

REFERENCE: SF-590090

PROJECT: BPI0.R012.1

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-590090	1	28

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

STRUCTURE

SUBSURFACE INVESTIGATION

COUNTY MECKLENBURG

PROJECT DESCRIPTION BRIDGE NO. 90 OVER SOUTH PRONG CLARKE CREEK ON SR 2442 (ASBURY CHAPEL RD)

SITE DESCRIPTION STA. 19+69 -L-

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4	PROFILE
5-7	CROSS SECTIONS
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PERSONNEL
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BRIDGER DRILLING

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SUBMITTED BY ECS SOUTHEAST, LLP
DATE FEBRUARY 2022

CAUTION NOTICE

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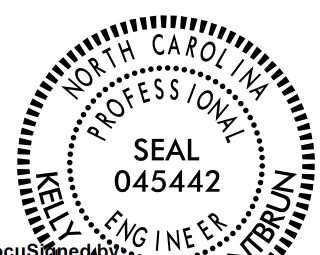
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND 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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- THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 - BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.



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02/22/2022

SIGNATURE _____ DATE _____

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS
(PAGE 1 OF 2)

SOIL DESCRIPTION										GRADATION									
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										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.									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS									
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.									
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										MINERALOGICAL COMPOSITION									
SYMBOL										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.									
% PASSING #10 #40 #200										COMPRESSIBILITY									
MATERIAL PASSING #40 LL PI										SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50									
GROUP INDEX										PERCENTAGE OF MATERIAL									
USUAL TYPES OF MAJOR MATERIALS										ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL									
GEN. RATING AS SUBGRADE										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									
CONSISTENCY OR DENSENESS										GROUND WATER									
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)										WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP									
TEXTURE OR GRAIN SIZE										MISCELLANEOUS SYMBOLS									
U.S. STD. SIEVE SIZE OPENING (MM)										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY									
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE, SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)										DIP & DIP DIRECTION OF ROCK STRUCTURES TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE									
GRAIN SIZE										RECOMMENDATION SYMBOLS									
SOIL MOISTURE - CORRELATION OF TERMS										UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK									
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										ABBREVIATIONS									
LL LIQUID LIMIT PLASTIC RANGE (PI) PL PLASTIC LIMIT OM OPTIMUM MOISTURE SHRINKAGE LIMIT SL										AR - AUGER REFUSAL MED. - MEDIUM MICA. - MICACEOUS CL. - CLAY MOD. - MODERATELY CPT - CONE PENETRATION TEST NP - NON PLASTIC CSE. - COARSE DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY									
PLASTICITY										VST - VANE SHEAR TEST WEA. - WEATHERED U - UNIT WEIGHT U _c - 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: ADVANCING TOOLS: HAMMER TYPE: CORE SIZE: HAND TOOLS:									
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.										CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING W/ ADVANCER TRICONE STEEL TEETH TRICONE TUNG-CARB. CORE BIT MUD ROTARY AUTOMATIC MANUAL -B -H -N Q2 POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST									

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SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS
(PAGE 2 OF 2)

ROCK DESCRIPTION		TERMS AND DEFINITIONS
<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>		<p>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 (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>
WEATHERED ROCK (WR)		NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)		FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)		FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)		COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.
WEATHERING		
FRESH		ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i>
SEVERE (SEV.)		ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i>
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. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i>
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 PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT		CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
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		BEDDING
TERM	SPACING	TERM THICKNESS
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED 4 FEET
WIDE	3 TO 10 FEET	THICKLY BEDDED 1.5 - 4 FEET
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED 0.16 - 1.5 FEET
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED 0.03 - 0.16 FEET
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED 0.008 - 0.03 FEET
		THINLY LAMINATED < 0.008 FEET
INDURATION		
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.		
FRIABLE		RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED		GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED		GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED		SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.
BENCH MARK: BM-2		STATION 20+69.28, 119.9' LEFT
		ELEVATION: 647.93 FEET
NOTES:		
BORINGS LOCATED USING TRIMBLE GEO7X.		
ROADWAY DESIGN FILES, .TIN, AND GPK FILE PROVIDED BY NCDOT.		
ELEVATION FOR BRIDGE BORINGS OBTAINED USING BENCHMARK BM-2 (N 607629 E 1463053)		
FIAD = FILLED IN AFTER DRILLING		
DATE: 8-15-14		

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SUBSURFACE INVESTIGATION

SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (PAGE 1 OF 2)

AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (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

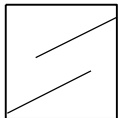
FAIR
Smooth, moderately weathered and altered surfaces

POOR
Slackensided, highly weathered surfaces with compact coatings or fillings or angular fragments

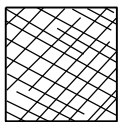
VERY POOR
Slackensided, highly weathered surfaces with soft clay coatings or fillings

DECREASING SURFACE QUALITY →

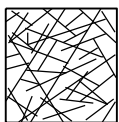
STRUCTURE



INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities



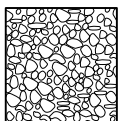
BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets



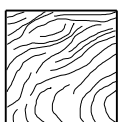
VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets



BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity



DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces



LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes

DECREASING INTERLOCKING OF ROCK PIECES
↓

90

80

70

60

50

40

30

20

10

N/A

N/A

N/A

N/A

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

**SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES
 FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (PAGE 2 OF 2)**

AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

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 GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.

SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)

VERY GOOD - Very Rough, fresh unweathered surfaces

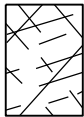
GOOD - Rough, slightly weathered surfaces

FAIR - Smooth, moderately weathered and altered surfaces

POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments

VERY POOR - Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings

COMPOSITION AND STRUCTURE



A. Thick bedded, very blocky sandstone. The effect of peltic 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.



B. Sandstone with thin inter-layers of siltstone



C. Sandstone and siltstone in similar amounts



D. Siltstone or silty shale with sandstone layers



E. Weak siltstone or clayey shale with sandstone layers

C, D, E, and G - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to **F** and **H**.



F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure



G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers



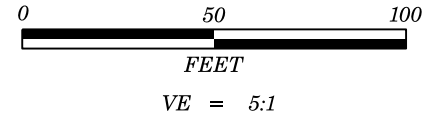
H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.

→ Means deformation after tectonic disturbance



670

-L- GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 01/17/2022. INFERRED STRATIGRAPHY IS DRAWN BORING TO BORING, WITH BOTH PROJECTED ON THE PROFILE.



PROJECT REFERENCE NO.	SHEET NO.
SF-590090	4
PROFILE BORING PROJECT ON -L- ALONG BRIDGE NO. 90	

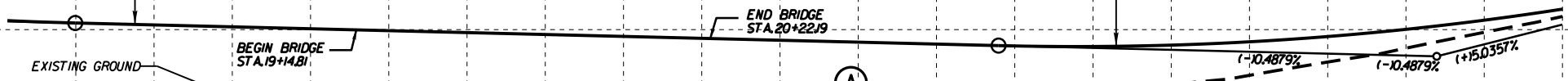
660

EB1-B 19+15 17' RT
 BI-B 19+85 8' RT
 EB2-B 20+21 14' RT

PI = 22+60.00
 EL = 653.30'
 VC = 280'
 K = 51
 DS = 35MPH

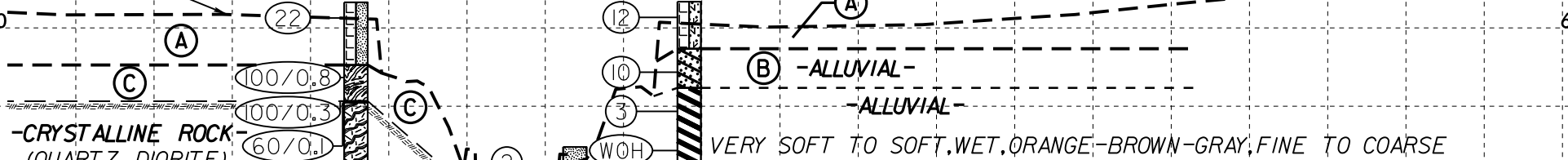
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650



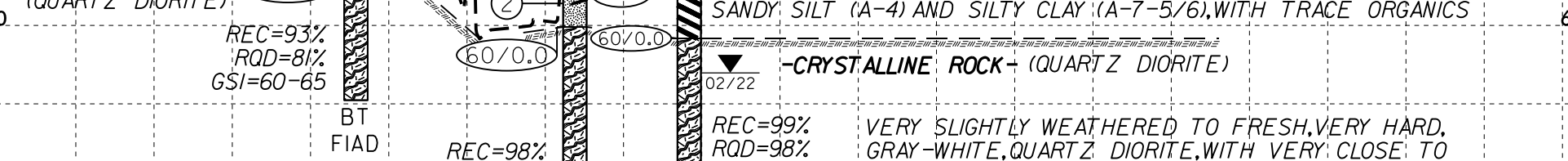
650

640



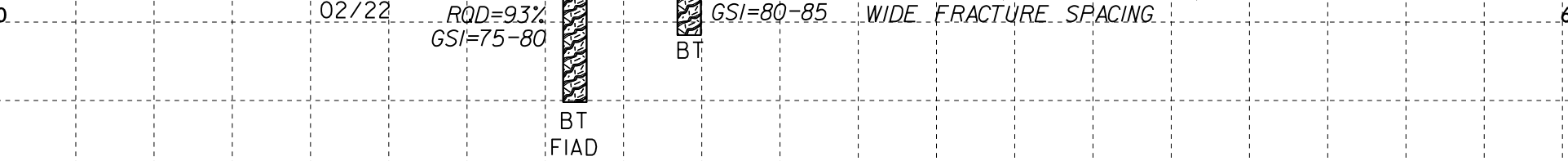
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630



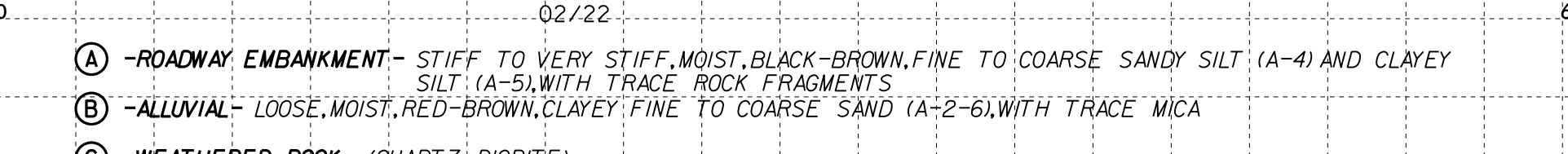
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620

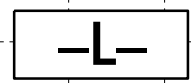


620

610



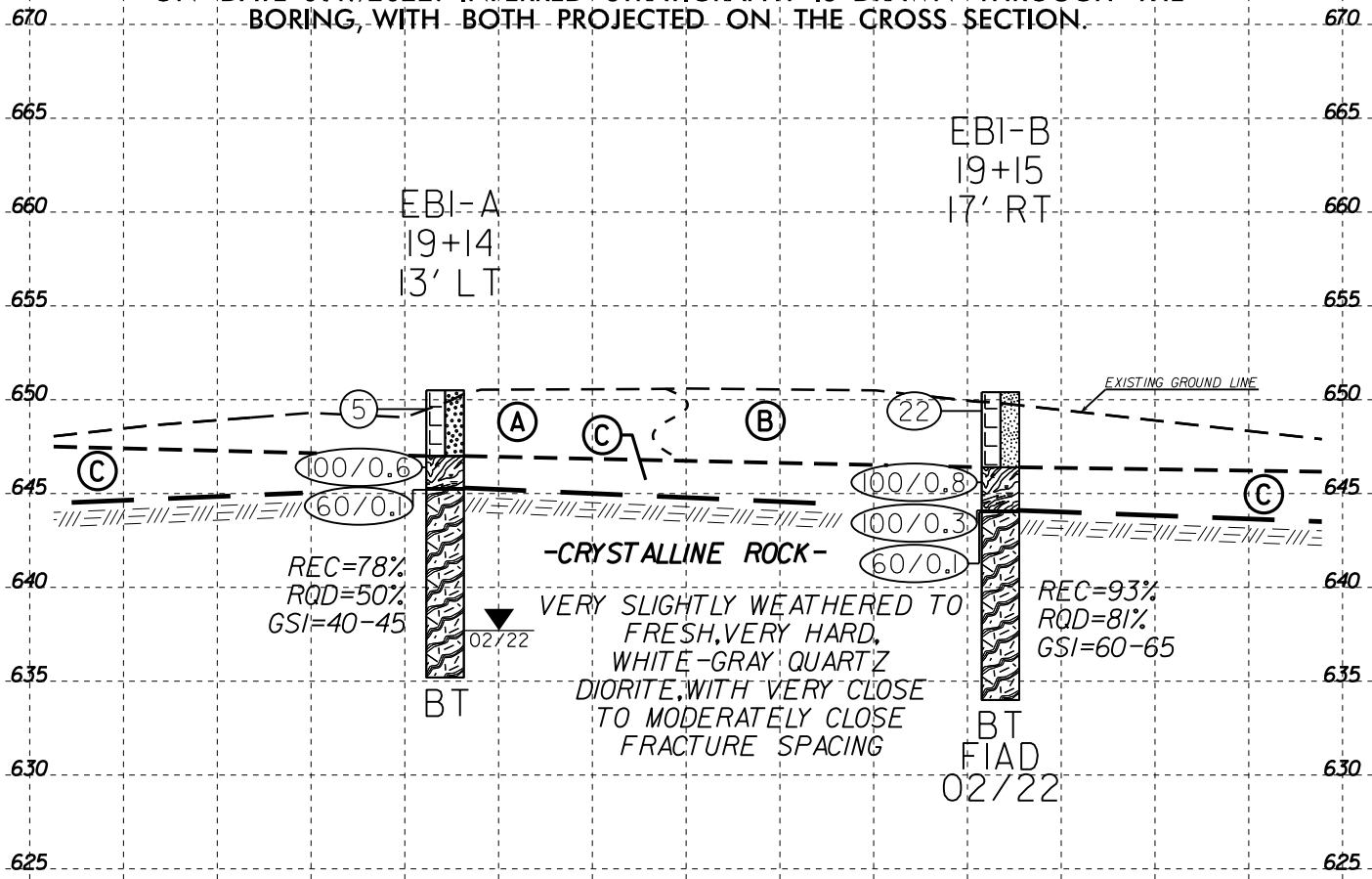
610



18+00 18+50 19+00 19+50 20+00 20+50 21+00 21+50 22+00 22+50 23+00

35 30 25 20 15 10 5 0 5 10

-L- GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 01/17/2022. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.



- (A) -ROADWAY EMBANKMENT- LOOSE, MOIST, RED-BROWN, SILTY FINE TO COARSE SAND (A-2-4)
- (B) -ROADWAY EMBANKMENT- VERY STIFF, MOIST, BLACK-BROWN, FINE TO COARSE SANDY SILT (A-4), WITH TRACE ROCK FRAGMENTS
- (C) -WEATHERED ROCK- (QUARTZ DIORITE)

19 + 14.81



35 30 25 20 15 10 5 0 5 10 15 20 25 30 35

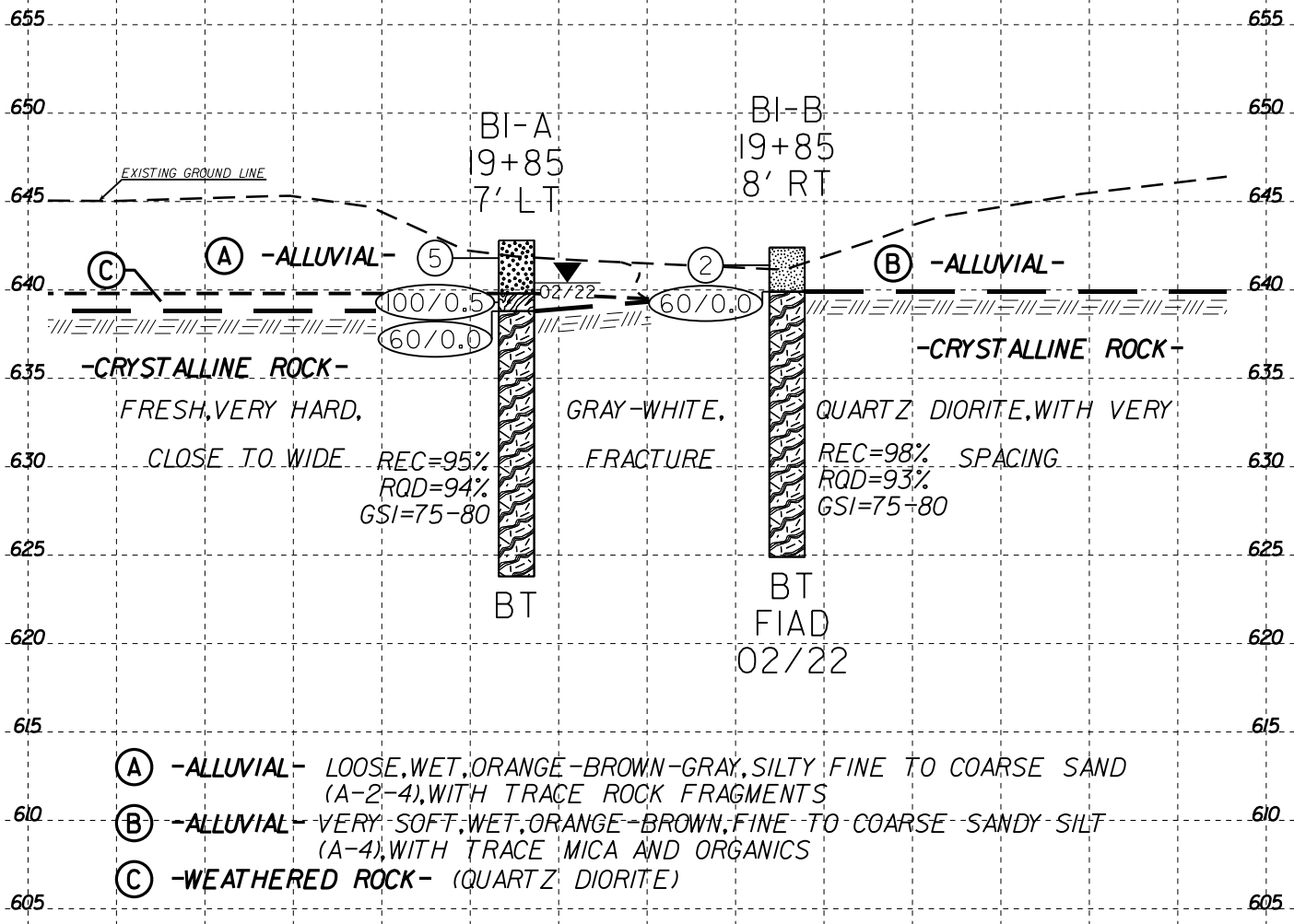


VE = 1:1

END BENT 1
BRIDGE SKEW=90 DEGREES

35 30 25 20 15 10 5 0 5 10

-L- GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 01/7/2022. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.



19 + 86.00



35 30 25 20 15 10 5 0 5 10 15 20 25 30 35

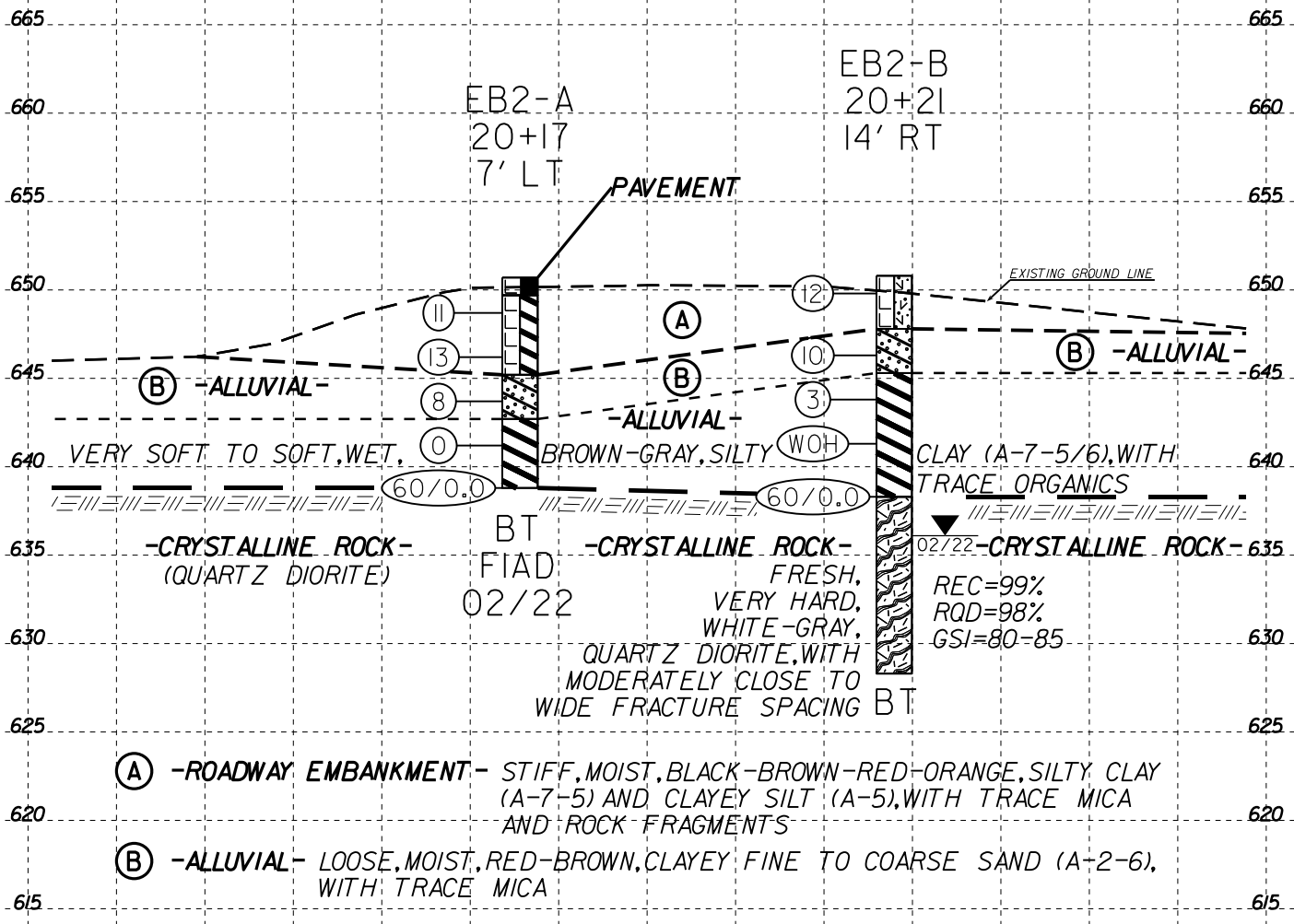


VE = 1:1

BENT 1
BRIDGE SKEW=90 DEGREES

35 30 25 20 15 10 5 0 5 10

-L- GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 01/7/2022. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.



- (A) -ROADWAY EMBANKMENT- STIFF, MOIST, BLACK-BROWN-RED-ORANGE, SILTY CLAY (A-7-5) AND CLAYEY SILT (A-5), WITH TRACE MICA AND ROCK FRAGMENTS
- (B) -ALLUVIAL- LOOSE, MOIST, RED-BROWN, CLAYEY FINE TO COARSE SAND (A-2-6), WITH TRACE MICA

20 + 22.19



HORIZ. SCALE 0 10 20 (FEET)

VE = 1:1

END BENT 2
BRIDGE SKEW=90 DEGREES

35 30 25 20 15 10 5 0 5 10 15 20 25 30 35

GEOTECHNICAL BORING REPORT


BORE LOG

WBS BP10.R012.1		TIP SF-590090		COUNTY MECKLENBURG		GEOLOGIST A. Suttle										
SITE DESCRIPTION Bridge No. 90 Over South Prong Clark Creek on SR 2442 (Asbury Chapel Road)							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 19+14		OFFSET 13 ft LT		ALIGNMENT -L-	0 HR. N/A									
COLLAR ELEV. 650.5 ft		TOTAL DEPTH 15.3 ft		NORTHING 607,498		EASTING 1,463,187	24 HR. 12.8									
DRILL RIG/HAMMER EFF./DATE BRI3895 CME-55 85% 03/15/2021				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic										
DRILLER J. Reeve		START DATE 02/09/22		COMP. DATE 02/09/22		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						ELEV. (ft)
655																
650	650.5	0.0													650.5	GROUND SURFACE 0.0
	647.0	3.5	4	2	3	5							M		647.0	ROADWAY EMBANKMENT Loose, Red-Brown, Silty Fine to Coarse SAND (A-2-4) 3.5
645	645.3	5.2	84	16/0.1						100/0.6					645.3	WEATHERED ROCK Gray-Black (QUARTZ DIORITE) 5.2
			60/0.1							60/0.1					645.2	CRYSTALLINE ROCK White-Gray (QUARTZ DIORITE) 5.3
640																CRYSTALLINE ROCK Very Slightly Weathered to Fresh, Very Hard, White-Gray QUARTZ DIORITE, with Close to Moderate to Close Fracture Spacing
															635.2	REC = 78%, RQD = 50%, GSI = 40 - 45 15.3
																Boring Terminated at Elevation 635.2 ft In Crystalline Rock (QUARTZ DIORITE)

NCDOT BORE SINGLE BRIDGE NO. 90 OVER SOUTH PRONG CLARK CREEK ON SR 2442 (ASBURY CHAPEL RD.), GPJ NC_DOT.GDT 2/22/22

GEOTECHNICAL BORING REPORT

CORE LOG

WBS BP10.R012.1			TIP SF-590090			COUNTY MECKLENBURG			GEOLOGIST A. Suttle		
SITE DESCRIPTION Bridge No. 90 Over South Prong Clark Creek on SR 2442 (Asbury Chapel Road)										GROUND WTR (ft)	
BORING NO. EB1-A			STATION 19+14			OFFSET 13 ft LT			ALIGNMENT -L-		
COLLAR ELEV. 650.5 ft			TOTAL DEPTH 15.3 ft			NORTHING 607,498			EASTING 1,463,187		
DRILL RIG/HAMMER EFF./DATE BRI3895 CME-55 85% 03/15/2021						DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic		
DRILLER J. Reeve			START DATE 02/09/22			COMP. DATE 02/09/22			SURFACE WATER DEPTH N/A		
CORE SIZE NQ			TOTAL RUN 10.0 ft								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %	REC. (ft) %	RQD (ft) %			
645.2											
	645.2	5.3	5.0	4:31/1.0 4:45/1.0 3:17/1.0 4:06/1.0 4:11/1.0	(4.9) 98%	(3.8) 76%	(7.8) 78%	(5.0) 50%		645.2	5.3
640	640.2	10.3	5.0	4:39/1.0 4:56/1.0 4:15/1.0 4:02/1.0 4:39/1.0	(2.9) 58%	(1.2) 24%					
	635.2	15.3								635.2	15.3
Begin Coring @ 5.3 ft CRYSTALLINE ROCK Very Slightly Weathered to Fresh, Very Hard, White-Gray QUARTZ DIORITE, with Close to Moderate Close Fracture Spacing REC = 78%, RQD = 50%, GSI = 40 - 45 Boring Terminated at Elevation 635.2 ft In Crystalline Rock (QUARTZ DIORITE)											

NCDOT CORE SINGLE BRIDGE NO. 90 OVER SOUTH PRONG CLARK CREEK ON SR 2442 (ASBURY CHAPEL RD.), GPJ NC_DOT.GDT 2/17/22



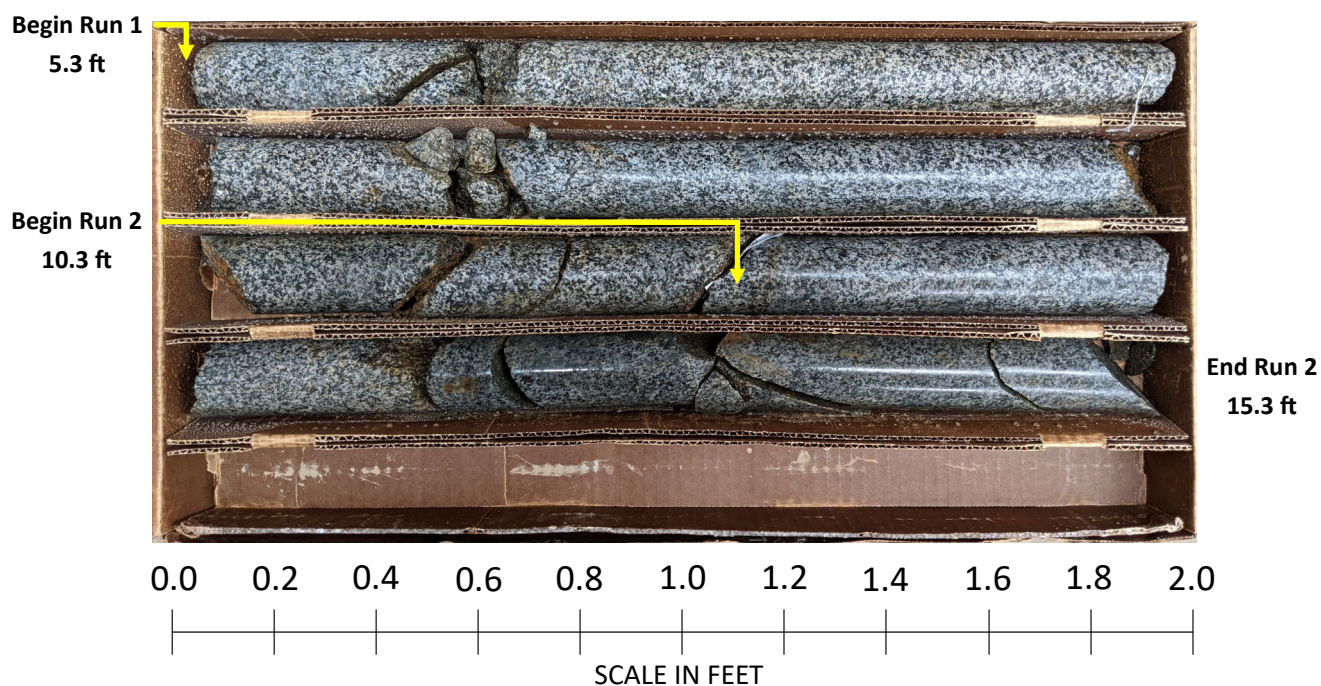
Bridge No. 90 over South Prong Clarke Creek on SR 2442 (Asbury Chapel Road)

Project ID: BP10.R012.1

Rock Core Photographs: Boring - EB1-A

-L- Station: 19+14

Offset: 13 ft LT



GEOTECHNICAL BORING REPORT

BORE LOG


WBS BP10.R012.1	TIP SF-590090	COUNTY MECKLENBURG	GEOLOGIST A. Suttle
SITE DESCRIPTION Bridge No. 90 Over South Prong Clark Creek on SR 2442 (Asbury Chapel Road)			GROUND WTR (ft)
BORING NO. EB1-B	STATION 19+15	OFFSET 17 ft RT	ALIGNMENT -L-
COLLAR ELEV. 650.4 ft	TOTAL DEPTH 16.4 ft	NORTHING 607,504	EASTING 1,463,216
DRILL RIG/HAMMER EFF./DATE BR13895 CME-55 85% 03/15/2021		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic
DRILLER J. Reeve	START DATE 02/10/22	COMP. DATE 02/10/22	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
655															
650	650.4	0.0												650.4	0.0
			3	11	11										
	646.9	3.5												646.4	4.0
645			4	54	46/0.3										
	644.4	6.0												644.1	6.3
	644.1	6.3	100/0.3											644.0	6.4
			60/0.1												
640															
635															
														634.0	16.4
Boring Terminated at Elevation 634.0 ft In Crystalline Rock (QUARTZ DIORITE)															

NCDOT BORE SINGLE BRIDGE NO. 90 OVER SOUTH PRONG CLARK CREEK ON SR 2442 (ASBURY CHAPEL RD.), GPJ NC_DOT.GDT 2/17/22

GEOTECHNICAL BORING REPORT

CORE LOG

WBS BP10.R012.1				TIP SF-590090		COUNTY MECKLENBURG			GEOLOGIST A. Suttle			
SITE DESCRIPTION Bridge No. 90 Over South Prong Clark Creek on SR 2442 (Asbury Chapel Road)										GROUND WTR (ft)		
BORING NO. EB1-B			STATION 19+15			OFFSET 17 ft RT			ALIGNMENT -L-		0 HR. N/A	
COLLAR ELEV. 650.4 ft			TOTAL DEPTH 16.4 ft			NORTHING 607,504			EASTING 1,463,216		24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE BRI3895 CME-55 85% 03/15/2021						DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic			
DRILLER J. Reeve				START DATE 02/10/22			COMP. DATE 02/10/22			SURFACE WATER DEPTH N/A		
CORE SIZE NQ				TOTAL RUN 10.0 ft								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (ft) %	RQD (ft) %	REC. (ft) %	RQD (ft) %				
644	644.0	6.4	5.0	6:23/1.0 5:07/1.0 6:41/1.0	(4.3) 86%	(3.6) 72%	(9.3) 93%	(8.1) 81%		644.0	6.4	
640	639.0	11.4	5.0	6:54/1.0 4:15/1.0						Very Slightly Weathered to Fresh, Very Hard, White-Gray QUARTZ DIORITE, with Very Close to Moderately Close Fracture Spacing		
635	634.0	16.4		5:07/1.0 7:17/1.0 7:40/1.0 7:16/1.0 9:26/1.0	(5.0) 100%	(4.5) 90%				REC = 93%, RQD = 81%, GSI = 60 - 65		
										Boring Terminated at Elevation 634.0 ft In Crystalline Rock (QUARTZ DIORITE)	16.4	

NCDOT CORE SINGLE BRIDGE NO. 90 OVER SOUTH PRONG CLARK CREEK ON SR 2442 (ASBURY CHAPEL RD.), GPJ NC_DOT.GDT 2/17/22



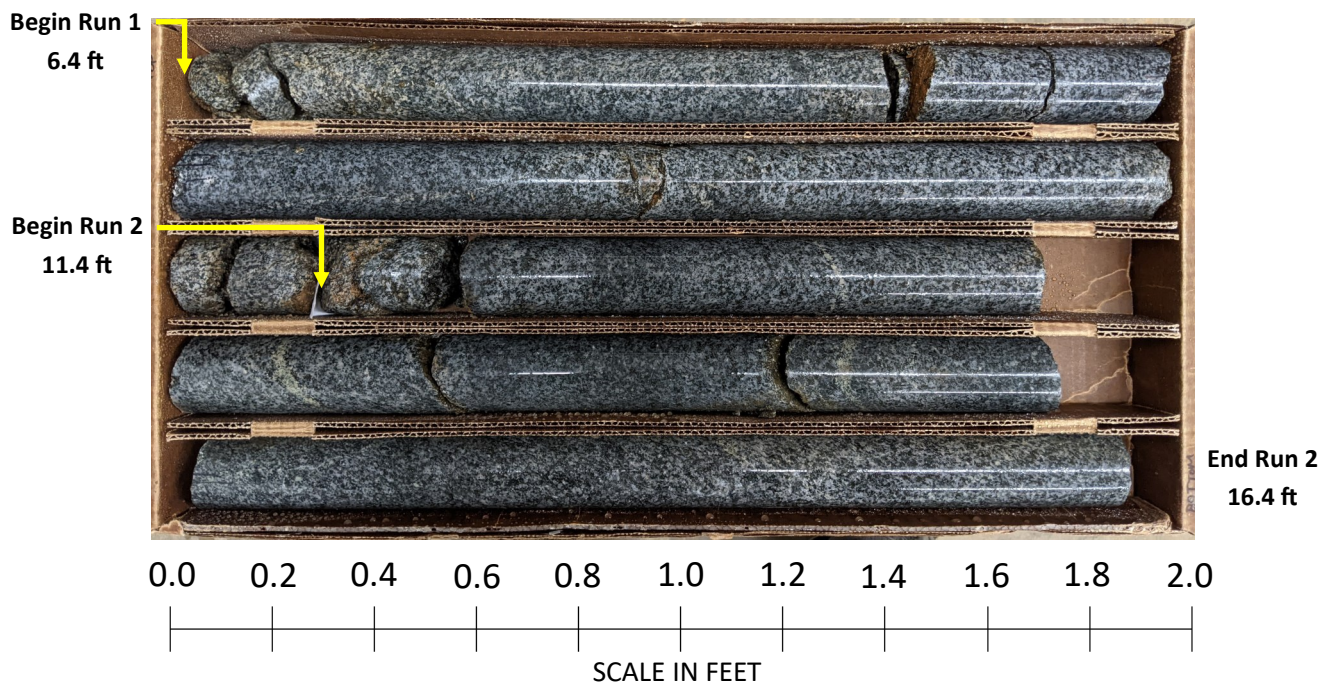
Bridge No. 90 over South Prong Clarke Creek on SR 2442 (Asbury Chapel Road)

Project ID: BP10.R012.1

Rock Core Photographs: Boring - EB1-B


Station: 19+15

Offset: 17 ft RT



GEOTECHNICAL BORING REPORT

CORE LOG

WBS BP10.R012.1				TIP SF-590090		COUNTY MECKLENBURG			GEOLOGIST A. Suttle			
SITE DESCRIPTION Bridge No. 90 Over South Prong Clark Creek on SR 2442 (Asbury Chapel Road)										GROUND WTR (ft)		
BORING NO. B1-A				STATION 19+85		OFFSET 7 ft LT			ALIGNMENT -L-		0 HR. N/A	
COLLAR ELEV. 642.8 ft				TOTAL DEPTH 19.0 ft		NORTHING 607,568			EASTING 1,463,179		24 HR. 2.4	
DRILL RIG/HAMMER EFF./DATE BRI3895 CME-55 85% 03/15/2021						DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic			
DRILLER J. Reeve				START DATE 02/02/22		COMP. DATE 02/02/22			SURFACE WATER DEPTH N/A			
CORE SIZE NQ				TOTAL RUN 15.0 ft								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (ft) %	RQD (ft) %	REC. (ft) %	RQD (ft) %				
638.8												
	638.8	4.0	5.0	N=60/0.0 2:02/1.0 5:23/1.0 5:42/1.0 6:30/1.0 5:45/1.0	(4.2) 84%	(4.2) 84%	(14.2) 95%	(14.1) 94%		Begin Coring @ 4.0 ft		
635										638.8	4.0	
	633.8	9.0										
630			5.0	5:07/1.0 5:15/1.0 4:42/1.0 5:37/1.0 5:42/1.0	(5.0) 100%	(4.9) 98%					Fresh, Very Hard, Gray-White QUARTZ DIORITE, with Very Close Fracture Spacing	
	628.8	14.0								REC = 95%, RQD = 94%, GSI = 75-80		
625			5.0	4:53/1.0 5:02/1.0 6:00/1.0 6:15/1.0 5:29/1.0	(5.0) 100%	(5.0) 100%						
	623.8	19.0									623.8	
										Boring Terminated at Elevation 623.8 ft In Crystalline Rock (QUARTZ DIORITE)	19.0	

NCDOT CORE SINGLE BRIDGE NO. 90 OVER SOUTH PRONG CLARK CREEK ON SR 2442 (ASBURY CHAPEL RD.), GPJ NC_DOT.GDT 2/22/22



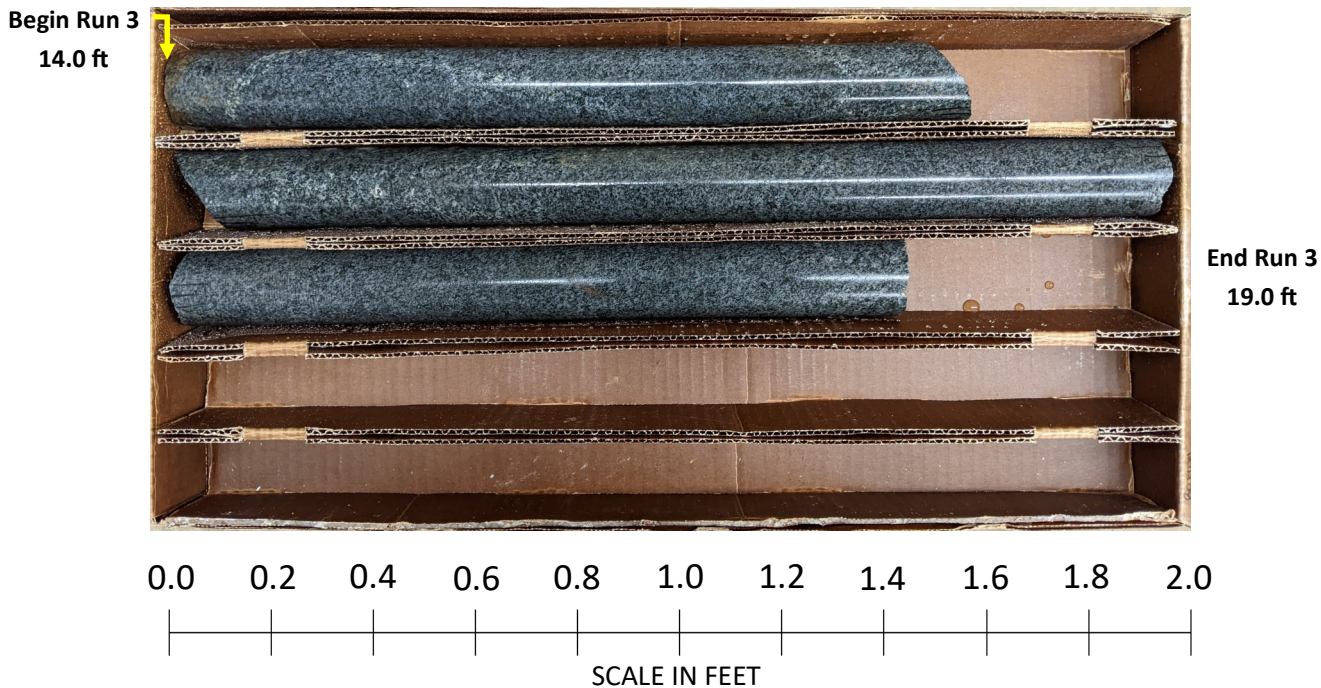
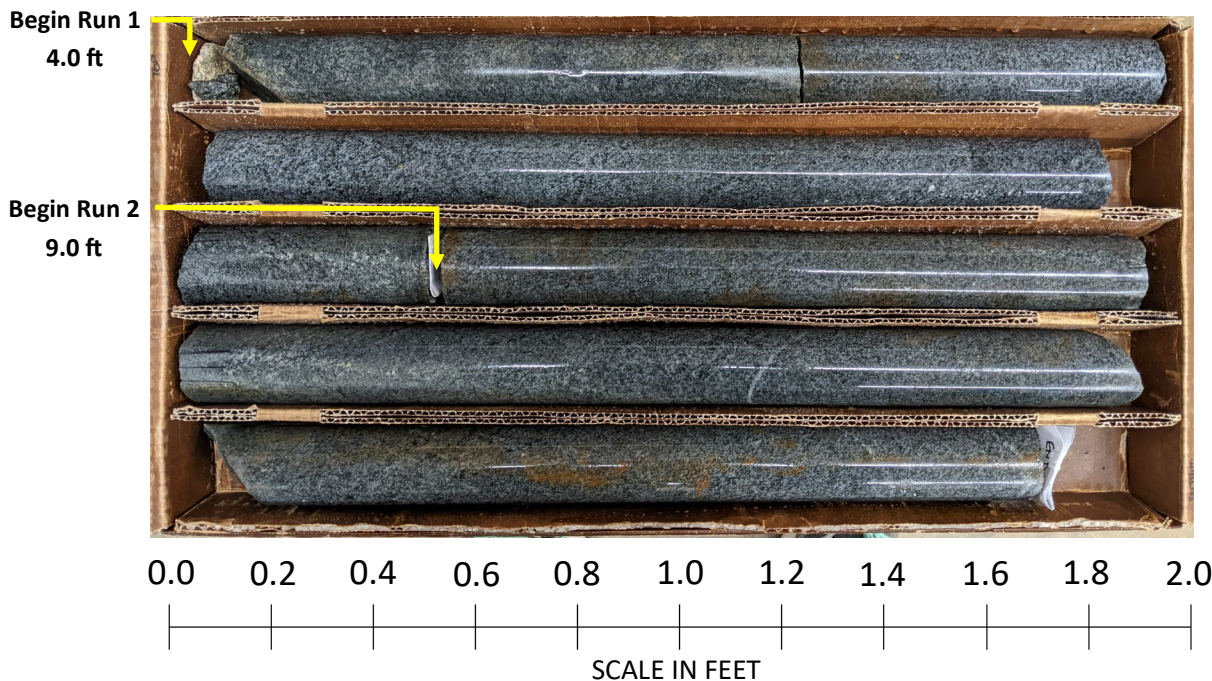
Bridge No. 90 over South Prong Clarke Creek on SR 2442 (Asbury Chapel Road)

Project ID: BP10.R012.1

Rock Core Photographs: Boring - B1-A


Station: 19+85

Offset: 7 ft LT



GEOTECHNICAL BORING REPORT

CORE LOG

WBS BP10.R012.1				TIP SF-590090		COUNTY MECKLENBURG			GEOLOGIST A. Suttle		
SITE DESCRIPTION Bridge No. 90 Over South Prong Clark Creek on SR 2442 (Asbury Chapel Road)										GROUND WTR (ft)	
BORING NO. B1-B				STATION 19+85		OFFSET 8 ft RT			ALIGNMENT -L-		0 HR. N/A
COLLAR ELEV. 642.4 ft				TOTAL DEPTH 17.5 ft		NORTHING 607,571			EASTING 1,463,194		24 HR. N/A
DRILL RIG/HAMMER EFF./DATE BRI3895 CME-55 85% 03/15/2021						DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic		
DRILLER J. Reeve				START DATE 02/10/22		COMP. DATE 02/10/22			SURFACE WATER DEPTH N/A		
CORE SIZE NQ				TOTAL RUN 15.0 ft							
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %	REC. (ft) %	RQD (ft) %			
639.9	639.9	2.5	5.0	N=60/0.0 7:37/1.0 7:07/1.0 8:11/1.0 11:40/1.0 11:17/1.0	(4.9) 98%	(4.9) 98%	(14.7) 98%	(14.0) 93%		Begin Coring @ 2.5 ft	2.5
635	634.9	7.5	5.0	9:26/1.0 9:32/1.0 8:48/1.0 11:28/1.0 15:41/1.0	(5.0) 100%	(4.3) 86%				Fresh, Very Hard, Gray-White QUARTZ DIORITE, with Close to Wide Fracture Spacing	
630	629.9	12.5	5.0	15:57/1.0 15:35/1.0 15:32/1.0 23:39/1.0 28:22/1.0	(4.8) 96%	(4.8) 96%				REC = 98%, RQD = 93%, GSI = 75 - 80	
625	624.9	17.5	5.0								Boring Terminated at Elevation 624.9 ft In Crystalline Rock (QUARTZ DIORITE)

NCDOT CORE SINGLE BRIDGE NO. 90 OVER SOUTH PRONG CLARK CREEK ON SR 2442 (ASBURY CHAPEL RD.), GPJ NC_DOT.GDT 2/17/22



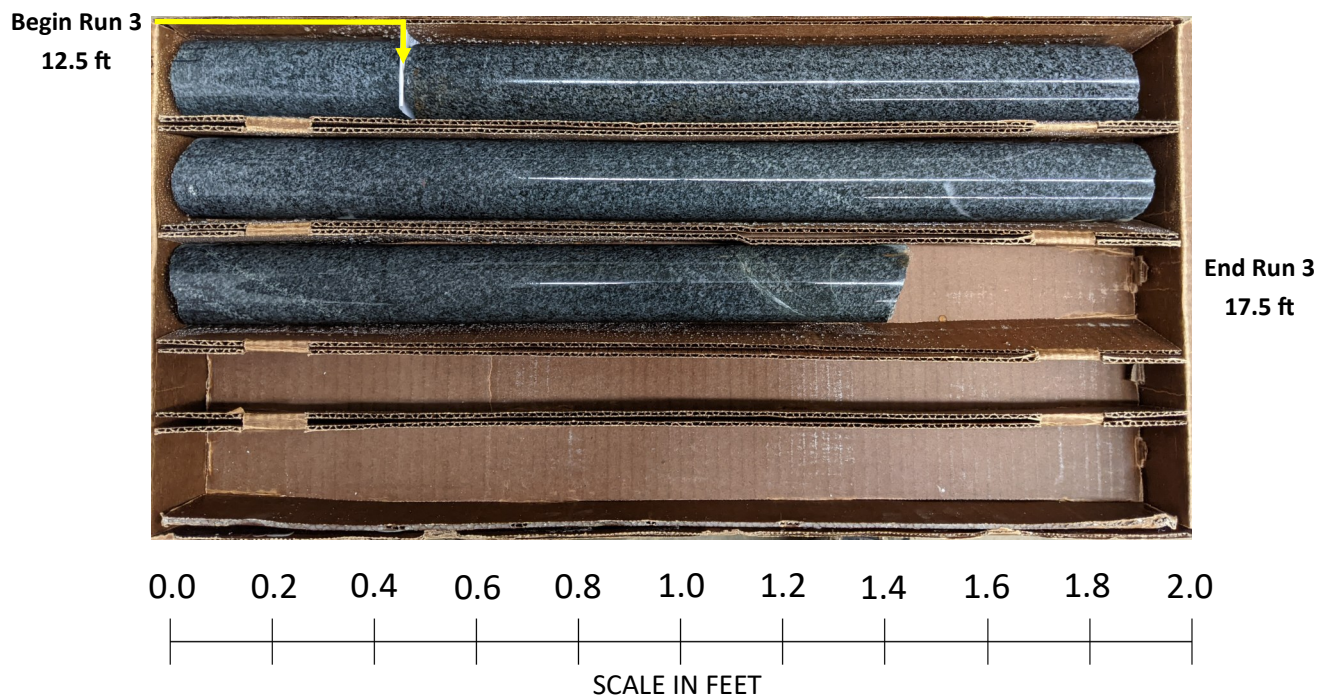
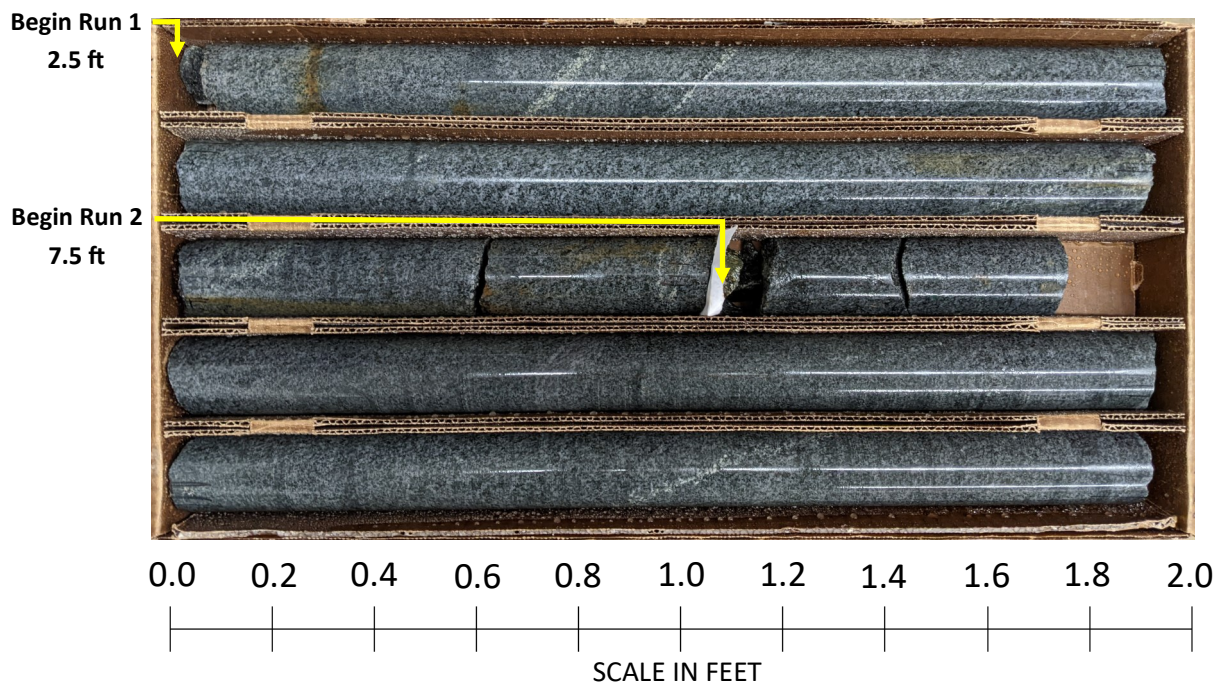
Bridge No. 90 over South Prong Clarke Creek on SR 2442 (Asbury Chapel Road)

Project ID: BP10.R012.1

Rock Core Photographs: Boring - B1-B

Station: 19+85

Offset: 8 ft RT



GEOTECHNICAL BORING REPORT

BORE LOG


WBS BP10.R012.1	TIP SF-590090	COUNTY MECKLENBURG	GEOLOGIST A. Suttle
SITE DESCRIPTION Bridge No. 90 Over South Prong Clark Creek on SR 2442 (Asbury Chapel Road)			GROUND WTR (ft)
BORING NO. EB2-A	STATION 20+17	OFFSET 7 ft LT	ALIGNMENT -L-
COLLAR ELEV. 650.7 ft	TOTAL DEPTH 11.9 ft	NORTHING 607,600	EASTING 1,463,173
DRILL RIG/HAMMER EFF./DATE BR13895 CME-55 85% 03/15/2021		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER J. Reeve	START DATE 02/09/22	COMP. DATE 02/09/22	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
655																
650	649.7	1.0	17	7	4	11								M	650.7 GROUND SURFACE 0.0 649.7 ROADWAY EMBANKMENT 1.0 Asphalt (0.3') Stone Base (0.7') Stiff, Orange-Red-Brown, Silty CLAY (A-7-5), with trace mica	
645	647.2	3.5	4	6	7	13								M		
640	644.7	6.0	4	4	4	8								M	645.2 ALLUVIAL 5.5 642.7 Loose, Red-Brown, Clayey Fine to Coarse SAND (A-2-6) 8.0 Very Soft, Gray, Silty CLAY (A-7-5), with trace organics	
638.8	638.8	11.9	1	0	0	0								W	638.8 Boring Terminated with Standard Penetration Test Refusal at Elevation 638.8 ft On Crystalline Rock (QUARTZ DIORITE) 11.9	
			60/0.0													

NCDOT BORE SINGLE BRIDGE NO. 90 OVER SOUTH PRONG CLARK CREEK ON SR 2442 (ASBURY CHAPEL RD.), GPJ NC_DOT.GDT 2/17/22

GEOTECHNICAL BORING REPORT

CORE LOG

WBS BP10.R012.1				TIP SF-590090		COUNTY MECKLENBURG			GEOLOGIST A. Suttle			
SITE DESCRIPTION Bridge No. 90 Over South Prong Clark Creek on SR 2442 (Asbury Chapel Road)										GROUND WTR (ft)		
BORING NO. EB2-B				STATION 20+21		OFFSET 14 ft RT		ALIGNMENT -L-		0 HR. N/A		
COLLAR ELEV. 650.8 ft				TOTAL DEPTH 22.5 ft		NORTHING 607,608		EASTING 1,463,193		24 HR. 14.7		
DRILL RIG/HAMMER EFF./DATE BRI3895 CME-55 85% 03/15/2021						DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic			
DRILLER J. Reeve				START DATE 02/09/22		COMP. DATE 02/09/22		SURFACE WATER DEPTH N/A				
CORE SIZE NQ				TOTAL RUN 10.0 ft								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %				RQD (ft) %
638.3										Begin Coring @ 12.5 ft		
	638.3	12.5	5.0	N=60/0.0 6:17/1.0 6:11/1.0 5:42/1.0 5:39/1.0 6:58/1.0	(5.0) 100%	(5.0) 100%		(9.9) 99%	(9.8) 98%		638.3	
635											CRYSTALLINE ROCK Fresh, Very Hard, White-Gray QUARTZ DIORITE, with Moderately Close to Wide Fracture Spacing REC = 99%, RQD = 98%, GSI = 80 - 85	12.5
	633.3	17.5										
630			5.0	5:24/1.0 8:19/1.0 9:55/1.0 11:05/1.0 15:06/1.0	(4.9) 98%	(4.8) 96%					628.3	
	628.3	22.5								Boring Terminated at Elevation 628.3 ft In Crystalline Rock (QUARTZ DIORITE)	22.5	

NCDOT CORE SINGLE BRIDGE NO. 90 OVER SOUTH PRONG CLARK CREEK ON SR 2442 (ASBURY CHAPEL RD.), GPJ NC_DOT.GDT 2/17/22



Bridge No. 90 over South Prong Clarke Creek on SR 2442 (Asbury Chapel Road)

Project ID: BP10.R012.1

Rock Core Photographs: Boring - EB2-B

Station: 20+21

Offset: 14 ft RT

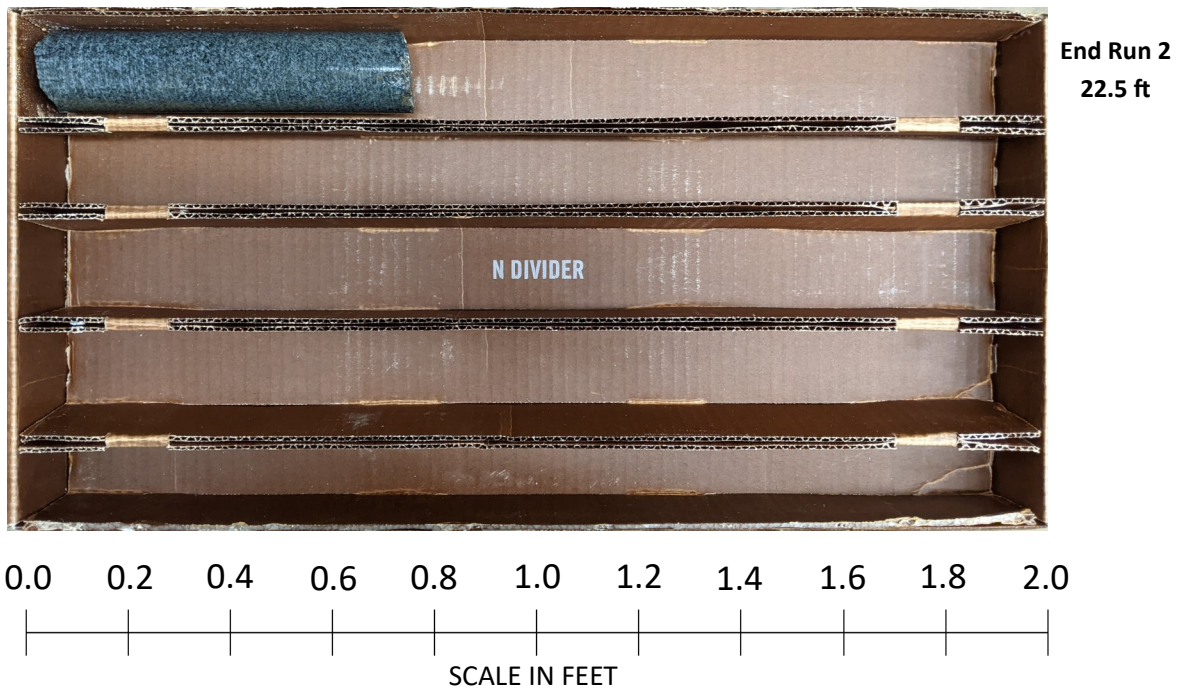
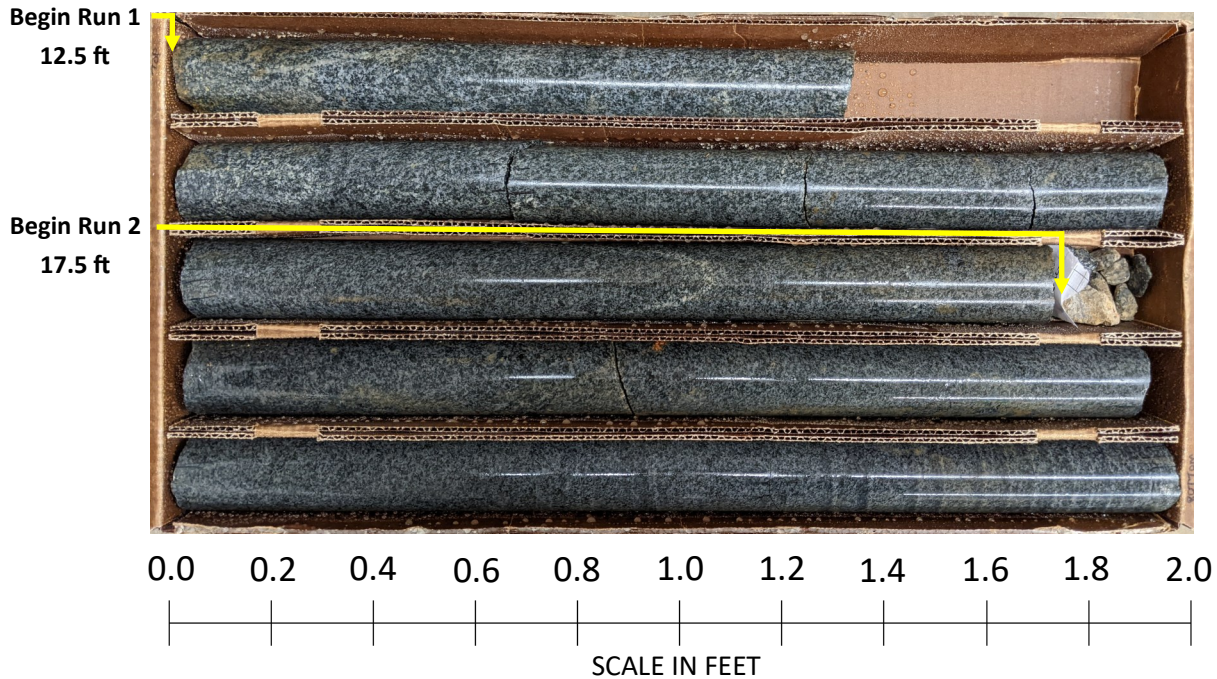




PHOTO 1 - VIEW DOWNSTATION FROM END BENT 2.



PHOTO 2 - VIEW FACING DOWNSTREAM FROM THE BRIDGE.



PHOTO 3 - VIEW UPSTATION FROM END BENT I.



PHOTO 4 - VIEW FACING UPSTREAM FROM THE BRIDGE.