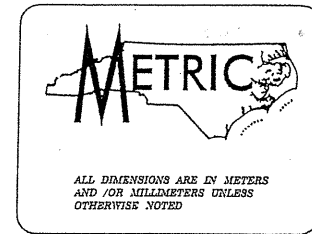


PROJECT: 34345.1.1 ID. R-06091B

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



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-06091B	1	13
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
8.1570601	MAF-F-119-(1)	P.E.	
WBS: 34345.1.1		CONST.	

**STRUCTURE
SUBSURFACE INVESTIGATION**

STATE PROJECT 34345.1.1 I.D. NO. R-06091B
 F.A. PROJECT _____
 COUNTY GUILFORD /RANDOLPH
 PROJECT DESCRIPTION US 311 HIGH POINT EAST BELT
FROM I-85 TO SOUTH OF SR 1920 NORTH OF ARCHDALE

SITE DESCRIPTION BRIDGE ON -Y9- (SR 1920) OVER
US 311 (HIGH POINT EAST BELT)
SITE 2 TUTTLE ROAD

INVENTORY

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4086. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS 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.

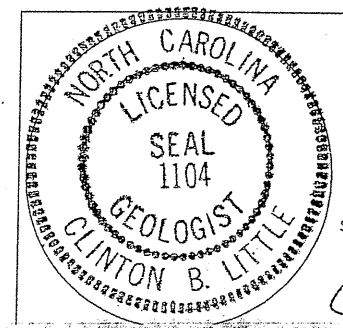
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT 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.

INVESTIGATED BY J.E. BEVERLY PERSONNEL C.C. MURRAY
 CHECKED BY C.B. LITTLE J.E. ESTEP
 SUBMITTED BY C.B. LITTLE D.K. BRATTON
 DATE MARCH 2004 J.W. VANDERBURG

DRAWN BY: J.K. McCLURE

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.



SEAL 3-26-04
[Signature]

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
R-06091B	34345.1.1	2	13



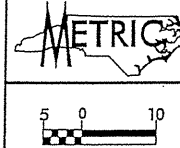
SUBSURFACE INVESTIGATION

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 WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER 30 cm ACCORDING TO STANDARD PENETRATION TEST (AASHTO T208, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND 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>VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</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>ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>		<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN 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 2.5 cm PER 50 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 (ALLOV.) - SOILS WHICH 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 - GRAY WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS WHICH 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 (F.P.) - 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 - A 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 SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL WHICH 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, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUSIVE ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p>																																																																																																																									
<p>SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <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 colspan="2">A-1</th> <th colspan="2">A-3</th> <th colspan="2">A-2</th> <th colspan="2">A-4</th> <th colspan="2">A-5</th> <th colspan="2">A-6</th> <th colspan="2">A-7</th> </tr> <tr> <th>SYMBOL</th> <td colspan="2">A-1-a</td> <td colspan="2">A-1-b</td> <td colspan="2">A-2-4</td> <td colspan="2">A-2-5</td> <td colspan="2">A-2-6</td> <td colspan="2">A-2-7</td> <td colspan="2">A-7-6</td> </tr> <tr> <th>% PASSING</th> <td colspan="2">50 MX</td> <td colspan="2">30 MX</td> <td colspan="2">10 MX</td> <td colspan="2">5 MX</td> <td colspan="2">2 MX</td> <td colspan="2">1 MX</td> <td colspan="2">0.75 MX</td> </tr> <tr> <th>LIQUID LIMIT PLASTIC INDEX</th> <td colspan="2">6 MX</td> <td colspan="2">N.P.</td> <td colspan="2">40 MX</td> <td colspan="2">40 MX</td> <td colspan="2">40 MX</td> <td colspan="2">40 MX</td> <td colspan="2">40 MX</td> </tr> <tr> <th>GROUP INDEX</th> <td colspan="2">0</td> <td colspan="2">0</td> <td colspan="2">0</td> <td colspan="2">4 MX</td> <td colspan="2">8 MX</td> <td colspan="2">12 MX</td> <td colspan="2">16 MX</td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <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">GRANULAR SOILS</td> <td colspan="2">SILT-CLAY SOILS</td> </tr> <tr> <th>GENERAL 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> </table> <p>P.I. OF A-7-5 ≤ L.L. - 30 : P.I. OF A-7-6 > L.L. - 30</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		SYMBOL	A-1-a		A-1-b		A-2-4		A-2-5		A-2-6		A-2-7		A-7-6		% PASSING	50 MX		30 MX		10 MX		5 MX		2 MX		1 MX		0.75 MX		LIQUID LIMIT PLASTIC INDEX	6 MX		N.P.		40 MX		40 MX		40 MX		40 MX		40 MX		GROUP INDEX	0		0		0		4 MX		8 MX		12 MX		16 MX		USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL AND SAND		FINE SAND		SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS		CLAYEY SOILS		GRANULAR SOILS		SILT-CLAY SOILS		GENERAL RATING AS A SUBGRADE	EXCELLENT TO GOOD				FAIR TO POOR				FAIR TO POOR		POOR		UNSATISFACTORY		<p>MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p>		<p>COMPRESSION</p> <p>SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE</p>		<p>ROCK DESCRIPTION</p> <p>WEATHERED ROCK (WR)</p> <p>CRYSTALLINE ROCK (CR)</p> <p>NON-CRYSTALLINE ROCK (NCR)</p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CP)</p>		<p>WEATHERING</p> <p>FRESH</p> <p>VERY SLIGHT (V. SL.)</p> <p>SLIGHT (SL.)</p> <p>MODERATE (MOD.)</p> <p>MODERATELY SEVERE (MOD. SEV.)</p> <p>SEVERE (SEV.)</p> <p>VERY SEVERE (V. SEV.)</p> <p>COMPLETE</p>	
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MODERATELY CLOSE	30 TO 100 cm																																																																																																																														
CLOSE	5 TO 30 cm																																																																																																																														
VERY CLOSE	LESS THAN 5 cm																																																																																																																														
TERM	THICKNESS																																																																																																																														
VERY THICKLY BEDDED	> 1 m																																																																																																																														
THICKLY BEDDED	0.5 - 1 m																																																																																																																														
THINLY BEDDED	0.05 - 0.5 m																																																																																																																														
VERY THINLY BEDDED	10 - 50 mm																																																																																																																														
THICKLY LAMINATED	2.5 - 10 mm																																																																																																																														
THINLY LAMINATED	< 2.5 mm																																																																																																																														
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REVISIONS

SEE SHEET 21 FOR -L- PROFILE
 SEE SHEETS 23 & 24 FOR -Y9- PROFILE
 SEE SHEET 2-B FOR DITCH DETAILS

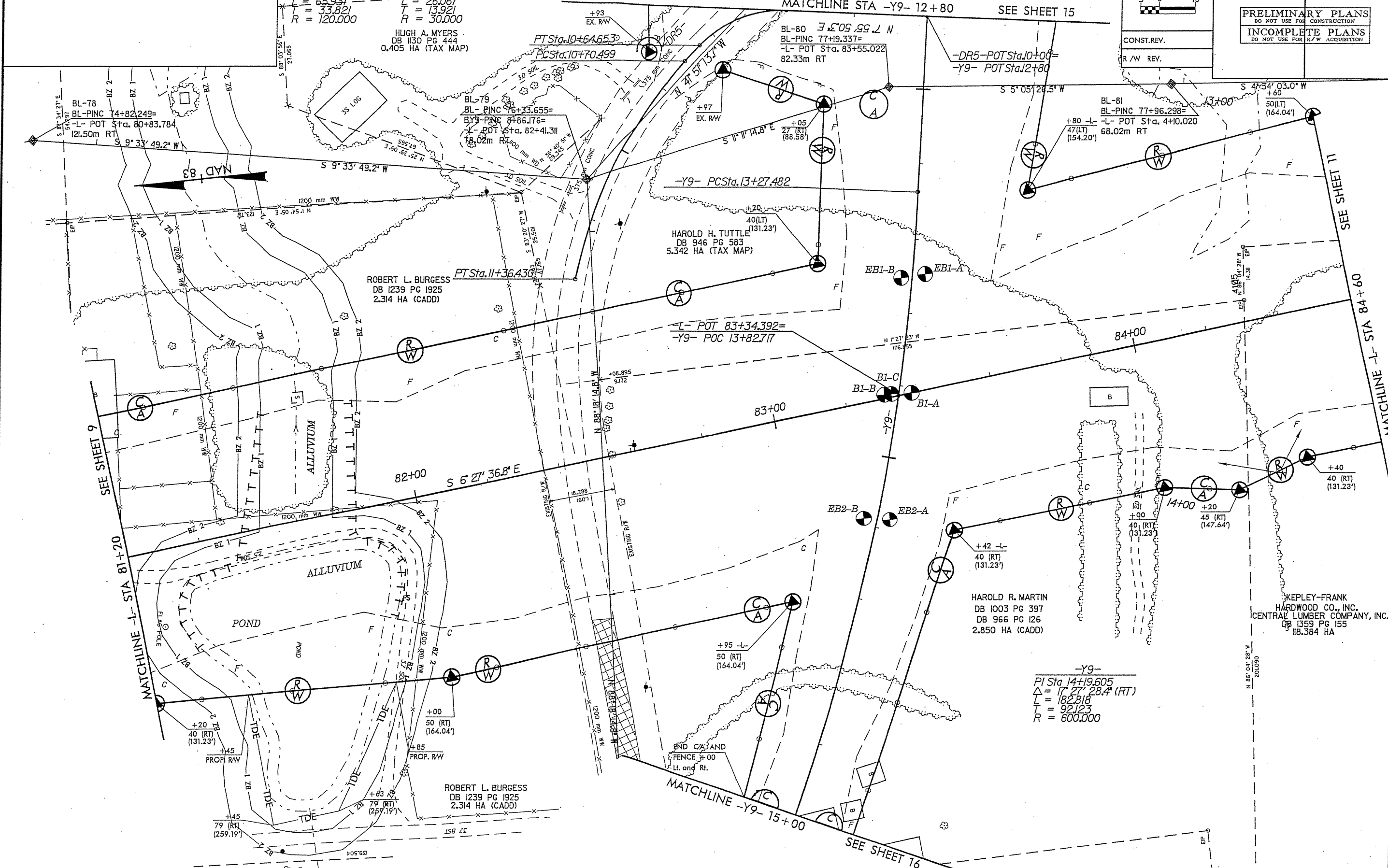


PROJECT REFERENCE NO. R-06091B	SHEET NO. 78.4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
CONST. REV.	
R/W REV.	

DRIVE

PI Sta 11+04.320	PI Sta 10+52.506
$\Delta = 31^{\circ} 28' 47.5" (LT)$	$\Delta = 49^{\circ} 47' 03.9" (LT)$
$L = 65.931$	$L = 26.067$
$R = 33.821$	$R = 13.921$
$R = 120.000$	$R = 30.000$

HUGH A. MYERS
 DB 1130 PG 444
 0.405 HA (TAX MAP)



MATCHLINE -L- STA 81+20
SEE SHEET 9

MATCHLINE -L- STA 84+60
SEE SHEET 11

MATCHLINE -Y9- 15+00
SEE SHEET 16

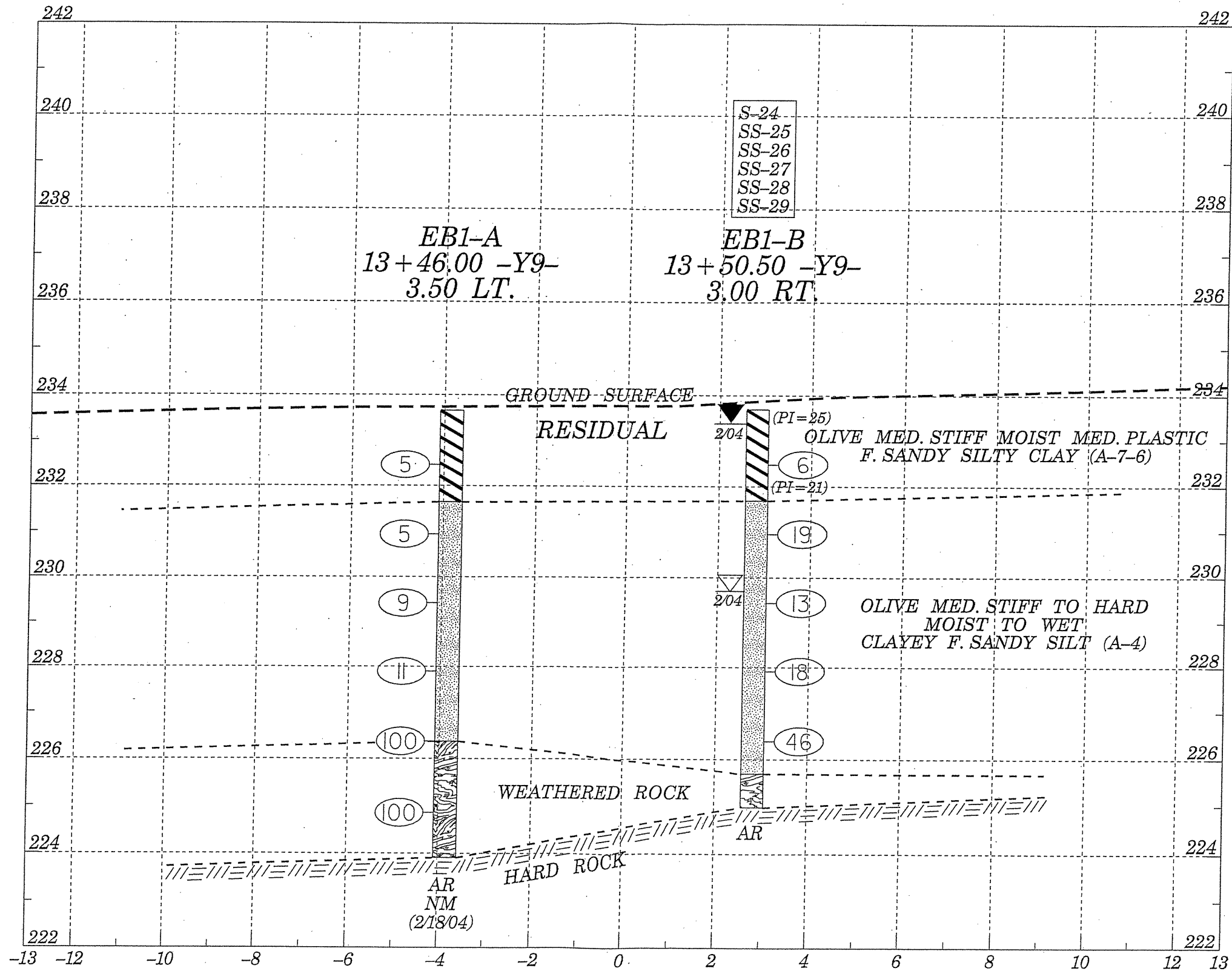
-Y9-

PI Sta 14+19.605
$\Delta = 17^{\circ} 27' 28.4" (RT)$
$L = 182.818$
$R = 92.123$
$R = 600.000$

KEPLEY-FRANK
 HARDWOOD CO., INC.
 CENTRAL LUMBER COMPANY, INC.
 DB 1359 PG 155
 118.384 HA

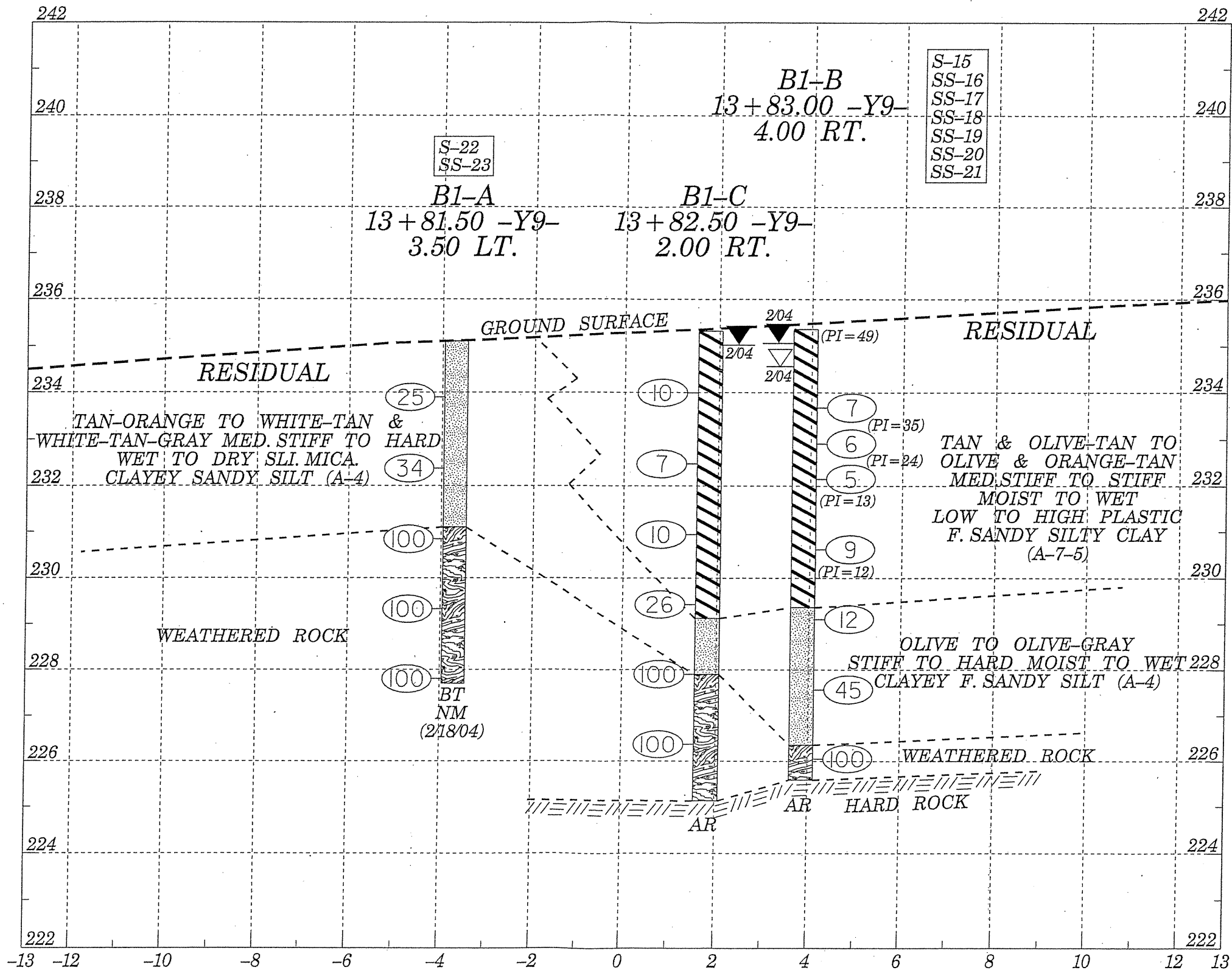
DATE PLOTTED: 08/01/00 10:00 AM

SECTION THRU END BENT ONE



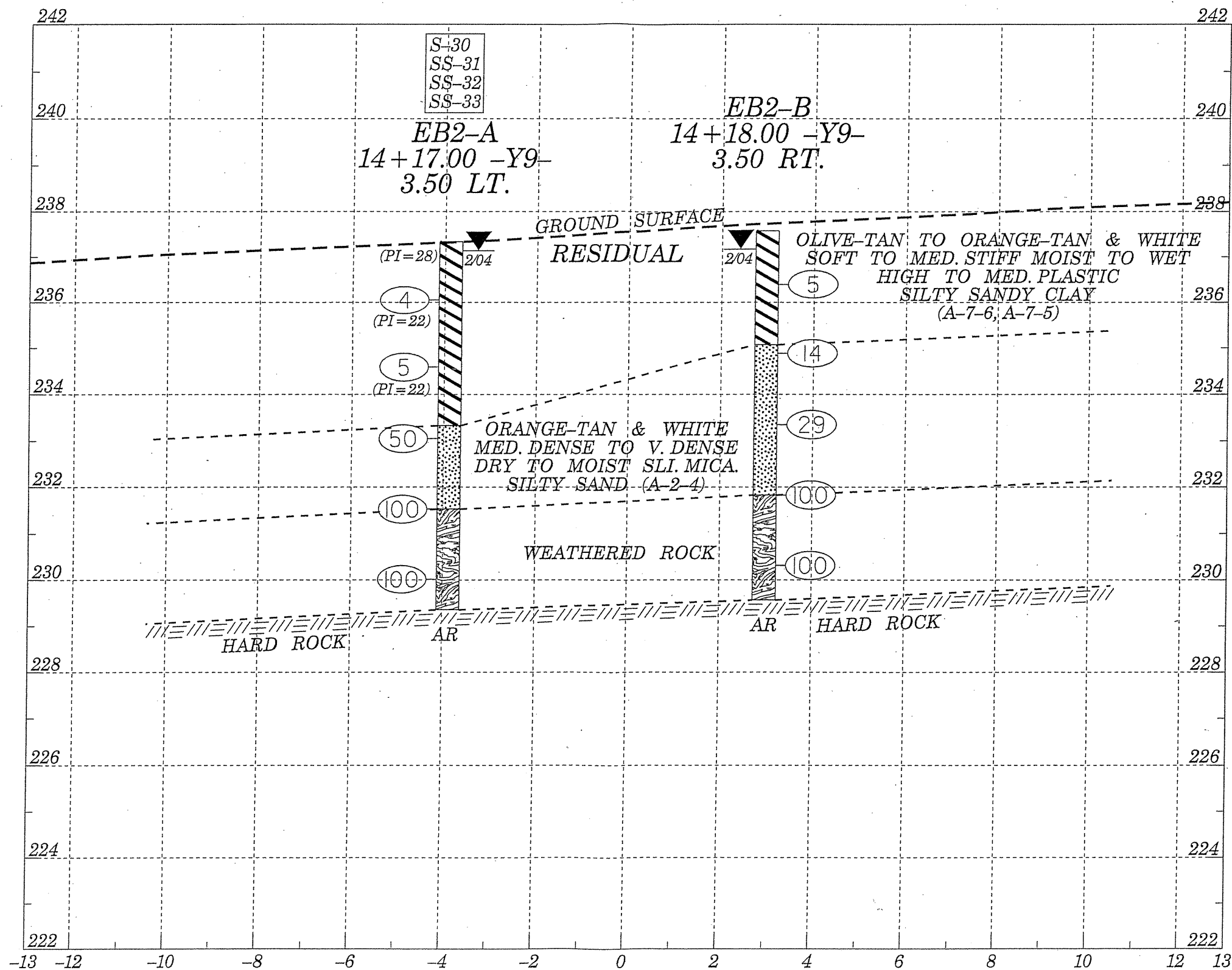
NOTE: 24 HR. WATER RESULT OF SURFACE RUNOFF

SECTION THRU BENT ONE



NOTE: 24 HR. WATER RESULT OF SURFACE RUNOFF

SECTION THRU END BENT TWO



NOTE: 24 HR. WATER RESULT OF SURFACE RUNOFF

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34345.1.1		ID R-06091B		COUNTY RANDOLPH		GEOLOGIST C.C. MURRAY							
SITE DESCRIPTION SITE 2 (-Y9- SR 1920 TUTTLE RD.) OVER US 311							GND WATER						
BORING NO EB1-A		NORTHING 0.00		EASTING 0.00		0 HR N/A	24 HR N/A						
ALIGNMENT Y9		BORING LOCATION 13+49.000		OFFSET 3.50m LT									
COLLAR ELEV 233.65m		TOTAL DEPTH 9.74m		START DATE 2/18/04		COMPLETION DATE 02/18/04							
DRILL MACHINE CME-550X			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK 9.74m			Log EB1-A, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		15cm	15cm	15cm		0	25	50	75				100
233.65													Ground Surface
233.00	1.19	2	2	3	0.30								(RESIDUAL) OLIVE MED. STIFF MED. PLASTIC F. SANDY SILTY CLAY (A-7-6)
231.00	2.71	2	2	3	0.30								OLIVE MED. STIFF TO STIFF CLAYEY F. SANDY SILT (A-4)
229.00	4.24	2	4	5	0.30								
	5.76	5	5	6	0.30								
227.00	7.28	5	50	50	0.18								
225.00	8.81	12	46	64	0.27								WEATHERED ROCK (OLIVE HARD F. SANDY SILT)
223.91													NOTE: 24 HR. WATER NOT MEASURED

PROJECT NO 34345.1.1		ID R-06091B		COUNTY RANDOLPH		GEOLOGIST C.C. MURRAY							
SITE DESCRIPTION SITE 2 (-Y9- SR 1920 TUTTLE RD.) OVER US 311							GND WATER						
BORING NO EB1-B		NORTHING 0.00		EASTING 0.00		0 HR 4.00m	24 HR 0.30m						
ALIGNMENT Y9		BORING LOCATION 13+50.500		OFFSET 3.00m RT									
COLLAR ELEV 233.69m		TOTAL DEPTH 8.72m		START DATE 2/18/04		COMPLETION DATE 02/18/04							
DRILL MACHINE CME-550X			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK 8.72m			Log EB1-B, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		15cm	15cm	15cm		0	25	50	75				100
233.69													Ground Surface
233.00	1.21	2	3	3	0.30								(RESIDUAL) OLIVE MED. STIFF MED. PLASTIC F. SANDY SILTY CLAY (A-7-6)
231.00	2.73	7	10	9	0.30								OLIVE STIFF TO HARD CLAYEY F. SANDY SILT (A-4)
229.00	4.26	3	5	8	0.30								
	5.78	4	7	11	0.30								
227.00	7.30	17	24	22	0.30								WEATHERED ROCK
224.90													AUGER REFUSAL AT ELEV. 224.967 ON HARD ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34345.1.1		ID R-06091B		COUNTY RANDOLPH		GEOLOGIST C.C. MURRAY									
SITE DESCRIPTION SITE 2 (-Y9- SR 1920 TUTTLE RD.) OVER US 311							GND WATER								
BORING NO B1-A		NORTHING 0.00		EASTING 0.00		0 HR N/A									
ALIGNMENT Y9		BORING LOCATION 13+81.500		OFFSET 3.50m LT		24 HR N/A									
COLLAR ELEV 235.10m		TOTAL DEPTH 7.40m		START DATE 2/18/04		COMPLETION DATE 02/18/04									
DRILL MACHINE CME-550X			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC									
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log B1-A, Page 1 of 1									
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION		
		15cm	15cm	15cm		0	25	50	75					100	
235.10														Ground Surface	
234.00	1.21	6	11	14	0.30								S-22	W	(RESIDUAL) TAN-ORANGE TO WHITE-TAN & WHITE-TAN-GRAY MED. STIFF TO HARD WET TO DRY SLI. MICA. CLAYEY SANDY SILT (A-4)
													SS-23	D/M	
232.00	2.73	9	17	17	0.30									D/M	
															WEATHERED ROCK (WHITE-TAN-GRAY HARD DRY TO MOIST SLI. MICA. CLAYEY SANDY SILT)
230.00	4.26	61	39		0.20										
228.00	5.78	100			0.12										
227.70	7.30	100			0.10										
TERMINATED BORING AT ELEV. 227.699 IN WEATHERED ROCK													NOTE: 24 HR WATER NOT MEASURED		

PROJECT NO 34345.1.1		ID R-06091B		COUNTY RANDOLPH		GEOLOGIST C.C. MURRAY								
SITE DESCRIPTION SITE 2 (-Y9- SR 1920 TUTTLE RD.) OVER US 311							GND WATER							
BORING NO B1-C		NORTHING 0.00		EASTING 0.00		0 HR N/A								
ALIGNMENT Y9		BORING LOCATION 13+82.500		OFFSET 2.00m RT		24 HR 0.30m								
COLLAR ELEV 235.32m		TOTAL DEPTH 10.20m		START DATE 2/17/04		COMPLETION DATE 02/17/04								
DRILL MACHINE CME-550X			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK 10.20m			Log B1-C, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		15cm	15cm	15cm		0	25	50	75					100
235.32														Ground Surface
234.00	1.33	4	5	5	0.30									(RESIDUAL) TAN TO OLIVE-TAN & OLIVE MED. STIFF TO STIFF MED. TO LOW PLASTIC F. SANDY SILTY CLAY (A-7-5)
232.00	2.85	2	2	5	0.30									
														OLIVE V. STIFF TO HARD CLAYEY SANDY SILT (A-4)
230.00	4.38	3	4	6	0.30									
228.00	7.42	31	69		0.23									
														WEATHERED ROCK
226.00	8.95	100			0.14									
AUGER REFUSAL AT ELEV. 225.118 ON HARD ROCK													NOTE: 24 HR WATER RESULT OF SURFACE RUNOFF	

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34345.1.1		ID R-06091B		COUNTY RANDOLPH		GEOLOGIST C.C. MURRAY						
SITE DESCRIPTION SITE 2 (-Y9- SR 1920 TUTTLE RD.) OVER US 311							GND WATER					
BORING NO B1-B		NORTHING 0.00		EASTING 0.00		0 HR 0.80m	24 HR 0.30m					
ALIGNMENT Y9		BORING LOCATION 13+83.000		OFFSET 4.00m RT								
COLLAR ELEV 235.36m		TOTAL DEPTH 9.78m		START DATE 2/17/04		COMPLETION DATE 02/17/04						
DRILL MACHINE CME-550X			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK 9.78m			Log B1-B, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		15cm	15cm	15cm		0	25	50	75			
235.36												
235.00												
	1.69	2	3	4	0.30							
233.00	2.45	3	3	3	0.30							
	3.21	2	2	3	0.30							
231.00	4.74	3	3	6	0.30							
229.00	6.26	3	4	8	0.30							
	7.79	9	19	26	0.30							
227.00	9.31	100			0.14							
225.58												
AUGER REFUSAL AT ELEV 225.581 ON HARD ROCK												
NOTE: 24 HR WATER RESULT OF SURFACE RUNOFF												

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34345.1.1		ID R-06091B		COUNTY RANDOLPH		GEOLOGIST C.C. MURRAY						
SITE DESCRIPTION SITE 2 (-Y9- SR 1920 TUTTLE RD.) OVER US 311							GND WATER					
BORING NO EB2-A		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT Y9		BORING LOCATION 14+17.000		OFFSET 3.50m LT		24 HR 0.20m						
COLLAR ELEV 237.33m		TOTAL DEPTH 7.98m		START DATE 2/18/04		COMPLETION DATE 02/18/04						
DRILL MACHINE CME-550X			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK 7.98m			Log EB2-A, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		15cm	15cm	15cm		0	25	50	75			
237.33												Ground Surface
236.00	1.28	1	2	2	0.30	4				S-30	M/W	(RESIDUAL) OLIVE-TAN TO ORANGE-TAN & WHITE SOFT TO MED. STIFF HIGH TO MED. PLASTIC SILTY SANDY CLAY (A-7-6, A-7-5)
234.00	2.75	1	2	3	0.30	5				SS-31	M/W	
234.00										SS-32	M/W	
232.00	4.28	5	23	27	0.30		50			SS-33	D/M	ORANGE-TAN & WHITE DENSE TO V. DENSE SLI. MICA. SILTY SAND (A-2-4)
230.00	5.80	25	63	37	0.18				100		D/M	WEATHERED ROCK
229.35	7.32	27	73		0.29				100			
AUGER REFUSAL AT ELEV. 229.35 ON HARD ROCK												NOTE: 24 HR WATER RESULT OF SURFACE RUNOFF

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34345.1.1		ID R-06091B		COUNTY RANDOLPH		GEOLOGIST C.C. MURRAY						
SITE DESCRIPTION SITE 2 (-Y9- SR 1920 TUTTLE RD.) OVER US 311							GND WATER					
BORING NO EB2-B		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT Y9		BORING LOCATION 14+18.000		OFFSET 3.50m RT		24 HR 0.40m						
COLLAR ELEV 237.57m		TOTAL DEPTH 8.01m		START DATE 2/18/04		COMPLETION DATE 02/18/04						
DRILL MACHINE CME-550X			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH N/A			DEPTH TO ROCK 8.01m			Log EB2-B, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		15cm	15cm	15cm		0	25	50	75			
237.57												Ground Surface
237.00	1.17	2	2	3	0.30	5					W	(RESIDUAL) OLIVE-TAN TO ORANGE-TAN & WHITE MED. STIFF HIGH TO MED. PLASTIC SILTY SANDY CLAY (A-7-6, A-7-5)
235.00	2.69	4	5	9	0.30	14					M	ORANGE-TAN & WHITE MED. DENSE SLI. MICA. SILTY SAND (A-2-4)
233.00	4.22	4	7	22	0.30				29		M	
231.00	5.74	64	36		0.18				100		M	WEATHERED ROCK
229.56	7.26	100			0.10				100		M	
AUGER REFUSAL AT ELEV. 229.567 ON HARD ROCK												NOTE: 24 HR WATER RESULT OF SURFACE RUNOFF

TEST RESULTS

PROJECT: 34345.1.1 R-06091B

COUNTY: RANDOLPH

SITE DESCRIPTION: SITE 2 (-Y9- SR 1920 TUTTLE RD.) OVER US 311

SOIL SAMPLE RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	N	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
								C. SAND	F. SAND	SILT	CLAY	10	40	200		
EB1-B																
S-24	3.0 RT	13+50.5	0.00-0.50	A-7-6(19)		46	25	8.9	21.0	35.7	34.4	100	95	76		
SS-25			1.21-1.66	A-7-6(16)	6	44	21	8.7	20.8	38.1	32.4	98	93	76		
SS-26			2.73-3.18	A-4(5)	19	35	7	4.2	34.2	49.4	12.1	100	99	72		
SS-27			4.26-4.71	A-4(2)	13	34	4	6.7	36.2	43.0	14.2	98	95	65		
SS-28			5.78-6.23	A-4(4)	18	34	7	6.5	34.0	49.4	10.1	100	97	69		
SS-29			7.30-7.75	A-4(0)	46	27	NP	8.0	46.7	37.2	8.1	100	98	58		
B1-A																
S-22	3.5LT	13+81.5	0.00-0.50	A-4(1)		27	8	26.2	31.1	20.4	22.2	100	89	49		
SS-23			1.21-1.66	A-4(0)	25	27	NP	34.3	34.4	19.2	12.1	100	82	38		
B1-B																
S-15	4.0 RT	13+83	0.00-0.50	A-7-5(48)		81	49	7.9	9.9	25.6	56.6	100	96	85		
SS-16			1.69-2.14	A-7-5(39)	7	68	35	1.6	9.1	36.7	52.6	100	99	93		
SS-17			2.45-2.90	A-7-5(24)	6	54	24	3.4	18.6	45.6	32.4	100	98	87		
SS-18			3.21-3.66	A-7-5(14)	5	47	13	2.6	25.7	47.4	24.3	100	99	84		
SS-19			4.74-5.19	A-7-5(11)	9	47	12	3.2	32.2	48.4	16.2	100	99	77		
SS-20			6.26-6.71	A-4(0)	12	32	NP	9.1	44.7	36.1	10.1	100	96	58		
SS-21			7.79-8.24	A-4(0)	45	25	NP	8.6	46.7	34.6	10.1	100	99	57		
EB2-A																
S-30	3.5 LT	14+17	0.00-0.50	A-7-6(12)		50	28	29.9	16.4	13.2	40.4	97	81	54		
SS-31			1.28-1.73	A-7-5(15)	4	53	22	18.8	17.0	25.8	38.4	100	89	68		
SS-32			2.75-3.20	A-7-6(14)	5	49	22	15.0	23.1	33.7	28.3	97	88	67		
SS-33			4.28-4.73	A-2-4(0)	50	26	NP	38.0	33.4	21.5	7.1	92	71	32		

PROJECT: 34345.1.1 ID.R-0609IB

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE

SUBSURFACE INVESTIGATION

STATE PROJECT 34345.1.1 I.D. NO. R-0609IB

F.A. PROJECT _____

COUNTY GUILFORD - RANDOLPH

PROJECT DESCRIPTION US 311 HIGH POINT
EAST BELT FROM I-85 TO SOUTH OF
SR 1920 NORTH OF ARCHDALE

SITE DESCRIPTION BRIDGE ON NC 62
OVER US 311 BETWEEN SR 1160 & SR 1161



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-0609IB	1	12
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
8.1570601	MAF-F-119-(1)	P.E.	
WBS #34345.1.1		CONST.	

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT # (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS 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 (ON-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.

INVESTIGATED BY J.E. BEVERLY PERSONNEL C.C. MURRAY

CHECKED BY C.B. LITTLE J.E. ESTEP

SUBMITTED BY C.B. LITTLE D.K. BRATTIN

DATE MARCH 2004

DRAWN BY: J.E. BEVERLY

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT 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.

3-11-04

SEAL

SIGNATURE

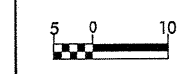
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT



SUBSURFACE INVESTIGATION

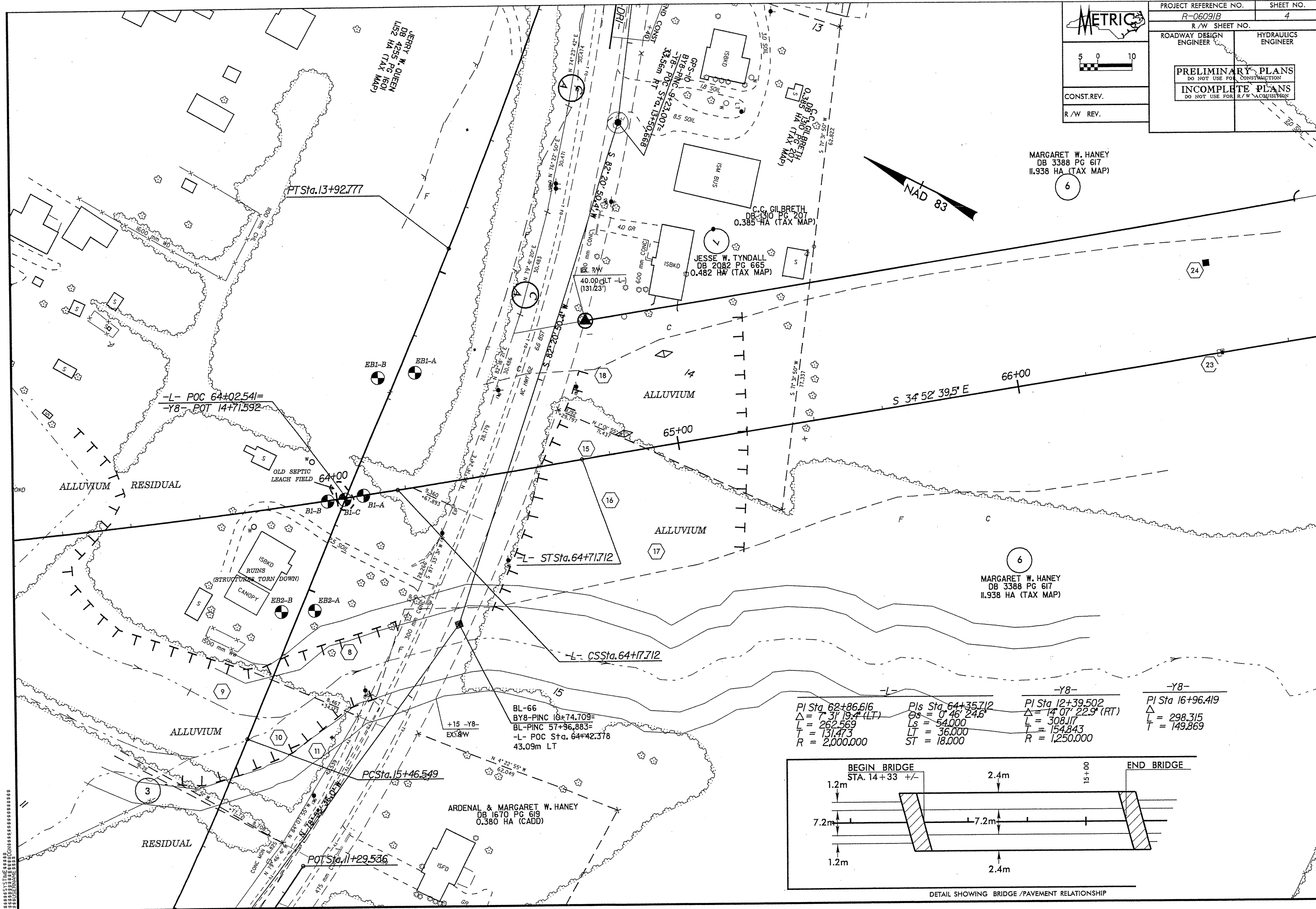
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION				GRADATION				ROCK DESCRIPTION				TERMS AND DEFINITIONS																																																																																														
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER 30 cm ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6				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.				HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN 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 2.5 cm PER 50 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:				ALLUVIUM (ALLUV.) - SOILS WHICH 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 IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (F.P.) - 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 SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL WHICH 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, WHICH 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 (IN OF A 63.5 kg HAMMER FALLING 0.76 METERS REQUIRED TO PRODUCE A PENETRATION OF 30 cm INTO SOIL WITH A 5 cm OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 2.5 cm PENETRATION WITH 50 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.																																																																																														
SOIL LEGEND AND AASHTO CLASSIFICATION <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr> <th>GENERAL CLASS.</th> <th>GRANULAR MATERIALS (>35% PASSING #200)</th> <th>SILT-CLAY MATERIALS (>35% PASSING #200)</th> <th>ORGANIC MATERIALS</th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1, A-3, A-2, A-4, A-5, A-6, A-7</td> <td>A-2, A-4, A-5, A-6, A-7</td> <td>A-1, A-2, A-3, A-4, A-5, A-6, A-7</td> </tr> <tr> <td>SYMBOL</td> <td>[Diagrams]</td> <td>[Diagrams]</td> <td>[Diagrams]</td> </tr> <tr> <td>% PASSING</td> <td>50 MX, 30 MX, 15 MX</td> <td>40 MX, 10 MX, 5 MX</td> <td>40 MX, 10 MX, 5 MX</td> </tr> <tr> <td>LIQUID LIMIT</td> <td>6 MX</td> <td>N.P.</td> <td>40 MX, 10 MX, 5 MX</td> </tr> <tr> <td>PLASTIC INDEX</td> <td>0</td> <td>0</td> <td>4 MX, 8 MX, 16 MX</td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS AND SAND, FINE SAND</td> <td>SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS, CLAYEY SOILS</td> </tr> <tr> <td>GEN. RATING AS A SUBGRADE</td> <td>EXCELLENT TO GOOD</td> <td>FAIR TO POOR</td> <td>FAIR TO POOR, POOR, UNSUITABLE</td> </tr> </table>				GENERAL CLASS.	GRANULAR MATERIALS (>35% PASSING #200)	SILT-CLAY MATERIALS (>35% PASSING #200)	ORGANIC MATERIALS	GROUP CLASS.	A-1, A-3, A-2, A-4, A-5, A-6, A-7	A-2, A-4, A-5, A-6, A-7	A-1, A-2, A-3, A-4, A-5, A-6, A-7	SYMBOL	[Diagrams]	[Diagrams]	[Diagrams]	% PASSING	50 MX, 30 MX, 15 MX	40 MX, 10 MX, 5 MX	40 MX, 10 MX, 5 MX	LIQUID LIMIT	6 MX	N.P.	40 MX, 10 MX, 5 MX	PLASTIC INDEX	0	0	4 MX, 8 MX, 16 MX	GROUP INDEX	0	0	0	USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS AND SAND, FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS, CLAYEY SOILS	GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD	FAIR TO POOR	FAIR TO POOR, POOR, UNSUITABLE	ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.				MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.				WEATHERING FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V. SL.) - 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. SLIGHT (SL.) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 2.5 cm. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. 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. 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. IF TESTED, WOULD YIELD SPT REFUSAL. SEVERE (SEV.) - ALL ROCKS 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. IF TESTED, YIELDS SPT N VALUES > 100 BLOWS PER 30 cm. 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. IF TESTED, YIELDS SPT N VALUES < 100 BLOWS PER 30 cm. 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.																																																										
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INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. 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.				NOTES: BENCH MARK: RR SPIKE IN BASE OF 320mm HICKORY, 90 METERS LT OF BASELINE STA 57+97 -L- ELEVATION: 247.151																																																																																																						

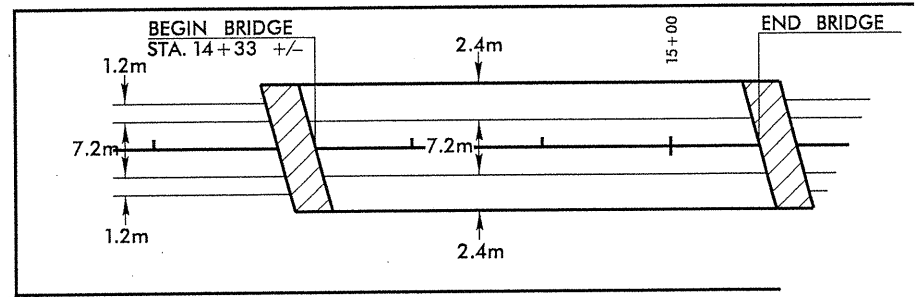


CONST. REV.
R/W REV.

MARGARET W. HANEY
DB 3388 PG 617
11.938 HA (TAX MAP)



-L-	-Y8-	-Y8-	-Y8-
PI Sta 62+86.616	PIs Sta 64+35.712	PI Sta 12+39.502	PI Sta 16+96.419
$\Delta = 7' 31'' 19.4'' (LT)$	$\Delta = 0' 46'' 24.6''$	$\Delta = 14' 07'' 22.9'' (RT)$	$\Delta = 298.315$
L = 262.569	Ls = 54.000	L = 308.117	L = 154.843
T = 131.473	LT = 36.000	T = 154.843	T = 149.869
R = 2,000,000	ST = 18.000	R = 1,250,000	

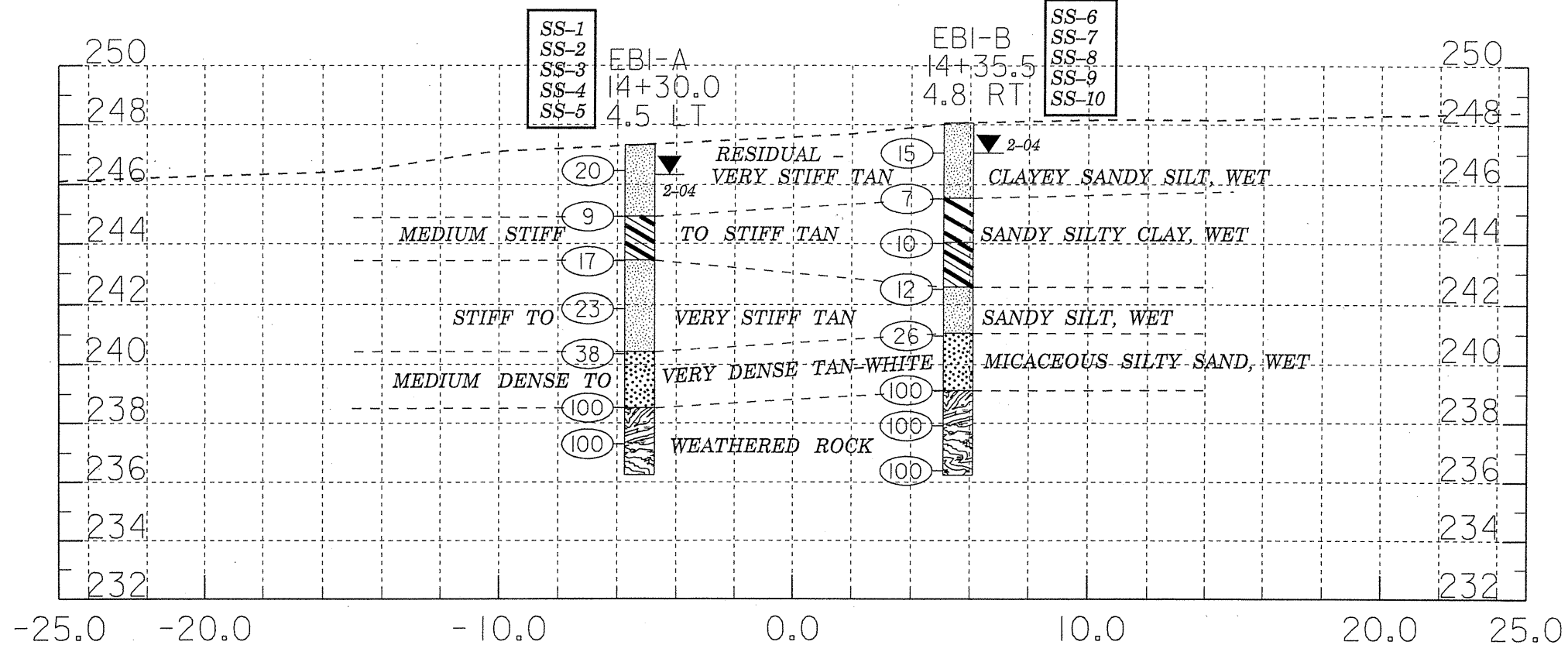


DETAIL SHOWING BRIDGE / PAVEMENT RELATIONSHIP

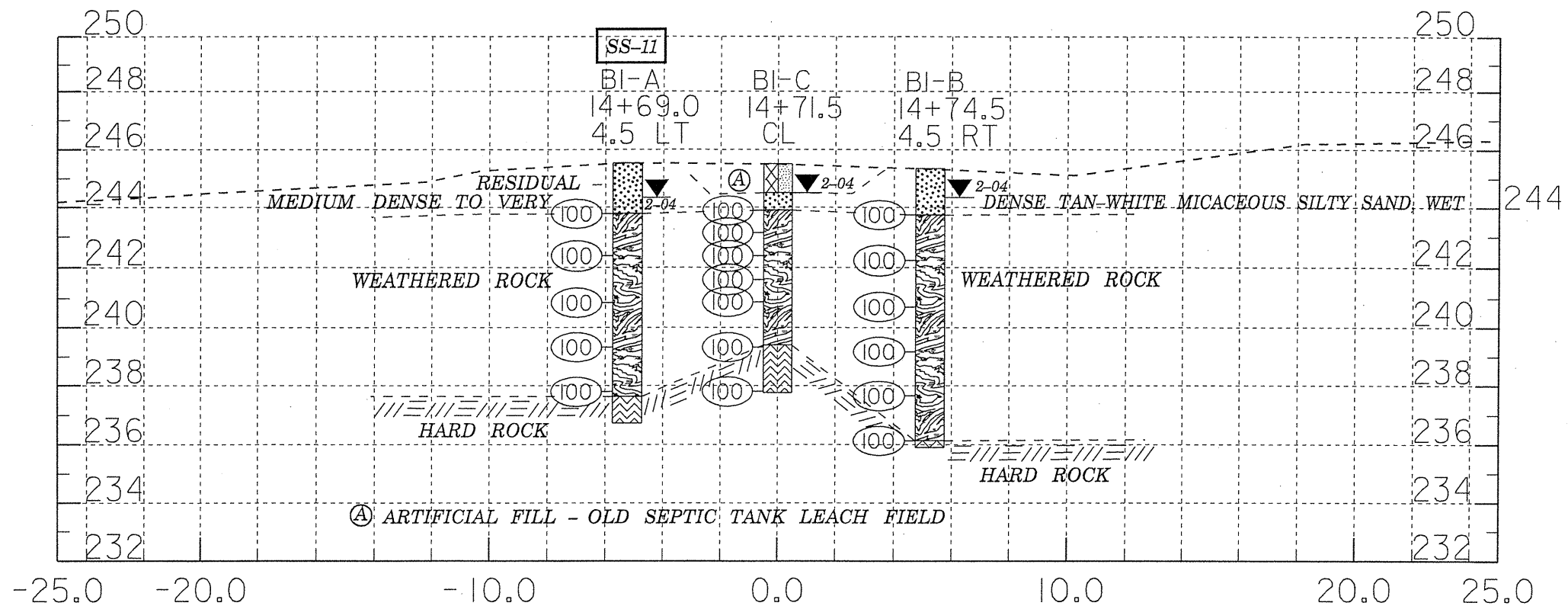


STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-0609IB	5	12
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
8.1570601		P.E.	
WBS #34345.1.1		CONST.	

SECTION THRU EB1-A & EB1-B



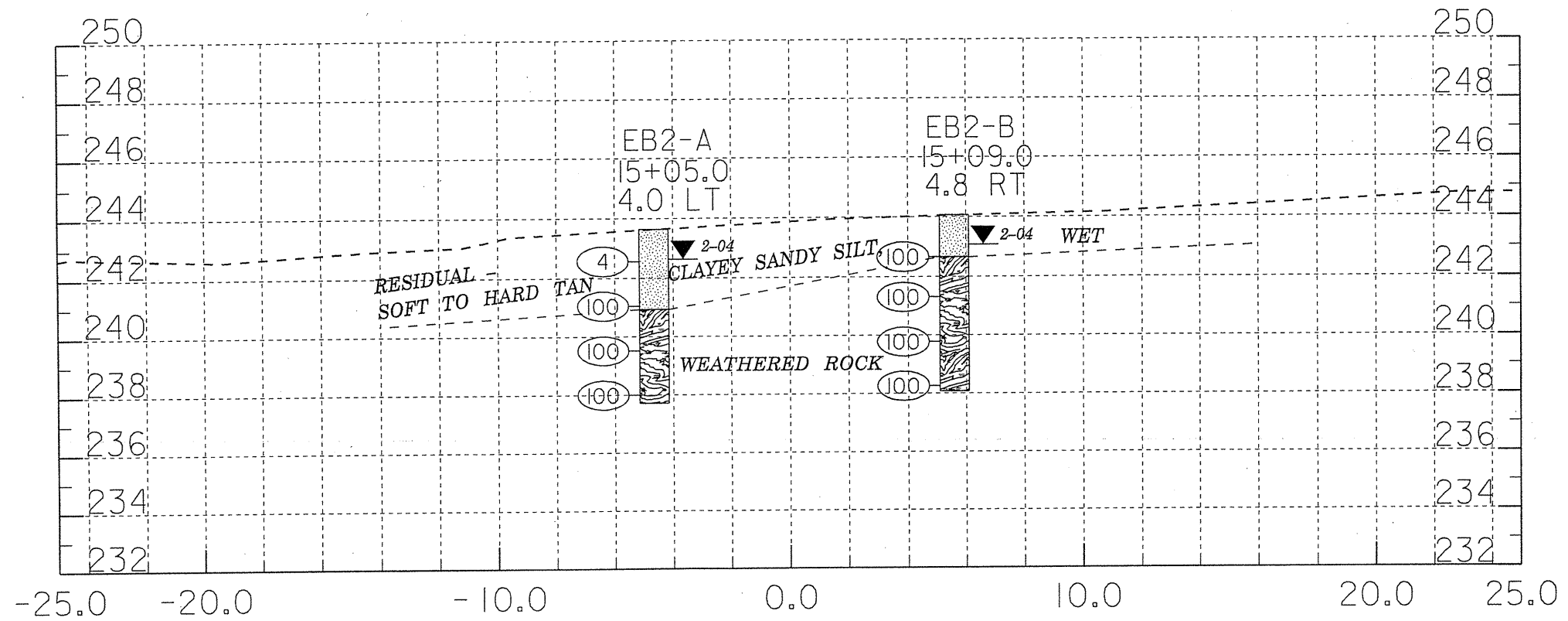
SECTION THRU B1-A, B1-C, & B1-B





STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
8.1570601		P.E.	
WBS #34345.1.1		CONST.	

SECTION THRU EB2-A & EB2-B



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34345.1.1		ID R-06091B		COUNTY GUILFORD		GEOLOGIST C.C. MURRAY							
SITE DESCRIPTION BRIDGE ON NC 62 (-Y8-) OVER US 311 BETWEEN SR 1160 & SR 1161							GND WATER						
BORING NO EB1-A		NORTHING 0.00		EASTING 0.00		0 HR 1.00m							
ALIGNMENT Y8		BORING LOCATION 14+30.000		OFFSET 4.50m LT		24 HR 1.00m							
COLLAR ELEV 247.33m		TOTAL DEPTH 11.08m		START DATE 2/10/04		COMPLETION DATE 02/10/04							
DRILL MACHINE CME-550			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB1-A, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		15cm	15cm	15cm		0	25	50	75				100
247.33												Ground Surface	
	0.87	8	8	12	0.30					20	SS-6	WET	RESIDUAL - VERY STIFF TAN CLAYEY SANDY SILT
	2.41	2	4	5	0.30					9	SS-7	WET	STIFF TAN SANDY SILTY CLAY
	3.93	3	7	10	0.30					7	SS-8	WET	VERY STIFF TAN SANDY SILT
	5.46	5	8	15	0.30					23	SS-9	WET	
	6.98	16	16	22	0.30					36	SS-10	WET	DENSE TAN-WHITE SILTY SAND
	8.51	18	51	49	0.25					100			WEATHERED ROCK
	10.03	49	51		0.22					100			
BORING TERMINATED AT ELEVATION 236.254 METERS IN WEATHERED ROCK													

PROJECT NO 34345.1.1		ID R-06091B		COUNTY GUILFORD		GEOLOGIST C.C. MURRAY							
SITE DESCRIPTION BRIDGE ON NC 62 (-Y8-) OVER US 311 BETWEEN SR 1160 & SR 1161							GND WATER						
BORING NO EB1-B		NORTHING 0.00		EASTING 0.00		0 HR N/A							
ALIGNMENT Y8		BORING LOCATION 14+35.500		OFFSET 4.80m RT		24 HR 1.00m							
COLLAR ELEV 248.05m		TOTAL DEPTH 11.81m		START DATE 2/10/04		COMPLETION DATE 02/10/04							
DRILL MACHINE CME-550			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB1-B, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		15cm	15cm	15cm		0	25	50	75				100
248.05												Ground Surface	
	1.00	3	6	9	0.30					15	SS-1	WET	RESIDUAL - STIFF TAN-WHITE CLAYEY SANDY SILT
	2.52	2	3	4	0.30					7	SS-2	WET	MEDIUM STIFF TAN SILTY SANDY CLAY
	4.04	4	4	6	0.30					10	SS-3	WET	STIFF TAN SILTY SANDY CLAY
	5.57	6	5	7	0.30					12	SS-4	WET	STIFF TAN CLAYEY SANDY SILT
	7.09	8	12	14	0.30					26	SS-5	WET	MEDIUM DENSE TO VERY DENSE TAN-WHITE MICACEOUS SILTY SAND
	8.62	26	55	45	0.25					100			WEATHERED ROCK
	10.14	100			0.15					100			
	11.66	100			0.15					100			
BORING TERMINATED AT ELEVATION 236.24 METERS IN WEATHERED ROCK													

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

SHEET 1

PROJECT NO 34345.1.1		ID R-06091B		COUNTY GUILFORD		GEOLOGIST C.C. MURRAY							
SITE DESCRIPTION BRIDGE ON NC 62 (-Y8-) OVER US 311 BETWEEN SR 1160 & SR 1161							GND WATER						
BORING NO B1-A		NORTHING 0.00		EASTING 0.00		0 HR N/A							
ALIGNMENT Y8		BORING LOCATION 14+69.000		OFFSET 4.50m LT		24 HR 1.20m							
COLLAR ELEV 245.53m		TOTAL DEPTH 8.80m		START DATE 2/10/04		COMPLETION DATE 02/10/04							
DRILL MACHINE CME-550			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK 7.90m			Log B1-A, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		15cm	15cm	15cm		0	25	50	75				100
													Ground Surface
245.53													
245.00	1.64	15	65	35	0.21				100	SS-11	WET		RESIDUAL - MEDIUM DENSE TO VERY DENSE TAN-WHITE MICACEOUS SILTY SAND
243.00	3.16	15	34	66	0.21				100				WEATHERED ROCK
241.00	4.69	35	65		0.24				100				
239.00	6.21	34	66		0.27				100				
237.00	7.74	100			0.10				100				HARD ROCK
236.73													BORING TERMINATED AT ELEVATION 236.73 METERS IN HARD ROCK

PROJECT NO 34345.1.1		ID R-06091B		COUNTY GUILFORD		GEOLOGIST C.C. MURRAY							
SITE DESCRIPTION BRIDGE ON NC 62 (-Y8-) OVER US 311 BETWEEN SR 1160 & SR 1161							GND WATER						
BORING NO B1-C		NORTHING 0.00		EASTING 0.00		0 HR 1.00m							
ALIGNMENT Y8		BORING LOCATION 14+71.500		OFFSET 0.00m		24 HR 1.00m							
COLLAR ELEV 245.50m		TOTAL DEPTH 7.75m		START DATE 2/11/04		COMPLETION DATE 02/11/04							
DRILL MACHINE CME-550			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK 6.10m			Log B1-C, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		15cm	15cm	15cm		0	25	50	75				100
													Ground Surface
245.50													
245.00													FILL - OLD SEPTIC LEACH FIELD
	1.61	40	60		0.22				100				RESIDUAL - VERY DENSE TAN-WHITE MICACEOUS SILTY SAND
243.00	2.37	100			0.13				100				WEATHERED ROCK
	3.13	100			0.10				100				
	3.89	100			0.15				100				
241.00	4.63	53	47		0.25				100				
	6.18	100			0.05				100				HARD ROCK
239.00													
237.75	7.70	100			0.05				100				BORING TERMINATED AT ELEVATION 237.75 METERS IN HARD ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34345.1.1		ID R-06091B		COUNTY GUILFORD		GEOLOGIST C.C. MURRAY									
SITE DESCRIPTION BRIDGE ON NC 62 (-Y8-) OVER US 311 BETWEEN SR 1160 & SR 1161							GND WATER								
BORING NO B1-B		NORTHING 0.00		EASTING 0.00		0 HR 1.00m	24 HR 1.00m								
ALIGNMENT Y8		BORING LOCATION 14+74.500		OFFSET 4.50m RT											
COLLAR ELEV 245.34m		TOTAL DEPTH 9.44m		START DATE 2/11/04		COMPLETION DATE 02/11/04									
DRILL MACHINE CME-550			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC									
SURFACE WATER DEPTH			DEPTH TO ROCK 9.20m			Log B1-B, Page 1 of 1									
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm					SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		15cm	15cm	15cm		0	25	50	75	100					
245.34															
															Ground Surface
244.00	1.50	30	70	0.30						100	X		WET	RESIDUAL - MEDIUM DENSE TO VERY DENSE TAN-WHITE MICACEOUS SILTY SAND	
242.00	3.12	39	61	0.28						100	X			WEATHERED ROCK	
240.00	4.64	100		0.12						100	X				
	6.17	100		0.07						100	X				
238.00	7.69	80	20	0.20						100	X				
236.00	9.21	100		0.05						100	X			HARD ROCK	
															BORING TERMINATED AT ELEVATION 235.90 METERS IN HARD ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34345.1.1		ID R-06091B		COUNTY GUILFORD		GEOLOGIST C.C. MURRAY							
SITE DESCRIPTION BRIDGE ON NC 62 (-Y8-) OVER US 311 BETWEEN SR 1160 & SR 1161							GND WATER						
BORING NO EB2-A		NORTHING 0.00		EASTING 0.00		0 HR N/A							
ALIGNMENT Y8		BORING LOCATION 15+05.000		OFFSET 4.00m LT		24 HR 1.00m							
COLLAR ELEV 243.63m		TOTAL DEPTH 5.92m		START DATE 2/16/04		COMPLETION DATE 02/16/04							
DRILL MACHINE CME-550			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB2-A, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		15cm	15cm	15cm		0	25	50	75				100
243.63													Ground Surface
243.00	1.07	2	2	2	0.30								RESIDUAL - SOFT TO HARD TAN CLAYEY SANDY SILT
241.00	2.59	14	86		0.30								WEATHERED ROCK
239.00	4.12	48	52		0.27								
237.71	5.64	25	75		0.28								
BORING TERMINATED AT ELEVATION 237.71 METERS IN WEATHERED ROCK													

PROJECT NO 34345.1.1		ID R-06091B		COUNTY GUILFORD		GEOLOGIST C.C. MURRAY							
SITE DESCRIPTION BRIDGE ON NC 62 (-Y8-) OVER US 311 BETWEEN SR 1160 & SR 1161							GND WATER						
BORING NO EB2-B		NORTHING 0.00		EASTING 0.00		0 HR N/A							
ALIGNMENT Y8		BORING LOCATION 15+09.000		OFFSET 4.80m RT		24 HR 1.00m							
COLLAR ELEV 244.06m		TOTAL DEPTH 5.99m		START DATE 2/16/04		COMPLETION DATE 02/16/04							
DRILL MACHINE CME-550			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH N/A			DEPTH TO ROCK 4.20m			Log EB2-B, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		15cm	15cm	15cm		0	25	50	75				100
244.06													Ground Surface
243.00	1.24	3	100		0.29								RESIDUAL - SOFT TO HARD TAN CLAYEY SANDY SILT
241.00	2.76	100			0.10								WEATHERED ROCK
239.00	4.29	76	24		0.18								
238.07	5.81	63	37		0.18								
BORING TERMINATED AT ELEVATION 238.07 METERS IN WEATHERED ROCK													

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAY
MATERIALS & TESTS UNIT
SOILS LABORATORY

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAY
MATERIALS & TESTS UNIT
SOILS LABORATORY

T. I. P. No. R-609IB

T. I. P. No. R-609IB

REPORT ON SAMPLES OF SOILS FOR QUALITY

REPORT ON SAMPLES OF SOILS FOR QUALITY

Project 34345.1.1 County GUILFORD Owner _____
Date: Sampled 2/4/04 Received 2/16/04 Reported 2/19/2004
Sampled from EB1-B By C.C. MURRAY
Submitted by N.W. WAINAINA 1995 Standard Specifications

Project 34345.1.1 County GUILFORD Owner _____
Date: Sampled 2/4/04 Received 2/16/04 Reported 2/19/2004
Sampled from EB1-B By C.C. MURRAY
Submitted by N.W. WAINAINA 1995 Standard Specifications

711530 TO 711540
3/8/04

711530 TO 711540
3/8/04

TEST RESULTS

TEST RESULTS

Proj. Sample No.	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6
Lab. Sample No.	711530	711531	711532	711533	711534	711535
Retained 4.75 mm Sieve %	-	-	-	20	-	-
Passing 2.00 mm Sieve %	98	97	93	69	88	100
Passing 425 µm Sieve %	79	72	70	60	56	97
Passing 75 µm Sieve %	48	40	50	44	26	76

Proj. Sample No.	SS-7	SS-8	SS-9	SS-10	SS-11
Lab. Sample No.	711536	711537	711538	711539	711540
Retained 4.75 mm Sieve %	-	-	-	-	-
Passing 2.00 mm Sieve %	100	100	100	93	97
Passing 425 µm Sieve %	97	93	95	51	66
Passing 75 µm Sieve %	75	54	61	18	23

MINUS 2.00 mm FRACTION

MINUS 2.00 mm FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - 250 µm %	32.2	37.1	32.4	17.8	50.1	5.9
Fine Sand Ret - 53 µm %	23.7	28.4	21.1	29.0	26.7	27.8
Silt 0.05 - 0.005 mm %	25.8	20.4	34.3	39.0	21.2	52.2
Clay < 0.005 mm %	18.2	14.2	12.2	14.2	2.0	14.2
Passing 425 µm Sieve %	-	-	-	-	-	-
Passing 75 µm Sieve %	-	-	-	-	-	-

SOIL MORTAR - 100%					
Coarse Sand Ret - 250 µm %	6.5	18.0	14.0	60.2	49.4
Fine Sand Ret - 53 µm %	29.0	36.7	35.1	24.1	32.2
Silt 0.05 - 0.005 mm %	48.3	39.2	42.9	13.7	14.3
Clay < 0.005 mm %	16.2	6.1	8.1	2.0	4.1
Passing 425 µm Sieve %	-	-	-	-	-
Passing 75 µm Sieve %	-	-	-	-	-

L. L.	40	41	38	37	29	37
P. I.	8	16	11	9	NP	7
AASHTO Classification	A-4(2)	A-7-6(3)	A-6(3)	A-4(1)	A-2-4(0)	A-4(6)
Station	14+35.5	14+35.5	14+35.5	14+35.5	14+35.5	14+30
	4.8 RT	4.8 RT	4.8 RT	4.8 RT	4.8 RT	4.5 LT
Hole No.	EB1-B	EB1-B	EB1-B	EB1-B	EB1-B	EB1-A
Depth (M)	0.97	2.52	4.05	5.57	7.09	0.87
to	1.42	2.97	4.50	6.02	7.54	1.32

L. L.	38	39	36	26	22
P. I.	12	7	8	NP	NP
AASHTO Classification	A-6(9)	A-4(3)	A-4(4)	A-2-4(0)	A-2-4(0)
Station	14+30	14+30	14+30	14+30	14+69
	4.5 LT	4.5 LT	4.5 LT	4.5 LT	4.5 LT
Hole No.	EB1-A	EB1-A	EB1-A	EB1-A	B1-A
Depth (M)	2.41	3.93	5.46	6.98	1.67
to	2.86	4.38	5.91	7.43	2.09

cc: C.C. MURRAY
Soils File

Soils Engineer

Soils Engineer

PROJECT: 34480.1.1 ID: R-2606A

STATE	STATE PROJECT REFERENCE NO.	SHEET	TOTAL SHEETS
N.C.	R-2606A	1	17
STATE PROJ. NO.	F.A. PROJ. NO.	DISCIPLINE	
34480.1.1	STP-NHF-311-GD	P.E. CONST.	

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

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STATE PROJECT 34480.1.1 I.D. NO. R-2606A

F.A. PROJECT STP-NHF-311(3)

COUNTY RANDOLPH

PROJECT DESCRIPTION Bridge on Poole Road over
US 311

SITE DESCRIPTION _____

For Letting

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS 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 BORING. THE LABORATORY SAMPLE DATA AND THE IN SITU (ON-PLACED) 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.

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.

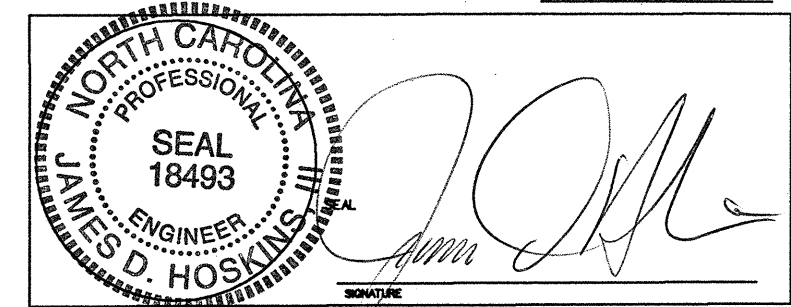
INVESTIGATED BY D. Hardister PERSONNEL D. Harris

CHECKED BY JD Hoskins III S. Tierney

SUBMITTED BY JD Hoskins III R. Benfield

DATE September 8, 2004

DRAWN BY: D. Hardister



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
R-2606A	34480.1.1	2	17

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 WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T296, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLES:</p> <p style="text-align: center;"><i>VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HARD 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 ARE 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 WHEN 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 8.1 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 WHICH HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARGILLACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. 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 WHICH 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. DIP - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH)- THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (F.P.)- 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 SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - 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 WHICH 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, WHICH 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 B.P.F.) 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 LESS THAN 8.1 FOOT PENETRATION WITH 60 BLOWS. STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - 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 (T.S.)- SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																																																																					
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OF A-7-5 ≤ L.L. - 30 ; P.I. OF A-7-6 > L.L. - 30</p>	GENERAL CLASS.	GRANULAR MATERIALS (30% PASSING #200)							SILT-CLAY MATERIALS (30% PASSING #200)							ORGANIC MATERIALS			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								GROUP CLASS.	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ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p style="text-align: center;">COMPRESSIBILITY</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>SLIGHTLY COMPRESSIBLE</td> <td>LIQUID LIMIT LESS THAN 30</td> </tr> <tr> <td>MODERATELY COMPRESSIBLE</td> <td>LIQUID LIMIT 31-50</td> </tr> <tr> <td>HIGHLY COMPRESSIBLE</td> <td>LIQUID LIMIT GREATER THAN 50</td> </tr> </table> <p style="text-align: center;">PERCENTAGE OF MATERIAL</p> <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> </table> <p style="text-align: center;">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.</p> <p> STATIC WATER LEVEL AFTER 24 HOURS.</p> <p> PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA</p> <p> SPRING OR SEEPAGE</p>	SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 30	MODERATELY COMPRESSIBLE	LIQUID LIMIT 31-50	HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50	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	<p>WEATHERED ROCK (WR) </p> <p>CRYSTALLINE ROCK (CR) </p> <p>NON-CRYSTALLINE ROCK (NCR) </p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CP) </p> <p style="text-align: center;">WEATHERING</p> <p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V. SL.) 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 (SL.) 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 ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPARS ARE KAOLINIZED TO SOME EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY 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 DIXES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p> <p style="text-align: center;">ROCK HARDNESS</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 GROVED OR GOUGED 0.25 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 GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.</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>
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WBS ELEMENT (TIP): 34480.1.1 (R-2606A)

FEDERAL PROJECT: STP-NHF-311(3)

COUNTY: Randolph

DESCRIPTION: Bridge on Poole Road over US 311

SUBJECT: Geotechnical Report of Subsurface Exploration

Project Description:

Geoscience Group, Inc. (Geoscience) has completed the authorized geotechnical investigation for the above referenced project in Randolph County, North Carolina. The bridge will be located in northern Randolph County, near Archdale. More precisely, the bridge will be located on Poole Road at its intersection with US 311. A Site Vicinity Map is included in the following pages. The project will consist of the construction of a two-span plate girder bridge with an overall length of 224.4 feet, a width of 32.1 feet (out to out) and a skew angle of 86° 17' 38". Minimal fill is required at the end bents, with up to 25 feet of cut at the interior bent. The 2H:1V end bent slopes are to be protected with concrete.

The purpose of this exploration was to investigate the subsurface conditions at the proposed bridge bent locations. The subsurface exploration was conducted on August 8 and on August 9, 2004. This exploration consisted of the execution of six (6) soil test borings. Using points surveyed by Geoscience personnel, the actual boring locations were measured for location using a tape measure and approximate right angles. Using an NCDOT provided benchmark, the boring locations were surveyed for elevation by the Geoscience personnel. Drilled boring locations are shown on the Boring Identification Diagram included in the following pages.

The soil test borings were advanced using a CME 550x drilling machine utilizing hollow-stem auger and rotary drilling techniques. In each boring, Standard Penetration tests were performed in general accordance with NCDOT guidelines. In conjunction with this testing, split-barrel soil samples were recovered for visual classification in the field. The split-barrel soil samples were returned to our laboratory for testing. Water for drilling purposes was obtained from a residential water supply. Drilling mud slurry was not utilized during the investigation. Core samples of the underlying weathered rock and bedrock were obtained from boring B1-B. The core samples were obtained using an HQ wireline barrel. The core samples were returned to our laboratory for review and classification as well as laboratory testing.

Laboratory testing was performed on representative split-barrel samples to aid in the assessment of AASHTO soil classification and to refine data for evaluation of engineering properties. The laboratory testing consisted of natural moisture content determinations, Atterberg Limits tests, and grain size analyses with hydrometer. The soil laboratory tests performed were in general accordance with AASHTO and NCDOT specifications. Rock core specimens were selected for laboratory testing of unconfined compressive strength. These tests were performed in general accordance with ASTM Method D 2938. The results of the soil laboratory tests and a rock core test summary are included in the following pages. Complete rock core testing results are provided in Appendix C under separate cover.

Physiography and Geology:

The project site is located in the Carolina Slate Belt of the Piedmont Physiographic Province of North Carolina. According to the 1985 Geologic Map of North Carolina, the site is located in an area consisting of metamorphosed granite of Cambrian to Late Proterozoic in age. The core samples obtained on-site consist of tan-black-white moderately severely to very slightly weathered, moderately to very hard metamorphosed granite. It should be noted that diabase, in the form of dikes, is present at the site. The overlying soils are the residual product of the physical and chemical weathering of the underlying bedrock. Site topography is relatively flat in the area of the bridge.

Foundation Materials:

Foundation materials present at the site consist of roadway embankment fill, residual soils, partially weathered rock, and crystalline rock. Subsurface conditions will be described across the site.

Roadway embankment fill is present along end bent-2 to an elevation of approximately 752 feet. The roadway embankment fill is associated with a culvert below the road in this area. The roadway embankment fill consists of moist medium dense silty coarse to fine SAND (A-2-4) and moist stiff clayey fine sandy SILT (A-4). Blow counts of 10 and 12 blows per foot (bpf) were measured in the roadway embankment fill.

Residual soil is present below the fill along end bent-2, is present from the ground surface at end bent-1, and is present interlayered with weathered rock in B1-B. The residual soils consist of soft to very stiff sandy silty CLAY (A-7-5), very stiff to hard fine sandy SILT (A-4), and loose to very dense silty coarse to fine SAND (A-2-4). Blow counts in the residual soils range between 4 and 58 bpf. Moistures range between dry and wet.

Weathered rock is present at the ground surface along bent-1. Additionally, weathered rock begins at elevations ranging between 752 and 734 feet along the end bents. The weathered rock consists of tan-black-white weathered metamorphosed granite. Within B1-B, the cored weathered rock consists of severely weathered medium hard and soft metamorphosed granite and diabase with close and very close fracture spacing. In B1-B, strata recovery values of the weathered rock ranges between 90 and 100 percent. The specimen from B1-B at 35.3 feet had an unconfined compressive strength of 750 pounds per square inch (psi). The end bent borings were terminated in weathered rock.

Crystalline rock is present in borings B1-A and B1-B. The crystalline rock begins at elevations of 748.3 and 747.9 feet, respectively. The crystalline rock generally consists of tan-black-white moderately severely to moderately weathered moderately hard metamorphosed granite with close fracture spacing to a depth of 12 feet below the rock line. From 47.7 feet, the quality of the rock is appreciably better and consists of white-black slightly and very slightly weathered hard and very hard metamorphosed granite with close to moderately close fracture spacing. Strata recovery of the crystalline rock ranges between 88 and 100 percent, with no apparent improvement with depth. Strata RQD being between 46 and 96 percent and improved with depth. The specimen from B1-B at 51.0 feet had an unconfined compressive strength of 4,190 psi. Boring B1-A was terminated in crystalline rock with SPT refusal at an elevation of 734.9 feet. Coring was terminated in B1-B at an elevation of 701.5 feet.

After completion of each boring, temporary piezometers (slotted PVC pipe) were installed in the boreholes. Piezometers were used to measure stabilized groundwater levels at least 24 hours after the completion of drilling. Groundwater elevations range between 746 and 742 feet. Groundwater control may be required. We do not anticipate groundwater to fluctuate more than 2 feet annually.

Notes to the Designer:

Weathered rock and crystalline rock are present within the anticipated cut area for US 311. Crystalline rock begins around elevation 748 feet. Proposed grade for US 311 is around 734 feet.

Closure:

The geotechnical foundation investigation is based on the Preliminary General Drawing dated January 2004. If any significant changes are made in the design or location of the proposed structure, the subsurface information will have to be reviewed and modified as necessary. For soil descriptions and general stratification at a particular boring location, the respective Boring Log should be reviewed. Cross-sections and profiles are a generalized interpretation of soil conditions between borings and should not be considered accurate other than at the boring locations. Subsurface conditions between boring locations or elsewhere on the site may vary, and subsurface anomalies may exist which were not detected.

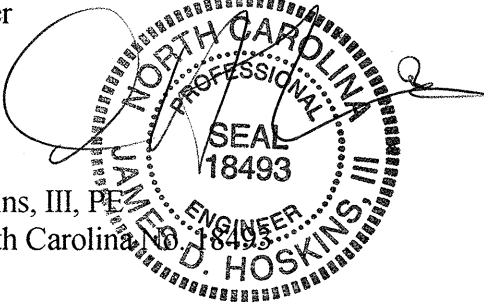
Geoscience Group, Inc. appreciates the opportunity to be of service to the NCDOT on this project. Should you have any questions concerning this report, please feel free to contact the undersigned.

Respectfully,
GEOSCIENCE GROUP, INC.

Dean Hardister

Dean Hardister, PE
Project Manager

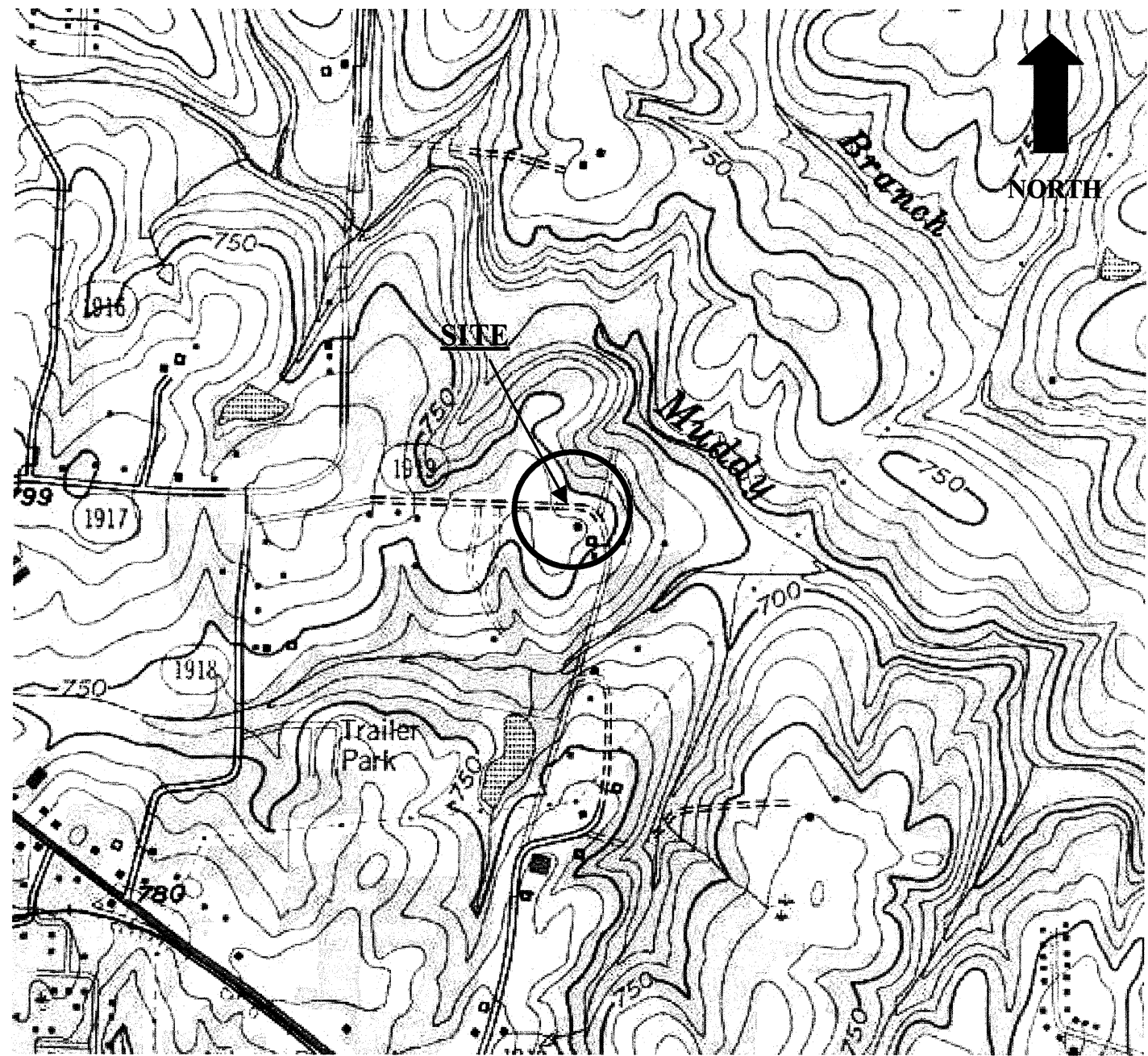
James D. Hoskins, III



James D. Hoskins, III, PE
Registered North Carolina, No. 18493


Enclosures

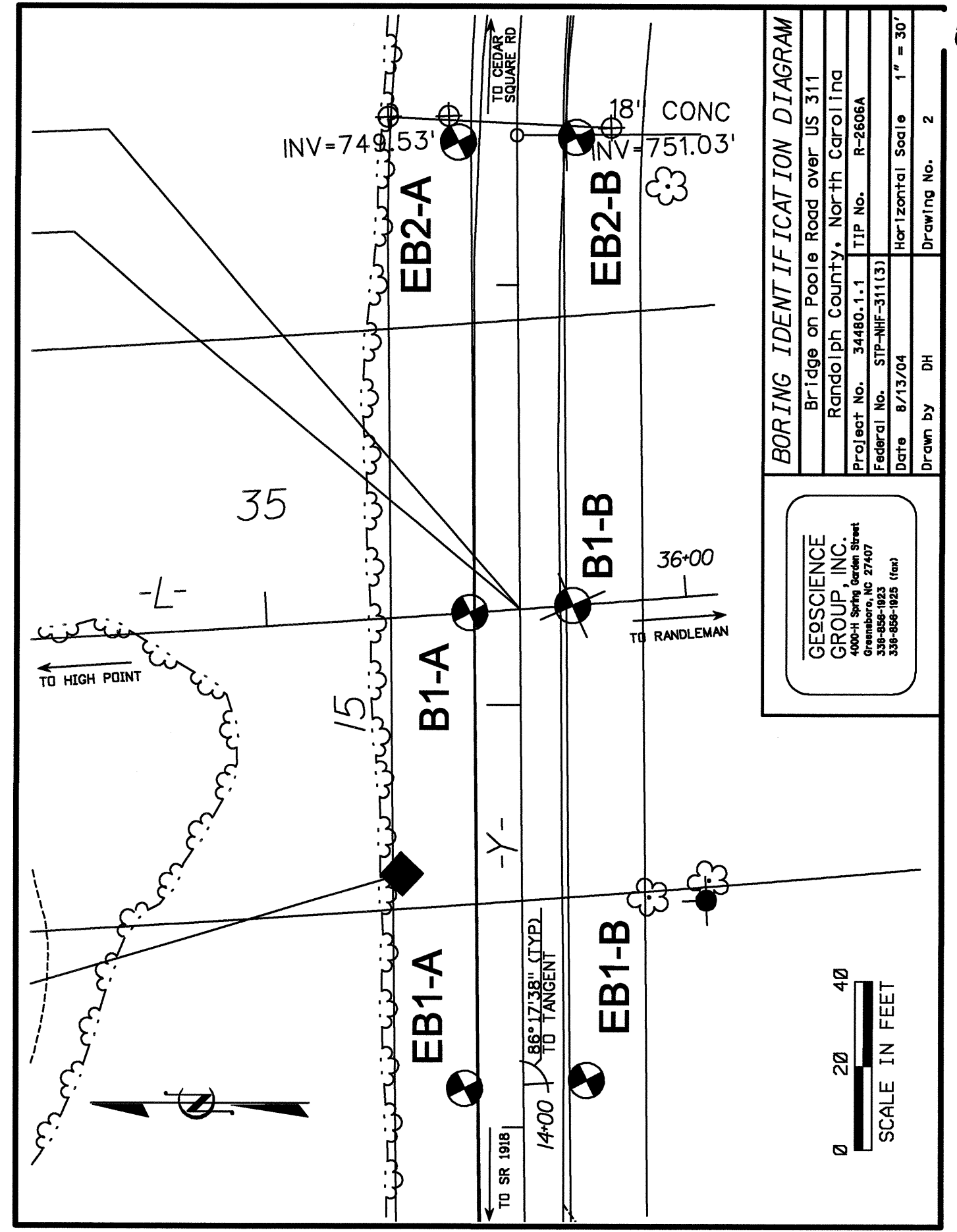
DH:JDH:dh



SCALE IN FEET

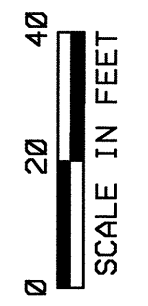


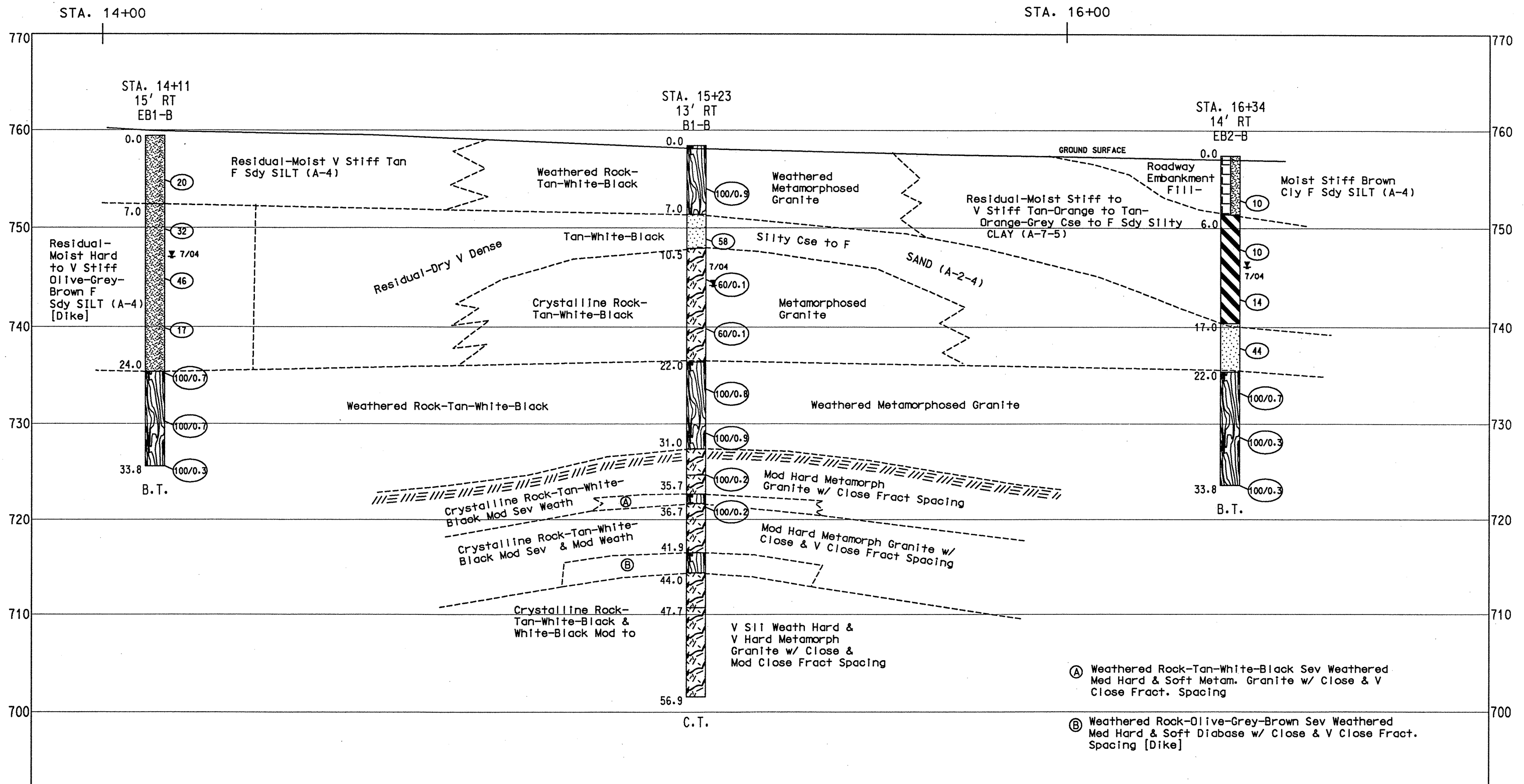
GEOSCIENCE GROUP, INC. GREENSBORO, NORTH CAROLINA		
SCALE: ±1" = 1000'	APPROVED BY: 	DRAWN BY: DH
DATE: 8/30/04		REVISED:
Bridge on Poole Road over US 311 Randolph County, North Carolina		
34480.1.1 (R-2606A)		DRAWING NUMBER
SITE VICINITY MAP		1



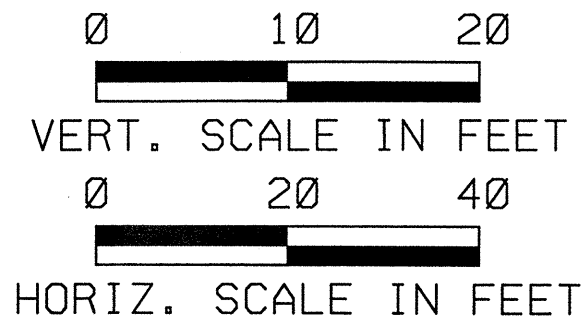
BORING IDENTIFICATION DIAGRAM	
Bridge on Poole Road over US 311	
Randolph County, North Carolina	
Project No. 34480.1.1	TIP No. R-2606A
Federal No. STP-NHF-311(3)	
Date 8/13/04	Horizontal Scale 1" = 30'
Drawn by DH	Drawing No. 2

GEOSCIENCE GROUP, INC.
 4000-H Spring Garden Street
 Greensboro, NC 27407
 336-856-1923
 336-856-1925 (fax)



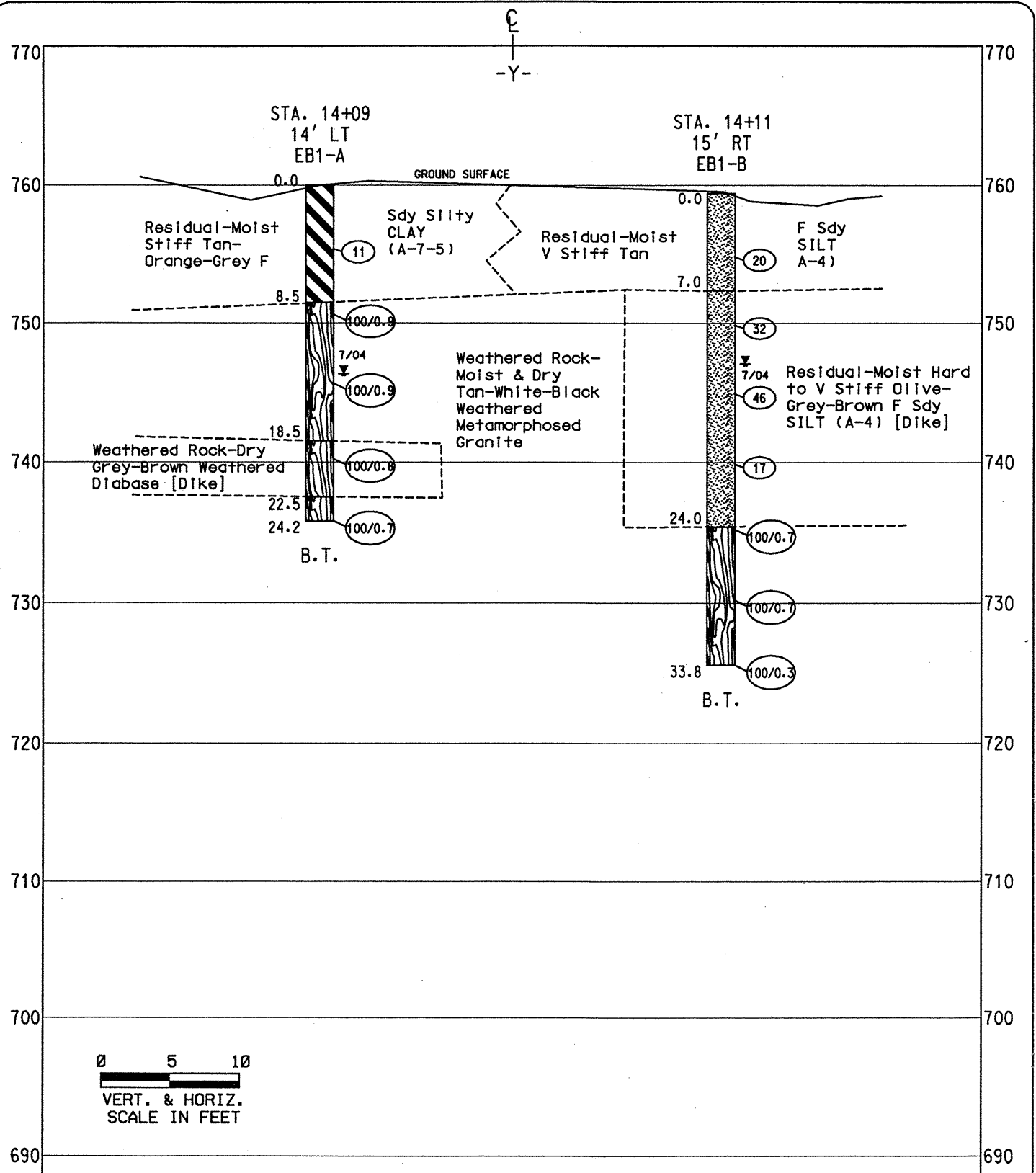


- Ⓐ Weathered Rock-Tan-White-Black Sev Weathered Med Hard & Soft Metam. Granite w/ Close & V Close Fract. Spacing
- Ⓑ Weathered Rock-Olive-Grey-Brown Sev Weathered Med Hard & Soft Diabase w/ Close & V Close Fract. Spacing [Dike]



GEOSCIENCE GROUP, INC.
 4000-H Spring Garden Street
 Greensboro, NC 27407
 336-856-1923
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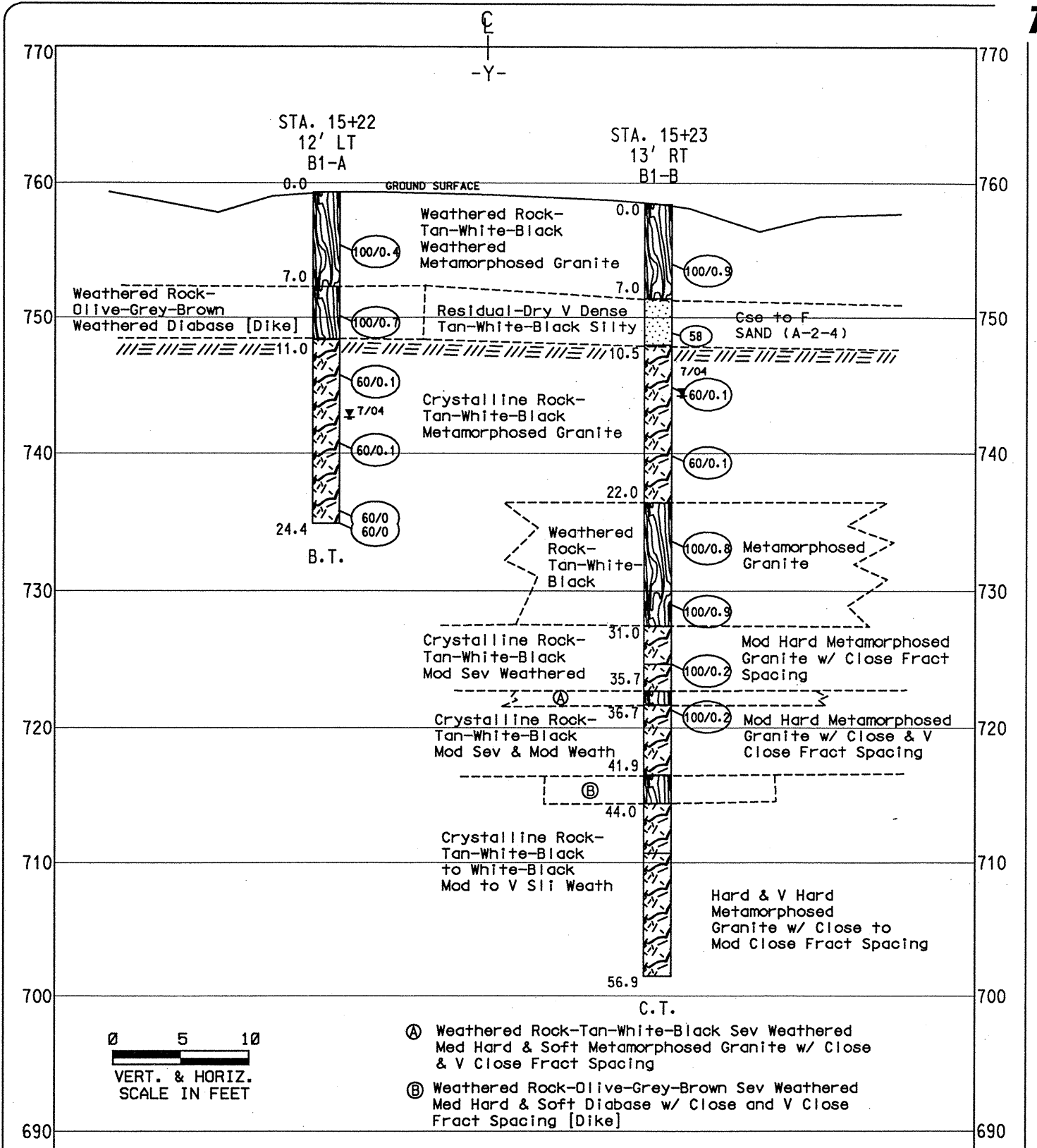
PROFILE 10ft RIGHT of -Y-	
Bridge on Poole Road over US 311	
Randolph County, North Carolina	
Project No. 34480.1.1	TIP No. R-2606A
Federal No. STP-NHF-311(3)	Vert. Scale 1" = 10'
Date 8/27/04	Horiz. Scale 1" = 20'
Drawn by DH	Drawing No. 3



CROSS-SECTION THROUGH END BENT-1

GEOSCIENCE GROUP, INC.
 4000-H Spring Garden Street
 Greensboro, NC 27407
 336-856-1923
 336-856-1925 (fax)

Bridge on Poole Road over US 311	
Randolph County, North Carolina	
Project No. 34480.1.1	TIP No. R-2606A
Federal No. STP-NHF-311(3)	Vert. Scale 1" = 10'
Date 8/27/04	Horiz. Scale 1" = 10'
Drawn by DH	Drawing No. 4

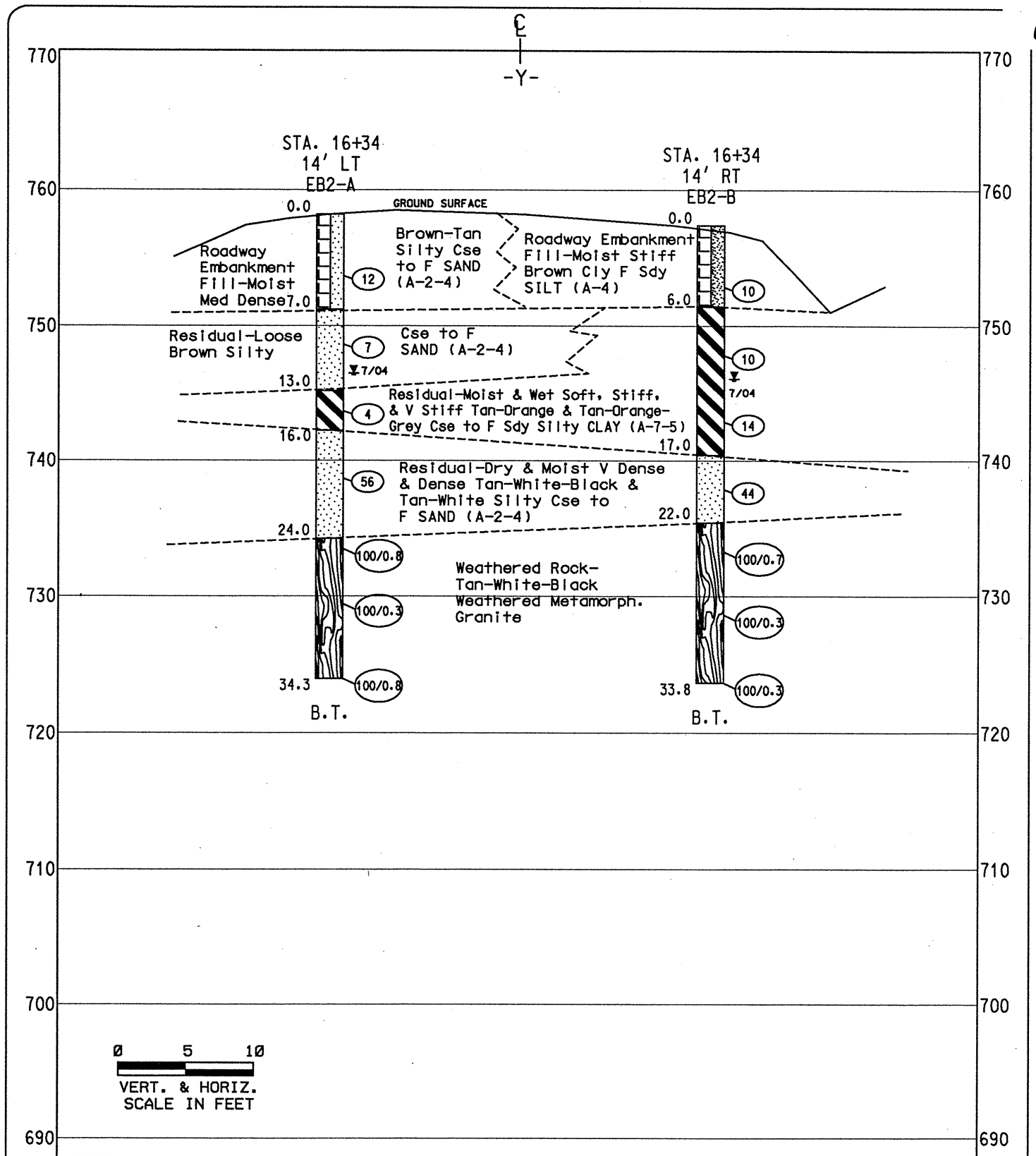


CROSS-SECTION THROUGH BENT-1

GEOSCIENCE GROUP, INC.
 4000-H Spring Garden Street
 Greensboro, NC 27407
 336-856-1923
 336-856-1925 (fax)

Bridge on Poole Road over US 311	
Randolph County, North Carolina	
Project No. 34480.1.1	TIP No. R-2606A
Federal No. STP-NHF-311(3)	Vert. Scale 1" = 10'
Date 8/27/04	Horiz. Scale 1" = 10'
Drawn by DH	Drawing No. 5

- Ⓐ Weathered Rock-Tan-White-Black Sev Weathered Med Hard & Soft Metamorphosed Granite w/ Close & V Close Fract Spacing
- Ⓑ Weathered Rock-Olive-Grey-Brown Sev Weathered Med Hard & Soft Diabase w/ Close and V Close Fract Spacing [Dike]



GEOSCIENCE GROUP, INC. 4000-H Spring Garden Street Greensboro, NC 27407 336-856-1923 336-856-1925 (fax)		CROSS-SECTION THROUGH END BENT-2	
		Bridge on Poole Road over US 311 Randolph County, North Carolina	
Project No.	34480.1.1	TIP No.	R-2606A
Federal No.	STP-NHF-311(3)	Vert. Scale	1" = 10'
Date	8/27/04	Horiz. Scale	1" = 10'
Drawn by	DH	Drawing No.	6

PROJECT NO.	34480.1.1	ID.	R-2606A	FED. NO.	STP-NHF-311(3)	CO.	Randolph	FIELD SUPERV.	D. Hardister					
SITE DESCRIPTION								Bridge on Poole Road over US 311						
BORING NO.	EB1-A	BORING LOCATION	14+09	OFFSET	14' LT	ALIGNMENT	-Y-	GROUND WATER (ft)						
COLLAR ELEV.		TOTAL DEPTH	NORTHING	EASTING			0 HR.	NGWE						
760.0 ft		24.2 ft	780365.76	1728840.13			24 HR.	13.7						
DRILL MACHINE	CME 550x	DRILL METHOD	HSA	HAMMER TYPE	Automatic	FINAL CASING DEPTH	N/A							
DATE STARTED	8/9/04	COMPLETED	8/9/04	DRILLING FLUID DENSITY	N/A	SURFACE WATER DEPTH	N/A							
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION		
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100	
760.0	0.00				Ground Surface Elev. 760.0 ft								760.0	0.00
	3.5	4	5	6							SS-1	38.5		Residual-Stiff Tan-Orange-Grey Fine Sandy Silty CLAY (A-7-5)
	8.5	14	86/0.4								D	100/0.9		Weathered Rock-Tan-White-Black Weathered Metamorphosed Granite
	13.5	19	81/0.4								D	100/0.9		Weathered Rock-Grey-Brown Weathered Diabase [Dike]
	18.5	24	43	57/0.3							D	100/0.8		Weathered Rock-Tan-White-Black Weathered Metamorphosed Granite
	23.5	28	72/0.2								D	100/0.7		Weathered Rock-Tan-White-Black Weathered Metamorphosed Granite
														Boring Terminated @ Elev. 735.8ft in Weathered Rock (Metamorphosed Granite)

NCDOT_BORE11X17M GR040266.GPJ NCDOT2.GDT 8/31/04

PROJECT NO.	34480.1.1	ID.	R-2606A	FED. NO.	STP-NHF-311(3)	CO.	Randolph	FIELD SUPERV.	D. Hardister					
SITE DESCRIPTION								Bridge on Poole Road over US 311						
BORING NO.	EB1-B	BORING LOCATION	14+11	OFFSET	15' RT	ALIGNMENT	-Y-	GROUND WATER (ft)						
COLLAR ELEV.		TOTAL DEPTH	NORTHING	EASTING			0 HR.	29.0						
759.4 ft		33.8 ft	780336.69	1728840.91			24 HR.	12.4						
DRILL MACHINE	CME 550x	DRILL METHOD	HSA	HAMMER TYPE	Automatic	FINAL CASING DEPTH	N/A							
DATE STARTED	8/9/04	COMPLETED	8/9/04	DRILLING FLUID DENSITY	N/A	SURFACE WATER DEPTH	N/A							
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION		
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100	
759.4	0.00				Ground Surface Elev. 759.4 ft								759.4	0.00
	3.5	7	9	11							M			Residual-Very Stiff Tan Fine Sandy SILT (A-4)
	8.5	7	14	18							M			Residual-Hard to Very Stiff Olive-Grey-Brown Fine Sandy SILT (A-4) [Dike]
	13.5	13	18	28							SS-2	16.8		
	18.5	4	7	10							M			
	23.5	9	91/0.2								M			Weathered Rock-Tan-White-Black Weathered Metamorphosed Granite
	28.5	57	43/0.2											
	33.5	100/0.3									D	100/0.3		Boring Terminated @ Elev. 725.6ft in Weathered Rock (Metamorphosed Granite)

NCDOT_BORE11X17M GR040266.GPJ NCDOT2.GDT 8/31/04

PROJECT NO.		ID.		FED. NO.		CO.		FIELD SUPERV.		
SITE DESCRIPTION										
BORING NO.					BORING LOCATION		OFFSET		ALIGNMENT	
COLLAR ELEV.		TOTAL DEPTH		NORTHING		EASTING		GROUND WATER (ft)		
DRILL MACHINE		DRILL METHOD		HAMMER TYPE		FINAL CASING DEPTH				
DATE STARTED		COMPLETED		DRILLING FLUID DENSITY		SURFACE WATER DEPTH				
CORE SIZE		HQ		TOTAL RUN		DRILLER				
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min./ft)	REC. (%)	RQD (%)	SAMP. NO.	STRATA REC. (%)	RQD (%)	DESCRIPTION AND REMARKS	
724.7									Begin Coring @ 724.70 ft	
724.7	33.7	3.2	4:22	(3.2) 100%	(1.4) 44%		2.0 100%	1.4 70%	Crystalline Rock-Tan-White-Black Moderately Severely Weathered Moderately Hard Metamorphosed Granite with Close Fracture Spacing 2 JTS @ 0-10° 1 JT @ 10-20° 2 JTS @ 40-50°	
			2:11			RS-1			722.7 35.7	
			2:25				1.0 100%	N/A	Weathered Rock-Tan-White-Black Severely Weathered Medium Hard and Soft Metamorphosed Granite with Close and Very Close Fracture Spacing	
721.5	36.9	0.39/0.2				N=100/0.2	4.6 88%	2.4 46%	5 JTS @ 0-10° 2 JTS @ 10-20° 4 JTS @ 80-90° Other Jts Not Discernible Crystalline Rock-Tan-White-Black Moderately Severely and Moderately Weathered Moderately Hard Metamorphosed Granite with Close and Very Close Fracture Spacing	
721.3	37.1	4.8	3:05	(4.4) 92%	(2.4) 50%				4 JTS @ 0-10° 1 JT @ 10-20° 4 JTS @ 20-30° 2 JTS @ 50-60° 2 JTS @ 80-90° Other Jts Not Discernible	
			1:41							
			2:22							
			2:40							
716.5	41.9	2:13/0.8							716.5 41.9	
716.5	41.9	5.0	7:49	(4.7) 94%	(2.1) 42%		1.9 90%	N/A	Weathered Rock-Olive-Grey-Brown Severely Weathered Medium Hard and Soft Diabase with Close and Very Close Fracture Spacing [Dike] 2 JTS @ 0-10° 2 JTS @ 10-20° 1 JT @ 50-60° 1 JT @ 80-90°	
			6:38						714.4 44.0	
			4:21				3.6 97%	2.9 78%	Other Jts Not Discernible Crystalline Rock-Tan-White-Black Moderately to Slightly Weathered Hard Metamorphosed Granite with Close Fracture Spacing	
			4:21						1 JT @ 0-10° 2 JTS @ 10-20° 4 JTS @ 20-30° 2 JTS @ 40-50° 1 JT @ 80-90° Clay In Jts	
711.5	46.9		5:17							
711.5	46.9	5.0	2:38	(5.0) 100%	(4.9) 98%		9.1 99%	8.8 96%	Crystalline Rock-Tan-White-Black Slightly and Very Slightly Weathered Hard and Very Hard Metamorphosed Granite with Close to Moderately Close Fracture Spacing 1 JT @ 0-10° 3 JTS @ 20-30° 4 JTS @ 40-50°	
			4:11			RS-2				
			3:45							
			2:18							
			2:29							
706.5	51.9									
706.5	51.9	5.0	2:46	(4.9) 98%	(4.7) 94%					
			2:11							
			3:15							
			3:11							

NCDOT_CORE#3-11X17_GRO40266.GPJ_NCDOT2.GDT_9/7/04

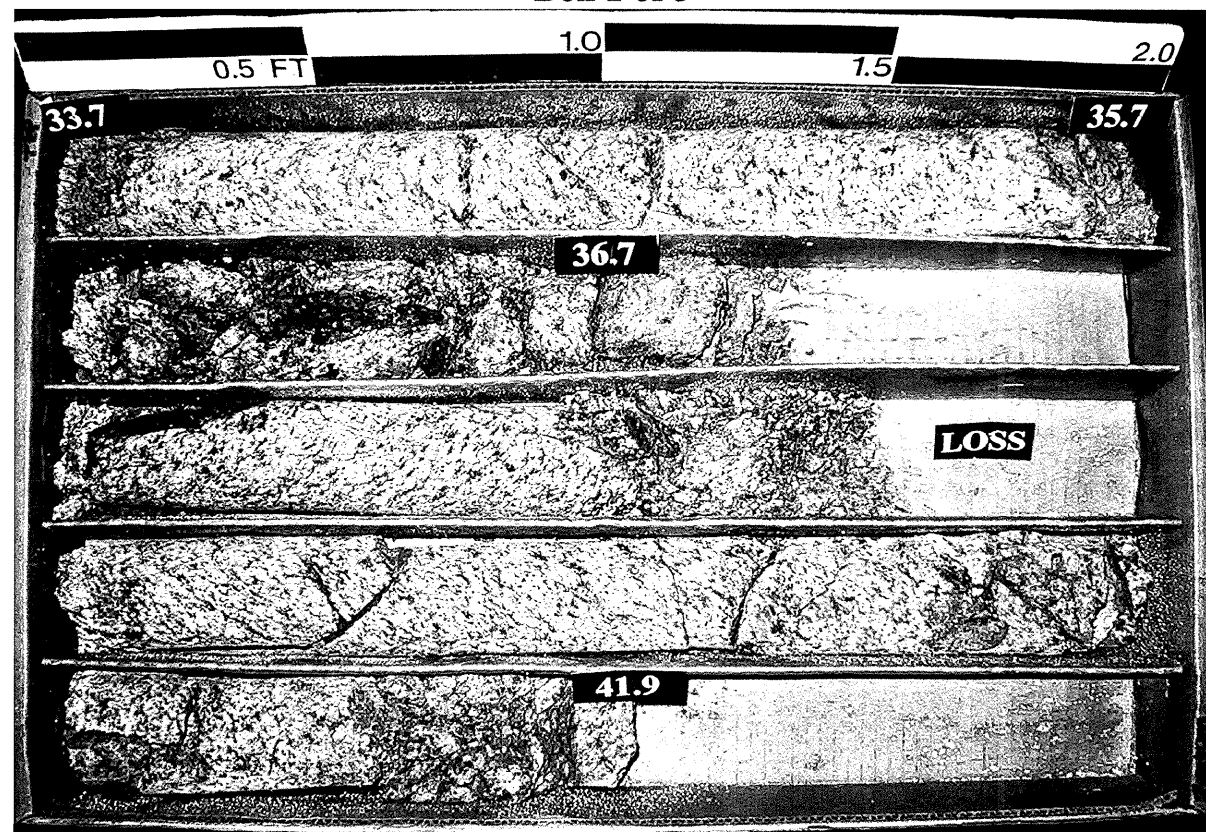
PROJECT NO.		ID.		FED. NO.		CO.		FIELD SUPERV.		
SITE DESCRIPTION										
BORING NO.					BORING LOCATION		OFFSET		ALIGNMENT	
COLLAR ELEV.		TOTAL DEPTH		NORTHING		EASTING		GROUND WATER (ft)		
DRILL MACHINE		DRILL METHOD		HAMMER TYPE		FINAL CASING DEPTH				
DATE STARTED		COMPLETED		DRILLING FLUID DENSITY		SURFACE WATER DEPTH				
CORE SIZE		HQ		TOTAL RUN		DRILLER				
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min./ft)	REC. (%)	RQD (%)	SAMP. NO.	STRATA REC. (%)	RQD (%)	DESCRIPTION AND REMARKS	
									Continued from previous page	
701.5	56.9		3:43						701.5 56.9 Coring Terminated at Elev. 701.5 ft in Crystalline Rock (Metamorphosed Granite)	

NCDOT_CORE#3-11X17_GRO40266.GPJ_NCDOT2.GDT_9/7/04

34480.1.1/R-2606A

B1-B

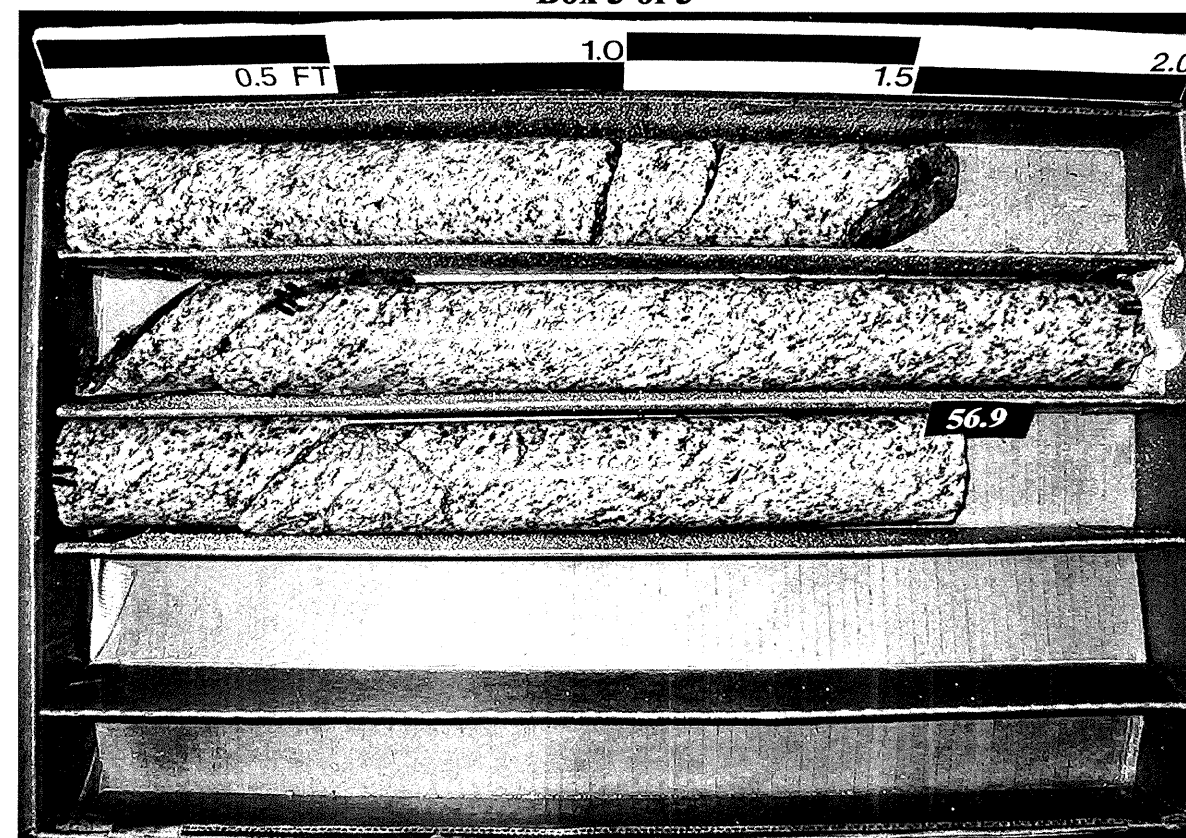
Box 1 of 3



34480.1.1/R-2606A

B1-B

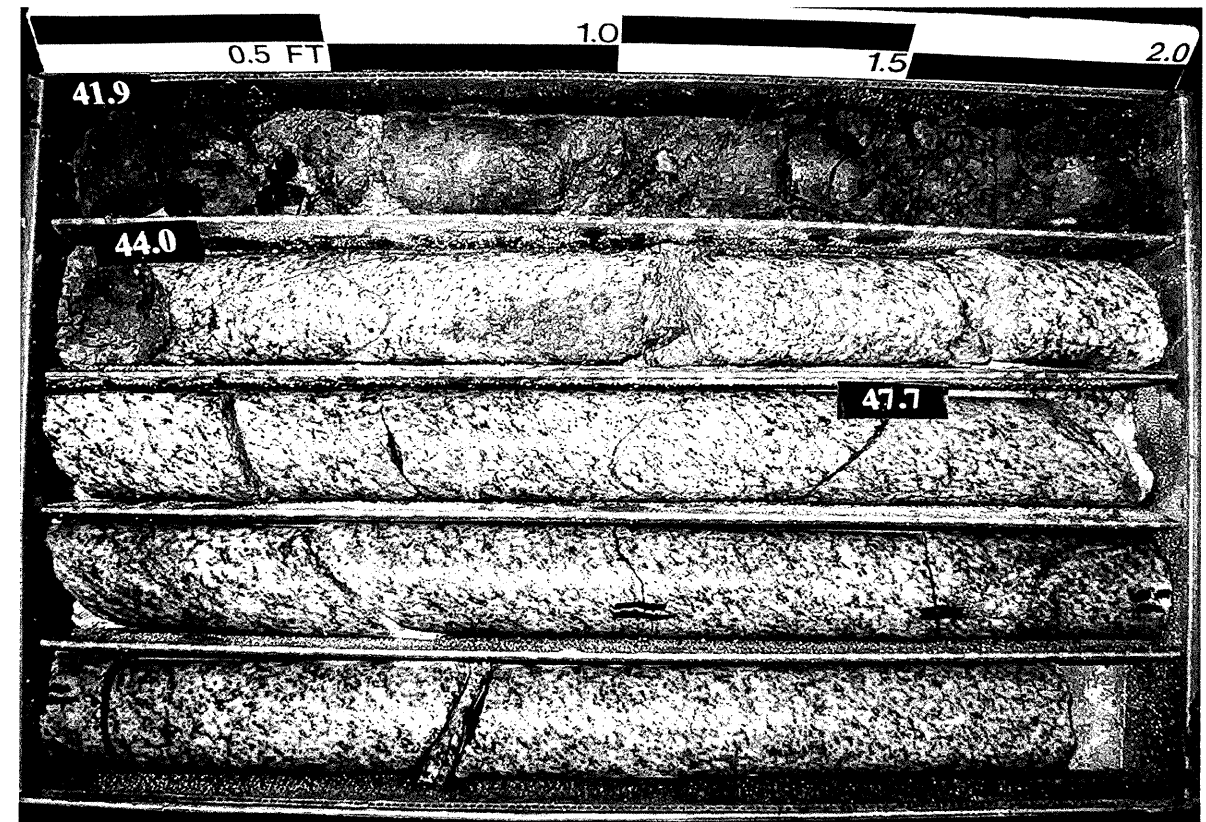
Box 3 of 3

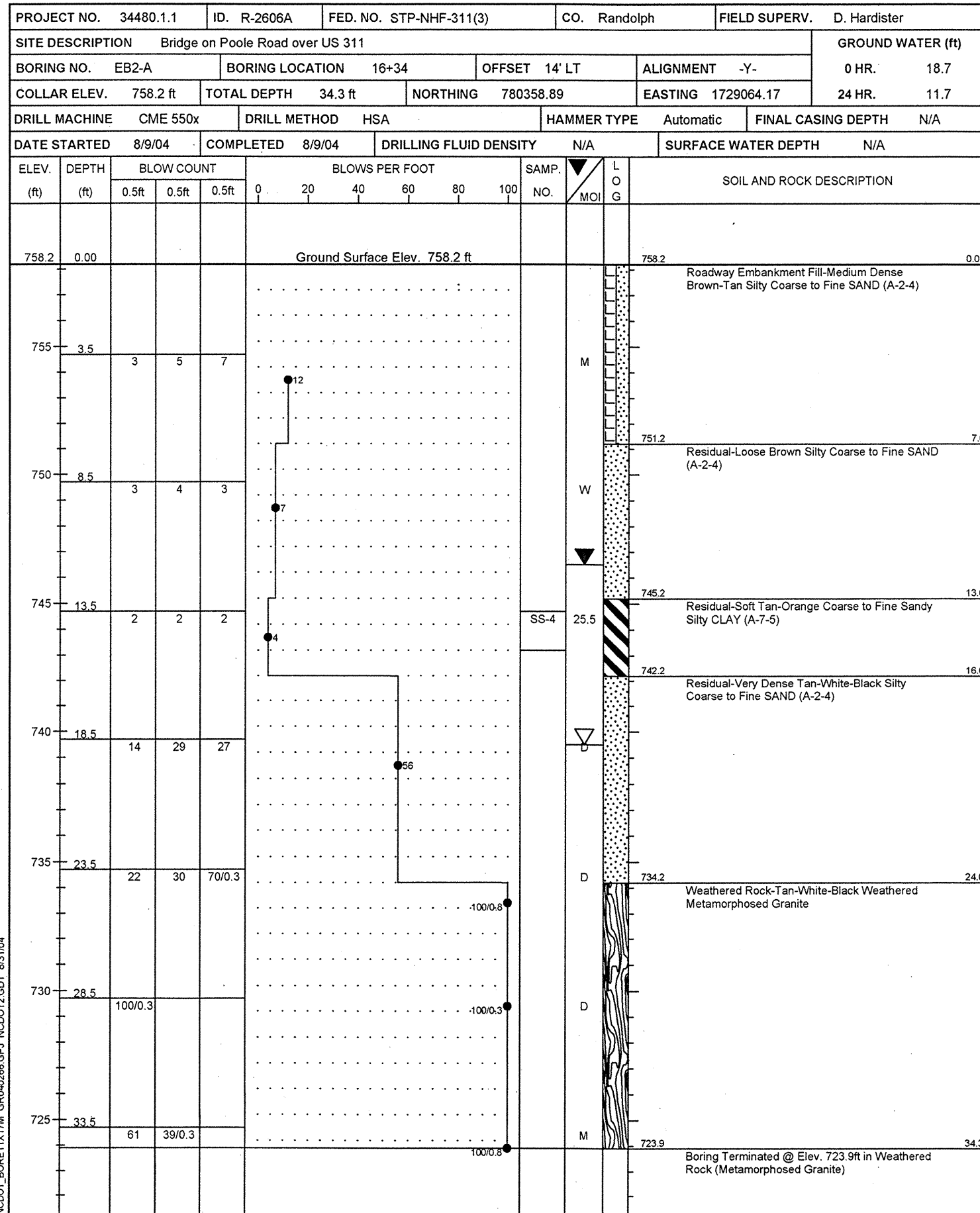


34480.1.1/R-2606A

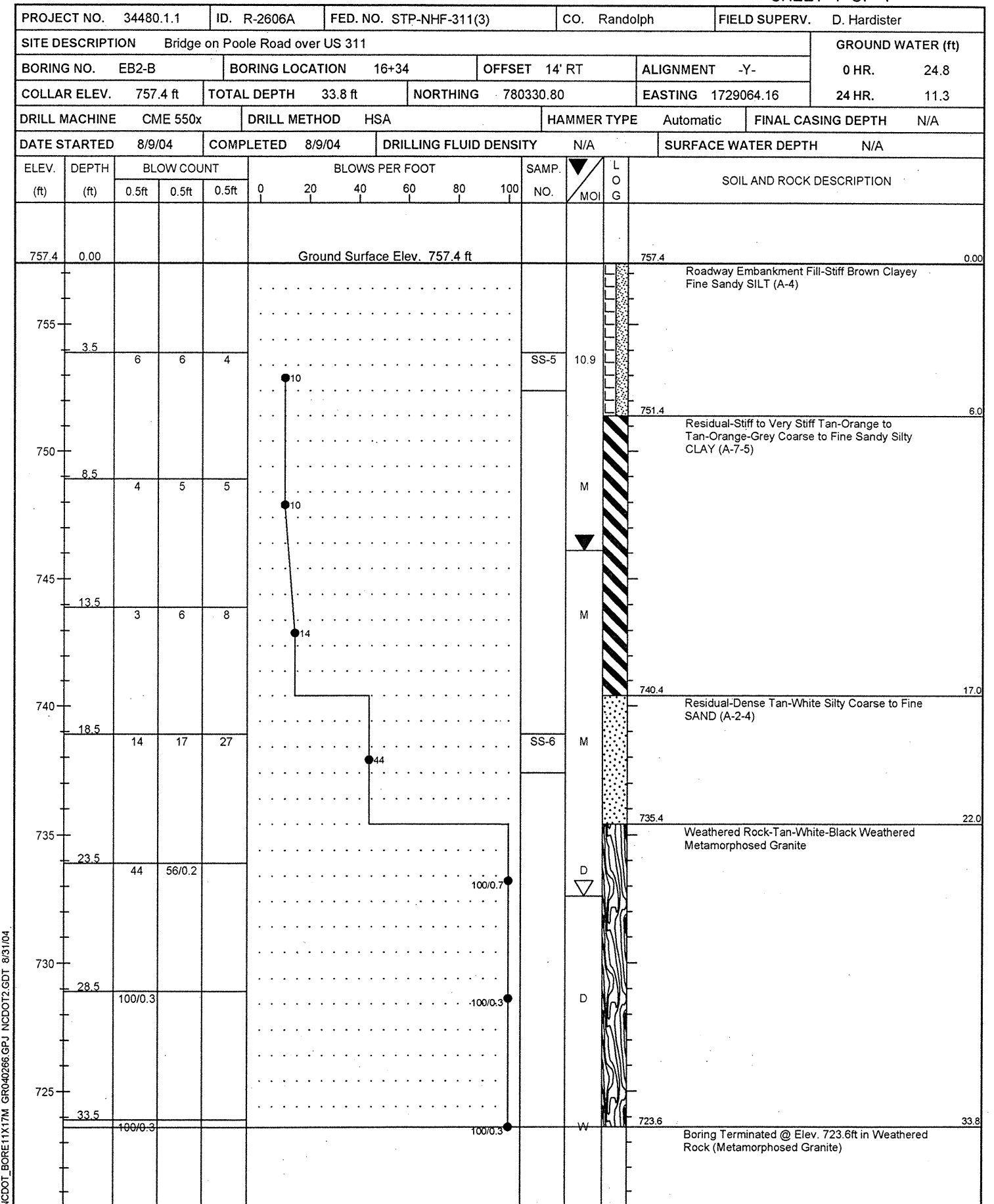
B1-B

Box 2 of 3





NCDOT_BORE11X17M GR040266.GPJ NCDOT2.GDT 8/31/04



NCDOT_BORE11X17M GR040266.GPJ NCDOT2.GDT 8/31/04

SITE PHOTOGRAPHS



Looking Left to Right along End Bent-1



Looking Left to Right along Bent-1

SITE PHOTOGRAPHS



Looking Left to Right along End Bent-2



Looking along Profile – 10' RT of -Y-

SITE PHOTOGRAPHS



Looking Increasing Station along -Y-

PROJECT: 34480.1.1 ID. R-2606A

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE
SUBSURFACE INVESTIGATION

STATE PROJECT 34480.1.1 I.D. NO. R-2606A

F.A. PROJECT _____

COUNTY RANDOLPH

PROJECT DESCRIPTION US 311 FROM SOUTH
OF SR 1920 TO NORTH OF SR 1929

SITE DESCRIPTION DUAL BRIDGES ON
US 311 OVER MUDDY CREEK

INVENTORY

DRAWN BY: J.E. BEVERLY / J.K. McCLURE

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT 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.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2606A	1	12
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34480.1.1		P.E. CONST.	

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT # (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS 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 UN-PLACED TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

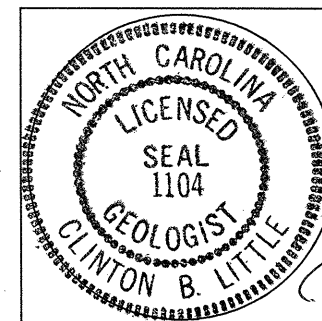
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INVESTIGATED BY J.E. BEVERLY PERSONNEL J.K. STICKNEY

CHECKED BY C.B. LITTLE D.K. BRATTEN

SUBMITTED BY C.B. LITTLE C.L. SMITH

DATE SEPTEMBER 2004



SEAL 9-14-04
SIGNATURE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
R-2606A	34480.1.1	2	12

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION				GRADATION				ROCK DESCRIPTION				TERMS AND DEFINITIONS			
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6				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.				HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN 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:				ALLUVIUM (ALLUV.) - SOILS WHICH 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 WHICH 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 (F.P.) - 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 SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - 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 WHICH 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, WHICH 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 (IN OR B.P.F.) 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 LESS THAN 0.1 FOOT PENETRATION WITH 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.			
SOIL LEGEND AND AASHTO CLASSIFICATION				MINERALOGICAL COMPOSITION				WEATHERING				WEATHERING			
GENERAL CLASS. GRANULAR MATERIALS (<5% PASSING #200) SILT-CLAY MATERIALS (>85% PASSING #200) ORGANIC MATERIALS				MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.				WEATHERED ROCK (WR) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)				NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER FOOT. FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. 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. COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.			
COMPRESSION				PERCENTAGE OF MATERIAL				GROUND WATER				MISCELLANEOUS SYMBOLS			
SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE				LIQUID LIMIT LESS THAN 30 LIQUID LIMIT 31-50 LIQUID LIMIT GREATER THAN 50				WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING. STATIC WATER LEVEL AFTER 24 HOURS. PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA SPRING OR SEEPAGE				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS INFERRED SOIL BOUNDARIES INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP/DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL			
CONSISTENCY OR DENSENESS				TEXTURE OR GRAIN SIZE				ROCK HARDNESS				ABBREVIATIONS			
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)				U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.0 0.42 0.25 0.075 0.053				VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. 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.				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 FRACS. - FRAGMENTS MED. - MEDIUM PMT - PRESSUREMETER TEST SD. - SAND, SANDY SL. - SILT, SILTY SLT. - SLIGHTLY TCR - TRICONE REFUSAL U - UNIT WEIGHT U _d - DRY UNIT WEIGHT W - MOISTURE CONTENT V. - VERY VST - VANE SHEAR TEST			
TEXTURE OR GRAIN SIZE				EQUIPMENT USED ON SUBJECT PROJECT				FRACTURE SPACING				BEDDING			
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F. SD.) SILT (SL.) CLAY (CL.) GRAIN SIZE MM 305 75 20 0.25 0.05 0.005 IN. 12" 3" 0.75 0.01 0.002 0.0002				DRILL UNITS: MOBILE B- BK-51 CME-45 CME-550 PORTABLE HOIST OTHER OTHER ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE *STEEL TEETH TRICONE *TUNG-CARB. CORE BIT OTHER HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST OTHER				TERM SPACING 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				TERM THICKNESS VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET			
SOIL MOISTURE - CORRELATION OF TERMS				INDURATION				FRAC. SPACING				BEDDING			
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION LL - LIQUID LIMIT - SATURATED - 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				FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. 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.				BENCH MARK: BL-502 @ -L- 2+18.18, 19.85' RT - ELEV: 724.84' BL-503 @ -L- 23+38.78, 26.52' RT - ELEV: 708.47 ELEVATION:							
PLASTICITY				INDURATION				FRAC. SPACING				BEDDING			
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH VERY LOW SLIGHT MEDIUM HIGH				INDURATION				FRAC. SPACING				BEDDING			
COLOR				INDURATION				FRAC. SPACING				BEDDING			
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.				INDURATION				FRAC. SPACING				BEDDING			



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY P.O. BOX 25201, RALEIGH, N.C. 27611-5201 LYNDY TIPPETT
GOVERNOR SECRETARY

September 9, 2004

STATE PROJECT: 34480.1.1 (R-2606A)
COUNTY: Randolph
DESCRIPTION: Dual Bridges on US 311 over Muddy Creek

SUBJECT: Geotechnical Report – Bridge Foundation Investigation

These are proposed dual structure bridges on new location along US 311 over Muddy Creek. Each new structure is a 160' single span design on 90 degree skew. Individual structure widths are approximately 38 feet and end bent slopes are proposed at 1.5:1 (H:V).

Foundation test borings were performed with a CME-550 drill machine utilizing Hollow Stem Augers, and automatic drop hammer. The field investigation for this project was conducted in August of 2004.

Physiography/Geology

The project area is located in Randolph County in the northern-central piedmont region of North Carolina. The site topography ranges from flat to gently sloping.

Geologically this site is part of the Carolina Slate Belt and is underlain by granitic and meta-granitic rock types.

Residual soil types encountered at the bridge site consist of medium stiff to stiff sandy silty clay (A-6, A-7-6) and dense to very dense micaceous silty sand (A-2-4). Alluvial soils encountered only at end bent 2 boring locations consist of loose silty sand (A-2-4). Weathered rock and / or hard rock was encountered at all boring locations

Foundation Materials

End Bent 1:

This proposed bent location is north of Muddy Creek. A total of four boring were performed across the bent to encompass left and right lane structures. Residual soil types extend below the ground surface some 5.5 to 9.2 feet. These soils consist of medium stiff to stiff tan-brown-black sandy silty clay (A-6, A-7-6) and dense to very dense tan-brown-white micaceous silty sand (A-2-4). Directly below residual soil weathered and / or hard rock is encountered. The following is a list of elevations for weathered and hard rock contacts at each boring location:

<u>BORING</u>	<u>Weathered Rock</u>	<u>Hard Rock</u>
EB1-A LT LN	704.96'	702.56'
EB1-B LT LN	N/A	708.41'
EB1-A RT LN	706.47'	705.67'
EB1-B RT LN	707.86'	705.06'

End Bent 2:

This proposed bent location is south of Muddy Creek. A total of four boring were performed across the bent to encompass left and right lane structures. Alluvial soil is present at the ground surface across the entire bent and extends 5.6 to 7.2 feet in depth. Alluvium consists of loose tan-brown silty sand (A-2-4). In most instances beneath alluvium at elevation 701 – 702 feet lies 1.5 to 3.0 feet of residual dense to very dense tan-brown micaceous silty sand (A-2-4). Underlying residual soil is weathered and / or hard rock. The following is a list of elevations for weathered and hard rock contacts at each boring location:

<u>BORING</u>	<u>Weathered Rock</u>	<u>Hard Rock</u>
EB2-A LT LN	699.24'	698.74'
EB2-B LT LN	702.30'	701.30'
EB2-A RT LN	N/A	698.73'
EB2-B RT LN	698.69'	696.49'

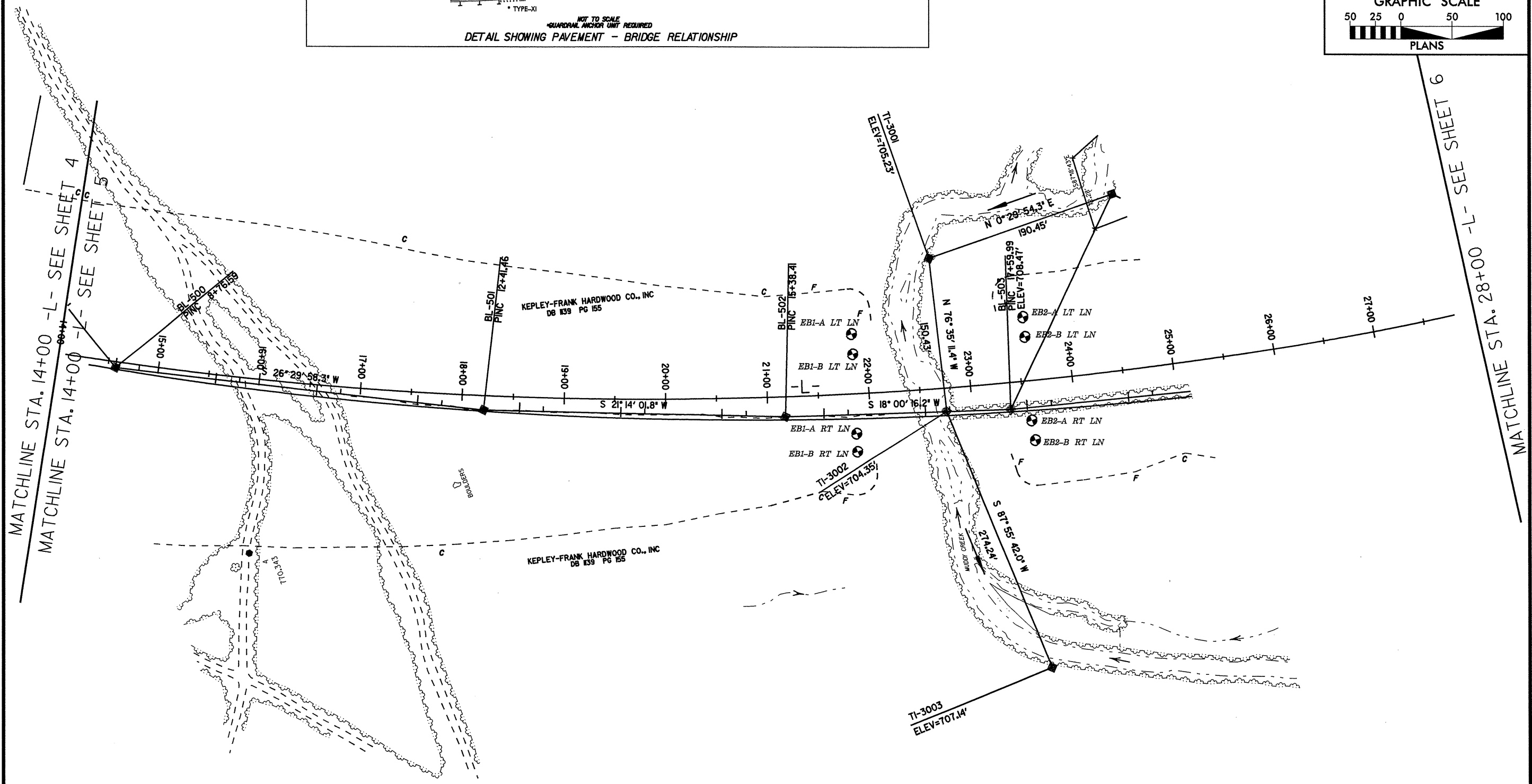
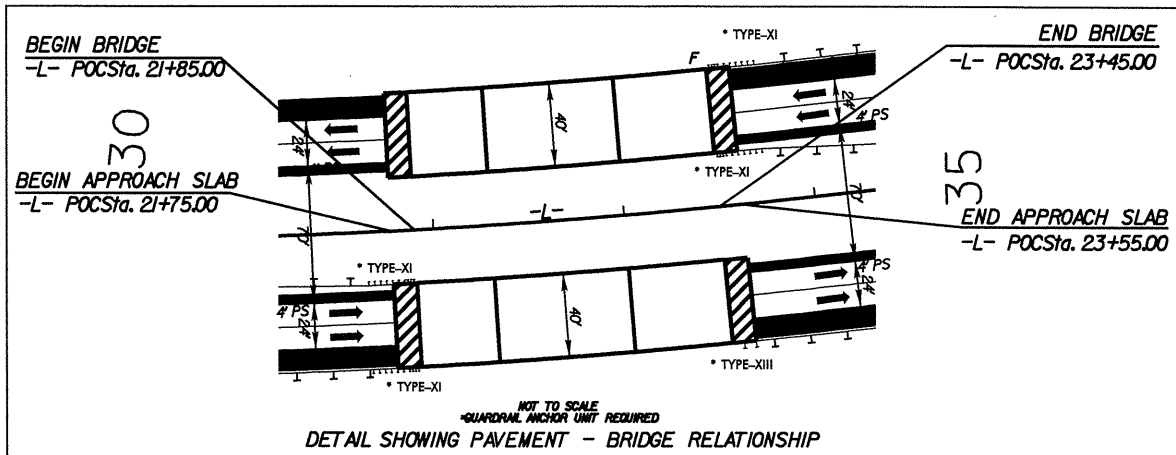
Groundwater

Each boring location was measured for groundwater immediately after drilling and after a period of 24 hours. With the exception of a single boring all holes were dry. Boring EB1-B LT LN produced a 24 hour water reading at elevation 708.41 feet.

Respectfully submitted,

J.E. Beverly, Project Geologist

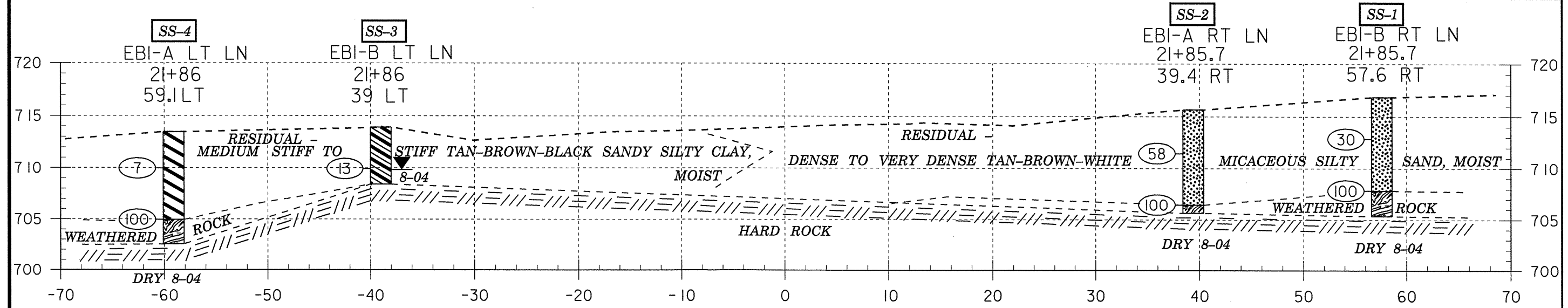
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R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
Prepared in the Office of: EARTH T E C H N I C I A N S	
701 Corporate Center Drive, Suite 475 Raleigh, NC 27607 (919) 854-6200 • (919) 854-6253(FAX)	
GRAPHIC SCALE	
50 25 0 50 100 PLANS	



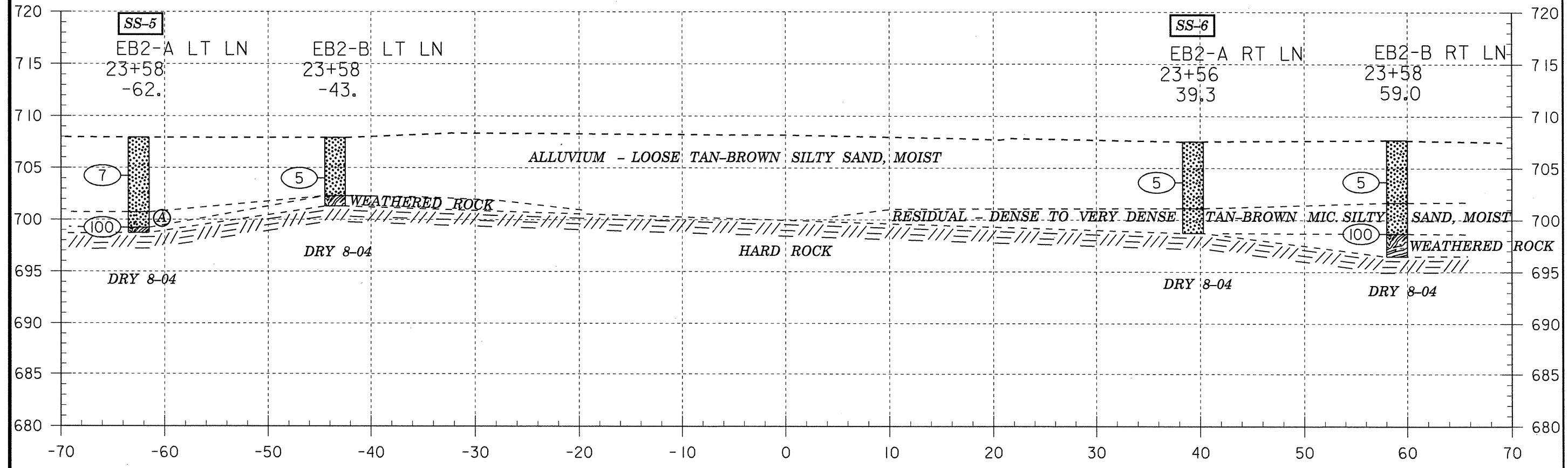
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ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	

SECTION THRU END BENT 1 LEFT AND RIGHT LANE BORINGS

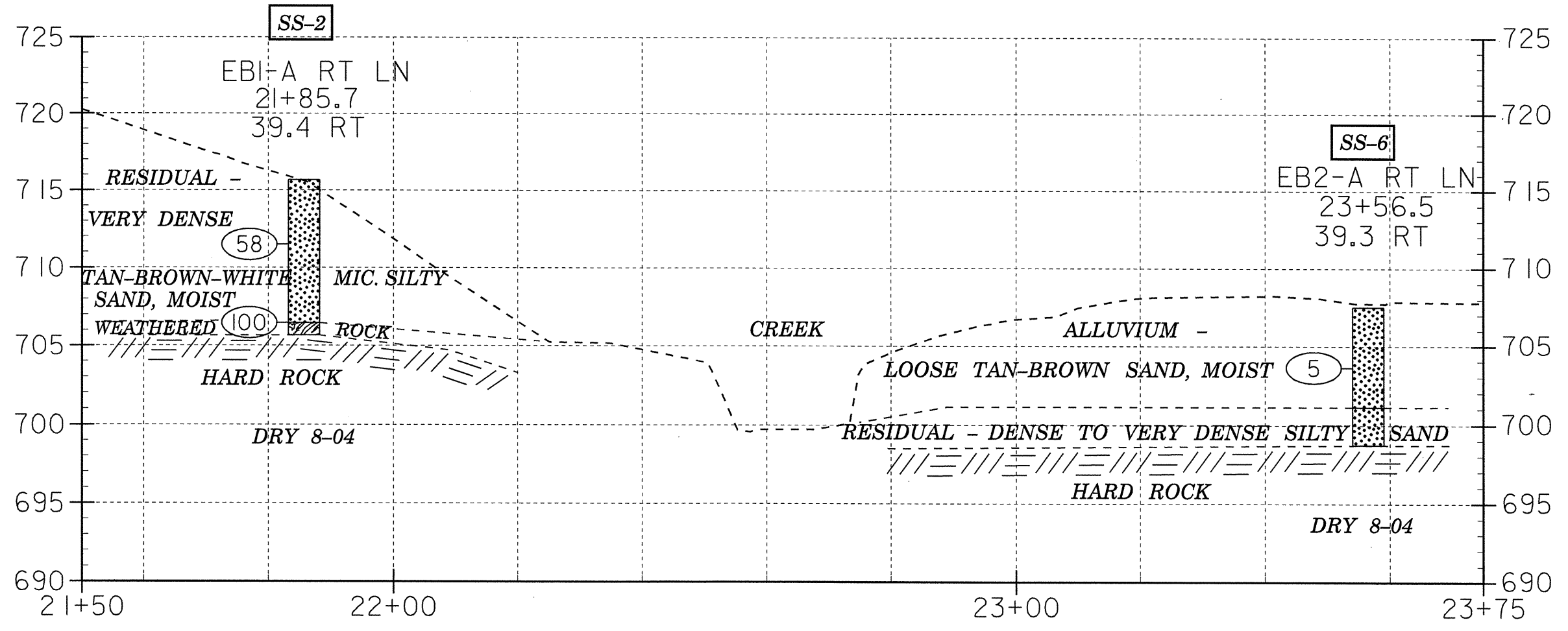


SECTION THRU END BENT 2 LEFT AND RIGHT LANE BORINGS



Ⓐ RESIDUAL - DENSE TO VERY DENSE TAN-BROWN-WHITE MICACEOUS SILTY SAND, MOIST TO DRY

PROFILE 39 FEET RIGHT OF -L-



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34480.1.1		ID R-2606A		COUNTY RANDOLPH		GEOLOGIST J.K. STICKNEY							
SITE DESCRIPTION DUAL BRIDGES ON US 311 OVER MUDDY CREEK							GND WATER						
BORING NO EB1-A LT LN		NORTHING 0.00		EASTING 0.00		0 HR NA Dry							
ALIGNMENT L		BORING LOCATION 21+86.000		OFFSET 59.10ft LT		24 HR NA Dry							
COLLAR ELEV 713.46ft		TOTAL DEPTH 10.90ft		START DATE 8/11/04		COMPLETION DATE 08/11/04							
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB1-A LT LN, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
713.46													Ground Surface
710.00	3.50	2	3	4	1.0					7	SS-4	MOIST	RESIDUAL - MEDIUM STIFF TAN-BROWN-BLACK SANDY SILTY CLAY
702.56	8.50	36	67		0.9					100		DRY	WEATHERED ROCK
													HOLLOW STEM REFUSAL AT ELEVATION 702.56' ON HARD ROCK

PROJECT NO 34480.1.1		ID R-2606A		COUNTY RANDOLPH		GEOLOGIST J.K. STICKNEY							
SITE DESCRIPTION DUAL BRIDGES ON US 311 OVER MUDDY CREEK							GND WATER						
BORING NO EB1-B LT LN		NORTHING 0.00		EASTING 0.00		0 HR NA Dry							
ALIGNMENT L		BORING LOCATION 21+86.000		OFFSET 39.00ft LT		24 HR 4.10ft							
COLLAR ELEV 713.91ft		TOTAL DEPTH 5.50ft		START DATE 8/11/04		COMPLETION DATE 08/11/04							
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB1-B LT LN, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
713.91													Ground Surface
710.00	4.00	3	4	9	1.0					13	SS-3	MOIST	RESIDUAL - STIFF TAN-BROWN-WHITE SILTY SANDY CLAY
708.41													HOLLOW STEM REFUSAL AT ELEVATION 708.41' ON HARD ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34480.1.1		ID R-2606A		COUNTY RANDOLPH		GEOLOGIST J.K. STICKNEY							
SITE DESCRIPTION DUAL BRIDGES ON US 311 OVER MUDDY CREEK							GND WATER						
BORING NO EB1-A RT LN		NORTHING 0.00		EASTING 0.00		0 HR NA Dry							
ALIGNMENT L		BORING LOCATION 21+85.700		OFFSET 39.40ft RT		24 HR NA Dry							
COLLAR ELEV 715.67ft		TOTAL DEPTH 10.00ft		START DATE 8/11/04		COMPLETION DATE 08/11/04							
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB1-A RT LN, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75				
715.67													Ground Surface
710.00	4.20	7	29	29	1.0						SS-2	MOIST	RESIDUAL - VERY DENSE TAN-BROWN-WHITE MICACEOUS SILTY SAND
705.67	9.20	10	90	0.9									WEATHERED ROCK
													HOLLOW STEM REFUSAL AT ELEVATION 705.67' ON HARD ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34480.1.1		ID R-2606A		COUNTY RANDOLPH		GEOLOGIST J.K. STICKNEY							
SITE DESCRIPTION DUAL BRIDGES ON US 311 OVER MUDDY CREEK							GND WATER						
BORING NO EB1-B RT LN		NORTHING 0.00		EASTING 0.00		0 HR NA Dry							
ALIGNMENT L		BORING LOCATION 21+85.700		OFFSET 57.60ft RT		24 HR NA Dry							
COLLAR ELEV 716.86ft		TOTAL DEPTH 11.50ft		START DATE 8/11/04		COMPLETION DATE 08/11/04							
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH N/A			DEPTH TO ROCK N/A			Log EB1-B RT LN, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75				
716.86													Ground Surface
710.00	4.00	4	16	14	1.0						SS-1	MOIST	RESIDUAL - DENSE TAN-BROWN MICACEOUS SILTY SAND
705.36	9.00	100			0.3							DRY	WEATHERED ROCK
													HOLLOW STEM REFUSAL AT ELEVATION 705.00' ON HARD ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34480.1.1		ID R-2606A		COUNTY RANDOLPH		GEOLOGIST J.K. STICKNEY								
SITE DESCRIPTION DUAL BRIDGES ON US 311 OVER MUDDY CREEK							GND WATER							
BORING NO EB2-A LT LN		NORTHING 0.00		EASTING 0.00		0 HR NA Dry								
ALIGNMENT L		BORING LOCATION 23+58.000		OFFSET 62.50ft LT		24 HR NA Dry								
COLLAR ELEV 707.94ft		TOTAL DEPTH 9.20ft		START DATE 8/11/04		COMPLETION DATE 08/11/04								
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB2-A LT LN, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75					100
707.94														Ground Surface
	3.70	1	3	4	1.0	7					SS-5	MOIST		ALLUVIUM - LOOSE TAN SILTY SAND
700.00 698.74	8.70	24	76		0.7				100					HOLLOW STEM REFUSAL AT ELEVATION 698.74' ON HARD ROCK RESIDUAL - DENSE TO VERY DENSE TAN-BROWN-WHITE MICACEOUS SILTY SAND WEATHERED ROCK

PROJECT NO 34480.1.1		ID R-2606A		COUNTY RANDOLPH		GEOLOGIST J.K. STICKNEY								
SITE DESCRIPTION DUAL BRIDGES ON US 311 OVER MUDDY CREEK							GND WATER							
BORING NO EB2-B LT LN		NORTHING 0.00		EASTING 0.00		0 HR NA Dry								
ALIGNMENT L		BORING LOCATION 23+58.000		OFFSET 43.50ft LT		24 HR NA Dry								
COLLAR ELEV 707.90ft		TOTAL DEPTH 6.60ft		START DATE 8/11/04		COMPLETION DATE 08/11/04								
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB2-B LT LN, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75					100
707.90														Ground Surface
	3.90	1	2	3	1.0	5						MOIST		ALLUVIUM - LOOSE TAN SILTY SAND
701.30														HOLLOW STEM REFUSAL AT ELEVATION 701.3' ON HARD ROCK WEATHERED ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34480.1.1		ID R-2606A		COUNTY RANDOLPH		GEOLOGIST J.K. STICKNEY								
SITE DESCRIPTION DUAL BRIDGES ON US 311 OVER MUDDY CREEK							GND WATER							
BORING NO EB2-A RT LN		NORTHING 0.00		EASTING 0.00		0 HR N/A Dry								
ALIGNMENT L		BORING LOCATION 23+56.500		OFFSET 39.30ft RT		24 HR N/A Dry								
COLLAR ELEV 707.53ft		TOTAL DEPTH 8.80ft		START DATE 8/11/04		COMPLETION DATE 08/11/04								
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB2-A RT LN, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75					100
707.53														Ground Surface
	3.90	1	2	3	1.0	5					SS-6	MOIST		ALLUVIUM - LOOSE TAN-BROWN SAND
700.00														RESIDUAL - DENSE TO VERY DENSE TAN-BROWN MICACEOUS SILTY SAND
698.73														HOLLOW STEM REFUSAL AT ELEVATION 698.73' ON HARD ROCK

PROJECT NO 34480.1.1		ID R-2606A		COUNTY RANDOLPH		GEOLOGIST J.K. STICKNEY								
SITE DESCRIPTION DUAL BRIDGES ON US 311 OVER MUDDY CREEK							GND WATER							
BORING NO EB2-B RT LN		NORTHING 0.00		EASTING 0.00		0 HR N/A Dry								
ALIGNMENT L		BORING LOCATION 23+58.000		OFFSET 59.00ft RT		24 HR N/A Dry								
COLLAR ELEV 707.69ft		TOTAL DEPTH 11.20ft		START DATE 8/11/04		COMPLETION DATE 08/11/04								
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH N/A			DEPTH TO ROCK N/A			Log EB2-B RT LN, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75					100
707.69														Ground Surface
	4.00	1	2	3	1.0	5						MOIST		ALLUVIUM - LOOSE TAN-BROWN SAND
700.00														RESIDUAL - DENSE TO VERY DENSE TAN-BROWN MICACEOUS SILTY SAND
696.49														HOLLOW STEM REFUSAL AT ELEVATION 696.49' ON HARD ROCK
	9.00	41	59		0.8				100					WEATHERED ROCK

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAY
MATERIALS & TESTS UNIT
SOILS LABORATORY**

T. I. P. No. R-2606A

REPORT ON SAMPLES OF SOILS FOR QUALITY

Project 34480.1.1 County RANDOLPH Owner _____
 Date: Sampled _____ Received 8/17/04 Reported 8/19/2004
 Sampled from _____ By J E BEVERLY
 Submitted by N WAINAINA _____ 1995 Standard Specifications

716407 TO 716412
8/23/04

TEST RESULTS

Proj. Sample No.	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6
Lab. Sample No.	716407	716408	716409	716410	716411	716412
Retained #4 Sieve %	-	-	-	-	-	-
Passing #10 Sieve %	100	100	100	100	100	100
Passing #40 Sieve %	73	79	79	97	85	69
Passing #200 Sieve %	29	31	47	85	23	14

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60 %	44.3	38.4	34.5	4.2	36.8	57.4
Fine Sand Ret - #270 %	31.7	36.2	23.8	17.6	46.5	31.4
Silt 0.05 - 0.005 mm %	13.8	15.4	21.4	39.8	11.7	6.2
Clay < 0.005 mm %	10.1	10.1	20.2	38.4	5.1	5.1
Passing #40 Sieve %	-	-	-	-	-	-
Passing #200 Sieve %	-	-	-	-	-	-

L. L.	26	24	33	49	21	21
P. I.	NP	NP	14	22	NP	NP
AASHTO Classification	A-2-4(0)	A-2-4(0)	A-6(3)	A-7-6(21)	A-2-4(0)	A-2-4(0)
Station	21+85.7	21+85.7	21+86	21+86	23+58	23+56.5
	57.6 LT	39.4RT	39 LT	59.1 LT	62.5 LT	39.3 RT
Hole No.						
Depth (Ft)	4.50	4.70	4.50	4.00	4.20	4.40
to	5.50	5.70	5.50	5.00	5.20	5.40

cc: J E BEVERLY
Soils File

Soils Engineer

GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: 34480.1.1 TIP NO.: R-2606A COUNTY: Randolph

DESCRIPTION(1): Dual Bridges on US 311 over Muddy Creek

◆ **INFORMATION ON EXISTING BRIDGES** Information obtained from Field Inspection
 Microfilm (Reel: Position:)
 Other

COUNTY BRIDGE NO. N/A BRIDGE LENGTH N/A NO. BENTS N/A NO. BENTS IN: CHANNEL N/A FLOODPLAIN N/A

FOUNDATION TYPE: None - new structure

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES:

INTERIOR BENTS:

CHANNEL BED: None

CHANNEL BANKS: None

◆ **EXISTING SCOUR PROTECTION:**

TYPE(3): None - new structure

EXTENT(4):

EFFECTIVENESS(5):

OBSTRUCTIONS(6) (DAMS, DEBRIS, ETC.): *Note: The potential for debris is high. There are many fallen trees, limbs, etc.*◆ **DESIGN INFORMATION**

CHANNEL BED MATERIAL(7) (Sample Results Attached): Sand, (Reference SS-5)

CHANNEL BANK MATERIAL(8) (Sample Results Attached): Sand (Reference SS-5)

CHANNEL BANK COVER(10): Mature Trees, Grass, Shrubs

FLOOD PLAIN WIDTH(11): approximately 220 feet

FLOOD PLAIN COVER(12): Mature Trees, Grass, Shrubs

STREAM IS: DEGRADING AGGRADING (13)

OTHER OBSERVATIONS AND COMMENTS:

◆
 ◆
 ◆ **DESIGN INFORMATION CONT.**

CHANNEL MIGRATION TENDENCY(14): Slight

GEOTECHNICAL ADJUSTED SCOUR ELEVATIONS (15):

Bridge scour should be a non-issue at this site as both structures are of a single span design utilizing end bent piles. End bents fall well outside of scour zone associated with the creek channel.

The theoretical 500 year scour prediction given on the NCDOT Hydro Report predicts the maximum scour elevation at approximately 690 feet. Based on geotechnical boring data collected at each end bent location we interpret the occurrence of hard rock between approximate elevation 700 (End Bent 2) and 705 feet (End Bent 1). Rock appears to be just beneath the creek channel. Scour should not occur below the hard rock horizon.

REPORTED BY: JKS / JEB DATE: 8-11-04

INSTRUCTIONS

- (1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED.
- (2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS DEGRADATIONS, ETC.)
- (3) NOTE ANY EXISTING SCOUR PROTECTION (RIPRAP, ETC.)
- (4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.
- (5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING.
- (6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC.
- (7) DESCRIBE THE CHANNEL BED MATERIAL; A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (8) DESCRIBE THE CHANNEL BANK MATERIAL; A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (9) DESCRIBE THE FOUNDATION BEARING MATERIAL
- (10) DESCRIBE THE BANK COVERING (GRASS, TREES, RIPRAP, NONE, ETC.)
- (11) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
- (12) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
- (13) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING.
- (14) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE Laterally DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
- (15) GIVE THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION. IF THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION IS DEPENDENT ON SCOUR COUNTER MEASURES, EXPLAIN. (RIPRAP ARMORING ON SLOPES, ETC.) THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE; PERCENT RQD; DIFFERENTIAL WEATHERING; SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.

PROJECT: 34480.1.1 ID. R-2606A

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 34480.1.1 I.D. NO. R-2606A

F.A. PROJECT _____

COUNTY RANDOLPH

PROJECT DESCRIPTION US 311 FROM SOUTH
OF SR 1920 TO NORTH OF SR 1929

SITE DESCRIPTION BRIDGE ON -Y1-
(CEDAR SQUARE RD.) OVER US 311

INVENTORY

DRAWN BY: J.E. BEVERLY /J.K. McCLURE

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.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2606A	1	14
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34480.1.1		P.E.	
		CONST.	

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS 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.

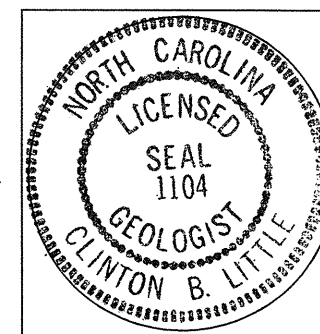
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT 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.


INVESTIGATED BY J.E. BEVERLY PERSONNEL J.K. STICKNEY

CHECKED BY C.B. LITTLE C.E. BURRIS

SUBMITTED BY C.B. LITTLE C.L. SMITH

DATE APRIL 2004 J.E. ESTEP



SEAL 4-28-04

 SIGNATURE




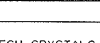












NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

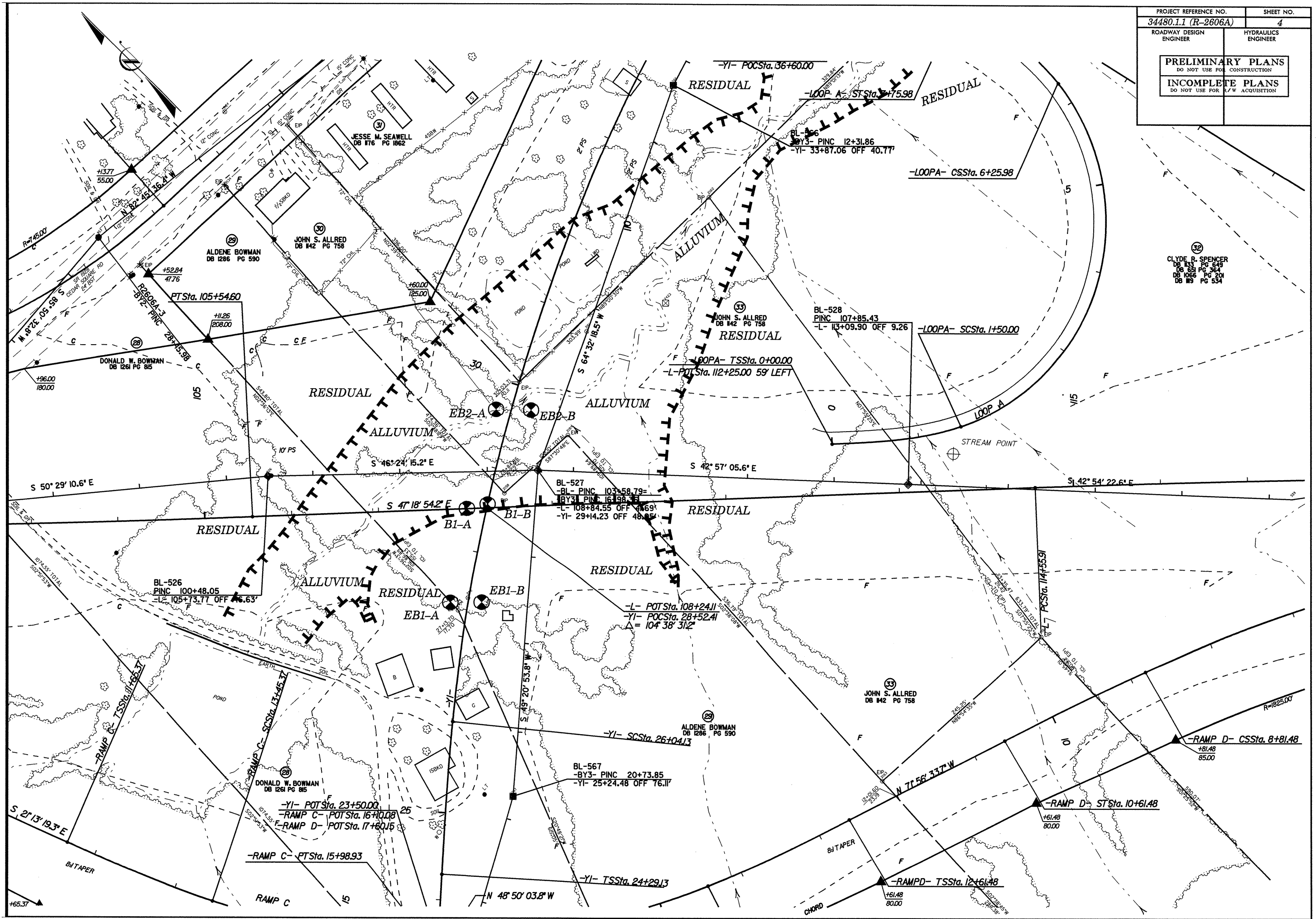
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

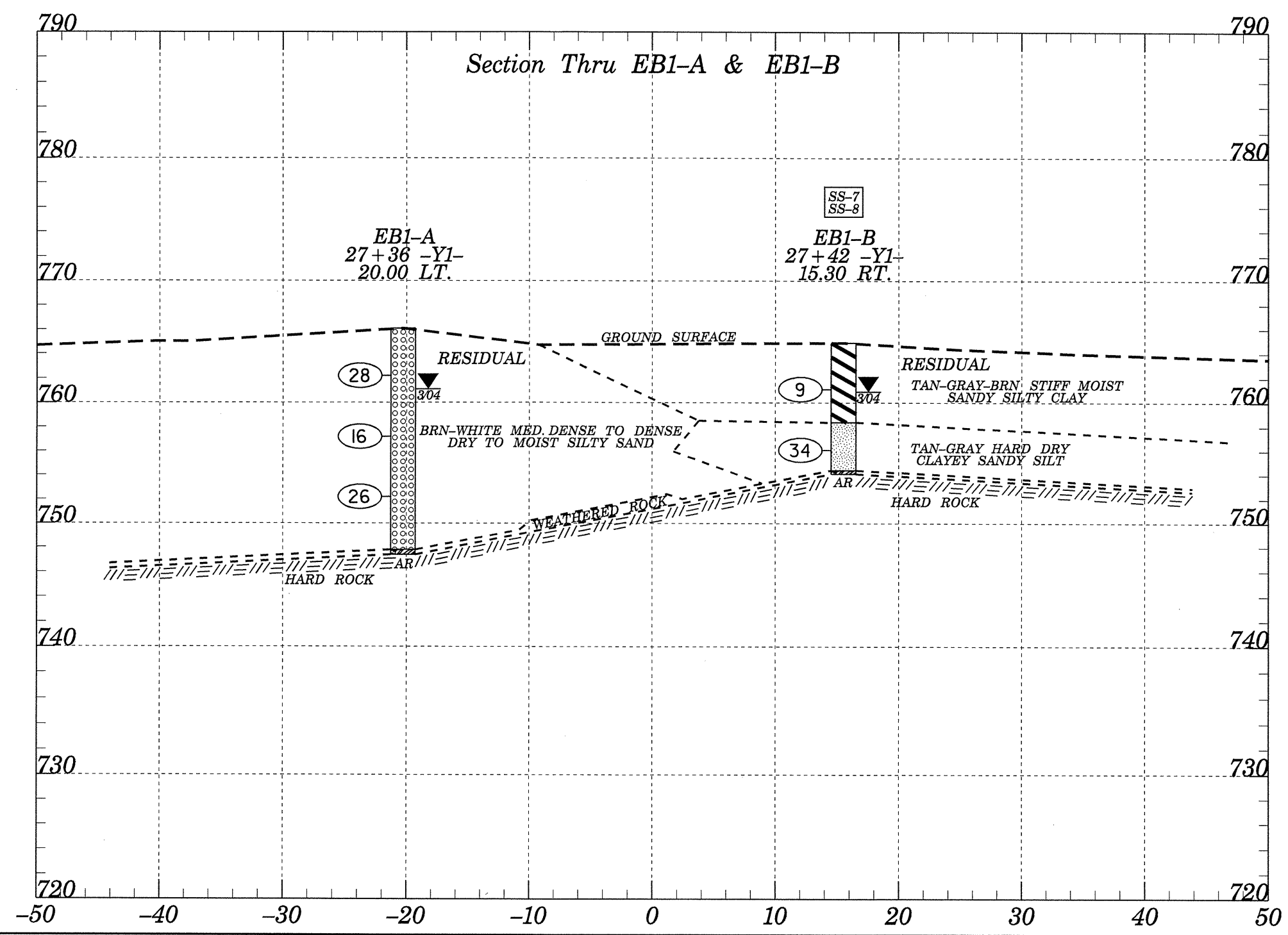
SUBSURFACE INVESTIGATION

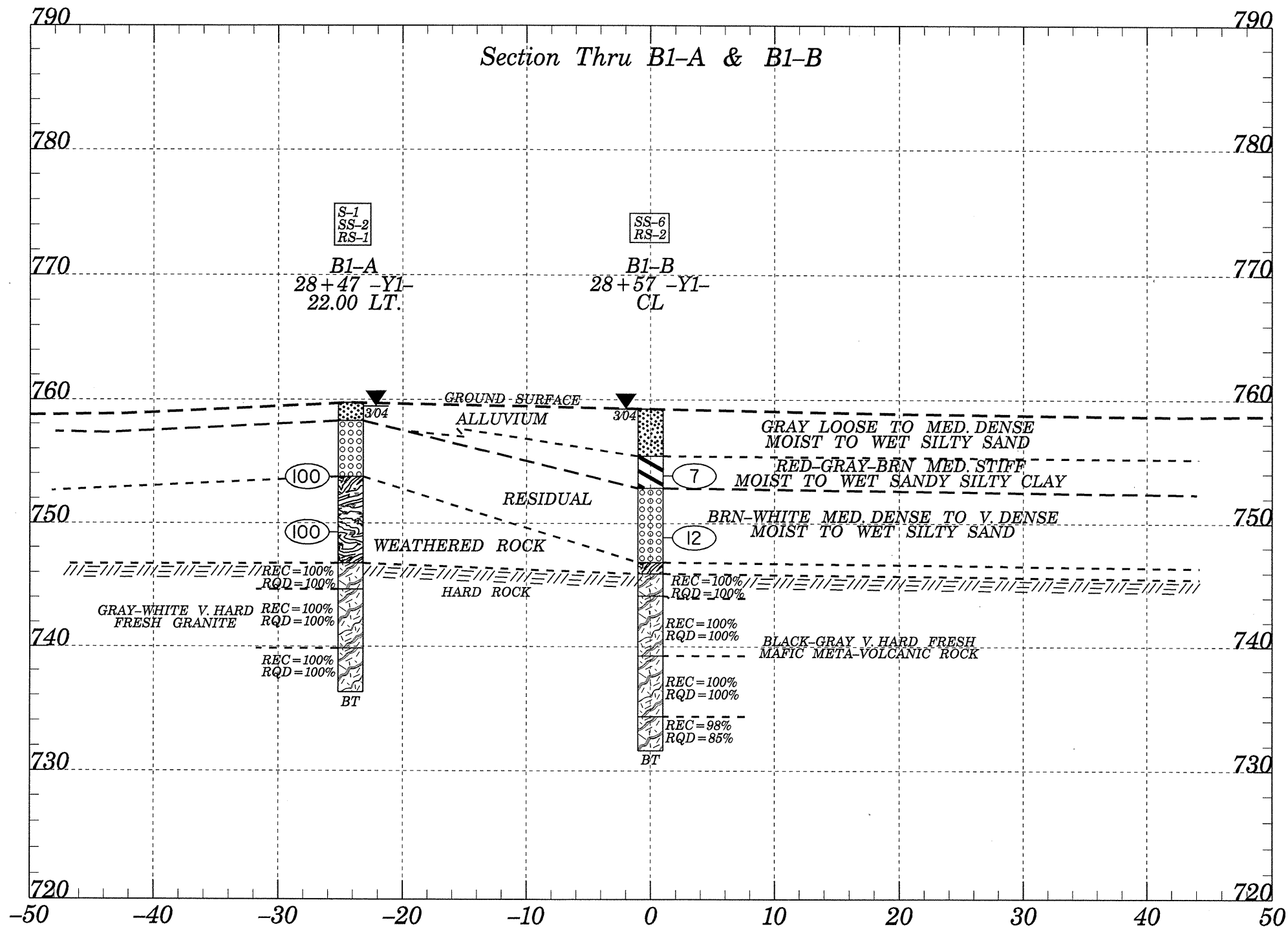
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
R-2606A	34480.1.1	2	14

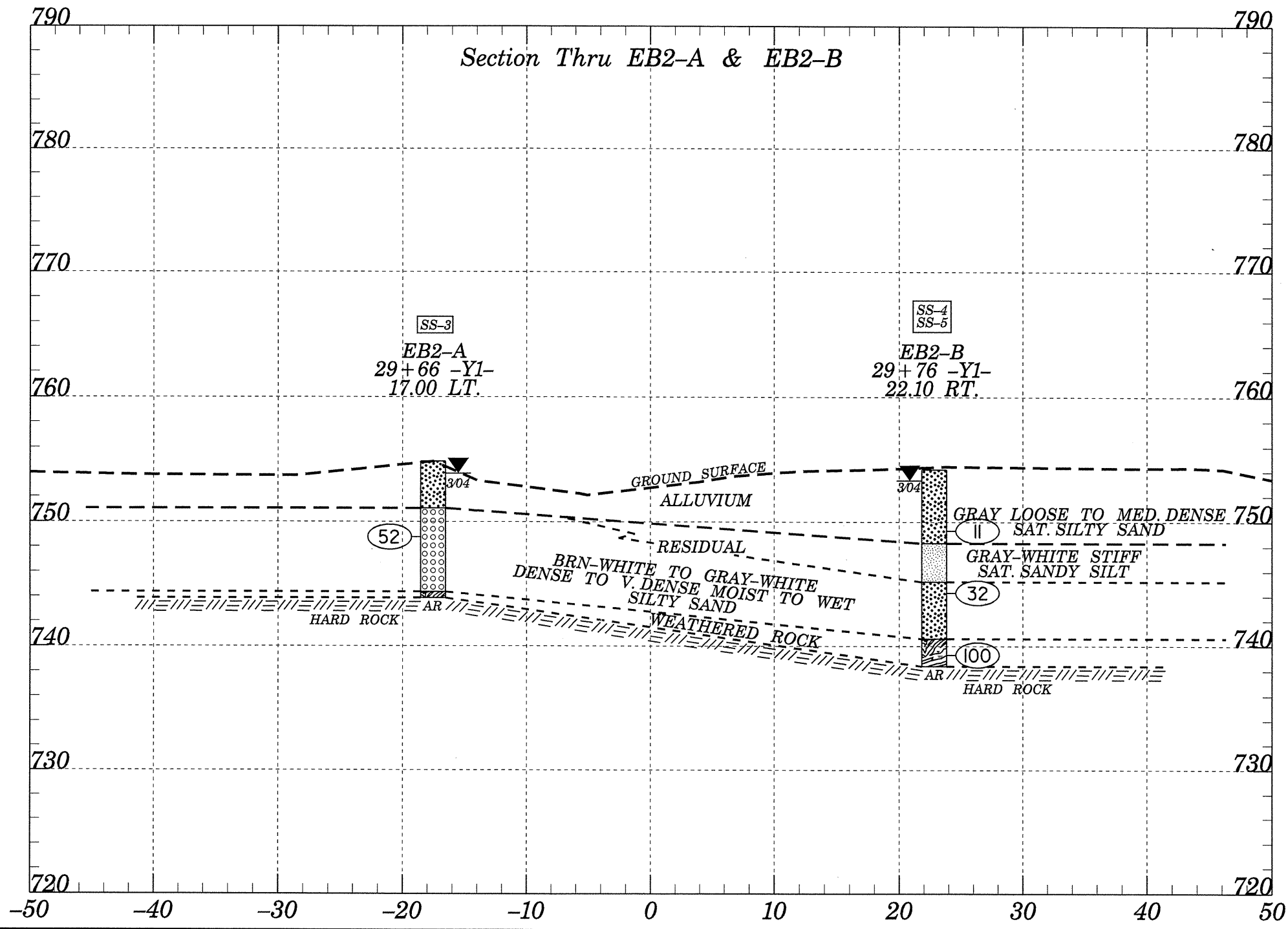
SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS	
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>		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. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.		HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN 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: WEATHERED ROCK (WR)  NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER FOOT. CRYSTALLINE ROCK (CR)  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. 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. COASTAL PLAIN SEDIMENTARY ROCK (CP)  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.		ALLUVIUM (ALLUV.) - SOILS WHICH 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 WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (F.P.) - 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 SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - 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 WHICH 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, WHICH 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 (IN OR B.P.F.) 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 LESS THAN 0.1 FOOT PENETRATION WITH 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.	
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING			
GENERAL CLASS. GRANULAR MATERIALS (< 75% PASSING #200) SILT-CLAY MATERIALS (> 75% PASSING #200) ORGANIC MATERIALS		MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V. SL.) 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. SLIGHT (SL.) 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. 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. 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. IF TESTED, WOULD YIELD SPT REFUSAL. SEVERE (SEV.) ALL ROCKS 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. IF TESTED, YIELDS SPT N VALUES > 100 BPF 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. IF TESTED, YIELDS SPT N VALUES < 100 BPF 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.		COMPRESSIONS SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30 MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50 PERCENTAGE OF MATERIAL ORGANIC MATERIAL GRANULAR SILTS SILT-CLAY OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE GROUND WATER  WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.  STATIC WATER LEVEL AFTER 24 HOURS.  PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA  SPRING OR SEEPAGE MISCELLANEOUS SYMBOLS  ROADWAY EMBANKMENT WITH SOIL DESCRIPTION  SOIL SYMBOL  ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS  INFERRED SOIL BOUNDARIES  INFERRED ROCK LINE  ALLUVIAL SOIL BOUNDARY  DIP/DIP DIRECTION OF ROCK STRUCTURES  SOUNDING ROD SPT TEST BORING SPT DMT VST TEST BORING SAMPLE DESIGNATIONS S - BULK SAMPLE SS - SPLIT SPOON SAMPLE ST - SHELBY TUBE SAMPLE RS - ROCK SAMPLE RT - RECOMPACTED TRIAXIAL SAMPLE CBR - CBR SAMPLE SPT N-VALUE SPT REFUSAL ABBREVIATIONS 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 FRAGS. - FRAGMENTS MED. - MEDIUM PMT - PRESSUREMETER TEST SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL γ - UNIT WEIGHT γ _d - DRY UNIT WEIGHT w - MOISTURE CONTENT v - VERY VST - VANE SHEAR TEST EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45 <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE MOIST <input type="checkbox"/> OTHER _____ <input type="checkbox"/> OTHER _____ ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input checked="" type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input checked="" type="checkbox"/> TUNG-CARBIDE INSERTS <input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER <input checked="" type="checkbox"/> TRICONE 2 1/2" STEEL TEETH <input type="checkbox"/> TRICONE _____" TUNG-CARB. <input checked="" type="checkbox"/> CORE BIT <input type="checkbox"/> OTHER _____ HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL CORE SIZE: <input type="checkbox"/> B- <input checked="" type="checkbox"/> N-XWL <input type="checkbox"/> H- HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST <input type="checkbox"/> OTHER _____ FRACTURE SPACING TERM SPACING 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 BEDDING TERM THICKNESS VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. 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CONSISTENCY OR DENSENESS		TEXTURE OR GRAIN SIZE		SOIL MOISTURE - CORRELATION OF TERMS			
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)		U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 0.425 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 75 2.0 0.25 0.05 0.005 IN. 12" 3"		SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION LL LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET. USUALLY FROM BELOW THE GROUND WATER TABLE PL PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE OM OPTIMUM MOISTURE SHRINKAGE LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH COLOR DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.			
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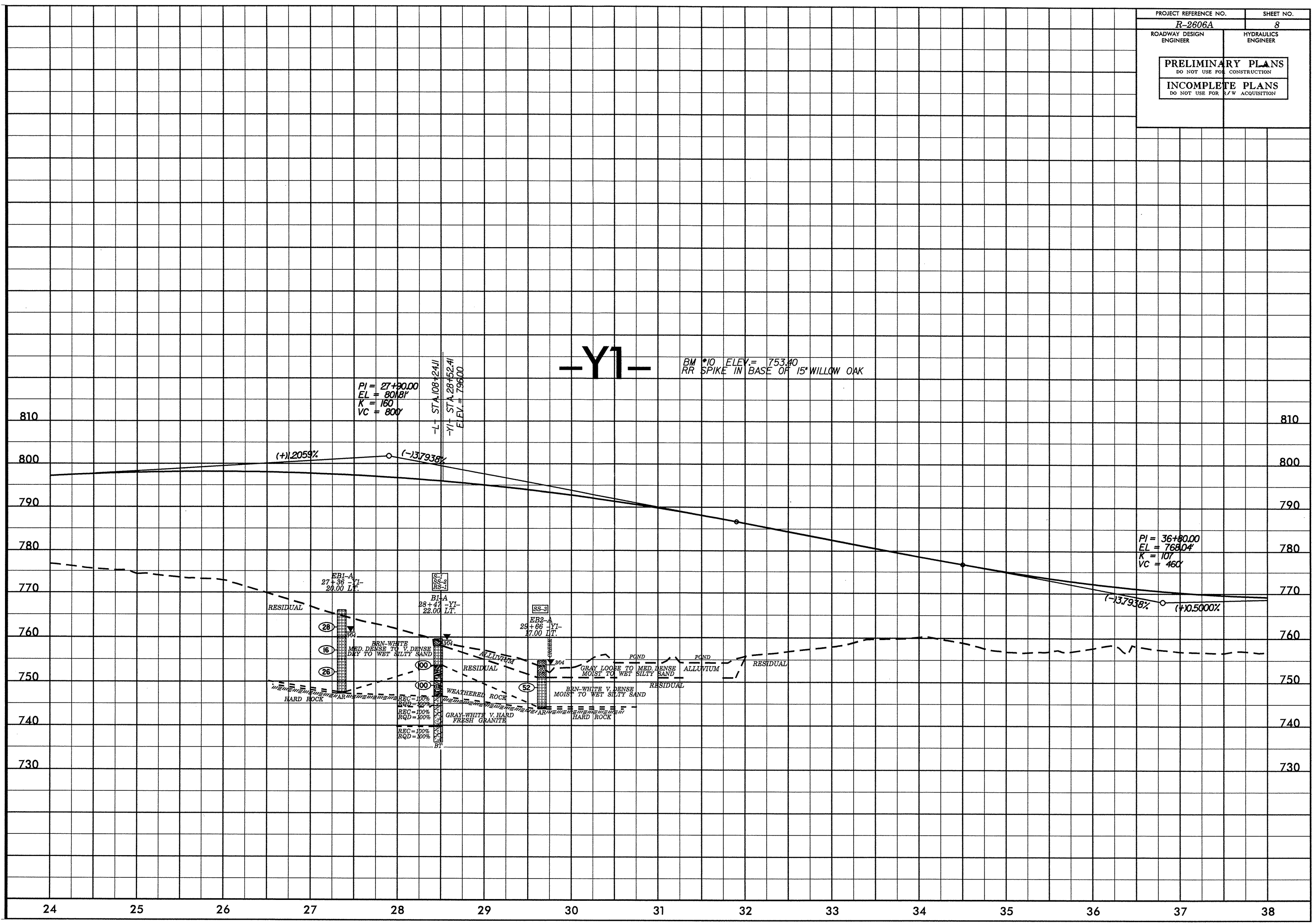






PROJECT REFERENCE NO. <i>R-2606A</i>	SHEET NO. <i>7</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
INCOMPLETE PLANS DO NOT USE FOR S/W ACQUISITION	





PI = 27+30.00
EL = 801.81'
K = 160
VC = 800'

-L- STA 108+24.11
-Y1- STA 28+52.41
ELEV. = 796.00

-Y1-

BM *10 ELEV. = 753.40
RR SPIKE IN BASE OF 15" WILLOW OAK

PI = 36+80.00
EL = 768.04'
K = 107
VC = 460'

EB1-A
27+36 -Y1-
20.00 LT.

SS-1
SS-2
RS-1

B1-A
28+47 -Y1-
22.00 LT.

SS-3

EB2-A
29+66 -Y1-
17.00 LT.

RESIDUAL

BRN-WHITE
MED DENSE TO V. DENSE
DRY TO WET SILTY SAND

ALLUVIUM

GRAY LOOSE TO MED DENSE
MOIST TO WET SILTY SAND

RESIDUAL

BRN-WHITE V. DENSE
MOIST TO WET SILTY SAND

RESIDUAL

WEATHERED ROCK

GRAY-WHITE V. HARD
FRESH GRANITE

HARD ROCK

REC = 100%
RQD = 100%

REC = 100%
RQD = 100%

REC = 100%
RQD = 100%

BT

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34480.1.1		ID R-2606A		COUNTY RANDOLPH		GEOLOGIST J.K. STICKNEY									
SITE DESCRIPTION BRIDGE ON CEDAR SQUARE RD. OVER US 311							GND WATER								
BORING NO EB1-A		NORTHING 0.00		EASTING 0.00		0 HR 14.00ft									
ALIGNMENT Y1		BORING LOCATION 27+36.000		OFFSET 20.00ft LT		24 HR 5.00ft									
COLLAR ELEV 766.10ft		TOTAL DEPTH 18.70ft		START DATE 3/18/04		COMPLETION DATE 03/18/04									
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC									
SURFACE WATER DEPTH			DEPTH TO ROCK 18.70ft			Log EB1-A, Page 1 of 1									
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100					
766.10															Ground Surface
	3.90	6	12	16	1.0										RESIDUAL - MEDIUM DENSE TO DENSE BROWN-WHITE SILTY SAND
	8.90	8	8	8	1.0										
	13.90	7	10	16	1.0										DRY
750.00															
747.40															ALGER REFUSAL ON CRYSTALLINE ROCK AT ELEVATION 747.4 FEET
															WEATHERED ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34480.1.1		ID R-2606A		COUNTY RANDOLPH		GEOLOGIST J.K. STICKNEY									
SITE DESCRIPTION BRIDGE ON CEDAR SQUARE RD. OVER US 311							GND WATER								
BORING NO EB1-B		NORTHING 0.00		EASTING 0.00		0 HR N/A									
ALIGNMENT Y1		BORING LOCATION 27+42.000		OFFSET 15.30ft RT		24 HR 4.00ft									
COLLAR ELEV 764.90ft		TOTAL DEPTH 10.80ft		START DATE 3/18/04		COMPLETION DATE 03/18/04									
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC									
SURFACE WATER DEPTH N/A			DEPTH TO ROCK 10.80ft			Log EB1-B, Page 1 of 1									
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100					
764.90															Ground Surface
	3.80	3	4	5	1.0										RESIDUAL - STIFF TAN-GRAY-BROWN SANDY SILTY CLAY
	8.80	6	12	22	1.0										HARD TAN-GRAY CLAYEY SANDY SILT
754.10															WEATHERED ROCK
															ALGER REFUSAL AT ELEVATION 754.10 FEET ON CRYSTALLINE ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34480.1.1		ID R-2606A		COUNTY RANDOLPH		GEOLOGIST J.K. STICKNEY							
SITE DESCRIPTION BRIDGE ON CEDAR SQUARE RD. OVER US 311							GND WATER						
BORING NO EB2-A		NORTHING 0.00		EASTING 0.00		0 HR 0.90ft							
ALIGNMENT Y1		BORING LOCATION 29+66.000		OFFSET 17.00ft LT		24 HR 1.00ft							
COLLAR ELEV 754.87ft		TOTAL DEPTH 11.00ft		START DATE 3/17/04		COMPLETION DATE 03/17/04							
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK 11.00ft			Log EB2-A, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
754.87													Ground Surface
750.00	6.10	16	23	29	1.0					52	SS-3	M/W	ALLUVIUM - LOOSE TO MEDIUM DENSE GRAY SILTY SAND
743.87													RESIDUAL - VERY DENSE BROWN-WHITE SILTY SAND
													WEATHERED ROCK
													AUGER REFUSAL AT ELEVATION 743.87 FEET ON CRYSTALLINE ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34480.1.1		ID R-2606A		COUNTY RANDOLPH		GEOLOGIST J.K. STICKNEY							
SITE DESCRIPTION BRIDGE ON CEDAR SQUARE RD. OVER US 311							GND WATER						
BORING NO EB2-B		NORTHING 0.00		EASTING 0.00		0 HR 0.60ft							
ALIGNMENT Y1		BORING LOCATION 29+76.000		OFFSET 22.10ft RT		24 HR 0.90ft							
COLLAR ELEV 754.20ft		TOTAL DEPTH 15.80ft		START DATE 3/17/04		COMPLETION DATE 03/17/04							
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH N/A			DEPTH TO ROCK 15.80ft			Log EB2-B, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
754.20													Ground Surface
750.00	4.90	3	5	6	1.0					11	SS-4	SAT	ALLUVIUM - LOOSE TO MEDIUM DENSE GRAY SILTY SAND
	9.90	17	14	18	1.0					32	SS-5	M/W	RESIDUAL - STIFF GRAY-WHITE SANDY SILT
740.00													DENSE GRAY-WHITE SILTY SAND
738.40	14.90	27	73		0.8					100		DRY	WEATHERED ROCK
													AUGER REFUSAL AT ELEVATION 738.4 FEET ON CRYSTALLINE ROCK

TEST RESULTS

PROJECT: 34480.1.1 R-2606A

COUNTY: RANDOLPH

SITE DESCRIPTION: BRIDGE NO. 519 ON -Y1- (CEDAR SQUARE RD.) OVER US 311

SOIL SAMPLE RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	N	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVES			UNIT WT. (d)	VOID RATIO
								C. SAND	F. SAND	SILT	CLAY	10	40	200		
EB1-B																
SS-7	15.30 RT.	27+42 (-Y1-)	4.30-5.30	A-7-6(12)	9	46	20	17.5	23.3	41	18.1	100	91	64		
SS-8					34	31	8	31	24.7	34.2	10.1	71	56	36		
B1-A																
S-1	22.00 LT.	28+47 (-Y1-)	0.00-1.50	A-2-4(0)		18	NP	41	33	23.9	2	98	78	30		
SS-2			6.00-7.00	A-2-4(0)	100	23	NP	56.5	20.5	18.9	4	93	54	25		
B1-B																
SS-6	CL	28+57 (-Y1-)	5.90-6.90	A-7-5(18)	7	49	18	3.2	19.7	61	16.1	100	99	86		
EB2-A																
SS-3	17.00 LT.	29+66 (-Y1-)	6.60-7.60	A-1-b(0)	52	21	NP	62.2	20.5	15.3	2	81	43	16		
EB2-B																
SS-4	22.10 RT.	29+76 RT.	5.40-6.40	A-4(0)	11	35	NP	23.3	34	36.6	6	98	84	51		
SS-5			10.40-11.40	A-2-4(0)	32	33	NP	36.6	21.5	37.8	4	54	37	27		

ROCK SAMPLE RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	RQD	UNIT WT	Q(MPa) (MPsi)	E(MPa) (MPsi)
B1-A							
RS-1	22.00 LT.	28+47 (-Y1-)	19.9-20.5	100%		CURRENTLY BEING TESTED	
B1-B							
RS-2	CL	28+57 (-Y1-)	24.9-25.4	98%		CURRENTLY BEING TESTED	

34480.1.1 R-2606A
RANDOLPH COUNTY
BRIDGE ON CEDAR SQUARE RD. OVER US 311

CORE PHOTOS

B1-A

B1-B

