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REFERENCE: R-1015

PROJECT: 34360

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY CRAVEN
PROJECT DESCRIPTION US 70 (HAVELOCK BYPASS)
 FROM NORTH OF PINE GROVE TO NORTH OF
 CARTERET COUNTY LINE
SITE DESCRIPTION DUAL BRIDGES ON US 70
 BYPASS OVER SOUTHWEST PRONG OF SLOCUM
 CREEK AT -L- STA. 287 + 62.5

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-1015	1	54

CAUTION NOTICE

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

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

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

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

PERSONNEL

LAW ENGINEERING

INVESTIGATED BY J.K. CRENSHAW

DRAWN BY C.P. TURNER

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE MARCH 2015



DocuSigned by:

Dean N. Argenbright

10/24/2016

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DATE

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

SOIL DESCRIPTION								GRADATION				ROCK DESCRIPTION				TERMS AND DEFINITIONS			
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 208, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6								WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.				HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL, SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:				ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND 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 (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 (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.			
SOIL LEGEND AND AASHTO CLASSIFICATION								ANGULARITY OF GRAINS				WEATHERING							
THE ANGLE OF ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.								THE ANGLE OF ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.				ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH, OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK, IF TESTED, WOULD YIELD SPT REFUSAL. ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN, IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF. ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN, IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF. 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.							
MINERALOGICAL COMPOSITION								COMPRESSION				PERCENTAGE OF MATERIAL							
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.								SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50				ORGANIC MATERIAL GRANULAR SILTS 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								MISCELLANEOUS SYMBOLS				ROCK HARDNESS							
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 SPT DMT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE				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.			
CONSISTENCY OR DENSENESS								RECOMMENDATION SYMBOLS				ABBREVIATIONS							
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)								UNDERCUT EXCAVATION UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK				AR - AUGER REFUSAL MED. - MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA - MICACEOUS WEA. - WEATHERED CL. - CLAY MOD. - MODERATELY UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC D - DRY UNIT WEIGHT CSE. - COARSE ORG. - ORGANIC PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DMT - DILATOMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY S - BULK DPT - DYNAMIC PENETRATION TEST SL. - SILT, SILTY SS - SPLIT SPOON e - VOID RATIO F - FINE ST - SHELBY TUBE FOSS. - FOSSILIFEROUS RS - ROCK FRAC. - FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS. - FRAGMENTS w - MOISTURE CONTENT CBR - CALIFORNIA BEARING RATIO HI. - HIGHLY V - VERY							
TEXTURE OR GRAIN SIZE								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								DRILL UNITS: [X] CME-45C [] CME-55 [] CME-550 [] VANE SHEAR TEST [] PORTABLE HOIST ADVANCING TOOLS: [] CLAY BITS [] 6" CONTINUOUS FLIGHT AUGER [] 8" HOLLOW AUGERS [] HARD FACED FINGER BITS [] TUNG-CARBIDE INSERTS [X] CASING [] w/ ADVANCER [X] TRICONE 2 15/16" STEEL TEETH [] TRICONE " TUNG-CARB. [X] CORE BIT HAMMER TYPE: [] AUTOMATIC [X] MANUAL CORE SIZE: [] -B [X] -H [] -N HAND TOOLS: [] POST HOLE DIGGER [] HAND AUGER [] SOUNDING ROD [] VANE SHEAR TEST				TERM SPACING MORE THAN 10 FEET 3 TO 10 FEET 1 TO 3 FEET 0.16 TO 1 FOOT LESS THAN 0.16 FEET TERM THICKNESS VERY THICKLY BEDDED 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET							
SOIL MOISTURE - CORRELATION OF TERMS								ROCK BEDDING				INDURATION							
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION LL - LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE PL - PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE OM - OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL - SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE								FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.											
PLASTICITY								INDURATION				ELEVATION							
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH								FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.				BENCH MARK: BM15; RR SPIKE IN TREE AT -BL- STA 210+11, 251FT LT N 418342 E 2616967 ELEVATION: 27.08 FEET							
COLOR								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.																			

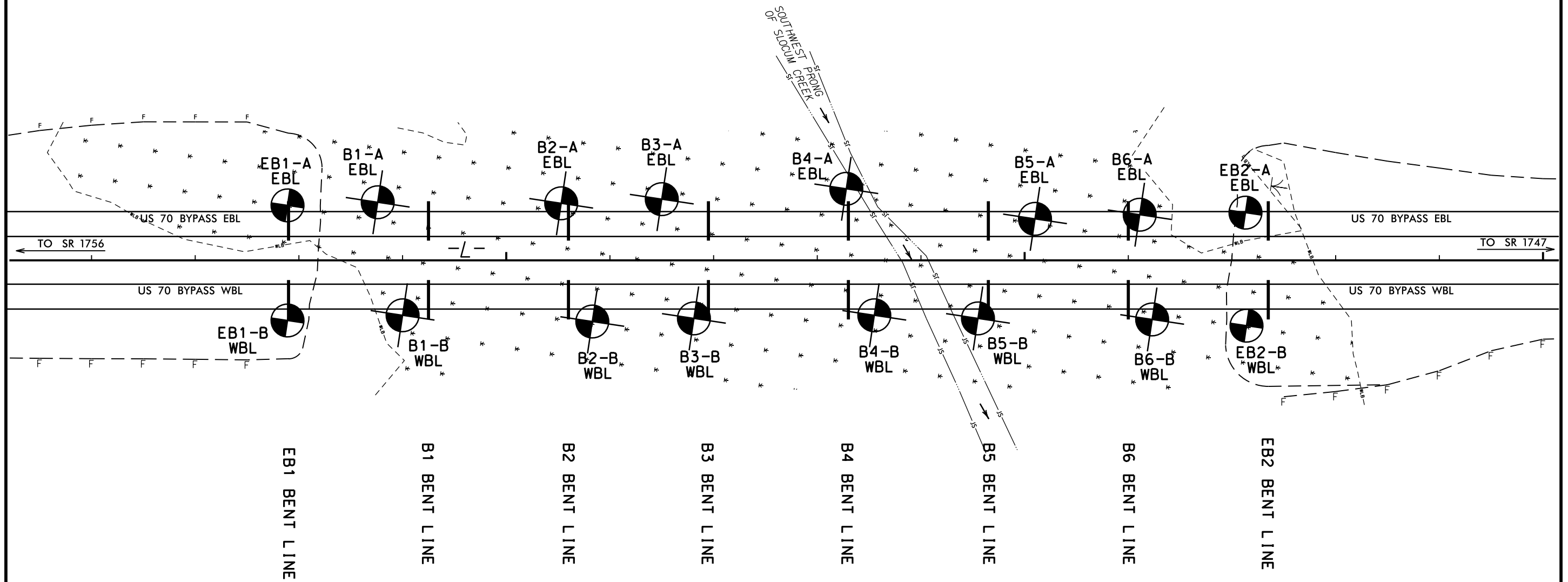


SKEW = 90°

285

290

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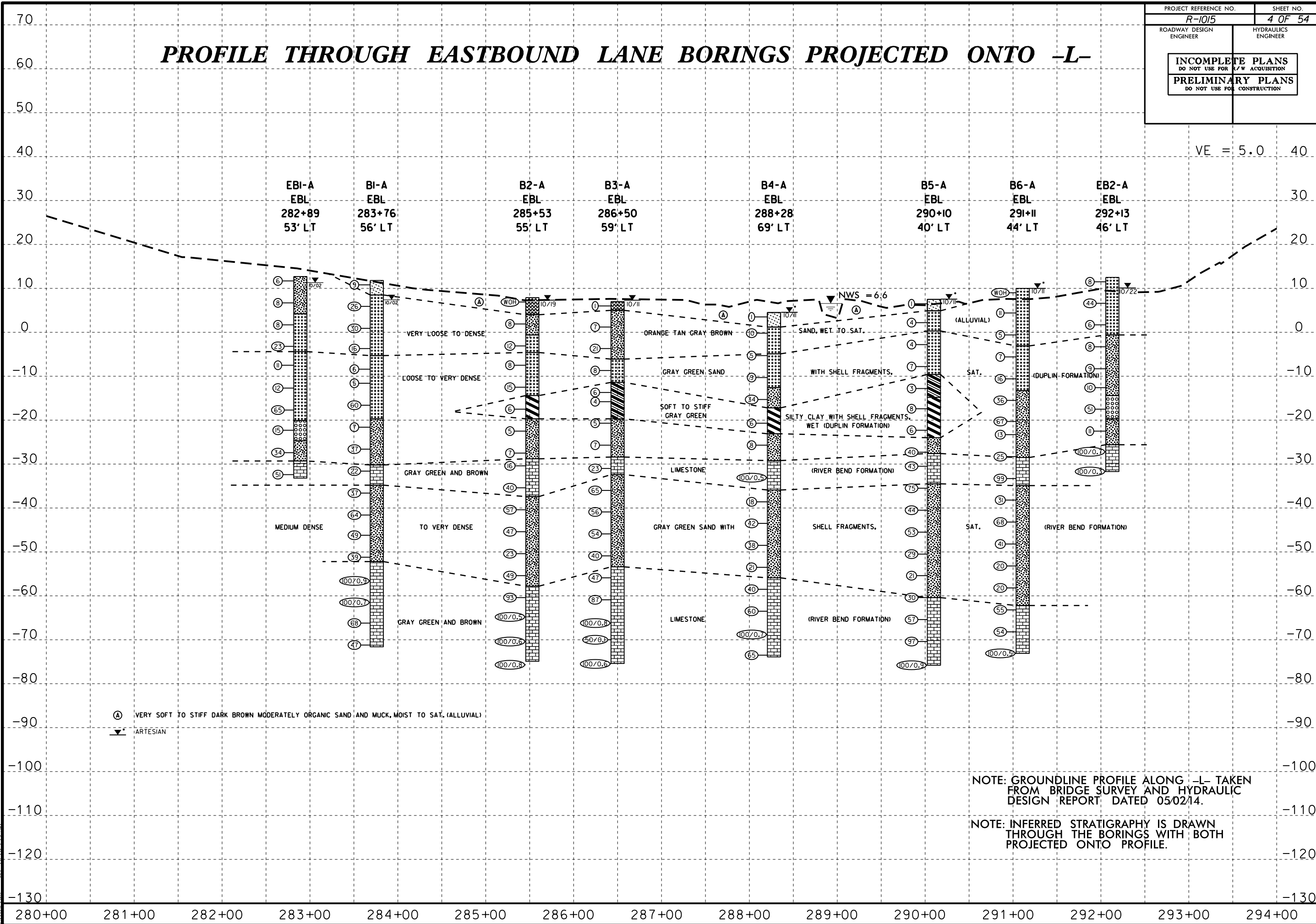


5/14/99

PROJECT REFERENCE NO. R-1015	SHEET NO. 4 OF 54
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PROFILE THROUGH EASTBOUND LANE BORINGS PROJECTED ONTO -L-

VE = 5.0 40



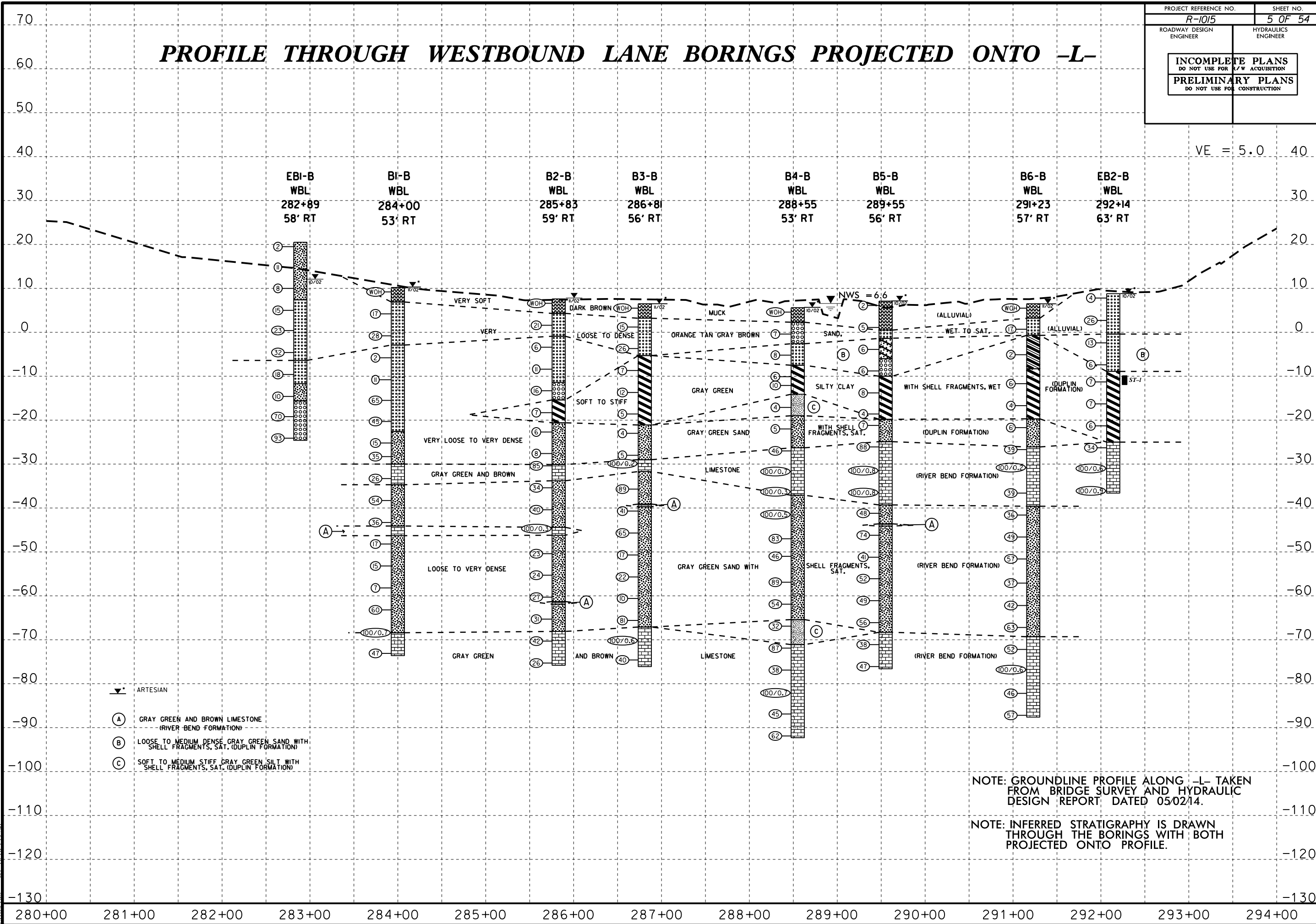
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5/14/99

PROJECT REFERENCE NO. R-1015	SHEET NO. 5 OF 54
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PROFILE THROUGH WESTBOUND LANE BORINGS PROJECTED ONTO -L-

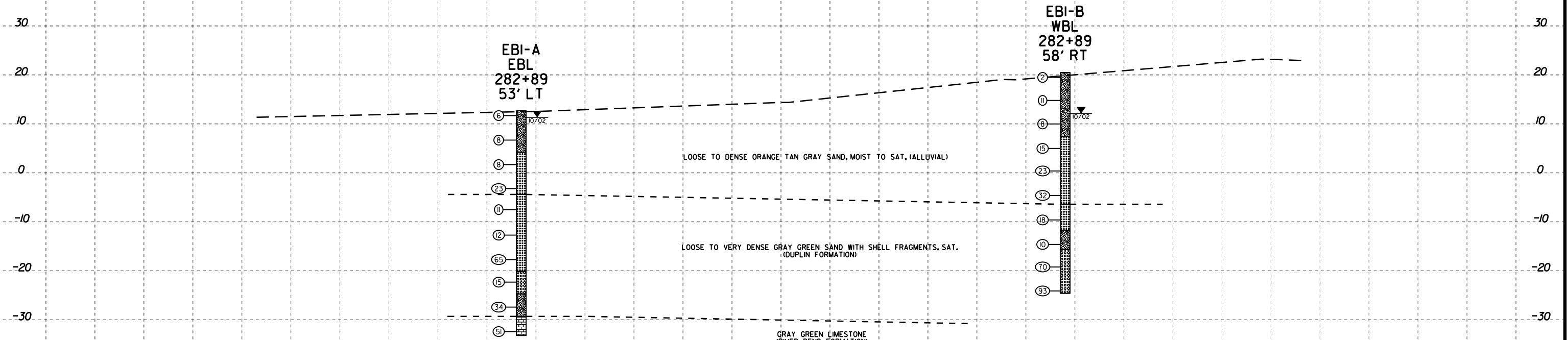
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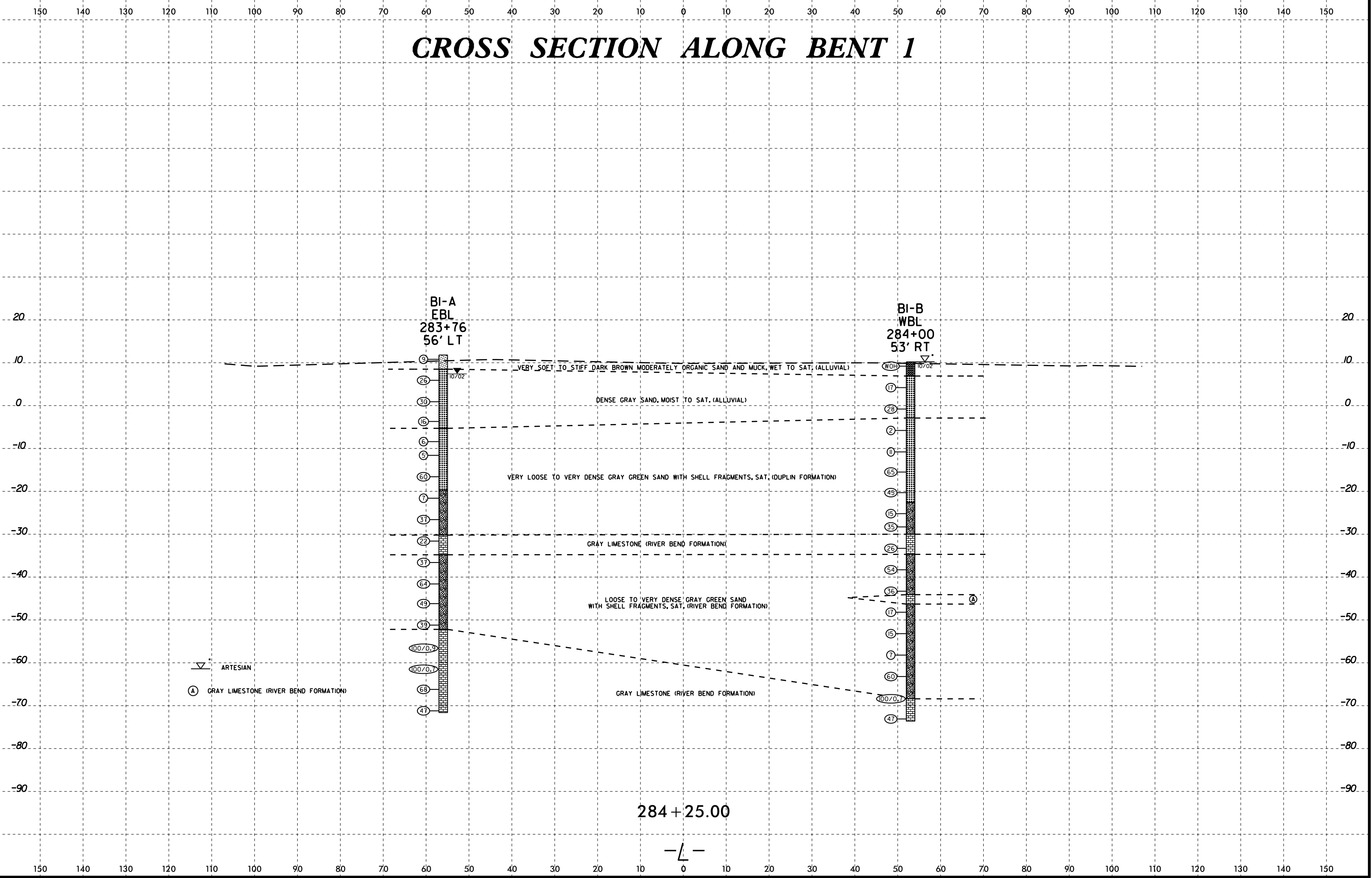
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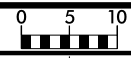
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G. Turner

CROSS SECTION ALONG BENT 1



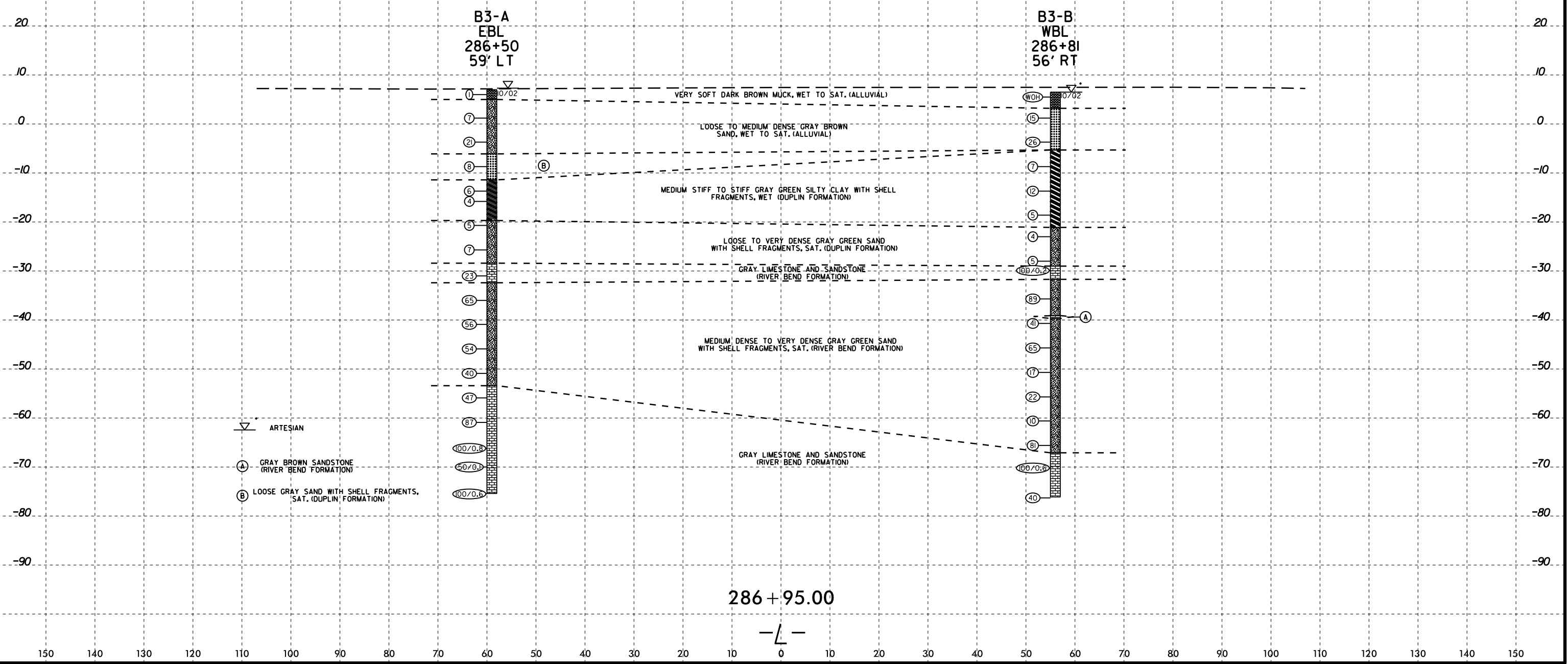
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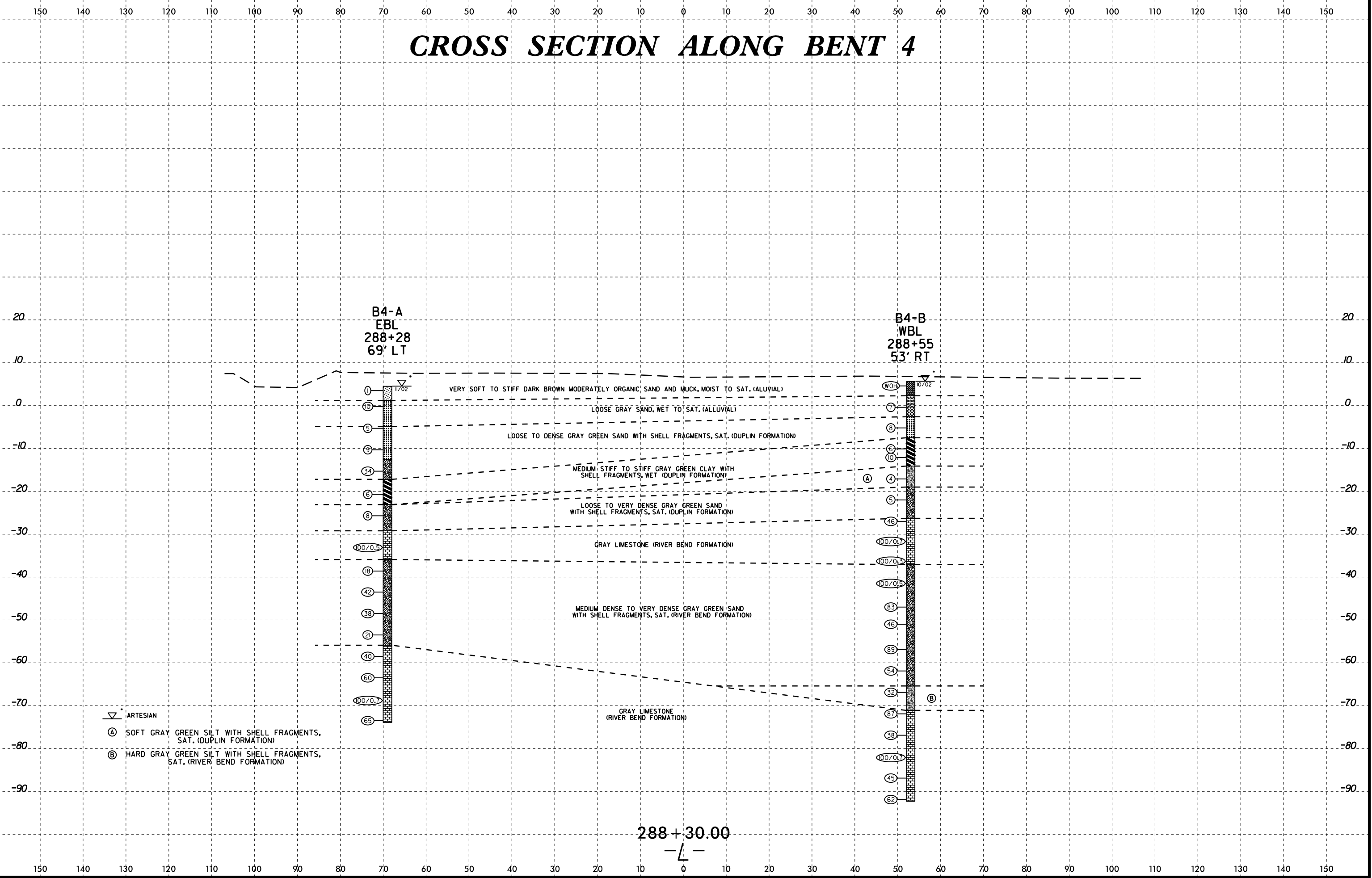
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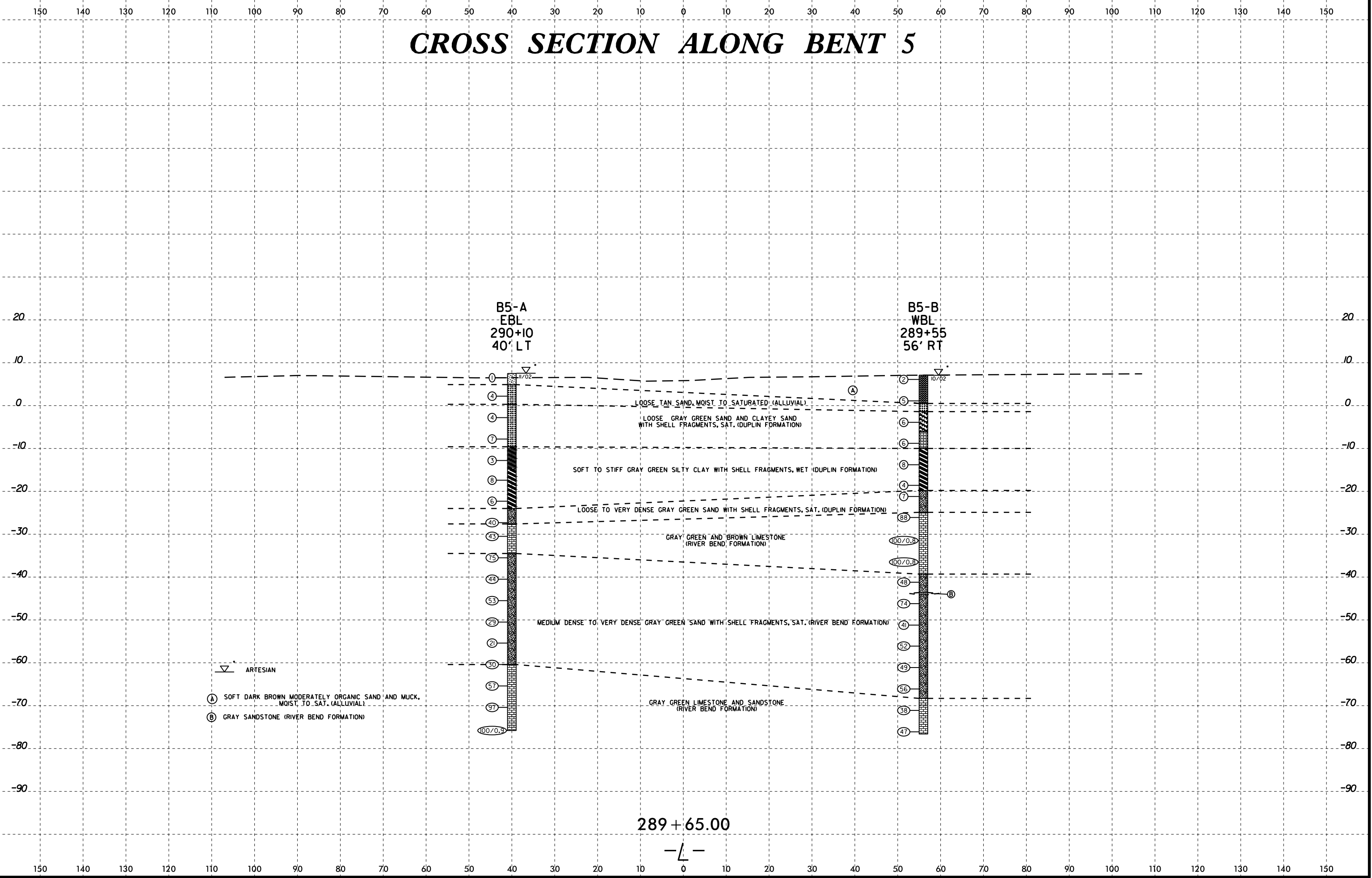
CROSS SECTION ALONG BENT 4



- ▽ ARTESIAN
- Ⓐ SOFT GRAY GREEN SILT WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION)
- Ⓑ HARD GRAY GREEN SILT WITH SHELL FRAGMENTS, SAT. (RIVER BEND FORMATION)

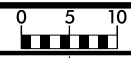
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 At: 06/27/2015

CROSS SECTION ALONG BENT 5

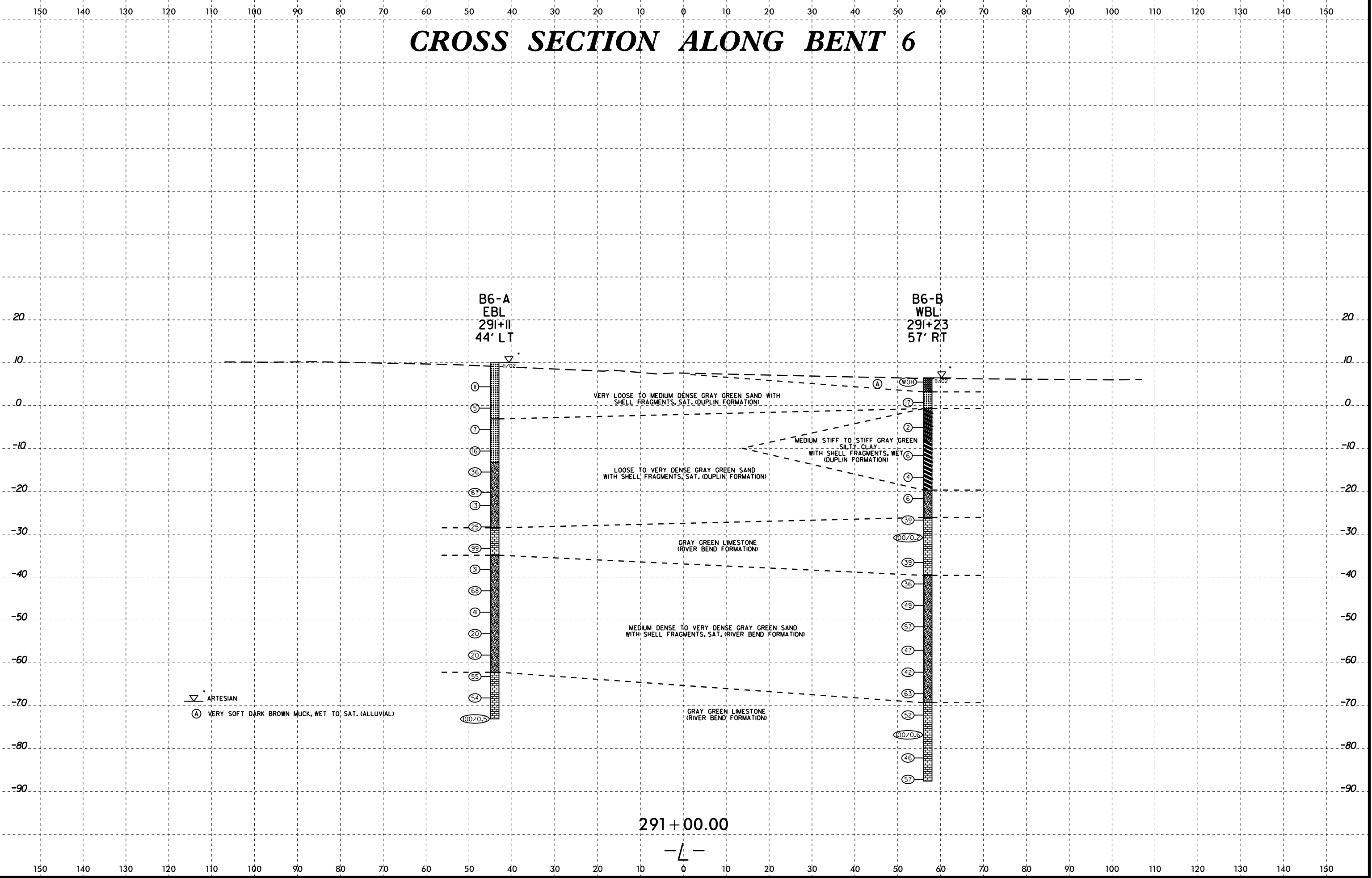


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Atty: G. Turner

8/23/99



CROSS SECTION ALONG BENT 6



B6-A
EBL
291+11
44' LT

B6-B
WBL
291+23
57' RT

VERY LOOSE TO MEDIUM DENSE GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION)

MEDIUM STIFF TO STIFF GRAY GREEN SILTY CLAY WITH SHELL FRAGMENTS, WET (DUPLIN FORMATION)

LOOSE TO VERY DENSE GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION)

GRAY GREEN LIMESTONE (RIVER BEND FORMATION)

MEDIUM DENSE TO VERY DENSE GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (RIVER BEND FORMATION)

GRAY GREEN LIMESTONE (RIVER BEND FORMATION)

ARTESIAN
VERY SOFT DARK BROWN MUCK, WET TO SAT. (ALLUVIAL)

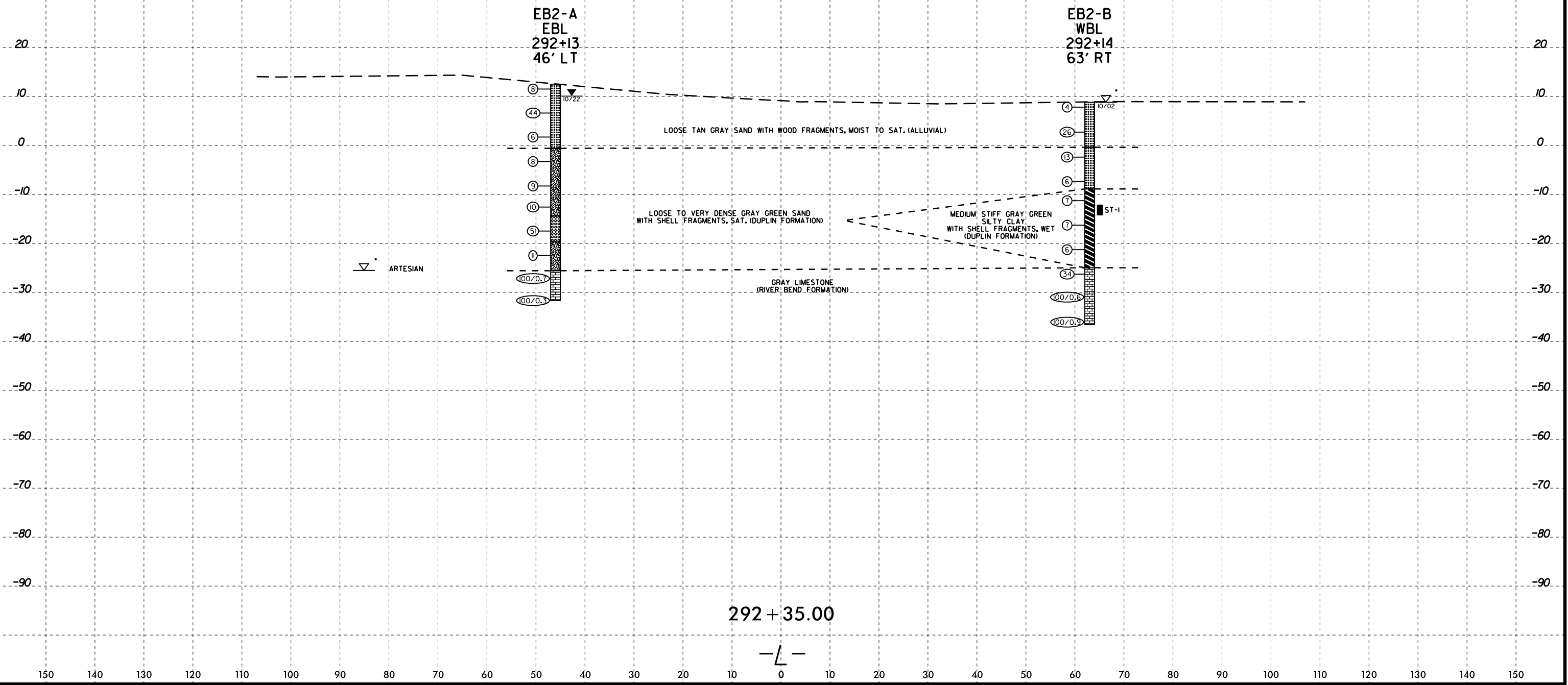
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G. Turner

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CROSS SECTION ALONG END BENT 2



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G. Turner



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. Lear										
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)									
BORING NO. EB1-A EBL		STATION 282+89		OFFSET 53 ft LT		ALIGNMENT -L-		0 HR. N/A								
COLLAR ELEV. 12.7 ft		TOTAL DEPTH 45.9 ft		NORTHING 416,611		EASTING 2,617,431		24 HR. 1.4								
DRILL RIG/HAMMER EFF./DATE CME-45				DRILL METHOD Mud Rotary		HAMMER TYPE Manual										
DRILLER Contract Driller		START DATE 10/09/02		COMP. DATE 10/09/02		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)		
15														12.7	0.0	GROUND SURFACE
	12.7	0.0	2	2	4											ALLUVIAL DARK GRAY SAND, WET TO SAT.
10	7.7	5.0	5	3	5											
5	2.7	10.0	3	3	5									4.2		
0	-2.2	14.9	7	11	12						SS-46					
-5	-6.5	19.2	6	5	6									-4.4		COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION)
-10	-11.7	24.4	4	4	8											
-15	-16.7	29.4	19	28	37											
-20	-21.3	34.0	10	8	7									-20.1		
-25	-26.4	39.1	17	19	15						SS-48			-24.7		
-30	-31.4	44.1	14	21	30									-29.3		COASTAL PLAIN GREEN LIMESTONE (RIVER BEND FORMATION)
														-33.2		Boring Terminated at Elevation -33.2 ft in Limestone

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NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. Lear										
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)									
BORING NO. EB1-B WBL		STATION 282+89		OFFSET 58 ft RT		ALIGNMENT -L-		0 HR. N/A								
COLLAR ELEV. 20.5 ft		TOTAL DEPTH 45.1 ft		NORTHING 416,627		EASTING 2,617,542		24 HR. 8.4								
DRILL RIG/HAMMER EFF./DATE CME-45				DRILL METHOD Mud Rotary		HAMMER TYPE Manual										
DRILLER Contract Driller		START DATE 10/09/02		COMP. DATE 10/09/02		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)		
25																
20	20.5	0.0	1	1	1									20.5	0.0	GROUND SURFACE
15	15.8	4.7	5	5	6											ALLUVIAL TAN ORANGE SAND WITH WOOD FRAGMENTS, MOIST TO SAT.
10	11.0	9.5	6	5	3											
5	6.0	14.5	6	5	10									7.4	13.1	
0	1.4	19.1	11	12	11											
-5	-3.6	24.1	14	14	18											
-10	-8.6	29.1	8	9	9									-6.4	26.9	COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION)
-15	-13.6	34.1	5	3	7									-11.7	32.2	
-20	-18.2	38.7	28	35	35									-15.6	36.1	
	-23.1	43.6	27	46	47									-24.6	45.1	
																Boring Terminated at Elevation -24.6 ft in Very Dense Sand

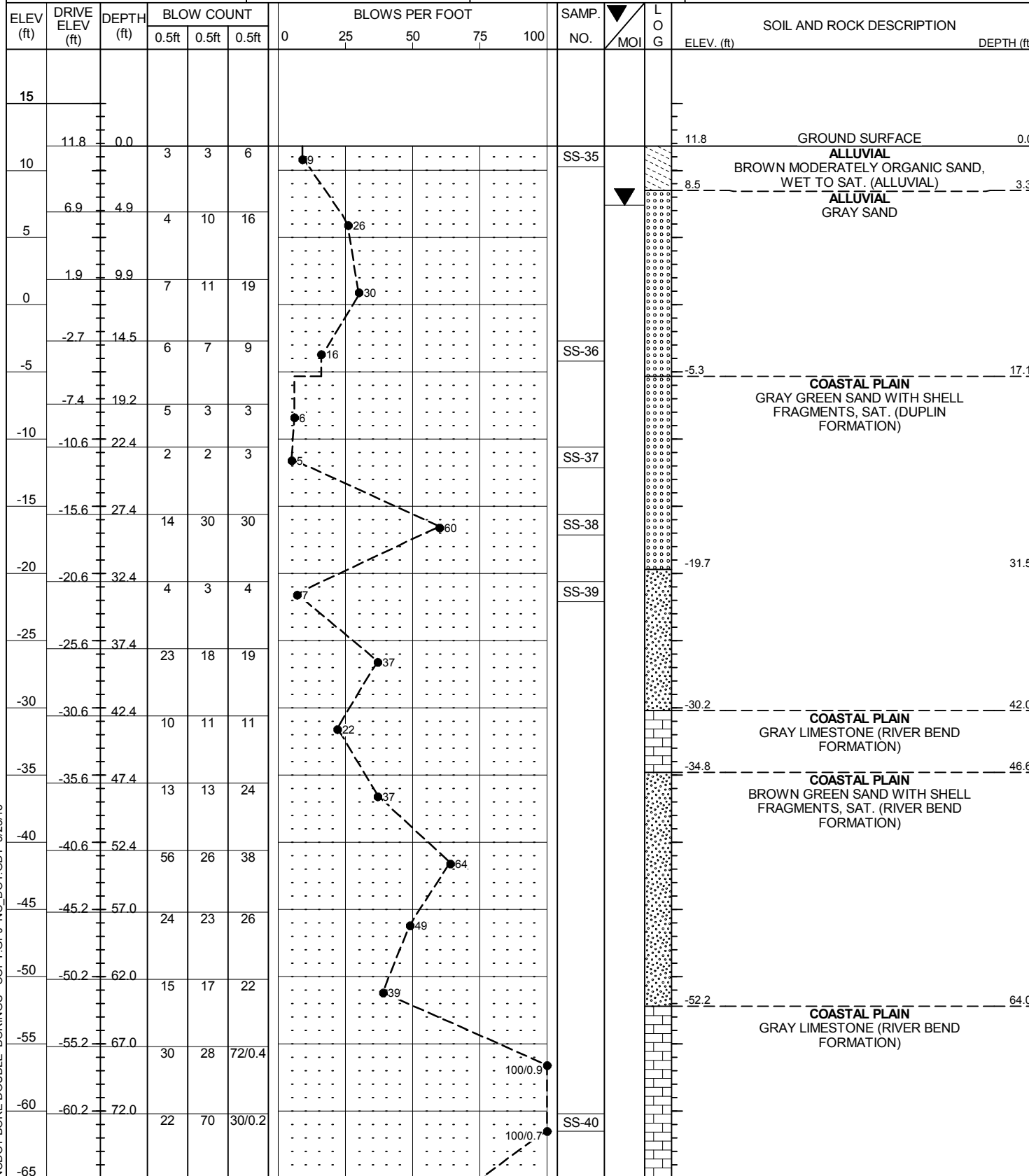
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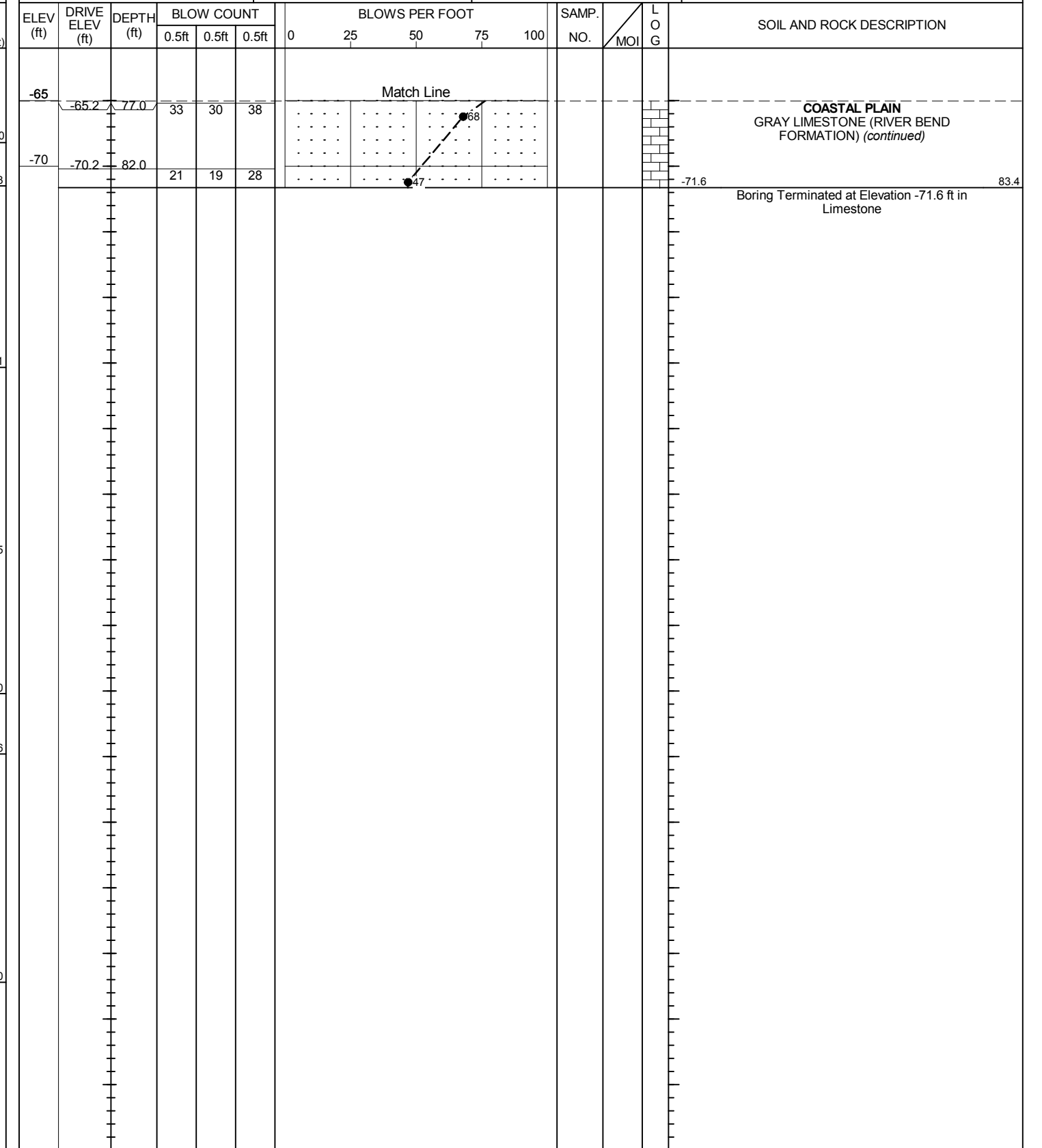
NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST M. Lear
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B1-A EBL	STATION 283+76	OFFSET 56 ft LT	ALIGNMENT -L-
COLLAR ELEV. 11.8 ft	TOTAL DEPTH 83.4 ft	NORTHING 416,698	EASTING 2,617,416
DRILL RIG/HAMMER EFF./DATE CME-45		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Manual
DRILLER Contract Driller	START DATE 10/10/02	COMP. DATE 10/10/02	SURFACE WATER DEPTH N/A



WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST M. Lear
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B1-A EBL	STATION 283+76	OFFSET 56 ft LT	ALIGNMENT -L-
COLLAR ELEV. 11.8 ft	TOTAL DEPTH 83.4 ft	NORTHING 416,698	EASTING 2,617,416
DRILL RIG/HAMMER EFF./DATE CME-45		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Manual
DRILLER Contract Driller	START DATE 10/10/02	COMP. DATE 10/10/02	SURFACE WATER DEPTH N/A



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NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. Lear	
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)
BORING NO. B1-A EBL		STATION 283+76		OFFSET 56 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 11.8 ft		TOTAL DEPTH 83.4 ft		NORTHING 416,698		EASTING 2,617,416	
DRILL RIG/HAMMER EFF./DATE CME-45			DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Manual	
DRILLER Contract Driller		START DATE 10/10/02		COMP. DATE 10/10/02		SURFACE WATER DEPTH N/A	

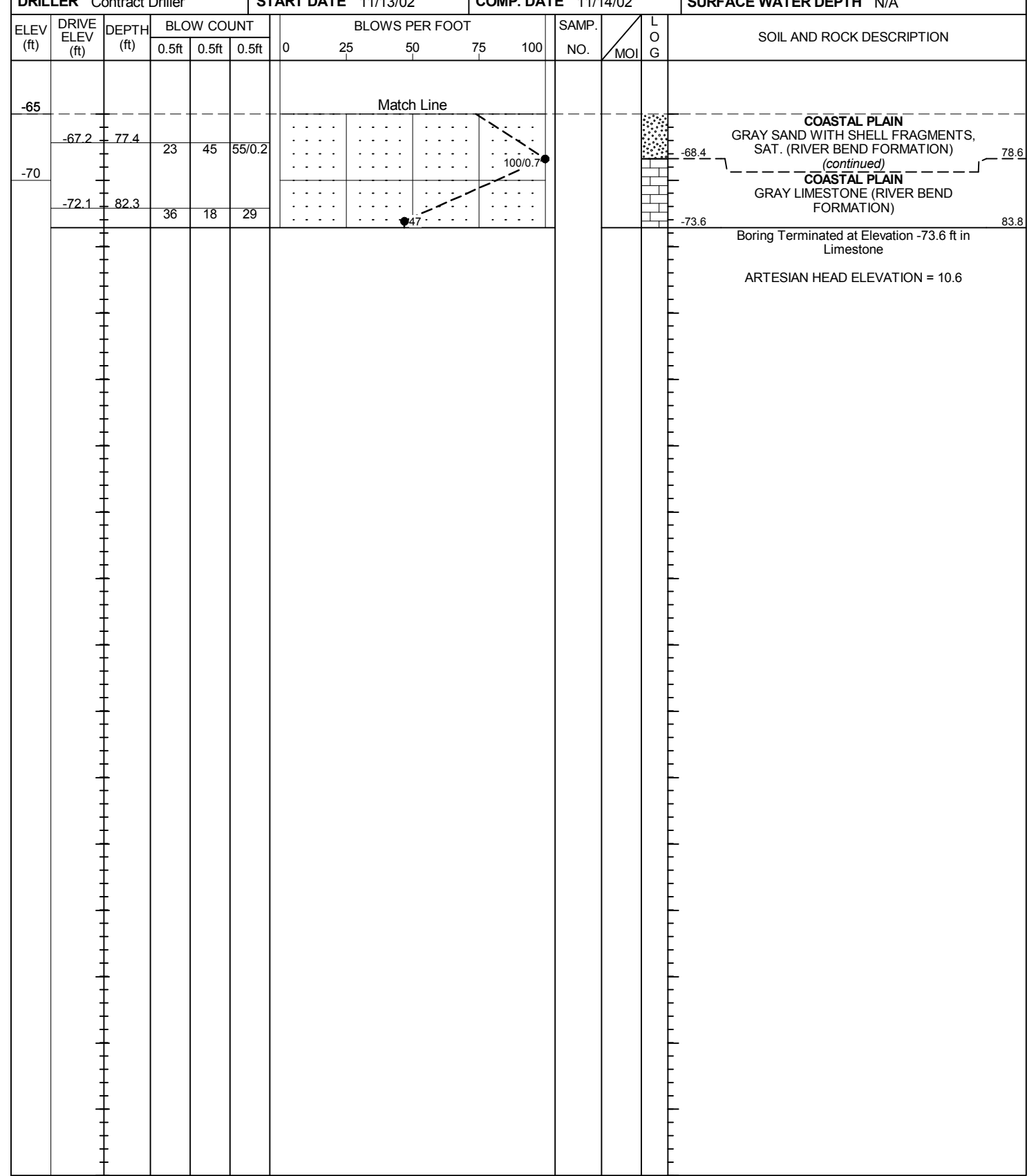
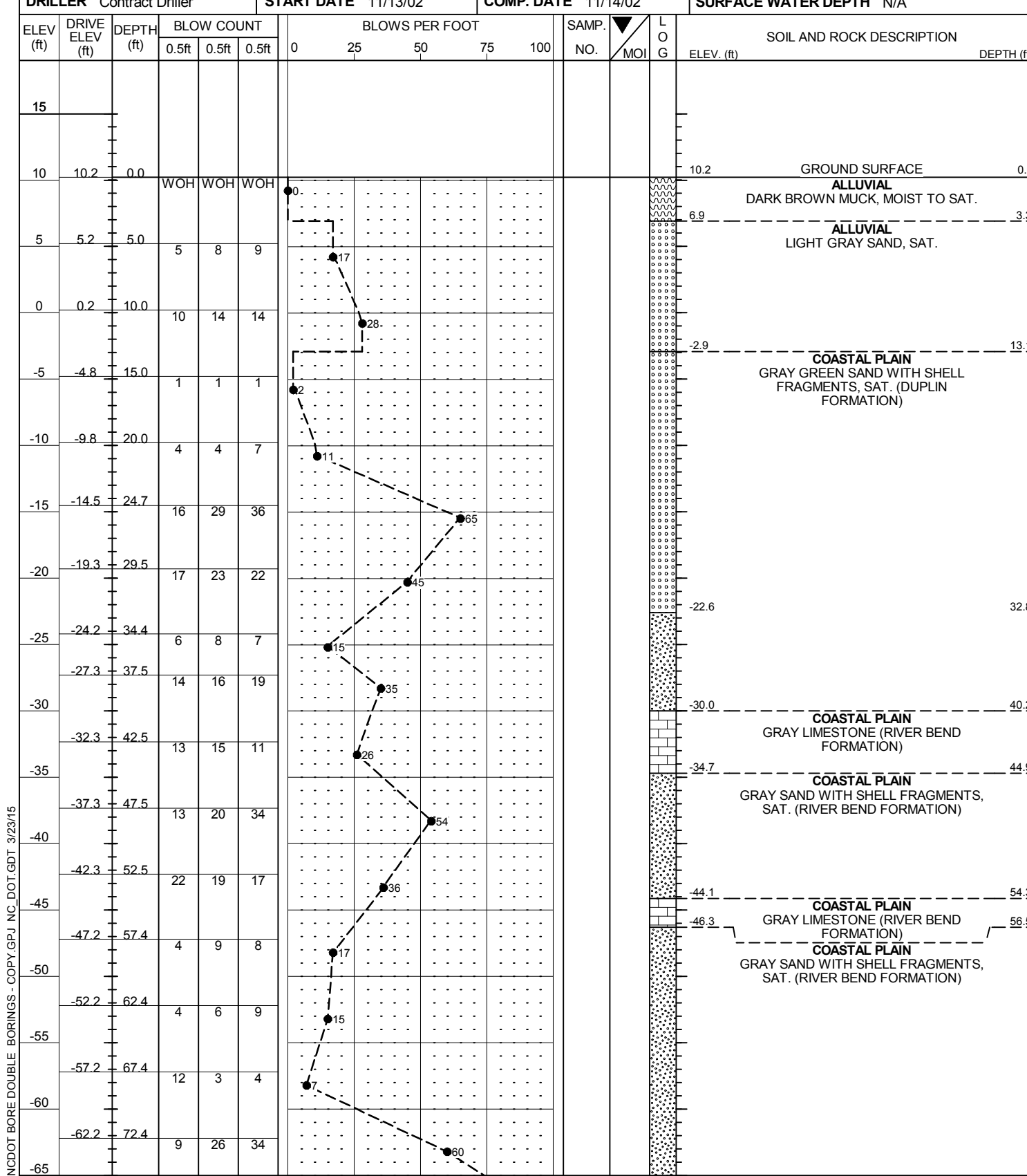
CORE SIZE HQ				TOTAL RUN 43.9 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %				
-8.9	-8.9	20.7	1.8	0:20/1.0	(0.0)						Begin Coring @ 20.7 ft		
-10	-10.7	22.5	3.5	0:15/0.8 <i>N=5</i>	0%						GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION) <i>(continued)</i>		
	-12.1	23.9		0:20/1.0 0:17/1.0 0:18/1.0 0:10/0.6 <i>N=60</i>	0%								
-15	-15.6	27.4		0:25/1.0 0:23/1.0 0:25/1.0 0:12/0.6 <i>N=7</i>	0%								
-20	-20.6	32.4	3.5	0:25/1.0 0:23/1.0 0:27/1.0 0:17/0.6 <i>N=37</i>	0%						-19.7	31.5	
	-22.1	33.9		0:20/1.0 0:23/1.0 0:21/1.0 0:17/0.6 <i>N=22</i>	0%								
-25	-25.6	37.4	3.5	0:42/1.0 0:41/1.0 0:31/1.0 0:15/0.6 <i>N=37</i>	0%						-30.2	42.0	
	-27.1	38.9		0:42/1.0 0:41/1.0 0:31/1.0 0:15/0.6 <i>N=37</i>	0%								
-30	-30.6	42.4	3.5	0:28/1.0 0:23/1.0 0:25/1.0 0:12/0.6 <i>N=64</i>	0%						-34.8	46.6	
	-32.1	43.9		0:28/1.0 0:23/1.0 0:25/1.0 0:12/0.6 <i>N=64</i>	0%								
-35	-35.6	47.4	3.5	1:53/1.0 0:34/1.0 0:30/1.0 0:17/0.2 <i>N=49</i>	0%						-52.2	64.0	
	-37.1	48.9		1:53/1.0 0:34/1.0 0:30/1.0 0:17/0.2 <i>N=49</i>	0%								
-40	-40.6	52.4	3.5	0:31/1.0 0:32/1.0 0:28/1.0 0:11/0.6 <i>N=39</i>	0%						-52.2	64.0	
	-42.0	53.8		1:37/1.0 1:17/1.0 1:40/1.0 0:42/0.6 <i>N=100/0.9</i>	(1.6) 46%								
-45	-45.2	57.0	3.6	1:29/1.0 1:15/1.0 0:31/1.0 0:15/0.7 <i>N=100/0.7</i>	(0.9) 25%						-71.6	83.4	
	-46.7	58.5		1:29/1.0 1:15/1.0 0:31/1.0 0:15/0.7 <i>N=100/0.7</i>	(0.9) 25%								
-50	-50.2	62.0	3.8	2:15/1.0 2:40/1.0 2:19/1.0 2:45/0.9 <i>N=68</i>	(2.9) 76%						-71.6	83.4	
	-51.7	63.5		2:15/1.0 2:40/1.0 2:19/1.0 2:45/0.9 <i>N=68</i>	(2.9) 76%								
-55	-55.2	67.0	3.5	2:37/1.0 2:52/1.0 1:43/1.0 2:21/0.6 <i>N=47</i>	(2.5) 71%						-71.6	83.4	
	-56.6	68.4		2:37/1.0 2:52/1.0 1:43/1.0 2:21/0.6 <i>N=47</i>	(2.5) 71%								
-60	-60.2	72.0	3.5								-71.6	83.4	
	-61.3	73.1											
-65	-65.1	76.9	3.5								-71.6	83.4	
	-66.6	78.4											
-70	-70.1	81.9											

NCDOT CORE DOUBLE BORINGS - COPY.GPJ NC_DOT.GDT 3/23/15

NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST M. Lear
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B1-B WBL	STATION 284+00	OFFSET 53 ft RT	ALIGNMENT -L-
COLLAR ELEV. 10.2 ft	TOTAL DEPTH 83.8 ft	NORTHING 416,736	EASTING 2,617,520
DRILL RIG/HAMMER EFF./DATE CME-45		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Manual
DRILLER Contract Driller	START DATE 11/13/02	COMP. DATE 11/14/02	SURFACE WATER DEPTH N/A

WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST M. Lear
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B1-B WBL	STATION 284+00	OFFSET 53 ft RT	ALIGNMENT -L-
COLLAR ELEV. 10.2 ft	TOTAL DEPTH 83.8 ft	NORTHING 416,736	EASTING 2,617,520
DRILL RIG/HAMMER EFF./DATE CME-45		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Manual
DRILLER Contract Driller	START DATE 11/13/02	COMP. DATE 11/14/02	SURFACE WATER DEPTH N/A

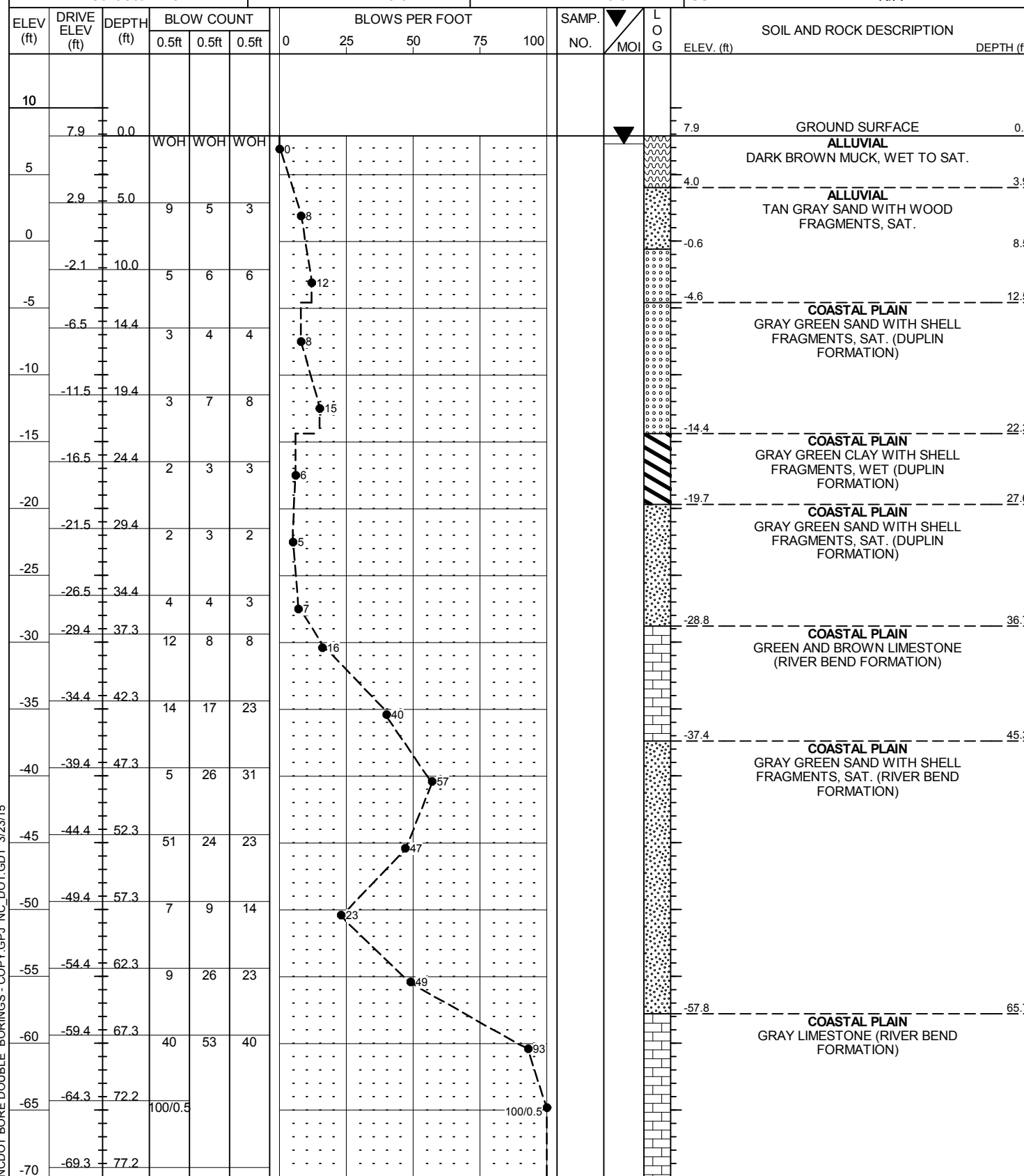


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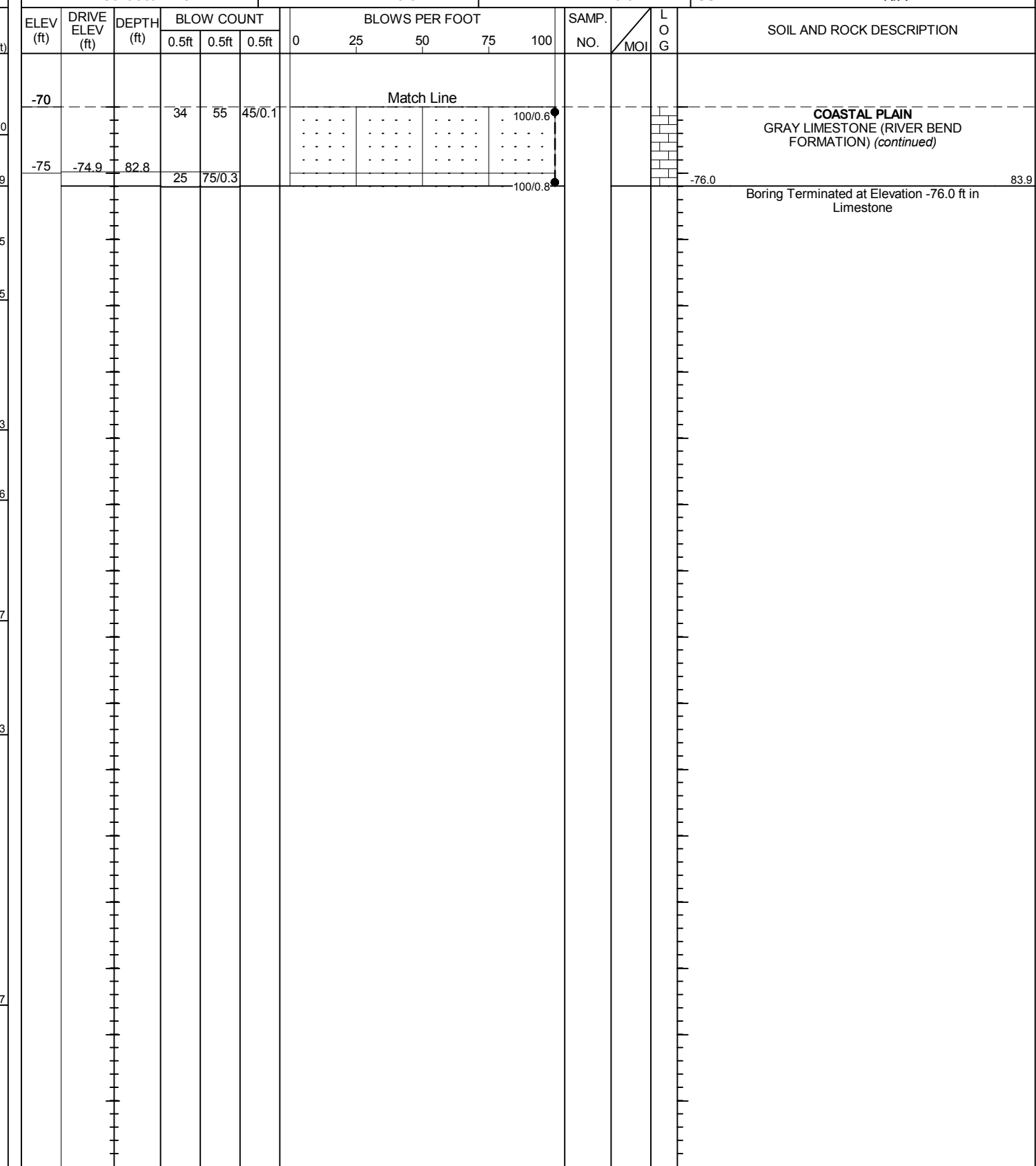
NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST M. Lear / B. Banks
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B2-A EBL	STATION 285+53	OFFSET 55 ft LT	ALIGNMENT -L-
COLLAR ELEV. 7.9 ft	TOTAL DEPTH 83.9 ft	NORTHING 416,871	EASTING 2,617,390
DRILL RIG/HAMMER EFF./DATE CME-45		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Manual
DRILLER Contract Driller	START DATE 11/19/02	COMP. DATE 11/19/02	SURFACE WATER DEPTH N/A



WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST M. Lear / B. Banks
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B2-A EBL	STATION 285+53	OFFSET 55 ft LT	ALIGNMENT -L-
COLLAR ELEV. 7.9 ft	TOTAL DEPTH 83.9 ft	NORTHING 416,871	EASTING 2,617,390
DRILL RIG/HAMMER EFF./DATE CME-45		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Manual
DRILLER Contract Driller	START DATE 11/19/02	COMP. DATE 11/19/02	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE BORINGS - COPY.GPJ NC_DOT.GDT 3/23/15

COASTAL PLAIN
GRAY LIMESTONE (RIVER BEND FORMATION) (continued)
Boring Terminated at Elevation -76.0 ft in Limestone



NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. Lear / B. Banks						
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)					
BORING NO. B2-A EBL		STATION 285+53		OFFSET 55 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 7.9 ft		TOTAL DEPTH 83.9 ft		NORTHING 416,871		EASTING 2,617,390						
DRILL RIG/HAMMER EFF./DATE CME-45				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Manual						
DRILLER Contract Driller		START DATE 11/19/02		COMP. DATE 11/19/02		SURFACE WATER DEPTH N/A						
CORE SIZE HQ		TOTAL RUN 34.4 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
-27.96											Begin Coring @ 35.9 ft	
-30	-28.0 -29.5 -30.9	35.9 37.4 38.8	1.5	0:16/1.0 0:15/0.5 N=16	(0.0) 0%						COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION) (continued)	36.2
-35	-34.4 -35.9	42.3 43.8	3.5	0:28/1.0 1:04/1.0 0:42/1.0 0:20/0.6 N=40	(2.3) 66%						COASTAL PLAIN GREEN AND BROWN LIMESTONE (RIVER BEND FORMATION)	
-40	-39.4 -40.9	47.3 48.8	3.5	0:31/1.0 0:25/1.0 0:16/1.0 0:10/0.6 N=57	(1.5) 44%						COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (RIVER BEND FORMATION)	45.3
-45	-44.4 -45.9	52.3 53.8	3.5	0:36/1.0 0:38/1.0 0:31/1.0 0:12/0.6 N=47	(0.0) 0%							
-50	-49.4 -50.9	57.3 58.8	3.5	0:38/1.0 0:34/1.0 0:33/1.0 0:09/0.6 N=23	(0.0) 0%							
-55	-54.4 -55.9	62.3 63.8	3.5	0:22/1.0 0:31/1.0 0:21/1.0 0:13/0.6 N=49	(0.0) 0%							
-60	-59.4 -60.8	67.3 68.7	3.5	0:31/1.0 0:30/1.0 0:35/1.0 0:12/0.6 N=93	(0.0) 0%						COASTAL PLAIN GRAY LIMESTONE (RIVER BEND FORMATION)	65.7
-65	-64.3 -64.8	72.2 72.7	3.5	1:34/1.0 0:25/1.0 1:41/1.0 0:26/0.6 N=100/0.5	(1.2) 35%							
-70	-69.3 -70.4	77.2 78.3	4.5	1:16/1.0 0:46/1.0 1:00/1.0 0:23/1.0 0:35/0.6 N=100/0.6	(1.4) 31%							
-75	-74.3	82.2	3.9	1:45/1.0 1:58/1.0 0:42/1.0 0:38/1.0 N=100/0.8	(1.7) 43%							
											Boring Terminated at Elevation -76.0 ft in Limestone	83.9

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NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. Lear										
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)									
BORING NO.	STATION 285+83		OFFSET 59 ft RT		ALIGNMENT -L-		0 HR. N/A									
COLLAR ELEV.	TOTAL DEPTH 83.4 ft		NORTHING 416,918		EASTING 2,617,499		24 HR. N/A									
DRILL RIG/HAMMER EFF./DATE CME-45			DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Manual											
DRILLER Contract Driller		START DATE 11/06/02	COMP. DATE 11/07/02		SURFACE WATER DEPTH 0.2ft											
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						
10	7.6	0.0												7.6	GROUND SURFACE	0.0
5	2.6	5.0	8	9	12									4.3	ALLUVIAL DARK BROWN MUCK, WET TO SAT.	3.3
0	-2.4	10.0	2	2	4									-0.9	ALLUVIAL BROWN GRAY SAND WITH WOOD FRAGMENTS, SAT.	8.5
-5	-7.4	15.0	6	6	5									-11.4	COASTAL PLAIN GRAY GREEN SAND, SAT. (DUPLIN FORMATION)	19.0
-10	-12.3	19.9	11	11	5									-15.4	COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION)	23.0
-15	-17.3	24.9	3	3	4									-20.6	COASTAL PLAIN GRAY GREEN CLAY WITH SHELL FRAGMENTS, WET (DUPLIN FORMATION)	28.2
-20	-21.7	29.3	3	3	3									-30.1	COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION)	37.7
-25	-26.6	34.2	3	4	4									-33.8	COASTAL PLAIN GRAY GREEN LESTONE (RIVER BEND FORMATION)	41.4
-30	-29.4	37.0	7	34	51									-44.4	COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (RIVER BEND FORMATION)	52.0
-35	-34.4	42.0	14	13	21									-46.2	COASTAL PLAIN GRAY GREEN LESTONE (RIVER BEND FORMATION)	53.8
-40	-39.4	47.0	12	17	23									-61.3	COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (RIVER BEND FORMATION)	68.9
-45	-44.4	52.0	100/0.3											-63.9	COASTAL PLAIN GRAY GREEN LESTONE (RIVER BEND FORMATION)	69.5
-50	-49.4	57.0	14	9	14									-68.1	COASTAL PLAIN SILTY SAND, SAT. (RIVER BEND FORMATION)	75.7
-55	-54.3	61.9	8	7	17											
-60	-59.3	66.9	7	9	18											
-65	-64.3	71.9	7	11	20											
-70	-69.3	76.9														

NCDOT BORE DOUBLE BORINGS - COPY.GPJ NC_DOT.GDT 3/23/15

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. Lear										
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)									
BORING NO.	STATION 285+83		OFFSET 59 ft RT		ALIGNMENT -L-		0 HR. N/A									
COLLAR ELEV.	TOTAL DEPTH 83.4 ft		NORTHING 416,918		EASTING 2,617,499		24 HR. N/A									
DRILL RIG/HAMMER EFF./DATE CME-45			DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Manual											
DRILLER Contract Driller		START DATE 11/06/02	COMP. DATE 11/07/02		SURFACE WATER DEPTH 0.2ft											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
-70														7.6	GROUND SURFACE	0.0
-75	-74.3	81.9	11	12	14									4.3	ALLUVIAL DARK BROWN MUCK, WET TO SAT.	3.3
														-0.9	ALLUVIAL BROWN GRAY SAND WITH WOOD FRAGMENTS, SAT.	8.5
														-11.4	COASTAL PLAIN GRAY GREEN SAND, SAT. (DUPLIN FORMATION)	19.0
														-15.4	COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION)	23.0
														-20.6	COASTAL PLAIN GRAY GREEN CLAY WITH SHELL FRAGMENTS, WET (DUPLIN FORMATION)	28.2
														-30.1	COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION)	37.7
														-33.8	COASTAL PLAIN GRAY GREEN LESTONE (RIVER BEND FORMATION)	41.4
														-44.4	COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (RIVER BEND FORMATION)	52.0
														-46.2	COASTAL PLAIN GRAY GREEN LESTONE (RIVER BEND FORMATION)	53.8
														-61.3	COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (RIVER BEND FORMATION)	68.9
														-63.9	COASTAL PLAIN GRAY GREEN LESTONE (RIVER BEND FORMATION)	69.5
														-68.1	COASTAL PLAIN SILTY SAND, SAT. (RIVER BEND FORMATION)	75.7

Match Line

COASTAL PLAIN GRAY LIMESTONE (RIVER BEND FORMATION) (continued)

Boring Terminated at Elevation -75.8 ft in Limestone
ARTESIAN FLOW



NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. Lear						
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)					
BORING NO. B2-B WBL		STATION 285+83		OFFSET 59 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 7.6 ft		TOTAL DEPTH 83.4 ft		NORTHING 416,918		EASTING 2,617,499						
DRILL RIG/HAMMER EFF./DATE CME-45				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Manual						
DRILLER Contract Driller		START DATE 11/06/02		COMP. DATE 11/07/02		SURFACE WATER DEPTH 0.2ft						
CORE SIZE HQ		TOTAL RUN 33.8 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	RQD (ft) %	LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
-28.1											Begin Coring @ 35.7 ft	
-30	-28.1 -29.4 -30.9	35.7 37.0 38.5	1.3	0:22/1.0 0:08/0.3 N=65	(0.0) 0%						COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION) (continued)	37.7
-35	-34.4 -35.9	42.0 43.5	3.5	1:21/1.0 0:23/1.0 2:36/1.0 0:39/0.6 N=34	(1.1) 31%						COASTAL PLAIN GRAY GREEN LIMESTONE (RIVER BEND FORMATION)	41.4
-40	-39.4 -40.9	47.0 48.5	3.5	0:34/1.0 1:03/1.0 0:24/1.0 0:29/0.6 N=40	(0.8) 23%						COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (RIVER BEND FORMATION)	
-45	-44.4 -44.8	52.0 52.4	4.5	0:23/1.0 0:22/1.0 0:26/1.0 0:18/0.6 N=100/0.3	(0.0) 0%						COASTAL PLAIN GRAY GREEN LIMESTONE (RIVER BEND FORMATION)	52.0
-50	-49.3 -50.8	56.9 58.4	3.5	0:38/1.0 0:28/1.0 0:19/1.0 0:26/1.0 0:15/0.6 N=23	(1.3) 29%						COASTAL PLAIN GRAY GREEN LIMESTONE (RIVER BEND FORMATION)	53.8
-55	-54.3 -55.8	61.9 63.4	3.5	0:25/1.0 0:25/1.0 0:26/1.0 0:10/0.6 N=24	(0.0) 0%						COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (RIVER BEND FORMATION)	
-60	-59.3 -60.8	66.9 68.4	3.5	0:48/1.0 0:27/1.0 0:27/1.0 0:12/0.6 N=27	(0.0) 0%						COASTAL PLAIN GRAY GREEN LIMESTONE (RIVER BEND FORMATION)	68.9
-65	-64.3 -65.8	71.9 73.4	3.5	2:56/1.0 2:23/1.0 0:23/1.0 0:10/0.6 N=31	(0.6) 17%						COASTAL PLAIN GRAY GREEN LIMESTONE (RIVER BEND FORMATION)	69.5
-70	-69.3 -70.8	76.9 78.4	3.5	0:38/1.0 0:24/1.0 1:05/1.0 0:31/0.6 N=42	(1.2) 34%						COASTAL PLAIN SILTY SAND, SAT. (RIVER BEND FORMATION)	75.7
-75	-74.3	81.9	3.5	0:32/1.0 0:40/1.0 0:43/1.0 0:19/0.6 N=26	(1.4) 40%						COASTAL PLAIN GRAY LIMESTONE (RIVER BEND FORMATION)	83.4
											Boring Terminated at Elevation -75.8 ft in Limestone	
											ARTESIAN FLOW	

NCDOT CORE DOUBLE BORINGS - COPY.GPJ NC_DOT.GDT 3/23/15



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. Lear										
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)									
BORING NO. B3-A EBL		STATION 286+50		OFFSET 59 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 7.0 ft		TOTAL DEPTH 82.4 ft		NORTHING 416,967		EASTING 2,617,373										
DRILL RIG/HAMMER EFF./DATE CME-45			DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Manual										
DRILLER Contract Driller		START DATE 10/11/02		COMP. DATE 10/16/02		SURFACE WATER DEPTH 0.3ft										
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						
10																
5	7.0	0.0	WOH	WOH	1									1	SS-50	7.0
0		2.2	4.8	3	3	4								7	SS-51	5.0
-5				8	13	8								21		
-10				3	3	5								8		
-15				3	3	3								6	SS-52	
-20				2	2	2								4		
-25				3	2	3								5	SS-53	
-30				3	3	4								7		
-35				17	12	11								23		
-40				41	32	33								65	SS-54	
-45				15	25	31								56		
-50				19	29	25								54		
-55				12	18	22								40		
-60				9	23	24								47		
-65				38	33	54								87	SS-55	
-70				19	34	66/0.3								100/0.8		

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. Lear										
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)									
BORING NO. B3-A EBL		STATION 286+50		OFFSET 59 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 7.0 ft		TOTAL DEPTH 82.4 ft		NORTHING 416,967		EASTING 2,617,373										
DRILL RIG/HAMMER EFF./DATE CME-45			DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Manual										
DRILLER Contract Driller		START DATE 10/11/02		COMP. DATE 10/16/02		SURFACE WATER DEPTH 0.3ft										
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						
-70																
-75	-74.9	81.9														

NCDOT BORE DOUBLE BORINGS - COPY.GPJ NC.DOT.GDT 3/23/15



NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. Lear						
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)					
BORING NO. B3-A EBL		STATION 286+50		OFFSET 59 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 7.0 ft		TOTAL DEPTH 82.4 ft		NORTHING 416,967		EASTING 2,617,373						
DRILL RIG/HAMMER EFF./DATE CME-45				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Manual						
DRILLER Contract Driller		START DATE 10/11/02		COMP. DATE 10/16/02		SURFACE WATER DEPTH 0.3ft						
CORE SIZE HQ		TOTAL RUN 44.5 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
-14.16											Begin Coring @ 21.2 ft	
-15	-14.2 -14.8 -16.2	21.2 21.8 23.2	0.6 3.5	0:20/0.6 N=4 0:23/1.0 0:30/1.0 0:27/1.0 0:08/0.6 N=5	(0.0) 0%						COASTAL PLAIN GRAY GREEN CLAY WITH SHELL FRAGMENTS, WET (DUPLIN FORMATION) (continued)	
-20	-19.7 -21.2	26.7 28.2	3.5	0:25/1.0 0:21/1.0 0:22/1.0 0:09/0.6 N=7	(0.0) 0%		SS-53				COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION)	26.7
-25	-24.7 -26.2	31.7 33.2	3.8	0:30/1.0 0:23/1.0 0:31/1.0 0:20/0.8 N=23	(0.0) 0%						COASTAL PLAIN GRAY CALCITE CEMENTED SANDSTONE WITH SHELL FRAGMENTS (RIVER BEND FORMATION)	35.4
-30	-30.0 -31.5	37.0 38.5	3.5	0:30/1.0 0:31/1.0 0:28/1.0 0:15/0.6 N=65	(0.0) 0%						COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (RIVER BEND FORMATION)	39.4
-35	-35.0 -36.4	42.0 43.4	3.5	0:25/1.0 0:28/1.0 0:21/1.0 0:15/0.6 N=56	(0.7) 19%		SS-54					
-40	-39.9 -41.4	46.9 48.4	3.5	0:29/1.0 0:27/1.0 0:31/1.0 0:12/0.6 N=54	(1.7) 50%							
-45	-44.9 -46.4	51.9 53.4	3.5	0:20/1.0 0:20/1.0 0:20/1.0 0:11/0.6 N=40	(1.1) 32%							
-50	-49.9 -51.4	56.9 58.4	3.5	0:22/1.0 0:21/1.0 0:24/1.0 0:15/0.6 N=47	(0.3) 9%							
-55	-54.9 -56.4	61.9 63.4	3.5	1:00/1.0 0:54/1.0 0:16/1.0 0:10/0.6 N=87	(0.5) 15%		SS-55				COASTAL PLAIN GRAY LIMESTONE (RIVER BEND FORMATION)	60.4
-60	-59.9 -61.4	66.9 68.4	3.5	0:57/1.0 0:45/1.0 0:37/1.0 0:39/0.6 N=100/0.8	(1.4) 39%							
-65	-64.9 -66.2	71.9 73.2	3.7	0:55/1.0 1:10/1.0 1:15/1.0 0:45/0.8 N=50/0.7	(1.8) 49%							
-70	-69.9 -69.9	76.9 76.9	4.9	1:54/1.0 1:54/1.0 1:05/1.0 1:10/1.0 0:45/1.0 0:35/1.0 N=100/0.6	(1.1) 23%							
-75	-74.8	81.8									Boring Terminated at Elevation -75.4 ft in Limestone	82.4

NCDOT CORE DOUBLE BORINGS - COPY.GPJ NC_DOT.GDT 3/23/15



**NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT**

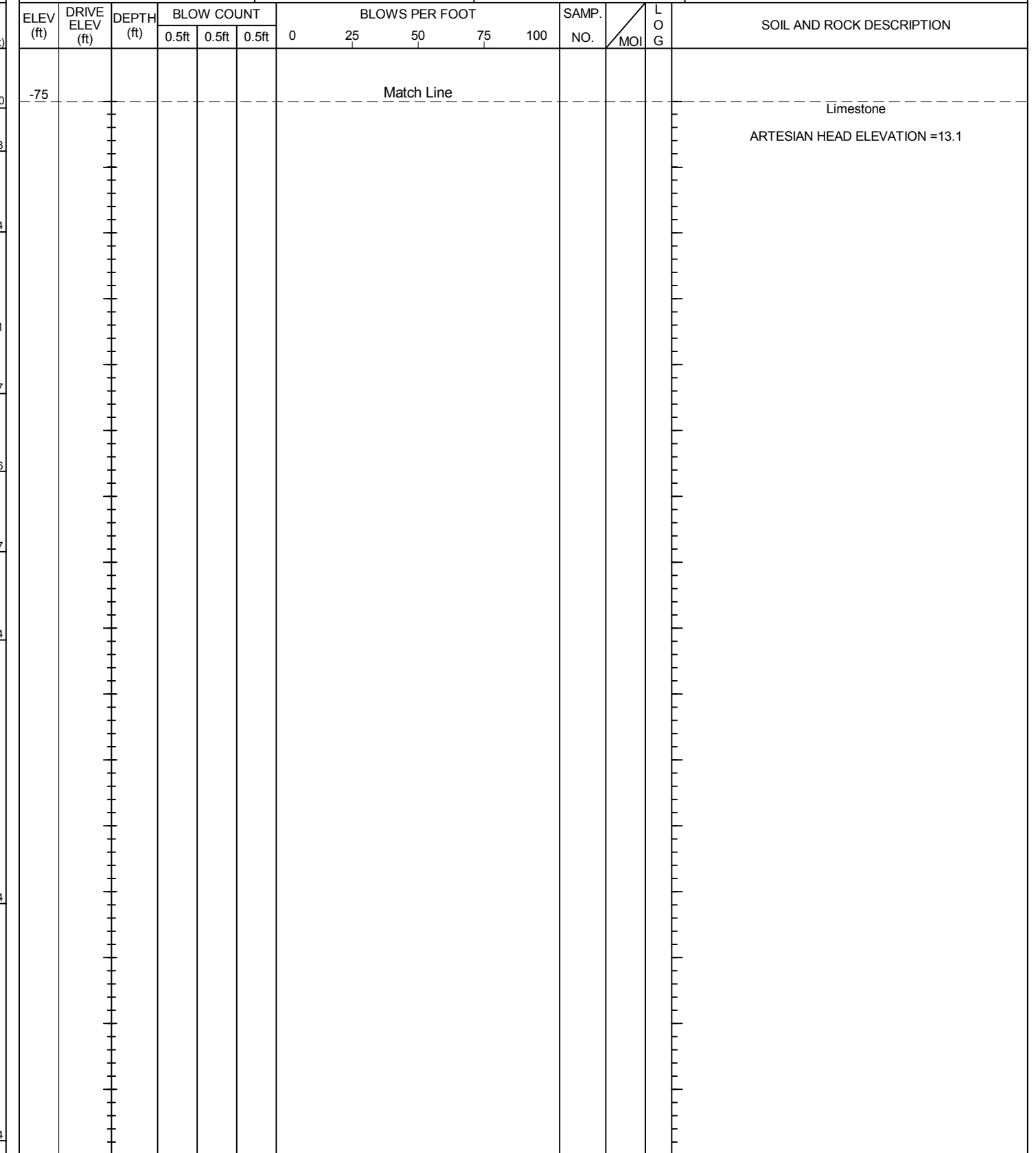
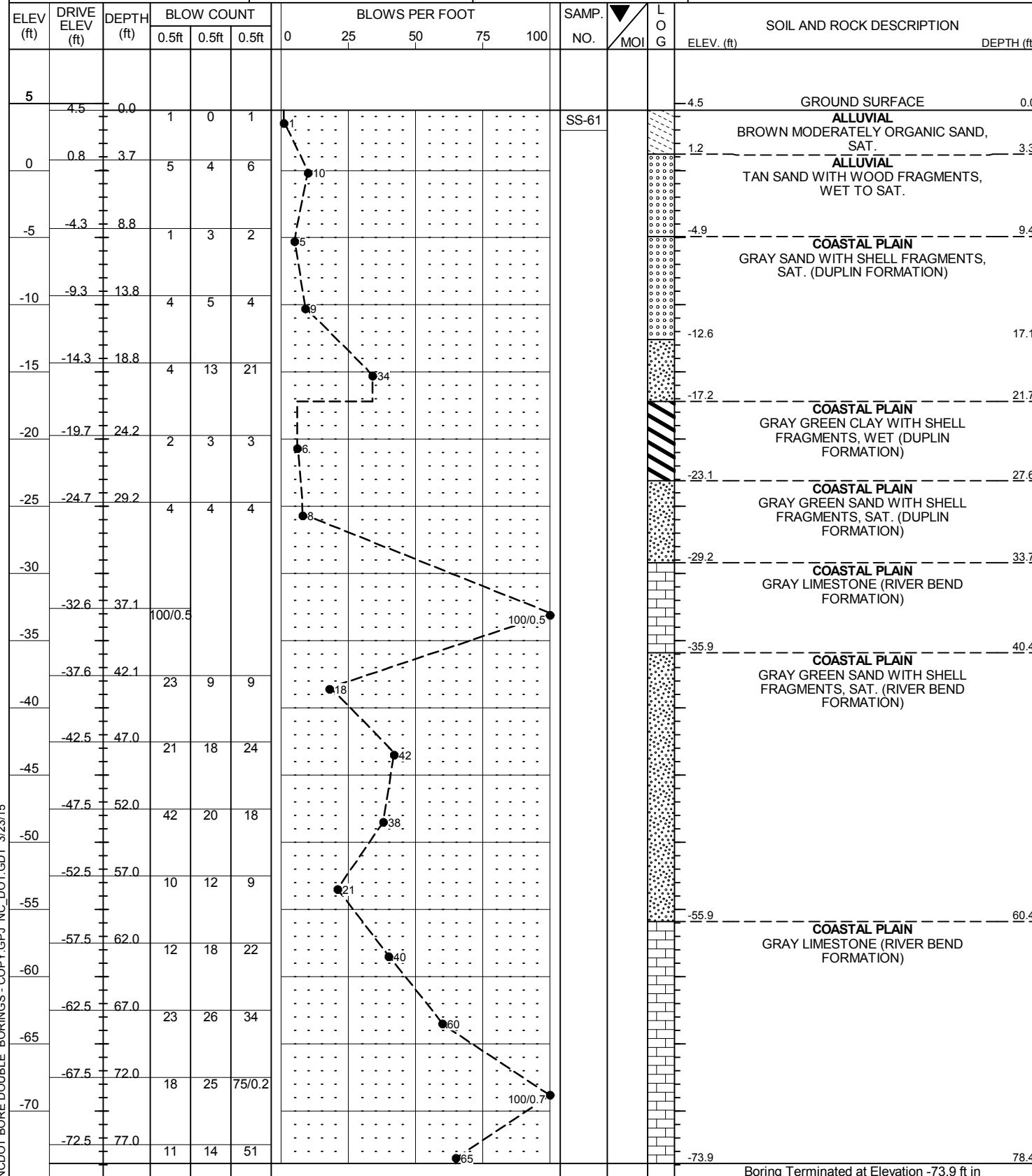
WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. Lear						
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)					
BORING NO. B3-B WBL		STATION 286+81		OFFSET 56 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 6.5 ft		TOTAL DEPTH 82.6 ft		NORTHING 417,014		EASTING 2,617,481						
DRILL RIG/HAMMER EFF./DATE CME-45				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Manual						
DRILLER Contract Driller		START DATE 11/04/02		COMP. DATE 11/05/02		SURFACE WATER DEPTH N/A						
CORE SIZE HQ		TOTAL RUN 35.0 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
-28.4	-28.4	34.9	1.3	1:17/1.0	(0.7)						Begin Coring @ 34.9 ft	
-30	-29.7	36.2	4.8	N=100/0.2 0:25/0.3 0:52/1.0 0:47/1.0 0:46/1.0 0:23/1.0 0:16/0.9	54% (1.8) 38%						COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION) (continued)	35.5
-35	-34.7	41.2									COASTAL PLAIN GRAY LIMESTONE (RIVER BEND FORMATION)	38.2
-40	-36.2	42.7	3.5	N=89 0:20/1.0 0:50/1.0 0:33/1.0 4:12/0.6	(0.6) 17%						COASTAL PLAIN GRAY SAND WITH SHELL FRAGMENTS, SAT. (RIVER BEND FORMATION)	
-45	-39.7	46.2	3.5	N=41 0:31/1.0 0:43/1.0 0:21/1.0 0:12/0.6	(0.0) 0%						COASTAL PLAIN GRAY CALCITE CEMENTED SANDSTONE, SAT. (RIVER BEND FORMATION)	45.6
-50	-44.7	51.2	3.5	N=65 0:27/1.0 0:29/1.0 0:31/1.0 0:18/0.6	(0.0) 0%						COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (RIVER BEND FORMATION)	46.2
-55	-46.2	52.7	3.5	N=17 0:31/1.0 0:34/1.0 0:24/1.0 0:11/0.6	(0.2) 6%							
-60	-54.6	61.1	3.5	N=22 1:13/1.0 1:13/1.0 1:03/1.0 0:12/0.6	(0.0) 0%							
-65	-56.1	62.6	3.5	N=10 0:22/1.0 0:33/1.0 0:29/1.0 0:10/0.6	(0.0) 0%							
-70	-59.6	66.1	3.5	N=81 0:28/1.0 4:05/1.0 0:31/1.0 0:15/0.6	(2.2) 63%						COASTAL PLAIN GRAY SANDSTONE (RIVER BEND FORMATION)	73.6
-75	-64.6	71.1	4.4	N=100/0.6 0:45/1.0 0:22/1.0 0:21/1.0 0:58/1.0 0:15/0.5	(1.3) 30%							
-76.1	-70.2	76.1										
-76.1	-74.6	81.1									Boring Terminated at Elevation -76.1 ft in Sandstone	82.6
											ARTESIAN FLOW	

NCDOT CORE DOUBLE BORINGS - COPY.GPJ NC_DOT.GDT 3/23/15

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST B. Banks
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B4-A EBL	STATION 288+28	OFFSET 69 ft LT	ALIGNMENT -L-
COLLAR ELEV. 4.5 ft	TOTAL DEPTH 78.4 ft	NORTHING 417,142	EASTING 2,617,337
DRILL RIG/HAMMER EFF./DATE CME-45		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Manual
DRILLER Contract Driller	START DATE 11/21/02	COMP. DATE 11/22/02	SURFACE WATER DEPTH N/A

WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST B. Banks
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B4-A EBL	STATION 288+28	OFFSET 69 ft LT	ALIGNMENT -L-
COLLAR ELEV. 4.5 ft	TOTAL DEPTH 78.4 ft	NORTHING 417,142	EASTING 2,617,337
DRILL RIG/HAMMER EFF./DATE CME-45		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Manual
DRILLER Contract Driller	START DATE 11/21/02	COMP. DATE 11/22/02	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE BORINGS - COPY.GPJ NC_DOT.GDT 3/23/15

Boring Terminated at Elevation -73.9 ft in



NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

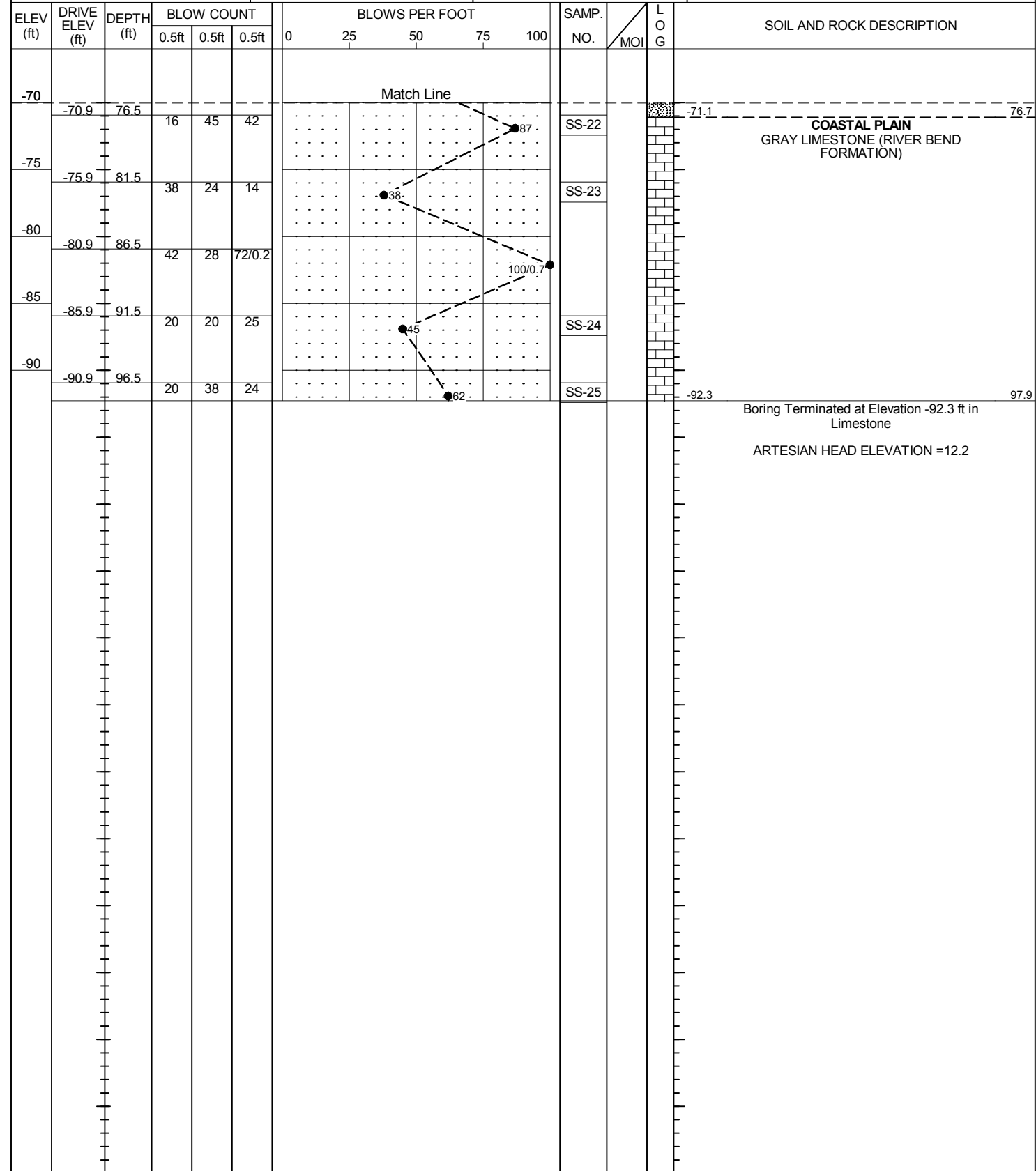
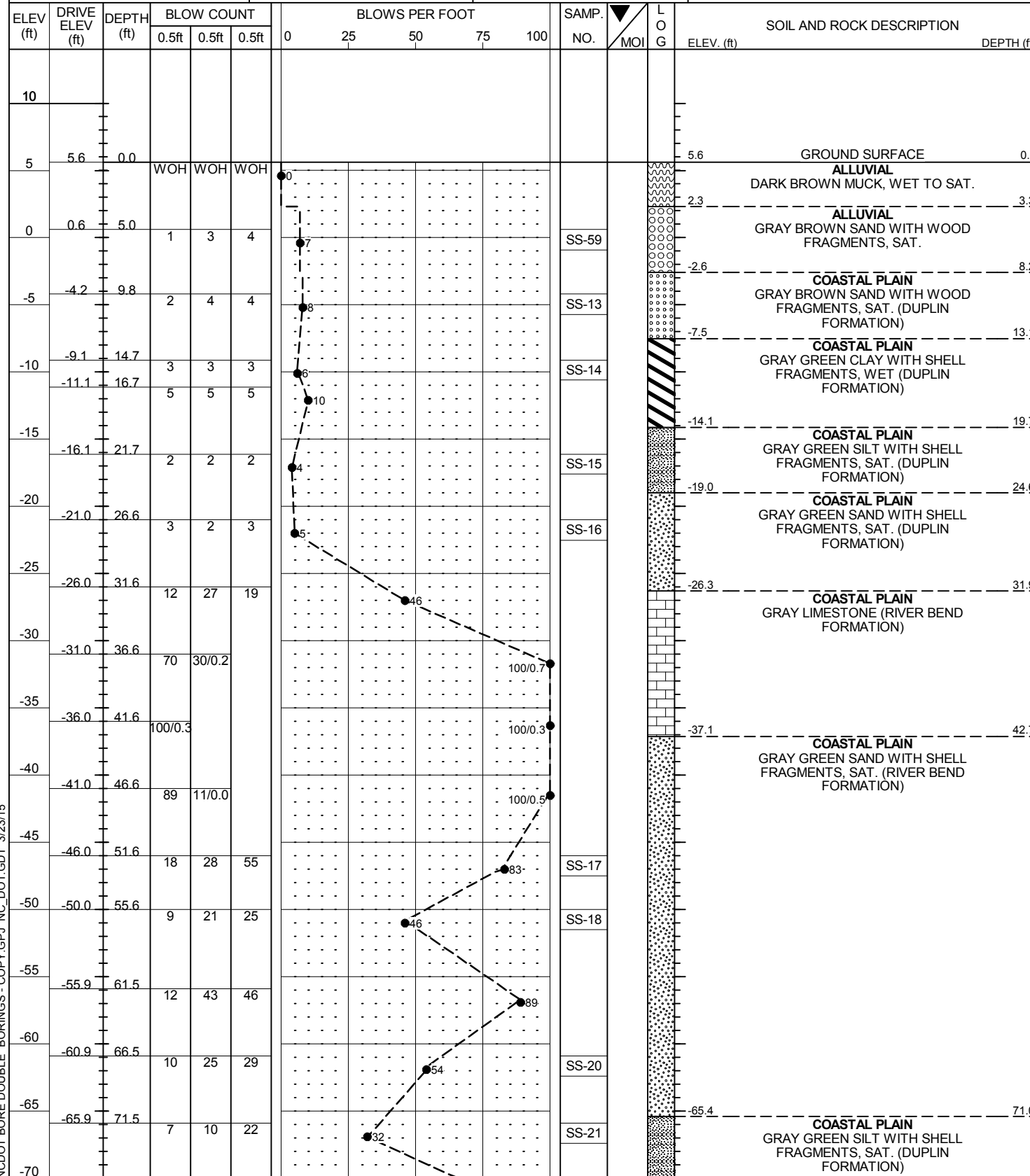
WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST B. Banks						
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)					
BORING NO. B4-A EBL		STATION 288+28		OFFSET 69 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 4.5 ft		TOTAL DEPTH 78.4 ft		NORTHING 417,142		EASTING 2,617,337						
DRILL RIG/HAMMER EFF./DATE CME-45				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Manual						
DRILLER Contract Driller		START DATE 11/21/02		COMP. DATE 11/22/02		SURFACE WATER DEPTH N/A						
CORE SIZE HQ		TOTAL RUN 32.7 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft)	RQD (%)		REC. (ft)	RQD (%)			
-29.2	-29.2	33.7	3.4	1:21/1.0 1:04/1.0 0:25/1.0 0:20/0.5	(1.0) 29%						Begin Coring @ 33.7 ft	33.7
-30	-32.6	37.1									COASTAL PLAIN GRAY LIMESTONE (RIVER BEND FORMATION)	
-35	-33.1	37.6	4.5	N=100/0.5 1:54/1.0 0:32/1.0 4:13/1.0 0:15/1.0 0:21/0.6	(1.1) 24%							
-35.9	-37.6	42.1									COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (RIVER BEND FORMATION)	40.4
-40	-39.0	43.5	3.5	N=18 0:23/1.0 0:26/1.0 0:27/1.0 0:16/0.6	(0.0) 0%							
-45	-42.5	47.0										
-45	-44.0	48.5	3.5	N=42 0:23/1.0 0:17/1.0 0:23/1.0 0:12/0.6	(2.8) 80%							
-50	-47.5	52.0										
-50	-49.0	53.5	3.5	N=38 0:26/1.0 0:18/1.0 0:38/1.0 0:12/0.6	(0.0) 0%							
-55	-52.5	57.0										
-55	-54.0	58.5	3.5	N=21 0:22/1.0 0:23/1.0 0:29/1.0 0:11/0.6	(0.7) 20%						COASTAL PLAIN GRAY LIMESTONE (RIVER BEND FORMATION)	60.4
-60	-57.5	62.0										
-60	-59.0	63.5	3.5	N=40 0:19/1.0 0:20/1.0 0:20/1.0 0:09/0.6	(1.4) 40%							
-65	-62.5	67.0										
-65	-64.0	68.5	3.5	N=60 0:56/1.0 0:22/1.0 1:10/1.0 0:12/0.6	(2.5) 71%							
-70	-67.5	72.0										
-70	-68.6	73.1	3.8	N=100/0.7 1:36/1.0 0:52/1.0 2:56/1.0 0:59/0.9	(2.0) 53%							
-72.4	-72.4	76.9										
												78.4
Boring Terminated at Elevation -73.9 ft in Limestone												
ARTESIAN HEAD ELEVATION =13.1												

NCDOT CORE DOUBLE BORINGS - COPY.GPJ NC_DOT.GDT 3/23/15

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST M. Lear
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B4-B WBL	STATION 288+55	OFFSET 53 ft RT	ALIGNMENT -L-
COLLAR ELEV. 5.6 ft	TOTAL DEPTH 97.9 ft	NORTHING 417,186	EASTING 2,617,453
DRILL RIG/HAMMER EFF./DATE CME-45			DRILL METHOD NW Casing W/SPT & Core
DRILLER Contract Driller			HAMMER TYPE Manual
START DATE 10/02/02		COMP. DATE 10/03/02	SURFACE WATER DEPTH N/A

WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST M. Lear
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B4-B WBL	STATION 288+55	OFFSET 53 ft RT	ALIGNMENT -L-
COLLAR ELEV. 5.6 ft	TOTAL DEPTH 97.9 ft	NORTHING 417,186	EASTING 2,617,453
DRILL RIG/HAMMER EFF./DATE CME-45			DRILL METHOD NW Casing W/SPT & Core
DRILLER Contract Driller			HAMMER TYPE Manual
START DATE 10/02/02		COMP. DATE 10/03/02	SURFACE WATER DEPTH N/A



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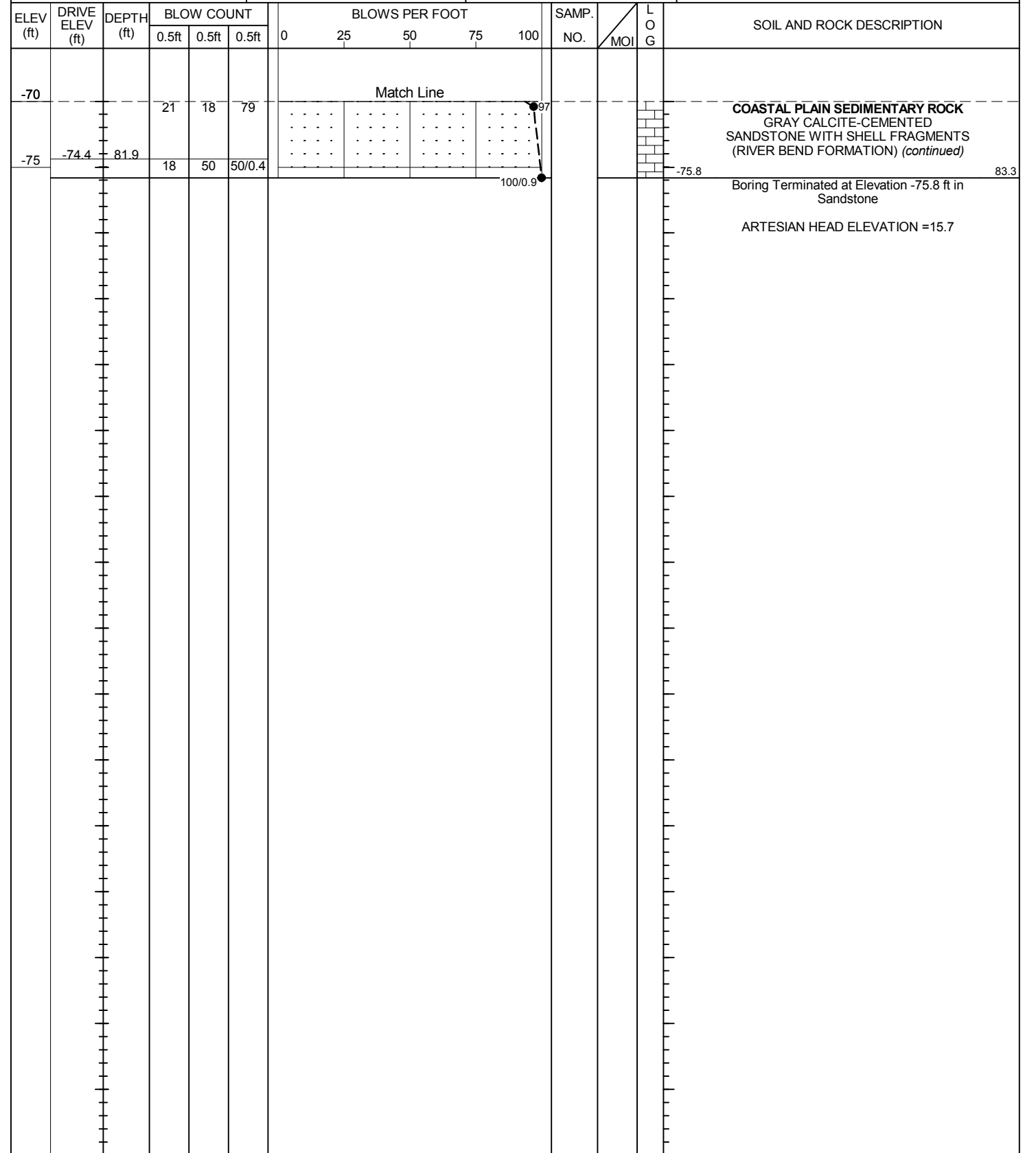
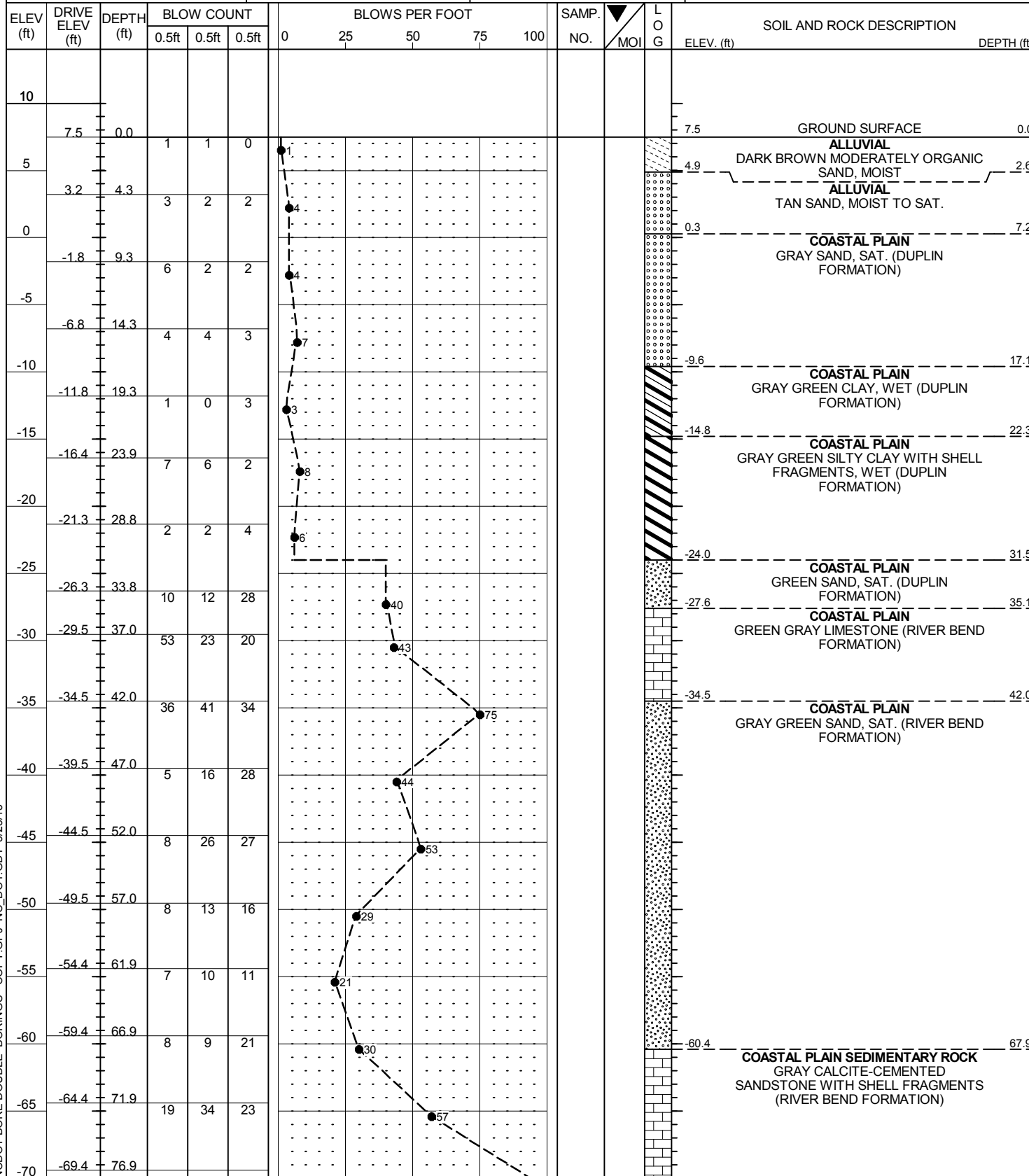


NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST B. Banks
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B5-A EBL	STATION 290+10	OFFSET 40 ft LT	ALIGNMENT -L-
COLLAR ELEV. 7.5 ft	TOTAL DEPTH 83.3 ft	NORTHING 417,325	EASTING 2,617,338
DRILL RIG/HAMMER EFF./DATE CME-45		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Manual
DRILLER Contract Driller	START DATE 11/22/02	COMP. DATE 11/24/02	SURFACE WATER DEPTH N/A

WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST B. Banks
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B5-A EBL	STATION 290+10	OFFSET 40 ft LT	ALIGNMENT -L-
COLLAR ELEV. 7.5 ft	TOTAL DEPTH 83.3 ft	NORTHING 417,325	EASTING 2,617,338
DRILL RIG/HAMMER EFF./DATE CME-45		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Manual
DRILLER Contract Driller	START DATE 11/22/02	COMP. DATE 11/24/02	SURFACE WATER DEPTH N/A



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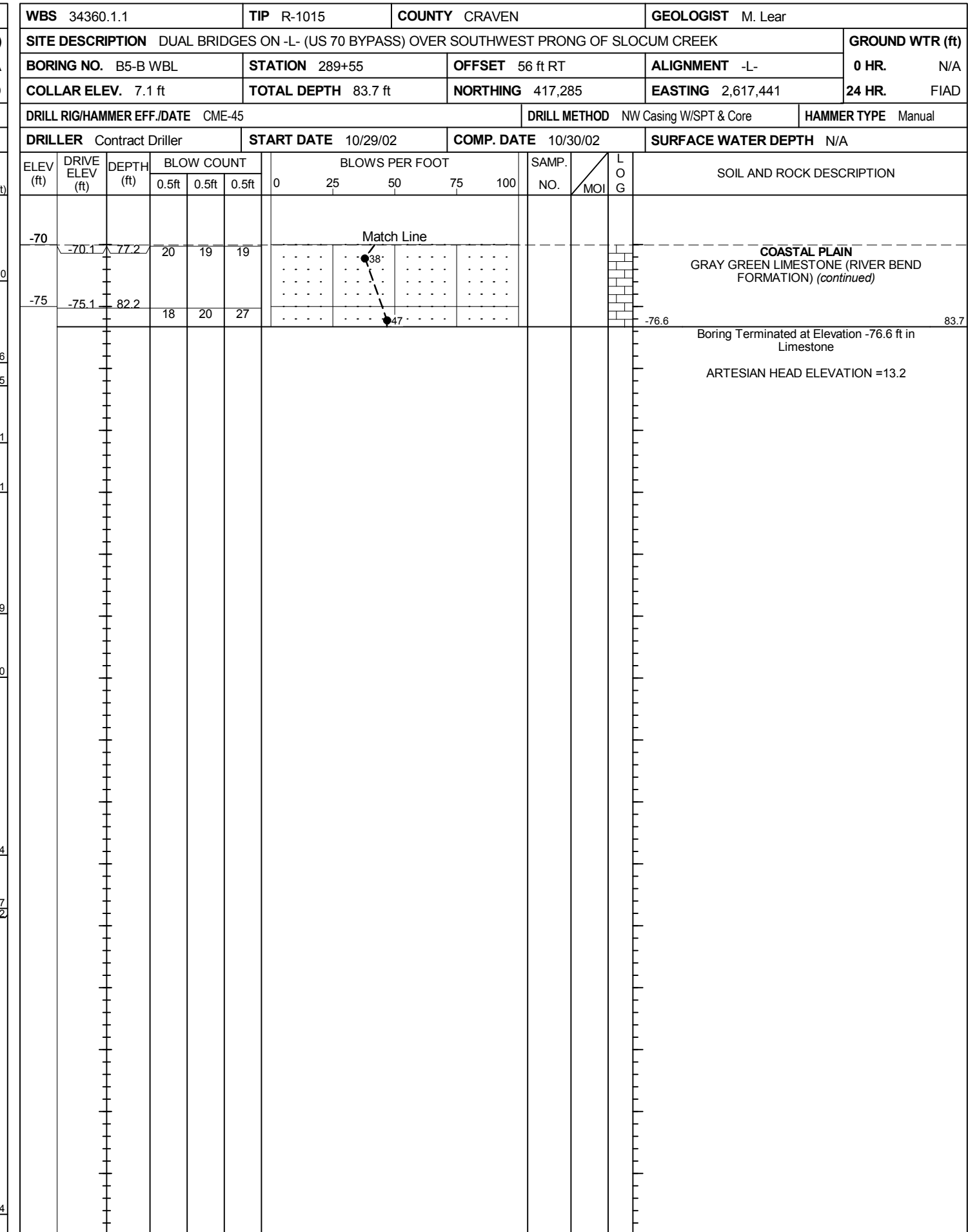
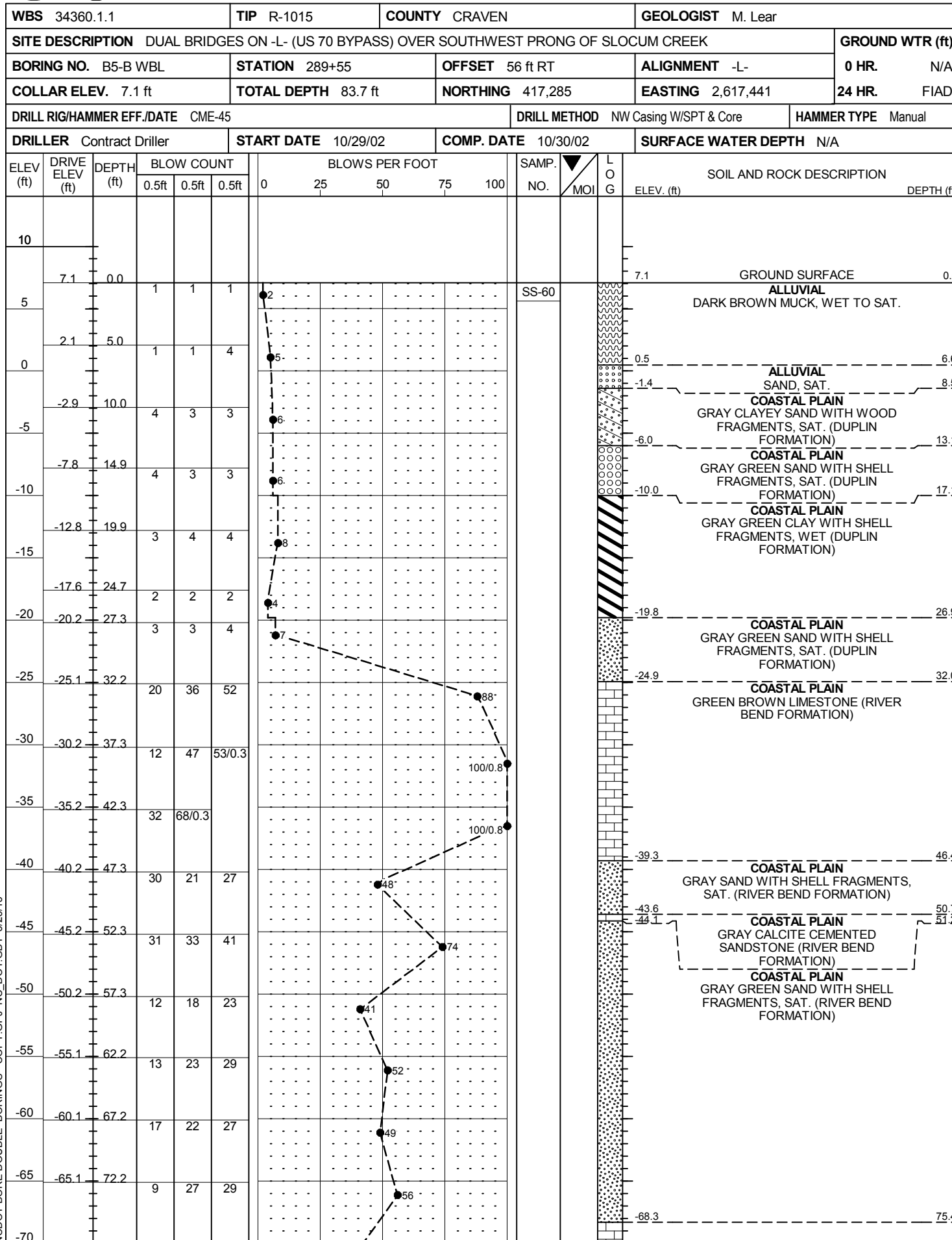
CORE BORING REPORT

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST B. Banks						
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)					
BORING NO. B5-A EBL		STATION 290+10		OFFSET 40 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 7.5 ft		TOTAL DEPTH 83.3 ft		NORTHING 417,325		EASTING 2,617,338						
DRILL RIG/HAMMER EFF./DATE CME-45				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Manual						
DRILLER Contract Driller		START DATE 11/22/02		COMP. DATE 11/24/02		SURFACE WATER DEPTH N/A						
CORE SIZE HQ		TOTAL RUN 33.2 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
-27.8											Begin Coring @ 35.3 ft	
-30	-27.8 -29.5 -31.0	35.3 37.0 38.5	1.7	3:08/1.0 1:26/0.7 N=43	(0.9) 54%						COASTAL PLAIN GREEN GRAY LIMESTONE (RIVER BEND FORMATION) (continued)	
-35	-34.5 -36.0	42.0 43.5	3.5	1:26/1.0 0:32/1.0 0:52/1.0 0:17/0.6 N=75	(2.1) 60%						COASTAL PLAIN GRAY GREEN SAND, SAT. (RIVER BEND FORMATION)	34.5 42.0
-40	-39.5 -41.0	47.0 48.5	3.5	0:53/1.0 0:25/1.0 0:33/1.0 0:24/0.6 N=44	(0.2) 7%							
-45	-44.5 -45.9	52.0 53.4	3.5	0:34/1.0 1:23/1.0 0:28/1.0 0:17/1.0 N=53	(0.0) 0%							
-50	-49.4 -50.9	56.9 58.4	3.5	0:22/1.0 0:50/1.0 0:34/1.0 0:10/0.6 N=29	(0.4) 12%							
-55	-54.4 -55.9	61.9 63.4	3.5	1:20/1.0 1:08/1.0 1:24/1.0 0:17/0.6 N=21	(0.0) 0%							
-60	-59.4 -60.9	66.9 68.4	3.5	0:24/1.0 0:15/1.0 0:37/1.0 0:22/0.6 N=30	(0.0) 0%							60.4 67.9
-65	-64.4 -65.9	71.9 73.4	3.5	0:20/1.0 0:34/1.0 1:24/1.0 0:29/0.6 N=57	(1.4) 41%						COASTAL PLAIN SEDIMENTARY ROCK GRAY CALCITE-CEMENTED SANDSTONE WITH SHELL FRAGMENTS (RIVER BEND FORMATION)	
-70	-69.4 -70.9	76.9 78.4	3.5	0:34/1.0 0:49/1.0 0:38/1.0 0:20/0.6 N=97	(1.6) 45%							
-75	-74.4	81.9	3.5	0:53/1.0 1:21/1.0 1:03/1.0 0:31/0.6 N=100/0.9	(1.1) 30%							75.8 83.3
Boring Terminated at Elevation -75.8 ft in Sandstone												
ARTESIAN HEAD ELEVATION =15.7												

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT



NCDOT BORE DOUBLE BORINGS - COPY.GPJ NC_DOT.GDT 3/23/15



**NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT**

WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST M. Lear
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B5-B WBL	STATION 289+55	OFFSET 56 ft RT	ALIGNMENT -L-
COLLAR ELEV. 7.1 ft	TOTAL DEPTH 83.7 ft	NORTHING 417,285	EASTING 2,617,441
DRILL RIG/HAMMER EFF./DATE CME-45		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Manual
DRILLER Contract Driller	START DATE 10/29/02	COMP. DATE 10/30/02	SURFACE WATER DEPTH N/A

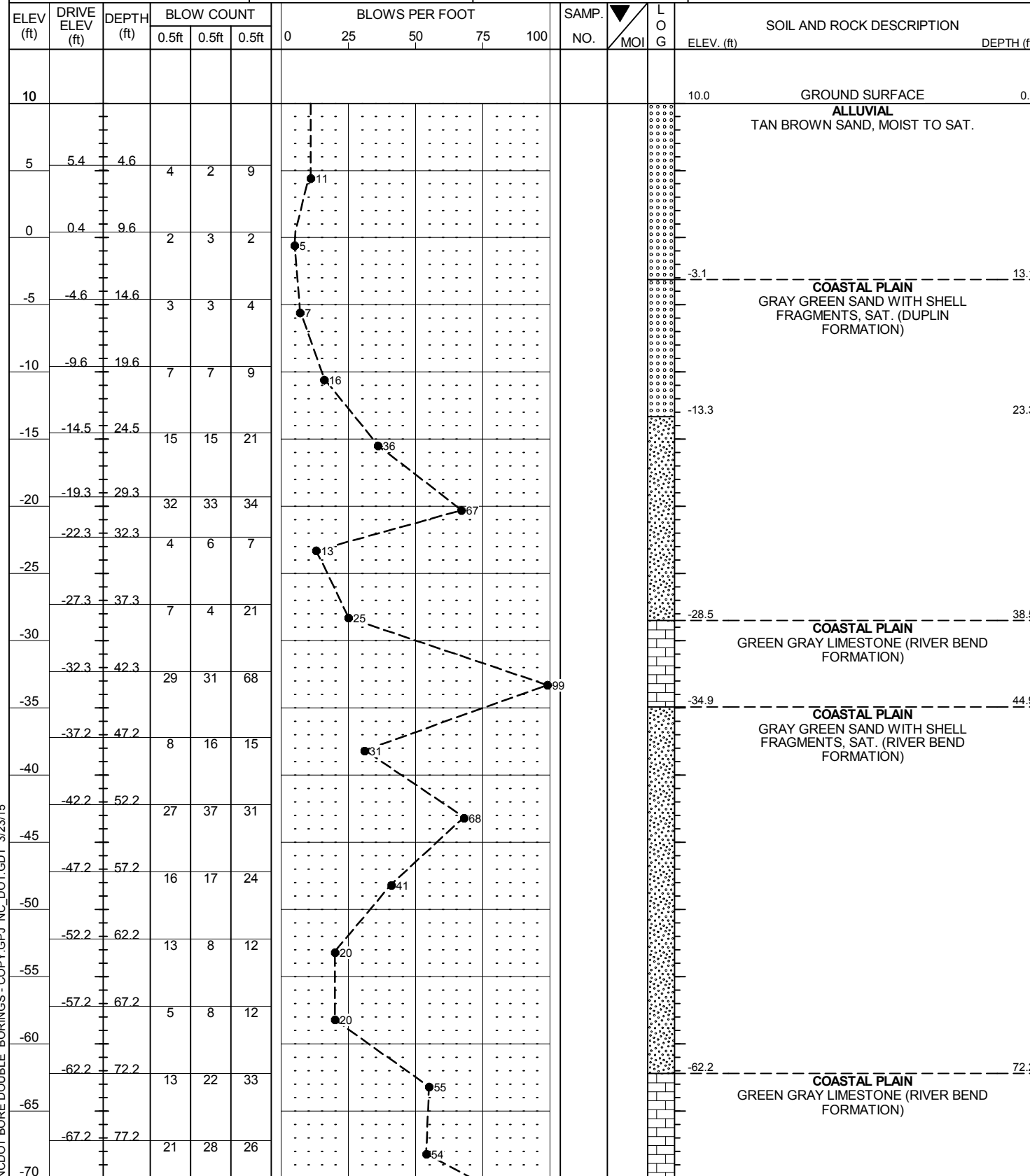
CORE SIZE HQ	TOTAL RUN 40.5 ft
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ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
-19.1											Begin Coring @ 26.2 ft	
-20	-19.1 -20.2 -21.7	28.2 27.3 28.8	1.1	0:31/1.0 0:05/0.1	(0.0)	0%					COASTAL PLAIN GRAY GREEN CLAY WITH SHELL FRAGMENTS, WET (DUPLIN FORMATION) (continued)	26.9
-25	-25.2 -26.7	32.3 33.8	3.5	0:15/1.0 0:14/1.0 0:15/1.0 1:28/0.6 N=88	(0.3)	9%					COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION)	32.0
-30	-30.2 -31.5	37.3 38.6	3.5	1:15/1.0 1:25/1.0 1:56/1.0 1:21/0.6	(1.0)	29%					COASTAL PLAIN GREEN BROWN LIMESTONE (RIVER BEND FORMATION)	
-35	-35.2 -36.0	42.3 43.1	3.7	1:34/1.0 1:35/1.0 0:46/1.0 0:15/0.6 N=100/0.6	(1.0)	27%						
-40	-40.2 -41.7	47.3 48.8	4.2	0:25/1.0 0:26/1.0 0:24/1.0 0:31/0.8 N=48	(3.2)	76%					COASTAL PLAIN GRAY SAND WITH SHELL FRAGMENTS, SAT. (RIVER BEND FORMATION)	46.4
-45	-45.2 -46.6	52.3 53.7	3.5	0:15/1.0 0:22/1.0 0:26/1.0 3:47/1.0 N=74	(0.5)	14%					COASTAL PLAIN GRAY CALCITE CEMENTED SANDSTONE (RIVER BEND FORMATION)	50.7
-50	-50.1 -51.6	57.2 58.7	3.5	0:11/0.3 0:35/1.0 0:31/1.0 0:17/1.0 0:12/0.6 N=47	(0.0)	0%					COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (RIVER BEND FORMATION)	51.2
-55	-55.1 -56.6	62.2 63.7	3.5	0:24/1.0 0:26/1.0 0:25/1.0 0:14/0.6 N=52	(0.0)	0%						
-60	-60.1 -61.6	67.2 68.7	3.5	0:42/1.0 0:21/1.0 0:22/1.0 0:16/0.6 N=49	(0.0)	0%						
-65	-65.1 -66.6	72.2 73.7	3.5	0:31/1.0 0:29/1.0 0:27/1.0 0:13/0.6 N=56	(0.0)	0%						
-70	-70.1 -71.6	77.2 78.7	3.5	0:31/1.0 0:49/1.0 1:15/1.0 0:25/0.6 N=38	(0.6)	17%					COASTAL PLAIN GRAY GREEN LIMESTONE (RIVER BEND FORMATION)	75.4
-75	-75.1	82.2	3.5	1:22/1.0 1:42/1.0 1:31/1.0 0:35/0.6 N=47	(0.9)	26%						
											Boring Terminated at Elevation -76.6 ft in Limestone	83.7
											ARTESIAN HEAD ELEVATION =13.2	

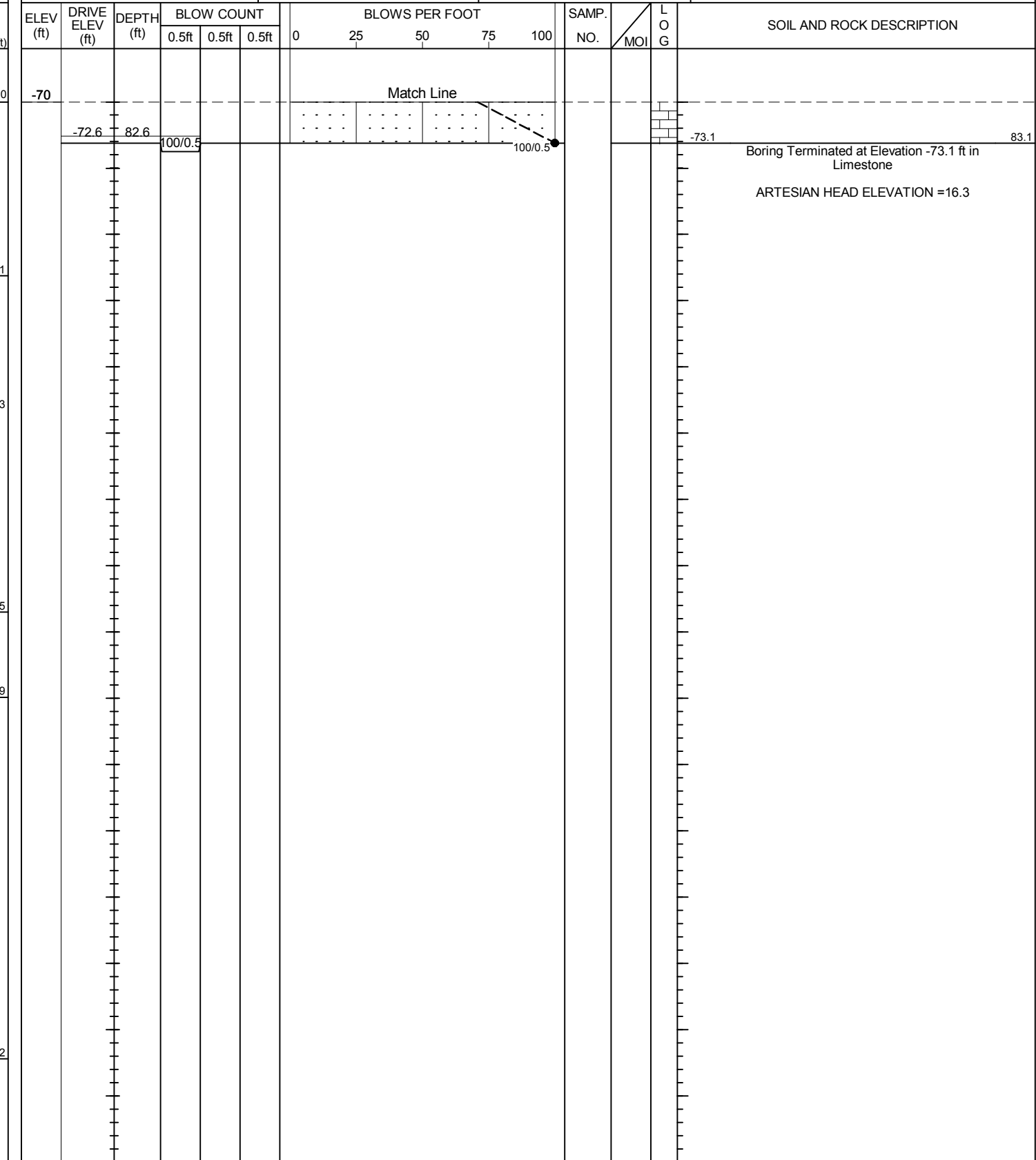
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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST M. Lear
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B6-A EBL	STATION 291+11	OFFSET 44 ft LT	ALIGNMENT -L-
COLLAR ELEV. 10.0 ft	TOTAL DEPTH 83.1 ft	NORTHING 417,425	EASTING 2,617,319
DRILL RIG/HAMMER EFF./DATE CME-45		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Manual
DRILLER Contract Driller	START DATE 11/25/02	COMP. DATE 11/25/02	SURFACE WATER DEPTH N/A



WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST M. Lear
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B6-A EBL	STATION 291+11	OFFSET 44 ft LT	ALIGNMENT -L-
COLLAR ELEV. 10.0 ft	TOTAL DEPTH 83.1 ft	NORTHING 417,425	EASTING 2,617,319
DRILL RIG/HAMMER EFF./DATE CME-45		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Manual
DRILLER Contract Driller	START DATE 11/25/02	COMP. DATE 11/25/02	SURFACE WATER DEPTH N/A



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**NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT**

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. Lear							
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)						
BORING NO. B6-A EBL		STATION 291+11		OFFSET 44 ft LT		ALIGNMENT -L-							
COLLAR ELEV. 10.0 ft		TOTAL DEPTH 83.1 ft		NORTHING 417,425		EASTING 2,617,319							
DRILL RIG/HAMMER EFF./DATE CME-45				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Manual							
DRILLER Contract Driller		START DATE 11/25/02		COMP. DATE 11/25/02		SURFACE WATER DEPTH N/A							
CORE SIZE HQ		TOTAL RUN 36.5 ft											
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS	ELEV. (ft)	DEPTH (ft)
-20.8	-20.8	30.8	1.5	0:19/1.0	(0.0)						Begin Coring @ 30.8 ft		
	-22.3	32.3		0:10/0.5	0%						GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION) (continued)		
	-23.8	33.8		N=13									
-25			3.5	0:21/1.0	(0.0)								
	-27.3	37.3		0:21/1.0	0%								
	-28.7	38.7		0:19/1.0									
				0:12/0.6									
				N=25									
-30			3.5	2:29/1.0	(0.3)						COASTAL PLAIN		
	-32.2	42.2		1:08/1.0	9%						GREEN GRAY LIMESTONE (RIVER BEND FORMATION)		
	-33.7	43.7		1:07/1.0									
				0:22/0.6									
				N=99									
-35			3.5	1:03/1.0	(0.4)						COASTAL PLAIN		
	-37.2	47.2		0:26/1.0	11%						GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (RIVER BEND FORMATION)		
	-38.7	48.7		0:21/1.0									
				0:18/0.6									
				N=31									
-40			3.5	0:33/1.0	(0.0)								
	-42.2	52.2		1:24/1.0	0%								
	-43.7	53.7		0:48/1.0									
				0:22/0.6									
				N=68									
-45			3.5	0:38/1.0	(0.9)								
	-47.2	57.2		0:30/1.0	26%								
	-48.7	58.7		0:45/1.0									
				0:23/0.6									
				N=41									
-50			3.5	0:30/1.0	(0.7)								
	-52.2	62.2		0:28/1.0	20%								
	-53.7	63.7		0:17/1.0									
				N=20									
-55			3.5	0:38/1.0	(0.0)								
	-57.2	67.2		0:27/1.0	0%								
	-58.7	68.7		0:24/1.0									
				0:13/0.6									
				N=20									
-60			3.5	0:19/1.0	(0.0)								
	-62.2	72.2		0:34/1.0	0%								
	-63.7	73.7		0:50/1.0									
				0:16/0.6									
				N=55									
-65			3.5	0:40/1.0	(1.6)								
	-67.2	77.2		0:34/1.0	46%								
	-68.6	78.6		0:27/1.0									
				0:25/0.6									
				N=54									
-70			3.5	1:13/1.0	(1.7)								
	-72.1	82.1		1:10/1.0	49%								
				0:35/1.0									
				0:37/0.6									
				N=100/0.5									
											Boring Terminated at Elevation -73.1 ft in Limestone		
											ARTESIAN HEAD ELEVATION =16.3		

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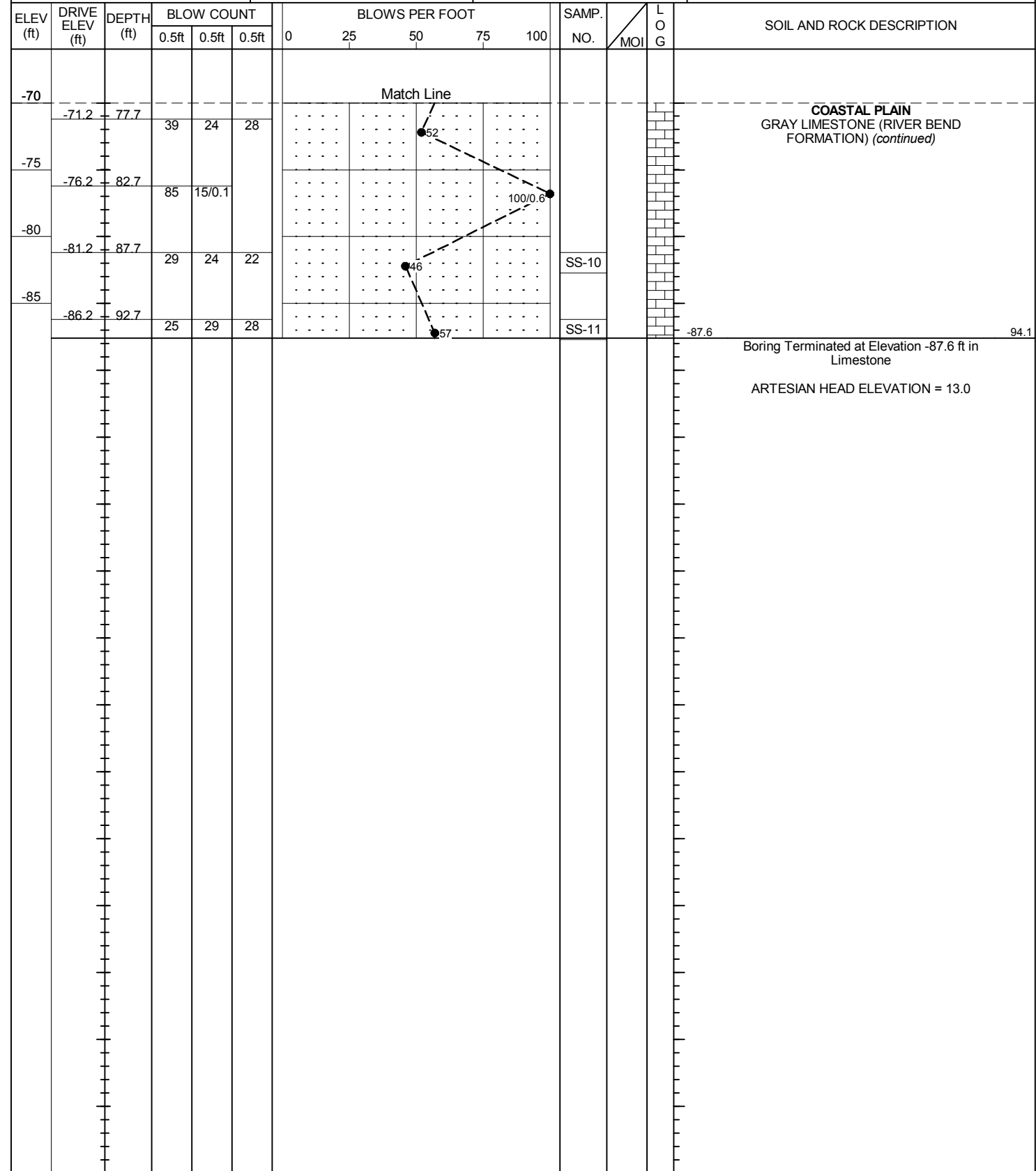
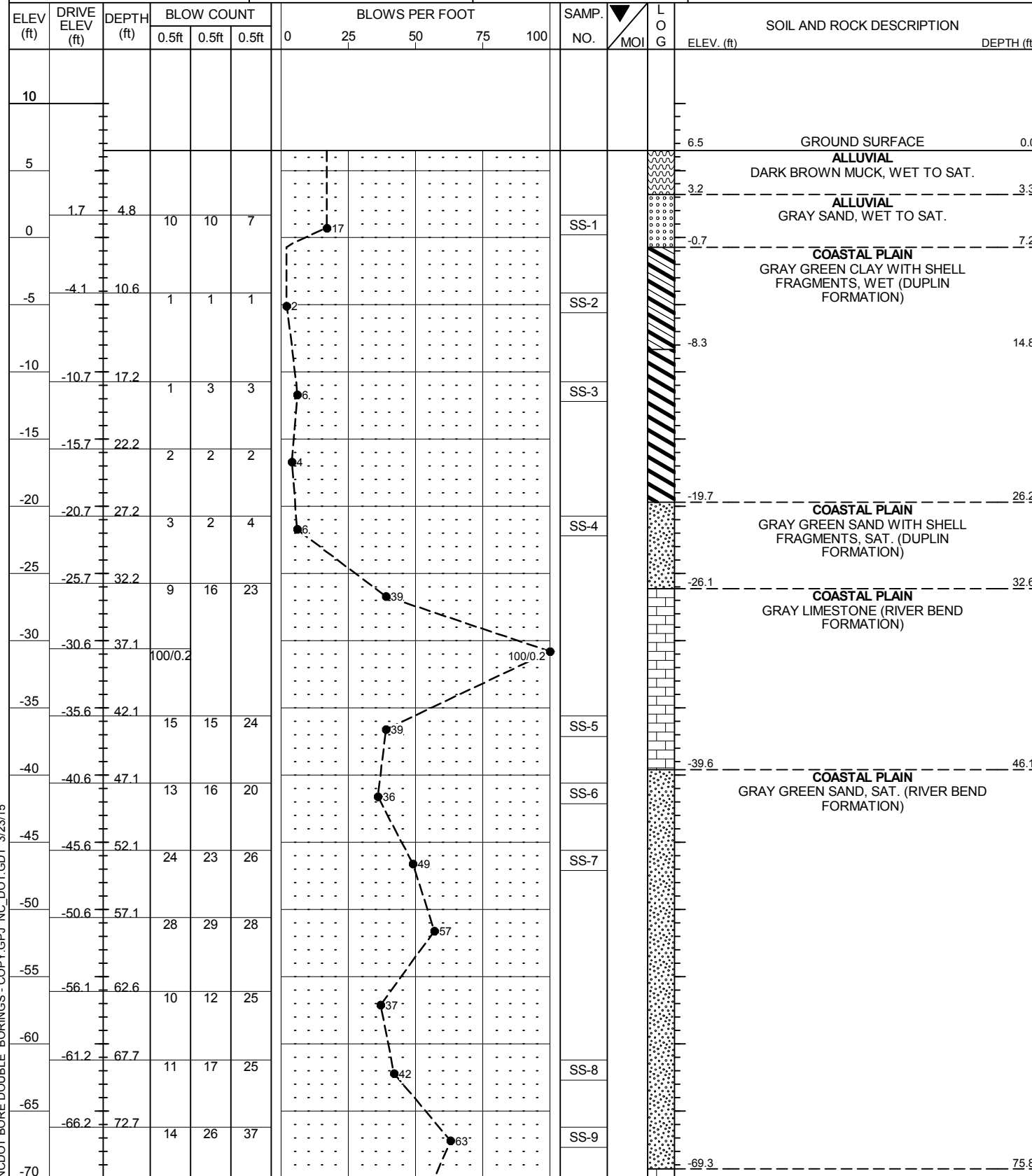


NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST M. Lear
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B6-B WBL	STATION 291+23	OFFSET 57 ft RT	ALIGNMENT -L-
COLLAR ELEV. 6.5 ft	TOTAL DEPTH 94.1 ft	NORTHING 417,451	EASTING 2,617,417
DRILL RIG/HAMMER EFF./DATE CME-45		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Manual
DRILLER Contract Driller	START DATE 09/17/02	COMP. DATE 09/17/02	SURFACE WATER DEPTH N/A

WBS 34360.1.1	TIP R-1015	COUNTY CRAVEN	GEOLOGIST M. Lear
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK			GROUND WTR (ft)
BORING NO. B6-B WBL	STATION 291+23	OFFSET 57 ft RT	ALIGNMENT -L-
COLLAR ELEV. 6.5 ft	TOTAL DEPTH 94.1 ft	NORTHING 417,451	EASTING 2,617,417
DRILL RIG/HAMMER EFF./DATE CME-45		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Manual
DRILLER Contract Driller	START DATE 09/17/02	COMP. DATE 09/17/02	SURFACE WATER DEPTH N/A



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NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. Lear						
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)					
BORING NO. B6-B WBL		STATION 291+23		OFFSET 57 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 6.5 ft		TOTAL DEPTH 94.1 ft		NORTHING 417,451		EASTING 2,617,417						
DRILL RIG/HAMMER EFF./DATE CME-45			DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Manual						
DRILLER Contract Driller		START DATE 09/17/02		COMP. DATE 09/17/02		SURFACE WATER DEPTH N/A						
CORE SIZE HQ		TOTAL RUN 60.4 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (%)	RUN RQD (%)	SAMP. NO.	STRATA REC. (%)	STRATA RQD (%)	LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
-5.7	-5.7	12.2	5.0	0:20/1.0 0:22/1.0 0:13/1.0 0:09/1.0 0:25/1.0 N=6	(0.0) 0%						Begin Coring @ 12.2 ft COASTAL PLAIN GRAY GREEN CLAY WITH SHELL FRAGMENTS, WET (DUPLIN FORMATION) (continued)	14.8
-10	-10.7	17.2										
-15	-15.7	22.2	3.5	1:30/1.0 1:15/1.0 1:08/1.0 0:31/0.6 N=4	(0.0) 0%							
-20	-20.7	27.2	3.5	0:36/1.0 0:28/1.0 0:31/1.0 0:15/0.6 N=6	(0.0) 0%						COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION)	26.2
-25	-25.6	32.1	3.5	0:35/1.0 0:37/1.0 0:29/1.0 0:21/0.6 N=39	(0.0) 0%							
-30	-30.6	37.1	3.5	2:31/1.0 2:27/1.0 2:20/1.0 0:52/0.6 N=100/0.2	(2.0) 57%						COASTAL PLAIN GRAY LIMESTONE (RIVER BEND FORMATION)	32.8
-35	-35.7	42.2	4.8	1:56/1.0 1:58/1.0 1:36/1.0 1:35/1.0 N=39	(1.3) 27%							
-40	-40.6	47.1	3.5	3:00/0.8 1:13/1.0 1:04/1.0 0:58/1.0 N=36	(2.0) 57%						COASTAL PLAIN GRAY GREEN SAND, SAT. (RIVER BEND FORMATION)	46.1
-45	-45.6	52.1	3.5	0:24/0.6 0:30/1.0 0:21/1.0 0:22/1.0 0:15/0.6 N=49	(0.0) 0%							
-50	-50.6	57.1	3.5	0:32/1.0 0:42/1.0 0:45/1.0 0:21/0.6 N=57	(0.3) 9%							
-55	-56.1	62.6	4.0	0:20/1.0 0:21/1.0 0:16/1.0 0:10/0.6 N=37	(0.0) 0%							
-60	-61.2	67.7	3.7	0:17/1.0 0:15/1.0 0:18/1.0 0:12/0.7 N=42	(0.0) 0%							
-65	-66.2	72.7	3.5	0:18/1.0 0:15/1.0 0:16/1.0 0:11/0.6 N=63	(0.0) 0%							
-70	-71.2	77.7	3.5	0:24/1.0 0:34/1.0 0:23/1.0 0:12/0.6 N=52	(0.0) 0%						COASTAL PLAIN GRAY LIMESTONE (RIVER BEND FORMATION)	75.8
-75	-78.2	82.7	3.5	1:11/1.0 2:19/1.0 0:45/1.0 0:21/0.6 N=100/0.6	(0.5) 14%							
-80	-81.1	87.6	4.4	0:31/1.0 0:35/1.0 0:32/1.0 0:25/1.0 0:15/0.5 N=46	(0.4) 9%							
-85	-82.6	89.1	3.5	0:45/1.0 0:51/1.0 0:32/1.0	(0.1) 3%							

NCDOT CORE DOUBLE BORINGS - COPY.GPJ NC_DOT.GDT 3/23/15

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. Lear						
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)					
BORING NO. B6-B WBL		STATION 291+23		OFFSET 57 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 6.5 ft		TOTAL DEPTH 94.1 ft		NORTHING 417,451		EASTING 2,617,417						
DRILL RIG/HAMMER EFF./DATE CME-45			DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Manual						
DRILLER Contract Driller		START DATE 09/17/02		COMP. DATE 09/17/02		SURFACE WATER DEPTH N/A						
CORE SIZE HQ		TOTAL RUN 60.4 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (%)	RUN RQD (%)	SAMP. NO.	STRATA REC. (%)	STRATA RQD (%)	LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
-85.7	-86.1	92.6		0:25/0.6 N=57							Begin Coring @ 92.2 ft	
											Boring Terminated at Elevation -87.6 ft in Limestone	94.1
											ARTESIAN HEAD ELEVATION = 13.0	



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. Lear										
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)									
BORING NO. EB2-A EBL		STATION 292+13		OFFSET 46 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 12.5 ft		TOTAL DEPTH 44.2 ft		NORTHING 417,525		EASTING 2,617,302										
DRILL RIG/HAMMER EFF./DATE CME-45				DRILL METHOD Mud Rotary		HAMMER TYPE Manual										
DRILLER Contract Driller		START DATE 10/22/02		COMP. DATE 10/23/02		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)		
15														12.5	GROUND SURFACE	0.0
10	12.5	0.0	2	3	5										ALLUVIAL TAN SAND WITH WOOD FRAGMENTS, MOIST TO SAT.	
5	7.6	4.9	13	20	24											
0	2.7	9.8	3	3	3											
-5	-2.3	14.8	4	4	4									-0.6	COASTAL PLAIN CLAYEY SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION)	13.1
-10	-7.3	19.8	2	2	7											
-15	-11.6	24.1	4	5	5											
-20	-16.5	29.0	17	26	25									-14.4	COASTAL PLAIN GRAY GREEN SAND WITH SHELL FRAGMENTS, SAT. (DUPLIN FORMATION)	26.9
-25	-21.5	34.0	4	5	6									-19.7		32.2
-30	-26.5	39.0	17	83/0.2										-25.6	COASTAL PLAIN GRAY LIMESTONE (RIVER BEND FORMATION)	38.1
	-31.4	43.9	100/0.3											-31.7		44.2
															Boring Terminated at Elevation -31.7 ft in Limestone	

NCDOT BORE DOUBLE BORINGS - COPY.GPJ NC_DOT.GDT 3/23/15



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 34360.1.1		TIP R-1015		COUNTY CRAVEN		GEOLOGIST M. Lear										
SITE DESCRIPTION DUAL BRIDGES ON -L- (US 70 BYPASS) OVER SOUTHWEST PRONG OF SLOCUM CREEK							GROUND WTR (ft)									
BORING NO. EB2-B WBL		STATION 292+14		OFFSET 63 ft RT		ALIGNMENT -L-	0 HR. N/A									
COLLAR ELEV. 8.8 ft		TOTAL DEPTH 45.4 ft		NORTHING 417,542		EASTING 2,617,409	24 HR. FIAD									
DRILL RIG/HAMMER EFF./DATE CME-45				DRILL METHOD Mud Rotary		HAMMER TYPE Manual										
DRILLER Contract Driller		START DATE 10/23/02		COMP. DATE 10/23/02		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	8.8	0.0	1	2	2									8.8	0.0	GROUND SURFACE
5	3.7	5.1	5	14	12											ALLUVIAL GRAY SAND WITH WOOD FRAGMENTS, MOIST TO SAT.
0	-1.4	10.2	16	8	5									-0.4	9.2	COASTAL PLAIN GRAY GREEN CLAYEY SAND, SAT. (DUPLIN FORMATION)
-5	-6.4	15.2	2	2	4											COASTAL PLAIN GRAY GREEN CLAY WITH SHELL FRAGMENTS, WET (DUPLIN FORMATION)
-10	-10.3	19.1	3	3	4											COASTAL PLAIN GRAY GREEN CLAY WITH SHELL FRAGMENTS, WET (DUPLIN FORMATION)
-15	-15.3	24.1	3	3	4											COASTAL PLAIN GRAY GREEN CLAY WITH SHELL FRAGMENTS, WET (DUPLIN FORMATION)
-20	-20.3	29.1	2	3	3											COASTAL PLAIN GRAY GREEN CLAY WITH SHELL FRAGMENTS, WET (DUPLIN FORMATION)
-25	-25.3	34.1	57	17	17											COASTAL PLAIN GRAY LIMESTONE (RIVER BEND FORMATION)
-30	-30.4	39.2	87	13/0.1												COASTAL PLAIN GRAY LIMESTONE (RIVER BEND FORMATION)
-35	-35.2	44.0	12	27	73/0.4											COASTAL PLAIN GRAY LIMESTONE (RIVER BEND FORMATION)
																Boring Terminated at Elevation -36.6 ft in Limestone
																ARTESIAN HEAD ELEVATION =13.0
																Other Samples: ST-1 (21.0 - 23.0)

NCDOT BORE DOUBLE BORINGS - COPY.GPJ NC_DOT.GDT 3/23/15

PROJECT REFERENCE NO. R-1015		SHEET NO. 42 OF 54	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

34360

R-1015

DUAL BRIDGES ON US 70 BYPASS OVER SOUTHWEST PRONG OF SLOCUM CREEK AT -L- STA. 287+62.5

EB1-A EBL 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-46	53 LT	282+89	10.0-11.5	A-3	16	NP	21.4	69.7	0.8	8.1	100	97	9	-	-
SS-47	53 LT	282+89	14.9-16.4	A-3	18	NP	7.2	79.3	8.2	5.3	100	98	15	-	-
SS-48	53 LT	282+89	34.0-35.5	A-1-b	25	NP	40.9	44.9	3.5	10.7	74	50	12	-	-
SS-49	53 LT	282+89	39.1-40.6	A-2-4	22	NP	7.2	79.3	8.2	5.3	100	98	15	-	-

EB1-B WBL 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-41	58 RT	282+89	4.7-6.2	A-2-4	22	NP	0.9	86.0	1.8	11.3	100	100	13.9	ND	ND
SS-42	58 RT	282+89	14.5-16.0	A-3	21	NP	8.5	85.8	0.4	5.3	100	99	6.6	ND	ND
SS-43	58 RT	282+89	29.1-30.6	A-3	19	NP	28.0	61.9	1.0	9.1	100	96	10	ND	ND
SS-44	58 RT	282+89	34.1-35.6	A-2-4	17	NP	54.9	28	4.4	12.7	95	73	19	ND	ND
SS-45	58 RT	282+89	38.7-40.2	A-1-B	20	NP	79.2	16.5	1.0	3.2	99	50	5	ND	ND

B1-A EBL 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-35	56 LT	283+76	0.0-1.5	A-2-4	38	NP	11.0	71.1	8.2	9.7	100	96	20	22.2	5.0
SS-36	56 LT	283+76	14.5-16.0	A-3	13	NP	41.1	57.4	0.5	1.0	100	96	2	-	-
SS-37	56 LT	283+76	22.4-23.9	A-3	16	NP	22.0	73.8	0	4.2	100	100	4	26.4	-
SS-38	56 LT	283+76	27.4-28.9	A-3	19	NP	64.8	27.0	3.0	5.2	96	64	9	-	-
SS-39	56 LT	283+76	32.4-33.9	A-2-4	29	NP	3.3	76.0	7.2	13.6	95	93	28	33.4	-
SS-40	56 LT	283+76	72.0-73.2	A-1-b	18	NP	72.1	19.2	3.5	5.2	93	39	9	-	-

B3-A EBL 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-50	59 LT	286+50	0.0-1.5	MUCK	-	NP	-	-	-	-	-	-	-	127.1	11.5
SS-51	59 LT	286+50	4.8-6.3	A-2-4	20	NP	5.2	67.8	8.6	18.4	100	100	30	22.9	-
SS-52	59 LT	286+50	19.7-21.2	A-6(2)	36	18	29.8	30.8	14.1	25.3	86	67	37	41.0	-
SS-53	59 LT	286+50	26.7-28.2	A-2-4	24	NP	71.9	13.3	9.2	5.6	83	34	13	39.6	-
SS-54	59 LT	286+50	42.0-43.5	A-2-4	18	NP	6.6	59.4	27.8	6.2	82	78	30	-	-
SS-55	59 LT	286+50	66.9-68.4	A-1-b	15	NP	71.9	13.3	9.2	5.6	83	34	13	-	-

B4-A EBL 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-61	59 LT	288+28	0.0-1.5	A-2-4	25	NP	17.3	72.0	6.1	4.6	100	95	12	59.1	6.0

B4-B WBL 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-59	53 RT	288+55	5.0-6.5	A-1-B	18	NP	77.0	20.5	0.0	2.5	100	44	3	ND	ND
SS-13	53 RT	288+55	9.8-11.3	A-3	19	NP	63.7	30.2	0.8	5.3	84.9	53	5.5	ND	ND
SS-14	53 RT	288+55	14.7-16.2	A-7-6(52)	74	51	2	6.4	31.8	59.7	98	96	91	78.6	ND
SS-15	53 RT	288+55	21.7-23.2	A-4	32	10	5.2	56.3	24.3	14.2	89	85	40	52.5	ND
SS-16	53 RT	288+55	26.6-28.1	A-2-4	25	NP	4.4	75.1	8.0	12.5	91	87	26	35.4	ND
SS-17	53 RT	288+55	51.6-53.1	A-2-4	19	NP	5.0	83.4	7.3	4.3	100	99	13	21.0	ND
SS-18	53 RT	288+55	56.6-58.1	A-2-4	23	NP	1.3	84.8	7.2	6.6	97	96	16	36.2	ND
SS-20	53 RT	288+55	66.5-68.0	A-2-4	25	NP	0.6	90.5	2.4	6.5	100	100	11.5	36.4	ND
SS-21	53 RT	288+55	71.5-73.0	A-4	23	NP	1.7	53.4	38.6	6.3	99	98	47	34.3	ND
SS-22	53 RT	288+55	76.5-78.0	A-2-4	18	NP	33.2	46.9	12.1	7.8	73	52	16	ND	ND
SS-23	53 RT	288+55	81.5-83.0	A-1-B	17	NP	74.1	12.2	8.2	5.5	75	29	11	ND	ND
SS-24	53 RT	288+55	91.5-93.0	A-3	24	NP	36.1	59.5	0.2	4.2	100	83	5	ND	ND
SS-25	53 RT	288+55	96.5-98.0	A-1-B	17	NP	65.4	21	7.3	6.3	68	29	10	ND	ND

B5-B WBL 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-60	56 RT	289+55	0.0-1.5	MUCK	46	NP	17.5	61.9	11.8	8.8	100	96	22	115.9	11.3

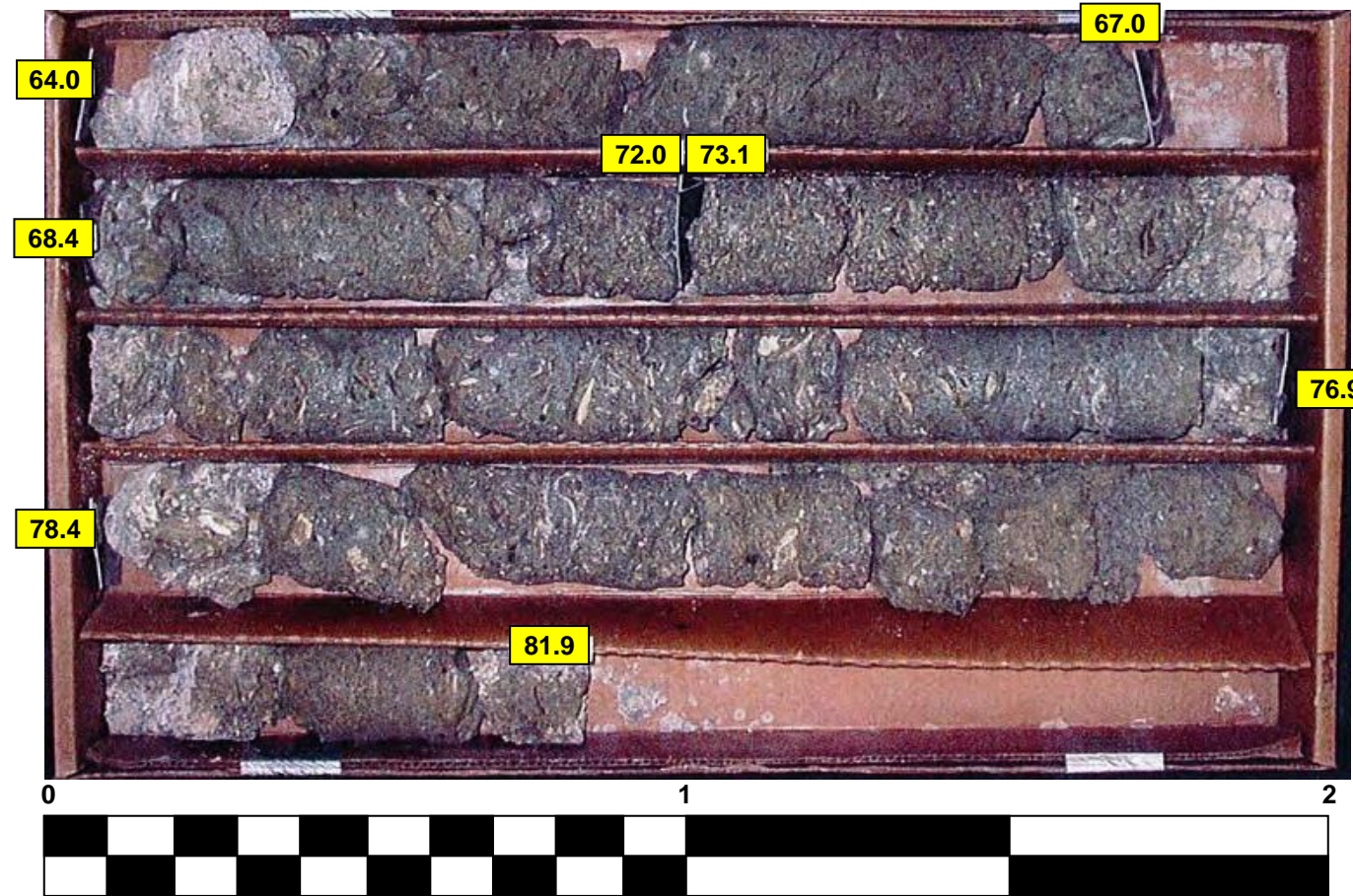
B6-B WBL SOIL TEST RESULTS

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	57 RT	291+23	4.8-6.3	A-3	22	NP	35.7	61.2	0.9	2.2	100	91	4	ND	ND
SS-2	57 RT	291+23	10.6-12.1	A-6	24	9	3.5	57.8	11.3	27.4	100	99	39	49.7	ND
SS-3	57 RT	291+23	17.2-18.7	A-7-6	46	29	9.1	23.1	26.8	41	98	91	70	66.4	ND
SS-4	57 RT	291+23	27.2-28.7	A-2-4	26	NP	18.5	63	4.1	14.5	86	73	20	29.3	ND
SS-5	57 RT	291+23	42.1-43.6	A-2-4	25	NP	3.8	78.8	9	8.4	99	97	21	28.3	ND
SS-6	57 RT	291+23	47.1-48.6	A-2-4	23	NP	7.8	80.8	5.8	5.5	100	97	14	27.1	ND
SS-7	57 RT	291+23	52.1-53.6	A-2-4	19	NP	3.7	81.2	11	4.1	100	98	17	24.6	ND
SS-8	57 RT	291+23	67.7-69.2	A-2-4	23	NP	0.9	86.5	5.3	7.3	100	99	15	35.6	ND
SS-9	57 RT	291+23	72.7-74.2	A-2-4	24	NP	0.9	89.3	4.6	5.2	100	100	11.6	27.9	ND
SS-10	57 RT	291+23	87.7-89.2	A-1-B	17	NP	68.6	17.1	9.1	5.1	75.9	32.2	12.2	ND	ND
SS-11	57 RT	291+23	92.7-94.2	A-1-B	15	NP	72.1	19.1	3.9	5.0	99	39	11	ND	ND

EB2-B WBL 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	63 RT	292+14	18.7-20.7	A-7-6(37)	67	41	3.3	16.8	25.2	54.7	99	96	83	79.7	ND

CORE PHOTOGRAPH
B1-A EBL
Box 1 of 1 (64.0' to 81.9')

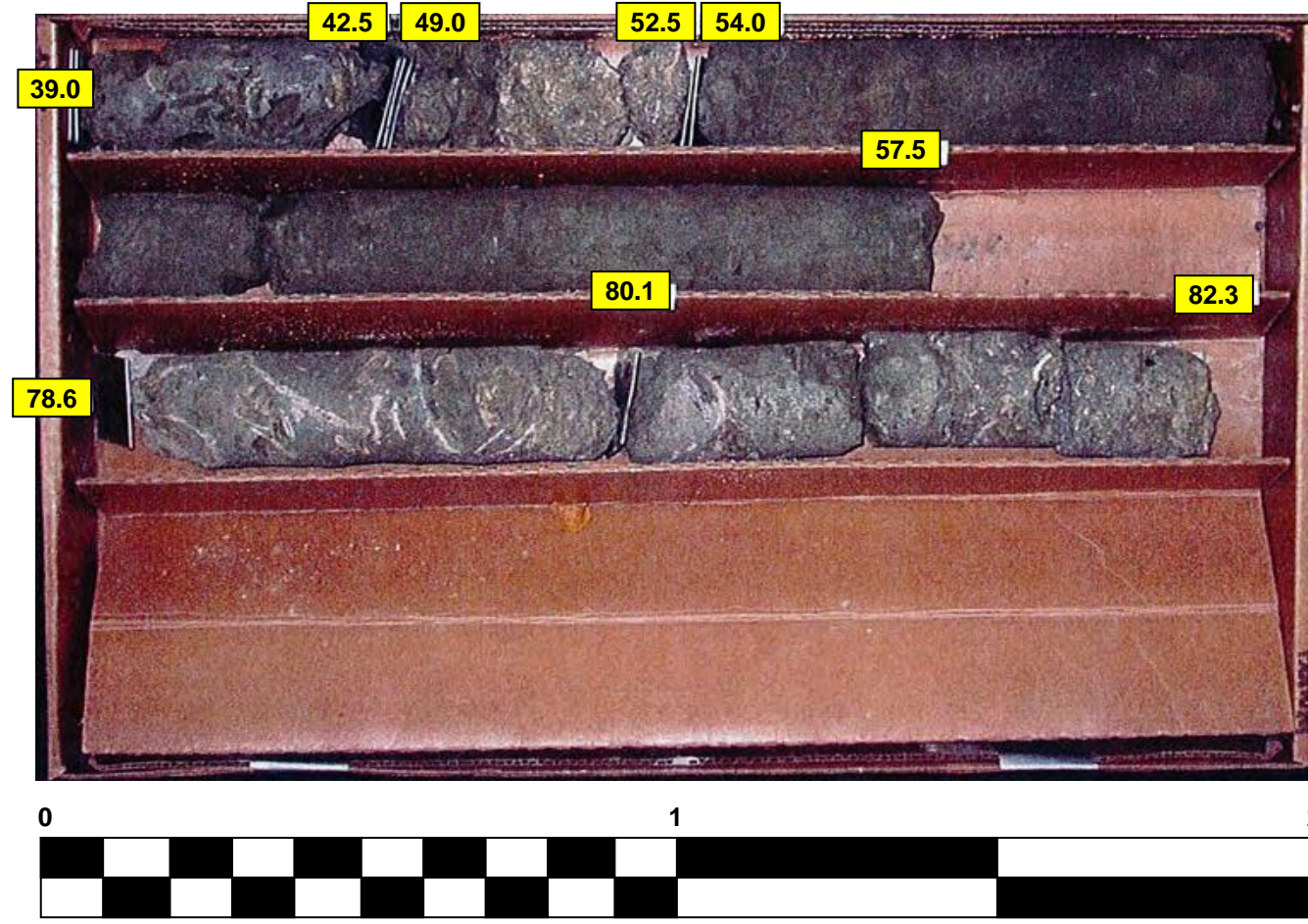


FEET

CORE PHOTOGRAPH

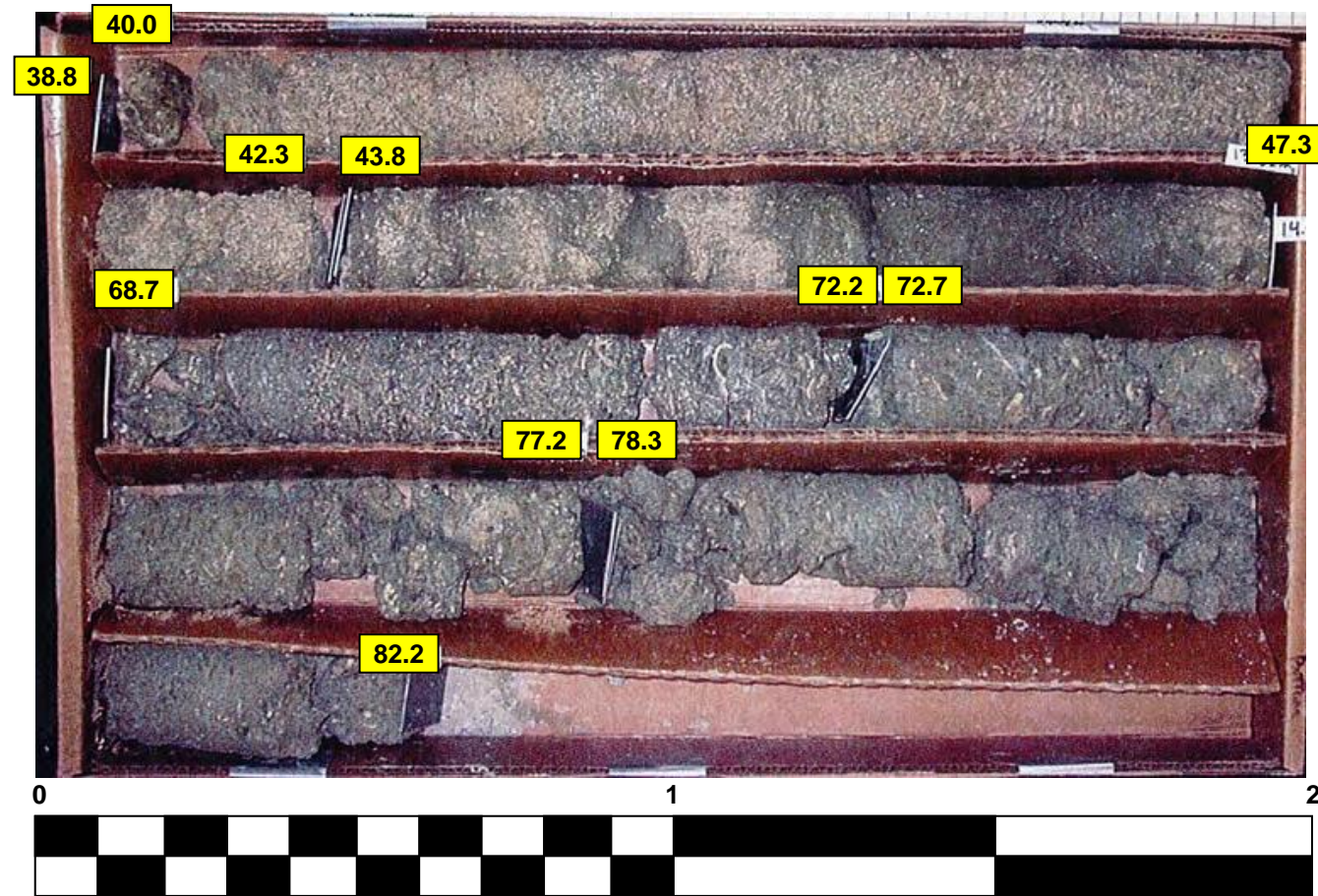
B1-B WBL

Box 1 of 1 (39.0' to 82.3')



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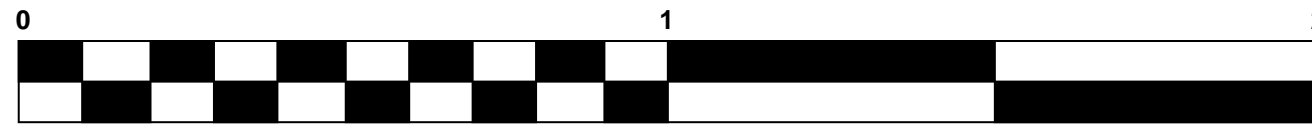
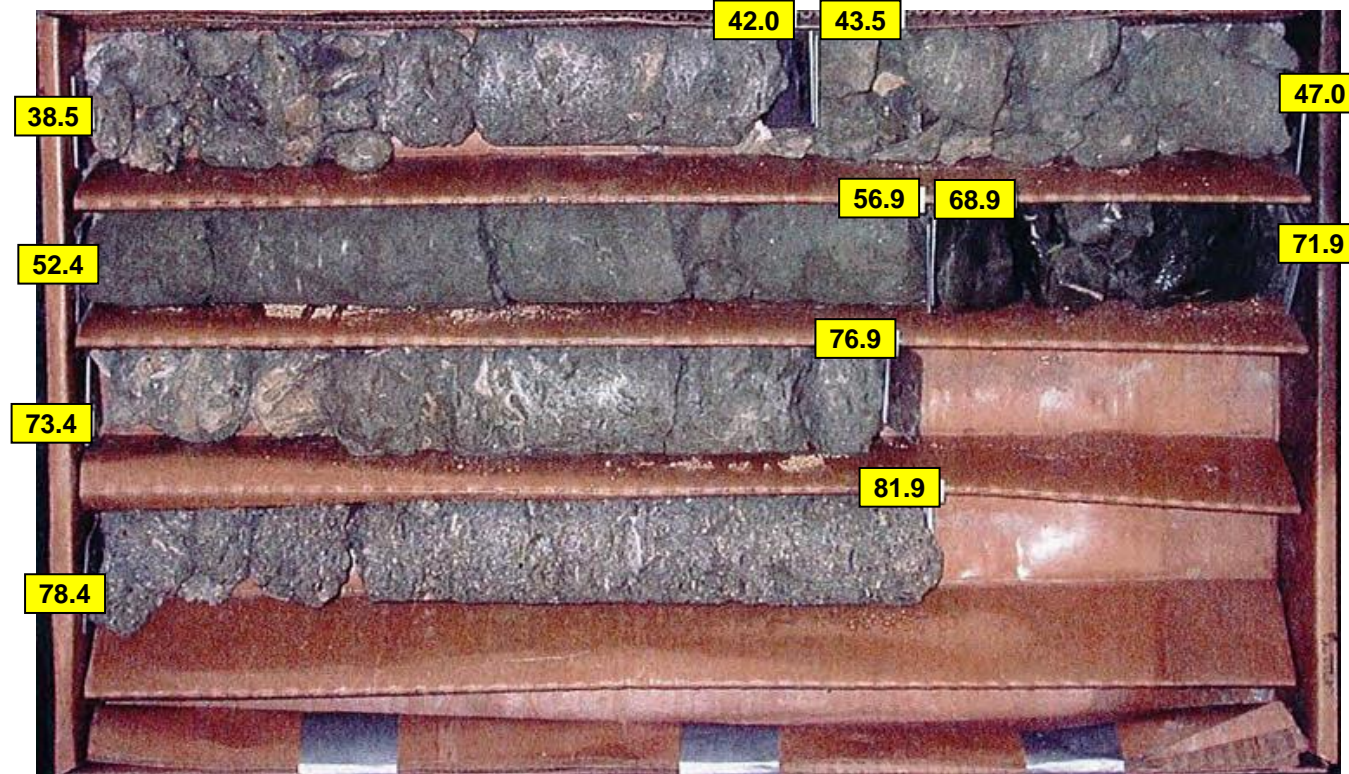
CORE PHOTOGRAPH
B2-A EBL
Box 1 of 1 (38.8' to 82.2')



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CORE PHOTOGRAPH
B2-B WBL

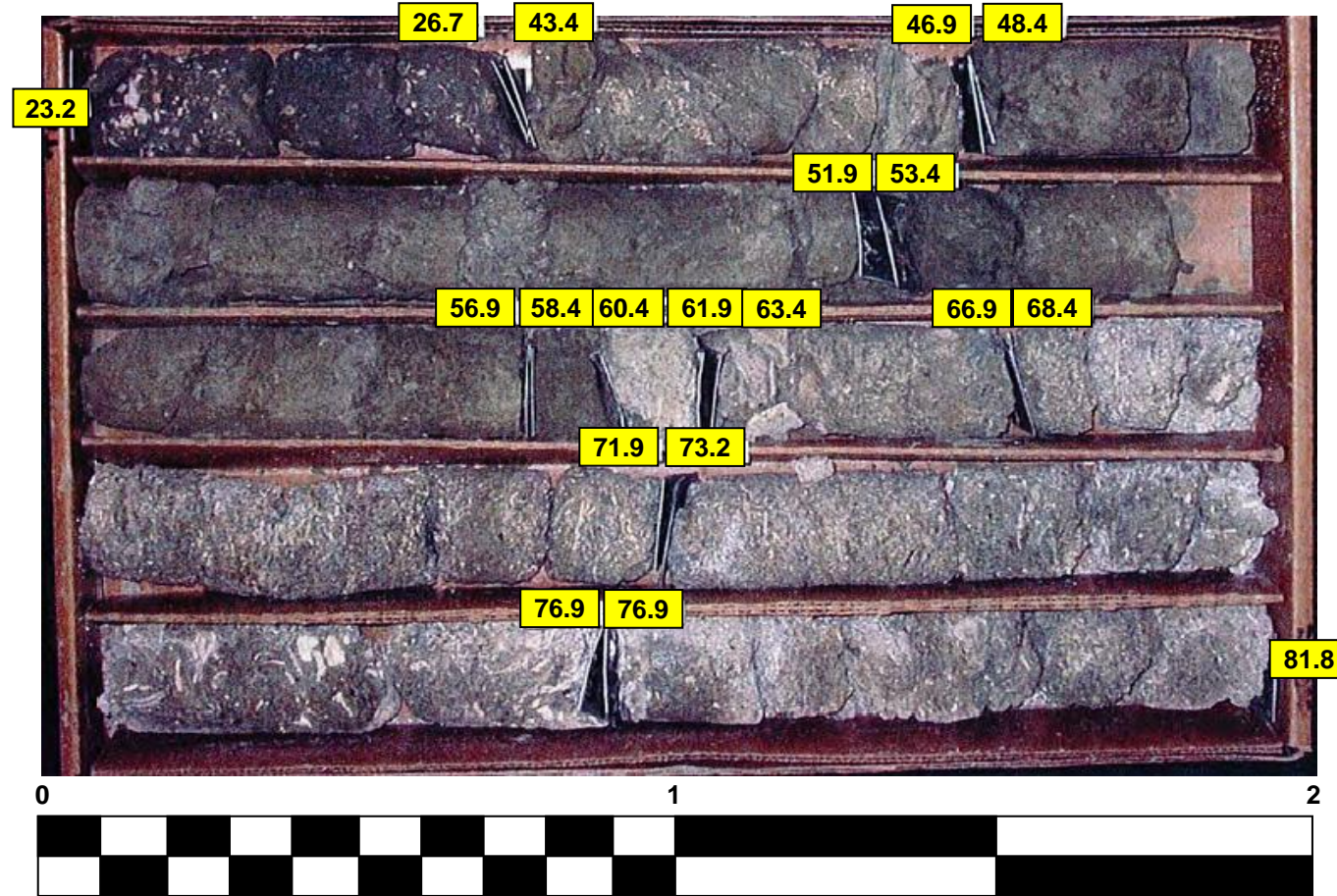
Box 1 of 1 (38.5' to 81.9')



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CORE PHOTOGRAPH B3-A EBL

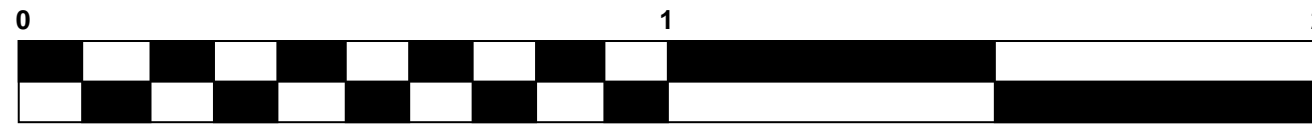
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CORE PHOTOGRAPH B3-B WBL

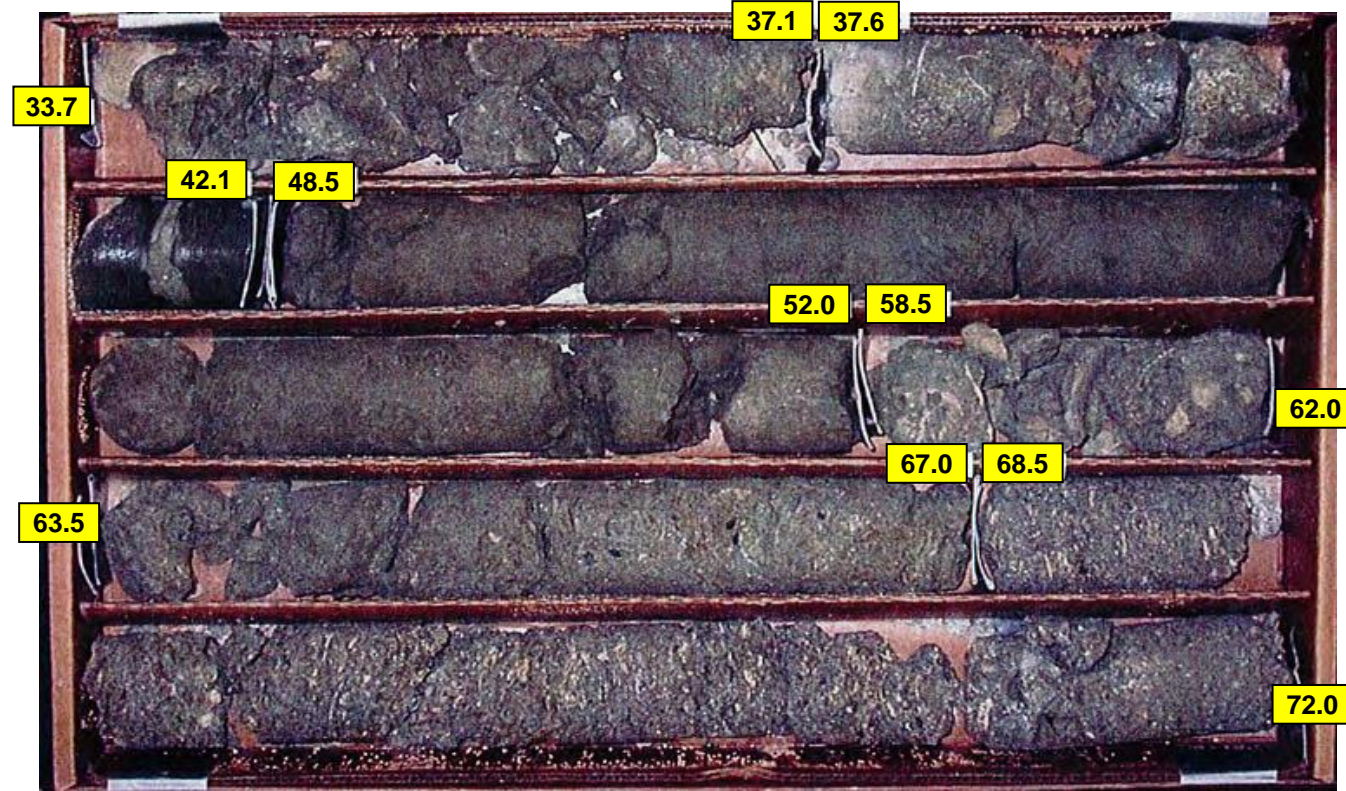
Box 1 of 1 (35.5' to 81.1')



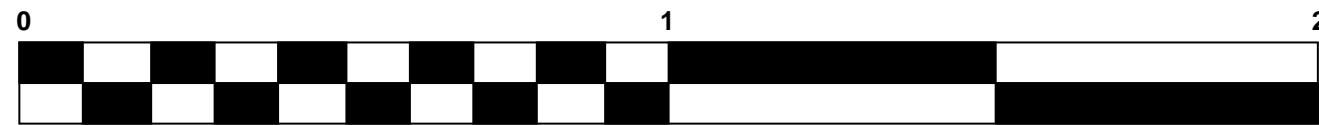
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CORE PHOTOGRAPH B4-A EBL

Box 1 of 2 (33.7' to 72.0')



Box 2 of 2 (73.1' to 77.0')



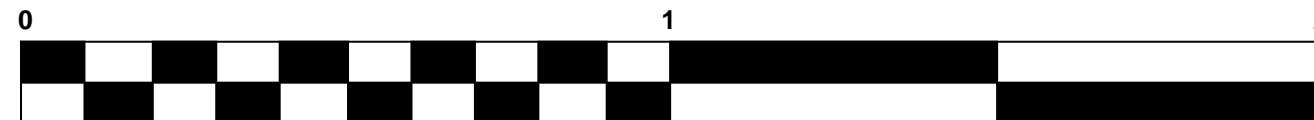
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CORE PHOTOGRAPH B4-B WBL

Box 1 of 2 (33.1' to 86.5')

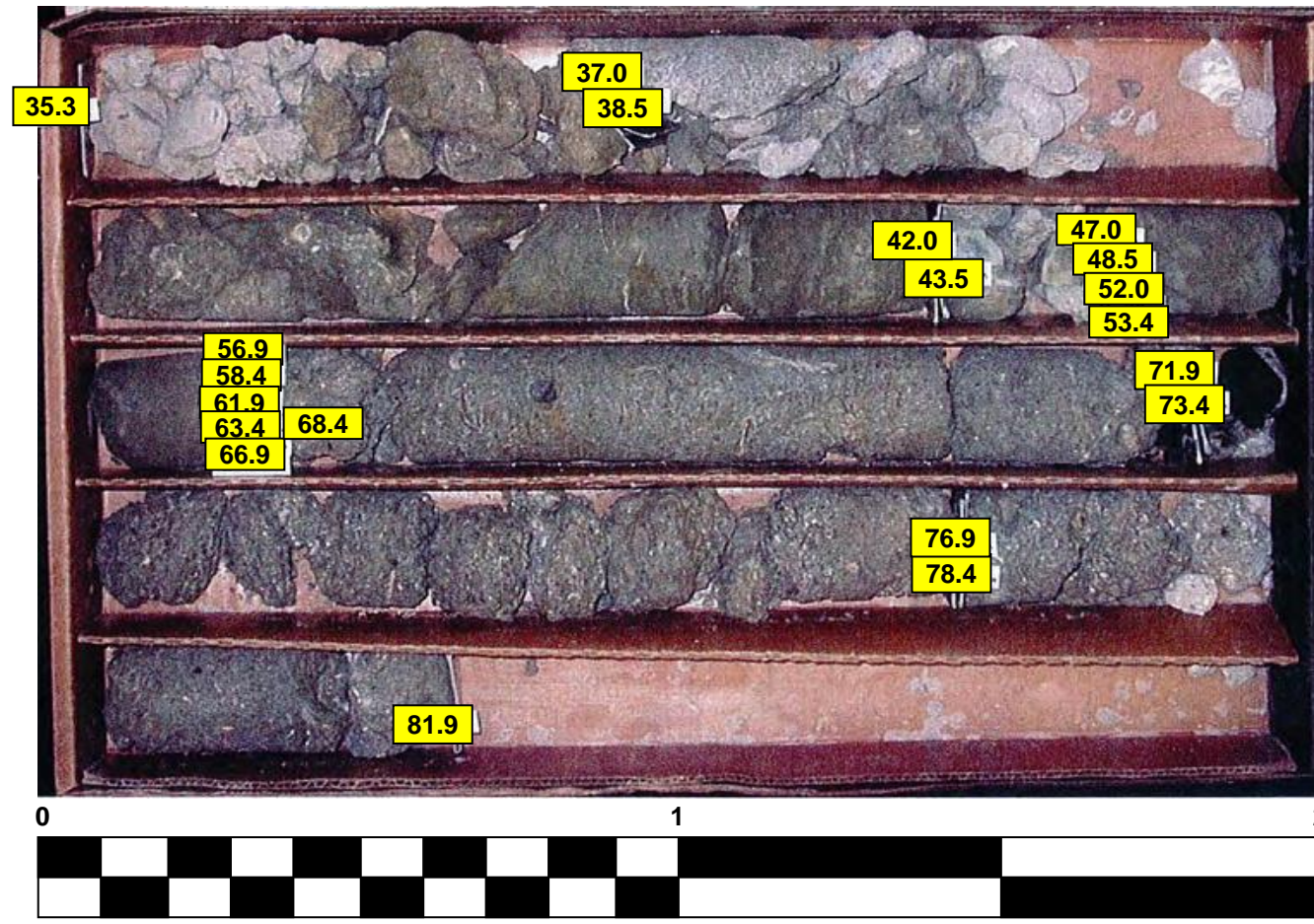


Box 2 of 2 (87.6' to 96.5')



FEET

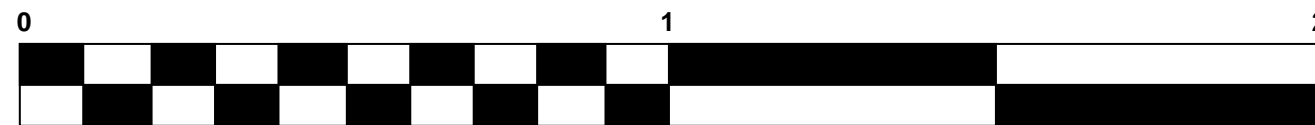
CORE PHOTOGRAPH
B5-A EBL
Box 1 of 1 35.3' to 81.9')



FEET

CORE PHOTOGRAPH B5-B WBL

Box 1 of 1 (28.8' to 82.2')



FEET

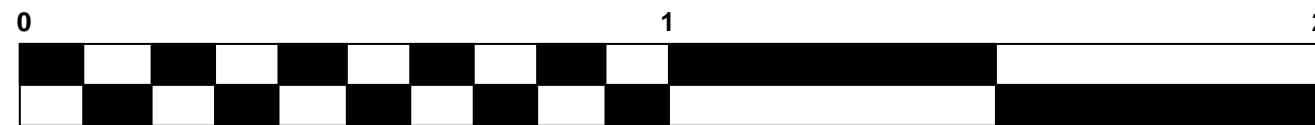
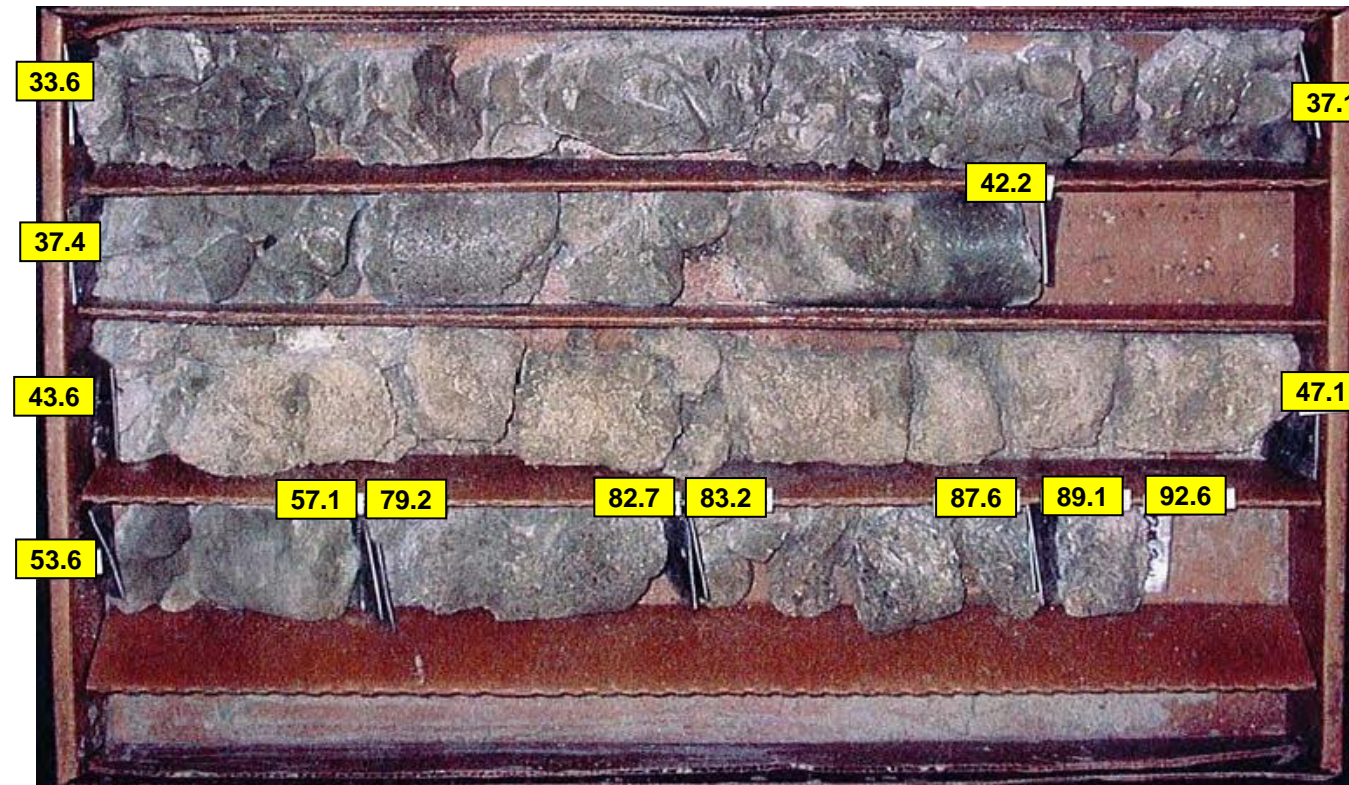
CORE PHOTOGRAPH
B6-A EBL

Box 1 of 1 (38.7' to 82.1')



FEET

CORE PHOTOGRAPH
B6-B WBL
Box 1 of 1 (33.6' to 92.7')



FEET

REFERENCE: R-1015

PROJECT: 34360

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

**STRUCTURE
SUBSURFACE INVESTIGATION**

COUNTY CRAVEN
PROJECT DESCRIPTION US 70 (HAVELOCK BYPASS)
FROM SOUTH OF CARTERET /CRAVEN COUNTY
LINE TO SOUTH OF SR 1176
SITE DESCRIPTION BRIDGE NO. 0283 ON -Y4- (SR 1747
SUNSET DRIVE) OVER -L- (US 70 HAVELOCK
BYPASS) AT STA 44+71.82

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5	CROSS SECTION
6-9	BORE LOGS
10	SOIL TEST RESULTS
11	SITE PHOTOGRAPHS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-1015	1	11

CAUTION NOTICE

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

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

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

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

PERSONNEL

ES Setnicky

RM Bleifernich

JR Helms

BR Spiro

GW Stalls

INVESTIGATED BY GET SOLUTIONS

DRAWN BY JR Helms; BR Spiro

CHECKED BY GW Stalls

SUBMITTED BY GW Stalls

DATE April, 2016



DocuSigned by:

Gerald W. Stalls, Jr. 7/14/2016

D9E3B27263A8414

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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

SOIL DESCRIPTION
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT...

SOIL LEGEND AND AASHTO CLASSIFICATION
GENERAL CLASS., GRANULAR MATERIALS, SILT-CLAY MATERIALS, ORGANIC MATERIALS

TEXTURE OR GRAIN SIZE
U.S. STD. SIEVE SIZE OPENING (MM), BOULDER, COBBLE, GRAVEL, SAND, SILT, CLAY

SOIL MOISTURE - CORRELATION OF TERMS
SOIL MOISTURE SCALE (ATTERBERG LIMITS), FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION

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.

GRADATION
WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.

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 WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIONIBILITY
SLIGHTLY COMPRESSIBLE, MODERATELY COMPRESSIBLE, HIGHLY COMPRESSIBLE

PERCENTAGE OF MATERIAL
ORGANIC MATERIAL, GRANULAR SOILS, SILT-CLAY SOILS, OTHER MATERIAL

GROUND WATER
WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING, STATIC WATER LEVEL AFTER 24 HOURS

MISCELLANEOUS SYMBOLS
ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION, SOIL SYMBOL, ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT

ROCK DESCRIPTION
HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.

WEATHERING
FRESH, VERY SLIGHT (V SL.), SLIGHT (SL.), MODERATE (MOD.), MODERATELY SEVERE (MOD. SEV.), SEVERE (SEV.), VERY SEVERE (V SEV.), COMPLETE

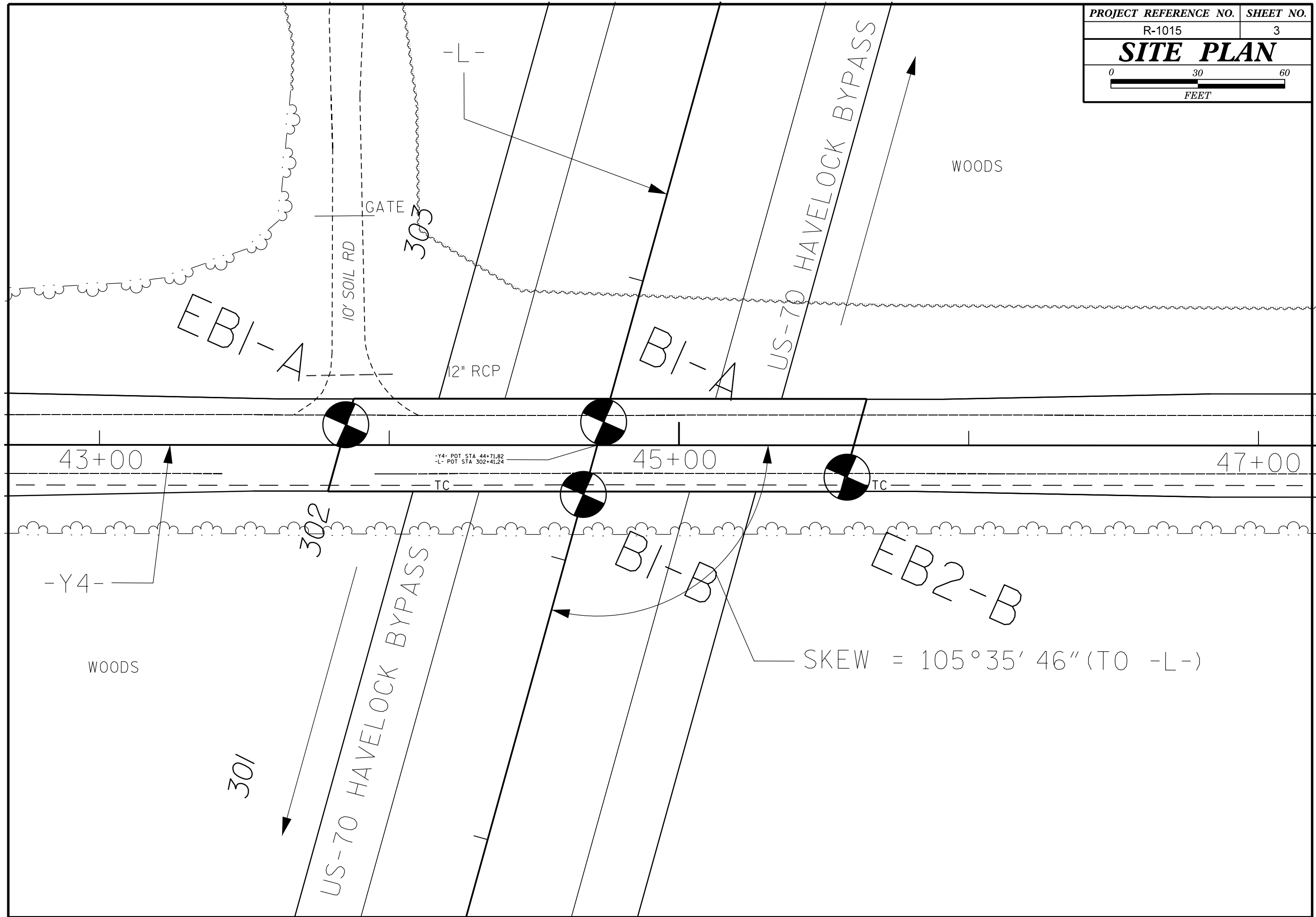
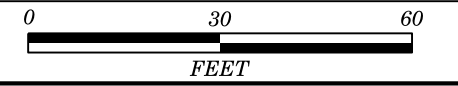
ROCK HARDNESS
VERY HARD, HARD, MODERATELY HARD, MEDIUM HARD, SOFT, VERY SOFT

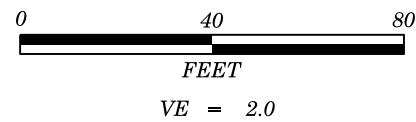
FRACTURE SPACING
IERM, VERY WIDE, WIDE, MODERATELY CLOSE, CLOSE, VERY CLOSE

TERMS AND DEFINITIONS
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.

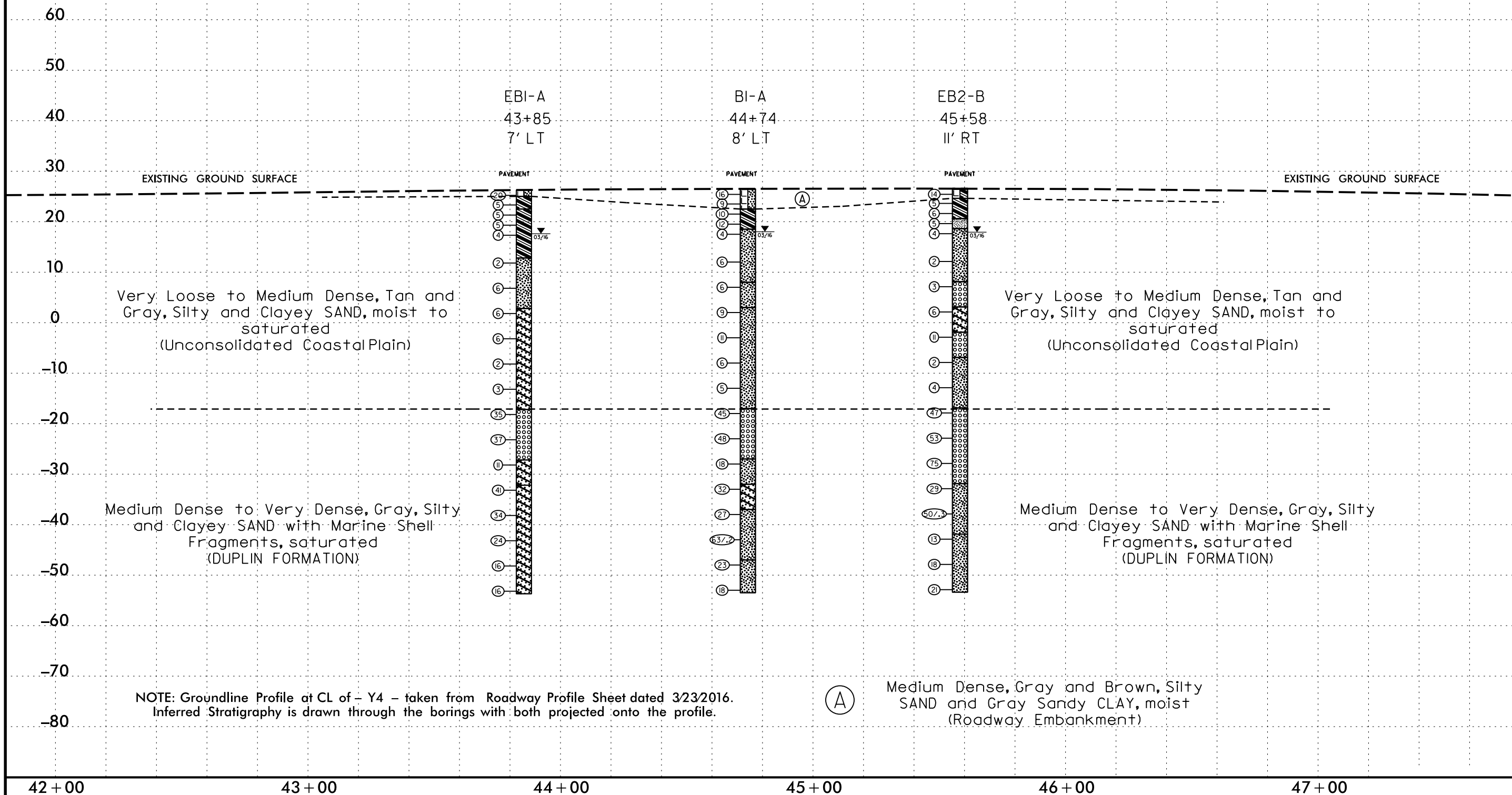
INDURATION
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE, MODERATELY INDURATED, INDURATED, EXTREMELY INDURATED

SITE PLAN

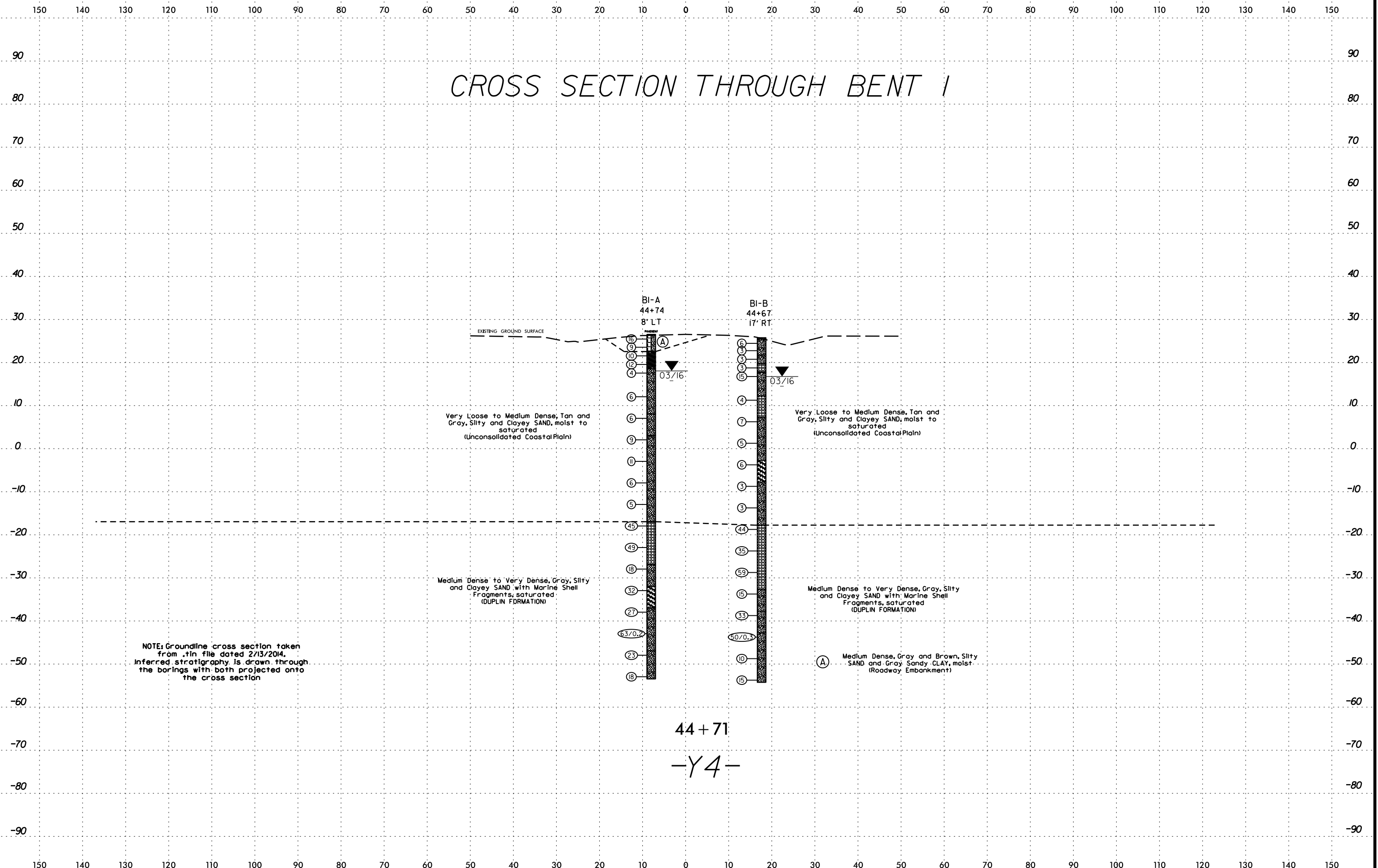




PROJECT REFERENCE NO.	SHEET NO.
R-1015	4
SUBSURFACE PROFILE ALONG -Y4- CENTERLINE	



CROSS SECTION THROUGH BENT 1



NOTE: Groundline cross section taken from .tin file dated 2/13/2014. Inferred stratigraphy is drawn through the borings with both projected onto the cross section

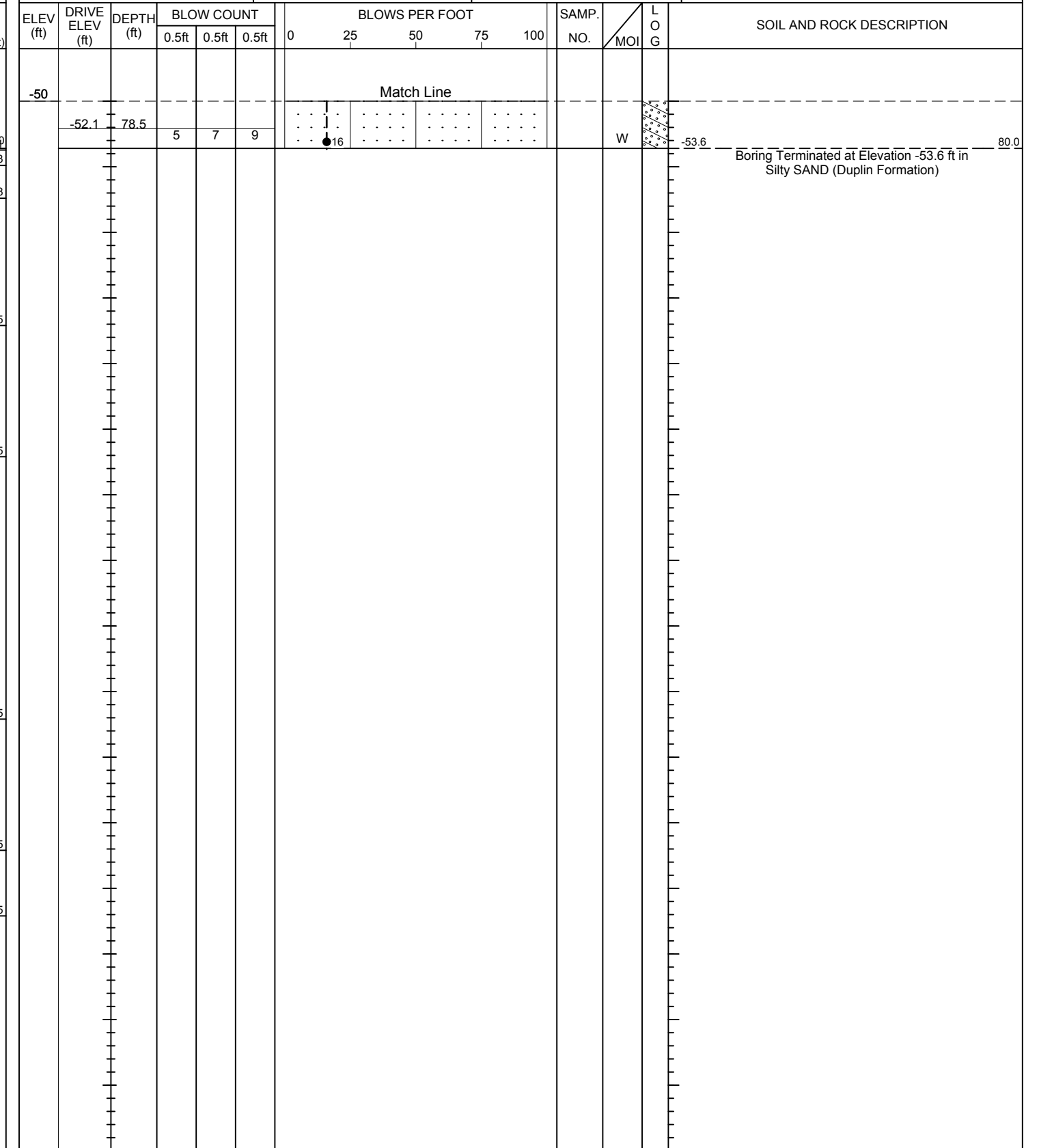
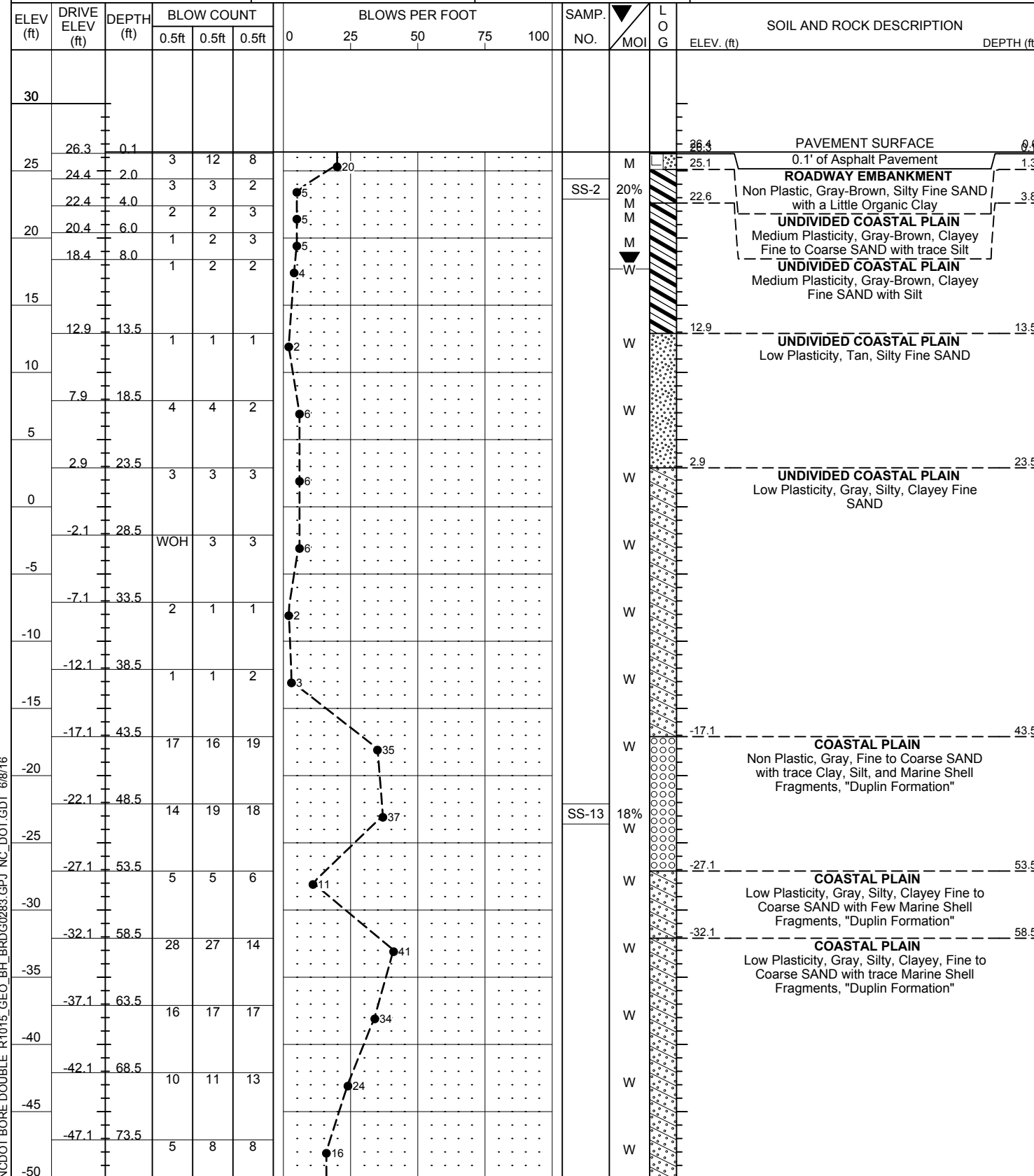
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 8/23/99

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.2	TIP R-1015	COUNTY CRAVEN	GEOLOGIST Bliefertich, R.
SITE DESCRIPTION BRIDGE NO. 0283 ON -Y4- (SR 1747 SUNSET DRIVE) OVER -L- (US HAVELOCK BYPASS) AT STA 44+71.8			GROUND WTR (ft)
BORING NO. EB1-A	STATION 43+85	OFFSET 7 ft LT	ALIGNMENT -Y4-
COLLAR ELEV. 26.4 ft	TOTAL DEPTH 80.0 ft	NORTHING 418,520	EASTING 2,617,108
DRILL RIG/HAMMER EFF./DATE GET7255 CME-55 80% 01/04/2016		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Donahue, T.	START DATE 03/24/16	COMP. DATE 03/24/16	SURFACE WATER DEPTH N/A

WBS 34360.1.2	TIP R-1015	COUNTY CRAVEN	GEOLOGIST Bliefertich, R.
SITE DESCRIPTION BRIDGE NO. 0283 ON -Y4- (SR 1747 SUNSET DRIVE) OVER -L- (US HAVELOCK BYPASS) AT STA 44+71.8			GROUND WTR (ft)
BORING NO. EB1-A	STATION 43+85	OFFSET 7 ft LT	ALIGNMENT -Y4-
COLLAR ELEV. 26.4 ft	TOTAL DEPTH 80.0 ft	NORTHING 418,520	EASTING 2,617,108
DRILL RIG/HAMMER EFF./DATE GET7255 CME-55 80% 01/04/2016		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Donahue, T.	START DATE 03/24/16	COMP. DATE 03/24/16	SURFACE WATER DEPTH N/A

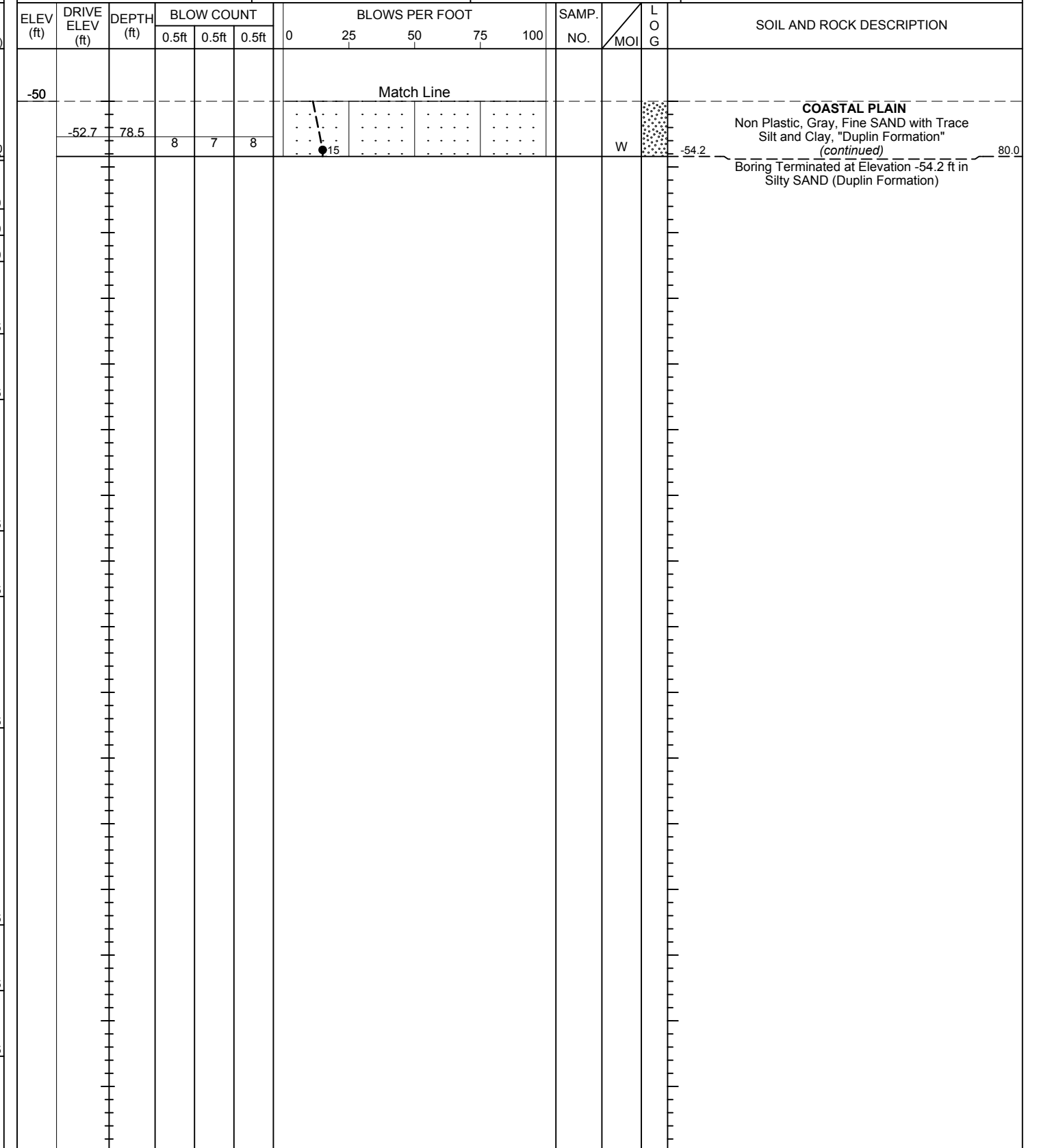
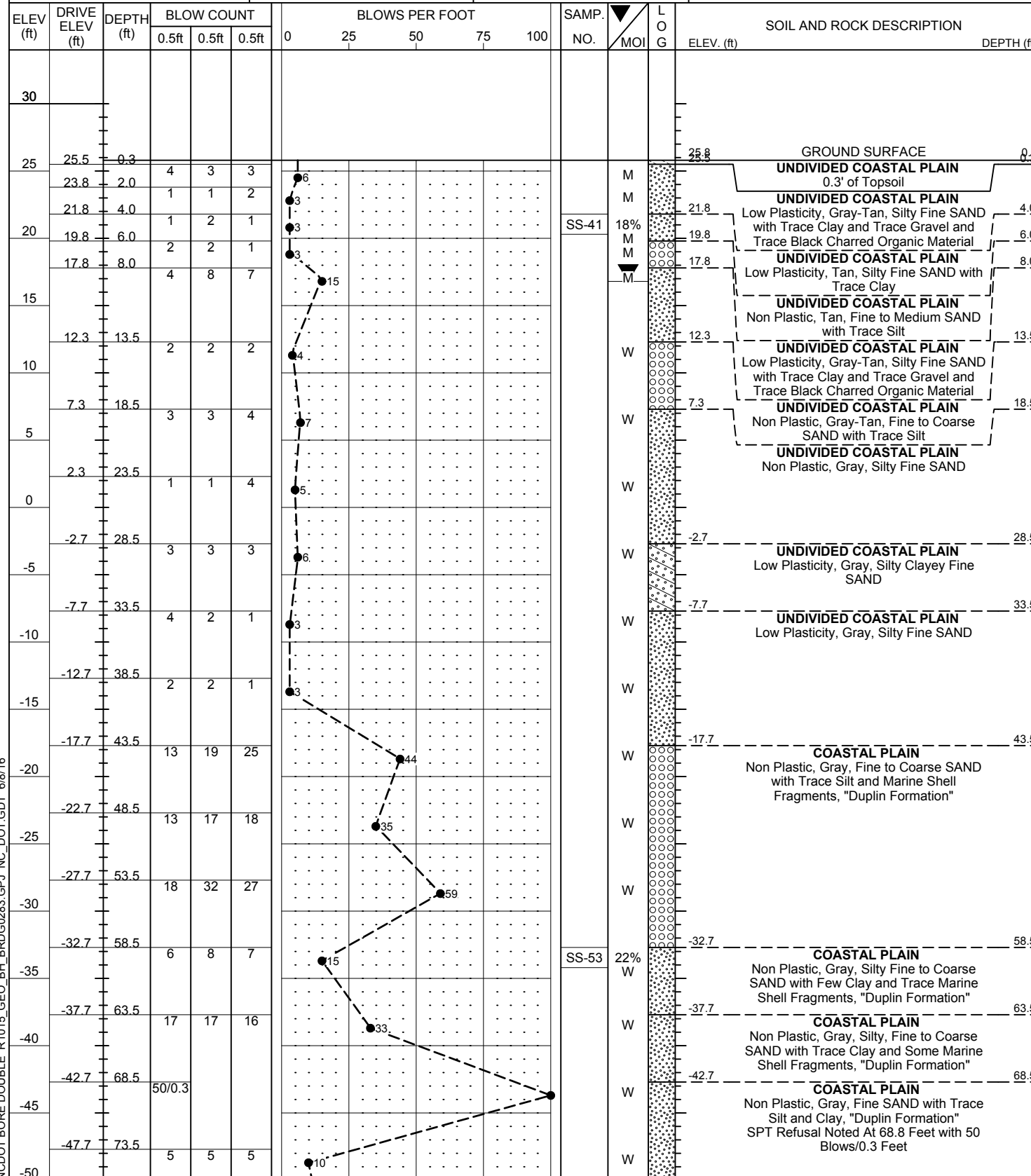


NCDOT BORE DOUBLE R1015_GEO_BH_BRD0283.GPJ NC_DOT.GDT 6/8/16

GEOTECHNICAL BORING REPORT BORE LOG

WBS 34360.1.2	TIP R-1015	COUNTY CRAVEN	GEOLOGIST Bliefernich, R.
SITE DESCRIPTION BRIDGE NO. 0283 ON -Y4- (SR 1747 SUNSET DRIVE) OVER -L- (US HAVELOCK BYPASS) AT STA 44+71.8			
BORING NO. B1-B	STATION 44+67	OFFSET 17 ft RT	ALIGNMENT -Y4-
COLLAR ELEV. 25.8 ft	TOTAL DEPTH 80.0 ft	NORTHING 418,532	EASTING 2,617,193
DRILL RIG/HAMMER EFF./DATE GET7255 CME-55 80% 01/04/2016		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Donahue, T.	START DATE 03/24/16	COMP. DATE 03/24/16	SURFACE WATER DEPTH N/A

WBS 34360.1.2	TIP R-1015	COUNTY CRAVEN	GEOLOGIST Bliefernich, R.
SITE DESCRIPTION BRIDGE NO. 0283 ON -Y4- (SR 1747 SUNSET DRIVE) OVER -L- (US HAVELOCK BYPASS) AT STA 44+71.8			
BORING NO. B1-B	STATION 44+67	OFFSET 17 ft RT	ALIGNMENT -Y4-
COLLAR ELEV. 25.8 ft	TOTAL DEPTH 80.0 ft	NORTHING 418,532	EASTING 2,617,193
DRILL RIG/HAMMER EFF./DATE GET7255 CME-55 80% 01/04/2016		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Donahue, T.	START DATE 03/24/16	COMP. DATE 03/24/16	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE R1015_GEO_BH_BRD0283.GPJ NC_DOT.GDT 6/8/16

SOIL TEST RESULTS EB1-A

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-13	7 LT	43+85	48.5-50.0	A-1-b	NV	NP	84.0	11.2	0.6	4.2	99	32	5	17.7	-

SOIL TEST RESULTS B1-A

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-34	8 LT	44+74	58.5-60.0	A-2-6(1)	35	19	28.1	37.0	20.2	14.7	75	61	27	19.3	-

SOIL TEST RESULTS B1-B

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-53	17 RT	44+67	58.5-60.0	A-2-4(0)	NV	NP	23.4	54.6	12.2	9.8	86	70	21	22.0	-

SOIL TEST RESULTS EB2-B

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-59	11 RT	45+58	2.0-3.5	A-6(6)	40	22	22.1	34.9	4.8	38.2	100	97	45	20.4	-
SS-74	11 RT	45+58	68.5-70.0	A-2-4(0)	NV	NP	1.0	84.4	5.2	9.4	100	100	18	34.5	-

SITE PHOTOGRAPHS

VIEW ALONG SR 1747 (SUNSET DRIVE)
FROM EBI-A TO EB2-B



VIEW ALONG SR 1747 (SUNSET DRIVE)
FROM EB2-B TO EBI-A



REFERENCE: R-1015

PROJECT: 34360

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY CRAVEN
 PROJECT DESCRIPTION US 70 (Havelock Bypass) from North of Pine Grove to North of Carteret County Line
 SITE DESCRIPTION Site No. 8 - Dual Bridges over NCRR between SR 1747 and US 70 Station 506 + 32.25 -L- / 13 + 07.59 -RREY3-

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5-8	CROSS SECTIONS
9-20	BORE LOGS
21	SOIL TEST RESULTS

APPENDICES

<u>APPENDIX</u>	<u>TITLE</u>	<u>SHEETS</u>
A	CONSOLIDATION & TRIAXIAL SHEAR TEST RESULTS	22-47

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-1015	1	47

CAUTION NOTICE

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SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS. 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.

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PERSONNEL

P.M. WEAVER

C.R. PASTRANA

Trigon Exploration

INVESTIGATED BY ESP Associates, INC.

DRAWN BY C.R. PASTRANA

CHECKED BY P.M. WEAVER

SUBMITTED BY ESP Associates, INC.

DATE MAY 2018

 **ESP ASSOCIATES, INC.**
 7011 ALBERT PICK RD
 SUITE E
 GREENSBORO, NC 27409
 FIRM # C-0587
 WWW.ESPASSOCIATES.COM



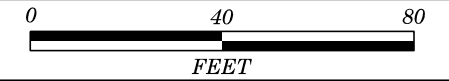
DocuSigned by:
Paul Weaver 6/6/2018
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**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**

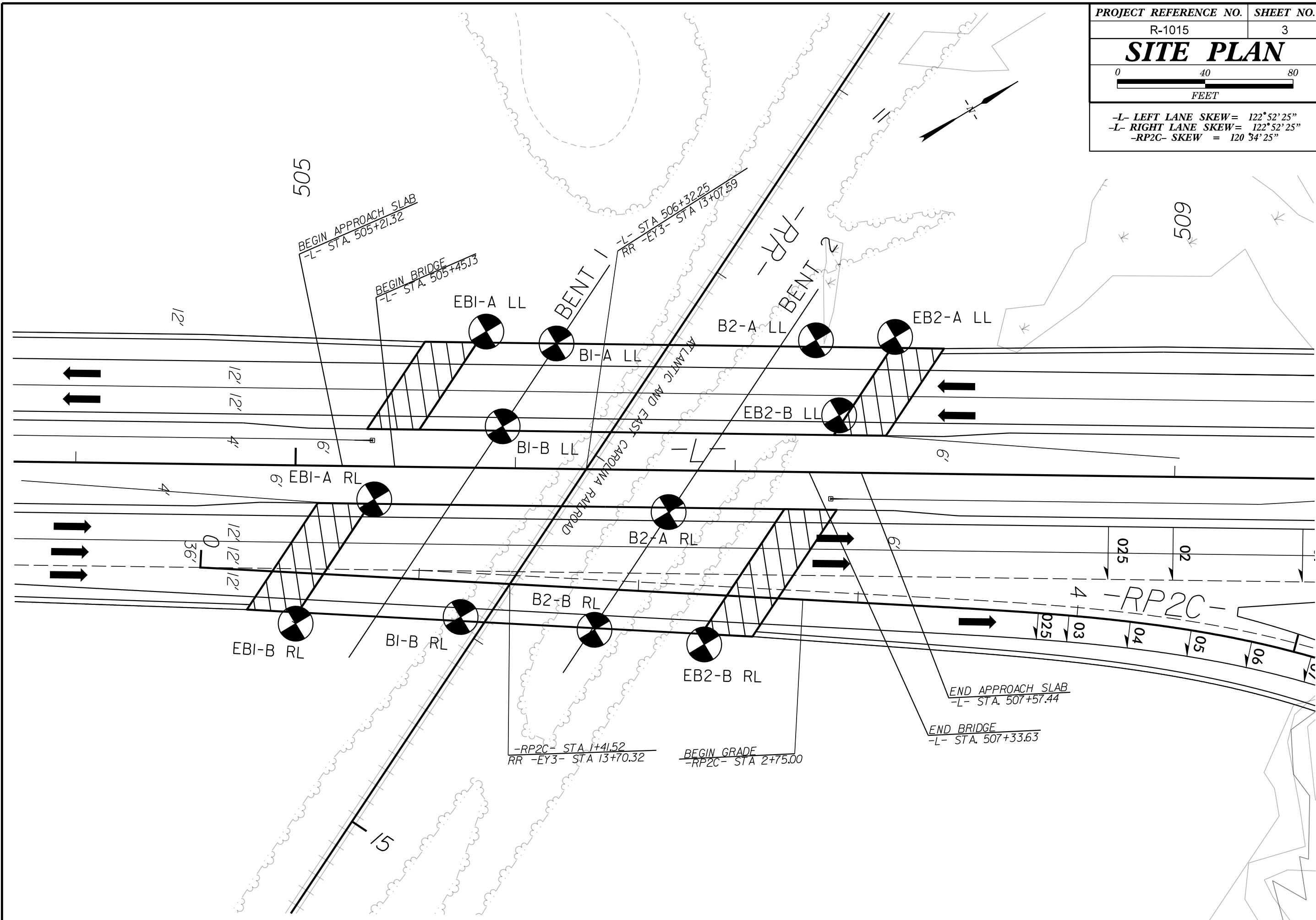
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

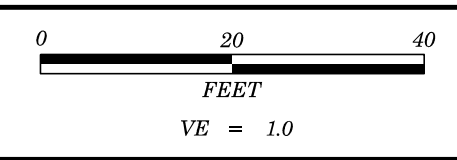
Table with multiple columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS, SOIL LEGEND AND AASHTO CLASSIFICATION, CONSISTENCY OR DENSENESS, TEXTURE OR GRAIN SIZE, SOIL MOISTURE - CORRELATION OF TERMS, PLASTICITY, COLOR, MISCELLANEOUS SYMBOLS, RECOMMENDATION SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, ROCK HARDNESS, FRACTURE SPACING, BEDDING, INDURATION.

SITE PLAN

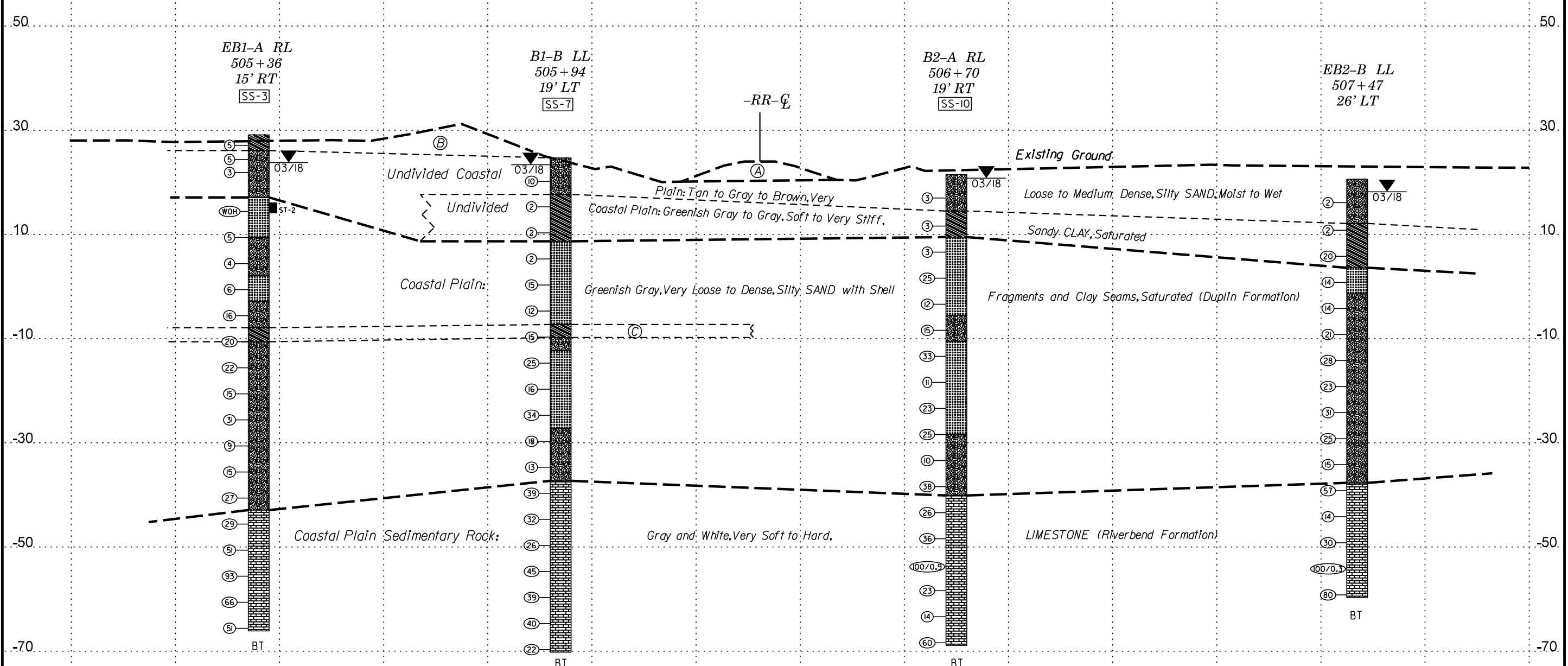


-L- LEFT LANE SKEW = 122° 52' 25"
 -L- RIGHT LANE SKEW = 122° 52' 25"
 -RP2C- SKEW = 120° 34' 25"





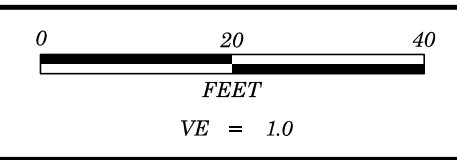
PROJECT REFERENCE NO.	SHEET NO.
R-1015	4
PROFILE BORINGS PROJECTED ALONG -L-	



- (A) Artificial Fill (Engineered): Tan-Brown, Medium Dense, Clayey SAND, Saturated (Railroad Embankment)
- (B) Undivided Coastal Plain: Brown to Tan-Brown, Medium Stiff, Sandy CLAY, Trace Roots, Moist
- (C) Coastal Plain: Greenish Gray to Brownish Gray, Medium Stiff, Sandy CLAY, Saturated (Duplin Formation)

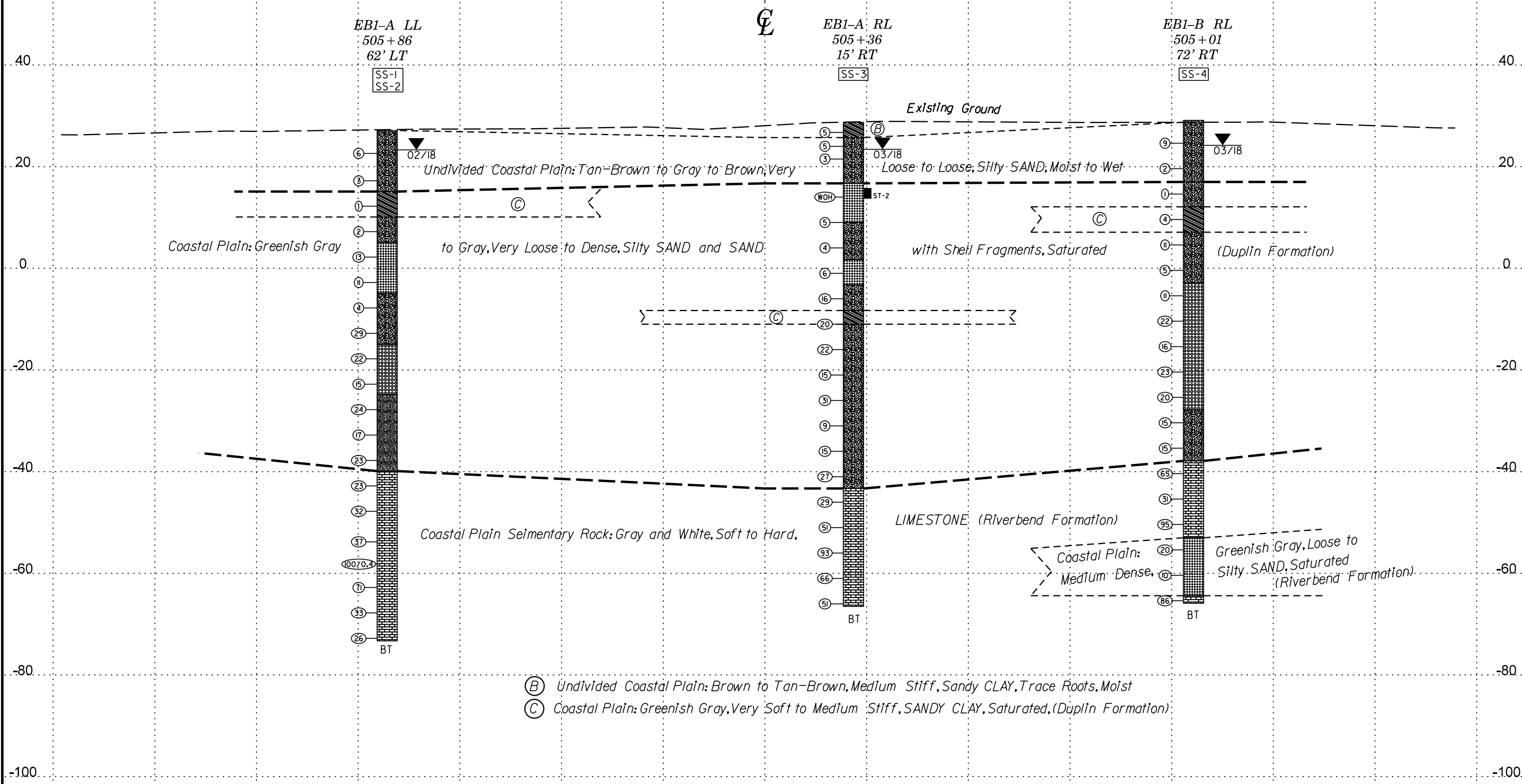
GROUNDLINE TAKEN FROM .TIN FILE PROVIDED BY NCDOT DATED 7/1/2016.
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
 PROJECTED ONTO THE BRIDGE PROFILE





PROJECT REFERENCE NO.	SHEET NO.
R-1015	5
SECTION THROUGH END BENT 1	

-L- STA. 505+45.12



EB1-A LL
505+86
62' LT
SS-1
SS-2

EB1-A RL
505+36
15' RT
SS-3

EB1-B RL
505+01
72' RT
SS-4

- 6
- 8
- 10
- 15
- 18
- 24
- 17
- 23
- 23
- 32
- 37
- 0070.4
- 11
- 33
- 26
- BT

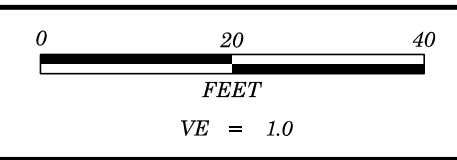
- 6
- 5
- 3
- WOH
- 5
- 4
- 6
- 16
- 20
- 22
- 15
- 31
- 9
- 15
- 27
- 29
- 51
- 93
- 66
- 51
- BT

- 9
- 2
- 4
- 10
- 5
- 10
- 22
- 16
- 23
- 20
- 15
- 15
- 65
- 31
- 95
- 20
- 10
- 86
- BT

- (B) Undivided Coastal Plain: Brown to Tan-Brown, Medium Stiff, Sandy CLAY, Trace Roots, Moist
- (C) Coastal Plain: Greenish Gray, Very Soft to Medium Stiff, SANDY CLAY, Saturated, (Duplin Formation)

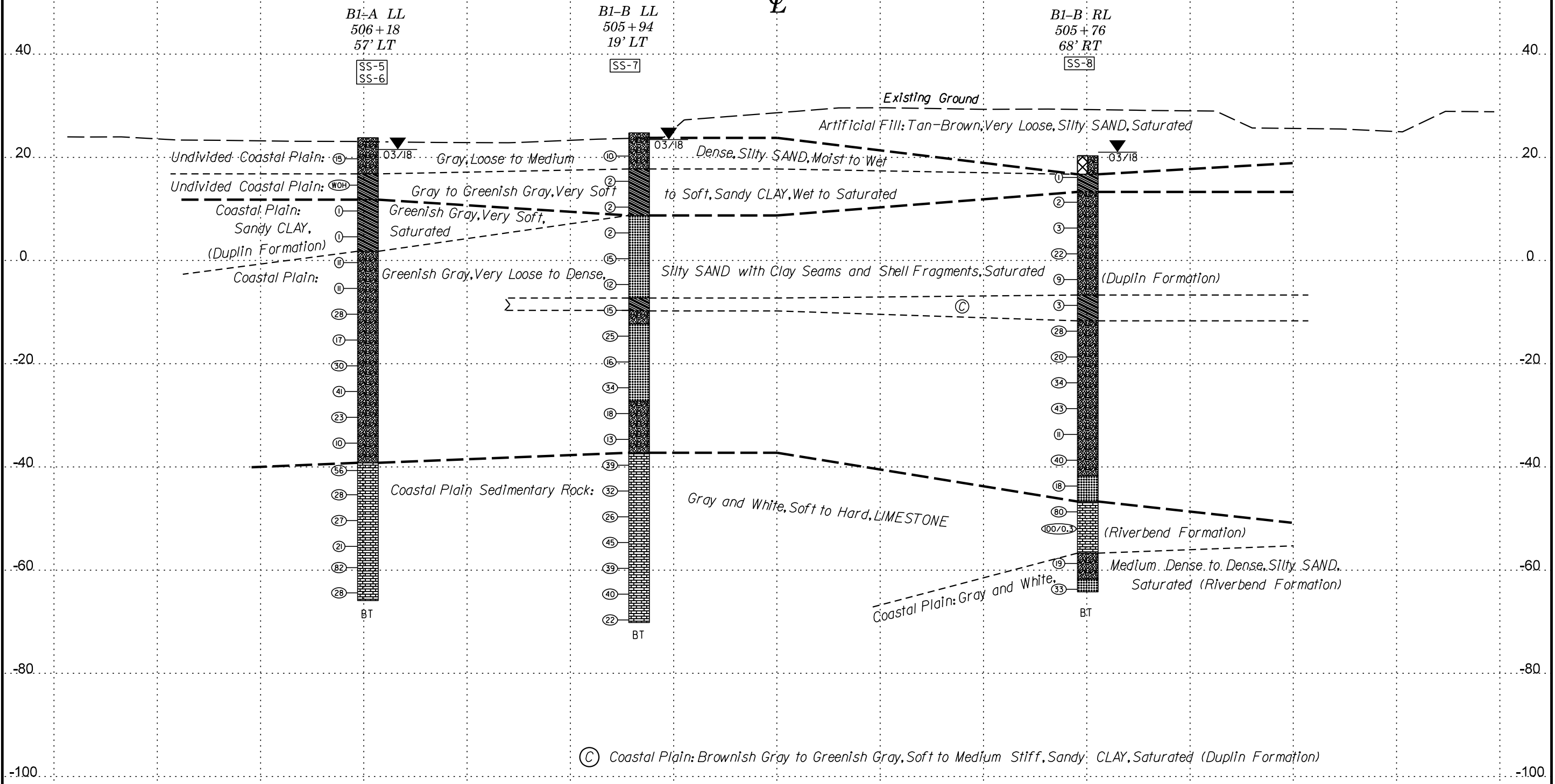
GROUNDLINE TAKEN FROM TIN FILE PROVIDED BY NCDOT DATED: 7/11/2016.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
PROJECTED ONTO THE BRIDGE CROSS SECTION

120 100 80 60 40 20 0 20 40 60 80 100 120

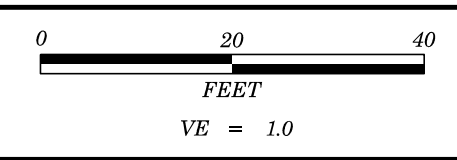


PROJECT REFERENCE NO.	SHEET NO.
R-1015	6
SECTION THROUGH BENT 1	

-L- STA. 505+81.62

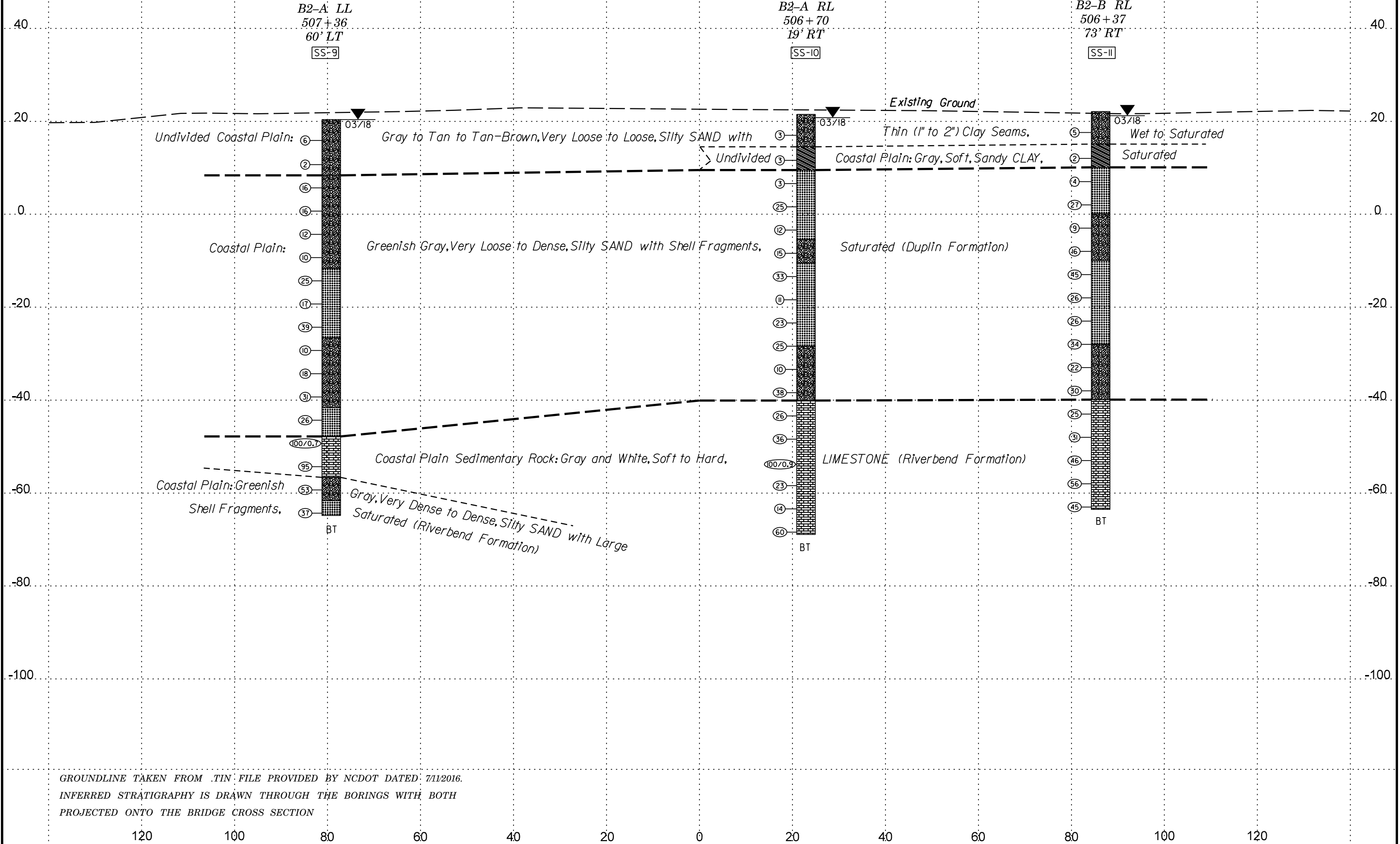


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INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
PROJECTED ONTO THE BRIDGE CROSS SECTION

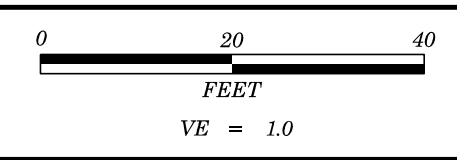


PROJECT REFERENCE NO.	SHEET NO.
R-1015	7
SECTION THROUGH BENT 2	

-L- STA. 506+82.87

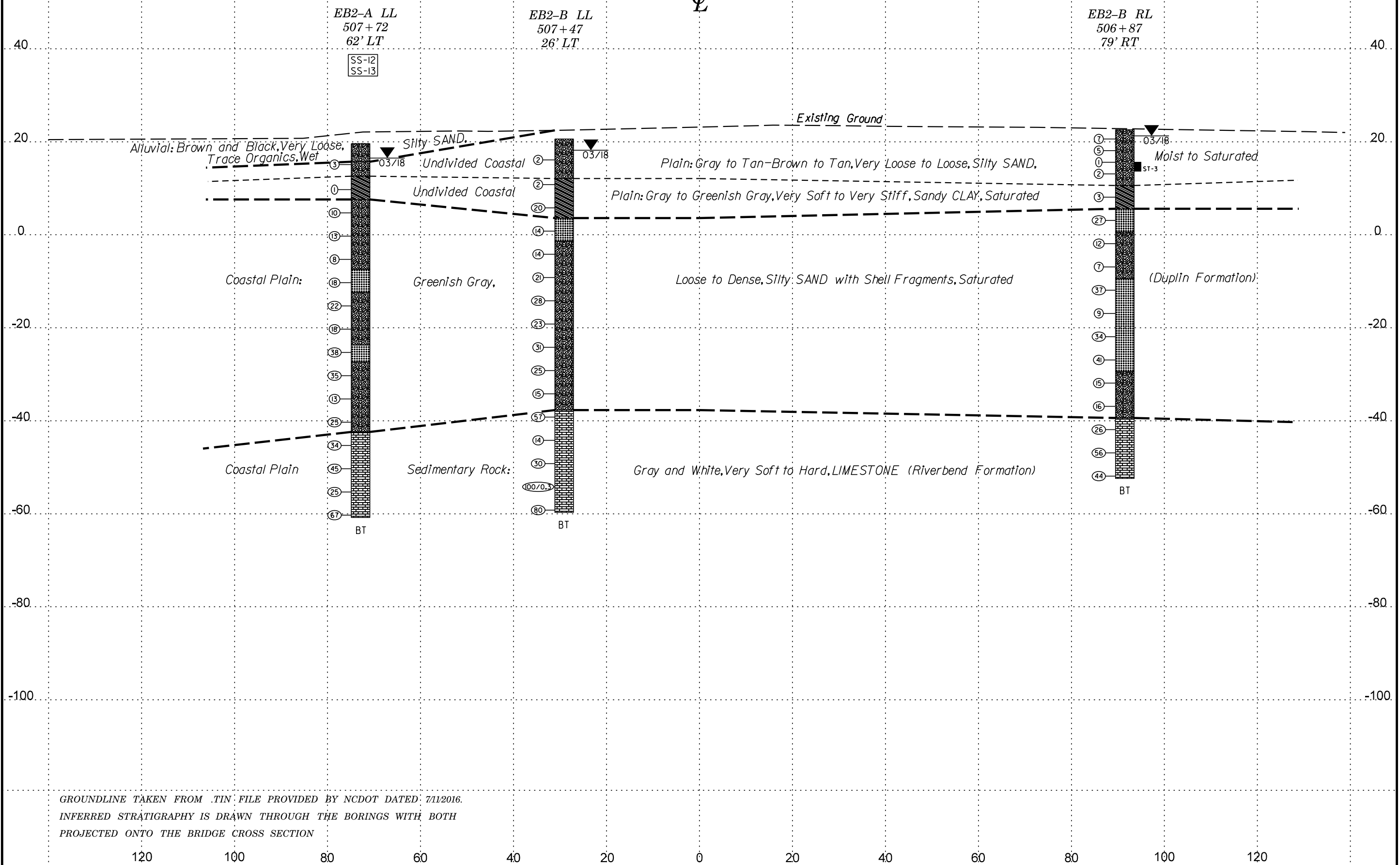


GROUNDLINE TAKEN FROM TIN FILE PROVIDED BY NCDOT DATED: 7/11/2016.
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
 PROJECTED ONTO THE BRIDGE CROSS SECTION



PROJECT REFERENCE NO.	SHEET NO.
R-1015	8
SECTION THROUGH END BENT 2	

-L- STA. 507+33.62



GROUNDLINE TAKEN FROM TIN FILE PROVIDED BY NCDOT DATED: 7/11/2016.
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
 PROJECTED ONTO THE BRIDGE CROSS SECTION

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.2	TIP R-1015	COUNTY CRAVEN	GEOLOGIST Pastrana, C.R.
SITE DESCRIPTION Site #8 - Dual Bridges on US 70 Bypass over NCRR Between SR 1747 and US 70			GROUND WTR (ft)
BORING NO. EB1-B RL	STATION 505+01	OFFSET 72 ft RT	ALIGNMENT -L-
COLLAR ELEV. 28.7 ft	TOTAL DEPTH 95.0 ft	NORTHING 436,899	EASTING 2,613,666
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/19/2018		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Toothman, R.	START DATE 02/28/18	COMP. DATE 03/01/18	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				
30													28.7	GROUND SURFACE
														UNDIVIDED COASTAL PLAIN Tan-Brown to Gray, Silty SAND, Moist to Wet
25	25.2	3.5	4	5	4									
20	20.2	8.5	3	1	1									
15	15.2	13.5	WOH	1	0								16.6	COASTAL PLAIN Greenish Gray, Silty SAND, Saturated (Duplin Formation)
10	10.2	18.5	1	2	2								11.7	Greenish Gray, Sandy CLAY, Saturated (Duplin Formation)
5	5.2	23.5	2	6	5								6.7	Greenish Gray, Silty SAND and SAND with Shell Fragments, Saturated (Duplin Formation) Note: Petroleum odor beginning around 44'
0	0.2	28.5	3	2	3									
-5	-4.8	33.5	4	4	7								-3.3	
-10	-9.8	38.5	5	8	14									
-15	-14.8	43.5	7	9	7							SS-4		
-20	-19.8	48.5	8	10	13									
-25	-24.8	53.5	13	10	10									
-30	-29.8	58.5	14	6	9								-28.3	
-35	-34.8	63.5	7	4	11									
-40	-39.8	68.5	23	30	35								-38.3	COASTAL PLAIN SEDIMENTARY ROCK Gray and White, Soft to Hard, LIMESTONE (Riverbend Formation)
-45	-44.8	73.5	11	15	16									
-50	-49.8	78.5												

NCDOT BORE DOUBLE R1015_SITES_GINT.GPJ NC_DOT_GDT 5/21/18

WBS 34360.1.2	TIP R-1015	COUNTY CRAVEN	GEOLOGIST Pastrana, C.R.
SITE DESCRIPTION Site #8 - Dual Bridges on US 70 Bypass over NCRR Between SR 1747 and US 70			GROUND WTR (ft)
BORING NO. EB1-B RL	STATION 505+01	OFFSET 72 ft RT	ALIGNMENT -L-
COLLAR ELEV. 28.7 ft	TOTAL DEPTH 95.0 ft	NORTHING 436,899	EASTING 2,613,666
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/19/2018		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Toothman, R.	START DATE 02/28/18	COMP. DATE 03/01/18	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				
-50			52	41	54									Match Line
-55	-54.8	83.5	9	11	9									COASTAL PLAIN SEDIMENTARY ROCK Gray and White, Soft to Hard, LIMESTONE (Riverbend Formation) <i>(continued)</i>
-60	-59.8	88.5	7	4	6									COASTAL PLAIN Greenish Gray, Silty SAND, Saturated (Riverbend Formation)
-65	-64.8	93.5	26	45	41									COASTAL PLAIN SEDIMENTARY ROCK Gray and White, Hard, LIMESTONE (Riverbend Formation) Boring Terminated at Elevation -66.3 ft in Coastal Plain Sedimentary Rock: LIMESTONE (Riverbend Formation)

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Pastrana, C.R.									
SITE DESCRIPTION Site #8 - Dual Bridges on US 70 Bypass over NCRR Between SR 1747 and US 70							GROUND WTR (ft)								
BORING NO. B2-A LL		STATION 507+36		OFFSET 60 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 20.4 ft		TOTAL DEPTH 85.2 ft		NORTHING 437,168		EASTING 2,613,677									
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/19/2018			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Toothman, R.		START DATE 03/09/18		COMP. DATE 03/09/18		SURFACE WATER DEPTH 0.0ft									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
25															
20														20.4	0.0
15	16.9	3.5	5	2	4										
10	11.7	8.7	WOH	1	1										
5	6.7	13.7	4	7	9										
0	1.7	18.7	4	7	9										
-5	-3.3	23.7	3	4	8										
-10	-8.3	28.7	4	3	7										
-15	-13.3	33.7	11	13	12										
-20	-18.3	38.7	6	7	10										
-25	-23.3	43.7	6	13	26										
-30	-28.3	48.7	5	5	5										
-35	-33.3	53.7	5	7	11										
-40	-38.3	58.7	6	9	22										
-45	-43.3	63.7	10	13	13										
-50	-48.3	68.7	31	52	48/0.2										
-55	-53.3	73.7	57	47	48										

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Pastrana, C.R.									
SITE DESCRIPTION Site #8 - Dual Bridges on US 70 Bypass over NCRR Between SR 1747 and US 70							GROUND WTR (ft)								
BORING NO. B2-A LL		STATION 507+36		OFFSET 60 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 20.4 ft		TOTAL DEPTH 85.2 ft		NORTHING 437,168		EASTING 2,613,677									
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/19/2018			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Toothman, R.		START DATE 03/09/18		COMP. DATE 03/09/18		SURFACE WATER DEPTH 0.0ft									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-55															
-60	-58.3	78.7	33	17	36										
	-63.3	83.7	22	16	21										

Match Line

NCDOT BORE DOUBLE R1015_SITES_GINT.GPJ NC_DOT_GDT 5/21/18

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Pastrana, C.R.	
SITE DESCRIPTION Site #8 - Dual Bridges on US 70 Bypass over NCRR Between SR 1747 and US 70							GROUND WTR (ft)
BORING NO. EB2-A LL		STATION 507+72		OFFSET 62 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 19.6 ft		TOTAL DEPTH 80.4 ft		NORTHING 437,200		EASTING 2,613,694	
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/19/2018			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic		
DRILLER Toothman, R.		START DATE 03/08/18		COMP. DATE 03/08/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
20															19.6	GROUND SURFACE	0.0
																ALLUVIAL	
																Brown and Black, Silty SAND, Trace Organics, Wet	
15	16.1	3.5	3	2	1										15.7	UNDIVIDED COASTAL PLAIN	3.9
																Gray, Silty SAND, Wet	
10	10.7	8.9	WOH	WOH	1										12.6	UNDIVIDED COASTAL PLAIN	7.0
																Gray, Sandy CLAY, Saturated	
5	5.7	13.9													7.6	COASTAL PLAIN	12.0
																Greenish Gray, Silty SAND with Shell Fragments, Saturated (Duplin Formation)	
0	0.7	18.9														Note: Petroleum odor beginning around 37'	
-5	-4.3	23.9															
-10	-9.3	28.9															
-15	-14.3	33.9															
-20	-19.3	38.9															
-25	-24.3	43.9															
-30	-29.3	48.9															
-35	-34.3	53.9															
-40	-39.3	58.9															
-45	-44.3	63.9															
-50	-49.3	68.9															
-55	-54.3	73.9															
-60	-59.3	78.9															

NCDOT BORE DOUBLE R1015_SITES_GINT.GPJ NC_DOT_GDT 5/21/18

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Pastrana, C.R.	
SITE DESCRIPTION Site #8 - Dual Bridges on US 70 Bypass over NCRR Between SR 1747 and US 70							GROUND WTR (ft)
BORING NO. EB2-A LL		STATION 507+72		OFFSET 62 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 19.6 ft		TOTAL DEPTH 80.4 ft		NORTHING 437,200		EASTING 2,613,694	
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/19/2018			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic		
DRILLER Toothman, R.		START DATE 03/08/18		COMP. DATE 03/08/18		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
-60			7	34	33										-60.8	Boring Terminated at Elevation -60.8 ft in Coastal Plain Sedimentary Rock: LIMESTONE (Riverbend Formation)	80.4

GEOTECHNICAL BORING REPORT BORE LOG

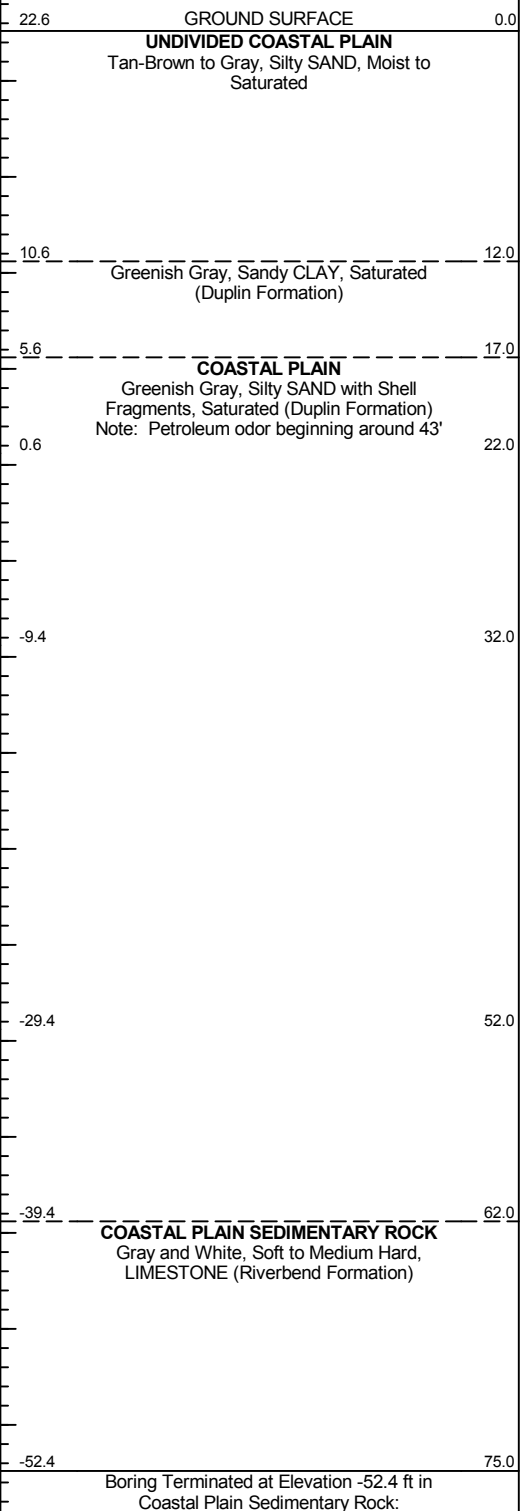
WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Pastrana, C.R.										
SITE DESCRIPTION Site #8 - Dual Bridges on US 70 Bypass over NCRR Between SR 1747 and US 70							GROUND WTR (ft)									
BORING NO. EB2-B RL		STATION 506+87		OFFSET 79 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 22.6 ft		TOTAL DEPTH 75.0 ft		NORTHING 437,053		EASTING 2,613,770										
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/19/2018				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Toothman, R.		START DATE 03/14/18		COMP. DATE 03/14/18		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
25																
20	21.6	1.0	3	4	3											
	19.1	3.5	3	2	3											
15	16.6	6.0	WOH	WOH	1											
	14.1	8.5	WOH		1											
10	9.1	13.5	1	1	2											
5	4.1	18.5	11	14	13											
0	-0.9	23.5	3	4	8											
-5	-5.9	28.5	2	3	4											
-10	-10.9	33.5	9	14	23											
-15	-15.9	38.5	5	4	5											
-20	-20.9	43.5	8	11	23											
-25	-25.9	48.5	19	22	19											
-30	-30.9	53.5	4	6	9											
-35	-35.9	58.5	9	5	11											
-40	-40.9	63.5	8	9	17											
-45	-45.9	68.5	28	25	31											
-50	-50.9	73.5	38	25	19											

WBS 34360.1.2		TIP R-1015		COUNTY CRAVEN		GEOLOGIST Pastrana, C.R.										
SITE DESCRIPTION Site #8 - Dual Bridges on US 70 Bypass over NCRR Between SR 1747 and US 70							GROUND WTR (ft)									
BORING NO. EB2-B RL		STATION 506+87		OFFSET 79 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 22.6 ft		TOTAL DEPTH 75.0 ft		NORTHING 437,053		EASTING 2,613,770										
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/19/2018				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Toothman, R.		START DATE 03/14/18		COMP. DATE 03/14/18		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
-55																

Match Line

LIMESTONE (Riverbend Formation)

Other Samples:
ST-3 collected at -L- Sta. 506+89, 75' RT
(7.0'-9.0')



NCDOT BORE DOUBLE R1015_SITES_GINT.GPJ NC_DOT_GDT 5/21/18

SOILS LABORATORY TESTS RESULTS

WBS NO.: 34360.1.2

TIP NO.: R-1015

COUNTY: Craven

SITE DESCRIPTION: Site #8 - Dual Bridges on US 70 Bypass over NCRR Between SR 1747 and US 70

BORING NO.	SAMPLE NO.	Boring Location	DEPTH INTERVAL (ft.)	AASHTO CLASS	N	L.L	P.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
								CSE. SAND	F. SAND	SILT	CLAY	10	40	200		
EB1-A LL	SS-1	-L- 505+86, 62' LT	13.9-15.4	A-6 (4)	1	26	13	19	27	19	35	100	99	56	51.9	-
EB1-A LL	SS-2	-L- 505+86, 62' LT	48.9-50.4	A-1-b (1)	15	NP	NP	64	29	3	4	85	45	8	-	-
	ST-2	-L- 505+39, 11' RT	13.0-15.0	A-3 (1)	N/A	NP	NP	10	82	1	7	100	95	9	33.6	-
EB1-A RL	SS-3	-L- 505+36, 15' RT	63.7-65.2	A-2-4 (0)	15	28	5	1	70	20	9	99	99	33	47.9	-
EB1-B RL	SS-4	-L- 505+01, 72' RT	43.5-45.0	A-1-b (1)	16	NP	NP	81	12	2	5	94	30	8	-	-
B1-A LL	SS-5	-L- 506+18, 57' LT	8.2-9.7	A-6 (7)	0	32	17	0	44	17	39	100	100	59	69.7	-
B1-A LL	SS-6	-L- 506+18, 57' LT	23.2-24.7	A-2-4 (0)	11	NP	NP	14	69	6	11	100	92	20	31.3	-
B1-B LL	SS-7	-L- 505+94, 19' LT	58.4-59.9	A-2-4 (0)	13	NP	NP	5	79	11	5	99	98	19	-	-
B1-B RL	SS-8	-L- 505+76, 68' RT	13.0-14.5	A-2-4 (0)	3	18	5	55	21	8	16	100	86	25	36.0	-
B2-A LL	SS-9	-L- 507+36, 60' LT	48.7-50.2	A-2-4 (0)	10	NP	NP	6	74	11	9	97	94	23	33.7	-
B2-A RL	SS-10	-L- 506+70, 19' RT	18.9-20.4	A-3 (1)	25	NP	NP	39	55	3	3	100	75	8	-	-
B2-B RL	SS-11	-L- 506+37, 73' RT	24.1-25.6	A-2-4 (0)	9	NP	NP	2	81	7	10	100	100	21	-	-
EB2-A LL	SS-12	-L- 507+72, 62' LT	3.5-5.0	A-2-4 (0)	3	NP	NP	18	70	2	10	100	94	13	24.9	-
EB2-A LL	SS-13	-L- 507+72, 62' LT	53.9-55.4	A-2-4 (0)	13	NP	NP	1	90	3	6	100	100	11	40.1	-
	ST-3	-L- 506+89, 75' RT	7.0-9.0	A-2-4 (0)	N/A	18	3	1	90	2	7	100	100	9	29.0	-

Signed:



NC DOT Certification No.

129-04-0411

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
APPENDIX A
CONSOLIDATION & TRIAXIAL SHEAR TEST RESULTS

REFERENCE: R-1015

PROJECT: 34360

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297**



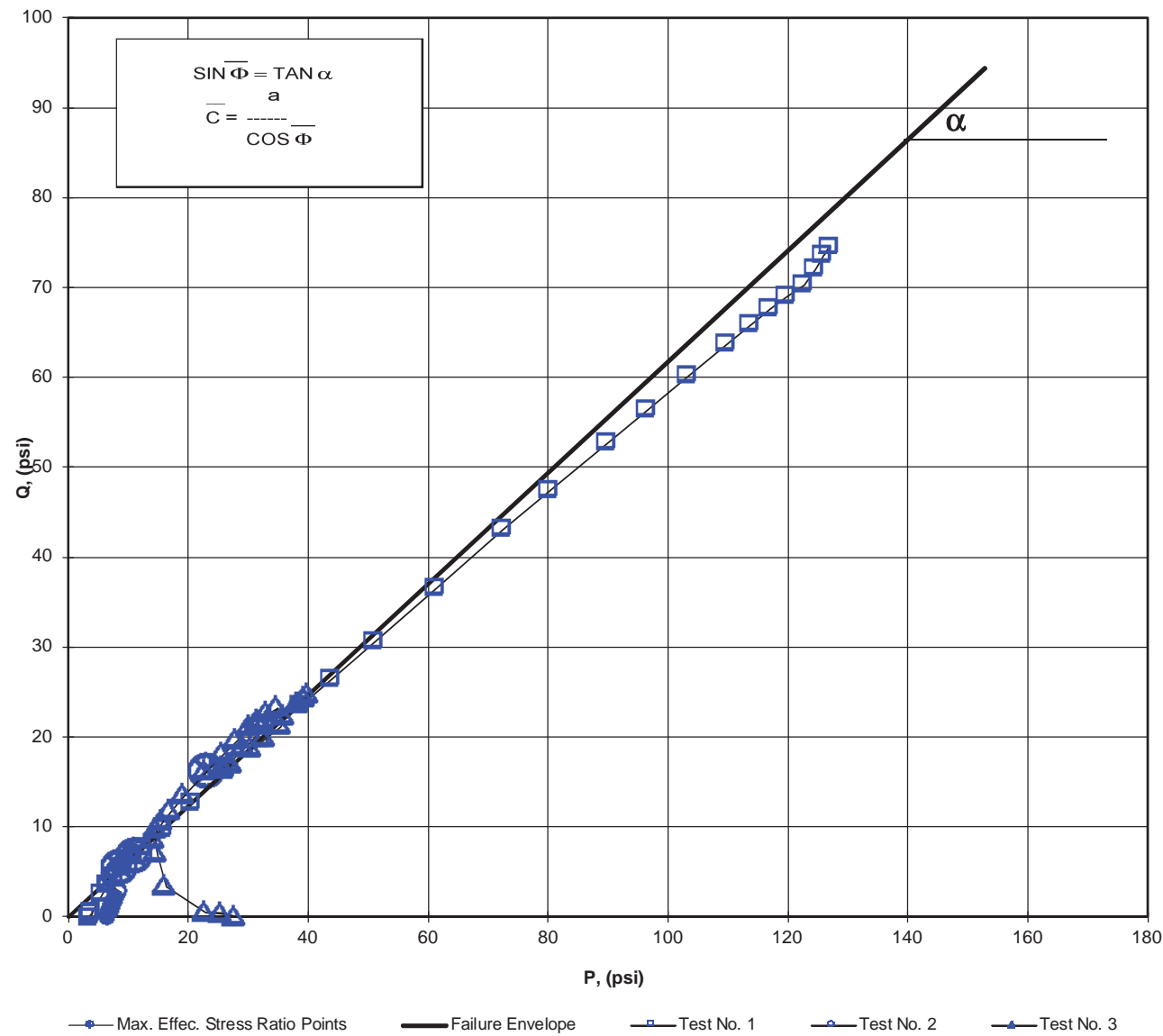
Client:	ESP Associates	Boring No.:	-L- STA 505+39 11'RT
Client Reference:	R-1015 Site B CS34.324.00	Depth (ft):	13.0-15.0
Project No.:	R-2018-075-001	Sample No.:	ST-2
Lab ID:	R-2018-075-001-003		

**MOHR TOTAL STRENGTH ENVELOPE
AASHTO T-297**

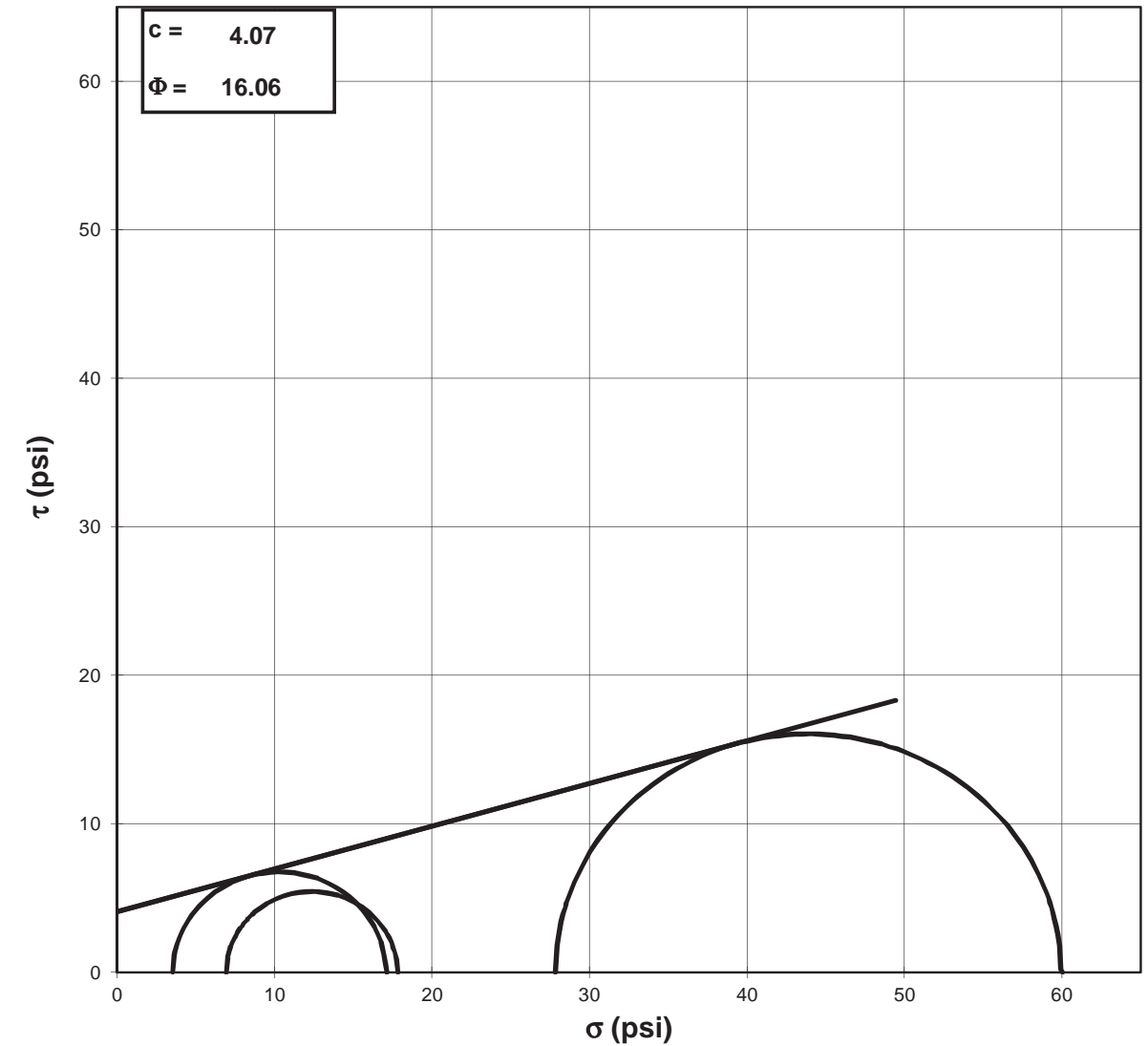


Client:	ESP Associates	Boring No.:	-L- STA 505+39 11'RT
Client Reference:	R-1015 Site B CS34.324.00	Depth (ft):	13.0-15.0
Project No.:	R-2018-075-001	Sample No.:	ST-2
Lab ID:	R-2018-075-001-003		
Visual Description:	TAN SAND (UNDISTURBED)		

Consolidated Undrained Triaxial Test with Pore Pressure



a	=	0.00	\bar{C}	=	0.00
α	=	31.7	$\bar{\Phi}$	=	38.11



Failure Based on Maximum Effective Principal Stress Ratio

NOTE: GRAPH NOT TO SCALE

Tested By: 129-04-0411 Date: 3/28/18 Approved By: MPS Date: 5/11/18

Tested By: 129-04-0411 Date: 3/28/18 Approved By: MPS Date: 5/11/18

page 2 of 11 DCN: CT-S28 DATE: 4/12/13 REVISION: 3

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
AASHTO T-297



Client: ESP Associates Boring No.: -L- STA 505+39 11'RT
 Client Reference: R-1015 Site B CS34.324.00 Depth (ft): 13.0-15.0
 Project No.: R-2018-075-001 Sample No.: ST-2
 Lab ID: R-2018-075-001-003

Visual Description: TAN SAND (UNDISTURBED)

Stage No.	1
Test No.	1

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	5.761	Diameter 1:	2.797
Length 2:	5.830	Diameter 2:	2.784
Length 3:	5.861	Diameter 3:	2.808
Length 4:	5.970	Diameter 4:	2.748
Avg. Length:	5.856	Avg. Diam.:	2.784

PRESSURES (psi)

Cell Pressure (psi)	53.5
Back Pressure (psi)	50.0
Eff. Conf. Pressure (psi)	3.5
Pore Pressure Response (%)	100

VOLUME CHANGE

Initial Burette Reading (ml)	24.0
Final Burette Reading (ml)	21.6
Final Change (ml)	2.4

MAXIMUM OBLIQUITY POINTS

\bar{P} =	10.96
\bar{Q} =	6.76

Initial Dial Reading (mil)	160
Dial Reading After Saturation (mil)	160
Dial Reading After Consolidation (mil)	165

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
5.5	0.000	50.0
11.2	0.001	50.0
12.4	0.003	50.0
36.5	0.008	50.4
49.7	0.014	50.5
60.8	0.019	50.3
72.9	0.028	49.8
88.1	0.037	49.3
100.4	0.048	48.7
125.3	0.068	47.4
162.1	0.097	45.6
207.1	0.132	43.4
252.8	0.166	41.0
301.8	0.206	38.2
340.6	0.235	36.1
394.8	0.276	32.9
475.7	0.331	28.6
565.7	0.389	24.1
627.1	0.432	20.7
702.7	0.489	16.3
757.7	0.533	13.2
815.1	0.576	10.2
869.9	0.619	7.4
904.6	0.648	5.6
933.1	0.677	4.0
957.0	0.706	2.5
981.5	0.735	1.2
1013.7	0.778	1.0
1042.8	0.821	1.0
1066.3	0.865	1.0
1074.9	0.910	1.0

Tested By: 129-04-0411 Date: 3/28/18 Input Checked By: GEM Date: 5/11/18
 page 3 of 11 DCN: CT-S28 DATE: 4/12/13 REVISION: 3 Sigmatriax.xls

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
AASHTO T-297



Client: ESP Associates Boring No.: -L- STA 505+39 11'RT
 Client Reference: R-1015 Site B CS34.324.00 Depth (ft): 13.0-15.0
 Project No.: R-2018-075-001 Sample No.: ST-2
 Lab ID: R-2018-075-001-003

Visual Description: TAN SAND (UNDISTURBED)

Effective Confining Pressure (psi)	3.5	Stage No.	1
		Test No.	1

INITIAL DIMENSIONS

Initial Sample Length (in)	5.86
Initial Sample Diameter (in)	2.78
Initial Sample Area (in ²)	6.09
Initial Sample Volume (in ³)	35.65

VOLUME CHANGE

Volume After Consolidation (in ³)	35.50
Length After Consolidation (in)	5.85
Area After Consolidation (in ²)	6.069

Strain (%)	Deviation Stress	ΔU	$\bar{\sigma}_1$	$\bar{\sigma}_3$	Effective Principle Stress Ratio	\bar{A}	\bar{P}	\bar{Q}
0.02	0.93	0.04	4.44	3.5	1.265	0.04	3.98	0.47
0.04	1.13	0.01	4.66	3.5	1.320	0.01	4.10	0.56
0.14	5.09	0.46	8.18	3.1	2.648	0.09	5.63	2.55
0.23	7.26	0.50	10.30	3.0	3.386	0.07	6.67	3.63
0.33	9.08	0.30	12.32	3.2	3.799	0.03	7.78	4.54
0.47	11.04	-0.18	14.77	3.7	3.960	-0.02	9.25	5.52
0.62	13.52	-0.65	17.72	4.2	4.224	-0.05	10.96	6.76
0.82	15.50	-1.31	20.35	4.9	4.194	-0.08	12.60	7.75
1.16	19.50	-2.58	25.63	6.1	4.182	-0.13	15.88	9.75
1.66	25.37	-4.40	33.32	7.9	4.192	-0.17	20.63	12.69
2.26	32.47	-6.61	42.63	10.2	4.196	-0.20	26.39	16.24
2.84	39.59	-8.95	52.08	12.5	4.169	-0.23	32.29	19.79
3.52	47.09	-11.73	62.37	15.3	4.083	-0.25	38.83	23.55
4.02	52.99	-13.92	70.45	17.5	4.034	-0.26	43.96	26.49
4.71	61.13	-17.03	81.70	20.6	3.971	-0.28	51.14	30.56
5.65	73.10	-21.36	98.00	24.9	3.935	-0.29	61.45	36.55
6.65	86.17	-25.91	115.63	29.5	3.925	-0.30	72.54	43.08
7.38	94.86	-29.29	127.70	32.8	3.889	-0.31	80.27	47.43
8.35	105.29	-33.68	142.51	37.2	3.828	-0.32	89.87	52.64
9.11	112.65	-36.77	152.97	40.3	3.794	-0.33	96.64	56.33
9.84	120.28	-39.76	163.59	43.3	3.777	-0.33	103.45	60.14
10.59	127.36	-42.59	173.50	46.1	3.760	-0.33	109.82	63.68
11.08	131.74	-44.38	179.67	47.9	3.749	-0.34	113.80	65.87
11.57	135.16	-45.97	184.68	49.5	3.730	-0.34	117.09	67.58
12.06	137.88	-47.47	188.89	51.0	3.703	-0.34	119.96	68.94
12.56	140.62	-48.83	192.99	52.4	3.685	-0.35	122.68	70.31
13.29	144.05	-48.98	196.58	52.5	3.743	-0.34	124.55	72.03
14.03	146.95	-48.98	199.47	52.5	3.798	-0.33	126.00	73.47
14.79	148.94	-48.98	201.47	52.5	3.836	-0.33	127.00	74.47
15.55	148.81	-48.98	201.33	52.5	3.833	-0.33	126.93	74.40

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**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
AASHTO T-297



Client: ESP Associates Boring No.: -L- STA 505+39 11'RT
 Client Reference: R-1015 Site B CS34.324.00 Depth (ft): 13.0-15.0
 Project No.: R-2018-075-001 Sample No.: ST-2
 Lab ID: R-2018-075-001-003

Visual Description: TAN SAND (UNDISTURBED)

Stage No.	1
Test No.	3

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	5.851	Diameter 1:	2.912
Length 2:	5.929	Diameter 2:	2.870
Length 3:	5.846	Diameter 3:	2.899
Length 4:	5.991	Diameter 4:	2.874
Avg. Length:	5.904	Avg. Diam.:	2.889

PRESSURES (psi)

Cell Pressure (psi)	77.8
Back Pressure (psi)	50.0
Eff. Conf. Pressure (psi)	27.8
Pore Pressure Response (%)	100

VOLUME CHANGE

Initial Burette Reading (ml)	24.0
Final Burette Reading (ml)	0.0
Final Change (ml)	24.0

MAXIMUM OBLIQUITY POINTS

P	=	22.86
Q	=	16.05

Initial Dial Reading (mil)	118
Dial Reading After Saturation (mil)	116
Dial Reading After Consolidation (mil)	145

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
12.8	0.000	50.0
17.1	0.001	52.5
18.2	0.003	55.4
54.7	0.008	64.9
102.0	0.013	70.1
120.6	0.019	71.9
135.6	0.028	72.6
147.2	0.037	72.7
162.0	0.048	72.4
184.8	0.069	71.9
219.8	0.098	71.0
247.1	0.134	70.1
267.8	0.169	69.3
288.5	0.211	68.5
299.5	0.240	67.9
313.1	0.281	67.2
324.6	0.337	66.1
299.8	0.396	66.1
269.3	0.440	67.2
242.0	0.500	68.5
243.7	0.544	68.3
251.0	0.588	67.8
252.5	0.633	67.4
278.7	0.662	65.9
297.7	0.692	64.9
318.4	0.722	63.6
335.8	0.751	64.1
357.8	0.795	63.2
370.7	0.839	62.7
378.5	0.869	62.5
384.1	0.899	60.3

Tested By: 129-04-0411 Date: 3/28/18 Input Checked By: GEM Date: 5/11/18

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
AASHTO T-297



Client: ESP Associates Boring No.: -L- STA 505+39 11'RT
 Client Reference: R-1015 Site B CS34.324.00 Depth (ft): 13.0-15.0
 Project No.: R-2018-075-001 Sample No.: ST-2
 Lab ID: R-2018-075-001-003

Visual Description: TAN SAND (UNDISTURBED)

Effective Confining Pressure (psi)	27.8	Stage No.	1
		Test No.	3

INITIAL DIMENSIONS

Initial Sample Length (in)	5.90
Initial Sample Diameter (in)	2.89
Initial Sample Area (in ²)	6.55
Initial Sample Volume (in ³)	38.70

VOLUME CHANGE

Volume After Consolidation (in ³)	37.27
Length After Consolidation (in)	5.88
Area After Consolidation (in ²)	6.342

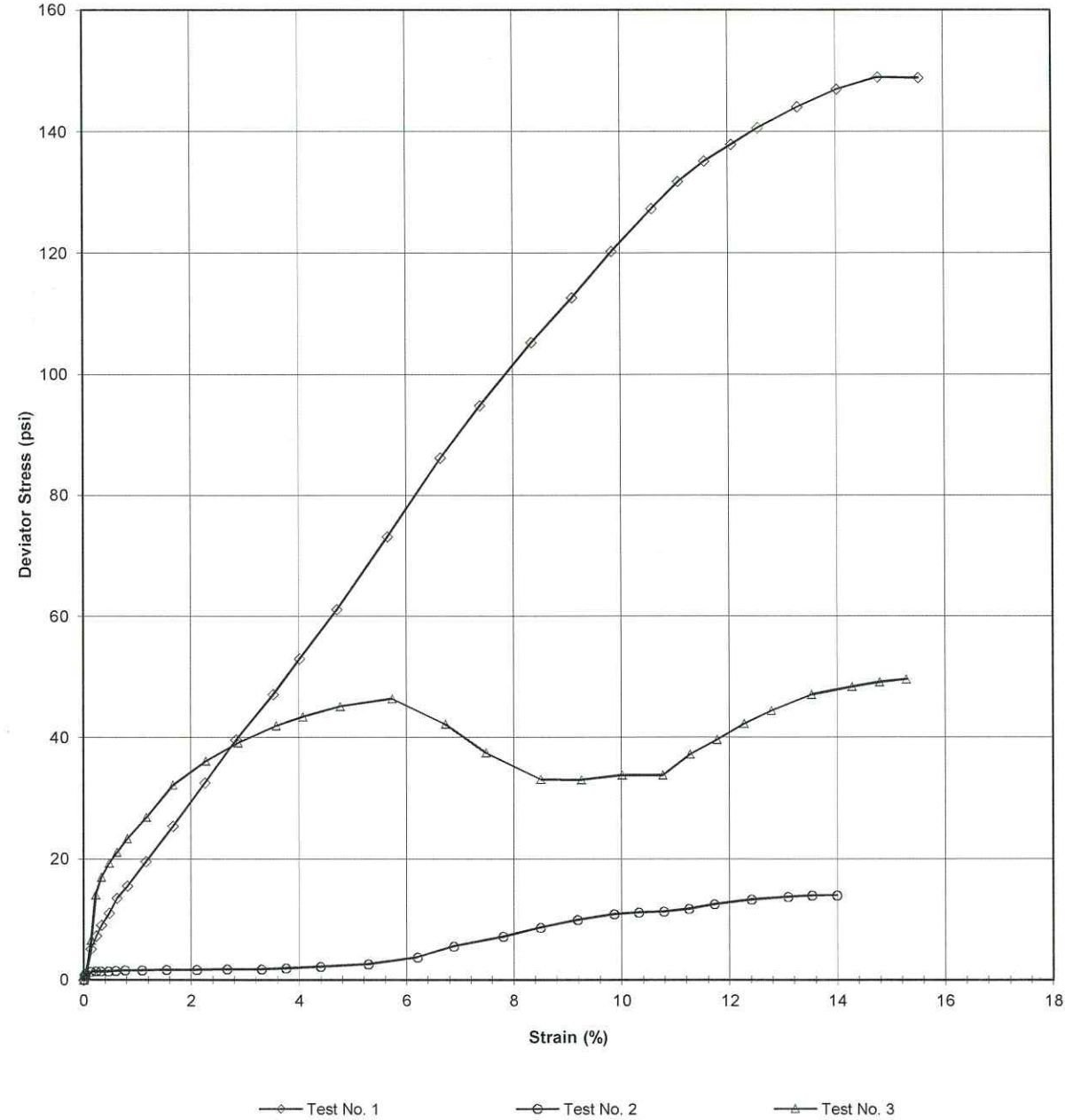
Strain (%)	Deviation Stress	Δ U	σ ₁	σ ₃	Effective Principle Stress Ratio	A	P	Q
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0.02	0.67	2.52	26.00	25.3	1.027	3.74	25.66	0.34
0.05	0.85	5.41	23.28	22.4	1.038	6.39	22.86	0.42
0.14	6.61	14.91	19.54	12.9	1.511	2.26	16.24	3.30
0.22	14.04	20.06	21.82	7.8	2.804	1.43	14.80	7.02
0.33	16.94	21.86	22.92	6.0	3.830	1.29	14.45	8.47
0.48	19.27	22.60	24.52	5.2	4.675	1.17	14.88	9.64
0.62	21.06	22.66	26.24	5.2	5.062	1.08	15.71	10.53
0.81	23.34	22.43	28.75	5.4	5.313	0.96	17.08	11.67
1.17	26.80	21.88	32.76	6.0	5.497	0.82	19.36	13.40
1.67	32.10	21.03	38.91	6.8	5.712	0.66	22.86	16.05
2.28	36.11	20.07	43.88	7.8	5.643	0.56	25.83	18.05
2.87	39.06	19.31	47.60	8.5	5.575	0.49	28.07	19.53
3.58	41.92	18.53	51.23	9.3	5.501	0.44	30.27	20.96
4.08	43.36	17.94	53.27	9.9	5.378	0.41	31.59	21.68
4.77	45.10	17.24	55.70	10.6	5.254	0.38	33.15	22.55
5.74	46.35	16.12	58.08	11.7	4.952	0.35	34.90	23.17
6.73	42.21	16.14	53.91	11.7	4.607	0.38	32.81	21.10
7.49	37.42	17.24	48.02	10.6	4.529	0.46	29.31	18.71
8.51	33.07	18.52	42.39	9.3	4.547	0.56	25.85	16.53
9.26	33.04	18.33	42.56	9.5	4.471	0.55	26.04	16.52
10.01	33.80	17.78	43.87	10.1	4.359	0.53	26.97	16.90
10.77	33.73	17.42	44.15	10.4	4.236	0.52	27.29	16.87
11.27	37.21	15.86	49.20	12.0	4.104	0.43	30.59	18.61
11.78	39.64	14.86	52.62	13.0	4.053	0.37	32.80	19.82
12.28	42.27	13.59	56.52	14.3	3.966	0.32	35.39	21.14
12.78	44.43	14.09	58.18	13.8	4.231	0.32	35.97	22.21
13.53	47.04	13.18	61.71	14.7	4.208	0.28	38.19	23.52
14.28	48.38	12.67	63.55	15.2	4.189	0.26	39.36	24.19
14.79	49.14	12.47	64.52	15.4	4.195	0.25	39.95	24.57
15.29	49.59	10.25	67.18	17.6	3.819	0.21	42.39	24.80



**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297**

Client: ESP Associates Boring No.: -L- STA 505+39 11'RT
 Client Reference: R-1015 Site B CS34.324.00 Depth (ft): 13.0-15.0
 Project No.: R-2018-075-001 Sample No.: ST-2
 Lab ID: R-2018-075-001-003
 Visual Description: TAN SAND (UNDISTURBED)



**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297**

Client: ESP Associates
 Client Reference: R-1015 Site B CS34.324.00
 Project No.: R-2018-075-001
 Lab ID: R-2018-075-001-003 Specific Gravity (Measured) 2.66
 Visual Description: TAN SAND (UNDISTURBED)

SAMPLE CONDITION SUMMARY

Boring No.:	-L- STA 505+39 11'RT	-L- STA 505+39 11'RT
Depth (ft):	13.0-15.0	13.0-15.0
Sample No.:	ST-2	ST-2
Test No.	T1	T3
Deformation Rate (in/min)	0.002	0.002
Back Pressure (psi)	50.0	50.0
Consolidation Time (days)	1	1
Moisture Content (%) (INITIAL)	33.6	33.6
Total Unit Weight (pcf)	130.9	126.5
Dry Unit Weight (pcf)	98.0	94.7
Moisture Content (%) (FINAL)	23.7	24.4
Initial State Void Ratio, e	0.694	0.752
Void Ratio at Shear, e	0.687	0.688

Tested By: 129-04-0411 Date: 3/28/18 Approved By: MPS Date: 5/11/18

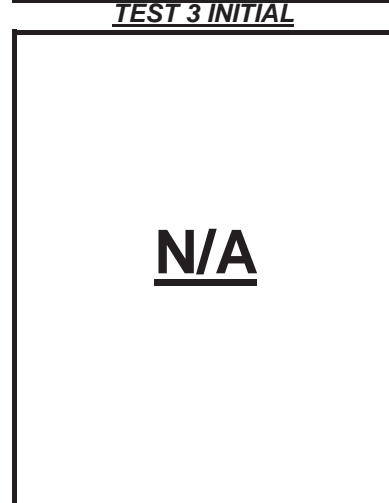
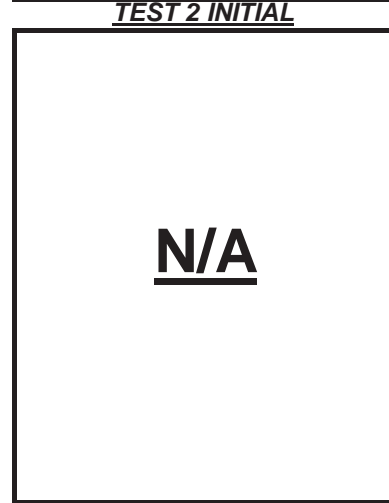
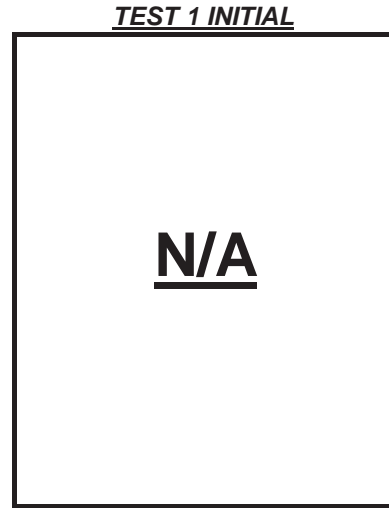
Tested By: 129-04-0411 Date: 3/28/18 Input Checked By: GEM Date: 5/11/18

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297**



Client: ESP Associates
 Client Reference: R-1015 Site B CS34.324.00
 Project No.: R-2018-075-001
 Lab ID: R-2018-075-001-003

Boring No.: -L- STA 505+39 1
 Depth (ft): 13.0-15.0
 Sample No.: ST-2

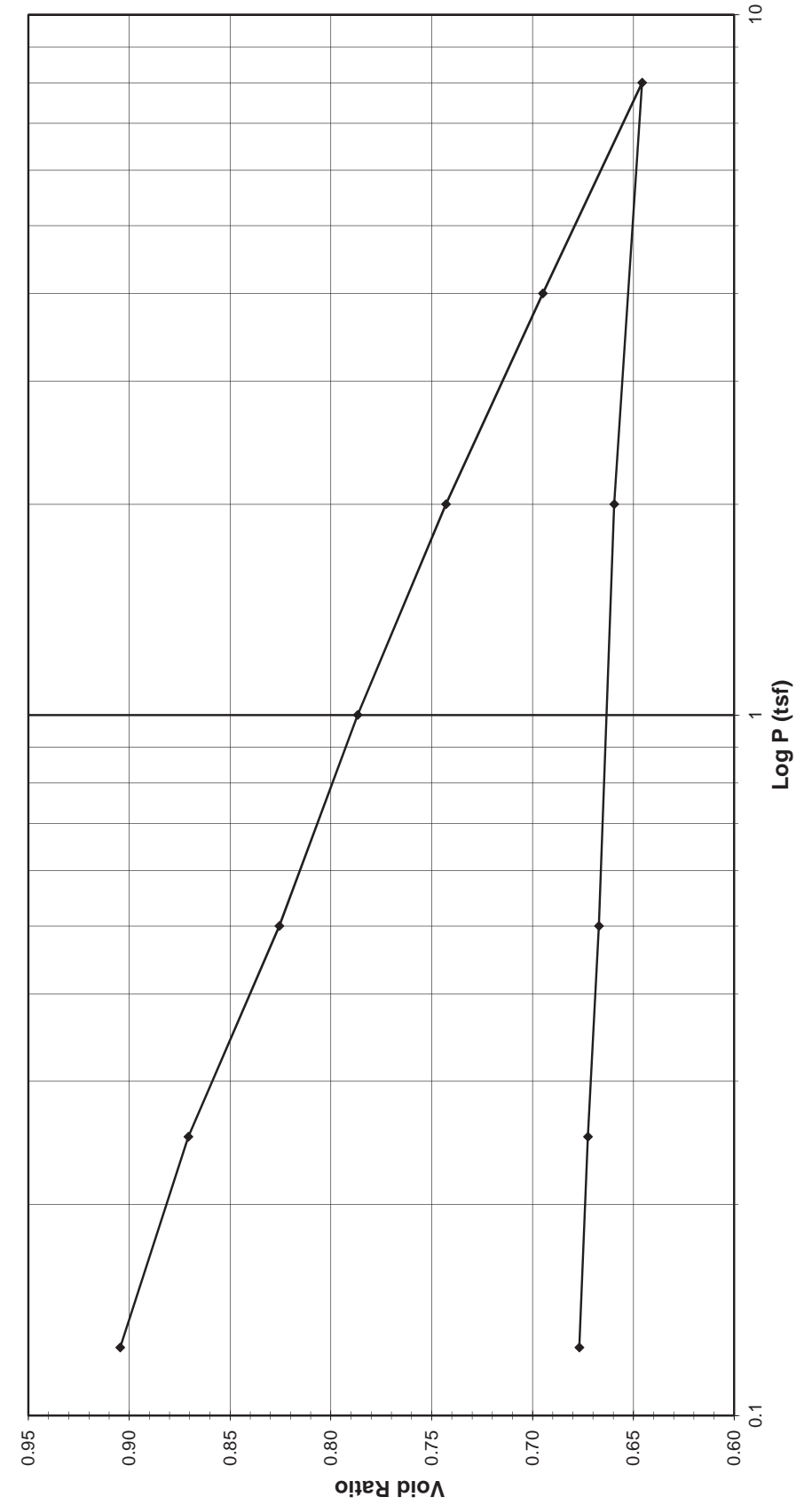


**ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216**

Client: ESP Associates
 Client Reference: R-1015 Site B CS34.324.00
 Project No.: R-2018-075-001
 Lab ID: R-2018-075-001-003

Boring No.: -L- STA 505+39 11'RT
 Depth (ft): 13.0-15.0
 Sample No.: ST-2
 Visual Description: TAN SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By 129-04-0411 Date 3/28/18 Approved By MPS Date 5/11/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client: ESP Associates
 Client Reference: R-1015 Site B CS34.324.00
 Project No.: R-2018-075-001
 Lab ID: R-2018-075-001-003

Boring No.: -L- STA 505+39 11'RT
 Depth (ft): 13.0-15.0
 Sample No.: ST-2
 Visual Description: TAN SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED
Consolidometer No.: R487
1 Division = 0.0001 (in.)

Sample Properties

	Initial	Final
<i>Water Content</i>		
Tare Number	SS-1	SS-8
Wt. Tare & WS (g)	395.74	226.77
Wt. Tare & DS (g)	316.52	200.61
Wt. Water (g)	79.22	26.16
Wt. Tare (g)	100.16	99.81
Wt. DS (g)	216.36	100.80
Water Content (%)	36.61	25.95
<i>Sample Parameters</i>		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.0000	0.8418
Sample Volume (cc)	80.44	67.72
Wt. Wet Sample + Ring (g)	251.20	239.75
Wt. of Ring (g)	104.45	104.45
Wt. of Wet Sample (g)	146.75	135.30
Wet Density (pcf)	113.84	124.67
Wet Density (g/cc)	1.82	2.00
Water Content (%)	36.61	25.95
Wt. of Dry Sample (g)	107.42	107.42
Dry Density (pcf)	83.33	98.98
Dry Density (g/cc)	1.34	1.59
Void Ratio	0.9919	0.6769
Saturation (%)	98.19	101.99
Specific Gravity	2.66	Measured

Test Data Summary

Applied Pressure (tsf)	Final Dial Reading (div)	Machine Deflection (div)	Corrected Reading (div)	Height of Sample (mm)	Volume (cc)	Dry Density (g/cc)	Void Ratio
Seating	0	0	0	25.400	80.440	1.33539	0.99192
0.125	442.4	3.6	438.9	24.285	76.910	1.39669	0.90450
0.25	617.3	9.0	608.4	23.855	75.546	1.42190	0.87074
0.5	855.6	21.0	834.6	23.280	73.726	1.45700	0.82567
1	1070.2	40.0	1030.2	22.783	72.153	1.48877	0.78671
2	1309.5	59.6	1249.9	22.225	70.386	1.52615	0.74295
4	1575.7	85.0	1490.7	21.614	68.448	1.56934	0.69498
8	1861.3	123.4	1737.9	20.986	66.460	1.61629	0.64574
2	1783.5	114.6	1668.9	21.161	67.015	1.60290	0.65949
0.5	1714.3	84.0	1630.3	21.259	67.326	1.59550	0.66719
0.25	1682.4	78.9	1603.5	21.327	67.542	1.59041	0.67253
0.125	1660.6	78.9	1581.7	21.383	67.717	1.58629	0.67687

page 2 of 2

DCN: CT-24E Date: 5/3/12 Revision: 6

Tested By: 129-04-0411 Date: 3/28/18 Input Checked By: GEM Date: 5/11/18

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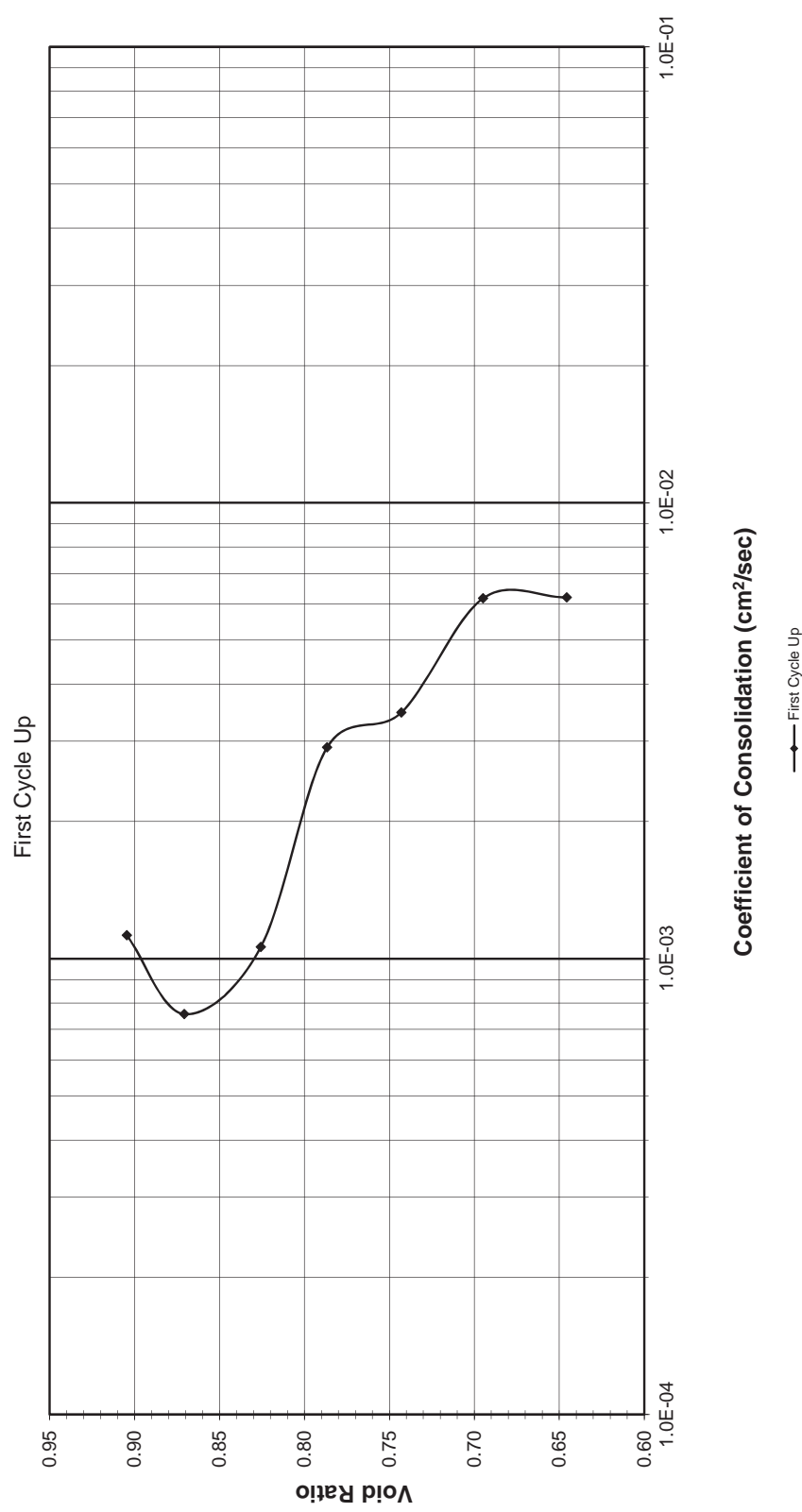
ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client: ESP Associates
 Client Reference: R-1015 Site B CS34.324.00
 Project No.: R-2018-075-001
 Lab ID: R-2018-075-001-003

Boring No.: -L- STA 505+39 11'RT
 Depth (ft): 13.0-15.0
 Sample No.: ST-2
 Visual Description: TAN SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



ONE DIMENSIONAL CONSOLIDATION

AASHTO T-216

Client ESP Associates
 Client Reference R-1015 Site B CS34.324.00
 Project No. R-2018-075-001
 Lab ID R-2018-075-001-003

Boring No. -L- STA 505+39 11'RT
 Depth (ft) 13.0-15.0
 Sample No. ST-2
 Visual Description TAN SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R487
 1 Division = 0.0001 (in.)

Sample Properties	Initial	Final
Water Content		
Tare Number	SS-1	SS-8
Wt. Tare & WS (g)	395.74	226.77
Wt. Tare & DS (g)	316.52	200.61
Wt. Water (g)	79.22	26.16
Wt. Tare (g)	100.16	99.81
Wt. DS (g)	216.36	100.80
Water Content (%)	36.61	25.95
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.000	0.842
Sample Volume (cc)	80.44	67.72
Wt. Wet Sample + Ring (g)	251.20	239.75
Wt. of Ring (g)	104.45	104.45
Wt. of Wet Sample (g)	146.75	135.30
Wet Density (pcf)	113.84	124.67
Wet Density (g/cc)	1.82	2.00
Water Content (%)	36.61	25.95
Wt. of Dry Sample (g)	107.42	107.42
Dry Density (pcf)	83.33	98.98
Dry Density (g/cc)	1.34	1.59
Void Ratio	0.9919	0.6769
Saturation (%)	98.19	101.99
Specific Gravity	2.66	Measured

Load Increment (tsf)	Dial Reading @ t ₅₀ (div)	Machine Deflection (div)	Corrected Dial Reading @ t ₅₀ (div)	Sample Height @ t ₅₀ (cm)	Time t ₅₀ (min.)	C _v (cm ² /sec)
0 - 0.125	223.3	3.6	219.7	2.484	4.50	0.00113
0.125 - 0.25	525.4	9.0	516.4	2.409	6.30	0.00076
0.25 - 0.5	740.1	21.0	719.1	2.357	4.30	0.00106
0.5 - 1	968.8	40.0	928.8	2.304	1.50	0.00291
1 - 2	1196.4	59.6	1136.8	2.251	1.20	0.00347
2 - 4	1450.0	85.0	1365.0	2.193	0.64	0.00617
4 - 8	1741.4	123.4	1618.0	2.129	0.60	0.00620
8 - 2	NA	114.6	NA	NA	NA	NA
2 - 0.5	NA	84.0	NA	NA	NA	NA
0.5 - 0.25	NA	78.9	NA	NA	NA	NA
0.25 - 0.125	NA	78.9	NA	NA	NA	NA

Tested By 129-04-0411 Date 3/28/18 Input Checked By GEM Date 5/11/18

DCN: CT-24E Date: 5/3/12 Revision: 6

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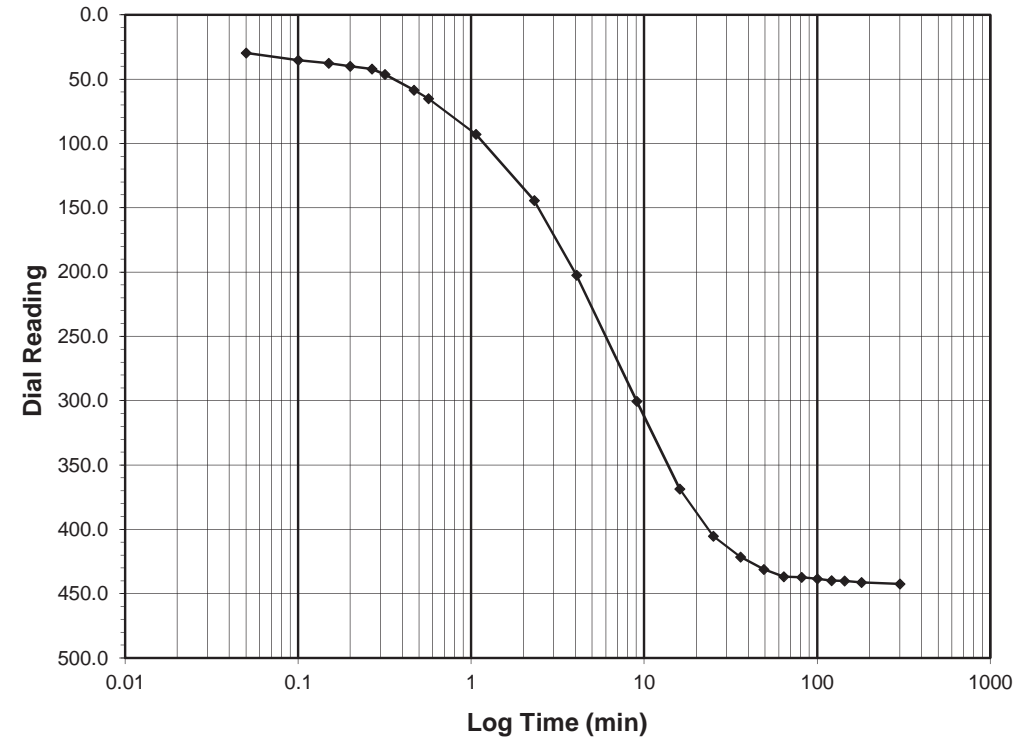
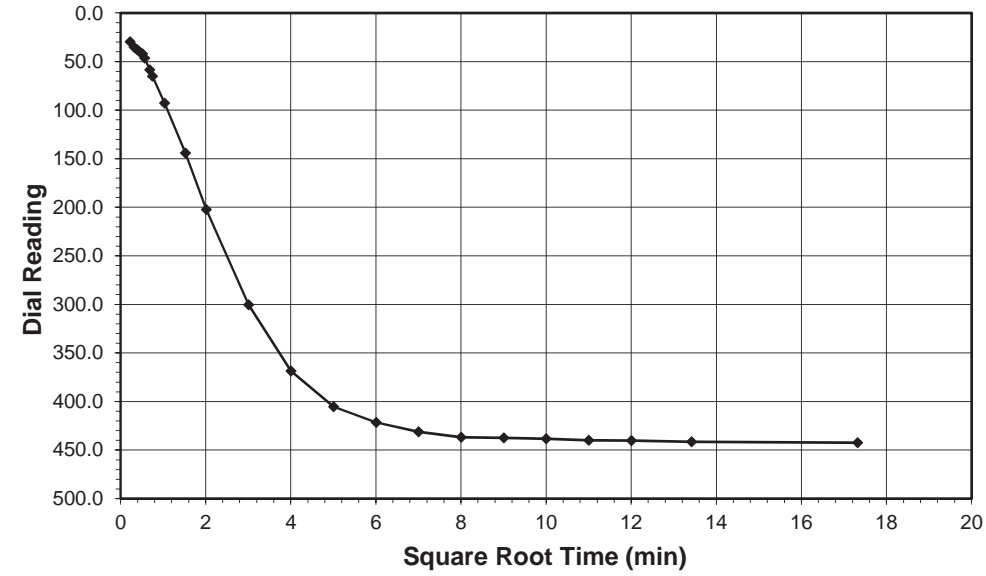
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page 4 of 4

ONE DIMENSIONAL CONSOLIDATION
 AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA 505+39 11'RT
Client Project	R-1015 Site B CS34.324.00	Depth (ft)	13.0-15.0
Project No.	R-2018-075-001	Sample No.	ST-2
Lab ID	R-2018-075-001-003	Visual Description	TAN SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.0-0.125
 Final Reading (div) 442.4
 Consolidometer No. R487
 1 Division (in) 0.0001
 Start Date 3/28/18
 Start Time 9:12:44

Elapsed Time (min)	Dial Reading (div)
Initial	0.0
0.05	29.6
0.10	35.2
0.15	37.6
0.20	39.9
0.27	42.1
0.32	46.4
0.47	58.4
0.57	65.2
1.07	92.9
2.32	144.2
4.07	202.4
9.07	300.4
16.07	368.6
25.07	405.2
36.07	421.5
49.07	431.2
64.08	436.9
81.08	437.3
100.08	438.3
121.08	440.0
144.08	440.1
180.08	441.4
300.08	442.4

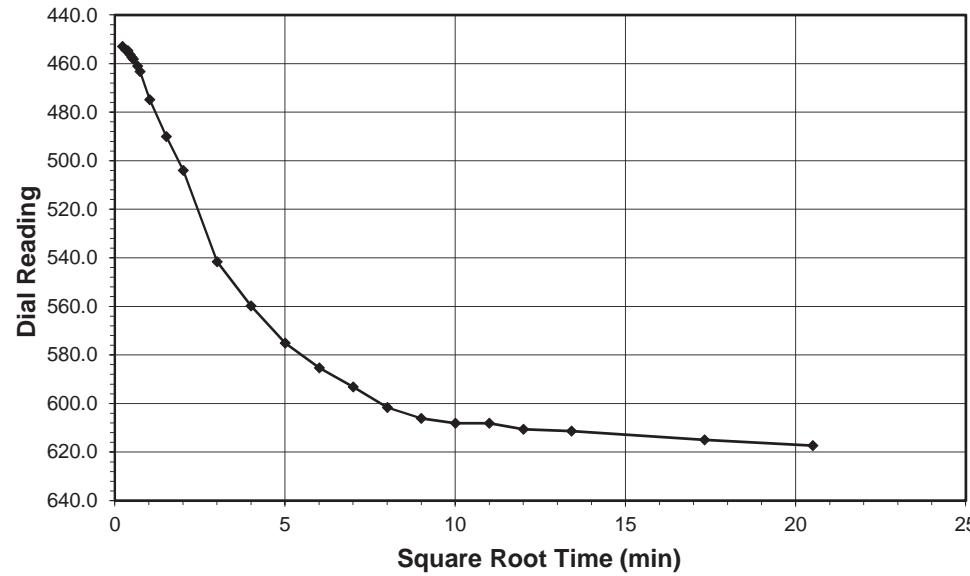
Tested By 129-04-0411 Date 3/28/18 Checked By GEM Date 5/11/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



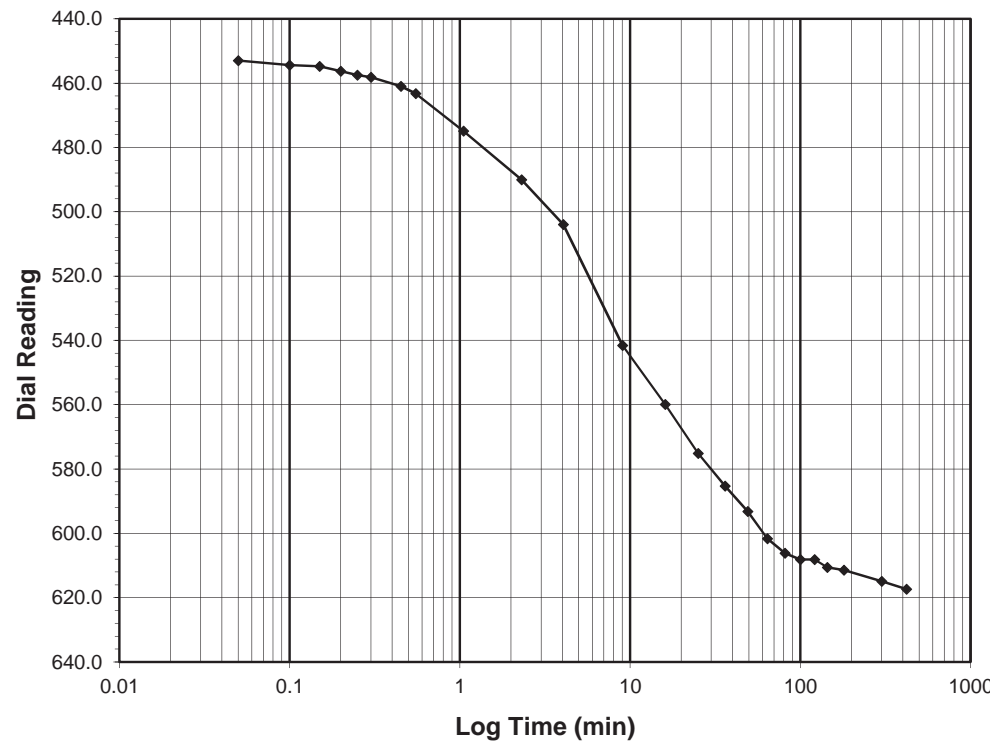
Client ESP Associates Boring No. -L- STA 505+39 11'RT
 Client Project R-1015 Site B CS34.324.00 Depth (ft) 13.0-15.0
 Project No. R-2018-075-001 Sample No. ST-2
 Lab ID R-2018-075-001-003 Visual Description TAN SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.125-0.25
Final Reading (div) 617.3
 Consolidometer No. **R487**
 1 Division (in) 0.0001
 Start Date 3/28/18
 Start Time 16:13:12

Elapsed Time (min)	Dial Reading (div)
Initial	442.4
0.05	453.0
0.10	454.4
0.15	454.7
0.20	456.3
0.25	457.4
0.30	458.2
0.45	461.0
0.55	463.2
1.05	474.9
2.30	490.0
4.05	504.0
9.05	541.6
16.05	559.9
25.07	575.1
36.07	585.3
49.07	593.2
64.07	601.6
81.07	606.1
100.08	608.2
121.08	608.2
144.08	610.6
180.08	611.4
300.08	614.9
420.47	617.3

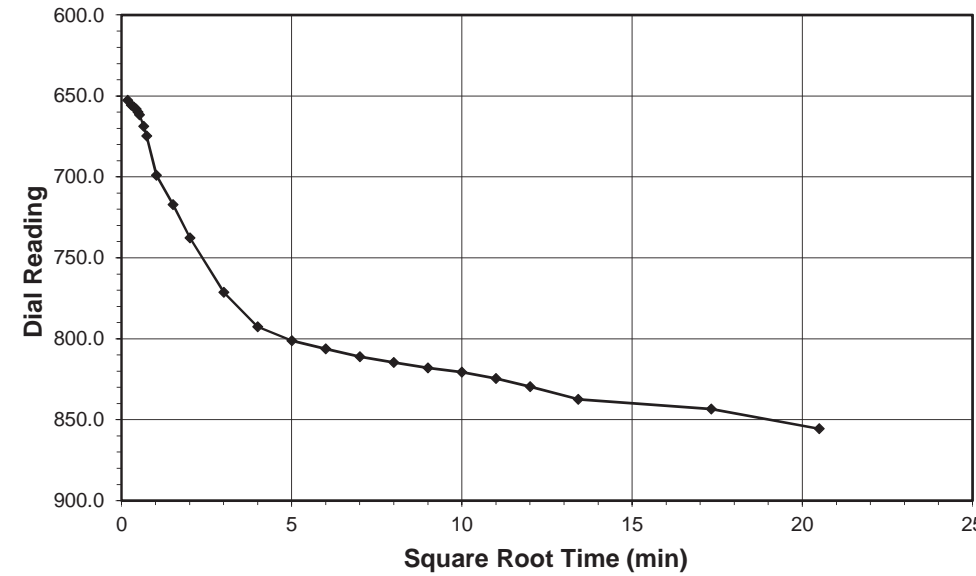


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



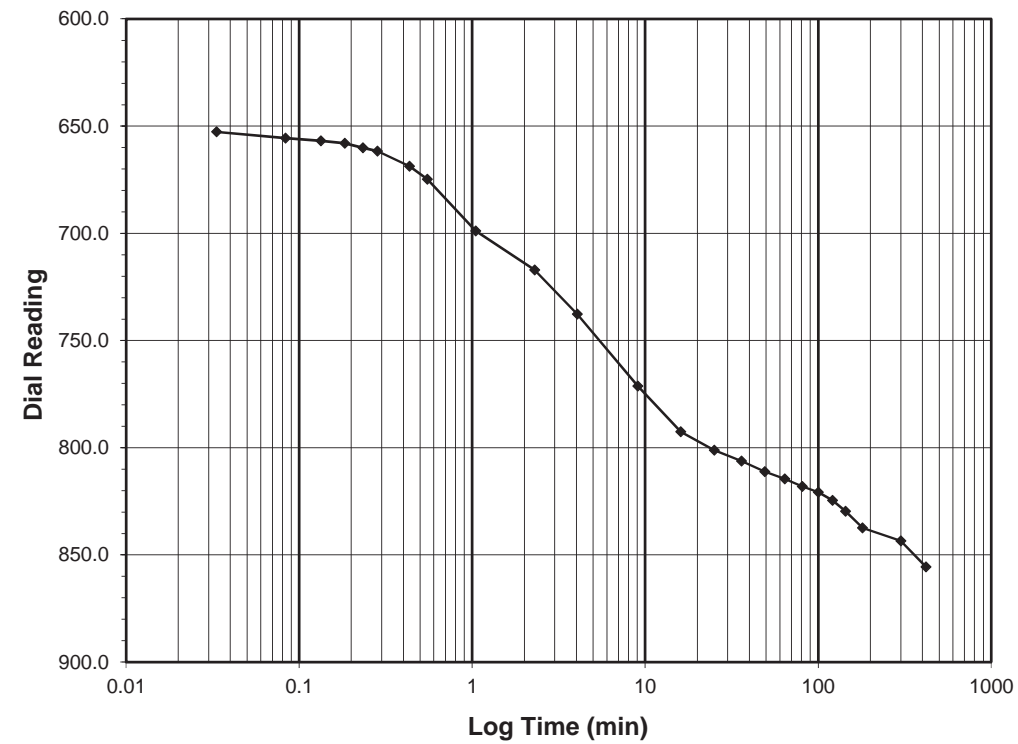
Client ESP Associates Boring No. -L- STA 505+39 11'RT
 Client Project R-1015 Site B CS34.324.00 Depth (ft) 13.0-15.0
 Project No. R-2018-075-001 Sample No. ST-2
 Lab ID R-2018-075-001-003 Visual Description TAN SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.25-0.5
Final Reading (div) 855.6
 Consolidometer No. **R487**
 1 Division (in) 0.0001
 Start Date 3/28/18
 Start Time 23:13:40

Elapsed Time (min)	Dial Reading (div)
Initial	617.3
0.03	652.6
0.08	655.6
0.13	656.8
0.18	658.0
0.23	660.0
0.28	661.6
0.43	668.7
0.55	674.8
1.05	698.9
2.30	717.0
4.05	737.7
9.05	771.3
16.05	792.5
25.05	801.2
36.05	806.2
49.05	811.1
64.05	814.6
81.05	818.0
100.05	820.7
121.05	824.5
144.05	829.6
180.05	837.3
300.05	843.4
420.32	855.6



Tested By 129-04-0411 Date 3/28/18 Checked By GEM Date 5/11/18

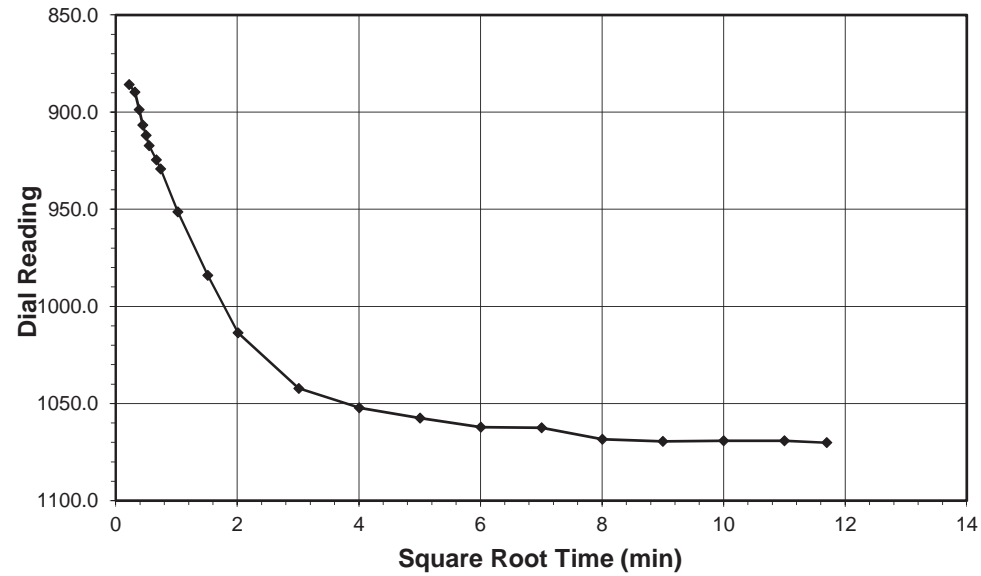
Tested By 129-04-0411 Date 3/28/18 Checked By GEM Date 5/11/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



Client ESP Associates Boring No. -L- STA 505+39 11'RT
 Client Project R-1015 Site B CS34.324.00 Depth (ft) 13.0-15.0
 Project No. R-2018-075-001 Sample No. ST-2
 Lab ID R-2018-075-001-003 Visual Description TAN SAND

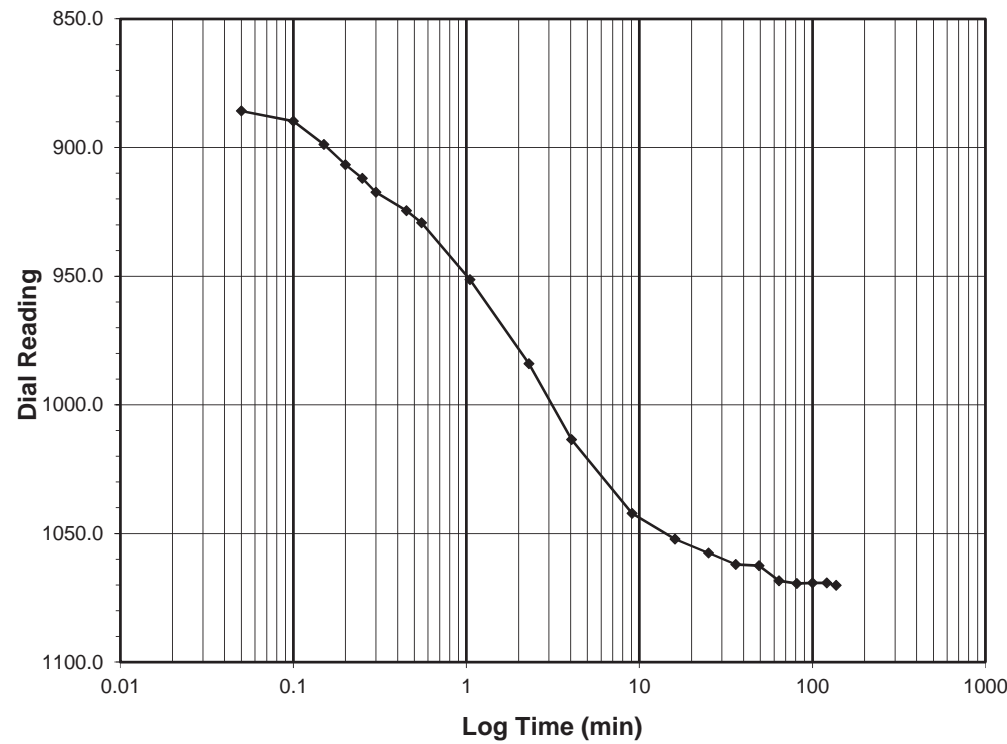
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.5-1.0
Final Reading (div) 1070.2
 Consolidometer No. **R487**
 1 Division (in) 0.0001

Start Date 3/29/18
 Start Time 6:14:00

Elapsed Time (min)	Dial Reading (div)
Initial	855.6
0.05	885.8
0.10	889.7
0.15	898.8
0.20	906.7
0.25	912.0
0.30	917.3
0.45	924.5
0.55	929.2
1.05	951.4
2.30	984.0
4.05	1013.5
9.07	1042.2
16.07	1052.2
25.07	1057.5
36.07	1062.1
49.07	1062.5
64.07	1068.4
81.07	1069.4
100.07	1069.2
121.07	1069.2
136.82	1070.2

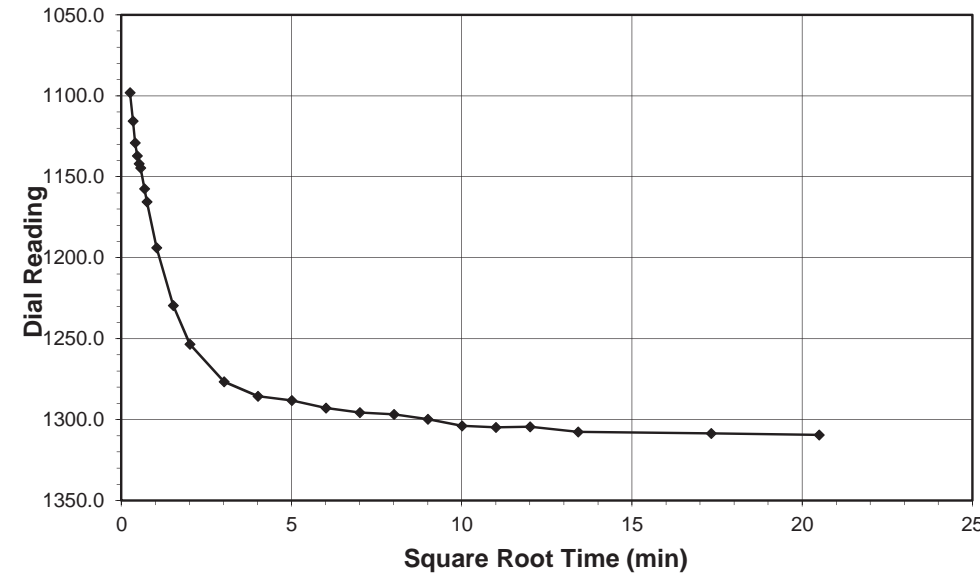


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



Client ESP Associates Boring No. -L- STA 505+39 11'RT
 Client Project R-1015 Site B CS34.324.00 Depth (ft) 13.0-15.0
 Project No. R-2018-075-001 Sample No. ST-2
 Lab ID R-2018-075-001-003 Visual Description TAN SAND

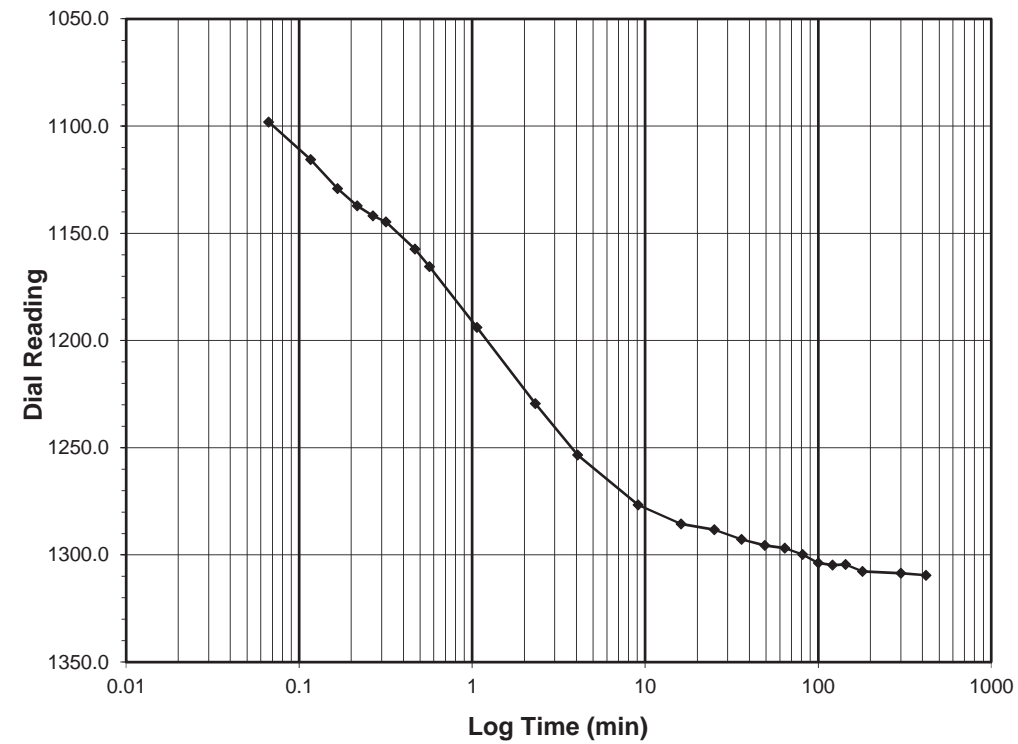
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-2.0
Final Reading (div) 1309.5
 Consolidometer No. **R487**
 1 Division (in) 0.0001

Start Date 3/29/18
 Start Time 8:30:50

Elapsed Time (min)	Dial Reading (div)
Initial	1070.2
0.07	1098.0
0.12	1115.6
0.17	1129.1
0.22	1137.1
0.27	1141.8
0.32	1144.6
0.47	1157.3
0.57	1165.5
1.07	1193.8
2.32	1229.4
4.07	1253.4
9.08	1276.7
16.08	1285.5
25.08	1288.2
36.08	1292.8
49.08	1295.6
64.08	1296.8
81.08	1299.8
100.08	1303.8
121.08	1304.7
144.08	1304.4
180.08	1307.6
300.08	1308.5
420.23	1309.5



Tested By 129-04-0411 Date 3/29/18 Checked By GEM Date 5/11/18

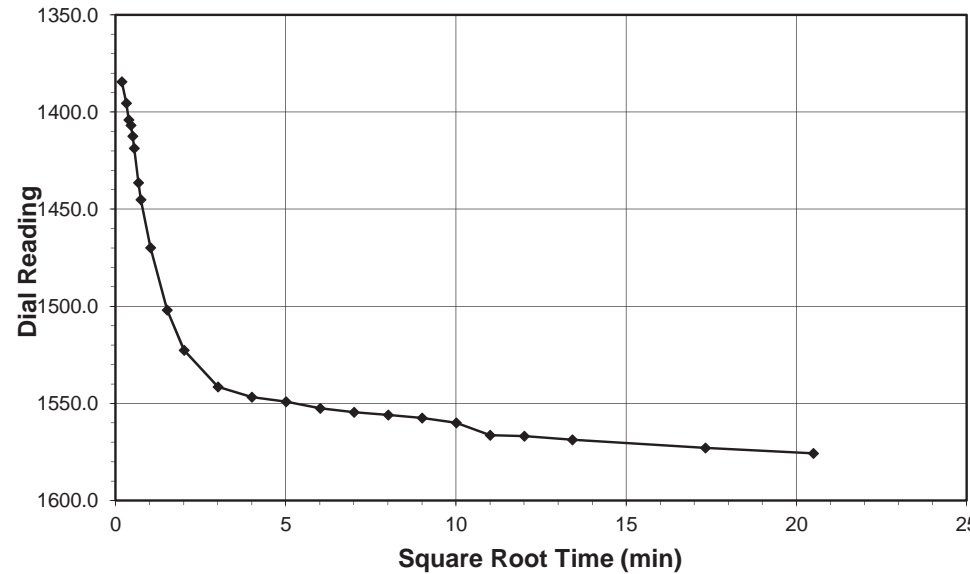
Tested By 129-04-0411 Date 3/29/18 Checked By GEM Date 5/11/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



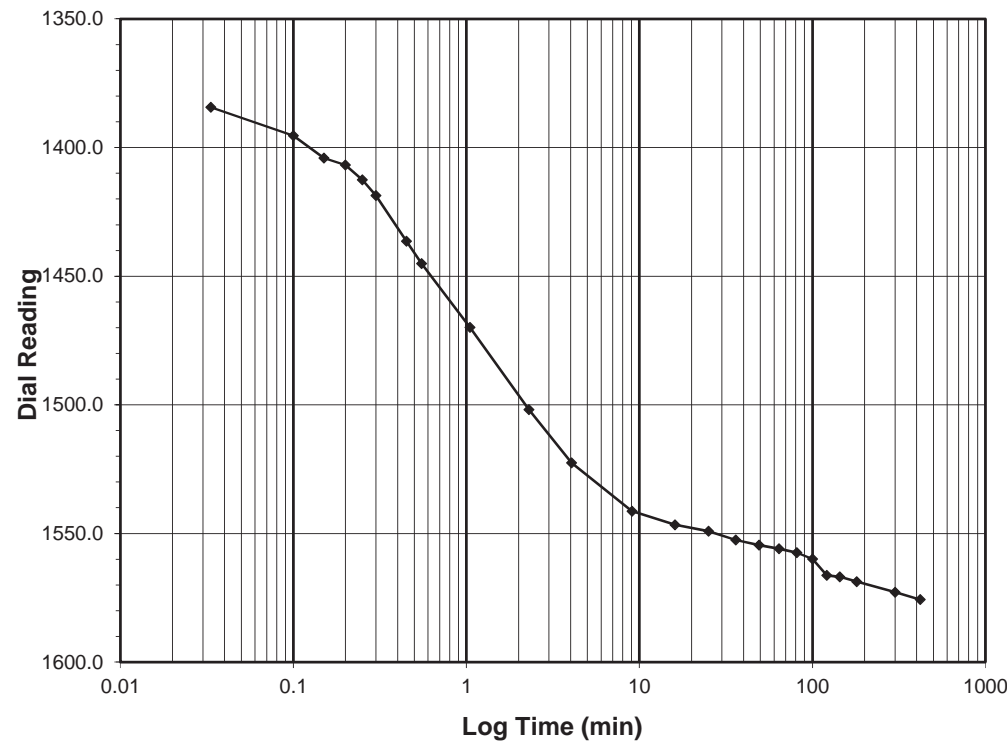
Client ESP Associates Boring No. -L- STA 505+39 11'RT
 Client Project R-1015 Site B CS34.324.00 Depth (ft) 13.0-15.0
 Project No. R-2018-075-001 Sample No. ST-2
 Lab ID R-2018-075-001-003 Visual Description TAN SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 2.0-4.0
 Final Reading (div) 1575.7
 Consolidometer No. R487
 1 Division (in) 0.0001
 Start Date 3/29/18
 Start Time 15:31:03

Elapsed Time (min)	Dial Reading (div)
Initial	1309.5
0.03	1384.3
0.10	1395.4
0.15	1404.1
0.20	1406.8
0.25	1412.5
0.30	1418.6
0.45	1436.4
0.55	1445.1
1.05	1469.9
2.30	1501.9
4.05	1522.6
9.05	1541.4
16.05	1546.7
25.05	1549.1
36.07	1552.5
49.07	1554.6
64.07	1555.9
81.07	1557.5
100.07	1559.9
121.07	1566.3
144.07	1566.9
180.07	1568.7
300.07	1572.9
420.27	1575.7

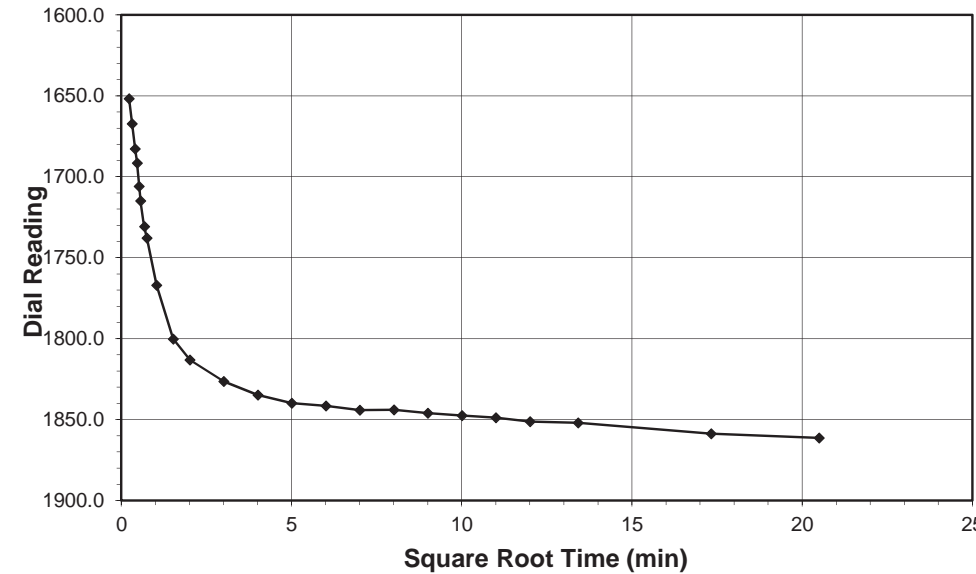


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



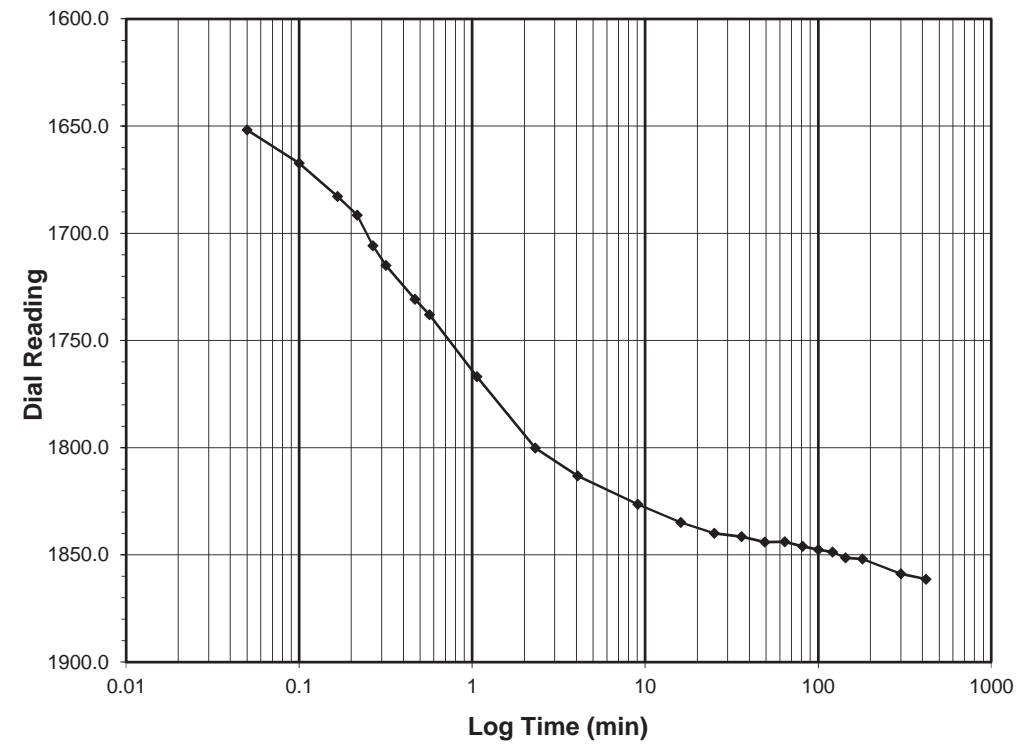
Client ESP Associates Boring No. -L- STA 505+39 11'RT
 Client Project R-1015 Site B CS34.324.00 Depth (ft) 13.0-15.0
 Project No. R-2018-075-001 Sample No. ST-2
 Lab ID R-2018-075-001-003 Visual Description TAN SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 4.0-8.0
 Final Reading (div) 1861.3
 Consolidometer No. R487
 1 Division (in) 0.0001
 Start Date 3/29/18
 Start Time 22:31:20

Elapsed Time (min)	Dial Reading (div)
Initial	1575.7
0.05	1651.8
0.10	1667.3
0.17	1682.7
0.22	1691.6
0.27	1705.8
0.32	1714.9
0.47	1730.8
0.57	1737.9
1.07	1766.9
2.32	1800.2
4.07	1813.1
9.07	1826.3
16.07	1834.8
25.07	1839.9
36.07	1841.5
49.07	1844.1
64.07	1843.9
81.07	1846.0
100.08	1847.5
121.08	1848.7
144.08	1851.3
180.08	1852.0
300.08	1858.8
420.28	1861.3



Tested By 129-04-0411 Date 3/29/18 Checked By GEM Date 5/11/18

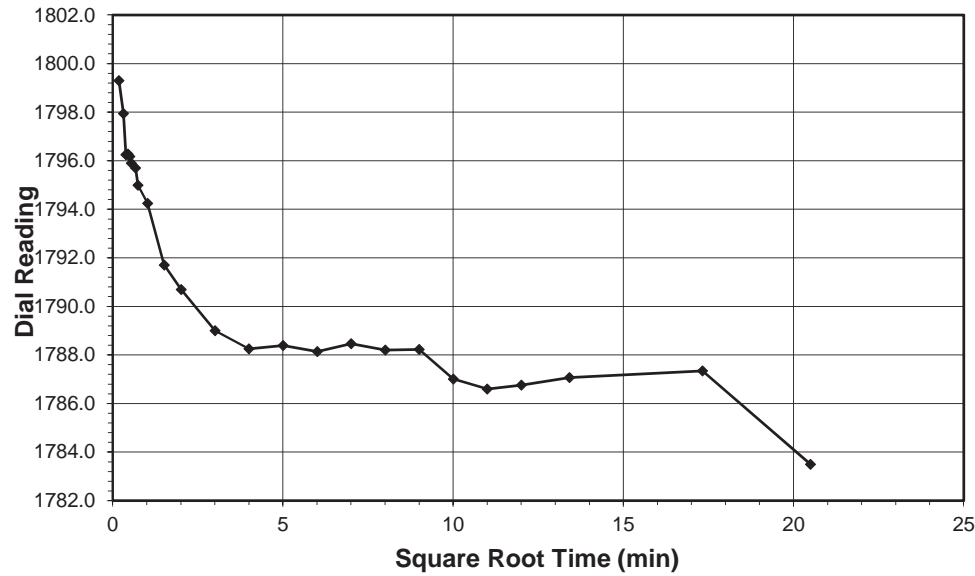
Tested By 129-04-0411 Date 3/29/18 Checked By GEM Date 5/11/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



Client ESP Associates Boring No. -L- STA 505+39 11'RT
 Client Project R-1015 Site B CS34.324.00 Depth (ft) 13.0-15.0
 Project No. R-2018-075-001 Sample No. ST-2
 Lab ID R-2018-075-001-003 Visual Description TAN SAND

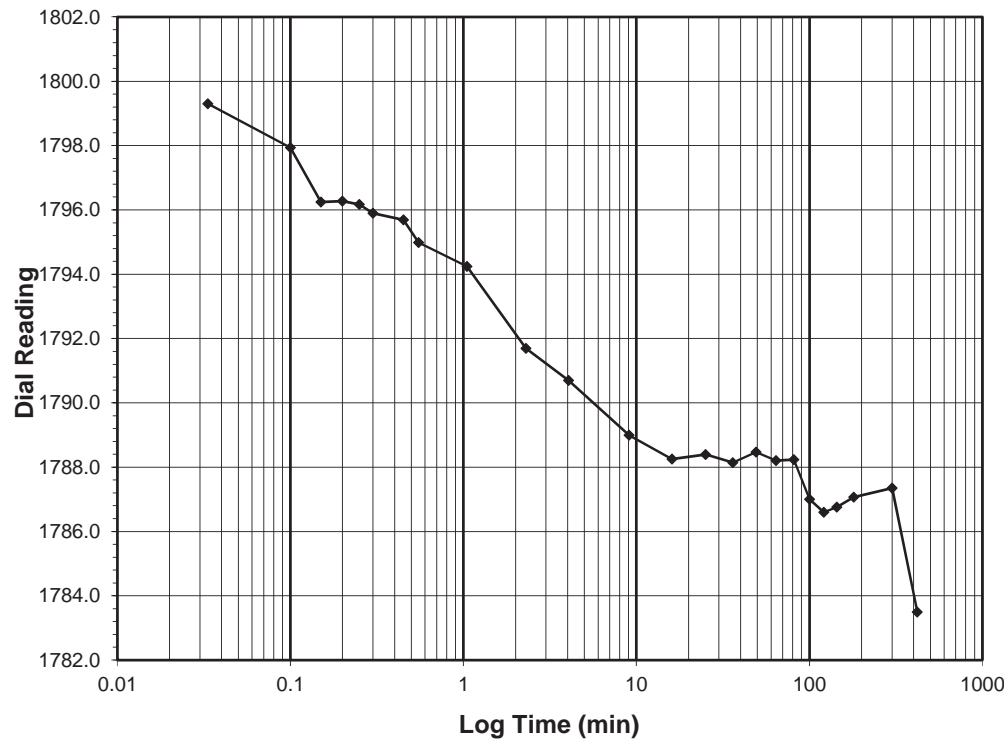
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 8.0-2.0
Final Reading (div) 1783.5
 Consolidometer No. **R487**
 1 Division (in) 0.0001

Start Date 3/30/18
 Start Time 5:31:37

Elapsed Time (min)	Dial Reading (div)
Initial	1861.3
0.03	1799.3
0.10	1797.9
0.15	1796.2
0.20	1796.3
0.25	1796.2
0.30	1795.9
0.45	1795.7
0.55	1795.0
1.05	1794.2
2.30	1791.7
4.05	1790.7
9.05	1789.0
16.05	1788.2
25.05	1788.4
36.07	1788.1
49.07	1788.5
64.07	1788.2
81.07	1788.2
100.07	1787.0
121.07	1786.6
144.07	1786.8
180.07	1787.1
300.07	1787.3
420.27	1783.5



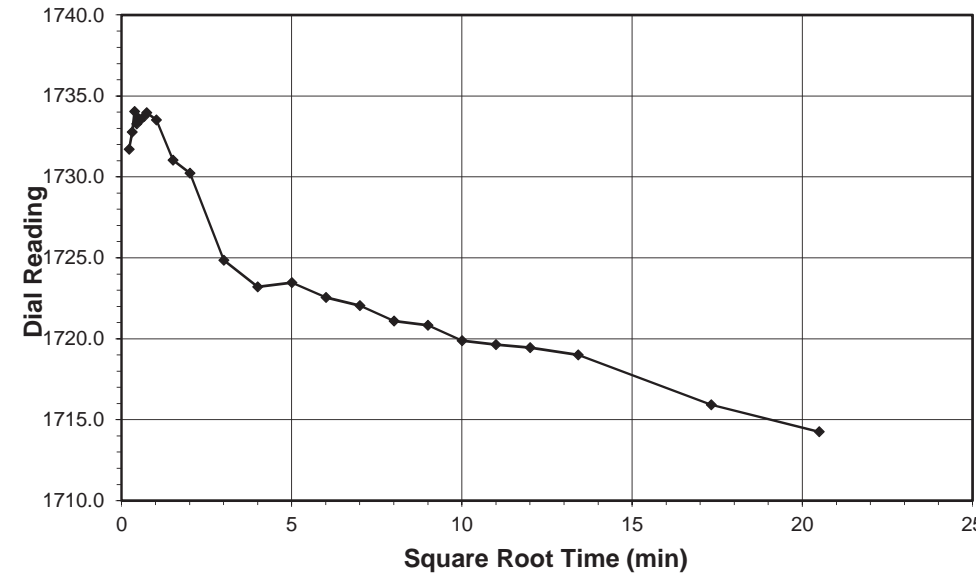
Tested By 129-04-0411 Date 3/30/18 Checked By GEM Date 5/11/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



Client ESP Associates Boring No. -L- STA 505+39 11'RT
 Client Project R-1015 Site B CS34.324.00 Depth (ft) 13.0-15.0
 Project No. R-2018-075-001 Sample No. ST-2
 Lab ID R-2018-075-001-003 Visual Description TAN SAND

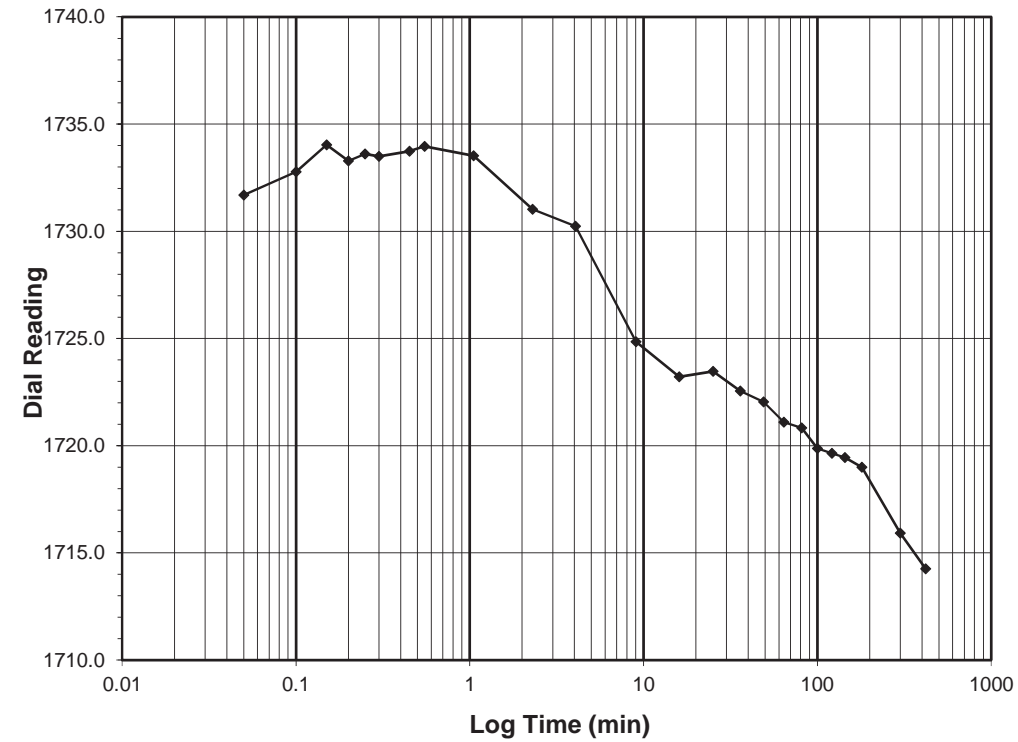
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 2.0-0.5
Final Reading (div) 1714.3
 Consolidometer No. **R487**
 1 Division (in) 0.0001

Start Date 3/30/18
 Start Time 12:31:54

Elapsed Time (min)	Dial Reading (div)
Initial	1783.5
0.05	1731.7
0.10	1732.8
0.15	1734.0
0.20	1733.3
0.25	1733.6
0.30	1733.5
0.45	1733.7
0.55	1734.0
1.05	1733.5
2.30	1731.0
4.05	1730.2
9.05	1724.8
16.05	1723.2
25.07	1723.5
36.07	1722.6
49.07	1722.1
64.07	1721.1
81.07	1720.8
100.07	1719.9
121.07	1719.6
144.07	1719.4
180.08	1719.0
300.08	1715.9
420.10	1714.3



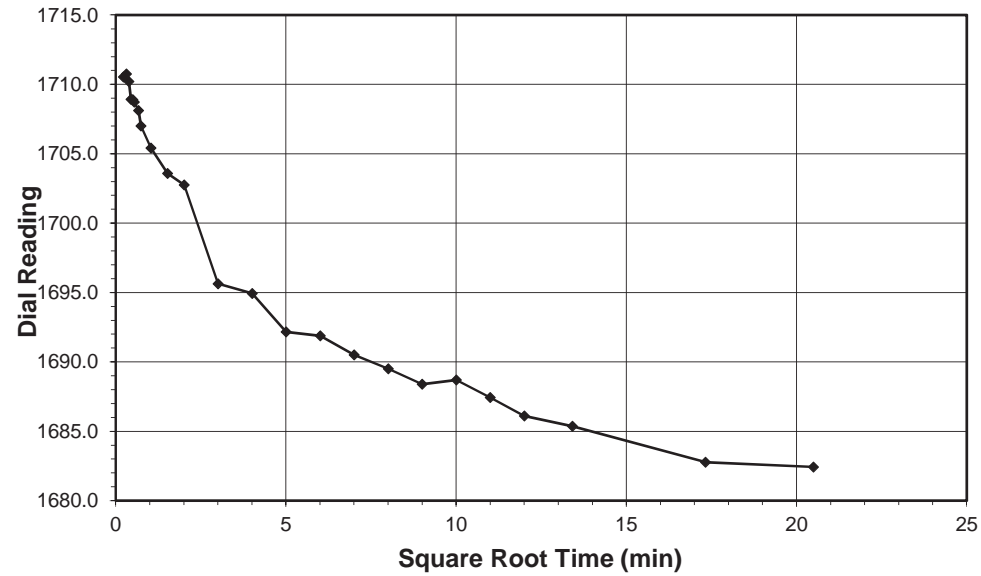
Tested By 129-04-0411 Date 3/30/18 Checked By GEM Date 5/11/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



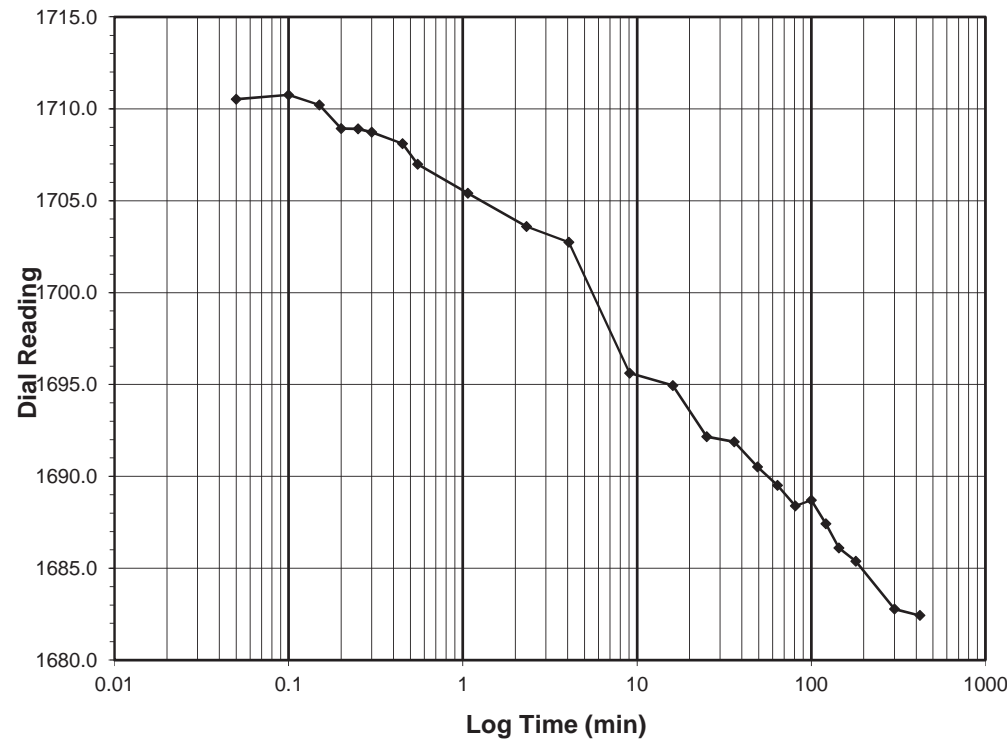
Client ESP Associates Boring No. -L- STA 505+39 11'RT
 Client Project R-1015 Site B CS34.324.00 Depth (ft) 13.0-15.0
 Project No. R-2018-075-001 Sample No. ST-2
 Lab ID R-2018-075-001-003 Visual Description TAN SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.5-0.25
 Final Reading (div) 1682.4
 Consolidometer No. R487
 1 Division (in) 0.0001
 Start Date 3/30/18
 Start Time 19:32:00

Elapsed Time (min)	Dial Reading (div)
Initial	1714.3
0.05	1710.5
0.10	1710.8
0.15	1710.2
0.20	1708.9
0.25	1708.9
0.30	1708.7
0.45	1708.1
0.55	1707.0
1.07	1705.4
2.32	1703.6
4.07	1702.7
9.07	1695.6
16.07	1694.9
25.07	1692.2
36.07	1691.9
49.07	1690.5
64.07	1689.5
81.07	1688.4
100.07	1688.7
121.07	1687.4
144.07	1686.1
180.07	1685.4
300.08	1682.8
420.28	1682.4



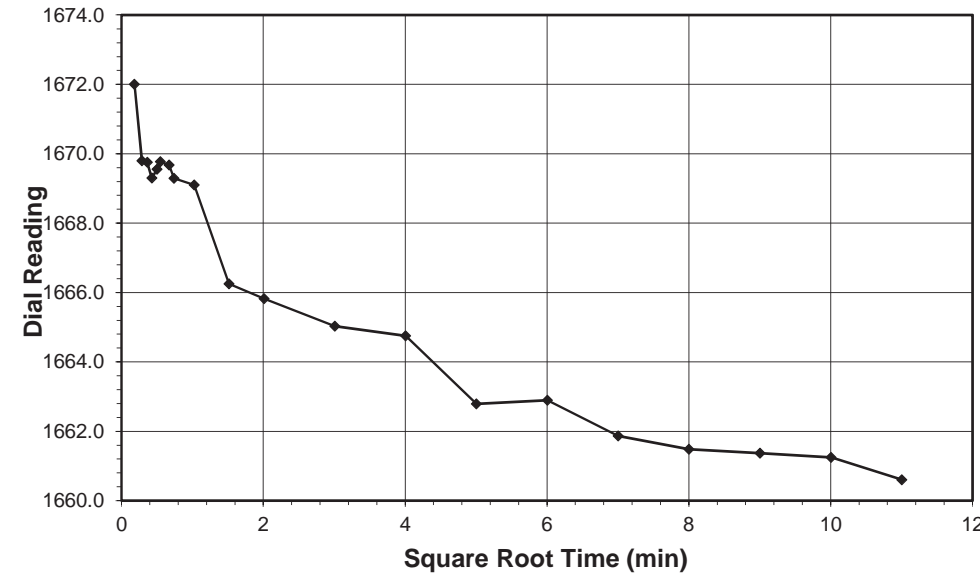
Tested By 129-04-0411 Date 3/30/18 Checked By GEM Date 5/11/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



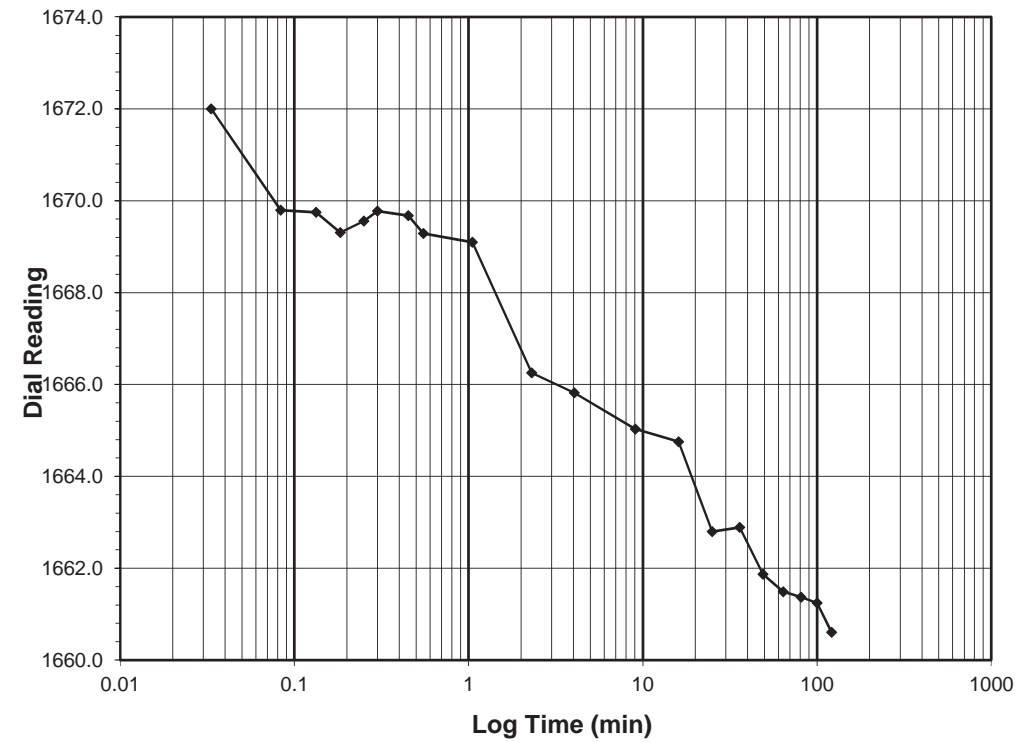
Client ESP Associates Boring No. -L- STA 505+39 11'RT
 Client Project R-1015 Site B CS34.324.00 Depth (ft) 13.0-15.0
 Project No. R-2018-075-001 Sample No. ST-2
 Lab ID R-2018-075-001-003 Visual Description TAN SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.25-0.125
 Final Reading (div) 1660.6
 Consolidometer No. R487
 1 Division (in) 0.0001
 Start Date 3/31/18
 Start Time 2:32:17

Elapsed Time (min)	Dial Reading (div)
Initial	1682.4
0.03	1672.0
0.08	1669.8
0.13	1669.8
0.18	1669.3
0.25	1669.6
0.30	1669.8
0.45	1669.7
0.55	1669.3
1.05	1669.1
2.30	1666.3
4.05	1665.8
9.05	1665.0
16.05	1664.8
25.05	1662.8
36.05	1662.9
49.05	1661.9
64.05	1661.5
81.07	1661.4
100.07	1661.2
121.07	1660.6



Tested By 129-04-0411 Date 3/31/18 Checked By GEM Date 5/11/18

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
AASHTO T-297



Client: ESP Associates Boring No.: -L- STA. 506+89, 75' RT
 Client Reference: R-1015 Site B CS34.324.00 Depth (ft): 7.0-9.0
 Project No.: R-2018-075-001 Sample No.: ST-3
 Lab ID: R-2018-075-001-015

Visual Description: ORANGE SAND (UNDISTURBED)

Stage No.	1	INITIAL SAMPLE DIMENSIONS (in)			
Test No.	1	Length 1:	6.251	Diameter 1:	2.800
		Length 2:	6.263	Diameter 2:	2.799
		Length 3:	6.244	Diameter 3:	2.787
		Length 4:	6.231	Diameter 4:	2.814
		Avg. Length:	6.247	Avg. Diam.:	2.800
PRESSURES (psi)		VOLUME CHANGE			
Cell Pressure (psi)	51.7	Initial Burette Reading (ml)	24.0		
Back Pressure (psi)	50.0	Final Burette Reading (ml)	22.4		
Eff. Conf. Pressure (psi)	1.7	Final Change (ml)	1.6		
Pore Pressure Response (%)	95				
MAXIMUM OBLIQUITY POINTS		Initial Dial Reading (mil)	112		
\bar{P}	= 6.67	Dial Reading After Saturation (mil)	112		
Q	= 4.43	Dial Reading After Consolidation (mil)	125		

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
9.4	0.000	50.0
12.4	0.001	50.2
13.1	0.002	50.3
30.7	0.008	50.6
36.9	0.013	50.4
41.3	0.019	50.2
48.4	0.027	50.0
55.4	0.035	49.7
64.4	0.046	49.5
72.8	0.066	49.1
97.0	0.097	48.1
121.0	0.133	46.9
147.1	0.170	45.6
178.8	0.210	44.1
201.9	0.240	42.9
241.1	0.281	41.2
264.4	0.338	39.7
282.1	0.397	38.5
297.9	0.441	37.6
321.9	0.500	36.5
339.1	0.546	35.5
353.3	0.590	34.8
373.3	0.633	33.9
385.8	0.662	33.2
398.6	0.692	32.6
414.1	0.723	31.9
429.7	0.753	31.1
453.3	0.797	30.0
473.1	0.840	29.0
494.2	0.885	27.9
517.2	0.930	26.7

Tested By: 129-04-0411 Date: 3/29/18 Input Checked By: GEM Date: 5/11/18
 page 3 of 11 DCN: CT-S28 DATE: 4/12/13 REVISION: 3 Sigmatriax.xls

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
AASHTO T-297



Client: ESP Associates Boring No.: -L- STA. 506+89, 75' RT
 Client Reference: R-1015 Site B CS34.324.00 Depth (ft): 7.0-9.0
 Project No.: R-2018-075-001 Sample No.: ST-3
 Lab ID: R-2018-075-001-015

Visual Description: ORANGE SAND (UNDISTURBED)

Effective Confining Pressure (psi)	1.7	Stage No.	1
		Test No.	1

INITIAL DIMENSIONS		VOLUME CHANGE	
Initial Sample Length (in)	6.25	Volume After Consolidation (in ³)	38.37
Initial Sample Diameter (in)	2.80	Length After Consolidation (in)	6.23
Initial Sample Area (in ²)	6.16	Area After Consolidation (in ²)	6.155
Initial Sample Volume (in ³)	38.47		

Strain (%)	Deviation Stress	ΔU	$\bar{\sigma}_1$	$\bar{\sigma}_3$	Effective Principle Stress Ratio	\bar{A}	\bar{P}	Q
0.01	0.48	0.22	1.97	1.5	1.327	0.47	1.73	0.24
0.03	0.61	0.26	2.04	1.4	1.422	0.46	1.74	0.30
0.12	3.46	0.57	4.59	1.1	4.061	0.17	2.86	1.73
0.21	4.45	0.37	5.78	1.3	4.349	0.09	3.56	2.23
0.30	5.17	0.23	6.64	1.5	4.512	0.05	4.05	2.58
0.43	6.31	0.02	7.99	1.7	4.750	0.00	4.84	3.15
0.57	7.44	-0.27	9.40	2.0	4.779	-0.04	5.68	3.72
0.75	8.87	-0.54	11.11	2.2	4.962	-0.06	6.67	4.43
1.07	10.19	-0.94	12.83	2.6	4.857	-0.10	7.73	5.09
1.55	14.02	-1.89	17.61	3.6	4.899	-0.14	10.60	7.01
2.14	17.74	-3.10	22.54	4.8	4.695	-0.18	13.67	8.87
2.72	21.77	-4.35	27.82	6.1	4.597	-0.21	16.94	10.88
3.38	26.58	-5.92	34.20	7.6	4.489	-0.23	20.91	13.29
3.84	30.07	-7.08	38.85	8.8	4.426	-0.25	23.81	15.04
4.51	35.94	-8.82	46.47	10.5	4.415	-0.26	28.50	17.97
5.42	39.18	-10.32	51.20	12.0	4.261	-0.28	31.61	19.59
6.37	41.48	-11.53	54.71	13.2	4.135	-0.29	33.97	20.74
7.07	43.55	-12.44	57.70	14.1	4.079	-0.30	35.92	21.78
8.03	46.70	-13.55	61.95	15.2	4.062	-0.31	38.60	23.35
8.76	48.87	-14.46	65.03	16.2	4.025	-0.31	40.59	24.44
9.47	50.58	-15.24	67.52	16.9	3.985	-0.32	42.23	25.29
10.15	53.12	-16.12	70.94	17.8	3.982	-0.32	44.38	26.56
10.62	54.66	-16.75	73.11	18.5	3.962	-0.32	45.78	27.33
11.10	56.22	-17.40	75.32	19.1	3.943	-0.33	47.21	28.11
11.59	58.13	-18.14	77.97	19.8	3.930	-0.33	48.90	29.06
12.08	60.03	-18.89	80.63	20.6	3.915	-0.33	50.61	30.02
12.78	62.91	-19.95	84.56	21.7	3.905	-0.33	53.11	31.45
13.48	65.19	-21.02	87.91	22.7	3.869	-0.34	55.32	32.59
14.19	67.58	-22.12	91.40	23.8	3.837	-0.34	57.61	33.79
14.92	70.19	-23.27	95.16	25.0	3.811	-0.35	60.07	35.09

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**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
AASHTO T-297



Client: ESP Associates Boring No.: -L- STA. 506+89, 75' RT
 Client Reference: R-1015 Site B CS34.324.00 Depth (ft): 7.0-9.0
 Project No.: R-2018-075-001 Sample No.: ST-3
 Lab ID: R-2018-075-001-015

Visual Description: ORANGE SAND (UNDISTURBED)

Stage No.	1
Test No.	2

INITIAL SAMPLE DIMENSIONS (in)			
Length 1:	6.122	Diameter 1:	2.822
Length 2:	6.124	Diameter 2:	2.840
Length 3:	6.129	Diameter 3:	2.813
Length 4:	6.128	Diameter 4:	2.801
Avg. Length:	6.126	Avg. Diam.:	2.819

PRESSURES (psi)

Cell Pressure (psi)	53.5
Back Pressure (psi)	50.0
Eff. Conf. Pressure (psi)	3.5
Pore Pressure Response (%)	99

VOLUME CHANGE

Initial Burette Reading (ml)	24.0
Final Burette Reading (ml)	20.9
Final Change (ml)	3.1

MAXIMUM OBLIQUITY POINTS

P	=	2.42	Initial Dial Reading (mil)	210
Q	=	1.65	Dial Reading After Saturation (mil)	214
			Dial Reading After Consolidation (mil)	220

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
16.2	0.000	50.0
23.4	0.001	50.2
34.1	0.002	50.5
48.8	0.008	50.7
56.6	0.013	50.6
63.9	0.019	50.5
74.8	0.027	50.0
86.5	0.035	49.6
102.6	0.046	48.9
132.8	0.066	47.5
146.4	0.097	47.7
61.2	0.133	51.9
37.3	0.170	52.7
28.7	0.210	53.0
25.8	0.240	53.1
22.0	0.281	53.2
18.5	0.338	53.4
18.2	0.397	53.4
17.4	0.441	53.3
17.0	0.500	53.3
17.4	0.546	53.3
17.5	0.590	53.3
17.6	0.633	53.3
17.3	0.662	53.3
17.5	0.692	53.3
17.6	0.723	53.3
18.1	0.753	53.3
17.9	0.797	53.3
17.7	0.840	53.3
18.1	0.870	53.3
18.1	0.900	53.3

Tested By: 129-04-0411 Date: 3/29/18 Input Checked By: GEM Date: 5/11/18

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
AASHTO T-297



Client: ESP Associates Boring No.: -L- STA. 506+89, 75' RT
 Client Reference: R-1015 Site B CS34.324.00 Depth (ft): 7.0-9.0
 Project No.: R-2018-075-001 Sample No.: ST-3
 Lab ID: R-2018-075-001-015

Visual Description: ORANGE SAND (UNDISTURBED)

Effective Confining Pressure (psi)	3.5	Stage No.	1
		Test No.	2

INITIAL DIMENSIONS

Initial Sample Length (in)	6.13
Initial Sample Diameter (in)	2.82
Initial Sample Area (in ²)	6.24
Initial Sample Volume (in ³)	38.23

VOLUME CHANGE

Volume After Consolidation (in ³)	37.97
Length After Consolidation (in)	6.12
Area After Consolidation (in ²)	6.208

Strain (%)	Deviation Stress	Δ U	σ ₁	σ ₃	Effective Principle Stress Ratio	A	P	Q
0.01	1.16	0.24	4.43	3.3	1.355	0.21	3.85	0.58
0.03	2.88	0.48	5.90	3.0	1.951	0.17	4.47	1.44
0.12	5.24	0.73	8.03	2.8	2.880	0.14	5.41	2.62
0.21	6.49	0.65	9.35	2.9	3.263	0.10	6.11	3.24
0.31	7.66	0.45	10.73	3.1	3.504	0.06	6.89	3.83
0.44	9.39	0.04	12.86	3.5	3.707	0.00	8.16	4.70
0.58	11.25	-0.45	15.21	4.0	3.843	-0.04	9.58	5.63
0.76	13.80	-1.15	18.46	4.7	3.964	-0.08	11.56	6.90
1.09	18.57	-2.51	24.60	6.0	4.084	-0.14	15.31	9.29
1.58	20.63	-2.35	26.49	5.9	4.523	-0.11	16.17	10.32
2.18	7.09	1.86	8.75	1.7	5.289	0.26	5.20	3.55
2.77	3.31	2.75	4.07	0.8	5.337	0.84	2.42	1.65
3.44	1.94	3.04	2.41	0.5	5.087	1.59	1.44	0.97
3.92	1.49	3.12	1.89	0.4	4.764	2.11	1.14	0.75
4.60	0.88	3.25	1.14	0.3	4.363	3.72	0.70	0.44
5.53	0.35	3.37	0.50	0.1	3.435	9.62	0.32	0.18
6.50	0.29	3.41	0.39	0.1	4.003	11.78	0.24	0.15
7.21	0.17	3.30	0.38	0.2	1.837	19.09	0.30	0.09
8.18	0.12	3.31	0.33	0.2	1.592	27.29	0.27	0.06
8.93	0.17	3.31	0.38	0.2	1.855	19.24	0.29	0.09
9.65	0.18	3.31	0.38	0.2	1.906	18.54	0.29	0.09
10.35	0.20	3.32	0.39	0.2	1.998	17.17	0.29	0.10
10.83	0.15	3.32	0.34	0.2	1.785	22.09	0.27	0.08
11.32	0.19	3.32	0.37	0.2	1.979	18.10	0.28	0.09
11.81	0.20	3.32	0.38	0.2	2.042	17.20	0.29	0.10
12.31	0.26	3.32	0.45	0.2	2.410	12.69	0.32	0.13
13.03	0.23	3.33	0.41	0.2	2.314	14.45	0.29	0.12
13.74	0.21	3.33	0.40	0.2	2.144	15.84	0.29	0.11
14.22	0.26	3.33	0.44	0.2	2.369	13.15	0.31	0.13
14.72	0.26	3.33	0.44	0.2	2.453	12.91	0.31	0.13

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
AASHTO T-297



Client: ESP Associates Boring No.: -L- STA. 506+89, 75' RT
 Client Reference: R-1015 Site B CS34.324.00 Depth (ft): 7.0-9.0
 Project No.: R-2018-075-001 Sample No.: ST-3
 Lab ID: R-2018-075-001-015

Visual Description: ORANGE SAND (UNDISTURBED)

Stage No.	1
Test No.	3

INITIAL SAMPLE DIMENSIONS (in)			
Length 1:	5.991	Diameter 1:	2.772
Length 2:	5.987	Diameter 2:	2.773
Length 3:	6.013	Diameter 3:	2.787
Length 4:	5.942	Diameter 4:	2.821
Avg. Length:	5.983	Avg. Diam.:	2.788

PRESSURES (psi)	
Cell Pressure (psi)	91.6
Back Pressure (psi)	50.0
Eff. Conf. Pressure (psi)	41.6
Pore Pressure Response (%)	99

VOLUME CHANGE	
Initial Burette Reading (ml)	48.0
Final Burette Reading (ml)	10.8
Final Change (ml)	37.2

MAXIMUM OBLIQUITY POINTS

P	=	33.22	Initial Dial Reading (mil)	50
Q	=	21.59	Dial Reading After Saturation (mil)	338
			Dial Reading After Consolidation (mil)	335

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
13.2	0.000	50.0
24.9	0.001	50.9
26.8	0.003	51.3
85.7	0.009	57.0
118.3	0.015	63.1
133.8	0.021	67.9
142.7	0.029	72.9
145.1	0.039	76.0
146.0	0.051	78.5
146.8	0.072	80.8
151.6	0.102	82.1
160.1	0.138	82.6
169.6	0.175	82.6
181.1	0.216	82.4
190.4	0.246	82.2
203.2	0.288	81.8
220.7	0.345	81.2
238.8	0.406	80.5
251.8	0.450	80.0
266.5	0.510	79.4
274.0	0.555	79.2
268.5	0.600	80.1
281.4	0.645	79.3
286.3	0.675	79.1
290.7	0.705	78.9
294.8	0.735	78.8
298.4	0.765	78.7
304.2	0.811	78.5
309.7	0.856	78.3

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
AASHTO T-297



Client: ESP Associates Boring No.: -L- STA. 506+89, 75' RT
 Client Reference: R-1015 Site B CS34.324.00 Depth (ft): 7.0-9.0
 Project No.: R-2018-075-001 Sample No.: ST-3
 Lab ID: R-2018-075-001-015

Visual Description: ORANGE SAND (UNDISTURBED)

Effective Confining Pressure (psi)	41.6	Stage No.	1
		Test No.	3

INITIAL DIMENSIONS	
Initial Sample Length (in)	5.98
Initial Sample Diameter (in)	2.79
Initial Sample Area (in ²)	6.11
Initial Sample Volume (in ³)	36.53

VOLUME CHANGE	
Volume After Consolidation (in ³)	28.99
Length After Consolidation (in)	5.70
Area After Consolidation (in ²)	5.087

Strain (%)	Deviation Stress	Δ U	σ ₁	σ ₃	Effective Principle Stress Ratio	A	P	Q
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0.02	2.30	0.89	43.01	40.7	1.056	0.39	41.86	1.15
0.06	2.66	1.32	42.94	40.3	1.066	0.50	41.61	1.33
0.15	14.23	7.01	48.82	34.6	1.411	0.50	41.71	7.12
0.26	20.60	13.06	49.15	28.5	1.722	0.64	38.84	10.30
0.37	23.62	17.88	47.34	23.7	1.996	0.76	35.53	11.81
0.51	25.33	22.85	44.07	18.7	2.351	0.91	31.41	12.66
0.68	25.75	25.97	41.38	15.6	2.647	1.02	28.51	12.87
0.90	25.86	28.49	38.97	13.1	2.973	1.11	26.04	12.93
1.26	25.93	30.76	36.77	10.8	3.393	1.20	23.80	12.97
1.79	26.72	32.09	36.24	9.5	3.810	1.21	22.87	13.36
2.42	28.18	32.60	37.18	9.0	4.130	1.17	23.09	14.09
3.06	29.80	32.64	38.76	9.0	4.328	1.11	23.86	14.90
3.79	31.76	32.44	40.92	9.2	4.467	1.03	25.04	15.88
4.31	33.33	32.20	42.73	9.4	4.548	0.98	26.06	16.67
5.05	35.45	31.80	45.25	9.8	4.619	0.91	27.52	17.73
6.06	38.31	31.19	48.71	10.4	4.680	0.82	29.56	19.15
7.12	41.19	30.49	52.30	11.1	4.707	0.75	31.71	20.60
7.89	43.19	29.97	54.82	11.6	4.714	0.70	33.22	21.59
8.95	45.33	29.37	57.56	12.2	4.707	0.65	34.89	22.66
9.74	46.27	29.25	58.62	12.4	4.746	0.64	35.49	23.13
10.52	44.91	30.08	56.43	11.5	4.900	0.68	33.97	22.45
11.32	46.75	29.30	59.05	12.3	4.802	0.63	35.67	23.38
11.85	47.32	29.12	59.80	12.5	4.793	0.62	36.14	23.66
12.37	47.80	28.95	60.45	12.7	4.778	0.61	36.55	23.90
12.90	48.21	28.81	61.00	12.8	4.771	0.60	36.89	24.11
13.43	48.54	28.67	61.47	12.9	4.754	0.60	37.20	24.27
14.23	49.06	28.46	62.20	13.1	4.733	0.59	37.67	24.53
15.02	49.53	28.35	62.78	13.3	4.737	0.58	38.02	24.76

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297**



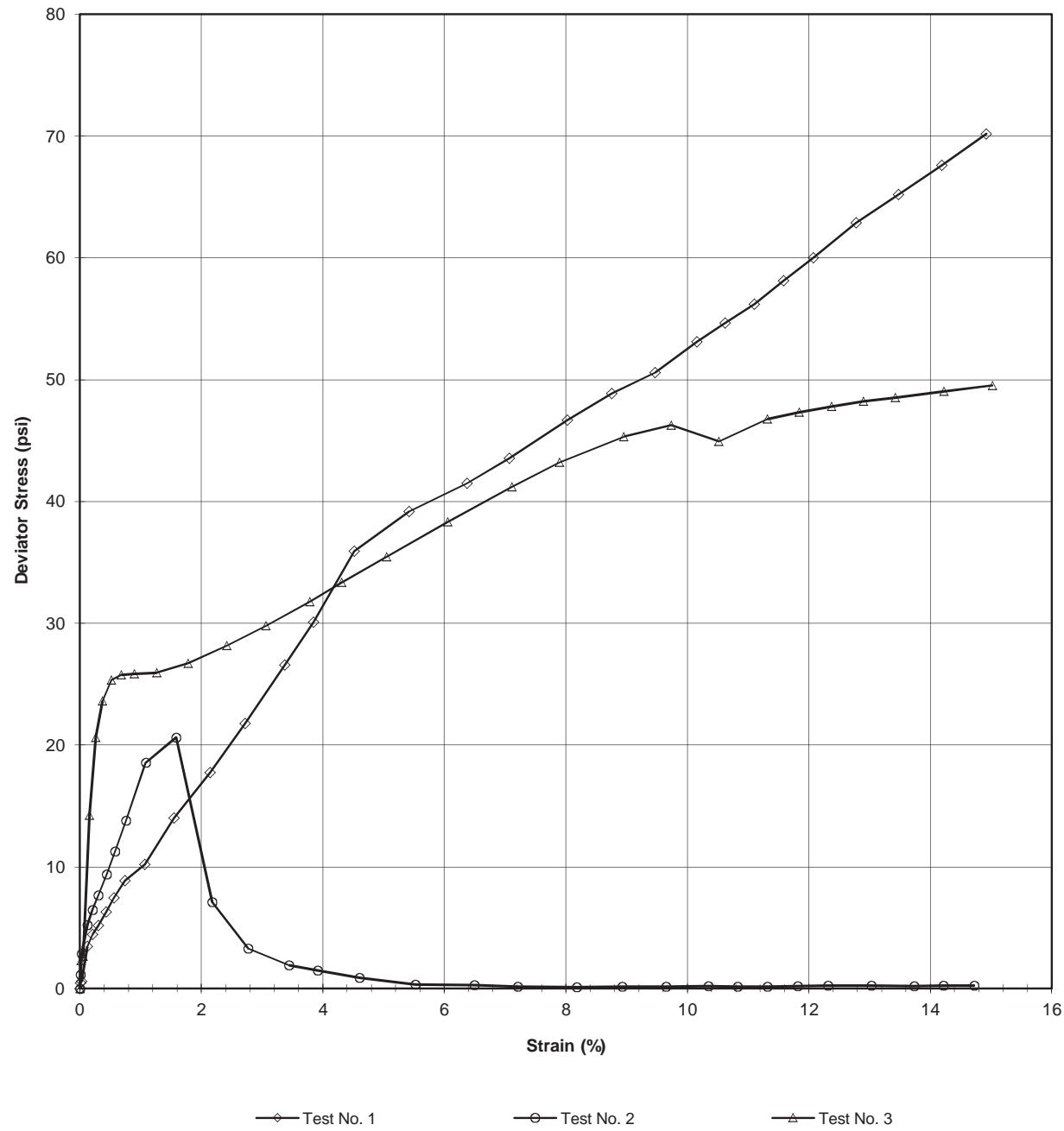
Client: ESP Associates Boring No.: -L- STA. 506+89, 75' RT
 Client Reference: R-1015 Site B CS34.324.00 Depth (ft): 7.0-9.0
 Project No.: R-2018-075-001 Sample No.: ST-3
 Lab ID: R-2018-075-001-015
 Visual Description: ORANGE SAND (UNDISTURBED)

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297**

Client: ESP Associates
 Client Reference: R-1015 Site B CS34.324.00
 Project No.: R-2018-075-001
 Lab ID: R-2018-075-001-015 Specific Gravity (Measured) 2.66
 Visual Description: ORANGE SAND (UNDISTURBED)

SAMPLE CONDITION SUMMARY

	-L- STA. 506+89, 75' RT	-L- STA. 506+89, 75' RT	-L- STA. 506+89, 75' RT
Boring No.:	-L- STA. 506+89, 75' RT	-L- STA. 506+89, 75' RT	-L- STA. 506+89, 75' RT
Depth (ft):	7.0-9.0	7.0-9.0	7.0-9.0
Sample No.:	ST-3	ST-3	ST-3
Test No.	T1	T2	T3
Deformation Rate (in/min)	0.002	0.002	0.002
Back Pressure (psi)	50.0	50.0	50.0
Consolidation Time (days)	1	1	1
Moisture Content (%) (INITIAL)	29.1	29.1	29.1
Total Unit Weight (pcf)	116.7	120.6	123.5
Dry Unit Weight (pcf)	90.4	93.4	95.6
Moisture Content (%) (FINAL)	27.5	29.7	26.1
Initial State Void Ratio, e	0.838	0.778	0.736
Void Ratio at Shear, e	0.833	0.766	0.378



Tested By: 129-04-0411 Date: 3/29/18 Approved By: MPS Date: 5/11/18

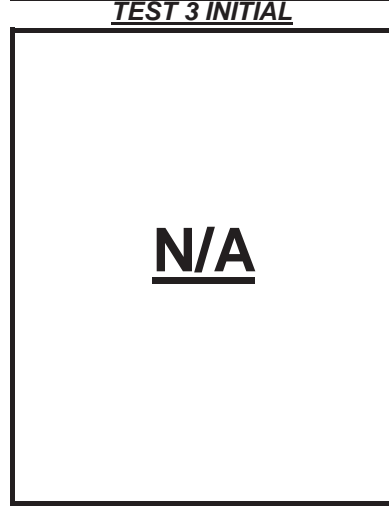
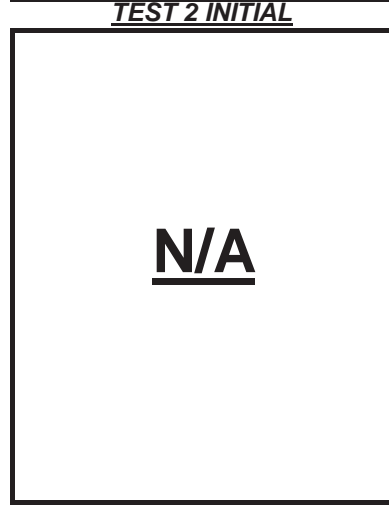
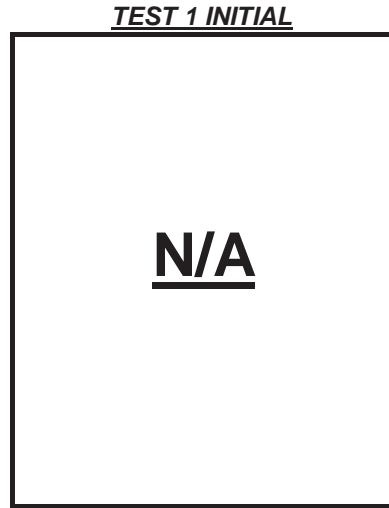
Tested By: 129-04-0411 Date: 3/29/18 Input Checked By: GEM Date: 5/11/18

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
AASHTO T-297**



Client: ESP Associates
 Client Reference: R-1015 Site B CS34.324.00
 Project No.: R-2018-075-001
 Lab ID: R-2018-075-001-015

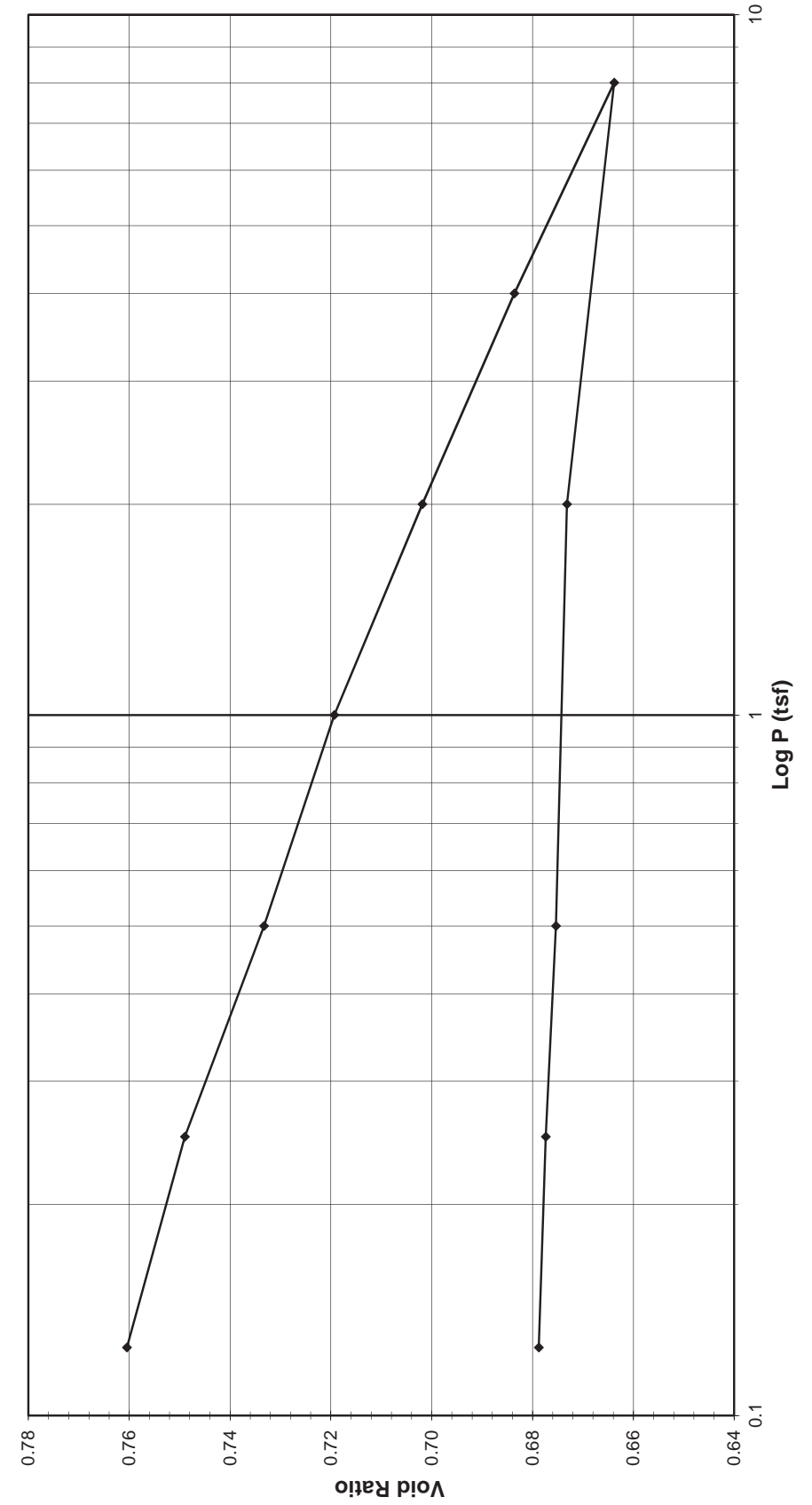
Boring No.: -L- STA. 506+89, 7
 Depth (ft): 7.0-9.0
 Sample No.: ST-3



**ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216**

Client	ESP Associates	Boring No.	-L- STA. 506+89, 75' RT
Client Reference	R-1015 Site B CS34.324.00	Depth (ft)	7.0-9.0
Project No.	R-2018-075-001	Sample No.	ST-3
Lab ID	R-2018-075-001-015	Visual Description	ORANGE SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By 129-04-0411 Date 3/29/18 Approved By MPS Date 5/11/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 506+89, 75' RT
Client Reference	R-1015 Site B CS34.324.00	Depth (ft)	7.0-9.0
Project No.	R-2018-075-001	Sample No.	ST-3
Lab ID	R-2018-075-001-015	Visual Description	ORANGE SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R491
1 Division = 0.0001 (in.)

Sample Properties

	Initial	Final
<i>Water Content</i>		
Tare Number	SS-0	SS-5
Wt. Tare & WS (g)	229.19	247.60
Wt. Tare & DS (g)	200.17	218.30
Wt. Water (g)	29.02	29.30
Wt. Tare (g)	100.59	99.98
Wt. DS (g)	99.58	118.32
Water Content (%)	29.14	24.76
<i>Sample Parameters</i>		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.0000	0.9461
Sample Volume (cc)	80.44	76.10
Wt. Wet Sample + Ring (g)	370.01	364.73
Wt. of Ring (g)	214.28	214.28
Wt. of Wet Sample (g)	155.73	150.45
Wet Density (pcf)	120.81	123.36
Wet Density (g/cc)	1.94	1.98
Water Content (%)	29.14	24.76
Wt. of Dry Sample (g)	120.59	120.59
Dry Density (pcf)	93.54	98.87
Dry Density (g/cc)	1.50	1.58
Void Ratio	0.7744	0.6788
Saturation (%)	100.10	97.05
Specific Gravity	2.66	Measured

Test Data Summary

Applied Pressure (tsf)	Final Dial Reading (div)	Machine Deflection (div)	Corrected Reading (div)	Height of Sample (mm)	Volume (cc)	Dry Density (g/cc)	Void Ratio
Seating	0	0	0	25.400	80.440	1.49911	0.77439
0.125	81.9	3.6	78.4	25.201	79.809	1.51095	0.76049
0.25	152.2	9.0	143.3	25.036	79.287	1.52090	0.74897
0.5	252.8	21.0	231.8	24.811	78.575	1.53467	0.73327
1	350.3	40.0	310.3	24.612	77.944	1.54712	0.71933
2	468.4	59.6	408.8	24.362	77.151	1.56300	0.70185
4	596.5	85.0	511.5	24.101	76.325	1.57992	0.68363
8	746.4	123.4	623.0	23.817	75.428	1.59871	0.66384
2	684.9	114.6	570.3	23.951	75.852	1.58978	0.67319
0.5	642.0	84.0	558.0	23.983	75.951	1.58770	0.67538
0.25	625.5	78.9	546.6	24.012	76.043	1.58578	0.67741
0.125	617.9	78.9	539.0	24.031	76.104	1.58451	0.67876

page 2 of 2

DCN: CT-24E Date: 5/3/12 Revision: 6

Tested By 129-04-0411 Date 3/28/18 Input Checked By GEM Date 5/11/18

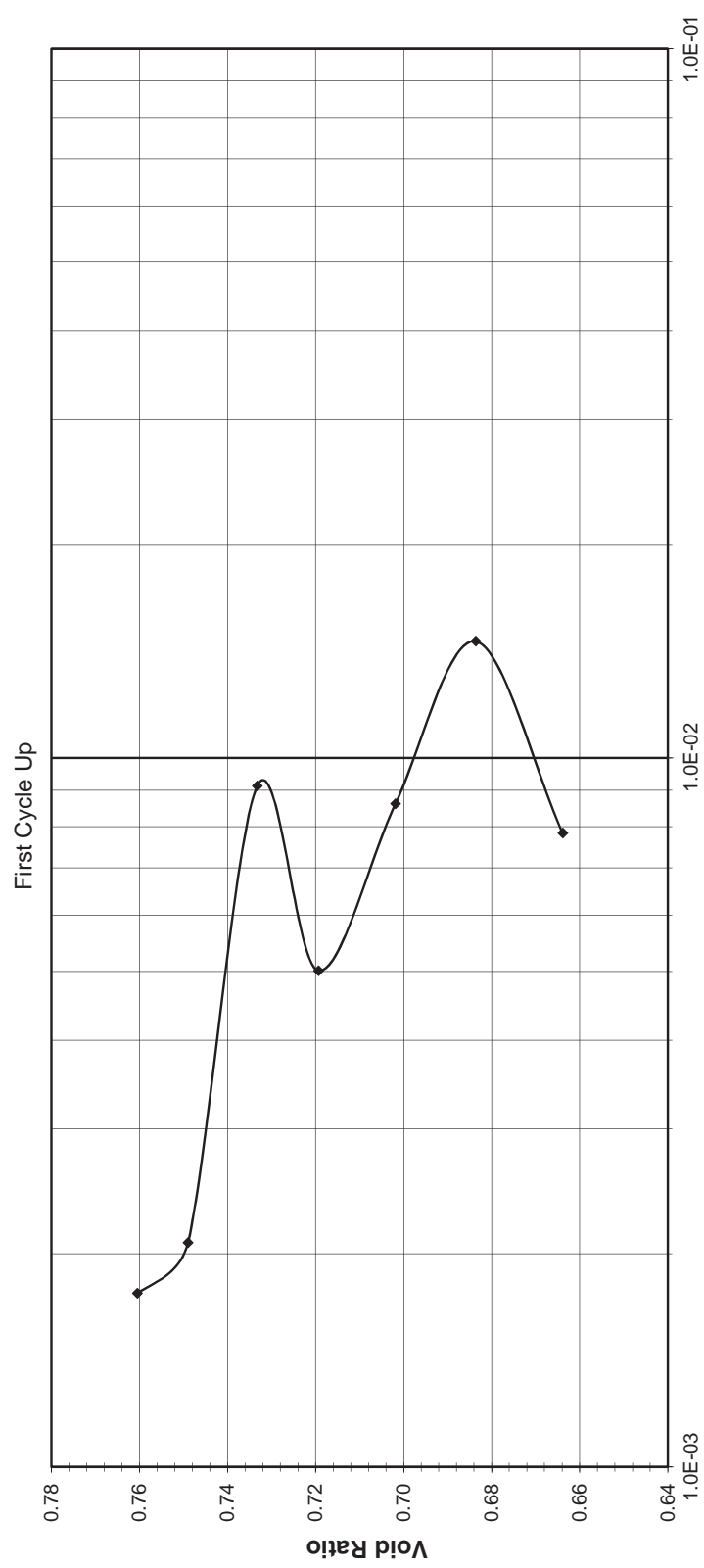
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2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 506+89, 75' RT
Client Reference	R-1015 Site B CS34.324.00	Depth (ft)	7.0-9.0
Project No.	R-2018-075-001	Sample No.	ST-3
Lab ID	R-2018-075-001-015	Visual Description	ORANGE SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Coefficient of Consolidation (cm²/sec)

← First Cycle Up



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 506+89, 75' RT
Client Reference	R-1015 Site B CS34.324.00	Depth (ft)	7.0-9.0
Project No.	R-2018-075-001	Sample No.	ST-3
Lab ID	R-2018-075-001-015	Visual Description	ORANGE SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R491
1 Division = 0.0001 (in.)

Sample Properties	Initial	Final
Water Content		
Tare Number	SS-0	SS-5
Wt. Tare & WS (g)	229.19	247.60
Wt. Tare & DS (g)	200.17	218.30
Wt. Water (g)	29.02	29.30
Wt. Tare (g)	100.59	99.98
Wt. DS (g)	99.58	118.32
Water Content (%)	29.14	24.76
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.000	0.946
Sample Volume (cc)	80.44	76.10
Wt. Wet Sample + Ring (g)	370.01	364.73
Wt. of Ring (g)	214.28	214.28
Wt. of Wet Sample (g)	155.73	150.45
Wet Density (pcf)	120.81	123.36
Wet Density (g/cc)	1.94	1.98
Water Content (%)	29.14	24.76
Wt. of Dry Sample (g)	120.59	120.59
Dry Density (pcf)	93.54	98.87
Dry Density (g/cc)	1.50	1.58
Void Ratio	0.7744	0.6788
Saturation (%)	100.10	97.05
Specific Gravity	2.66	Measured

Load Increment (tsf)	Dial Reading @ t ₅₀ (div)	Machine Deflection (div)	Corrected Dial Reading @ t ₅₀ (div)	Sample Height @ t ₅₀ (cm)	Time t ₅₀ (min.)	C _v (cm ² /sec)
0 - 0.125	27.2	3.6	23.6	2.534	3.00	0.00176
0.125 - 0.25	120.6	9.0	111.6	2.512	2.50	0.00207
0.25 - 0.5	197.7	21.0	176.7	2.495	0.56	0.00913
0.5 - 1	314.3	40.0	274.3	2.470	1.00	0.00501
1 - 2	430.7	59.6	371.1	2.446	0.57	0.00861
2 - 4	547.9	85.0	462.9	2.422	0.33	0.01460
4 - 8	705.2	123.4	581.8	2.392	0.60	0.00783
8 - 2	NA	114.6	NA	NA	NA	NA
2 - 0.5	NA	84.0	NA	NA	NA	NA
0.5 - 0.25	NA	78.9	NA	NA	NA	NA
0.25 - 0.125	NA	78.9	NA	NA	NA	NA

page 4 of 4 DCN: CT-24E Date: 5/3/12 Revision: 6 Date: 3/28/18 Input Checked By: GEM Date: 5/11/18

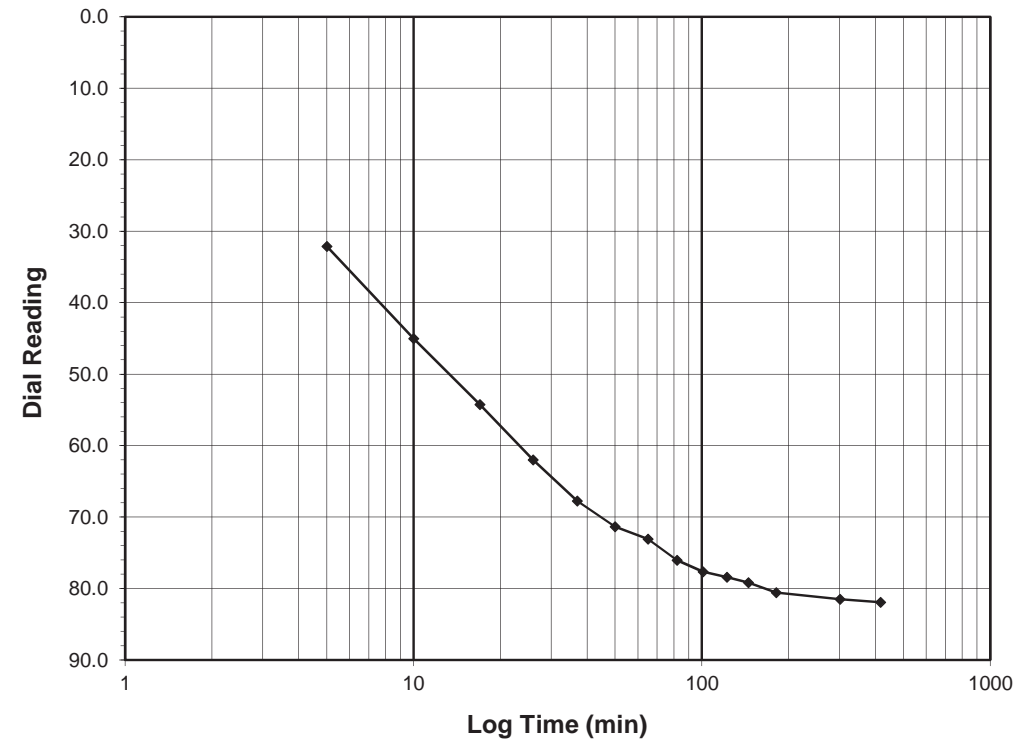
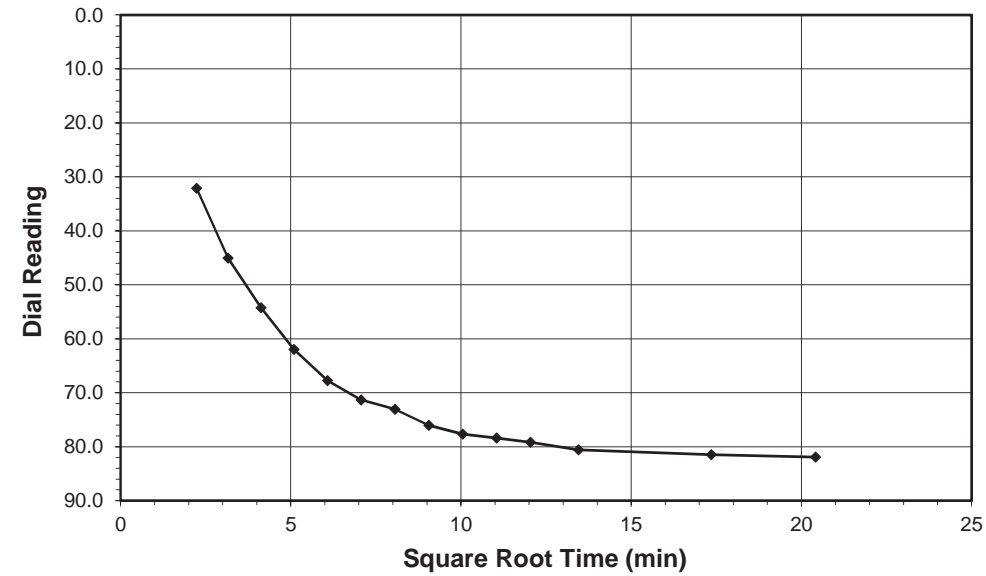
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ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client	ESP Associates	Boring No.	-L- STA. 506+89, 75' RT
Client Project	R-1015 Site B CS34.324.00	Depth (ft)	7.0-9.0
Project No.	R-2018-075-001	Sample No.	ST-3
Lab ID	R-2018-075-001-015	Visual Description	ORANGE SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf)	0.0-0.125
Final Reading (div)	81.9
Consolidometer No.	R491
1 Division (in)	0.0001
Start Date	3/28/18
Start Time	9:21:08

Elapsed Time (min)	Dial Reading (div)
Initial	0.0
5.00	32.1
10.00	45.0
17.00	54.2
26.00	62.0
37.00	67.7
50.00	71.4
65.00	73.1
82.00	76.1
101.00	77.7
122.00	78.4
145.00	79.2
181.00	80.6
301.00	81.5
416.82	81.9

Tested By 129-04-0411 Date 3/28/18 Checked By GEM Date 5/11/18

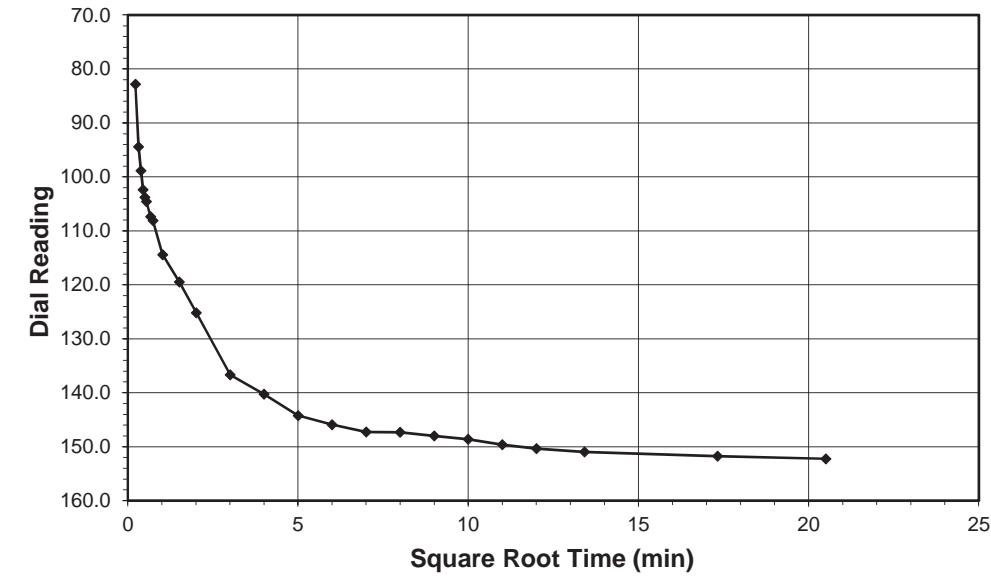


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



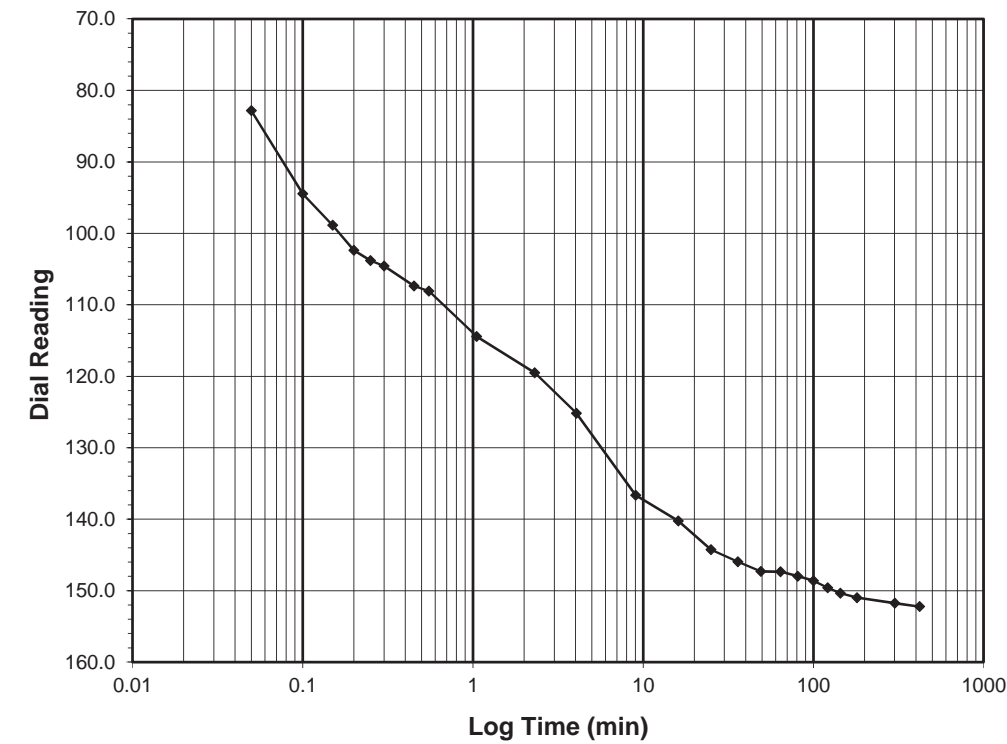
Client ESP Associates Boring No. -L- STA. 506+89, 75' RT
 Client Project R-1015 Site B CS34.324.00 Depth (ft) 7.0-9.0
 Project No. R-2018-075-001 Sample No. ST-3
 Lab ID R-2018-075-001-015 Visual Description ORANGE SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.125-0.25
Final Reading (div) 152.2
 Consolidometer No. **R491**
 1 Division (in) 0.0001
 Start Date 3/28/18
 Start Time 16:13:00

Elapsed Time (min)	Dial Reading (div)
Initial	81.9
0.05	82.8
0.10	94.4
0.15	98.8
0.20	102.4
0.25	103.8
0.30	104.6
0.45	107.4
0.55	108.1
1.05	114.4
2.30	119.5
4.05	125.2
9.05	136.7
16.05	140.2
25.05	144.3
36.05	145.9
49.05	147.3
64.05	147.4
81.05	148.0
100.05	148.6
121.05	149.6
144.05	150.4
180.05	151.0
300.05	151.8
420.43	152.2

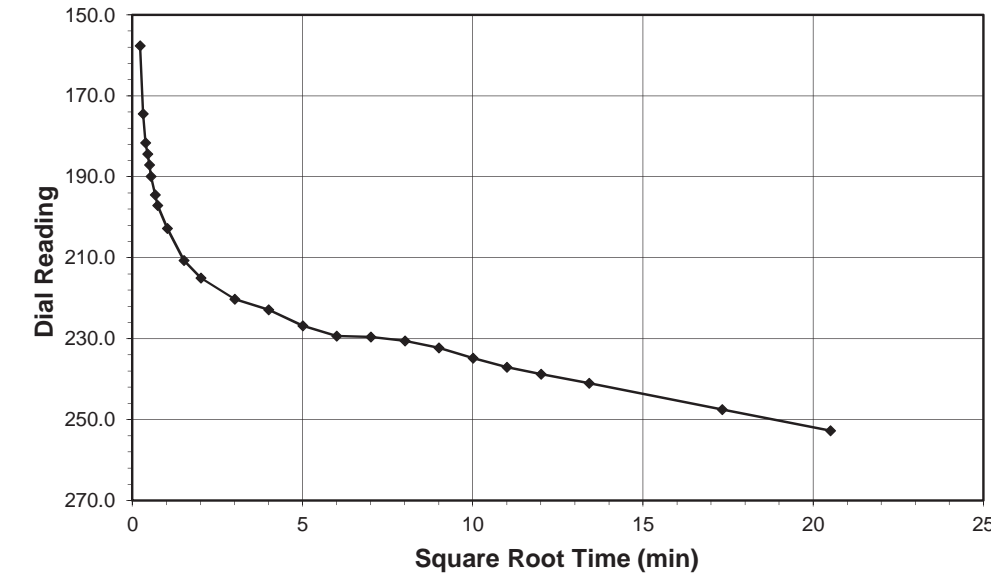


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



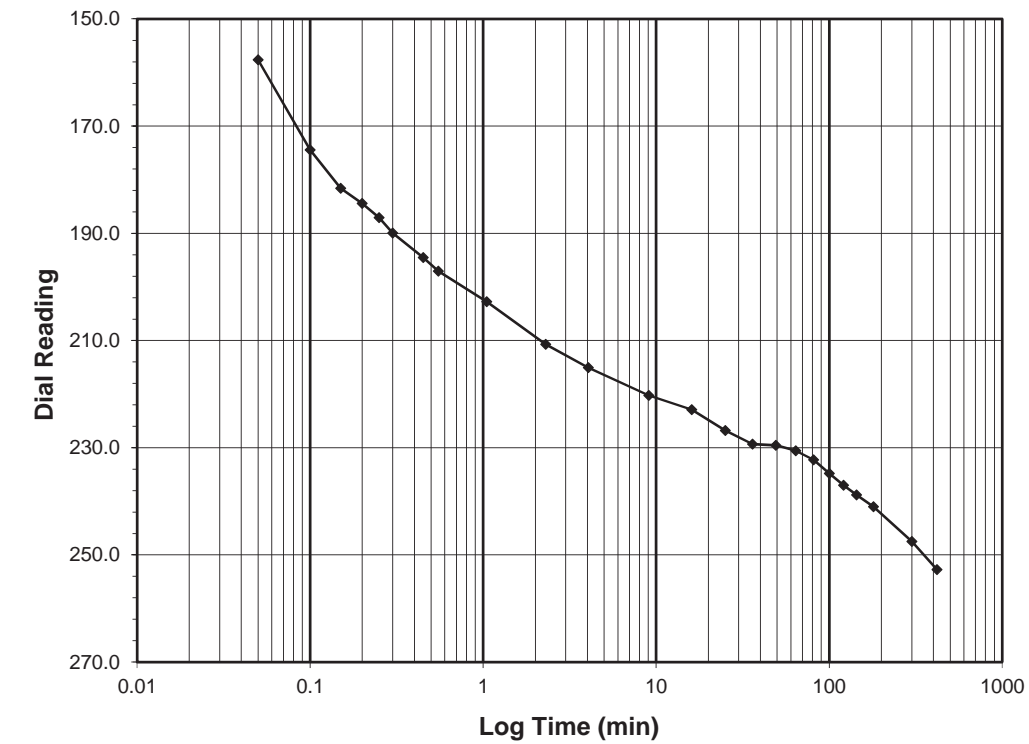
Client ESP Associates Boring No. -L- STA. 506+89, 75' RT
 Client Project R-1015 Site B CS34.324.00 Depth (ft) 7.0-9.0
 Project No. R-2018-075-001 Sample No. ST-3
 Lab ID R-2018-075-001-015 Visual Description ORANGE SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.25-0.5
Final Reading (div) 252.8
 Consolidometer No. **R491**
 1 Division (in) 0.0001
 Start Date 3/28/18
 Start Time 23:13:26

Elapsed Time (min)	Dial Reading (div)
Initial	152.2
0.05	157.6
0.10	174.4
0.15	181.6
0.20	184.4
0.25	187.1
0.30	189.9
0.45	194.5
0.55	197.1
1.05	202.8
2.30	210.7
4.05	215.0
9.05	220.2
16.05	222.9
25.05	226.8
36.05	229.3
49.07	229.6
64.07	230.5
81.07	232.3
100.07	234.8
121.07	237.0
144.07	238.8
180.07	241.0
300.07	247.5
420.35	252.8



Tested By 129-04-0411 Date 3/28/18 Checked By GEM Date 5/11/18

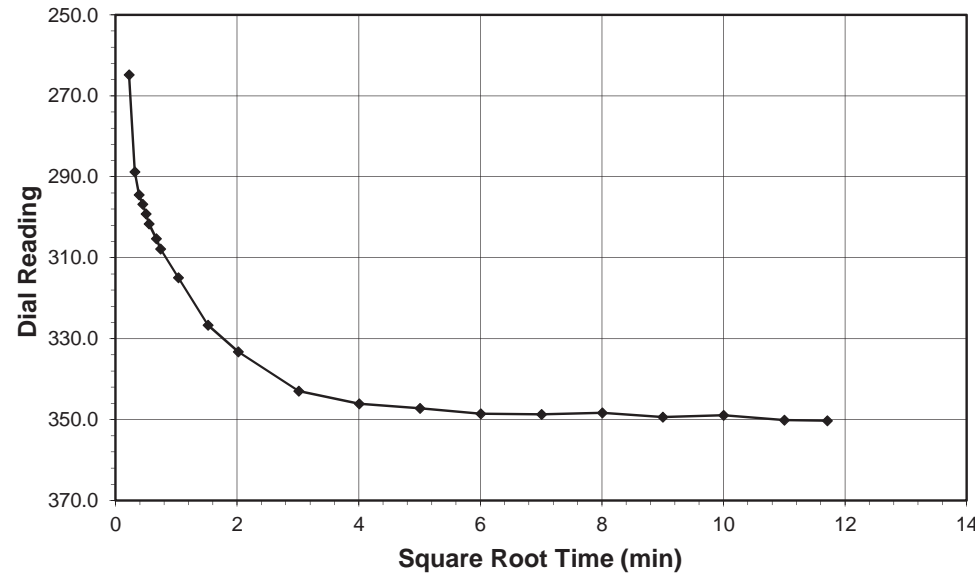
Tested By 129-04-0411 Date 3/28/18 Checked By GEM Date 5/11/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



Client ESP Associates Boring No. -L- STA. 506+89, 75' RT
 Client Project R-1015 Site B CS34.324.00 Depth (ft) 7.0-9.0
 Project No. R-2018-075-001 Sample No. ST-3
 Lab ID R-2018-075-001-015 Visual Description ORANGE SAND

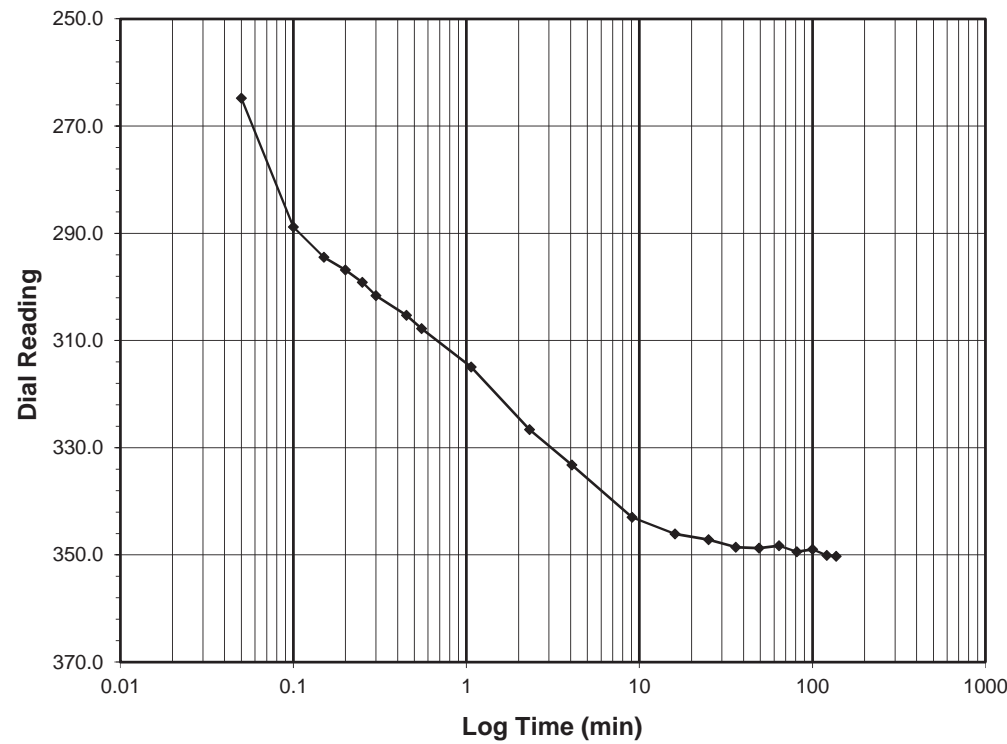
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.5-1.0
Final Reading (div) 350.3
 Consolidometer No. **R491**
 1 Division (in) 0.0001

Start Date 3/29/18
 Start Time 6:13:47

Elapsed Time (min)	Dial Reading (div)
Initial	252.8
0.05	264.8
0.10	288.8
0.15	294.5
0.20	296.8
0.25	299.2
0.30	301.6
0.45	305.3
0.55	307.8
1.07	314.9
2.32	326.6
4.07	333.2
9.07	343.0
16.07	346.1
25.07	347.2
36.07	348.6
49.07	348.7
64.07	348.3
81.07	349.4
100.07	349.0
121.07	350.1
137.10	350.3



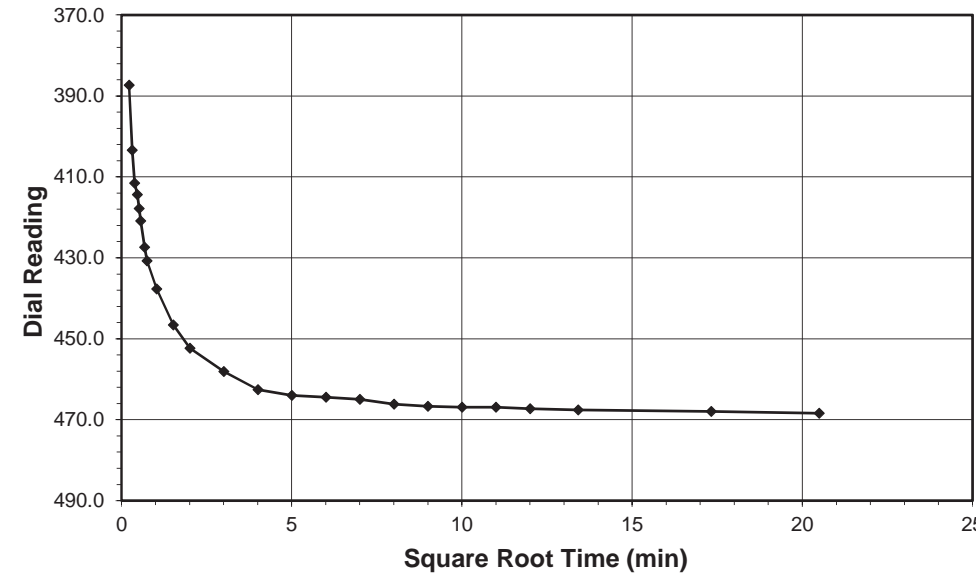
Tested By 129-04-0411 Date 3/29/18 Checked By GEM Date 5/11/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



Client ESP Associates Boring No. -L- STA. 506+89, 75' RT
 Client Project R-1015 Site B CS34.324.00 Depth (ft) 7.0-9.0
 Project No. R-2018-075-001 Sample No. ST-3
 Lab ID R-2018-075-001-015 Visual Description ORANGE SAND

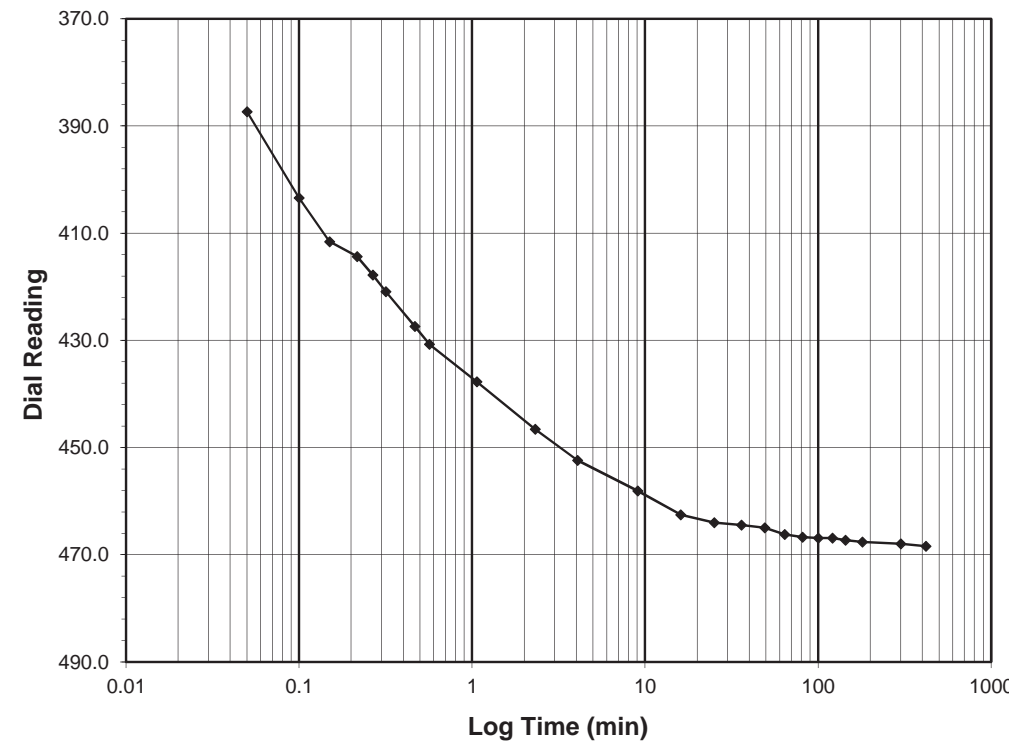
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-2.0
Final Reading (div) 468.4
 Consolidometer No. **R491**
 1 Division (in) 0.0001

Start Date 3/29/18
 Start Time 8:30:53

Elapsed Time (min)	Dial Reading (div)
Initial	350.3
0.05	387.4
0.10	403.4
0.15	411.6
0.22	414.4
0.27	417.8
0.32	420.9
0.47	427.4
0.57	430.7
1.07	437.7
2.32	446.6
4.07	452.3
9.07	458.1
16.07	462.6
25.07	464.0
36.07	464.5
49.07	465.0
64.07	466.2
81.07	466.7
100.07	466.9
121.07	466.9
144.07	467.3
180.08	467.6
300.08	467.9
420.28	468.4



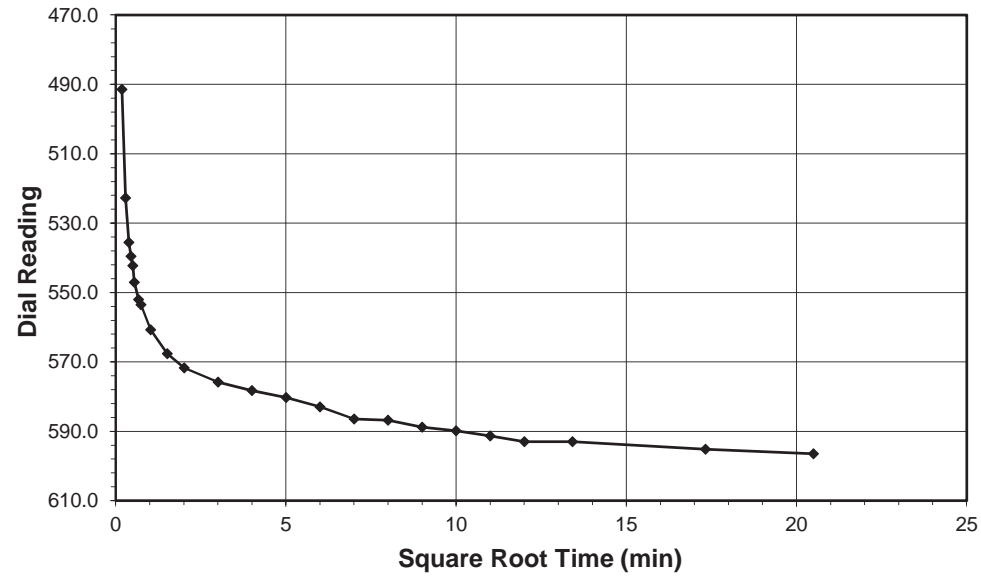
Tested By 129-04-0411 Date 3/29/18 Checked By GEM Date 5/11/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



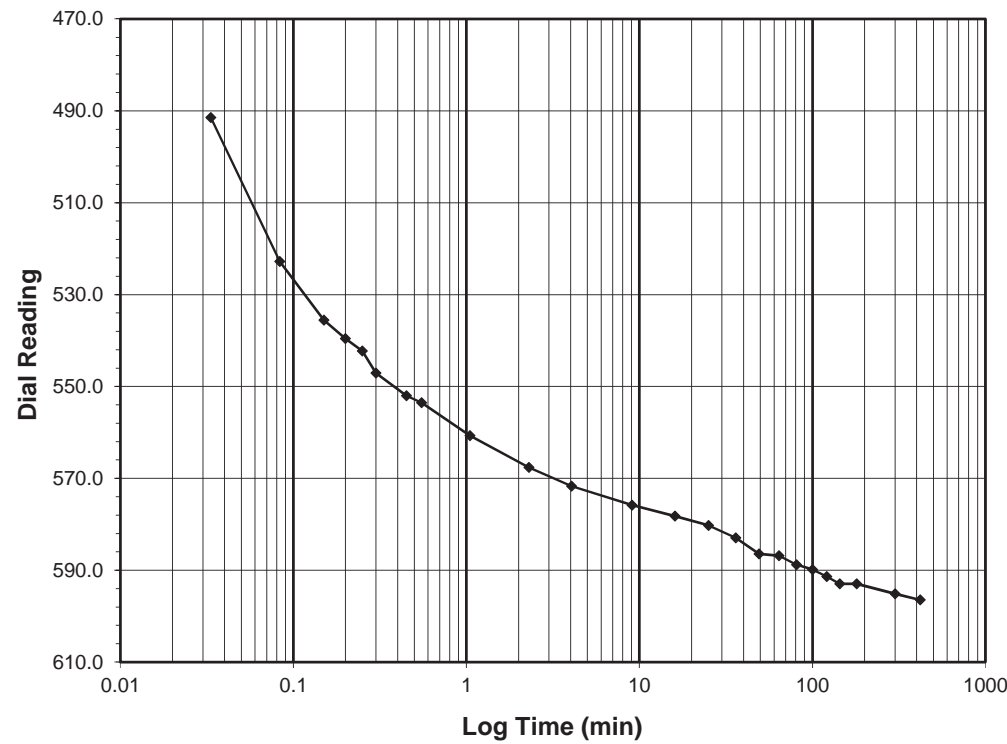
Client: ESP Associates Boring No.: -L- STA. 506+89, 75' RT
 Client Project: R-1015 Site B CS34.324.00 Depth (ft): 7.0-9.0
 Project No.: R-2018-075-001 Sample No.: ST-3
 Lab ID: R-2018-075-001-015 Visual Description: ORANGE SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf): 2.0-4.0
Final Reading (div): 596.5
 Consolidometer No.: R491
 1 Division (in): 0.0001
 Start Date: 3/29/18
 Start Time: 15:31:10

Elapsed Time (min)	Dial Reading (div)
Initial	468.4
0.03	491.5
0.08	522.8
0.15	535.6
0.20	539.6
0.25	542.2
0.30	547.1
0.45	552.0
0.55	553.5
1.05	560.7
2.30	567.6
4.05	571.7
9.05	575.9
16.05	578.2
25.05	580.3
36.05	583.0
49.05	586.4
64.05	586.8
81.05	588.8
100.05	589.9
121.07	591.4
144.07	593.0
180.07	593.0
300.07	595.1
420.28	596.5

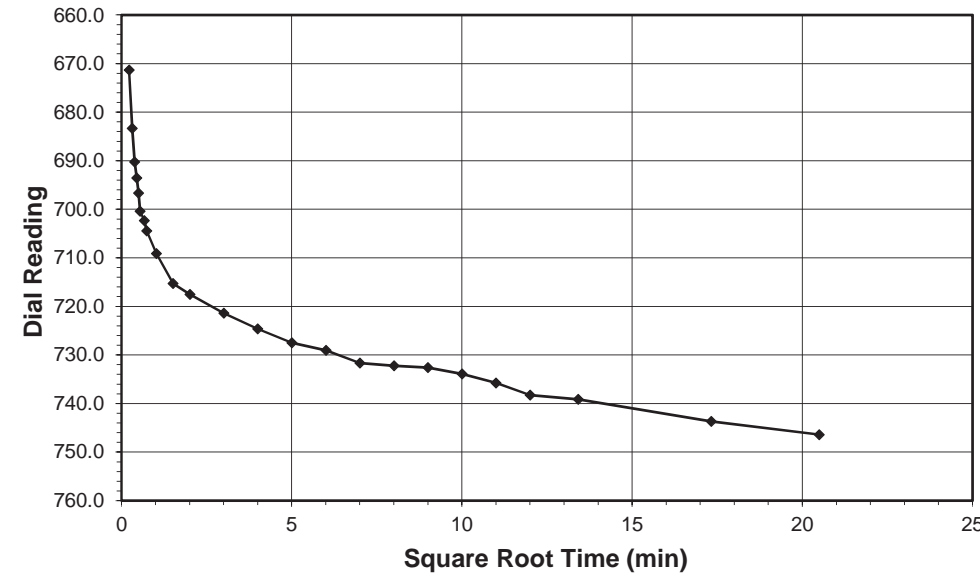


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



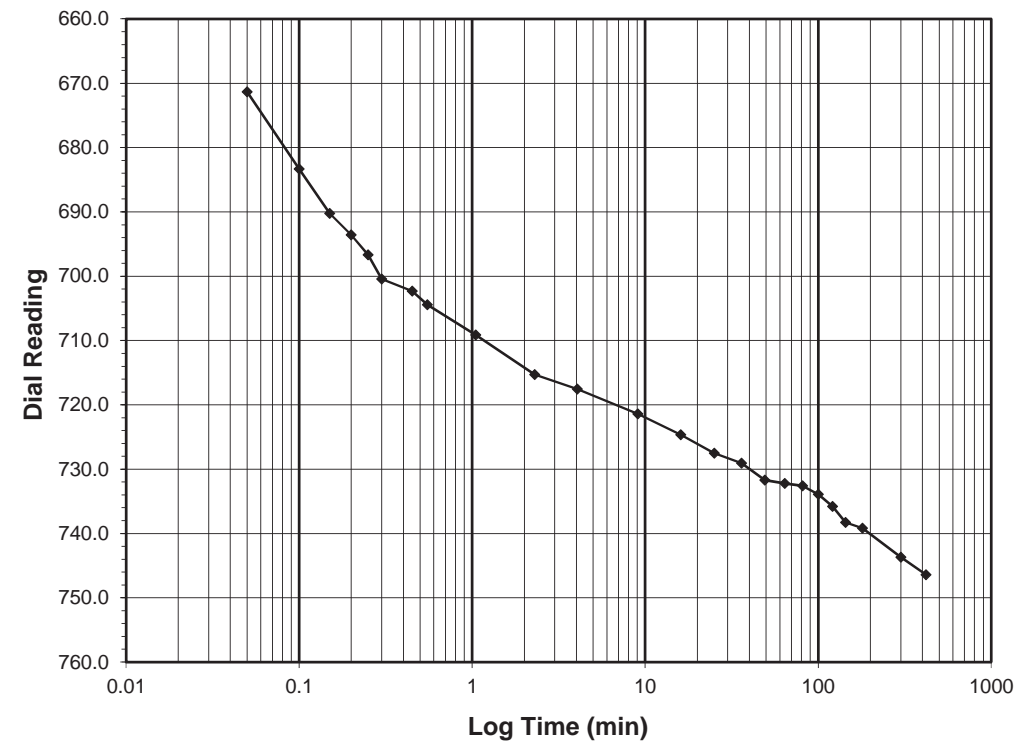
Client: ESP Associates Boring No.: -L- STA. 506+89, 75' RT
 Client Project: R-1015 Site B CS34.324.00 Depth (ft): 7.0-9.0
 Project No.: R-2018-075-001 Sample No.: ST-3
 Lab ID: R-2018-075-001-015 Visual Description: ORANGE SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf): 4.0-8.0
Final Reading (div): 746.4
 Consolidometer No.: R491
 1 Division (in): 0.0001
 Start Date: 3/29/18
 Start Time: 22:31:28

Elapsed Time (min)	Dial Reading (div)
Initial	596.5
0.05	671.3
0.10	683.3
0.15	690.2
0.20	693.6
0.25	696.7
0.30	700.4
0.45	702.3
0.55	704.4
1.05	709.1
2.30	715.3
4.05	717.6
9.05	721.4
16.05	724.7
25.07	727.5
36.07	729.1
49.07	731.7
64.07	732.2
81.07	732.6
100.07	733.9
121.07	735.8
144.07	738.3
180.07	739.2
300.07	743.7
420.25	746.4



Tested By 129-04-0411 Date 3/29/18 Checked By GEM Date 5/11/18

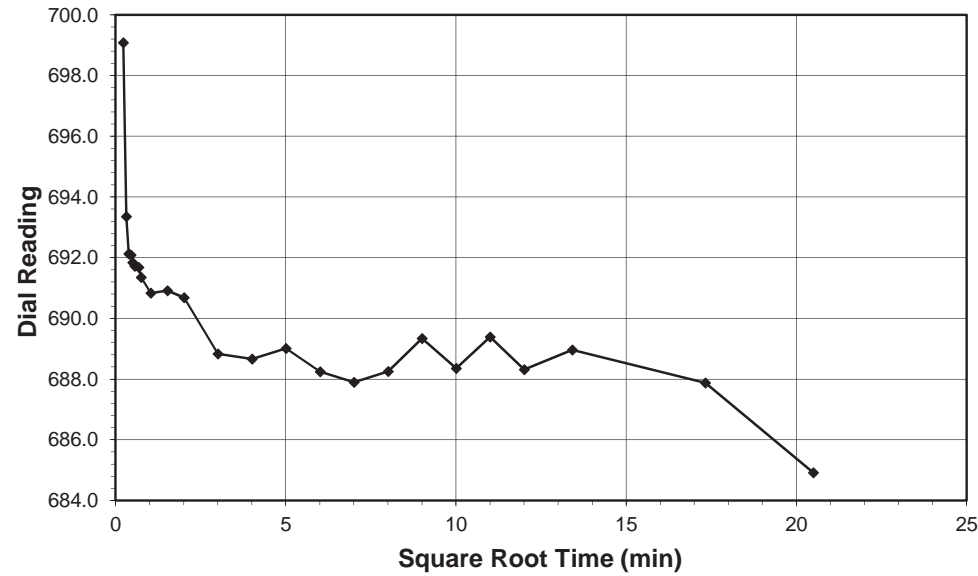
Tested By 129-04-0411 Date 3/29/18 Checked By GEM Date 5/11/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



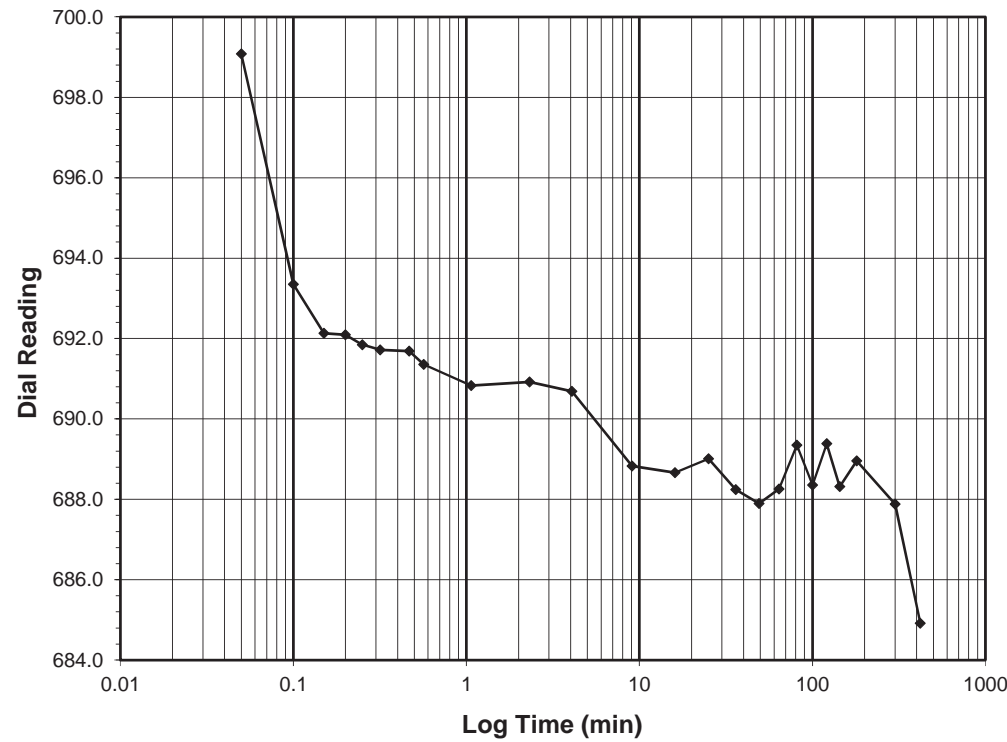
Client ESP Associates Boring No. -L- STA. 506+89, 75' RT
 Client Project R-1015 Site B CS34.324.00 Depth (ft) 7.0-9.0
 Project No. R-2018-075-001 Sample No. ST-3
 Lab ID R-2018-075-001-015 Visual Description ORANGE SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 8.0-2.0
 Final Reading (div) 684.9
 Consolidometer No. R491
 1 Division (in) 0.0001
 Start Date 3/30/18
 Start Time 5:31:43

Elapsed Time (min)	Dial Reading (div)
Initial	746.4
0.05	699.1
0.10	693.3
0.15	692.1
0.20	692.1
0.25	691.8
0.32	691.7
0.47	691.7
0.57	691.4
1.07	690.8
2.32	690.9
4.07	690.7
9.07	688.8
16.07	688.7
25.07	689.0
36.07	688.2
49.07	687.9
64.08	688.3
81.08	689.3
100.08	688.4
121.08	689.4
144.08	688.3
180.08	689.0
300.08	687.9
420.28	684.9



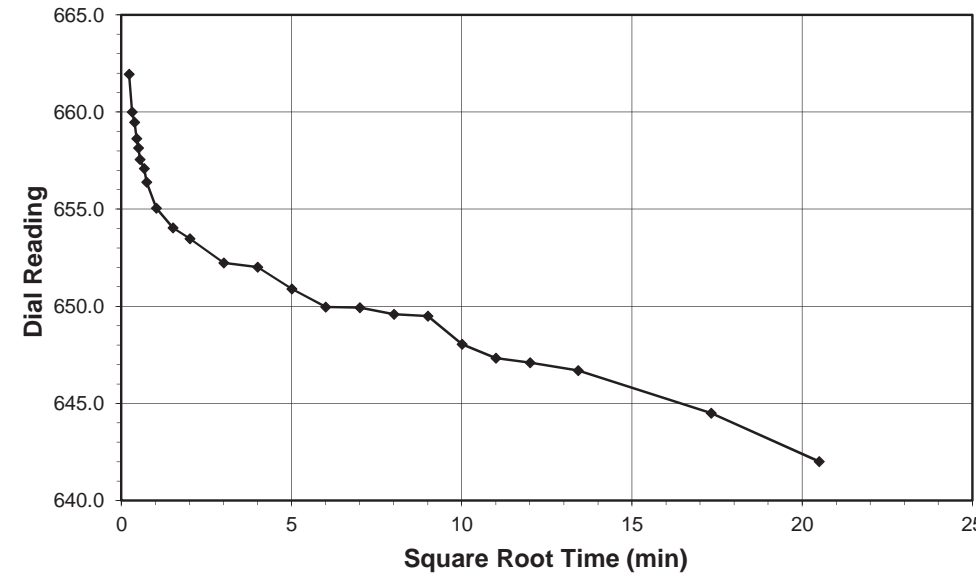
Tested By 129-04-0411 Date 3/30/18 Checked By GEM Date 5/11/18

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216



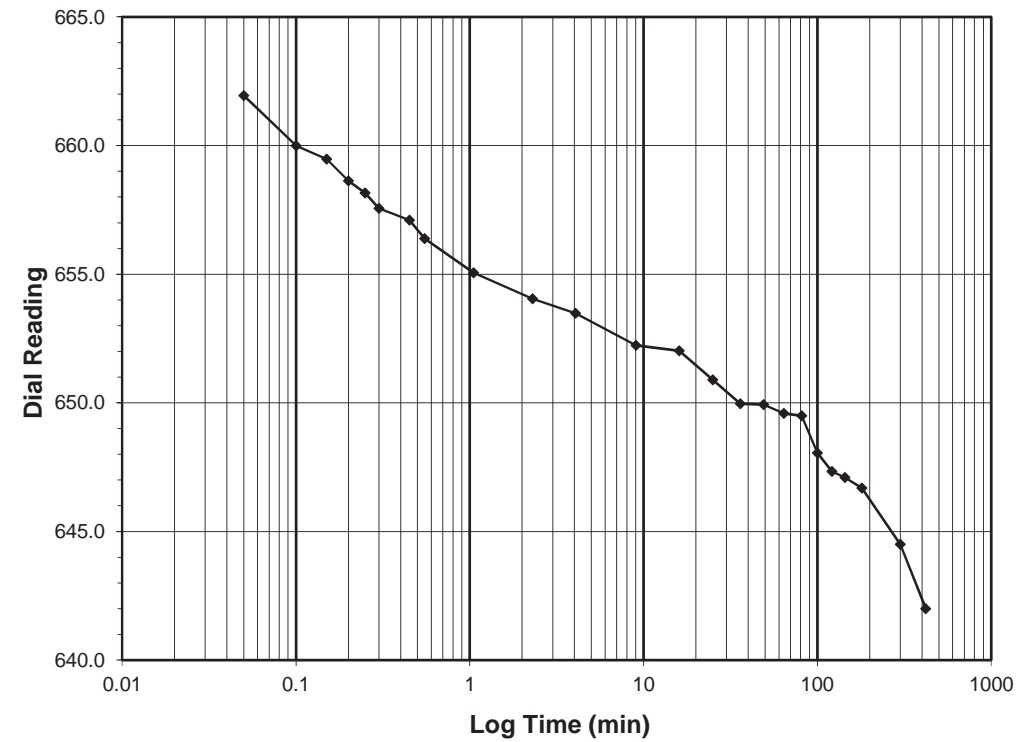
Client ESP Associates Boring No. -L- STA. 506+89, 75' RT
 Client Project R-1015 Site B CS34.324.00 Depth (ft) 7.0-9.0
 Project No. R-2018-075-001 Sample No. ST-3
 Lab ID R-2018-075-001-015 Visual Description ORANGE SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 2.0-0.5
 Final Reading (div) 642.0
 Consolidometer No. R491
 1 Division (in) 0.0001
 Start Date 3/30/18
 Start Time 12:32:00

Elapsed Time (min)	Dial Reading (div)
Initial	684.9
0.05	661.9
0.10	660.0
0.15	659.5
0.20	658.6
0.25	658.2
0.30	657.6
0.45	657.1
0.55	656.4
1.05	655.1
2.30	654.0
4.05	653.5
9.05	652.2
16.05	652.0
25.05	650.9
36.05	650.0
49.07	649.9
64.07	649.6
81.07	649.5
100.07	648.1
121.07	647.3
144.07	647.1
180.07	646.7
300.07	644.5
420.22	642.0



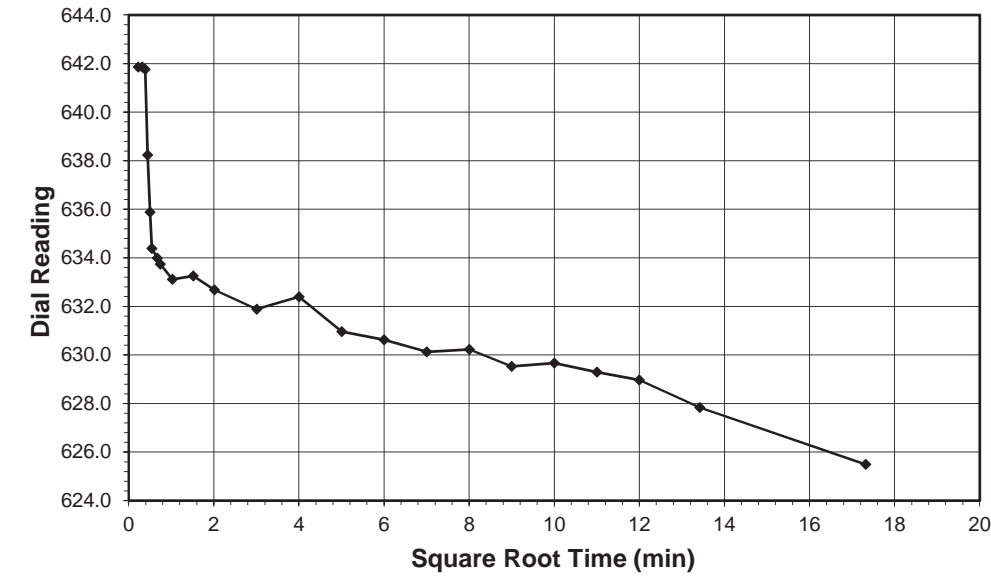
Tested By 129-04-0411 Date 3/30/18 Checked By GEM Date 5/11/18



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

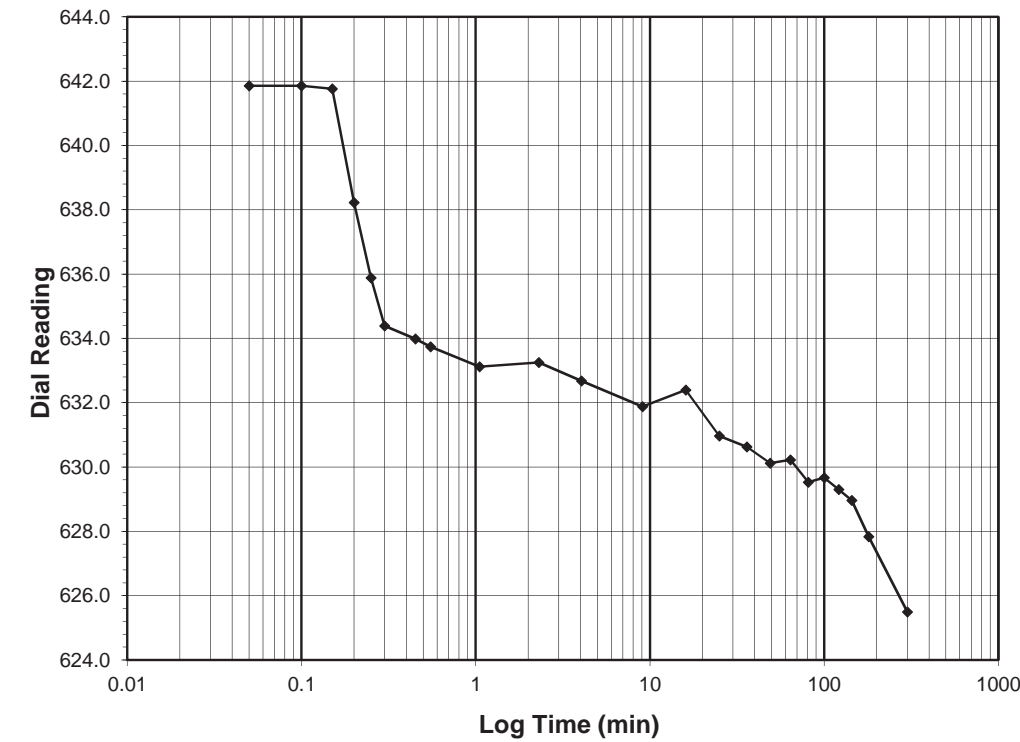
Client: ESP Associates Boring No.: -L- STA. 506+89, 75' RT
 Client Project: R-1015 Site B CS34.324.00 Depth (ft): 7.0-9.0
 Project No.: R-2018-075-001 Sample No.: ST-3
 Lab ID: R-2018-075-001-015 Visual Description: ORANGE SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.5-0.25
 Final Reading (div) 625.5
 Consolidometer No. R491
 1 Division (in) 0.0001
 Start Date 3/30/18
 Start Time 19:32:13

Elapsed Time (min)	Dial Reading (div)
Initial	642.0
0.05	641.9
0.10	641.9
0.15	641.8
0.20	638.2
0.25	635.9
0.30	634.4
0.45	634.0
0.55	633.7
1.05	633.1
2.30	633.3
4.05	632.7
9.05	631.9
16.05	632.4
25.05	631.0
36.05	630.6
49.05	630.1
64.07	630.2
81.07	629.5
100.07	629.7
121.07	629.3
144.07	629.0
180.07	627.8
300.07	625.5



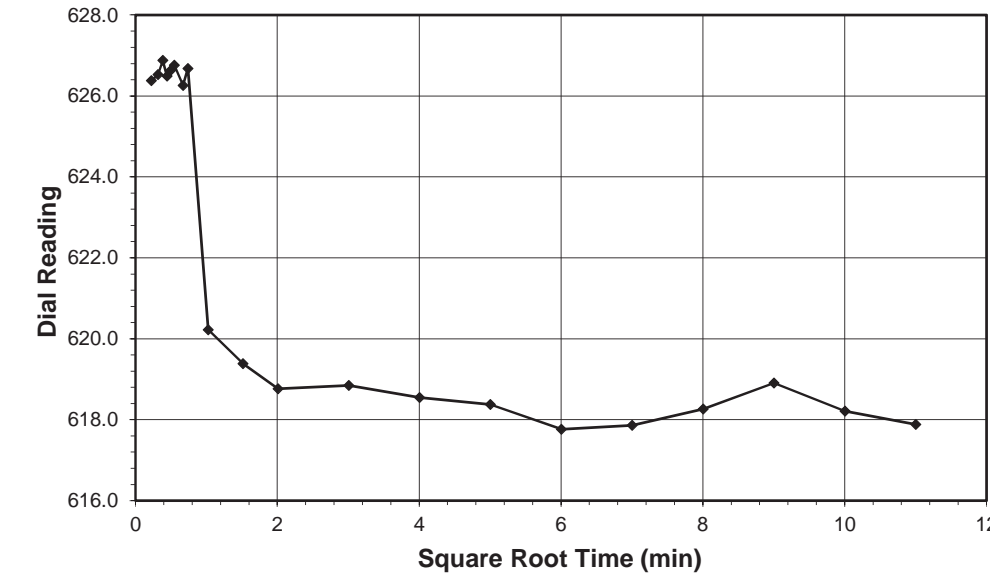
Tested By 129-04-0411 Date 3/30/18 Checked By GEM Date 5/11/18



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

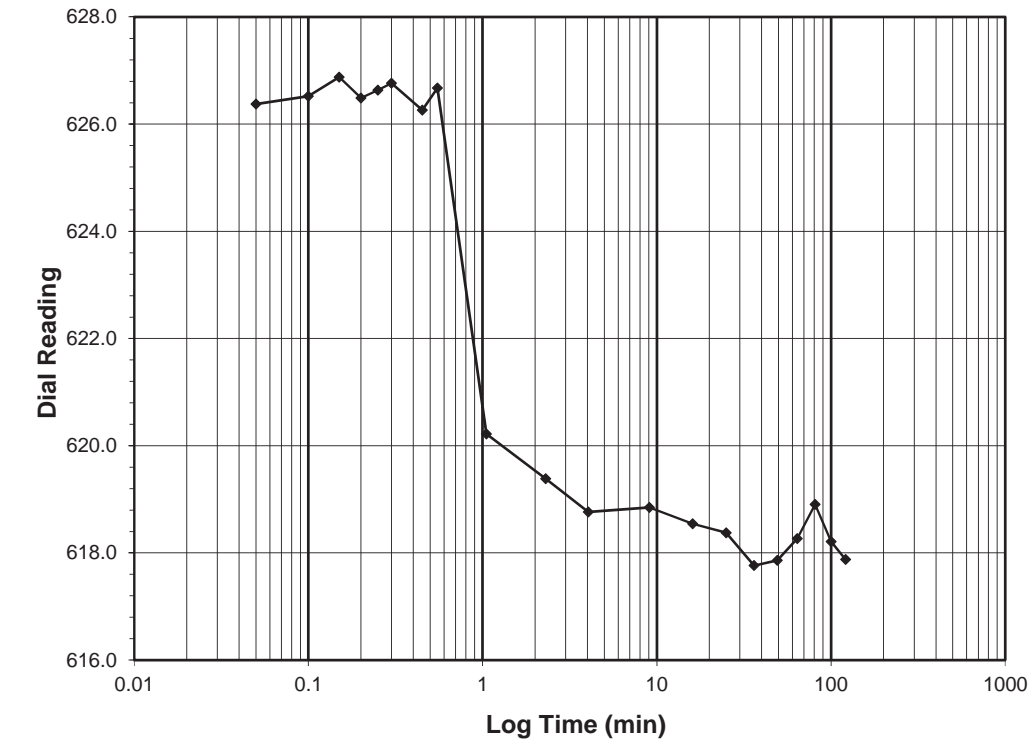
Client: ESP Associates Boring No.: -L- STA. 506+89, 75' RT
 Client Project: R-1015 Site B CS34.324.00 Depth (ft): 7.0-9.0
 Project No.: R-2018-075-001 Sample No.: ST-3
 Lab ID: R-2018-075-001-015 Visual Description: ORANGE SAND

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.25-0.125
 Final Reading (div) 617.9
 Consolidometer No. R491
 1 Division (in) 0.0001
 Start Date 3/31/18
 Start Time 2:32:32

Elapsed Time (min)	Dial Reading (div)
Initial	625.5
0.05	626.4
0.10	626.5
0.15	626.9
0.20	626.5
0.25	626.6
0.30	626.8
0.45	626.3
0.55	626.7
1.05	626.2
2.30	619.4
4.05	618.8
9.05	618.9
16.05	618.5
25.05	618.4
36.07	617.8
49.07	617.9
64.07	618.3
81.07	618.9
100.07	618.2
121.07	617.9



Tested By 129-04-0411 Date 3/31/18 Checked By GEM Date 5/11/18