

REFERENCE: BR-0004

PROJECT: 67004

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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

Table with columns: STATE (N.C.), STATE PROJECT REFERENCE NO. (BR-0004), SHEET NO. (1), TOTAL SHEETS

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Table with columns: LINE, STATION, PLAN, PROFILE, CROSS SECTION, BORING LOG

APPENDICES

Table with columns: A, LAB RESULTS, 19-35

ROADWAY SUBSURFACE INVESTIGATION

COUNTY BEAUFORT & HYDE PROJECT DESCRIPTION BRIDGE NO. 66 ON US 264 OVER PUNGO RIVER

INVENTORY

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...

- NOTES: 1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION... 2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS...

PERSONNEL

- C. SWAFFORD K. TACKETT MID-ATLANTIC DRILLING, INC.

INVESTIGATED BY HDR DRAWN BY S. KABRA CHECKED BY P. ZHANG SUBMITTED BY HDR DATE JULY 2024

HDR Engineering, Inc. of the Carolinas 555 Fayetteville St, Suite 900 Raleigh, N.C. 27601 N.C.B.E.L.S. License Number: F-0116



DocuSigned by: Saket Kabra 07/24/2024 93B8C24A4A248E 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

Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. It contains detailed technical specifications, classification codes, and symbols for soil and rock analysis.

See Sheet 1A For Index of Sheets  
See Sheet 1B For Conventional Symbols

# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

## BEAUFORT & HYDE COUNTY

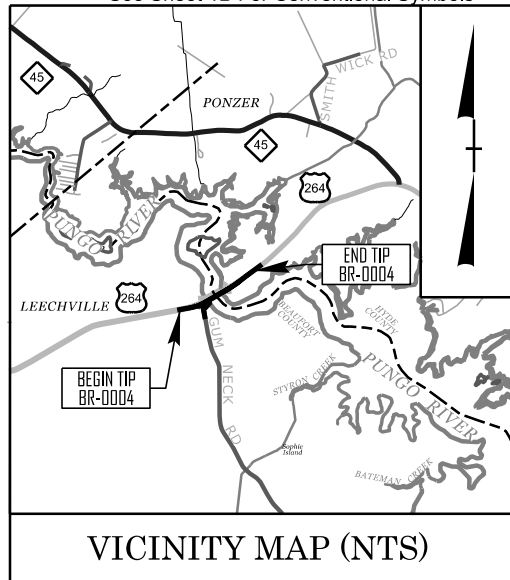
LOCATION: *BRIDGE NO. 66 ON US. 264 OVER PUNGO RIVER*

TYPE OF WORK: *GRADING, PAVING, DRAINAGE, AND STRUCTURES*

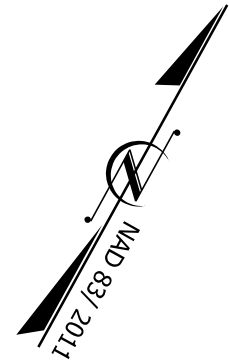
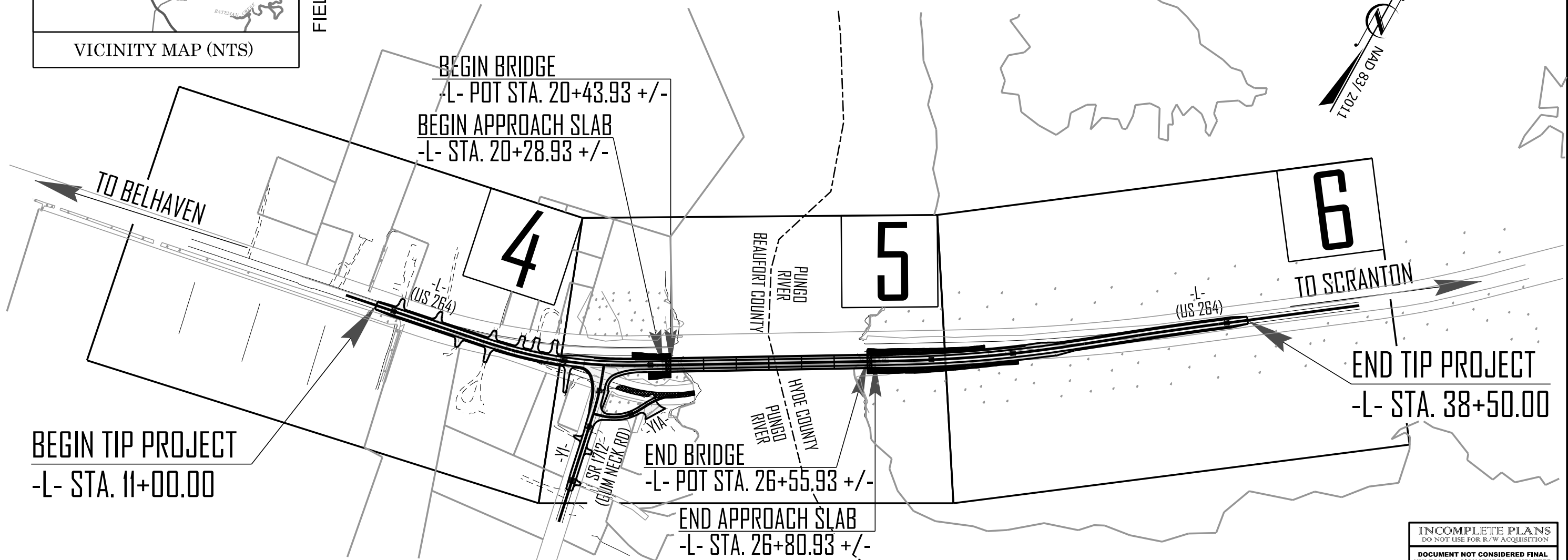
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0004	3	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
67004.1.1	N/A	P.E.	

TIP PROJECT: BR-0004

CONTRACT:

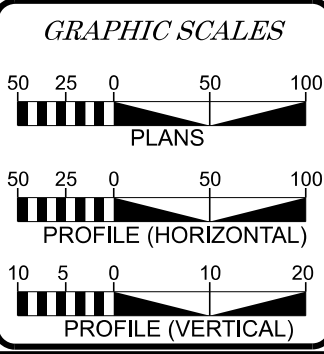


FIELD INSPECTION PLAN SET



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION  
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



**DESIGN DATA**

ADT 2025 = 2,763  
ADT 2045 = 3,800

K = 9 %  
D = 55 %  
T = 17 % \*  
V = 60 MPH

(\* TTST 3% + DUAL 14%)  
FUNC CLASS = RURAL ARTERIAL  
REGIONAL TIER

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT BR-0004 = 0.405 MILES  
LENGTH STRUCTURE TIP PROJECT BR-0004 = 0.116 MILES  
TOTAL LENGTH TIP PROJECT BR-0004 = 0.521 MILES

NCDOT CONTACT: CATHERINE A. HOSSACK-MEYER, PE  
PROJECT MANAGER

**HDR** HDR Engineering, Inc. of the Carolinas  
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601  
N.C.B.E.L.S. License Number: F-0116

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: OCTOBER 31, 2024  
LETTING DATE: SEPTEMBER 16, 2025

DOMENICA A. COLETTI, PE  
PROJECT ENGINEER

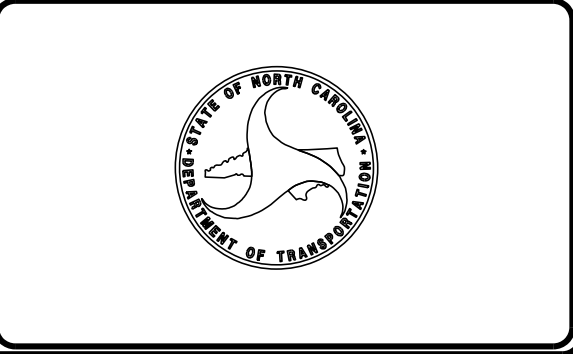
JORDAN C. BOND, PE  
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

ROADWAY DESIGN ENGINEER

SIGNATURE: \_\_\_\_\_ P.E.

SIGNATURE: \_\_\_\_\_ P.E.



July 3, 2024

WBS Number: 67004.1.1  
 TIP Number: BR-0004  
 PROJECT ID: 44305  
 COUNTIES: Beaufort and Hyde  
 DESCRIPTION: Bridge No. 66 on US 264 over Pungo River  
 SUBJECT: Geotechnical Inventory Report

**Project Description**

The project consists of relocation of existing US 264 to a 2-lane undivided roadway with 12-foot travel lanes and 8-foot shoulders for the bridge and approach roadways. The project is also proposed to improve the US 264/ Gum Neck Road intersection, located on the south side of US 264 at the river, and consolidate the two intersections into one 2-lane undivided roadway with 11-foot travel lanes on Gum Neck Road (SR 1712). The proposed bridge replacement structure is currently planned to be six (6) spans at 102 feet each, totalling 612 feet in length. The superstructure is planned to be 54-inch prestressed precast concrete girder structure with sloping abutments. The total project length is approximately 0.5 miles. It is noted that the proposed roadway side slopes on the eastern side of the Pungo River will be at a configuration of 1.5:1 (H:V) on both sides to allow for the creation of CAMA wetlands.

The geotechnical field investigation for the roadway portion of the project was conducted from March 2024 to April 2024. During this time, a total of 19 Standard Penetration Test (SPT) borings were drilled. A CME-45C rubber track-mounted drill rig equipped with an automatic hammer was used during the investigation. Mud rotary drilling procedures were used to advance borings to the required depths. SPT's were performed with four drives in the top ten feet and every five feet thereafter. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis. In addition, hand augers were performed to delineate the alluvial boundary in wetland areas.

The following alignments were explored. Subsurface cross-sections of these alignments are included in this report.

<u>Line</u>	<u>Stations (±)</u>
-L-	11+00 – 38+50
-Y1-	10+00 – 14+05
-Y1A-	10+00 – 12+09

Two bulk samples and four Shelby tube samples were collected during the subsurface investigation. The bulk samples were tested for the Standard Proctor and California Bearing Ratio Test. Shelby tube ST-2 tested for 1-D Consolidation. Shelby tube ST-3 tested for Consolidated Undrained Test. Shelby Tube ST-4 contained sand and only classification testing was performed. Shelby tube ST-1 had zero recovery.

**Physiography and Geology**

The project site is located in the Coastal Plain Physiographic Province. The terrain within and around the project is generally flat. The land surrounding the proposed roadway is typically forested, but there are a few locations with swamps on one or both sides of the existing roadway. Topographic relief along the length of the project alignment ranges in elevation from 0.0 feet to 3.0 feet.

Geologically, the project is located within the Surficial Deposits, Undivided. Generally, the Undivided Surficial Deposits consist of sand, clay, gravel, and peat deposited in marine, fluvial, eolian, and lacustrine environments. Surficial soils in this area are generally classified as roadway embankment and alluvial sediments and are underlain by undivided coastal plain and formational Coastal Plain soils belonging to Yorktown Formation, Pungo River Formation, and Castle Hyne Formation. A typical soil profile consists of a loose/soft upper layer of sand or clay underlain by more stiff/dense material of the formational Coastal Plain soils. The formational Coastal Plain soils are typically composed of sands and clays. An increase in stiffness/density usually differentiates between undivided Coastal Plain and the underlying formational Coastal Plain soils.

The near-surface soils overlay the Yorktown Formation. The Yorktown formation (Tertiary, Pliocene age), which consists of greenish-gray, bluish-gray, and brownish-yellow, fine- to coarse-grained sand, partly glauconitic and phosphatic, commonly very shelly, interbedded with sandy and silty blue-gray clay.

The Yorktown formation was underlain by Pungo River Formation and Castle Hayne Formation. Pungo River Formation is composed of interbedded phosphatic sands, silts, and clays, diatomaceous clays, and phosphatic and nonphosphatic limestones. Unconformably overlies Castle Hayne Limestone; unconformably underlies Yorktown Formation. Age is middle Miocene.

The Castle Hayne Limestone (also called the Castle Hayne Formation) is a geologic formation in North Carolina. It consists of cobble to pebble sized clasts, usually rounded, coated with phosphate and glauconite in a limestone matrix. The Castle Hayne Limestone is known for containing fossils dating back to the Paleogene period. It preserves many of North Carolina's renowned Eocene fossils.

**Groundwater**

Twenty-four-hour stabilized groundwater measurements were taken at most borings. Some borings were backfilled immediately upon completion because of safety concerns. Groundwater was measured at elevations ranging from -2.9' to 2.9'. It should be noted that the groundwater levels fluctuate depending on seasonal factors such as precipitation and temperature. As such, soil moisture and groundwater conditions at other times may vary or be different from those described in this report. Small intermittent channels exist throughout the project providing drainage during heavy rainfall events.

**Soil Properties**

Soils encountered during this investigation include roadway embankment, alluvial, undivided coastal plain (UCP), and coastal plain.

Roadway embankment soils are present along portions of existing -L- and -Y1- and consist of gray, light to dark brown, and black, very soft to soft, moist, sandy silt (A-4), and loose to medium dense, silty sand and sand and gravel (A-2-4, A-1-b) with trace to some amount of organics (root fragments). One Laboratory tested roadway embankment soil sample has a 29% natural moisture and a plasticity index (PI) of 7. Encountered roadway embankment soils were up to 5.5 feet thick.

Alluvial soils are present along streams, wetlands, throughout the project corridor. These soils have been deposited by moving water. These soils, where encountered, consist of brown, tan, and gray, wet to saturated, very soft to medium stiff, muck, sandy silt and silty clay (A-4, A-7-6), and loose to medium dense, fine to coarse silty sand

(A-2-4), and contain highly organic matter (wood fragments). Laboratory tested alluvial soil samples have natural moisture varied from 18 to 33% and PI ranged from 3-11. Encountered alluvial soils were up to 21 feet thick.

UCP soils are generally present underneath the alluvial soils. These soils consist of gray, light to dark brown, and orange, loose to medium dense, moist to saturated, fine to coarse, silty and clayey sand, and sand (A-2-4, A-2-6, A-3, A-1-b), with trace to some shell fragments. Encountered UCP soils were up to 30 feet thick.

Coastal plain soils are present underneath the UCP soils. These soils consist of gray, white, and black, medium stiff to stiff, saturated, sandy silt, and silty clay (A-4, A-7-6), and medium dense to very dense, saturated, fine to coarse, silty and clayey sand, and sand (A-2-4, A-2-6, A-3) with trace to some shell fragments.

### Areas of Special Geotechnical Interest

- 1) Loose/Soft Soils: The following areas contain very loose non-cohesive soils or very soft to soft, fine grained/cohesive soils (N-value<4) which have the potential to cause embankment/subgrade and/or slope stability problems during construction.

<u>Line</u>	<u>Stations (±)</u>	<u>Offset</u>
-L-	11+00 – 20+43	RT
-L-	26+56 – 38+50	LT & RT
-Y1A-	10+00 – 11+50	LT & RT

- 2) Highly Plastic Soils: The highly plastic soils with PI greater than 16 were not encountered within 3 feet of the subgrade during our investigation. There may be other unexplored areas on the project where highly plastic soils may be present.

- 3) Artificial Fill: Artificial Fill was not encountered during our subsurface investigation. Several smaller areas of artificial fill are present throughout the project corridor and are related to gravel and soil driveways or previous infrastructure construction.

- 4) Organic Soils: The following areas contain moderately to highly organic soils associated with wetlands or alluvial deposits. These soils can potentially cause embankment/subgrade and/or slope stability problems during construction.

<u>Line</u>	<u>Stations (±)</u>	<u>Offset</u>
-L-	11+00 – 20+43	LT & RT
-L-	26+56 – 37+00	LT & RT

- 5) Groundwater: Groundwater was encountered within six (6) feet of the proposed subgrade at the following locations:

<u>Line</u>	<u>Station (±)</u>
-L-	11+00 – 19+50
-L-	29+00 – 38+50
-Y1-	10+00 – 14+50
-Y1A-	10+00 – 12+00

- 6) Ponds: Ponds were not encountered during subsurface investigations.

- 7) Water Wells: One water well was encountered within or near the proposed right of way at the time of drilling at the following location:

<u>Line</u>	<u>Station (±)</u>	<u>Offset (ft)</u>
-L-	15+04	107 LT

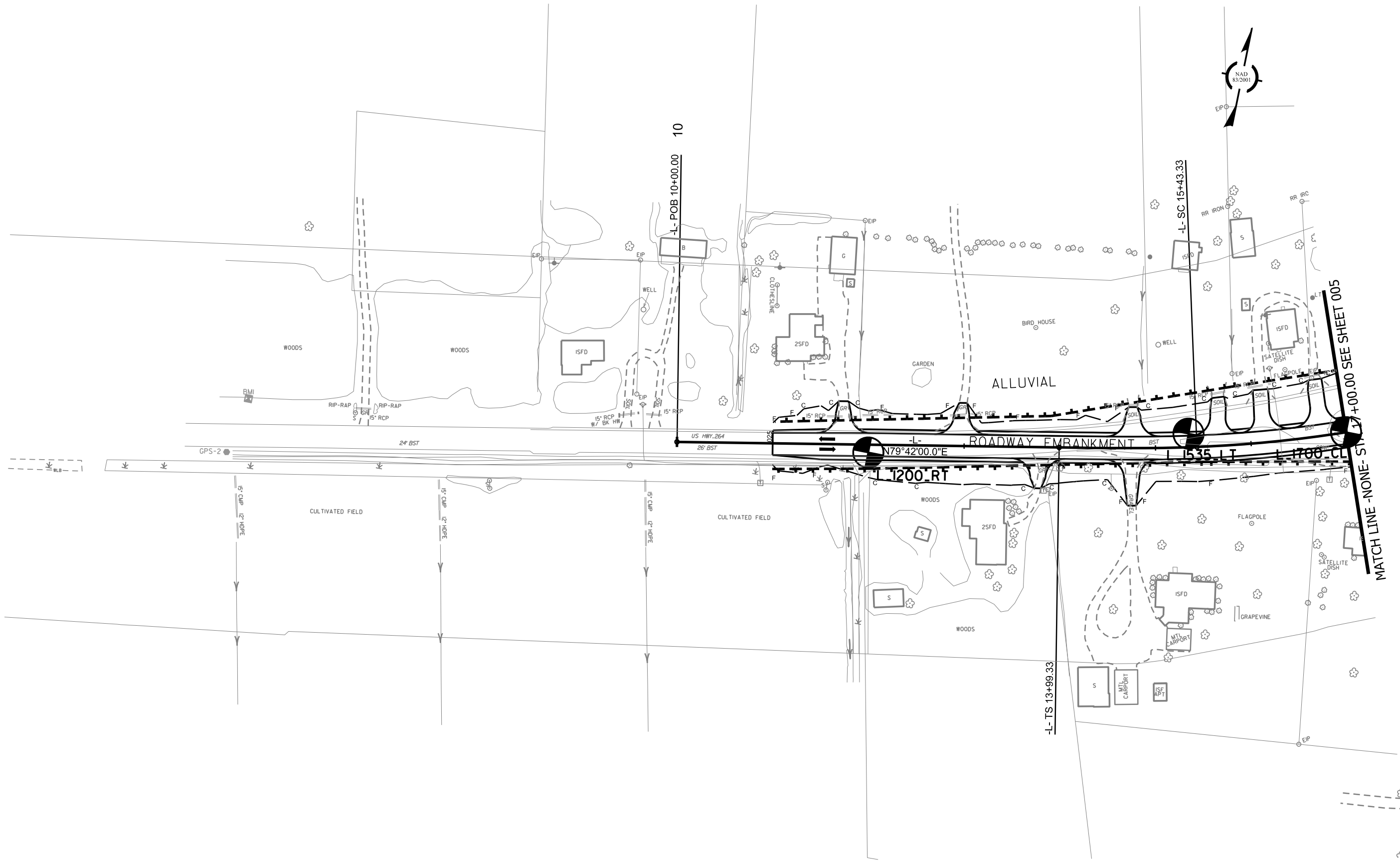
- 8) Streams: Several streams were encountered within or near the proposed right of way at the time of the drilling at the following location:

<u>Line</u>	<u>Station (±)</u>	<u>Offset (ft)</u>
-L-	11+80 – 12+02	35' RT
-L-	14+88	55' LT
-L-	15+86	67' LT

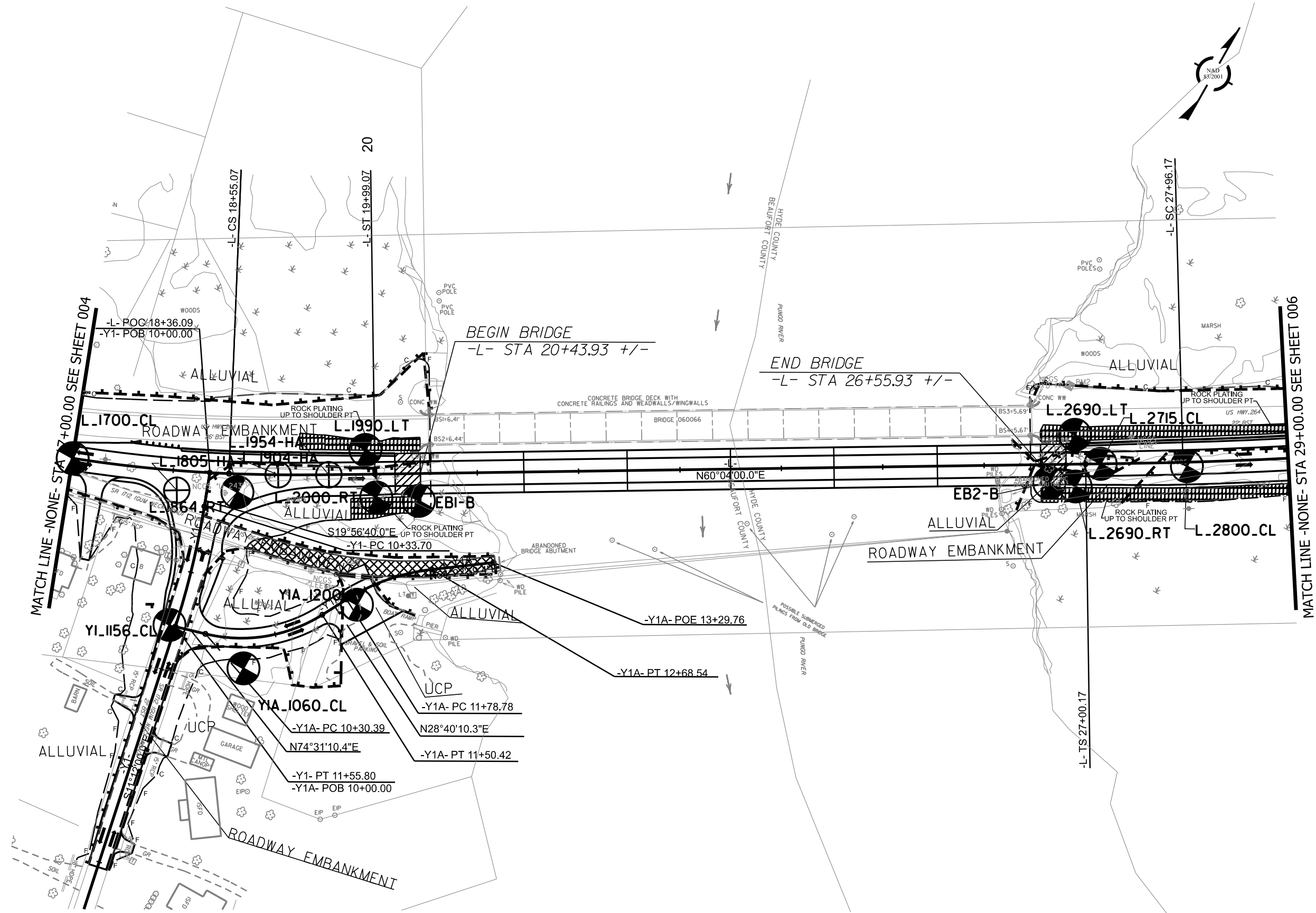
Prepared By,  
**HDR Engineering, Inc., of the Carolinas**

Brian D. Keaney, P.E.  
Senior Geotechnical Project Manager

Saket Kabra, P.E.  
Geotechnical Engineer



REVISIONS



REVISIONS



MATCH LINE - NONE - STA 29+00.00 SEE SHEET 005

30

40

-L- CS 32+40.30

-L- PC 35+06.56

-L- PT 37+59.07

-L- POE 42+01.23

-L- ST 33+36.30

ROADWAY EMBANKMENT

ROADWAY EMBANKMENT

L\_3000.CL  
ALLUVIAL

L\_3200.CL  
MARSH

L\_3400.CL  
ALLUVIAL

L\_3700.RT  
ALLUVIAL

WOODS

WOODS

WOODS

ALLUVIAL

MARSH

MARSH

ALLUVIAL

MARSH

ALLUVIAL

ALLUVIAL

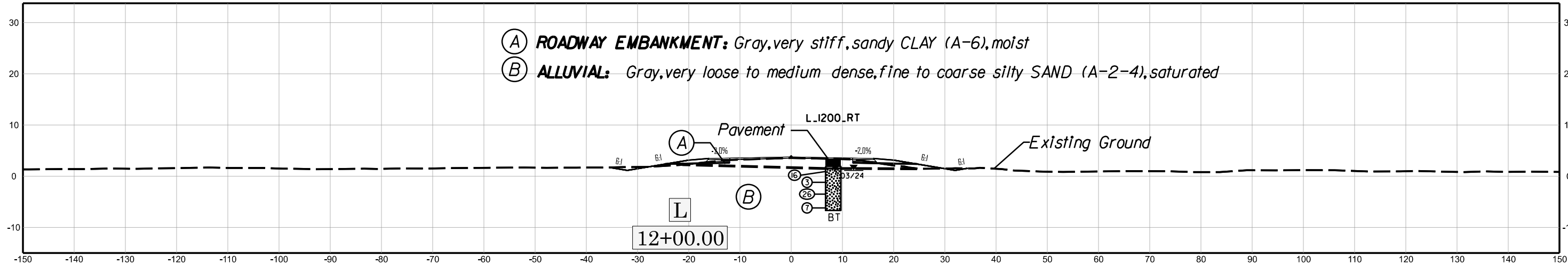
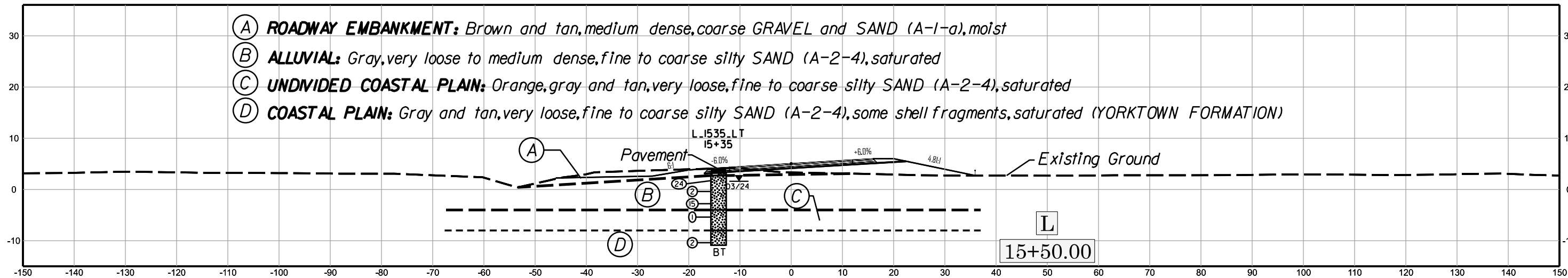
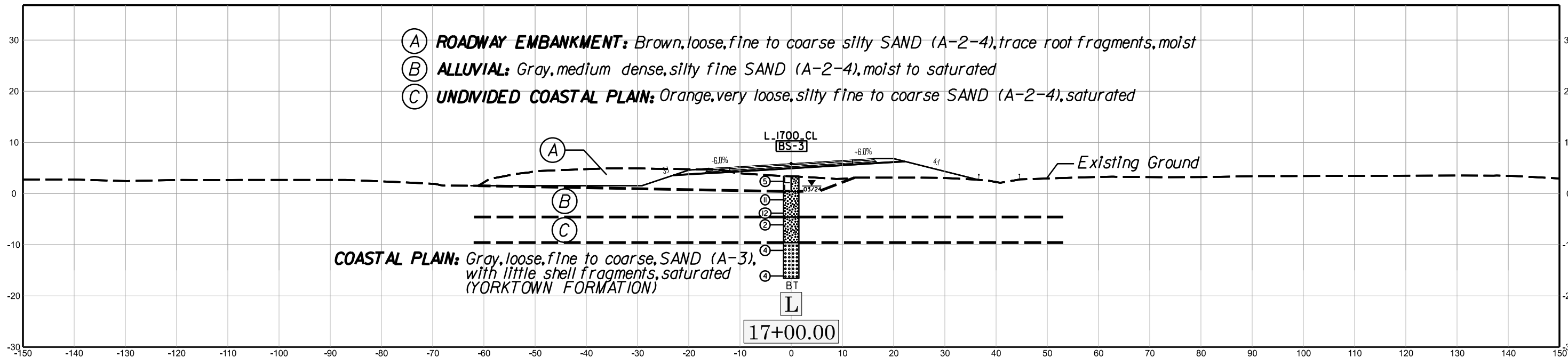
MARSH

N 9°47.7' E

N 53°38'00.0" E

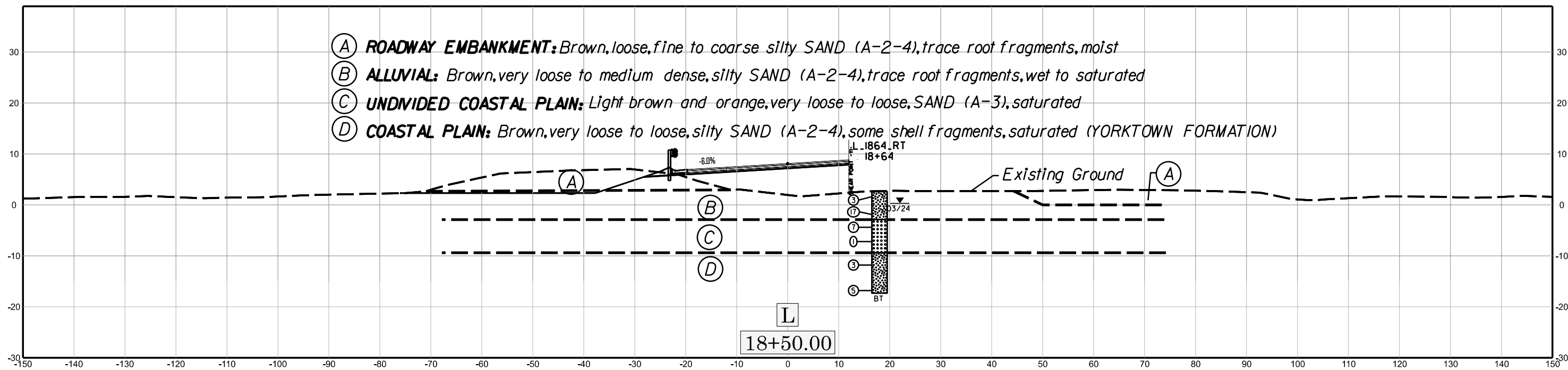
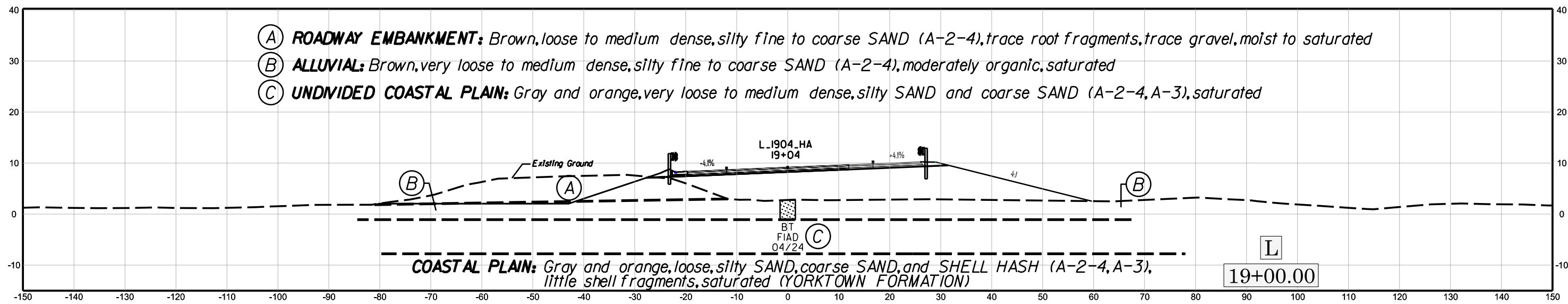
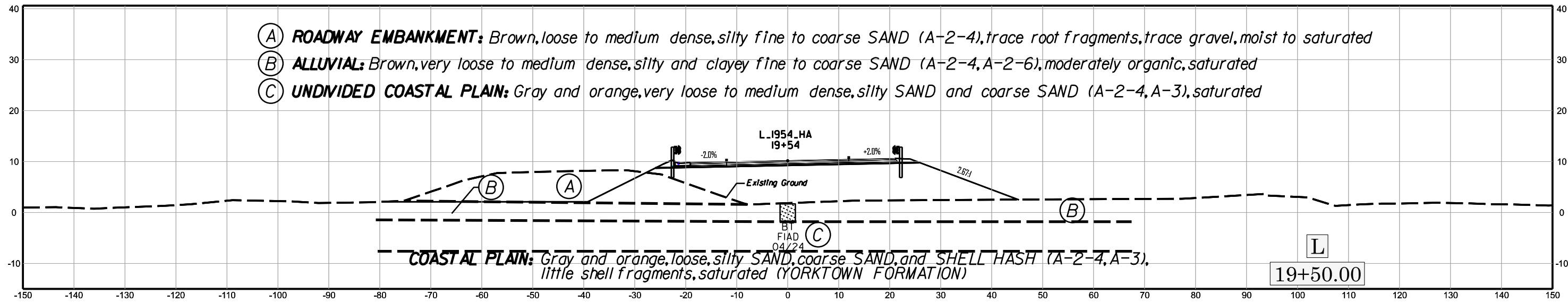
US HWY. 264  
22' B51

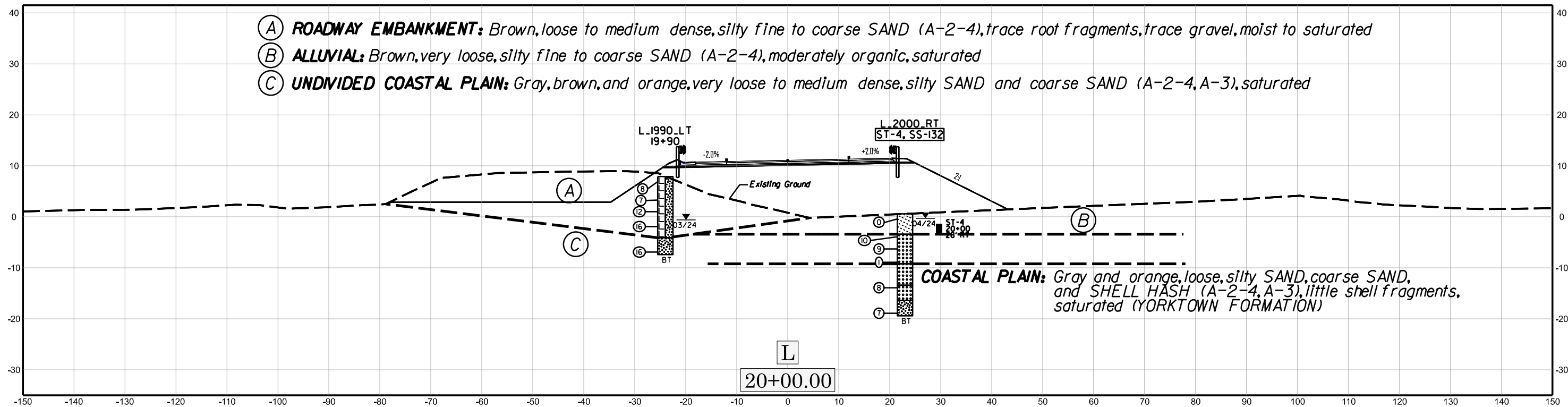
GPS-3



X 007

BR-0004

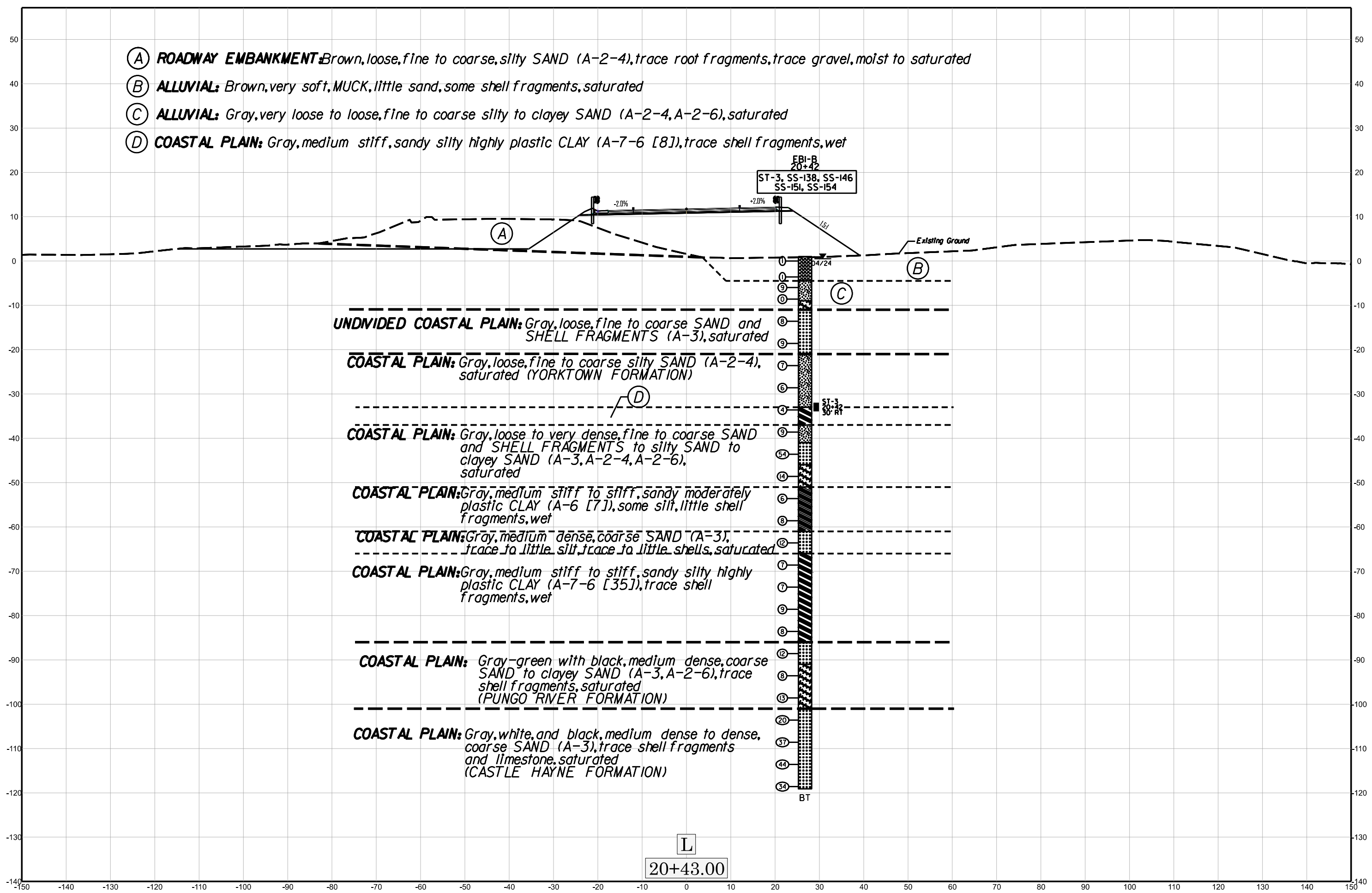




X 009

BR-0004

- (A) **ROADWAY EMBANKMENT:** Brown, loose, fine to coarse, silty SAND (A-2-4), trace root fragments, trace gravel, moist to saturated
- (B) **ALLUVIAL:** Brown, very soft, MUCK, little sand, some shell fragments, saturated
- (C) **ALLUVIAL:** Gray, very loose to loose, fine to coarse silty to clayey SAND (A-2-4, A-2-6), saturated
- (D) **COASTAL PLAIN:** Gray, medium stiff, sandy silty highly plastic CLAY (A-7-6 [8]), trace shell fragments, wet



**UNDIVIDED COASTAL PLAIN:** Gray, loose, fine to coarse SAND and SHELL FRAGMENTS (A-3), saturated

**COASTAL PLAIN:** Gray, loose, fine to coarse silty SAND (A-2-4), saturated (YORKTOWN FORMATION)

**COASTAL PLAIN:** Gray, loose to very dense, fine to coarse SAND and SHELL FRAGMENTS to silty SAND to clayey SAND (A-3, A-2-4, A-2-6), saturated

**COASTAL PLAIN:** Gray, medium stiff to stiff, sandy moderately plastic CLAY (A-6 [7]), some silt, little shell fragments, wet

**COASTAL PLAIN:** Gray, medium dense, coarse SAND (A-3), trace to little silt, trace to little shells, saturated

**COASTAL PLAIN:** Gray, medium stiff to stiff, sandy silty highly plastic CLAY (A-7-6 [35]), trace shell fragments, wet

**COASTAL PLAIN:** Gray-green with black, medium dense, coarse SAND to clayey SAND (A-3, A-2-6), trace shell fragments, saturated (PUNGO RIVER FORMATION)

**COASTAL PLAIN:** Gray, white, and black, medium dense to dense, coarse SAND (A-3), trace shell fragments and limestone, saturated (CASTLE HAYNE FORMATION)

FBI-B  
20+42  
ST-3, SS-138, SS-146  
SS-151, SS-154

ST-3  
30+42

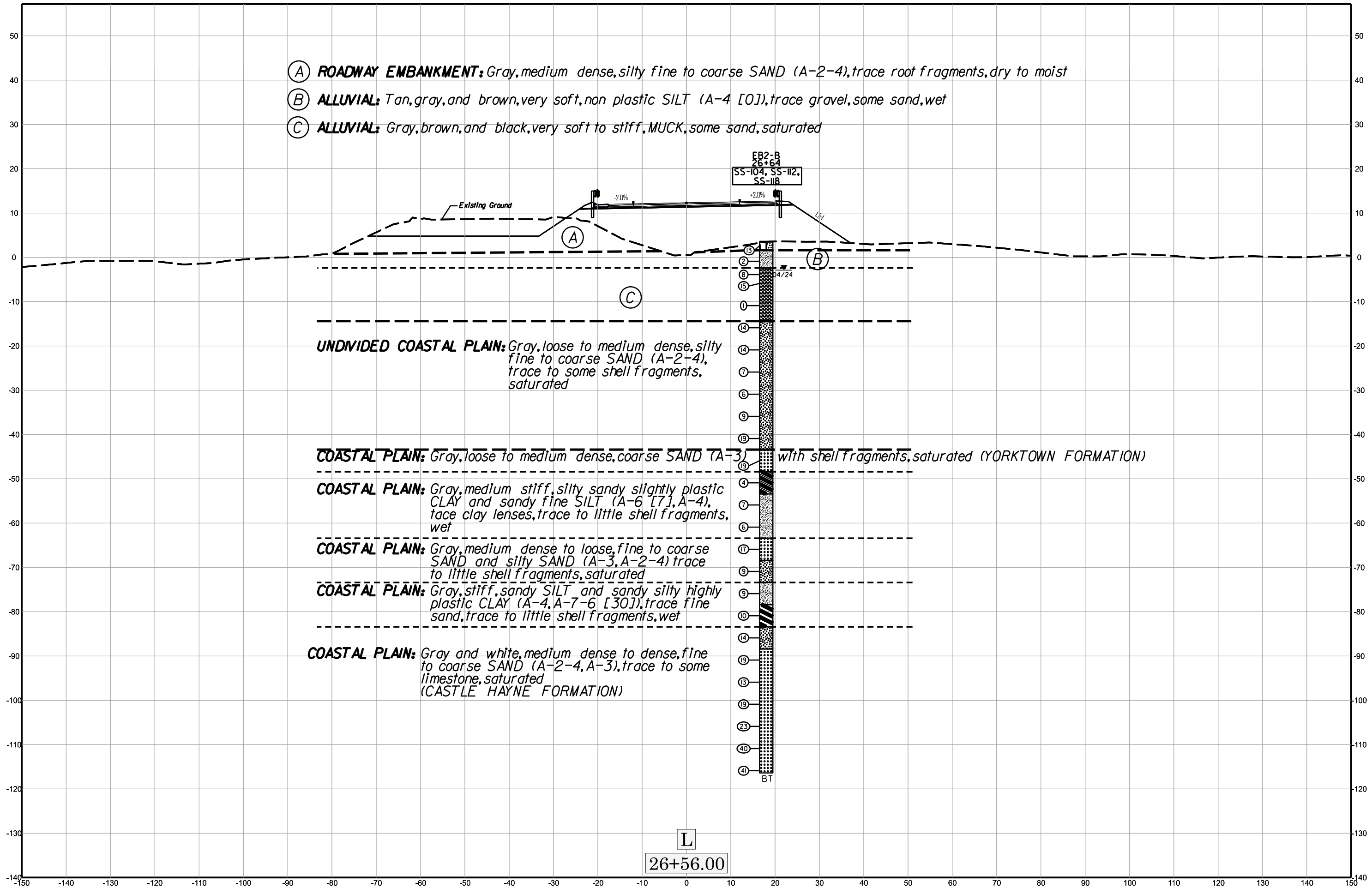
L

20+43.00



X 010

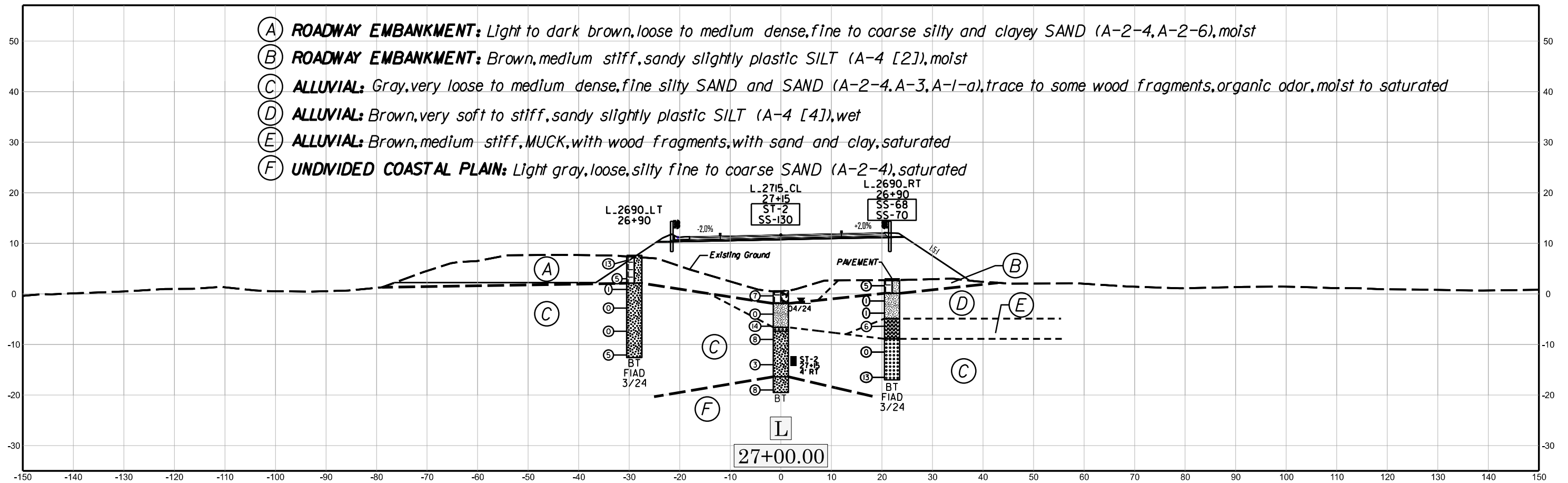
BR-0004

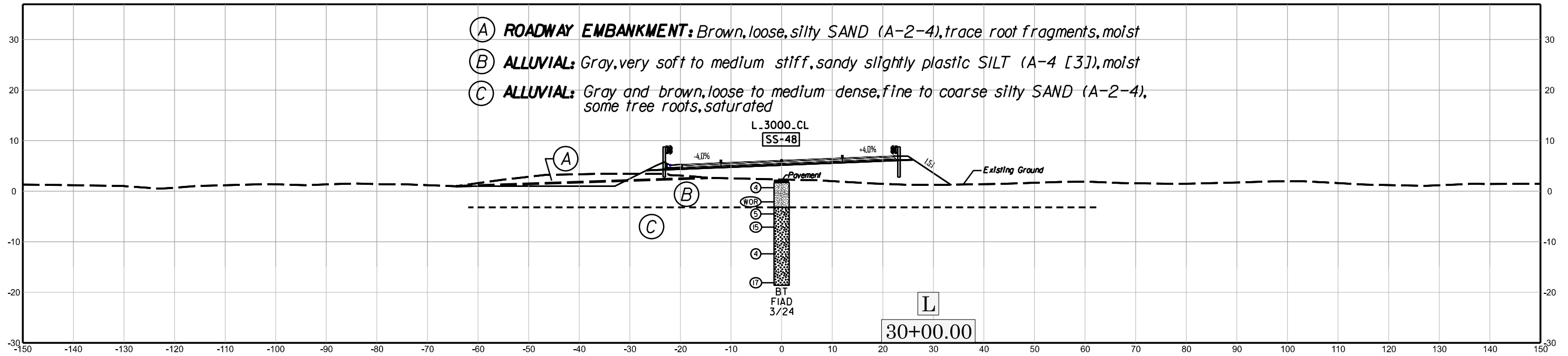




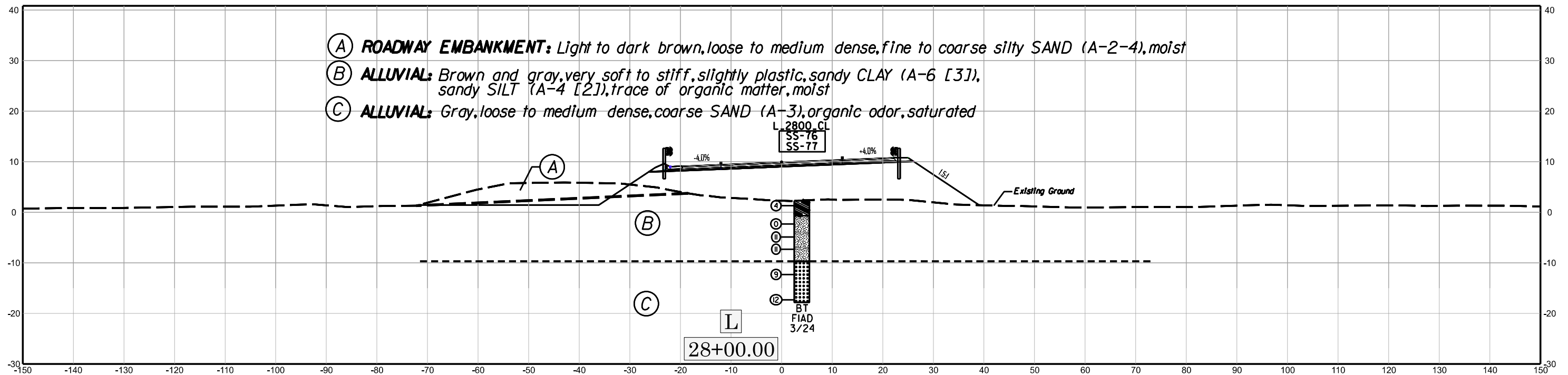
X 012

BR-0004

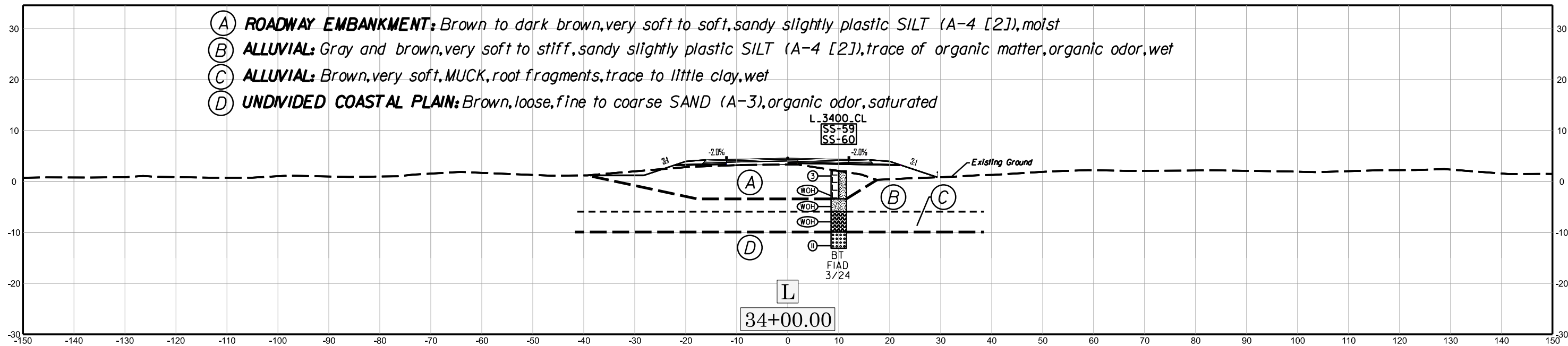




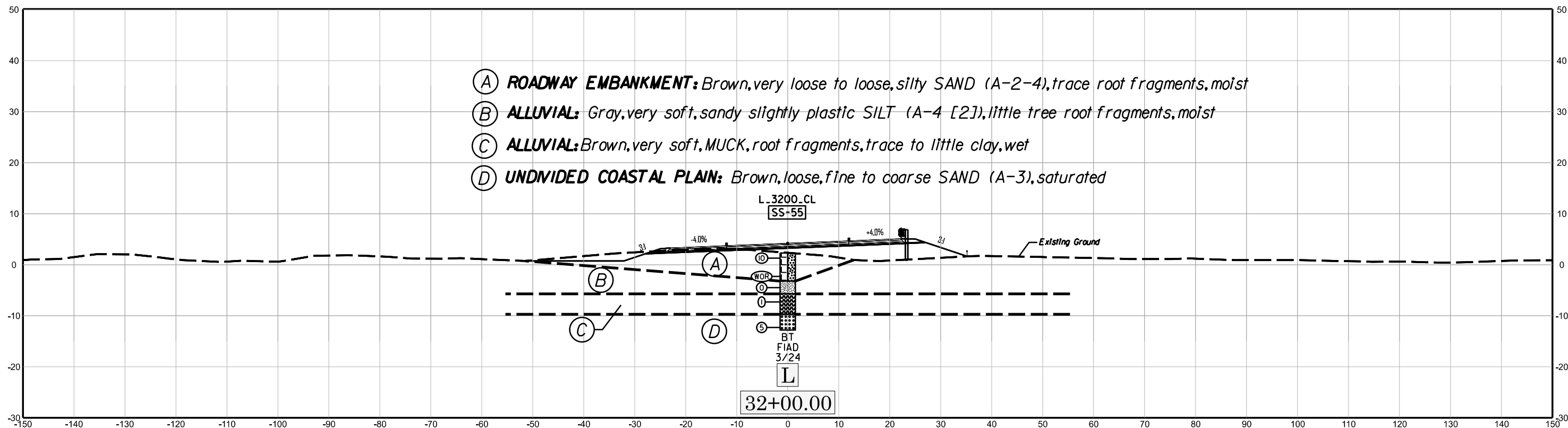
X 013



BR-0004



X 0/4

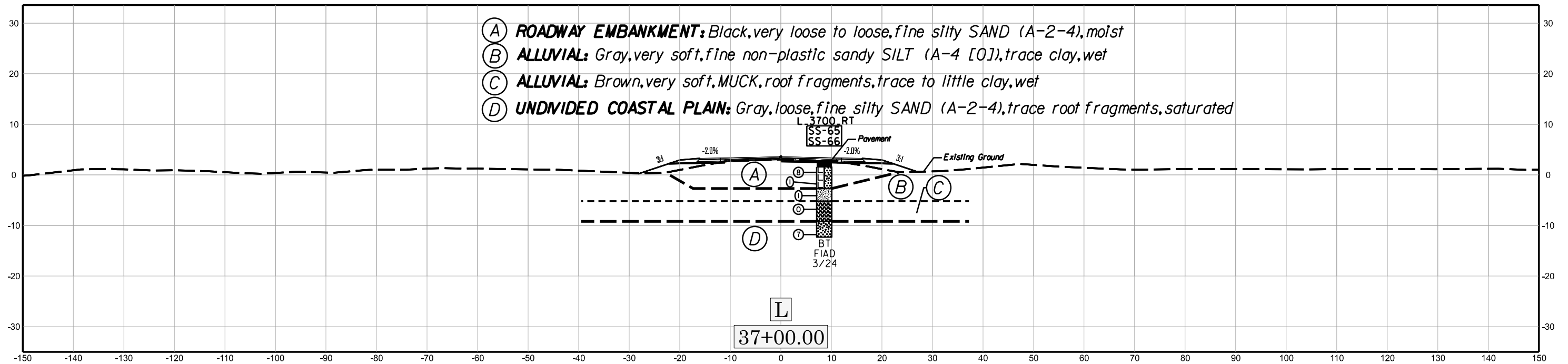


BR-0004

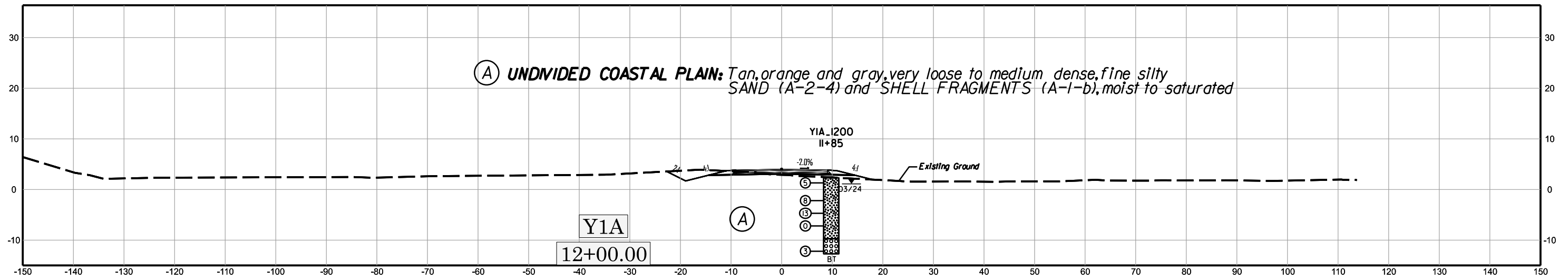


X 015

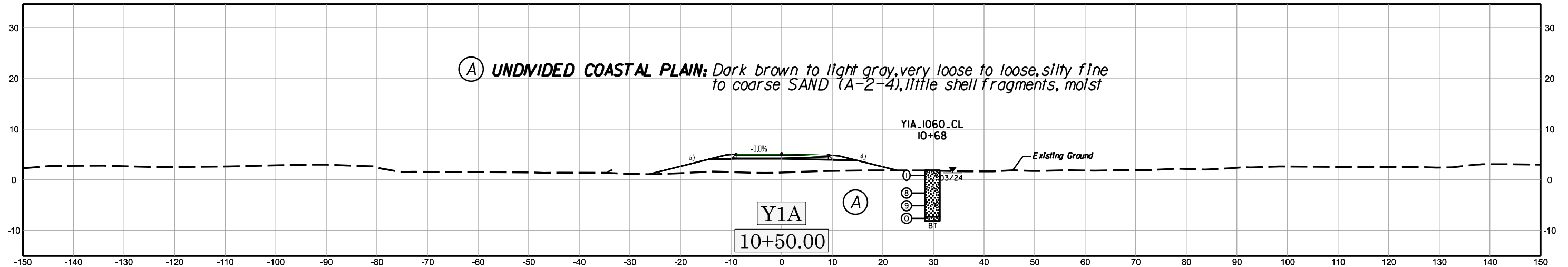
BR-0004







X 017



BR-0004

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 67004.1.1		TIP BR-0004		COUNTY BEAUFORT		GEOLOGIST Swafford, C.											
SITE DESCRIPTION BRIDGE NO. 66 ON NC 264 OVER PUNGO RIVER							GROUND WTR (ft)										
BORING NO. L_1805_HA		STATION 18+05		OFFSET 20 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 2.9 ft		TOTAL DEPTH 4.8 ft		NORTHING 671,991		EASTING 2,742,490											
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Hand Auger		HAMMER TYPE N/A											
DRILLER Albright, G.		START DATE 04/24/24		COMP. DATE 04/24/24		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
5																	
															2.9	GROUND SURFACE	0.0
0													M			<b>UNDIVIDED COASTAL PLAIN</b>	
													Sat.			Orange, tan and light gray, medium dense to loose, silty SAND (A-2-4)	
															-1.9	Boring Terminated at Elevation -1.9 ft in Alluvial, sandy Clay	4.8
																Boring Terminate at 4.8 ft due to water suction and hole collapsing	

NCDOT BORE DOUBLE BR-0004.GPJ NC\_DOT.GDT 7/3/24

**REFERENCE: BR-0004**

**PROJECT: 67004**

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

**ROADWAY**  
**SUBSURFACE INVESTIGATION**

**APPENDIX A**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0004	19	

**-L- SOIL TEST RESULTS**

Boring No.	SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC	NORTHING	EASTING
								C.SAND	F.SAND	SILT	CLAY	10	40	200				
L 1700 CL	BS-3	17+00	27' LT	0.0-5.0	A-2-4	17	NP	14.3	55.6	22.0	8.1	93.6	88.6	32.4	-	-	671,993	2,742,385
L 2000 RT	SS-132	20+00	23' RT	0-1.5	-	-	-	-	-	-	-	-	-	-	69.9	9.8	672,080	2,742,666
L 2000 RT	ST-4	20+00	28' RT	2-4	A-2-4	NP	NP	9.8	62.5	16	11.7	100	98.9	30.8	14.7	-	672,080	2,742,666
EB1-B	SS-138	20+42	27' RT	0.1.5	-	-	-	-	-	-	-	-	-	-	110.8	15.2	672,098	2,742,704
EB1-B	SS-146	20+42	27' RT	33.6-35.1	A-7-6 [8]	52	29	8.4	54.8	9.6	27.3	99.9	93.3	44.3	73.2	-	672,098	2,742,704
EB1-B	SS-151	20+42	27' RT	58.6-60.1	A-6 [7]	40	18	25.4	28.6	20.9	25.2	95.4	75.8	52.8	31.9	-	672,098	2,742,704
EB1-B	SS-154	20+42	27' RT	73.6-75.1	A-7-6 [35]	59	39	5	17.4	30.9	46.6	98.5	94.6	84.9	46.5	-	672,098	2,742,704
EB1-B	ST-3-1	20+42	30' RT	34.6-35	A-2-4	NP	NP	2.8	76.4	5.4	15.4	99.7	98.9	24.8	33.6	-	672,098	2,742,704
EB1-B	ST-3-2	20+42	30' RT	33.5 - 34	A-4 [0]	NP	NP	14.3	49.1	16.6	20	99.9	95.9	37.9	41	-	672,098	2,742,704
EB2-B	SS-104	26+64	18' RT	53.5-55.0	-	-	-	-	-	-	-	-	-	-	141	15.2	672,416	2,743,239
EB2-B	SS-112	26+64	18' RT	53.5-55.0	A-6 [7]	33	13	1.1	32.4	27	39.7	96.19	95.8	67.9	39.7	-	672,416	2,743,239
EB2-B	SS-118	26+64	18' RT	83.5-85.0	A-7-6 (30)	53	30	2.7	15.0	39.9	42.4	98.5	96.8	91.9	40.4	-	672,416	2,743,239
L 2690 LT	BS-1	26+90	29' LT	0.0-3.0	A-2-4	19	NP	36.0	46.0	12.9	5.1	86.5	69.1	19.5	-	-	672,426	2,743,263
L 2690 RT	SS-68	26+90	22' RT	0.5-2.0	A-4 [4]	23	9	6.2	26.6	38.2	29.0	99.9	98.5	71.3	18	-	672,426	2,743,263
L 2690 RT	SS-70	26+90	22' RT	5.9-7.4	A-4 [2]	21	7	6.5	32.6	38.9	22.0	99.5	97.8	64.5	22	-	672,426	2,743,263
L 2715 CL	SS-130	27+15	CL	13.6-15.1	-	-	-	-	-	-	-	-	-	-	46.4	4	672,457	2,743,274
L 2715 CL	ST-2-1	27+15	4' RT	13.0-15.0	A-2-4	NP	NP	2.3	78.2	9.6	9.9	95	94.4	20.6	58.2	-	672,457	2,743,274
L 2715 CL	ST-2-2	27+15	4' RT	13.0-15.0	A-2-4	NP	NP	0.7	78.6	15.9	4.8	99.8	99.7	22.4	114.5	-	672,457	2,743,274
L 2800 CL	SS-76	28+00	4' RT	0.0-1.5	A-6 [3]	24	11	6.2	22.3	44.5	27.0	75.8	74.1	57.5	20	1.8	672,497	2,743,349
L 2800 CL	SS-77	28+00	4' RT	3.6-5.1	A-4 [2]	23	9	11.0	36.4	33.6	19.0	98.6	91.9	54.8	23	-	672,497	2,743,349
L 3000 CL	SS-48	30+00	CL	3.4-4.9	A-4 [3]	25	8	4.5	28.4	44.0	23.1	100.0	99.2	71.0	24	-	672,606	2,743,517
L 3200 CL	SS-55	32+00	CL	5.8-7.3	A-4 [2]	22	7	5.3	28.1	40.5	26.1	100.0	99.0	71.1	26	-	672,721	2,743,680
L 3400 CL	SS-59	34+00	10' RT	3.9-5.4	A-4 [2]	21	7	5.9	27.3	40.8	26.0	99.8	98.3	70.5	29	-	672,833	2,743,844
L 3400 CL	SS-60	34+00	10' RT	6.0-7.5	A-4 [2]	22	7	5.7	28.8	44.5	21.0	99.9	98.7	69.8	33	1.7	672,833	2,743,844
L 3700 RT	SS-65	37+00	9' RT	5.9-7.4	A-4 [0]	18	3	8.4	46.1	30.5	15.0	99.1	97.2	49.6	24	-	673,018	2,744,084
L 3700 RT	SS-66	37+00	9' RT	8.6-10.1	-	-	-	-	-	-	-	-	-	-	-	62.9	673,018	2,744,084



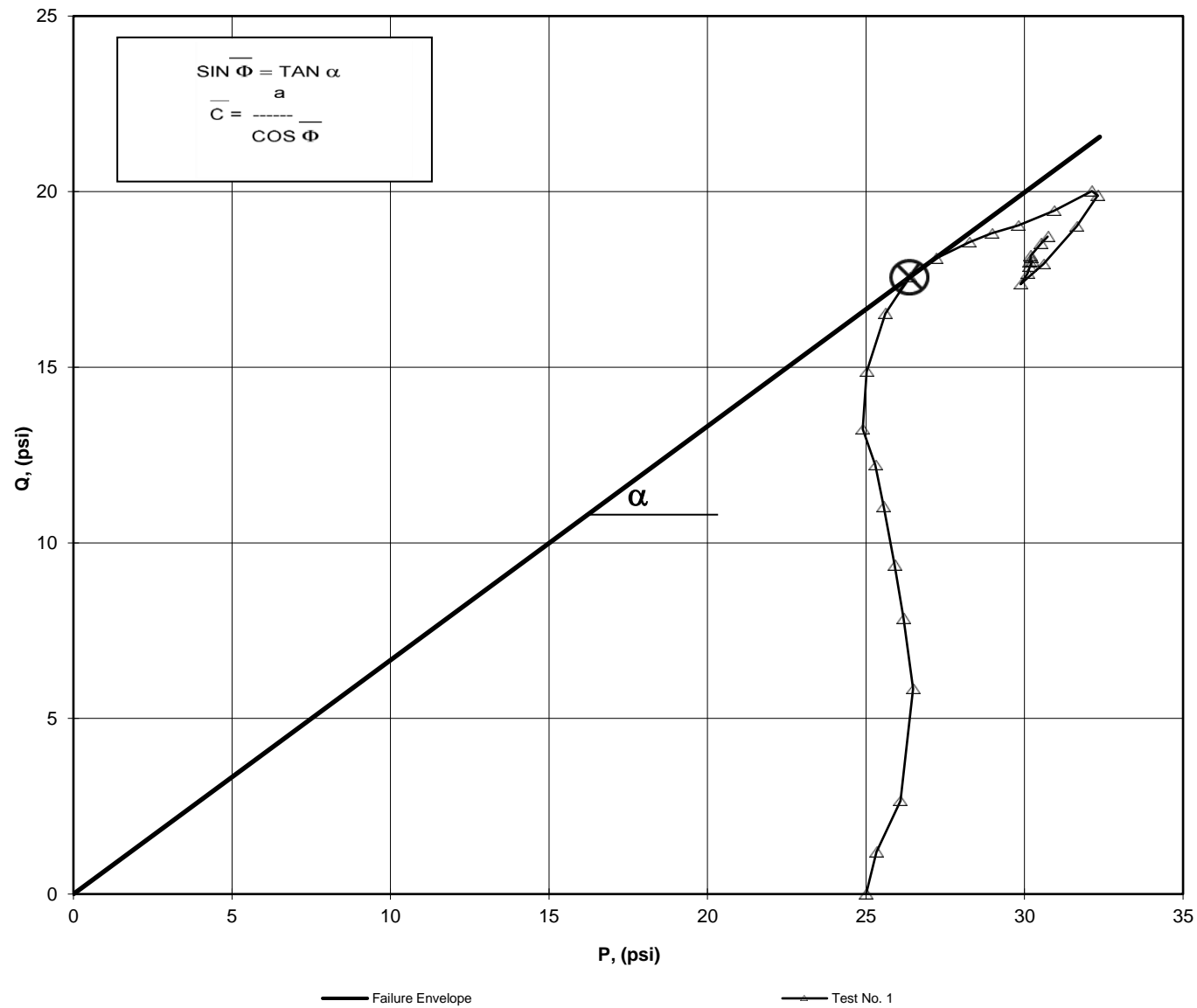
**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS  
AASHTO T-297**

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

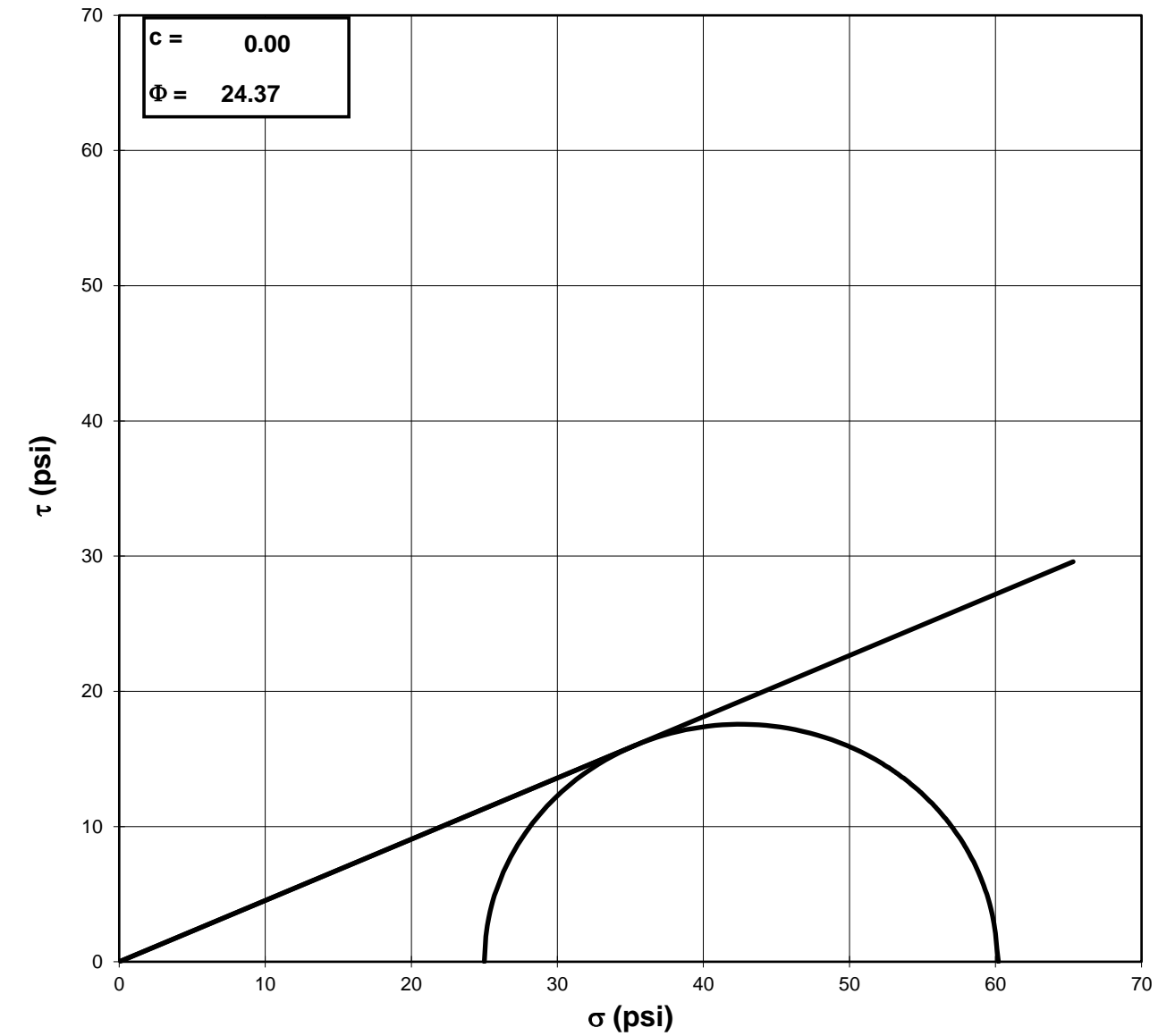
Client: HDR Engineering, Inc. Boring No.: EB1-B  
 Client Reference: Bridge No. 66 on US 264 over Pu Depth (ft): 33-35  
 Project No.: R-2024-155-001 Sample No.: ST-3  
 Lab ID: R-2024-155-001-005

Client: HDR Engineering, Inc. Boring No.: EB1-B  
 Client Reference: Bridge No. 66 on US 264 over Pu Depth (ft): 33-35  
 Project No.: R-2024-155-001 Sample No.: ST-3  
 Lab ID: R-2024-155-001-005  
 Visual Description: Brown Sandy Clay (UND)

**Consolidated Undrained Triaxial Test with Pore Pressure**



<b>a</b>	<b>=</b>	<b>0.00</b>	<b>C̄</b>	<b>=</b>	<b>0.00</b>
<b>α</b>	<b>=</b>	<b>33.7</b>	<b>Φ̄</b>	<b>=</b>	<b>41.76</b>



Failure Based on Maximum Effective Principal Stress Ratio

NOTE: GRAPH NOT TO SCALE

Tested By: 129-02-0411 Date: 5/17/24 Approved By: MPS Date: 5/23/24

Tested By: 129-02-0411 Date: 5/17/24 Approved By: MPS Date: 5/23/24



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

Client: HDR Engineering, Inc. Boring No.: EB1-B  
 Client Reference: Bridge No. 66 on US 264 over Pur Depth (ft): 33-35  
 Project No.: R-2024-155-001 Sample No.: ST-3  
 Lab ID: R-2024-155-001-005

Visual Description: Brown Sandy Clay (UND)

Stage No.	0
Test No.	1

**INITIAL SAMPLE DIMENSIONS (in)**

Length 1:	6.144	Diameter 1:	2.862
Length 2:	6.168	Diameter 2:	2.865
Length 3:	6.177	Diameter 3:	2.857
Length 4:	6.152	Diameter 4:	2.833
Avg. Length:	6.160	Avg. Diam.:	2.854

**PRESSURES (psi)**

Cell Pressure (psi)	85.0
Back Pressure (psi)	60.0
Eff. Conf. Pressure (psi)	25.0
Pore Pressure Response (%)	95

**VOLUME CHANGE**

Initial Burette Reading (ml)	24.0
Final Burette Reading (ml)	3.0
Final Change (ml)	21.0

**MAXIMUM OBLIQUITY POINTS**

$\bar{P}$	=	26.37
Q	=	17.56

Initial Dial Reading (mil)	202
Dial Reading After Saturation (mil)	218
Dial Reading After Consolidation (mil)	282

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
19.3	0.000	60.0
34.2	0.001	60.9
52.3	0.002	61.6
92.2	0.008	64.4
117.2	0.013	66.7
136.2	0.019	68.5
157.3	0.028	70.5
172.2	0.037	71.9
185.4	0.049	73.3
206.5	0.070	74.9
228.4	0.099	75.9
242.9	0.136	76.2
251.1	0.171	75.9
258.7	0.214	75.3
263.2	0.243	74.9
267.9	0.285	74.2
275.8	0.343	73.5
286.1	0.403	72.9
286.5	0.448	72.6
277.5	0.508	72.4
264.9	0.553	72.3
258.9	0.598	72.5
265.2	0.643	72.6
269.2	0.673	72.7
272.8	0.702	72.8
274.0	0.732	72.9
277.0	0.762	72.9
280.0	0.808	73.0
287.4	0.853	73.0
291.9	0.883	73.0
293.1	0.913	73.0

Tested By: 129-02-0411 Date: 5/17/24 Input Checked By: MPS Date: 5/23/24

DCN: CT-S28 DATE: 4/12/13 REVISION: 3

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

Client: HDR Engineering, Inc. Boring No.: EB1-B  
 Client Reference: Bridge No. 66 on US 264 over Pur Depth (ft): 33-35  
 Project No.: R-2024-155-001 Sample No.: ST-3  
 Lab ID: R-2024-155-001-005

Visual Description: Brown Sandy Clay (UND)

Effective Confining Pressure (psi)	25.0	Stage No.	0
		Test No	1

**INITIAL DIMENSIONS**

Initial Sample Length (in)	6.16
Initial Sample Diameter (in)	2.85
Initial Sample Area (in <sup>2</sup> )	6.40
Initial Sample Volume (in <sup>3</sup> )	39.42

**VOLUME CHANGE**

Volume After Consolidation (in <sup>3</sup> )	37.83
Length After Consolidation (in)	6.08
Area After Consolidation (in <sup>2</sup> )	6.221

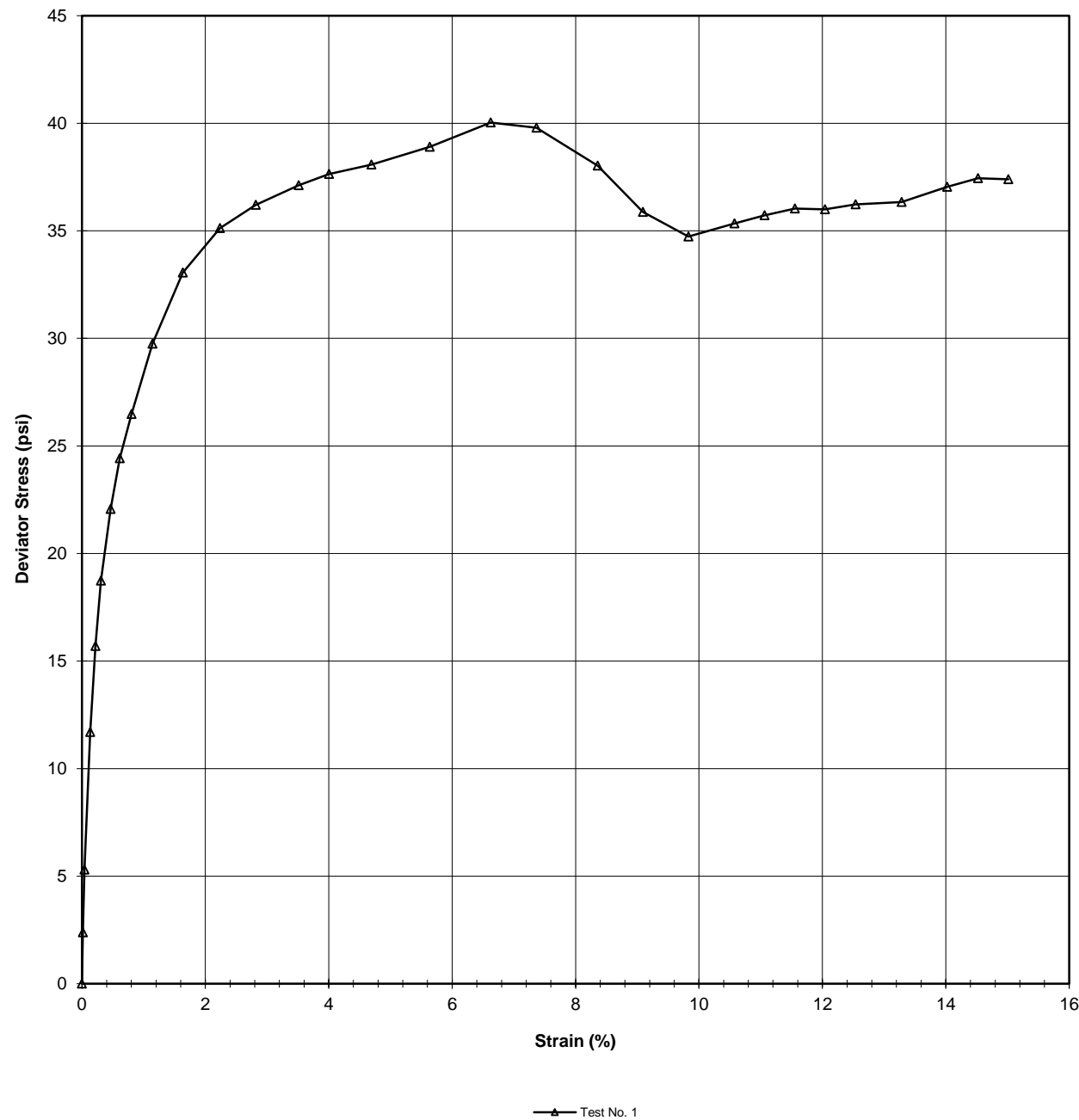
Strain (%)	Deviator Stress PSI	$\Delta U$	$\bar{\sigma}_1$	$\bar{\sigma}_3$	Effective Principal Stress Ratio	$\bar{A}$	$\bar{P}$	Q
------------	---------------------	------------	------------------	------------------	----------------------------------	-----------	-----------	---

0.01	2.39	0.87	26.52	24.1	1.099	0.38	25.32	1.19
0.04	5.30	1.57	28.73	23.4	1.226	0.31	26.08	2.65
0.13	11.70	4.37	32.33	20.6	1.567	0.39	26.48	5.85
0.22	15.70	6.66	34.03	18.3	1.856	0.45	26.18	7.85
0.31	18.74	8.46	35.27	16.5	2.133	0.48	25.91	9.37
0.47	22.07	10.47	36.59	14.5	2.519	0.50	25.56	11.03
0.61	24.43	11.92	37.51	13.1	2.868	0.51	25.29	12.21
0.80	26.48	13.34	38.14	11.7	3.271	0.53	24.90	13.24
1.14	29.75	14.86	39.89	10.1	3.933	0.53	25.02	14.87
1.63	33.06	15.92	42.14	9.1	4.641	0.51	25.61	16.53
2.24	35.13	16.19	43.93	8.8	4.988	0.49	26.37	17.56
2.82	36.20	15.89	45.31	9.1	4.976	0.46	27.21	18.10
3.51	37.12	15.30	46.82	9.7	4.829	0.43	28.26	18.56
4.00	37.63	14.85	47.78	10.1	4.708	0.42	28.97	18.82
4.69	38.08	14.24	48.84	10.8	4.539	0.39	29.80	19.04
5.63	38.90	13.52	50.37	11.5	4.389	0.37	30.93	19.45
6.62	40.03	12.89	52.14	12.1	4.306	0.34	32.12	20.02
7.36	39.79	12.59	52.20	12.4	4.205	0.33	32.31	19.89
8.36	38.02	12.37	50.66	12.6	4.010	0.34	31.65	19.01
9.09	35.88	12.34	48.54	12.7	3.834	0.36	30.60	17.94
9.83	34.73	12.49	47.24	12.5	3.775	0.38	29.88	17.36
10.57	35.34	12.58	47.76	12.4	3.844	0.37	30.09	17.67
11.06	35.72	12.70	48.03	12.3	3.903	0.37	30.16	17.86
11.55	36.03	12.77	48.27	12.2	3.946	0.37	30.25	18.02
12.04	36.00	12.86	48.14	12.1	3.965	0.38	30.14	18.00
12.54	36.22	12.91	48.31	12.1	3.997	0.38	30.20	18.11
13.28	36.34	12.98	48.36	12.0	4.023	0.38	30.19	18.17
14.02	37.04	13.00	49.04	12.0	4.088	0.37	30.52	18.52
14.52	37.44	13.00	49.45	12.0	4.119	0.37	30.73	18.72
15.01	37.40	12.95	49.45	12.0	4.105	0.36	30.75	18.70

page 4 of 6

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

Client: HDR Engineering, Inc. Boring No.: EB1-B  
 Client Reference: Bridge No. 66 on US 264 over Pungo Depth (ft): 33-35  
 Project No.: R-2024-155-001 Sample No.: ST-3  
 Lab ID: R-2024-155-001-005  
 Visual Description: Brown Sandy Clay (UND)



**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS  
ASTM D4767-11**

Client: HDR Engineering, Inc.  
 Client Reference: Bridge No. 66 on US 264 over Pungo River  
 Project No.: R-2024-155-001  
 Lab ID: R-2024-155-001-005 Specific Gravity (Assumed) 2.68  
 Visual Description: Brown Sandy Clay (UND)

**SAMPLE CONDITION SUMMARY**

Boring No.:	EB1-B
Depth (ft):	33-35
Sample No.:	ST-3
Test No.:	T1
Deformation Rate (in/min)	0.001
Back Pressure (psi)	60.0
Consolidation Time (days)	2
Moisture Content (%) (INITIAL)	47.7
Total Unit Weight (pcf)	106.6
Dry Unit Weight (pcf)	72.2
Moisture Content (%) (FINAL)	45.0
Initial State Void Ratio, e	1.318
Void Ratio at Shear, e	1.225



Tested By: 129-02-0411 Date: 5/17/24 Approved By: MPS Date: 5/23/24

Tested By: 129-02-0411 Date: 5/17/24 Input Checked By: MPS Date: 5/23/24



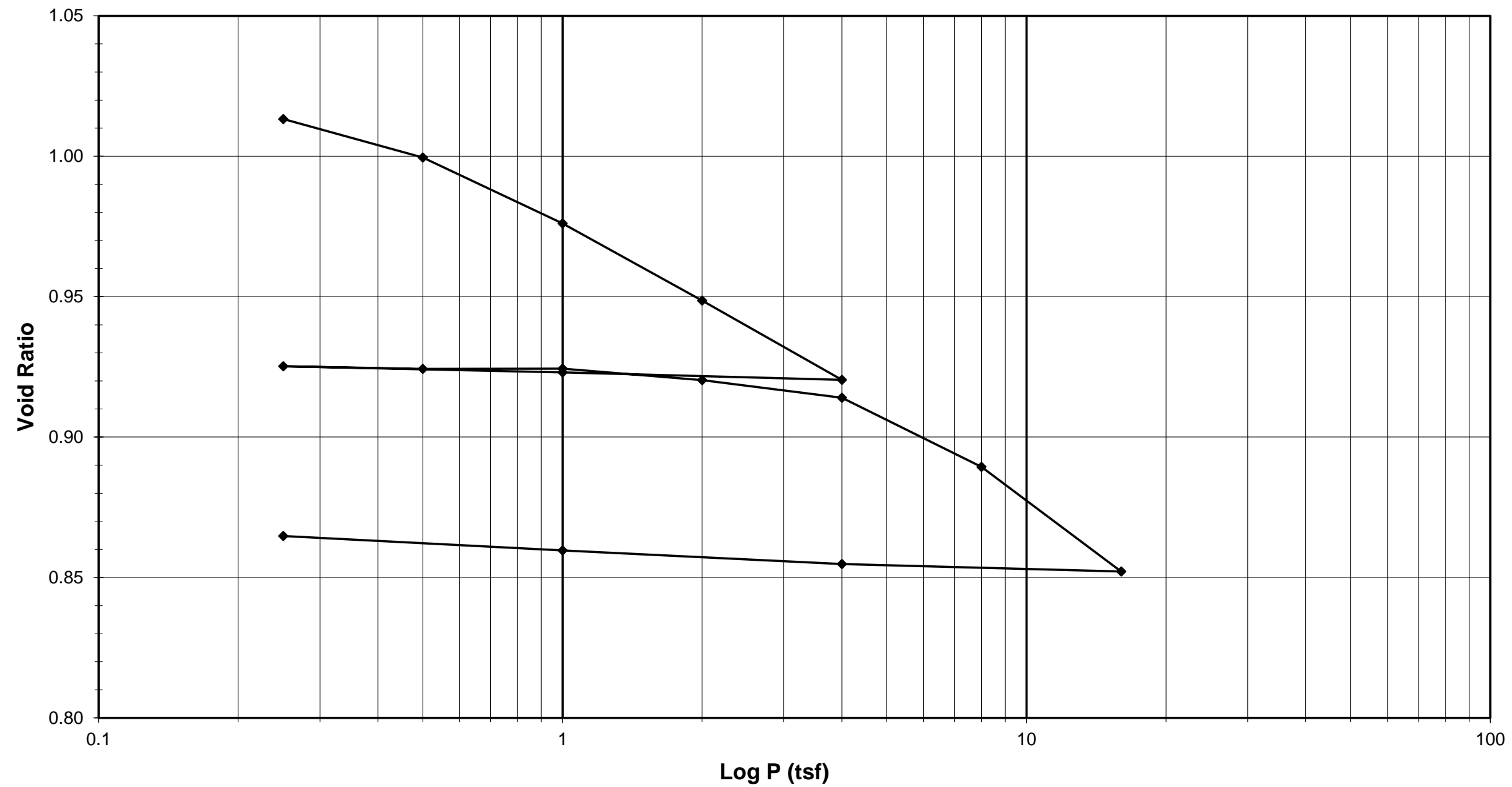
### ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc.  
 Client Project: Bridge No. 66 on US 264 over Pungo River  
 Project No.: R-2024-155-001  
 Lab ID: R-2024-155-001-011

Boring No.: L\_2715\_CL  
 Depth (ft): 13-15  
 Sample No.: ST-2  
 Visual Description: Brown Clayey Sand with Organics

**Sample Conditions:** Undisturbed, Inundated, Double Drained



Tested By DL Date 5/21/24 Approved By MPS Date 5/29/24



## ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc.  
 Client Project: Bridge No. 66 on US 264 over Pungo River  
 Project No.: R-2024-155-001  
 Lab ID: R-2024-155-001-011

Boring No.: L\_2715\_CL  
 Depth (ft): 13-15  
 Sample No.: ST-2  
 Visual Description: Brown Clayey Sand with Organics

**Sample Conditions:** Undisturbed, Inundated, Double Drained

**Consolidometer No.** R-470  
**1 Division** = 0.0001 (in.)

<u>Sample Properties</u>	<u>Initial</u>	<u>Final</u>	<u>Test Data Summary</u>							
<b>Water Content</b>			<b>Applied Pressure</b>	<b>Final Dial Reading</b>	<b>Machine Deflection</b>	<b>Corrected Reading</b>	<b>Height of Sample</b>	<b>Volume</b>	<b>Dry Density</b>	<b>Void Ratio</b>
Tare Number	17-A	13-A	(tsf)	(div)	(div)	(div)	(mm)	(cm <sup>3</sup> )	(g/cm <sup>3</sup> )	
Wt. of Tare & WS (g)	525.47	226.71	Seating	0	0	0	25.400	80.440	1.31865	<b>1.04755</b>
Wt. of Tare & DS (g)	410.20	195.48	0.25	185.0	17.6	167.4	24.975	79.093	1.34110	<b>1.01327</b>
Wt. of Water (g)	115.27	31.23	0.5	268.7	34.4	234.3	24.805	78.555	1.35029	<b>0.99958</b>
Wt. of Tare (g)	90.19	87.70	1	403.2	54.2	348.9	24.514	77.633	1.36632	<b>0.97610</b>
Wt. of DS (g)	320.01	107.78	2	553.0	70.0	483.0	24.173	76.554	1.38558	<b>0.94864</b>
Water Content (%)	36.02	28.98	4	716.5	95.3	621.1	23.822	75.443	1.40598	<b>0.92037</b>
<b>Sample Parameters</b>			1	671.3	63.4	607.9	23.856	75.550	1.40400	<b>0.92307</b>
Sample Diameter (in)	2.5	2.5	0.25	633.3	36.0	597.3	23.883	75.635	1.40242	<b>0.92524</b>
Sample Height (in)	1.0000	0.9107	0.5	644.9	42.7	602.3	23.870	75.595	1.40316	<b>0.92423</b>
Sample Volume (cm <sup>3</sup> )	80.44	73.26	1	660.3	58.6	601.7	23.872	75.599	1.40308	<b>0.92434</b>
Wt. of Wet Sample + Ring (g)	358.94	351.47	2	695.8	74.3	621.5	23.821	75.441	1.40603	<b>0.92030</b>
Wt. of Ring (g)	214.66	214.66	4	748.2	95.9	652.3	23.743	75.193	1.41066	<b>0.91399</b>
Wt. of Wet Sample (g)	144.28	136.81	8	904.1	131.8	772.3	23.438	74.228	1.42901	<b>0.88942</b>
Wet Density (pcf)	111.92	116.53	16	1130.4	176.0	954.4	22.976	72.763	1.45778	<b>0.85214</b>
Wet Density (g/cm <sup>3</sup> )	1.79	1.87	4	1048.6	107.2	941.4	23.009	72.867	1.45569	<b>0.85479</b>
Water Content (%)	36.02	28.98	1	991.0	73.4	917.6	23.069	73.059	1.45188	<b>0.85966</b>
Wt. of Dry Sample (g)	106.07	106.07	0.25	935.4	42.9	892.5	23.133	73.260	1.44788	<b>0.86480</b>
Dry Density (pcf)	82.28	90.35								
Dry Density (g/cm <sup>3</sup> )	1.32	1.45								
Void Ratio	1.0475	0.8648								
Saturation (%)	92.84	90.47								
Specific Gravity	2.70	<i>Assumed</i>								
			<i>Tested By</i>	<i>DL</i>	<i>Date</i>	<i>5/21/24</i>	<i>Checked By</i>	<i>MPS</i>	<i>Date</i>	<i>5/29/24</i>



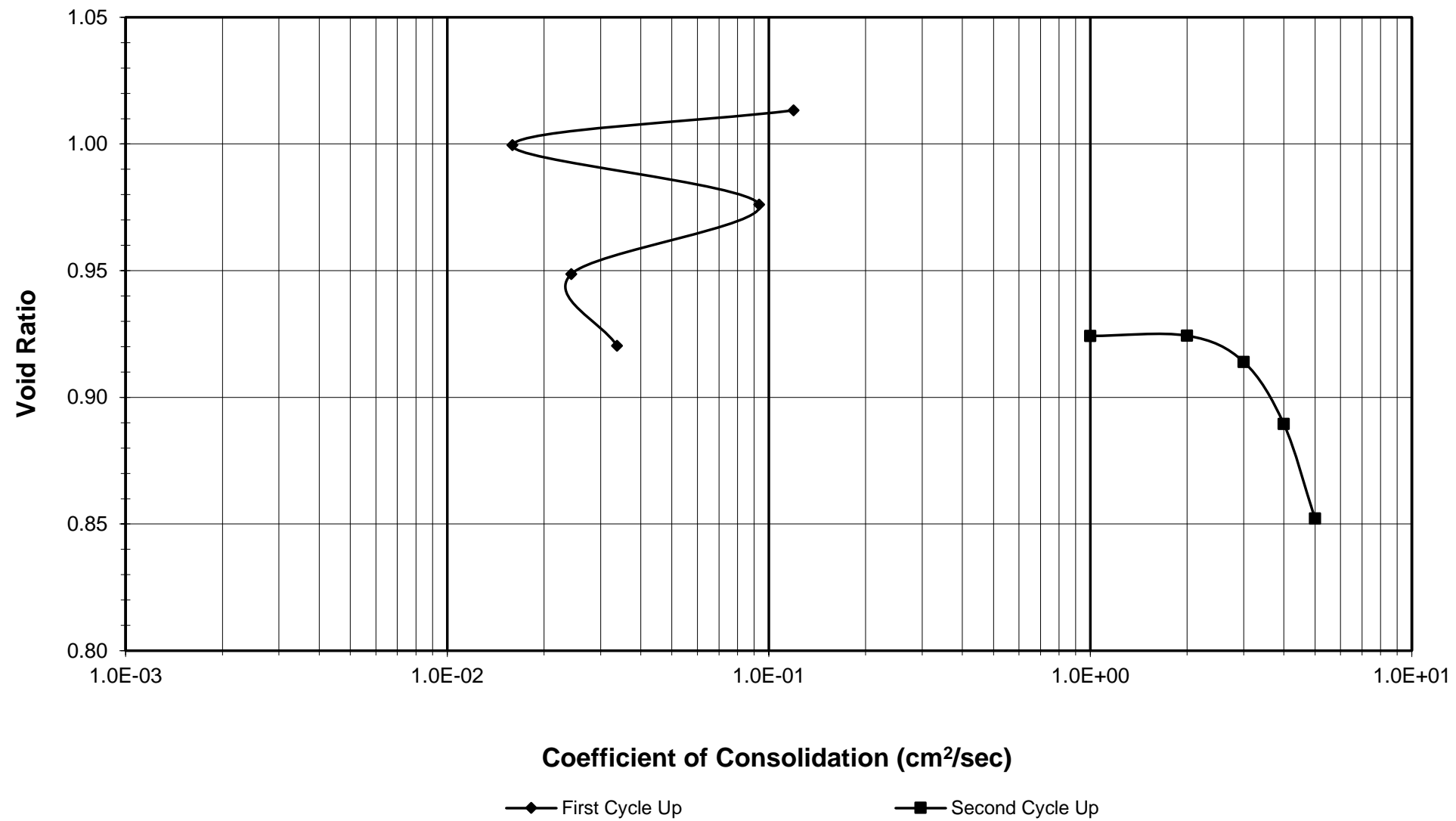
# ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc.  
 Client Project: Bridge No. 66 on US 264 over Pungo River  
 Project No.: R-2024-155-001  
 Lab ID: R-2024-155-001-011

Boring No.: L\_2715\_CL  
 Depth (ft): 13-15  
 Sample No.: ST-2  
 Visual Description: Brown Clayey Sand with Organics

**Sample Conditions:** Undisturbed, Inundated, Double Drained



Tested By DL Date 5/21/24 Checked By MPS Date 5/29/24

## ONE DIMENSIONAL CONSOLIDATION

ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc.  
 Client Project: Bridge No. 66 on US 264 over Pungo River  
 Project No.: R-2024-155-001  
 Lab ID: R-2024-155-001-011

Boring No.: L\_2715\_CL  
 Depth (ft): 13-15  
 Sample No.: ST-2  
 Visual Description: Brown Clayey Sand with Organics

**Sample Conditions:** Undisturbed, Inundated, Double Drained

**Consolidometer No.** R-470  
**1 Division** = 0.0001 (in.)

### C<sub>v</sub> Test Data Summary

<u>Sample Properties</u>	<u>Initial</u>	<u>Final</u>	<u>Load</u>	<u>Dial</u>	<u>Machine</u>	<u>Corrected</u>	<u>Sample</u>	<u>Time</u>	<u>C<sub>v</sub></u>
			<u>Increment</u>	<u>Reading</u>	<u>Deflection</u>	<u>Dial Reading</u>	<u>Height</u>	<u>t<sub>50</sub></u>	<u>(cm<sup>2</sup>/sec)</u>
			(tsf)	@ t <sub>50</sub> (div)	(div)	@ t <sub>50</sub> (div)	@ t <sub>50</sub> (cm)	(min.)	
<b>Water Content</b>									
Tare Number	17-A	13-A							
Wt. of Tare & WS (g)	525.47	226.71							
Wt. of Tare & DS (g)	410.20	195.48							
Wt. of Water (g)	115.27	31.23	0 - 0.25	57.8	17.6	40.2	2.530	<b>0.04</b>	<b>0.1194</b>
Wt. of Tare (g)	90.19	87.70	0.25 - 0.5	218.5	34.4	184.1	2.493	<b>0.32</b>	<b>0.0159</b>
Wt. of DS (g)	320.01	107.78	0.5 - 1	292.7	54.2	238.4	2.479	<b>0.05</b>	<b>0.0934</b>
Water Content (%)	36.02	28.98	1 - 2	487.3	70.0	417.2	2.434	<b>0.20</b>	<b>0.0243</b>
			2 - 4	650.2	95.3	554.8	2.399	<b>0.14</b>	<b>0.0337</b>
			4 - 1	NA	NA	NA	NA	<b>NA</b>	<b>NA</b>
<b>Sample Parameters</b>									
Sample Diameter (in)	2.5	2.5	1 - 0.25	NA	NA	NA	NA	<b>NA</b>	<b>NA</b>
Sample Height (in)	1.0000	0.9107	0.25 - 0.5	NA	NA	NA	NA	<b>NA</b>	<b>NA</b>
Sample Volume (cm <sup>3</sup> )	80.44	73.26	0.5 - 1	657.0	58.6	598.4	2.388	<b>20.00</b>	<b>0.0002</b>
Wt. of Wet Sample + Ring (g)	358.94	351.47	1 - 2	NA	NA	NA	NA	<b>NA</b>	<b>NA</b>
Wt. of Ring (g)	214.66	214.66	2 - 4	740.7	95.9	644.7	2.376	<b>39.00</b>	<b>0.0001</b>
Wt. of Wet Sample (g)	144.28	136.81	4 - 8	834.4	131.8	702.5	2.362	<b>0.08</b>	<b>0.0565</b>
Wet Density (pcf)	111.92	116.53	8 - 16	1057.0	176.0	881.0	2.316	<b>0.09</b>	<b>0.0484</b>
Wet Density (g/cm <sup>3</sup> )	1.79	1.87	16 - 4	NA	NA	NA	NA	<b>NA</b>	<b>NA</b>
Water Content (%)	36.02	28.98	4 - 1	NA	NA	NA	NA	<b>NA</b>	<b>NA</b>
Wt. of Dry Sample (g)	106.07	106.07	1 - 0.25	NA	NA	NA	NA	<b>NA</b>	<b>NA</b>
Dry Density (pcf)	82.28	90.35							
Dry Density (g/cm <sup>3</sup> )	1.32	1.45							
Void Ratio	1.0475	0.8648							
Saturation (%)	92.84	90.47							
Specific Gravity	2.70	Assumed							

Tested By DL Date 5/21/24 Checked By MPS Date 5/29/24

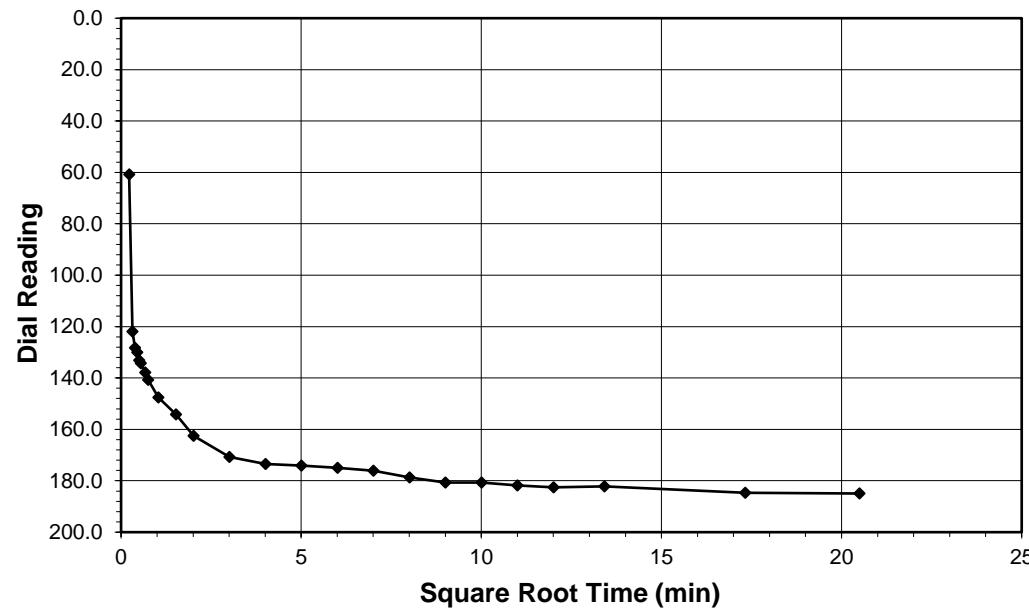


**ONE DIMENSIONAL CONSOLIDATION**

ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc. Boring No.: L\_2715\_CL  
 Client Project: Bridge No. 66 on US 264 over Pungo River Depth (ft): 13-15  
 Project No.: R-2024-155-001 Sample No.: ST-2  
 Lab ID: R-2024-155-001-011 Visual Description: Brown Clayey Sand with Organics

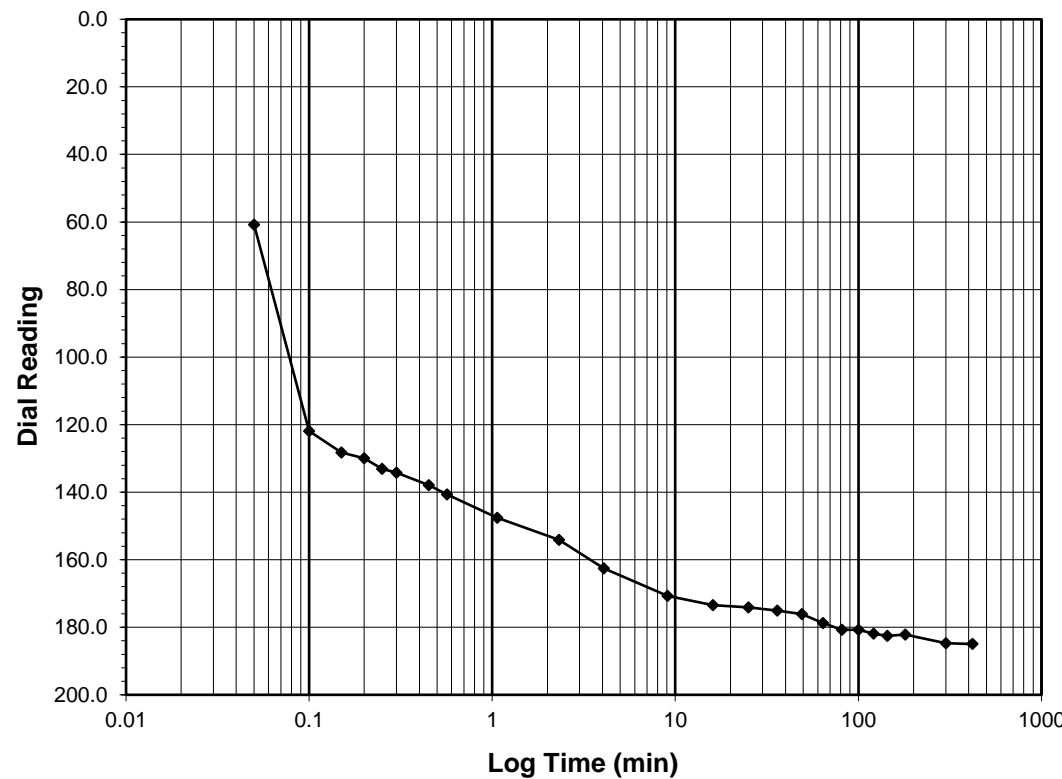
Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load (tsf) 0 - 0.25  
 Final Reading (div) 185.0  
 Consolidometer No. R-470  
 1 Division (in) 0.0001

Start Date 5/21/24  
 Start Time 16:28:42

Elapsed Time (min)	Dial Reading (div)
Initial	0.0
0.05	60.8
0.10	121.9
0.15	128.2
0.20	130.0
0.25	133.1
0.30	134.3
0.45	137.9
0.57	140.7
1.07	147.6
2.32	154.1
4.07	162.5
9.07	170.7
16.07	173.5
25.07	174.1
36.07	175.0
49.07	176.1
64.07	178.7
81.07	180.7
100.07	180.7
121.07	181.9
144.07	182.5
180.07	182.2
300.07	184.7
420.03	185.0



Tested By DL Date 5/21/24 Checked By MPS Date 1/24/24

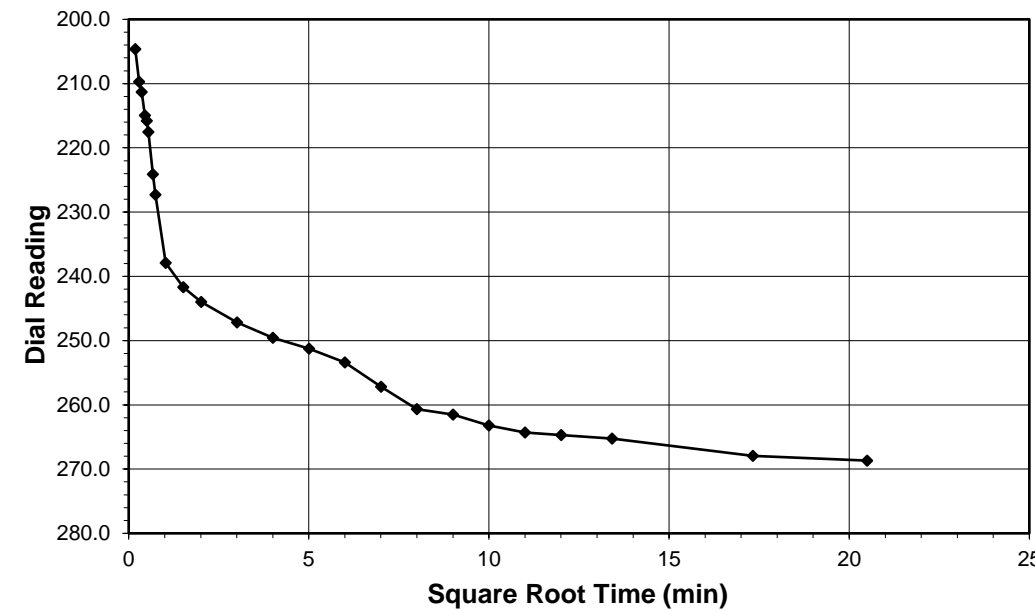


**ONE DIMENSIONAL CONSOLIDATION**

ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc. Boring No.: L\_2715\_CL  
 Client Project: Bridge No. 66 on US 264 over Pungo River Depth (ft): 13-15  
 Project No.: R-2024-155-001 Sample No.: ST-2  
 Lab ID: R-2024-155-001-011 Visual Description: Brown Clayey Sand with Organics

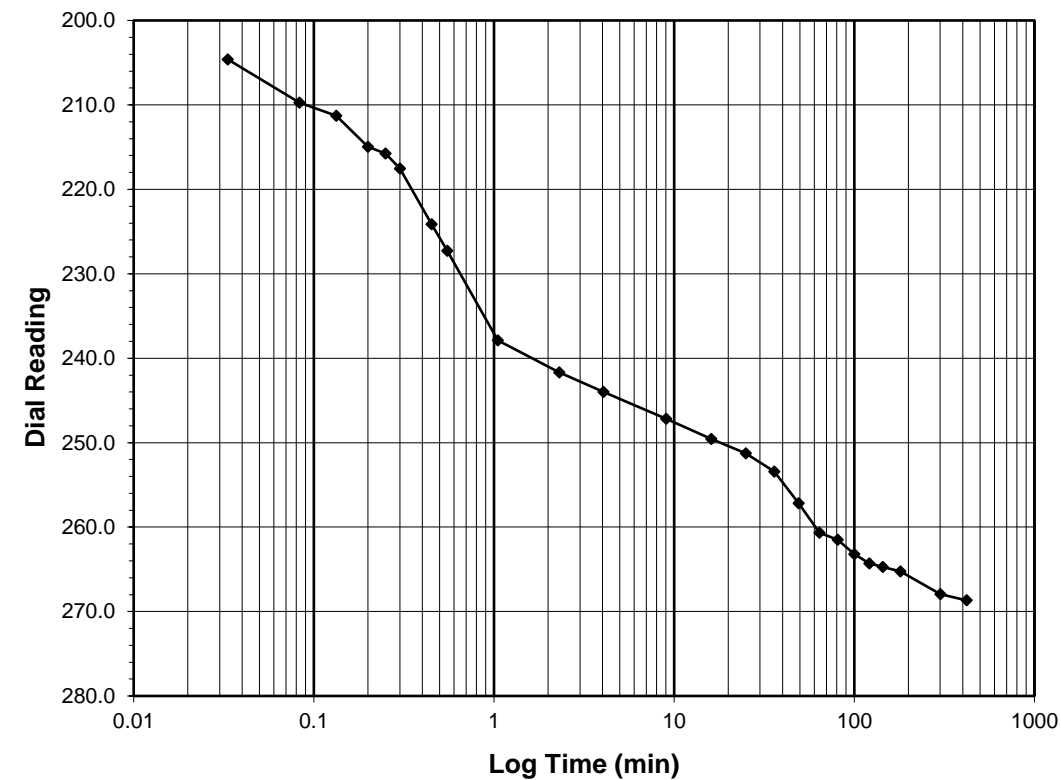
Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load (tsf) 0.25 - 0.5  
 Final Reading (div) 268.7  
 Consolidometer No. R-470  
 1 Division (in) 0.0001

Start Date 5/21/24  
 Start Time 23:28:44

Elapsed Time (min)	Dial Reading (div)
Initial	185.0
0.03	204.6
0.08	209.7
0.13	211.3
0.20	215.0
0.25	215.8
0.30	217.5
0.45	224.1
0.55	227.3
1.05	237.9
2.30	241.7
4.05	244.0
9.05	247.2
16.05	249.6
25.05	251.2
36.05	253.4
49.05	257.2
64.05	260.7
81.05	261.5
100.05	263.2
121.05	264.3
144.07	264.7
180.07	265.3
300.07	267.9
420.02	268.7



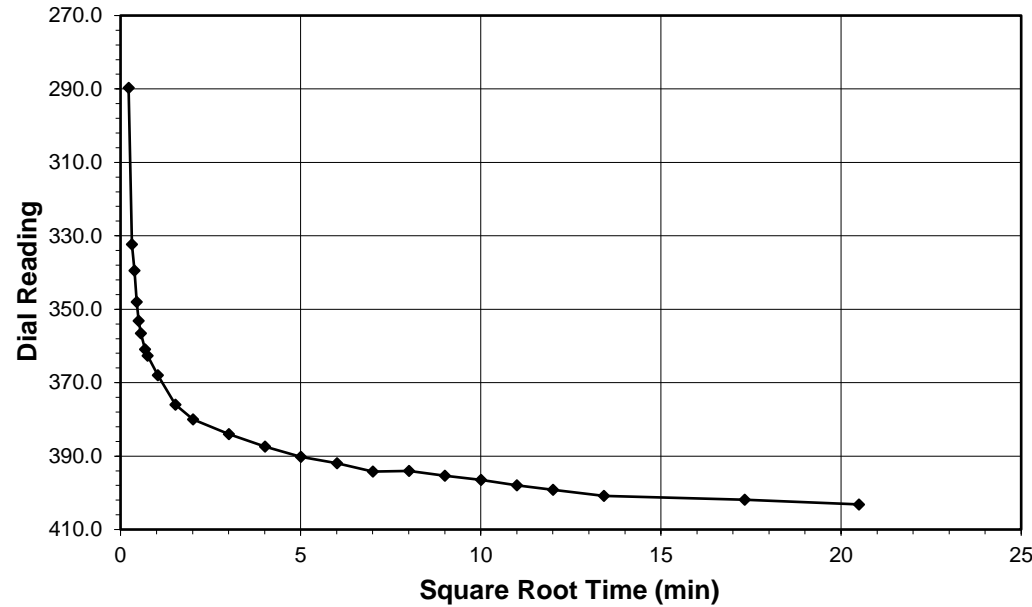
Tested By DL Date 5/21/24 Checked By MPS Date 1/24/24



**ONE DIMENSIONAL CONSOLIDATION**  
ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc. Boring No.: L\_2715\_CL  
 Client Project: Bridge No. 66 on US 264 over Pungo River Depth (ft): 13-15  
 Project No.: R-2024-155-001 Sample No.: ST-2  
 Lab ID: R-2024-155-001-011 Visual Description: Brown Clayey Sand with Organics

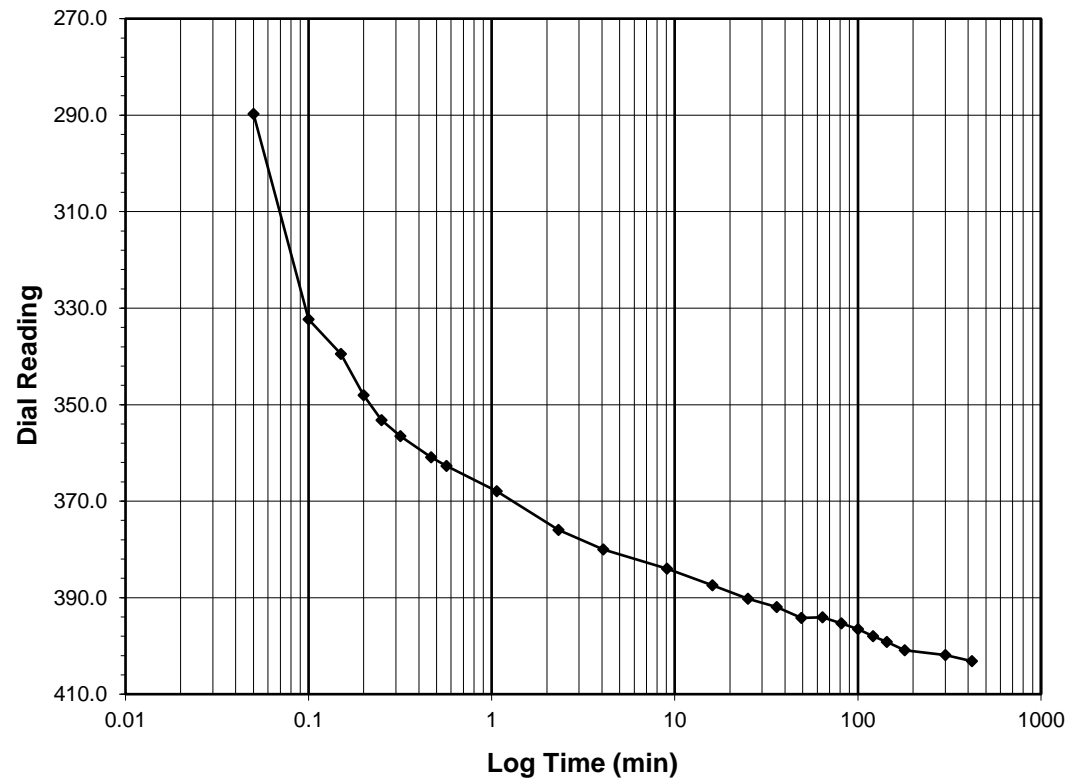
**Sample Conditions:** Undisturbed, Inundated, Double Drained



**Test Load (tsf) 0.5 - 1**  
**Final Reading (div) 403.2**  
 Consolidometer No. **R-470**  
 1 Division (in) 0.0001

Start Date 5/22/24  
 Start Time 6:28:46

Elapsed Time (min)	Dial Reading (div)
<b>Initial</b>	<b>268.7</b>
0.05	289.7
0.10	332.3
0.15	339.5
0.20	348.1
0.25	353.2
0.32	356.6
0.47	360.9
0.57	362.7
1.07	368.0
2.32	376.0
4.07	380.0
9.07	384.0
16.07	387.4
25.07	390.2
36.07	392.0
49.07	394.2
64.07	394.0
81.07	395.3
100.07	396.5
121.07	398.0
144.07	399.2
180.08	400.9
300.08	401.9
420.05	403.2



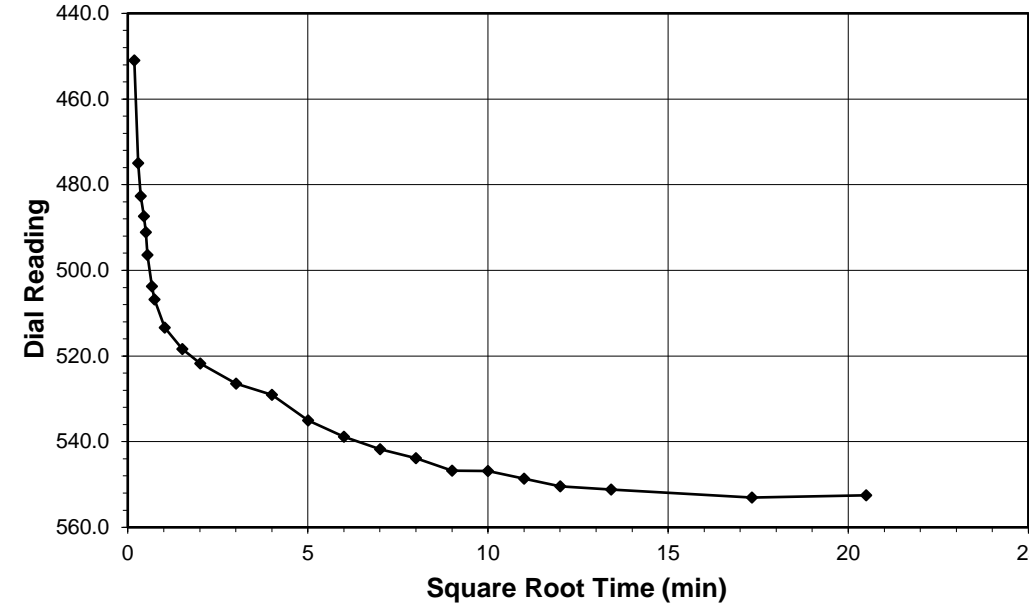
Tested By DL Date 5/22/24 Checked By MPS Date 1/24/24



**ONE DIMENSIONAL CONSOLIDATION**  
ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc. Boring No.: L\_2715\_CL  
 Client Project: Bridge No. 66 on US 264 over Pungo River Depth (ft): 13-15  
 Project No.: R-2024-155-001 Sample No.: ST-2  
 Lab ID: R-2024-155-001-011 Visual Description: Brown Clayey Sand with Organics

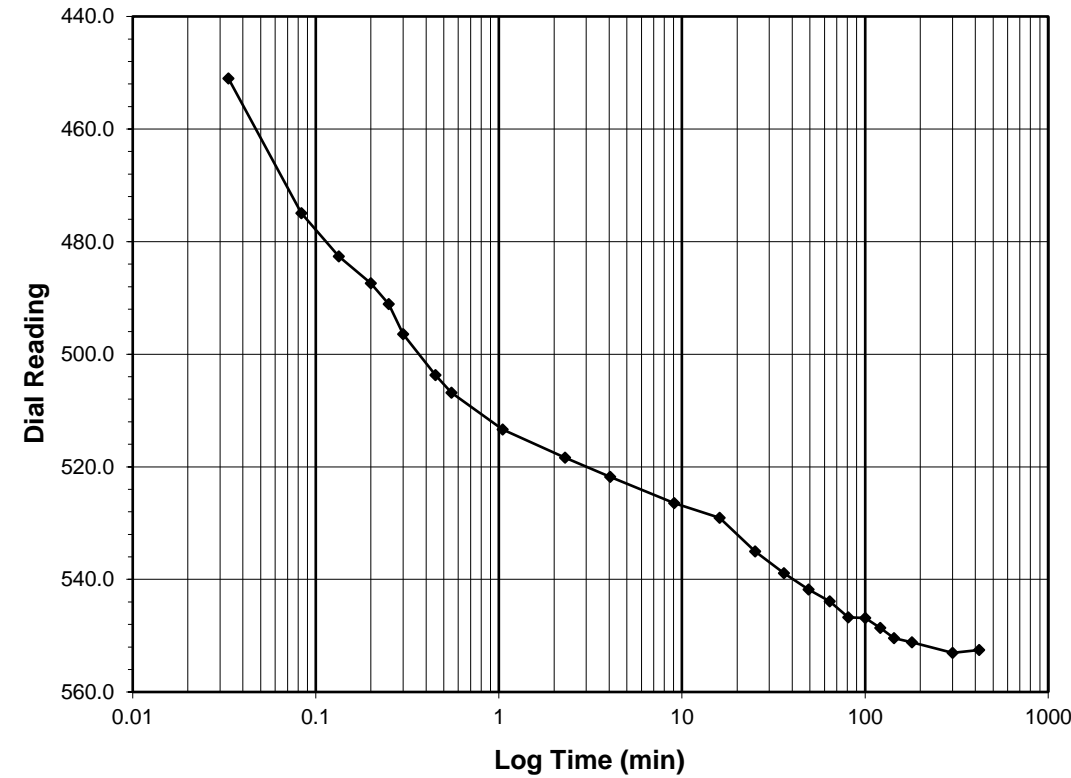
**Sample Conditions:** Undisturbed, Inundated, Double Drained



**Test Load (tsf) 1 - 2**  
**Final Reading (div) 553.0**  
 Consolidometer No. **R-470**  
 1 Division (in) 0.0001

Start Date 5/22/24  
 Start Time 13:28:49

Elapsed Time (min)	Dial Reading (div)
<b>Initial</b>	<b>403.2</b>
0.03	451.0
0.08	475.0
0.13	482.6
0.20	487.4
0.25	491.1
0.30	496.4
0.45	503.7
0.55	506.8
1.05	513.4
2.30	518.4
4.05	521.8
9.05	526.5
16.05	529.1
25.05	535.0
36.05	538.9
49.05	541.8
64.05	543.9
81.05	546.8
100.05	546.8
121.05	548.6
144.05	550.4
180.05	551.2
300.05	553.0
420.02	552.6



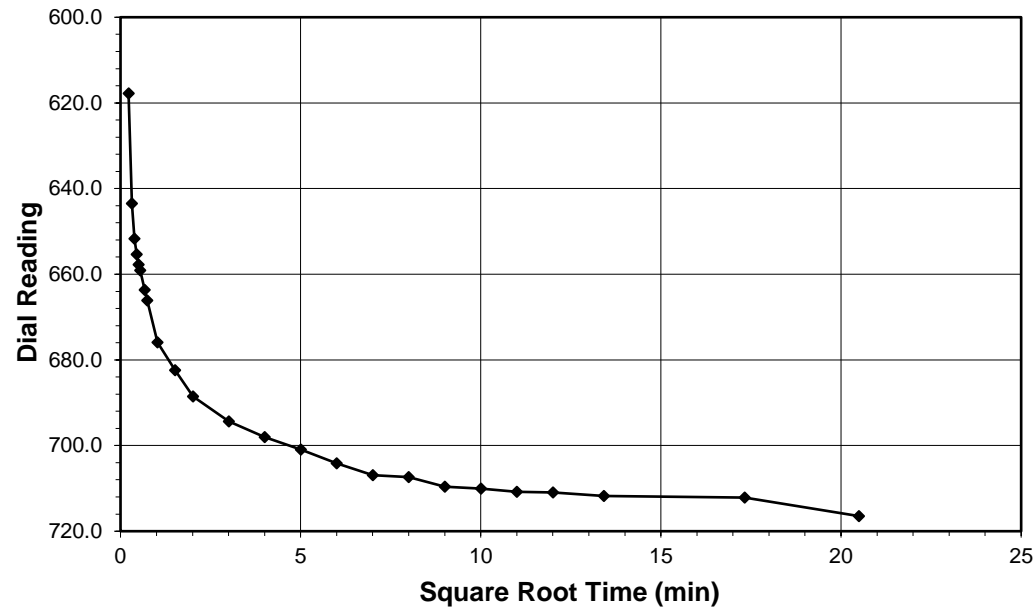
Tested By DL Date 5/22/24 Checked By MPS Date 1/24/24



**ONE DIMENSIONAL CONSOLIDATION**  
ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc. Boring No.: L\_2715\_CL  
 Client Project: Bridge No. 66 on US 264 over Pungo River Depth (ft): 13-15  
 Project No.: R-2024-155-001 Sample No.: ST-2  
 Lab ID: R-2024-155-001-011 Visual Description: Brown Clayey Sand with Organics

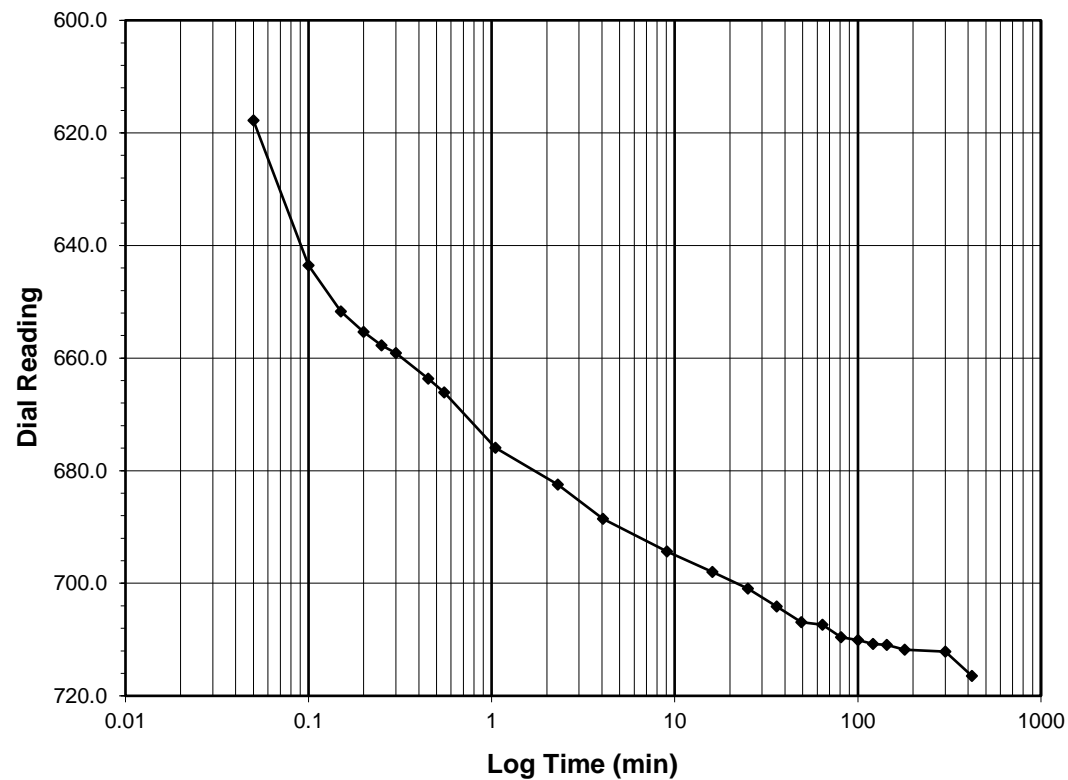
Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load (tsf) 2 - 4  
 Final Reading (div) 716.5  
 Consolidometer No. R-470  
 1 Division (in) 0.0001

Start Date 5/22/24  
 Start Time 20:28:51

Elapsed Time (min)	Dial Reading (div)
<b>Initial</b>	<b>553.0</b>
0.05	617.8
0.10	643.5
0.15	651.7
0.20	655.3
0.25	657.7
0.30	659.1
0.45	663.7
0.55	666.1
1.05	675.9
2.30	682.4
4.05	688.5
9.05	694.3
16.05	698.0
25.05	700.9
36.05	704.1
49.05	706.9
64.05	707.4
81.05	709.6
100.07	710.1
121.07	710.8
144.07	710.9
180.07	711.8
300.07	712.2
420.07	716.5



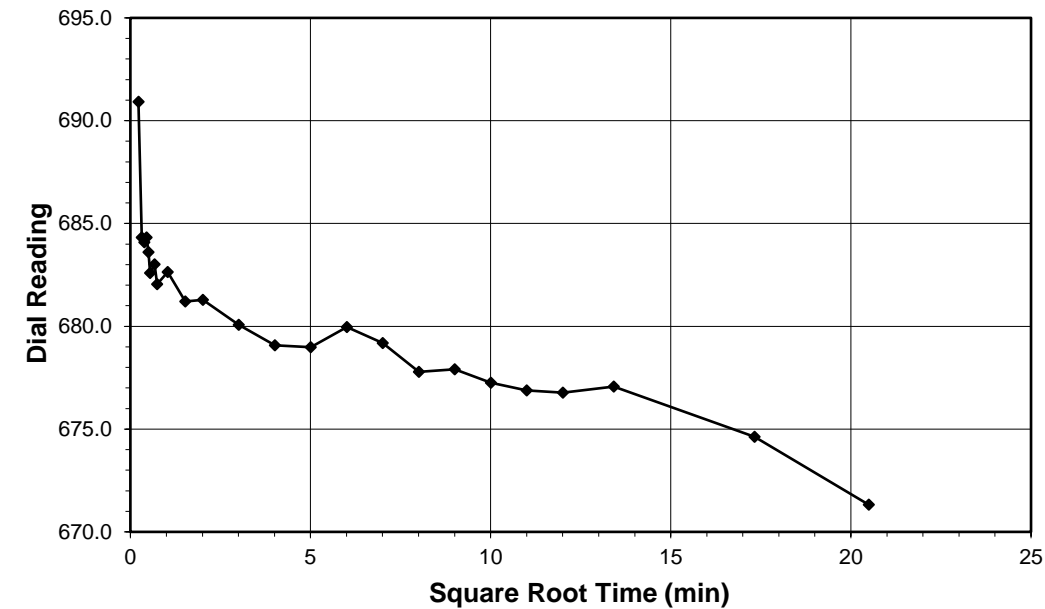
Tested By DL Date 5/22/24 Checked By MPS Date 1/24/24



**ONE DIMENSIONAL CONSOLIDATION**  
ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc. Boring No.: L\_2715\_CL  
 Client Project: Bridge No. 66 on US 264 over Pungo River Depth (ft): 13-15  
 Project No.: R-2024-155-001 Sample No.: ST-2  
 Lab ID: R-2024-155-001-011 Visual Description: Brown Clayey Sand with Organics

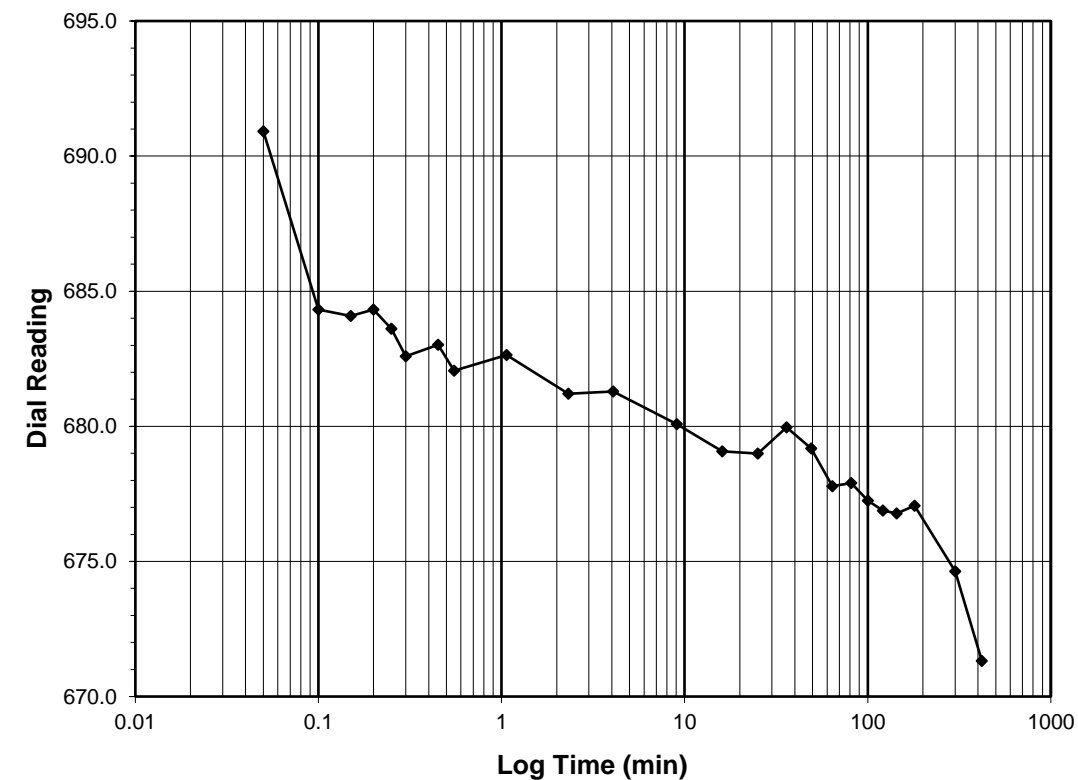
Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load (tsf) 4 - 1  
 Final Reading (div) 671.3  
 Consolidometer No. R-470  
 1 Division (in) 0.0001

Start Date 5/23/24  
 Start Time 3:28:55

Elapsed Time (min)	Dial Reading (div)
<b>Initial</b>	<b>716.5</b>
0.05	690.9
0.10	684.3
0.15	684.1
0.20	684.3
0.25	683.6
0.30	682.6
0.45	683.0
0.55	682.1
1.07	682.6
2.32	681.2
4.07	681.3
9.07	680.1
16.07	679.1
25.07	679.0
36.07	680.0
49.07	679.2
64.07	677.8
81.07	677.9
100.07	677.2
121.07	676.9
144.07	676.8
180.07	677.1
300.08	674.6
420.15	671.3



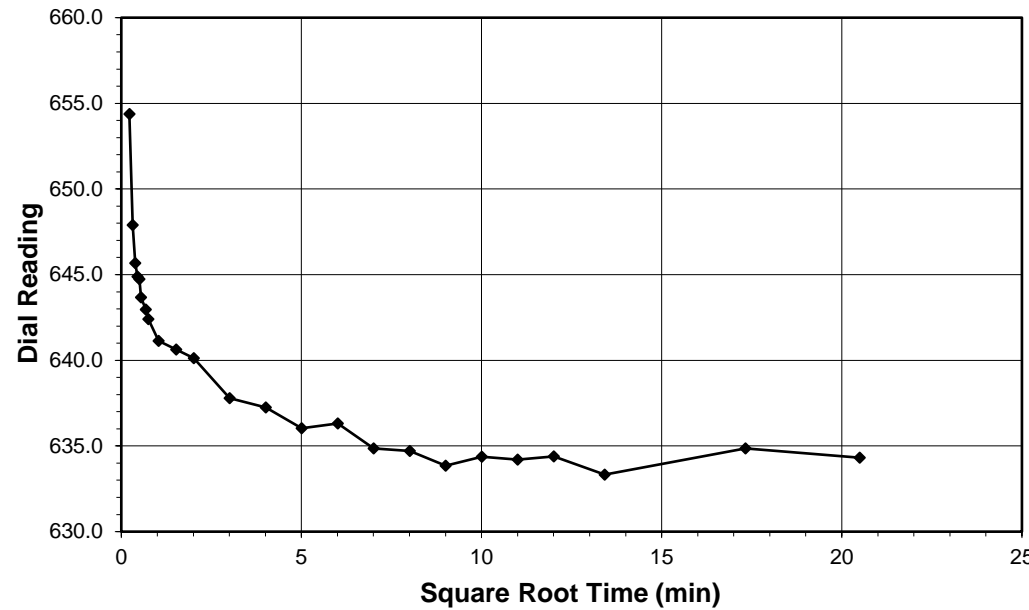
Tested By DL Date 5/23/24 Checked By MPS Date 1/24/24



**ONE DIMENSIONAL CONSOLIDATION**  
ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc. Boring No.: L\_2715\_CL  
 Client Project: Bridge No. 66 on US 264 over Pungo River Depth (ft): 13-15  
 Project No.: R-2024-155-001 Sample No.: ST-2  
 Lab ID: R-2024-155-001-011 Visual Description: Brown Clayey Sand with Organics

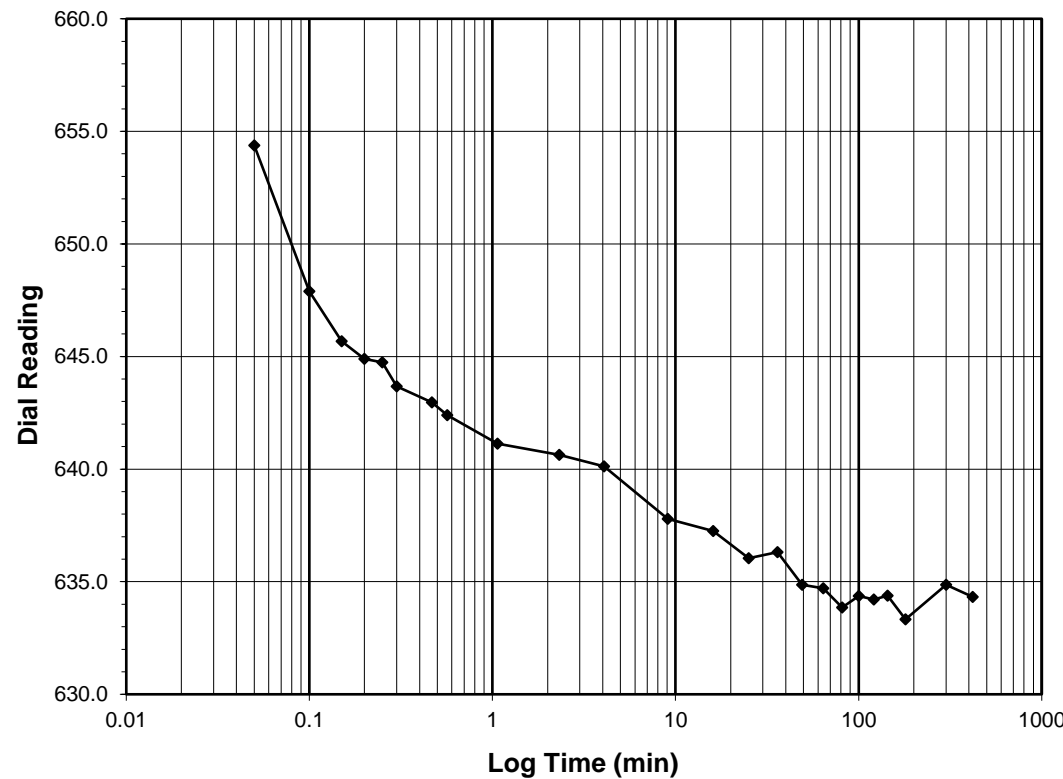
Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load (tsf) 1 - 0.25  
 Final Reading (div) 633.3  
 Consolidometer No. R-470  
 1 Division (in) 0.0001

Start Date 5/23/24  
 Start Time 10:29:04

Elapsed Time (min)	Dial Reading (div)
Initial	671.3
0.05	654.4
0.10	647.9
0.15	645.7
0.20	644.9
0.25	644.7
0.30	643.7
0.47	643.0
0.57	642.4
1.07	641.1
2.32	640.6
4.07	640.1
9.07	637.8
16.07	637.3
25.07	636.0
36.07	636.3
49.07	634.9
64.07	634.7
81.07	633.9
100.07	634.4
121.07	634.2
144.07	634.4
180.07	633.3
300.07	634.9
420.10	634.3



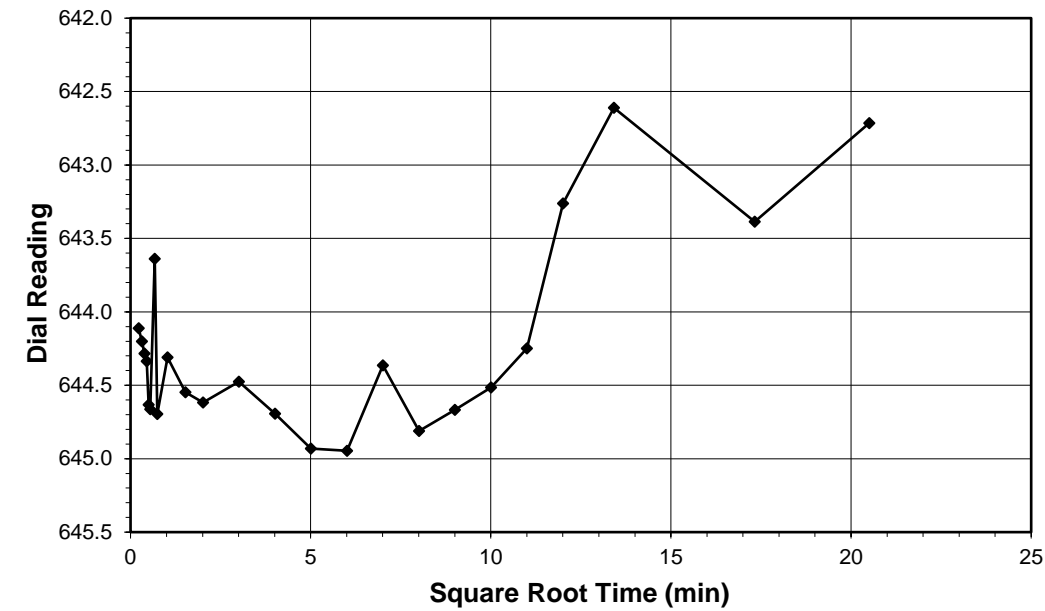
Tested By DL Date 5/23/24 Checked By MPS Date 1/24/24



**ONE DIMENSIONAL CONSOLIDATION**  
ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc. Boring No.: L\_2715\_CL  
 Client Project: Bridge No. 66 on US 264 over Pungo River Depth (ft): 13-15  
 Project No.: R-2024-155-001 Sample No.: ST-2  
 Lab ID: R-2024-155-001-011 Visual Description: Brown Clayey Sand with Organics

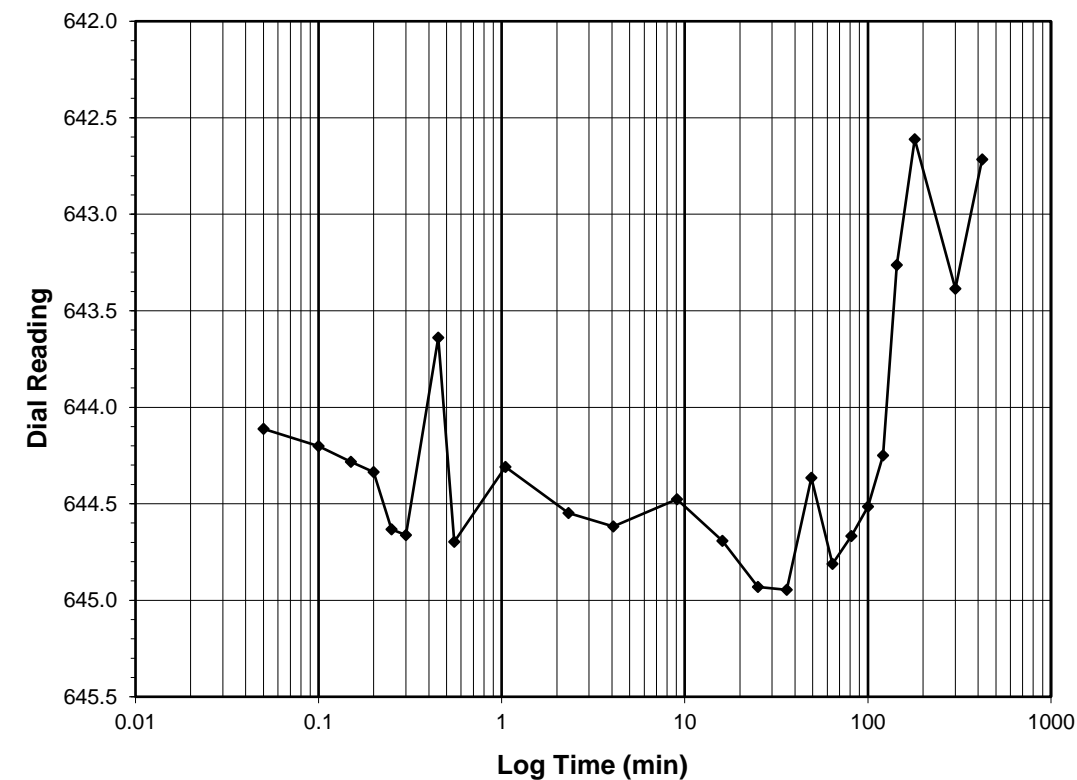
Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load (tsf) 0.25 - 0.5  
 Final Reading (div) 644.9  
 Consolidometer No. R-470  
 1 Division (in) 0.0001

Start Date 5/23/24  
 Start Time 17:29:10

Elapsed Time (min)	Dial Reading (div)
Initial	633.3
0.05	644.1
0.10	644.2
0.15	644.3
0.20	644.3
0.25	644.6
0.30	644.7
0.45	643.6
0.55	644.7
1.05	644.3
2.32	644.5
4.07	644.6
9.07	644.5
16.07	644.7
25.07	644.9
36.07	644.9
49.07	644.4
64.07	644.8
81.07	644.7
100.07	644.5
121.07	644.2
144.07	643.3
180.07	642.6
300.07	643.4
420.42	642.7



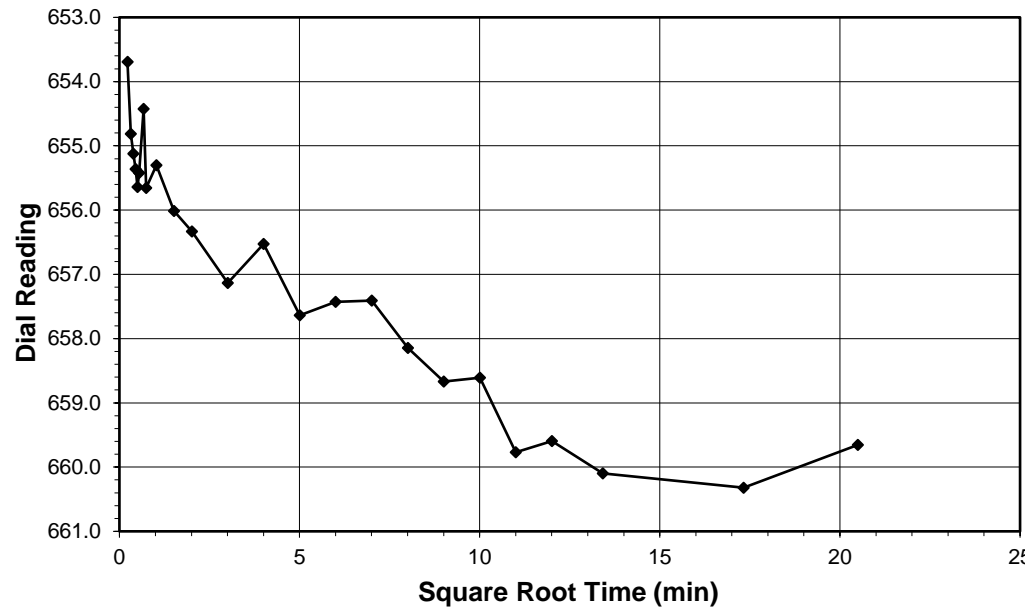
Tested By DL Date 5/23/24 Checked By MPS Date 1/24/24



**ONE DIMENSIONAL CONSOLIDATION**  
ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc. Boring No.: L\_2715\_CL  
 Client Project: Bridge No. 66 on US 264 over Pungo River Depth (ft): 13-15  
 Project No.: R-2024-155-001 Sample No.: ST-2  
 Lab ID: R-2024-155-001-011 Visual Description: Brown Clayey Sand with Organics

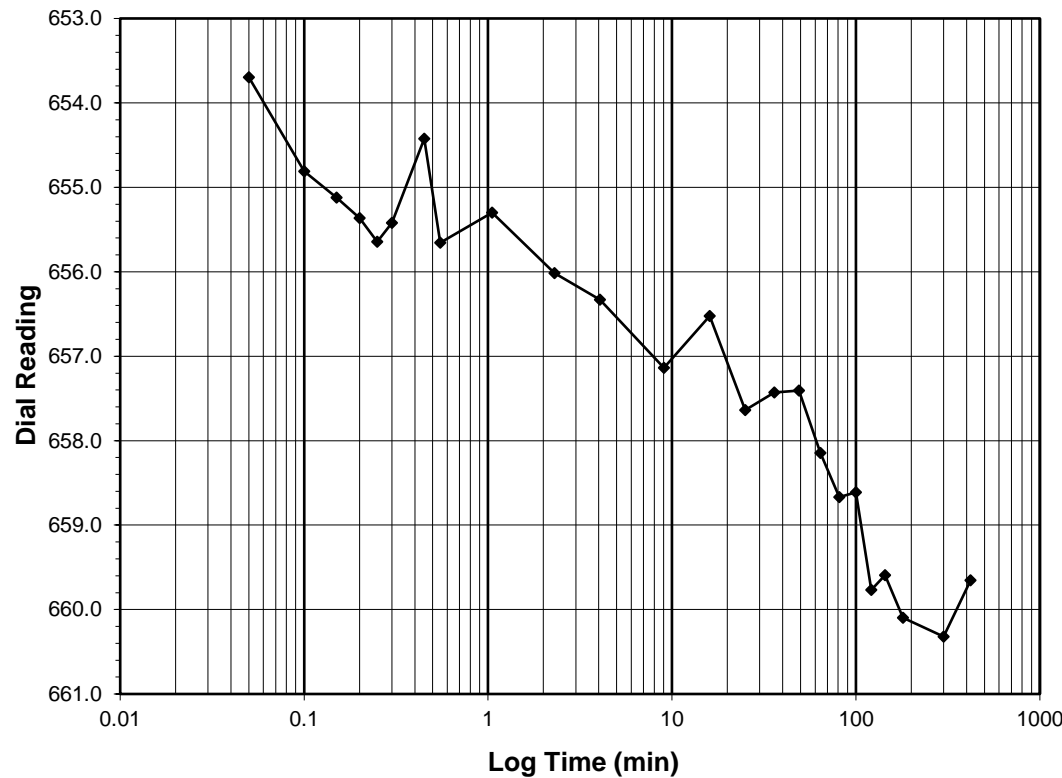
Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load (tsf) 0.5 - 1  
 Final Reading (div) 660.3  
 Consolidometer No. R-470  
 1 Division (in) 0.0001

Start Date 5/24/24  
 Start Time 0:29:36

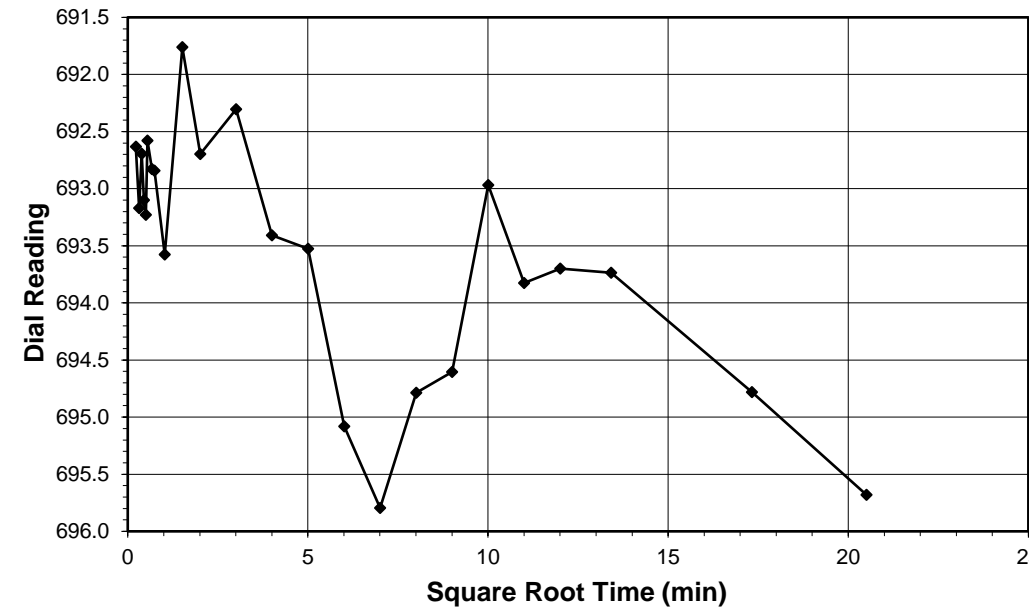
Elapsed Time (min)	Dial Reading (div)
Initial	644.9
0.05	653.7
0.10	654.8
0.15	655.1
0.20	655.4
0.25	655.6
0.30	655.4
0.45	654.4
0.55	655.7
1.05	655.3
2.30	656.0
4.05	656.3
9.05	657.1
16.05	656.5
25.05	657.6
36.05	657.4
49.05	657.4
64.07	658.1
81.07	658.7
100.07	658.6
121.07	659.8
144.07	659.6
180.07	660.1
300.07	660.3
420.07	659.7



**ONE DIMENSIONAL CONSOLIDATION**  
ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc. Boring No.: L\_2715\_CL  
 Client Project: Bridge No. 66 on US 264 over Pungo River Depth (ft): 13-15  
 Project No.: R-2024-155-001 Sample No.: ST-2  
 Lab ID: R-2024-155-001-011 Visual Description: Brown Clayey Sand with Organics

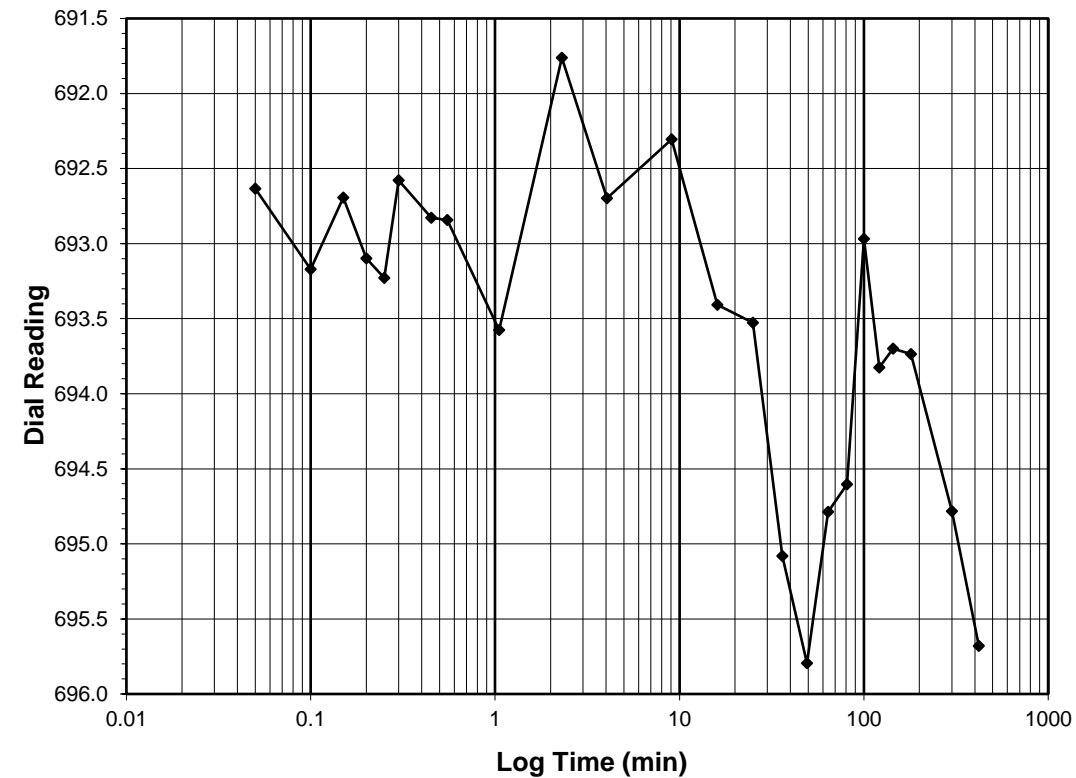
Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load (tsf) 1 - 2  
 Final Reading (div) 695.8  
 Consolidometer No. R-470  
 1 Division (in) 0.0001

Start Date 5/24/24  
 Start Time 7:29:40

Elapsed Time (min)	Dial Reading (div)
Initial	660.3
0.05	692.6
0.10	693.2
0.15	692.7
0.20	693.1
0.25	693.2
0.30	692.6
0.45	692.8
0.55	692.8
1.05	693.6
2.30	691.8
4.05	692.7
9.05	692.3
16.05	693.4
25.05	693.5
36.07	695.1
49.07	695.8
64.07	694.8
81.07	694.6
100.07	693.0
121.07	693.8
144.07	693.7
180.07	693.7
300.07	694.8
420.47	695.7



Tested By DL Date 5/24/24 Checked By MPS Date 1/24/24

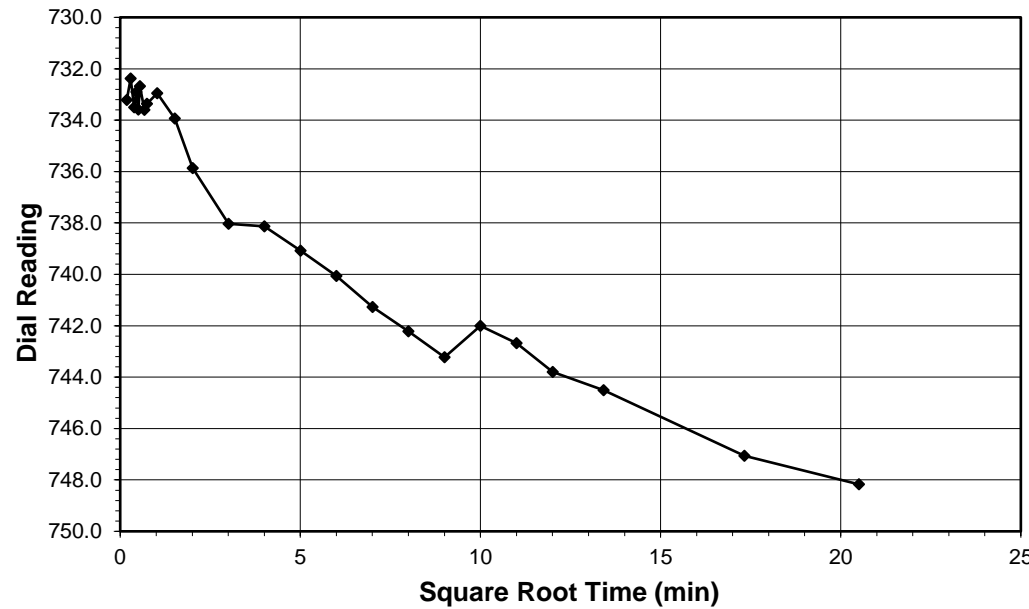
Tested By DL Date 5/24/24 Checked By MPS Date 1/24/24



**ONE DIMENSIONAL CONSOLIDATION**  
ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc. Boring No.: L\_2715\_CL  
 Client Project: Bridge No. 66 on US 264 over Pungo River Depth (ft): 13-15  
 Project No.: R-2024-155-001 Sample No.: ST-2  
 Lab ID: R-2024-155-001-011 Visual Description: Brown Clayey Sand with Organics

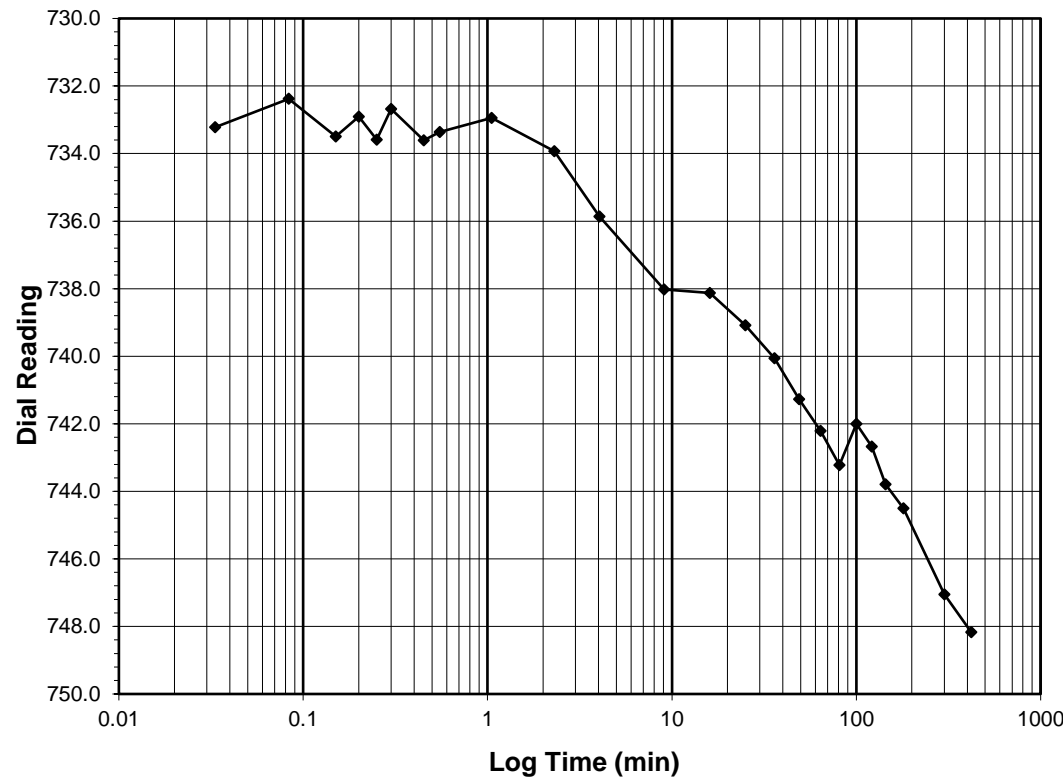
Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load (tsf) 2 - 4  
 Final Reading (div) 748.2  
 Consolidometer No. R-470  
 1 Division (in) 0.0001

Start Date 5/24/24  
 Start Time 14:30:08

Elapsed Time (min)	Dial Reading (div)
<b>Initial</b>	<b>695.8</b>
0.03	733.2
0.08	732.4
0.15	733.5
0.20	732.9
0.25	733.6
0.30	732.7
0.45	733.6
0.55	733.4
1.05	732.9
2.30	733.9
4.05	735.9
9.05	738.0
16.05	738.1
25.05	739.1
36.05	740.1
49.05	741.3
64.05	742.2
81.05	743.2
100.05	742.0
121.07	742.7
144.07	743.8
180.07	744.5
300.07	747.1
420.45	748.2



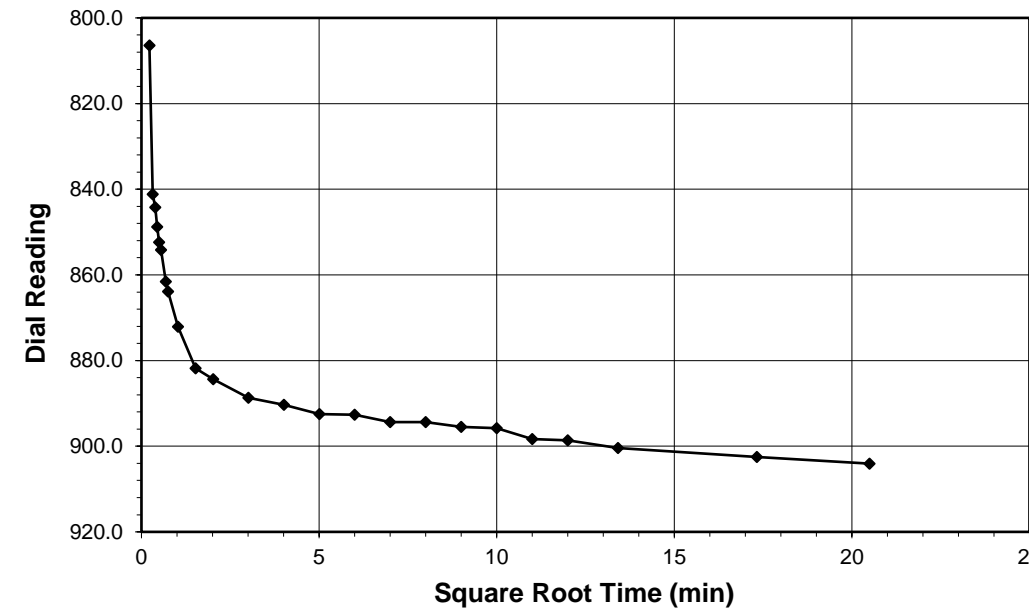
Tested By DL Date 5/24/24 Checked By MPS Date 1/24/24



**ONE DIMENSIONAL CONSOLIDATION**  
ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc. Boring No.: L\_2715\_CL  
 Client Project: Bridge No. 66 on US 264 over Pungo River Depth (ft): 13-15  
 Project No.: R-2024-155-001 Sample No.: ST-2  
 Lab ID: R-2024-155-001-011 Visual Description: Brown Clayey Sand with Organics

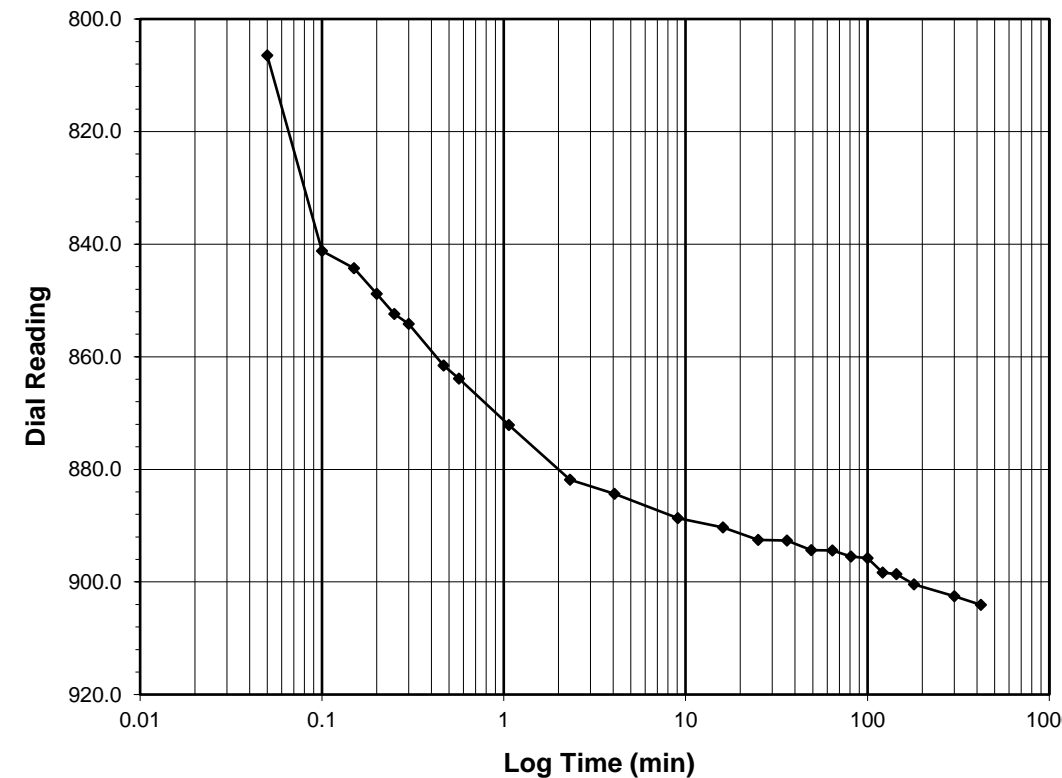
Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load (tsf) 4 - 8  
 Final Reading (div) 904.1  
 Consolidometer No. R-470  
 1 Division (in) 0.0001

Start Date 5/24/24  
 Start Time 21:30:36

Elapsed Time (min)	Dial Reading (div)
<b>Initial</b>	<b>748.2</b>
0.05	806.5
0.10	841.2
0.15	844.3
0.20	848.8
0.25	852.4
0.30	854.2
0.47	861.6
0.57	863.9
1.07	872.1
2.32	881.8
4.07	884.3
9.07	888.7
16.07	890.3
25.07	892.5
36.07	892.7
49.07	894.4
64.07	894.4
81.07	895.5
100.07	895.8
121.07	898.3
144.07	898.6
180.07	900.4
300.07	902.5
420.07	904.1



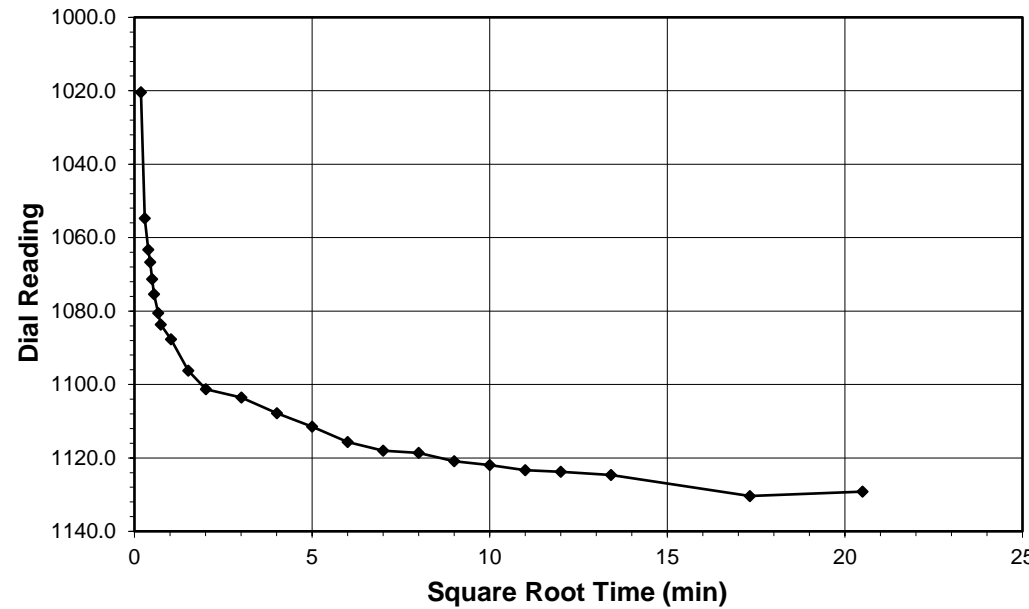
Tested By DL Date 5/24/24 Checked By MPS Date 1/24/24



**ONE DIMENSIONAL CONSOLIDATION**  
ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc. Boring No.: L\_2715\_CL  
 Client Project: Bridge No. 66 on US 264 over Pungo River Depth (ft): 13-15  
 Project No.: R-2024-155-001 Sample No.: ST-2  
 Lab ID: R-2024-155-001-011 Visual Description: Brown Clayey Sand with Organics

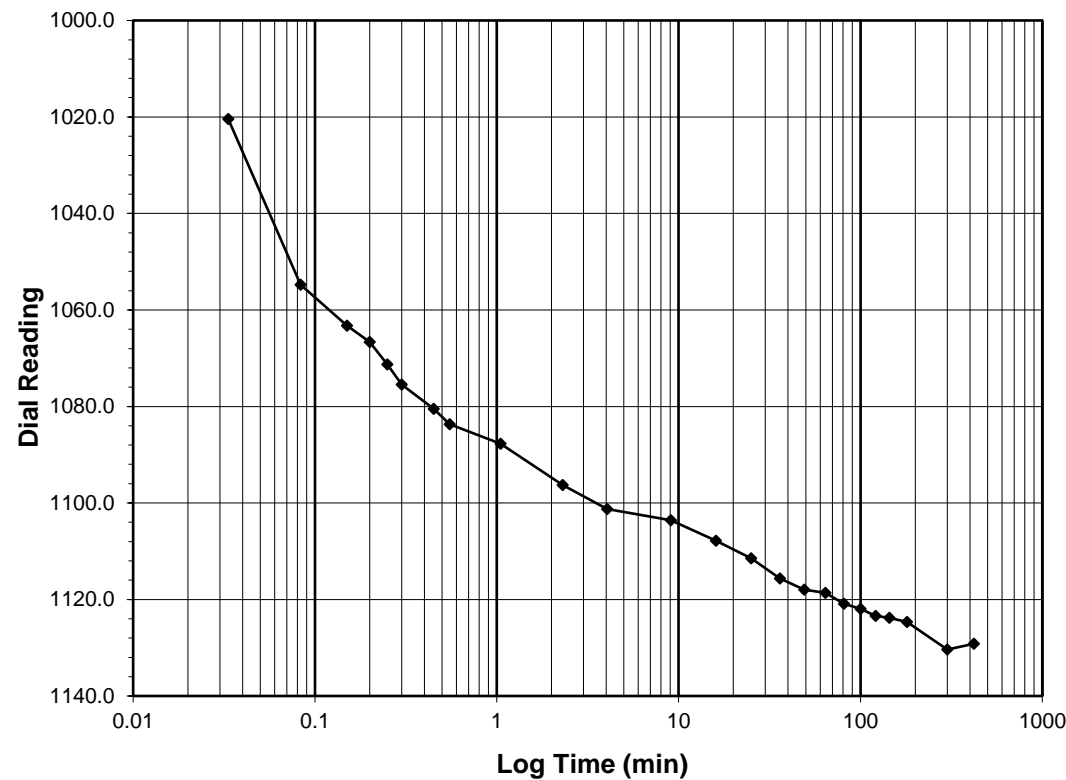
Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load (tsf) 8 - 16  
 Final Reading (div) 1130.4  
 Consolidometer No. R-470  
 1 Division (in) 0.0001

Start Date 5/25/24  
 Start Time 4:30:40

Elapsed Time (min)	Dial Reading (div)
Initial	904.1
0.03	1020.4
0.08	1054.7
0.15	1063.3
0.20	1066.7
0.25	1071.3
0.30	1075.4
0.45	1080.5
0.55	1083.7
1.05	1087.7
2.30	1096.3
4.05	1101.3
9.05	1103.6
16.05	1107.8
25.05	1111.5
36.05	1115.6
49.05	1118.0
64.05	1118.7
81.07	1120.9
100.07	1122.0
121.07	1123.4
144.07	1123.8
180.07	1124.7
300.07	1130.4
420.13	1129.2



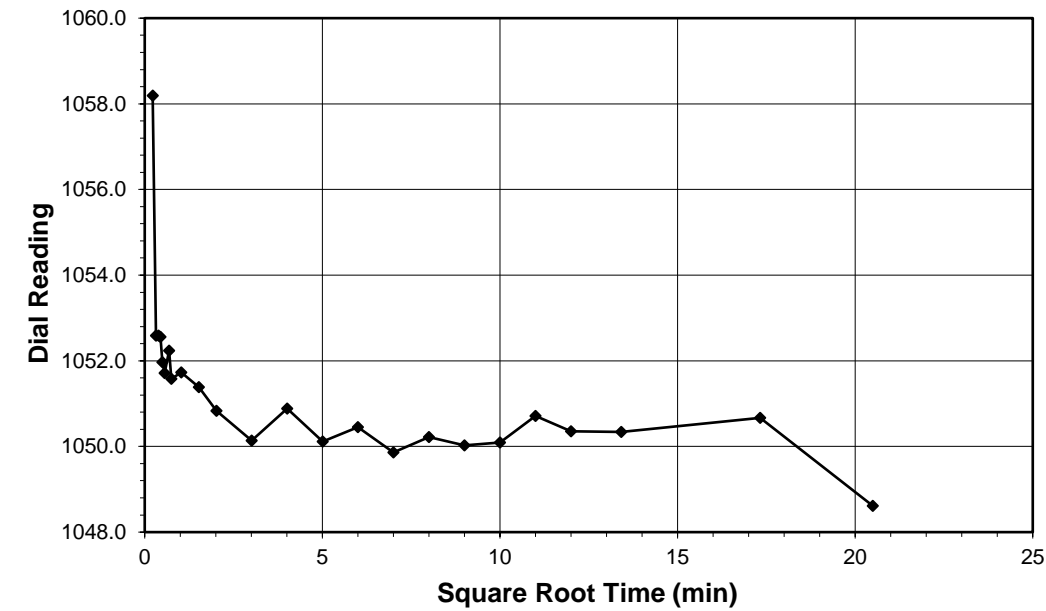
Tested By DL Date 5/25/24 Checked By MPS Date 1/24/24



**ONE DIMENSIONAL CONSOLIDATION**  
ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc. Boring No.: L\_2715\_CL  
 Client Project: Bridge No. 66 on US 264 over Pungo River Depth (ft): 13-15  
 Project No.: R-2024-155-001 Sample No.: ST-2  
 Lab ID: R-2024-155-001-011 Visual Description: Brown Clayey Sand with Organics

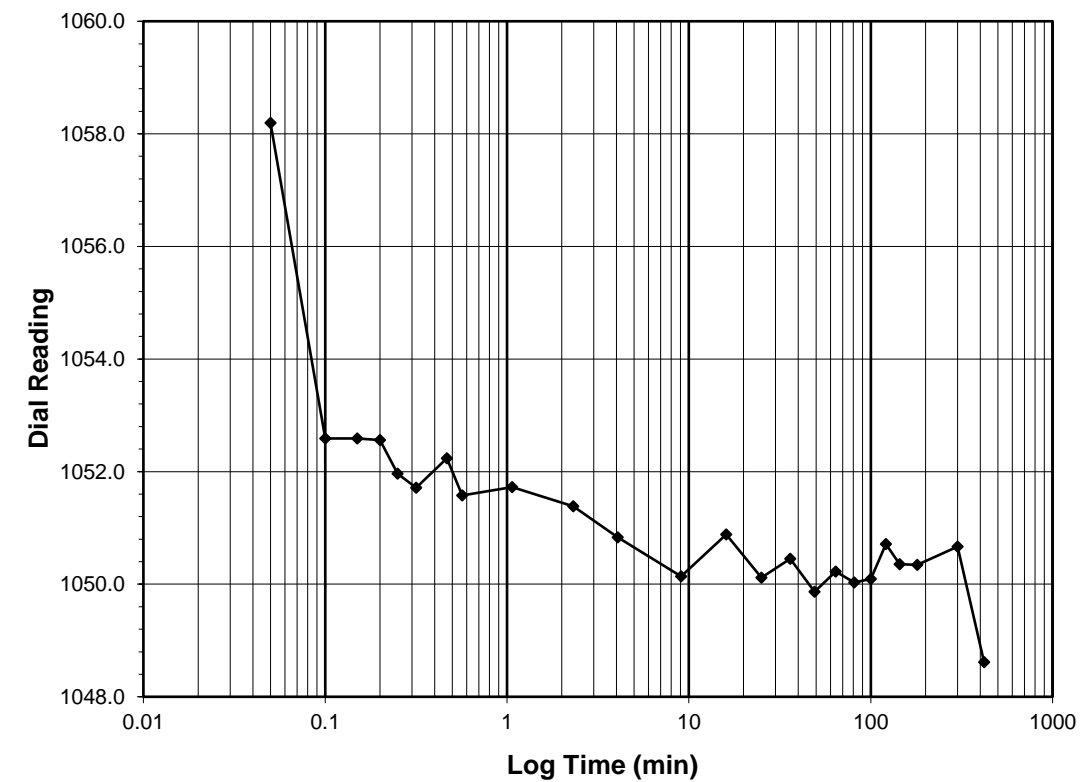
Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load (tsf) 16 - 4  
 Final Reading (div) 1048.6  
 Consolidometer No. R-470  
 1 Division (in) 0.0001

Start Date 5/25/24  
 Start Time 11:30:49

Elapsed Time (min)	Dial Reading (div)
Initial	1130.4
0.05	1058.2
0.10	1052.6
0.15	1052.6
0.20	1052.6
0.25	1052.0
0.32	1051.7
0.47	1052.2
0.57	1051.6
1.07	1051.7
2.32	1051.4
4.07	1050.8
9.07	1050.1
16.07	1050.9
25.07	1050.1
36.07	1050.4
49.07	1049.9
64.07	1050.2
81.07	1050.0
100.07	1050.1
121.07	1050.7
144.07	1050.4
180.07	1050.3
300.07	1050.7
420.15	1048.6



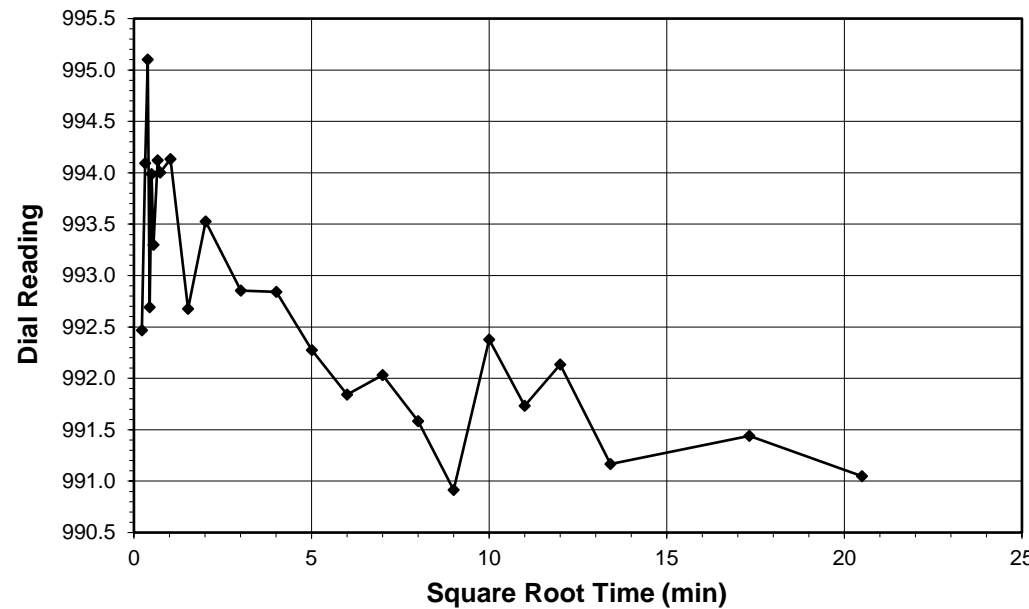
Tested By DL Date 5/25/24 Checked By MPS Date 1/24/24



**ONE DIMENSIONAL CONSOLIDATION**  
ASTM D 2435-96 (SOP-S24A)

Client: HDR Engineering, Inc. Boring No.: L\_2715\_CL  
 Client Project: Bridge No. 66 on US 264 over Pungo River Depth (ft): 13-15  
 Project No.: R-2024-155-001 Sample No.: ST-2  
 Lab ID: R-2024-155-001-011 Visual Description: Brown Clayey Sand with Organics

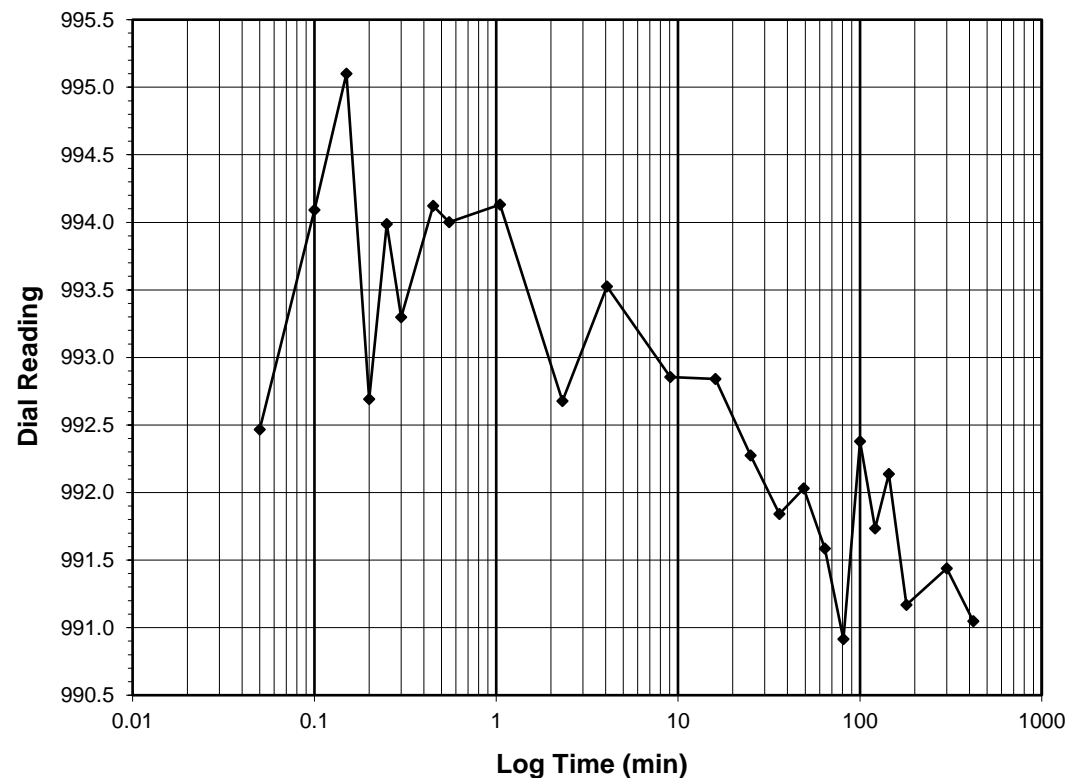
Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load (tsf) 4 - 1  
 Final Reading (div) 991.0  
 Consolidometer No. R-470  
 1 Division (in) 0.0001

Start Date 5/25/24  
 Start Time 18:30:58

Elapsed Time (min)	Dial Reading (div)
Initial	1048.6
0.05	992.5
0.10	994.1
0.15	995.1
0.20	992.7
0.25	994.0
0.30	993.3
0.45	994.1
0.55	994.0
1.05	994.1
2.32	992.7
4.07	993.5
9.07	992.9
16.07	992.8
25.07	992.3
36.07	991.8
49.07	992.0
64.07	991.6
81.07	990.9
100.07	992.4
121.07	991.7
144.07	992.1
180.07	991.2
300.08	991.4
420.18	991.0



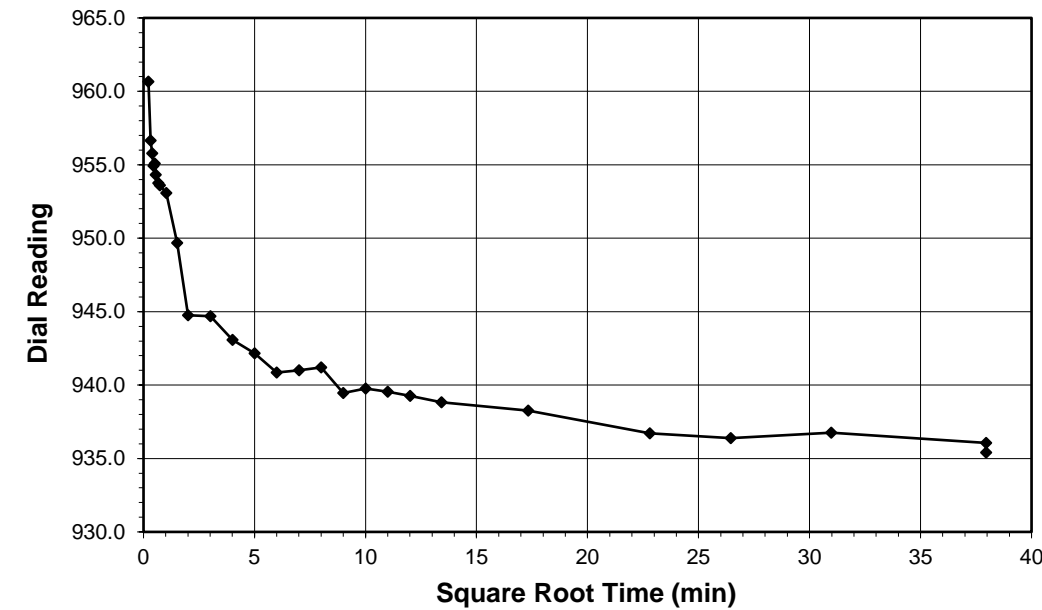
Tested By DL Date 5/25/24 Checked By MPS Date 1/24/24



**ONE DIMENSIONAL CONSOLIDATION**  
ASTM D2435 / D2435M-11

Client: HDR Engineering, Inc. Boring No.: L\_2715\_CL  
 Client Project: Bridge No. 66 on US 264 over Pungo River Depth (ft): 13-15  
 Project No.: R-2024-155-001 Sample No.: ST-2  
 Lab ID: R-2024-155-001-011 Visual Description: Brown Clayey Sand with Organics

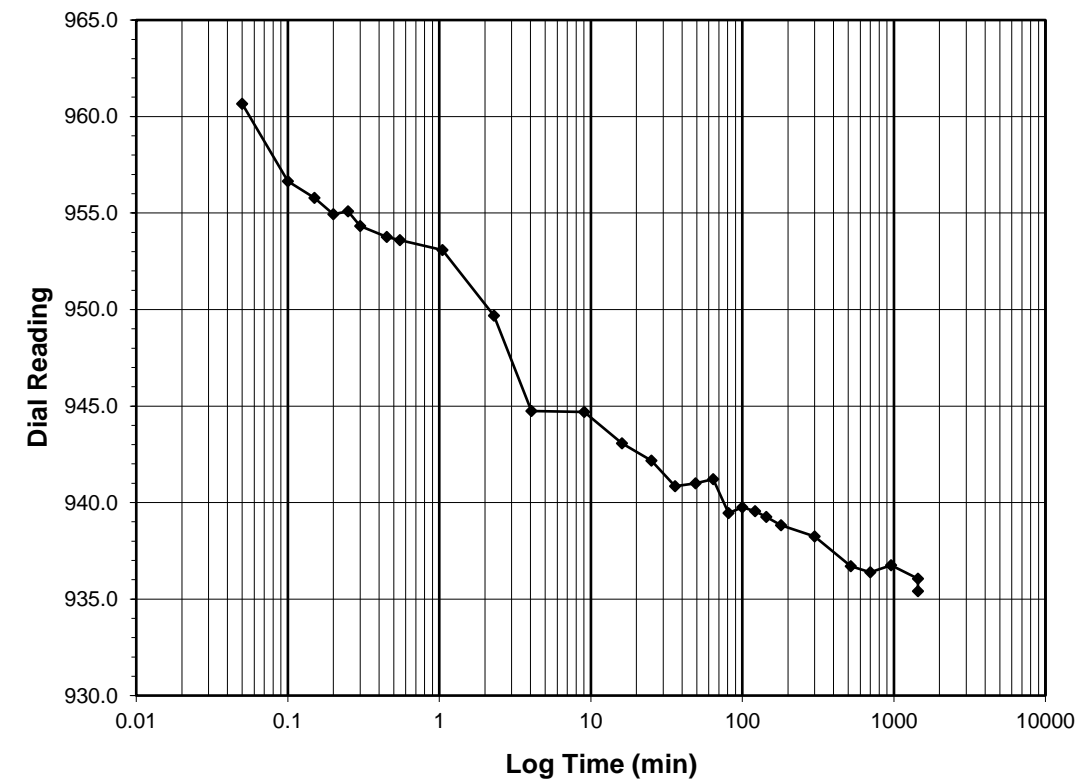
Sample Conditions: Undisturbed, Inundated, Double Drained



Test Load (tsf) 1 - 0.25  
 Final Reading (div) 935.4  
 Consolidometer No. R-470  
 1 Division (in) 0.0001

Start Date 5/26/24  
 Start Time 1:31:09

Elapsed Time (min)	Dial Reading (div)
Initial	991.0
0.05	960.7
0.10	956.6
0.15	955.8
0.20	954.9
0.25	955.1
0.30	954.3
0.45	953.8
0.55	953.6
1.05	953.1
2.30	949.7
4.05	944.7
9.05	944.7
16.05	943.1
25.05	942.2
36.05	940.8
49.07	941.0
64.07	941.2
81.07	939.5
100.07	939.8
121.07	939.5
144.07	939.3
180.07	938.8
300.07	938.3
520.07	936.7
700.07	936.4
960.07	936.8
1440.08	936.1
1440.32	935.4



Tested By DL Date 5/26/24 Checked By MPS Date 1/24/24