

PROJECT: BPI.R004.1 REFERENCE: SF-070009

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY BERTIE  
 PROJECT DESCRIPTION BRIDGE NO. 9 ON -L- (SR 1219)  
OVER CONNARITSA SWAMP AT -L- STA. 16 + 09

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-070009	1	6

**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**

S.N. ZIMARINO  
R.E. SMITH  
C.M. WALKER

INVESTIGATED BY T.C. BOTTOMS  
 DRAWN BY T.C. BOTTOMS  
 CHECKED BY D.N. ARGENBRIGHT  
 SUBMITTED BY D.N. ARGENBRIGHT  
 DATE DECEMBER 2021



DocuSigned by:  
Tyler C. Bottoms 01/25/2022 | 7  
 48A2D3BD086C1A SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

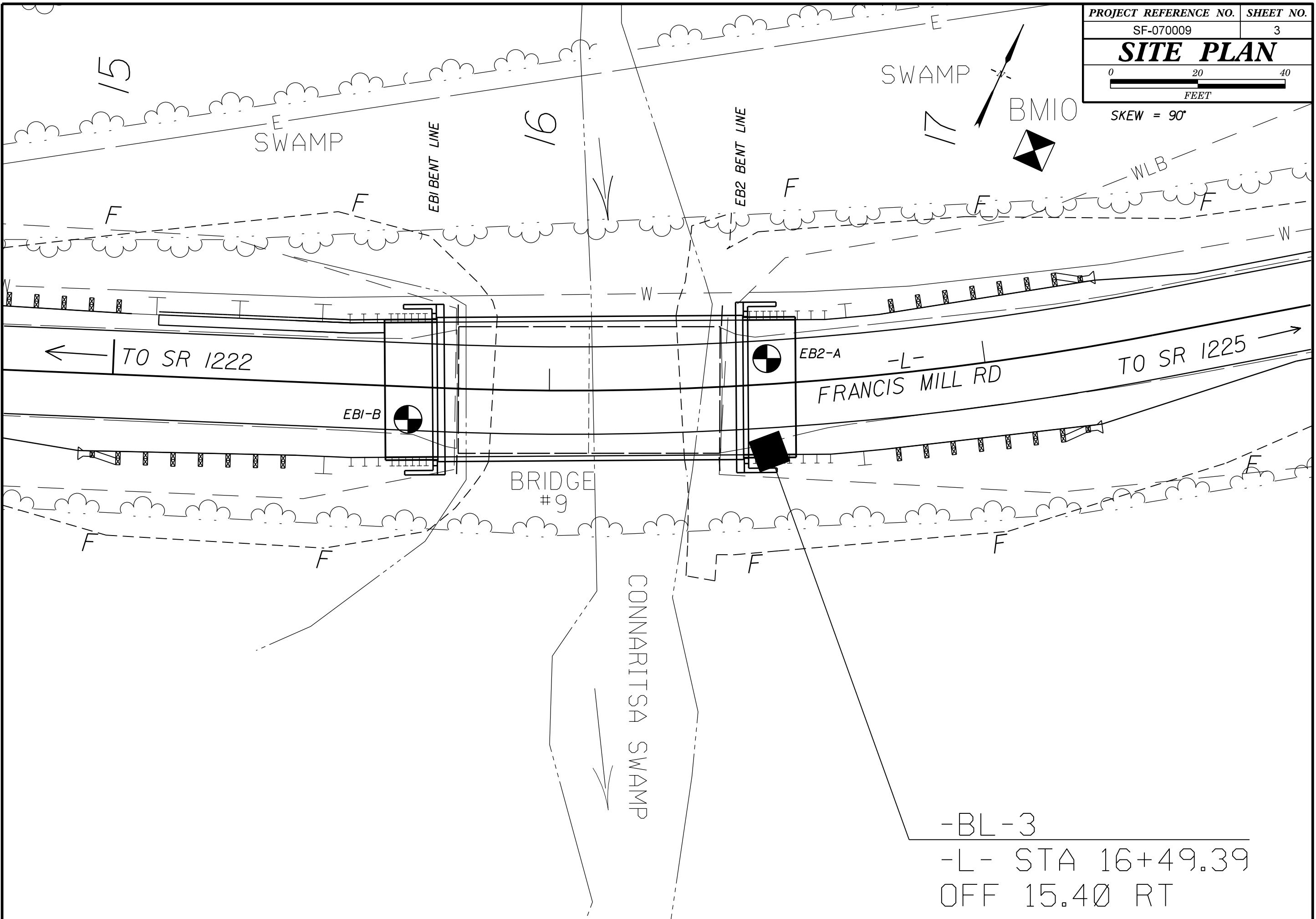
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT  
SUBSURFACE INVESTIGATION  
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION: 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 (ASTM T 206, 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, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION: Table with columns for GRANULAR MATERIALS (A-1 to A-7), SILT-CLAY MATERIALS (A-4 to A-7), and ORGANIC MATERIALS (A-1, A-2 to A-6, A-7). Includes symbols for material types and plasticity charts.
GRADATION: WELL GRADED, UNIFORMLY GRADED, GAP-GRADED. ANGULARITY OF GRAINS: THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.
ROCK DESCRIPTION: 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. WEATHERED ROCK (WR), CRYSTALLINE ROCK (CR), NON-CRYSTALLINE ROCK (NCR), COASTAL PLAIN SEDIMENTARY ROCK (CP).
TERMS AND DEFINITIONS: ALLUVIUM (ALLUV.), AQUIFER, ARENACEOUS, ARGILLACEOUS, ARTESIAN, CALCAREOUS (CALC.), COLLUVIUM, CORE RECOVERY (REC.), DIKE, DIP, DIP DIRECTION (DIP AZIMUTH), FAULT, FISSILE, FLOAT, FLOOD PLAIN (FP), FORMATION (FM), JOINT, LEDGE, LENS, MOTTLED (MOT.), PERCHED WATER, RESIDUAL (RES.) SOIL, ROCK QUALITY DESIGNATION (ROD), SAPROLITE (SAP.), SILL, SLICKENSIDE, STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT), STRATA CORE RECOVERY (SREC.), STRATA ROCK QUALITY DESIGNATION (SROD), TOPSOIL (TS.).
CONSISTENCY OR DENSENESS: Table relating primary soil type to compactness or consistency and range of unconfined compressive strength.
MISCELLANEOUS SYMBOLS: Symbols for ROADWAY EMBANKMENT (RE), SOIL SYMBOL, ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT, INFERRED SOIL BOUNDARY, INFERRED ROCK LINE, ALLUVIAL SOIL BOUNDARY, DIP & DIP DIRECTION OF ROCK STRUCTURES, TEST BORING, AUGER BORING, CORE BORING, MONITORING WELL, PIEZOMETER INSTALLATION, SLOPE INDICATOR INSTALLATION, CONE PENETROMETER TEST, SOUNDING ROD, TEST BORING WITH CORE, SPT N-VALUE.
RECOMMENDATION SYMBOLS: 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.
ABBREVIATIONS: AR - AUGER REFUSAL, BT - BORING TERMINATED, CL - CLAY, CPT - COARSE 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, UNIT WEIGHT, DRY UNIT WEIGHT, SAMPLE ABBREVIATIONS: S - BULK, SS - SPLIT SPOON, ST - SHELBY TUBE, RS - ROCK, RT - RECOMPACTED TRIAXIAL, CBR - CALIFORNIA BEARING RATIO.
TEXTURE OR GRAIN SIZE: Table showing U.S. STD. SIEVE SIZE (4, 10, 40, 60, 200, 270) and corresponding opening (mm) and percentages for BOULDER, COBBLE, GRAVEL, COARSE SAND, FINE SAND, SILT, CLAY.
SOIL MOISTURE - CORRELATION OF TERMS: SOIL MOISTURE SCALE (ATTERBERG LIMITS), FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION. Plasticity chart (PI) showing LIQUID LIMIT (LL), PLASTIC LIMIT (PL), and OPTIMUM MOISTURE SHRINKAGE LIMIT (OM).
PLASTICITY: Table relating PLASTICITY INDEX (PI) to DRY STRENGTH.
COLOR: TABLE showing descriptions and modifiers for soil color.
EQUIPMENT USED ON SUBJECT PROJECT: DRILL UNITS (CME-45C, CME-55, CME-550, VANE SHEAR TEST, PORTABLE HOIST), ADVANCING TOOLS (CLAY BITS, CONTINUOUS FLIGHT AUGER, 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).
ROCK HARDNESS: VERY HARD, HARD, MODERATELY HARD, MEDIUM HARD, SOFT, VERY SOFT, COMPLETE. Descriptions of rock hardness levels.
FRACTURE SPACING and BEDDING: TABLES for FRACTURE SPACING (TERM, SPACING) and BEDDING (TERM, THICKNESS).
INDURATION: TABLE for INDURATION (TERM, DESCRIPTION).
BENCH MARK: BL-3, N: 881267.2934, E: 2568296.1171, ELEVATION: 48.27 FEET.
NOTES: FIAD: FILLED IMMEDIATELY AFTER DRILLING.

SKEW = 90°

BM10

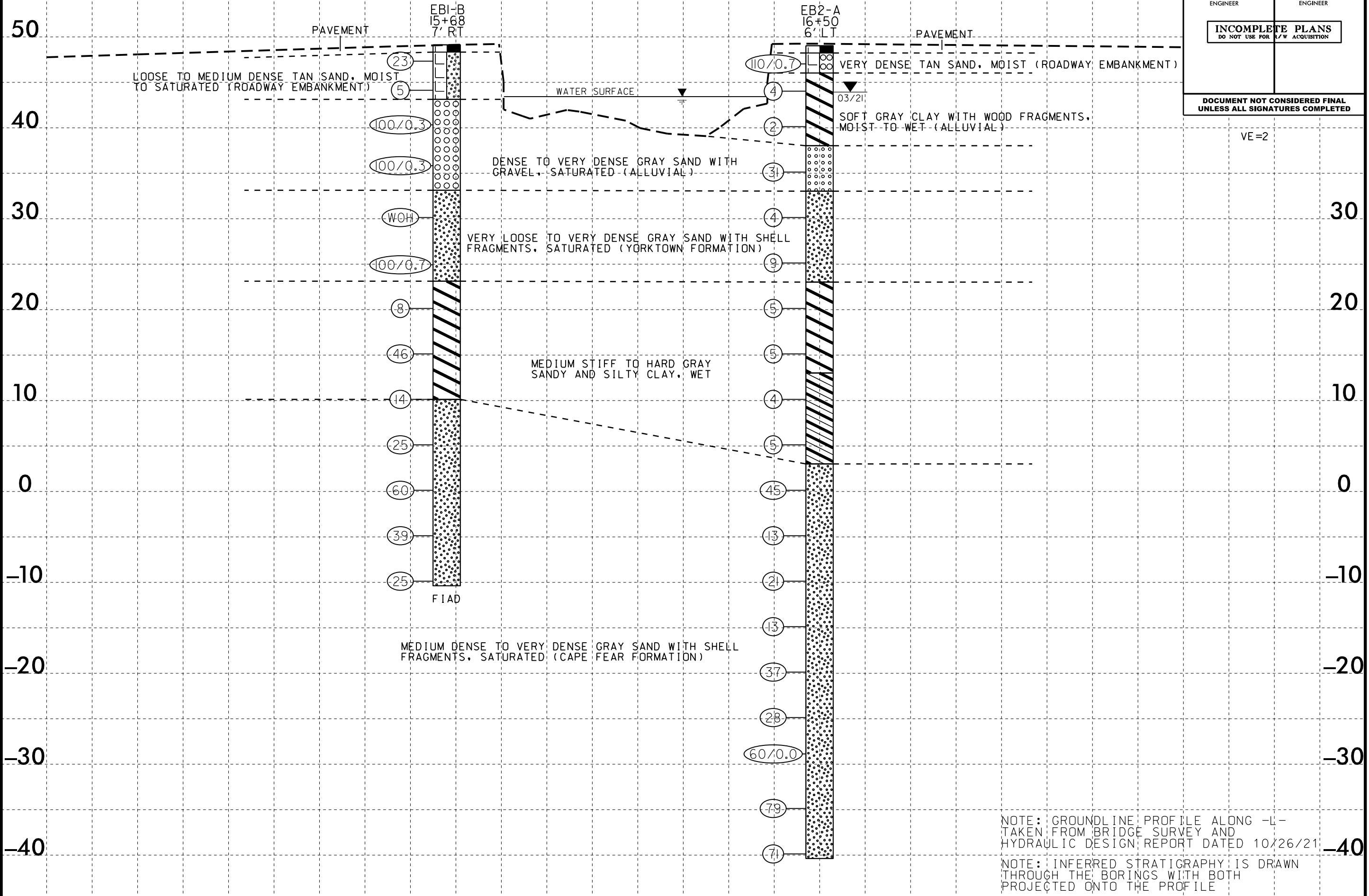


-BL-3  
 -L- STA 16+49.39  
 OFF 15.40 RT

5/14/99  
 07-DEC-2021 06:59  
 S:\BRG\Cresville\_Investigation\TIP\_SF070009\_GEO\_BRDG\CADD\_GEO TECH\PlanProf\BP1.R004.1.rdy.wp1.dgn  
 \$\$\$\$STRAND\$\$\$\$

### PROFILE THROUGH BORINGS PROJECTED ALONG -L-

PROJECT REFERENCE NO. <b>SF-070009</b>	SHEET NO. <b>4</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED 10/26/21

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

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# GEOTECHNICAL BORING REPORT

## BORE LOG

<b>WBS</b> BP1.R004.1		<b>TIP</b> SF-070009		<b>COUNTY</b> BERTIE		<b>GEOLOGIST</b> Zimarino, S. N.	
<b>SITE DESCRIPTION</b> BRIDGE NO. 9 ON -L- (SR 1219) OVER CONNARITSA SWAMP							<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> EB1-B		<b>STATION</b> 15+68		<b>OFFSET</b> 7 ft RT		<b>ALIGNMENT</b> -L-	
<b>COLLAR ELEV.</b> 49.2 ft		<b>TOTAL DEPTH</b> 59.5 ft		<b>NORTHING</b> 881,450		<b>EASTING</b> 2,568,763	
<b>DRILL RIGHAMMER EFF./DATE</b> GFC0075 CME-45C 87% 11/23/2021				<b>DRILL METHOD</b> Mud Rotary		<b>HAMMER TYPE</b> Automatic	
<b>DRILLER</b> Smith, R. E.		<b>START DATE</b> 03/09/21		<b>COMP. DATE</b> 03/09/21		<b>SURFACE WATER DEPTH</b> 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)			
50														49.2	0.0	GROUND SURFACE	
	48.4	0.8	9	13	10									48.4	0.8	PAVEMENT	
																	ROADWAY EMBANKMENT TAN SAND, MOIST TO SATURATED
45	45.2	4.0	2	3	2									43.2	6.0	ALLUVIAL GRAY SAND AND GRAVEL, SATURATED	
40	41.2	8.0	35	100/0.3													
35	36.2	13.0	100/0.3														
30	31.2	18.0	WOH	WOH	WOH									33.2	16.0	COASTAL PLAIN GRAY SAND, SATURATED (YORKTOWN FORMATION)	
25	26.2	23.0	12	45	55/0.2												* HIGH BPF POTENTIALLY DUE TO GRAVEL CAVE IN
20	21.2	28.0	4	4	4									23.2	26.0	GRAY SILTY CLAY, WET	
15	16.2	33.0	14	18	28												
10	11.2	38.0	4	5	9									10.2	39.0	GRAY SAND WITH SHELL FRAGMENTS, SATURATED (CAPE FEAR FORMATION)	
5	6.2	43.0	10	12	13												
0	1.2	48.0	15	20	40												
-5	-3.8	53.0	8	16	23												
-10	-8.8	58.0	6	10	15												
														-10.3	59.5		Boring Terminated at Elevation -10.3 ft in Medium Dense Sand

NCDOT BORE DOUBLE SF070009 GEO\_BRDG.GPJ NC\_DOT.GDT 12/7/21

