

SEE SHEET 3 FOR PLAN SHEET LAYOUT  
AT TIME OF INVESTIGATION

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5300	1	9

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	16+00 TO 21+00	4	5
-DRI-	10+00 TO 11+52	4	5

**ROADWAY  
SUBSURFACE INVESTIGATION**

COUNTY BEAUFORT  
PROJECT DESCRIPTION BRIDGE NO. 55 ON US 264  
OVER PANTEGO CREEK

**INVENTORY**

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	16+50 TO 18+00	6-7
-L-	19+50 TO 20+50	8
-DRI-	10+50 TO 11+00	9

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 TOT-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.

REFERENCE: B-5300

PROJECT: 46000

PERSONNEL

J.K. CRENSHAW

R.E. SMITH

C.E. CONGLETON

INVESTIGATED BY J.L. STONE

DRAWN BY C.P. TURNER

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE JANUARY 2015



DocuSigned by:

Joseph L. Stone

1/26/2015

1330580A87A24F5...

SIGNATURE

DATE

SIGNATURE

DATE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
**GEOTECHNICAL ENGINEERING UNIT**  
**SUBSURFACE INVESTIGATION**  
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION														GRADATION														ROCK DESCRIPTION														TERMS AND DEFINITIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																		
<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 208; 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, <b>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</b></p>																																																										<p><b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <b>UNIFORMLY GRADED</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p> <p><b>ANGULARITY OF GRAINS</b> THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <b>ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</b></p> <p><b>MINERALOGICAL COMPOSITION</b> MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p><b>COMPRESSIBILITY</b> SLIGHTLY COMPRESSIBLE      LL &lt; 31 MODERATELY COMPRESSIBLE    LL = 31 - 50 HIGHLY COMPRESSIBLE         LL &gt; 50</p> <p><b>PERCENTAGE OF MATERIAL</b></p> <table border="1"> <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>&gt; 10%</td> <td>&gt; 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </tbody> </table> <p><b>GROUND WATER</b></p> <p>▽ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING ▼ STATIC WATER LEVEL AFTER 24 HOURS ▽PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA ○ SPRING OR SEEP</p> <p><b>MISCELLANEOUS SYMBOLS</b></p> <table border="1"> <tr> <td></td> <td>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</td> <td></td> <td>DIP &amp; DIP DIRECTION OF ROCK STRUCTURES</td> </tr> <tr> <td></td> <td>SOIL SYMBOL</td> <td></td> <td>SPT TEST BORING</td> </tr> <tr> <td></td> <td>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</td> <td></td> <td>AUGER BORING</td> </tr> <tr> <td></td> <td>INFERRED SOIL BOUNDARY</td> <td></td> <td>CORE BORING</td> </tr> <tr> <td></td> <td>INFERRED ROCK LINE</td> <td></td> <td>MONITORING WELL</td> </tr> <tr> <td></td> <td>ALLUVIAL SOIL BOUNDARY</td> <td></td> <td>PIEZOMETER INSTALLATION</td> </tr> <tr> <td></td> <td>SLOPE INDICATOR INSTALLATION</td> <td></td> <td>CONE PENETROMETER TEST</td> </tr> <tr> <td></td> <td>SOUNDING ROD</td> <td></td> <td>TEST BORING WITH CORE</td> </tr> <tr> <td></td> <td>SPT N-VALUE</td> <td></td> <td></td> </tr> </table>																																																										ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%	HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE		ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION		DIP & DIP DIRECTION OF ROCK STRUCTURES		SOIL SYMBOL		SPT TEST BORING		ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT		AUGER BORING		INFERRED SOIL BOUNDARY		CORE BORING		INFERRED ROCK LINE		MONITORING WELL		ALLUVIAL SOIL BOUNDARY		PIEZOMETER INSTALLATION		SLOPE INDICATOR INSTALLATION		CONE PENETROMETER TEST		SOUNDING ROD		TEST BORING WITH CORE		SPT N-VALUE			<p><b>WEATHERED ROCK (WR)</b> NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</p> <p><b>CRYSTALLINE ROCK (CR)</b> FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p> <p><b>NON-CRYSTALLINE ROCK (NCR)</b> FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p> <p><b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b> COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p> <p><b>WEATHERING</b></p> <p><b>FRESH</b> - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p><b>VERY SLIGHT (V SL.)</b> - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p> <p><b>SLIGHT (SL.)</b> - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p><b>MODERATE (MOD.)</b> - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p> <p><b>MODERATELY SEVERE (MOD. SEV.)</b> - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p><b>SEVERE (SEV.)</b> - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</i></p> <p><b>VERY SEVERE (V SEV.)</b> - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</i></p> <p><b>COMPLETE</b> - ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p>																																																										<p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p><b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.</p> <p><b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p><b>ARGILLACEOUS</b> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.</p> <p><b>ARTESIAN</b> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.</p> <p><b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p><b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p><b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p><b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p><b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p><b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p><b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p><b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p><b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOADED FROM PARENT MATERIAL.</p> <p><b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p><b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p><b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p><b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p><b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p><b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p><b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p><b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p><b>ROCK QUALITY DESIGNATION (RQD)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p><b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p><b>SILL</b> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMBLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.</p> <p><b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p><b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.</p> <p><b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p><b>STRATA ROCK QUALITY DESIGNATION (SROD)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.</p> <p><b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																																																																																																						
ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION		DIP & DIP DIRECTION OF ROCK STRUCTURES																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	SOIL SYMBOL		SPT TEST BORING																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT		AUGER BORING																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	INFERRED SOIL BOUNDARY		CORE BORING																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	INFERRED ROCK LINE		MONITORING WELL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	ALLUVIAL SOIL BOUNDARY		PIEZOMETER INSTALLATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	SLOPE INDICATOR INSTALLATION		CONE PENETROMETER TEST																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	SOUNDING ROD		TEST BORING WITH CORE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	SPT N-VALUE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
<p><b>GENERAL CLASS.</b>      GRANULAR MATERIALS (≤ 35% PASSING #200)      SILT-CLAY MATERIALS (&gt; 35% PASSING #200)      ORGANIC MATERIALS</p> <table border="1"> <thead> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> <th></th> <th></th> <th></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></td> <td>A-7-5</td> <td>A-7-6</td> <td></td> <td></td> <td></td> <td></td> <td></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 10 MX</td> <td>51 MN 35 MX 35 MX 35 MX 35 MX</td> <td>36 MN 36 MN 36 MN</td> <td>36 MN 36 MN 36 MN</td> <td>36 MN 36 MN 36 MN</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>MATERIAL PASSING #40 LL PI</td> <td>—</td> <td>—</td> <td>40 MX 10 MX</td> <td>41 MN 10 MX</td> <td>40 MX 11 MN</td> <td>41 MN 10 MX</td> <td>41 MN 10 MX</td> <td>40 MX 11 MN</td> <td>41 MN 11 MN</td> <td></td> <td></td> <td></td> <td></td> <td></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> <td></td> <td></td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td colspan="2">STONE FRAGS. GRAVEL, AND SAND</td> <td colspan="2">FINE SAND</td> <td colspan="2">SILTY OR CLAYEY GRAVEL AND SAND</td> <td colspan="2">SILTY SOILS</td> <td colspan="2">CLAYEY SOILS</td> <td colspan="2">SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td colspan="2">HIGHLY ORGANIC SOILS</td> </tr> <tr> <td>GEN. RATING AS SUBGRADE</td> <td colspan="5">EXCELLENT TO GOOD</td> <td colspan="5">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td>UNSUITABLE</td> </tr> </tbody> </table> <p>PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS &gt; LL - 30</p>														GROUP CLASS.	A-1	A-3	A-2	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-7-5	A-7-6						SYMBOL															% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX 10 MX	51 MN 35 MX 35 MX 35 MX 35 MX	36 MN 36 MN 36 MN	36 MN 36 MN 36 MN	36 MN 36 MN 36 MN									MATERIAL PASSING #40 LL PI	—	—	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN						GROUP INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX							USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND		SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS		CLAYEY SOILS		SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS		GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD					FAIR TO POOR					FAIR TO POOR	POOR	UNSUITABLE	<p><b>CONSISTENCY OR DENSENESS</b></p> <table border="1"> <thead> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT<sup>2</sup>)</th> </tr> </thead> <tbody> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE</td> <td>&lt; 4 4 TO 10 10 TO 30 30 TO 50 &gt; 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD</td> <td>&lt; 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 &gt; 30</td> <td>&lt; 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 &gt; 4</td> </tr> </tbody> </table>														PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )	GENERALLY GRANULAR MATERIAL (NON-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	<p><b>TEXTURE OR GRAIN SIZE</b></p> <table border="1"> <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 (Cse. 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> </tbody> </table>														U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270		4.76	2.00	0.42	0.25	0.075	0.053	Boulder (Bldr.)							Cobble (Cob.)							Gravel (Gr.)							Coarse Sand (Cse. Sd.)							Fine Sand (F Sd.)							Silt (Sl.)							Clay (Cl.)							<p><b>RECOMMENDATION SYMBOLS</b></p> <table border="1"> <tr> <td></td> <td>UNDERCUT EXCAVATION</td> <td></td> <td>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</td> <td></td> <td>UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</td> </tr> <tr> <td></td> <td>SHALLOW UNDERCUT</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>															UNDERCUT EXCAVATION		UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE		UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK		SHALLOW UNDERCUT					<p><b>ABBREVIATIONS</b></p> <table border="1"> <tr> <td>AR - AUGER REFUSAL</td> <td>BT - BORING TERMINATED</td> <td>CL - CLAY</td> <td>CPT - CONE PENETRATION TEST</td> <td>CSE - COARSE</td> <td>DMT - DILATOMETER TEST</td> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>e - VOID RATIO</td> <td>F - FINE</td> <td>FOSS. - FOSSILIFEROUS</td> <td>FRAC. - FRACTURED, FRACTURES</td> <td>FRAGS. - FRAGMENTS</td> <td>HI. - HIGHLY</td> <td>MED. - MEDIUM</td> <td>MICA - MICACEOUS</td> <td>MOD. - MODERATELY</td> <td>NP - NON PLASTIC</td> <td>ORG. - ORGANIC</td> <td>PMT - PRESSUREMETER TEST</td> <td>SAP. - SAPROLITIC</td> <td>SD. - SAND, SANDY</td> <td>SL. - SILT, SILTY</td> <td>SLI. - SLIGHTLY</td> <td>TCR - TRICONE REFUSAL</td> <td>w - MOISTURE CONTENT</td> <td>V - VERY</td> <td>VST - VANE SHEAR TEST</td> <td>WEA. - WEATHERED</td> <td>γ - UNIT WEIGHT</td> <td>γ<sub>d</sub> - DRY UNIT WEIGHT</td> </tr> <tr> <td colspan="30"> <p><b>SAMPLE ABBREVIATIONS</b></p> <p>S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACT TRIAXIAL CBR - CALIFORNIA BEARING RATIO</p> </td> </tr> </table>														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	MED. - MEDIUM	MICA - MICACEOUS	MOD. - MODERATELY	NP - NON PLASTIC	ORG. - ORGANIC	PMT - PRESSUREMETER TEST	SAP. - SAPROLITIC	SD. - SAND, SANDY	SL. - SILT, SILTY	SLI. - SLIGHTLY	TCR - TRICONE REFUSAL	w - MOISTURE CONTENT	V - VERY	VST - VANE SHEAR TEST	WEA. - WEATHERED	γ - UNIT WEIGHT	γ <sub>d</sub> - DRY UNIT WEIGHT	<p><b>SAMPLE ABBREVIATIONS</b></p> <p>S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACT TRIAXIAL CBR - CALIFORNIA BEARING RATIO</p>																														<p><b>SOIL MOISTURE - CORRELATION OF TERMS</b></p> <table border="1"> <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</td> <td>LIQUID LIMIT</td> <td>- SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL</td> <td>PLASTIC LIMIT</td> <td>- WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM</td> <td>OPTIMUM MOISTURE</td> <td>- MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL</td> <td>SHRINKAGE LIMIT</td> <td>- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </tbody> </table>														SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION	LL	LIQUID LIMIT	- SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE	PL	PLASTIC LIMIT	- WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	OM	OPTIMUM MOISTURE	- MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	SL	SHRINKAGE LIMIT	- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	<p><b>EQUIPMENT USED ON SUBJECT PROJECT</b></p> <table border="1"> <tr> <td><input type="checkbox"/> CME-45C</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input type="checkbox"/> AUTOMATIC</td> <td><input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> CME-55</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td colspan="2">CORE SIZE: <input type="checkbox"/> -B      <input type="checkbox"/> -H <input type="checkbox"/> -N</td> </tr> <tr> <td><input type="checkbox"/> CME-550</td> <td><input type="checkbox"/> 8" HOLLOW AUGERS</td> <td colspan="2">HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input checked="" type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST</td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td colspan="2"></td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td> <td colspan="2"></td> </tr> <tr> <td></td> <td><input type="checkbox"/> CASING      <input type="checkbox"/> w/ ADVANCER</td> <td colspan="2"></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE      * STEEL TEETH</td> <td colspan="2"></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE      * TUNG-CARB.</td> <td colspan="2"></td> </tr> <tr> <td></td> <td><input type="checkbox"/> CORE BIT</td> <td colspan="2"></td> </tr> </table>														<input type="checkbox"/> CME-45C	<input type="checkbox"/> CLAY BITS	<input type="checkbox"/> AUTOMATIC	<input type="checkbox"/> MANUAL	<input type="checkbox"/> CME-55	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER	CORE SIZE: <input type="checkbox"/> -B <input type="checkbox"/> -H <input type="checkbox"/> -N		<input type="checkbox"/> CME-550	<input type="checkbox"/> 8" HOLLOW AUGERS	HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input checked="" type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST		<input type="checkbox"/> VANE SHEAR TEST	<input type="checkbox"/> HARD FACED FINGER BITS			<input type="checkbox"/> PORTABLE HOIST	<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><b>FRACATURE SPACING</b></p> <table border="1"> <tr> <th>TERM</th> <th>SPACING</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </table> <p><b>BEDDING</b></p> <table border="1"> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>&lt; 0.008</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>&lt; 0.008 FEET</td> </tr> </table> <p><b>INDURATION</b></p> <table border="1"> <tr> <td>FRIABLE</td> <td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <td>MODERATELY INDURATED</td> <td>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <td>INDURATED</td> <td>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <td>EXTREMELY INDURATED</td> <td>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> </table>														TERM	SPACING	VERY WIDE	MORE THAN 10 FEET	WIDE	3 TO 10 FEET	MODERATELY CLOSE	1 TO 3 FEET	CLOSE	0.16 TO 1 FOOT	VERY CLOSE	LESS THAN 0.16 FEET	TERM	THICKNESS	VERY THICKLY BEDDED	4 FEET	THICKLY BEDDED	1.5 - 4 FEET	THINLY BEDDED	0.16 - 1.5 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET	THICKLY LAMINATED	< 0.008	THINLY LAMINATED	< 0.008 FEET	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><b>BENCH MARK:</b></p> <p style="text-align: right;">ELEVATION:                  FEET</p> <p><b>NOTES:</b></p> <p style="text-align: right;">_____ APPROXIMATE LIMIT OF ORGANIC SOILS</p>													
GROUP CLASS.	A-1	A-3	A-2	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-7-5	A-7-6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
SYMBOL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX 10 MX	51 MN 35 MX 35 MX 35 MX 35 MX	36 MN 36 MN 36 MN	36 MN 36 MN 36 MN	36 MN 36 MN 36 MN																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
MATERIAL PASSING #40 LL PI	—	—	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
GROUP INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND		SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS		CLAYEY SOILS		SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD					FAIR TO POOR					FAIR TO POOR	POOR	UNSUITABLE																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE 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																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
	4.76	2.00	0.42	0.25	0.075	0.053																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
Boulder (Bldr.)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Cobble (Cob.)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Gravel (Gr.)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Coarse Sand (Cse. Sd.)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Fine Sand (F Sd.)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Silt (Sl.)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Clay (Cl.)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
	UNDERCUT EXCAVATION		UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE		UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
	SHALLOW UNDERCUT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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	MED. - MEDIUM	MICA - MICACEOUS	MOD. - MODERATELY	NP - NON PLASTIC	ORG. - ORGANIC	PMT - PRESSUREMETER TEST	SAP. - SAPROLITIC	SD. - SAND, SANDY	SL. - SILT, SILTY	SLI. - SLIGHTLY	TCR - TRICONE REFUSAL	w - MOISTURE CONTENT	V - VERY	VST - VANE SHEAR TEST	WEA. - WEATHERED	γ - UNIT WEIGHT	γ <sub>d</sub> - DRY UNIT WEIGHT																																																																																																																																																																																																																																																																																																																																																																																																																																																															
<p><b>SAMPLE ABBREVIATIONS</b></p> <p>S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACT TRIAXIAL CBR - CALIFORNIA BEARING RATIO</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
LL	LIQUID LIMIT	- SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
PL	PLASTIC LIMIT	- WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
OM	OPTIMUM MOISTURE	- MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
SL	SHRINKAGE LIMIT	- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
<input type="checkbox"/> CME-45C	<input type="checkbox"/> CLAY BITS	<input type="checkbox"/> AUTOMATIC	<input type="checkbox"/> MANUAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
<input type="checkbox"/> CME-55	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER	CORE SIZE: <input type="checkbox"/> -B <input type="checkbox"/> -H <input type="checkbox"/> -N																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
<input type="checkbox"/> CME-550	<input type="checkbox"/> 8" HOLLOW AUGERS	HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input checked="" type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
<input type="checkbox"/> VANE SHEAR TEST	<input type="checkbox"/> HARD FACED FINGER BITS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
<input type="checkbox"/> PORTABLE HOIST	<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																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
TERM	SPACING																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
VERY WIDE	MORE THAN 10 FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
WIDE	3 TO 10 FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
MODERATELY CLOSE	1 TO 3 FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
CLOSE	0.16 TO 1 FOOT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
VERY CLOSE	LESS THAN 0.16 FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
TERM	THICKNESS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
VERY THICKLY BEDDED	4 FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
THICKLY BEDDED	1.5 - 4 FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
THINLY BEDDED	0.16 - 1.5 FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
THICKLY LAMINATED	< 0.008																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
THINLY LAMINATED	< 0.008 FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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><b>PLASTICITY</b></p> <table border="1"> <thead> <tr> <th>NON PLASTIC</th> <th>SLIGHTLY PLASTIC</th> <th>MODERATELY PLASTIC</th> <th>HIGHLY PLASTIC</th> <th>PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td>0-5</td> <td>VERY LOW</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>16-25</td> <td>MEDIUM</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </tbody> </table> <p><b>COLOR</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>														NON PLASTIC	SLIGHTLY PLASTIC	MODERATELY PLASTIC	HIGHLY PLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH					0-5	VERY LOW					6-15	SLIGHT					16-25	MEDIUM					26 OR MORE	HIGH	<p>DATE: 8-15-14</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																
NON PLASTIC	SLIGHTLY PLASTIC	MODERATELY PLASTIC	HIGHLY PLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
				0-5	VERY LOW																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
				6-15	SLIGHT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
				16-25	MEDIUM																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
				26 OR MORE	HIGH																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							

See Sheet 1A For Index of Sheets  
See Sheet 1B For Conventional Symbols

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

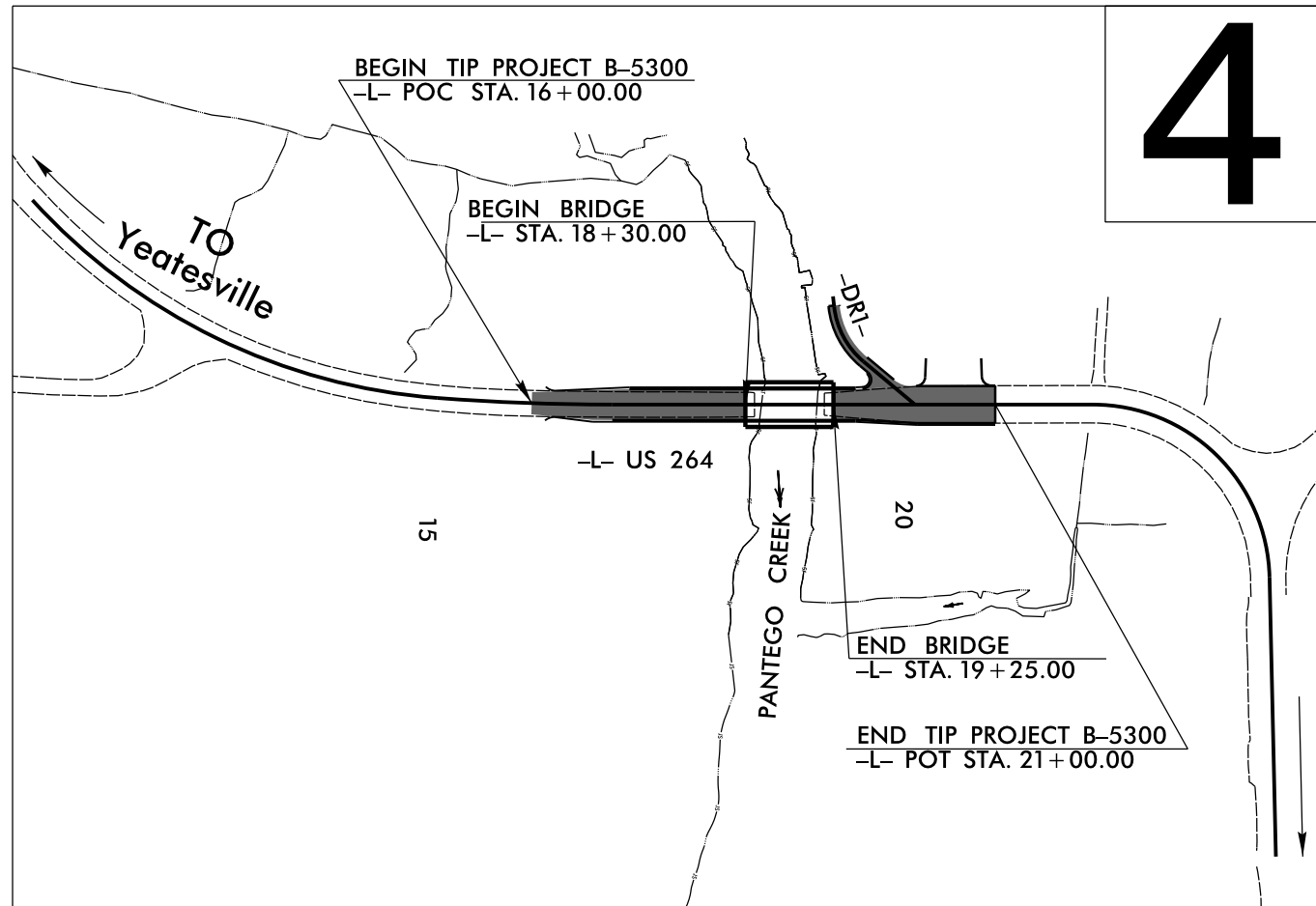
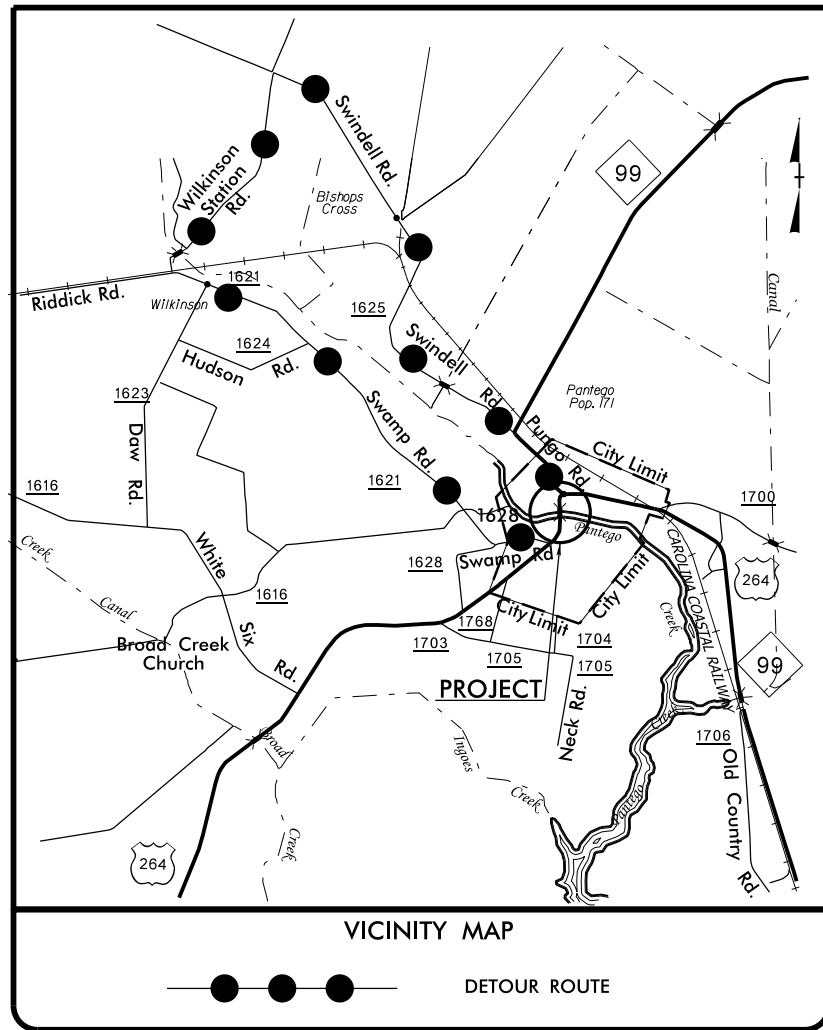
**BEAUFORT COUNTY**

LOCATION: REPLACE BRIDGE NO. 55 OVER PANTEGO CREEK ON US 264

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5300	3	9
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
46000.1.1	BRSTP-0264(53)	P.E.	
46000.2.FS1	BRSTP-0264(53)	R/W	

TIP PROJECT: B-5300

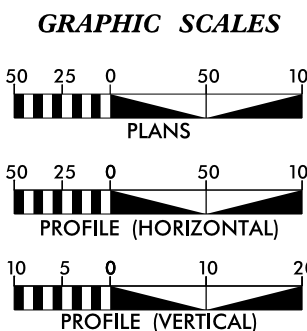


4

THERE IS NO CONTROL OF ACCESS ON THIS PROJECT  
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD \_\_\_\_.  
THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARY OF PANTEGO.

**INCOMPLETE PLANS**  
DO NOT USE FOR R/W ACQUISITION  
**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION

CONTRACT:



**DESIGN DATA**

ADT 2017 =	4474
ADT 2037 =	7170
K =	10 %
D =	60 %
T =	14 % *
V =	30 MPH
* TTST =	8% DUAL = 6%
FUNC CLASS =	ARTERIAL
SUBREGIONAL TIER	

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-5300 =	0.077 MILES
LENGTH STRUCTURE TIP PROJECT B-5300 =	0.018 MILES
TOTAL LENGTH TIP PROJECT B-5300 =	0.095 MILES

**amec** Prepared in the Office of:  
AMEC Environment & Infrastructure, Inc.  
4021 Stirrup Creek Drive, Suite 100  
Durham, North Carolina 27703  
NC Engineering F-1253 NC Geology C-247  
(919) 381-9900

2012 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
MARCH 20, 2015

**LETTING DATE:**  
MARCH 21, 2017

**W. S. HOOD, PE**  
PROJECT ENGINEER

**BRAD TRIPP, PE**  
PROJECT DESIGN ENGINEER

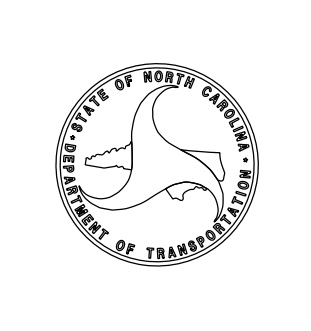
**GARY LOVERING, PE**  
PROJECT ENGINEER  
NCDOT ROADWAY DESIGN

**HYDRAULICS ENGINEER**

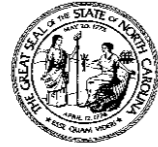
SIGNATURE: \_\_\_\_\_ P.E.

**ROADWAY DESIGN ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.



26-JAN-2015 13:33 L:\FRO\Greenville\_Inv\Investigation\TIP\B5300\_GEO\_RDWY\CADD\_GEOTECH\Site&Sub\B5300\_GEO\_RDY\_TITLE.dgn cp:turner AT GEG27230



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY  
GOVERNOR

ANTHONY J. TATA  
SECRETARY

January 26, 2015

STATE PROJECT: 46000.1.1 (B-5300)  
F.A. PROJECT: BRSTP-0264 (53)  
COUNTY: Beaufort  
  
DESCRIPTION: Bridge No. 55 on US 264 over Pantego Creek  
  
SUBJECT: Geotechnical Inventory Report

**Project Description**

This project is located at the existing US 264 bridge over Pantego Creek. This investigation was confined to the areas of proposed construction.

Fieldwork was conducted in December 2014. Hand auger borings were completed at various offsets along the project corridor. Representative soil samples were collected for visual classification in the field and for laboratory analysis by the Materials and Tests Unit.

The following alignments were investigated. Subsurface profiles and selected cross sections of these alignments are included in this report.

<u>Line</u>	<u>Station(±)</u>
-L-	16+00 to 21+00
-DR1-	10+00 to 11+52

**Areas of Special Geotechnical Interest**

- 1) The entire project was found to exhibit seasonal high ground water.

- 2) The entire project contains cohesive soils which have the potential to cause embankment/subgrade and or slope stability problems during construction.
- 3) The following section contains organic soils that have the potential to cause embankment/subgrade and or slope stability problems during construction.

<u>Line</u>	<u>Station(±)</u>
-L-	16+75 to 18+55

**Physiography and Geology**

This project corridor is located within the Coastal Plain Physiographic Province. Topography along the project is nearly flat. Natural ground elevations ranged from -9± below sea level in the bed of Pantego Creek to 6± feet above sea level along the existing US 264 embankment.

Surficial soils in this area are generally classified as alluvial sediments.

**Ground Water**

Ground water data was collected in December 2014, during a time of normal precipitation. Ground water elevations ranged from 1± to 3± feet above sea level.

**Soils**

Soils encountered within this project area have been divided into two categories, alluvial soils and roadway embankment.

Soils identified as alluvial are composed of 2± to 6+ feet of soft silt (A-4), with 2± to 3+ feet of very loose to loose sand (A-2-4) and 1± to 3± feet of very soft muck. Moisture samples taken within the cohesive units returned a natural moisture content of 83%. Organic samples taken within the muck returned organic percentages ranging from 21% to 25%.

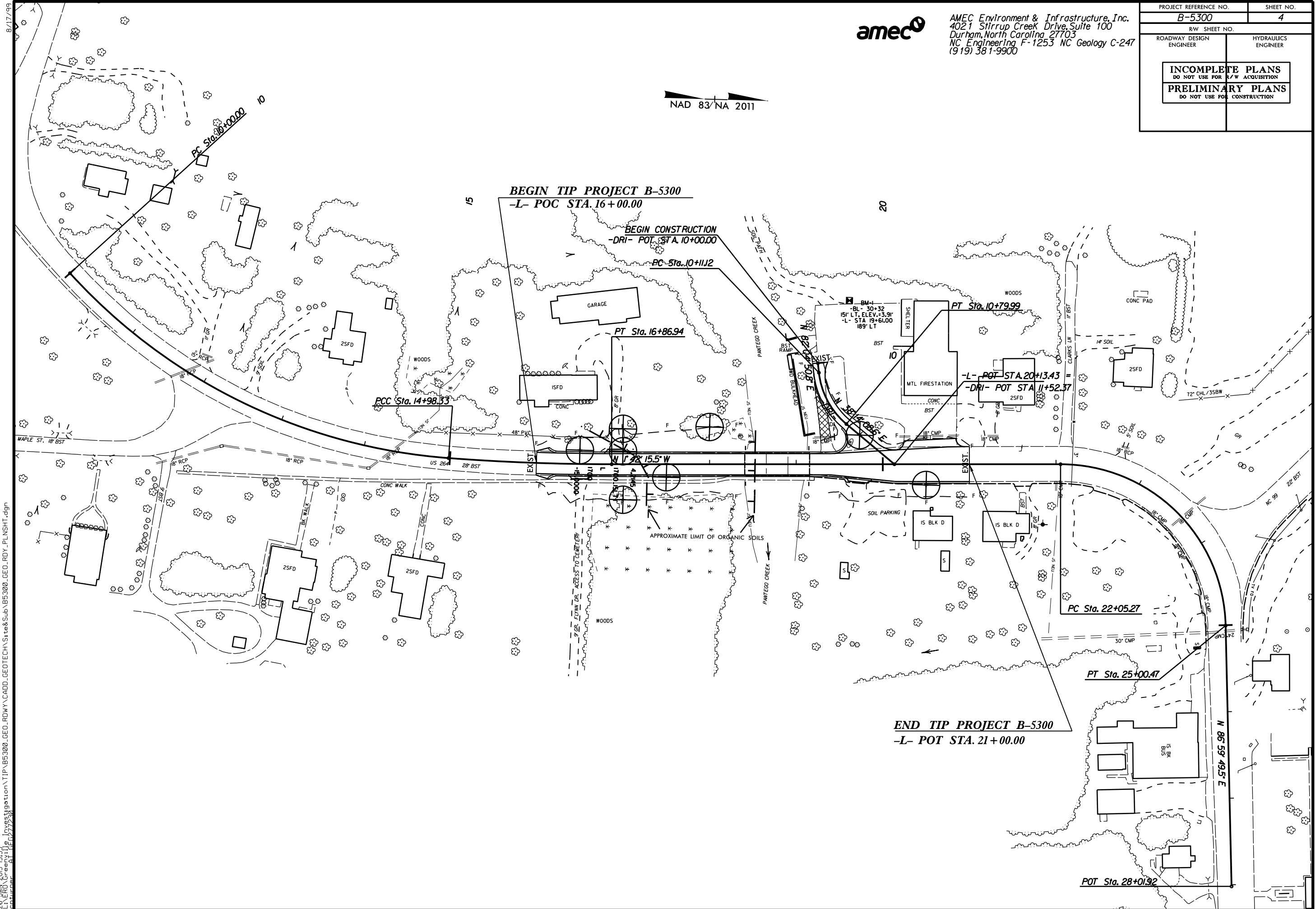
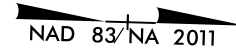
Roadway embankment soils were found within the existing US 264 embankment. Where encountered it was composed of 1± to 4± feet of loose sand (A-2-4).

8/17/99



AMEC Environment & Infrastructure, Inc.  
4021 Sittrop Creek Drive, Suite 100  
Durham, North Carolina 27703  
NC Engineering F-1253 NC Geology C-247  
(919) 381-9900

PROJECT REFERENCE NO. <b>B-5300</b>	SHEET NO. <b>4</b>
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



**BEGIN TIP PROJECT B-5300**  
-L- POC STA. 16+00.00

BEGIN CONSTRUCTION  
-DRI- POT STA. 10+00.00

PC STA. 10+11.12

PCC Sta. 14+98.33

PT Sta. 16+86.94

PT Sta. 10+79.99

-L- POT STA. 20+13.43

-DRI- POT STA. 11+52.37

PC Sta. 22+05.27

PT Sta. 25+00.47

**END TIP PROJECT B-5300**  
-L- POT STA. 21+00.00

POT Sta. 28+01.92

N 86.59 495° E

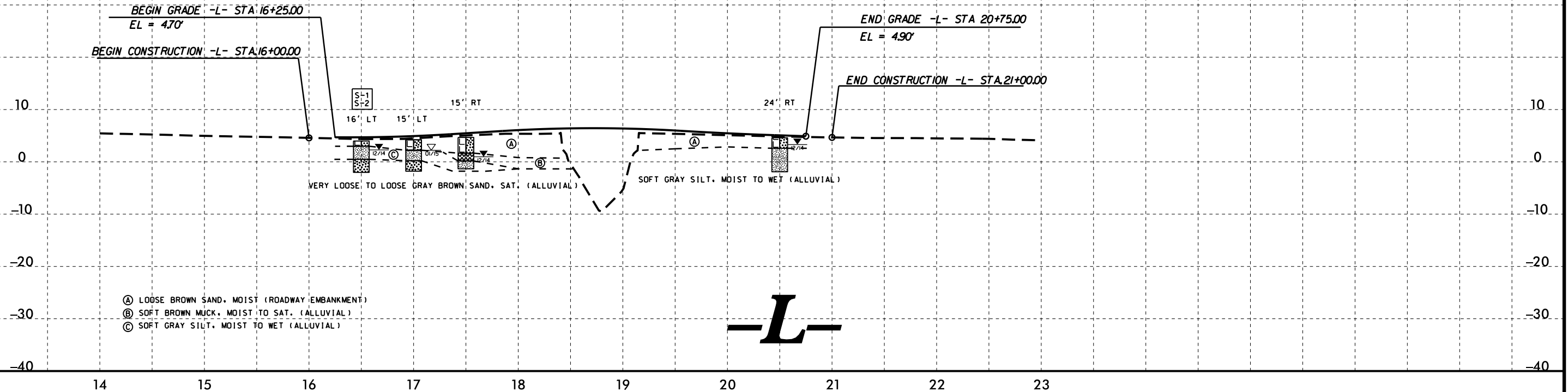
26-JAN-2015 13:33  
L:\ERON\Greenville\_Investigation\TIP\B5300\_GEO\_RDWY\CADD\GEO\TECH\Site&Sub\B5300\_GEO\_RDWY\_PLNSHT.dgn  
Author: AT  
Plot: 27230

5/28/99

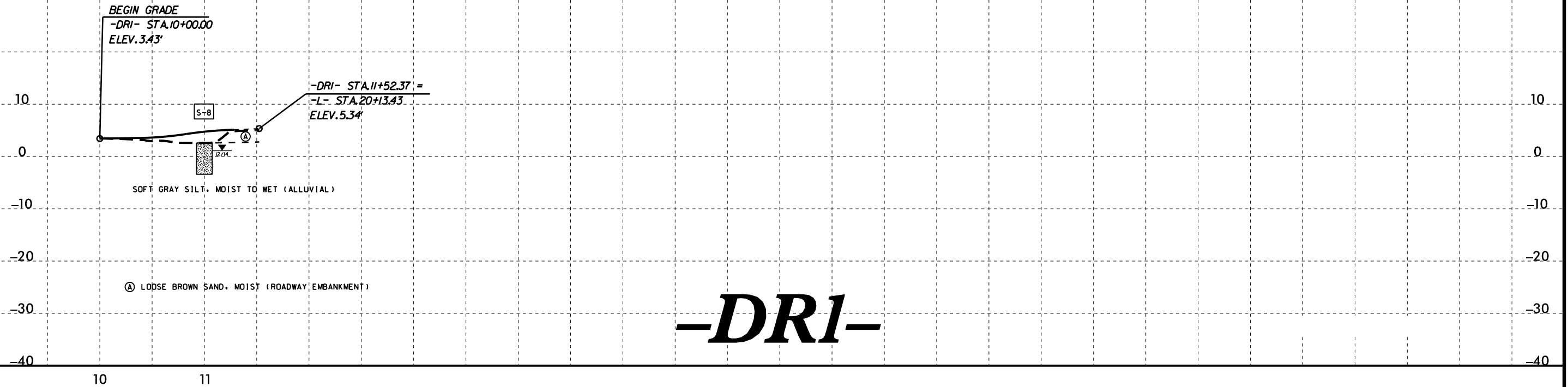
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT			% PASSING (SIEVES)			% MOISTURE	% ORGANIC	
							C. SAND	F. SAND	SILT	10	40	200			
S-1	16 LT	16+50	1.0-3.5	A-4(8)	28	10	1.6	8.6	79.4	10.4	100	99	93	-	-
S-2	16 LT	16+50	3.5-4.5	A-2-4(0)	17	NP	27.0	46.6	18.0	8.4	100	91	30	-	-

AMEC Environment & Infrastructure, Inc.  
 4021 Sittrop Creek Drive, Suite 100  
 Durham, North Carolina 27703  
 NC Engineering F-1253 NC Geology C-247  
 (919) 381-9900

PROJECT REFERENCE NO. B-5300	SHEET NO. 5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT			% PASSING (SIEVES)			% MOISTURE	% ORGANIC	
							C. SAND	F. SAND	SILT	10	40	200			
S-8	CL	11+00	2.5-6.0	A-4(2)	27	7	9.4	38.2	44.0	8.4	100	98	59	82.0	-

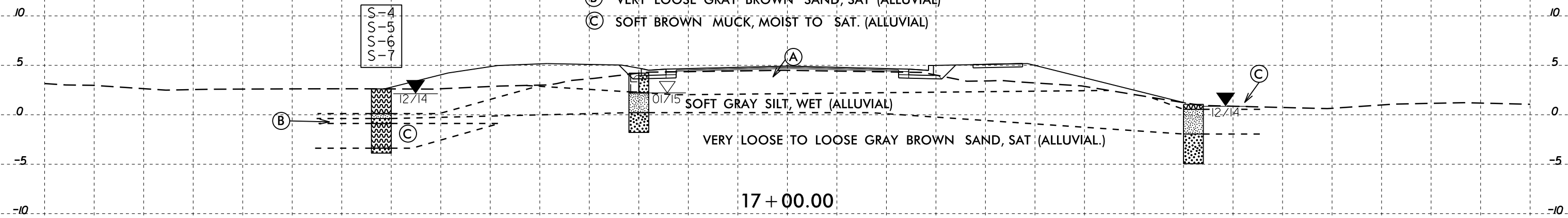


26-JAN-2015 13:33  
 L:\ERD\Greenville\_Investigation\TIP\B5300\_GEO\_RDWY\CADD\GEO\TECH\Plan\Prof\B5300\_GEO\_RDWY\_pfl\_L.dgn  
 Author: AT 11/27/2008

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

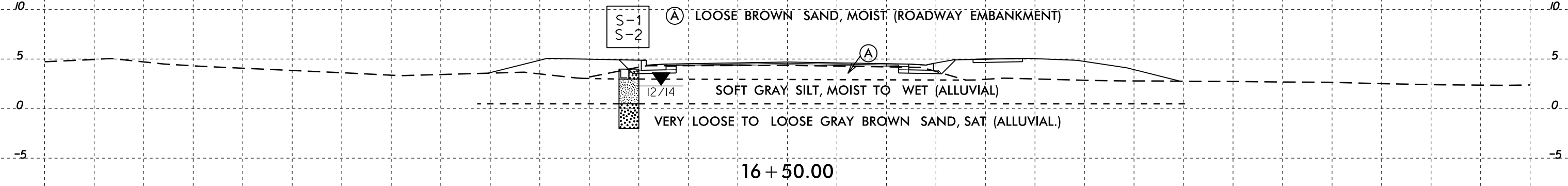
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-4	41 LT	17+00	0.0-2.5	A-5(0)	50	NP	22.8	33.0	35.8	8.4	100	86	48	-	25.2
S-5	41 LT	17+00	2.5-3.0	A-4(3)	26	5	3.4	17.0	65.2	14.4	100	99	82	83.0	-
S-6	41 LT	17+00	3.0-3.5	A-2-4(0)	17	NP	14.8	62.2	19.0	4.0	100	95	26	-	-
S-7	41 LT	17+00	3.5-6.0	-	-	-	-	-	-	-	-	-	-	-	21.3

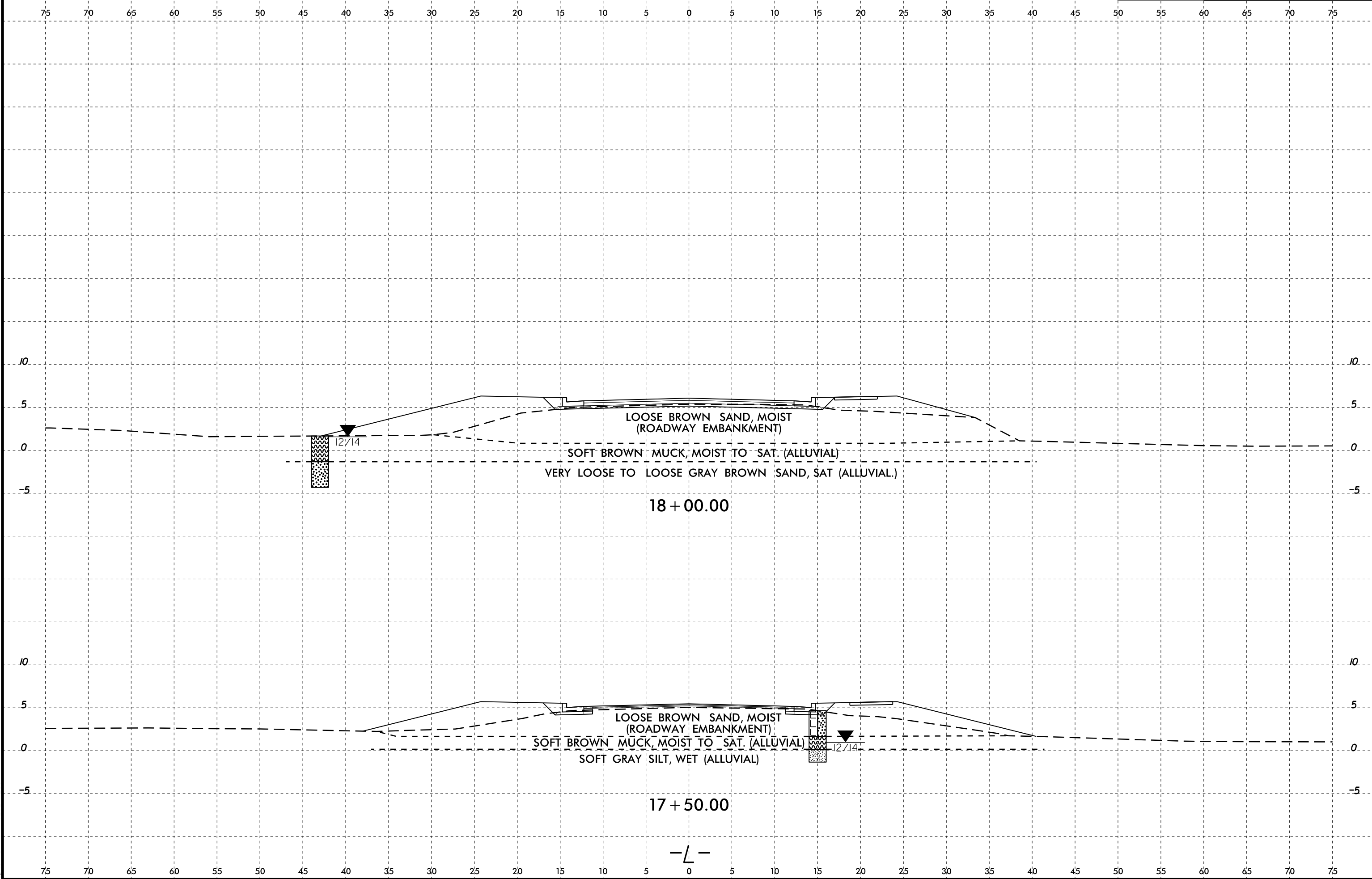
- (A) LOOSE BROWN SAND, MOIST (ROADWAY EMBANKMENT)
- (B) VERY LOOSE GRAY BROWN SAND, SAT (ALLUVIAL)
- (C) SOFT BROWN MUCK, MOIST TO SAT. (ALLUVIAL)



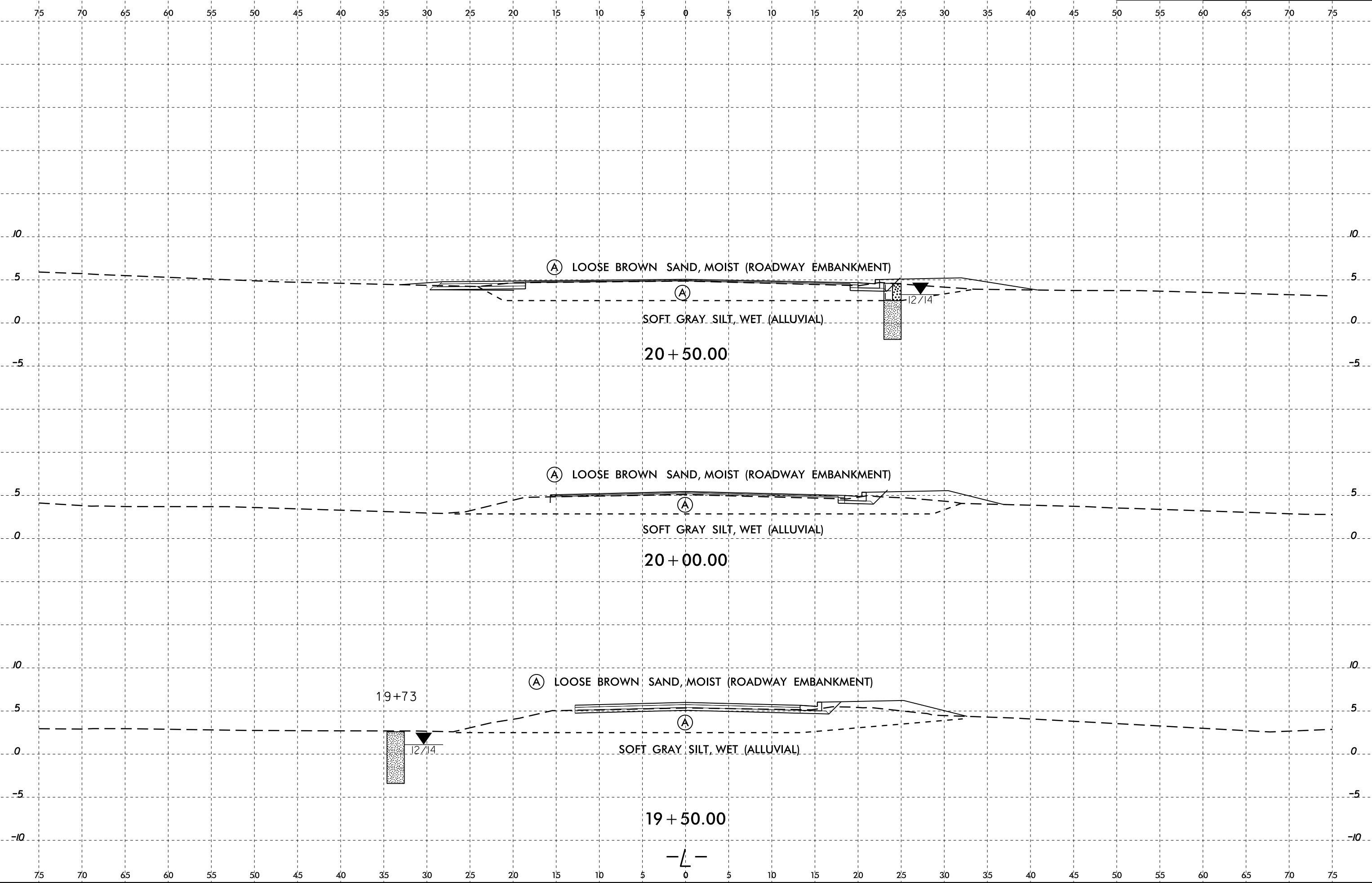
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-1	16 LT	16+50	1.0-3.5	A-4(8)	28	10	1.6	8.6	79.4	10.4	100	99	93	-	-
S-2	16 LT	16+50	3.5-4.5	A-2-4(0)	17	NP	27.0	46.6	18.0	8.4	100	91	30	-	-

- (A) LOOSE BROWN SAND, MOIST (ROADWAY EMBANKMENT)









75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-8	CL	11+00	2.5+6.0	A-4(2)	27	7	9.4	38.2	44.0	8.4	100	98	59	82.0	-

