevation 2,574.8 ft in WEATHERED ROCK: MICA SCHIST

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,630.8 ft	**TOTAL DEPTH** 34.2 ft	**NORTHING** 679,074	**EASTING** 860,996	**24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE TR18016 MOBILE B-57 82% 04/23/2021		**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic
DRILLER E. Estep	**START DATE** 01/31/22	**COMP. DATE** 01/31/22	**SURFACE WATER DEPTH** N/A	

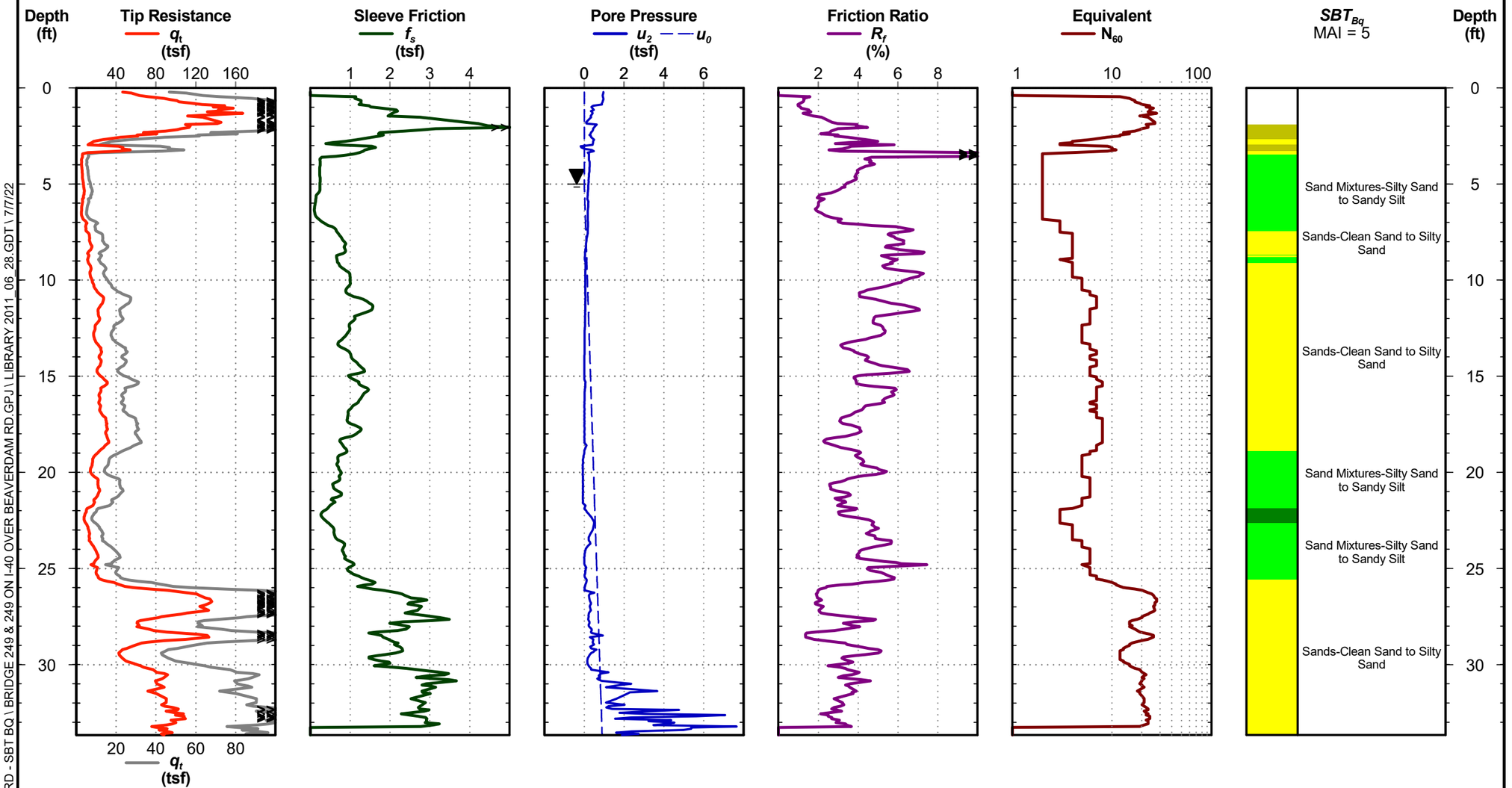
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
2635											
2630	2,630.8	0.0	WOH	1	1	2		M		2,630.8 GROUND SURFACE	0.0
										ROADWAY EMBANKMENT Yellowish Brown, Silty, Coarse to Fine SAND	
	2,626.6	4.2	2	2	2	4	SS-7	M		2,626.8	4.0
2625										**RESIDUAL** Gray, Silty CLAY with Trace Mica	
	2,621.6	9.2	5	5	10	15		W		2,622.3 Gray, Coarse to Fine SAND with Trace Rock Fragments	8.5
2620											
	2,616.6	14.2	8	6	7	13		W		2,617.3 Olive Yellow to Black to Olive Brown, Silty, Coarse to Fine SAND with Little Rock Fragments and Mica	13.5
2615											
	2,611.6	19.2	12	15	11	26		W			
2610											
	2,606.6	24.2	9	15	18	33		W			
2605											
	2,601.6	29.2	40	60/0.4		100/0.9				2,601.6 **WEATHERED ROCK** Olive Brown to Yellowish Brown, MICA SCHIST	29.2
2600											
	2,596.6	34.2	60/0.0			60/0.0				2,596.6 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,596.6 ft in CRYSTALLINE ROCK: MICA SCHIST	34.2

Bridge 248 & 249 on I-40 over Beaverdam Rd
Haywood County, North Carolina
S&ME Project No: 22350010

Sounding ID: 248-B2-C

Date: Jun. 22, 2022
Estimated Water Depth: 5 ft
Rig/Operator: ATV/MW | TC

Total Depth: 33.7 ft
Termination Criteria: Maximum Reaction Force
Cone Size: 1.75



CPT REPORT - STANDARD - SBT BQ \ BRIDGE 249 & 249 ON I-40 OVER BEAVERDAM RD.GPJ \ LIBRARY 2011_06_28.GDT \ 7/7/22

Cone Penetration Test

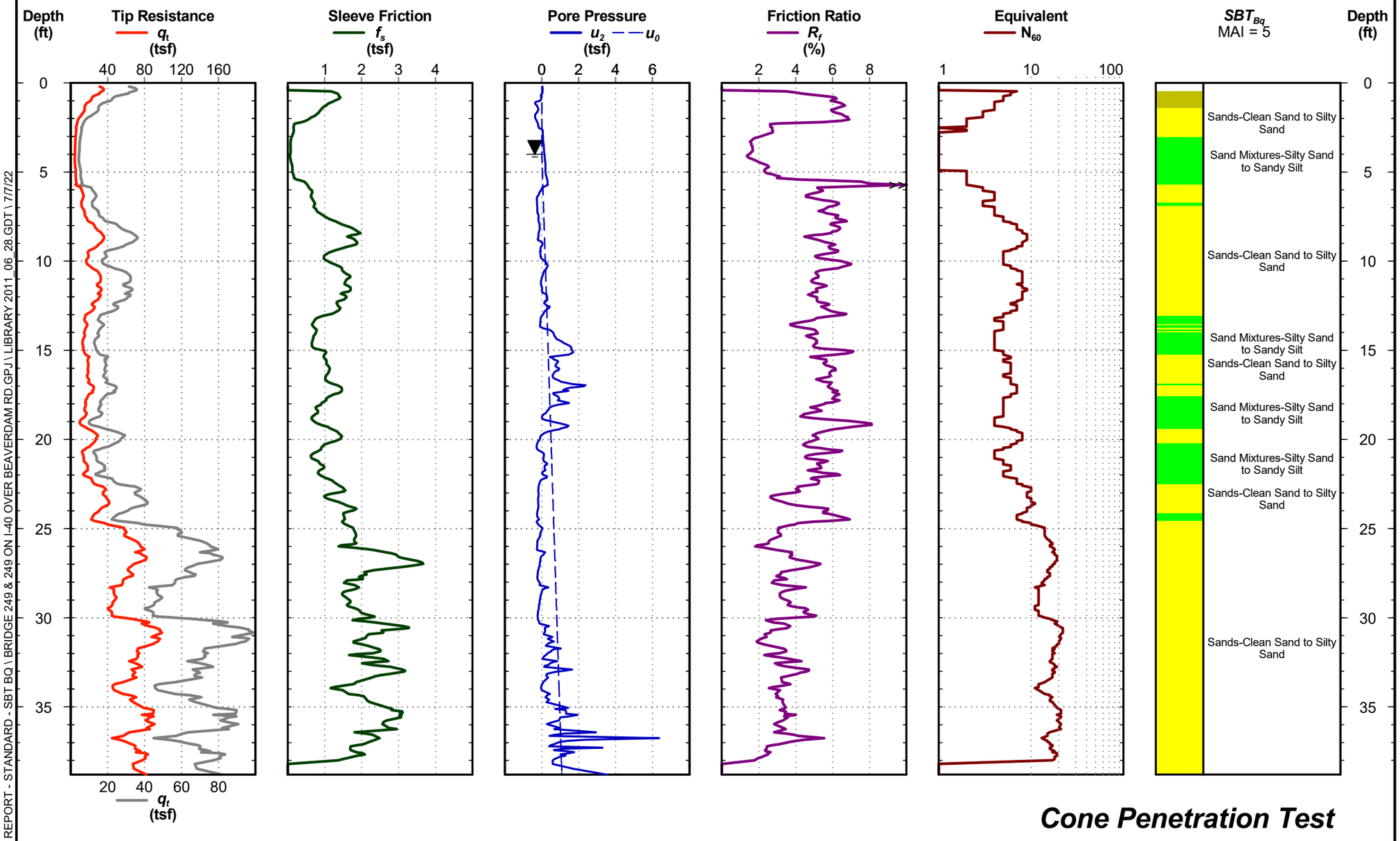
Electronic Filename: 248-B2-C.DAT

Bridge 248 & 249 on I-40 over Beaverdam Rd
Haywood County, North Carolina
S&ME Project No: 22350010

Sounding ID: 248-B2-D

Date: Jun. 22, 2022
Estimated Water Depth: 4 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 249 & 249 ON I-40 OVER BEAVERDAM RD.GPJ \ LIBRARY 2011_06_28.GDT \ 7/7/22

Cone Penetration Test

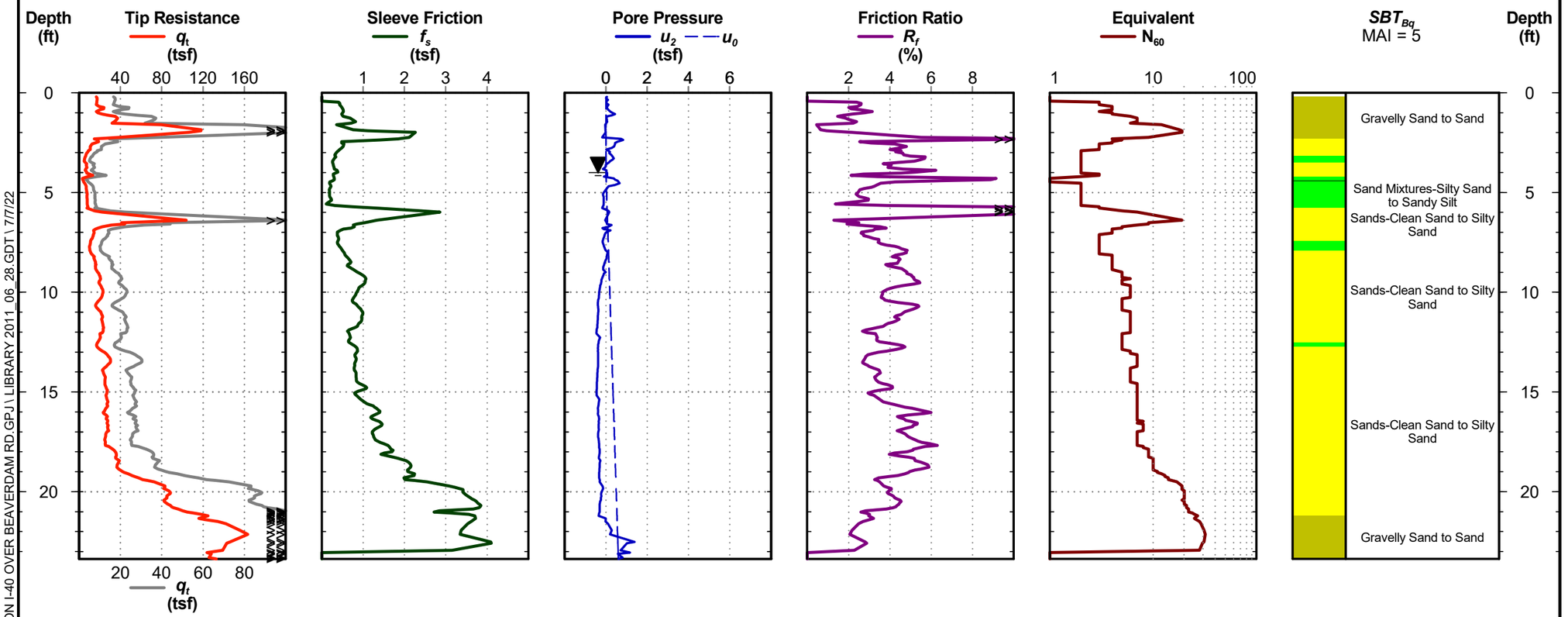
Electronic Filename: 248-B2-D.DAT

Bridge 248 & 249 on I-40 over Beaverdam Rd
Haywood County, North Carolina
S&ME Project No: 22350010

Sounding ID: 248-B2-E

Date: Jun. 22, 2022
Estimated Water Depth: 4 ft
Rig/Operator: ATV/MW | TC

Total Depth: 23.4 ft
Termination Criteria: Maximum Reaction Force
Cone Size: 1.75



CPT REPORT - STANDARD - SBT BQ \ BRIDGE 249 & 249 ON I-40 OVER BEAVERDAM RD.GPJ \ LIBRARY 2011_06_28.GDT \ 7/7/22

Cone Penetration Test

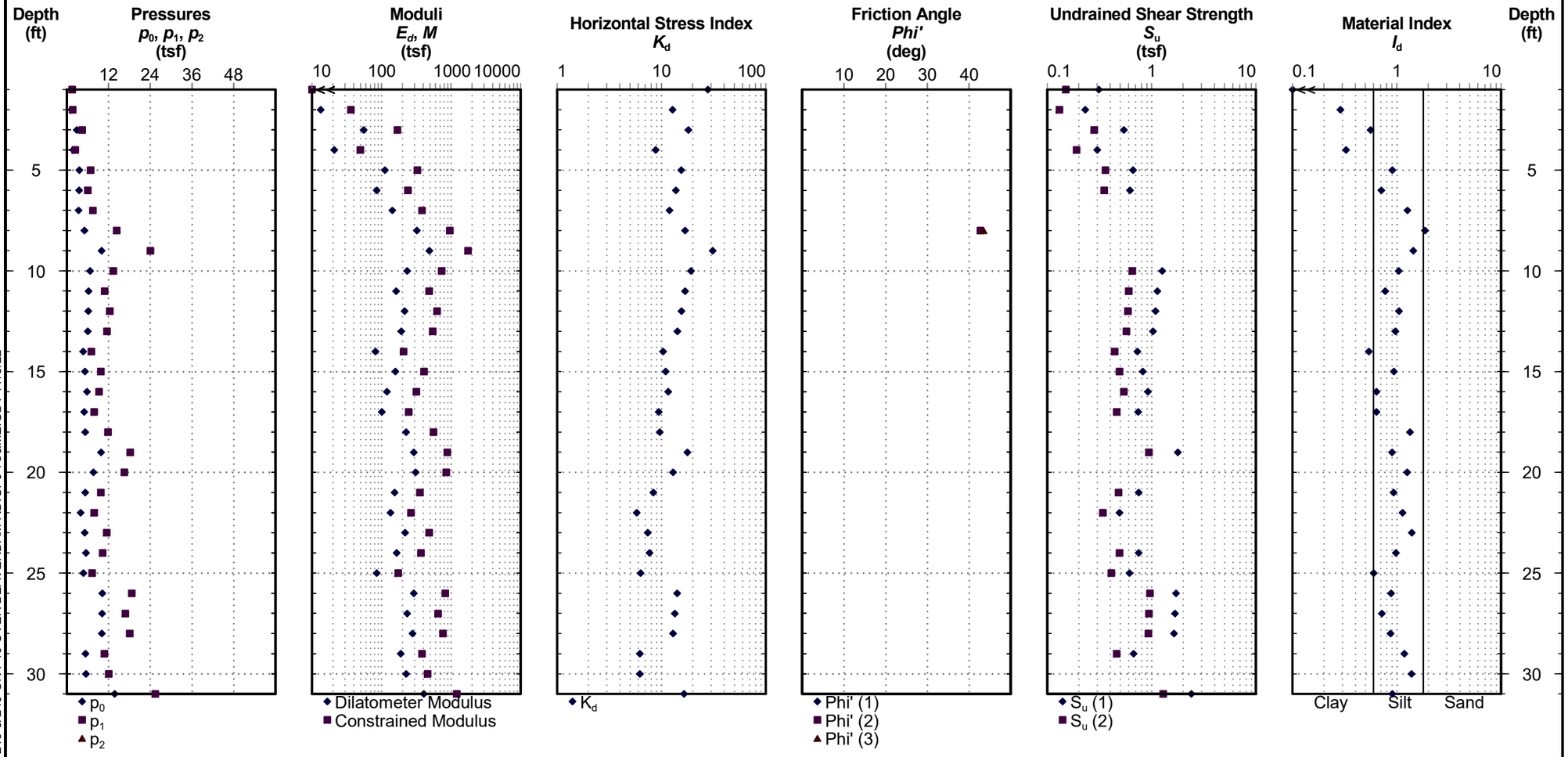
Electronic Filename: 248-B2-E.DAT

Bridge 248 & 249 on I-40 over Beaverdam Rd
Haywood County, North Carolina
S&ME Project No: 22350010

Sounding ID: 248-B2-D

Date: Jun. 22, 2022
Estimated Water Depth: 4 ft
Rig/Operator: ATV/MW | TC

Total Depth: 31.0 ft
Termination Criteria: Maximum Reaction Force
Membrane Type: H-25

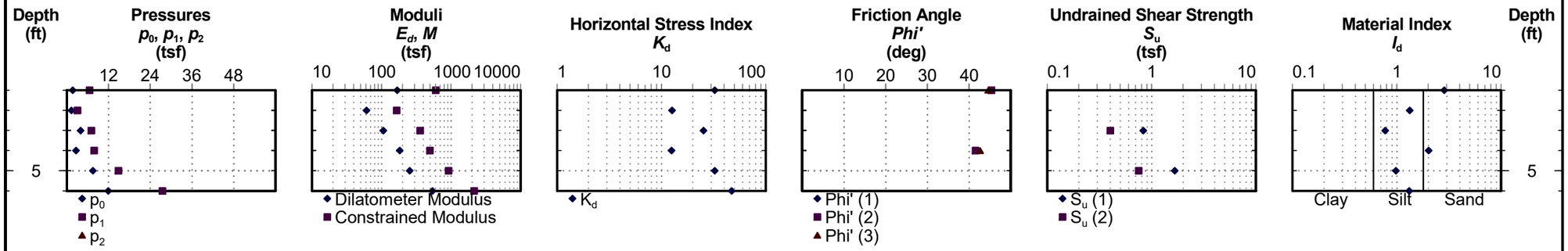


Bridge 248 & 249 on I-40 over Beaverdam Rd
Haywood County, North Carolina
S&ME Project No: 22350010

Sounding ID: 248-B2-E

Date: Jun. 22, 2022
Estimated Water Depth: 4 ft
Rig/Operator: ATV/MW | TC

Total Depth: 6.0 ft
Termination Criteria: Maximum Reaction Force
Membrane Type: H-25



DMT REPORT - DYNAMIC \ BRIDGE 249 & 249 ON I-40 OVER BEAVERDAM RD.GPJ \ S&ME.GDT \ 7/8/22

LABORATORY SUMMARY SHEET FOR SOIL SAMPLES

WBS NO. (TIP NO.): 55041.1.1 (HB-0002)
PROJECT ID: 38834
COUNTY: HAYWOOD
DESCRIPTION: REPLACE BRIDGE NOS. 248 & 249 ON I-40 OVER SR 1613

								Atterberg Limits			Gradation Results							
Sample No.	Boring Number	Alignment	Station	Offset	Sample Depth (ft.)	AASHTO Class.	N-Value (blows/ ft.)	L.L.	P.L.	P.I.	Retained #4 Sieve	Pass #10 Sieve	Pass #40 Sieve	Pass #200 Sieve	Coarse Sand (%)	Fine Sand (%)	Silt (%)	Clay (%)
SS-1	EB1-A	-L-	N/A	N/A	8.5 - 10.0	A-2-4	1	NP	NP	NP	1.0	99.0	78.0	22.2	39.9	43.3	10.7	6.1
SS-2	EB1-B	-L-	N/A	N/A	38.3 - 39.8	A-2-4	73	NP	NP	NP	0.0	5.0	77.0	26.8	34.3	44.3	15.3	6.0
SS-3	B1-C	-L-	N/A	N/A	54.0 - 55.5	A-2-4	20	NP	NP	NP	0.0	96.0	68.0	24.0	45.1	35.4	12.3	7.2
SS-4	B1-E	-L-	N/A	N/A	38.7 - 40.2	A-2-4	100	NP	NP	NP	0.0	99.0	78.0	22.2	39.9	43.3	10.7	16.1
SS-5	B2-B	-L-	N/A	N/A	24.1 - 25.6	A-2-4	16	NP	NP	NP	3.0	91.0	67.0	22.1	43.6	37.4	13.0	6.1
SS-6	EB2-A	-L-	N/A	N/A	18.6 - 20.1	A-4	5	NP	NP	NP	0.0	1.0	91.0	58.1	16.3	34.9	36.4	12.3
SS-7	EB2-B	-L-	N/A	N/A	4.2 - 5.7	A-7-5	4	55	30	25	0.0	100.0	99.0	84.0	3.3	22.0	19.0	55.7

SITE PHOTOGRAPH

Replace Bridge Nos. 248 & 249 on –L– (I-40) over SR 1613

Looking South Along SR 1613

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HB-0002	1	30

REFERENCE: HB-0002

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. 248 & 249 ON I-40 OVER SR 1613 (BEAVERDAM ROAD)*

SITE DESCRIPTION
RETAINING WALL -WL1-

CONTENTS

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.

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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

J. KARDON

TRIGON EXPLORATION

INVESTIGATED BY *J. KARDON*

DRAWN BY *M. FOSTER* DS

CHECKED BY *T. WELLS*

SUBMITTED BY *KLEINFELDER, INC.*

DATE *DECEMBER 2022*

Prepared in the Office of:

KLEINFELDER
Bright People. Right Solutions.
422 GALLIMORE DAIRY ROAD, SUITE B
GREENSBORO, NORTH CAROLINA 27409
NC ENGINEERING FIRM LICENSE NO. F-1312

NORTH CAROLINA PROFESSIONAL SEAL 037998 ENGINEER THOMAS R. WELLS

DocuSigned by:
Thomas R. Wells 12/07/2022
7DA5D2D05A18F4B0...
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	2

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 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

SOIL LEGEND AND AASHTO CLASSIFICATION

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	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10	50 MX													
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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 RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
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	4	10	40	60	200	270
OPENING (MM)	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

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

PLASTICITY

	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

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

- 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

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

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

ABBREVIATIONS

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
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
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [X] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

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. 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 YEILD 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 (V 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 (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
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 GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
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 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 FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 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 DISLODGED 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 (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.

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 (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 THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: N/A

ELEVATION: N/A FEET

NOTES:

FIAD - FILLED IMMEDIATELY AFTER DRILLING

RETAINING WALL BORING ELEVATIONS WERE TAKEN FROM THE PROJECT TIN FILE HB0002_LS_TIN.TIN RECEIVED ON OCTOBER 18, 2022.

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	3

SITE PLAN

0 60 120

FEET

NC GRID
NAD 83 NA 2011

PROPOSED RETAINING WALL

END PROP. RETAIN. WALL & SFCB -Y2- STA. 16+54.23

SR 1631 FREEDOM DR.

SR 1613 BEAVERDAM RD.

RWI-1 10+00 20' RT 2,641.0'

RWI-2 10+50 10' RT 2,640.6

RWI-3 11+00 CL 2,637.9'

RWI-4 11+93 24' RT 2,634.2'

RWI-5 12+60 CL 2,635.2'

RWI-6 13+00 5' LT 2,635.7'

RWI-7 13+50 5' LT 2,636.1'

RWI-8 14+00 5' LT 2,636.4'

RWI-9 14+50 9' LT 2,636.9'

RWI-10 15+00 9' LT 2,637.4'

RWI-11 15+40 10' LT 2,637.9'

RWI-12 15+99 10' LT 2,638.7'

RWI-13 16+49 10' LT 2,639.5'

RWI-14 16+99 9' LT 2,640.3'

RWI-15 17+49 9' LT 2,641.3'

RWI-16 17+98 9' LT 2,642.4'

INV=2645.53'

INV=2627.71'

GREU TL-3

TYPE B-77

CAT I TYPE III

RIPRAP

CONC PAD

PANEL

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	4

PROFILE ON RETAINING WALL -WL1-

0 50 100
FEET
VE = 5

(A) **RESIDUAL:** MOIST TO SATURATED, VERY SOFT TO HARD, REDDISH BROWN, YELLOW BROWN, OLIVE YELLOW, WHITE, GRAY, OLIVE BROWN, AND OLIVE YELLOW, COARSE TO FINE SANDY SILT (A-4), CLAYEY SILT (A-5), AND SILTY CLAY (A-7)

(B) **ROADWAY EMBANKMENT:** MOIST TO WET, SOFT TO VERY STIFF, REDDISH BROWN TO BROWN AND OLIVE BROWN, COARSE TO FINE SANDY SILT (A-4), FINE SANDY CLAY (A-6), AND SILTY CLAY (A-7) WITH TRACE MICA AND GRAVEL

(C) **ALLUVIAL:** WET TO MOIST, VERY SOFT TO STIFF, REDDISH BROWN, BROWN, AND GRAY, COARSE TO FINE SANDY SILT (A-4), FINE SANDY CLAY (A-6), AND SILTY CLAY (A-7) WITH TRACE MICA AND GRAVEL

(D) **ALLUVIAL:** MOIST TO SATURATED, LOOSE TO VERY DENSE, GRAY, FINE TO COARSE SAND (A-1) WITH TRACE GRAVEL

(E) **RESIDUAL:** MOIST, DENSE TO MEDIUM DENSE, GRAY, BROWN, OLIVE BROWN, SILTY, COARSE TO FINE SAND (A-2-4) WITH TRACE MICA

(F) **RESIDUAL:** WET, VERY SOFT, GRAY, COARSE TO FINE SAND (A-4) WITH TRACE MICA

FINISHED GRADE AT BOTTOM OF WALL GRADE ELEVATION

EXISTING GROUND LINE

RW1–16 17+98 9' LT
RW1–15 17+49 9' LT
RW1–14 16+99 9' LT
RW1–13 16+49 10' LT
RW1–12 15+99 10' LT
RW1–11 15+40 10' LT
RW1–10 15+00 8' LT
RW1–9 14+50 9' LT
RW1–8 14+00 5' LT
RW1–7 13+50 5' LT
RW1–6 13+00 5' LT
RW1–5 12+60 CL
RW1–4 11+93 24' RT

BT DRY 11/22
BT DRY 11/22
BT 11/22
BT 11/22
BT 11/22
BT 11/22
BT FIAD 11/22
BT 11/22
BT 11/22
BT 11/22
BT 11/22
BT 11/22
BT 11/22

MATCHLINE AT STA. 11+50, SEE SHEET 5

NOTES:

GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE

2670 2660 2650 2640 2630 2620 2610 2600 2590 2580

18+00 17+50 17+00 16+50 16+00 15+50 15+00 14+50 14+00 13+50 13+00 12+50 12+00 11+50

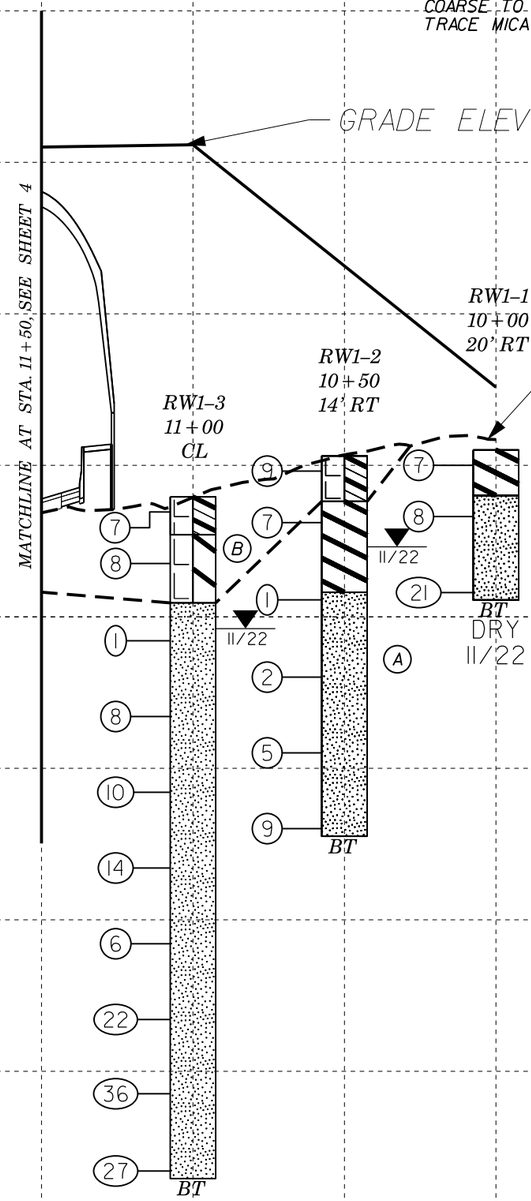
PROJECT REFERENCE NO.	SHEET NO.
HB-0002	5

PROFILE ON RETAINING WALL -WL1-

0 50 100
FEET
VE = 5

(A) **RESIDUAL:** MOIST TO SATURATED, VERY SOFT TO HARD, REDDISH BROWN, YELLOW BROWN, OLIVE YELLOW, WHITE, GRAY, OLIVE BROWN, AND OLIVE YELLOW, COARSE TO FINE SANDY SILT (A-4), CLAYEY SILT (A-5), AND SILTY CLAY (A-7)

(B) **ROADWAY EMBANKMENT:** MOIST TO WET, SOFT TO VERY STIFF, REDDISH BROWN TO BROWN AND OLIVE BROWN, COARSE TO FINE SANDY SILT (A-4), FINE SANDY CLAY (A-6), AND SILTY CLAY (A-7) WITH TRACE MICA AND GRAVEL



NOTES:

GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE

NOTES:

GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

0 10 20
FEET
VE = 1

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	6

CROSS SECTION RETAINING WALL –WL1– AT STA. 10+00

℄

2690
2680
2670
2660
2650
2640
2630
2620

RW1–1
10+50
20' RT

7
8
21

BT
DRY
11/22

RESIDUAL:
MOIST, MEDIUM STIFF TO VERY STIFF, REDDISH BROWN TO YELLOW BROWN, SILTY CLAY (A-7) TO COARSE TO FINE SANDY SILT (A-4) WITH TRACE MICA AND ROCK FRAGMENTS

70 60 50 40 30 20 10 0 10 20 30 40 50 60

NOTES:

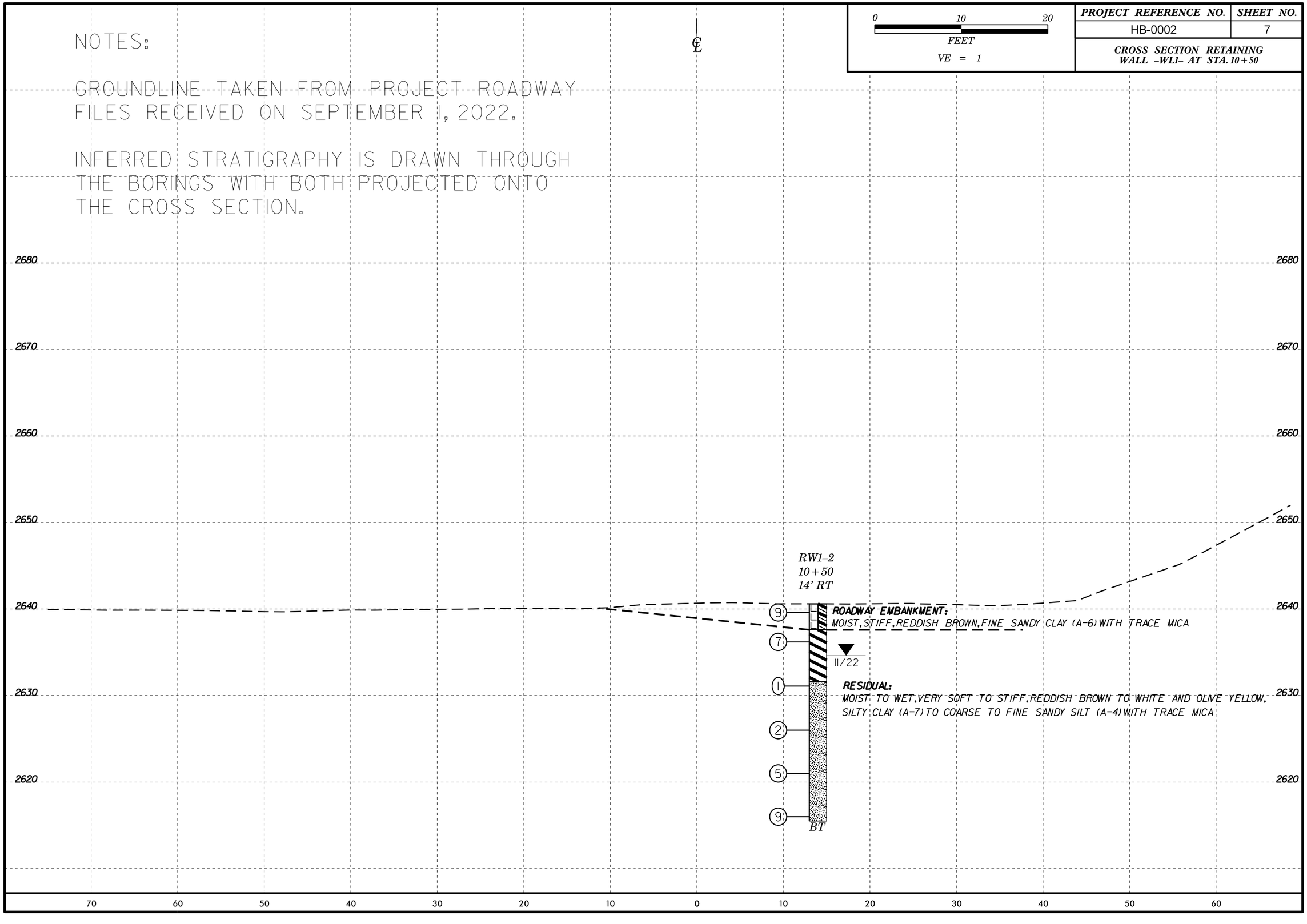
GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

0 10 20
FEET
VE = 1

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	7

CROSS SECTION RETAINING WALL –WL1– AT STA. 10+50



PROJECT REFERENCE NO.	SHEET NO.
HB-0002	8

CROSS SECTION RETAINING WALL –WL1– AT STA. 11+00

0 10 20
FEET
VE = 1

NOTES:

GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

℄

RW1-3
11+00
CL

ROADWAY EMBANKMENT:
MOIST, MEDIUM STIFF, REDDISH BROWN TO OLIVE YELLOW AND GRAY, FINE SANDY CLAY (A-6) TO SILTY CLAY (A-7)

11/22

RESIDUAL:
MOIST TO WET, VERY SOFT TO HARD, OLIVE BROWN AND GRAY, COARSE TO FINE SANDY SILT (A-4) WITH TRACE MICA AND MANGANESE

7
8
1
8
10
14
6
22
36
27

BT

2680
2670
2660
2650
2640
2630
2620
2610
2600
2590

70 60 50 40 30 20 10 0 10 20 30 40 50 60

6/23/16

NOTES:

GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

0 10 20
FEET
VE = 1

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	9

CROSS SECTION RETAINING WALL -WL1- AT STA. 12+00

℄

2665 2655 2645 2635 2625 2615 2605 2595 2585 2575

(A) **ROADWAY EMBANKMENT:** MOIST, MEDIUM STIFF, BROWN, FINE SANDY CLAY (A-6)

RW1-4
11+93
24' RT

6 A
1
11/22
3
6
7
7
9
12
15
23
57
BT

RESIDUAL:
MOIST TO WET, VERY SOFT TO HARD, YELLOWISH BROWN TO BROWN AND WHITE, COARSE TO FINE SANDY SILT (A-4) WITH TRACE MICA

70 60 50 40 30 20 10 0 10 20 30 40 50 60

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	10

CROSS SECTION RETAINING WALL –WL1– AT STA. 12+50

0 10 20
FEET
VE = 1

NOTES:

GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

℄

RW1-5
12+60
CL

ROADWAY EMBANKMENT:
MOIST TO WET, MEDIUM STIFF TO SOFT, REDDISH BROWN TO BROWN, COARSE TO FINE SANDY SILT (A-4) WITH TRACE MICA

11/22

RESIDUAL:
MOIST AND MOIST, SOFT TO HARD, LIGHT BROWNISH GRAY TO BROWN AND WHITE, CLAYEY SILT (A-5) TO COARSE TO FINE SANDY SILT (A-4) WITH TRACE MICA

BT

2670 2660 2650 2640 2630 2620 2610 2600 2590 2580

70 60 50 40 30 20 10 0 10 20 30 40 50 60

NOTES:

GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

0 10 20
FEET
VE = 1

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	11

CROSS SECTION RETAINING WALL -WL1- AT STA. 13+00

℄

RW1-6
13+00
5' LT

ROADWAY EMBANKMENT:
MOIST, MEDIUM STIFF, REDDISH BROWN TO BROWN, FINE SANDY SILT (A-4) TO FINE SANDY CLAY (A-6) WITH TRACE MICA

11/22

RESIDUAL:
WET TO MOIST, SOFT TO VERY STIFF, YELLOWISH BROWN, OLIVE YELLOW, BROWN, AND WHITE, COARSE TO FINE SANDY SILT (A-4) WITH TRACE MICA

BT

2670 2660 2650 2640 2630 2620 2610 2600 2590

70 60 50 40 30 20 10 0 10 20 30 40 50 60

NOTES:

GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

0 10 20
FEET
VE = 1

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	12

CROSS SECTION RETAINING WALL –WL1– AT STA. 13+50

℄

RW1–7
13+50
5' LT

5
5
4
11/22
6
10
11
13
19
24
22
BT

ROADWAY EMBANKMENT:
MOIST, MEDIUM STIFF, REDDISH BROWN, COARSE TO FINE SANDY SILT (A-4) WITH TRACE MICA

ALLUVIAL:
WET, MEDIUM STIFF, GRAY, SILTY CLAY (A-7) TO FINE TO COARSE SANDY SILT (A-4) WITH TRACE GRAVEL

RESIDUAL:
WET, STIFF TO VERY STIFF, YELLOWISH BROWN, OLIVE BROWN TO BROWN AND WHITE, COARSE TO FINE SANDY SILT (A-4) WITH TRACE MICA

2665
2655
2645
2635
2625
2615
2605
2595
2585

70 60 50 40 30 20 10 0 10 20 30 40 50 60

NOTES:

GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

0 10 20
FEET
VE = 1

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	13

CROSS SECTION RETAINING WALL –WL1– AT STA. 14+00

℄

RW1–8
14+00
5' LT

2670
2660
2650
2640
2630
2620
2610
2600
2590

(6) (4)

ROADWAY EMBANKMENT:
MOIST, MEDIUM STIFF, REDDISH BROWN, COARSE TO FINE SANDY SILT (A-4) WITH TRACE MICA

(4)

11/22

(17)

ALLUVIAL:
WET, SOFT TO VERY STIFF, GRAY, SILTY CLAY (A-7) TO FINE TO COARSE SANDY SILT (A-4) WITH TRACE GRAVEL

(5)

RESIDUAL:
WET, MEDIUM STIFF TO VERY STIFF, YELLOWISH BROWN TO BROWN AND WHITE, COARSE TO FINE SANDY SILT (A-4) WITH TRACE MICA

(14)

(19)

(18)

(25)

BT

70 60 50 40 30 20 10 0 10 20 30 40 50 60

NOTES:

GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

0 10 20
FEET
VE = 1

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	14

CROSS SECTION RETAINING WALL –WL1– AT STA. 14+50

℄

RW1–9
14+50
9' LT

2670
2660
2650
2640
2630
2620
2610
2600

(7) (7) **ROADWAY EMBANKMENT:** MOIST TO WET, REDDISH BROWN, COARSE TO FINE SANDY SILT (A-4) WITH TRACE MICA

(3) 11/22 **ALLUVIAL:** MOIST, SOFT, GRAY, FINE SANDY CLAY (A-6)

(66) MOIST, VERY DENSE, FINE TO COARSE SAND (A-1) WITH TRACE GRAVEL

(10) **RESIDUAL:** MOIST TO WET, STIFF TO VERY STIFF, YELLOWISH BROWN. COARSE TO FINE SANDY SILT (A-4) WITH TRACE MICA

(9)

(22)

(21) MOIST, DENSE, GRAY AND BROWN, SILTY, COARSE TO FINE SAND (A-2-4) WITH TRACE MICA

(36)

BT

70 60 50 40 30 20 10 0 10 20 30 40 50 60

NOTES:

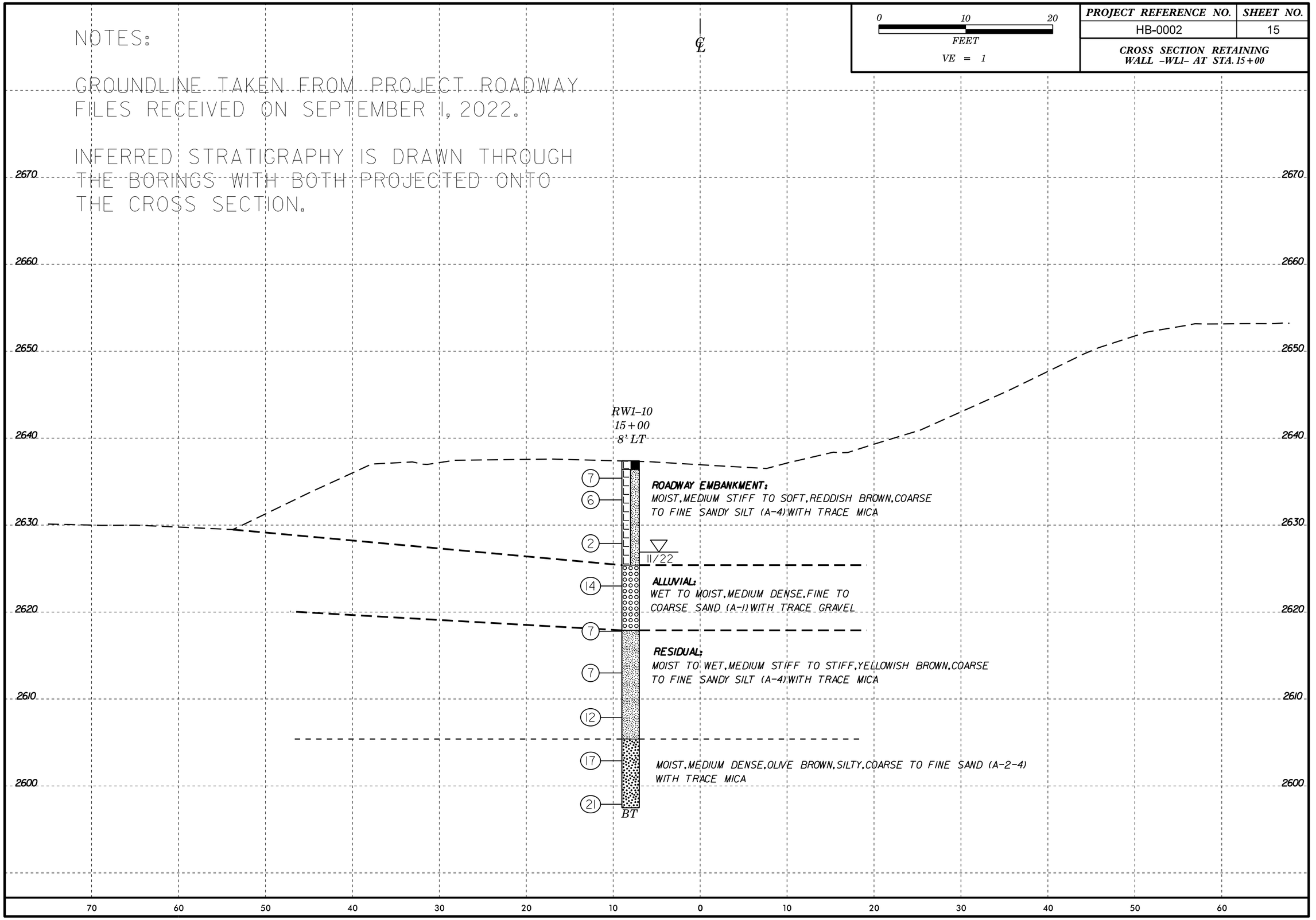
GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

0 10 20
FEET
VE = 1

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	15

CROSS SECTION RETAINING WALL –WL1– AT STA. 15+00



NOTES:

GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

0 10 20
FEET
VE = 1

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	16

CROSS SECTION RETAINING WALL –WL1– AT STA. 15+50

℄

2665
2655
2645
2635
2625
2615
2605

RW1-11
15+40
10' LT

(9) (4) **ROADWAY EMBANKMENT:**
MOIST, STIFF TO SOFT, REDDISH BROWN, COARSE TO FINE SANDY SILT (A-4) WITH TRACE MICA

(1) **ALLUVIAL:**
MOIST, VERY SOFT, BROWN AND GRAY, SILTY CLAY (A-7)

(19) WET, MEDIUM DENSE, GRAY, FINE TO COARSE SAND (A-1) WITH TRACE GRAVEL

(6) **RESIDUAL:**
MOIST, MEDIUM STIFF TO STIFF, OLIVE YELLOW TO YELLOWISH BROWN, COARSE TO FINE SANDY SILT (A-4) WITH TRACE MICA

(9) (13)

BT
FIAD
11/22

70 60 50 40 30 20 10 0 10 20 30 40 50 60

NOTES:

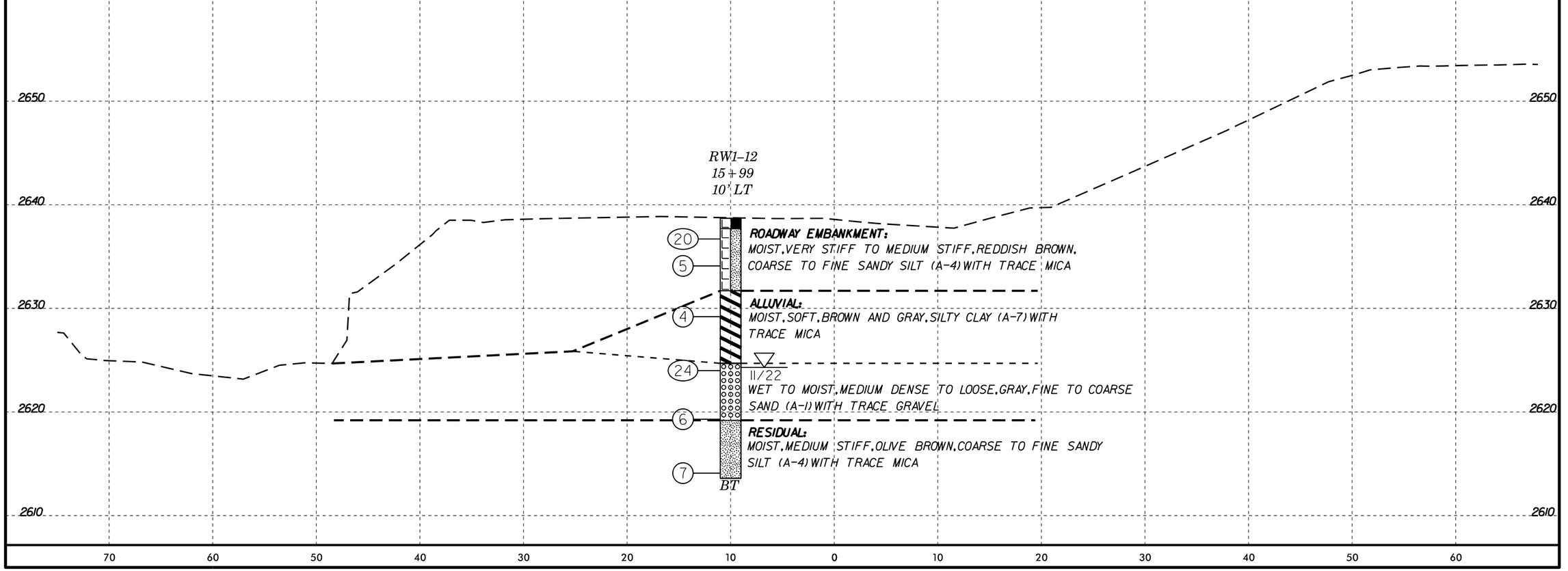
GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

0 10 20
FEET
VE = 1

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	17

CROSS SECTION RETAINING WALL –WL1– AT STA. 16+00



NOTES:

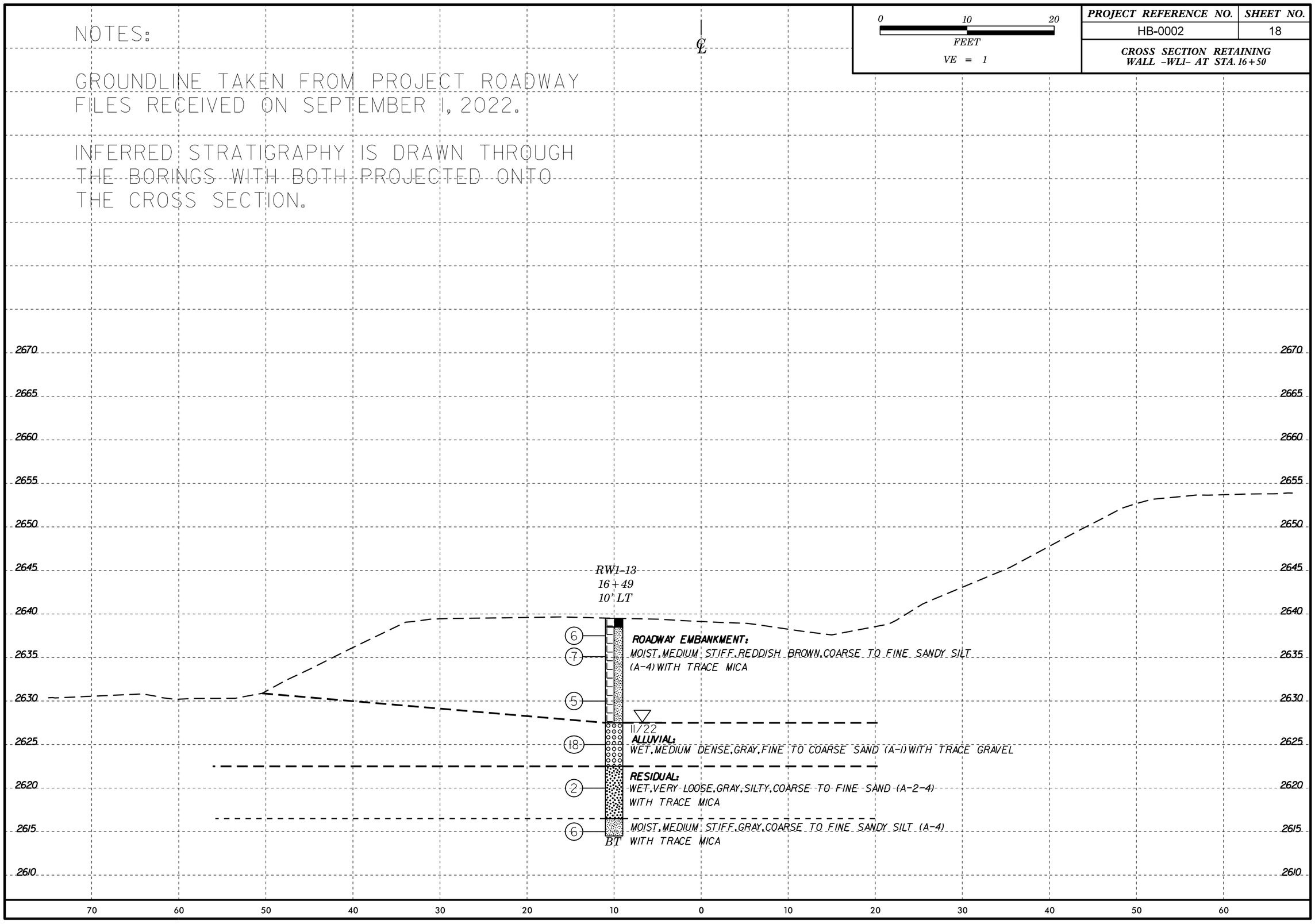
GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

0 10 20
FEET
VE = 1

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	18

CROSS SECTION RETAINING WALL –WL1– AT STA. 16+50



NOTES:

GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

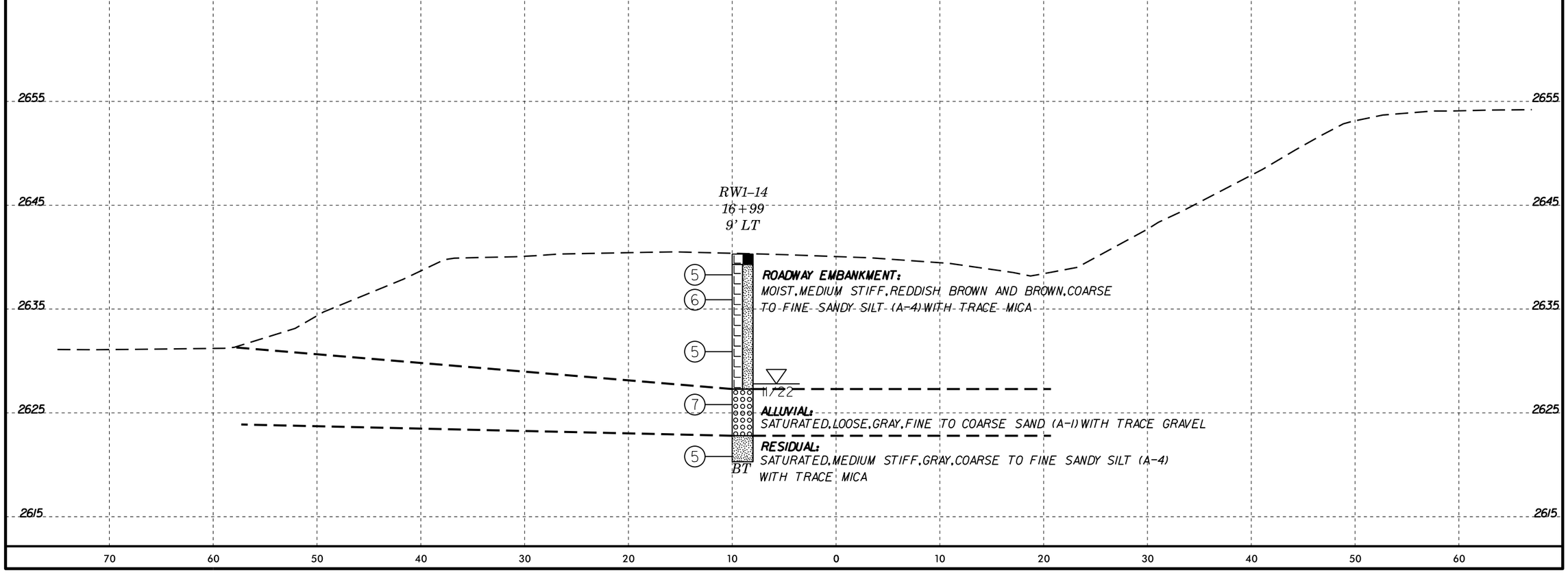
0 10 20

FEET

VE = 1

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	19

CROSS SECTION RETAINING WALL –WL1– AT STA. 17+00



NOTES:

GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022.

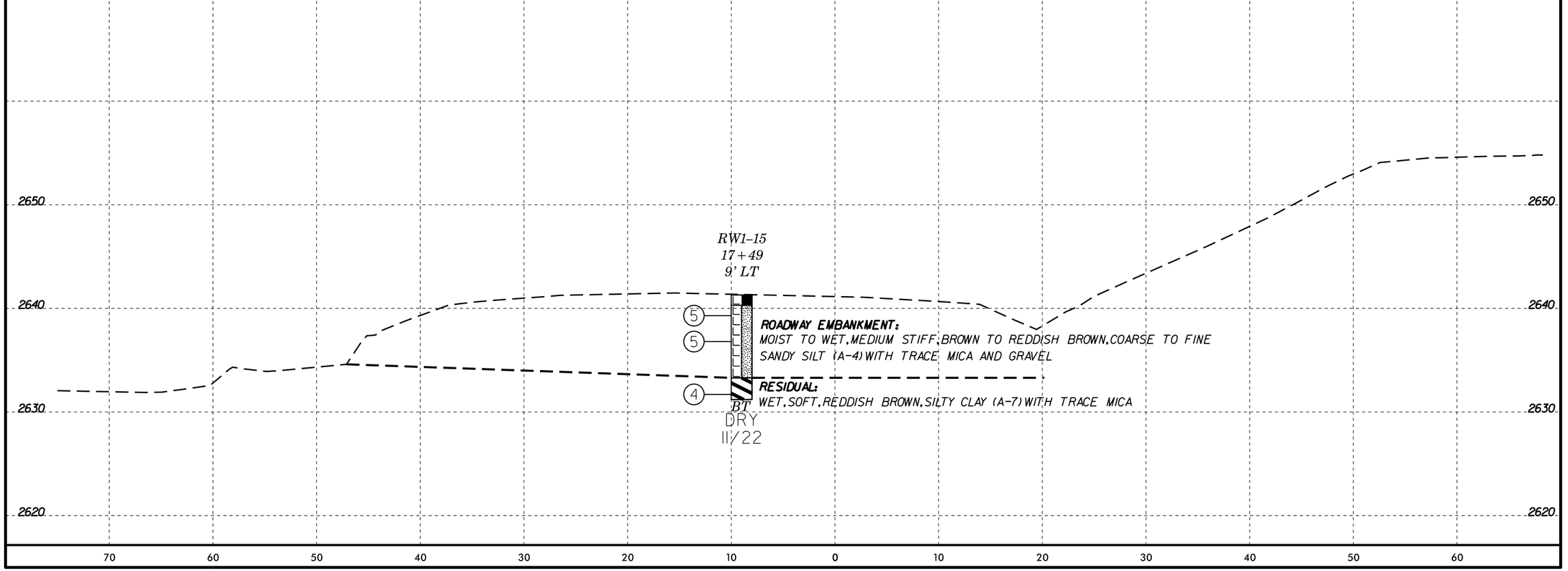
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

℄

0 10 20
FEET
VE = 1

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	20

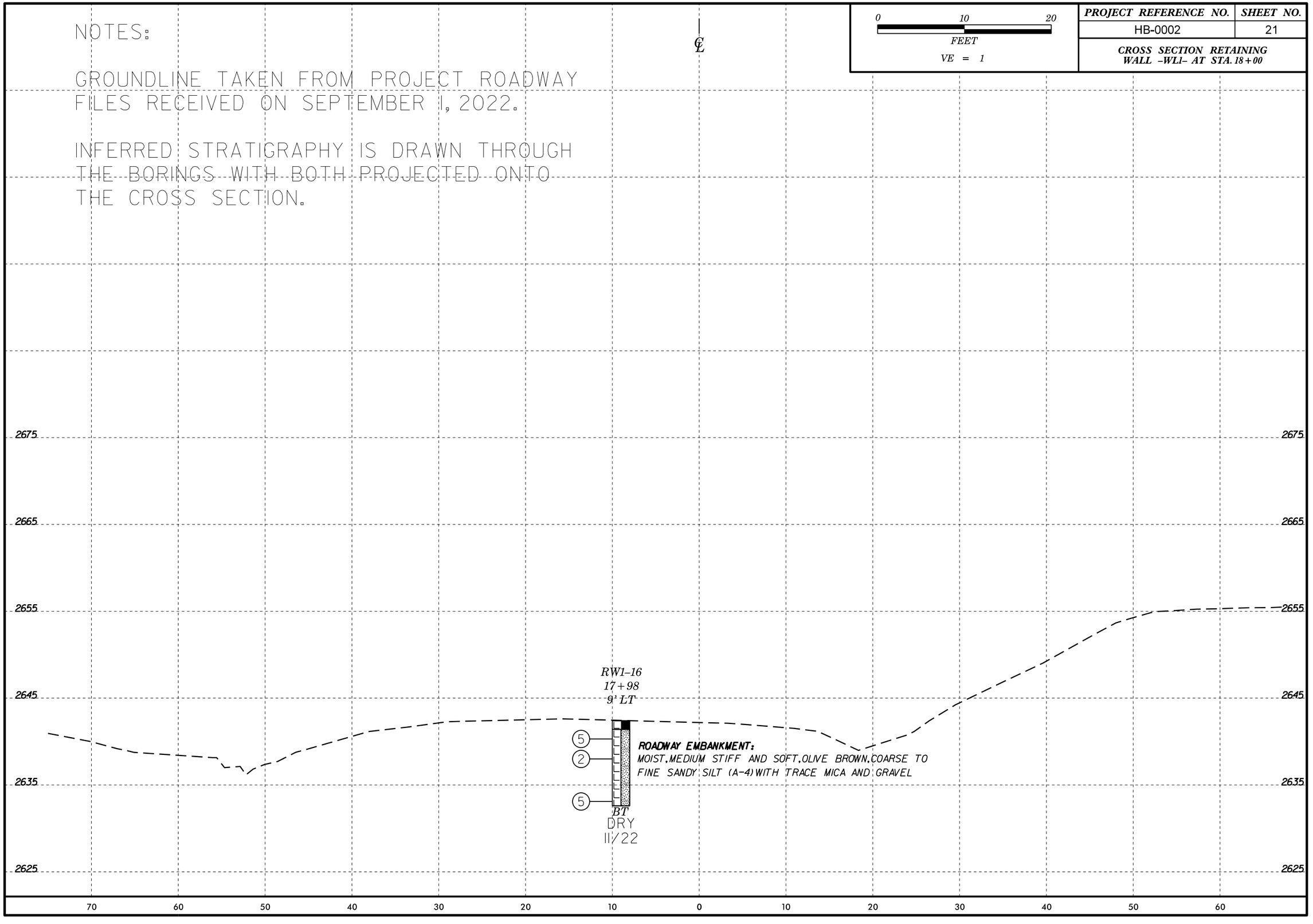
CROSS SECTION RETAINING WALL –WL1– AT STA. 17+50



NOTES:

GROUNDLINE TAKEN FROM PROJECT ROADWAY FILES RECEIVED ON SEPTEMBER 1, 2022.

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.



0 10 20
FEET
VE = 1

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	21

CROSS SECTION RETAINING WALL -WL1- AT STA. 18+00

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** Kardon, J.	
SITE DESCRIPTION Replace Bridge No. 248 & 249 on I-40 over SR 1613 (Beaverdam Road): Retaining Wall -WL1-				**GROUND WTR (ft)**
BORING NO. RW1-1	**STATION** 10+00	**OFFSET** 20 ft RT	**ALIGNMENT** -WL1-	**0 HR.** Dry
COLLAR ELEV. 2,641.0 ft	**TOTAL DEPTH** 9.9 ft	**NORTHING** 679,292	**EASTING** 860,680	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 11/03/22	**COMP. DATE** 11/03/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
2645										
	2,641.0	0.0	2	3	4	7		M		2,641.0 GROUND SURFACE 0.0 **RESIDUAL** Reddish Brown, Silty CLAY (A-7)
2640	2,637.6	3.4	3	4	4	8		M		2,638.0 3.0 Yellowish Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica and Rock Fragments
2635	2,632.6	8.4	9	17	4	21		M		2,631.1 9.9 Boring Terminated at Elevation 2,631.1 ft in RESIDUAL: Sandy SILT (A-4) Notes: Topsoil from 0.0 to 0.3 ft.

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** Kardon, J.	
SITE DESCRIPTION Replace Bridge No. 248 & 249 on I-40 over SR 1613 (Beaverdam Road): Retaining Wall -WL1-				**GROUND WTR (ft)**
BORING NO. RW1-2	**STATION** 10+50	**OFFSET** 14 ft RT	**ALIGNMENT** -WL1-	**0 HR.** 12.6
COLLAR ELEV. 2,640.6 ft	**TOTAL DEPTH** 25.1 ft	**NORTHING** 679,285	**EASTING** 860,730	**24 HR.** 6.0
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 11/02/22	**COMP. DATE** 11/02/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
2645										
	2,640.6	0.0	2	6	3	9		M		2,640.6 GROUND SURFACE 0.0 **ROADWAY EMBANKMENT** Reddish Brown, Fine Sandy CLAY (A-6) with Trace Mica
2640	2,637.2	3.4	2	4	3	7		M		2,637.6 3.0 **RESIDUAL** Olive Yellow, Silty CLAY (A-7)
2635	2,632.1	8.5	WOH	WOH	1	1		M		2,631.6 9.0 White, Olive Yellow, and Reddish Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica
2630	2,627.0	13.6	1	1	1	2		M		
2625	2,622.0	18.6	2	3	2	5		W		
2620	2,617.0	23.6	2	4	5	9		M		2,615.5 25.1 Boring Terminated at Elevation 2,615.5 ft in RESIDUAL: Sandy SILT (A-4) Notes: Topsoil from 0.0 to 0.2 ft.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** Kardon, J.	
SITE DESCRIPTION Replace Bridge No. 248 & 249 on I-40 over SR 1613 (Beaverdam Road): Retaining Wall -WL1-				**GROUND WTR (ft)**
BORING NO. RW1-3	**STATION** 11+00	**OFFSET** CL	**ALIGNMENT** -WL1-	**0 HR.** 11.0
COLLAR ELEV. 2,637.9 ft	**TOTAL DEPTH** 45.0 ft	**NORTHING** 679,286	**EASTING** 860,782	**24 HR.** 5.8
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 10/31/22	**COMP. DATE** 10/31/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
2640										
	2,637.9	0.0	1	3	4	7		M		2,637.9 GROUND SURFACE 0.0
2635										**ROADWAY EMBANKMENT**
	2,634.5	3.4	2	4	4	8		M		2,635.4 Reddish Brown, Fine Sandy CLAY (A-6) 2.5
2630										Olive Yellow and Gray, Silty CLAY (A-7)
	2,629.4	8.5	WOH	WOH	1	1		M		2,630.9 7.0
2625										**RESIDUAL**
	2,624.4	13.5	2	4	4	8		M		Olive Brown and Gray, Coarse to Fine Sandy SILT (A-4) with Trace Mica and Manganese
2620										
	2,619.4	18.5	3	5	5	10		W		
2615										
	2,614.4	23.5	6	7	7	14		W		
2610										
	2,609.4	28.5	2	3	3	6		W		
2605										
	2,604.4	33.5	10	9	13	22		W		
2600										
	2,599.5	38.4	12	18	18	36		W		
2595										
	2,594.4	43.5	9	14	13	27		W		2,592.9 45.0
										Boring Terminated at Elevation 2,592.9 ft in RESIDUAL: Sandy SILT (A-4)
										Notes: Topsoil from 0.0 to 0.2 ft

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** Kardon, J.	
SITE DESCRIPTION Replace Bridge No. 248 & 249 on I-40 over SR 1613 (Beaverdam Road): Retaining Wall -WL1-				**GROUND WTR (ft)**
BORING NO. RW1-4	**STATION** 11+93	**OFFSET** 24 ft RT	**ALIGNMENT** -WL1-	**0 HR.** 6.7
COLLAR ELEV. 2,634.2 ft	**TOTAL DEPTH** 49.8 ft	**NORTHING** 679,274	**EASTING** 860,878	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 11/07/22	**COMP. DATE** 11/08/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2635										
	2,634.2	0.0	1	3	3	6		M		2,634.2 GROUND SURFACE 0.0
2630										**ROADWAY EMBANKMENT**
	2,630.7	3.5	WOH	WOH	1	1		M		2,632.2 Brown, Fine Sandy CLAY (A-6) 2.0
2625										**RESIDUAL**
	2,625.6	8.6	1	2	1	3		M		Yellowish Brown to Brown and White, Coarse to Fine Sandy SILT (A-4) with Trace Mica
2620										
	2,620.7	13.5	2	3	3	6		W		
2615										
	2,615.7	18.5	2	3	4	7		W		
2610										
	2,610.8	23.4	1	3	4	7		W		
2605										
	2,605.6	28.6	2	4	5	9		W		
2600										
	2,600.6	33.6	4	6	6	12		W		
2595										
	2,595.8	38.4	6	7	8	15		M		
2590										
	2,590.9	43.3	5	10	13	23		M		
2585										
	2,585.9	48.3	7	18	39	57		M		2,584.4 49.8
										Boring Terminated at Elevation 2,584.4 ft in RESIDUAL: Sandy SILT (A-4)
										Notes: Topsoil from 0.0 to 0.2 ft.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** Kardon, J.	
SITE DESCRIPTION Replace Bridge No. 248 & 249 on I-40 over SR 1613 (Beaverdam Road): Retaining Wall -WL1-				**GROUND WTR (ft)**
BORING NO. RW1-5	**STATION** 12+60	**OFFSET** CL	**ALIGNMENT** -WL1-	**0 HR.** 10.0
COLLAR ELEV. 2,635.2 ft	**TOTAL DEPTH** 49.8 ft	**NORTHING** 679,296	**EASTING** 860,938	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 11/04/22	**COMP. DATE** 11/04/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
2640											
2635										2,635.2 GROUND SURFACE	0.0
	2,634.2	1.0	3	3	4	7		M		2,634.2 **ROADWAY EMBANKMENT** Pavement: Asphalt (0.0 to 0.3 ft.) & ABC Stone (0.3 to 1.0 ft.) Reddish Brown to Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica	1.0
	2,631.5	3.7	3	2	1	3		M			
2630											
	2,626.5	8.7	2	2	3	5		W			
2625											
	2,621.6	13.6	1	2	3	5		W		2,622.2 **RESIDUAL** Light Brownish Gray, Clayey SILT (A-5) with Trace Mica	13.0
2620											
	2,616.7	18.5	WOH	2	2	4		W			
2615											
	2,611.7	23.5	2	5	5	10		M			
2610											
	2,606.7	28.5	2	3	4	7		M			
2605											
	2,601.7	33.5	9	11	10	21		M			
2600											
	2,596.5	38.7	7	9	11	20		M			
2595											
	2,591.9	43.3	9	10	9	19		W			
2590											
	2,586.9	48.3	8	29	59	88		M		2,585.4 Boring Terminated at Elevation 2,585.4 ft in RESIDUAL: Sandy SILT (A-4)	49.8

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** Kardon, J.	
SITE DESCRIPTION Replace Bridge No. 248 & 249 on I-40 over SR 1613 (Beaverdam Road): Retaining Wall -WL1-				**GROUND WTR (ft)**
BORING NO. RW1-6	**STATION** 13+00	**OFFSET** 5 ft LT	**ALIGNMENT** -WL1-	**0 HR.** 13.3
COLLAR ELEV. 2,635.7 ft	**TOTAL DEPTH** 44.9 ft	**NORTHING** 679,298	**EASTING** 860,978	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 11/07/22	**COMP. DATE** 11/07/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
2640											
2635										2,635.7 GROUND SURFACE	0.0
	2,634.7	1.0	4	2	3	5		M		2,634.7 **ROADWAY EMBANKMENT**	1.0
	2,632.2	3.5	4	3	3	6		M		2,633.2 Pavement: Asphalt (0.0 to 0.3 ft.) & ABC Stone (0.3 to 1.0 ft.)	2.5
2630										**ROADWAY EMBANKMENT** Reddish Brown, Fine Sandy SILT (A-4)	
	2,627.4	8.3	6	3	4	7		M		**ROADWAY EMBANKMENT** Brown, Fine Sandy CLAY (A-6) with Trace Gravel	
2625											
	2,622.1	13.6	1	2	2	4		W		2,624.7 **RESIDUAL** Yellowish Brown, Olive Yellow, Brown and White, Coarse to Fine Sandy SILT (A-4) with Trace Mica	11.0
2620											
	2,617.2	18.5	1	3	4	7		W			
2615											
	2,612.3	23.4	2	3	4	7		W			
2610											
	2,607.1	28.6	2	3	3	6		W			
2605											
	2,602.2	33.5	3	5	6	11		W			
2600											
	2,597.1	38.6	4	9	11	20		M			
2595											
	2,592.3	43.4	5	8	11	19		M		2,590.8 Boring Terminated at Elevation 2,590.8 ft in RESIDUAL: Sandy SILT (A-4)	44.9

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** Kardon, J.	
SITE DESCRIPTION Replace Bridge No. 248 & 249 on I-40 over SR 1613 (Beaverdam Road): Retaining Wall -WL1-				**GROUND WTR (ft)**
BORING NO. RW1-7	**STATION** 13+50	**OFFSET** 5 ft LT	**ALIGNMENT** -WL1-	**0 HR.** 10.2
COLLAR ELEV. 2,636.1 ft	**TOTAL DEPTH** 45.0 ft	**NORTHING** 679,295	**EASTING** 861,028	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 11/03/22	**COMP. DATE** 11/03/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) / DEPTH (ft)
2640										
2635	2,635.1	1.0	3	3	2	5		M		2,636.1 GROUND SURFACE 0.0
	2,632.3	3.8	2	2	3	5		M		2,635.1 **ROADWAY EMBANKMENT** 1.0 Pavement: Asphalt (0.0 to 0.3 ft.) & ABC Stone (0.3 to 1.0 ft.) Reddish Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica
2630										
2625	2,627.7	8.4	1	2	2	4		W		2,629.1 7.0 **ALLUVIAL** Gray, Silty CLAY (A-7)
	2,622.3	13.8	2	3	3	6		W		2,625.1 11.0 Gray, Fine to Coarse Sandy SILT (A-4) with Trace Gravel
2620										
2615	2,617.6	18.5	2	4	6	10		W		2,616.6 19.5 **RESIDUAL** Yellowish Brown, Olive Brown to Brown and White, Coarse to Fine Sandy SILT (A-4) with Trace Mica
2610	2,612.4	23.7	2	5	6	11		W		
	2,607.5	28.6	4	6	7	13		W		
2605										
2600	2,602.7	33.4	5	8	11	19		W		
	2,597.6	38.5	8	11	13	24		W		
2595	2,592.6	43.5	5	8	14	22		W		2,591.1 45.0 Boring Terminated at Elevation 2,591.1 ft in RESIDUAL: Sandy SILT (A-4)

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** Kardon, J.	
SITE DESCRIPTION Replace Bridge No. 248 & 249 on I-40 over SR 1613 (Beaverdam Road): Retaining Wall -WL1-				**GROUND WTR (ft)**
BORING NO. RW1-8	**STATION** 14+00	**OFFSET** 5 ft LT	**ALIGNMENT** -WL1-	**0 HR.** 10.8
COLLAR ELEV. 2,636.4 ft	**TOTAL DEPTH** 40.0 ft	**NORTHING** 679,292	**EASTING** 861,078	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 11/03/22	**COMP. DATE** 11/03/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2640										
2635	2,635.4	1.0	7	3	3	6		M		2,636.4 GROUND SURFACE 0.0
	2,632.6	3.8	1	2	2	4		M		2,635.4 **ROADWAY EMBANKMENT** 1.0 Pavement: Asphalt (0.0 to 0.3 ft.) & ABC Stone (0.3 to 1.0 ft.) Reddish Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica
2630										
2625	2,627.9	8.5	2	2	2	4		W		2,628.4 8.0 **ALLUVIAL** Gray, Silty CLAY (A-7)
	2,622.8	13.6	10	12	5	17		W		2,625.4 11.0 Gray, Fine to Coarse Sandy SILT (A-4) with Trace Gravel
2620										
2615	2,617.8	18.6	2	2	3	5		W		2,616.9 19.5 **RESIDUAL** Yellowish Brown to Brown and White, Coarse to Fine Sandy SILT (A-4) with Trace Mica
2610	2,612.9	23.5	3	5	9	14		W		
	2,607.9	28.5	4	9	10	19		W		
2605										
2600	2,603.0	33.4	6	10	8	18		W		
	2,597.9	38.5	8	12	13	25		W		2,596.4 40.0 Boring Terminated at Elevation 2,596.4 ft in RESIDUAL: Sandy SILT (A-4)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** Kardon, J.	
SITE DESCRIPTION Replace Bridge No. 248 & 249 on I-40 over SR 1613 (Beaverdam Road): Retaining Wall -WL1-				**GROUND WTR (ft)**
BORING NO. RW1-9	**STATION** 14+50	**OFFSET** 9 ft LT	**ALIGNMENT** -WL1-	**0 HR.** 9.5
COLLAR ELEV. 2,636.9 ft	**TOTAL DEPTH** 39.9 ft	**NORTHING** 679,292	**EASTING** 861,128	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 11/02/22	**COMP. DATE** 11/02/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
2640											
										2,636.9	0.0
										GROUND SURFACE	
	2,635.9	1.0								2,635.9	1.0
2635			4	4	3	7		M		**ROADWAY EMBANKMENT**	
	2,633.5	3.4								Pavement: Asphalt (0.0 to 0.3 ft.) & ABC Stone (0.3 to 1.0 ft.)	
			3	3	4	7		W		Reddish Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica	
2630											
	2,628.6	8.3									
			2	1	2	3		M		2,627.4	9.5
2625										**ALLUVIAL**	
	2,623.4	13.5								2,624.9	12.0
			6	20	46	66		M		Gray, Fine Sandy CLAY (A-6)	
2620										Gray, Fine to Coarse SAND (A-1) with Trace Gravel	
	2,618.4	18.5									
			2	4	m			M		2,617.4	19.5
2615										**RESIDUAL**	
	2,613.4	23.5								Yellowish Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica	
			4	4	5	9		W			
2610											
	2,608.6	28.3									
			5	10	12	22		M			
2605										2,604.9	32.0
	2,603.5	33.4								Gray and Brown, Silty, Coarse to Fine SAND (A-2-4) with Trace Mica	
			7	10	m			M			
2600											
	2,598.5	38.4								2,597.0	39.9
			4	18	18	36		M		Boring Terminated at Elevation 2,597.0 ft in RESIDUAL: Silty SAND (A-2-4)	

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** Kardon, J.	
SITE DESCRIPTION Replace Bridge No. 248 & 249 on I-40 over SR 1613 (Beaverdam Road): Retaining Wall -WL1-				**GROUND WTR (ft)**
BORING NO. RW1-10	**STATION** 15+00	**OFFSET** 8 ft LT	**ALIGNMENT** -WL1-	**0 HR.** 10.5
COLLAR ELEV. 2,637.4 ft	**TOTAL DEPTH** 40.0 ft	**NORTHING** 679,288	**EASTING** 861,178	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 11/02/22	**COMP. DATE** 11/02/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2640										
										2,637.4 GROUND SURFACE 0.0
	2,636.4	1.0								2,636.4 **ROADWAY EMBANKMENT** 1.0
2635			5	4	3	7		M		Pavement: Asphalt (0.0 to 0.3 ft.) & ABC Stone (0.3 to 1.0 ft.)
	2,633.9	3.5								Reddish Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica
			2	2	4	6		M		
2630										
	2,628.9	8.5								
			1	1	1	2		M		2,625.4 12.0
2625										**ALLUVIAL**
	2,624.0	13.4								Gray, Fine to Coarse SAND (A-1) with Trace Gravel
			6	5	9	14		W		
2620										
	2,618.8	18.6								
			1	3	4	7		M		2,617.9 19.5
2615										**RESIDUAL**
	2,614.0	23.4								Yellowish Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica
			2	4	3	7		M		
2610										
	2,608.9	28.5								
			4	5	7	12		W		
2605										2,605.4 32.0
	2,603.9	33.5								Olive Brown, Silty, Coarse to Fine SAND (A-2-4) with Trace Mica
			5	7	10	17		M		
2600										
	2,598.9	38.5								2,597.4 40.0
			4	10	11	21		M		Boring Terminated at Elevation 2,597.4 ft in RESIDUAL: Silty SAND (A-2-4)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** Kardon, J.	
SITE DESCRIPTION Replace Bridge No. 248 & 249 on I-40 over SR 1613 (Beaverdam Road): Retaining Wall -WL1-				**GROUND WTR (ft)**
BORING NO. RW1-11	**STATION** 15+40	**OFFSET** 10 ft LT	**ALIGNMENT** -WL1-	**0 HR.** Dry
COLLAR ELEV. 2,637.9 ft	**TOTAL DEPTH** 30.0 ft	**NORTHING** 679,288	**EASTING** 861,218	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 11/02/22	**COMP. DATE** 11/02/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)
2640										
	2,637.9	0.0								2,637.9 GROUND SURFACE 0.0
	2,636.9	1.0								2,636.9 **ROADWAY EMBANKMENT** 1.0 Pavement: Asphalt (0.0 to 0.3 ft.) & ABC Stone (0.3 to 1.0 ft.) Reddish Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica
2635	2,634.4	3.5	8	5	4	9		M		
			2	2	2	4		M		
2630	2,629.3	8.6								2,630.9 7.0 **ALLUVIAL** Brown and Gray, Silty CLAY (A-7)
			WOH	WOH	1	1		M		
2625	2,624.4	13.5								2,623.9 14.0 Gray, Fine to Coarse SAND (A-1) with Trace Gravel
			WOH	7	12	19		W		
2620	2,619.3	18.6								2,618.4 19.5 **RESIDUAL** Olive Yellow to Yellowish Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica
			1	3	3	6		M		
2615	2,614.4	23.5								
			2	4	5	9		M		
2610	2,609.4	28.5								
			4	6	7	13		M		2,607.9 30.0 Boring Terminated at Elevation 2,607.9 ft in RESIDUAL: Sandy SILT (A-4)

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** Kardon, J.	
SITE DESCRIPTION Replace Bridge No. 248 & 249 on I-40 over SR 1613 (Beaverdam Road): Retaining Wall -WL1-				**GROUND WTR (ft)**
BORING NO. RW1-12	**STATION** 15+99	**OFFSET** 10 ft LT	**ALIGNMENT** -WL1-	**0 HR.** 14.4
COLLAR ELEV. 2,638.7 ft	**TOTAL DEPTH** 25.1 ft	**NORTHING** 679,284	**EASTING** 861,277	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 11/01/22	**COMP. DATE** 11/01/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2640										
	2,637.7	1.0								2,638.7 GROUND SURFACE 0.0
			7	7	13	20		M		2,637.7 **ROADWAY EMBANKMENT** 1.0 Pavement: Asphalt (0.0 to 0.3 ft.) & ABC Stone (0.3 to 1.0 ft.) Reddish Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica
2635	2,635.1	3.6								
			2	2	3	5		M		
2630	2,630.2	8.5								2,631.7 7.0 **ALLUVIAL** Brown and Gray, Silty CLAY (A-7) with Trace Mica
			2	2	2	4		M		
2625	2,625.0	13.7								2,624.7 14.0 Gray, Fine to Coarse SAND (A-1) with Trace Gravel
			4	8	16	24		W		
2620	2,620.3	18.4								2,619.2 19.5 **RESIDUAL** Olive Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica
			1	3	3	6		M		
2615	2,615.1	23.6								
			2	3	4	7		M		2,613.6 25.1 Boring Terminated at Elevation 2,613.6 ft in RESIDUAL: Sandy SILT (A-4)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** Kardon, J.	
SITE DESCRIPTION Replace Bridge No. 248 & 249 on I-40 over SR 1613 (Beaverdam Road): Retaining Wall -WL1-				**GROUND WTR (ft)**
BORING NO. RW1-13	**STATION** 16+49	**OFFSET** 10 ft LT	**ALIGNMENT** -WL1-	**0 HR.** 11.9
COLLAR ELEV. 2,639.5 ft	**TOTAL DEPTH** 25.0 ft	**NORTHING** 679,280	**EASTING** 861,327	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 11/01/22	**COMP. DATE** 11/01/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
2640										2,639.5 GROUND SURFACE	0.0
	2,638.5	1.0	4	3	3	6		M		2,638.5 **ROADWAY EMBANKMENT** Pavement: Asphalt (0.0 to 0.3 ft.) & ABC Stone (0.3 to 1.0 ft.)	1.0
2635	2,636.1	3.4	7	4	3	7		M		Reddish Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica	
	2,631.0	8.5	1	2	3	5		M		2,627.5 **ALLUVIAL**	12.0
2630										Gray, Fine to Coarse SAND (A-1) with Trace Gravel	
2625	2,626.0	13.5	2	10	8	18		W		2,622.5 **RESIDUAL**	17.0
	2,621.0	18.5	WOH	1	1	2		W		Gray, Silty, Coarse to Fine SAND (A-4) with Trace Mica	
2620										2,616.5 Gray, Coarse to Fine Sandy SILT (A-4) with Trace Mica	23.0
2615	2,616.0	23.5	1	2	4	6		M		2,614.5 Boring Terminated at Elevation 2,614.5 ft in RESIDUAL: Sandy SILT (A-4)	25.0

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** Kardon, J.	
SITE DESCRIPTION Replace Bridge No. 248 & 249 on I-40 over SR 1613 (Beaverdam Road): Retaining Wall -WL1-				**GROUND WTR (ft)**
BORING NO. RW1-14	**STATION** 16+99	**OFFSET** 9 ft LT	**ALIGNMENT** -WL1-	**0 HR.** 12.5
COLLAR ELEV. 2,640.3 ft	**TOTAL DEPTH** 20.0 ft	**NORTHING** 679,275	**EASTING** 861,377	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 11/01/22	**COMP. DATE** 11/01/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2645										
2640	2,639.3	1.0	5	2	3	5		M		2,640.3 GROUND SURFACE 0.0
	2,636.9	3.4	2	1	5	6		M		2,639.3 **ROADWAY EMBANKMENT** 1.0
2635										Pavement: Asphalt (0.0 to 0.3 ft.) & ABC Stone (0.3 to 1.0 ft.)
	2,631.9	8.4	2	2	3	5		M		Reddish Brown and Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica
2630										2,627.3 13.0
2625	2,626.8	13.5	4	5	2	7		Sat.		**ALLUVIAL** Gray, Fine to Coarse SAND (A-1) with Trace Gravel
	2,621.8	18.5	2	2	3	5		Sat.		2,622.8 **RESIDUAL** 17.5
										2,620.3 Gray, Coarse to Fine Sandy SILT (A-4) with Trace Mica 20.0
										Boring Terminated at Elevation 2,620.3 ft in RESIDUAL: Sandy SILT (A-4)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** Kardon, J.	
SITE DESCRIPTION Replace Bridge No. 248 & 249 on I-40 over SR 1613 (Beaverdam Road): Retaining Wall -WL1-				**GROUND WTR (ft)**
BORING NO. RW1-15	**STATION** 17+49	**OFFSET** 9 ft LT	**ALIGNMENT** -WL1-	**0 HR.** Dry
COLLAR ELEV. 2,641.3 ft	**TOTAL DEPTH** 10.1 ft	**NORTHING** 679,269	**EASTING** 861,427	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 11/01/22	**COMP. DATE** 11/01/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
2645											
										2,641.3 GROUND SURFACE	0.0
2640	2,640.3	1.0	6	3	2	5		M		2,640.3 **ROADWAY EMBANKMENT** Pavement: Asphalt (0.0 to 0.3 ft.) & ABC Stone (0.3 to 1.0 ft.)	1.0
	2,637.8	3.5	2	3	2	5		W		Brown to Reddish Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica and Gravel	
2635										2,633.3	8.0
	2,632.7	8.6	1	2	2	4		W		2,631.2 **RESIDUAL** Reddish Brown, Silty CLAY (A-7) with Trace Mica	10.1
										Boring Terminated at Elevation 2,631.2 ft in RESIDUAL: Silty CLAY (A-7)	

WBS 55041.1.1	**TIP** HB-0002	**COUNTY** HAYWOOD	**GEOLOGIST** Kardon, J.	
SITE DESCRIPTION Replace Bridge No. 248 & 249 on I-40 over SR 1613 (Beaverdam Road): Retaining Wall -WL1-				**GROUND WTR (ft)**
BORING NO. RW1-16	**STATION** 17+98	**OFFSET** 9 ft LT	**ALIGNMENT** -WL1-	**0 HR.** Dry
COLLAR ELEV. 2,642.4 ft	**TOTAL DEPTH** 9.8 ft	**NORTHING** 679,263	**EASTING** 861,476	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Toothman, R.	**START DATE** 11/01/22	**COMP. DATE** 11/01/22	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2645										
										2,642.4 GROUND SURFACE 0.0
	2,641.3	1.1	6	3	2	5		M		2,641.4 **ROADWAY EMBANKMENT** 1.0
2640	2,639.0	3.4	1	1	1	2		M		Pavement: Asphalt (0.0 to 0.3 ft.) & ABC Stone (0.3 to 1.0 ft.) Olive Brown, Coarse to Fine Sandy SILT (A-4) with Trace Mica and Gravel
2635										
	2,634.1	8.3	2	3	2	5		M		2,632.6 9.8
										Boring Terminated at Elevation 2,632.6 ft in RESIDUAL: Sandy SILT (A-4)
										Notes: Topsoil from 0.0 to 0.2 ft.

SITE PHOTOGRAPH

View of Retaining Wall

Looking East from West End of Retaining Wall along -WL1-