

PROJECT: 35742.1.1 ID: U-4438

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 35742.1.1 (U-4438) F.A. PROJ. STP-0158(31)  
 COUNTY PASQUOTANK & CAMDEN COUNTIES  
 PROJECT LOCATION US 158 (EAST ELIZABETH ST.) FROM US 17 BUSINESS  
(NORTH ROAD ST.) TO EAST OF PASQUOTANK RIVER  
 SITE DESCRIPTION GEOTECHNICAL INVESTIGATION FOR MSP-1 THROUGH  
MSP-8

**INVENTORY**

| STATE           | STATE PROJECT REFERENCE NO. | SHEET NO.   | TOTAL SHEETS |
|-----------------|-----------------------------|-------------|--------------|
| N.C.            | 35742.1.1 (U-4438)          | 1           | 16           |
| STATE PROJ. NO. | F.A. PROJ. NO.              | DESCRIPTION |              |
| 35742.1.1       | STP-0158(31)                | P.E.        |              |
|                 |                             | RW & UTIL.  |              |
|                 |                             |             |              |
|                 |                             |             |              |

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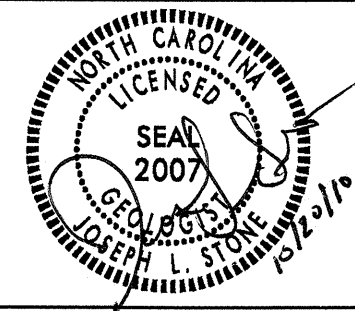
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND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

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

PERSONNEL

- TCB
- JME
- RES
- JRS
- CMW
- S&ME PERSONNEL

INVESTIGATED BY J.L. STONE  
 CHECKED BY D.N. ARGENBRIGHT  
 SUBMITTED BY D.N. ARGENBRIGHT  
 DATE OCTOBER 2010



DRAWN BY: C.R. SUMNER, J.L. STONE

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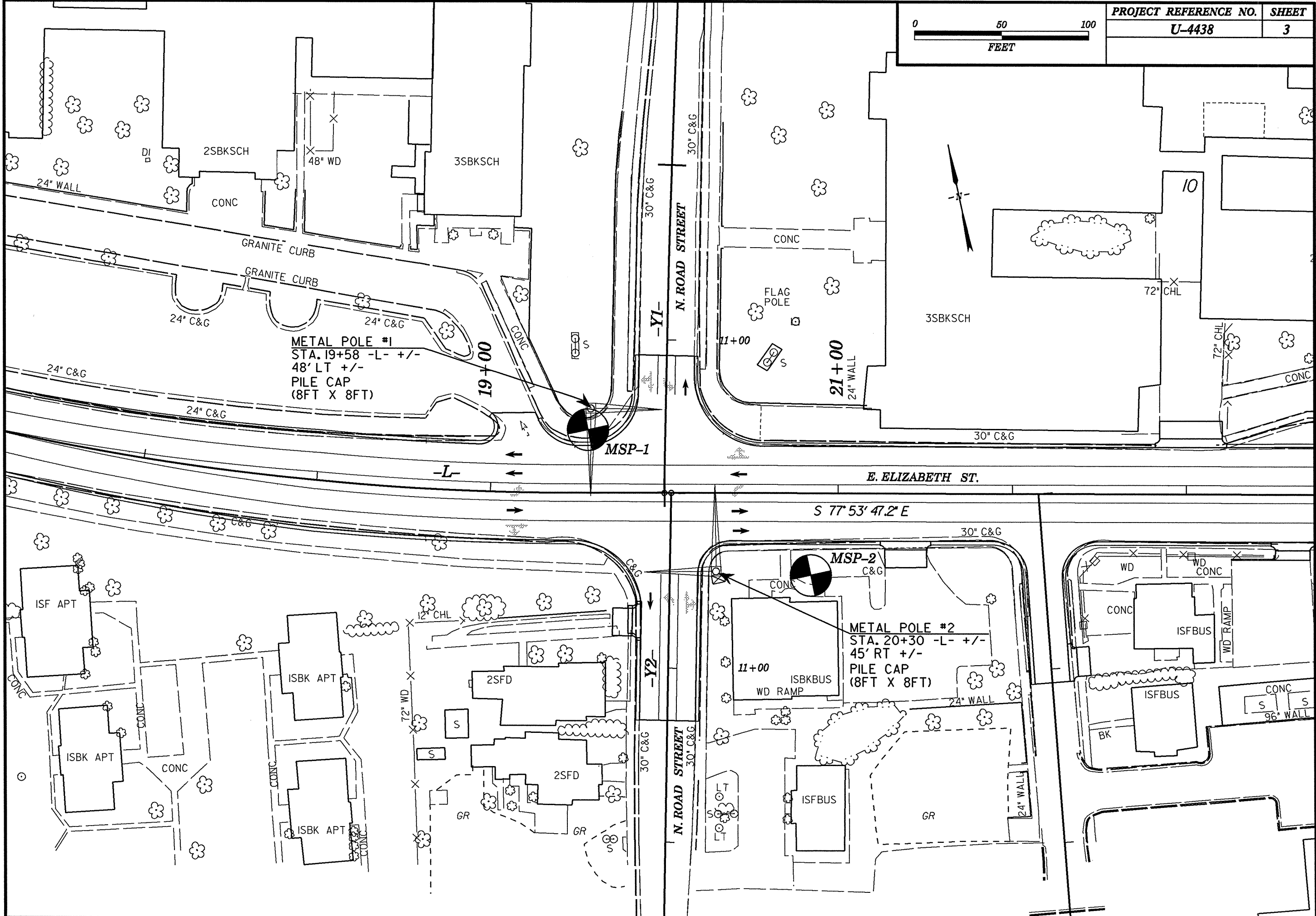
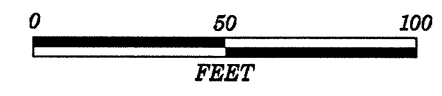
NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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

**SUBSURFACE INVESTIGATION**

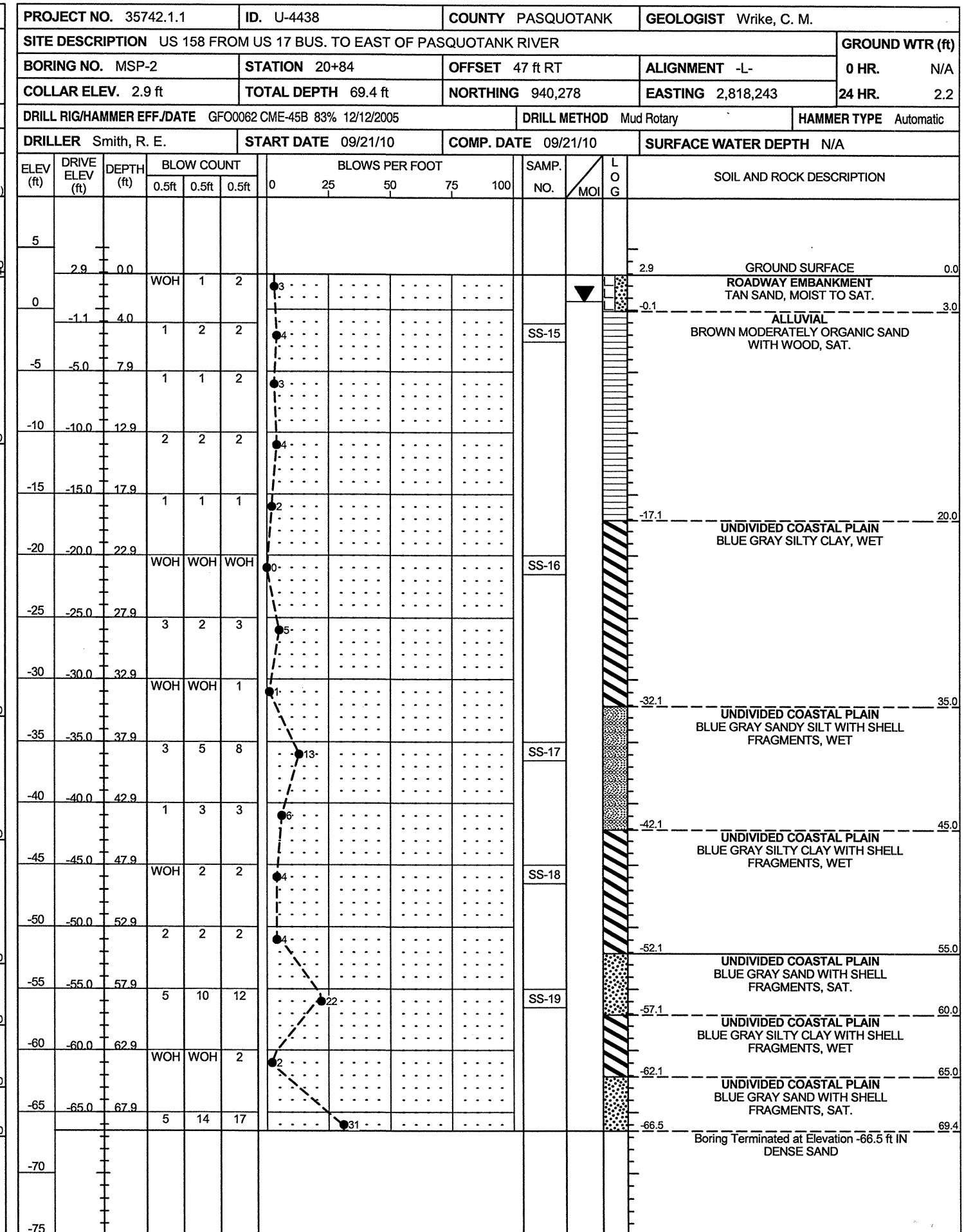
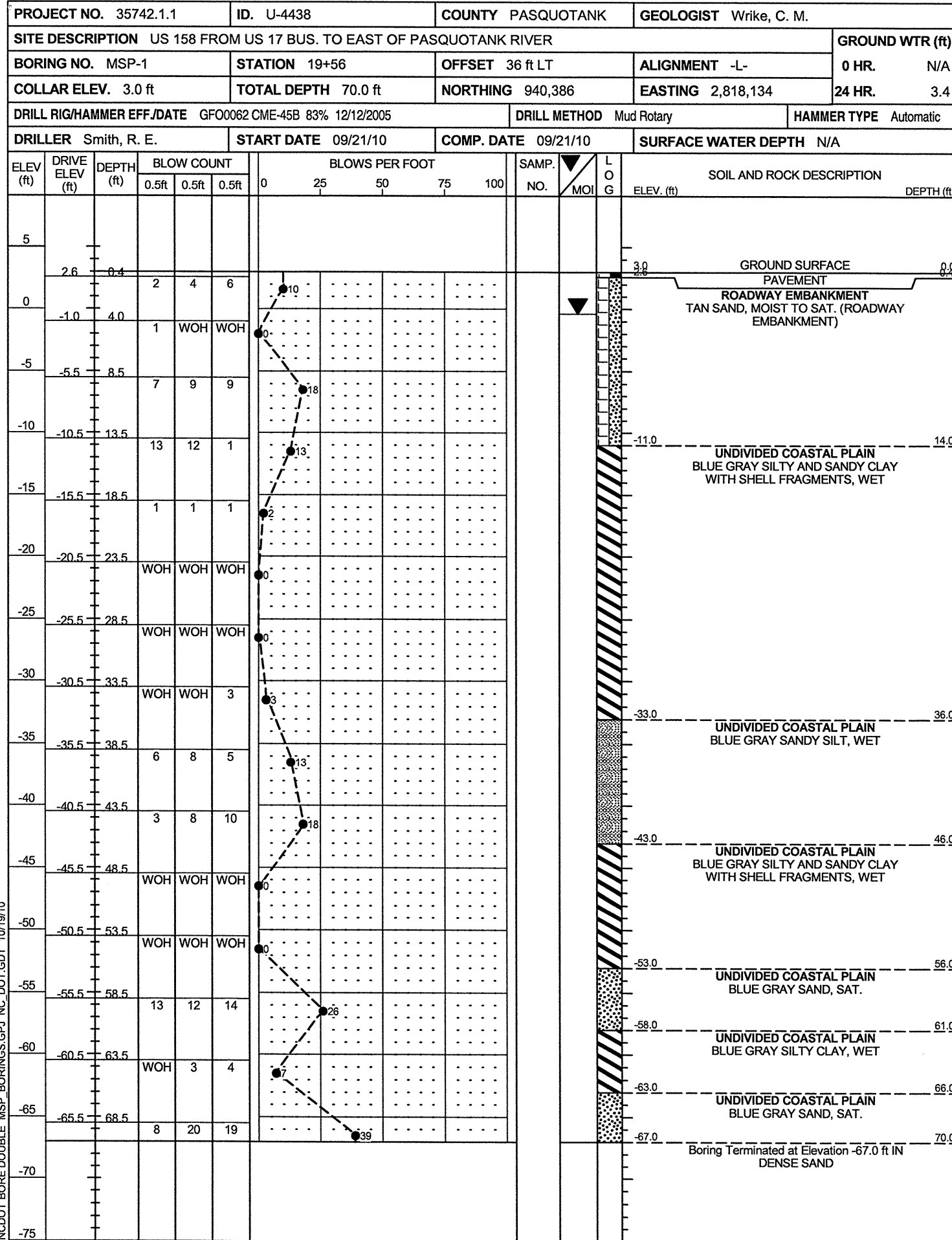
**SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

| SOIL DESCRIPTION  |   | GRADATION   |  | ROCK DESCRIPTION  |  | TERMS AND DEFINITIONS  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
|---|---|---|--|---|--|--|--|--|-----------------------------------|---|--|--|---|----------------------------------|-------------|--|---------------|---|------------------------|--|--|-------------|------------|---------------------|---------------------|--------------------------------|-------------------------------|--|---------------------------|--|-------------------|--------------------|--------------------------------|---|------------------------|------------------|------------------|-----------------|-------------------|-------------------------|-----------------------------|------------------|----------------------------------|-----------------------|----------------|---------|------------------------|--------------------------|-----------------------------|--------------------------------|-------------------|----------------|----------------|-------------------|----------------------|---|--------------------|------------------|----------------------|-----------------|-----------|------------------------------|-----------------------|---------------------------|--------------------|----------------------|--------------------------------|--------------|----------|--|--|--|--------------|------------------|--------------|--|------------------------------------|--|--------------------------------|---|-------------------|---|---|---------------------------------|---|---|---------------------------------|---|--|---------------------------------|--------------------------------|---|--------------------|---|--|---|--|--|-------------------------------------|--|-----------------------------------|---------------------------------------|--|--------------------------------|--|---|--|------|---------|-----------|-----------|-------------------|------------------------------|------|--------------|-----------------------------|------------------|-------------|-------------------------------|-------|----------------|-------------------------------------|------------|---------------------|-------------------------------------|--|--|-------------------------------|---|--|
| SOIL IS CONSIDERED TO BE THE 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 STANDARD PENETRATION TEST (ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLES:<br><i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LIVERS, HIGH PLASTIC, A-7-6</i>  |   | <b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.<br><b>UNIFORM</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)<br><b>POORLY GRADED</b><br><b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.<br><b>ANGULARITY OF GRAINS</b><br>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <b>ANGULAR</b> , <b>SUBANGULAR</b> , <b>SUBROUNDED</b> , OR <b>ROUNDED</b> . |  | <b>HARD ROCK</b> IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:<br><b>WEATHERED ROCK (WR)</b><br><b>CRYSTALLINE ROCK (CR)</b><br><b>NON-CRYSTALLINE ROCK (NCR)</b><br><b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b> |  | <b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.<br><b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.<br><b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.<br><b>ARGILLACEOUS</b> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.<br><b>ARTESIAN</b> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.<br><b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.<br><b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.<br><b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.<br><b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.<br><b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.<br><b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.<br><b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.<br><b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.<br><b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.<br><b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.<br><b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.<br><b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.<br><b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.<br><b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.<br><b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.<br><b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.<br><b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.<br><b>ROCK QUALITY DESIGNATION (RQD)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.<br><b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.<br><b>SILL</b> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.<br><b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.<br><b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - 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.<br><b>STRATA CORE RECOVERY (SCRC)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.<br><b>STRATA ROCK QUALITY DESIGNATION (SRQD)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.<br><b>TOPSOIL (TS)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| <b>SOIL LEGEND AND AASHTO CLASSIFICATION</b><br><table border="1"> <tr> <th>GENERAL CLASS.</th> <th>GRANULAR MATERIALS (&lt;= 35% PASSING #200)</th> <th>SILT-CLAY MATERIALS (&gt; 35% PASSING #200)</th> <th>ORGANIC MATERIALS</th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1, A-3, A-2, A-4, A-5, A-6, A-7</td> <td>A-2, A-4, A-5, A-6, A-7</td> <td>A-1, A-2, A-3, A-4, A-5, A-6, A-7</td> </tr> <tr> <td>SYMBOL</td> <td>[Pattern]</td> <td>[Pattern]</td> <td>[Pattern]</td> </tr> <tr> <td>% PASSING</td> <td>10, 40, 200</td> <td>10, 40, 200</td> <td>10, 40, 200</td> </tr> <tr> <td>LIQUID LIMIT PLASTIC INDEX</td> <td>6, 10, 15</td> <td>10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95</td> <td>10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95</td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> <td>0, 4, 8, 12, 16, 20</td> <td>0, 4, 8, 12, 16, 20</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS, GRAVEL, AND SAND</td> <td>FINE SAND, SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS, CLAYEY SOILS</td> </tr> <tr> <td>GEN. RATING AS A SUBGRADE</td> <td>EXCELLENT TO GOOD</td> <td>FAIR TO POOR</td> <td>FAIR TO POOR, POOR, UNSUITABLE</td> </tr> </table> |   | GENERAL CLASS.  | GRANULAR MATERIALS (<= 35% PASSING #200)                               | SILT-CLAY MATERIALS (> 35% PASSING #200)  | ORGANIC MATERIALS  | GROUP CLASS.   | A-1, A-3, A-2, A-4, A-5, A-6, A-7                          | A-2, A-4, A-5, A-6, A-7                        | A-1, A-2, A-3, A-4, A-5, A-6, A-7 | SYMBOL                                  | [Pattern]  | [Pattern]  | [Pattern]   | % PASSING                        | 10, 40, 200 | 10, 40, 200  | 10, 40, 200   | LIQUID LIMIT PLASTIC INDEX  | 6, 10, 15              | 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95 | 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95 | GROUP INDEX | 0          | 0, 4, 8, 12, 16, 20 | 0, 4, 8, 12, 16, 20 | 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 A SUBGRADE  | EXCELLENT TO GOOD | FAIR TO POOR       | FAIR TO POOR, POOR, UNSUITABLE | <b>MINERALOGICAL COMPOSITION</b><br>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.<br><b>COMPRESSIBILITY</b><br>SLIGHTLY COMPRESSIBLE<br>MODERATELY COMPRESSIBLE<br>HIGHLY COMPRESSIBLE<br>LIQUID LIMIT LESS THAN 31<br>LIQUID LIMIT EQUAL TO 31-50<br>LIQUID LIMIT GREATER THAN 50<br><b>PERCENTAGE OF MATERIAL</b><br><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>&gt;10%</td> <td>&gt;20%</td> <td>HIGHLY 35% AND ABOVE</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 | <b>WEATHERING</b><br><b>FRESH</b> - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.<br><b>VERY SLIGHT (V SLJ)</b> - 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.<br><b>SLIGHT (SLJ)</b> - 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.<br><b>MODERATE (MODJ)</b> - 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.<br><b>MODERATELY SEVERE (MOD. SEV.)</b> - 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><br><b>SEVERE (SEV.)</b> - 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, YIELDS SPT N VALUES &lt; 100 BPF</i><br><b>VERY SEVERE (V SEV.)</b> - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES &lt; 100 BPF</i><br><b>COMPLETE</b> - 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. |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| GENERAL CLASS.  | GRANULAR MATERIALS (<= 35% PASSING #200)  | SILT-CLAY MATERIALS (> 35% PASSING #200)  | ORGANIC MATERIALS  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| GROUP CLASS.  | A-1, A-3, A-2, A-4, A-5, A-6, A-7   | A-2, A-4, A-5, A-6, A-7   | A-1, A-2, A-3, A-4, A-5, A-6, A-7                                      |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| SYMBOL  | [Pattern]   | [Pattern]   | [Pattern]  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| % PASSING   | 10, 40, 200   | 10, 40, 200   | 10, 40, 200  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| LIQUID LIMIT PLASTIC INDEX  | 6, 10, 15   | 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95  | 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95 |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| GROUP INDEX   | 0   | 0, 4, 8, 12, 16, 20   | 0, 4, 8, 12, 16, 20  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| 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 A SUBGRADE   | EXCELLENT TO GOOD   | FAIR TO POOR  | FAIR TO POOR, POOR, UNSUITABLE   |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| 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   |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| <b>CONSISTENCY OR DENSENESS</b><br><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/FT<sup>2</sup>)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE<br/>LOOSE<br/>MEDIUM DENSE<br/>DENSE<br/>VERY DENSE</td> <td>&lt; 4<br/>4 TO 10<br/>10 TO 30<br/>30 TO 50<br/>&gt; 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT<br/>SOFT<br/>MEDIUM STIFF<br/>STIFF<br/>VERY STIFF<br/>HARD</td> <td>&lt; 2<br/>2 TO 4<br/>4 TO 8<br/>8 TO 15<br/>15 TO 30<br/>&gt; 30</td> <td>&lt; 0.25<br/>0.25 TO 0.50<br/>0.5 TO 1.0<br/>1 TO 2<br/>2 TO 4<br/>&gt; 4</td> </tr> </table>  |   | PRIMARY SOIL TYPE   | COMPACTNESS OR CONSISTENCY   | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)  | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> ) | GENERALLY GRANULAR MATERIAL (NON-COHESIVE)   | VERY LOOSE<br>LOOSE<br>MEDIUM DENSE<br>DENSE<br>VERY DENSE | < 4<br>4 TO 10<br>10 TO 30<br>30 TO 50<br>> 50 | N/A                               | GENERALLY SILT-CLAY MATERIAL (COHESIVE) | VERY SOFT<br>SOFT<br>MEDIUM STIFF<br>STIFF<br>VERY STIFF<br>HARD | < 2<br>2 TO 4<br>4 TO 8<br>8 TO 15<br>15 TO 30<br>> 30 | < 0.25<br>0.25 TO 0.50<br>0.5 TO 1.0<br>1 TO 2<br>2 TO 4<br>> 4 | <b>MISCELLANEOUS SYMBOLS</b><br> |             | <b>ROCK HARDNESS</b><br><b>VERY HARD</b> - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.<br><b>HARD</b> - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.<br><b>MODERATELY HARD</b> - 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.<br><b>MEDIUM HARD</b> - CAN BE GROVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.<br><b>SOFT</b> - CAN BE GROVED 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.<br><b>VERY SOFT</b> - 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. |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| PRIMARY SOIL TYPE   | COMPACTNESS OR CONSISTENCY  | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)  | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )       |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| GENERALLY GRANULAR MATERIAL (NON-COHESIVE)  | VERY LOOSE<br>LOOSE<br>MEDIUM DENSE<br>DENSE<br>VERY DENSE                      | < 4<br>4 TO 10<br>10 TO 30<br>30 TO 50<br>> 50  | N/A  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| GENERALLY SILT-CLAY MATERIAL (COHESIVE)   | VERY SOFT<br>SOFT<br>MEDIUM STIFF<br>STIFF<br>VERY STIFF<br>HARD                | < 2<br>2 TO 4<br>4 TO 8<br>8 TO 15<br>15 TO 30<br>> 30  | < 0.25<br>0.25 TO 0.50<br>0.5 TO 1.0<br>1 TO 2<br>2 TO 4<br>> 4        |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| <b>TEXTURE OR GRAIN SIZE</b><br><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 (CSE, SD.)</th> <th>FINE SAND (F SD.)</th> <th>SILT (SL.)</th> <th>CLAY (CL.)</th> </tr> <tr> <td>GRAIN SIZE</td> <td>MM 305<br/>IN. 12</td> <td>MM 75<br/>IN. 3</td> <td>MM 2.0</td> <td>MM 0.25</td> <td>MM 0.05</td> <td>MM 0.005</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 (CSE, SD.) | FINE SAND (F SD.)  | SILT (SL.)   | CLAY (CL.)  | GRAIN SIZE | MM 305<br>IN. 12    | MM 75<br>IN. 3      | MM 2.0                         | MM 0.25                       | MM 0.05                                    | MM 0.005                  | <b>ABBREVIATIONS</b><br><table border="1"> <tr> <td>AR - AUGER REFUSAL</td> <td>MED. - MEDIUM</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>MICA - MICACEOUS</td> <td>WEA. - WEATHERED</td> </tr> <tr> <td>CL - CLAY</td> <td>MOD. - MODERATELY</td> <td>W - UNIT WEIGHT</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>NP - NON PLASTIC</td> <td>W<sub>d</sub> - DRY UNIT WEIGHT</td> </tr> <tr> <td>CSE - COARSE</td> <td>ORG. - ORGANIC</td> <td></td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>PMT - PRESSUREMETER TEST</td> <td><b>SAMPLE ABBREVIATIONS</b></td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>SAP. - SAPROLITIC</td> <td>S - BULK</td> </tr> <tr> <td>ø - VOID RATIO</td> <td>SD. - SAND, SANDY</td> <td>SS - SPLIT SPOON</td> </tr> <tr> <td>F - FINE</td> <td>SL. - SILTY, SILTY</td> <td>ST - SHELBY TUBE</td> </tr> <tr> <td>FSS. - FOSSILIFEROUS</td> <td>SLJ. - SLIGHTLY</td> <td>RS - ROCK</td> </tr> <tr> <td>FRAC. - FRACTURED, FRACTURES</td> <td>TCR - TRICONE REFUSAL</td> <td>RT - RECOMPACTED TRIAXIAL</td> </tr> <tr> <td>FRAGS. - FRAGMENTS</td> <td>W - MOISTURE CONTENT</td> <td>CBR - CALIFORNIA BEARING RATIO</td> </tr> <tr> <td>HL. - HIGHLY</td> <td>V - VERY</td> <td></td> </tr> </table> |                   | AR - AUGER REFUSAL | MED. - MEDIUM                  | VST - VANE SHEAR TEST   | BT - BORING TERMINATED | MICA - MICACEOUS | WEA. - WEATHERED | CL - CLAY       | MOD. - MODERATELY | W - UNIT WEIGHT         | CPT - CONE PENETRATION TEST | NP - NON PLASTIC | W <sub>d</sub> - DRY UNIT WEIGHT | CSE - COARSE          | ORG. - ORGANIC |         | DMT - DILATOMETER TEST | PMT - PRESSUREMETER TEST | <b>SAMPLE ABBREVIATIONS</b> | DPT - DYNAMIC PENETRATION TEST | SAP. - SAPROLITIC | S - BULK       | ø - VOID RATIO | SD. - SAND, SANDY | SS - SPLIT SPOON     | F - FINE  | SL. - SILTY, SILTY | ST - SHELBY TUBE | FSS. - FOSSILIFEROUS | SLJ. - SLIGHTLY | RS - ROCK | FRAC. - FRACTURED, FRACTURES | TCR - TRICONE REFUSAL | RT - RECOMPACTED TRIAXIAL | FRAGS. - FRAGMENTS | W - MOISTURE CONTENT | CBR - CALIFORNIA BEARING RATIO | HL. - HIGHLY | V - VERY |  | <b>EQUIPMENT USED ON SUBJECT PROJECT</b><br><table border="1"> <tr> <th>DRILL UNITS:</th> <th>ADVANCING TOOLS:</th> <th>HAMMER TYPE:</th> </tr> <tr> <td><input type="checkbox"/> MOBILE B-____</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC <input checked="" type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> BK-51</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td><b>CORE SIZE:</b></td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-45B</td> <td><input type="checkbox"/> 8" HOLLOW AUGERS</td> <td><input type="checkbox"/> B-____</td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-55B</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td><input type="checkbox"/> N-____</td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG.-CARBIDE INSERTS</td> <td><input type="checkbox"/> H-____</td> </tr> <tr> <td><input type="checkbox"/> _____</td> <td><input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</td> <td><b>HAND TOOLS:</b></td> </tr> <tr> <td><input checked="" type="checkbox"/> MOBILE B-57</td> <td><input checked="" type="checkbox"/> TRICONE 2 1/8" * STEEL TEETH</td> <td><input type="checkbox"/> POST HOLE DIGGER</td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE _____ * TUNG.-CARB.</td> <td><input type="checkbox"/> HAND AUGER</td> </tr> <tr> <td></td> <td><input type="checkbox"/> CORE BIT</td> <td><input type="checkbox"/> SOUNDING ROD</td> </tr> <tr> <td></td> <td><input type="checkbox"/> _____</td> <td><input type="checkbox"/> VANE SHEAR TEST</td> </tr> </table> |  | DRILL UNITS: | ADVANCING TOOLS: | HAMMER TYPE: | <input type="checkbox"/> MOBILE B-____ | <input type="checkbox"/> CLAY BITS | <input checked="" type="checkbox"/> AUTOMATIC <input checked="" type="checkbox"/> MANUAL | <input type="checkbox"/> BK-51 | <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER | <b>CORE SIZE:</b> | <input checked="" type="checkbox"/> CME-45B | <input type="checkbox"/> 8" HOLLOW AUGERS | <input type="checkbox"/> B-____ | <input checked="" type="checkbox"/> CME-55B | <input type="checkbox"/> HARD FACED FINGER BITS | <input type="checkbox"/> N-____ | <input type="checkbox"/> PORTABLE HOIST | <input type="checkbox"/> TUNG.-CARBIDE INSERTS | <input type="checkbox"/> H-____ | <input type="checkbox"/> _____ | <input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER | <b>HAND TOOLS:</b> | <input checked="" type="checkbox"/> MOBILE B-57 | <input checked="" type="checkbox"/> TRICONE 2 1/8" * STEEL TEETH | <input type="checkbox"/> POST HOLE DIGGER |  | <input type="checkbox"/> TRICONE _____ * TUNG.-CARB. | <input type="checkbox"/> HAND AUGER |  | <input type="checkbox"/> CORE BIT | <input type="checkbox"/> SOUNDING ROD |  | <input type="checkbox"/> _____ | <input type="checkbox"/> VANE SHEAR TEST | <b>FRACTURE SPACING</b><br><table border="1"> <tr> <th>TERM</th> <th>SPACING</th> <th>THICKNESS</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED &gt; 4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED 1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED 0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FEET</td> <td>VERY THINLY BEDDED 0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED 0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED &lt; 0.008 FEET</td> </tr> </table> |  | TERM | SPACING | THICKNESS | VERY WIDE | MORE THAN 10 FEET | VERY THICKLY BEDDED > 4 FEET | WIDE | 3 TO 10 FEET | THICKLY BEDDED 1.5 - 4 FEET | MODERATELY CLOSE | 1 TO 3 FEET | THINLY BEDDED 0.16 - 1.5 FEET | CLOSE | 0.16 TO 1 FEET | VERY THINLY BEDDED 0.03 - 0.16 FEET | VERY CLOSE | LESS THAN 0.16 FEET | THICKLY LAMINATED 0.008 - 0.03 FEET |  |  | THINLY LAMINATED < 0.008 FEET | <b>BENCH MARK:</b><br>_____<br><b>ELEVATION:</b> _____ <b>FT.</b> |  |
| 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 (CSE, SD.)   | FINE SAND (F SD.)   | SILT (SL.)   | CLAY (CL.)   |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| GRAIN SIZE  | MM 305<br>IN. 12  | MM 75<br>IN. 3  | MM 2.0   | MM 0.25   | MM 0.05  | MM 0.005   |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| AR - AUGER REFUSAL  | MED. - MEDIUM   | VST - VANE SHEAR TEST   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| BT - BORING TERMINATED  | MICA - MICACEOUS  | WEA. - WEATHERED  |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| CL - CLAY   | MOD. - MODERATELY   | W - UNIT WEIGHT   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| CPT - CONE PENETRATION TEST   | NP - NON PLASTIC  | W <sub>d</sub> - DRY UNIT WEIGHT  |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| CSE - COARSE  | ORG. - ORGANIC  |   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| DMT - DILATOMETER TEST  | PMT - PRESSUREMETER TEST  | <b>SAMPLE ABBREVIATIONS</b>   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| DPT - DYNAMIC PENETRATION TEST  | SAP. - SAPROLITIC   | S - BULK  |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| ø - VOID RATIO  | SD. - SAND, SANDY   | SS - SPLIT SPOON  |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| F - FINE  | SL. - SILTY, SILTY  | ST - SHELBY TUBE  |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| FSS. - FOSSILIFEROUS  | SLJ. - SLIGHTLY   | RS - ROCK   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| FRAC. - FRACTURED, FRACTURES  | TCR - TRICONE REFUSAL   | RT - RECOMPACTED TRIAXIAL   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| FRAGS. - FRAGMENTS  | W - MOISTURE CONTENT  | CBR - CALIFORNIA BEARING RATIO  |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| HL. - HIGHLY  | V - VERY  |   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| DRILL UNITS:  | ADVANCING TOOLS:  | HAMMER TYPE:  |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| <input type="checkbox"/> MOBILE B-____  | <input type="checkbox"/> CLAY BITS  | <input checked="" type="checkbox"/> AUTOMATIC <input checked="" type="checkbox"/> MANUAL  |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| <input type="checkbox"/> BK-51  | <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER                             | <b>CORE SIZE:</b>   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| <input checked="" type="checkbox"/> CME-45B   | <input type="checkbox"/> 8" HOLLOW AUGERS                                       | <input type="checkbox"/> B-____   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| <input checked="" type="checkbox"/> CME-55B   | <input type="checkbox"/> HARD FACED FINGER BITS                                 | <input type="checkbox"/> N-____   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| <input type="checkbox"/> PORTABLE HOIST   | <input type="checkbox"/> TUNG.-CARBIDE INSERTS                                  | <input type="checkbox"/> H-____   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| <input type="checkbox"/> _____  | <input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER | <b>HAND TOOLS:</b>  |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| <input checked="" type="checkbox"/> MOBILE B-57   | <input checked="" type="checkbox"/> TRICONE 2 1/8" * STEEL TEETH                | <input type="checkbox"/> POST HOLE DIGGER   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
|   | <input type="checkbox"/> TRICONE _____ * TUNG.-CARB.                            | <input type="checkbox"/> HAND AUGER   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
|   | <input type="checkbox"/> CORE BIT   | <input type="checkbox"/> SOUNDING ROD   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
|   | <input type="checkbox"/> _____  | <input type="checkbox"/> VANE SHEAR TEST  |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| TERM  | SPACING   | THICKNESS   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| VERY WIDE   | MORE THAN 10 FEET   | VERY THICKLY BEDDED > 4 FEET  |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| WIDE  | 3 TO 10 FEET  | THICKLY BEDDED 1.5 - 4 FEET   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| MODERATELY CLOSE  | 1 TO 3 FEET   | THINLY BEDDED 0.16 - 1.5 FEET   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| CLOSE   | 0.16 TO 1 FEET  | VERY THINLY BEDDED 0.03 - 0.16 FEET   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| VERY CLOSE  | LESS THAN 0.16 FEET   | THICKLY LAMINATED 0.008 - 0.03 FEET   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
|   |   | THINLY LAMINATED < 0.008 FEET   |  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| <b>PLASTICITY</b><br><table border="1"> <tr> <th>NONPLASTIC</th> <th>LOW PLASTICITY</th> <th>MED. PLASTICITY</th> <th>HIGH PLASTICITY</th> </tr> <tr> <td>PLASTICITY INDEX (PI)</td> <td>0-5</td> <td>6-15</td> <td>16-25</td> </tr> <tr> <td>DRY STRENGTH</td> <td>VERY LOW</td> <td>SLIGHT</td> <td>MEDIUM</td> </tr> <tr> <td></td> <td></td> <td></td> <td>HIGH</td> </tr> </table>   |   | NONPLASTIC  | LOW PLASTICITY   | MED. PLASTICITY   | HIGH PLASTICITY  | PLASTICITY INDEX (PI)  | 0-5  | 6-15   | 16-25                             | DRY STRENGTH                            | VERY LOW   | SLIGHT   | MEDIUM  |                                  |             |  | HIGH          | <b>INDURATION</b><br>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.<br><b>FRIABLE</b> - RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.<br><b>MODERATELY INDURATED</b> - GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.<br><b>INDURATED</b> - GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.<br><b>EXTREMELY INDURATED</b> - SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS. |                        | <b>NOTES:</b><br>_____<br>_____  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| NONPLASTIC  | LOW PLASTICITY  | MED. PLASTICITY   | HIGH PLASTICITY  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| PLASTICITY INDEX (PI)   | 0-5   | 6-15  | 16-25  |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
| DRY STRENGTH  | VERY LOW  | SLIGHT  | MEDIUM   |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |
|   |   |   | HIGH   |   |  |  |  |  |                                   |   |  |  |   |                                  |             |  |               |   |                        |  |  |             |            |                     |                     |                                |                               |  |                           |  |                   |                    |                                |   |                        |                  |                  |                 |                   |                         |                             |                  |                                  |                       |                |         |                        |                          |                             |                                |                   |                |                |                   |                      |   |                    |                  |                      |                 |           |                              |                       |                           |                    |                      |                                |              |          |  |  |  |              |                  |              |  |                                    |  |                                |   |                   |   |   |                                 |   |   |                                 |   |  |                                 |                                |   |                    |   |  |   |  |  |                                     |  |                                   |                                       |  |                                |  |   |  |      |         |           |           |                   |                              |      |              |                             |                  |             |                               |       |                |                                     |            |                     |                                     |  |  |                               |   |  |





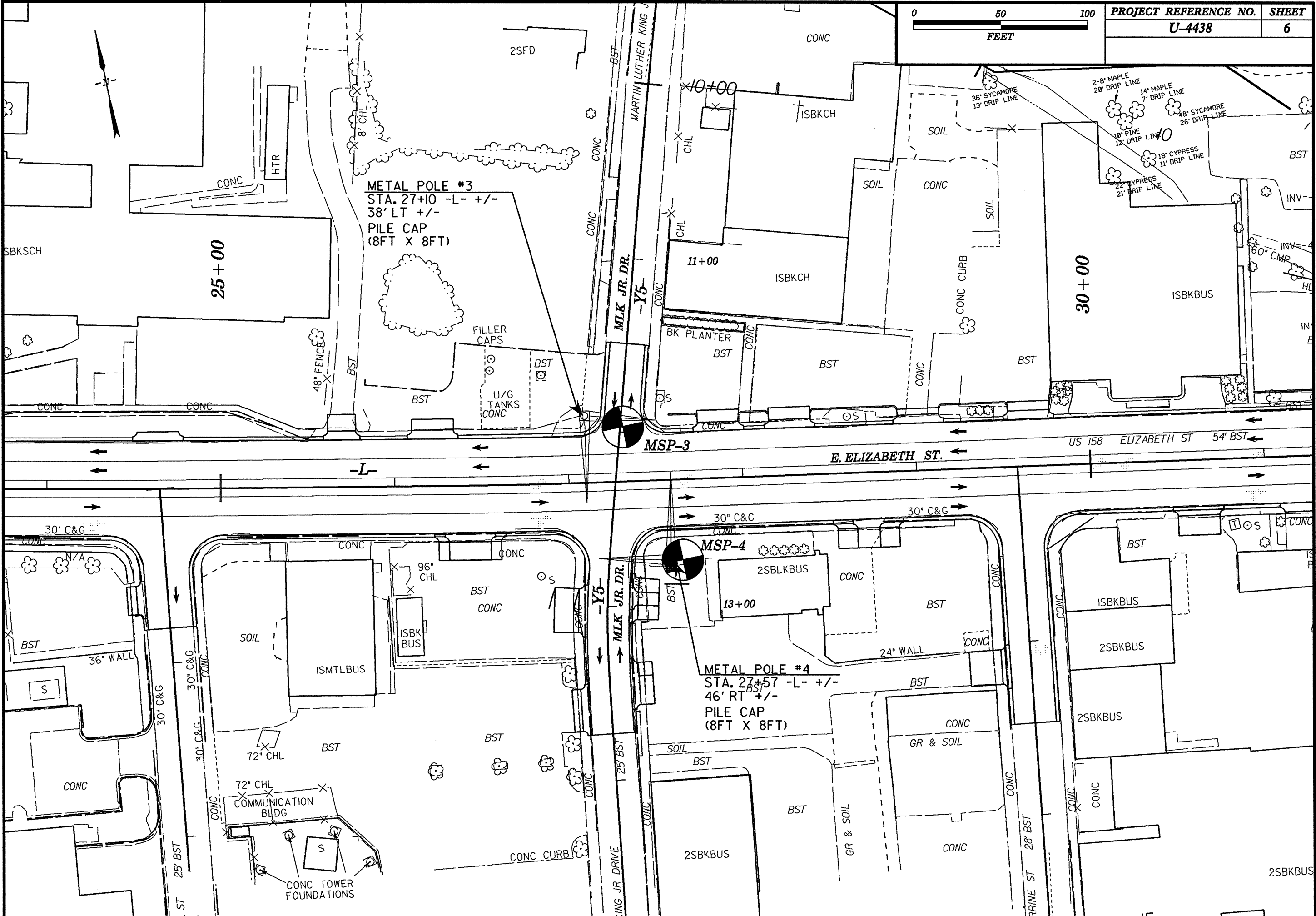
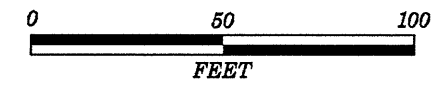
**NCDOT GEOTECHNICAL ENGINEERING UNIT**  
**BORELOG REPORT**



NCDOT BORE DOUBLE MSP BORINGS.GPJ NC\_DOT.GDT 10/19/10

### SOIL TEST RESULTS MSP-2

| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |        |      |      | % PASSING (SIEVES) |     |     | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|-----|-----|------------|-----------|
|            |        |         |                |               |      |      | C.SAND      | F.SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |
| SS- 15     | 47 RT  | 20+84   | 4.0-5.5        | A-2-4(0)      | 37   | NP   | 21.0        | 48.8   | 25.2 | 5.1  | 97                 | 94  | 31  | -          | 8.3       |
| SS- 16     | 47 RT  | 20+84   | 22.9-24.4      | A-7-6(18)     | 41   | 22   | 0.6         | 31.6   | 37.3 | 30.5 | 100                | 100 | 82  | -          | -         |
| SS- 17     | 47 RT  | 20+84   | 37.9-39.4      | A-4(0)        | 25   | 2    | 0.5         | 64.3   | 23.0 | 12.2 | 100                | 100 | 51  | -          | -         |
| SS- 18     | 47 RT  | 20+84   | 47.9-49.4      | A-7-6(33)     | 53   | 30   | 0.8         | 5.3    | 53.2 | 40.7 | 100                | 100 | 97  | -          | -         |
| SS- 19     | 47 RT  | 20+84   | 57.9-59.4      | A-2-4(0)      | 21   | NP   | 61.8        | 26.7   | 4.4  | 7.1  | 97                 | 56  | 14  | -          | -         |



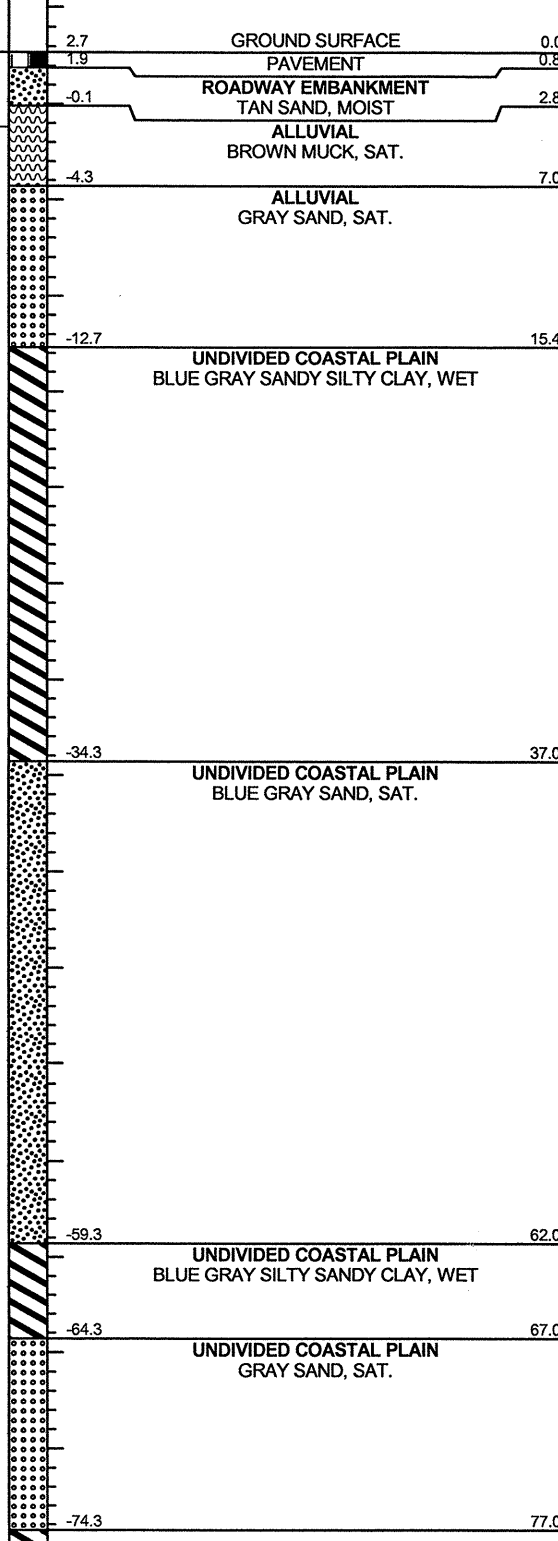
METAL POLE #3  
 STA. 27+10 -L- +/-  
 38' LT +/-  
 PILE CAP  
 (8FT X 8FT)

METAL POLE #4  
 STA. 27+57 -L- +/-  
 46' RT +/-  
 PILE CAP  
 (8FT X 8FT)

| PROJECT NO. 35742.1.1   |                 | ID. U-4438              |            | COUNTY PASQUOTANK     |       | GEOLOGIST Bottoms, T. C. |                 |    |    |     |           |       |                           |            |  |  |
|---|-----------------|-------------------------|------------|-----------------------|-------|--------------------------|-----------------|----|----|-----|-----------|-------|---------------------------|------------|--|--|
| SITE DESCRIPTION US 158 FROM US 17 BUS. TO EAST OF PASQUOTANK RIVER |                 |                         |            |                       |       |                          | GROUND WTR (ft) |    |    |     |           |       |                           |            |  |  |
| BORING NO. MSP-3  |                 | STATION 27+31           |            | OFFSET 31 ft LT       |       | ALIGNMENT -L-            |                 |    |    |     |           |       |                           |            |  |  |
| COLLAR ELEV. 2.7 ft   |                 | TOTAL DEPTH 95.7 ft     |            | NORTHING 940,224      |       | EASTING 2,818,893        |                 |    |    |     |           |       |                           |            |  |  |
| DRILL RIG/HAMMER EFF./DATE MACTEC B-57                              |                 | DRILL METHOD Mud Rotary |            | HAMMER TYPE Automatic |       |                          |                 |    |    |     |           |       |                           |            |  |  |
| DRILLER Contract Driller  |                 | START DATE 02/15/07     |            | COMP. DATE 02/15/07   |       | SURFACE WATER DEPTH N/A  |                 |    |    |     |           |       |                           |            |  |  |
| ELEV (ft)   | DRIVE ELEV (ft) | DEPTH (ft)              | BLOW COUNT |                       |       | BLOWS PER FOOT           |                 |    |    |     | SAMP. NO. | L O G | SOIL AND ROCK DESCRIPTION | DEPTH (ft) |  |  |
|   |                 |                         | 0.5ft      | 0.5ft                 | 0.5ft | 0                        | 25              | 50 | 75 | 100 |           |       |                           |            |  |  |
| 5   |                 |                         |            |                       |       |                          |                 |    |    |     |           |       |                           |            |  |  |
| 0   | 1.9             | 0.8                     | 8          | 5                     | 4     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -5  | -1.5            | 4.2                     | 1          | 1                     | 1     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -10   | -6.5            | 9.2                     | WOH        | 1                     | 2     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -15   | -11.5           | 14.2                    | 4          | 4                     | 1     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -20   | -16.5           | 19.2                    | 1          | 1                     | 1     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -25   | -21.5           | 24.2                    | 1          | 1                     | 1     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -30   | -26.5           | 29.2                    | 1          | 1                     | 1     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -35   | -31.5           | 34.2                    | 1          | 1                     | 1     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -40   | -36.5           | 39.2                    | 3          | 8                     | 16    |                          |                 |    |    |     |           |       |                           |            |  |  |
| -45   | -41.5           | 44.2                    | 10         | 14                    | 7     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -50   | -46.5           | 49.2                    | 1          | 2                     | 1     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -55   | -51.5           | 54.2                    | 2          | 8                     | 9     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -60   | -56.5           | 59.2                    | 2          | 6                     | 9     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -65   | -61.5           | 64.2                    | 2          | 1                     | 1     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -70   | -66.5           | 69.2                    | 9          | 14                    | 14    |                          |                 |    |    |     |           |       |                           |            |  |  |
| -75   | -71.5           | 74.2                    | 20         | 31                    | 38    |                          |                 |    |    |     |           |       |                           |            |  |  |

| PROJECT NO. 35742.1.1   |                 | ID. U-4438              |            | COUNTY PASQUOTANK     |       | GEOLOGIST Bottoms, T. C. |                 |    |    |     |           |       |                           |            |  |  |
|---|-----------------|-------------------------|------------|-----------------------|-------|--------------------------|-----------------|----|----|-----|-----------|-------|---------------------------|------------|--|--|
| SITE DESCRIPTION US 158 FROM US 17 BUS. TO EAST OF PASQUOTANK RIVER |                 |                         |            |                       |       |                          | GROUND WTR (ft) |    |    |     |           |       |                           |            |  |  |
| BORING NO. MSP-3  |                 | STATION 27+31           |            | OFFSET 31 ft LT       |       | ALIGNMENT -L-            |                 |    |    |     |           |       |                           |            |  |  |
| COLLAR ELEV. 2.7 ft   |                 | TOTAL DEPTH 95.7 ft     |            | NORTHING 940,224      |       | EASTING 2,818,893        |                 |    |    |     |           |       |                           |            |  |  |
| DRILL RIG/HAMMER EFF./DATE MACTEC B-57                              |                 | DRILL METHOD Mud Rotary |            | HAMMER TYPE Automatic |       |                          |                 |    |    |     |           |       |                           |            |  |  |
| DRILLER Contract Driller  |                 | START DATE 02/15/07     |            | COMP. DATE 02/15/07   |       | SURFACE WATER DEPTH N/A  |                 |    |    |     |           |       |                           |            |  |  |
| ELEV (ft)   | DRIVE ELEV (ft) | DEPTH (ft)              | BLOW COUNT |                       |       | BLOWS PER FOOT           |                 |    |    |     | SAMP. NO. | L O G | SOIL AND ROCK DESCRIPTION | DEPTH (ft) |  |  |
|   |                 |                         | 0.5ft      | 0.5ft                 | 0.5ft | 0                        | 25              | 50 | 75 | 100 |           |       |                           |            |  |  |
| -75   |                 |                         |            |                       |       |                          |                 |    |    |     |           |       |                           |            |  |  |
| -80   | -76.5           | 79.2                    | 3          | 4                     | 5     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -85   | -81.5           | 84.2                    | 3          | 5                     | 5     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -90   | -86.5           | 89.2                    | 3          | 4                     | 5     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -95   | -91.5           | 94.2                    | 5          | 4                     | 4     |                          |                 |    |    |     |           |       |                           |            |  |  |
| -100  |                 |                         |            |                       |       |                          |                 |    |    |     |           |       |                           |            |  |  |
| -105  |                 |                         |            |                       |       |                          |                 |    |    |     |           |       |                           |            |  |  |
| -110  |                 |                         |            |                       |       |                          |                 |    |    |     |           |       |                           |            |  |  |
| -115  |                 |                         |            |                       |       |                          |                 |    |    |     |           |       |                           |            |  |  |
| -120  |                 |                         |            |                       |       |                          |                 |    |    |     |           |       |                           |            |  |  |
| -125  |                 |                         |            |                       |       |                          |                 |    |    |     |           |       |                           |            |  |  |
| -130  |                 |                         |            |                       |       |                          |                 |    |    |     |           |       |                           |            |  |  |
| -135  |                 |                         |            |                       |       |                          |                 |    |    |     |           |       |                           |            |  |  |
| -140  |                 |                         |            |                       |       |                          |                 |    |    |     |           |       |                           |            |  |  |
| -145  |                 |                         |            |                       |       |                          |                 |    |    |     |           |       |                           |            |  |  |
| -150  |                 |                         |            |                       |       |                          |                 |    |    |     |           |       |                           |            |  |  |
| -155  |                 |                         |            |                       |       |                          |                 |    |    |     |           |       |                           |            |  |  |

NCDOT BORE DOUBLE BORINGS.GPJ, NC\_DOT\_GDT\_10/19/10



Match Line

COASTAL PLAIN  
 BLUE GRAY SILTY CLAY WITH SHELL  
 FRAGMENTS, WET (YORKTOWN  
 FORMATION) (continued)

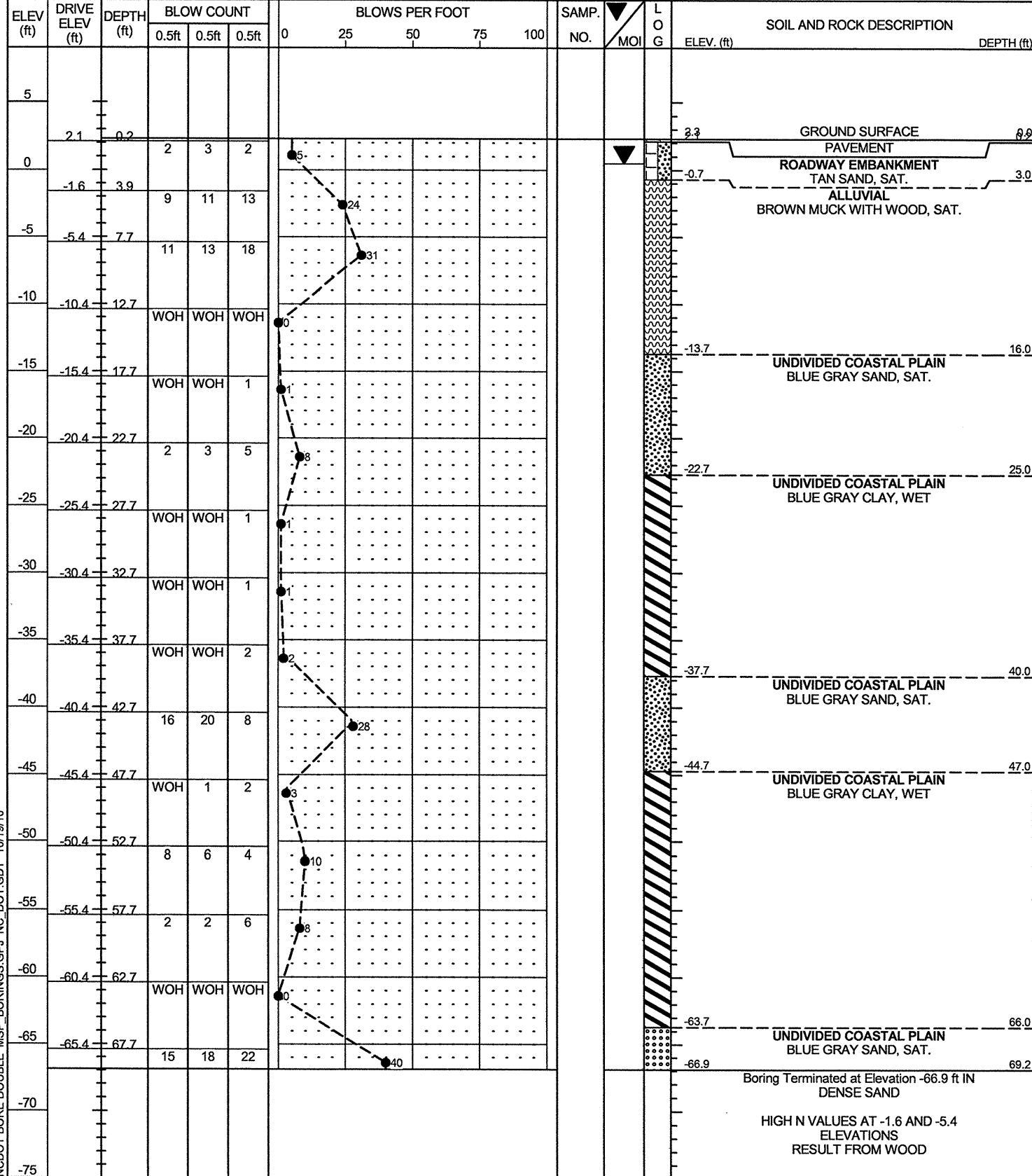
Boring Terminated at Elevation -93.0 ft IN  
 STIFF SILTY CLAY



# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

|   |                     |                         |                         |
|---|---------------------|-------------------------|-------------------------|
| PROJECT NO. 35742.1.1   | ID. U-4438          | COUNTY PASQUOTANK       | GEOLOGIST Wrike, C. M.  |
| SITE DESCRIPTION US 158 FROM US 17 BUS. TO EAST OF PASQUOTANK RIVER |                     |                         | GROUND WTR (ft)         |
| BORING NO. MSP-4  | STATION 27+64       | OFFSET 46 ft RT         | ALIGNMENT -L-           |
| COLLAR ELEV. 2.3 ft   | TOTAL DEPTH 69.2 ft | NORTHING 940,143        | EASTING 2,818,909       |
| DRILL RIG/HAMMER EFF./DATE GFO0062 CME-45B 83% 12/12/2005           |                     | DRILL METHOD Mud Rotary | HAMMER TYPE Automatic   |
| DRILLER Smith, R. E.  | START DATE 09/21/10 | COMP. DATE 09/22/10     | SURFACE WATER DEPTH N/A |



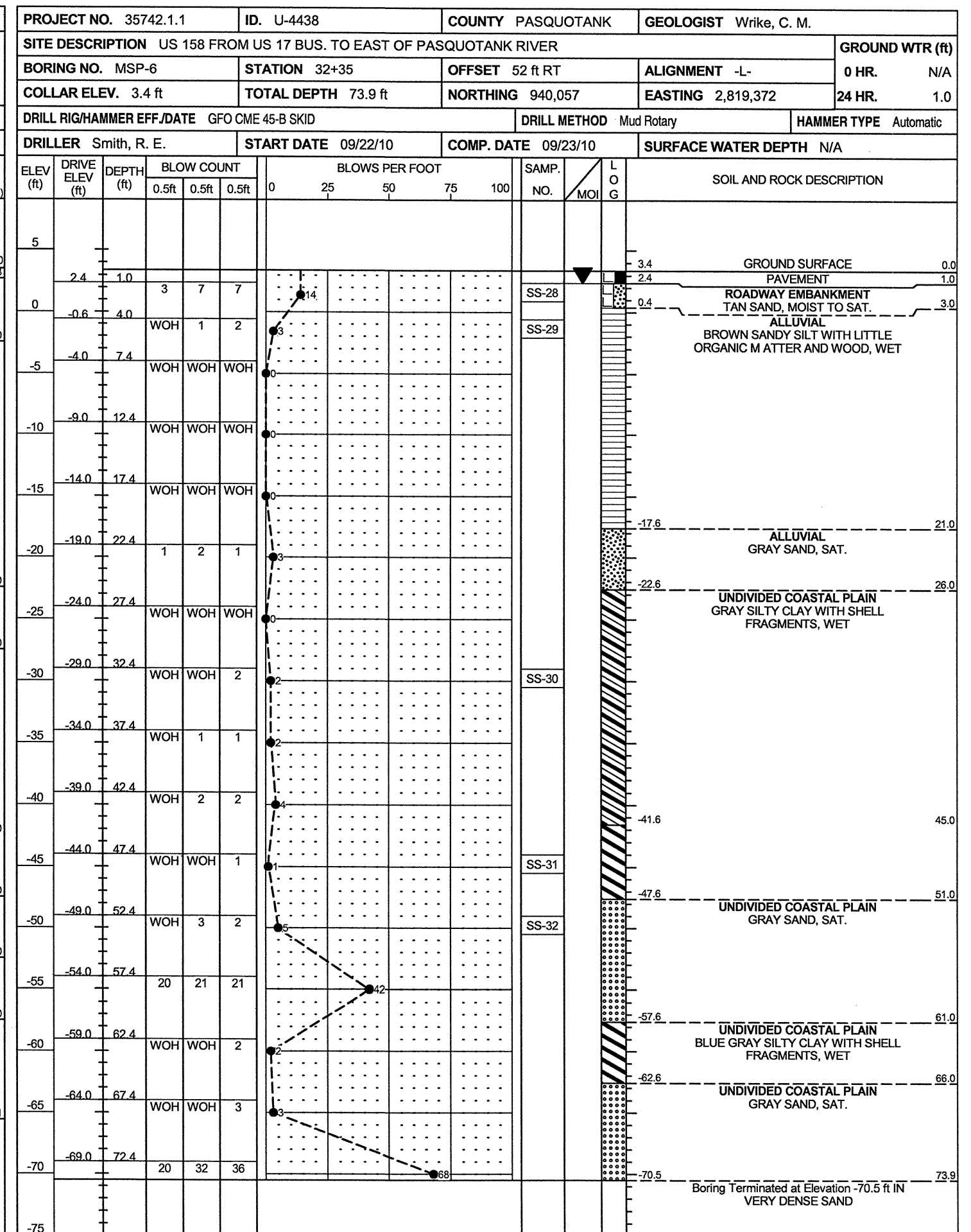
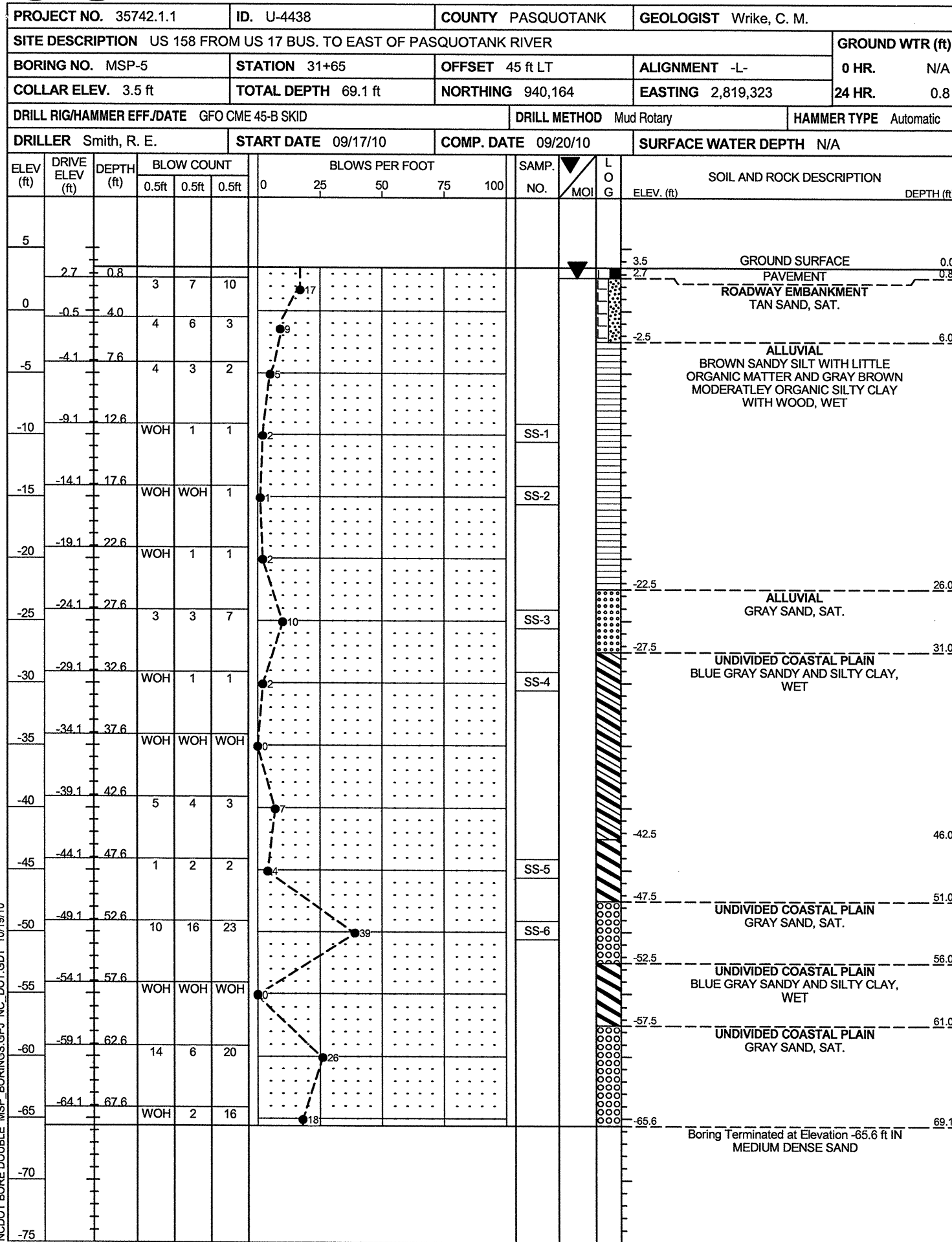
NCDOT BORE DOUBLE MSP\_BORINGS.GPJ NC\_DOT.GDT 10/19/10



### SOIL TEST RESULTS MSP-3

| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS.     | L.L. | P.I. | % BY WEIGHT |        |      |      | % PASSING (SIEVES) |     |     | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|-------------------|------|------|-------------|--------|------|------|--------------------|-----|-----|------------|-----------|
|            |        |         |                |                   |      |      | C.SAND      | F.SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |
| SS-65      | 31 LT  | 27+31   | 0.8-2.3        | A-2-4(0)          | 15   | NP   | 50.8        | 31.4   | 12.2 | 5.6  | 100                | 83  | 21  | -          | -         |
| SS-66      | 31 LT  | 27+31   | 4.2-5.7        | NOT ENOUGH SAMPLE |      |      |             |        |      |      |                    |     |     |            |           |
| SS-67      | 31 LT  | 27+31   | 9.2-10.7       | A-3(0)            | 13   | NP   | 21.2        | 77.6   | 1.2  | 0.0  | 100                | 97  | 1   | -          | -         |
| SS-68      | 31 LT  | 27+31   | 19.2-20.7      | A-7-6             | 34   | 8    | 3.0         | 21.2   | 66.2 | 9.6  | 100                | 99  | 84  | -          | -         |
| SS-69      | 31 LT  | 27+31   | 34.2-35.7      | A-7-6             | 34   | 8    | 0.4         | 38.8   | 43.2 | 17.7 | 100                | 100 | 84  | -          | -         |
| SS-70      | 31 LT  | 27+31   | 39.2-40.7      | A-2-4(0)          | 25   | NP   | 0.6         | 83.7   | 12.0 | 3.6  | 100                | 100 | 29  | -          | -         |
| SS-71      | 31 LT  | 27+31   | 54.2-55.7      | A-2-4(0)          | 22   | NP   | 14.7        | 63.5   | 20.3 | 1.6  | 100                | 94  | 30  | -          | -         |
| SS-72      | 31 LT  | 27+31   | 64.2-65.7      | A-7-6             | 29   | 4    | 1.8         | 47.4   | 37.1 | 13.7 | 100                | 99  | 72  | -          | -         |
| SS-73      | 31 LT  | 27+31   | 74.2-75.7      | NOT ENOUGH SAMPLE |      |      |             |        |      |      |                    |     |     |            |           |





NCDOT BORE DOUBLE MSP BORINGS.GPJ NC\_DOT.GDT 10/19/10

### SOIL TEST RESULTS MSP-5

| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT       |        |      |      | % PASSING (SIEVES) |     |     | % MOISTURE | % ORGANIC |  |     |
|------------|--------|---------|----------------|---------------|------|------|-------------------|--------|------|------|--------------------|-----|-----|------------|-----------|--|-----|
|            |        |         |                |               |      |      | C.SAND            | F.SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |  |     |
| SS-1       | 45 LT  | 31+65   | 12.6-14.1      |               |      |      | NOT ENOUGH SAMPLE |        |      |      |                    |     |     |            |           |  | 7.4 |
| SS-2       | 45 LT  | 31+65   | 17.6-19.1      | A-7-5(43)     | 72   | 36   | 1.6               | 2.9    | 44.6 | 50.9 | 100                | 99  | 96  | -          | -         |  |     |
| SS-3       | 45 LT  | 31+65   | 27.6-29.1      | A-3(0)        | 22   | NP   | 34.1              | 59.2   | 3.7  | 3.1  | 100                | 89  | 8   | -          | -         |  |     |
| SS-4       | 45 LT  | 31+65   | 32.6-34.1      | A-6(9)        | 32   | 11   | 0.4               | 39.9   | 39.3 | 20.4 | 100                | 100 | 84  | -          | -         |  |     |
| SS-5       | 45 LT  | 31+65   | 47.6-49.1      | A-7-6(30)     | 53   | 31   | 1.8               | 12.6   | 40.7 | 44.8 | 100                | 99  | 89  | -          | -         |  |     |
| SS-6       | 45 LT  | 31+65   | 52.6-54.1      | A-1-b(0)      | 19   | NP   | 79.4              | 15.2   | 2.3  | 3.1  | 95                 | 35  | 7   | -          | -         |  |     |

### SOIL TEST RESULTS MSP-6

| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT       |        |      |      | % PASSING (SIEVES) |     |     | % MOISTURE | % ORGANIC |  |      |
|------------|--------|---------|----------------|---------------|------|------|-------------------|--------|------|------|--------------------|-----|-----|------------|-----------|--|------|
|            |        |         |                |               |      |      | C.SAND            | F.SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |  |      |
| SS-28      | 52 RT  | 32+35   | 1.0-2.5        | A-2-4(0)      | 16   | NP   | 18.0              | 55.8   | 9.9  | 16.3 | 92                 | 89  | 26  | -          | -         |  |      |
| SS-29      | 52 RT  | 32+35   | 4.0-5.5        |               |      |      | NOT ENOUGH SAMPLE |        |      |      |                    |     |     |            |           |  | 11.3 |
| SS-30      | 52 RT  | 32+35   | 32.4-33.9      | A-6(11)       | 34   | 13   | 0.4               | 36.9   | 42.4 | 20.4 | 100                | 100 | 87  | -          | -         |  |      |
| SS-31      | 52 RT  | 32+35   | 47.4-48.9      | A-7-6(36)     | 57   | 33   | 0.4               | 6.9    | 43.8 | 48.9 | 100                | 100 | 96  | -          | -         |  |      |
| SS-32      | 52 RT  | 32+35   | 52.4-53.9      | A-3(0)        | 19   | NP   | 33.2              | 60.3   | 3.5  | 3.1  | 100                | 99  | 8   | -          | -         |  |      |





| PROJECT NO. 35742.1.1   |                 | ID. U-4438              |            | COUNTY Pasquotank     |       | GEOLOGIST Wrike, C. M.  |                 |    |    |     |           |         |       |                           |            |   |     |
|---|-----------------|-------------------------|------------|-----------------------|-------|-------------------------|-----------------|----|----|-----|-----------|---------|-------|---------------------------|------------|---|-----|
| SITE DESCRIPTION BRIDGE NO. 19 ON -L1- (US 158/ NC34) OVER PASQUOTANK RIVER |                 |                         |            |                       |       |                         | GROUND WTR (ft) |    |    |     |           |         |       |                           |            |   |     |
| BORING NO. MSP-8  |                 | STATION 12+10           |            | OFFSET 40 ft RT       |       | ALIGNMENT -L1-          |                 |    |    |     |           |         |       |                           |            |   |     |
| COLLAR ELEV. 5.2 ft   |                 | TOTAL DEPTH 150.2 ft    |            | NORTHING 2,819,665    |       | EASTING 940,029         |                 |    |    |     |           |         |       |                           |            |   |     |
| DRILL RIG/HAMMER EFF./DATE CME-550  |                 | DRILL METHOD Mud Rotary |            | HAMMER TYPE Automatic |       |                         |                 |    |    |     |           |         |       |                           |            |   |     |
| DRILLER MACTEC  |                 | START DATE 03/30/10     |            | COMP. DATE 03/31/10   |       | SURFACE WATER DEPTH N/A |                 |    |    |     |           |         |       |                           |            |   |     |
| ELEV (ft)   | DRIVE ELEV (ft) | DEPTH (ft)              | BLOW COUNT |                       |       | BLOWS PER FOOT          |                 |    |    |     | SAMP. NO. | LOG MOI | LOG G | SOIL AND ROCK DESCRIPTION | ELEV. (ft) | DEPTH (ft)  |     |
|   |                 |                         | 0.5ft      | 0.5ft                 | 0.5ft | 0                       | 25              | 50 | 75 | 100 |           |         |       |                           |            |   |     |
| 10  |                 |                         |            |                       |       |                         |                 |    |    |     |           |         |       |                           |            |   |     |
| 5   | 5.2             | 0.0                     | 2          | 3                     | 3     |                         |                 |    |    |     |           |         |       |                           | 5.2        | GROUND SURFACE  | 0.0 |
| 0   | 1.4             | 3.8                     | 2          | 1                     | 1     |                         |                 |    |    |     |           |         |       |                           | 2.2        | ARTIFICIAL FILL<br>TAN SAND, MOIST  | 3.0 |
| -5  | -3.6            | 8.8                     | 1          | 2                     | 2     |                         |                 |    |    |     |           |         |       |                           | -1.8       | ARTIFICIAL FILL<br>BROWN CLAYEY SILT WITH TRACE<br>ORGANIC MATTER (4.5% ORGANIC),<br>MOIST TO WET | 7.0 |
| -10   | -8.6            | 13.8                    | 2          | 1                     | 1     |                         |                 |    |    |     |           |         |       |                           |            | BROWN SILTY SANDY CLAY WITH LITTLE<br>ORGANIC MATTER AND WOOD<br>FRAGMENTS, WET                   |     |
| -15   | -13.5           | 18.7                    | WOH        | WOH                   | 1     |                         |                 |    |    |     |           |         |       |                           |            |   |     |
| -20   | -18.5           | 23.7                    | WOH        | WOH                   | WOH   |                         |                 |    |    |     |           |         |       |                           |            |   |     |
| -25   | -23.5           | 28.7                    | WOH        | WOH                   | 1     |                         |                 |    |    |     |           |         |       |                           |            |   |     |
| -30   | -28.5           | 33.7                    | 1          | 1                     | 1     |                         |                 |    |    |     |           |         |       |                           |            |   |     |
| -35   | -33.5           | 38.7                    | 1          | 1                     | 1     |                         |                 |    |    |     |           |         |       |                           |            |   |     |
| -40   | -38.5           | 43.7                    | 1          | 0                     | 1     |                         |                 |    |    |     |           |         |       |                           |            |   |     |
| -45   | -43.5           | 48.7                    | 1          | 2                     | 1     |                         |                 |    |    |     |           |         |       |                           |            |   |     |
| -50   | -48.5           | 53.7                    | 1          | 1                     | 1     |                         |                 |    |    |     |           |         |       |                           |            |   |     |
| -55   | -53.5           | 58.7                    | 2          | 3                     | 3     |                         |                 |    |    |     |           |         |       |                           |            |   |     |
| -60   | -58.5           | 63.7                    | 9          | 18                    | 14    |                         |                 |    |    |     |           |         |       |                           |            |   |     |
| -65   | -63.5           | 68.7                    | 5          | 8                     | 8     |                         |                 |    |    |     |           |         |       |                           |            |   |     |
| -70   | -68.5           | 73.7                    | 8          | 9                     | 11    |                         |                 |    |    |     |           |         |       |                           |            |   |     |

| PROJECT NO. 35742.1.1   |                 | ID. U-4438              |            | COUNTY Pasquotank     |       | GEOLOGIST Wrike, C. M.  |                 |    |    |     |           |         |       |                           |            |            |  |
|---|-----------------|-------------------------|------------|-----------------------|-------|-------------------------|-----------------|----|----|-----|-----------|---------|-------|---------------------------|------------|------------|--|
| SITE DESCRIPTION BRIDGE NO. 19 ON -L1- (US 158/ NC34) OVER PASQUOTANK RIVER |                 |                         |            |                       |       |                         | GROUND WTR (ft) |    |    |     |           |         |       |                           |            |            |  |
| BORING NO. MSP-8  |                 | STATION 12+10           |            | OFFSET 40 ft RT       |       | ALIGNMENT -L1-          |                 |    |    |     |           |         |       |                           |            |            |  |
| COLLAR ELEV. 5.2 ft   |                 | TOTAL DEPTH 150.2 ft    |            | NORTHING 2,819,665    |       | EASTING 940,029         |                 |    |    |     |           |         |       |                           |            |            |  |
| DRILL RIG/HAMMER EFF./DATE CME-550  |                 | DRILL METHOD Mud Rotary |            | HAMMER TYPE Automatic |       |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| DRILLER MACTEC  |                 | START DATE 03/30/10     |            | COMP. DATE 03/31/10   |       | SURFACE WATER DEPTH N/A |                 |    |    |     |           |         |       |                           |            |            |  |
| ELEV (ft)   | DRIVE ELEV (ft) | DEPTH (ft)              | BLOW COUNT |                       |       | BLOWS PER FOOT          |                 |    |    |     | SAMP. NO. | LOG MOI | LOG G | SOIL AND ROCK DESCRIPTION | ELEV. (ft) | DEPTH (ft) |  |
|   |                 |                         | 0.5ft      | 0.5ft                 | 0.5ft | 0                       | 25              | 50 | 75 | 100 |           |         |       |                           |            |            |  |
| -70   |                 |                         |            |                       |       |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| -75   | -73.5           | 78.7                    | 2          | 3                     | 3     |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| -80   | -78.5           | 83.7                    | 3          | 3                     | 4     |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| -85   | -83.5           | 88.7                    | 2          | 3                     | 3     |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| -90   | -88.5           | 93.7                    | 2          | 4                     | 5     |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| -95   | -93.5           | 98.7                    | 3          | 4                     | 4     |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| -100  | -98.5           | 103.7                   | 3          | 4                     | 5     |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| -105  | -103.5          | 108.7                   | 9          | 8                     | 10    |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| -110  | -108.5          | 113.7                   | 3          | 9                     | 15    |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| -115  | -113.5          | 118.7                   | 7          | 4                     | 7     |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| -120  | -118.5          | 123.7                   | 4          | 4                     | 13    |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| -125  | -123.5          | 128.7                   | 4          | 6                     | 5     |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| -130  | -128.5          | 133.7                   | 4          | 5                     | 9     |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| -135  | -133.5          | 138.7                   | 4          | 5                     | 8     |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| -140  | -138.5          | 143.7                   | 4          | 5                     | 9     |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| -145  | -143.5          | 148.7                   | 3          | 5                     | 6     |                         |                 |    |    |     |           |         |       |                           |            |            |  |
| -150  |                 |                         |            |                       |       |                         |                 |    |    |     |           |         |       |                           |            |            |  |

NCDOT BORE DOUBLE U-4438\_GEO\_BRDG.GPJ\_NC\_DOT.GDT\_10/18/10

Boring Terminated at Elevation -145.0 ft in Medium Dense Sand

### SOIL TEST RESULTS MSP-7

| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT       |        |      |      | % PASSING (SIEVES) |     |     | % MOISTURE | % ORGANIC |  |  |
|------------|--------|---------|----------------|---------------|------|------|-------------------|--------|------|------|--------------------|-----|-----|------------|-----------|--|--|
|            |        |         |                |               |      |      | C.SAND            | F.SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |  |  |
| SS-105     | 19 LT  | 11+35   | 4, 3-5.8       | A-1-a(0)      | 32   | NP   | 39.2              | 41.6   | 19.2 | 0.0  | 33                 | 27  | 8   | -          | -         |  |  |
| SS-106     | 19 LT  | 11+35   | 19, 3-20.8     | A-1-b(0)      | 37   | NP   | 36.4              | 38.4   | 25.2 | 0.0  | 42                 | 36  | 11  | -          | -         |  |  |
| SS-107     | 19 LT  | 11+35   | 23, 3-24.8     |               |      |      | NOT ENOUGH SAMPLE |        |      |      |                    |     |     |            |           |  |  |
| SS-108     | 19 LT  | 11+35   | 29, 3-30.8     | A-2-4(0)      | 19   | NP   | 28.0              | 63.8   | 8.2  | 0.0  | 100                | 94  | 12  | -          | -         |  |  |
| SS-109     | 19 LT  | 11+35   | 34, 3-35.8     | A-7-6         | 30   | -    | 0.6               | 51.4   | 36.8 | 11.2 | 100                | 100 | 73  | -          | -         |  |  |
| SS-110     | 19 LT  | 11+35   | 54, 3-55.8     | A-7-6         | 32   | -    | 1.8               | 40.4   | 48.6 | 9.2  | 100                | 99  | 82  | -          | -         |  |  |
| SS-111     | 19 LT  | 11+35   | 64, 3-65.6     | A-3(0)        | 14   | NP   | 73.9              | 18.8   | 7.2  | 0.0  | 100                | 60  | 9   | -          | -         |  |  |
| SS-112     | 19 LT  | 11+35   | 79, 3-80.8     | A-7-6         | 35   | -    | 2.8               | 33.2   | 44.8 | 19.2 | 100                | 98  | 79  | -          | -         |  |  |

### SOIL TEST RESULTS MSP-8

| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |        |      |      | % PASSING (SIEVES) |     |     | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|-----|-----|------------|-----------|
|            |        |         |                |               |      |      | C.SAND      | F.SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |
| SS-55A     | 40 RT  | 12+10   | 1.0-1.5        | A-3(0)        | 17   | NP   | 44.2        | 48.7   | 3.1  | 4.1  | 100                | 86  | 10  | -          | -         |
| SS-56A     | 40 RT  | 12+10   | 3.8-5.3        | A-4(7)        | 28   | 10   | 5.3         | 17.3   | 44.9 | 32.6 | 100                | 98  | 87  | 28.0       | 4.5       |
| SS-57A     | 40 RT  | 12+10   | 18.7-20.2      | A-7-5(17)     | 65   | 26   | 13.0        | 25.2   | 23.1 | 38.7 | 100                | 96  | 64  | -          | -         |
| SS-58A     | 40 RT  | 12+10   | 23.7-25.2      | A-7-6(23)     | 45   | 25   | 0.4         | 21.6   | 29.2 | 48.8 | 100                | 100 | 87  | -          | -         |
| SS-59A     | 40 RT  | 12+10   | 33.7-35.2      | A-4(7)        | 32   | 8    | 0.2         | 36.0   | 35.3 | 28.5 | 100                | 100 | 86  | -          | -         |
| SS-60A     | 40 RT  | 12+10   | 43.7-45.2      | A-6(11)       | 37   | 21   | 8.7         | 31.3   | 25.3 | 34.6 | 98                 | 94  | 64  | -          | -         |
| SS-61A     | 40 RT  | 12+10   | 53.7-55.2      | A-7-6(26)     | 46   | 25   | 0.2         | 15.5   | 39.6 | 44.8 | 100                | 100 | 95  | -          | -         |
| SS-62A     | 40 RT  | 12+10   | 63.7-65.2      | A-2-4(0)      | 18   | NP   | 29.4        | 61.3   | 5.2  | 4.1  | 100                | 98  | 13  | -          | -         |
| SS-63A     | 40 RT  | 12+10   | 73.7-75.2      | A-2-4(0)      | 21   | NP   | 12.8        | 70.2   | 7.8  | 9.2  | 100                | 96  | 23  | -          | -         |
| SS-64A     | 40 RT  | 12+10   | 78.7-80.2      | A-6(21)       | 40   | 22   | 0.2         | 18.5   | 40.6 | 40.7 | 100                | 100 | 92  | -          | -         |
| SS-65A     | 40 RT  | 12+10   | 88.7-90.2      | A-7-6(28)     | 48   | 26   | 0.8         | 5.5    | 51.0 | 42.7 | 100                | 99  | 97  | -          | -         |
| SS-66A     | 40 RT  | 12+10   | 98.7-100.2     | A-6(4)        | 30   | 15   | 7.7         | 48.2   | 15.6 | 28.5 | 93                 | 88  | 50  | -          | -         |
| SS-67A     | 40 RT  | 12+10   | 108.7-110.2    | A-4(1)        | 29   | 10   | 20.1        | 44.2   | 17.4 | 18.3 | 97                 | 87  | 40  | -          | -         |
| SS-68A     | 40 RT  | 12+10   | 113.7-115.2    | A-2-4(0)      | 25   | 2    | 24.8        | 49.7   | 11.2 | 14.2 | 96                 | 89  | 27  | -          | -         |
| SS-69A     | 40 RT  | 12+10   | 123.7-125.2    | A-2-4(0)      | 26   | 4    | 18.1        | 47.4   | 18.2 | 16.3 | 90                 | 80  | 35  | -          | -         |
| SS-70A     | 40 RT  | 12+10   | 113.7-135.2    | A-2-4(0)      | 22   | NP   | 18.7        | 51.5   | 14.5 | 15.3 | 95                 | 86  | 31  | -          | -         |
| SS-71A     | 40 RT  | 12+10   | 143.7-145.2    | A-2-4(0)      | 26   | 1    | 10.0        | 60.3   | 14.4 | 15.3 | 98                 | 96  | 34  | -          | -         |