

SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP5.R075	1	

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 T07-6850. 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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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

GOODNIGHT, D. J.

TRIGON EXP.

INVESTIGATED BY GOODNIGHT, D. J.

DRAWN BY HUNSBERGER, W. S.

CHECKED BY CROCKETT, S. C.

SUBMITTED BY FALCON

DATE AUGUST 2024

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**ROADWAY
SUBSURFACE INVESTIGATION**

COUNTY WARREN

PROJECT DESCRIPTION REPLACE BRIDGE NO. 16 OVER
BEN'S CREEK ON ODELL LITTLETON ROAD
(SR 1509)

INVENTORY

REFERENCE: BP5.R075

PROJECT: N/A



Signed by:

W. Scott Hunsberger 8/27/2024

5A469AC80FCD49E

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>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 DISLOGGED 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 (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (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%; text-align: center;"> <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-1-b</th><th>A-2</th><th>A-2-4</th><th>A-2-5</th><th>A-2-6</th><th>A-2-7</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> </tr> <tr> <th>GROUP CLASS.</th> <td>A-1-a</td><td>A-1-b</td><td>A-2</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> <th>SYMBOL</th> <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>○○○○○○○○</td> </tr> <tr> <th>% PASSING #10 #40 #200</th> <td>50 MX 30 MX 15 MX</td><td>50 MX 25 MX</td><td>51 MN 10 MX</td><td>35 MX 35 MX</td><td>35 MX 35 MX</td><td>35 MX 35 MX</td><td>36 MN 36 MX</td><td>36 MN 36 MN</td><td>36 MN 36 MN</td><td>36 MN 36 MN</td><td>36 MN 36 MN</td><td>GRANULAR SOILS</td><td>SILT-CLAY SOILS</td><td>MUCK, PEAT</td><td></td><td></td> </tr> <tr> <th>MATERIAL PASSING #40 LL PI</th> <td>-</td><td>-</td><td>40 MX 10 MX</td><td>41 MN 10 MX</td><td>41 MN 11 MN</td><td>41 MN 11 MN</td><td>40 MX 10 MX</td><td>41 MN 11 MN</td><td>40 MX 10 MX</td><td>41 MN 11 MN</td><td>41 MN 11 MN</td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <th>GROUP INDEX</th> <td>0</td><td>0</td><td>0</td><td>4 MX</td><td>8 MX</td><td>12 MX</td><td>16 MX</td><td>NO MX</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td>STONE FRAGS. 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>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td><td>HIGHLY ORGANIC SOILS</td><td></td><td></td><td></td> </tr> <tr> <th>GEN. RATING AS SUBGRADE</th> <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><td></td><td></td> </tr> <tr> <td colspan="10">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</td> <td colspan="10"></td> <td colspan="10"></td> </tr> <tr> <td colspan="10"> <p style="text-align: center;">CONSISTENCY OR DENSENESS</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <th rowspan="2">PRIMARY SOIL TYPE</th> <th rowspan="2">COMPACTNESS OR CONSISTENCY</th> <th colspan="2">RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th rowspan="2">RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</th> </tr> <tr> <th>< 4</th><th>4 TO 10</th> <th>< 0.25</th> </tr> <tr> <td rowspan="3">GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE</td> <td>4 TO 10</td> <td>10 TO 30</td> <td>N/A</td> </tr> <tr> <td>MEDIUM DENSE</td> <td>10 TO 30</td> <td>30 TO 50</td> <td></td> </tr> <tr> <td>DENSE</td> <td>30 TO 50</td> <td>> 50</td> <td></td> </tr> <tr> <td rowspan="4">GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT</td> <td>< 2</td> <td>2 TO 4</td> <td>0.25 TO 0.5</td> </tr> <tr> <td>SOFT</td> <td>2 TO 4</td> <td>4 TO 8</td> <td>0.5 TO 1.0</td> </tr> <tr> <td>MEDIUM STIFF</td> <td>4 TO 8</td> <td>8 TO 15</td> <td>1 TO 2</td> </tr> <tr> <td>STIFF</td> <td>8 TO 15</td> <td>15 TO 30</td> <td>2 TO 4</td> </tr> <tr> <td></td> <td>VERY STIFF</td> <td>> 30</td> <td>> 30</td> <td>> 4</td> </tr> </table> </td> <td colspan="10"> <p style="text-align: center;">TEXTURE OR GRAIN SIZE</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <td>4</td><td>10</td><td>40</td><td>60</td><td>200</td><td>270</td> </tr> <tr> <td></td> <td>4.75</td><td>2.00</td><td>0.42</td><td>0.25</td><td>0.075</td><td>0.053</td> </tr> <tr> <th>BOULDER (BLDR.)</th> <th>COBBLE (COB.)</th> <th>GRAVEL (GR.)</th> <th>COARSE SAND (CSE. SD.)</th> <th>FINE SAND (F SD.)</th> <th>SILT (SL.)</th> <th>CLAY (CL.)</th> </tr> <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> </table> </td> <td colspan="10"> <p style="text-align: center;">RECOMMENDATION SYMBOLS</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td> UNDERCUT</td> <td> UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</td> <td> UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</td> </tr> <tr> <td> SHALLOW UNDERCUT</td> <td> UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</td> <td></td> </tr> </table> </td> <td colspan="10"> <p style="text-align: center;">ABBREVIATIONS</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>AR - AUGER REFUSAL</td> <td>CL. - CLAY</td> <td>CPT - CONE PENETRATION TEST</td> <td>CSE. - COARSE</td> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>e - VOID RATIO</td> <td>F - FINE</td> <td>FOSS. - FOSSILIFEROUS</td> <td>FRAC. - FRACTURED, FRACTURES</td> <td>FRAGS. - FRAGMENTS</td> <td>HI. - HIGHLY</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>CL. - CLAY</td> <td>CPT - CONE PENETRATION TEST</td> <td>CSE. - COARSE</td> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>e - VOID RATIO</td> <td>F - FINE</td> <td>FOSS. - FOSSILIFEROUS</td> <td>FRAC. - FRACTURED, FRACTURES</td> <td>FRAGS. - FRAGMENTS</td> <td>HI. - HIGHLY</td> </tr> <tr> <td>ME. - MEDIUM</td> <td>MICA. - MICACEOUS</td> <td>MOD. - MODERATELY</td> <td>NP - NON PLASTIC</td> <td>ORG. - ORGANIC</td> <td>PMT - PRESSUREMETER TEST</td> <td>SAP. - SAPROLITIC</td> <td>SD. - SAND, SANDY</td> <td>SL. - SILT, SILTY</td> <td>SLI. - SLIGHTLY</td> <td>TCR - TRICONE REFUSAL</td> <td>w - MOISTURE CONTENT</td> <td>V - VERY</td> <td>VST - VANE SHEAR TEST</td> <td>WEA. - WEATHERED</td> <td>UW - UNIT WEIGHT</td> <td>UDW - DRY UNIT WEIGHT</td> </tr> <tr> <td></td> </tr> </table> </td> <td colspan="10"> <p style="text-align: center;">SOIL MOISTURE - CORRELATION OF TERMS</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL - PLASTIC LIMIT</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE SHRINKAGE LIMIT</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table> </td> </tr> <tr> <td colspan="10"> <p style="text-align: center;">PLASTICITY</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <th rowspan="2">NON PLASTIC</th> <th colspan="2">PLASTICITY INDEX (PI)</th> <th rowspan="2">DRY STRENGTH</th> </tr> <tr> <td>0-5</td> <td>VERY LOW</td> </tr> <tr> <td>SLIGHTLY PLASTIC</td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td>MODERATELY PLASTIC</td> <td>16-25</td> <td>MEDIUM</td> </tr> <tr> <td>HIGHLY PLASTIC</td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </table> </td> <td colspan="10"> <p style="text-align: center;">EQUIPMENT USED ON SUBJECT PROJECT</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>DRILL UNITS:</td> <td>ADVANCING TOOLS:</td> <td>HAMMER TYPE:</td> </tr> <tr> <td><input type="checkbox"/> CME-45C</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> CME-55</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td></td> </tr> <tr> <td><input type="checkbox"/> CME-550</td> <td><input checked="" type="checkbox"/> 8" HOLLOW AUGERS</td> <td></td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td></td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td> <td></td> </tr> <tr> <td><input checked="" type="checkbox"/> MOBILE B-57</td> <td><input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE _____ * STEEL TEETH</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE _____ * TUNG-CARB.</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> CORE BIT</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table> </td> <td colspan="10"> <p style="text-align: center;">ROCK HARDNESS</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <th>VERY HARD</th> <td>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</td> </tr> <tr> <th>HARD</th> <td>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</td> </tr> <tr> <th>MODERATELY HARD</th> <td>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.</td> </tr> <tr> <th>MEDIUM HARD</th> <td>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.</td> </tr> <tr> <th>SOFT</th> <td>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.</td> </tr> <tr> <th>VERY SOFT</th> <td>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.</td> </tr> </table> </td> </tr> <tr> <td colspan="10"> <p style="text-align: center;">FRACTURE SPACING</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <th>TERM</th> <th>SPACING</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </table> </td> <td colspan="10"> <p style="text-align: center;">BEDDING</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table> </td> </tr> <tr> <td colspan="10"> <p style="text-align: center;">INDURATION</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <th>FRIBLE</th> <td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <th>MODERATELY INDURATED</th> <td>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <th>INDURATED</th> <td>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <th>EXTREMELY INDURATED</th> <td>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> </table> </td> <td colspan="10"> <p style="text-align: center;">NOTES:</p> <p>FIAD - FILLED IMMEDIATELY AFTER DRILLING</p> </td> </tr> <tr> <td colspan="10"> <p style="text-align: center;">BENCH MARK: BL-102 (N: 962423.436, E: 2313614.164)</p> </td> <td colspan="10"> <p style="text-align: center;">ELEVATION: 215.22 FEET</p> </td> </tr> <tr> <td colspan="10"> <p style="text-align: center;">PLASTICITY</p> </td> <td colspan="10"> <p style="text-align: center;">INDURATION</p> </td> </tr> <tr> <td colspan="10"> <p style="text-align: center;">COLOR</p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p> </td> <td colspan="10"> <p style="text-align: center;">INDURATION</p> </td> </tr> </table>										GENERAL CLASS.	GRANULAR MATERIALS (<= 35% PASSING #200)					SILT-CLAY MATERIALS (> 35% PASSING #200)					ORGANIC MATERIALS					A-1	A-1-b	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-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		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	36 MN 36 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	41 MN 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 11 MN	40 MX 10 MX	41 MN 11 MN	41 MN 11 MN						GROUP INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX									USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS							SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	HIGHLY ORGANIC 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																														<p style="text-align: center;">CONSISTENCY OR DENSENESS</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <th rowspan="2">PRIMARY SOIL TYPE</th> <th rowspan="2">COMPACTNESS OR CONSISTENCY</th> <th colspan="2">RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th rowspan="2">RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</th> </tr> <tr> <th>< 4</th><th>4 TO 10</th> <th>< 0.25</th> </tr> <tr> <td rowspan="3">GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE</td> <td>4 TO 10</td> <td>10 TO 30</td> <td>N/A</td> </tr> <tr> <td>MEDIUM DENSE</td> <td>10 TO 30</td> <td>30 TO 50</td> <td></td> </tr> <tr> <td>DENSE</td> <td>30 TO 50</td> <td>> 50</td> <td></td> </tr> <tr> <td rowspan="4">GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT</td> <td>< 2</td> <td>2 TO 4</td> <td>0.25 TO 0.5</td> </tr> <tr> <td>SOFT</td> <td>2 TO 4</td> <td>4 TO 8</td> <td>0.5 TO 1.0</td> </tr> <tr> <td>MEDIUM STIFF</td> <td>4 TO 8</td> <td>8 TO 15</td> <td>1 TO 2</td> </tr> <tr> <td>STIFF</td> <td>8 TO 15</td> <td>15 TO 30</td> <td>2 TO 4</td> </tr> <tr> <td></td> <td>VERY STIFF</td> <td>> 30</td> <td>> 30</td> <td>> 4</td> </tr> </table>										PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)		RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)	< 4	4 TO 10	< 0.25	GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	4 TO 10	10 TO 30	N/A	MEDIUM DENSE	10 TO 30	30 TO 50		DENSE	30 TO 50	> 50		GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	< 2	2 TO 4	0.25 TO 0.5	SOFT	2 TO 4	4 TO 8	0.5 TO 1.0	MEDIUM STIFF	4 TO 8	8 TO 15	1 TO 2	STIFF	8 TO 15	15 TO 30	2 TO 4		VERY STIFF	> 30	> 30	> 4	<p style="text-align: center;">TEXTURE OR GRAIN SIZE</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <th>U.S. STD. 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CONTRACT: PROJECT: BP5.R075.1

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

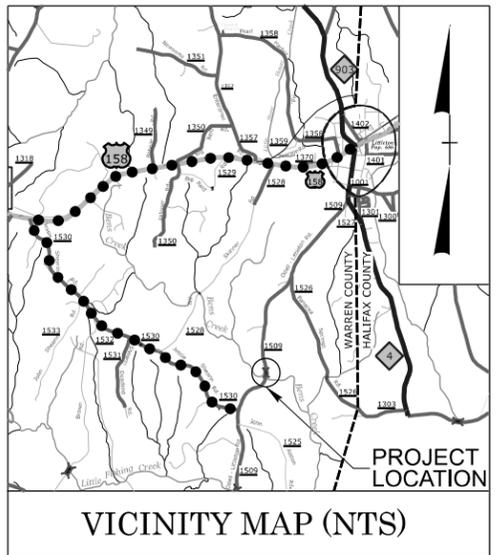
WARREN COUNTY

LOCATION: *REPLACE BRIDGE NO. 16 OVER
BEN'S CREEK ON ODELL
LITTLETON ROAD (SR 1509)*

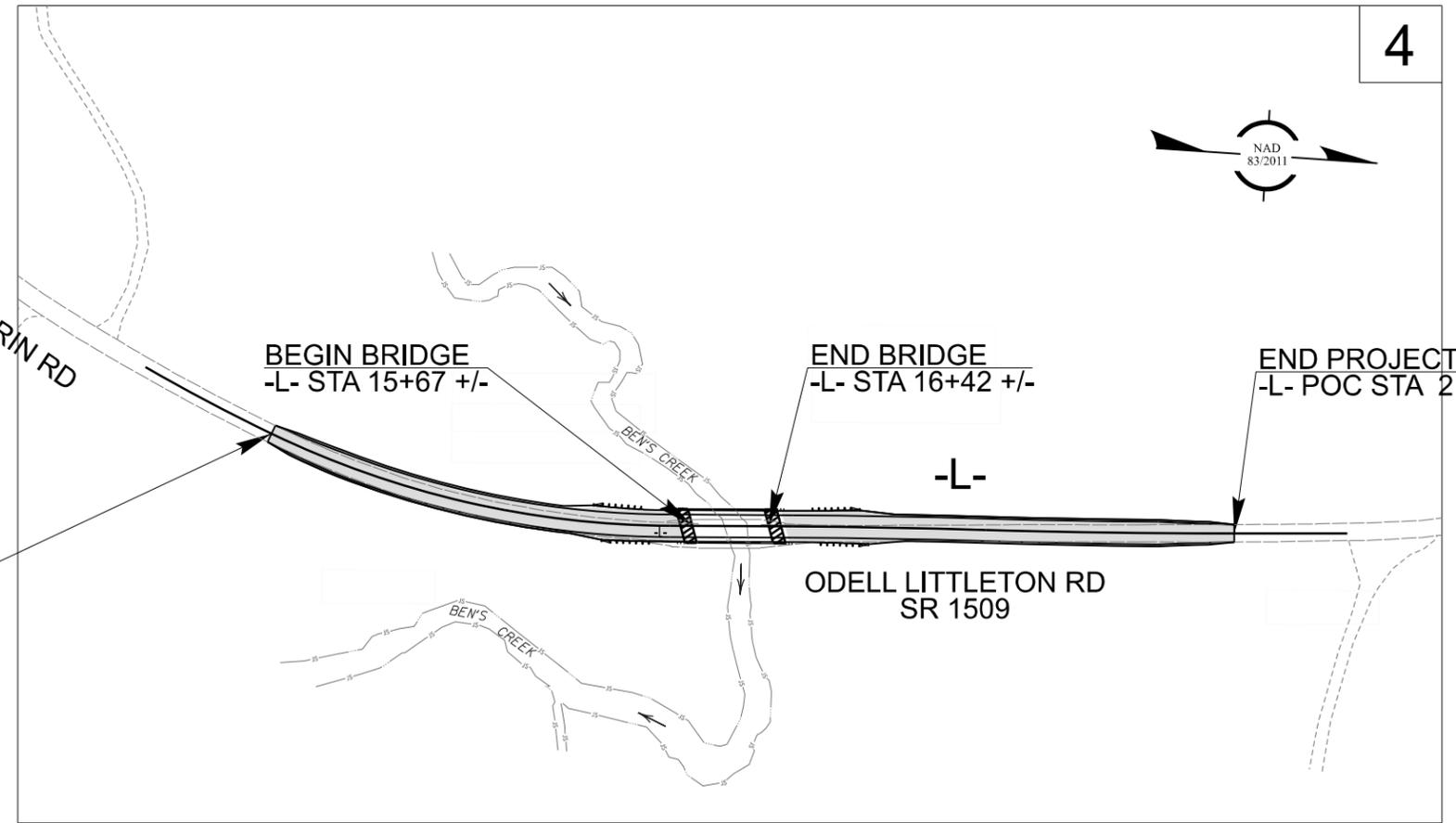
TYPE OF WORK: *GRADING, PAVING,
DRAINAGE, AND STRUCTURE*

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP5.R075.1	3	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
BP5.R075.1	N/A	PE	
BP5.R075.2	N/A	R/W	
BP5.R075.3	N/A	CONST.	

Design Recommendation Plan Set
Plans Developed with
OpenRoads (ORD)



●●●●● OFF-SITE DETOUR



- NOTES:
1. THIS IS NOT A CONTROL OF ACCESS PROJECT
 2. THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARY
 3. CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

<p>GRAPHIC SCALES</p> <p>0 50 100 PLANS</p> <p>0 50 100 PROFILE (HORIZONTAL)</p> <p>0 10 20 PROFILE (VERTICAL)</p>	<p>DESIGN DATA</p> <p>ADT 2025 = 300 ADT 2045 = 400</p> <p>V = 50 MPH</p> <p>FUNC CLASS = LOCAL SUBREGIONAL TIER</p>	<p style="text-align: center;">PROJECT LENGTH</p> <p style="text-align: center;">LENGTH ROADWAY PROJECT BP5.R075.1 = 0.168 MILES</p> <p style="text-align: center;">LENGTH STRUCTURES PROJECT BP5.R075.1 = 0.014 MILES</p> <p style="text-align: center;">TOTAL LENGTH PROJECT BP5.R075.1 = 0.182 MILES</p>	<p style="text-align: center;">Prepared in the Office of:</p> <p style="text-align: center;">LOCHNER</p> <p style="font-size: small;">H.W. LOCHNER, INC. 2040 PLAZA PLACE, SUITE 202 RALEIGH, NC 27612 919.571.7111</p> <p style="font-size: small;">VHB ENGINEERING INC. (C-3705) 940 MAIN CAMPUS DRIVE, SUITE 500 RALEIGH, NC 27606</p> <p style="text-align: center;">2024 STANDARD SPECIFICATIONS</p> <p>RIGHT OF WAY DATE: FY 2025</p> <p>LETTING DATE: JULY 23, 2025</p>	<p style="text-align: center;">HYDRAULICS ENGINEER</p> <p style="text-align: center;">SIGNATURE: _____ P.E.</p> <hr/> <p style="text-align: center;">ROADWAY DESIGN ENGINEER</p> <p style="text-align: center;">SIGNATURE: _____ P.E.</p>	
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Roadway Subsurface Investigation Report - Inventory

Replace Bridge No. 16 over Ben's Creek on Odell Littleton Road (SR 1509)
Warren County, North Carolina
TIP: BP5.R075
Falcon Project No.: G24012.00

Prepared for:
LOCHNER
2840 Plaza Place, Suite 202
Raleigh, NC 27612

Submitted by:
Falcon Engineering, Inc.
1210 Trinity Road, Suite 110
Cary, North Carolina 27513
(919) 871-0800
www.falconengineers.com

August 27, 2024

TIP: BP5.R075
COUNTY: Warren
DESCRIPTION: Replace Bridge No. 16 Over Ben's Creek on Odell Littleton Road (SR 1509)
SUBJECT: Roadway Subsurface Investigation – Inventory

PROJECT DESCRIPTION

This project consists of 0.18 miles of proposed new grading, new paving, and new structure construction along Odell Littleton Road in Warren County. The existing bridge over Ben's Creek on Odell Littleton Road will be replaced. The structure investigation and recommendations can be found under separate cover.

The investigation was conducted between April 1st through 4th, 2024. The information provided in this report are based solely on our site reconnaissance, soil test borings and laboratory test data, engineering evaluation of these data, and generally accepted soil and foundation engineering practices and principles.

A total of six (6) Standard Penetration Test (SPT) borings were performed for the proposed roadway alignment. All mechanical borings were drilled using a Mobil B-57 ATV rig equipped with 2 1/4-inch inside diameter hollow-stem augers, and SPT testing was performed with an automatic hammer. Representative soil samples, collected with a split-barrel sampler, were selected for laboratory testing to verify visual field classifications.





The following alignment, totaling approximately 0.18 miles was explicitly investigated.

<u>Alignment</u>	<u>Station (ft)</u>
-L- (Odell Littleton Road)	11+40 — 21+00

AREAS OF SPECIAL GEOTECHNICAL INTEREST

- I. Shallow ground water within 4 feet of existing ground surface was encountered at the following locations:

<u>Alignment</u>	<u>Station (ft)</u>
-L-	14+61
-L-	17+07

- II. Alluvial soils were encountered at the following location:

<u>Alignment</u>	<u>Station (ft)</u>
-L-	12+62

- III. Soft/very loose soils (N value < 4 bpf) were found at the ground surface at the following location:

<u>Alignment</u>	<u>Station (ft)</u>
-L-	14+61

PHYSIOGRAPHY AND GEOLOGY

The project site is in the Raliegh Belt Physiographic Province of North Carolina. According to the **Geologic Map of North Carolina** (1985), the site is underlain by Felsic Mica Gneiss (**CZlg**) – Interlayered with graphitic mica schist and mica-garnet schist, commonly with kyanite; minor hornblende gneiss.

Existing site topography is typical of North Carolina's Piedmont Region. Topography along the project corridor generally slopes from both ends towards the creek crossing the middle of the project corridor. The existing ground surface has elevations ranging from a high of around 259 feet to a low of around 203 feet at the creek bed.

Existing land use within the project corridor is generally undeveloped. On either side of the project corridor, the land is generally developed with residential areas, with some agricultural development to the north of the corridor.





SOIL PROPERTIES

A variety of soils were encountered along the project, including existing roadway embankments, alluvial soils, residual soils, and weathered rock. Areas where soils at the ground surface are of a unique origin (i.e. not residual soils) are approximately delineated on the boring location plans based on subsurface conditions encountered in nearby borings, and various topographical, vegetative, or other visual surface features.

Topsoil was encountered in grassy, brushy, and wooded areas ranging in thickness from 0.1 to 0.5 feet, and typically on the order of 0.2 feet.

Roadway Embankment soils were encountered at the ground surface adjacent to and beneath existing roadways. These consist of up to 9.0 feet of moist to wet, very loose to medium dense, silty sands (A-2-4, A-2-5) and soft, sandy silt (A-4) with trace gravel.

Alluvial soils were encountered beneath roadway embankment soils near natural waterways. These consist of wet, soft, clayey silts (A-5) with trace gravel and organics.

Residual soils were encountered at the ground surface, or beneath roadway embankments. These soils consist of moist to wet, loose to dense, silty sands (A-2-4 and A-2-5) and soft to medium stiff, sandy silt (A-4).

Weathered Rock (WR) is a very hard material with properties intermediate of soil and rock. WR is classified as having an N-value of greater than 100 blows per one foot. WR encountered on the project generally consists of gray, felsic gneiss. WR was encountered at one location explored at approximately elevation 222.5 ft, msl.

GROUNDWATER PROPERTIES

Groundwater levels were measured at the time of boring completion, and in many cases after a waiting period of at least 24 hours. Borings drilled within and in close proximity to existing roadways, and within residential or commercial areas likely to see pedestrian traffic were backfilled immediately after completion due to safety considerations.

Groundwater levels across the site were generally deep, becoming shallower as they got closer to the existing creek. The existing creek, Ben's Creek, runs perpendicular to the project corridor, crossing at approximately -L- 16+00.

CLOSING

Falcon appreciates the opportunity to have provided our geotechnical engineering services for the above referenced project. If you have any questions concerning the contents of this report or need additional information, please do not hesitate to contact our office.

FALCON ENGINEERING, INC.

Report Prepared By:

A handwritten signature in blue ink, appearing to read "W. Scott Hunsberger".

W. Scott Hunsberger, PE
Geotechnical Engineer

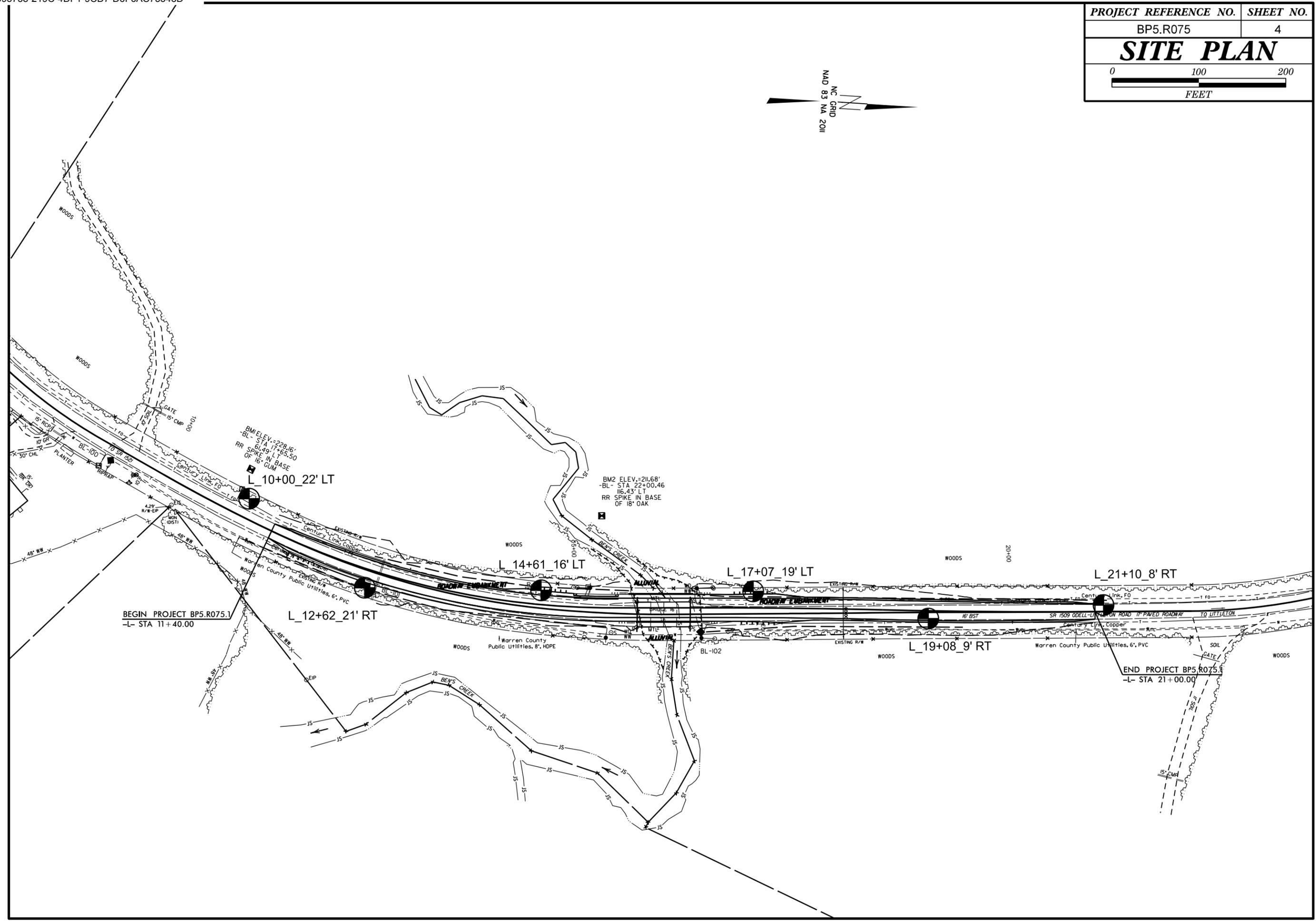
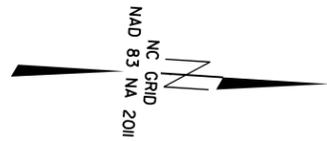
Report Reviewed By:

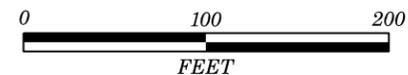
A handwritten signature in blue ink, appearing to read "Jeremy R. Hamm".

Jeremy R. Hamm, PE
Geotechnical Engineering Manager

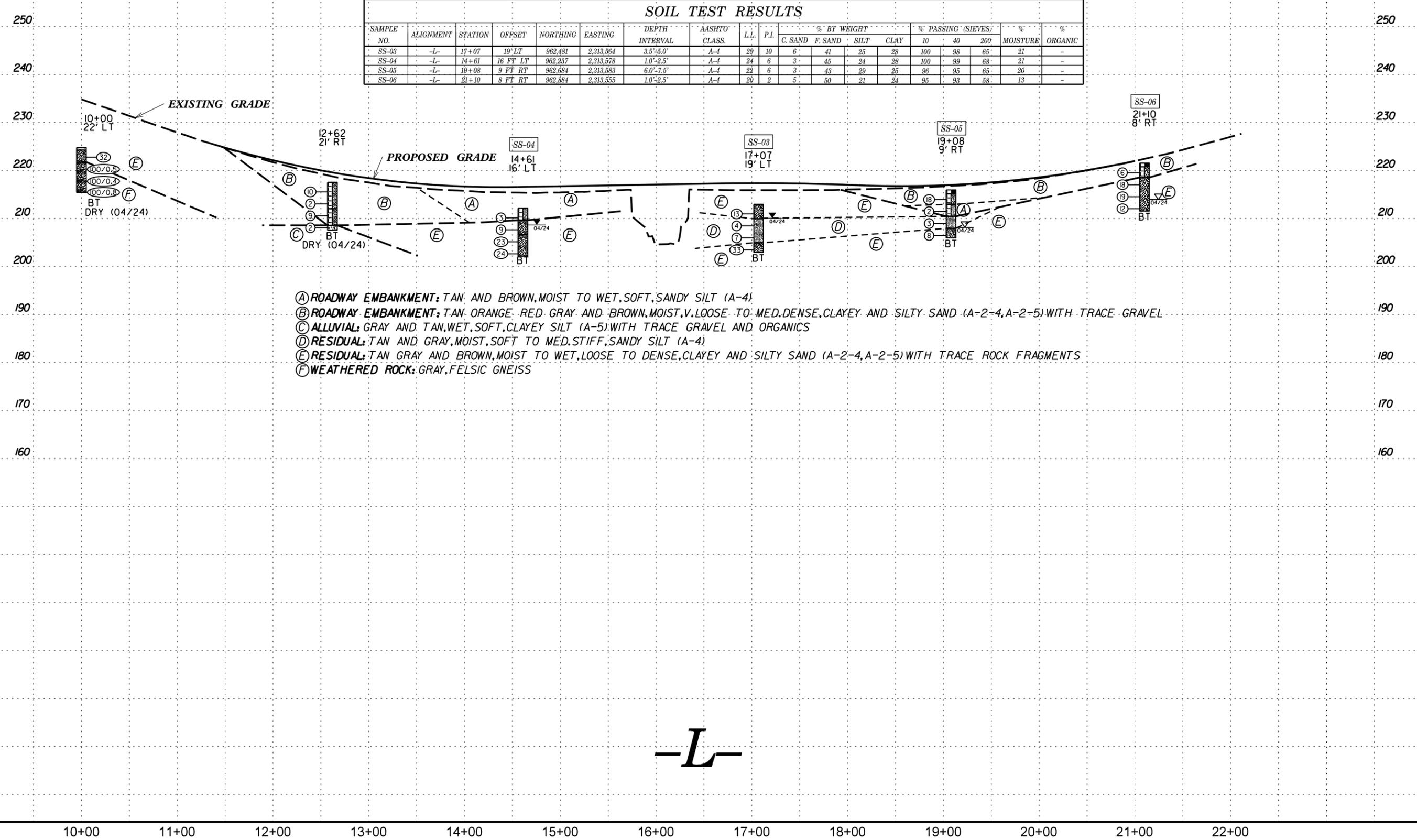


PROJECT REFERENCE NO.	SHEET NO.
BP5.R075	4
SITE PLAN	
 0 100 200 FEET	





SAMPLE NO.	ALIGNMENT	STATION	OFFSET	NORTHING	EASTING	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
										C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-03	-L-	17+07	19' LT	962,481	2,313,564	3.5'-5.0'	A-4	29	10	6	41	25	28	100	98	65	21	-
SS-04	-L-	14+61	16 FT LT	962,237	2,313,578	1.0'-2.5'	A-4	24	6	3	45	24	28	100	99	68	21	-
SS-05	-L-	19+08	9 FT RT	962,684	2,313,583	6.0'-7.5'	A-4	22	6	3	43	29	26	96	95	65	20	-
SS-06	-L-	21+10	8 FT RT	962,884	2,313,555	1.0'-2.5'	A-4	20	2	5	50	21	24	95	93	58	13	-



- (A) ROADWAY EMBANKMENT: TAN AND BROWN, MOIST TO WET, SOFT, SANDY SILT (A-4)
- (B) ROADWAY EMBANKMENT: TAN, ORANGE, RED, GRAY AND BROWN, MOIST, V. LOOSE TO MED. DENSE, CLAYEY AND SILTY SAND (A-2-4, A-2-5) WITH TRACE GRAVEL
- (C) ALLUVIAL: GRAY AND TAN, WET, SOFT, CLAYEY SILT (A-5) WITH TRACE GRAVEL AND ORGANICS
- (D) RESIDUAL: TAN AND GRAY, MOIST, SOFT TO MED. STIFF, SANDY SILT (A-4)
- (E) RESIDUAL: TAN, GRAY AND BROWN, MOIST TO WET, LOOSE TO DENSE, CLAYEY AND SILTY SAND (A-2-4, A-2-5) WITH TRACE ROCK FRAGMENTS
- (F) WEATHERED ROCK: GRAY, FELSIC GNEISS

-L-