

REFERENCE: BR-0126

PROJECT: 67126

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY WILKES  
PROJECT DESCRIPTION REPLACE BRIDGE #0667  
ON SR 1749 (AUSTIN TRAPHILL RD.)  
OVER SPARKS CREEK

**CONTENTS**

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2A	SUPPLEMENTAL LEGEND (GSI)
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4	PROFILE
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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0126	1	14

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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

PERSONNEL

C.D. JOHNSON

D.O. CHEEK

C.J. COFFEY

INVESTIGATED BY D.M. MULLEN

DRAWN BY DMM

CHECKED BY JCK

SUBMITTED BY JCK

DATE \_\_\_\_\_



DocuSigned by: D Matt Mullen 12/31/2019  
18909BD3CDB940C... SIGNATURE DATE

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

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

# SUBSURFACE INVESTIGATION

**SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
<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><b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.  <b>UNIFORMLY GRADED</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.  <b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p> <p style="text-align: center;"><b>ANGULARITY OF GRAINS</b></p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:  <b>ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</b></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><b>WEATHERED ROCK (WR)</b> - NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</p> <p><b>CRYSTALLINE ROCK (CR)</b> - FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p> <p><b>NON-CRYSTALLINE ROCK (NCR)</b> - 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.</p> <p><b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b> - COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>										<p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.  <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  <b>ARGILLACEOUS</b> - 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.  <b>ARTESIAN</b> - 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.  <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.  <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.  <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.  <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.  <b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.  <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.  <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.  <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.  <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  <b>ROCK QUALITY DESIGNATION (RQD)</b> - 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.  <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.  <b>SILL</b> - 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.  <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.  <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - 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.  <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  <b>STRATA ROCK QUALITY DESIGNATION (SROD)</b> - 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.  <b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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GRAVEL, AND SAND</td> <td>FINE SAND</td> <td>SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS</td> <td>CLAYEY SOILS</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GEN. RATING AS SUBGRADE</td> <td colspan="5">EXCELLENT TO GOOD</td> <td colspan="5">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td>UNSATURABLE</td> <td></td> </tr> <tr> <td colspan="10">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS &gt; LL - 30</td> <td colspan="10"></td> <td colspan="10"></td> </tr> <tr> <th colspan="10" style="text-align: center;">CONSISTENCY OR DENSENESS</th> <th colspan="10" style="text-align: center;">COMPRESSION</th> <th colspan="10" style="text-align: center;">PERCENTAGE OF MATERIAL</th> <th colspan="10" style="text-align: center;">GROUND WATER</th> </tr> <tr> <td colspan="10"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT<sup>2</sup>)</th> </tr> </thead> <tbody> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)</td> <td>VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE</td> <td>&lt; 4 4 TO 10 10 TO 30 30 TO 50 &gt; 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD</td> <td>&lt; 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 &gt; 30</td> <td>&lt; 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 &gt; 4</td> </tr> </tbody> </table> </td> <td colspan="10"> <p><b>SLIGHTLY COMPRESSIBLE</b> LL &lt; 31  <b>MODERATELY COMPRESSIBLE</b> LL = 31 - 50  <b>HIGHLY COMPRESSIBLE</b> LL &gt; 50</p> <p style="text-align: center;"><b>PERCENTAGE OF MATERIAL</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> </thead> <tbody> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt; 10%</td> <td>&gt; 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </tbody> </table> </td> <td colspan="10"> <p><b>WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</b></p> <p><b>STATIC WATER LEVEL AFTER 24 HOURS</b></p> <p><b>PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</b></p> <p><b>SPRING OR SEEP</b></p> </td> <td colspan="10"> <p style="text-align: center;"><b>GROUND WATER</b></p> <p></p> <p></p> <p></p> <p></p> </td> </tr> <tr> <th colspan="10" style="text-align: center;">TEXTURE OR GRAIN SIZE</th> <th colspan="10" style="text-align: center;">RECOMMENDATION SYMBOLS</th> <th colspan="10" style="text-align: center;">ABBREVIATIONS</th> <th colspan="10" style="text-align: center;">SOIL MOISTURE - CORRELATION OF TERMS</th> </tr> <tr> <td colspan="10"> <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> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>BOULDER (BLDR.)</th> <th>COBBLE (COB.)</th> <th>GRAVEL (GR.)</th> <th>COARSE SAND (CS, SD.)</th> <th>FINE SAND (F SD.)</th> <th>SILT (SL.)</th> <th>CLAY (CL.)</th> </tr> </thead> <tbody> <tr> <td>GRAIN SIZE</td> <td>MM 305</td> <td>75</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> <tr> <td></td> <td>IN. 12</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> </td> <td colspan="10"> <p><b>UNDERCUT</b> </p> <p><b>SHALLOW UNDERCUT</b> </p> <p><b>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</b> </p> <p><b>UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</b> </p> <p style="text-align: center;"><b>ABBREVIATIONS</b></p> <table border="1" style="width: 100%; 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BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p><b>INDURATED</b> - GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p><b>EXTREMELY INDURATED</b> - SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p> </td> </tr> <tr> <td colspan="10" style="text-align: center;">COLOR</td> <td colspan="10" style="text-align: center;">FRACURE SPACING</td> <td colspan="10" style="text-align: center;">BEDDING</td> <td colspan="10" style="text-align: center;">NOTES:</td> </tr> <tr> <td colspan="10"> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). 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GRANULAR MATERIALS (≤ 35% PASSING #200)					SILT-CLAY MATERIALS (> 35% PASSING #200)					ORGANIC MATERIALS					A-1	A-1-b	A-3	A-2	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7	GROUP CLASS.	A-1-a	A-1-b	A-3	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7	SYMBOL																% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX 35 MX	35 MX 35 MX	35 MX 35 MX	35 MX 35 MX	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT		MATERIAL PASSING #40 LL PI	-	-	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 11 MN	41 MN 11 MN	40 MX 11 MN	41 MN 11 MN	40 MX 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	HIGHLY ORGANIC SOILS			GROUP INDEX	0	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX							USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS											GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD					FAIR TO POOR					FAIR TO POOR	POOR	UNSATURABLE		PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30																														CONSISTENCY OR DENSENESS										COMPRESSION										PERCENTAGE OF MATERIAL										GROUND WATER										<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT<sup>2</sup>)</th> </tr> </thead> <tbody> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)</td> <td>VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE</td> <td>&lt; 4 4 TO 10 10 TO 30 30 TO 50 &gt; 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD</td> <td>&lt; 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 &gt; 30</td> <td>&lt; 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 &gt; 4</td> </tr> </tbody> </table>										PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )	GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A	GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4	<p><b>SLIGHTLY COMPRESSIBLE</b> LL &lt; 31  <b>MODERATELY COMPRESSIBLE</b> LL = 31 - 50  <b>HIGHLY COMPRESSIBLE</b> LL &gt; 50</p> <p style="text-align: center;"><b>PERCENTAGE OF MATERIAL</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> </thead> <tbody> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt; 10%</td> <td>&gt; 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </tbody> </table>											GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%	HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE	<p><b>WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</b></p> <p><b>STATIC WATER LEVEL AFTER 24 HOURS</b></p> <p><b>PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</b></p> <p><b>SPRING OR SEEP</b></p>										<p style="text-align: center;"><b>GROUND WATER</b></p> <p></p> <p></p> <p></p> <p></p>										TEXTURE OR GRAIN SIZE										RECOMMENDATION SYMBOLS										ABBREVIATIONS										SOIL MOISTURE - CORRELATION OF TERMS										<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>U.S. STD. 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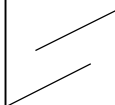
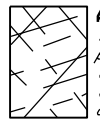
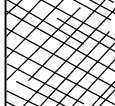
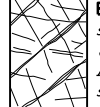



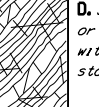

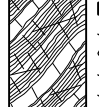


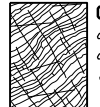

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

**SUBSURFACE INVESTIGATION**

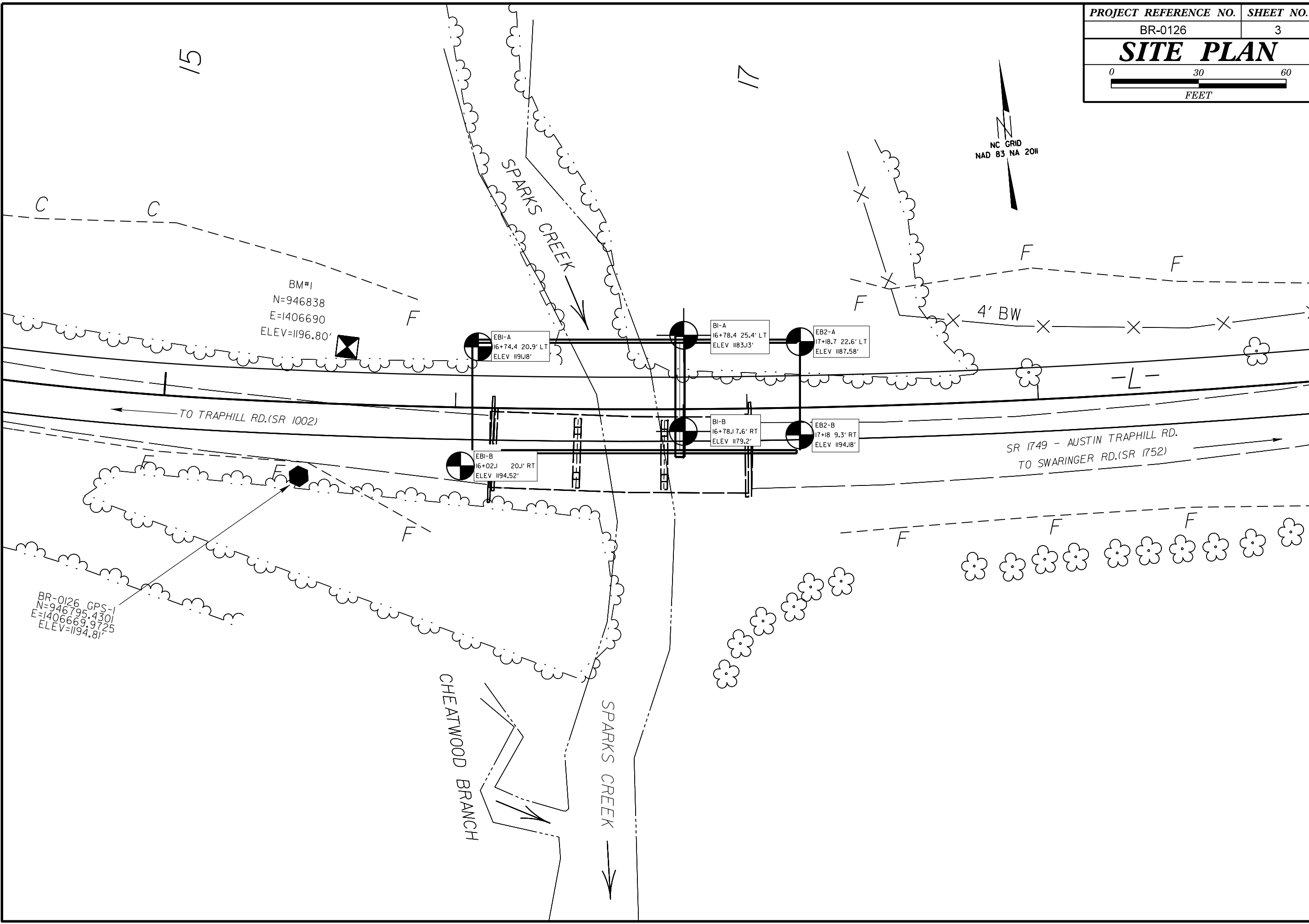
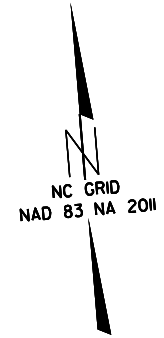
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES  
FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

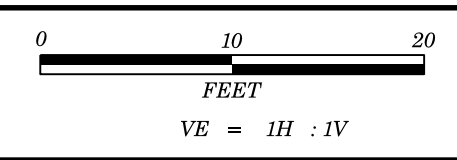
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

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)		SURFACE CONDITIONS					GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)		SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)				
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.		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	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.		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
STRUCTURE		DECREASING SURFACE QUALITY →					COMPOSITION AND STRUCTURE						
 INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities		90			N/A	N/A	 <b>A.</b> Thick bedded, very blocky sandstone. The effect of pelitic 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.	70					
 BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets		80					 <b>B.</b> Sandstone with thin inter-layers of siltstone	60					
 VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets			70				 <b>C.</b> Sandstone and siltstone in similar amounts	50					
 BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity			60				 <b>D.</b> Siltstone or silty shale with sandstone layers	40					
 DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces			50				 <b>E.</b> Weak siltstone or clayey shale with sandstone layers	30					
 LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes			40				 <b>F.</b> Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure	20					
			30				 <b>G.</b> Undisturbed silty or clayey shale with or without a few very thin sandstone layers	10					
			20				 <b>H.</b> Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.						
			10										
		N/A	N/A										

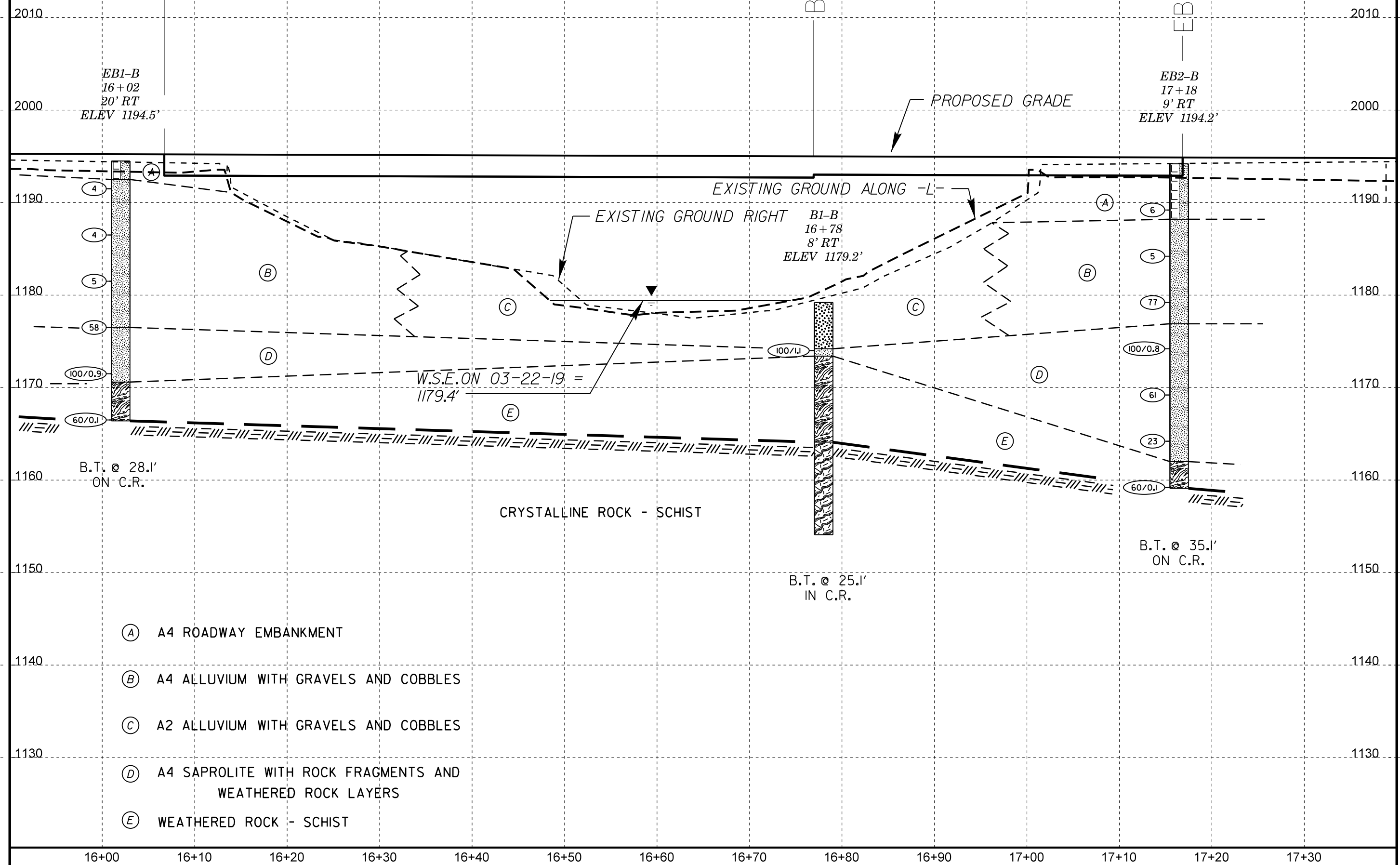
→ Means deformation after tectonic disturbance





<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
BR-0126	4
<b>PROFILE ALONG -L-</b>	

SKEW = 90 DEG.



- (A) A4 ROADWAY EMBANKMENT
- (B) A4 ALLUVIUM WITH GRAVELS AND COBBLES
- (C) A2 ALLUVIUM WITH GRAVELS AND COBBLES
- (D) A4 SAPROLITE WITH ROCK FRAGMENTS AND WEATHERED ROCK LAYERS
- (E) WEATHERED ROCK - SCHIST

EB1-B  
16+02  
20' RT  
ELEV 1194.5'

EB2-B  
17+18  
9' RT  
ELEV 1194.2'

B1-B  
16+78  
8' RT  
ELEV 1179.2'

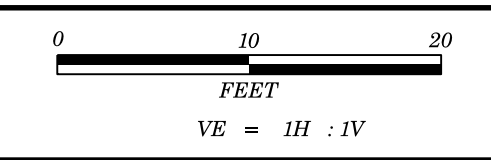
B.T. @ 28.1'  
ON C.R.

B.T. @ 25.1'  
IN C.R.

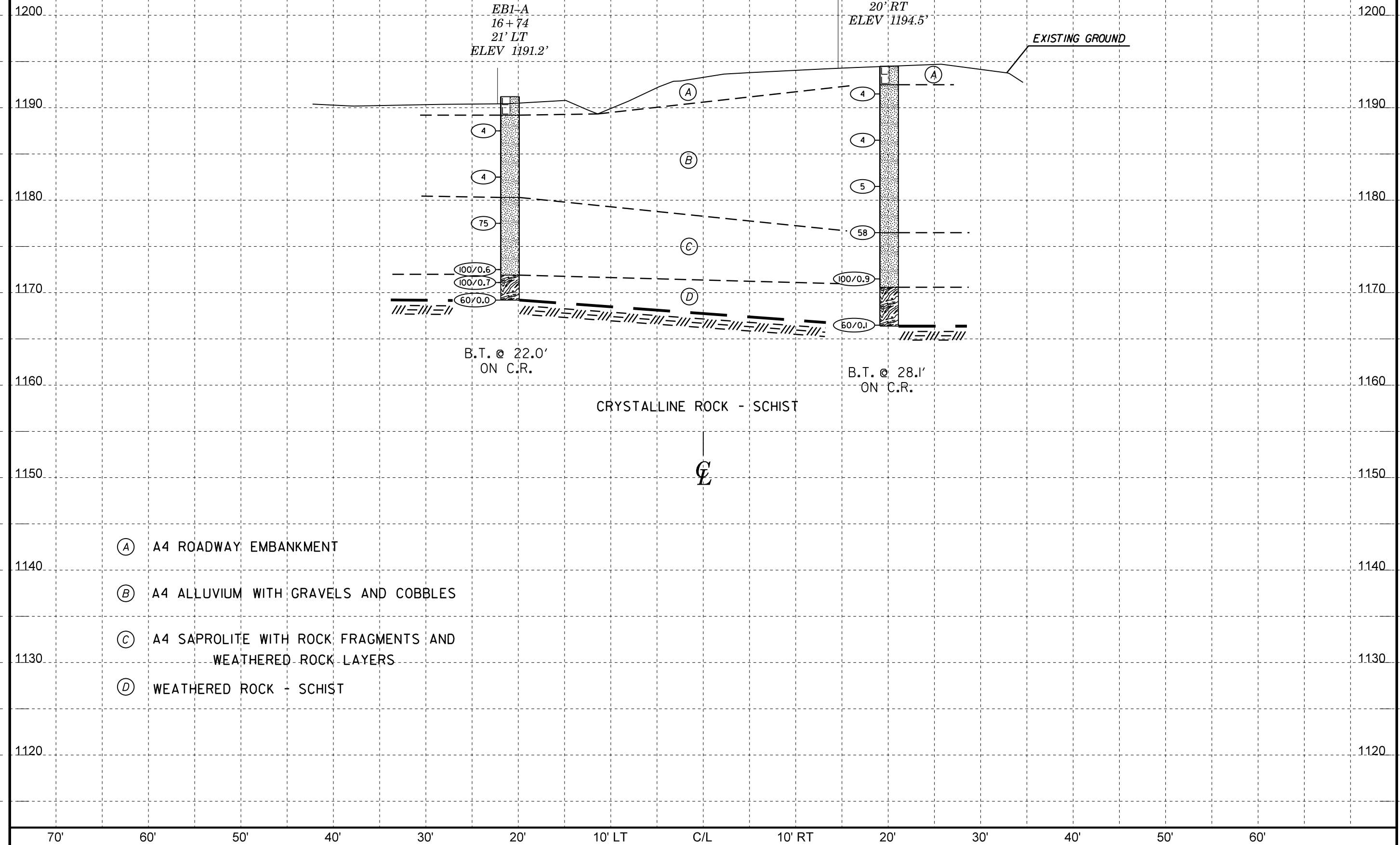
B.T. @ 35.1'  
ON C.R.

W.S.E. ON 03-22-19 =  
1179.4'

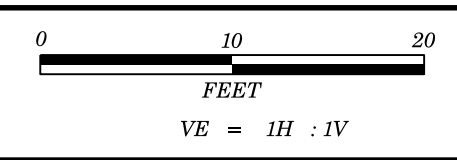
CRYSTALLINE ROCK - SCHIST



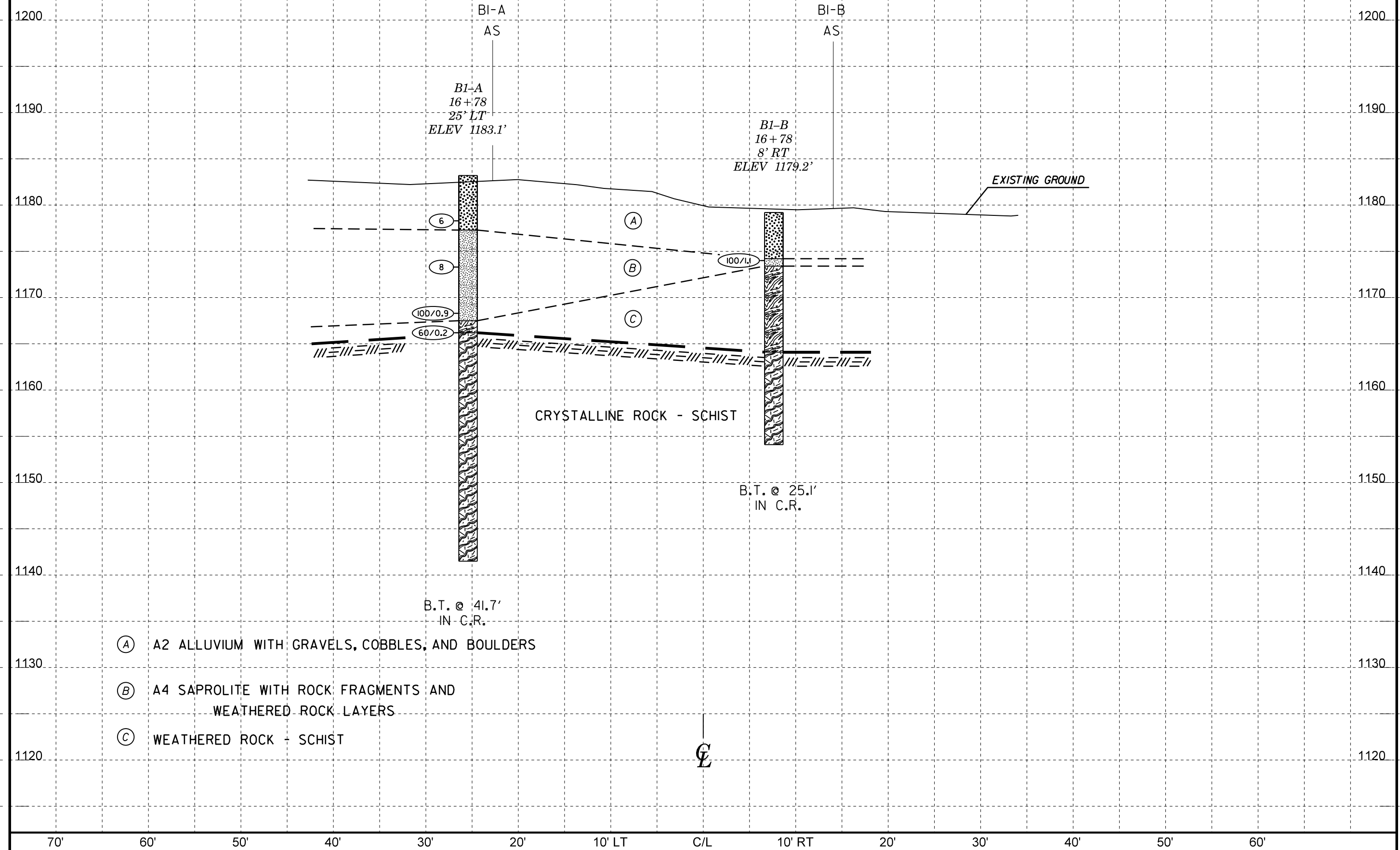
<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
BR-0126	5
<b>CROSS SECTION ALONG END BENT 1</b>	
SKEW = 90 DEG.	



- (A) A4 ROADWAY EMBANKMENT
- (B) A4 ALLUVIUM WITH GRAVELS AND COBBLES
- (C) A4 SAPROLITE WITH ROCK FRAGMENTS AND WEATHERED ROCK LAYERS
- (D) WEATHERED ROCK - SCHIST



<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
BR-0126	6
<b>CROSS SECTION ALONG INTERIOR BENT 1</b>	
SKEW = 90 DEG.	



- (A) A2 ALLUVIUM WITH GRAVELS, COBBLES, AND BOULDERS
- (B) A4 SAPROLITE WITH ROCK FRAGMENTS AND WEATHERED ROCK LAYERS
- (C) WEATHERED ROCK - SCHIST

BI-A  
AS  
BI-A  
16+78  
25' LT  
ELEV 1183.1'

BI-B  
AS  
BI-B  
16+78  
8' RT  
ELEV 1179.2'

CRYSTALLINE ROCK - SCHIST

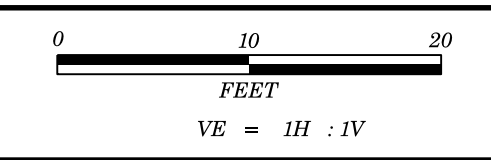
B.T. @ 41.7'  
IN C.R.

B.T. @ 25.1'  
IN C.R.

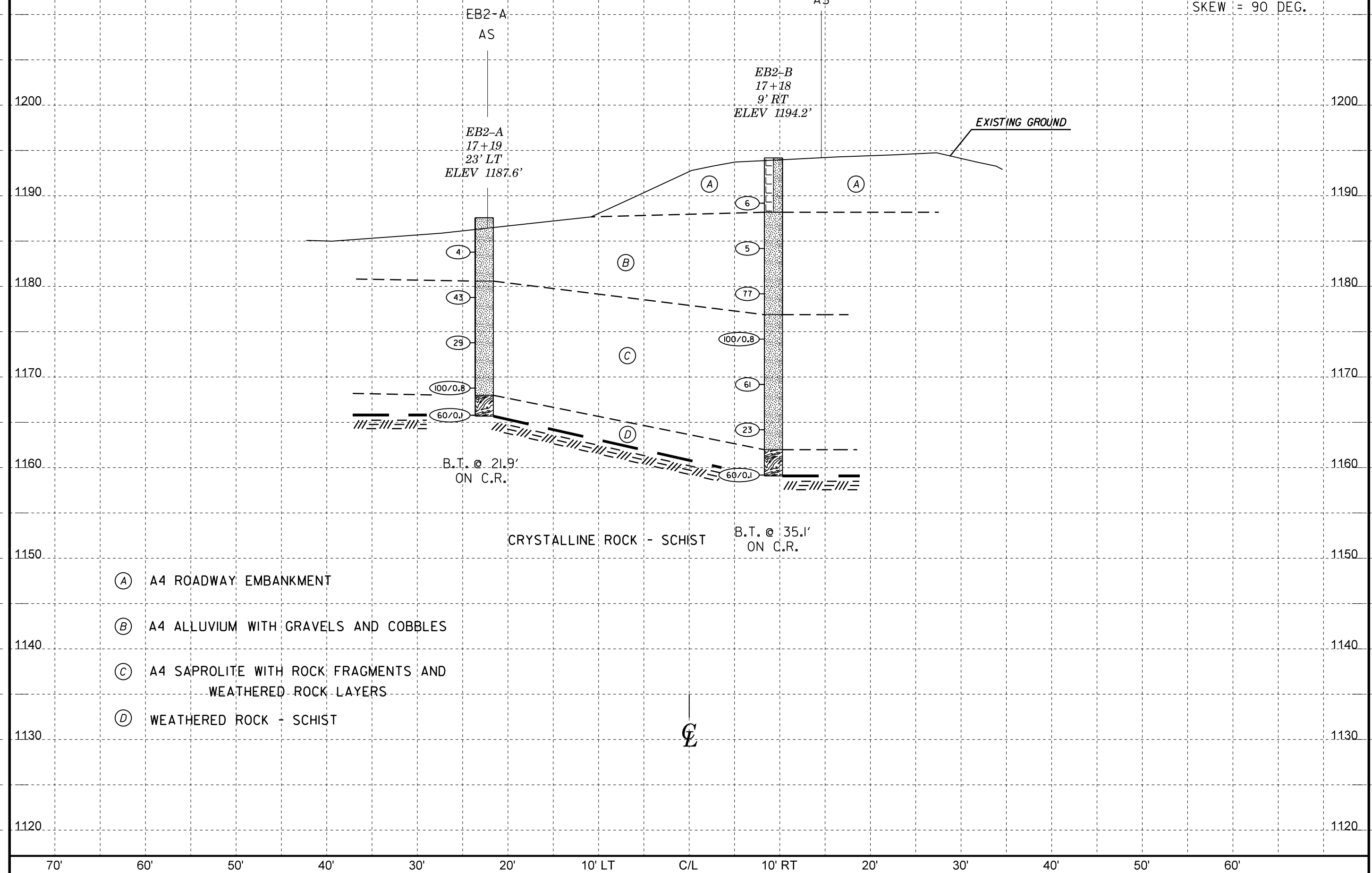
EXISTING GROUND



70' 60' 50' 40' 30' 20' 10' LT C/L 10' RT 20' 30' 40' 50' 60'



PROJECT REFERENCE NO.	SHEET NO.
BR-0126	7
CROSS SECTION ALONG END BENT 2	
SKEW = 90 DEG.	



- (A) A4 ROADWAY EMBANKMENT
- (B) A4 ALLUVIUM WITH GRAVELS AND COBBLES
- (C) A4 SAPROLITE WITH ROCK FRAGMENTS AND WEATHERED ROCK LAYERS
- (D) WEATHERED ROCK - SCHIST

70' 60' 50' 40' 30' 20' 10' LT C/L 10' RT 20' 30' 40' 50' 60'



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS BR-0126		TIP 67126.1.1		COUNTY WILKES		GEOLOGIST Johnson, C. D.										
SITE DESCRIPTION Replace Wilkes bridge #0667 on SR - 1749 (Austin Traphill Rd.) over Sparks Creek							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 16+74		OFFSET 21 ft LT		ALIGNMENT L										
COLLAR ELEV. 1,191.2 ft		TOTAL DEPTH 22.0 ft		NORTHING 946,835		EASTING 1,406,735										
DRILL RIGHAMMER EFF./DATE AFC6744 CME - 45C 96% 04/08/2019			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER Cheek, D. O.		START DATE 12/12/19		COMP. DATE 12/12/19		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						
1195																
1190														1,191.2	GROUND SURFACE	0.0
														1,189.2	ROADWAY EMBANKMENT Brown, slightly micaceous, sandy silt with roots, leaves, sticks and a trace of clay	2.0
	1,187.5	3.7	2	2	2										ALLUVIAL Brown, slightly micaceous, coarse sandy silt with cobbles at 10.8	
1185																
	1,182.5	8.7	1	2	2											
1180																
	1,177.5	13.7	15	39	36										SAPROLITE Brown to white, micaceous, sandy silt with a few rock fragments and stiff layers	10.9
1175																
	1,172.5	18.7														
	1,171.1	20.1	53	47/0.1												
1170																
	1,169.2	22.0	61	39/0.2											WEATHERED ROCK Weathered rock - brown schist	19.3
															CRYSTALLINE ROCK Crystalline rock - brown schist Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,169.2 ft ON C.R.	22.0

WBS BR-0126		TIP 67126.1.1		COUNTY WILKES		GEOLOGIST Johnson, C. D.										
SITE DESCRIPTION Replace Wilkes bridge #0667 on SR - 1749 (Austin Traphill Rd.) over Sparks Creek							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 16+02		OFFSET 20 ft RT		ALIGNMENT L										
COLLAR ELEV. 1,194.5 ft		TOTAL DEPTH 28.1 ft		NORTHING 946,794		EASTING 1,406,726										
DRILL RIGHAMMER EFF./DATE AFC6744 CME - 45C 96% 04/08/2019			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER Cheek, D. O.		START DATE 12/17/19		COMP. DATE 12/14/19		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						
1195																
														1,194.5	GROUND SURFACE	0.0
	1,191.5	3.0	2	2	2									1,192.5	ROADWAY EMBANKMENT Red, orange, slightly micaceous, clayey sandy silt with a few gravels	2.0
1190															ALLUVIAL Light brown, slightly micaceous, sandy silt	
	1,186.5	8.0	2	2	2											
1185																
	1,181.5	13.0	1	2	3											
1180																
	1,176.5	18.0	59	36	22										SAPROLITE Gray, brown, micaceous, sandy silt with weathered rock layers < .5'	18.0
1175																
	1,171.5	23.0	21	79/0.4												
1170																
															WEATHERED ROCK Weathered rock - schist	23.9
															CRYSTALLINE ROCK Crystalline rock - schist Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,166.4 ft ON C.R.	28.1

# GEOTECHNICAL BORING REPORT BORE LOG

# GEOTECHNICAL BORING REPORT CORE LOG

WBS BR-0126		TIP 67126.1.1		COUNTY WILKES		GEOLOGIST Johnson, C. D.										
SITE DESCRIPTION Replace Wilkes bridge #0667 on SR - 1749 (Austin Traphill Rd.) over Sparks Creek							GROUND WTR (ft)									
BORING NO. B1-A		STATION 16+78		OFFSET 25 ft LT		ALIGNMENT L										
COLLAR ELEV. 1,183.1 ft		TOTAL DEPTH 41.7 ft		NORTHING 946,833		EASTING 1,406,806										
DRILL RIGHAMMER EFF./DATE AFC6744 CME - 45C 96% 04/08/2019			DRILL METHOD NW Casing WSPT & Core			HAMMER TYPE Automatic										
DRILLER Cheek, D. O.		START DATE 12/15/19		COMP. DATE 12/15/19		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						
1185														1,183.1	GROUND SURFACE	0.0
1180	1,178.2	4.9	4	3	3									1,177.2	ALLUVIAL Fine to coarse sand	5.9
1175	1,173.2	9.9	2	3	5									1,167.4	SAPROLITE Brown, tan, micaceous, fine, sandy silt harder drilling at 12.7	15.7
1170	1,168.2	14.9	48	52/3										1,166.1	WEATHERED ROCK Weathered rock - Schist	17.0
1165	1,166.1	17.0	60/0.02												CRYSTALLINE ROCK Crystalline rock - Schist	
1160																
1155																
1150																
1145																
														1,141.4	Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,141.4 ft IN C.R.	41.7

WBS BR-0126		TIP 67126.1.1		COUNTY WILKES		GEOLOGIST Johnson, C. D.					
SITE DESCRIPTION Replace Wilkes bridge #0667 on SR - 1749 (Austin Traphill Rd.) over Sparks Creek							GROUND WTR (ft)				
BORING NO. B1-A		STATION 16+78		OFFSET 25 ft LT		ALIGNMENT L					
COLLAR ELEV. 1,183.1 ft		TOTAL DEPTH 41.7 ft		NORTHING 946,833		EASTING 1,406,806					
DRILL RIGHAMMER EFF./DATE AFC6744 CME - 45C 96% 04/08/2019			DRILL METHOD NW Casing WSPT & Core			HAMMER TYPE Automatic					
DRILLER Cheek, D. O.		START DATE 12/15/19		COMP. DATE 12/15/19		SURFACE WATER DEPTH N/A					
CORE SIZE		TOTAL RUN		RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (%)		RQD (%)	REC. (%)			
1166.1	1,166.1	17.0	4.7		(4.2) 89%	(2.0) 43%				Begin Coring @ 17.0 ft	17.0
1165	1,161.4	21.7	5.0		(3.7) 74%	(1.7) 34%				CRYSTALLINE ROCK	
1160	1,156.4	26.7	5.0		(3.5) 70%	(1.6) 32%				17.02 - 18 GSI: 85 - 90 18 - 27.9 GSI: 40 - 50 27.9 - 39.02 GSI: 70 - 75	
1155	1,151.4	31.7	5.0		(5.0) 100%	(4.9) 98%					
1150	1,146.4	36.7	5.0		(4.2) 84%	(2.8) 56%					
1145	1,141.4	41.7								Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,141.4 ft IN C.R.	41.7



# GEOTECHNICAL BORING REPORT

## BORE LOG

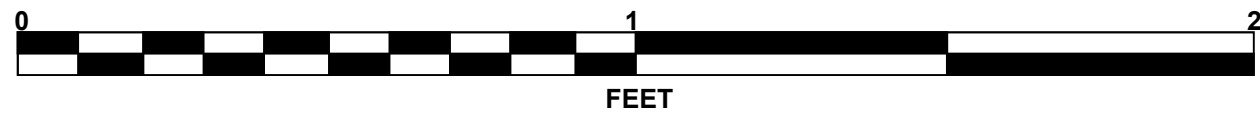
WBS BR-0126		TIP 67126.1.1		COUNTY WILKES		GEOLOGIST Johnson, C. D.										
SITE DESCRIPTION Replace Wilkes bridge #0667 on SR - 1749 (Austin Traphill Rd.) over Sparks Creek							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 17+19		OFFSET 23 ft LT		ALIGNMENT L										
COLLAR ELEV. 1,187.6 ft		TOTAL DEPTH 21.9 ft		NORTHING 946,827		EASTING 1,406,845										
DRILL RIGHAMMER EFF./DATE AFC6744 CME - 45C 96% 04/08/2019			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER Cheek, D. O.		START DATE 12/12/19		COMP. DATE 12/12/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1190															1,187.6	0.0
1185	1,183.8	3.8	1	2	2										1,180.6	7.0
1180	1,178.8	8.8	9	22	21										1,168.0	19.6
1175	1,173.8	13.8	7	11	18										1,165.7	21.9
1170	1,168.8	18.8	26	74/0.3												
	1,165.8	21.8	60/0.1													

WBS BR-0126		TIP 67126.1.1		COUNTY WILKES		GEOLOGIST Johnson, C. D.										
SITE DESCRIPTION Replace Wilkes bridge #0667 on SR - 1749 (Austin Traphill Rd.) over Sparks Creek							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 17+18		OFFSET 9 ft RT		ALIGNMENT L										
COLLAR ELEV. 1,194.2 ft		TOTAL DEPTH 35.1 ft		NORTHING 946,795		EASTING 1,406,842										
DRILL RIGHAMMER EFF./DATE AFC6744 CME - 45C 96% 04/08/2019			DRILL METHOD NW Casing w/ SPT			HAMMER TYPE Automatic										
DRILLER Cheek, D. O.		START DATE 12/16/19		COMP. DATE 12/16/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
1195															1,194.2	0.0
1190	1,189.2	5.0	2	2	4										1,188.2	6.0
1185	1,184.2	10.0	1	2	3										1,176.9	17.3
1180	1,179.2	15.0	11	50	27										1,162.0	32.2
1175	1,174.2	20.0	57	43/0.3											1,159.1	35.1
1170	1,169.2	25.0	26	36	25											
1165	1,164.2	30.0	10	12	11											
1160	1,159.2	35.0	60/0.1													

# CORE PHOTOGRAPHS

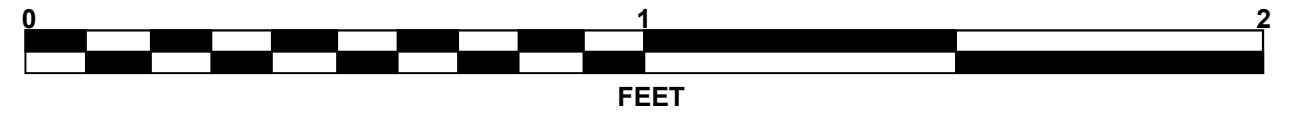
## B1-A

BOX 1 OF 3: 17.02 - 27.9  
17.02 - 18 GSI: 85 - 90  
18 - 27.9 GSI: 40 - 50



## B1-A

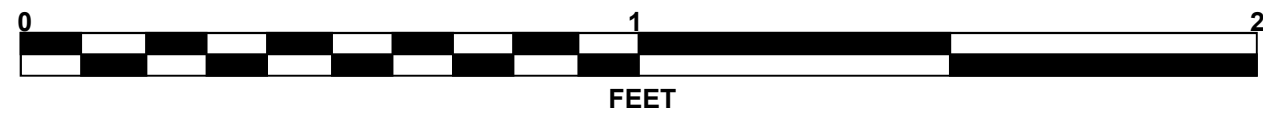
BOX 2 OF 3: 27.9 - 39.02 FEET  
GSI: 70 - 75



# CORE PHOTOGRAPHS

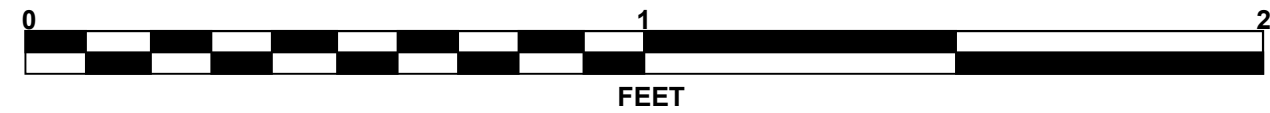
## B1-A

BOX 3 OF 3: 39.02 - 41.72 FEET  
GSI: 75 - 80



## B1-B

BOX 1 OF 2: 5.8 - 22.8 FEET  
GSI 40 - 45



# CORE PHOTOGRAPHS

**B1-B**  
BOX 2 OF 2: 22.8 - 35.1 FEET  
GSI: 50 - 60

