

REFERENCE: BR-0042

PROJECT: 67042

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY ROCKINGHAM
 PROJECT DESCRIPTION REPLACEMENT BRIDGE NO. 116
ON SR 2600 OVER US 29

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0042	1	20

CAUTION NOTICE

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

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

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

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

PERSONNEL

S. PAPKE

C. DRISCOLL

TRIGON EXPLORATION

INVESTIGATED BY C. DRISCOLL

DRAWN BY S. PAPKE

CHECKED BY X. BARRETT

SUBMITTED BY KLEINFELDER, INC

DATE JULY 2019

Prepared in the Office of:



DocuSigned by:
Xavier Barrett 8/30/2019

2D00374F688407 SIGNATURE DATE

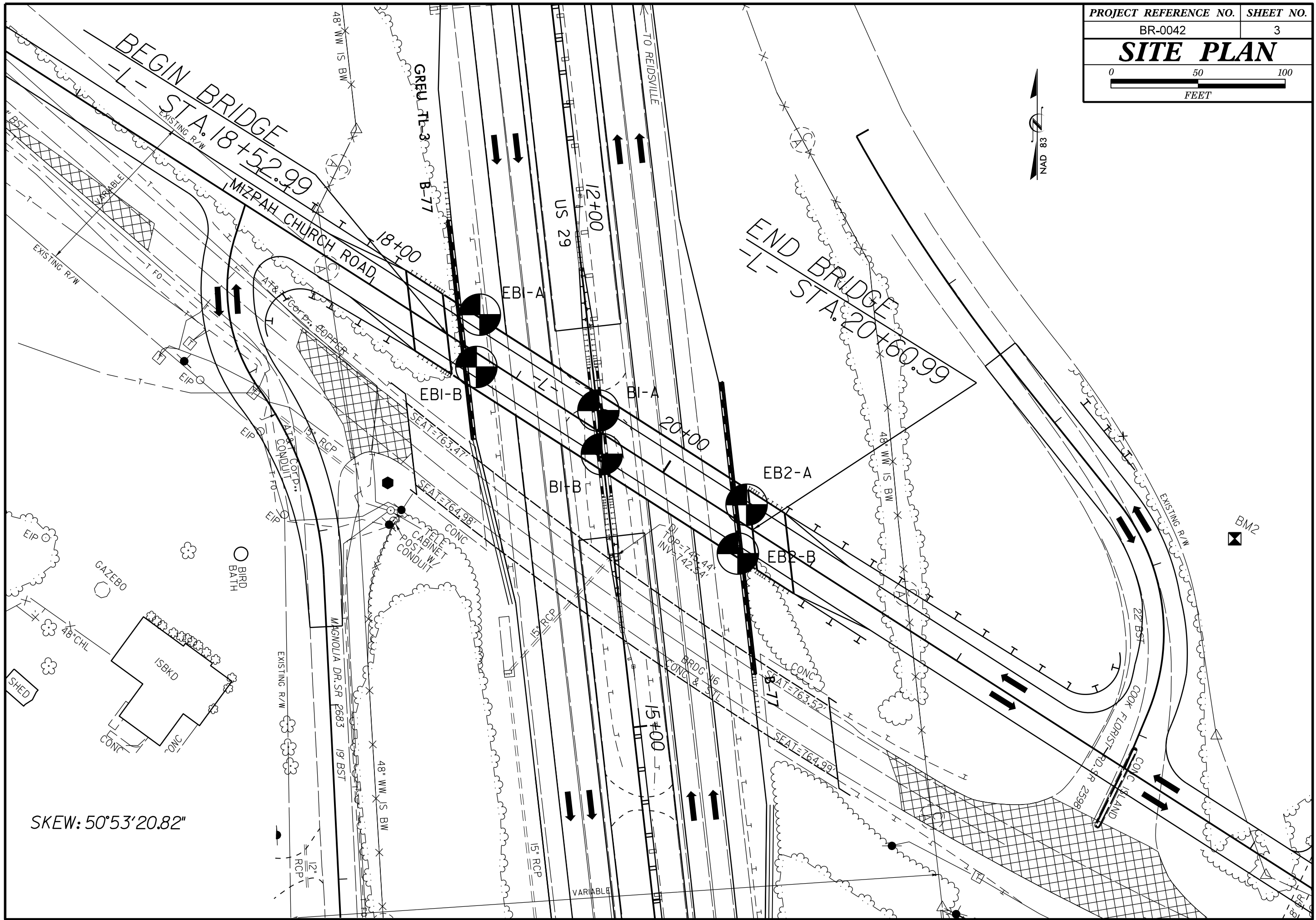
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**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT**

SUBSURFACE INVESTIGATION

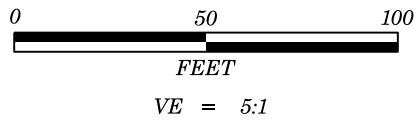
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="7">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="4">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th> <th>A-1-b</th> <th>A-2</th> <th>A-2-4</th> <th>A-2-5</th> <th>A-2-6</th> <th>A-2-7</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> </tr> </thead> <tbody> <tr> <td>GROUP CLASS.</td> <td>A-1-a</td> <td>A-1-b</td> <td>A-2-4</td> <td>A-2-5</td> <td>A-2-6</td> <td>A-2-7</td> <td>A-4</td> <td>A-5</td> <td>A-6</td> <td>A-7</td> <td>A-1, A-2</td> <td>A-3</td> <td>A-4, A-5</td> <td>A-6, A-7</td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING #10 #40 #200</td> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX</td> <td>51 MN 35 MX</td> <td>40 MX 35 MX</td> <td>41 MN 35 MX</td> <td>42 MN 35 MX</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>GRANULAR SOILS</td> <td>SILT-CLAY SOILS</td> <td>MUCK, PEAT</td> </tr> <tr> <td>MATERIAL PASSING #40 LL PI</td> <td>- 6 MX</td> <td>-</td> <td>40 MX 10 MX</td> <td>41 MN 10 MX</td> <td>42 MN 11 MN</td> <td>43 MN 11 MN</td> <td>40 MX 10 MX</td> <td>41 MN 10 MX</td> <td>42 MN 10 MX</td> <td>43 MN 11 MN</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td>HIGHLY ORGANIC SOILS</td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> <td>0</td> <td>0</td> <td>4 MX</td> <td>8 MX</td> <td>12 MX</td> <td>16 MX</td> <td>NO MX</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS. GRAVEL, AND SAND</td> <td>FINE SAND</td> <td>SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS</td> <td>CLAYEY SOILS</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GEN. RATING AS SUBGRADE</td> <td colspan="3">EXCELLENT TO GOOD</td> <td colspan="3">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td>UNSATURABLE</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="4">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</td> </tr> <tr> <td colspan="4" style="text-align: center;">CONSISTENCY OR DENSENESS</td> </tr> <tr> <td colspan="4"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</th> </tr> </thead> <tbody> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE</td> <td>< 4 4 TO 10 10 TO 30 30 TO 50 > 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD</td> <td>< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30</td> <td>< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4</td> </tr> </tbody> </table> </td> </tr> <tr> <td colspan="4" style="text-align: center;">TEXTURE OR GRAIN SIZE</td> </tr> <tr> <td colspan="4"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> </thead> <tbody> <tr> <td></td> <td>4.76</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> <tr> <td>BOULDER (BLDR.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>COBBLE (COB.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GRAVEL (GR.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>COARSE SAND (CS.E. SD.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>FINE SAND (F SD.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>SILT (SL.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>CLAY (CL.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GRAIN SIZE</td> <td>305</td> <td>75</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> <tr> <td></td> <td>12</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> </td> </tr> <tr> <td colspan="4" style="text-align: center;">SOIL MOISTURE - CORRELATION OF TERMS</td> </tr> <tr> <td colspan="4"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL - PLASTIC LIMIT</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE SHRINKAGE LIMIT</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </tbody> </table> </td> </tr> <tr> <td colspan="4" style="text-align: center;">PLASTICITY</td> </tr> <tr> <td colspan="4"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NON PLASTIC</th> <th>PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> </thead> <tbody> <tr> <td>SLIGHTLY PLASTIC</td> <td>0-5</td> <td>VERY LOW</td> </tr> <tr> <td>MODERATELY PLASTIC</td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td>HIGHLY PLASTIC</td> <td>16-25</td> <td>MEDIUM</td> </tr> <tr> <td></td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </tbody> </table> </td> </tr> <tr> <td colspan="4" style="text-align: center;">COLOR</td> </tr> <tr> <td colspan="4"> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p> </td> </tr> <tr> <td colspan="4" style="text-align: center;">GRADATION</td> </tr> <tr> <td colspan="4"> <p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p> </td> </tr> <tr> <td colspan="4" style="text-align: center;">ANGULARITY OF GRAINS</td> </tr> <tr> <td colspan="4"> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p> </td> </tr> <tr> <td colspan="4" style="text-align: center;">MINERALOGICAL COMPOSITION</td> </tr> <tr> <td colspan="4"> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p> </td> </tr> <tr> <td colspan="4" style="text-align: center;">COMPRESSIBILITY</td> </tr> <tr> <td colspan="4"> <p>SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50</p> </td> </tr> <tr> <td colspan="4" style="text-align: center;">PERCENTAGE OF MATERIAL</td> </tr> <tr> <td colspan="4"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> </thead> <tbody> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>> 10%</td> <td>> 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </tbody> </table> </td> </tr> <tr> <td colspan="4" style="text-align: center;">GROUND WATER</td> </tr> <tr> <td colspan="4"> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP</p> </td> </tr> <tr> <td colspan="4" style="text-align: center;">MISCELLANEOUS SYMBOLS</td> </tr> <tr> <td colspan="4"> <p> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY</p> <p> DIP & DIP DIRECTION OF ROCK STRUCTURES TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE</p> </td> </tr> <tr> <td colspan="4" style="text-align: center;">RECOMMENDATION SYMBOLS</td> </tr> <tr> <td colspan="4"> <p> UNDERCUT SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADED ROCK UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</p> </td> </tr> <tr> <td colspan="4" style="text-align: center;">ABBREVIATIONS</td> </tr> <tr> <td colspan="4"> <p>AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY</p> <p>MED. - MEDIUM MICA - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY</p> <p>VST - VANE SHEAR TEST WEA. - WEATHERED % - UNIT WEIGHT %g - DRY UNIT WEIGHT</p> <p>SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO</p> </td> </tr> <tr> <td colspan="4" style="text-align: center;">EQUIPMENT USED ON SUBJECT PROJECT</td> </tr> <tr> <td colspan="4"> <p>DRILL UNITS: <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-55 <input type="checkbox"/> CME-550 <input type="checkbox"/> VANE SHEAR TEST <input type="checkbox"/> PORTABLE HOIST</p> <p>ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input checked="" type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE _____ * STEEL TEETH <input type="checkbox"/> TRICONE _____ * TUNG-CARB. <input type="checkbox"/> CORE BIT</p> <p>HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</p> <p>CORE SIZE: <input type="checkbox"/> -B _____ <input type="checkbox"/> -H _____ <input type="checkbox"/> -N _____</p> <p>HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST</p> </td> </tr> <tr> <td colspan="4" style="text-align: center;">ROCK HARDNESS</td> </tr> <tr> <td colspan="4"> <p>VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.</p> </td> </tr> <tr> <td colspan="4" style="text-align: center;">ROCK HARDNESS</td> </tr> <tr> <td colspan="4"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>TERM</th> <th>SPACING</th> <th>TERM</th> <th>THICKNESS</th> </tr> </thead> <tbody> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </tbody> </table> </td> </tr> <tr> <td colspan="4" style="text-align: center;">INDURATION</td> </tr> <tr> <td colspan="4"> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p> </td> </tr> <tr> <td colspan="4" style="text-align: center;">TERMS AND DEFINITIONS</td> </tr> <tr> <td colspan="4"> <p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p> </td> </tr> <tr> <td colspan="4"> <p>BENCH MARK: DROP INLET AT STA. 20+01.95 -L- 55' RT (924,137 FT. N., 1,811,070 FT. E.) ELEVATION: 745.44 FEET</p> </td> </tr> <tr> <td colspan="4" style="text-align: center;">NOTES:</td> </tr> <tr> <td colspan="4"> <p>FIAD - FILLED IMMEDIATELY AFTER DRILLING</p> </td> </tr> </tbody> </table>				GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS			A-1	A-1-b	A-2	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7	GROUP CLASS.	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7	SYMBOL															% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 35 MX	40 MX 35 MX	41 MN 35 MX	42 MN 35 MX	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT	MATERIAL PASSING #40 LL PI	- 6 MX	-	40 MX 10 MX	41 MN 10 MX	42 MN 11 MN	43 MN 11 MN	40 MX 10 MX	41 MN 10 MX	42 MN 10 MX	43 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	HIGHLY ORGANIC SOILS	GROUP INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX					USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS								GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD			FAIR TO POOR			FAIR TO POOR	POOR	UNSATURABLE				PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30				CONSISTENCY OR DENSENESS				<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</th> </tr> </thead> <tbody> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE</td> <td>< 4 4 TO 10 10 TO 30 30 TO 50 > 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD</td> <td>< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30</td> <td>< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4</td> </tr> </tbody> </table>				PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)	GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A	GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4	TEXTURE OR GRAIN SIZE				<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>U.S. STD. 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MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>				GRADATION				<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>				ANGULARITY OF GRAINS				<p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>				MINERALOGICAL COMPOSITION				<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>				COMPRESSIBILITY				<p>SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50</p>				PERCENTAGE OF MATERIAL				<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> </thead> <tbody> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>> 10%</td> <td>> 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </tbody> </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	GROUND WATER				<p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP</p>				MISCELLANEOUS SYMBOLS				<p> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY</p> <p> DIP & DIP DIRECTION OF ROCK STRUCTURES TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE</p>				RECOMMENDATION SYMBOLS				<p> UNDERCUT SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADED ROCK UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</p>				ABBREVIATIONS				<p>AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY</p> <p>MED. - MEDIUM MICA - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY</p> <p>VST - VANE SHEAR TEST WEA. - WEATHERED % - UNIT WEIGHT %g - DRY UNIT WEIGHT</p> <p>SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO</p>				EQUIPMENT USED ON SUBJECT PROJECT				<p>DRILL UNITS: <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-55 <input type="checkbox"/> CME-550 <input type="checkbox"/> VANE SHEAR TEST <input type="checkbox"/> PORTABLE HOIST</p> <p>ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input checked="" type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE _____ * STEEL TEETH <input type="checkbox"/> TRICONE _____ * TUNG-CARB. <input type="checkbox"/> CORE BIT</p> <p>HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</p> <p>CORE SIZE: <input type="checkbox"/> -B _____ <input type="checkbox"/> -H _____ <input type="checkbox"/> -N _____</p> <p>HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST</p>				ROCK HARDNESS				<p>VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. 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COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>				<p>BENCH MARK: DROP INLET AT STA. 20+01.95 -L- 55' RT (924,137 FT. N., 1,811,070 FT. E.) ELEVATION: 745.44 FEET</p>				NOTES:				<p>FIAD - FILLED IMMEDIATELY AFTER DRILLING</p>			
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<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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<p> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY</p> <p> DIP & DIP DIRECTION OF ROCK STRUCTURES TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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<p>AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY</p> <p>MED. - MEDIUM MICA - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY</p> <p>VST - VANE SHEAR TEST WEA. - WEATHERED % - UNIT WEIGHT %g - DRY UNIT WEIGHT</p> <p>SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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<p>DRILL UNITS: <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-55 <input type="checkbox"/> CME-550 <input type="checkbox"/> VANE SHEAR TEST <input type="checkbox"/> PORTABLE HOIST</p> <p>ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input checked="" type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE _____ * STEEL TEETH <input type="checkbox"/> TRICONE _____ * TUNG-CARB. <input type="checkbox"/> CORE BIT</p> <p>HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</p> <p>CORE SIZE: <input type="checkbox"/> -B _____ <input type="checkbox"/> -H _____ <input type="checkbox"/> -N _____</p> <p>HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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<p>VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
<p>BENCH MARK: DROP INLET AT STA. 20+01.95 -L- 55' RT (924,137 FT. N., 1,811,070 FT. E.) ELEVATION: 745.44 FEET</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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SKEW: 50°53'20.82"

780



PROJECT REFERENCE NO.	SHEET NO.
BR-0042	4
BRIDGE ON SR 2600 (MIZPAH CHURCH RD) OVER US 29 PROFILE ALONG -L- CENTERLINE	

- (A) ROADWAY EMBANKMENT: MOIST, MEDIUM STIFF, DARK AND LIGHT BROWN, COARSE TO FINE SANDY SILT
- (B) RESIDUAL: LOOSE, MOIST, TAN AND WHITE, SILTY COARSE TO FINE SAND (A-2-4) WITH LITTLE MICA
- (C) WEATHERED ROCK: BLACK, WHITE, BROWN, ORANGE AND TAN BIOTITE GNEISS

770

770

760

760

750

750

740

740

730

730

720

720

710

710

700

700

690

690

EBI-A
18+62
20' LT

Y1
℄

BI-A
19+50
10' LT

EB2-A
20+50
10' LT

EXISTING GROUNDLINE

RESIDUAL:
MOIST TO WET, MEDIUM STIFF TO HARD,
BROWN, TAN AND WHITE, SILTY CLAY (A-7) TO
COARSE TO FINE SANDY SILT (A-4) TO CLAYEY
SILT (A-5) WITH LITTLE MICA AND TRACE
QUARTZ FRAGMENTS

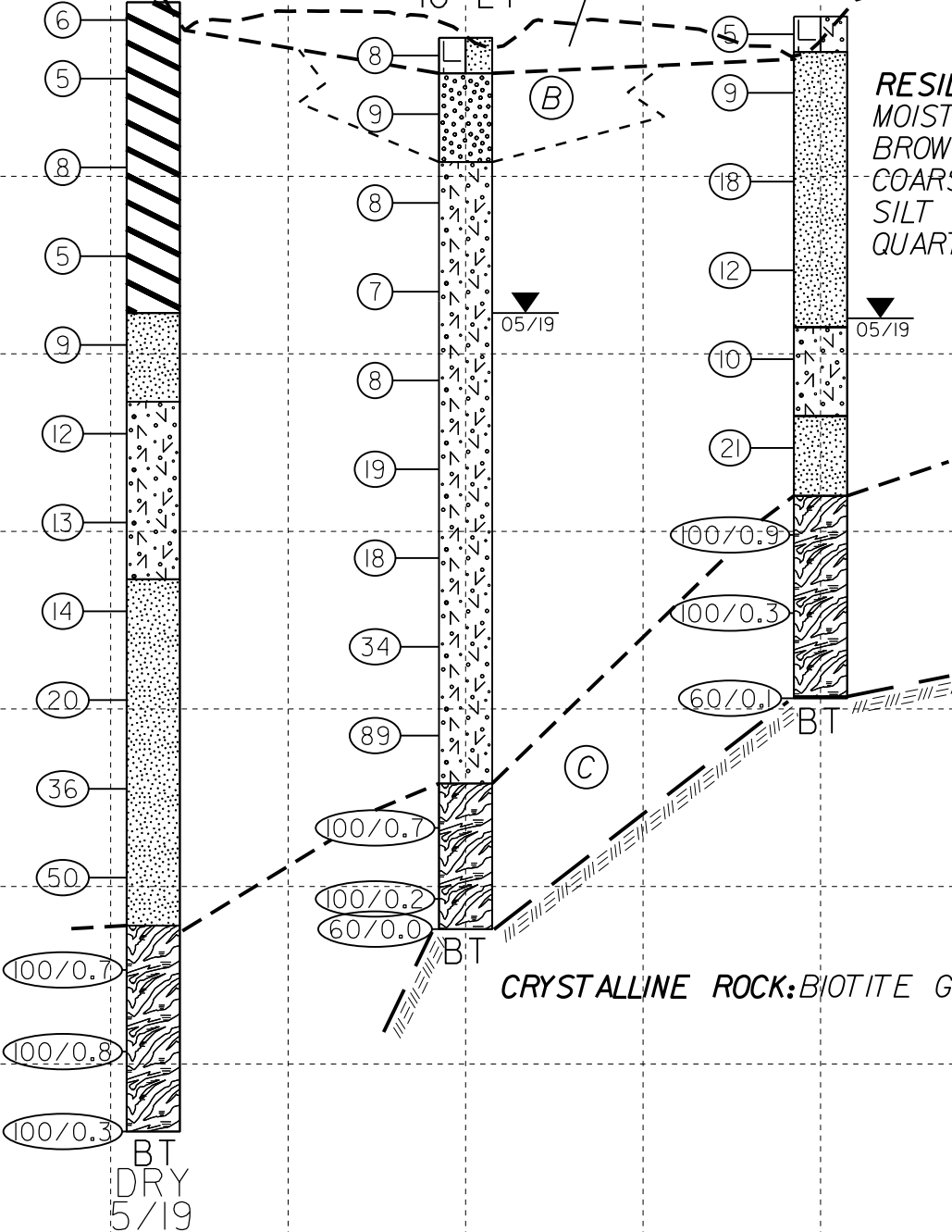
CRYSTALLINE ROCK: BIOTITE GNEISS

NOTE:
GROUNDLINE ALONG CENTERLINE TAKEN FROM
ROADWAY PLANS RECEIVED ON MAY 3, 2019

INFERRED STRATIGRAPHY IS DRAWN THROUGH
THE BORINGS WITH BOTH PROJECTED ONTO
THE PROFILE

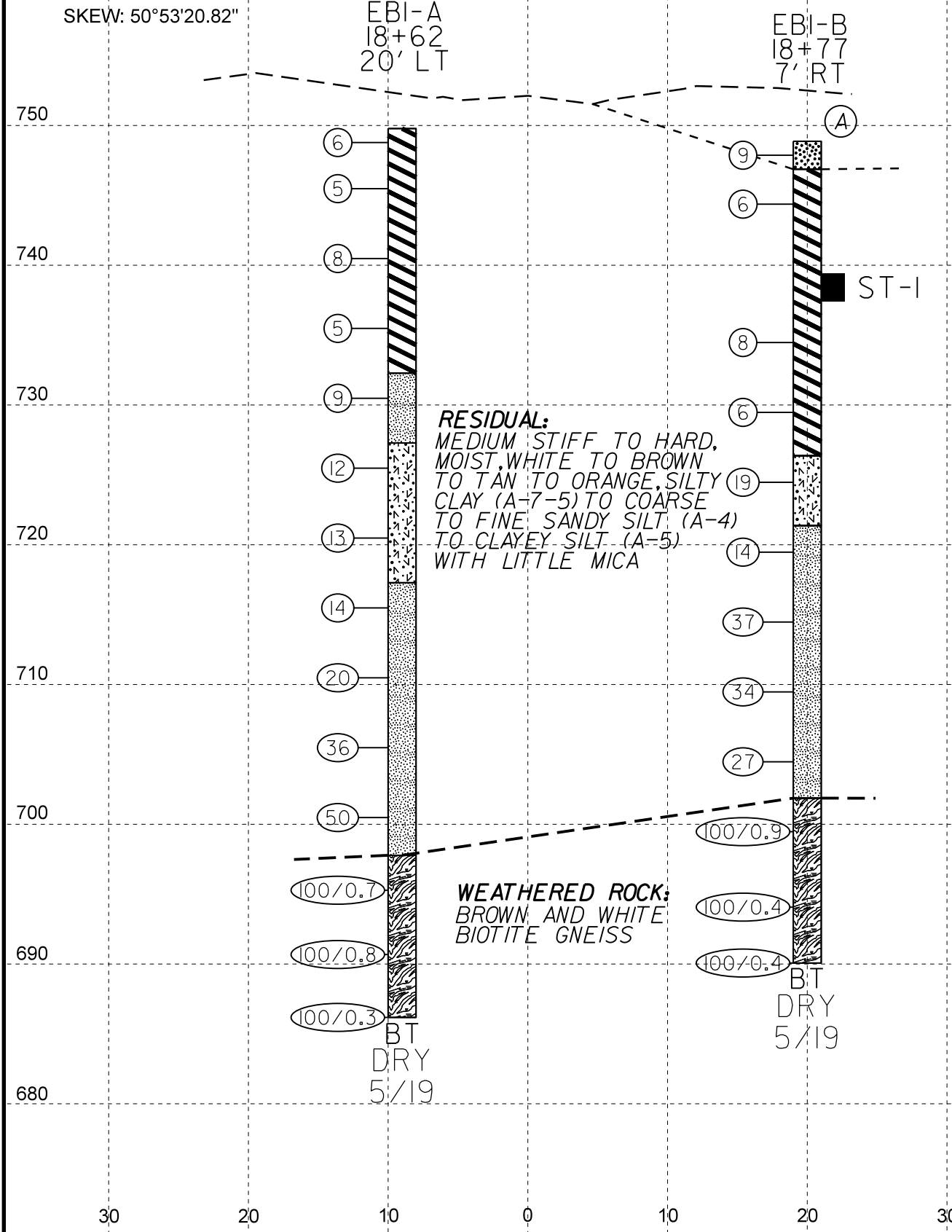
SKEW: 50°53'20.82"

17+00 17+50 18+00 18+50 19+00 19+50 20+00 20+50 21+00 21+50 22+00 22+50 23+00 23+50



NOTES:
 GROUNDLINE TAKEN FROM PROJECT TIN FILE BR-0042. TIN RECEIVED ON MAY 3, 2019.
 INFERRED STRAIGRAPHY IS DRAWN THROUGH THE BROINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

(A) **RESIDUAL:**
 MOIST, LOOSE, TAN TO WHITE, SILTY FINE TO COARSE SAND (A-2-4)



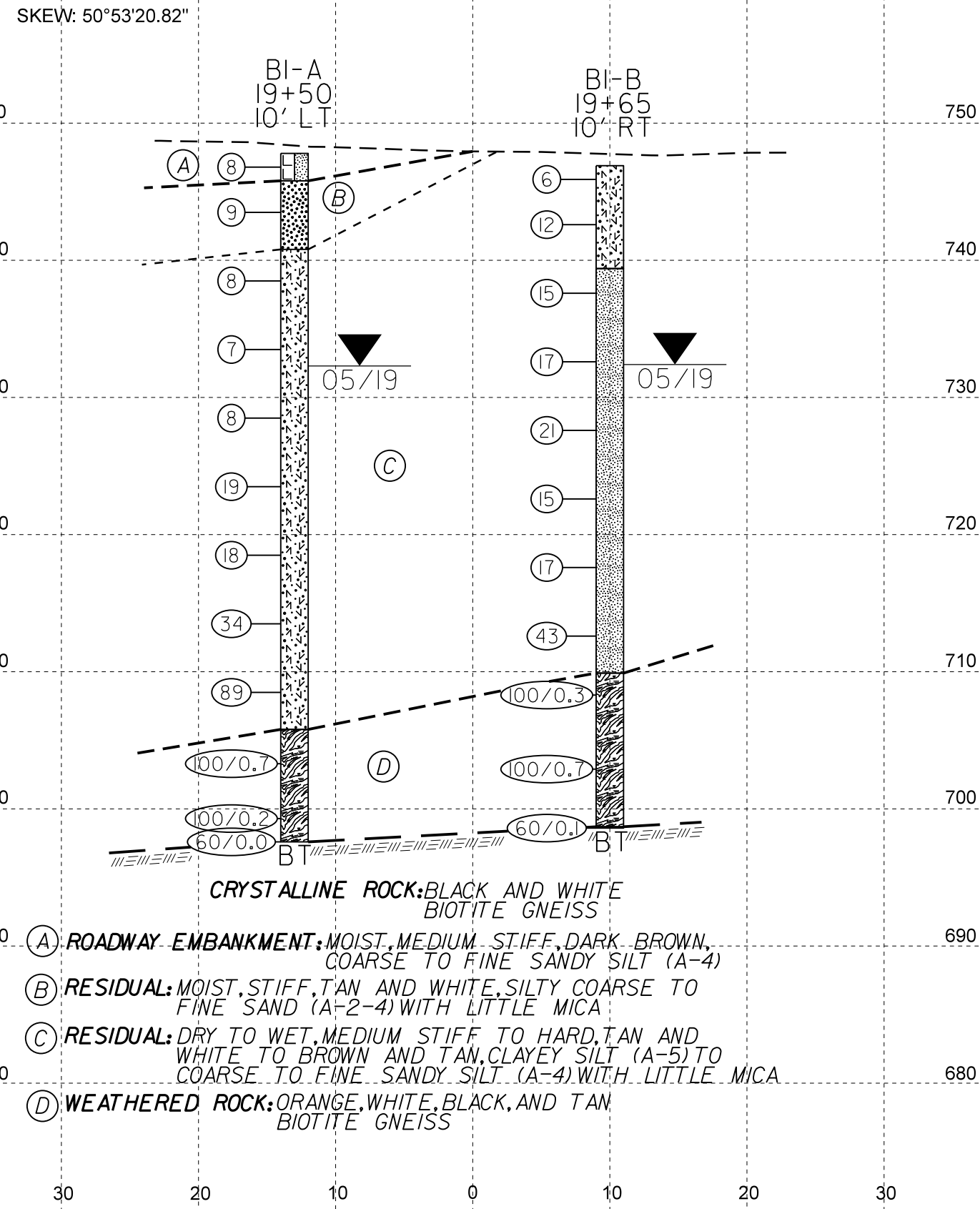
RESIDUAL:
 MEDIUM STIFF TO HARD, MOIST, WHITE TO BROWN TO TAN TO ORANGE, SILTY CLAY (A-7-5) TO COARSE TO FINE SANDY SILT (A-4) TO CLAYEY SILT (A-5) WITH LITTLE MICA

WEATHERED ROCK:
 BROWN AND WHITE BIOTITE GNEISS

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

CROSS SECTION ALONG END BENT 1 AT 18+52.99 -L-

NOTES:
 GROUNDLINE TAKEN FROM PROJECT TIN FILE BR-0042. TIN RECEIVED ON MAY 3, 2019.
 INFERRED STRAIGRAPHY IS DRAWN THROUGH THE BROINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.



- (A) **ROADWAY EMBANKMENT:** MOIST, MEDIUM STIFF, DARK BROWN, COARSE TO FINE SANDY SILT (A-4)
- (B) **RESIDUAL:** MOIST, STIFF, TAN AND WHITE, SILTY COARSE TO FINE SAND (A-2-4) WITH LITTLE MICA
- (C) **RESIDUAL:** DRY TO WET, MEDIUM STIFF TO HARD, TAN AND WHITE TO BROWN AND TAN, CLAYEY SILT (A-5) TO COARSE TO FINE SANDY SILT (A-4) WITH LITTLE MICA
- (D) **WEATHERED ROCK:** ORANGE, WHITE, BLACK, AND TAN BIOTITE GNEISS

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

CROSS SECTION ALONG BENT 1 AT 19+20.99 -L-

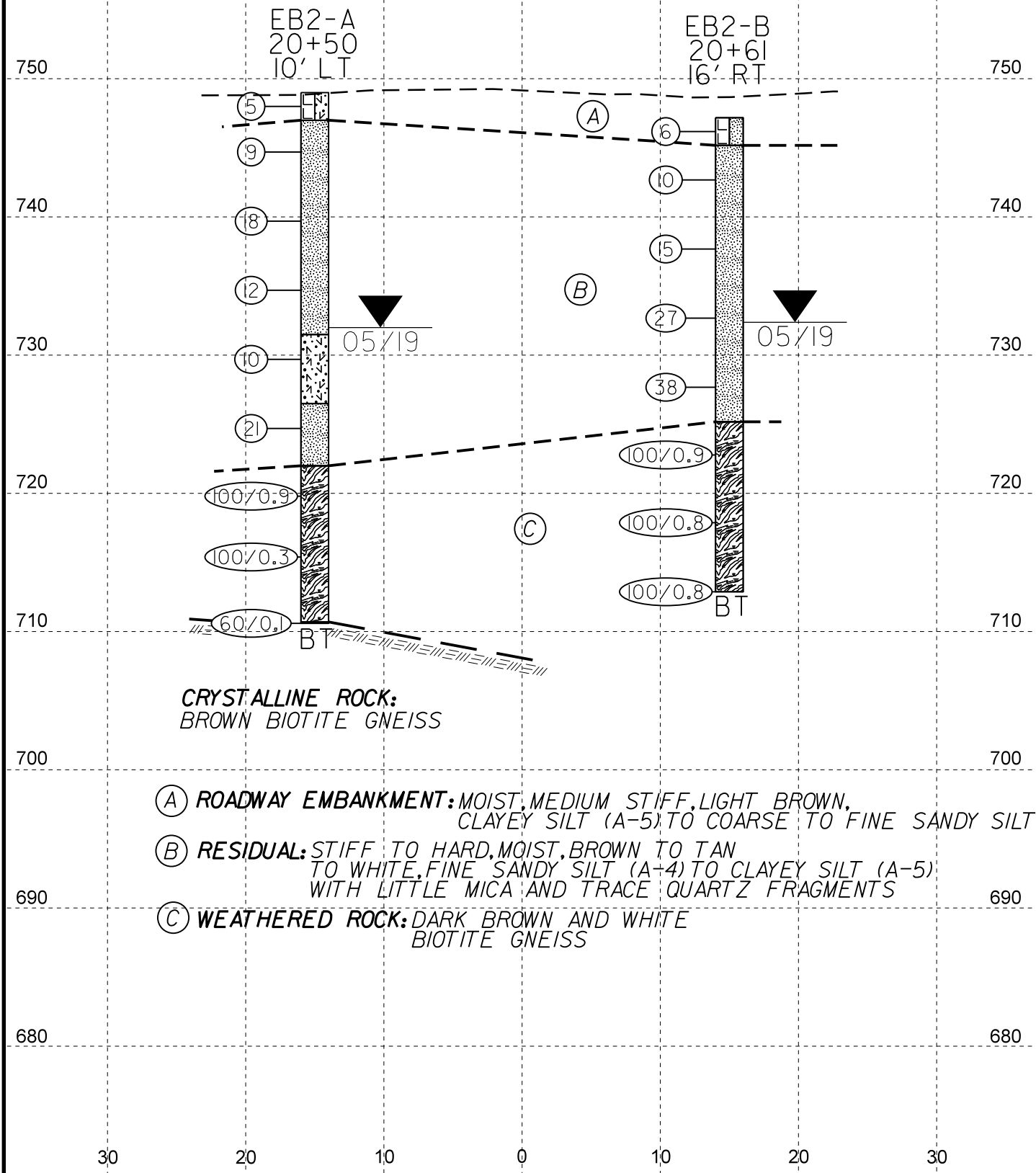
CRYSTALLINE ROCK: BLACK AND WHITE BIOTITE GNEISS

NOTES:

GROUNDLINE TAKEN FROM PROJECT TIN FILE BR-0042.TIN RECEIVED ON MAY 3, 2019.

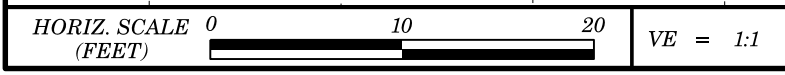
INFERRED STRAIGRAPHY IS DRAWN THROUGH THE BROINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

SKEW: 50°53'20.82"



CRYSTALLINE ROCK:
BROWN BIOTITE GNEISS

- (A) **ROADWAY EMBANKMENT:** MOIST, MEDIUM STIFF, LIGHT BROWN, CLAYEY SILT (A-5) TO COARSE TO FINE SANDY SILT (A-4)
- (B) **RESIDUAL:** STIFF TO HARD, MOIST, BROWN TO TAN TO WHITE, FINE SANDY SILT (A-4) TO CLAYEY SILT (A-5) WITH LITTLE MICA AND TRACE QUARTZ FRAGMENTS
- (C) **WEATHERED ROCK:** DARK BROWN AND WHITE BIOTITE GNEISS



**CROSS SECTION ALONG
END BENT 2 AT 20+60.99 -L-**

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 67042.1.1		TIP BR-0042		COUNTY ROCKINGHAM		GEOLOGIST C. Driscoll								
SITE DESCRIPTION Replace Bridge No. 116 on SR 2600 (Mizpah Church Rd.) over US 29							GROUND WTR (ft)							
BORING NO. EB1-A		STATION 18+62		OFFSET 20 ft LT		ALIGNMENT -L-								
COLLAR ELEV. 749.8 ft		TOTAL DEPTH 63.6 ft		NORTHING 924,274		EASTING 1,810,995								
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/21/2019		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER R. Toothman		START DATE 05/28/19		COMP. DATE 05/28/19		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
750	749.8	0.0	1	3	3							M	749.8 GROUND SURFACE 0.0	
	746.5	3.3	2	2	3							M	RESIDUAL Brown, Silty CLAY with Little Mica	
745												M		
	741.5	8.3	2	3	5							M		
740												M		
	736.5	13.3	3	2	3							M		
735												M		
	731.5	18.3	3	4	5							M	732.3 Tan and White, Coarse to Fine Sandy SILT with Little Mica 17.5	
730												M		
	726.5	23.3	3	6	6							M	727.3 Tan and White, Clayey SILT with Little Mica 22.5	
725												M		
	721.5	28.3	3	5	8							M		
720												M		
	716.5	33.3	6	6	8							M	717.3 Tan, White, and Brown, Coarse to Fine Sandy SILT with Little Mica 32.5	
715												M		
	711.5	38.3	4	9	11							M		
710												M		
	706.5	43.3	11	17	19							M		
705												M		
	701.5	48.3	15	22	28							M		
700												M		
	696.5	53.3	16	65	35/0.2							M	697.8 WEATHERED ROCK 52.0 Brown, White, and Black BIOTITE GNEISS	
695												M		
	691.5	58.3	57	43/0.3								M		
690												M		
	686.5	63.3	100/0.3									M	686.2 Boring Terminated at Elevation 686.2 ft in WEATHERED ROCK: BIOTITE GNEISS 63.6	

WBS 67042.1.1		TIP BR-0042		COUNTY ROCKINGHAM		GEOLOGIST C. Driscoll								
SITE DESCRIPTION Replace Bridge No. 116 on SR 2600 (Mizpah Church Rd.) over US 29							GROUND WTR (ft)							
BORING NO. EB1-B		STATION 18+77		OFFSET 7 ft RT		ALIGNMENT -L-								
COLLAR ELEV. 748.9 ft		TOTAL DEPTH 58.8 ft		NORTHING 924,244		EASTING 1,810,993								
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/21/2019		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER R. Toothman		START DATE 05/28/19		COMP. DATE 05/28/19		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
750	748.9	0.0	1	3	6							M	748.9 GROUND SURFACE 0.0	
	746.9	2.0										M	RESIDUAL Tan and White, Silty Fine to Coarse SAND Slightly Plastic, Brown, Tan, and Orange, Coarse to Fine Sandy, Silty CLAY (A-7-5) with Little Mica	
745	745.4	3.5	2	3	3							M		
												M		
740												M		
	735.5	13.4	3	4	4							M		
735												M		
	730.5	18.4	2	2	4							M		
730												M		
	725.5	23.4	2	7	12							M	726.4 Orange and Brown, Clayey SILT with Little Mica 22.5	
725												M		
	720.5	28.4	3	6	8							M	721.4 Brown and Orange, Coarse to Fine Sandy SILT with Little Mica 27.5	
720												M		
	715.5	33.4	9	16	21							M		
715												M		
	710.5	38.4	8	12	22							M		
710												M		
	705.5	43.4	3	12	15							M		
705												M		
	700.5	48.4	25	41	59/0.4							M	701.9 WEATHERED ROCK 47.0 Brown and White BIOTITE GNEISS	
700												M		
	695.5	53.4	100/0.4									M		
695												M		
	690.5	58.4	100/0.4									M		
690												M		
	690.1	58.8										M	Boring Terminated at Elevation 690.1 ft in WEATHERED ROCK: BIOTITE GNEISS Other Samples: ST-1 (5.0 - 7.0)	

NCDOT BORE DOUBLE BR0042_GEO_BRDG116_GINT.GPJ NC_DOT.GDT 8/26/19

LABORATORY SUMMARY SHEET FOR SOIL SAMPLES

SHEET 10

PROJECT NO.: 67042.1.1 (BR-0042)

COUNTY: ROCKINGHAM

REPLACE BRIDGE NO. 116 ON SR 2600 over US 29

								Atterberg Limits			Gradation Results							
Sample No.	Boring Number	Alignment	Station	Offset	Sample Depth (ft.)	Natural Moisture Content (%)	AASHTO Class.	L.L.	P.L.	P.I.	Retained #4 Sieve	Pass #10 Sieve	Pass #40 Sieve	Pass #200 Sieve	Coarse Sand (%)	Fine Sand (%)	Silt (%)	Clay (%)
ST-1	EB1-B	-L-	18+77	7' RT	5.0 - 7.0	28.6	A-7-5	48	36	12	0.2	99.2	85.5	52.0	22.3	34.1	31.7	11.9



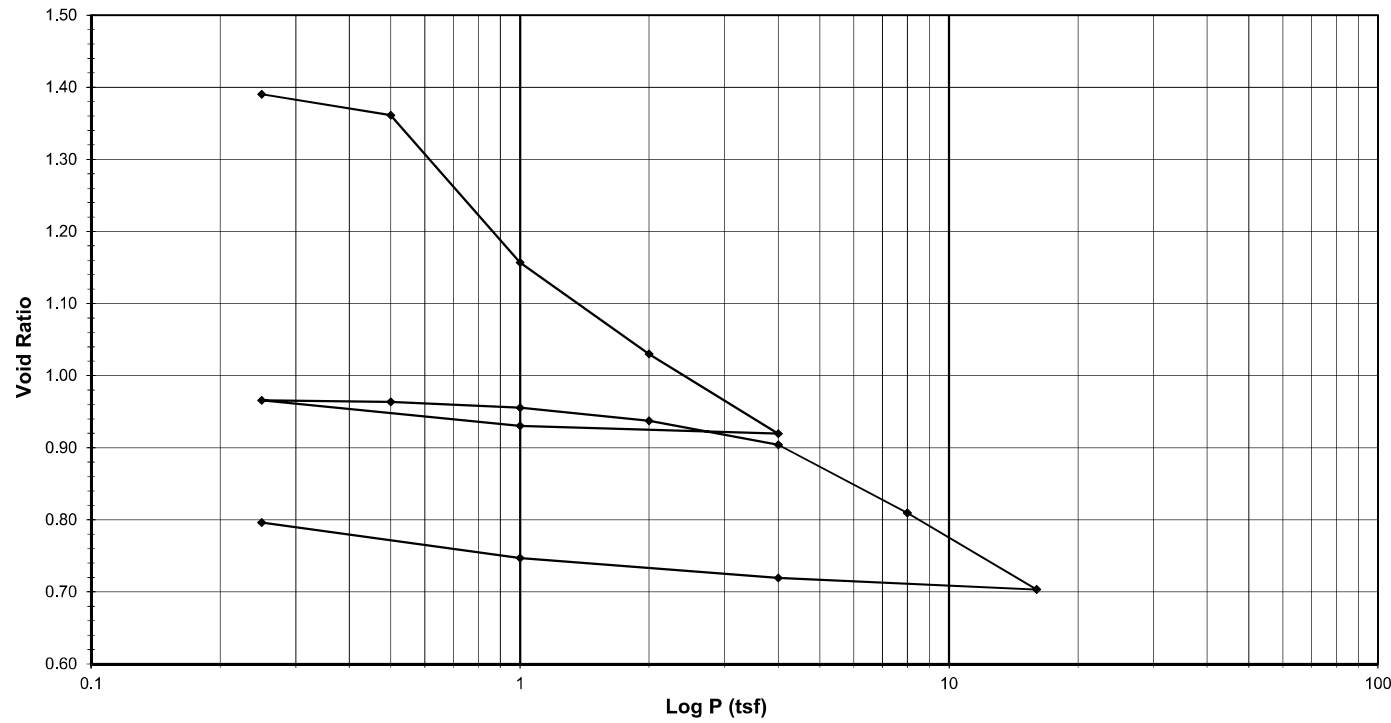
Michael P. Smith
Geotechnics, Inc.



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Reference BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By 129-0411 Date 6/18/2019 Approved By MPS Date 6/25/2019

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Reference BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R470
 1 Division = 0.0001 (in.)

Sample Properties

	Initial	Final
<i>Water Content</i>		
Tare Number	TB-10	TB-04
Wt. Tare & WS (g)	365.64	250.68
Wt. Tare & DS (g)	314.24	226.31
Wt. Water (g)	51.40	24.37
Wt. Tare (g)	134.65	135.15
Wt. DS (g)	179.59	91.16
Water Content (%)	28.62	26.73
<i>Sample Parameters</i>		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.0000	0.7383
Sample Volume (cc)	80.44	59.39
Wt. Wet Sample + Ring (g)	332.88	331.15
Wt. of Ring (g)	214.66	214.66
Wt. of Wet Sample (g)	118.22	116.49
Wet Density (pcf)	91.71	122.39
Wet Density (g/cc)	1.47	1.96
Water Content (%)	28.62	26.73
Wt. of Dry Sample (g)	91.91	91.91
Dry Density (pcf)	71.30	96.57
Dry Density (g/cc)	1.14	1.55
Void Ratio	1.4330	0.7963
Saturation (%)	55.53	93.33
Specific Gravity	2.78	Measured

Test Data Summary

Applied Pressure (tsf)	Final Dial Reading (div)	Machine Deflection (div)	Corrected Reading (div)	Height of Sample (mm)	Volume (cc)	Dry Density (g/cc)	Void Ratio
Seating	0	0	0	25.400	80.440	1.14264	1.43297
0.25	197.9	22.8	175.1	24.955	79.031	1.16300	1.39037
0.5	338.7	44.2	294.5	24.652	78.071	1.17731	1.36131
1	1195.1	60.5	1134.6	22.518	71.313	1.28888	1.15692
2	1750.5	93.6	1656.9	21.192	67.112	1.36956	1.02985
4	2241.6	130.5	2111.2	20.038	63.458	1.44842	0.91933
1	2148.5	83.0	2065.5	20.154	63.825	1.44010	0.93043
0.25	1974.2	52.7	1921.5	20.519	64.984	1.41441	0.96548
0.5	1987.1	58.3	1928.8	20.501	64.924	1.41570	0.96369
1	2037.9	74.9	1963.0	20.414	64.649	1.42172	0.95537
2	2137.5	100.0	2037.5	20.225	64.050	1.43502	0.93726
4	2307.4	133.4	2174.0	19.878	62.952	1.46006	0.90404
8	2731.7	169.9	2561.8	18.893	59.832	1.53618	0.80968
16	3224.8	226.1	2998.7	17.783	56.318	1.63204	0.70339
4	3094.6	161.7	2933.0	17.950	56.847	1.61686	0.71938
1	2932.1	111.7	2820.3	18.236	57.753	1.59149	0.74679
0.25	2689.8	73.0	2616.8	18.753	59.390	1.54762	0.79631

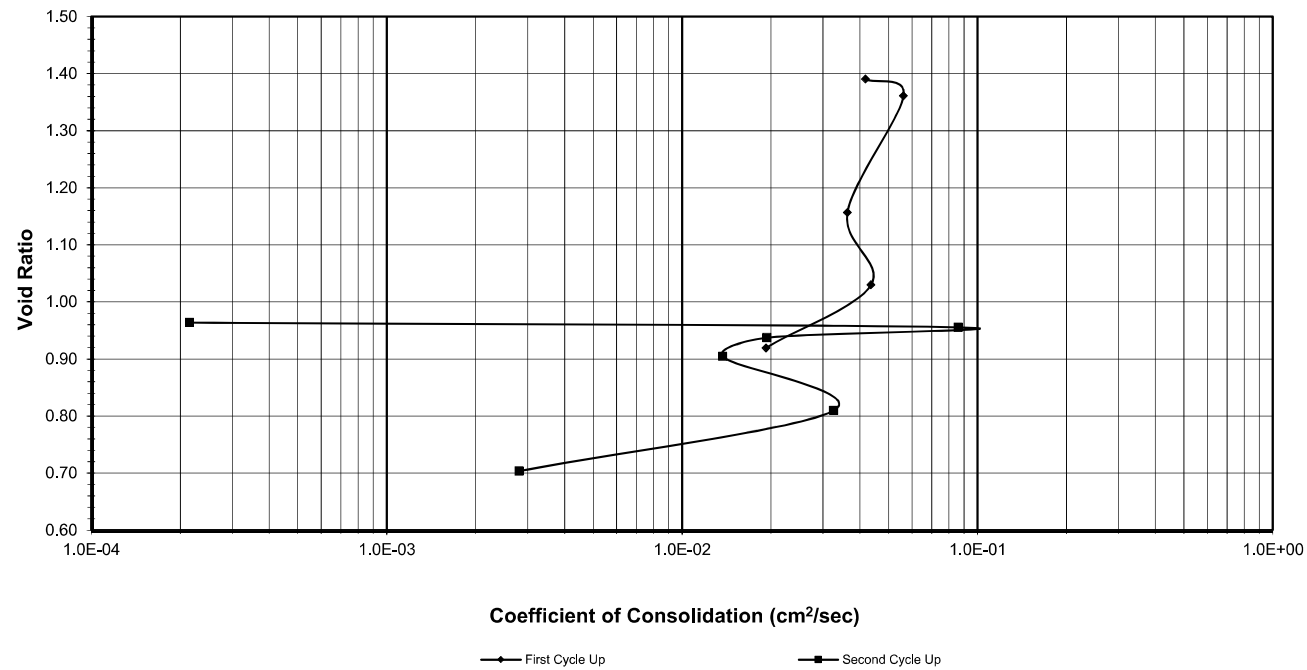
Tested By 129-0411 Date 6/18/2019 Input Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Reference BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By 129-0411 Date 6/18/2019 Input Checked By GEM Date 6/25/2019

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Reference BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R470
 1 Division = 0.0001 (in.)

Sample Properties	Initial	Final
Water Content		
Tare Number	TB-10	TB-04
Wt. Tare & WS (g)	365.64	250.68
Wt. Tare & DS (g)	314.24	226.31
Wt. Water (g)	51.40	24.37
Wt. Tare (g)	134.65	135.15
Wt. DS (g)	179.59	91.16
Water Content (%)	28.62	26.73
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.000	0.738
Sample Volume (cc)	80.44	59.39
Wt. Wet Sample + Ring (g)	332.88	331.15
Wt. of Ring (g)	214.66	214.66
Wt. of Wet Sample (g)	118.22	116.49
Wet Density (pcf)	91.71	122.39
Wet Density (g/cc)	1.47	1.96
Water Content (%)	28.62	26.73
Wt. of Dry Sample (g)	91.91	91.91
Dry Density (pcf)	71.30	96.57
Dry Density (g/cc)	1.14	1.55
Void Ratio	1.4330	0.7963
Saturation (%)	55.53	93.33
Specific Gravity	2.78	Measured

Load Increment (tsf)	Dial Reading @ t ₅₀ (div)	Machine Deflection (div)	C _v Test Data Summary		Time t ₅₀ (min.)	C _v (cm ² /sec)
			Corrected Dial Reading @ t ₅₀ (div)	Sample Height @ t ₅₀ (cm)		
0 - 0.25	100.0	22.8	77.2	2.520	0.13	0.04171
0.25 - 0.5	273.4	44.2	229.2	2.482	0.09	0.05617
0.5 - 1.0	806.5	60.5	746.0	2.351	0.13	0.03628
1.0 - 2.0	1488.8	93.6	1395.2	2.186	0.09	0.04357
2.0 - 4.0	2048.5	130.5	1918.0	2.053	0.18	0.01922
4.0 - 1.0	NA	83.0	NA	NA	NA	NA
1.0 - 0.25	NA	52.7	NA	NA	NA	NA
0.25 - 0.5	1986.8	58.3	1928.5	2.050	16.07	0.00021
0.5 - 1.0	2015.6	74.9	1940.7	2.047	0.04	0.08599
1.0 - 2.0	2109.1	100.0	2009.1	2.030	0.18	0.01932
2.0 - 4.0	2250.9	133.4	2117.5	2.002	0.24	0.01371
4.0 - 8.0	2523.3	169.9	2353.4	1.942	0.10	0.03259
8.0 - 16.0	2984.4	226.1	2758.3	1.839	0.99	0.00281
16.0 - 4.0	NA	161.7	NA	NA	NA	NA
4.0 - 1.0	NA	111.7	NA	NA	NA	NA
1.0 - 0.25	NA	73.0	NA	NA	NA	NA

Tested By 129-0411 Date 6/18/2019 Input Checked By GEM Date 6/25/2019

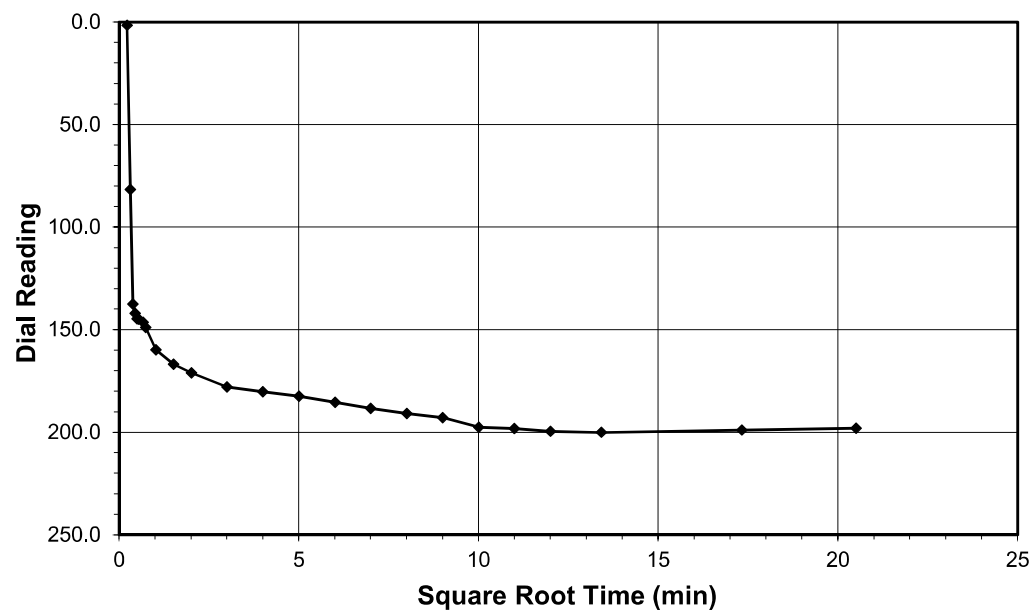


ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

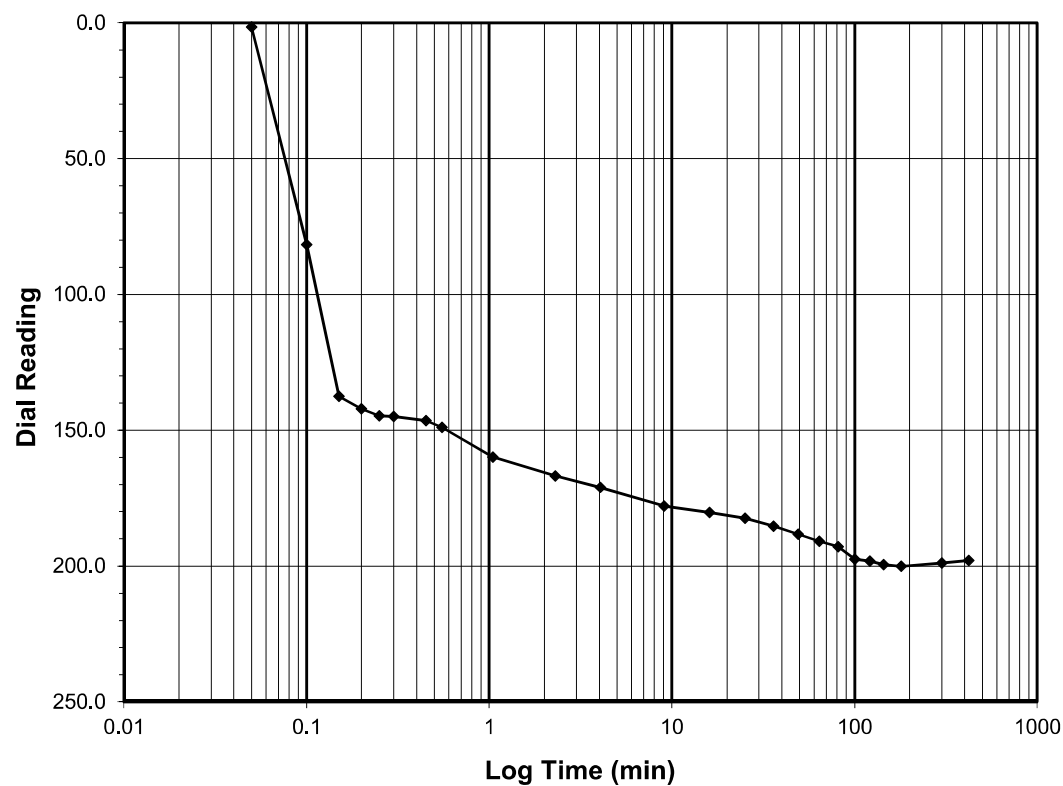
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.0-0.25
Final Reading (div) 197.9
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 6/18/2019
 Start Time 13:32:51

Elapsed Time (min)	Dial Reading (div)
Initial	0.0
0.05	1.5
0.10	81.7
0.15	137.6
0.20	142.1
0.25	144.7
0.30	145.0
0.45	146.5
0.55	148.9
1.05	159.9
2.30	166.8
4.05	171.1
9.05	178.0
16.05	180.3
25.07	182.4
36.07	185.4
49.07	188.3
64.07	190.9
81.07	192.9
100.07	197.5
121.07	198.1
144.07	199.5
180.07	200.1
300.07	198.9
420.45	197.9



ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

Sample Con

Tested By 129-0411 Date 6/18/2019 Checked By GEM Date 6/25/2019

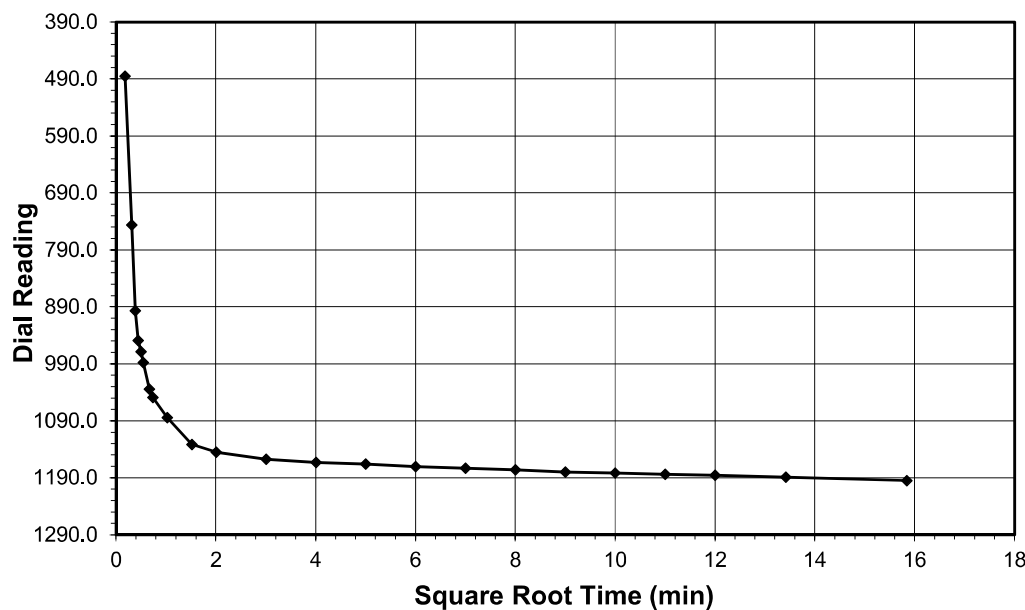


ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

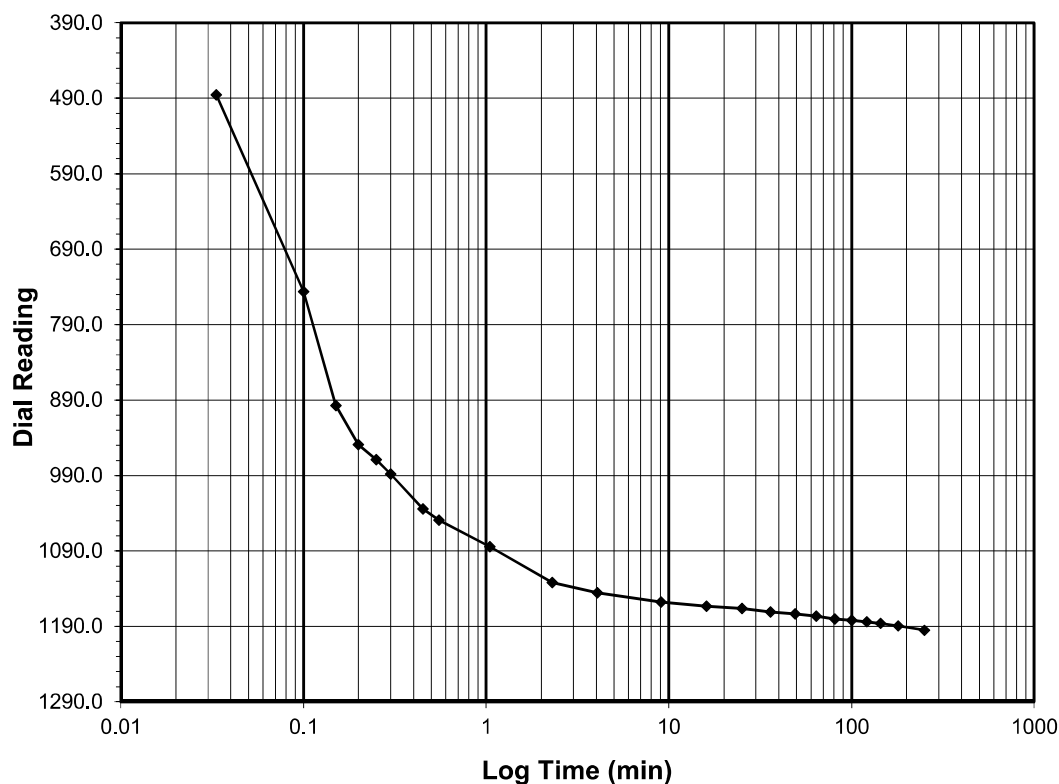
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.5-1.0
Final Reading (div) 1195.1
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 6/19/2019
 Start Time 3:33:26

Elapsed Time (min)	Dial Reading (div)
Initial	338.7
0.03	485.5
0.10	746.5
0.15	897.3
0.20	949.0
0.25	968.9
0.30	987.9
0.45	1034.6
0.55	1049.2
1.05	1084.3
2.30	1131.7
4.05	1145.5
9.05	1157.6
16.05	1163.2
25.05	1166.2
36.05	1170.6
49.05	1173.3
64.05	1176.1
81.05	1180.2
100.05	1181.9
121.05	1183.8
144.05	1185.9
180.05	1189.3
251.08	1195.1



Tested By 129-0411 Date 6/19/2019 Checked By GEM Date 6/25/2019

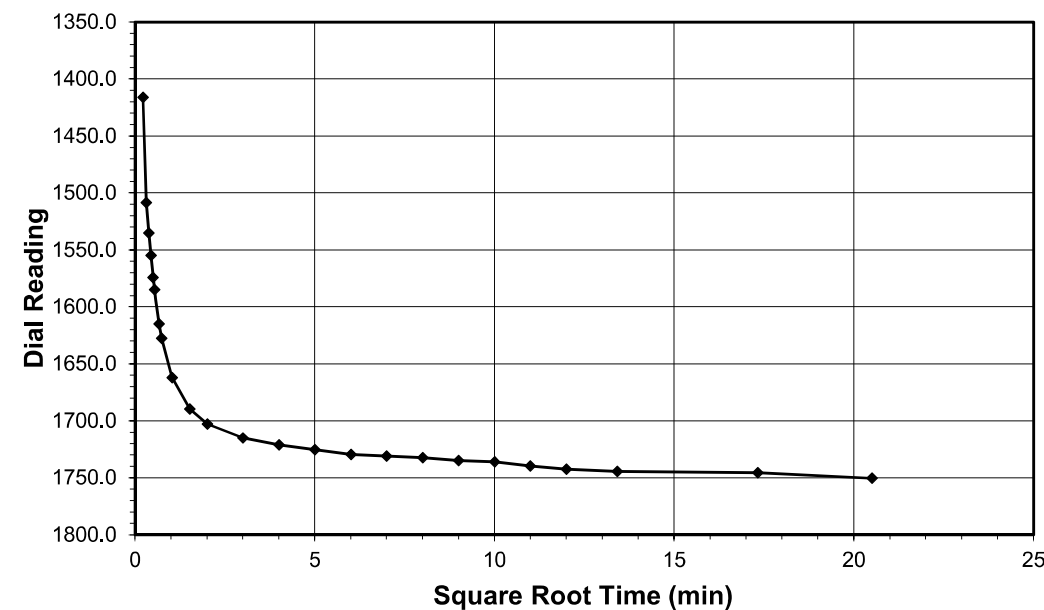


ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

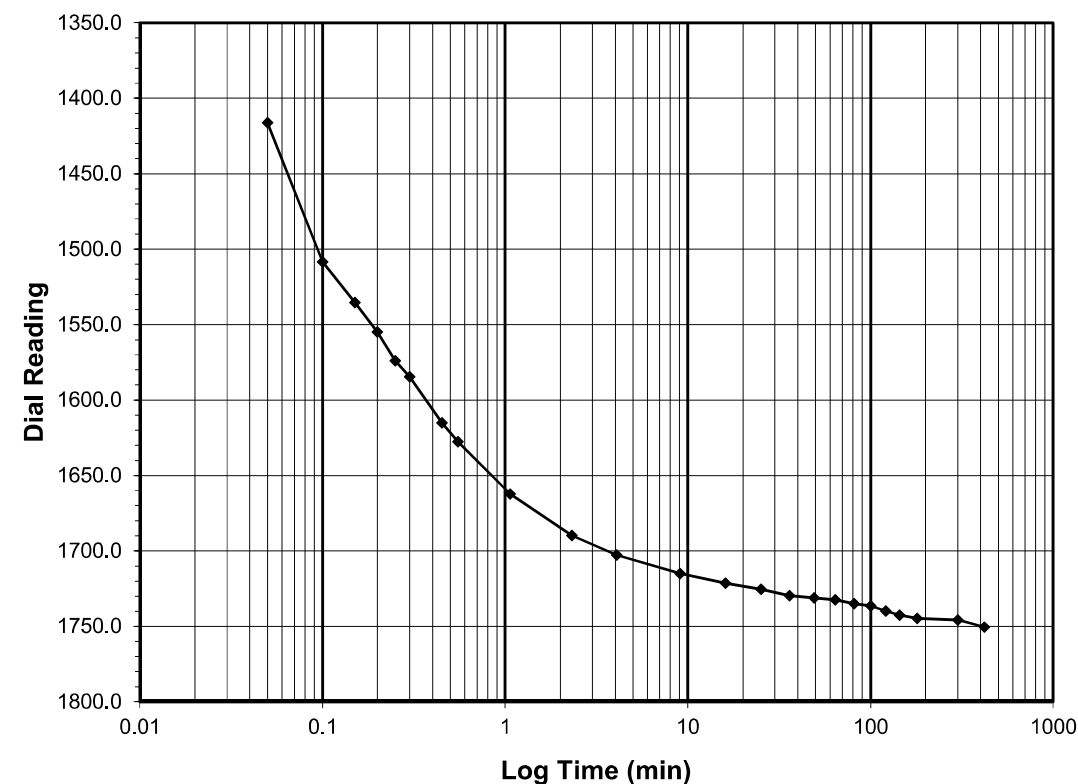
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-2.0
Final Reading (div) 1750.5
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 6/19/2019
 Start Time 7:44:32

Elapsed Time (min)	Dial Reading (div)
Initial	1195.1
0.05	1416.2
0.10	1508.5
0.15	1535.2
0.20	1554.8
0.25	1574.1
0.30	1584.7
0.45	1615.1
0.55	1627.6
1.07	1662.3
2.32	1689.7
4.07	1702.8
9.07	1715.0
16.07	1721.3
25.07	1725.4
36.07	1729.6
49.07	1731.0
64.07	1732.4
81.07	1734.9
100.07	1736.2
121.07	1739.7
144.07	1742.5
180.07	1744.6
300.07	1745.6
420.37	1750.5



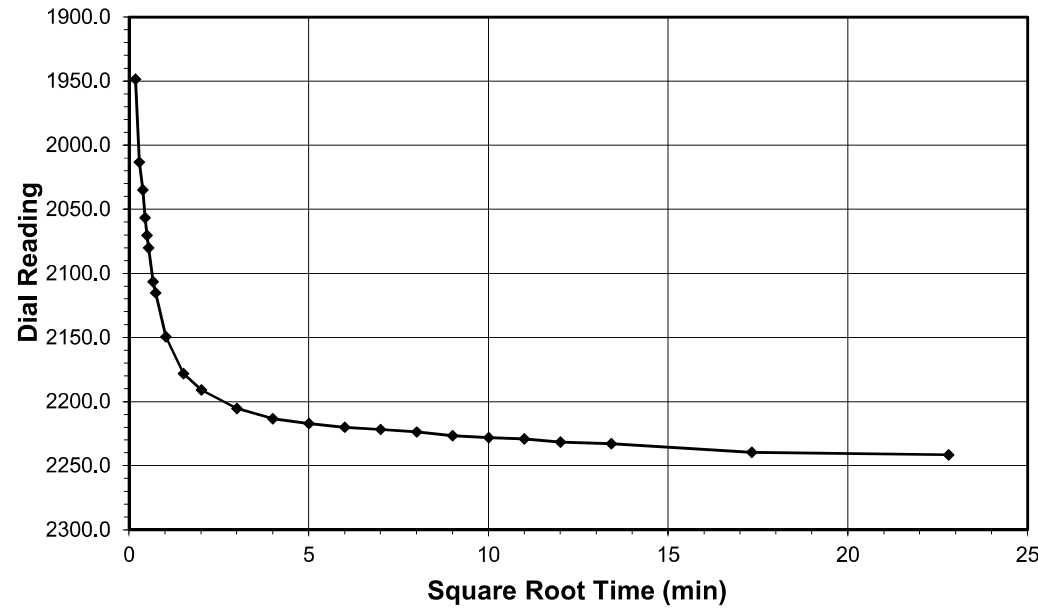
Tested By 129-0411 Date 6/19/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

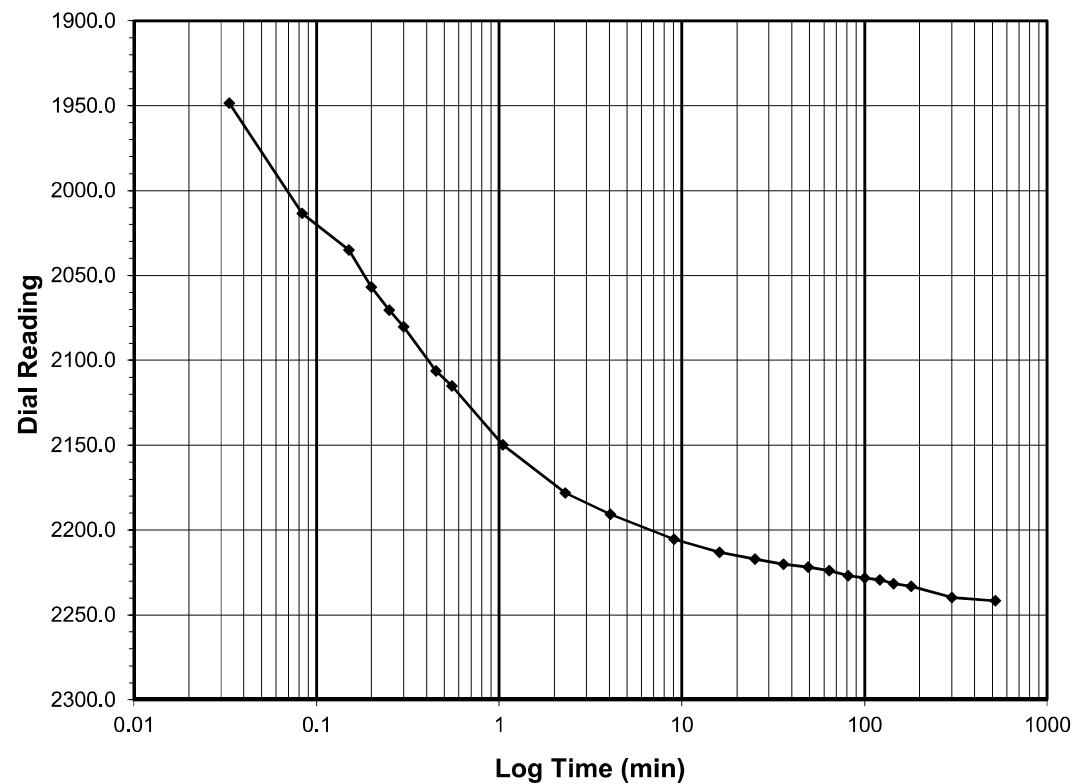
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 2.0-4.0
Final Reading (div) 2241.6
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 6/19/2019
 Start Time 14:44:54

Elapsed Time (min)	Dial Reading (div)
Initial	1750.5
0.03	1948.5
0.08	2013.4
0.15	2035.0
0.20	2056.8
0.25	2070.4
0.30	2080.1
0.45	2106.4
0.55	2115.2
1.05	2149.7
2.30	2178.2
4.05	2190.8
9.05	2205.3
16.05	2213.2
25.05	2217.1
36.05	2220.1
49.07	2221.8
64.07	2223.8
81.07	2226.8
100.07	2228.2
121.07	2229.3
144.07	2231.6
180.07	2233.0
300.07	2239.7
520.07	2241.6



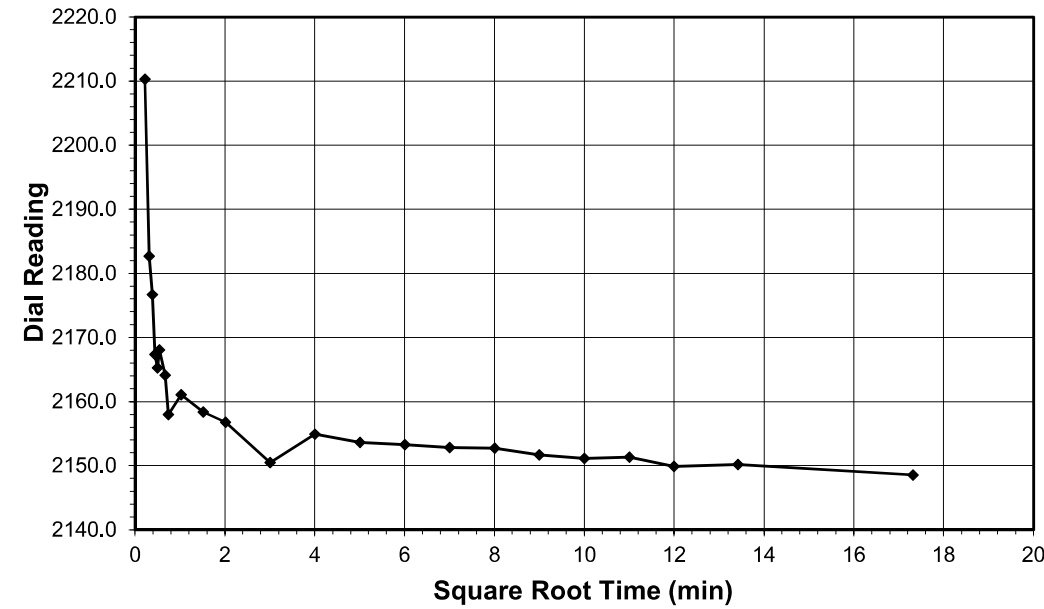
Tested By 129-0411 Date 6/19/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

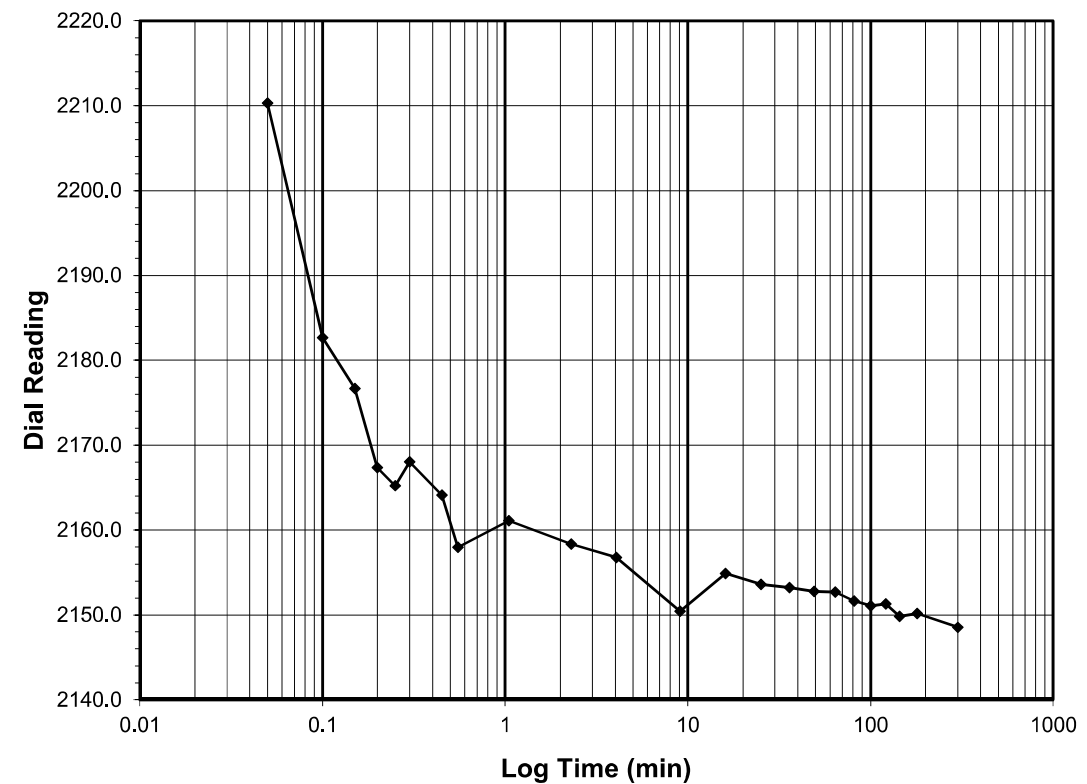
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 4.0-1.0
Final Reading (div) 2148.5
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 6/20/2019
 Start Time 2:45:06

Elapsed Time (min)	Dial Reading (div)
Initial	2241.6
0.05	2210.3
0.10	2182.7
0.15	2176.7
0.20	2167.4
0.25	2165.2
0.30	2168.0
0.45	2164.1
0.55	2158.0
1.05	2161.1
2.30	2158.4
4.05	2156.8
9.07	2150.4
16.07	2154.9
25.07	2153.6
36.07	2153.2
49.07	2152.8
64.07	2152.7
81.07	2151.7
100.07	2151.1
121.07	2151.3
144.07	2149.9
180.08	2150.2
300.08	2148.5



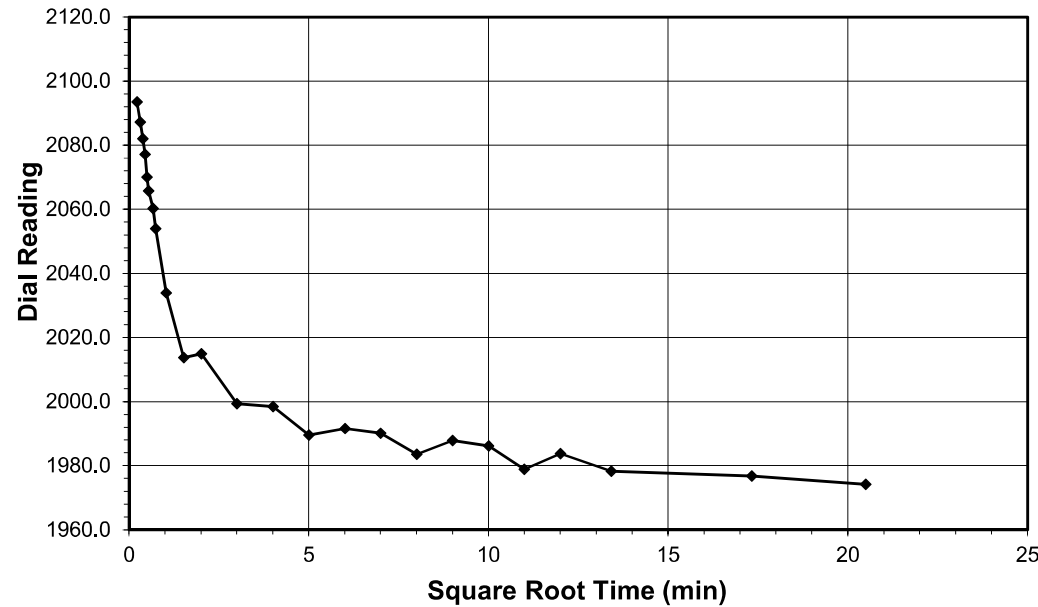
Tested By 129-0411 Date 6/20/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

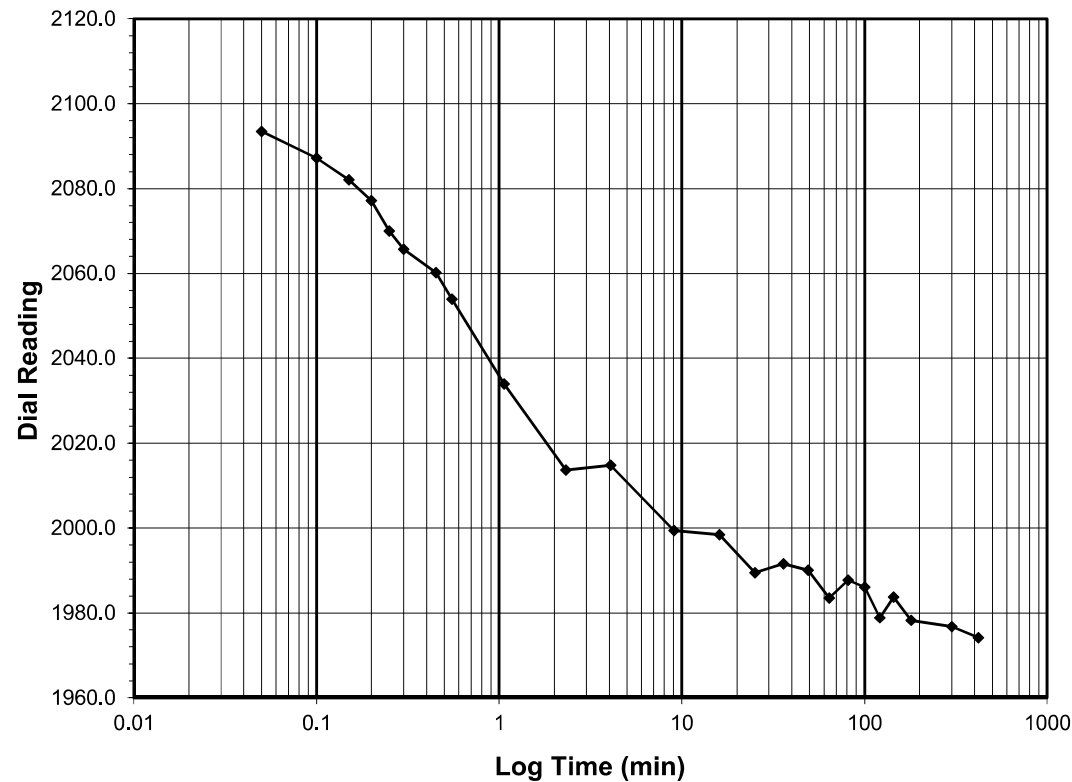
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-0.25
Final Reading (div) 1974.2
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 6/20/2019
 Start Time 9:45:33

Elapsed Time (min)	Dial Reading (div)
Initial	2148.5
0.05	2093.5
0.10	2087.2
0.15	2082.1
0.20	2077.2
0.25	2070.0
0.30	2065.7
0.45	2060.2
0.55	2053.9
1.07	2033.9
2.32	2013.7
4.07	2014.9
9.07	1999.4
16.07	1998.5
25.07	1989.5
36.07	1991.6
49.07	1990.1
64.07	1983.5
81.07	1987.8
100.07	1986.1
121.07	1978.9
144.07	1983.7
180.07	1978.3
300.07	1976.8
420.00	1974.2



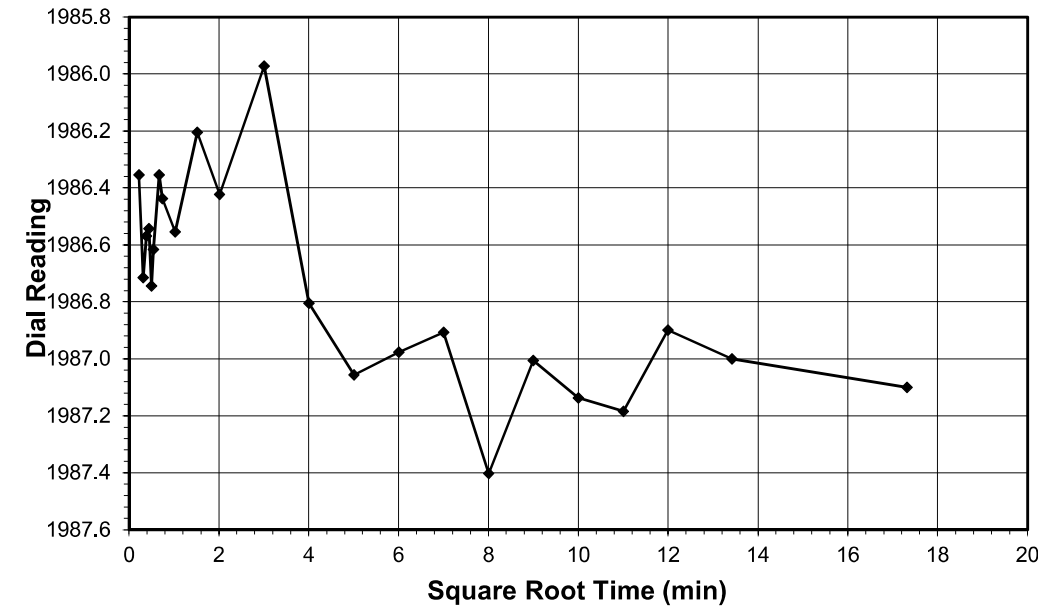
Tested By 129-0411 Date 6/20/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

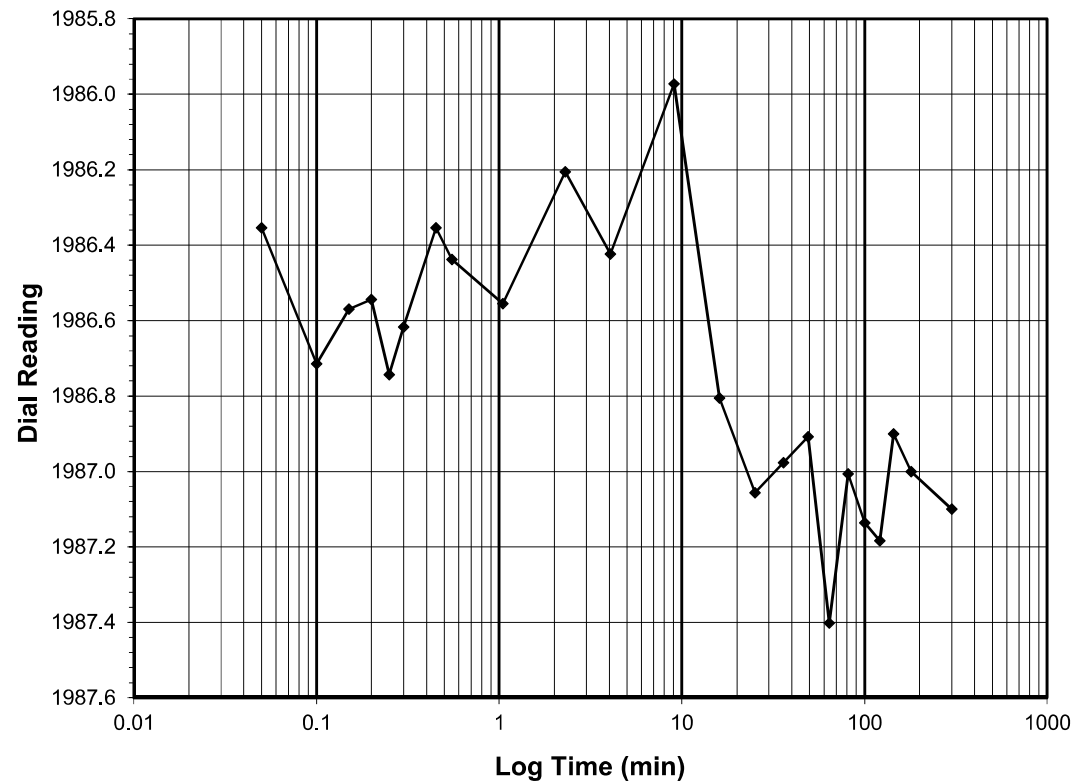
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.25-0.5
Final Reading (div) 1987.1
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 6/20/2019
 Start Time 16:45:33

Elapsed Time (min)	Dial Reading (div)
Initial	1974.2
0.05	1986.4
0.10	1986.7
0.15	1986.6
0.20	1986.5
0.25	1986.7
0.30	1986.6
0.45	1986.4
0.55	1986.4
1.05	1986.6
2.30	1986.2
4.05	1986.4
9.05	1986.0
16.07	1986.8
25.07	1987.1
36.07	1987.0
49.07	1986.9
64.07	1987.4
81.07	1987.0
100.07	1987.1
121.07	1987.2
144.07	1986.9
180.07	1987.0
300.07	1987.1



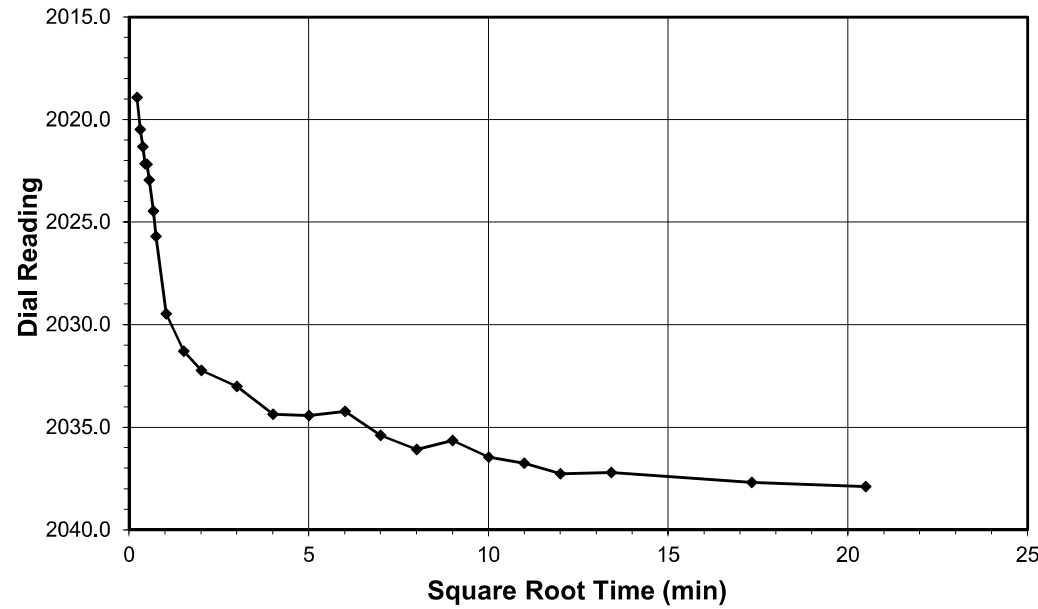
Tested By 129-0411 Date 6/20/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

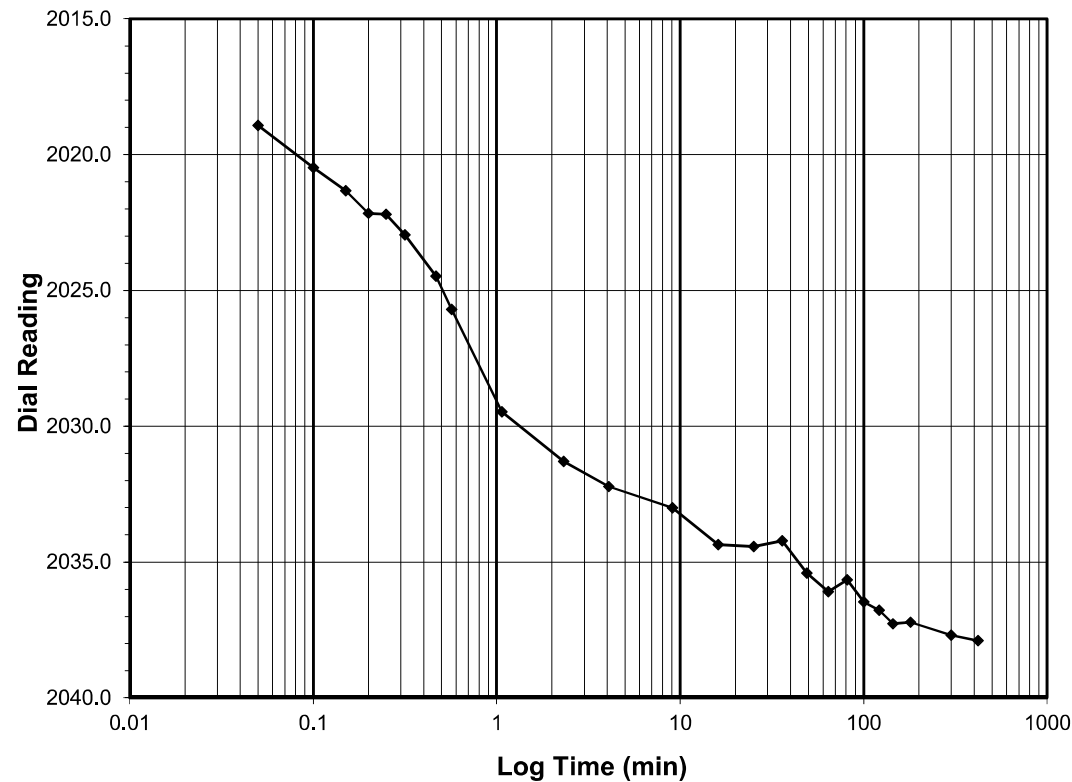
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.5-1.0
 Final Reading (div) 2037.9
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/20/2019
 Start Time 23:46:03

Elapsed Time (min)	Dial Reading (div)
Initial	1987.1
0.05	2018.9
0.10	2020.5
0.15	2021.3
0.20	2022.2
0.25	2022.2
0.32	2023.0
0.47	2024.5
0.57	2025.7
1.07	2029.5
2.32	2031.3
4.07	2032.2
9.07	2033.0
16.07	2034.4
25.07	2034.4
36.07	2034.2
49.07	2035.4
64.07	2036.1
81.07	2035.6
100.07	2036.5
121.07	2036.8
144.07	2037.3
180.07	2037.2
300.07	2037.7
420.07	2037.9



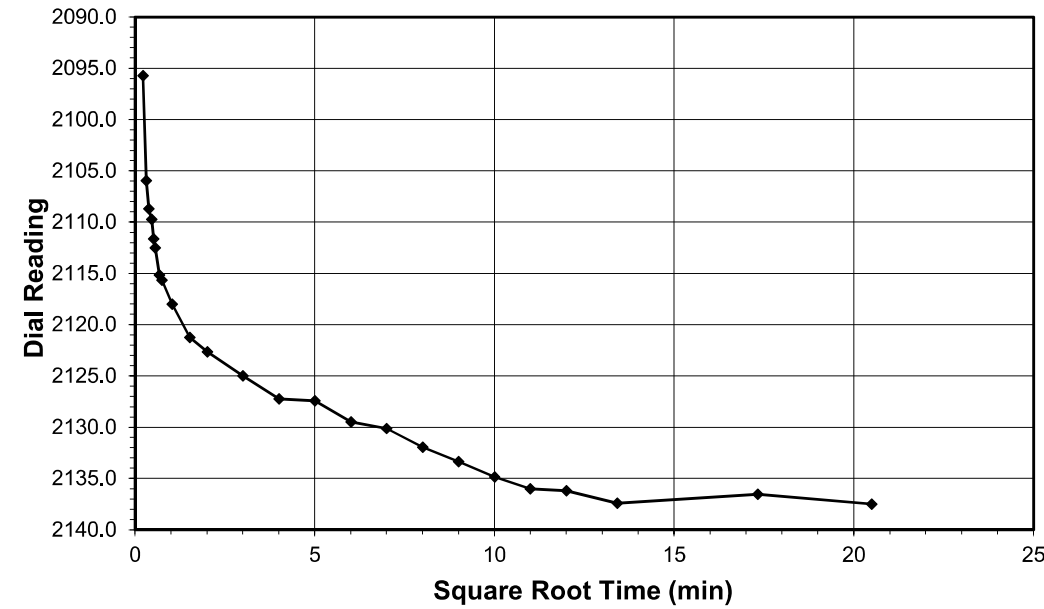
Tested By 129-0411 Date 6/20/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

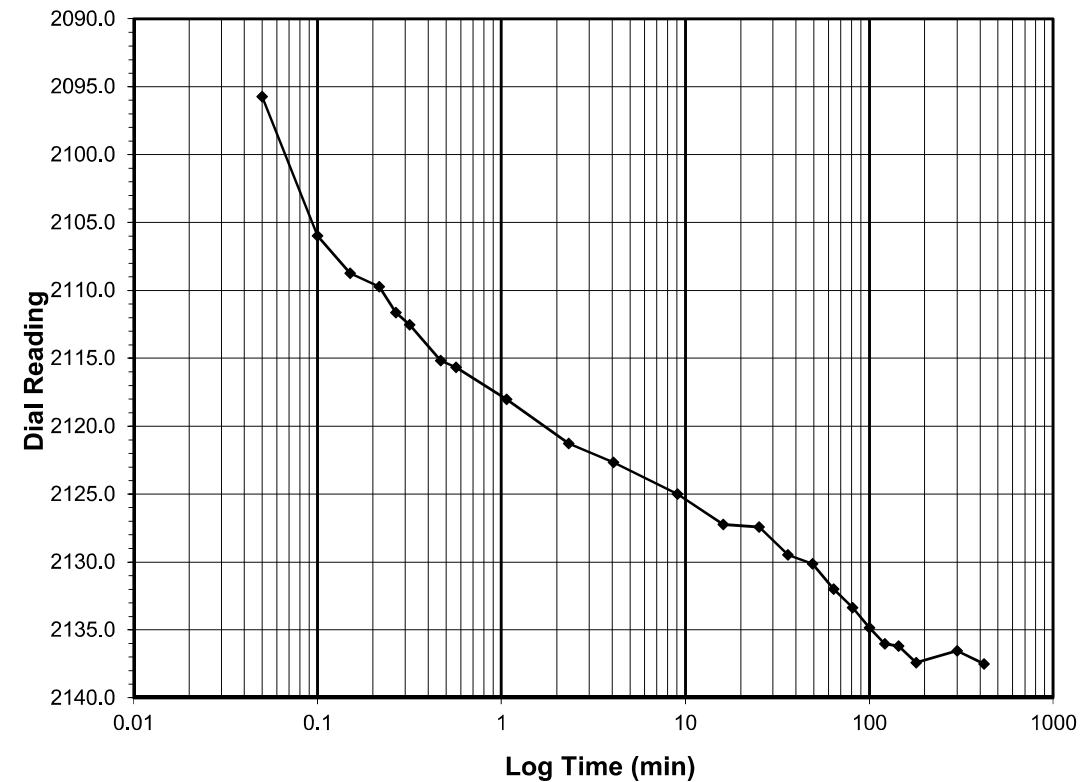
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-2.0
 Final Reading (div) 2137.5
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/21/2019
 Start Time 6:46:07

Elapsed Time (min)	Dial Reading (div)
Initial	2037.9
0.05	2095.7
0.10	2106.0
0.15	2108.7
0.22	2109.7
0.27	2111.6
0.32	2112.5
0.47	2115.2
0.57	2115.7
1.07	2118.0
2.32	2121.3
4.07	2122.7
9.07	2125.0
16.07	2127.2
25.07	2127.4
36.07	2129.5
49.07	2130.1
64.07	2132.0
81.07	2133.4
100.07	2134.9
121.08	2136.0
144.08	2136.2
180.08	2137.4
300.08	2136.5
420.08	2137.5



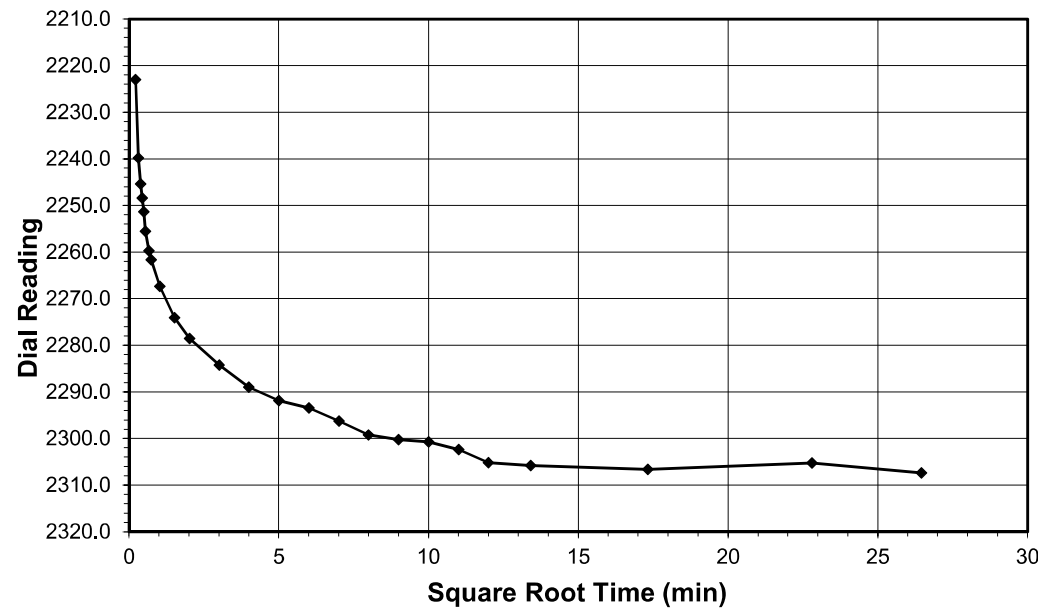
Tested By 129-0411 Date 6/21/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

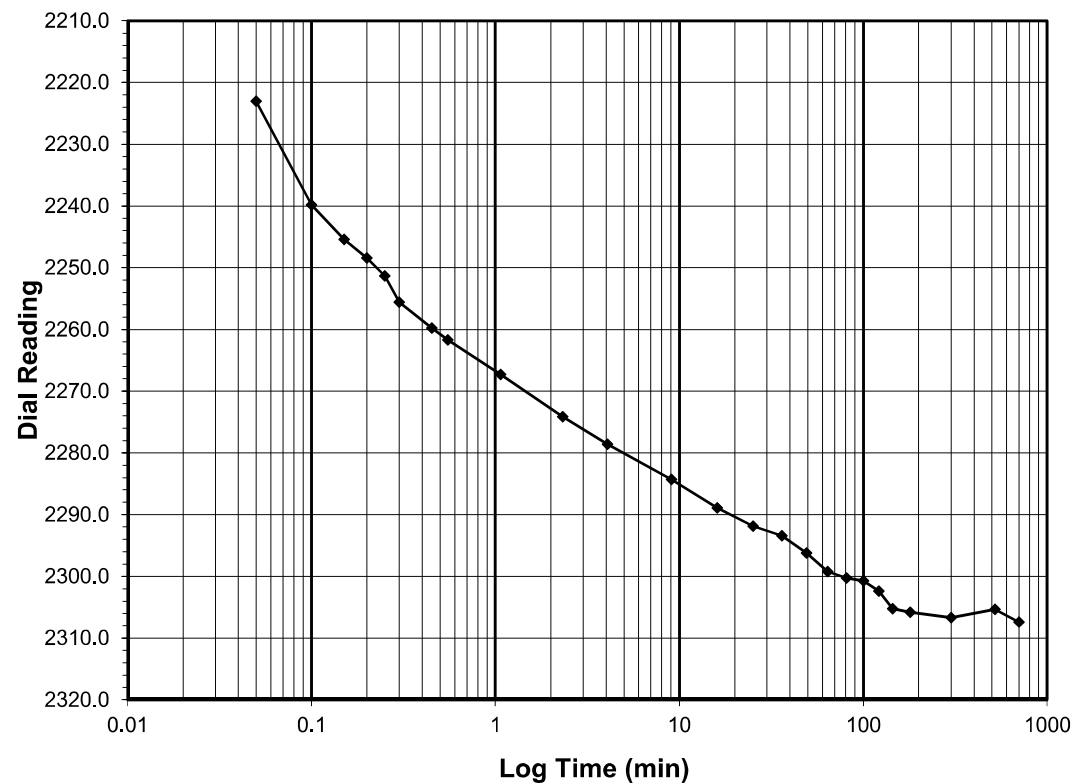
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 2.0-4.0
Final Reading (div) 2307.4
 Consolidometer No. **R470**
 1 Division (in) 0.0001

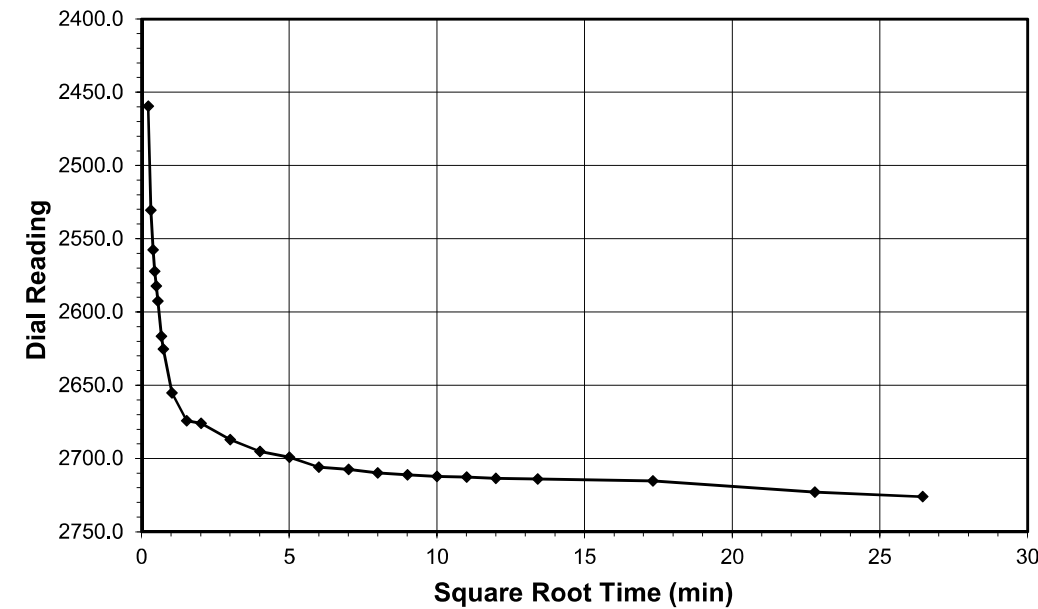
Start Date 6/21/2019
 Start Time 13:46:12

Elapsed Time (min)	Dial Reading (div)
Initial	2137.5
0.05	2223.1
0.10	2239.8
0.15	2245.4
0.20	2248.4
0.25	2251.3
0.30	2255.6
0.45	2259.7
0.55	2261.6
1.07	2267.3
2.32	2274.1
4.07	2278.6
9.07	2284.3
16.07	2288.9
25.07	2291.9
36.07	2293.4
49.07	2296.2
64.07	2299.2
81.07	2300.3
100.07	2300.7
121.07	2302.4
144.07	2305.2
180.07	2305.8
300.07	2306.7
520.07	2305.3
700.07	2307.4



Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

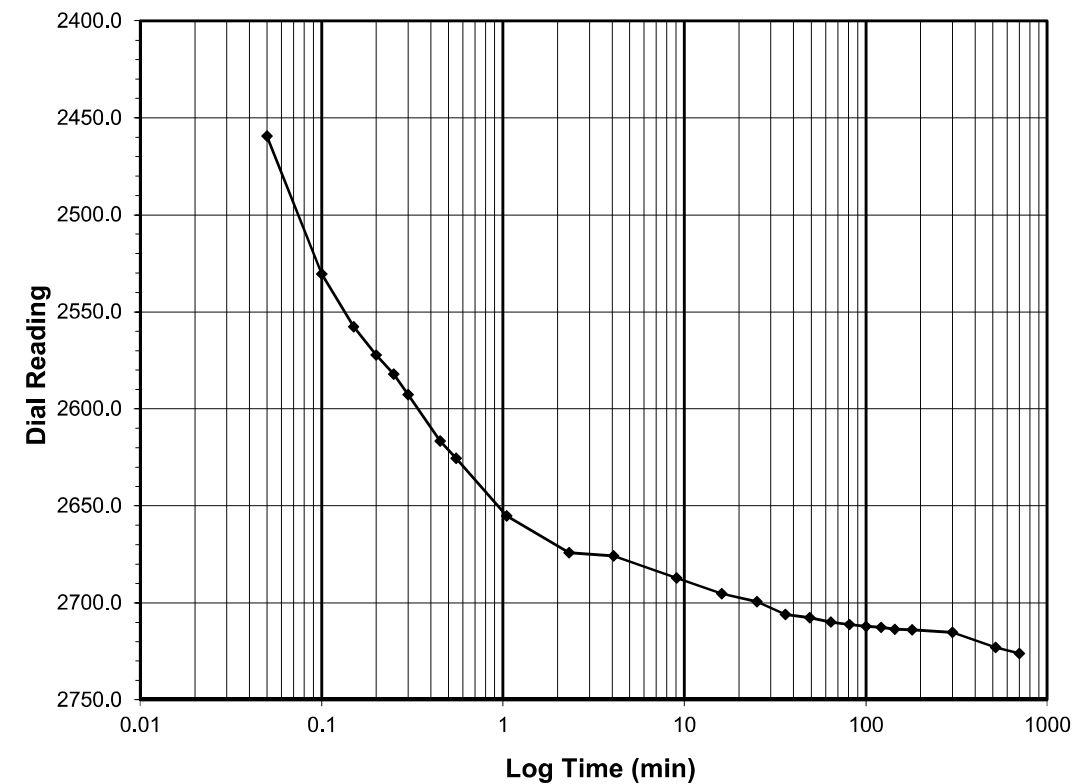
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 4.0-8.0
Final Reading (div) 2731.7
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 6/22/2019
 Start Time 1:46:23

Elapsed Time (min)	Dial Reading (div)
Initial	2307.4
0.05	2459.4
0.10	2530.4
0.15	2557.6
0.20	2572.2
0.25	2582.1
0.30	2592.7
0.45	2616.6
0.55	2625.4
1.05	2655.2
2.32	2674.2
4.07	2675.8
9.07	2687.2
16.07	2695.2
25.07	2699.3
36.07	2705.9
49.07	2707.5
64.07	2709.9
81.07	2711.1
100.07	2712.2
121.07	2712.7
144.07	2713.7
180.07	2714.0
300.07	2715.3
520.07	2723.0
700.08	2731.7



Tested By 129-0411 Date 6/21/2019 Checked By GEM Date 6/25/2019

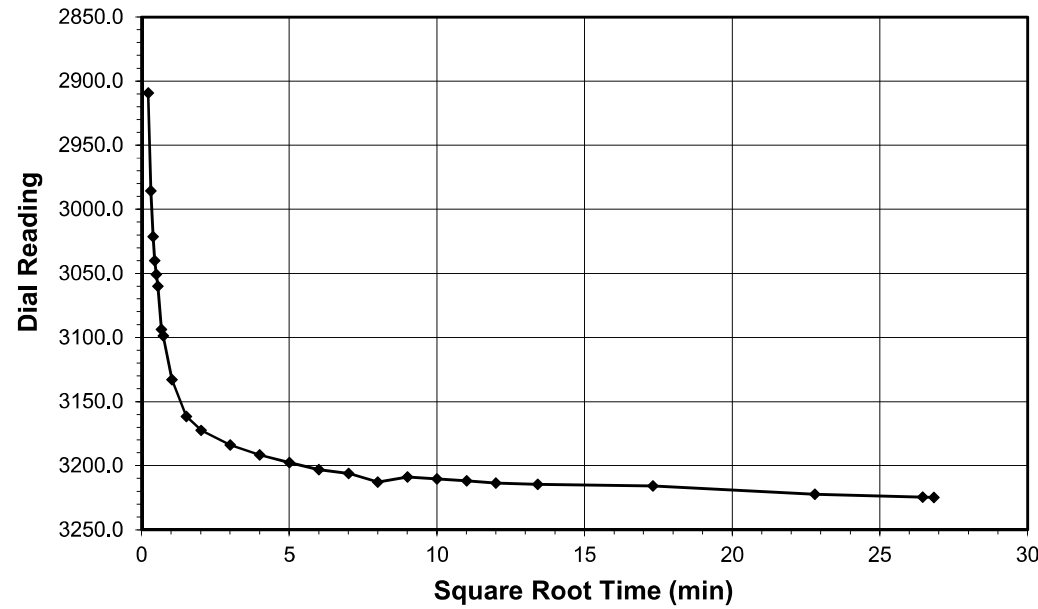
Tested By 129-0411 Date 6/22/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

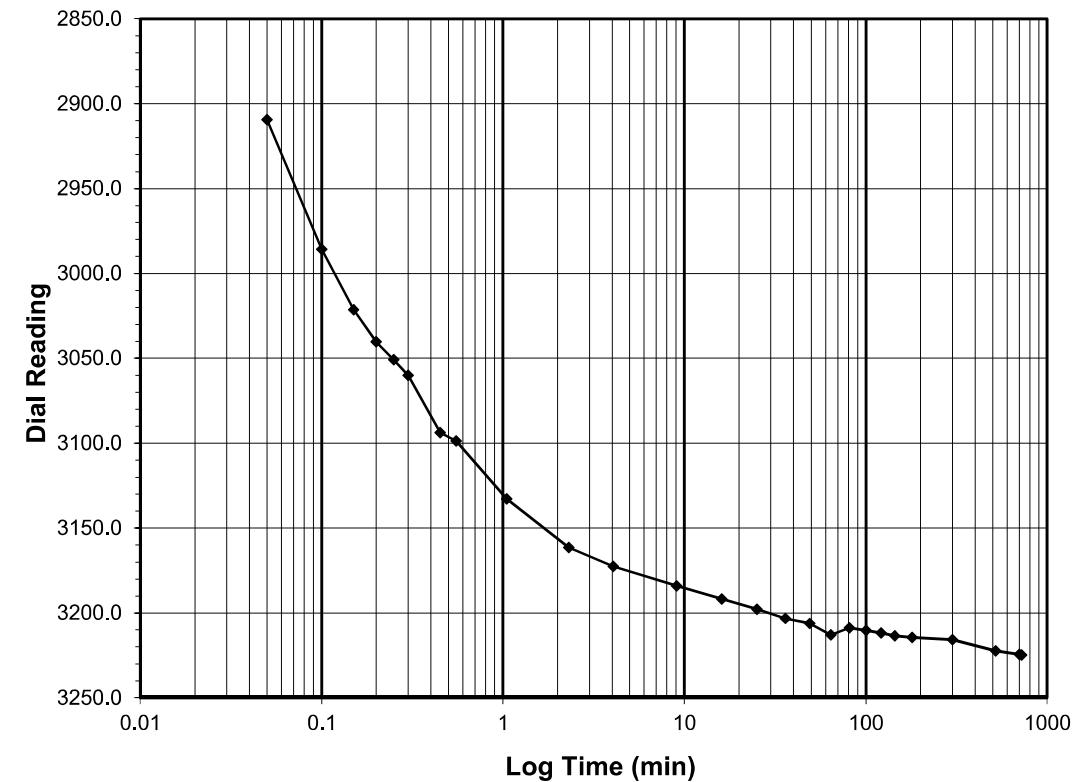
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 8.0-16.0
Final Reading (div) 3224.8
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 6/22/2019
 Start Time 13:46:32

Elapsed Time (min)	Dial Reading (div)
Initial	2731.7
0.05	2909.4
0.10	2985.9
0.15	3021.3
0.20	3040.1
0.25	3050.8
0.30	3060.0
0.45	3093.7
0.55	3098.7
1.05	3132.9
2.30	3161.5
4.05	3172.5
9.05	3184.1
16.05	3191.7
25.05	3197.6
36.07	3203.2
49.07	3206.3
64.07	3212.9
81.07	3208.8
100.07	3210.3
121.07	3211.9
144.07	3213.6
180.07	3214.5
300.07	3215.8
520.07	3222.3
700.07	3224.5
720.20	3224.8



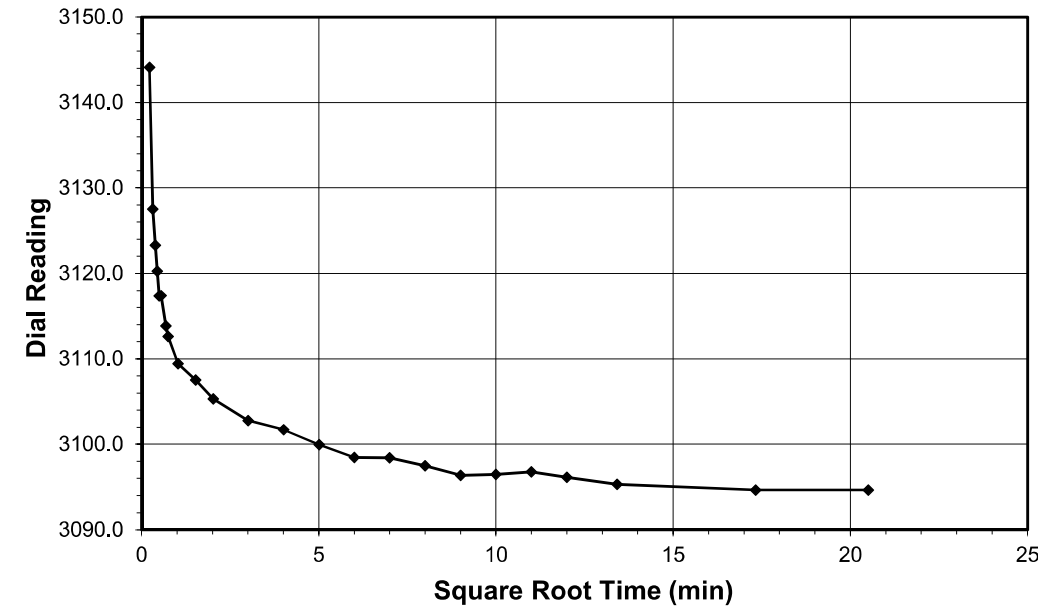
Tested By 129-0411 Date 6/22/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

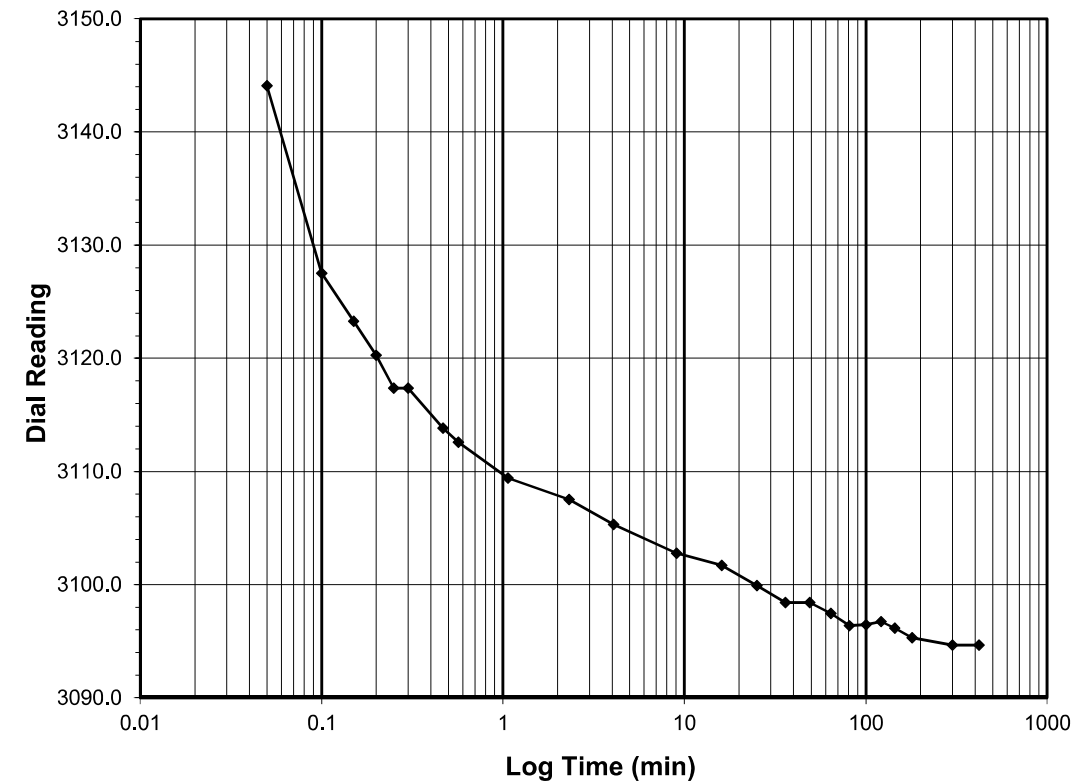
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 16.0-4.0
Final Reading (div) 3094.6
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 6/23/2019
 Start Time 1:46:44

Elapsed Time (min)	Dial Reading (div)
Initial	3224.8
0.05	3144.1
0.10	3127.5
0.15	3123.3
0.20	3120.3
0.25	3117.4
0.30	3117.4
0.47	3113.8
0.57	3112.6
1.07	3109.4
2.32	3107.5
4.07	3105.3
9.07	3102.8
16.07	3101.7
25.07	3099.9
36.07	3098.4
49.07	3098.4
64.08	3097.5
81.08	3096.4
100.08	3096.5
121.08	3096.7
144.08	3096.1
180.08	3095.3
300.08	3094.6
420.50	3094.6



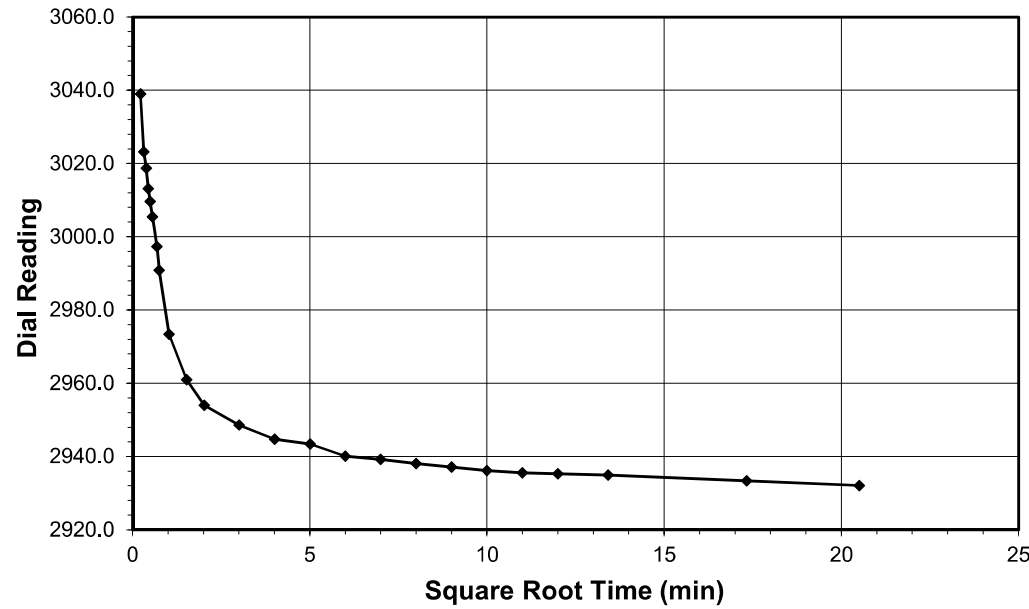
Tested By 129-0411 Date 6/23/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

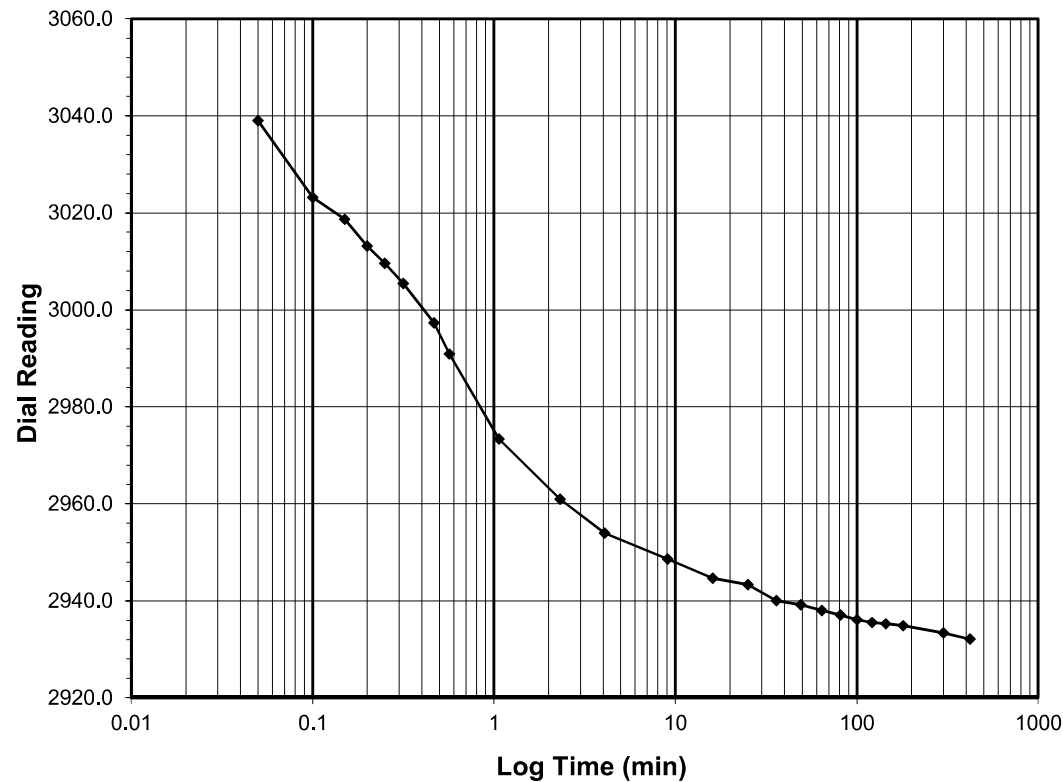
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 4.0-1.0
 Final Reading (div) 2932.1
 Consolidometer No. R470
 1 Division (in) 0.0001

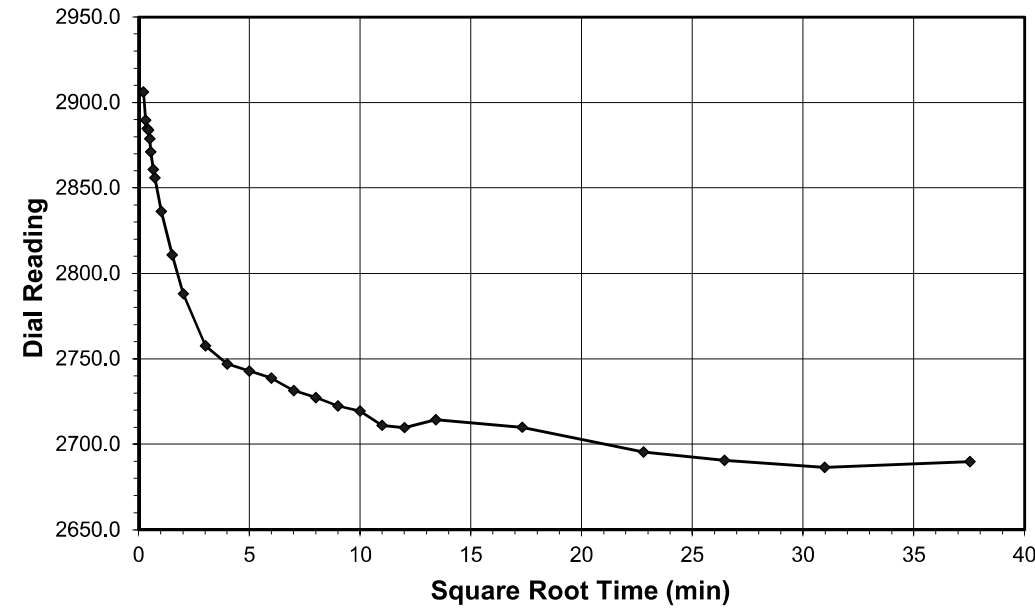
Start Date 6/23/2019
 Start Time 8:47:14

Elapsed Time (min)	Dial Reading (div)
Initial	3094.6
0.05	3039.0
0.10	3023.2
0.15	3018.6
0.20	3013.1
0.25	3009.6
0.32	3005.4
0.47	2997.3
0.57	2990.9
1.07	2973.4
2.32	2960.9
4.07	2954.0
9.07	2948.6
16.07	2944.7
25.07	2943.3
36.07	2940.1
49.07	2939.2
64.07	2938.0
81.07	2937.1
100.07	2936.1
121.07	2935.5
144.07	2935.3
180.07	2934.9
300.07	2933.3
420.48	2932.1



Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

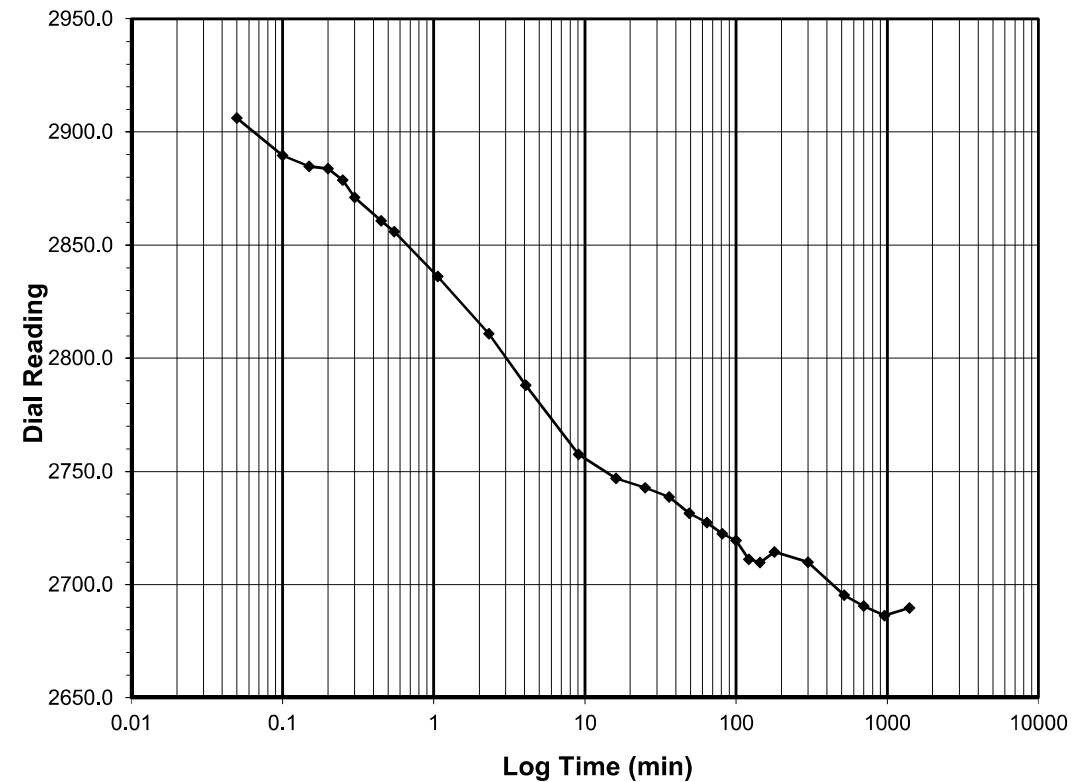
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-0.25
 Final Reading (div) 2689.8
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/23/2019
 Start Time 15:47:43

Elapsed Time (min)	Dial Reading (div)
Initial	2932.1
0.05	2906.1
0.10	2889.7
0.15	2884.8
0.20	2883.8
0.25	2878.8
0.30	2871.1
0.45	2860.7
0.55	2855.9
1.07	2836.1
2.32	2810.9
4.07	2788.1
9.07	2757.6
16.07	2747.0
25.07	2742.9
36.07	2738.7
49.07	2731.5
64.07	2727.4
81.07	2722.5
100.07	2719.6
121.07	2711.2
144.07	2709.9
180.07	2714.5
300.07	2710.0
520.07	2695.5
700.07	2690.6
960.07	2686.4
1409.47	2689.8



Tested By 129-0411 Date 6/23/2019 Checked By GEM Date 6/25/2019

Tested By 129-0411 Date 6/23/2019 Checked By GEM Date 6/25/2019

REFERENCE: BR-0042

PROJECT: 67042

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY ROCKINGHAM
PROJECT DESCRIPTION REPLACE BRIDGE NO. 116 ON
SR 2600 (MIZPAH CHURCH ROAD) OVER US 29
SITE DESCRIPTION MSE WALLS AT END BENT NO. 1
AND END BENT NO. 2

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4-5	PROFILES
6-9	BORE LOGS
10-20	SOIL LABORATORY RESULTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0042	1	20

CAUTION NOTICE

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

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

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

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

PERSONNEL

C. DRISCOLL

TRIGON EXPLORATION

INVESTIGATED BY C. DRISCOLL

DRAWN BY T. WELLS

CHECKED BY X. BARRETT

SUBMITTED BY KLEINFELDER, INC.

DATE AUGUST 2019

Prepared in the Office of:



DocuSigned by:
Xavier Barrett 9/9/2019
2D00374FA68B407
SIGNATURE DATE

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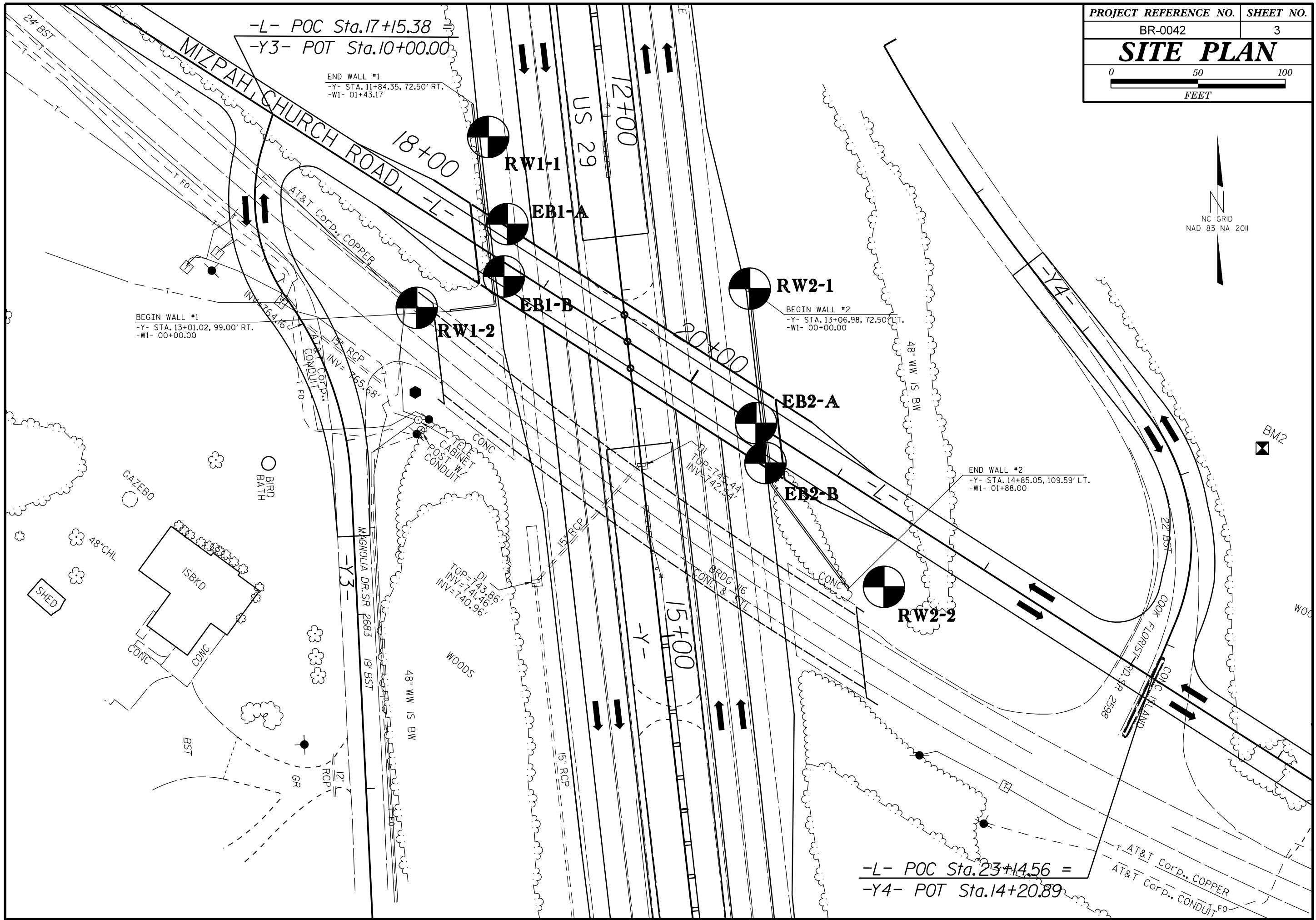
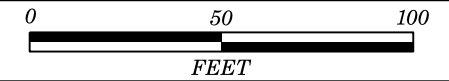
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT**

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																																	
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>										<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>										<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																	
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)										CRYSTALLINE ROCK (CR)																																																																																	
<p>GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-1-b</th> <th>A-2</th> <th>A-2-4</th> <th>A-2-5</th> <th>A-2-6</th> <th>A-2-7</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> </tr> <tr> <th>SYMBOL</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>% PASSING #10 #40 #200</th> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX</td> <td>51 MN 35 MX 35 MX</td> <td>40 MX 35 MX</td> <td>41 MN 40 MX 35 MX</td> <td>41 MN 40 MX 35 MX</td> <td>41 MN 40 MX 35 MX</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>GRANULAR SOILS</td> <td>SILT-CLAY SOILS</td> <td>MUCK, PEAT</td> <td></td> </tr> </table>										GROUP CLASS.	A-1	A-1-b	A-2	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7	SYMBOL																% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 35 MX 35 MX	40 MX 35 MX	41 MN 40 MX 35 MX	41 MN 40 MX 35 MX	41 MN 40 MX 35 MX	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT		<p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>										<p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p>										<p>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p>																																	
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<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p>SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50</p>										<p>FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p>										<p>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>																																																																																	
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<p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>										<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>										<p>FIAD - FILLED IMMEDIATELY AFTER DRILLING</p> <p>RETAINING WALL BORING ELEVATIONS TAKEN FROM PROJECT TIN FILE, BR-0042.TIN RECIVED ON MAY 3, 2019.</p>										<p>ELEVATION: 745.44 FEET</p>																																																																																	

SITE PLAN



-L- POC Sta.17+15.38 =
 -Y3- POT Sta.10+00.00

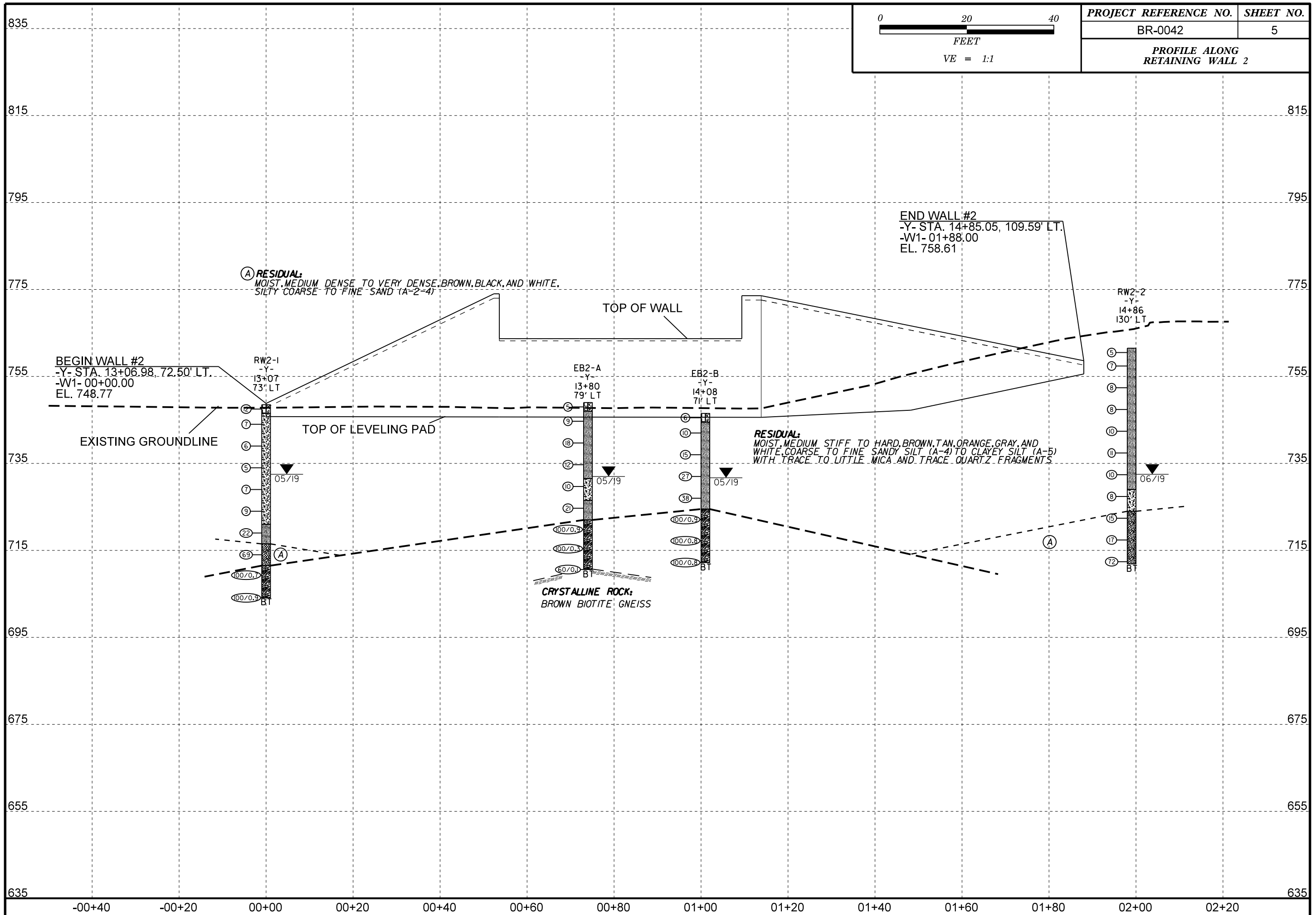
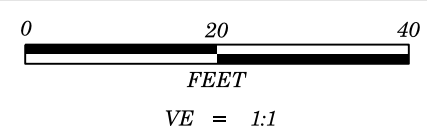
END WALL #1
 -Y- STA. 11+84.35, 72.50' RT.
 -W1- 01+43.17

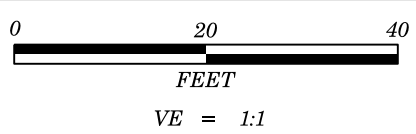
BEGIN WALL #1
 -Y- STA. 13+01.02, 99.00' RT.
 -W1- 00+00.00

BEGIN WALL #2
 -Y- STA. 13+06.98, 72.50' LT.
 -W1- 00+00.00

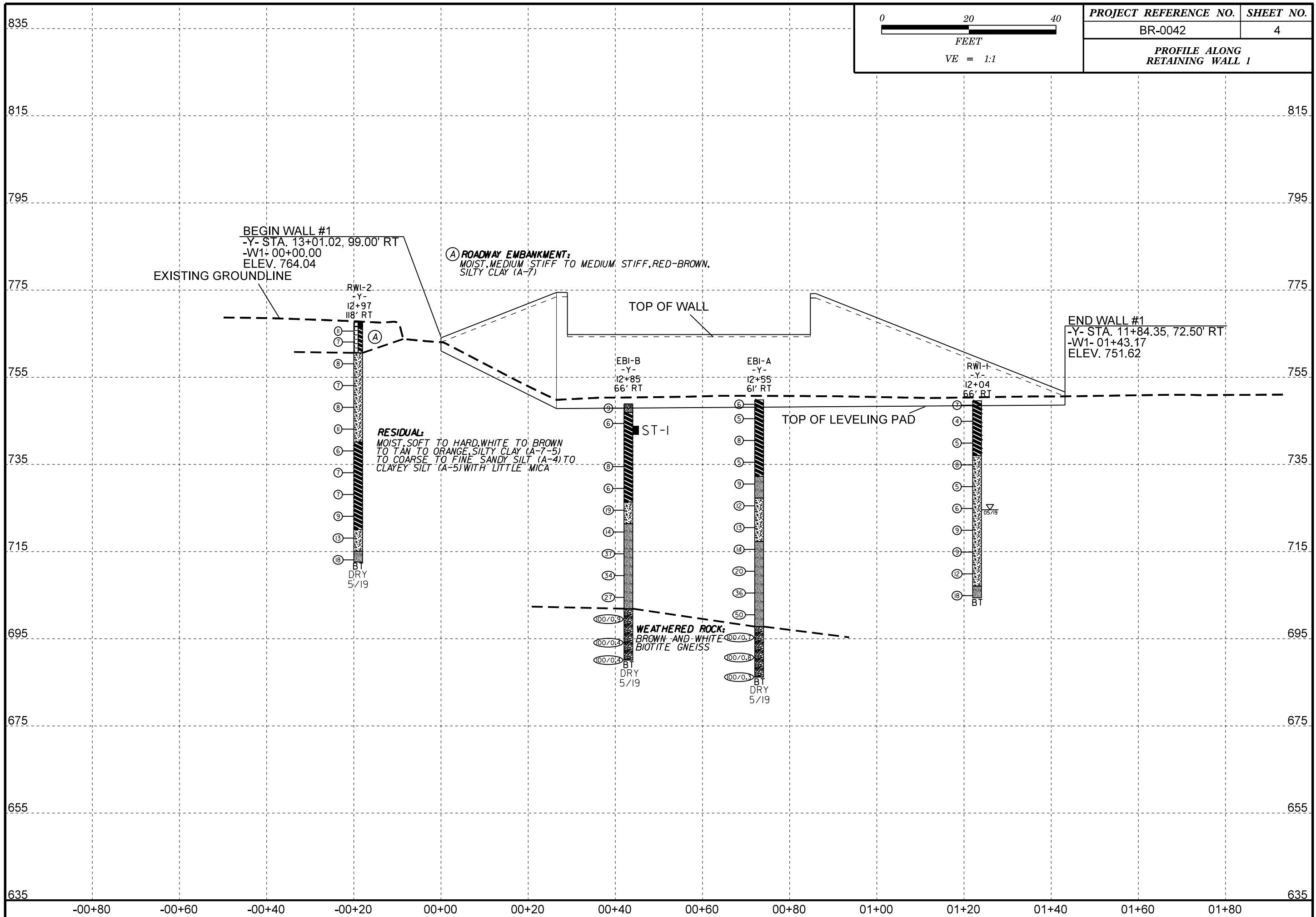
END WALL #2
 -Y- STA. 14+85.05, 109.59' LT.
 -W1- 01+88.00

-L- POC Sta.23+14.56 =
 -Y4- POT Sta.14+20.89





PROJECT REFERENCE NO.	SHEET NO.
BR-0042	4
PROFILE ALONG RETAINING WALL 1	



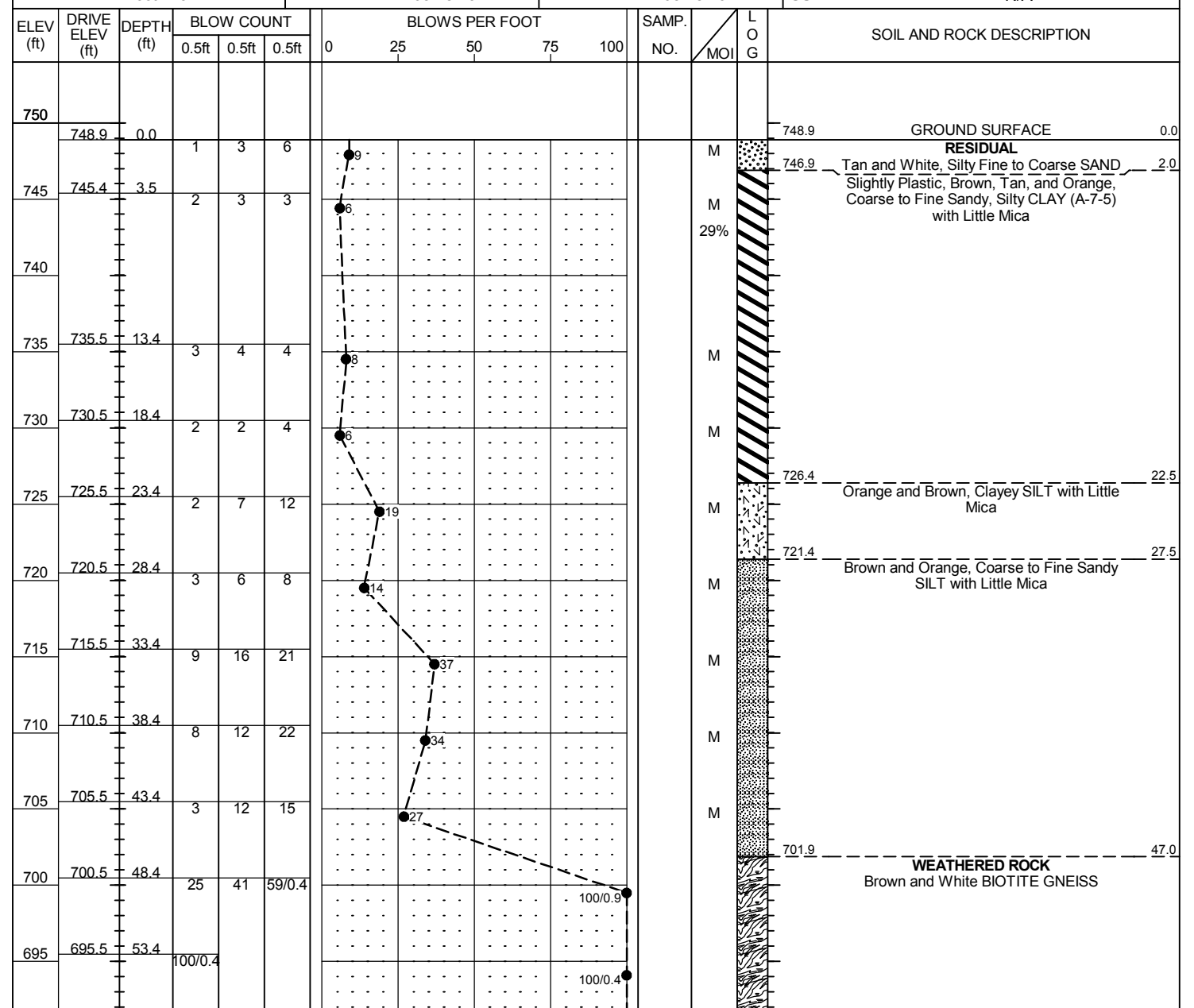
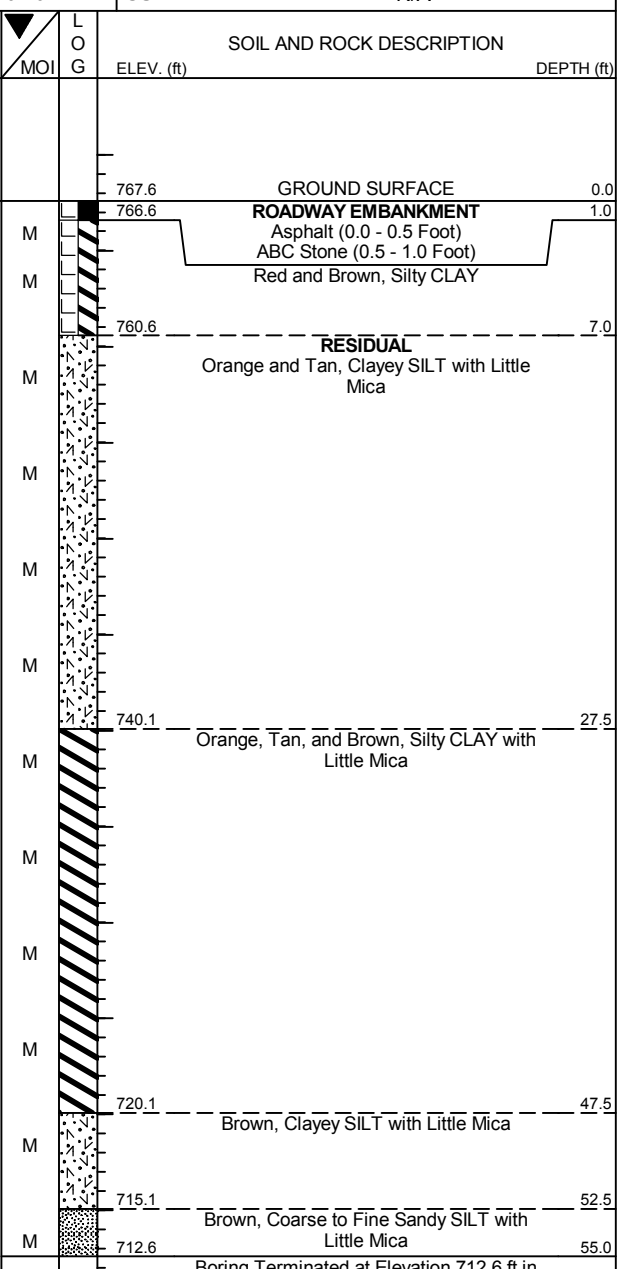
GEOTECHNICAL BORING REPORT

BORE LOG

WBS 67042.1.1		TIP BR-0042		COUNTY ROCKINGHAM		GEOLOGIST C. Driscoll										
SITE DESCRIPTION Retaining Walls for Bridge on SR 2600 (Mizpah Church Rd.) over US 29 Between SR 2683 and SR 2598							GROUND WTR (ft)									
BORING NO. RW1-2		STATION 12+97		OFFSET 118 ft RT		ALIGNMENT -Y-										
COLLAR ELEV. 767.6 ft		TOTAL DEPTH 55.0 ft		NORTHING 924,226		EASTING 1,810,943										
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/21/2019			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER R. Toothman		START DATE 05/29/19		COMP. DATE 05/29/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
770																
	766.6	1.0	2	2	9											
765	764.1	3.5	5	3	4											
	759.1	8.5	2	4	4											
760	754.1	13.5	2	3	4											
	749.1	18.5	2	3	5											
755	744.1	23.5	3	5	6											
750	739.1	28.5	2	3	3											
	734.1	33.5	3	3	4											
745	729.1	38.5	3	3	4											
	724.1	43.5	2	4	5											
740	719.1	48.5	2	5	8											
	714.1	53.5	7	6	12											
735																
730																
725																
720																
715																

WBS 67042.1.1		TIP BR-0042		COUNTY ROCKINGHAM		GEOLOGIST C. Driscoll										
SITE DESCRIPTION Retaining Walls for Bridge on SR 2600 (Mizpah Church Rd.) over US 29 Between SR 2683 and SR 2598							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 12+85		OFFSET 66 ft RT		ALIGNMENT -Y-										
COLLAR ELEV. 748.9 ft		TOTAL DEPTH 58.8 ft		NORTHING 924,244		EASTING 1,810,993										
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/21/2019			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER R. Toothman		START DATE 05/28/19		COMP. DATE 05/28/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
750	748.9	0.0	1	3	6											
	745.4	3.5	2	3	3											
745																
	735.5	13.4	3	4	4											
740																
	730.5	18.4	2	2	4											
735	725.5	23.4	2	7	12											
	720.5	28.4	3	6	8											
730	715.5	33.4	9	16	21											
	710.5	38.4	8	12	22											
725	705.5	43.4	3	12	15											
	700.5	48.4	25	41	59/0.4											
720	695.5	53.4	100/0.4													
	690.5	58.4	100/0.4													
715																

NCDOT BORE DOUBLE BR0042_GEO_RWAL_GINT.GPJ_NC_DOT.GDT 8/30/19



Boring Terminated at Elevation 712.6 ft in RESIDUAL: Sandy SILT

NOTE:
-W1-, -00+14, 4 ft LT

Boring Terminated at Elevation 690.1 ft in WEATHERED ROCK: BIOTITE GNEISS

NOTE:
-W1-, 00+43, 6 ft RT

Other Samples:
ST-1 (5.0 - 7.0)

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 67042.1.1		TIP BR-0042		COUNTY ROCKINGHAM		GEOLOGIST C. Driscoll	
SITE DESCRIPTION Retaining Walls for Bridge on SR 2600 (Mizpah Church Rd.) over US 29 Between SR 2683 and SR 2598							GROUND WTR (ft)
BORING NO. EB1-A		STATION 12+55		OFFSET 61 ft RT		ALIGNMENT -Y-	
COLLAR ELEV. 749.8 ft		TOTAL DEPTH 63.6 ft		NORTHING 924,274		EASTING 1,810,995	
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/21/2019			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic	
DRILLER R. Toothman		START DATE 05/28/19		COMP. DATE 05/28/19		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
750	749.8	0.0	1	3	3									749.8	GROUND SURFACE	0.0
	746.5	3.3	2	2	3										RESIDUAL Brown, Silty CLAY with Little Mica	
745																
	741.5	8.3	2	3	5											
740																
	736.5	13.3	3	2	3											
735																
	731.5	18.3	3	4	5											
730																
	726.5	23.3	3	6	6											
725																
	721.5	28.3	3	5	8											
720																
	716.5	33.3	6	6	8											
715																
	711.5	38.3	4	9	11											
710																
	706.5	43.3	11	17	19											
705																
	701.5	48.3	15	22	28											
700																
	696.5	53.3	16	65	35/0.2											
695																
	691.5	58.3	57	43/0.3												
690																
	686.5	63.3	100/0.3													

WBS 67042.1.1		TIP BR-0042		COUNTY ROCKINGHAM		GEOLOGIST C. Driscoll	
SITE DESCRIPTION Retaining Walls for Bridge on SR 2600 (Mizpah Church Rd.) over US 29 Between SR 2683 and SR 2598							GROUND WTR (ft)
BORING NO. RW1-1		STATION 12+04		OFFSET 66 ft RT		ALIGNMENT -Y-	
COLLAR ELEV. 749.6 ft		TOTAL DEPTH 45.2 ft		NORTHING 924,324		EASTING 1,810,984	
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/21/2019			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic	
DRILLER R. Toothman		START DATE 06/03/19		COMP. DATE 06/03/19		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
750	749.6	0.0	2	4	3									749.6	GROUND SURFACE	0.0
	745.9	3.7	2	2	2										RESIDUAL Brown and Orange, Silty CLAY with Little Mica	
745																
	740.9	8.7	2	2	3											
740																
	735.9	13.7	3	3	5											
735																
	730.9	18.7	2	2	3											
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	725.9	23.7	2	3	3											
725																
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720																
	715.9	33.7	2	3	6											
715																
	710.9	38.7	2	5	7											
710																
	705.9	43.7	3	6	12											
705																

737.1 --- Tan, Clayey SILT with Little Mica --- 12.5

717.3 --- Tan, White, and Brown, Coarse to Fine Sandy SILT with Little Mica --- 32.5

707.1 --- White and Black, Coarse to Fine Sandy SILT with Little Mica --- 42.5

704.4 --- Boring Terminated at Elevation 704.4 ft in RESIDUAL: Sandy SILT --- 45.2

NOTE:
-W1-, 01+23, 6 ft RT

NCDOT BORE DOUBLE BR0042_GEO_RWAL_GINT.GPJ_NC_DOT.GDT 8/30/19

LABORATORY SUMMARY SHEET FOR SOIL SAMPLES

PROJECT NO.: 67042.1.1 (BR-0042)

COUNTY: ROCKINGHAM

RETAINING WALLS FOR BRIDGE ON SR 2600 (MIZPAH CHURCH RD.) OVER US 29 BETWEEN SR 2683 AND SR 2598

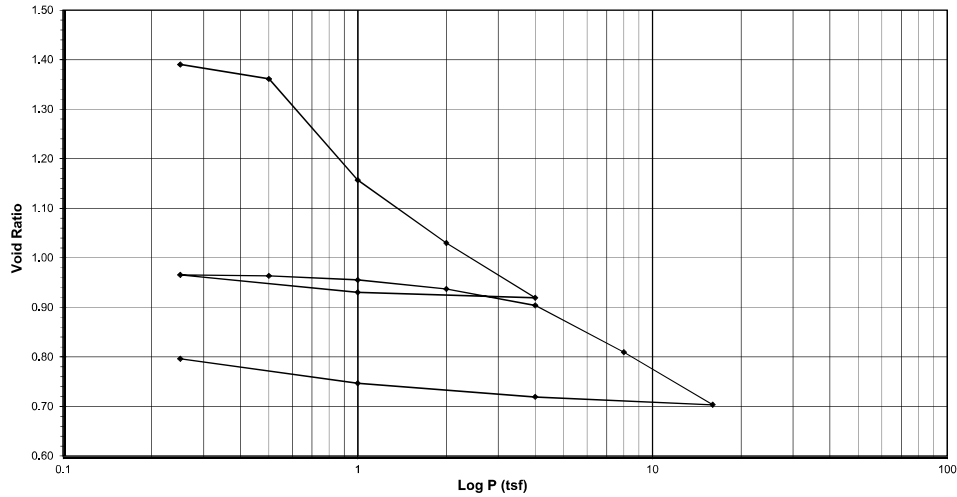
								Atterberg Limits			Gradation Results							
Sample No.	Boring Number	Alignment	Station	Offset	Sample Depth (ft.)	Natural Moisture Content (%)	AASHTO Class.	L.L.	P.L.	P.I.	Retained #4 Sieve	Pass #10 Sieve	Pass #40 Sieve	Pass #200 Sieve	Coarse Sand (%)	Fine Sand (%)	Silt (%)	Clay (%)
ST-1	EB1-B	-L-	18+77	7' RT	5.0 - 7.0	28.6	A-7-5	48	36	12	0.2	99.2	85.5	52.0	22.3	34.1	31.7	11.9



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Reference BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By 129-0411 Date 6/18/2019 Approved By MPS Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Reference BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R470
 1 Division = 0.0001 (in.)

Sample Properties	Initial	Final
<i>Water Content</i>		
Tare Number	TB-10	TB-04
Wt. Tare & WS (g)	365.64	250.68
Wt. Tare & DS (g)	314.24	226.31
Wt. Water (g)	51.40	24.37
Wt. Tare (g)	134.65	135.15
Wt. DS (g)	179.59	91.16
Water Content (%)	28.62	26.73
<i>Sample Parameters</i>		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.0000	0.7383
Sample Volume (cc)	80.44	59.39
Wt. Wet Sample + Ring (g)	332.88	331.15
Wt. of Ring (g)	214.66	214.66
Wt. of Wet Sample (g)	118.22	116.49
Wet Density (pcf)	91.71	122.39
Wet Density (g/cc)	1.47	1.96
Water Content (%)	28.62	26.73
Wt. of Dry Sample (g)	91.91	91.91
Dry Density (pcf)	71.30	96.57
Dry Density (g/cc)	1.14	1.55
Void Ratio	1.4330	0.7963
Saturation (%)	55.53	93.33
Specific Gravity	2.78	Measured

Test Data Summary							
Applied Pressure (tsf)	Final Dial Reading (div)	Machine Deflection (div)	Corrected Reading (div)	Height of Sample (mm)	Volume (cc)	Dry Density (g/cc)	Void Ratio
Seating	0	0	0	25,400	80,440	1.14264	1.43297
0.25	197.9	22.8	175.1	24,955	79,031	1.16300	1.39037
0.5	338.7	44.2	294.5	24,652	78,071	1.17731	1.36131
1	1195.1	60.5	1134.6	22,518	71,313	1.28888	1.15692
2	1750.5	93.6	1656.9	21,192	67,112	1.36956	1.02985
4	2241.6	130.5	2111.2	20,038	63,458	1.44842	0.91933
1	2148.5	83.0	2065.5	20,154	63,825	1.44010	0.93043
0.25	1974.2	52.7	1921.5	20,519	64,964	1.41441	0.96548
0.5	1987.1	58.3	1928.8	20,501	64,924	1.41570	0.96369
1	2037.9	74.9	1963.0	20,414	64,649	1.42172	0.95537
2	2137.5	100.0	2037.5	20,225	64,050	1.43502	0.93726
4	2307.4	133.4	2174.0	19,878	62,952	1.46006	0.90404
8	2731.7	169.9	2561.8	18,893	59,832	1.53618	0.80968
16	3224.8	226.1	2998.7	17,783	56,318	1.63204	0.70339
4	3094.6	161.7	2933.0	17,950	56,847	1.61686	0.71938
1	2932.1	111.7	2820.3	18,236	57,753	1.59149	0.74679
0.25	2689.8	73.0	2616.8	18,753	59,390	1.54762	0.79631

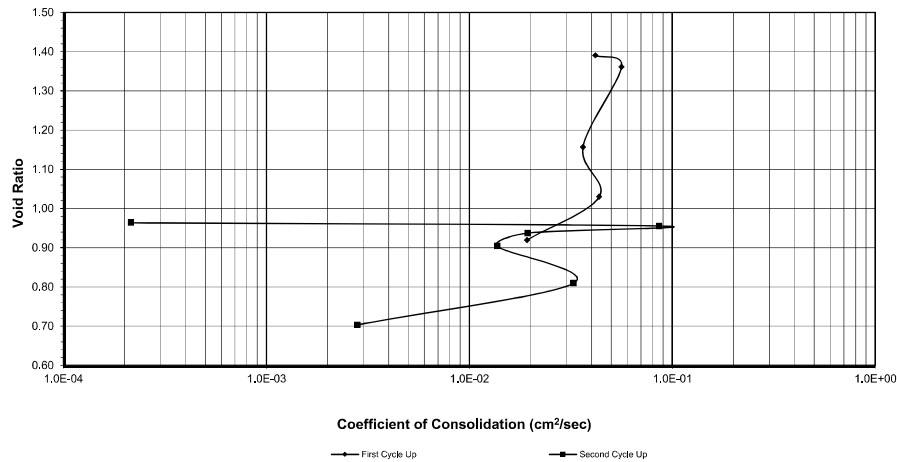
Tested By 129-0411 Date 6/18/2019 Input Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Reference BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By 129-0411 Date 6/18/2019 Input Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Reference BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R470
 1 Division = 0.0001 (in.)

Sample Properties	Initial	Final
Water Content		
Tare Number	TB-10	TB-04
Wt. Tare & WS (g)	365.64	250.68
Wt. Tare & DS (g)	314.24	226.31
Wt. Water (g)	51.40	24.37
Wt. Tare (g)	134.65	135.15
Wt. DS (g)	179.59	91.16
Water Content (%)	28.62	26.73
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.000	0.738
Sample Volume (cc)	80.44	59.39
Wt. Wet Sample + Ring (g)	332.88	331.15
Wt. of Ring (g)	214.66	214.66
Wt. of Wet Sample (g)	118.22	116.49
Wet Density (pcf)	91.71	122.39
Wet Density (g/cc)	1.47	1.96
Water Content (%)	28.62	26.73
Wt. of Dry Sample (g)	91.91	91.91
Dry Density (pcf)	71.30	96.57
Dry Density (g/cc)	1.14	1.55
Void Ratio	1.4330	0.7963
Saturation (%)	55.53	93.33
Specific Gravity	2.78	

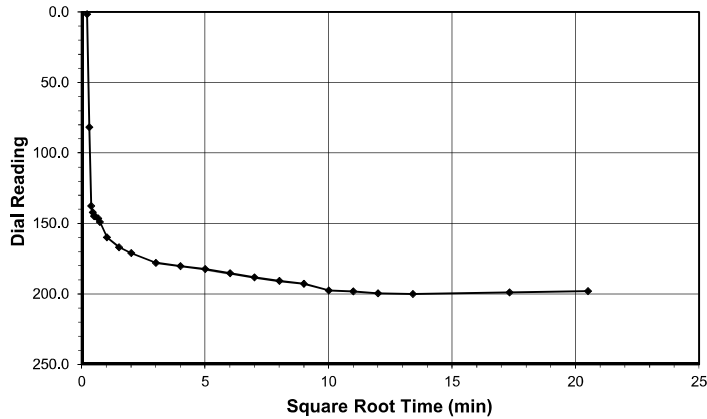
Load Increment (tsf)	Dial Reading @ t ₅₀ (div)	Machine Deflection (div)	C _v Test Data Summary		Time t ₅₀ (min.)	C _v (cm ² /sec)
			Corrected Dial Reading @ t ₅₀ (div)	Sample Height @ t ₅₀ (cm)		
0 - 0.25	100.0	22.8	77.2	2,520	0.13	0.04171
0.25 - 0.5	273.4	44.2	229.2	2,482	0.09	0.05617
0.5 - 1.0	806.5	60.5	746.0	2,351	0.13	0.03628
1.0 - 2.0	1488.8	93.6	1395.2	2,186	0.09	0.04357
2.0 - 4.0	2048.5	130.5	1918.0	2,053	0.18	0.01922
4.0 - 1.0	NA	83.0	NA	NA	NA	NA
1.0 - 0.25	NA	52.7	NA	NA	NA	NA
0.25 - 0.5	1986.8	58.3	1928.5	2,050	16.07	0.00021
0.5 - 1.0	2015.6	74.9	1940.7	2,047	0.04	0.08599
1.0 - 2.0	2109.1	100.0	2009.1	2,030	0.18	0.01932
2.0 - 4.0	2250.9	133.4	2117.5	2,002	0.24	0.01371
4.0 - 8.0	2523.3	169.9	2353.4	1,942	0.10	0.03259
8.0 - 16.0	2984.4	226.1	2758.3	1,839	0.99	0.00281
16.0 - 4.0	NA	161.7	NA	NA	NA	NA
4.0 - 1.0	NA	111.7	NA	NA	NA	NA
1.0 - 0.25	NA	73.0	NA	NA	NA	NA



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

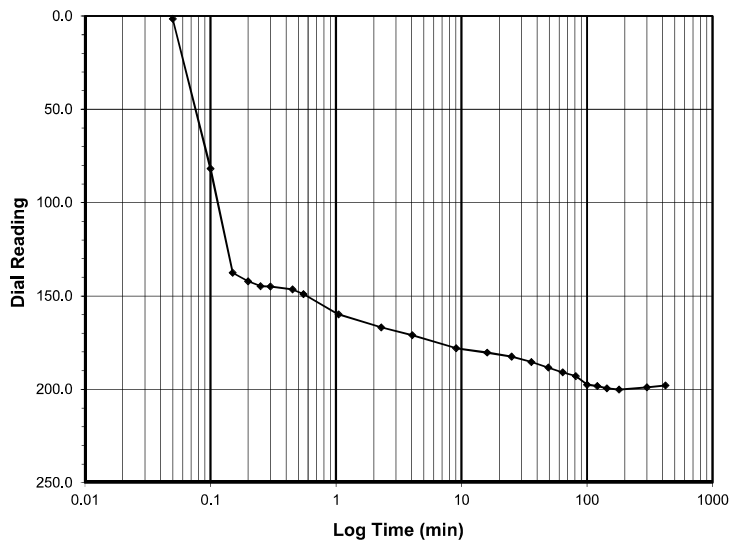
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.0-0.25
 Final Reading (div) 197.9
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/18/2019
 Start Time 13:32:51

Elapsed Time (min)	Dial Reading (div)
Initial	0.0
0.05	1.5
0.10	81.7
0.15	137.6
0.20	142.1
0.25	144.7
0.30	145.0
0.45	146.5
0.55	148.9
1.05	159.9
2.30	166.8
4.05	171.1
9.05	178.0
16.05	180.3
25.07	182.4
36.07	185.4
49.07	188.3
64.07	190.9
81.07	192.9
100.07	197.5
121.07	198.1
144.07	199.5
180.07	200.1
300.07	198.9
420.45	197.9



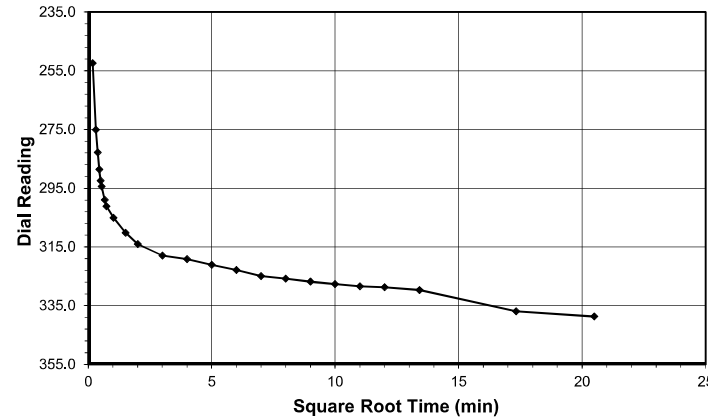
Tested By 129-0411 Date 6/18/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

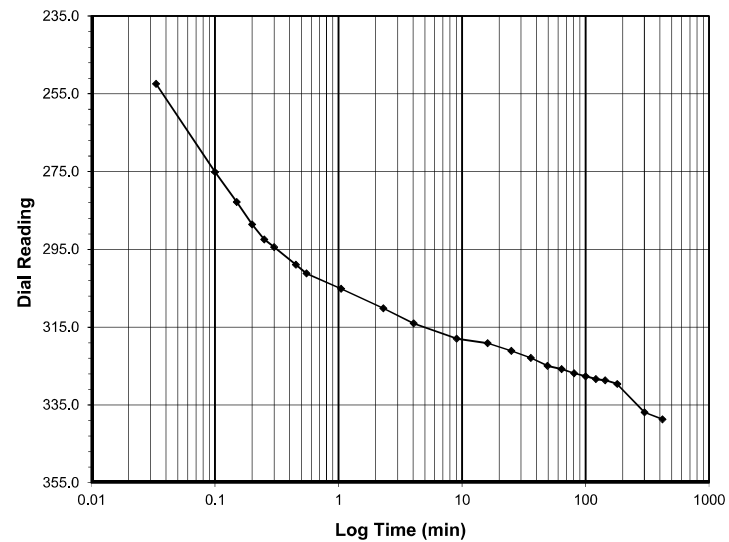
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.25-0.5
 Final Reading (div) 338.7
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/18/2019
 Start Time 20:33:18

Elapsed Time (min)	Dial Reading (div)
Initial	197.9
0.03	252.4
0.10	275.1
0.15	282.8
0.20	288.6
0.25	292.4
0.30	294.4
0.45	298.9
0.55	301.2
1.05	305.1
2.30	310.1
4.05	314.0
9.05	317.9
16.05	319.1
25.05	321.1
36.05	322.9
49.05	324.9
64.05	325.8
81.05	326.8
100.05	327.6
121.05	328.4
144.05	328.7
180.05	329.6
300.07	336.9
420.12	338.7



Tested By 129-0411 Date 6/18/2019 Checked By GEM Date 6/25/2019

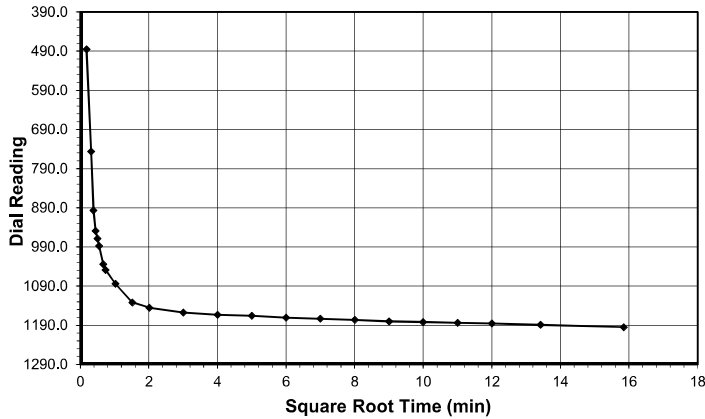


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client: Kleinfelder
 Client Project: BR-0042 Roadway
 Project No.: R-2019-178-001
 Lab ID: R-2019-178-001-001

Boring No.: EB1-B
 Depth (ft): 5.0-7.0
 Sample No.: ST-1
 Visual Description: TAN SILT

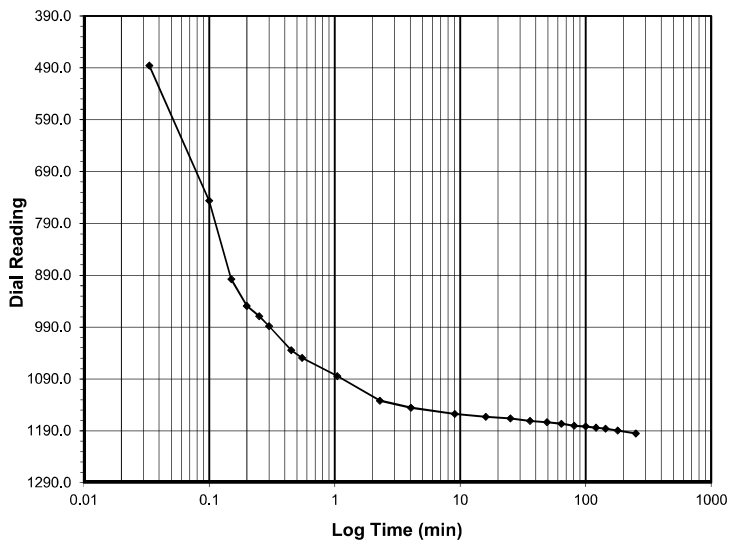
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.5-1.0
 Final Reading (div) 1195.1
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/19/2019
 Start Time 3:33:26

Elapsed Time (min)	Dial Reading (div)
Initial	338.7
0.03	485.5
0.10	746.5
0.15	897.3
0.20	949.0
0.25	968.9
0.30	987.9
0.45	1034.6
0.55	1049.2
1.05	1084.3
2.30	1131.7
4.05	1145.5
9.05	1157.6
16.05	1163.2
25.05	1166.2
36.05	1170.6
49.05	1173.3
64.05	1176.1
81.05	1180.2
100.05	1181.9
121.05	1183.8
144.05	1185.9
180.05	1189.3
251.08	1195.1



Tested By 129-0411 Date 6/19/2019 Checked By GEM Date 6/25/2019

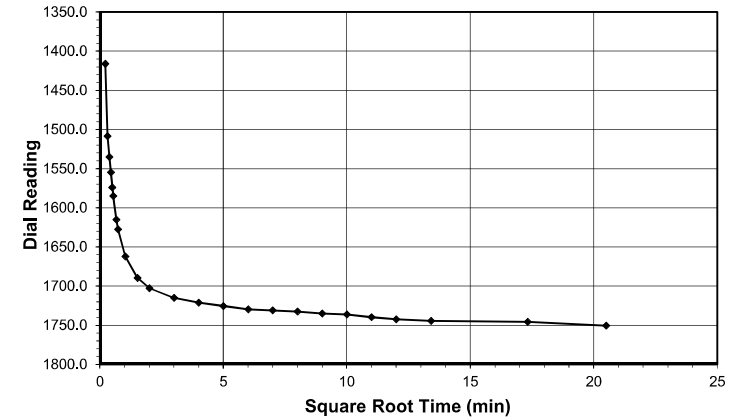


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client: Kleinfelder
 Client Project: BR-0042 Roadway
 Project No.: R-2019-178-001
 Lab ID: R-2019-178-001-001

Boring No.: EB1-B
 Depth (ft): 5.0-7.0
 Sample No.: ST-1
 Visual Description: TAN SILT

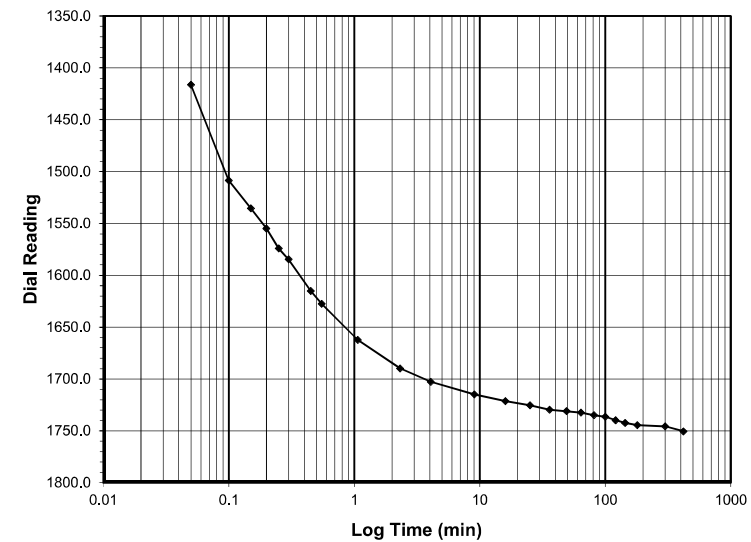
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-2.0
 Final Reading (div) 1750.5
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/19/2019
 Start Time 7:44:32

Elapsed Time (min)	Dial Reading (div)
Initial	1195.1
0.05	1416.2
0.10	1508.5
0.15	1535.2
0.20	1554.8
0.25	1574.1
0.30	1584.7
0.45	1615.1
0.55	1627.6
1.07	1662.3
2.32	1689.7
4.07	1702.8
9.07	1715.0
16.07	1721.3
25.07	1725.4
36.07	1729.6
49.07	1731.0
64.07	1732.4
81.07	1734.9
100.07	1736.2
121.07	1739.7
144.07	1742.5
180.07	1744.6
300.07	1745.6
420.37	1750.5



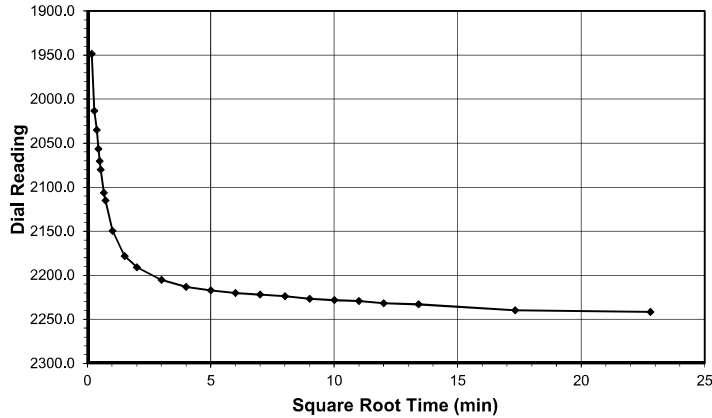
Tested By 129-0411 Date 6/19/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

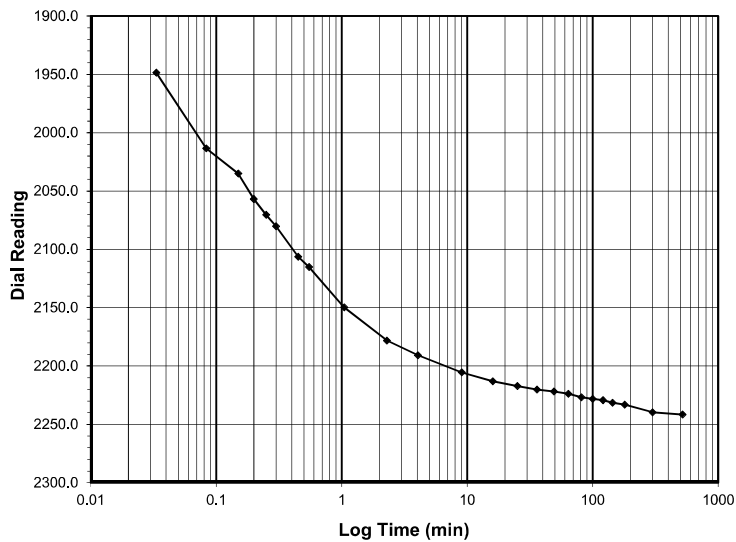
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 2.0-4.0
 Final Reading (div) 2241.6
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/19/2019
 Start Time 14:44:54

Elapsed Time (min)	Dial Reading (div)
Initial	1750.5
0.03	1948.5
0.08	2013.4
0.15	2035.0
0.20	2056.8
0.25	2070.4
0.30	2080.1
0.45	2106.4
0.55	2115.2
1.05	2149.7
2.30	2178.2
4.05	2190.8
9.05	2205.3
16.05	2213.2
25.05	2217.1
36.05	2220.1
49.07	2221.8
64.07	2223.8
81.07	2226.8
100.07	2228.2
121.07	2229.3
144.07	2231.6
180.07	2233.0
300.07	2239.7
520.07	2241.6



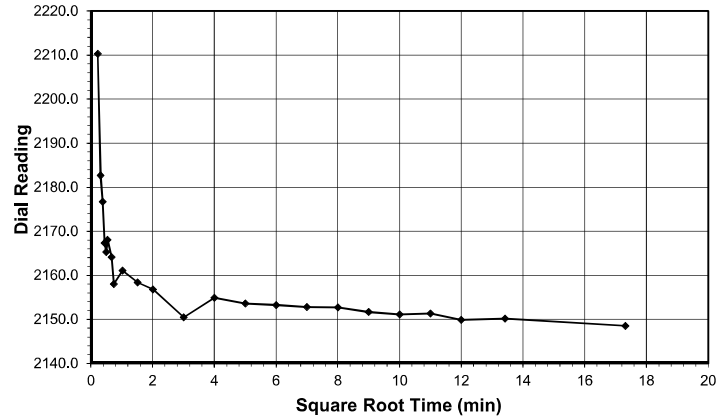
Tested By 129-0411 Date 6/19/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

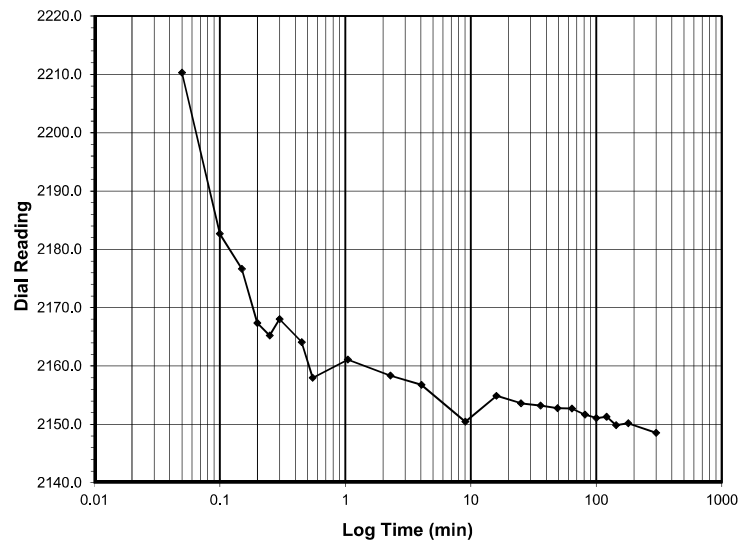
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 4.0-1.0
 Final Reading (div) 2148.5
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/20/2019
 Start Time 2:45:06

Elapsed Time (min)	Dial Reading (div)
Initial	2241.6
0.05	2210.3
0.10	2182.7
0.15	2176.7
0.20	2167.4
0.25	2165.2
0.30	2168.0
0.45	2164.1
0.55	2158.0
1.05	2161.1
2.30	2158.4
4.05	2156.8
9.07	2150.4
16.07	2154.9
25.07	2153.6
36.07	2153.2
49.07	2152.8
64.07	2152.7
81.07	2151.7
100.07	2151.1
121.07	2151.3
144.07	2149.9
180.08	2150.2
300.08	2148.5



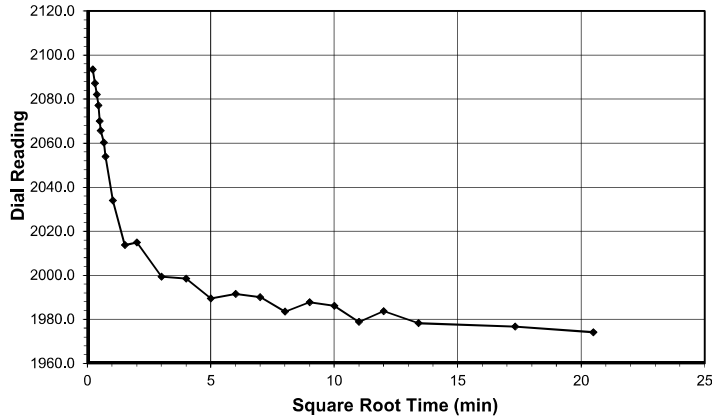
Tested By 129-0411 Date 6/20/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

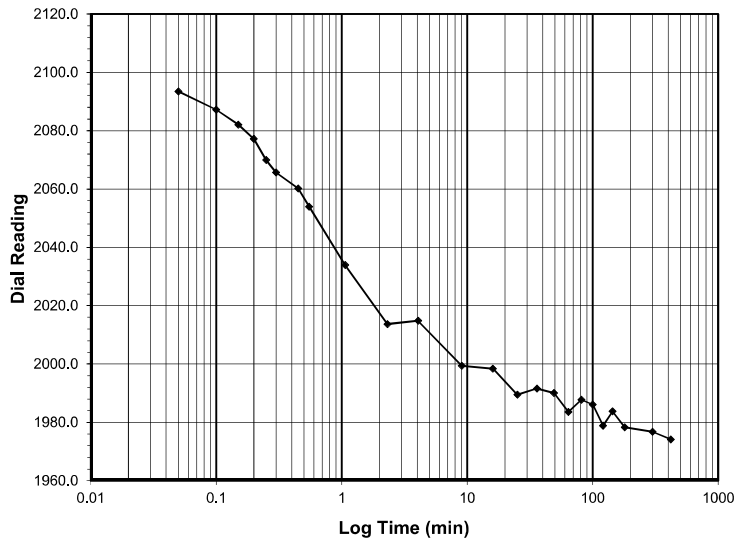
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-0.25
 Final Reading (div) 1974.2
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/20/2019
 Start Time 9:45:33

Elapsed Time (min)	Dial Reading (div)
Initial	2148.5
0.05	2093.5
0.10	2087.2
0.15	2082.1
0.20	2077.2
0.25	2070.0
0.30	2065.7
0.45	2060.2
0.55	2053.9
1.07	2033.9
2.32	2013.7
4.07	2014.9
9.07	1999.4
16.07	1998.5
25.07	1989.5
36.07	1991.6
49.07	1990.1
64.07	1983.5
81.07	1987.8
100.07	1986.1
121.07	1978.9
144.07	1983.7
180.07	1978.3
300.07	1976.8
420.00	1974.2



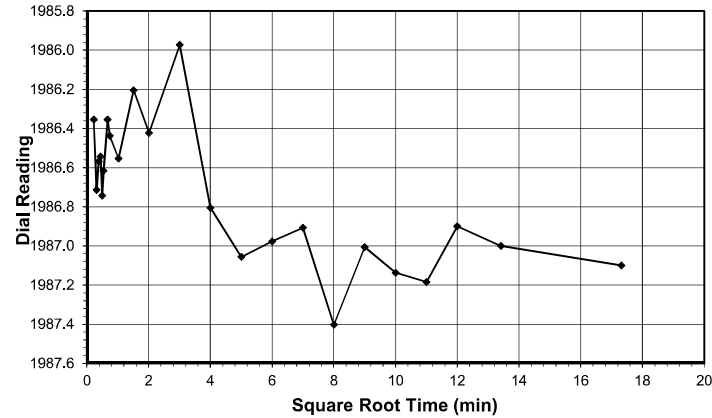
Tested By 129-0411 Date 6/20/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

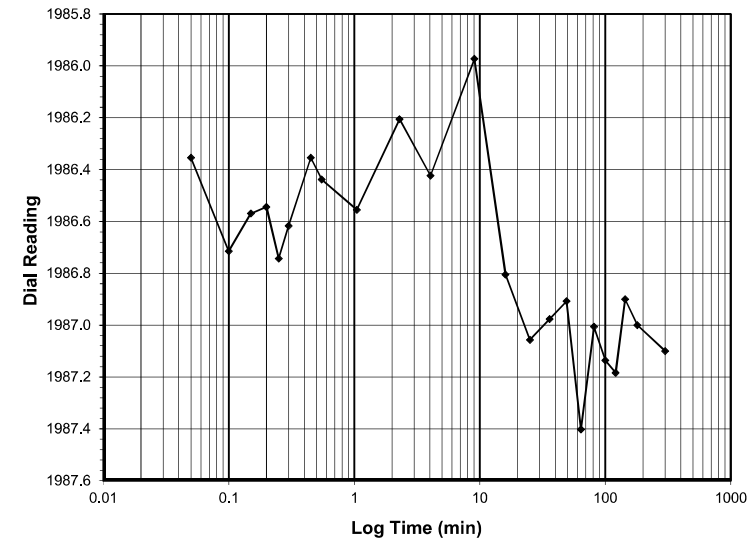
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.25-0.5
 Final Reading (div) 1987.1
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/20/2019
 Start Time 16:45:33

Elapsed Time (min)	Dial Reading (div)
Initial	1974.2
0.05	1986.4
0.10	1986.7
0.15	1986.6
0.20	1986.5
0.25	1986.7
0.30	1986.6
0.45	1986.4
0.55	1986.4
1.05	1986.6
2.30	1986.2
4.05	1986.4
9.05	1986.0
16.07	1986.8
25.07	1987.1
36.07	1987.0
49.07	1986.9
64.07	1987.4
81.07	1987.0
100.07	1987.1
121.07	1987.2
144.07	1986.9
180.07	1987.0
300.07	1987.1



Tested By 129-0411 Date 6/20/2019 Checked By GEM Date 6/25/2019

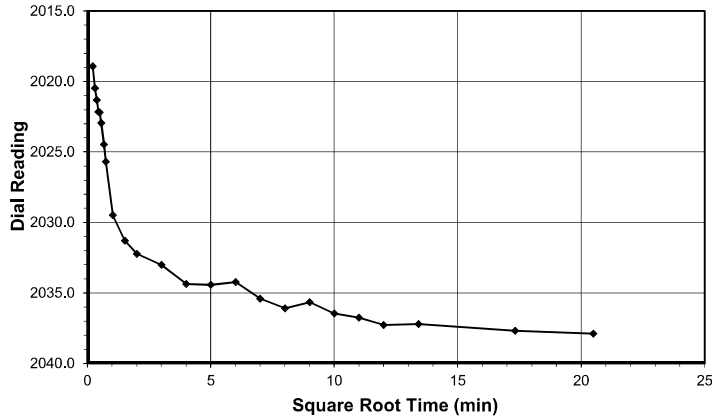


ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

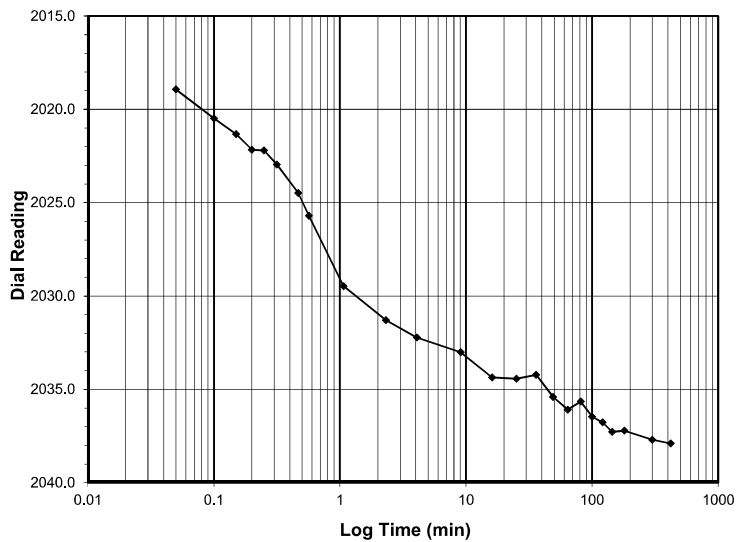
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.5-1.0
 Final Reading (div) 2037.9
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/20/2019
 Start Time 23:46:03

Elapsed Time (min)	Dial Reading (div)
Initial	1987.1
0.05	2018.9
0.10	2020.5
0.15	2021.3
0.20	2022.2
0.25	2022.2
0.32	2023.0
0.47	2024.5
0.57	2025.7
1.07	2029.5
2.32	2031.3
4.07	2032.2
9.07	2033.0
16.07	2034.4
25.07	2034.4
36.07	2034.2
49.07	2035.4
64.07	2036.1
81.07	2035.6
100.07	2036.5
121.07	2036.8
144.07	2037.3
180.07	2037.2
300.07	2037.7
420.07	2037.9



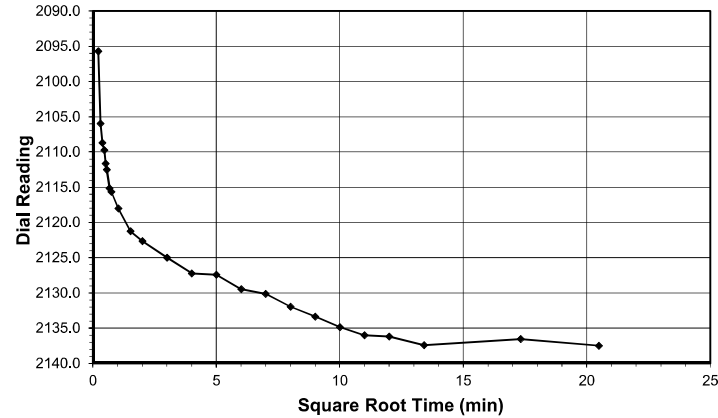
Tested By 129-0411 Date 6/20/2019 Checked By GEM Date 6/25/2019

ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

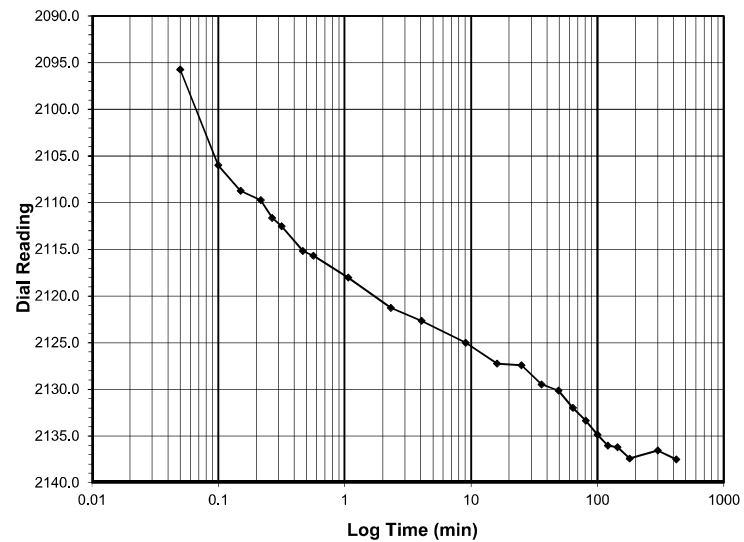
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-2.0
 Final Reading (div) 2137.5
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/21/2019
 Start Time 6:46:07

Elapsed Time (min)	Dial Reading (div)
Initial	2037.9
0.05	2095.7
0.10	2106.0
0.15	2108.7
0.22	2109.7
0.27	2111.6
0.32	2112.5
0.47	2115.2
0.57	2115.7
1.07	2118.0
2.32	2121.3
4.07	2122.7
9.07	2125.0
16.07	2127.2
25.07	2127.4
36.07	2129.5
49.07	2130.1
64.07	2132.0
81.07	2133.4
100.07	2134.9
121.08	2136.0
144.08	2136.2
180.08	2137.4
300.08	2136.5
420.08	2137.5



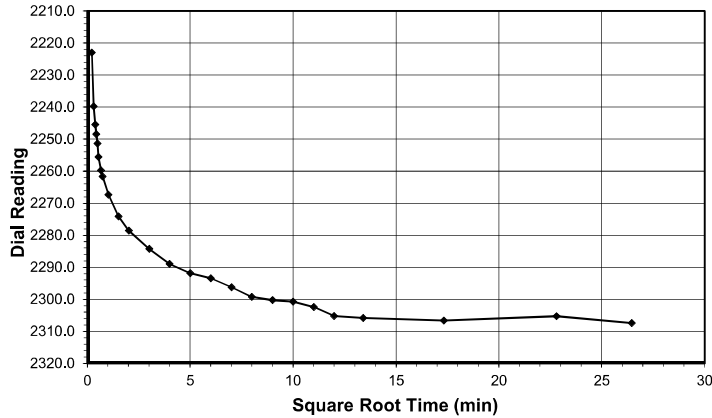
Tested By 129-0411 Date 6/21/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client: Kleinfelder
 Client Project: BR-0042 Roadway
 Project No.: R-2019-178-001
 Lab ID: R-2019-178-001-001
 Boring No.: EB1-B
 Depth (ft): 5.0-7.0
 Sample No.: ST-1
 Visual Description: TAN SILT

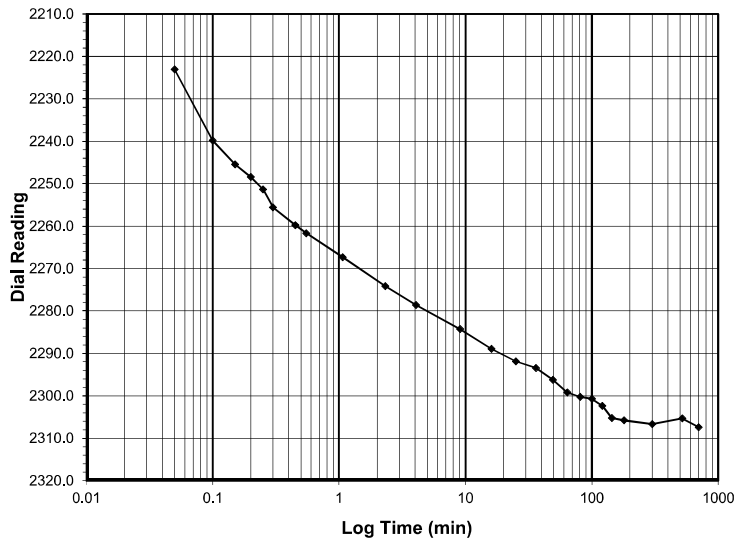
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) **2.0-4.0**
 Final Reading (div) **2307.4**
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 6/21/2019
 Start Time 13:46:12

Elapsed Time (min)	Dial Reading (div)
Initial	2137.5
0.05	2223.1
0.10	2239.8
0.15	2245.4
0.20	2248.4
0.25	2251.3
0.30	2255.6
0.45	2259.7
0.55	2261.6
1.07	2267.3
2.32	2274.1
4.07	2278.6
9.07	2284.3
16.07	2288.9
25.07	2291.9
36.07	2293.4
49.07	2296.2
64.07	2299.2
81.07	2300.3
100.07	2300.7
121.07	2302.4
144.07	2305.2
180.07	2305.8
300.07	2306.7
520.07	2305.3
700.07	2307.4



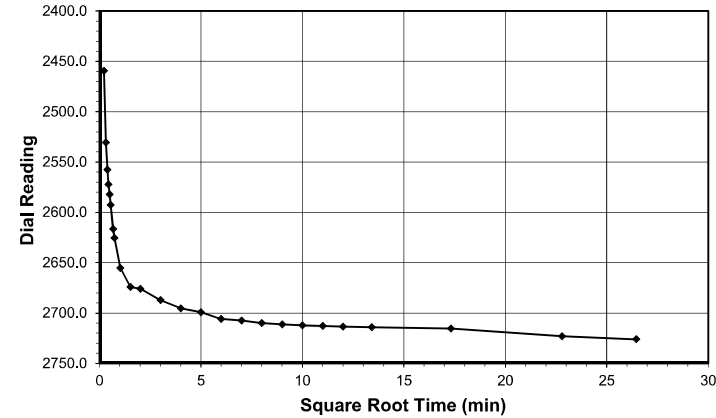
Tested By 129-0411 Date 6/21/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client: Kleinfelder
 Client Project: BR-0042 Roadway
 Project No.: R-2019-178-001
 Lab ID: R-2019-178-001-001
 Boring No.: EB1-B
 Depth (ft): 5.0-7.0
 Sample No.: ST-1
 Visual Description: TAN SILT

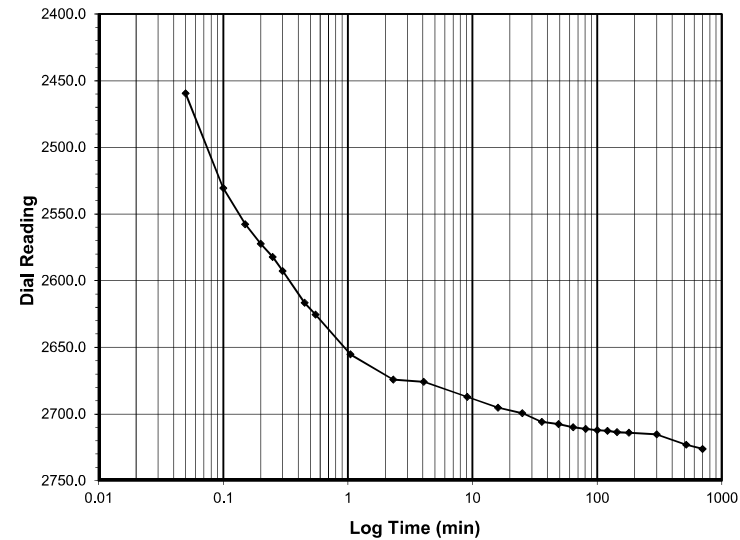
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) **4.0-8.0**
 Final Reading (div) **2731.7**
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 6/22/2019
 Start Time 1:46:23

Elapsed Time (min)	Dial Reading (div)
Initial	2307.4
0.05	2459.4
0.10	2530.4
0.15	2557.6
0.20	2572.2
0.25	2582.1
0.30	2592.7
0.45	2616.6
0.55	2625.4
1.05	2655.2
2.32	2674.2
4.07	2675.8
9.07	2687.2
16.07	2695.2
25.07	2699.3
36.07	2705.9
49.07	2707.5
64.07	2709.9
81.07	2711.1
100.07	2712.2
121.07	2712.7
144.07	2713.7
180.07	2714.0
300.07	2715.3
520.07	2723.0
700.07	2731.7



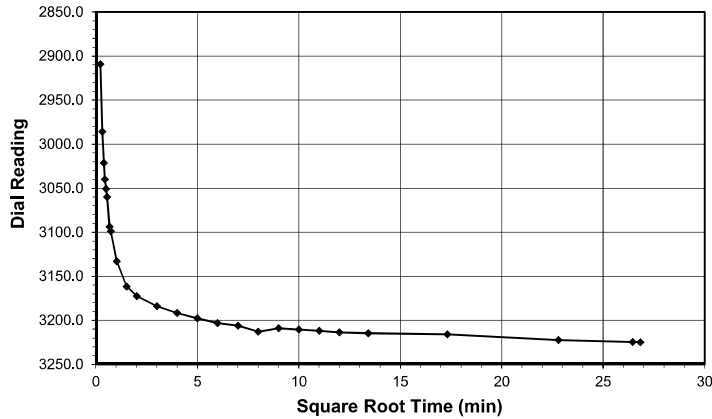
Tested By 129-0411 Date 6/22/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

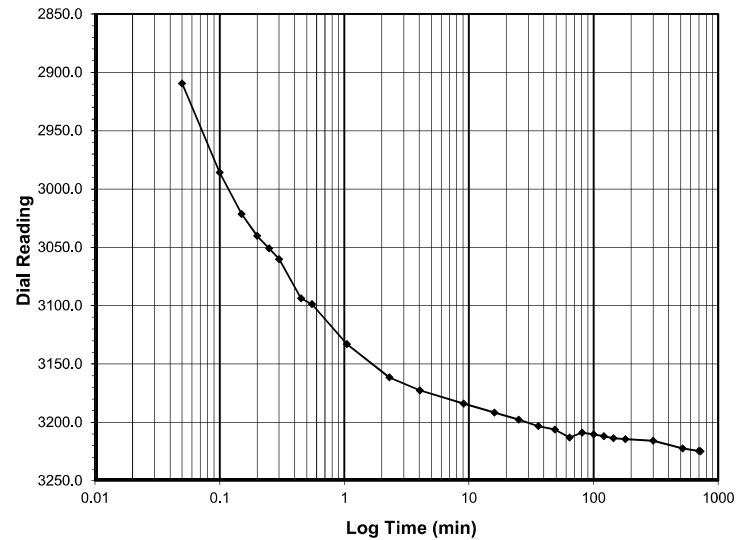
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 8.0-16.0
 Final Reading (div) 3224.8
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/22/2019
 Start Time 13:46:32

Elapsed Time (min)	Dial Reading (div)
Initial	2731.7
0.05	2909.4
0.10	2985.9
0.15	3021.3
0.20	3040.1
0.25	3050.8
0.30	3060.0
0.45	3093.7
0.55	3098.7
1.05	3132.9
2.30	3161.5
4.05	3172.5
9.05	3184.1
16.05	3191.7
25.05	3197.6
36.07	3203.2
49.07	3206.3
64.07	3212.9
81.07	3208.8
100.07	3210.3
121.07	3211.9
144.07	3213.6
180.07	3214.5
300.07	3215.8
520.07	3222.3
700.07	3224.5
720.20	3224.8



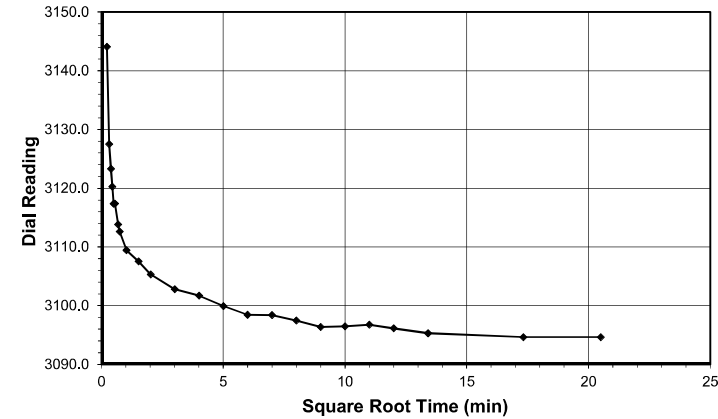
Tested By 129-0411 Date 6/22/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

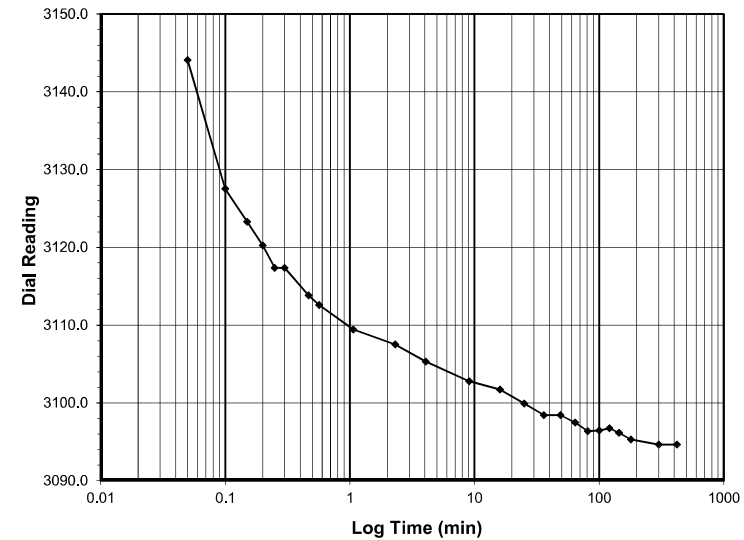
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 16.0-4.0
 Final Reading (div) 3094.6
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/23/2019
 Start Time 1:46:44

Elapsed Time (min)	Dial Reading (div)
Initial	3224.8
0.05	3144.1
0.10	3127.5
0.15	3123.3
0.20	3120.3
0.25	3117.4
0.30	3117.4
0.47	3113.8
0.57	3112.6
1.07	3109.4
2.32	3107.5
4.07	3105.3
9.07	3102.8
16.07	3101.7
25.07	3099.9
36.07	3098.4
49.07	3098.4
64.08	3097.5
81.08	3096.4
100.08	3096.5
121.08	3096.7
144.08	3096.1
180.08	3095.3
300.08	3094.6
420.50	3094.6



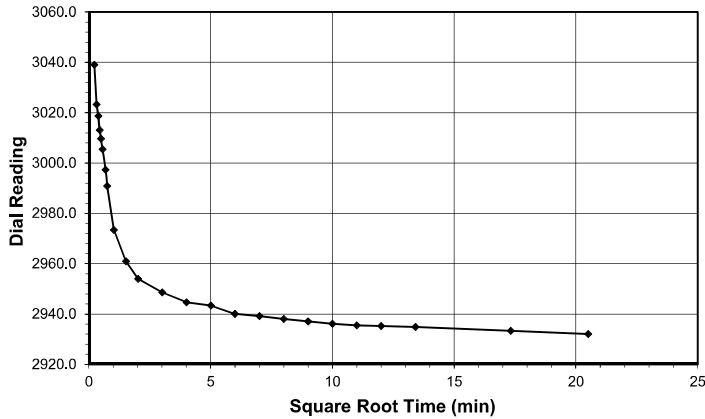
Tested By 129-0411 Date 6/23/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

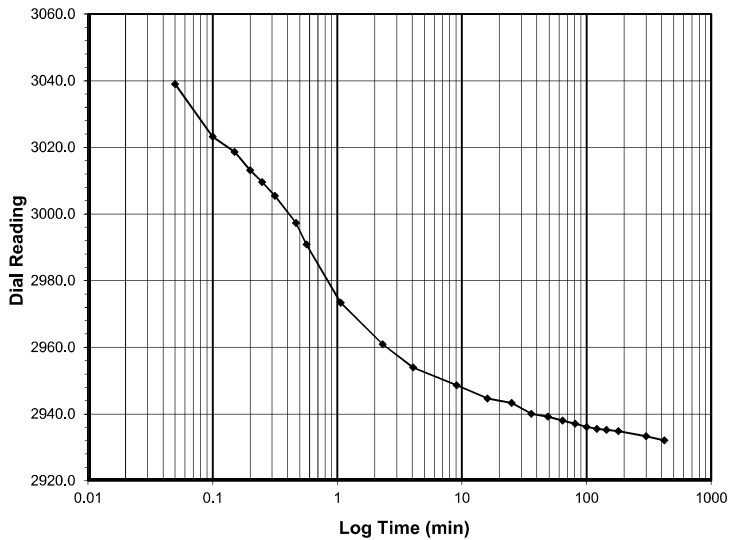
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 4.0-1.0
 Final Reading (div) 2932.1
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/23/2019
 Start Time 8:47:14

Elapsed Time (min)	Dial Reading (div)
Initial	3094.6
0.05	3039.0
0.10	3023.2
0.15	3018.6
0.20	3013.1
0.25	3009.6
0.32	3005.4
0.47	2997.3
0.57	2990.9
1.07	2973.4
2.32	2960.9
4.07	2954.0
9.07	2948.6
16.07	2944.7
25.07	2943.3
36.07	2940.1
49.07	2939.2
64.07	2938.0
81.07	2937.1
100.07	2936.1
121.07	2935.5
144.07	2935.3
180.07	2934.9
300.07	2933.3
420.48	2932.1



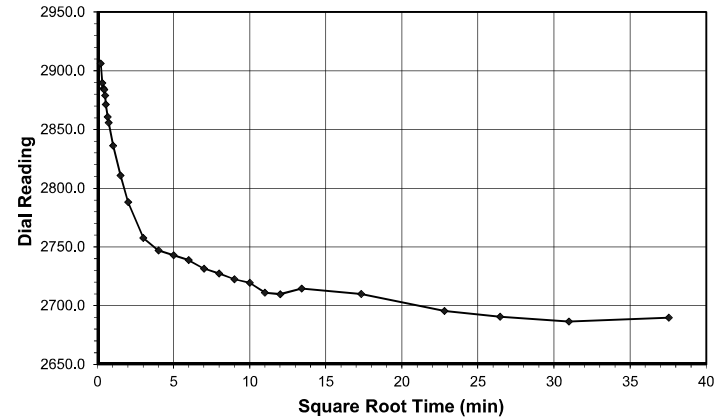
Tested By 129-0411 Date 6/23/2019 Checked By GEM Date 6/25/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client Kleinfelder Boring No. EB1-B
 Client Project BR-0042 Roadway Depth (ft) 5.0-7.0
 Project No. R-2019-178-001 Sample No. ST-1
 Lab ID R-2019-178-001-001 Visual Description TAN SILT

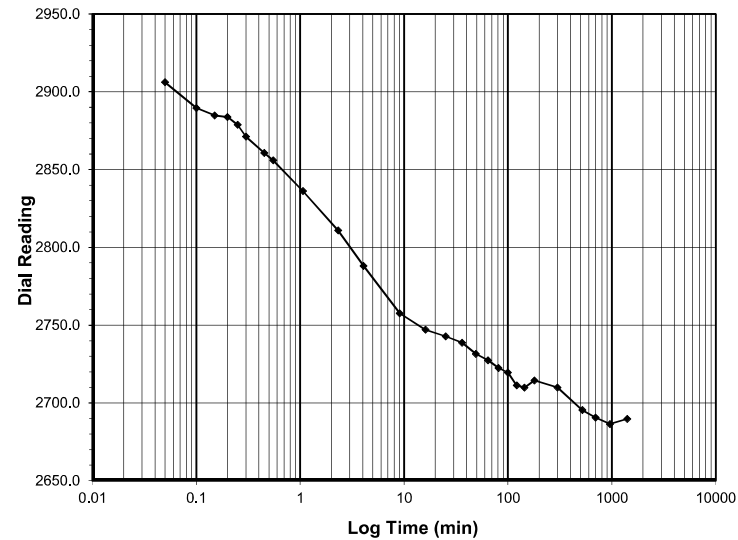
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-0.25
 Final Reading (div) 2689.8
 Consolidometer No. R470
 1 Division (in) 0.0001

Start Date 6/23/2019
 Start Time 15:47:43

Elapsed Time (min)	Dial Reading (div)
Initial	2932.1
0.05	2906.1
0.10	2889.7
0.15	2884.8
0.20	2883.8
0.25	2878.8
0.30	2871.1
0.45	2860.7
0.55	2855.9
1.07	2836.1
2.32	2810.9
4.07	2788.1
9.07	2757.6
16.07	2747.0
25.07	2742.9
36.07	2738.7
49.07	2731.5
64.07	2727.4
81.07	2722.5
100.07	2719.6
121.07	2711.2
144.07	2709.9
180.07	2714.5
300.07	2710.0
520.07	2695.5
700.07	2690.6
960.07	2686.4
1409.47	2689.8



Tested By 129-0411 Date 6/23/2019 Checked By GEM Date 6/25/2019