

REFERENCE: I-5986B

PROJECT: 47532

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY HARNETT  
PROJECT DESCRIPTION I-95 WIDENING FROM SR 1811  
(BUD HAWKINS ROAD) (EXIT 70) TO I-40 (EXIT 81)  
- WIDEN TO EIGHT LANES  
SITE DESCRIPTION SECTION 2 OF 4; I-5878 PORTION,  
REPLACE CULVERT BENEATH I-95 @ -L- STA.  
1042+09 ALONG STONY RUN

**CONTENTS**

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-8	BORE LOGS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5986B	1	8

**CAUTION NOTICE**

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

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

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

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

PERSONNEL

H. CAMP

T. WILLIAMS

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INVESTIGATED BY S&ME, INC.

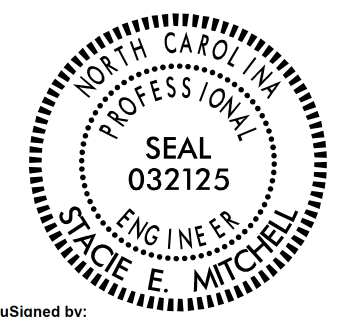
DRAWN BY C.CHANDLER

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SUBMITTED BY S. MITCHELL

DATE FEBRUARY 2020

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DocuSigned by:  
Stacie Mitchell 2/7/2020

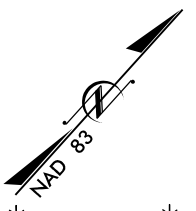
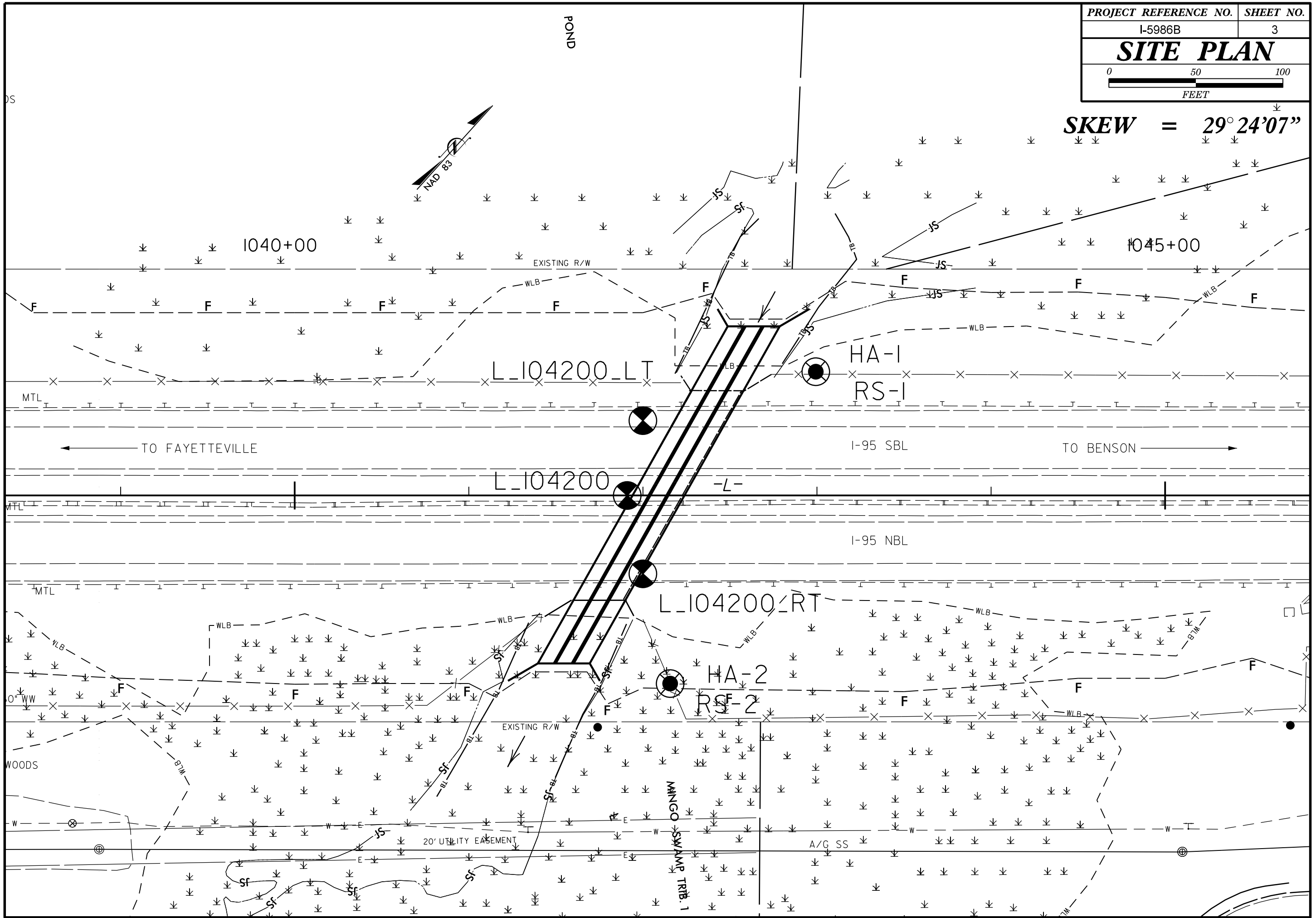
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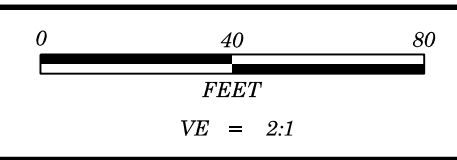
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 GEOTECHNICAL ENGINEERING UNIT  
**SUBSURFACE INVESTIGATION**  
 SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION											GRADATION						ROCK DESCRIPTION				TERMS AND DEFINITIONS															
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 208, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>											WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.						HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL 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 THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOADED 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 IMPERVIUOUS 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 EMPLOYED 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 BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.															
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>											<b>ANGULARITY OF GRAINS</b>						<b>WEATHERED ROCK (WR)</b>																			
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS											THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.						NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.																			
<b>MINERALOGICAL COMPOSITION</b>											<b>CRYSTALLINE ROCK (CR)</b>						<b>NON-CRYSTALLINE ROCK (NCR)</b>																			
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.											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.																			
<b>COMPRESSIBILITY</b>											<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>						<b>WEATHERING</b>																			
SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50											COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.						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 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. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF VERY SEVERE (V. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD 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.																			
<b>PERCENTAGE OF MATERIAL</b>																																				
ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE																																				
<b>GROUND WATER</b>																																				
▽ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING ▽ STATIC WATER LEVEL AFTER 24 HOURS ▽ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA ○ SPRING OR SEEP																																				
<b>MISCELLANEOUS SYMBOLS</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											25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES SPT TEST BORE AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION						SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE																			
<b>RECOMMENDATION SYMBOLS</b>																																				
UNDERCUT SHALLOW UNDERCUT											UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK						UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL																			
<b>ABBREVIATIONS</b>																																				
AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - COPE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY											MED. - MEDIUM MICA - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY						VST - VANE SHEAR TEST WEA. - WEATHERED U - UNIT WEIGHT G - DRY UNIT WEIGHT				SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO															
<b>TEXTURE OR GRAIN SIZE</b>																																				
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053																																				
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE, SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)																																				
GRAIN SIZE MM 305 75 2.0 0.25 0.05 0.005 IN. 12 3																																				
<b>SOIL MOISTURE - CORRELATION OF TERMS</b>																																				
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION																																				
LL - LIQUID LIMIT PL - PLASTIC LIMIT OM - OPTIMUM MOISTURE SHRINKAGE LIMIT											- SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE																									
<b>PLASTICITY</b>																																				
NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC											PLASTICITY INDEX (PI) 0-5 6-15 16-25 26 OR MORE DRY STRENGTH VERY LOW SLIGHT MEDIUM HIGH																									
<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.																																				
<b>EQUIPMENT USED ON SUBJECT PROJECT</b>																																				
DRILL UNITS: CME-45C CME-55 CME-550 VANE SHEAR TEST PORTABLE HOIST D-50											ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE 2 1/2" * STEEL TEETH TRICONE * TUNG-CARB. CORE BIT						HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: -B -H -N HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST																			
<b>FRACATURE SPACING</b>																																				
TERM VERY WIDE WIDE MODERATELY CLOSE CLOSE VERY CLOSE SPACING MORE THAN 10 FEET 3 TO 10 FEET 1 TO 3 FEET 0.16 TO 1 FOOT LESS THAN 0.16 FEET																																				
<b>BEDDING</b>																																				
TERM VERY THICKLY BEDDED THICKLY BEDDED THINLY BEDDED VERY THINLY BEDDED THICKLY LAMINATED THINLY LAMINATED THICKNESS 4 FEET 1.5 - 4 FEET 0.16 - 1.5 FEET 0.03 - 0.16 FEET 0.008 - 0.03 FEET < 0.008 FEET																																				
<b>INDURATION</b>																																				
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF 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: * SEE NOTE											ELEVATION: FEET																									
NOTES: * Elevations derived from geopak and the .tin file 15896B_2.ls.tin.tin dated 10/22/18																																				

**SKEW = 29° 24' 07"**

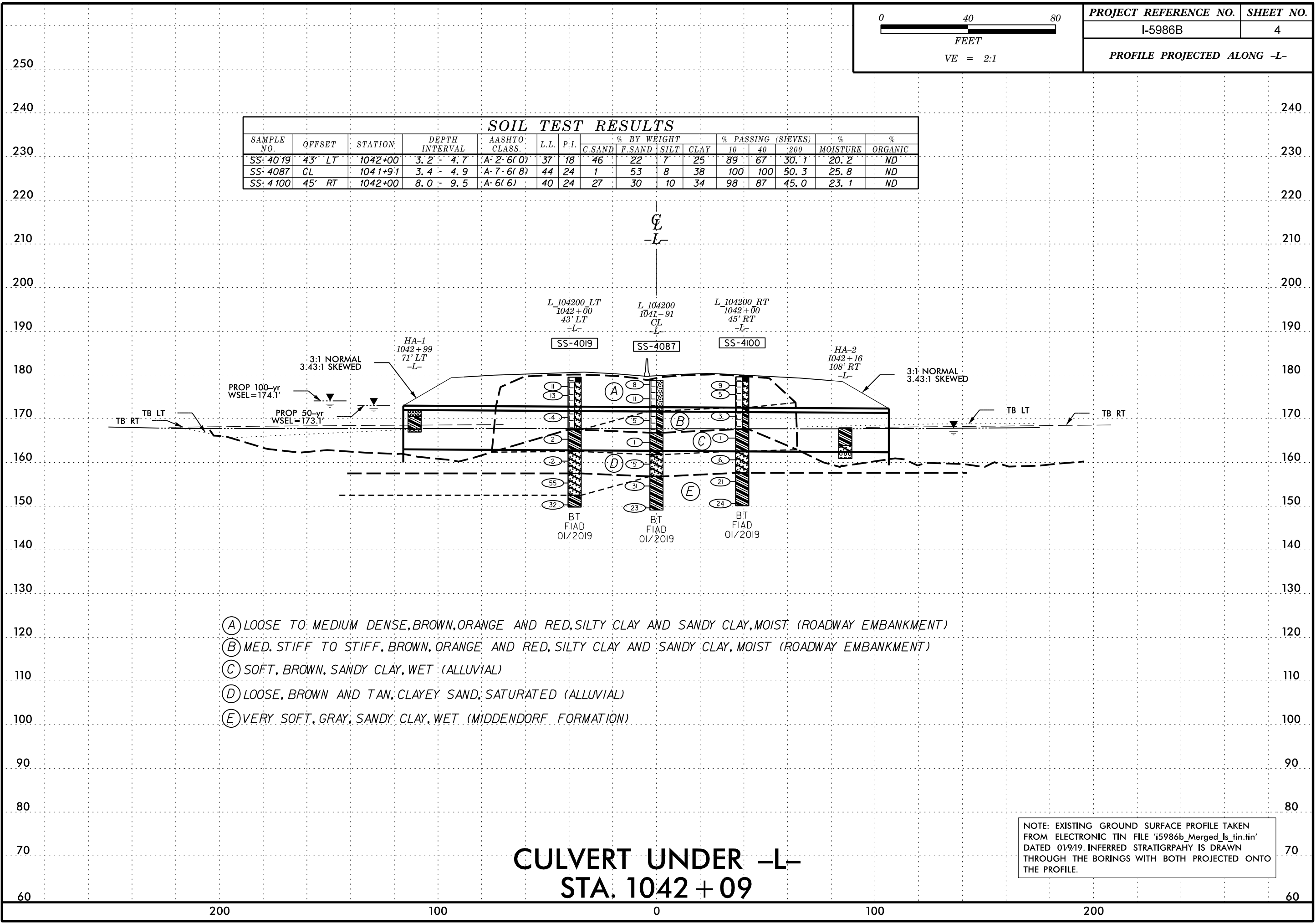


5/14/99



PROJECT REFERENCE NO.	SHEET NO.
I-5986B	4
PROFILE PROJECTED ALONG -L-	

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-4019	43' LT	1042+00	3.2 - 4.7	A-2-6(0)	37	18	46	22	7	25	89	67	30.1	20.2	ND
SS-4087	CL	1041+9.1	3.4 - 4.9	A-7-6(8)	44	24	1	53	8	38	100	100	50.3	25.8	ND
SS-4100	45' RT	1042+00	8.0 - 9.5	A-6(6)	40	24	27	30	10	34	98	87	45.0	23.1	ND



- (A) LOOSE TO MEDIUM DENSE, BROWN, ORANGE AND RED, SILTY CLAY AND SANDY CLAY, MOIST (ROADWAY EMBANKMENT)
- (B) MED. STIFF TO STIFF, BROWN, ORANGE AND RED, SILTY CLAY AND SANDY CLAY, MOIST (ROADWAY EMBANKMENT)
- (C) SOFT, BROWN, SANDY CLAY, WET (ALLUVIAL)
- (D) LOOSE, BROWN AND TAN, CLAYEY SAND, SATURATED (ALLUVIAL)
- (E) VERY SOFT, GRAY, SANDY CLAY, WET (MIDDENDORF FORMATION)

**CULVERT UNDER -L-  
STA. 1042 + 09**

NOTE: EXISTING GROUND SURFACE PROFILE TAKEN FROM ELECTRONIC TIN FILE 'i5986b\_Merged\_Is\_tin.tin' DATED 01/9/19. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

## GEOTECHNICAL BORING REPORT BORE LOG

WBS 47532		TIP I-5878		COUNTY Harnett		GEOLOGIST H. Camp									
SITE DESCRIPTION Replace Culvert Beneath I-95 at -L- Station 1042+09 Along Stony Run							GROUND WTR (ft)								
BORING NO. HA-1		STATION 1042+99		OFFSET 71 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 172.0 ft		TOTAL DEPTH 5.0 ft		NORTHING 566,721		EASTING 2,122,680									
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Hand Auger		HAMMER TYPE N/A									
DRILLER N/A		START DATE 12/03/19		COMP. DATE 12/03/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
175															
														172.0	0.0
														170.5	1.5
170															
														167.5	4.5
														167.0	5.0

WBS 47532		TIP I-5878		COUNTY Harnett		GEOLOGIST H. Camp									
SITE DESCRIPTION Replace Culvert Beneath I-95 at -L- Station 1042+09 Along Stony Run							GROUND WTR (ft)								
BORING NO. RS-1		STATION 1042+99		OFFSET 71 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 172.0 ft		TOTAL DEPTH 12.0 ft		NORTHING 566,721		EASTING 2,122,680									
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Rod Sounding		HAMMER TYPE N/A									
DRILLER N/A		START DATE 12/03/19		COMP. DATE 12/03/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
175															
														172.0	0.0
														171.0	1.0
170															
														170.0	2.0
														169.0	3.0
														168.0	4.0
														167.0	5.0
														166.0	6.0
														165.0	7.0
														164.0	8.0
														163.0	9.0
														162.0	10.0
														161.0	11.0
160															

NCDOT BORE DOUBLE\_CULVERT\_L\_104209 LOGS.GPJ NC\_DOT.GDT 2/6/20

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 47532		TIP I-5878		COUNTY Harnett		GEOLOGIST H. Camp								
SITE DESCRIPTION Replace Culvert Beneath I-95 at -L- Station 1042+09 Along Stony Run							GROUND WTR (ft)							
BORING NO. L_104200_LT		STATION 1042+00		OFFSET 43 ft LT		ALIGNMENT -L-								
COLLAR ELEV. 179.5 ft		TOTAL DEPTH 29.7 ft		NORTHING 566,634		EASTING 2,122,625								
DRILL RIG/HAMMER EFF./DATE SME275 DIEDRICH D-50 90% 11/08/2018			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER T. Williams		START DATE 01/17/19		COMP. DATE 01/17/19		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)
180	178.4	1.1	2	4	7									179.5 GROUND SURFACE 0.0
	178.4													178.4 PAVEMENT (8 INCHES OF ASPHALT AND 5 INCHES OF STONE) 1.1
175	176.3	3.2	5	7	6									ROADWAY EMBANKMENT LOOSE TO MEDIUM DENSE, RED, ORANGE, AND TAN, CLAYEY FINE TO COARSE SAND (A-2-6)
170	171.3	8.2	2	2	2									
165	166.3	13.2	2	2	0									167.5 ALLUVIAL VERY SOFT, BROWN AND GRAY, SANDY CLAY (A-6) 12.0
160	161.3	18.2	3	1	1									162.5 VERY LOOSE, GRAY AND BROWN, CLAYEY FINE TO COARSE SAND (A-2-6) 17.0
155	156.3	23.2	26	35	20									157.5 COASTAL PLAIN VERY DENSE, GRAY, CLAYEY FINE TO COARSE SAND (A-2-6) [MIDDENDORF FORMATION] 22.0
150	151.3	28.2	9	15	17									152.5 HARD, GRAY, SANDY CLAY (A-6) 27.0
														149.8 Boring Terminated at Elevation 149.8 ft IN HARD SANDY CLAY 29.7

WBS 47532		TIP I-5878		COUNTY Harnett		GEOLOGIST H. Camp								
SITE DESCRIPTION Replace Culvert Beneath I-95 at -L- Station 1042+09 Along Stony Run							GROUND WTR (ft)							
BORING NO. L_104200		STATION 1042+00		OFFSET CL		ALIGNMENT -L-								
COLLAR ELEV. 178.8 ft		TOTAL DEPTH 29.7 ft		NORTHING 566,602		EASTING 2,122,654								
DRILL RIG/HAMMER EFF./DATE SME275 DIEDRICH D-50 90% 11/08/2018			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER T. Williams		START DATE 01/20/19		COMP. DATE 01/20/19		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)
180	178.8	0.0	2	4	4									178.8 GROUND SURFACE 0.0
175	175.6	3.2	5	6	5									ROADWAY EMBANKMENT LOOSE TO MEDIUM DENSE, RED AND BROWN, SILTY FINE SAND (A-2-4), TRACE MICA
170	170.6	8.2	2	3	2									171.8 MEDIUM STIFF, RED AND TAN, SANDY CLAY (A-6) 7.0
165	165.6	13.2	1	0	1									166.8 ALLUVIAL VERY LOOSE, GRAY, SANDY CLAY (A-6) 12.0
160	160.6	18.2	4	4	1									161.8 LOOSE, GRAY, CLAYEY FINE TO COARSE SAND (A-2-6), TRACE GRAVEL 17.0
155	155.6	23.2	7	11	20									156.8 COASTAL PLAIN VERY STIFF TO HARD, BLUE AND GRAY, SANDY CLAY (A-6) [MIDDENDORF FORMATION] 22.0
150	150.6	28.2	8	9	14									149.1 Boring Terminated at Elevation 149.1 ft IN VERY STIFF SANDY CLAY 29.7

NCDOT BORE DOUBLE CULVERT\_L\_104209 LOGS.GPJ NC\_DOT.GDT 2/6/20

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 47532			TIP I-5878			COUNTY Harnett			GEOLOGIST H. Camp								
SITE DESCRIPTION Replace Culvert Beneath I-95 at -L- Station 1042+09 Along Stony Run								GROUND WTR (ft)									
BORING NO. L_104200_RT			STATION 1042+00			OFFSET 45 ft RT			ALIGNMENT -L-			0 HR. N/A					
COLLAR ELEV. 179.6 ft			TOTAL DEPTH 29.5 ft			NORTHING 566,568			EASTING 2,122,684			24 HR. FIAD					
DRILL RIG/HAMMER EFF./DATE SME275 DIEDRICH D-50 90% 11/08/2018						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic								
DRILLER T. Williams			START DATE 01/16/19			COMP. DATE 01/16/19			SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)			
180														179.6	0.0	GROUND SURFACE	
	178.6	1.0	3	4	5							M		178.6	1.0	PAVEMENT (8 INCHES OF ASPHALT AND 4 INCHES OF STONE)	
	176.6	3.0	4	3	2							M				<b>ROADWAY EMBANKMENT</b> LOOSE, GRAY, RED, AND ORANGE, CLAYEY FINE TO COARSE SAND (A-2-6)	
175														172.6	7.0	SOFT, RED, ORANGE, AND GRAY, SANDY CLAY (A-6)	
	171.6	8.0	1	2	1						SS-4010	M					
170														167.6	12.0	<b>ALLUVIAL</b> VERY SOFT, BLACK, SANDY CLAY (A-6)	
	166.6	13.0	1	1	0							W					
165														162.6	17.0	LOOSE, GRAY AND BLACK, CLAYEY FINE TO COARSE SAND (A-2-6)	
	161.6	18.0	2	1	5							Sat.					
160														157.6	22.0	<b>UNDIVIDED COASTAL PLAIN</b> MEDIUM DENSE, BLUE AND GRAY, SANDY CLAY (A-6)	
	156.6	23.0	5	9	12							M					
155																	
	151.6	28.0	3	8	16							M		150.1	29.5	Boring Terminated at Elevation 150.1 ft IN MEDIUM DENSE SANDY CLAY	

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## GEOTECHNICAL BORING REPORT BORE LOG

WBS 47532			TIP I-5878			COUNTY Harnett			GEOLOGIST H. Camp		
SITE DESCRIPTION Replace Culvert Beneath I-95 at -L- Station 1042+09 Along Stony Run								GROUND WTR (ft)			
BORING NO. HA-2		STATION 1042+16		OFFSET 108 ft RT		ALIGNMENT -L-		0 HR. N/A			
COLLAR ELEV. 167.9 ft		TOTAL DEPTH 7.0 ft		NORTHING 566,532		EASTING 2,122,738		24 HR. N/A			
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Hand Auger			HAMMER TYPE N/A				
DRILLER N/A			START DATE 12/03/19		COMP. DATE 12/03/19		SURFACE WATER DEPTH N/A				

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
170													▽	GROUND SURFACE	0.0
													//	ALLUVIAL GRAY TAN BLACK SANDY CLAY, TRACE ORGANICS	
													//	BLACK CLAYEY SAND, TRACE ORGANICS, TRACE GRAVEL	4.0
165													•••••	BROWN SANDY GRAVEL, TRACE ORGANICS	5.5
													•••••	Boring Terminated at Elevation 160.9 ft In Sandy Gravel	7.0

WBS 47532			TIP I-5878			COUNTY Harnett			GEOLOGIST H. Camp		
SITE DESCRIPTION Replace Culvert Beneath I-95 at -L- Station 1042+09 Along Stony Run								GROUND WTR (ft)			
BORING NO. RS-2		STATION 1042+16		OFFSET 108 ft RT		ALIGNMENT -L-		0 HR. N/A			
COLLAR ELEV. 167.9 ft		TOTAL DEPTH 11.5 ft		NORTHING 566,532		EASTING 2,122,738		24 HR. N/A			
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Rod Sounding			HAMMER TYPE N/A				
DRILLER N/A			START DATE 12/03/19		COMP. DATE 12/03/19		SURFACE WATER DEPTH N/A				

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
170													▽	GROUND SURFACE	0.0
165															
160															

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