-004 K B REFERENCE **CONTENTS**

DESCRIPTION

LEGEND (SOIL & ROCK)

SUPPLEMENTAL LEGEND (GSI)

SOIL & ROCK TEST RESULTS SITE PHOTOGRAPH(S)

BORE LOG(S) & CORE REPORT(S) & CORE PHOTOGRAPH(S)

TITLE SHEET

SITE PLAN

PROFILE(S)

CROSS SECTION(S)

SHEET NO.

2Α

4-5

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9-18

19-20

7043 9 **PROJEC** STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY ROCKING	НАМ		
SITE DESCRIPTION _	REPLACE	BRIDGE	780151 ON
US 158/NC 14 OV	ER US 29		

STATE PROJECT REPERENCE NO. BR-0043

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 NSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991 707-680. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

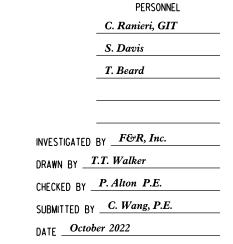
CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (INP-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 NIDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE TOTAL WITH THE ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

NOTES:

1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.

2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.





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12/12/2022

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PROJECT REPERENCE NO. SHEET NO. 2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

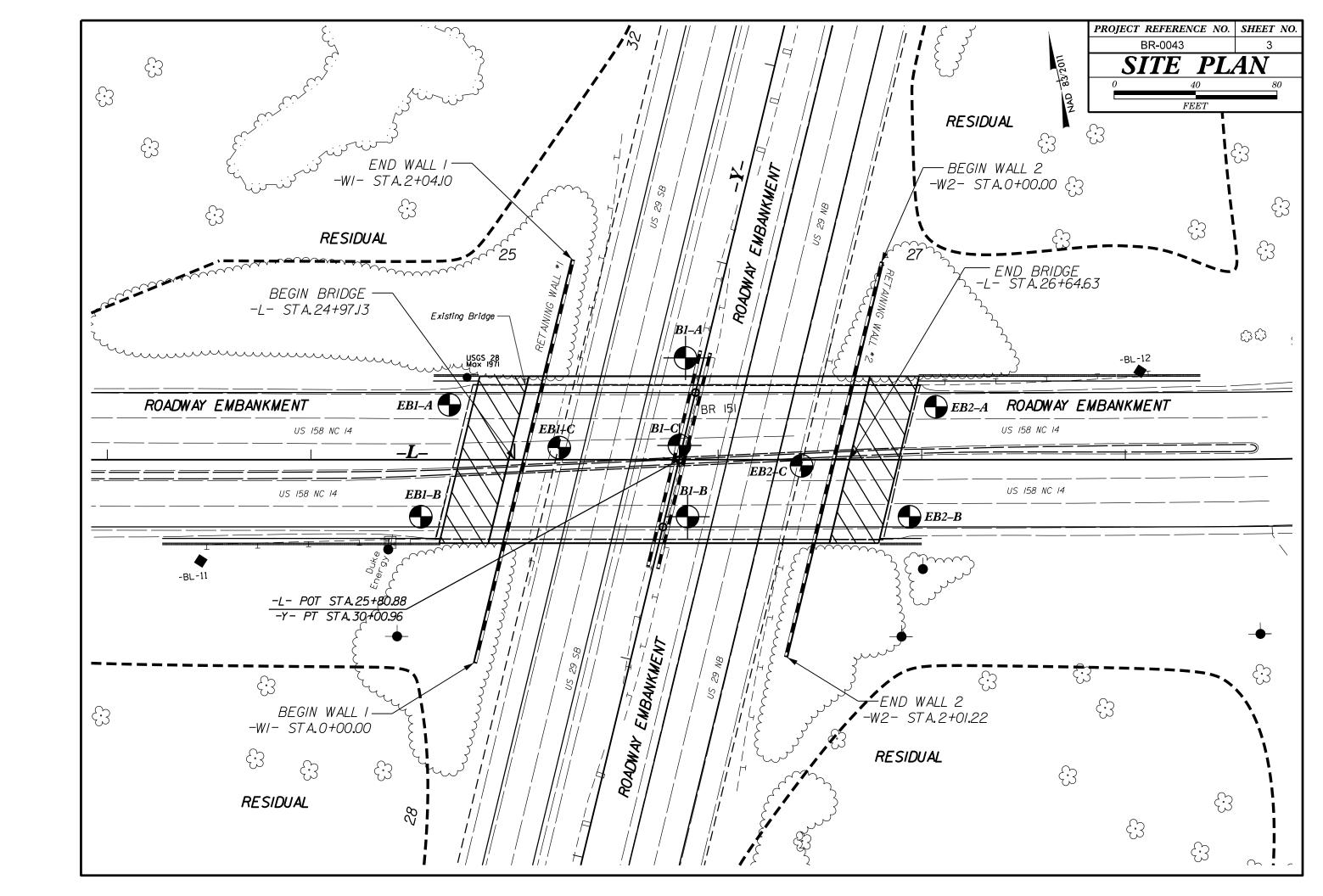
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	<u>WELL GRADED</u> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC.A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED VILLE NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE CRYSTALLINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
LLASS. (\$ 35% PASSING *200) (> 35% PASSING *200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-3 A-6, A-7 A-6, A-7	COMPRESSIBILITY	NON COVETAL INF. FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
999999999	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL 000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
▼ PASSING GRANULAR SILT- MUCK,	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
■ 40 30 MX 50 MX 51 MN	GRANULAR SILT - CLAY	- WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
אווי סל אווי ס	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL PASSING *40	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	HORIZONTAL.
LL 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 500L5 WITH	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
PI 6 MX NP 18 MX 18 MX 11 MN 11 MN 10 MX 18 MX 11 MN 11 MN 11 MN 10 MX 10 MX 10 MX 11 MN 11 MN MODERATE ORGANIC ORGANI		OF A CRYSTALLINE NATURE.	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
HIGHAL TYPES STONE EPAGS ORGANIC SOILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND FINE SILIT OF CLATET SILIT CLATET MATTER		CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SHIND SHIND SHIND SUILS SUILS	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE OF THE POOR POOR POOR POOR UNSUITABLE OF THE POOR POOR POOR POOR POOR POOR POOR POO		DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP	WITH FRESH ROCK,	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED	III 25 (225	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONFIGURES ON PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) OF ROCK STRUCTURES OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
VERY LOOSE (4	SPT OF THE TEST PODING SLOPE INDICATOR	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GENERALLY	_ 131 FM	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS
MATERIAL DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERT DENSE / DU		SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
VERY SOFT < 2	— INFERRED SOIL BOUNDARY — CORE BORING SOUNDING ROD	(V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MW MONITORING WELL TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
MATERIAL	A ALLINIA COL POLINDARY A PIEZOMETER	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
HARD > 30 > 4	INSTRUCTION	ROCK HARDNESS	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053		HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN. MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.005	AR - AUGER REFUSAL MED MEDIUM YST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
SIZE IN. 12 3	☐ CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL
SOIL MOISTURE - CORRELATION OF TERMS	CPT - CONE PENETRATION TEST NP - NON PLASTIC $\dot{\gamma}_{ m d}$ - DRY UNIT WEIGHT	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION SOIL MOISTURE SCALE FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
(SAT.) FROM BELOW THE GROUND WATER TABLE		VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES I INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY	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.
LL LIOUID LIMIT	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
BANGE / SEMISULIU; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS w - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: USGS BENCH MARK STAMPED "USGS 28 MAX 1971"
(PI) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	ON BRIDGE WINGWALL AT THE NORTHWEST CORNER OF BRIDGE
ON CONTINUE MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	Easting: 1,815,132.935, Northing: 950,691.222 ELEVATION: 763.0 FEET
OM OPTIMUM MOISTURE SL SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	BRIDGE BORING ELEVATIONS OBTAINED USING USGS BENCHMARK
- DRY - (D) ATTAIN OPTIMUM MOISTURE	X CME-55 G* CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED < 0.008 FEET	FIAD= FILLED IMMEDIATELY AFTER DRILLING
PLASTICITY	B' HOLLOW AUGERS L -B L -H	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS X -N Q3	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	NM= NOT MEASURED
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT	TUNGCARBIDE INSERTS	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM	X CASING X W/ ADVANCER HAND TOOLS:	CDAING CAN DE CEDADATED EDON CANDIE WITH CTEEL DOODE	
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST X TRICONE 215/16 STEEL TEETH HAND AUGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE TUNGCARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	X CORE BIT VANE SHEAR TEST	DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SAMPLE REPEAYS ACROSS GRAINS	DATE 8-15-14

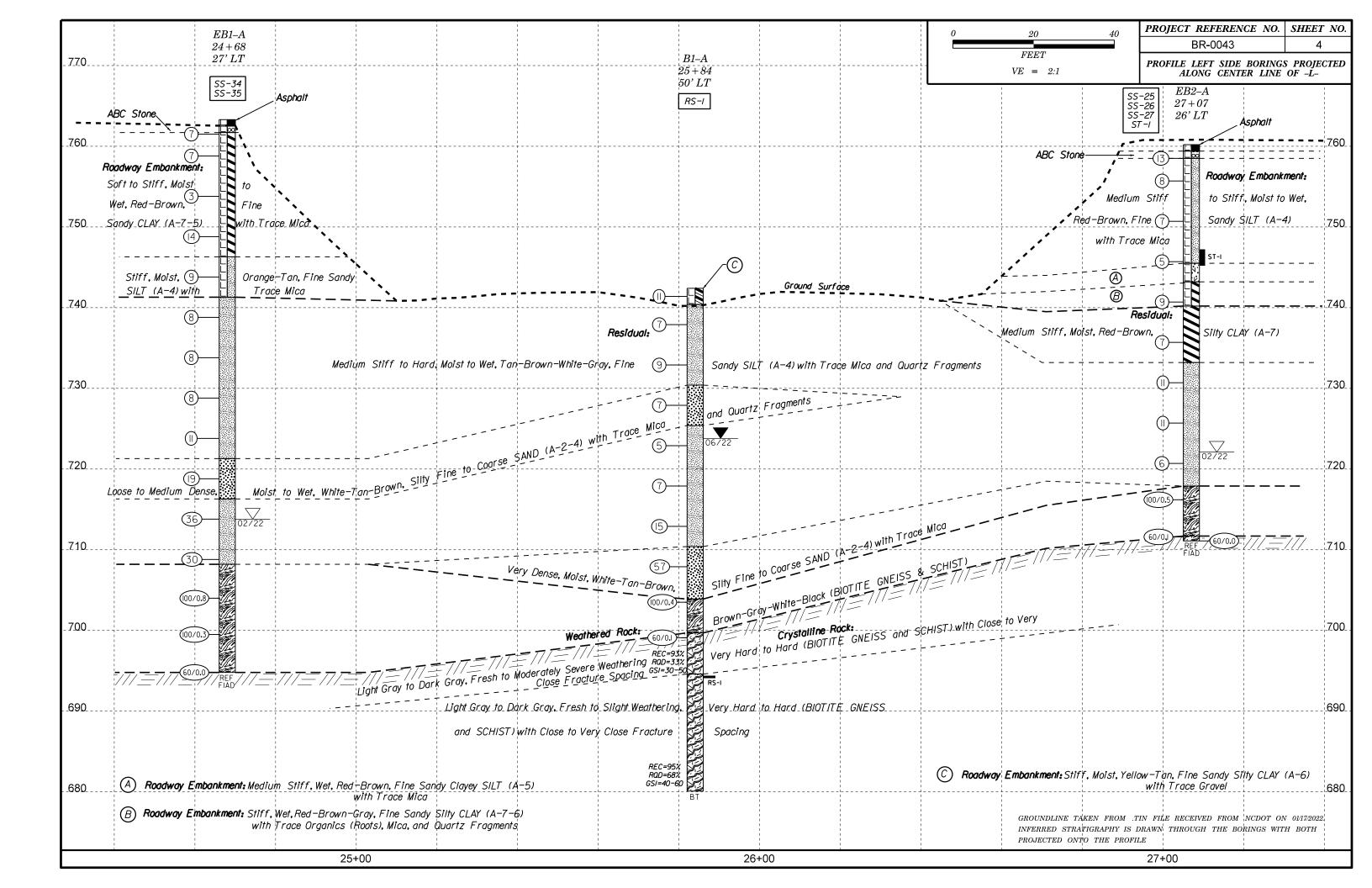
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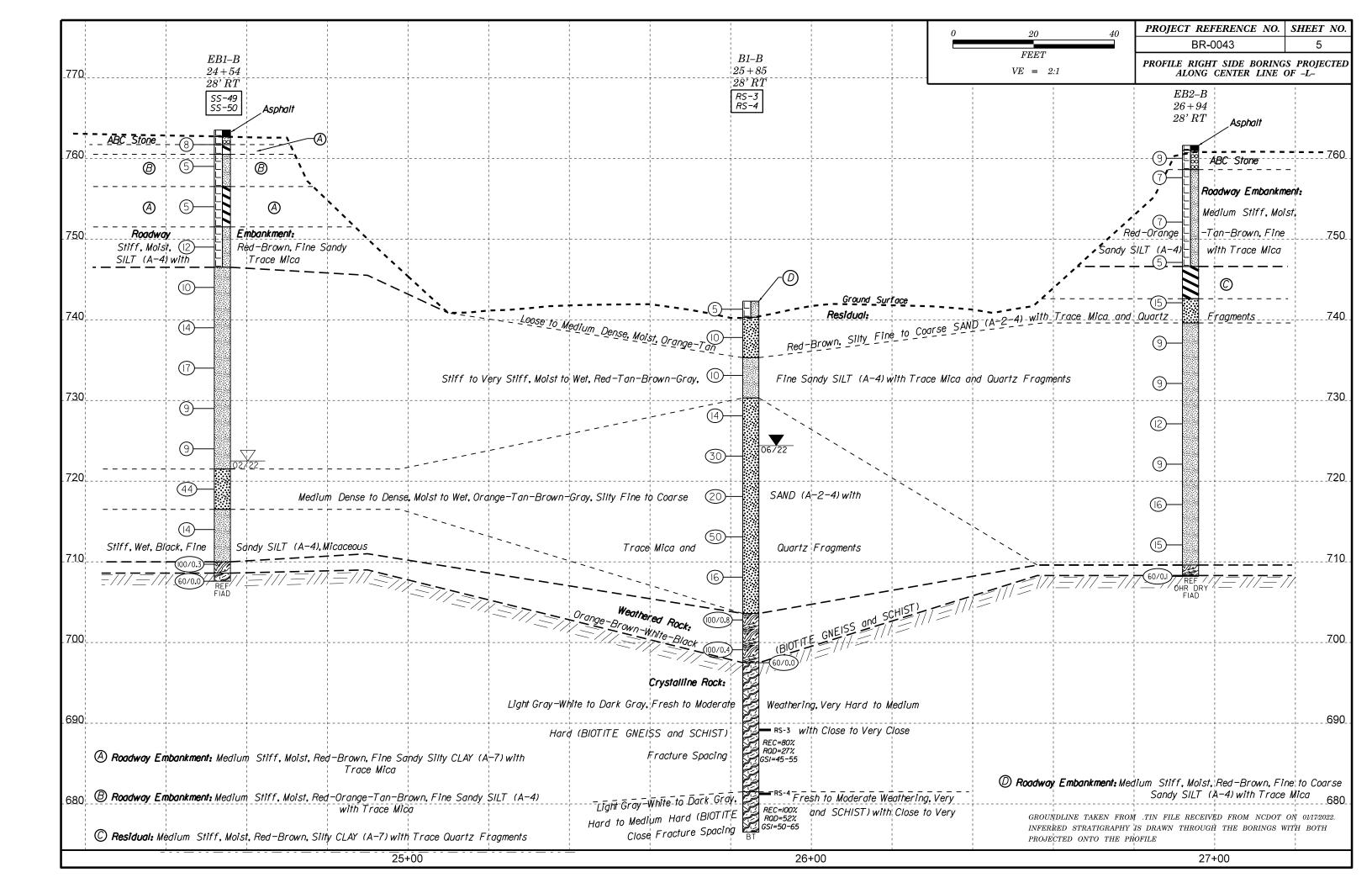
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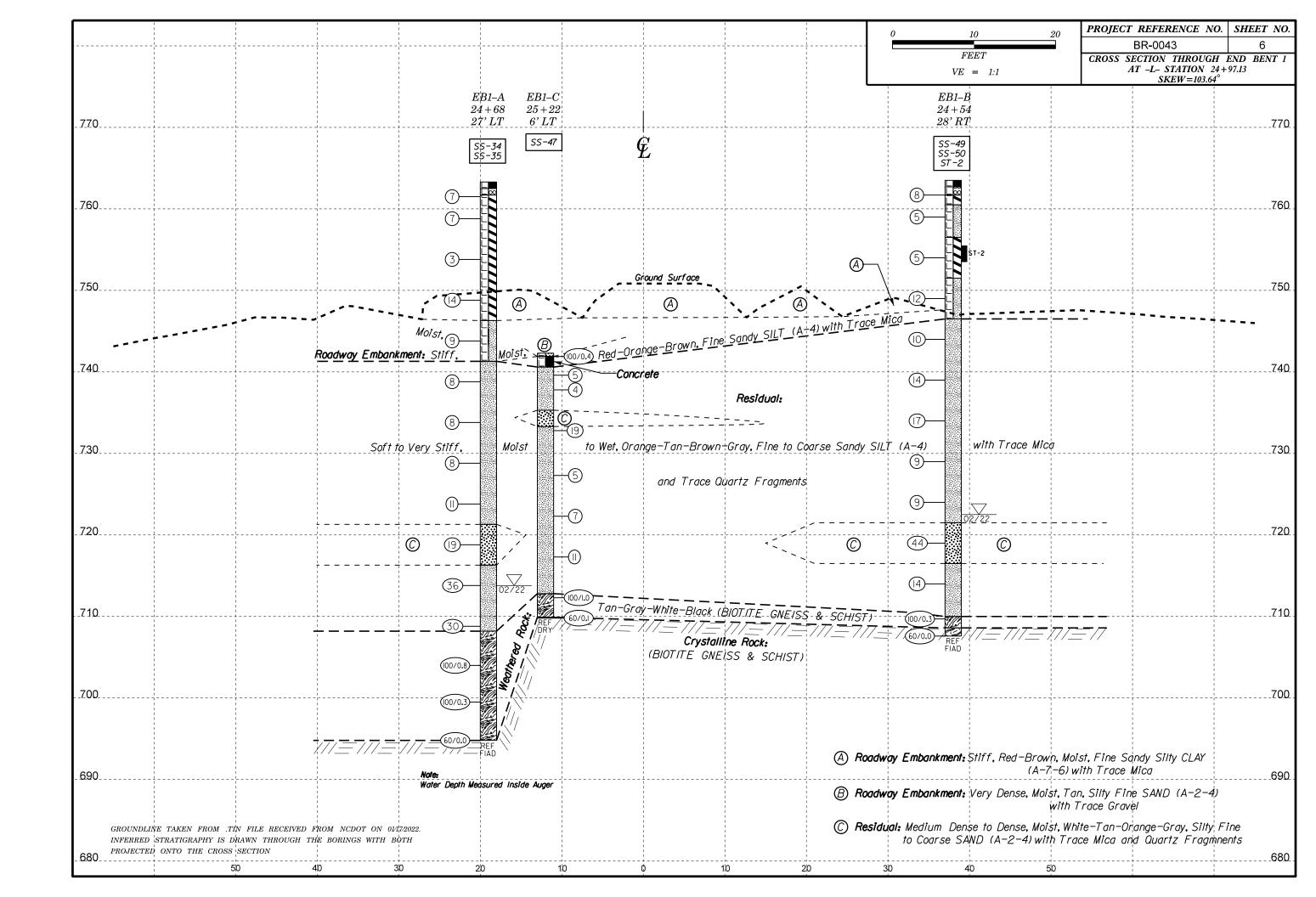
SUBSURFACE INVESTIGATION

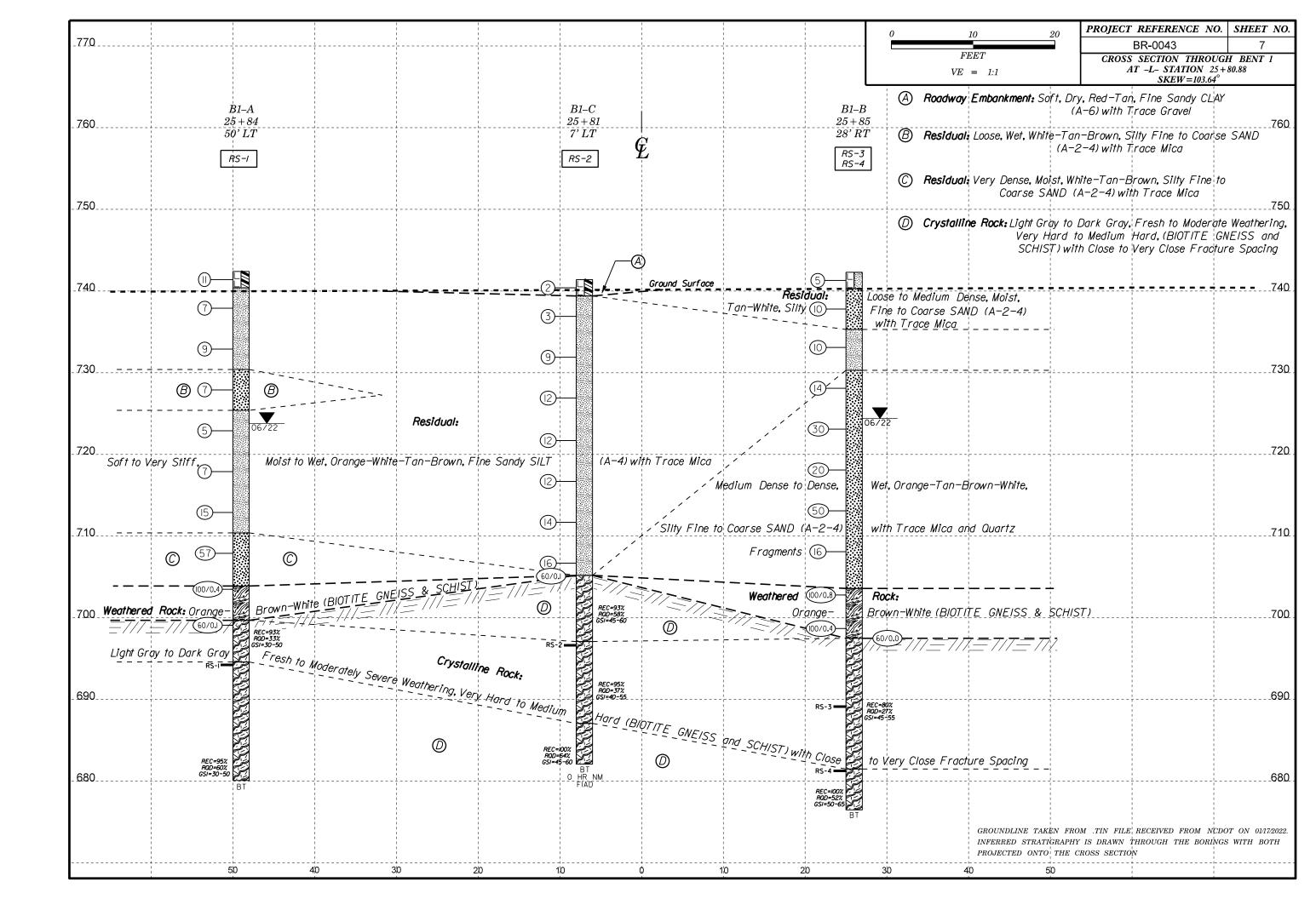
	,	SUPPLEMI FR	ENTAL LI OM AAS	EGEND, G. HTO LRI	EOLOGIC FD BRID	AL STRENGTH INDEX (GSI) TABLES GE DESIGN SPECIFICATIONS
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Joint	ed Rock Mass (Ma	nnos and Hoek,	2000)			AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)
GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000) From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.	SURFACE CONDITIONS VERY GOOD Very rough, fresh unweathered surfaces	GOOD Rough, slightly weathered, iron stained surfaces	FAIR Smooth, moderately weathered and altered surfaces	POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments	VERY POOR Slickensided, highly weathered surfaces with soft clay coatings or fillings	GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000) From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise, Quoting a range from 33 to 37 is more realistic than giving a range from 35 to 37 is more realistic than giving a range from 37 to 37 is more realistic than giving a range from 38 to 37 is more r
STRUCTURE	- I	CREASING S		ALITY =	!	COMPOSITION AND STRUCTURE
INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities	80 BIECES			N/A	N/A	A. Thick bedded, very blocky sandstone The effect of pellitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.
BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets VERY BLOCKY - interlocked, partially disturbed mass with	OF ROCK	70 60	50			B. Sand- stone with thin inter- layers of siltstone amounts C. Sand- stone and siltstone or silty shale with sand- stone layers shale with sandstone layers 40
multi-faceted angular blocks formed by 4 or more joint sets	ERLOCKING		40			C. D. E. and G - may be more or F. Tectonically deformed,
BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity	ASING INTER			30		less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to F and H. 1
DISINTEGRATED - poorly inter- locked, heavily broken rock mass with mixture of angular and rounded rock pieces	DECRE			20		G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers H. Tectonically deformed silty or clayey shale forming a clayer shale forming a clayer shale form the pockets of clay. Thin layers of sandstone are transformed
LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes	♡ N/A	N/A		///	10	Into small rock pieces. → Means deformation after tectonic disturbance DATE: 8-19-16

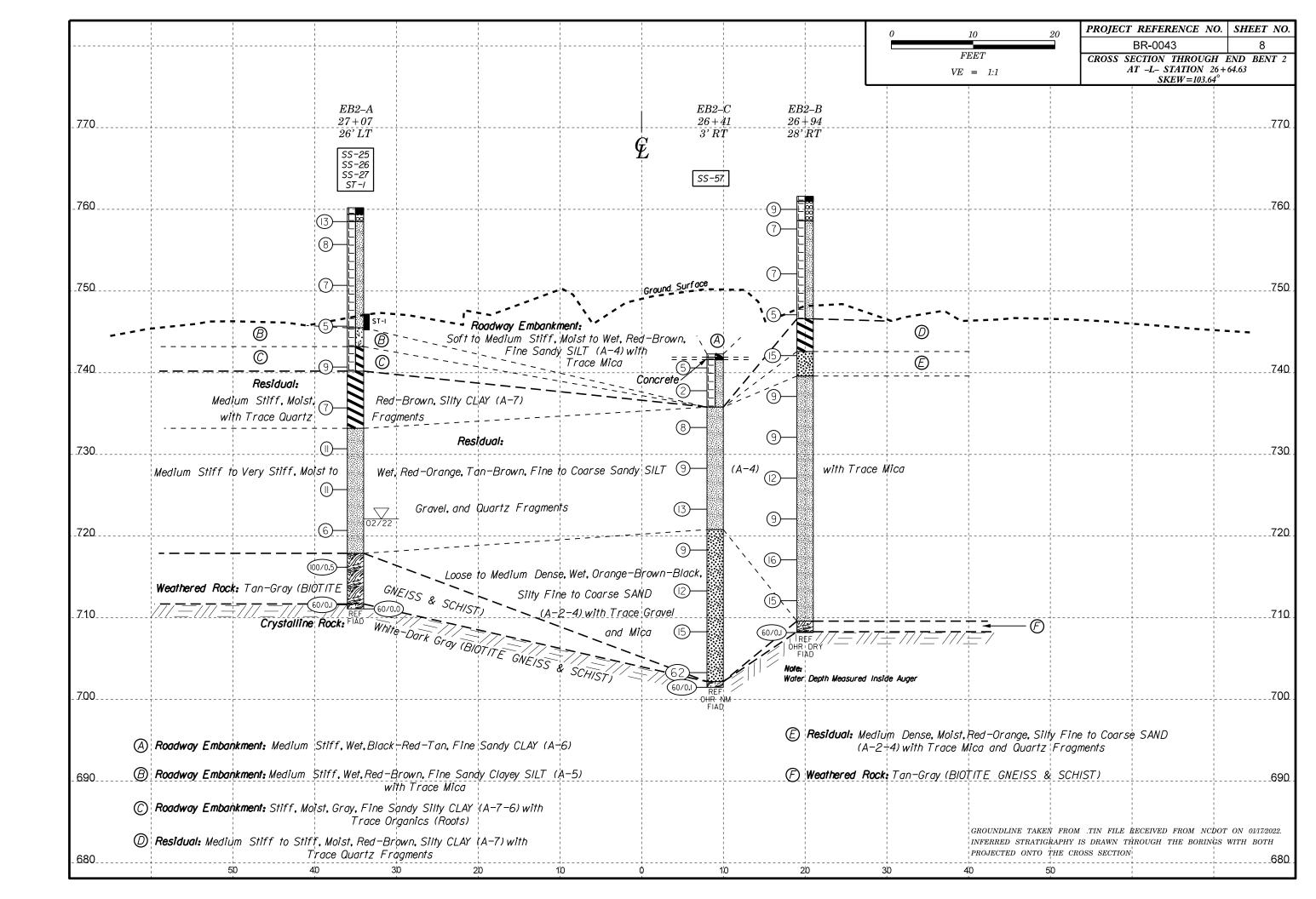


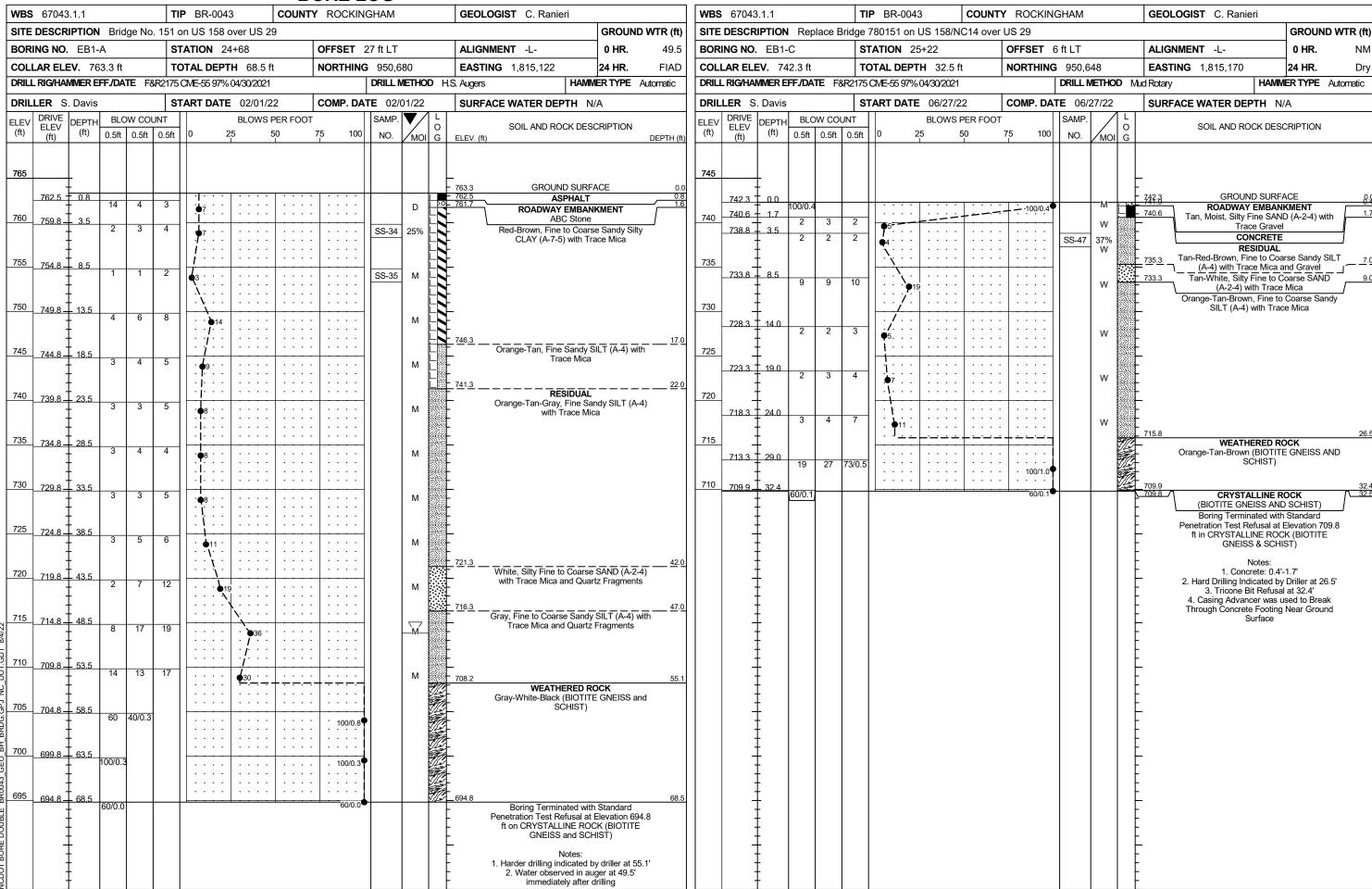














SHEET 10

								<u>ORE L</u>	<u>UG</u>							
WBS	67043	3.1.1			TI	IP BR-0043	COUNT	Y ROCKING	GHAM			GEOLOGI	ST C. Ranieri			
SITE	DESCR	IPTION	l Brid	dge No	o. 151	on US 158 over US 2	9							GI	ROUND	WTR (ft)
BOR	ING NO.	EB1-	-B		S	STATION 24+54		OFFSET 2	28 ft RT		1	ALIGNME	NT -L-	0	HR.	41.0
COLI	LAR ELE	EV . 76	3.5 ft		T	OTAL DEPTH 55.9 f	t	NORTHING	950,6	29	E	ASTING	1,815,096	24	HR.	FIAD
DRILL	RIG/HAI	VIMER E	FF./DA	TE F	&R2175	5 CME-55 97% 04/30/2021			DRILL N	/IETHOD	H.S. A	lugers		HAMMER	TYPE /	Automatic
DRIL	LER S	. Davis			S	START DATE 02/02/2	22	COMP. DAT	TE 02/	02/22	s	SURFACE	WATER DEPT	H N/A		
ELEV	DRIVE	DEPTH	T 51.	OW CO		11	PER FOOT	l	SAMP.		-	70.1.7.102				
(ft)	ELEV (ft)	(ft)	0.5ft	_	_	-	50	75 100	NO.	MOI		EV. (ft)	SOIL AND ROCK	(DESCRIF	TION	DEPTH (f
765		-									_					
	762.7 -	- 0.8					 				- 76	3.5	GROUND :			0.
760		<u> </u>	6	5	3					M	· ·	0.5	ROADWAY EI		NT	1.8
700	760.0	3.5	2	2	3	5	 	1	SS-49	29%		. — 기 Re	ed-Brown, Fine Sar	ndy Silty Cl	AY (A-7	<i></i>
	-	_									- 75	6.5 Red	<u>with Tra</u> -Brown, Fine to Co		/ SII T (A	
755	755.0 <u> </u>	L L 8.5							ST-2	32%	Ē	. – –	with Tra	ce Mica		
	-	-	3	2	3	6 5· · · · · · ·			SS-50	l w L	7	R	Red-Brown, Fine to CLAY (A-7-5) w	Coarse Sa vith Trace N	ndy Silty ∕lica	
	-	ļ				'\'					- 7 <u>5</u>	1.5				12.0
750	750.0	13.5	4	5	7	.	ļ · · · ·				Œ	R	ed-Brown, Fine Sa Trace	indy SILT (Mlca	A-4) with	
	-	<u> </u>	4)	'	12				M	#					
	-	ŧ				:::::::::::::::::::::::::::::::::::::					74	6.5		5.TAI		<u>17</u> .
745	745.0	18.5	2	5	5	10	+			M		Tan-	-Brown-Gray, Fine	Sandy SIL	T (A-4) w	ith
	-	F								"	₩F		Trace	Mica		
740	740.0						: : : :				#F					
7 10	740.0_	23.5	3	6	8	- • • 14	1			М	F					
	-	<u> </u>				: : † : : : : :										
735	735.0	28.5] } -					Æ.					
	-	-	6	8	9	17				М	NF					
	-	F									SF.					
730	730.0	33.5	4	4	5	/	ļ · · · ·			🖁	#					
		‡	"	4	"	9				M	% ‡					
705	-	<u> </u>									% E					
725	725.0	38.5	3	4	5		+	 		М	<u>-</u>					
	-	-									%	4.5				40.4
720	720.0	L 43.5				::::\	: : : :				::F /2		an-Orange-Gray,			42.9
	- 120.0	43.5	16	19	25		4			М		SA	ND (A-2-4) with Tra Fragn		ind Quar	tz
	-	<u> </u>				:::: ;;/::					71	6.5	3			47.0
715	715.0	48.5				/					Œ		ack, Fine Sandy SI	LT (A-4), N	licaceou	
	-	<u> </u>	5	6	8	14				W	E.					
	-	-									¥F					
710	710.0	53.5	100/0.3	3			<u> </u>	100/0.3			<i>774</i> –	0.0	— — WEATHER	ED BOCK		53.
	707.6 -	- - 55.9									70 70	8.6 7.6 \ E	Black (BIOTITE GN	EISS and S	SCHIST)	54.9 55.9
		‡ <u> </u>	60/0.0		1			60/0.0			E	7	CRYSTALL (BIOTITE GNEIS			
	_	t									-		Boring Terminate	ed with Sta	ndard	
	- -	<u> </u>									-		netration Test Refu ft in CRYSTALLINE GNEISS an	E ROCK (E	IOTITE	.0
	-	<u> </u>									-	1. F	Not Harder drilling indic	ated by dri		.9'
	- -	 									Ė	3.	2. Auger refi Shelby Tube (ST-2 28') Obtained		2,
	- -	<u> </u>									ŧ		<u>er Samples:</u> T-2 (8.0 - 10.0)			
	- -	<u> </u>									-		·			
	:	<u> </u>									Ė					
		<u> </u>														

									<u> </u>	<u>.0G</u>				
WBS	67043	3.1.1			Т	IP BR-004	13	COUNT	Y ROCKII	IGHAM			GEOLOGIST C. Ranieri	
SITE	DESCR	IPTION	Rep	lace B	ridge	780151 on	US 158/N	C14 over	US 29					GROUND WTR (ft)
30RI	ING NO.	B1-A			S	STATION 2	25+84		OFFSET	50 ft LT			ALIGNMENT -L-	0 HR . NM
COLL	LAR ELE	EV . 74	2.4 ft		т	OTAL DEP	TH 62.3	t	NORTHIN	G 950,6	677		EASTING 1,815,240	24 HR. 18.6
DRILL	RIG/HAI	VIMER E	FF./DA	TE F8	R2175	5 CME-55 97%	6 04/30/2021			DRILL N	METHO	D NV	V Casing W/SPT & Core HAMMI	ER TYPE Automatic
DRIL	LER S	. Davis			S	START DAT	E 06/21/2	22	COMP. DA	TE 06/	21/22		SURFACE WATER DEPTH N/A	A
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	0.5ft	JNT 0.5ft	0		PER FOOT 50	75 100	SAMP. NO.	MOI	L O G	SOIL AND ROCK DESC	CRIPTION DEPTH (ft)
45	742.4	- 0.0	4	5	6		T::::	T::::			M		742.4 GROUND SURFA ROADWAY EMBANY 740.4 Yellow-Tan, Fine Sandy Silty ((MENT
40	738.9 -	- - 3.5	3	3	4					-	М		740.4Yellow-Tan, Fine Sandy Silty 0	i
35	733.9	- - - 8.5	3	4	5					-		F	Trace Roots and N	Aica
30	- - 728.9 -	- - - - 13.5	Ü	7	J	9				-	W		730.4White-Tan-Brown, Silty Fir	
25	120.9 - - -	-	2	3	4	7					w		SAND (A-2-4) with Tra	17.0
20	723.9 - - - -	18.5 -	2	2	3	5					M		White-Tan-Brown, Fine San with Trace Mica	dy SILT (A-4) a
.U	718.9 - -	- - 23.5 -	2	3	4	-					М			
15	713.9 - - 713.9 -	- - 28.5 -	4	6	9	\				-	w			
10	708.9 -	33.5	13	21	36					<u> </u> -	м		710.4 White-Tan-Brown, Silty Fir SAND (A-2-4) with Tra	
)5	- - 703.9 -	- - - 38.5	100/0.4									- - -	703.9 WEATHERED RO	38.5
00	699.2	43.2							. 100/0.4				Orange-Brown-White (BIOTIT SCHIST) .699.7 699.1 CRYSTALLINE RG	E GNEISS and 42.7
95	-	-	60/0.1						60/0.1				Light Gray-White to Dark G GNEISS and SCH	ray (BIOTITE
90	-	-								RS-1	,		Light Gray-White to Dark G GNEISS and SCH	ray (BIOTITE
	-	- - - -											•	
35_	- - -	- - -												
	- - -	- - -					1	1				-	Boring Terminated at Elevat CRYSTALLINE ROCK (BIOT SCHIST)	
	- - - - - -	-											. Notes: 1. Surficial Organic Soil 2. Harder Drilling indicated by 3. Auger Refusal at 4. Start Coring at ² 5. 0 HR Water Level Not Me Water being introduced	/ driller at 42.7' 43.2' 13.3' asured due to

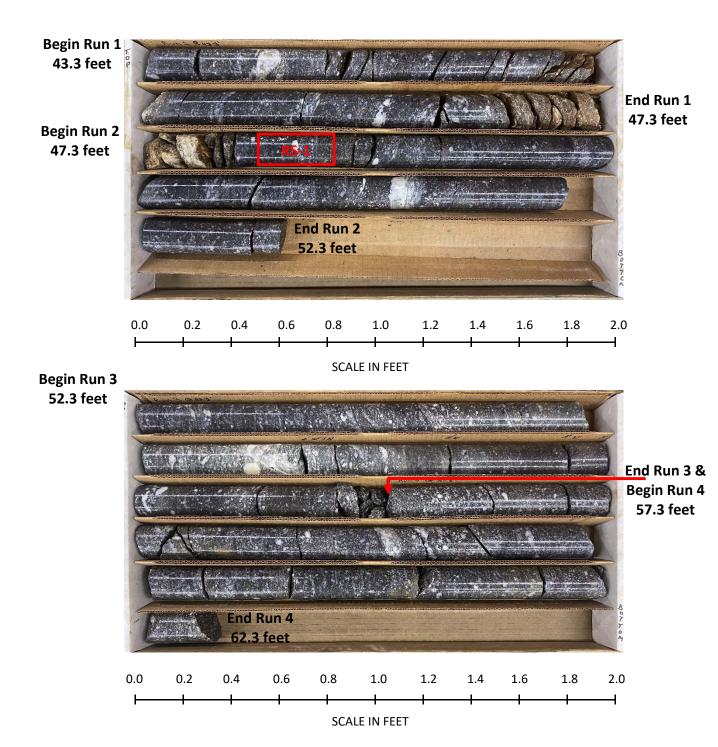
											KE L							
-	67043					BR-00					ROCKING	GHAM		GEOLOGIS	T C. Rani	eri		
-				lace Brid	 			8/NC1	4 over	_							-	ID WTR (ft)
BOR	ING NO.	B1-A			STA	TION	25+84			OF	FSET 5	0 ft LT		ALIGNMEN	T -L-		0 HR.	NM
	LAR ELI						PTH 62			NC	RTHING	950,677		EASTING			24 HR.	18.6
DRILL	_ RIG/HA	MMER E	FF./DA	TE F&R2	175 CM	1E-55 97	7% 04/30/2	021				DRILL METHOD	NWC	Casing W/SPT	& Core	HAMM	ER TYPE	Automatic
DRIL	LER S	. Davis			STA	RT DA	TE 06/2	21/22		CC	MP. DAT	E 06/21/22	!	SURFACE \	NATER DE	PTH N	/A	
COR	E SIZE	NQ					N 19.01) A T A	<u> </u>								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft)	UN RQD (ft) %	SAMP. NO.	REC. (ft)	RQD (ft) %	L O G	ELEV. (fi	.)	DE	SCRIPTION A	AND REMARI	KS		DEPTH (ft)
699.1	699.1	43.3	4.0	1:40/1.0 1:30/1.0 1:10/1.0	(3.8) 95%	(1.5) 38%		(4.2) 93%	(1.5) 33%		699.1	Light Gray to Dark to Hard (BIOTIT	k Gray,	NEISS) with C	derately Seve	re Weathe	ering, Very ture Spacii	Hard 43.3
695	695.1	47.3	5.0	1:32/1.0 1:10/1.0 1:27/1.0 1:39/1.0	(4.4) 88%	(3.1) 62%	RS-1	(13.8) 95%	(9.9) 68%		- 694.6 -	Light Gray to Da	S and	ay, Fresh to S SCHIST) with	Slight Weathe	y Close Fr		
690	690.1	52.3	5.0	1:50/1.0 1:47/1.0 1:37/1.0 1:49/1.0	(4.8) 96%	(3.5) 70%					- - - -	RS	RS-1: 4	8.0'-48.3', qu	=5,015 psi, G	SI=40-60		
685	685.1	57.3	5.0	1:58/1.0 1:58/1.0 1:55/1.0 1:43/1.0		(3.3)					- - -							
	680.1	62.3	0.0	1:42/1.0 1:43/1.0 1:52/1.0 2:28/1.0	100%	66%					- - - - 680.1							62.3
	-											Boring Terminated	ed at E		Ift in CRYST & SCHIST)	ALLINE R	OCK (BIO	ΓΙΤΕ
	-										- - -		1.	No Surficial Orga	otes: anic Soil: 0.0-	0.2'		
	-	<u> </u>									_	2.	. Harde	er Drilling indi 3. Auger Re	fusal at 43.2'			
		<u> </u>									_	5. 0 HR Water Lev	vel Not		oring at 43.3' ue to Water b	eing intro	duced for c	oring
	-	<u> </u>									_					Ü		
		‡									-							
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CORE PHOTOGRAPHS:

BR-0043 I 67043.1.1

B1-A: -L- Station 25+84, 50' LT



							B	<u>ORE L</u>	<u>UG</u>				
WBS	67043	3.1.1			TI	P BR-0043	COUNT	Y ROCKING	SHAM			GEOLOGIST C. Ranieri	
SITE	DESCR	IPTION	l Rep	lace E	Bridge	780151 on US 158/N	C14 over	US 29					GROUND WTR (ft)
BOR	ING NO.	B1-0	;		S	TATION 25+81		OFFSET 7	ft LT			ALIGNMENT -L-	0 HR. NM
	LAR ELE				- 1	OTAL DEPTH 59.3 f		NORTHING	950,6	36		EASTING 1,815,228	24 HR. FIAD
DRILL	_RIG/HAI	VIMER E	FF./DA	TE F8	R2175	CME-55 97% 04/30/2021			DRILL N	NETHO	D N	V Casing W/SPT & Core HAMIN	IER TYPE Automatic
DRIL	LER S	. Davis			S	TART DATE 06/23/2	2	COMP. DAT	E 06/2	23/22		SURFACE WATER DEPTH N	/A
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	0.5ft	UNT 0.5ft	4	PER FOOT	75 100	SAMP. NO.	MOI	L O G	SOIL AND ROCK DESC	CRIPTION DEPTH (ft)
745												_	
740	741.4	0.0	WOH	1	1	2				D		741.4 GROUND SURFA ROADWAY EMBAN 739.4 Red-Tan, Fine Sandy CLAY	KMENT
	737.9	3.5										Mica and Trace G	
705	-	_	WOH	1	2	3				М	ŀ	RESIDUAL Yellow-Tan-Brown, Fine Sa	
735		<u> </u>				1		1				_ with Trace Mic	ca ca
	732.9 -	8.5	4	4	5					w			
730	_	‡										-	
	727.9	13.5	3	5	7	: 1::: ::::				w	F		
725	-	Ī				12· · · · · · · · · · · · · · · · · · ·				vv	F		
	- 722.7 -	18.7									E	-	
	-	10.7	3	5	7	12				W	E		
720	_	_				 		+			Ŀ	-	
	717.7 -	23.7	3	5	7					l w			
715	_	_				12				''		_	
	- 712.7 -	28.7				::\:: ::::							
740			4	6	8	14				W			
710	_	-										-	
	707.7 - -	33.7	3	6	10					l w			
705	705.2	36.2	60/0.1				· · · ·	60/0.1				705.2 -705.1 CRYSTALLINE R	36.2 OCK 36.3
	-	 	00/0.1									Light Gray to Dark Gray (BIC and SCHIST)	OTITE GNEISS
700	-	<u> </u>										and Schilor,	'
700	-	<u> </u>										-	
	-	ļ.							DC 1			697.1 Light Gray to Dark Gray (BIO	OTITE GNEISS
695	_	ļ.							RS-2	1		and SCHIST))
	-	F											
690	-	E										_	
	-	E						1 : : : :				-	
		E										687.1 Light Gray to Dark Gray (BIO	DTITE GNEISS
685	_	<u> </u>						+				_ and SCHIST)	
		<u> </u>										682.1	59.3
	-	<u> </u>										Boring Terminated at Eleva CRYSTALLINE ROCK (BIOT SCHIST)	tion 682.1 ft in FITE GNEISS &
	-	E									F	Notes:	
	- - - - -										-	1. Tricone Bit Refusa 2. Start Coring at 3. 0 HR Water Level Not M Water being introduced	36.3' easured due to
	-	F										-	
	-	‡											
		t									1 h		

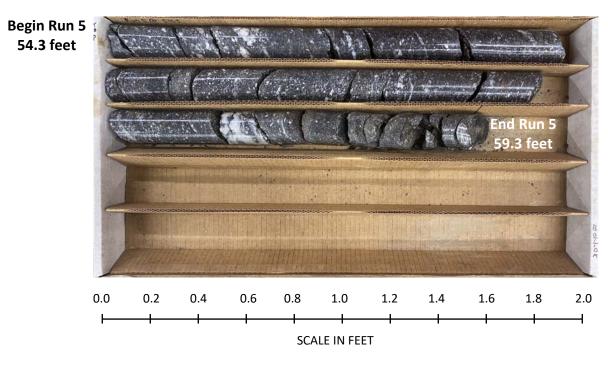
									<u></u>	U	ORE LOG	
WBS	67043	3.1.1			TIP	BR-0	043	C	OUNT	Υ	ROCKINGHAM GEOLOGIST C. Ranieri	
SITE	DESCR	IPTION	Rep	lace Brid	Ť		on US 158	3/NC1	4 over	_		R (ft)
BOR	NG NO	B1-C	;		STA	TION	25+81			0		NM
	AR ELI				<u> </u>		PTH 59			N		IAD
DRILL	RIG/HA	MMER E	FF./DA	TE F&R2	2175 CIV	1E-55 97	7% 04/30/2	021		_	DRILL METHOD NW Casing W/SPT & Core HAMMER TYPE Automa	atic
DRIL	LER S	. Davis			STAI	RT DA	TE 06/2	3/22		С	COMP. DATE 06/23/22 SURFACE WATER DEPTH N/A	
COR	E SIZE	NQ					N 23.0 f					
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	UN RQD (ft) %	SAMP. NO.	STR REC. (ft) %	RQD (ft) %	L O G	DESCRIPTION AND REMARKS	TH (ft)
7/05/51	705.1	36.3	0.0	0.04/4.0	(0.0)	(4.5)		(7.4)	(4.0)	-	Begin Coring @ 36.3 ft	20.0
700	702.1	t	5.0	2:04/1.0 2:37/1.0 1:39/1.0 1:44/1.0 1:46/1.0	(3.0) 100% (4.4) 88%	(1.5) 50% (3.1) 62%		(7.4) 93%	(4.6) 58%		705.1 Light Gray to Dark Gray, Fresh to Moderate Weathering, Very Hard to Medium Hard (BIOTITE GNEISS and SCHIST) with Close to Very Close Fracture Spacing GSI=45-60	36.3
100	697.1	44.3	5.0	2:00/1.0 2:26/1.0 1:43/1.0				(0.5)	(0.7)	No.	697.1	44.3
695	692.1	49.3	5.0	2:25/1.0 1:55/1.0 1:32/1.0 2:05/1.0 2:44/1.0	90%	(1.8) 36%	RS-2	(9.5) 95%	(3.7) 37%		Light Gray to Dark Gray, Fresh to Moderate Weathering, Very Hard to Medium Hard (BIOTITE GNEISS & SCHIST) with Close to Very Close Fracture Spacing RS-2: 44.6'-44.9', qu=6,566 psi, GSI=40-55	
690	687.1	54.3	5.0	1:53/1.0 1:45/1.0 1:47/1.0 1:59/1.0	(5.0) 100%	(1.9) 38%				No. of States	687.1	54.3
685	- - -	<u></u>	5.0	1:46/1.0 1:56/1.0 1:49/1.0 1:44/1.0 1:56/1.0	(5.0) 100%	(3.2) 64%		(5.0) 100%	(3.2) 64%		Light Gray to Dark Gray, Fresh to Moderate Weathering, Very Hard to Medium Hard (BIOTITE GNEISS and SCHIST) with Close to Very Close Fracture Spacing GSI=45-60	
	682.1	59.3		1:53/1.0							Boring Terminated at Elevation 682.1 ft in CRYSTALLINE ROCK (BIOTITE GNEISS & SCHIST)	59.3
											Notes: 1. Tricone Bit Refusal at 36.2' 2. Start Coring at 36.3' 3. 0 HR Water Level Not Measured due to Water being introduced for coring	



CORE PHOTOGRAPHS: BR-0043 I 67043.1.1

B1-C:-L- Station 25+81, 7' LT





Begin Run 3 44.3 feet



SHEET 15

GEOTECHNICAL BORING REPORT BORE LOG

							D	<u>URE L</u>	UG				
WBS	67043	3.1.1			TII	P BR-0043	COUNT	Y ROCKIN	GHAM			GEOLOGIST C. Ranieri	
SITE	DESCR	IPTION	l Rep	olace B	ridge	780151 on US 15	3/NC14 over	US 29					GROUND WTR (ft)
BOR	ING NO.	B1-E	3		ST	FATION 25+85		OFFSET	28 ft RT			ALIGNMENT -L-	0 HR. NM
COL	LAR ELI	EV . 74	42.3 ft		TC	OTAL DEPTH 65	8 ft	NORTHING	950,6	01		EASTING 1,815,224	24 HR. 17.9
DRILI	RIG/HA	MMER E	FF./DA	TE F&	R2175	CME-55 97% 04/30/2)21		DRILL N	METHO	D M	W Casing W/SPT & Core HAMM	ER TYPE Automatic
DRIL	LER S	. Davis	;		ST	TART DATE 06/2	8/22	COMP. DA	TE 06/2	28/22		SURFACE WATER DEPTH N/	Ά
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft	O.5ft	BLOV 0 25	/S PER FOOT	75 100	SAMP. NO.	MOI	L O G	SOIL AND ROCK DESC ELEV. (ft)	CRIPTION DEPTH (ft)
745	-	<u> </u>									_	<u>-</u>	
	742.3	0.0	1	2	3	T ^e				М		742.3 GROUND SURFA	
740	700 0	ļ	1			9 5						= 740.3 Red-Brown, Fine to Coarse S with Trace Mic	andy SILT (A-4) <u>2</u> .0
	738.8 -	3.5	3	5	5	10				М		RESIDUAL	
735	:	‡										Tan-White, Silty Fine to C (A-2-4) with Trace	Mica 7.0
100	734.1	8.2	3	4	6					. .		Orange-Tan-Brown, Micaced SILT (A-4) with Traced	us. Fine Sandy
		‡		+	١ '	10				M		· OILT (A-7) WITH HAC	o miou
730	700.4	1,,,										730.3 Orange-Tan-Brown-White	Silty Fine to
	729.1	13.2	4	6	8	14				w		Coarse SAND (A-2-4) with T Quartz Fragmer	race Mica and
705		<u> </u>									-	. Qualtz Flagillei	its
725	724.1	18.2	ļ	14	16	\\\\\\					-	-	
		‡	5	14	16	30				W			
720	_	Ł				/					_	_	
	719.1	23.2	6	8	12					l w			
		-										•	
715	714.1	28.2										-	
			21	27	23		50			W		•	
710		‡				:::: :;/:	. : : : :					•	
7.10	709.1	33.2	7	7	9	1						- ·	
	-	‡	'	,		· · • • 16 · · · ·				W		•	
705	704.4	<u> </u>										-	
	704.1	38.2	28	50	50/0.3	:: !++::	-+	100/0			77	- 703.6 - WEATHERED RO	38.7 OCK
700		‡						100/0.8				Orange-Brown-White (BIOTI)	TE GNEISS and
700	699.1	43.2	100/0										
	697.5	44.8	100/0.4	1				. 100/0.4	3			- 697.5 - CRYSTALLINE R	44.8
695	_	Ł	00/0.0									Light Gray-White to Dark G	Gray (BIOTITE
	-	ł										GNEISS and SCH	1151)
		-										•	
690	-	F	1					+				: -	
		F							RS-3	1		•	
685		F										•	
] -	F	1									- ·	
	-	Ŧ	1									- 681.5	60.8
680	_	ļ.	1						RS-4	1		Light Gray-White to Dark G GNEISS and SCH	Gray (BIOTITE IIST)
		‡										•	,
	-	 	\vdash						1			- 676.5 Boring Terminated at Eleva	65.8 tion 676.5 ft in
	-	‡										CRYSTALLINE ROCK (BIOT SCHIST)	TITE GNEISS &
	:	‡	1									Notes:	
	-	‡	1									1. Tricone Bit Refusal	
	-	t	1								[2. Start Coring at 3. 0hr water level not measur	ed due to water
	-	ł									F	being introduced for	coring
		Τ	1	1					1	I	ı h	•	

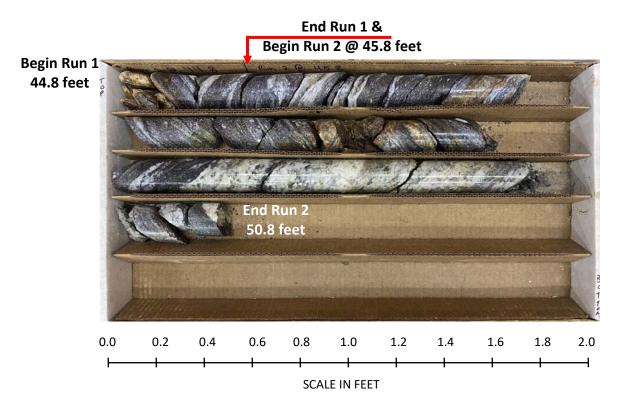
									C	U	KE L	UG				
WBS	67043.1.	.1			TIP	BR-0	043	С	OUNT	Y F	ROCKIN	GHAM	GEOLOGIST C. Ranier	i	1	
	DESCRIPT		Rep	lace Brid				8/NC1	4 over	_						ID WTR (ft)
BOR	ING NO. E	31-B			-		25+85			OF	FSET 2	28 ft RT	ALIGNMENT -L-		0 HR.	NM
	LAR ELEV.				1		PTH 65			NC	RTHING	950,601	EASTING 1,815,224		24 HR.	17.9
DRIL	L RIG/HAMM	ER EF	F./DA	TE F&R2	175 CIV	E -55 97	7% 04/30/2	021				DRILL METHOD	VW Casing W/SPT & Core	HAMM	ER TYPE	Automatic
DRIL	LER S. D	avis			STA	RT DA	TE 06/2	28/22		CC	MP. DA	TE 06/28/22	SURFACE WATER DEPT	TH N/	Α	
COR	E SIZE NO	Q					N 21.01									
ELEV (ft)		PTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP. NO.	REC. (ft)	RQD (ft) %	L O G	ELEV. (f	t)	DESCRIPTION AND REMARKS			DEPTH (ft)
697.5	697.5 /	18	4.0	N-00/0 0	(4.0)	(0.0)		(40.0)	(4.0)		007.5		Begin Coring @ 44.8 ft			44.0
695		4.8 5.8 60.8	5.0	N=60/0.0 \1:40/1.0 1:22/1.0 1:22/1.0 1;20/1.0 1:55/1.0 2:31/1.0	(100%) (4.6) 92%	(0.0) 0% / (1.4) 28%		(12.8) 80%	(4.3) 27%		697.5 - - -	Medium Hard (Bl	CRYSTALLINE ROCK Dark Gray, Fresh to Moderate W OTITE GNEISS and SCHIST) with Fracture Spacing 3-3: 53.0'-53.3', qu=8,452 psi, GSI	n Close t		
690	686.5 - 5	55.8	5.0	1:58/1.0 1:31/1.0 1:24/1.0 1:24/1.0 1:46/1.0	(4.3) 86%	(1.8) 36%	RS-3	7								
685	681.5 + 6	60.8	5.0	1:26/1.0 1:30/1.0 1:12/1.0 1:24/1.0 3;55/1.0	(2.9) 58%	(1.1) 22%					- - - 681.5					60.8
680	676.5 + 6	5.8	5.0	2:11/1.0 1:57/1.0 2:07/1.0 1:59/1.0 2:09/1.0	(5.0) 100%	(2.6) 52%	RS-4	(5.0) 100%	(2.6) 52%		- - - - 676.5	Medium Hard (BI RS	Dark Gray, Fresh to Moderate W OTITE GNEISS and SCHIST) with Fracture Spacing 1-4: 60.9'-61.2', qu=6,608 psi, GSI	n Close t =50-65	to Very Clo	ose 65.8
												·	at Elevation 676.5 ft in CRYSTAL GNEISS & SCHIST) Notes: 1. Tricone Bit Refusal at 44.8' 2. Start Coring at 44.8' not measured due to water being		·	

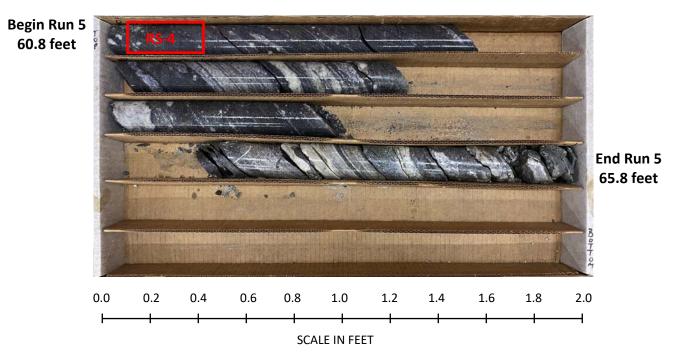


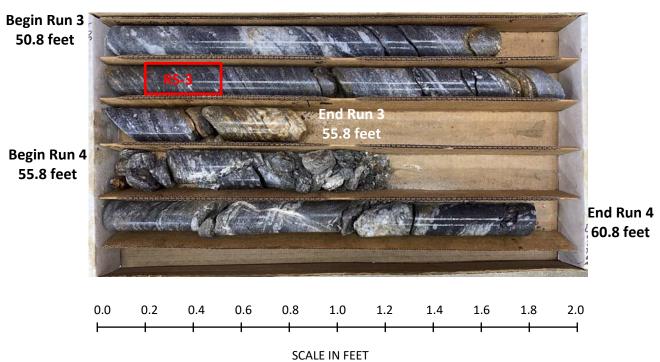
CORE PHOTOGRAPHS:

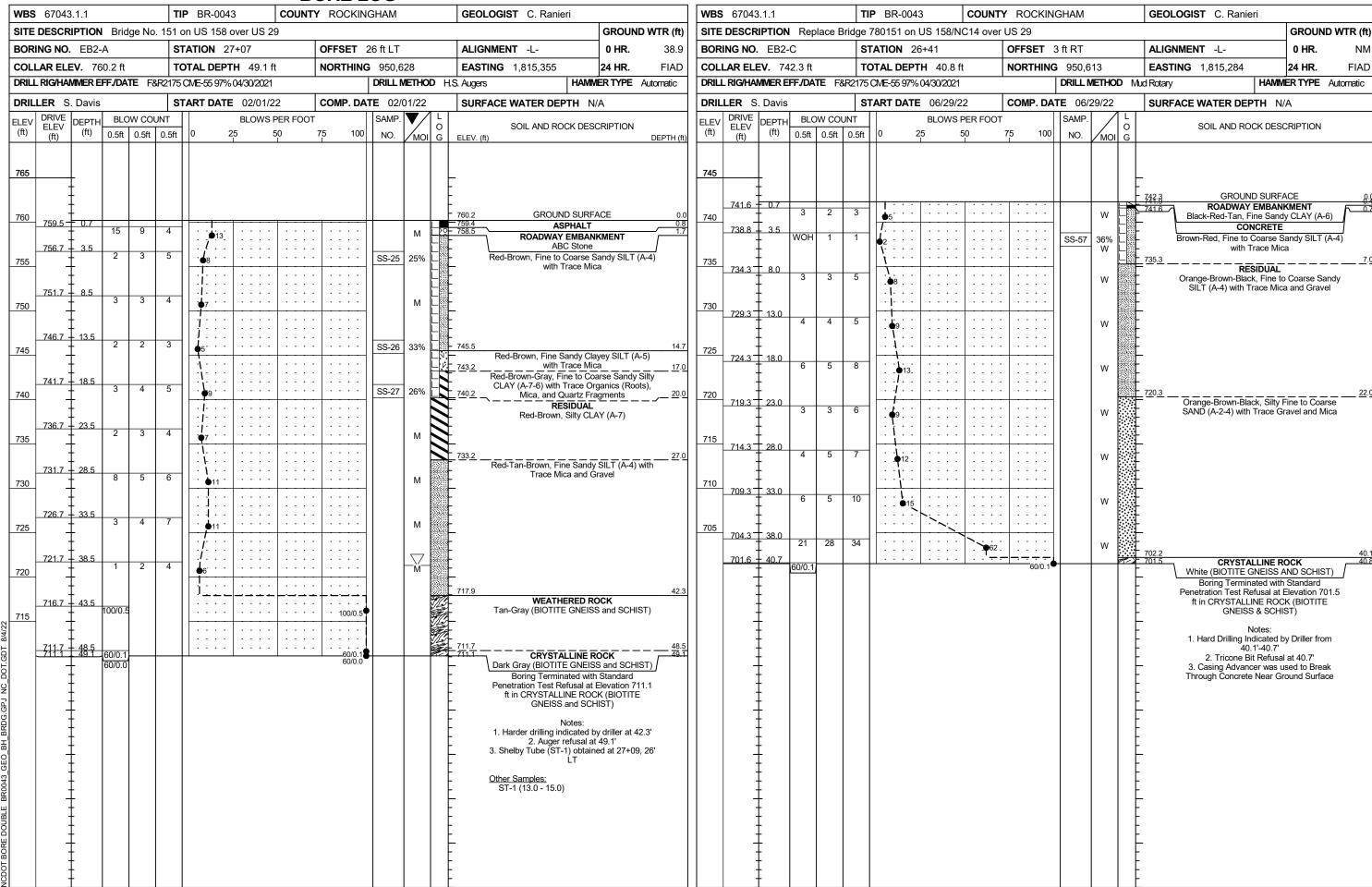
BR-0043 I 67043.1.1

B1-B:-L-Station 25+85, 28' RT









SHEET 18

WBS	67043	3.1.1			TI	P BR-0	043		COUNT	Y RC	CKIN	GHAM			GEOL	OGIST C. Ranie	ri		
SITE	DESCR	IPTION	I Brid	lge No	o. 151 d	on US 15	58 ov	er US 2	9									GROUN	D WTR (ft)
BOR	NG NO.	. EB2-	В		ST	TATION	26+	94		OFFS	SET 2	28 ft RT			ALIGN	IMENT -L-		0 HR.	Dry
COLI	AR ELE	EV. 76	31.6 ft		TC	OTAL DE	PTH	53.4 f	t	NOR'	THING	950,5			1	ING 1,815,330		24 HR.	FIAD
DRILL	. RIG/HAI	MMER E	FF./DA	TE F	&R2175	CME-55 9	7%04	1/30/2021				DRILL I	METHO	D H.	S. Augers		HAMM	ER TYPE	Automatic
DRIL	LER S	. Davis			ST	TART DA	TE	02/02/2	22	СОМ	P. DA	TE 02/	02/22		SURF	ACE WATER DEP	TH N	'A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	0.5ft	UNT 0.5ft	0	25		PER FOO ⁻ 50	Γ 75	100	SAMP. NO.	MOI	L O G	ELEV. (ft)	SOIL AND RO	CK DES	CRIPTION	DEPTH (ft
765	- - - 761.0	0.6				- 1			1						- . 761.6 . 761.0		D SURFA	ACE.	0.0
760	_	+	12	5	4	9-			ļ : : : :				М		- · 758.6	ROADWAY	EMBAN	KMENT	3.0
	758.6	3.0	2	3	4	. · · · · · · · · · · · · · · · · ·				.	::		М		. 756.0	AB0 Red-Brown, Fine	C Stone Sandv SI	LT (A-4) wi	
755	-	Ŧ					-			.							ce Mica	()	
750	753.1 -	8.5	2	3	4	· · · · · · · · · · · · · · · · · · ·							М		-				
700	748.1	13.5	1	2	3	1				: : :			M		-				45.0
745	-	Ī				٧٥		 			: :		"		<u>746.6</u>	Red-Brown, Silty (SIDUAL	. — — — — .7) with Tra	15.0
	743.1	18.5				/.				.					· 742.6	Quartz	Fragmer	nts	19.0
	-	<u> </u>	3	7	8		15			.			М			Red-Orange, Silty (A-2-4) with Tra	Fine to (Coarse SAN	ND
740	-	ł				 	-							<u> </u>	739.6	Fra	gments		<u></u>
	738.1	23.5	2	4	5					.			М	F	•	Red-Orange and T SILT (A-4) with T	an-Brow race Mica	n, Fine Sar a and Quar	ndy tz
735	-	Ŧ					-			.	: :		""			Fra	gments		
	733.1	T 28.5				-								F					
	-		2	4	5	. 9.	:			: : :			М	F					
730	-	Ŧ				 	-			4				F	-				
	728.1	33.5	5	6	6	• 1 •	.			: : :	: :		M	F	•				
725	-	‡				• • • 12				.			IVI		•				
720	723.1	38.5				1								ļ	-				
	123.1	30.3	3	3	6	. . ● 9 .	:			.			М						
720	_	‡				\ \ \				-					-				
	718.1	43.5	4	7	9	j':: $ $: : :	: :		l	ļ					
745	-	‡	4	′	9	•	16			. .			M		•				
715		<u> </u>					-								-				
	713.1	48.5	4	5	10		15			.			w						
710	-	‡					<u>:</u>	 	<u> </u>	<u> </u>	<u>:</u>				- 709.6				52.0
	708.3	53.3	60/0.1			:	<u> </u>			-7	60/0.1			972	708.3	WEATHI (BIOTITE GNE			53.3
			60/0.1								60/0.1				- 7082_/	Harder drilling ind 2. Auger r 3. Water observing immediate	LLINE RESIDENT AND ALL STATES AND AL	OCK SCHIST) Standard Elevation 7 K (BIOTITE IIST) y driller at 5 53.3' ger at 45.5' Irilling	08.2 = 52.0'



 PROJECT REFERENCE NO.
 SHEET NO.

 67043.1.1
 19

County: Rockingham

Description: Bridge No. 151 on US 158 over US 29

	SOIL TEST RESULTS															
SAMPLE	-L- STATION	LOCATION	OFFSET *	DEPTH	AASHTO CLASS.	L.L.	P.I.		% BY W	/EIGHT		% PA	ASSING (SIE	%	%	
NO.	-L- STATION	LOCATION	OFFSET	INTERVAL		L.L.	P.I.	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-34	24+68	EB1-A	27' LT	3.5-5.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	24.7	NT
SS-35	24+68	EB1-A	27' LT	8.5-10.0	A-7-5 (13)	61	20	17.7	26.0	18.5	37.8	99.9	95.5	61.6	NT	NT
SS-47	25+22	EB1-C	6' LT	3.5-5.0	A-4 (0)	NP	NP	22.4	30.7	18.6	28.3	94.8	81.7	51.0	37.2	NT
SS-49	24+54	EB1-B	28' RT	3.5-5.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	28.6	NT
SS-50	24+54	EB1-B	28' RT	8.5-10.0	A-7-5 (16)	60	25	16.5	25.1	14.7	43.7	99.7	91.0	62.7	NT	NT
ST-2	24+52	EB1-B	28' RT	8.0-10.0	A-7-5 (13)	61	17	9.9	32.8	20.8	36.5	100.0	95.5	64.0	31.6	NT
SS-25	27+07	EB2-A	26' LT	3.5-5.0	A-4 (0)	NP	NP	15.5	40.9	21.9	21.7	99.2	91.6	51.5	24.9	NT
SS-26	27+07	EB2-A	26' LT	14.7-15.0	ND	55	9	NT	NT	NT	NT	NT	NT	NT	32.9	NT
SS-27	27+07	EB2-A	26' LT	18.5-20.0	A-7-6 (8)	44	21	19.8	30.9	13.0	36.3	96.6	86.3	51.9	26.4	NT
ST-1	27+09	EB2-A	26' LT	13.0-15.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SS-57	26+41	EB2- C	3' RT	3.5-5.0	A-4 (0)	NP	NP	27.7	25.3	19.4	27.6	96.1	77.3	48.9	35.6	NT

NP = Not Plastic

NT = Not Tested

ND = Not Determined

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C.Wang, P.E.

Lab Manager, Certification No. 101-02-0603

Soils Engineer



PROJECT REFERENCE NO. SHEET NO. 67043.1.1 20

County: Rockingham

Description: Bridge No. 151 on US 158 over US 29

	ROCK TEST RESULTS														
SAMPLE NO.	BORING NO.	ALIGNMENT	STATION	OFFSET	DEPTH INTERVAL	ROCK TYPE	Geologic Map Unit	Run RQD	Length (in)	Diameter (in)	Unit Weight (pcf)	Unconfined Compressive Strength (psi)	Young's Modulus E (ksi)	GSI	
RS-1	B1-A	-L-	25+84	50' Lt.	48.0 - 48.3	Biotite Gneiss and Schist	CZbg	62%	3.94	1.77	172.5	5,015	700	40-60	
RS-2	В1-С	-L-	25+81	7' Lt.	44.6 - 44.9	Biotite Gneiss and Schist	CZbg	36%	4.03	1.76	162.4	6,566	1,000	40-55	
RS-3	B1-B	-L-	25+85	28' Rt.	53.0 - 53.3	Biotite Gneiss and Schist	CZbg	36%	4.17	1.77	169.5	8,452	850	45-55	
RS-4	B-1B	-L-	25+85	28' Rt.	60.9 - 61.2	Biotite Gneiss and Schist	CZbg	52%	3.96	1.77	171.2	6,608	900	50-65	

NP = Not Plastic

NT = Not Tested

ND = Not Determined

D. Council Lab Manager, Certification No. 101-02-0603 C.Wang, P.E.

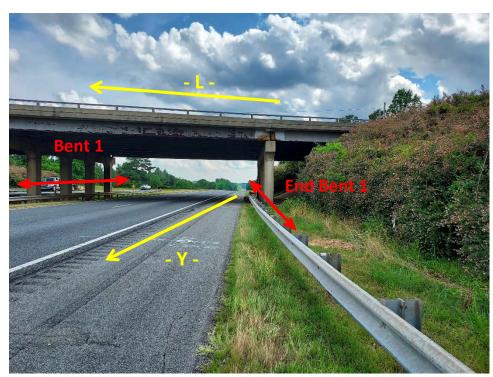
Soils Engineer



Replace Bridge 780151 on US 158/NC 14 over US 29 SITE PHOTOGRAPHS



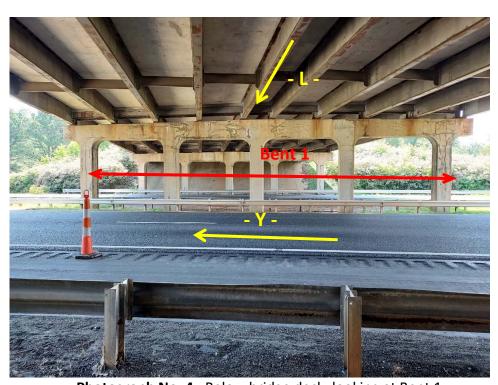
Photograph No. 1: View looking northeast at Bent 1



Photograph No. 2: View looking south along End Bent 1



Photograph No. 3: View looking south-southwest at bent 1 on bridge deck



Photograph No. 4: Below bridge deck, looking at Bent 1

-004 2 B REFERENCE **CONTENTS**

DESCRIPTION

LEGEND (SOIL & ROCK)

TITLE SHEET

SITE PLAN

PROFILE(S)

BORE LOG(S) SOIL TEST RESULTS

SHEET NO.

4-5

6-9

7043 9 **PROIEC**

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY ROCKINGHAM

SITE DESCRIPTION <u>RETAINING</u> WALL NO. 1 ON -WI-FROM 0+00 TO 2+04.14 AND RETAINING WALL ON -W2 - FROM 0 + 00 TO 2 + 01.22

STATE PROJECT REPERENCE NO. BR-0043

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 NSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991 707-680. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

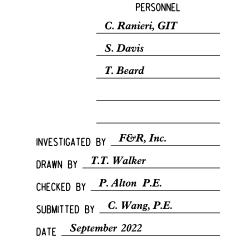
CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (INP-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 NIDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE TOTAL WITH THE ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

- NOTES:

 1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.

 2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.





Prepared in the Office of:

FROEHLING & ROBERTSON, INC.

Engineering Stability Since 1881

310 Hubert Street Raleigh, North Carolina 27603-2302 | USA T 919.828.3441 | F 919.828.5751



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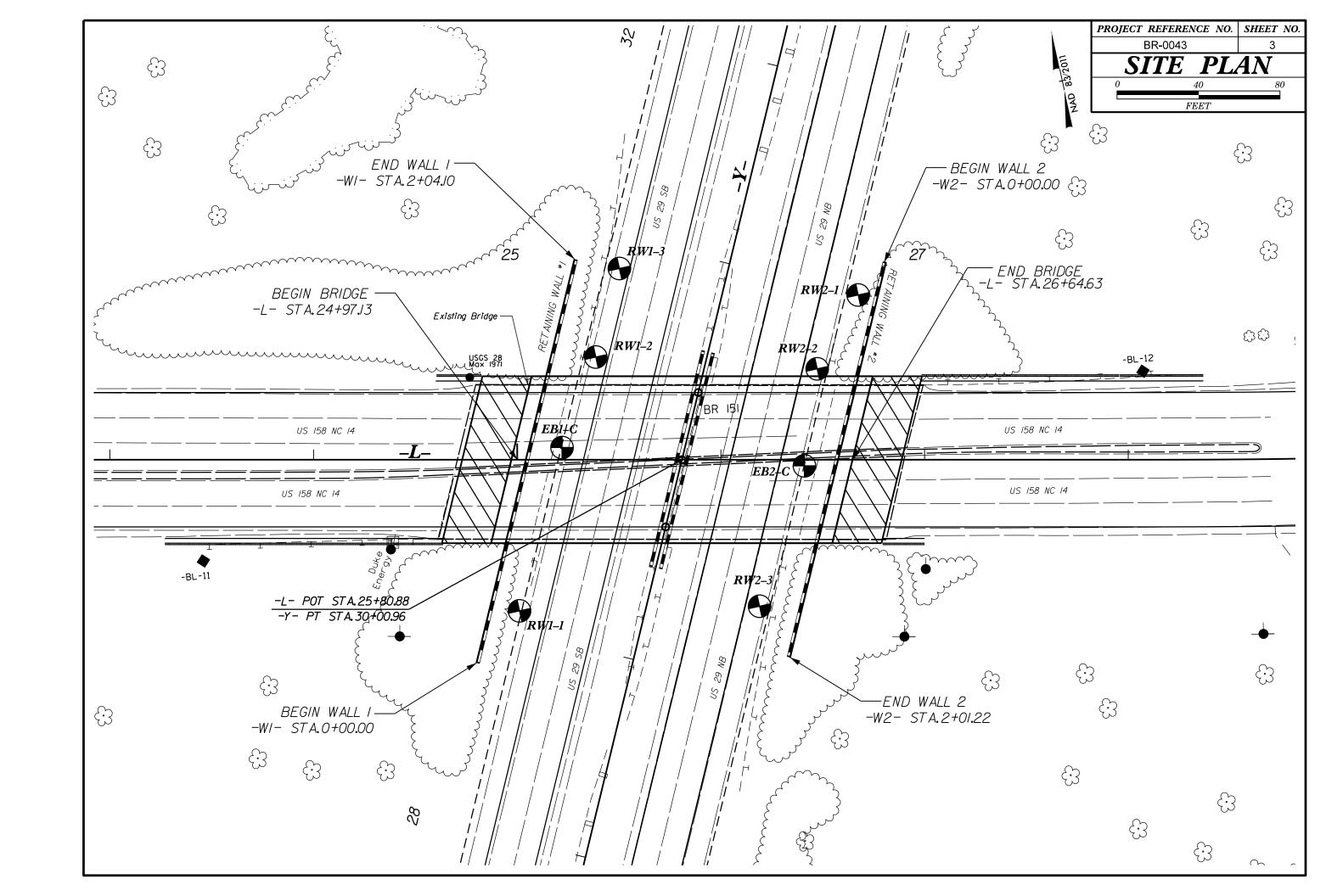
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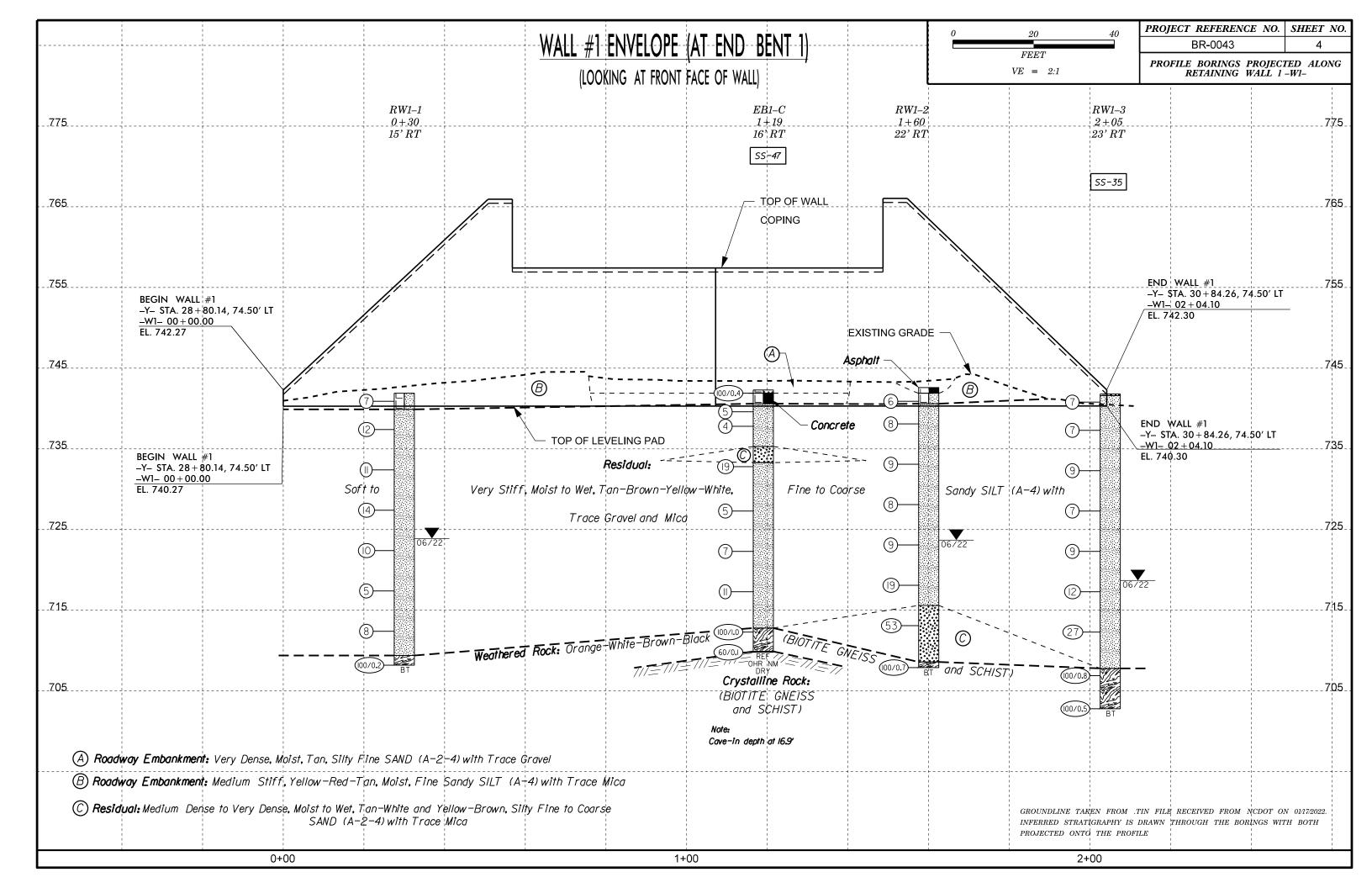
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

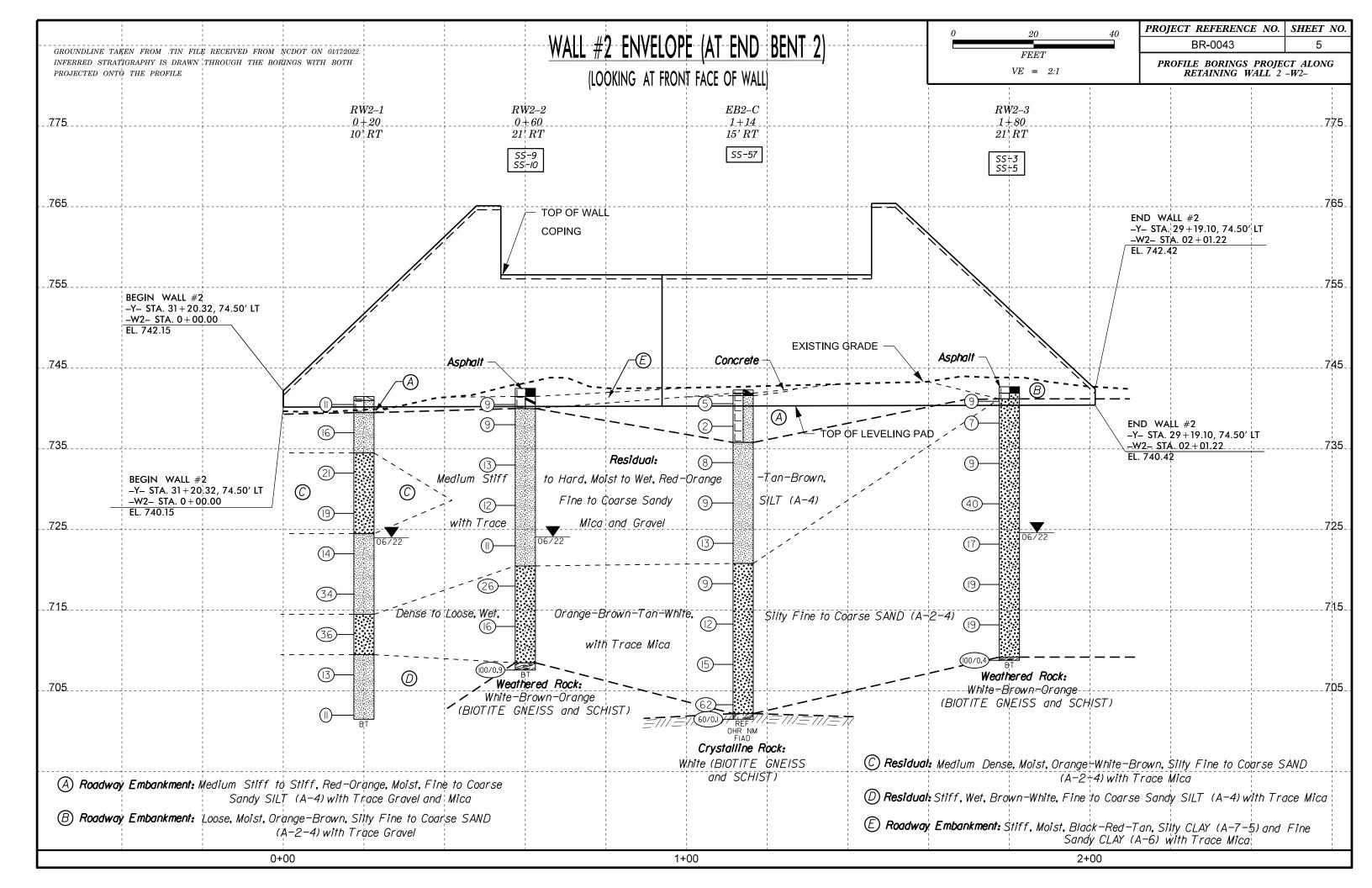
SUBSURFACE INVESTIGATION

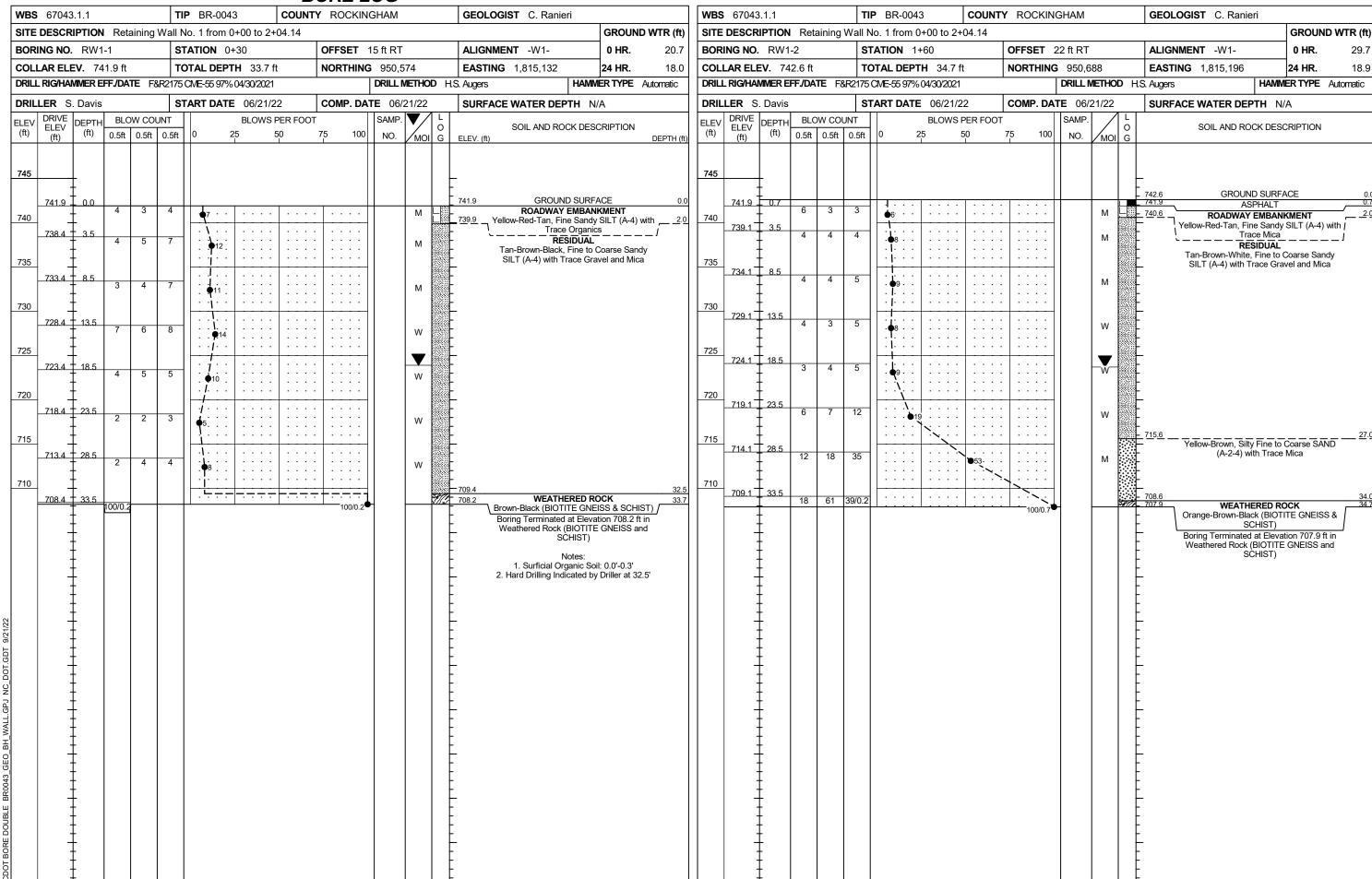
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

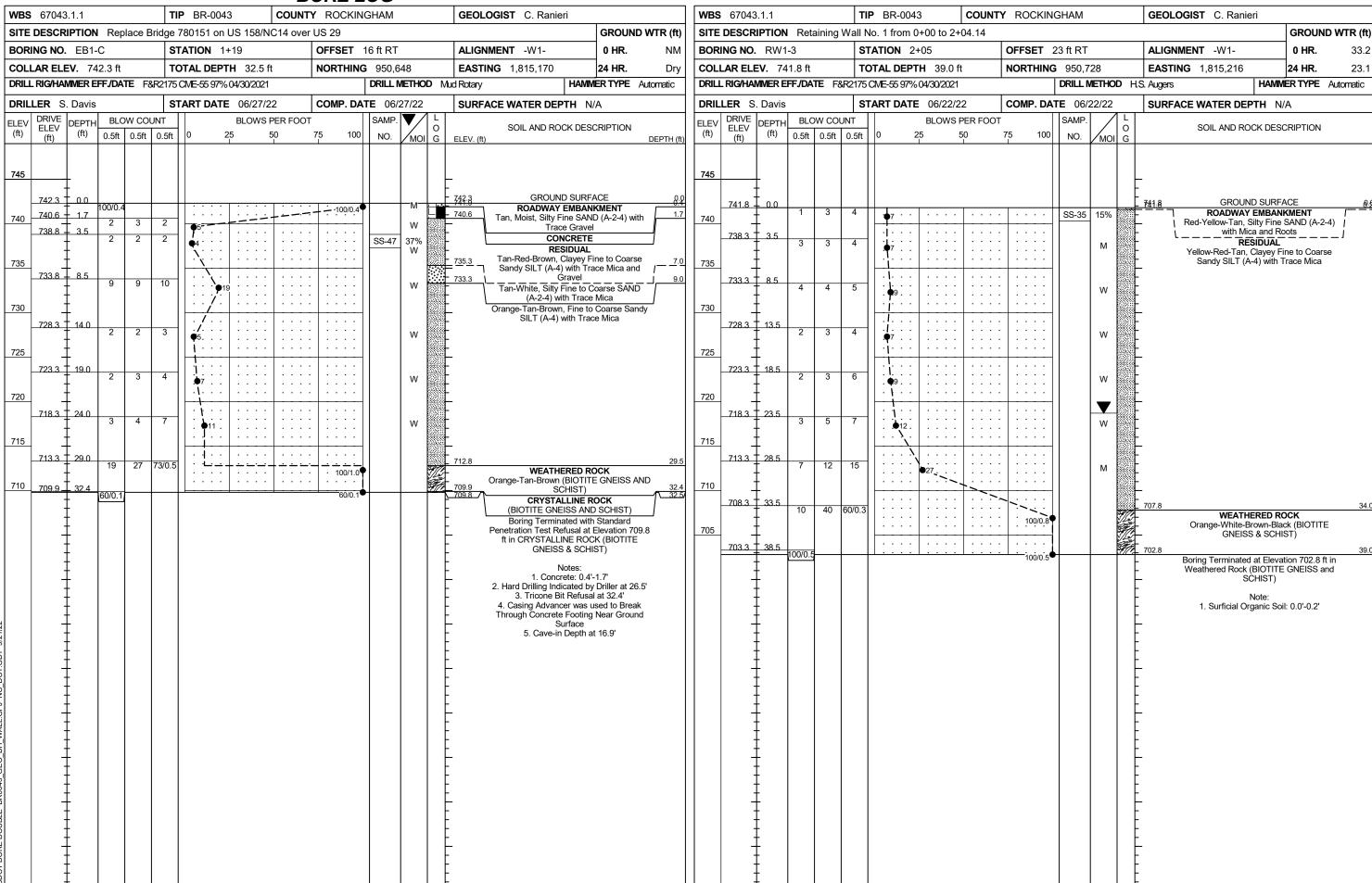
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	<u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED /// NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
CENTEDAL CRANIILI AD MATERIAL C. CILIT. CLAV MATERIAL C.	MINERALOGICAL COMPOSITION	FINE TO COARSE CRAIN ICNICALS AND METAMORPHIC POCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GREISS, GABBRO, SCHIST, ETC.	SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	NON CRYSTALLING FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
00000000000000000000000000000000000000	COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	COLLUYIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL 000000000000000000000000000000000000	₩ MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
Z PASSING SA MX SILT-MUCK,	HIGHLY COMPRESSIBLE LL > 50 PERCENTAGE OF MATERIAL	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*10 56 MX 40 36 MX 50 MX 51 MN 25 MX 2	GRANULAR SILT - CLAY	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
#200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL PASSING *40	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.	HORIZONTAL.
LL - 40 MX 41 MN 501L5 WITH	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP IU MX IU MX II MN II MN IU MX IU MX II MN II MN MODERATE ORGANIC	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE GROUND WATER	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
GROUP INDEX W W A MX 8 MX 12 MX 16 MX NU MX AMUUN IS UF SOILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MATTER STUNE FRAUS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	▼ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SOILS SOILS	▼ STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) 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	PARENT MATERIAL.
AS SUBURALE PUUR	SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 :PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS	0 11	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
PANCE OF STANDARD PANCE OF UNCONFINED	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD.SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES 'CLUNK' SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONFICENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	<u>IF TESTED, WOULD YIELD SPT REFUSAL</u>	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
(N-VALUE) (TUNS/FT-)	WITH SOIL DESCRIPTION OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.
GENERALLY VERY LOOSE GENERALLY LOOSE 4 TO 10	SOIL SYMBOL OPT ONT TEST BORING SLOPE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT AUGER BORING CONE PENETROMETER TEST	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
DENSE 30 TO 50	THAN ROADWAY EMBANKMENT TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT	— INFERRED SOIL BOUNDARY — CORE BORING ● SOUNDING ROD	(V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MN MONITORING WELL TEST BORING	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BFF</u> COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2	WITH CORE	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	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
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4	→ SPT N-VALUE TREADMETER INSTALLATION SPT N-VALUE	ALSO AN EXAMPLE.	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	- ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
U.S. STD. SIEVE SIZE 4 10 40 60 200 270		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNSUITABLE WASTE	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (SE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY 7 - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 - DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE CHIEF FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
(ATTERBERG LIMITS) DESCRIPTION OUTDE FOR FIELD MOISTONE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES I INCH	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
(SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC CEMICOLIDE DRIVING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS,) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) ATTAIN OPTIMUM MOISTURE	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING	BENCH MARK: USGS BENCH MARK STAMPED "USGS 28 MAX 1971"
"" PL L + PLASTIC LIMIT	EQUIPMENT USED ON SUBJECT PROJECT	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	ON BRIDGE WINGWALL AT THE NORTHWEST CORNER OF BRIDGE
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	■ WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	Easting: I,815,132.935, Northing: 950,691.222 ELEVATION: 763.0 FEET
SL SHRINKAGE LIMIT	CME-45C CLAY BITS X AUTOMATIC MANUAL	MODERATELY CLOSE	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6 CONTINUOUS ELIGHT AUGER	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	BRIDGE BORING ELEVATIONS OBTAINED USING USGS BENCHMARK
	X CME-55	THINLY LAMINATED < 0.008 FEET INDURATION	FIAD= FILLED IMMEDIATELY AFTER DRILLING
PLASTICITY		INDUMH I ION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	NM= NOT MEASURED
PLASTICITY INDEX (PI) ORY STRENGTH		PURRING WITH FINGER FREES NUMEROUS GRAINS.	
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST TUNG,-CARBIDE INSERTS HAND TOOLS:	FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	X CASING X W/ ADVANCER POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
	PORTABLE HOIST X TRICONE 215/6 STEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE TUNG,-CARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER,	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT VANE SHEAR TEST	SHARP HAMMER BLOWS REGULDED TO RREAK SAMPLE.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SHAMP HAMMER BLOWS REGULARD TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14

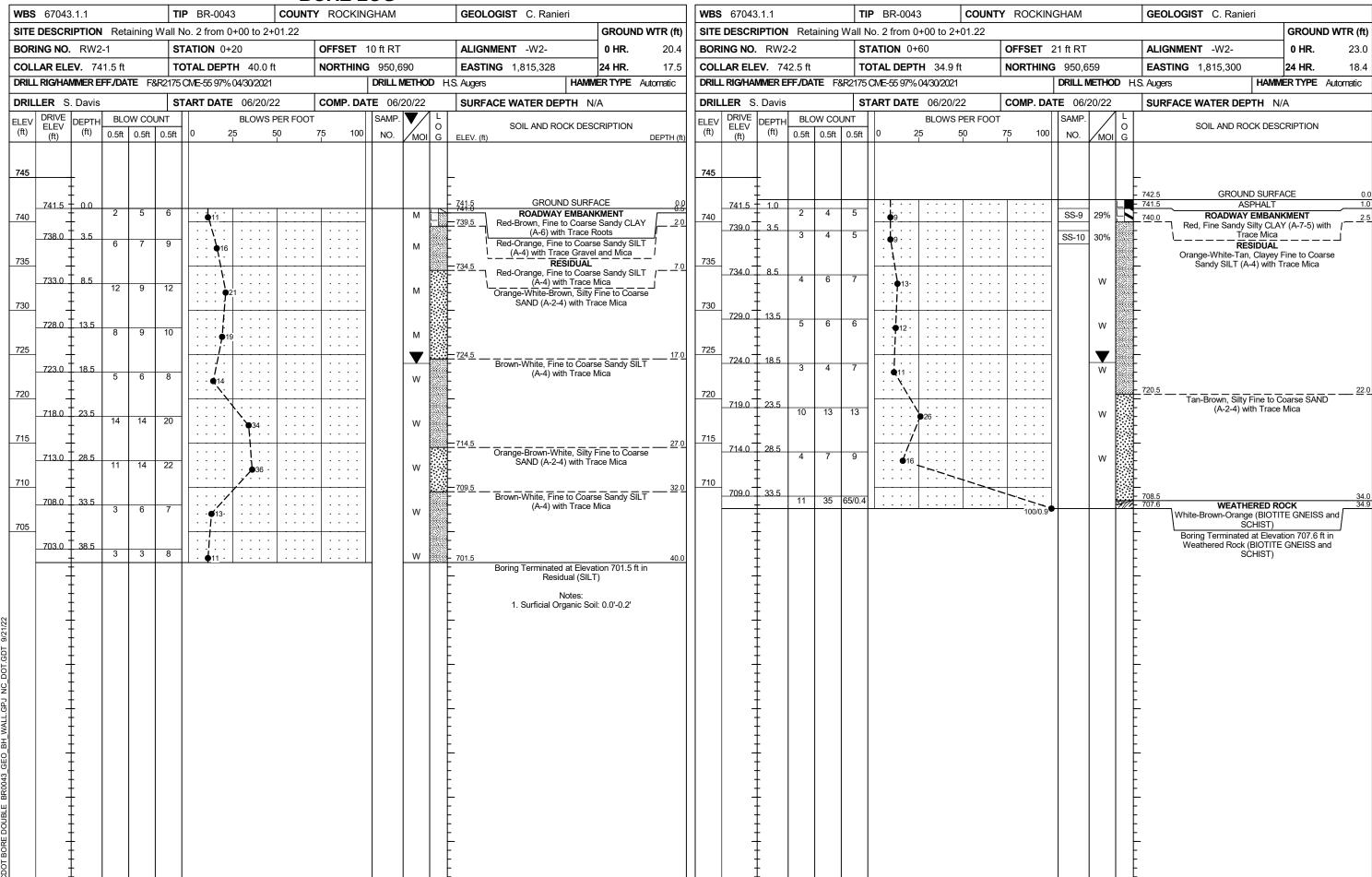


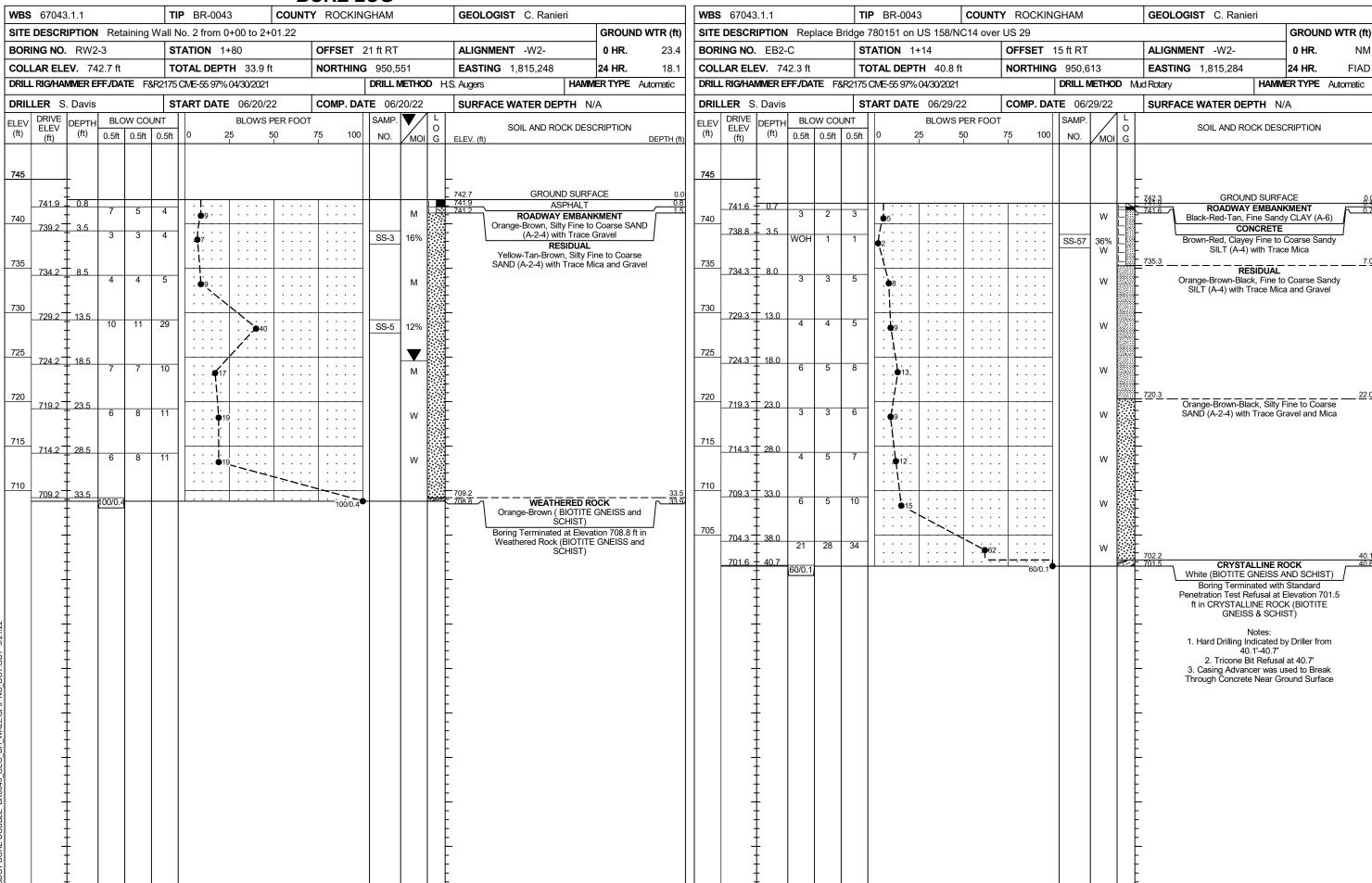














PROJECT REFERENCE NO. SHEET NO. 67043.1.1 10

County: Rockingham

Description:Retaining Wall No. 1 from 0+00 to 2+04.14 and Retaining Wall No. 2 from 0+00 to 2+01.22

	SOIL TEST RESULTS															
SAMPLE	STATION	LOCATION	OFFSET	DEPTH	AASHTO	, ,	P.I.		% BY W	VEIGHT		% PA	ASSING (SIE	VES)	%	%
NO.	STATION	LOCATION	OFFSET	INTERVAL(ft)	CLASS.	L.L.	F.I.	C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-47	-W1- 1+19	EB1-C	16' RT	3.5-5.0	A-4 (0)	NP	NP	22.4	30.7	18.6	28.3	94.8	81.7	51	37.2	NT
SS-35	-W1- 2+05	RW1-3	23' RT	0.2-0.8	A-4 (0)	NP	NP	28.7	34.8	21.3	15.2	96.3	78.6	42.2	15.3	NT
SS-9	-W2- 0+60	RW2-2	21' RT	1.0-2.5	A-7-5 (18)	67	21	7.8	25.4	21.5	45.3	99.7	95.9	72.1	29.3	NT
SS-10	-W2- 0+60	RW2-2	21' RT	3.5-5.0	A-4 (0)	NP	NP	10.4	51.5	16.3	21.8	99.9	95.3	46.6	30.1	NT
SS-57	-W2- 1+14	EB2- C	15' RT	3.5-5.0	A-4 (0)	NP	NP	27.7	25.3	19.4	27.6	96.1	77.3	48.9	35.6	NT
SS-3	-W2- 1+80	RW2-3	21' RT	3.5-5.0	A-2-4	NP	NP	15.3	63.3	14.4	7.0	100.0	94.6	33.2	15.6	NT
SS-5	-W2- 1+80	RW2-3	21' RT	13.5-15.0	ND	NP	NP	NT	NT	NT	NT	NT	NT	14.3	11.6	NT

NP = Not Plastic

NT = Not Tested

ND = Not Determined

C.Wang, P.E.

D. Council
Lab Manager, Certification No. 101-02-0603

Soils Engineer