

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-070023	1	6

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 17BP.1.R.66 (SF-070023) F.A. PROJ. _____
COUNTY BERTIE
PROJECT DESCRIPTION BRIDGE NO. 23 ON SR 1328 (BUNCOMB RD.)
OVER CHINKAPIN SWAMP AT -L- STA. 15+00.80

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) 707-6850. 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: 17BP.1.R.66 ID: SF-070023

PERSONNEL
J.D. GEMPERLINE
R.E. SMITH
D.G. PINTER

INVESTIGATED BY J.L. STONE
CHECKED BY D.N. ARGENBRIGHT
SUBMITTED BY D.N. ARGENBRIGHT
DATE MARCH 2014



DRAWN BY: C.P. TURNER

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

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO. SF-070023	SHEET NO. 2 OF 6
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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 (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: VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HEAVY PLASTIC, A-7-6				WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. 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:				ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARGILLACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS 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 DISLOGGED 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.) - IRRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (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 (SCREC) - 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				WEATHERING			
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7 SYMBOL. [Symbol grid] % PASSING: 10, 40, 200 LIQUID LIMIT, PLASTIC INDEX, GROUP INDEX USUAL TYPES OF MAJOR MATERIALS: STONE FRAGS, GRAVEL AND SAND; FINE SAND; SILTY OR CLAYEY GRAVEL AND SAND; SILTY SOILS; CLAYEY SOILS GEN. RATING AS A SUBGRADE: EXCELLENT TO GOOD, FAIR TO POOR, POOR, UNSUITABLE PI OF A-7-5 SUBGROUP IS <= LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30				MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE. COMPRESSIBILITY: SLIGHTLY COMPRESSIBLE, MODERATELY COMPRESSIBLE, HIGHLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31, EQUAL TO 31-50, GREATER THAN 50 PERCENTAGE OF MATERIAL: ORGANIC MATERIAL, GRANULAR SOILS, SILT-CLAY SOILS, OTHER MATERIAL TRACE OF ORGANIC MATTER, LITTLE ORGANIC MATTER, MODERATELY ORGANIC, HIGHLY ORGANIC 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				WEATHERED ROCK (WR), CRYSTALLINE ROCK (CR), NON-CRYSTALLINE ROCK (NCR), COASTAL PLAIN SEDIMENTARY ROCK (CP) FRESH, VERY SLIGHT (V SL), SLIGHT (SL), MODERATE (MOD), MODERATELY SEVERE (MOD. SEV), SEVERE (SEV), VERY SEVERE (V SEV), COMPLETE 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. IF TESTED, WOULD YIELD SPT REFUSAL. 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, YIELDS SPT N VALUES > 100 BPF. ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF. 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.							
CONSISTENCY OR DENSENESS				MISCELLANEOUS SYMBOLS				ROCK HARDNESS				ROCK HARDNESS			
PRIMARY SOIL TYPE, COMPACTNESS OR CONSISTENCY, RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE), RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²) GENERALLY GRANULAR MATERIAL (NON-COHESSIVE), VERY SOFT, SOFT, MEDIUM STIFF, STIFF, VERY STIFF, HARD VERY LOOSE, MEDIUM DENSE, DENSE, VERY DENSE < 4, 4 TO 10, 10 TO 30, 30 TO 50 < 0.25, 0.25 TO 0.50, 0.5 TO 1.0, 1 TO 2, 2 TO 4, > 4				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 SPT DPT DVT VST PVT TEST BORING, AUGER BORING, CORE BORING, MONITORING WELL, PIEZOMETER INSTALLATION, SLOPE INDICATOR INSTALLATION, CONE PENETROMETER TEST, SOUNDING ROD				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 GROOVED 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 GROOVED OR GOUGED 0.25 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. 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				ABBREVIATIONS				FRACTURE SPACING				BEDDING			
U.S. STD. SIEVE SIZE OPENING (MM): 4, 10, 40, 60, 200, 270 4.75, 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				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, HL - 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, WE. - WEATHERED, W - UNIT WEIGHT, W _d - DRY UNIT WEIGHT SAMPLE ABBREVIATIONS: S - BULK, SS - SPLIT SPOON, ST - SHELBY TUBE, RS - ROCK, RT - RECOMPACTED TRIAXIAL, CBR - CALIFORNIA BEARING RATIO				TERM, SPACING, TERM, THICKNESS VERY WIDE, WIDE, MODERATELY CLOSE, CLOSE, VERY CLOSE MORE THAN 10 FEET, 3 TO 10 FEET, 1 TO 3 FEET, 0.16 TO 1 FEET, LESS THAN 0.16 FEET VERY THICKLY BEDDED, THICKLY BEDDED, THINLY BEDDED, VERY THINLY BEDDED, THICKLY LAMINATED, THINLY LAMINATED > 4 FEET, 1.5 - 4 FEET, 0.16 - 1.5 FEET, 0.03 - 0.16 FEET, < 0.008 FEET							
SOIL MOISTURE - CORRELATION OF TERMS				EQUIPMENT USED ON SUBJECT PROJECT				INDURATION				INDURATION			
SOIL MOISTURE SCALE (ATTERBERG LIMITS), FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION LIQUID LIMIT, PLASTIC LIMIT, OPTIMUM MOISTURE, SHRINKAGE LIMIT SATURATED (SAT), WET (W), MOIST (M), DRY (D)				DRILL UNITS: MOBILE B-, 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 w/ ADVANCER, TRICONE 2 1/2" 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				FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. 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				COLOR				BENCH MARK				BENCH MARK			
NONPLASTIC, LOW PLASTICITY, MED. PLASTICITY, HIGH PLASTICITY PLASTICITY INDEX (PI), DRY STRENGTH, VERY LOW, SLIGHT, MEDIUM, HIGH				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.				BM-1 SPIKE IN 18' GUM AT -L- STA. 15+87.43' RT (N 906820, E 2641964) ELEVATION: 22.26 FT.				NOTES:			

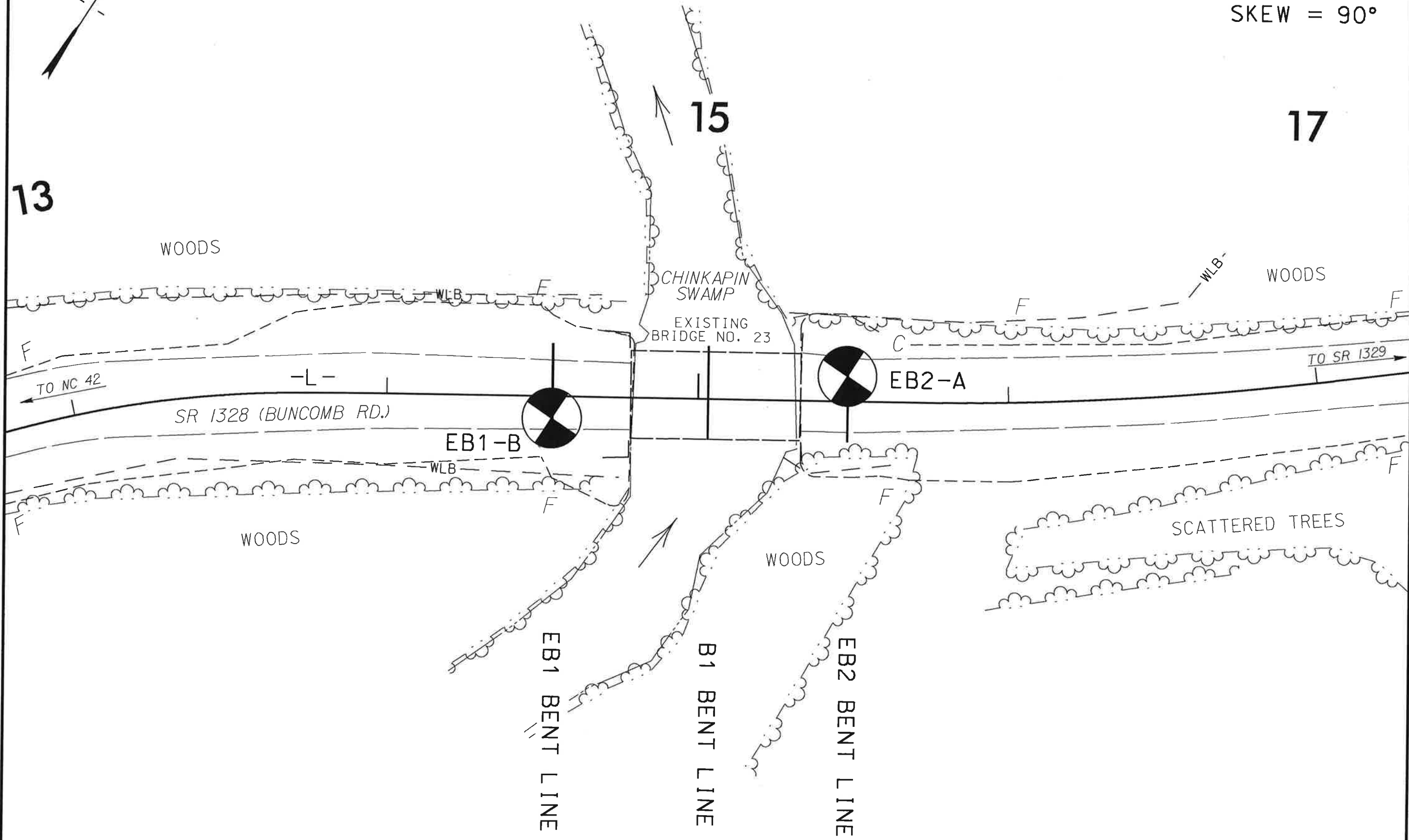
SKEW = 90°



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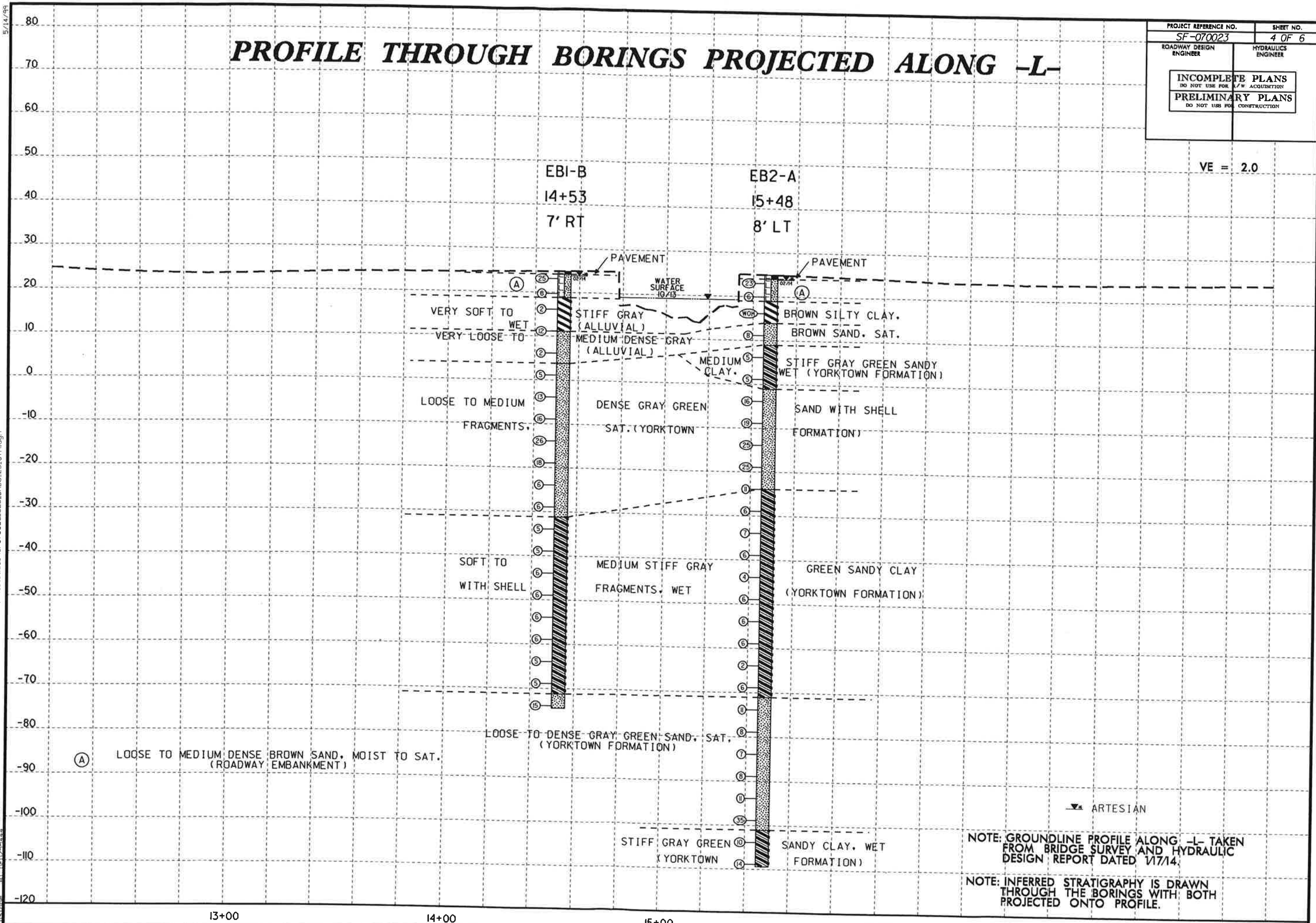
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17



PROFILE THROUGH BORINGS PROJECTED ALONG -L-

VE = 2.0



NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED 1/7/14.

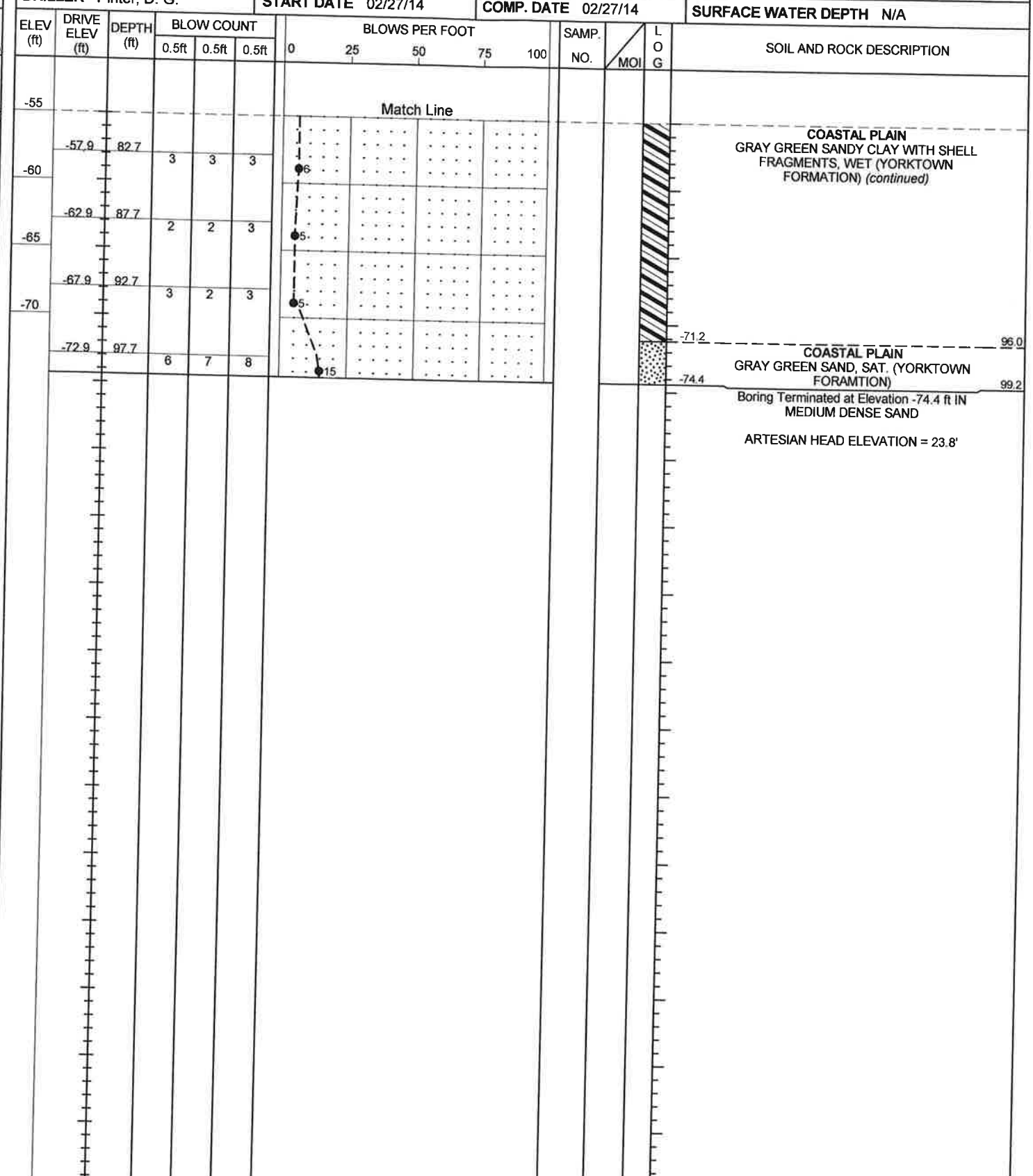
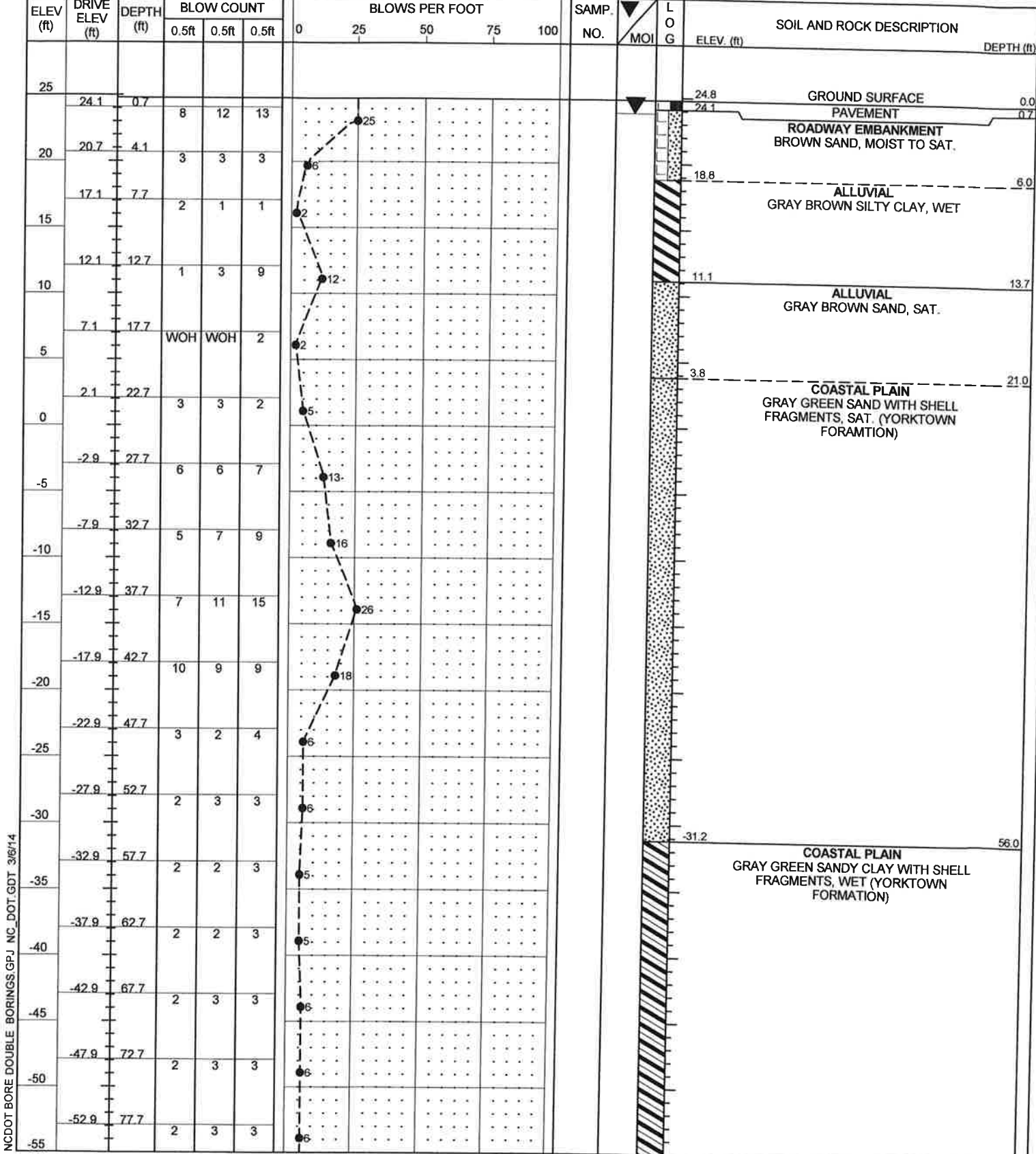
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.

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WBS 17BP.1.R.66	TIP SF-070023	COUNTY BERTIE	GEOLOGIST Gemperline, J. D.
SITE DESCRIPTION BRIDGE NO.23 ON -L- (SR 1328) OVER CHINKAPIN SWAMP			
BORING NO. EB1-B	STATION 14+53	OFFSET 7 ft RT	ALIGNMENT -L-
COLLAR ELEV. 24.8 ft	TOTAL DEPTH 99.2 ft	NORTHING 906,776	EASTING 2,641,831
DRILL RIG/HAMMER EFF./DATE GFO1042 CME-550 87% 09/03/2009		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Pinter, D. G.	START DATE 02/27/14	COMP. DATE 02/27/14	SURFACE WATER DEPTH N/A

WBS 17BP.1.R.66	TIP SF-070023	COUNTY BERTIE	GEOLOGIST Gemperline, J. D.
SITE DESCRIPTION BRIDGE NO.23 ON -L- (SR 1328) OVER CHINKAPIN SWAMP			
BORING NO. EB1-B	STATION 14+53	OFFSET 7 ft RT	ALIGNMENT -L-
COLLAR ELEV. 24.8 ft	TOTAL DEPTH 99.2 ft	NORTHING 906,776	EASTING 2,641,831
DRILL RIG/HAMMER EFF./DATE GFO1042 CME-550 87% 09/03/2009		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Pinter, D. G.	START DATE 02/27/14	COMP. DATE 02/27/14	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE BORINGS GPJ NC_DOT_GDT 3/6/14



WBS 17BP.1.R.66		TIP SF-070023		COUNTY BERTIE		GEOLOGIST Gemperline, J. D.											
SITE DESCRIPTION BRIDGE NO.23 ON -L- (SR 1328) OVER CHINKAPIN SWAMP																	
BORING NO. EB2-A		STATION 15+48		OFFSET 8 ft LT		ALIGNMENT -L-											
COLLAR ELEV. 24.9 ft		TOTAL DEPTH 134.3 ft		NORTHING 906,840		EASTING 2,641,902											
DRILL RIG/HAMMER EFF./DATE GFO1042 CME-550 87% 09/03/2009		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic													
DRILLER Smith, R. E.		START DATE 02/26/14		COMP. DATE 02/26/14		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							
25	24.0	0.9	4	15	8												
20	20.9	4.0	4	3	3												
15	17.1	7.8	WOH	WOH	WOH												
10	12.1	12.8	4	3	5												
5	7.1	17.8	1	2	3												
0	2.1	22.8	3	3	2												
-5	-2.9	27.8	6	7	9												
-10	-7.9	32.8	7	10	9												
-15	-12.9	37.8	9	12	13												
-20	-17.9	42.8	16	16	9												
-25	-22.9	47.8	4	5	6												
-30	-27.9	52.8	2	3	3												
-35	-32.9	57.8	3	3	4												
-40	-37.9	62.8	2	3	3												
-45	-42.9	67.8	2	2	2												
-50	-47.9	72.8	2	3	3												
-55	-52.9	77.8	2	3	3												

WBS 17BP.1.R.66		TIP SF-070023		COUNTY BERTIE		GEOLOGIST Gemperline, J. D.											
SITE DESCRIPTION BRIDGE NO.23 ON -L- (SR 1328) OVER CHINKAPIN SWAMP																	
BORING NO. EB2-A		STATION 15+48		OFFSET 8 ft LT		ALIGNMENT -L-											
COLLAR ELEV. 24.9 ft		TOTAL DEPTH 134.3 ft		NORTHING 906,840		EASTING 2,641,902											
DRILL RIG/HAMMER EFF./DATE GFO1042 CME-550 87% 09/03/2009		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic													
DRILLER Smith, R. E.		START DATE 02/26/14		COMP. DATE 02/26/14		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							
-55																	
-60	-57.9	82.8	3	3	3												
-65	-62.9	87.8	WOH	1	1												
-70	-67.9	92.8	2	3	3												
-75	-72.9	97.8	5	5	6												
-80	-77.9	102.8	4	6	2												
-85	-82.9	107.8	3	3	4												
-90	-87.9	112.8	3	4	4												
-95	-92.9	117.8	6	6	5												
-100	-97.9	122.8	19	14	21												
-105	-102.9	127.8	5	3	7												
	-107.9	132.8	4	7	7												

NCDOT BORE DOUBLE BORINGS.GPJ NC_DOT.GDT 3/6/14