

REFERENCE: BR-0002

PROJECT: 67002

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

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

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
2A	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4-6	PROFILES
7-8	CROSS SECTIONS
9-14	BORE LOGS & CORE REPORTS
15-18	CORE PHOTOGRAPHS

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY ASHE
PROJECT DESCRIPTION REPLACE BRIDGE #8 ON NC 194
OVER NORTH FORK NEW RIVER

SITE DESCRIPTION _____

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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

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

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

PERSONNEL

C.D. JOHNSON

D.O. CHEEK

C.J. COFFEY

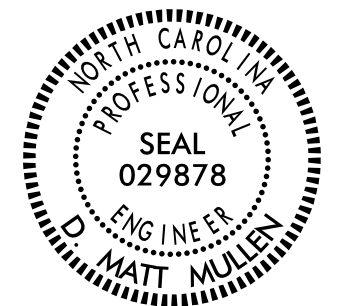
INVESTIGATED BY D.M. MULLEN

DRAWN BY DMM

CHECKED BY J.C. KUHNE

SUBMITTED BY JCK

DATE 8/1/2019

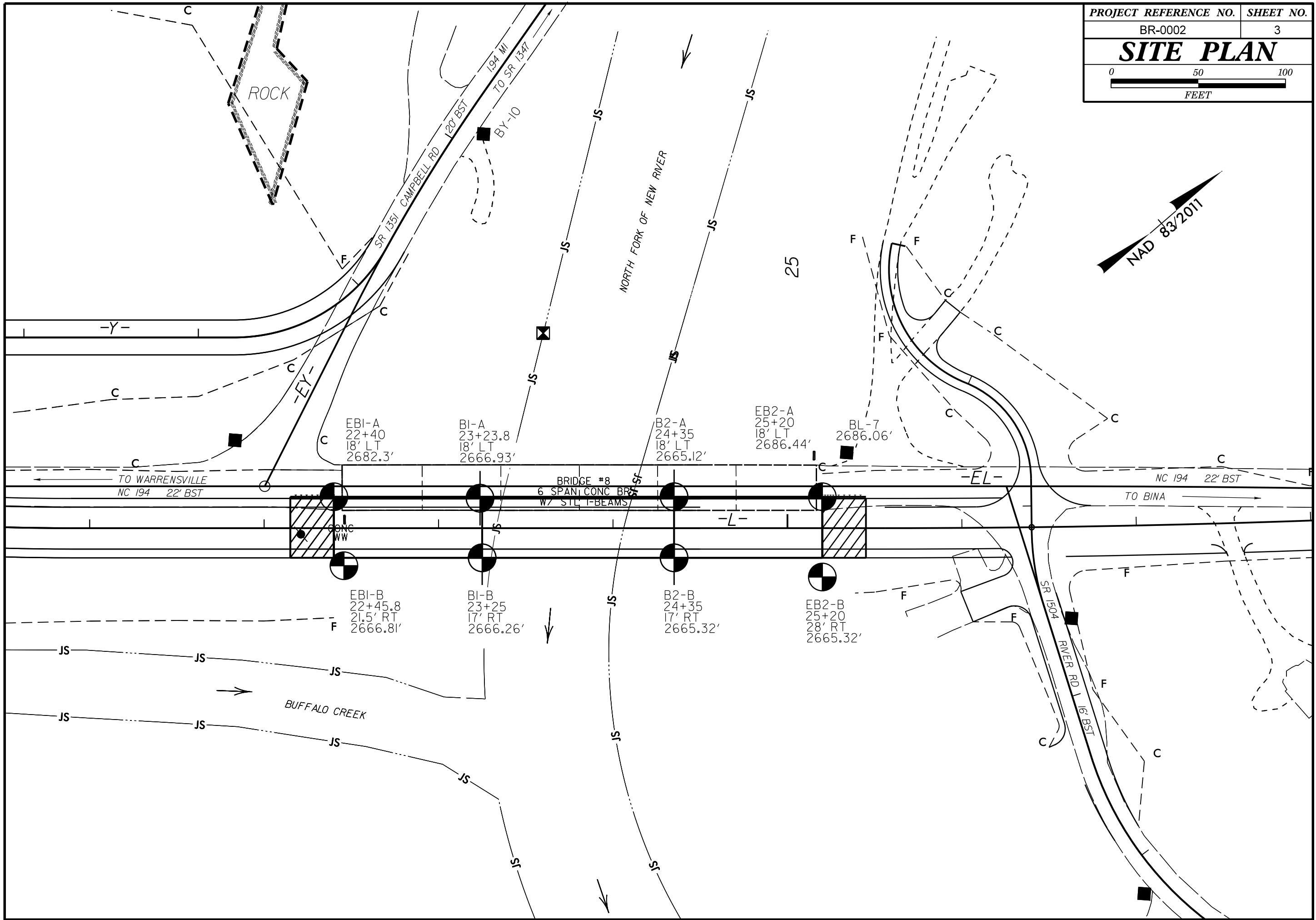


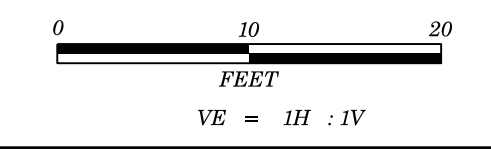
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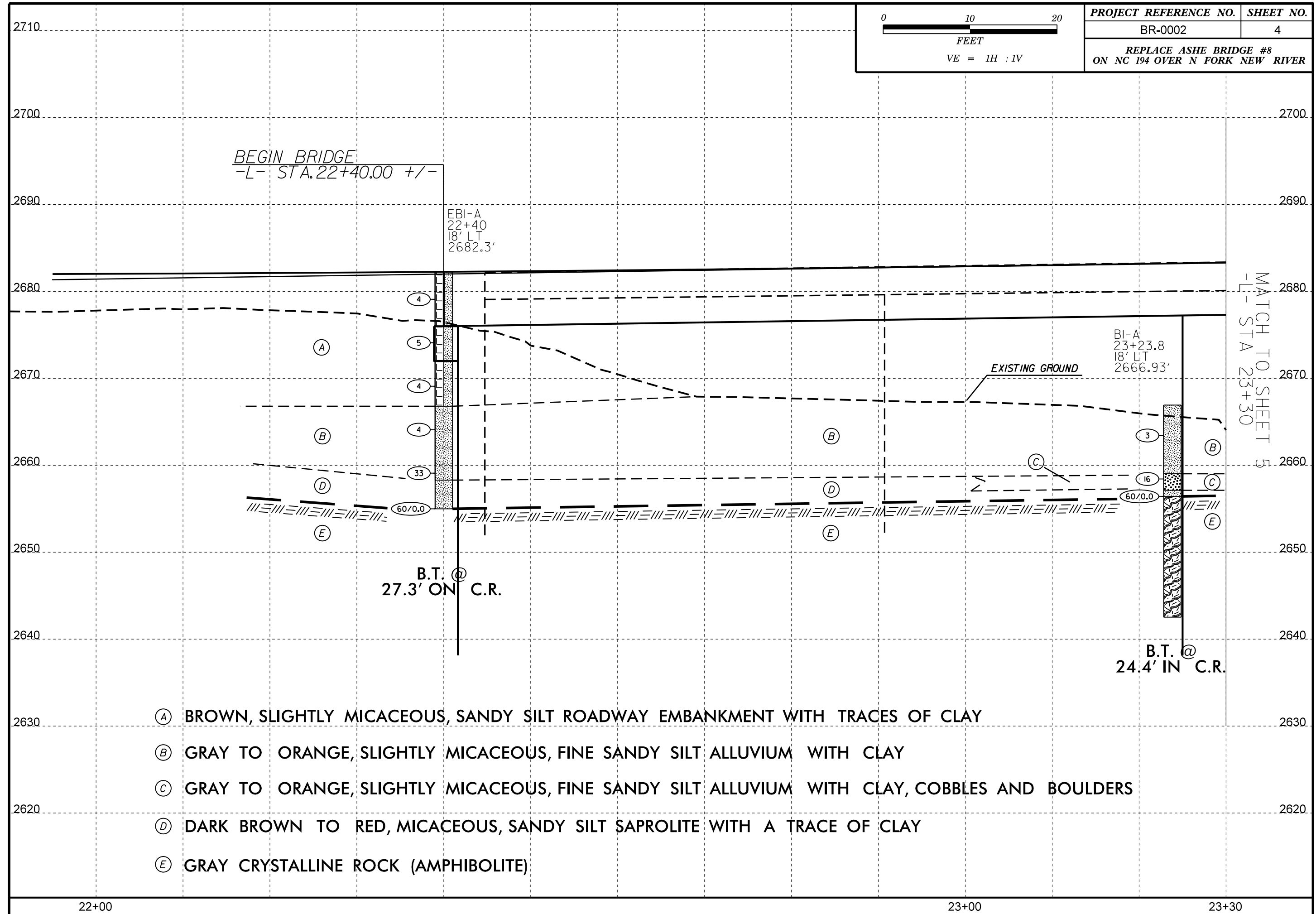
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																																																																																																																
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p>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.</p>										<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>																																																																																																																																																																
<p style="text-align: center;">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="5">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="5">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="5">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>GROUP CLASS.</td> <td>A-1-a</td> <td>A-1-b</td> <td>A-2-4</td> <td>A-2-5</td> <td>A-2-6</td> <td>A-2-7</td> <td>A-4</td> <td>A-5</td> <td>A-6</td> <td>A-7</td> <td>A-1, A-2</td> <td>A-3</td> <td>A-4, A-5</td> <td>A-6, A-7</td> <td></td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING #10 #40 #200</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> <td>50 30 15</td> </tr> <tr> <td>MATERIAL PASSING #40 LL PI</td> <td>-</td> <td>-</td> <td>40 10</td> <td>41 10</td> <td>40 10</td> <td>41 10</td> <td>40 10</td> <td>41 10</td> <td>40 10</td> <td>41 10</td> <td>40 10</td> <td>41 10</td> <td>40 10</td> <td>41 10</td> <td>40 10</td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS. 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ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p style="text-align: center;">WEATHERING</p> <p>FRESH: ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SL.): 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.</p> <p>SLIGHT (SL.): 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.</p> <p>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.</p> <p>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></p> <p>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></p> <p>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></p> <p>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.</p>									
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<p style="text-align: center;">TEXTURE OR GRAIN SIZE</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> </thead> <tbody> <tr> <td></td> <td>4.76</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> <tr> <td>BOULDER (BLDR.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>COBBLE (COB.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GRAVEL (GR.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>COARSE SAND (CS, SD.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>FINE SAND (F SD.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>SILT (SL.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>CLAY (CL.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GRAIN SIZE</td> <td>305</td> <td>75</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> <tr> <td>MM</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>IN.</td> <td>12</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>										U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270		4.76	2.00	0.42	0.25	0.075	0.053	BOULDER (BLDR.)							COBBLE (COB.)							GRAVEL (GR.)							COARSE SAND (CS, SD.)							FINE SAND (F SD.)							SILT (SL.)							CLAY (CL.)							GRAIN SIZE	305	75	2.0	0.25	0.05	0.005	MM							IN.	12	3					<p style="text-align: center;">RECOMMENDATION SYMBOLS</p> <p> UNDERCUT</p> <p> SHALLOW UNDERCUT</p> <p> UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</p> <p> UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</p> <p> UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</p>										<p style="text-align: center;">ROCK HARDNESS</p> <p>VERY HARD: CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD: CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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 FINGER NAIL.</p>																																																																																						
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<p style="text-align: center;">INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE: RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>MODERATELY INDURATED: GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>INDURATED: GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>EXTREMELY INDURATED: SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>										<p style="text-align: center;">NOTES:</p> <p style="text-align: right;">ELEVATION: 2686.06 FEET</p>																																																																																																																																																																																				





PROJECT REFERENCE NO.	SHEET NO.
BR-0002	4
REPLACE ASHE BRIDGE #8 ON NC 194 OVER N FORK NEW RIVER	



BEGIN BRIDGE
-L- STA. 22+40.00 +/-

EBI-A
22+40
18' LT
2682.3'

BI-A
23+23.8
18' LT
2666.93'

EXISTING GROUND

MATCH TO SHEET 5
-L- STA 23+30

B.T. @
27.3' ON C.R.

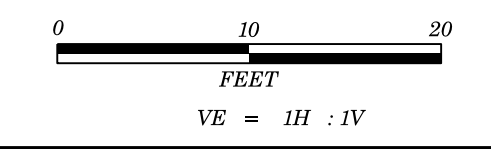
B.T. @
24.4' IN C.R.

- (A) BROWN, SLIGHTLY MICACEOUS, SANDY SILT ROADWAY EMBANKMENT WITH TRACES OF CLAY
- (B) GRAY TO ORANGE, SLIGHTLY MICACEOUS, FINE SANDY SILT ALLUVIUM WITH CLAY
- (C) GRAY TO ORANGE, SLIGHTLY MICACEOUS, FINE SANDY SILT ALLUVIUM WITH CLAY, COBBLES AND BOULDERS
- (D) DARK BROWN TO RED, MICACEOUS, SANDY SILT SAPROLITE WITH A TRACE OF CLAY
- (E) GRAY CRYSTALLINE ROCK (AMPHIBOLITE)

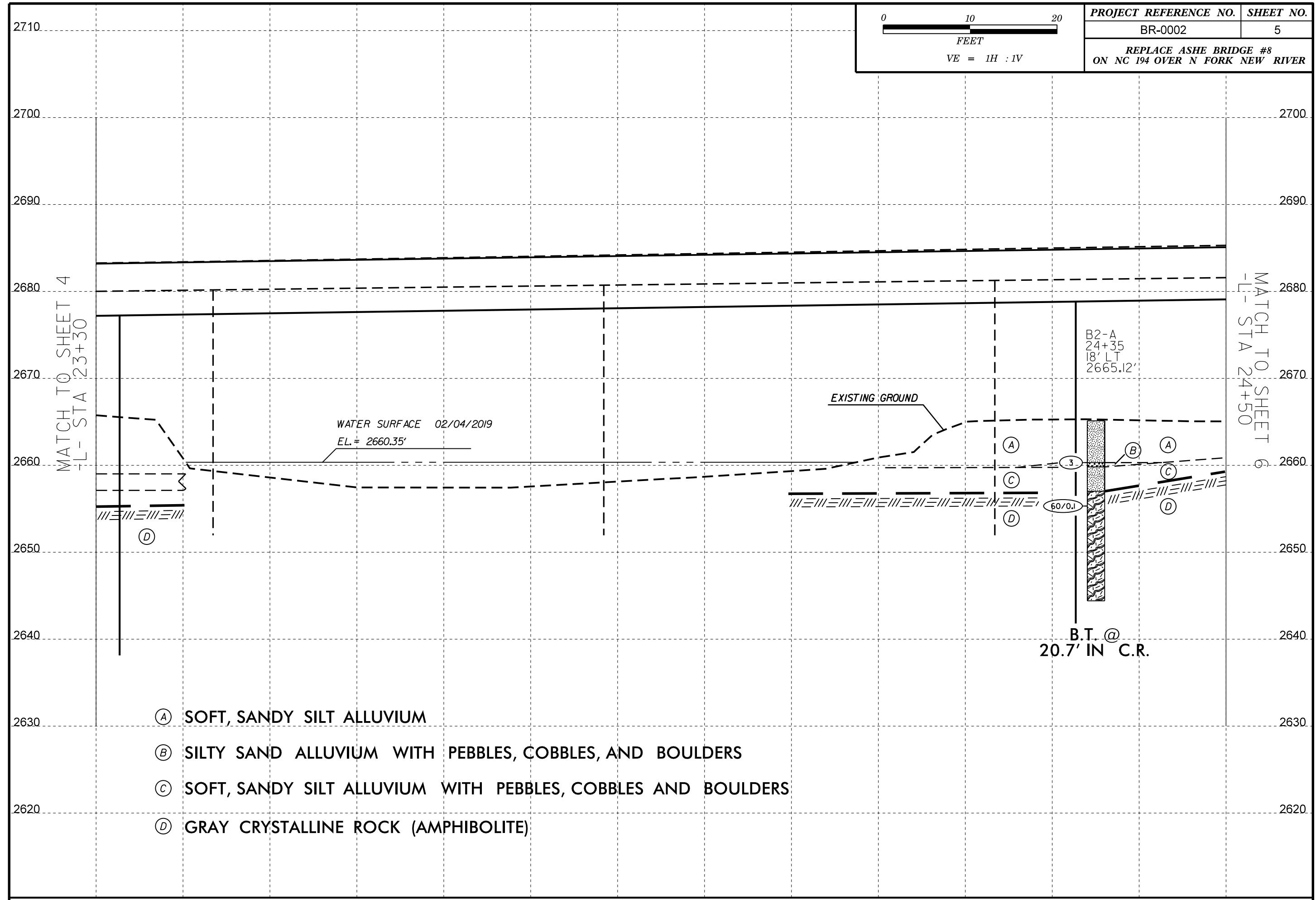
22+00

23+00

23+30



PROJECT REFERENCE NO.	SHEET NO.
BR-0002	5
REPLACE ASHE BRIDGE #8 ON NC 194 OVER N FORK NEW RIVER	

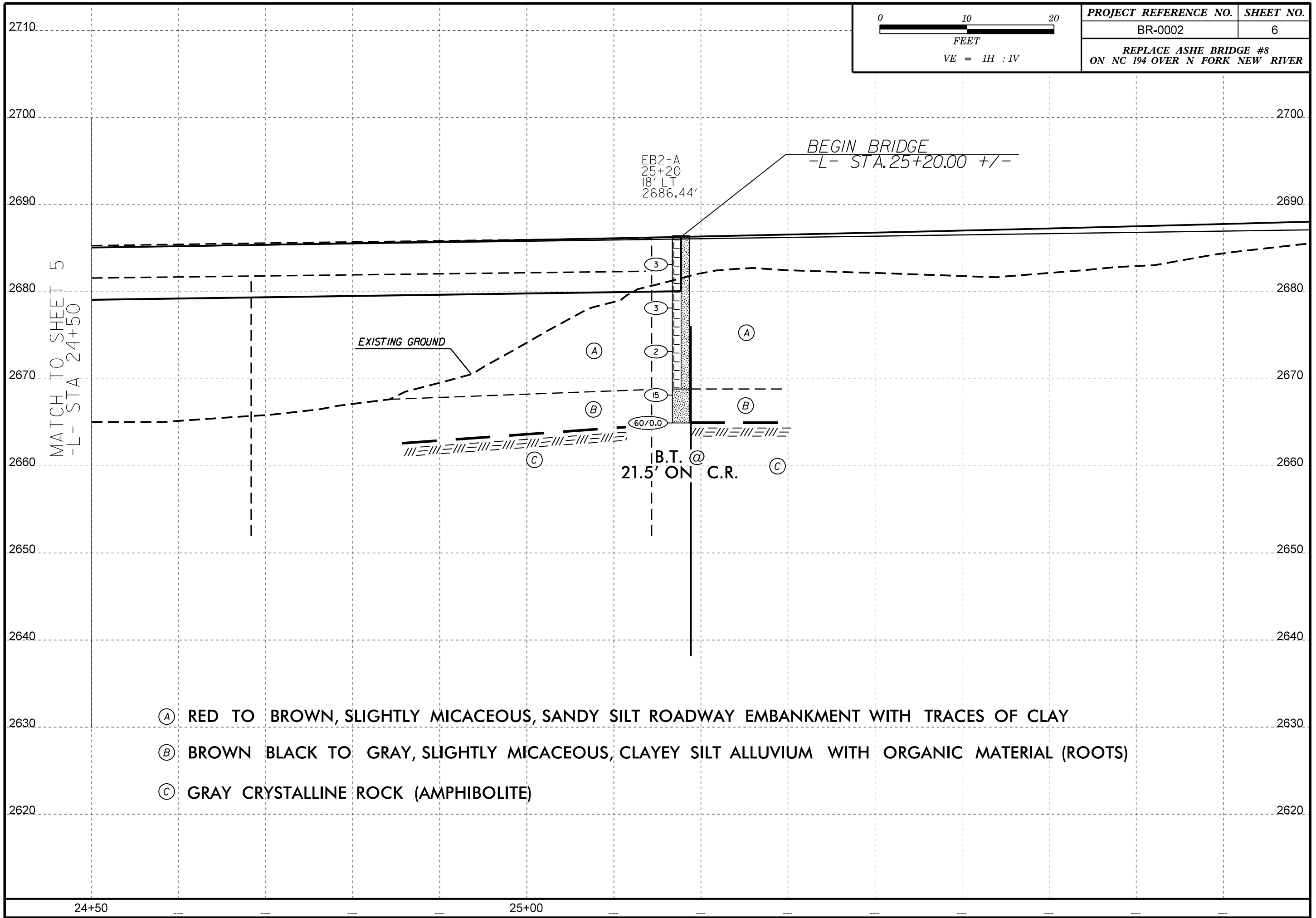
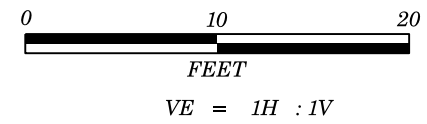


- Ⓐ SOFT, SANDY SILT ALLUVIUM
- Ⓑ SILTY SAND ALLUVIUM WITH PEBBLES, COBBLES, AND BOULDERS
- Ⓒ SOFT, SANDY SILT ALLUVIUM WITH PEBBLES, COBBLES AND BOULDERS
- Ⓓ GRAY CRYSTALLINE ROCK (AMPHIBOLITE)

23+30

24+00

24+50



MATCH TO SHEET 5
-L- STA 24+50

EXISTING GROUND

BEGIN BRIDGE
-L- STA. 25+20.00 +/-

EB2-A
25+20
18' LT
2686.44'

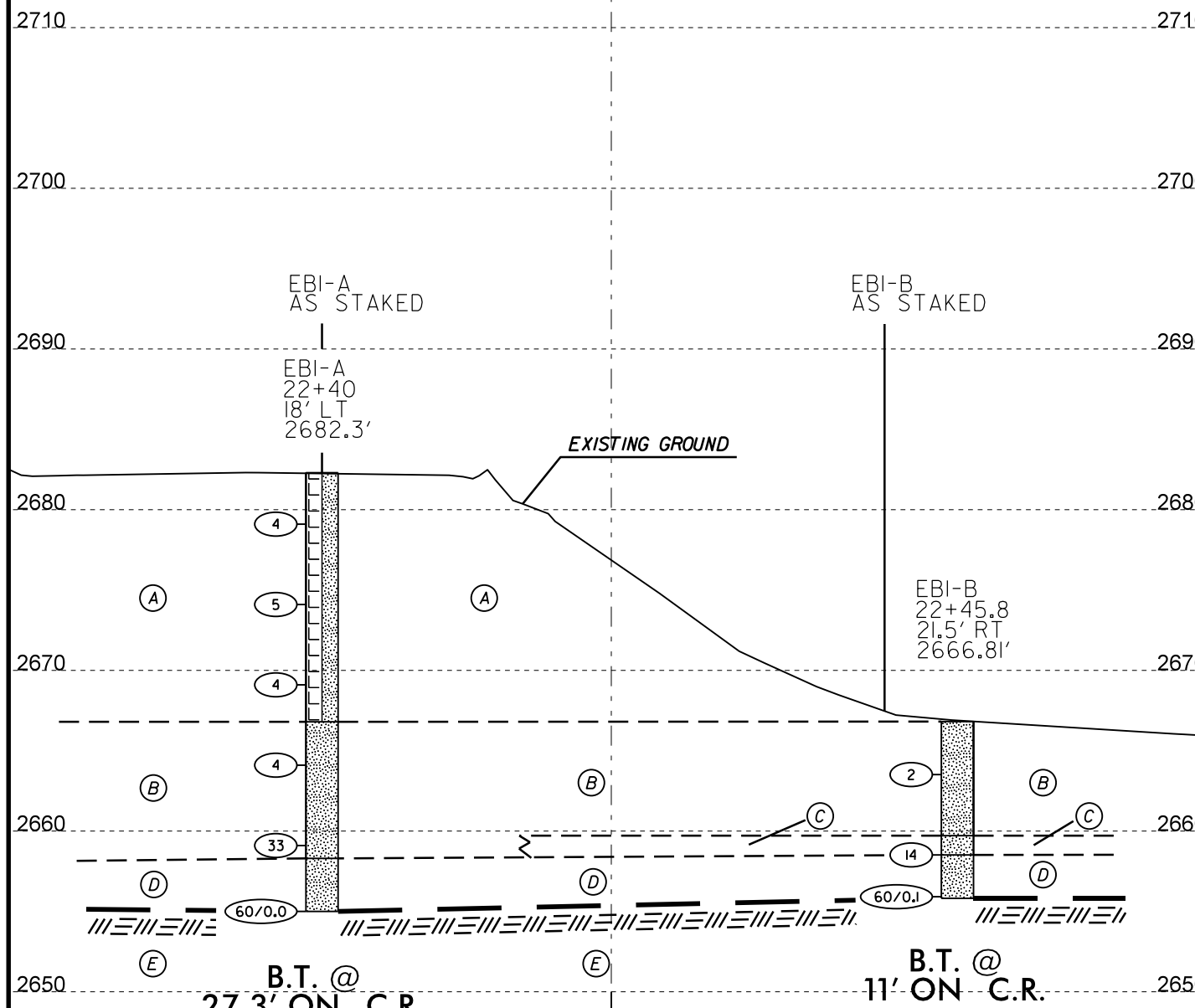
B.T. @
21.5' ON C.R.

60/0.0

- (A) RED TO BROWN, SLIGHTLY MICACEOUS, SANDY SILT ROADWAY EMBANKMENT WITH TRACES OF CLAY
- (B) BROWN BLACK TO GRAY, SLIGHTLY MICACEOUS, CLAYEY SILT ALLUVIUM WITH ORGANIC MATERIAL (ROOTS)
- (C) GRAY CRYSTALLINE ROCK (AMPHIBOLITE)

24+50

25+00

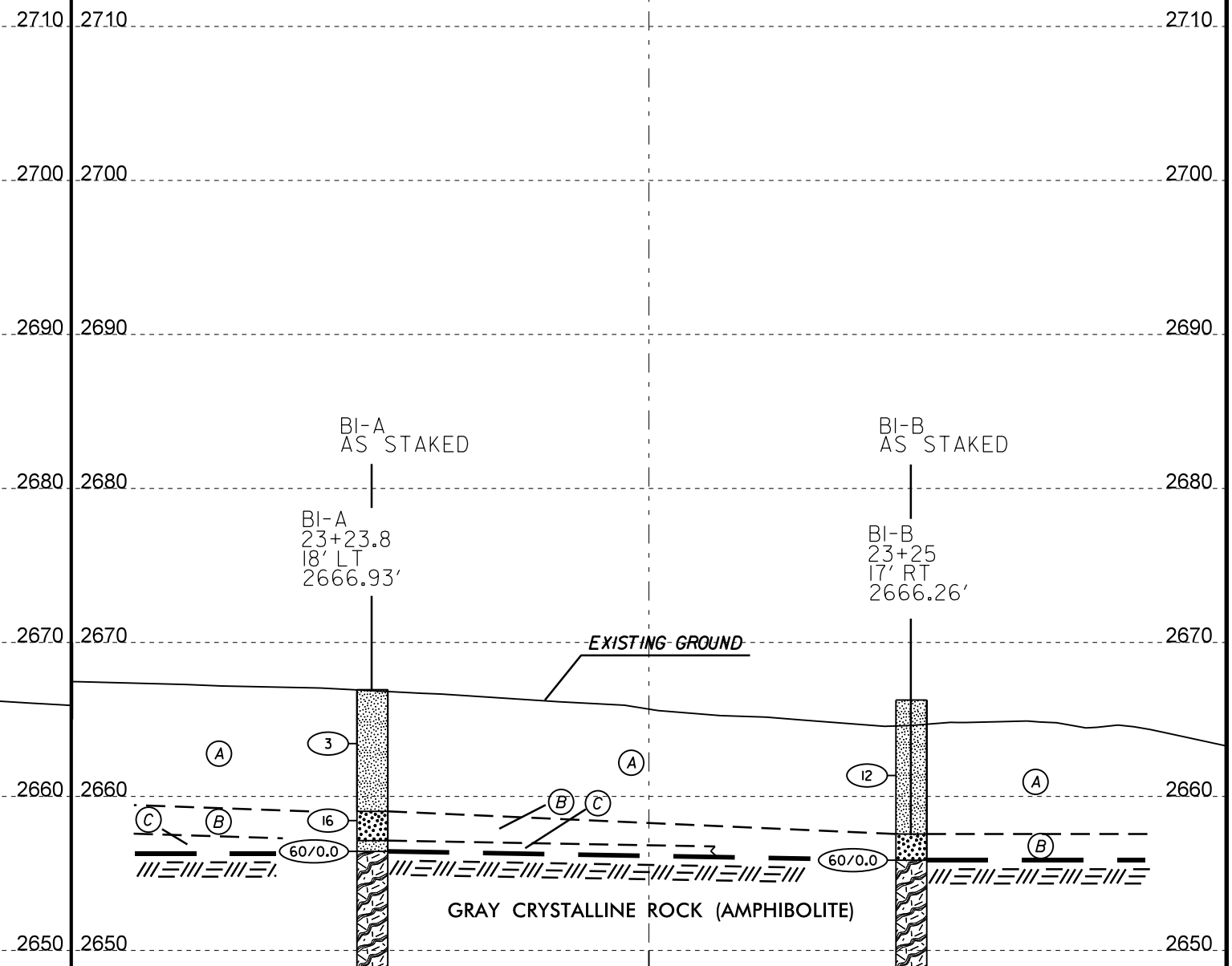


- (A) BROWN, SLIGHTLY MICACEOUS, SANDY SILT ROADWAY EMBANKMENT WITH TRACES OF CLAY
- (B) GRAY TO ORANGE, SLIGHTLY MICACEOUS, FINE SANDY SILT ALLUVIUM WITH CLAY
- (C) GRAY TO ORANGE, SLIGHTLY MICACEOUS, FINE SANDY SILT ALLUVIUM WITH CLAY, COBBLES AND BOULDERS
- (D) DARK BROWN TO RED, MICACEOUS, SANDY SILT SAPROLITE WITH A TRACE OF CLAY
- (E) GRAY CRYSTALLINE ROCK (AMPHIBOLITE)

-L- STA 22 + 40 SKEW = 90 DEG.

HORIZ. SCALE 0 10 20 (FEET) VE = 1H:1V

SECTION ALONG EBI

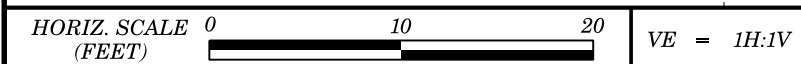
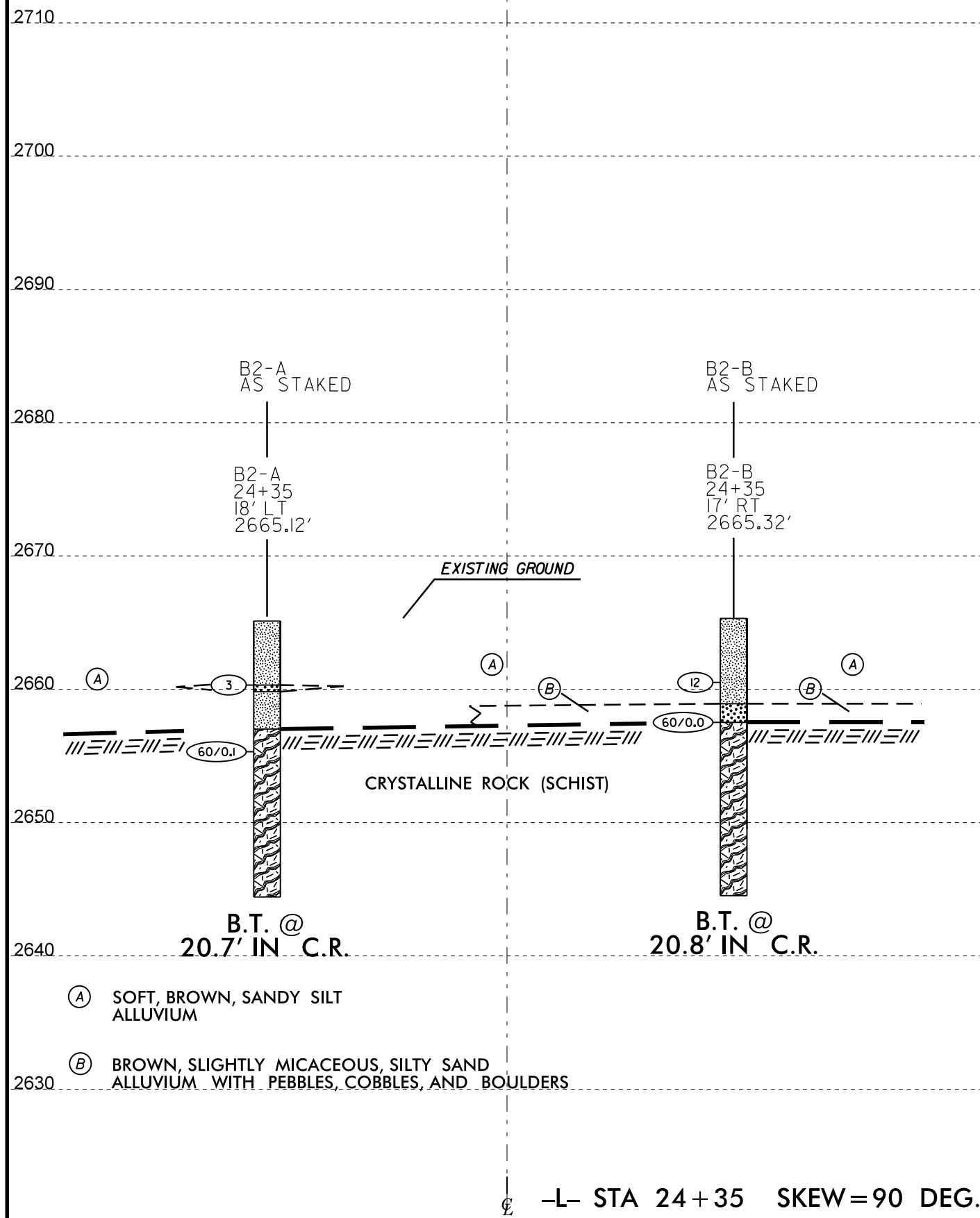


- (A) BROWN, FINE TO COARSE SANDY SILT ALLUVIUM WITH A TRACE OF MICA
- (B) BROWN, FINE TO COARSE, SILTY SAND ALLUVIUM WITH A TRACE OF MICA
- (C) BROWN, MICACEOUS SANDY SILT SAPROLITE

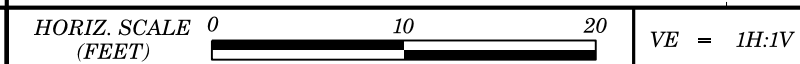
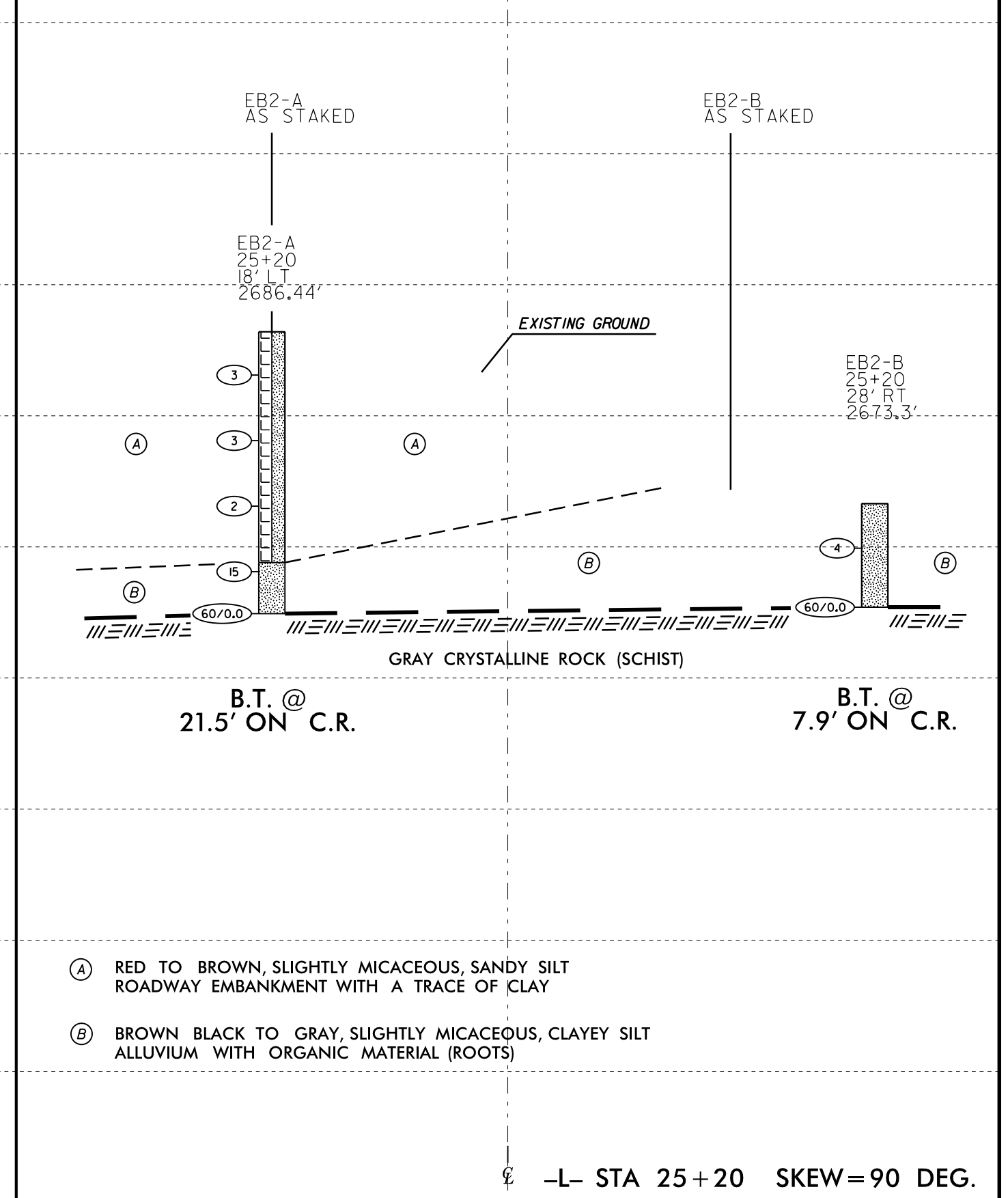
-L- STA 23 + 25 SKEW = 90 DEG.

HORIZ. SCALE 0 10 20 (FEET) VE = 1H:1V

SECTION ALONG BI



SECTION ALONG B2



SECTION ALONG EB2

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 67002.1.1		TIP BR-0002		COUNTY ASHE		GEOLOGIST Johnson, C. D.									
SITE DESCRIPTION BRIDGE #8 ON NC194 OVER NORTH FORK NEW RIVER							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 22+40		OFFSET 18 ft LT		ALIGNMENT L									
COLLAR ELEV. 2,682.3 ft		TOTAL DEPTH 27.3 ft		NORTHING 997,900		EASTING 1,261,495									
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 92% 07/31/2017			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Cheek, D. O.		START DATE 05/29/19		COMP. DATE 05/29/19		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					
2685															
2680	2,679.1	3.2													
2675	2,674.1	8.2	2	2	2										
2670	2,669.1	13.2	1	2	3										
2665	2,664.1	18.2	2	2	2										
2660	2,659.1	23.2	4	13	20										
2655	2,655.0	27.3													
		60/0.0													60/0.0

WBS 67002.1.1		TIP BR-0002		COUNTY ASHE		GEOLOGIST Johnson, C. D.									
SITE DESCRIPTION BRIDGE #8 ON NC194 OVER NORTH FORK NEW RIVER							GROUND WTR (ft)								
BORING NO. EB1-B		STATION 22+46		OFFSET 22 ft RT		ALIGNMENT L									
COLLAR ELEV. 2,673.3 ft		TOTAL DEPTH 11.0 ft		NORTHING 997,879		EASTING 1,261,529									
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 92% 07/31/2017			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Cheek, D. O.		START DATE 05/30/19		COMP. DATE 05/30/19		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					
2675															
2670	2,670.0	3.3													
2665	2,665.0	8.3	1	1	1										
	2,662.4	10.9													
		60/0.1													60/0.1

NCDOT BORE DOUBLE BR0002_BRDG0008_ASH_BOREHOLES.GPJ NC_DOT_GDT 7/19/19

GEOTECHNICAL BORING REPORT BORE LOG

GEOTECHNICAL BORING REPORT CORE LOG

WBS 67002.1.1		TIP BR-0002		COUNTY ASHE		GEOLOGIST Johnson, C. D.									
SITE DESCRIPTION BRIDGE #8 ON NC194 OVER NORTH FORK NEW RIVER							GROUND WTR (ft)								
BORING NO. B1-A		STATION 23+24		OFFSET 18 ft LT		ALIGNMENT L									
COLLAR ELEV. 2,666.9 ft		TOTAL DEPTH 24.4 ft		NORTHING 997,963		EASTING 1,261,551									
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 92% 07/31/2017				DRILL METHOD NW Casing WSPT & Core		HAMMER TYPE Automatic									
DRILLER Cheek, D. O.		START DATE 05/30/19		COMP. DATE 05/30/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2670															
2665	2,663.4	3.5	2	2	1									GROUND SURFACE	0.0
2660	2,658.4	8.5	8	9	7									ALLUVIAL Brown, fine to coarse sandy silt with a trace of mica	
2655	2,656.4	10.5	60/0.0											ALLUVIAL Brown, fine to coarse silty sand with a trace of mica	9.8
2650														SAPROLITE Brown, micaceous silty sand	
2645														CRYSTALLINE ROCK	
Boring Terminated at Elevation 2,642.5 ft IN CRYSTALLINE ROCK (SCHIST)															

NCDOT BORE DOUBLE BR0002_BRDG0008_ASHE_BOREHOLES.GPJ_NC_DOT.GDT 7/19/19

NCDOT BORE DOUBLE BR0002_BRDG0008_ASHE_BOREHOLES.GPJ_NC_DOT.GDT 7/19/19

WBS 67002.1.1		TIP BR-0002		COUNTY ASHE		GEOLOGIST Johnson, C. D.						
SITE DESCRIPTION BRIDGE #8 ON NC194 OVER NORTH FORK NEW RIVER							GROUND WTR (ft)					
BORING NO. B1-A		STATION 23+24		OFFSET 18 ft LT		ALIGNMENT L						
COLLAR ELEV. 2,666.9 ft		TOTAL DEPTH 24.4 ft		NORTHING 997,963		EASTING 1,261,551						
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 92% 07/31/2017				DRILL METHOD NW Casing WSPT & Core		HAMMER TYPE Automatic						
DRILLER Cheek, D. O.		START DATE 05/30/19		COMP. DATE 05/30/19		SURFACE WATER DEPTH N/A						
CORE SIZE nxwl			TOTAL RUN 13.9 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %			
2656.43												
2655	2,656.4	10.5	3.9	N=60/0.0	(3.6)	(3.0)					Begin Coring @ 10.5 ft	10.5
	2,652.5	14.4			92%	77%					CRYSTALLINE ROCK	
2650			5.0		(5.0)	(4.7)					GSI 80 - 90	
	2,647.5	19.4			100%	94%						
2645			5.0		(5.0)	(4.7)						
	2,642.5	24.4			100%	94%					Boring Terminated at Elevation 2,642.5 ft IN CRYSTALLINE ROCK (SCHIST)	

GEOTECHNICAL BORING REPORT BORE LOG

GEOTECHNICAL BORING REPORT CORE LOG

WBS 67002.1.1		TIP BR-0002		COUNTY ASHE		GEOLOGIST Johnson, C. D.									
SITE DESCRIPTION BRIDGE #8 ON NC194 OVER NORTH FORK NEW RIVER							GROUND WTR (ft)								
BORING NO. B2-A		STATION 24+35		OFFSET 18 ft LT		ALIGNMENT L									
COLLAR ELEV. 2,665.1 ft		TOTAL DEPTH 20.7 ft		NORTHING 998,048		EASTING 1,261,623									
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 92% 07/31/2017				DRILL METHOD NW Casing WSPT & Core		HAMMER TYPE Automatic									
DRILLER Cheek, D. O.		START DATE 05/30/19		COMP. DATE 05/30/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2670															
2665														2,665.1	0.0
2660	2,660.3	4.8	50	2	1									2,660.3	4.8
2655	2,655.3	9.8	60/0.1											2,657.0	8.1
2650															
2645															
Boring Terminated at Elevation 2,644.4 ft IN CRYSTALLINE ROCK (SCHIST)															

NCDOT BORE DOUBLE BR0002_BRDG0008_ASH_BOREHOLES.GPJ NC_DOT.GDT 7/19/19

WBS 67002.1.1		TIP BR-0002		COUNTY ASHE		GEOLOGIST Johnson, C. D.						
SITE DESCRIPTION BRIDGE #8 ON NC194 OVER NORTH FORK NEW RIVER							GROUND WTR (ft)					
BORING NO. B2-A		STATION 24+35		OFFSET 18 ft LT		ALIGNMENT L						
COLLAR ELEV. 2,665.1 ft		TOTAL DEPTH 20.7 ft		NORTHING 998,048		EASTING 1,261,623						
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 92% 07/31/2017				DRILL METHOD NW Casing WSPT & Core		HAMMER TYPE Automatic						
DRILLER Cheek, D. O.		START DATE 05/30/19		COMP. DATE 05/30/19		SURFACE WATER DEPTH N/A						
CORE SIZE n x w l			TOTAL RUN 11.4 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %			
2655.82												
2655	2,655.8	9.3	1.4	N=60/0.1	(1.2) 86%	(1.2) 86%						
	2,654.4	10.7	5.0		(5.0) 100%	(4.5) 90%						
2650	2,649.4	15.7	5.0		(4.9) 98%	(4.9) 98%						
2645	2,644.4	20.7									GSI 80 - 90	
Continued from previous page												

NCDOT BORE DOUBLE BR0002_BRDG0008_ASH_BOREHOLES.GPJ NC_DOT.GDT 7/19/19

GEOTECHNICAL BORING REPORT BORE LOG

GEOTECHNICAL BORING REPORT CORE LOG

WBS 67002.1.1		TIP BR-0002		COUNTY ASHE		GEOLOGIST Johnson, C. D.								
SITE DESCRIPTION BRIDGE #8 ON NC194 OVER NORTH FORK NEW RIVER							GROUND WTR (ft)							
BORING NO. B2-B		STATION 24+35		OFFSET 17 ft RT		ALIGNMENT L								
COLLAR ELEV. 2,665.3 ft		TOTAL DEPTH 20.8 ft		NORTHING 998,025		EASTING 1,261,649								
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 92% 07/31/2017		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic										
DRILLER Cheek, D. O.		START DATE 05/30/19		COMP. DATE 05/30/19		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
2670														
2665														2,665.3 GROUND SURFACE 0.0
2660	2,660.5	4.8	4	6	9									ALLUVIAL Brown, sandy silt with mica and a trace of clay
2655	2,657.5	7.8	60/0.0											2,658.9 6.4 2,657.5 7.8 ALLUVIAL Brown, silty sand with cobbles and boulders CRYSTALLINE ROCK
2650														
2645														Boring Terminated at Elevation 2,644.5 ft IN CRYSTALLINE ROCK (SCHIST)

WBS 67002.1.1		TIP BR-0002		COUNTY ASHE		GEOLOGIST Johnson, C. D.					
SITE DESCRIPTION BRIDGE #8 ON NC194 OVER NORTH FORK NEW RIVER							GROUND WTR (ft)				
BORING NO. B2-B		STATION 24+35		OFFSET 17 ft RT		ALIGNMENT L					
COLLAR ELEV. 2,665.3 ft		TOTAL DEPTH 20.8 ft		NORTHING 998,025		EASTING 1,261,649					
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 92% 07/31/2017		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic							
DRILLER Cheek, D. O.		START DATE 05/30/19		COMP. DATE 05/30/19		SURFACE WATER DEPTH N/A					
CORE SIZE n x w l			TOTAL RUN 13.0 ft								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	RQD (ft) %	LOG	DESCRIPTION AND REMARKS
2657.52	2,657.5	7.8	3.0		(2.9) 97%	(2.9) 97%					Continued from previous page
2655	2,654.5	10.8	5.0		(4.9) 98%	(4.7) 94%					CRYSTALLINE ROCK
2650	2,649.5	15.8	5.0		(4.5) 90%	(4.1) 82%					GSI 80 - 90
2645	2,644.5	20.8									Boring Terminated at Elevation 2,644.5 ft IN CRYSTALLINE ROCK (SCHIST)

GEOTECHNICAL BORING REPORT

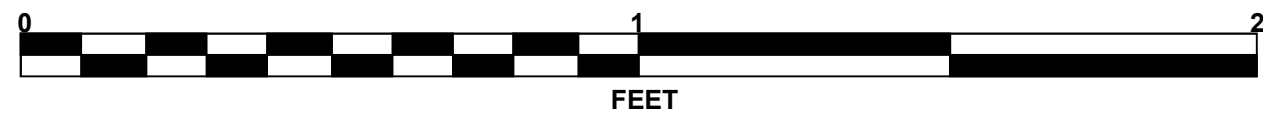
BORE LOG

WBS 67002.1.1		TIP BR-0002		COUNTY ASHE		GEOLOGIST Johnson, C. D.										
SITE DESCRIPTION BRIDGE #8 ON NC194 OVER NORTH FORK NEW RIVER							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 25+20		OFFSET 18 ft LT		ALIGNMENT L										
COLLAR ELEV. 2,686.4 ft		TOTAL DEPTH 21.5 ft		NORTHING 998,112		EASTING 1,261,678										
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 92% 07/31/2017			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Cheek, D. O.		START DATE 05/29/19		COMP. DATE 05/29/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2690																
2685	2,683.1	3.3	1	1	2											2,686.4
GROUND SURFACE 0.0																
ROADWAY EMBANKMENT RED-BROWN, SL MIC, CL-SND-SLT																
2680	2,678.1	8.3	1	1	2											
2675	2,673.1	13.3	1	1	1											
2670	2,668.1	18.3	4	7	8											2,668.8
2665	2,664.9	21.5														2,664.9
ALLUVIAL BRN-BLACK TO GREY, SL MIC, CL-SLT w/ORGX (ROOTS) 17.6																
CRYSTALLINE ROCK BROWN CRYSTALLINE ROCK (SCHIST) Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 2,664.9 ft ON CRYSTALLINE ROCK (SCHIST) 21.5																

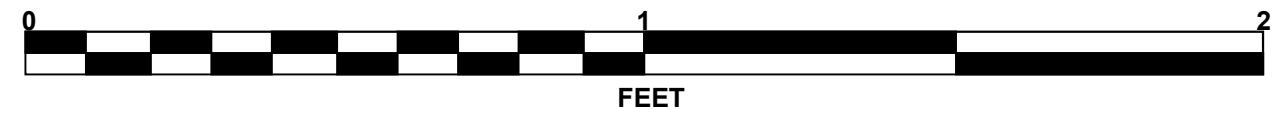
WBS 67002.1.1		TIP BR-0002		COUNTY ASHE		GEOLOGIST Johnson, C. D.										
SITE DESCRIPTION BRIDGE #8 ON NC194 OVER NORTH FORK NEW RIVER							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 25+20		OFFSET 28 ft RT		ALIGNMENT L										
COLLAR ELEV. 2,673.3 ft		TOTAL DEPTH 7.9 ft		NORTHING 998,082		EASTING 1,261,713										
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 92% 07/31/2017			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Cheek, D. O.		START DATE 05/30/19		COMP. DATE 05/30/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2675																
GROUND SURFACE 0.0																
ALLUVIAL LT BROWN, SL MIC, CL-SND-SLT HARDER BEGIN 6.6'-7.7'																
2670	2,669.9	3.4	3	1	3											2,673.3
CRYSTALLINE ROCK BROWN CRYSTALLINE ROCK (SCHIST) Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 2,665.4 ft ON CRYSTALLINE ROCK (SCHIST) 7.9																

CORE PHOTOGRAPHS

B1-A
BOX 1 OF 2: 10.5 - 19.4 FEET
GSI 80 - 90



B1-A
BOX 2 OF 2: 19.4 - 24.4 FEET
GSI 80 - 90



CORE PHOTOGRAPHS

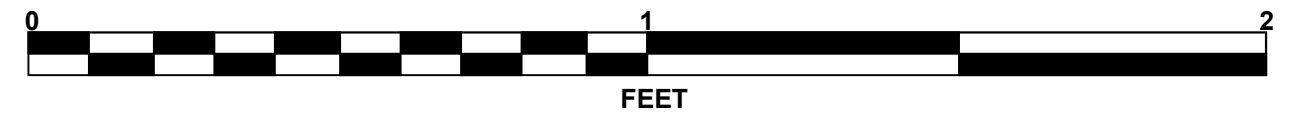
B1-B

BOX 1 OF 2: 10.4 - 20.2 FEET
GSI 80 - 90



B1-B

BOX 2 OF 2: 20.2 - 25.7 FEET
GSI 80 - 90



CORE PHOTOGRAPHS

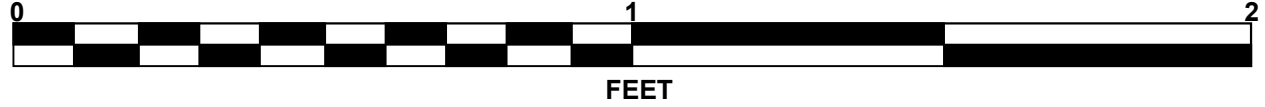
B2-A

BOX 1 OF 2: 9.3 - 17.5 FEET
GSI 80 - 90



B2-A

BOX 2 OF 2: 17.5 - 20.7 FEET
GSI 80 - 90



CORE PHOTOGRAPHS

B2-B

BOX 1 OF 2: 7.8 - 15.8 FEET
GSI 80 - 90



B2-B

BOX 2 OF 2: 15.8 - 20.8 FEET
GSI 80 - 90

