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REFERENCE: B-4786

PROJECT: 38222

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY PITT
 PROJECT DESCRIPTION REPLACE BRIDGE 38 OVER
THE TAR RIVER ON US 13 IN GREENVILLE
STA. 28+03 -L- - REVISED
 SITE DESCRIPTION _____

CONTENTS

SHEET NO.	DESCRIPTION
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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4786	1	28

CAUTION NOTICE

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

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

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

NOTES:

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

PERSONNEL

B. SMITH, PG

B. WORLEY, PG

A. GROSS

M.G. MOSELEY

J. MOSELEY

INVESTIGATED BY B. SMITH, PG

DRAWN BY B. SMITH, PG

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SUBMITTED BY B. SMITH, PG

DATE DECEMBER, 2018

Prepared in the
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DocuSigned by:

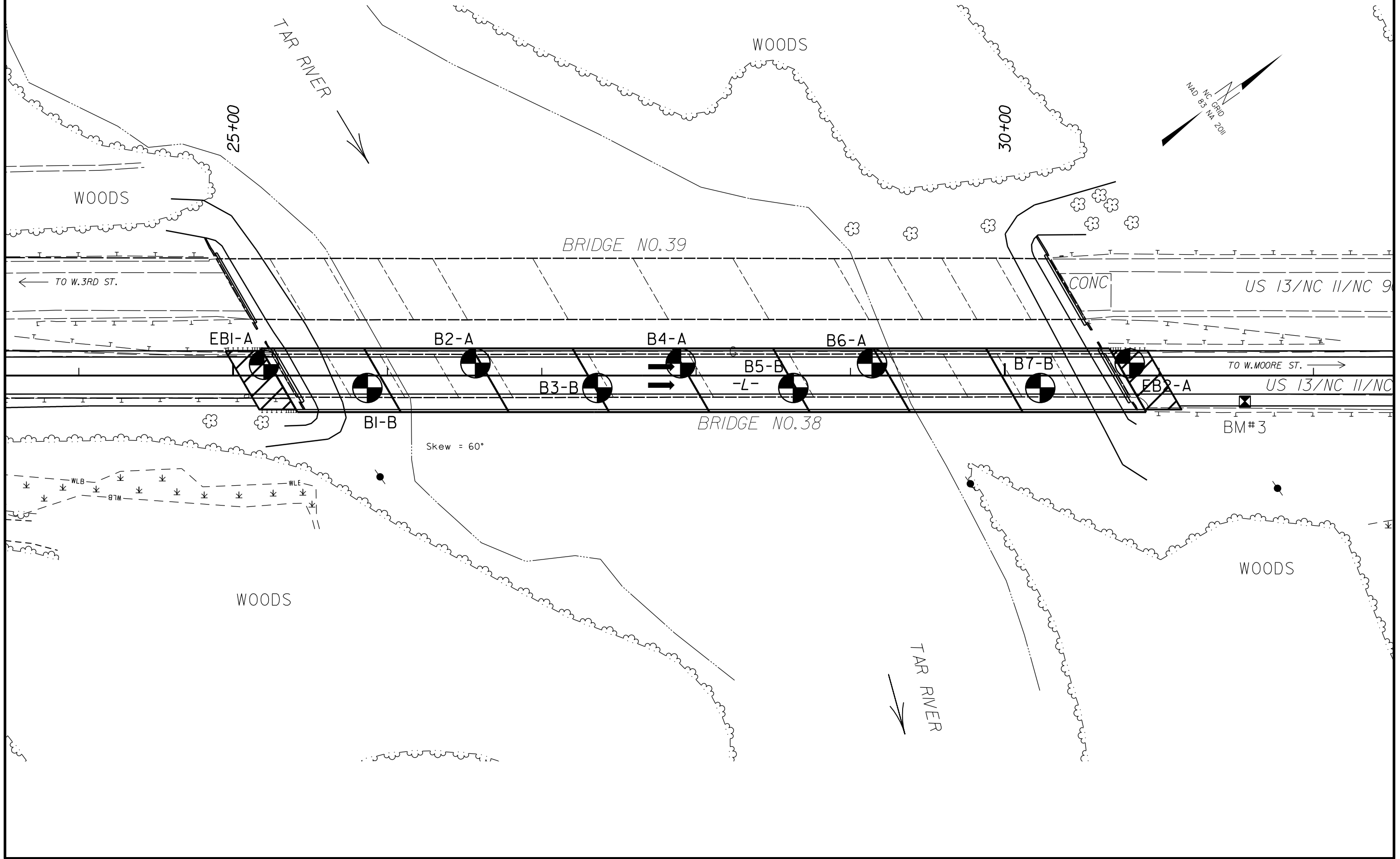
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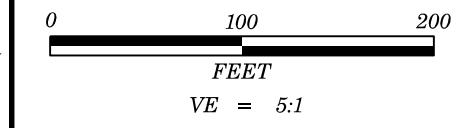
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**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS									
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6										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 DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN OR BPF OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH DODGE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SRC) - 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										WEATHERED ROCK (WR)										NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.									
GENERAL CLASS. GRANULAR MATERIALS (< 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.										CRYSTALLINE ROCK (CR)										FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.									
GROUP CLASS. A-1, A-1-b, A-3, A-2-4, A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.										NON-CRYSTALLINE ROCK (NCR)										FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.									
SYMBOL										COMPRESSION										COASTAL PLAIN SEDIMENTARY ROCK (CP)										COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.									
% PASSING #10, #40, #200										SLIGHTLY COMPRESSIBLE, MODERATELY COMPRESSIBLE, HIGHLY COMPRESSIBLE										LL < 31, LL = 31 - 50, LL > 50																			
MATERIAL PASSING #40 LL, PI										PERCENTAGE OF MATERIAL										WEATHERING																			
GROUP INDEX										ORGANIC MATERIAL, GRANULAR SOILS, SILT-CLAY SOILS, OTHER MATERIAL										FRESH, VERY SLIGHT (V SLI.), SLIGHT (SLI.), MODERATE (MOD.), MODERATELY SEVERE (MOD. SEV.), SEVERE (SEV.), VERY SEVERE (V SEV.), COMPLETE																			
USUAL TYPES OF MAJOR MATERIALS										GROUND WATER										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION, SOIL SYMBOL, ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT, INFERRED SOIL BOUNDARY, INFERRED ROCK LINE, ALLUVIAL SOIL BOUNDARY										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									
GEN. RATING AS SUBGRADE										MISCELLANEOUS SYMBOLS										DIP & DIP DIRECTION OF ROCK STRUCTURES, SLOPE INDICATOR INSTALLATION, CONE PENETROMETER TEST, SOUNDING ROD, TEST BORING WITH CORE, SPT N-VALUE																			
CONSISTENCY OR DENSENESS										RECOMMENDATION SYMBOLS										ROCK HARDNESS																			
PRIMARY SOIL TYPE, COMPACTNESS OR CONSISTENCY, RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE), RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)										UNDERCUT, SHALLOW UNDERCUT, UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE, UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										VERY HARD, HARD, MODERATELY HARD, MEDIUM HARD, SOFT, VERY SOFT																			
TEXTURE OR GRAIN SIZE										ABBREVIATIONS										FRACTURE SPACING, BEDDING																			
U.S. STD. SIEVE SIZE OPENING (MM), BOULDER (BLDR.), COBBLE (COB.), GRAVEL (GR.), COARSE SAND (CSE. SD.), FINE SAND (F. SD.), SILT (SL.), CLAY (CL.)										AR - AUGER REFUSAL, BT - BORING TERMINATED, CL - CLAY, CPT - CONE PENETRATION TEST, CSE - COARSE, DMT - DILATOMETER TEST, DPT - DYNAMIC PENETRATION TEST, e - VOID RATIO, F - FINE, FOSS. - FOSSILIFEROUS, FRAC. - FRACTURED, FRACTURES, FRAGS. - FRAGMENTS, HL - HIGHLY, MED. - MEDIUM, MICA - MICACEOUS, MOD. - MODERATELY, NP - NON PLASTIC, ORG. - ORGANIC, PMT - PRESSUREMETER TEST, SAP. - SAPROLITIC, SD. - SAND, SANDY, SL. - SILT, SILTY, SLI. - SLIGHTLY, TCR - TRICONE REFUSAL, w - MOISTURE CONTENT, V - VERY, VST - VANE SHEAR TEST, WEA. - WEATHERED, w _g - UNIT WEIGHT, w _d - DRY UNIT WEIGHT										TERM, SPACING, TERM, THICKNESS																			
SOIL MOISTURE - CORRELATION OF TERMS										EQUIPMENT USED ON SUBJECT PROJECT										INDURATION																			
SOIL MOISTURE SCALE (ATTERBERG LIMITS), FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION										DRILL UNITS, ADVANCING TOOLS, HAMMER TYPE, CORE SIZE, HAND TOOLS										FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE, MODERATELY INDURATED, INDURATED, EXTREMELY INDURATED																			
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.																																							

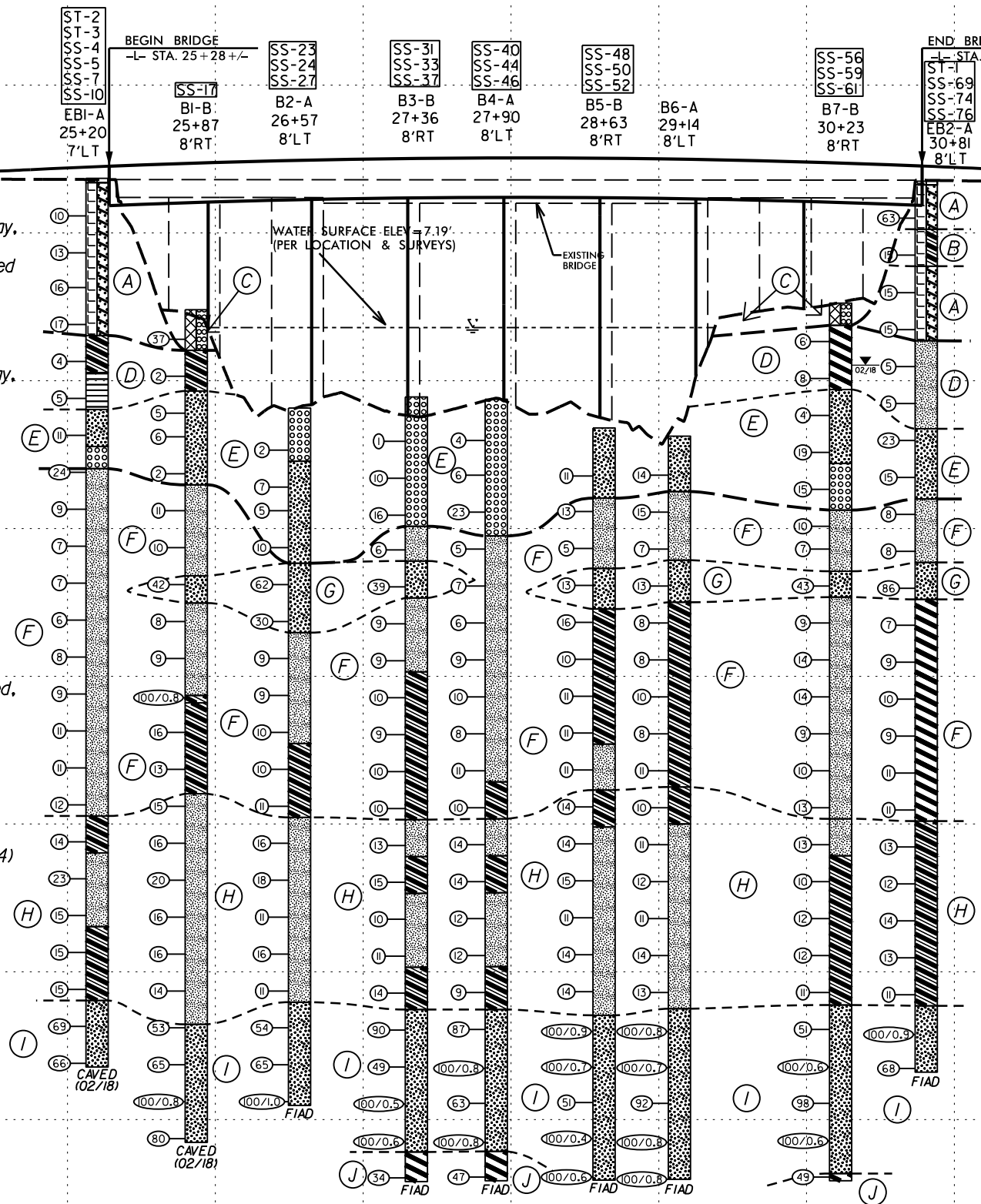




BEGIN GRADE
-L- STA. 22+00.00
ELEV=27.86'

END GRADE
-L- STA. 34+50.00
ELEV=25.91'

- (A) ROADWAY EMBANKMENT: orange-brown and gray, moist to wet, medium dense to very dense, clayey SAND (A-2-6) with trace organics and fossilized shell fragments
- (B) ROADWAY EMBANKMENT: gray, moist, stiff, sandy CLAY (A-6)
- (C) ARTIFICIAL FILL (ENGINEERED): brown and gray, moist to saturated, dense, GRAVEL (A-1-a) with some sand, cobbles and boulders (rip rap)
- (D) ALLUVIAL: brown, gray to dark gray, mottled yellow-brown and orange-brown, moist to saturated, soft to stiff, fine sandy CLAY (A-6) with some silt, clayey SILT (A-5) with some fine sand, highly sandy, silty CLAY (A-7-6), and highly clayey, sandy SILT (A-4) with moderate to trace organics and wood fragments
- (E) ALLUVIAL: gray, brown, and orange-brown, saturated, very loose to medium dense, silty SAND (A-2-4), and fine to coarse SAND (A-1-b) with some to trace gravel and wood fragments
- (F) COASTAL PLAIN (YORKTOWN FORMATION): blue-gray, dark gray, and dark green-gray, moist to wet, medium stiff to hard, sandy SILT (A-4) with some to little clay, fine sandy CLAY (A-6), and highly sandy, silty CLAY (A-7-6), some to trace fossilized shell fragments with locally highly fossiliferous zones, slightly calcareous, some to trace mica
- (G) COASTAL PLAIN (YORKTOWN FORMATION): blue-gray and dark green-gray, moist to saturated, medium dense to very dense, silty fine SAND (A-2-4) with little to trace clay, some mica, and trace fossilized shell fragments
- (H) COASTAL PLAIN (PEEDEE FORMATION): dark green-gray, dark gray, and blue-gray, moist to saturated, stiff to very stiff, fine sandy SILT (A-4) with little clay, and fine sandy CLAY (A-6) with some to trace mica and trace fossilized shell fragments, glauconitic
- (I) COASTAL PLAIN (BLACK CREEK FORMATION): light to dark gray, and green-gray, moist to saturated, dense to very dense, silty SAND (A-2-4) with little clay (v. thin seams), some mica, and little to trace lignite
- (J) COASTAL PLAIN (CAPE FEAR FORMATION): pale gray to gray, and mottled yellow-brown, moist, hard, highly sandy, silty CLAY (A-7-6)

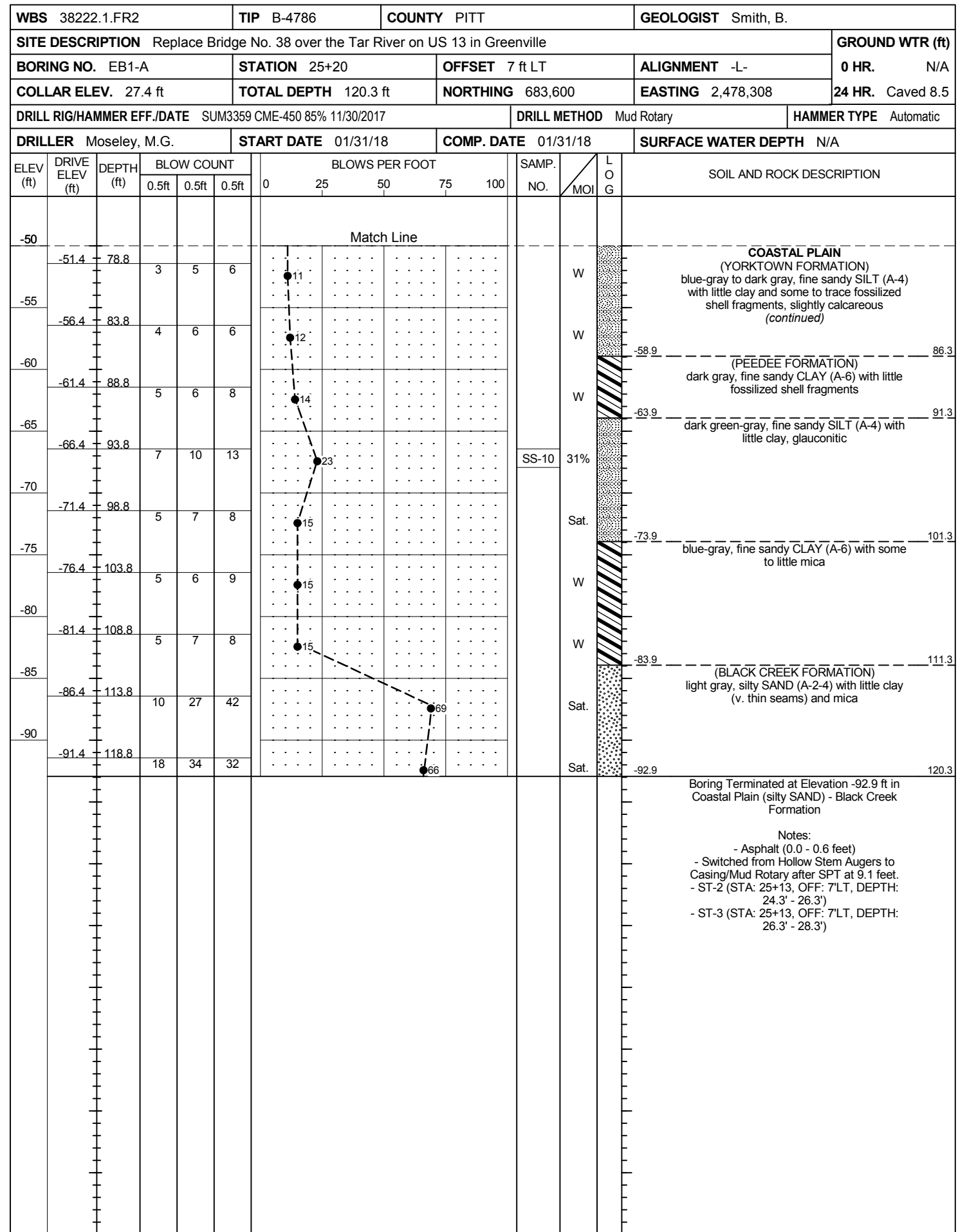
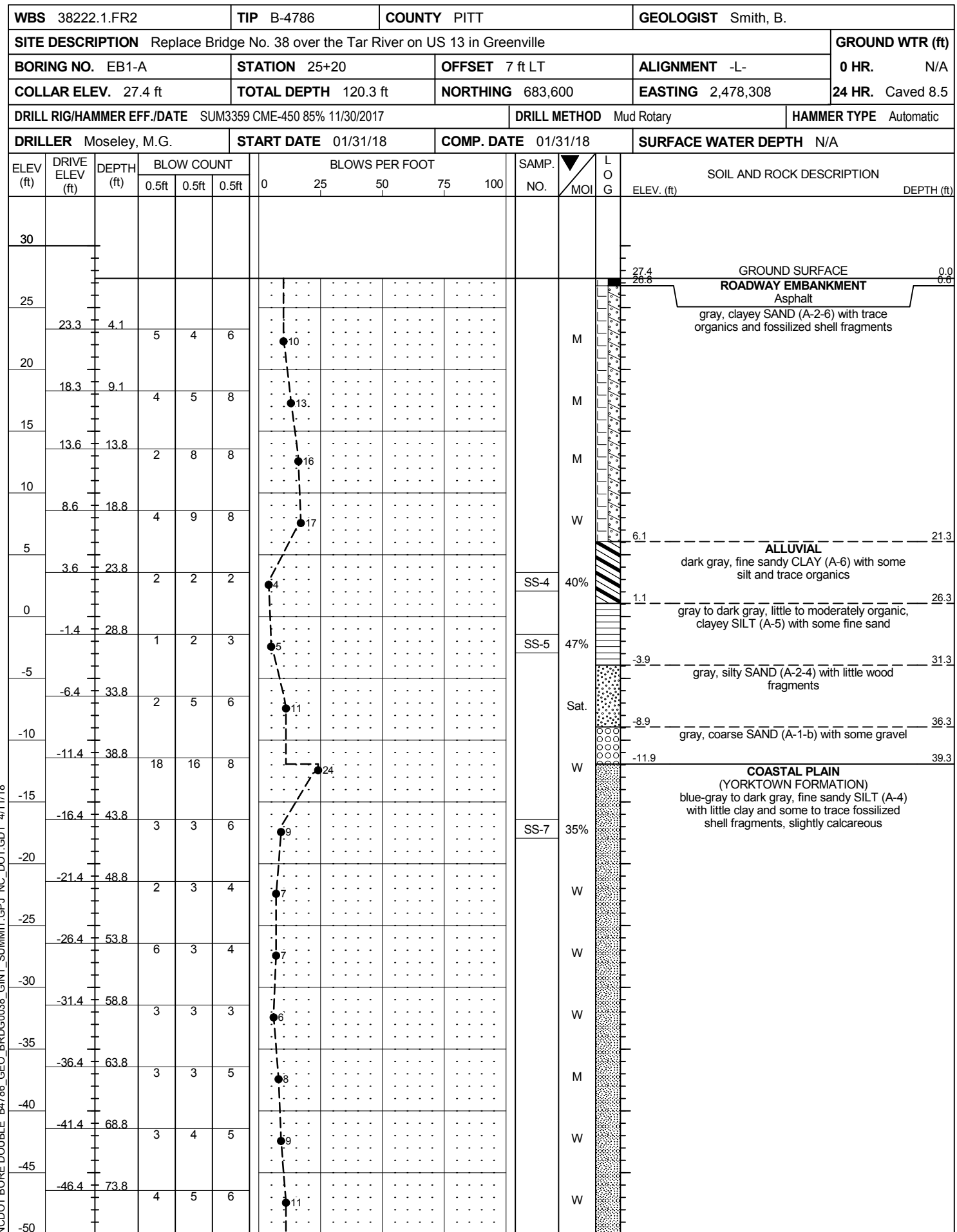


22+00 23+00 24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00 35+00

Note: Existing ground-line generated along -L- profile from B4786.ls_fin.fin. Stratigraphy shown is drawn through offset borings with both projected onto the -L- profile.

GEOTECHNICAL BORING REPORT

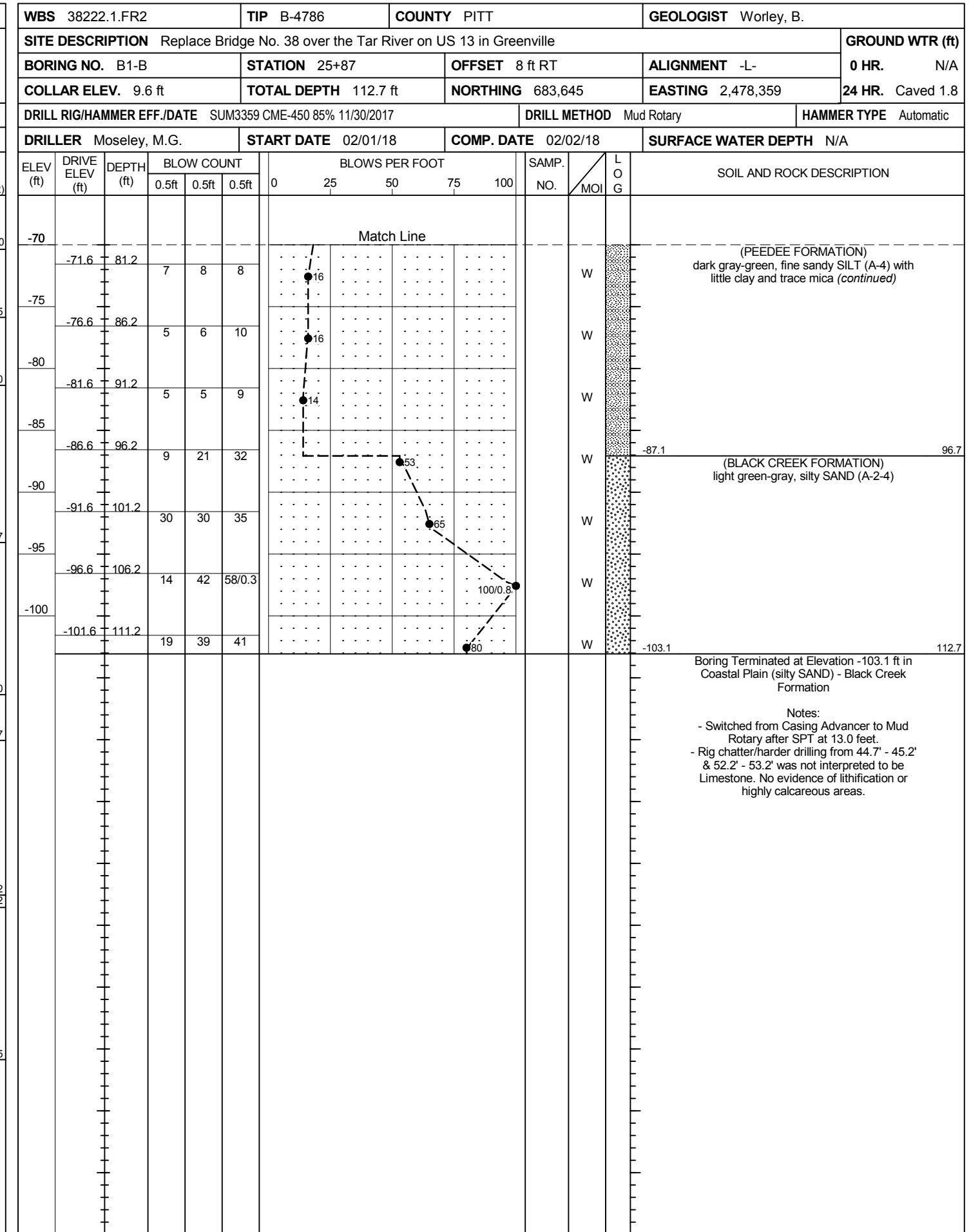
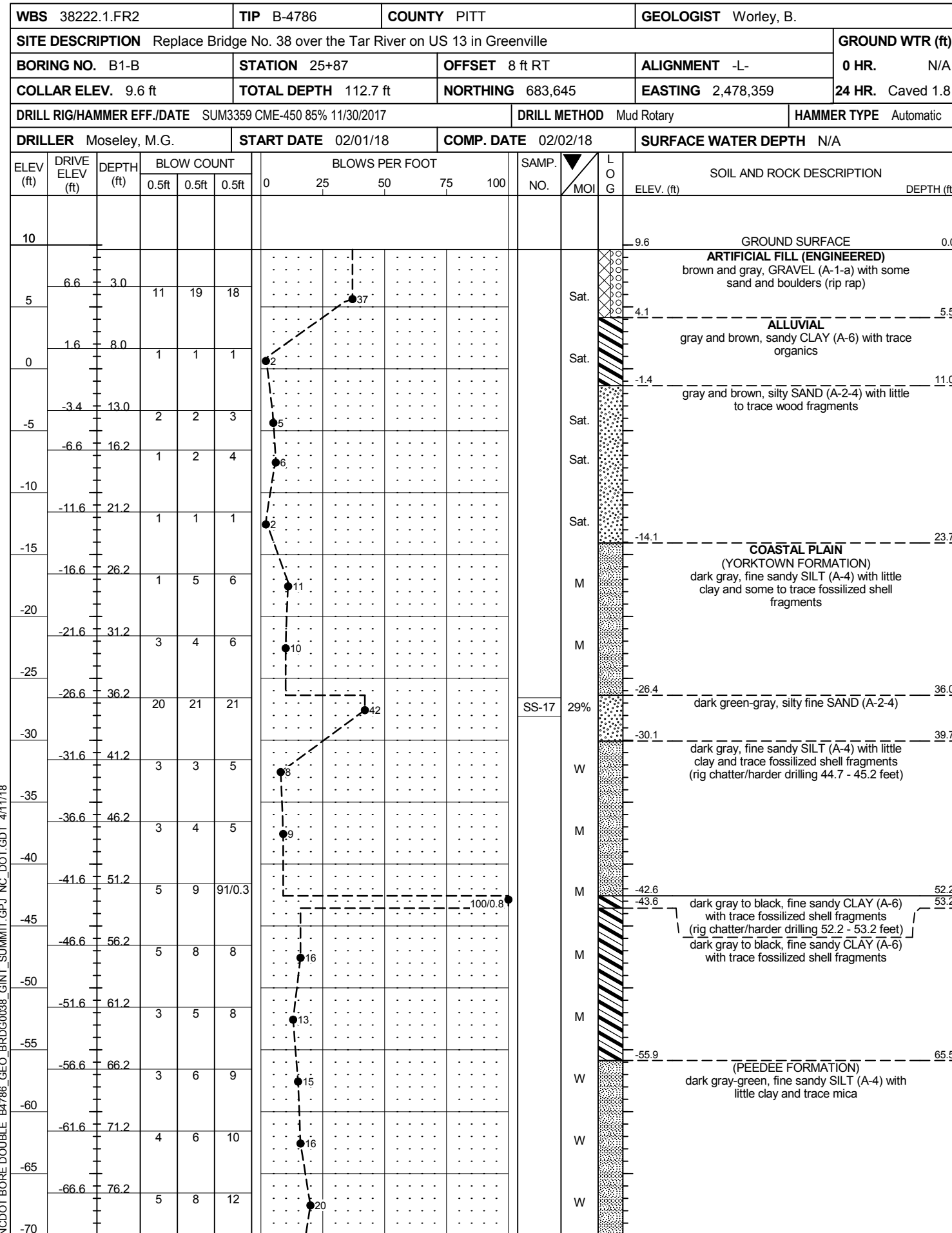
BORE LOG



NCDOT BORE DOUBLE B4786_GEO_BRDG0038_GINT_SUMMIT.GPJ_NC_DOT.GDT 4/11/18

GEOTECHNICAL BORING REPORT

BORE LOG



NCDOT BORE DOUBLE B4786_GEO_BRDG0038_GINT_SUMMIT.GPJ_NC_DOT.GDT 4/11/18

Boring Terminated at Elevation -103.1 ft in Coastal Plain (silty SAND) - Black Creek Formation

Notes:
 - Switched from Casing Advancer to Mud Rotary after SPT at 13.0 feet.
 - Rig chatter/harder drilling from 44.7' - 45.2' & 52.2' - 53.2' was not interpreted to be Limestone. No evidence of lithification or highly calcareous areas.

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 38222.1.FR2		TIP B-4786		COUNTY PITT		GEOLOGIST Smith, B.	
SITE DESCRIPTION Replace Bridge No. 38 over the Tar River on US 13 in Greenville							GROUND WTR (ft)
BORING NO. B2-A		STATION 26+57		OFFSET 8 ft LT		ALIGNMENT -L-	
COLLAR ELEV. -3.7 ft		TOTAL DEPTH 94.4 ft		NORTHING 683,712		EASTING 2,478,386	
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 11/30/2017			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic		
DRILLER Moseley, M.G.		START DATE 02/05/18		COMP. DATE 02/05/18		SURFACE WATER DEPTH 8.5ft	

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						
5																
0																
-5																
-10	-8.4	4.7	2	1	1											
-15	-13.4	9.7	1	1	6											
-20	-16.6	12.9	2	2	3											
-25	-21.6	17.9	5	5	5											
-30	-26.6	22.9	12	22	40											
-35	-31.6	27.9	28	18	12											
-40	-36.6	32.9	3	4	5											
-45	-41.6	37.9	3	4	5											
-50	-46.6	42.9	3	5	5											
-55	-51.6	47.9	4	4	6											
-60	-56.6	52.9	4	5	6											
-65	-61.6	57.9	4	7	9											
-70	-66.6	62.9	6	8	10											
-75	-71.6	67.9	5	5	6											

WBS 38222.1.FR2		TIP B-4786		COUNTY PITT		GEOLOGIST Smith, B.	
SITE DESCRIPTION Replace Bridge No. 38 over the Tar River on US 13 in Greenville							GROUND WTR (ft)
BORING NO. B2-A		STATION 26+57		OFFSET 8 ft LT		ALIGNMENT -L-	
COLLAR ELEV. -3.7 ft		TOTAL DEPTH 94.4 ft		NORTHING 683,712		EASTING 2,478,386	
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 11/30/2017			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic		
DRILLER Moseley, M.G.		START DATE 02/05/18		COMP. DATE 02/05/18		SURFACE WATER DEPTH 8.5ft	

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						
-75																
-80	-76.6	72.9	5	6	10											
-85	-81.6	77.9	4	5	6											
-90	-86.6	82.9	15	24	30											
-95	-91.6	87.9	15	30	35											
-98.1	-96.6	92.9	24	43	57											

NCDOT BORE DOUBLE B4786_GEO_BRDG0038_GINT_SUMMIT.GPJ_NC_DOT.GDT 4/11/18

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 38222.1.FR2		TIP B-4786		COUNTY PITT		GEOLOGIST Smith, B.									
SITE DESCRIPTION Replace Bridge No. 38 over the Tar River on US 13 in Greenville							GROUND WTR (ft)								
BORING NO. B3-B		STATION 27+36		OFFSET 8 ft RT		ALIGNMENT -L-									
COLLAR ELEV. -2.2 ft		TOTAL DEPTH 106.2 ft		NORTHING 683,767		EASTING 2,478,445									
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 11/30/2017		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER Moseley, M.G.		START DATE 02/06/18		COMP. DATE 02/06/18		SURFACE WATER DEPTH 6.9ft									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
5															
0															
-5															
-10															
-15															
-20															
-25															
-30															
-35															
-40															
-45															
-50															
-55															
-60															
-65															
-70															
-75															

WBS 38222.1.FR2		TIP B-4786		COUNTY PITT		GEOLOGIST Smith, B.									
SITE DESCRIPTION Replace Bridge No. 38 over the Tar River on US 13 in Greenville							GROUND WTR (ft)								
BORING NO. B3-B		STATION 27+36		OFFSET 8 ft RT		ALIGNMENT -L-									
COLLAR ELEV. -2.2 ft		TOTAL DEPTH 106.2 ft		NORTHING 683,767		EASTING 2,478,445									
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 11/30/2017		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER Moseley, M.G.		START DATE 02/06/18		COMP. DATE 02/06/18		SURFACE WATER DEPTH 6.9ft									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-75															
-80															
-85															
-90															
-95															
-100															
-105															
-106.2															

NCDOT BORE DOUBLE B4786_GEO_BRDG0038_GINT_SUMMIT.GPJ_NC_DOT.GDT 4/11/18

Boring Terminated at Elevation -108.4 ft in Coastal Plain (silty CLAY) - Cape Fear Formation

Notes:
- Switched from Casing to Mud Rotary after SPT at 15.0 feet.

GEOTECHNICAL BORING REPORT
BORE LOG

Table with header information for Bore Log 1: WBS 38222.1.FR2, TIP B-4786, COUNTY PITT, GEOLOGIST Smith, B. SITE DESCRIPTION: Replace Bridge No. 38 over the Tar River on US 13 in Greenville. BORING NO. B4-A, STATION 27+90, OFFSET 8 ft LT, ALIGNMENT -L-. COLLAR ELEV. -2.5 ft, TOTAL DEPTH 105.8 ft, NORTHING 683,820, EASTING 2,478,463. DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 11/30/2017, DRILL METHOD Mud Rotary, HAMMER TYPE Automatic. DRILLER Moseley, M.G., START DATE 02/07/18, COMP. DATE 02/07/18, SURFACE WATER DEPTH 7.0ft.

Table with header information for Bore Log 2: WBS 38222.1.FR2, TIP B-4786, COUNTY PITT, GEOLOGIST Smith, B. SITE DESCRIPTION: Replace Bridge No. 38 over the Tar River on US 13 in Greenville. BORING NO. B4-A, STATION 27+90, OFFSET 8 ft LT, ALIGNMENT -L-. COLLAR ELEV. -2.5 ft, TOTAL DEPTH 105.8 ft, NORTHING 683,820, EASTING 2,478,463. DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 11/30/2017, DRILL METHOD Mud Rotary, HAMMER TYPE Automatic. DRILLER Moseley, M.G., START DATE 02/07/18, COMP. DATE 02/07/18, SURFACE WATER DEPTH 7.0ft.

Main data table for Bore Log 1 showing depth, drive elevation, blow counts, soil descriptions (e.g., ALLUVIAL brown-gray, fine to coarse SAND, COASTAL PLAIN), and sampling data.

Main data table for Bore Log 2 showing depth, drive elevation, blow counts, soil descriptions (e.g., blue-gray, fine sandy SILT, (BLACK CREEK FORMATION) light to dark gray, silty SAND, (CAPE FEAR FORMATION) gray, highly sandy, silty CLAY), and sampling data.

NCDOT BORE DOUBLE B4786_GEO_BRDG0038_GINT_SUMMIT.GPJ_NC_DOT.GDT 4/11/18

Notes:
- Switched from Casing to Mud Rotary after SPT at 4.6 feet.
- Rig chatter/harder drilling 52.4' - 53.2' not interpreted as Limestone. No evidence of lithification was observed.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 38222.1.FR2		TIP B-4786		COUNTY PITT		GEOLOGIST Worley, B.	
SITE DESCRIPTION Replace Bridge No. 38 over the Tar River on US 13 in Greenville							GROUND WTR (ft)
BORING NO. B5-B		STATION 28+63		OFFSET 8 ft RT		ALIGNMENT -L-	
COLLAR ELEV. -6.4 ft		TOTAL DEPTH 101.8 ft		NORTHING 683,871		EASTING 2,478,519	
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 11/30/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER Moseley, M.G.		START DATE 02/08/18		COMP. DATE 02/08/18		SURFACE WATER DEPTH 10.7ft	

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						
5																
0																
-5																
-6.4																
-10																
-11.9	5.5															
-15																
-16.7	10.3															
-20																
-21.7	15.3															
-25																
-26.7	20.3															
-30																
-31.7	25.3															
-35																
-36.7	30.3															
-40																
-41.7	35.3															
-45																
-46.7	40.3															
-50																
-51.7	45.3															
-55																
-56.7	50.3															
-60																
-61.7	55.3															
-65																
-66.7	60.3															
-70																
-71.7	65.3															
-75																

WBS 38222.1.FR2		TIP B-4786		COUNTY PITT		GEOLOGIST Worley, B.	
SITE DESCRIPTION Replace Bridge No. 38 over the Tar River on US 13 in Greenville							GROUND WTR (ft)
BORING NO. B5-B		STATION 28+63		OFFSET 8 ft RT		ALIGNMENT -L-	
COLLAR ELEV. -6.4 ft		TOTAL DEPTH 101.8 ft		NORTHING 683,871		EASTING 2,478,519	
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 11/30/2017			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER Moseley, M.G.		START DATE 02/08/18		COMP. DATE 02/08/18		SURFACE WATER DEPTH 10.7ft	

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						
-75																
-76.7	70.3															
-80																
-81.7	75.3															
-85																
-86.7	80.3															
-90																
-91.7	85.3															
-95																
-96.7	90.3															
-100																
-101.7	95.3															
-105																
-106.7	100.3															
-108.2																

Match Line

Boring Terminated at Elevation -108.2 ft in Coastal Plain (silty SAND) - Black Creek Formation

Notes:
- Switched from Casing to Mud Rotary after SPT at 5.5 feet.

NCDOT BORE DOUBLE B4786_GEO_BRD0038_GINT_SUMMIT.GPJ_NC_DOT.GDT 4/11/18

GEOTECHNICAL BORING REPORT BORE LOG

WBS 38222.1.FR2		TIP B-4786		COUNTY PITT		GEOLOGIST Gross, A.	
SITE DESCRIPTION Replace Bridge No. 38 over the Tar River on US 13 in Greenville							GROUND WTR (ft)
BORING NO. B6-A		STATION 29+14		OFFSET 8 ft LT		ALIGNMENT -L-	
COLLAR ELEV. -7.5 ft		TOTAL DEPTH 100.6 ft		NORTHING 683,921		EASTING 2,478,535	
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 11/30/2017				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic	
DRILLER Moseley, M.G.		START DATE 02/09/18		COMP. DATE 02/09/18		SURFACE WATER DEPTH 11.5ft	

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					
5															
0															
-5															
-10															
-11.8	4.3		4	6	8						14				
-15															
-16.8	9.3		5	6	9						15				
-20															
-21.8	14.3		2	3	4						7				
-25															
-26.8	19.3		5	5	8						13				
-30															
-31.8	24.3		3	4	4						8				
-35															
-36.8	29.3		3	4	4						9				
-40															
-41.8	34.3		4	4	6						10				
-45															
-46.8	39.3		3	4	4						8				
-50															
-51.8	44.3		4	5	6						11				
-55															
-56.8	49.3		4	4	6						10				
-60															
-61.8	54.3		6	5	6						11				
-65															
-66.8	59.3		6	6	6						12				
-70															
-71.8	64.3		4	5	6						11				
-75															

WBS 38222.1.FR2		TIP B-4786		COUNTY PITT		GEOLOGIST Gross, A.	
SITE DESCRIPTION Replace Bridge No. 38 over the Tar River on US 13 in Greenville							GROUND WTR (ft)
BORING NO. B6-A		STATION 29+14		OFFSET 8 ft LT		ALIGNMENT -L-	
COLLAR ELEV. -7.5 ft		TOTAL DEPTH 100.6 ft		NORTHING 683,921		EASTING 2,478,535	
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 11/30/2017				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic	
DRILLER Moseley, M.G.		START DATE 02/09/18		COMP. DATE 02/09/18		SURFACE WATER DEPTH 11.5ft	

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					
-75															
-76.8	69.3		4	6	8						14				
-80															
-81.8	74.3		3	6	7						13				
-85															
-86.8	79.3		34	75	25/0.3										
-90															
-91.8	84.3		24	69	31/0.2										
-95															
-96.8	89.3		33	43	49						92				
-100															
-101.8	94.3		23	35	65/0.3										
-105															
-106.8	99.3		47	64	36/0.3										

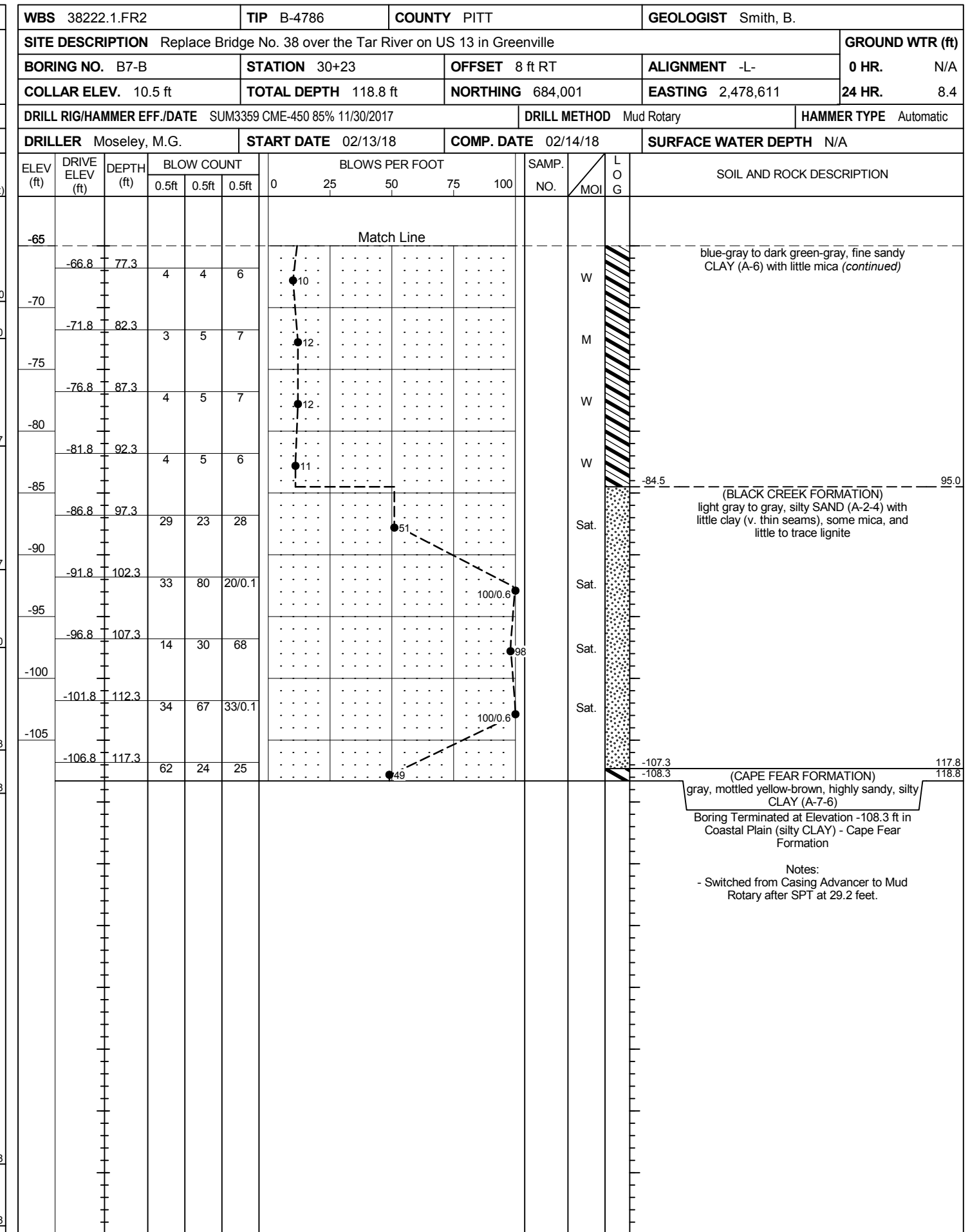
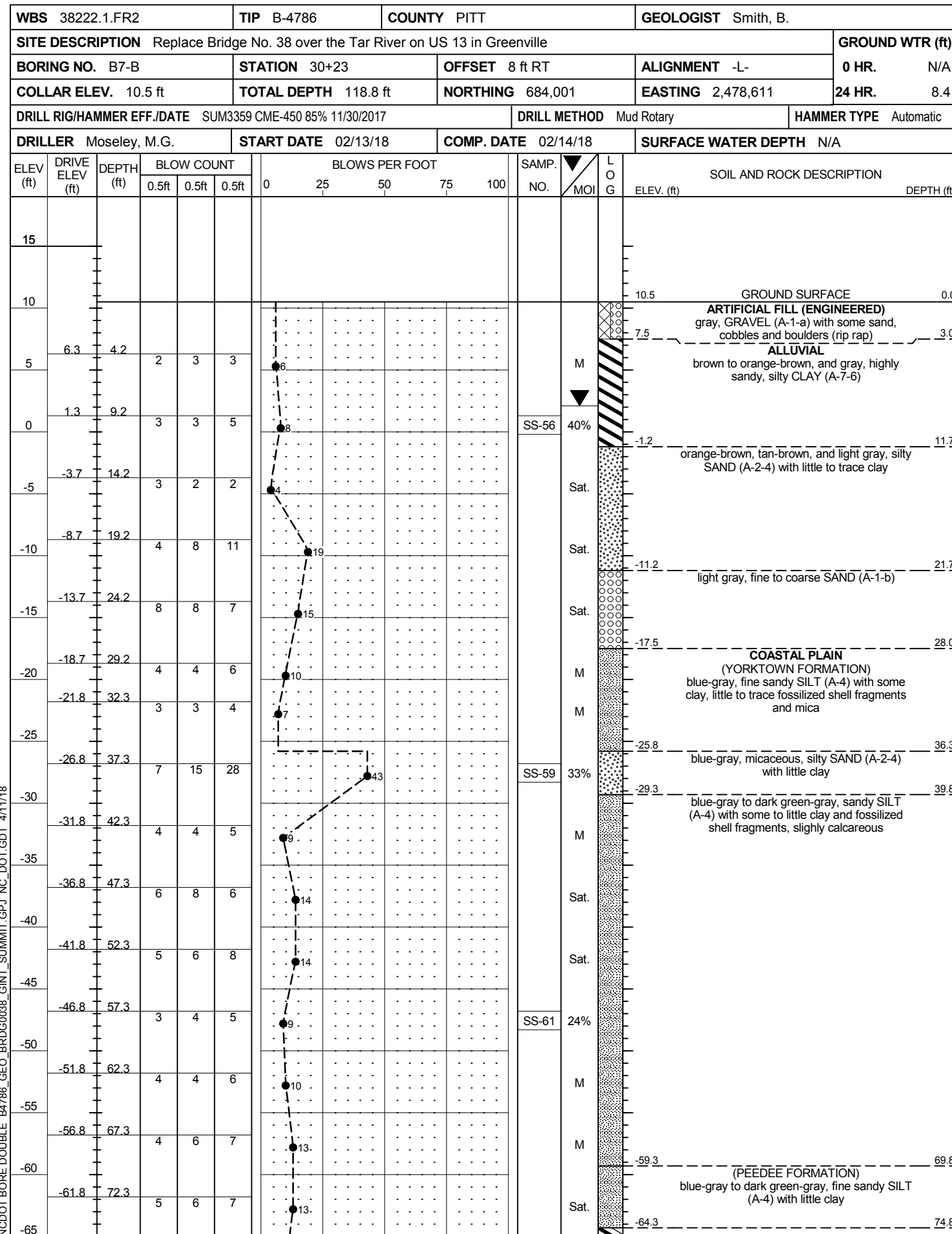
NCDOT BORE DOUBLE B4786_GEO_BRD0038_GINT_SUMMIT.GPJ_NC_DOT.GDT 4/11/18

Boring Terminated at Elevation -108.1 ft in Coastal Plain (silty SAND) - Black Creek Formation

Notes:
- Switch from Casing to Mud Rotary did not change sample interval due to rig adjustments.

GEOTECHNICAL BORING REPORT

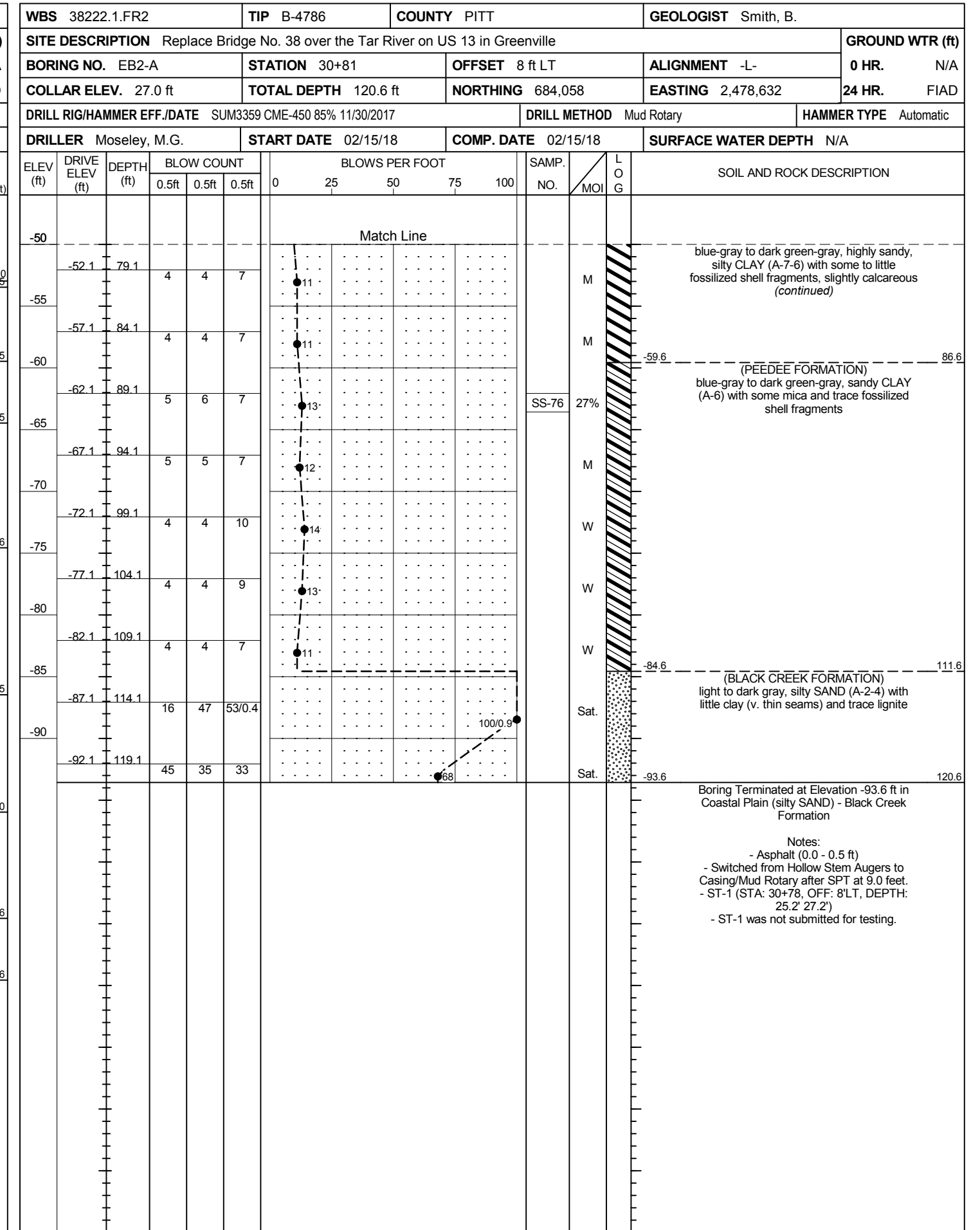
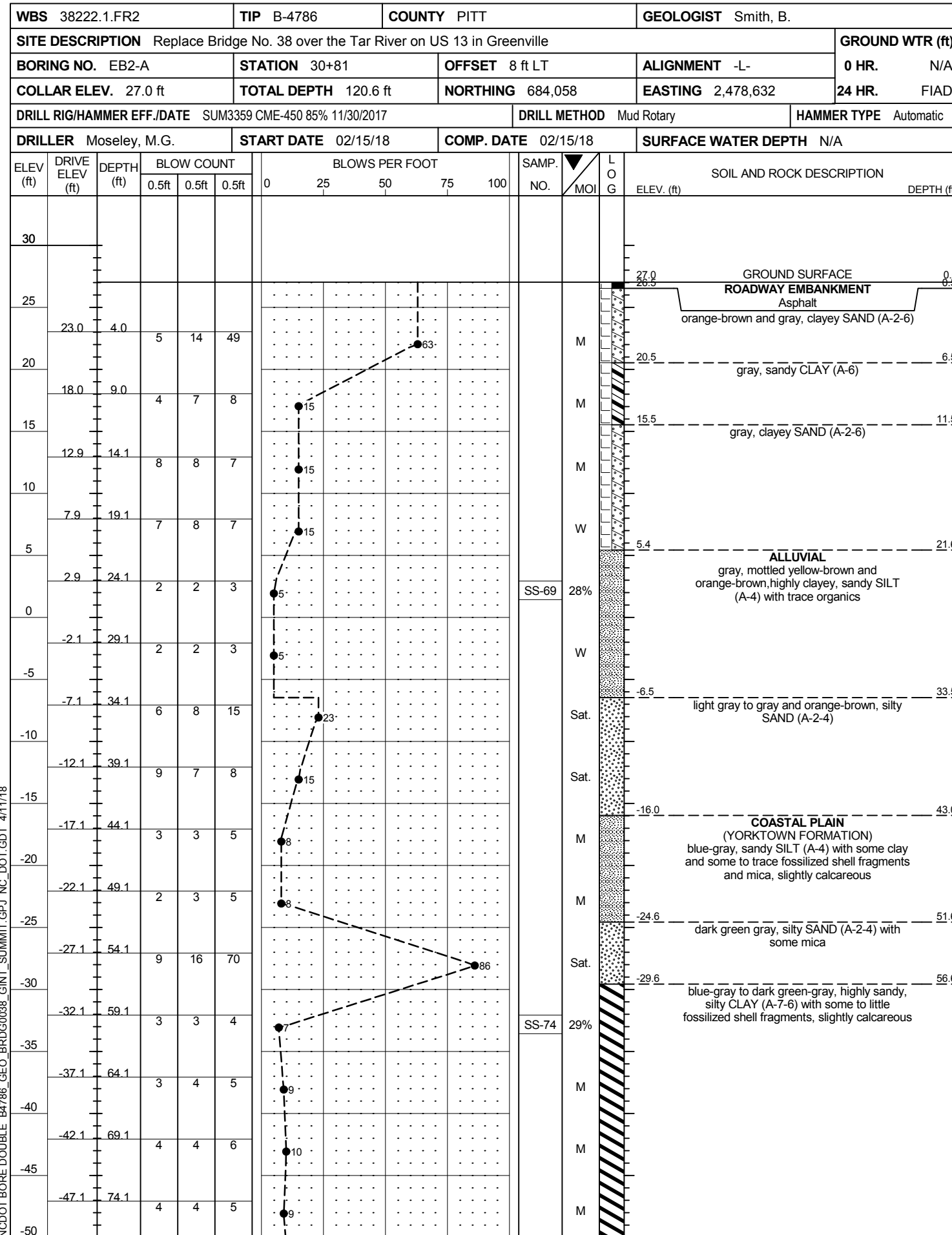
BORE LOG



NCDOT BORE DOUBLE B4786_GEO_BRDG0038_GINT_SUMMIT.GPJ_NC_DOT.GDT 4/11/18

Notes:
 - Switched from Casing Advancer to Mud Rotary after SPT at 29.2 feet.

GEOTECHNICAL BORING REPORT
BORE LOG



NCDOT BORE DOUBLE B4786_GEO_BRD0038_GINT_SUMMIT.GPJ_NC_DOT.GDT 4/11/18

Notes:
 - Asphalt (0.0 - 0.5 ft)
 - Switched from Hollow Stem Augers to Casing/Mud Rotary after SPT at 9.0 feet.
 - ST-1 (STA: 30+78, OFF: 8'LT, DEPTH: 25.2' 27.2')
 - ST-1 was not submitted for testing.

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MATERIALS & TESTS UNIT
SOILS LABORATORY**

T. I. P. No. B-4786

T. I. P. No. B-4786

REPORT ON SAMPLES OF Bridge No. 38 over the Tar River

REPORT ON SAMPLES OF Bridge No. 38 over the Tar River

Project 38222.1.FR2 **County** Pitt **Owner** B. Smith
Date: Sampled 1/31/18 - 2/16/18 **Received** 2/21/18 **Reported** _____
Sampled from Bridge **By** B. Smith & B. Worley
Submitted by B. Smith 2008 Standard Specifications

Project 38222.1.FR2 **County** Pitt **Owner** B. Smith
Date: Sampled 1/31/18 - 2/16/18 **Received** 2/21/18 **Reported** _____
Sampled from Bridge **By** B. Smith & B. Worley
Submitted by B. Smith 2008 Standard Specifications

3/8/18

3/8/18

TEST RESULTS

Proj. Sample No.	SS-4	SS-5	SS-7	SS-10	SS-17	SS-23
Boring No.	EB1-A	EB1-A	EB1-A	EB1-A	B1-B	B2-A
Retained #4 Sieve %	0	0	0	0	0	0
Passing #10 Sieve %	100	100	100	100	100	99
Passing #40 Sieve %	100	99	96	98	99	94
Passing #200 Sieve %	87	81	39	40	23	22

TEST RESULTS

Proj. Sample No.	SS-24	SS-27	SS-31	SS-33	SS-37	SS-40
Boring No.	B2-A	B2-A	B3-B	B3-B	B3-B	B4-A
Retained #4 Sieve %	0	0	0	0	4	1
Passing #10 Sieve %	99	100	100	100	94	98
Passing #40 Sieve %	94	100	100	99	89	93
Passing #200 Sieve %	52	51	16	67	23	47

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60 %	0.8	2.3	6.2	5.7	1.7	10.3
Fine Sand Ret - #270 %	17.3	31.4	70.7	75.0	83.3	74.1
Silt 0.05 - 0.005 mm %	29.7	50.2	9.2	7.2	7.2	7.8
Clay < 0.005 mm %	52.2	16.1	14.0	12.0	7.8	7.8
Passing #40 Sieve %	99.7	98.8	96.9	98.5	99.2	94.5
Passing #200 Sieve %	86.7	80.7	39.3	39.6	23.4	22.2

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60 %	9.0	0.4	0.6	2.8	15.6	11.9
Fine Sand Ret - #270 %	60.1	73.8	89.9	50.4	62.6	53.8
Silt 0.05 - 0.005 mm %	11.9	9.0	3.6	16.2	6.1	11.8
Clay < 0.005 mm %	18.9	16.8	5.9	30.6	15.7	22.6
Passing #40 Sieve %	95.1	99.7	99.8	98.9	94.5	94.9
Passing #200 Sieve %	52.2	50.8	15.9	66.9	24.9	47.5

L. L.	40	46	28	24	25	20
P. I.	18	2	2	2	1	0
AASHTO Classification	A-6	A-5	A-4	A-4	A-2-4	A-2-4
Group Index	16	5	0	0	0	0
pH	N/A	N/A	N/A	N/A	N/A	N/A
Station	25+20	25+20	25+20	25+20	25+87	26+57
OFFSET	7'LT	7'LT	7'LT	7'LT	8'RT	8'LT
ALIGNMENT	-L-	-L-	-L-	-L-	-L-	-L-
Depth (Ft)	23.8	28.8	43.8	93.8	36.2	22.9
to	25.3	30.3	45.3	95.3	37.7	24.4
Natural Moisture %	40.3	47.1	34.5	31.4	29.4	40.5

L. L.	30	30	25	37	21	33
P. I.	4	2	0	16	0	7
AASHTO Classification	A-4	A-4	A-2-4	A-6	A-2-4	A-4
Group Index	0	0	0	9	0	1
pH	N/A	N/A	N/A	N/A	N/A	N/A
Station	26+57	26+57	27+36	27+36	27+36	27+90
OFFSET	8'LT	8'LT	8'RT	8'RT	8'RT	8'LT
ALIGNMENT	-L-	-L-	-L-	-L-	-L-	-L-
Depth (Ft)	32.9	67.9	24.7	39.7	89.7	29.3
to	34.4	69.4	26.2	41.2	91.2	30.8
Natural Moisture %	29.0	32.4	25.1	27.2	32.9	27.5

Aaron Hackett
Soils Engineer

Aaron Hackett
Soils Engineer

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REPORT ON SAMPLES OF Bridge No. 38 over the Tar River

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Project 38222.1.FR2 **County** Pitt **Owner** B. Smith
Date: Sampled 1/31/18 - 2/16/18 **Received** 2/21/18 **Reported** _____
Sampled from Bridge **By** B. Smith & B. Worley
Submitted by B. Smith 2008 Standard Specifications

Project 38222.1.FR2 **County** Pitt **Owner** B. Smith
Date: Sampled 1/31/18 - 2/16/18 **Received** 2/21/18 **Reported** _____
Sampled from Bridge **By** B. Smith & B. Worley
Submitted by B. Smith 2008 Standard Specifications

3/8/18

TEST RESULTS

Proj. Sample No.	SS-44	SS-46	SS-48	SS-50	SS-52	SS-56
Boring No.	B4-A	B4-A	B5-B	B5-B	B5-B	B7-B
Retained #4 Sieve	% 0	0	0	2	0	3
Passing #10 Sieve	% 99	91	97	93	99	89
Passing #40 Sieve	% 93	90	87	92	98	85
Passing #200 Sieve	% 41	64	40	69	65	39

3/8/18

TEST RESULTS

Proj. Sample No.	SS-59	SS-61	SS-69	SS-74	SS-76
Boring No.	B7-B	B7-B	EB2-A	EB2-A	EB2-A
Retained #4 Sieve	% 0	0	1	0	0
Passing #10 Sieve	% 100	99	95	97	94
Passing #40 Sieve	% 100	95	94	96	94
Passing #200 Sieve	% 15	55	78	37	46

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60	% 14.7	4.7	19.6	4.1	2.6	26.0
Fine Sand Ret - #270	% 54.9	34.5	51.3	25.3	48.5	38.1
Silt 0.05 - 0.005 mm	% 14.0	19.3	11.3	25.3	18.3	14.0
Clay < 0.005 mm	% 16.4	41.6	17.8	45.2	30.6	21.8
Passing #40 Sieve	% 93.6	98.6	89.5	99.4	98.9	96.1
Passing #200 Sieve	% 41.7	70.3	41.1	74.2	65.5	44.0

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60	% 77.1	14.7	5.0	9.5	14.0	
Fine Sand Ret - #270	% 8.9	56.5	15.7	68.2	54.4	
Silt 0.05 - 0.005 mm	% 1.8	10.9	30.7	0.0	15.8	
Clay < 0.005 mm	% 12.1	18.0	48.6	22.2	15.8	
Passing #40 Sieve	% 99.9	95.5	99.3	98.1	99.8	
Passing #200 Sieve	% 14.7	55.2	82.2	38.2	48.5	

L. L.	34	45	34	36	36	44
P. I.	7	27	9	13	14	23
AASHTO Classification	A-4	A-7-6	A-4	A-6	A-6	A-7-6
Group Index	0	15	1	8	7	4
pH	N/A	N/A	N/A	N/A	N/A	N/A
Station	27+90	27+90	28+63	28+63	28+63	30+23
OFFSET	8'LT	8'LT	8'RT	8'RT	8'RT	8'RT
ALIGNMENT	-L-	-L-	-L-	-L-	-L-	-L-
Depth (Ft)	69.3	104.3	10.3	25.3	50.3	9.2
to	70.8	105.8	11.8	26.8	51.8	10.7
Natural Moisture %	34.4	16.5	30.4	25.0	25.9	40.3

L. L.	27	27	25	42	32	
P. I.	0	5	0	23	12	
AASHTO Classification	A-2-4	A-4	A-4	A-7-6	A-6	
Group Index	0	1	0	3	2	
pH	N/A	N/A	N/A	N/A	N/A	
Station	30+23	30+23	30+81	30+81	30+81	
OFFSET	8'RT	8'RT	8'LT	8'LT	8'LT	
ALIGNMENT	-L-	-L-	-L-	-L-	-L-	
Depth (Ft)	37.3	57.3	24.1	59.1	89.1	
to	38.8	58.8	25.6	60.6	90.6	
Natural Moisture %	33.0	24.0	27.5	28.7	26.8	



Soils Engineer



Soils Engineer



March 7, 2018

Project No. R-2018-050-001

Mr. Brad Worley
Summit Design & Eng. Services
504 Meadowlands Dr.
Hillsborough, NC 27278

Brad.worley@summitde.net

Transmittal
Laboratory Test Results
17-0535.I40 B4786 Bridge 38

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

Michael P. Smith
Regional Manager

***We understand that you have a choice in your laboratory services
and we thank you for choosing Geotechnics.***

SPECIFIC GRAVITY

AASHTO T-100-15 / ASTM D 854-14

Client	Summit Design & Eng. Services	Boring No.	EB1-A (25+13, 7'LT)
Client Reference	17-0535.I40 B-4786 Bridge 38	Depth (ft)	24.3-26.3
Project No.	R-2018-050-001	Sample No.	ST-2
Lab ID	R-2018-050-001-001	Visual Description	Gray Clay (Minus No.4 sieve material, airdried)

Replicate Number	1	2
Pycnometer ID	R 544	R 545
Weight of Pycnometer + Soil + Water (gm)	710.55	725.3
Temperature, T (°Celsius)	21.8	21.8
Weight of Pycnometer + Water (gm)	664.02	661.78
Tare Number	544	545
Weight of Tare + Dry Soil (gm)	241.47	266.84
Weight of Tare (gm)	165.86	163.66
Weight of Dry Soil (gm)	75.61	103.18
Specific Gravity of Soil @ T	2.600	2.602
Specific Gravity of Water @ T	0.9978	0.9978
Conversion Factor for Temperature T	0.9996	0.9996
Specific Gravity @ 20° Celsius	2.601	2.602

Average Specific Gravity @ 20° Celsius	2.60
--	------

Tested By SFS Date 3/6/18 Checked By GEM Date 3/6/18

DCN: CT-S5 Date: 03/24/05 Revision: 10/2018 PROJECTS\SUMMIT D&E\2018-050 SUMMIT D&E - B-4786 BRIDGE 38\2018-050-001-001 Specific Gravity Soils RAL.xlsm]Sheet1

DCN: Data Transmittal Letter Date: 1/28/05 Rev.: 1

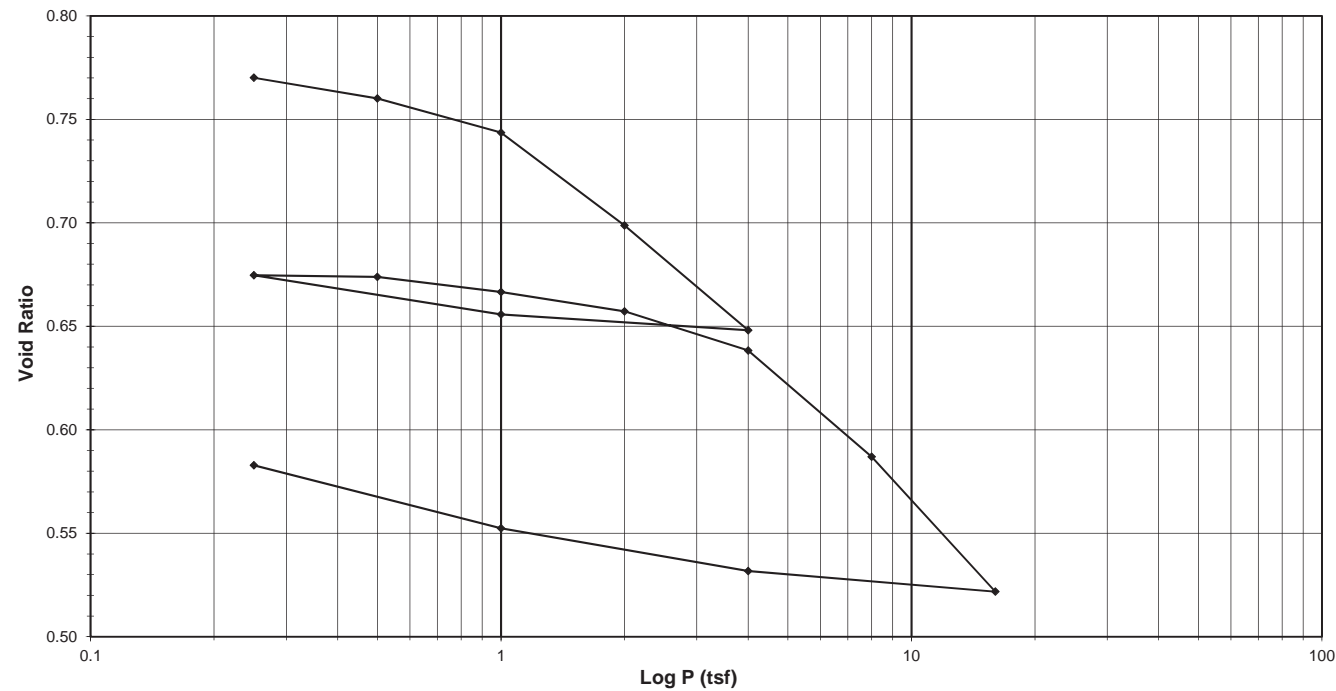


ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Reference 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By 129-04-0411 Date 2/27/18 Approved By MPS Date 3/6/18



ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Reference 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R470
 1 Division = 0.0001 (in.)

Sample Properties	Initial	Final
<i>Water Content</i>		
Tare Number	825	815
Wt. Tare & WS (g)	395.14	280.99
Wt. Tare & DS (g)	335.43	253.14
Wt. Water (g)	59.71	27.85
Wt. Tare (g)	136.83	136.07
Wt. DS (g)	198.60	117.07
Water Content (%)	30.07	23.79
<i>Sample Parameters</i>		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.0000	0.8831
Sample Volume (cc)	80.44	71.04
Wt. Wet Sample + Ring (g)	365.34	358.02
Wt. of Ring (g)	213.58	213.58
Wt. of Wet Sample (g)	151.76	144.44
Wet Density (pcf)	117.73	126.88
Wet Density (g/cc)	1.89	2.03
Water Content (%)	30.07	23.79
Wt. of Dry Sample (g)	116.68	116.68
Dry Density (pcf)	90.51	102.50
Dry Density (g/cc)	1.45	1.64
Void Ratio	0.7925	0.5829
Saturation (%)	98.64	106.11
Specific Gravity	2.60	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	1.45052	0.79246
0.25	135.6	10.9	124.7	25.083	79.437	1.46883	0.77011
0.5	202.6	21.9	180.8	24.941	78.986	1.47723	0.76006
1	306.9	34.2	272.7	24.707	78.246	1.49119	0.74357
2	576.2	53.1	523.1	24.071	76.232	1.53059	0.69869
4	880.2	74.5	805.7	23.354	73.959	1.57763	0.64805
1	802.2	39.6	762.6	23.463	74.306	1.57027	0.65577
0.25	676.6	19.4	657.2	23.731	75.153	1.55256	0.67466
0.5	687.2	25.4	661.8	23.719	75.116	1.55332	0.67383
1	738.3	36.0	702.3	23.616	74.790	1.56009	0.66657
2	808.6	54.4	754.2	23.484	74.373	1.56884	0.65727
4	934.3	74.5	859.9	23.216	73.523	1.58698	0.63833
8	1256.9	110.2	1146.7	22.487	71.216	1.63839	0.58692
16	1664.3	154.4	1509.9	21.565	68.294	1.70849	0.52181
4	1543.6	89.3	1454.4	21.706	68.741	1.69738	0.53177
1	1387.5	48.1	1339.4	21.998	69.665	1.67486	0.55237
0.25	1191.0	21.9	1169.1	22.430	71.035	1.64256	0.58290

Tested By 129-04-0411 Date 2/27/18 Input Checked By GEM Date 3/6/18



ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Reference 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

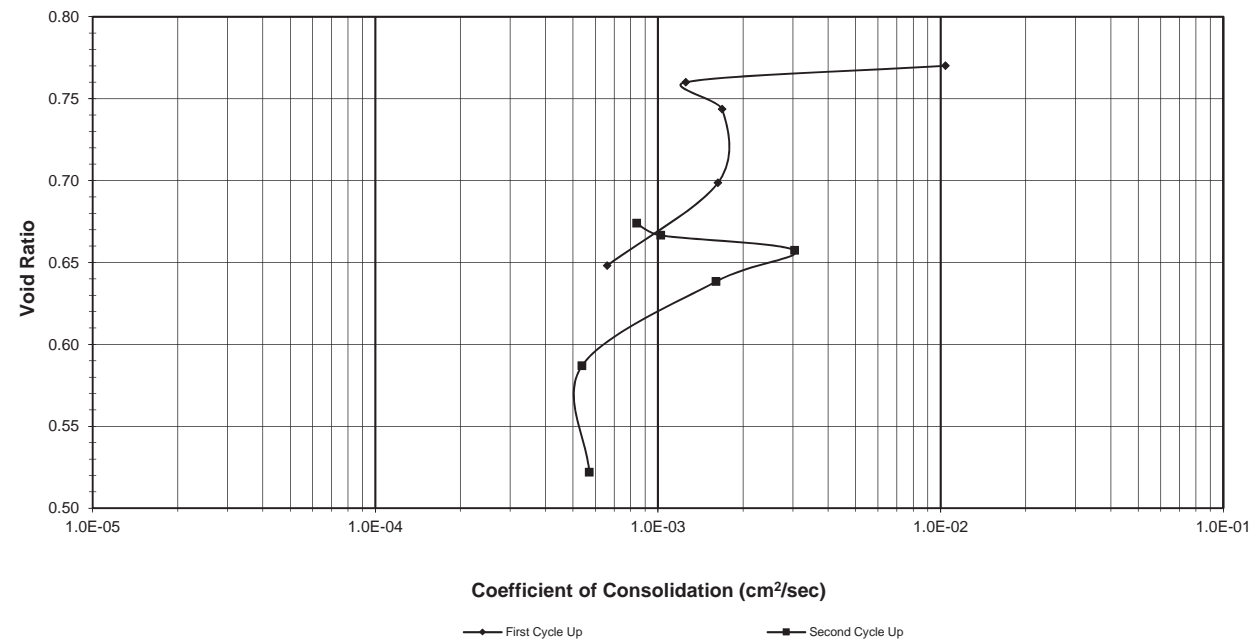
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Reference 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R470
 1 Division = 0.0001 (in.)



Sample Properties	Initial	Final	C _v Test Data Summary				Time t ₅₀ (min.)	C _v (cm ² /sec)
			Load Increment (tsf)	Dial Reading @ t ₅₀ (div)	Machine Deflection (div)	Corrected Dial Reading @ t ₅₀ (div)		
Water Content								
Tare Number	825	815						
Wt. Tare & WS (g)	395.14	280.99						
Wt. Tare & DS (g)	335.43	253.14						
Wt. Water (g)	59.71	27.85	0 - 0.25	103.1	10.9	92.2	2.517	0.50 0.01040
Wt. Tare (g)	136.83	136.07	0.25 - 0.5	170.6	21.9	148.7	2.502	4.10 0.00125
Wt. DS (g)	198.60	117.07	0.5 - 1.0	260.6	34.2	226.4	2.482	3.00 0.00169
Water Content (%)	30.07	23.79	1.0 - 2.0	443.4	53.1	390.3	2.441	3.00 0.00163
			2.0 - 4.0	728.4	74.5	653.9	2.374	7.00 0.00066
			4.0 - 1.0	NA	39.6	NA	NA	NA NA
Sample Parameters			1.0 - 0.25	NA	19.4	NA	NA	NA NA
Sample Diameter (in)	2.5	2.5	0.25 - 0.5	683.1	25.4	657.7	2.373	5.50 0.00084
Sample Height (in)	1.000	0.883	0.5 - 1.0	714.3	36.0	678.3	2.368	4.50 0.00102
Sample Volume (cc)	80.44	71.04	1.0 - 2.0	772.0	54.4	717.6	2.358	1.50 0.00304
Wt. Wet Sample + Ring (g)	365.34	358.02	2.0 - 4.0	865.3	74.5	790.8	2.339	2.80 0.00160
Wt. of Ring (g)	213.58	213.58	4.0 - 8.0	1092.8	110.2	982.6	2.290	8.00 0.00054
Wt. of Wet Sample (g)	151.76	144.44	8.0 - 16.0	1464.7	154.4	1310.3	2.207	7.00 0.00057
Wet Density (pcf)	117.73	126.88	16.0 - 4.0	NA	89.3	NA	NA	NA NA
Wet Density (g/cc)	1.89	2.03	4.0 - 1.0	NA	48.1	NA	NA	NA NA
Water Content (%)	30.07	23.79	1.0 - 0.25	NA	21.9	NA	NA	NA NA
Wt. of Dry Sample (g)	116.68	116.68						
Dry Density (pcf)	90.51	102.50						
Dry Density (g/cc)	1.45	1.64						
Void Ratio	0.7925	0.5829						
Saturation (%)	98.64	106.11						
Specific Gravity	2.6	Measured						

Tested By 129-04-0411 Date 2/27/18 Input Checked By GEM Date 3/6/18

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

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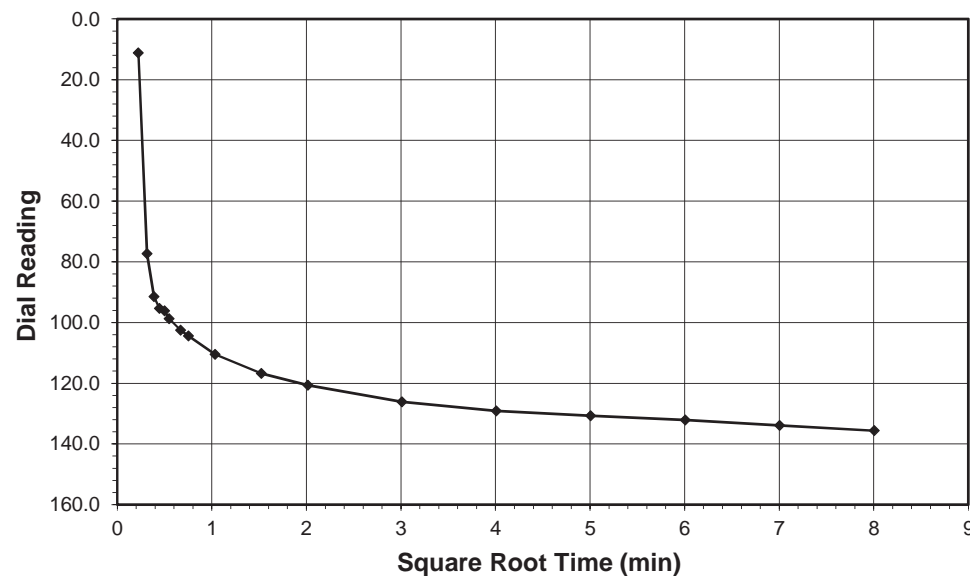
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Project 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

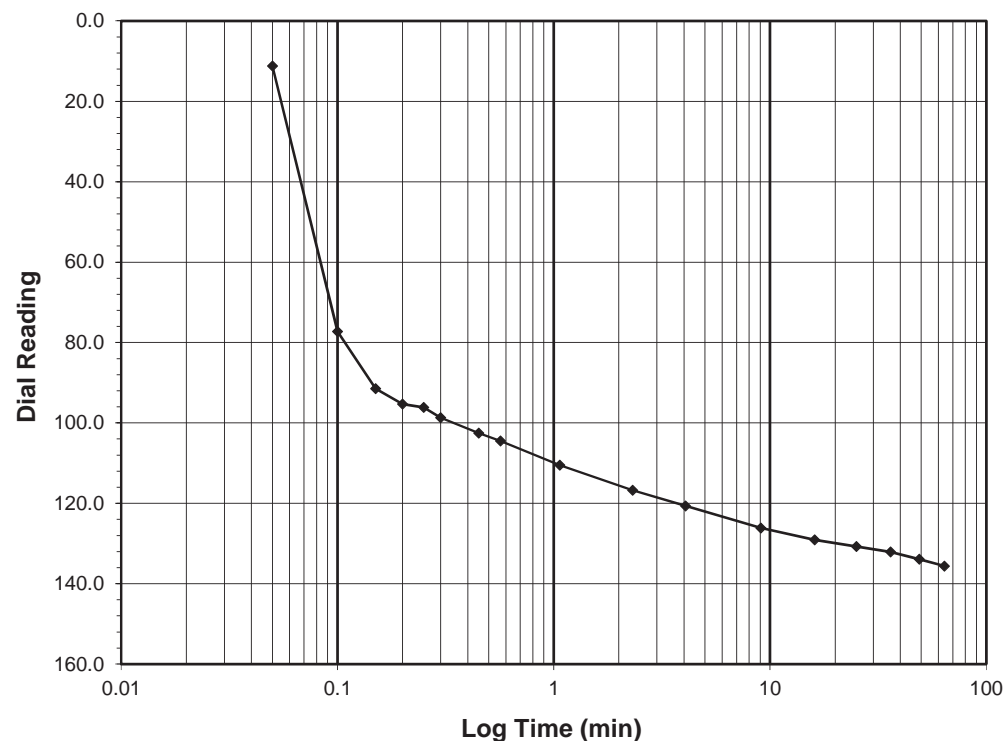
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.0-0.25
Final Reading (div) 135.6
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 2/27/18
 Start Time 15:07:56

Elapsed Time (min)	Dial Reading (div)
Initial	0.0
0.05	11.2
0.10	77.3
0.15	91.5
0.20	95.3
0.25	96.2
0.30	98.7
0.45	102.5
0.57	104.5
1.07	110.5
2.32	116.8
4.07	120.6
9.07	126.2
16.07	129.1
25.07	130.7
36.07	132.1
49.07	133.9
64.07	135.6



Tested By 129-04-0411 Date 2/27/18 Checked By GEM Date 3/6/18

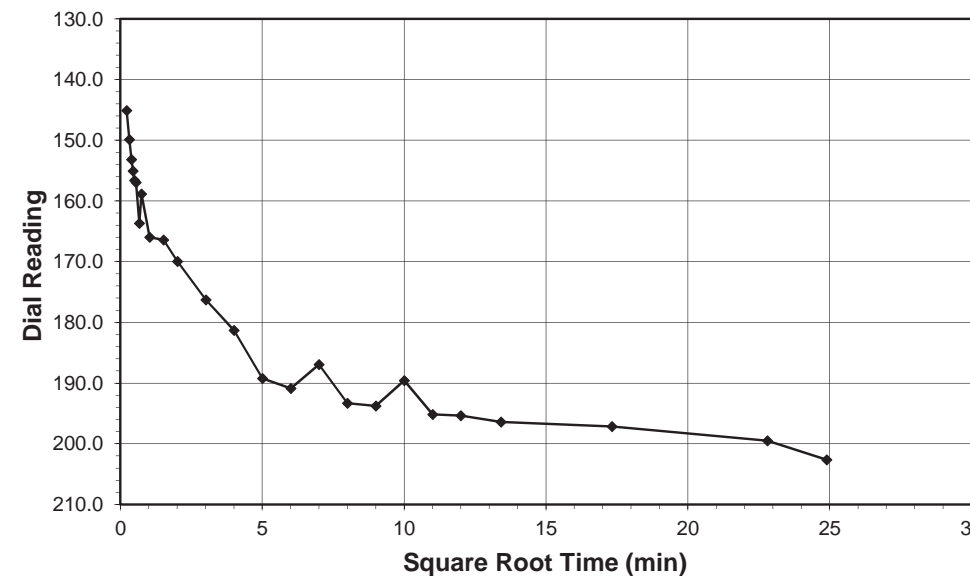
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Project 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

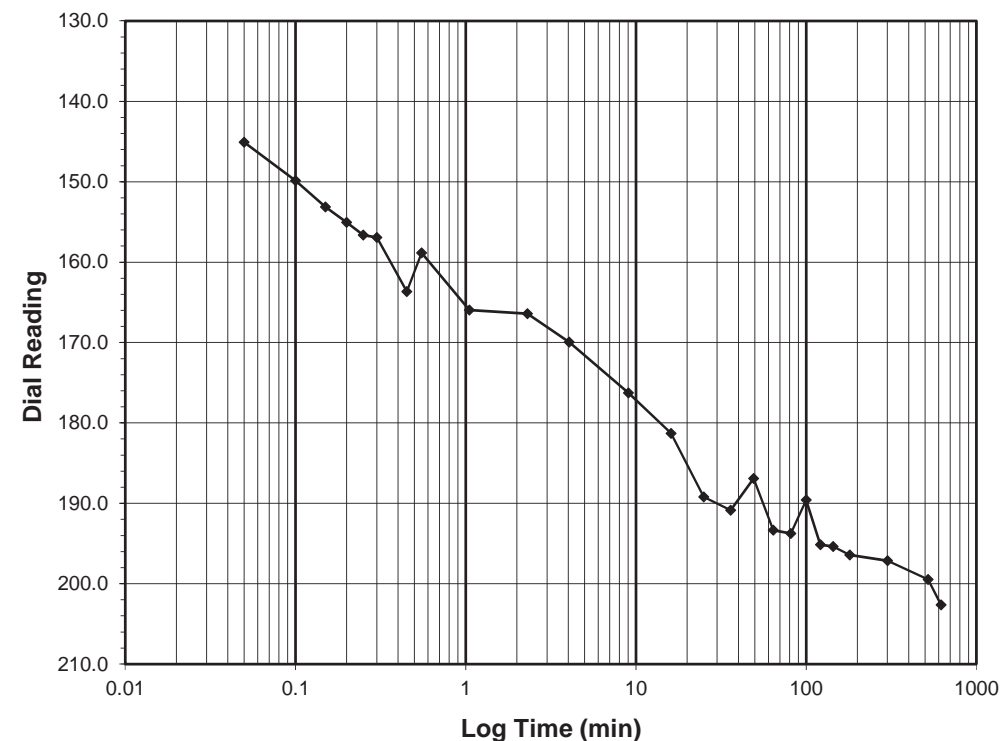
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.25-0.5
Final Reading (div) 202.6
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 2/27/18
 Start Time 23:48:23

Elapsed Time (min)	Dial Reading (div)
Initial	135.6
0.05	145.1
0.10	149.9
0.15	153.1
0.20	155.1
0.25	156.6
0.30	156.9
0.45	163.7
0.55	158.9
1.05	166.0
2.30	166.4
4.05	169.9
9.05	176.3
16.05	181.3
25.05	189.2
36.05	190.9
49.05	186.9
64.05	193.3
81.07	193.7
100.07	189.6
121.07	195.1
144.07	195.4
180.07	196.4
300.07	197.2
520.07	199.5
619.85	202.6



Tested By 129-04-0411 Date 2/27/18 Checked By GEM Date 3/6/18

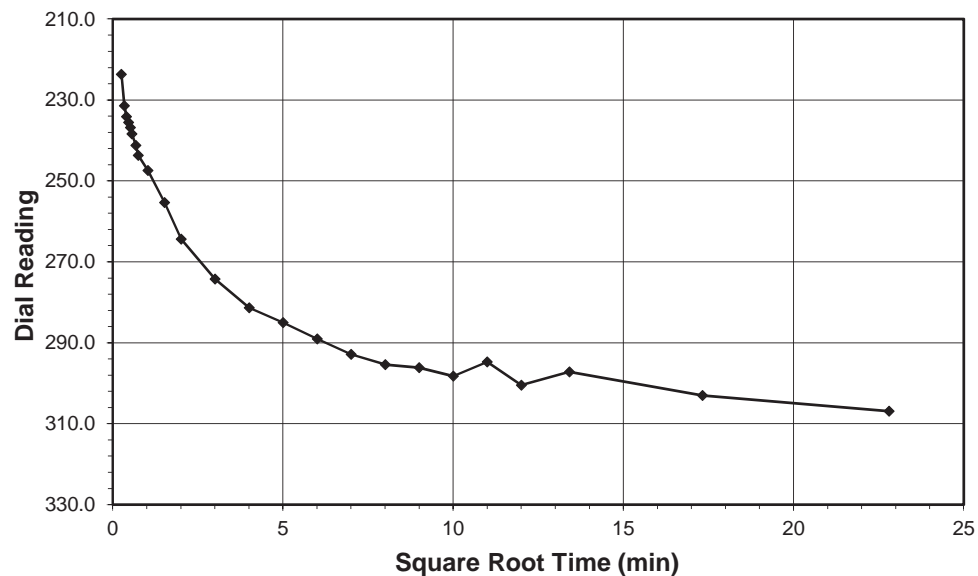
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



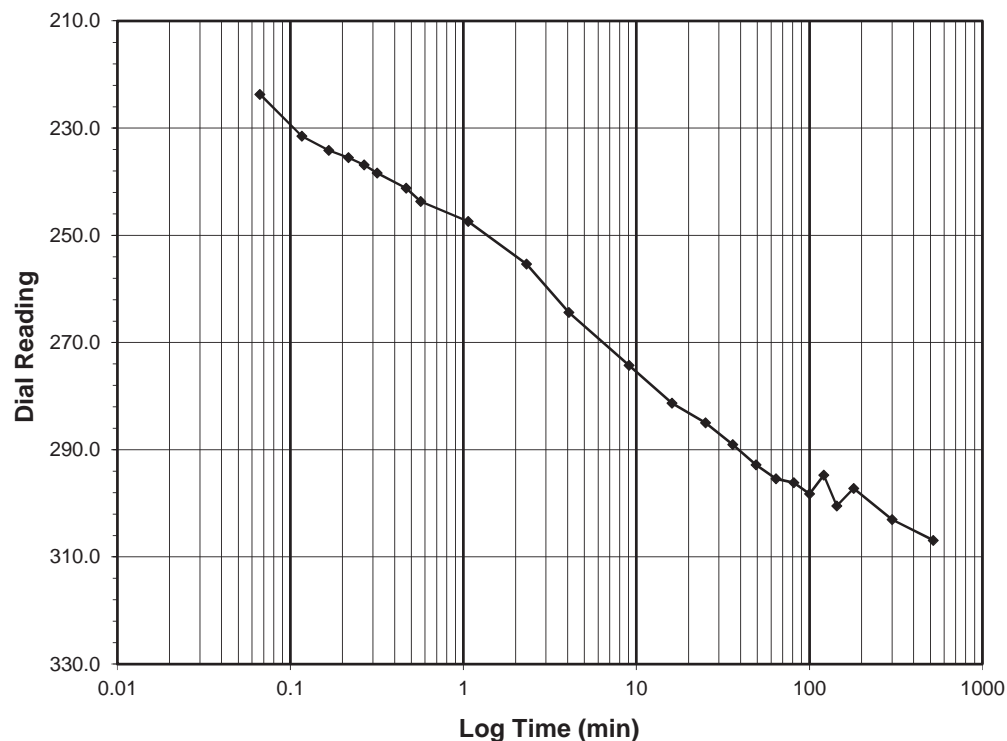
Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Project 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.5-1.0
Final Reading (div) 306.9
 Consolidometer No. **R470**
 1 Division (in) 0.0001
 Start Date 2/28/18
 Start Time 10:08:15

Elapsed Time (min)	Dial Reading (div)
Initial	202.6
0.07	223.7
0.12	231.5
0.17	234.2
0.22	235.5
0.27	236.8
0.32	238.4
0.47	241.2
0.57	243.7
1.07	247.4
2.32	255.4
4.07	264.4
9.07	274.3
16.07	281.3
25.07	285.0
36.07	289.0
49.07	292.8
64.08	295.4
81.08	296.2
100.08	298.2
121.08	294.7
144.08	300.5
180.08	297.2
300.08	303.0
520.08	306.9



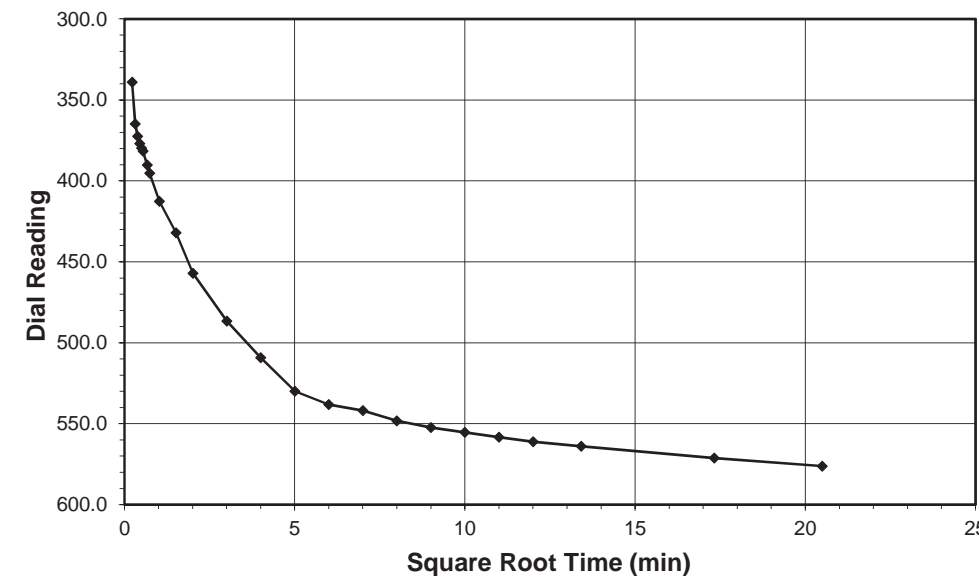
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11



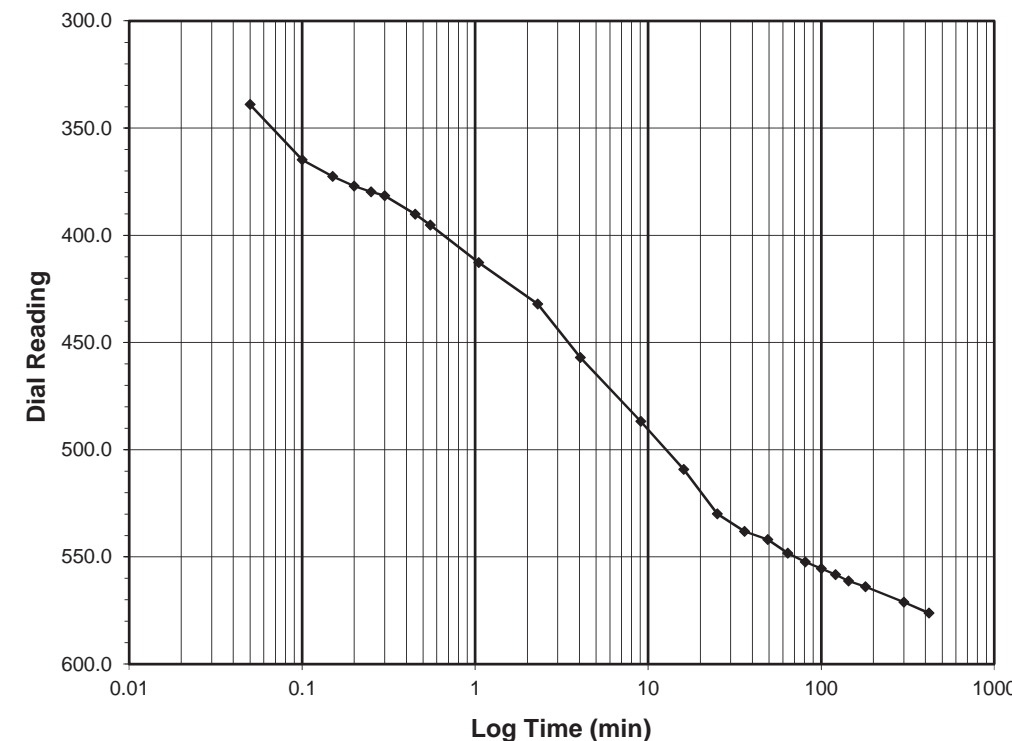
Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Project 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-2.0
Final Reading (div) 576.2
 Consolidometer No. **R470**
 1 Division (in) 0.0001
 Start Date 2/28/18
 Start Time 18:48:42

Elapsed Time (min)	Dial Reading (div)
Initial	306.9
0.05	339.0
0.10	364.8
0.15	372.5
0.20	377.0
0.25	379.7
0.30	381.6
0.45	390.2
0.55	395.2
1.05	412.7
2.30	432.1
4.05	457.0
9.05	486.7
16.05	509.2
25.05	529.9
36.05	538.1
49.05	542.0
64.05	548.2
81.05	552.4
100.05	555.4
121.05	558.3
144.05	561.2
180.05	563.9
300.07	571.1
420.28	576.2



Tested By 129-04-0411 Date 2/28/18 Checked By GEM Date 3/6/18

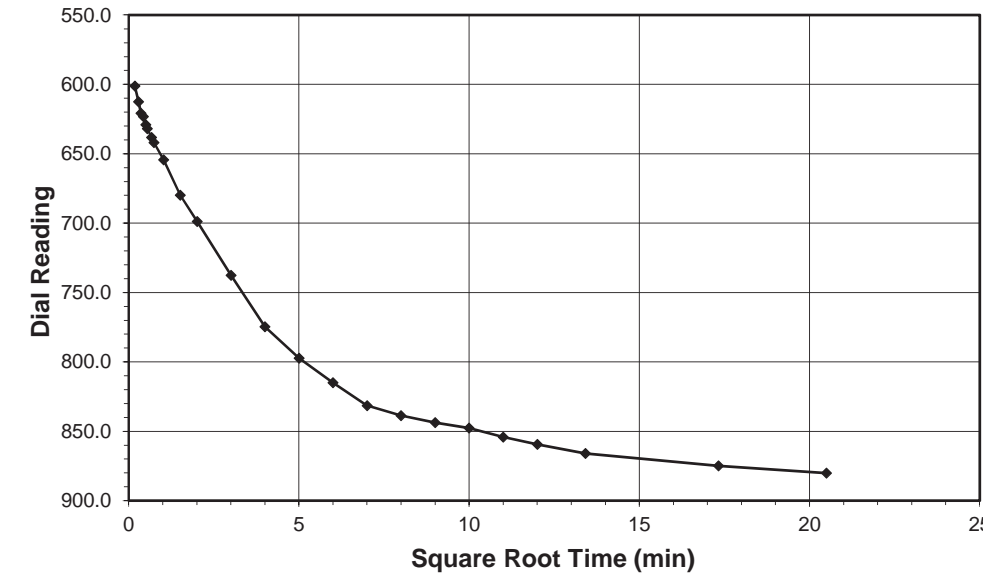
Tested By 129-04-0411 Date 2/28/18 Checked By GEM Date 3/6/18

ONE DIMENSIONAL CONSOLIDATION
ASTM D 2435-11



Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Project 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

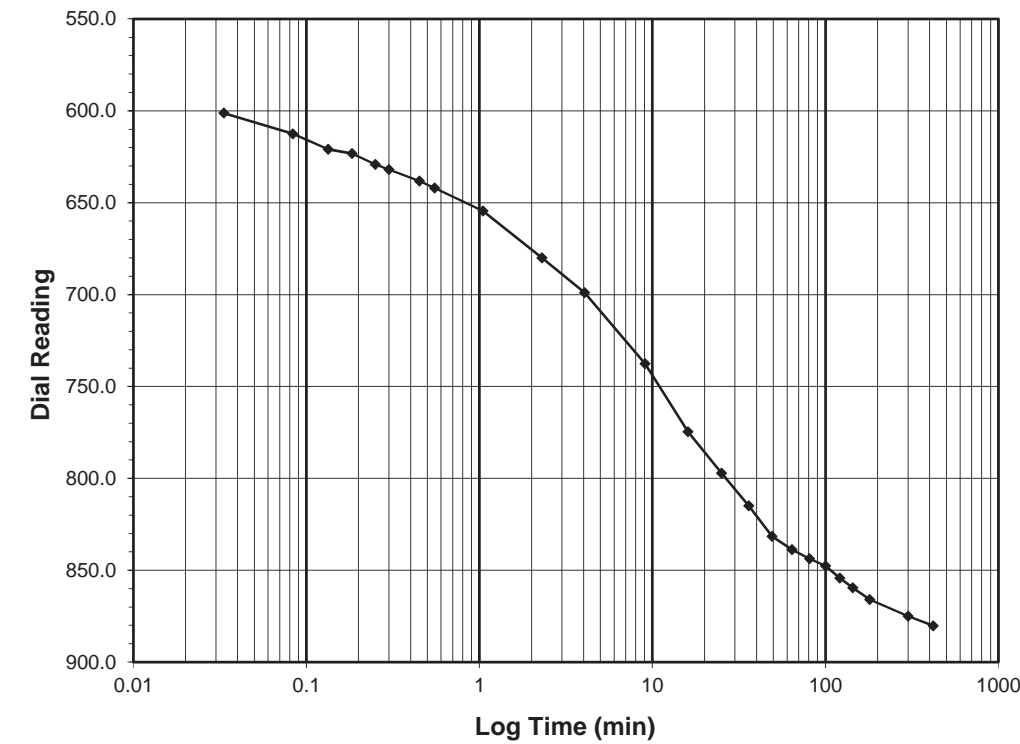
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 2.0-4.0
Final Reading (div) 880.2
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 3/1/18
 Start Time 1:48:59

Elapsed Time (min)	Dial Reading (div)
Initial	576.2
0.03	601.2
0.08	612.5
0.13	620.9
0.18	623.3
0.25	629.1
0.30	631.9
0.45	638.2
0.55	641.9
1.05	654.4
2.30	680.0
4.05	698.9
9.05	737.6
16.05	774.7
25.05	797.2
36.05	815.0
49.05	831.6
64.05	838.8
81.05	843.7
100.05	847.7
121.07	854.2
144.07	859.5
180.07	865.9
300.07	874.9
420.32	880.2

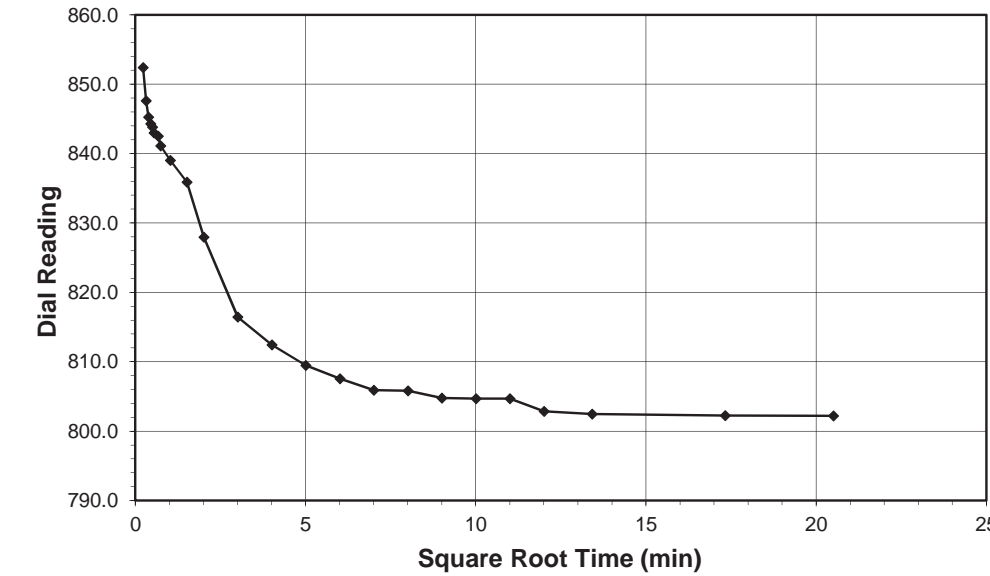


ONE DIMENSIONAL CONSOLIDATION
ASTM D 2435-11



Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Project 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

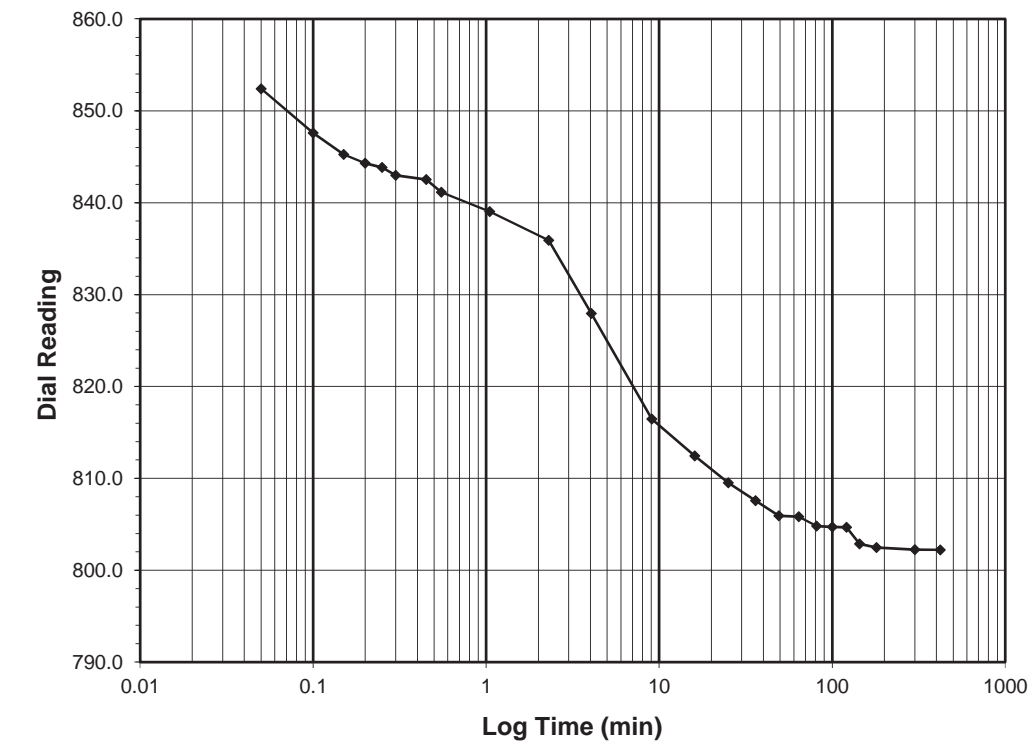
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 4.0-1.0
Final Reading (div) 802.2
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 3/1/18
 Start Time 8:49:19

Elapsed Time (min)	Dial Reading (div)
Initial	880.2
0.05	852.4
0.10	847.6
0.15	845.3
0.20	844.3
0.25	843.8
0.30	843.0
0.45	842.5
0.55	841.1
1.05	839.0
2.30	835.9
4.05	827.9
9.07	816.4
16.07	812.4
25.07	809.5
36.07	807.6
49.07	805.9
64.07	805.8
81.07	804.8
100.07	804.7
121.07	804.7
144.07	802.9
180.07	802.5
300.07	802.2
420.40	802.2



Tested By 129-04-0411 Date 3/1/18 Checked By GEM Date 3/6/18

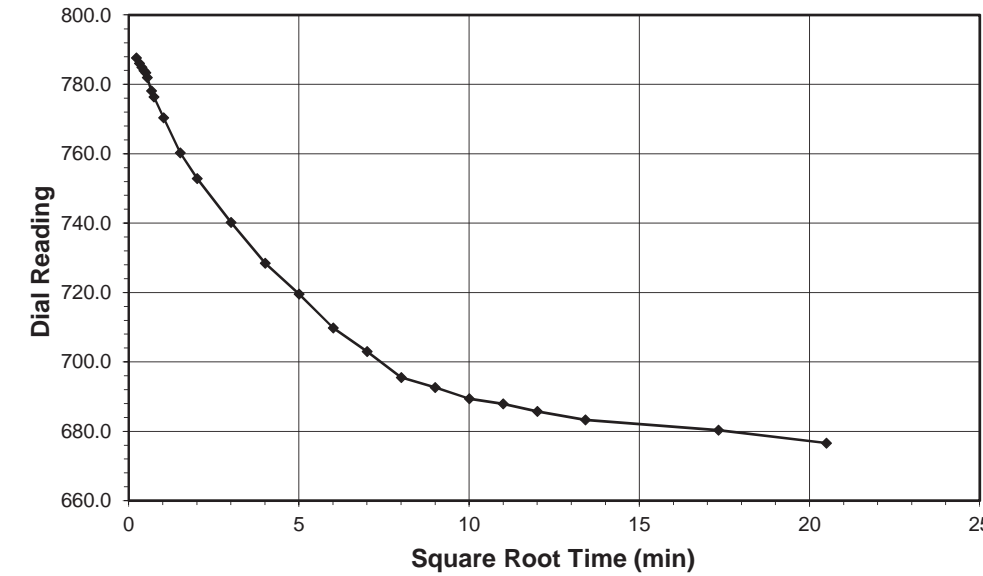
Tested By 129-04-0411 Date 3/1/18 Checked By GEM Date 3/6/18

ONE DIMENSIONAL CONSOLIDATION
ASTM D 2435-11



Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Project 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

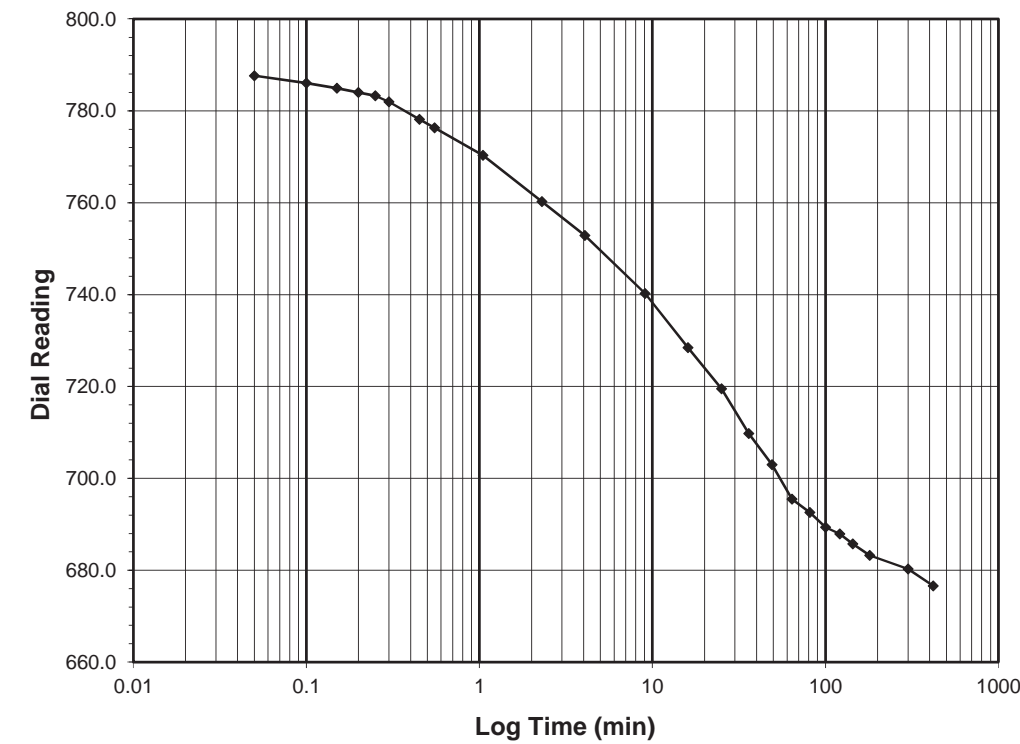
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-0.25
Final Reading (div) 676.6
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 3/1/18
 Start Time 15:49:43

Elapsed Time (min)	Dial Reading (div)
Initial	802.2
0.05	787.6
0.10	786.0
0.15	784.9
0.20	784.0
0.25	783.3
0.30	781.9
0.45	778.1
0.55	776.3
1.05	770.3
2.30	760.2
4.07	752.8
9.07	740.2
16.07	728.4
25.07	719.5
36.07	709.8
49.07	703.0
64.07	695.5
81.07	692.6
100.07	689.4
121.07	687.9
144.07	685.7
180.07	683.2
300.07	680.3
420.23	676.6

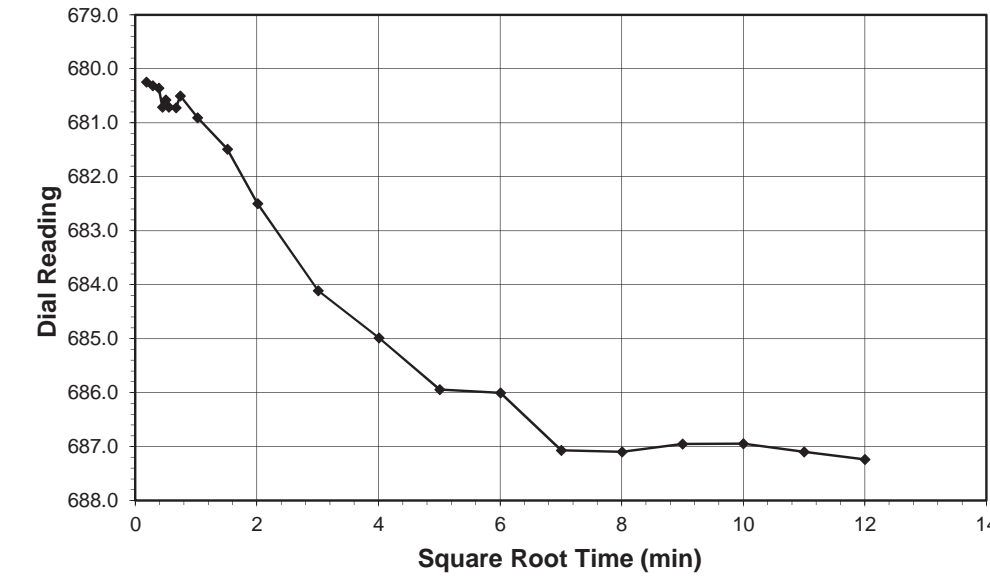


ONE DIMENSIONAL CONSOLIDATION
ASTM D 2435-11



Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Project 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

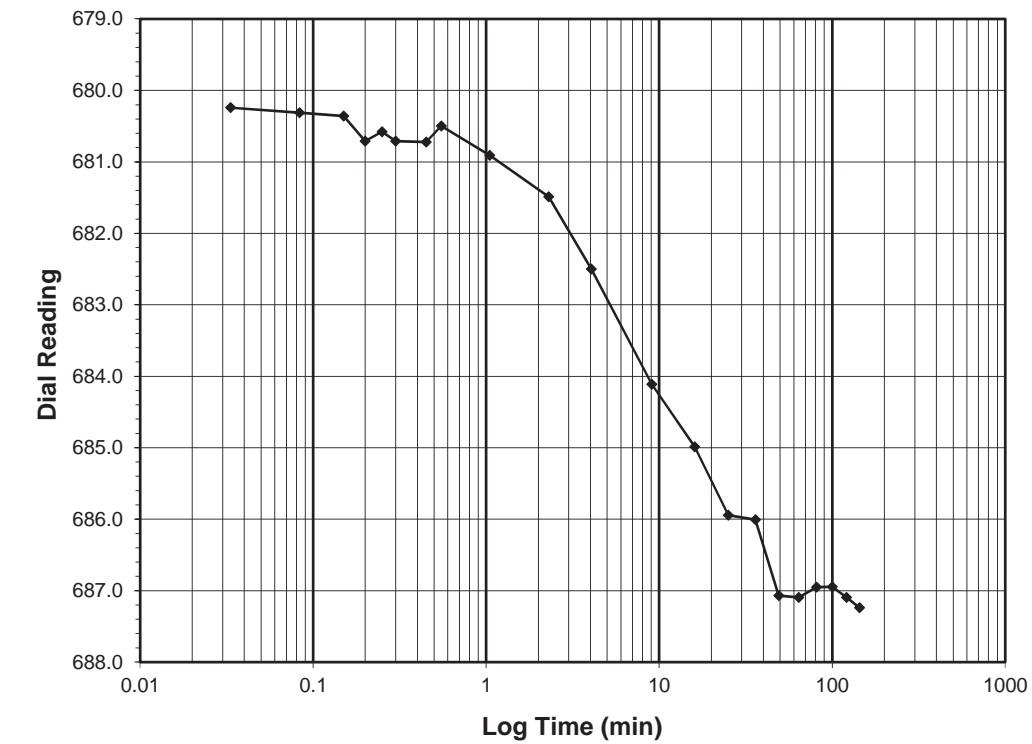
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.25-0.5
Final Reading (div) 687.2
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 3/1/18
 Start Time 22:49:57

Elapsed Time (min)	Dial Reading (div)
Initial	676.6
0.03	680.2
0.08	680.3
0.15	680.4
0.20	680.7
0.25	680.6
0.30	680.7
0.45	680.7
0.55	680.5
1.05	680.9
2.30	681.5
4.05	682.5
9.05	684.1
16.05	685.0
25.05	685.9
36.07	686.0
49.07	687.1
64.07	687.1
81.07	687.0
100.07	686.9
121.07	687.1
144.07	687.2



Tested By 129-04-0411 Date 3/1/18 Checked By GEM Date 3/6/18

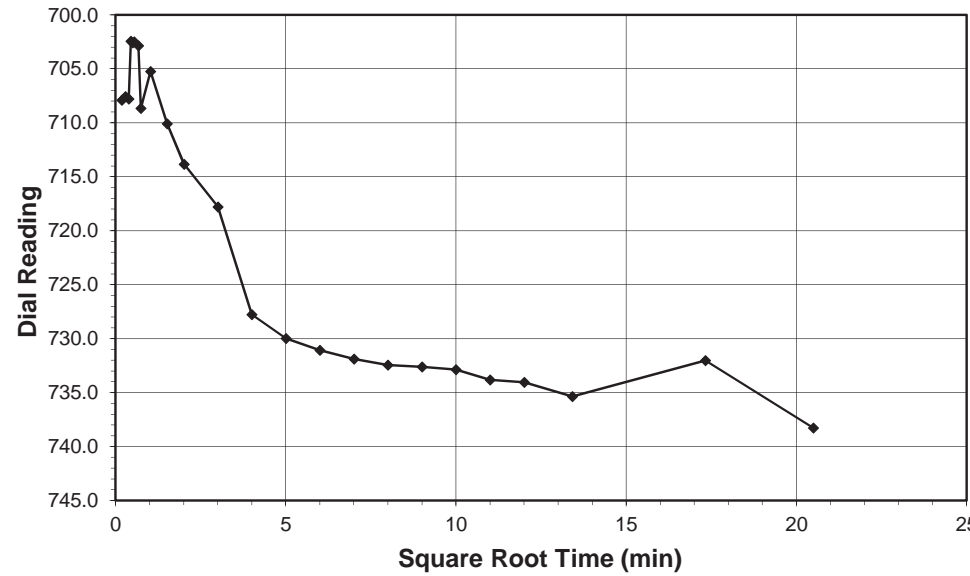
Tested By 129-04-0411 Date 3/1/18 Checked By GEM Date 3/6/18

ONE DIMENSIONAL CONSOLIDATION
ASTM D 2435-11



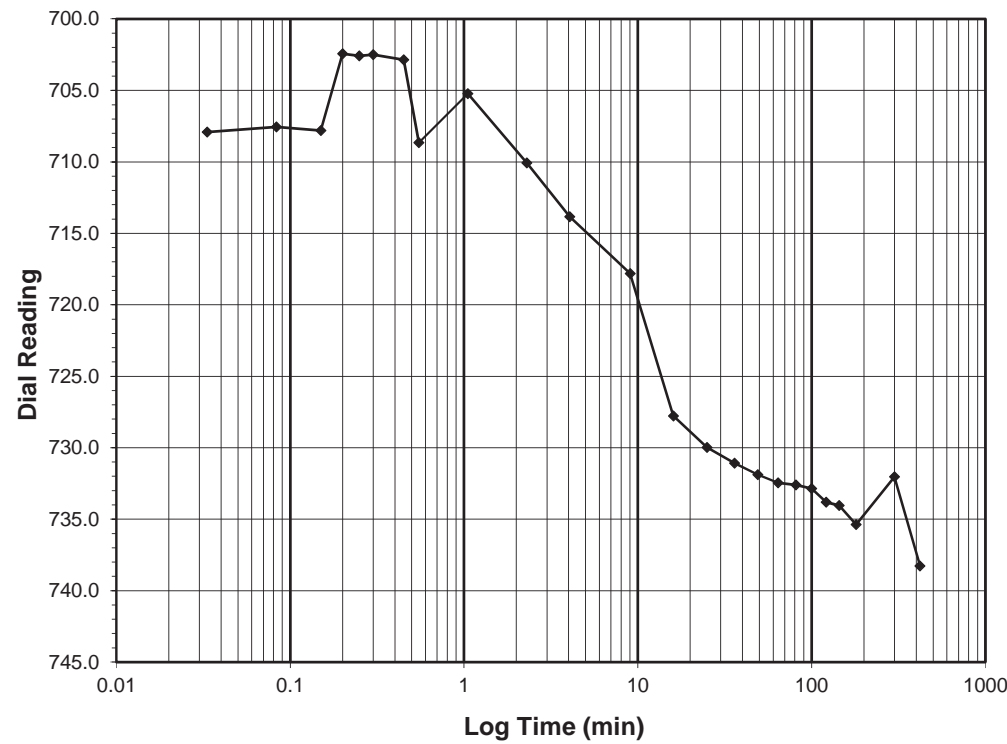
Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Project 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.5-1.0
Final Reading (div) 738.3
 Consolidometer No. **R470**
 1 Division (in) 0.0001
 Start Date 3/2/18
 Start Time 5:50:15

Elapsed Time (min)	Dial Reading (div)
Initial	687.2
0.03	707.9
0.08	707.6
0.15	707.8
0.20	702.4
0.25	702.6
0.30	702.5
0.45	702.9
0.55	708.7
1.05	705.2
2.30	710.1
4.05	713.8
9.05	717.8
16.05	727.8
25.05	730.0
36.05	731.1
49.05	731.9
64.05	732.4
81.05	732.6
100.05	732.9
121.05	733.8
144.05	734.0
180.05	735.4
300.05	732.0
420.15	738.3



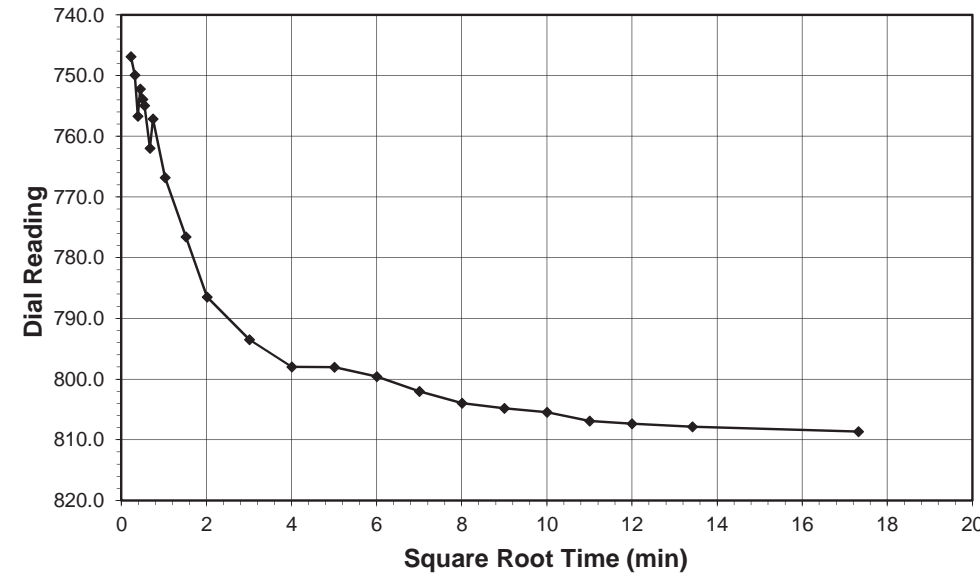
Tested By 129-04-0411 Date 3/2/18 Checked By GEM Date 3/6/18

ONE DIMENSIONAL CONSOLIDATION
ASTM D 2435-11



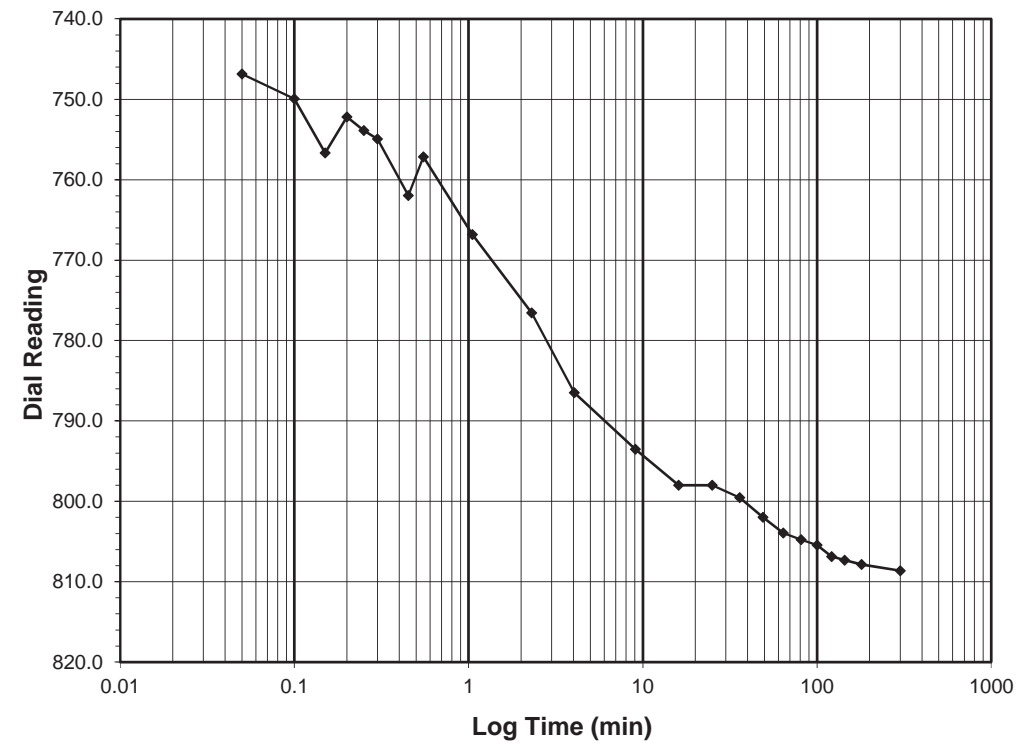
Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Project 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-2.0
Final Reading (div) 808.6
 Consolidometer No. **R470**
 1 Division (in) 0.0001
 Start Date 3/2/18
 Start Time 12:50:25

Elapsed Time (min)	Dial Reading (div)
Initial	738.3
0.05	746.9
0.10	749.9
0.15	756.7
0.20	752.2
0.25	753.9
0.30	754.9
0.45	762.0
0.55	757.1
1.05	766.8
2.30	776.6
4.05	786.5
9.05	793.5
16.05	798.0
25.05	798.0
36.05	799.6
49.05	802.0
64.07	803.9
81.07	804.8
100.07	805.4
121.07	806.9
144.07	807.3
180.07	807.9
300.07	808.6



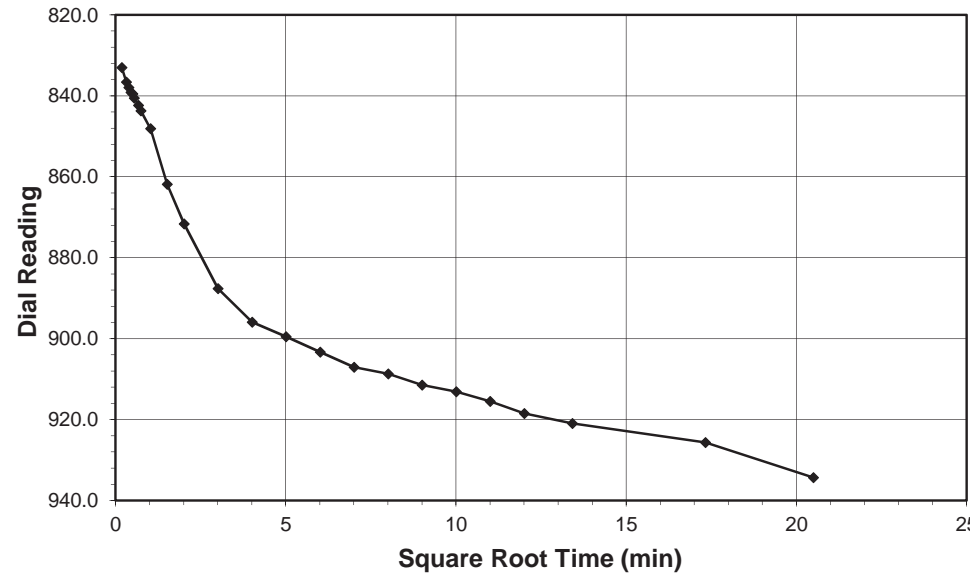
Tested By 129-04-0411 Date 3/2/18 Checked By GEM Date 3/6/18

ONE DIMENSIONAL CONSOLIDATION
ASTM D 2435-11



Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Project 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

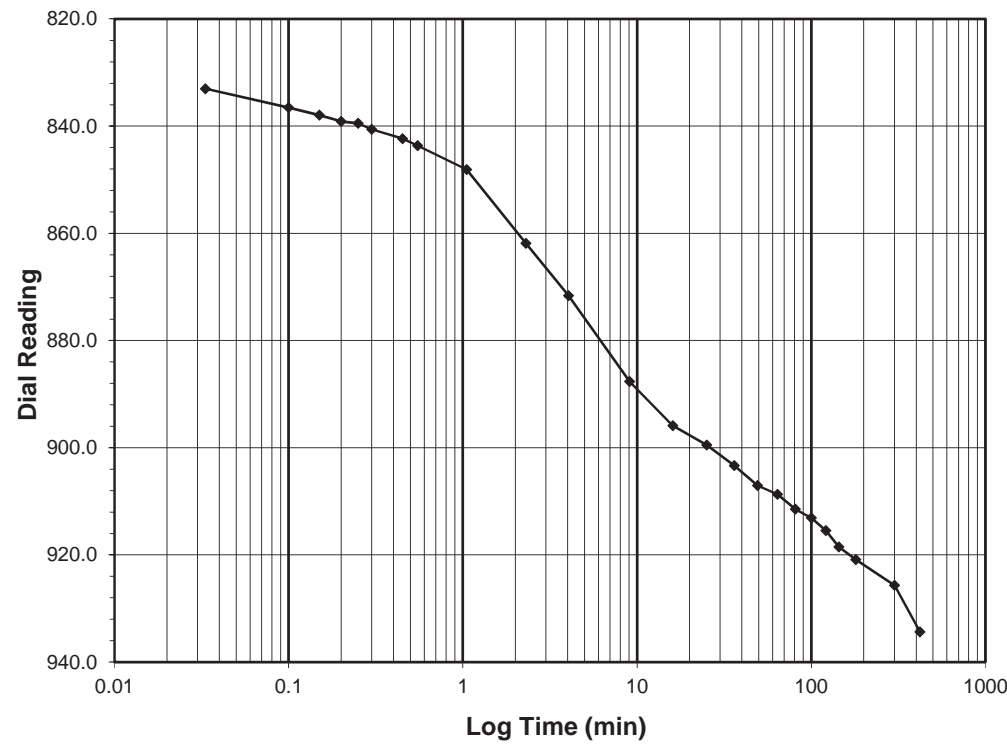
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 2.0-4.0
Final Reading (div) 934.3
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 3/2/18
 Start Time 19:50:47

Elapsed Time (min)	Dial Reading (div)
Initial	808.6
0.03	833.0
0.10	836.6
0.15	838.0
0.20	839.1
0.25	839.5
0.30	840.6
0.45	842.3
0.55	843.7
1.05	848.1
2.30	861.9
4.05	871.6
9.07	887.6
16.07	895.9
25.07	899.5
36.07	903.3
49.07	907.1
64.07	908.7
81.07	911.5
100.07	913.1
121.07	915.5
144.07	918.5
180.07	920.9
300.07	925.7
420.22	934.3

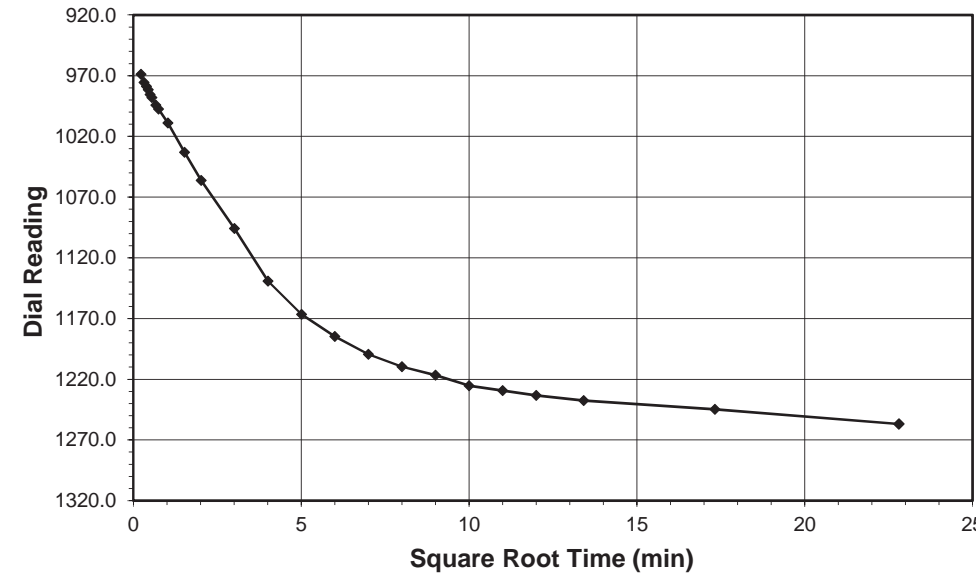


ONE DIMENSIONAL CONSOLIDATION
ASTM D 2435-11



Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Project 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

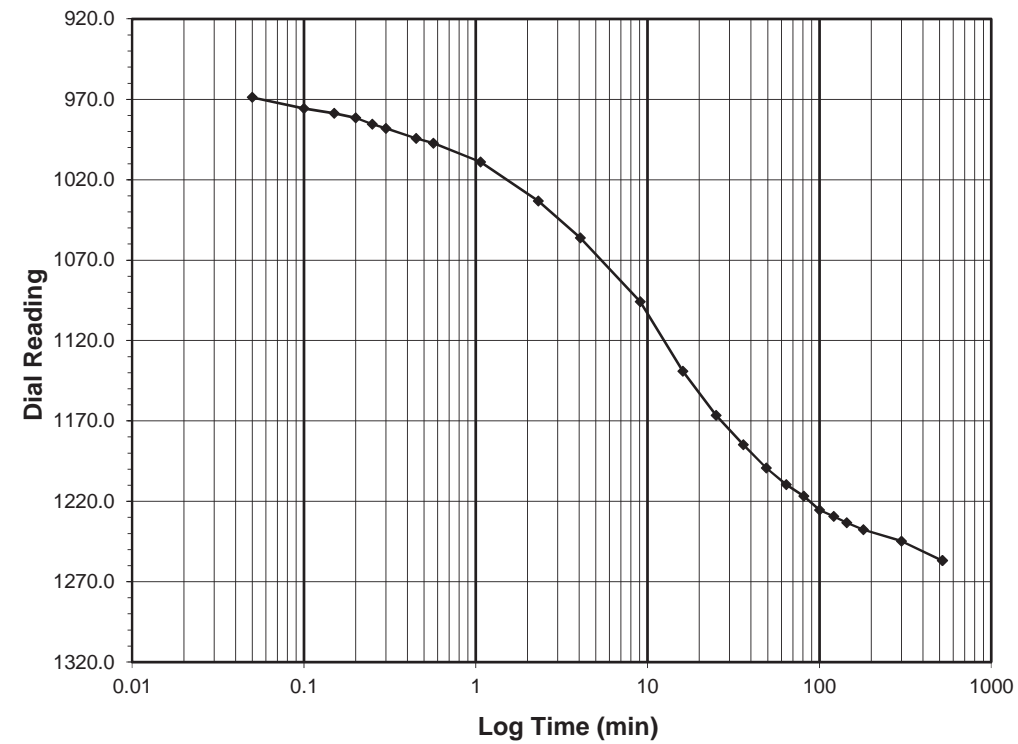
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 4.0-8.0
Final Reading (div) 1256.9
 Consolidometer No. **R470**
 1 Division (in) 0.0001

Start Date 3/3/18
 Start Time 2:51:01

Elapsed Time (min)	Dial Reading (div)
Initial	934.3
0.05	968.7
0.10	975.6
0.15	978.7
0.20	981.5
0.25	985.5
0.30	988.1
0.45	994.2
0.57	997.4
1.07	1008.9
2.32	1033.2
4.07	1056.2
9.07	1095.9
16.07	1139.2
25.07	1166.5
36.07	1184.8
49.07	1199.3
64.07	1209.6
81.07	1216.7
100.07	1225.4
121.07	1229.4
144.07	1233.3
180.07	1237.6
300.07	1244.9
520.07	1256.9
520.38	1256.8



Tested By 129-04-0411 Date 3/2/18 Checked By GEM Date 3/6/18

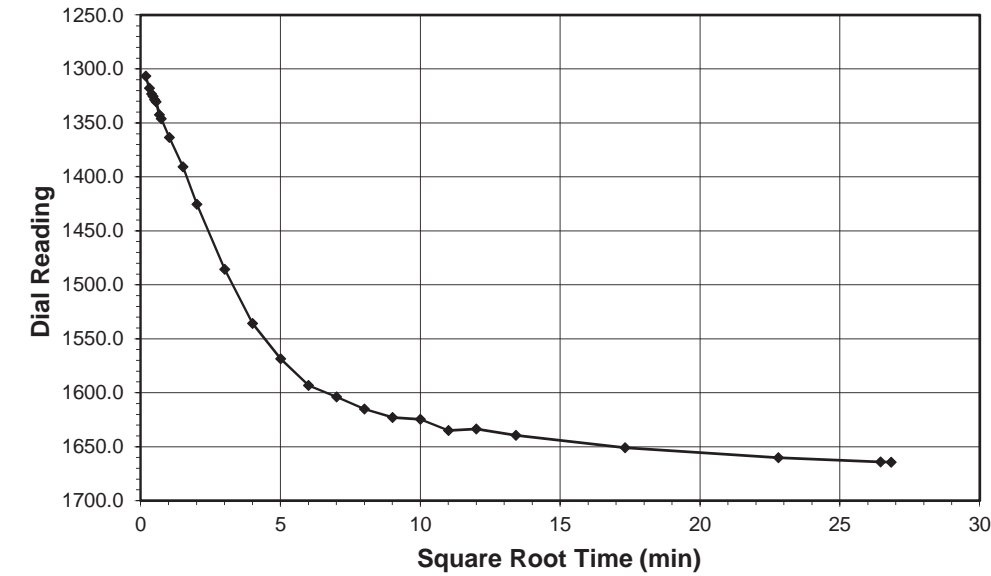
Tested By 129-04-0411 Date 3/3/18 Checked By GEM Date 3/6/18

ONE DIMENSIONAL CONSOLIDATION
ASTM D 2435-11



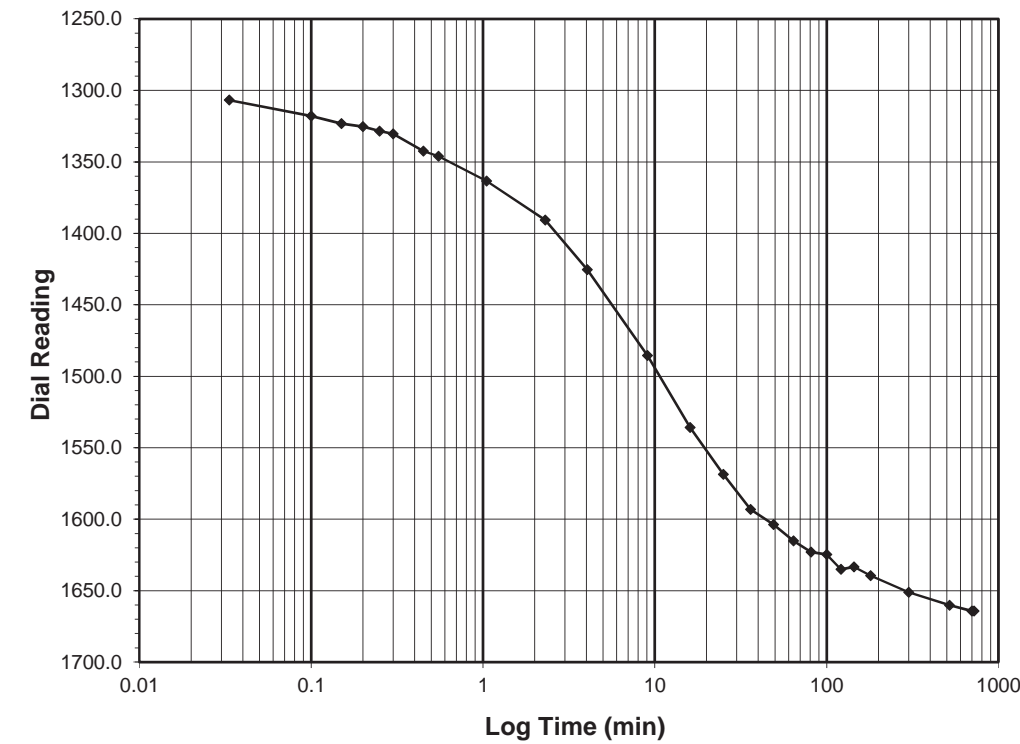
Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Project 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 8.0-16.0
Final Reading (div) 1664.3
 Consolidometer No. **R470**
 1 Division (in) 0.0001
 Start Date 3/3/18
 Start Time 11:31:24

Elapsed Time (min)	Dial Reading (div)
Initial	1256.9
0.03	1306.8
0.10	1317.9
0.15	1323.2
0.20	1325.3
0.25	1328.5
0.30	1330.4
0.45	1342.5
0.55	1346.0
1.05	1363.4
2.30	1390.7
4.05	1425.5
9.05	1485.6
16.05	1535.8
25.05	1568.7
36.05	1593.2
49.05	1603.8
64.07	1615.2
81.07	1623.0
100.07	1624.7
121.07	1635.1
144.07	1633.5
180.07	1639.5
300.07	1651.1
520.07	1660.2
700.07	1664.2
720.15	1664.3

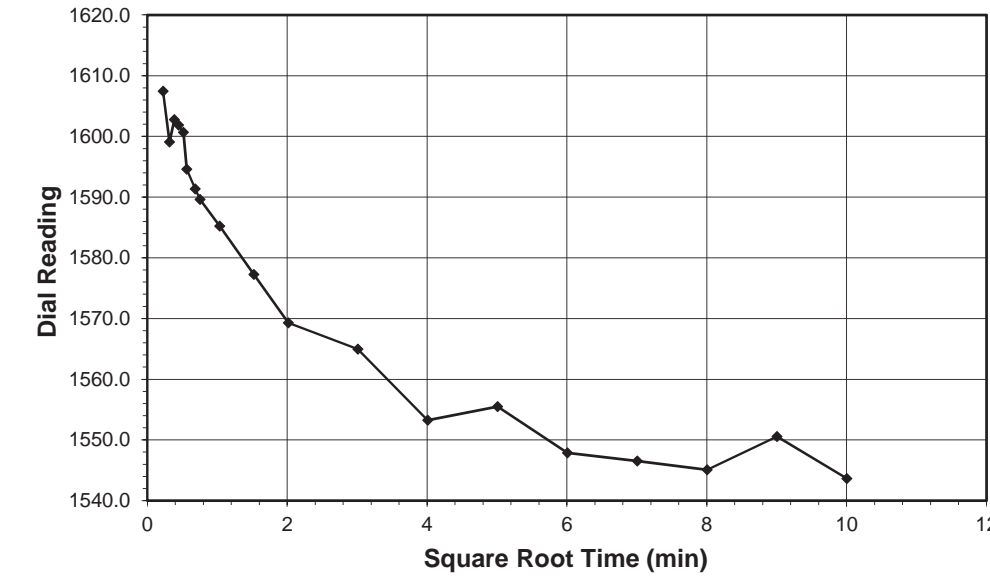


ONE DIMENSIONAL CONSOLIDATION
ASTM D 2435-11



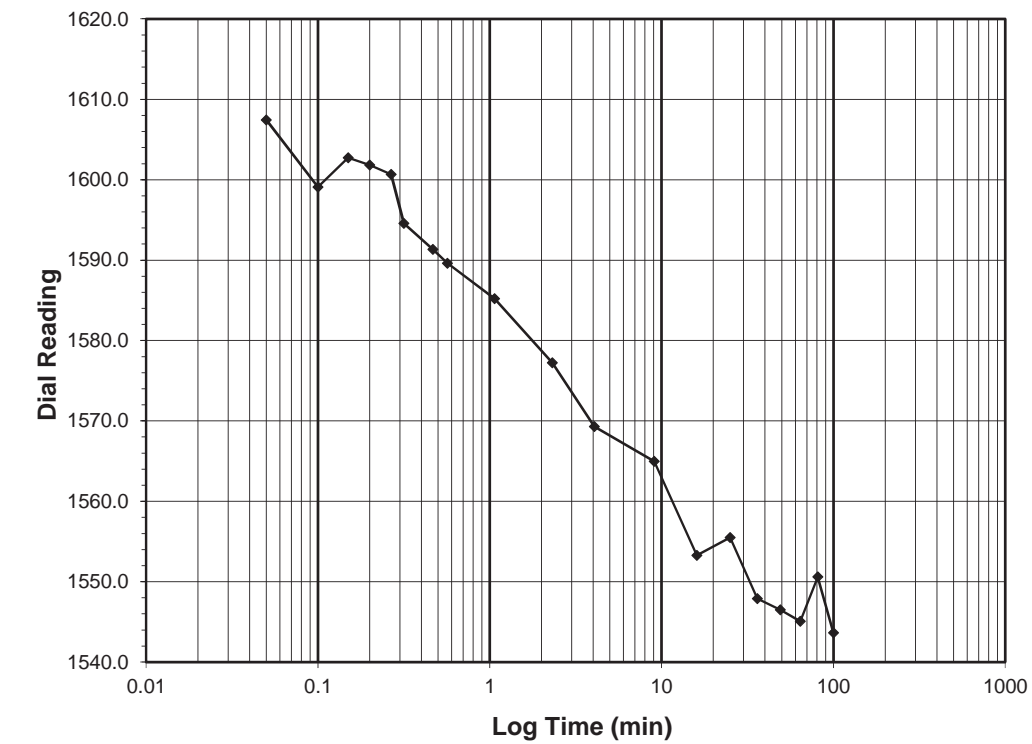
Client Summit Design & Eng. Services Boring No. EB1-A (25+13, 7'LT)
 Client Project 17-0535.140 B-4786 Bridge 38 Depth (ft) 24.3-26.3
 Project No. R-2018-050-001 Sample No. ST-2
 Lab ID R-2018-050-001-001 Visual Description GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 16.0-4.0
Final Reading (div) 1543.6
 Consolidometer No. **R470**
 1 Division (in) 0.0001
 Start Date 3/3/18
 Start Time 23:31:34

Elapsed Time (min)	Dial Reading (div)
Initial	1664.3
0.05	1607.5
0.10	1599.1
0.15	1602.7
0.20	1601.8
0.27	1600.7
0.32	1594.6
0.47	1591.4
0.57	1589.6
1.07	1585.2
2.32	1577.2
4.07	1569.3
9.07	1565.0
16.07	1553.3
25.08	1555.5
36.08	1547.9
49.08	1546.5
64.08	1545.1
81.08	1550.6
100.08	1543.6



Tested By 129-04-0411 Date 3/3/18 Checked By GEM Date 3/6/18

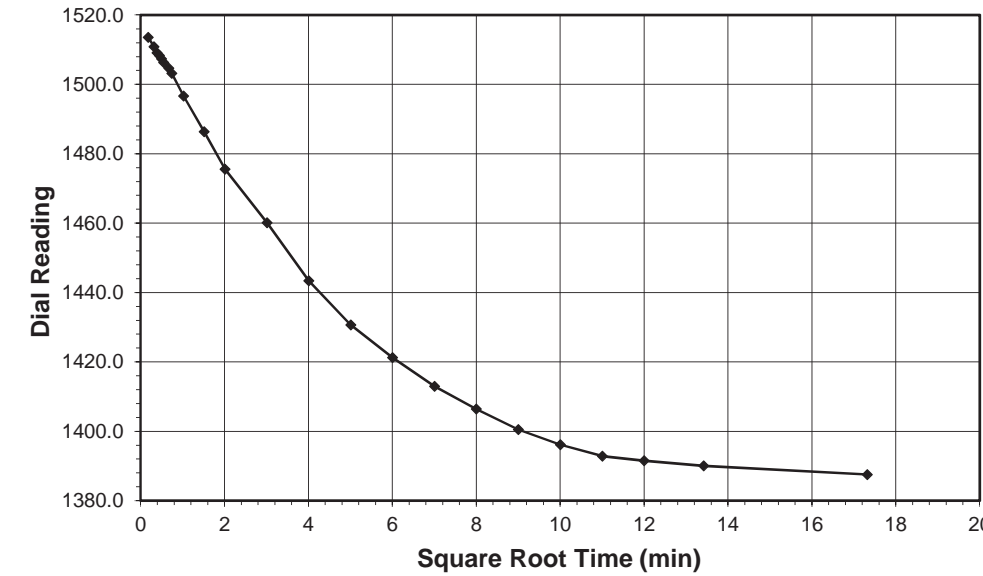
Tested By 129-04-0411 Date 3/3/18 Checked By GEM Date 3/6/18

ONE DIMENSIONAL CONSOLIDATION
ASTM D 2435-11



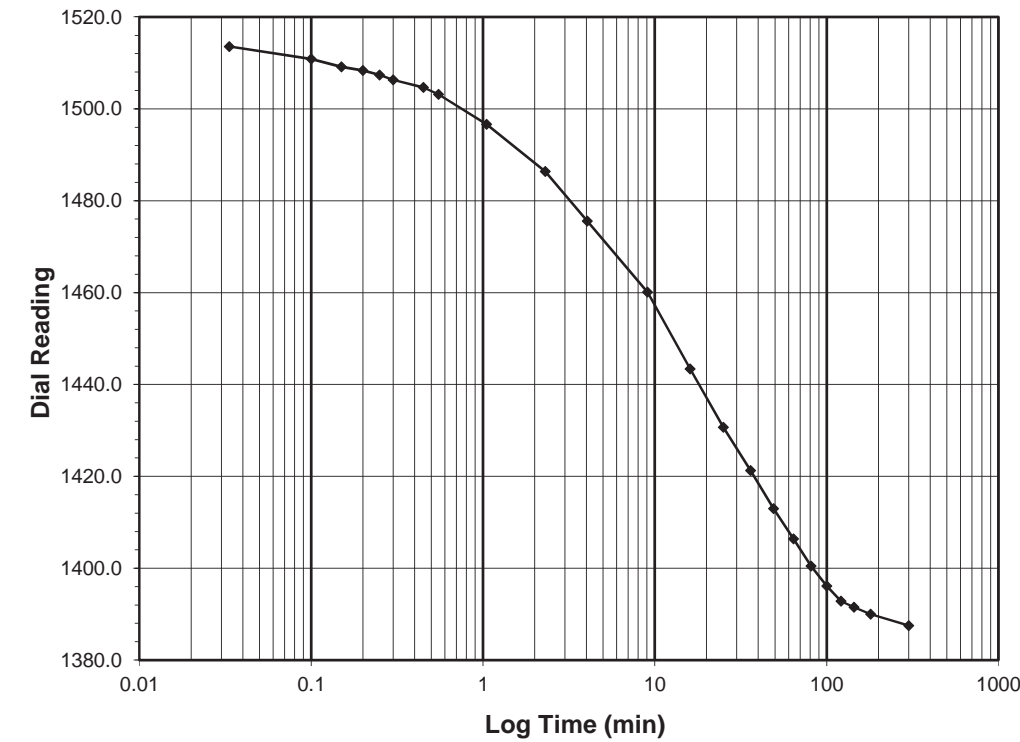
Client: Summit Design & Eng. Services
 Client Project: 17-0535.140 B-4786 Bridge 38
 Project No.: R-2018-050-001
 Lab ID: R-2018-050-001-001
 Boring No.: EB1-A (25+13, 7'LT)
 Depth (ft): 24.3-26.3
 Sample No.: ST-2
 Visual Description: GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf): 4.0-1.0
Final Reading (div): 1387.5
 Consolidometer No.: R470
 1 Division (in): 0.0001
 Start Date: 3/4/18
 Start Time: 6:31:59

Elapsed Time (min)	Dial Reading (div)
Initial	1543.6
0.03	1513.6
0.10	1510.8
0.15	1509.1
0.20	1508.3
0.25	1507.4
0.30	1506.3
0.45	1504.7
0.55	1503.1
1.05	1496.6
2.30	1486.4
4.05	1475.5
9.07	1460.1
16.07	1443.3
25.07	1430.7
36.07	1421.3
49.07	1412.9
64.07	1406.4
81.07	1400.5
100.07	1396.1
121.07	1392.8
144.07	1391.5
180.07	1390.0
300.07	1387.5

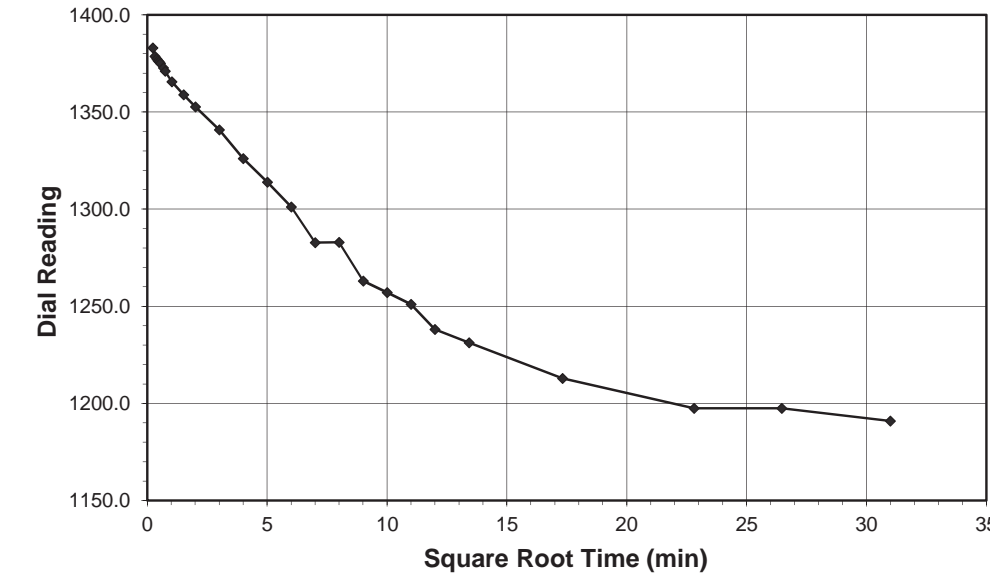


ONE DIMENSIONAL CONSOLIDATION
ASTM D 2435-11



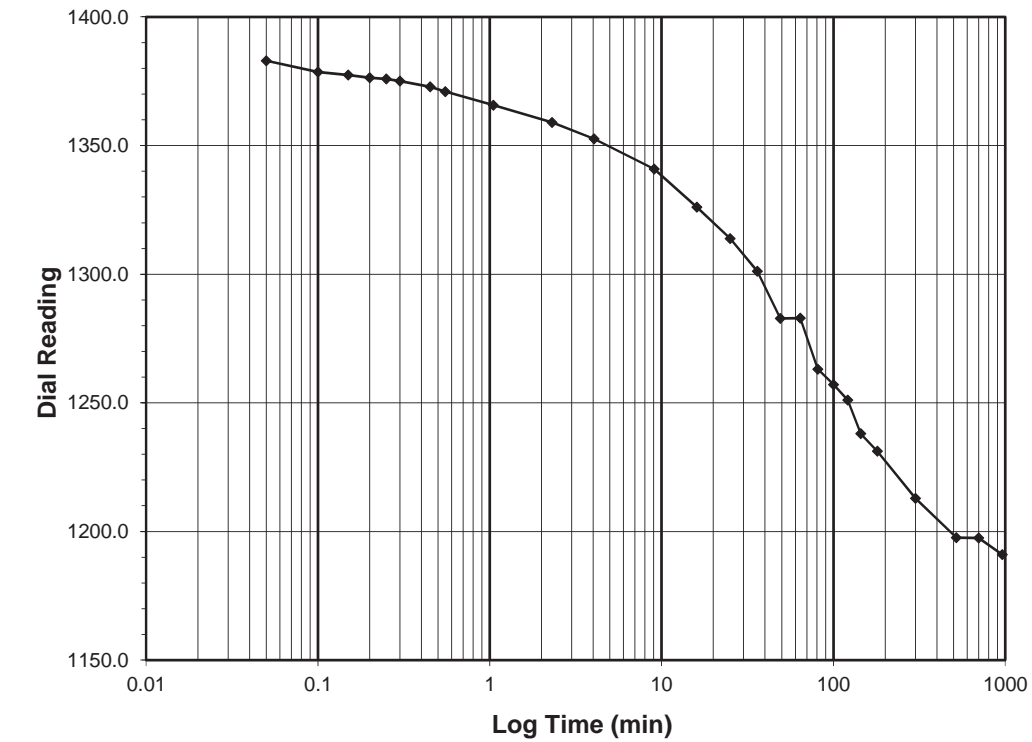
Client: Summit Design & Eng. Services
 Client Project: 17-0535.140 B-4786 Bridge 38
 Project No.: R-2018-050-001
 Lab ID: R-2018-050-001-001
 Boring No.: EB1-A (25+13, 7'LT)
 Depth (ft): 24.3-26.3
 Sample No.: ST-2
 Visual Description: GRAY CLAY

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf): 1.0-0.25
Final Reading (div): 1191.0
 Consolidometer No.: R470
 1 Division (in): 0.0001
 Start Date: 3/4/18
 Start Time: 13:32:11

Elapsed Time (min)	Dial Reading (div)
Initial	1387.5
0.05	1383.0
0.10	1378.6
0.15	1377.5
0.20	1376.4
0.25	1375.9
0.30	1375.1
0.45	1372.8
0.55	1371.0
1.05	1365.6
2.30	1358.9
4.05	1352.6
9.05	1340.8
16.05	1326.0
25.05	1313.9
36.05	1301.1
49.05	1282.8
64.05	1282.9
81.05	1263.1
100.05	1257.1
121.05	1251.1
144.05	1238.1
180.05	1231.2
300.07	1212.8
520.07	1197.6
700.07	1197.5
960.07	1191.0



Tested By 129-04-0411 Date 3/4/18 Checked By GEM Date 3/6/18

Tested By 129-04-0411 Date 3/4/18 Checked By GEM Date 3/6/18



SHELBY TUBE UNIT WEIGHT

D 7263-09

Client	Summit Design & Eng. Services	Boring No.	EB1-A (25+13, 7'LT)
Client Reference	17-0535.140 B-4786 Bridge 38	Depth Pushed(ft)	26.3-28.3
Project No.	R-2018-050-001	Shelby Tube No.	ST-3
Lab ID	R-2018-050-001-002	Recovery(ft)	2.3

MOISTURE CONTENT

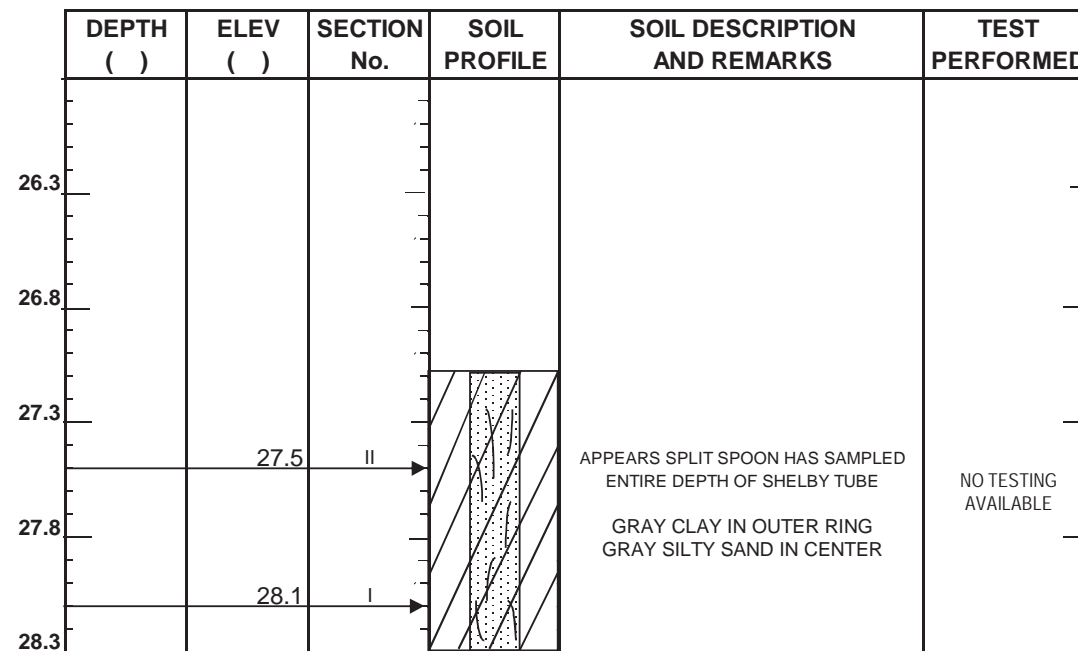
Section Number	1	2	3	4	5
Tare Number					
Wt. Tare & WS(gm.)					
Wt. Tare & DS(gm.)					
Wt. Tare(gm.)					
Moisture Content(%)					

UNIT WEIGHT

Wt. Tube & WS.(gms.)
 Wt. Of Tube(gms.)
 Wt. Of WS.(gms.)
 Length 1 (in.)
 Length 2 (in.)
 Length 3 (in.)
 Top Diameter (in.)
 Middle Diameter (in.)
 Bottom Diameter (in.)
 Sample Volume (cc)
 Moisture Content(%)
 Unit Wet Wt.(gms/cc)
 Unit Wet Wt.(pcf.)
 Unit Dry Wt.(gms/cc)
 Unit Dry Wt.(pcf.)



SOIL PROFILE AND SAMPLING



Note: When full recovery is not achieved, the elevation can not be accurately defined.
 Indicate each cut of the tube with an arrow.
 Indicate dividing line between soil types with a solid line.
 Indicate wax by cross-hatching. Indicate soil types by standard symbols.

Tested By SFS Date 2/27/18 Checked By GEM Date 2/27/18

SITE PHOTOGRAPHS

Bridge No. 38 on -L- (US 13) over the Tar River



Looking Southwest towards End Bent 1



Looking Northeast towards End Bent 2



Looking Northeast towards End Bent 2