

REFERENCE: B-5327

PROJECT: 46041

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY PERSON
PROJECT DESCRIPTION REPLACE BRIDGE NO. 49 ON
SR 1300 (CONCORD CHURCH RD) OVER SOUTH
HYCO CREEK

CONTENTS

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17	SITE PHOTOGRAPHS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5327	1	17

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 (919) 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.

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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 DJG

DRAWN BY HUNSBERGER, W. S.

CHECKED BY HAMM, J. R.

SUBMITTED BY FALCON

DATE AUGUST 2016



DocuSigned by:
W. Scott Hunsberger 9/9/2016
EA39AB9EDF5845A... SIGNATURE DATE

**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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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<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>

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| <p align="center">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="7">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="7">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="6">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>A-1, A-2</th><th>A-3</th><th>A-4, A-5</th><th>A-6, A-7</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>A-1, A-2</td><td>A-3</td><td>A-4, A-5</td><td>A-6, A-7</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><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>35 MX 35 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><td></td><td></td> </tr> <tr> <th>MATERIAL PASSING #40 LL PI</th> <td>— 6 MX</td><td>— NP</td><td>40 MX 41 MN</td><td>40 MX 41 MN</td><td>40 MX 41 MN</td><td>40 MX 41 MN</td><td>40 MX 41 MN</td> <td>40 MX 41 MN</td><td>40 MX 41 MN</td><td>40 MX 41 MN</td><td>40 MX 41 MN</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td><td>HIGHLY ORGANIC SOILS</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><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></td><td></td><td></td> <td></td><td></td><td></td><td></td> </tr> <tr> <th>GEN. RATING AS SUBGRADE</th> <td colspan="7">EXCELLENT TO GOOD</td><td colspan="4">FAIR TO POOR</td><td>FAIR TO POOR</td><td>POOR</td><td>UNSATURABLE</td> <td></td><td></td><td></td><td></td> </tr> <tr> <td colspan="40"> <p align="center">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</p> </td> </tr> <tr> <td colspan="10"> <p align="center">CONSISTENCY OR DENSENESS</p> <table border="1"> <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/FT²)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE
LOOSE
MEDIUM DENSE
DENSE
VERY DENSE</td> <td>< 4
4 TO 10
10 TO 30
30 TO 50
> 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>< 2
2 TO 4
4 TO 8
8 TO 15
15 TO 30
> 30</td> <td>< 0.25
0.25 TO 0.5
0.5 TO 1.0
1 TO 2
2 TO 4
> 4</td> </tr> </table> </td> </tr> <tr> <td colspan="10"> <p align="center">TEXTURE OR GRAIN SIZE</p> <table border="1"> <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> <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 (CS.E. 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> </tr> <tr> <td colspan="10"> <p align="center">SOIL MOISTURE - CORRELATION OF TERMS</p> <table border="1"> <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 align="center">PLASTICITY</p> <table border="1"> <tr> <th>NON PLASTIC</th><th>SLIGHTLY PLASTIC</th><th>MODERATELY PLASTIC</th><th>HIGHLY PLASTIC</th> </tr> <tr> <td>PLASTICITY INDEX (PI)</td><td>0-5</td><td>6-15</td><td>16-25</td> </tr> <tr> <td></td><td>26 OR MORE</td><td></td><td></td> </tr> <tr> <th>DRY STRENGTH</th> <td>VERY LOW</td><td>SLIGHT</td><td>MEDIUM</td> </tr> <tr> <td></td><td></td><td></td><td>HIGH</td> </tr> </table> </td> </tr> <tr> <td colspan="10"> <p align="center">COLOR</p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p> </td> </tr> <tr> <td colspan="10"> <p align="center">GRADATION</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 align="center">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p> <p align="center">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p align="center">COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE LL < 31
MODERATELY COMPRESSIBLE LL = 31 - 50
HIGHLY COMPRESSIBLE LL > 50</p> <p align="center">PERCENTAGE OF MATERIAL</p> <table border="1"> <tr> <th>ORGANIC MATERIAL</th><th>GRANULAR SOILS</th><th>SILT - CLAY SOILS</th><th>OTHER MATERIAL</th> </tr> <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>> 10%</td><td>> 20%</td><td>HIGHLY 35% AND ABOVE</td> </tr> </table> <p align="center">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
 STATIC WATER LEVEL AFTER 24 HOURS
 PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
 SPRING OR SEEP</p> <p align="center">MISCELLANEOUS SYMBOLS</p> <table border="1"> <tr> <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>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</td> <td>SOIL SYMBOL</td> <td>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</td> <td>INFERRED SOIL BOUNDARY</td> <td>INFERRED ROCK LINE</td> <td>ALLUVIAL SOIL BOUNDARY</td> <td>DIP & DIP DIRECTION OF ROCK STRUCTURES</td> <td>SPT TEST BORING</td> <td>SLOPE INDICATOR INSTALLATION</td> <td>CONE PENETROMETER TEST</td> <td>SOUNDING ROD</td> <td>TEST BORING WITH CORE</td> <td>SPT N-VALUE</td> </tr> </table> </td> </tr> <tr> <td colspan="10"> <p align="center">RECOMMENDATION SYMBOLS</p> <table border="1"> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>UNDERCUT EXCAVATION</td> <td>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</td> <td>UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>SHALLOW UNDERCUT</td> <td></td> <td></td> </tr> </table> <p align="center">ABBREVIATIONS</p> <table border="1"> <tr> <td>AR - AUGER REFUSAL</td><td>BT - BORING TERMINATED</td><td>CL - CLAY</td><td>CPT - COARSE PENETRATION TEST</td><td>CSE - COARSE</td><td>DMT - DILATOMETER TEST</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>MED. - 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> </tr> <tr> <td>VST - VANE SHEAR TEST</td><td>WEA. - WEATHERED</td><td>UNIT WEIGHT</td><td>DRY UNIT WEIGHT</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <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> </table> </td> </tr> <tr> <td colspan="10"> <p align="center">EQUIPMENT USED ON SUBJECT PROJECT</p> <table border="1"> <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 checked="" type="checkbox"/> CME-55</td><td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td><td>CORE SIZE:</td> </tr> <tr> <td><input type="checkbox"/> CME-550</td><td><input type="checkbox"/> 8" HOLLOW AUGERS</td><td><input type="checkbox"/> -B <input type="checkbox"/> -H</td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td><td><input type="checkbox"/> HARD FACED FINGER BITS</td><td><input checked="" type="checkbox"/> -N Q2</td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td><td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td><td>HAND TOOLS:</td> </tr> <tr> <td><input type="checkbox"/></td><td><input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</td><td><input type="checkbox"/> POST HOLE DIGGER</td> </tr> <tr> <td><input type="checkbox"/></td><td><input checked="" type="checkbox"/> TRICONE 2-15/16" STEEL TEETH</td><td><input type="checkbox"/> HAND AUGER</td> </tr> <tr> <td><input type="checkbox"/></td><td><input type="checkbox"/> TRICONE " TUNG-CARB.</td><td><input type="checkbox"/> SOUNDING ROD</td> </tr> <tr> <td><input type="checkbox"/></td><td><input checked="" type="checkbox"/> CORE BIT</td><td><input type="checkbox"/> VANE SHEAR TEST</td> </tr> <tr> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> </tr> </table> </td> </tr> <tr> <td colspan="10"> <p align="center">ROCK DESCRIPTION</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 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> <table border="1"> <tr> <td></td> <td>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</td> </tr> <tr> <td></td> <td>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</td> </tr> <tr> <td></td> <td>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.</td> </tr> <tr> <td></td> <td>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</td> </tr> </table> <p align="center">WEATHERING</p> <table border="1"> <tr> <td>FRESH</td><td>ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</td> </tr> <tr> <td>VERY SLIGHT (IV SLI.)</td><td>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.</td> </tr> <tr> <td>SLIGHT (SLI.)</td><td>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.</td> </tr> <tr> <td>MODERATE (MOD.)</td><td>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.</td> </tr> <tr> <td>MODERATELY SEVERE (MOD. SEV.)</td><td>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></td> </tr> <tr> <td>SEVERE (SEV.)</td><td>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></td> </tr> <tr> <td>VERY SEVERE (IV SEV.)</td><td>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></td> </tr> <tr> <td>COMPLETE</td><td>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.</td> </tr> </table> <p align="center">ROCK HARDNESS</p> <table border="1"> <tr> <td>VERY HARD</td><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> <td>HARD</td><td>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</td> </tr> <tr> <td>MODERATELY HARD</td><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> <td>MEDIUM HARD</td><td>CAN BE GROUDED 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> <td>SOFT</td><td>CAN BE GROUDED 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> <td>VERY SOFT</td><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 align="center">TERMS AND DEFINITIONS</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 DISLOADED 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> </td> </tr> <tr> <td colspan="10"> <p align="center">FRACTURE SPACING</p> <table border="1"> <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> <p align="center">BEDDING</p> <table border="1"> <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 align="center">INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <table border="1"> <tr> <td>FRIABLE</td><td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <td>MODERATELY INDURATED</td><td>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <td>INDURATED</td><td>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <td>EXTREMELY INDURATED</td><td>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> </table> </td> </tr> <tr> <td colspan="10"> <p align="center">NOTES:</p> <p>FIAD - FILLED IMMEDIATELY AFTER DRILLING</p> </td> </tr> <tr> <td colspan="10"> <p align="center">BENCH MARK: B-5327 BL-5 - 36" REBAR WITH ALUMINUM TRAVERSE CAP
 N: 980520 E: 1972640
 -L- 12+50.12, 16 ft LT ELEVATION: 416.80 FEET</p> </td> </tr> <tr> <td colspan="10"> <p align="right">DATE: 8-15-14</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 | 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 | 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 | — 6 MX | — NP | 40 MX 41 MN | 40 MX 41 MN | 40 MX 41 MN | 40 MX 41 MN | 40 MX 41 MN | 40 MX 41 MN | 40 MX 41 MN | 40 MX 41 MN | 40 MX 41 MN | SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER | HIGHLY ORGANIC SOILS | | | | | | 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 | | | | | | | | | | | | | | GEN. RATING AS SUBGRADE | EXCELLENT TO GOOD | | | | | | | FAIR TO POOR | | | | FAIR TO POOR | POOR | UNSATURABLE | | | | | <p align="center">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | <p align="center">CONSISTENCY OR DENSENESS</p> <table border="1"> <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/FT²)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE
LOOSE
MEDIUM DENSE
DENSE
VERY DENSE</td> <td>< 4
4 TO 10
10 TO 30
30 TO 50
> 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>< 2
2 TO 4
4 TO 8
8 TO 15
15 TO 30
> 30</td> <td>< 0.25
0.25 TO 0.5
0.5 TO 1.0
1 TO 2
2 TO 4
> 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) | GENERALLY GRANULAR MATERIAL (NON-COHESIVE) | VERY LOOSE
LOOSE
MEDIUM DENSE
DENSE
VERY DENSE | < 4
4 TO 10
10 TO 30
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> 50 | N/A | GENERALLY SILT-CLAY MATERIAL (COHESIVE) | VERY SOFT
SOFT
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STIFF
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8 TO 15
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0.25 TO 0.5
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1 TO 2
2 TO 4
> 4 | <p align="center">TEXTURE OR GRAIN SIZE</p> <table border="1"> <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> <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 (CS.E. 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> | | | | | | | | | | U.S. STD. SIEVE SIZE OPENING (MM) | 4 | 10 | 40 | 60 | 200 | 270 | | 4.75 | 2.00 | 0.42 | 0.25 | 0.075 | 0.053 | BOULDER (BLDR.) | COBBLE (COB.) | GRAVEL (GR.) | COARSE SAND (CS.E. SD.) | FINE SAND (F SD.) | SILT (SL.) | CLAY (CL.) | GRAIN SIZE | MM 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005 | | IN. 12 | 3 | | | | | <p align="center">SOIL MOISTURE - CORRELATION OF TERMS</p> <table border="1"> <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> | | | | | | | | | | SOIL MOISTURE SCALE (ATTERBERG LIMITS) | FIELD MOISTURE DESCRIPTION | GUIDE FOR FIELD MOISTURE DESCRIPTION | LL - LIQUID LIMIT | - SATURATED - (SAT.) | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | PL - PLASTIC LIMIT | - WET - (W) | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | OM - OPTIMUM MOISTURE SHRINKAGE LIMIT | - MOIST - (M) | SOLID; AT OR NEAR OPTIMUM MOISTURE | SL - SHRINKAGE LIMIT | - DRY - (D) | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | <p align="center">PLASTICITY</p> <table border="1"> <tr> <th>NON PLASTIC</th><th>SLIGHTLY PLASTIC</th><th>MODERATELY PLASTIC</th><th>HIGHLY PLASTIC</th> </tr> <tr> <td>PLASTICITY INDEX (PI)</td><td>0-5</td><td>6-15</td><td>16-25</td> </tr> <tr> <td></td><td>26 OR MORE</td><td></td><td></td> </tr> <tr> <th>DRY STRENGTH</th> <td>VERY LOW</td><td>SLIGHT</td><td>MEDIUM</td> </tr> <tr> <td></td><td></td><td></td><td>HIGH</td> </tr> </table> | | | | | | | | | | NON PLASTIC | SLIGHTLY PLASTIC | MODERATELY PLASTIC | HIGHLY PLASTIC | PLASTICITY INDEX (PI) | 0-5 | 6-15 | 16-25 | | 26 OR MORE | | | DRY STRENGTH | VERY LOW | SLIGHT | MEDIUM | | | | HIGH | <p align="center">COLOR</p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p> | | | | | | | | | | <p align="center">GRADATION</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 align="center">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p> <p align="center">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p align="center">COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE LL < 31
MODERATELY COMPRESSIBLE LL = 31 - 50
HIGHLY COMPRESSIBLE LL > 50</p> <p align="center">PERCENTAGE OF MATERIAL</p> <table border="1"> <tr> <th>ORGANIC MATERIAL</th><th>GRANULAR SOILS</th><th>SILT - CLAY SOILS</th><th>OTHER MATERIAL</th> </tr> <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>> 10%</td><td>> 20%</td><td>HIGHLY 35% AND ABOVE</td> </tr> </table> <p align="center">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
 STATIC WATER LEVEL AFTER 24 HOURS
 PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
 SPRING OR SEEP</p> <p align="center">MISCELLANEOUS SYMBOLS</p> <table border="1"> <tr> <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>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</td> <td>SOIL SYMBOL</td> <td>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</td> <td>INFERRED SOIL BOUNDARY</td> <td>INFERRED ROCK LINE</td> <td>ALLUVIAL SOIL BOUNDARY</td> <td>DIP & DIP DIRECTION OF ROCK STRUCTURES</td> <td>SPT TEST BORING</td> <td>SLOPE INDICATOR INSTALLATION</td> <td>CONE PENETROMETER TEST</td> <td>SOUNDING ROD</td> <td>TEST BORING WITH CORE</td> <td>SPT N-VALUE</td> </tr> </table> | | | | | | | | | | ORGANIC MATERIAL | 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 | | | | | | | | | | | | | | ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION | SOIL SYMBOL | ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT | INFERRED SOIL BOUNDARY | INFERRED ROCK LINE | ALLUVIAL SOIL BOUNDARY | DIP & DIP DIRECTION OF ROCK STRUCTURES | SPT TEST BORING | SLOPE INDICATOR INSTALLATION | CONE PENETROMETER TEST | SOUNDING ROD | TEST BORING WITH CORE | SPT N-VALUE | <p align="center">RECOMMENDATION SYMBOLS</p> <table border="1"> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>UNDERCUT EXCAVATION</td> <td>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</td> <td>UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>SHALLOW UNDERCUT</td> <td></td> <td></td> </tr> </table> <p align="center">ABBREVIATIONS</p> <table border="1"> <tr> <td>AR - AUGER REFUSAL</td><td>BT - BORING TERMINATED</td><td>CL - CLAY</td><td>CPT - COARSE PENETRATION TEST</td><td>CSE - COARSE</td><td>DMT - DILATOMETER TEST</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>MED. - 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> </tr> <tr> <td>VST - VANE SHEAR TEST</td><td>WEA. - WEATHERED</td><td>UNIT WEIGHT</td><td>DRY UNIT WEIGHT</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <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> </table> | | | | | | | | | | | | | UNDERCUT EXCAVATION | UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE | UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK | | | | SHALLOW UNDERCUT | | | AR - AUGER REFUSAL | BT - BORING TERMINATED | CL - CLAY | CPT - COARSE PENETRATION TEST | CSE - COARSE | DMT - DILATOMETER TEST | DPT - DYNAMIC PENETRATION TEST | e - VOID RATIO | F - FINE | FOSS. - FOSSILIFEROUS | FRAC. - FRACTURED, FRACTURES | FRAGS. - FRAGMENTS | HI. - HIGHLY | MED. - MEDIUM | MICA - MICACEOUS | MOD. - MODERATELY | NP - NON PLASTIC | ORG. - ORGANIC | PMT - PRESSUREMETER TEST | SAP. - SAPROLITIC | SD. - SAND, SANDY | SL. - SILT, SILTY | SLI. - SLIGHTLY | TCR - TRICONE REFUSAL | w - MOISTURE CONTENT | V - VERY | VST - VANE SHEAR TEST | WEA. - WEATHERED | UNIT WEIGHT | DRY UNIT WEIGHT | | | | | | | | | | | | | | | | | | | | | | | <p align="center">EQUIPMENT USED ON SUBJECT PROJECT</p> <table border="1"> <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 checked="" type="checkbox"/> CME-55</td><td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td><td>CORE SIZE:</td> </tr> <tr> <td><input type="checkbox"/> CME-550</td><td><input type="checkbox"/> 8" HOLLOW AUGERS</td><td><input type="checkbox"/> -B <input type="checkbox"/> -H</td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td><td><input type="checkbox"/> HARD FACED FINGER BITS</td><td><input checked="" type="checkbox"/> -N Q2</td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td><td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td><td>HAND TOOLS:</td> </tr> <tr> <td><input type="checkbox"/></td><td><input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</td><td><input type="checkbox"/> POST HOLE DIGGER</td> </tr> <tr> <td><input type="checkbox"/></td><td><input checked="" type="checkbox"/> TRICONE 2-15/16"
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THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p> <table border="1"> <tr> <td></td> <td>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</td> </tr> <tr> <td></td> <td>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</td> </tr> <tr> <td></td> <td>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.</td> </tr> <tr> <td></td> <td>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</td> </tr> </table> <p align="center">WEATHERING</p> <table border="1"> <tr> <td>FRESH</td><td>ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. 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 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 DISLOADED 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 align="center">FRACTURE SPACING</p> <table border="1"> <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> <p align="center">BEDDING</p> <table border="1"> <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> | | | | | | | | | | TERM | SPACING | VERY WIDE | MORE THAN 10 FEET | WIDE | 3 TO 10 FEET | MODERATELY CLOSE | 1 TO 3 FEET | CLOSE | 0.16 TO 1 FOOT | VERY CLOSE | LESS THAN 0.16 FEET | TERM | THICKNESS | VERY THICKLY BEDDED | 4 FEET | THICKLY BEDDED | 1.5 - 4 FEET | THINLY BEDDED | 0.16 - 1.5 FEET | VERY THINLY BEDDED | 0.03 - 0.16 FEET | THICKLY LAMINATED | 0.008 - 0.03 FEET | THINLY LAMINATED | < 0.008 FEET | <p align="center">INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <table border="1"> <tr> <td>FRIABLE</td><td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <td>MODERATELY INDURATED</td><td>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <td>INDURATED</td><td>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <td>EXTREMELY INDURATED</td><td>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> </table> | | | | | | | | | | FRIABLE | RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. | MODERATELY INDURATED | GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. | INDURATED | GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. | EXTREMELY INDURATED | SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS. | <p align="center">NOTES:</p> <p>FIAD - FILLED IMMEDIATELY AFTER DRILLING</p> | | | | | | | | | | <p align="center">BENCH MARK: B-5327 BL-5 - 36" REBAR WITH ALUMINUM TRAVERSE CAP
 N: 980520 E: 1972640
 -L- 12+50.12, 16 ft LT ELEVATION: 416.80 FEET</p> | | | | | | | | | | <p align="right">DATE: 8-15-14</p> | | | | | | | | | |
| GENERAL CLASS.

 | GRANULAR MATERIALS (≤ 35% PASSING #200) | | | | | | | SILT-CLAY MATERIALS (> 35% PASSING #200) | | | | | | | ORGANIC MATERIALS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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 | 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 | A-1, A-2 | A-3 | A-4, A-5 | A-6, A-7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 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 | A-1, A-2 | A-3 | A-4, A-5 | A-6, A-7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| % 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| MATERIAL PASSING #40 LL PI

 | — 6 MX | — NP | 40 MX 41 MN | 40 MX 41 MN | 40 MX 41 MN | 40 MX 41 MN | 40 MX 41 MN | 40 MX 41 MN | 40 MX 41 MN | 40 MX 41 MN | 40 MX 41 MN | SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER | HIGHLY ORGANIC SOILS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| GROUP INDEX

 | 0 | 0 | 0 | 4 MX | 8 MX | 12 MX | 16 MX | NO MX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| USUAL TYPES OF MAJOR MATERIALS

 | STONE FRAGS. GRAVEL, AND SAND | FINE SAND | SILTY OR CLAYEY GRAVEL AND SAND | SILTY SOILS | CLAYEY SOILS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| GEN. RATING AS SUBGRADE

 | EXCELLENT TO GOOD | | | | | | | FAIR TO POOR | | | | FAIR TO POOR | POOR | UNSATURABLE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p align="center">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</p>

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| <p align="center">CONSISTENCY OR DENSENESS</p> <table border="1"> <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/FT²)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE
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| GENERALLY GRANULAR MATERIAL (NON-COHESIVE)

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| GENERALLY SILT-CLAY MATERIAL (COHESIVE)

 | VERY SOFT
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> 30 | < 0.25
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| <p align="center">TEXTURE OR GRAIN SIZE</p> <table border="1"> <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> <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 (CS.E. 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>

 | | | | | | | | | | U.S. STD. SIEVE SIZE OPENING (MM) | 4 | 10 | 40 | 60 | 200 | 270 | | 4.75 | 2.00 | 0.42 | 0.25 | 0.075 | 0.053 | BOULDER (BLDR.) | COBBLE (COB.) | GRAVEL (GR.) | COARSE SAND (CS.E. SD.) | FINE SAND (F SD.) | SILT (SL.) | CLAY (CL.) | GRAIN SIZE | MM 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005 | | IN. 12 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| U.S. STD. SIEVE SIZE OPENING (MM)

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 | 4.75 | 2.00 | 0.42 | 0.25 | 0.075 | 0.053 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p align="center">SOIL MOISTURE - CORRELATION OF TERMS</p> <table border="1"> <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>

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| LL - LIQUID LIMIT

 | - SATURATED - (SAT.) | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| PL - PLASTIC LIMIT

 | - WET - (W) | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| OM - OPTIMUM MOISTURE SHRINKAGE LIMIT

 | - MOIST - (M) | SOLID; AT OR NEAR OPTIMUM MOISTURE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| SL - SHRINKAGE LIMIT

 | - DRY - (D) | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p align="center">PLASTICITY</p> <table border="1"> <tr> <th>NON PLASTIC</th><th>SLIGHTLY PLASTIC</th><th>MODERATELY PLASTIC</th><th>HIGHLY PLASTIC</th> </tr> <tr> <td>PLASTICITY INDEX (PI)</td><td>0-5</td><td>6-15</td><td>16-25</td> </tr> <tr> <td></td><td>26 OR MORE</td><td></td><td></td> </tr> <tr> <th>DRY STRENGTH</th> <td>VERY LOW</td><td>SLIGHT</td><td>MEDIUM</td> </tr> <tr> <td></td><td></td><td></td><td>HIGH</td> </tr> </table>

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| <p align="center">COLOR</p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>

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| <p align="center">GRADATION</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 align="center">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p> <p align="center">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p align="center">COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE LL < 31
MODERATELY COMPRESSIBLE LL = 31 - 50
HIGHLY COMPRESSIBLE LL > 50</p> <p align="center">PERCENTAGE OF MATERIAL</p> <table border="1"> <tr> <th>ORGANIC MATERIAL</th><th>GRANULAR SOILS</th><th>SILT - CLAY SOILS</th><th>OTHER MATERIAL</th> </tr> <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>> 10%</td><td>> 20%</td><td>HIGHLY 35% AND ABOVE</td> </tr> </table> <p align="center">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
 STATIC WATER LEVEL AFTER 24 HOURS
 PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
 SPRING OR SEEP</p> <p align="center">MISCELLANEOUS SYMBOLS</p> <table border="1"> <tr> <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>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</td> <td>SOIL SYMBOL</td> <td>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</td> <td>INFERRED SOIL BOUNDARY</td> <td>INFERRED ROCK LINE</td> <td>ALLUVIAL SOIL BOUNDARY</td> <td>DIP & DIP DIRECTION OF ROCK STRUCTURES</td> <td>SPT TEST BORING</td> <td>SLOPE INDICATOR INSTALLATION</td> <td>CONE PENETROMETER TEST</td> <td>SOUNDING ROD</td> <td>TEST BORING WITH CORE</td> <td>SPT N-VALUE</td> </tr> </table>

 | | | | | | | | | | ORGANIC MATERIAL | 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 | | | | | | | | | | | | | | ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION | SOIL SYMBOL | ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT | INFERRED SOIL BOUNDARY | INFERRED ROCK LINE | ALLUVIAL SOIL BOUNDARY | DIP & DIP DIRECTION OF ROCK STRUCTURES | SPT TEST BORING | SLOPE INDICATOR INSTALLATION | CONE PENETROMETER TEST | SOUNDING ROD | TEST BORING WITH CORE | SPT N-VALUE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION

 | SOIL SYMBOL | ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT | INFERRED SOIL BOUNDARY | INFERRED ROCK LINE | ALLUVIAL SOIL BOUNDARY | DIP & DIP DIRECTION OF ROCK STRUCTURES | SPT TEST BORING | SLOPE INDICATOR INSTALLATION | CONE PENETROMETER TEST | SOUNDING ROD | TEST BORING WITH CORE | SPT N-VALUE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p align="center">RECOMMENDATION SYMBOLS</p> <table border="1"> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>UNDERCUT EXCAVATION</td> <td>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</td> <td>UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>SHALLOW UNDERCUT</td> <td></td> <td></td> </tr> </table> <p align="center">ABBREVIATIONS</p> <table border="1"> <tr> <td>AR - AUGER REFUSAL</td><td>BT - BORING TERMINATED</td><td>CL - CLAY</td><td>CPT - COARSE PENETRATION TEST</td><td>CSE - COARSE</td><td>DMT - DILATOMETER TEST</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>MED. - 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> </tr> <tr> <td>VST - VANE SHEAR TEST</td><td>WEA. - WEATHERED</td><td>UNIT WEIGHT</td><td>DRY UNIT WEIGHT</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <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> </table>

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 | BT - BORING TERMINATED | CL - CLAY | CPT - COARSE PENETRATION TEST | CSE - COARSE | DMT - DILATOMETER TEST | DPT - DYNAMIC PENETRATION TEST | e - VOID RATIO | F - FINE | FOSS. - FOSSILIFEROUS | FRAC. - FRACTURED, FRACTURES | FRAGS. - FRAGMENTS | HI. - HIGHLY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| MED. - MEDIUM

 | MICA - MICACEOUS | MOD. - MODERATELY | NP - NON PLASTIC | ORG. - ORGANIC | PMT - PRESSUREMETER TEST | SAP. - SAPROLITIC | SD. - SAND, SANDY | SL. - SILT, SILTY | SLI. - SLIGHTLY | TCR - TRICONE REFUSAL | w - MOISTURE CONTENT | V - VERY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| VST - VANE SHEAR TEST

 | WEA. - WEATHERED | UNIT WEIGHT | DRY UNIT WEIGHT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p align="center">EQUIPMENT USED ON SUBJECT PROJECT</p> <table border="1"> <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 checked="" type="checkbox"/> CME-55</td><td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td><td>CORE SIZE:</td> </tr> <tr> <td><input type="checkbox"/> CME-550</td><td><input type="checkbox"/> 8" HOLLOW AUGERS</td><td><input type="checkbox"/> -B <input type="checkbox"/> -H</td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td><td><input type="checkbox"/> HARD FACED FINGER BITS</td><td><input checked="" type="checkbox"/> -N Q2</td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td><td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td><td>HAND TOOLS:</td> </tr> <tr> <td><input type="checkbox"/></td><td><input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</td><td><input type="checkbox"/> POST HOLE DIGGER</td> </tr> <tr> <td><input type="checkbox"/></td><td><input checked="" type="checkbox"/> TRICONE 2-15/16" STEEL TEETH</td><td><input type="checkbox"/> HAND AUGER</td> </tr> <tr> <td><input type="checkbox"/></td><td><input type="checkbox"/> TRICONE " TUNG-CARB.</td><td><input type="checkbox"/> SOUNDING ROD</td> </tr> <tr> <td><input type="checkbox"/></td><td><input checked="" type="checkbox"/> CORE BIT</td><td><input type="checkbox"/> VANE SHEAR TEST</td> </tr> <tr> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> </tr> </table>

 | | | | | | | | | | DRILL UNITS: | ADVANCING TOOLS: | HAMMER TYPE: | <input type="checkbox"/> CME-45C | <input type="checkbox"/> CLAY BITS | <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL | <input checked="" type="checkbox"/> CME-55 | <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER | CORE SIZE: | <input type="checkbox"/> CME-550 | <input type="checkbox"/> 8" HOLLOW AUGERS | <input type="checkbox"/> -B <input type="checkbox"/> -H | <input type="checkbox"/> VANE SHEAR TEST | <input type="checkbox"/> HARD FACED FINGER BITS | <input checked="" type="checkbox"/> -N Q2 | <input type="checkbox"/> PORTABLE HOIST | <input type="checkbox"/> TUNG-CARBIDE INSERTS | HAND TOOLS: | <input type="checkbox"/> | <input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER | <input type="checkbox"/> POST HOLE DIGGER | <input type="checkbox"/> | <input checked="" type="checkbox"/> TRICONE 2-15/16" STEEL TEETH | <input type="checkbox"/> HAND AUGER | <input type="checkbox"/> | <input type="checkbox"/> TRICONE " TUNG-CARB. | <input type="checkbox"/> SOUNDING ROD | <input type="checkbox"/> | <input checked="" type="checkbox"/> CORE BIT | <input type="checkbox"/> VANE SHEAR TEST | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| DRILL UNITS:

 | ADVANCING TOOLS: | HAMMER TYPE: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <input type="checkbox"/> CME-45C

 | <input type="checkbox"/> CLAY BITS | <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <input checked="" type="checkbox"/> CME-55

 | <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER | CORE SIZE: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <input type="checkbox"/> CME-550

 | <input type="checkbox"/> 8" HOLLOW AUGERS | <input type="checkbox"/> -B <input type="checkbox"/> -H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <input type="checkbox"/> VANE SHEAR TEST

 | <input type="checkbox"/> HARD FACED FINGER BITS | <input checked="" type="checkbox"/> -N Q2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p align="center">ROCK DESCRIPTION</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 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> <table border="1"> <tr> <td></td> <td>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</td> </tr> <tr> <td></td> <td>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</td> </tr> <tr> <td></td> <td>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.</td> </tr> <tr> <td></td> <td>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</td> </tr> </table> <p align="center">WEATHERING</p> <table border="1"> <tr> <td>FRESH</td><td>ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</td> </tr> <tr> <td>VERY SLIGHT (IV SLI.)</td><td>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.</td> </tr> <tr> <td>SLIGHT (SLI.)</td><td>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.</td> </tr> <tr> <td>MODERATE (MOD.)</td><td>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.</td> </tr> <tr> <td>MODERATELY SEVERE (MOD. SEV.)</td><td>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></td> </tr> <tr> <td>SEVERE (SEV.)</td><td>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></td> </tr> <tr> <td>VERY SEVERE (IV SEV.)</td><td>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></td> </tr> <tr> <td>COMPLETE</td><td>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.</td> </tr> </table> <p align="center">ROCK HARDNESS</p> <table border="1"> <tr> <td>VERY HARD</td><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> <td>HARD</td><td>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</td> </tr> <tr> <td>MODERATELY HARD</td><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> <td>MEDIUM HARD</td><td>CAN BE GROUDED 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> <td>SOFT</td><td>CAN BE GROUDED 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> <td>VERY SOFT</td><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>

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| SLIGHT (SLI.)

 | ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 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. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| MODERATELY SEVERE (MOD. SEV.)

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| VERY SEVERE (IV SEV.)

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| COMPLETE

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| VERY HARD

 | CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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 | CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 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. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| MEDIUM HARD

 | CAN BE GROUDED 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. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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 | CAN BE GROUDED 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. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p align="center">TERMS AND DEFINITIONS</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 DISLOADED 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>

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| <p align="center">FRACTURE SPACING</p> <table border="1"> <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> <p align="center">BEDDING</p> <table border="1"> <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>

 | | | | | | | | | | TERM | SPACING | VERY WIDE | MORE THAN 10 FEET | WIDE | 3 TO 10 FEET | MODERATELY CLOSE | 1 TO 3 FEET | CLOSE | 0.16 TO 1 FOOT | VERY CLOSE | LESS THAN 0.16 FEET | TERM | THICKNESS | VERY THICKLY BEDDED | 4 FEET | THICKLY BEDDED | 1.5 - 4 FEET | THINLY BEDDED | 0.16 - 1.5 FEET | VERY THINLY BEDDED | 0.03 - 0.16 FEET | THICKLY LAMINATED | 0.008 - 0.03 FEET | THINLY LAMINATED | < 0.008 FEET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p align="center">INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <table border="1"> <tr> <td>FRIABLE</td><td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <td>MODERATELY INDURATED</td><td>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <td>INDURATED</td><td>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <td>EXTREMELY INDURATED</td><td>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> </table>

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| FRIABLE

 | RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| MODERATELY INDURATED

 | GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| INDURATED

 | GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| EXTREMELY INDURATED

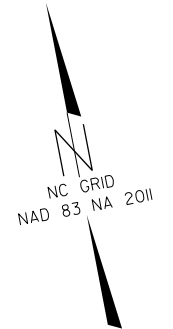
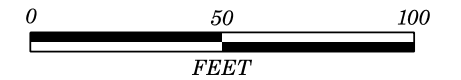
 | SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p align="center">NOTES:</p> <p>FIAD - FILLED IMMEDIATELY AFTER DRILLING</p>

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| <p align="center">BENCH MARK: B-5327 BL-5 - 36" REBAR WITH ALUMINUM TRAVERSE CAP
 N: 980520 E: 1972640
 -L- 12+50.12, 16 ft LT ELEVATION: 416.80 FEET</p>

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| <p align="right">DATE: 8-15-14</p>

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BEGIN TIP PROJECT B-5327
-L- STA 10+00.00



12+00

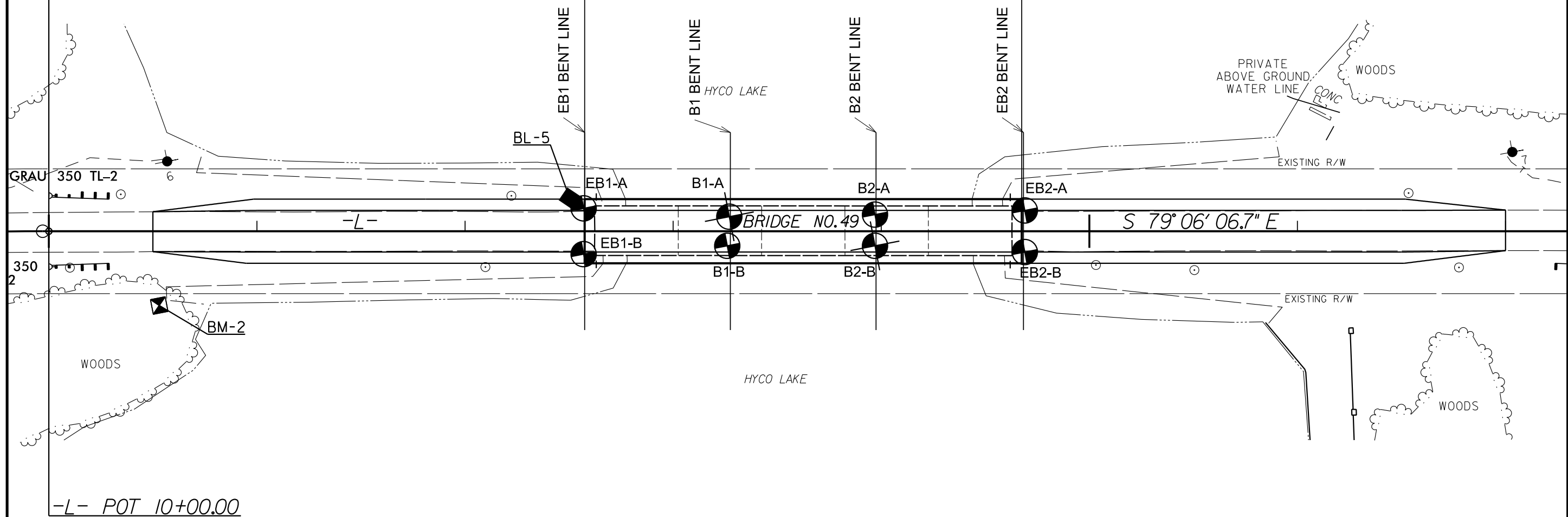
13+00

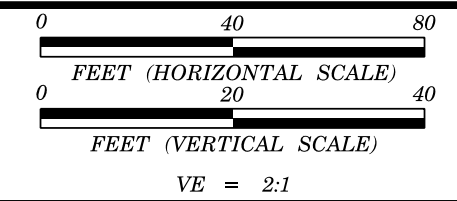
14+00

15+00

BEGIN BRIDGE
-L- STA 12+57.50 ±

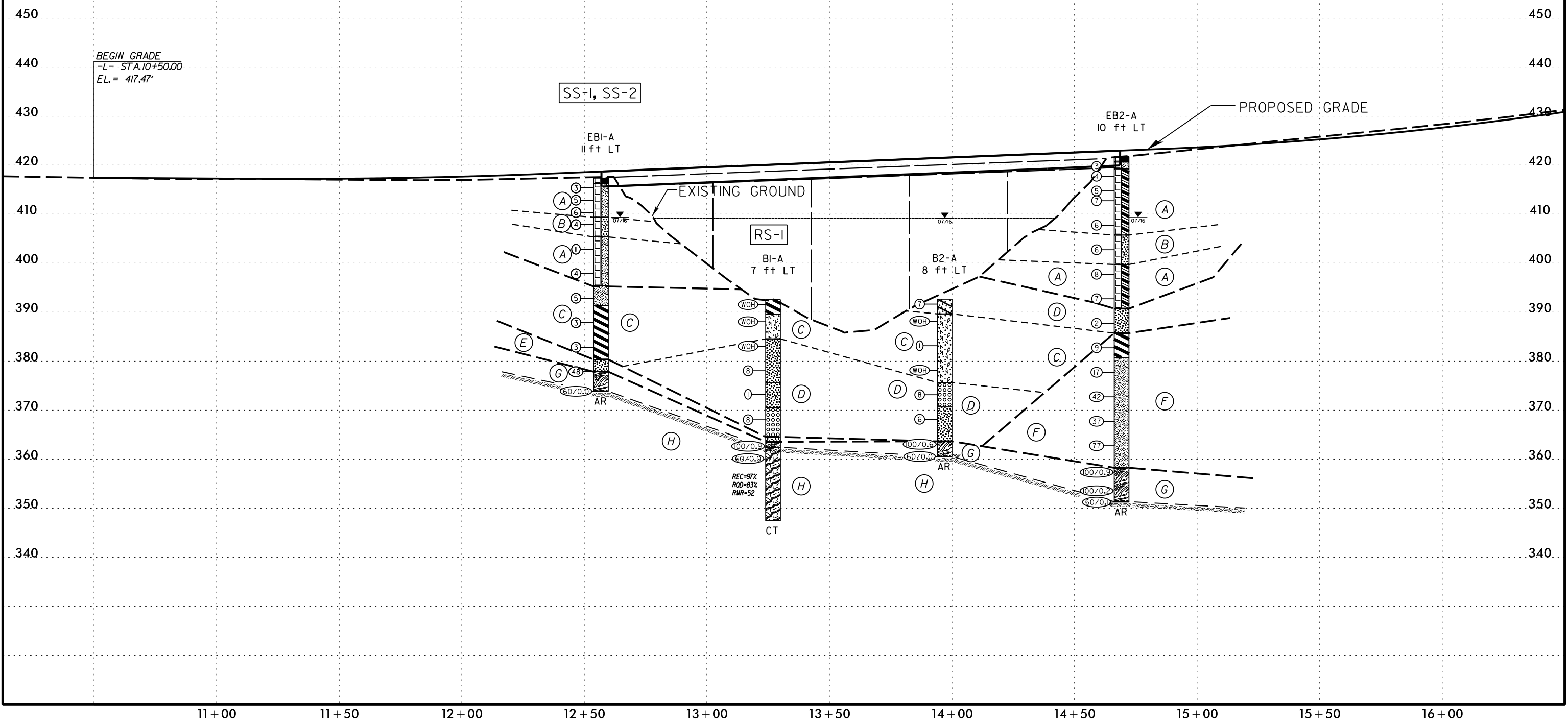
END BRIDGE
-L- STA 14+67.50 ±



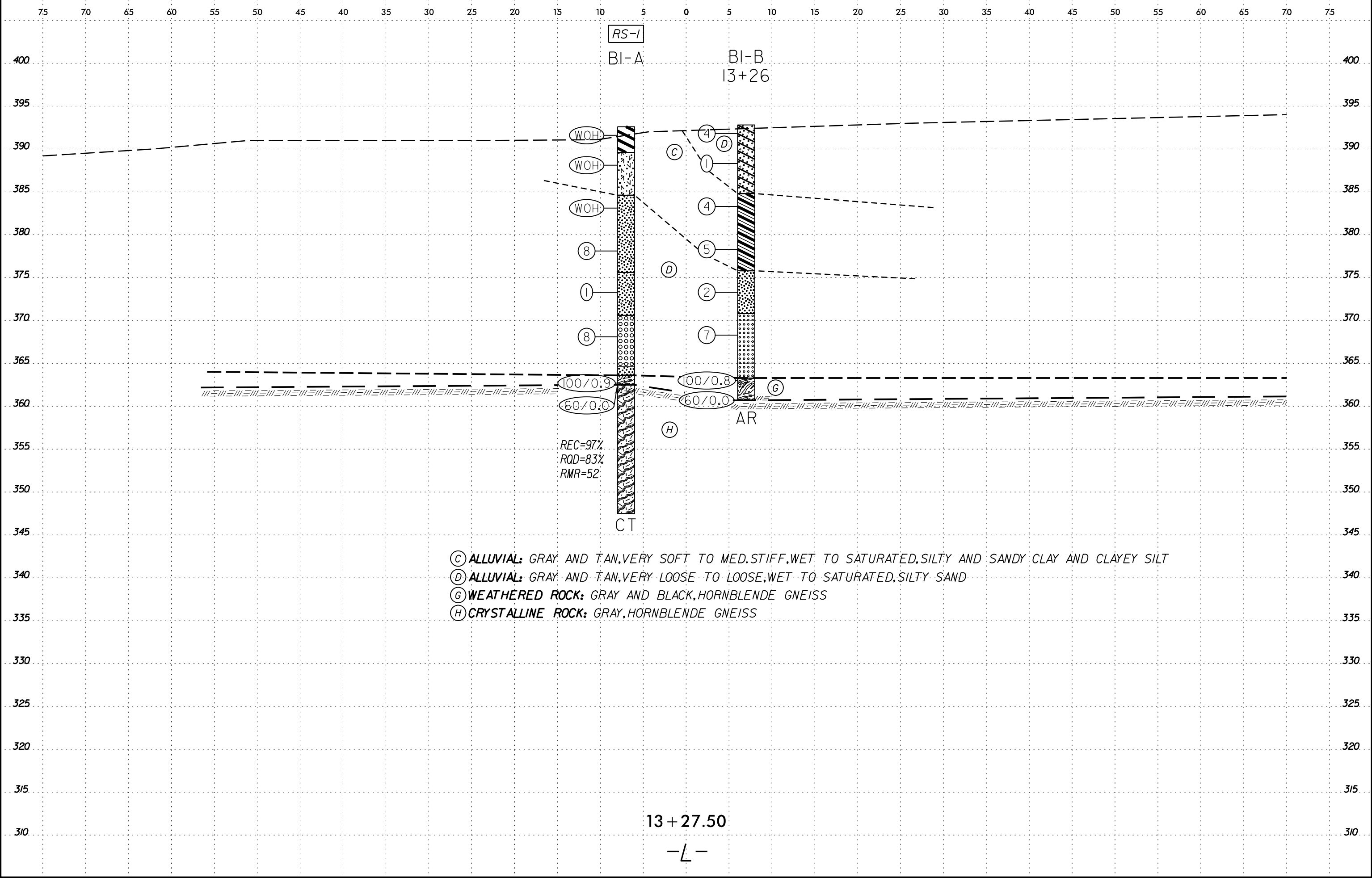


- (A) ROADWAY EMBANKMENT: TAN GRAY AND BROWN, SOFT TO STIFF, MOIST, SANDY SILT AND CLAY W/ TRACE GRAVEL AND TRACE ORGANICS
- (B) ROADWAY EMBANKMENT: TAN AND BROWN, LOOSE TO MED. DENSE, MOIST, SILTY CSE. TO F. SAND W/ TRACE GRAVEL AND ORGANICS
- (C) ALLUVIAL: GRAY AND TAN, VERY SOFT TO STIFF, MOIST, F. SANDY CLAYEY SILT AND SILTY CLAY W/ TRACE GRAVEL
- (D) ALLUVIAL: GRAY AND TAN, VERY LOOSE TO LOOSE, WET, CLAYEY F. SAND
- (E) RESIDUAL: GRAY, DENSE TO VERY DENSE, MOIST, SILTY CSE. TO F. SAND
- (F) RESIDUAL: TAN BROWN AND GRAY, STIFF TO HARD, MOIST, SANDY AND SILTY CLAY AND SANDY SILT W/ TRACE ROCK FRAGMENTS
- (G) WEATHERED ROCK: GRAY GREEN AND BROWN, HORNBLLENDE GNEISS
- (H) CRYSTALLINE ROCK: GREEN AND BROWN, HORNBLLENDE GNEISS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-1	11 ft LT	12+57	13.5-15.0	A-4	37	10	12	25	40	23	83	76	59	20.9	-
SS-2	11 ft LT	12+57	28.5-30.0	A-6	31	13	9	26	34	31	100	95	70	23.6	-

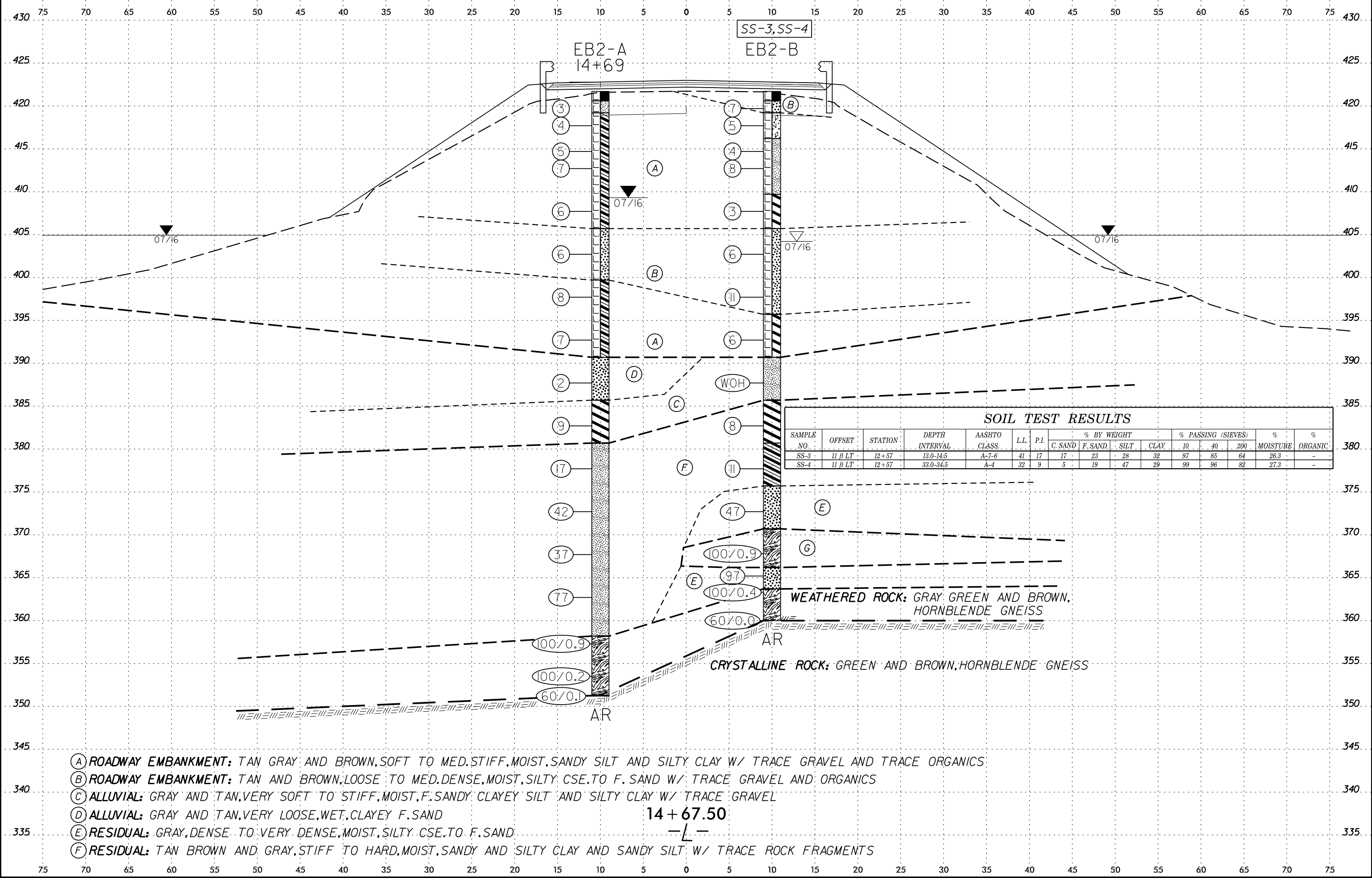


8/23/99
22-AUG-2016 09:22
I:\Projects\2016\160902.00 NCDOT GEU B-5327 Bridge No. 49 Person County\B5327_NCDOT_Electronic_File_Tree\Geotech\InvestigationDesign\B5327_GEO_BRD060049\CADD_GEO\TECH\XSC\B5327_GEO.XSL.dgn
cadmachine AT GEU-4



13 + 27.50
-L-

8/23/99



- (A) ROADWAY EMBANKMENT: TAN GRAY AND BROWN, SOFT TO MED. STIFF, MOIST, SANDY SILT AND SILTY CLAY W/ TRACE GRAVEL AND TRACE ORGANICS
- (B) ROADWAY EMBANKMENT: TAN AND BROWN, LOOSE TO MED. DENSE, MOIST, SILTY CSE. TO F. SAND W/ TRACE GRAVEL AND ORGANICS
- (C) ALLUVIAL: GRAY AND TAN, VERY SOFT TO STIFF, MOIST, F. SANDY CLAYEY SILT AND SILTY CLAY W/ TRACE GRAVEL
- (D) ALLUVIAL: GRAY AND TAN, VERY LOOSE, WET, CLAYEY F. SAND
- (E) RESIDUAL: GRAY, DENSE TO VERY DENSE, MOIST, SILTY CSE. TO F. SAND
- (F) RESIDUAL: TAN BROWN AND GRAY, STIFF TO HARD, MOIST, SANDY AND SILTY CLAY AND SANDY SILT W/ TRACE ROCK FRAGMENTS

14+67.50

-L-

GEOTECHNICAL BORING REPORT BORE LOG

WBS 46041.1.1		TIP B-5327		COUNTY PERSON		GEOLOGIST D. Goodnight								
SITE DESCRIPTION BRIDGE NO. 49 ON SR 1300 (CONCORD CHURCH RD) OVER SOUTH HYCO CREEK						GROUND WTR (ft)								
BORING NO. EB1-A		STATION 12+57		OFFSET 11 ft LT		ALIGNMENT -L-								
COLLAR ELEV. 417.4 ft		TOTAL DEPTH 43.5 ft		NORTHING 980,520		EASTING 1,972,646								
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 85% 02/22/2016		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 07/11/16		COMP. DATE 07/11/16		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	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)
420														417.4 0.3' TOPSOIL 0.0
415	416.4	1.0	3	1	2							M	416.3 0.8' AGGREGATE BASE COURSE 1.1	
	413.9	3.5	2	2	3							M	ROADWAY EMBANKMENT	
	411.4	6.0	2	3	3							M	NON-PLASTIC, TAN, SANDY SILT (A-4) WITH TRACE GRAVEL	
410	408.9	8.5	3	2	2							M	409.4 NON-PLASTIC, BROWN, SILTY CSE. TO F. SAND (A-2-4) WITH TRACE GRAVEL 8.0	
405	403.9	13.5	7	6	5							M	405.4 NON-PLASTIC, TAN AND BROWN, SANDY SILT (A-4) WITH TRACE GRAVEL 12.0	
400	398.9	18.5	2	2	2						SS-1 21%	M	395.4 ALLUVIAL NON-PLASTIC, GRAY, CSE. TO F. SANDY SILT (A-4) WITH TRACE ORGANICS AND WOOD 22.0	
395	393.9	23.5	WOH	1	4							M	391.4 HIGHLY PLASTIC, TAN AND BROWN, SANDY CLAY (A-6) 26.0	
390	388.9	28.5	1	1	2						SS-2 24%	M	380.4 RESIDUAL NON-PLASTIC, LIGHT GRAY, SILTY CSE. TO F. SAND (A-2-4) WITH SOME ROCK FRAGMENTS 37.0	
385	383.9	33.5	WOH	1	2							W	376.9 WEATHERED ROCK GRAY AND WHITE, HORNBLLENDE GNEISS 40.5	
380	378.9	38.5	44	28	20							W	373.9 Boring Terminated with Standard Penetration Test Refusal at Elevation 373.9 ft on CR: HORNBLLENDE GNEISS 43.5	
375	373.9	43.5	60/0.0											

WBS 46041.1.1		TIP B-5327		COUNTY PERSON		GEOLOGIST D. Goodnight								
SITE DESCRIPTION BRIDGE NO. 49 ON SR 1300 (CONCORD CHURCH RD) OVER SOUTH HYCO CREEK						GROUND WTR (ft)								
BORING NO. EB1-B		STATION 12+57		OFFSET 11 ft RT		ALIGNMENT -L-								
COLLAR ELEV. 417.4 ft		TOTAL DEPTH 34.9 ft		NORTHING 980,499		EASTING 1,972,641								
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 85% 02/22/2016		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 07/11/16		COMP. DATE 07/11/16		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	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)
420														417.4 0.3' TOPSOIL 0.0
415	416.4	1.0	3	1	1							M	416.3 0.8' AGGREGATE BASE COURSE 1.1	
	413.9	3.5	3	1	6							M	ROADWAY EMBANKMENT	
	411.4	6.0	4	3	3							M	SLI. PLASTIC, TAN, SANDY CLAYEY SILT (A-4) WITH TRACE GRAVEL	
410	408.9	8.5	3	3	3							M	411.9 NON-PLASTIC, BROWN AND GRAY, SILTY CSE. TO F. SAND (A-2-4) WITH TRACE GRAVEL 5.5	
405	403.9	13.5	4	4	6							M	405.4 NON-PLASTIC, TAN, CSE. TO F. SANDY SILT (A-4) WITH TRACE GRAVEL 12.0	
400	398.9	18.5	2	2	3							W	395.4 ALLUVIAL NON-PLASTIC, GRAY, CLAYEY SILTY CSE. TO F. SAND (A-2-4) WITH TRACE ORGANICS 22.0	
395	393.9	23.5	3	1	3							W	391.4 HIGHLY PLASTIC, BROWN, SILTY CLAY (A-7) 26.0	
390	388.9	28.5	1	2	4							W	385.9 WEATHERED ROCK DARK GRAY, HORNBLLENDE GNEISS 31.5	
385	383.9	33.5	100/0.2										382.6 CRYSTALLINE ROCK DARK GRAY, HORNBLLENDE GNEISS 34.8	
	382.6	34.8	60/0.1										382.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 382.5 ft in CR: HORNBLLENDE GNEISS 34.9	

NCDOT BORE DOUBLE B5327_GEO_BRDG0049_BORINGS.GPJ_NC_DOT.GDT 7/29/16

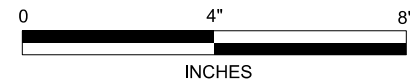
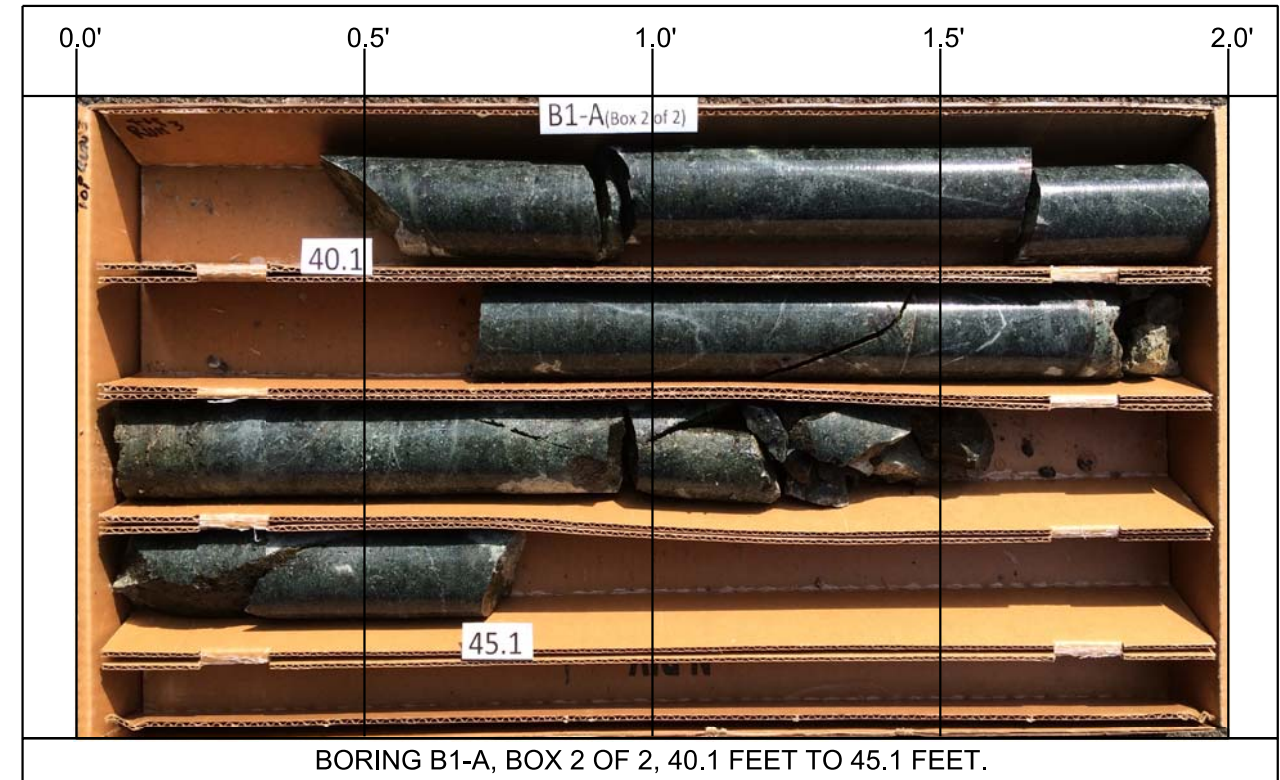
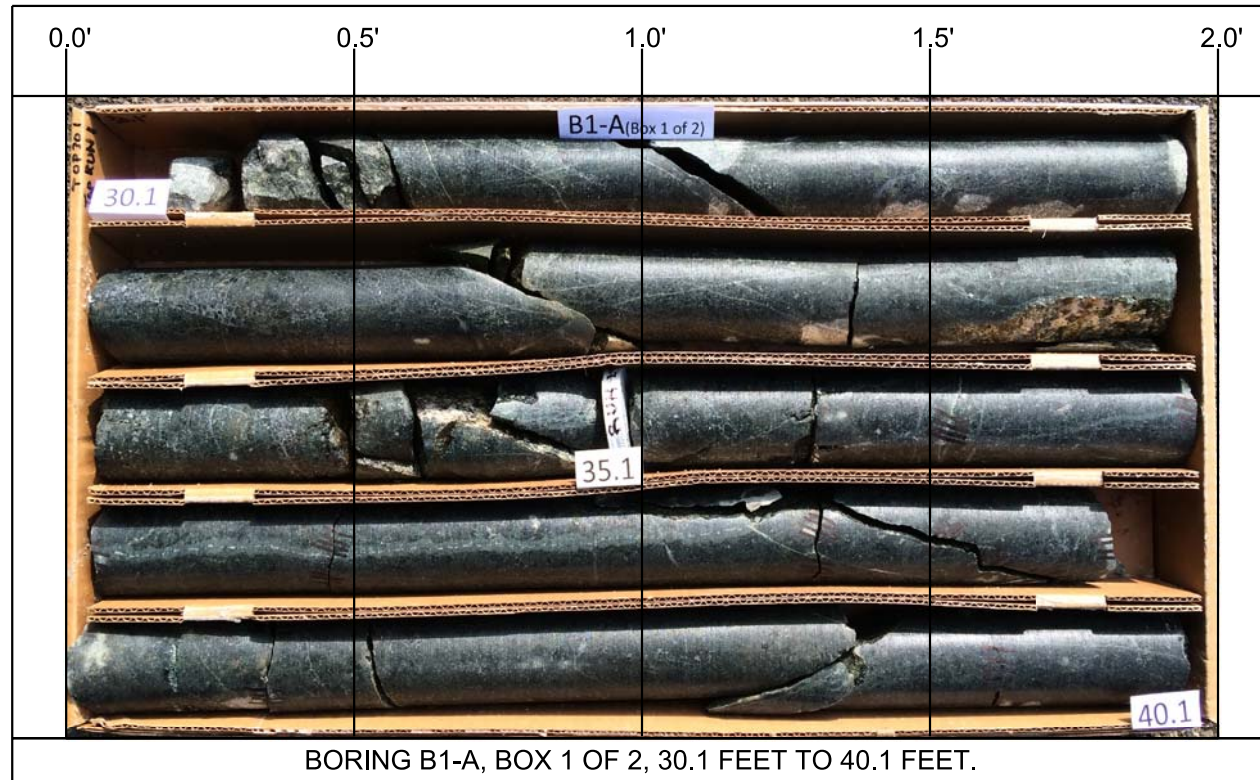
GEOTECHNICAL BORING REPORT

BORE LOG

WBS 46041.1.1		TIP B-5327		COUNTY PERSON		GEOLOGIST D. Goodnight									
SITE DESCRIPTION BRIDGE NO. 49 ON SR 1300 (CONCORD CHURCH RD) OVER SOUTH HYCO CREEK						GROUND WTR (ft)									
BORING NO. B1-A		STATION 13+27		OFFSET 7 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 392.6 ft		TOTAL DEPTH 45.1 ft		NORTHING 980,503		EASTING 1,972,717									
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 85% 02/22/2016		DRILL METHOD Wash Boring		HAMMER TYPE Automatic											
DRILLER Contract Driller		START DATE 07/13/16		COMP. DATE 07/14/16		SURFACE WATER DEPTH 17.0									
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					
395	392.6	0.0	2	WOH	WOH	0							W	392.6	0.0
390	389.1	3.5	WOH	WOH	WOH	0							Sat.	389.6	3.0
385	384.1	8.5	1	WOH	WOH	0							W	384.6	8.0
380	379.1	13.5	3	3	5	8							W	375.6	17.0
375	374.3	18.3	1	WOH	1								Sat.	370.6	22.0
370	369.1	23.5	4	3	5								W	364.6	28.0
365	364.1	28.5	10	27	73/0.4									363.6	29.0
360	362.5	30.1	60/0.0			100/0.9							RS-1	362.5	30.1
355															
350															
Boring Terminated with Standard Penetration Test Refusal at Elevation 347.5 ft in CR: HORNBLENDE GNEISS															
BRIDGE DECK 0.7' DECK TO DATUM 25.4' SURFACE WATER DEPTH 17.0'															

WBS 46041.1.1		TIP B-5327		COUNTY PERSON		GEOLOGIST D. Goodnight					
SITE DESCRIPTION BRIDGE NO. 49 ON SR 1300 (CONCORD CHURCH RD) OVER SOUTH HYCO CREEK						GROUND WTR (ft)					
BORING NO. B1-A		STATION 13+27		OFFSET 7 ft LT		ALIGNMENT -L-					
COLLAR ELEV. 392.6 ft		TOTAL DEPTH 45.1 ft		NORTHING 980,503		EASTING 1,972,717					
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 85% 02/22/2016		DRILL METHOD Wash Boring		HAMMER TYPE Automatic							
DRILLER Contract Driller		START DATE 07/13/16		COMP. DATE 07/14/16		SURFACE WATER DEPTH 17.0					
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)	REC. (%)	RQD (%)			
362.5	362.5	30.1	5.0	8:03/1.0 5:29/1.0 5:11/1.0 5:23/1.0 5:01/1.0	(4.8) 96%	(3.8) 76%	(14.5) 97%	(12.5) 83%		Begin Coring @ 30.1 ft	30.1
360	357.5	35.1	5.0	3:38/1.0 3:50/1.0 4:02/1.0 3:40/1.0 4:03/1.0	(4.9) 98%	(4.9) 98%				CR: HORNBLENDE GNEISS	30.1
355	352.5	40.1	5.0	3:45/1.0 3:53/1.0 3:43/1.0 3:23/1.0 3:29/1.0	(4.8) 96%	(3.8) 76%				R1= 7, R2 = 17, R3 = 8, R4 = 20, R5 = 0, RMR = 52 CLASS III, TYPE E	30.1
350	347.5	45.1								Boring Terminated with Standard Penetration Test Refusal at Elevation 347.5 ft in CR: HORNBLENDE GNEISS	45.1

NCDOT BORE DOUBLE B5327_GEO_BRDG0049_BORINGS.GPJ_NC_DOT.GDT 7/29/16



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ROCK CORE PHOTOGRAPHS

BRIDGE NO. 49 ON SR 1300
(CONCORD CHURCH RD) OVER SOUTH HYCO CREEK
WBS NO.: 46041.1.1 TIP NO.: B-5327
PERSON COUNTY, NC

GEOTECHNICAL BORING REPORT BORE LOG

WBS 46041.1.1		TIP B-5327		COUNTY PERSON		GEOLOGIST D. Goodnight								
SITE DESCRIPTION BRIDGE NO. 49 ON SR 1300 (CONCORD CHURCH RD) OVER SOUTH HYCO CREEK							GROUND WTR (ft)							
BORING NO. B1-B		STATION 13+26		OFFSET 7 ft RT		ALIGNMENT -L-								
COLLAR ELEV. 392.8 ft		TOTAL DEPTH 32.1 ft		NORTHING 980,488		EASTING 1,972,713								
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 85% 02/22/2016		DRILL METHOD Wash Boring		HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 07/15/16		COMP. DATE 07/15/16		SURFACE WATER DEPTH 16.9								
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				
395														
	392.8	0.0	2	3	1								W	392.8 0.0
390	389.3	3.5	WOH	WOH	1								Sat.	ALLUVIAL SLI. PLASTIC, GRAY, CLAYEY CSE. TO F. SAND (A-2-6) WITH TRACE ORGANICS
385	384.3	8.5	WOH	2	2								W	384.8 8.0 MOD. PLASTIC, TAN, F. SANDY CLAY (A-6)
380	379.3	13.5	3	3	2								W	375.8 17.0 NON-PLASTIC, GRAY, SILTY CSE. TO F. SAND (A-2-4) WITH TRACE ORGANICS AND TRACE GRAVEL
375	374.3	18.5	3	1	1								Sat.	370.8 22.0 NON-PLASTIC, GRAY, SILTY SAND (A-3)
370	369.3	23.5	3	2	5								W	363.3 29.5 WEATHERED ROCK DARK GRAY AND BLACK, HORNBLENDE GNEISS
365	364.3	28.5	3	5	100/0.3									360.7 32.1 Boring Terminated with Standard Penetration Test Refusal at Elevation 360.7 ft on CR: HORNBLENDE GNEISS
	360.7	32.1	60/0.0											60/0.0 BRIDGE DECK 0.7' DECK TO DATUM 25.2' SURFACE WATER DEPTH 16.9'

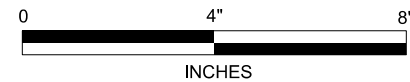
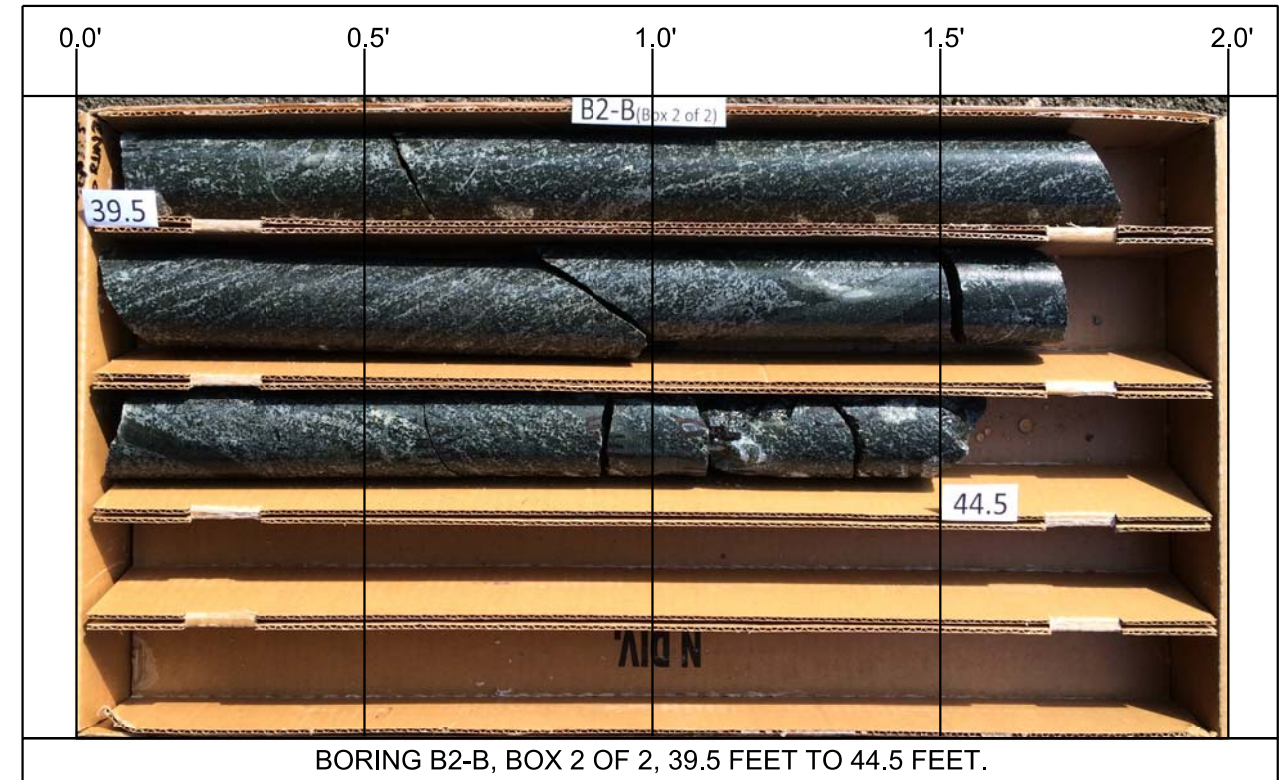
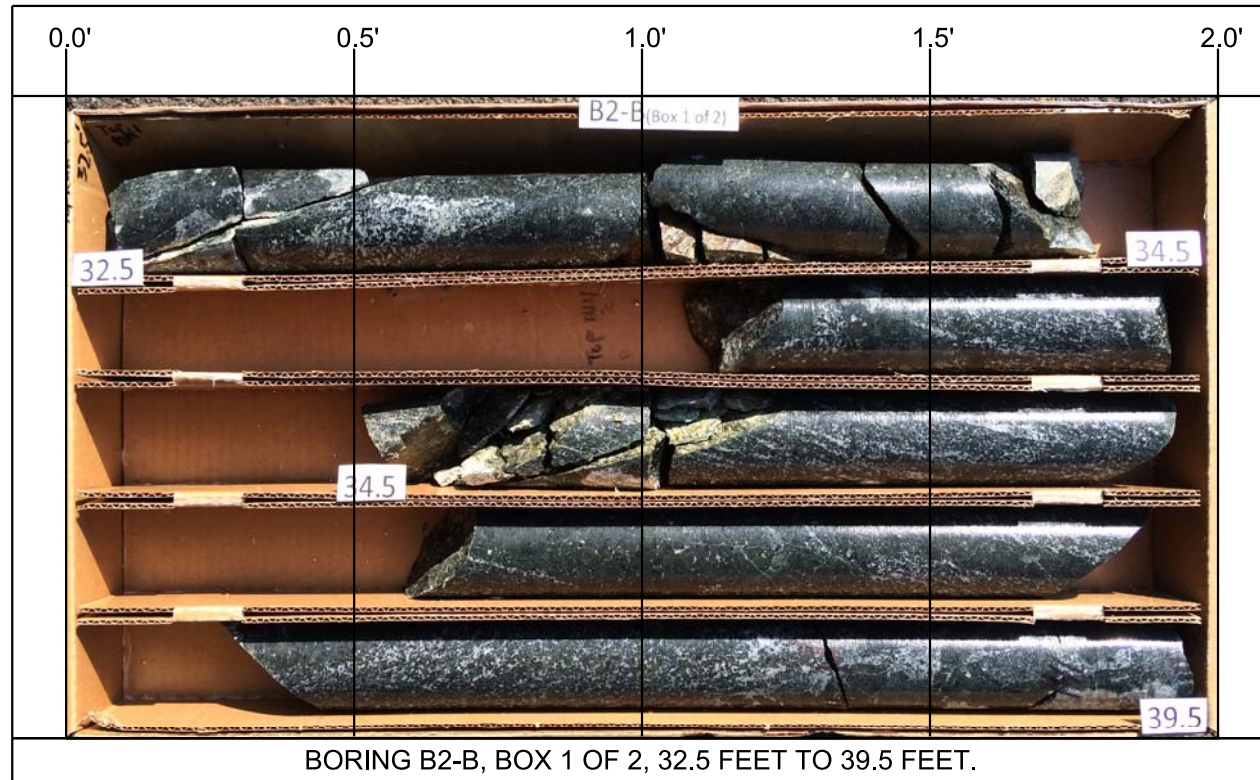
WBS 46041.1.1		TIP B-5327		COUNTY PERSON		GEOLOGIST D. Goodnight								
SITE DESCRIPTION BRIDGE NO. 49 ON SR 1300 (CONCORD CHURCH RD) OVER SOUTH HYCO CREEK							GROUND WTR (ft)							
BORING NO. B2-A		STATION 13+97		OFFSET 8 ft LT		ALIGNMENT -L-								
COLLAR ELEV. 392.7 ft		TOTAL DEPTH 32.1 ft		NORTHING 980,490		EASTING 1,972,784								
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 85% 02/22/2016		DRILL METHOD Wash Boring		HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 07/19/16		COMP. DATE 07/19/16		SURFACE WATER DEPTH 16.8								
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				
395														
	392.7	0.0	6	5	2								Sat.	392.7 0.0
390	389.2	3.5	WOH	WOH	WOH								W	389.7 3.0 ALLUVIAL SLI. PLASTIC, GRAY, CLAYEY CSE. TO F. SAND (A-2-6) WITH TRACE ORGANICS AND GRAVEL
385	384.2	8.5	WOH	WOH	1								Sat.	MOD. PLASTIC, GRAY, F. SANDY CLAYEY SILT (A-5) WITH INTERMITTENT LENSES OF CSE. TO F. SAND AND TRACE ORGANICS
380	379.2	13.5	WOH	1	WOH								W	375.7 17.0 NON-PLASTIC, LIGHT GRAY, F. TO CSE. SAND (A-1-b) WITH TRACE GRAVEL AND WOOD FRAGMENTS
375	374.2	18.5	3	4	4								Sat.	370.7 22.0 NON-PLASTIC, GRAY, SILTY SAND (A-2-4) WITH TRACE GRAVEL
370	369.2	23.5	14	3	3								Sat.	363.7 29.0 WEATHERED ROCK BLACK AND GRAY, HORNBLENDE GNEISS
365	364.2	28.5	10	80	20/0.1									360.6 32.1 Boring Terminated with Standard Penetration Test Refusal at Elevation 360.6 ft on CR: HORNBLENDE GNEISS
	360.6	32.1	60/0.0											60/0.0 BRIDGE DECK 0.7' DECK TO DATUM 26.7' SURFACE WATER DEPTH 16.8'

NCDOT BORE DOUBLE B5327_GEO_BRDG0049_BORINGS.GPJ NC_DOT.GDT 7/29/16

GEOTECHNICAL BORING REPORT CORE LOG

WBS 46041.1.1		TIP B-5327		COUNTY PERSON		GEOLOGIST D. Goodnight								
SITE DESCRIPTION BRIDGE NO. 49 ON SR 1300 (CONCORD CHURCH RD) OVER SOUTH HYCO CREEK						GROUND WTR (ft)								
BORING NO. B2-B		STATION 13+97		OFFSET 7 ft RT		ALIGNMENT -L-								
COLLAR ELEV. 393.1 ft		TOTAL DEPTH 44.5 ft		NORTHING 980,474		EASTING 1,972,780								
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 85% 02/22/2016		DRILL METHOD Wash Boring		HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 07/18/16		COMP. DATE 07/18/16		SURFACE WATER DEPTH 16.5								
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				
395														
	393.1	0.0	1	WOH	1									393.1 0.0
390	389.6	3.5	WOH	WOH	WOH									390.1 -3.0
	384.6	8.5	WOH	WOH	WOH									
385	379.6	13.5	WOH	WOH	WOH									
380	374.6	18.5	1	2	2									376.1 -17.0
375	369.6	23.5	2	8	10									
370	364.6	28.5	8	17	83/0.4									
365	360.6	32.5	60/0.0											364.1 29.0
360														360.6 32.5
355														
350														348.6 44.5

WBS 46041.1.1		TIP B-5327		COUNTY PERSON		GEOLOGIST D. Goodnight					
SITE DESCRIPTION BRIDGE NO. 49 ON SR 1300 (CONCORD CHURCH RD) OVER SOUTH HYCO CREEK						GROUND WTR (ft)					
BORING NO. B2-B		STATION 13+97		OFFSET 7 ft RT		ALIGNMENT -L-					
COLLAR ELEV. 393.1 ft		TOTAL DEPTH 44.5 ft		NORTHING 980,474		EASTING 1,972,780					
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 85% 02/22/2016		DRILL METHOD Wash Boring		HAMMER TYPE Automatic							
DRILLER Contract Driller		START DATE 07/18/16		COMP. DATE 07/18/16		SURFACE WATER DEPTH 16.5					
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	TOTAL RUN 12.0 ft		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS
					REC. (%)	RQD (%)		REC. (%)	RQD (%)		
360.6											
	360.6	32.5	2.0	3:50/1.0	(1.8)	(0.5)	RS-2	(11.8)	(9.9)		Begin Coring @ 32.5 ft
	358.6	34.5	5.0	3:57/1.0	90%	25%		98%	83%		CRYSTALLINE ROCK
				3:55/1.0							GRAY AND BLACK, SLIGHT TO V. SLIGHT WEATHERING, MODERATELY HARD TO HARD, CLOSE TO MODERATELY CLOSE FRACTURED HORNBLENDE GNEISS
				3:38/1.0							R1= 9, R2 = 17, R3 = 8, R4 = 20, R5 = 0, RMR = 54 CLASS III, TYPE E
355	353.6	39.5	5.0	3:57/1.0	100%	88%					
				4:03/1.0							
350				4:18/1.0	(5.0)	(5.0)					
				3:51/1.0	100%	100%					
				3:50/1.0							
	348.6	44.5		4:30/1.0							Boring Terminated with Standard Penetration Test Refusal at Elevation 348.6 ft in CR: HORNBLENDE GNEISS
				5:15/1.0							BRIDGE DECK 0.6' DECK TO DATUM 26.3' SURFACE WATER DEPTH 16.5'



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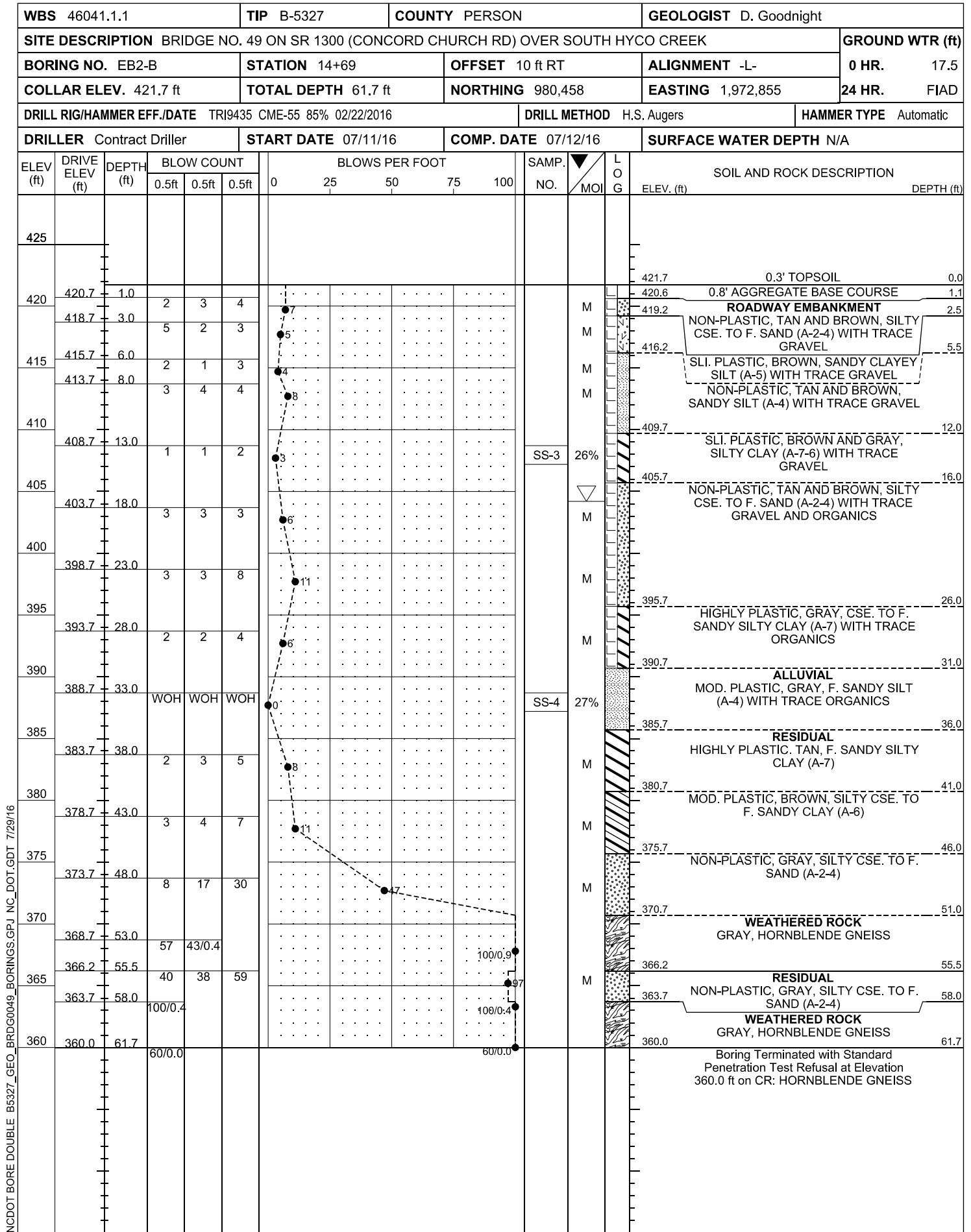
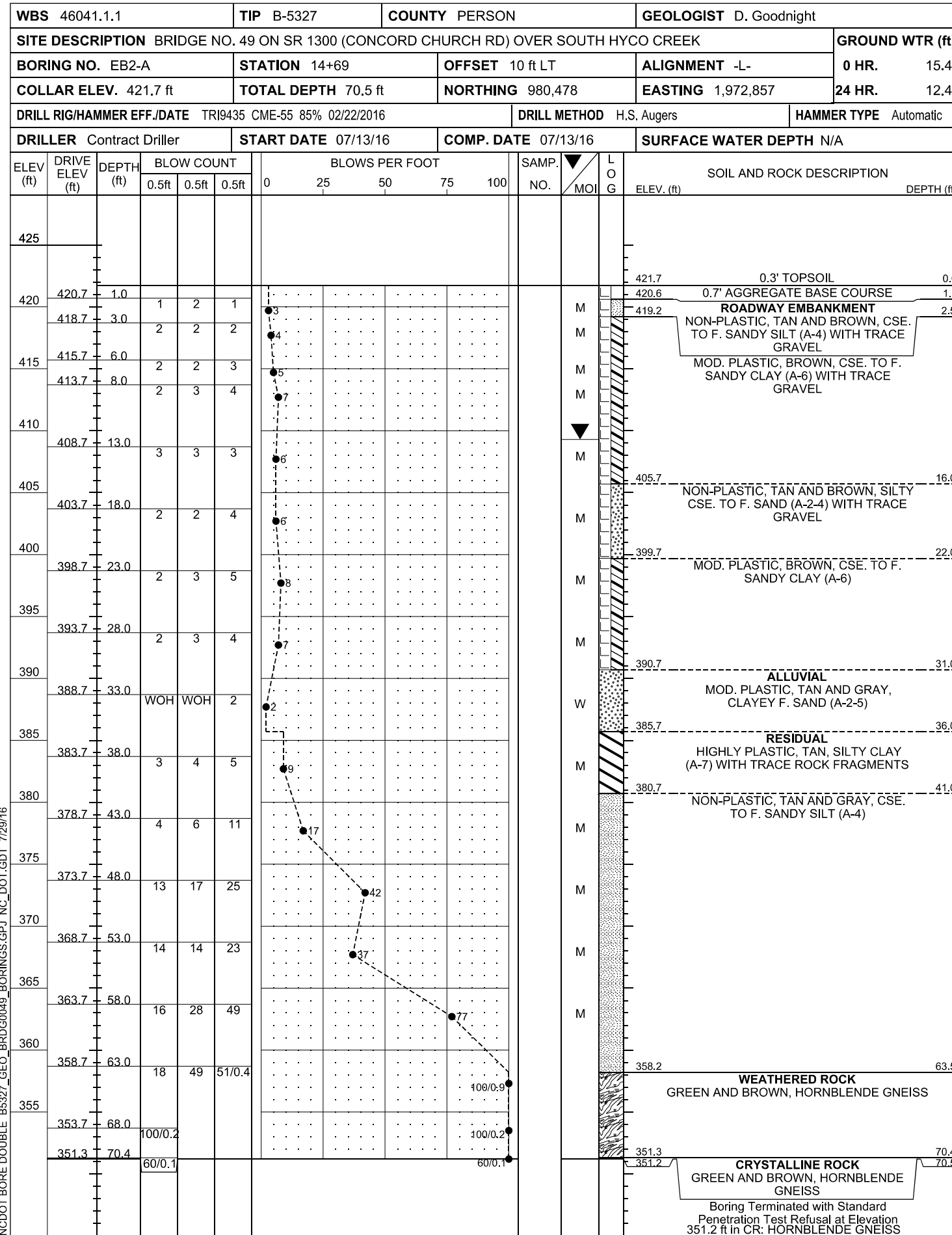
PHONE: 919.871.0800
FAX: 919.871.0803

ROCK CORE PHOTOGRAPHS

BRIDGE NO. 49 ON SR 1300
(CONCORD CHURCH RD) OVER SOUTH HYCO CREEK
WBS NO.: 46041.1.1 TIP NO.: B-5327
PERSON COUNTY, NC

GEOTECHNICAL BORING REPORT

BORE LOG



NC DOT BORE DOUBLE B5327_GEO_BRDG0049_BORINGS.GPJ_NC_DOT.GDT 7/29/16

NC DOT BORE DOUBLE B5327_GEO_BRDG0049_BORINGS.GPJ_NC_DOT.GDT 7/29/16

AASHTO SOIL CLASSIFICATION AND GRADATION SHEET

BRIDGE NO. 49 ON SR 1300 (CONCORD CHURCH RD) OVER SOUTH HYCO CREEK

TIP NO.: B-5327

PERSON COUNTY, NORTH CAROLINA

FALCON ENGINEERING, INC. PROJECT NO: G16032.00

LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES

BRIDGE NO. 49 ON SR 1300 (CONCORD CHURCH RD) OVER SOUTH HYCO CREEK

TIP NO.: B-5327

PERSON COUNTY, NORTH CAROLINA

FALCON ENGINEERING, INC. PROJECT NO: G16032.00

BORING			SAMPLE	TOTAL SAMPLE			Atterberg Limit Test Results			COARSE SAND (%)	FINE SAND (%)	SILT (%)	CLAY (%)
AASHTO Classification			PERCENT PASSING										
STATION	OFFSET (FEET)	DEPTH (FEET)	#10	#40	#200	LL	PL	PI					
EB1-A			SS-1	83	76	59	37	27	10	12	25	40	23
A-4													
12+57 -L-	11' LT	13.5-15.0											
EB1-A			SS-2	100	95	70	31	18	13	9	26	34	31
A-6													
12+57 -L-	11' LT	28.5-30.0											
EB2-B			SS-3	97	85	64	41	24	17	17	23	28	32
A-7-6													
14+69 -L-	10' RT	13.0-14.5											
EB2-B			SS-4	99	96	82	32	23	9	5	19	47	29
A-4													
14+69 -L-	10' RT	33.0-34.5											

Sample No.	Boring	Depth (ft)	Rock Type	Geologic Map Unit	Run RQD	Length (ft)	Diameter (ft)	Unit Weight (PCF)	Unconfined Compressive Strength (PSI)	Young's Modulus (PSI)	Rock Mass Rating (RMR)
RS-1	B1-A	31.4-31.8	AMPHIBOLITE	CZg	83%	0.33	0.16	185.5	10,407	3,697,321	52
RS-2	B2-B	33.1-33.5	AMPHIBOLITE	CZg	83%	0.33	0.16	192.4	16,338	3,048,190	54



LOOKING UPSTATION ALONG -L-



LOOKING UPSTATION FROM LEFT OF EB1, DOWNSTREAM LEFT.



LOOKING DOWNSTATION FROM RIGHT OF EB2, DOWNSTREAM RIGHT.

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SITE PHOTOGRAPHS
BRIDGE NO. 49 ON SR 1300
(CONCORD CHURCH RD) OVER SOUTH HYCO CREEK
WBS NO.: 46041.1.1 TIP NO.: B-5327
PERSON COUNTY, NC