

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33552.1.1 (B-4205)	1	12

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

STRUCTURE
SUBSURFACE INVESTIGATION

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	GEOTECHNICAL REPORT
4	SITE PLAN
5	PROFILE(S)
6-7	CROSS SECTION(S)
8-10	BORE LOG & CORE REPORT(S)
11	SOIL TEST RESULTS
12	SCOUR REPORT

PROJ. REFERENCE NO. 33552.1.1 F.A. PROJ. _____
COUNTY MONTGOMERY
PROJECT DESCRIPTION BRIDGE 133 ON SR 1310 OVER DUMAS CREEK

SITE DESCRIPTION _____

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) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

DT HERING

OB OTT

DW DIXON

CE HADEN

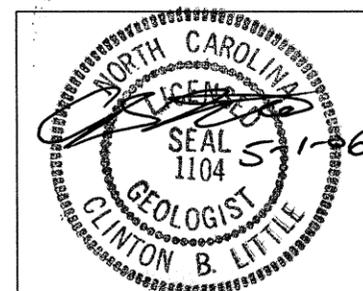
JP ROGERS

INVESTIGATED BY LITTLEHERING

CHECKED BY LITTLE

SUBMITTED BY LITTLE

DATE APRIL 2006



DRAWN BY: HERINGLITTLE

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

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

PROJECT: 33552.1.1 ID: B-4205

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO. 33552.11(B-4205) SHEET NO. 2

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS																																																																																																																																							
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p style="text-align: center;"><i>VERY STIFF, GRAY, SILTY CLAY, MOST 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. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p style="text-align: center;">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <u>ANGULAR</u>, <u>SUBANGULAR</u>, <u>SUBROUNDED</u>, OR <u>ROUNDED</u>.</p>		<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</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, 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 DISLODGED 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 (SCRC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - 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		MINERALOGICAL COMPOSITION		WEATHERING																																																																																																																																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>GENERAL CLASS.</th> <th colspan="4">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="4">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="4">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th colspan="2">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-4, A-5</th> <th>A-6, A-7</th> <th colspan="3"></th> </tr> <tr> <th>SYMBOL</th> <td></td> </tr> <tr> <th>% PASSING</th> <td>10 20 40</td> <td>10 25 50 60</td> </tr> <tr> <th>LIQUID LIMIT</th> <td>6 MX</td> <td>NP</td> <td>40 MX</td> <td>41 MN</td> </tr> <tr> <th>GROUP INDEX</th> <td>0</td> <td>0</td> <td>0</td> <td>4 MX</td> <td>8 MX</td> <td>12 MX</td> <td>16 MX</td> <td>18 MX</td> <td>20 MX</td> <td>22 MX</td> <td>24 MX</td> <td>26 MX</td> <td>28 MX</td> <td>30 MX</td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td colspan="2">FINE SAND</td> <td colspan="2">SILT-CLAYEY GRAVEL AND SAND</td> <td colspan="2">SILT-CLAYEY GRAVEL AND SAND</td> <td colspan="2">SILT-CLAYEY SOILS</td> <td colspan="2">SILT-CLAYEY SOILS</td> <td colspan="2">SILT-CLAYEY SOILS</td> <td colspan="2">MUCK, PEAT</td> </tr> <tr> <th>GEN. RATING AS A SUBGRADE</th> <td colspan="4">EXCELLENT TO GOOD</td> <td colspan="4">FAIR TO POOR</td> <td colspan="2">FAIR TO POOR</td> <td colspan="2">POOR</td> <td colspan="2">UNSATISFACTORY</td> </tr> <tr> <td colspan="14">PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30</td> </tr> </table>		GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)				SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS				GROUP CLASS.	A-1	A-3	A-2		A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-6, A-7				SYMBOL															% PASSING	10 20 40	10 25 50 60	LIQUID LIMIT	6 MX	NP	40 MX	41 MN	GROUP INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	18 MX	20 MX	22 MX	24 MX	26 MX	28 MX	30 MX	USUAL TYPES OF MAJOR MATERIALS	FINE SAND		SILT-CLAYEY GRAVEL AND SAND		SILT-CLAYEY GRAVEL AND SAND		SILT-CLAYEY SOILS		SILT-CLAYEY SOILS		SILT-CLAYEY SOILS		MUCK, PEAT		GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD				FAIR TO POOR				FAIR TO POOR		POOR		UNSATISFACTORY		PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30														<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p>		<p>COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50</p>		<p>NON-CRYSTALLINE ROCK (NCR) - 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 SEDIMENTARY ROCK (CP) - FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES SHELL BEDS, ETC.</p>		<p>FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SLI.) - 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>SLIGHT (SLI.) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p>MODERATE (MOD.) - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p> <p>MODERATELY SEVERE (MOD. SEV.) - 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>SEVERE (SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i></p> <p>VERY SEVERE (V SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i></p> <p>COMPLETE - 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>																							
GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)				SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS																																																																																																																																				
GROUP CLASS.	A-1	A-3	A-2		A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-6, A-7																																																																																																																																		
SYMBOL																																																																																																																																													
% PASSING	10 20 40	10 25 50 60	10 25 50 60	10 25 50 60	10 25 50 60	10 25 50 60	10 25 50 60	10 25 50 60	10 25 50 60	10 25 50 60	10 25 50 60	10 25 50 60	10 25 50 60	10 25 50 60																																																																																																																															
LIQUID LIMIT	6 MX	NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN																																																																																																																															
GROUP INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	18 MX	20 MX	22 MX	24 MX	26 MX	28 MX	30 MX																																																																																																																															
USUAL TYPES OF MAJOR MATERIALS	FINE SAND		SILT-CLAYEY GRAVEL AND SAND		SILT-CLAYEY GRAVEL AND SAND		SILT-CLAYEY SOILS		SILT-CLAYEY SOILS		SILT-CLAYEY SOILS		MUCK, PEAT																																																																																																																																
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD				FAIR TO POOR				FAIR TO POOR		POOR		UNSATISFACTORY																																																																																																																																
PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30																																																																																																																																													
PERCENTAGE OF MATERIAL		GROUND WATER		ROCK HARDNESS																																																																																																																																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY</td> </tr> <tr> <td></td> <td></td> <td></td> <td>35% AND ABOVE</td> </tr> </table>		ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	HIGHLY				35% AND ABOVE	<p>▽ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p>▽ 24 STATIC WATER LEVEL AFTER 24 HOURS</p> <p>▽ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p>○ SPRING OR SEEP</p>		<p>VERY HARD - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>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.</p> <p>MEDIUM HARD - CAN BE GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p>SOFT - CAN BE GROUDED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.</p> <p>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>																																																																																																																	
ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL																																																																																																																																										
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE																																																																																																																																										
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE																																																																																																																																										
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME																																																																																																																																										
HIGHLY ORGANIC	>10%	>20%	HIGHLY																																																																																																																																										
			35% AND ABOVE																																																																																																																																										
CONSISTENCY OR DENSENESS		MISCELLANEOUS SYMBOLS		ABBREVIATIONS																																																																																																																																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE</td> <td><4 4 TO 10 10 TO 30 30 TO 50 >50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD</td> <td><2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30</td> <td><0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4</td> </tr> </table>		PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)	GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 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 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4	<p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</p> <p>SOIL SYMBOL</p> <p>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</p> <p>INFERRED SOIL BOUNDARY</p> <p>INFERRED ROCK LINE</p> <p>ALLUVIAL SOIL BOUNDARY</p> <p>DIP & DIP DIRECTION OF ROCK STRUCTURES</p> <p>SOUNDING ROD</p> <p>SPT TEST BORING</p> <p>AUGER BORING</p> <p>CORE BORING</p> <p>MONITORING WELL</p> <p>PIEZOMETER INSTALLATION</p> <p>SLOPE INDICATOR INSTALLATION</p> <p>SPT N-VALUE</p> <p>SPT REFUSAL</p>		<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</p> <p>HI - HIGHLY MED - MEDIUM MICA - MICA MOD - MODERATELY NP - NON PLASTIC ORG - ORGANIC PMT - PRESSUREMETER TEST SAP - SAPROLITIC SD - SAND, SANDY SIL - SILT, SILTY SLI - SLIGHTLY TCR - TRICONE REFUSAL</p> <p>w - MOISTURE CONTENT v - VERY VST - VANE SHEAR TEST WEA - WEATHERED γ - UNIT WEIGHT γ_d - DRY UNIT WEIGHT</p>																																																																																																																													
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 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4																																																																																																																																										
TEXTURE OR GRAIN SIZE		ABBREVIATIONS		EQUIPMENT USED ON SUBJECT PROJECT																																																																																																																																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> <tr> <td></td> <td>4.76</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> <tr> <th>BOULDER (BLDR.)</th> <th>COBBLE (COB.)</th> <th>GRAVEL (GR.)</th> <th>COARSE SAND (CSE, SD.)</th> <th>FINE SAND (F SD.)</th> <th>SILT (SL.)</th> <th>CLAY (CL.)</th> </tr> <tr> <td>GRAIN SIZE</td> <td>MM 305 IN. 12</td> <td>75 3</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> </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.)	GRAIN SIZE	MM 305 IN. 12	75 3	2.0	0.25	0.05	0.005	<p>DRILL UNITS:</p> <p>MOBILE B- BK-51 <input checked="" type="checkbox"/> CME-45C CME-550 PORTABLE HOIST</p> <p>ADVANCING TOOLS:</p> <p>CLAY BITS 6" CONTINUOUS FLIGHT AUGER <input checked="" type="checkbox"/> 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE * STEEL TEETH TRICONE * TUNG-CARB. <input checked="" type="checkbox"/> CORE BIT</p> <p>HAMMER TYPE:</p> <p>AUTOMATIC <input type="checkbox"/> MANUAL <input type="checkbox"/></p> <p>CORE SIZE:</p> <p>B- <input checked="" type="checkbox"/> N-X H-</p> <p>HAND TOOLS:</p> <p>POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST</p>		<p>VERY HARD - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>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.</p> <p>MEDIUM HARD - CAN BE GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p>SOFT - CAN BE GROUDED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.</p> <p>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>																																																																																																													
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.)																																																																																																																																							
GRAIN SIZE	MM 305 IN. 12	75 3	2.0	0.25	0.05	0.005																																																																																																																																							
SOIL MOISTURE - CORRELATION OF TERMS		FRACTURE SPACING		BEDDING																																																																																																																																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL - PLASTIC LIMIT</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table>		SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION	LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE	PL - PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	OM - OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE	SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	<p>TERM</p> <p>VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET</p> <p>TERM</p> <p>VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET</p>		<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>																																																																																																																										
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																																																																																																																																											
PLASTICITY		INDURATION		NOTES:																																																																																																																																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NONPLASTIC</th> <th>PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> <tr> <td>LOW PLASTICITY</td> <td>0-5</td> <td>VERY LOW</td> </tr> <tr> <td>MED. PLASTICITY</td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td>HIGH PLASTICITY</td> <td>16-25</td> <td>MEDIUM</td> </tr> <tr> <td></td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </table>		NONPLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH	LOW PLASTICITY	0-5	VERY LOW	MED. PLASTICITY	6-15	SLIGHT	HIGH PLASTICITY	16-25	MEDIUM		26 OR MORE	HIGH	<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p>		<p>BENCH MARK: IBM; BRIDGE NAIL IN BASE OF UGC POLE 22' RT. STA. 10+96 ASSUMED ELEVATION = 100.0' ELEVATION: _____ FT.</p> <p>ORIGINAL INVESTIGATION PERFORMED AS A BRIDGE MAINTENANCE REPLACEMENT PROJECT IN JUNE 1999. ADJUSTED BORING ELEVATIONS WERE APPROXIMATED FROM THE ROADWAY PROFILES.</p>																																																																																																																										
NONPLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH																																																																																																																																											
LOW PLASTICITY	0-5	VERY LOW																																																																																																																																											
MED. PLASTICITY	6-15	SLIGHT																																																																																																																																											
HIGH PLASTICITY	16-25	MEDIUM																																																																																																																																											
	26 OR MORE	HIGH																																																																																																																																											
COLOR		INDURATION		NOTES:																																																																																																																																									
<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 THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p>		<p>BENCH MARK: IBM; BRIDGE NAIL IN BASE OF UGC POLE 22' RT. STA. 10+96 ASSUMED ELEVATION = 100.0' ELEVATION: _____ FT.</p> <p>ORIGINAL INVESTIGATION PERFORMED AS A BRIDGE MAINTENANCE REPLACEMENT PROJECT IN JUNE 1999. ADJUSTED BORING ELEVATIONS WERE APPROXIMATED FROM THE ROADWAY PROFILES.</p>																																																																																																																																									



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MIKE F. EASLEY
GOVERNOR

P.O. BOX 25201, RALEIGH, N.C. 27611-5201

LYNDO TIPPETT
SECRETARY

April 7, 2006

STATE PROJECT: 33552.1.1
I.D. : B-4205
COUNTY: Montgomery

SITE DESCRIPTION: Bridge No. 0133 on SR 1310 over Dumas Creek
Station 18+80 -L-

SUBJECT: Geotechnical Report - Bridge Foundation Investigation

SITE DESCRIPTION AND GEOLOGY

The project was originally investigated in February and March of 1999 as a bridge maintenance project. The original design called for a three span, 100' long structure. The project has since been upgraded to a TIP project. The new design calls for a one span (90' long) box beam structure. The original data from the report generated in June 1999 is utilized herein in modified form. In addition, some of the subsurface information presented in this report are excerpts taken from the original report written by David Hering in June 1999.

The project is located in central Montgomery County approximately 2.5 miles north of the town of Troy. Geologically, the site is within the Carolina Slate Belt and is underlain by Metavolcanic Tuffs. A subsurface investigation was conducted during February and March 1999 utilizing a trailer-mounted CME-45C drill machine. Standard Penetration Test (SPT) borings utilizing hollow stem augers were performed at each End Bent. 'N' casing with a tricone advancer was used to advance the borings at the originally proposed Interior Bents. NX wireline rock coring tools were also used at the Interior Bents. Representative soil samples were obtained for visual classification in the field and selected samples were sent to the Materials and Tests Unit for laboratory analysis.

The skew is 90 degrees to line -L- (SR 1310). The proposed bridge will be at the same location as the existing structure. The benchmark (TBM, assumed elev. 100.00') used to survey the collar elevations was a nail in base of UGC Pole, Sta. 10+96, 22' Rt. We found an old benchmark matching the description, tied it to the current datum, and checked for consistency. The original test boring data is presented here, modified with the corrected elevations. Further, the alignment direction is reversed from the original to the new survey. All of the stationing has been adjusted and the profiles and cross-sections have been reversed. The interior bent cross-sections have been omitted since these bents

are no longer proposed. The data remains on the profile and boring logs. The original core photos are available upon request, but are not included in this report.

Rock core samples were taken when the structure was drilled originally. At that time, two interior bents were part of the overall structure design. These samples were submitted to the rock lab where they were tested for Unit Weight, Compressive Strength, and Young's Modulus, and Poisson's Ratio. The results from these tests can be obtained from either the M&T lab or the Raleigh Field Office.

FOUNDATION SUMMARY

End Bent One (EB1)

Roadway fill soils at this location are approximately 9' thick and consist of medium stiff to stiff, sandy silt (A-4). Approximately 5' of residual soils were encountered in the boring performed at EB1-B. These soils consist of medium dense sand (A-1-b) with rock fragments. Weathered rock (severely weathered meta-volcanic tuff) was encountered in the boring at EB1-B near elevation 474.5'. Crystalline rock (auger refusal) was encountered near elevation 474'. Please refer to the appropriate attached borelog(s) for this bent to view SPT penetration data. At the time of the investigation, groundwater was near elevation 475.5'.

End Bent Two (EB2)

Roadway fill soils at this location are approximately 11' thick and consist of soft, silty clay (A-7). The fill rests directly on weathered rock (severely weathered meta-volcanic tuff) near elevation 477.5'. Crystalline rock (auger refusal) was encountered near elevation 475.8'. Please refer to the appropriate attached borelog(s) for this bent to view SPT penetration data. At the time of the investigation, groundwater was near elevation 478.5' at this location.

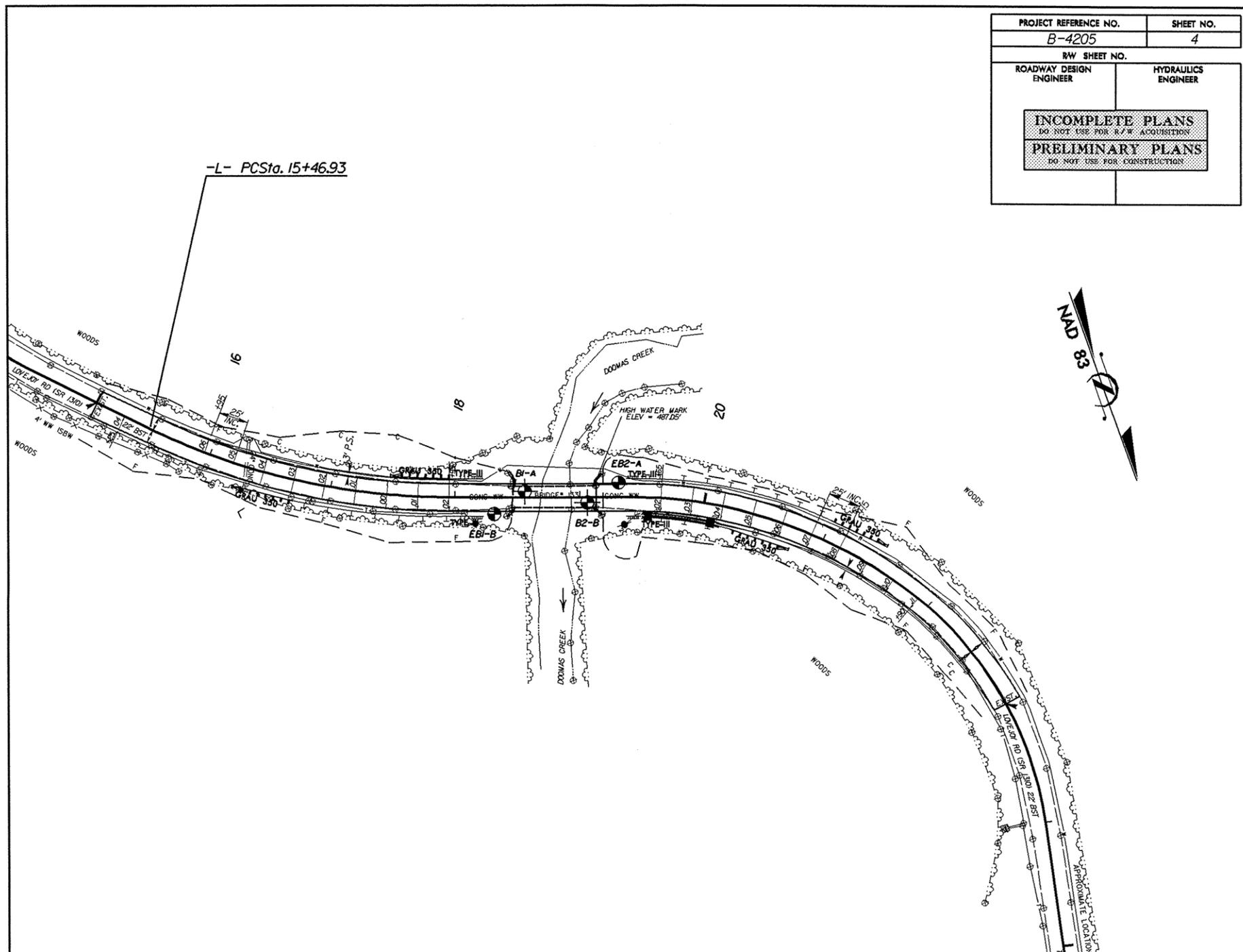
Respectfully submitted,

for: J. P. Rogers

Project Engineering Geologist
Geotechnical Engineering Unit - Harrisburg Field Office

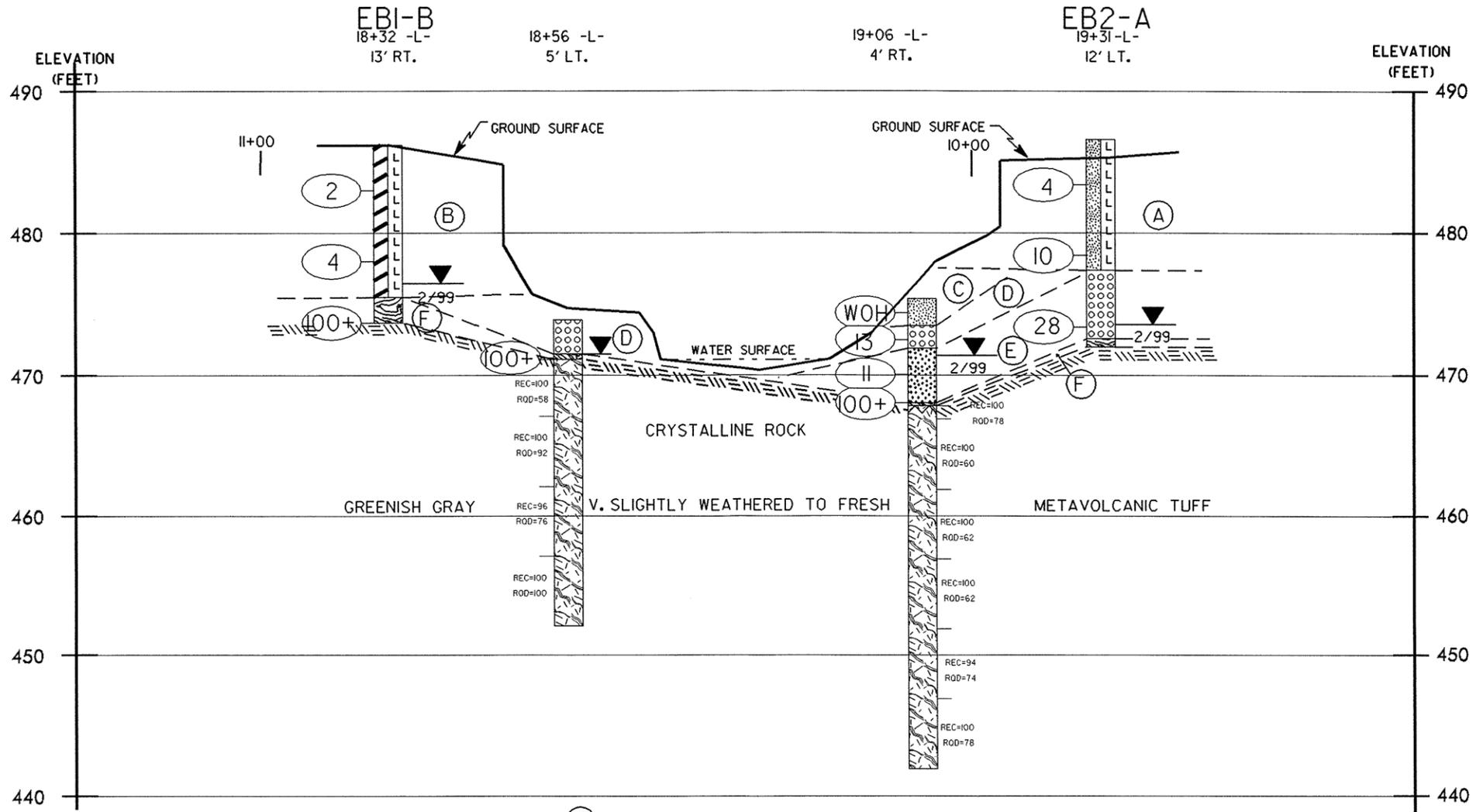
cc: Tim Johnson, PE
Division 08 Engineer

PROJECT REFERENCE NO.		SHEET NO.	
B-4205		4	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS <small>DO NOT USE FOR R/W ACQUISITION</small>			
PRELIMINARY PLANS <small>DO NOT USE FOR CONSTRUCTION</small>			

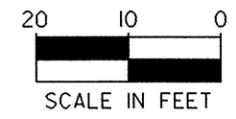


33552.1.1 (B-4205)
MONTGOMERY CO.
BRIDGE NO. 133

SOIL PROFILE 13.0' RIGHT OF -L-

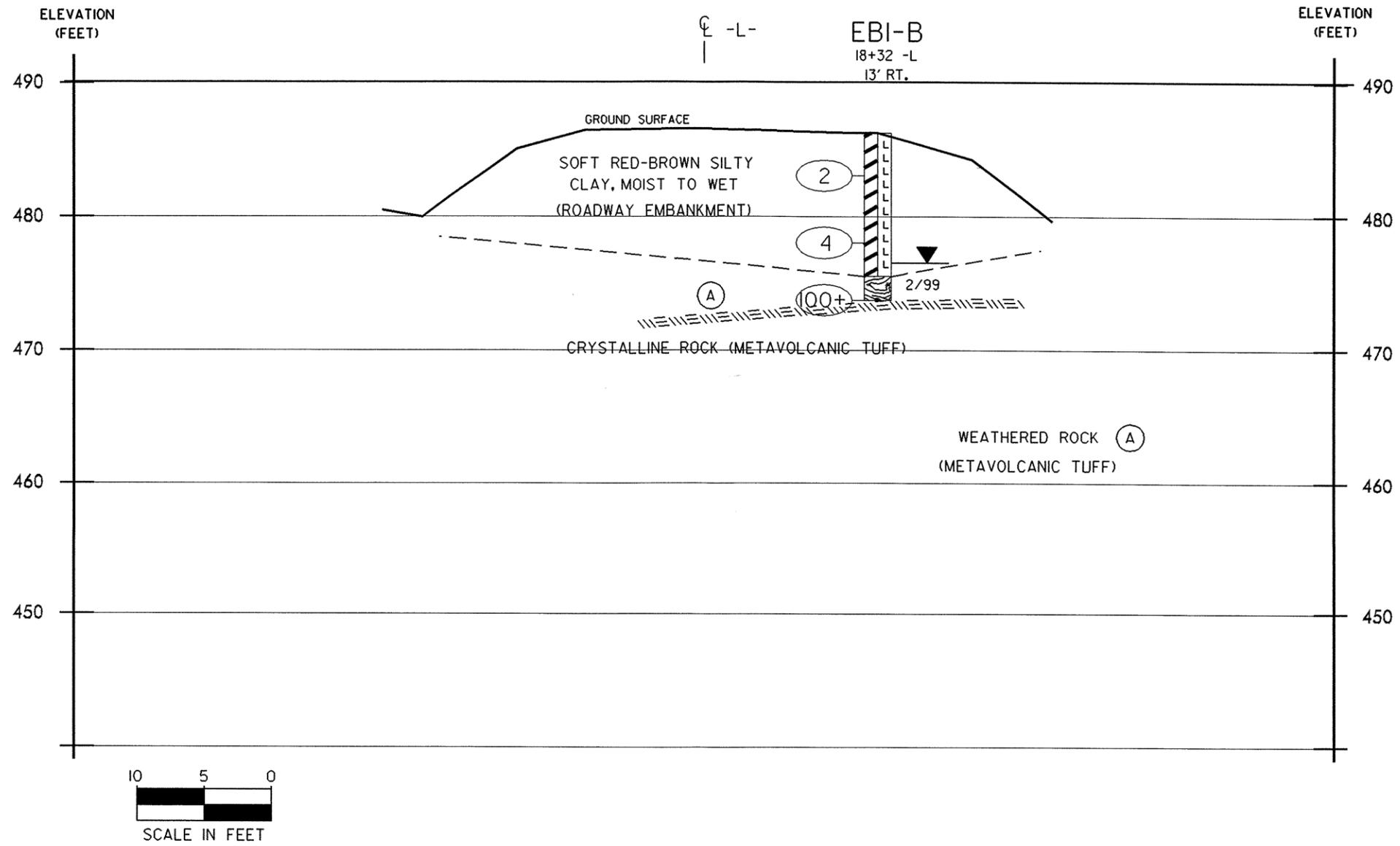


- (A) MEDIUM STIFF TO STIFF TAN-BROWN SANDY SILT, MOIST (ROADWAY EMBANKMENT)
- (B) SOFT RED BROWN SILTY CLAY, MOIST TO WET. (ROADWAY EMBANKMENT)
- (C) SOFT TAN BROWN SANDY SILT, MOI. (ALLUVIUM)
- (D) MEDIUM DENSE TAN-BRN. SAND WITH GRAVEL AND BOULDERS, MOIST TO SAT. (ALLUVIUM)
- (E) MEDIUM DENSE TAN-BROWN SILTY SAND WITH ROCK FRAGMENTS, MOIST TO WET (RESIDUAL)
- (F) WEATHERED ROCK (METAVOLCANIC TUFF)



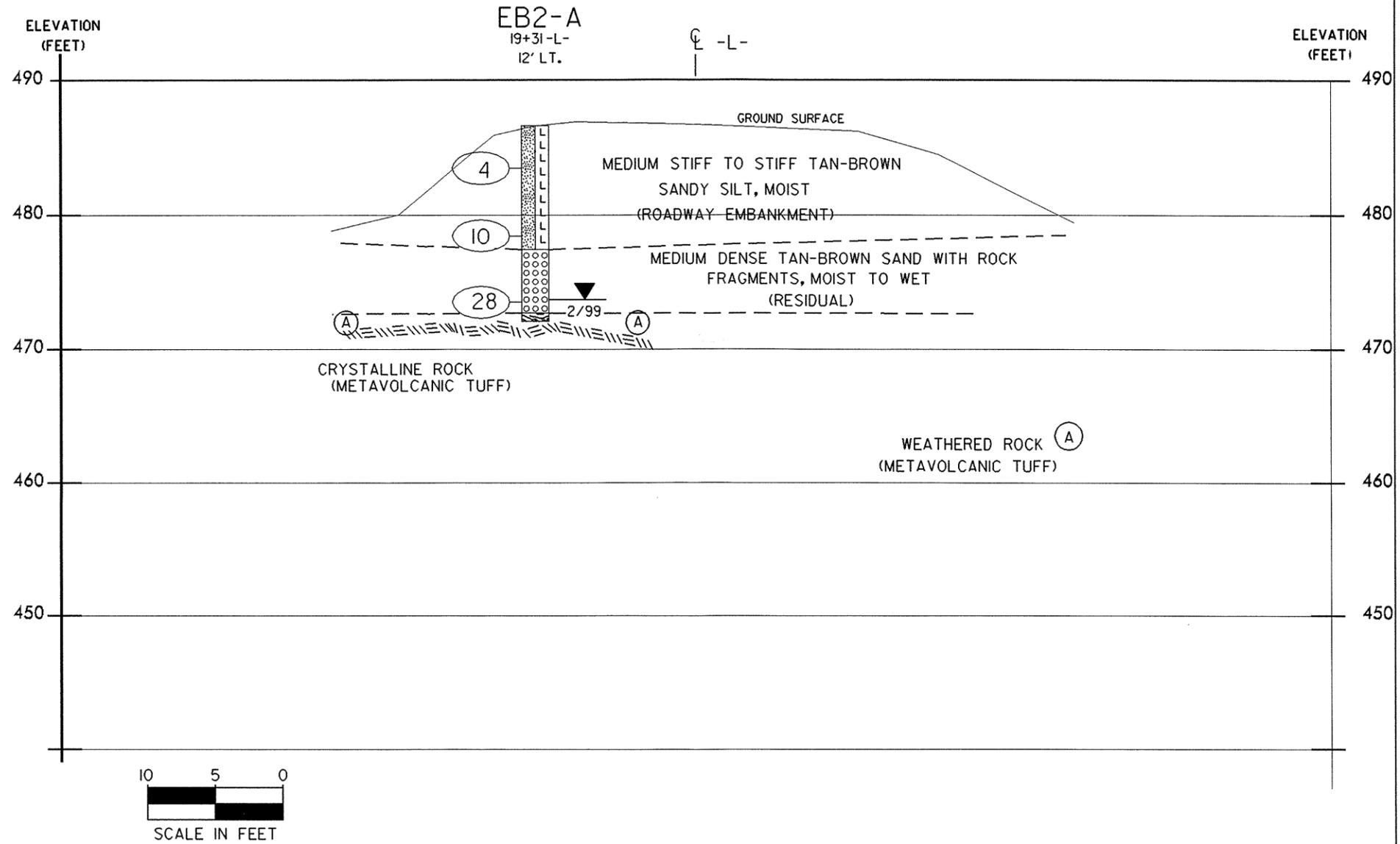
33552.II(B-4205)
MONTGOMERY CO.
BRIDGE NO. 133

CROSS SECTION THROUGH END BENT 1



33552.11 (B-4205)
MONTGOMERY CO.
BRIDGE NO. 133

CROSS SECTION THROUGH END BENT 2



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33552.1.1	ID B-4205	COUNTY MONTGOMERY	GEOLOGIST O.B. OTI
SITE DESCRIPTION BRIDGE 133 ON SR 1310 OVER DUMAS CREEK			GND WATER
BORING NO EB1-B	NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT -L-	BORING LOCATION 18+32.000	OFFSET 13.00ft RT	24 HR 9.70ft
COLLAR ELEV 486.24ft	TOTAL DEPTH 12.50ft	START DATE 2/25/99	COMPLETION DATE 02/25/99
DRILL MACHINE CME-45 SKID	DRILL METHOD SPT CORE BORING	HAMMER TYPE AUTOMATIC	
SURFACE WATER DEPTH		DEPTH TO ROCK N/A	

ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75				
486.24													Ground Surface
	2.20	1	1	1	1.0					2			SS-4
	7.20	2	2	2	1.0					4			
473.74	12.20	100			0.2					100			WEATHERED ROCK
AUGER REFUSAL ON ROCK AT ELEVATION 473.74'													

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33552.1.1	ID B-4205	COUNTY MONTGOMERY	GEOLOGIST O.B. OTI
SITE DESCRIPTION BRIDGE 133 ON SR 1310 OVER DUMAS CREEK			GND WATER
BORING NO EB2-A	NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT -L-	BORING LOCATION 19+31.000	OFFSET 12.00ft LT	24 HR 11.50ft
COLLAR ELEV 486.64ft	TOTAL DEPTH 14.60ft	START DATE 2/25/99	COMPLETION DATE 02/25/99
DRILL MACHINE CME-45 SKID	DRILL METHOD SPT CORE BORING	HAMMER TYPE AUTOMATIC	
SURFACE WATER DEPTH		DEPTH TO ROCK N/A	

ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75				
486.64													Ground Surface
	2.20	2	2	2	1.0					4			SS-1
	7.20	4	5	5	1.0					10			SS-2
	12.20	8	13	15	1.0					28			SS-3
472.04													WEATHERED ROCK
AUGER REFUSAL ON ROCK AT ELEVATION 472.04'													

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

SHEET OF

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 GEOTECHNICAL UNIT CORE BORING REPORT

PROJECT NO 33552.1.1	ID B-4205	COUNTY MONTGOMERY	GEOLOGIST O.B. OTI
SITE DESCRIPTION BRIDGE 133 ON SR 1310 OVER DUMAS CREEK			GND WATER
BORING NO B2-B	NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT -L-	BORING LOCATION 19+06.000	OFFSET 4.00ft RT	24 HR 4.00ft
COLLAR ELEV 475.44ft	TOTAL DEPTH 33.50ft	START DATE 2/25/99	COMPLETION DATE 02/26/99
DRILL MACHINE CME-45 SKID	DRILL METHOD SPT CORE BORING	HAMMER TYPE AUTOMATIC	
SURFACE WATER DEPTH		DEPTH TO ROCK N/A	

PROJECT NO: 33552.1.1 PROJECT ID: B-4205 COUNTY: MONTGOMERY GEOLOGIST: O.B. OTI
 SITE DESCRIPTION: BRIDGE 133 ON SR 1310 OVER DUMAS CREEK DRILLER: D.W. DIXON
 BORING NO: B2-B BORING LOCATION (STA): 19+06 -L- OFFSET: 4' RT.
 COLLAR ELEV: 475.44 PERSONNEL: CORE SIZE: NXWL
 TOTAL DEPTH: 33.5 DRILL MACHINE: CME-45 DATE STARTED: 2-25-99
 TOTAL RUN: 25.9 DRILL EQUIP: DATE COMPLETED: 2-26-99

ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
475.44	0.00	0	0	0	1.0							Ground Surface
	1.90	2	7	6	1.0					SS-5	M	TAN-BRN, VERY SOFT SANDY SILT, MOIST (ALLUVIUM)
	4.40	2	5	6	1.0					SS-6	W	TAN-BROWN, MEDIUM DENSE SAND WITH GRAVEL, MOIST
470.00	6.40	12	6	94	0.7					SS-7		TAN-BROWN, MED. DENSE SILTY SAND WITH ROCK FRAG., MOIST TO WET (RESIDUAL)
												WEATHERED ROCK
												V. SLI. WEATH. TO FRESH GRAY FINE TO COARSE GRAINED META- VOLCANIC TUFF
460.00												
450.00												
441.94												TERMINATED AT ELEVATION 441.94 IN CRYSTALLINE ROCK (METAVOLCANIC TUFF)

ELEV. (FT)	DEPTH (FT)	DRILL RATE (MIN/1.0 FT)	RUN NO.	REC % (FT)	RQD % (FT)	SAMPLE NO.	FIELD CLASSIFICATION AND REMARKS
467.84	7.6	1:03	1	100	78		V. SLIGHTLY WEATHERED GRAY FINE TO COARSE GRAINED METAVOLCANIC TUFF W/ PYROCLAST
466.94	8.5	1:02 1:06 1:08 1:12 1:09	2	100	60	RS-1 12.4- 13.5	V. SLIGHTLY WEATHERED GRAY FINE TO COARSE GRAINED METAVOLCANIC TUFF W/ PYROCLAST 1 JT @ 65, 1 JT @ 23, 1 JT @ 70, 1 JT @ 85, 1 JT @ 55
461.94	13.5	1:22 1:34 1:22 1:30 1:30	3	100	62		V. SLI. WEATHERED GREENISH-GRAY FINE TO COARSE GRAINED METAVOLCANIC ROCK 1 JT @ 50, 1 JT @ 68, 1 JT @ 48, 1 JT @ 65, 1 JT @ 45 1 JT @ 90
456.94	18.5	1:43 1:48 1:46 1:29 1:27	4	100	62		V. SLI. WEATHERED GRAY FINE TO COARSE GRAINED METAVOLCANIC TUFF W/ PYROCLAST NUMEROUS VERTICAL FRACTURES 1 JT @ 50
451.94	23.5	2:00 1:40 1:52 1:51 1:48	5	94	74	RS-2 27.7- 28.5	FRESH GRAY FINE TO COARSE GRAINED METAVOLCANIC TUFF W/ PYROCLAST 1 JT @ 62, 1 JT @ 75, 1 JT @ 70
446.94	28.5	1:39 1:06 1:37 1:43	6	100	78		FRESH TO V. SLI. WEATH. GRAY FINE TO COARSE GRAINED METAVOLCANIC TUFF W/ PYROCLAST 1 JT @ 64, 1 JT @ 70, 1 JT @ 50, 1 JT @ 30, 1 JT @ 10
441.94	33.5	3:05					
NOTES							

5.5551

HOLE #	SAMPLE #	PASS 10	PASS 40	PASS 200	COESAND	FINESAND	SI	CL	LL	PI	CLASS	DEPTH	MOIST. ORG.
EB1-B	SS-1	99	84	51	26.6	27.6	29.8	16.1	20	3	A4(0)	2.2-3.7	
	SS-2	99	86	57	22.3	25.8	33.8	18.1	21	4	A4(0)	7.2-8.7	
	SS-3	65	42	24	47.7	18.5	21.7	12.1	20	1	A1B(0)	12.2-13.7	
EB2-A	SS-4	96	91	84	7.4	7.4	32.8	52.3	46	19	A76(17)	2.2-3.7	
B1-A	SS-5	99	89	58	21.7	24.1	32.0	22.1	24	4	A4(0)	0.0-1.5	
	SS-6	58	37	20	51.3	17.3	19.3	12.1	19	3	A1B(0)	1.9-3.4	
	SS-7	63	46	31	36.8	17.5	31.6	14.1	25	5	A24(0)	4.4-5.9	
CREEK	SS-8	100	22	2	95.1	3.0	0.9	1.0	17	NP	A1B(0)	0.0-1.0	



FIELD SCOUR REPORT

WBS: 33552.1.1 TIP: B-4205 COUNTY: MONTGOMERY

DESCRIPTION(1): BRIDGE 133 ON SR 1310 OVER DUMAS CREEK

EXISTING BRIDGE

Information from: Field Inspection Microfilm _____ (reel _____ pos: _____)
 Other (explain) _____

Bridge No.: 133 Length: 68 Total Bents: 5 Bents in Channel: 1 Bents in Floodplain: 4
 Foundation Type: CONCRETE FOOTINGS AND COLUMNS WITH ONE TIMBER CRUTCH BENT

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: MINOR LOCAL AND CONTRACTION SCOUR

Interior Bents: LOCAL SCOUR AROUND FOOTINGS

Channel Bed: MINOR CONTRACTION SCOUR, BOULDER IN CHANNEL

Channel Bank: MINOR CONTRACTION SCOUR, EVIDENCE OF WATERFLOW OVERTOPPING BANKS

EXISTING SCOUR PROTECTION

Type(3): RIP-RAP

Extent(4): AROUND FOOTINGS WITH SOME NEAR THE END BENTS

Effectiveness(5): OK, SOME SCOUR STILL OCCURRING

Obstructions(6): NONE

INSTRUCTIONS

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoretical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

DESIGN INFORMATION

Channel Bed Material(7): BOULDERS WITH SOME SAND

Channel Bank Material(8): SAND AND SILT

Channel Bank Cover(9): SHRUBS, GRASS, SMALL AND LARGE TREES

Floodplain Width(10): 200'

Floodplain Cover(11): WOODS, SHRUBS, GRASS

Stream is(12): Aggrading _____ Degrading Static _____

Channel Migration Tendency(13): TOWARD EAST AND SOUTH

Observations and Other Comments: _____

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

BENTS

B1	B2										
N/A	N/A										

Comparison of DSE to Hydraulics Unit theoretical scour:

The Hydraulics Unit Theoretical Overtopping (Contraction) Scour Elevation is 464.5. Design Scour Elevation (Contraction) = 467.0' (Adjusted upward due to presence of rock). No Interior Bents, No End Bent Impact.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank										
Sample No.										
Retained #4										
Passed #10										
Passed #40										
Passed #200										
Coarse Sand										
Fine Sand										
Silt										
Clay										
LL										
PI										
AASHTO										
Station										
Offset										
Depth										

Template Revised 02/07/06

Reported by:
 DT Hering, CB Little

Date: 7/14/2006