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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2514D	1	12

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34442.1.5 (R-2514D) F.A. PROJ. NHF-17(7)
COUNTY JONES
PROJECT DESCRIPTION US 17 FROM SOUTH OF NC 58 TO THE
NEW BERN BYPASS

SITE DESCRIPTION BRIDGE NO. 95 AND NO. 96 ON -L- (US 17
BYPASS) OVER -Y3- (US 58) AT -L- STA. 320+39.56

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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: 34442.1.5 ID: R-2514D

PERSONNEL

C.M. WRIKE

R.E. SMITH

D.G. PINTER

J.D. GEMPERLINE

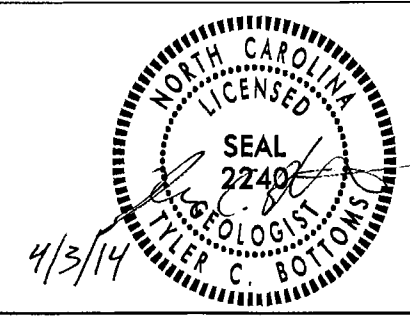
MIDATLANTIC PERSONNEL

INVESTIGATED BY T.C. BOTTOMS

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE APRIL 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 IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

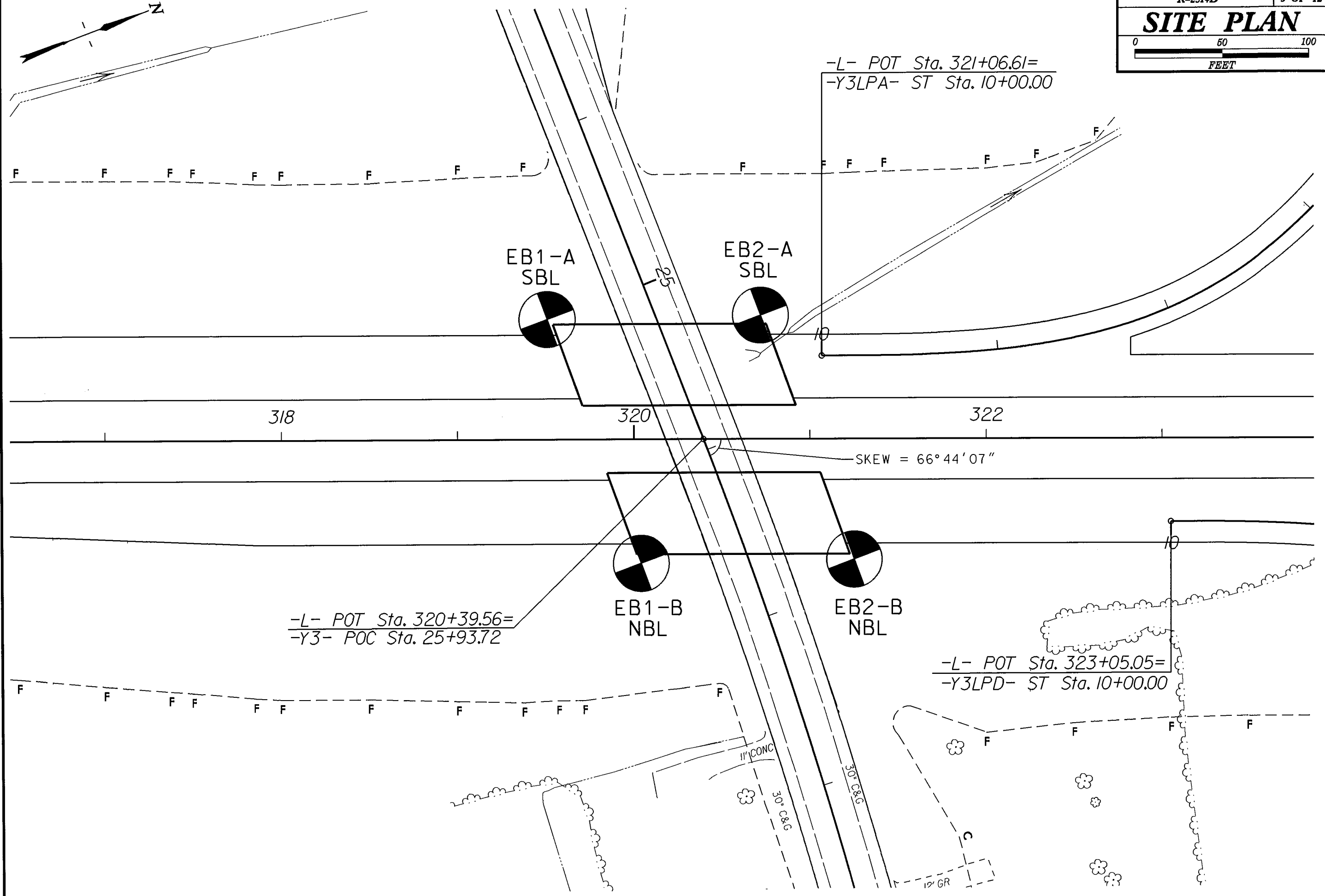
NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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 (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. ANGULARITY OF GRAINS 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:  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.  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 PHYLITE, SLATE, SANDSTONE, ETC.  COASTAL PLAIN SEDIMENTARY 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 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.) - 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 (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 INTRODUCED 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 (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		ROCK HARDNESS					
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 SLI.) 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 (SLI.) 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, YIELDS SPT N VALUES > 100 BPF. VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF. COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50		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, YIELDS SPT N VALUES > 100 BPF. VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF. COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		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 GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.	
CONSISTENCY OR DENSENESS		GROUND WATER		MISCELLANEOUS SYMBOLS		ROCK HARDNESS					
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/F ²)		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		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		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 GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.					
TEXTURE OR GRAIN SIZE		ABBREVIATIONS		EQUIPMENT USED ON SUBJECT PROJECT		FRACTURE SPACING					
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		AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS - FOSSILIFEROUS FRAC. - FRACTURED, 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		DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input checked="" type="checkbox"/> CME-45B <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST		TERM SPACING VERY WIDE MORE THAN 18 FEET WIDE 3 TO 18 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET					
SOIL MOISTURE - CORRELATION OF TERMS		SOIL MOISTURE SCALE (ATTERBERG LIMITS)		ADVANCING TOOLS:		TERMINATION					
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION		FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION		CLAY BITS 6" CONTINUOUS FLIGHT AUGER HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE 2 1/16" STEEL TEETH TRICONE " TUNG-CARB. CORE BIT		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.					
PLASTICITY		PLASTICITY INDEX (PI)		DRILL UNITS:		FRACTURE SPACING					
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY		DRY STRENGTH VERY LOW SLIGHT MEDIUM HIGH		DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input checked="" type="checkbox"/> CME-45B <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST		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					
COLOR		PLASTICITY INDEX (PI)		ADVANCING TOOLS:		FRACTURE SPACING					
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.		DRY STRENGTH VERY LOW SLIGHT MEDIUM HIGH		CLAY BITS 6" CONTINUOUS FLIGHT AUGER HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE 2 1/16" STEEL TEETH TRICONE " TUNG-CARB. CORE BIT		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					



318

320

322

SKEW = 66° 44' 07"

-L- POT Sta. 320+39.56 =
-Y3- POC Sta. 25+93.72

EB1-A
SBL

EB2-A
SBL

EB1-B
NBL

EB2-B
NBL

-L- POT Sta. 323+05.05 =
-Y3LPD- ST Sta. 10+00.00

11' CONC

30' C&G

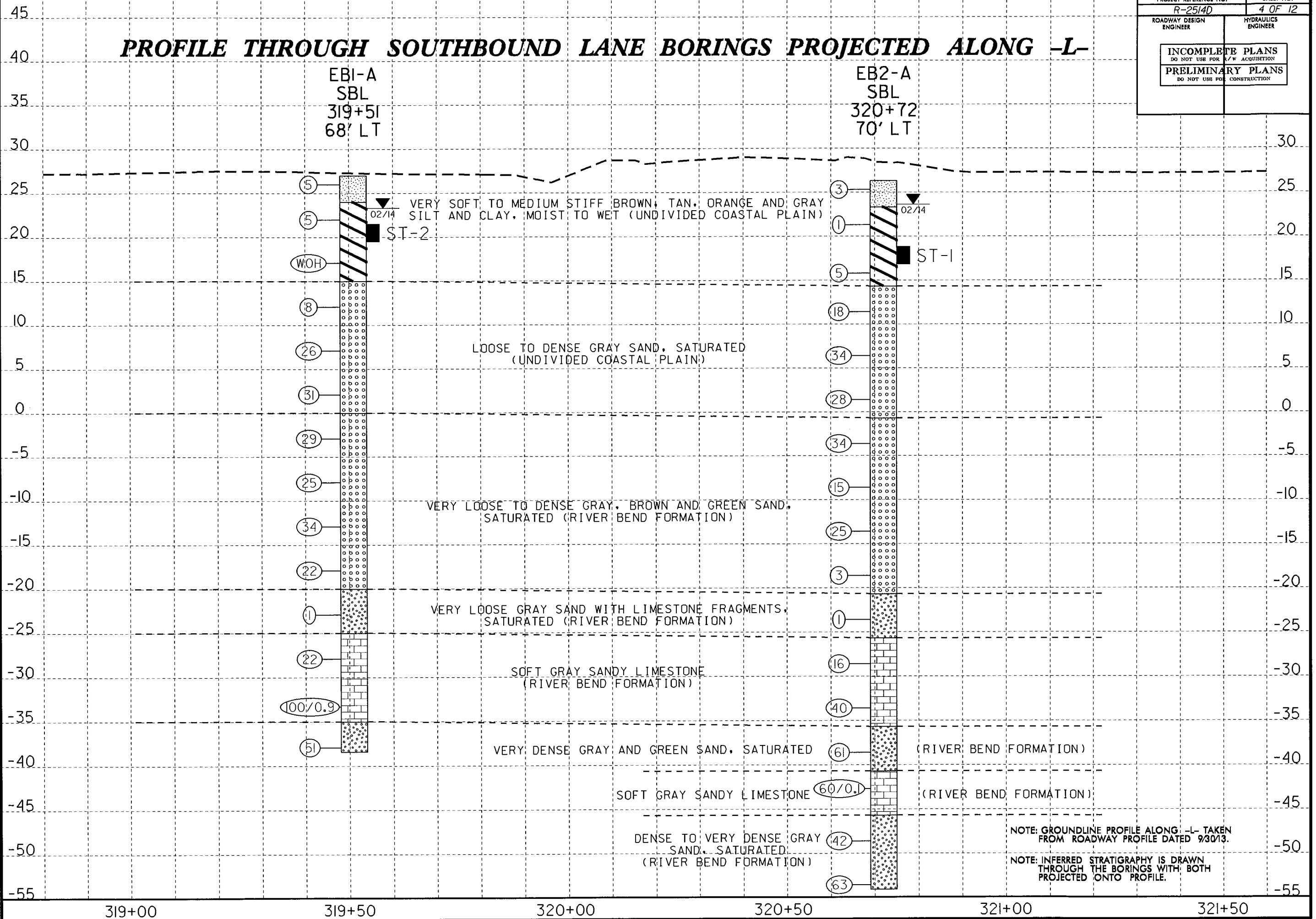
30' C&G

12' GR

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 5/14/99

PROJECT REFERENCE NO. R-2514D	SHEET NO. 4 OF 12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PROFILE THROUGH SOUTHBOUND LANE BORINGS PROJECTED ALONG -L-



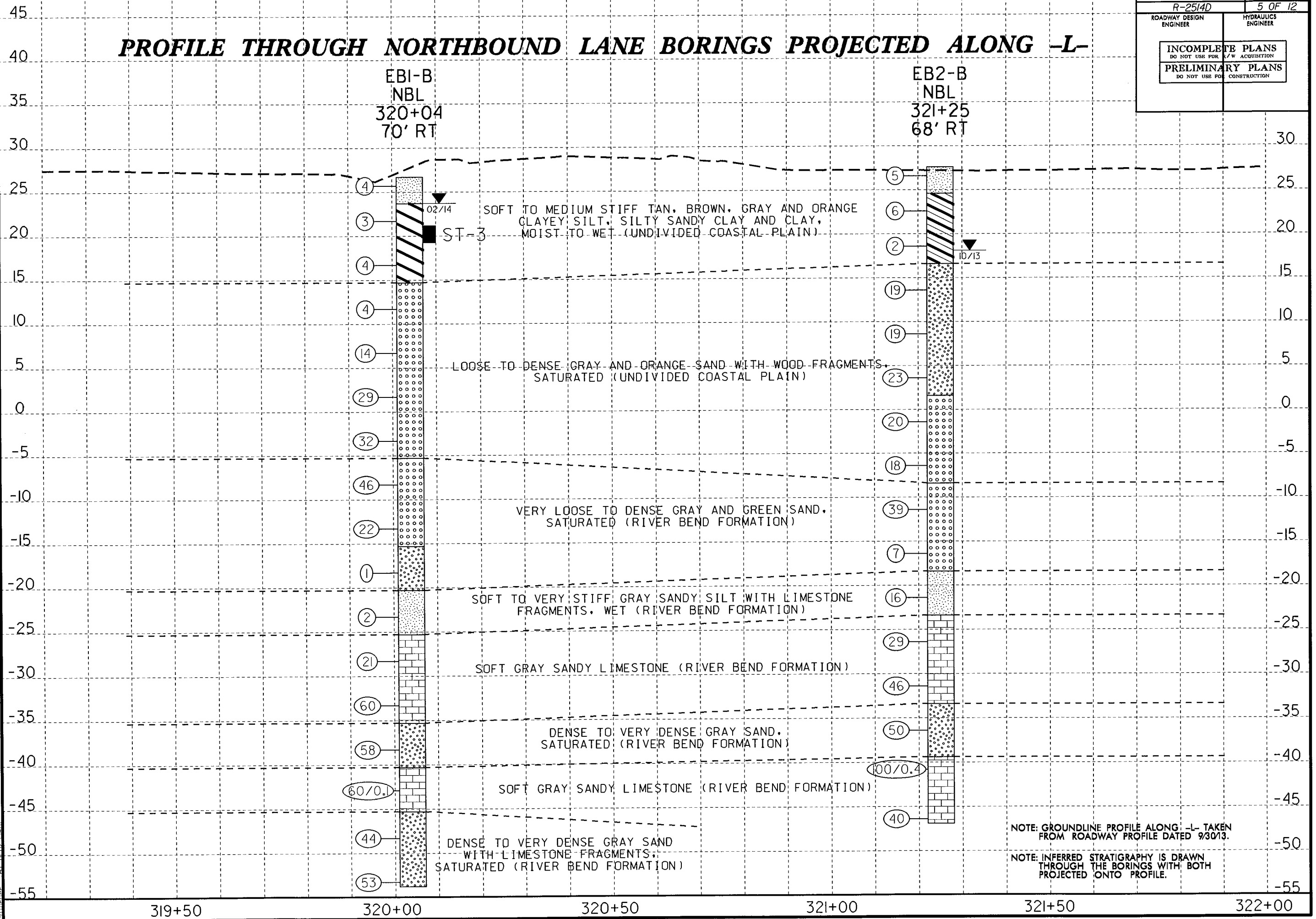
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PROJECT REFERENCE NO. R-2514D	SHEET NO. 5 OF 12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PROFILE THROUGH NORTHBOUND LANE BORINGS PROJECTED ALONG -L-



319+50

320+00

320+50

321+00

321+50

322+00

8/23/99

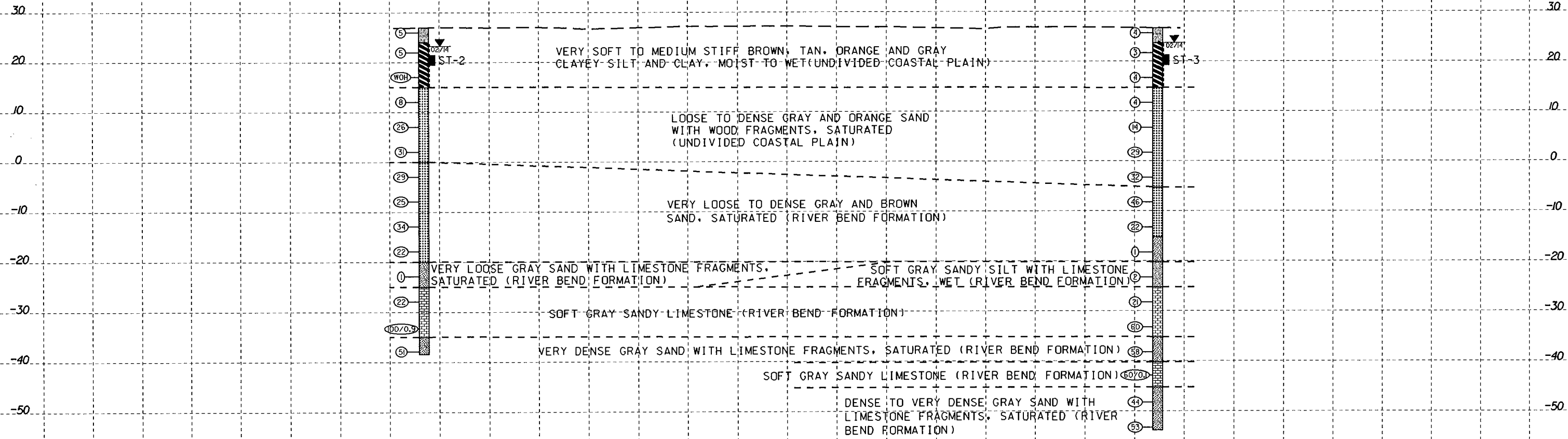


150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

CROSS SECTION ALONG END BENT 1 NBL AND SBL

EBI-A
SBL
319+51
68' LT

EBI-B
NBL
320+04
70' RT



319 + 77.97

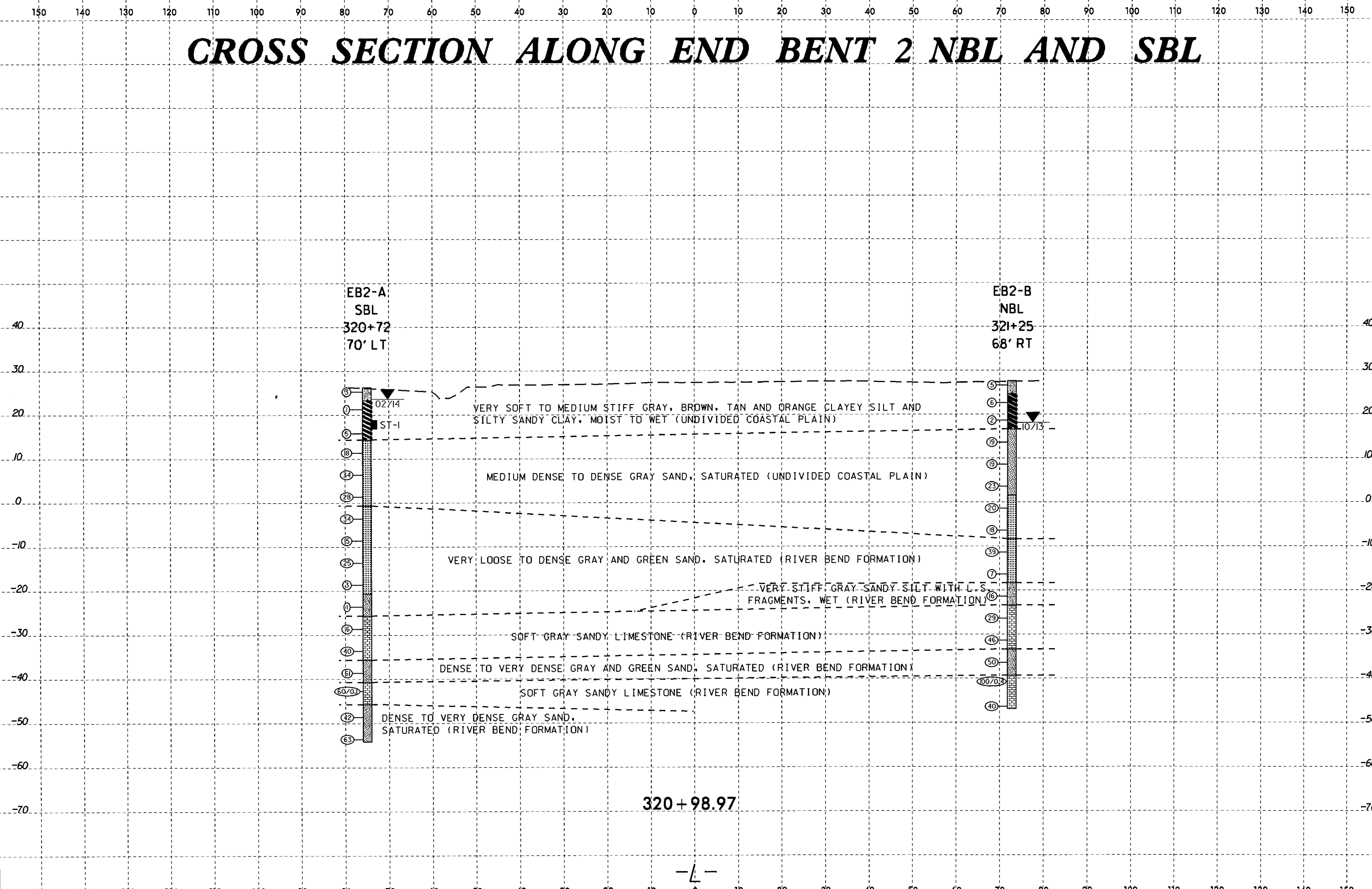
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CROSS SECTION ALONG END BENT 2 NBL AND SBL





NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5		TIP R-2514D		COUNTY JONES		GEOLOGIST Gemperline, J. D.										
SITE DESCRIPTION Bridge No. 95 on -L- (US 17 Bypass) over -Y3- (NC 58)							GROUND WTR (ft)									
BORING NO. EB1-A SBL		STATION 319+51		OFFSET 68 ft LT		ALIGNMENT -L-	0 HR. N/A									
COLLAR ELEV. 27.0 ft		TOTAL DEPTH 65.4 ft		NORTHING 459,312		EASTING 2,529,090	24 HR. 3.7									
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 80.5% 12/26/2013				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 02/05/14		COMP. DATE 02/05/14		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						
30	27.0	0.0	2	3	2									27.0	GROUND SURFACE	0.0
25	23.0	4.0	1	2	3									24.0	UNDIVIDED COASTAL PLAIN BROWN AND TAN SILT, MOIST	3.0
20	18.1	8.9	WOH	WOH	WOH									15.0	UNDIVIDED COASTAL PLAIN GRAY AND ORANGE CLAY, MOIST TO WET	12.0
15	13.1	13.9	5	5	3									15.0	UNDIVIDED COASTAL PLAIN GRAY SAND, SATURATED	12.0
10	8.1	18.9	6	12	14									0.0	COASTAL PLAIN GRAY AND BROWN SAND, SATURATED (RIVER BEND FORMATION)	27.0
5	3.1	23.9	9	14	17									0.0	COASTAL PLAIN GRAY AND BROWN SAND, SATURATED (RIVER BEND FORMATION)	27.0
0	-1.9	28.9	8	14	15									0.0	COASTAL PLAIN GRAY AND BROWN SAND, SATURATED (RIVER BEND FORMATION)	27.0
-5	-6.9	33.9	6	9	16									0.0	COASTAL PLAIN GRAY AND BROWN SAND, SATURATED (RIVER BEND FORMATION)	27.0
-10	-11.9	38.9	11	17	17									0.0	COASTAL PLAIN GRAY AND BROWN SAND, SATURATED (RIVER BEND FORMATION)	27.0
-15	-16.9	43.9	8	12	10									0.0	COASTAL PLAIN GRAY AND BROWN SAND, SATURATED (RIVER BEND FORMATION)	27.0
-20	-21.9	48.9	WOH	WOH	1									0.0	COASTAL PLAIN GRAY SAND WITH LIMESTONE FRAGMENTS, SATURATED (RIVER BEND FORMATION)	47.0
-25	-26.9	53.9	6	9	13									0.0	COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION)	52.0
-30	-31.9	58.9	10	43	57/0.4									0.0	COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION)	52.0
-35	-36.9	63.9	12	18	33									0.0	COASTAL PLAIN GRAY SAND WITH LIMESTONE FRAGMENTS, SATURATED (RIVER BEND FORMATION)	62.0
														0.0	COASTAL PLAIN GRAY SAND WITH LIMESTONE FRAGMENTS, SATURATED (RIVER BEND FORMATION)	65.4
															Boring Terminated at Elevation -38.4 ft in Very Dense Sand	
															Other Samples: ST-2 (5.5 - 7.5)	

NCDOT BORE DOUBLE R-2514D_GEO_BRDG_LOVRY3.GPJ NC_DOT_GDT 4/3/14



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5		TIP R-2514D		COUNTY JONES		GEOLOGIST Gemperline, J. D.										
SITE DESCRIPTION Bridge No. 96 on -L- (US 17 Bypass) over -Y3- (NC 58)								GROUND WTR (ft)								
BORING NO. EB1-B NBL		STATION 320+04		OFFSET 70 ft RT		ALIGNMENT -L-		0 HR. N/A								
COLLAR ELEV. 26.7 ft		TOTAL DEPTH 80.5 ft		NORTHING 459,313		EASTING 2,529,238		24 HR. 3.0								
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 80.5% 12/26/2013				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 02/05/14		COMP. DATE 02/06/14		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	ELEV. (ft)	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
30	26.7	0.0	1	2	2									26.7	0.0	GROUND SURFACE
25	22.7	4.0	1	2	1									23.7	3.0	UNDIVIDED COASTAL PLAIN BROWN CLAYEY SILT, MOIST
20	17.7	9.0	WOH	2	2									14.7	12.0	UNDIVIDED COASTAL PLAIN GRAY, BROWN AND ORANGE CLAY, WET
15	12.7	14.0		3	2	2								14.7	12.0	UNDIVIDED COASTAL PLAIN GRAY AND ORANGE SAND WITH WOOD FRAGMENTS, SATURATED
10	7.7	19.0		3	5	9								5.4	32.0	COASTAL PLAIN GRAY SAND, SATURATED (RIVER BEND FORMATION)
5	2.7	24.0		3	17	12								15.4	42.0	COASTAL PLAIN GRAY SANDY SILT WITH LIMESTONE FRAGMENTS, WET (RIVER BEND FORMATION)
0	-2.4	29.0		9	14	18								20.4	47.0	COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION)
-5	-7.4	34.0		8	17	29								25.4	52.0	COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION)
-10	-12.4	39.0		6	9	13								35.4	62.0	COASTAL PLAIN GRAY SAND, SATURATED (RIVER BEND FORMATION)
-15	-17.4	44.0		1	0	1								40.4	67.0	COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION)
-20	-22.4	49.0		1	1	1								45.4	72.0	COASTAL PLAIN GRAY SAND WITH LIMESTONE FRAGMENTS, SATURATED (RIVER BEND FORMATION)
-25	-27.4	54.0		6	10	11										
-30	-32.4	59.0		8	33	27										
-35	-37.4	64.0		20	27	31										
-40	-42.4	69.0		34	60/0.1											
-45	-47.4	74.0		14	20	24										
-50																

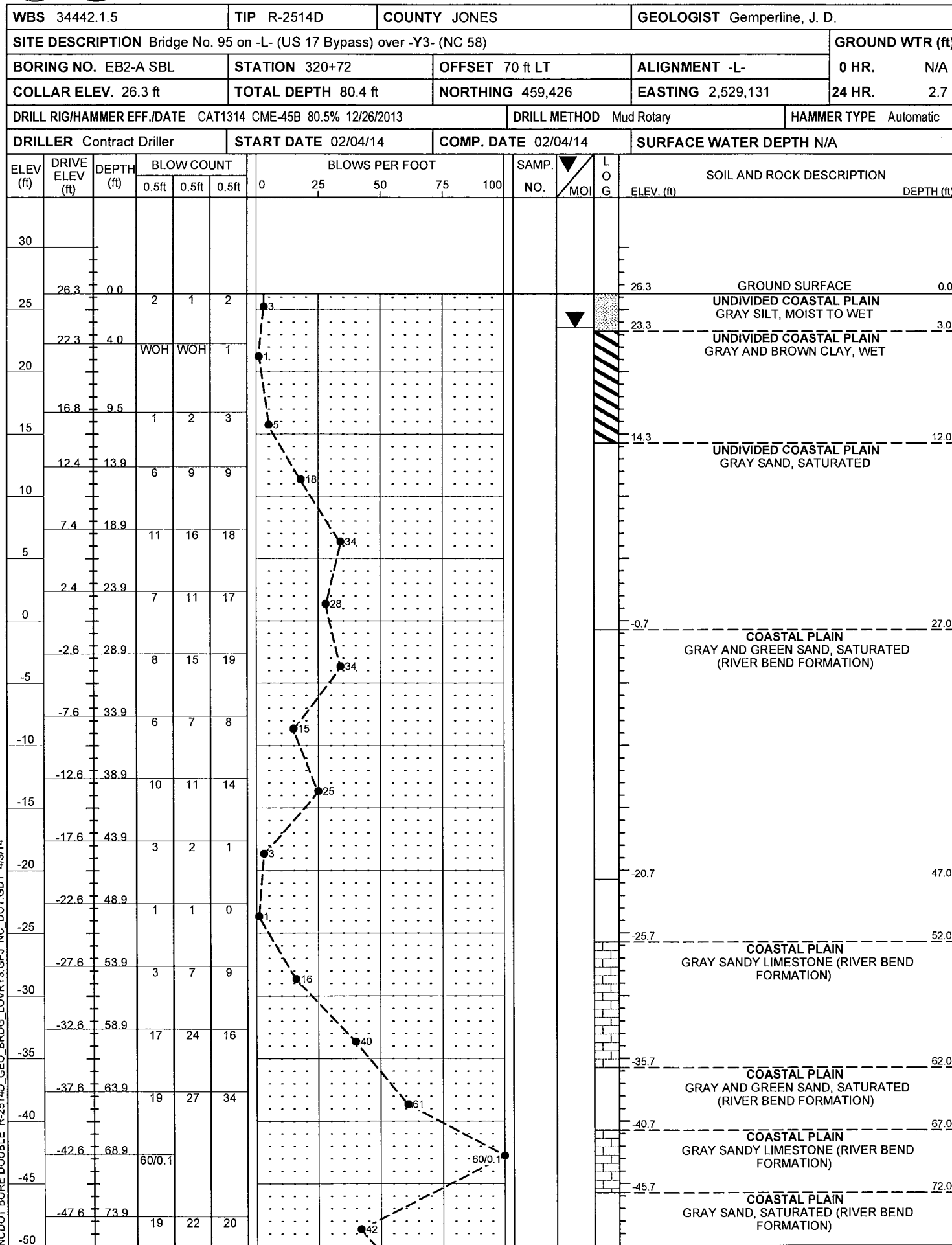
NCDOT BORE DOUBLE R-2514D_GEO_BRDG_LOVRY3.GPJ_NC_DOT_GDT_4/3/14

WBS 34442.1.5		TIP R-2514D		COUNTY JONES		GEOLOGIST Gemperline, J. D.										
SITE DESCRIPTION Bridge No. 96 on -L- (US 17 Bypass) over -Y3- (NC 58)								GROUND WTR (ft)								
BORING NO. EB1-B NBL		STATION 320+04		OFFSET 70 ft RT		ALIGNMENT -L-		0 HR. N/A								
COLLAR ELEV. 26.7 ft		TOTAL DEPTH 80.5 ft		NORTHING 459,313		EASTING 2,529,238		24 HR. 3.0								
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 80.5% 12/26/2013				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 02/05/14		COMP. DATE 02/06/14		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	ELEV. (ft)	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
-50	-52.4	79.0	17	20	33									-53.9	80.5	Boring Terminated at Elevation -53.9 ft in Very Dense Sand
																Other Samples: ST-3 (5.5 - 7.5)

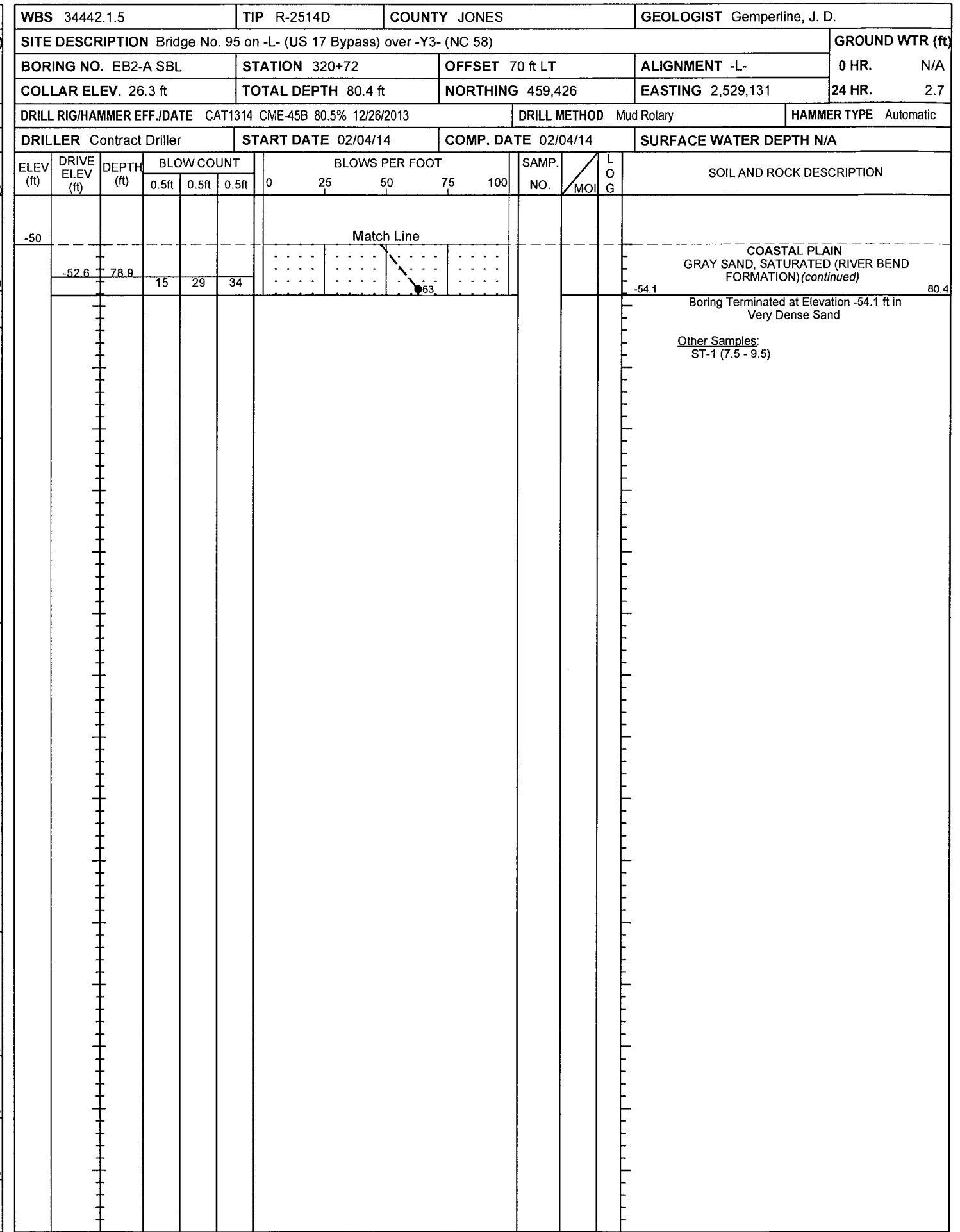


NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT



NCDOT BORE DOUBLE R-2514D_GEO_BRDG_LOVRY3.GPJ_NC_DOT_GDT_4/3/14



Match Line

COASTAL PLAIN
GRAY SAND, SATURATED (RIVER BEND
FORMATION)(continued)

Boring Terminated at Elevation -54.1 ft in
Very Dense Sand

Other Samples:
ST-1 (7.5 - 9.5)



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5		TIP R-2514D		COUNTY JONES		GEOLOGIST Wrike, C. M.										
SITE DESCRIPTION Bridge No. 96 on -L- (US 17 Bypass) over -Y3- (NC 58)							GROUND WTR (ft)									
BORING NO. EB2-B NBL		STATION 321+25		OFFSET 68 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 27.6 ft		TOTAL DEPTH 74.5 ft		NORTHING 459,427		EASTING 2,529,279										
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 10/14/13		COMP. DATE 10/14/13		SURFACE WATER DEPTH 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					ELEV. (ft)	
30	27.6	0.0	2	2	3									27.6	GROUND SURFACE	0.0
25	23.6	4.0	3	3	3									24.6	UNDIVIDED COASTAL PLAIN TAN AND BROWN CLAYEY SILT, MOIST	3.0
20	19.6	8.0	WOH			1	1							16.6	UNDIVIDED COASTAL PLAIN TAN AND ORANGE SILTY SANDY CLAY, MOIST TO WET	11.0
15	14.6	13.0	7	9	10									16.6	UNDIVIDED COASTAL PLAIN GRAY SAND, SATURATED	11.0
10	9.6	18.0	7	9	10											
5	4.6	23.0	8	11	12											
0	-0.4	28.0	8	9	11									1.6		26.0
-5	-5.4	33.0	6	8	10											
-10	-10.4	38.0	11	18	21									-8.4	COASTAL PLAIN GRAY AND GREEN SAND, SATURATED (RIVER BEND FORMATION)	36.0
-15	-15.4	43.0	4	4	3											
-20	-20.4	48.0	7	13	3									-18.4	COASTAL PLAIN GRAY SANDY SILT WITH LIMESTONE FRAGMENTS, WET (RIVER BEND FORMATION)	46.0
-25	-25.4	53.0	10	13	16									-23.4	COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION)	51.0
-30	-30.4	58.0	21	26	20											
-35	-35.4	63.0	20	26	24									-33.4	COASTAL PLAIN GRAY SAND, SATURATED (RIVER BEND FORMATION)	61.0
-40	-40.4	68.0	20	26	24									-39.4	COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION)	67.0
-45	-45.4	73.0	20	21	19									-46.9		74.5
															Boring Terminated at Elevation -46.9 ft in Dense Sand	

NCDOT BORE DOUBLE R-2514D_GEO_BRDG_LOVRY3.GPJ_NC_DOT_GDT_4/3/14

34442.5
R-2514D

BRIDGE NO. 95 AND NO. 96 ON L- (US 17 BYPASS) OVER Y3- (US 58) AT L- STA. 320+39.56

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.T.	P.I.	% BY WEIGHT				MOISTURE %	ORGANIC %		
							C.SAND	F.SAND	SILT	CLAY				
SS-25	70 RT	320+04	0.0-1.5	A-4(5)	27	6	0.6	12.5	62.7	24.2	100	100	94	-
SS-26	70 RT	320+04	9.0-10.5	A-7-(6)(35)	58	31	1.0	4.8	13.5	80.6	100	100	99	96
SS-27	70 RT	320+04	14.0-15.5	A-3(0)	16	NP	10.9	86.7	2.4	0.0	100	100	4	-
SS-28	70 RT	320+04	24.0-25.5	A-3(0)	55	NP	86.0	11.5	0.5	2.0	100	100	51	3
SS-29	70 RT	320+04	34.0-35.5	A-3(0)	17	NP	59.8	36.0	2.2	2.0	95	87	5	-
SS-30	70 RT	320+04	44.0-45.5	A-2-4(0)	25	NP	6.9	72.0	15.1	6.0	99	97	31	-
SS-31	70 RT	320+04	49.0-50.5	A-4(0)	20	NP	16.3	48.2	25.4	10.1	90	84	37	-
SS-32	70 RT	320+04	59.0-60.5	A-1-0(0)	16	NP	71.8	16.3	7.9	4.0	43	16	6	-
SS-33	70 RT	320+04	69.0-69.6	A-1-0(0)	17	NP	54.2	29.0	12.7	4.0	43	24	9	-
SS-34	70 RT	320+04	79.0-80.5	A-2-4(0)	22	NP	6.7	82.5	4.8	6.0	96	93	16	-

EB1-B NBL SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.T.	P.I.	% BY WEIGHT				MOISTURE %	ORGANIC %		
							C.SAND	F.SAND	SILT	CLAY				
SS-1	68 RT	321+25	0.0-1.5	A-4(1)	25	2	0.6	16.3	62.9	20.1	100	100	93	-
SS-2	68 RT	321+25	4.0-5.5	A-6(13)	36	17	0.2	35.6	27.9	36.3	100	100	82	-
SS-3	68 RT	321+25	13.0-14.5	A-2-4(0)	25	NP	1.8	87.5	5.6	5.0	100	100	21	-
SS-4	68 RT	321+25	28.0-29.5	A-3(0)	16	NP	62.3	32.5	2.1	3.0	100	86	7	-
SS-5	68 RT	321+25	38.0-39.5	A-3(0)	20	NP	58.1	38.6	1.3	2.0	100	93	4	-
SS-6	68 RT	321+25	48.0-49.5	A-4(0)	21	NP	7.5	52.4	24.1	16.1	100	98	48	-
SS-7	68 RT	321+25	53.0-54.5	A-1-b(0)	20	NP	46.7	36.0	12.3	5.0	67	44	14	-
SS-8	68 RT	321+25	63.0-64.5	A-2-4(0)	25	NP	4.6	86.6	4.7	4.0	100	98	12	-
SS-9	68 RT	321+25	68.0-68.4		-	-	56.0	21.8	10.2	12.1	38	21	10	-

EB2-B NBL SOIL TEST RESULTS

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34442.1.5 (R-2514D) F.A. PROJ. NHF-17(7)

COUNTY JONES

PROJECT DESCRIPTION US 17 FROM SOUTH OF NC 58 TO THE
NEW BERN BYPASS

SITE DESCRIPTION BRIDGE NO. 97 AND NO. 98 ON -L- (US 17
BYPASS) OVER -Y4- (SR 1337) AT -L- STA. 363+38.90

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	PROFILES
6-7	CROSS SECTIONS
8-9	BORE LOGS
10	SOIL TEST RESULTS

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 UN-PLACED TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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
C.M. WRIKE

R.E. SMITH

D.G. PINTER

INVESTIGATED BY **T.C. BOTTOMS**

CHECKED BY **D.N. ARGENBRIGHT**

SUBMITTED BY **D.N. ARGENBRIGHT**

DATE **DECEMBER 2013**



ID: R-2514D

PROJECT: 34442.1.5

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 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

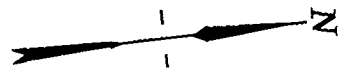
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R-2514D

SHEET NO.

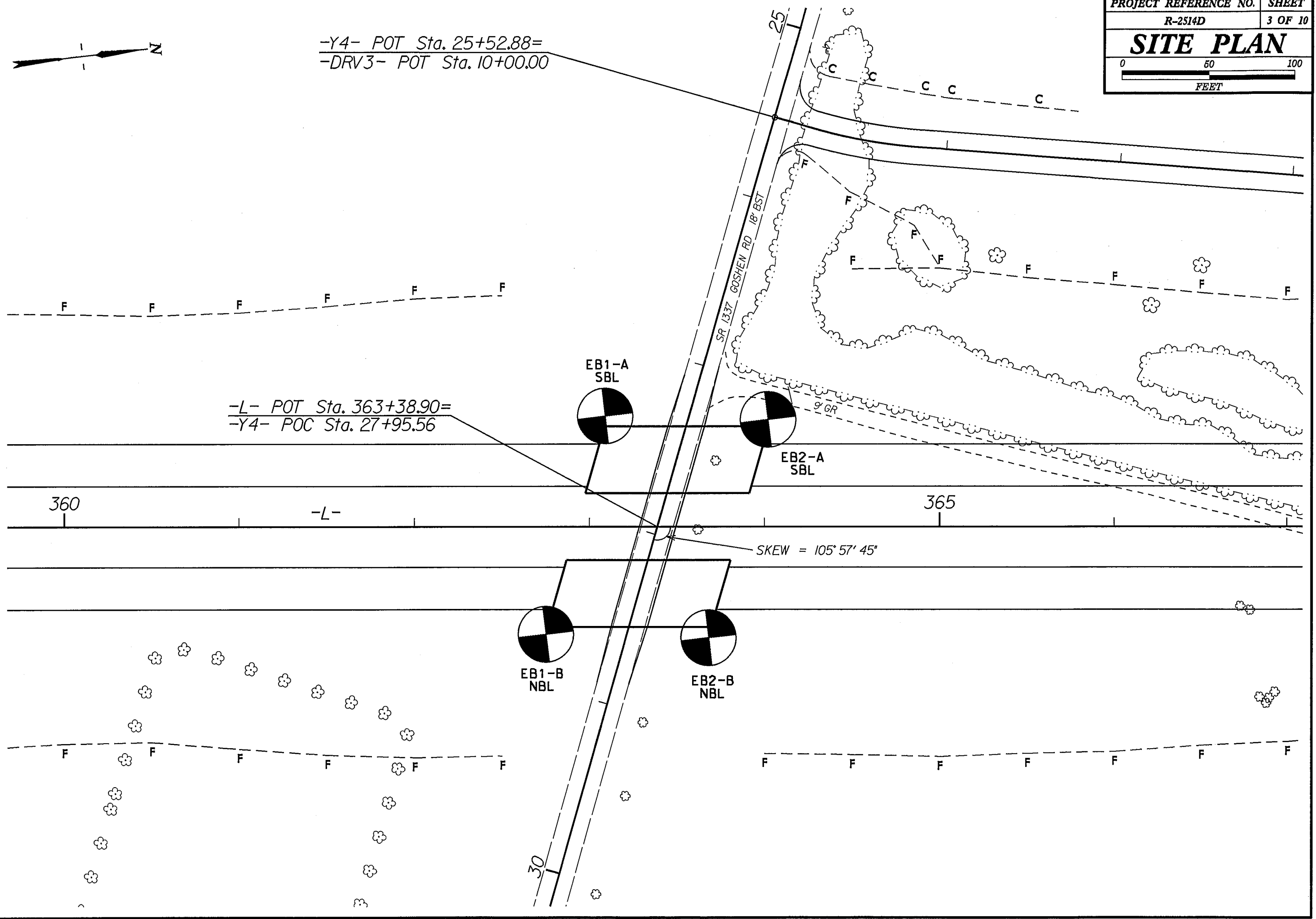
2 OF 10

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-7-5</i>	WELL-GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED. MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE. COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50 PERCENTAGE OF MATERIAL ORGANIC MATERIAL GRANULAR SILT - CLAY OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP MISCELLANEOUS SYMBOLS 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 TEST BORING W/ CORE SPT N-VALUE SPT REFUSAL AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CORE PENETROMETER TEST SOUNDING ROD	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 PHYLITE, 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. WEATHERING FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SLT.) 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 (SLT.) 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 "CLUNKY" SOUND WHEN STRUCK. 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. 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. 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. ROCK HARDNESS VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE 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. 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. 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. BENCH MARK: _____ ELEVATION: _____ FT. NOTES:																																																																																																												
<p>SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <thead> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="4">GRANULAR MATERIALS (< 35% PASSING #200)</th> <th colspan="4">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-2-7</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-4, A-5</th> <th>A-6, A-7</th> </tr> </thead> <tbody> <tr> <td>GROUP CLASS.</td> <td>A-1-a</td> <td>A-1-b</td> <td>A-2-4</td> <td>A-2-5</td> <td>A-2-6</td> <td>A-2-7</td> <td>A-7-5</td> <td>A-7-6</td> <td>A-7-7</td> <td>A-7-8</td> <td>A-7-9</td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> </tr> <tr> <td>LIQUID LIMIT PLASTIC INDEX</td> <td>6</td> <td>NP</td> <td>40</td> <td>41</td> <td>40</td> <td>41</td> <td>40</td> <td>41</td> <td>40</td> <td>41</td> <td>40</td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> <td>0</td> <td>0</td> <td>4</td> <td>0</td> <td>8</td> <td>12</td> <td>16</td> <td>0</td> <td>8</td> <td>12</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS. GRAVEL AND SAND</td> <td>FINE SAND</td> <td>SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS</td> <td>CLAYEY SOILS</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> </tr> <tr> <td>GEN. RATING AS A SUBGRADE</td> <td colspan="3">EXCELLENT TO GOOD</td> <td colspan="3">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td>UNSATURABLE</td> <td colspan="2"></td> </tr> </tbody> </table> <p>P1 OF A-7-5 SUBGROUP IS ≤ LL - 30 ; P1 OF A-7-6 SUBGROUP IS > LL - 30</p>				GENERAL CLASS.	GRANULAR MATERIALS (< 35% PASSING #200)				SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS			A-1	A-3	A-2	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-6, A-7	GROUP CLASS.	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-7-5	A-7-6	A-7-7	A-7-8	A-7-9	SYMBOL												% PASSING	10	10	10	10	10	10	10	10	10	10	10	LIQUID LIMIT PLASTIC INDEX	6	NP	40	41	40	41	40	41	40	41	40	GROUP INDEX	0	0	0	4	0	8	12	16	0	8	12	USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD			FAIR TO POOR			FAIR TO POOR	POOR	UNSATURABLE		
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-Y4- POT Sta. 25+52.88=
 -DRV3- POT Sta. 10+00.00

-L- POT Sta. 363+38.90=
 -Y4- POC Sta. 27+95.56

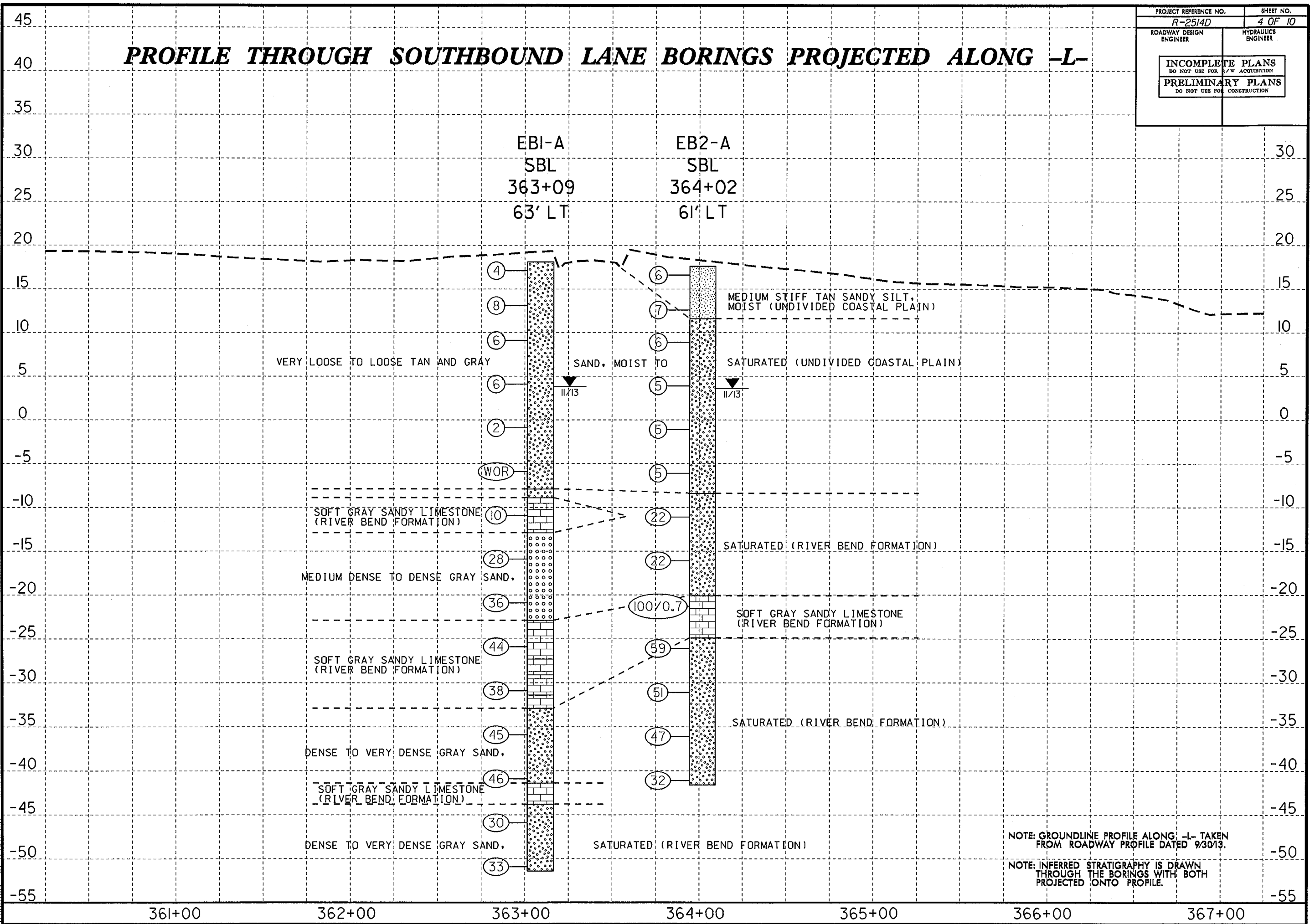


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PROJECT REFERENCE NO. R-2514D	SHEET NO. 4 OF 10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PROFILE THROUGH SOUTHBOUND LANE BORINGS PROJECTED ALONG -L-

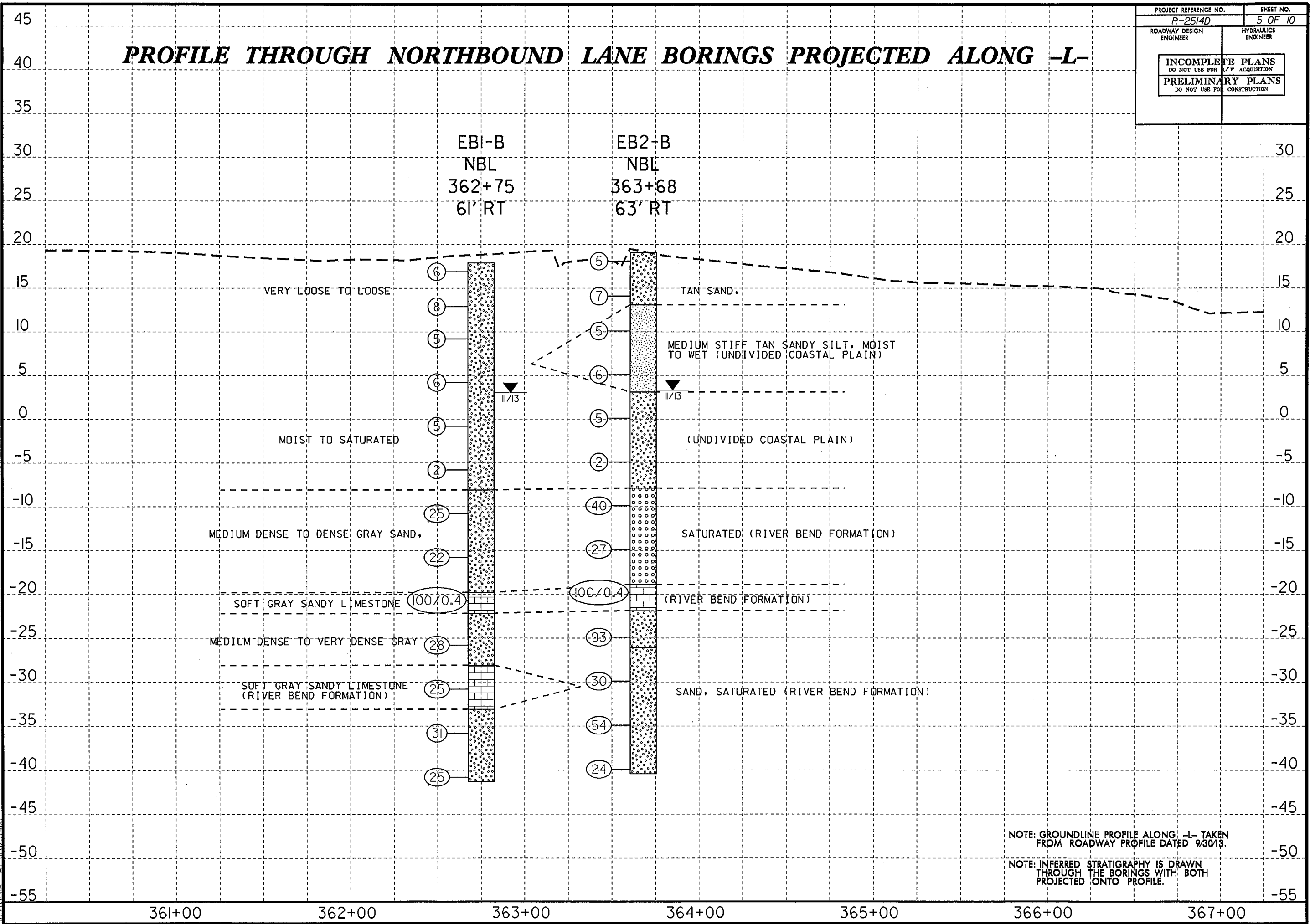


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 5/14/99

PROJECT REFERENCE NO. <i>R-2514D</i>	SHEET NO. <i>5 OF 10</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

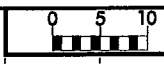
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NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM ROADWAY PROFILE DATED 9/30/13.

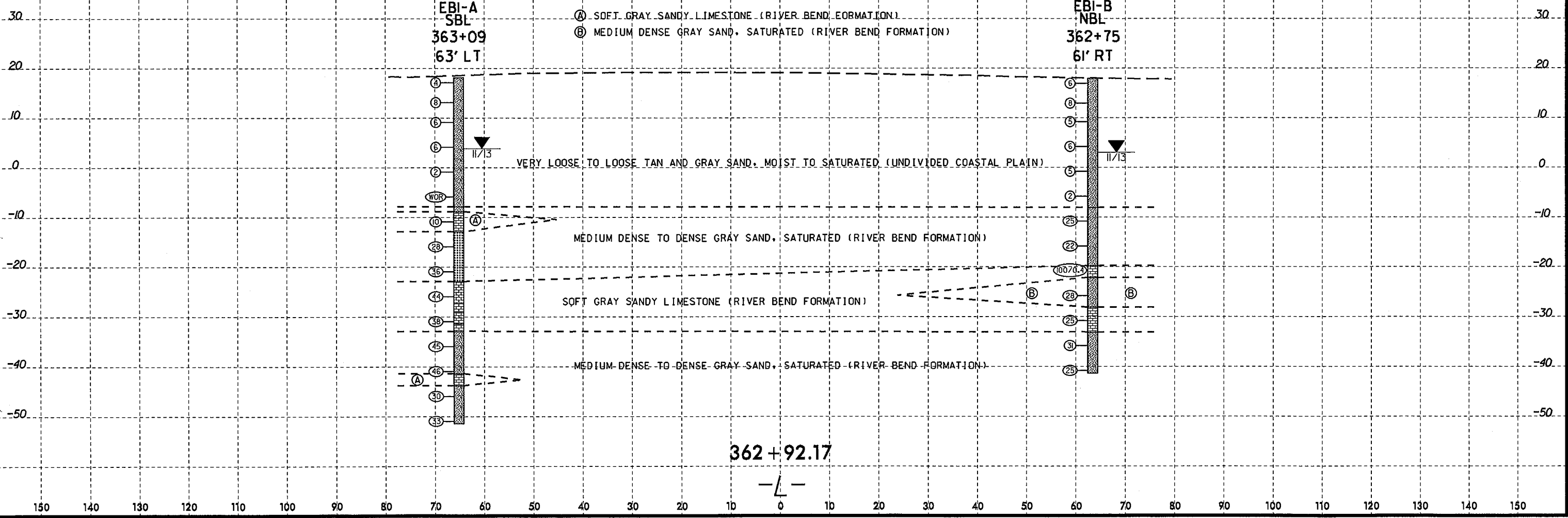
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.

8/23/99



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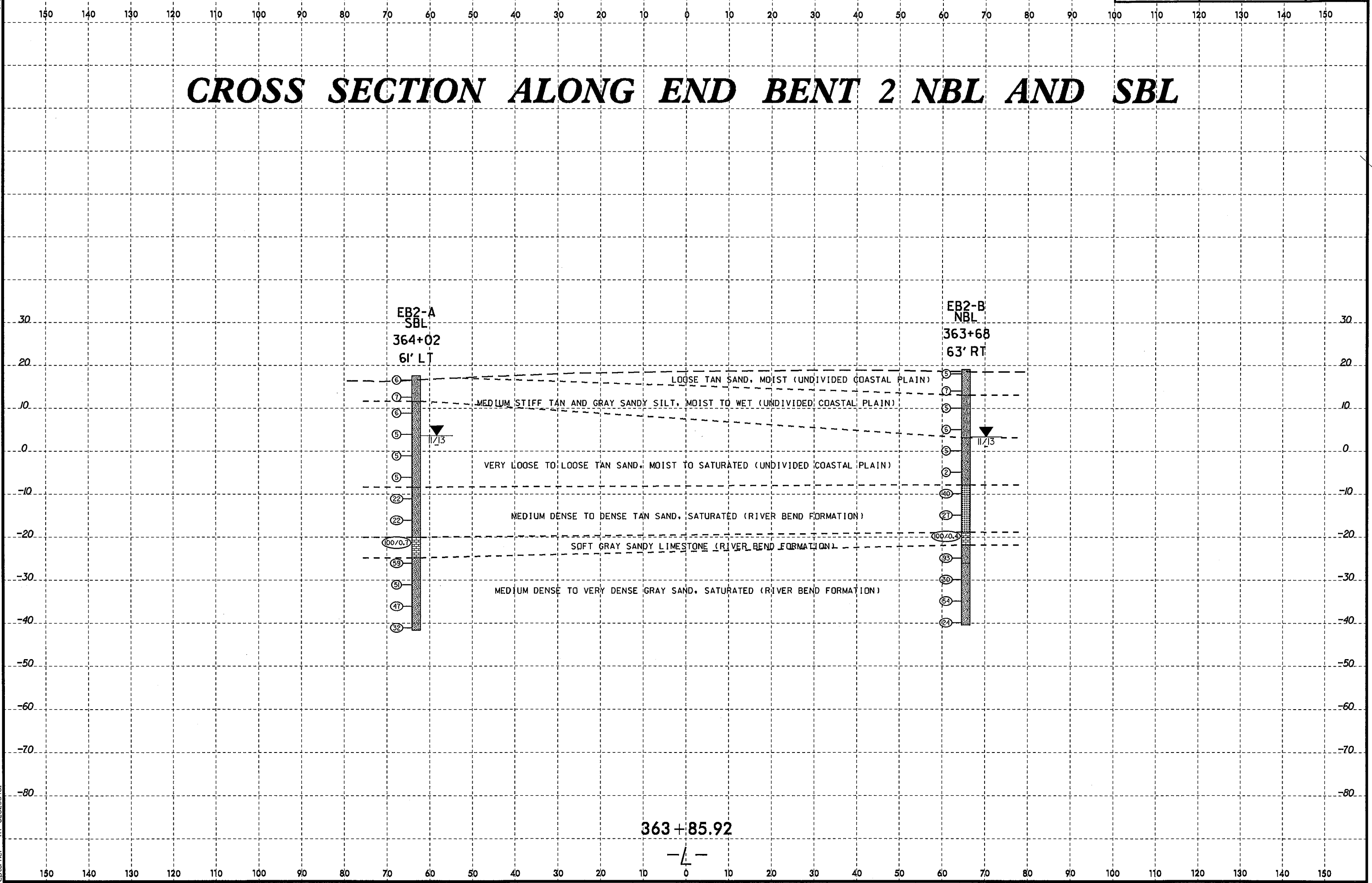
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CROSS SECTION ALONG END BENT 2 NBL AND SBL

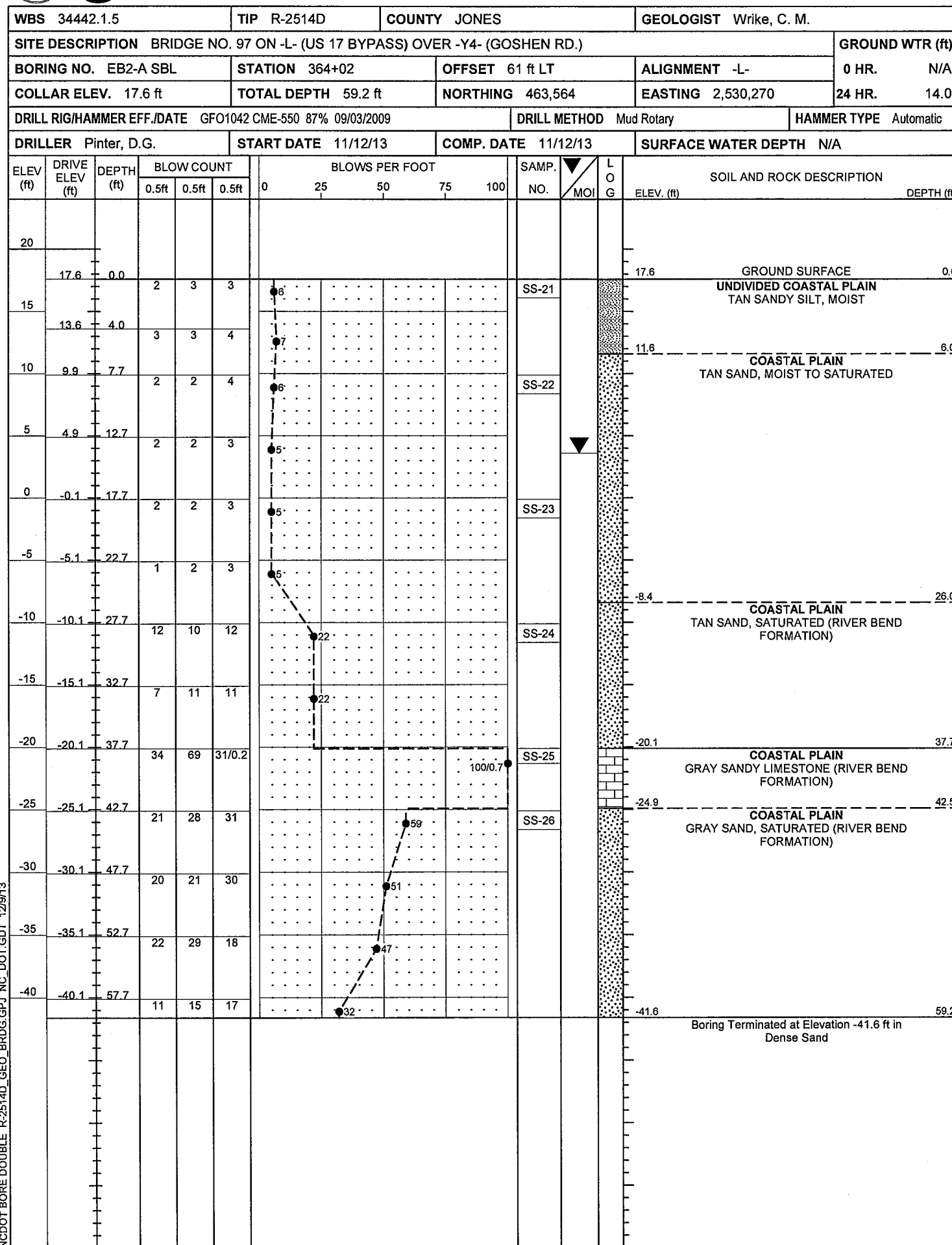




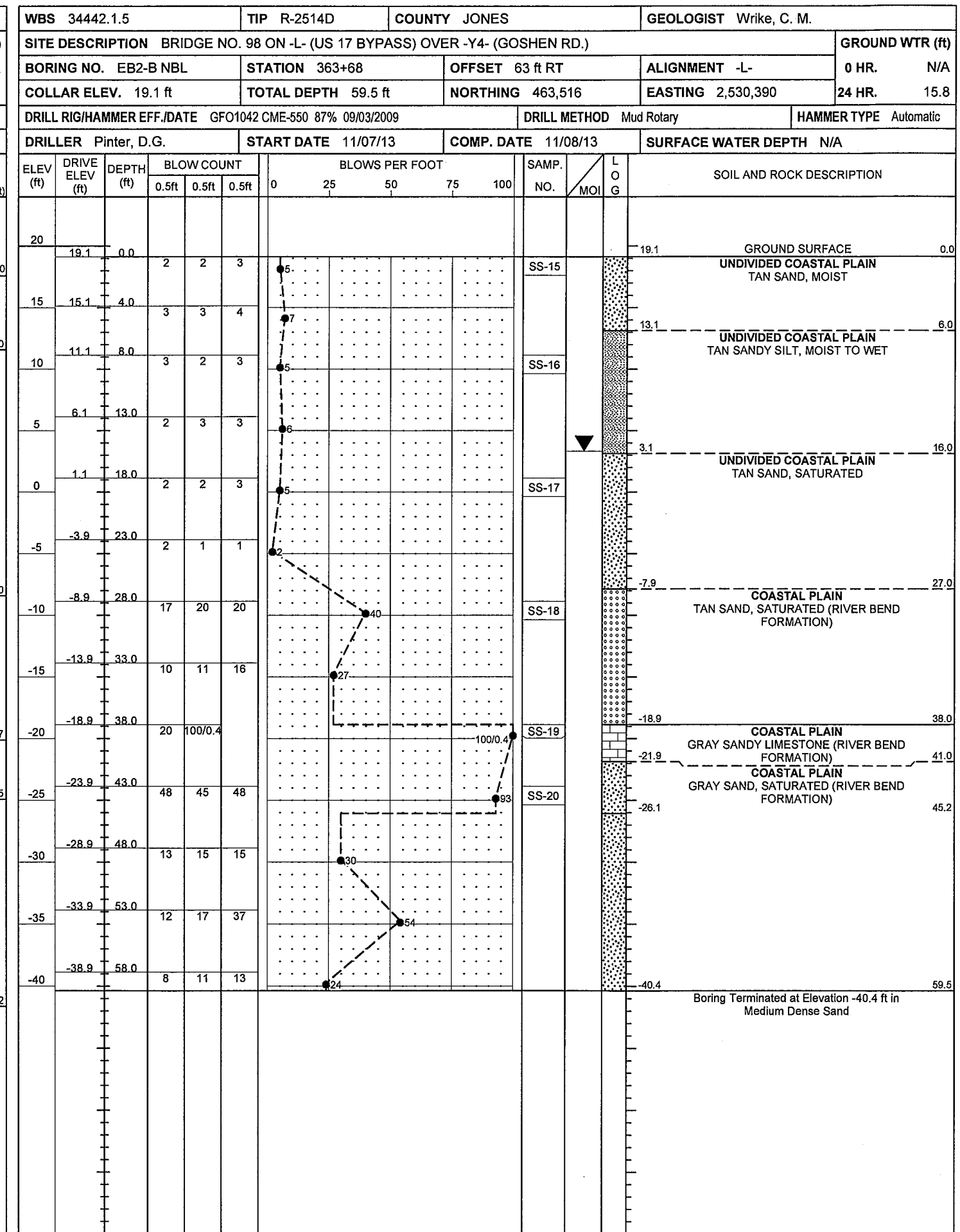
WBS 34442.1.5		TIP R-2514D		COUNTY JONES		GEOLOGIST Wrike, C. M.										
SITE DESCRIPTION BRIDGE NO. 97 ON -L- (US 17 BYPASS) OVER -Y4- (GOSHEN RD.)							GROUND WTR (ft)									
BORING NO. EB1-A SBL		STATION 363+09		OFFSET 63 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 18.1 ft		TOTAL DEPTH 69.5 ft		NORTHING 463,472		EASTING 2,530,257										
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 11/06/13		COMP. DATE 11/06/13		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						
20	18.1	0.0	3	2	2									18.1	GROUND SURFACE	0.0
15	14.1	4.0	3	3	5										UNDIVIDED COASTAL PLAIN TAN AND GRAY SAND, MOIST TO SATURATED	
10	10.1	8.0	2	3	3											
5	5.1	13.0	2	3	3											
0	0.1	18.0	1	1	1											
-5	-4.9	23.0	WOR	WOR	WOR											
-10	-9.9	28.0	3	4	6									-7.9	COASTAL PLAIN GRAY SAND, SATURATED (RIVER BEND FORMATION)	26.0
-15	-14.9	33.0	7	12	16									-8.9	COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION)	27.0
-20	-19.9	38.0	12	16	20									-12.9	COASTAL PLAIN GRAY SAND, SATURATED (RIVER BEND FORMATION)	31.0
-25	-24.9	43.0	13	18	26									-22.9	COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION)	41.0
-30	-29.9	48.0	16	25	13									-27.3	COASTAL PLAIN GRAY SAND, SATURATED (RIVER BEND FORMATION)	45.4
-35	-34.9	53.0	16	23	22									-29.1	COASTAL PLAIN GRAY SAND, SATURATED (RIVER BEND FORMATION)	47.2
-40	-39.9	58.0	18	27	19									-31.4	COASTAL PLAIN GRAY SAND, SATURATED (RIVER BEND FORMATION)	49.5
-45	-44.9	63.0	10	18	12									-32.9	COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION)	51.0
-50	-49.9	68.0	16	21	12									-41.4	COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION)	59.5
														-43.8	COASTAL PLAIN GRAY SAND, SATURATED (RIVER BEND FORMATION)	61.9
														-51.4	Boring Terminated at Elevation -51.4 ft in Dense Sand	69.5

WBS 34442.1.5		TIP R-2514D		COUNTY JONES		GEOLOGIST Wrike, C. M.										
SITE DESCRIPTION BRIDGE NO. 98 ON -L- (US 17 BYPASS) OVER -Y4- (GOSHEN RD.)							GROUND WTR (ft)									
BORING NO. EB1-B NBL		STATION 362+75		OFFSET 61 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 17.9 ft		TOTAL DEPTH 59.2 ft		NORTHING 463,424		EASTING 2,530,377										
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 11/07/13		COMP. DATE 11/07/13		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						
20	17.9	0.0	2	3	3									17.9	GROUND SURFACE	0.0
15	13.9	4.0	3	4	4										UNDIVIDED COASTAL PLAIN TAN SAND, MOIST TO SATURATED	
10	10.2	7.7	2	3	2											
5	5.2	12.7	3	3	3											
0	0.2	17.7	2	2	3											
-5	-4.8	22.7	2	1	1											
-10	-9.8	27.7	10	13	12									-8.1	COASTAL PLAIN GRAY SAND, SATURATED (RIVER BEND FORMATION)	26.0
-15	-14.8	32.7	11	12	10									-19.8	COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION)	37.7
-20	-19.8	37.7	13	100/0.4										-22.2	COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION)	40.1
-25	-24.8	42.7	11	13	15									-28.1	COASTAL PLAIN GRAY SAND, SATURATED (RIVER BEND FORMATION)	46.0
-30	-29.8	47.7	10	12	13									-33.1	COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION)	51.0
-35	-34.8	52.7	10	12	19									-41.3	COASTAL PLAIN GRAY SAND, SATURATED (RIVER BEND FORMATION)	59.2
-40	-39.8	57.7	10	12	13										Boring Terminated at Elevation -41.3 ft in Medium Dense Sand	

NCDOT BORE DOUBLE R-2514D_GEO_BRDG.GPJ_NC_DOT.GDT 12/9/13



NCDOT BORE DOUBLE R-2514D_GEO_BRDG.GPJ_NC_DOT.GDT 12/9/13



34442.1.5
R-2514D

BRIDGE NO. 97 AND NO. 98 ON -L- (US 17 BYPASS) OVER -Y4- (SR 1337) AT -L- STA. 363+38.90

EB1-A SBL SOIL TEST RESULTS

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-1	63 LT	363+09	0.0-1.5	A-2-4(0)	17	NP	4.9	83.4	3.6	8.1	100	99	15	-	-
SS-2	63 LT	363+09	8.0-9.5	A-2-4(0)	25	NP	1.3	82.9	6.7	9.1	100	100	31	-	-
SS-3	63 LT	363+09	18.0-19.5	A-2-4(0)	23	NP	11.2	82.5	2.2	4.0	100	99	11	-	-
SS-4	63 LT	363+09	28.0-29.5	A-1-b(0)	19	NP	52.5	28.9	14.6	4.0	55	31	12	-	-
SS-5	63 LT	363+09	33.0-34.5	A-3(0)	23	NP	2.6	90.1	4.2	3.0	100	99	10	-	-
SS-6	63 LT	363+09	43.0-44.5	A-2-4(0)	20	NP	23.8	61.4	10.8	4.0	67	55	14	-	-
SS-7	63 LT	363+09	53.0-54.5	A-2-4(0)	23	NP	9.0	82.8	4.1	4.0	100	97	16	-	-

EB1-B NBL SOIL TEST RESULTS

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-8	61 RT	362+75	0.0-1.5	A-2-4(0)	20	NP	4.7	77.9	11.3	6.1	100	99	24	-	-
SS-9	61 RT	362+75	7.7-9.2	A-2-4(0)	27	NP	0.8	82.2	6.9	10.1	100	100	33	-	-
SS-10	61 RT	362+75	17.7-19.2	A-2-4(0)	24	NP	29.2	56.5	3.2	11.1	100	95	19	-	-
SS-11	61 RT	362+75	27.7-29.2	A-2-4(0)	15	NP	7.0	79.7	9.3	4.0	94	91	16	-	-
SS-12	61 RT	362+75	37.7-38.6	A-1-b(0)	23	NP	25.8	60.9	7.2	6.1	61	49	10	-	-
SS-13	61 RT	362+75	42.7-44.2	A-2-5(0)	49	NP	8.3	81.9	3.7	6.1	96	93	13	-	-
SS-14	61 RT	362+75	47.7-49.2	A-1-a(0)	20	NP	47.2	34.7	10.0	8.1	48	29	10	-	-

EB2-A SBL SOIL TEST RESULTS

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-21	61 LT	364+02	0.0-1.5	A-4(0)	19	NP	4.0	70.2	15.7	10.1	100	99	36	-	-
SS-22	61 LT	364+02	7.7-9.2	A-2-4(0)	27	NP	1.0	81.9	9.1	8.1	100	100	34	-	-
SS-23	61 LT	364+02	17.7-19.2	A-2-4(0)	25	NP	7.3	85.1	3.6	4.0	100	100	11	-	-
SS-24	61 LT	364+02	27.7-29.2	A-2-4(0)	26	NP	4.4	85.3	6.2	4.0	100	99	15	-	-
SS-25	61 LT	364+02	37.7-38.9	A-1-a(0)	16	NP	65.1	20.4	8.5	6.0	39	17	7	-	-
SS-26	61 LT	364+02	42.7-44.2	A-2-4(0)	24	NP	14.1	75.4	6.5	4.0	100	95	15	-	-

EB2-B NBL SOIL TEST RESULTS

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-15	63 RT	363+68	0.0-1.5	A-2-4(0)	19	NP	3.2	72.4	14.3	10.1	100	99	32	-	-
SS-16	63 RT	363+68	8.0-9.5	A-4(0)	28	NP	1.0	79.2	11.7	8.1	96	96	37	-	-
SS-17	63 RT	363+68	18.0-19.5	A-2-4(0)	19	NP	1.2	86.3	6.5	6.0	92	92	15	-	-
SS-18	63 RT	363+68	28.0-29.5	A-3(0)	27	NP	3.8	87.9	4.2	4.0	57	56	7	-	-
SS-19	63 RT	363+68	38.0-38.9	A-2-4(0)	20	NP	51.0	37.9	5.0	6.0	100	56	13	-	-
SS-20	63 RT	363+68	43.0-44.5	A-2-4(0)	22	NP	7.7	81.0	7.3	4.0	93	90	16	-	-

PROJECT: 34442.1.5 ID: R-2514D

SHEET NO.:	CONTENTS:
01	TITLE SHEET
02	LEGEND
03	SITE PLAN
04-05	PROFILES
06-08	CROSS SECTIONS
09-21	BORE LOGS & CORE REPORTS
22	SITE PHOTOGRAPHS

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34442.1.5 (R-2514D)	01	22

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.

PROJ. REFERENCE NO.: 34442.1.5 F.A. PROJ. N/A

COUNTY: Jones

PROJECT DESCRIPTION: US 17 from North of NC 58 to the New Bern

Bypass

SITE DESCRIPTION: Dual Bridges on -L- over Goshen Branch

PERSONNEL:

COREY FUTRAL

CHARLES BRAKE

BENJAMIN J. ASHBA, LG

SEAN O'NEIL, PE

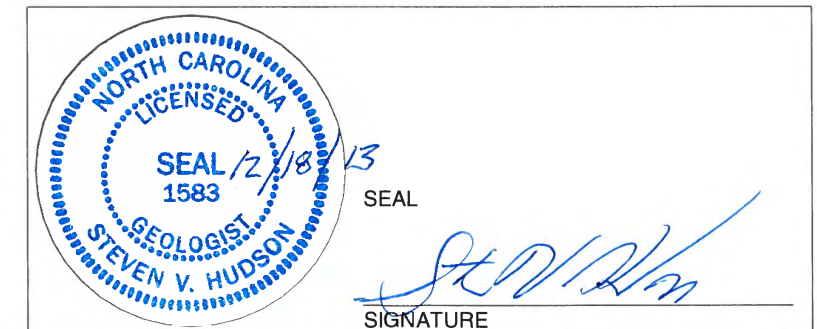
D. SEAN LEGGETT, RLS

INVESTIGATED BY: CATLIN ENGINEERS AND SCIENTISTS

CHECKED BY: STEVEN V. HUDSON, LG, CWD

SUBMITTED BY: STEVEN V. HUDSON, P.G., CWD

DATE: December, 2013



DRAWN BY: STEVEN V. HUDSON, LG, CWD

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.

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS



ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-2514D	34442.1.5	02	22

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																																																																																																																									
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>	<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p>ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>	<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 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 AS FOLLOWS:</p>	<p>ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. HYDRAULIC PUSH (HP) - ADVANCEMENT OF SAMPLING TOOLS UTILIZING MECHANICAL/HYDRAULIC DOWN-FORCE OF DRILLING MACHINE. 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 (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR 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 (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																																									
<p>SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="7">GRANULAR MATERIALS (< 35% PASSING #200)</th> <th colspan="7">SILT-CLAY MATERIALS (>35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th> <th>A-3</th> <th colspan="2">A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2, A-3</th> <th>A-4, A-5, A-6, A-7</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1-a</td> <td>A-1-b</td> <td>A-2-4</td> <td>A-2-5</td> <td>A-2-6</td> <td>A-2-7</td> <td>A-4</td> <td>A-5</td> <td>A-6</td> <td>A-7</td> <td>A-1, A-2, A-3</td> <td>A-4, A-5, A-6, A-7</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING</td> <td>10 30 50 75 100</td> <td>10 30 50 75 100</td> <td>10 30 50 75 100</td> <td>10 30 50 75 100</td> <td>10 30 50 75 100</td> <td>10 30 50 75 100</td> <td>10 30 50 75 100</td> <td>10 30 50 75 100</td> <td>10 30 50 75 100</td> <td>10 30 50 75 100</td> <td>10 30 50 75 100</td> <td>10 30 50 75 100</td> <td>10 30 50 75 100</td> <td>10 30 50 75 100</td> <td>10 30 50 75 100</td> <td>10 30 50 75 100</td> <td>10 30 50 75 100</td> </tr> <tr> <td>LIQUID LIMIT PLASTIC INDEX</td> <td>6 MX</td> <td>N.P.</td> <td>40 MX</td> <td>41 MX</td> <td>40 MX</td> <td>41 MX</td> <td>40 MX</td> <td>41 MX</td> <td>40 MX</td> <td>41 MX</td> <td>40 MX</td> <td>41 MX</td> <td>40 MX</td> <td>41 MX</td> <td>40 MX</td> <td>41 MX</td> <td>40 MX</td> <td>41 MX</td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS GRAVEL AND SAND</td> <td>FINE SAND</td> <td colspan="4">SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS</td> <td>CLAYEY SOILS</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GEN. 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ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p>COMPRESSIBILITY SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE</p> <p>PERCENTAGE OF MATERIAL</p> <table border="1"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT-CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY</td> </tr> </table>	ORGANIC MATERIAL	GRANULAR SOILS	SILT-CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	HIGHLY	<p>WEATHERING FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V. SLI.) 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 (SLI.) 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. SEVERE (SEV.) ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. 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. 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.</p>	<p>WEATHERING WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES >100 BLOWS PER FOOT CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTARY ROCK (CP) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>
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<p>GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA SPRING OR SEEPAGE</p> <p>MISCELLANEOUS SYMBOLS</p> <p> ROADWAY EMBANKMENT WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS INFERRERD SOIL BOUNDARIES INFERRERD ROCK LINE ALLUVIAL SOIL BOUNDARY DIP/DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD</p> <p> TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST</p>	<p>ROCK HARDNESS VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.</p>	<p>FRACTURE SPACING</p> <table border="1"> <tr> <th>TERM</th> <th>SPACING</th> </tr> <tr> <td>VERY WIDE</td> <td>> 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 3 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>< 0.16 FEET</td> </tr> </table> <p>BEDDING</p> <table border="1"> <tr> <th>TERM</th> <th>SPACING</th> </tr> <tr> <td>VERY THICKLY BEDDED</td> <td>> 4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table>	TERM	SPACING	VERY WIDE	> 10 FEET	WIDE	3 TO 10 FEET	MODERATELY CLOSE	1 TO 3 FEET	CLOSE	0.16 TO 3 FEET	VERY CLOSE	< 0.16 FEET	TERM	SPACING	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																																																																																																																																																																
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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.</p>																																																																																								
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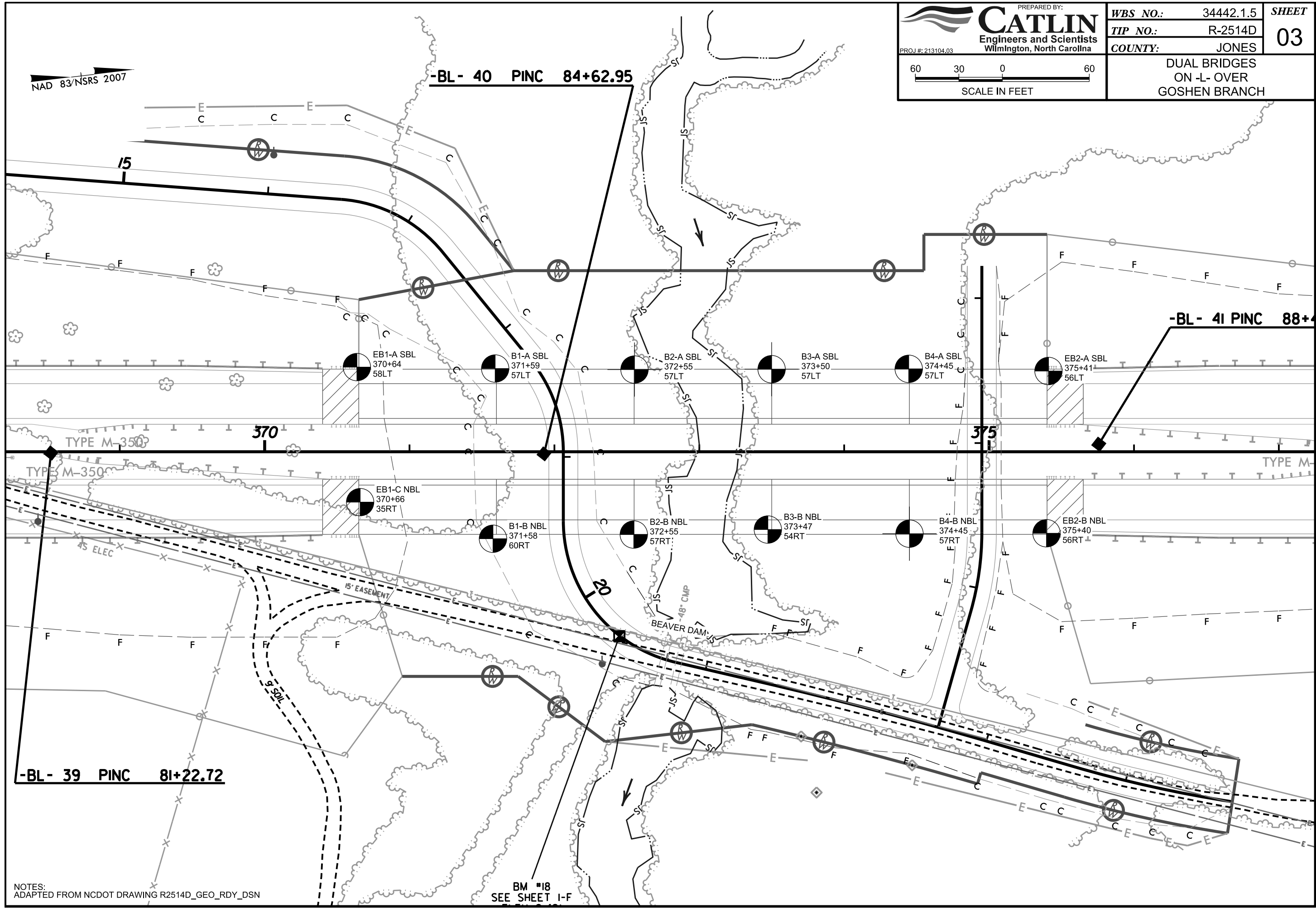
NAD 83/NSRS 2007

PREPARED BY:
CATLIN
 Engineers and Scientists
 Wilmington, North Carolina

WBS NO.:	34442.1.5	SHEET
TIP NO.:	R-2514D	03
COUNTY:	JONES	



DUAL BRIDGES
 ON -L- OVER
 GOSHEN BRANCH

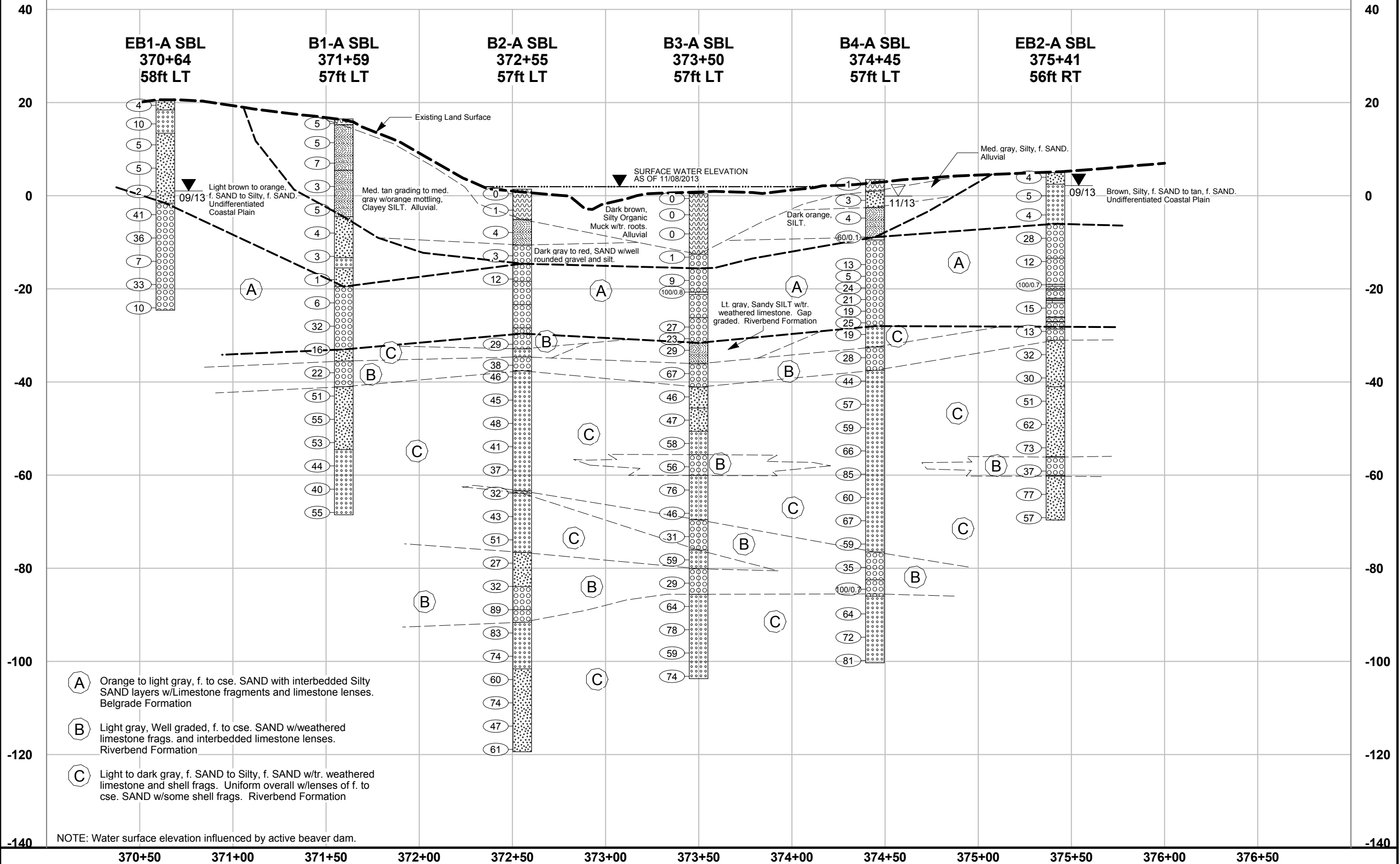


NOTES:
 ADAPTED FROM NCDOT DRAWING R2514D_GEO_RDY_DSN

BM #18
 SEE SHEET I-F

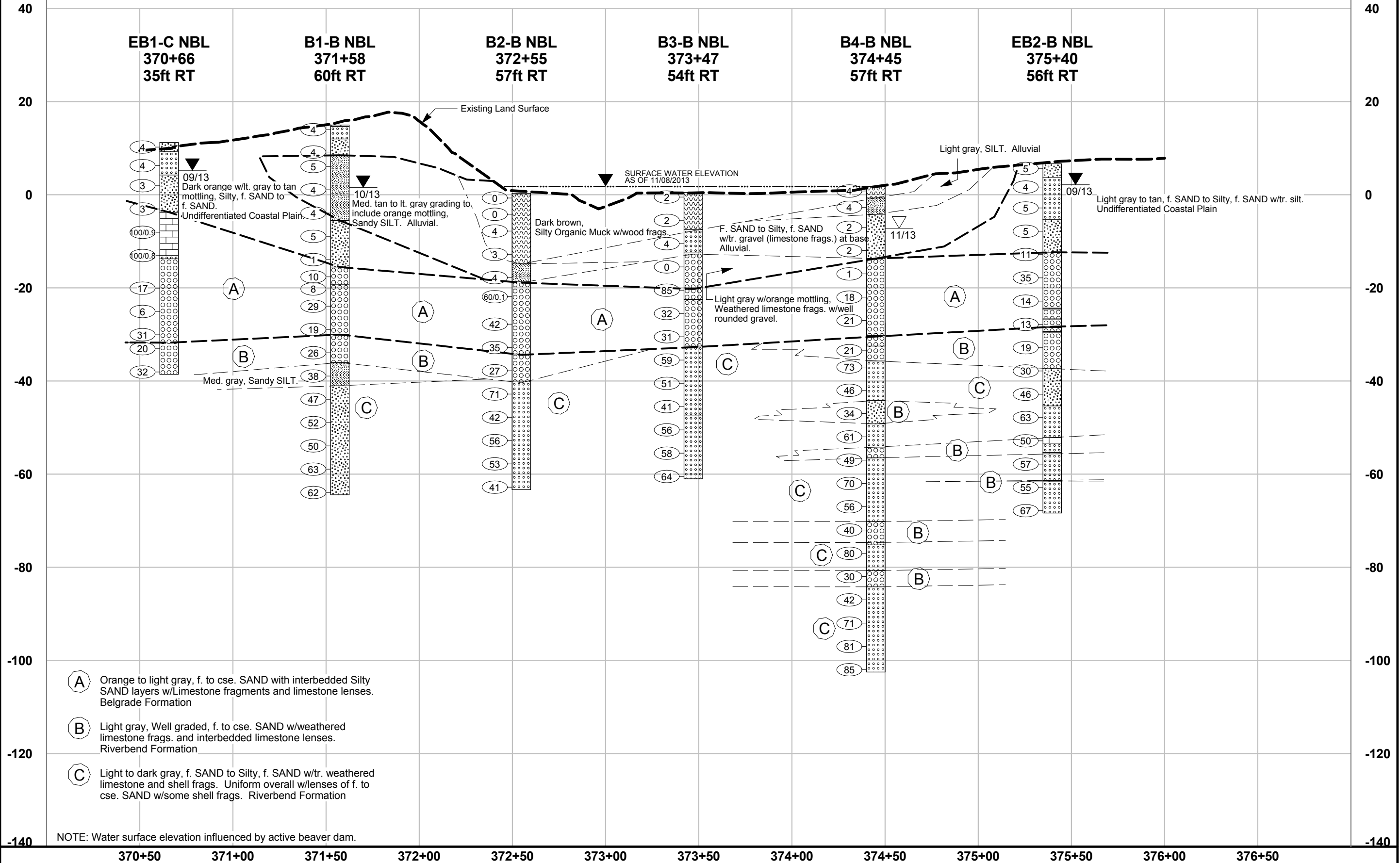
PROFILE SOUTH BOUND LANE 57 FEET LEFT OF -L-

V.E. = 2.5



PROFILE NORTH BOUND LANE 57 FEET RIGHT OF -L-

V.E. = 2.5

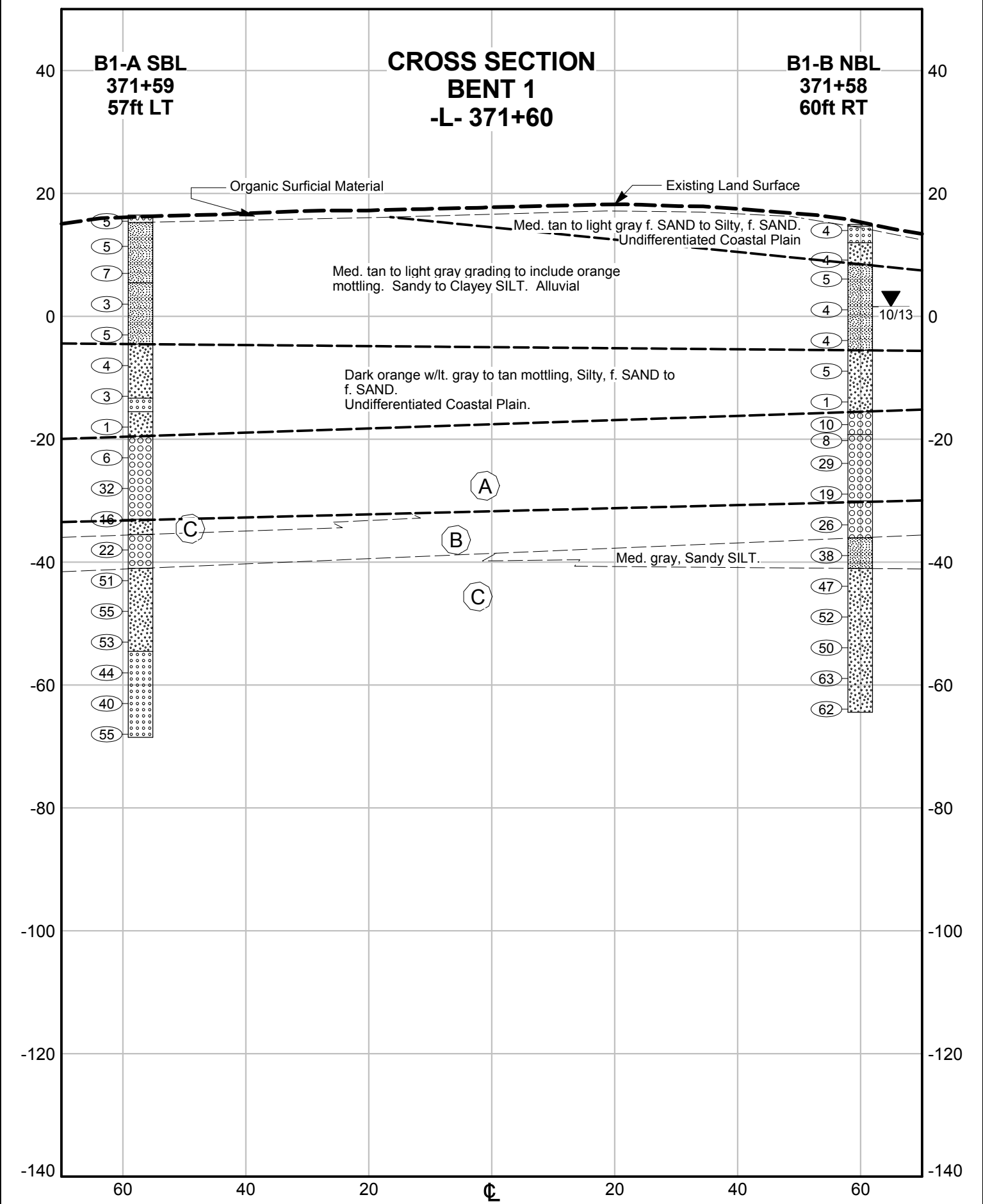
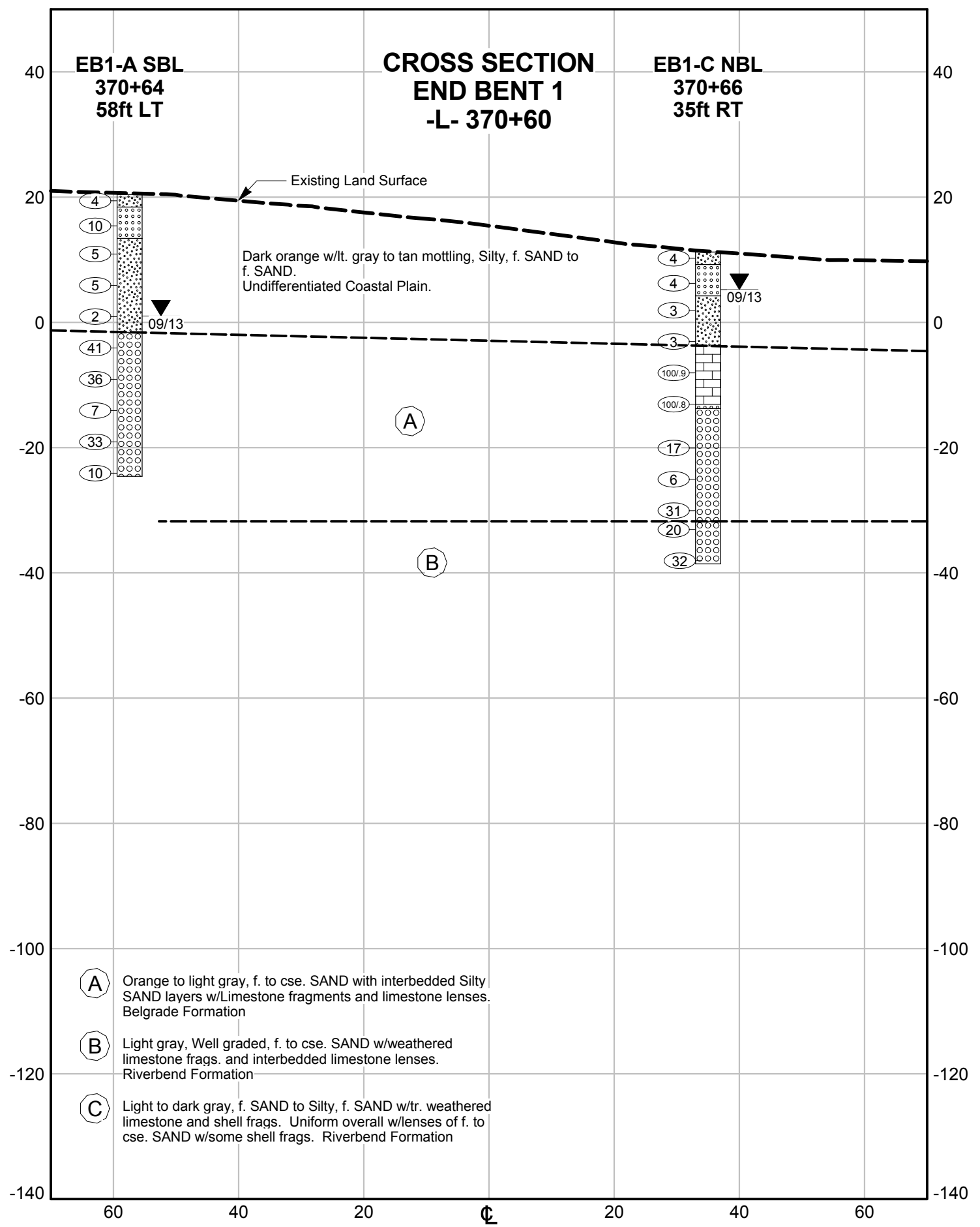


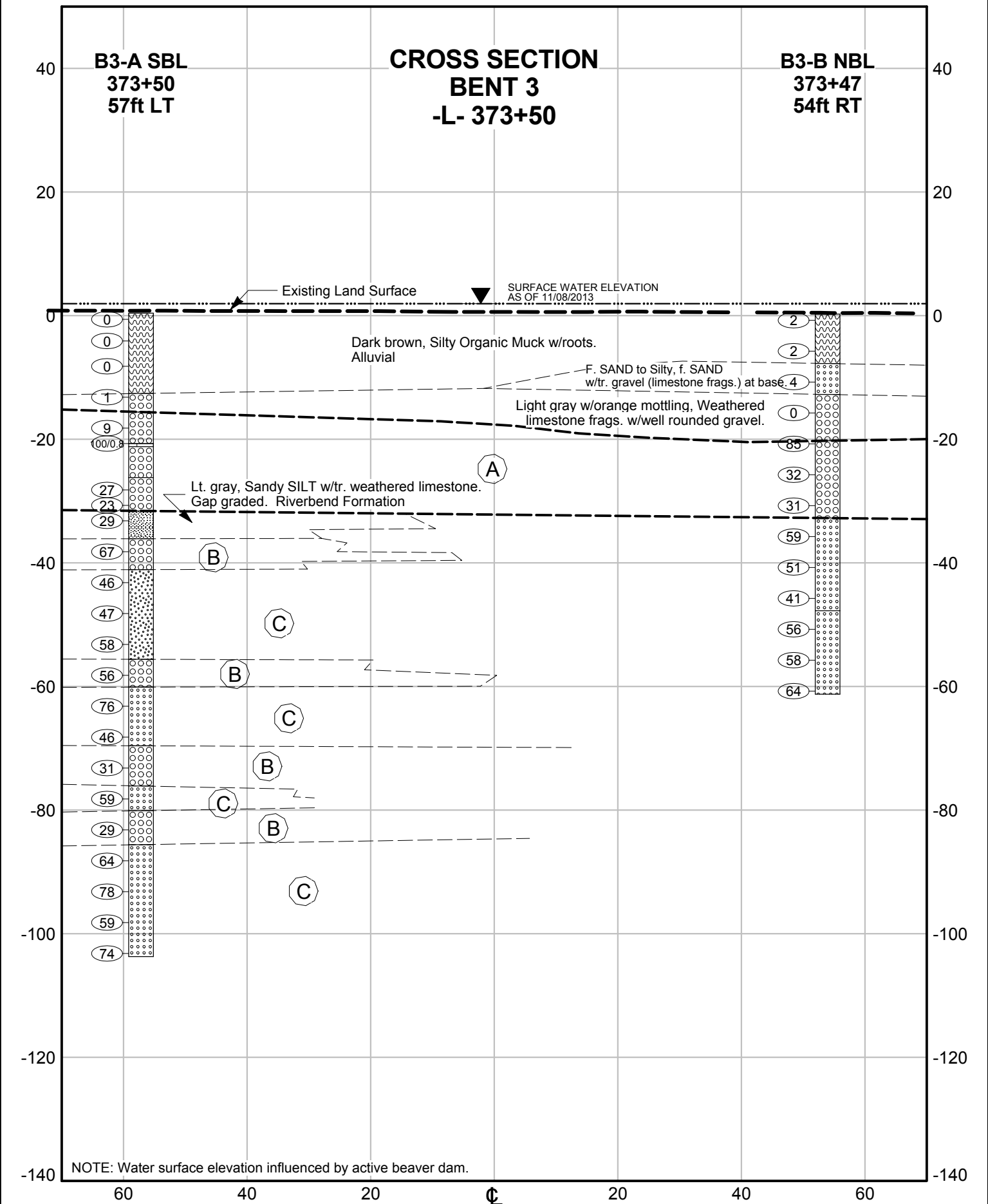
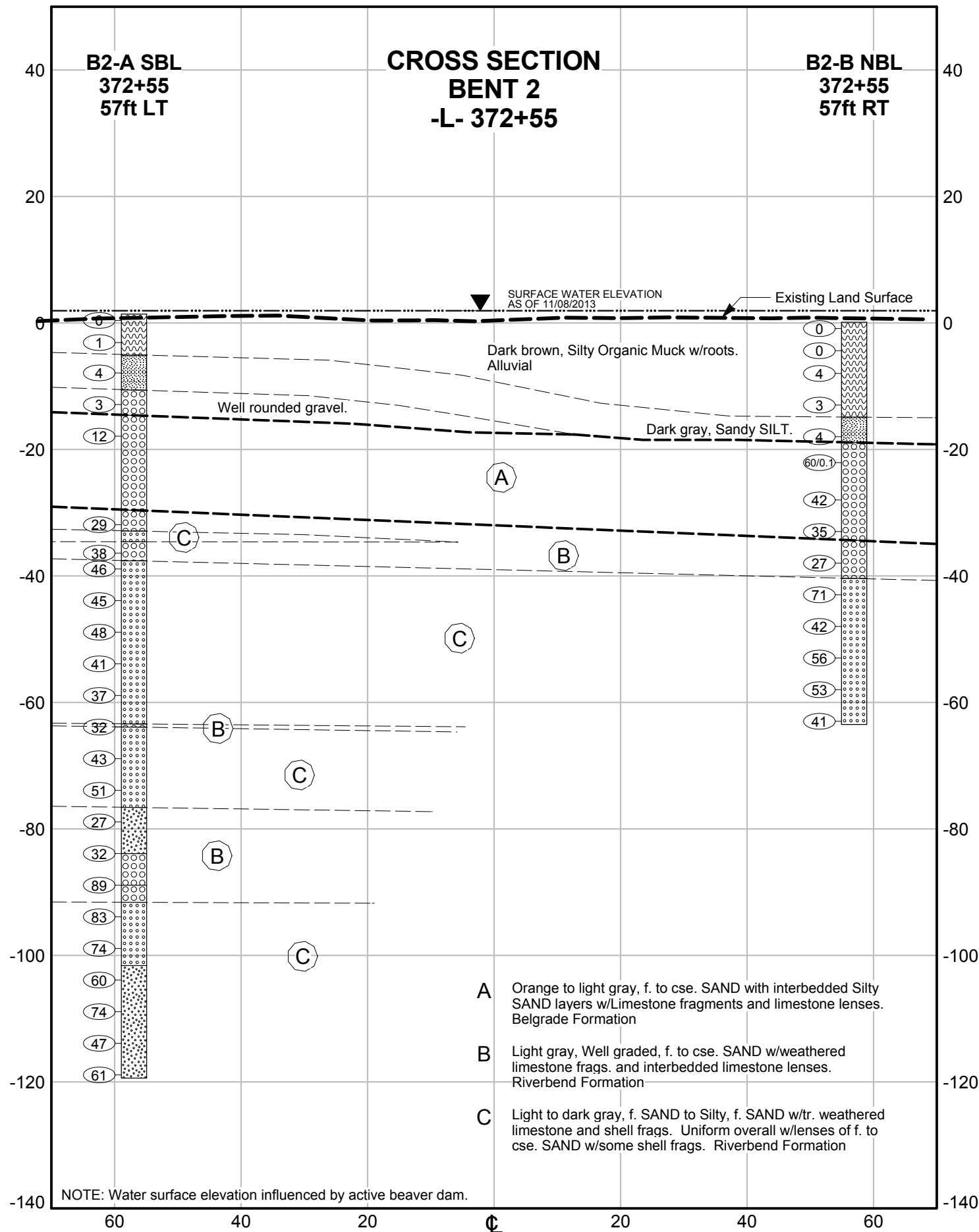
V.E. = 1



DESCRIPTION:
Dual Bridges on -L- over Goshen Branch

SHEET NO.: 06 of 22
PROJ. NO.: 34442.1.5
TIP NO.: R-2514D
COUNTY: Jones



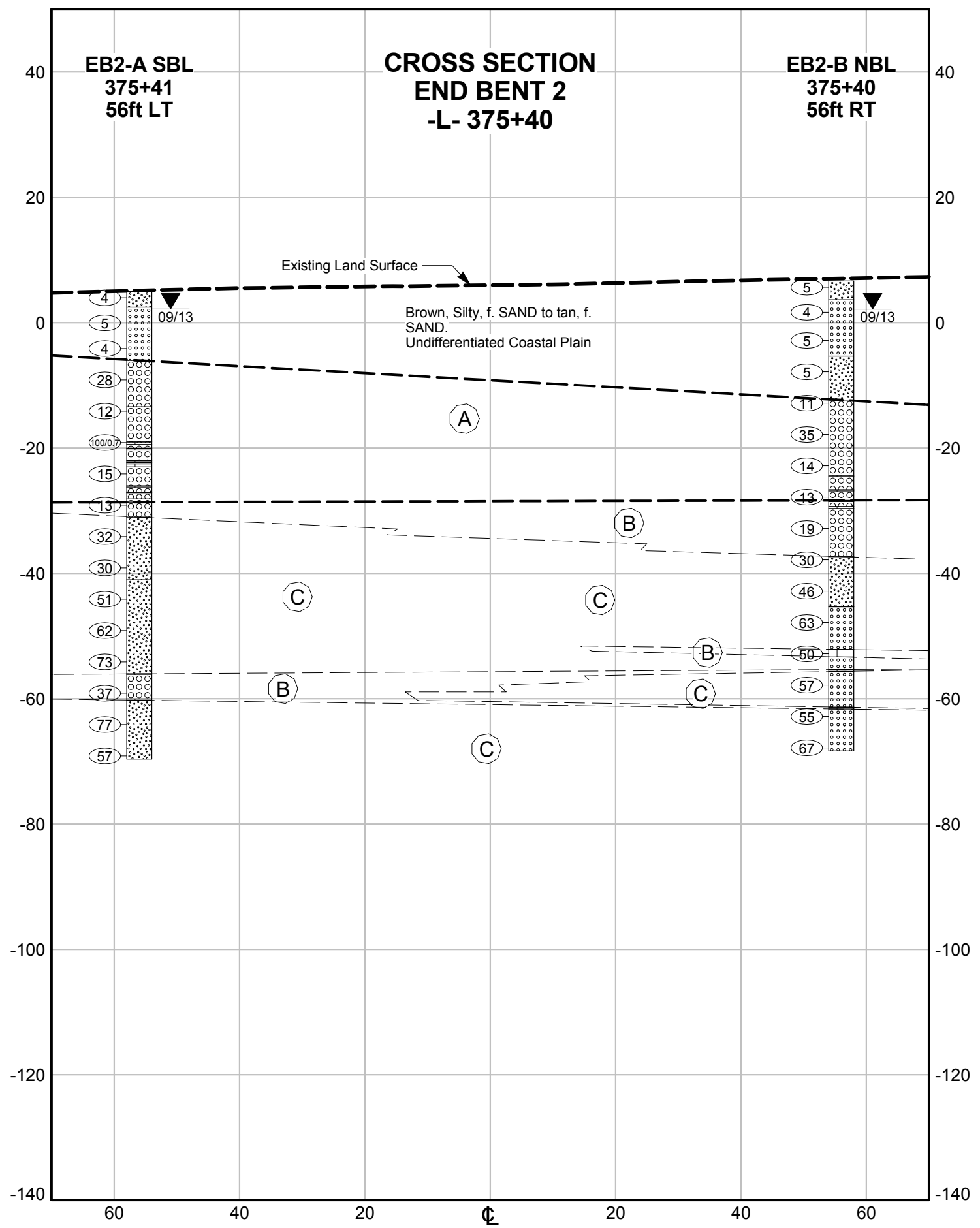
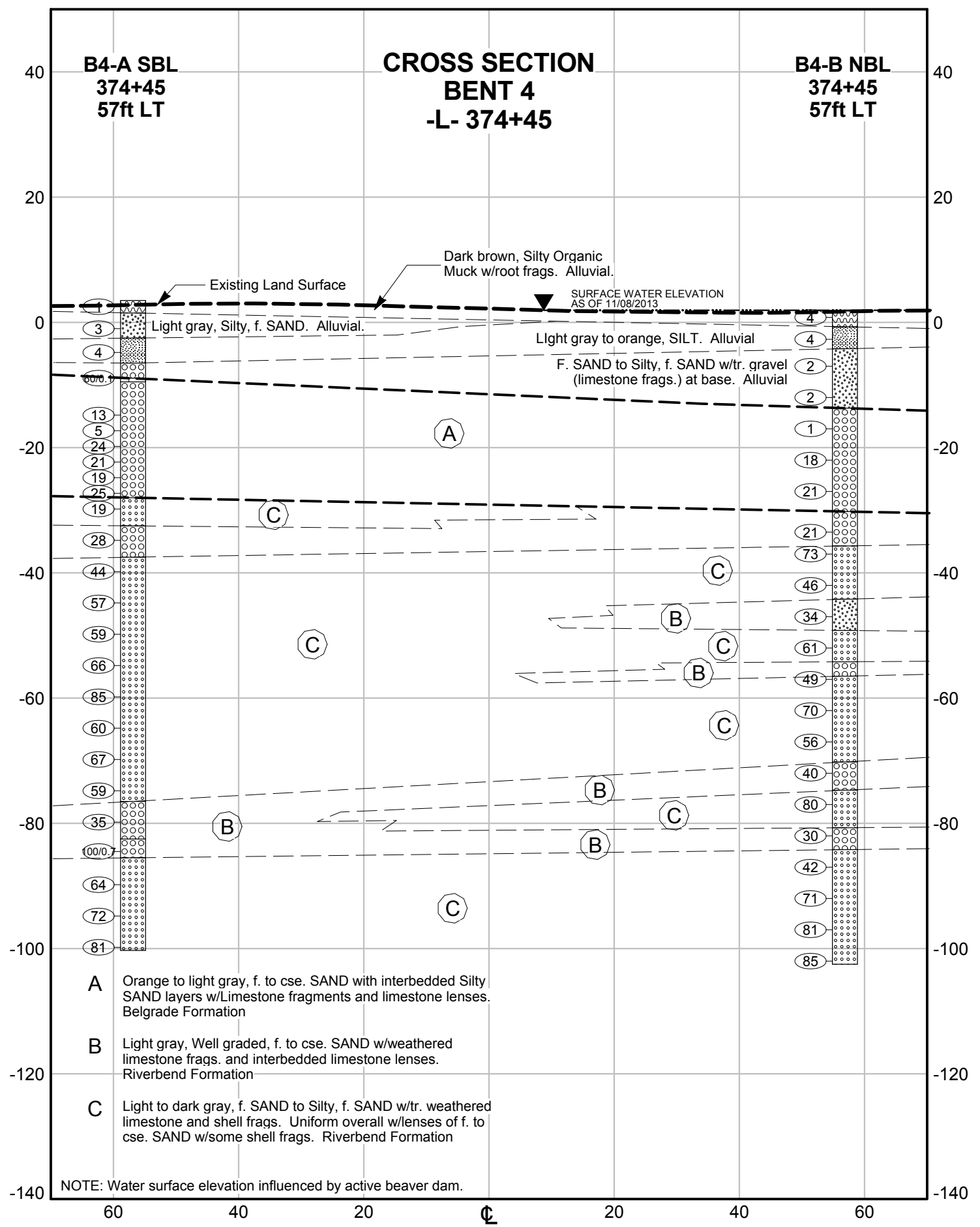


V.E. = 1



DESCRIPTION:
Dual Bridges on -L- over Goshen
Branch

SHEET NO.: 08 of 22
PROJ. NO.: 34442.1.5
TIP NO.: R-2514D
COUNTY: Jones





NCDOT GEOTECHNICAL ENGINEERING UNIT

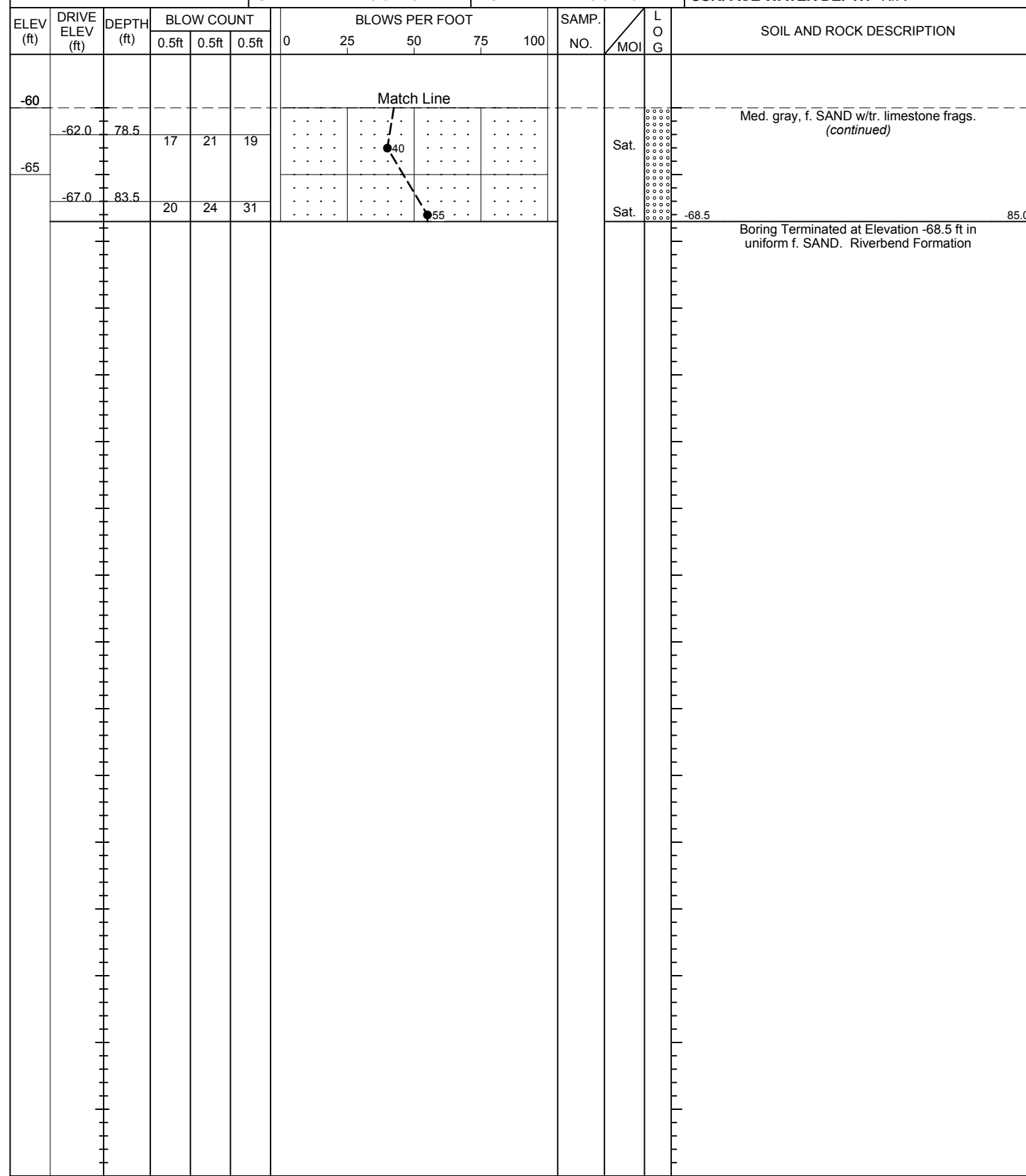
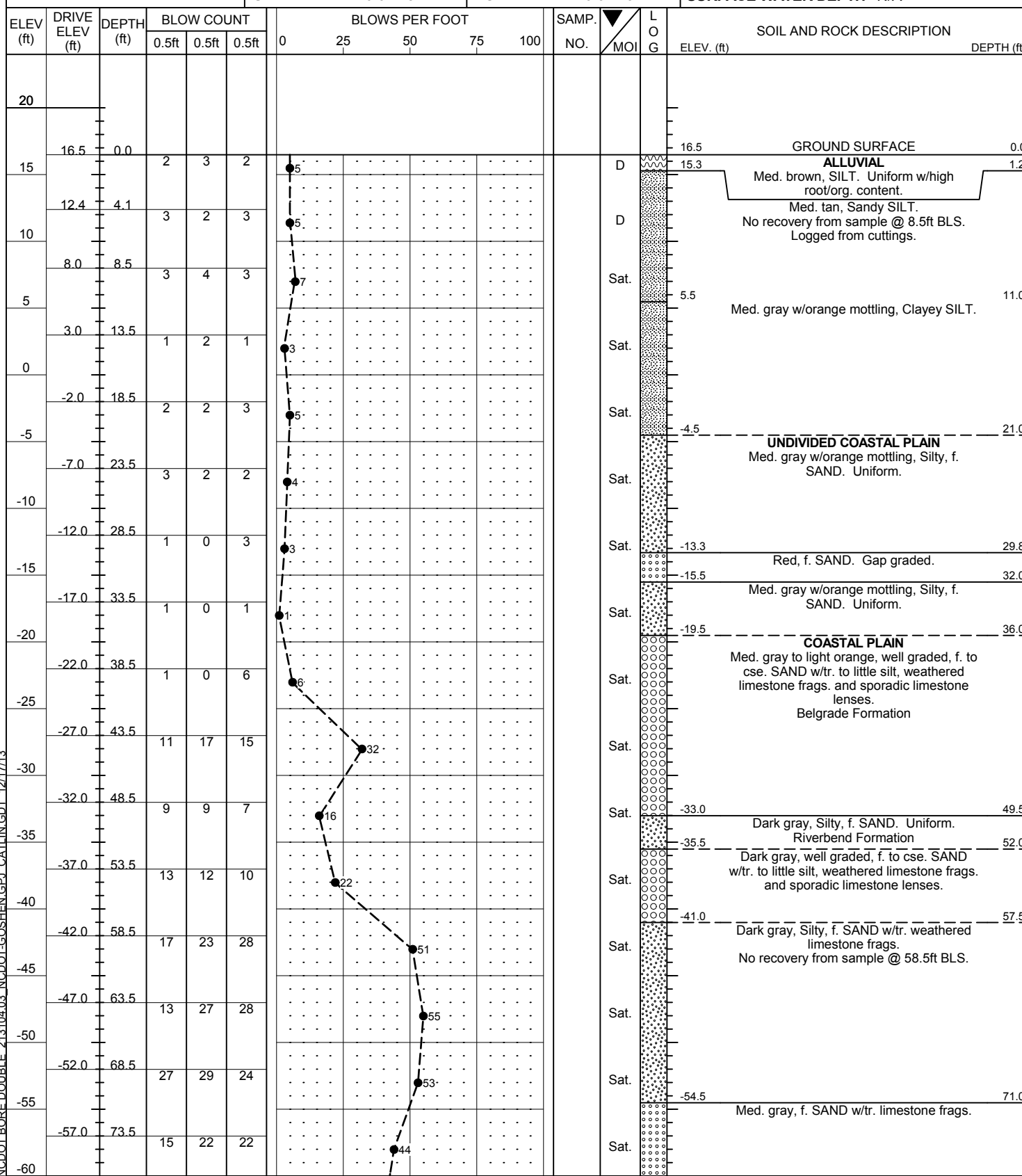
BORELOG REPORT



SHEET: 10 OF 22
 PROJ. NO.: 34442.1.5
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 COUNTY: Jones

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Branch
SITE DESCRIPTION Dual Bridges on -L- over Goshen Branch			GROUND WTR (ft)
BORING NO. B1-A SBL	STATION 371+59	OFFSET 57ft LT	ALIGNMENT -L-
COLLAR ELEV. 16.5 ft	TOTAL DEPTH 85.0 ft	NORTHING 464,316	EASTING 2,530,364
DRILL RIG/HAMMER EFF./DATE CAT1303 CME-550 77% 11/30/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER N/A	START DATE 10/04/13	COMP. DATE 10/07/13	SURFACE WATER DEPTH N/A

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Branch
SITE DESCRIPTION Dual Bridges on -L- over Goshen Branch			GROUND WTR (ft)
BORING NO. B1-A SBL	STATION 371+59	OFFSET 57ft LT	ALIGNMENT -L-
COLLAR ELEV. 16.5 ft	TOTAL DEPTH 85.0 ft	NORTHING 464,316	EASTING 2,530,364
DRILL RIG/HAMMER EFF./DATE CAT1303 CME-550 77% 11/30/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER N/A	START DATE 10/04/13	COMP. DATE 10/07/13	SURFACE WATER DEPTH N/A



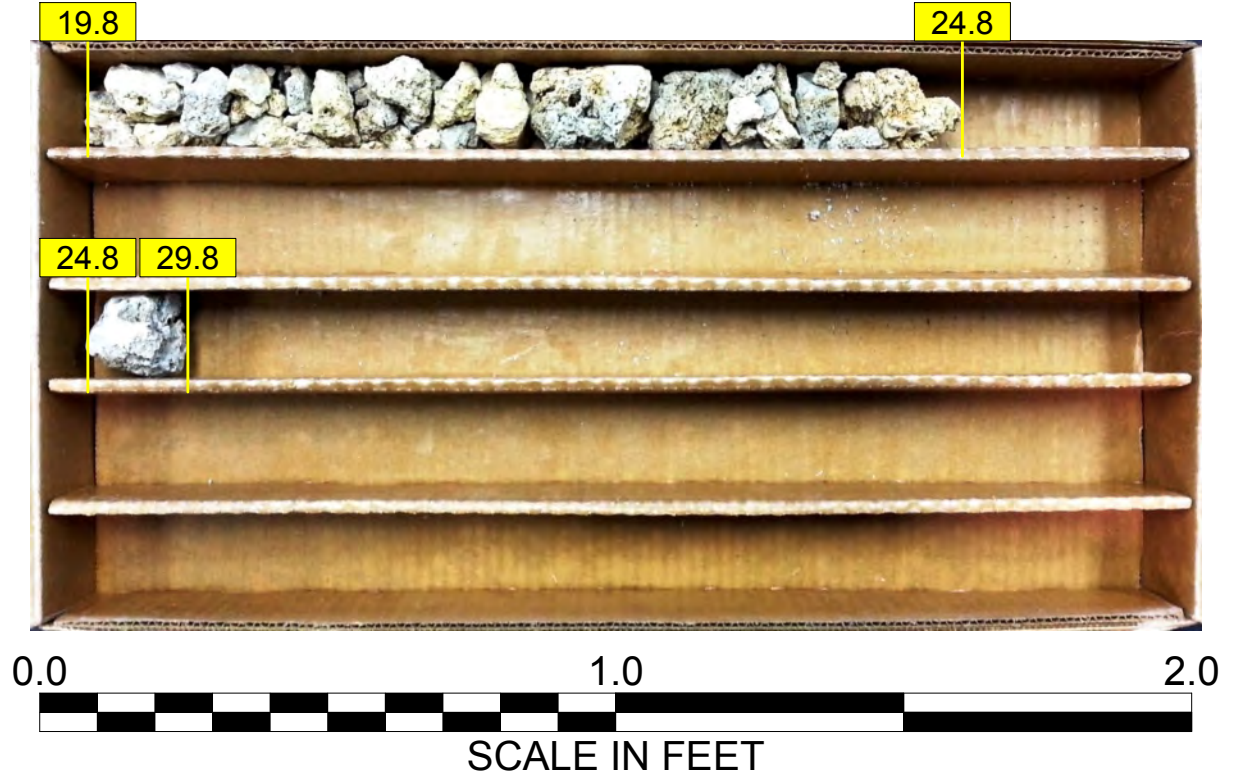
NCDOT BORE DOUBLE 213104.03_NCDOT-GOSHEN.GPJ CATLIN.GDT 12/17/13



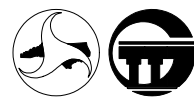
NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Corey Futral					
SITE DESCRIPTION Dual Bridges on -L- over Goshen Branch							GROUND WTR (ft)				
BORING NO. B2-A SBL		STATION 372+55		OFFSET 57ft LT		ALIGNMENT -L-					
COLLAR ELEV. 1.4 ft		TOTAL DEPTH 120.8 ft		NORTHING 464,411		EASTING 2,530,376					
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic					
DRILLER N/A		START DATE 10/29/13		COMP. DATE 10/30/13		SURFACE WATER DEPTH 0.4ft					
CORE SIZE NQ		TOTAL RUN 10.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %			
-18.4	-18.4	19.8	5.0	00:38/1.0 00:15/1.0 00:26/1.0 00:30/1.0 00:11/1.0	(1.6) 32%	N/A	(1.6) 32%	N/A	OOO	Begin Coring @ 19.8 ft	19.8
-20	-23.4	24.8	5.0	01:14/1.0 00:30/1.0 00:25/1.0 00:20/1.0 02:49/1.0	(0.1) 2%	N/A	(0.1) 2%	N/A	OOO	Tan to brown gray, Sandy, Weathered Limestone. Thin (<0.2ft.) lenses of friable material. Vuggy and sli. foss.	19.8
-25	-28.4	29.8	5.0						OOO	Light gray, f. Sandy Limestone lens. Sli. foss. Well indurated.	24.8
-30									OOO		29.8

B2-A SBL
BOX 1 of 1
ELEV. -18.4 to -28.4 FT



NCDOT CORE DOUBLE 213104.03_NCDOT-GOSHEN.GPJ_CATLIN.GDT 11/15/13

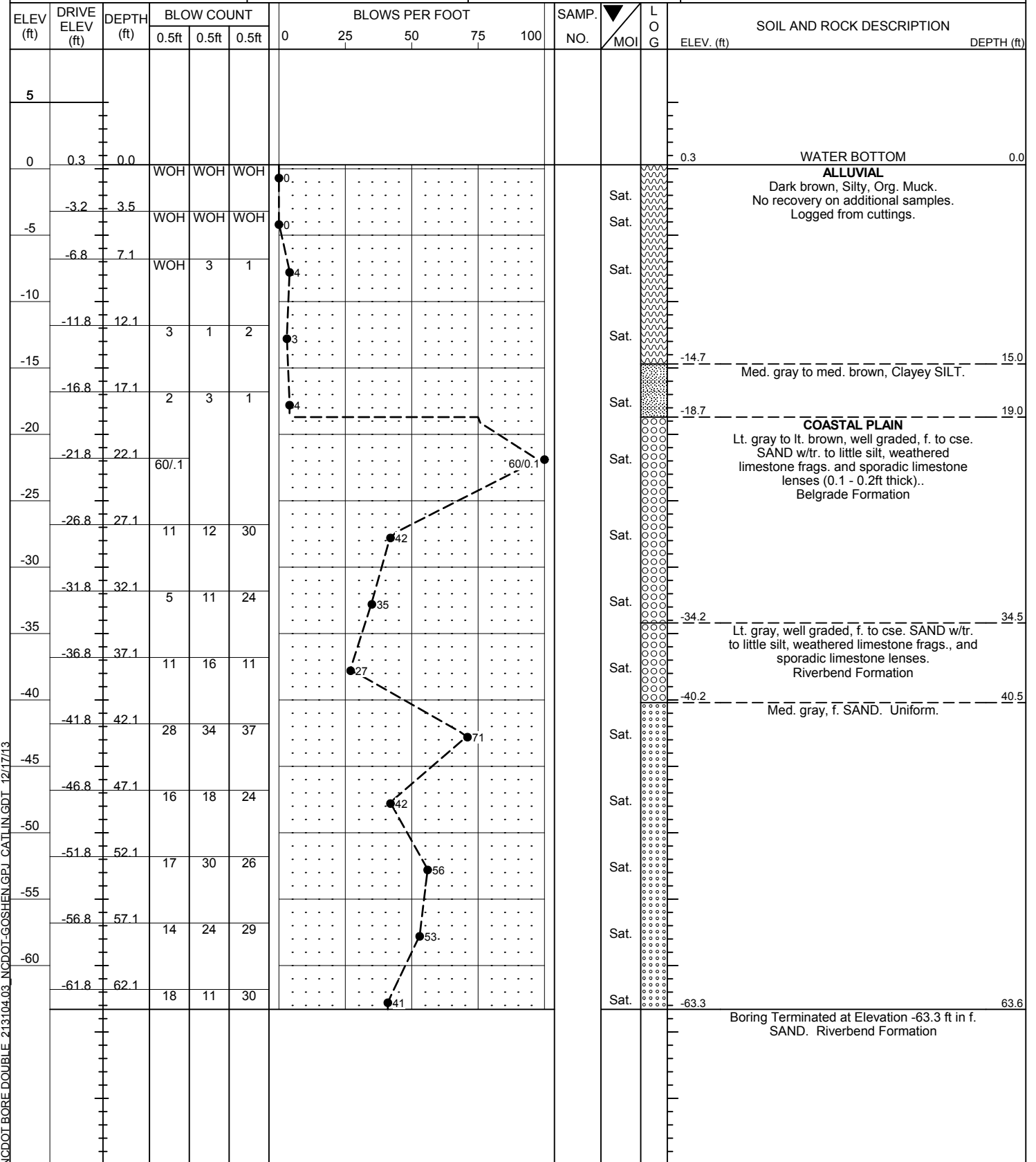


NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT



SHEET: 14 OF 22
PROJ. NO.: 34442.1.5
TIP NO.: R-2514D
COUNTY: Jones

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Corey Futral
SITE DESCRIPTION Dual Bridges on -L- over Goshen Branch			GROUND WTR (ft)
BORING NO. B2-B NBL	STATION 372+55	OFFSET 57ft RT	ALIGNMENT -L-
COLLAR ELEV. 0.3 ft	TOTAL DEPTH 63.6 ft	NORTHING 464,397	EASTING 2,530,489
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER N/A	START DATE 10/24/13	COMP. DATE 10/25/13	SURFACE WATER DEPTH 1.4ft



NCDOT BORE DOUBLE 213104.03_NCDOT-GOSHEN.GPJ CATLIN.GDT 12/17/13



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT



SHEET: 15 OF 22
 PROJ. NO.: 34442.1.5
 TIP NO.: R-2514D
 COUNTY: Jones

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Corey Futral										
SITE DESCRIPTION Dual Bridges on -L- over Goshen Branch							GROUND WTR (ft)									
BORING NO. B3-A SBL		STATION 373+50		OFFSET 57ft LT		ALIGNMENT -L-										
COLLAR ELEV. 0.4 ft		TOTAL DEPTH 104.1 ft		NORTHING 464,505		EASTING 2,530,387										
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012			DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic										
DRILLER N/A		START DATE 10/30/13		COMP. DATE 10/31/13		SURFACE WATER DEPTH 4.6ft										
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						
5																
0	0.4	0.0	WOH	WOH	WOH									0.4		0.0
-5	-3.1	3.5	WOH	WOH	WOH											
-10	-7.2	7.6	WOH	WOH	WOH											
-15	-12.2	12.6	WOH	1	0											
-20	-17.2	17.6	2	3	6											
-25	-19.7	20.1	23	17	83/3											
-30	-27.2	27.6	4	7	20											
-35	-29.7	30.1	7	9	14											
-40	-32.2	32.6	12	14	15											
-45	-37.2	37.6	15	31	36											
-50	-42.2	42.6	14	19	27											
-55	-47.2	47.6	20	30	17											
-60	-52.2	52.6	30	28	30											
-65	-57.2	57.6	11	23	33											
-70	-62.2	62.6	13	30	46											
-75	-67.2	67.6	13	20	26											
	-72.2	72.6	35	11	20											

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Corey Futral										
SITE DESCRIPTION Dual Bridges on -L- over Goshen Branch							GROUND WTR (ft)									
BORING NO. B3-A SBL		STATION 373+50		OFFSET 57ft LT		ALIGNMENT -L-										
COLLAR ELEV. 0.4 ft		TOTAL DEPTH 104.1 ft		NORTHING 464,505		EASTING 2,530,387										
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012			DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic										
DRILLER N/A		START DATE 10/30/13		COMP. DATE 10/31/13		SURFACE WATER DEPTH 4.6ft										
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						
-75																
-80	-77.2	77.6	14	25	34											
-85	-82.2	82.6	16	12	17											
-90	-87.2	87.6	10	28	36											
-95	-92.2	92.6	17	32	46											
-100	-97.2	97.6	17	27	32											
	-102.2	102.6	19	32	42											

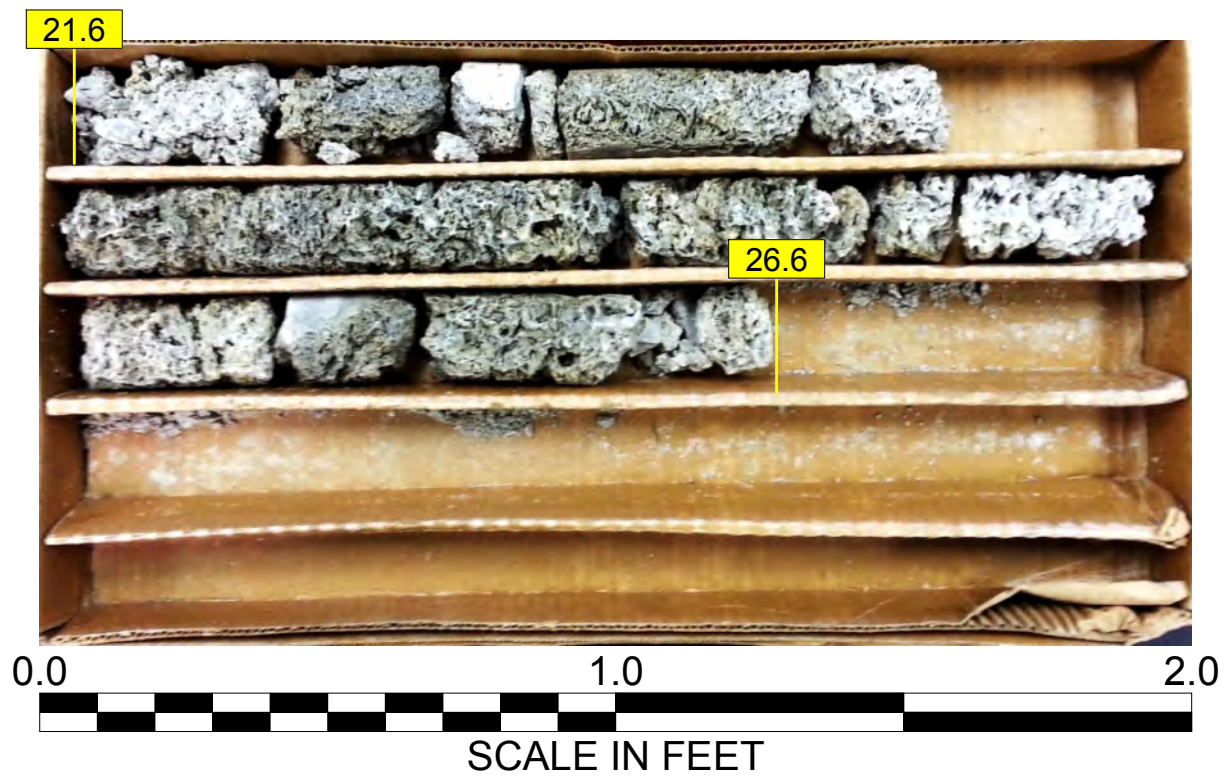
NCDOT BORE DOUBLE 213104.03_NCDOT-GOSHEN.GPJ_CATLIN.GDT_12/17/13



NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Corey Futral					
SITE DESCRIPTION Dual Bridges on -L- over Goshen Branch							GROUND WTR (ft)				
BORING NO. B3-A SBL		STATION 373+50		OFFSET 57ft LT		ALIGNMENT -L-					
COLLAR ELEV. 0.4 ft		TOTAL DEPTH 104.1 ft		NORTHING 464,505		EASTING 2,530,387					
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic					
DRILLER N/A		START DATE 10/30/13		COMP. DATE 10/31/13		SURFACE WATER DEPTH 4.6ft					
CORE SIZE NQ		TOTAL RUN 5.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft)	RQD (%)	REC. (ft)	RQD (%)			
-21.2	-21.2	21.6	5.0	1:03/1.0 5:00/1.0 0:20/1.0 0:23/1.0 1:32/1.0	(4.6) 92%	N/A	(4.6) 92%	N/A	OOO OOO OOO OOO OOO	Begin Coring @ 21.6 ft	21.6
-25	-26.2	26.6							OOO OOO OOO OOO OOO	Gray brown, Foss. Limestone. Vuggy. Mod. indurated w/numerous sand lenses. High porosity.	26.6
-30											
-35											
-40											
-45											
-50											
-55											
-60											
-65											
-70											
-75											
-80											
-85											
-90											
-95											
-100											

B3-A SBL
BOX 1 of 1
ELEV. -21.2 to -26.2 FT



NCDOT CORE DOUBLE 213104.03_NCDOT-GOSHEN.GPJ_CATLIN.GDT 11/15/13



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT



SHEET: 17 OF 22
PROJ. NO.: 34442.1.5
TIP NO.: R-2514D
COUNTY: Jones

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Corey Futral										
SITE DESCRIPTION Dual Bridges on -L- over Goshen Branch							GROUND WTR (ft)									
BORING NO. B3-B NBL		STATION 373+47		OFFSET 54ft RT		ALIGNMENT -L-										
COLLAR ELEV. 0.5 ft		TOTAL DEPTH 61.5 ft		NORTHING 464,489		EASTING 2,530,497										
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012				DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic										
DRILLER N/A		START DATE 10/24/13		COMP. DATE 10/24/13		SURFACE WATER DEPTH 1.9ft										
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)		
5																
0	0.5	0.0	1	1	1	2								0.5		0.0
-5	-4.5	5.0	1	1	1	2										
-10	-9.5	10.0	2	1	3	4								-7.5		8.0
-15	-14.5	15.0	1	0	0	0								-12.5		13.0
-20	-19.5	20.0	4	7	78	0								-20.0		20.5
-25	-24.5	25.0	40	20	12	85								-22.5		23.0
-30	-29.5	30.0	7	15	16	32								-32.5		33.0
-35	-34.5	35.0	5	22	37	31								-32.5		33.0
-40	-39.5	40.0	13	21	30	59										
-45	-44.5	45.0	10	20	21	51										
-50	-49.5	50.0	15	28	28	41								-47.5		48.0
-55	-54.5	55.0	19	26	32	56										
-60	-59.5	60.0	18	31	33	58										
						64								-61.0		61.5
															Boring Terminated at Elevation -61.0 ft in f. SAND. Riverbend Formation	

NCDOT BORE DOUBLE 213104.03_NCDOT-GOSHEN.GPJ_CATLIN.GDT 12/17/13



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Corey Futral										
SITE DESCRIPTION Dual Bridges on -L- over Goshen Branch							GROUND WTR (ft)									
BORING NO. B4-A SBL		STATION 374+45		OFFSET 57ft LT		ALIGNMENT -L-										
COLLAR ELEV. 3.5 ft		TOTAL DEPTH 103.8 ft		NORTHING 464,599		EASTING 2,530,398										
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012			DRILL METHOD NW Casing w/ SPT			HAMMER TYPE Automatic										
DRILLER N/A		START DATE 10/31/13		COMP. DATE 11/01/13		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						
5																
	3.5	0.0														
			WOH	WOH	1											
0	0.0	3.5	1	2	1											
-5	-3.8	7.3	WOH	WOH	4											
-10	-8.8	12.3			60/1											
-15	-13.8	17.3	2	6	7											
-20	-16.3	19.8	3	2	3											
-25	-18.8	22.3	8	10	14											
-30	-21.3	24.8	9	10	11											
-35	-23.8	27.3	7	9	10											
-40	-26.3	29.8	12	17	8											
-45	-28.8	32.3	7	9	10											
-50	-33.8	37.3	12	10	18											
-55	-38.8	42.3	17	21	23											
-60	-43.8	47.3	17	26	31											
-65	-48.8	52.3	17	27	32											
-70	-53.8	57.3	19	32	34											
-75	-58.8	62.3	16	35	50											
-80	-63.8	67.3	18	26	34											
-85	-68.8	72.3	24	35	32											
-90	-73.8	77.3	16	25	34											

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Corey Futral										
SITE DESCRIPTION Dual Bridges on -L- over Goshen Branch							GROUND WTR (ft)									
BORING NO. B4-A SBL		STATION 374+45		OFFSET 57ft LT		ALIGNMENT -L-										
COLLAR ELEV. 3.5 ft		TOTAL DEPTH 103.8 ft		NORTHING 464,599		EASTING 2,530,398										
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012			DRILL METHOD NW Casing w/ SPT			HAMMER TYPE Automatic										
DRILLER N/A		START DATE 10/31/13		COMP. DATE 11/01/13		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						
-75																
-80	-78.8	82.3	8	17	18											
-85	-83.8	87.3	83	177.2												
-90	-88.8	92.3	16	27	37											
-95	-93.8	97.3	16	30	42											
-100	-98.8	102.3	18	36	45											

NCDOT BORE DOUBLE 213104.03_NCDOT-GOSHEN.GPJ_CATLIN.GDT_12/17/13

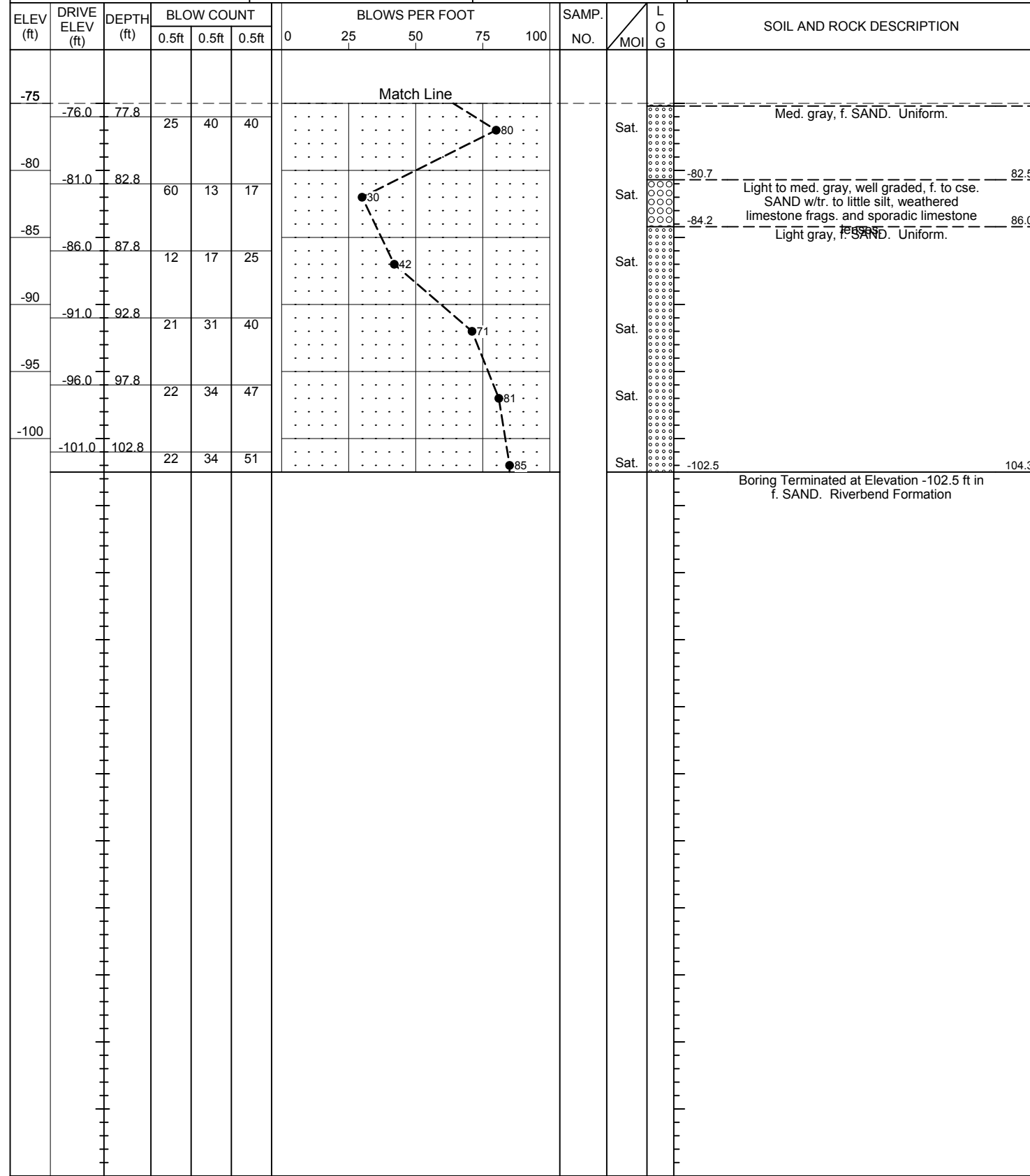
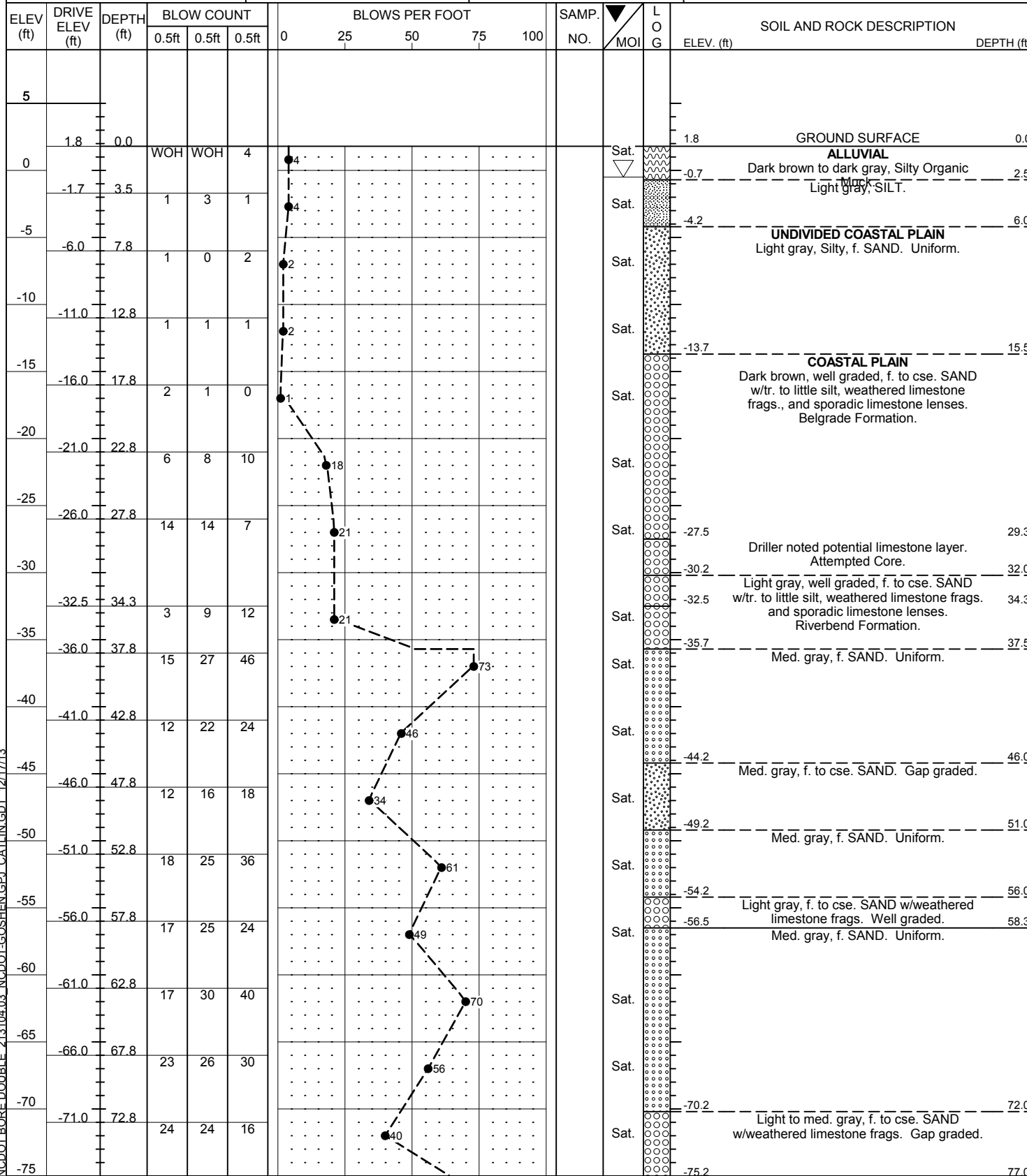


NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Corey Futral
SITE DESCRIPTION Dual Bridges on -L- over Goshen Branch			GROUND WTR (ft)
BORING NO. B4-B NBL	STATION 374+45	OFFSET 57ft RT	ALIGNMENT -L-
COLLAR ELEV. 1.8 ft	TOTAL DEPTH 104.3 ft	NORTHING 464,586	EASTING 2,530,511
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic
DRILLER N/A	START DATE 11/04/13	COMP. DATE 11/05/13	SURFACE WATER DEPTH N/A

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Corey Futral
SITE DESCRIPTION Dual Bridges on -L- over Goshen Branch			GROUND WTR (ft)
BORING NO. B4-B NBL	STATION 374+45	OFFSET 57ft RT	ALIGNMENT -L-
COLLAR ELEV. 1.8 ft	TOTAL DEPTH 104.3 ft	NORTHING 464,586	EASTING 2,530,511
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic
DRILLER N/A	START DATE 11/04/13	COMP. DATE 11/05/13	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE 213104.03 NCDOT-GOSHEN.GPJ CATLIN.GDT 12/17/13



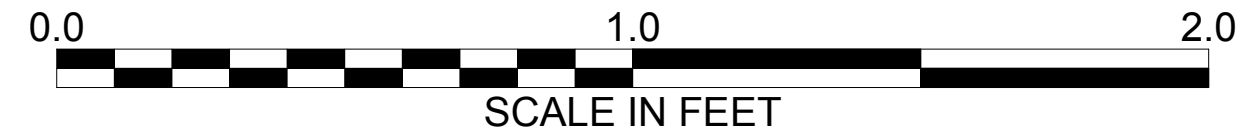
NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

 213104.03	SHEET:	20 OF 22
	PROJ. NO.:	34442.1.5
	TIP NO.:	R-2514D
	COUNTY:	Jones

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Corey Futral					
SITE DESCRIPTION Dual Bridges on -L- over Goshen Branch							GROUND WTR (ft)				
BORING NO. B4-B NBL		STATION 374+45		OFFSET 57ft RT		ALIGNMENT -L-					
COLLAR ELEV. 1.8 ft		TOTAL DEPTH 104.3 ft		NORTHING 464,586		EASTING 2,530,511					
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic					
DRILLER N/A		START DATE 11/04/13		COMP. DATE 11/05/13		SURFACE WATER DEPTH N/A					
CORE SIZE NQ		TOTAL RUN 5.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %	REC. (ft) %	RQD (ft) %			
-27.5	-27.5	29.3	5.0	0:30/1.0	(0.0)	N/A	(0.0)	N/A	OOO	Begin Coring @ 29.3 ft	
-30				0:18/1.0	0%		0%		OOO	COASTAL PLAIN (continued)	
				1:10/1.0					OOO	NO RECOVERY	32.0
	-32.5	34.3		0:27/1.0					OOO		
				0:33/1.0					OOO		34.3
-35											
-40											
-45											
-50											
-55											
-60											
-65											
-70											
-75											
-80											
-85											
-90											
-95											
-100											

B4-B NBL
BOX 1 of 1
ELEV. -27.5 to -32.5 FT

NO RECOVERY



NCDOT CORE DOUBLE 213104.03_NCDOT-GOSHEN.GPJ CATLIN.GDT 11/15/13

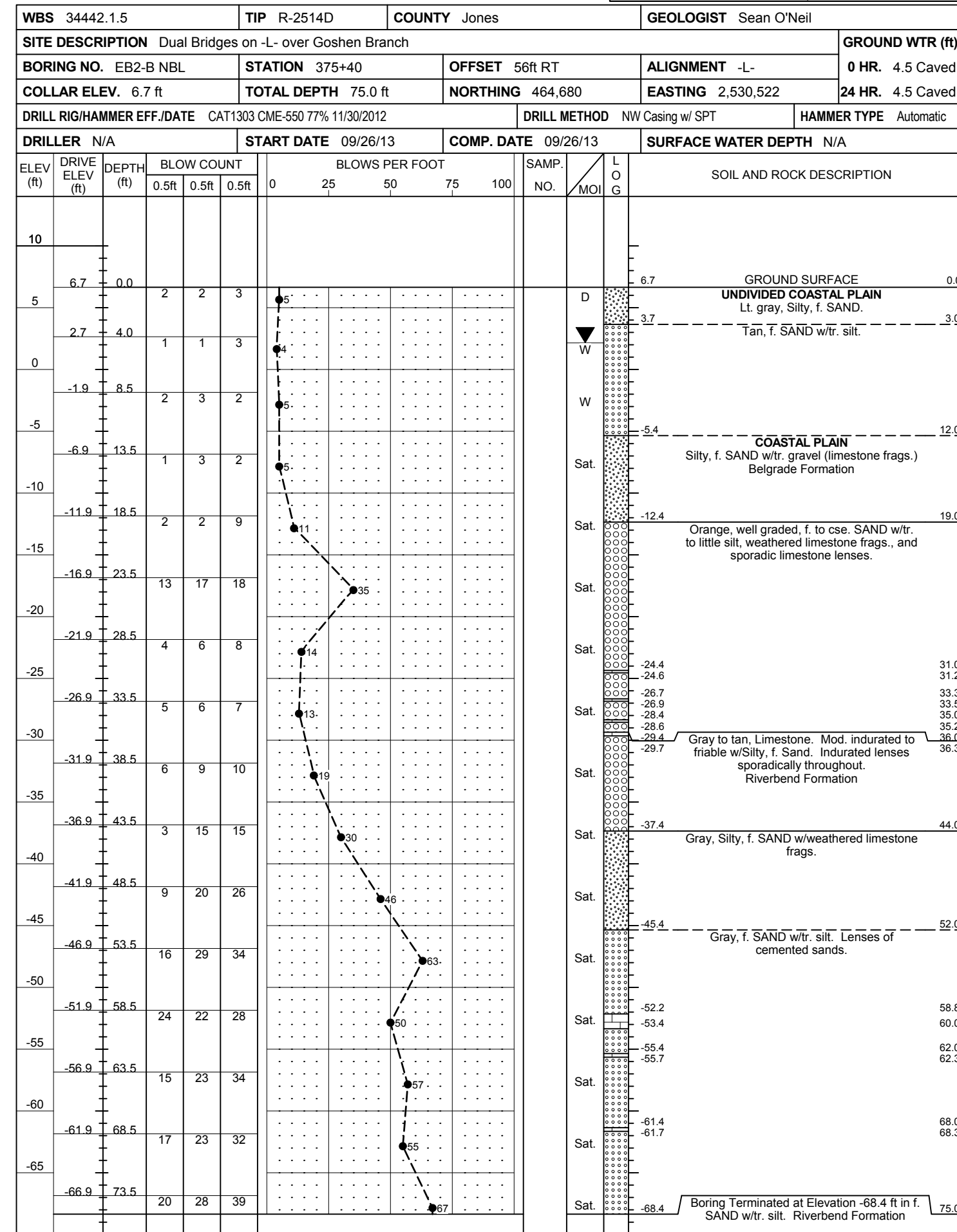
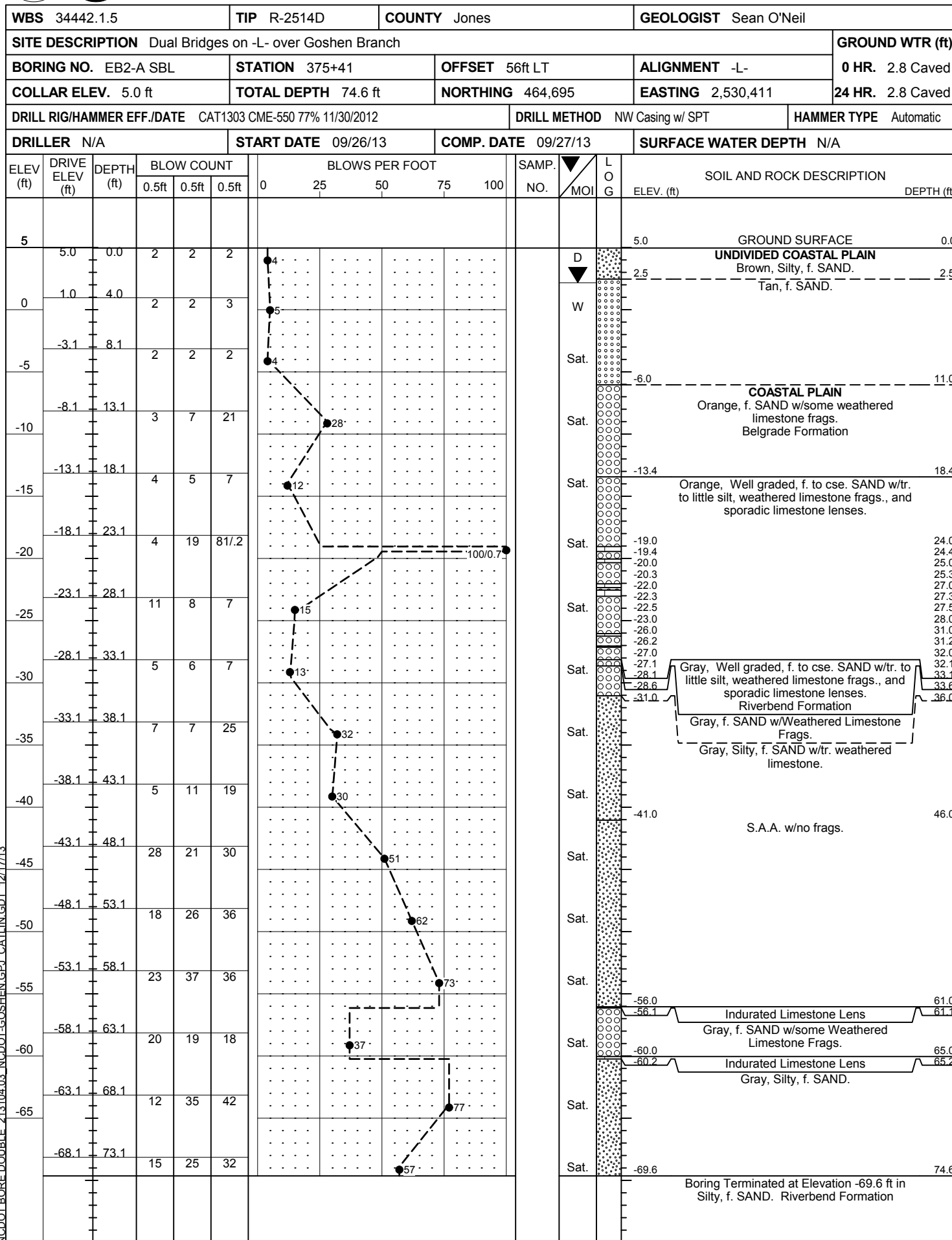


NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT



SHEET: 21 OF 22
 PROJ. NO.: 34442.1.5
 TIP NO.: R-2514D
 COUNTY: Jones

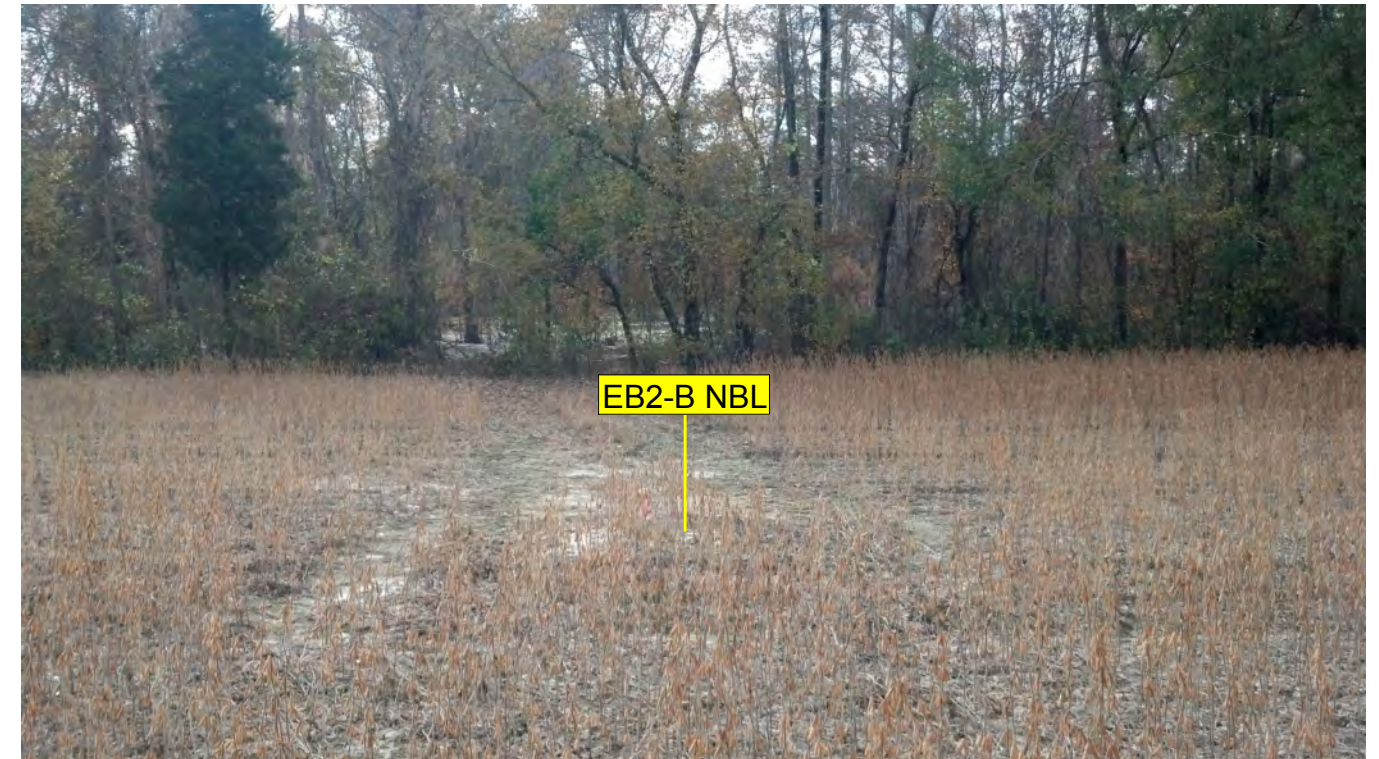


NCDOT BORE DOUBLE 213104.03 NCDOT-GOSHEN.GPJ CATLIN.GDT 12/17/13

SITE PHOTOGRAPHS



NORTH ALONG -L-
END BENT 1 IN FOREGROUND



FACING SOUTH ALONG -L-
END BENT 2 IN FOREGROUND



BENT 1 FACING NORTH ALONG -L-



EAST OF -L- FACING WEST
BENT 2 AND BENT 3

PROJECT: 34442.1.5 ID: R-2514D

SHEET NO.:	CONTENTS:
01	TITLE SHEET
02	LEGEND
03	SITE PLAN
04-09	PROFILES
10-16	CROSS SECTIONS
17-40	BORE LOGS & CORE REPORTS
41	SITE PHOTOGRAPHS

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

STRUCTURE

SUBSURFACE INVESTIGATION

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34442.1.5 (R-2514D)	01	41

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.

PROJ. REFERENCE NO.: 34442.1.5 F.A. PROJ. N/A
 COUNTY: Jones
 PROJECT DESCRIPTION: US 17 from North of NC 58 to the New Bern Bypass
 SITE DESCRIPTION: Dual Bridges on -L- over the Trent River

PERSONNEL:

- Corey Futral
- Charles Brake
- D. Sean Leggett, RLS
- Mid-Atlantic Drilling

INVESTIGATED BY: CATLIN ENGINEERS AND SCIENTISTS
 CHECKED BY: Steven V. Hudson, L.G., CWD
 SUBMITTED BY: Steven V. Hudson, L.G., CWD
 DATE: February, 2014



SEAL

Steven V. Hudson
SIGNATURE

DRAWN BY: Steven V. Hudson, L.G., CWD

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.

SUBSURFACE INVESTIGATION

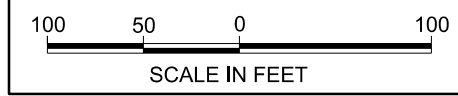
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS



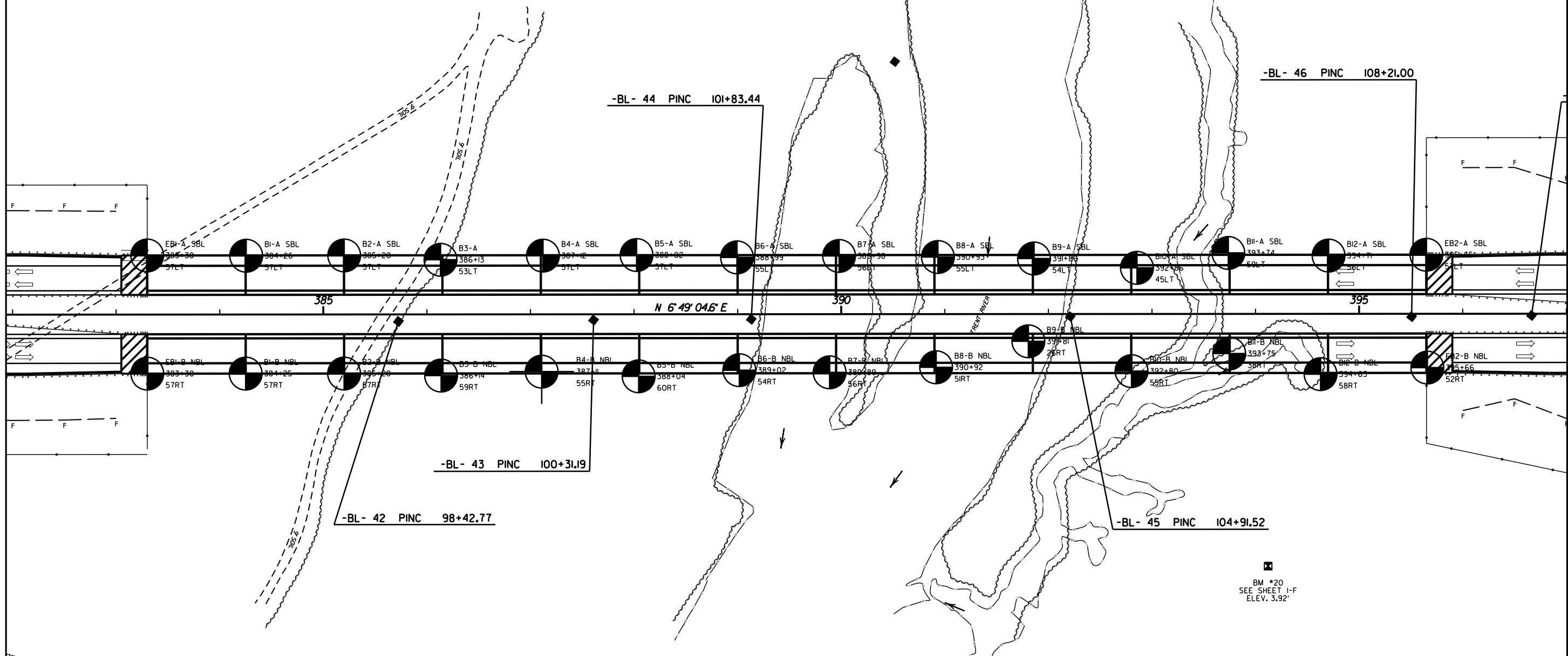
ID	WBS ELEMENT	SHEET NO.	TOTAL SHEETS
R-2514D	34442.1.5	02	41

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																																																																																																																																																																																										
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p>VERY STIFF, GRAY SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</p>										<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p>										<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY AS FOLLOWS:</p>										<p>ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. HYDRAULIC PUSH (HP) - ADVANCEMENT OF SAMPLING TOOLS UTILIZING MECHANICAL/HYDRAULIC DOWN-FORCE OF DRILLING MACHINE. 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 (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR 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 (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																																																																																										
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<p>GROUND WATER</p> <p>WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA SPRING OR SEEPAGE</p>										<p>MISCELLANEOUS SYMBOLS</p> <p>ROADWAY EMBANKMENT WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS INFERRED SOIL BOUNDARIES INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP/DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD</p> <p>TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST</p>										<p>ROCK HARDNESS</p> <p>VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT</p>										<p>FRACTURE SPACING</p> <p>VERY WIDE WIDE MODERATELY CLOSE CLOSE VERY CLOSE</p> <p>BEDDING</p> <p>VERY THICKLY BEDDED THICKLY BEDDED THINLY BEDDED VERY THINLY BEDDED THICKLY LAMINATED THINLY LAMINATED</p>																																																																																																																																																																																																																																										
<p>TEXTURE OR GRAIN SIZE</p> <table border="1"> <tr> <th>U.S. STD. SIEVE SIZE</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> <tr> <th>OPENING (mm)</th> <td>4.76</td> <td>2.0</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> </table>										U.S. STD. SIEVE SIZE	4	10	40	60	200	270	OPENING (mm)	4.76	2.0	0.42	0.25	0.075	0.053	<p>BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F. SD.) SILT (SL.) CLAY (CL.)</p> <table border="1"> <tr> <td>GRAIN SIZE</td> <td>MM</td> <td>305</td> <td>75</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> <tr> <td></td> <td>IN.</td> <td>12</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>										GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005		IN.	12	3					<p>SOIL MOISTURE - CORRELATION OF TERMS</p> <table border="1"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td rowspan="2">LL - LIQUID LIMIT PL - PLASTIC LIMIT</td> <td>- SATURATED - (SAT)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td rowspan="2">OM - OPTIMUM MOISTURE SL - SHRINKAGE LIMIT</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table>										SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION	LL - LIQUID LIMIT PL - PLASTIC LIMIT	- SATURATED - (SAT)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	OM - OPTIMUM MOISTURE SL - SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	<p>ABBREVIATIONS</p> <p>AR - AUGER REFUSAL BLS - BELOW LAND SURFACE BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FIAD - FILLED IMMEDIATELY AFTER DRILLING FOSS - FOSSILIFEROUS FRAC - FRACTURED, FRACTURES FRAGS - FRAGMENTS HI - HIGHLY MED - MEDIUM MICA - MICACEOUS</p> <p>MOD - MODERATELY N/A - NOT APPLICABLE NE - NOT ENCOUNTERED NM - NOT MEASURED NP - NON PLASTIC ORG - ORGANIC PMT - PRESSUREMETER TEST SAA - SAME AS ABOVE SAP - SAPROLITIC SD - SAND, SANDY SL - SILT, SILTY SLI - SLIGHTLY TOR - TRICONE REFUSAL U.C.P. - UNDIFFERENTIATED COASTAL PLAIN W - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST</p> <p>WEA - WEATHERED</p> <p>γ - UNIT WEIGHT γ_d - DRY UNIT WEIGHT</p> <p>SAMPLE ABBREVIATIONS</p> <p>S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - SHELBY RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO</p>										<p>EQUIPMENT USED ON SUBJECT PROJECT</p> <p>DRILL UNITS: <input type="checkbox"/> DIEDRICH D-50 <input checked="" type="checkbox"/> DIEDRICH D-25 <input checked="" type="checkbox"/> CME-45B ATV <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST <input type="checkbox"/> AMS POWER PROBE <input type="checkbox"/> OTHER</p> <p>ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input type="checkbox"/> 8" HOLLOW AUGERS <input checked="" type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG.-CARBIDE INSERTS <input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ADVANCER <input checked="" type="checkbox"/> TRICONE 2 7/8" STEEL TEETH <input type="checkbox"/> TRICONE " " TUNG.-CARBIDE <input checked="" type="checkbox"/> CORE BIT <input type="checkbox"/> OTHER</p> <p>HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</p> <p>CORE SIZE: <input type="checkbox"/> - B <input type="checkbox"/> - H <input checked="" type="checkbox"/> - NWD4 <input type="checkbox"/> -</p> <p>HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST <input type="checkbox"/> OTHER</p>										<p>INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE MODERATELY INDURATED INDURATED EXTREMELY INDURATED</p> <p>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.</p>										<p>PLASTICITY</p> <table border="1"> <tr> <th>NONPLASTIC</th> <th>LOW PLASTICITY</th> <th>MED. PLASTICITY</th> <th>HIGH PLASTICITY</th> <th>PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>0 - 5</td> <td>VERY LOW</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>6 - 15</td> <td>SLIGHT</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>16 - 25</td> <td>MEDIUM</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </table>										NONPLASTIC	LOW PLASTICITY	MED. 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<p>CATLIN # 213104.04</p>										<p>BENCH MARK: Survey conducted with Trimble 5800 GPS and Trimble TSC2 Data Collector. Additional traditional survey conducted with Total Station using NCDOT -BL-43 and -BL-44 ELEVATION: -BL-43=12.2ft / -BL-44=3.4ft</p>										<p>NOTES: Coordinate System = North Carolina State Plane Geoid Model = GEOID03 (Conus) 1983 Project Datum = North American Datum 1983 All Units = US Feet (Conus) Zone = North Carolina 3200</p>																																																																																																																																																																																																																																																				

NAD 83/NSRS 2007



DUAL BRIDGES
 ON -L- OVER THE
 TRENT RIVER

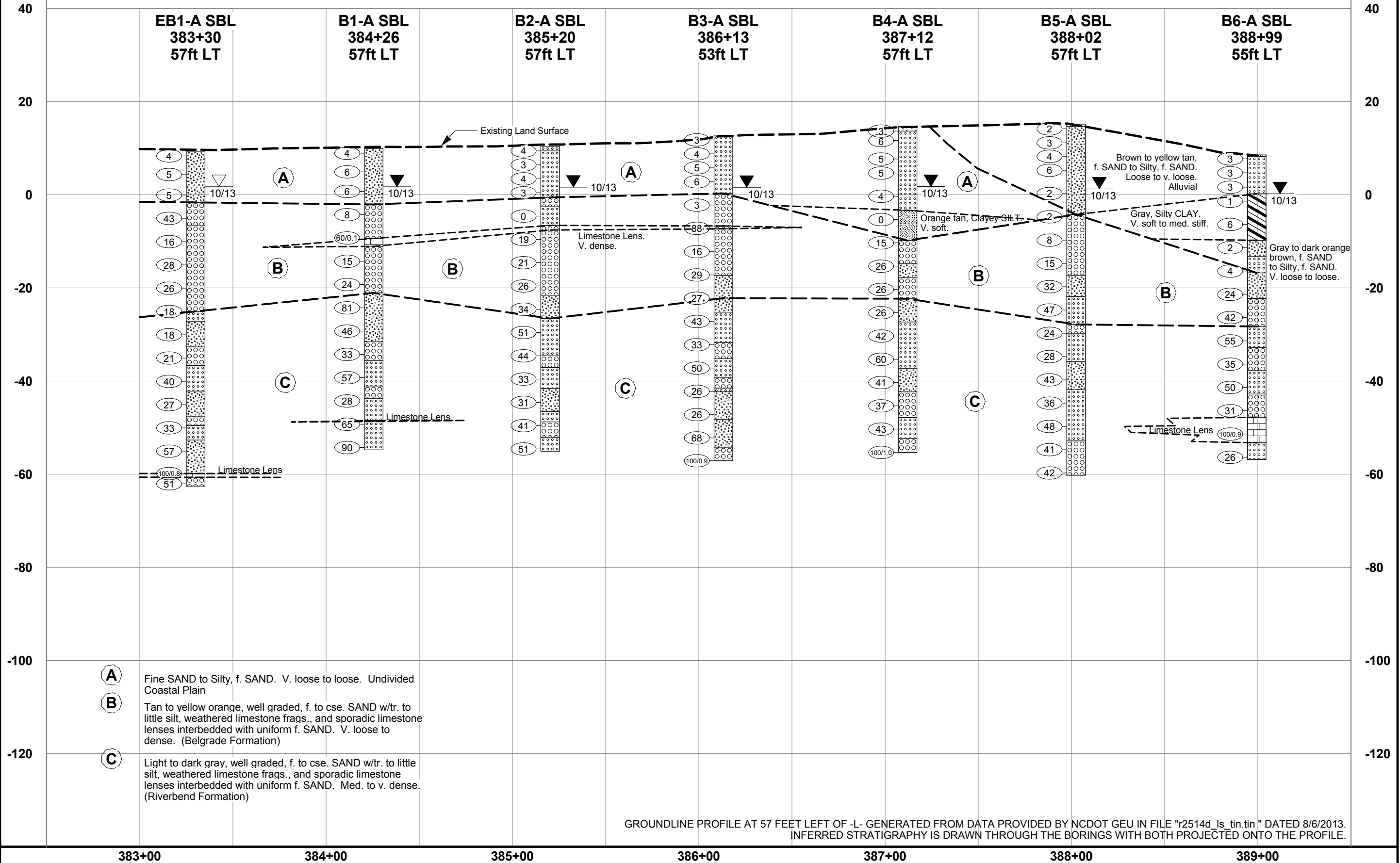


BM #19
 SEE SHEET I-F
 ELEV. 13.46'

BM #20
 SEE SHEET I-F
 ELEV. 3.92'

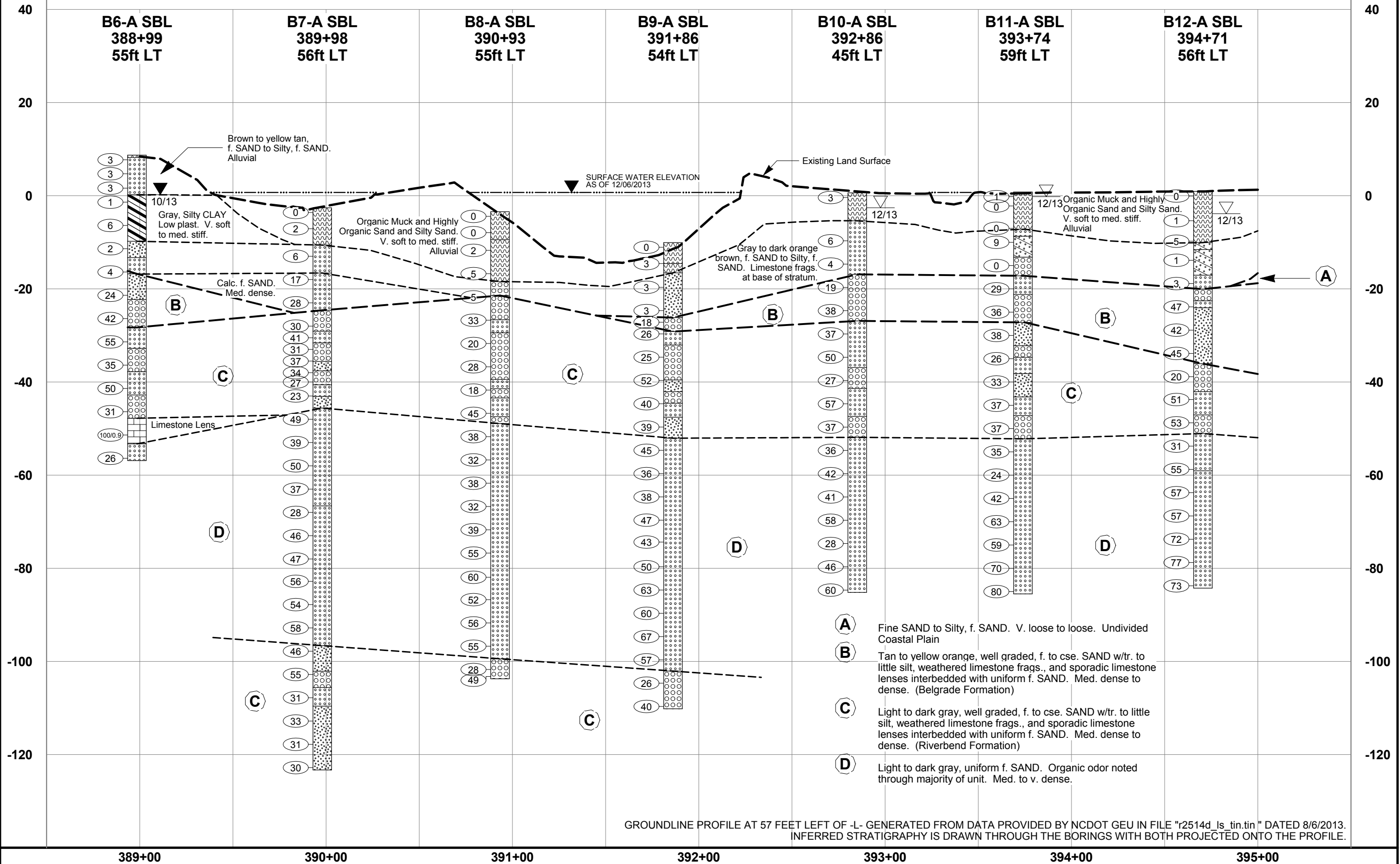
PROFILE SOUTH BOUND LANE 57 FEET LEFT OF -L-

V.E. = 2.5



PROFILE SOUTH BOUND LANE 57 FEET LEFT OF -L-

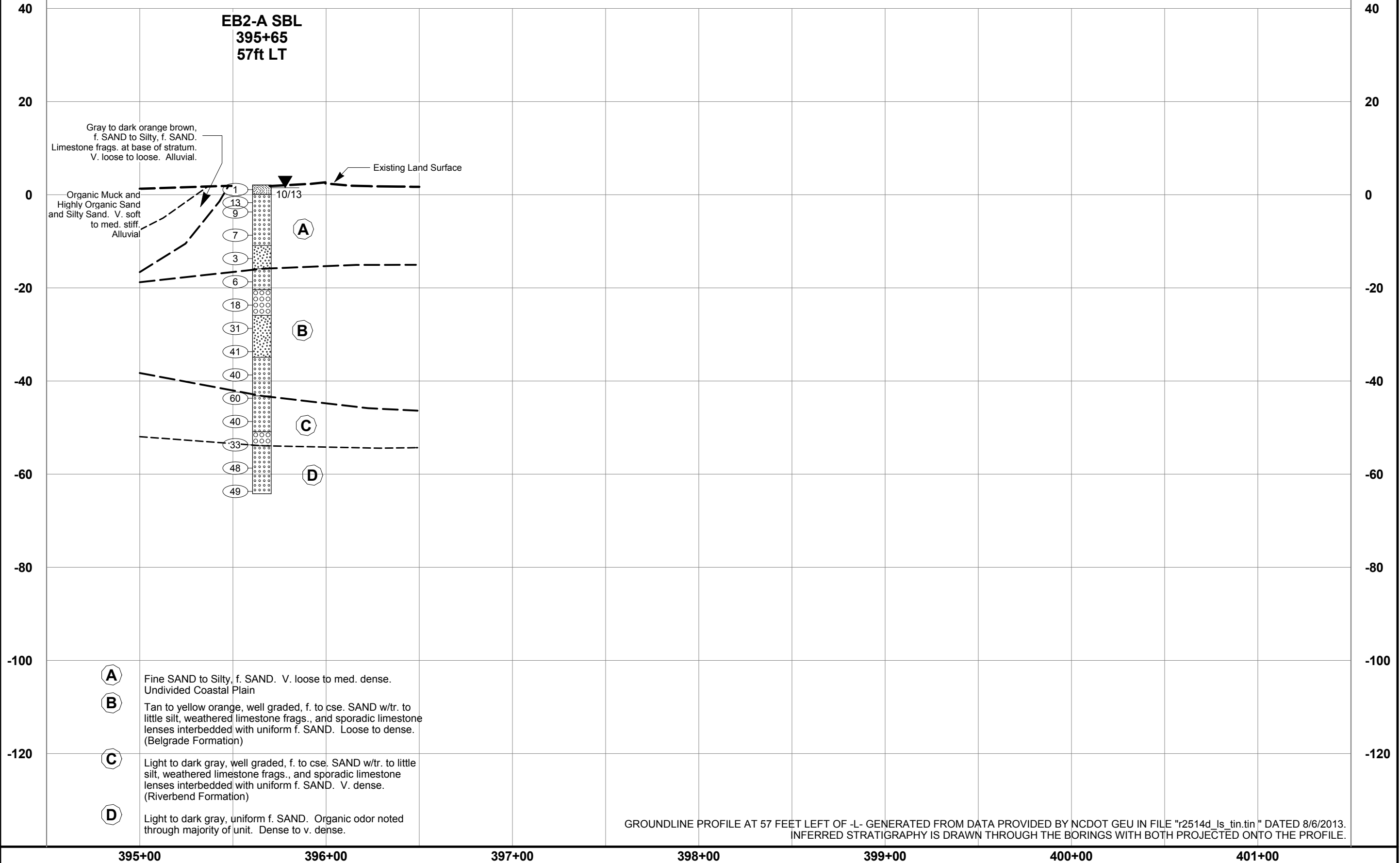
V.E. = 2.5



GROUNDLINE PROFILE AT 57 FEET LEFT OF -L- GENERATED FROM DATA PROVIDED BY NCDOT GEU IN FILE "r2514d_Is_tin.tin" DATED 8/6/2013.
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

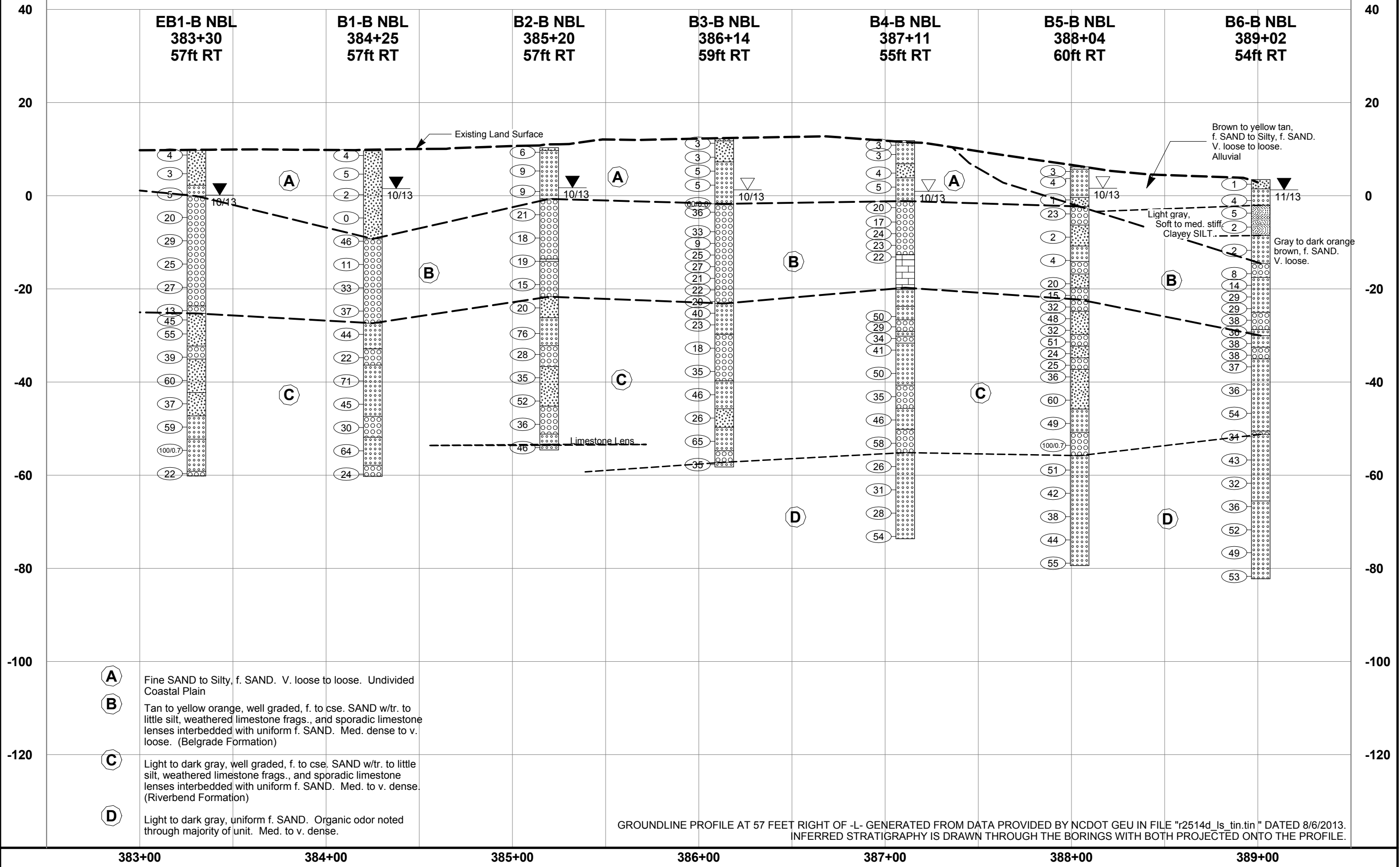
PROFILE SOUTH BOUND LANE 57 FEET LEFT OF -L-

V.E. = 2.5



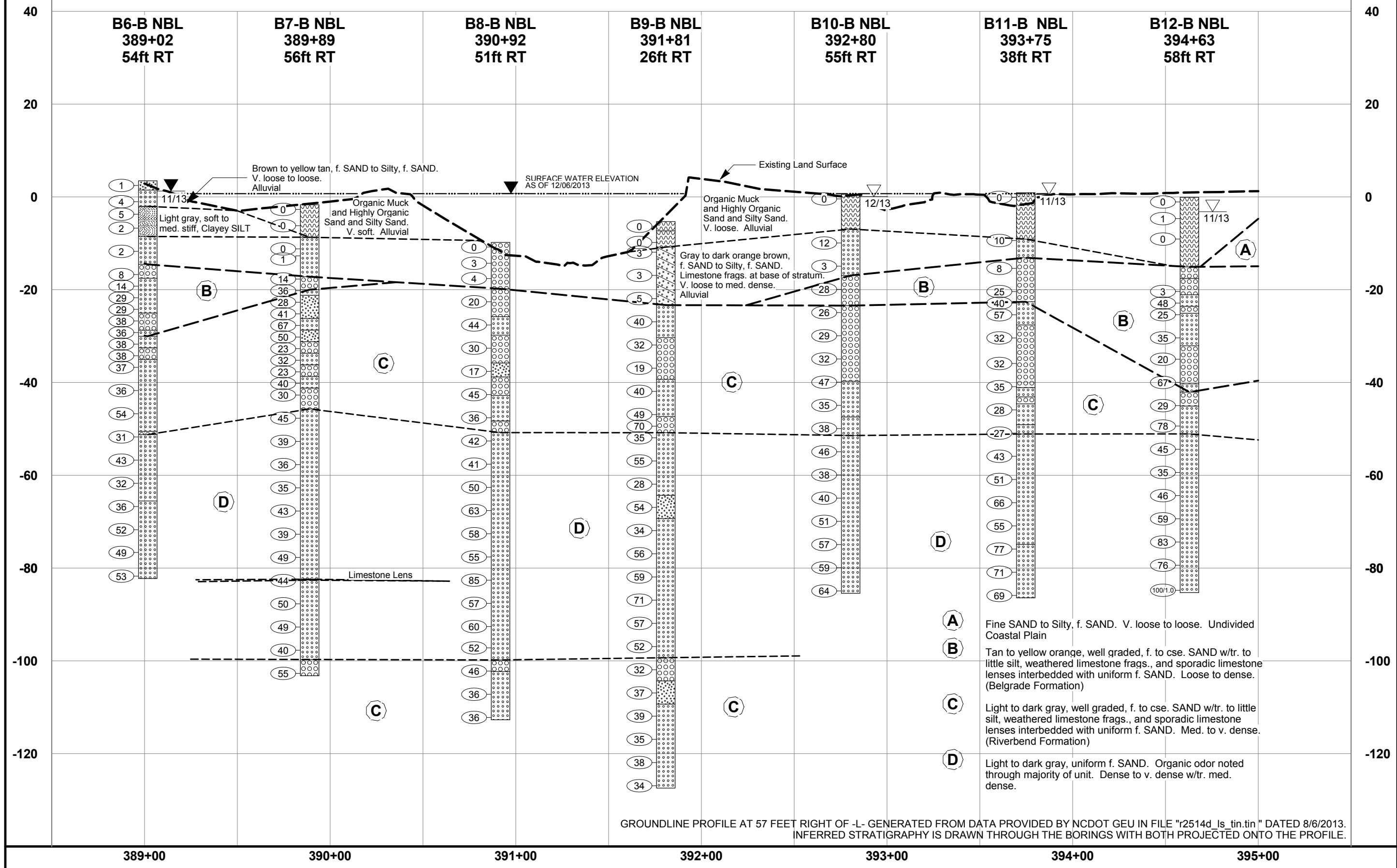
PROFILE NORTH BOUND LANE 57 FEET RIGHT OF -L-

V.E. = 2.5



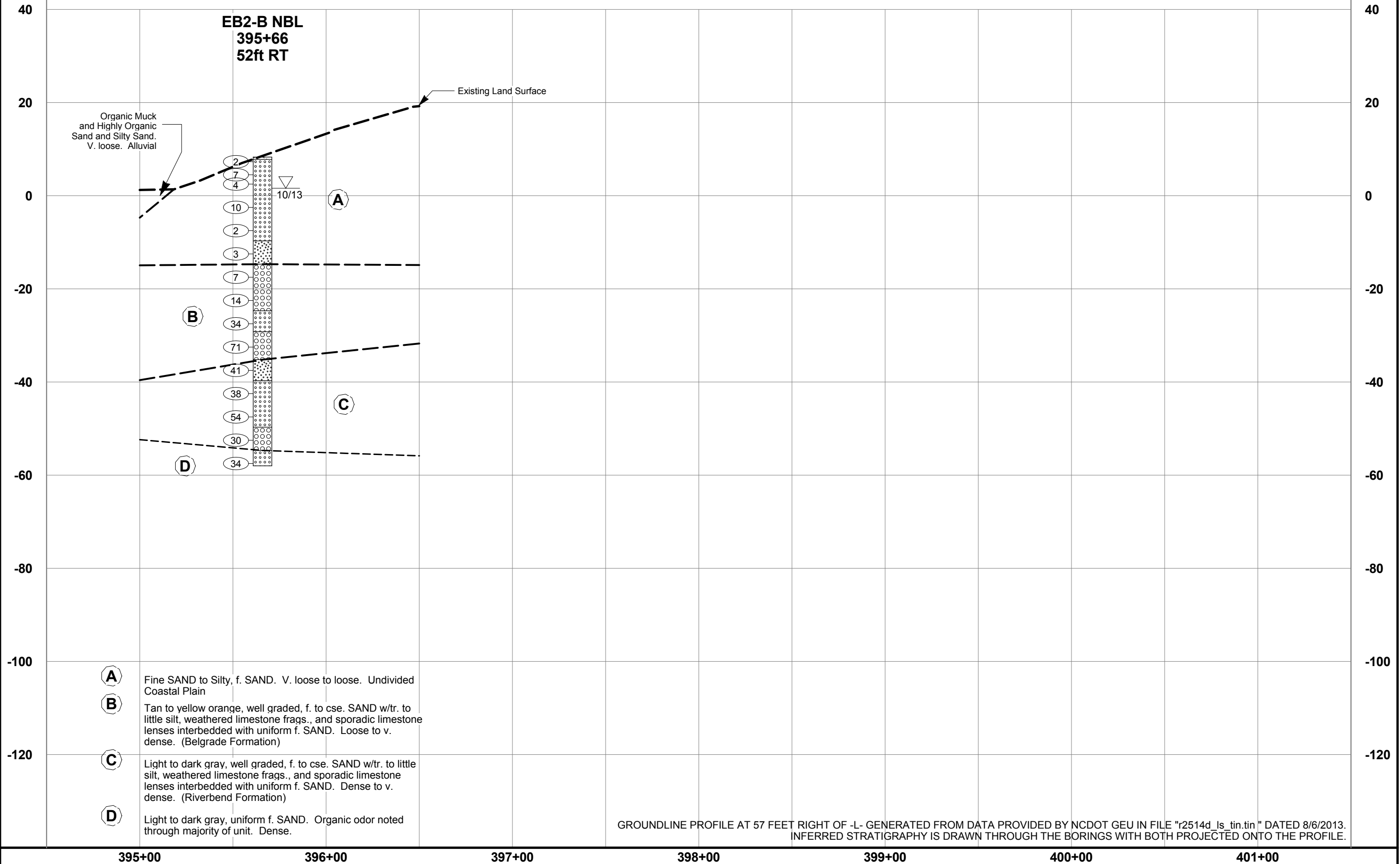
PROFILE NORTH BOUND LANE 57 FEET RIGHT OF -L-

V.E. = 2.5



PROFILE NORTH BOUND LANE 57 FEET RIGHT OF -L-

V.E. = 2.5

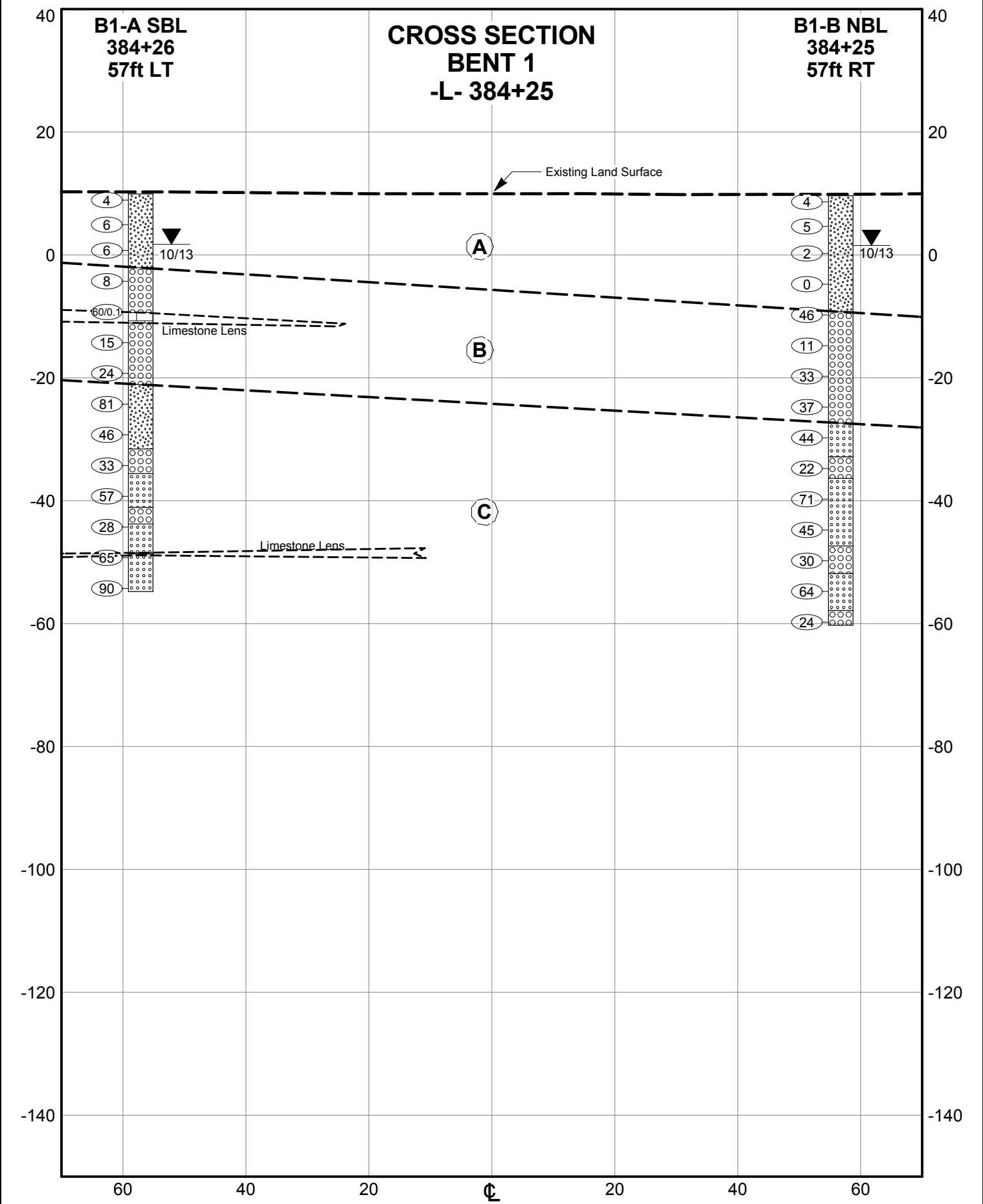
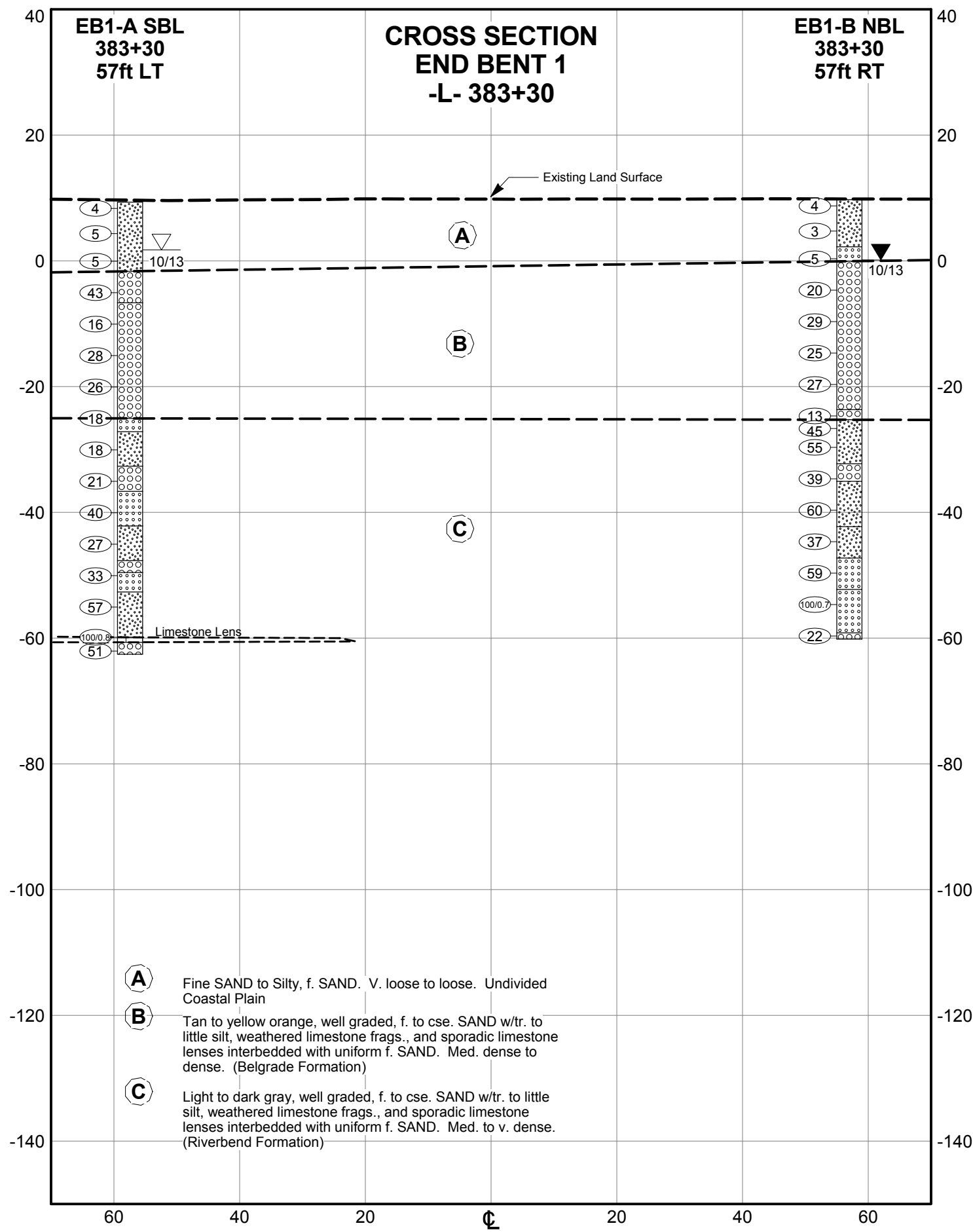


V.E. = 1



DESCRIPTION:
Dual Bridges on -L- over the Trent
River

SHEET NO.: 10 of 41
PROJ. NO.: 34442.1.5
TIP NO.: R-2514D
COUNTY: Jones

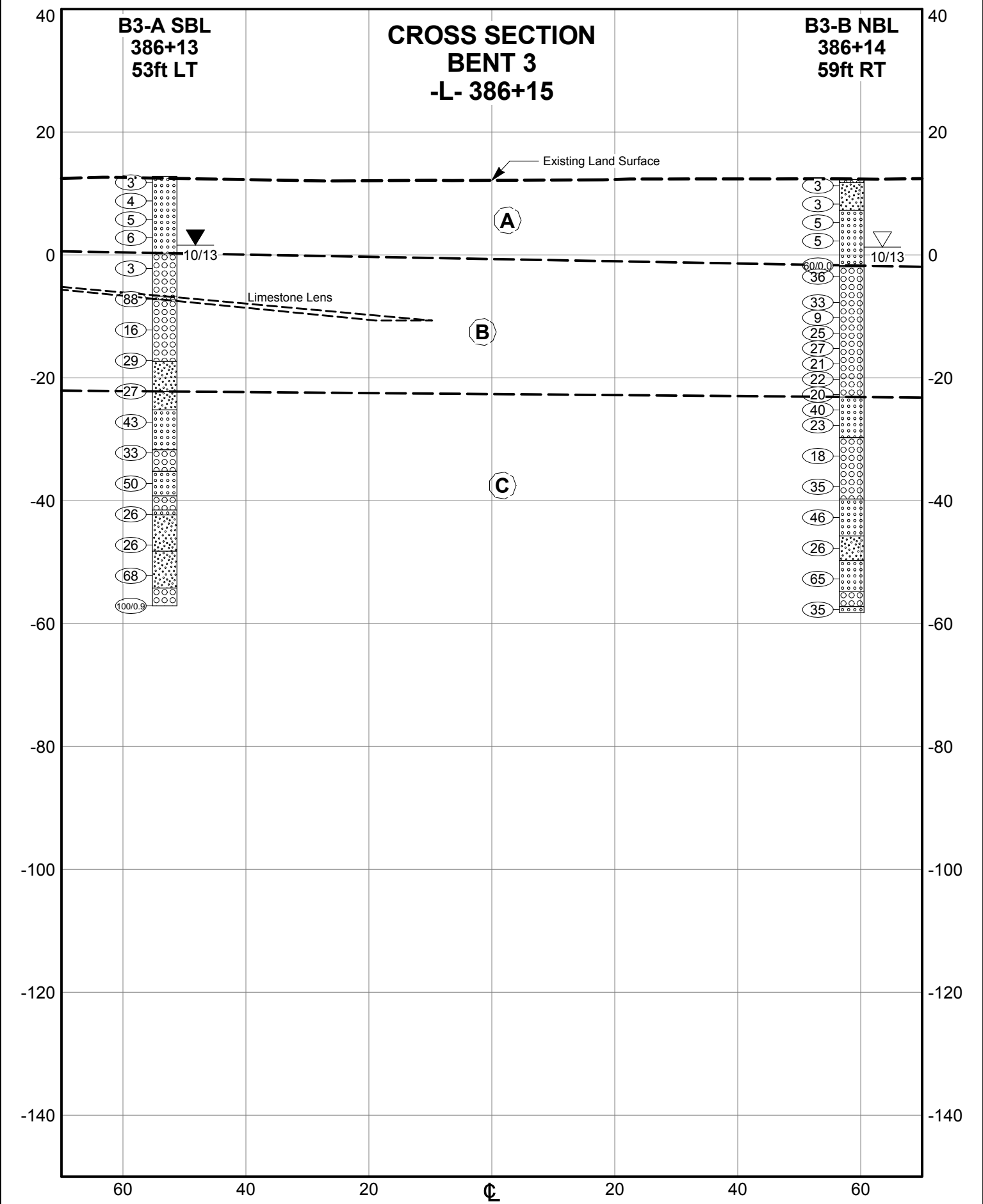
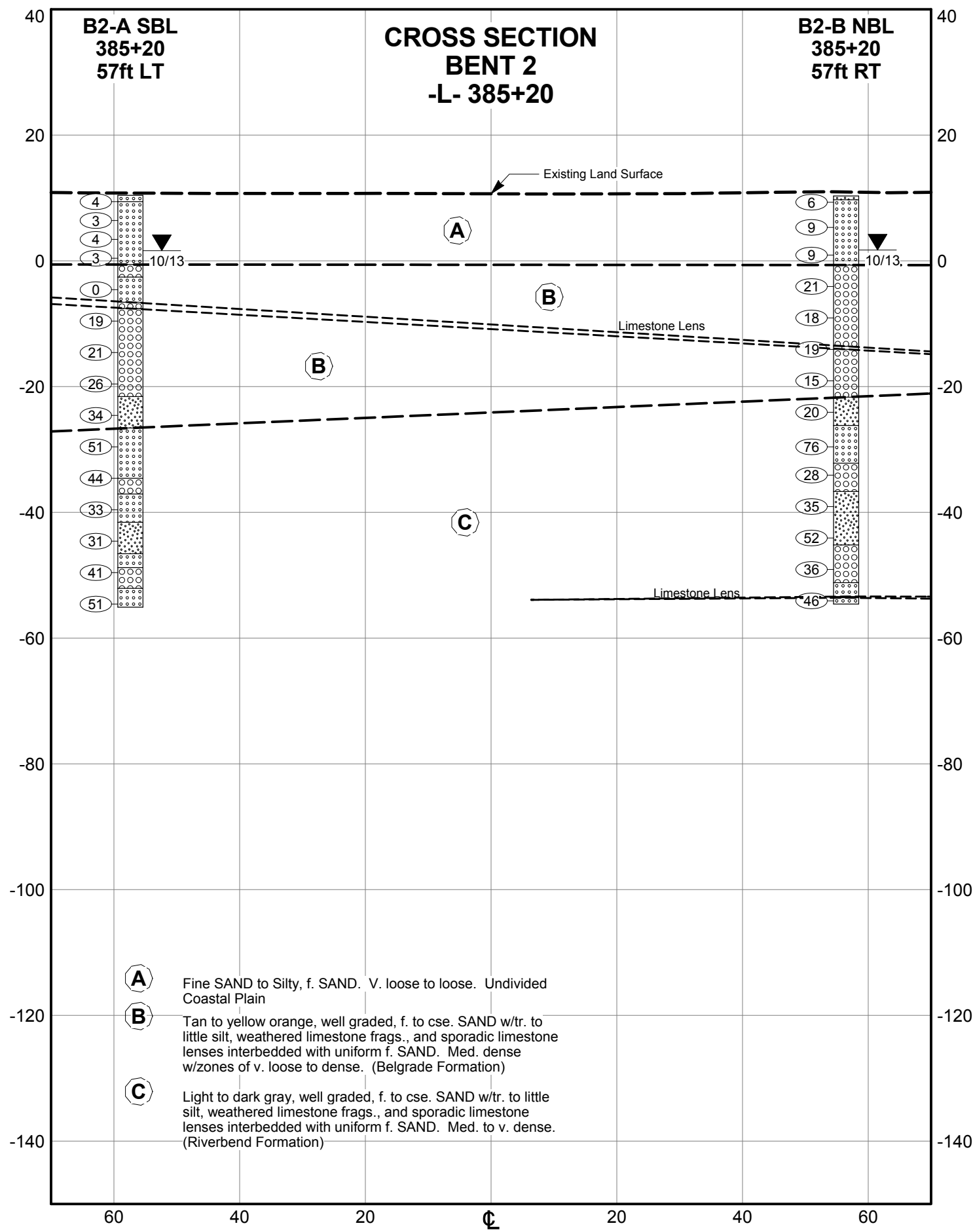


V.E. = 1



DESCRIPTION:
Dual Bridges on -L- over the Trent
River

SHEET NO.: 11 of 41
PROJ. NO.: 34442.1.5
TIP NO.: R-2514D
COUNTY: Jones

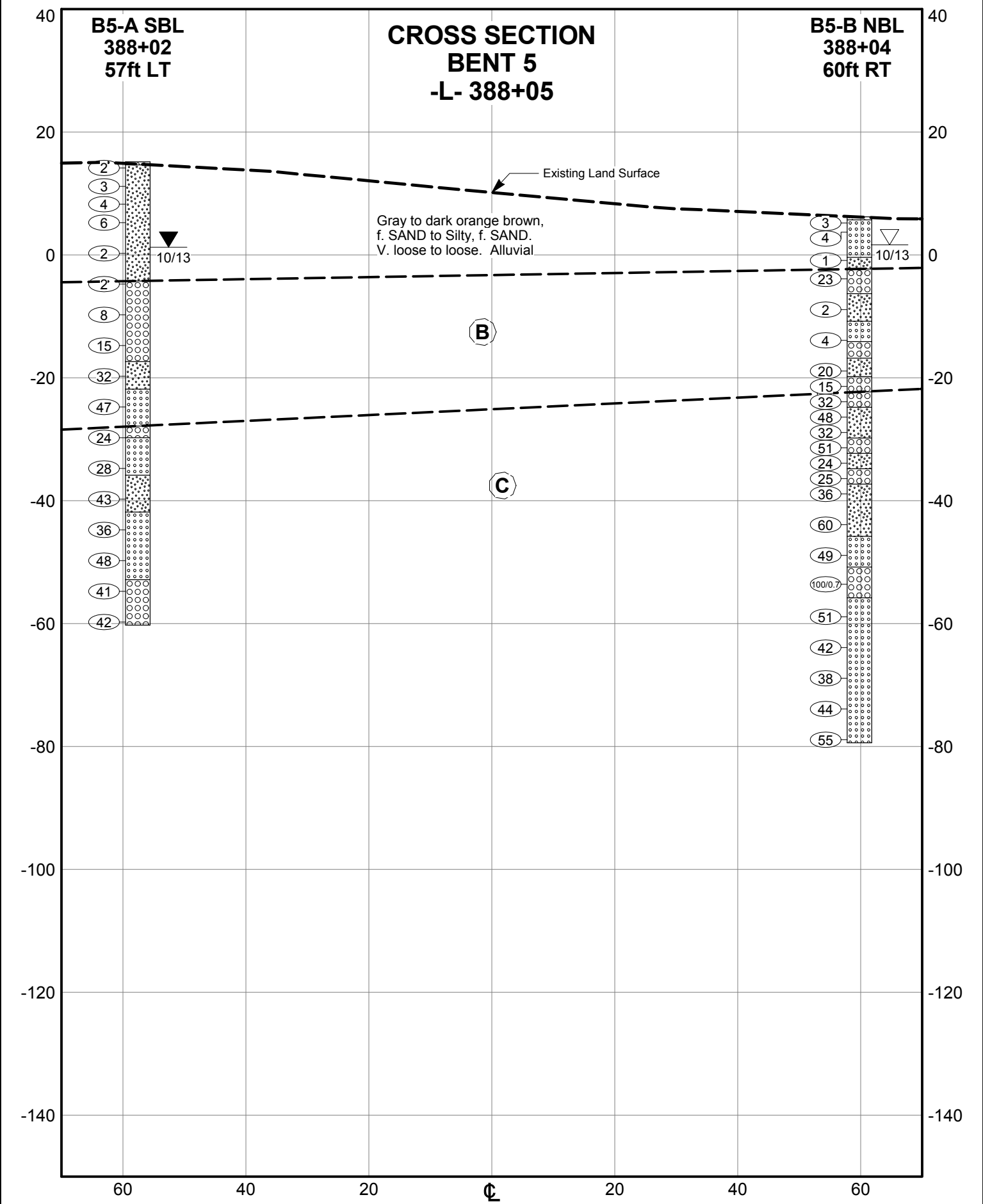
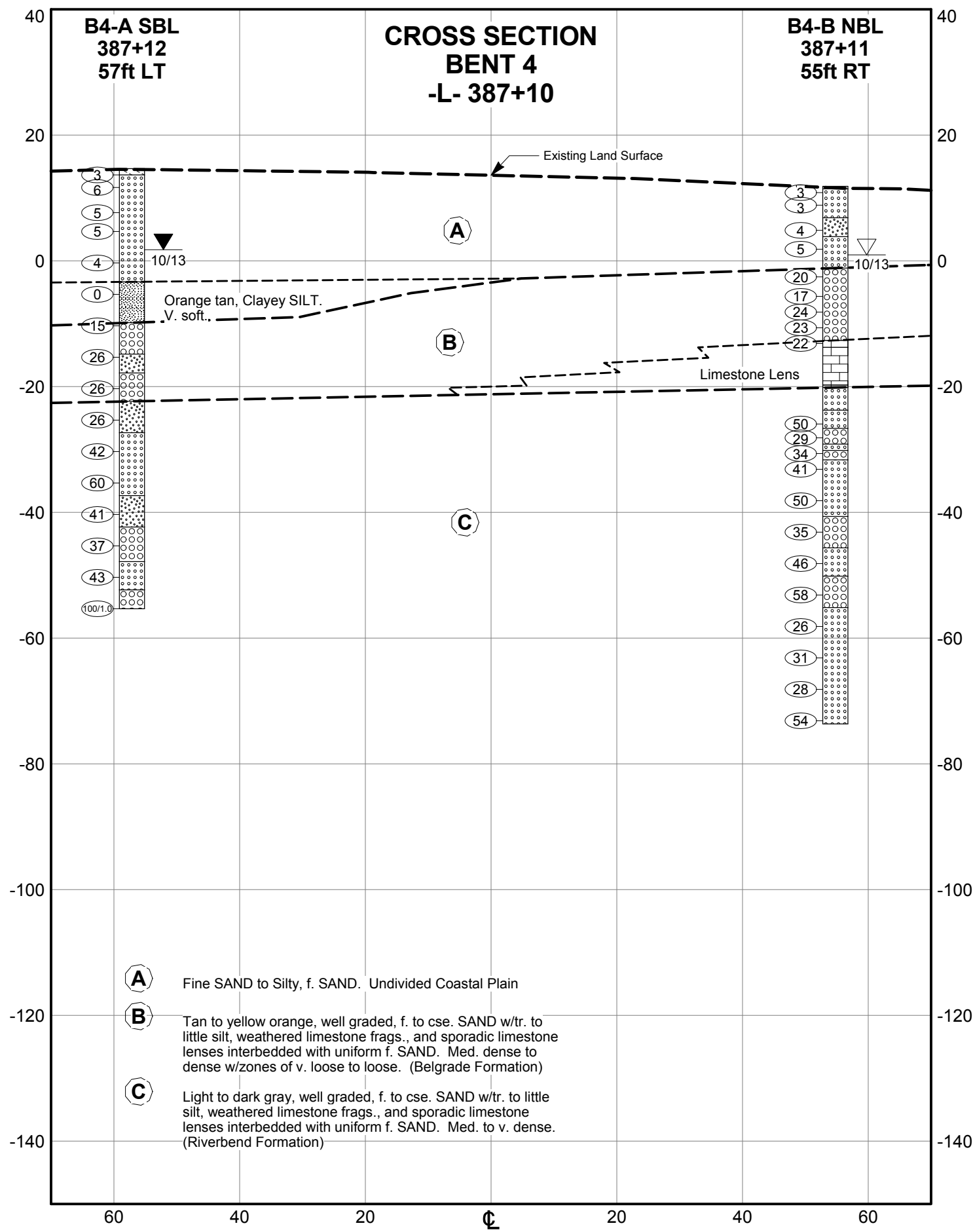


V.E. = 1



DESCRIPTION:
Dual Bridges on -L- over the Trent
River

SHEET NO.: 12 of 41
PROJ. NO.: 34442.1.5
TIP NO.: R-2514D
COUNTY: Jones

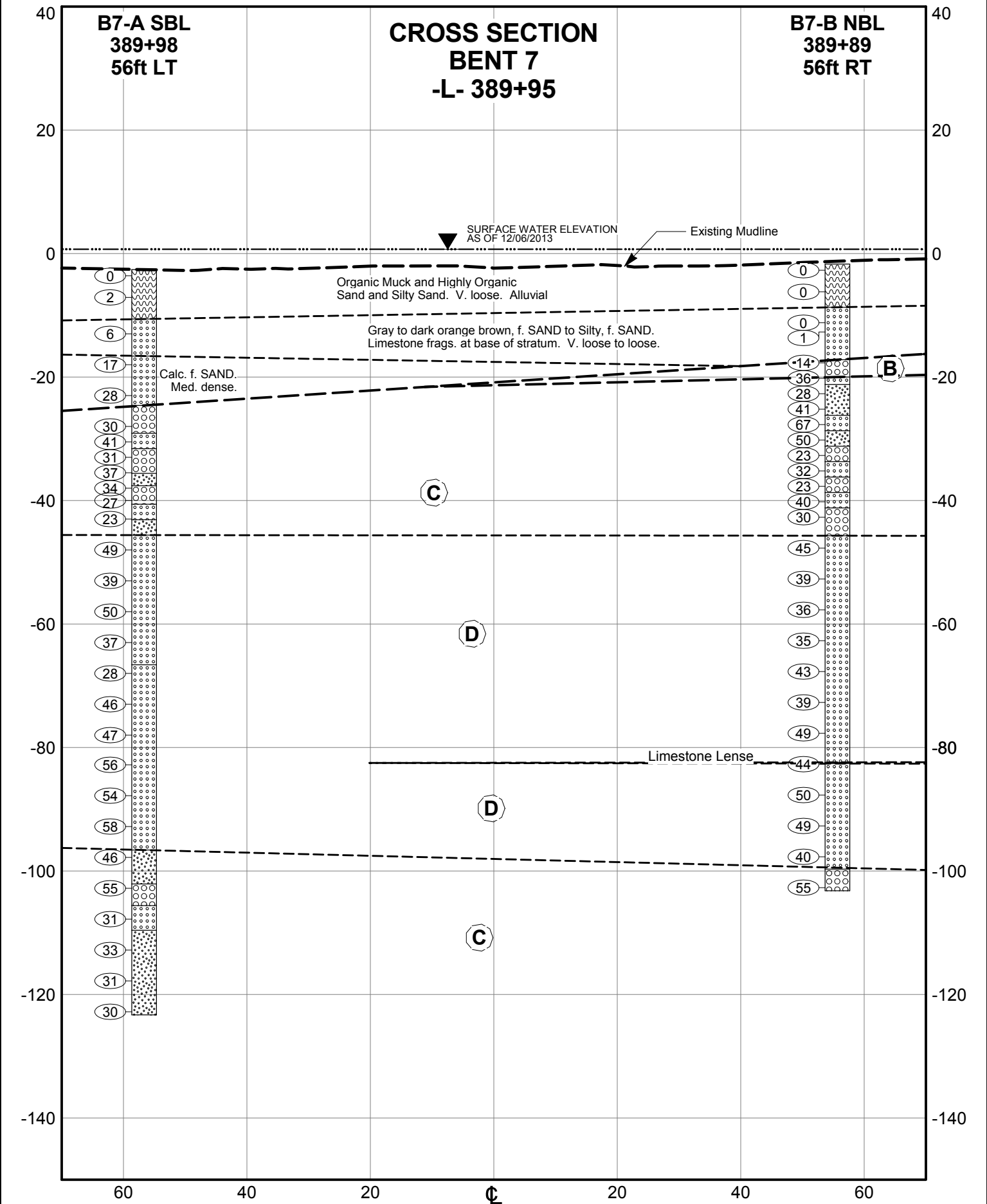
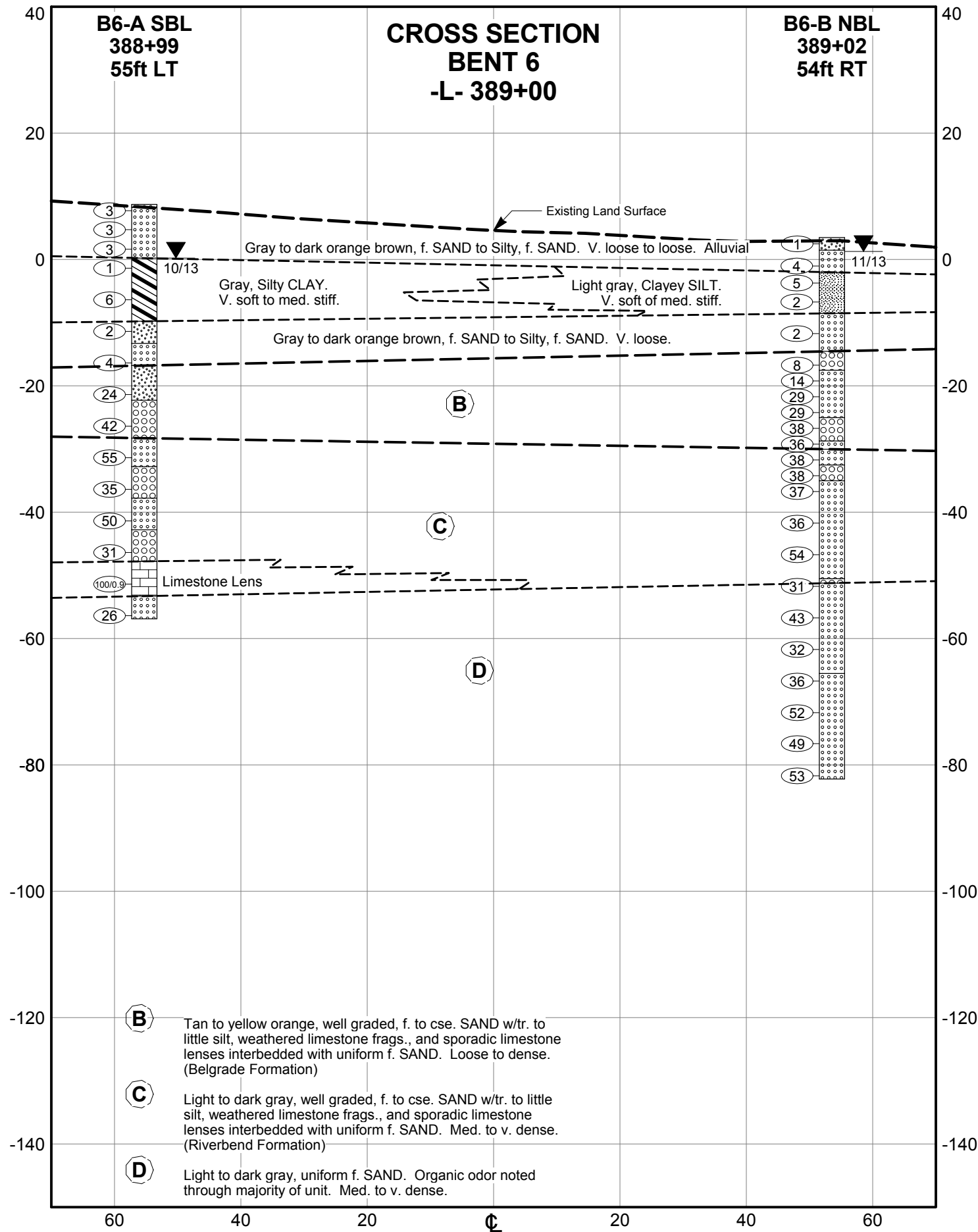


V.E. = 1



DESCRIPTION:
Dual Bridges on -L- over the Trent
River

SHEET NO.: 13 of 41
PROJ. NO.: 34442.1.5
TIP NO.: R-2514D
COUNTY: Jones

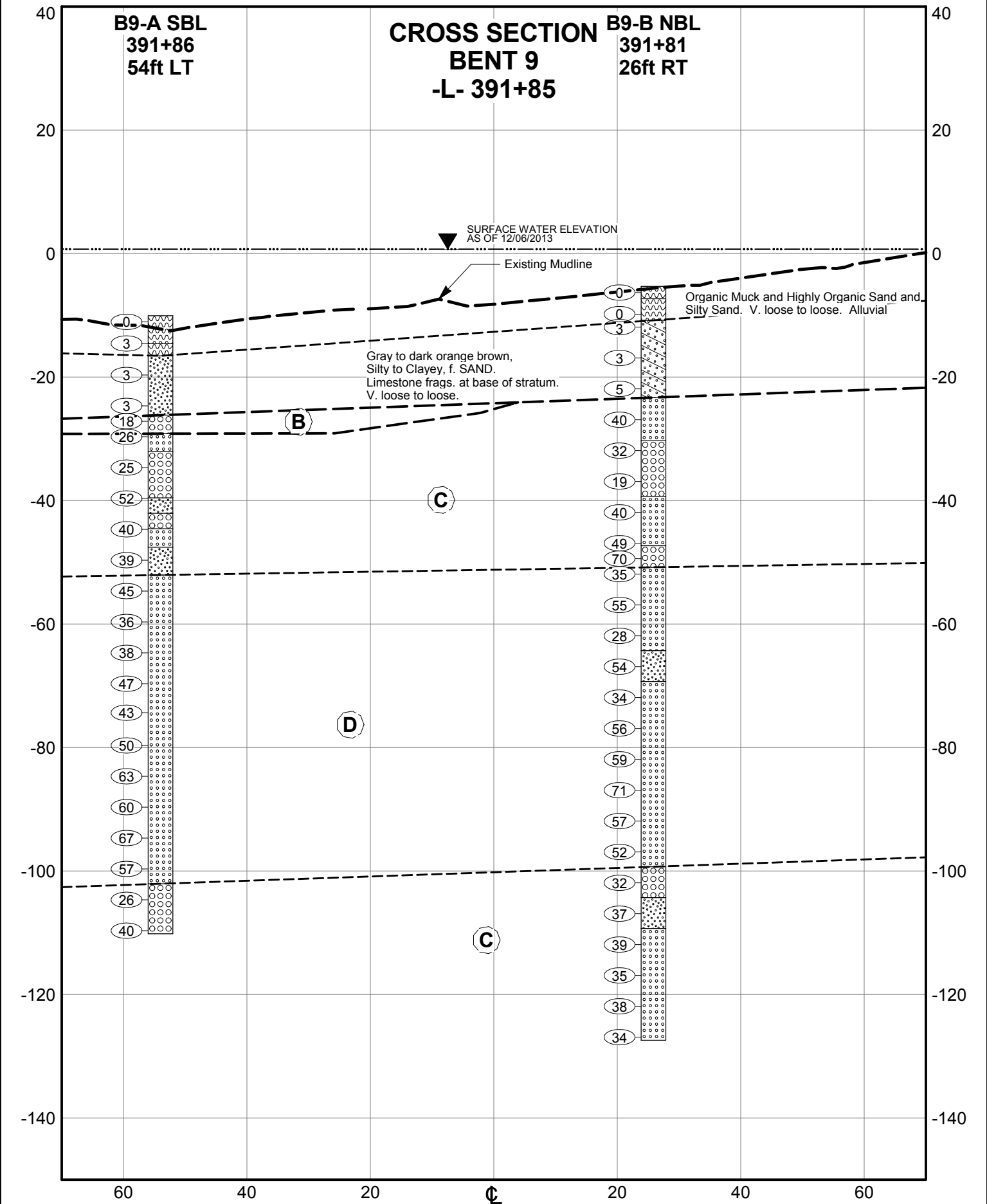
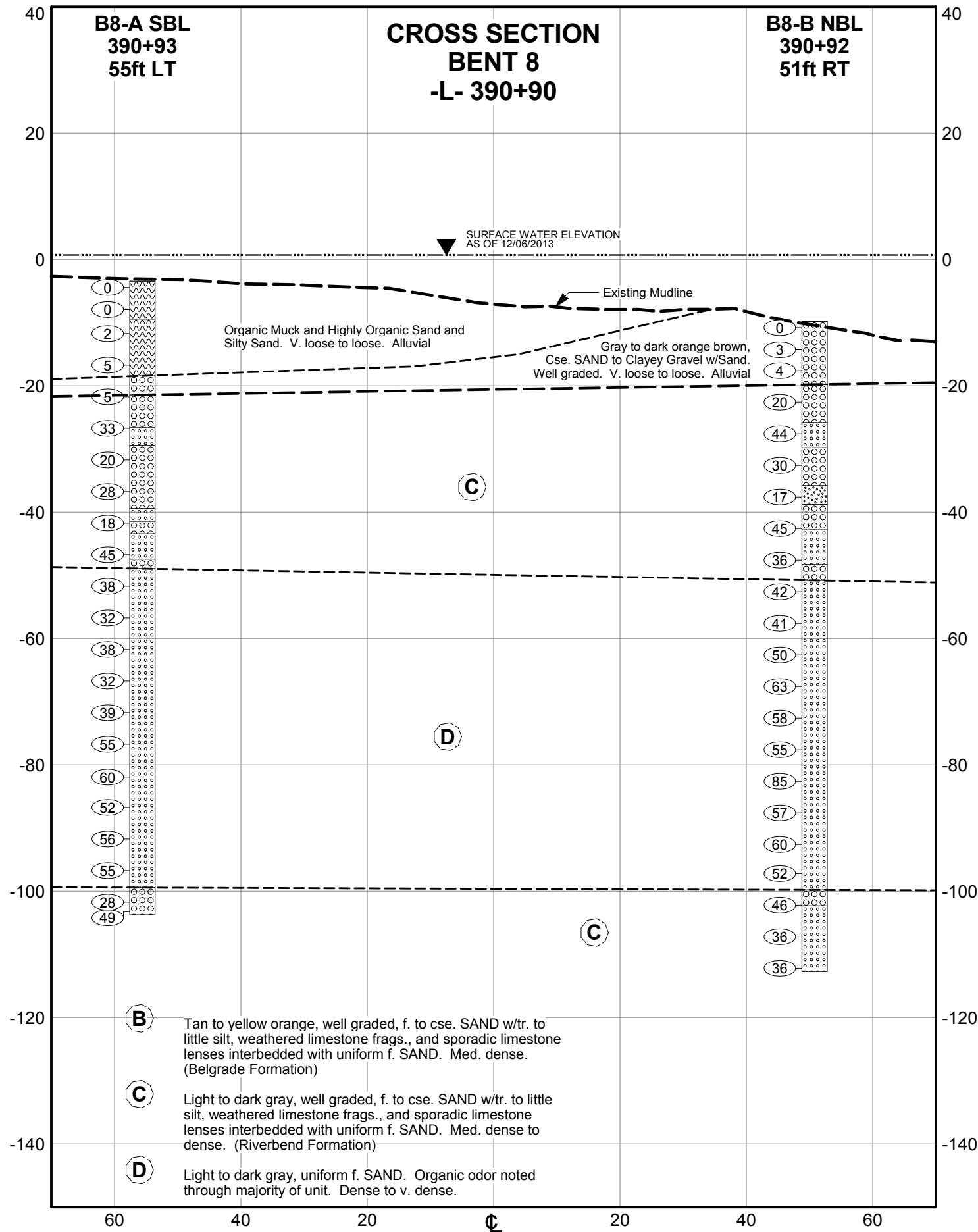


V.E. = 1



DESCRIPTION:
Dual Bridges on -L- over the Trent
River

SHEET NO.: 14 of 41
PROJ. NO.: 34442.1.5
TIP NO.: R-2514D
COUNTY: Jones

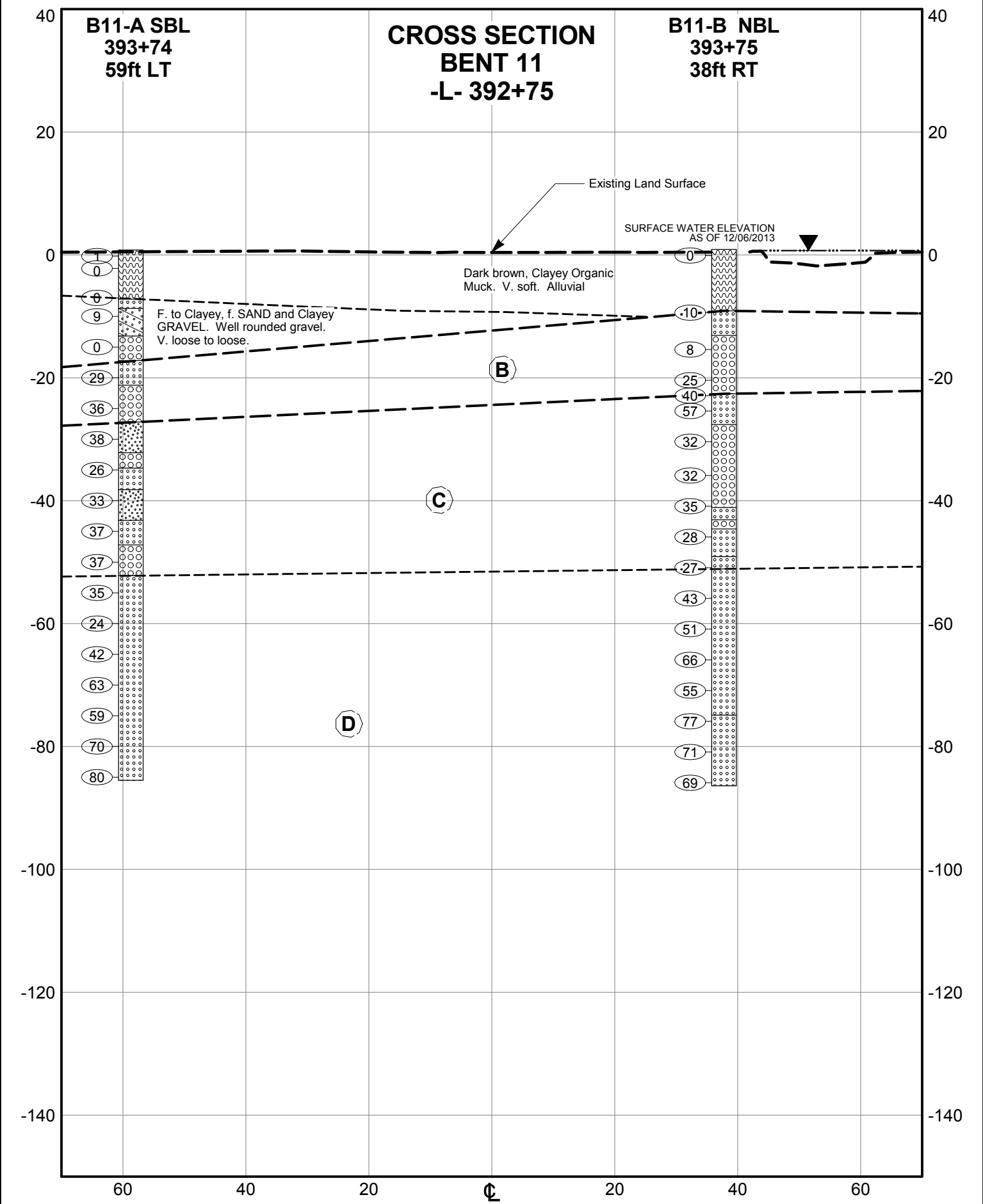
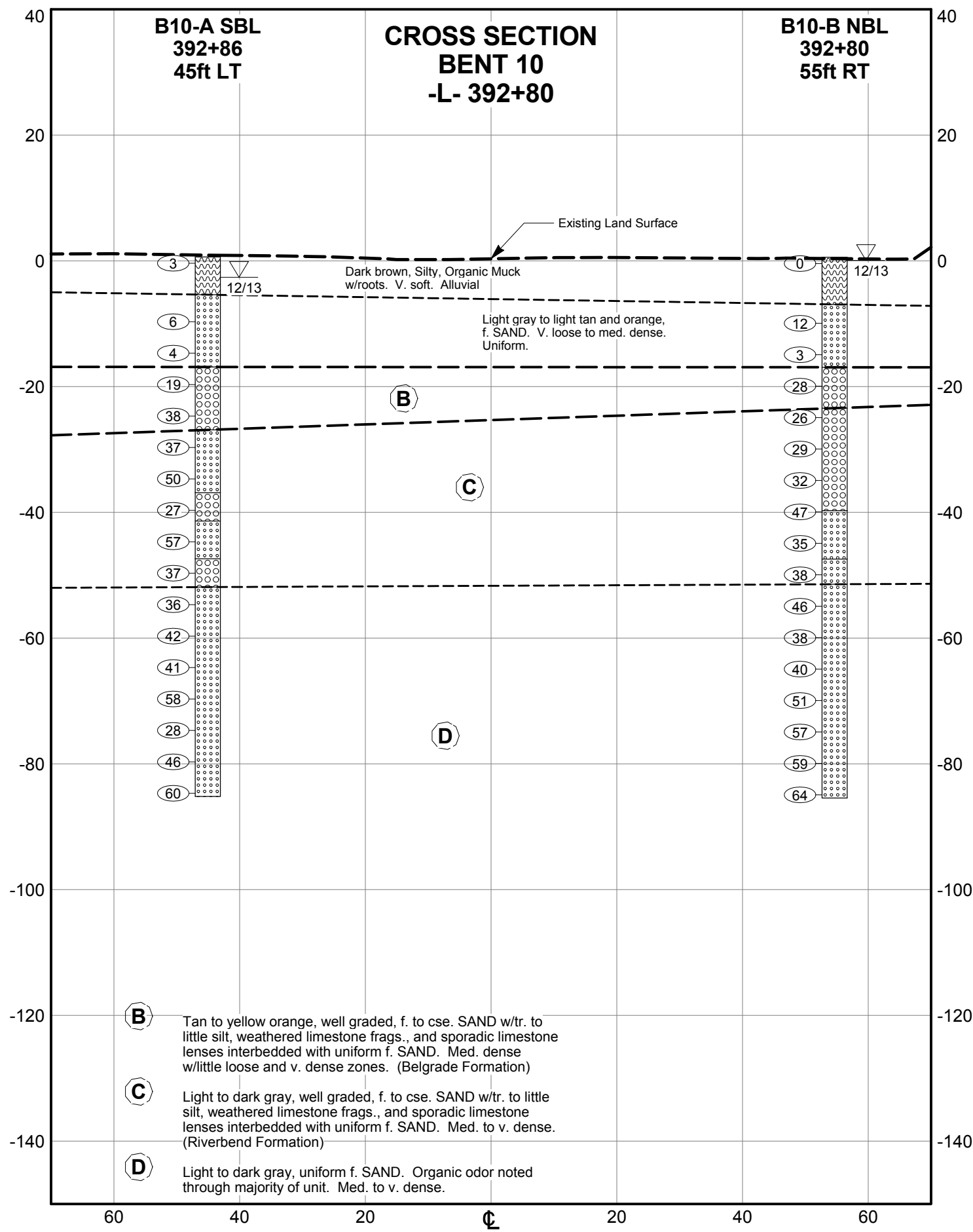


V.E. = 1



DESCRIPTION:
Dual Bridges on -L- over the Trent
River

SHEET NO.: 15 of 41
PROJ. NO.: 34442.1.5
TIP NO.: R-2514D
COUNTY: Jones

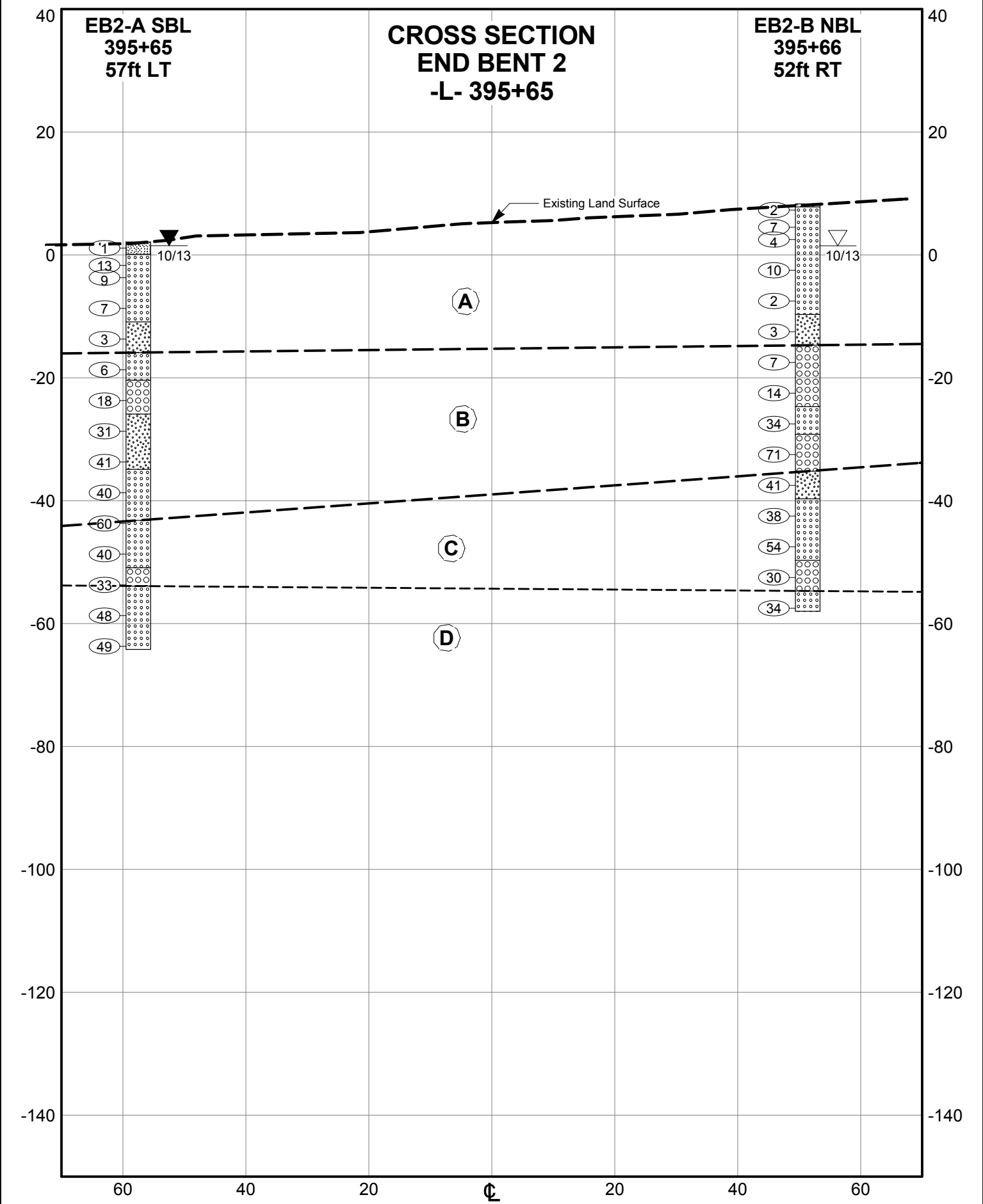
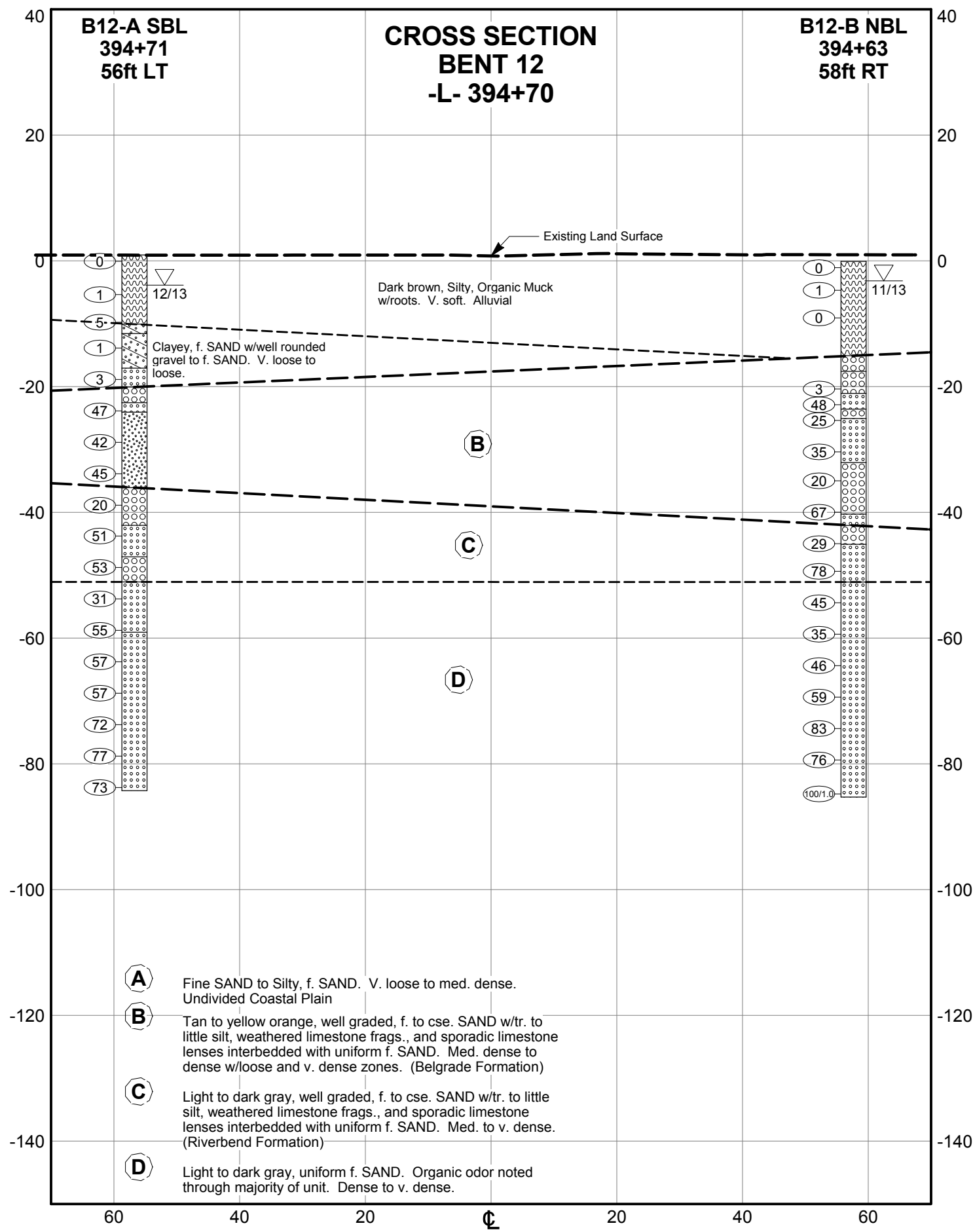


V.E. = 1



DESCRIPTION:
Dual Bridges on -L- over the Trent
River

SHEET NO.: 16 of 41
PROJ. NO.: 34442.1.5
TIP NO.: R-2514D
COUNTY: Jones



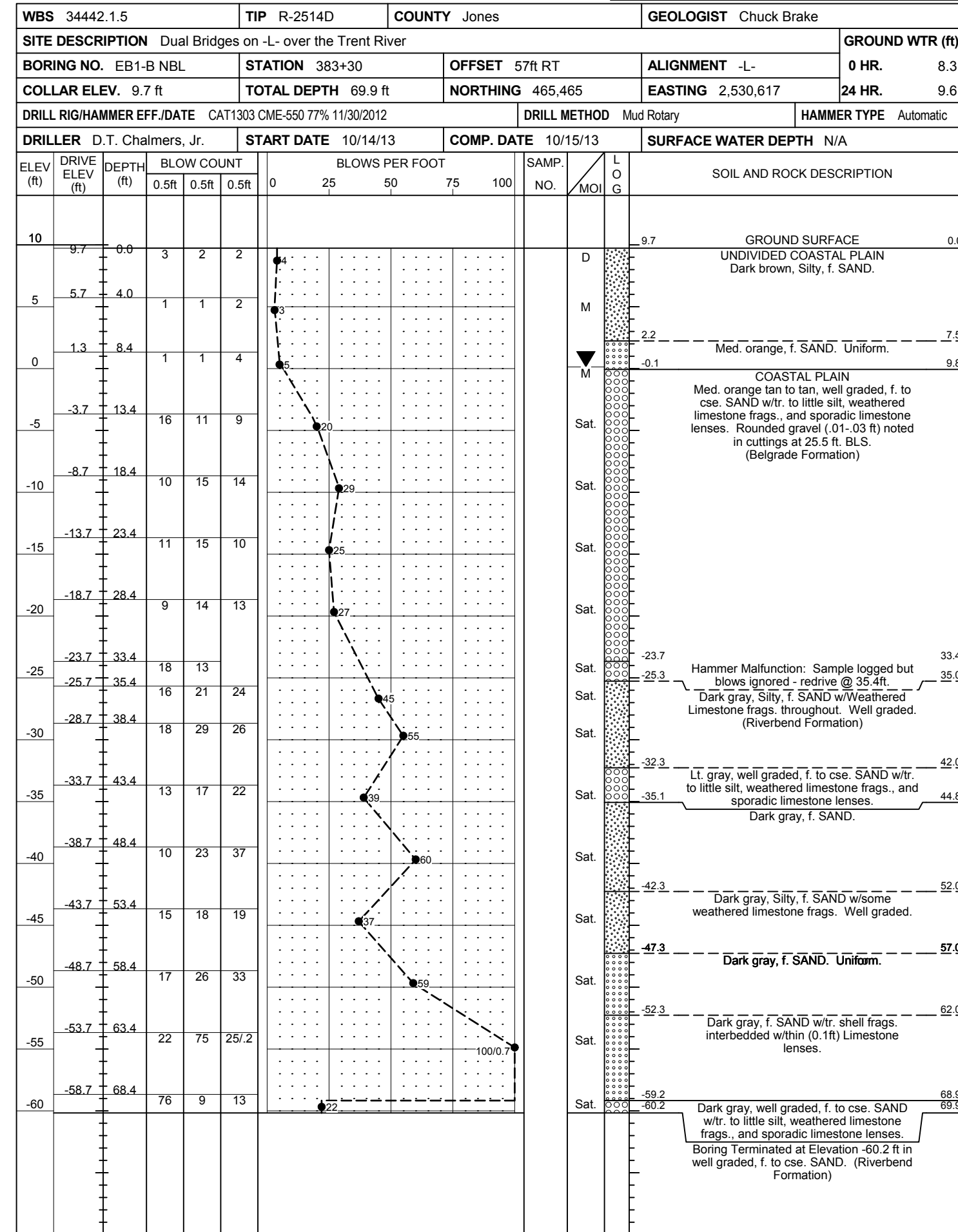
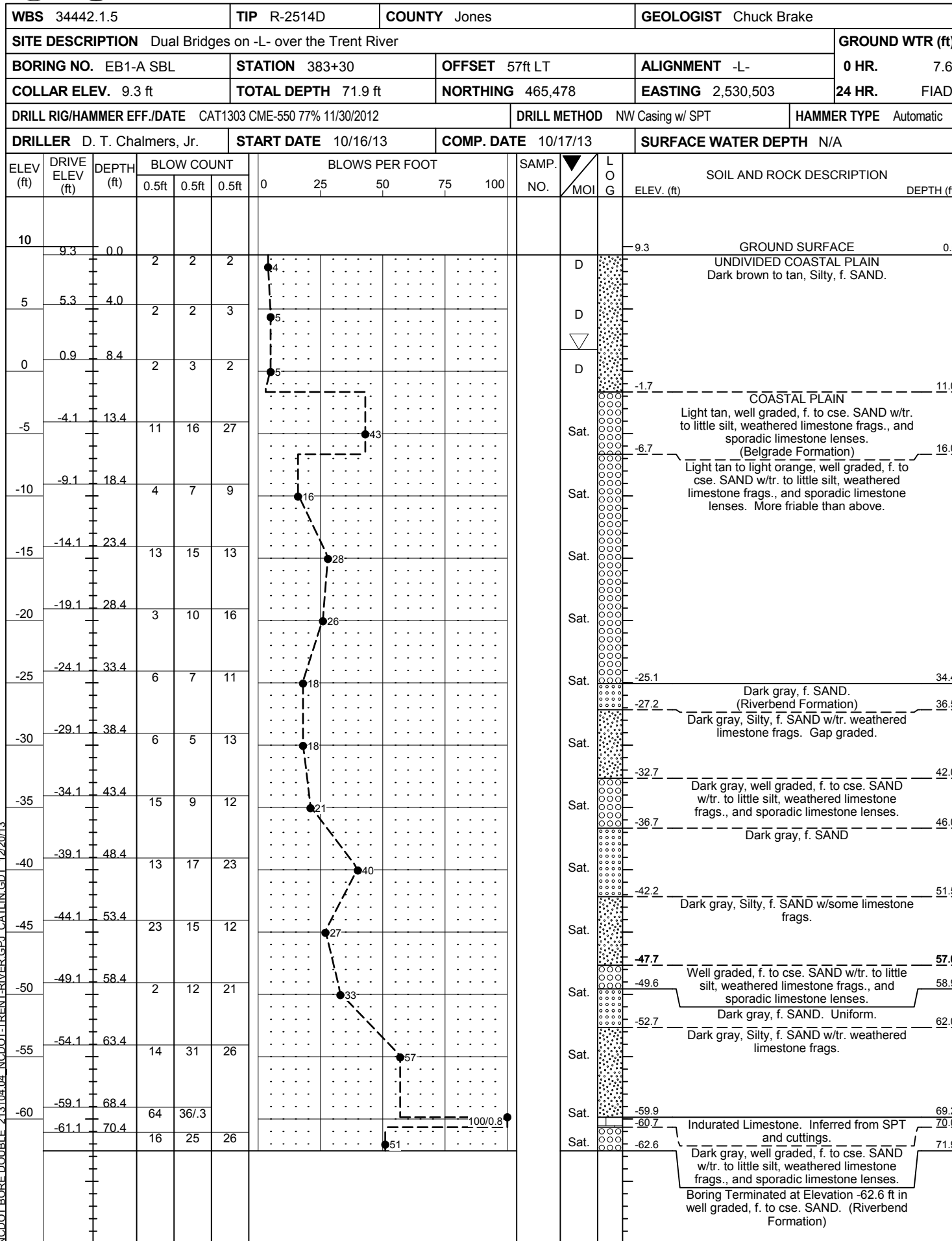


NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT



SHEET: 17 of 41
 PROJ. NO.: 34442.1.5
 TIP NO.: R-2514D
 COUNTY: Jones



NCDOT BORE DOUBLE 213104.04 NCDOT-TRENT-RIVER.GPJ CATLIN.GDT 12/20/13

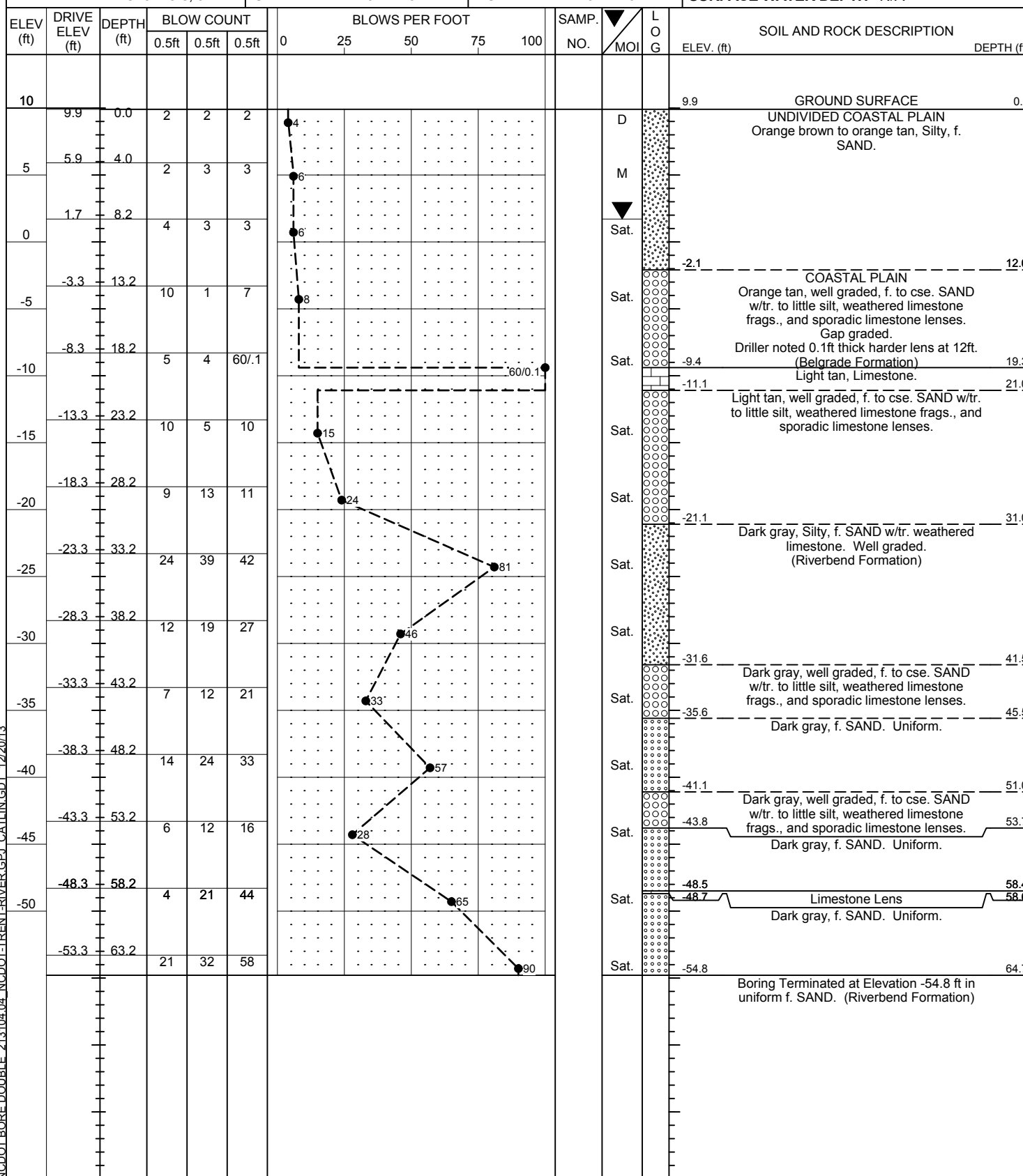
NCDOT BORE DOUBLE 213104.04 NCDOT-TRENT-RIVER.GPJ CATLIN.GDT 12/20/13



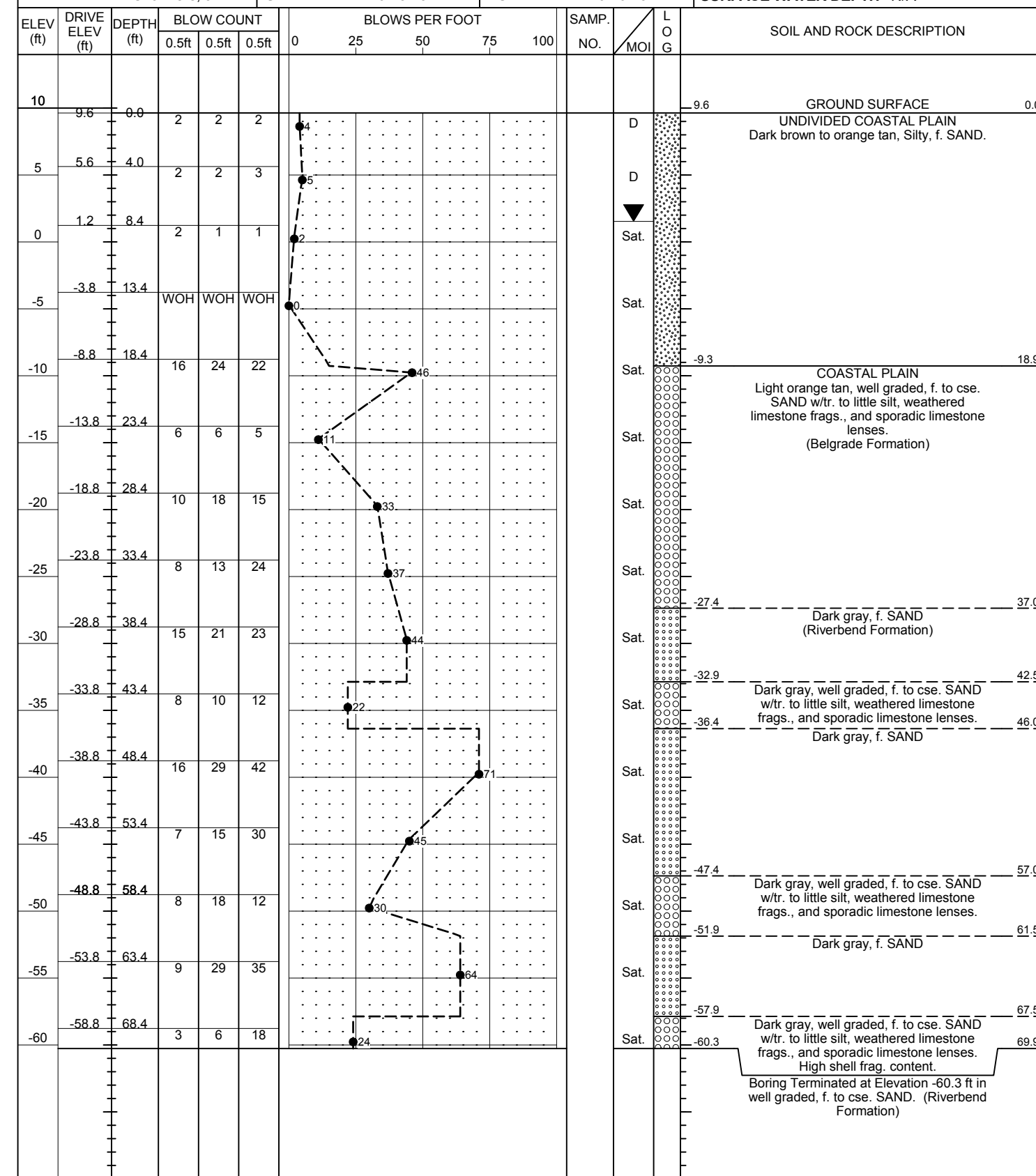
NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B1-A SBL	STATION 384+26	OFFSET 57ft LT	ALIGNMENT -L-
COLLAR ELEV. 9.9 ft	TOTAL DEPTH 64.7 ft	NORTHING 465,573	EASTING 2,530,515
DRILL RIG/HAMMER EFF./DATE CAT1303 CME-550 77% 11/30/2012			DRILL METHOD NW Casing w/ SPT
DRILLER D. T. Chalmers, Jr.			HAMMER TYPE Automatic
START DATE 10/17/13	COMP. DATE 10/17/13	SURFACE WATER DEPTH N/A	



WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B1-B NBL	STATION 384+25	OFFSET 57ft RT	ALIGNMENT -L-
COLLAR ELEV. 9.6 ft	TOTAL DEPTH 69.9 ft	NORTHING 465,559	EASTING 2,530,628
DRILL RIG/HAMMER EFF./DATE CAT1303 CME-550 77% 11/30/2012			DRILL METHOD NW Casing w/ SPT
DRILLER D. T. Chalmers, Jr.			HAMMER TYPE Automatic
START DATE 10/15/13	COMP. DATE 10/16/13	SURFACE WATER DEPTH N/A	



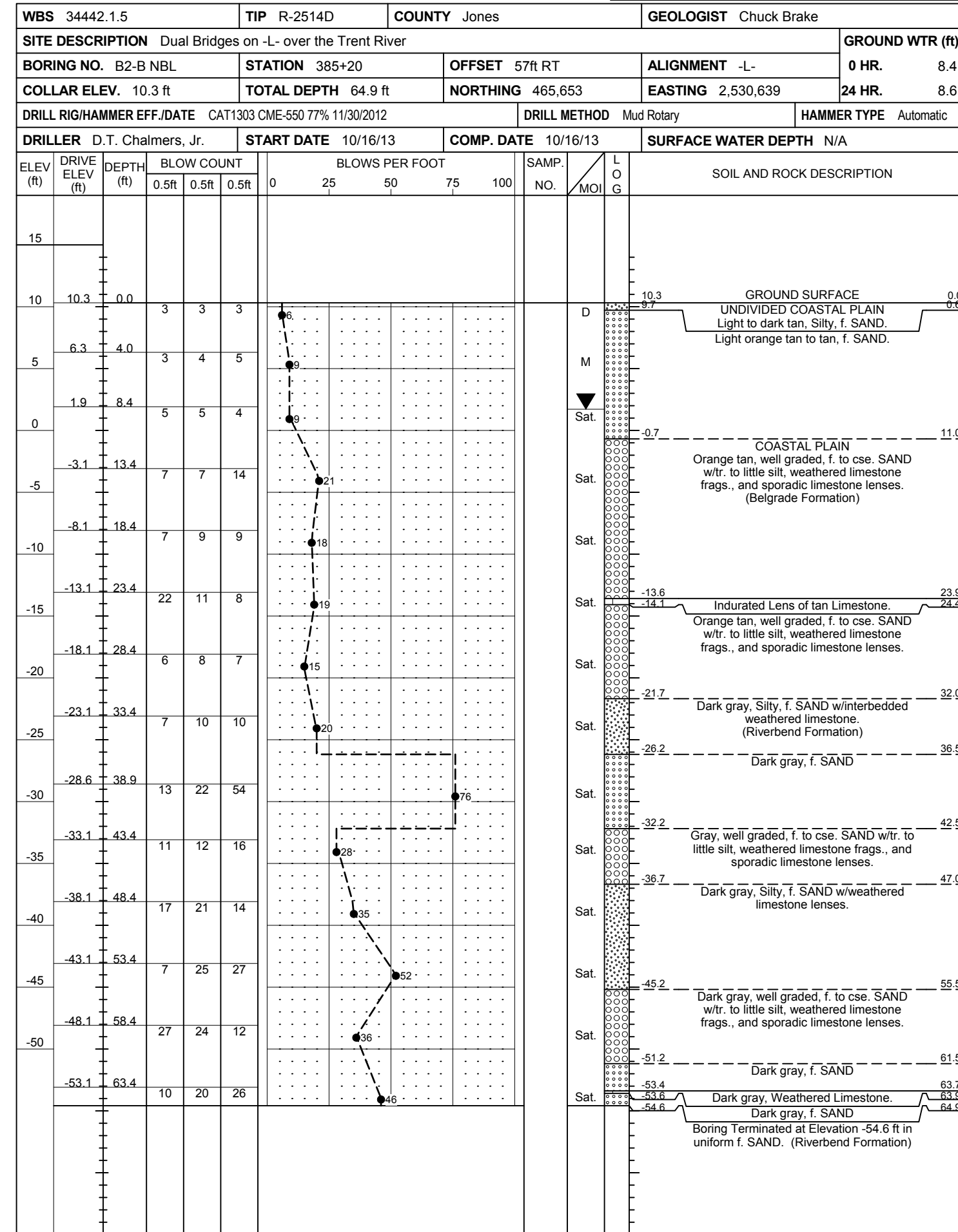
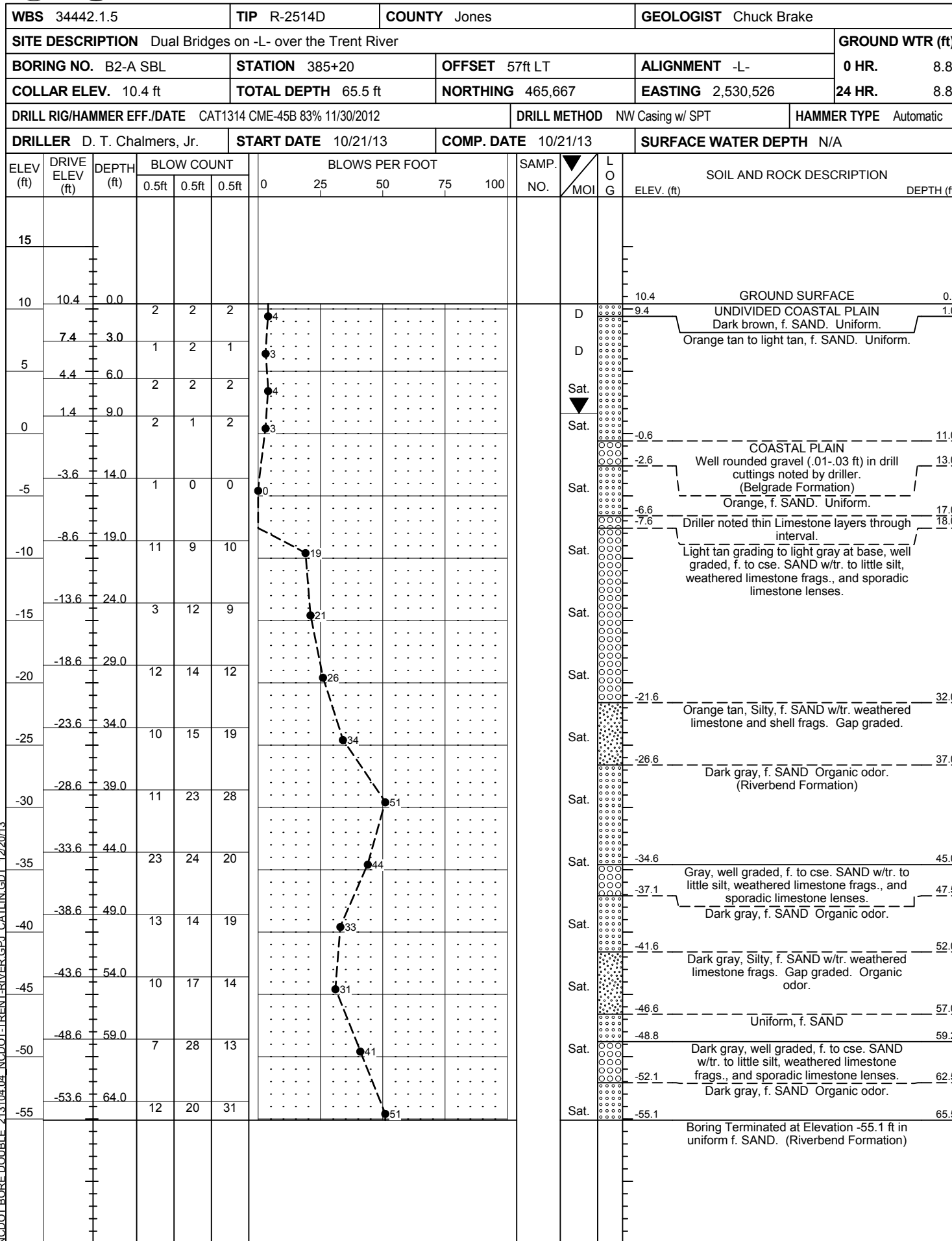
NCDOT BORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ_CATLIN.GDT_12/20/13

NCDOT BORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ_CATLIN.GDT_12/20/13



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT



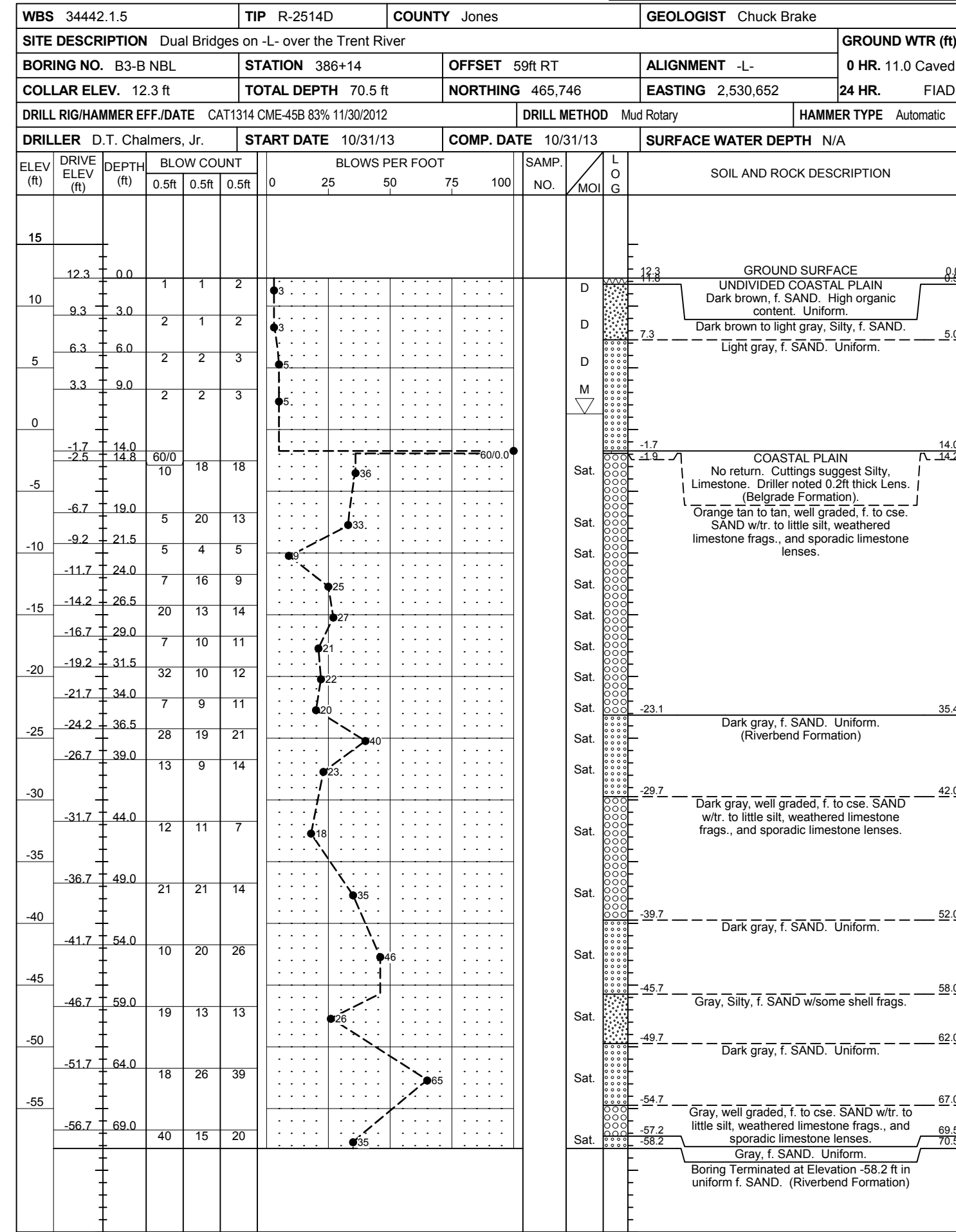
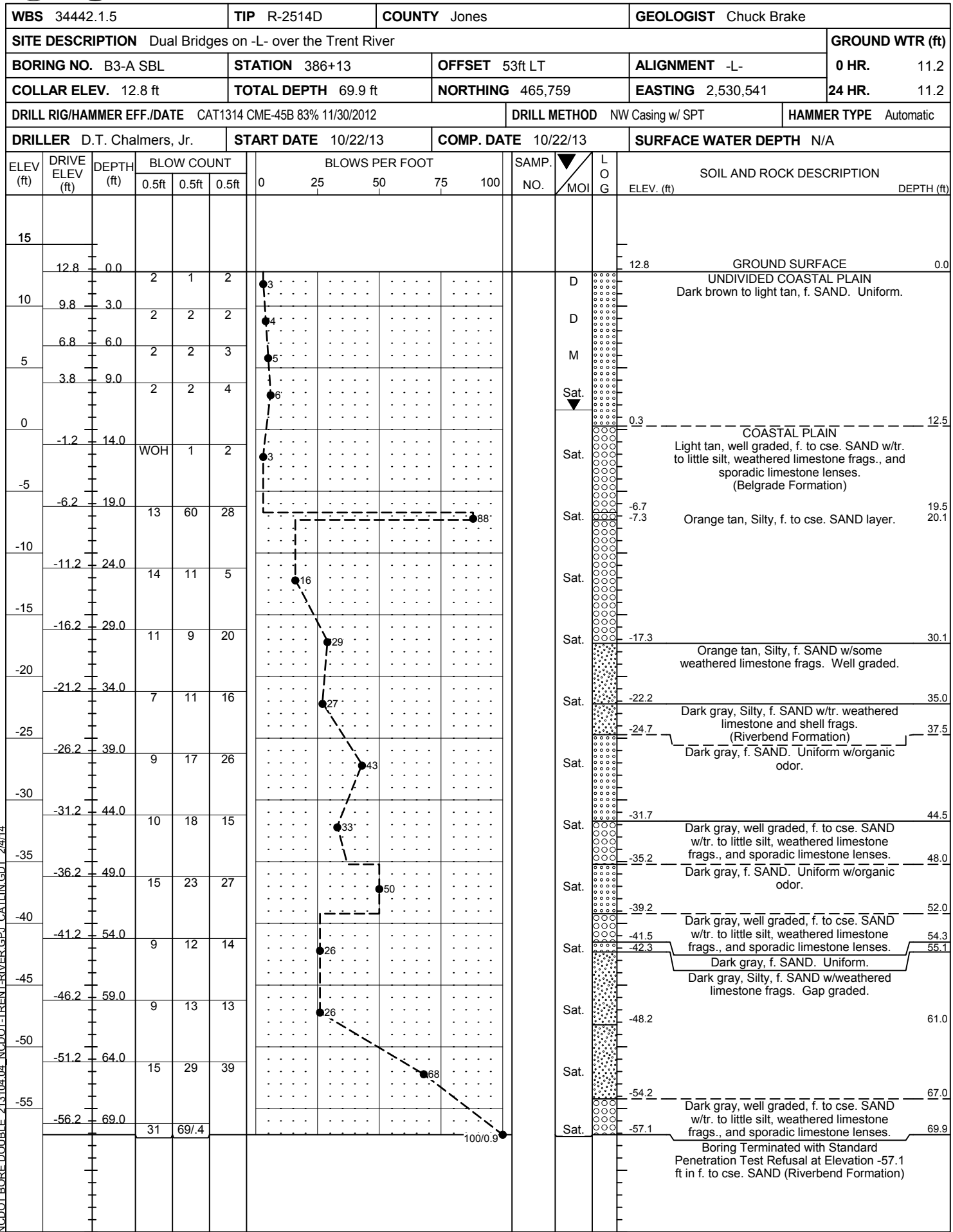
NCDOT BORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ CATLIN.GDT 12/20/13



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT



SHEET: 20 of 41
 PROJ. NO.: 34442.1.5
 TIP NO.: R-2514D
 COUNTY: Jones



NCDOT BORE DOUBLE 213104.04 NCDOT-TRENT-RIVER.GPJ CATLIN.GDT 2/4/14



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Chuck Brake											
SITE DESCRIPTION Dual Bridges on -L- over the Trent River							GROUND WTR (ft)										
BORING NO. B4-A SBL		STATION 387+12		OFFSET 57ft LT		ALIGNMENT -L-											
COLLAR ELEV. 14.7 ft		TOTAL DEPTH 70.0 ft		NORTHING 465,858		EASTING 2,530,549											
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 83% 11/30/2012				DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
DRILLER N/A		START DATE 10/23/13		COMP. DATE 10/23/13		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
15	14.7	0.0	2	1	2										14.7	0.0	GROUND SURFACE
	12.7	2.0	2	3	3										13.7	1.0	UNDIVIDED COASTAL PLAIN Dark brown, f. SAND w/organics. Light yellow tan, f. SAND. Uniform.
10	8.7	6.0	2	2	3												
5	5.7	9.0	2	3	2												
0	0.7	14.0	2	2	2												
-5	-4.3	19.0	WOH	WOH	WOH										-3.3	18.0	Orange tan, Clayey SILT.
-10	-9.3	24.0	3	7	8										-9.8	24.5	
-15	-14.3	29.0	7	14	12										-14.8	29.5	COASTAL PLAIN Light tan to white, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses. (Belgrade Formation)
-20	-19.3	34.0	16	14	12										-17.8	32.5	Orange tan, Silty, f. SAND w/some weathered limestone frags.
-25	-24.3	39.0	17	12	14										-22.3	37.0	Light orange tan, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses.
-30	-29.3	44.0	21	19	23										-27.3	42.0	Dark gray, Silty, f. SAND w/tr. weathered limestone frags. Gap graded. (Riverbend Formation)
-35	-34.3	49.0	17	24	36										-37.3	52.0	Dark gray, f. SAND. Uniform. Organic odor.
-40	-39.3	54.0	14	22	19										-42.3	57.0	Dark gray, Silty, f. SAND w/some weathered limestone frags. Gap graded.
-45	-44.3	59.0	12	17	20										-47.8	62.5	Dark gray, f. SAND. Uniform. Organic odor.
-50	-49.3	64.0	10	19	24										-52.3	67.0	Dark gray, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses.
-55	-54.3	69.0	33	67.5											-55.3	70.0	Boring Terminated with Standard Penetration Test Refusal at Elevation -55.3 ft in well graded, f. to cse. SAND. (Riverbend Formation)

NCDOT BORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ_CATLIN.GDT_12/24/13



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

CATLIN Engineers and Scientists
230 Old Dairy Road
Wilmington, NC 28405
Corporate License No. for Engineering Services C-6685
213104.04

SHEET: 22 of 41
PROJ. NO.: 34442.1.5
TIP NO.: R-2514D
COUNTY: Jones

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B4-B NBL	STATION 387+11	OFFSET 55ft RT	ALIGNMENT -L-
COLLAR ELEV. 11.9 ft	TOTAL DEPTH 85.5 ft	NORTHING 465,843	EASTING 2,530,660
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 83% 11/30/2012	DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic
DRILLER D. T. Chalmers, Jr.	START DATE 10/29/13	COMP. DATE 10/31/13	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
15	11.9	0.0	1	1	2										11.9	GROUND SURFACE	0.0
10	9.9	2.0	2	2	1								D		UNDIVIDED COASTAL PLAIN Dark brown, Silty, f. SAND. High root content.		
5	5.9	6.0	2	2	2								M		Light tan, f. SAND. Dark orange tan, Silty, f. SAND.	5.0	
0	2.9	9.0	3	2	3								Sat.		Light tan gray, f. SAND.	8.0	
-5	-1.6	13.4	21	12	8								Sat.		COASTAL PLAIN Light tan to orange tan, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses. (Belgrade Formation)	13.0	
-10	-4.7	16.5	10	6	11								Sat.				
-15	-7.2	19.0	13	13	11								Sat.				
-20	-9.7	21.5	10	10	13								Sat.				
-25	-12.2	24.0	23	11	11								Sat.				
-30	-19.8	31.6											Sat.				
-35	-20.2	32.0											Sat.				
-40	-23.8	35.6											Sat.				
-45	-26.7	38.5											Sat.				
-50	-29.2	41.0											Sat.				
-55	-30.2	42.0											Sat.				
-60	-31.7	43.5											Sat.				
-65	-40.7	52.5											Sat.				
-70	-45.7	57.5											Sat.				
-75	-50.2	62.0											Sat.				
-80	-55.2	67.0											Sat.				

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B4-B NBL	STATION 387+11	OFFSET 55ft RT	ALIGNMENT -L-
COLLAR ELEV. 11.9 ft	TOTAL DEPTH 85.5 ft	NORTHING 465,843	EASTING 2,530,660
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 83% 11/30/2012	DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic
DRILLER D. T. Chalmers, Jr.	START DATE 10/29/13	COMP. DATE 10/31/13	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
-65																
-70	-67.2	79.0	12	12	16								Sat.			
-75	-72.2	84.0	20	20	34								Sat.			

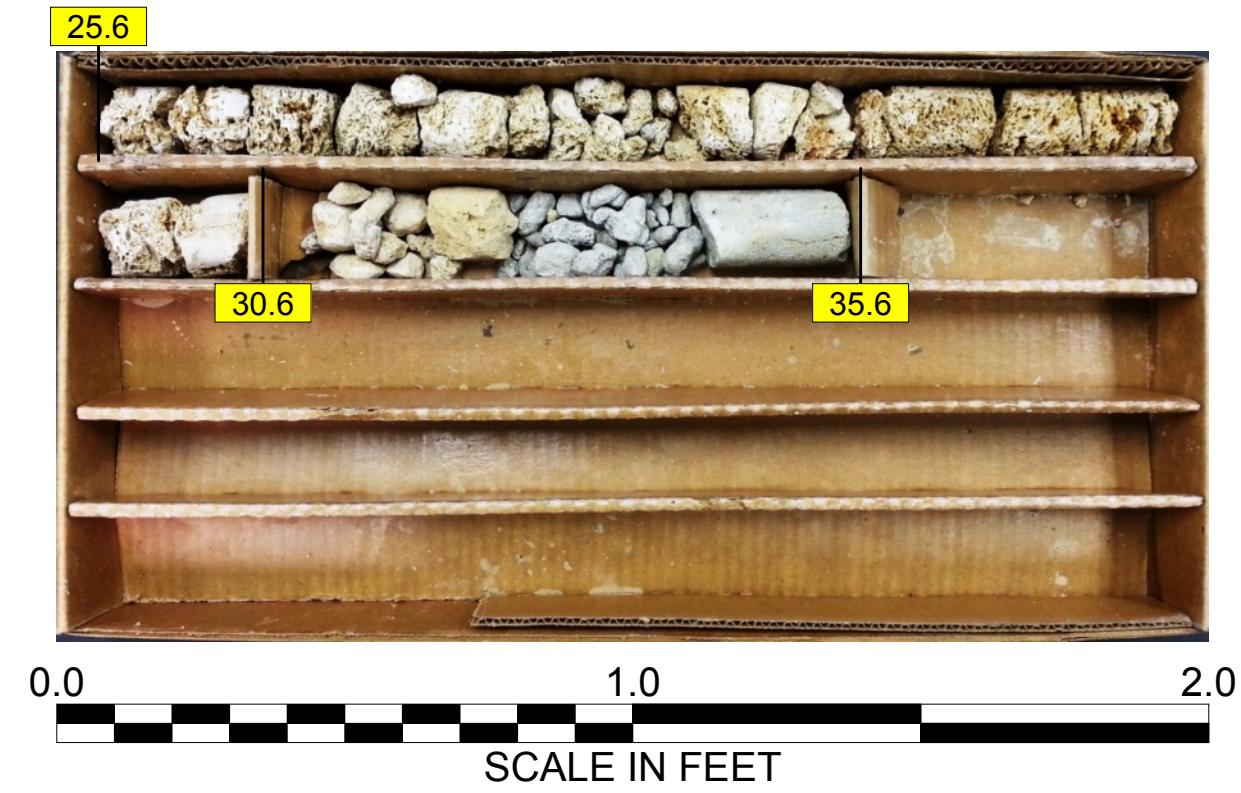
NCDOT BORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ_CATLIN.GDT_12/20/13



NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Chuck Brake					
SITE DESCRIPTION Dual Bridges on -L- over the Trent River							GROUND WTR (ft)				
BORING NO. B4-B NBL		STATION 387+11		OFFSET 55ft RT		ALIGNMENT -L-					
COLLAR ELEV. 11.9 ft		TOTAL DEPTH 85.5 ft		NORTHING 465,843		EASTING 2,530,660					
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 83% 11/30/2012		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic							
DRILLER D.T. Chalmers, Jr.		START DATE 10/29/13		COMP. DATE 10/31/13		SURFACE WATER DEPTH N/A					
CORE SIZE N		TOTAL RUN 10.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft)	RQD (%)	REC. (ft)	RQD (%)			
-13.75										Begin Coring @ 25.6 ft	
-15	-13.8	25.6	5.0	2:30/1.0 0:59/1.0 0:30/1.0 0:47/1.0 0:49/1.0	(2.3) 46%		(2.3) 38%			-13.8 Light tan, Limestone w/high porosity from shell casts. Interlayers and inclusions of silt. Silt is approximately 25% of rock. (Silty, Molluscan Cast, Biomic Rudite)	25.6
-20	-18.8	30.6	5.0	0:45/1.0 1:55/1.0 0:33/1.0 0:32/1.0 0:32/1.0	(1.0) 20%		(1.0) 20%			-19.8 Dark gray, Cemented f. SAND.	31.6
-25	-23.8	35.6								-20.2	32.0
-30											
-35											
-40											
-45											
-50											
-55											
-60											
-65											
-70											

B4-B NBL
BOX 1 of 1
ELEV. -13.75 to -18.75 FT



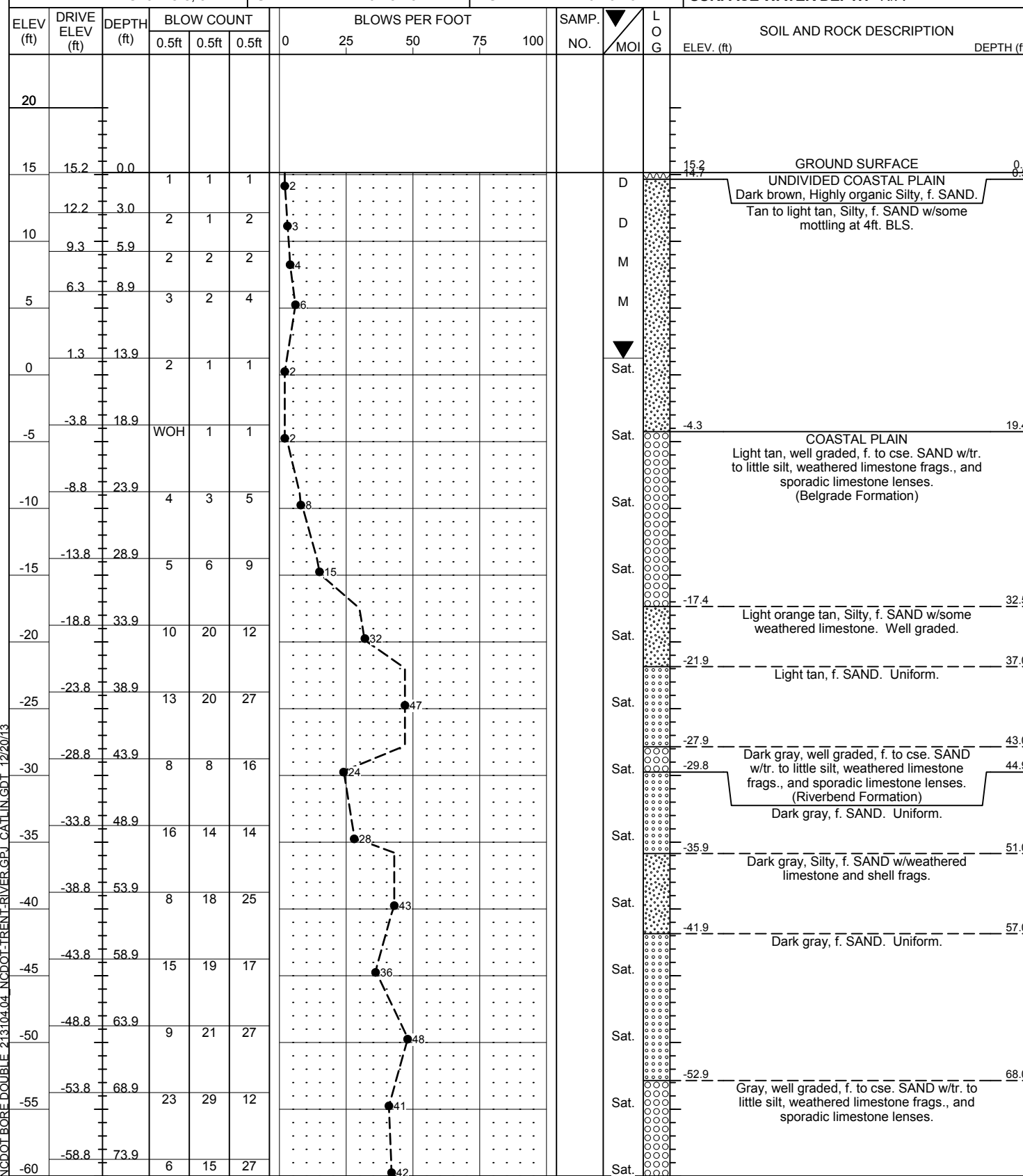
NCDOT CORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ CATLIN.GDT 12/20/13



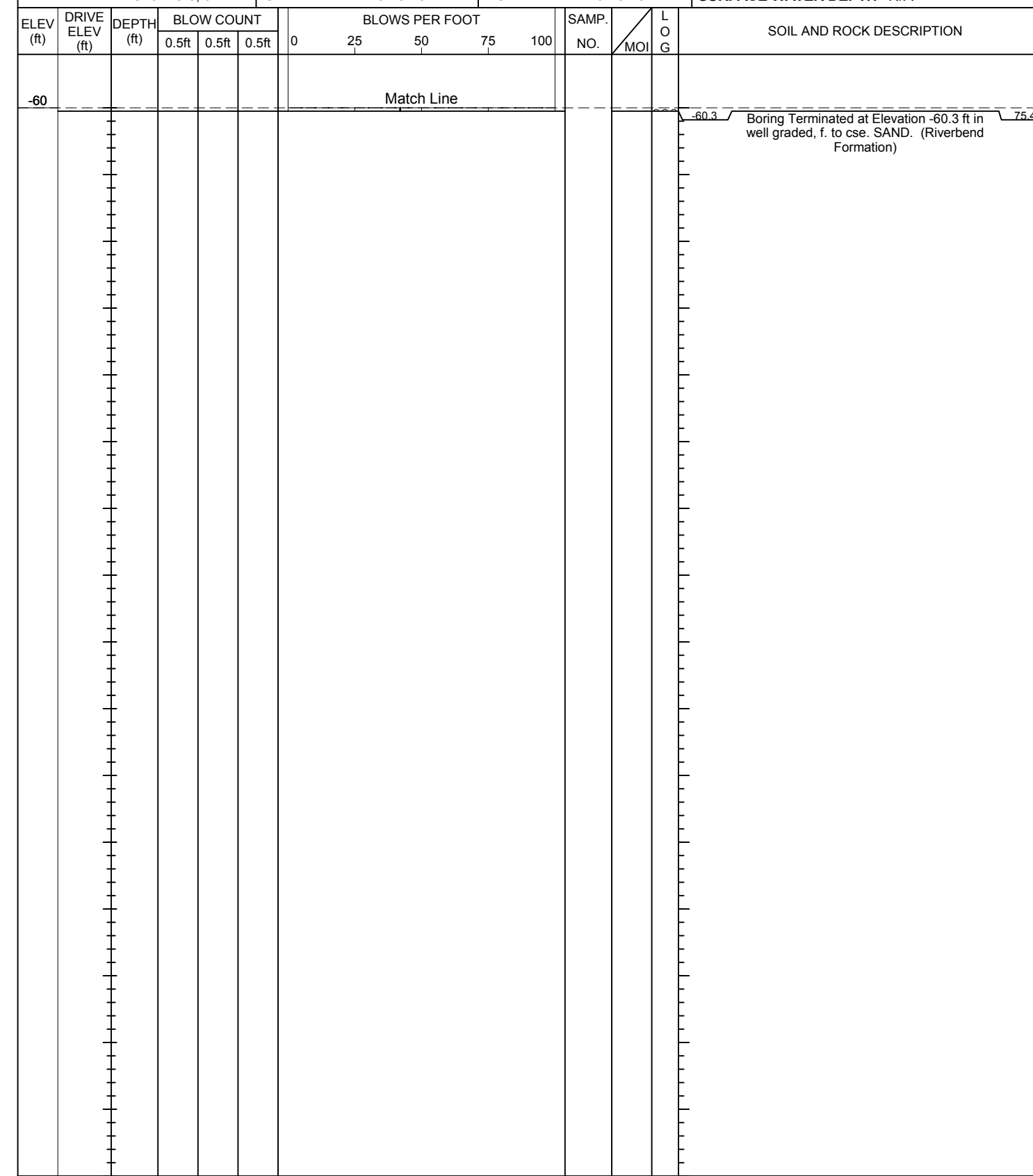
NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B5-A SBL	STATION 388+02	OFFSET 57ft LT	ALIGNMENT -L-
COLLAR ELEV. 15.2 ft	TOTAL DEPTH 75.4 ft	NORTHING 465,947	EASTING 2,530,559
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 83% 11/30/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER D. T. Chalmers, Jr.	START DATE 10/23/13	COMP. DATE 10/23/13	SURFACE WATER DEPTH N/A



WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B5-A SBL	STATION 388+02	OFFSET 57ft LT	ALIGNMENT -L-
COLLAR ELEV. 15.2 ft	TOTAL DEPTH 75.4 ft	NORTHING 465,947	EASTING 2,530,559
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 83% 11/30/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER D.T. Chalmers, Jr.	START DATE 10/23/13	COMP. DATE 10/23/13	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ_CATLIN.GDT_12/20/13



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Chuck Brake											
SITE DESCRIPTION Dual Bridges on -L- over the Trent River							GROUND WTR (ft)										
BORING NO. B6-A SBL		STATION 388+99		OFFSET 55ft LT		ALIGNMENT -L-											
COLLAR ELEV. 8.7 ft		TOTAL DEPTH 65.6 ft		NORTHING 466,043		EASTING 2,530,573											
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 83% 11/30/2012				DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
DRILLER D.T. Chalmers, Jr.		START DATE 10/24/13		COMP. DATE 10/24/13		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)			
10	8.7	0.0	2	1	2	3								8.7	0.0	GROUND SURFACE	
														8.2	0.3	UNDIVIDED COASTAL PLAIN Dark brown, SILT. Highly organic. Tan to yellow tan, f. SAND.	
5	5.7	3.0	2	1	2	3											
0	2.6	6.1	2	1	2	3											
-5	-0.4	9.1	WOH	WOH	1	1								0.2	8.5	Gray, Silty CLAY w/orange mottling. Low plast.	
-10	-5.4	14.1	3	3	3	6											
-15	-10.4	19.1	1	0	2	2								-9.8	18.5	Gray, Silty, f. SAND w/orange mottling.	
-20	-15.4	24.1	2	2	2	4								-13.3	22.0	Dark orange tan, f. SAND. Uniform.	
-25	-20.4	29.1	13	11	13	24								-16.8	25.5	COASTAL PLAIN Tan, Silty, f. SAND w/some weathered limestone frags. Gap graded. (Belgrade Formation)	
-30	-25.4	34.1	20	27	15	42								-22.3	31.0	Tan, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses.	
-35	-30.4	39.1	15	25	30	55								-28.3	37.0	Dark gray, f. SAND. Uniform w/organic odor. (Riverbend Formation)	
-40	-35.4	44.1	20	17	18	35								-32.8	41.5	Dark gray, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses.	
-45	-40.4	49.1	19	26	24	50								-37.8	46.5	Dark gray, f. SAND. Uniform w/organic odor.	
-50	-45.4	54.1	13	7	24	31								-42.8	51.5	Dark gray, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses.	
-55	-50.4	59.1	42	51	49/4	100/0.9								-47.8	56.5	Limestone Lens	
-55	-55.4	64.1	9	11	15	26								-53.3	62.0	Dark gray, f. SAND. Uniform w/organic odor.	
														-56.9	65.6	Boring Terminated at Elevation -56.9 ft in uniform f. SAND. (Riverbend Formation)	

NCDOT BORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ_CATLIN.GDT_12/20/13

NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B6-B NBL	STATION 389+02	OFFSET 54ft RT	ALIGNMENT -L- 0 HR. 3.3
COLLAR ELEV. 3.5 ft	TOTAL DEPTH 85.7 ft	NORTHING 466,033	EASTING 2,530,681 24 HR. 2.2
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 83% 11/30/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER D.T. Chalmers, Jr.	START DATE 11/04/13	COMP. DATE 11/05/13	SURFACE WATER DEPTH N/A

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B6-B NBL	STATION 389+02	OFFSET 54ft RT	ALIGNMENT -L- 0 HR. 3.3
COLLAR ELEV. 3.5 ft	TOTAL DEPTH 85.7 ft	NORTHING 466,033	EASTING 2,530,681 24 HR. 2.2
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 83% 11/30/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER D.T. Chalmers, Jr.	START DATE 11/04/13	COMP. DATE 11/05/13	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					
5															
	3.5	0.0	WOH	WOH	1							M	GROUND SURFACE	0.0	
0	0.0	3.5	2	2	2							Sat.	UNDIVIDED COASTAL PLAIN Brown, SILT w/tr. roots.	2.0	
-5	-2.7	6.2	2	2	3							Sat.	Tan gray, f. SAND w/orange mottling. Uniform.		
-10	-5.7	9.2	2	1	1							Sat.	Light gray, Clayey SILT.	5.5	
-15	-10.7	14.2	1	1	1							Sat.	Orange tan, f. SAND. Uniform.	12.0	
-20	-15.7	19.2	5	5	3							Sat.	COASTAL PLAIN Tan, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses. (Belgrade Formation)	18.0	
-25	-18.2	21.7	7	9	5							Sat.	Tan orange, f. SAND. Tr. weathered limestone frags.	21.0	
-30	-20.7	24.2	11	10	19							Sat.			
-35	-23.2	26.7	9	13	16							Sat.			
-40	-25.7	29.2	8	22	16							Sat.	Light tan, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses.	28.5	
-45	-28.2	31.7	10	16	20							Sat.			
-50	-30.7	34.2	8	18	20							Sat.	Tan, f. SAND. Uniform. Calc. Dark gray, f. SAND. Uniform. (Riverbend Formation)	32.2	
-55	-33.2	36.7	8	22	16							Sat.			
-60	-35.7	39.2	8	13	24							Sat.	Gray, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses.	36.0	
-65	-40.7	44.2	3	15	21							Sat.			
-70	-45.7	49.2	13	19	35							Sat.	Dark gray, f. SAND. Uniform.	38.5	
-75	-50.7	54.2	8	8	23							Sat.			
-80	-55.7	59.2	10	11	32							Sat.	Gray, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses.	54.0	
-85	-60.7	64.2	10	12	20							Sat.			
-90	-65.7	69.2	10	14	22							Sat.	Gray, f. SAND. Uniform.	54.7	
-95	-70.7	74.2	14	23	29							Sat.			
-100												Sat.	organic odor	69.0	

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					
-75	-75.7	79.2													
-80	-80.7	84.2													

NCDOT BORE DOUBLE 213104.04 NCDOT-TRENT-RIVER.GPJ CATLIN.GDT 2/3/14



NCDOT GEOTECHNICAL ENGINEERING UNIT

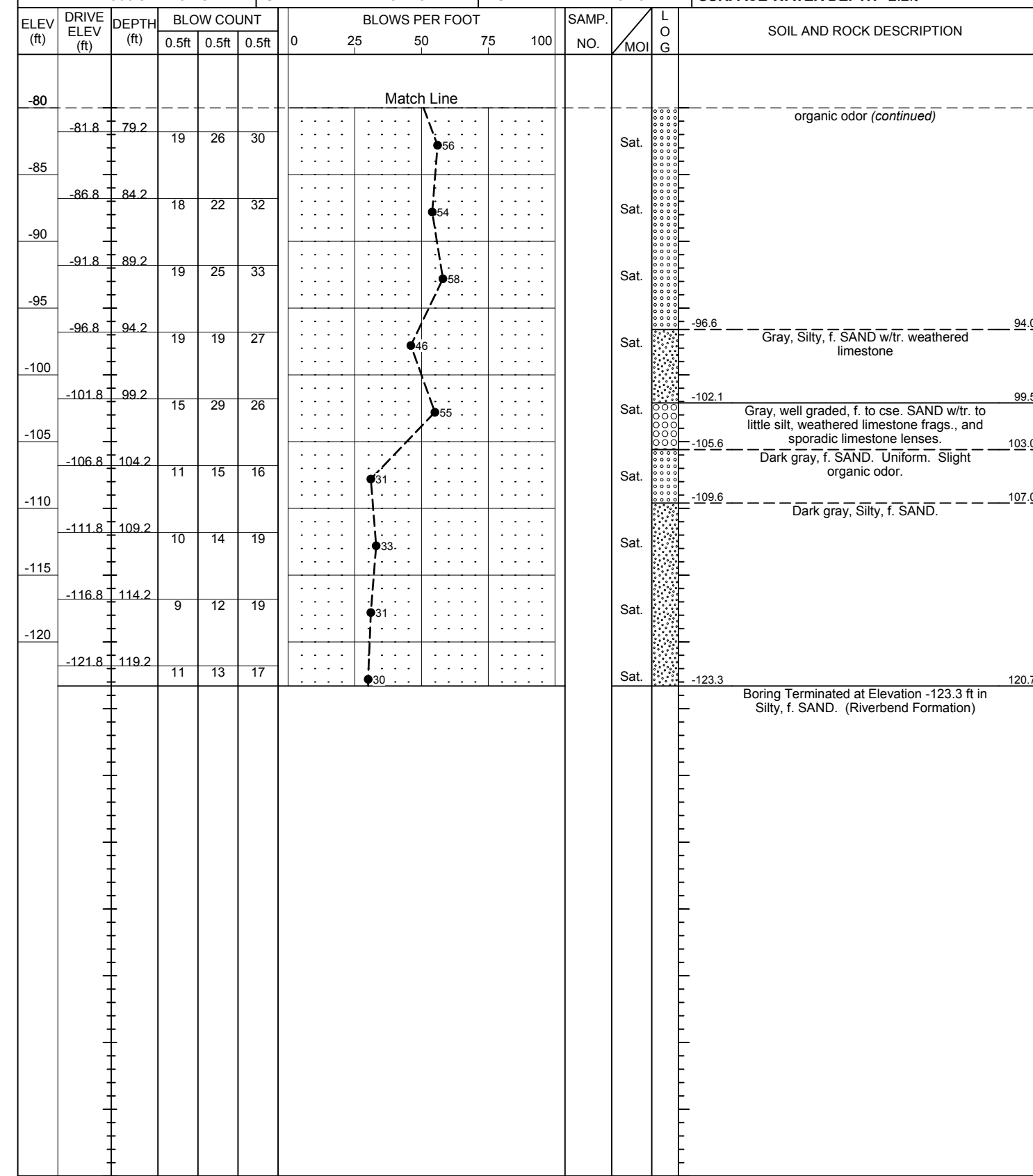
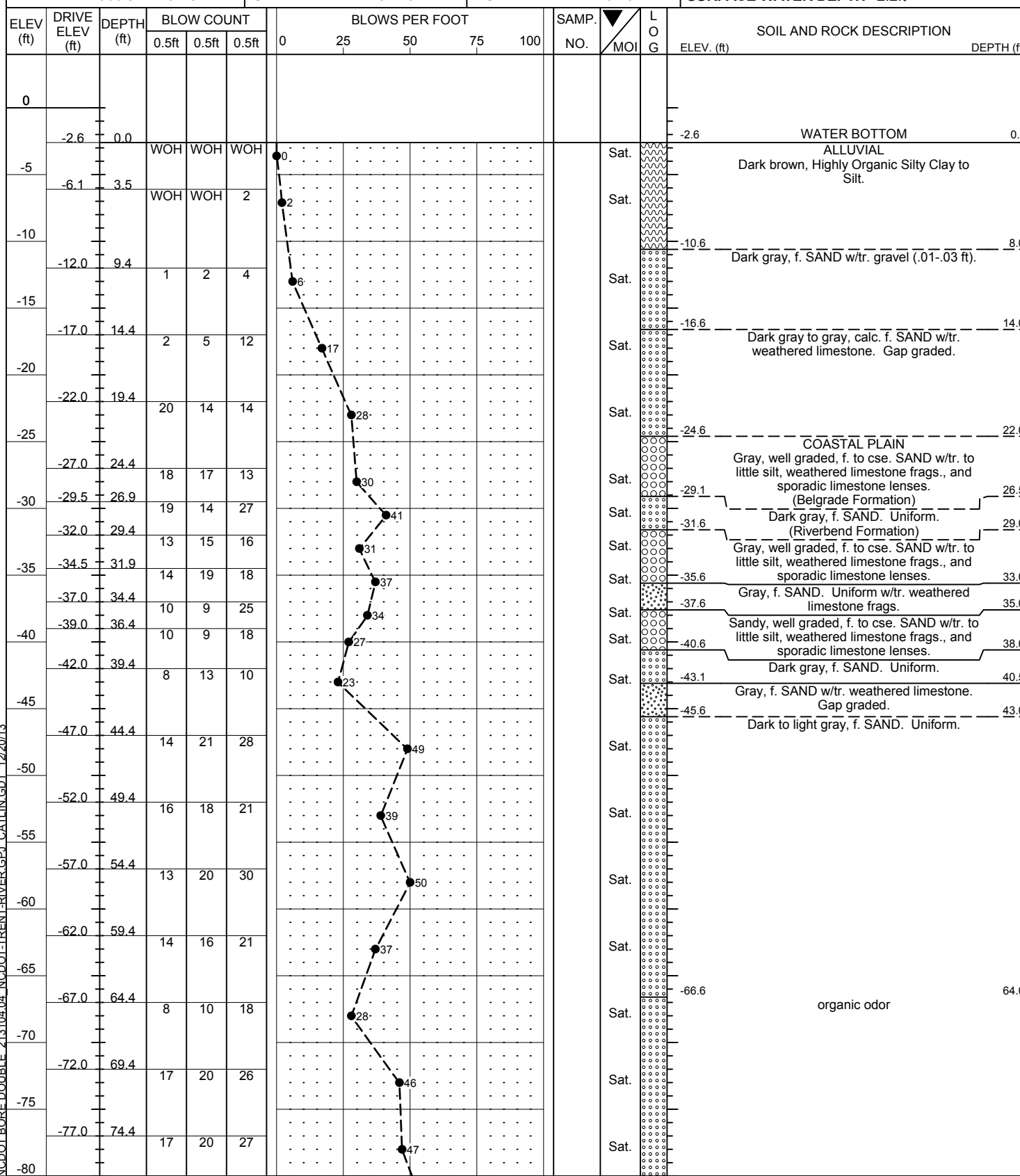
BORELOG REPORT



SHEET: 28 of 41
 PROJ. NO.: 34442.1.5
 TIP NO.: R-2514D
 COUNTY: Jones

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B7-A SBL	STATION 389+98	OFFSET 56ft LT	ALIGNMENT -L-
COLLAR ELEV. -2.6 ft	TOTAL DEPTH 120.7 ft	NORTHING 466,141	EASTING 2,530,583
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Bobbie D. Fowler	START DATE 11/07/13	COMP. DATE 11/13/13	SURFACE WATER DEPTH 2.2ft

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B7-A SBL	STATION 389+98	OFFSET 56ft LT	ALIGNMENT -L-
COLLAR ELEV. -2.6 ft	TOTAL DEPTH 120.7 ft	NORTHING 466,141	EASTING 2,530,583
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Bobbie D. Fowler	START DATE 11/07/13	COMP. DATE 11/13/13	SURFACE WATER DEPTH 2.2ft



NCDOT BORE DOUBLE 213104.04 NCDOT-TRENT-RIVER.GPJ CATLIN.GDT 12/20/13

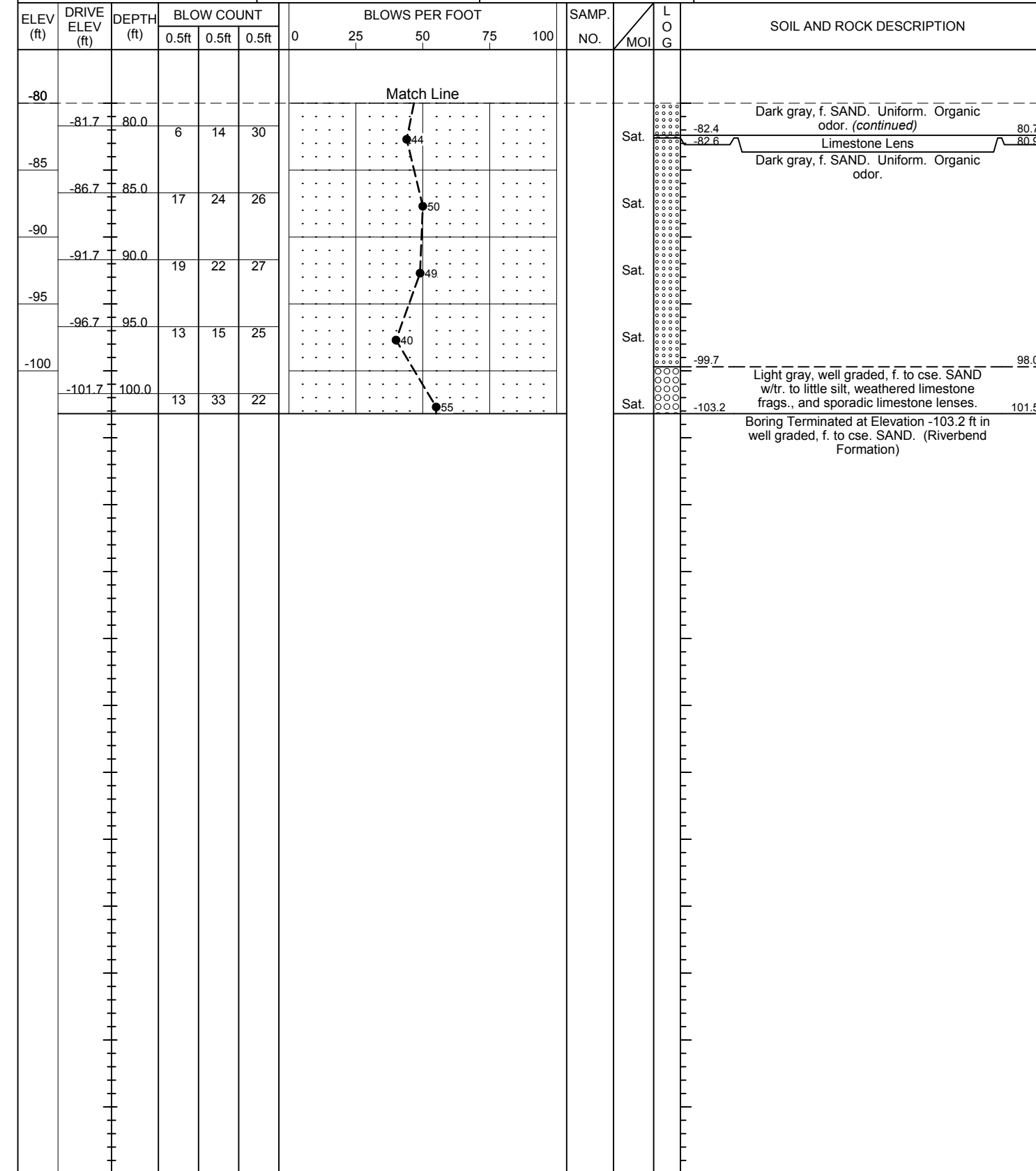
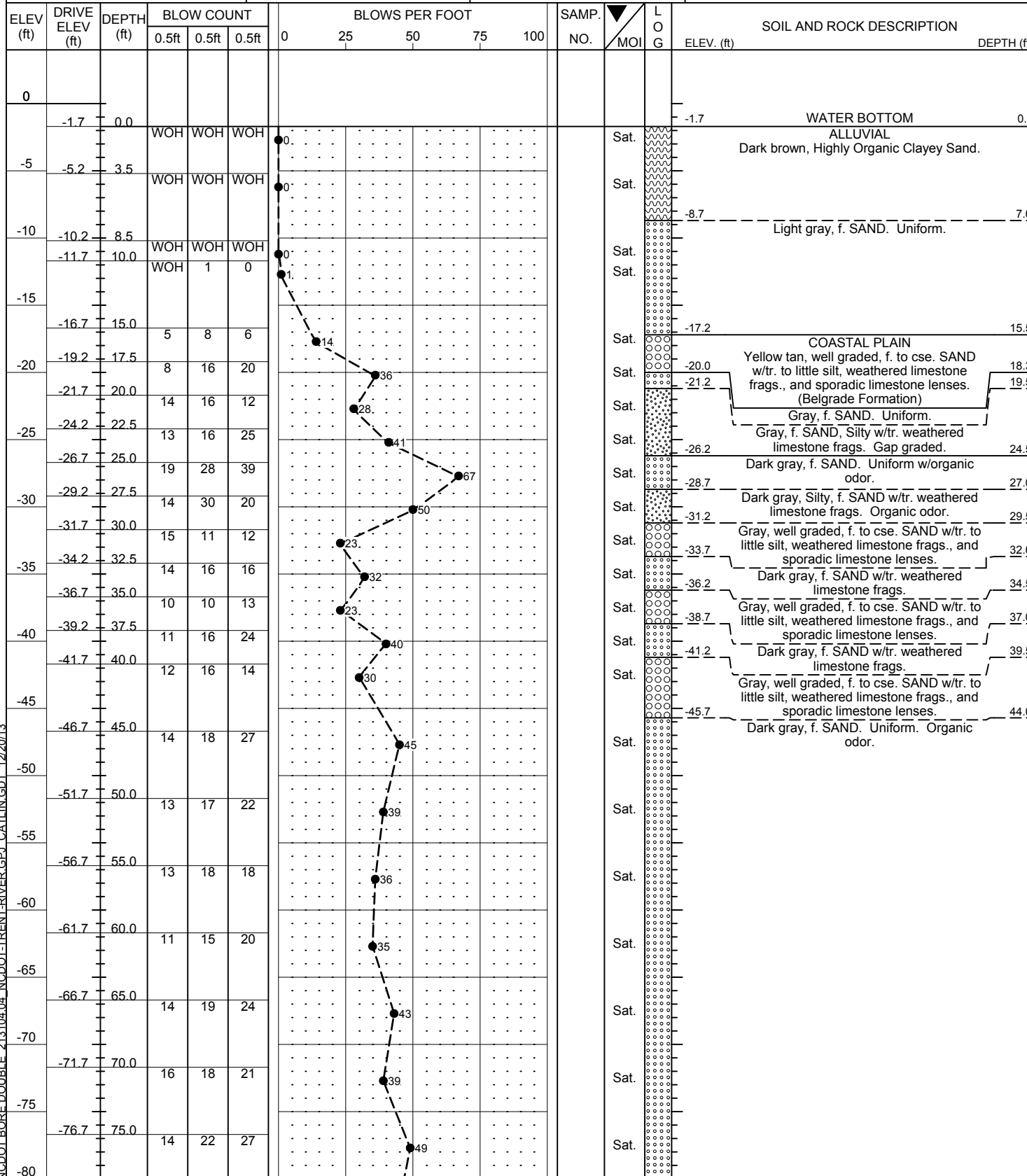


NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B7-B NBL	STATION 389+89	OFFSET 56ft RT	ALIGNMENT -L-
COLLAR ELEV. -1.7 ft	TOTAL DEPTH 101.5 ft	NORTHING 466,119	EASTING 2,530,694
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Bobbie D. Fowler	START DATE 11/12/13	COMP. DATE 11/12/13	SURFACE WATER DEPTH 1.6ft

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B7-B NBL	STATION 389+89	OFFSET 56ft RT	ALIGNMENT -L-
COLLAR ELEV. -1.7 ft	TOTAL DEPTH 101.5 ft	NORTHING 466,119	EASTING 2,530,694
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Bobbie D. Fowler	START DATE 11/12/13	COMP. DATE 11/12/13	SURFACE WATER DEPTH 1.6ft



NCDOT BORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ_CATLIN.GDT_12/20/13

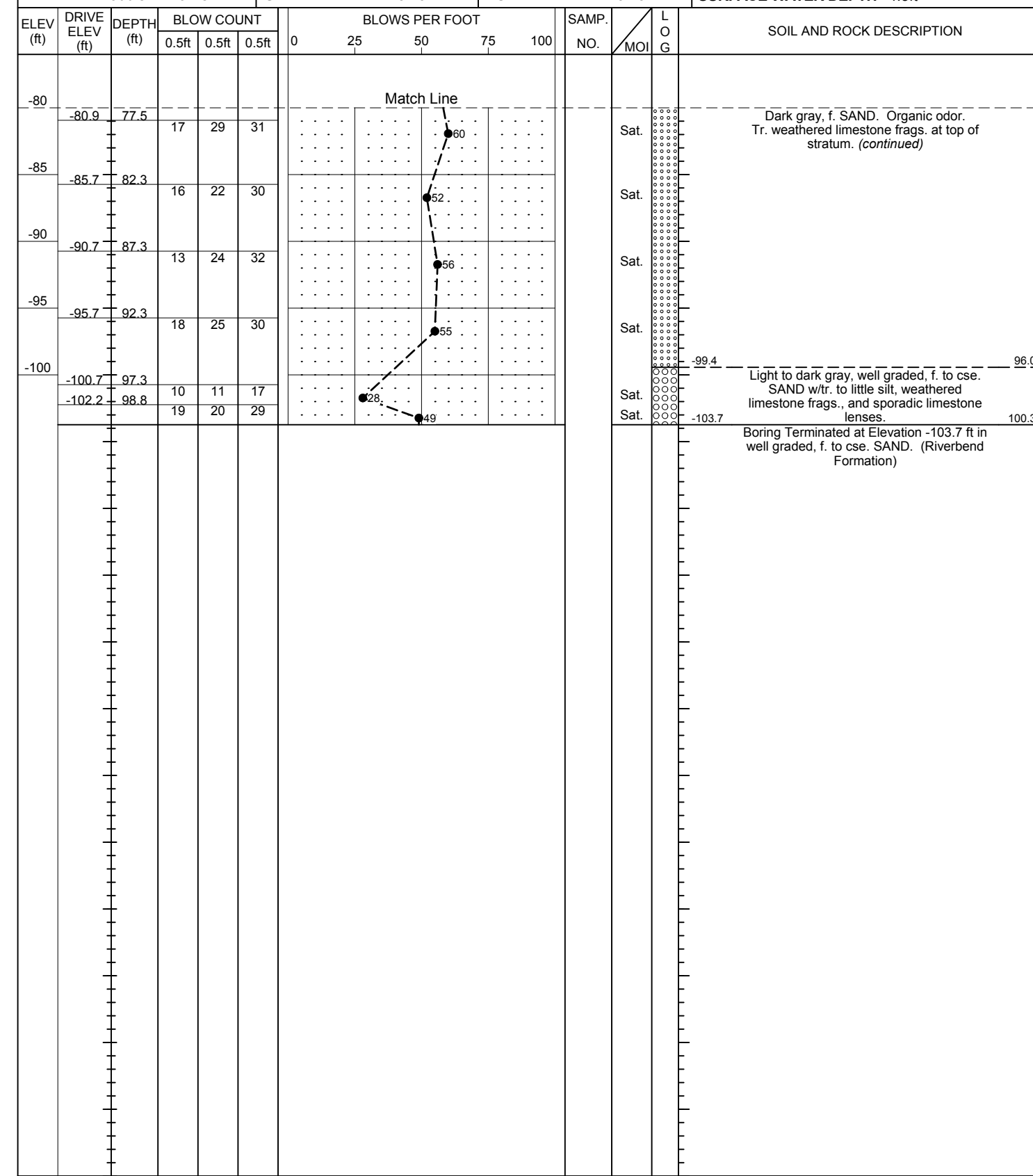
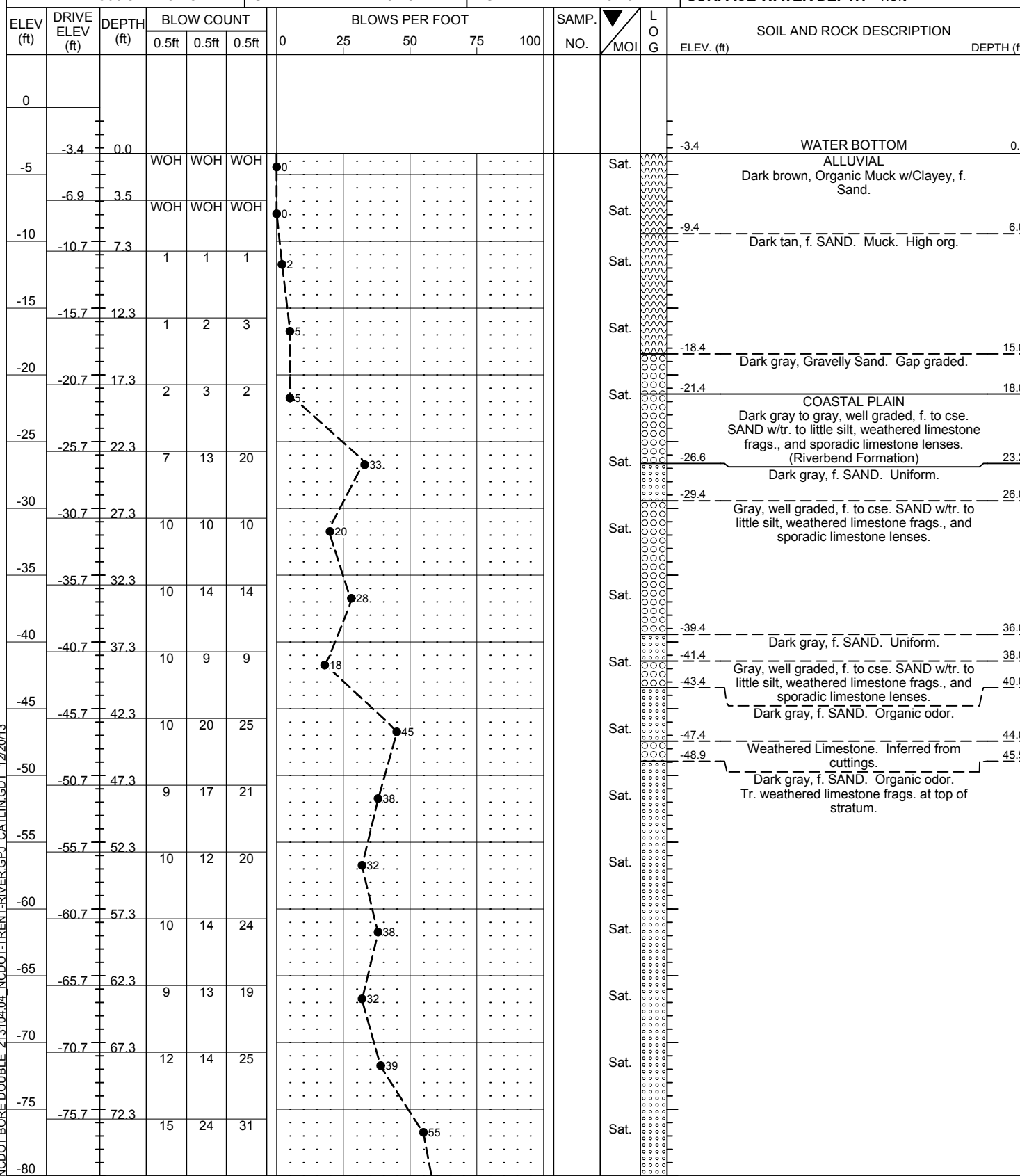


NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B8-A SBL	STATION 390+93	OFFSET 55ft LT	ALIGNMENT -L-
COLLAR ELEV. -3.4 ft	TOTAL DEPTH 100.3 ft	NORTHING 466,236	EASTING 2,530,596
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Bobbie D. Fowler	START DATE 11/15/13	COMP. DATE 11/15/13	SURFACE WATER DEPTH 4.3ft

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B8-A SBL	STATION 390+93	OFFSET 55ft LT	ALIGNMENT -L-
COLLAR ELEV. -3.4 ft	TOTAL DEPTH 100.3 ft	NORTHING 466,236	EASTING 2,530,596
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Bobbie D. Fowler	START DATE 11/15/13	COMP. DATE 11/15/13	SURFACE WATER DEPTH 4.3ft



NCDOT BORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ_CATLIN.GDT_12/20/13



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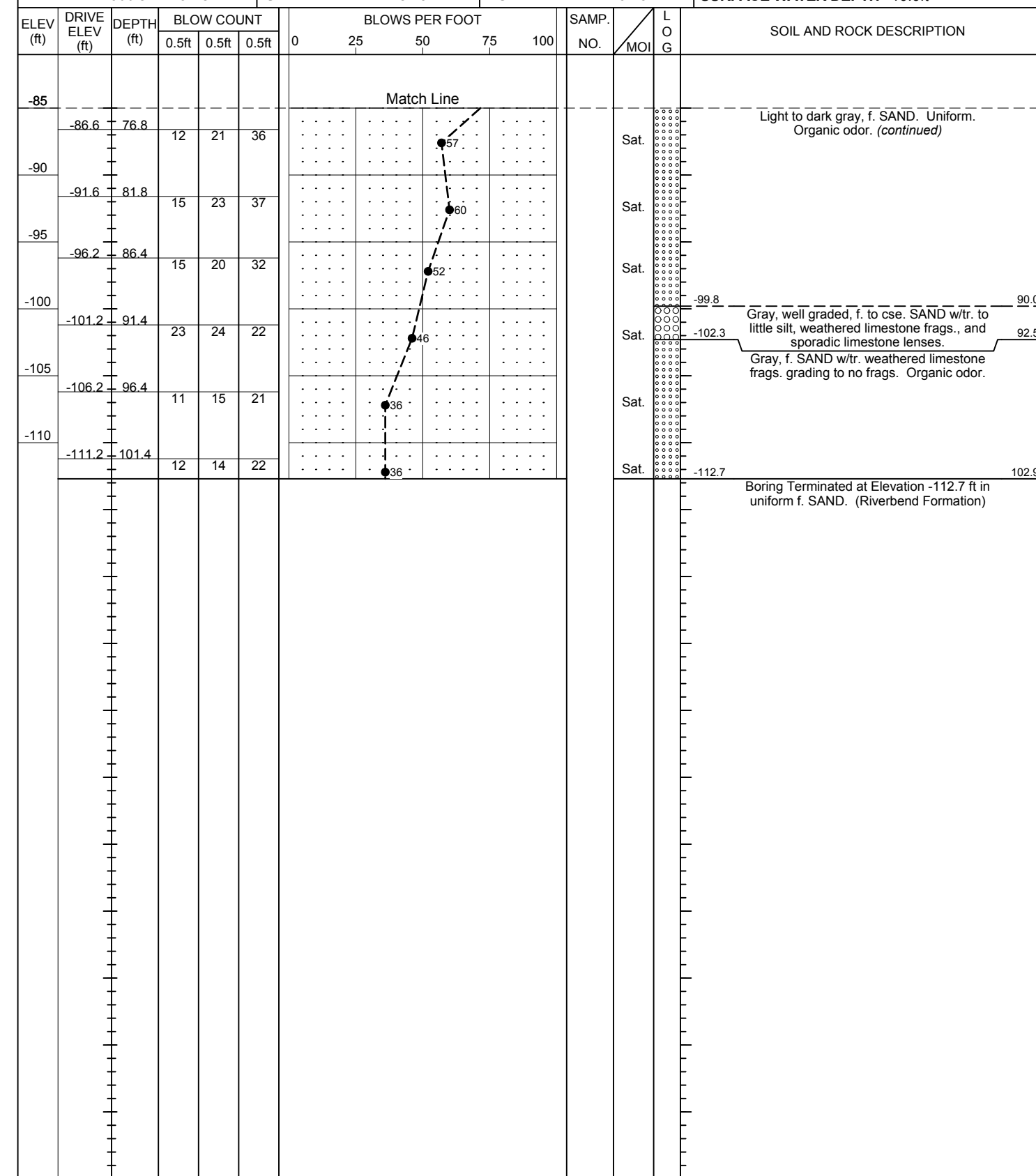
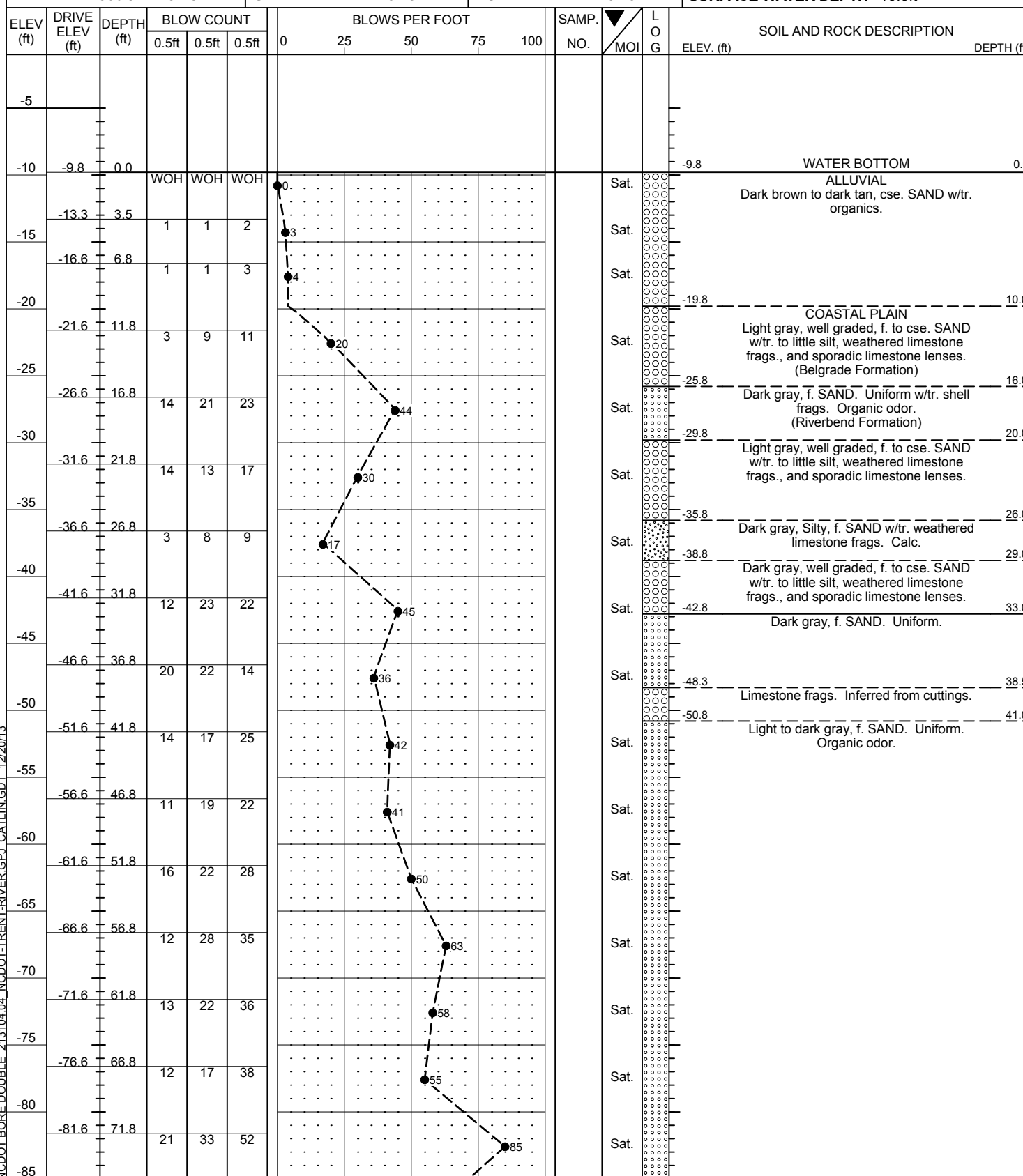
BORELOG REPORT



SHEET: 31 of 41
 PROJ. NO.: 34442.1.5
 TIP NO.: R-2514D
 COUNTY: Jones

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B8-B NBL	STATION 390+92	OFFSET 51ft RT	ALIGNMENT -L-
COLLAR ELEV. -9.8 ft	TOTAL DEPTH 102.9 ft	NORTHING 466,222	EASTING 2,530,701
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Bobbie D. Fowler	START DATE 11/18/13	COMP. DATE 11/19/13	SURFACE WATER DEPTH 10.0ft

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B8-B NBL	STATION 390+92	OFFSET 51ft RT	ALIGNMENT -L-
COLLAR ELEV. -9.8 ft	TOTAL DEPTH 102.9 ft	NORTHING 466,222	EASTING 2,530,701
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Bobbie D. Fowler	START DATE 11/18/13	COMP. DATE 11/19/13	SURFACE WATER DEPTH 10.0ft



NCDOT BORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ_CATLIN.GDT_12/20/13



NCDOT GEOTECHNICAL ENGINEERING UNIT

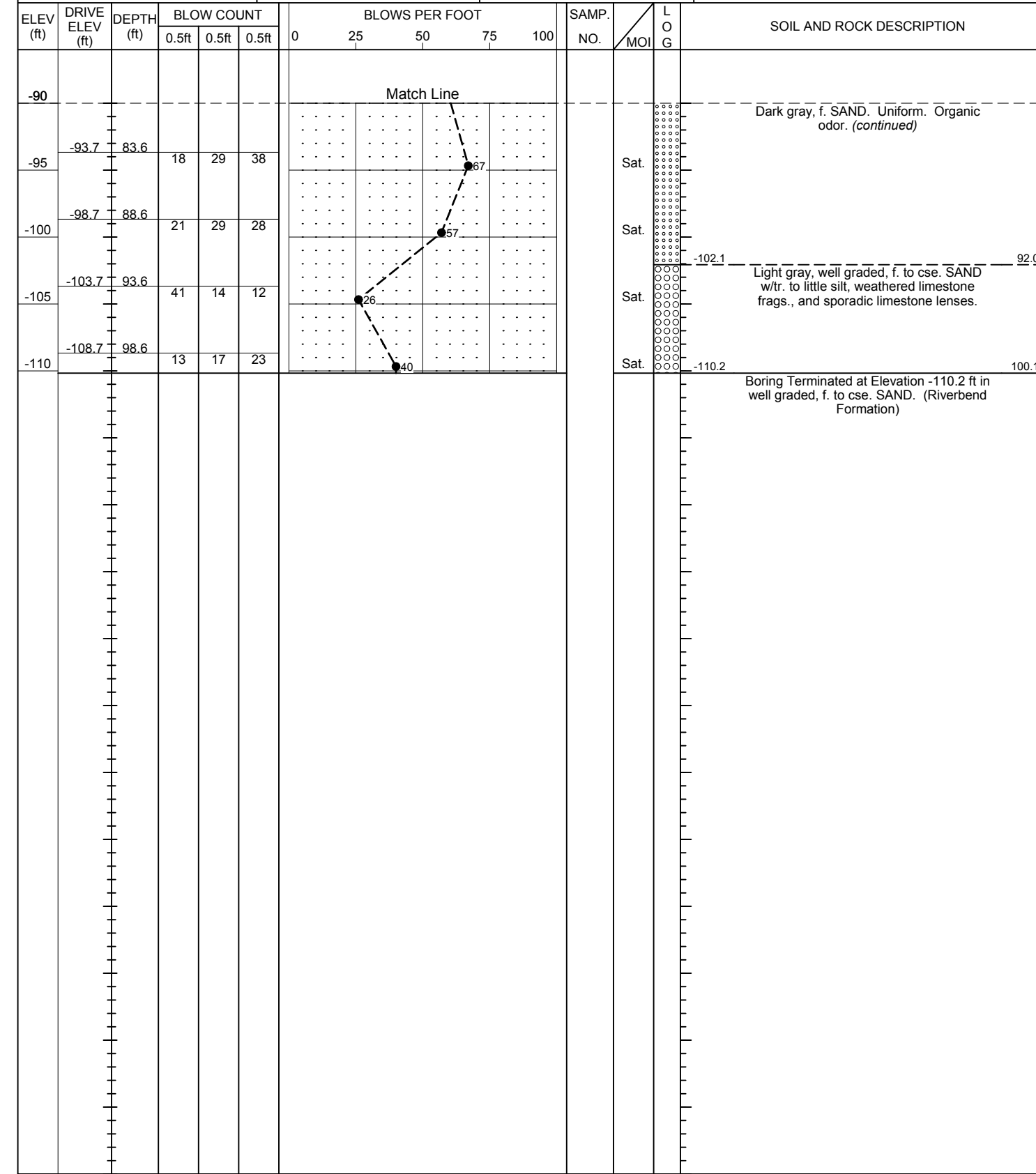
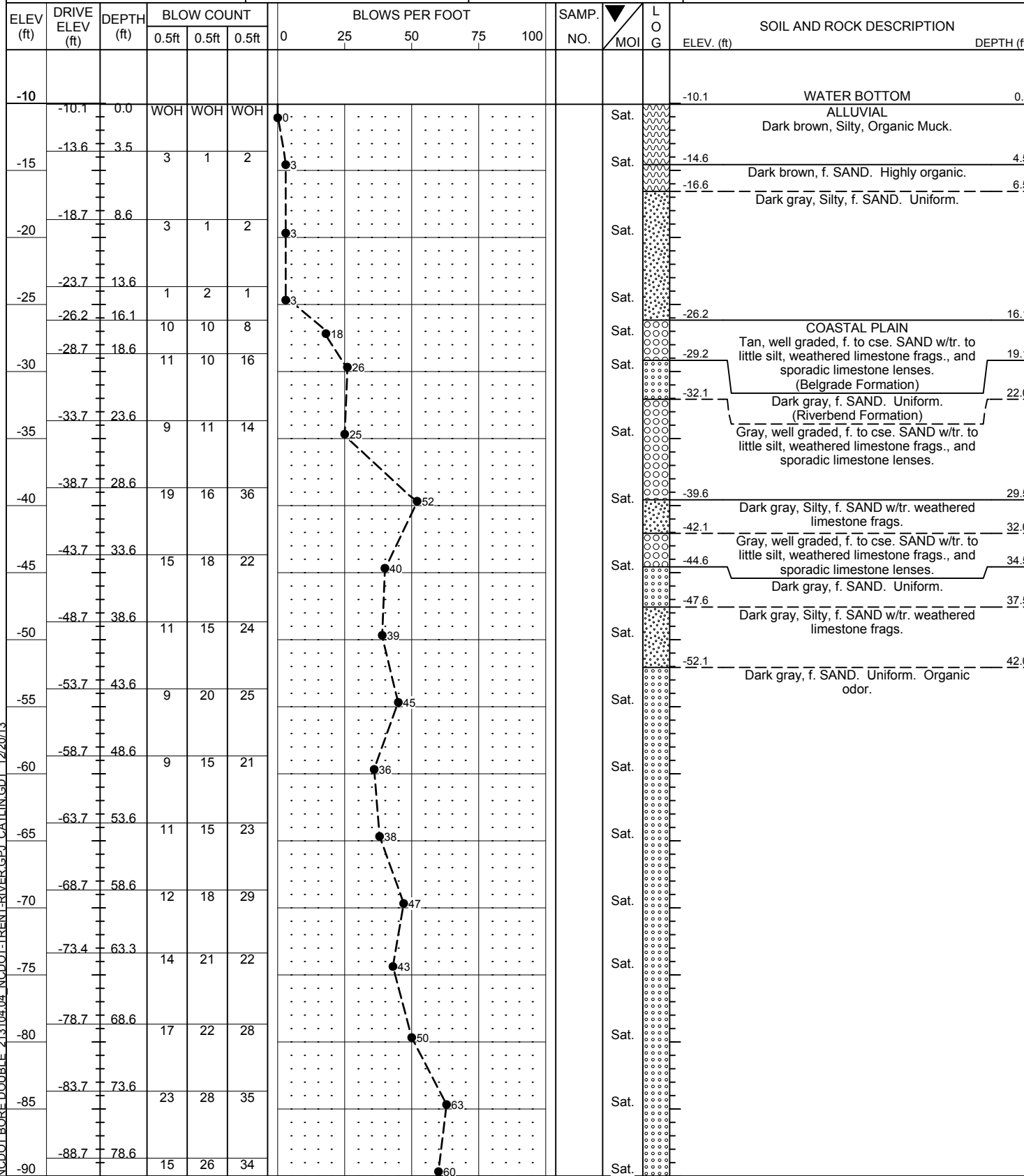
BORELOG REPORT



SHEET: 32 of 41
 PROJ. NO.: 34442.1.5
 TIP NO.: R-2514D
 COUNTY: Jones

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B9-A SBL	STATION 391+86	OFFSET 54ft LT	ALIGNMENT -L-
COLLAR ELEV. -10.1 ft	TOTAL DEPTH 100.1 ft	NORTHING 466,328	EASTING 2,530,608
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Bobbie D. Fowler	START DATE 11/14/13	COMP. DATE 11/14/13	SURFACE WATER DEPTH 8.1ft

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B9-A SBL	STATION 391+86	OFFSET 54ft LT	ALIGNMENT -L-
COLLAR ELEV. -10.1 ft	TOTAL DEPTH 100.1 ft	NORTHING 466,328	EASTING 2,530,608
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Bobbie D. Fowler	START DATE 11/14/13	COMP. DATE 11/14/13	SURFACE WATER DEPTH 8.1ft



NCDOT BORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ_CATLIN.GDT_12/20/13

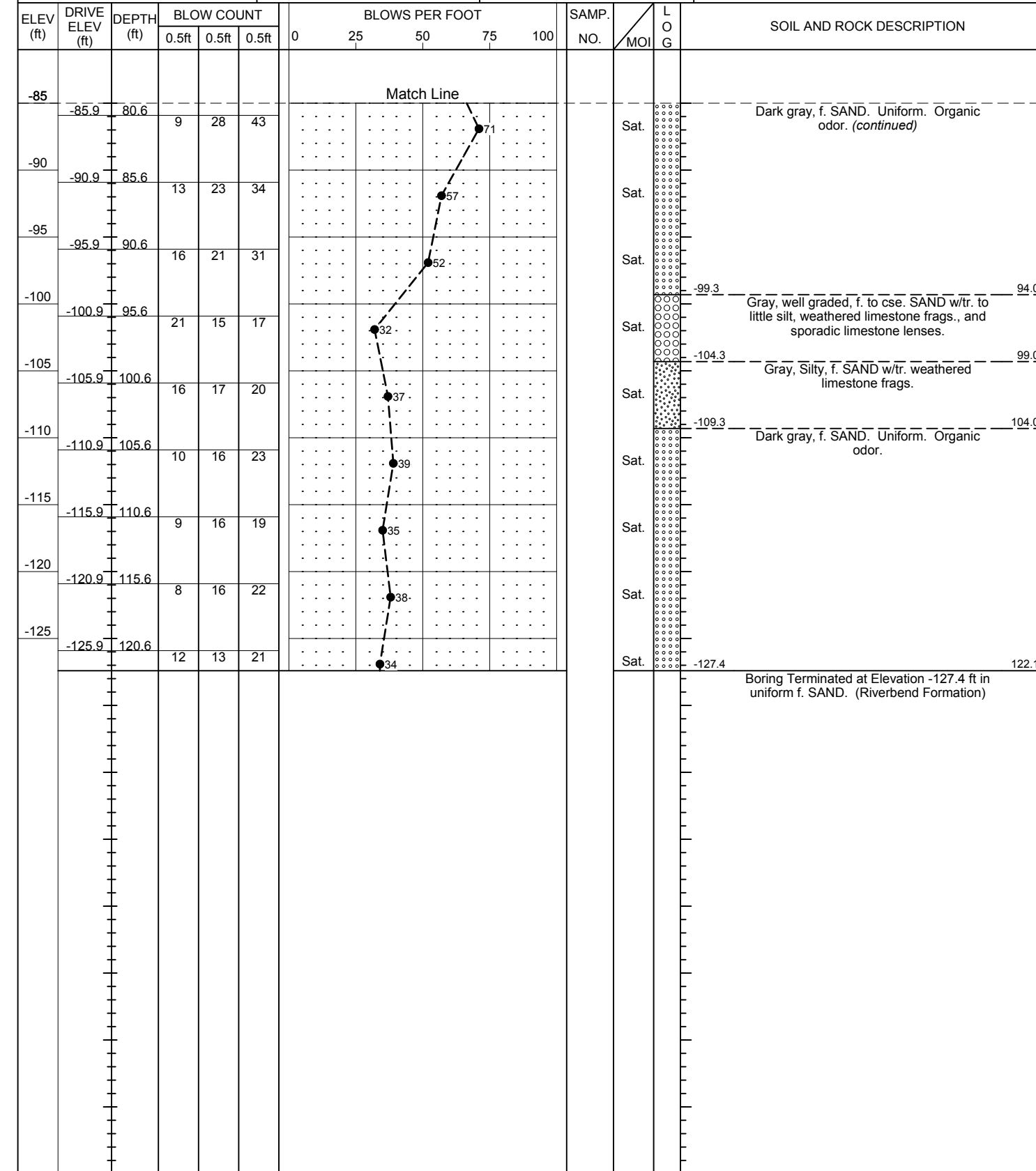
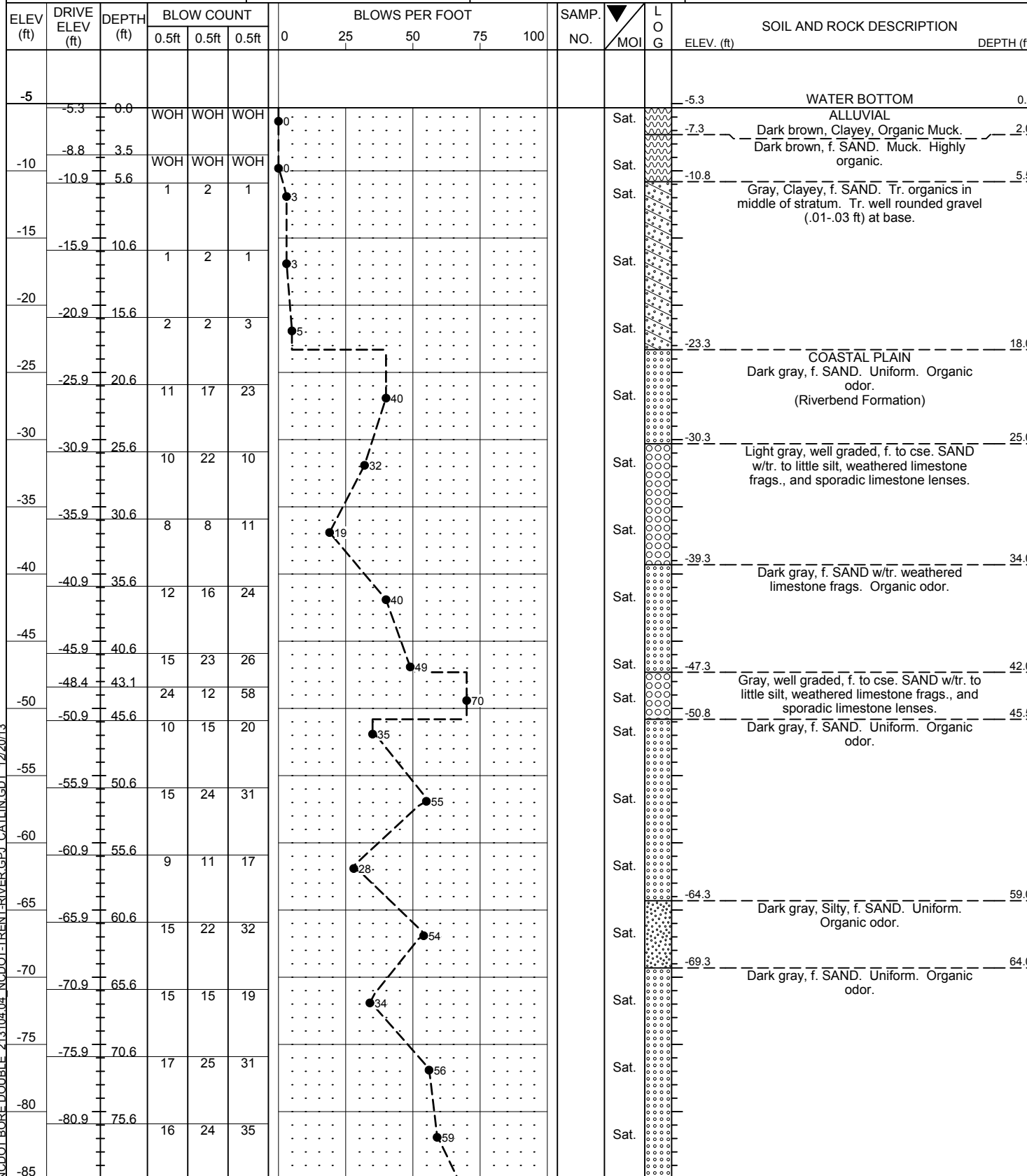


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BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B9-B NBL	STATION 391+81	OFFSET 26ft RT	ALIGNMENT -L-
COLLAR ELEV. -5.3 ft	TOTAL DEPTH 122.1 ft	NORTHING 466,313	EASTING 2,530,687
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Bobbie D. Fowler	START DATE 11/13/13	COMP. DATE 11/13/13	SURFACE WATER DEPTH 6.0ft

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B9-B NBL	STATION 391+81	OFFSET 26ft RT	ALIGNMENT -L-
COLLAR ELEV. -5.3 ft	TOTAL DEPTH 122.1 ft	NORTHING 466,313	EASTING 2,530,687
DRILL RIG/HAMMER EFF./DATE MAD5152 D-25 75% 05/25/2012		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Bobbie D. Fowler	START DATE 11/13/13	COMP. DATE 11/13/13	SURFACE WATER DEPTH 6.0ft



NCDOT BORE DOUBLE 213104.04 NCDOT-TRENT-RIVER.GPJ CATLIN.GDT 12/20/13

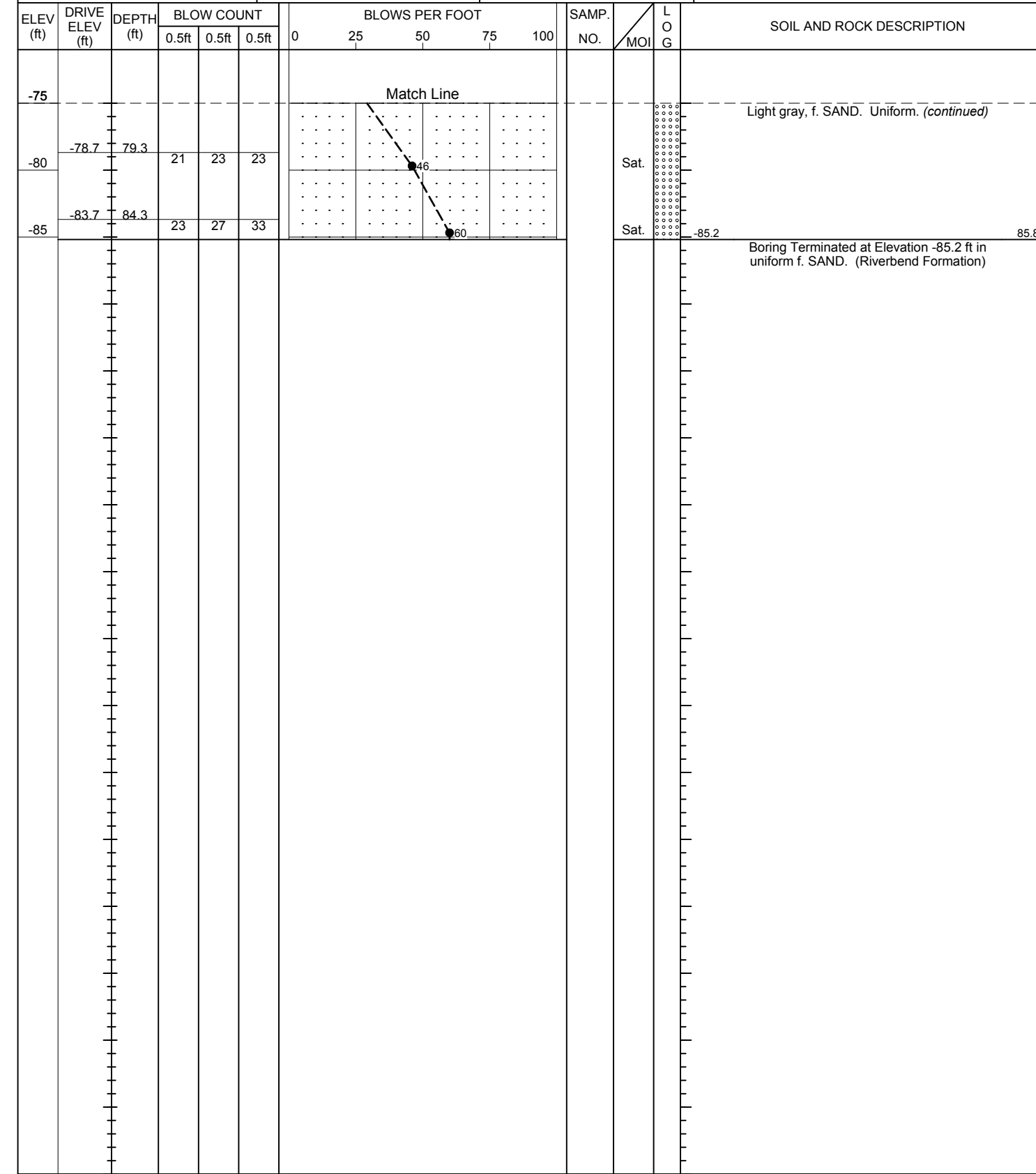
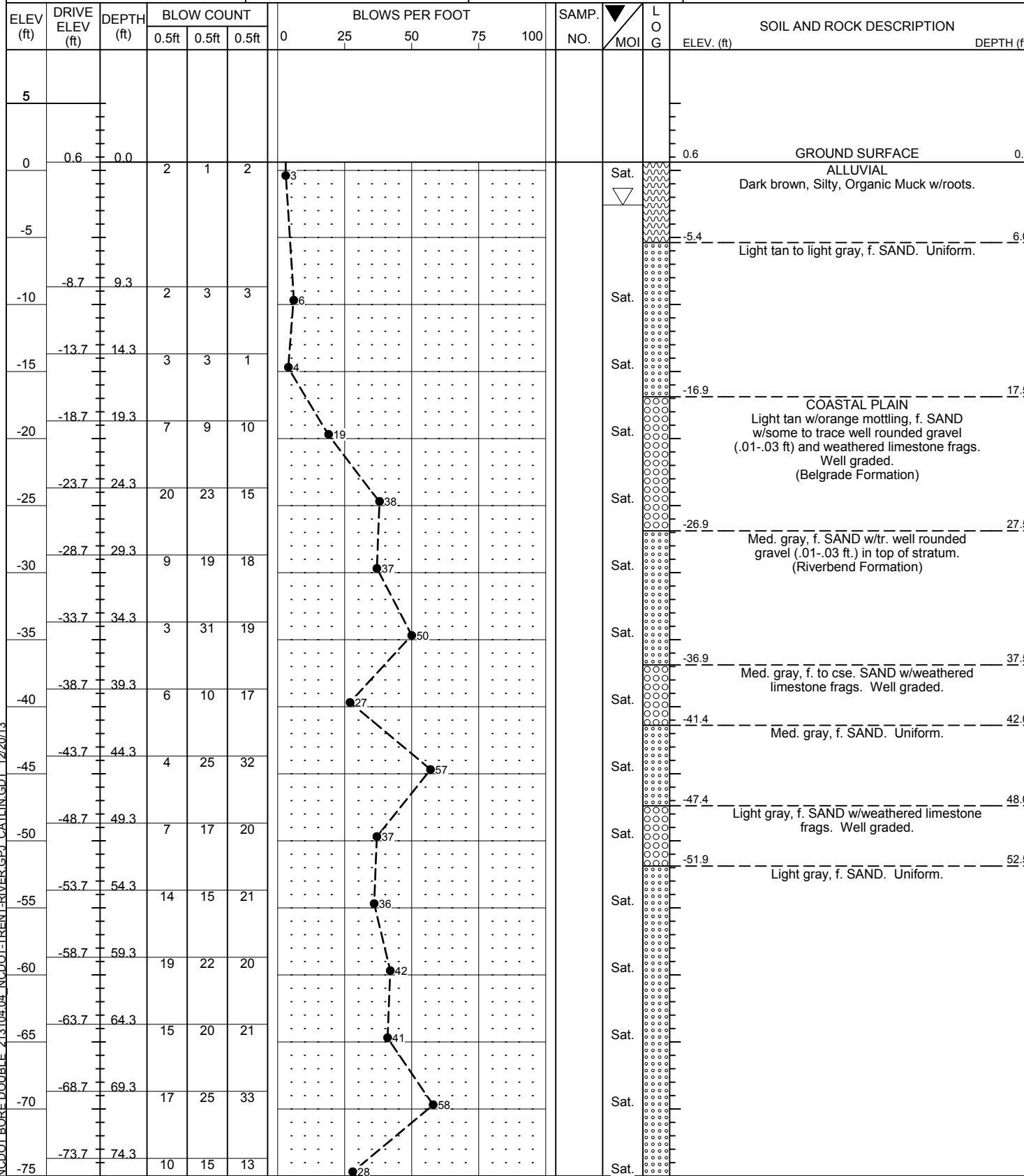


NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Corey Futral
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B10-A SBL	STATION 392+86	OFFSET 45ft LT	ALIGNMENT -L-
COLLAR ELEV. 0.6 ft	TOTAL DEPTH 85.8 ft	NORTHING 466,425	EASTING 2,530,629
DRILL RIG/HAMMER EFF./DATE MAD2544 CME 45 82% 07/25/2013		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER W. Matt Wiggins	START DATE 12/11/13	COMP. DATE 12/11/13	SURFACE WATER DEPTH N/A

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Corey Futral
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B10-A SBL	STATION 392+86	OFFSET 45ft LT	ALIGNMENT -L-
COLLAR ELEV. 0.6 ft	TOTAL DEPTH 85.8 ft	NORTHING 466,425	EASTING 2,530,629
DRILL RIG/HAMMER EFF./DATE MAD2544 CME 45 82% 07/25/2013		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER W. Matt Wiggins	START DATE 12/11/13	COMP. DATE 12/11/13	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ_CATLIN.GDT_12/20/13



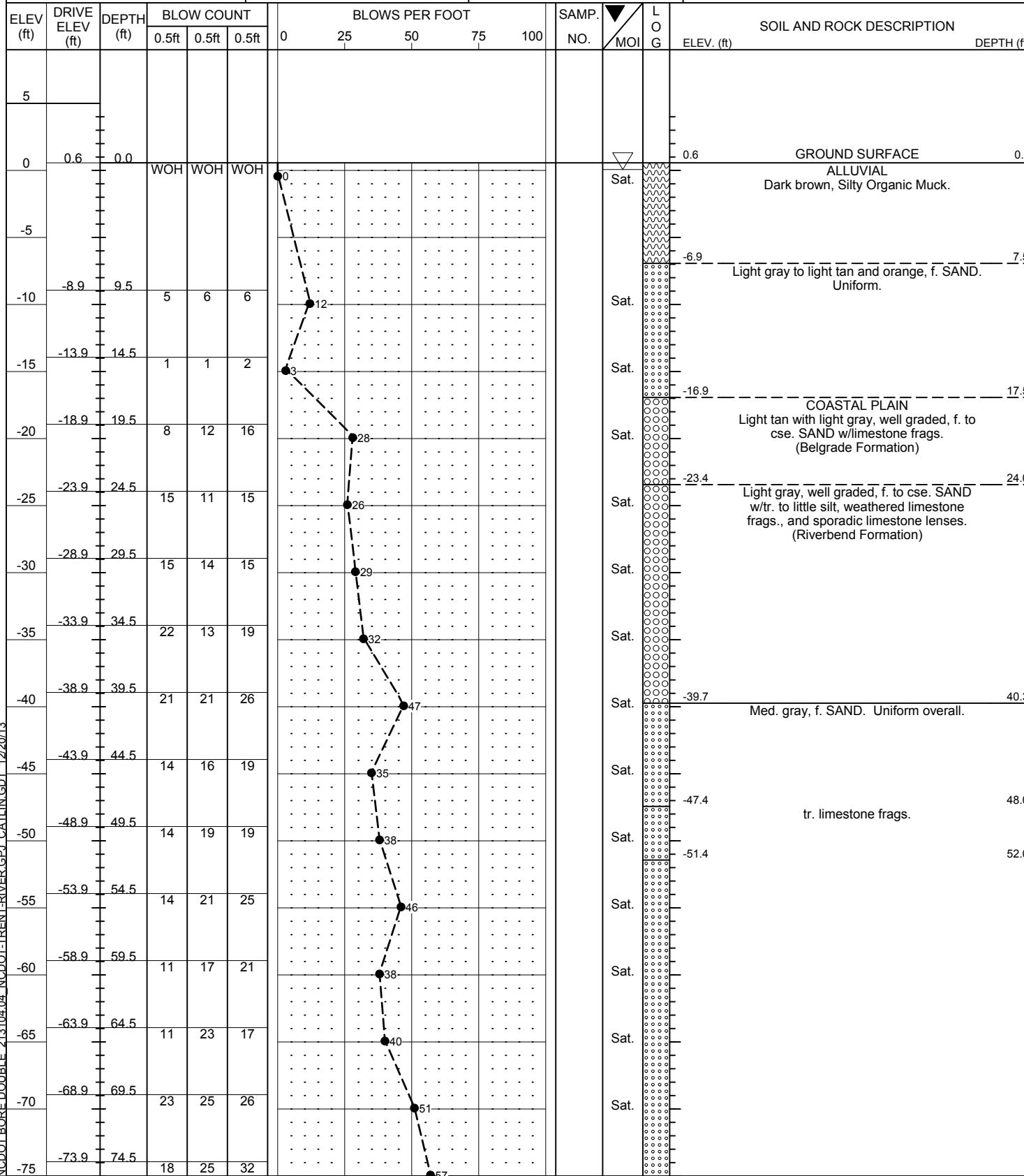
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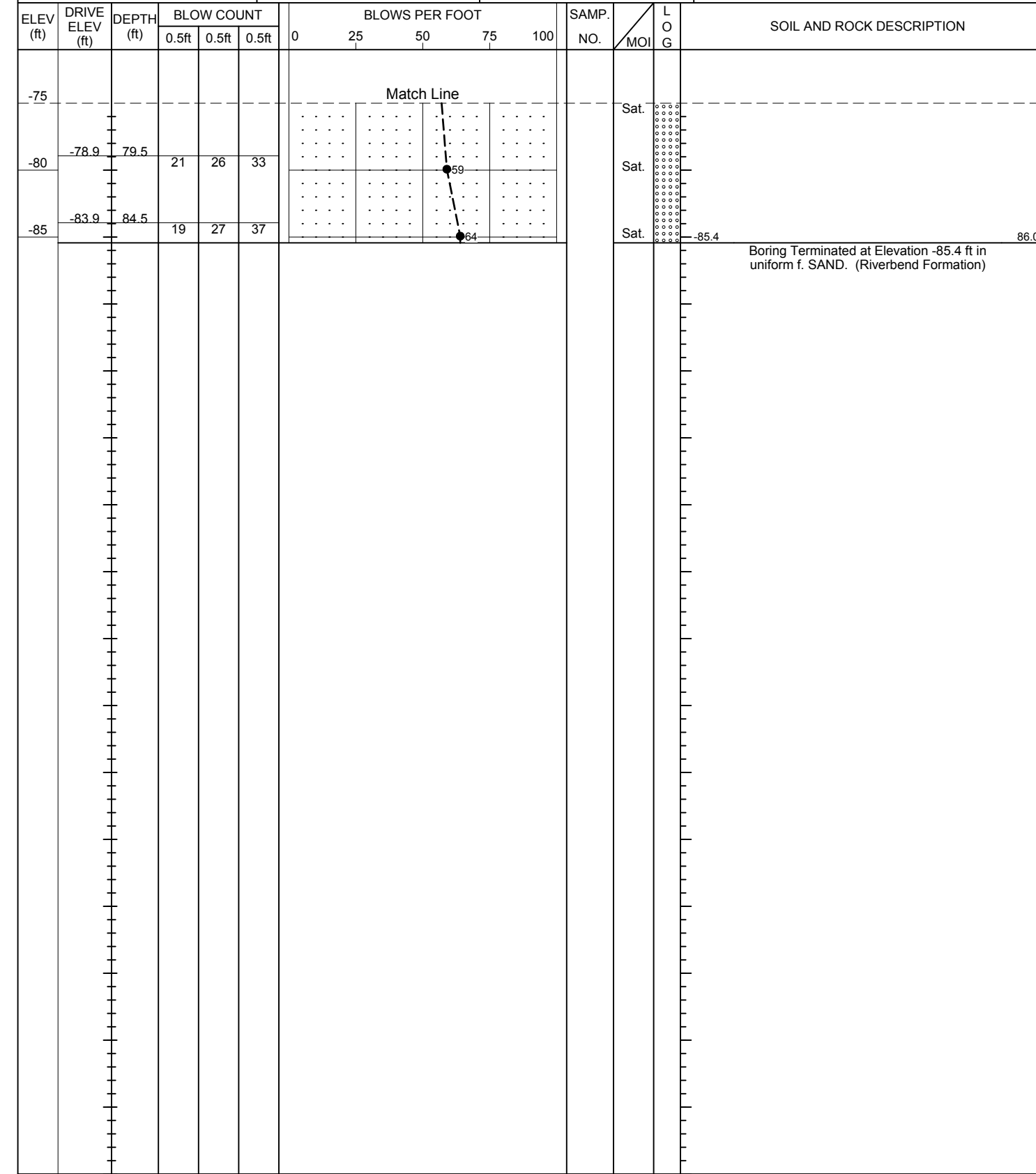


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 PROJ. NO.: 34442.1.5
 TIP NO.: R-2514D
 COUNTY: Jones

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Corey Futral
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B10-B NBL	STATION 392+80	OFFSET 55ft RT	ALIGNMENT -L-
COLLAR ELEV. 0.6 ft	TOTAL DEPTH 86.0 ft	NORTHING 466,408	EASTING 2,530,727
DRILL RIG/HAMMER EFF./DATE MAD2544 CME 45 82% 07/25/2013		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER W. Matt Wiggins	START DATE 12/12/13	COMP. DATE 12/12/13	SURFACE WATER DEPTH N/A



WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Corey Futral
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B10-B NBL	STATION 392+80	OFFSET 55ft RT	ALIGNMENT -L-
COLLAR ELEV. 0.6 ft	TOTAL DEPTH 86.0 ft	NORTHING 466,408	EASTING 2,530,727
DRILL RIG/HAMMER EFF./DATE MAD2544 CME 45 82% 07/25/2013		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER W. Matt Wiggins	START DATE 12/12/13	COMP. DATE 12/12/13	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ_CATLIN.GDT_12/20/13



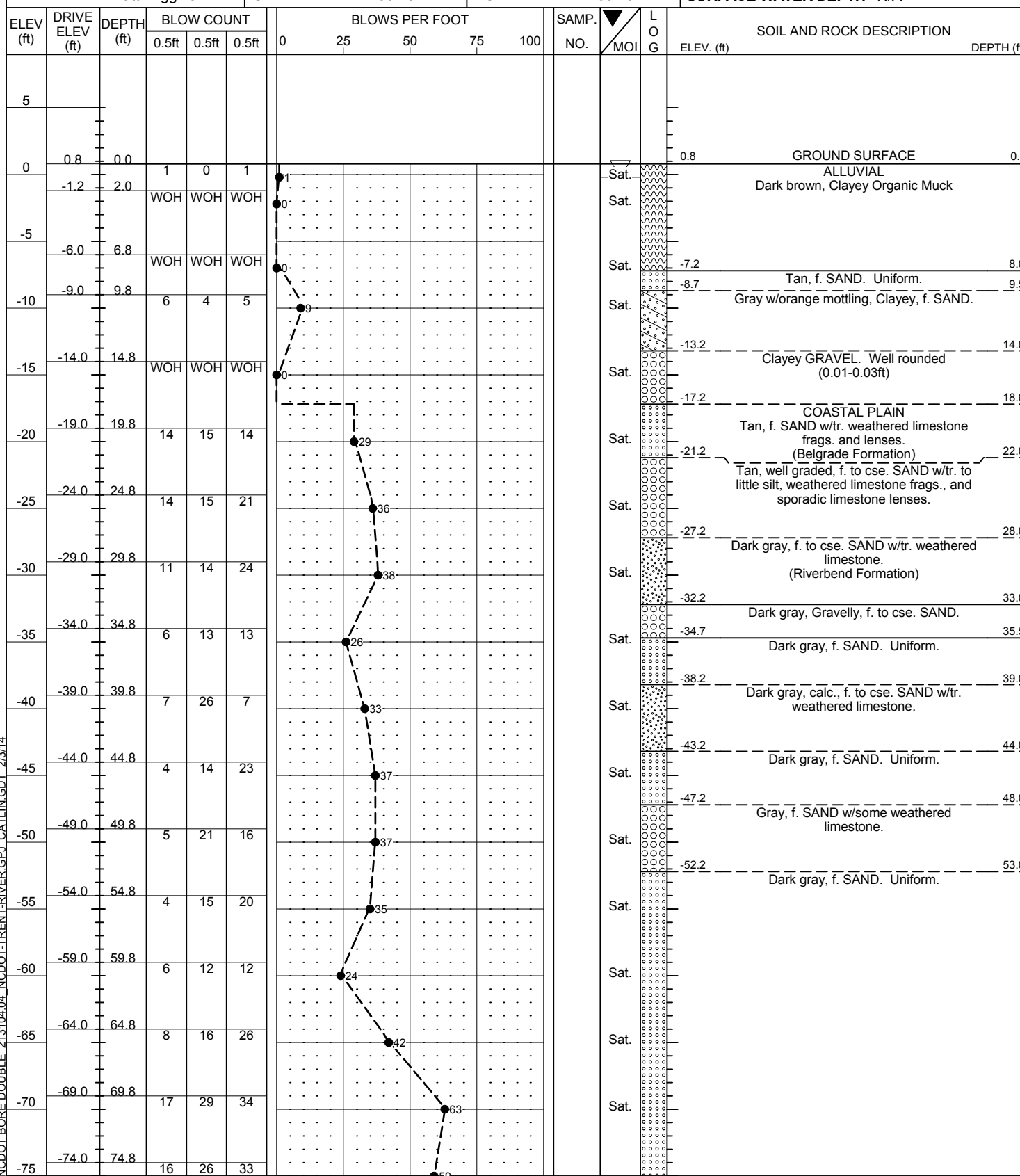
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BORELOG REPORT

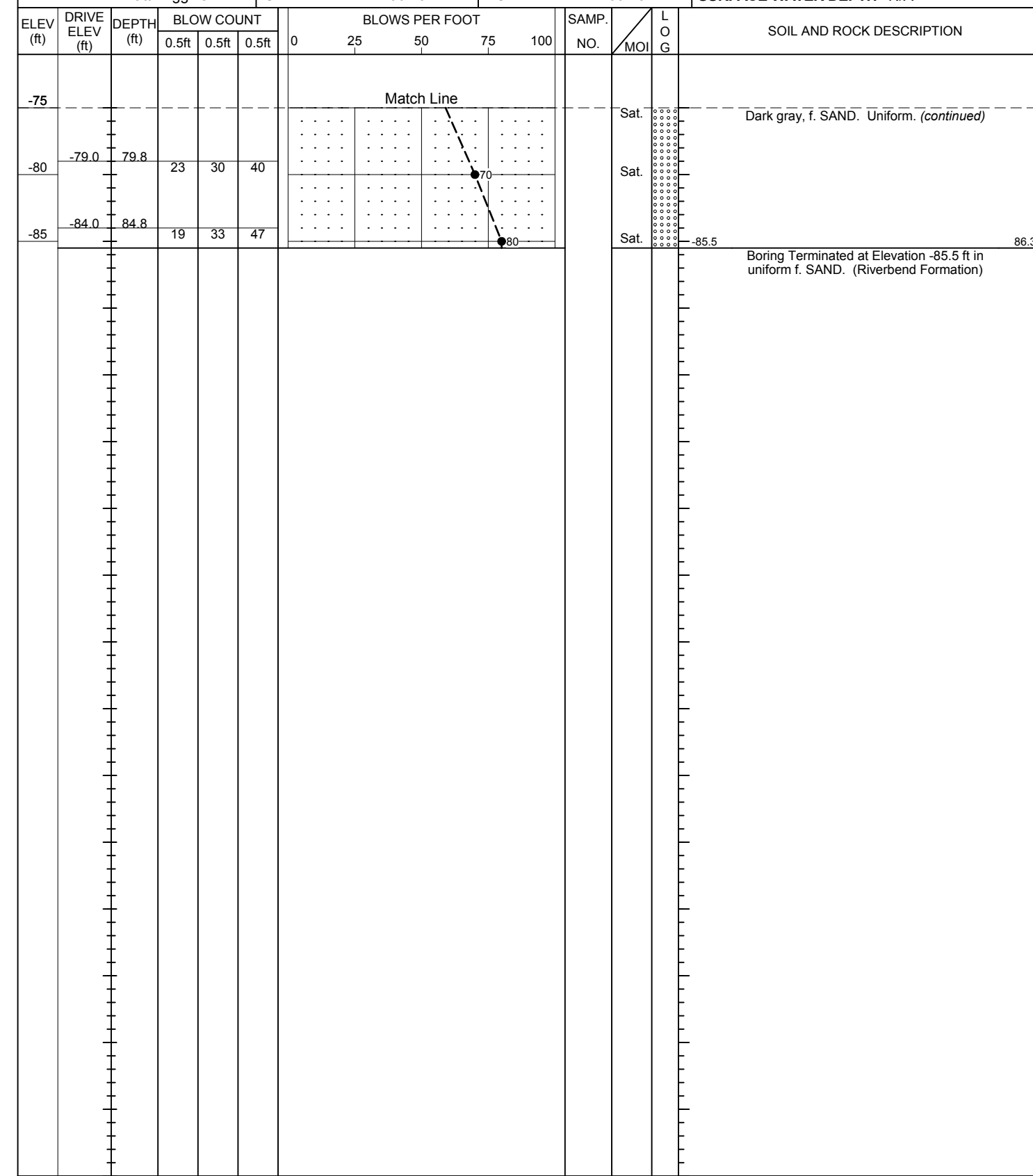


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 PROJ. NO.: 34442.1.5
 TIP NO.: R-2514D
 COUNTY: Jones

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Corey Futral
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B11-A SBL	STATION 393+74	OFFSET 59ft LT	ALIGNMENT -L-
COLLAR ELEV. 0.8 ft	TOTAL DEPTH 86.3 ft	NORTHING 466,515	EASTING 2,530,625
DRILL RIG/HAMMER EFF./DATE MAD2544 CME 45 82% 07/25/2013		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER W. Matt Wiggins	START DATE 12/06/13	COMP. DATE 12/09/13	SURFACE WATER DEPTH N/A



WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Corey Futral
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B11-A SBL	STATION 393+74	OFFSET 59ft LT	ALIGNMENT -L-
COLLAR ELEV. 0.8 ft	TOTAL DEPTH 86.3 ft	NORTHING 466,515	EASTING 2,530,625
DRILL RIG/HAMMER EFF./DATE MAD2544 CME 45 82% 07/25/2013		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER W. Matt Wiggins	START DATE 12/06/13	COMP. DATE 12/09/13	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ_CATLIN.GDT_2/3/14



NCDOT GEOTECHNICAL ENGINEERING UNIT

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SHEET: 37 of 41
 PROJ. NO.: 34442.1.5
 TIP NO.: R-2514D
 COUNTY: Jones

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Chuck Brake											
SITE DESCRIPTION Dual Bridges on -L- over the Trent River							GROUND WTR (ft)										
BORING NO. B11-B NBL		STATION 393+75		OFFSET 38ft RT		ALIGNMENT -L-											
COLLAR ELEV. 0.9 ft		TOTAL DEPTH 87.3 ft		NORTHING 466,504		EASTING 2,530,722											
DRILL RIG/HAMMER EFF./DATE MAD2544 CME 45 82% 07/25/2013				DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
DRILLER W. Matt Wiggins		START DATE 11/21/13		COMP. DATE 11/22/13		SURFACE WATER DEPTH 0.8ft											
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							
5																	
0	0.9	0.0	WOH	WOH	WOH										0.9	GROUND SURFACE	
-5																	ALLUVIAL Dark brown, Organic Muck.
-10	-8.4	9.3	4	6	4												Dark gray, f. SAND. Uniform.
-15	-14.4	15.3	5	3	5												COASTAL PLAIN Tan to light yellow tan, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses. (Belgrade Formation)
-20	-19.4	20.3	18	10	15												Dark gray, f. SAND w/tr. weathered limestone frags. (Riverbend Formation)
-25	-24.4	25.3	16	28	29												Gray, Sandy, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses.
-30	-29.4	30.3	9	17	15												Dark gray, f. SAND. Uniform.
-35	-34.9	35.8	6	17	15												Limestone lens. Inferred from cuttings.
-40	-39.9	40.8	3	8	27												Gray to dark gray, f. SAND.
-45	-44.9	45.8	4	10	18												Tr. weathered limestone frags.
-50	-49.9	50.8	5	14	13												
-55	-54.9	55.8	12	18	25												
-60	-59.9	60.8	12	22	29												
-65	-64.9	65.8	20	29	37												
-70	-69.9	70.8	19	24	31												
-75	-74.9	75.8															

NCDOT BORE DOUBLE 213104.04 NCDOT-TRENT-RIVER.GPJ CATLIN.GDT 12/20/13

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Chuck Brake											
SITE DESCRIPTION Dual Bridges on -L- over the Trent River							GROUND WTR (ft)										
BORING NO. B11-B NBL		STATION 393+75		OFFSET 38ft RT		ALIGNMENT -L-											
COLLAR ELEV. 0.9 ft		TOTAL DEPTH 87.3 ft		NORTHING 466,504		EASTING 2,530,722											
DRILL RIG/HAMMER EFF./DATE MAD2544 CME 45 82% 07/25/2013				DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
DRILLER W. Matt Wiggins		START DATE 11/21/13		COMP. DATE 11/22/13		SURFACE WATER DEPTH 0.8ft											
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							
-75																	
-80	-79.9	80.8	21	31	40												Slight organic odor (continued)
-85	-84.9	85.8	22	31	38												Boring Terminated at Elevation -86.4 ft in uniform f. SAND. (Riverbend Formation)



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Chuck Brake											
SITE DESCRIPTION Dual Bridges on -L- over the Trent River							GROUND WTR (ft)										
BORING NO. B12-A SBL		STATION 394+71		OFFSET 56ft LT		ALIGNMENT -L-											
COLLAR ELEV. 0.9 ft		TOTAL DEPTH 85.2 ft		NORTHING 466,611		EASTING 2,530,639											
DRILL RIG/HAMMER EFF./DATE MAD2544 CME 45 82% 07/25/2013		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic													
DRILLER N/A		START DATE 12/04/13		COMP. DATE 12/05/13		SURFACE WATER DEPTH 0.1ft											
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							
5																	
0	0.9	0.0												0.9	GROUND SURFACE	0.0	
-5	-4.4	5.3	1	0	1										ALLUVIAL Dark brown, Clayey Organic Muck.		
-10	-8.8	9.7	1	0	5										Dark gray, Clayey, f. SAND. Well rounded gravel noted in cuttings.		
-15	-12.9	13.8	2	0	1										Orange tan, f. SAND. Uniform.		
-20	-17.9	18.8	2	2	1										COASTAL PLAIN Weathered Limestone Frags. Logged from cuttings. (Belgrade Formation)		
-25	-22.9	23.8	16	22	25										Yellow tan, f. SAND. Uniform. Light tan to light orange tan, f. SAND w/weathered limestone frags. and lenses (0.1 ft. thick) of limestone.		
-30	-27.9	28.8	13	21	21										Dark gray, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses. (Riverbend Formation)		
-35	-32.9	33.8	17	28	17										Dark gray, f. SAND. Uniform.		
-40	-37.9	38.8	10	10	10										Light gray, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses.		
-45	-42.8	43.7	18	24	27										Gray, f. SAND. Uniform.		
-50	-47.8	48.7	14	26	27												
-55	-52.8	53.7	9	14	17												
-60	-57.8	58.7	14	29	26											Organic odor	
-65	-62.8	63.7	15	26	31												
-70	-67.8	68.7	18	25	32												
-75	-72.8	73.7	18	33	39												

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Chuck Brake									
SITE DESCRIPTION Dual Bridges on -L- over the Trent River							GROUND WTR (ft)								
BORING NO. B12-A SBL		STATION 394+71		OFFSET 56ft LT		ALIGNMENT -L-									
COLLAR ELEV. 0.9 ft		TOTAL DEPTH 85.2 ft		NORTHING 466,611		EASTING 2,530,639									
DRILL RIG/HAMMER EFF./DATE MAD2544 CME 45 82% 07/25/2013		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
DRILLER N/A		START DATE 12/04/13		COMP. DATE 12/05/13		SURFACE WATER DEPTH 0.1ft									
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					
-75															
-80	-77.8	78.7	24	33	44										Organic odor (continued)
-85	-82.8	83.7	25	35	38										Boring Terminated at Elevation -84.3 ft in uniform f. SAND. (Riverbend Formation)

NCDOT BORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ_CATLIN.GDT_12/24/13



NCDOT GEOTECHNICAL ENGINEERING UNIT

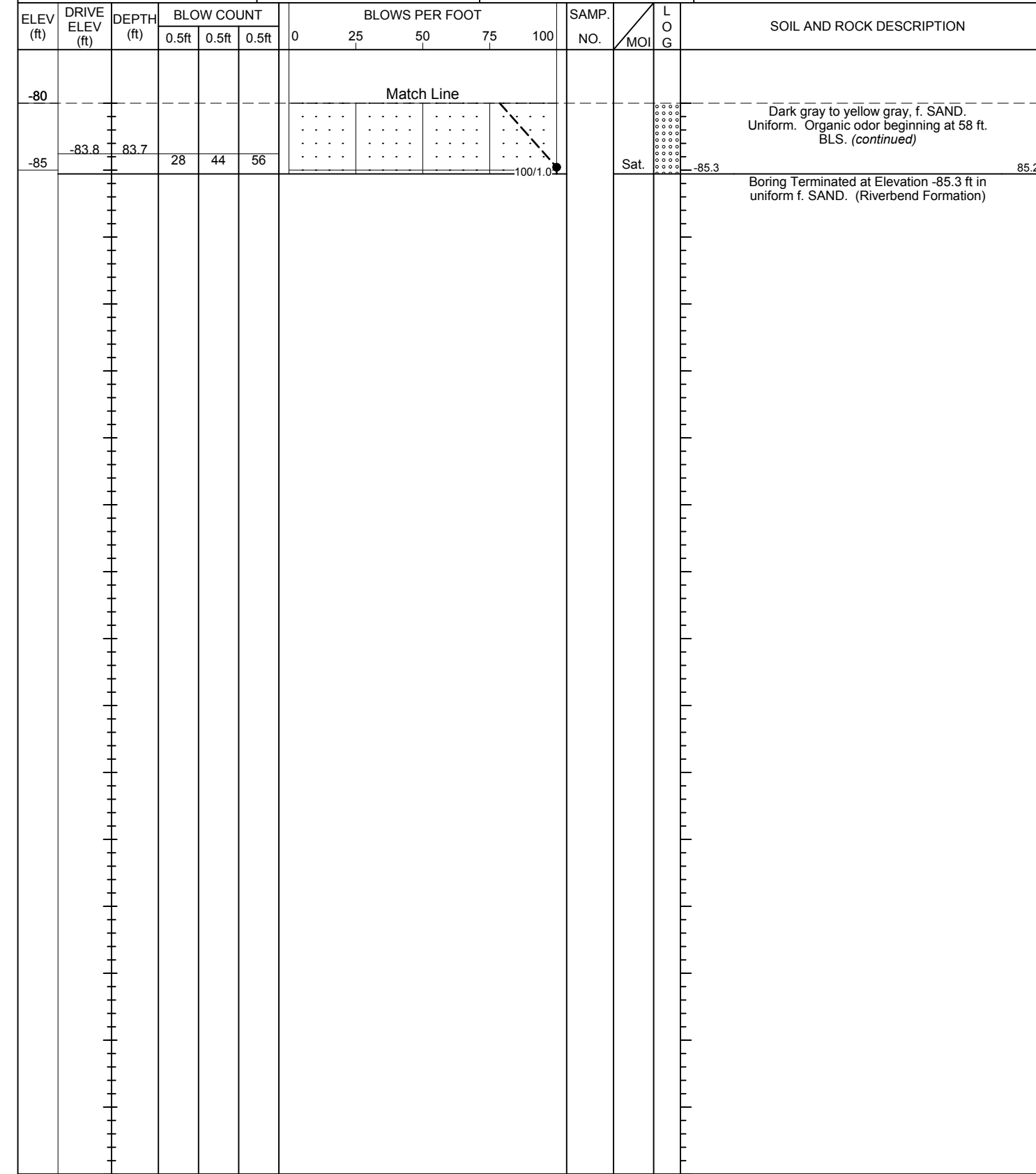
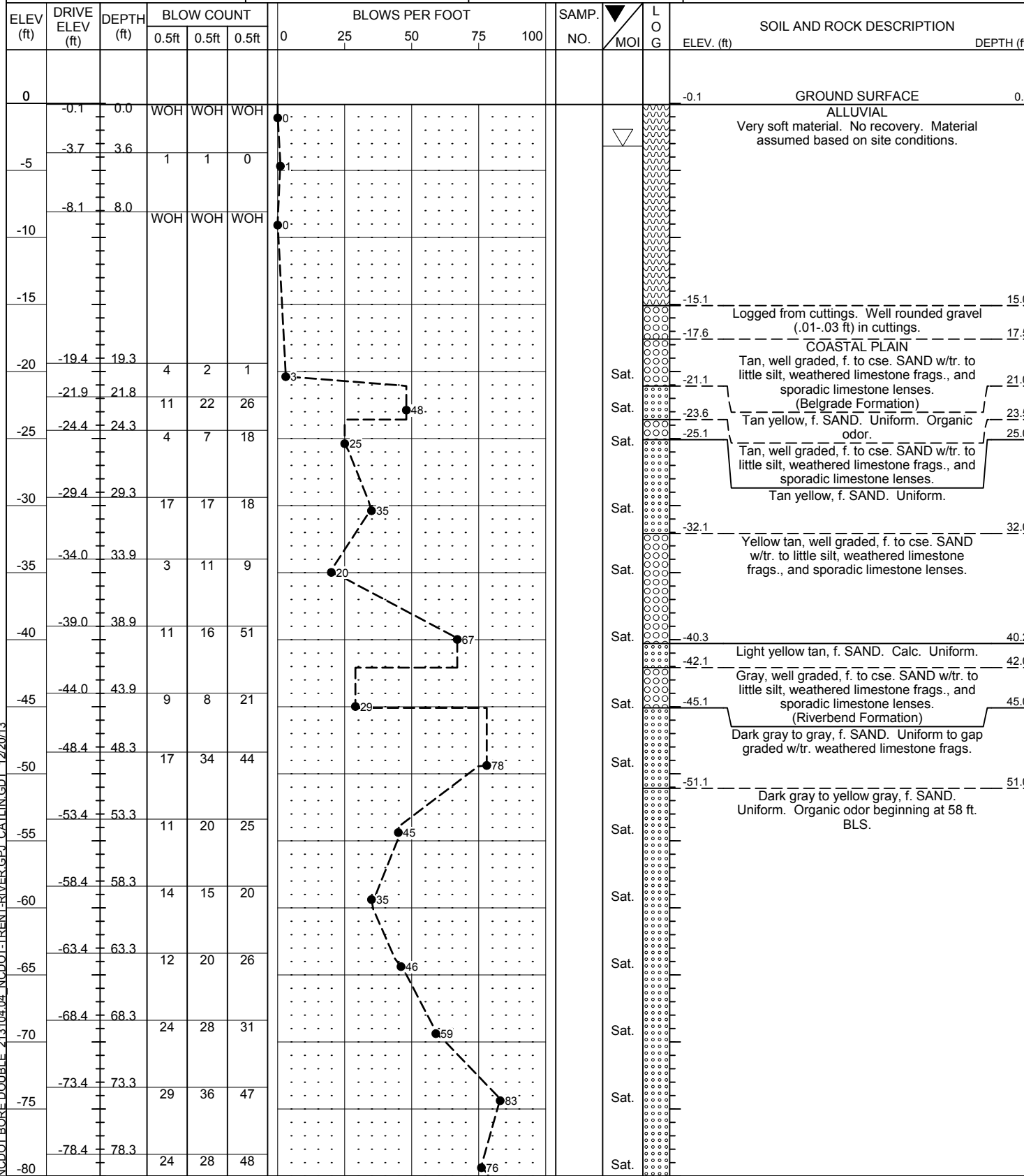
BORELOG REPORT



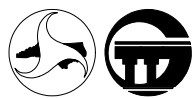
SHEET: 39 of 41
 PROJ. NO.: 34442.1.5
 TIP NO.: R-2514D
 COUNTY: Jones

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B12-B NBL	STATION 394+63	OFFSET 58ft RT	ALIGNMENT -L-
COLLAR ELEV. -0.1 ft	TOTAL DEPTH 85.2 ft	NORTHING 466,589	EASTING 2,530,752
DRILL RIG/HAMMER EFF./DATE MAD2544 CME 45 82% 07/25/2013		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER W. Matt Wiggins	START DATE 11/19/13	COMP. DATE 11/20/13	SURFACE WATER DEPTH 0.8ft

WBS 34442.1.5	TIP R-2514D	COUNTY Jones	GEOLOGIST Chuck Brake
SITE DESCRIPTION Dual Bridges on -L- over the Trent River			GROUND WTR (ft)
BORING NO. B12-B NBL	STATION 394+63	OFFSET 58ft RT	ALIGNMENT -L-
COLLAR ELEV. -0.1 ft	TOTAL DEPTH 85.2 ft	NORTHING 466,589	EASTING 2,530,752
DRILL RIG/HAMMER EFF./DATE MAD2544 CME 45 82% 07/25/2013		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER W. Matt Wiggins	START DATE 11/19/13	COMP. DATE 11/20/13	SURFACE WATER DEPTH 0.8ft



NCDOT BORE DOUBLE 213104.04_NCDOT-TRENT-RIVER.GPJ_CATLIN.GDT_12/20/13



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Corey Futral									
SITE DESCRIPTION Dual Bridges on -L- over the Trent River							GROUND WTR (ft)								
BORING NO. EB2-A SBL		STATION 395+65		OFFSET 57ft LT		ALIGNMENT -L-									
COLLAR ELEV. 2.1 ft		TOTAL DEPTH 66.3 ft		NORTHING 466,704		EASTING 2,530,650									
DRILL RIG/HAMMER EFF./DATE MAD3964 CME-45C 86% 07/25/2013			DRILL METHOD NW Casing w/ SPT			HAMMER TYPE Automatic									
DRILLER W. Matt Wiggins		START DATE 10/22/13		COMP. DATE 10/22/13		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					
5															
	2.1	0.0	WOH	1	0								2.1	GROUND SURFACE	0.0
0	-0.7	2.8										W	0.1	UNDIVIDED COASTAL PLAIN	2.0
	-2.7	4.8										Sat.		Dark gray and brown, Clayey SILT w/tr. f. sand and roots.	
	-7.7	9.8										Sat.		Light gray, f. SAND. Uniform. Tr. orange mottling in top of stratum.	
-5															
	-12.7	14.8										Sat.		Med. gray, Silty, f. SAND.	13.0
-10															
	-17.7	19.8										Sat.		COASTAL PLAIN	18.0
	-22.7	24.8										Sat.		Med. gray w/orange mottling, f. SAND w/tr. limestone frags. (Belgrade Formation)	22.5
-15															
	-27.7	29.8										Sat.		Light tan w/orange mottling, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses.	28.0
-20															
	-34.9	37.0										Sat.		Med. tan w/orange mottling, Silty, f. SAND w/some limestone frags. Well graded.	37.0
-25															
	-43.2	45.3										Sat.		Dark gray, f. SAND. Uniform. (Riverbend Formation)	45.3
-30															
	-50.9	53.0										Sat.		Light gray, f. to cse. SAND w/Weathered Limestone. Well graded.	53.0
-35															
	-53.9	56.0										Sat.		Med. to dark gray, f. SAND. Uniform.	56.0
-40															
	-64.2	66.3										Sat.		Boring Terminated at Elevation -64.2 ft in uniform f. SAND. (Riverbend Formation)	66.3

WBS 34442.1.5		TIP R-2514D		COUNTY Jones		GEOLOGIST Corey Futral									
SITE DESCRIPTION Dual Bridges on -L- over the Trent River							GROUND WTR (ft)								
BORING NO. EB2-B NBL		STATION 395+66		OFFSET 52ft RT		ALIGNMENT -L-									
COLLAR ELEV. 8.3 ft		TOTAL DEPTH 66.3 ft		NORTHING 466,692		EASTING 2,530,758									
DRILL RIG/HAMMER EFF./DATE MAD3964 CME-45C 86% 07/25/2013			DRILL METHOD NW Casing w/ SPT			HAMMER TYPE Automatic									
DRILLER W. Matt Wiggins		START DATE 10/22/13		COMP. DATE 10/22/13		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					
10															
	8.3	0.0		1	1	1									
5	5.5	2.8		3	3	4						D		UNDIVIDED COASTAL PLAIN	0.0
	3.5	4.8		2	2	2						M		Dark brown, Topsoil w/tr. leaves and roots.	7.0
												W		Med. to light tan, f. SAND. Uniform. Med. orange mottling noted below ~9 ft.	
0															
	-1.5	9.8		4	5	5						Sat.			
-5															
	-6.5	14.8		2	1	1						Sat.			
-10															
	-11.5	19.8		1	2	1						Sat.		Med. tan w/orange and dark brown mottling, Silty, f. SAND.	18.0
-15															
	-16.5	24.8		2	5	2						Sat.		COASTAL PLAIN	23.0
-20															
	-21.5	29.8		7	7	7						Sat.		Med. tan w/light gray to lt. tan w/orange, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses. (Belgrade Formation)	28.0
-25															
	-26.5	34.8		15	20	14						Sat.		Med. to light tan w/light orange mottling, f. SAND. Uniform.	33.0
-30															
	-31.5	39.8		18	19	52						Sat.		Med. tan w/light brown and orange mottling, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses.	37.5
-35															
	-36.5	44.8		12	19	22						Sat.		Med. gray, Silty, f. SAND w/tr. shell and weathered limestone frags. Gap graded. (Riverbend Formation)	43.5
-40															
	-41.5	49.8		14	21	17						Sat.		Med. gray, f. SAND. Uniform.	48.0
-45															
	-46.5	54.8		21	23	31						Sat.			
-50															
	-51.5	59.8		42	19	11						Sat.		Light gray, well graded, f. to cse. SAND w/tr. to little silt, weathered limestone frags., and sporadic limestone lenses.	58.0
-55															
	-56.5	64.8		11	12	22						Sat.		Light gray, f. SAND. Uniform.	63.0
-60															
												Sat.		Boring Terminated at Elevation -58.0 ft in uniform f. SAND. (Riverbend Formation)	66.3

NCDOT BORE DOUBLE 213104.04 NCDOT-TRENT-RIVER.GPJ CATLIN.GDT 12/20/13

SITE PHOTOGRAPHS



END BENT TWO FACING SOUTH
ALONG -L- CENTER LINE



DRILL ON BORING B-11A SBL
FACING NORTH ALONG -L- SBL



BENT 7 FACING SOUTH
ALONG -L- CENTER LINE



BENT 8 FACING NORTH
ALONG -L- CENTER LINE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2514D	1	12

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34442.1.5 (R-2514D) F.A. PROJ. NHF-17(7)
COUNTY JONES
PROJECT DESCRIPTION US 17 FROM SOUTH OF NC 58 TO THE
NEW BERN BYPASS

SITE DESCRIPTION BRIDGE NO. 103 AND 104 ON -L- (US 17 BYPASS)
OVER -Y5- (SR 1121) AT -L- STA. 428+53.58

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	PROFILES
6-7	CROSS SECTIONS
8-11	BORE LOGS
12	SOIL TEST RESULTS

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 1901 TOL-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.

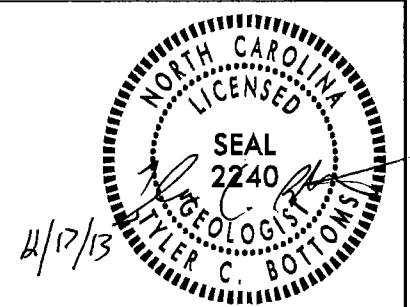
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT 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: 34442.1.5 ID: R-2514D

PERSONNEL

C.M. WRIKE
R.E. SMITH
D.G. PINTER

INVESTIGATED BY T.C. BOTTOMS
CHECKED BY D.N. ARGENBRIGHT
SUBMITTED BY D.N. ARGENBRIGHT
DATE DECEMBER 2013



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 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.

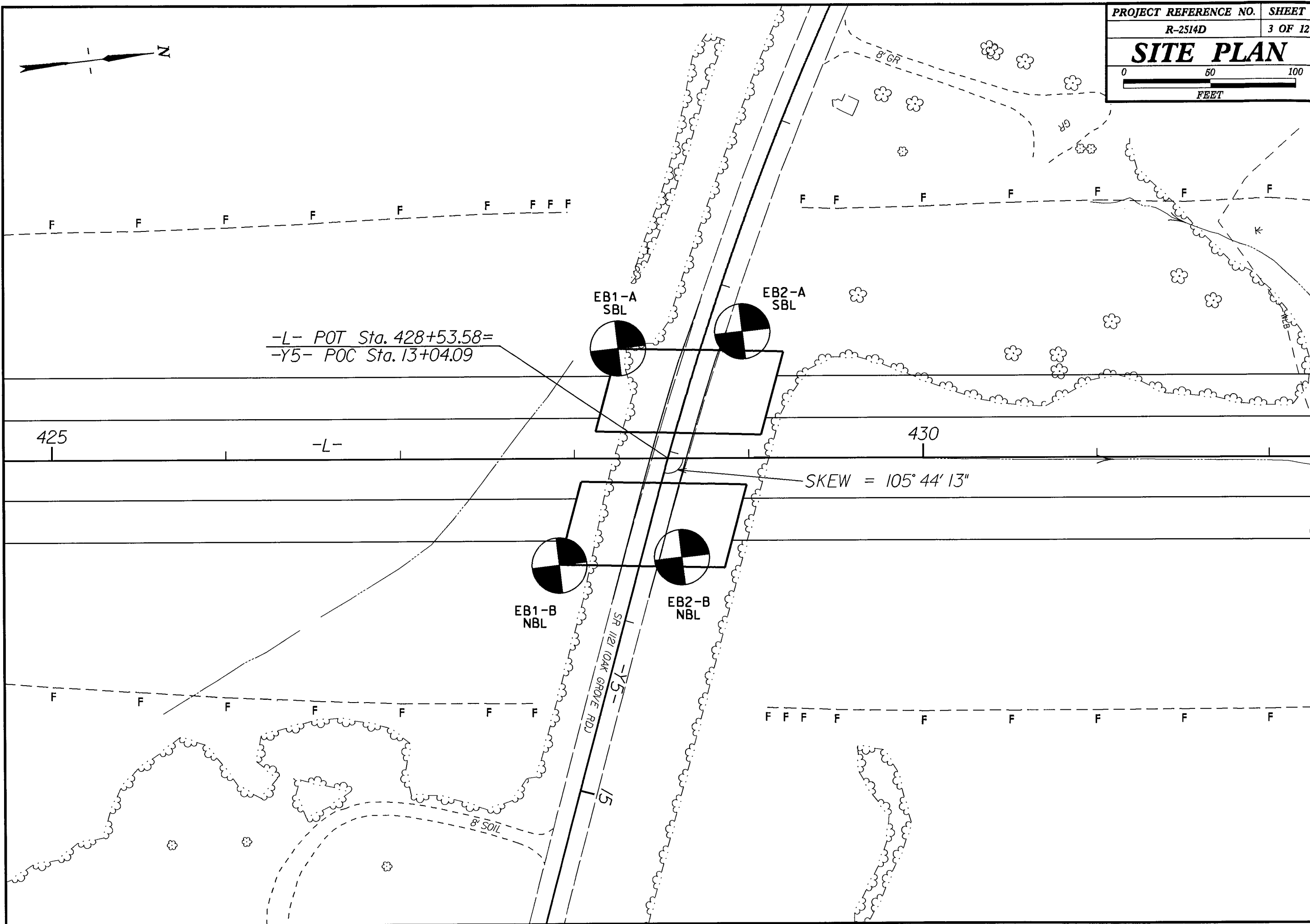
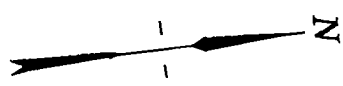
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO. R-2514D
 SHEET NO. 2 OF 12

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

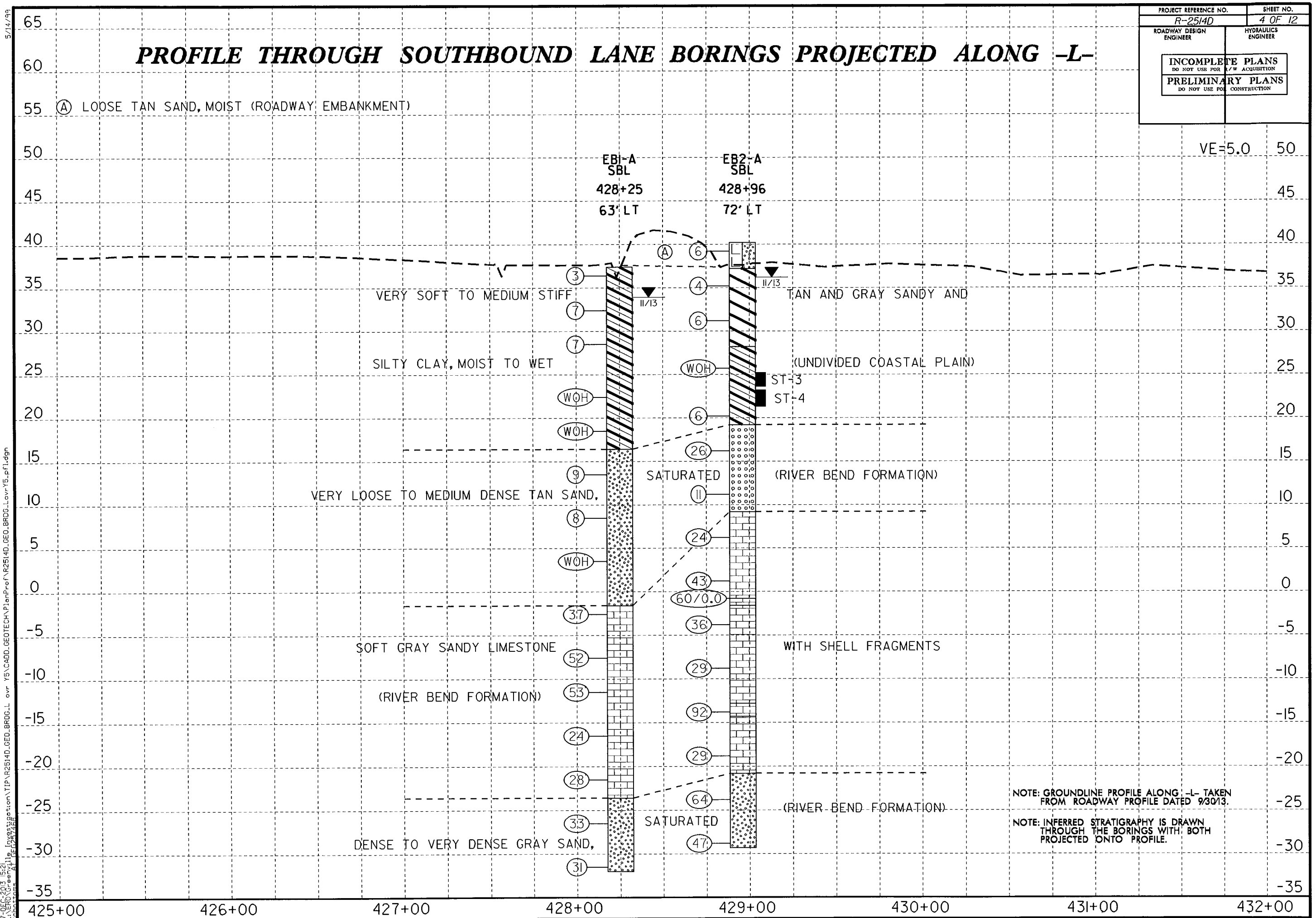
SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS			
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (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. ANGULARITY OF GRAINS 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 (CPI) - 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. 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 (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		ROCK HARDNESS			
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 REFUSAL</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 > 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 < 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.		COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50		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 GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT - CAN BE GROUDED 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 FINGERNAIL.	
PERCENTAGE OF MATERIAL		GROUND WATER		MISCELLANEOUS SYMBOLS		TEXTURE OR GRAIN SIZE			
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		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		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		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			
CONSISTENCY OR DENSENESS		ABBREVIATIONS		EQUIPMENT USED ON SUBJECT PROJECT		FRACTURE SPACING			
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)		AR - AUGER REFUSAL MED. - MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA - MICAACEOUS WEA - WEATHERED CL - CLAY MOD. - MODERATELY UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC DRY - DRY UNIT WEIGHT CSE - COARSE DRG. - ORGANIC SAMPLE ABBREVIATIONS DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST S - BULK DPT - DYNAMIC PENETRATION TEST SD - SAND, SANDY SS - SPLIT SPOON e - VOID RATIO SL - SILT, SILTY RS - ROCK F - FINE FOSS. - FOSSILIFEROUS TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAC. - FRACTURED, FRACTURES # - MOISTURE CONTENT CBR - CALIFORNIA BEARING RATIO FRAGS. - FRAGMENTS SLI. - SLIGHTLY HI. - HIGHLY		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 1/16" 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 TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED > 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET			
SOIL MOISTURE - CORRELATION OF TERMS		INDURATION		PLASTICITY		NOTES:			
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.		PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH		BENCH MARK: BM-22; RR SPIKE IN POWER POLE AT -Y5- STA. 16+20, 48' LT ELEVATION: 39.54 FT.			
COLOR		FRACTURE SPACING		INDURATION		NOTES:			
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.		TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED > 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.		BENCH MARK: BM-22; RR SPIKE IN POWER POLE AT -Y5- STA. 16+20, 48' LT ELEVATION: 39.54 FT.			



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PROFILE THROUGH SOUTHBOUND LANE BORINGS PROJECTED ALONG -L-

PROJECT REFERENCE NO. <i>R-2514D</i>	SHEET NO. 4 OF 12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS <small>DO NOT USE FOR PERMITS ACQUISITION</small>	
PRELIMINARY PLANS <small>DO NOT USE FOR CONSTRUCTION</small>	



VE=5.0 50

45

40

35

30

25

20

15

10

5

0

-5

-10

-15

-20

-25

-30

-35

425+00 426+00 427+00 428+00 429+00 430+00 431+00 432+00

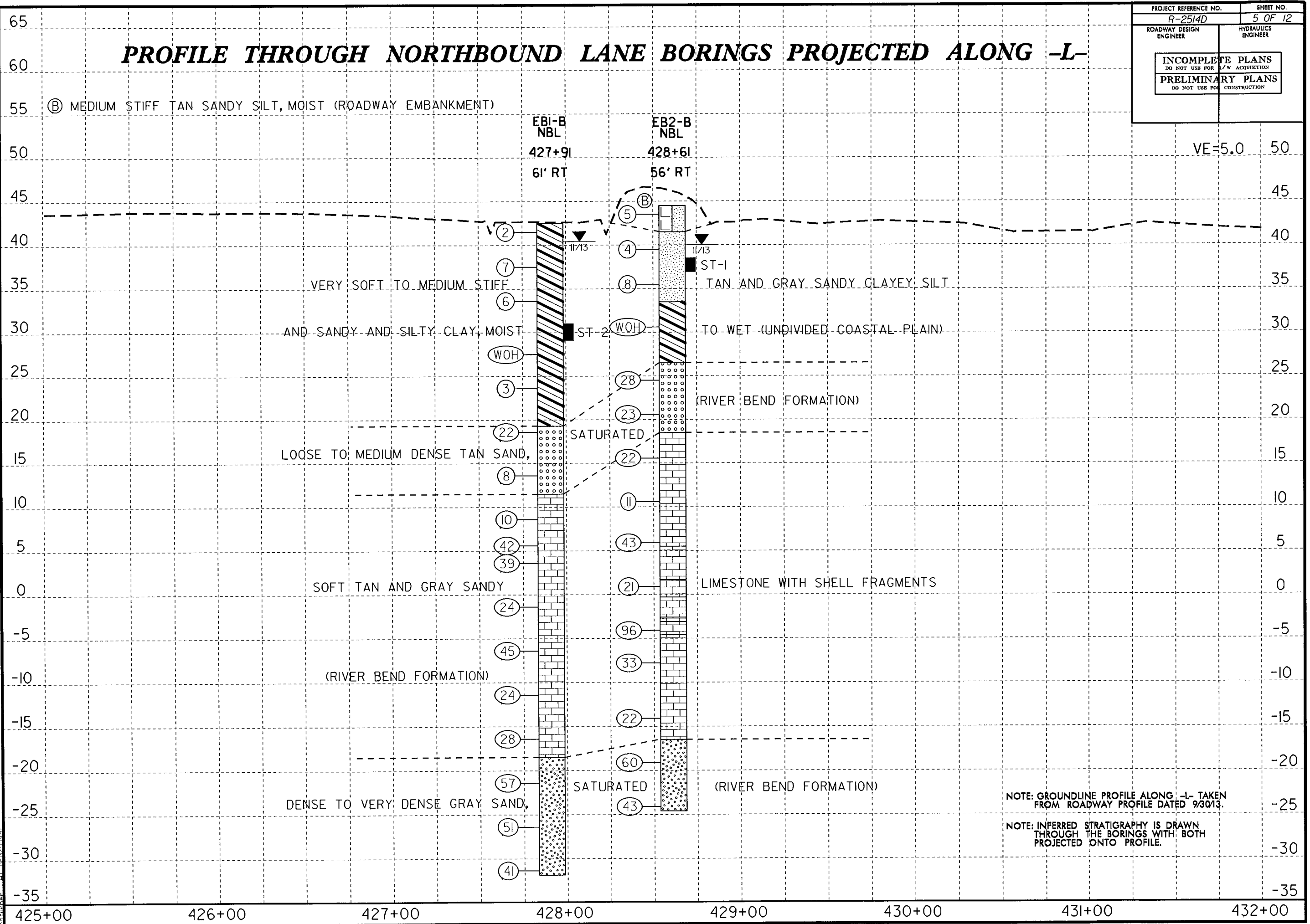
NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM ROADWAY PROFILE DATED 9/30/13.

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

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 Number: 01

PROJECT REFERENCE NO. R-2514D	SHEET NO. 5 OF 12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PROFILE THROUGH NORTHBOUND LANE BORINGS PROJECTED ALONG -L-



VE=5.0 50

NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM ROADWAY PROFILE DATED 9/30/13.

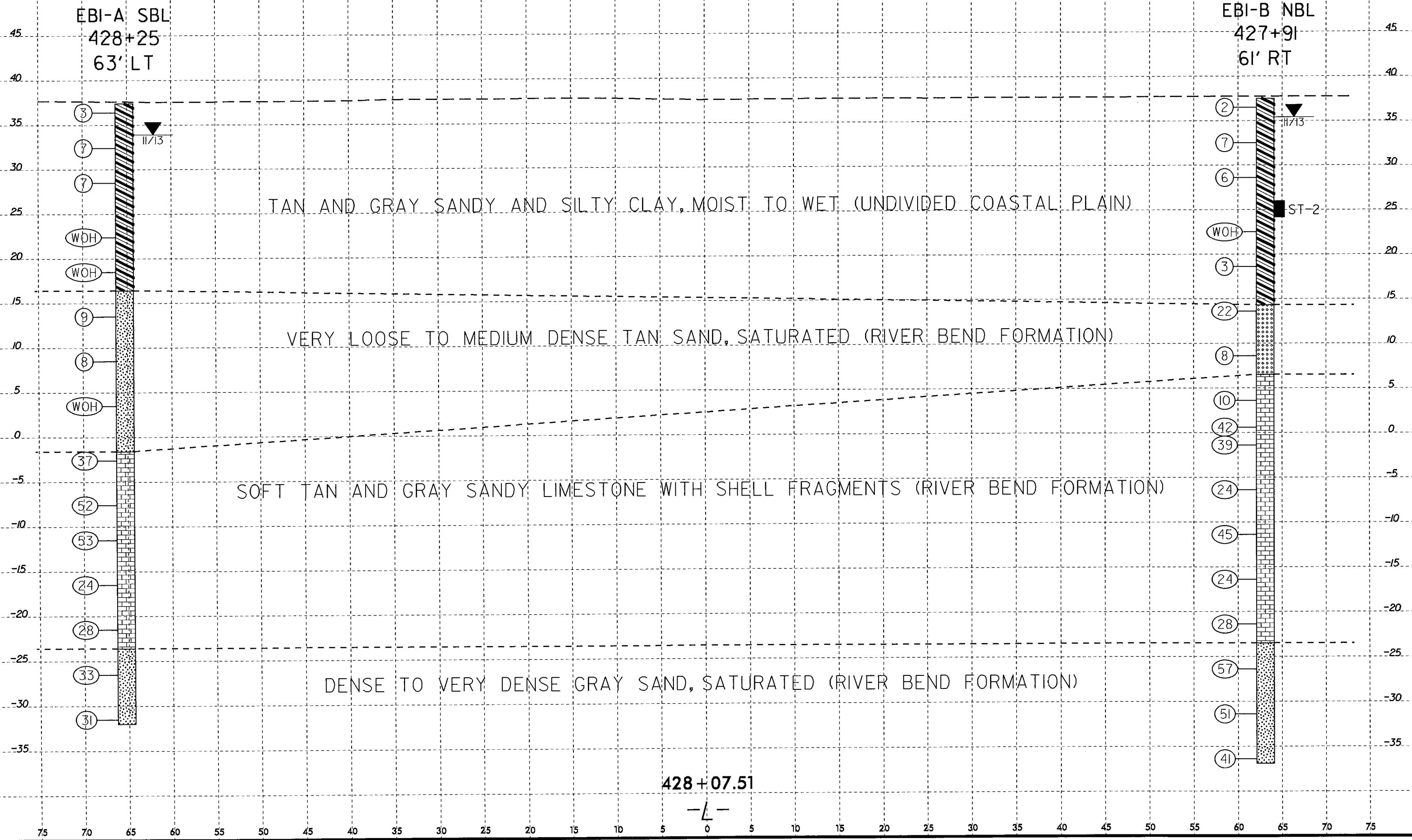
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.

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PROJ. REFERENCE NO.	SHEET NO.
R-2514D	6 OF 12

CROSS SECTION ALONG END BENT 1 NBL AND SBL



EBI-A SBL
428+25
63' LT

EBI-B NBL
427+91
61' RT

TAN AND GRAY SANDY AND SILTY CLAY, MOIST TO WET (UNDIVIDED COASTAL PLAIN)

VERY LOOSE TO MEDIUM DENSE TAN SAND, SATURATED (RIVER BEND FORMATION)

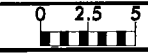
SOFT TAN AND GRAY SANDY LIMESTONE WITH SHELL FRAGMENTS (RIVER BEND FORMATION)

DENSE TO VERY DENSE GRAY SAND, SATURATED (RIVER BEND FORMATION)

428+07.51

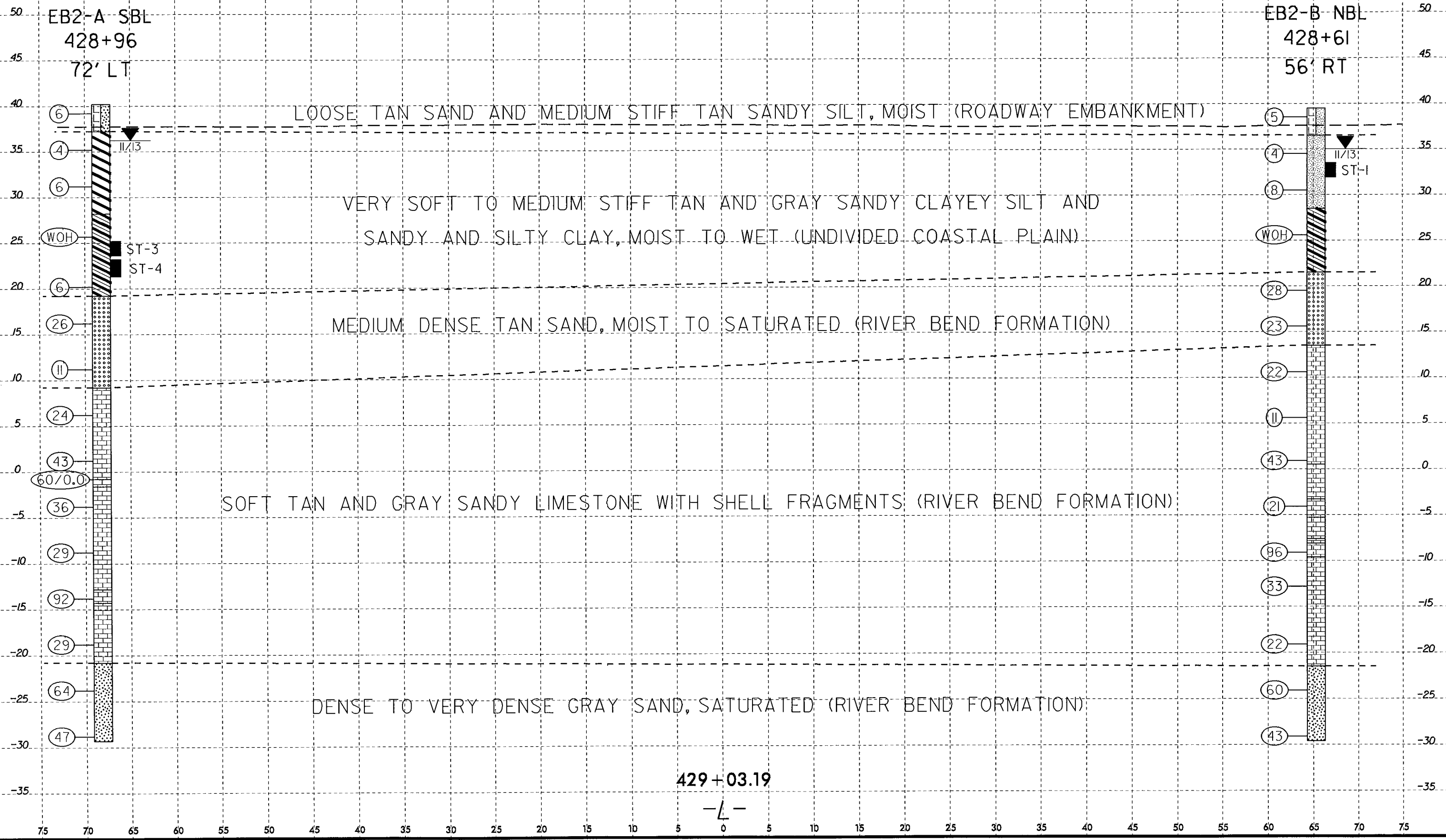
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PROJ. REFERENCE NO.	SHEET NO.
R-2514D	7 OF 12

CROSS SECTION ALONG END BENT 2 NBL AND SBL



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 34442.1.5		TIP R-2514D		COUNTY JONES		GEOLOGIST Wrike, C. M.									
SITE DESCRIPTION BRIDGE NO. 103 ON -L- (US 17) OVER -Y5- (OAK GROVE RD.)						GROUND WTR (ft)									
BORING NO. EB2-A SBL		STATION 428+96		OFFSET 72 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 40.2 ft		TOTAL DEPTH 69.5 ft		NORTHING 470,014		EASTING 2,531,030									
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 11/21/13		COMP. DATE 11/21/13		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					
45															
40	40.2	0.0	1	3	3							SS-26		GROUND SURFACE ROADWAY EMBANKMENT TAN SAND, MOIST	0.0
35	36.2	4.0	1	2	2							SS-27		UNDIVIDED COASTAL PLAIN TAN AND GRAY SILTY CLAY, MOIST TO WET	3.0
30	32.2	8.0	3	3	3										
25	26.7	13.5	WOH	WOH	WOH							SS-28			12.0
20	21.2	19.0	1	2	4										
15	17.2	23.0	6	11	15							SS-29		COASTAL PLAIN TAN SAND, SATURATED (RIVER BEND FORMATION)	21.0
10	12.2	28.0	9	6	5										
5	7.2	33.0	10	12	12							SS-30		COASTAL PLAIN TAN AND GRAY SANDY LIMESTONE WITH SHELL FRAGMENTS (RIVER BEND FORMATION)	31.0
0	2.2	38.0	13	21	22							SS-31			
-5	-0.8	41.0	60/0/0									SS-32			41.0
-10	-7.8	48.0	8	12	17										41.8
-15	-12.8	53.0	18	45	47							SS-33			53.0
-20	-17.8	58.0	11	12	17										54.5
-25	-22.8	63.0	33	34	30							SS-34		COASTAL PLAIN GRAY SAND, SATURATED (RIVER BEND FORMATION)	61.0
-29.3	-27.8	68.0	20	25	22										69.5
Boring Terminated at Elevation -29.3 ft in Dense Sand															
Other Samples: ST-3 (15.0 - 16.6)															

WBS 34442.1.5		TIP R-2514D		COUNTY JONES		GEOLOGIST Wrike, C. M.									
SITE DESCRIPTION BRIDGE NO. 103 ON -L- (US 17) OVER -Y5- (OAK GROVE RD.)						GROUND WTR (ft)									
BORING NO. EB2-A SBL		STATION 428+96		OFFSET 72 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 40.2 ft		TOTAL DEPTH 69.5 ft		NORTHING 470,014		EASTING 2,531,030									
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 11/21/13		COMP. DATE 11/21/13		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					
-35														Match Line	
															ST-4 (17.0 - 18.9)

NCDOT BORE DOUBLE R-2514D_GEO_BRDG_Y5.GPJ_NC_DOT_GDT_12/17/13

34442.1.5
R-2514D

BRIDGE NO. 103 AND NO. 104 ON -L- (US 17 BYPASS) OVER -Y5- (SR 1121) AT -L- STA. 428+53.58

EB1-A SBL SOIL TEST RESULTS

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-18	63 LT	428+25	0, 0- 1.5	A-6(9)	29	13	2.4	20.8	28.4	48.4	100	99	84	-	-
SS-19	63 LT	428+25	7, 9- 9.4	A-6(11)	35	19	5.0	34.5	22.2	38.3	100	98	71	-	-
SS-20	63 LT	428+25	22, 9- 24.4	A-2-4(0)	19	NP	14.0	63.7	17.2	5.0	100	95	35	-	-
SS-21	63 LT	428+25	32, 9- 34.4	A-2-4(0)	22	NP	58.5	29.5	2.9	9.1	98	78	13	-	-
SS-22	63 LT	428+25	39, 0- 40.5	A-1-b(0)	16	NP	41.7	39.3	10.9	8.1	57	38	13	-	-
SS-23	63 LT	428+25	47, 9- 49.4	A-1-b(0)	18	NP	32.7	52.3	8.0	7.1	61	46	11	-	-
SS-24	63 LT	428+25	57, 9- 59.4	A-1-b(0)	18	NP	46.1	36.4	11.5	6.0	65	41	13	-	-
SS-25	63 LT	428+25	62, 9- 64.4	A-2-4(0)	14	NP	31.9	56.7	7.5	4.0	94	76	14	-	-

EB1-B NBL SOIL TEST RESULTS

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-10	61 RT	427+91	0, 0- 1.5	A-6(7)	28	11	2.8	27.4	27.4	42.3	100	99	79	-	-
SS-11	61 RT	427+91	14, 0- 15.5	A-6(15)	34	18	0.2	23.2	38.3	38.3	100	100	89	-	-
SS-12	61 RT	427+91	23, 2- 24.4	A-3(0)	15	NP	55.7	38.3	2.9	3.0	96	70	7	-	-
SS-13	61 RT	427+91	32, 9- 34.4	A-1-b(0)	20	NP	67.4	12.9	10.6	9.1	96	48	21	-	-
SS-14	61 RT	427+91	35, 9- 37.4	A-1-b(0)	17	NP	49.2	30.4	8.3	12.1	57	36	13	-	-
SS-15	61 RT	427+91	42, 9- 44.4	A-1-b(0)	20	NP	40.3	37.5	12.1	10.1	51	34	14	-	-
SS-16	61 RT	427+91	52, 9- 54.4	A-1-a(0)	17	NP	46.2	36.7	7.1	10.1	46	29	10	-	-
SS-17	61 RT	427+91	62, 9- 64.4	A-2-4(0)	20	NP	10.2	79.7	5.0	5.0	100	97	14	-	-

EB2-A SBL SOIL TEST RESULTS

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-26	72 LT	428+96	0, 0- 1.5	A-2-4(0)	18	NP	7.7	61.1	15.1	16.1	100	97	35	-	-
SS-27	72 LT	428+96	4, 0- 5.5	A-7-6(23)	46	25	1.6	17.1	24.8	56.5	100	99	88	-	-
SS-28	72 LT	428+96	13, 5- 15.0	A-6(11)	32	11	0.0	15.9	53.8	30.2	100	100	99	-	-
SS-29	72 LT	428+96	23, 0- 24.5	A-3(0)	16	NP	72.8	20.7	2.5	4.0	95	63	8	-	-
SS-30	72 LT	428+96	33, 0- 34.5	A-1-b(0)	16	NP	61.2	19.8	11.0	8.1	82	50	17	-	-
SS-31	72 LT	428+96	38, 0- 39.5	A-1-b(0)	18	NP	55.8	22.0	12.1	10.1	60	35	15	-	-
SS-32	72 LT	428+96	43, 0- 44.5	A-1-a(0)	17	NP	51.6	27.2	15.1	6.0	49	27	12	-	-
SS-33	72 LT	428+96	53, 0- 54.5	-	-	-	5.2	84.6	5.1	5.0	49	48	7	-	-
SS-34	72 LT	428+96	63, 0- 64.5	-	-	-	NOT	ENOUGH	MATERIAL	-	-	-	-	-	-

EB2-B NBL SOIL TEST RESULTS

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-1	56 RT	428+61	0, 0- 1.5	A-4(0)	21	3	7.9	48.6	25.4	18.1	99	96	50	-	-
SS-2	56 RT	428+61	4, 0- 5.5	A-4(1)	22	8	7.1	46.8	20.0	26.2	99	95	52	-	-
SS-3	56 RT	428+61	12, 9- 14.4	A-6(18)	37	18	0.2	14.9	54.6	30.2	100	100	98	-	-
SS-4	56 RT	428+61	22, 9- 24.4	A-3(0)	18	NP	52.0	42.5	2.4	3.0	100	81	7	-	-
SS-5	56 RT	428+61	27, 9- 29.4	A-2-4(0)	21	NP	29.1	57.9	4.9	8.1	85	65	13	-	-
SS-6	56 RT	428+61	37, 6- 39.1	A-1-b(0)	19	NP	60.9	21.6	9.5	8.1	70	38	14	-	-
SS-7	56 RT	428+61	42, 6- 44.1	-	-	-	43.8	37.9	10.3	8.1	30	19	7	-	-
SS-8	56 RT	428+61	47, 6- 49.1	A-1-b(0)	18	NP	30.2	49.8	11.9	8.1	40	31	9	-	-
SS-9	56 RT	428+61	57, 6- 59.1	A-1-b(0)	19	NP	49.0	35.9	11.1	4.0	68	41	12	-	-

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34442.1.5 (R-2514D) F.A. PROJ. NHF-17(7)
COUNTY JONES
PROJECT DESCRIPTION US 17 FROM SOUTH OF NC 58 TO THE
NEW BERN BYPASS

SITE DESCRIPTION BRIDGE NO. 105 AND 106 ON -L- (US 17 BYPASS)
OVER -Y6- (SR 1002) AT -L- STA. 526 + 71.12

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	PROFILES
6-9	CROSS SECTIONS
10-18	BORE LOGS
19	SOIL TEST RESULTS

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: 34442.1.5 ID: R-2514D

PERSONNEL

C.M. WRIKE

R.E. SMITH

D.G. PINTER

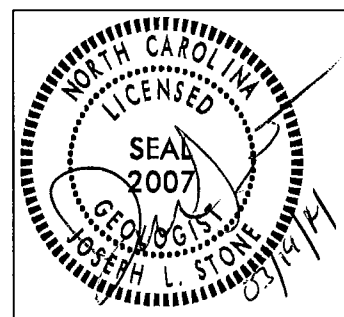
MID ATLANTIC PERSONNEL

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.

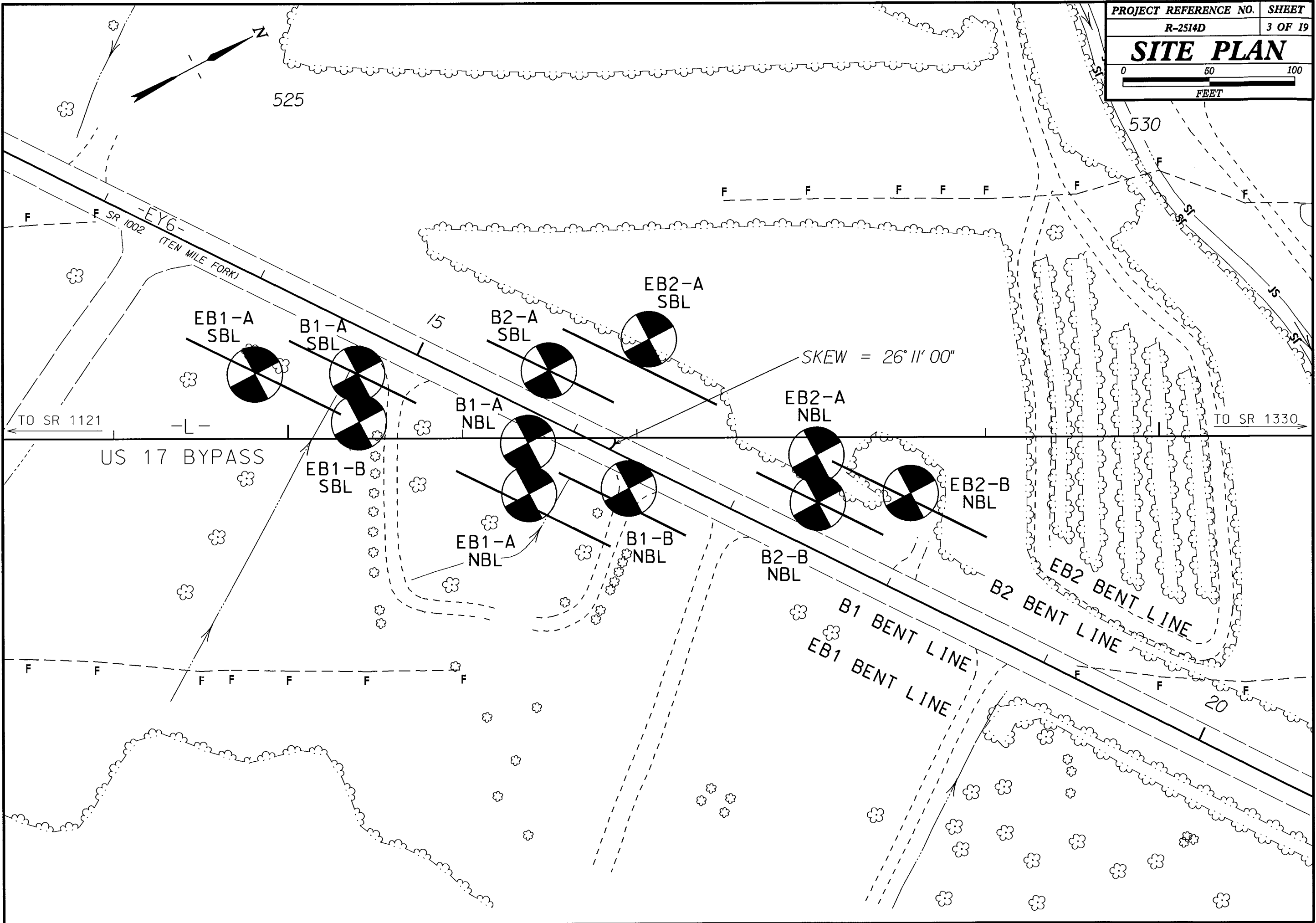
NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

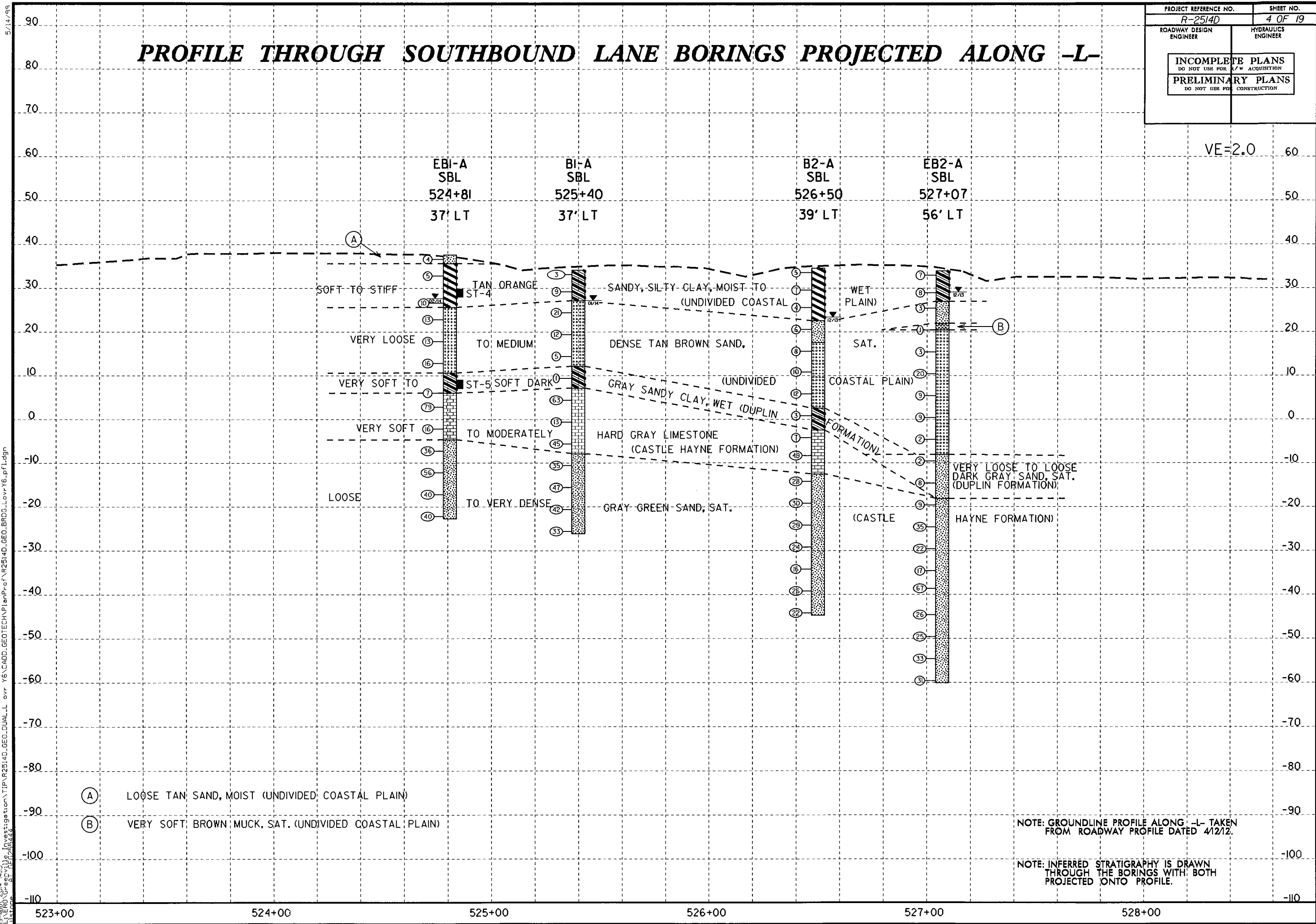
SOIL DESCRIPTION			GRADATION			ROCK DESCRIPTION			TERMS AND DEFINITIONS																																																																																																																																																																													
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, 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.			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. 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 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.) - 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 (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.																																																																																																																																																																													
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<table border="1" style="width: 100%; font-size: x-small;"> <tr> <th>GENERAL CLASS.</th> <th colspan="7">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="7">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th><th>A-3</th><th colspan="2">A-2</th><th>A-4</th><th>A-5</th><th>A-6</th><th>A-7</th> <th>A-1, A-2</th><th>A-3</th><th>A-4, A-5</th><th>A-6, A-7</th> <th colspan="7"></th> <th colspan="3"></th> </tr> <tr> <th>SYMBOL</th> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> <td colspan="7"></td><td colspan="3"></td> </tr> <tr> <th>% PASSING</th> <td>10</td><td>10</td><td>10</td><td>10</td><td>10</td><td>10</td><td>10</td><td>10</td> <td>10</td><td>10</td><td>10</td><td>10</td> <td colspan="7"></td><td colspan="3"></td> </tr> <tr> <th>LIQUID LIMIT</th> <td>6</td><td>NP</td><td>40</td><td>40</td><td>40</td><td>40</td><td>40</td><td>40</td> <td>40</td><td>40</td><td>40</td><td>40</td> <td colspan="7"></td><td colspan="3"></td> </tr> <tr> <th>GROUP INDEX</th> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> <td>0</td><td>0</td><td>0</td><td>0</td> <td colspan="7"></td><td colspan="3"></td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td>STONE FRAGS. GRAVEL AND SAND</td><td>FINE SAND</td><td colspan="2">SILTY OR CLAYEY GRAVEL AND SAND</td><td>SILTY SOILS</td><td>CLAYEY SOILS</td><td colspan="2">SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td><td colspan="4">GRANULAR SOILS</td><td colspan="3">SILT-CLAY SOILS</td><td colspan="3">MUCK, PEAT</td> </tr> <tr> <th>GEN. RATING AS A SUBGRADE</th> <td colspan="4">EXCELLENT TO GOOD</td><td colspan="4">FAIR TO POOR</td><td colspan="2">FAIR TO POOR</td><td colspan="2">POOR</td><td colspan="3">UNSATURABLE</td><td colspan="3"></td> </tr> </table>			GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)							ORGANIC MATERIALS			GROUP CLASS.	A-1	A-3	A-2		A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7											SYMBOL																							% PASSING	10	10	10	10	10	10	10	10	10	10	10	10											LIQUID LIMIT	6	NP	40	40	40	40	40	40	40	40	40	40											GROUP INDEX	0	0	0	0	0	0	0	0	0	0	0	0											USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS	CLAYEY SOILS	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		GRANULAR SOILS				SILT-CLAY SOILS			MUCK, PEAT			GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD				FAIR TO POOR				FAIR TO POOR		POOR		UNSATURABLE						MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.			WEATHERED ROCK (WR)			CRYSTALLINE ROCK (CR)		
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COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)			COMPRESSIBILITY SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE			NON-CRYSTALLINE ROCK (NCR)			NON-CRYSTALLINE SEDIMENTARY ROCK (CP)																																																																																																																																																																													
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)			PERCENTAGE OF MATERIAL ORGANIC MATERIAL TRACE OF ORGANIC MATTER LITTLE ORGANIC MATTER MODERATELY ORGANIC HIGHLY ORGANIC			WEATHERING FRESH VERY SLIGHT (V SL.) SLIGHT (SL.) MODERATE (MOD.) MODERATELY SEVERE (MOD. SEV.) SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE			MISCELLANEOUS SYMBOLS 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			ROCK HARDNESS VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT																																																																																																																																																																										
CONSISTENCY OR DENSENESS PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)			GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP			TEXTURE OR GRAIN SIZE 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.)			ABBREVIATIONS AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, 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 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			FRACTURE SPACING TERM THICKNESS																																																																																																																																																																										
SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION			EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: CORE SIZE: HAND TOOLS:			BEDDING TERM THICKNESS			INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.																																																																																																																																																																													
PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH			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.			BENCH MARK: BM-27; RAILROAD SPIKE IN H-POLE AT -L- STA. 524+80, 178' LT. ELEVATION: 35.11 FT.			NOTES:																																																																																																																																																																													



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PROJECT REFERENCE NO. R-2514D	SHEET NO. 4 OF 19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PROFILE THROUGH SOUTHBOUND LANE BORINGS PROJECTED ALONG -L-



VE=2.0 60

- (A) LOOSE TAN SAND, MOIST (UNDIVIDED COASTAL PLAIN)
- (B) VERY SOFT BROWN MUCK, SAT. (UNDIVIDED COASTAL PLAIN)

NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM ROADWAY PROFILE DATED 4/12/12.

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

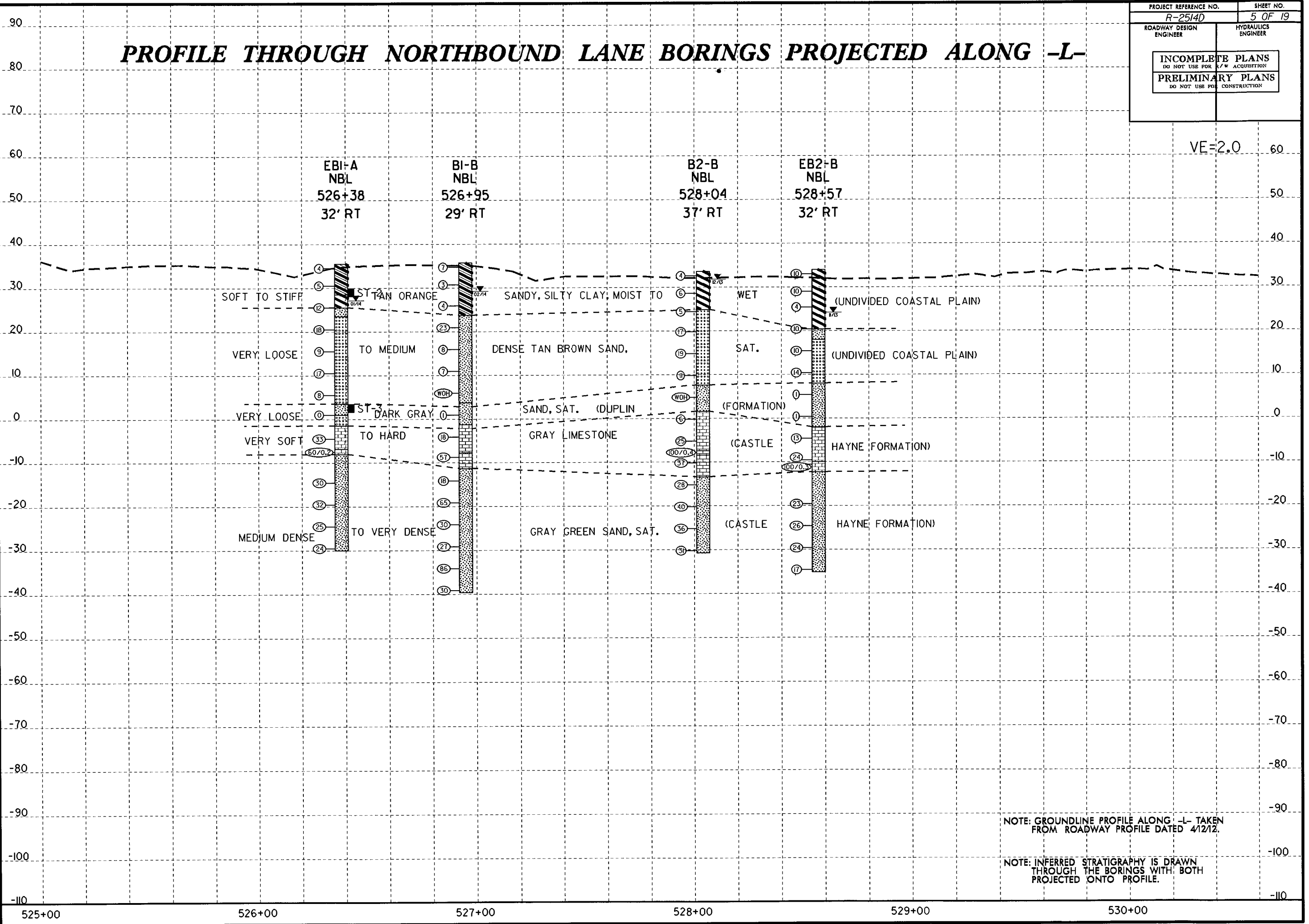
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PROJECT REFERENCE NO. R-2514D	SHEET NO. 5 OF 19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PROFILE THROUGH NORTHBOUND LANE BORINGS PROJECTED ALONG -L-

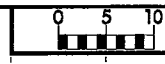
VE=2.0 60



NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM ROADWAY PROFILE DATED 4/12/12.

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

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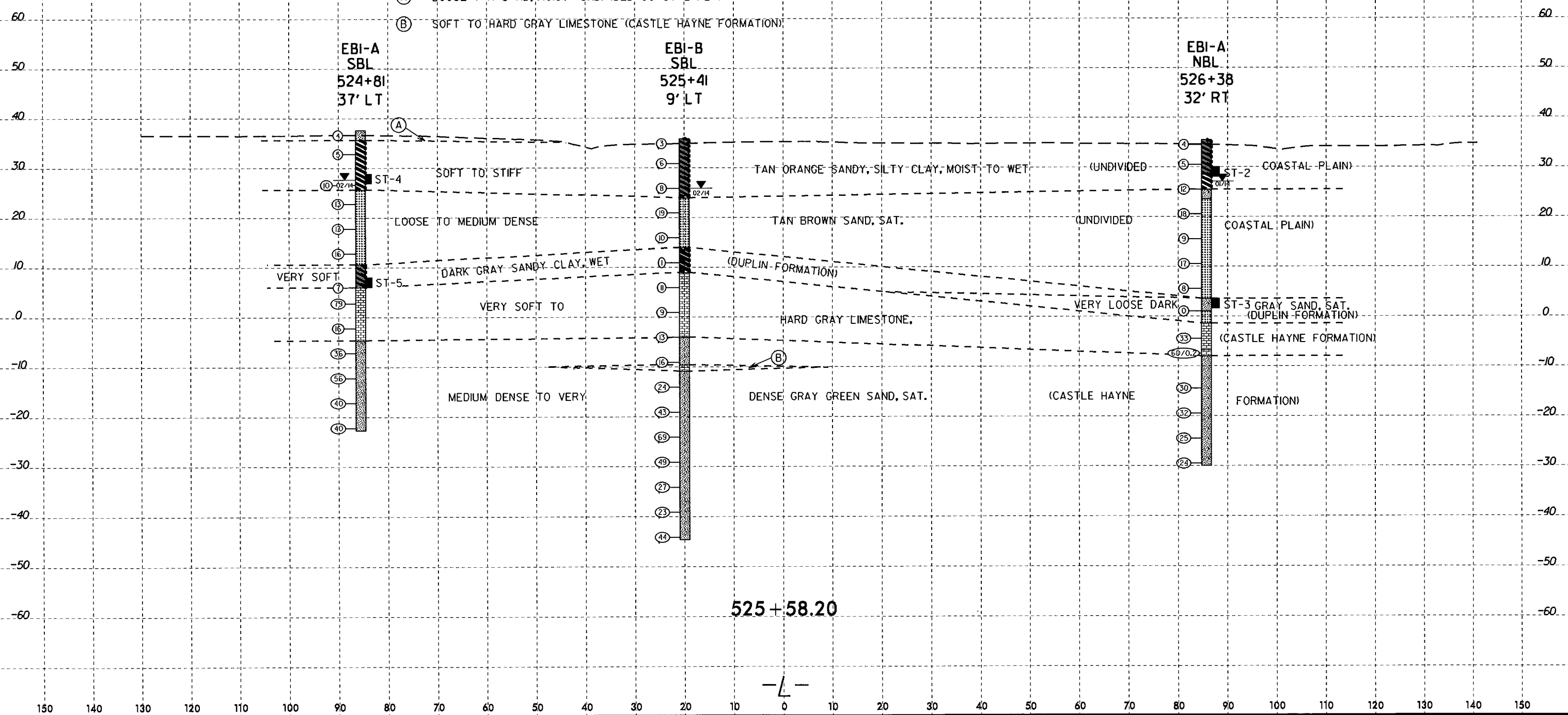
CROSS SECTION ALONG END BENT 1 NBL AND SBL

- (A) LOOSE TAN SAND, MOIST (UNDIVIDED COASTAL PLAIN)
- (B) SOFT TO HARD GRAY LIMESTONE (CASTLE HAYNE FORMATION)

**EBI-A
SBL
524+81
37' LT**

**EBI-B
SBL
525+41
9' LT**

**EBI-A
NBL
526+38
32' RT**

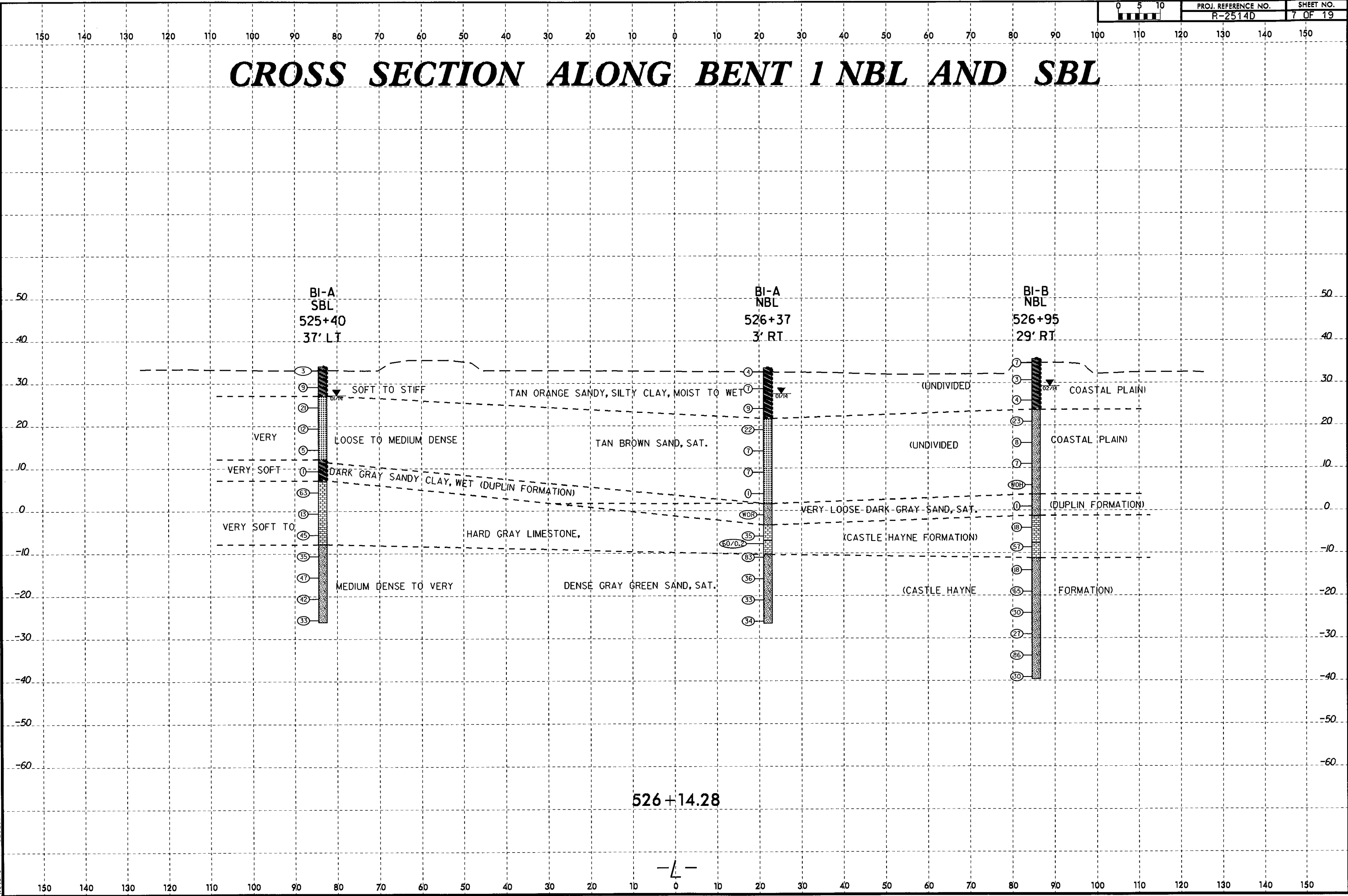


525+58.20

-L-

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 Plot: 0625544

CROSS SECTION ALONG BENT 1 NBL AND SBL

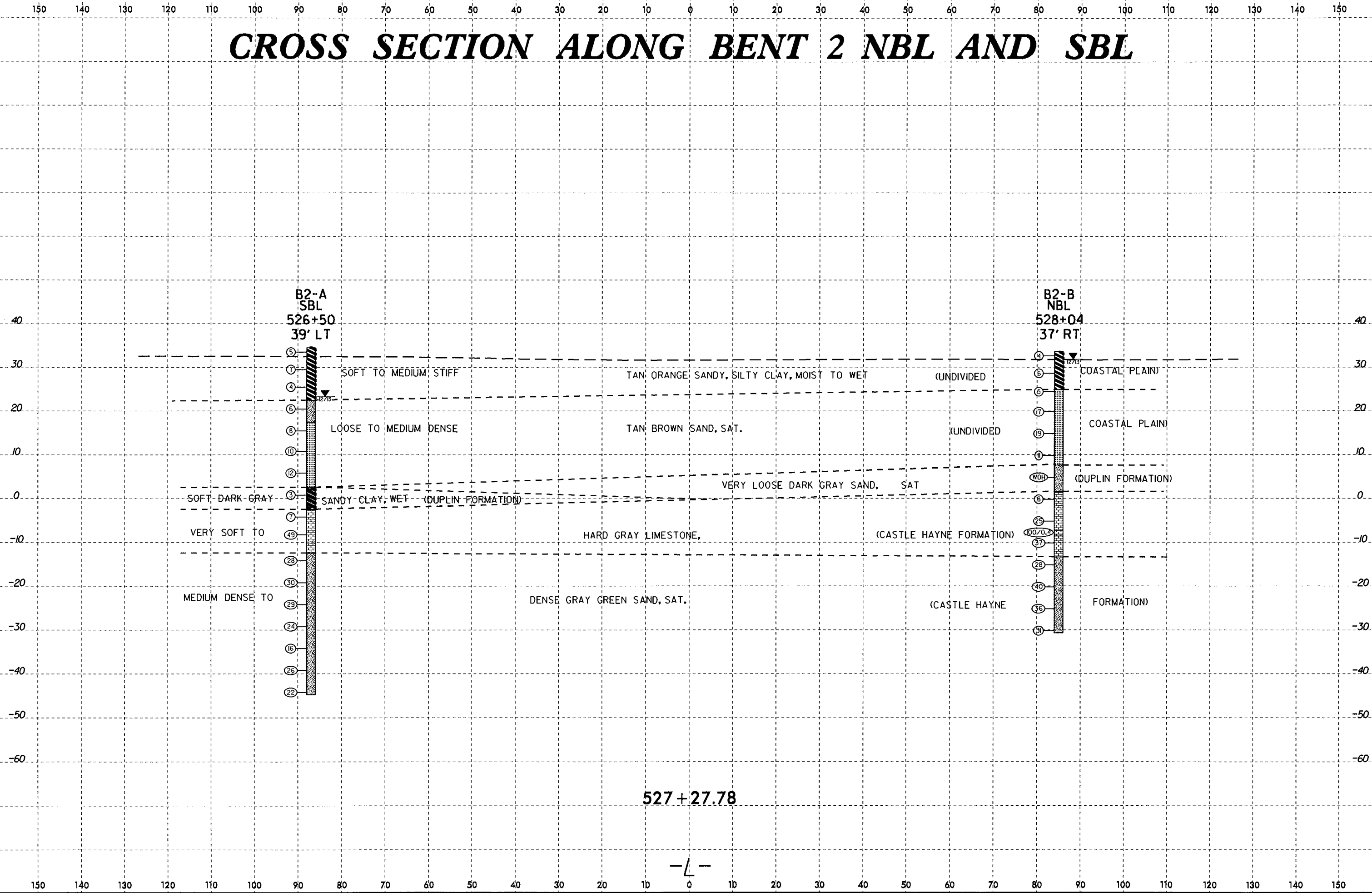


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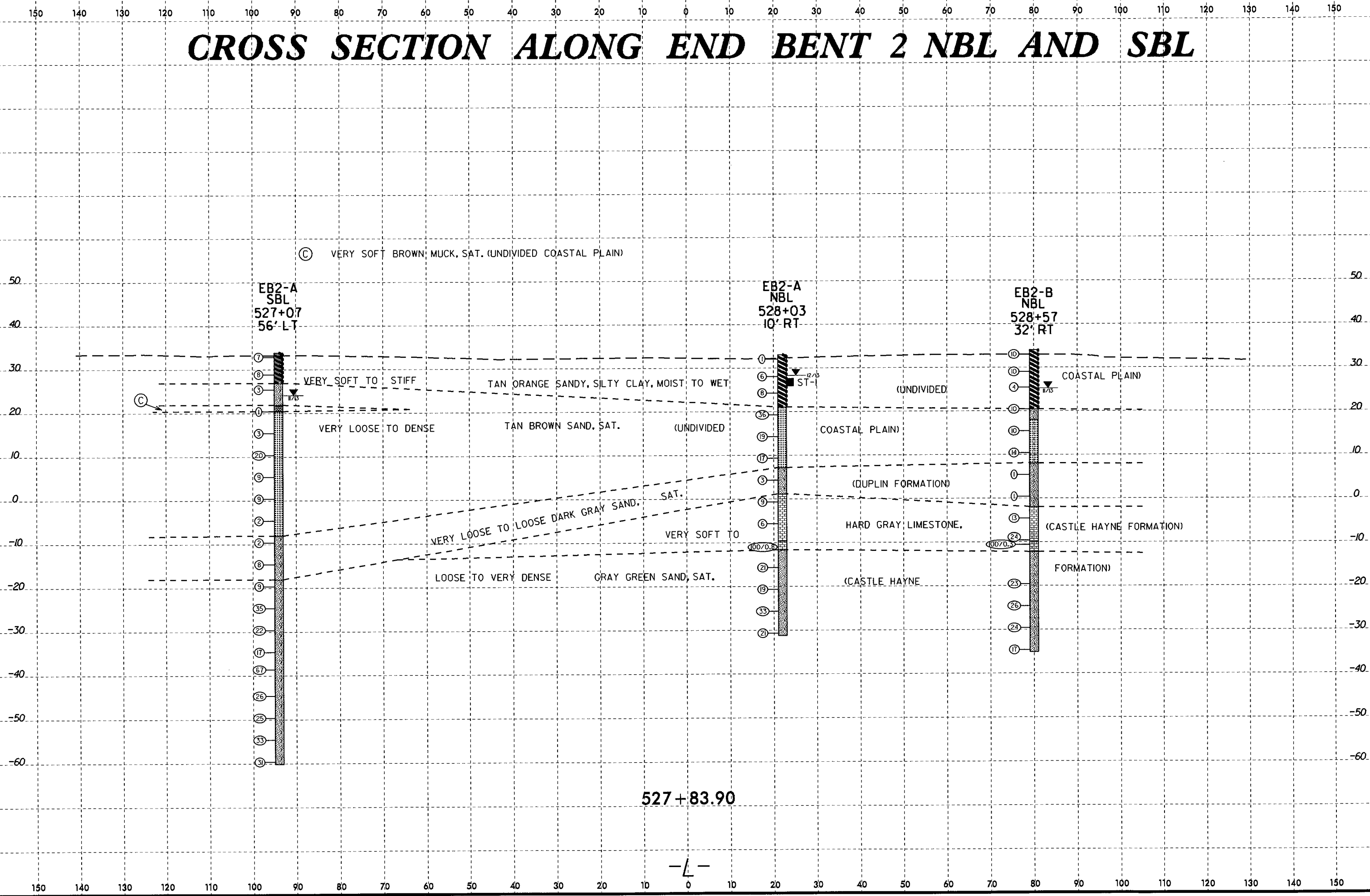
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CROSS SECTION ALONG BENT 2 NBL AND SBL



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Limestone

CROSS SECTION ALONG END BENT 2 NBL AND SBL





NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

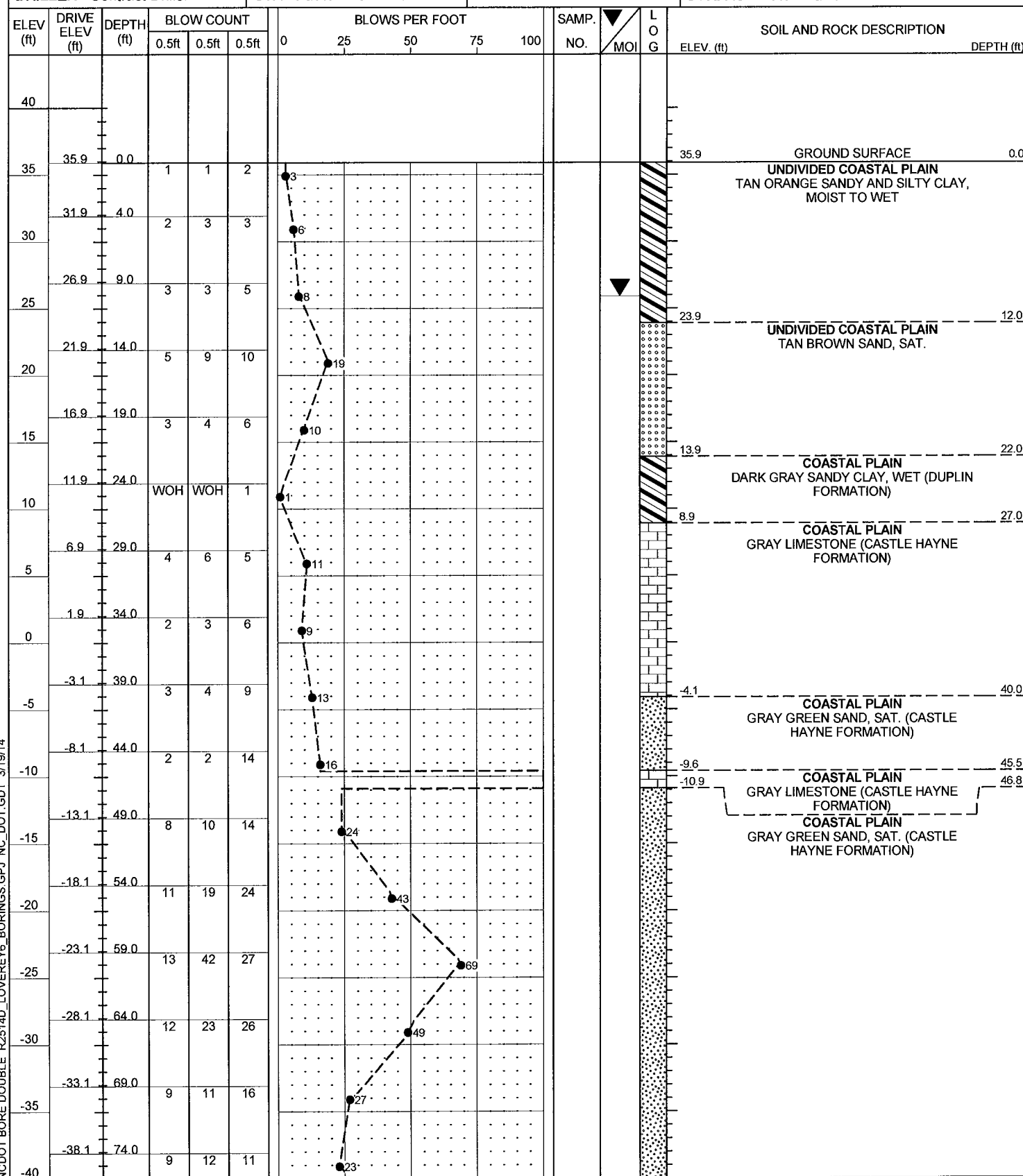
WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Gemperline, J. D.
SITE DESCRIPTION BRIDGE NO. 105 ON -L- (US 17 BYPASS) OVER -Y6- (TEN MILE FORK RD.)			GROUND WTR (ft)
BORING NO. EB1-A SBL	STATION 524+81	OFFSET 37 ft LT	ALIGNMENT -L-
COLLAR ELEV. 37.6 ft	TOTAL DEPTH 60.3 ft	NORTHING 478,814	EASTING 2,534,626
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45-B 80.5% 12/26/13		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Contract Driller	START DATE 01/31/14	COMP. DATE 01/31/14	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
40														GROUND SURFACE	0.0
35	37.6	0.0	2	2	2									UNDIVIDED COASTAL PLAIN TAN SAND, MOIST	2.0
	33.8	3.8	2	2	3						SS-21			UNDIVIDED COASTAL PLAIN TAN ORANGE SANDY AND SILTY CLAY, MOIST TO WET	
30															
25	27.6	10.0	4	4	6									UNDIVIDED COASTAL PLAIN TAN BROWN SAND, SAT.	12.0
	23.8	13.8	5	6	7						SS-22				
20															
15	18.8	18.8	5	7	6										
	13.8	23.8	5	7	9						SS-23				
10														COASTAL PLAIN DARK GRAY SANDY CLAY, WET (DUPLIN FORMATION)	27.0
	7.0	30.6	1	3	4						SS-24 SS-25			COASTAL PLAIN GRAY LIMESTONE (CASTLE HAYNE FORMATION)	31.6
5															
	3.8	33.8	42	58	21										
0															
	-1.2	38.8	4	9	7						SS-26				
-5															
	-6.2	43.8	12	17	19									COASTAL PLAIN GRAY GREEN SAND, SAT. (CASTLE HAYNE FORMATION)	42.3
-10															
	-11.2	48.8	17	24	32						SS-27				
-15															
	-16.2	53.8	12	16	24										
-20															
	-21.2	58.8	12	17	23						SS-28				
														Boring Terminated at Elevation -22.7 ft IN DENSE SAND	60.3
														Other Samples: ST-4 (7.8 - 9.7) ST-5 (28.6 - 30.6)	

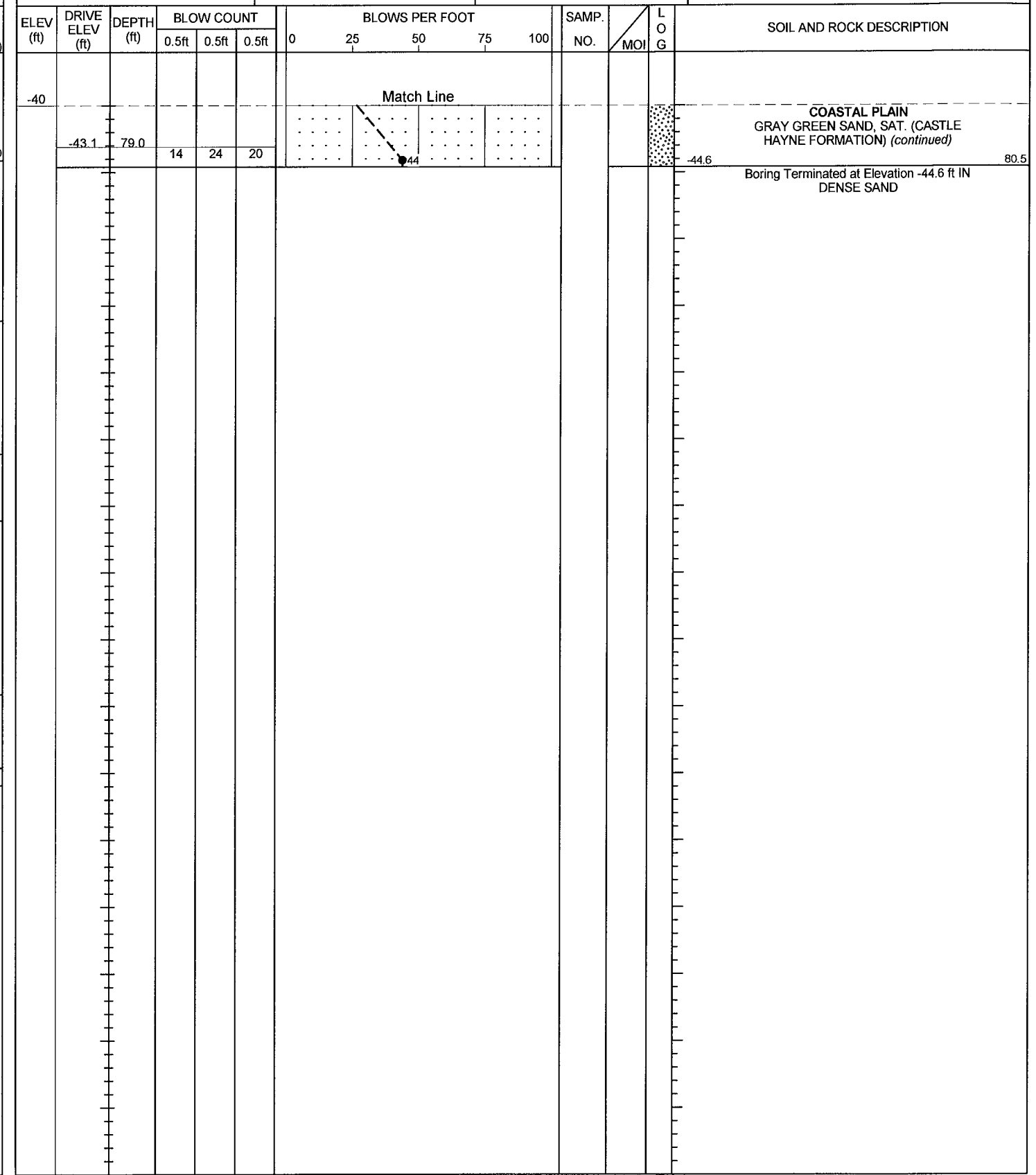
NCDOT BORE DOUBLE R2514D_LOVEREYS_BORINGS.GPJ NC_DOT_GDT_3/19/14

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Gemperline, J. D.	
SITE DESCRIPTION BRIDGE NO. 105 ON -L- (US 17 BYPASS) OVER -Y6- (TEN MILE FORK RD.)			GROUND WTR (ft)	
BORING NO. EB1-B SBL	STATION 525+41	OFFSET 9 ft LT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 35.9 ft	TOTAL DEPTH 80.5 ft	NORTHING 478,854	EASTING 2,534,678	24 HR. 10.0
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45-B 80.5% 12/26/13		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Contract Driller	START DATE 01/22/14	COMP. DATE 01/24/14	SURFACE WATER DEPTH N/A	



WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Gemperline, J. D.	
SITE DESCRIPTION BRIDGE NO. 105 ON -L- (US 17 BYPASS) OVER -Y6- (TEN MILE FORK RD.)			GROUND WTR (ft)	
BORING NO. EB1-B SBL	STATION 525+41	OFFSET 9 ft LT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 35.9 ft	TOTAL DEPTH 80.5 ft	NORTHING 478,854	EASTING 2,534,678	24 HR. 10.0
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45-B 80.5% 12/26/13		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Contract Driller	START DATE 01/22/14	COMP. DATE 01/24/14	SURFACE WATER DEPTH N/A	



NCDOT BORE DOUBLE R2514D_LOVEREY6_BORINGS.GPJ NC_DOT_GDT_3/19/14



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5		TIP R-2514D		COUNTY JONES		GEOLOGIST Gemperline, J. D.			
SITE DESCRIPTION BRIDGE NO. 106 ON -L- (US 17 BYPASS) OVER -Y6- (TEN MILE FORK RD.)						GROUND WTR (ft)			
BORING NO. EB1-A NBL		STATION 526+38		OFFSET 32 ft RT		ALIGNMENT -L-			
COLLAR ELEV. 35.5 ft		TOTAL DEPTH 65.5 ft		NORTHING 478,921		EASTING 2,534,760			
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45-B 80.5% 12/26/13				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic			
DRILLER Contract Driller		START DATE 01/24/14		COMP. DATE 01/27/14		SURFACE WATER DEPTH N/A			
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			SAMP. NO.	LOG MOI G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft				
40									
35	35.5	0.0	1	1	3			GROUND SURFACE	0.0
30	31.5	4.0	2	2	3	SS-11		UNDIVIDED COASTAL PLAIN TAN ORANGE SANDY AND SILTY CLAY, MOIST TO WET	
25	26.5	9.0	3	6	6	SS-12 SS-13		UNDIVIDED COASTAL PLAIN TAN BROWN SAND, SAT.	10.0
20	21.5	14.0	6	8	10	SS-14			
15	16.5	19.0	2	4	5				
10	11.5	24.0	4	8	9	SS-15			
5	6.5	29.0	2	4	4				
0	1.5	34.0	1	0	0	SS-16 SS-17		COASTAL PLAIN DARK GRAY SAND, SAT. (DUPLIN FORMATION)	34.5
-5	-3.5	39.0	14	17	16	SS-18		COASTAL PLAIN GRAY LIMESTONE (CASTLE HAYNE FORMATION)	37.0
-10	-6.8	42.3	35	60/0.2					42.3
-15	-13.5	49.0	9	13	17	SS-19		COASTAL PLAIN GRAY GREEN SAND, SAT. (CASTLE HAYNE FORMATION)	43.5
-20	-18.5	54.0	8	12	20				
-25	-23.5	59.0	9	10	15	SS-20			
-30	-28.5	64.0	9	10	14				
								Boring Terminated at Elevation -30.0 ft IN MEDIUM DENSE SAND	65.5

NCDOT BORE DOUBLE R2514D_LOVEREY6_BORINGS.GPJ NC_DOT_GDT 3/19/14

Other Samples:
ST-2 (5.5 - 7.5)
ST-3 (32.0 - 34.0)

WBS 34442.1.5		TIP R-2514D		COUNTY JONES		GEOLOGIST Gemperline, J. D.			
SITE DESCRIPTION BRIDGE NO. 105 ON -L- (US 17 BYPASS) OVER -Y6- (TEN MILE FORK RD.)						GROUND WTR (ft)			
BORING NO. B1-A SBL		STATION 525+40		OFFSET 37 ft LT		ALIGNMENT -L-			
COLLAR ELEV. 34.1 ft		TOTAL DEPTH 60.2 ft		NORTHING 478,866		EASTING 2,534,653			
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45-B 80.5% 12/26/13				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic			
DRILLER Contract Driller		START DATE 01/22/14		COMP. DATE 01/22/14		SURFACE WATER DEPTH N/A			
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			SAMP. NO.	LOG MOI G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft				
35									
30	34.1	0.0	WOH	WOH	3			GROUND SURFACE	0.0
25	30.2	3.9	2	5	4			UNDIVIDED COASTAL PLAIN TAN ORANGE SANDY AND SILTY CLAY, MOIST TO WET	
20	25.4	8.7	6	9	12			UNDIVIDED COASTAL PLAIN TAN BROWN SAND, SAT.	7.0
15	20.4	13.7	4	5	7				
10	15.4	18.7	2	2	3				
5	10.4	23.7	1	0	1				
0	5.4	28.7	11	20	43				
-5	0.4	33.7	5	6	7				
-10	-4.6	38.7	12	25	20				
-15	-9.6	43.7	9	15	20				
-20	-14.6	48.7	16	22	25				
-25	-19.6	53.7	12	16	26				
	-24.6	58.7	12	14	19				
								Boring Terminated at Elevation -26.1 ft IN DENSE SAND	60.2



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5			TIP R-2514D			COUNTY JONES			GEOLOGIST Gemperline, J. D.							
SITE DESCRIPTION BRIDGE NO. 106 ON -L- (US 17 BYPASS) OVER -Y6- (TEN MILE FORK RD.)								GROUND WTR (ft)								
BORING NO. B1-A NBL		STATION 526+37		OFFSET 3 ft RT		ALIGNMENT -L-		0 HR.		N/A						
COLLAR ELEV. 33.6 ft		TOTAL DEPTH 60.1 ft		NORTHING 478,934		EASTING 2,534,734		24 HR.		6.1						
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45-B 80.5% 12/26/13						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic							
DRILLER Contract Driller		START DATE 01/21/14		COMP. DATE 01/21/14		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)		
	33.6	0.0												33.6		GROUND SURFACE
			WOH	1	3											UNDIVIDED COASTAL PLAIN TAN ORANGE SANDY AND SILTY CLAY, MOIST TO WET
30	29.7	3.9		2	3	4										
				2	3	4										
25	25.0	8.6		2	4	5										
				2	4	5										
20	20.0	13.6		9	11	11								21.6		UNDIVIDED COASTAL PLAIN TAN BROWN SAND, SAT.
				9	11	11										
15	15.0	18.6		3	3	4										
				3	3	4										
10	10.0	23.6		2	3	4										
				2	3	4										
5	5.0	28.6		WOH	1	0										
				WOH	1	0										
0	0.0	33.6		WOR	WOR	WOR								1.6		COASTAL PLAIN DARK GRAY SAND, SAT. (DUPLIN FORMATION)
				WOR	WOR	WOR										
-5	-5.0	38.6		11	13	22								-3.4		COASTAL PLAIN GRAY LIMESTONE (CASTLE HAYNE FORMATION)
				11	13	22										
	-7.1	40.7		54	60/0.2									-7.1		
				54	60/0.2											
-10	-10.0	43.6		22	40	43								-10.4		COASTAL PLAIN GRAY GREEN SAND, SAT. (CASTLE HAYNE FORMATION)
				22	40	43										
-15	-15.0	48.6		14	17	19										
				14	17	19										
-20	-20.0	53.6		12	15	18										
				12	15	18										
-25	-25.0	58.6		12	15	19										
				12	15	19										
														-26.5		Boring Terminated at Elevation -26.5 ft IN DENSE SAND

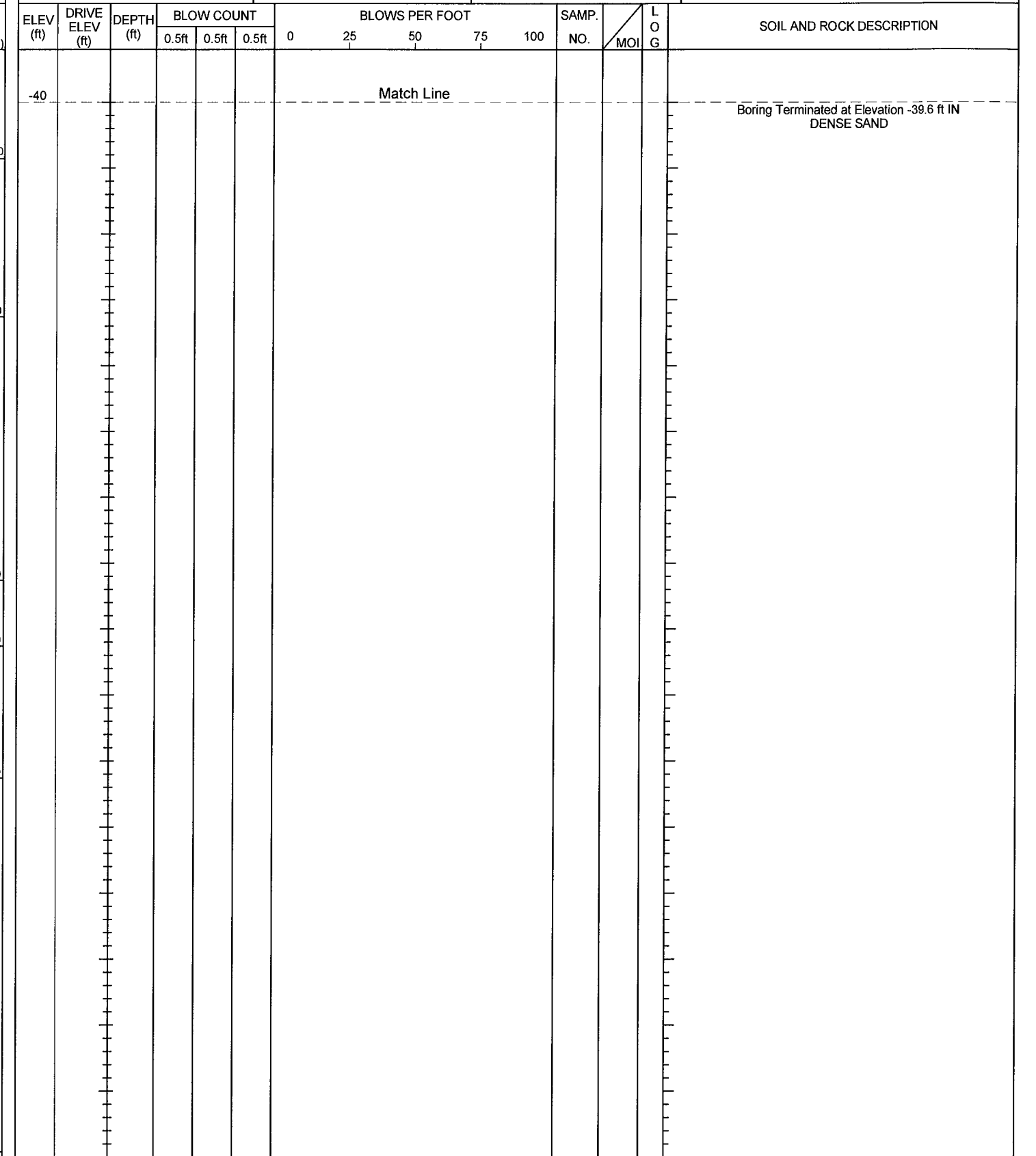
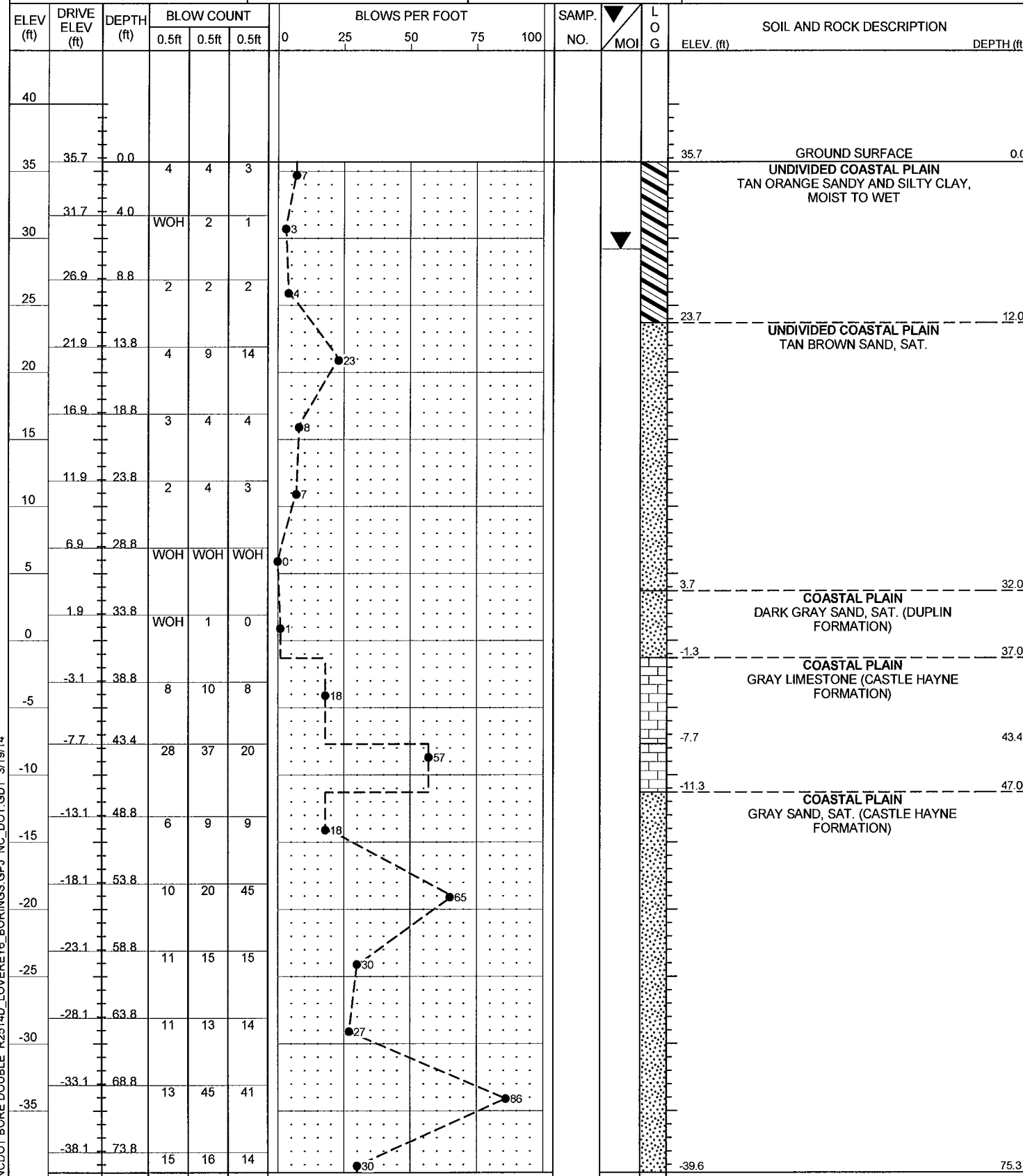
NCDOT BORE DOUBLE P2514D_LOVEREVE6_BORINGS.GPJ NC_DOT_GDT 3/19/14



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 34442.1.5		TIP R-2514D	COUNTY JONES	GEOLOGIST Gemperline, J. D.	
SITE DESCRIPTION BRIDGE NO. 106 ON -L- (US 17 BYPASS) OVER -Y6- (TEN MILE FORK RD.)					GROUND WTR (ft)
BORING NO. B1-B NBL	STATION 526+95	OFFSET 29 ft RT	ALIGNMENT -L-	0 HR.	N/A
COLLAR ELEV. 35.7 ft	TOTAL DEPTH 75.3 ft	NORTHING 478,973	EASTING 2,534,784	24 HR.	6.5
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45-B 80.5% 12/26/13			DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Contract Driller		START DATE 02/03/14	COMP. DATE 02/03/14	SURFACE WATER DEPTH N/A	

WBS 34442.1.5		TIP R-2514D	COUNTY JONES	GEOLOGIST Gemperline, J. D.	
SITE DESCRIPTION BRIDGE NO. 106 ON -L- (US 17 BYPASS) OVER -Y6- (TEN MILE FORK RD.)					GROUND WTR (ft)
BORING NO. B1-B NBL	STATION 526+95	OFFSET 29 ft RT	ALIGNMENT -L-	0 HR.	N/A
COLLAR ELEV. 35.7 ft	TOTAL DEPTH 75.3 ft	NORTHING 478,973	EASTING 2,534,784	24 HR.	6.5
DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45-B 80.5% 12/26/13			DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Contract Driller		START DATE 02/03/14	COMP. DATE 02/03/14	SURFACE WATER DEPTH N/A	



NCDOT BORE DOUBLE R2514D_LOVEREY6 BORINGS.GPJ NC_DOT.GDT 3/19/14

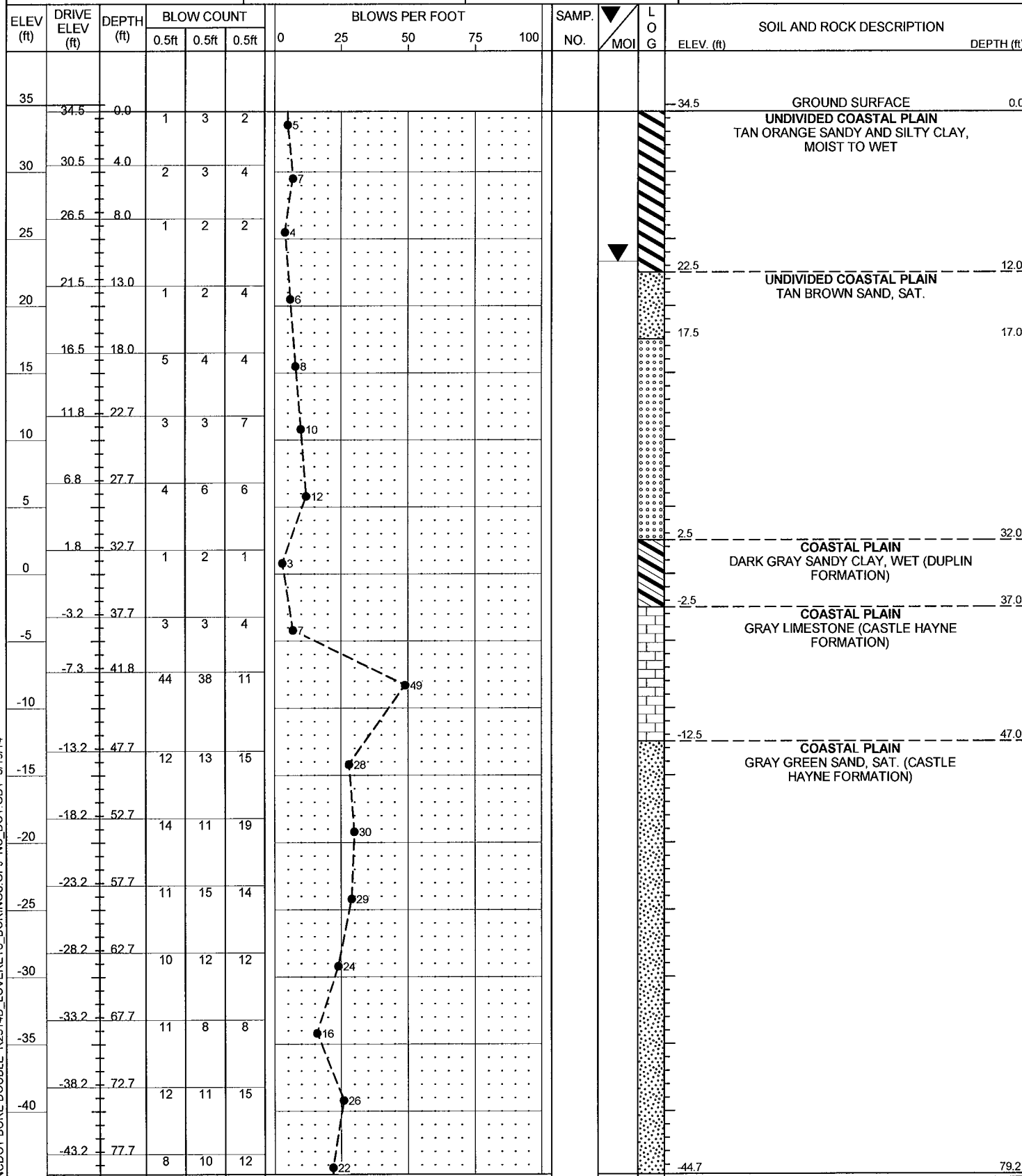


NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

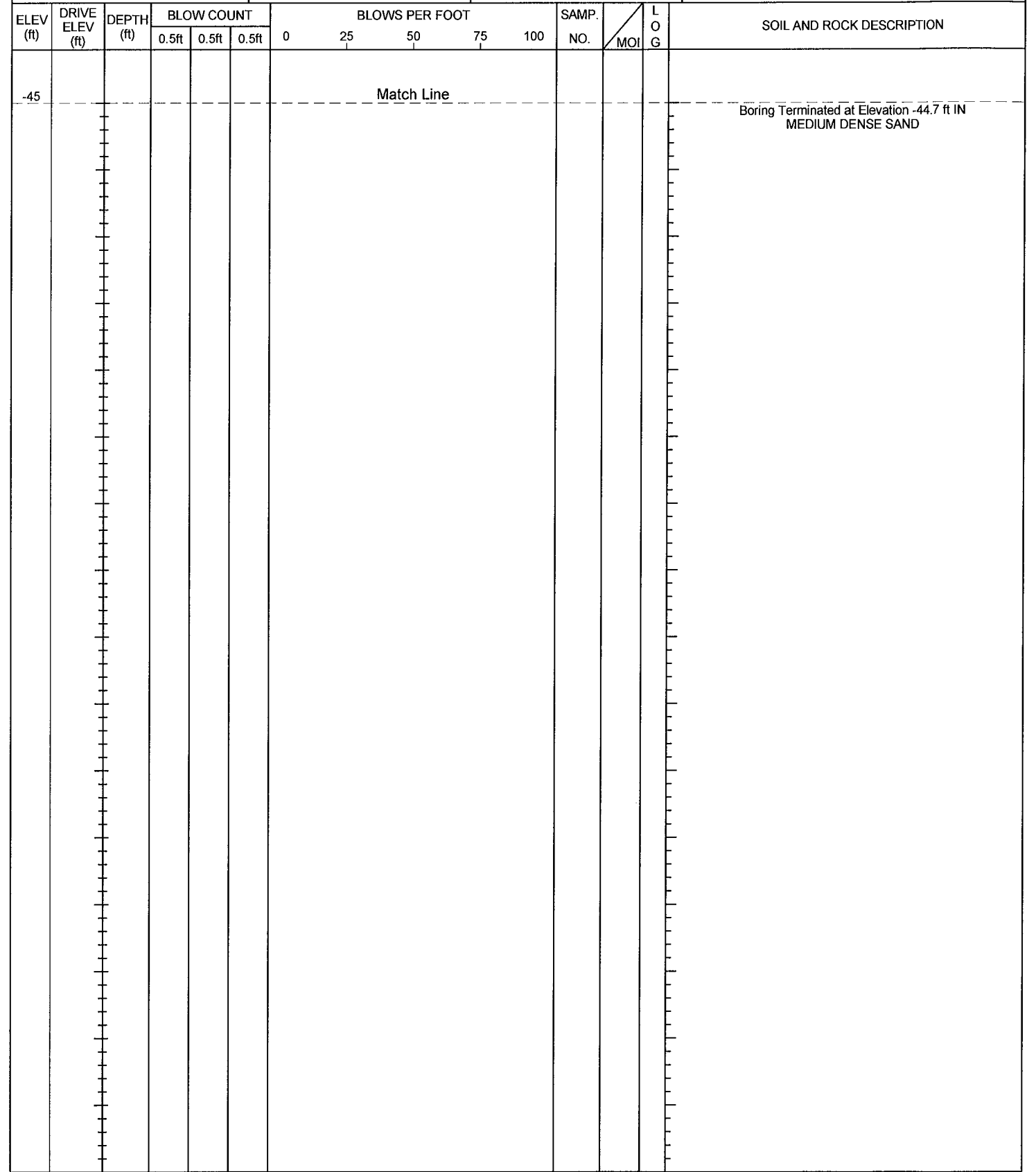
WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Gemperline, J. D.	
SITE DESCRIPTION BRIDGE NO. 105 ON -L- (US 17 BYPASS) OVER -Y6- (TEN MILE FORK RD.)				GROUND WTR (ft)
BORING NO. B2-A SBL	STATION 526+50	OFFSET 39 ft LT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 34.5 ft	TOTAL DEPTH 79.2 ft	NORTHING 478,964	EASTING 2,534,703	24 HR. 11.2

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 12/02/13	COMP. DATE 12/02/13
SURFACE WATER DEPTH N/A		



WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Gemperline, J. D.	
SITE DESCRIPTION BRIDGE NO. 105 ON -L- (US 17 BYPASS) OVER -Y6- (TEN MILE FORK RD.)				GROUND WTR (ft)
BORING NO. B2-A SBL	STATION 526+50	OFFSET 39 ft LT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 34.5 ft	TOTAL DEPTH 79.2 ft	NORTHING 478,964	EASTING 2,534,703	24 HR. 11.2

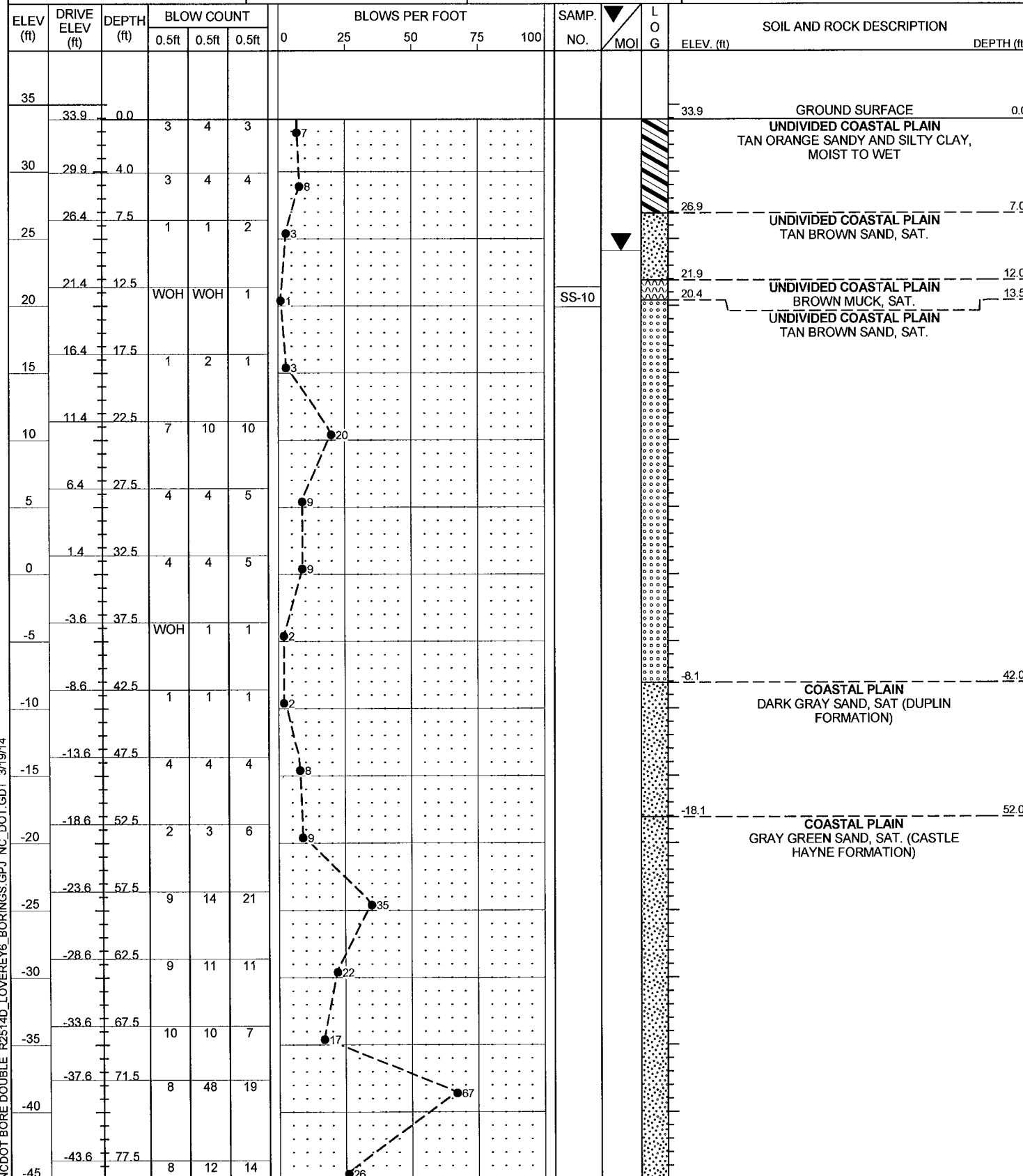
DRILL RIG/HAMMER EFF./DATE GFO1042 CME-550 87% 09/03/2009	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Smith, R. E.	START DATE 12/02/13	COMP. DATE 12/02/13
SURFACE WATER DEPTH N/A		



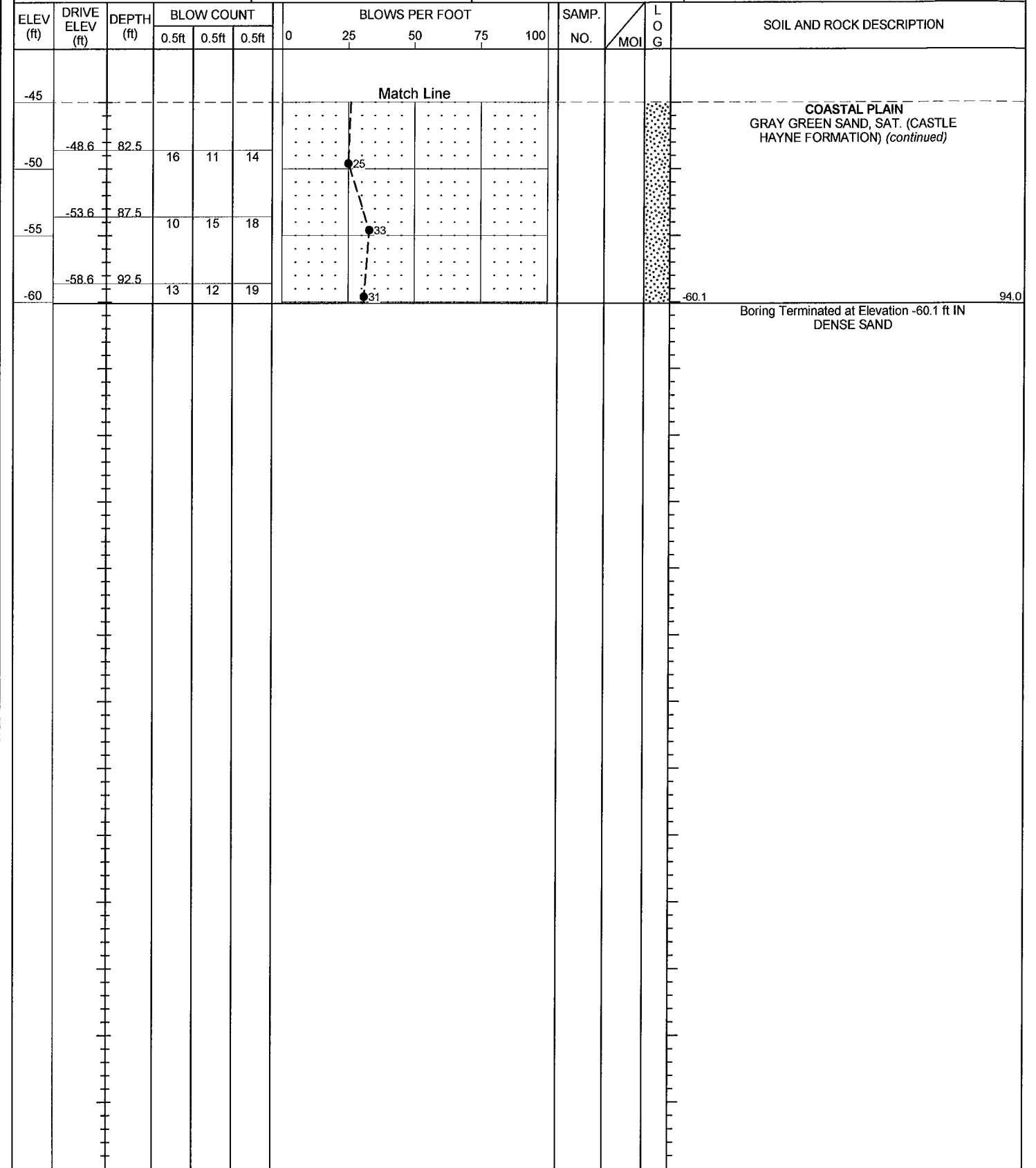
NCDOT BORE DOUBLE R2514D_LOVEREY6_BORINGS.GPJ NC_DOT_GDT 3/19/14

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Gemperline, J. D.
SITE DESCRIPTION BRIDGE NO. 105 ON -L- (US 17 BYPASS) OVER -Y6- (TEN MILE FORK RD.)			GROUND WTR (ft)
BORING NO. EB2-A SBL	STATION 527+07	OFFSET 56 ft LT	ALIGNMENT -L-
			0 HR. N/A
COLLAR ELEV. 33.9 ft	TOTAL DEPTH 94.0 ft	NORTHING 479,023	EASTING 2,534,714
			24 HR. 9.8
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 11/26/13	COMP. DATE 11/26/13	SURFACE WATER DEPTH N/A



WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Gemperline, J. D.
SITE DESCRIPTION BRIDGE NO. 105 ON -L- (US 17 BYPASS) OVER -Y6- (TEN MILE FORK RD.)			GROUND WTR (ft)
BORING NO. EB2-A SBL	STATION 527+07	OFFSET 56 ft LT	ALIGNMENT -L-
			0 HR. N/A
COLLAR ELEV. 33.9 ft	TOTAL DEPTH 94.0 ft	NORTHING 479,023	EASTING 2,534,714
			24 HR. 9.8
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 11/26/13	COMP. DATE 11/26/13	SURFACE WATER DEPTH N/A



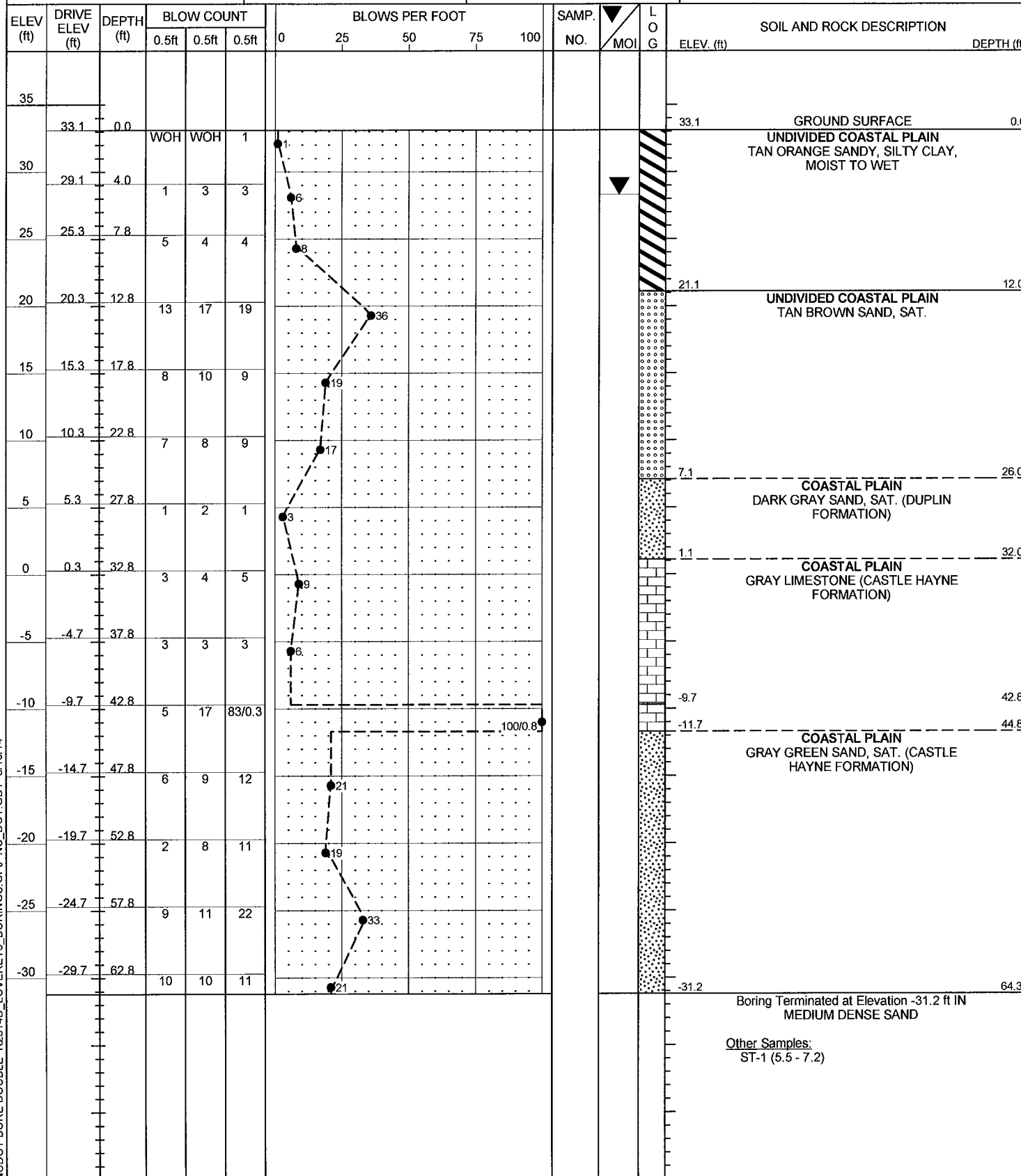
NCDOT BORE DOUBLE R2514D_LOVEREY6 BORINGS.GPJ NC_DOT.GDT 3/19/14



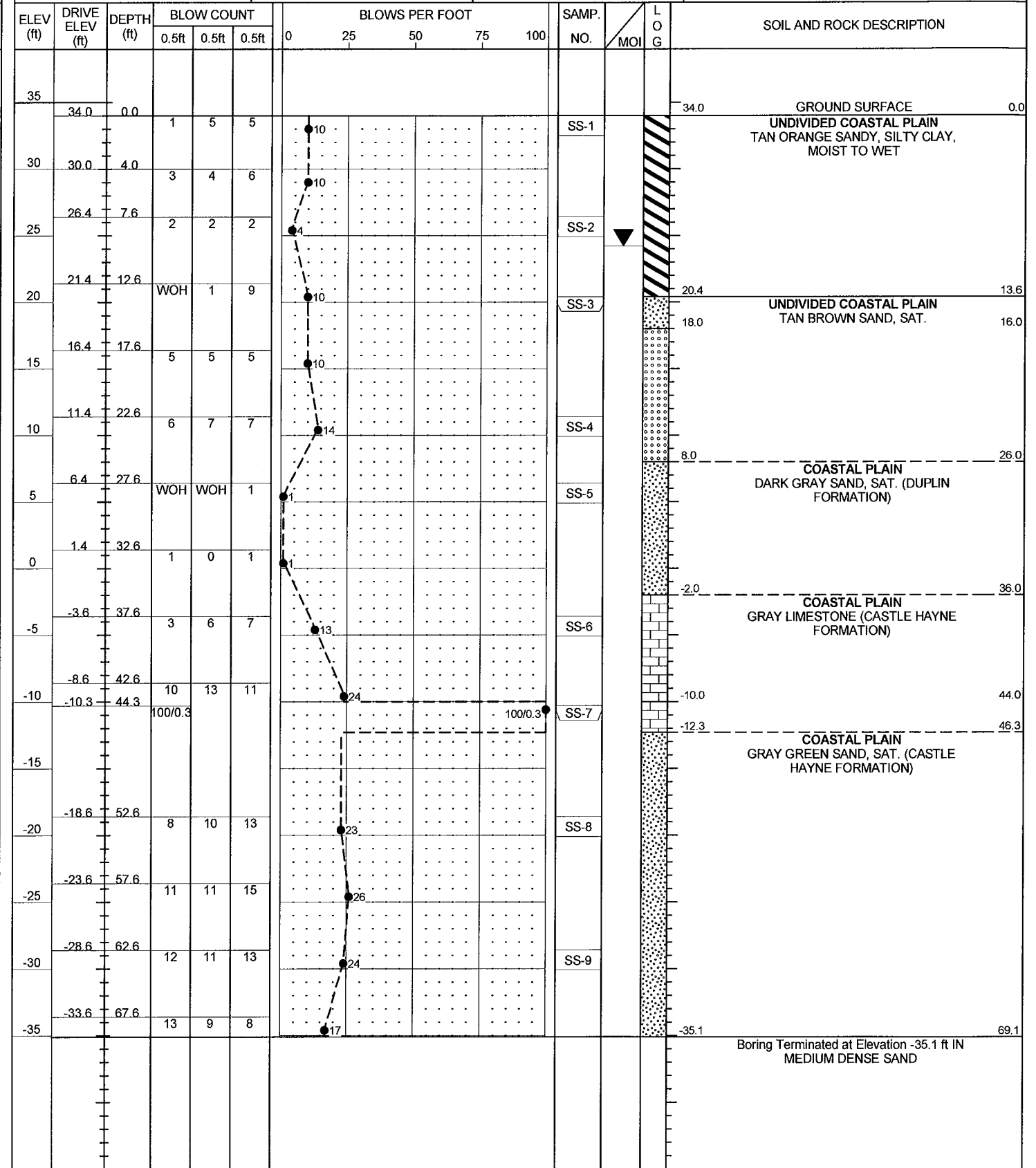
NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Gemperline, J. D.	
SITE DESCRIPTION BRIDGE NO. 106 ON -L- (US 17 BYPASS) OVER -Y6- (TEN MILE FORK RD.)				GROUND WTR (ft)
BORING NO. EB2-A NBL	STATION 528+03	OFFSET 10 ft RT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 33.1 ft	TOTAL DEPTH 64.3 ft	NORTHING 479,077	EASTING 2,534,817	24 HR. 4.8
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 12/04/13	COMP. DATE 12/05/13	SURFACE WATER DEPTH N/A	



WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Gemperline, J. D.	
SITE DESCRIPTION BRIDGE NO. 106 ON -L- (US 17 BYPASS) OVER -Y6- (TEN MILE FORK RD.)				GROUND WTR (ft)
BORING NO. EB2-B NBL	STATION 528+57	OFFSET 32 ft RT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 34.0 ft	TOTAL DEPTH 69.1 ft	NORTHING 479,114	EASTING 2,534,862	24 HR. 9.8
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 11/25/13	COMP. DATE 11/25/13	SURFACE WATER DEPTH N/A	



NCDOT BORE DOUBLE R2514D_LOVEREY6 BORINGS.GPJ NC_DOT_GDT_3/19/14

BRIDGE NO. 105 AND NO. 106 ON -L- (US 17 BYPASS) OVER -Y6- (SR 1002) AT -L- STA. 526+71.12

EB1-A SBL SOIL TEST RESULTS

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- 21	37 LT	524+81	3.8-5.3	A-7-6(26)	50	30	1.2	18.6	24.0	56.1	100	99	84	-	-
SS- 22	37 LT	524+81	13.8-15.3	A-3(0)	19	NP	68.6	22.7	1.6	7.0	100	58	9	-	-
SS- 23	37 LT	524+81	23.8-25.3	A-3(0)	15	NP	47.7	46.8	2.5	3.0	100	91	7	-	-
SS- 24	37 LT	524+81	30.6-31.6	A-6(5)	37	22	31.4	25.8	9.8	33.1	99	85	44	-	-
SS- 25	37 LT	524+81	31.6-32.1	A-2-4(0)	25	6	56.1	8.8	11.0	24.0	85	51	31	-	-
SS- 26	37 LT	524+81	38.8-40.3	A-2-4(0)	18	NP	44.7	40.3	7.0	8.0	95	71	17	-	-
SS- 27	37 LT	524+81	48.8-50.3	A-2-4(0)	26	NP	4.6	83.4	7.0	5.0	100	98	18	-	-
SS- 28	37 LT	524+81	58.8-60.3	A-2-4(0)	26	NP	3.2	88.9	1.9	6.0	100	99	14	-	-

EB1-A NBL SOIL TEST RESULTS

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- 11	32 RT	526+38	4.0-5.5	A-6(11)	35	19	2.0	34.5	21.4	42.1	100	99	69	-	-
SS- 12	32 RT	526+38	9.0-10.0	A-7-6(19)	43	26	9.6	13.4	36.9	40.1	100	95	78	-	-
SS- 13	32 RT	526+38	10.0-10.5	A-2-4(0)	17	NP	43.3	42.5	6.2	8.0	100	78	15	-	-
SS- 14	32 RT	526+38	14.0-15.5	A-3(0)	17	NP	50.7	42.7	2.6	4.0	100	80	7	-	-
SS- 15	32 RT	526+38	24.0-25.5	A-3(0)	19	NP	34.7	58.4	4.9	2.0	100	94	8	-	-
SS- 16	32 RT	526+38	34.0-34.5	A-2-4(0)	27	NP	44.7	34.7	6.6	14.0	90	75	19	-	-
SS- 17	32 RT	526+38	34.5-35.5	A-3(0)	25	NP	46.4	47.2	4.4	2.0	100	86	7	-	-
SS- 18	32 RT	526+38	39.0-41.5	A-1-b(0)	19	NP	33.5	7.4	55.1	4.0	40	29	24	-	-
SS- 19	32 RT	526+38	49.0-50.5	A-2-4(0)	26	NP	2.8	88.4	4.8	4.0	99	99	15	-	-
SS- 20	32 RT	526+38	59.0-60.5	A-2-4(0)	21	NP	11.1	76.7	4.2	8.0	99	51	15	-	-

EB2-A SBL SOIL TEST RESULTS

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- 10	56 LT	527+07	12.5-14.0	A-2-4(0)	24	NP	30.0	50.5	14.4	5.1	100	86	23	-	-

EB2-A NBL SOIL TEST RESULTS

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		
ST- 1 1	10 RT	528+03	5.5-7.2	A-7-6(21)	44	27	2.0	26.6	27.0	44.4	100	99	81	-	3.5
ST- 1 2	10 RT	528+03	5.5-7.2	A-6(12)	35	17	15.7	12.3	37.7	34.3	100	89	78	-	3.1

EB2-B NBL SOIL TEST RESULTS

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- 1	32 RT	528+57	0.0-1.5	A-7-6(41)	63	40	0.4	3.6	27.3	68.7	95	95	92	-	-
SS- 2	32 RT	528+57	7.6-9.0	A-7-6(30)	60	40	13.5	11.9	22.0	52.5	100	93	75	-	-
SS- 3	32 RT	528+57	13.6-14.1	A-2-4(0)	18	NP	12.3	73.7	5.9	8.1	100	97	16	-	-
SS- 4	32 RT	528+57	22.6-24.1	A-3(0)	15	NP	61.1	32.5	2.3	4.0	100	77	7	-	-
SS- 5	32 RT	528+57	27.6-29.1	A-2-4(0)	23	NP	45.5	42.8	6.7	5.1	100	86	13	-	-
SS- 6	32 RT	528+57	37.6-39.1	A-1-b(0)	19	NP	53.4	17.0	20.5	9.1	74	44	24	-	-
SS- 7	32 RT	528+57	44.3-45.8	-	-	-	42.4	31.3	16.2	10.1	65	45	19	-	-
SS- 8	32 RT	528+57	52.6-54.1	A-2-4(0)	19	NP	3.8	85.8	6.4	4.0	100	99	16	-	-
SS- 9	32 RT	528+57	62.6-64.1	A-2-4(0)	20	NP	25.6	61.4	7.0	6.1	100	82	15	-	-

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2514D	1	12

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34442.1.5 (R-2514D) F.A. PROJ. NHF-17(7)
COUNTY JONES
PROJECT DESCRIPTION US 17 FROM SOUTH OF NC 58 TO THE
NEW BERN BYPASS

SITE DESCRIPTION BRIDGE NO. 107 AND 108 ON -L- (US 17 BYPASS)
OVER -Y7- (SIMMONS LOOP RD) AT -L- STA. 561+15.20

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	PROFILES
6-7	CROSS SECTIONS
8-II	BORE LOGS
12	SOIL TEST RESULTS

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) 707-6650. 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: 34442.1.5 ID: R-2514D

PERSONNEL

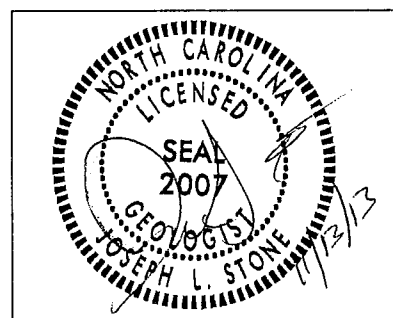
C.M. WRIKE
R.E. SMITH
D.G. PINTER

INVESTIGATED BY J.L. STONE

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE NOVEMBER 2013



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 IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

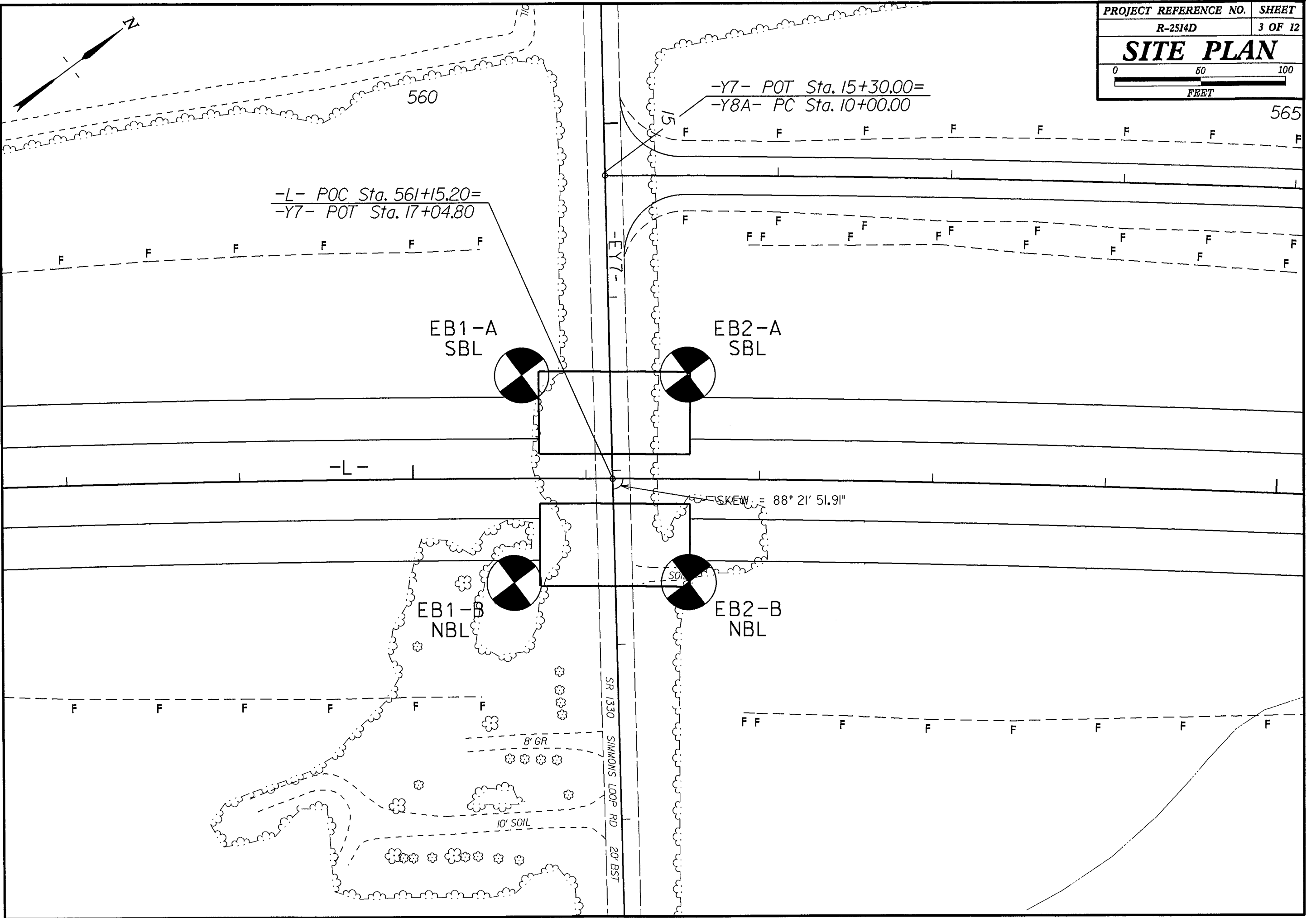
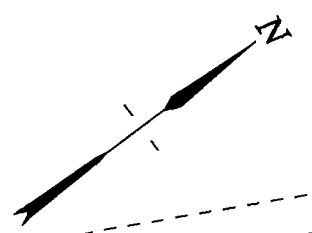
NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

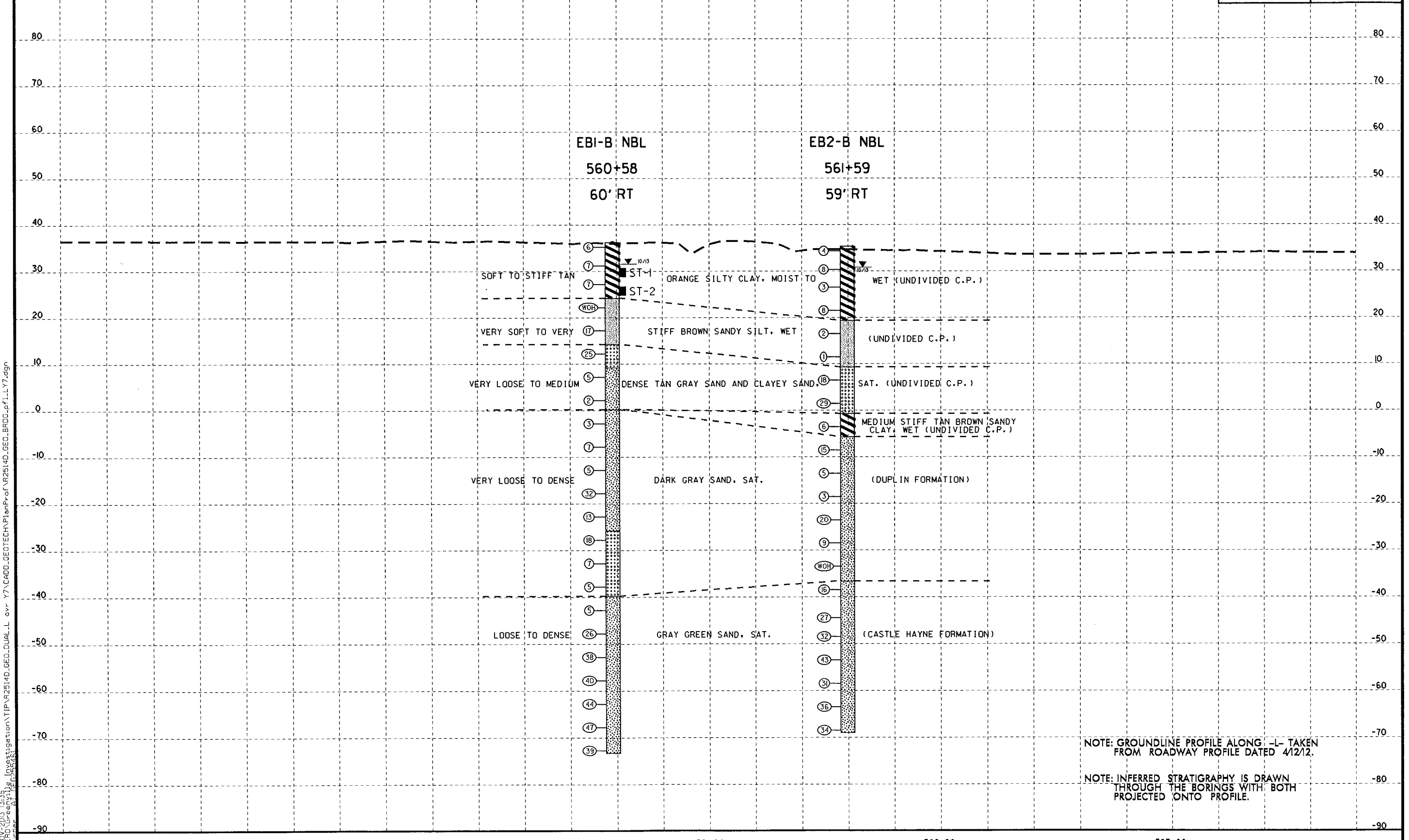
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																										
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, 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. ANGULARITY OF GRAINS 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) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)	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 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 - A FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (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.																										
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	WEATHERING																											
GENERAL CLASS. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>GRANULAR MATERIALS (≤ 35% PASSING #200)</td> <td>SILT-CLAY MATERIALS (> 35% PASSING #200)</td> <td>ORGANIC MATERIALS</td> </tr> <tr> <td>GROUP CLASS. A-1 A-1-b A-2 A-2-4 A-2-5 A-2-6 A-2-7</td> <td>A-4 A-5 A-6 A-7</td> <td>A-1, A-2 A-3 A-4, A-5 A-6, A-7</td> </tr> <tr> <td>SYMBOL [Diagrams showing soil symbols for various groups]</td> <td></td> <td></td> </tr> <tr> <td>% PASSING 10 40 200</td> <td></td> <td></td> </tr> <tr> <td>LIQUID LIMIT PLASTIC INDEX</td> <td></td> <td></td> </tr> <tr> <td>GROUP INDEX</td> <td></td> <td></td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td></td> <td></td> </tr> <tr> <td>GEN. RATING AS A SUBGRADE</td> <td></td> <td></td> </tr> </table>	GRANULAR MATERIALS (≤ 35% PASSING #200)	SILT-CLAY MATERIALS (> 35% PASSING #200)	ORGANIC MATERIALS	GROUP CLASS. A-1 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-1, A-2 A-3 A-4, A-5 A-6, A-7	SYMBOL [Diagrams showing soil symbols for various groups]			% PASSING 10 40 200			LIQUID LIMIT PLASTIC INDEX			GROUP INDEX			USUAL TYPES OF MAJOR MATERIALS			GEN. RATING AS A SUBGRADE			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 PERCENTAGE OF MATERIAL ORGANIC MATERIAL TRACE OF ORGANIC MATTER LITTLE ORGANIC MATTER MODERATELY ORGANIC HIGHLY ORGANIC GRANULAR SOILS SILT-CLAY SOILS MUCK, PEAT SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER HIGHLY ORGANIC SOILS	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 REFUSAL</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 > 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 < 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.			
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U.S. STD. SIEVE SIZE OPENING (MM) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>4</td> <td>10</td> <td>40</td> <td>60</td> <td>200</td> <td>270</td> </tr> <tr> <td>0.075</td> <td>0.425</td> <td>0.850</td> <td>0.250</td> <td>0.075</td> <td>0.053</td> </tr> </table>	4	10	40	60	200	270	0.075	0.425	0.850	0.250	0.075	0.053		AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DPT - DYNAMIC PENETRATION TEST V - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HL. - HIGHLY MED. - MEDIUM MICA. - MICACEOUS MO. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILTY, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL W - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED W - UNIT WEIGHT W _d - DRY UNIT WEIGHT															
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0.075	0.425	0.850	0.250	0.075	0.053																								
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SOIL MOISTURE SCALE (ATTERBERG LIMITS) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>FIELD MOISTURE DESCRIPTION</td> <td>GUIDE FOR FIELD MOISTURE DESCRIPTION</td> </tr> <tr> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table>	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION	- 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		DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST	ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input type="checkbox"/> B" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input checked="" type="checkbox"/> TRICONE 2 1/16" * STEEL TEETH <input type="checkbox"/> TRICONE * TUNG-CARB. <input type="checkbox"/> CORE BIT	HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL CORE SIZE: <input type="checkbox"/> -B- <input type="checkbox"/> -N- <input type="checkbox"/> -H- HAND TOOLS: <input type="checkbox"/> PDST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST															
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PLASTICITY		INDURATION																											
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY	PLASTICITY INDEX (PI) DRY STRENGTH VERY LOW SLIGHT MEDIUM HIGH	FRATURE SPACING <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>TERM</td> <td>SPACING</td> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </table>	TERM	SPACING	VERY WIDE	MORE THAN 10 FEET	WIDE	3 TO 10 FEET	MODERATELY CLOSE	1 TO 3 FEET	CLOSE	0.16 TO 1 FEET	VERY CLOSE	LESS THAN 0.16 FEET	BEDDING <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>TERM</td> <td>THICKNESS</td> </tr> <tr> <td>VERY THICKLY BEDDED</td> <td>> 4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table>	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
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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.		FRATURE SPACING <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>TERM</td> <td>SPACING</td> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </table>	TERM	SPACING	VERY WIDE	MORE THAN 10 FEET	WIDE	3 TO 10 FEET	MODERATELY CLOSE	1 TO 3 FEET	CLOSE	0.16 TO 1 FEET	VERY CLOSE	LESS THAN 0.16 FEET	BEDDING <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>TERM</td> <td>THICKNESS</td> </tr> <tr> <td>VERY THICKLY BEDDED</td> <td>> 4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table>	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
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		INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	BENCH MARK: R/W MARKER AT -Y7- STA. 18+69 29' LT ELEVATION: 36.0 FT.																										



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PROJECT REFERENCE NO.	SHEET NO.
R-2514D	4 OF 12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PROFILE THROUGH NORTHBOUND LANE BORINGS PROJECTED ALONG -L-



EB1-B NBL
560+58
60' RT

EB2-B NBL
561+59
59' RT

SOFT TO STIFF TAN
ORANGE SILTY CLAY, MOIST TO WET (UNDIVIDED C.P.)

VERY SOFT TO VERY
STIFF BROWN SANDY SILT, WET
(UNDIVIDED C.P.)

VERY LOOSE TO MEDIUM
DENSE TAN GRAY SAND AND CLAYEY SAND, SAT. (UNDIVIDED C.P.)

VERY LOOSE TO DENSE
DARK GRAY SAND, SAT.
(DUPLIN FORMATION)

LOOSE TO DENSE
GRAY GREEN SAND, SAT.
(CASTLE HAYNE FORMATION)

ST-1
ST-2

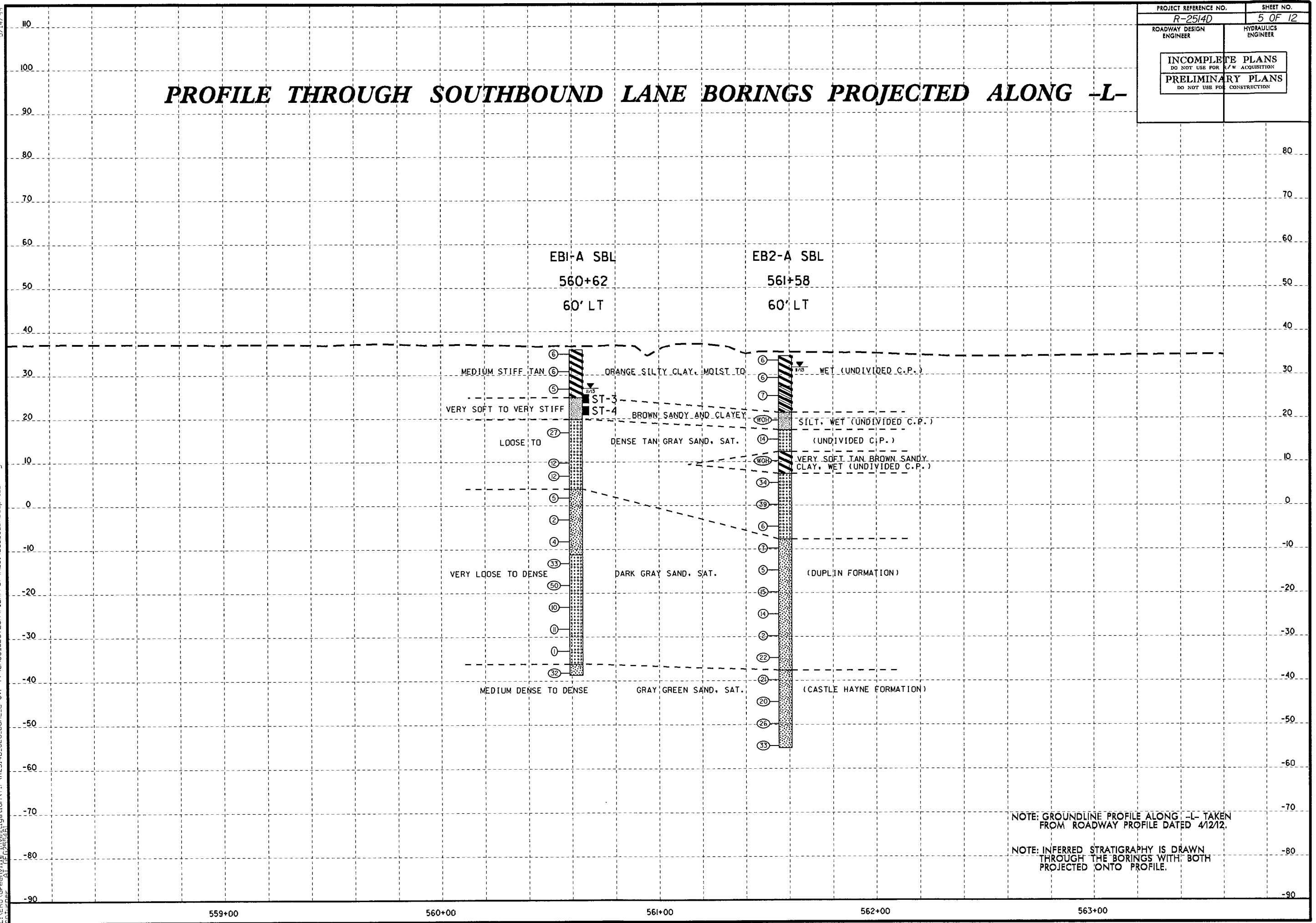
NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM ROADWAY PROFILE DATED 4/12/12.

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

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PROJECT REFERENCE NO. R-2514D	SHEET NO. 5 OF 12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PROFILE THROUGH SOUTHBOUND LANE BORINGS PROJECTED ALONG -L-



NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM ROADWAY PROFILE DATED 4/12/12.

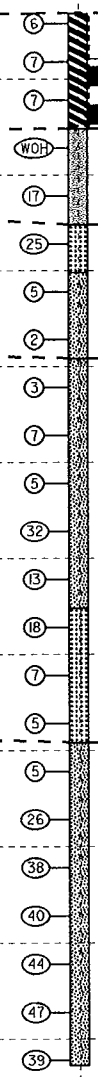
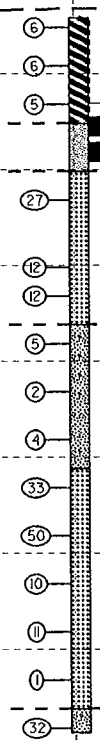
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1:stone

CROSS SECTION THROUGH END BENT 1 NBL AND SBL

EBI-A SBL
560+62
59' LT

EBI-B NBL
560+58
60' RT



MEDIUM STIFF TAN ORANGE SILTY CLAY, MOIST TO WET
(UNDIVIDED C.P.)

VERY SOFT TO VERY STIFF BROWN SANDY SILT, WET
(UNDIVIDED C.P.)

VERY LOOSE TO MEDIUM DENSE TAN GRAY SAND AND CLAYEY SAND, SAT.
(UNDIVIDED C.P.)

VERY LOOSE TO DENSE DARK GRAY SAND, SAT.
(DUPLIN FORMATION)

LOOSE TO DENSE GRAY GREEN SAND, SAT.
(CASTLE HAYNE FORMATION)

560+73.18

-L-

CROSS SECTION THROUGH END BENT 2 NBL AND SBL

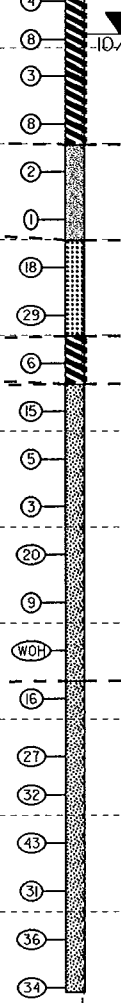
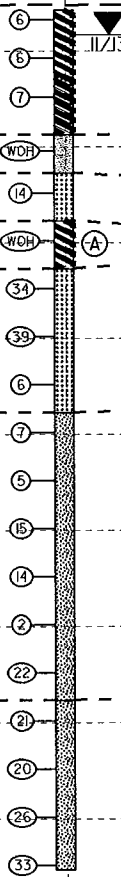


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40 30 20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 40 30 20 10 0 -10 -20 -30 -40 -50 -60 -70 -80

EB2-A SBL
561+58
60' LT

EB2-B NBL
561+59
59' RT



SOFT TO STIFF TAN ORANGE SILTY CLAY, MOIST TO WET (UNDIVIDED C.P.)

VERY SOFT TO SOFT BROWN SANDY AND CLAYEY SILT, WET (UNDIVIDED C.P.)

LOOSE TO DENSE TAN GRAY SAND, SAT. (UNDIVIDED C.P.)

VERY LOOSE TO MEDIUM DENSE DARK GRAY SAND, SAT. (DUPLIN FORMATION)

MEDIUM DENSE TO DENSE GRAY GREEN SAND, SAT. (CASTLE HAYNE FORMATION)

Ⓐ VERY SOFT TO MEDIUM STIFF TAN BROWN SANDY CLAY, WET (UNDIVIDED C.P.)

561+60.04

-L-

8/23/99
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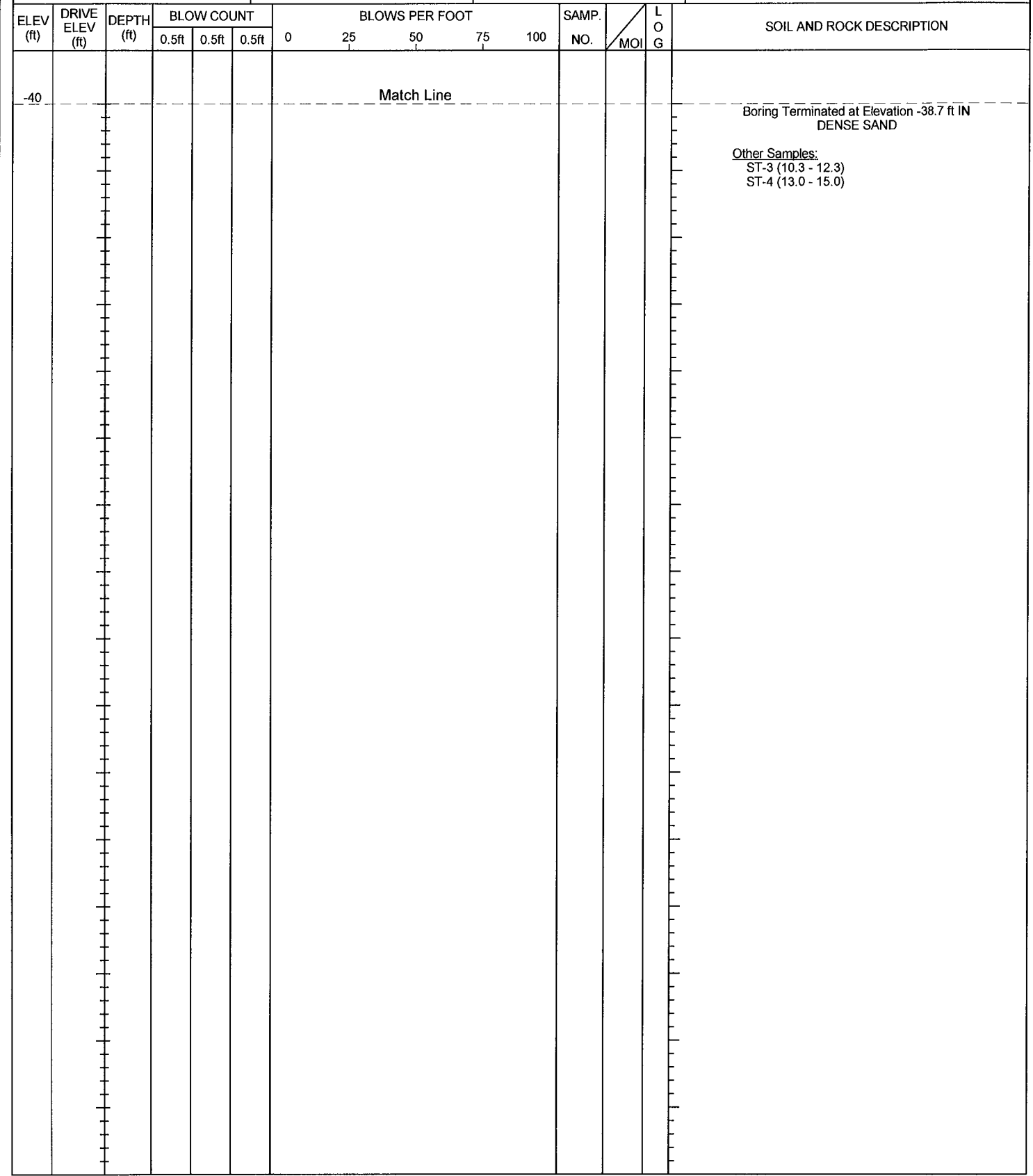
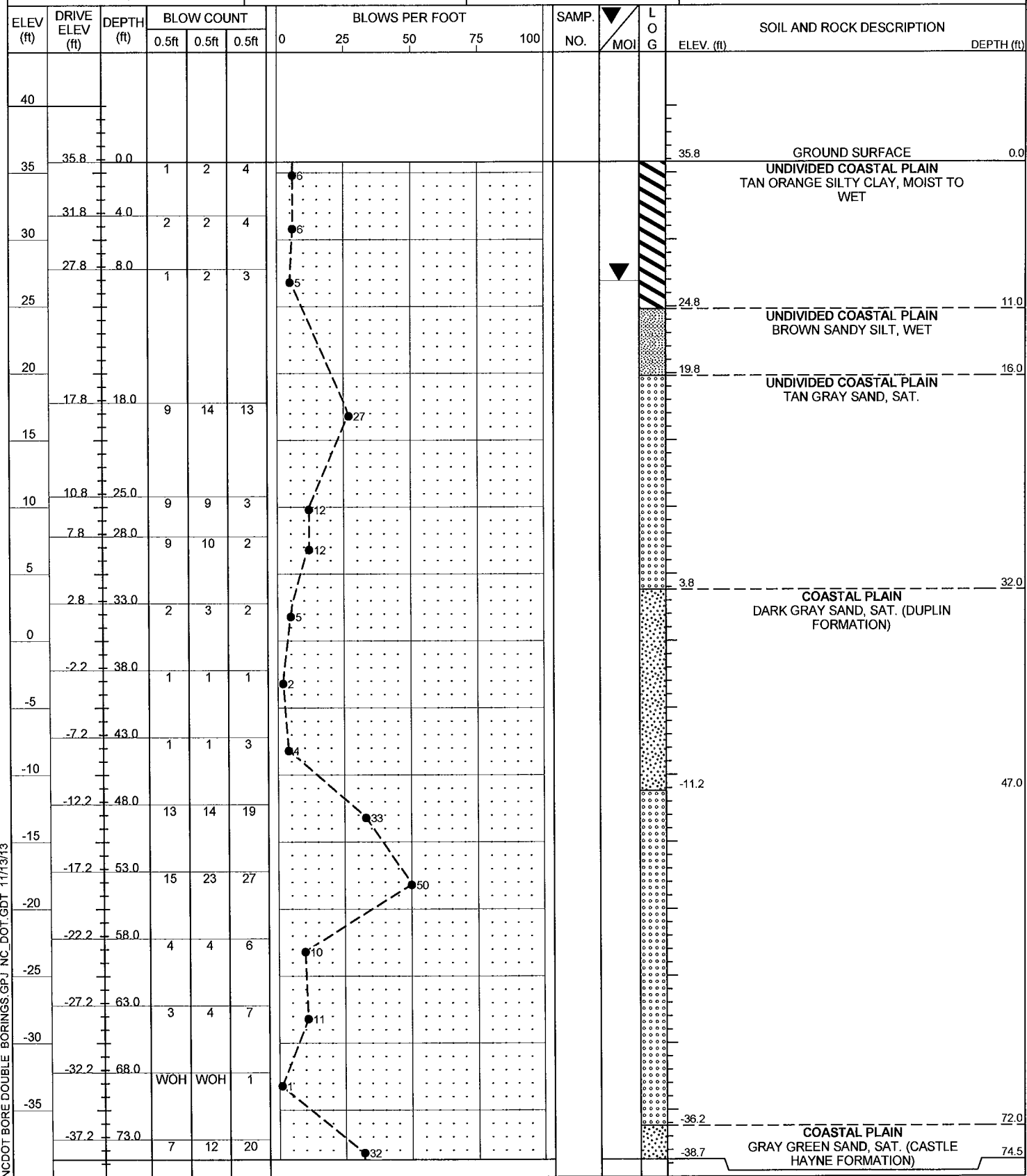


NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

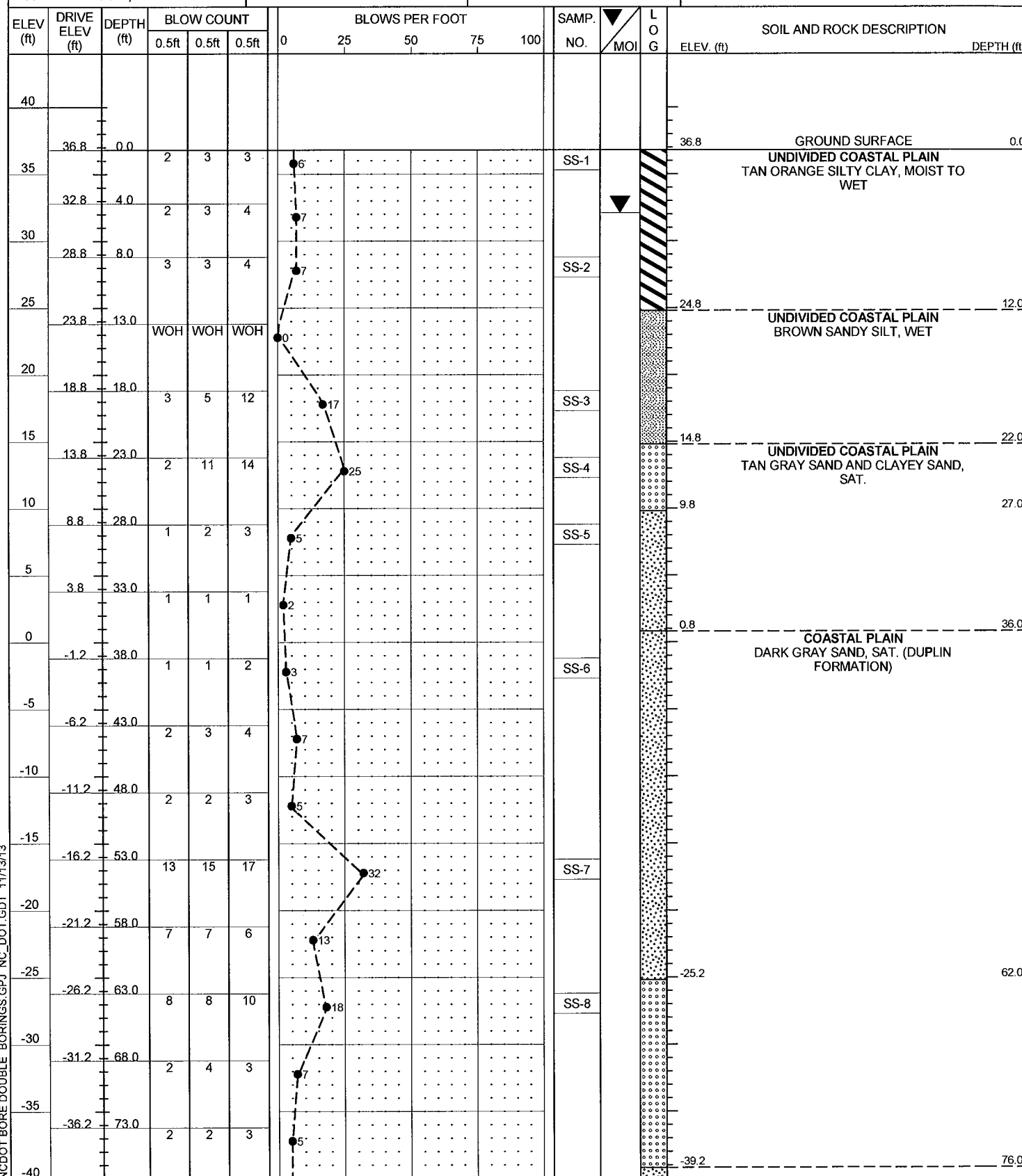
WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Stone, J. L.
SITE DESCRIPTION BRIDGE NO. 107 ON -L- (US 17 BYPASS) OVER -Y7- (SIMMONS LOOP RD.)			GROUND WTR (ft)
BORING NO. EB1-A SBL	STATION 560+62	OFFSET 60 ft LT	ALIGNMENT -L-
COLLAR ELEV. 35.8 ft	TOTAL DEPTH 74.5 ft	NORTHING 481,938	EASTING 2,536,387
DRILL RIG/HAMMER EFF./DATE GFO1042 CME-550 87% 09/03/2009			DRILL METHOD Mud Rotary
DRILLER Smith, R. E.			HAMMER TYPE Automatic
START DATE 11/04/13		COMP. DATE 11/04/13	SURFACE WATER DEPTH N/A

WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Stone, J. L.
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START DATE 11/04/13		COMP. DATE 11/04/13	SURFACE WATER DEPTH N/A

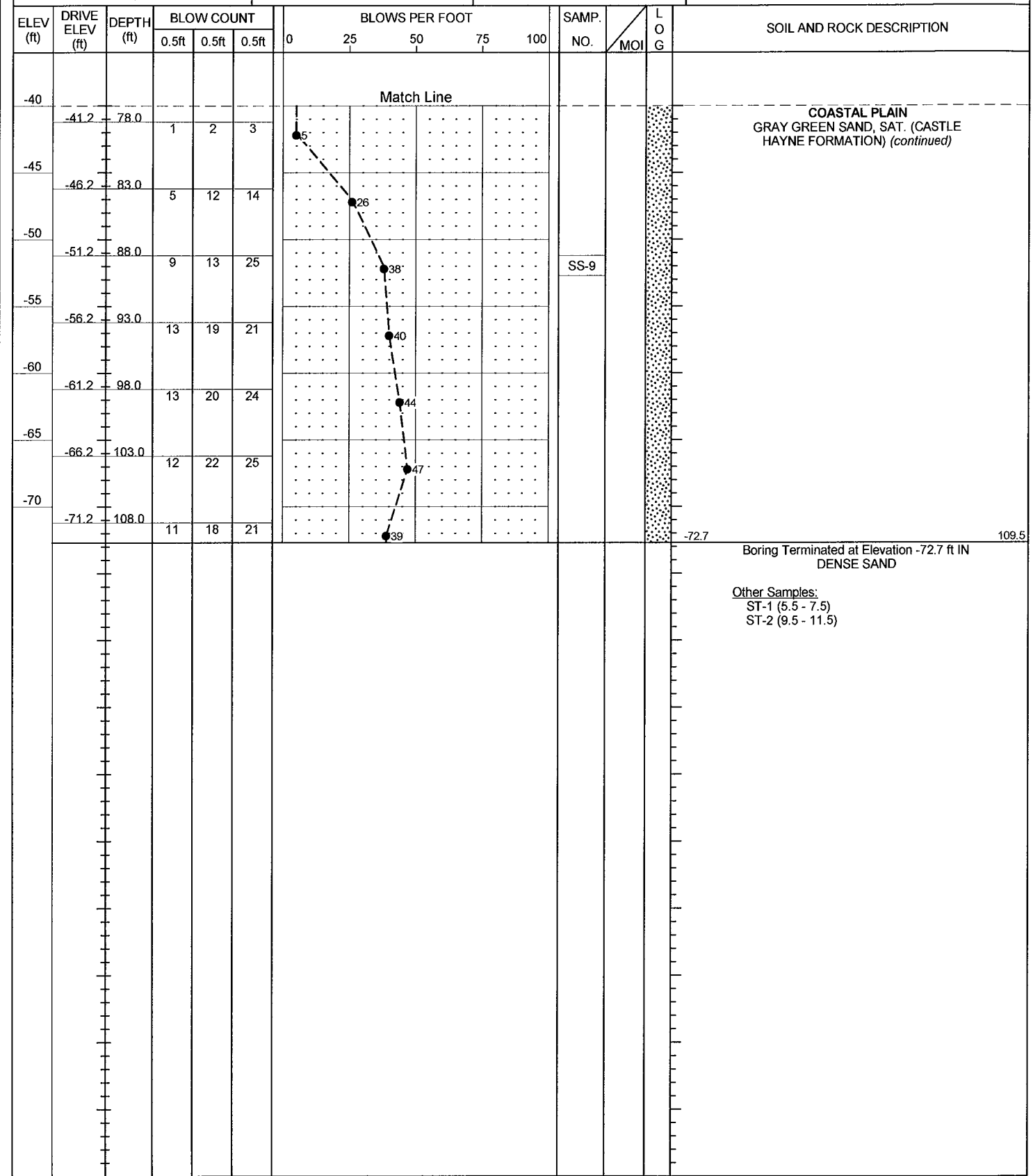


NCDOT BORE DOUBLE BORINGS.GPJ NC_DOT.GDT 11/13/13

WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 108 ON -L- (US 17 BYPASS) OVER -Y7- (SIMMONS LOOP RD.)			GROUND WTR (ft)
BORING NO. EB1-B NBL	STATION 560+58	OFFSET 60 ft RT	ALIGNMENT -L-
COLLAR ELEV. 36.8 ft	TOTAL DEPTH 109.5 ft	NORTHING 481,863	EASTING 2,536,480
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 10/30/13	COMP. DATE 10/30/13	SURFACE WATER DEPTH N/A



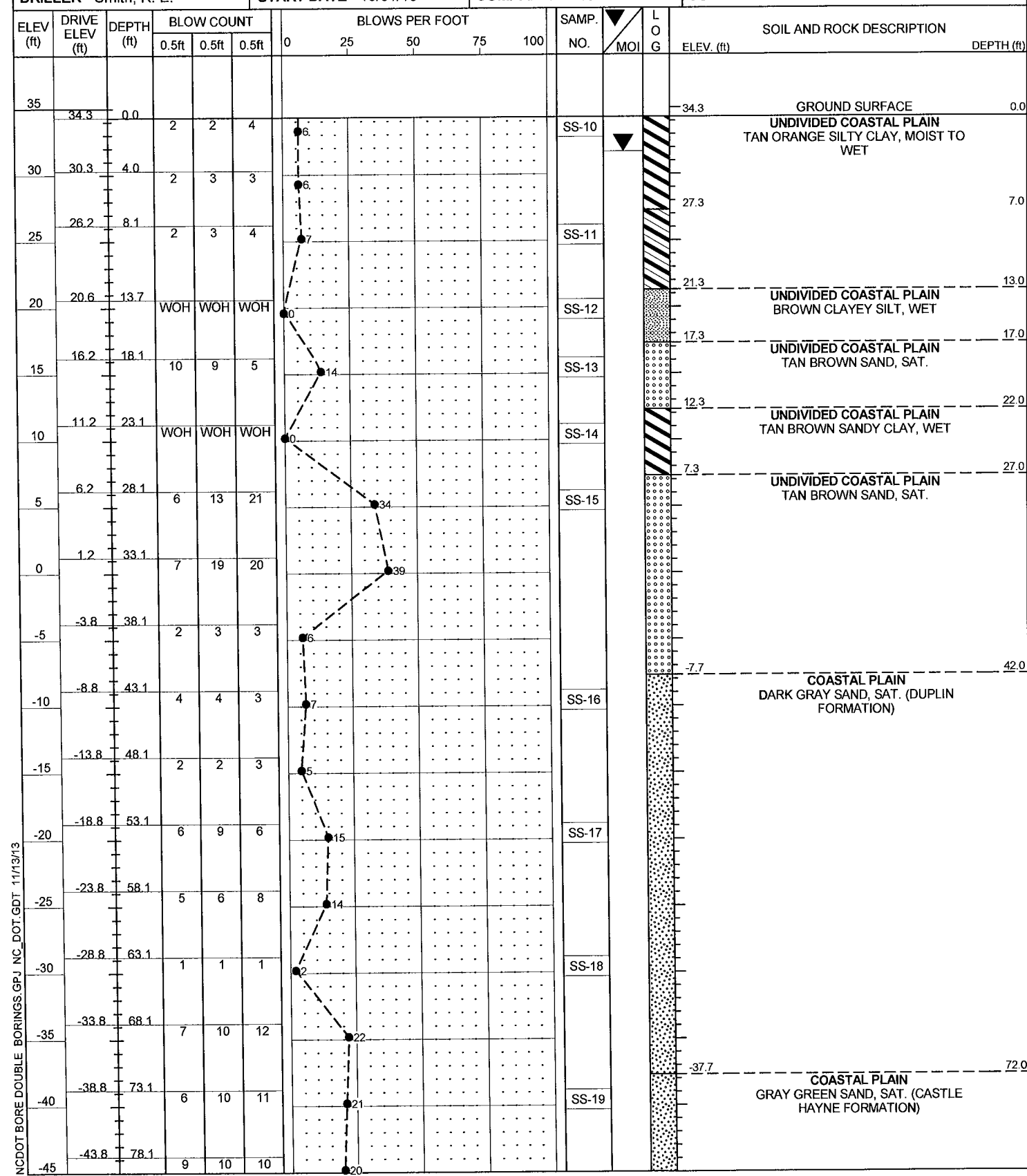
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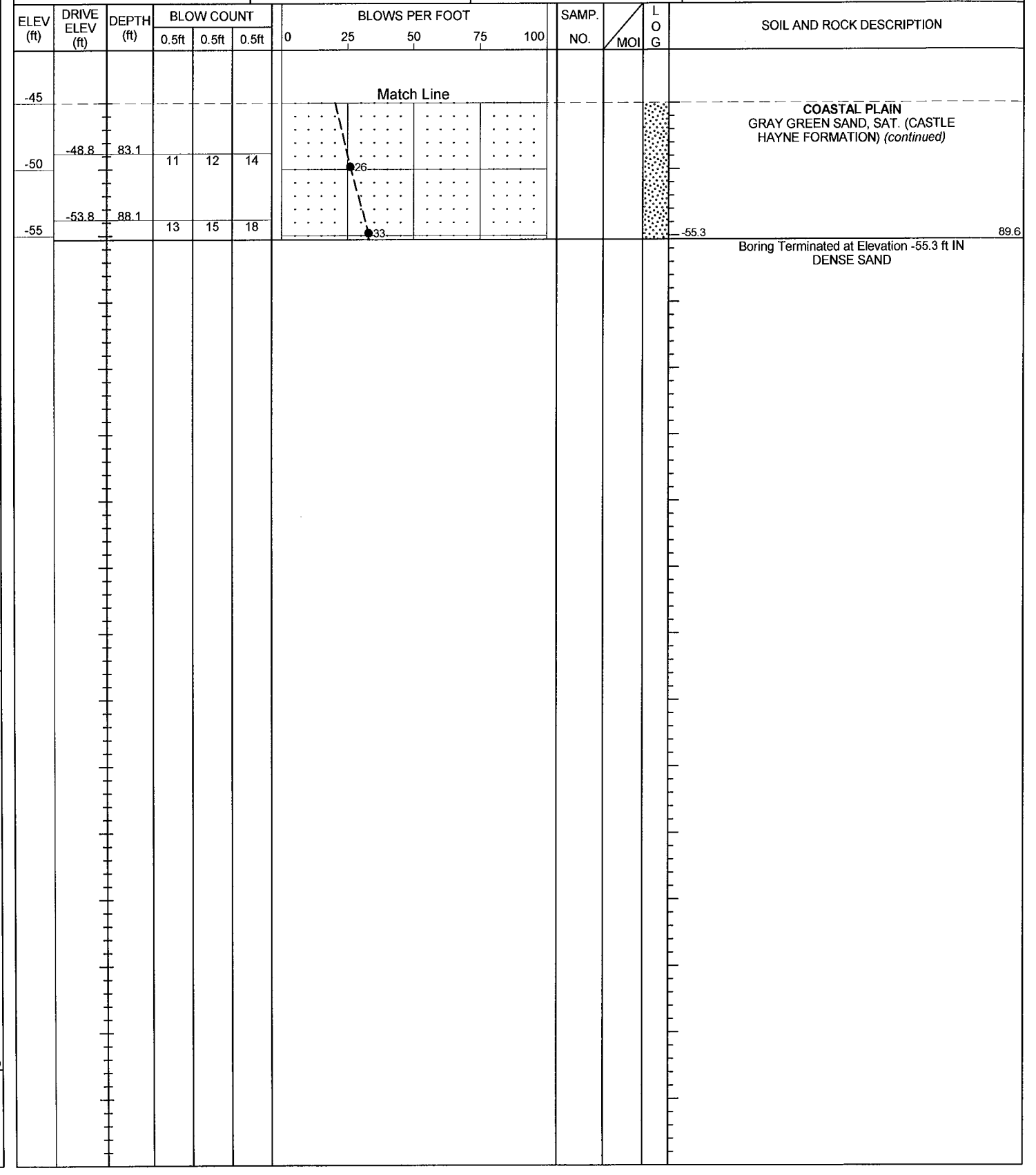
NCDOT BORE DOUBLE BORINGS.GPJ NC_DOT.GDT 11/13/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 107 ON -L- (US 17 BYPASS) OVER -Y7- (SIMMONS LOOP RD.)			GROUND WTR (ft)
BORING NO. EB2-A SBL	STATION 561+58	OFFSET 60 ft LT	ALIGNMENT -L-
COLLAR ELEV. 34.3 ft	TOTAL DEPTH 89.6 ft	NORTHING 482,015	EASTING 2,536,444
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 10/31/13	COMP. DATE 10/31/13	SURFACE WATER DEPTH N/A

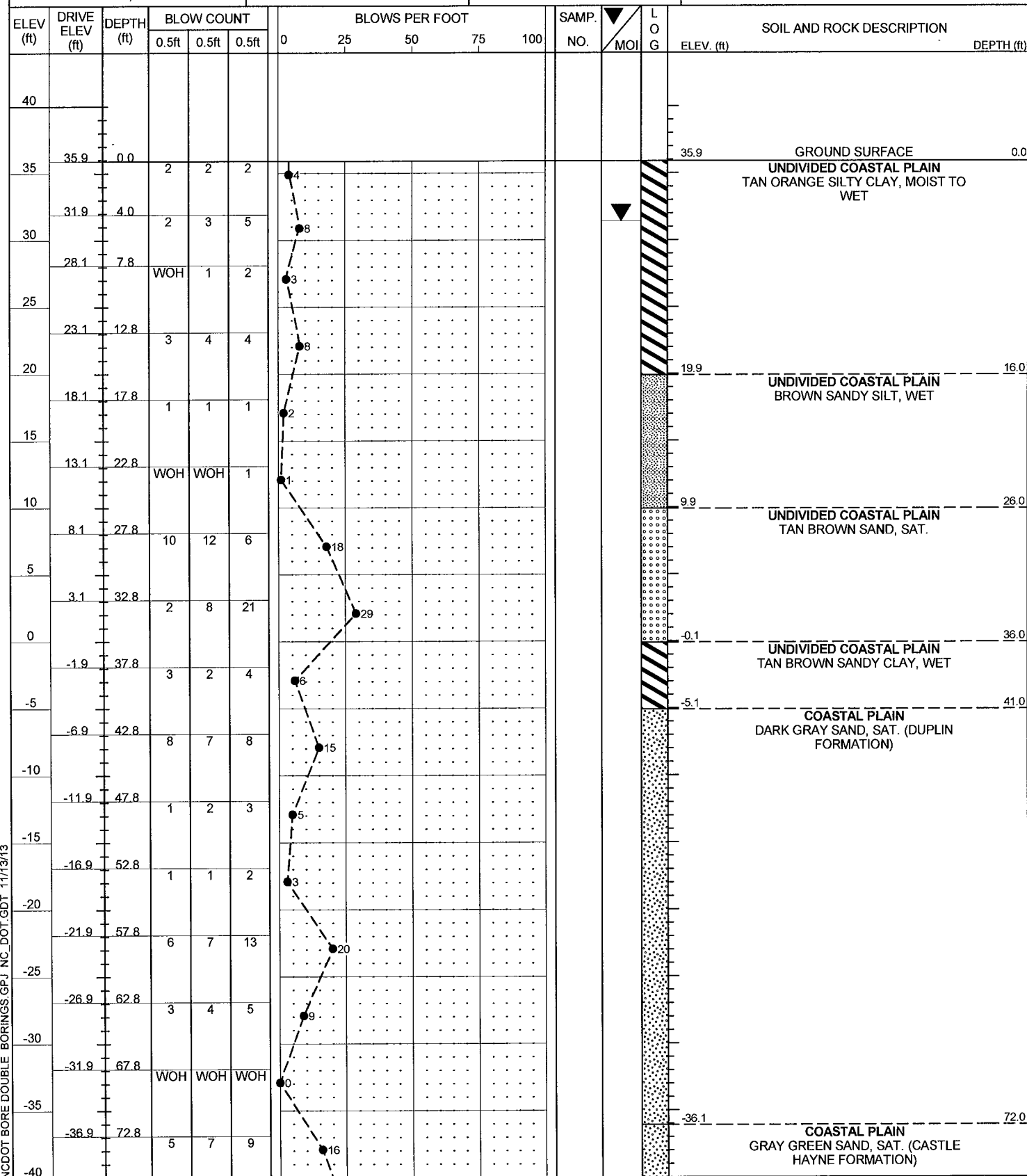


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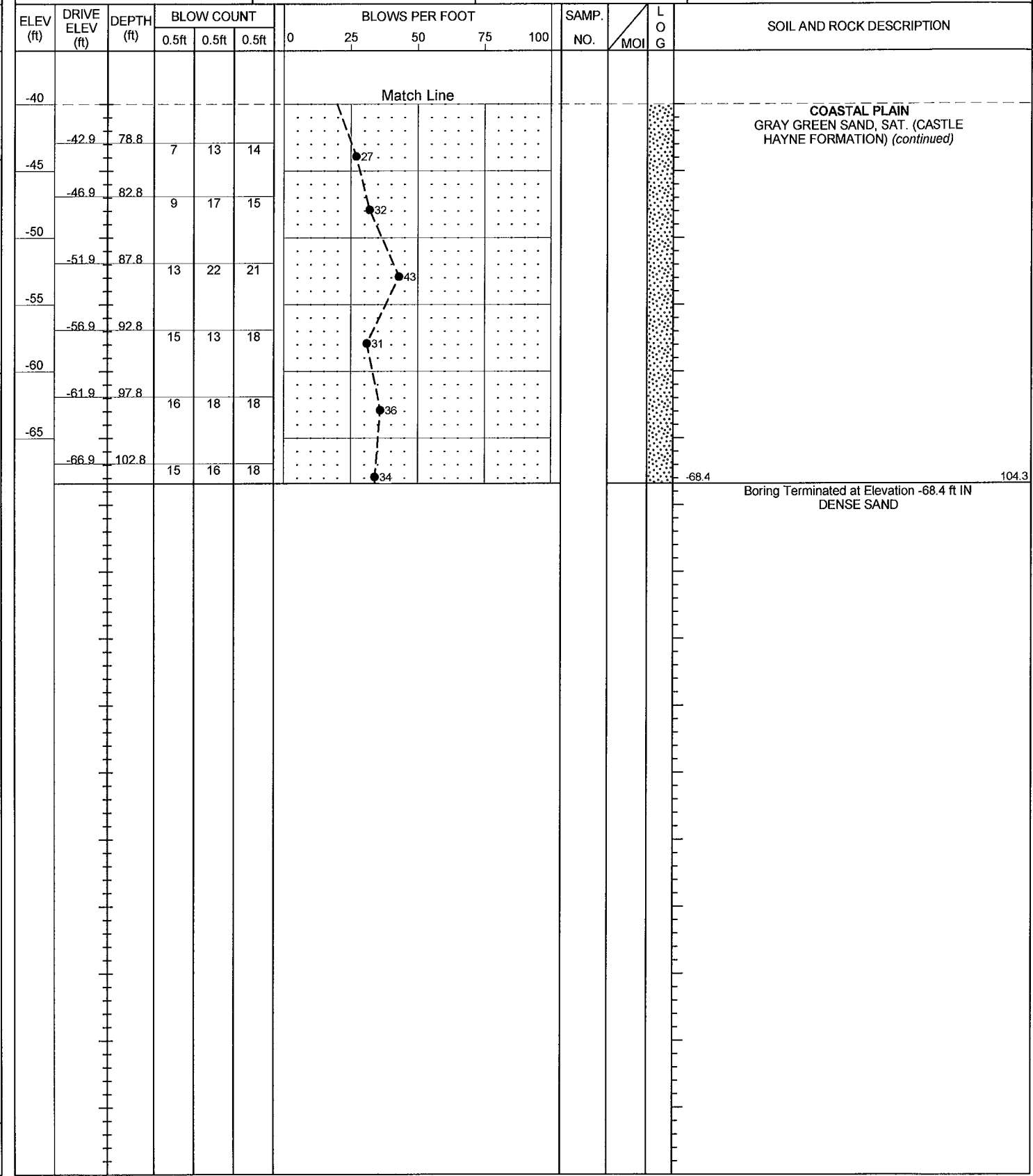


NCDOT BORE DOUBLE BORINGS.GPJ NC_DOT_GDT_11/13/13

WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 108 ON -L- (US 17 BYPASS) OVER -Y7- (SIMMONS LOOP RD.)			GROUND WTR (ft)
BORING NO. EB2-B NBL	STATION 561+59	OFFSET 59 ft RT	ALIGNMENT -L-
COLLAR ELEV. 35.9 ft	TOTAL DEPTH 104.3 ft	NORTHING 481,944	EASTING 2,536,540
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 10/29/13	COMP. DATE 10/29/13	SURFACE WATER DEPTH N/A



WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 108 ON -L- (US 17 BYPASS) OVER -Y7- (SIMMONS LOOP RD.)			GROUND WTR (ft)
BORING NO. EB2-B NBL	STATION 561+59	OFFSET 59 ft RT	ALIGNMENT -L-
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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 10/29/13	COMP. DATE 10/29/13	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE BORINGS.GPJ NC_DOT_GDT 11/13/13

34442.1.5

R-2514D

BRIDGE NO. 107 AND 108 ON -L- (US 17 BYPASS) OVER -Y7- (SIMMONS LOOP RD.) AT -L- STA. 561+15.20

EB1-B NBL SOIL TEST RESULTS

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- 1	60 RT	560+58	0.0- 1.5	A-7-6(24)	45	25	0.8	13.1	27.4	58.6	100	100	90	-	-
SS- 2	60 RT	560+58	8.0-9.5	A-7-6(26)	45	26	0.4	13.8	47.4	38.4	100	100	95	-	-
SS- 3	60 RT	560+58	18.0- 19.5	A-4(0)	18	2	27.5	34.0	20.3	18.2	82	70	38	-	-
SS- 4	60 RT	560+58	23.0-24.5	A-3(0)	18	NP	67.6	24.2	0.1	8.1	98	55	9	-	-
SS- 5	60 RT	560+58	28.0-29.5	A-2-4(0)	25	4	8.0	65.2	6.6	20.2	100	98	30	-	-
SS- 6	60 RT	560+58	38.0-39.5	A-2-4(0)	21	NP	16.2	61.8	3.8	18.2	100	100	24	-	-
SS- 7	60 RT	560+58	53.0-54.5	A-2-4(0)	19	NP	25.6	64.1	2.2	8.1	100	99	11	-	-
SS- 8	60 RT	560+58	63.0-64.5	A-3(0)	19	NP	12.9	79.9	2.1	5.1	98	93	10	-	-
SS- 9	60 RT	560+58	88.0-89.5	A-2-4(0)	18	NP	8.4	79.7	4.9	7.1	100	97	15	-	-

EB2-A SBL SOIL TEST RESULTS

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- 10	60 LT	561+58	0.0- 1.5	A-7-6(30)	53	28	0.8	6.7	29.8	62.7	100	100	95	-	-
SS- 11	60 LT	561+58	8.1-9.6	A-6(12)	35	11	0.2	12.1	59.4	28.3	100	100	98	-	-
SS- 12	60 LT	561+58	13.7- 15.2	A-4(8)	30	10	3.4	8.9	53.3	34.4	100	98	91	-	-
SS- 13	60 LT	561+58	18.1- 19.6	A-3(0)	17	NP	45.0	46.2	4.8	4.0	100	78	10	-	-
SS- 14	60 LT	561+58	23.1-24.6	A-7-6(12)	45	26	22.9	21.6	11.0	44.5	100	87	58	-	-
SS- 15	60 LT	561+58	28.1-29.6	A-3(0)	15	NP	69.5	25.7	1.8	3.0	99	57	6	-	-
SS- 16	60 LT	561+58	43.1-44.6	A-2-4(0)	17	NP	41.7	40.3	3.8	14.2	100	97	19	-	-
SS- 17	60 LT	561+58	53.1-54.6	A-2-4(0)	23	NP	35.3	51.0	4.7	9.1	90	73	14	-	-
SS- 18	60 LT	561+58	63.1-64.6	A-2-4(0)	22	NP	3.5	84.1	5.3	7.1	100	98	18	-	-
SS- 19	60 LT	561+58	73.1-74.6	A-2-4(0)	21	NP	6.5	83.6	2.8	7.1	100	97	13	-	-

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34442.1.5 (R-2514D) F.A. PROJ. NHF-17(7)

COUNTY JONES

PROJECT DESCRIPTION US 17 FROM SOUTH OF NC 58 TO THE
NEW BERN BYPASS

SITE DESCRIPTION DUAL BRIDGES ON -Y10- (US 17 CONNECTOR)
OVER -L- (PROPOSED US 17) AT -Y10- STA. 28+29.35

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	PROFILES
6-8	CROSS SECTIONS
9-15	BORE LOGS
16	SOIL TEST RESULTS

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.

PERSONNEL

C.M. WRIKE

R.E. SMITH

D.G. PINTER

H.R. CONLEY

H.L. FROATS

INVESTIGATED BY T.C. BOTTOMS

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE FEBRUARY 2014



ID: R-2514D

PROJECT: 34442.1.5

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 IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

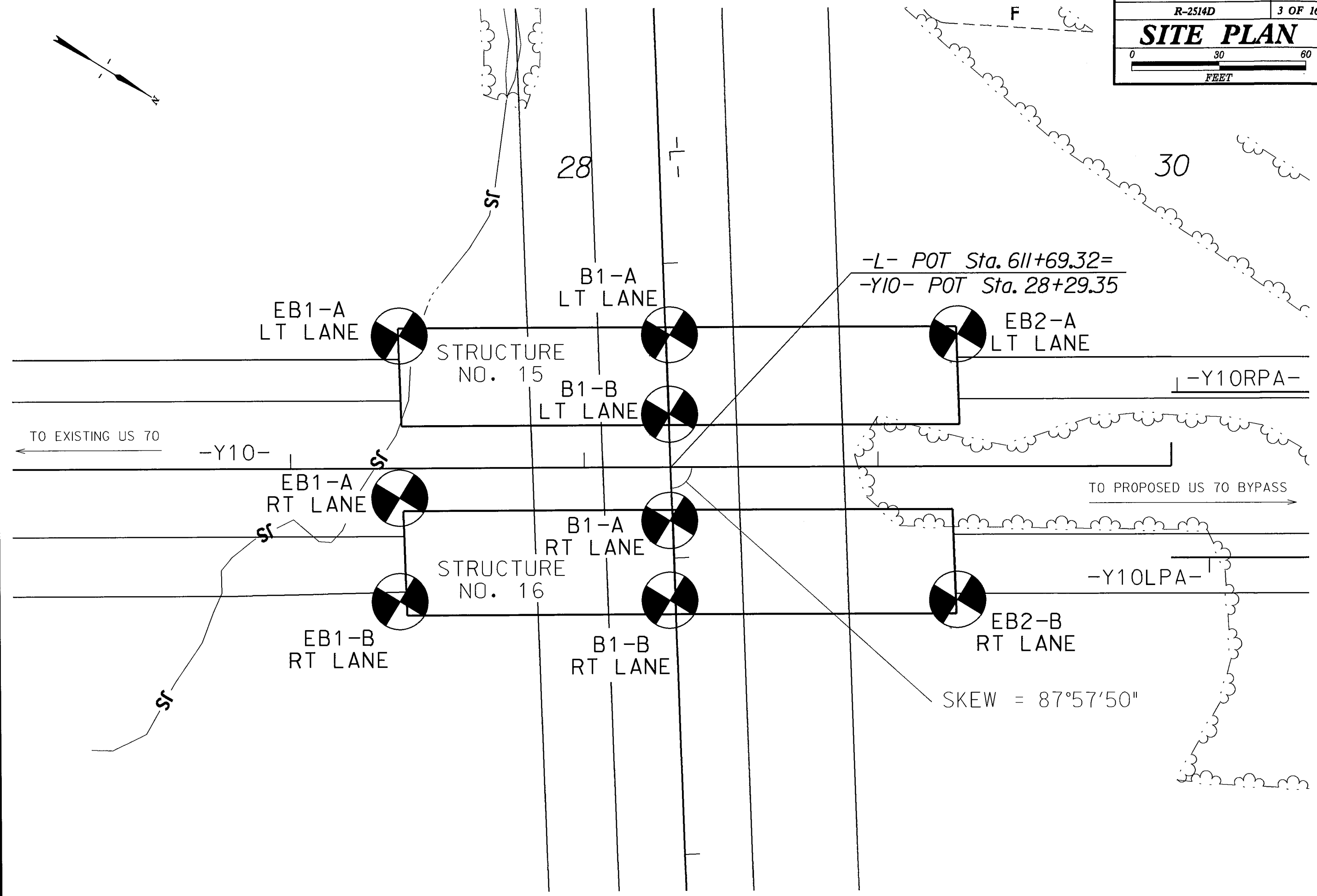
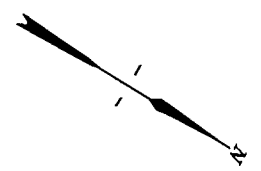
NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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, GRAY-SILT CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HARDY PLASTIC, A-7-6</i>	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS 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 DISLOOSED 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 (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	
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. 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. VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i> 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.	
COMPRESSIONIBILITY	PERCENTAGE OF MATERIAL	GROUND WATER	
SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE	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	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	
TEXTURE OR GRAIN SIZE	MISCELLANEOUS SYMBOLS	ROCK HARDNESS	
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	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	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 GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROUDED 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.	
CONSISTENCY OR DENSITY	ABBREVIATIONS	FRACTURE SPACING	BEDDING
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)	AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DPT - 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 SLI. - SLIGHTLY TCR - TRICONE REFUSAL W - MOISTURE CONTENT V - VERY TEST BORING WITH CORE AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD	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	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
GENERAL GRANULAR MATERIAL (NON-COHESIVE) VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DPT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST F - FINE FOSS - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY	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 GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROUDED 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.	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
GENERAL SILT-CLAY MATERIAL (COHESIVE) VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DPT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST F - FINE FOSS - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY	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 GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROUDED 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.	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
PLASTICITY	EQUIPMENT USED ON SUBJECT PROJECT	INDURATION	
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY	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 1/16" 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	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.	
COLOR			NOTES:
DESCRIPTORS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.			BENCH MARK: BM-32; RAILROAD SPIKE IN 7" PINE AT -L- STA. 608+78.00, 849' LT ELEVATION: 36.79 FT.

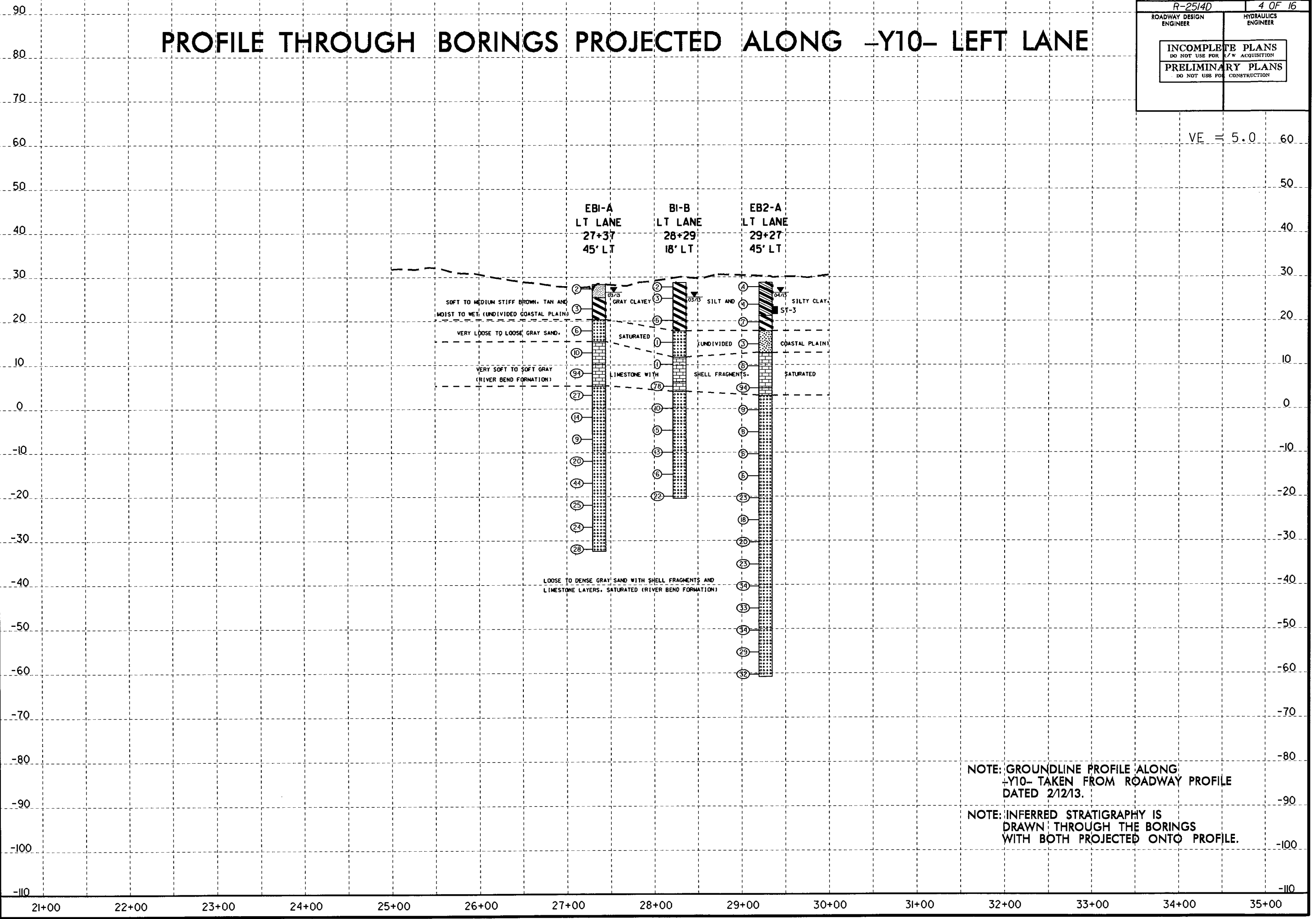


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PROJECT REFERENCE NO. R-2514D	SHEET NO. 4 OF 16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PROFILE THROUGH BORINGS PROJECTED ALONG -Y10- LEFT LANE

VE = 5.0 60



NOTE: GROUNDLINE PROFILE ALONG -Y10- TAKEN FROM ROADWAY PROFILE DATED 2/12/13.

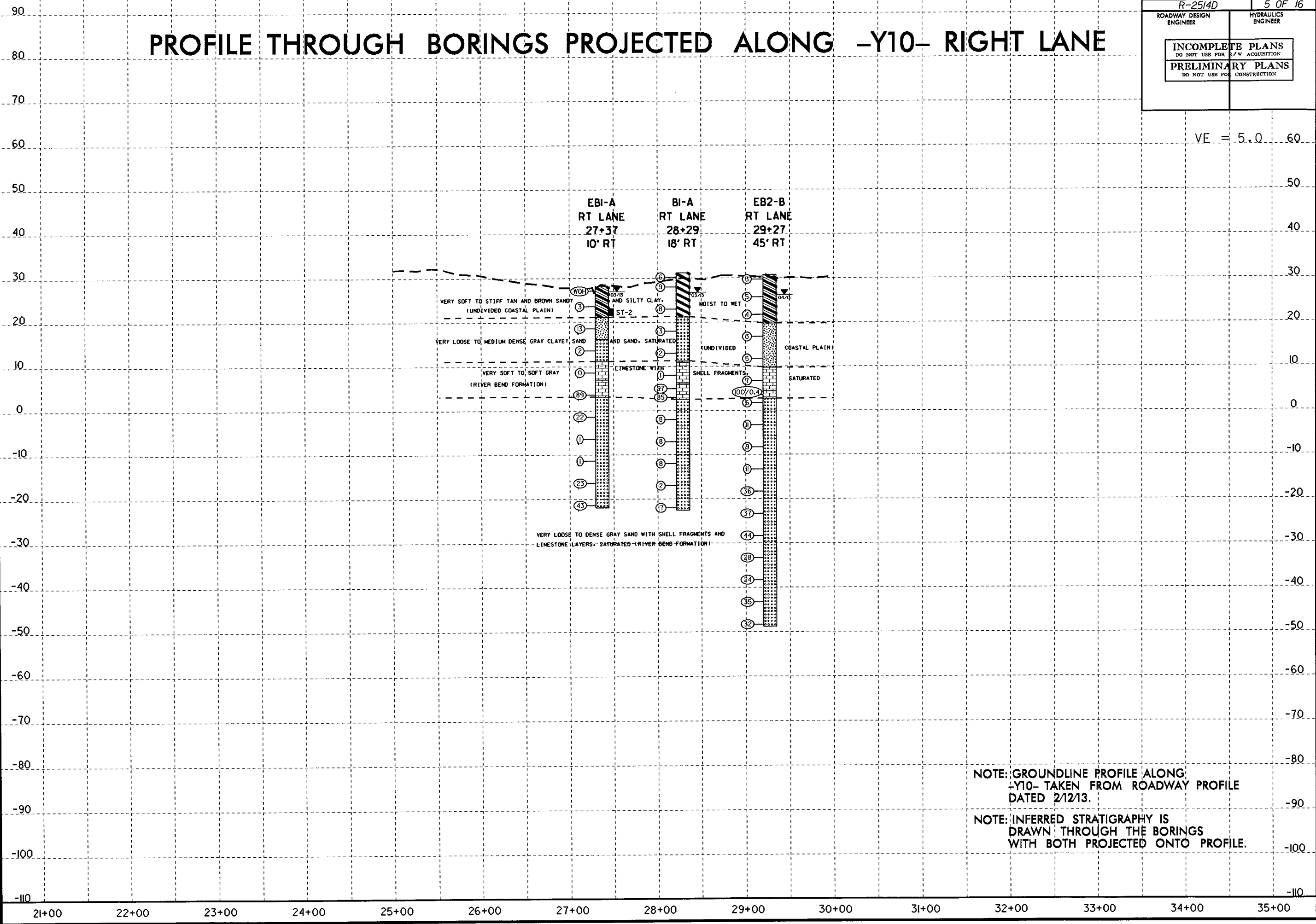
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.

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PROJECT REFERENCE NO. R-2514D	SHEET NO. 5 OF 16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PROFILE THROUGH BORINGS PROJECTED ALONG -Y10- RIGHT LANE

VE = 5.0 60

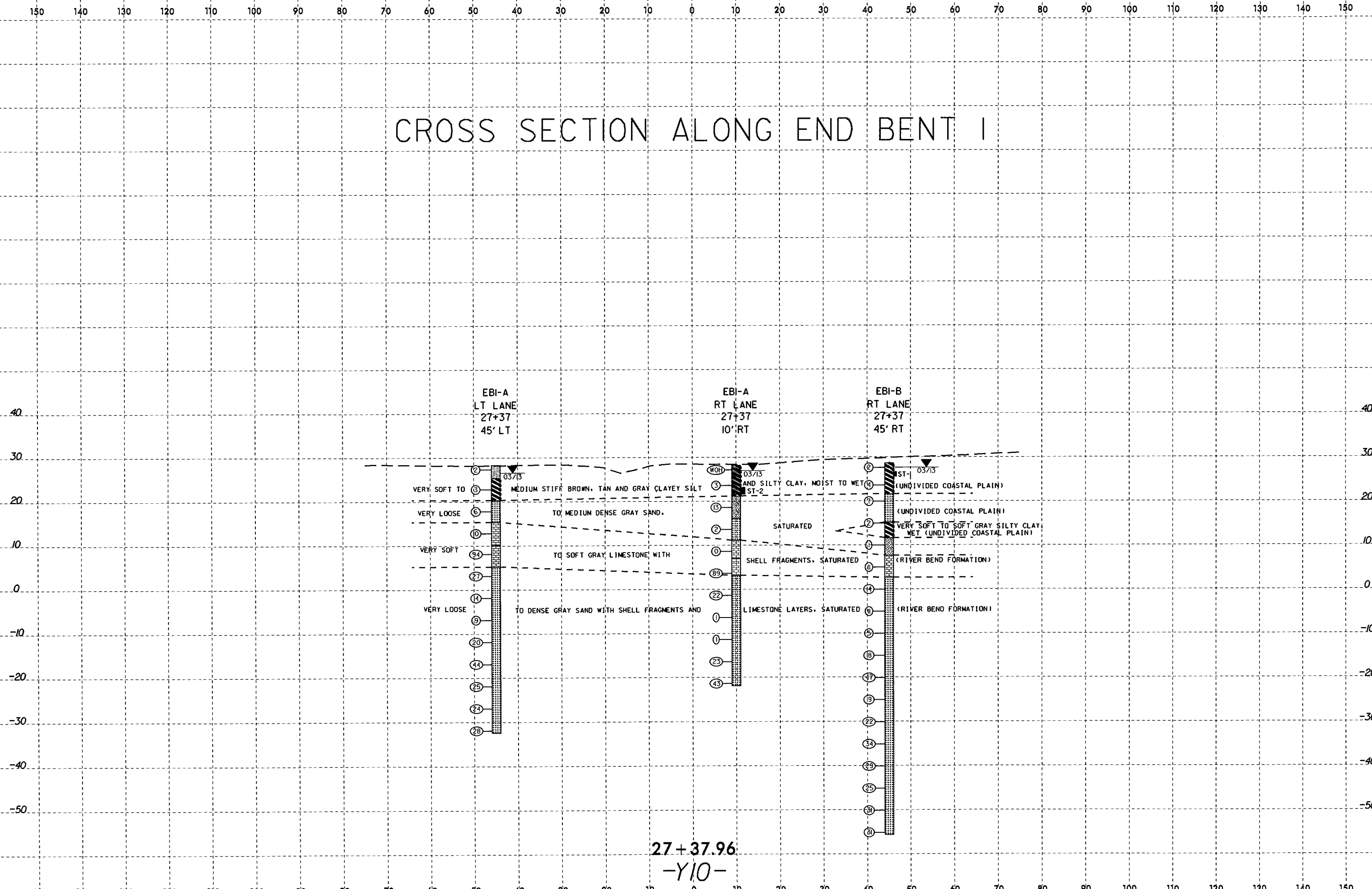


NOTE: GROUNDLINE PROFILE ALONG -Y10- TAKEN FROM ROADWAY PROFILE DATED 2/12/13.

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

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CP: JG

CROSS SECTION ALONG END BENT I



27+37.96
-Y10-

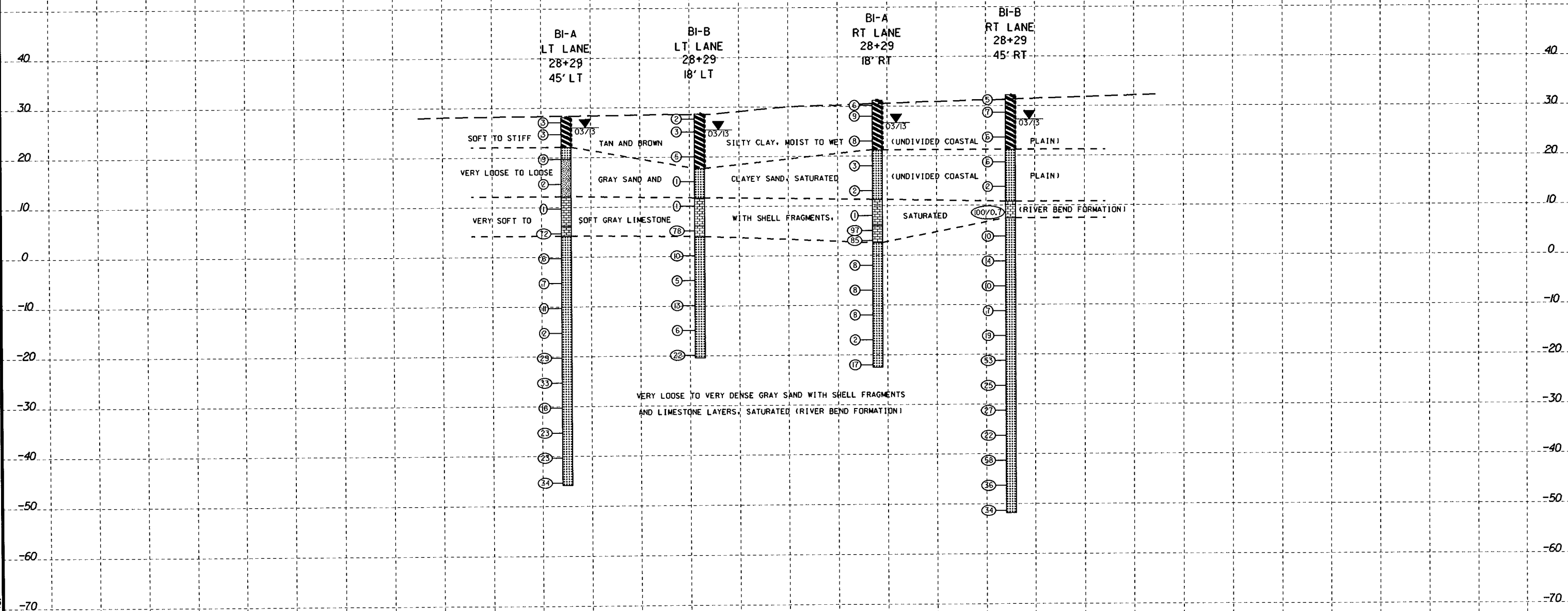
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PROJ. REFERENCE NO.
R-2514D

SHEET NO.
7 OF 16

CROSS SECTION ALONG BENT 1



28+29.35

-Y10-

8/23/98



PROJ. REFERENCE NO.
R-2514D

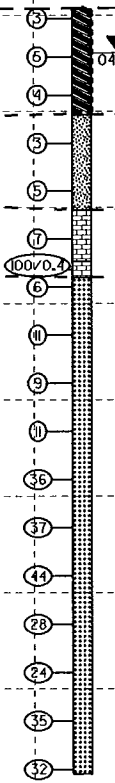
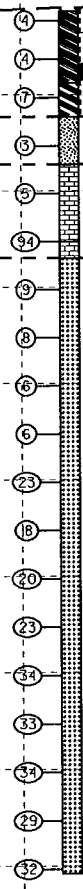
SHEET NO.
8 OF 16

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CROSS SECTION ALONG END BENT 2

EB2-A
LT LANE
29+27
45' LT

EB2-B
RT LANE
29+27
45' RT



SOFT TO MEDIUM STIFF TAN AND BROWN SANDY AND SILTY CLAY, MOIST TO WET (UNDIVIDED COASTAL PLAIN)

VERY LOOSE TO LOOSE GRAY SAND, SATURATED (UNDIVIDED COASTAL PLAIN)

VERY SOFT TO SOFT GRAY LIMESTONE WITH SHELL FRAGMENTS, SATURATED (RIVER BEND FORMATION)

LOOSE TO DENSE GRAY SAND WITH SHELL FRAGMENTS AND LIMESTONE LAYERS, SATURATED (RIVER BEND FORMATION)

29+24.82

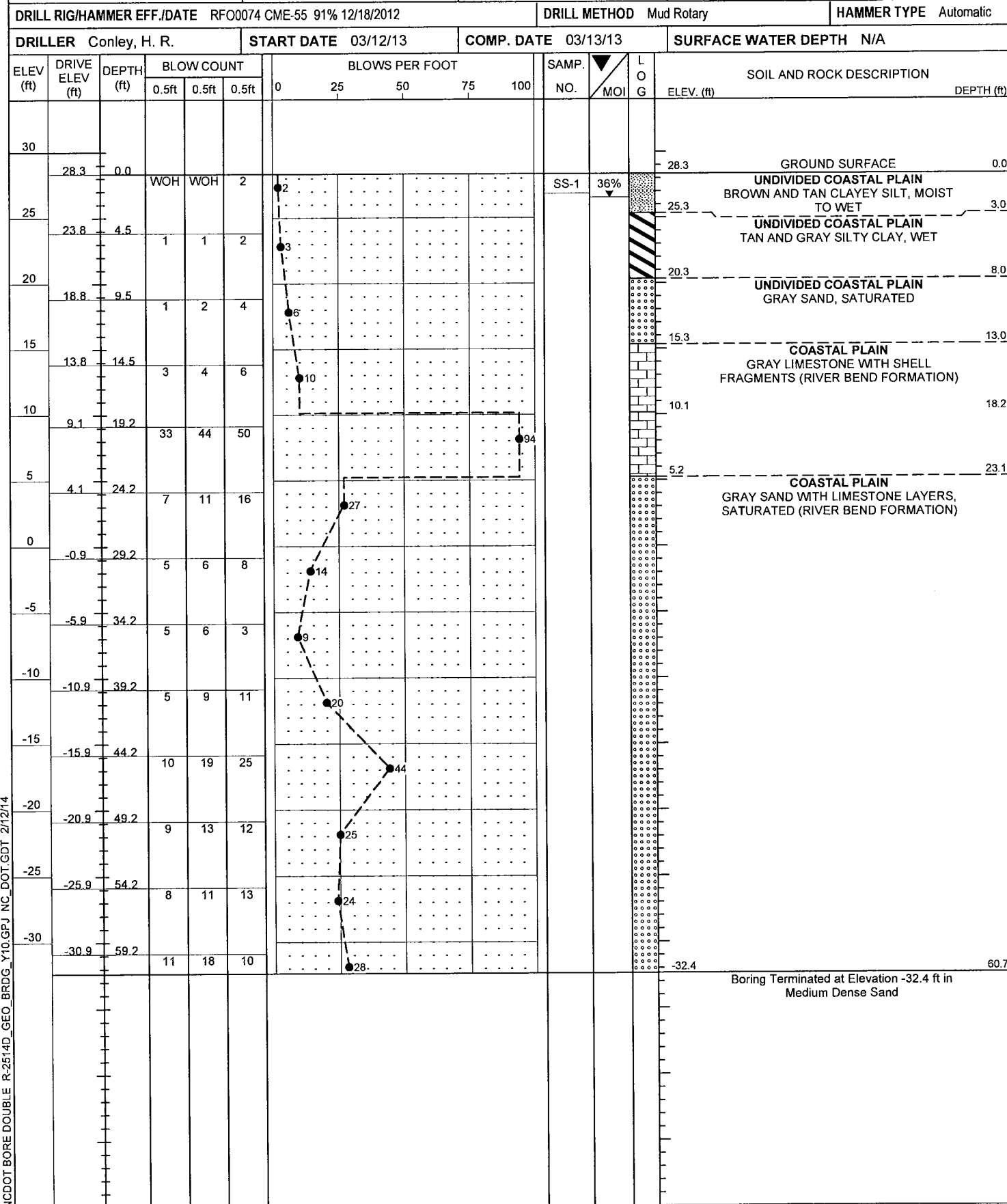
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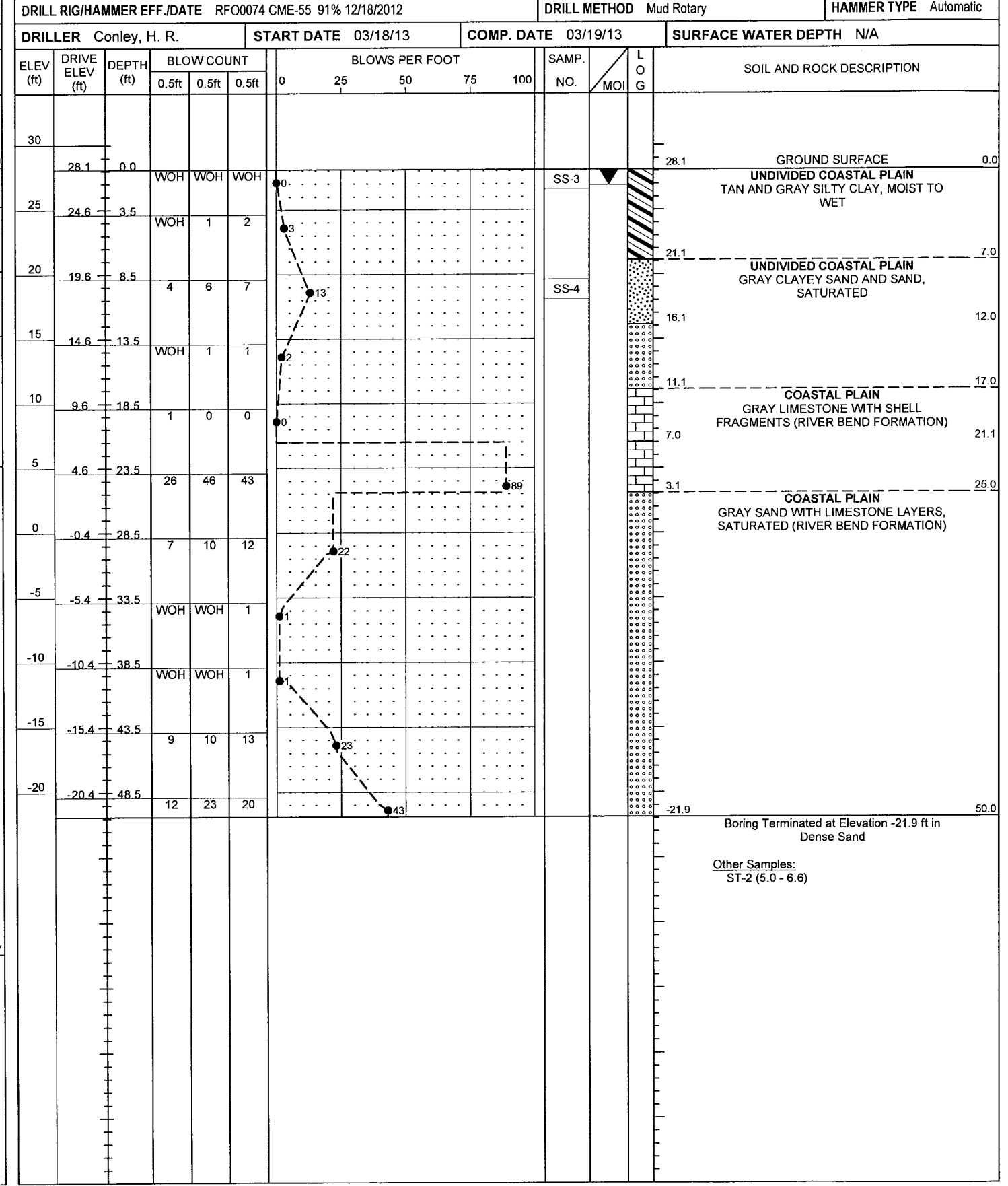
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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Wrike, C. M.
SITE DESCRIPTION STRUCTURE NO. 15 ON -Y10- (US 17 CONNECTOR) OVER -L- (US 17 BYPASS)			GROUND WTR (ft)
BORING NO. EB1-A LT. LN.	STATION 27+37	OFFSET 45 ft LT	ALIGNMENT -Y10-
COLLAR ELEV. 28.3 ft	TOTAL DEPTH 60.7 ft	NORTHING 485,090	EASTING 2,540,306
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 91% 12/18/2012			DRILL METHOD Mud Rotary
DRILLER Conley, H. R.			HAMMER TYPE Automatic
START DATE 03/12/13	COMP. DATE 03/13/13	SURFACE WATER DEPTH N/A	



WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Wrike, C. M.
SITE DESCRIPTION STRUCTURE NO. 16 ON -Y10- (US 17 CONNECTOR) OVER -L- (US 17 BYPASS)			GROUND WTR (ft)
BORING NO. EB1-A RT. LN.	STATION 27+37	OFFSET 10 ft RT	ALIGNMENT -Y10-
COLLAR ELEV. 28.1 ft	TOTAL DEPTH 50.0 ft	NORTHING 485,119	EASTING 2,540,352
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 91% 12/18/2012			DRILL METHOD Mud Rotary
DRILLER Conley, H. R.			HAMMER TYPE Automatic
START DATE 03/18/13	COMP. DATE 03/19/13	SURFACE WATER DEPTH N/A	



NCDOT BORE DOUBLE R-2514D_GEO_BRDG_Y10_GP1_NC_DOT_GDT_2/12/14



**NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT**

WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Wrike, C. M.
SITE DESCRIPTION STRUCTURE NO. 16 ON -Y10- (US 17 CONNECTOR) OVER -L- (US 17 BYPASS)			GROUND WTR (ft)
BORING NO. EB1-B RT. LN.	STATION 27+37	OFFSET 45 ft RT	ALIGNMENT -Y10-
COLLAR ELEV. 28.6 ft	TOTAL DEPTH 84.2 ft	NORTHING 485,137	EASTING 2,540,382
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 91% 12/18/2012		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Conley, H. R.	START DATE 03/13/13	COMP. DATE 03/14/13	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
30	28.6	0.0												GROUND SURFACE 28.6 0.0
			WOH	1	1	2								UNDIVIDED COASTAL PLAIN BROWN AND TAN SILTY CLAY, MOIST TO WET
25	24.6	4.0		1	2	2								
20	20.9	7.7		1	2	5								UNDIVIDED COASTAL PLAIN GRAY SAND, SATURATED
15	15.9	12.7	WOH	1	1									UNDIVIDED COASTAL PLAIN GRAY SILTY CLAY, WET
10	10.9	17.7		1	1	0								UNDIVIDED COASTAL PLAIN GRAY SAND, SATURATED
5	5.9	22.7		2	3	8								COASTAL PLAIN GRAY LIMESTONE WITH SHELL FRAGMENTS (RIVER BEND FORMATION)
0	0.9	27.7		3	5	9								COASTAL PLAIN GRAY SAND WITH LIMESTONE LAYERS, SATURATED (RIVER BEND FORMATION)
-5	-4.1	32.7		4	5	6								
-10	-9.1	37.7		2	2	3								
-15	-14.1	42.7		7	11	7								
-20	-19.1	47.7		2	17	30								
-25	-24.1	52.7		5	9	10								
-30	-29.1	57.7		4	9	13								
-35	-34.1	62.7		10	17	17								
-40	-39.1	67.7		7	14	15								
-45	-44.1	72.7		9	12	13								
-50	-49.1	77.7		11	14	17								

WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Wrike, C. M.
SITE DESCRIPTION STRUCTURE NO. 16 ON -Y10- (US 17 CONNECTOR) OVER -L- (US 17 BYPASS)			GROUND WTR (ft)
BORING NO. EB1-B RT. LN.	STATION 27+37	OFFSET 45 ft RT	ALIGNMENT -Y10-
COLLAR ELEV. 28.6 ft	TOTAL DEPTH 84.2 ft	NORTHING 485,137	EASTING 2,540,382
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 91% 12/18/2012		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Conley, H. R.	START DATE 03/13/13	COMP. DATE 03/14/13	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
-50														Match Line
	-54.1	82.7	10	15	16									COASTAL PLAIN GRAY SAND WITH LIMESTONE LAYERS, SATURATED (RIVER BEND FORMATION) (continued)
														Boring Terminated at Elevation -55.6 ft in Dense Sand

NCDOT BORE DOUBLE R-2514D_GEO_BRDG_Y10_GPJ_NC_DOT_GDT_2/12/14



NCDOT GEOTECHNICAL ENGINEERING UNIT

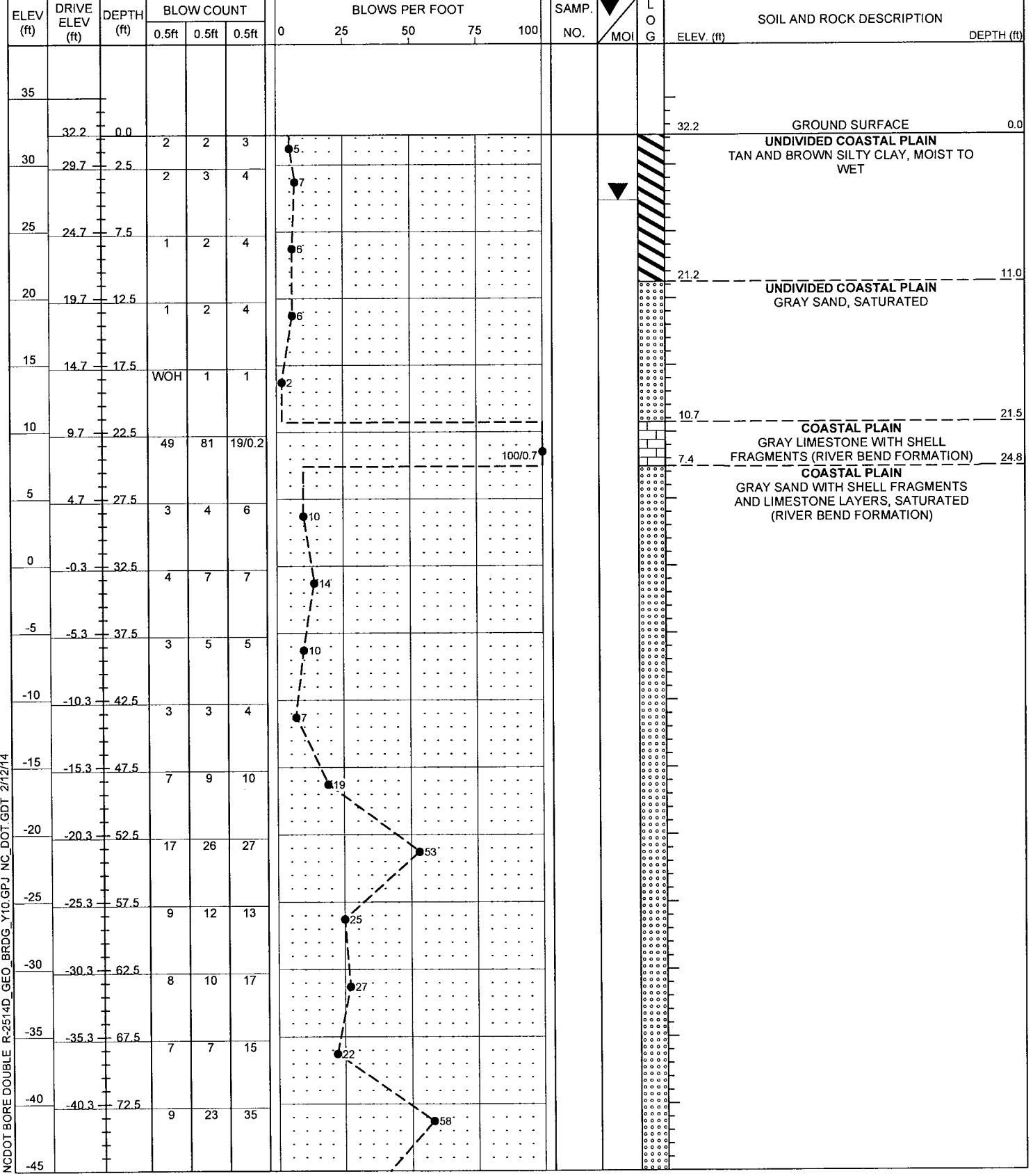
BORELOG REPORT

WBS 34442.1.5		TIP R-2514D		COUNTY JONES		GEOLOGIST Wrike, C. M.										
SITE DESCRIPTION STRUCTURE NO. 16 ON -Y10- (US 17 CONNECTOR) OVER -L- (US 17 BYPASS)							GROUND WTR (ft)									
BORING NO. B1-A RT. LN.		STATION 28+29		OFFSET 18 ft RT		ALIGNMENT -Y10-										
COLLAR ELEV. 31.2 ft		TOTAL DEPTH 53.7 ft		NORTHING 485,201		EASTING 2,540,311										
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 91% 12/18/2012				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Conley, H. R.		START DATE 03/21/13		COMP. DATE 03/21/13		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
35																
	31.2	0.0	1	2	4										31.2	GROUND SURFACE
30	29.0	2.2	2	4	5											UNDIVIDED COASTAL PLAIN TAN AND BROWN SILTY CLAY, MOIST TO WET
25	24.0	7.2	1	4	4											
20	19.0	12.2	1	2	1										21.2	UNDIVIDED COASTAL PLAIN GRAY SAND, SATURATED
15	14.0	17.2	WOH	1	1											
10	9.0	22.2	WOH	WOH	1										11.2	COASTAL PLAIN GRAY LIMESTONE WITH SHELL FRAGMENTS (RIVER BEND FORMATION)
5	6.0	25.2	22	49	48										6.0	
	4.0	27.2	25	43	42										2.5	COASTAL PLAIN GRAY SAND WITH LIMESTONE LAYERS, SATURATED (RIVER BEND FORMATION)
0	-1.0	32.2	3	3	5											
-5	-6.0	37.2	3	4	4											
-10	-11.0	42.2	3	4	4											
-15	-16.0	47.2	WOH	1	1											
-20	-21.0	52.2	6	7	10											
															-22.5	Boring Terminated at Elevation -22.5 ft in Medium Dense Sand

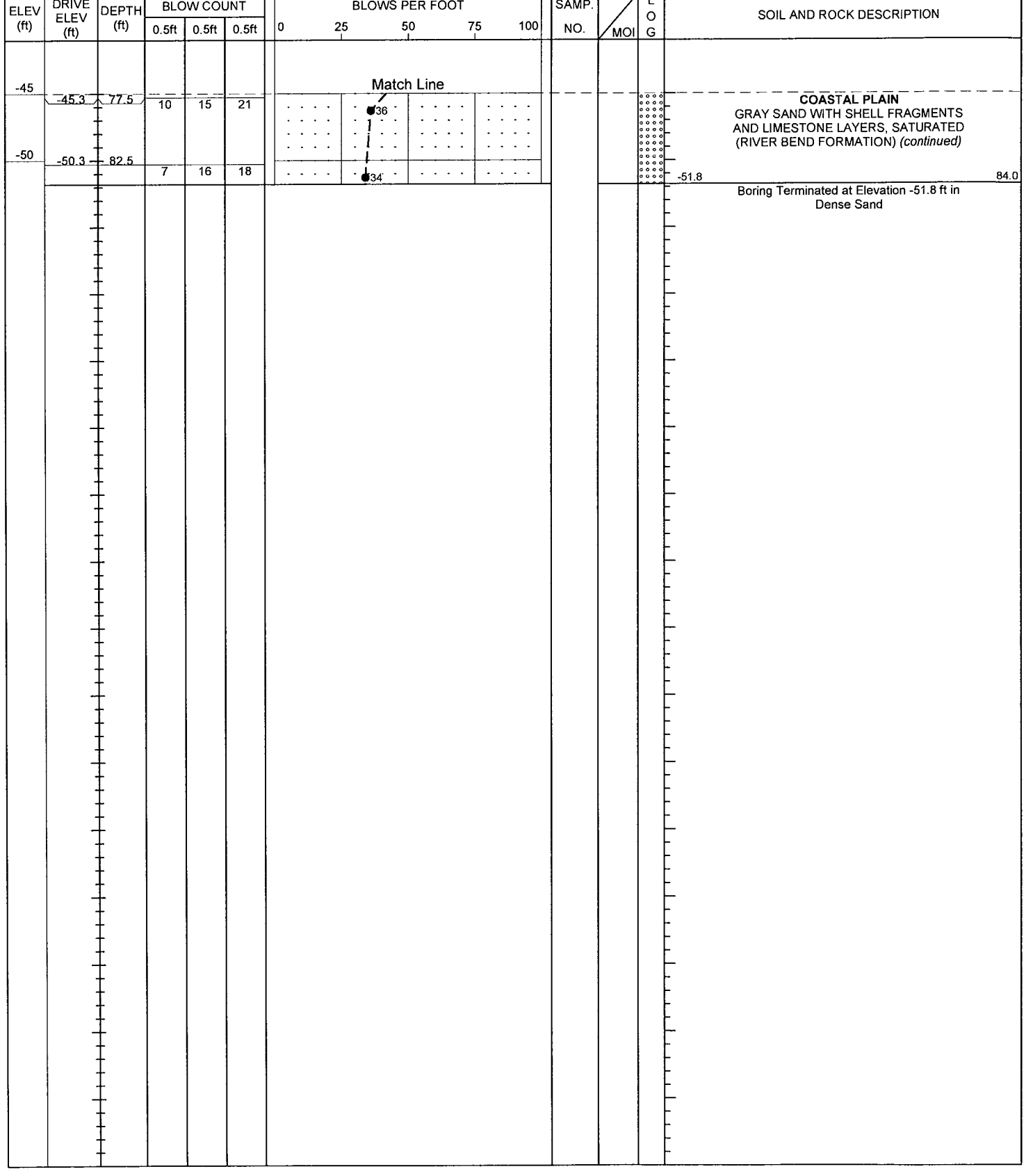
NCDOT BORE DOUBLE R-2514D_GEO_BRDG_Y10.GPJ_NC_DOT.GDT_2/12/14

NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Wrike, C. M.
SITE DESCRIPTION STRUCTURE NO. 16 ON -Y10- (US 17 CONNECTOR) OVER -L- (US 17 BYPASS)			GROUND WTR (ft)
BORING NO. B1-B RT. LN.	STATION 28+29	OFFSET 45 ft RT	ALIGNMENT -Y10-
COLLAR ELEV. 32.2 ft	TOTAL DEPTH 84.0 ft	NORTHING 485,215	EASTING 2,540,334
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 91% 12/18/2012		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Conley, H. R.	START DATE 03/25/13	COMP. DATE 03/26/13	SURFACE WATER DEPTH N/A



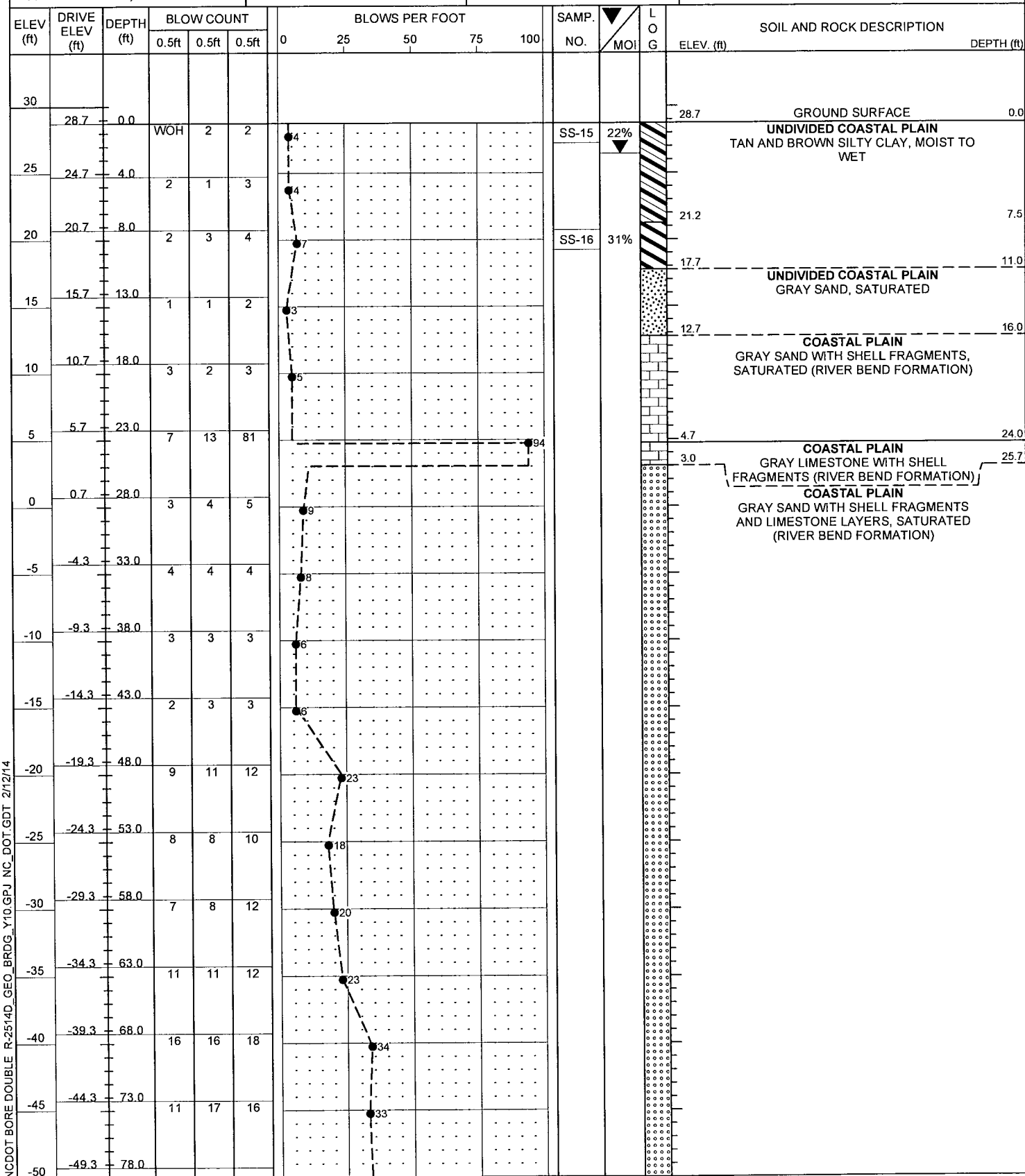
WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Wrike, C. M.
SITE DESCRIPTION STRUCTURE NO. 16 ON -Y10- (US 17 CONNECTOR) OVER -L- (US 17 BYPASS)			GROUND WTR (ft)
BORING NO. B1-B RT. LN.	STATION 28+29	OFFSET 45 ft RT	ALIGNMENT -Y10-
COLLAR ELEV. 32.2 ft	TOTAL DEPTH 84.0 ft	NORTHING 485,215	EASTING 2,540,334
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 91% 12/18/2012		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Conley, H. R.	START DATE 03/25/13	COMP. DATE 03/26/13	SURFACE WATER DEPTH N/A



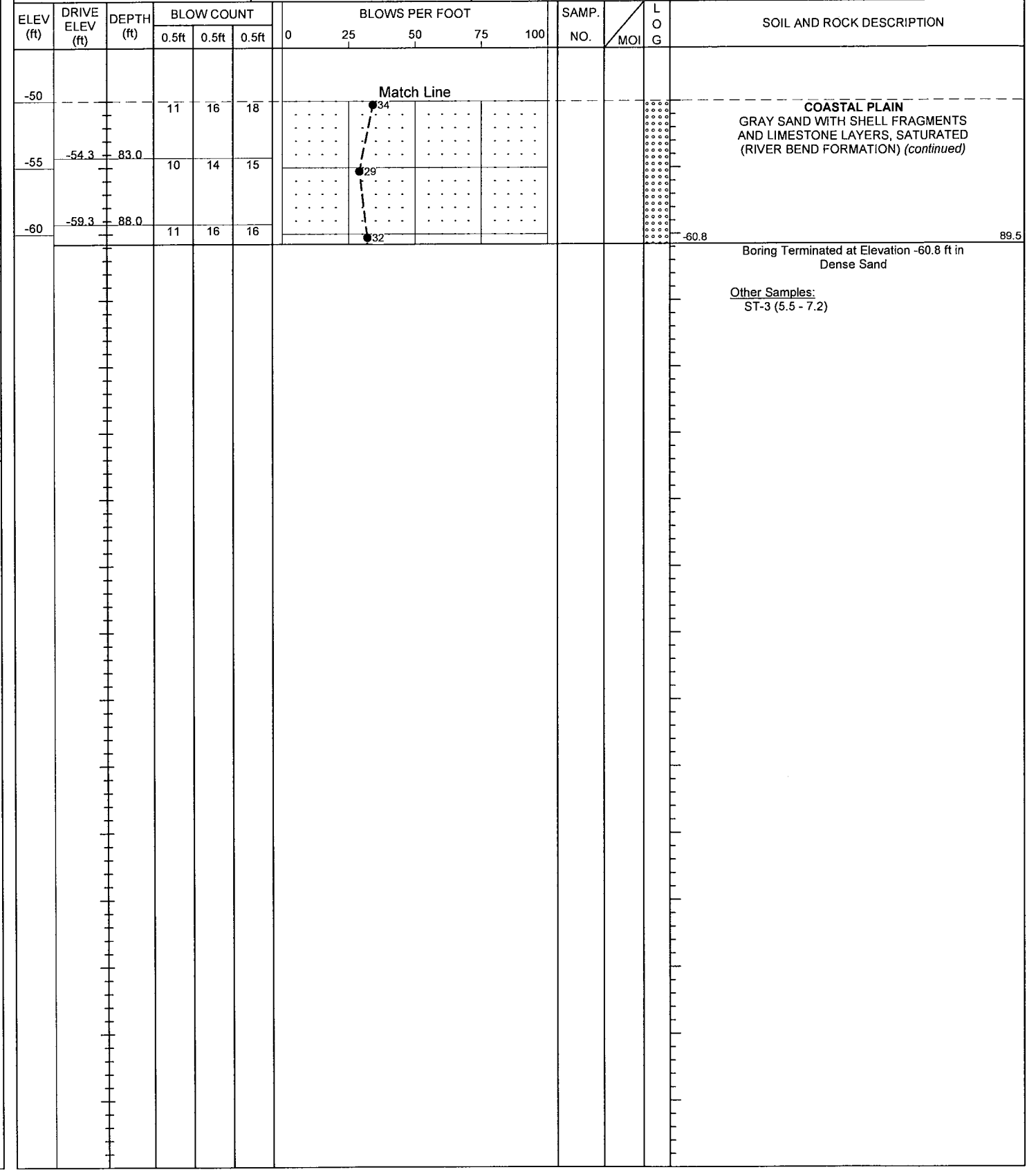
NCDOT BORE DOUBLE R-2514D_GEO_BRDG_Y10.GPJ_NC_DOT_GDT 2/12/14

NC DOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Wrike, C. M.
SITE DESCRIPTION STRUCTURE NO. 15 ON -Y10- (US 17 CONNECTOR) OVER -L- (US 17 BYPASS)			GROUND WTR (ft)
BORING NO. EB2-A LT. LN.	STATION 29+27	OFFSET 45 ft LT	ALIGNMENT -Y10-
COLLAR ELEV. 28.7 ft	TOTAL DEPTH 89.5 ft	NORTHING 485,252	EASTING 2,540,206
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 01/22/2013		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Smith, R. E.	START DATE 04/03/13	COMP. DATE 04/03/13	SURFACE WATER DEPTH N/A



WBS 34442.1.5	TIP R-2514D	COUNTY JONES	GEOLOGIST Wrike, C. M.
SITE DESCRIPTION STRUCTURE NO. 15 ON -Y10- (US 17 CONNECTOR) OVER -L- (US 17 BYPASS)			GROUND WTR (ft)
BORING NO. EB2-A LT. LN.	STATION 29+27	OFFSET 45 ft LT	ALIGNMENT -Y10-
COLLAR ELEV. 28.7 ft	TOTAL DEPTH 89.5 ft	NORTHING 485,252	EASTING 2,540,206
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 01/22/2013		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Smith, R. E.	START DATE 04/03/13	COMP. DATE 04/03/13	SURFACE WATER DEPTH N/A



NC DOT BORE DOUBLE R-2514D_GEO_BRDG_Y10_GPJ_NC_DOT_GDT_2/12/14

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34442.1.5 (R-2514D) F.A. PROJ. NHF-17(7)
COUNTY JONES / CRAVEN
PROJECT DESCRIPTION US 17 FROM SOUTH OF NC 58 TO THE
NEW BERN BYPASS
SITE DESCRIPTION BRIDGE NO. 259 ON US 17 OVER DEEP GULLY
AT -L- STA. 625 + 23.29

CONTENTS

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

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) 107-6850. 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 W-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.

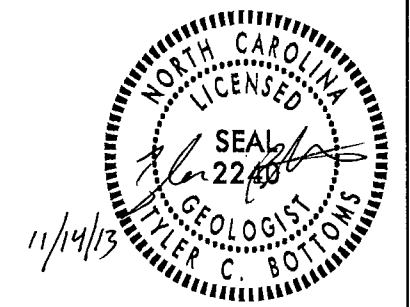
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT 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: 34442.1.5 ID: R-2514D

PERSONNEL

J.R. SWARTLEY
S&ME PERSONNEL

INVESTIGATED BY T.C. BOTTOMS
CHECKED BY D.N. ARGENBRIGHT
SUBMITTED BY D.N. ARGENBRIGHT
DATE NOVEMBER 2013



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.

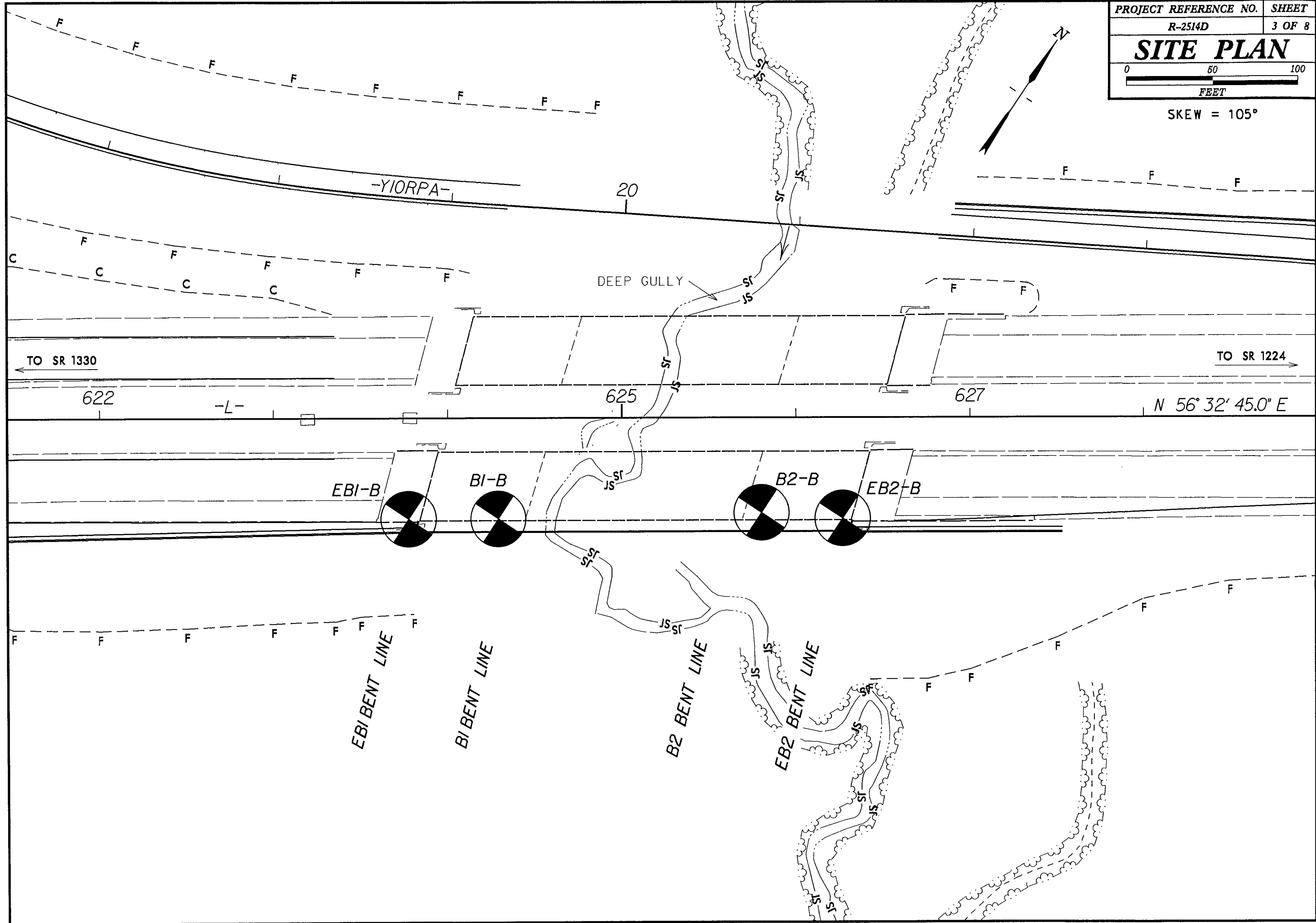
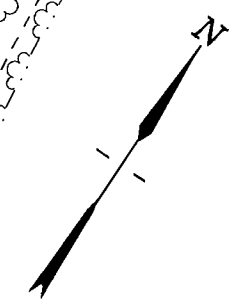
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

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 BLDMS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, 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, GRAV, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HEAVY PLASTIC, A-7-6</i>	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS 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 BLDMS. 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) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)	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, 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 BLDMS. 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.	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, YIELDS SPT N VALUES > 100 BPF. VERY SEVERE (V SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF. COMPLETE - ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		
GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1, A-2, A-4, A-5, A-6, A-7	COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	CRISTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)		
SYMBOL	PERCENTAGE OF MATERIAL 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	WEATHERING		
% PASSING #10, #40, #200	GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP			
LIQUID LIMIT, GROUP INDEX, USUAL TYPES OF MAJOR MATERIALS, GEN. RATING AS A SUBGRADE	MISCELLANEOUS SYMBOLS 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			
PI OF A-7-5 SUBGROUP IS <= LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30				
CONSISTENCY OR DENSENESS				
PRIMARY SOIL TYPE, COMPACTNESS OR CONSISTENCY, RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE), RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)				
GENERAL GRANULAR MATERIAL (NON-COHESIVE), GENERAL SILT-CLAY MATERIAL (COHESIVE)				
TEXTURE OR GRAIN SIZE				
U.S. STD. SIEVE SIZE, BOULDER (BLDR.), COBBLE (COB.), GRAVEL (GR.), COARSE SAND (CSE, SD.), FINE SAND (F SD.), SILT (SL.), CLAY (CL.)				
SOIL MOISTURE - CORRELATION OF TERMS				
SOIL MOISTURE SCALE (ATTERBERG LIMITS), FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION				
LL, PL, OM, SL				
PLASTICITY				
NONPLASTIC, LOW PLASTICITY, MED. PLASTICITY, HIGH PLASTICITY				
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.				
	ABBREVIATIONS AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, 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 YST - VANE SHEAR TEST WEA. - WEATHERED W - UNIT WEIGHT G - DRY UNIT WEIGHT S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - RDCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO			
	EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: MOBILE B-____, BK-51, CME-45C, CME-750, 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 1/16" 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			
		ROCK HARDNESS 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 HAND BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD - CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT - CAN BE 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.		
		FRACTURE SPACING TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET	BEDDING TERM THICKNESS VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	
		INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE - RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED - GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED - GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED - SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	NOTES: BENCH MARK: BL-7 (R-2301A) ELEVATION: 32.79 FT.	

SKEW = 105°



TO SR 1330

TO SR 1224

N 56° 32' 45.0" E

-YIORPA-

20

DEEP GULLY

622

625

627

EBI-B

BI-B

B2-B

EB2-B

EBI BENT LINE

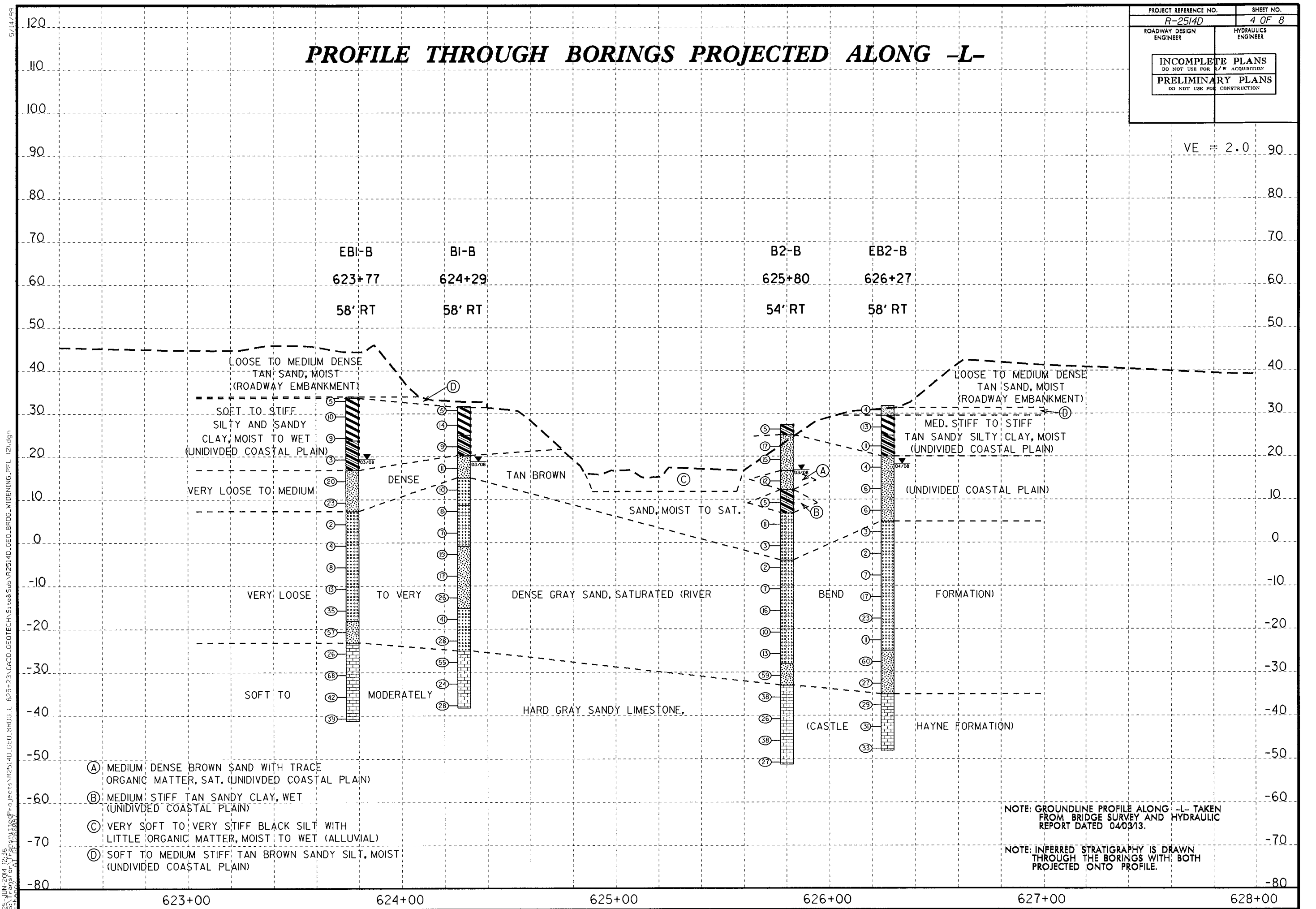
BI BENT LINE

B2 BENT LINE

EB2 BENT LINE

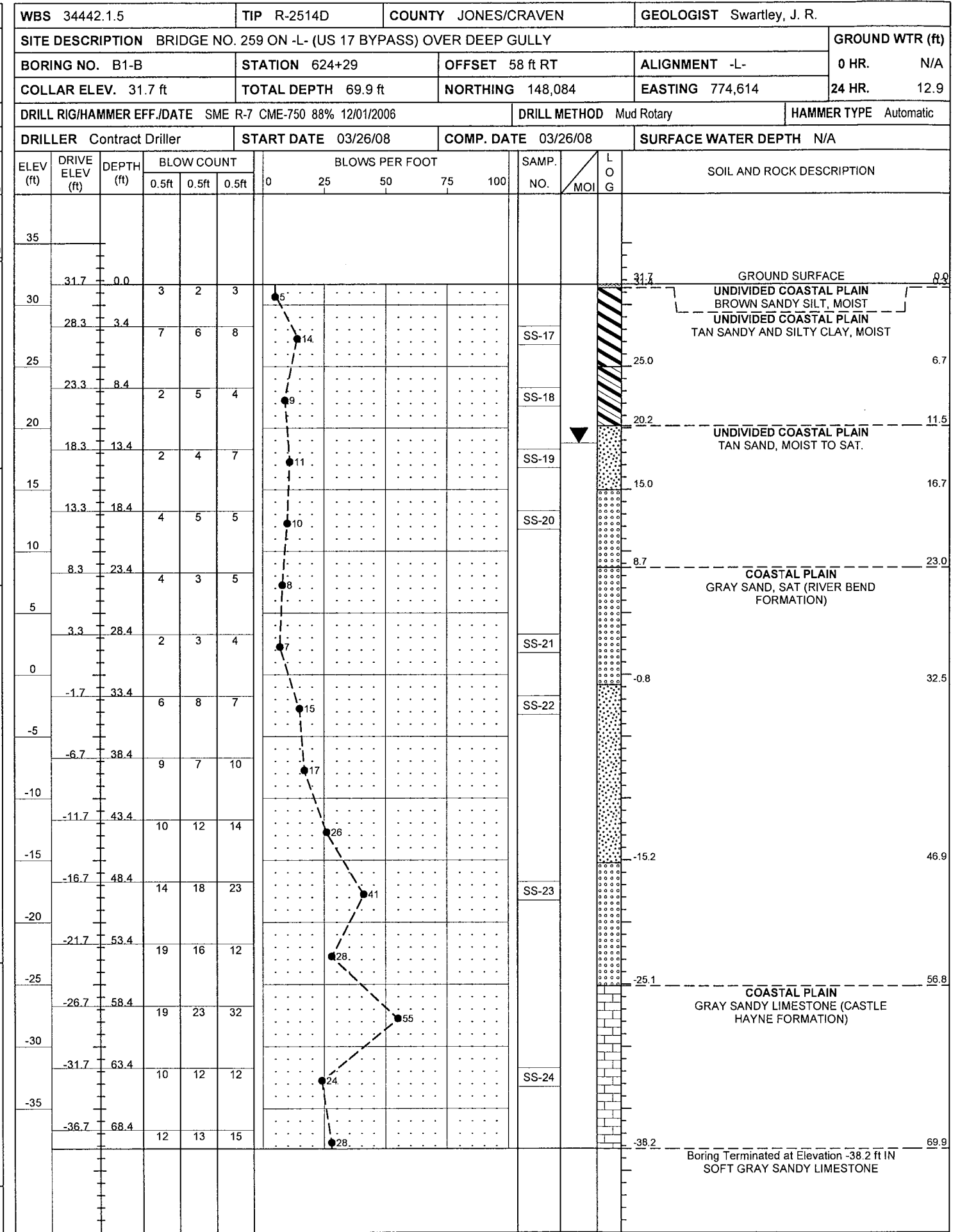
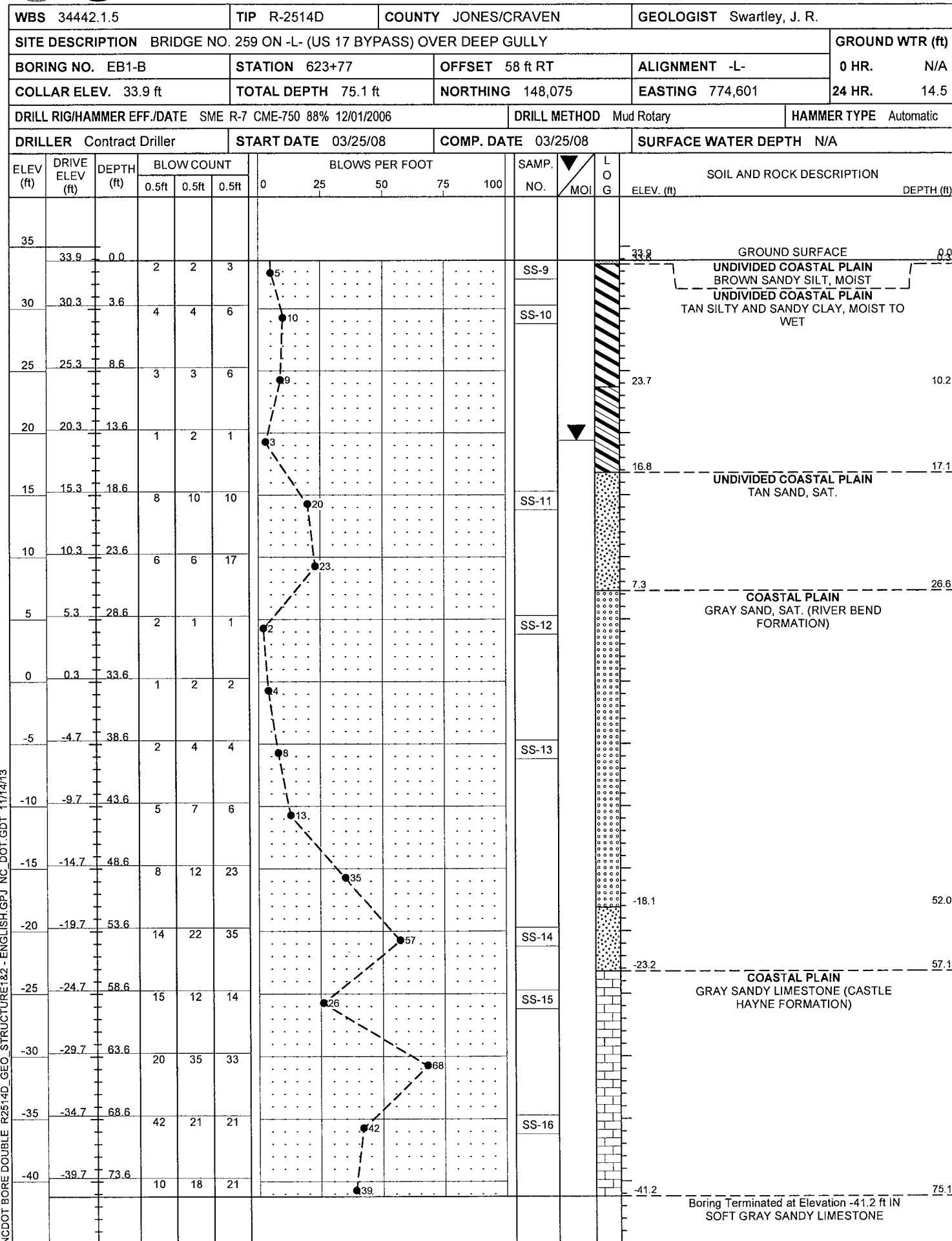
PROFILE THROUGH BORINGS PROJECTED ALONG -L-

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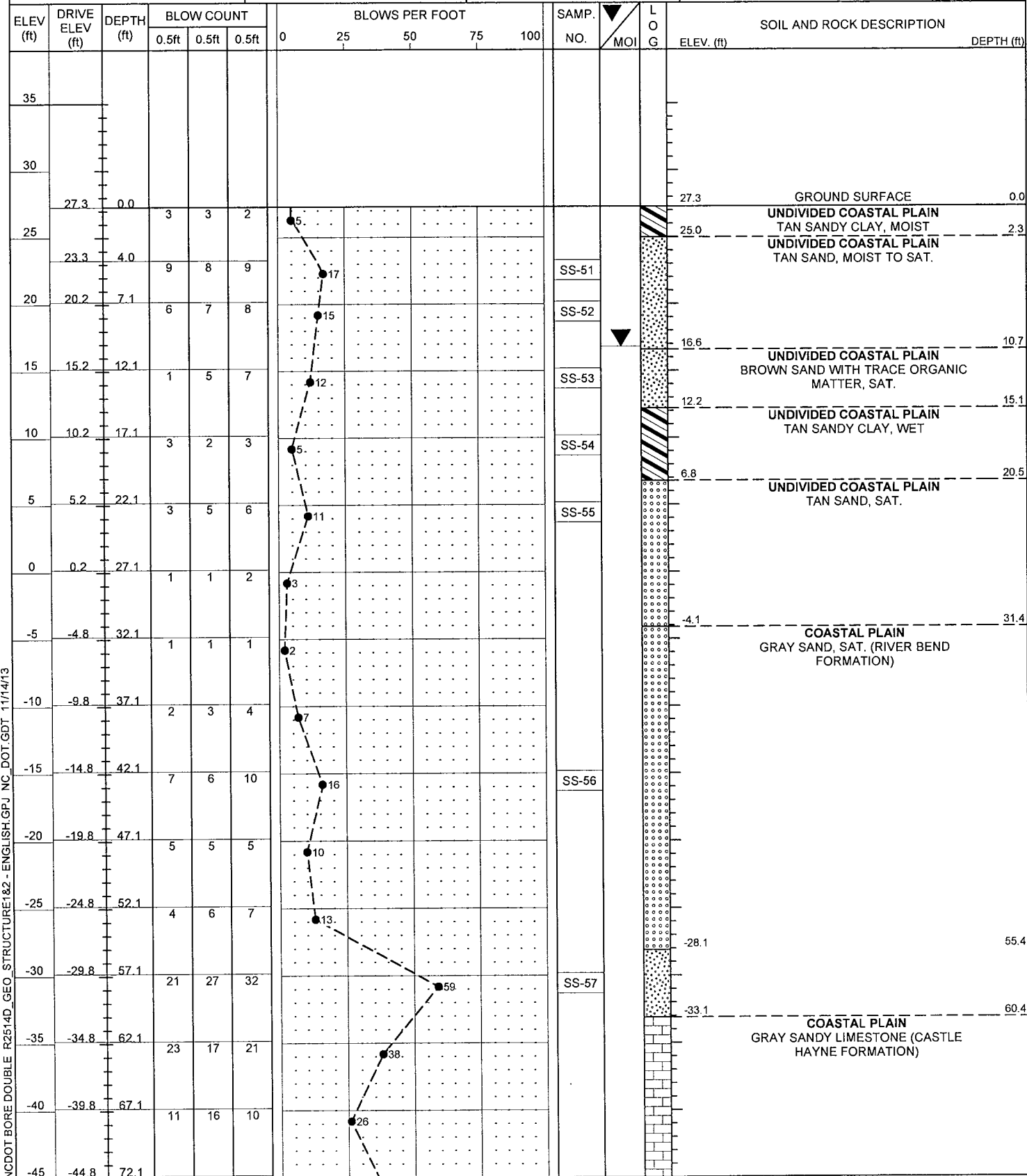
NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT



NCDOT BORE DOUBLE R2514D_GEO_STRUCTURE1&2 - ENGLISH.GPJ NC_DOT_GDT 11/14/13

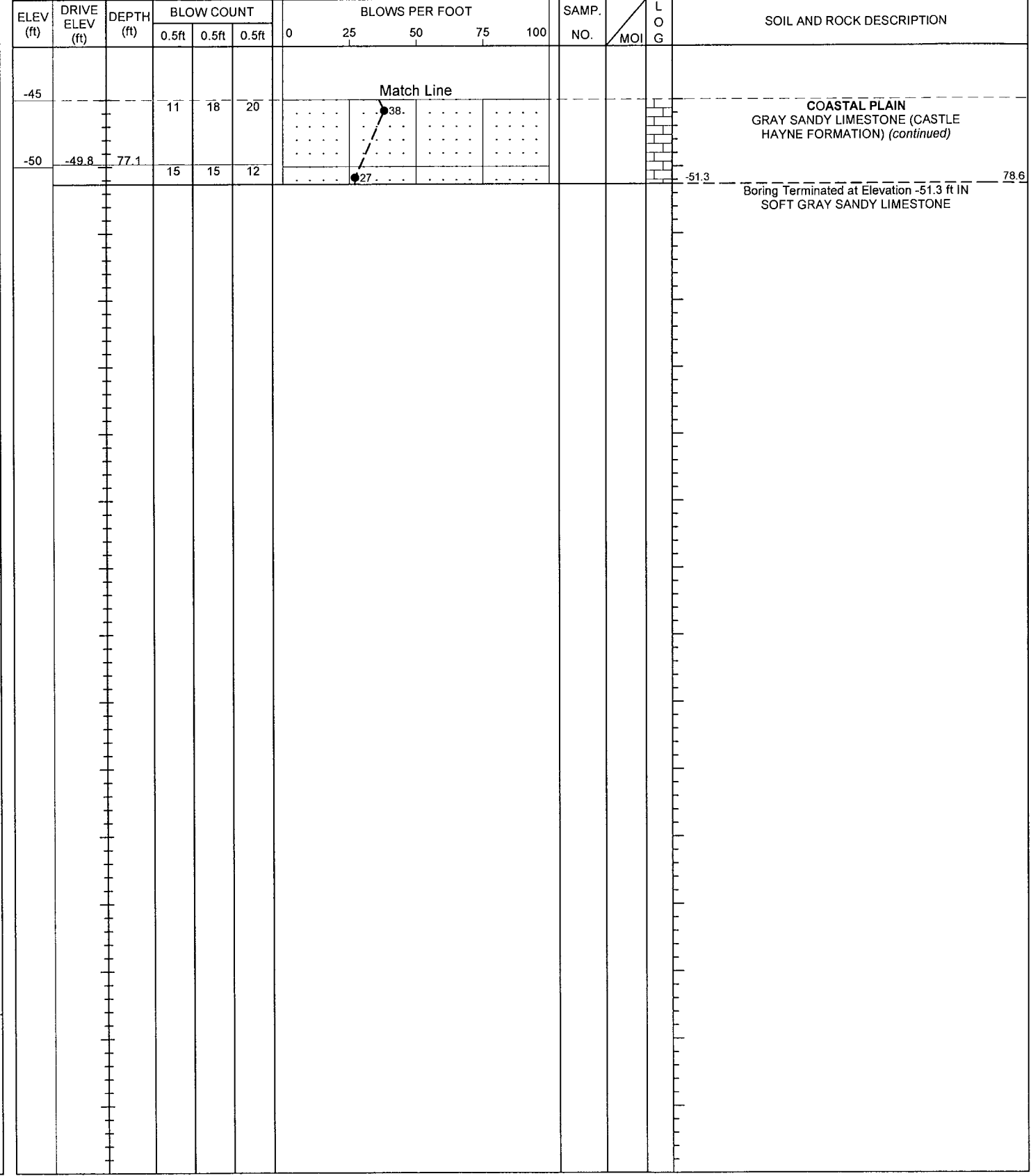
NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY JONES/CRAVEN	GEOLOGIST Swartley, J. R.	
SITE DESCRIPTION BRIDGE NO. 259 ON -L- (US 17 BYPASS) OVER DEEP GULLY				GROUND WTR (ft)
BORING NO. B2-B	STATION 625+80	OFFSET 54 ft RT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 27.3 ft	TOTAL DEPTH 78.6 ft	NORTHING 148,110	EASTING 774,652	24 HR. 10.5
DRILL RIG/HAMMER EFF./DATE SME R-7 CME-750 88% 12/01/2006		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Contract Driller	START DATE 03/27/08	COMP. DATE 03/27/08	SURFACE WATER DEPTH N/A	



NCDOT BORE DOUBLE R2514D_GEO_STRUCTURE1&2 - ENGLISH.GPJ, NC_DOT.GDT, 11/14/13

WBS 34442.1.5	TIP R-2514D	COUNTY JONES/CRAVEN	GEOLOGIST Swartley, J. R.	
SITE DESCRIPTION BRIDGE NO. 259 ON -L- (US 17 BYPASS) OVER DEEP GULLY				GROUND WTR (ft)
BORING NO. B2-B	STATION 625+80	OFFSET 54 ft RT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 27.3 ft	TOTAL DEPTH 78.6 ft	NORTHING 148,110	EASTING 774,652	24 HR. 10.5
DRILL RIG/HAMMER EFF./DATE SME R-7 CME-750 88% 12/01/2006		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Contract Driller	START DATE 03/27/08	COMP. DATE 03/27/08	SURFACE WATER DEPTH N/A	



BRIDGE NO. 259 ON -L- (US 17 BYPASS) OVER DEEP GULLY

HOLE #	SAMPLE #	PASS #10	PASS #40	PASS #200	CSESAND	FINESAND	SI	CL	LL	PI	CLASS	DEPTH	MOIST. ORG.
EB1-B	SS-9	100	100	88	1.6	17.2	51.0	30.3	24	5	A-4(3)	0.0-1.5	
	SS-10	97	96	85	2.0	14.9	24.5	58.5	43	20	A-7-6(18)	3.6-5.1	
	SS-11	100	97	16	11.8	74.4	2.7	11.1	17	NP	A-2-4(0)	18.6-20.1	
	SS-12	100	98	5	32.1	63.5	1.4	3.0	14	NP	A-3(0)	28.6-30.1	
	SS-13	100	98	6	5.9	90.2	0.9	3.0	25	NP	A-3(0)	38.6-40.1	
	SS-14	100	98	13	6.5	83.8	4.7	5.0	24	NP	A-2-4(0)	53.6-55.1	
	SS-15	99	89	25	13.9	64.8	11.2	10.1	17	NP	A-2-4(0)	58.6-60.1	
	SS-16	46	26	14	53.9	28.1	10.0	8.1	16	NP	A-1-a(0)	68.6-70.1	
B1-B	SS-17	92	92	78	1.4	19.2	24.9	54.5	49	26	A-7-6(21)	3.4-4.9	
	SS-18	99	97	52	8.1	42.2	11.4	38.3	32	16	A-6(5)	8.4-9.9	
	SS-19	99	86	24	31.1	46.6	4.1	18.2	20	3	A-2-4(0)	13.4-14.9	
	SS-20	99	88	5	51.2	44.7	1.1	3.0	13	NP	A-3(0)	18.4-19.9	
	SS-21	100	88	9	31.0	61.6	3.4	4.0	15	NP	A-3(0)	28.4-29.9	
	SS-22	100	100	21	1.2	80.5	10.2	8.1	20	NP	A-2-4(0)	33.4-34.9	
	SS-23	100	100	10	2.7	89.2	4.0	4.0	21	NP	A-3(0)	48.4-49.9	
	SS-24	93	71	15	30.0	55.4	8.6	6.1	18	NP	A-2-4(0)	63.4-64.9	
B2-B	SS-51	100	88	35	30.3	36.6	2.8	30.3	25	10	A-2-4(0)	4.0-5.5	
	SS-52	100	93	31	28.9	41.4	1.4	28.3	21	5	A-2-4(0)	7.1-8.6	
	SS-53	100	85	14	45.1	41.7	2.1	11.1	22	NP	A-2-4(0)	12.1-13.6	3.0
	SS-54	99	91	43	16.6	43.6	5.5	34.3	29	12	A-6(2)	17.1-18.6	
	SS-55	100	97	7	31.8	61.1	3.0	4.0	18	NP	A-3(0)	22.1-23.6	
	SS-56	100	99	4	3.1	93.7	0.1	3.0	21	NP	A-3(0)	42.1-43.6	
	SS-57	100	97	14	6.5	82.0	2.4	9.1	19	NP	A-2-4(0)	57.1-58.6	
EB2-B	SS-58	100	99	86	3.6	15.6	40.4	40.4	25	6	A-4(4)	0.0-1.5	
	SS-59	100	99	83	2.0	18.2	13.1	66.7	62	39	A-7-6(35)	4.0-5.5	28.4
	SS-60	100	95	37	29.9	34.3	3.4	32.3	27	12	A-6(1)	8.4-9.9	
	SS-61	100	78	15	41.6	42.8	1.4	14.1	18	NP	A-2-4(0)	18.4-19.9	
	SS-62	100	96	6	18.7	75.6	2.7	3.0	15	NP	A-3(0)	28.4-29.9	
	SS-63	100	98	5	4.2	92.5	0.2	3.0	23	NP	A-3(0)	43.4-44.9	
	SS-64	98	89	20	13.5	70.1	4.2	12.1	16	NP	A-2-4(0)	58.4-59.9	
	SS-65	85	40	16	62.0	22.2	1.6	14.1	25	NP	A-1-b(0)	68.4-69.9	
	SS-66	84	43	17	57.6	25.1	5.3	12.1	20	NP	A-1-b(0)	78.4-79.9	

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34442.1.5 (R-2514D) F.A. PROJ. NHF-17(7)
COUNTY JONES/CRAVEN
PROJECT DESCRIPTION US 17 FROM SOUTH OF NC 58 TO THE
NEW BERN BYPASS
Site DESCRIPTION BRIDGE NO. 269 ON RAMP FROM US 17
BYPASS TO US 17 OVER DEEP GULLY AT -Y10RPA- STA. 19+43

CONTENTS

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

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) 707-6860. 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

C.M. WRIKE

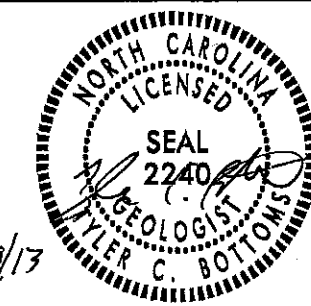
MID-ATLANTIC

INVESTIGATED BY T.C. BOTTOMS

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE DECEMBER 2013



PROJECT: 34442.1.5 ID: R-2514D

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.

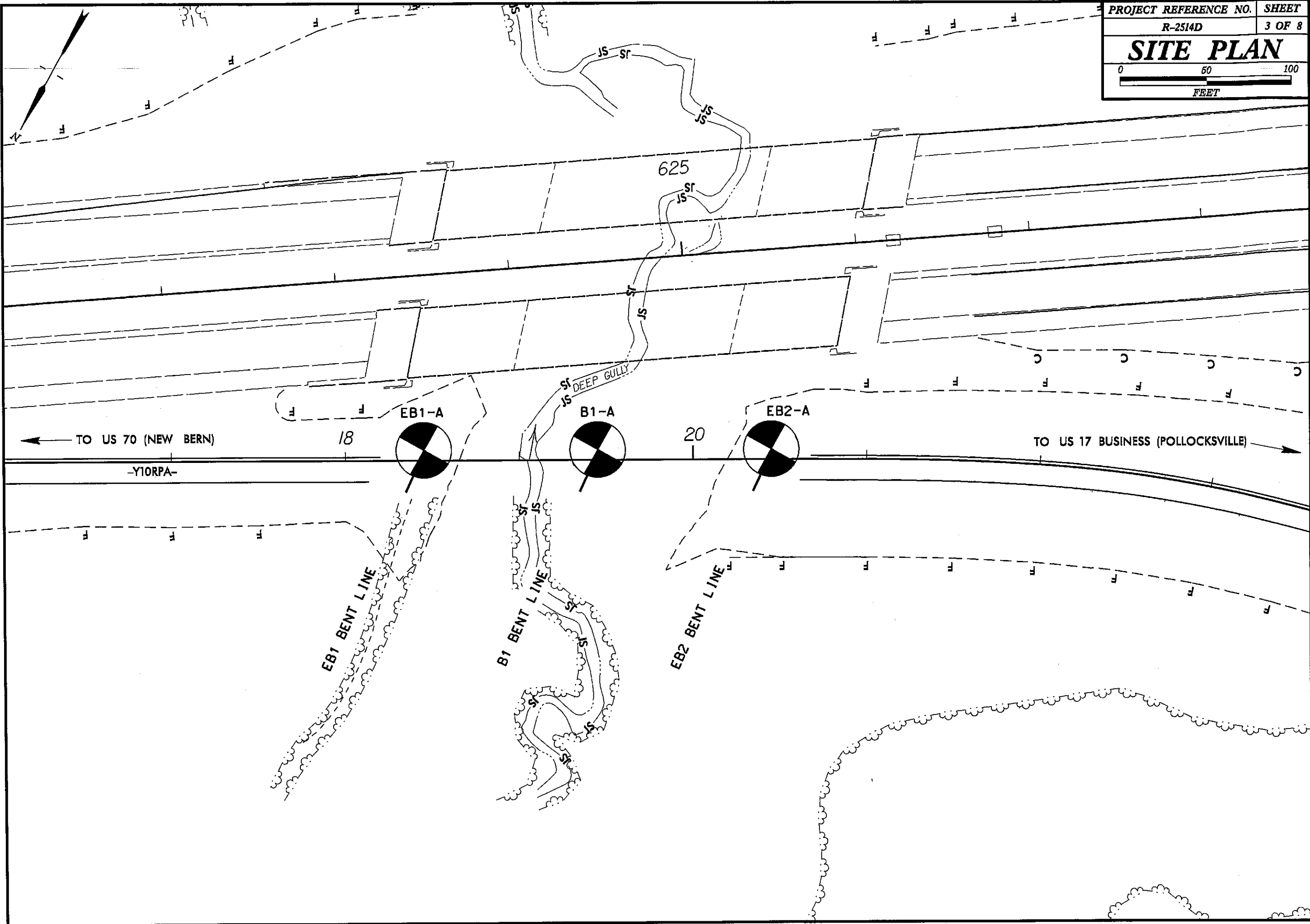
NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

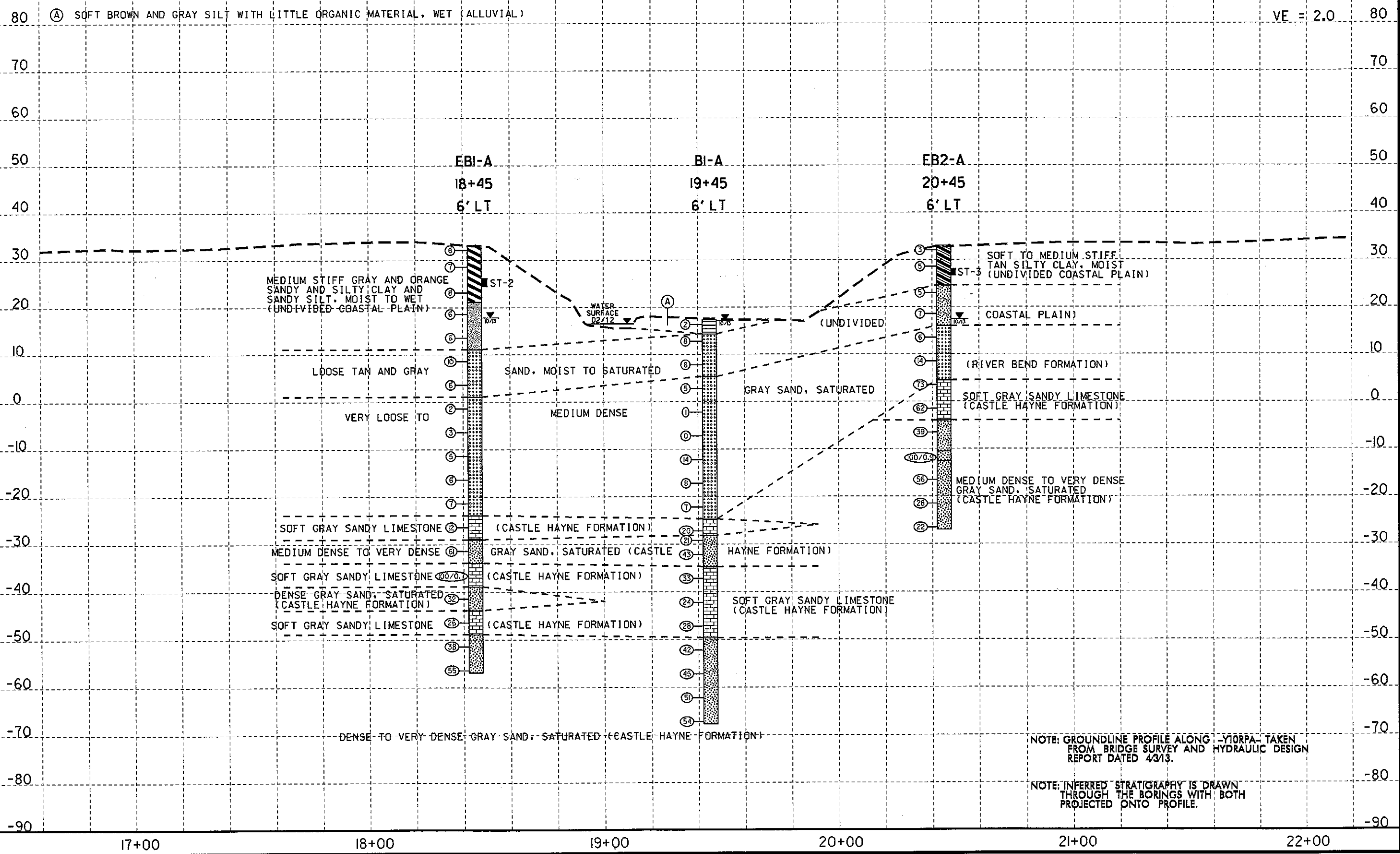
SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS																																																									
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM D1586). 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, GRAV, 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.		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 PER FOOT 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, 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 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.) - 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 (ROQ) - 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 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 (SROQ) - 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.																																																									
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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.																																																														
TEXTURE OR GRAIN SIZE		ABBREVIATIONS		FRACTURE SPACING		BEDDING																																																									
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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.						ELEVATION: 36.79 FT.																																																									
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09-DEC-2013 08:54
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 17+00 18+00 19+00 20+00 21+00 22+00

PROJECT REFERENCE NO. R-2514D	SHEET NO. 4 OF 8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PROFILE THROUGH BORINGS PROJECTED ALONG -Y10RPA-

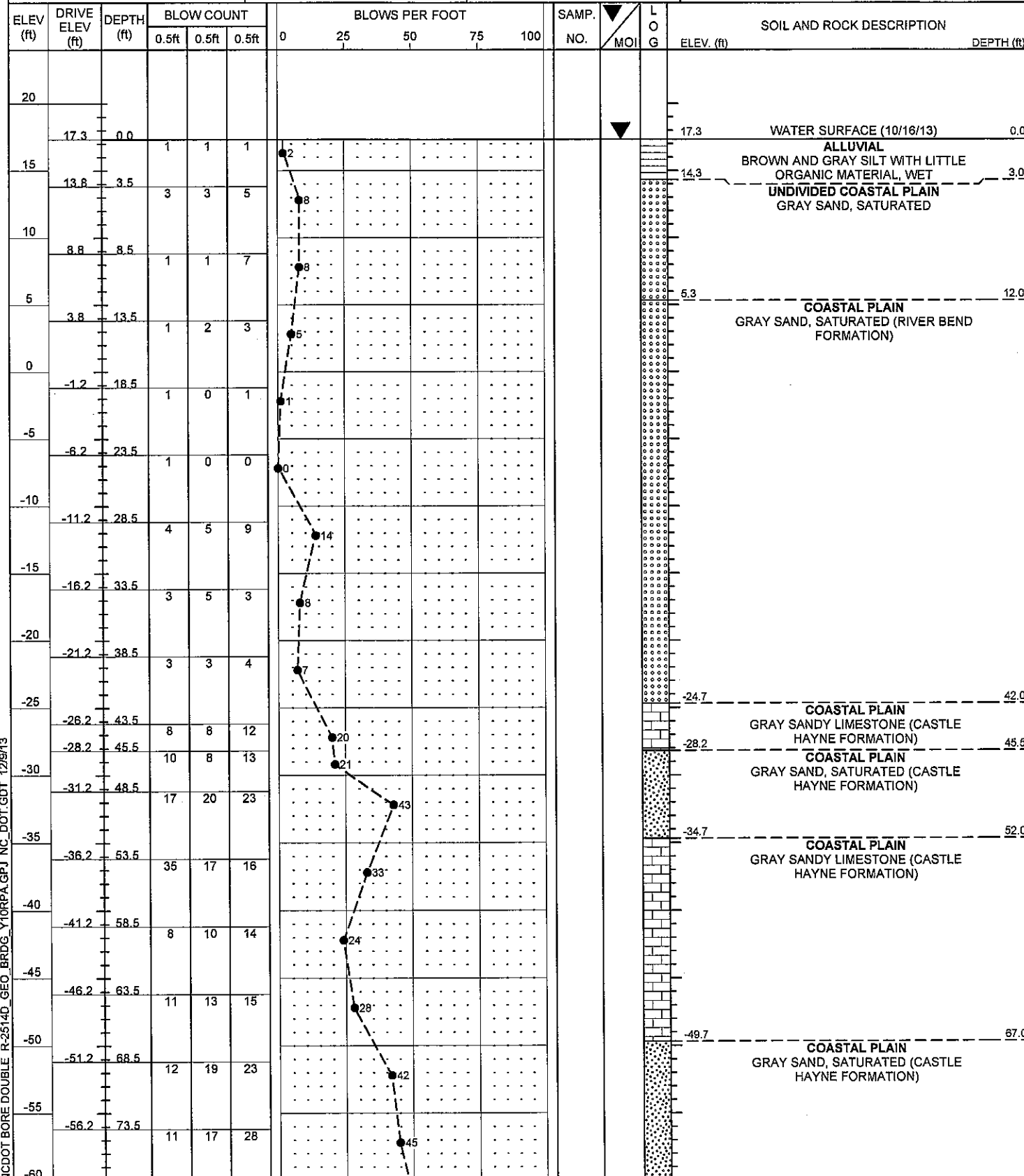




NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

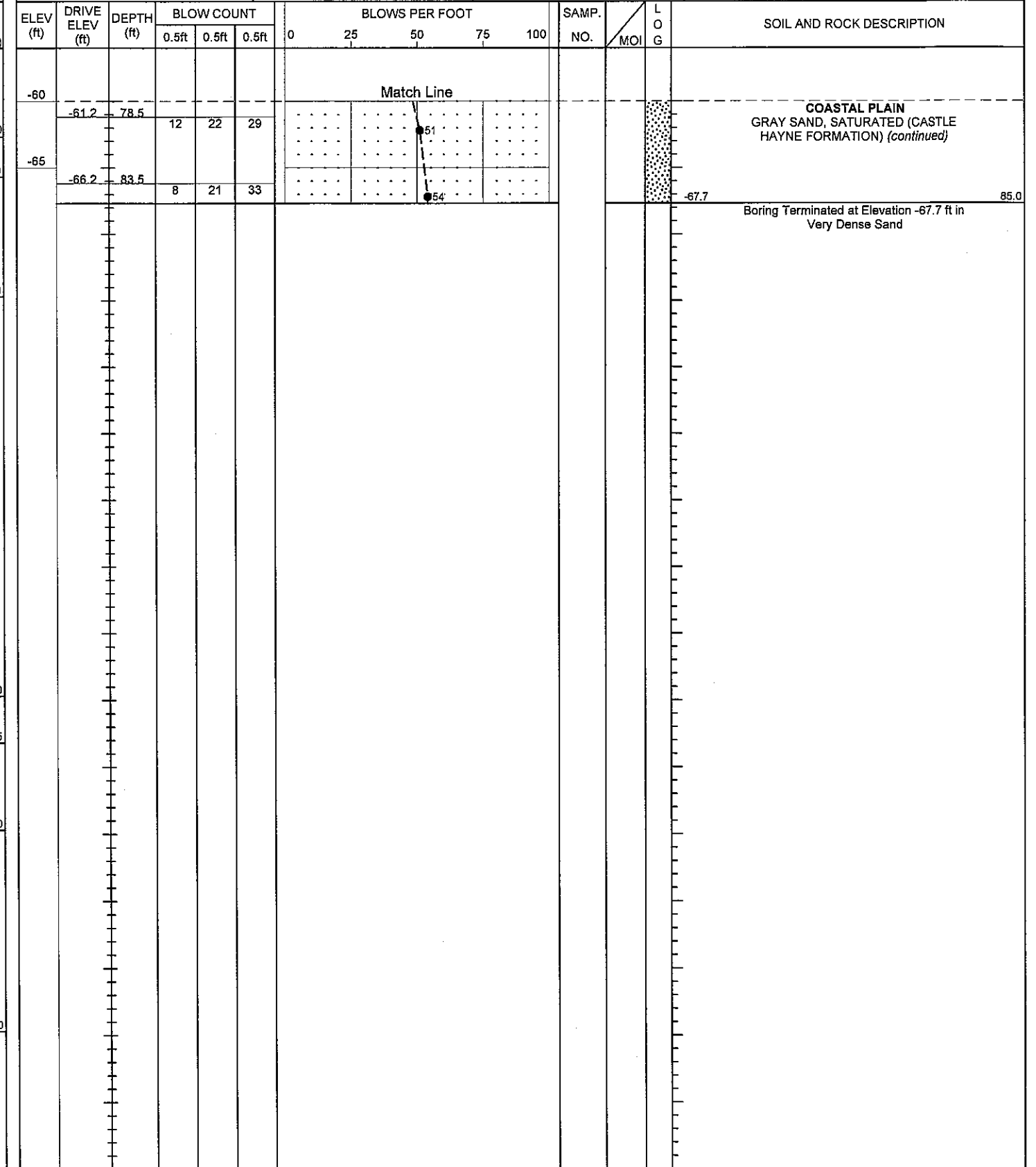
WBS 34442.1.5 TIP R-2514D COUNTY JONES/ CRAVEN GEOLOGIST Wrike, C. M.
SITE DESCRIPTION BR. NO. 269 ON -Y10RPA- (RAMP FROM US 17 BYPASS TO EXISTING US 17) OVER DEEP GULLY GROUND WTR (ft)
BORING NO. B1-A STATION 19+45 OFFSET 6 ft LT ALIGNMENT -Y10RPA- 0 HR. N/A
COLLAR ELEV. 17.3 ft TOTAL DEPTH 85.0 ft NORTHING 486,046 EASTING 2,541,394 24 HR. N/A

DRILL RIG/HAMMER EFF./DATE MID3964 CME-45C 86% 07/25/2013 DRILL METHOD Mud Rotary HAMMER TYPE Automatic
DRILLER Contract Driller START DATE 10/16/13 COMP. DATE 10/16/13 SURFACE WATER DEPTH 0.0ft



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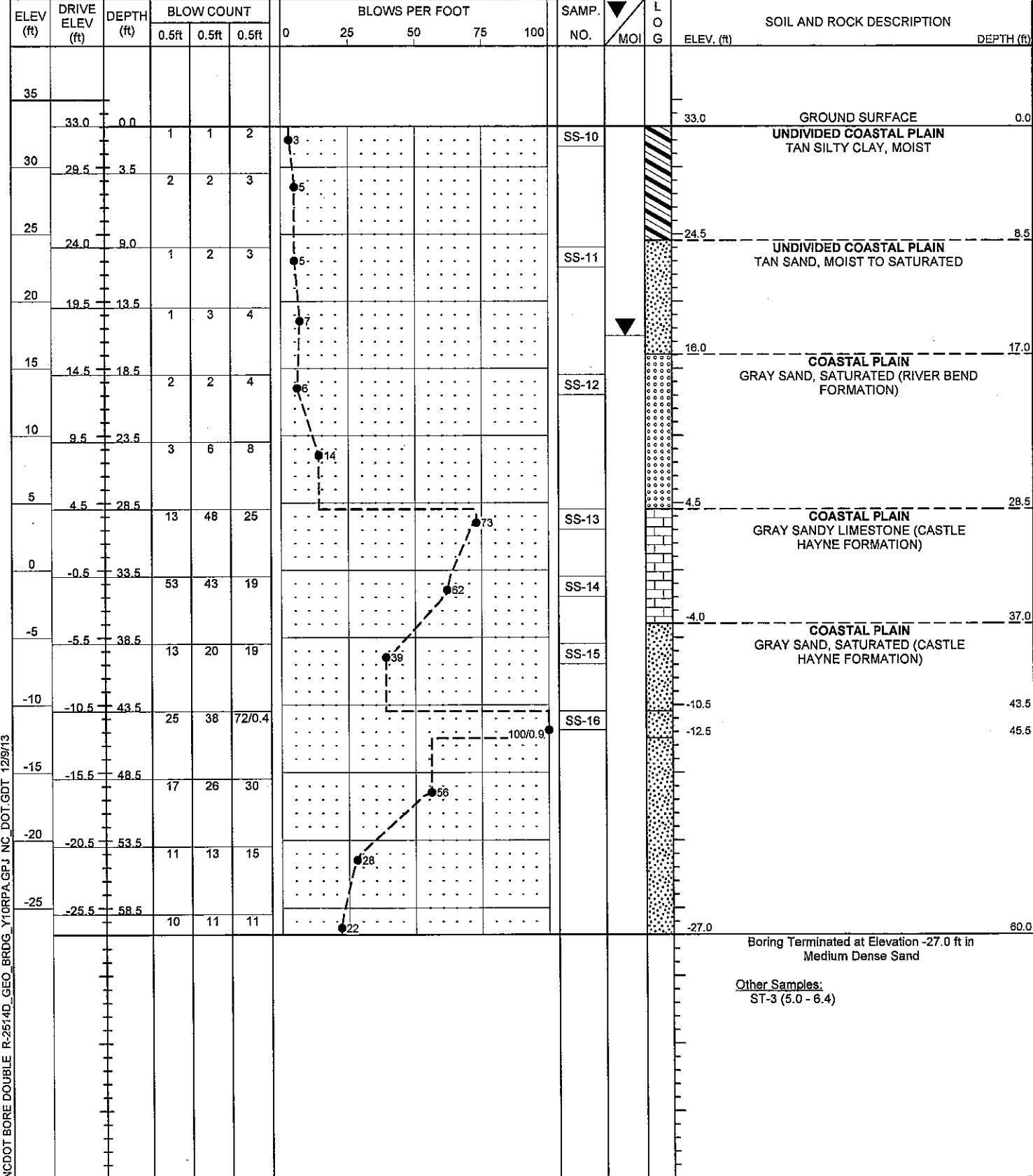
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NCDOT BORE DOUBLE R-2514D_GEO_BRDG_Y10RPA.GPJ NC_DOT.GDT 12/9/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34442.1.5	TIP R-2514D	COUNTY JONES/ CRAVEN	GEOLOGIST Wrike, C. M.
SITE DESCRIPTION BR. NO. 269 ON -Y10RPA- (RAMP FROM US 17 BYPASS TO EXISTING US 17) OVER DEEP GULLY			GROUND WTR (ft)
BORING NO. EB2-A	STATION 20+45	OFFSET 6 ft LT	ALIGNMENT -Y10RPA-
COLLAR ELEV. 33.0 ft	TOTAL DEPTH 60.0 ft	NORTHING 485,997	EASTING 2,541,307
DRILL RIG/HAMMER EFF./DATE MID3964 CME-45C 86% 07/25/2013		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Contract Driller	START DATE 10/17/13	COMP. DATE 10/17/13	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE R-2514D_GEO_BRDG_Y10RPA.GPJ NC_DOT.GDT 12/9/13

34442.1.5

R-2514D

BRIDGE NO. 269 ON -Y10RPA- (RAMP FROM US 17 BYPASS TO US 17) OVER DEEP GULLY AT -Y10RPA- STA. 19+43

EB1-A SOIL TEST RESULTS

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-1	6 LT	18+45	0.0-1.5	A-7-6(32)	54	31	1.6	8.9	31.2	58.4	100	100	93	30.4	-
SS-2	6 LT	18+45	9.0-10.5	A-7-6(20)	45	28	3.6	25.8	22.3	48.3	100	99	76	-	-
SS-3	6 LT	18+45	13.5-15.0	A-4(0)	21	4	27.2	33.6	19.1	20.1	100	95	45	-	-
SS-4	6 LT	18+45	23.5-25.0	A-3(0)	14	NP	63.3	27.1	1.6	8.0	94	78	10	-	-
SS-5	6 LT	18+45	33.5-35.0	A-3(0)	18	NP	68.2	26.8	0.0	5.0	100	77	5	-	-
SS-6	6 LT	18+45	48.5-50.0	A-3(0)	20	NP	0.5	95.3	2.2	2.0	100	100	5	-	-
SS-7	6 LT	18+45	58.5-60.0	A-1-b(0)	18	NP	45.6	31.0	16.4	7.0	74	46	19	-	-
SS-8	6 LT	18+45	63.5-65.0	A-2-4(0)	16	NP	3.4	83.4	7.1	6.0	99	97	16	-	-
SS-9	6 LT	18+45	68.5-70.0	A-1-b(0)	15	NP	48.9	30.0	11.1	10.1	65	40	16	-	-

EB2-A SOIL TEST RESULTS

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-10	6 LT	20+45	0.0-1.5	A-6(13)	34	15	2.2	12.3	41.2	44.3	100	99	89	-	-
SS-11	6 LT	20+45	9.0-10.5	A-2-4(0)	17	NP	31.2	45.7	5.0	18.1	100	92	24	-	-
SS-12	6 LT	20+45	18.5-20.0	A-3(0)	18	NP	15.5	80.7	1.8	2.0	100	98	4	-	-
SS-13	6 LT	20+45	28.5-30.0	A-1-b(0)	16	NP	41.1	32.8	16.0	10.1	60	44	18	-	-
SS-14	6 LT	20+45	33.5-35.0	A-1-a(0)	17	NP	62.1	22.6	10.3	5.0	42	20	8	-	-
SS-15	6 LT	20+45	38.5-40.0	A-2-4(0)	21	NP	2.5	86.1	6.3	5.0	100	99	15	-	-
SS-16	6 LT	20+45	43.5-45.0	A-2-4(0)	20	NP	2.7	86.3	6.9	4.0	100	99	14	-	-