

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4682	1	10

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 33835.1.1 (B-4682) F.A. PROJ. BRSTP-1628(1)  
COUNTY WILSON  
PROJECT DESCRIPTION BRIDGE NO. 2 ON -L- (SR 1628) OVER  
CONTENTNEA CREEK AT -L- STATION 15+47

**CONTENTS**

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**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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

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

**PROJECT: 33835.1.1 ID: B-4682**

**PERSONNEL**

T.C. BOTTOMS

**MACTEC PERSONNEL**

J.R. SWARTLEY

R.E. SMITH

J.M. EDMONDSON

INVESTIGATED BY F.M. WESCOTT III

CHECKED BY D.N. ARGENBRIGHT

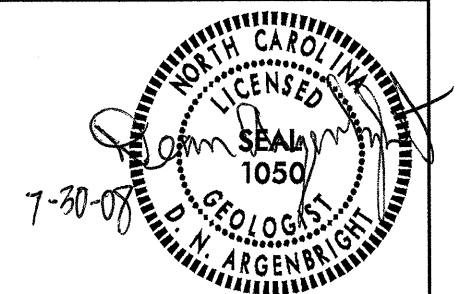
SUBMITTED BY D.N. ARGENBRIGHT

DATE JULY 2008

DRAWN BY: C.R. SUMNER

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.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 GEOTECHNICAL ENGINEERING UNIT

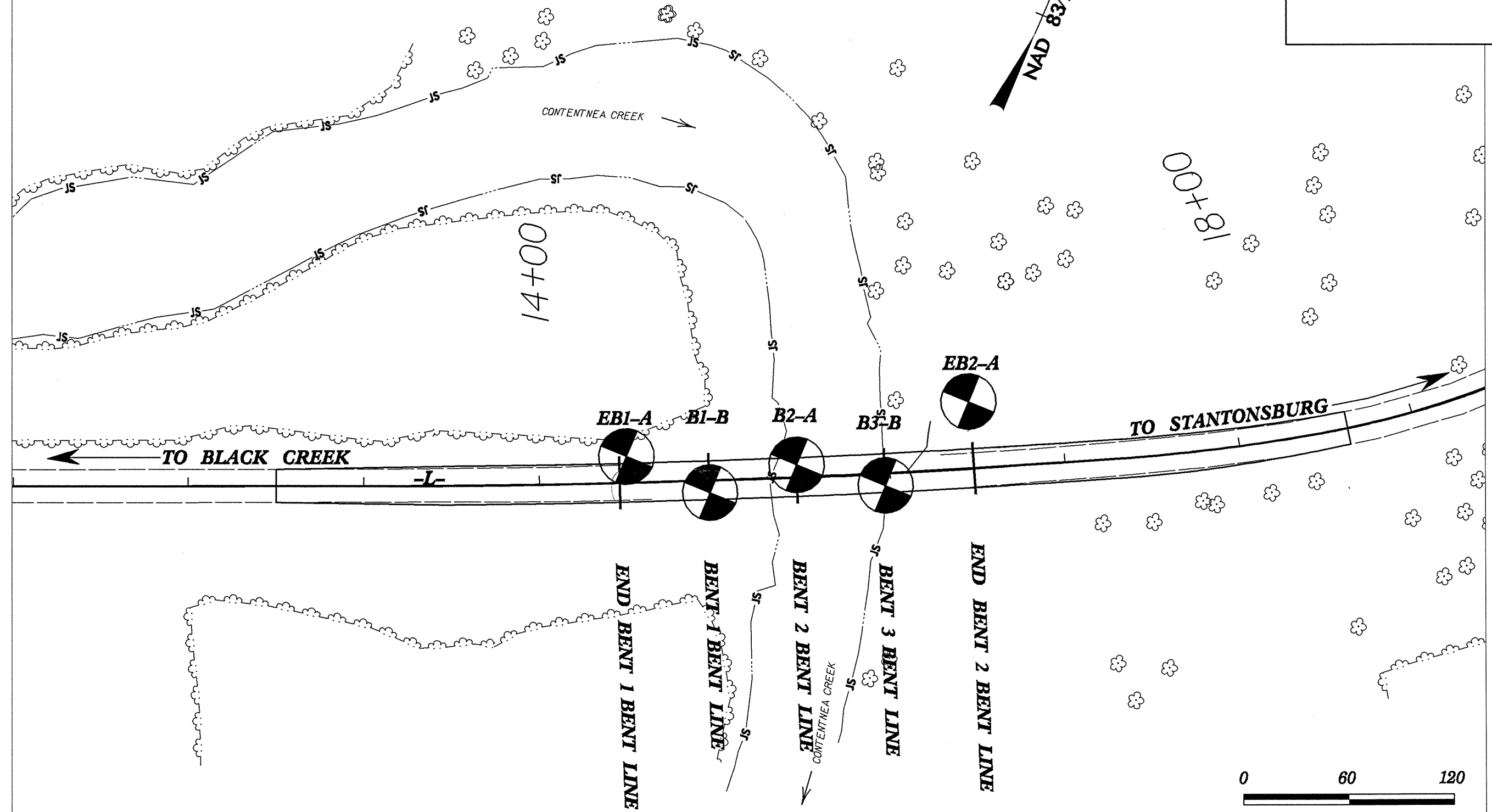
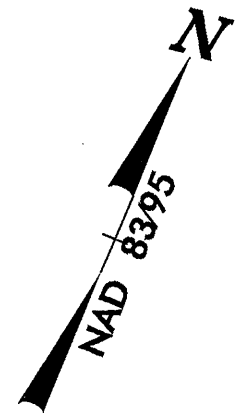
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																													
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRN, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAKERS, HIGH 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.										HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 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 (ALLOV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUSIVE 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 BPF OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 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 (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.																													
SOIL LEGEND AND AASHTO CLASSIFICATION										MINERALOGICAL COMPOSITION										WEATHERING																																							
GENERAL CLASS. GRANULAR MATERIALS (< 35% PASSING #200) SILT-CLAY MATERIALS (> 35% 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) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.																																							
GROUP CLASS. A-1-a, A-1-b, A-2, A-2-4, A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7, A-7-5, A-7-6, A-1, A-2, A-3, A-4, A-5, A-6, A-7										SLIGHTLY COMPRESSIBLE, MODERATELY COMPRESSIBLE, HIGHLY COMPRESSIBLE										FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.																																							
SYMBOL										PERCENTAGE OF MATERIAL										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.																																							
% PASSING: 10, 40, 200										ORGANIC MATERIAL, GRANULAR SOILS, SILT-CLAY SOILS, OTHER MATERIAL										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.																																							
LIQUID LIMIT, PLASTIC INDEX, GROUP INDEX										GROUND WATER										FRESH, VERY SLIGHT (V SL), SLIGHT (SL), MODERATE (MOD), MODERATELY SEVERE (MOD. SEV.), SEVERE (SEV.), VERY SEVERE (V SEV.), COMPLETE																																							
USUAL TYPES OF MAJOR MATERIALS										WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING, STATIC WATER LEVEL AFTER 24 HOURS, PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA, SPRING OR SEEP										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. 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. 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. 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> ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES &gt; 100 BPF</i> ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES &lt; 100 BPF</i> 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.																																							
GENERATING AS A SUBGRADE										MISCELLANEOUS SYMBOLS																																																	
EXCELLENT TO GOOD, FAIR TO POOR, FAIR TO POOR, POOR, UNSUITABLE										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION, SOIL SYMBOL, ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT, INFERRED SOIL BOUNDARY, INFERRED ROCK LINE, ALLUVIAL SOIL BOUNDARY, DIP & DIP DIRECTION OF ROCK STRUCTURES, SOUNDING ROD										SPT CPT DMT DPT VST, AUGER BORING, CORE BORING, MONITORING WELL, PIEZOMETER INSTALLATION, SLOPE INDICATOR INSTALLATION, SPT N-VALUE, SPT REFUSAL										SAMPLE DESIGNATIONS: S - BULK SAMPLE, SS - SPLIT SPOON SAMPLE, ST - SHELBY TUBE SAMPLE, RS - ROCK SAMPLE, RT - RECOMPACTED TRIAXIAL SAMPLE, CBR - CALIFORNIA BEARING RATIO SAMPLE																													
CONSISTENCY OR DENSENESS										ABBREVIATIONS										ROCK HARDNESS																																							
PRIMARY SOIL TYPE, COMPACTNESS OR CONSISTENCY, RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE), RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )										AR - AUGER REFUSAL, BT - BORING TERMINATED, CL - CLAY, CPT - CONE PENETRATION TEST, CSE - COARSE, DMT - DILATOMETER TEST, DPT - DYNAMIC PENETRATION TEST, F - FINE, FOSS - FOSSILIFEROUS, FRAC. - FRACTURED, FRACTURES, FRAGS. - FRAGMENTS, HI. - HIGHLY, MED. - MEDIUM, MICA - MICACEOUS, MOD. - MODERATELY, NP - NON PLASTIC, ORG. - ORGANIC, PMT - PRESSUREMETER TEST, SAP. - SAPROLITIC, SD. - SAND, SANDY, SL. - SILT, SILTY, SLL - SLIGHTLY, TCR - TRICONE REFUSAL, W - MOISTURE CONTENT, V - VERY, VST - VANE SHEAR TEST, WE. - WEATHERED, U - UNIT WEIGHT, U <sub>d</sub> - DRY UNIT WEIGHT										VERY HARD, HARD, MODERATELY HARD, MEDIUM HARD, SOFT, VERY SOFT										CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. 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. CAN BE GROUVED 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. CAN BE GROUVED 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. 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.																													
TEXTURE OR GRAIN SIZE										EQUIPMENT USED ON SUBJECT PROJECT										FRACTURE SPACING										BEDDING																													
U.S. STD. SIEVE SIZE OPENING (MM), BOULDER (BLDR.), COBBLE (COB.), GRAVEL (GR.), COARSE SAND (CSE, SD.), FINE SAND (F SD.), SILT (SL), CLAY (CL.)										DRILL UNITS: MOBILE B-51, BK-51, CME-45C, CME-550, PORTABLE HOIST										ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG.-CARBIDE INSERTS, CASING, TRICONE 2 1/8" STEEL TEETH, TRICONE, TUNG.-CARB. CORE BIT										HAMMER TYPE: AUTOMATIC, MANUAL, CORE SIZE: B, N, H, HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST										TERM, SPACING, IERM, THICKNESS																			
SOIL MOISTURE - CORRELATION OF TERMS										INDURATION																																																	
SOIL MOISTURE SCALE (ATTERBERG LIMITS), FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION										FRIABLE, MODERATELY INDURATED, INDURATED, EXTREMELY INDURATED										RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																																							
PLASTICITY										BENCH MARK: RR. SPIKE IN BASE OF 36' PIN OAK -L- STATION 13+65.12, 61.04' LT, ELEVATION: 69.71 FT.																																																	
NONPLASTIC, LOW PLASTICITY, MED. PLASTICITY, HIGH PLASTICITY										NOTES:																																																	
COLOR																																																											
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.																																																											

# SITE PLAN

PROJECT REFERENCE NO. B-4682	SHEET NO. 3
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



**SKEW = 90°**

REVISIONS

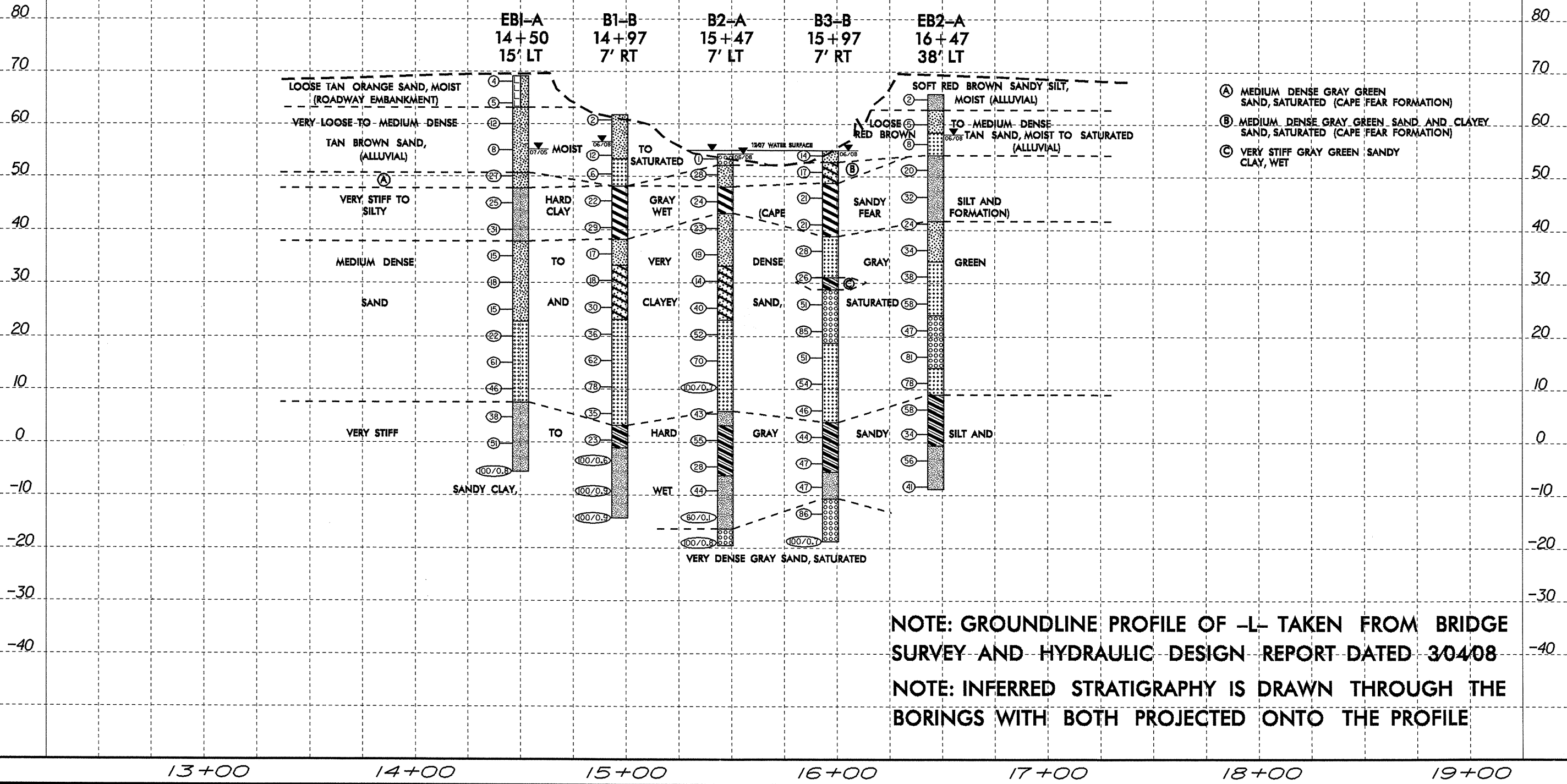
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PROJECT REFERENCE NO. <b>B-4682</b>	SHEET NO. <b>4 OF 10</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

# PROFILE THROUGH BORINGS PROJECTED ALONG -L-

VE = 2.5



PROJECT NO. 33835.1.1	ID. B-4682	COUNTY WILSON	GEOLOGIST Jordan, J. N.
SITE DESCRIPTION BRIDGE NO. 2 ON -L- (SR 1628) OVER CONTENTNEA CREEK			GROUND WTR (ft)
BORING NO. EB1-A	STATION 14+50	OFFSET 15ft LT	ALIGNMENT -L-
COLLAR ELEV. 69.1 ft	TOTAL DEPTH 74.7 ft	NORTHING 678,827	EASTING 2,337,302
DRILL MACHINE CME-45C	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 07/07/05	COMP. DATE 06/23/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
70	69.1	0.0											GROUND SURFACE	0.0
			1	3	1								TAN ORANGE SAND, MOIST (ROADWAY EMBANKMENT)	
65	65.0	4.1	2	1	4									
													TAN SAND, MOIST TO SATURATED (ALLUVIAL)	
60	61.0	8.1	4	6	6									
55	56.0	13.1	5	5	3									
											SS-1			
50	51.0	18.1	7	16	11									
													GRAY GREEN SAND, SATURATED (CAPE FEAR FORMATION)	18.5
45	46.0	23.1	8	11	14								GRAY GREEN SANDY SILT, WET	21.3
40	41.0	28.1	7	15	16									
35	36.0	33.1	6	7	8									
													GRAY GREEN SAND, SATURATED	
30	31.0	38.1	10	8	10									
25	26.0	43.1	9	8	7									
20	21.0	48.1	9	10	12									
15	16.0	53.1	29	37	24									
10	11.0	58.1	15	25	21									
5	5.7	63.4	14	20	18									
0	0.7	68.4	19	23	28									
-5	-4.3	73.4	34	53	47/0.3									
-10														

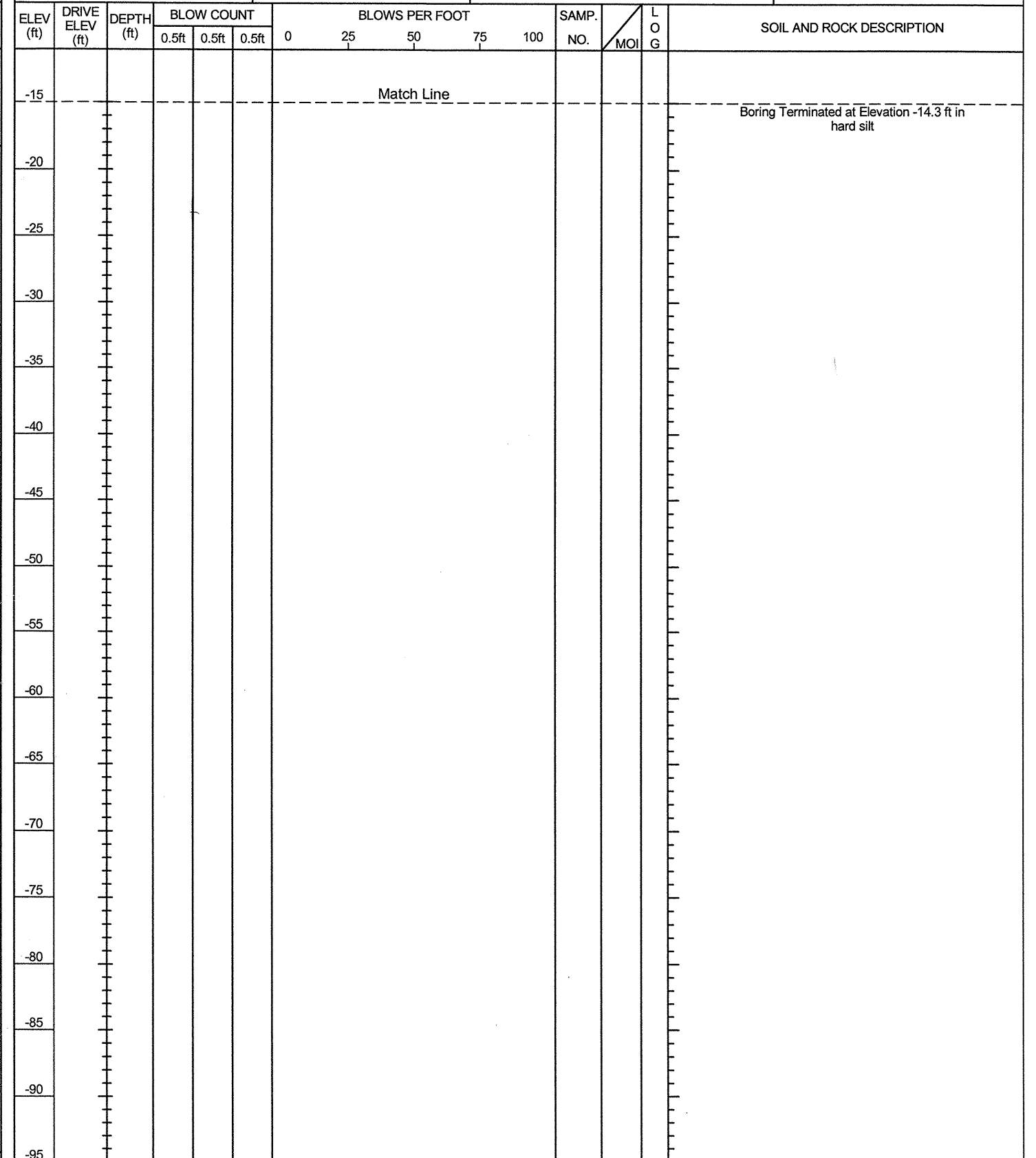
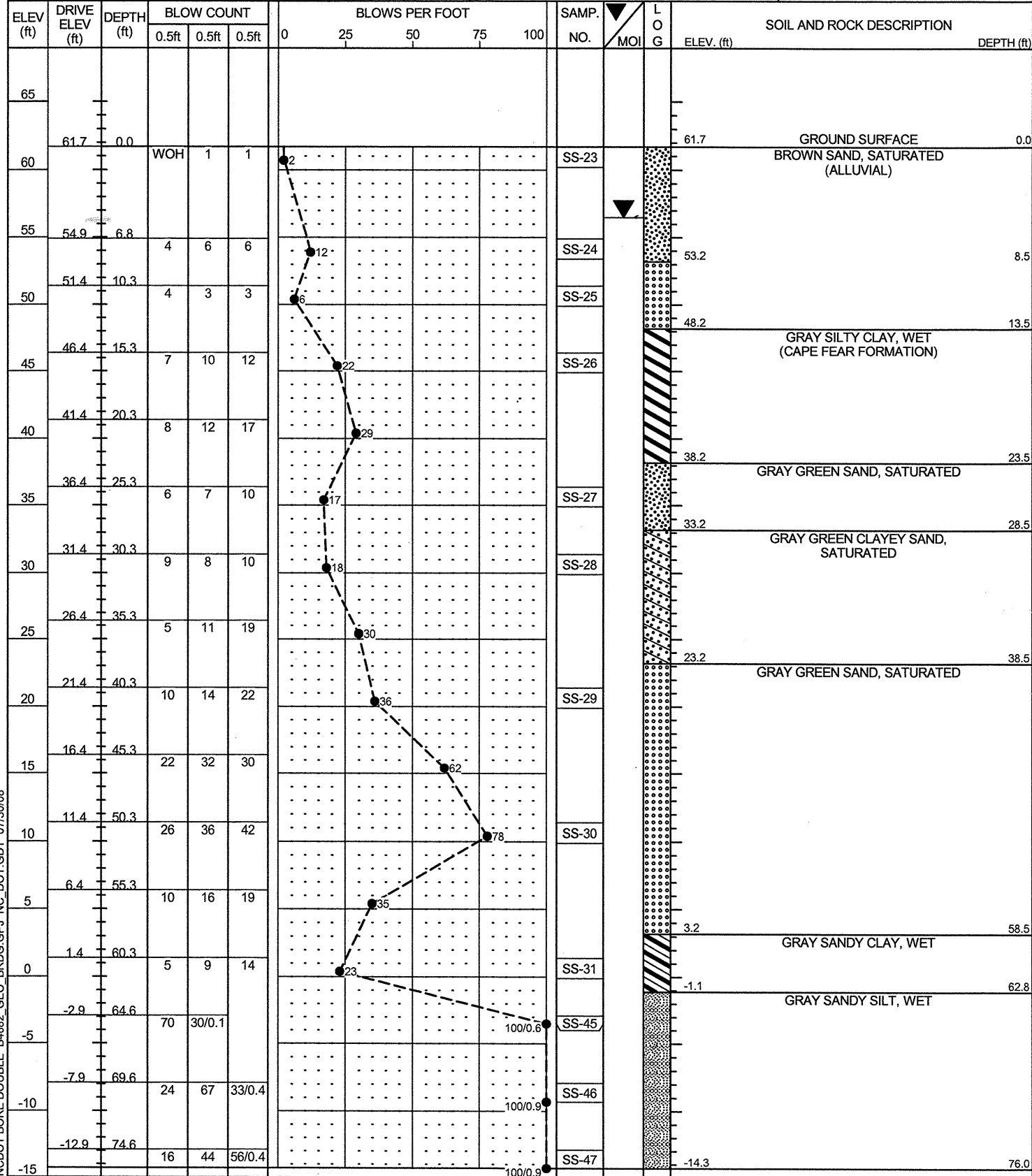
NCDOT BORE DOUBLE B4682 GEO BRDG.GPJ NC DOT.GDT 07/30/08

Boring Terminated at Elevation -5.6 ft in hard silt



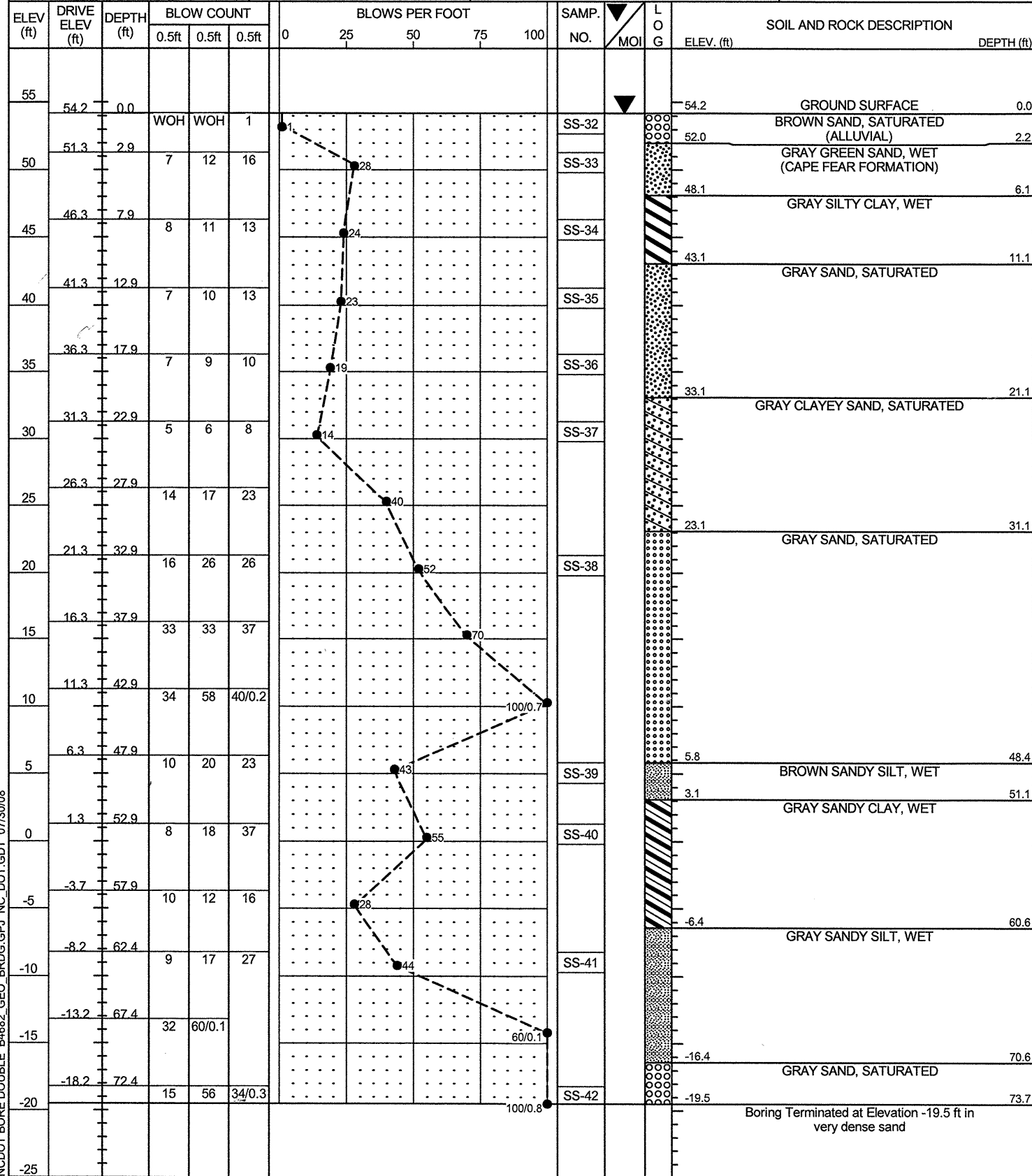
PROJECT NO. 33835.1.1	ID. B-4682	COUNTY WILSON	GEOLOGIST Bottoms, T. C.
SITE DESCRIPTION BRIDGE NO. 2 ON -L- (SR 1628) OVER CONTENTNEA CREEK			GROUND WTR (ft)
BORING NO. B1-B	STATION 14+97	OFFSET 7ft RT	ALIGNMENT -L-
COLLAR ELEV. 61.7 ft	TOTAL DEPTH 76.0 ft	NORTHING 678,826	EASTING 2,337,354
DRILL MACHINE CME-45C	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 06/04/08	COMP. DATE 06/26/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

PROJECT NO. 33835.1.1	ID. B-4682	COUNTY WILSON	GEOLOGIST Bottoms, T. C.
SITE DESCRIPTION BRIDGE NO. 2 ON -L- (SR 1628) OVER CONTENTNEA CREEK			GROUND WTR (ft)
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START DATE 06/04/08	COMP. DATE 06/26/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

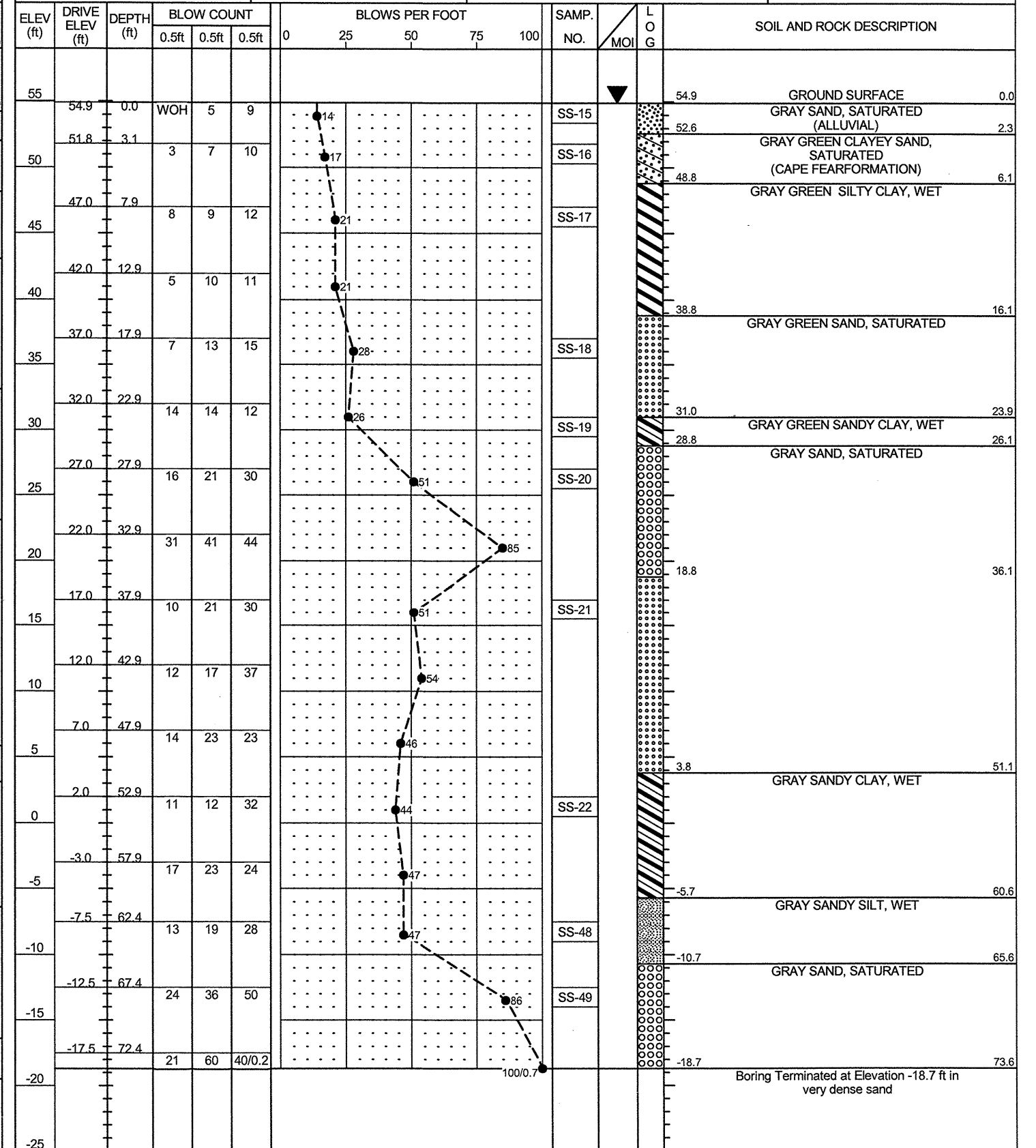


NCDOT BORE DOUBLE B4682\_GEO\_BRDG.GPJ NC\_DOT\_GDT\_07/30/08

PROJECT NO. 33835.1.1	ID. B-4682	COUNTY WILSON	GEOLOGIST Bottoms, T. C.
SITE DESCRIPTION BRIDGE NO. 2 ON -L- (SR 1628) OVER CONTENTNEA CREEK			GROUND WTR (ft)
BORING NO. B2-A	STATION 15+47	OFFSET 7ft LT	ALIGNMENT -L-
COLLAR ELEV. 54.2 ft	TOTAL DEPTH 73.7 ft	NORTHING 678,860	EASTING 2,337,394
DRILL MACHINE CME-45C	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 06/04/08	COMP. DATE 06/25/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



PROJECT NO. 33835.1.1	ID. B-4682	COUNTY WILSON	GEOLOGIST Bottoms, T. C.
SITE DESCRIPTION BRIDGE NO. 2 ON -L- (SR 1628) OVER CONTENTNEA CREEK			GROUND WTR (ft)
BORING NO. B3-B	STATION 15+97	OFFSET 7ft RT	ALIGNMENT -L-
COLLAR ELEV. 54.9 ft	TOTAL DEPTH 73.6 ft	NORTHING 678,868	EASTING 2,337,445
DRILL MACHINE CME-45C	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 06/03/08	COMP. DATE 06/24/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



NCDOT BORE DOUBLE B4682\_GEO\_BRDG.GPJ, NC\_DOT.GDT 07/30/08

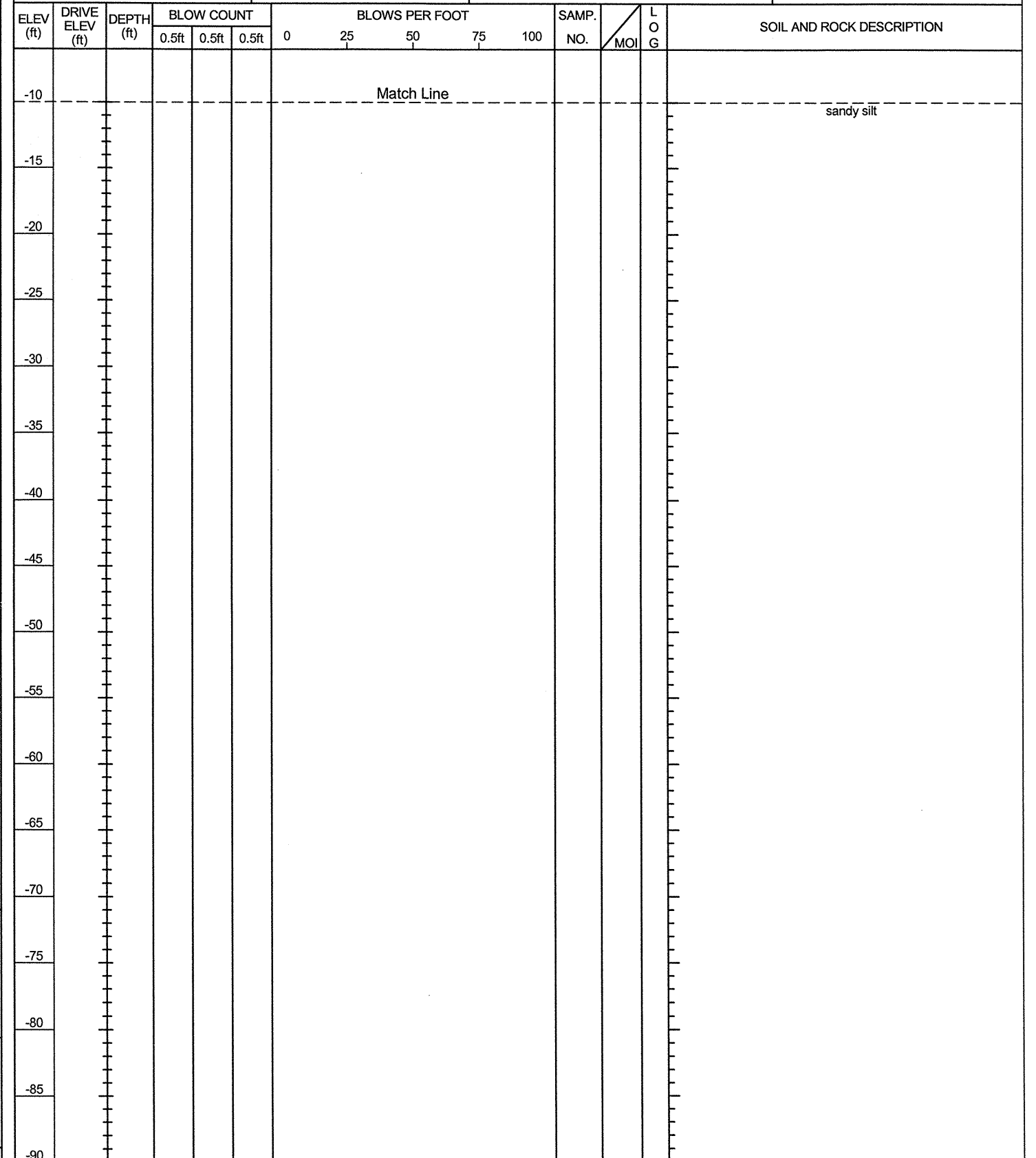
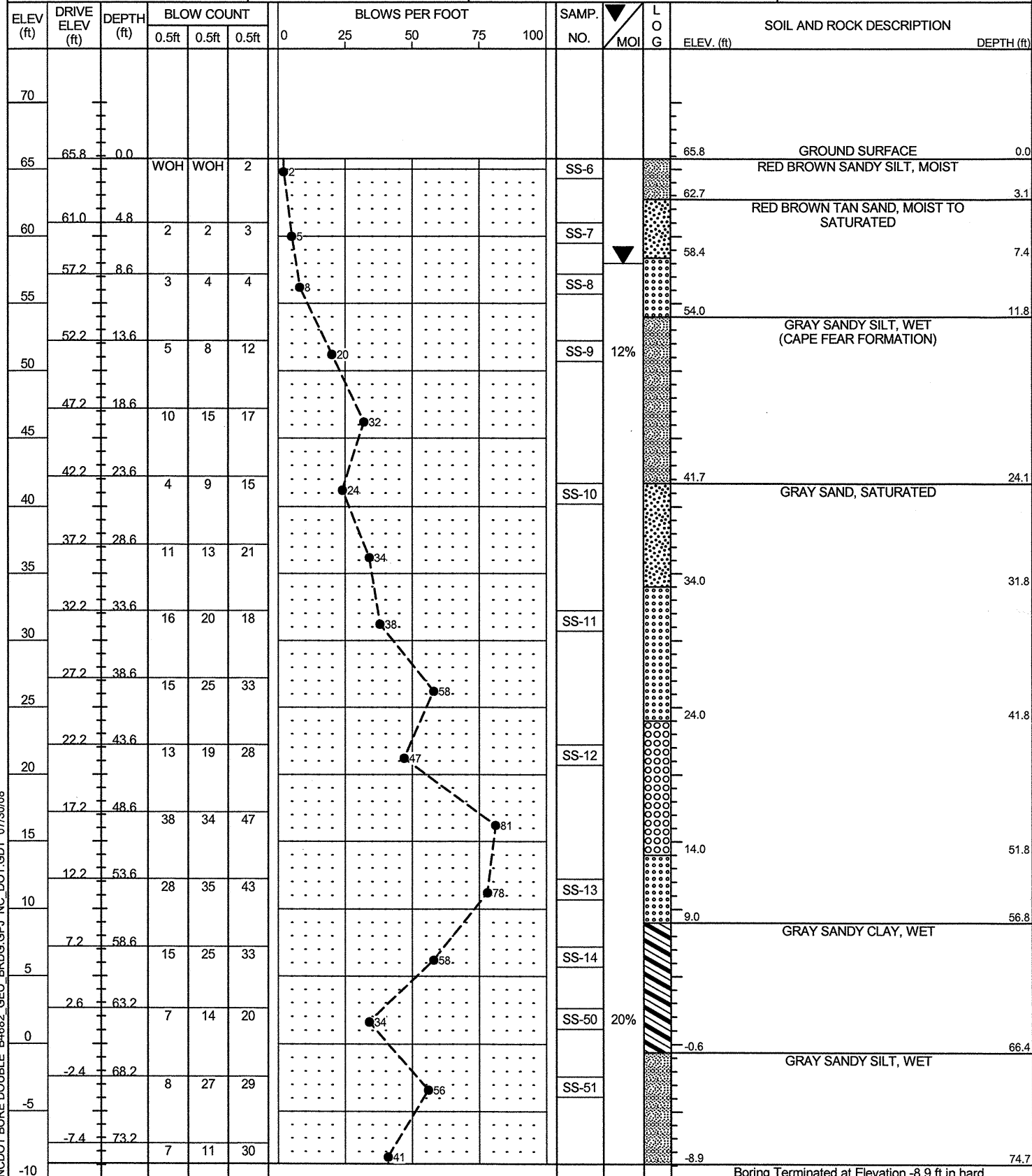


# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

PROJECT NO. 33835.1.1	ID. B-4682	COUNTY WILSON	GEOLOGIST Wescott, F. M.
SITE DESCRIPTION BRIDGE NO. 2 ON -L- (SR 1628) OVER CONTENTNEA CREEK			GROUND WTR (ft)
BORING NO. EB2-A	STATION 16+47	OFFSET 38ft LT	ALIGNMENT -L-
COLLAR ELEV. 65.8 ft	TOTAL DEPTH 74.7 ft	NORTHING 678,930	EASTING 2,337,471
DRILL MACHINE CME-45C	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 06/02/08	COMP. DATE 06/23/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

PROJECT NO. 33835.1.1	ID. B-4682	COUNTY WILSON	GEOLOGIST Wescott, F. M.
SITE DESCRIPTION BRIDGE NO. 2 ON -L- (SR 1628) OVER CONTENTNEA CREEK			GROUND WTR (ft)
BORING NO. EB2-A	STATION 16+47	OFFSET 38ft LT	ALIGNMENT -L-
COLLAR ELEV. 65.8 ft	TOTAL DEPTH 74.7 ft	NORTHING 678,930	EASTING 2,337,471
DRILL MACHINE CME-45C	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 06/02/08	COMP. DATE 06/23/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



NCDOT BORE DOUBLE B4682\_GEO\_BRDG.GPJ\_NC\_DOT.GDT 07/30/08

Boring Terminated at Elevation -8.9 ft in hard



**B-4682**  
**Bridge No. 2 on SR 1628 over Contentnea Creek**

HOLE #	SAMPLE #	PASS 10	PASS 40	PASS 200	CSESAND	FINESAND	SI	CL	LL	PI	CLASS	DEPTH	MOIST.	ORG.
EB1-A	SS-1	100	100	26	5.2	75.6	6.8	12.4	18	NP	A-2-4(0)	13.1-14.6		
	SS-2	97	54	21	61.6	18.4	7.6	12.4	30	6	A-2-4(0)	18.5-19.6		
	SS-3	100	99	67	1.6	44.8	33.2	20.4	37	8	A-4(5)	23.1-24.6		
	SS-4	100	97	18	24.8	59.2	7.6	8.4	25	NP	A-2-4(0)	33.1-34.6		
	SS-5	100	80	11	78.6	11.6	1.4	8.4	20	NP	A-2-4(0)	43.1-44.6		
	SS-43	99	85	53	27.5	30.1	34.3	8.1	18	1	A-4(0)	63.4-64.9		
	SS-44	100	100	86	0.6	38.8	46.4	14.2	22	1	A-4(0)	68.4-69.9		
EB2-A	SS-6	100	99	70	6.6	27.8	27.2	38.4	33	4	A-4(2)	1.0-1.5		
	SS-7	100	99	27	9.8	68.0	7.8	14.4	16	NP	A-2-4(0)	4.8-6.3		
	SS-8	100	57	6	81.4	13.4	2.8	2.4	17	NP	A-3(0)	8.6-10.1		
	SS-9	100	83	44	32.6	28.4	22.6	16.4	30	9	A-4(1)	13.6-15.1	11.7	
	SS-10	100	97	27	7.2	75.8	8.6	8.4	24	NP	A-2-4(0)	24.1-25.1		
	SS-11	91	54	10	66.2	25.0	4.4	4.4	19	NP	A-3(0)	33.6-35.1		
	SS-12	93	46	9	74.6	17.4	3.6	4.4	18	NP	A-1-b(0)	43.6-45.1		
	SS-13	98	62	9	65.8	27.2	4.6	2.4	19	NP	A-3(0)	53.6-55.1		
	SS-14	100	99	95	1.8	8.6	49.2	40.4	26	12	A-6(9)	58.6-60.1		
	SS-50	100	99	95	2.2	6.5	36.7	54.6	37	21	A-6(20)	63.2-64.7	20.0	
SS-51	100	99	92	1.0	21.6	57.1	20.2	24	5	A-4(3)	68.2-69.7			
B3-B	SS-15	100	80	27	41.1	35.2	12.5	11.2	28	9	A-2-4(0)	1.0-1.5		
	SS-16	100	69	26	48.4	26.6	13.9	11.2	32	12	A-2-6(0)	3.1-4.6		
	SS-17	100	98	89	2.8	17.8	59.0	20.3	47	19	A-7-6(19)	7.9-9.4		
	SS-18	99	80	8	48.9	43.9	3.1	4.1	18	NP	A-3(0)	17.9-19.4		
	SS-19	100	97	81	8.1	14.8	32.5	44.6	40	22	A-6(17)	23.9-24.4		
	SS-20	100	49	9	79.4	12.6	1.9	6.1	15	NP	A-1-b(0)	27.9-29.4		
	SS-21	100	62	9	56.4	36.2	3.3	4.1	16	NP	A-3(0)	37.9-39.4		
	SS-22	100	100	96	0.8	12.2	44.4	42.6	31	14	A-6(13)	52.9-54.4		
	SS-48	99	92	52	12.5	50.2	29.2	8.1	21	2	A-4(0)	62.4-63.9		
	SS-49	99	45	16	66.7	21.4	7.8	4.0	18	NP	A-1-b(0)	67.4-68.9		
B1-B	SS-23	89	81	21	28.2	51.5	10.1	10.1	18	NP	A-2-4(0)	1.0-1.5		
	SS-24	100	95	22	18.3	63.3	10.3	8.1	16	NP	A-2-4(0)	6.8-8.3		
	SS-25	100	86	6	57.8	37.3	2.8	2.0	15	NP	A-3(0)	10.3-11.8		
	SS-26	100	99	92	2.2	12.4	55.0	30.4	51	31	A-7-6(25)	15.3-16.8		
	SS-27	100	83	17	43.4	40.2	7.3	9.1	26	NP	A-2-4(0)	25.3-26.8		
	SS-28	98	25	13	81.3	5.7	3.9	9.1	36	16	A-2-6(0)	30.3-31.8		
	SS-29	98	52	7	80.2	13.1	1.6	5.1	18	NP	A-3(0)	40.3-41.8		
	SS-30	100	65	6	67.7	27.5	2.7	2.0	16	NP	A-3(0)	50.3-51.8		
	SS-31	100	99	97	1.4	5.7	46.2	46.7	31	15	A-6(14)	60.3-61.8		
	SS-45	100	100	76	1.0	50.4	40.5	8.1	24	NP	A-4(0)	64.6-65.2		
B2-A	SS-32	92	39	11	74.0	14.6	7.3	4.1	27	NP	A-1-b(0)	1.0-1.5		
	SS-33	98	59	17	64.9	20.4	9.6	5.1	31	NP	A-2-4(0)	2.9-4.4		
	SS-34	100	98	87	3.7	14.4	61.7	20.3	49	18	A-7-5(19)	7.9-9.4		
	SS-35	100	99	24	11.3	69.2	13.5	6.1	30	NP	A-2-4(0)	12.9-14.4		
	SS-36	100	99	12	20.3	68.3	6.4	5.1	27	NP	A-2-4(0)	17.9-19.4		
	SS-37	97	49	27	60.5	13.4	9.8	16.2	30	15	A-2-6(1)	22.9-24.4		
	SS-38	100	68	7	77.2	17.1	2.6	3.0	14	NP	A-3(0)	32.9-34.4		
	SS-39	100	99	84	2.2	23.5	60.0	14.2	20	3	A-4(0)	48.4-49.4		
	SS-40	100	99	90	1.0	21.3	43.2	34.5	26	11	A-6(8)	52.9-54.4		
	SS-41	99	95	65	7.1	45.5	37.3	10.1	23	2	A-4(0)	62.4-63.9		
SS-42	49	24	9	65.5	20.6	9.8	4.0	17	NP	A-1-a(0)	72.4-73.7			



**FIELD  
SCOUR REPORT**

WBS: 33835.1.1 TIP: B-4682 COUNTY: Wilson

DESCRIPTION(1): Bridge No. 2 on SR 1628 over Contentnea Creek

**EXISTING BRIDGE**

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

Bridge No.: 2 Length: 165' Total Bents: 10 Bents in Channel: 5 Bents in Floodplain: 5  
Foundation Type: Timber piles

**EVIDENCE OF SCOUR(2)**

Abutments or End Bent Slopes: None noted

Interior Bents: None noted

Channel Bed: None noted

Channel Bank: None noted

**EXISTING SCOUR PROTECTION**

Type(3): Concrete end walls

Extent(4): 4' from outside edge of bridge

Effectiveness(5): Appears satisfactory

Obstructions(6): Tress and construction debris

**INSTRUCTIONS**

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

**DESIGN INFORMATION**

Channel Bed Material(7): Sand (SS-15, SS-32)

Channel Bank Material(8): Sand (SS-1) and sandy silt (SS-6)

Channel Bank Cover(9): Trees and shrubs

Floodplain Width(10): 250+/- feet

Floodplain Cover(11): Trees and shrubs

Stream is(12): Aggrading  Degrading \_\_\_\_\_ Static \_\_\_\_\_

Channel Migration Tendency(13): Slight tendency to migrate east toward End Bent 2

Observations and Other Comments: \_\_\_\_\_

**DESIGN SCOUR ELEVATIONS(14)**

Feet  Meters \_\_\_\_\_

	BENTS									
	B1	B2	B3							
10 yr. Overtopping	56	46.5	48							

Comparison of DSE to Hydraulics Unit theoretical scour:  
Design Scour Elevation agrees with the Hydraulics Unit's 10 yr. overtopping scour.

**SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL**

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

See Sheet 9,  
"Soil Test Results",  
for samples:  
Channel bank SS-1,SS-6  
Channel Bed SS-15, SS-32

Reported by: *Demetrius...*

Date: 7-30-08

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4992	1	8

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 41537.1.1 (B-4992) F.A. PROJ. BRSTP-1628(2)  
COUNTY WILSON  
PROJECT DESCRIPTION BRIDGE NO.1 ON SR 1628 OVER RUN OF  
BEAVERDAM SWAMP AT -L- STATION 13+15

**CONTENTS**

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5-6	BORE LOG REPORT
7	SOIL TEST RESULTS
8	SCOUR REPORT

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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

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

PERSONNEL

T.C. BOTTOMS

R.E. SMITH

J. EDMONDSON

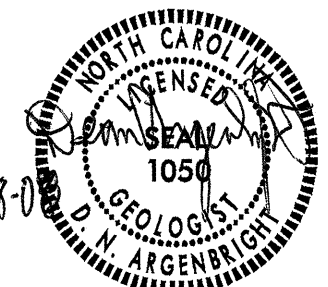
C.M. WRIKE

INVESTIGATED BY F.M. WESCOTT III

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE JULY 2008



**PROJECT: 41537.1.1 ID: B-4992**

DRAWN BY: C.R. SUMNER

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.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO. B-4992	SHEET NO. 2 OF 8
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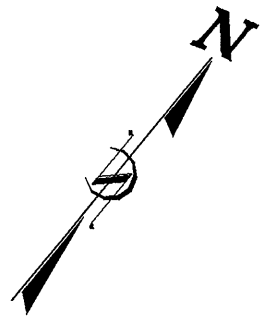
## SUBSURFACE INVESTIGATION

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

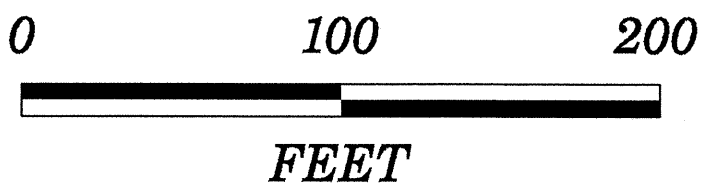
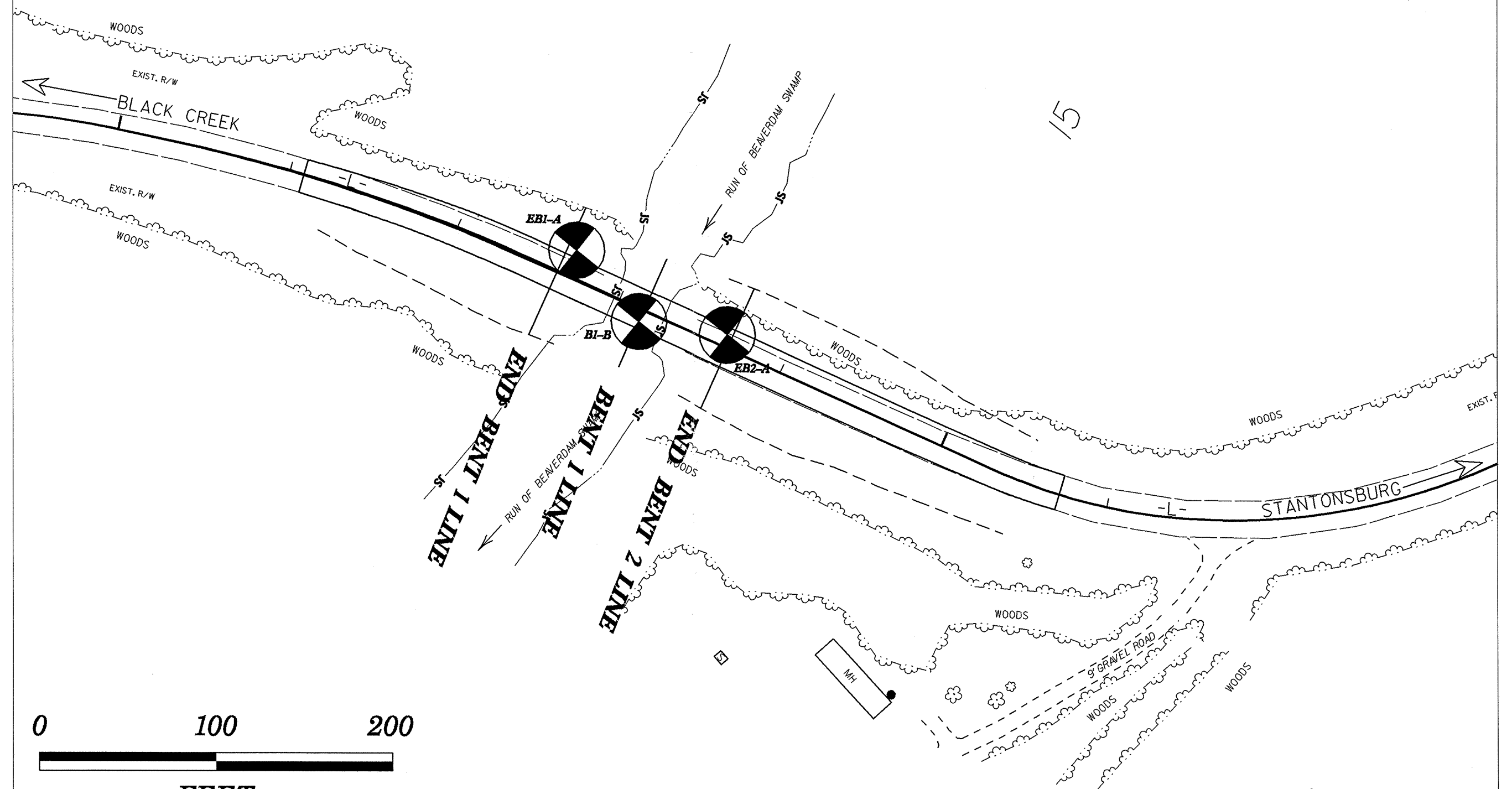
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T208, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH 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.  THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:  WEATHERED ROCK (WR)  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.  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 THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLED IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>	<b>MINERALOGICAL COMPOSITION</b>	<b>WEATHERING</b>	
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% 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. <i>IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</i> SEVERE (SEV) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES &gt; 100 BPF</i> 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 &lt; 100 BPF</i> 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.	
GROUP CLASS. A-1, A-1-b, A-2, A-2-5, A-2-7, A-4, A-5, A-6, A-7, A-7-5, A-7-6, A-1, A-2, A-3, A-4, A-5, A-6, A-7	<b>COMPRESSIONIBILITY</b> SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	CRACKING WEATHERING	
SYMBOL	<b>PERCENTAGE OF MATERIAL</b>		
% PASSING #10, #40, #200	ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL		
LIQUID LIMIT, PLASTIC INDEX, GROUP INDEX	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		
USUAL TYPES OF MAJOR MATERIALS	<b>GROUND WATER</b>		
GEN. RATING AS A SUBGRADE	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP		
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	<b>MISCELLANEOUS SYMBOLS</b>		
<b>CONSISTENCY OR DENSENESS</b>	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD	SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL	SAMPLE DESIGNATIONS S - BULK SAMPLE SS - SPLIT SPOON SAMPLE ST - SHELBY TUBE SAMPLE RS - ROCK SAMPLE RT - RECOMPACTED TRIAXIAL SAMPLE CBR - CALIFORNIA BEARING RATIO SAMPLE
PRIMARY SOIL TYPE, COMPACTNESS OR CONSISTENCY, RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE), RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )	<b>ABBREVIATIONS</b>		
GENERALY GRANULAR MATERIAL (NON-COHESIVE), GENERALY SILT-CLAY MATERIAL (COHESIVE)	AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY MED. - MEDIUM MICA. - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITE SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT v - VERY VST - VANE SHEAR TEST WEA. - WEATHERED w - UNIT WEIGHT w <sub>d</sub> - DRY UNIT WEIGHT		
<b>TEXTURE OR GRAIN SIZE</b>	<b>EQUIPMENT USED ON SUBJECT PROJECT</b>	<b>ROCK HARDNESS</b>	
U.S. STD. SIEVE SIZE OPENING (MM), BOULDER (BLDR.), COBBLE (COB.), GRAVEL (GR.), COARSE SAND (CSE, SD.), FINE SAND (F SD.), SILT (SL.), CLAY (CL.)	DRILL UNITS: MOBILE B-51, BK-51, CME-45C, CME-55B, PORTABLE HOIST, CME-45B ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE 2 1/8" STEEL TEETH, TRICONE TUNG-CARB. CORE BIT HAMMER TYPE: AUTOMATIC, MANUAL CORE SIZE: B, N, H HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST	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 PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.	
<b>SOIL MOISTURE - CORRELATION OF TERMS</b>		<b>INDURATION</b>	
SOIL MOISTURE SCALE (ATTERBERG LIMITS), FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION		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.	
<b>PLASTICITY</b>		<b>FRACTURE SPACING</b>	<b>BEDDING</b>
NONPLASTIC, LOW PLASTICITY, MED. PLASTICITY, HIGH PLASTICITY		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
<b>COLOR</b>			
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.			

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# SITE PLAN



PROJECT REFERENCE NO. B-4992	SHEET NO. 3 OF 8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



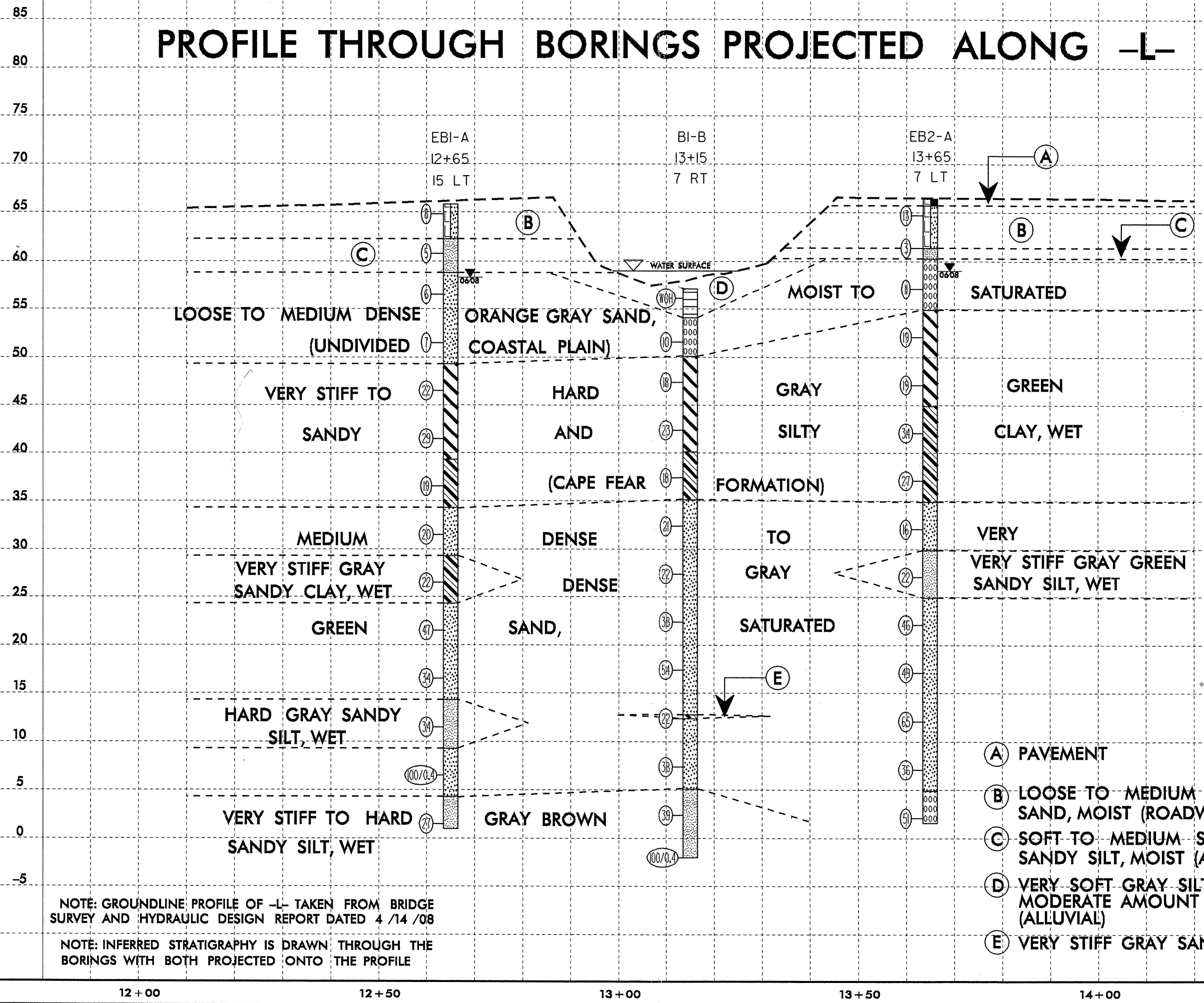
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# PROFILE THROUGH BORINGS PROJECTED ALONG -L-

PROJECT REFERENCE NO. <b>B-4992</b>	SHEET NO. <b>4 OF 8</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <b>INCOMPLETE PLANS</b>  <small>DO NOT USE FOR ACQUISITION</small> </div>	
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <b>PRELIMINARY PLANS</b>  <small>DO NOT USE FOR CONSTRUCTION</small> </div>	

VE = 2



NOTE: GROUNDLINE PROFILE OF -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED 4 /14 /08

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

- (A) PAVEMENT
- (B) LOOSE TO MEDIUM DENSE BROWN SAND, MOIST (ROADWAY EMBANKMENT)
- (C) SOFT TO MEDIUM STIFF GRAY BROWN SANDY SILT, MOIST (ALLUVIAL)
- (D) VERY SOFT GRAY SILTY CLAY WITH MODERATE AMOUNT OF ORGANICS, WET (ALLUVIAL)
- (E) VERY STIFF GRAY SANDY CLAY, WET

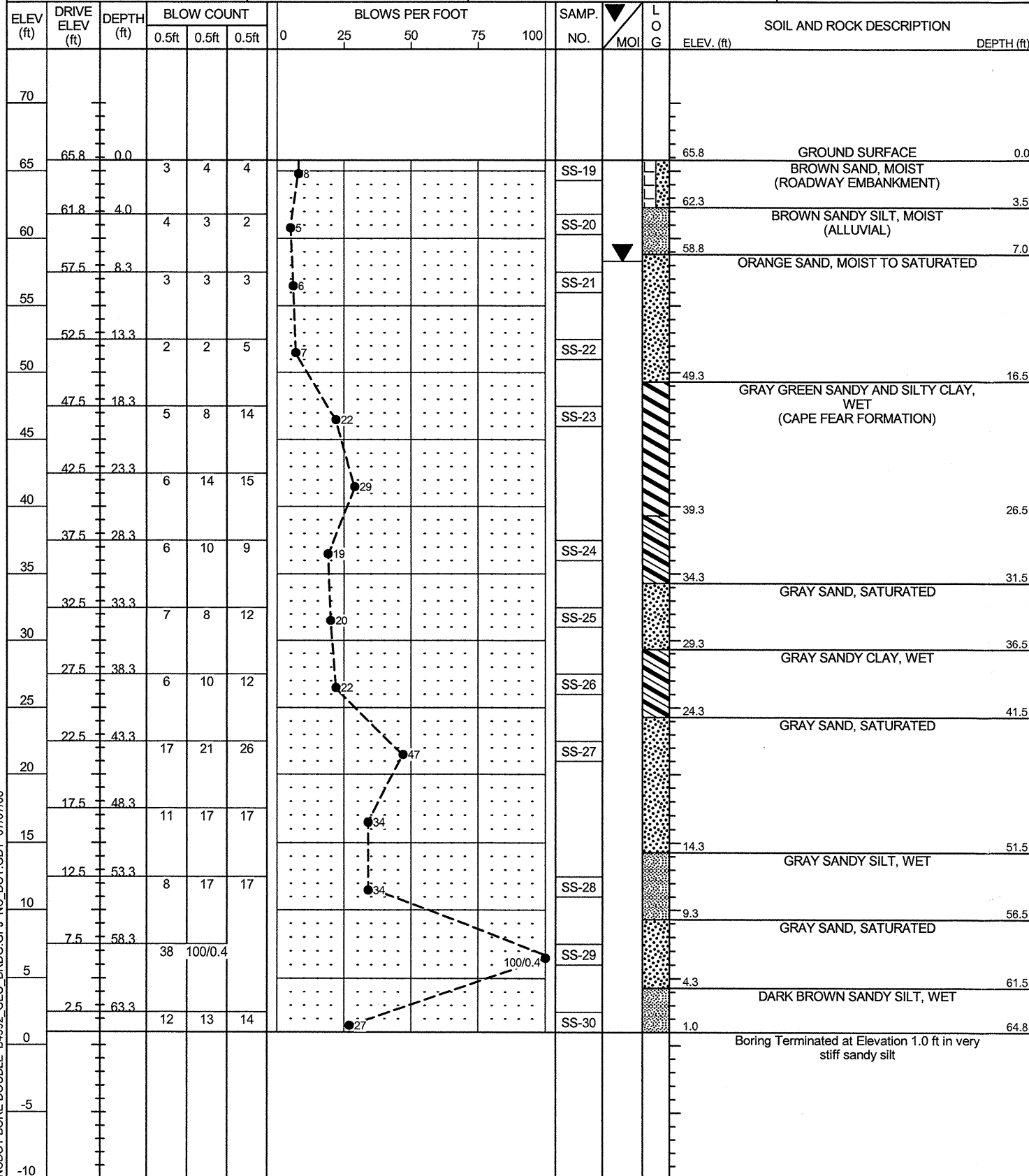
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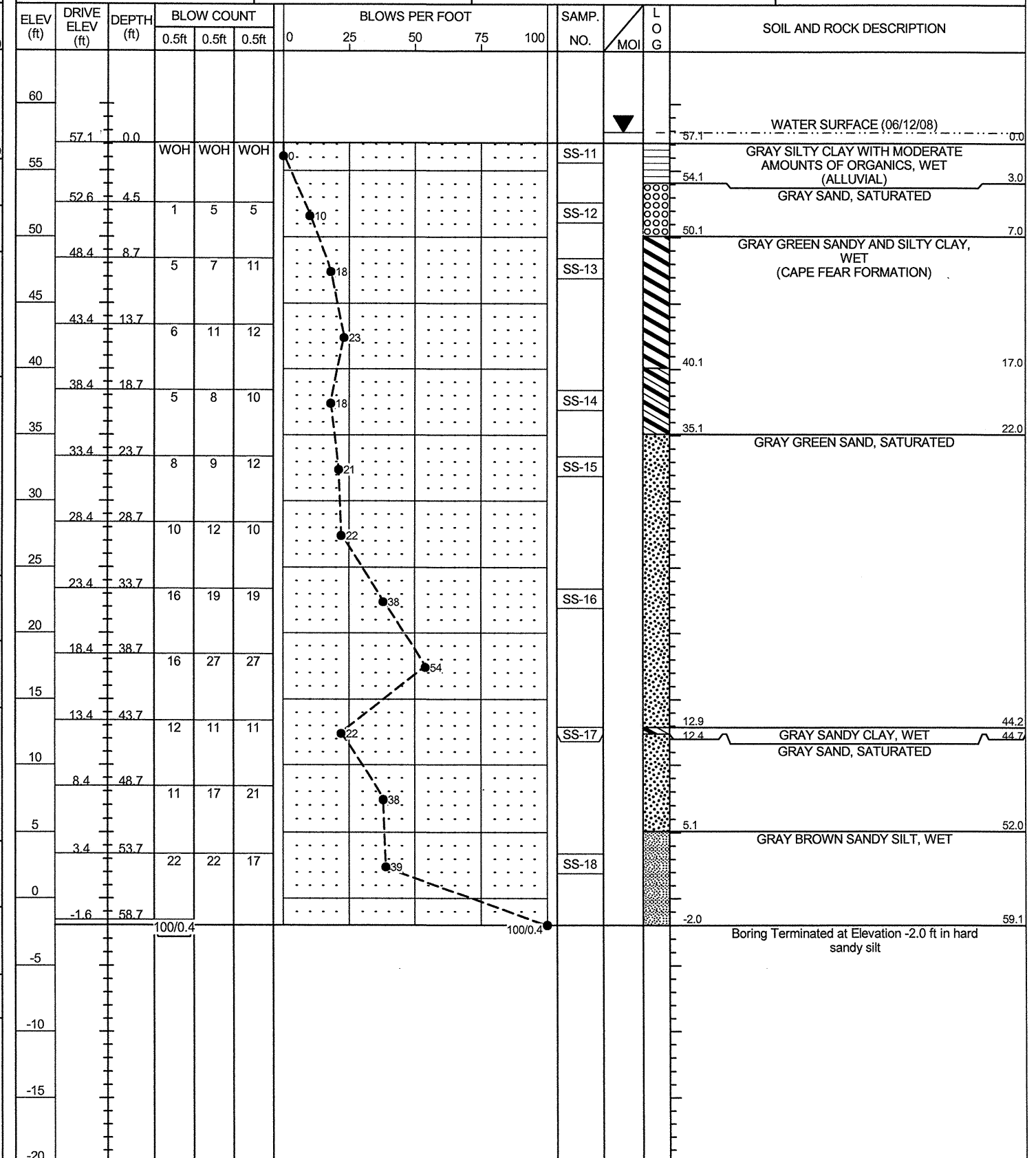
# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

PROJECT NO. 41537.1.1	ID. B-4992	COUNTY WILSON	GEOLOGIST Bottoms, T. C.
SITE DESCRIPTION BRIDGE NO. 1 ON SR 1628 OVER RUN OF BEAVERDAM SWAMP			GROUND WTR (ft)
BORING NO. EB1-A	STATION 12+65	OFFSET 15ft LT	ALIGNMENT -L-
COLLAR ELEV. 65.8 ft	TOTAL DEPTH 64.8 ft	NORTHING 679,872	EASTING 2,338,510
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 06/13/08	COMP. DATE 06/13/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



PROJECT NO. 41537.1.1	ID. B-4992	COUNTY WILSON	GEOLOGIST Bottoms, T. C.
SITE DESCRIPTION BRIDGE NO. 1 ON SR 1628 OVER RUN OF BEAVERDAM SWAMP			GROUND WTR (ft)
BORING NO. B1-B	STATION 13+15	OFFSET 7ft RT	ALIGNMENT -L-
COLLAR ELEV. 57.1 ft	TOTAL DEPTH 59.1 ft	NORTHING 679,861	EASTING 2,338,563
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 06/12/08	COMP. DATE 06/12/08	SURFACE WATER DEPTH 0.8ft	DEPTH TO ROCK N/A

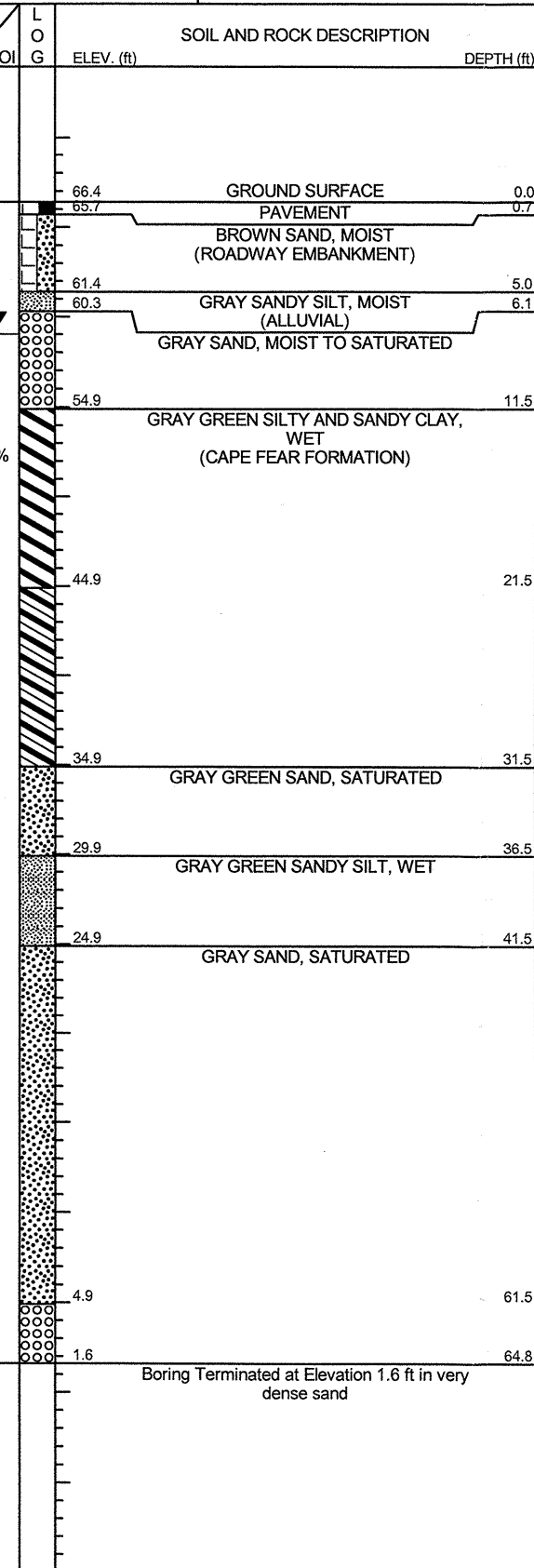


NCDOT BORE DOUBLE B4992 GEO BRDG.GPJ NC.DOT.GDT 07/07/08

PROJECT NO. 41537.1.1	ID. B-4992	COUNTY WILSON	GEOLOGIST Bottoms, T. C.
SITE DESCRIPTION BRIDGE NO. 1 ON SR 1628 OVER RUN OF BEAVERDAM SWAMP			GROUND WTR (ft)
BORING NO. EB2-A	STATION 13+65	OFFSET 7ft LT	ALIGNMENT -L-
COLLAR ELEV. 66.4 ft	TOTAL DEPTH 64.8 ft	NORTHING 679,890	EASTING 2,338,607
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 06/11/08	COMP. DATE 06/11/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
70															
65	65.7	0.7	9	6	7								SS-1	GROUND SURFACE 0.0	
														PAVEMENT 0.7	
	62.4	4.0	3	2	1								SS-2	BROWN SAND, MOIST (ROADWAY EMBANKMENT)	
60														GRAY SANDY SILT, MOIST (ALLUVIAL) 5.0	
	58.1	8.3	4	5	6								SS-3	GRAY SAND, MOIST TO SATURATED 6.1	
55															
	53.1	13.3	4	9	10										
50															
	48.1	18.3	5	9	10										
45															
	43.1	23.3	6	15	19										
40															
	38.1	28.3	7	12	15										
35															
	33.1	33.3	5	6	10										
30															
	28.1	38.3	8	9	13										
25															
	23.1	43.3	14	21	25										
20															
	18.1	48.3	14	24	25										
15															
	13.1	53.3	14	34	31										
10															
	8.1	58.3	10	16	20										
5															
	3.1	63.3	17	27	24										
0															
-5															
-10															

NCDOT BORE DOUBLE B4992\_GEO\_BRDGG.PJ NC\_DOT.GDT 07/07/08





## Bridge No. 1 on SR 1628 over Run of Beaverdam Swamp

HOLE #	SAMPLE #	PASS 10	PASS 40	PASS 200	CSESAND	FINESAND	SI	CL	LL	PI	CLASS	DEPTH	MOIST.	ORG.
EB2-A	SS-1	72	64	25	26.8	43.6	13.4	16.2	16	2	A-2-4(0)	1.0-2.2		
	SS-2	100	92	40	26.2	39.4	18.3	16.2	19	5	A-4(0)	5.0-5.5		
	SS-3	64	26	6	77.9	14.8	3.2	4.1	19	NP	A-1-b(0)	8.3-9.8		
	SS-4	100	95	84	7.3	13.4	30.6	48.7	49	28	A-7-6(24)	13.3-14.8	18.0	
	SS-5	100	98	81	6.1	18.7	40.8	34.5	39	18	A-6(14)	23.3-24.8		
	SS-6	99	80	27	35.3	40.3	10.2	14.2	26	8	A-2-4(0)	33.3-34.8		
	SS-7	100	97	38	6.7	64.1	17.0	12.2	30	9	A-4(0)	38.3-39.8		
	SS-8	100	97	12	22.3	67.1	2.4	8.1	22	NP	A-2-4(0)	43.3-44.8		
	SS-9	100	98	12	33.1	57.1	2.7	7.1	16	NP	A-2-4(0)	53.3-54.8		
	SS-10	100	50	6	70.7	24.4	1.8	3.0	20	NP	A-1-b(0)	63.3-64.8		
B1-B	SS-11	100	99	88	2.6	12.2	26.4	58.8	65	30	A-7-5(32)	1.0-1.5		15.3
	SS-12	89	30	6	84.7	9.8	0.4	5.1	18	NP	A-1-b(0)	4.5-6.0		
	SS-13	98	90	81	10.1	10.8	24.3	54.8	49	27	A-7-6(22)	8.7-10.2		
	SS-14	100	99	59	4.3	49.9	25.6	20.3	40	16	A-6(7)	18.7-20.2		
	SS-15	97	68	29	49.2	25.1	11.6	14.2	25	9	A-2-4(0)	23.7-25.2		
	SS-16	100	95	12	25.3	64.0	2.6	8.1	18	NP	A-2-4(0)	33.7-35.2		
	SS-17	100	95	75	12.2	18.3	33.1	36.5	23	11	A-6(5)	44.2-44.7		
	SS-18	100	100	91	1.4	20.5	55.8	22.3	23	5	A-4(3)	53.7-55.2		
EB1-A	SS-19	95	82	33	25.8	46.7	13.4	14.2	15	1	A-2-4(0)	1.0-1.5		
	SS-20	100	99	54	4.3	50.1	21.3	24.3	23	6	A-4(1)	4.0-5.5		
	SS-21	100	100	26	15.4	64.2	9.2	11.2	22	NP	A-2-4(0)	8.3-9.8		
	SS-22	100	89	17	40.7	45.4	7.8	6.1	18	NP	A-2-4(0)	13.3-14.8		
	SS-23	100	98	84	4.5	17.0	35.9	42.6	52	32	A-7-6(28)	18.3-19.8		
	SS-24	100	95	36	16.7	50.4	6.5	26.4	30	12	A-6(1)	28.3-29.8		
	SS-25	100	94	20	33.1	47.9	1.8	17.2	23	NP	A-2-4(0)	33.3-34.8		
	SS-26	100	98	68	4.7	40.4	28.6	26.4	38	17	A-6(10)	38.3-39.8		
	SS-27	100	88	30	29.0	45.7	10.0	15.2	19	NP	A-2-4(0)	43.3-44.8		
	SS-28	100	98	44	5.7	60.0	13.0	21.3	19	3	A-4(0)	53.3-54.8		
	SS-29	100	82	11	51.7	39.7	2.5	6.1	15	NP	A-2-4(0)	58.3-59.2		
	SS-30	100	100	78	1.2	37.5	45.0	16.2	21	NP	A-4(0)	63.3-64.8		



# FIELD SCOUR REPORT

WBS: 41537.1.1 TIP: B-4992 COUNTY: Wilson

DESCRIPTION(1): Bridge No. 1 on SR 1628 over Run of Beaverdam Swamp

### EXISTING BRIDGE

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

Bridge No.: 1 Length: 53' Total Bents: 4 Bents in Channel: 2 Bents in Floodplain: 2  
 Foundation Type: Timber pile

#### EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: None noted

Interior Bents: None noted

Channel Bed: None noted

Channel Bank: None noted

#### EXISTING SCOUR PROTECTION

Type(3): Wooden end walls

Extent(4): 8' outside edge of bridge

Effectiveness(5): Appears satisfactory

Obstructions(6): Fallen trees and trash

#### INSTRUCTIONS

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

### DESIGN INFORMATION

Channel Bed Material(7): Silty clay with moderate amounts of organics (SS-11)

Channel Bank Material(8): Sandy silt (SS-2, SS-20)

Channel Bank Cover(9): Trees and shrubs

Floodplain Width(10): 100 +/- feet

Floodplain Cover(11): Trees and shrubs

Stream is(12): Aggrading \_\_\_\_\_ Degrading  Static \_\_\_\_\_

Channel Migration Tendency(13): Not likely, but possibly west toward End Bent 1

Observations and Other Comments: \_\_\_\_\_

#### DESIGN SCOUR ELEVATIONS(14)

Feet X Meters \_\_\_\_\_

	BENTS									
	B1									
10 yr. Overtopping	52.5									

Comparison of DSE to Hydraulics Unit theoretical scour:  
 Design Scour Elevation agrees with the Hydraulics Unit's 10 yr. overtopping scour.

#### SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

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

See Sheet 7,  
 "Soil Test Results",  
 for samples:  
 Channel bed SS-11  
 Channel bank SS-2, SS-20

Reported by: Fred M. W. [Signature]

Date: 7-7-08