GEOTECHNICAL SUBSURFACE DATA REPORT

US 76 over Chauga River
Oconee County, South Carolina

PREPARED FOR
SCDOT
955 Park Street
Columbia, South Carolina 29201

PREPARED BY
F&ME Consultants, Inc.
211 Business Park Boulevard
Columbia, South Carolina 29203

SCDOT Project ID: P043969
FME Project No.: G7100.005

OCTOBER 31, 2024

October 31, 2024

Mr. Trapp Harris, P.E.
South Carolina Department of Transportation
955 Park Street
Columbia, South Carolina 29201

Re: Geotechnical Subsurface Data Report
US 76 over Chauga River
Oconee County, South Carolina
SCDOT Project ID: P043969
FME Project No.: G7100.005

Mr. Harris:

Submitted herein is F&ME Consultants, Inc.'s (FME) Geotechnical Subsurface Data Report for the US 76 over Chauga River project. This report contains findings from our subsurface field exploration and laboratory testing program.

It has been a pleasure collaborating with you on this project and we appreciate the opportunity to be of service. Please notify us if there are any questions or if we can be of further assistance.

Respectfully Submitted,

F&ME CONSULTANTS, INC.

William J. Gieser, P.E.
Senior Project Engineer

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 31529 10/31/24 WILLIAM JOHN GIESER

Alex M. Abernethy, E.I.T.
Materials Laboratory Manager

SOUTH CAROLINA F&ME CONSULTANTS, INC. No. 4891 CERTIFICATE OF AUTHORIZATION

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1. INTRODUCTION

1.1. GENERAL

The project is located along US 76 (Long Creek Highway) and is located approximately four (4) miles northwest of Westminster, South Carolina. We understand that this project will involve the demolition/removal of the existing bridge structure and the replacement with a new bridge structure on the existing roadway alignment. A Site Location Plan is presented in Section 1 of the Appendix of this report.

1.2. SCOPE

FME performed a geotechnical subsurface exploration and laboratory testing for the project. The South Carolina Department of Transportation (SCDOT) Scope of Services was issued on October 10, 2024. This documentation is provided within Section 9 of the Appendix of this report.

The field exploration consisted of Soil Test Borings (STB) with Standard Penetration Testing (SPT), Downhole Shear Wave Velocity (DHT) Testing, Seismic Refraction Testing, and the collection of Bulk Soil Samples (BS) via Manual Auger Boring (MAB) methodologies. Laboratory testing was performed on soil and rock samples collected from the Soil Test Borings and Bulk Soil Samples. Field exploration methods and laboratory procedures were conducted in general accordance with the current American Association of State Highway and Transportation Officials (AASHTO), American Society of Testing and Materials (ASTM) Standards. This report was prepared in general accordance with the 2022 SCDOT Geotechnical Design Manual (GDM).

2. SUBSURFACE EXPLORATION SUMMARY

From October 14, 2024, through October 21, 2024, thirteen (13) Soil Test Borings, one (1) Downhole Shear wave velocity Test and four (4) Manual Auger Borings were performed on site. The four (4) Manual Auger Borings were performed for the purpose of collection Bulk Soil Samples.

The soils were visually classified in the field based upon the Unified Soil Classification System (USCS) in general accordance with ASTM D2488. Testing locations and target exploration depths were provided by the SCDOT. A Boring Location Plan (Figure 2) displaying the test locations performed during the subsurface exploration is contained in Section 2 of the Appendix within to this report.

2.1. SOIL TEST BORINGS

Soil Test Borings were performed utilizing either a Dietrich D50 track-mounted drill rig or Mobile Drill B-29 truck-mounted drill rig. The measured energy transfer ratio for the Dietrich D50 and Mobile Drill B-29 hammers were respectively 86% and 86% utilizing an automatic hammer. SPT hammer calibration records are provided within Section 9 of the Appendix of this report. Soil Test Borings B-1/DH-1, B-3, B-4, B-5, R-1 and R-2 utilized Rotary Wash drilling techniques to maintain a stable borehole. Alternatively, Soil Test Borings B-2 and P-1 through P-6 were performed using Hollow Stem Auger drilling methodologies. Borings were sampled continuously through the upper ten (10) feet below the existing ground surface utilizing SPT testing. Following the continuous sampling, SPT testing was performed on standard five (5) foot intervals thereafter. SPT sampling was performed in general

accordance with ASTM D1586 to determine the relative densities and consistencies of the subsurface soils, and to collect subsurface soil samples. Per the request of the SCDOT, a Photo Log of the pavement cores encountered during the exploration is presented in Section 8 of the Appendix of this report.

Copies of the Soil Test Boring Logs are contained within Section 4A in the Appendix of this report. The following table is a summary of the Soil Test Boring depths, locations, and surface elevations.

Table 1 – Field Exploration Summary Table – Soil Test Borings

Test ID	Test Type	Soil Depth (ft)	Bridge Deck/ Air/Water Gap (ft)	Rock Core Depth (ft)	Total Boring Depth (ft)	Latitude	Longitude	Elevation (ft-MSL)
B-1/DH-1	STB/DHT	65.1	--	34.1	99.2	34.68575410	-83.15117961	776.7
B-2	STB	63.6	--	21.2	84.8	34.68578767	-83.15123741	776.7
B-3	STB	2.6	49.1	20.6	72.3	34.68569424	-83.15147703	777.8
B-4	STB	0.0	44.6	20.0	64.6	34.68552398	-83.15177111	780.6
B-5	STB	33.7	--	21.2	54.9	34.68547036	-83.15203410	783.4
P-1	STB	2.8	--	--	2.8	34.6866541	-83.14901864	798.6
P-2	STB	3.0	--	--	3.0	34.68632809	-83.14975291	787.5
P-3	STB	2.9	--	--	2.9	34.68604842	-83.15054099	778.1
P-4	STB	3.6	--	--	3.6	34.68516617	-83.15274782	794.2
P-5	STB	3.3	--	--	3.3	34.68505783	-83.15357360	804.1
P-6	STB	3.3	--	--	3.3	34.68506342	-83.15440205	814.6
R-1	STB	38.8	--	--	38.8	34.68585655	-83.15095163	776.7
R-2	STB	13.5	--	--	13.5	34.68535245	-83.15230327	787.5
TOTALS		353.3	93.7	117.1	447.0			

2.2. MANUAL AUGER BORINGS

Four (4) Bulk Soil Samples, designated as BS-1 through BS-4, were collected on site via Manual Auger Boring methodologies. The following table is a summary of the bulk soil sample designations, depths, locations, and surface elevations.

Table 2 – Field Exploration Summary Table – Manual Auger Borings

Test ID	Test Type	Test Depth (ft)	Latitude	Longitude	Elevation (ft-MSL)
BS-1	BS	5.0	34.68588540	-83.15111873	776.2
BS-2	BS	5.0	34.68538213	-83.15198111	782.9
BS-3	BS	2.0	34.68607365	-83.15055645	777.5
BS-4	BS	2.0	34.68514384	-83.15273405	793.5
TOTAL		14.0			

2.3. DOWNHOLE SHEAR WAVE VELOCITY TESTING

On October 21, 2024, Downhole Shear Wave Velocity testing (DHT) was performed at approximately two and one-half (2.5) foot depths within Soil Test Boring B-1/DH-1. At each depth, a hammer strike

was applied at the ground surface to a shear beam, and the response was measured in the geophones within the borehole. The downhole testing generated a one-dimensional subsurface shear wave velocity profile at the discrete locations of boring B-1/DH-1. The results from the downhole shear wave velocity testing are provided in Section 5 of the Appendix.

Table 3 – Field Exploration Summary Table – Downhole Shear Wave Velocity Testing

Test ID	Test Type	Test Depth (ft)	Latitude	Longitude	Elevation (ft-MSL)
B-1/DH-1	DHT	99.2	34.6857541	-83.15117961	776.7

2.4. SEISMIC REFRATION TESTING

On October 16 through October 17, 2024, A Geometrics ES-3000 - 24 channel seismograph was used to collect the geophysical data. Multiple energy input locations were performed along each array. At each energy input location, the striker plate was impacted a minimum of five (5) times, and the data was "stacked" for processing by the software. "Stacking" is utilized to increase the signal to noise ratio.

The field data processing begins by "picking first breaks". This initial step involves determining when the signal/energy from the hammer striking the plate reaches each geophone. This procedure is repeated for each shot point. A curve is then generated representing arrival times at each geophone. All the curves from each survey line are then combined. These curves are then processed using the refraction analysis software. Subsequently, the tomographic method was used to create a two-dimensional image of seismic velocity. The results from the Seismic Refraction Testing are provided in Section 5 of the Appendix.

2.5. GROUNDWATER

Groundwater depths were recorded at the time of boring (TOB) and twenty-four (24) hours following boring completion, where practical. Groundwater depth measurements are noted on the individual Subsurface Exploration Logs in Section 4 of the Appendix.

2.6. TEST LOCATION TABLE

The following table summarizes the state plane coordinates in feet, latitude-longitude in decimal degrees, and existing surface elevations of the test locations for the subsurface exploration.

Table 4 – Geotechnical Exploration Summary Table

Test ID	Test Type	Test Depth (ft)	Latitude	Longitude	Elevation (ft-MSL)
B-1/DH-1	STB/DHT	99.2	34.6857541	-83.15117961	776.7
B-2	STB	84.8	34.68578767	-83.15123741	776.7
B-3	STB	72.3	34.68569424	-83.15147703	777.8
B-4	STB	64.6	34.68552398	-83.15177111	780.6
B-5	STB	54.9	34.68547036	-83.1520341	783.4
BS-1	BS	5.0	34.68588540	-83.15111873	776.2
BS-2	BS	5.0	34.68538213	-83.15198111	782.9
BS-3	BS	2.0	34.68607365	-83.15055645	777.5
BS-4	BS	2.0	34.68514384	-83.15273405	793.5
P-1	STB	2.8	34.6866541	-83.14901864	798.6
P-2	STB	3.0	34.68632809	-83.14975291	787.5
P-3	STB	2.9	34.68604842	-83.15054099	778.1
P-4	STB	3.6	34.68516617	-83.15274782	794.2
P-5	STB	3.3	34.68505783	-83.1535736	804.1
P-6	STB	3.3	34.68506342	-83.15440205	814.6
R-1	STB	38.8	34.68585655	-83.15095163	776.7
R-2	STB	13.5	34.68535245	-83.15230327	787.5

3. LABORATORY TESTING SUMMARY

Following completion of FME's field exploration, draft boring logs were generated and reviewed internally by FME. Based on the data represented in these logs, FME was authorized to designate soil samples for laboratory testing on behalf of the SCDOT. On October 16, 2024, through October 21, 2024, lab work order requests were submitted internally by FME. The laboratory testing performed on the soil and rock samples collected from the Soil Test Borings is summarized in the table below. Data sheets containing the results from this testing are provided in Section 6A and Section 6B within the Appendix of this report.

Table 5 – Laboratory Testing Summary Table – Soil Test Boring Samples

Type of Test	Quantity	Procedure
Moisture Content	11	AASHTO T265 (ASTM D2216)
Atterberg Limits	11	AASHTO T89/T90 (ASTM D4318)
Grain-size Distribution w/ Wash 200	10	ASTM D6913/AASHTO T11 (ASTM D1140)
Hydrometer and Grain Size	1	ASTM D7928/ASTM D6913
Compressive Strength of Rock Cores	10	ASTM D7012 – Methods C & D
pH	2	AASHTO T289 (ASTM G51)
Soil Sulfate Content	2	AASHTO T290 (ASTM C1580)
Soil Chloride Content	2	AASHTO T291
Soil Resistivity	2	AASHTO T288

Laboratory testing performed on the Bulk Soil Samples is summarized in the table below. The data sheets containing the results from this testing are provided in Section 6C of the Appendix attached to this report.

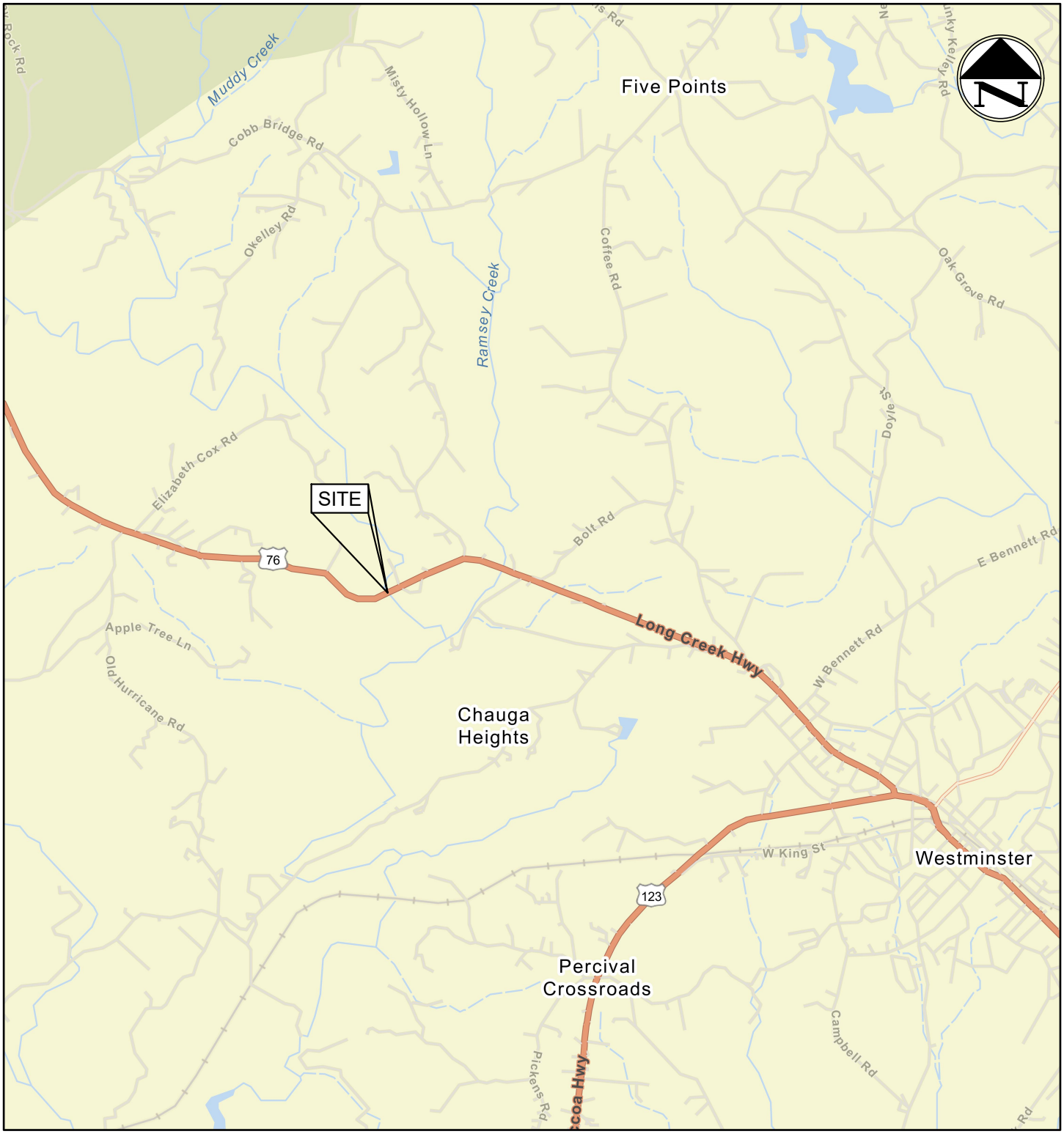
Table 6 – Laboratory Testing Summary Table – Bulk Soil Samples

Type of Test	Quantity	Procedure
Moisture Content	2	AASHTO T265 (ASTM D2216)
Atterberg Limits	2	AASHTO T89/T90 (ASTM D4318)
Grain-size Distribution w/ Wash 200	2	ASTM D6913/AASHTO T11 (ASTM D1140)
Standard Proctor	2	AASHTO T99 (ASTM D698)
California Bearing Ratio	2	AASHTO T193 (ASTM D1883)
Consolidated Undrained (CU) Triaxial	2	AASHTO T297 (ASTM D4767)
pH	2	AASHTO T289 (ASTM G51)
Soil Sulfate Content	2	AASHTO T290 (ASTM C1580)
Soil Chloride Content	2	AASHTO T291
Soil Resistivity	2	AASHTO T288

APPENDIX

APPENDIX

SECTION 1 SITE LOCATION PLAN



1:58,000

0 0.4 0.8 1.6 mi

0 0.5 1 2 km

F&ME CONSULTANTS, INC.
COLUMBIA, SC

REV.	BY	DATE	DESCRIPTION OF REVISION
4			
3			
2			
1			

TOPO. _____ DATE _____
DWG. CTC DATE 10.15.24 GROUP ____ – _____
R/W _____ DATE _____

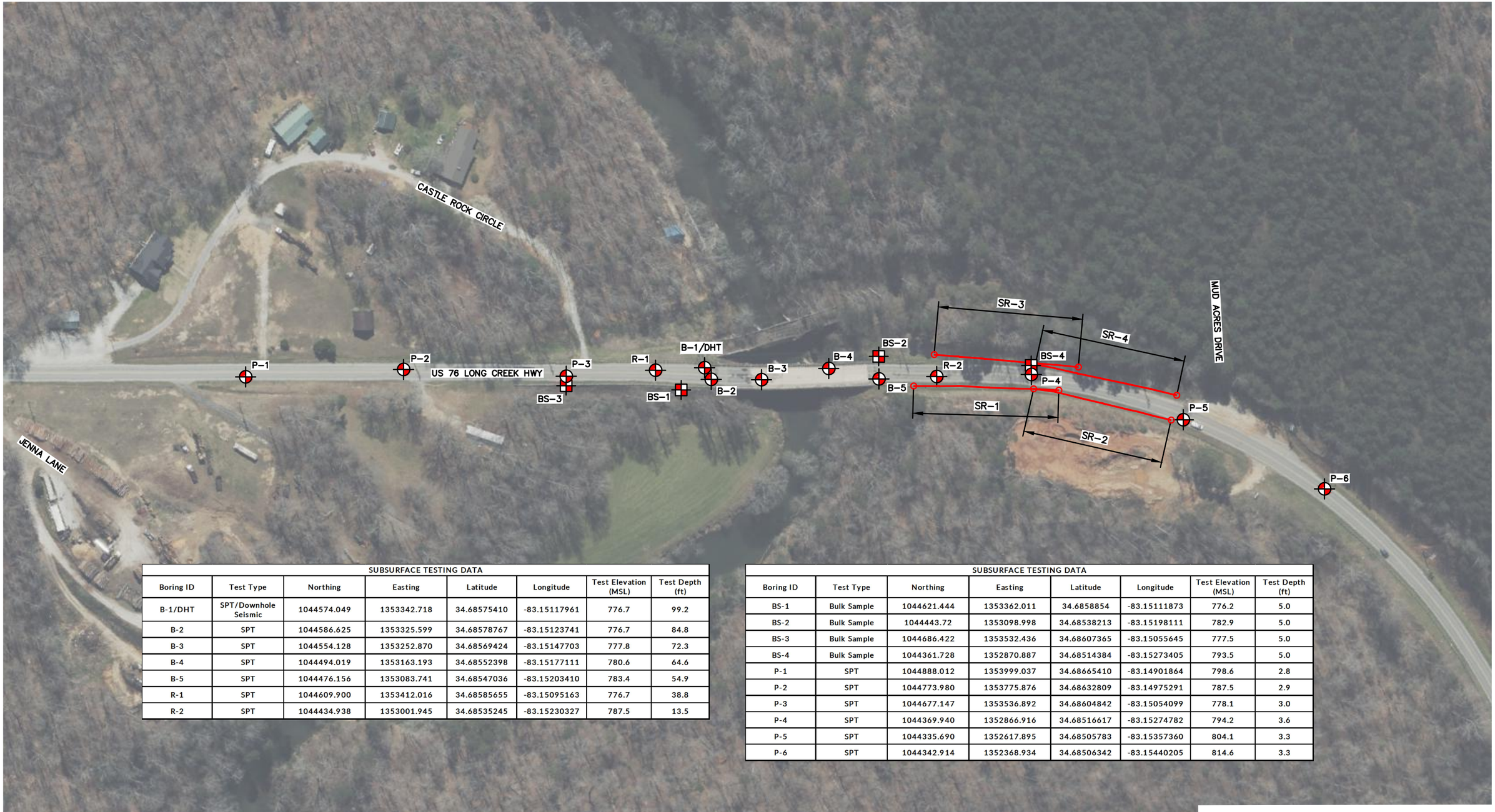
US 76 OVER CHAUGA RIVER
OCONEE COUNTY, SOUTH CAROLINA

SITE LOCATION PLAN

SCDOT PROJECT ID: P043969	FME JOB NO. G7100.005
SCALE: AS NOTED	FIGURE 1

APPENDIX

SECTION 2 BORING LOCATION PLAN



SUBSURFACE TESTING DATA

Boring ID	Test Type	Northing	Easting	Latitude	Longitude	Test Elevation (MSL)	Test Depth (ft)
B-1/DHT	SPT/Downhole Seismic	1044574.049	1353342.718	34.68575410	-83.15117961	776.7	99.2
B-2	SPT	1044586.625	1353325.599	34.68578767	-83.15123741	776.7	84.8
B-3	SPT	1044554.128	1353252.870	34.68569424	-83.15147703	777.8	72.3
B-4	SPT	1044494.019	1353163.193	34.68552398	-83.15177111	780.6	64.6
B-5	SPT	1044476.156	1353083.741	34.68547036	-83.15203410	783.4	54.9
R-1	SPT	1044609.900	1353412.016	34.68585655	-83.15095163	776.7	38.8
R-2	SPT	1044434.938	1353001.945	34.68535245	-83.15230327	787.5	13.5

SUBSURFACE TESTING DATA

Boring ID	Test Type	Northing	Easting	Latitude	Longitude	Test Elevation (MSL)	Test Depth (ft)
BS-1	Bulk Sample	1044621.444	1353362.011	34.6858854	-83.15111873	776.2	5.0
BS-2	Bulk Sample	1044443.72	1353098.998	34.68538213	-83.15198111	782.9	5.0
BS-3	Bulk Sample	1044686.422	1353532.436	34.68607365	-83.15055645	777.5	5.0
BS-4	Bulk Sample	1044361.728	1352870.887	34.68514384	-83.15273405	793.5	5.0
P-1	SPT	1044888.012	1353999.037	34.68665410	-83.14901864	798.6	2.8
P-2	SPT	1044773.980	1353775.876	34.68632809	-83.14975291	787.5	2.9
P-3	SPT	1044677.147	1353536.892	34.68604842	-83.15054099	778.1	3.0
P-4	SPT	1044369.940	1352866.916	34.68516617	-83.15274782	794.2	3.6
P-5	SPT	1044335.690	1352617.895	34.68505783	-83.15357360	804.1	3.3
P-6	SPT	1044342.914	1352368.934	34.68506342	-83.15440205	814.6	3.3

LEGEND:

- SOIL TEST BORING LOCATION
- BULK SAMPLE TEST LOCATION
- SEISMIC REFRACTION ARRAY

REV.	BY	DATE	DESCRIPTION OF REVISION
4			
3			
2			
1			

TOPO. _____ DATE _____
DWG. CTC DATE 10.15.24 GROUP ____ – _____
R/W _____ DATE _____

F&ME CONSULTANTS, INC.
COLUMBIA, SC

US 76 OVER CHAUGA RIVER
OCONEE COUNTY, SOUTH CAROLINA

BORING LOCATION PLAN

SCDOT PROJECT ID: P043969	FME JOB NO. G7100.005
SCALE: 1" =150'	FIGURE 2

APPENDIX

SECTION 3 SUBSURFACE EXPLORATION LOGS

Soil Test Boring Log Descriptors

Correlation of Penetration Resistance with Relative Density and Consistency

Coarse Grained Soils (Sands/Gravel)		Fine Grained Soils (Silt/Clay)	
SPT Blow Count	Relative Density	SPT Blow Count	Consistency
≤ 4	Very Loose	≤ 2	Very Soft
5 – 10	Loose	3 – 4	Soft
11 – 30	Medium Dense	5 – 8	Firm
31 – 50	Dense	9 – 15	Stiff
≥ 51	Very Dense	16 – 30	Very Stiff
		≥ 31	Hard

Particle Size Identification

Gravel	Sieve Size
Fine	#4 to ¾ inch
Coarse	¾ inch to 3 inch

Sand	Sieve Size
Fine	#200 to #40
Medium	#40 to #10
Coarse	#10 to #4

Gravel	Sieve Size
Fines Content	< #200

SYMBOL	PRINT CODE*	TYPICAL DESCRIPTION
	SCCT	*CONCRETE*
	SCAT	*ASPHALT*
	SCTS	*TOPSOIL/PEAT*
	SCSAND	*SAND*
	SCSTSAND	*SILTY SAND/SANDY SILT*
	SCCLSAND	*CLAYEY SAND/SANDY CLAY*
	SCCLAY	*CLAY*
	SCSILT	*SILT*
	SCSTCLAY	*SILTY CLAY/CLAYEY SILT*
	SCSAP	*SAPROLITE*
	SCLS	*LIMESTONE*
	SCBR	*GRANITE (BEDROCK)*
	SCMARL	*MARL*

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS: GRAPH	SYMBOLS: LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE)	GRAVEL AND GRAVELLY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE)	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS (MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE)	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

Rock Description Legend

Discontinuity Type
F = Fault
J = Joint
Sh = Shear
Fo = Foliation
V = Vein
B = Bedding

Discontinuity Width (mm)
W = Wide (12.5 – 50)
MW = Moderately Wide (2.5– 12.5)
N = Narrow (1.25 – 2.5)
VN = Very Narrow (<1.25)
T = Tight

Amount of Infilling
Su = Surface Stain
Sp = Spotty
Pa = Partially Filled
FI = Filled
No = None

Type of Infilling
Cl = Clay
Ca = Calcite
Ch = Chloride
Fe = Iron Oxide
Gy = Gypsum/Talc
H = Healed
No = None
Py = Pyrite
Qz = Quartz
Sd = Sand

Surace Shape of Joint
Wa = Wave
Pl = Planar
St = Stepped
Ir = Irregular

Discontinuity Spacing (ft)
EW = Extremely Wide (>65)
W = Wide (22 – 65)
M = Moderate (7.5 – 22)
C = Close (2 – 7.5)
VC = Very Close (<2)

Roughness of Surface

Slk = Slickensided (Surface has smooth, glassy finish with visual evidence of striations)
S = Smooth (Surface appears smooth and feels smooth to touch
SR = Slightly Rough (Asperities on the discontinuity surfaces are distinguishable and can be felt)
R = Rough (some ridges and side-angle steps are evident; asperities are clearly visible, and discontinuity surface feels very abrasive)
VE = Very Rough (Near vertical steps and ridges occur on the discontinuity Surface

APPENDIX

SECTION 3 SUBSURFACE EXPLORATION LOGS

SECTION 3A SOIL TEST BORING (STB) LOGS

SCDOT Soil Test Log

Project ID:	P043969	**County:**	Oconee	**Boring No.:**	B-1/DH-1		
Site Description:	US 76 over Chauga River			**Route:**	US 76		
Eng./Geo.:	A. Chandler	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	776.7 ft	**Latitude:**	34.6857541	**Longitude:**	-83.15117961	**Date Started:**	10/15/2024
Total Depth:	99.2 ft	**Soil Depth:**	65.1 ft	**Core Depth:**	34.1 ft	**Date Completed:**	10/16/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Diedrich D-50	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	95.5%
Core Size:	NQ	**Driller:**	C. Odom	**Groundwater:**	**TOB** NR	**24HR**	NR

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0								
	0.7	**ASPHALT PAVEMENT (US 76)** (8-in.)	0.7						
		EXISTING FILL		SS-1	4	6	7	7	13
		Stiff to Very Stiff, Moist, Reddish Brown, Low Plasticity to Medium Plasticity, Sandy SILT (ML/A-4), Micaceous, 5YR5/4	2.0	SS-2	5	9	9	8	18
			4.0						
771.7				SS-3	4	5	7	5	12
		@SS-4: Hard	6.0						
				SS-4	9	17	15	16	32
		@SS-5: with Trace Asphalt	8.0						
				SS-5	6	16	31	11	47
766.7	10.0								
		PIEDMONT RESIDUUM							
		Loose, Moist, Reddish Brown, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4), Micaceous, 5YR 5/3	13.5						
		@SS-6: LL=NP, PL=NP, PI=NP, NMC=21.4%, %200=30.0		SS-6	3	5	4		9
761.7									
			18.5						
		@SS-7: Brown, 7.5YR5/3, LL=NP, PL=NP, PI=NP, NMC=29.3%, %200=24.1		SS-7	3	3	3		6
756.7									
			23.5						
		@SS-8: LL=NP, PL=NP, PI=NP, NMC=26.7%, %#200=31.4		SS-8	2	3	3		6
751.7									
			28.5						
				SS-9	3	3	3		6
746.7									
			33.5						
		@SS-10: LL=NP, PL=NP, PI=NP, NMC=17.1%, %#200=12.7		SS-10	3	3	3		6
741.7									
	38.5		38.5						

SPT N VALUE ● PL × MC ○ LL × ▲ FINES CONTENT (%) ✿ RQD (%) ■ REC (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P043969	**County:**	Oconee	**Boring No.:**	B-1/DH-1		
Site Description:	US 76 over Chauga River			**Route:**	US 76		
Eng./Geo.:	A. Chandler	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	776.7 ft	**Latitude:**	34.6857541	**Longitude:**	-83.15117961	**Date Started:**	10/15/2024
Total Depth:	99.2 ft	**Soil Depth:**	65.1 ft	**Core Depth:**	34.1 ft	**Date Completed:**	10/16/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Diedrich D-50	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	95.5%
Core Size:	NQ	**Driller:**	C. Odom	**Groundwater:**	**TOB** NR	**24HR**	NR

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
736.7		Firm, Wet, Strong Brown, Medium Plasticity, Sandy Lean CLAY (CL/A-6), 7.5YR5/6			SS-11	3	3	5		8
		@SS-11: LL=33, PL=19, PI=14, NMC=24.7%, %#200=65.0								
	43.5			43.5						
731.7		Stiff, Wet, Yellowish Brown, Low Plasticity to Medium Plasticity, Sandy SILT (ML/A-4), Micaceous, 5YR5/6			SS-12	4	5	8		13
	48.5			48.5						
726.7		Very Dense, Wet, Brown, Non-Plastic, fine to Medium Poorly Graded SAND (SP/A-3), 7.5YR5/3			SS-13	50/3"				100+
				53.5	SS-14	50/2"				100+
721.7										
				58.5	SS-15	50/6"				100+
716.7		@SS-15: 7.5YR4/4								
	63.5			63.5	SS-16	50/1"				100+
711.7	65.1	@SS-16: No Recovery		65.1	SS-17	50/0.5"				100+
		GNEISS		65.1						
		Metamorphic, Black/White, Coarse to Medium Grained, Laminated, Hornblende/ Plagioclase/ Quartz/ Biotite, Fresh, Strong to Medium Strong, Few Joints Dip from 0° to 10°, J/FO, M/N, No, No, Pl/Ir, VC, R, %REC=100, %RQD=96, GSI=80-90, RMR=63, 3.7 min/ft., Class II (Good Rock), #8 Bit Ultra			NQ-1					
				69.2						
706.7					NQ-2					
		@NQ-2: Occasional Joints Dip from 0° to 35°, SR/R, %REC=98, %RQD=92, GSI=70-80, RMR=51, 3.6 min/ft., Class III (Fair Rock)		74.2						
701.7		@NQ-3: Few Joints/Foliations Dip from 5° to 10°, SR, %REC=100, %RQD=100,			NQ-3					

SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) ✿ RQD (%) ■ REC (%)
0 10 20 30 40 50 60 70 80 90

Continued Next Page

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P043969			**County:**	Oconee	**Boring No.:**	B-1/DH-1
Site Description:	US 76 over Chauga River					**Route:**	US 76
Eng./Geo.:	A. Chandler	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	776.7 ft	**Latitude:**	34.6857541	**Longitude:**	-83.15117961	**Date Started:**	10/15/2024
Total Depth:	99.2 ft	**Soil Depth:**	65.1 ft	**Core Depth:**	34.1 ft	**Date Completed:**	10/16/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Diedrich D-50	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	95.5%
Core Size:	NQ	**Driller:**	C. Odom	**Groundwater:**	**TOB** NR	**24HR**	NR

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6" / 2nd 6" / 3rd 6" / 4th 6"	N Value
		GSI=80-90, RMR=63, 4.6 min/ft., Class II (Good Rock)		79.2			
696.7		@NQ-4: %REC=100, %RQD=95, GSI=70-80, RMR=51, 8.0 min/ft., Class III (Fair Rock)			NQ-4		
				84.2			
691.7		@NQ-5: Wa/Pl, R, %REC=100, %RQD=97, GSI=70-80, RMR=59, 12.2 min/ft., Class III (Fair Rock)			NQ-5		
				89.2			
686.7		@NQ-6: Occasional Joints/Foliations Dip from 5° to 25°, R/VR, %REC=98, GSI=70-80, RMR=51, %RQD=95, 4.2 min/ft., Class III (Fair Rock)			NQ-6		
				94.2			
681.7		@NQ-7: Few Foliations Dip from 5° to 25°, Pl, SR/R %REC=100, %RQD=100, GSI=80-90, RMR=63, 5.0 min/ft., Class II (Good Rock)			NQ-7		
	99.2						
676.7		Boring Terminated at 99.2-ft. Below Existing Pavement Surface. Target Boring Depth Achieved.					
671.7							
666.7							
661.7							

SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) ✿ RQD (%) ■ REC (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT G7100.005 - US 76 OVER CHAUGA RIVER.GPJ SCDOT_DATATEMPLATE.GDT 10/31/24

SCDOT Soil Test Log

Project ID:	P043969	**County:**	Oconee	**Boring No.:**	B-2		
Site Description:	US 76 over Chauga River			**Route:**	US 76		
Eng./Geo.:	A. Chandler	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	776.7 ft	**Latitude:**	34.68578767	**Longitude:**	-83.15123741	**Date Started:**	10/14/2024
Total Depth:	84.8 ft	**Soil Depth:**	63.6 ft	**Core Depth:**	21.2 ft	**Date Completed:**	10/15/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Diedrich D-50	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95.5%
Core Size:	NQ	**Driller:**	C. Odom	**Groundwater:**	**TOB** 52 ft	**24HR**	Backfilled

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0								
	0.7	**ASPHALT PAVEMENT (US 76)** (8-in.)							
	1.7	**STONE BASE MATERIAL** (12-in.)	1.7						
		EXISTING FILL		SS-1	2	2	3	3	5
	3.7	Firm, Moist, Red, Low Plasticity to Medium Plasticity, SILT (ML/A-2-4), 2.5YR 4/6, Micaceous	3.7	SS-2	2	3	4	4	7
771.7	5.7	Firm, Moist, Red/Brown, Medium Plasticity, Clayey Fine to Medium SAND (SC/A-2-6), 2.5YR 4/6 & 7.5YR 4/4, Micaceous	5.7	SS-3	4	4	5	6	9
		@SS-2: LL=36, PL=21, PI=15, NMC=20.3%, %200=33.0	7.7	SS-4	4	4	6	8	10
766.7	10.7	Loose, Moist, Brown, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), 2.5YR 4/4, Micaceous	9.7	SS-5	8	10	50/4"		60+
		@SS-4: Reddish Brown, 2.5YR 4/3, Trace of Gravel							
		@SS-5: Very Dense, Light Gray, 2.5YR 7/1	13.5	SS-6	2	3	4		7
		PIEDMONT RESIDUUM							
761.7		Very Dense, Moist, Light Gray, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), 2.5YR 7/1							
		@SS-6: Loose to Medium Dense, Reddish Brown, 2.5YR 4/3, Trace of Gravel, LL=32, PL=28, PI=4, NMC=18.2%, %200=34.5	18.5	SS-7	4	4	5		9
756.7									
		@SS-8: Red, 2.5YR 5/6, Micaceous, Trace of Gravel	23.5	SS-8	3	3	3		6
751.7									
		@SS-9: Red/Light Olive Brown, 2.5YR 5/6 & 2.5Y 5/6, LL=NP, PL=NP, PI=NP, NMC=19.1%, %200=29.2	28.5	SS-9	1	2	2		4
746.7			33.5						

SPT N VALUE ● PL × MC ○ LL × ▲ FINES CONTENT (%) ✿ RQD (%) ■ REC (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P043969	**County:**	Oconee	**Boring No.:**	B-2		
Site Description:	US 76 over Chauga River			**Route:**	US 76		
Eng./Geo.:	A. Chandler	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	776.7 ft	**Latitude:**	34.68578767	**Longitude:**	-83.15123741	**Date Started:**	10/14/2024
Total Depth:	84.8 ft	**Soil Depth:**	63.6 ft	**Core Depth:**	21.2 ft	**Date Completed:**	10/15/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Diedrich D-50	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95.5%
Core Size:	NQ	**Driller:**	C. Odom	**Groundwater:**	**TOB** 52 ft	**24HR**	Backfilled

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
741.7		@SS-10: Dark Yellowish Brown/Black, Trace Organics, LL=NP, PL=NP, PI=NP, NMC=7.9%, %200=16.2			SS-10	3	3	4		7
736.7		@SS-11: Brownish Yellow, 10YR 6/6, LL=NP, PL=NP, PI=NP, NMC=14.1%, %200=45.0		38.5	SS-11	3	4	4		8
731.7		@SS-12: Trace of Gravel		43.5	SS-12	6	12	14		26
726.7		@SS-13: Very Dense, Brown/Light Gray, 7.5YR 4/3 & 7.5YR 7/1		48.5	SS-13	33	50/5.5"			100+
	53.5			53.5	SS-14	50/5"				100+
721.7		Very Dense, Wet, Brown/Light Gray, Non-Plastic to Low Plasticity, Fine to Coarse Poorly Graded SAND (SP/A-3), 7.5YR 4/3 & 7.5YR 7/1, Trace of Gravel								
	58.5			58.5	SS-15	42	50/5.5"			100+
716.7		Very Dense, Moist, Dark Brown/Very Pale Brown, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), 7.5YR 3/2 & 10YR 7/3, Micaceous								
	63.6			63.5	SS-16	50/0"				100+
711.7		**AMPHILBOLITE GNEISS** Regular #8 Bit, Metamorphic, Black/White, Laminated Foliations, Coarse to Medium Grained, Hornblende/Plaq/Biotite/Quartz,		63.6 64.8	NQ-1					

SPT N VALUE ● PL × MC ○ LL × ▲ FINES CONTENT (%) ✿ RQD (%) ■ REC (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

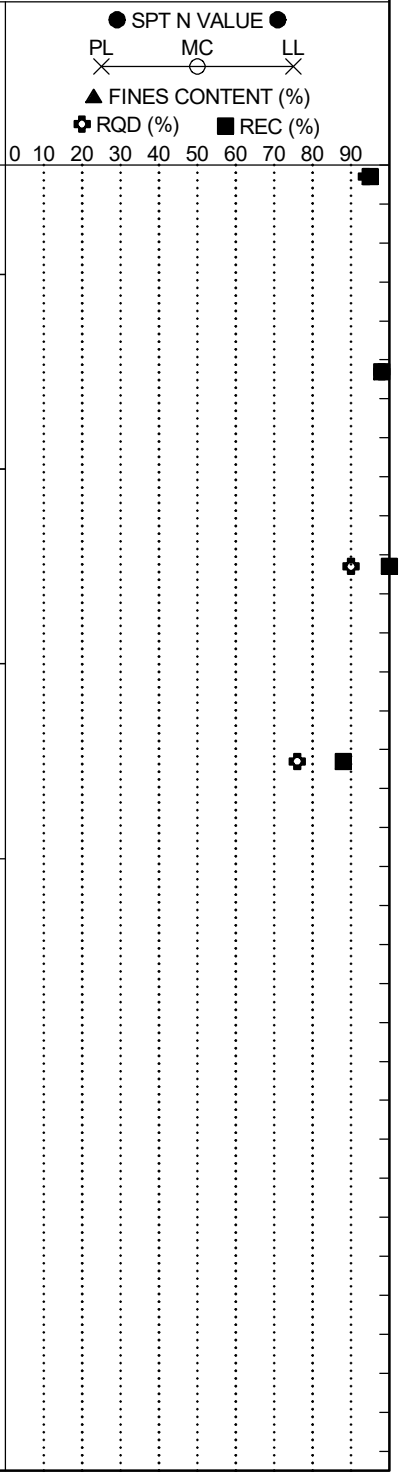
Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P043969			**County:**	Oconee	**Boring No.:**	B-2
Site Description:	US 76 over Chauga River					**Route:**	US 76
Eng./Geo.:	A. Chandler	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	776.7 ft	**Latitude:**	34.68578767	**Longitude:**	-83.15123741	**Date Started:**	10/14/2024
Total Depth:	84.8 ft	**Soil Depth:**	63.6 ft	**Core Depth:**	21.2 ft	**Date Completed:**	10/15/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Diedrich D-50	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95.5%
Core Size:	NQ	**Driller:**	C. Odom	**Groundwater:**	**TOB** 52 ft	**24HR**	Backfilled

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6" / 2nd 6" / 3rd 6" / 4th 6"	N Value
706.7		Slightly Weathered/Fresh, Strong, Few Joints Dip from 0° to 5°, Fo, N, No, No, Pl, VC, R, %RQD=76, %REC=55, GSI=70-80, RMR=60, Class III (Fair Rock), q_u=13,600 psi, 4.2 min/ft		69.8	NQ-2		
701.7		@NQ-2: Few Joints Dip from 0° to 15°, J/Fo, Wa/Pl, C/VC, SR/R, %RQD=95, %REC=94, GSI=75-85, RMR=77, Class II (Good Rock), q_u=13,290 psi, 4.4 min/ft		74.8	NQ-3		
		@NQ-3: Freshly Weathered, Few Joints Dip from 5° to 10°, M/N, Pl, VC, %RQD=98, %REC=98, GSI=70-80, RMR=54, 4.6 min/ft, Class III (Fair Rock)					
696.7		@NQ-4: Regular #8 Bit Changed, Few Joints Dip from 5° to 20°,nPl/Ir, %RQD=100, %REC=90, GSI=65-75, RMR=54, 8.8 min/ft, Class III (Fair Rock)		79.8	NQ-4		
		@NQ-5: Few Joints Dip from 5° to 15°, Pl/Ir, VC, %RQD=88, %REC=76, GSI=68-78, RMR=59, 4.8 min/ft, Class III (Fair Rock)			NQ-5		
691.7	84.8	Boring Terminated at 84.8 ft. Below Existing Pavement Surface. Target Boring Depth Achieved.					
686.7							
681.7							
676.7							

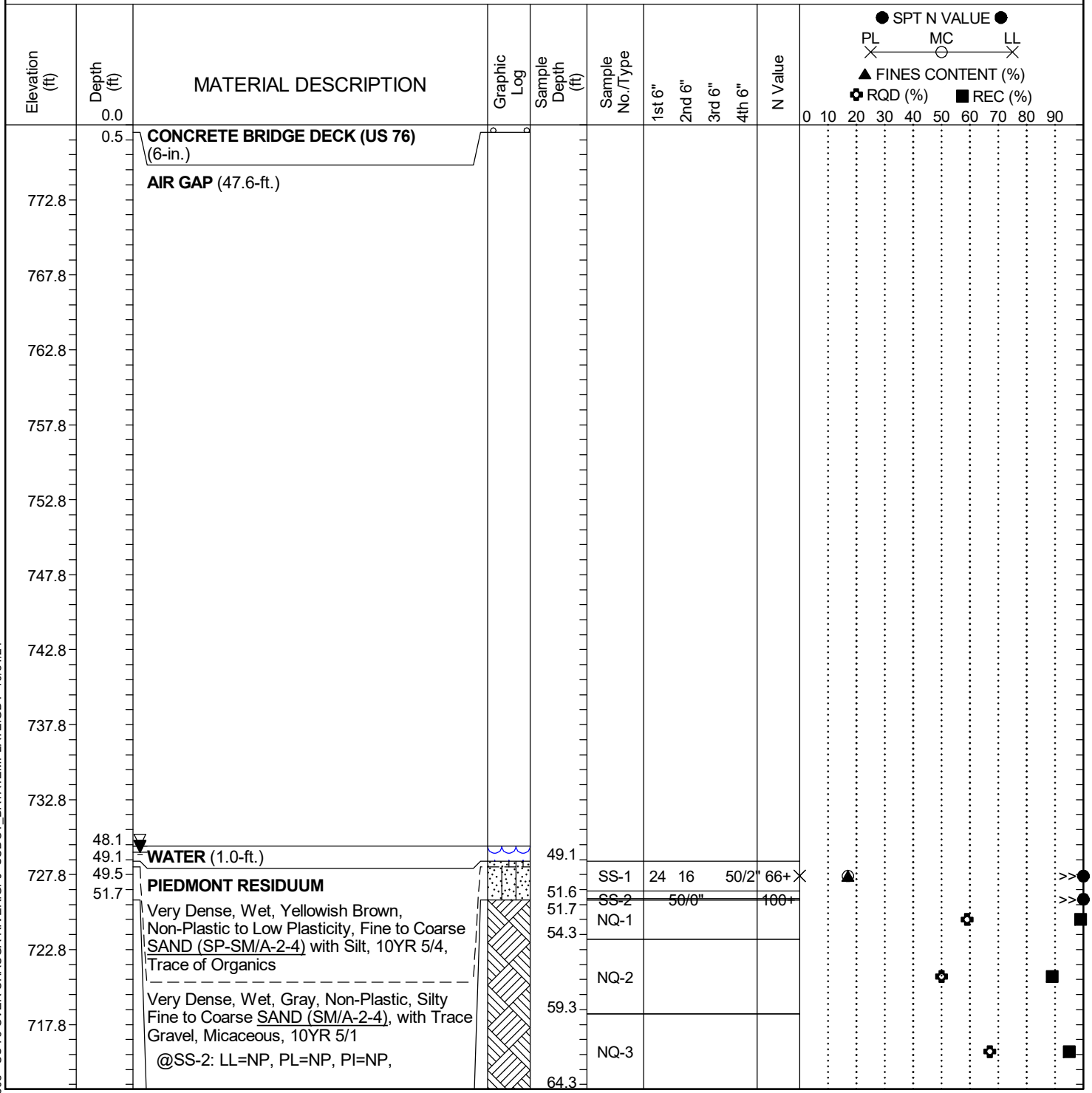


LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P043969	**County:**	Oconee	**Boring No.:**	B-3		
Site Description:	US 76 over Chauga River			**Route:**	US 76		
Eng./Geo.:	C Piercy	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	777.8 ft	**Latitude:**	34.68569424	**Longitude:**	-83.15147703	**Date Started:**	10/19/2024
Total Depth:	72.3 ft	**Soil Depth:**	2.6 ft	**Core Depth:**	20.6 ft	**Date Completed:**	10/19/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Diedrich D-50	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	95.5%
Core Size:	NQ	**Driller:**	C. Odom	**Groundwater:**	**TOB** 48.1 ft	**24HR**	48.5 ft



LEGEND

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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P043969	**County:**	Oconee	**Boring No.:**	B-3		
Site Description:	US 76 over Chauga River			**Route:**	US 76		
Eng./Geo.:	C Piercy	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	777.8 ft	**Latitude:**	34.68569424	**Longitude:**	-83.15147703	**Date Started:**	10/19/2024
Total Depth:	72.3 ft	**Soil Depth:**	2.6 ft	**Core Depth:**	20.6 ft	**Date Completed:**	10/19/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Diedrich D-50	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	95.5%
Core Size:	NQ	**Driller:**	C. Odom	**Groundwater:**	**TOB** 48.1 ft	**24HR**	48.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6" / 2nd 6" / 3rd 6" / 4th 6"	N Value
712.8		NMC=16.6%, %200=16.5					
		GNEISS			NQ-4		
		Metamorphic, Black/White, Coarse to Medium Grained, Laminated Foliations, Biotite/ Plagioclase/ Hornblende, Muscovite, Moderately Weathered to Slightly Weathered, Medium Strong to Strong, Few Joints Dip from 5° to 30°, J/Fo, M/VN, No/Su, Fe/No, Pl/St, VC, R, Regular #8 Bit, %REC=99, %RQD=59, GSI=40-60, RMR=33, Class IV (Poor Rock), q_u=5,000-psi, 2.3 min/ft		69.3			
707.8					NQ-5		
	72.3						
702.8		@NQ-2: Biotite/ Plagioclase/ Quartz/ Hornblende, Slightly Weathered to Fresh, Numerous Joints Dip from 0° to 45°, M/N, Wa/Pl, SR/R, %REC=98, %RQD=58, GSI=60-70, RMR=47, q_u=13,530-psi, 5.2 min/ft, Class III (Fair Rock)					
697.8		@NQ-3: Slightly Weathered to Moderately Weathered, Occasional Joints Dip from 5° to 15°, No, No, Pl, %REC=95, %RQD=67, GSI=62-72, RMR=41, q_u=7,500-psi, 4.4 min/ft, Class III (Fair Rock)					
692.8		@NQ-4: Few Joints, %REC=98, %RQD=86, GSI=70-80, RMR=48, q_u=8,150-psi, 5.8 min/ft, Class III (Fair Rock)					
687.8		@NQ-5: Few Joints, Fo, M, C, %REC=100, %RQD=93, GSI=80-90, RMR=63, Class II (Good Rock), 6.0 min/ft					
682.8		Boring Terminated at 72.3 ft. Below Existing Bridge Surface. Target Boring Depth Achieved.					
677.8							
672.8							
667.8							
662.8							
657.8							
652.8							

SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) ✿ RQD (%) ■ REC (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P043969	**County:**	Oconee	**Boring No.:**	B-4		
Site Description:	US 76 over Chauga River			**Route:**	US 76		
Eng./Geo.:	C Piercy	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	780.6 ft	**Latitude:**	34.68552398	**Longitude:**	-83.15177111	**Date Started:**	10/19/2024
Total Depth:	64.6 ft	**Soil Depth:**	0 ft	**Core Depth:**	20 ft	**Date Completed:**	10/19/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Diedrich D-50	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	95.5%
Core Size:	NQ	**Driller:**	C. Odom	**Groundwater:**	**TOB** NR	**24HR**	51.9 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6" / 2nd 6" / 3rd 6" / 4th 6"	N Value	SPT N VALUE / PL MC LL / FINES CONTENT (%) / RQD (%) / REC (%)
	0.0							0 10 20 30 40 50 60 70 80 90
	0.6	**CONCRETE BRIDGE DECK (US 76)** (6-in.)						
		AIR GAP (44.0-ft.)						
775.6								
770.6								
765.6								
760.6								
755.6								
750.6								
745.6								
740.6								
	44.6			44.5	SS-1	50/0"	100+	>>
735.6		**GNEISS**		44.6	NQ-1			
		Metamorphic, Black/White, Coarse to Medium Grained, Laminated Foliation, Biotite/ Plagioclase/ Hornblende/ Muscovite, Slightly Weathered to Fresh, Strong to Very Strong, Numerous Joints Dip from 0° to 35°, J/Fo, M/N, Su/Sp/No, Fe/No, Pl/St, VC, SR/VR, Regular #8 Bit, %REC=99, %RQD=59, GSI=55-65, RMR=41, q_u=7,880 psi, 4.8 min/ft, Class III (Fair Rock)		49.6	NQ-2			
730.6				54.6	NQ-3			
725.6		@NQ-2: Biotite/ Quartz/ Plagioclase/ Amphibolite, Joints Dip from 0° to 45°,		59.6				

Continued Next Page

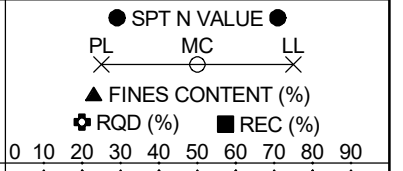
LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P043969			**County:**	Oconee	**Boring No.:**	B-4
Site Description:	US 76 over Chauga River					**Route:**	US 76
Eng./Geo.:	C Piercy	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	780.6 ft	**Latitude:**	34.68552398	**Longitude:**	-83.15177111	**Date Started:**	10/19/2024
Total Depth:	64.6 ft	**Soil Depth:**	0 ft	**Core Depth:**	20 ft	**Date Completed:**	10/19/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Diedrich D-50	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	95.5%
Core Size:	NQ	**Driller:**	C. Odom	**Groundwater:**	**TOB** NR	**24HR**	51.9 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6" / 2nd 6" / 3rd 6" / 4th 6"	N Value
720.6		Cl/No/Fe, Pl/Ir, S/SR/R, %REC=91, %RQD=67, GSI=60-70, RMR=41, q_u=11,760 psi, 4.8 min/ft, Class III (Fair Rock)			NQ-4		
715.6	64.6	@NQ-3: Numerous Joints Dip from 5° to 45°, Su/No, Fe/No, Pl, SR/R, %REC=95, %RQD=67, GSI=55-65, RMR=41, q_u=12,100 psi, 3.0 min/ft, Class III (Fair Rock)					
710.6		@NQ-4: Fresh, Occasional Joints Dip from 5° to 30°, No, No, Pl/Ir, R/VR, %REC=100, %RQD=66, GSI=60-70, RMR=49, q_u=15,440 psi, 5.2 min/ft, Class III (Fair Rock)					
705.6		Boring Terminated at 64.6 ft. Below Existing Bridge Surface. Target Boring Depth Achieved.					
700.6							
695.6							
690.6							
685.6							
680.6							
675.6							
670.6							
665.6							



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P043969			**County:**	Oconee	**Boring No.:**	B-5
Site Description:	US 76 over Chauga River					**Route:**	US 76
Eng./Geo.:	B. Carter	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	783.4 ft	**Latitude:**	34.68547036	**Longitude:**	-83.1520341	**Date Started:**	10/19/2024
Total Depth:	54.9 ft	**Soil Depth:**	33.7 ft	**Core Depth:**	21.2 ft	**Date Completed:**	10/19/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Mobile B-29	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	91.7%
Core Size:	NQ	**Driller:**	M. Brewer	**Groundwater:**	**TOB** 29 ft	**24HR**	30.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0								
	0.8	**ASPHALT PAVEMENT (US 76)** (9-in.)							
	1.7	**STONE BASE MATERIAL** (11-in.)	1.7						
		EXISTING FILL Loose, Moist, Brown, Non-Plastic, Silty Fine to Coarse SAND (SM/A-2-4) with Gravel, 10YR 5/3, Micaceous		SS-1	2	4	4	4	8
778.4			3.7	SS-2	3	3	3	6	6
		@SS-3: LL=NP, PL=NP, PL=NP, NMC=12.4, %200=17.5	5.7	SS-3	3	3	3	2	6
			7.7	SS-4	4	4	4	7	8
	9.7		9.7						
773.4		Very Loose to Loose, Moist, Brown, Non-Plastic, Silty Fine to Coarse SAND (SM/A-2-4), Micaceous, 10YR5/3		SS-5	4	3	1	3	4
		@SS-5: LL=NP, PL=NP, PI=NP, NMC=32.4%, %200=28.2	13.5						
		@SS-6: LL=NP, PL=NP, PI=NP, NMC=22.6%, %200=25.5		SS-6	2	1	2		3
768.4			18.5						
				SS-7	3	3	4		7
763.4			23.5						
		@SS-8: Brown/Dark Grayish Brown, 10YR 5/3 & 10YR4/2, LL=NP, PL=NP, PI=NP, NMC=26.0%, %200=17.1		SS-8	3	1	2		3
758.4									
	27.0								
		PIEDMONT RESIDUUM Very Dense, Moist, Dark Grayish Brown/White, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4), 10YR 4/2 & N 9.5/N	28.5	SS-9	50/3"				100+
753.4									

SPT N VALUE ● PL × MC ○ LL × ▲ FINES CONTENT (%) ✿ RQD (%) ■ REC (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P043969			**County:**	Oconee	**Boring No.:**	B-5
Site Description:	US 76 over Chauga River					**Route:**	US 76
Eng./Geo.:	B. Carter	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	783.4 ft	**Latitude:**	34.68547036	**Longitude:**	-83.1520341	**Date Started:**	10/19/2024
Total Depth:	54.9 ft	**Soil Depth:**	33.7 ft	**Core Depth:**	21.2 ft	**Date Completed:**	10/19/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Mobile B-29	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	91.7%
Core Size:	NQ	**Driller:**	M. Brewer	**Groundwater:**	**TOB** 29 ft	**24HR**	30.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6" / 2nd 6" / 3rd 6" / 4th 6"	N Value
	33.7			33.5		50/0.25"	100+
		GNEISS		33.7	NQ-1		
748.4		Metamorphic, Black/White, Coarse to Medium Grained, Laminated Foliations, Biotite/Plagioclase/ Quartz/ Hornblende, Slightly Weathered, Medium Strong to Strong, Few Joints Dip from 10° to 25°, J/Fo, M, Su/Sp, Fe, Pl, VC, R, Regular #8 Bit, %REC=100, %RQD=47, GSI=65-75, RMR=33, 5.8 min/ft, Class IV (Poor Rock)		34.9	NQ-2		
743.4		@NQ-2: Slightly Weathered to Fresh, Joints Dip from 5° to 15°, M/N, Su/Sp/No, Fe/No, R/VR, %REC=90, %RQD=90, GSI=75-85, RMR=55, q_u=7,390 psi, 4.2 min/ft, Class III (Fair Rock)		39.9	NQ-3		
738.4		@NQ-3: Occasional Joints Dip from 0° to 15°, M, SP/No, Pl/Ir, R, %REC=69, %RQD=92, GSI=75-85, RMR=45, q_u=7,160 psi, 6.4 min/ft, Class III (Fair Rock)		44.9	NQ-4		
		@NQ-4: Few Joints Dip from 5° to 10°, Pl, C/VC, Changed Regular #8 Bit to #10 Bit, %REC=100, %RQD=100, GSI=80-90, RMR=57, 8.2 min/ft, Class III (Fair Rock)					
733.4		@NQ-5: J/Fo, Su/No, Pl/Ir, C, SR/R, %REC=100, %RQD=100, GSI=80-90, RMR=57, 3.0 min/ft, Class III (Fair Rock)		49.9	NQ-5		
728.4	54.9	Boring Terminated at 54.9-ft. Below Existing Pavement Surface. Target Boring Depth Achieved.					
723.4							

SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) ✿ RQD (%) ■ REC (%)

0 10 20 30 40 50 60 70 80 90

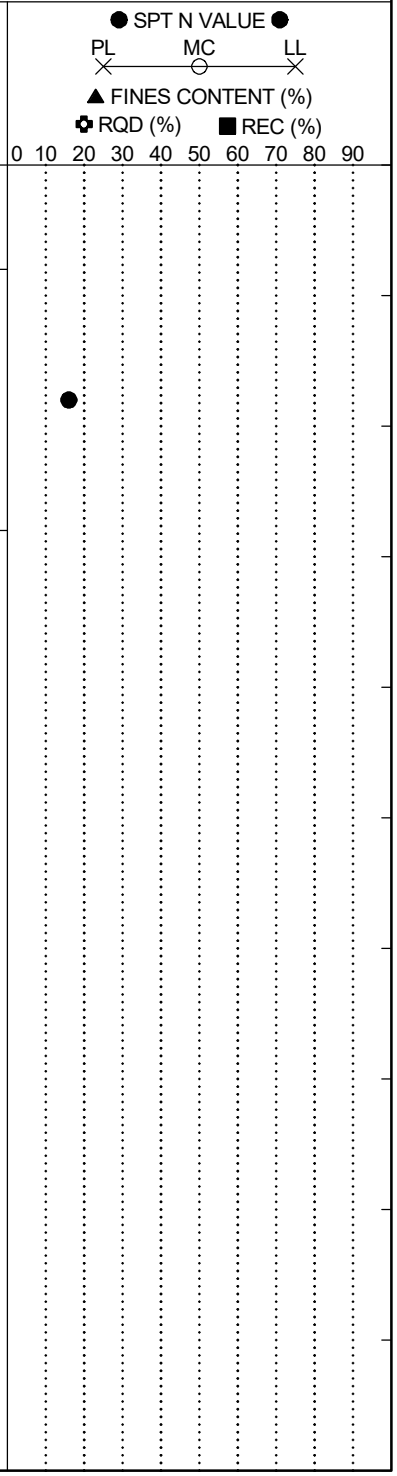
LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P043969			**County:**	Oconee	**Boring No.:**	P-1
Site Description:	US 76 over Chauga River					**Route:**	US 76
Eng./Geo.:	M. Miller	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	798.6 ft	**Latitude:**	34.6866541	**Longitude:**	-83.14901864	**Date Started:**	10/20/2024
Total Depth:	2.8 ft	**Soil Depth:**	2.8 ft	**Core Depth:**	N/A ft	**Date Completed:**	10/20/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Diedrich D-50	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95.5%
Core Size:	N/A	**Driller:**	C. Odom	**Groundwater:**	**TOB** N/A	**24HR**	Backfilled

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	**ASPHALT PAVEMENT (US 76)** (10-in.)								
	0.8	**PIEDMONT RESIDUUM** Medium Dense, Brown, Dry, Non-Plastic, Silty Fine SAND (SM/A-2-4), 10YR 5/3		0.8	SS-1	8	8	8	8	16
793.6	2.8	Boring Terminated at 2.8-ft. Below Existing Pavement Surface. Target Boring Depth Achieved.								



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT G7100.005 - US 76 OVER CHAUGA RIVER.GPJ SCDOT_DATATEMPLATE.GDT 10/29/24

SCDOT Soil Test Log

Project ID:	P043969			**County:**	Oconee	**Boring No.:**	P-2
Site Description:	US 76 over Chauga River					**Route:**	US 76
Eng./Geo.:	M. Miller	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	787.5 ft	**Latitude:**	34.68632809	**Longitude:**	-83.14975291	**Date Started:**	10/20/2024
Total Depth:	3 ft	**Soil Depth:**	2.8 ft	**Core Depth:**	N/A ft	**Date Completed:**	10/20/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Diedrich D-50	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95.5%
Core Size:	N/A	**Driller:**	C. Odom	**Groundwater:**	**TOB** N/A	**24HR**	Backfilled

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	**ASPHALT PAVEMENT (US 76)** (5.5-in.)								
	0.5	**STONE BASE MATERIAL** (5.5-in.)								
	0.9	**PIEDMONT RESIDUUM** Very Loose, Moist, Reddish Brown/White, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4), 5YR 5/4		0.9	SS-1	4	5	3	4	8
782.5	2.9	Boring Terminated at 2.9-ft. Below Existing Pavement Surface. Target Boring Depth Achieved.								

SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) ✿ RQD (%) ■ REC (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P043969			**County:**	Oconee	**Boring No.:**	P-3
Site Description:	US 76 over Chauga River					**Route:**	US 76
Eng./Geo.:	M. Miller	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	778.1 ft	**Latitude:**	34.68604842	**Longitude:**	-83.15054099	**Date Started:**	10/20/2024
Total Depth:	2.9 ft	**Soil Depth:**	2.8 ft	**Core Depth:**	N/A ft	**Date Completed:**	10/20/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Diedrich D-50	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95.5%
Core Size:	N/A	**Driller:**	C. Odom	**Groundwater:**	**TOB** N/A	**24HR**	Backfilled

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	**ASPHALT PAVEMENT (US 76)** (5.5-in.)								
	0.5	**STONE BASE MATERIAL** (5.5-in.)								
	0.9	**PIEDMONT RESIDUUM** Medium Dense, Moist, Brown, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4), Micaceous, 10YR5/3		0.9	SS-1	5	8	6	8	14
773.1	2.9	Boring Terminated at 2.9-ft. Below Existing Pavement Surface. Target Boring Depth Achieved.								

SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) ✿ RQD (%) ■ REC (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT G7100.005 - US 76 OVER CHAUGA RIVER.GPJ SCDOT_DATATEMPLATE.GDT 10/29/24

SCDOT Soil Test Log

Project ID:	P043969	**County:**	Oconee	**Boring No.:**	P-4		
Site Description:	US 76 over Chauga River			**Route:**	US 76		
Eng./Geo.:	B. Carter	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	794.2 ft	**Latitude:**	34.68516617	**Longitude:**	-83.15274782	**Date Started:**	10/19/2024
Total Depth:	3.6 ft	**Soil Depth:**	2 ft	**Core Depth:**	N/A ft	**Date Completed:**	10/19/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Mobile B-29	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	91.7%
Core Size:	N/A	**Driller:**	M. Brewer	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	**ASPHALT PAVEMENT (US 76)** (5-in.)								
	0.4	**STONE BASE MATERIAL** (14-in.)								
	1.6	**PIEDMONT RESIDUUM** Loose, Moist, Pale Brown, Non-Plastic to Low Plasticity, Silty Fine to Coarse SAND (SM/A-2-4), 10YR 6/3		1.6	SS-1	4	5	5	5	10
789.2	3.6	Boring Terminated at 3.6 ft. Below Existing Pavement Surface. Target Boring Depth Achieved.								

SPT N VALUE ● PL × MC ○ LL × ▲ FINES CONTENT (%) ✿ RQD (%) ■ REC (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT G7100.005 - US 76 OVER CHAUGA RIVER.GPJ SCDOT_DATATEMPLATE.GDT 10/31/24

SCDOT Soil Test Log

Project ID:	P043969			**County:**	Oconee	**Boring No.:**	P-5
Site Description:	US 76 over Chauga River					**Route:**	US 76
Eng./Geo.:	B. Carter	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	804.1 ft	**Latitude:**	34.68505783	**Longitude:**	-83.1535736	**Date Started:**	10/19/2024
Total Depth:	3.3 ft	**Soil Depth:**	2 ft	**Core Depth:**	N/A ft	**Date Completed:**	10/19/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Mobile B-29	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	91.7%
Core Size:	N/A	**Driller:**	M. Brewer	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	**ASPHALT PAVEMENT (US 76)** (7-in.)								
	0.6	**STONE BASE MATERIAL** (9-in.)								
	1.3	**PIEDMONT RESIDUUM** Medium Dense, Moist, Brown/Yellowish Brown, Non-Plastic to Low Plasticity, Silty Fine to Coarse SAND (SM/A-2-4), 10YR 5/3 & 10YR 5/8		1.3	SS-1	5	10	9	9	19
799.1	3.3	Boring Terminated at 3.3 ft. Below Existing Pavement Surface. Target Boring Depth Achieved.								

SPT N VALUE ● PL × MC ○ LL ×
▲ FINES CONTENT (%)
✿ RQD (%) ■ REC (%)
0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P043969			**County:**	Oconee	**Boring No.:**	P-6
Site Description:	US 76 over Chauga River					**Route:**	US 76
Eng./Geo.:	B. Carter	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	814.6 ft	**Latitude:**	34.68506342	**Longitude:**	-83.15440205	**Date Started:**	10/19/2024
Total Depth:	3.3 ft	**Soil Depth:**	2 ft	**Core Depth:**	N/A ft	**Date Completed:**	10/19/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Mobile B-29	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	91.7%
Core Size:	N/A	**Driller:**	M. Brewer	**Groundwater:**	**TOB** N/A	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	**ASPHALT PAVEMENT (US 76)** (6.5-in.)								
	0.5	**STONE BASE MATERIAL** (9.5-in.)								
	1.3	**PIEDMONT RESIDUUM** Stiff, Moist, Yellowish Brown/Yellowish Red, Non-Plastic to Low Plasticity, Fine to Coarse Sandy SILT (ML/A-4), 10YR 5/8 & 5YR 5/8		1.3	SS-1	4	7	7	5	14
809.6	3.3	Boring Terminated at 3.3 ft. Below Existing Pavement Surface. Target Boring Depth Achieved.								

SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) ✿ RQD (%) ■ REC (%)
0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P043969	**County:**	Oconee	**Boring No.:**	R-1		
Site Description:	US 76 over Chauga River			**Route:**	US 76		
Eng./Geo.:	A. Chandler	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	776.7 ft	**Latitude:**	34.68585655	**Longitude:**	-83.15095163	**Date Started:**	10/14/2024
Total Depth:	38.8 ft	**Soil Depth:**	38.8 ft	**Core Depth:**	N/A ft	**Date Completed:**	10/14/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Diedrich D-50	**Drill Method:**	HSA	**Hammer Type:**	Automatic	**Energy Ratio:**	95.5%
Core Size:	N/A	**Driller:**	C. Odom	**Groundwater:**	**TOB** Dry	**24HR**	Backfilled

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0								
	0.7	**ASPHALT PAVEMENT (US 76)** (8-in.)							
	1.7	**STONE BASE MATERIAL** (12.-in.)	1.7						
		PIEDMONT RESIDUUM							
		Medium Dense to Loose, Moist, Light Gray/Light Brown/Brown, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4), 7.5YR 7/1, 7.5YR 6/4 & 7.5YR 5/4	3.7	SS-1	8	7	7	9	14
771.7			5.7	SS-2	4	6	7	9	13
			7.7	SS-3	5	3	3	2	6
		@SS-2: Brown, 7.5YR 4/3							
		@SS-3: Brown/Light Gray, 7.5YR 5/4 & 7.5YR 7/1	9.7	SS-4	1	1	1	2	2
766.7	9.7	@SS-4: Very Loose, Dark Yellowish Brown, Micaceous, 10YR 4/4, LL=NP, PL=NP, PI=NP, NMC=14.8%, %200=26.2	9.7	SS-5	2	2	2	2	2
	13.5	Very Loose, Moist, Dark Yellowish Brown, Non-Plastic, Silty Fine to Medium SAND (SM/A-1-b) with Gravel, 10YR4/4	13.5	SS-6	1	2	2		4
761.7		@SS-5: LL=NP, PL=NP, PI=NP, NMC=8.9%, %200=21.9							
		Very Loose to Loose, Moist, Strong Brown, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4), 7.5YR 5/6	18.5	SS-7	2	3	3		6
756.7									
			23.5	SS-8	3	3	3		6
		@SS-8: Reddish Brown/Light Gray, 2.5YR 4/6 & 2.5YR 7/1, LL=NP, PL=NP, PI=NP, NMC=16.7%, %200=27.4							
751.7									
	28.5	Stiff, Moist, Red, Non-Plastic to Low Plasticity, SILT (ML/A-4), 10R 4/6, Micaceous	28.5	SS-9	3	6	7		13
746.7									
	33.5	Very Dense, Moist, Dark Grayish Brown/Light Gray, Non-Plastic to Low Plasticity, Fine to Medium Poorly Graded SAND (SP/A-3), 2.5Y 4/2 & 2.5 YR 7/1	33.5	SS-10	23	50/4"			100+
741.7									
	38.8	Boring Terminated at 38.8-ft. Below Existing Pavement Surface. Target Boring Depth Achieved.	38.5	SS-11		50/4"			100+
736.7									

SPT N VALUE: PL, MC, LL; ▲ FINES CONTENT (%); ✿ RQD (%); ■ REC (%); 0 10 20 30 40 50 60 70 80 90

LEGEND

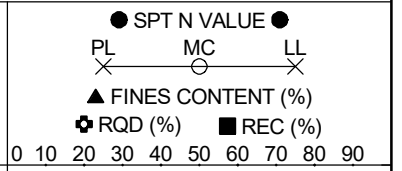
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT G7100.005 - US 76 OVER CHAUGA RIVER.GPJ SCDOT_DATATEMPLATE.GDT 10/29/24

SCDOT Soil Test Log

Project ID:	P043969			**County:**	Oconee	**Boring No.:**	R-2
Site Description:	US 76 over Chauga River					**Route:**	US 76
Eng./Geo.:	B. Carter	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	787.5 ft	**Latitude:**	34.68535245	**Longitude:**	-83.15230327	**Date Started:**	10/19/2024
Total Depth:	13.5 ft	**Soil Depth:**	13.5 ft	**Core Depth:**	N/A ft	**Date Completed:**	10/19/2024
Bore Hole Diameter (in):	6	**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	Mobile B-29	**Drill Method:**	RW	**Hammer Type:**	Automatic	**Energy Ratio:**	91.7%
Core Size:	N/A	**Driller:**	M. Brewer	**Groundwater:**	**TOB** Dry	**24HR**	Dry

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value
	0.0	**ASPHALT PAVEMENT (US 76)** (7.25-in)								
	0.6	**STONE BASE MATERIAL** (10.75-in.)								
	1.5	**PIEDMONT RESIDUUM** Medium Dense to Dense, Dry, White/Brown, Non-Plastic, Silty Fine to Coarse SAND (SM/A-2-4), N 9.5/N & 10YR 5/3 @SS-1: LL=NP, PL=NP, PI=NP, NMC=10.9%, %200=18.9		1.5	SS-1	7	7	4	6	11
		@SS-2: Brown, 10YR 5/3		3.5	SS-2	6	8	13	15	21
782.5		@SS-3: Micaceous		5.5	SS-3	7	14	20	23	34
		@SS-4: LL=NP, PL=NP, PI=NP, NMC=9.4%, %200=25.4		7.5	SS-4	10	11	19	24	30
		@SS-5: Very Dense		9.5	SS-5	30	47	45	47	92
777.5	13.5	Boring Terminated at 13.5-ft. Below Existing Pavement Surface. Boring Terminated Due to Rollercone Refusal.		13.5	SS-6	50/0.75"				100+



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

APPENDIX

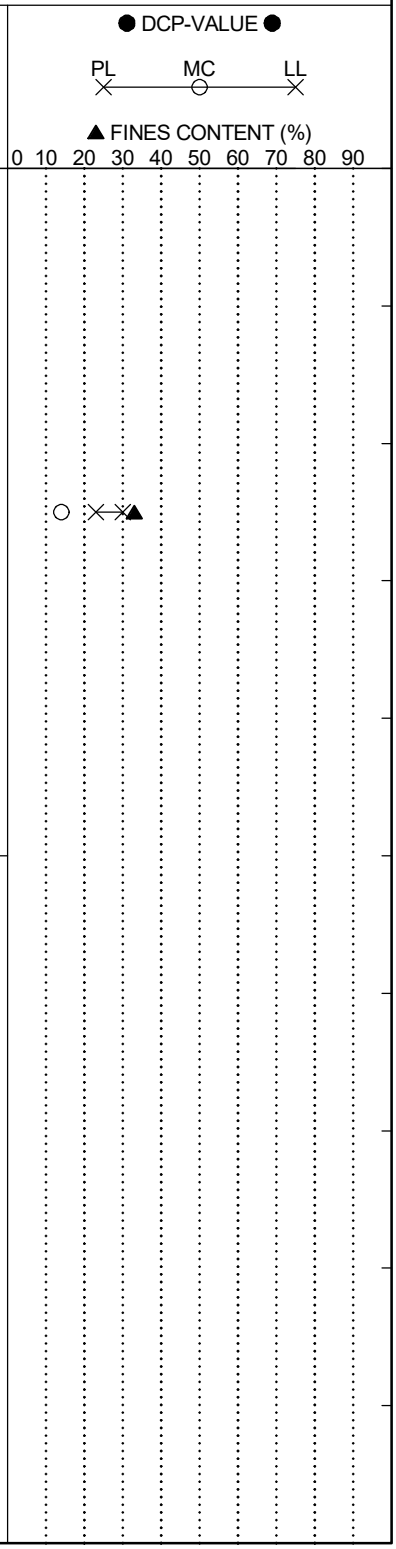
SECTION 3 SUBSURFACE EXPLORATION LOGS

SECTION 3B MANUAL AUGER BORING (MAB) LOGS

SCDOT Manual Auger Log

Project ID:	P043969			**County:**	Oconee	**Boring No.:**	BS-1
Site Description:	US 76 over Chauga River					**Route:**	US 76
Driller:	A. Chandler	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	776.2 ft	**Latitude:**	34.6858854	**Longitude:**	-83.15111873	**Date Started:**	10/15/2024
Total Depth:	5 ft	**Groundwater:**	**TOB** N/A	**24 hr**	Backfilled	**Date Completed:**	10/15/2024
Dynamic Cone Penetrometer Test Procedure:		Sowers and Hedges (1966)					

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 1.75"	2nd 1.75"	3rd 1.75"	DCP-Value
	0.0	Moist, Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4) @BS-1: LL=30, PL=23, PI=7, NMC=13.6%, %200=32.7		0.0	BS-1				
771.2	5.0	Boring Terminated 5.0-ft. Below Existing Ground Surface. Boring Achieved Target Depth.							



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	DCP Dynamic Cone Penetrometer	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	NE - Not Encountered

MANUAL AUGER LOG G7100.005 - US 76 OVER CHAUGA RIVER.GPJ FME2017.GDT 10/29/24

SCDOT Manual Auger Log

Project ID:	P043969			**County:**	Oconee	**Boring No.:**	BS-2
Site Description:	US 76 over Chauga River					**Route:**	US 76
Driller:	W. Pitts	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	782.9 ft	**Latitude:**	34.68538213	**Longitude:**	-83.15198111	**Date Started:**	10/16/2024
Total Depth:	5 ft	**Groundwater:**	**TOB** N/A	**24 hr**	Backfilled	**Date Completed:**	10/16/2024
Dynamic Cone Penetrometer Test Procedure:		Sowers and Hedges (1966)					

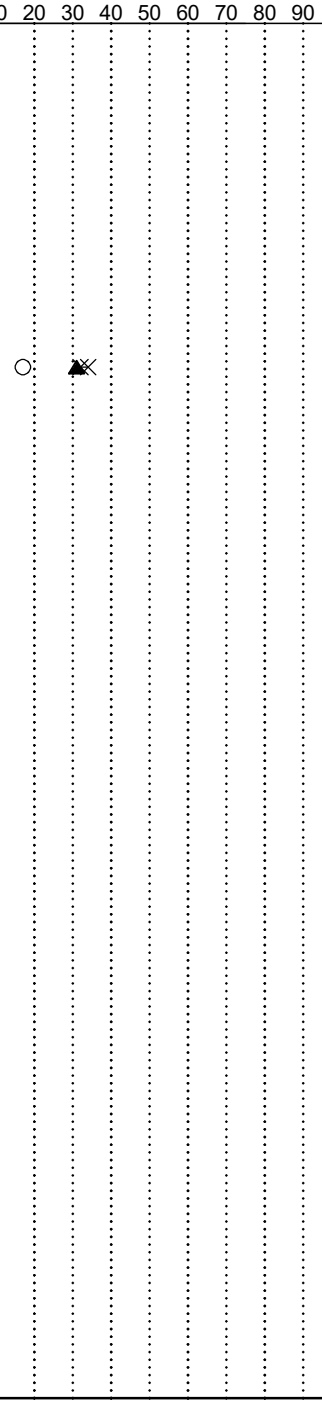
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 1.75"	2nd 1.75"	3rd 1.75"	DCP-Value
	0.0	Moist, Low Plasticity, Silty Fine to Medium SAND (SM/A-2-4) @BS-2: LL=34, PL=32, PI=2, NMC=17.1%, %200=30.6		0.0	BS-2				
777.9	5.0	Boring Terminated 5.0-ft. Below Existing Ground Surface. Boring Achieved Target Depth.							

● DCP-VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	DCP Dynamic Cone Penetrometer	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	NE - Not Encountered

MANUAL AUGER LOG G7100.005 - US 76 OVER CHAUGA RIVER.GPJ FME2017.GDT 10/29/24

SCDOT Manual Auger Log

Project ID:	P043969			**County:**	Oconee	**Boring No.:**	BS-3
Site Description:	US 76 over Chauga River					**Route:**	US 76
Driller:	W. Pitts	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	777.5 ft	**Latitude:**	34.68607365	**Longitude:**	-83.15055645	**Date Started:**	10/16/2024
Total Depth:	2 ft	**Groundwater:**	**TOB** N/A	**24 hr**	Backfilled	**Date Completed:**	10/16/2024
Dynamic Cone Penetrometer Test Procedure:		Sowers and Hedges (1966)					

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 1.75"	2nd 1.75"	3rd 1.75"	DCP-Value	● DCP-VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	Moist, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4) @BS-3: LL=NP, PL=NP, PI=NP, NMC=12.7%, %200=28.3		0.0	BS-3					
	2.0	Boring Terminated 2.0-ft. Below Existing Ground Surface. Boring Achieved Target Depth.								
772.5										

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	DCP Dynamic Cone Penetrometer	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	NE - Not Encountered

MANUAL AUGER LOG G7100.005 - US 76 OVER CHAUGA RIVER.GPJ FME2017.GDT 10/29/24

SCDOT Manual Auger Log

Project ID:	P043969			**County:**	Oconee	**Boring No.:**	BS-4
Site Description:	US 76 over Chauga River					**Route:**	US 76
Driller:	B. Carter	**Boring Location:**	N/A	**Offset:**	N/A	**Alignment:**	Existing CL
Elev.:	793.5 ft	**Latitude:**	34.68514384	**Longitude:**	-83.15273405	**Date Started:**	10/19/2024
Total Depth:	2 ft	**Groundwater:**	**TOB** N/A	**24 hr**	Backfilled	**Date Completed:**	10/19/2024
Dynamic Cone Penetrometer Test Procedure:		Sowers and Hedges (1966)					

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 1.75"	2nd 1.75"	3rd 1.75"	DCP-Value	● DCP-VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
	0.0	Moist, Non-Plastic, Silty Fine to Medium SAND (SM/A-2-4) @BS-4: LL=NP, PL=NP, PI=NP, NMC=10.6%, %200=27.4		0.0	BS-4					
	2.0	Boring Terminated 2.0-ft. Below Existing Ground Surface. Boring Achieved Target Depth.								
788.5										

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	DCP Dynamic Cone Penetrometer	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	NE - Not Encountered

MANUAL AUGER LOG G7100.005 - US 76 OVER CHAUGA RIVER.GPJ FME2017.GDT 10/29/24

APPENDIX

SECTION 4 DOWNHOLE SHEAR WAVE VELOCITY TESTING

October 22, 2024

Mr. Trapp Harris, P.E.
South Carolina Department of Transportation
955 Park Street
Columbia, South Carolina 29201

Re: Downhole Seismic Test Report
US 76 over Chauga River
Oconee County, South Carolina
SCDOT Project ID: P043969
FME Project No.: G7100.005

Mr. Harris:

A Downhole Seismic Test, designated as Borehole B-1/DH-1, was conducted at US 76 over the Chauga River on October 21,2024 to determine shear-wave velocities at 2.0 and 2.5-foot intervals for the proposed bridge project. This report summarizes the downhole testing method and presents the shear-wave and compression-wave velocity results.

The boring was cased with a two-inch PVC pipe and grouted in the annulus between the casing and the borehole wall, the deepest depth reading for the downhole test was at 87.5 ft. The grout setup a minimum of 72 hours before testing. Water was pumped from the downhole pipe prior to testing.

Seismic data for the downhole testing was collected by recording seismic shear-waves and compression waves with a Geometrics Geode seismograph paired with a GeoStuff triaxial BHG-3 geophone. Seismic waves were generated by using a sixteen-pound sledgehammer to horizontally strike both ends of a 7-foot-long wood beam with steel plates attached to the ends. Compression waves were generated by striking an aluminum plate on the ground surface with the sledgehammer. Seismic data was recorded starting at the bottom of the borehole and continued at 2.5-foot intervals from 87.5 to 80 ft and 60 to 0 ft and at 2-foot intervals from 80 to 60 ft.

Shear wave data was collected by striking the beam from opposite sides to produce reverse polarized waves when they are combined, these waves were used to identify shear wave arrivals. First arrivals were identified from the compression waves. The arrival times were used to calculate seismic shear wave and compression wave velocities for the interval depths. The seismic velocities for the intervals are visually presented on the attached graph and in table form for both seismic wave types. Geometrics software was used to process the seismic data.

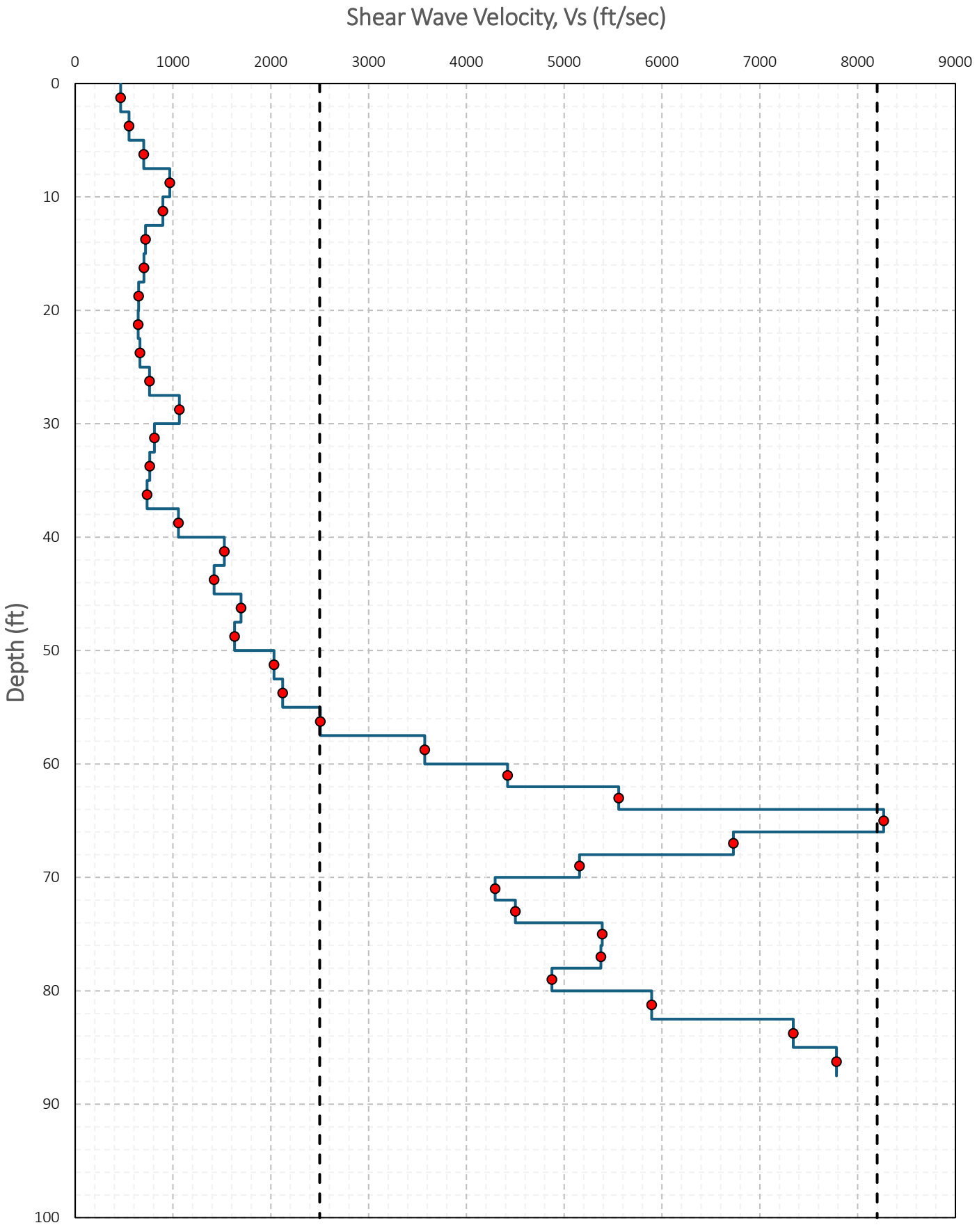
The results from the downhole seismic test are a V_s87.5 value of 999 ft/sec and a V_p87.5 value of 1,860 ft/sec. This downhole seismic test was conducted at one location at the test site, the attached seismic velocity models may not be representative of subsurface conditions across the entire project area.

Regards,

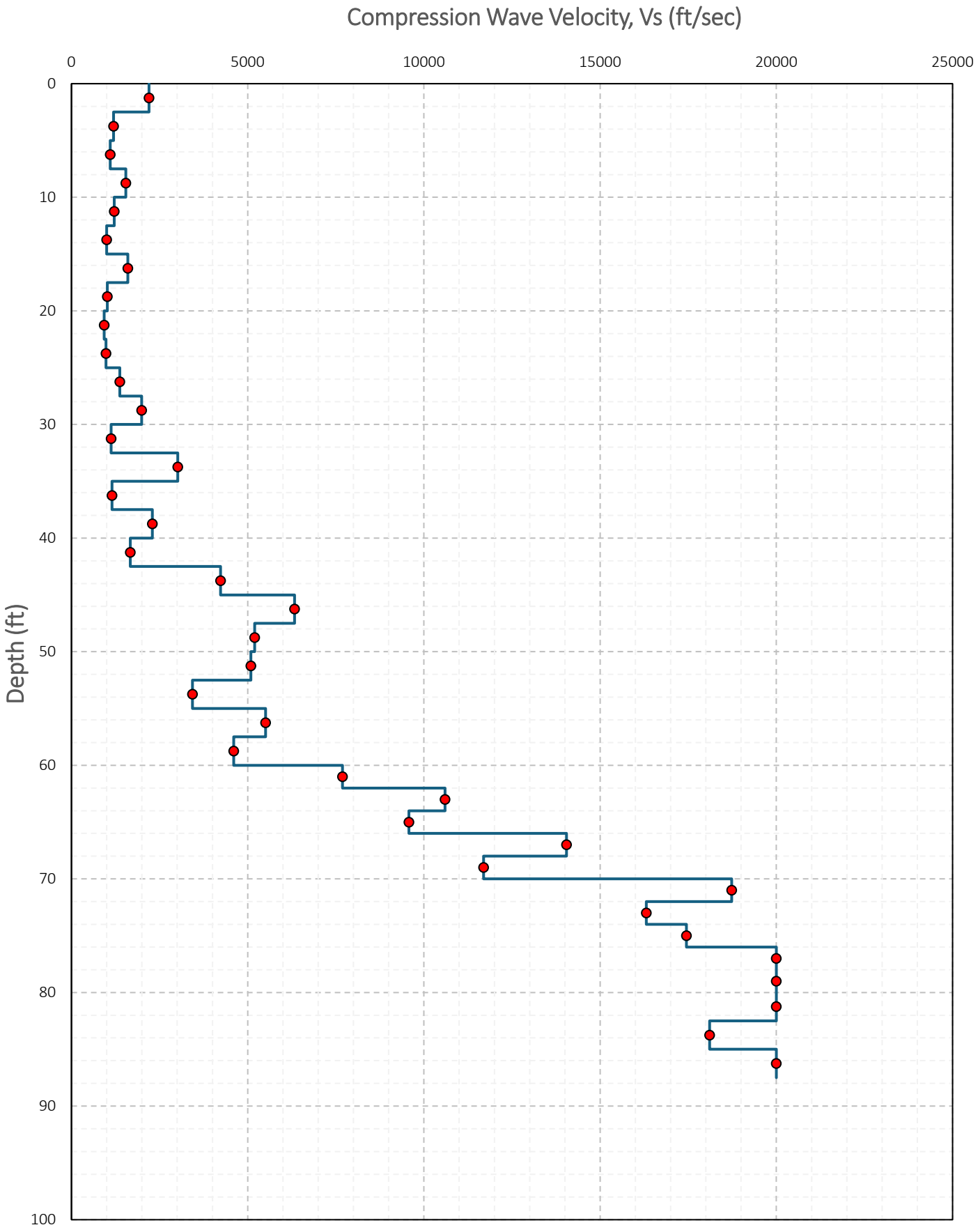
Craig Piercy, P.G.
Senior Geologist

US 76 RBO Chauga River B-1/DHT			
Compression (P) Wave Velocity		**Shear (S) Wave Velocity**	
Depth(ft)	**Interval velocity(ft/sec)**	**Depth(ft)**	**Interval velocity(ft/sec)**
0.0	--	0.0	--
2.5	2,202	2.5	465
5.0	1,194	5.0	552
7.5	1,102	7.5	701
10.0	1,542	10.0	967
12.5	1,214	12.5	896
15.0	1,002	15.0	719
17.5	1,602	17.5	704
20.0	1,017	20.0	649
22.5	928	22.5	644
25.0	977	25.0	662
27.5	1,371	27.5	760
30.0	1,989	30.0	1,065
32.5	1,124	32.5	809
35.0	3,016	35.0	762
37.5	1,152	37.5	736
40.0	2,292	40.0	1,056
42.5	1,667	42.5	1,526
45.0	4,228	45.0	1,420
47.5	6,330	47.5	1,695
50.0	5,196	50.0	1,629
52.5	5,090	52.5	2,033
55.0	3,432	55.0	2,122
57.5	5,511	57.5	2,505
60.0	4,606	60.0	3,574
62.0	7,691	62.0	4,420
64.0	10,600	64.0	5,556
66.0	9,576	66.0	8,266
68.0	14,044	68.0	6,730
70.0	11,694	70.0	5,156
72.0	18,735	72.0	4,293
74.0	16,308	74.0	4,500
76.0	17,451	76.0	5,388
78.0	20,000	78.0	5,376
80.0	20,000	80.0	4,875
82.5	20,000	82.5	5,893
85.0	18,109	85.0	7,343
87.5	20,000	87.5	7,785
V_p87.5=1,860 ft/sec		V_s87.5=999 ft/sec	

Project: US 76 over Chauga River
Date: October 23, 2024
Analysis: Downhole Geophysical Test Results in Soil Boring B-1

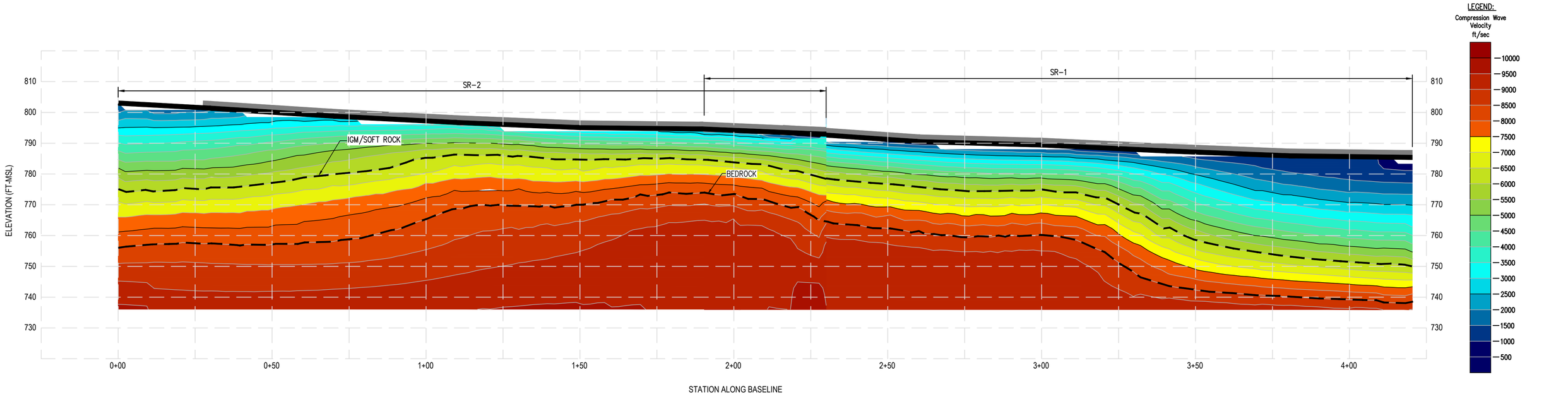


Project: US 76 over Chauga River
Date: October 23, 2024
Analysis: Downhole Geophysical Test Results in Soil Boring B-1



APPENDIX

SECTION 5 SEISMIC REFRACTION TESTING



THE GEOLOGIC BOUNDARIES SHOWN ON THIS DRAWING ARE F&ME'S INTERPRETATION OF THE VARIOUS GEOLOGIES ENCOUNTERED AT THE SITE. THESE GEOLOGIC BOUNDARIES WERE DETERMINED BY F&ME ENGINEERS AND GEOLOGISTS. THE DESIGN TEAM SHALL REVIEW, CONFIRM, AND ADJUST THESE GEOLOGIC BOUNDARIES, AS NECESSARY, BASED ON THEIR OWN INTERPRETATION.

F&ME CONSULTANTS, INC.
COLUMBIA, SC

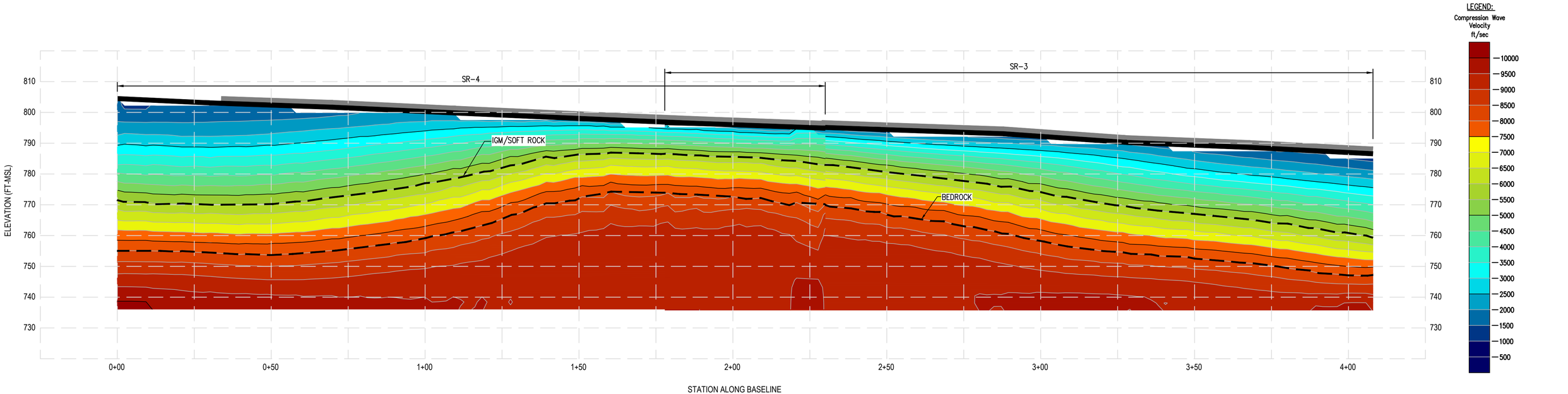
REV	BY	DATE	DESCRIPTION OF REVISION
4			
3			
2			
1			

TOPO. _____ DATE _____
DWG. CTC DATE 10.28.24 GROUP ____ – ____
R/W _____ DATE _____

US 76 OVER CHAUGA RIVER
OCONEE COUNTY, SOUTH CAROLINA

SEISMIC REFRACTION PROFILE SR-1 - SR-2

SCDOT PROJECT ID: P043969	FME JOB NO. G7100.005
SCALE: NTS	FIGURE 3



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F&ME CONSULTANTS, INC.
COLUMBIA, SC

REV	BY	DATE	DESCRIPTION OF REVISION
4			
3			
2			
1			

TOPO. ____ DATE ____
DWG. CTC DATE 10.28.24 GROUP ____ – ____
R/W ____ DATE ____

US 76 OVER CHAUGA RIVER
OCONEE COUNTY, SOUTH CAROLINA

SEISMIC REFRACTION PROFILE SR-3 - SR-4

SCDOT PROJECT ID: P043969	FME JOB NO. G7100.005
SCALE: NTS	FIGURE 4

APPENDIX

SECTION 6 LABORATORY TEST RESULTS

APPENDIX

SECTION 6 LABORATORY TEST RESULTS

SECTION 6A SPLIT-SPOON SAMPLES

SUMMARY OF LABORATORY RESULTS

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-1/DH-1	15.0	NP	NP	NP	19	30	SM	21.4			
B-1/DH-1	20.0	NP	NP	NP	4.76	24	SM	29.3			
B-1/DH-1	25.0	NP	NP	NP	4.76	31	SM	26.7			
B-1/DH-1	35.0	NP	NP	NP	9.51	13	SM	17.1			
B-1/DH-1	40.0	33	19	14	4.76	65	CL	24.7			
B-2	5.7	36	21	15	9.51	33	SC	20.3			
B-2	15.0	32	28	4	25	35	SM	18.2			
B-2	30.0	NP	NP	NP	9.51	29	SM	19.1			
B-2	35.0	NP	NP	NP	9.51	16	SM	7.9			
B-2	40.0	25	24	1	4.76	45	SM	14.1			
B-3	51.1	NP	NP	NP	9.51	17	SM	16.6			
B-5	7.7	NP	NP	NP	25	17	SM	12.4			
B-5	11.7	NP	NP	NP	19	28	SM	32.4			
B-5	15.0	NP	NP	NP	9.51	25	SM	22.6			
B-5	25.0	NP	NP	NP	9.51	17	SM	26.0			
R-1	9.7	NP	NP	NP	19	26	SM	14.8			
R-1	11.7	NP	NP	NP	25	22	SM	8.9			
R-1	25.0	NP	NP	NP	9.51	27	SM	16.7			
R-2	3.5	NP	NP	NP	9.51	19	SM	10.9			
R-2	9.5	NP	NP	NP	9.51	25	SM	9.4			

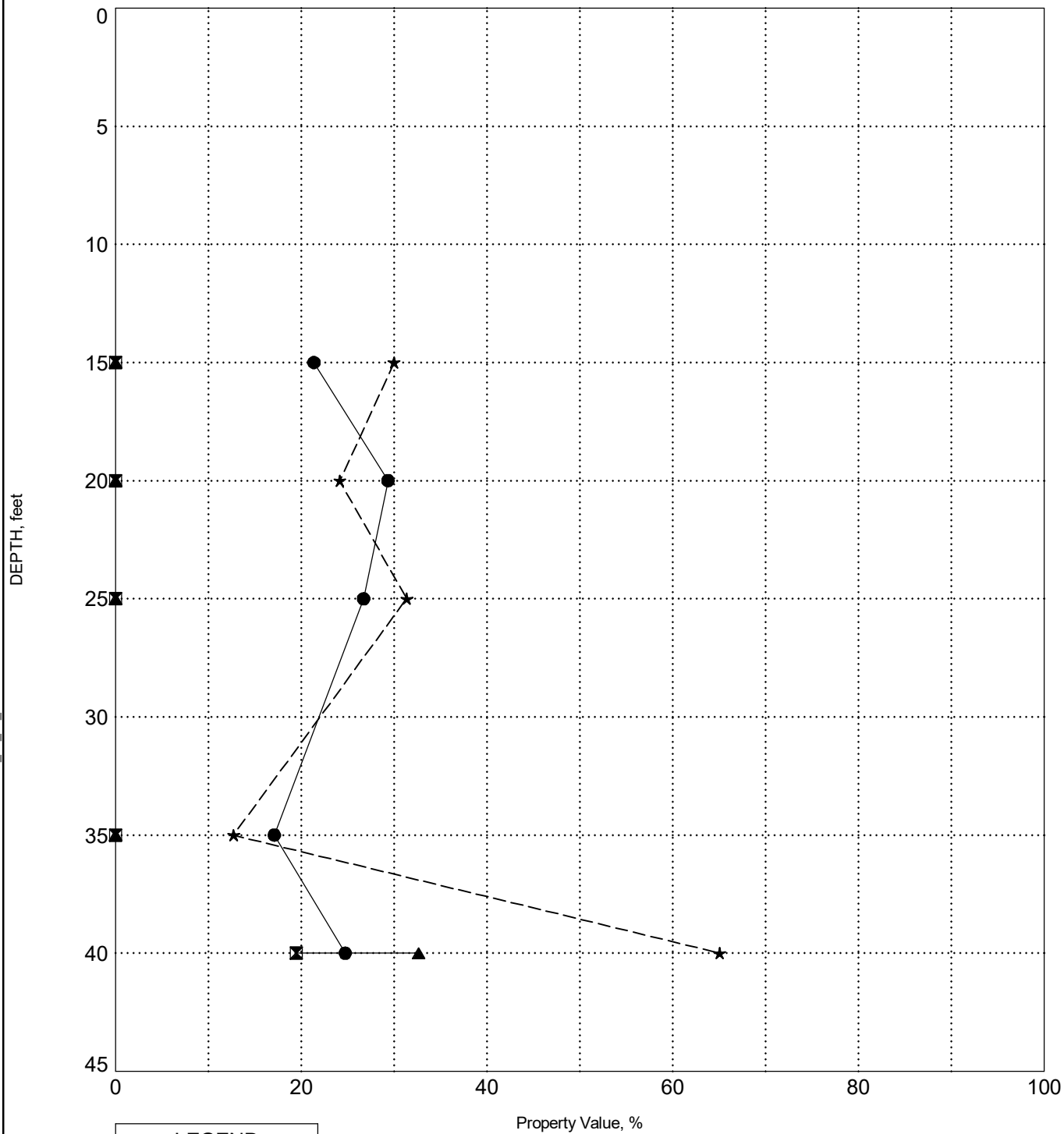
INDEX PROPERTIES VERSUS DEPTH

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

BORING B-1/DH-1

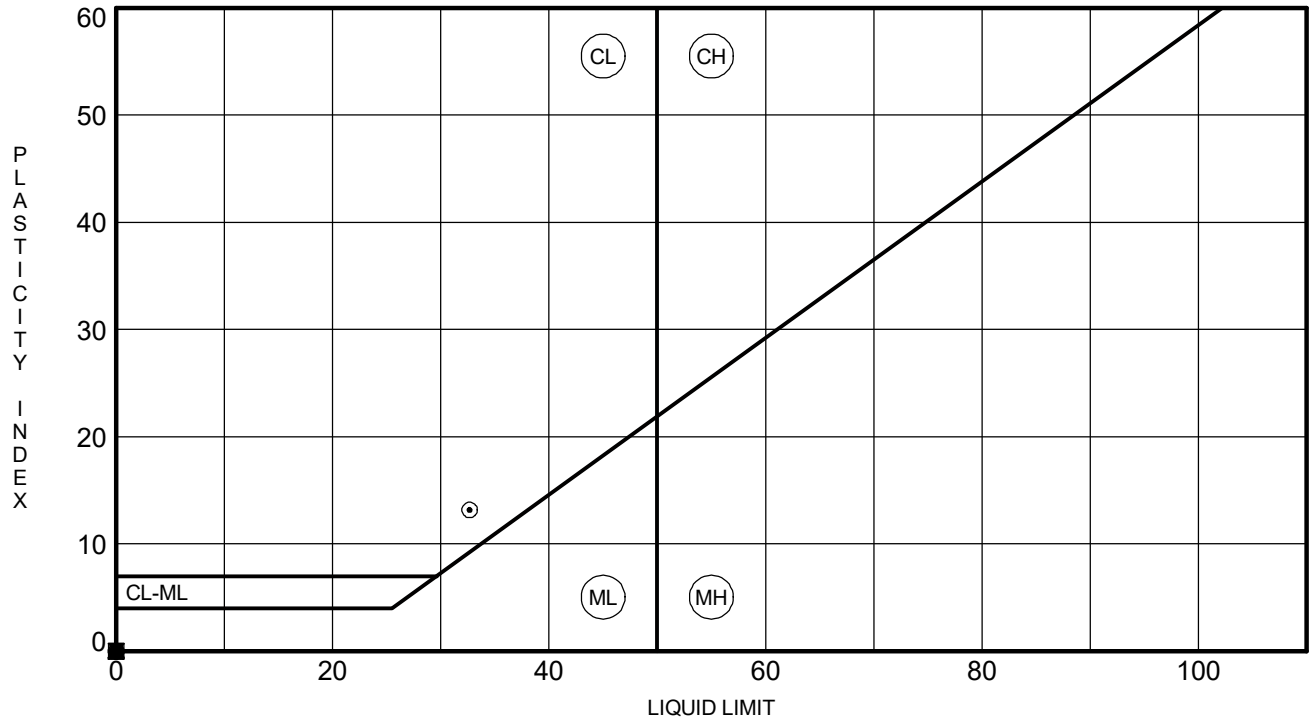
SURFACE ELEVATION: 776.7



ATTERBERG LIMITS' RESULTS

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

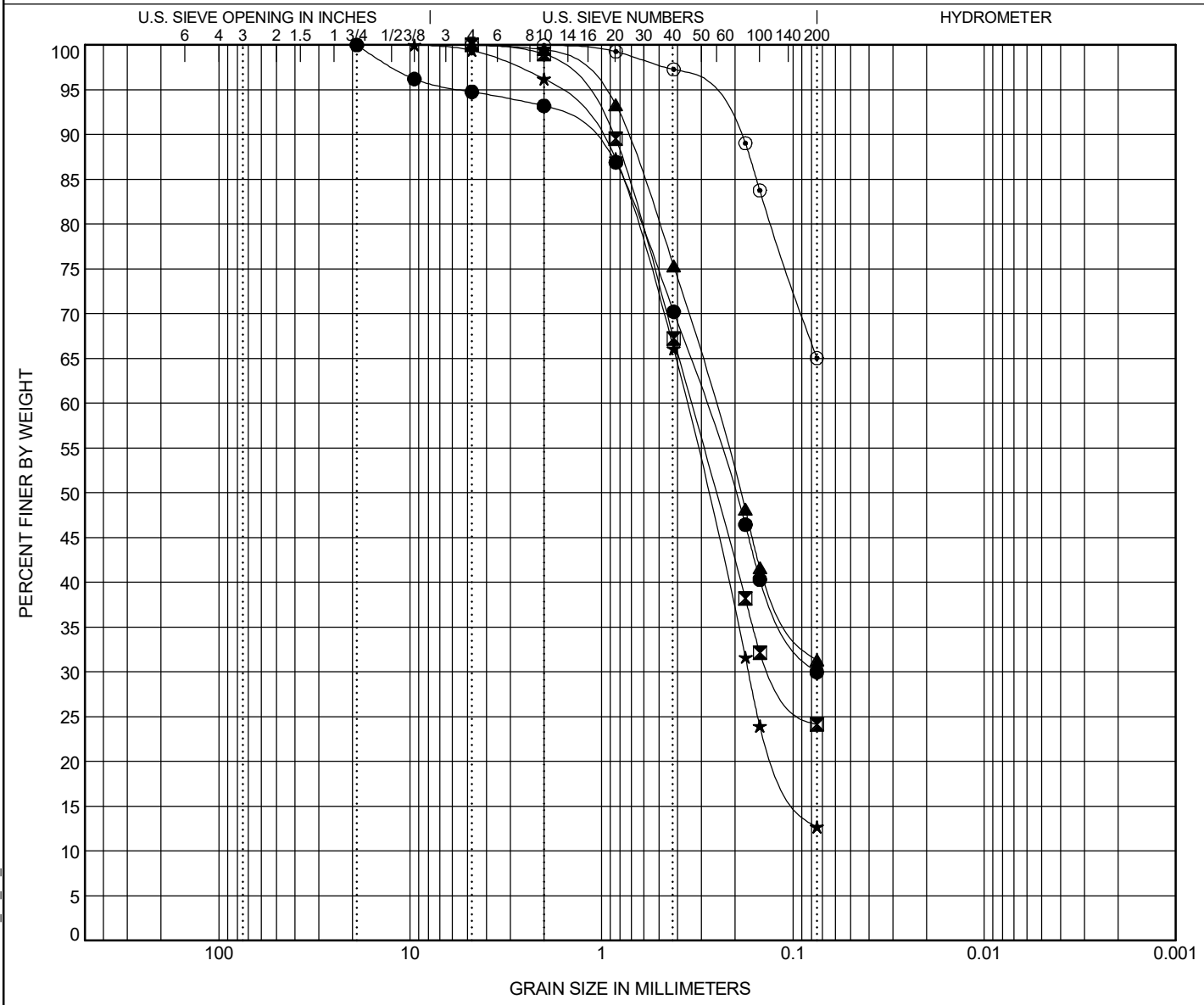


	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**B-1/DH-1**	**15.0**	**NP**	**NP**	**NP**	**30**	**SILTY SAND (SM/A-2-4)**
⊠	**B-1/DH-1**	**20.0**	**NP**	**NP**	**NP**	**24**	**SILTY SAND (SM/A-2-4)**
▲	**B-1/DH-1**	**25.0**	**NP**	**NP**	**NP**	**31**	**SILTY SAND (SM/A-2-4)**
★	**B-1/DH-1**	**35.0**	**NP**	**NP**	**NP**	**13**	**SILTY SAND (SM/A-2-4)**
⊙	**B-1/DH-1**	**40.0**	**33**	**19**	**14**	**65**	**SANDY LEAN CLAY (CL/A-6)**

GRAIN SIZE DISTRIBUTION

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-1/DH-1	15.0	SILTY SAND (SM/A-2-4)	NP	NP	NP		
⊠	B-1/DH-1	20.0	SILTY SAND (SM/A-2-4)	NP	NP	NP		
▲	B-1/DH-1	25.0	SILTY SAND (SM/A-2-4)	NP	NP	NP		
★	B-1/DH-1	35.0	SILTY SAND (SM/A-2-4)	NP	NP	NP		
⊙	B-1/DH-1	40.0	SANDY LEAN CLAY (CL/A-6)	33	19	14		

	BOREHOLE	DEPTH	D90	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-1/DH-1	15.0	1.287	0.29	0.075		5.2	64.8	30.0	
⊠	B-1/DH-1	20.0	0.876	0.339	0.124		0.0	75.9	24.1	
▲	B-1/DH-1	25.0	0.739	0.258			0.0	68.6	31.4	
★	B-1/DH-1	35.0	1.092	0.36	0.171		0.6	86.7	12.7	
⊙	B-1/DH-1	40.0	0.196				0.0	35.0	65.0	

GRAIN SIZE G7100.005 - US 76 OVER CHAUGA RIVER.GPJ SCDOT DATA TEMPLATE_01_30_2015.GDT 10/23/24

REV 12/2023

F&ME CONSULTANTS, INC
211 Business Park Blvd.
Columbia, SC 29203

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US 76 over Chauga River	**PROJECT NO.:**	P043969
SAMPLE NUMBER:	24-3638	**DATE REQUESTED:**	10/16/2024
DESCRIPTION OF SOIL:	Various		
TESTED BY:	Jada Marken & Abbie Grier	**DATE OF TESTING:**	10/17/2024
WEIGHED BY:	Jada Marken & Abbie Grier	**DATE OF WEIGHING:**	10/18/2024

BORING NO.	B-1/DH-1	B-1/DH-1	B-1/DH-1	B-1/DH-1	B-1/DH-1
SAMPLE NO.	SS-6	SS-7	SS-8	SS-10	SS-11
SAMPLE DEPTH	13.5 - 15.0	18.5 - 20.0	23.5 - 25.0	33.5 - 35.0	38.5 - 40.0
WATER CONTENT, W%	21.4	29.3	26.7	17.1	24.7

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

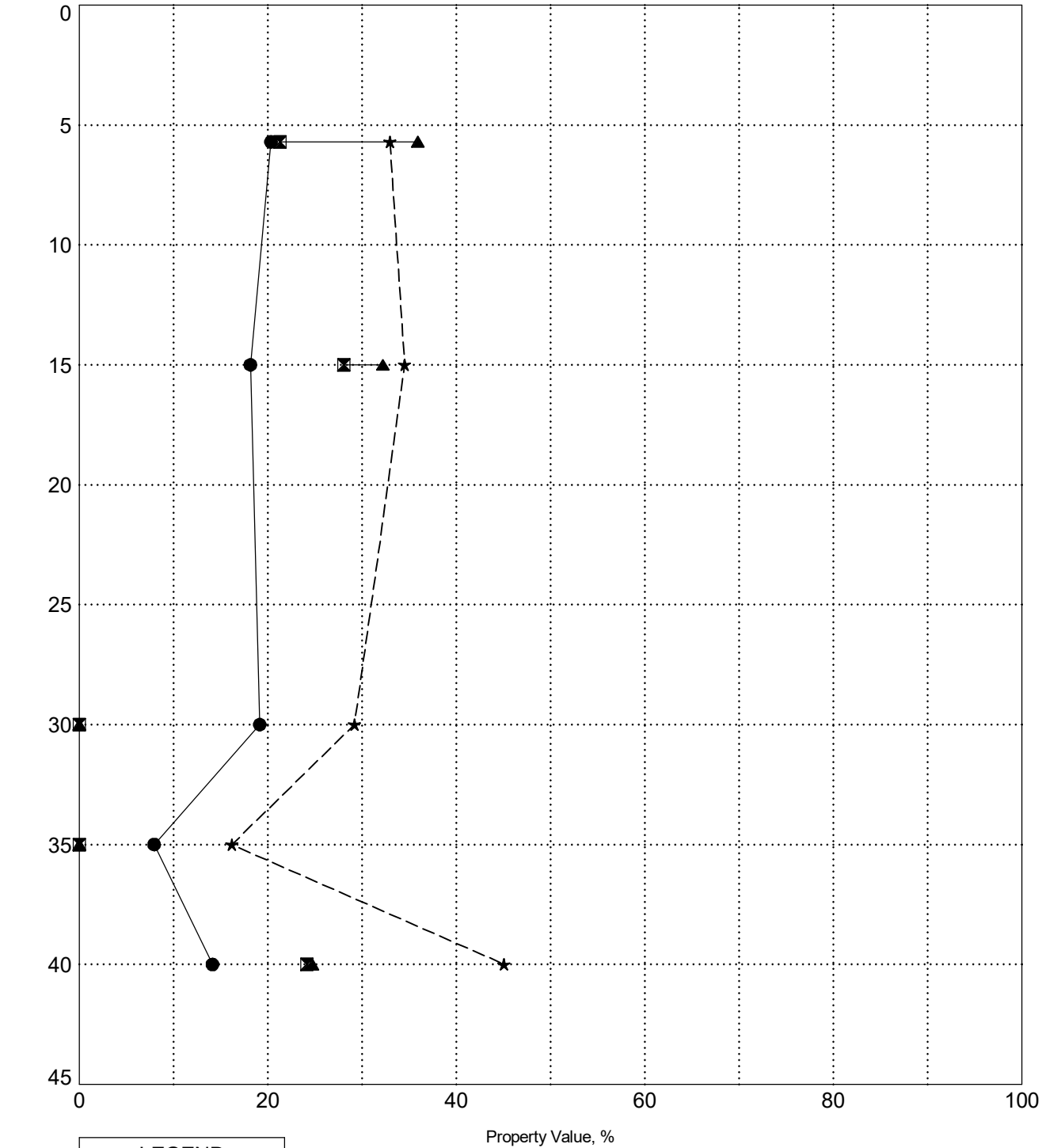
INDEX PROPERTIES VERSUS DEPTH

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

BORING B-2

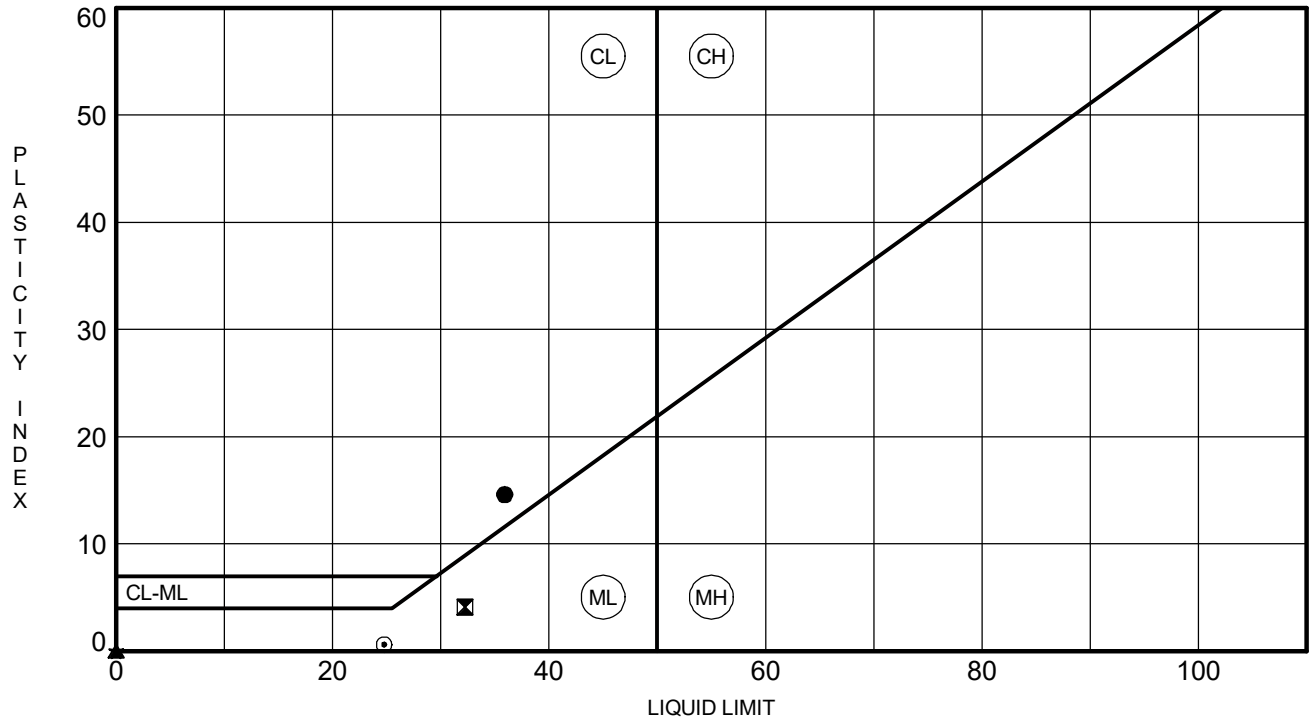
SURFACE ELEVATION: 776.7



ATTERBERG LIMITS' RESULTS

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

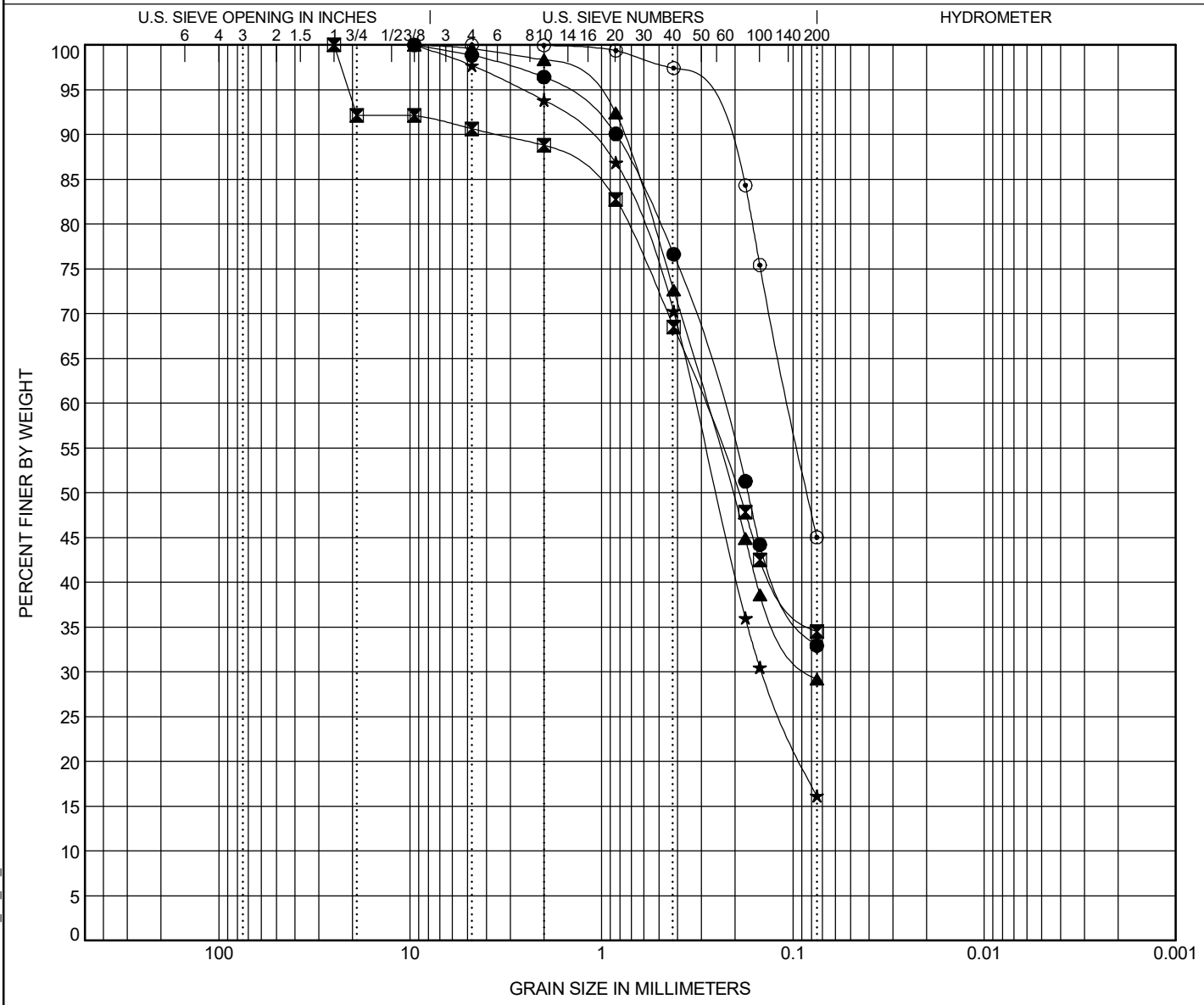


	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**B-2**	**5.7**	**36**	**21**	**15**	**33**	**CLAYEY SAND (SC/A-2-6)**
⊠	**B-2**	**15.0**	**32**	**28**	**4**	**35**	**SILTY SAND (SM/A-2-4)**
▲	**B-2**	**30.0**	**NP**	**NP**	**NP**	**29**	**SILTY SAND (SM/A-2-4)**
★	**B-2**	**35.0**	**NP**	**NP**	**NP**	**16**	**SILTY SAND (SM/A-2-4)**
⊙	**B-2**	**40.0**	**25**	**24**	**1**	**45**	**SILTY SAND (SM/A-4)**

GRAIN SIZE DISTRIBUTION

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-2	5.7	CLAYEY SAND (SC/A-2-6)	36	21	15		
⊠	B-2	15.0	SILTY SAND (SM/A-2-4)	32	28	4		
▲	B-2	30.0	SILTY SAND (SM/A-2-4)	NP	NP	NP		
★	B-2	35.0	SILTY SAND (SM/A-2-4)	NP	NP	NP		
⊙	B-2	40.0	SILTY SAND (SM/A-4)	25	24	1		

	BOREHOLE	DEPTH	D90	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-2	5.7	0.838	0.238			1.1	65.9	33.0	
⊠	B-2	15.0	3.505	0.294			9.4	56.1	34.5	
▲	B-2	30.0	0.773	0.283	0.08		0.4	70.4	29.2	
★	B-2	35.0	1.241	0.324	0.145		2.3	81.5	16.2	
⊙	B-2	40.0	0.257	0.105			0.0	55.0	45.0	

REV 12/2023

F&ME CONSULTANTS, INC
211 Business Park Blvd.
Columbia, SC 29203

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US 76 over Chauga River	**PROJECT NO.:**	P043969
SAMPLE NUMBER:	24-3633	**DATE REQUESTED:**	10/16/2024
DESCRIPTION OF SOIL:	Various		
TESTED BY:	Ashleigh Burgess & Abbie Grier	**DATE OF TESTING:**	10/16/2024
WEIGHED BY:	Jada Marken & Abbie Grier	**DATE OF WEIGHING:**	10/17/2024

BORING NO.	B-2	B-2	B-2	B-2	B-2
SAMPLE NO.	SS-2	SS-6	SS-9	SS-10	SS-11
SAMPLE DEPTH	3.5 - 5.7	13.5 - 15.0	28.5 - 30.0	33.5 - 35.0	38.5 - 40.0
WATER CONTENT, W%	20.3	18.2	19.1	7.9	14.1

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

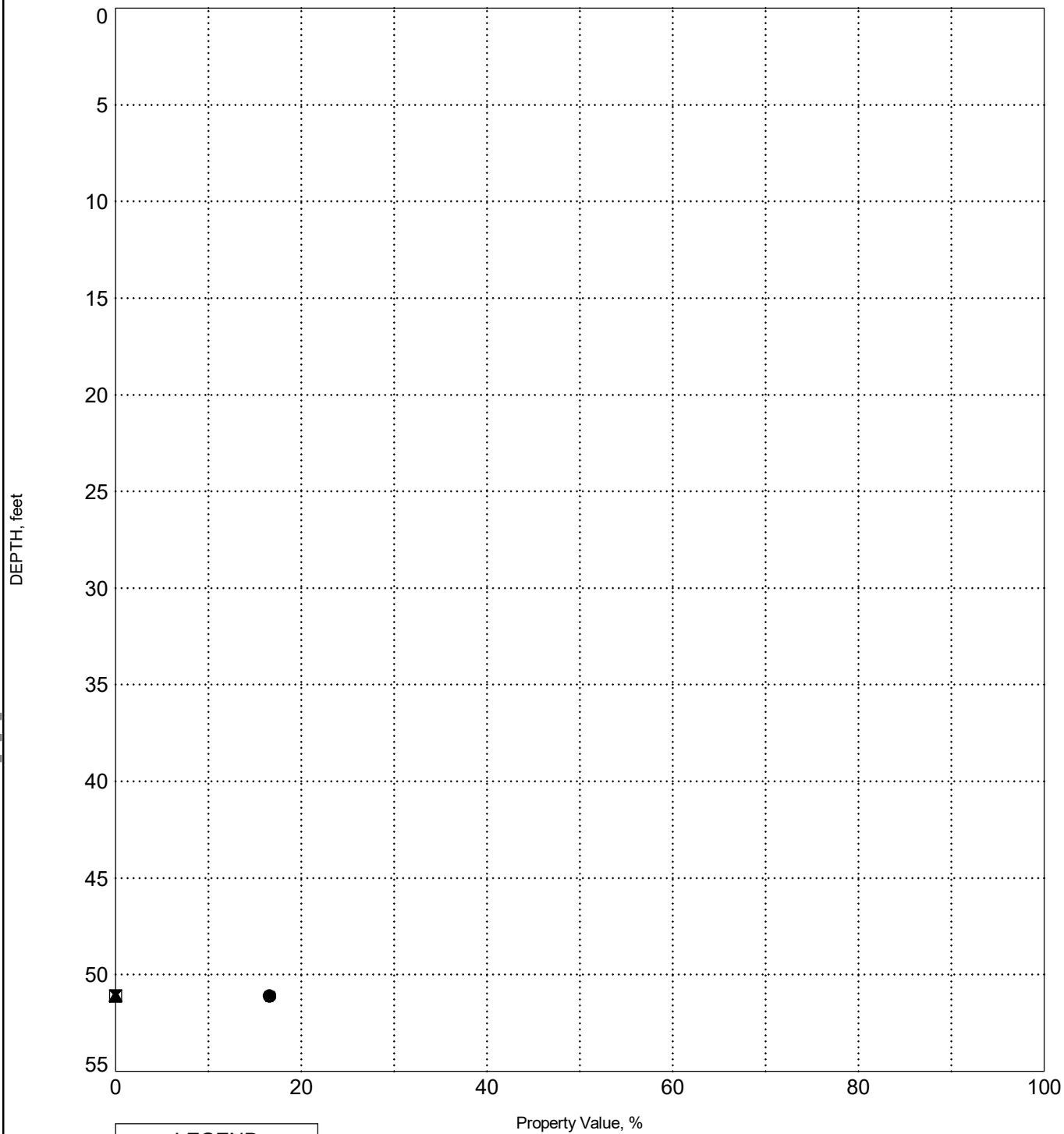
INDEX PROPERTIES VERSUS DEPTH

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

BORING B-3

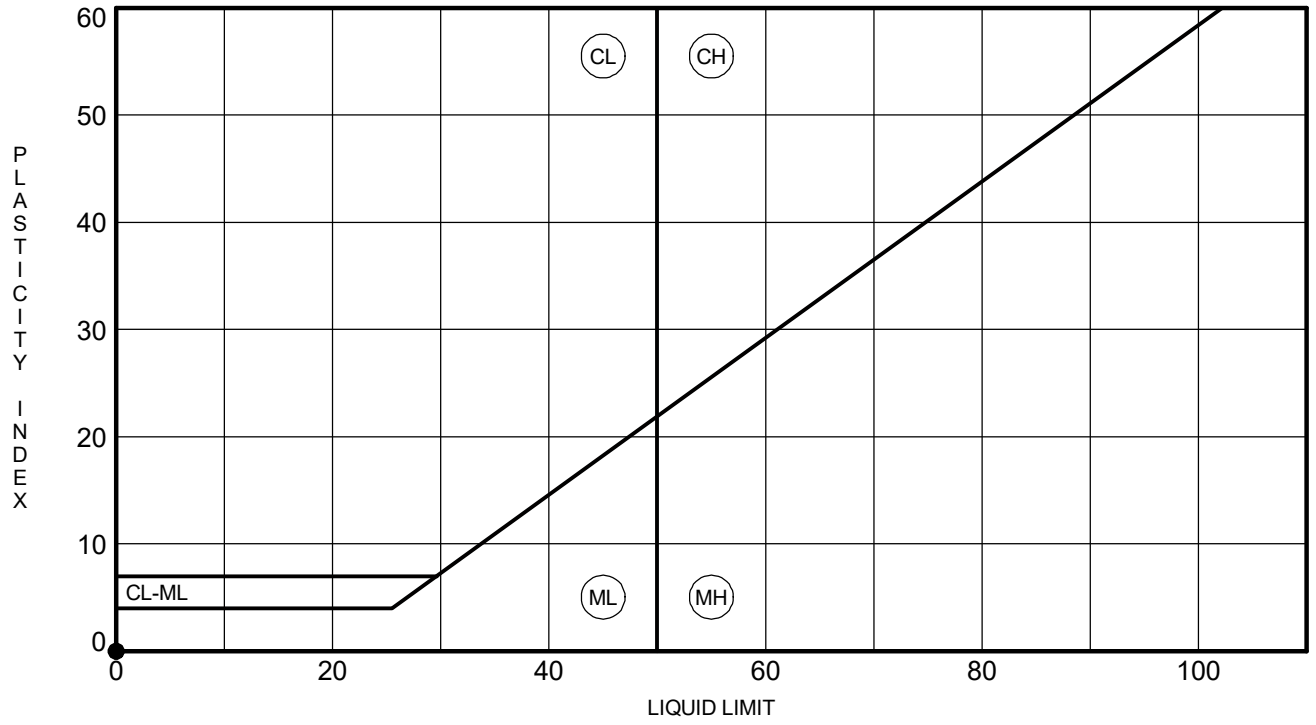
SURFACE ELEVATION: 777.8



ATTERBERG LIMITS' RESULTS

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

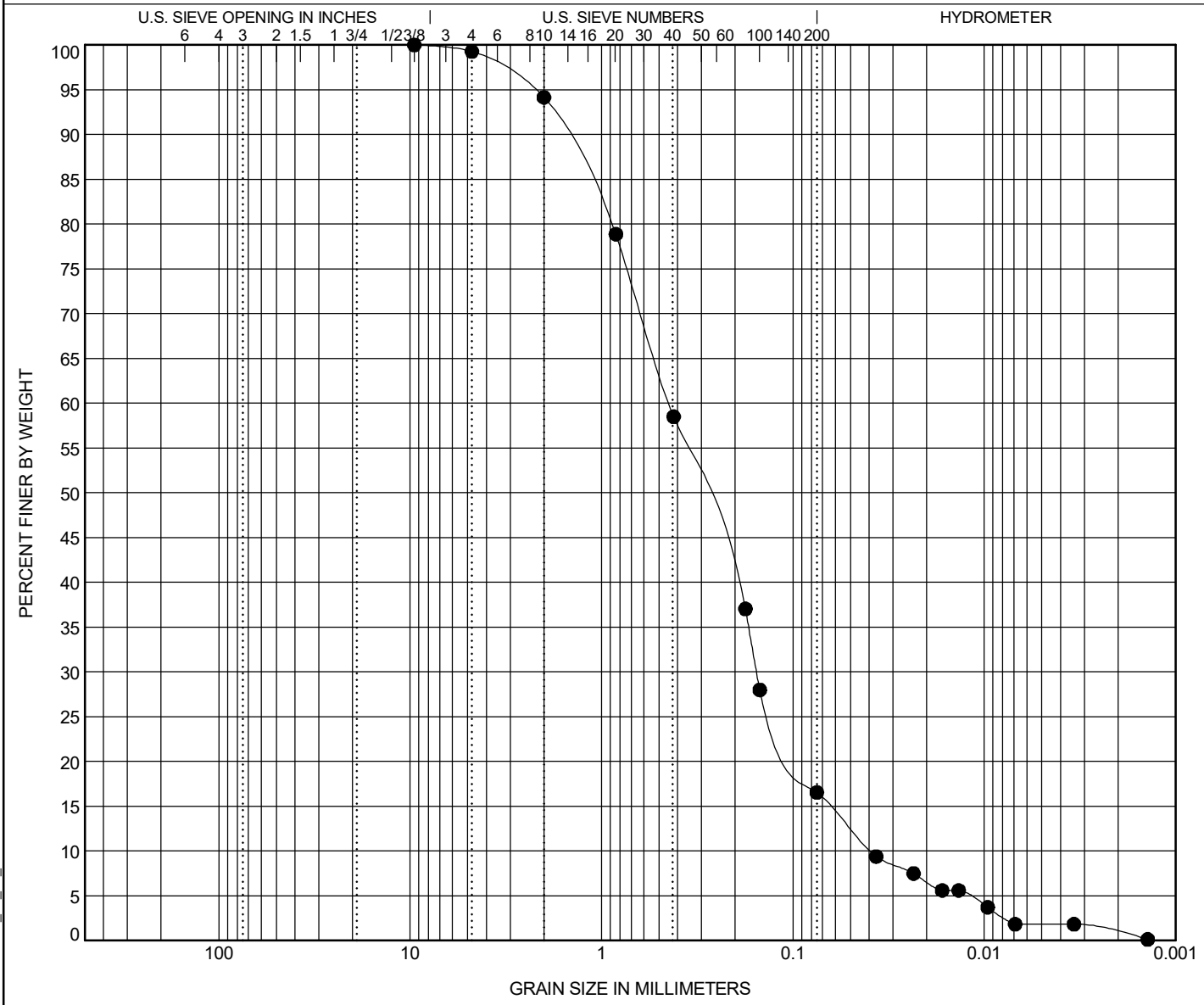


	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**B-3**	**51.1**	**NP**	**NP**	**NP**	**17**	**SILTY SAND (SM/A-2-4)**

GRAIN SIZE DISTRIBUTION

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● **B-3**	**51.1**	**SILTY SAND (SM/A-2-4)**	**NP**	**NP**	**NP**	**1.39**	**11.33**

BOREHOLE	DEPTH	D90	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **B-3**	**51.1**	**1.58**	**0.442**	**0.155**	**0.039**	**0.7**	**82.7**	**14.7**	**1.8**

GRAIN SIZE G7100.005 - US 76 OVER CHAUGA RIVER.GPJ SCDOT DATA TEMPLATE_01_30_2015.GDT 10/28/24

REV 12/2023

F&ME CONSULTANTS, INC
211 Business Park Blvd.
Columbia, SC 29203

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US 76 over Chauga River	**PROJECT NO.:**	P043969
SAMPLE NUMBER:	24-3684	**DATE REQUESTED:**	10/21/2024
DESCRIPTION OF SOIL:	Silty SAND (SM/A-2-4)		
TESTED BY:	LiAnn Johson & Tyler Ennis	**DATE OF TESTING:**	10/22/2024
WEIGHED BY:	Ashleigh Burgess	**DATE OF WEIGHING:**	10/23/2024

BORING NO.	B-3				
SAMPLE NO.	SS-1				
SAMPLE DEPTH	49.1 - 51.1				
WATER CONTENT, W%	16.6				

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

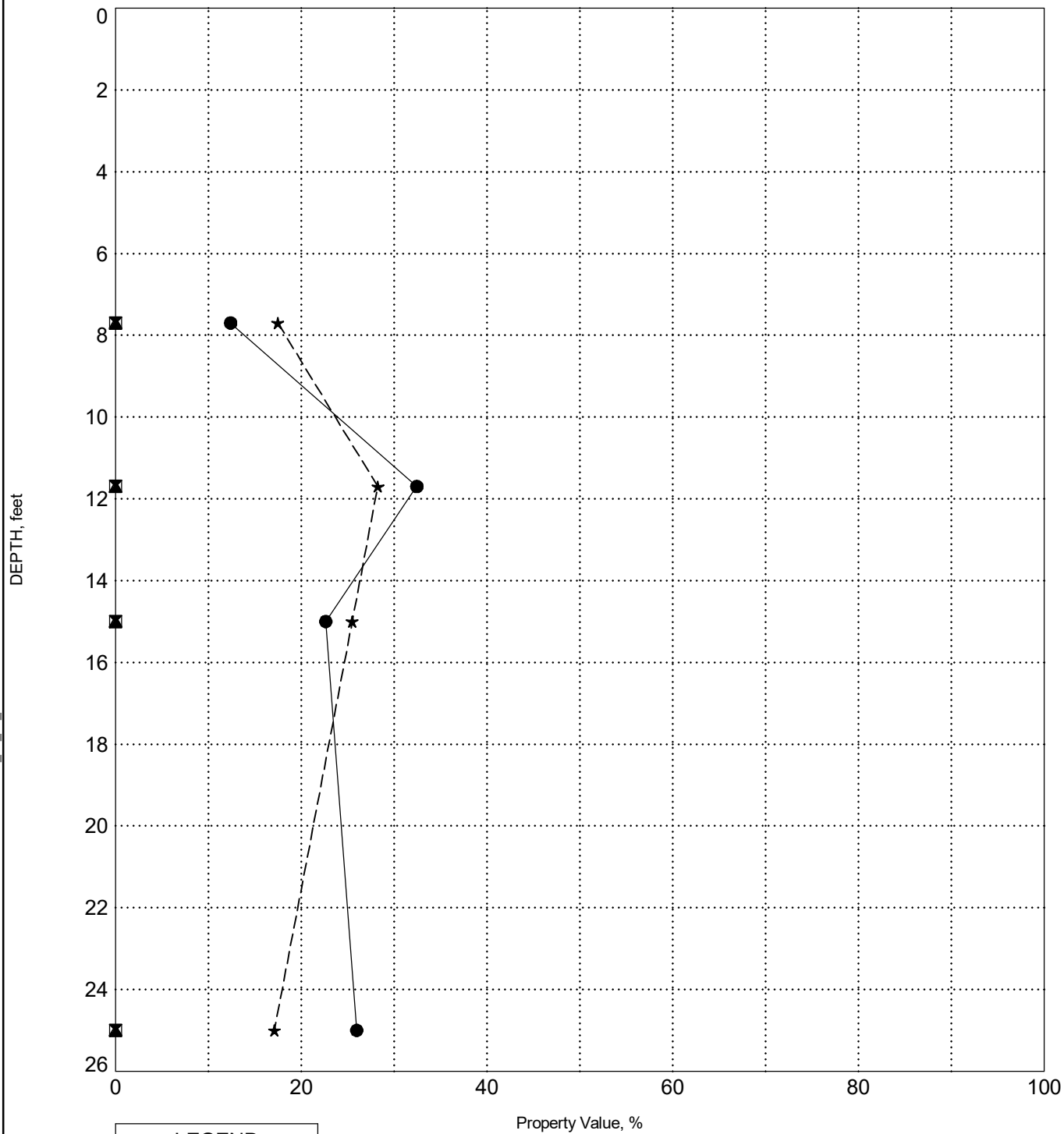
INDEX PROPERTIES VERSUS DEPTH

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

BORING B-5

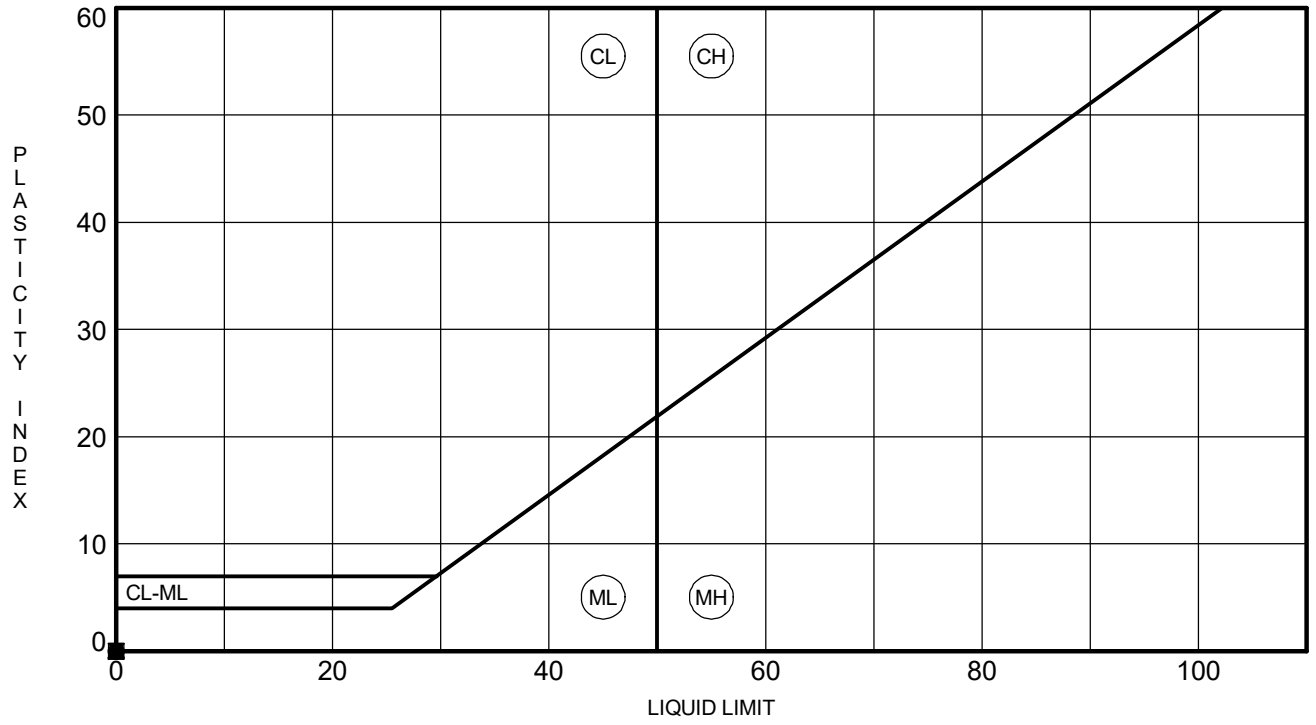
SURFACE ELEVATION: 783.4



ATTERBERG LIMITS' RESULTS

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

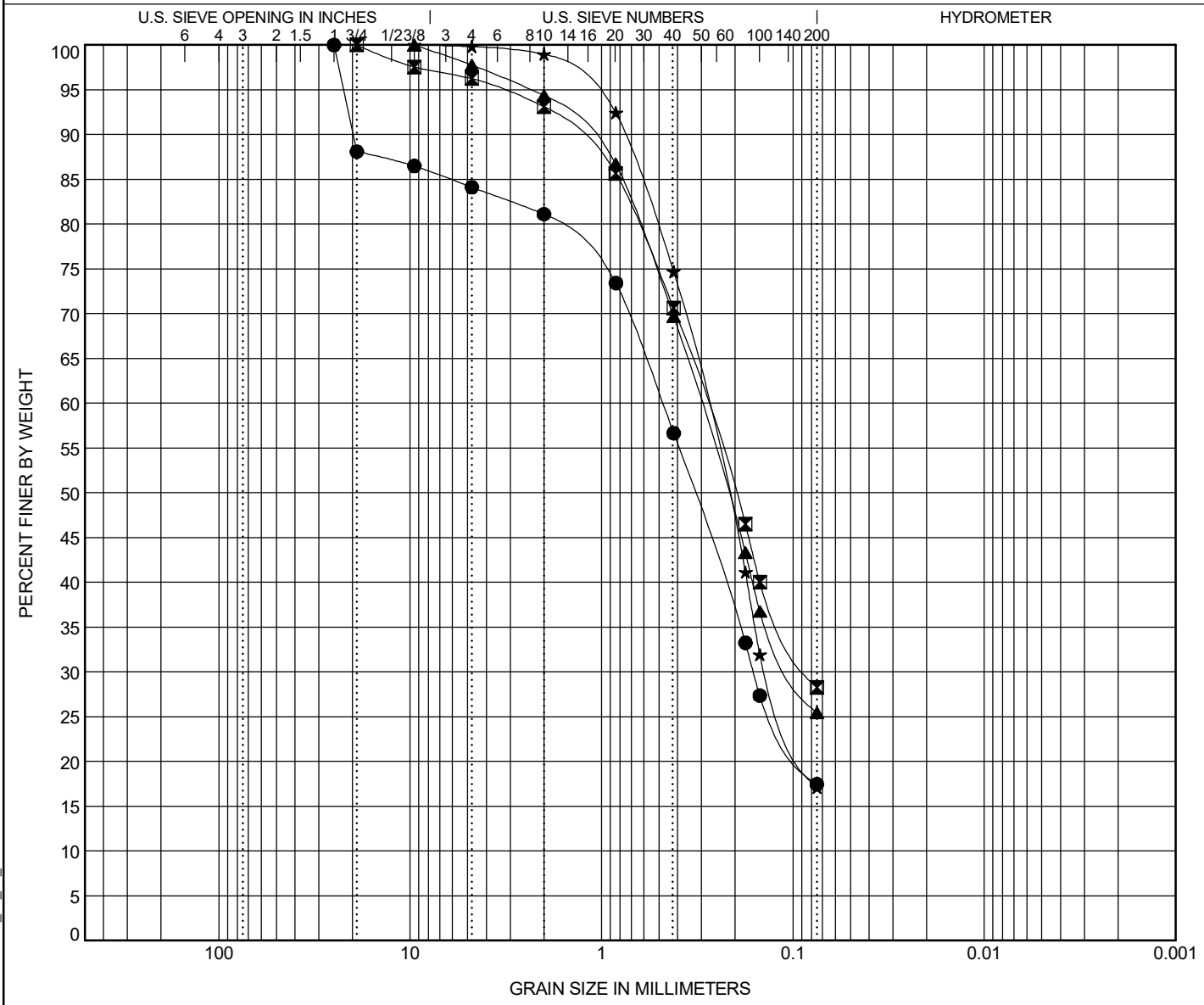


	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**B-5**	**7.7**	**NP**	**NP**	**NP**	**17**	**SILTY SAND with GRAVEL (SM/A-2-4)**
⊠	**B-5**	**11.7**	**NP**	**NP**	**NP**	**28**	**SILTY SAND (SM/A-2-4)**
▲	**B-5**	**15.0**	**NP**	**NP**	**NP**	**25**	**SILTY SAND (SM/A-2-4)**
★	**B-5**	**25.0**	**NP**	**NP**	**NP**	**17**	**SILTY SAND (SM/A-2-4)**

GRAIN SIZE DISTRIBUTION

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-5**	**7.7**	**SILTY SAND with GRAVEL (SM/A-2-4)**	**NP**	**NP**	**NP**		
⊠	**B-5**	**11.7**	**SILTY SAND (SM/A-2-4)**	**NP**	**NP**	**NP**		
▲	**B-5**	**15.0**	**SILTY SAND (SM/A-2-4)**	**NP**	**NP**	**NP**		
★	**B-5**	**25.0**	**SILTY SAND (SM/A-2-4)**	**NP**	**NP**	**NP**		

	BOREHOLE	DEPTH	D90	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-5**	**7.7**	**19.85**	**0.482**	**0.161**		**15.9**	**66.7**	**17.5**	
⊠	**B-5**	**11.7**	**1.392**	**0.287**	**0.083**		**3.8**	**68.0**	**28.2**	
▲	**B-5**	**15.0**	**1.218**	**0.306**	**0.099**		**2.2**	**72.3**	**25.5**	
★	**B-5**	**25.0**	**0.764**	**0.288**	**0.136**		**0.2**	**82.7**	**17.1**	

REV 12/2023

F&ME CONSULTANTS, INC
211 Business Park Blvd.
Columbia, SC 29203

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US 76 over Chauga River	**PROJECT NO.:**	P043969
SAMPLE NUMBER:	24-3690	**DATE REQUESTED:**	10/16/2024
DESCRIPTION OF SOIL:	Various		
TESTED BY:	LiAnn Johnson & Tyler Ennis	**DATE OF TESTING:**	10/22/2024
WEIGHED BY:	Ashleigh Burgess	**DATE OF WEIGHING:**	10/23/2024

BORING NO.	B-5	B-5	B-5	B-5	
SAMPLE NO.	SS-3	SS-5	SS-6	SS-8	
SAMPLE DEPTH	5.7 - 7.7	9.7 - 11.7	13.5 - 15.0	23.5 - 25.0	
WATER CONTENT, W%	12.4	32.4	22.6	26.0	

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

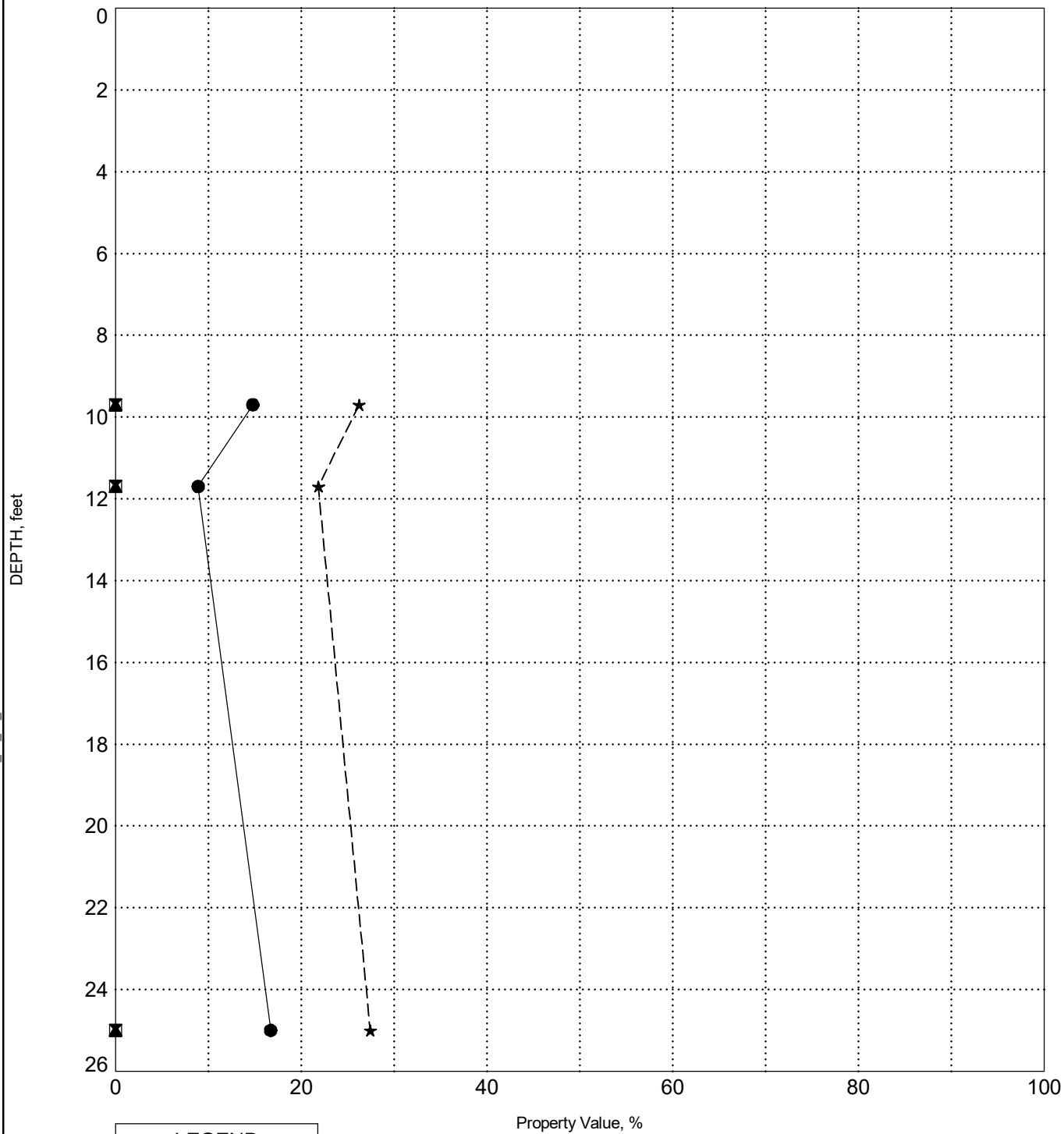
INDEX PROPERTIES VERSUS DEPTH

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

BORING R-1

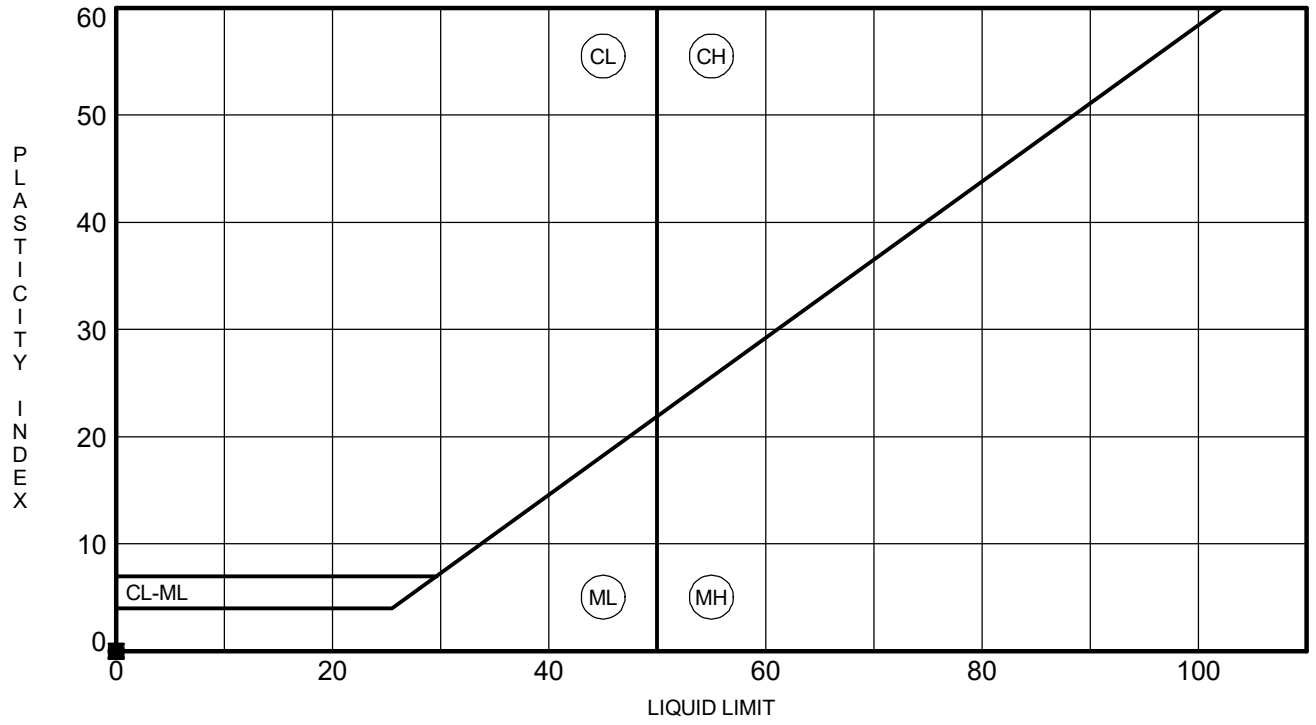
SURFACE ELEVATION: 776.7



ATTERBERG LIMITS' RESULTS

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

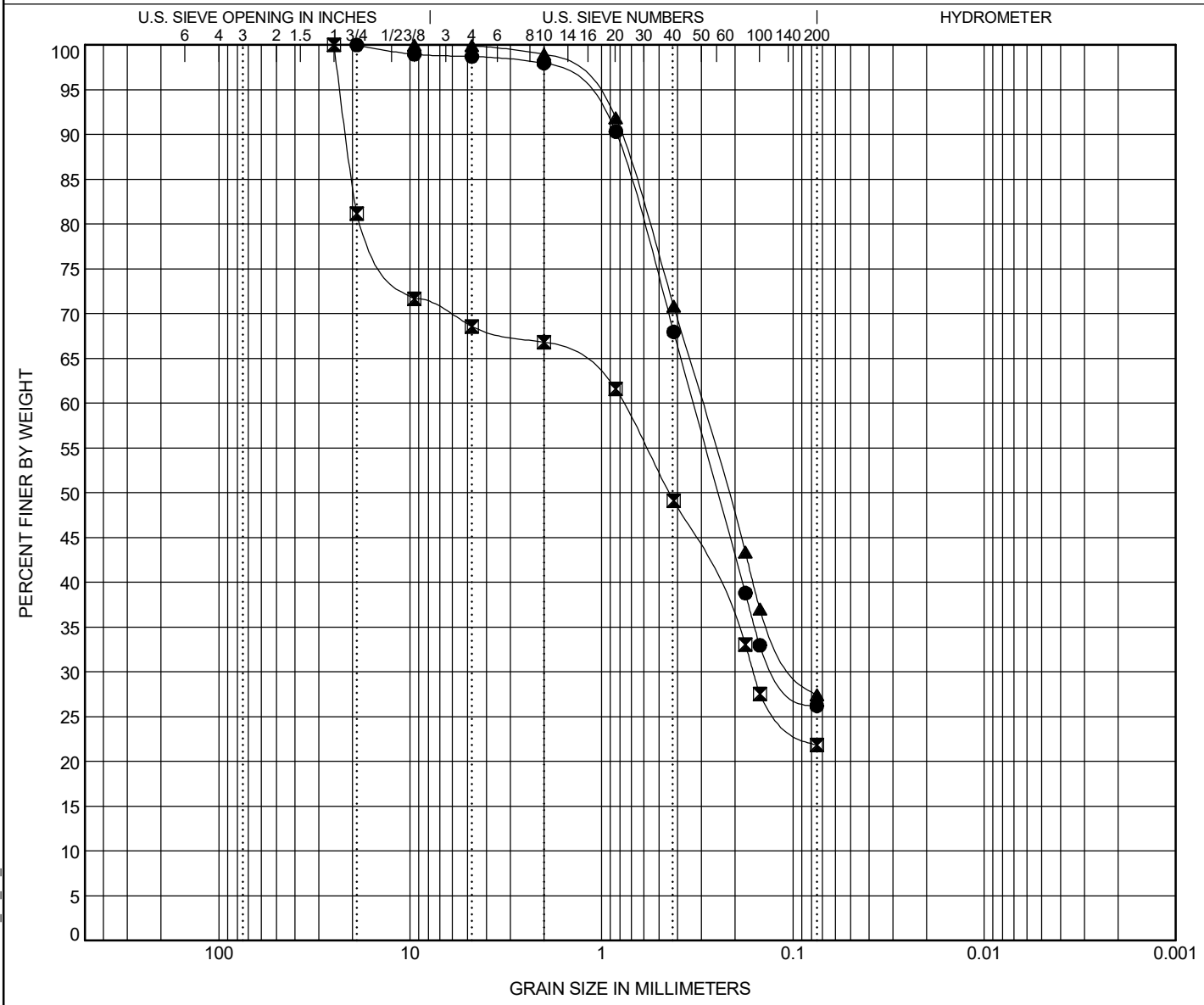


	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**R-1**	**9.7**	**NP**	**NP**	**NP**	**26**	**SILTY SAND (SM/A-2-4)**
⊠	**R-1**	**11.7**	**NP**	**NP**	**NP**	**22**	**SILTY SAND with GRAVEL (SM/A-1-b)**
▲	**R-1**	**25.0**	**NP**	**NP**	**NP**	**27**	**SILTY SAND (SM/A-2-4)**

GRAIN SIZE DISTRIBUTION

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**R-1**	**9.7**	**SILTY SAND (SM/A-2-4)**	**NP**	**NP**	**NP**		
⊠	**R-1**	**11.7**	**SILTY SAND with GRAVEL (SM/A-1-b)**	**NP**	**NP**	**NP**		
▲	**R-1**	**25.0**	**SILTY SAND (SM/A-2-4)**	**NP**	**NP**	**NP**		

	BOREHOLE	DEPTH	D90	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**R-1**	**9.7**	**0.832**	**0.332**	**0.11**		**1.3**	**72.5**	**26.2**	
⊠	**R-1**	**11.7**	**21.61**	**0.77**	**0.161**		**31.4**	**46.7**	**21.9**	
▲	**R-1**	**25.0**	**0.79**	**0.298**	**0.09**		**0.1**	**72.5**	**27.4**	

REV 12/2023

F&ME CONSULTANTS, INC
211 Business Park Blvd.
Columbia, SC 29203

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US 76 over Chauga River	**PROJECT NO.:**	P043969
SAMPLE NUMBER:	24-3634	**DATE REQUESTED:**	10/16/2024
DESCRIPTION OF SOIL:	Various		
TESTED BY:	Ashleigh Burgess & Abbie Grier	**DATE OF TESTING:**	10/16/2024
WEIGHED BY:	Ashleigh Burgess	**DATE OF WEIGHING:**	10/17/2024

BORING NO.	R-1	R-1	R-1		
SAMPLE NO.	SS-4	SS-5	SS-8		
SAMPLE DEPTH	7.7 - 9.7	9.7 - 11.7	23.5 - 25.0		
WATER CONTENT, W%	14.8	8.9	16.7		

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

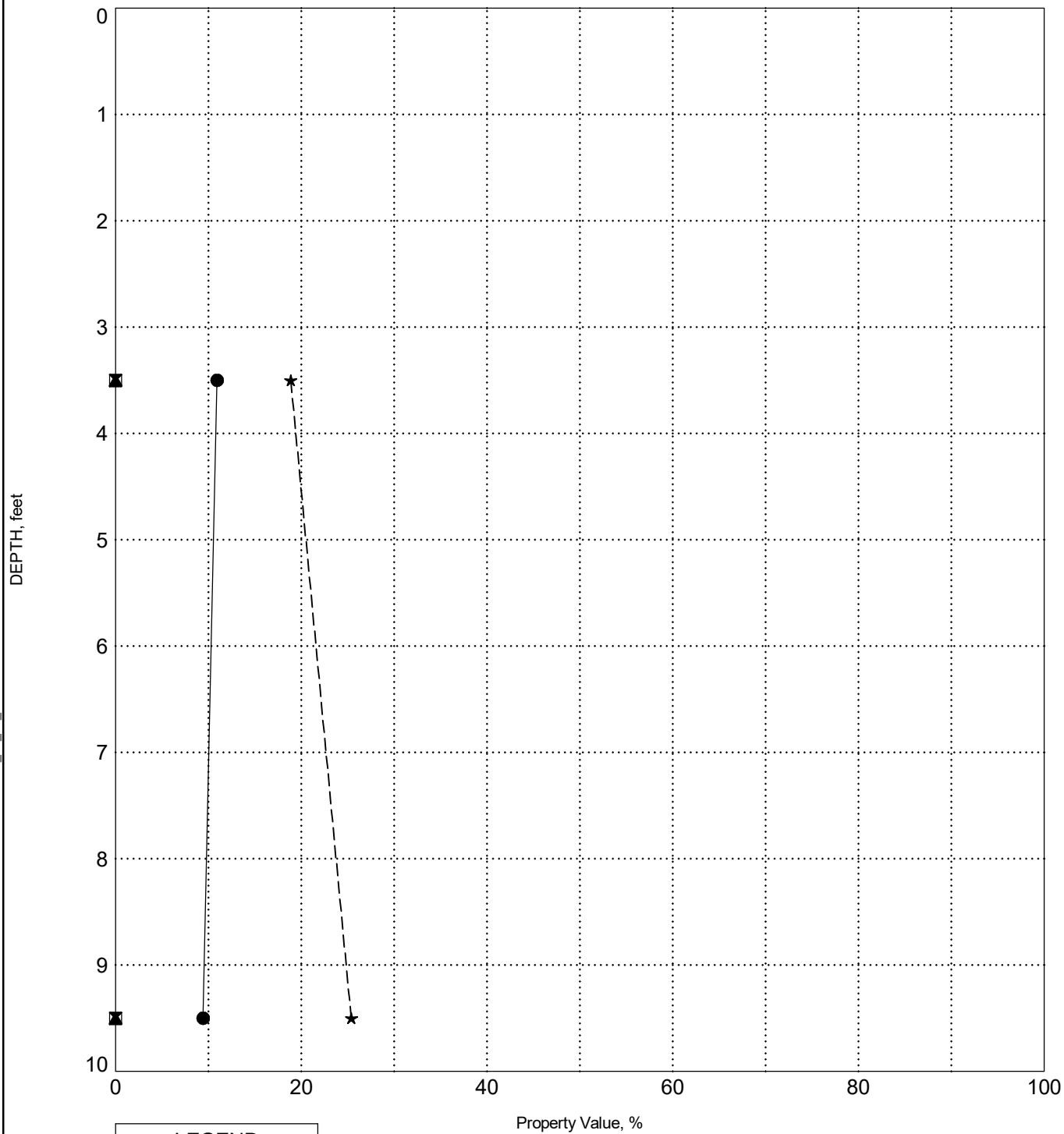
INDEX PROPERTIES VERSUS DEPTH

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

BORING R-2

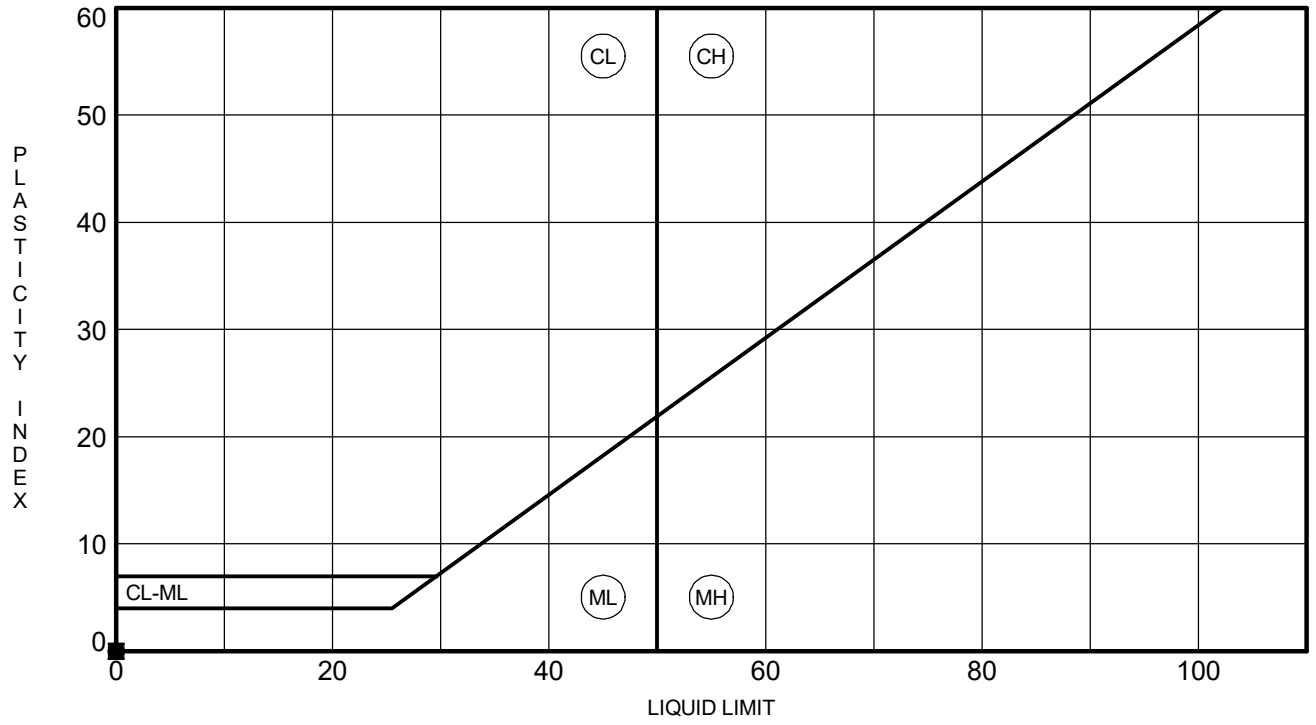
SURFACE ELEVATION: 787.5



ATTERBERG LIMITS' RESULTS

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

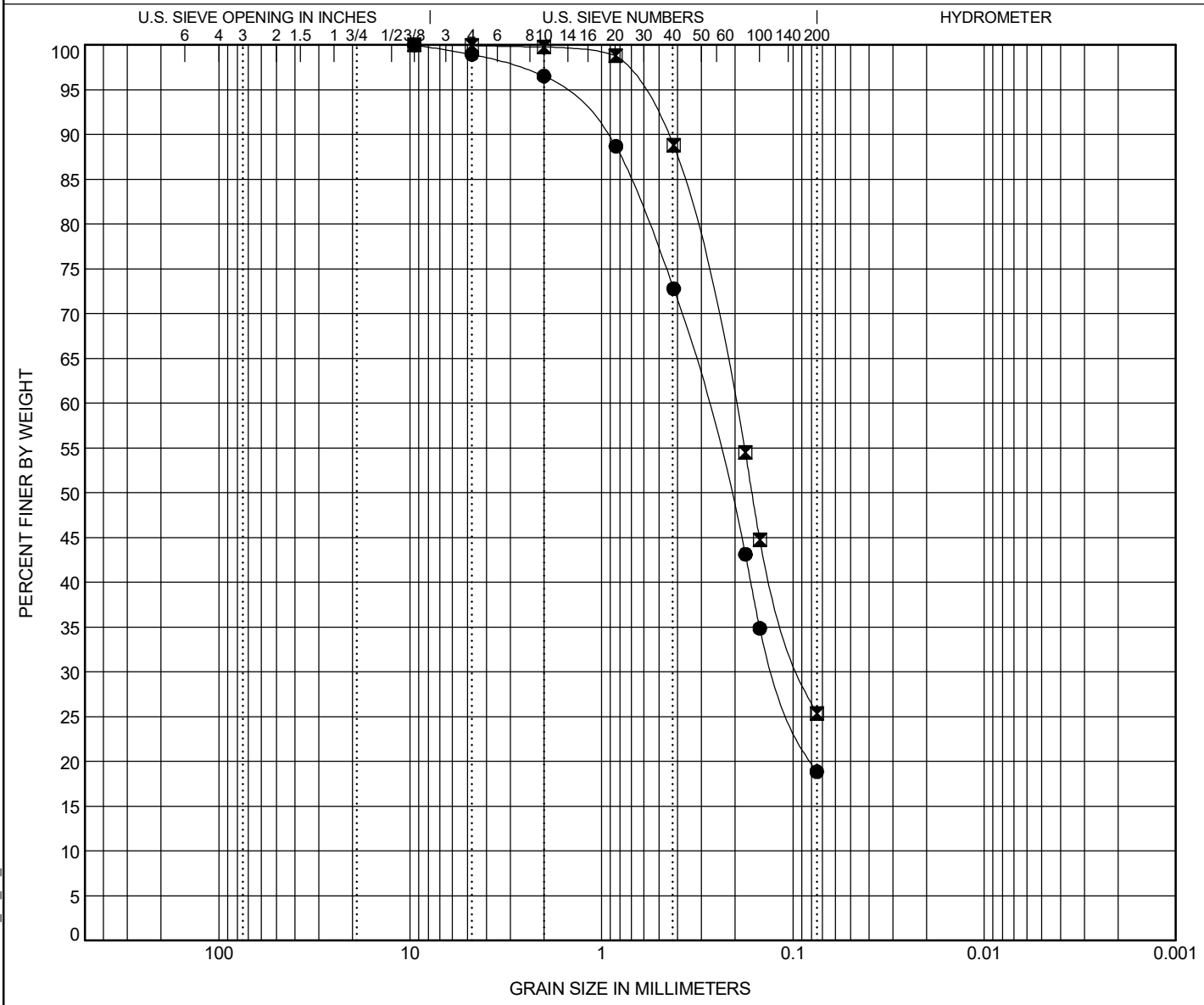


	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**R-2**	**3.5**	**NP**	**NP**	**NP**	**19**	**SILTY SAND (SM/A-2-4)**
⧓	**R-2**	**9.5**	**NP**	**NP**	**NP**	**25**	**SILTY SAND (SM/A-2-4)**

GRAIN SIZE DISTRIBUTION

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**R-2**	**3.5**	**SILTY SAND (SM/A-2-4)**	**NP**	**NP**	**NP**		
⊠	**R-2**	**9.5**	**SILTY SAND (SM/A-2-4)**	**NP**	**NP**	**NP**		

	BOREHOLE	DEPTH	D90	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**R-2**	**3.5**	**0.971**	**0.289**	**0.121**		**1.1**	**80.1**	**18.9**	
⊠	**R-2**	**9.5**	**0.456**	**0.203**	**0.088**		**0.1**	**74.6**	**25.4**	

REV 12/2023

F&ME CONSULTANTS, INC
211 Business Park Blvd.
Columbia, SC 29203

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US 76 over Chauga River	**PROJECT NO.:**	P043969
SAMPLE NUMBER:	24-3688	**DATE REQUESTED:**	10/16/2024
DESCRIPTION OF SOIL:	Various		
TESTED BY:	LiAnn Johnson & Tyler Ennis	**DATE OF TESTING:**	10/22/2024
WEIGHED BY:	Ashleigh Burgess	**DATE OF WEIGHING:**	10/23/2024

BORING NO.	R-2	R-2			
SAMPLE NO.	SS-1	SS-4			
SAMPLE DEPTH	1.5 - 3.5	7.5 - 9.5			
WATER CONTENT, W%	10.9	9.4			

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

US 76 over Chauga River

Geotechnical Subsurface Data Report

SPLIT-SPOON

CORROSION SERIES DATA

F&ME CONSULTANTS

CORROSION SERIES SUMMARY (SPLIT-SPOON)

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

Borehole	Sample No.	Sample Depth (ft.)	pH of Soil in Distilled Water	Electrical Resistivity (Ω-cm)	Chloride Content (mg/kg (ppm))	Sulfate Content (mg/kg (ppm))
B-2	SS-3/SS-4	(4.0 – 8.0) (Composite)	6.5	18,042	24.16	49.0
B-5	SS-1/SSS-2	(1.7 – 5.7) (Composite)	7.5	6,510	42.11	55.1

pH DTERMINTATION
(AASHTO T289)

Project Name:	US 76 RBO Chauga River	SCDOT Project ID:	P043969
Description of Sample:	Soil (Composite)	Date Requested:	10/16/2024
Tested By:	LiAnn Johnson/Jada Marken	Date Tested:	10/23/2024

SCDOT Sample ID	B-2			
Sample Depth (ft.)	4.0 - 8.0 (Composite)			
FME Lab ID No.	24-3633			
pH Value	6.54			
Temperature (˚C)	21.7			

Date Reviewed: 10/28/2024 Reviewed By: Alex Abernethy

REV 09/2022

SOIL RESISTIVITY
(AASHTO T288)

Project Name:	US 75 over Chauga River	SCDOT Project ID:	P043969
Location:	B-2	FME Lab ID No.:	24-3633
Sampled By:	F&ME Consultants, Inc.	Date Sampled:	--
Soil Description:	Soil (Composite)	Date Requested:	10/16/2024
Tested By:	Ashleigh Burgess	Date Tested:	10/23/2024

Boring ID	Sample Depth (ft.)	Minimum Soil Resistivity, Ω-cm
B-2	4.0 - 8.0	18,042

Date Reviewed: 10/28/2024 Reviewed By:

CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2018) (*Method B*)

Client:	F&ME Consultants, Inc.	Boring No.:	B-2
Client Reference:	Chauga River G7100.005	Depth (ft):	4.0-8.0'
Project No.:	2024-785-001	Sample No.:	SS-3/SS-4
Lab ID:	2024-785-001-001	Description:	Brown Soil

(- # 10 Sieve material)

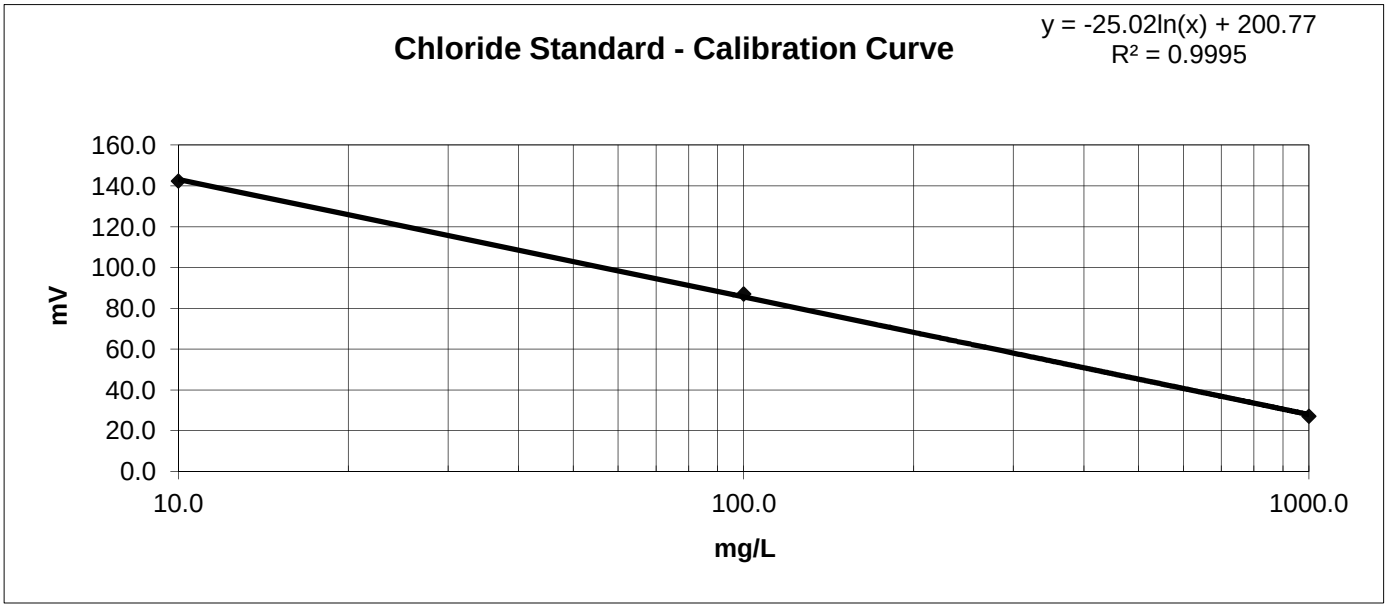
CHLORIDE STANDARD: CALIBRATION CURVE

STANDARD		MILLIVOLTS (mV)
10.0	mg/L	142.4
100.0	mg/L	87.1
1000.0	mg/L	27.2

MEASUREMENT OF CHLORIDES

		CONCENTRATION (mg/L)	CONCENTRATION (mg/kg)
Sample Weight (g):	100.0		
Water added to Sample (ml):	100.0		
Size of Sample Aliquot (ml):	25.0		
Sample Reading (mV):	121.1	24.16	24.16

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO_3 solution (1:1 volume).
2) Samples were dried for a minimum of 12 hours at 110 $^{+}/_{-}$ 5^{o}C.



Notes:

Tested By	JAM	Date	10/30/24	Checked By	KC	Date	10/30/24

DCN: CT-S63A DATE: 6/2/14 REVISION: 1

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Water-Soluble Sulfate Ion Content in Soil

AASHTO T 290-95 (2020)

Client:	F&ME Consultants, Inc.	Boring No.:	B-2
Client Reference:	Chauga River G7100.005	Depth (ft):	4.0-8.0'
Project No.:	2024-785-001	Sample No.:	SS-3/SS-4
Lab ID:	2024-785-001-001	Soil Description:	Brown Soil

Sulfate Standard - Calibration Curve Spectrophotometer Readings

Sulfate Ion Concentrations (mg/L)

0.0	4.0	10.0	20.0	30.0	40.0	60.0	80.0	100.0

Spectrophotometer Readings (FAU)

Underrange	Underrange	7	20	42	63	112	163	243

Measurement of Barium Chloride Turbidity

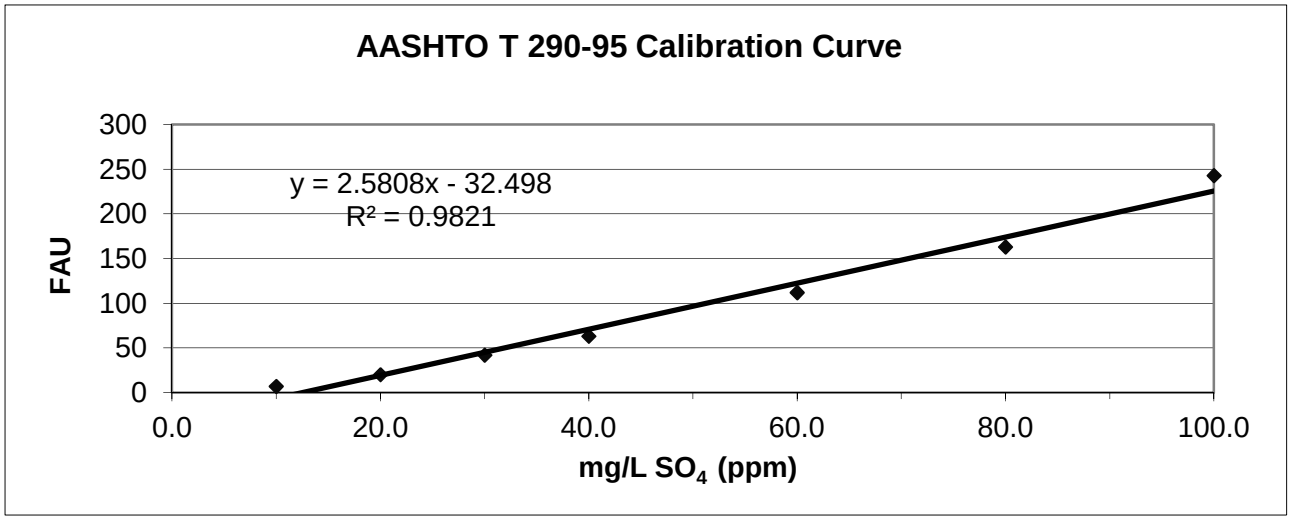
(Sample contains 5.0 mL NaCl solution and 0.3 g $BaCl_2 \cdot 2H_2O$)

Sample Weight (g):	100.0
Water added to Sample (mL):	300.0
Size of Sample Aliquot (mL):	50.0
Sample Reading (FAU):	9
Sample Diluted:	No
Sulfate Solution Added (ml):	0

Sample Moisture Content

Tare Number:	484
Weight of Tare & Wet Sample (g):	201.77
Weight of Tare & Dry Sample (g):	200.19
Weight of Tare (g):	98.13
Weight of Water (g):	1.58
Weight of Dry Sample (g):	102.06
Moisture Content (%):	1.55

Sample Sulfate Ion Concentration:	16.08	**mg/L SO_4 (ppm)**
Sample Sulfate Ion Content:	48.2	**mg/Kg SO_4 (not corrected for moisture)**
Sample Sulfate Ion Content:	49.0	**mg/Kg SO_4 (corrected for moisture)**



Tested by: JAM Date: 10/30/24 Checked by: KC Date: 10/30/24

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pH DTERMINTATION
(AASHTO T289)

Project Name:	US 76 RBO Chauga River	SCDOT Project ID:	P043969
Description of Sample:	Soil (Composite)	Date Requested:	10/16/2024
Tested By:	LiAnn Johnson/Jada Marken	Date Tested:	10/23/2024

SCDOT Sample ID	B-5			
Sample Depth (ft.)	1.7 - 5.7 (Composite)			
FME Lab ID No.	24-3685			
pH Value	7.53			
Temperature (˚C)	21.5			

Date Reviewed: 10/28/2024 Reviewed By: Alex Abernethy

REV 09/2022

SOIL RESISTIVITY
(AASHTO T288)

Project Name:	US 75 over Chauga River	SCDOT Project ID:	P043969
Location:	B-5	FME Lab ID No.:	24-3685
Sampled By:	F&ME Consultants, Inc.	Date Sampled:	--
Soil Description:	Soil (Composite)	Date Requested:	10/16/2024
Tested By:	Ashleigh Burgess	Date Tested:	10/23/2024

Boring ID	Sample Depth (ft.)	Minimum Soil Resistivity, Ω-cm
B-5	1.7 - 5.7	6,510

Date Reviewed: 10/28/2024 Reviewed By:

CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2018) (*Method B*)

Client:	F&ME Consultants, Inc.	Boring No.:	B-5
Client Reference:	Chauga River G7100.005	Depth (ft):	1.7-5.7'
Project No.:	2024-785-001	Sample No.:	SS-1/SS-2
Lab ID:	2024-785-001-002	Description:	Brown Soil

(- # 10 Sieve material)

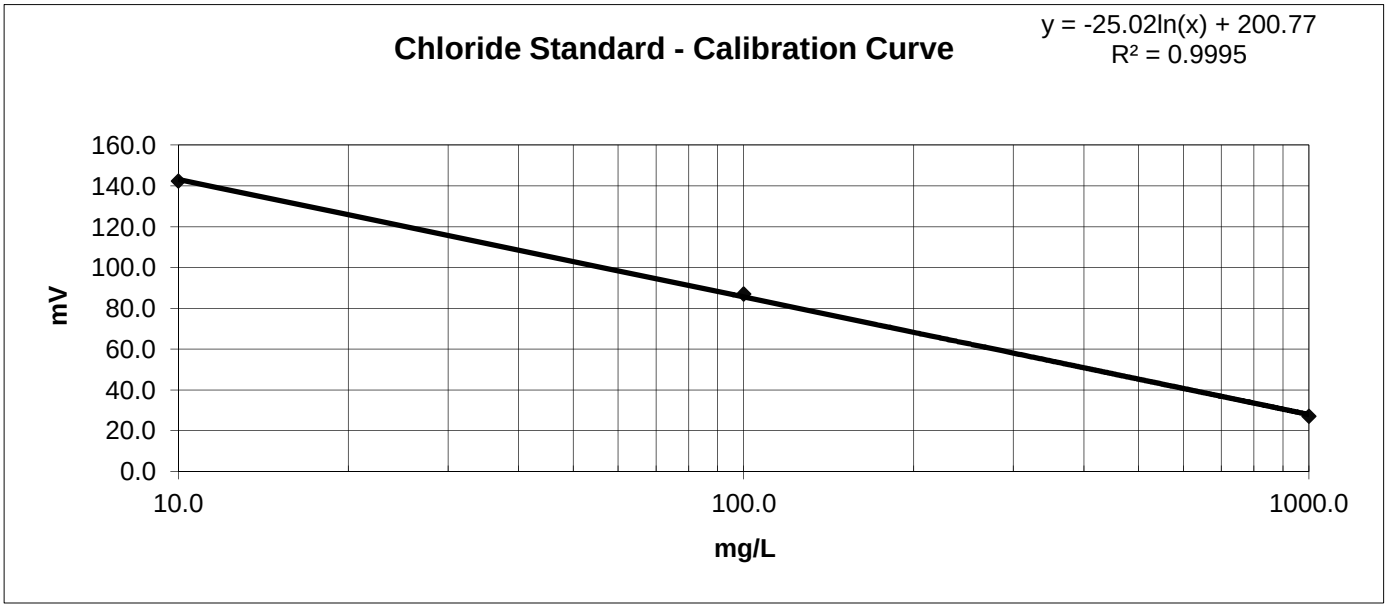
CHLORIDE STANDARD: CALIBRATION CURVE

STANDARD		MILLIVOLTS (mV)
10.0	mg/L	142.4
100.0	mg/L	87.1
1000.0	mg/L	27.2

MEASUREMENT OF CHLORIDES

		CONCENTRATION (mg/L)	CONCENTRATION (mg/kg)
Sample Weight (g):	100.0		
Water added to Sample (ml):	100.0		
Size of Sample Aliquot (ml):	25.0		
Sample Reading (mV):	107.2	42.11	42.11

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO_3 solution (1:1 volume).
2) Samples were dried for a minimum of 12 hours at 110 $^{+}/_{-}$ 5^{o}C.



Notes:

Tested By	JAM	Date	10/30/24	Checked By	KC	Date	10/30/24

DCN: CT-S63A DATE: 6/2/14 REVISION: 1

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Water-Soluble Sulfate Ion Content in Soil

AASHTO T 290-95 (2020)

Client:	F&ME Consultants, Inc.	Boring No.:	B-5
Client Reference:	Chauga River G7100.005	Depth (ft):	1.7-5.7'
Project No.:	2024-785-001	Sample No.:	SS-1/SS-2
Lab ID:	2024-785-001-002	Soil Description:	Brown Soil

Sulfate Standard - Calibration Curve Spectrophotometer Readings

Sulfate Ion Concentrations (mg/L)

0.0	4.0	10.0	20.0	30.0	40.0	60.0	80.0	100.0

Spectrophotometer Readings (FAU)

Underrange	Underrange	7	20	42	63	112	163	243

Measurement of Barium Chloride Turbidity

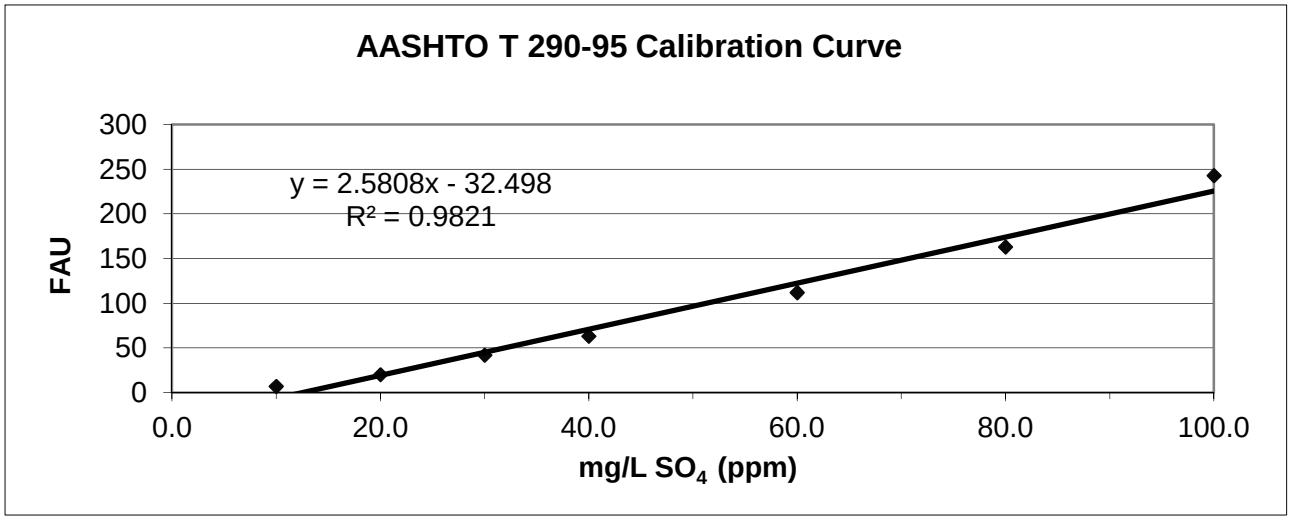
(Sample contains 5.0 mL NaCl solution and 0.3 g $BaCl_2 \cdot 2H_2O$)

Sample Weight (g):	100.0
Water added to Sample (mL):	300.0
Size of Sample Aliquot (mL):	50.0
Sample Reading (FAU):	14
Sample Diluted:	No
Sulfate Solution Added (ml):	0

Sample Moisture Content

Tare Number:	1122
Weight of Tare & Wet Sample (g):	200.86
Weight of Tare & Dry Sample (g):	198.70
Weight of Tare (g):	83.73
Weight of Water (g):	2.16
Weight of Dry Sample (g):	114.97
Moisture Content (%):	1.88

Sample Sulfate Ion Concentration:	18.02	**mg/L SO_4 (ppm)**
Sample Sulfate Ion Content:	54.0	**mg/Kg SO_4 (not corrected for moisture)**
Sample Sulfate Ion Content:	55.1	**mg/Kg SO_4 (corrected for moisture)**



Tested by: JAM Date: 10/30/24 Checked by: KC Date: 10/30/24

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APPENDIX

SECTION 6 LABORATORY TEST RESULTS

SECTION 6B ROCK CORE SAMPLES

Rock Coring Summary

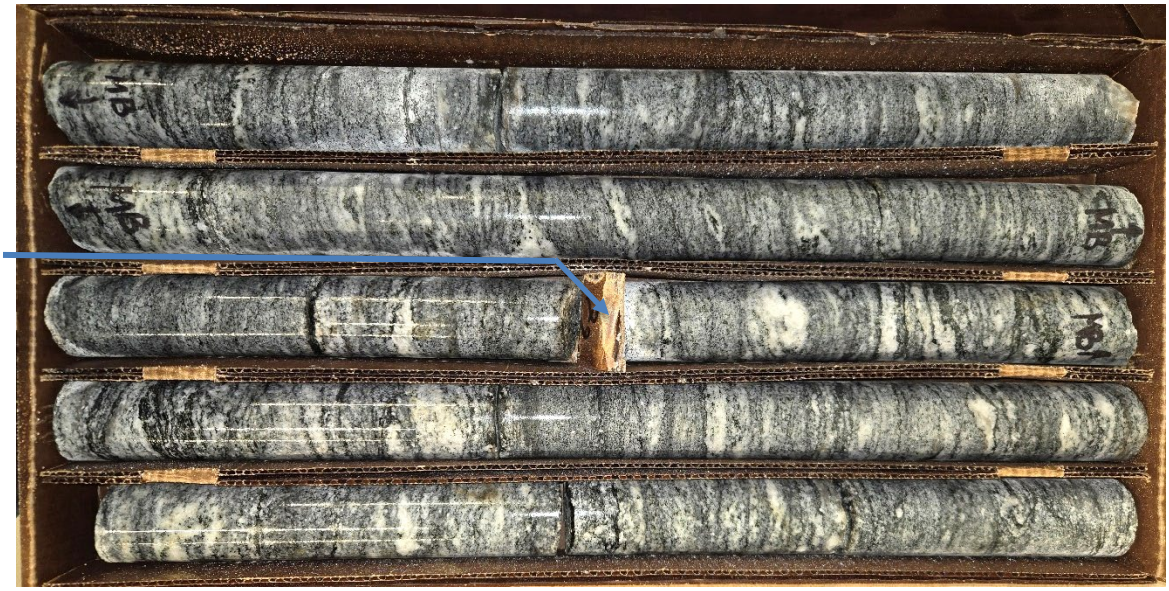
PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

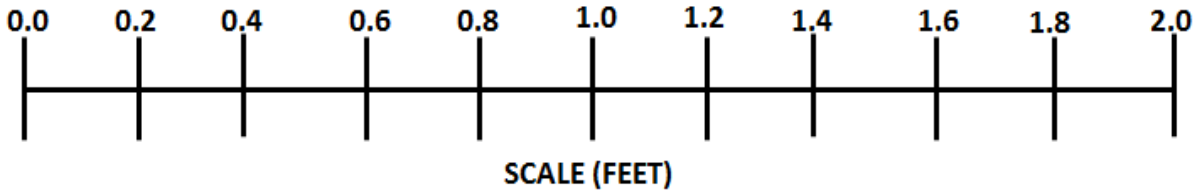
PROJECT COUNTY Oconee

Borehole	Core Run Number	Core Run Top Depth	REC (%)	RQD (%)	q_u (psi)	Poisson's Ratio	Elastic Modulus (ksi)	Unit Weight (pcf)	RMR	GSI
B-1/DH-1	NQ-1	65.1	100	96					63	85
B-1/DH-1	NQ-2	69.2	98	72					51	75
B-1/DH-1	NQ-3	74.2	100	100					63	85
B-1/DH-1	NQ-4	79.2	100	95					51	75
B-1/DH-1	NQ-5	84.2	100	97					59	75
B-1/DH-1	NQ-6	89.2	98	95					51	75
B-1/DH-1	NQ-7	94.2	100	100					63	85
B-2	NQ-1	63.6	76	55	13600	0.24	4260	170	60	75
B-2	NQ-2	64.8	95	94	13290	0.21	4970	169	77	80
B-2	NQ-3	69.8	98	98					53	75
B-2	NQ-4	74.8	100	90					54	70
B-2	NQ-5	79.8	88	76					59	73
B-3	NQ-1	51.7	99	59	5000	0.13	755	166	33	50
B-3	NQ-2	54.3	89	50	13530	0.17	4860	167	47	65
B-3	NQ-3	59.3	95	67	7500	0.36	3990	168	41	67
B-3	NQ-4	64.3	98	86	8150	0.42	5120	166	48	75
B-3	NQ-5	69.3	100	93					63	85
B-4	NQ-1	44.6	99	59	7880	0.05	576	168	41	60
B-4	NQ-2	49.6	91	67	11760	0.11	3200	167	41	65
B-4	NQ-3	54.6	95	67	12100	0.10	1950	170	41	60
B-4	NQ-4	59.6	100	66	15440	0.15	1850	166	49	65
B-5	NQ-1	33.7	100	47					33	70
B-5	NQ-2	34.9	90	90	7390	0.29	3870	164	55	80
B-5	NQ-3	39.9	92	69	7160	N/A*	N/A*	169	45	80
B-5	NQ-4	44.9	100	100					57	85
B-5	NQ-5	49.9	100	100					57	85

*Axial strain gauge did not engage during testing. Thus, Linear Elastic Modulus region or Elastic Modulus/Poisson's Ratio were not determined

US 76 over Chauga River
CORE PHOTOGRAPHS: B-1/DHT

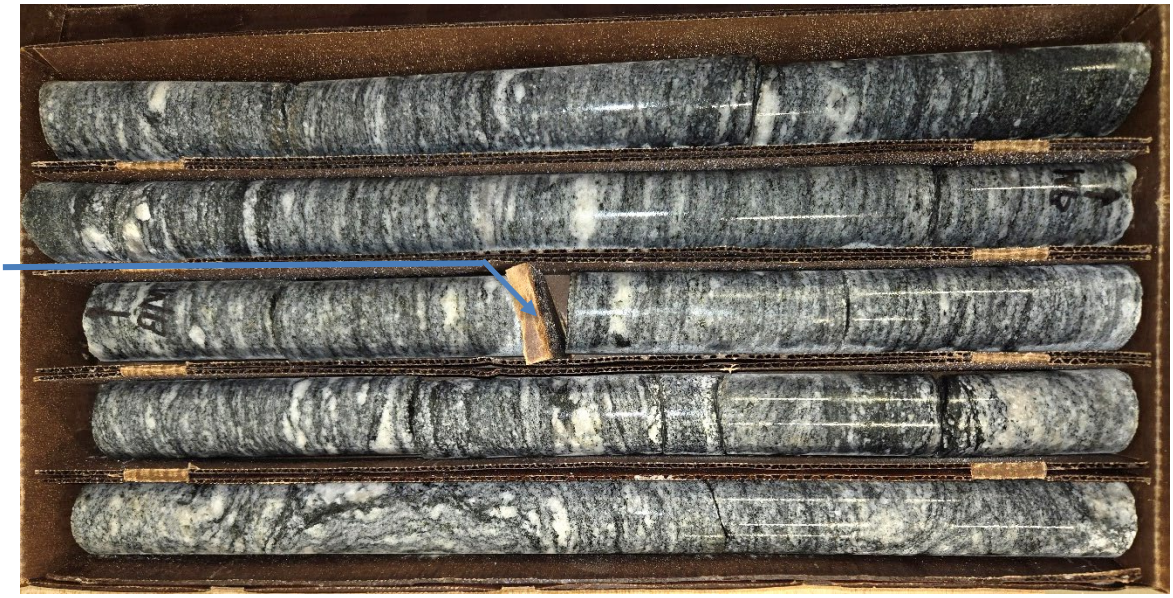




US 76 over Chauga River
CORE PHOTOGRAPHS: B-1/DHT

Begin Run 5
84.2 Feet

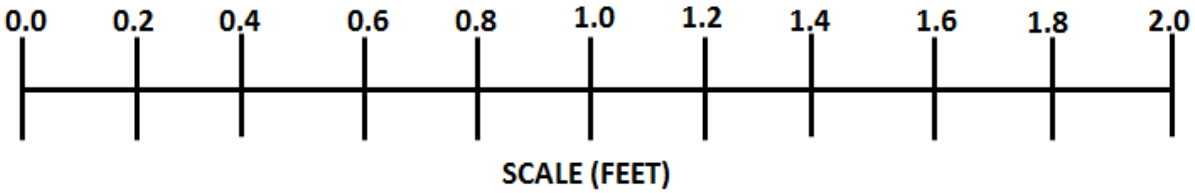
Begin Run 6
89.2 Feet



End Run 6
94.2 Feet

Begin Run 7
94.2 Feet

End Run 7
99.2 Feet



US 76 over Chauga River
CORE PHOTOGRAPHS: B-2

Begin Run 1
63.6 Feet

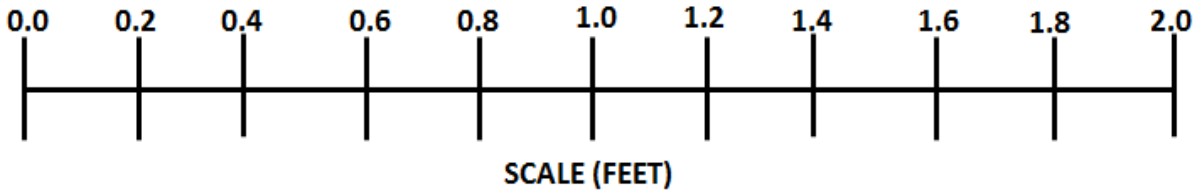
Begin Run 2
64.8 Feet

End Run 2
69.8 Feet

Begin Run 3
69.8 Feet

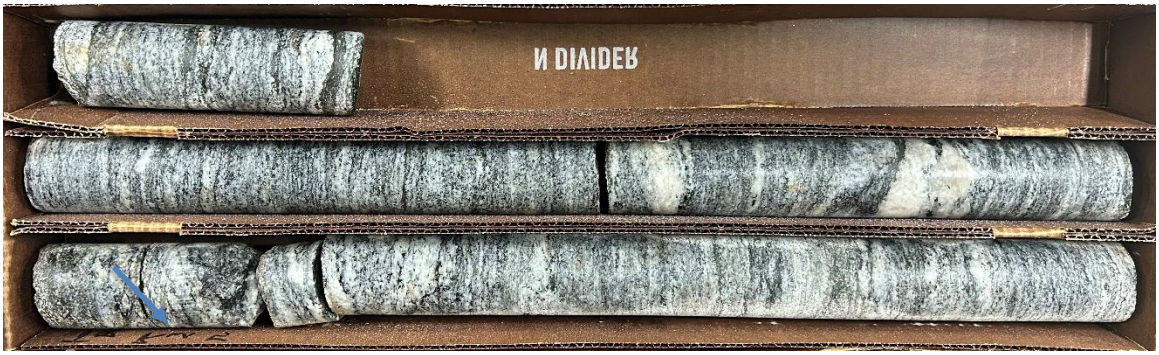
Begin Run 4
74.8 Feet

End Run 4
79.8 Feet

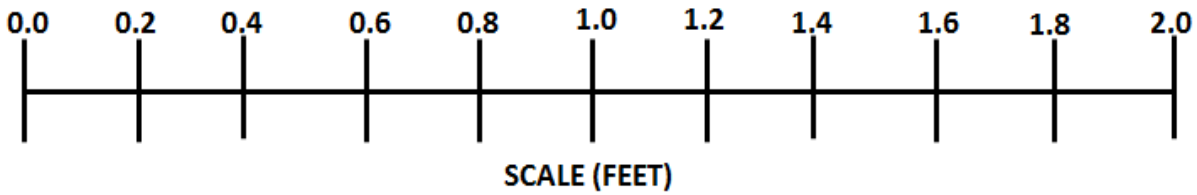


US 76 over Chauga River
CORE PHOTOGRAPHS: B-2

Begin Run 5
79.8 Feet



End Run 5
84.8 Feet



Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/17/2024
Project No.	G7100.005	Sample Diameter (in.)	1.863	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.686	Reviewed By	WJG
Boring	B-2	Unit Weight (pcf)	169.9	Core Size	NQ
Sample No.	NQ-1 / 24-3633	L/D Ratio	2.52	Recovery	76%
Depth	63.9' - 64.3'	Load Rate (psi/sec)	20	RQD	55%
Description	Light Gray/Gray Gneiss				

Test Data

Percent of Failure Load	Strain (10^{-6}) Axial	Strain (10^{-6}) Radial	Load (lbs)	Compressive Stress (psi)	Secant Modulus x10^{6} (psi)	Poisson's Ratio
10%	-664	93	3,713	1,362	4.10	0.14
20%	-1305	233	7,413	2,719	4.17	0.18
30%	-1938	427	11,116	4,078	4.21	0.22
40%	-2533	659	14,825	5,439	4.29	0.26
50%	-3133	958	18,528	6,797	4.34	0.31
60%	-3369	1318	22,236	8,157	4.84	0.39
70%	-3972	1839	25,939	9,516	4.79	0.46
80%	-4582	2638	29,648	10,876	4.75	0.58
90%	-5377	4206	33,353	12,235	4.55	0.78
100%	-7017	13069	37,064	13,597		

Sample Photos

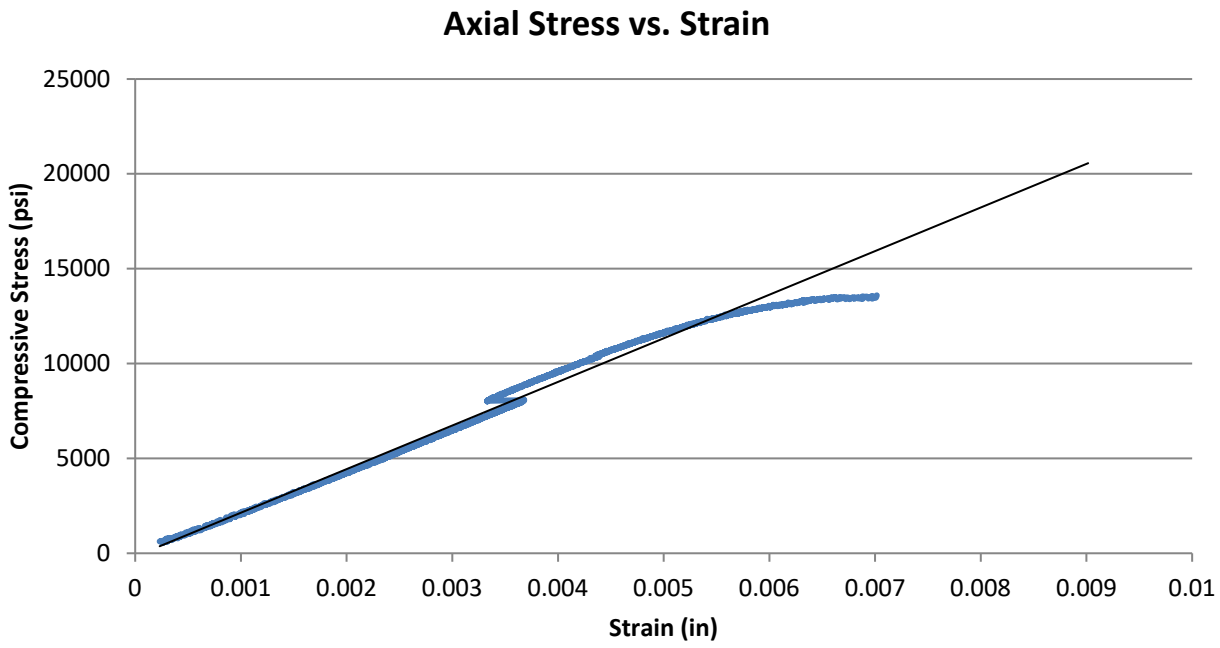
Test Results

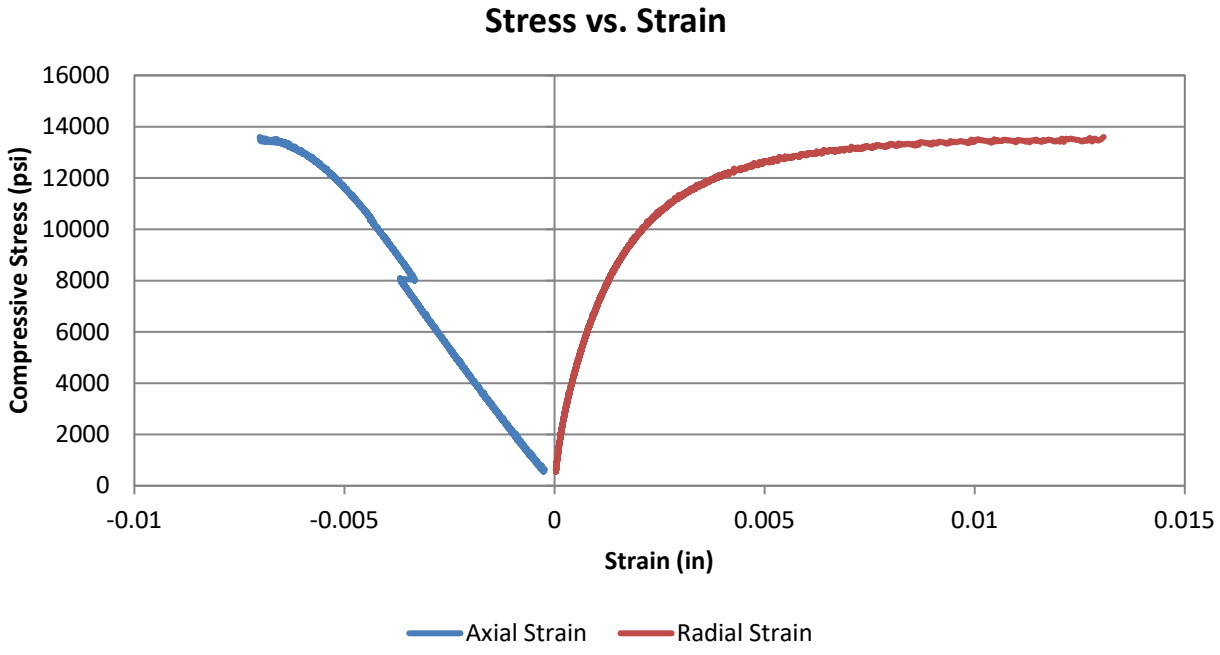
Unconfined Compressive Strength (psi)	**13,600**	Elastic Modulus (psi)	4.26E+06
		Poisson's Ratio in Elastic Range	0.24
Comments	Elastic range was taken as between 0.001 and 0.0035 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range.		

F&ME CONSULTANTS

Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/17/2024
Project No.	G7100.005	Sample Diameter (in.)	1.863	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.686	Reviewed By	WJG
Boring	B-2	Unit Weight (pcf)	169.9	Core Size	NQ
Sample No.	NQ-1 / 24-3633	L/D Ratio	2.52	Recovery	76%
Depth	63.9' - 64.3'	Load Rate (psi/sec)	20	RQD	55%
Description	Light Gray/Gray Gneiss				





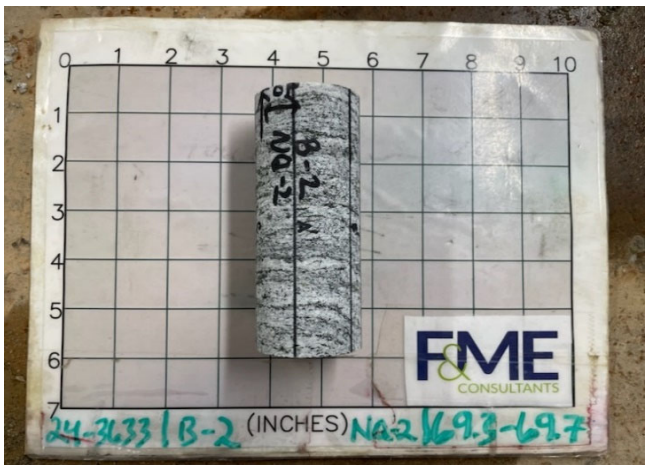
Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

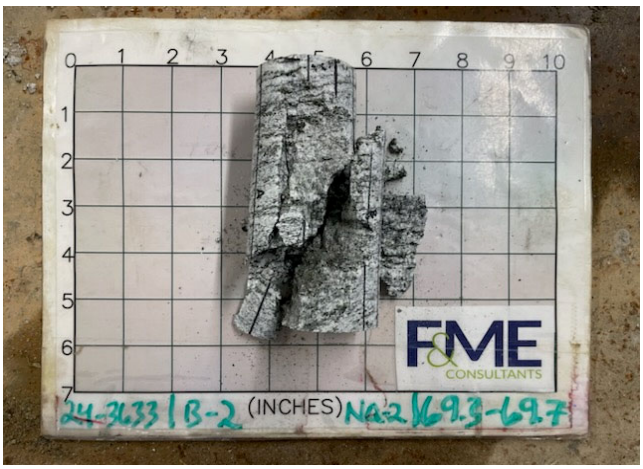
Project	US 76 over Chauga River			Date	10/17/2024
Project No.	G7100.005	Sample Diameter (in.)	1.866	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.608	Reviewed By	WJG
Boring	B-2	Unit Weight (pcf)	169.1	Core Size	NQ
Sample No.	NQ-2 / 24-3633	L/D Ratio	2.47	Recovery	95%
Depth	69.3' - 69.7'	Load Rate (psi/sec)	20	RQD	94%
Description	Light Gray/Gray Gneiss				

Test Data

Percent of Failure Load	Strain (10^{-6}) Axial	Strain (10^{-6}) Radial	Load (lbs)	Compressive Stress (psi)	Secant Modulus $x10^6$ (psi)	Poisson's Ratio
10%	-428	70	3,632	1,328	6.20	0.16
20%	-973	174	7,241	2,648	5.44	0.18
30%	-1557	308	10,927	3,996	5.13	0.20
40%	-2193	474	14,530	5,313	4.85	0.22
50%	-2753	654	18,171	6,644	4.83	0.24
60%	-3399	877	21,805	7,973	4.69	0.26
70%	-3950	1139	25,435	9,301	4.71	0.29
80%	-4616	1553	29,076	10,632	4.61	0.34
90%	-5362	2363	32,704	11,959	4.46	0.44
100%	-6390	7244	36,343	13,290		

Sample Photos





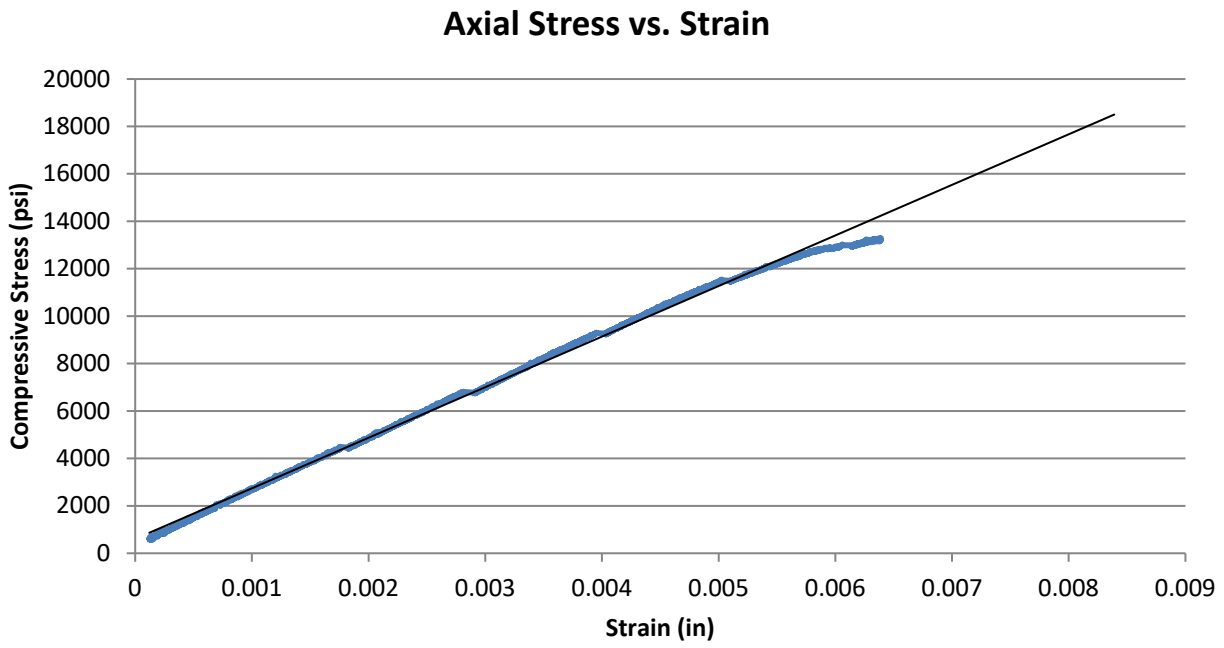
Test Results

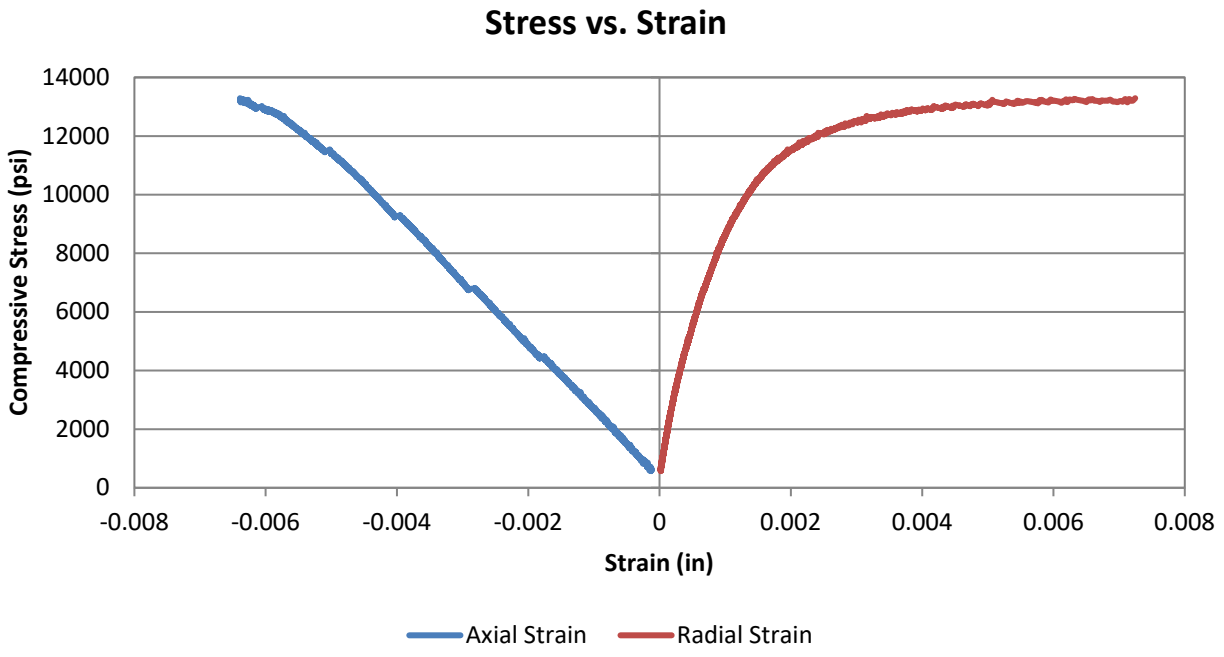
Unconfined Compressive Strength (psi)	**13,290**	Elastic Modulus (psi)	4.97E+06
		Poisson's Ratio in Elastic Range	0.21
Comments	Elastic range was taken as between 0.001 and 0.003 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range.		

F&ME CONSULTANTS

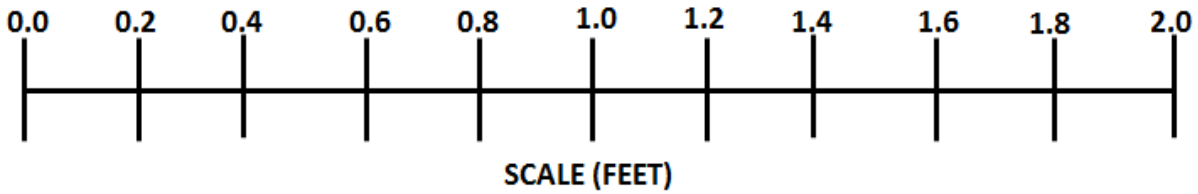
Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/17/2024
Project No.	G7100.005	Sample Diameter (in.)	1.866	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.608	Reviewed By	WJG
Boring	B-2	Unit Weight (pcf)	169.1	Core Size	NQ
Sample No.	NQ-2 / 24-3633	L/D Ratio	2.47	Recovery	95%
Depth	69.3' - 69.7'	Load Rate (psi/sec)	20	RQD	94%
Description	Light Gray/Gray Gneiss				



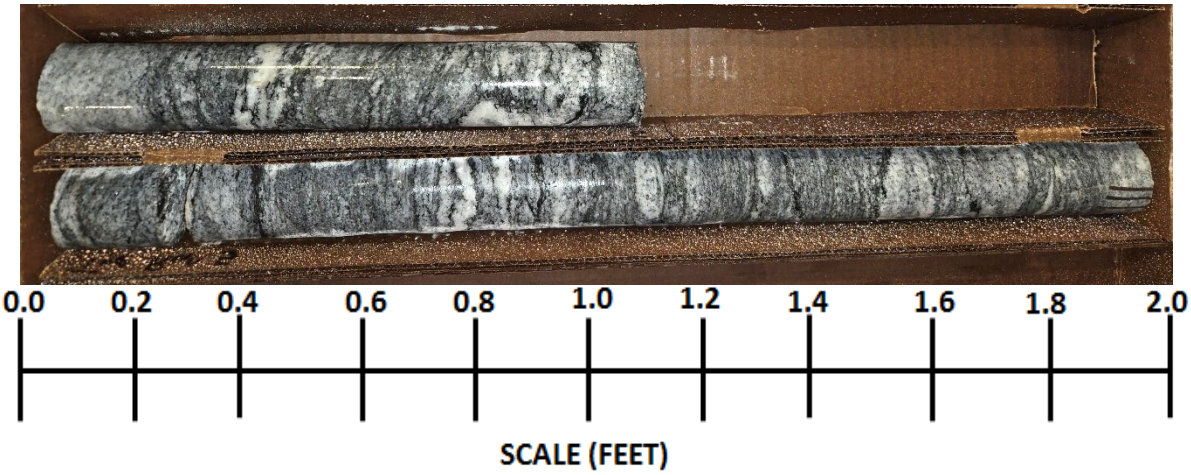


US 76 over Chauga River
CORE PHOTOGRAPHS: B-3



US 76 over Chauga River
CORE PHOTOGRAPHS: B-3

Begin Run 5
69.3 Feet



End Run 5
72.3 Feet

Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.844	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.394	Reviewed By	WJG
Boring	B-3	Unit Weight (pcf)	166.4	Core Size	NQ
Sample No.	NQ-1 / 24-3684	L/D Ratio	2.38	Recovery	99%
Depth	53.2' - 53.6'	Load Rate (psi/sec)	20	RQD	59%
Description	Black/White Gneiss				

Test Data

Percent of Failure Load	Strain (10^{-6}) Axial	Strain (10^{-6}) Radial	Load (lbs)	Compressive Stress (psi)	Secant Modulus $x10^6$ (psi)	Poisson's Ratio
10%	Sample Preload Range					
20%	-2994	231	2,673	1,001	0.67	0.08
30%	-3999	458	4,017	1,504	0.75	0.11
40%	-5039	831	5,358	2,006	0.80	0.16
50%	-5729	1182	6,694	2,507	0.88	0.21
60%	-6608	1808	8,017	3,002	0.91	0.27
70%	-7527	2766	9,355	3,503	0.93	0.37
80%	-8529	4433	10,693	4,004	0.94	0.52
90%	-9969	8076	12,027	4,504	0.90	0.81
100%	-12169	21996	13,365	5,005		

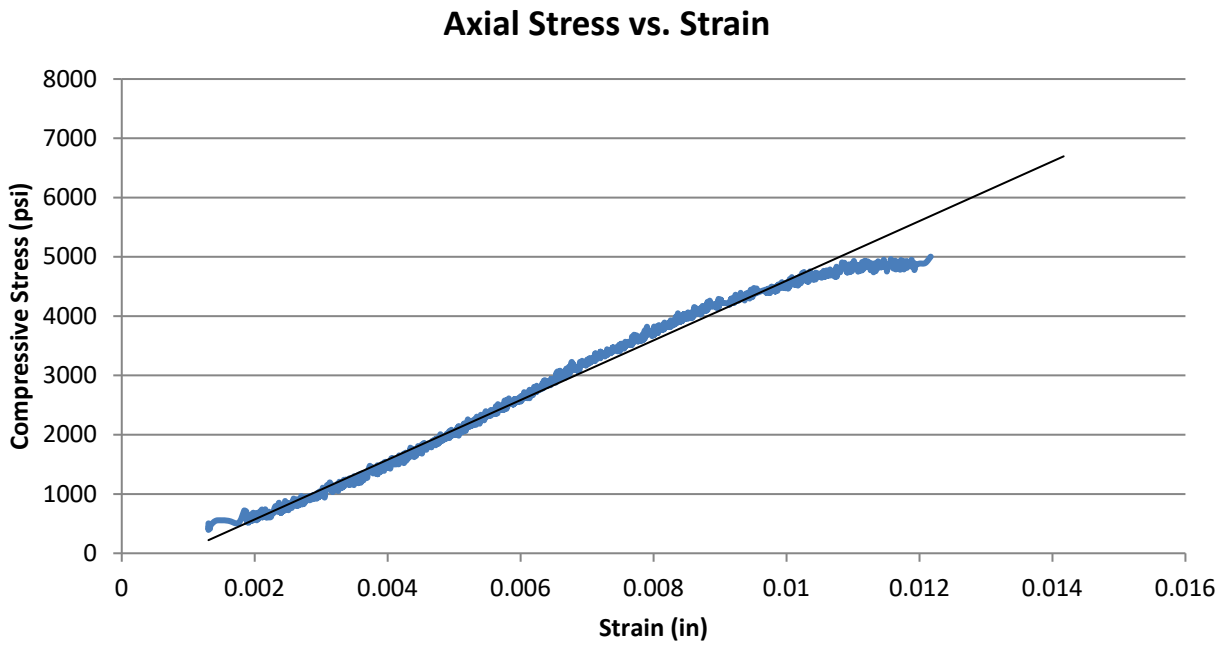
Sample Photos

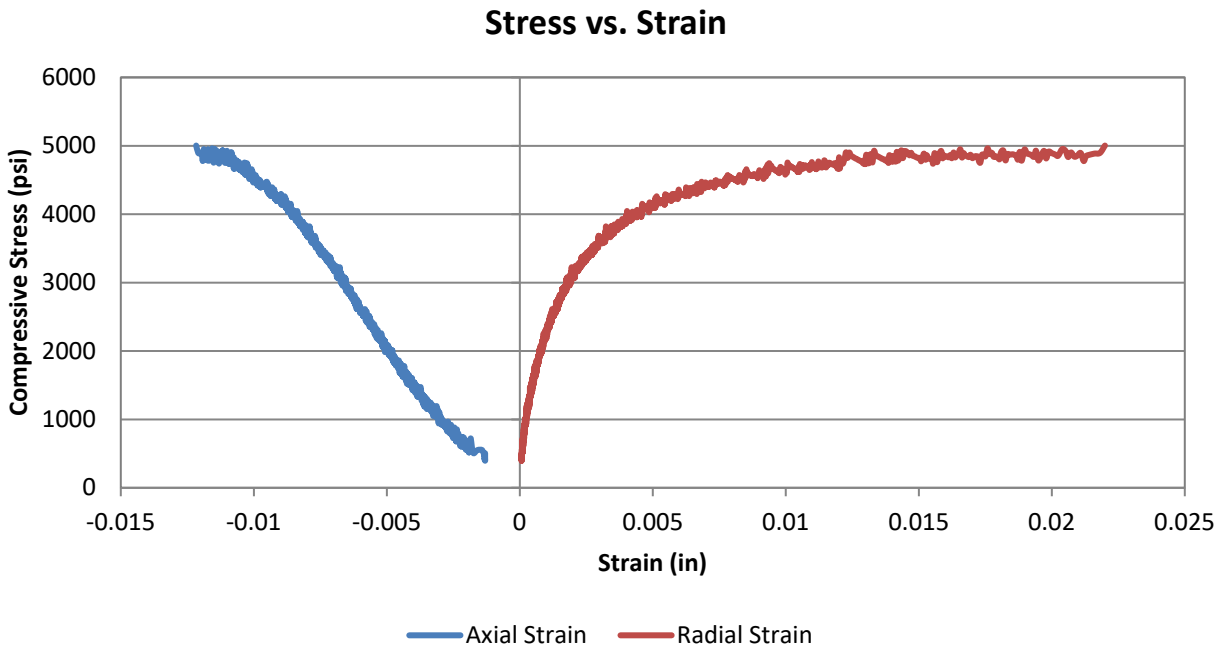
Test Results

Unconfined Compressive Strength (psi)	**5,000**	Elastic Modulus (psi)	7.55E+05
		Poisson's Ratio in Elastic Range	0.13
Comments	Elastic range was taken as between 0.002 and 0.006 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range.		

Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.844	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.394	Reviewed By	WJG
Boring	B-3	Unit Weight (pcf)	166.4	Core Size	NQ
Sample No.	NQ-1 / 24-3684	L/D Ratio	2.38	Recovery	99%
Depth	53.2' - 53.6'	Load Rate (psi/sec)	20	RQD	59%
Description	Black/White Gneiss				





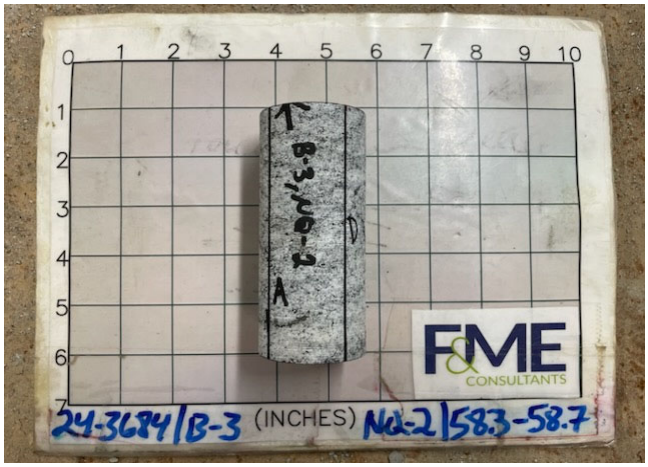
Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.862	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.316	Reviewed By	WJG
Boring	B-3	Unit Weight (pcf)	166.9	Core Size	NQ
Sample No.	NQ-2 / 24-3684	L/D Ratio	2.32	Recovery	98%
Depth	58.3' - 58.7'	Load Rate (psi/sec)	20	RQD	58%
Description	Black/White Gneiss				

Test Data

Percent of Failure Load	Strain (10^{-6}) Axial	Strain (10^{-6}) Radial	Load (lbs)	Compressive Stress (psi)	Secant Modulus x10^{6} (psi)	Poisson's Ratio
10%	-499	58	3,643	1,338	5.36	0.12
20%	-1119	147	7,366	2,705	4.84	0.13
30%	-1665	243	11,061	4,062	4.88	0.15
40%	-2172	353	14,734	5,411	4.98	0.16
50%	-2818	502	18,425	6,766	4.80	0.18
60%	-3309	651	22,105	8,118	4.91	0.20
70%	-3850	842	25,785	9,469	4.92	0.22
80%	-4360	1078	29,472	10,823	4.96	0.25
90%	-4855	1441	33,156	12,176	5.02	0.30
100%	-8860	6631	36,839	13,529		

Sample Photos

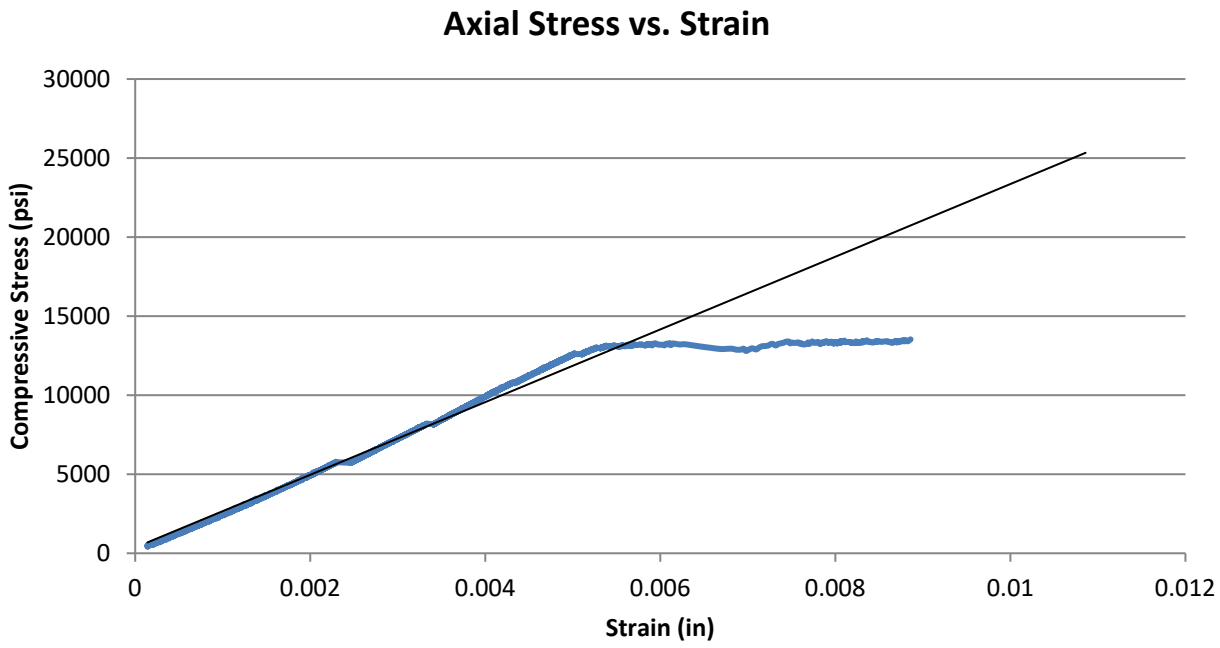


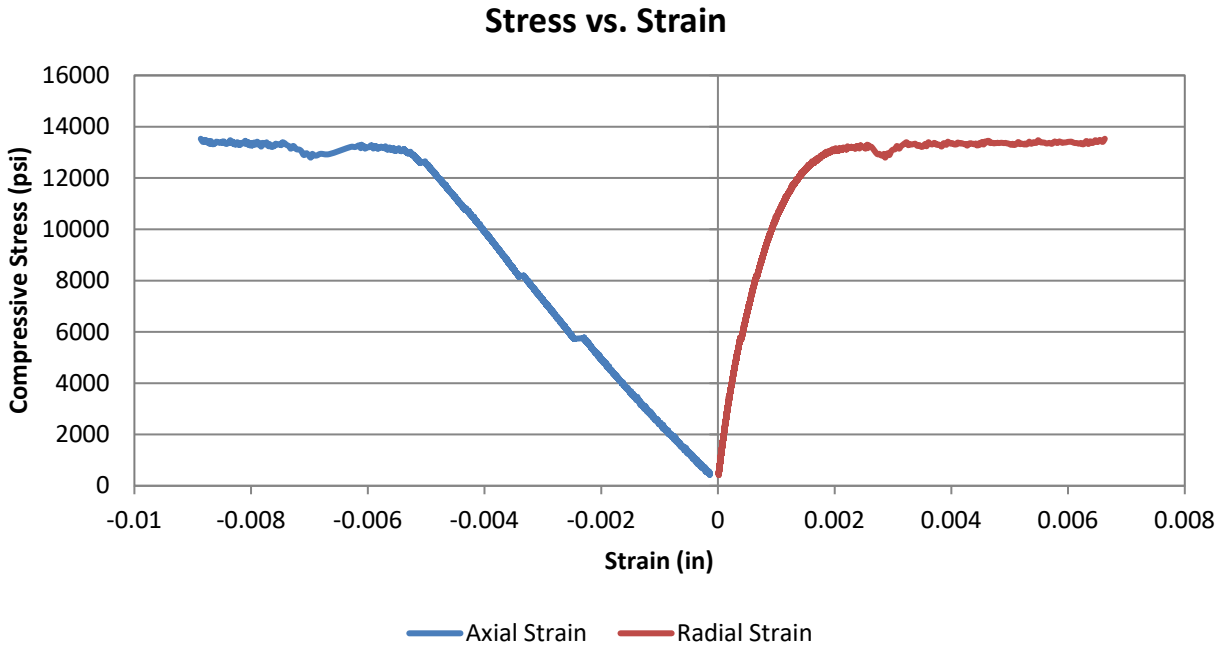
Test Results

Unconfined Compressive Strength (psi)	**13,530**	Elastic Modulus (psi)	4.86E+06
		Poisson's Ratio in Elastic Range	0.17
Comments	Elastic range was taken as between 0.001 and 0.004 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range.		

Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.862	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.316	Reviewed By	WJG
Boring	B-3	Unit Weight (pcf)	166.9	Core Size	NQ
Sample No.	NQ-2 / 24-3684	L/D Ratio	2.32	Recovery	98%
Depth	58.3' - 58.7'	Load Rate (psi/sec)	20	RQD	58%
Description	Black/White Gneiss				





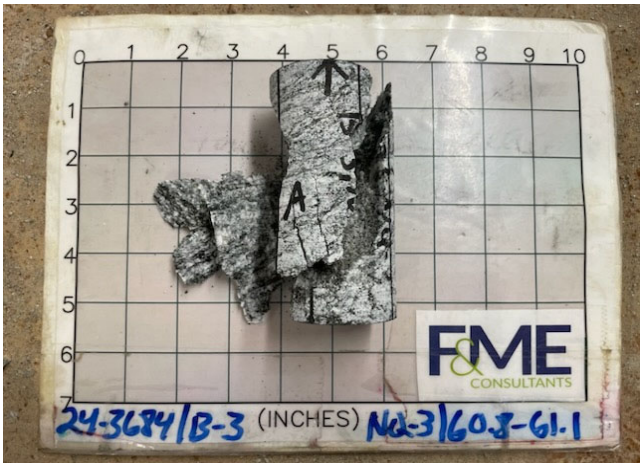
Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.873	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.316	Reviewed By	WJG
Boring	B-3	Unit Weight (pcf)	167.5	Core Size	NQ
Sample No.	NQ-3 / 24-3684	L/D Ratio	2.30	Recovery	95%
Depth	60.8' - 61.1'	Load Rate (psi/sec)	20	RQD	67%
Description	Black/White Gneiss				

Test Data

Percent of Failure Load	Strain (10^{-6}) Axial	Strain (10^{-6}) Radial	Load (lbs)	Compressive Stress (psi)	Secant Modulus x10^{6} (psi)	Poisson's Ratio
10%	-422	133	2,057	746	3.54	0.32
20%	-773	296	4,129	1,499	3.88	0.38
30%	-1151	398	6,210	2,254	3.92	0.35
40%	-1687	499	8,291	3,009	3.57	0.30
50%	-2108	613	10,323	3,747	3.56	0.29
60%	-2590	772	12,387	4,496	3.47	0.30
70%	-3051	1012	14,449	5,244	3.44	0.33
80%	-3482	1357	16,523	5,997	3.44	0.39
90%	-4509	3305	18,585	6,745	2.99	0.73
100%	-3029	28435	20,652	7,495		

Sample Photos

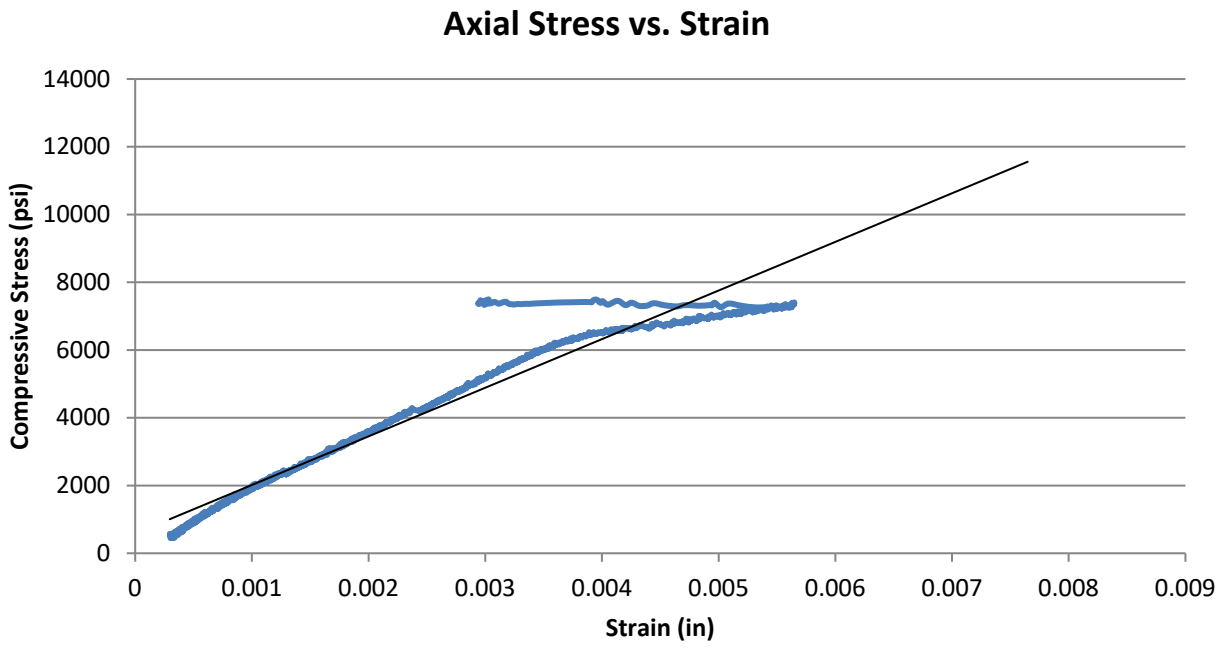


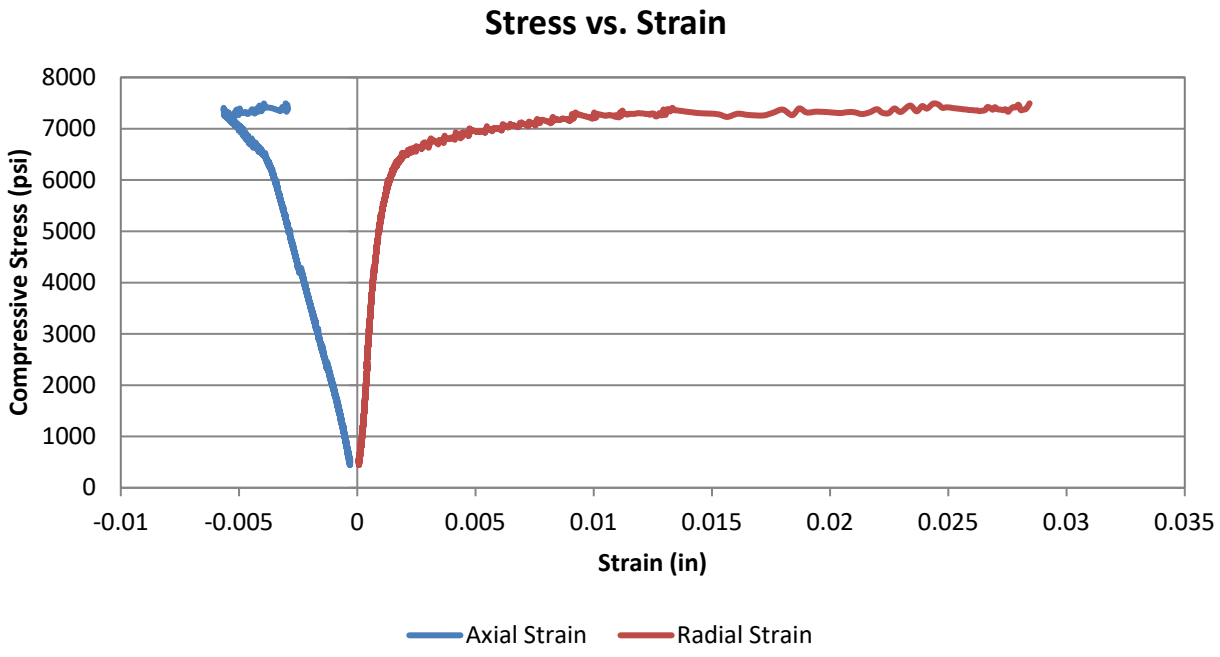
Test Results

Unconfined Compressive Strength (psi)	**7,500**	Elastic Modulus (psi)	3.99E+06
		Poisson's Ratio in Elastic Range	0.36
Comments	Elastic range was taken as between 0.001 and 0.003 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range.		

Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.873	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.316	Reviewed By	WJG
Boring	B-3	Unit Weight (pcf)	167.5	Core Size	NQ
Sample No.	NQ-3 / 24-3684	L/D Ratio	2.30	Recovery	95%
Depth	60.8' - 61.1'	Load Rate (psi/sec)	20	RQD	67%
Description	Black/White Gneiss				





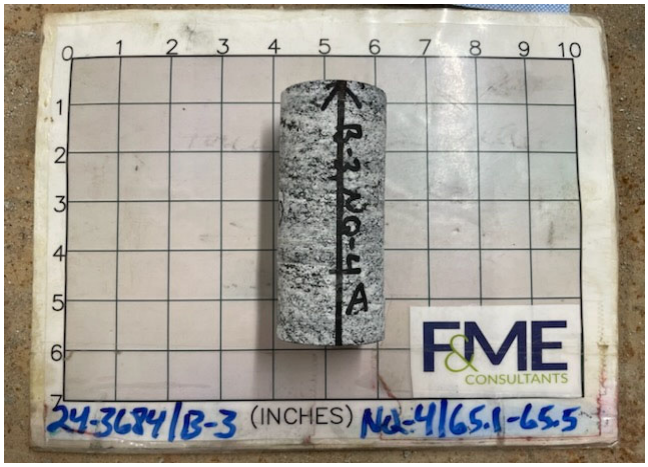
Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.864	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.357	Reviewed By	WJG
Boring	B-3	Unit Weight (pcf)	166.4	Core Size	NQ
Sample No.	NQ-4 / 24-3684	L/D Ratio	2.34	Recovery	98%
Depth	65.1' - 65.5'	Load Rate (psi/sec)	20	RQD	86%
Description	Black/White Gneiss				

Test Data

Percent of Failure Load	Strain (10^{-6}) Axial	Strain (10^{-6}) Radial	Load (lbs)	Compressive Stress (psi)	Secant Modulus $x10^6$ (psi)	Poisson's Ratio
10%	-87	59	2,227	816	18.69	0.68
20%	-303	187	4,446	1,629	10.76	0.62
30%	-717	268	6,671	2,445	6.82	0.37
40%	-1223	428	8,896	3,260	5.33	0.35
50%	-1723	642	11,129	4,078	4.73	0.37
60%	-2185	907	13,355	4,894	4.48	0.41
70%	-2638	1315	15,554	5,700	4.32	0.50
80%	-3129	2159	17,799	6,523	4.17	0.69
90%	-3769	4934	20,021	7,337	3.89	1.31
100%	-3824	50679	22,245	8,152		

Sample Photos



Test Results

Unconfined Compressive Strength (psi)	**8,150**	Elastic Modulus (psi)	5.12E+06
		Poisson's Ratio in Elastic Range	0.42
Comments	Elastic range was taken as between 0.0005 and 0.003 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range.		

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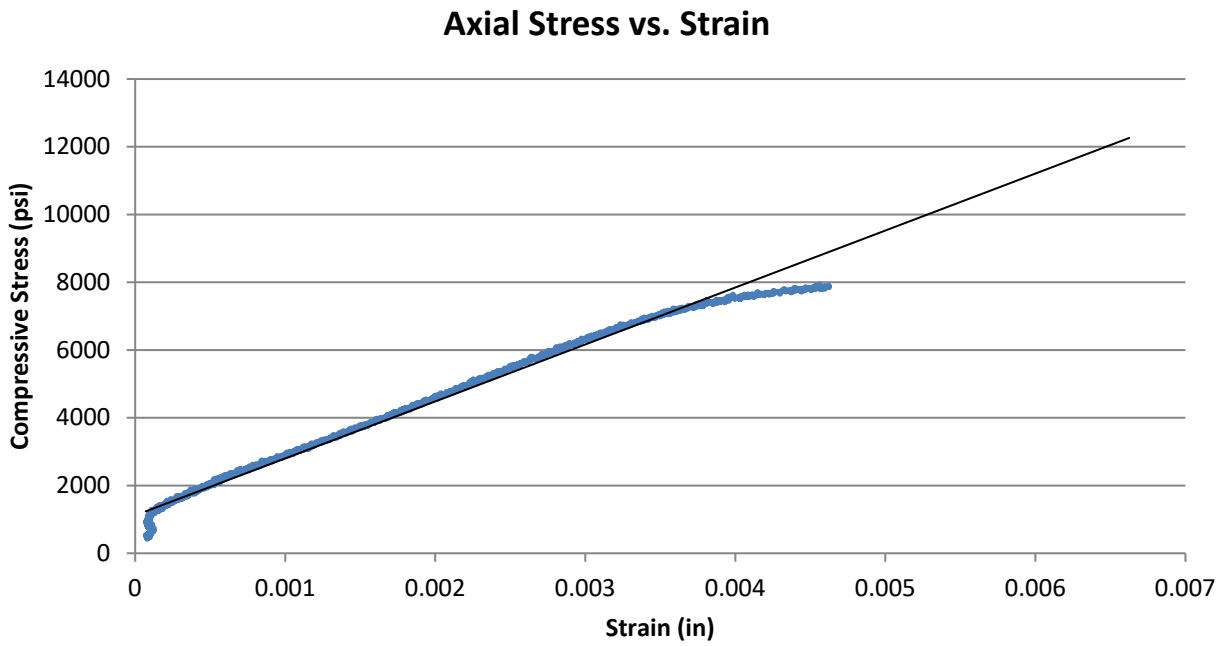
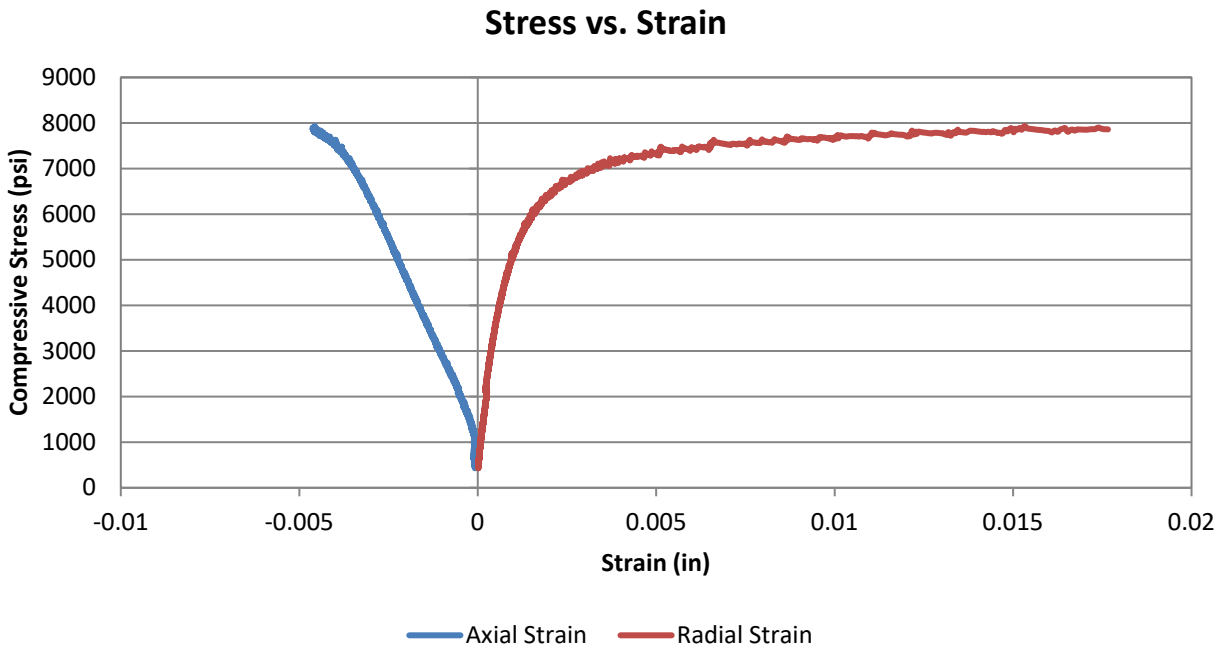
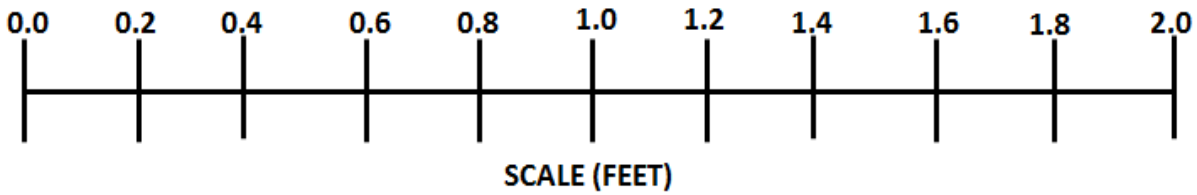
Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.864	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.357	Reviewed By	WJG
Boring	B-3	Unit Weight (pcf)	166.4	Core Size	NQ
Sample No.	NQ-4 / 24-3684	L/D Ratio	2.34	Recovery	98%
Depth	65.1' - 65.5'	Load Rate (psi/sec)	20	RQD	86%
Description	Black/White Gneiss				





US 76 over Chauga River
CORE PHOTOGRAPHS: B-4



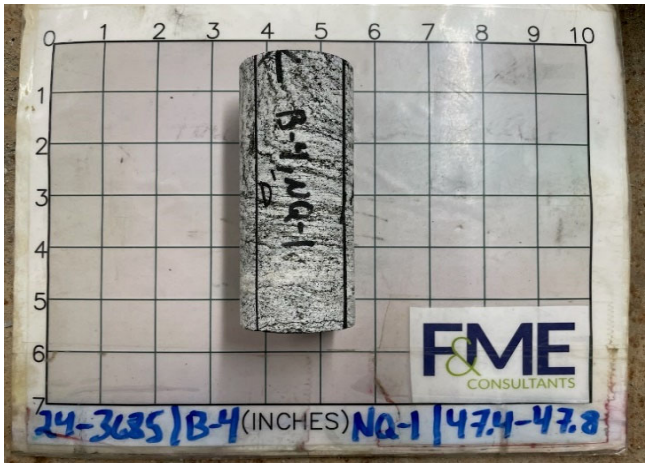
Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.862	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.337	Reviewed By	WJG
Boring	B-4	Unit Weight (pcf)	167.6	Core Size	NQ
Sample No.	NQ-1 / 24-3685	L/D Ratio	2.33	Recovery	99%
Depth	47.4' - 47.8'	Load Rate (psi/sec)	20	RQD	59%
Description	Black/White Gneiss				

Test Data

Percent of Failure Load	Strain (10^{-6}) Axial	Strain (10^{-6}) Radial	Load (lbs)	Compressive Stress (psi)	Secant Modulus $x10^6$ (psi)	Poisson's Ratio
10%	-2955	79	2,169	797	0.54	0.03
20%	-5104	297	4,290	1,575	0.62	0.06
30%	-6693	575	6,441	2,365	0.71	0.09
40%	-7987	907	8,588	3,154	0.79	0.11
50%	-9032	1289	10,733	3,942	0.87	0.14
60%	-9996	1791	12,875	4,728	0.95	0.18
70%	-10888	2511	15,024	5,517	1.01	0.23
80%	-11787	3674	17,172	6,306	1.07	0.31
90%	-12971	5859	19,315	7,093	1.09	0.45
100%	-14760	11921	21,463	7,882		

Sample Photos

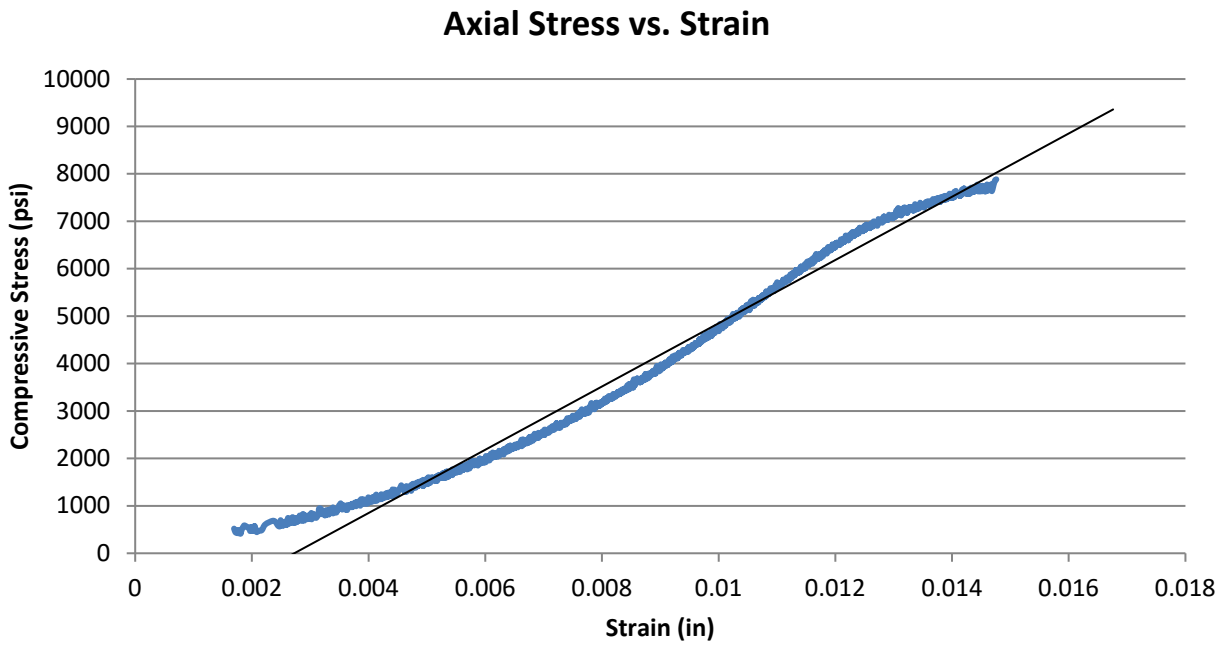


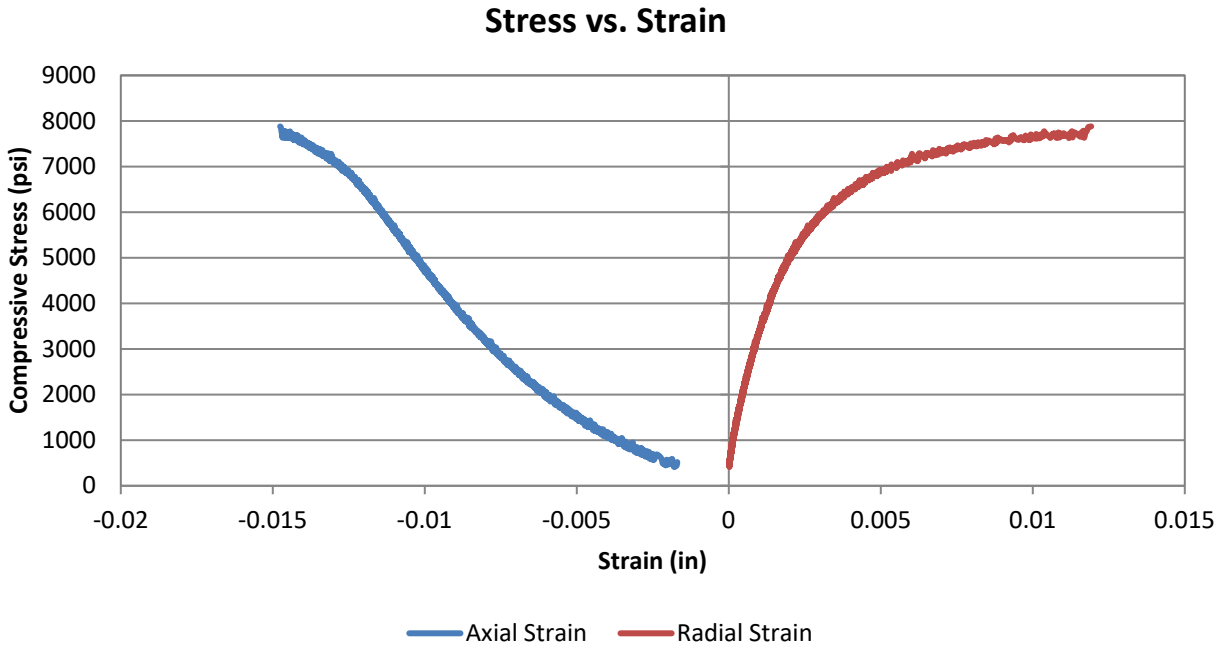
Test Results

Unconfined Compressive Strength (psi)	**7,880**	Elastic Modulus (psi)	5.76E+05
		Poisson's Ratio in Elastic Range	0.05
Comments	Elastic range was taken as between 0.002 and 0.006 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range.		

Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.862	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.337	Reviewed By	WJG
Boring	B-4	Unit Weight (pcf)	167.6	Core Size	NQ
Sample No.	NQ-1 / 24-3685	L/D Ratio	2.33	Recovery	99%
Depth	47.4' - 47.8'	Load Rate (psi/sec)	20	RQD	59%
Description	Black/White Gneiss				





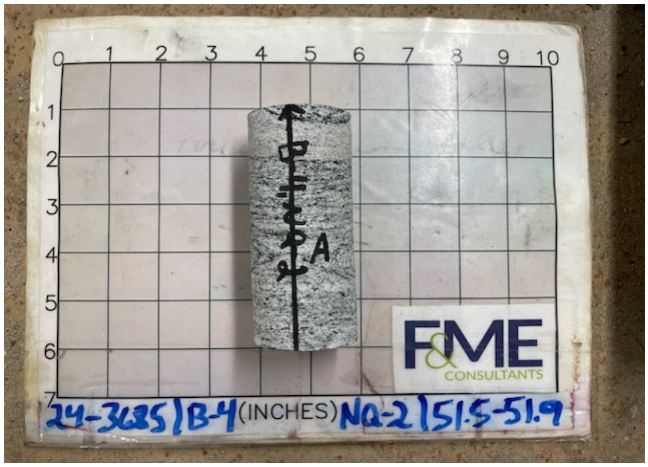
Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.863	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.204	Reviewed By	WJG
Boring	B-4	Unit Weight (pcf)	166.8	Core Size	NQ
Sample No.	NQ-2 / 24-3685	L/D Ratio	2.26	Recovery	91%
Depth	51.5' - 51.9'	Load Rate (psi/sec)	20	RQD	67%
Description	Black/White Gneiss				

Test Data

Percent of Failure Load	Strain (10^{-6}) Axial	Strain (10^{-6}) Radial	Load (lbs)	Compressive Stress (psi)	Secant Modulus $x10^6$ (psi)	Poisson's Ratio
10%	-713	37	3,206	1,176	3.30	0.05
20%	-1545	129	6,414	2,353	3.05	0.08
30%	-2191	239	9,620	3,529	3.22	0.11
40%	-2755	362	12,771	4,685	3.40	0.13
50%	-3327	532	16,028	5,880	3.54	0.16
60%	-3830	719	19,238	7,057	3.69	0.19
70%	-4312	948	22,444	8,233	3.82	0.22
80%	-4816	1323	25,649	9,409	3.91	0.27
90%	-5293	1999	28,857	10,586	4.00	0.38
100%	-5405	6991	32,060	11,761		

Sample Photos



Test Results

Unconfined Compressive Strength (psi)	**11,760**	Elastic Modulus (psi)	3.20E+06
		Poisson's Ratio in Elastic Range	0.11
Comments	Elastic range was taken as between 0.001 and 0.003 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range.		

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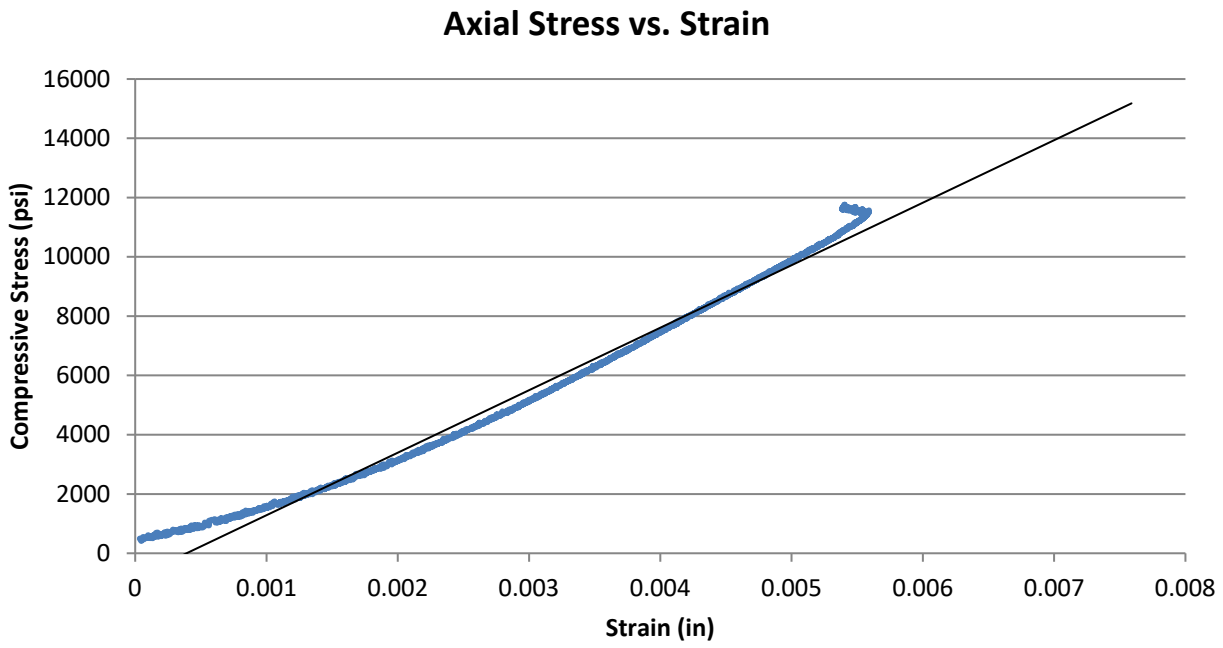
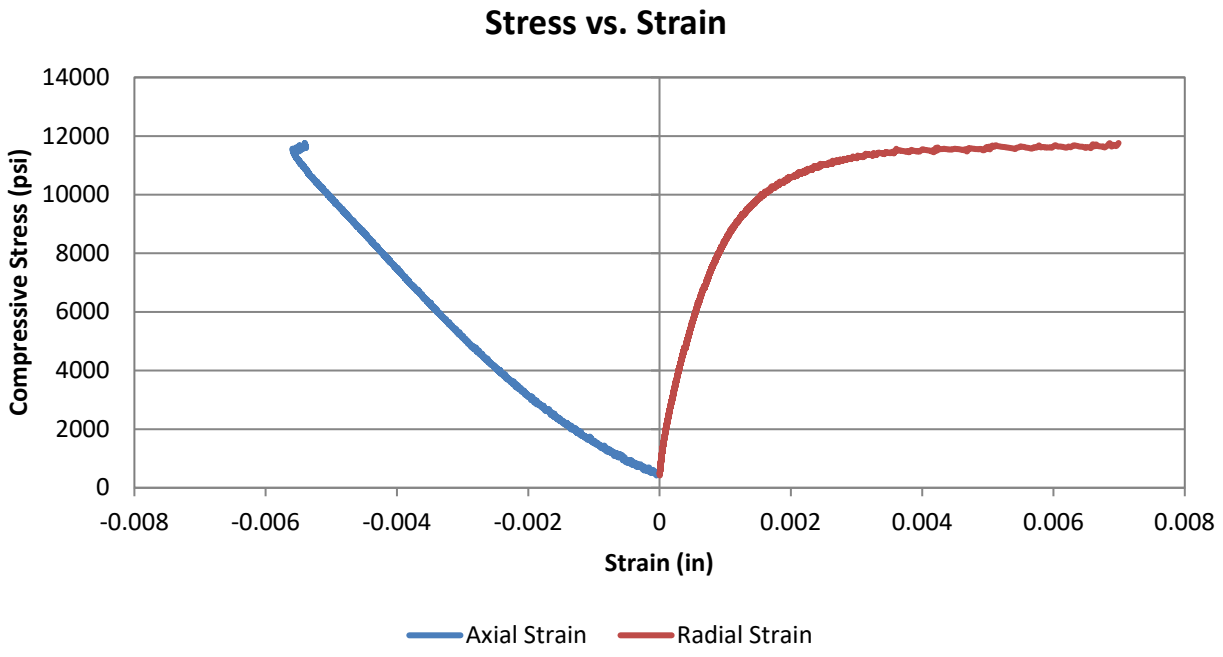
Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.863	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.204	Reviewed By	WJG
Boring	B-4	Unit Weight (pcf)	166.8	Core Size	NQ
Sample No.	NQ-2 / 24-3685	L/D Ratio	2.26	Recovery	91%
Depth	51.5' - 51.9'	Load Rate (psi/sec)	20	RQD	67%
Description	Black/White Gneiss				





Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.865	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.177	Reviewed By	WJG
Boring	B-4	Unit Weight (pcf)	169.6	Core Size	NQ
Sample No.	NQ-3 / 24-3685	L/D Ratio	2.24	Recovery	95%
Depth	55.6' - 56.0'	Load Rate (psi/sec)	20	RQD	67%
Description	Black/White Gneiss				

Test Data

Percent of Failure Load	Strain (10^{-6}) Axial	Strain (10^{-6}) Radial	Load (lbs)	Compressive Stress (psi)	Secant Modulus $x10^6$ (psi)	Poisson's Ratio
10%	-1340	73	3,304	1,209	1.81	0.05
20%	-2539	257	6,619	2,423	1.91	0.10
30%	-3489	469	9,916	3,630	2.08	0.13
40%	-4780	727	13,224	4,841	2.03	0.15
50%	-5555	1012	16,532	6,052	2.18	0.18
60%	-6439	1400	19,830	7,259	2.25	0.22
70%	-7120	1877	23,146	8,473	2.38	0.26
80%	-7926	2586	26,443	9,680	2.44	0.33
90%	-8747	3853	29,767	10,897	2.49	0.44
100%	-19100	10626	33,064	12,104		

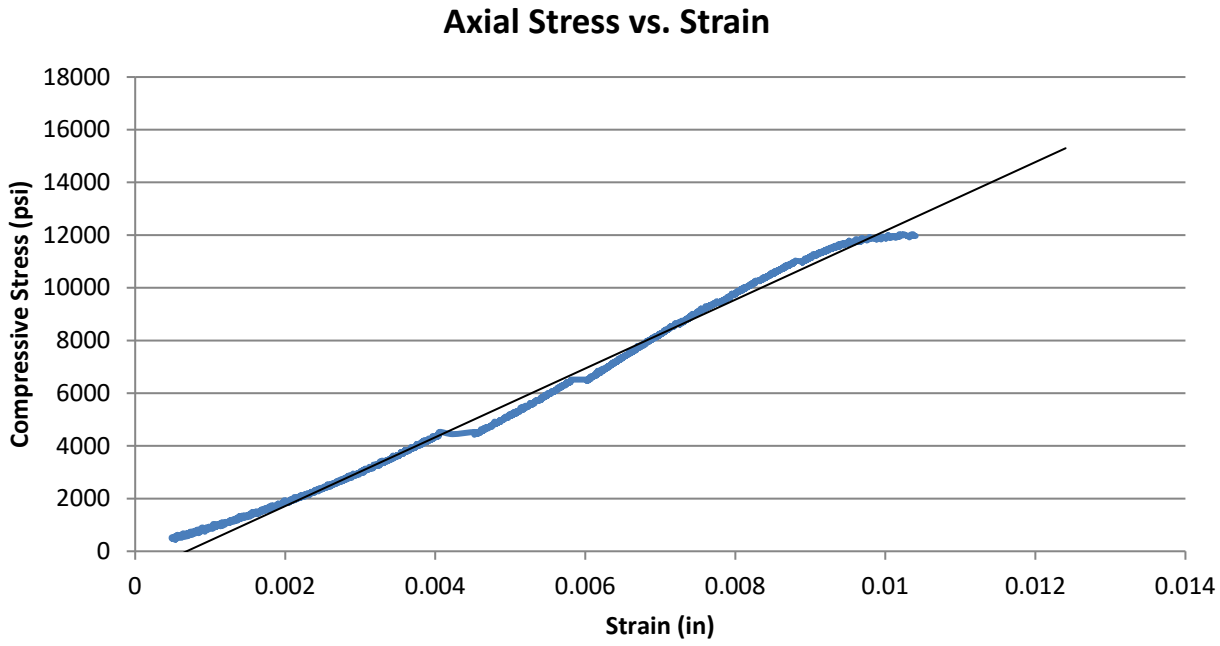
Sample Photos

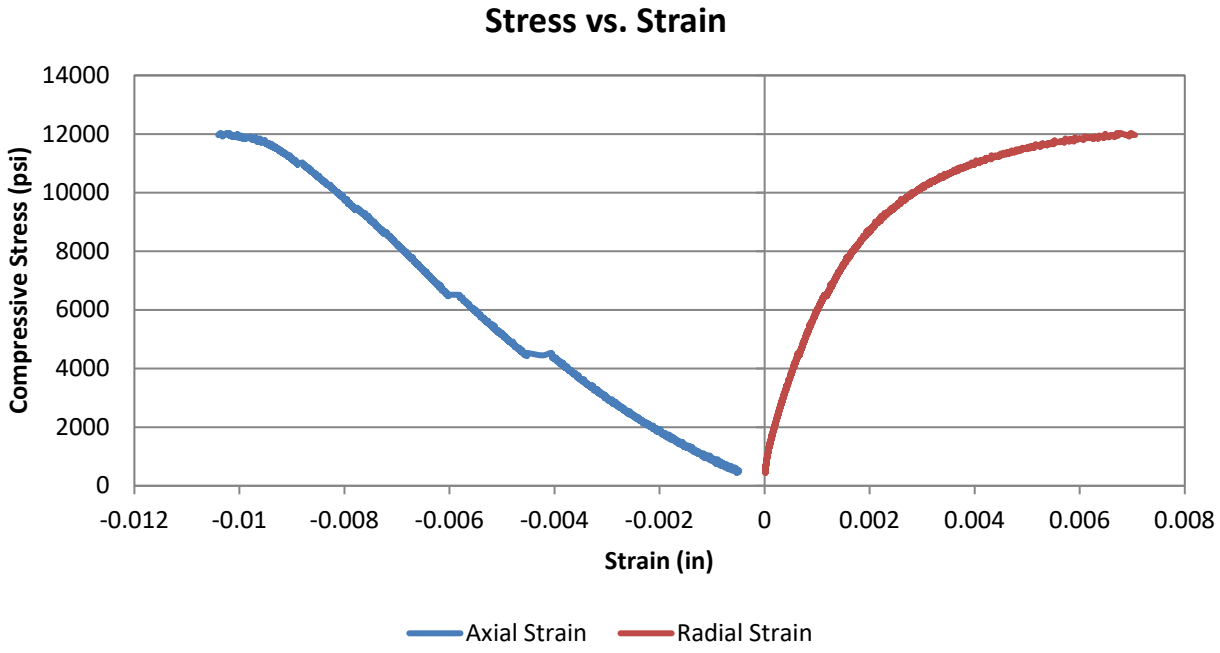
Test Results

Unconfined Compressive Strength (psi)	**12,100**	Elastic Modulus (psi)	1.95E+06
		Poisson's Ratio in Elastic Range	0.10
Comments	Elastic range was taken as between 0.001 and 0.004 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range.		

Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.865	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.177	Reviewed By	WJG
Boring	B-4	Unit Weight (pcf)	169.6	Core Size	NQ
Sample No.	NQ-3 / 24-3685	L/D Ratio	2.24	Recovery	95%
Depth	55.6' - 56.0'	Load Rate (psi/sec)	20	RQD	67%
Description	Black/White Gneiss				





Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.868	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.245	Reviewed By	WJG
Boring	B-4	Unit Weight (pcf)	165.9	Core Size	NQ
Sample No.	NQ-4 / 24-3685	L/D Ratio	2.27	Recovery	100%
Depth	62.0' - 62.4'	Load Rate (psi/sec)	20	RQD	66%
Description	Black/White Gneiss				

Test Data

Percent of Failure Load	Strain (10^{-6}) Axial	Strain (10^{-6}) Radial	Load (lbs)	Compressive Stress (psi)	Secant Modulus $x10^6$ (psi)	Poisson's Ratio
10%	-1162	118	4,233	1,545	2.66	0.10
20%	-2428	302	8,460	3,087	2.54	0.12
30%	-3388	485	12,693	4,632	2.73	0.14
40%	-4148	678	16,921	6,174	2.98	0.16
50%	-4818	901	21,149	7,717	3.20	0.19
60%	-5416	1166	25,380	9,261	3.42	0.22
70%	-6069	1519	29,611	10,805	3.56	0.25
80%	-6647	2050	33,843	12,349	3.72	0.31
90%	-7307	3176	38,067	13,890	3.80	0.43
100%	-10762	89509	42,302	15,435		

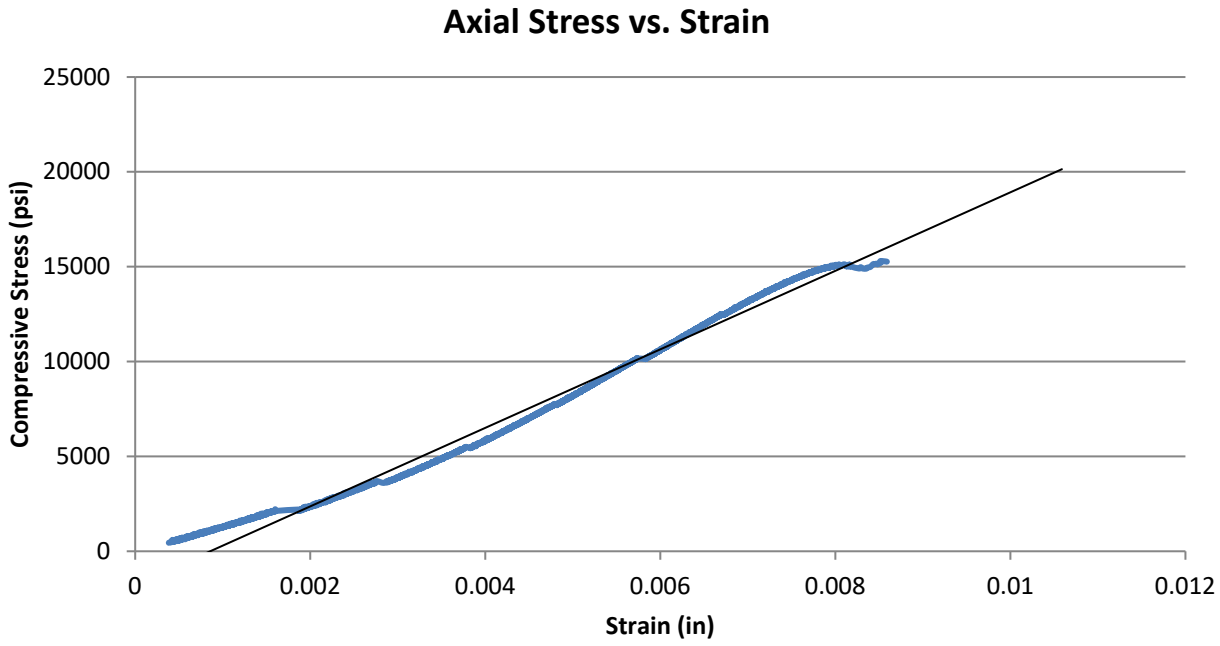
Sample Photos

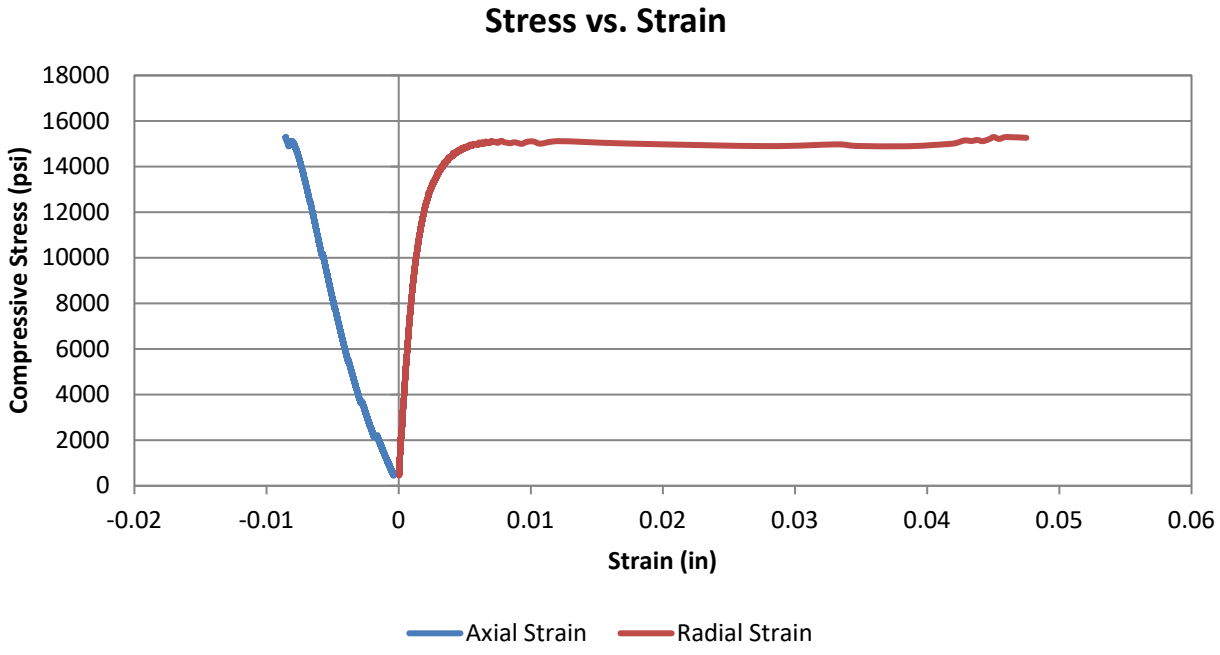
Test Results

Unconfined Compressive Strength (psi)	**15,440**	Elastic Modulus (psi)	2.85E+06
		Poisson's Ratio in Elastic Range	0.15
Comments	Elastic range was taken as between 0.002 and 0.005 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range.		

Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.868	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.245	Reviewed By	WJG
Boring	B-4	Unit Weight (pcf)	165.9	Core Size	NQ
Sample No.	NQ-4 / 24-3685	L/D Ratio	2.27	Recovery	100%
Depth	62.0' - 62.4'	Load Rate (psi/sec)	20	RQD	66%
Description	Black/White Gneiss				





US 76 over Chauga River
CORE PHOTOGRAPHS: B-5

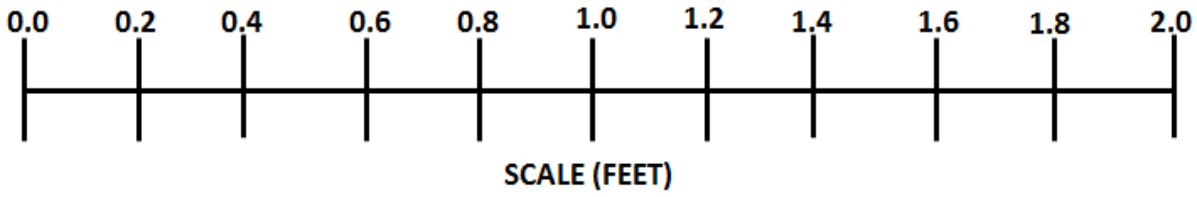
Begin Run 1
33.7 Feet

Begin Run 2
34.9 Feet

Begin Run 3
39.9 Feet

Begin Run 4
44.9 Feet

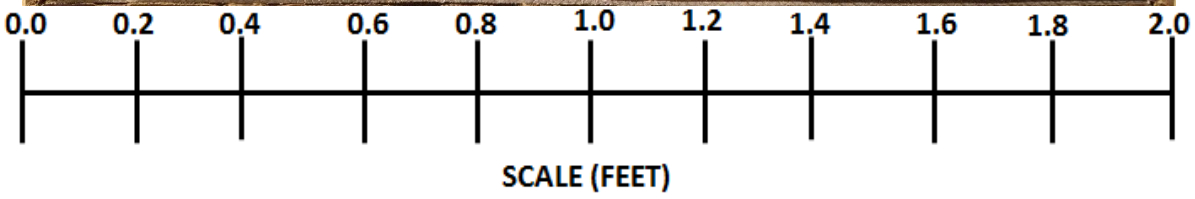
End Run 4
49.9 Feet



US 76 over Chauga River
CORE PHOTOGRAPHS: B-5

Begin Run 5
49.9 Feet

End Run 5
54.9 Feet



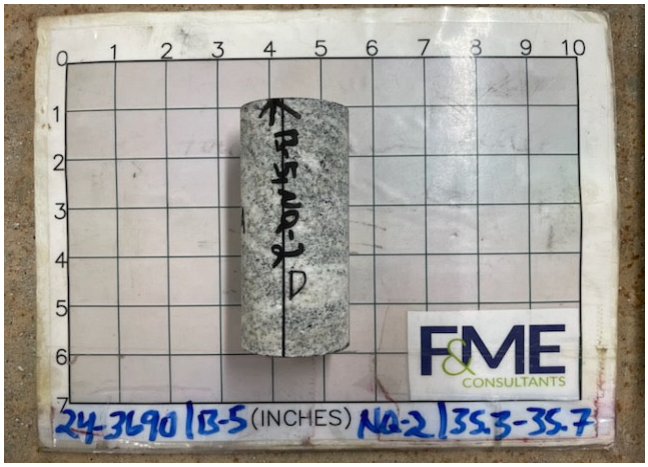
Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.876	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.25	Reviewed By	WJG
Boring	B-5	Unit Weight (pcf)	163.8	Core Size	NQ
Sample No.	NQ-2 / 24-3690	L/D Ratio	2.27	Recovery	90%
Depth	35.3' - 35.7'	Load Rate (psi/sec)	20	RQD	90%
Description	Black/White Gneiss				

Test Data

Percent of Failure Load	Strain (10^{-6}) Axial	Strain (10^{-6}) Radial	Load (lbs)	Compressive Stress (psi)	Secant Modulus x10^{6} (psi)	Poisson's Ratio
10%	67	73	2,040	738	22.20	1.10
20%	-270	176	4,080	1,476	10.93	0.65
30%	-931	284	6,128	2,217	4.77	0.31
40%	-1675	445	8,171	2,956	3.53	0.27
50%	-2382	621	10,229	3,700	3.11	0.26
60%	-3032	866	12,261	4,436	2.93	0.29
70%	-3697	1230	14,306	5,176	2.80	0.33
80%	-4362	1908	16,348	5,915	2.71	0.44
90%	-5860	22629	18,395	6,655	2.27	3.86
100%	-10969	90685	20,436	7,393		

Sample Photos

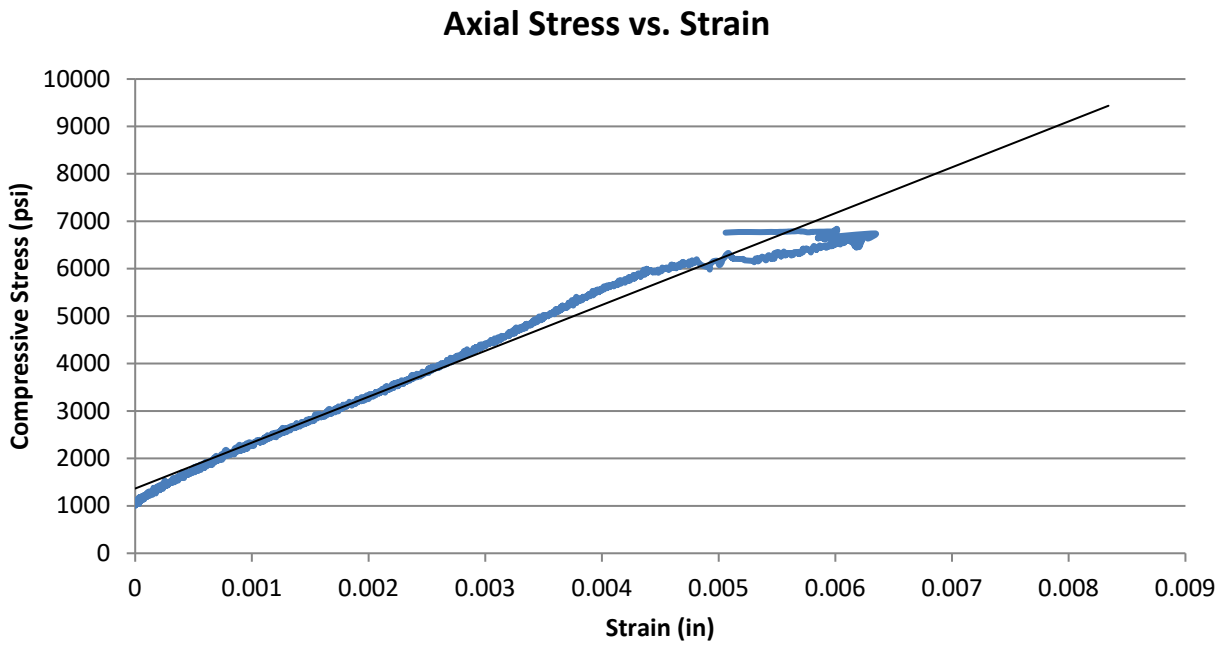


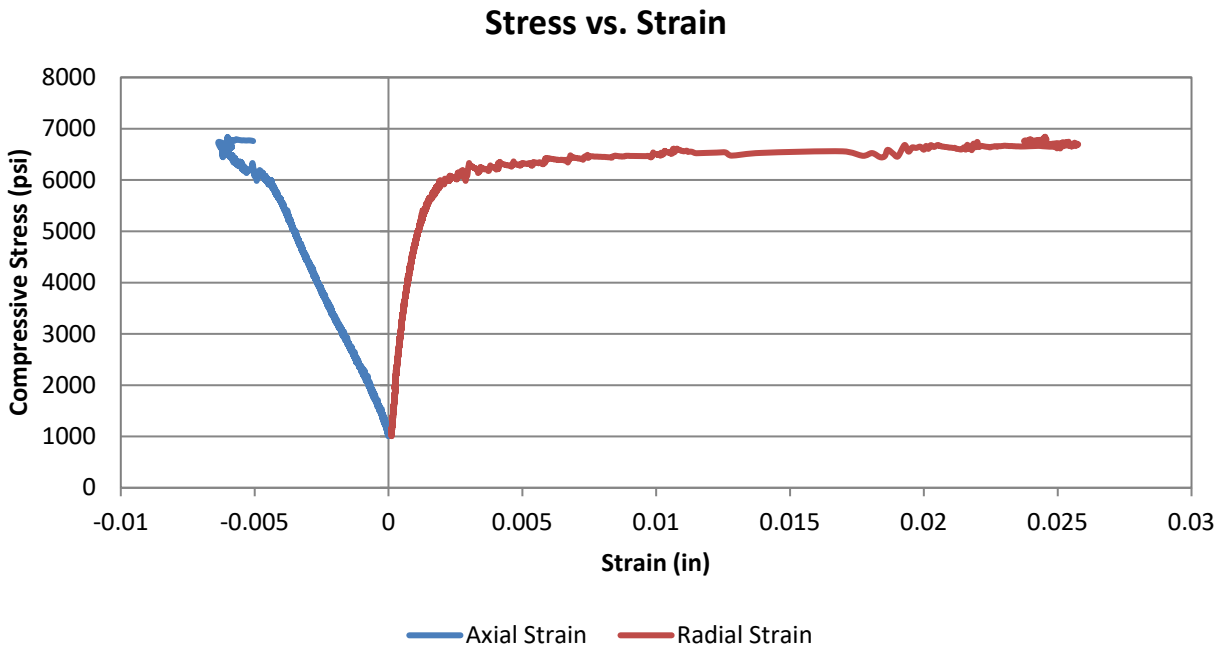
Test Results

Unconfined Compressive Strength (psi)	**7,390**	Elastic Modulus (psi)	3.87E+06
		Poisson's Ratio in Elastic Range	0.29
Comments	Elastic range was taken as between 0.0005 and 0.003 inches of axial strain. This range was chosen to avoid any non-linear behavior from the initial loading and the inflection point at the end of the elastic range.		

Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.876	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.25	Reviewed By	WJG
Boring	B-5	Unit Weight (pcf)	163.8	Core Size	NQ
Sample No.	NQ-2 / 24-3690	L/D Ratio	2.27	Recovery	90%
Depth	35.3' - 35.7'	Load Rate (psi/sec)	20	RQD	90%
Description	Black/White Gneiss				





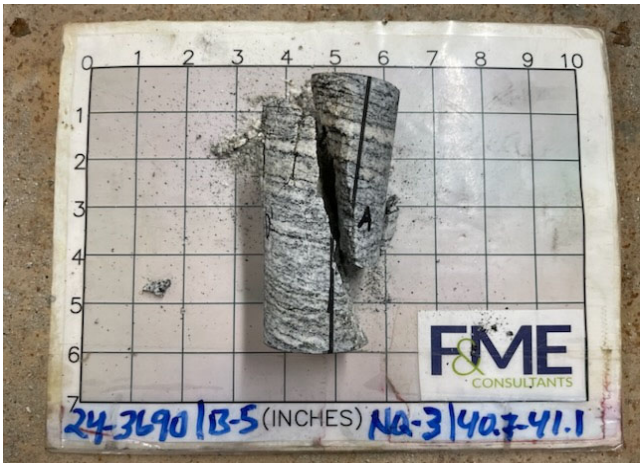
Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.875	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.317	Reviewed By	WJG
Boring	B-5	Unit Weight (pcf)	169.0	Core Size	NQ
Sample No.	NQ-3 / 24-3690	L/D Ratio	2.30	Recovery	92%
Depth	40.7' - 41.1'	Load Rate (psi/sec)	20	RQD	69%
Description	Black/White Gneiss				

Test Data

Percent of Failure Load	Strain (10^{-6}) Axial	Strain (10^{-6}) Radial	Load (lbs)	Compressive Stress (psi)	Secant Modulus x10^{6} (psi)	Poisson's Ratio
10%	-78	115	1,975	715	18.43	1.48
20%	-336	274	3,950	1,430	8.51	0.81
30%	-15	475	5,932	2,149	290.53	32.14
40%	-455	691	7,913	2,866	12.60	1.52
50%	-975	957	9,885	3,580	7.35	0.98
60%	-1568	1359	11,861	4,296	5.48	0.87
70%	-2231	1912	13,840	5,012	4.49	0.86
80%	-3267	3961	15,817	5,729	3.51	1.21
90%	-4075	5756	17,791	6,443	3.16	1.41
100%	-3834	24711	19,772	7,161		

Sample Photos

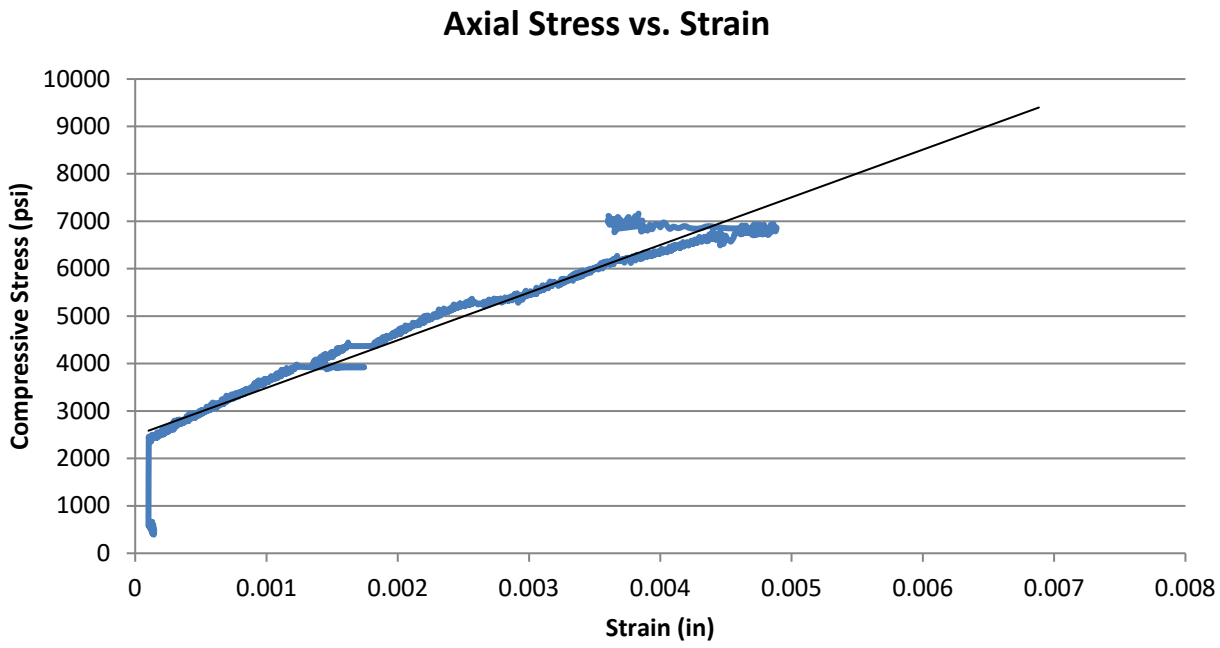


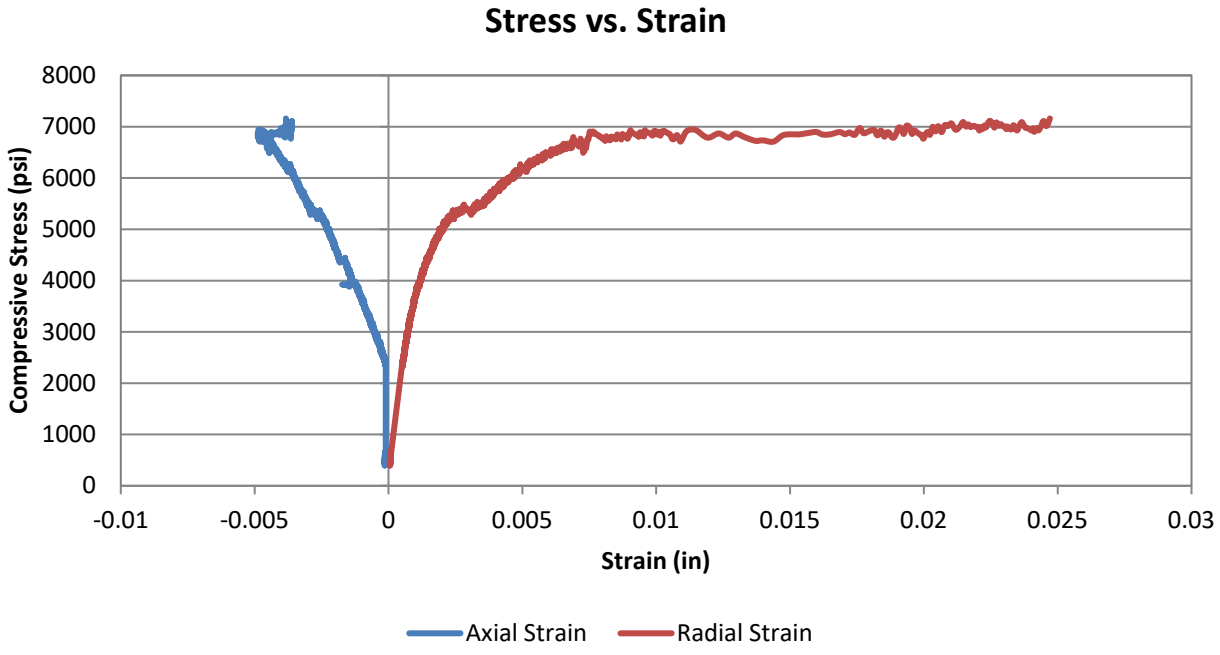
Test Results

Unconfined Compressive Strength (psi)	**7,160**	Elastic Modulus (psi)	N/A
		Poisson's Ratio in Elastic Range	N/A
Comments	Axial Strain Gauge did not engage during testing. The Linear Elastic Modulus region can not be deterimined. Elastic Modulus and Poisson's Ratio was not determined.		

Compressive Strength and Elastic Moduli of Intact Rock Core Specimens
ASTM D7012 - Method D / SC-T-39

Project	US 76 over Chauga River			Date	10/24/2024
Project No.	G7100.005	Sample Diameter (in.)	1.875	Tested By	WAP
SCDOT ID	P043969	Sample Length (in.)	4.317	Reviewed By	WJG
Boring	B-5	Unit Weight (pcf)	169.0	Core Size	NQ
Sample No.	NQ-3 / 24-3690	L/D Ratio	2.30	Recovery	92%
Depth	40.7' - 41.1'	Load Rate (psi/sec)	20	RQD	69%
Description	Black/White Gneiss				





APPENDIX

SECTION 6 LABORATORY TEST RESULTS

SECTION 6C BULK SOIL SAMPLES

SUMMARY OF LABORATORY RESULTS

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

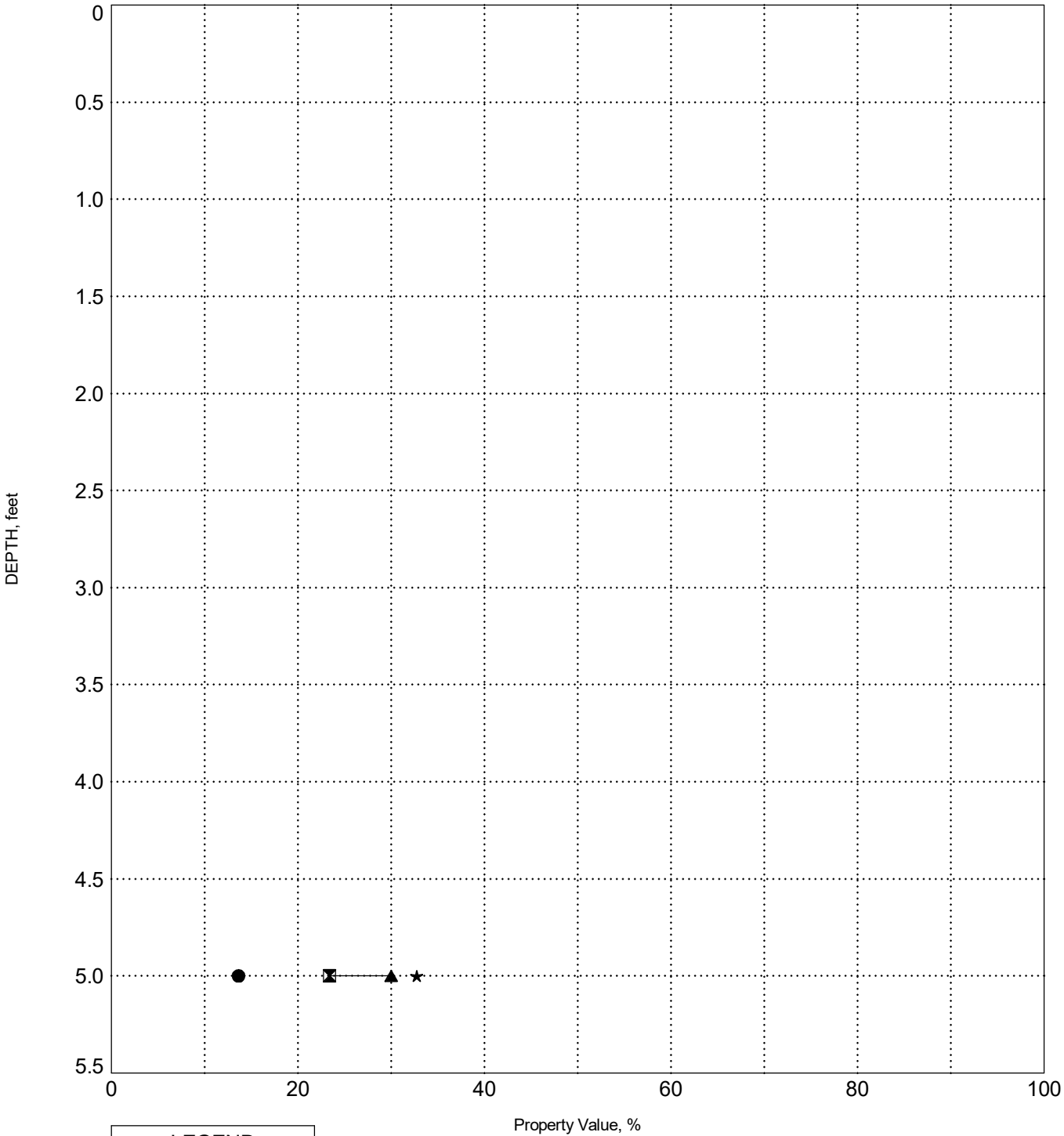
Boring No.	Sample Depth (ft.)	Liquid Limit	Plastic Limit	Plasticity Index	%<#200 Sieve	Soil Classification	Moisture Content (%)	Max Dry Density (PCF)	Optimum Moisture Content (%)	C (psi)	ϕ (Degrees)	C' (psi)	ϕ' (Degrees)
BS-1	0.0 – 5.0	30	23	7	33	SM	13.6	107.2	16.7	2.4	13.7	0.6	36.6
BS-2	0.0 – 5.0	34	32	2	31	SM	17.1	104.3	15.8	2.4	16.3	0.7	35.0
BS-3	0.0 – 2.0	NP	NP	NP	28	SM	12.7	112.1	15.0	N/A	N/A	N/A	N/A
BS-4	0.0 – 2.0	NP	NP	NP	27	SM	10.6	111.5	14.9	N/A	N/A	N/A	N/A

INDEX PROPERTIES VERSUS DEPTH

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

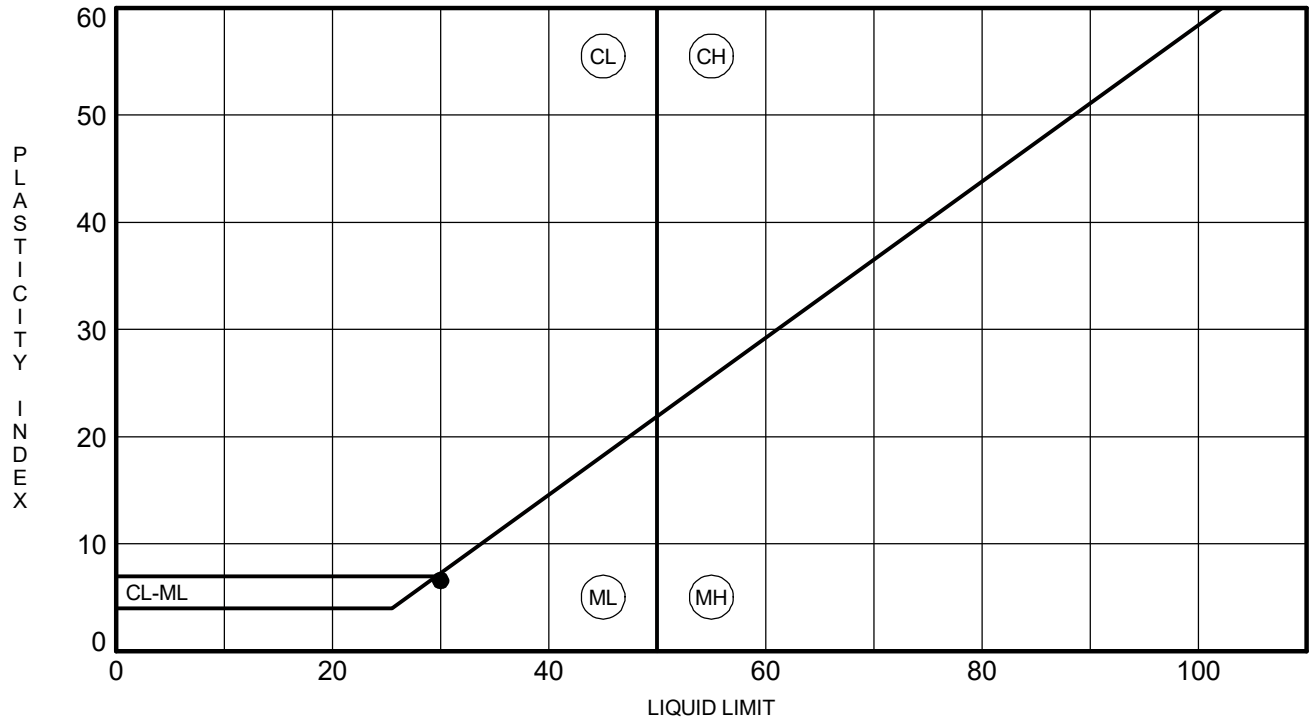
BORING BS-1



ATTERBERG LIMITS' RESULTS

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

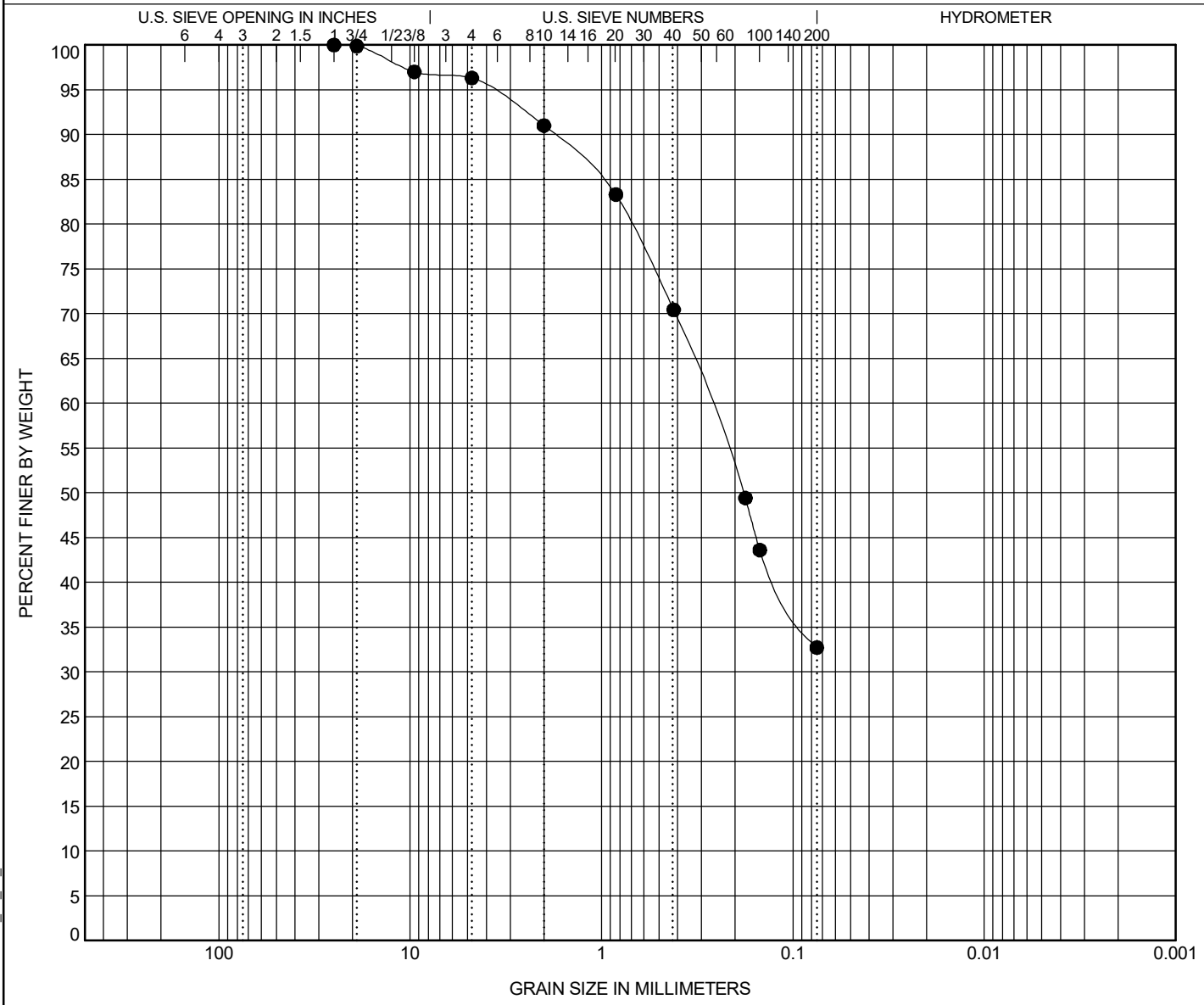


	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**BS-1**	**5.0**	**30**	**23**	**7**	**33**	**SILTY SAND (SM/A-2-4)**

GRAIN SIZE DISTRIBUTION

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**BS-1**	**5.0**	**SILTY SAND (SM/A-2-4)**	**30**	**23**	**7**		

	BOREHOLE	DEPTH	D90	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BS-1**	**5.0**	**1.785**	**0.273**			**3.7**	**63.6**	**32.7**	

REV 12/2023

F&ME CONSULTANTS, INC
211 Business Park Blvd.
Columbia, SC 29203

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US 76 over Chauga River	**PROJECT NO.:**	P043969
SAMPLE NUMBER:	24-3639	**DATE REQUESTED:**	10/16/2024
DESCRIPTION OF SOIL:	Silty SAND (SM/A-2-4)		
TESTED BY:	LiAnn Johnson	**DATE OF TESTING:**	10/16/2024
WEIGHED BY:	Ashleigh Burgess	**DATE OF WEIGHING:**	10/17/2024

BORING NO.	BS-1				
SAMPLE NO.	--				
SAMPLE DEPTH	0.0 - 5.0				
WATER CONTENT, W%	13.6				

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

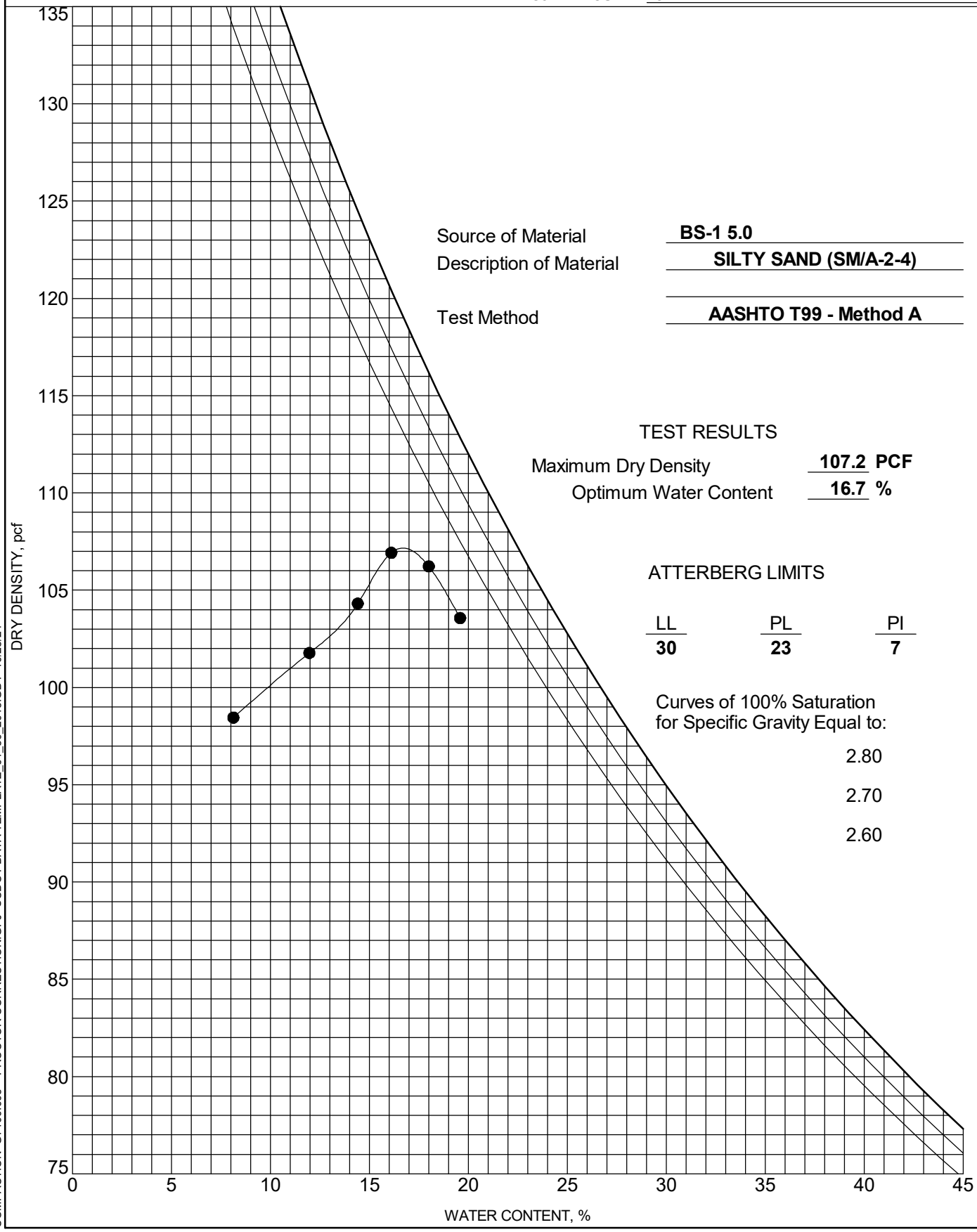
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

MOISTURE-DENSITY RELATIONSHIP

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee



Source of Material **BS-1 5.0**

Description of Material **SILTY SAND (SM/A-2-4)**

Test Method **AASHTO T99 - Method A**

TEST RESULTS

Maximum Dry Density **107.2** **PCF**

Optimum Water Content **16.7** **%**

ATTERBERG LIMITS

LL	PL	PI
30	**23**	**7**

Curves of 100% Saturation for Specific Gravity Equal to:

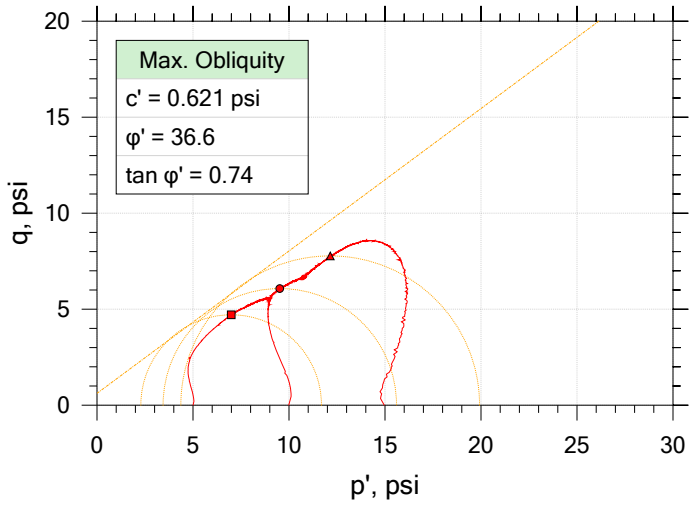
2.80

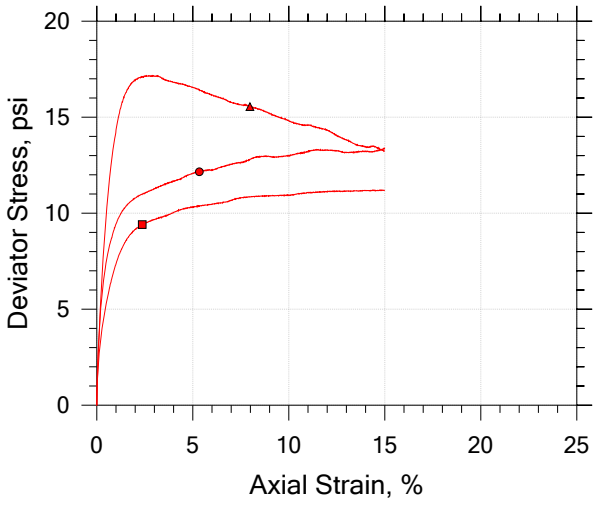
2.70

2.60

COMPACTION G7100.005 - PROCTOR CORRECTION.GPJ SCDOT DATA TEMPLATE_01_30_2015.GDT 10/28/24

Consolidated Undrained by AASHTO T297





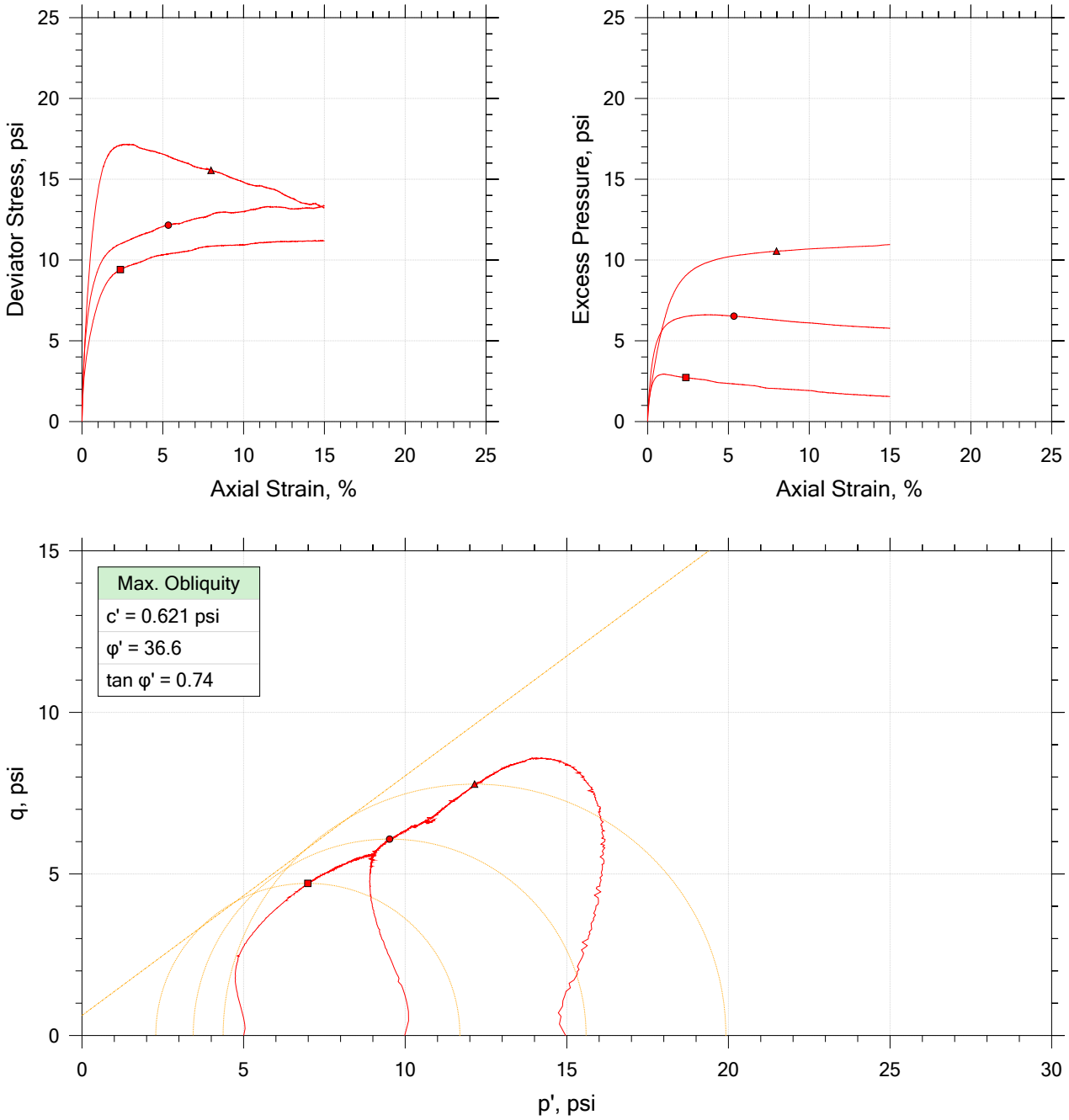
Symbol		■	●	▲	
Sample ID		24-3639	24-3639	24-3639	
Depth		0.0' - 5.0'	0.0' - 5.0'	0.0' - 5.0'	
Test Number		A	B	C	
Initial	Height, in	6.000	6.000	6.000	
	Diameter, in	2.800	2.800	2.800	
	Moisture Content (from Cuttings), %	16.5	16.5	16.5	
	Dry Density, pcf	102.	102.	102.	
	Saturation (Wet Method), %	68.9	68.8	68.9	
	Void Ratio	0.642	0.643	0.643	
Final	Moisture Content, %	23.1	22.3	22.8	
	Dry Density, pcf	103.	105.	104.	
	Cross-Sectional Area (Method A), in²	6.102	6.033	6.068	
	Saturation, %	100.0	100.0	100.0	
	Void Ratio	0.620	0.597	0.611	
	Back Pressure, psi	101.0	101.0	3.815	
Vertical Effective Consolidation Stress, psi		4.986	9.945	14.93	
Horizontal Effective Consolidation Stress, psi		5.005	9.990	14.97	
Vertical Strain after Consolidation, %		0.2343	0.5795	0.4986	
Volumetric Strain after Consolidation, %		0.7719	2.156	1.826	
Time to 50% Consolidation, min		0.2400	0.3500	0.4000	
Shear Strength, psi		4.706	6.079	7.777	
Strain at Failure, %		2.37	5.34	7.98	
Strain Rate, %/min		0.0001000	0.0005000	0.0005000	
Deviator Stress at Failure, psi		9.412	12.16	15.55	
Effective Minor Principal Stress at Failure, psi		2.281	3.440	4.368	
Effective Major Principal Stress at Failure, psi		11.69	15.60	19.92	
B-Value		0.90	0.92	0.59	

Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

F&ME CONSULTANTS

Project Name: US 76 RBO Chauga River	Location: Oconee County	Project Number: P043969
Boring Number: BS-1	Tester: RMC	Checker: WAP/ WJG
Sample Number: 24-3639	Test Date: 10/21/2024	Depth: 0.0' - 5.0'
Test Number: ABC	Preparation: Remolded	Elevation:
Description: SILTY SAND (SM/A-2-4) LL=30, PL=23, PI=7, %200=32.7		
Remarks: Max Dry Density=107.2 pcf, OMC=16.7%, Samples Molded at 95% of Max Dry Density		

Consolidated Undrained by AASHTO T297

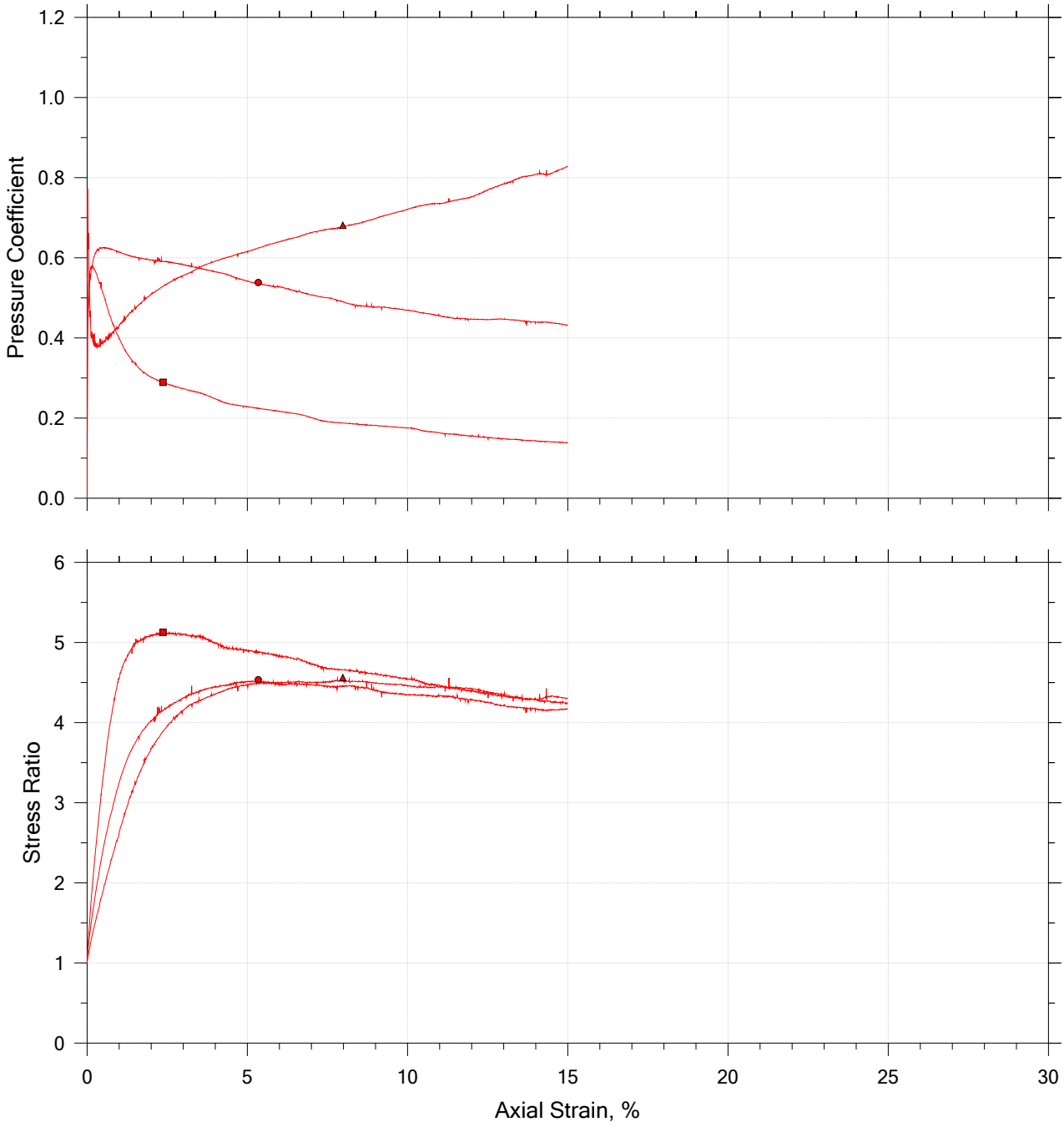


	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	24-3639	A	0.0' - 5.0'	RMC	10/21/2024	WAP/ WJG	10/28/2024	G7100.005_BS-1_testA.dat
●	24-3639	B	0.0' - 5.0'	RMC	10/21/2024	WAP/ WJG	10/28/2024	G7100.005_BS-1_TestB.dat
▲	24-3639	C	0.0' - 5.0'	RMC	10/21/2024	WAP/ WJG	10/28/2024	G7100.005_BS-1_Testc.dat

F&ME CONSULTANTS

Project Name: US 76 RBO Chauga River	Location: Oconee County	Project Number: P043969
Boring Number: BS-1	Tester: RMC	Checker: WAP/ WJG
Sample Number: 24-3639	Test Date: 10/21/2024	Depth: 0.0' - 5.0'
Test Number: ABC	Preparation: Remolded	Elevation:
Description: SILTY SAND (SM/A-2-4) LL=30, PL=23, PI=7, %200=32.7		
Remarks: Max Dry Density=107.2 pcf, OMC=16.7%, Samples Molded at 95% of Max Dry Density		

Consolidated Undrained by AASHTO T297

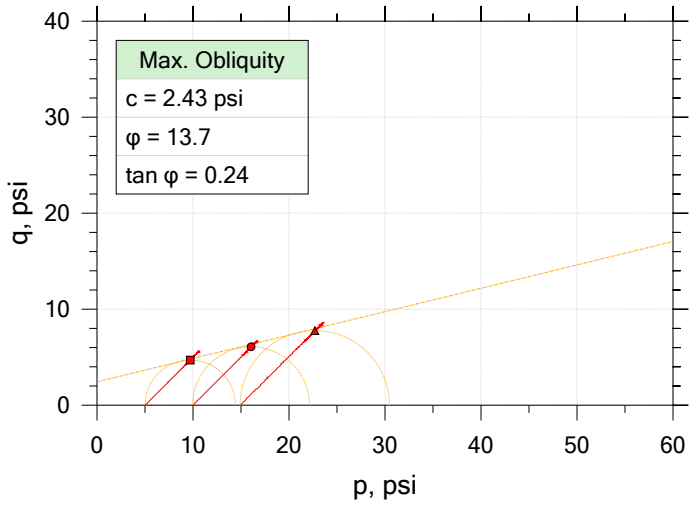


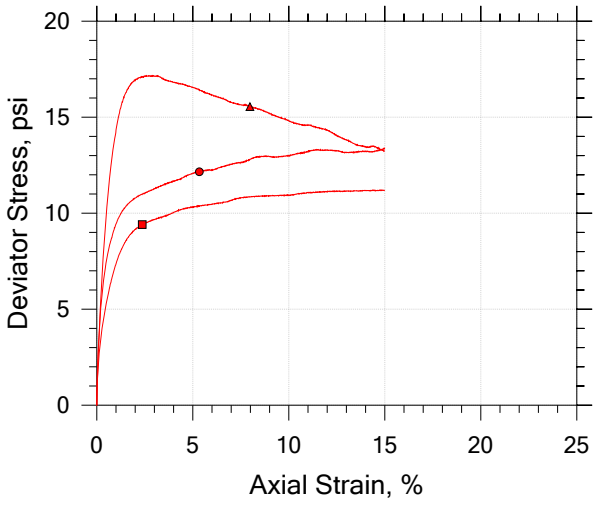
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	24-3639	A	0.0' - 5.0'	RMC	10/21/2024	WAP/ WJG	10/28/2024	G7100.005_BS-1_testA.dat
●	24-3639	B	0.0' - 5.0'	RMC	10/21/2024	WAP/ WJG	10/28/2024	G7100.005_BS-1_TestB.dat
▲	24-3639	C	0.0' - 5.0'	RMC	10/21/2024	WAP/ WJG	10/28/2024	G7100.005_BS-1_Testc.dat

F&ME CONSULTANTS

Project Name: US 76 RBO Chauga River	Location: Oconee County	Project Number: P043969
Boring Number: BS-1	Tester: RMC	Checker: WAP/ WJG
Sample Number: 24-3639	Test Date: 10/21/2024	Depth: 0.0' - 5.0'
Test Number: ABC	Preparation: Remolded	Elevation:
Description: SILTY SAND (SM/A-2-4) LL=30, PL=23, PI=7, %200=32.7		
Remarks: Max Dry Density=107.2 pcf, OMC=16.7%, Samples Molded at 95% of Max Dry Density		

Consolidated Undrained by AASHTO T297





Symbol		■	●	▲	
Sample ID		24-3639	24-3639	24-3639	
Depth		0.0' - 5.0'	0.0' - 5.0'	0.0' - 5.0'	
Test Number		A	B	C	
Initial	Height, in	6.000	6.000	6.000	
	Diameter, in	2.800	2.800	2.800	
	Moisture Content (from Cuttings), %	16.5	16.5	16.5	
	Dry Density, pcf	102.	102.	102.	
	Saturation (Wet Method), %	68.9	68.8	68.9	
	Void Ratio	0.642	0.643	0.643	
Final	Moisture Content, %	23.1	22.3	22.8	
	Dry Density, pcf	103.	105.	104.	
	Cross-Sectional Area (Method A), in²	6.102	6.033	6.068	
	Saturation, %	100.0	100.0	100.0	
	Void Ratio	0.620	0.597	0.611	
	Back Pressure, psi	101.0	101.0	3.815	
Vertical Effective Consolidation Stress, psi		4.986	9.945	14.93	
Horizontal Effective Consolidation Stress, psi		5.005	9.990	14.97	
Vertical Strain after Consolidation, %		0.2343	0.5795	0.4986	
Volumetric Strain after Consolidation, %		0.7719	2.156	1.826	
Time to 50% Consolidation, min		0.2400	0.3500	0.4000	
Shear Strength, psi		4.706	6.079	7.777	
Strain at Failure, %		2.37	5.34	7.98	
Strain Rate, %/min		0.0001000	0.0005000	0.0005000	
Deviator Stress at Failure, psi		9.412	12.16	15.55	
Effective Minor Principal Stress at Failure, psi		2.281	3.440	4.368	
Effective Major Principal Stress at Failure, psi		11.69	15.60	19.92	
B-Value		0.90	0.92	0.59	

Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

F&ME CONSULTANTS

Project Name: US 76 RBO Chauga River	Location: Oconee County	Project Number: P043969
Boring Number: BS-1	Tester: RMC	Checker: WAP/ WJG
Sample Number: 24-3639	Test Date: 10/21/2024	Depth: 0.0' - 5.0'
Test Number: ABC	Preparation: Remolded	Elevation:
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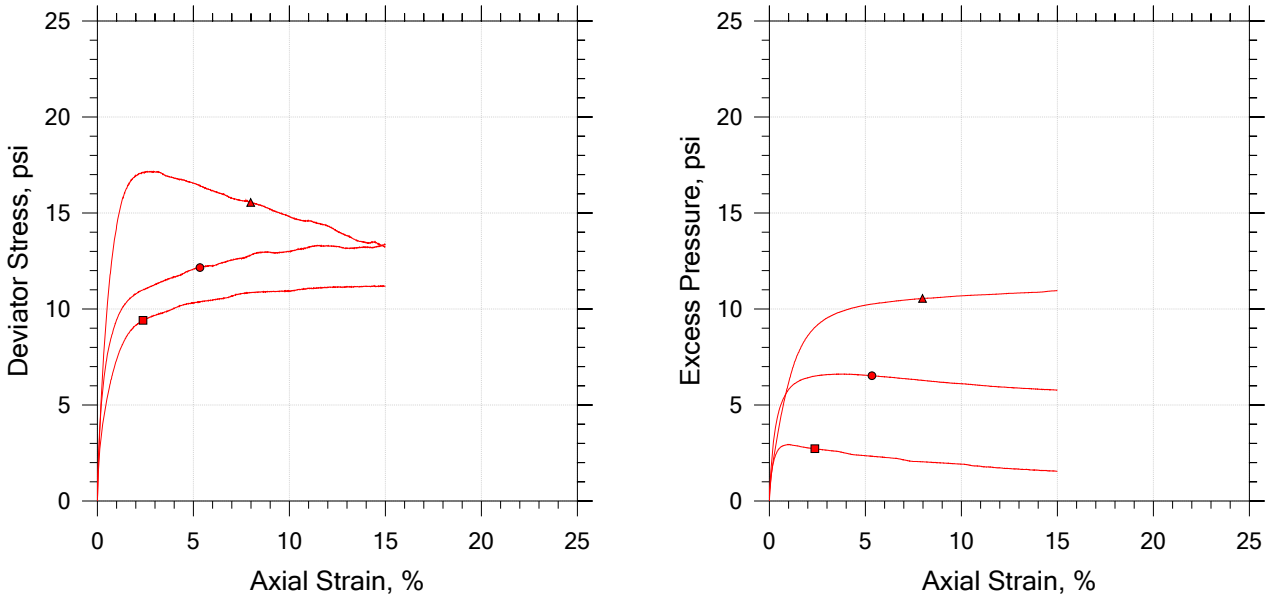

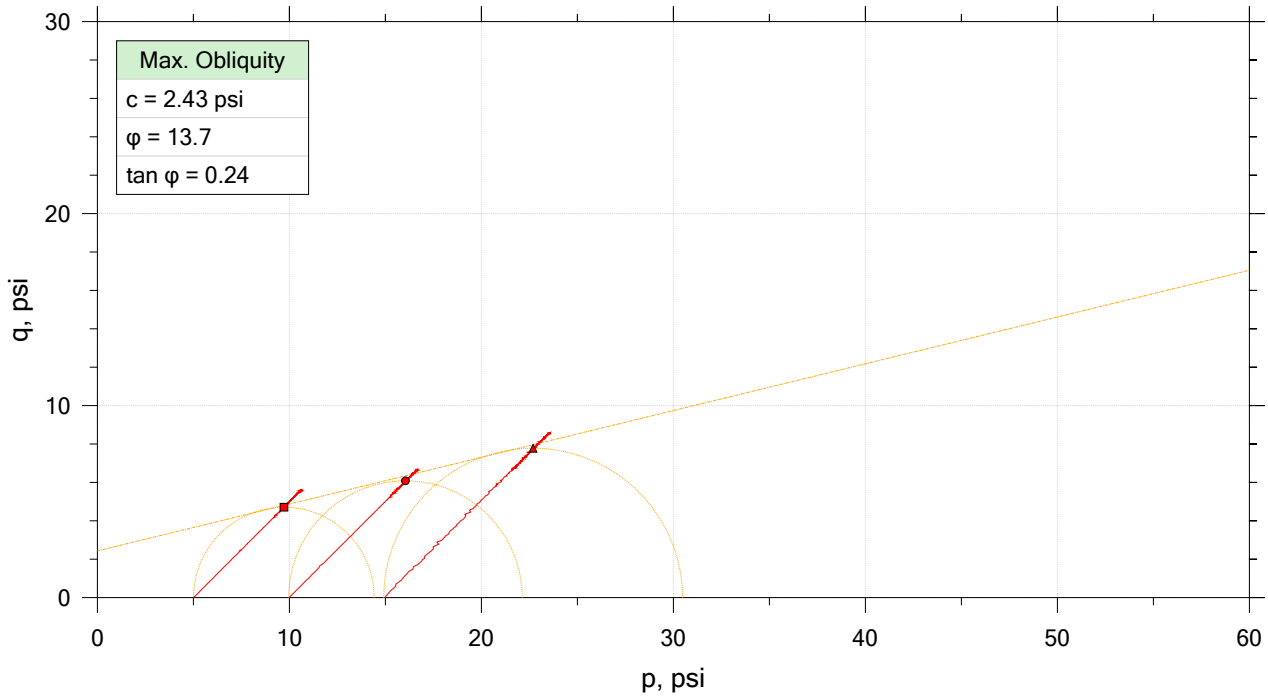

	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	24-3639	A	0.0' - 5.0'	RMC	10/21/2024	WAP/ WJG	10/28/2024	G7100.005_BS-1_testA.dat
●	24-3639	B	0.0' - 5.0'	RMC	10/21/2024	WAP/ WJG	10/28/2024	G7100.005_BS-1_TestB.dat
▲	24-3639	C	0.0' - 5.0'	RMC	10/21/2024	WAP/ WJG	10/28/2024	G7100.005_BS-1_Testc.dat

F&ME CONSULTANTS

Project Name: US 76 RBO Chauga River	Location: Oconee County	Project Number: P043969
Boring Number: BS-1	Tester: RMC	Checker: WAP/ WJG
Sample Number: 24-3639	Test Date: 10/21/2024	Depth: 0.0' - 5.0'
Test Number: ABC	Preparation: Remolded	Elevation:
Description: SILTY SAND (SM/A-2-4) LL=30, PL=23, PI=7, %200=32.7		
Remarks: Max Dry Density=107.2 pcf, OMC=16.7%, Samples Molded at 95% of Max Dry Density		

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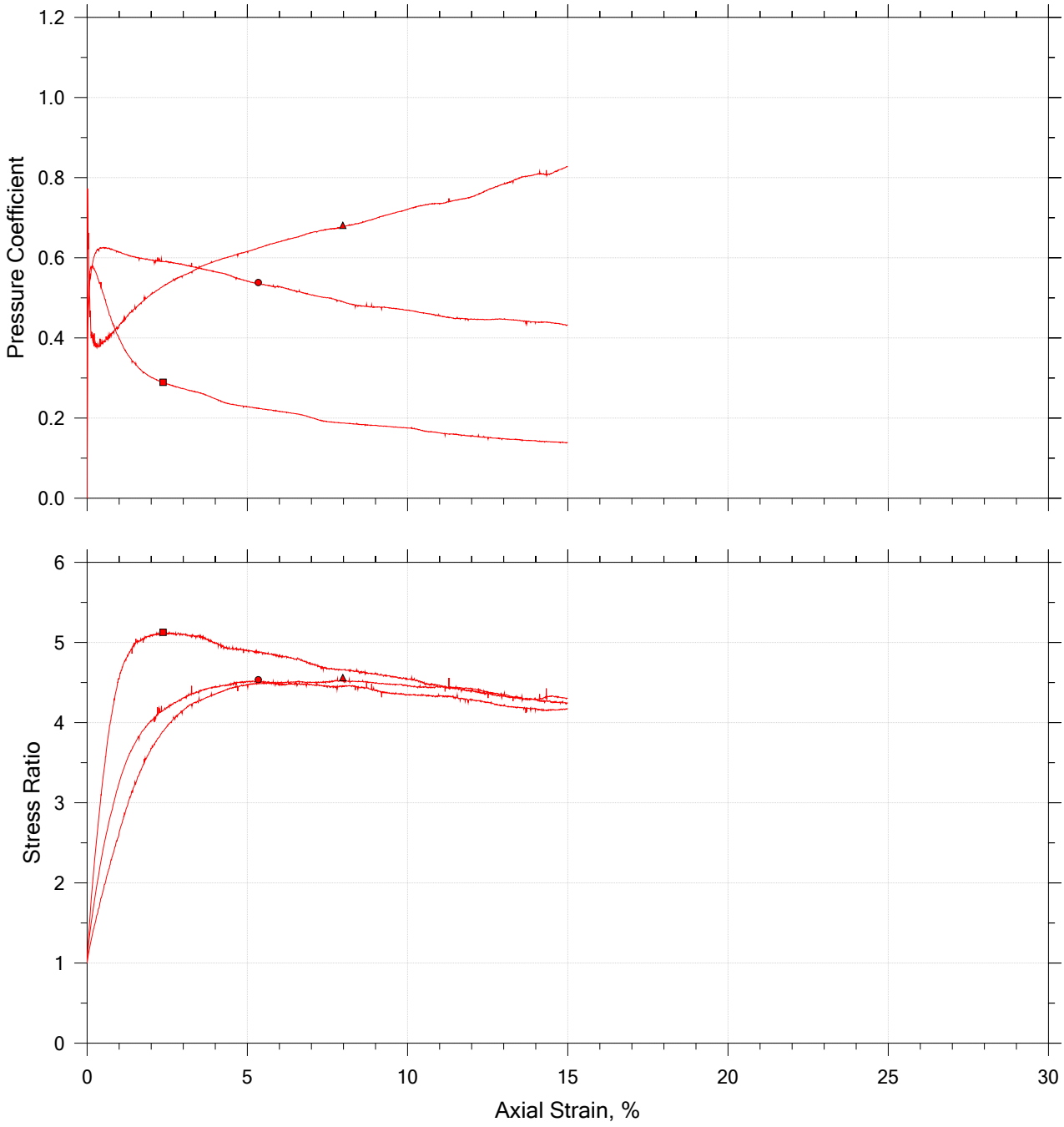


	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	24-3639	A	0.0' - 5.0'	RMC	10/21/2024	WAP/ WJG	10/28/2024	G7100.005_BS-1_testA.dat
●	24-3639	B	0.0' - 5.0'	RMC	10/21/2024	WAP/ WJG	10/28/2024	G7100.005_BS-1_TestB.dat
▲	24-3639	C	0.0' - 5.0'	RMC	10/21/2024	WAP/ WJG	10/28/2024	G7100.005_BS-1_Testc.dat

F&ME CONSULTANTS

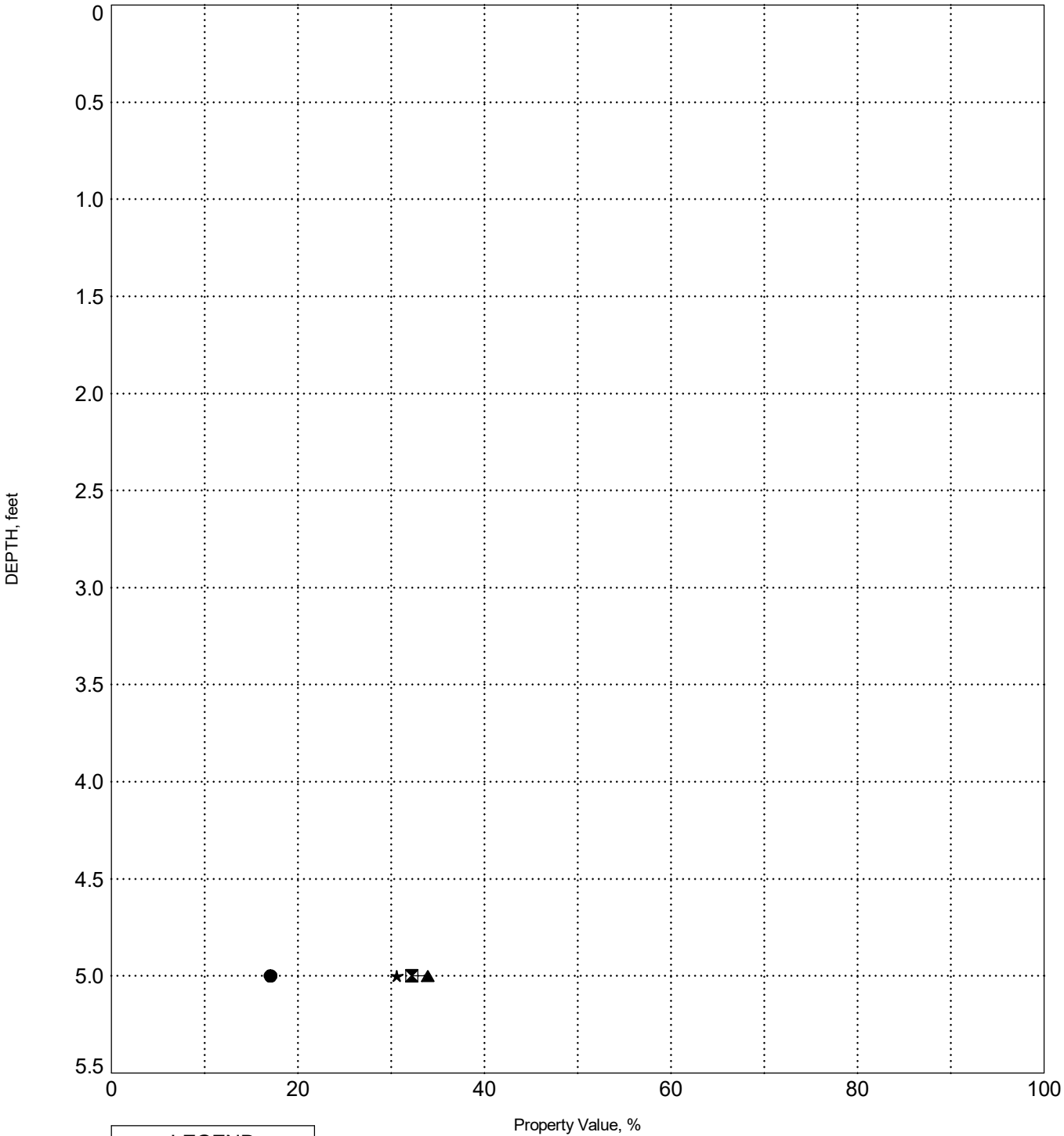
Project Name: US 76 RBO Chauga River	Location: Oconee County	Project Number: P043969
Boring Number: BS-1	Tester: RMC	Checker: WAP/ WJG
Sample Number: 24-3639	Test Date: 10/21/2024	Depth: 0.0' - 5.0'
Test Number: ABC	Preparation: Remolded	Elevation:
Description: SILTY SAND (SM/A-2-4) LL=30, PL=23, PI=7, %200=32.7		
Remarks: Max Dry Density=107.2 pcf, OMC=16.7%, Samples Molded at 95% of Max Dry Density		

INDEX PROPERTIES VERSUS DEPTH

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

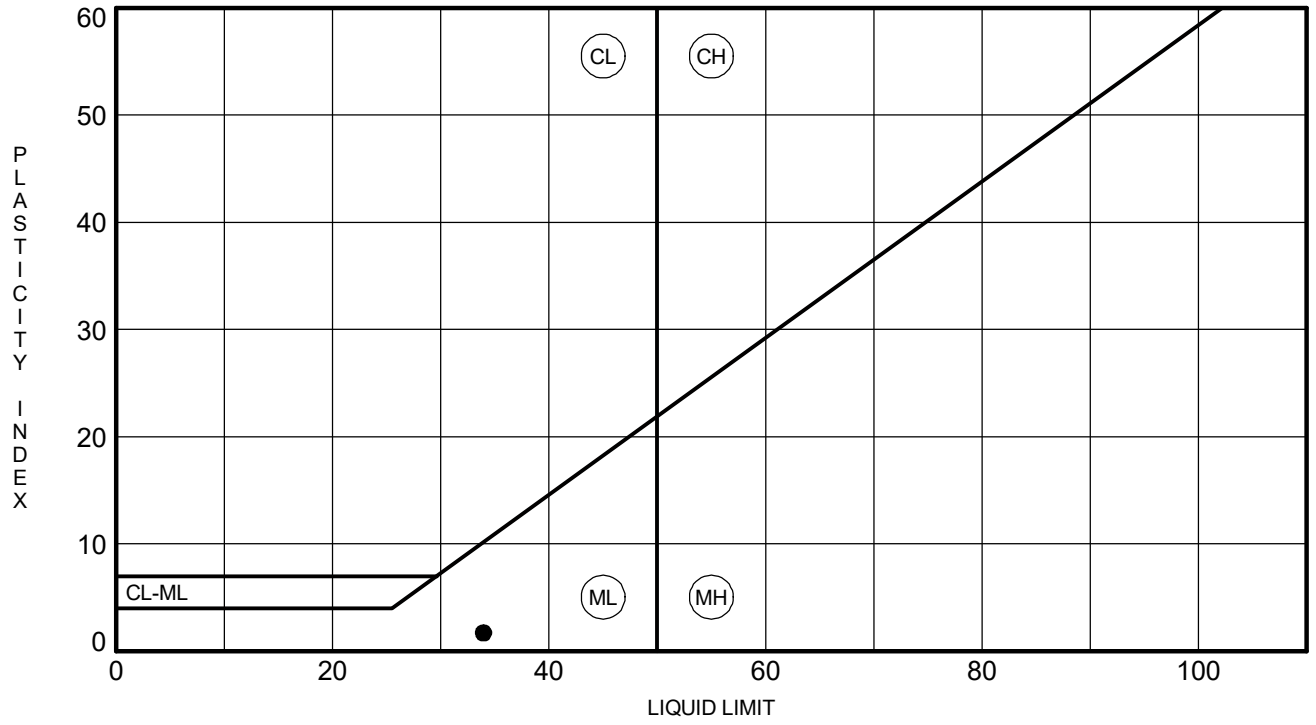
BORING BS-2



ATTERBERG LIMITS' RESULTS

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

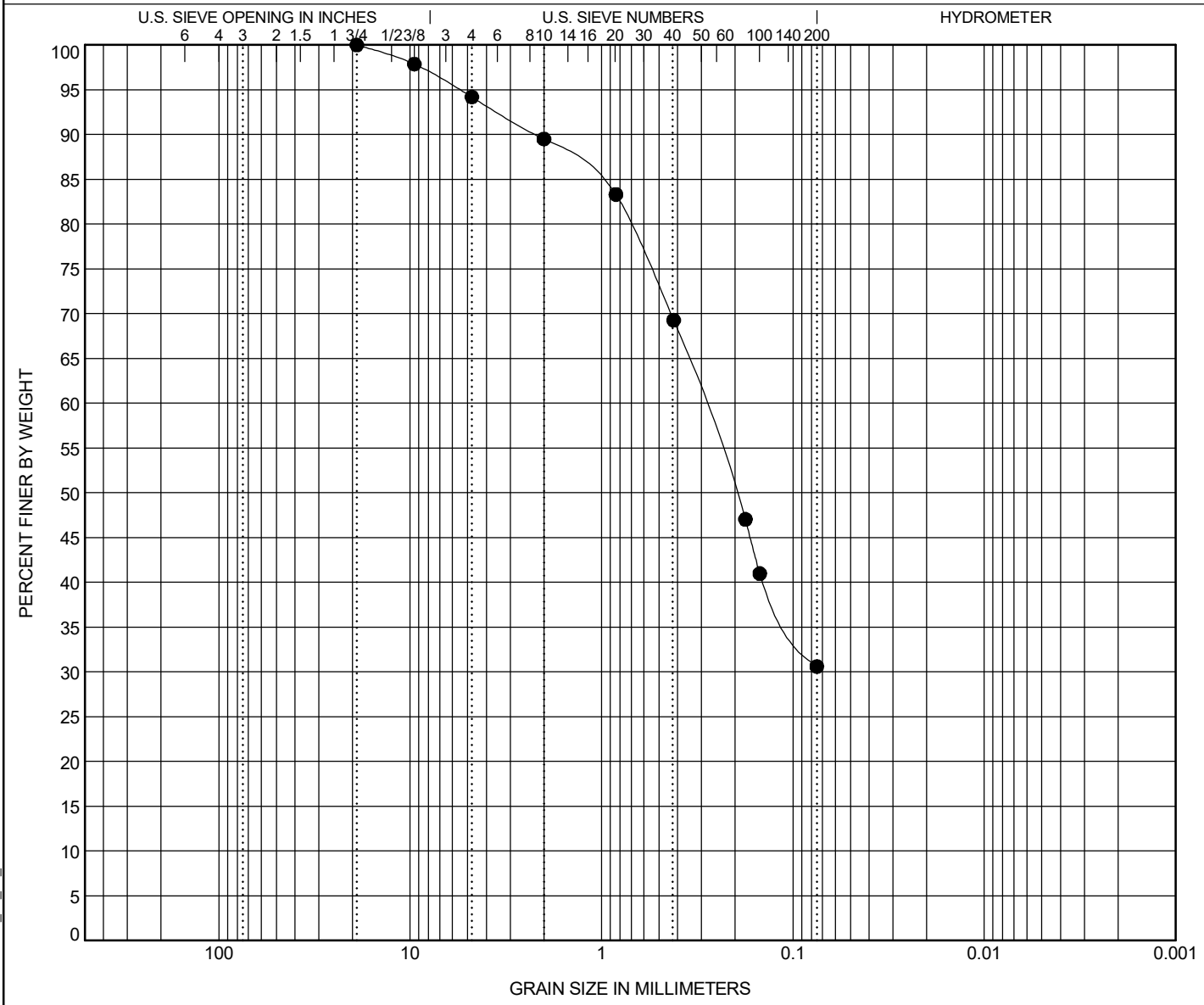


	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**BS-2**	**5.0**	**34**	**32**	**2**	**31**	**SILTY SAND (SM/A-2-4)**

GRAIN SIZE DISTRIBUTION

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**BS-2**	**5.0**	**SILTY SAND (SM/A-2-4)**	**34**	**32**	**2**		

	BOREHOLE	DEPTH	D90	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BS-2**	**5.0**	**2.19**	**0.293**			**5.8**	**63.6**	**30.6**	

REV 12/2023

F&ME CONSULTANTS, INC
211 Business Park Blvd.
Columbia, SC 29203

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US 76 over Chauga River	**PROJECT NO.:**	P043969
SAMPLE NUMBER:	24-3640	**DATE REQUESTED:**	10/16/2024
DESCRIPTION OF SOIL:	Silty SAND (SM/A-2-4)		
TESTED BY:	Alex Abernethy	**DATE OF TESTING:**	10/16/2024
WEIGHED BY:	Ashleigh Burgess	**DATE OF WEIGHING:**	10/17/2024

BORING NO.	BS-2				
SAMPLE NO.	--				
SAMPLE DEPTH	0.0 - 5.0				
WATER CONTENT, W%	17.1				

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

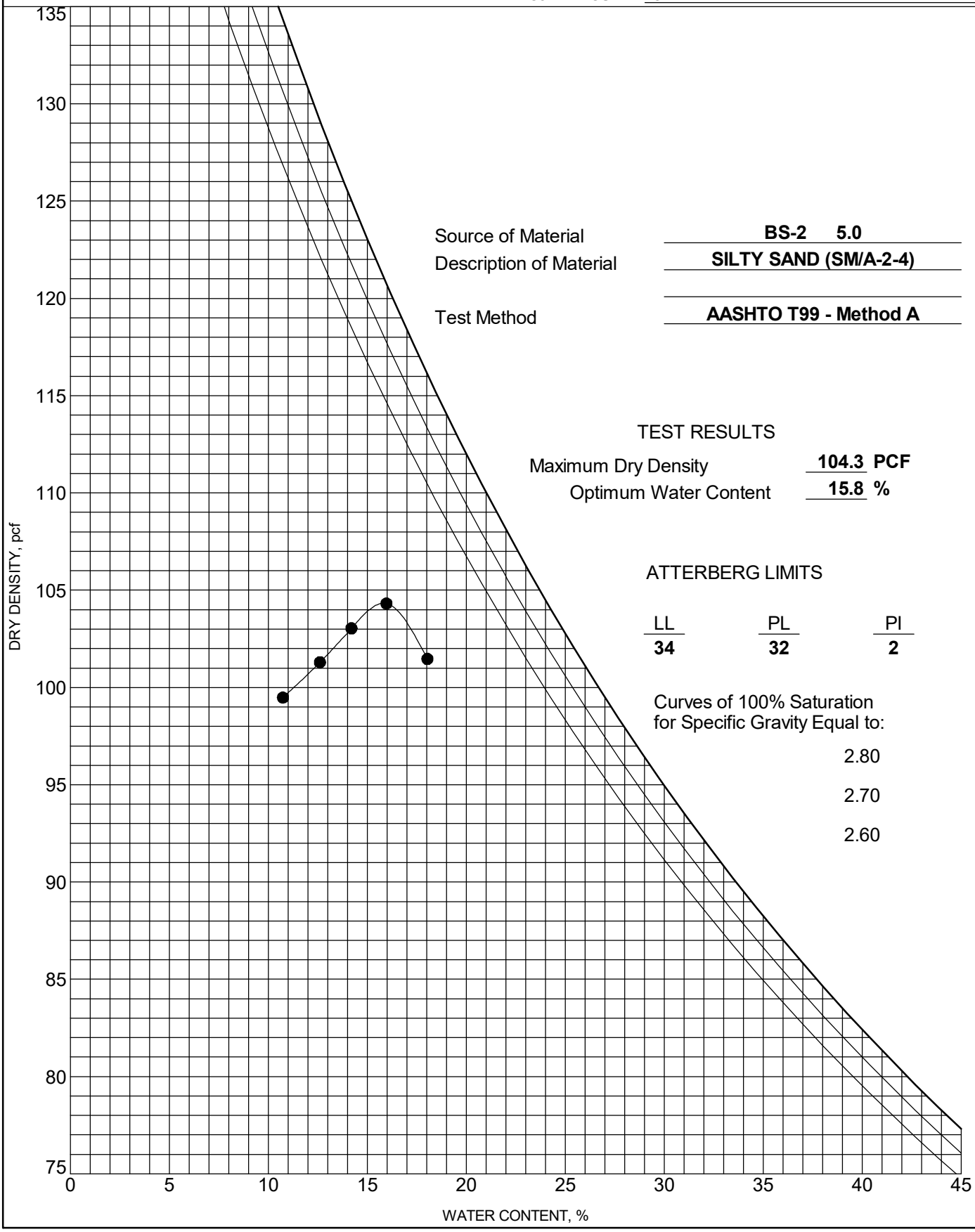
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

MOISTURE-DENSITY RELATIONSHIP

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee



Source of Material **BS-2 5.0**

Description of Material **SILTY SAND (SM/A-2-4)**

Test Method **AASHTO T99 - Method A**

TEST RESULTS

Maximum Dry Density **104.3** **PCF**

Optimum Water Content **15.8** **%**

ATTERBERG LIMITS

LL	PL	PI
34	**32**	**2**

Curves of 100% Saturation for Specific Gravity Equal to:

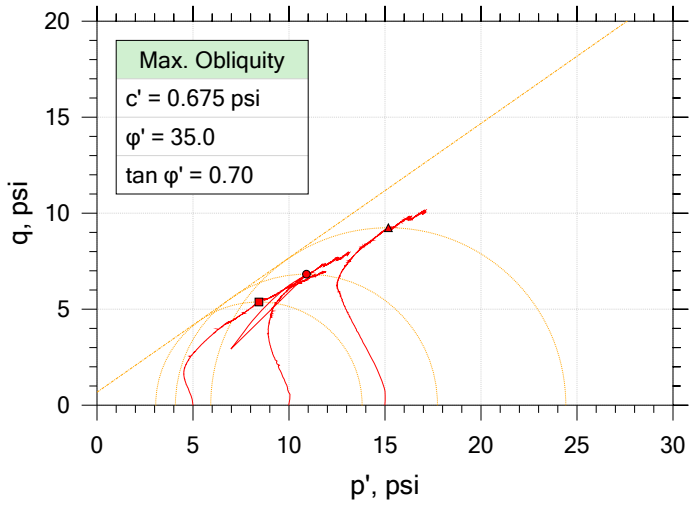
2.80

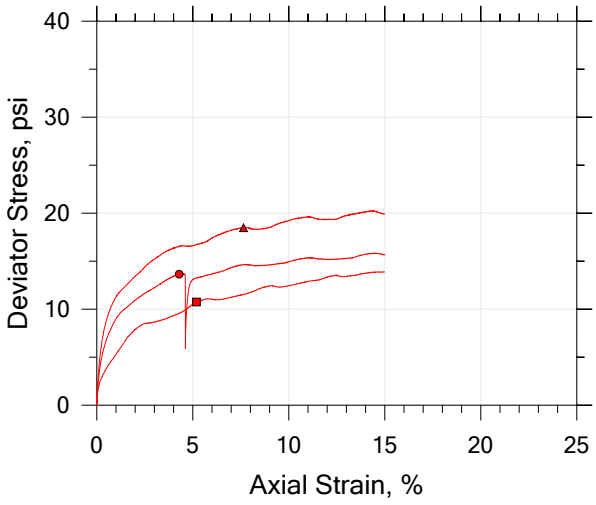
2.70

2.60

COMPACTION - SCDOT G7100.005 - US 76 OVER CHAUGA RIVER.GPJ FME2017.GDT 10/29/24

Consolidated Undrained by AASHTO T297





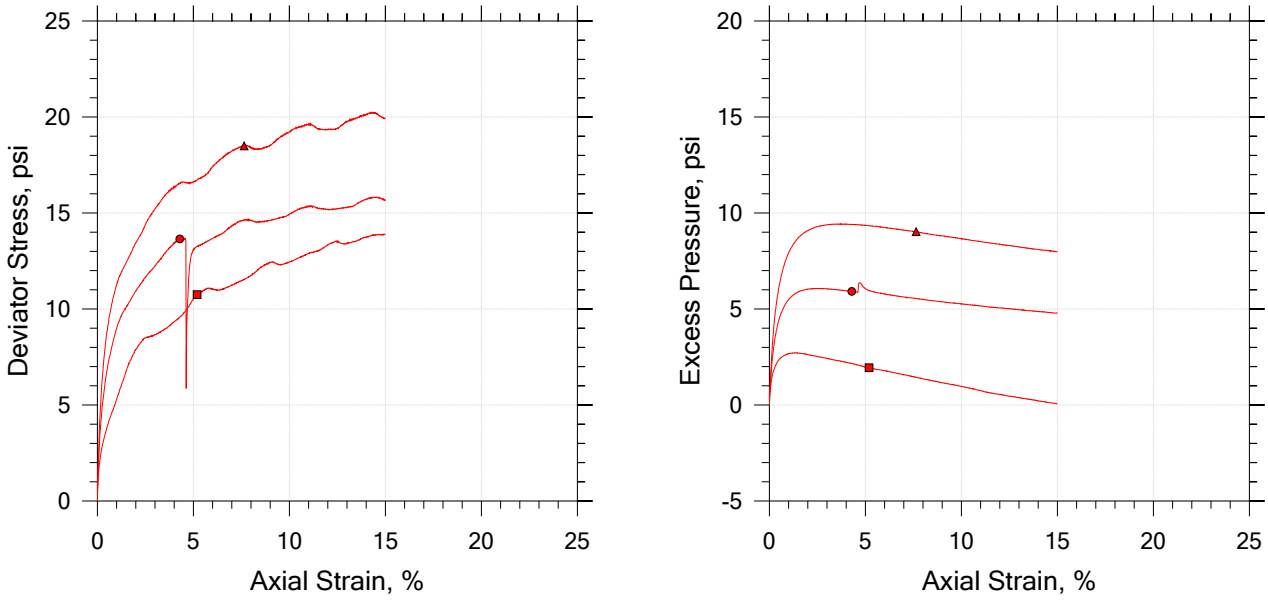
Symbol		■	●	▲	
Sample ID		24-3640	24-3640	24-3640	
Depth		0.0' - 5.0'	0.0' - 5.0'	0.0' - 5.0'	
Test Number		A	B	C	
Initial	Height, in	6.000	6.000	6.000	
	Diameter, in	2.800	2.800	2.800	
	Moisture Content (from Cuttings), %	15.8	15.8	15.8	
	Dry Density, pcf	98.6	98.6	97.3	
	Saturation (Wet Method), %	62.5	62.5	66.3	
	Void Ratio	0.697	0.696	0.720	
Final	Moisture Content, %	24.4	23.7	23.8	
	Dry Density, pcf	101.	102.	102.	
	Cross-Sectional Area (Method A), in²	6.044	5.993	5.934	
	Saturation, %	100.0	100.0	100.0	
	Void Ratio	0.653	0.634	0.638	
	Back Pressure, psi	101.0	101.0	100.8	
Vertical Effective Consolidation Stress, psi		4.976	9.940	14.93	
Horizontal Effective Consolidation Stress, psi		5.006	9.990	15.00	
Vertical Strain after Consolidation, %		0.3142	0.6520	0.8845	
Volumetric Strain after Consolidation, %		1.335	2.640	4.032	
Time to 50% Consolidation, min		0.5000	0.3800	0.3800	
Shear Strength, psi		5.375	6.828	9.247	
Strain at Failure, %		5.19	4.29	7.64	
Strain Rate, %/min		0.0001000	0.0005000	0.0005000	
Deviator Stress at Failure, psi		10.75	13.66	18.49	
Effective Minor Principal Stress at Failure, psi		3.054	4.078	5.924	
Effective Major Principal Stress at Failure, psi		13.80	17.73	24.42	
B-Value		0.93	0.91	0.93	

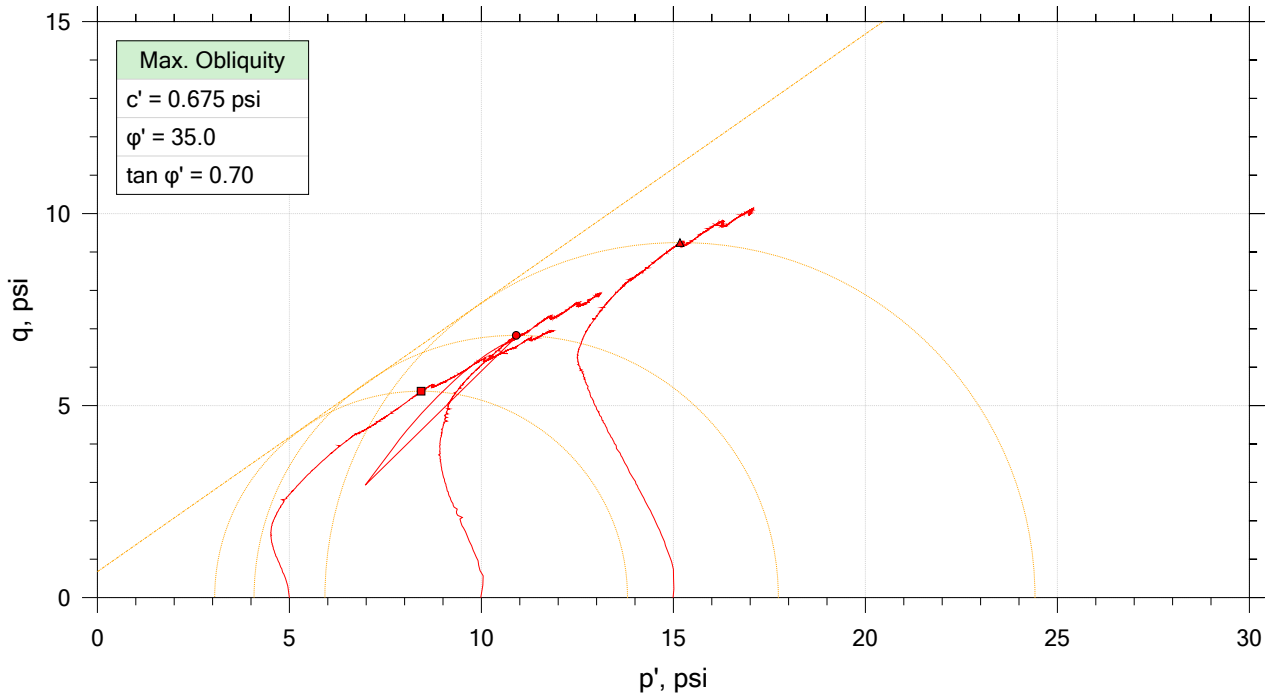
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

F&ME CONSULTANTS

Project Name: US 76 over Chauga River	Location: Oconee County	Project Number: G7100.005
Boring Number: BS-2	Tester: RMC	Checker: WAP/ WJG
Sample Number: 24-3640	Test Date: 10/23/2024	Depth: 0.0' - 5.0'
Test Number: A	Preparation: Remolded	Elevation:
Description: SILTY SAND (SM/A-2-4) LL=34, PL=32, PI=2, %200=30.6		
Remarks: Max Dry Density=104.3 pcf, OMC=15.8%, Samples Molded at 95% of Max Dry Density		

Consolidated Undrained by AASHTO T297





	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	24-3640	A	0.0' - 5.0'	RMC	10/23/2024	WAP/ WJG	10/28/2024	G7100.005_BS-2_TestA.dat
●	24-3640	B	0.0' - 5.0'	RMC	10/22/2024	WAP/ WJG	10/28/2024	G7100.005_BS-2_TestB.dat
▲	24-3640	C	0.0' - 5.0'	RMC	10/22/2024	WAP/ WJG	10/28/2024	G7100.005_BS-2_Testc.dat

F&ME CONSULTANTS	Project Name: US 76 over Chauga River	Location: Oconee County	Project Number: G7100.005
	Boring Number: BS-2	Tester: RMC	Checker: WAP/ WJG
	Sample Number: 24-3640	Test Date: 10/23/2024	Depth: 0.0' - 5.0'
	Test Number: A	Preparation: Remolded	Elevation:
	Description: SILTY SAND (SM/A-2-4) LL=34, PL=32, PI=2, %200=30.6		
	Remarks: Max Dry Density=104.3 pcf, OMC=15.8%, Samples Molded at 95% of Max Dry Density		

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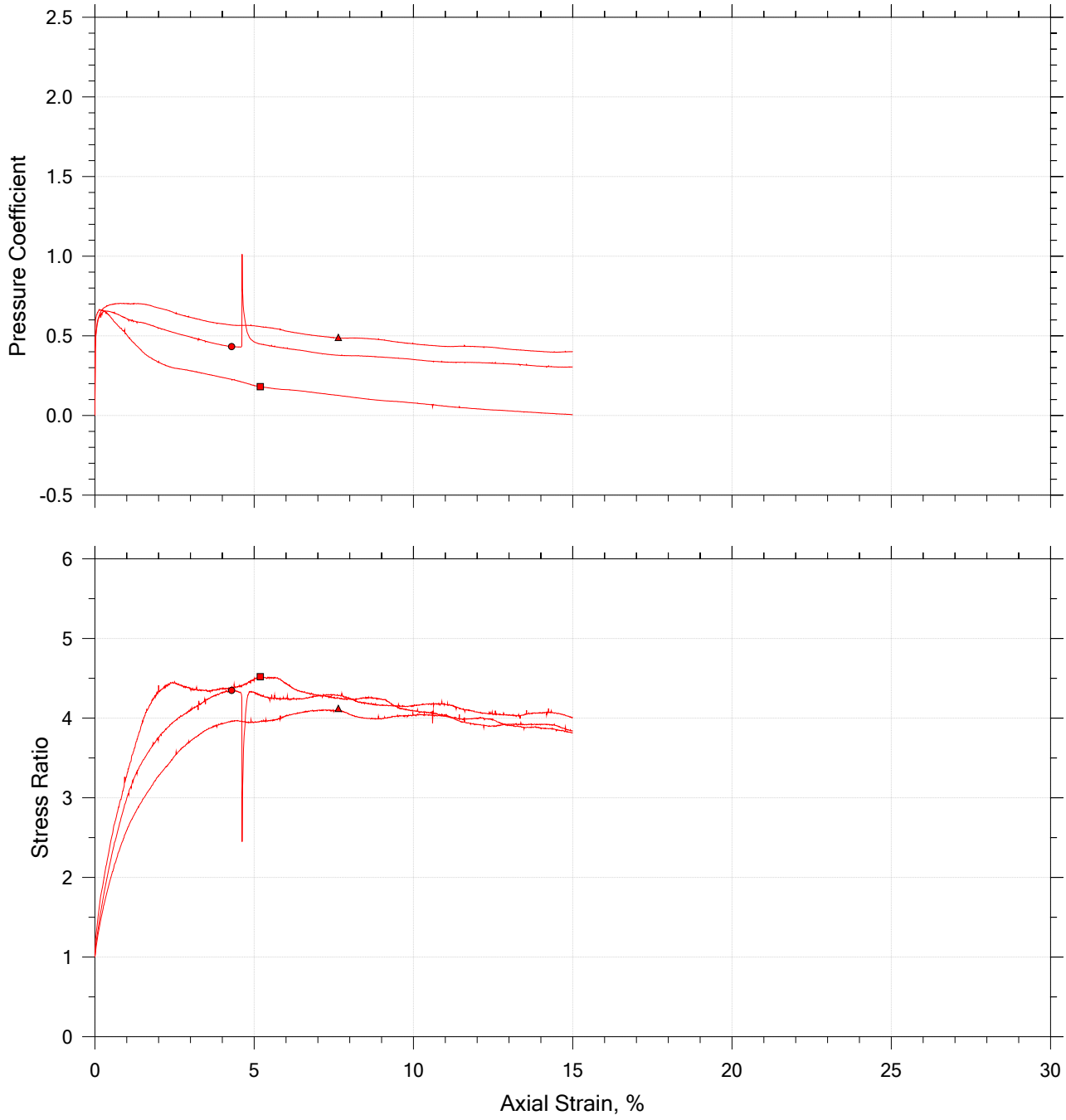

	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	24-3640	A	0.0' - 5.0'	RMC	10/23/2024	WAP/ WJG	10/28/2024	G7100.005_BS-2_TestA.dat
●	24-3640	B	0.0' - 5.0'	RMC	10/22/2024	WAP/ WJG	10/28/2024	G7100.005_BS-2_TestB.dat
▲	24-3640	C	0.0' - 5.0'	RMC	10/22/2024	WAP/ WJG	10/28/2024	G7100.005_BS-2_Testc.dat

F&ME CONSULTANTS

Project Name: US 76 over Chauga River	Location: Oconee County	Project Number: G7100.005
Boring Number: BS-2	Tester: RMC	Checker: WAP/ WJG
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Test Number: A	Preparation: Remolded	Elevation:
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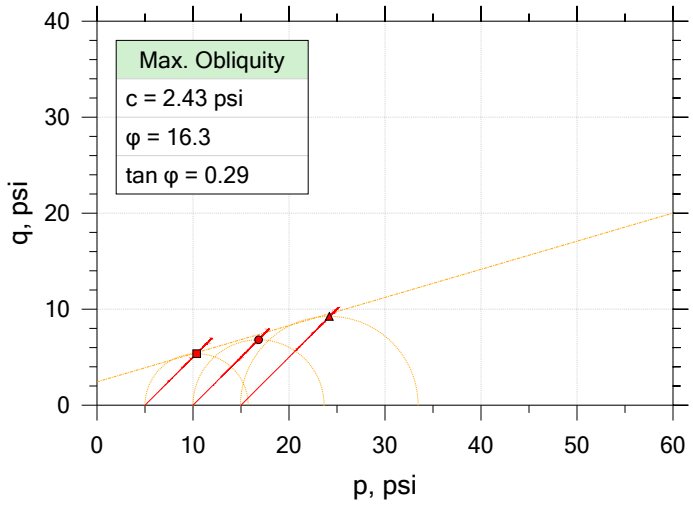

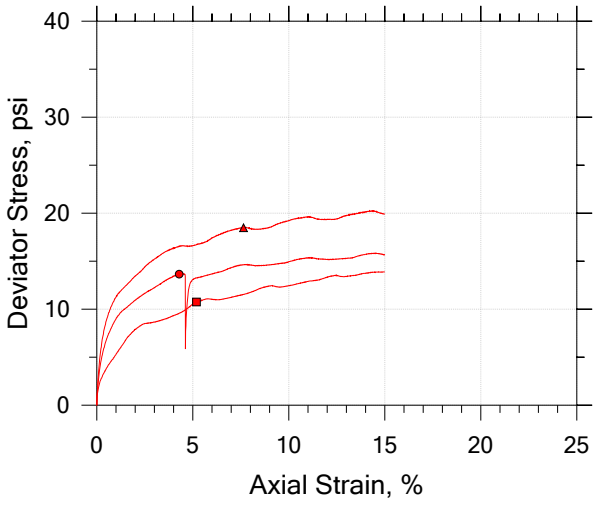

Symbol		■	●	▲	
Sample ID		24-3640	24-3640	24-3640	
Depth		0.0' - 5.0'	0.0' - 5.0'	0.0' - 5.0'	
Test Number		A	B	C	
Initial	Height, in	6.000	6.000	6.000	
	Diameter, in	2.800	2.800	2.800	
	Moisture Content (from Cuttings), %	15.8	15.8	15.8	
	Dry Density, pcf	98.6	98.6	97.3	
	Saturation (Wet Method), %	62.5	62.5	66.3	
	Void Ratio	0.697	0.696	0.720	
Final	Moisture Content, %	24.4	23.7	23.8	
	Dry Density, pcf	101.	102.	102.	
	Cross-Sectional Area (Method A), in²	6.044	5.993	5.934	
	Saturation, %	100.0	100.0	100.0	
	Void Ratio	0.653	0.634	0.638	
	Back Pressure, psi	101.0	101.0	100.8	
Vertical Effective Consolidation Stress, psi		4.976	9.940	14.93	
Horizontal Effective Consolidation Stress, psi		5.006	9.990	15.00	
Vertical Strain after Consolidation, %		0.3142	0.6520	0.8845	
Volumetric Strain after Consolidation, %		1.335	2.640	4.032	
Time to 50% Consolidation, min		0.5000	0.3800	0.3800	
Shear Strength, psi		5.375	6.828	9.247	
Strain at Failure, %		5.19	4.29	7.64	
Strain Rate, %/min		0.0001000	0.0005000	0.0005000	
Deviator Stress at Failure, psi		10.75	13.66	18.49	
Effective Minor Principal Stress at Failure, psi		3.054	4.078	5.924	
Effective Major Principal Stress at Failure, psi		13.80	17.73	24.42	
B-Value		0.93	0.91	0.93	

Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
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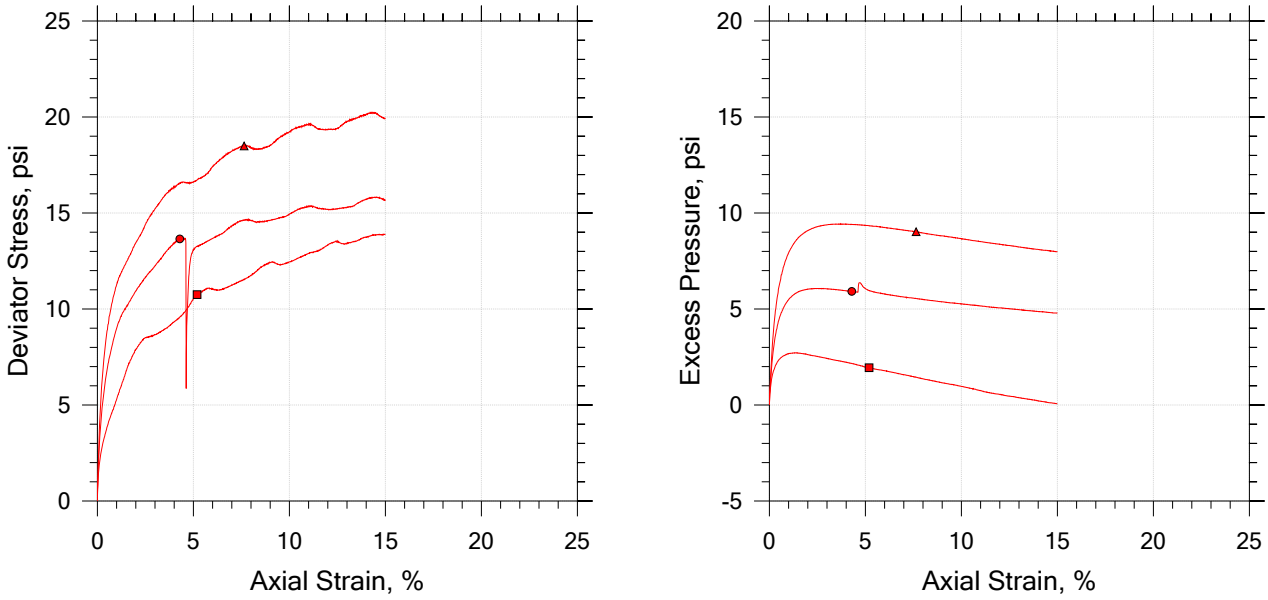
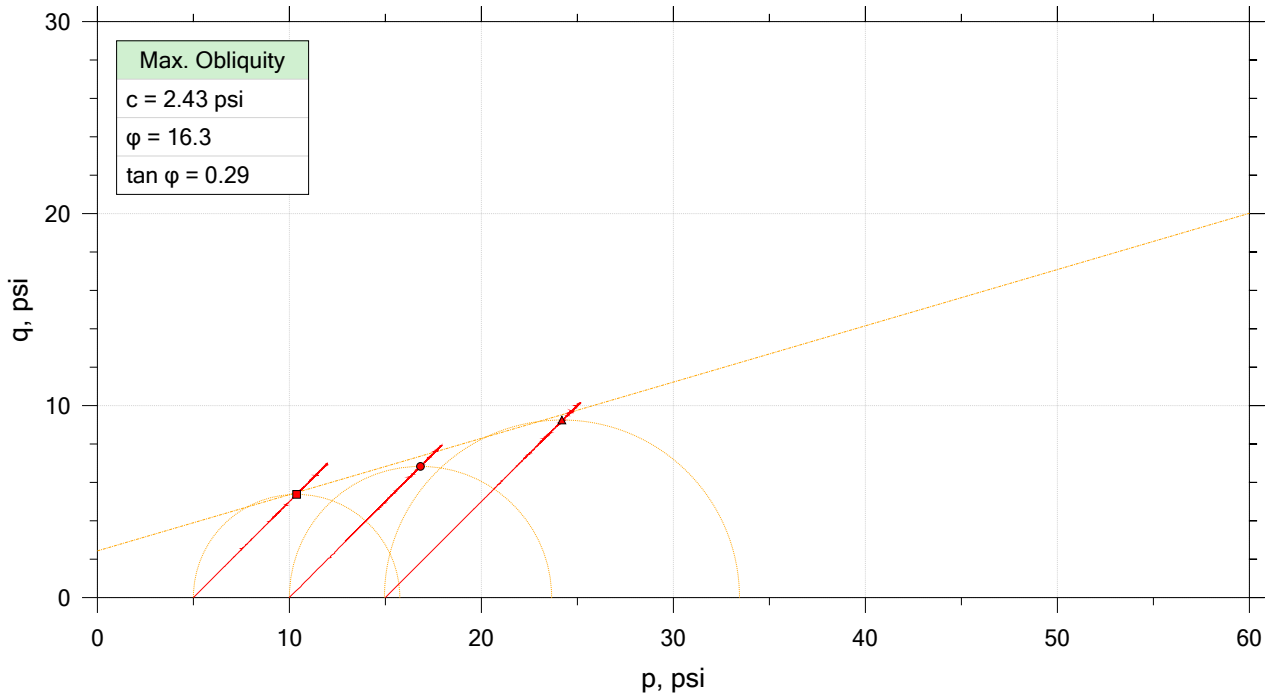
Consolidated Undrained by AASHTO T297



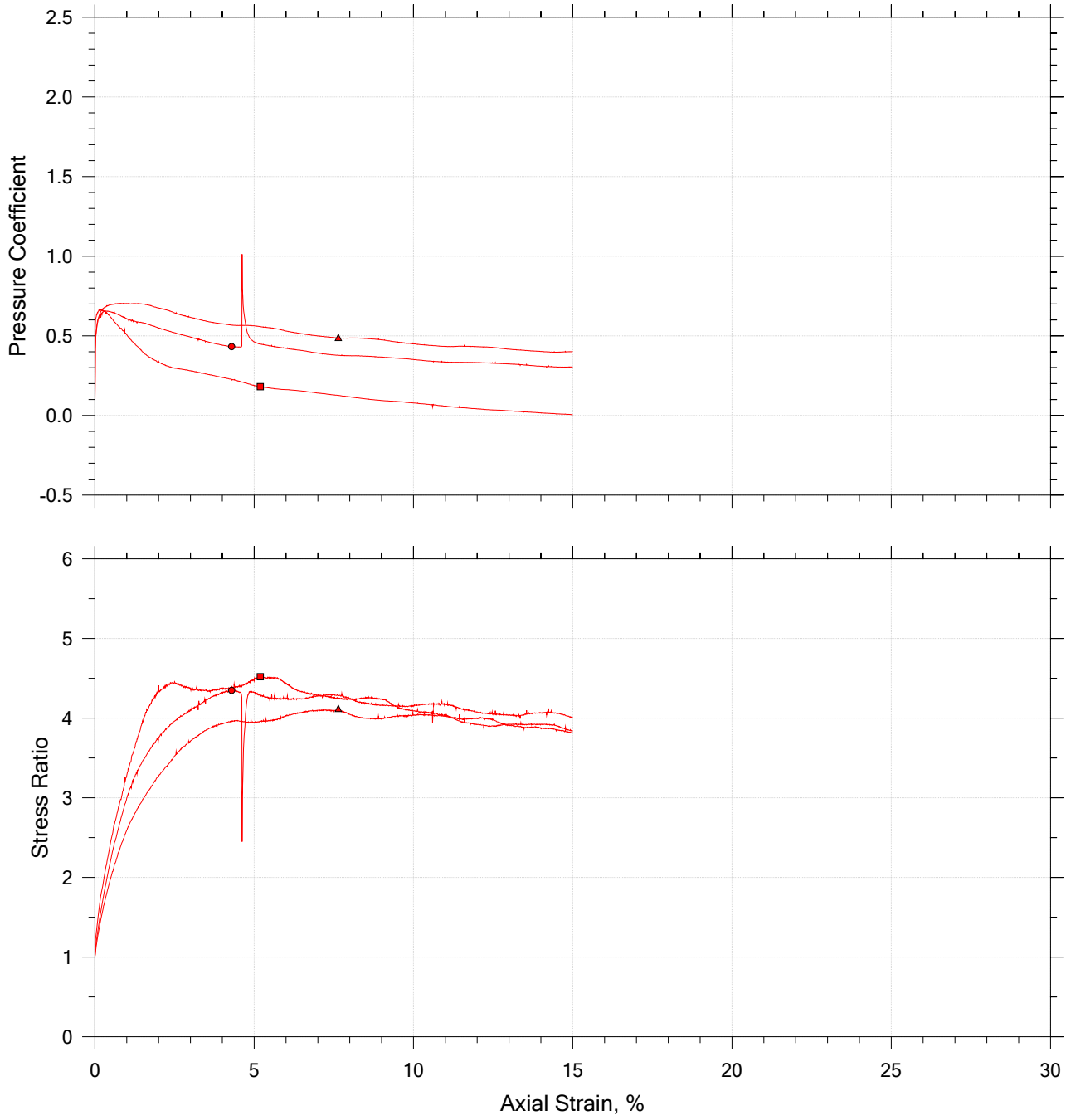


	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	24-3640	A	0.0' - 5.0'	RMC	10/23/2024	WAP/ WJG	10/28/2024	G7100.005_BS-2_TestA.dat
●	24-3640	B	0.0' - 5.0'	RMC	10/22/2024	WAP/ WJG	10/28/2024	G7100.005_BS-2_TestB.dat
▲	24-3640	C	0.0' - 5.0'	RMC	10/22/2024	WAP/ WJG	10/28/2024	G7100.005_BS-2_Testc.dat

F&ME CONSULTANTS

Project Name: US 76 over Chauga River	Location: Oconee County	Project Number: G7100.005
Boring Number: BS-2	Tester: RMC	Checker: WAP/ WJG
Sample Number: 24-3640	Test Date: 10/23/2024	Depth: 0.0' - 5.0'
Test Number: ABC	Preparation: Remolded	Elevation:
Description: SILTY SAND (SM/A-2-4) LL=34, PL=32, PI=2, %200=30.6		
Remarks: Max Dry Density=104.3 pcf, OMC=15.8%, Samples Molded at 95% of Max Dry Density		

Consolidated Undrained by AASHTO T297



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	24-3640	A	0.0' - 5.0'	RMC	10/23/2024	WAP/ WJG	10/28/2024	G7100.005_BS-2_TestA.dat
●	24-3640	B	0.0' - 5.0'	RMC	10/22/2024	WAP/ WJG	10/28/2024	G7100.005_BS-2_TestB.dat
▲	24-3640	C	0.0' - 5.0'	RMC	10/22/2024	WAP/ WJG	10/28/2024	G7100.005_BS-2_Testc.dat

F&ME CONSULTANTS

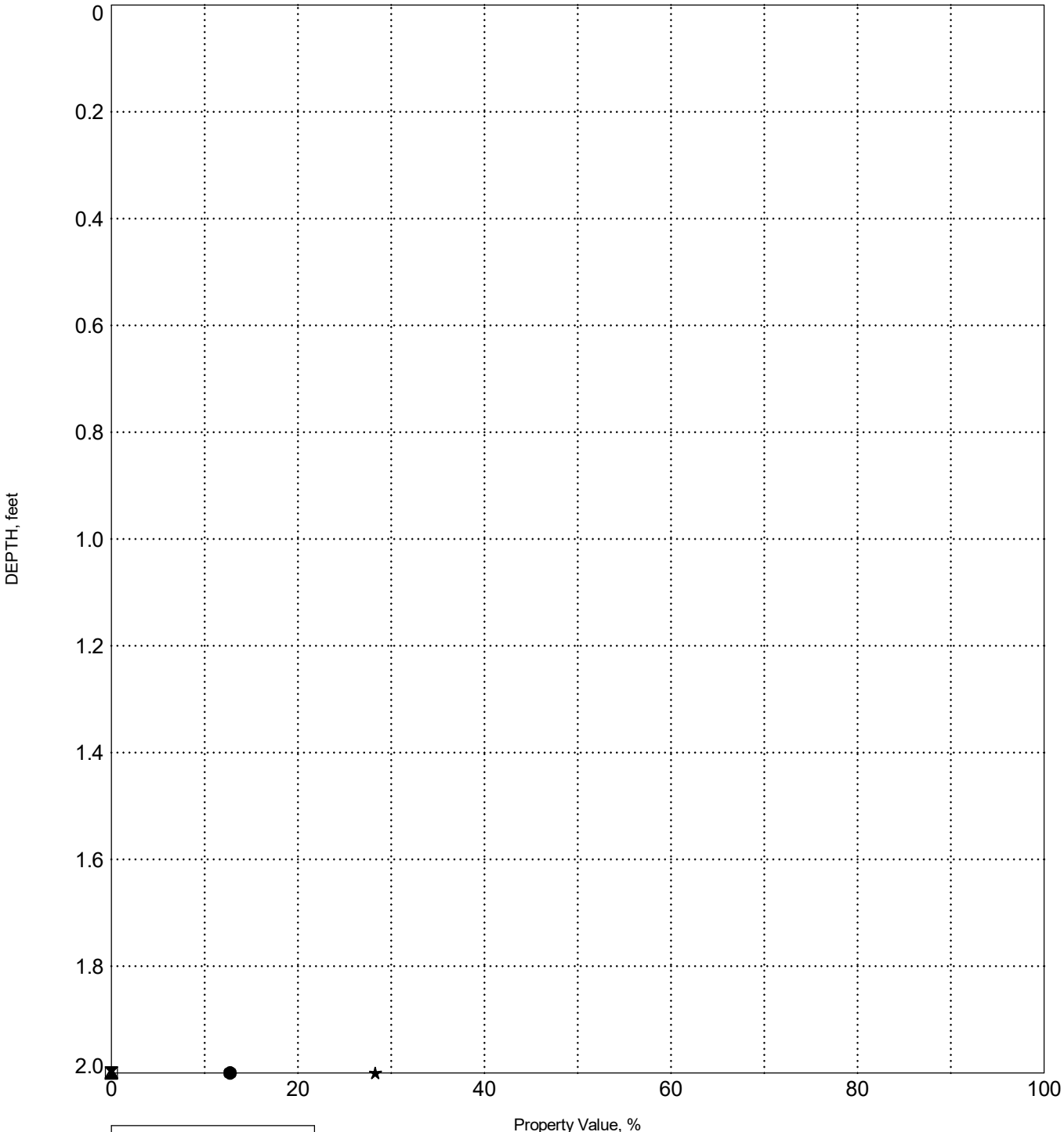
Project Name: US 76 over Chauga River	Location: Oconee County	Project Number: G7100.005
Boring Number: BS-2	Tester: RMC	Checker: WAP/ WJG
Sample Number: 24-3640	Test Date: 10/23/2024	Depth: 0.0' - 5.0'
Test Number: ABC	Preparation: Remolded	Elevation:
Description: SILTY SAND (SM/A-2-4) LL=34, PL=32, PI=2, %200=30.6		
Remarks: Max Dry Density=104.3 pcf, OMC=15.8%, Samples Molded at 95% of Max Dry Density		

INDEX PROPERTIES VERSUS DEPTH

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

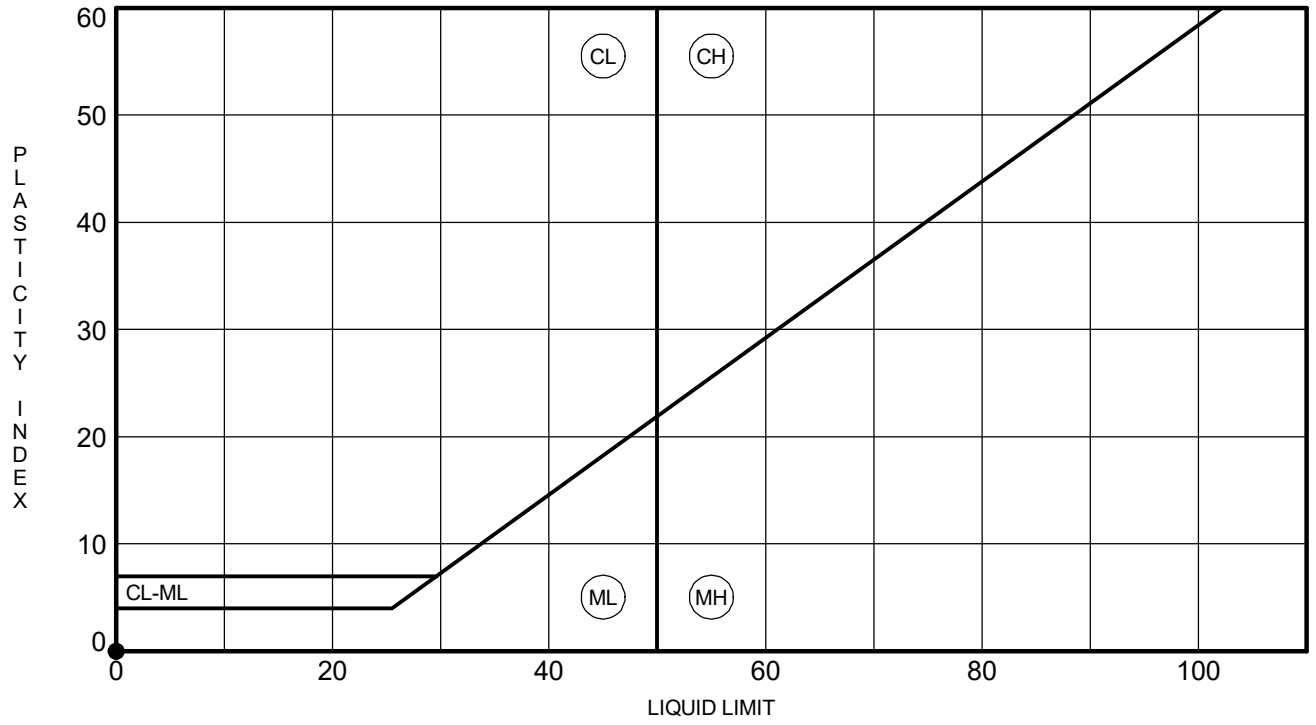
BORING BS-3



ATTERBERG LIMITS' RESULTS

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

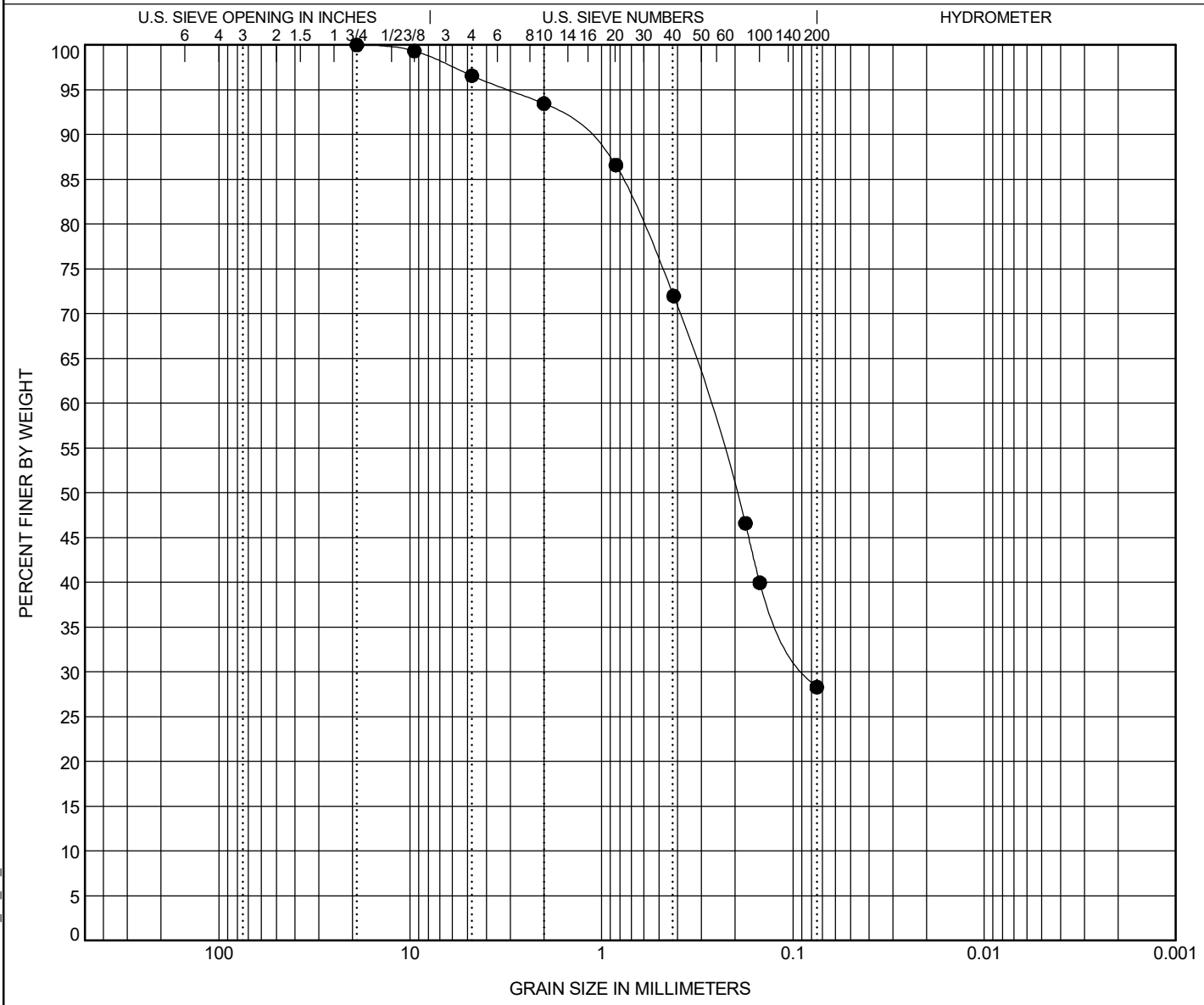


	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**BS-3**	**2.0**	**NP**	**NP**	**NP**	**28**	**SILTY SAND (SM/A-2-4)**

GRAIN SIZE DISTRIBUTION

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**BS-3**	**2.0**	**SILTY SAND (SM/A-2-4)**	**NP**	**NP**	**NP**		

	BOREHOLE	DEPTH	D90	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BS-3**	**2.0**	**1.291**	**0.279**	**0.083**		**3.4**	**68.3**	**28.3**	

GRAIN SIZE G7100.005 - US 76 OVER CHAUGA RIVER.GPJ SCDOT DATA TEMPLATE_01_30_2015.GDT 10/23/24

REV 12/2023

F&ME CONSULTANTS, INC
211 Business Park Blvd.
Columbia, SC 29203

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US 76 over Chauga River	**PROJECT NO.:**	P043969
SAMPLE NUMBER:	24-3666	**DATE REQUESTED:**	10/16/2024
DESCRIPTION OF SOIL:	Silty SAND (SM/A-2-4)		
TESTED BY:	Will Pitts	**DATE OF TESTING:**	10/18/2024
WEIGHED BY:	Ashleigh Burgess	**DATE OF WEIGHING:**	10/21/2024

BORING NO.	BS-3				
SAMPLE NO.	--				
SAMPLE DEPTH	0.0 - 2.0				
WATER CONTENT, W%	12.7				

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

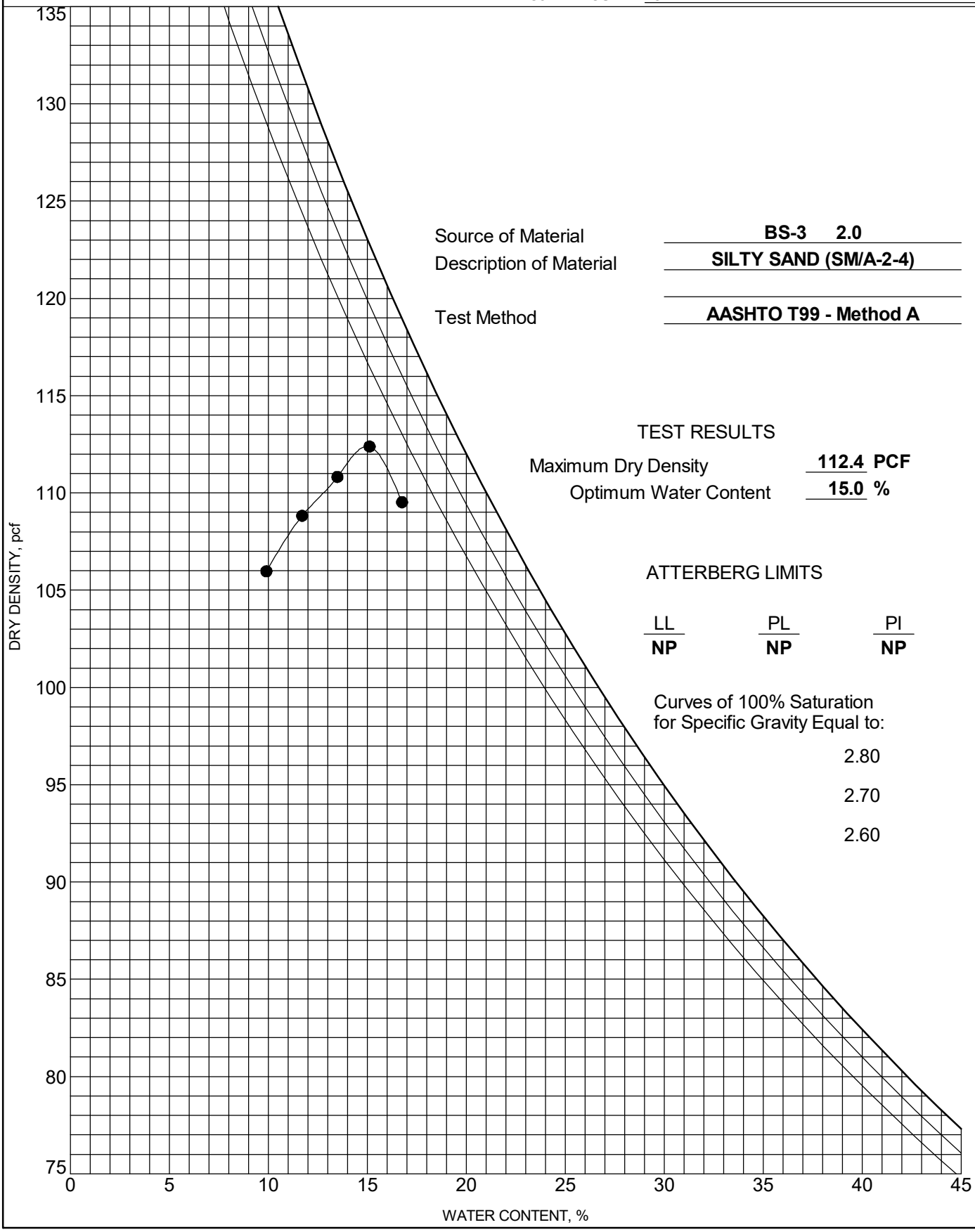
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

MOISTURE-DENSITY RELATIONSHIP

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee



Source of Material **BS-3 2.0**

Description of Material **SILTY SAND (SM/A-2-4)**

Test Method **AASHTO T99 - Method A**

TEST RESULTS

Maximum Dry Density **112.4** **PCF**

Optimum Water Content **15.0** **%**

ATTERBERG LIMITS

LL	PL	PI
NP	**NP**	**NP**

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION - SCDOT G7100.005 - US 76 OVER CHAUGA RIVER.GPJ FME2017.GDT 10/29/24

REV 01/2023

CALIFORNIA BEARING RATIO (CBR)
AASHTO T193

SAMPLE INFORMATION

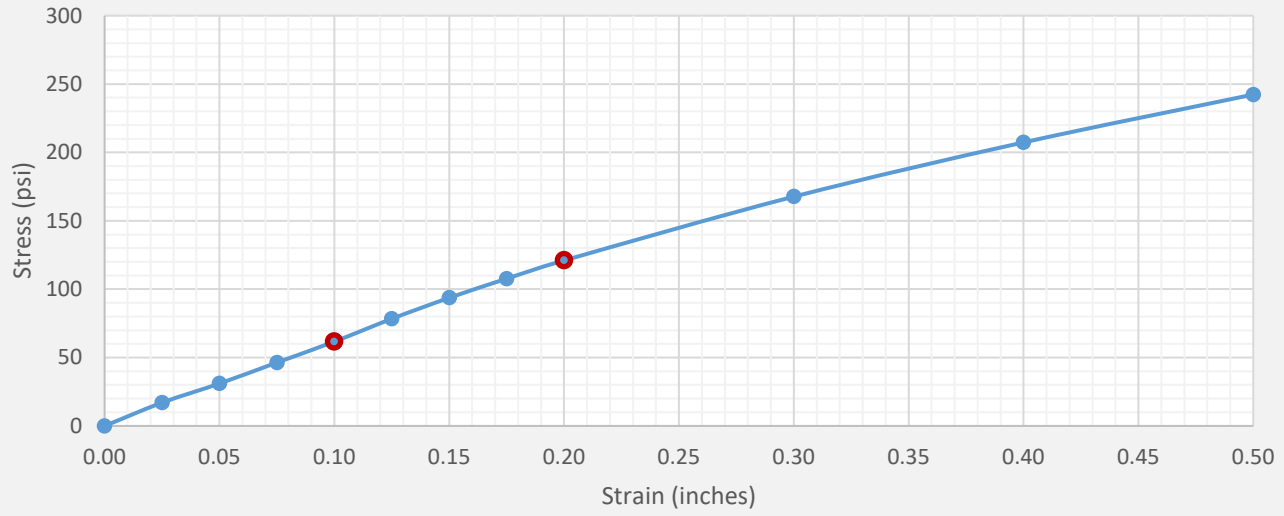
Project Name	US 76 over Chauga River			Project No.	G7100.005
Sample Location	BS-3			FME Lab ID	24-3687
Soil Description	Silty SAND (SM/A-2-4)			Depth/Elev.	0.0 - 2.0
Date Sampled	--	Sampled By:	F&ME	Date Received	10/20/2024
Date Test Began	10/25/2024	Date Completed	10/29/24	Tested By	DH

MOLDING CHARACTERISTICS

Method	AASHTO T99 - Method A	% Retained on 3/4" Sieve	0%
Max Dry Density (lb/ft^3)	112.4	Optimum Moisture Content (%)	15.0
Soak Time (hr)	96	Surcharge Weight (lb)	10.0

TESTING RESULTS

CBR at 0.10-inch penetration	CBR at 0.20-inch penetration
6.2	**8.1**



Before Soaking	
Dry Density (lb/ft^3)	101.7
Moisture Content	14.8%
Percent Compaction	90.4%
Percent Shrink/Swell	--

After Soaking	
Dry Density (lb/ft^3)	101.9
Moisture Content (Top 1")	20.4%
Percent Compaction	90.6%
Percent Shrink/Swell	0.4%

ADDITIONAL COMMENTS

Target %Compaction = 90%

F&ME CONSULTANTS

F&ME Consultants, Inc.

211 Business Park Blvd., Columbia, South Carolina 29203

Alix M Armstrong

Reviewed By

10/30/24

Date

REV 01/2023

CALIFORNIA BEARING RATIO (CBR)
AASHTO T193

SAMPLE INFORMATION

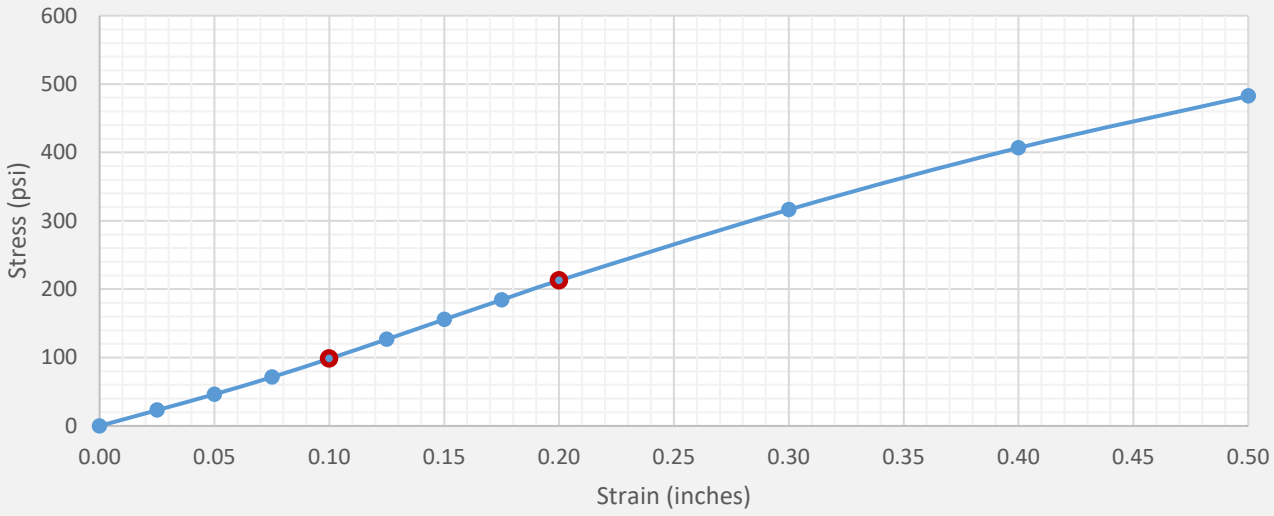
Project Name	US 76 over Chauga River			Project No.	G7100.005
Sample Location	BS-3			FME Lab ID	24-3687
Soil Description	Silty SAND (SM/A-2-4)			Depth/Elev.	0.0 - 2.0
Date Sampled	--	Sampled By:	F&ME	Date Received	10/20/2024
Date Test Began	10/25/2024	Date Completed	10/29/24	Tested By	DH

MOLDING CHARACTERISTICS

Method	AASHTO T99 - Method A	% Retained on 3/4" Sieve	0%
Max Dry Density (lb/ft^3)	112.4	Optimum Moisture Content (%)	15.0
Soak Time (hr)	96	Surcharge Weight (lb)	10.0

TESTING RESULTS

CBR at 0.10-inch penetration	CBR at 0.20-inch penetration
9.8	**14.2**



Before Soaking	
Dry Density (lb/ft^3)	107.6
Moisture Content	14.8%
Percent Compaction	95.8%
Percent Shrink/Swell	--

After Soaking	
Dry Density (lb/ft^3)	107.1
Moisture Content (Top 1")	17.7%
Percent Compaction	95.3%
Percent Shrink/Swell	0.4%

ADDITIONAL COMMENTS

Target %Compaction = 95%

F&ME Consultants, Inc.

211 Business Park Blvd., Columbia, South Carolina 29203

Alix M Armstrong

Reviewed By

10/30/24

Date

REV 01/2023

CALIFORNIA BEARING RATIO (CBR)
AASHTO T193

SAMPLE INFORMATION

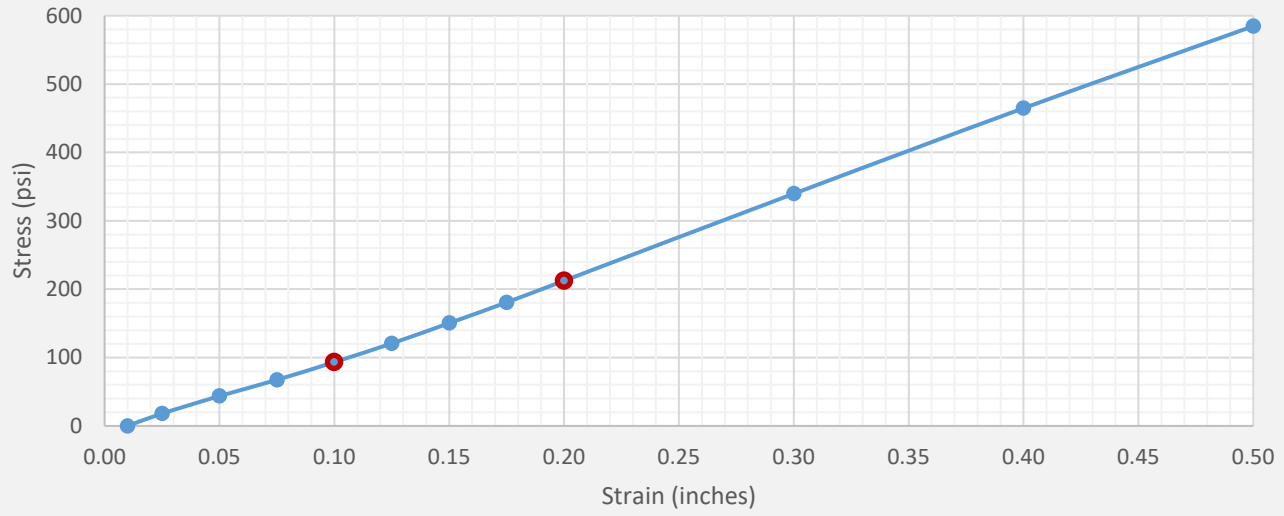
Project Name	US 76 over Chauga River			Project No.	G7100.005
Sample Location	BS-3			FME Lab ID	24-3687
Soil Description	Silty SAND (SM/A-2-4)			Depth/Elev.	0.0 - 2.0
Date Sampled	--	Sampled By:	F&ME	Date Received	10/20/2024
Date Test Began	10/25/2024	Date Completed	10/29/24	Tested By	DH

MOLDING CHARACTERISTICS

Method	AASHTO T99 - Method A	% Retained on 3/4" Sieve	0%
Max Dry Density (lb/ft^3)	112.4	Optimum Moisture Content (%)	15.0
Soak Time (hr)	96	Surcharge Weight (lb)	10.0

TESTING RESULTS

Corrected CBR at 0.10-inch penetration	Corrected CBR at 0.20-inch penetration
10.3	**14.3**



Before Soaking	
Dry Density (lb/ft^3)	112.2
Moisture Content	14.7%
Percent Compaction	99.8%
Percent Shrink/Swell	--

After Soaking	
Dry Density (lb/ft^3)	112.3
Moisture Content (Top 1")	17.1%
Percent Compaction	99.9%
Percent Shrink/Swell	0.5%

ADDITIONAL COMMENTS

Target %Compaction = 100%

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F&ME Consultants, Inc.

211 Business Park Blvd., Columbia, South Carolina 29203

Alix M Armstrong

Reviewed By

10/30/24

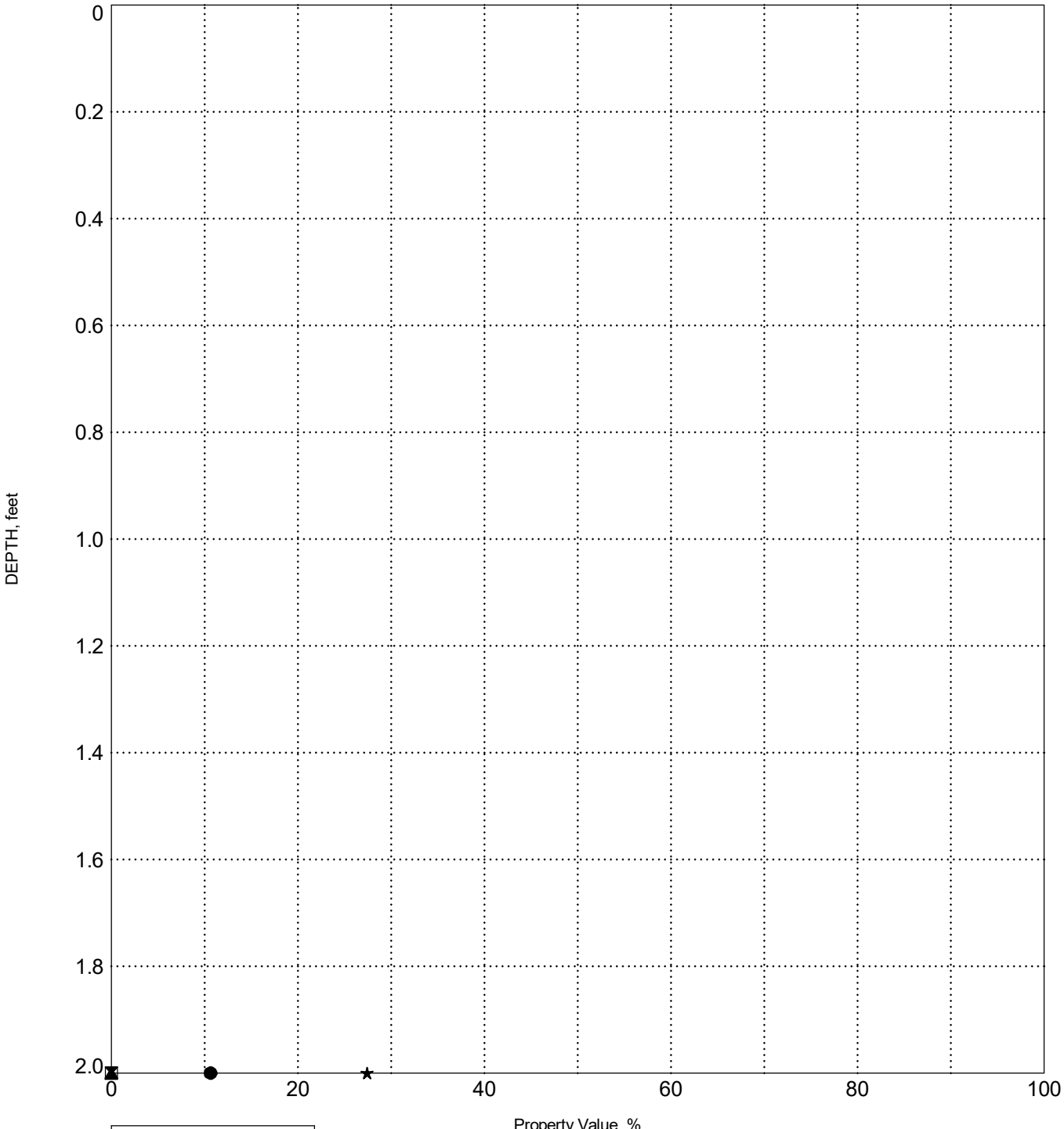
Date

INDEX PROPERTIES VERSUS DEPTH

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

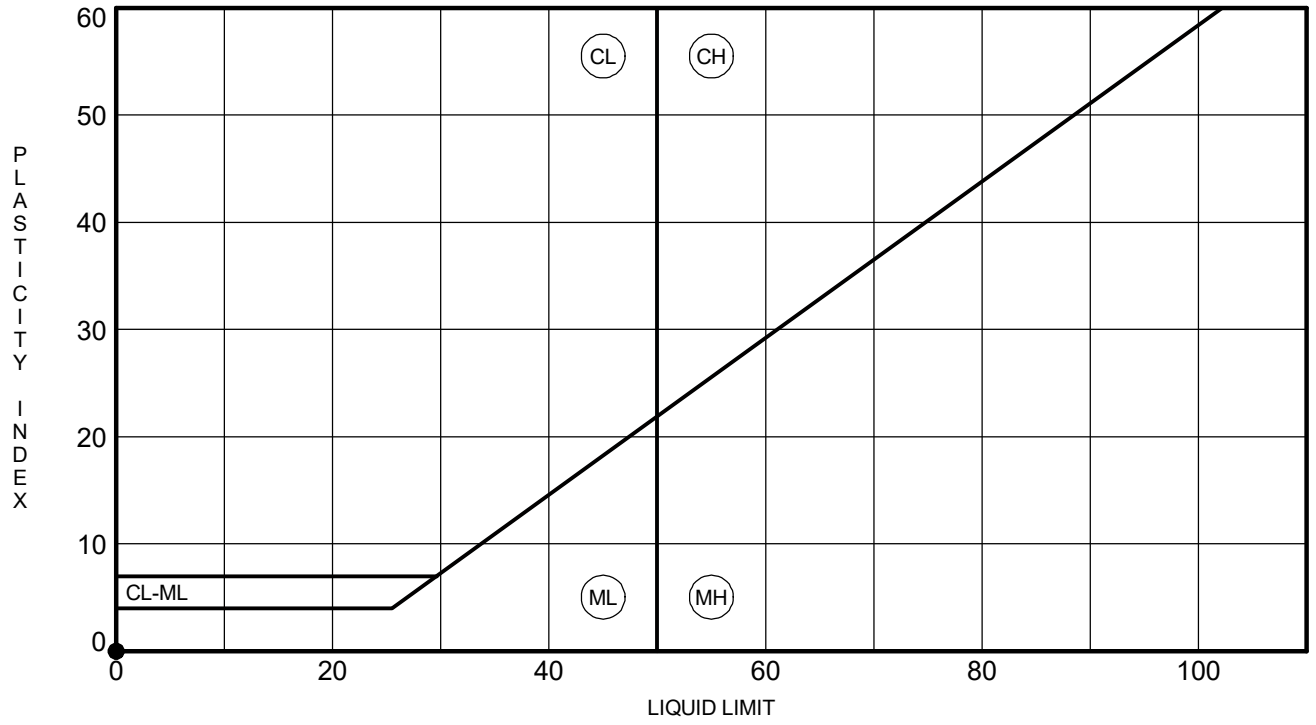
BORING BS-4



ATTERBERG LIMITS' RESULTS

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

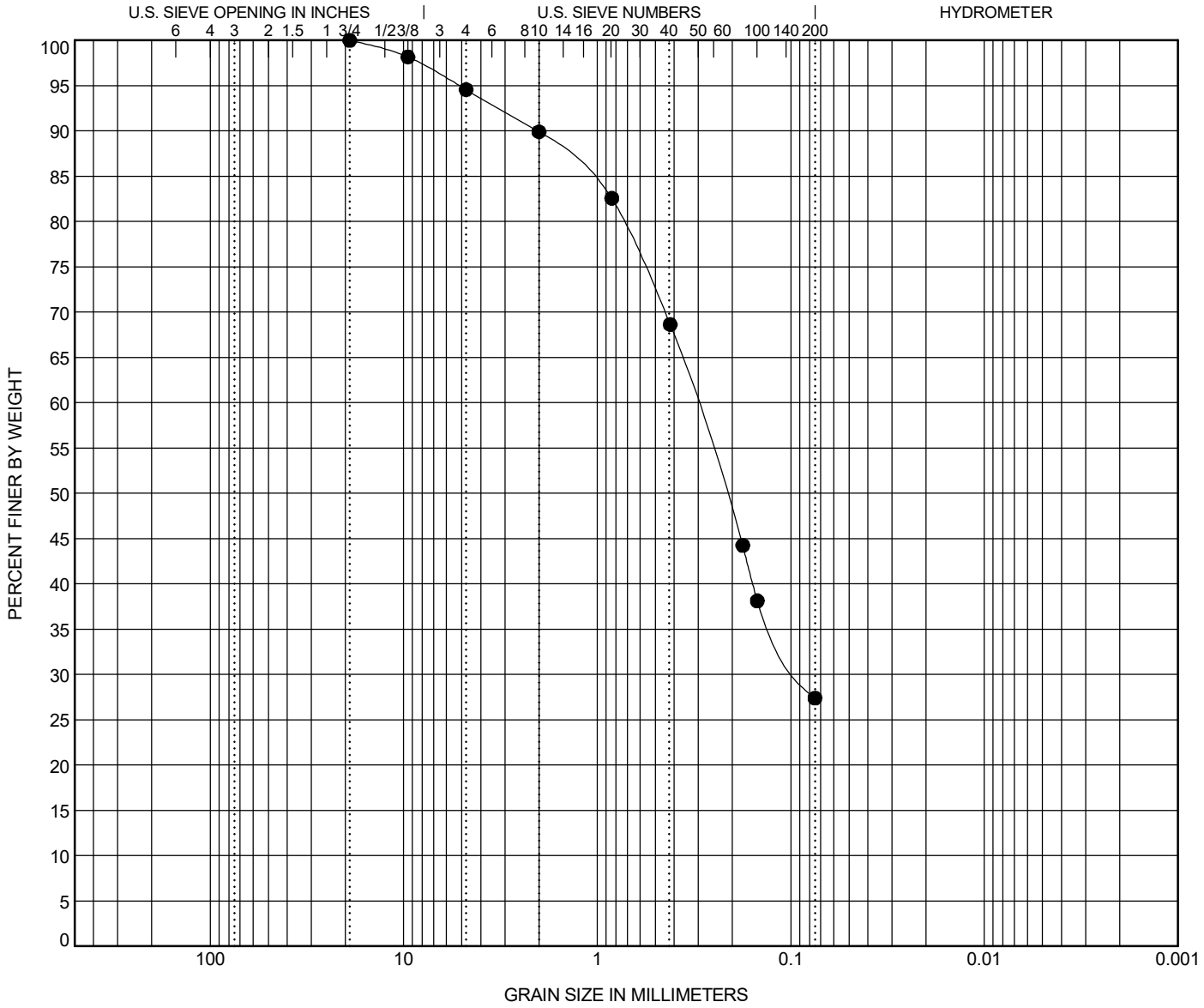


	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**BS-4**	**2.0**	**NP**	**NP**	**NP**	**27**	**SILTY SAND (SM/A-2-4)**

GRAIN SIZE DISTRIBUTION

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**BS-4**	**2.0**	**SILTY SAND (SM/A-2-4)**	**NP**	**NP**	**NP**		

	BOREHOLE	DEPTH	D90	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BS-4**	**2.0**	**2.032**	**0.309**	**0.089**		**5.4**	**67.2**	**27.4**	

REV 12/2023

F&ME CONSULTANTS, INC
211 Business Park Blvd.
Columbia, SC 29203

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	US 76 over Chauga River	**PROJECT NO.:**	P043969
SAMPLE NUMBER:	24-3689	**DATE REQUESTED:**	10/16/2024
DESCRIPTION OF SOIL:	Silty SAND (SM/A-2-4)		
TESTED BY:	LiAnn Johnson/Jada Marken	**DATE OF TESTING:**	10/21/2024
WEIGHED BY:	Ashleigh Burgess	**DATE OF WEIGHING:**	10/22/2024

BORING NO.	BS-4				
SAMPLE NO.	--				
SAMPLE DEPTH	0.0 - 2.0				
WATER CONTENT, W%	10.6				

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

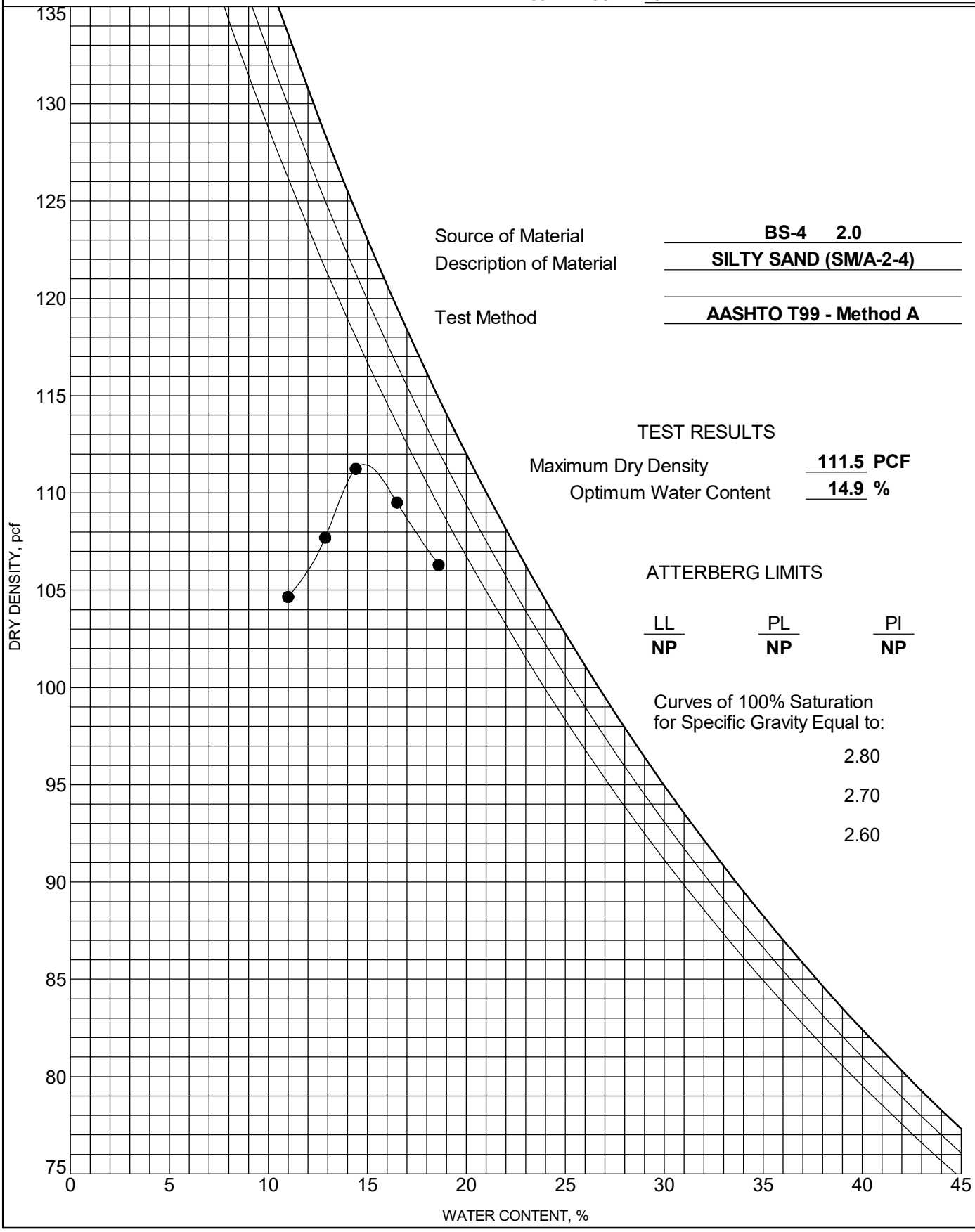
BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

BORING NO.					
SAMPLE NO.					
SAMPLE DEPTH					
WATER CONTENT, W%					

MOISTURE-DENSITY RELATIONSHIP

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee



Source of Material **BS-4 2.0**

Description of Material **SILTY SAND (SM/A-2-4)**

Test Method **AASHTO T99 - Method A**

TEST RESULTS

Maximum Dry Density **111.5** **PCF**

Optimum Water Content **14.9** **%**

ATTERBERG LIMITS

LL	PL	PI
NP	**NP**	**NP**

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION - SCDOT G7100.005 - US 76 OVER CHAUGA RIVER.GPJ FME2017.GDT 10/29/24

REV 01/2023

CALIFORNIA BEARING RATIO (CBR)
AASHTO T193

SAMPLE INFORMATION

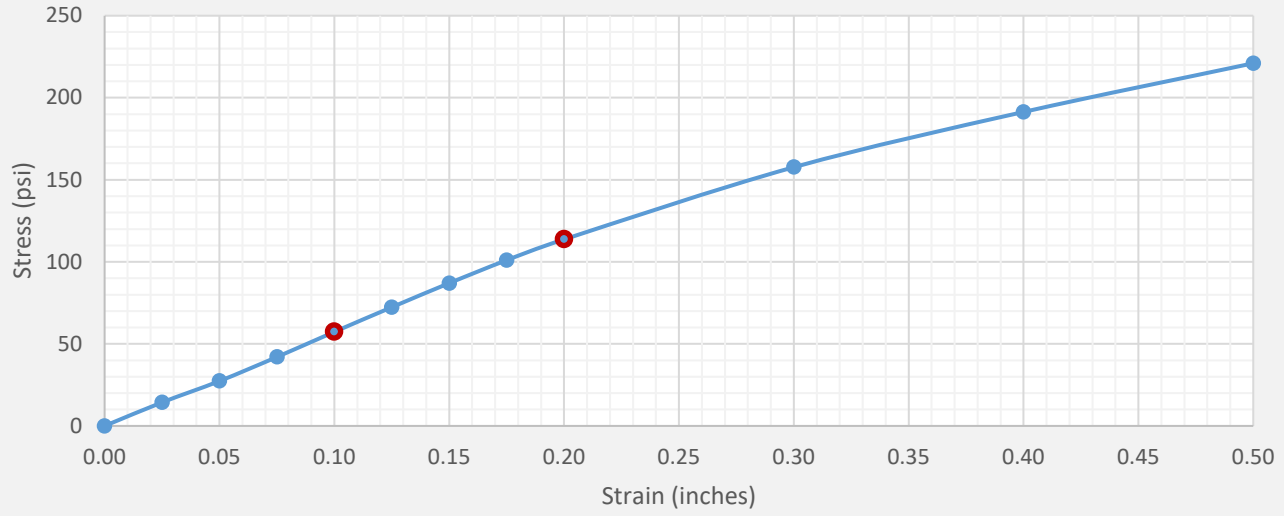
Project Name	US 76 over Chauga River			Project No.	G7100.005
Sample Location	BS-4			FME Lab ID	24-3689
Soil Description	Silty SAND (SM/A-2-4)			Depth/Elev.	0.0 - 2.0
Date Sampled	--	Sampled By:	F&ME	Date Received	10/20/2024
Date Test Began	10/25/2024	Date Completed	10/29/24	Tested By	DH

MOLDING CHARACTERISTICS

Method	AASHTO T99 - Method A	% Retained on 3/4" Sieve	0%
Max Dry Density (lb/ft^3)	111.5	Optimum Moisture Content (%)	14.9
Soak Time (hr)	96	Surcharge Weight (lb)	10.0

TESTING RESULTS

CBR at 0.10-inch penetration	CBR at 0.20-inch penetration
5.7	**7.6**



Before Soaking	
Dry Density (lb/ft^3)	101.5
Moisture Content	14.4%
Percent Compaction	91.0%
Percent Shrink/Swell	--

After Soaking	
Dry Density (lb/ft^3)	102.1
Moisture Content (Top 1")	18.9%
Percent Compaction	91.6%
Percent Shrink/Swell	0.5%

ADDITIONAL COMMENTS

Target %Compaction = 90%

F&ME CONSULTANTS

F&ME Consultants, Inc.

211 Business Park Blvd., Columbia, South Carolina 29203

Alix M Armstrong

Reviewed By

10/30/24

Date

REV 01/2023

CALIFORNIA BEARING RATIO (CBR)
AASHTO T193

SAMPLE INFORMATION

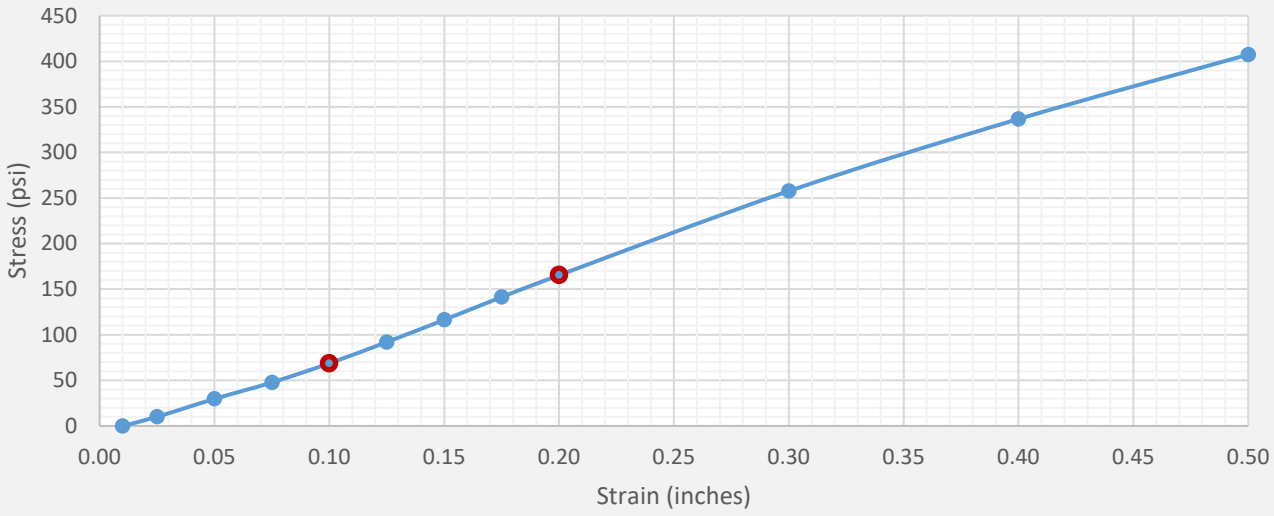
Project Name	US 76 over Chauga River			Project No.	G7100.005
Sample Location	BS-4			FME Lab ID	24-3689
Soil Description	Silty SAND (SM/A-2-4)			Depth/Elev.	0.0 - 2.0
Date Sampled	--	Sampled By:	F&ME	Date Received	10/20/2024
Date Test Began	10/25/2024	Date Completed	10/29/24	Tested By	DH

MOLDING CHARACTERISTICS

Method	AASHTO T99 - Method A	% Retained on 3/4" Sieve	0%
Max Dry Density (lb/ft^3)	111.5	Optimum Moisture Content (%)	14.9
Soak Time (hr)	96	Surcharge Weight (lb)	10.0

TESTING RESULTS

Corrected CBR at 0.10-inch penetration	Corrected CBR at 0.20-inch penetration
7.9	**11.7**



Before Soaking	
Dry Density (lb/ft^3)	106.4
Moisture Content	14.6%
Percent Compaction	95.4%
Percent Shrink/Swell	--

After Soaking	
Dry Density (lb/ft^3)	107.1
Moisture Content (Top 1")	16.8%
Percent Compaction	96.1%
Percent Shrink/Swell	0.5%

ADDITIONAL COMMENTS

Target %Compaction = 95%

F&ME CONSULTANTS

F&ME Consultants, Inc.

211 Business Park Blvd., Columbia, South Carolina 29203

Alix M Armstrong

Reviewed By

10/30/24

Date

REV 01/2023

CALIFORNIA BEARING RATIO (CBR)
AASHTO T193

SAMPLE INFORMATION

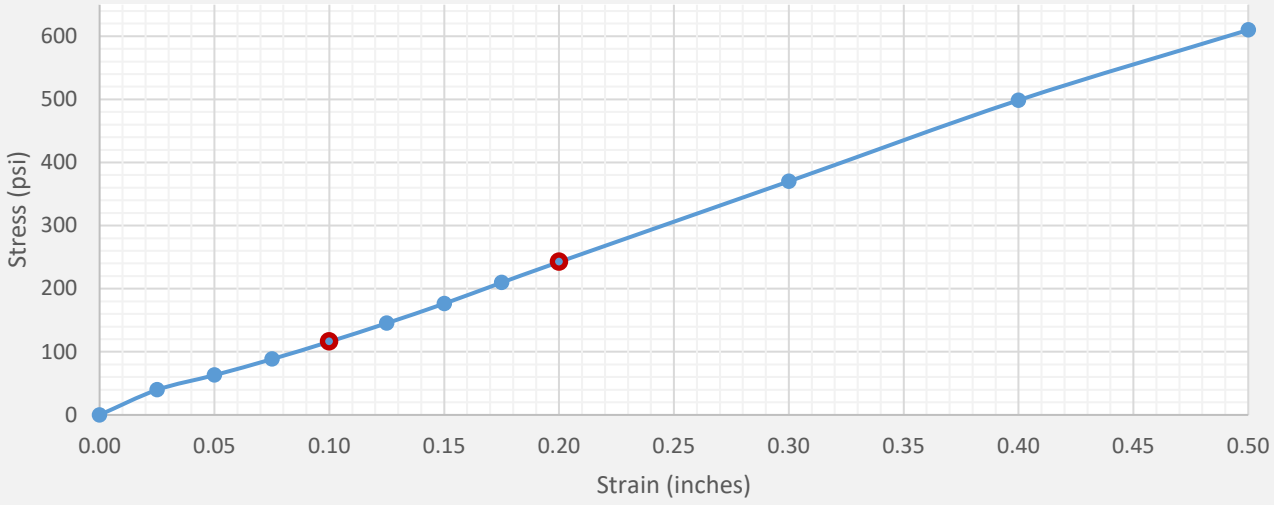
Project Name	US 76 over Chauga River			Project No.	G7100.005
Sample Location	BS-4			FME Lab ID	24-3689
Soil Description	Silty SAND (SM/A-2-4)			Depth/Elev.	0.0 - 2.0
Date Sampled	--	Sampled By:	F&ME	Date Received	10/20/2024
Date Test Began	10/25/2024	Date Completed	10/29/24	Tested By	JJ

MOLDING CHARACTERISTICS

Method	AASHTO T99 - Method A	% Retained on 3/4" Sieve	0%
Max Dry Density (lb/ft^3)	111.5	Optimum Moisture Content (%)	14.9
Soak Time (hr)	96	Surcharge Weight (lb)	10.0

TESTING RESULTS

CBR at 0.10-inch penetration	CBR at 0.20-inch penetration
11.6	**16.2**



Before Soaking	
Dry Density (lb/ft^3)	111.9
Moisture Content	14.6%
Percent Compaction	100.4%
Percent Shrink/Swell	--

After Soaking	
Dry Density (lb/ft^3)	111.5
Moisture Content (Top 1")	16.8%
Percent Compaction	100.0%
Percent Shrink/Swell	0.5%

ADDITIONAL COMMENTS

Target %Compaction = 100%

F&ME CONSULTANTS

F&ME Consultants, Inc.

211 Business Park Blvd., Columbia, South Carolina 29203

Alix M Armstrong

Reviewed By

10/30/24

Date

US 76 over Chauga River

Geotechnical Subsurface Data Report

BULK SOIL SAMPLE

CORROSION SERIES DATA

F&ME CONSULTANTS

CORROSION SERIES SUMMARY (BULK SOIL SAMMPLE)

PROJECT ID P043969 **PROJECT NAME** US 76 over Chauga River

PROJECT COUNTY Oconee

Borehole	Sample No.	Sample Depth (ft.)	pH of Soil in Distilled Water	Electrical Resistivity (Ω-cm)	Chloride Content (mg/kg (ppm))	Sulfate Content (mg/kg (ppm))
BS-1	--	0.0 – 5.0	5.7	26,536	3.42	72.6
BS-2	--	0.0 – 5.0	5.9	14,880	3.84	59.4

pH DTERMINTATION
(AASHTO T289)

Project Name:	US 76 RBO Chauga River	SCDOT Project ID:	P043969
Description of Sample:	Silty SAND (SM/A-2-4)	Date Requested:	10/16/2024
Tested By:	LiAnn Johnson/Jada Marken	Date Tested:	10/21/2024

SCDOT Sample ID	BS-1			
Sample Depth (ft.)	0.0 - 5.0			
FME Lab ID No.	24-3639			
pH Value	5.66			
Temperature (˚C)	20.5			

Date Reviewed: 10/28/2024 Reviewed By: Alex Abernethy

REV 09/2022

SOIL RESISTIVITY
(AASHTO T288)

Project Name:	US 75 over Chauga River	SCDOT Project ID:	P043969
Location:	BS-1	FME Lab ID No.:	24-3639
Sampled By:	F&ME Consultants, Inc.	Date Sampled:	--
Soil Description:	SANDY SILT (SM/A-2-4)	Date Requested:	10/16/2024
Tested By:	Ashleigh Burgess	Date Tested:	10/21/2024

Boring ID	Sample Depth (ft.)	Minimum Soil Resistivity, Ω-cm
BS-1	0.0 - 5.0	26,536

Date Reviewed: 10/28/2024 Reviewed By:

CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2018) (*Method B*)

Client:	F&ME Consultants, Inc.	Boring No.:	BS-1
Client Reference:	Chauga River G7100.005	Depth (ft):	NA
Project No.:	2024-762-001	Sample No.:	BS-1
Lab ID:	2024-762-001-001	Description:	REDDISH BROWN

(- # 10 Sieve material)

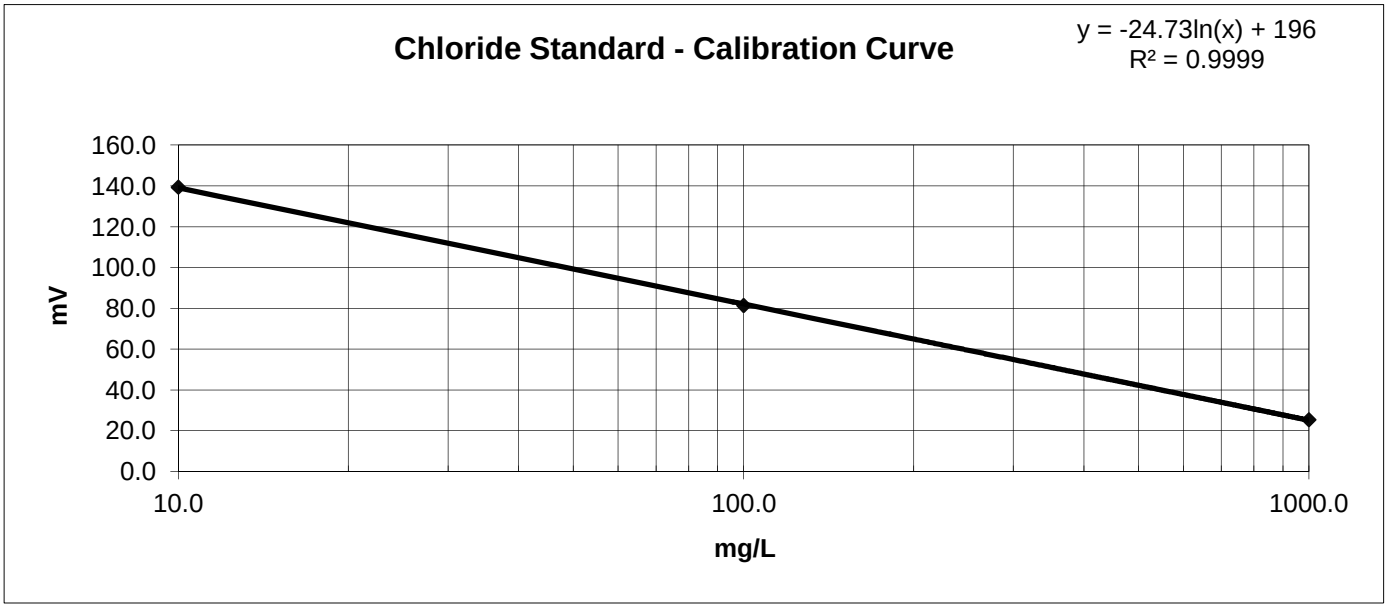
CHLORIDE STANDARD: CALIBRATION CURVE

STANDARD		MILLIVOLTS (mV)
10.0	mg/L	139.4
100.0	mg/L	81.4
1000.0	mg/L	25.5

MEASUREMENT OF CHLORIDES

		CONCENTRATION (mg/L)	CONCENTRATION (mg/kg)
Sample Weight (g):	100.0		
Water added to Sample (ml):	100.0		
Size of Sample Aliquot (ml):	25.0		
Sample Reading (mV):	165.6	3.42	3.42

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO_3 solution (1:1 volume).
2) Samples were dried for a minimum of 12 hours at 110 $^{+}/_{-}$ 5^{o}C.



Notes:

Tested By	JAM	Date	10/22/24	Checked By	GRK	Date	10/22/24

DCN: CT-S63A DATE: 6/2/14 REVISION: 1

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Water-Soluble Sulfate Ion Content in Soil

AASHTO T 290-95 (2020)

Client:	F&ME Consultants, Inc.	Boring No.:	BS-1
Client Reference:	Chauga River G7100.005	Depth (ft):	NA
Project No.:	2024-762-001	Sample No.:	BS-1
Lab ID:	2024-762-001-001	Soil Description:	Reddish Brown

Sulfate Standard - Calibration Curve Spectrophotometer Readings

Sulfate Ion Concentrations (mg/L)

0.0	4.0	10.0	20.0	30.0	40.0	60.0	80.0	100.0

Spectrophotometer Readings (FAU)

Underrange	Underrange	7	20	42	63	112	163	243

Measurement of Barium Chloride Turbidity

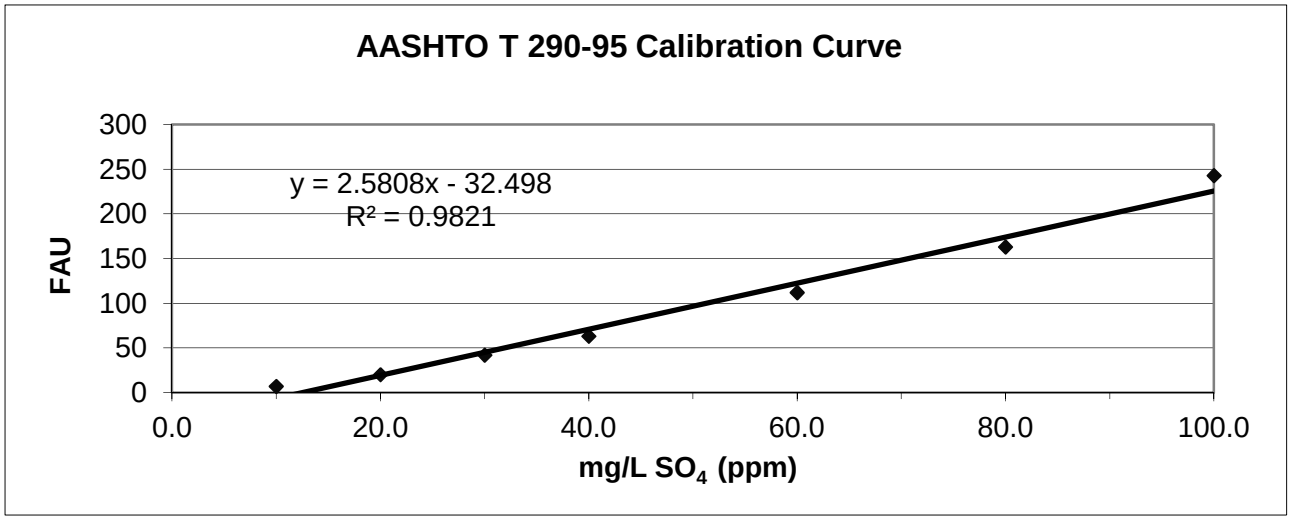
(Sample contains 5.0 mL NaCl solution and 0.3 g $BaCl_2 \cdot 2H_2O$)

Sample Weight (g):	100.0
Water added to Sample (mL):	300.0
Size of Sample Aliquot (mL):	50.0
Sample Reading (FAU):	29
Sample Diluted:	No
Sulfate Solution Added (ml):	0

Sample Moisture Content

Tare Number:	1126
Weight of Tare & Wet Sample (g):	219.42
Weight of Tare & Dry Sample (g):	217.40
Weight of Tare (g):	84.40
Weight of Water (g):	2.02
Weight of Dry Sample (g):	133.00
Moisture Content (%):	1.52

Sample Sulfate Ion Concentration:	23.83	**mg/L SO_4 (ppm)**
Sample Sulfate Ion Content:	71.5	**mg/Kg SO_4 (not corrected for moisture)**
Sample Sulfate Ion Content:	72.6	**mg/Kg SO_4 (corrected for moisture)**



Tested by: JAM Date: 10/22/24 Checked by: GRK Date: 10/22/24

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pH DTERMINTATION
(AASHTO T289)

Project Name:	US 76 RBO Chauga River	SCDOT Project ID:	P043969
Description of Sample:	Silty SAND (SM/A-2-4)	Date Requested:	10/16/2024
Tested By:	LiAnn Johnson/Jada Marken	Date Tested:	10/21/2024

SCDOT Sample ID	BS-2			
Sample Depth (ft.)	0.0 - 5.0			
FME Lab ID No.	24-3640			
pH Value	5.94			
Temperature (˚C)	20.7			

Date Reviewed: 10/28/2024 Reviewed By: Alex Abernethy

REV 09/2022

SOIL RESISTIVITY
(AASHTO T288)

Project Name:	US 75 over Chauga River	SCDOT Project ID:	P043969
Location:	BS-2	FME Lab ID No.:	24-3640
Sampled By:	F&ME Consultants, Inc.	Date Sampled:	--
Soil Description:	SANDY SILT (SM/A-2-4)	Date Requested:	10/16/2024
Tested By:	Ashleigh Burgess	Date Tested:	10/21/2024

Boring ID	Sample Depth (ft.)	Minimum Soil Resistivity, Ω-cm
BS-2	0.0 - 5.0	14,880

Date Reviewed: 10/28/2024 Reviewed By: Alix M Armitage

CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2018) (*Method B*)

Client:	F&ME Consultants, Inc.	Boring No.:	BS-2
Client Reference:	Chauga River G7100.005	Depth (ft):	NA
Project No.:	2024-762-001	Sample No.:	BS-2
Lab ID:	2024-762-001-002	Description:	REDDISH BROWN

(- # 10 Sieve material)

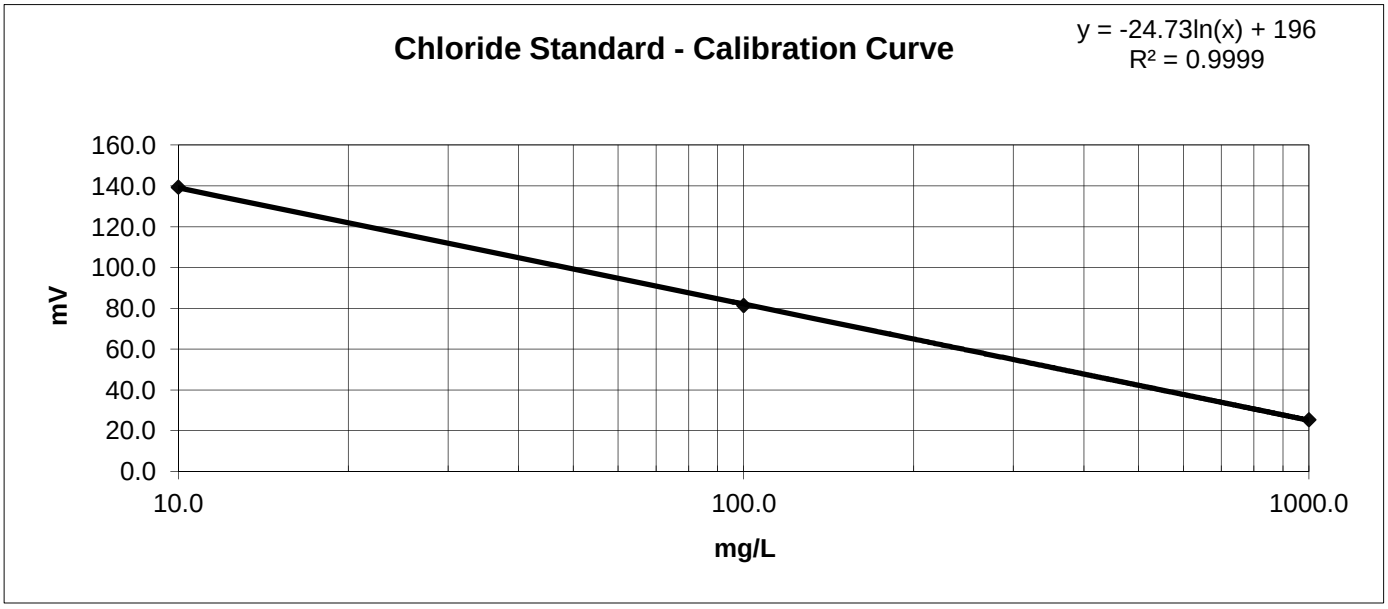
CHLORIDE STANDARD: CALIBRATION CURVE

STANDARD		MILLIVOLTS (mV)
10.0	mg/L	139.4
100.0	mg/L	81.4
1000.0	mg/L	25.5

MEASUREMENT OF CHLORIDES

		CONCENTRATION (mg/L)	CONCENTRATION (mg/kg)
Sample Weight (g):	100.0		
Water added to Sample (ml):	100.0		
Size of Sample Aliquot (ml):	25.0		
Sample Reading (mV):	162.7	3.84	3.84

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO_3 solution (1:1 volume).
2) Samples were dried for a minimum of 12 hours at 110 $^{+}/_{-}$ 5^{o}C.



Notes:

Tested By JAM Date 10/22/24 Checked By GRK Date 10/22/24

DCN: CT-S63A DATE: 6/2/14 REVISION: 1

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Water-Soluble Sulfate Ion Content in Soil

AASHTO T 290-95 (2020)

Client:	F&ME Consultants, Inc.	Boring No.:	BS-2
Client Reference:	Chauga River G7100.005	Depth (ft):	NA
Project No.:	2024-762-001	Sample No.:	BS-2
Lab ID:	2024-762-001-002	Soil Description:	Reddish Brown

Sulfate Standard - Calibration Curve Spectrophotometer Readings

Sulfate Ion Concentrations (mg/L)

0.0	4.0	10.0	20.0	30.0	40.0	60.0	80.0	100.0

Spectrophotometer Readings (FAU)

Underrange	Underrange	7	20	42	63	112	163	243

Measurement of Barium Chloride Turbidity

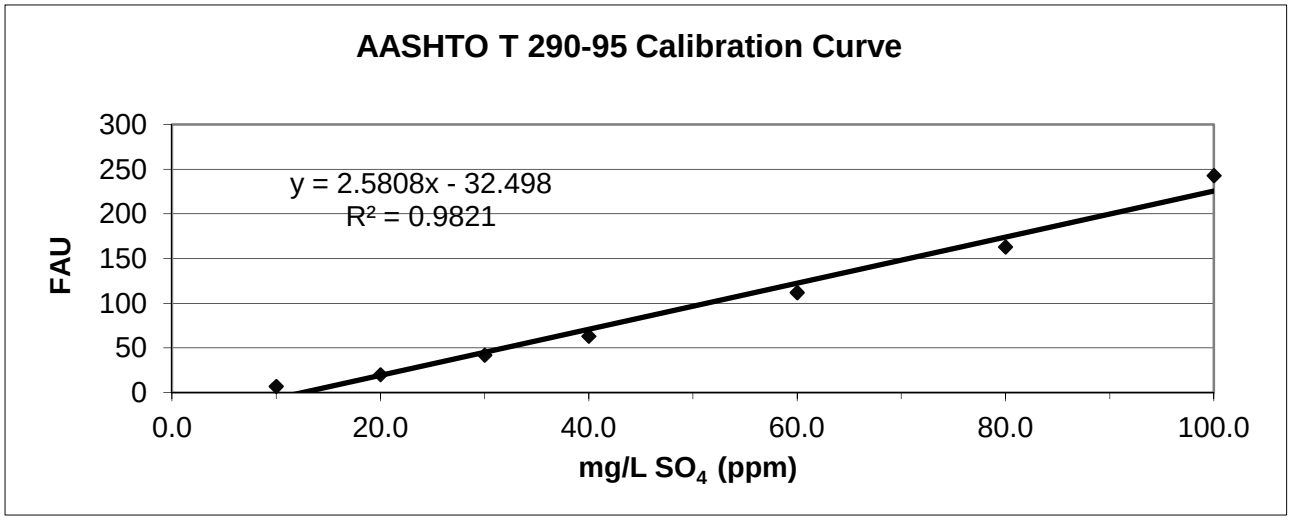
(Sample contains 5.0 mL NaCl solution and 0.3 g $BaCl_2 \cdot 2H_2O$)

Sample Weight (g):	100.0
Water added to Sample (mL):	300.0
Size of Sample Aliquot (mL):	50.0
Sample Reading (FAU):	18
Sample Diluted:	No
Sulfate Solution Added (ml):	0

Sample Moisture Content

Tare Number:	479
Weight of Tare & Wet Sample (g):	202.57
Weight of Tare & Dry Sample (g):	201.40
Weight of Tare (g):	97.72
Weight of Water (g):	1.17
Weight of Dry Sample (g):	103.68
Moisture Content (%):	1.13

Sample Sulfate Ion Concentration:	19.57	**mg/L SO_4 (ppm)**
Sample Sulfate Ion Content:	58.7	**mg/Kg SO_4 (not corrected for moisture)**
Sample Sulfate Ion Content:	59.4	**mg/Kg SO_4 (corrected for moisture)**



Tested by: JAM Date: 10/22/24 Checked by: GRK Date: 10/22/24

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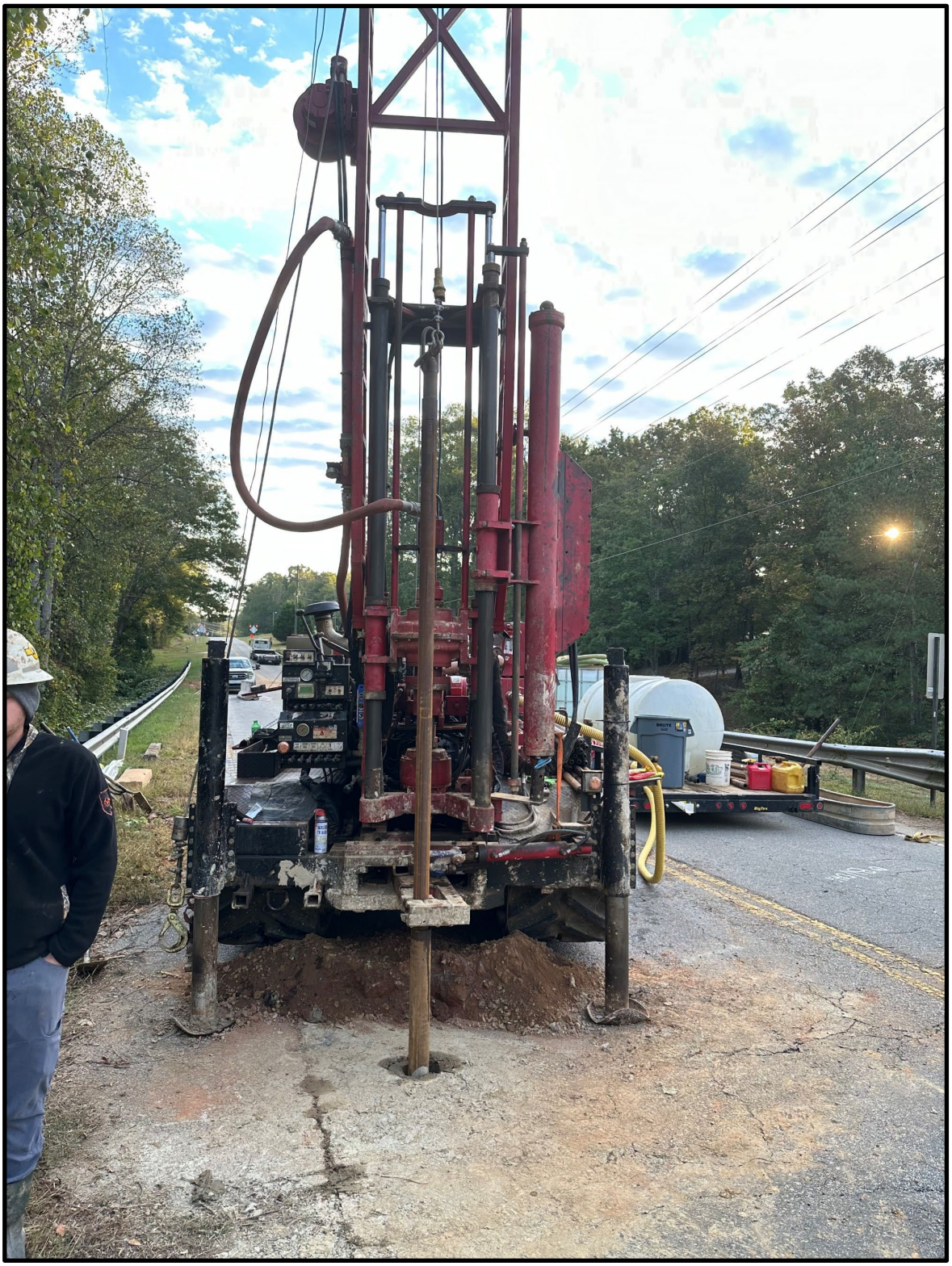
APPENDIX

SECTION 7 ON SITE DRILL RIG PHOTOS

Drill Rig Setup Photos

B-1

Drill Rig Setup Photos



B-2

Drill Rig Setup Photos

B-3

Drill Rig Setup Photos

B-4

Drill Rig Setup Photos

B-5

Drill Rig Setup Photos

P-3

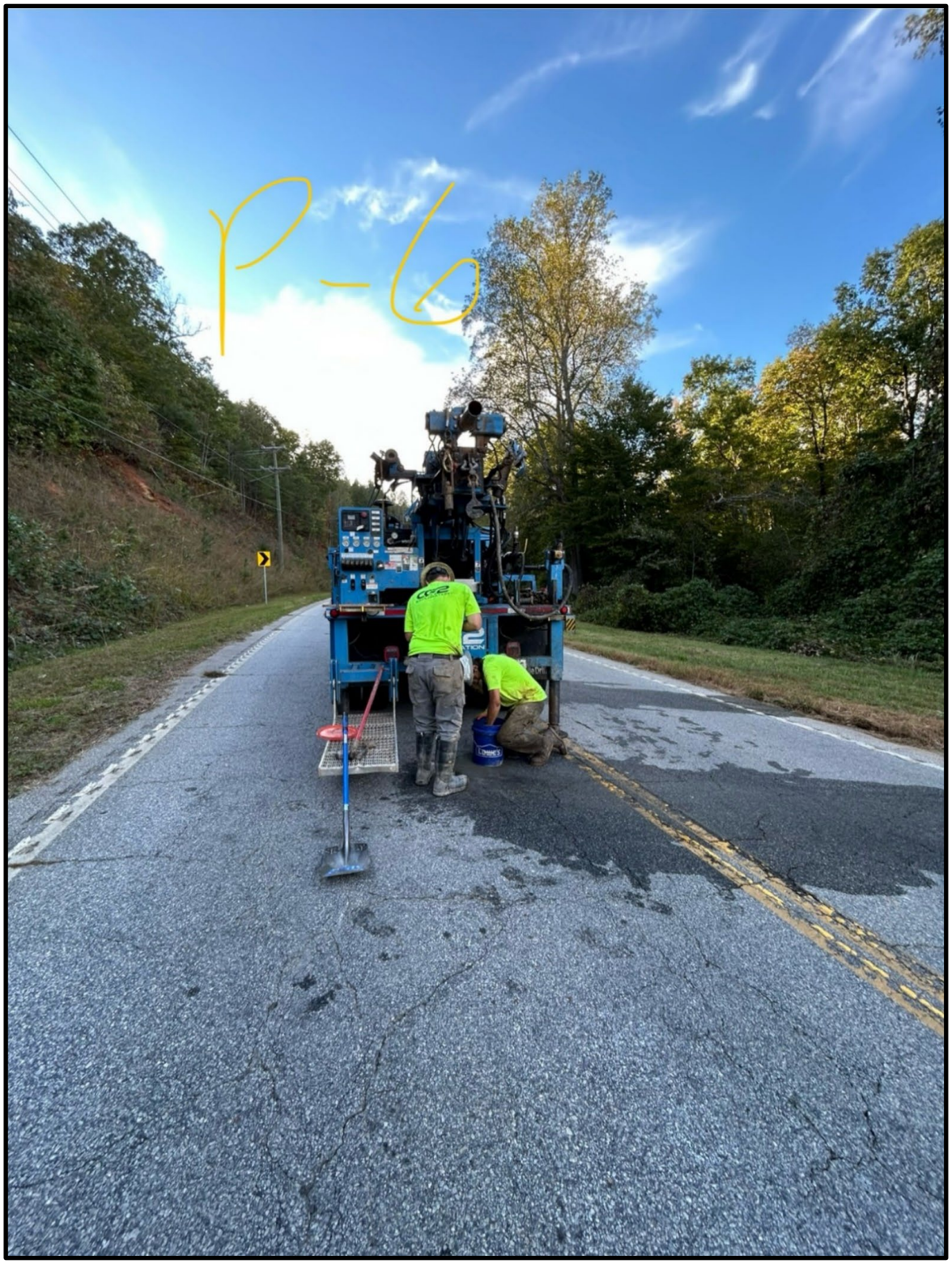
Drill Rig Setup Photos

P-4

Drill Rig Setup Photos

P-5

Drill Rig Setup Photos

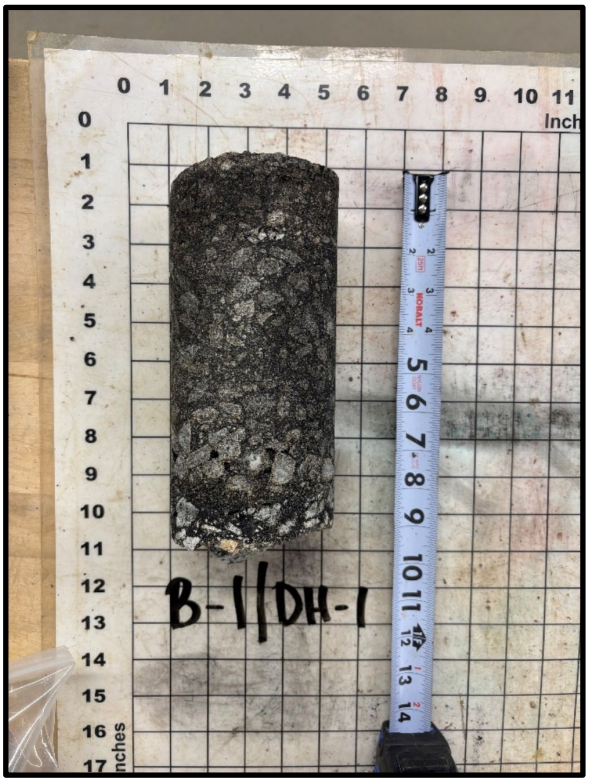


P-6

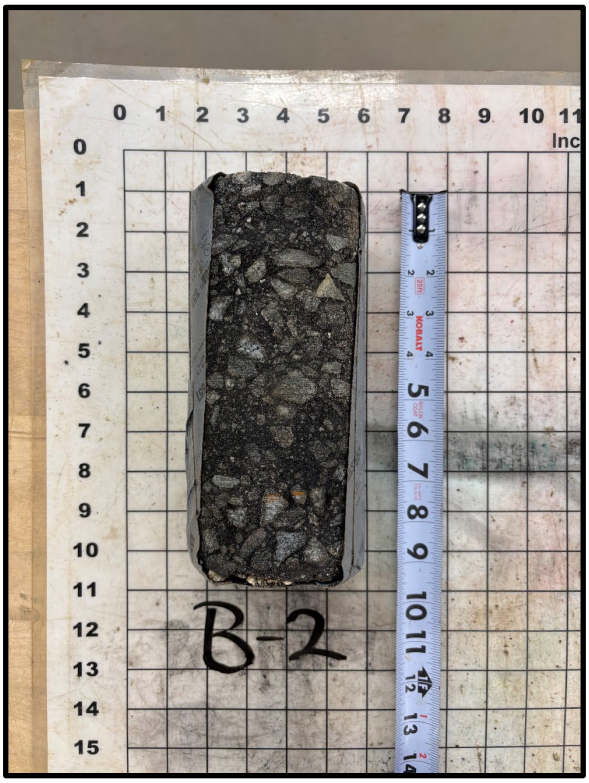
APPENDIX

SECTION 8 PAVEMENT CORE PHOTOS

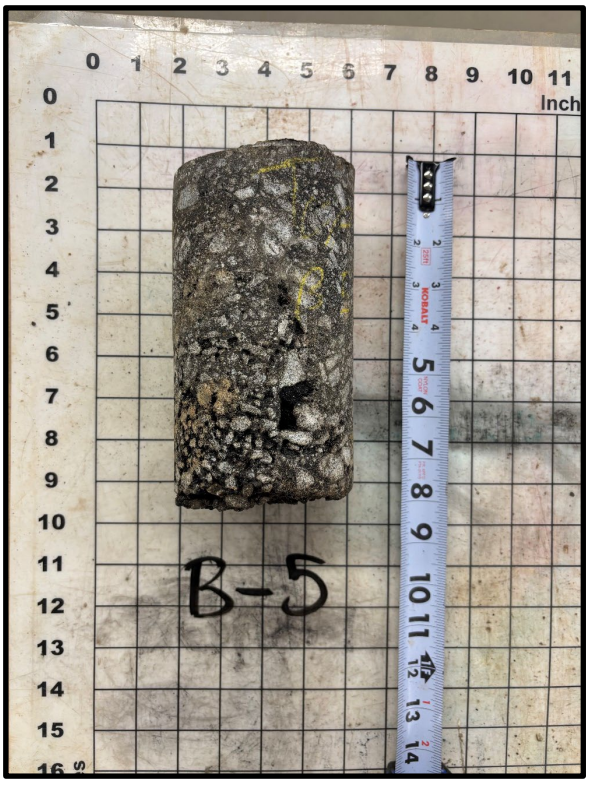
Pavement Core Photos



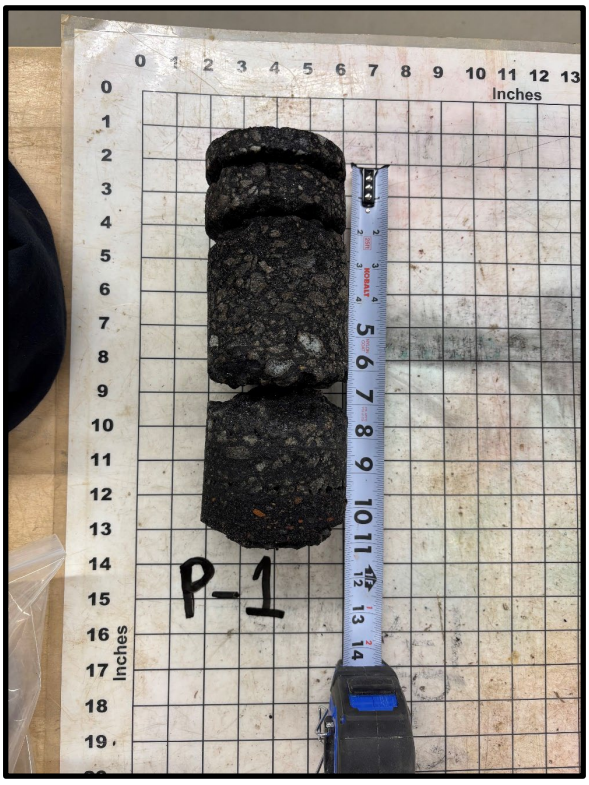
B-1/DH-1
(8-in)



B-2
(8-in)

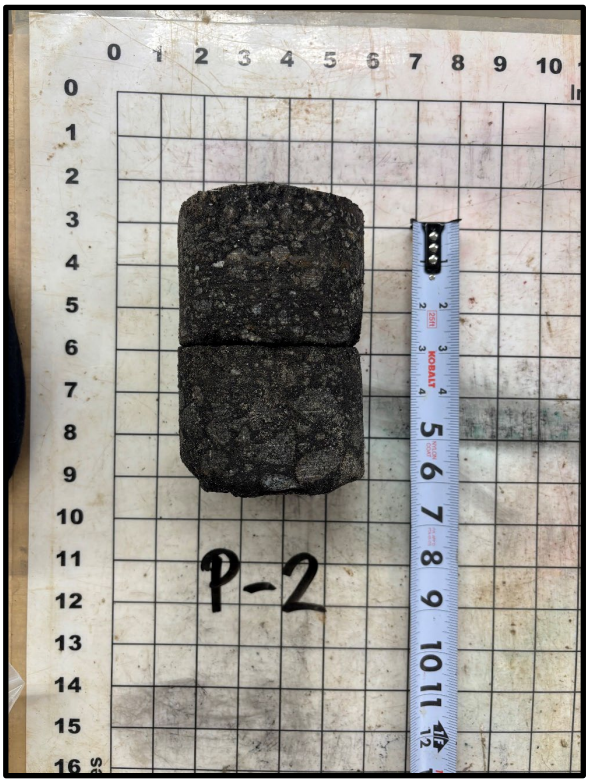


B-5
(9-in)

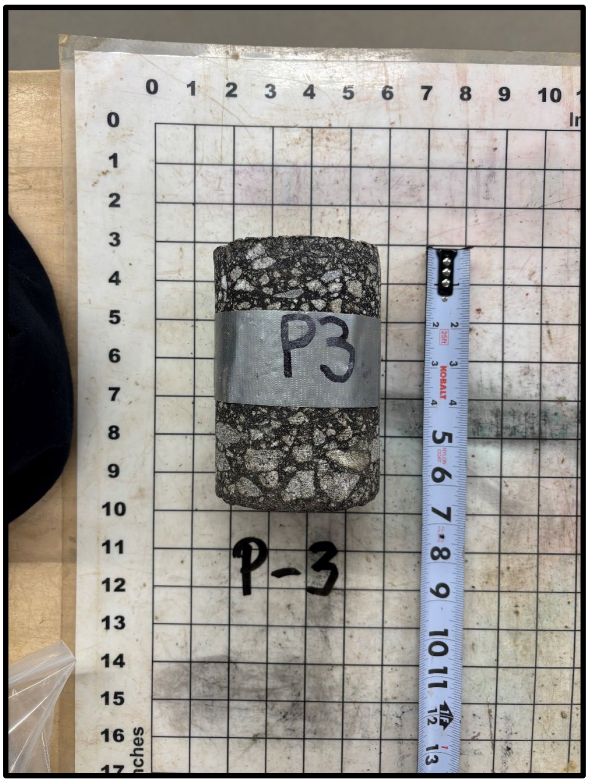


P-1
(10-in)

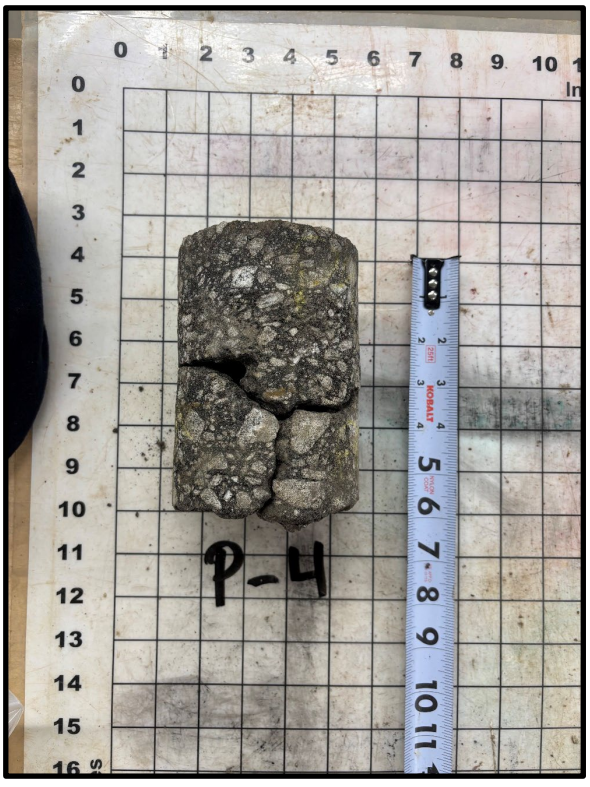
Pavement Core Photos



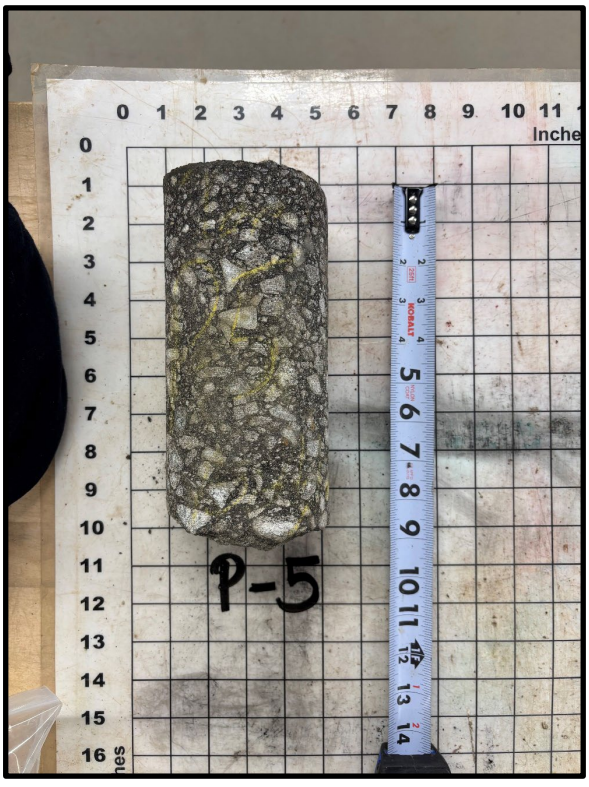
P-2
(5.5-in)



P-3
(5.5-in.)

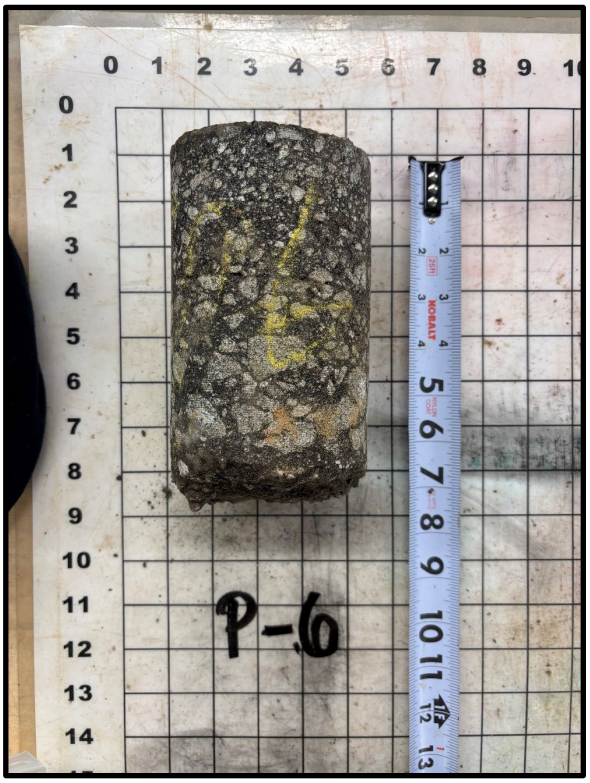


P-4
(5-in)

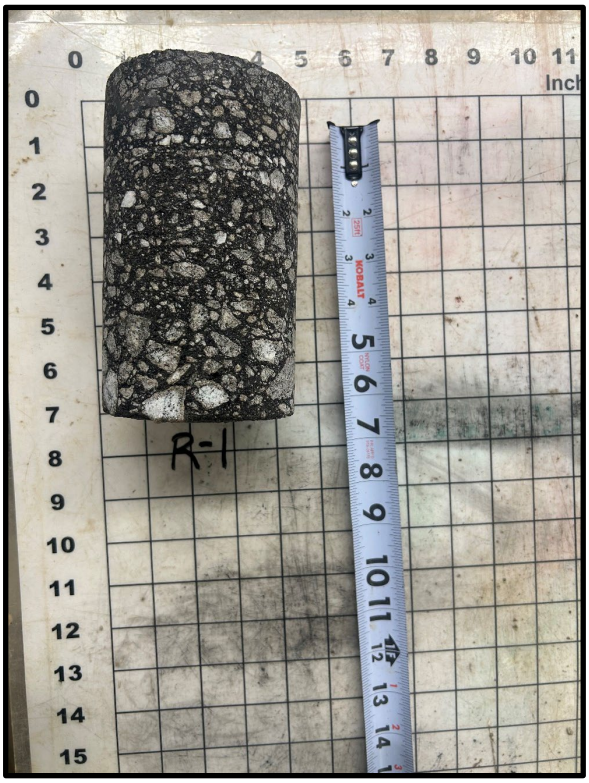


P-5
(7-in)

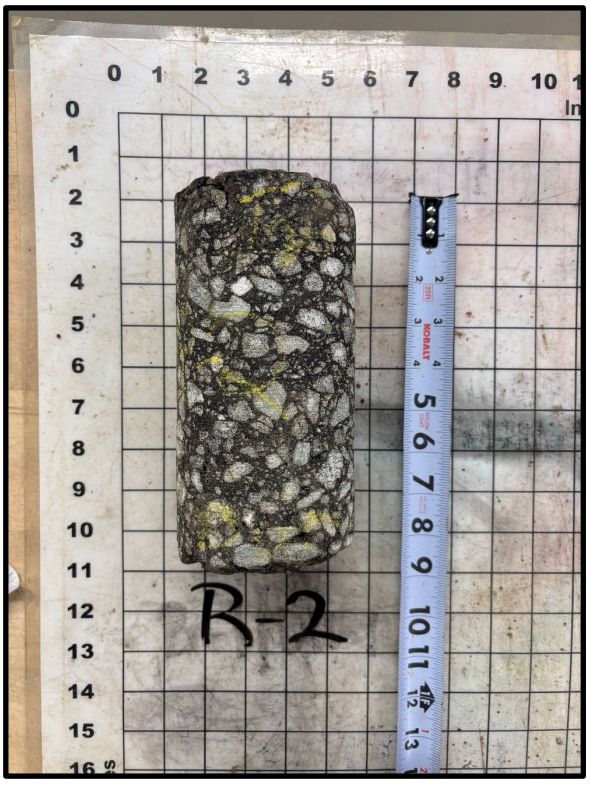
Pavement Core Photos



P-6
(6.5-in)



R-1
(8-in)



R-2
(7.25-in)

APPENDIX

SECTION 9 SCOPE OF SERVICES

SCOPE OF SERVICES

A work order request is issued for the following location:

Submittal Date:	October 10, 2024
County:	Oconee County
Road:	US 76
Project ID:	P043969
Project Name:	US 76 over Chauga River
Local Route Name:	Long Creek Highway
Project Manager:	Trapp Harris (803) 737-0766
Priority:	**Information needed by November 8, 2024**

This work order request is for the US 76 over Chauga River project. Site soil testing will be required as described below and will consist of soil test borings (STB). A total of seven SPT borings for this scope of services. All field and lab testing along with reporting of the results shall be performed and provided in accordance with the 2022 Geotechnical Design Manual (GDM). **Any deviations from this request or the requirements set forth in the GDM shall be approved by the D/B GDS prior to execution of the tasks.**

All test hole and sampling are to be conducted within the SCDOT Right-of-Way. The bridge is expected to be replaced on the existing horizontal alignment.

Consultant shall perform two bridge soil test borings approximately 15 and 20 feet back from the existing east abutment (approximate Station 171+20) and one bridge soil testing boring approximately 10 feet back from the existing west abutment (approximate Station 173+90) for the proposed new bridge abutment locations. Additionally, one soil testing boring shall be conducted approximately 70 feet east from the existing western bridge abutment (approximate Station 173+10) and one soil testing boring shall be conducted approximately 180 feet east from the existing western bridge abutment (approximate Station 172+00). Bridge soil test borings shall be performed using mud-rotary drilling techniques and shall be extended to 100 feet each at the bridge location. If drilling refusal is encountered prior to 100 feet, Consultant shall perform NQ diameter rock coring 20 feet into refusal materials. One bulk sample shall also be obtained from each existing bridge embankment fill.

Downhole seismic shear wave velocities shall be measured in the bridge boring at the proposed east abutment location to a depth of 100 feet or 20 feet into rock, whichever is least. Compression waves shall also be obtained within the downhole seismic test.

Consultant shall also perform one roadway embankment boring approximately 100 feet back from each existing bridge abutment. The roadway embankment borings shall be conducted to a depth of 40 feet each. Consultant shall also perform six roadway approach borings (3 on each side of bridge) evenly spaced at approximately 250 feet, 500 feet, and 750 feet back from each abutment to a depth of 2 feet each. One bulk sample shall be obtained from the roadway approach borings. Pavement coring shall be provided at all soil test boring locations. Cores shall be documented

including thickness measurements, distress, and surface conditions including a photo log of the cores.

The test hole depths shall be determined from the existing ground surface. Within the STBs, five split-spoon samples with Standard Penetration Test (SPT) N-value shall be obtained in the upper 10 feet and on 5-foot centers thereafter until the boring termination depth is reached. In addition, do continuous sampling on the top 30 ft on one of the borings at the east abutment and the borings at the west abutment; for a total of 12 additional SPT samples. A field operations engineer or geologist shall be present during all drilling operations so that sampling efforts and soil classifications can be completed in the field.

The upper 40 feet of each soil test boring performed within the existing roadway shall be grouted with non-shrink grout at the completion of the borings and measurement of water levels.

Table 1: Proposed Subsurface Investigation Test Summary

Test Type	Number of Test Locations	Depth (ft.)
Bridge SPT	5	100
Downhole Seismic Test	1	100
Embankment SPT	2	40
Roadway Hand Augers w/ DCP	6	2

The existing bridge cannot be accessed from the east. Borings will have to be drilled on the east side of the bridge and the drill rig will have to mobilize around to the other side to access the western side and the existing bridge. Traffic control is not anticipated to be required during drilling operations and the road is expected to be closed to traffic.

Geophysical Testing

We request for the consultant perform seismic refraction to profile rock at the project site. Testing inside the exiting SCDOT Right-of-Way. Weathered rock and rock boulders were observed at the surface near the project site during site reconnaissance, therefore the purpose of the seismic refraction is to map and gauge what the subsurface site conditions are like for the cut sections at the western end of project. 4 seismic refraction arrays, parallel to the existing roadway center line should be sufficient. Submit all appropriate files and documentation as required in the 2022 GDM.

Laboratory Testing

Laboratory testing shall consist of performing up to 6 Full Grain Size Analyses with Hydrometer, 30 Sieve Analyses with Wash No. 200, 30 Atterberg Limits, 36 Natural Moisture Contents, 12 Unconfined Compressive Strength of Rock Cores, One Organic Content, Two Corrosion Series Test, Two Standard Proctor Compaction Test, Two CU Triaxial Shear Tests with Pore Pressure Measurements (Remolded to 95% of Standard Proctor) and One California Bearing Ratio Test. Classification testing shall be conducted on the upper sample of roadway embankment boring samples and on bulk samples and are included in the quantities above.

Geotechnical Baseline Report and Subsurface Data Report

After completion of the field and laboratory testing, the **CONSULTANT** will prepare a geotechnical baseline report (GBR) and geotechnical subsurface data report. The reports shall be completed in accordance with the 2022 GDM and shall include, but not be limited to the following:

1. Site description with photographic documentation showing the drill rig on the test hole;

2. Drilling and testing procedures, along with charts illustrating the soil classification criteria and terminology;

3. Boring location plan which will include the locations of all testing and surface soil sampling performed;

4. STB logs which describe the various subsurface strata and graphically illustrate stratigraphy, SPT data, and **24-hour groundwater levels**;

5. 2D Seismic refraction profiles;

6. gINT data files;

7. Laboratory testing procedures and individual test data sheets.

Asbestos and Lead-Based Paint Survey

An asbestos and lead-based paint survey is requested for the both the existing and old US 76 bridges over the Chauga River. Separate reports shall be produced for each bridge structure.

The inspector must comply with procedures specified in The Environmental Protection Agency Code of Federal Regulations (CFR) Title 40, Chapter I, Subchapter R, Part 763. This work shall be conducted by a firm properly certified to evaluate asbestos and lead-based paints.

At a minimum, the report should include information required in 40 CFR 763.85 (a)(4)(vi)(A)-(E), as well as, project location map, photos of existing structure, the date of inspection and the name, license number, and signature of the licensed inspector who performed the inspection and completed the report. The cover sheet of the report shall include project identification information, including SCDOT Project ID, route carried by structure, and description of what the structure crosses. Please place the following notes on the cover sheets of the reports and check the appropriate boxes:

____ Yes, Asbestos was found ____ Yes, Lead-Based Paint was found

____ No, Asbestos was not found ____ No, Lead-Based Paint was not found

The following hazardous materials testing is estimated for this project:

- Twenty (30) Polarized Light Microscopy (PLM) Tests for asbestos containing materials,

- Twelve (12) Transmission Electron Microscopy (TEM) Tests for asbestos containing materials,
- One (1) day of X-Ray Fluorescence (XRF) Analyzer testing for lead-based paint,
- Two (2) days of Bridge Inspection Truck

Deliverables

Deliverables to the Department shall be an electronic copy of the final geotechnical baseline and subsurface data reports. The electronic copy shall include a PDF version of the report along with a DGN file of the test hole location plan. Boring logs file shall also be submitted in gINT data file format.

The lead-based paint and asbestos reports shall be submitted in electronic PDF format.

To execute this Scope of Services, it is estimated that 240 man-hours will be required for the geotechnical investigation, laboratory testing, and report preparation services. It is estimated that 80 man-hours will be required for the lead-based paint and asbestos assessment.

APPENDIX

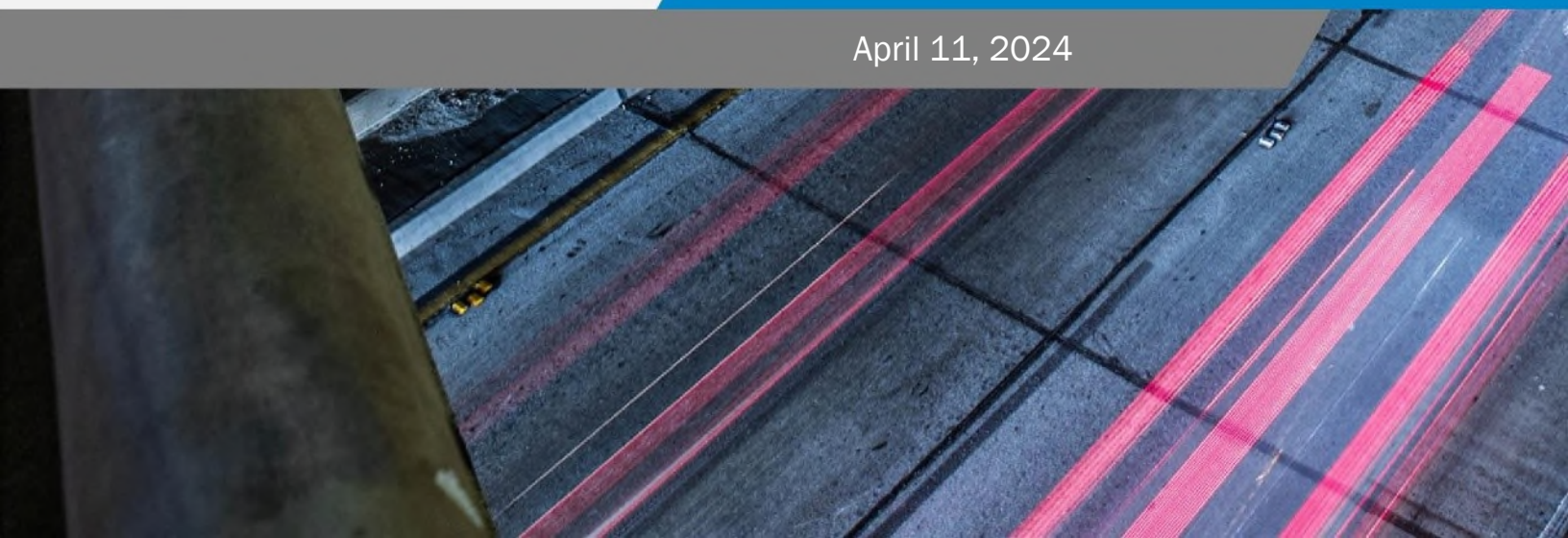
SECTION 9 SPT HAMMER CALIBRATION

CAROLINAS GEOTECHNICAL GROUP

Report of SPT Hammer Energy

Prepared for:
North Carolina Department of Transportation
Geotechnical Engineering Unit
1589 Mail Service Center
Raleigh, North Carolina 27699

April 11, 2024



CAROLINAS GEOTECHNICAL GROUP

N.C. Firm License: P-1904

2400 Crownpoint Executive Drive
Suite 800
Charlotte, NC 28227

(980) 339-8684
contact@carolinasgeotech.com
www.carolinasgeotech.com

April 11, 2024

North Carolina Department of Transportation
Geotechnical Engineering Unit
1589 Mail Service Center
Raleigh, North Carolina 27699

Attention: Mr. Gregory C. Bodenheimer, P.E.

Cc: Ms. Christina M. Bruinsma, L.G.; Dr. Shunyi (Chris) Chen, Ph.D., P.E.

SUBJECT: **Report of SPT Hammer Energy**
CG2 Mobile B-29 Truck Rig (SN 2019022)
Statesville, North Carolina
CG2 Project No.: 240019024

Dear Mr. Bodenheimer:

Carolinas Geotechnical Group, PLLC (CG2) has completed the Standard Penetration Test (SPT) energy measurements on the automatic hammer mounted on our Mobile B-29 truck-mounted drill rig with a serial number of 2019022, see attached Drill Rig Photo Log. This service was performed by Mr. Robert E. Kral, PE on April 9, 2024. SPT energy testing was performed in general accordance with ASTM D4633 and the most recent revision of the North Carolina Department of Transportation (NCDOT), Geotechnical Engineering Unit's requirements. The testing procedures, equipment used during testing, and detailed results are presented in this report.

DYNAMIC TESTING METHODOLOGY

Testing was performed using a model SPT (Serial No. 4553 TB) Pile Driving Analyzer™ (PDA) manufactured by Pile Dynamics, Inc. The PDA was used to record and interpret data from two piezoresistive accelerometers (Serial Nos. K10959 and K10960) bolted to a 2-foot long AWJ drill rod (SN 728AWJ) internally instrumented with two strain transducers. The instrumented AWJ drill rod has a cross-sectional area of 1.13 square inches, an outside diameter of approximately 1.75 inches, and an inside diameter of 1.25 inches at the gauge location. The accelerometer and strain gauges, which are mounted on opposing axis near the middle of the instrumented rod, monitor acceleration and strain for each hammer blow. The analyzer converts the data to velocities and forces and computes the maximum transferred hammer energies with the "EFV" method described in ASTM D4633. Preliminary results are recorded and displayed in real-time for each blow. Calibration sheets for the PDA, accelerometers, and the instrumented rod are included in the Appendix III.

TESTING AND OBSERVATIONS

CG2 personnel were on site April 9, 2024 to observe and perform high-strain dynamic testing during SPT sampling on the Mobile B-29 truck-mounted drill rig operated by M. Brewer of CG2. The measurements were taken during drilling operations at 1550 Wall Street in Statesville, North Carolina (Iredell County). The approximate coordinates (not professionally surveyed) for the test location are 35.7604171, -80.8633185. A Soil Test Boring Log was not maintained. SPT energy measurements were recorded during three intervals at depths of approximately 28½, 33½, and 38½ feet below the existing ground surface. The information presented in the table below summarizes the equipment tested and tooling used during the SPT energy measurements.

Table 1: SPT Field Data

Drill Rig Information	
Manufacturer	Mobile
Model	B-29
Serial Number	2019022
Operator	M. Brewer
Carrier	Truck
Hammer Information	
Model / Type	Mobile / Auto
Serial Number	N/A
Anvil Height (inches)	6.5
Anvil Diameter (inches)	2.5
Drop Height (inches)	30
Ram Weight (pounds)	140
Ram Serial Number	N/A
Drilling and Instrumented Rod Information	
Drill Rod Type	AWJ
OD (inches)	1.75
ID (inches)	1.25
Cross-Sectional Area (in^2)	1.13
Typical Lengths (feet)	5 and 2
Instrumented Rod Type	AWJ (SN 728)
OD (inches)	1.75
ID (inches)	1.25
Cross-Sectional Area (in^2)	1.13
Total Instrumented Rod Length (feet)	2.00
Length Below Gages (feet)	0.70
Split-Spoon Length (feet)	2.85

DYNAMIC TESTING RESULTS

The total rod length from the instrumentation to the tip of the split-spoon sampler was determined by adding 3.6 feet to the required drill rod length at each sample depth. Based on the test data, the automatic hammer on the Mobile B-29 truck-mounted drill rig operated at a rate of about 51.9 to 53.9 blows per minute (BPM) during dynamic testing. The measured transferred hammer energy (EFV) ranged from 294.5 to 336.5 foot-pounds, which corresponds to Energy Transfer Ratio (ETR) values of 84.1 to 96.1%, respectively. These data ranges are based on the overall minimum and maximum values for the last 12 inches of each sample interval.

The SPT Energy Measurement Data Summary tables in the appendix present the test data from every hammer blow at each sampling interval along with representative force and velocity traces for each test interval. The reported blow counts, obtained by the drill rig personnel, a summary of the test data, and average computed BPM, EFV, and ETR values are provided in Table 2. The BPM, EFV, and ETR values presented in Table 2 were computed by averaging data from the last 12 inches of each sample interval. Plots and tables of the following are also included in the appendix and present the test data with depth for each test interval:

- Penetration vs. BLC
- Penetration vs. FMX
- Penetration vs. EFV
- Penetration vs. CSX
- Penetration vs. VMX
- Penetration vs. ETR
- Average ETR vs. Rod Length
- ETR vs. Rod Length

Table 2: Summary of Dynamic Testing Results

Data Set ID	Sample Depth (ft)	Drill Rod Length (ft)	Instrumentation to Sampler Tip Length (ft)	Blows per 6" Increment / N-value	Soil Sample Description (Piedmont Residual)	Avg. BPM	Avg. EFV (ft-lbs)	Avg. ETR (%)
1	28½ - 30	32	35.6	6-7-7 / 14	SILT	53.2	306.9	87.7
2	33½ - 35	37	40.6	4-8-10 / 18	SILT	52.7	327.5	93.6
3	38½ - 40	42	45.6	4-6-7 / 13	SILT	52.6	326.3	93.2
					Overall Average	**52.8**	**320.8**	**91.7**

The average hammer rate, transferred energy, and transfer ratio were calculated for each depth interval. Per ASTM D4633, only the blows from the final foot of each sample interval (i.e., the blows that determine the N-value) were included when computing the average values shown in Table 2. The overall average transferred hammer energy for the automatic hammer on the Mobile B-29 truck-mounted drill rig (for all the depth intervals included in Table 2) was 320.8 foot-pounds, with an average ETR of 91.7%.

LIMITATIONS OF REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The information contained in this report were based on the applicable standards of our profession in this geographic area at the time this report was prepared. No other warranty, express or implied, is made.

CLOSING

CG2 is pleased to have the opportunity to provide these services to you. If you have questions concerning the content of this report, or if CG2 can be of further service, please contact CG2 at (980) 339-8684.

Sincerely,
Carolinas Geotechnical Group, PLLC

DocuSigned by:
Pressley M. Perry
F926DBFBAB0F4FE...
Pressley M. Perry, EIT
Staff Professional

DocuSigned by:
Robert E. Kral
8AD703B2A8484F4...
Robert E. Kral, PE
Senior Project Engineer
NC Registration No. 042642

Appendices:

- Appendix I - Mobile B-29 Truck Rig (SN 2019022) SPT Energy Measurements Summary Plots and Tables
- Appendix II - SPT Hammer Energy Field Form (Field Log) and Drill Rig Photo Log
- Appendix III - Instrumented Rod and Accelerometer Calibration Sheets
- Appendix IV - Certificate of Proficiency and Certificate of Calibration

APPENDIX I

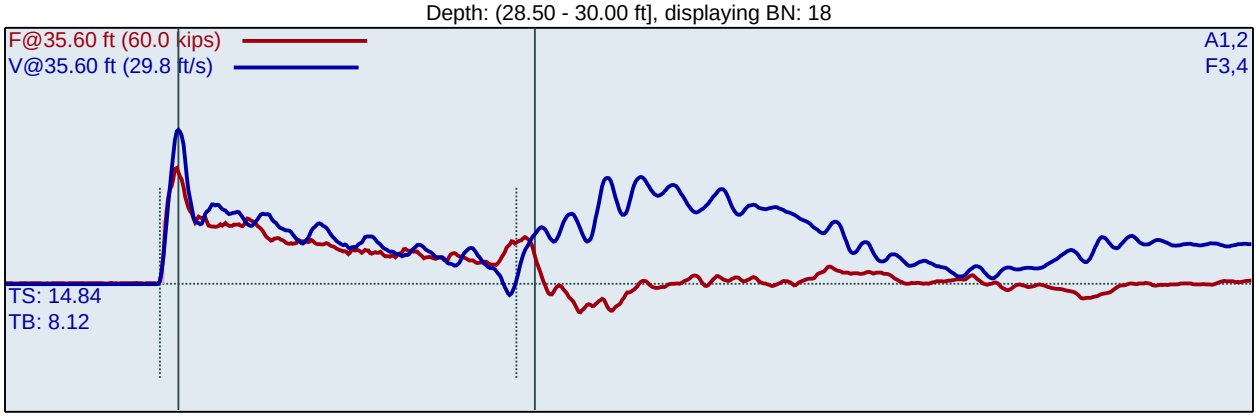
MOBILE B-29 (SN 2019022)
REK
B-1

B-1
Interval start: 4/9/2024

AR: 1.13 in^2
LE: 35.60 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (28.50 - 30.00 ft], displaying BN: 18



F3 : [728AWJ1] 224.649 PDICAL (1) FF1
F4 : [728AWJ2] 224.139 PDICAL (1) FF1

A1 (PR): [K10959] 413.827 mv/6.4v/5000g (1) VF1
A2 (PR): [K10960] 419.894 mv/6.4v/5000g (1) VF1

BPM: Blows/Minute
FMX: Maximum Force
VMX: Maximum Velocity
DMX: Maximum Displacement

CSX: Compression Stress Maximum
DFN: Final Displacement
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

LP	BL#	BC	BPM	FMX	VMX	DMX	CSX	DFN	EFV	ETR
ft		/6"	bpm	kips	ft/s	in	ksi	in	ft-lb	%
28.58	1	6	1.9	25.7	15.7	1.2	22.8	1.0	298.4	85.3
28.67	2	6	53.4	25.7	17.5	1.1	22.7	1.0	308.7	88.2
28.75	3	6	53.2	26.1	17.6	1.1	23.1	1.0	310.6	88.8
28.83	4	6	52.9	26.1	17.6	1.1	23.1	1.0	312.2	89.2
28.92	5	6	53.4	26.0	17.2	1.1	23.0	1.0	299.9	85.7
29.00	6	6	53.1	26.1	17.2	1.1	23.1	1.0	303.6	86.7
29.07	7	7	53.3	26.4	17.4	0.9	23.4	0.9	299.6	85.6
29.14	8	7	53.9	26.7	17.6	0.9	23.6	0.9	303.4	86.7
29.21	9	7	53.0	26.5	17.6	0.9	23.4	0.9	301.2	86.1
29.29	10	7	53.3	26.4	18.5	0.9	23.4	0.9	327.1	93.5
29.36	11	7	53.3	26.2	17.6	0.9	23.2	0.9	301.4	86.1
29.43	12	7	53.4	27.0	18.0	0.9	23.9	0.9	306.7	87.6
29.50	13	7	52.6	26.4	17.3	0.9	23.3	0.9	294.5	84.1
29.57	14	7	53.2	26.5	17.8	0.9	23.5	0.9	311.7	89.0
29.64	15	7	53.2	26.8	17.7	1.0	23.8	0.9	313.1	89.5
29.71	16	7	53.1	27.0	17.9	0.9	23.9	0.9	314.1	89.8
29.79	17	7	53.4	26.7	17.6	1.0	23.6	0.9	304.7	87.0
29.86	18	7	53.2	27.1	17.9	1.0	24.0	0.9	313.5	89.6
29.93	19	7	52.4	26.7	17.8	0.9	23.7	0.9	310.9	88.8
30.00	20	7	53.3	26.7	17.6	1.0	23.6	0.9	295.3	84.4
		Average	53.2	26.7	17.7	0.9	23.6	0.9	306.9	87.7
		Std Dev	0.3	0.3	0.3	0.0	0.2	0.0	8.5	2.4
		Maximum	53.9	27.1	18.5	1.0	24.0	0.9	327.1	93.5
		Minimum	52.4	26.2	17.3	0.9	23.2	0.9	294.5	84.1

N-value: 14

Sample Interval Time: 21.41 seconds.

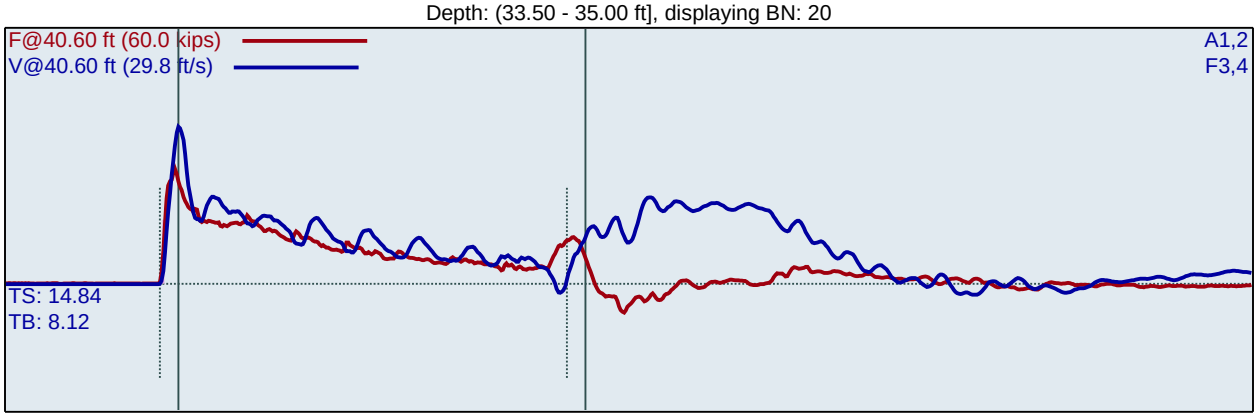
MOBILE B-29 (SN 2019022)
REK
B-1

B-1
Interval start: 4/9/2024

AR: 1.13 in^2
LE: 40.60 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (33.50 - 35.00 ft], displaying BN: 20



F3 : [728AWJ1] 224.649 PDICAL (1) FF1
F4 : [728AWJ2] 224.139 PDICAL (1) FF1

A1 (PR): [K10959] 413.827 mv/6.4v/5000g (1) VF1
A2 (PR): [K10960] 419.894 mv/6.4v/5000g (1) VF1

LP ft	BL#	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
33.63	1	4	1.9	27.0	18.1	2.4	23.9	1.5	323.1	92.3
33.75	2	4	53.1	26.3	17.7	1.5	23.3	1.5	316.0	90.3
33.88	3	4	52.2	26.2	18.6	1.5	23.2	1.5	350.1	100.0
34.00	4	4	52.6	26.0	18.0	1.5	23.0	1.5	344.6	98.5
34.06	5	8	53.1	25.9	18.4	0.9	22.9	0.7	320.1	91.4
34.13	6	8	53.2	26.4	18.4	1.0	23.4	0.7	330.0	94.3
34.19	7	8	52.5	27.5	19.1	1.0	24.3	0.7	328.7	93.9
34.25	8	8	52.6	28.2	18.9	1.0	24.9	0.7	330.9	94.6
34.31	9	8	53.2	27.3	19.0	0.9	24.2	0.7	329.1	94.0
34.38	10	8	52.3	26.0	18.6	1.0	23.0	0.7	329.9	94.3
34.44	11	8	52.9	26.3	18.0	1.0	23.3	0.7	327.3	93.5
34.50	12	8	52.6	26.1	18.7	0.9	23.1	0.7	324.6	92.7
34.55	13	10	52.7	26.3	18.1	0.9	23.2	0.6	323.6	92.4
34.60	14	10	53.1	26.6	18.3	0.8	23.5	0.6	317.5	90.7
34.65	15	10	52.2	26.7	18.6	0.9	23.6	0.6	323.6	92.5
34.70	16	10	52.3	26.3	18.2	0.9	23.2	0.6	336.5	96.1
34.75	17	10	52.6	26.0	18.6	0.8	23.0	0.6	329.6	94.2
34.80	18	10	52.3	26.0	17.6	0.9	23.0	0.6	331.3	94.7
34.85	19	10	53.0	26.4	18.3	0.8	23.3	0.6	334.6	95.6
34.90	20	10	53.3	27.0	18.2	0.7	23.9	0.6	326.0	93.1
34.95	21	10	51.9	26.9	18.8	0.7	23.8	0.6	329.2	94.1
35.00	22	10	52.5	26.8	18.1	0.7	23.7	0.6	323.1	92.3
		Average	52.7	26.6	18.4	0.9	23.5	0.7	327.5	93.6
		Std Dev	0.4	0.6	0.4	0.1	0.5	0.1	4.7	1.3
		Maximum	53.3	28.2	19.1	1.0	24.9	0.7	336.5	96.1
		Minimum	51.9	25.9	17.6	0.7	22.9	0.6	317.5	90.7
					N-value: 18					

Sample Interval Time: 23.95 seconds.

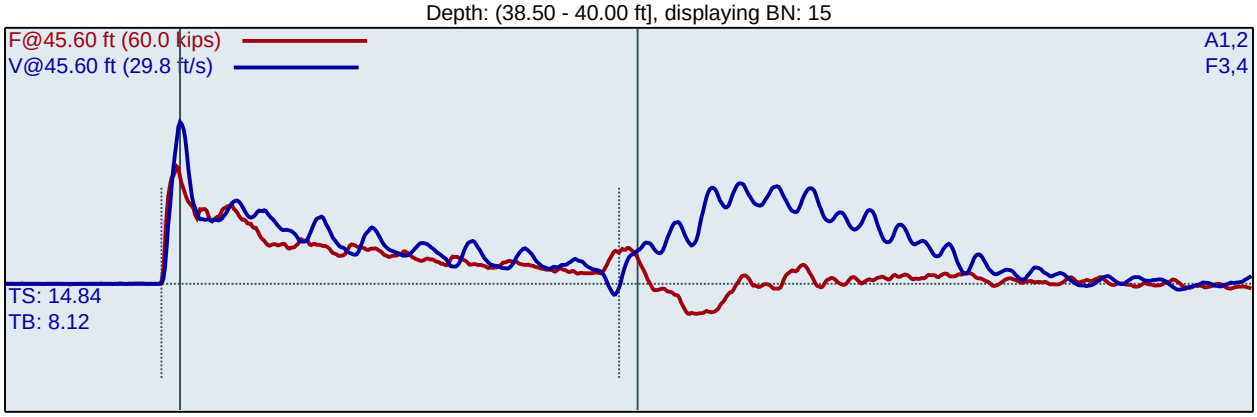
MOBILE B-29 (SN 2019022)
REK
B-1

B-1
Interval start: 4/9/2024

AR: 1.13 in^2
LE: 45.60 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (38.50 - 40.00 ft], displaying BN: 15



F3 : [728AWJ1] 224.649 PDICAL (1) FF1
F4 : [728AWJ2] 224.139 PDICAL (1) FF1

A1 (PR): [K10959] 413.827 mv/6.4v/5000g (1) VF1
A2 (PR): [K10960] 419.894 mv/6.4v/5000g (1) VF1

LP	BL#	BC	BPM	FMX	VMX	DMX	CSX	DFN	EFV	ETR
ft		/6"	bpm	kips	ft/s	in	ksi	in	ft-lb	%
38.63	1	4	1.9	26.6	17.5	2.2	23.5	1.5	316.5	90.4
38.75	2	4	52.2	26.4	18.1	1.6	23.4	1.5	317.9	90.8
38.88	3	4	52.4	26.4	18.0	1.6	23.3	1.5	310.6	88.7
39.00	4	4	52.3	26.5	18.4	1.7	23.5	1.5	324.4	92.7
39.08	5	6	52.1	25.9	18.4	1.5	23.0	1.0	324.9	92.8
39.17	6	6	53.1	26.0	18.3	1.3	23.0	1.0	319.9	91.4
39.25	7	6	52.5	26.6	17.8	1.3	23.6	1.0	321.0	91.7
39.33	8	6	52.4	26.9	18.3	1.3	23.8	1.0	331.8	94.8
39.42	9	6	52.7	26.4	18.7	1.1	23.3	1.0	325.6	93.0
39.50	10	6	52.4	26.9	18.5	1.1	23.8	1.0	318.7	91.1
39.57	11	7	53.0	25.7	18.6	1.1	22.7	0.9	325.2	92.9
39.64	12	7	52.5	26.6	18.7	1.0	23.5	0.9	324.1	92.6
39.71	13	7	52.4	26.5	18.5	1.1	23.5	0.9	333.9	95.4
39.79	14	7	52.7	26.3	18.8	0.9	23.3	0.9	332.4	95.0
39.86	15	7	52.3	27.5	18.8	1.0	24.3	0.9	333.0	95.1
39.93	16	7	53.1	27.5	18.5	0.9	24.3	0.9	330.4	94.4
40.00	17	7	52.2	26.2	18.2	0.9	23.2	0.9	321.7	91.9
		Average	52.6	26.5	18.5	1.1	23.5	0.9	326.3	93.2
		Std Dev	0.3	0.5	0.3	0.2	0.5	0.1	5.1	1.5
		Maximum	53.1	27.5	18.8	1.5	24.3	1.0	333.9	95.4
		Minimum	52.1	25.7	17.8	0.9	22.7	0.9	318.7	91.1

N-value: 13

Sample Interval Time: 18.27 seconds.

Summary of SPT Test Results

Project: MOBILE B-29 (SN 2019022), Test Date: 4/9/2024

BPM: Blows/Minute
FMX: Maximum Force
VMX: Maximum Velocity
DMX: Maximum Displacement
CSX: Compression Stress Maximum
DFN: Final Displacement
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

Instr. Length ft	Start Depth ft	Final Depth ft	Blows Applied /6"	**N Value**	**N60 Value**	Average BPM bpm	Average FMX kips	Average VMX ft/s	Average DMX in	Average CSX ksi	Average DFN in	Average EFV ft-lb	Average ETR %
35.60	28.50	30.00	**6-7-7**	**14**	**21**	53.2	26.7	17.7	0.9	23.6	0.9	306.9	87.7
40.60	33.50	35.00	**4-8-10**	**18**	**27**	52.7	26.6	18.4	0.9	23.5	0.7	327.5	93.6
45.60	38.50	40.00	**4-6-7**	**13**	**19**	52.6	26.5	18.5	1.1	23.5	0.9	326.3	93.2
			Overall Average Values:			52.8	26.6	18.2	1.0	23.5	0.8	320.8	91.7
			Standard Deviation:			0.4	0.5	0.5	0.1	0.4	0.1	11.2	3.2
			Overall Maximum Value:			53.9	28.2	19.1	1.5	24.9	1.0	336.5	96.1
			Overall Minimum Value:			51.9	25.7	17.3	0.7	22.7	0.6	294.5	84.1

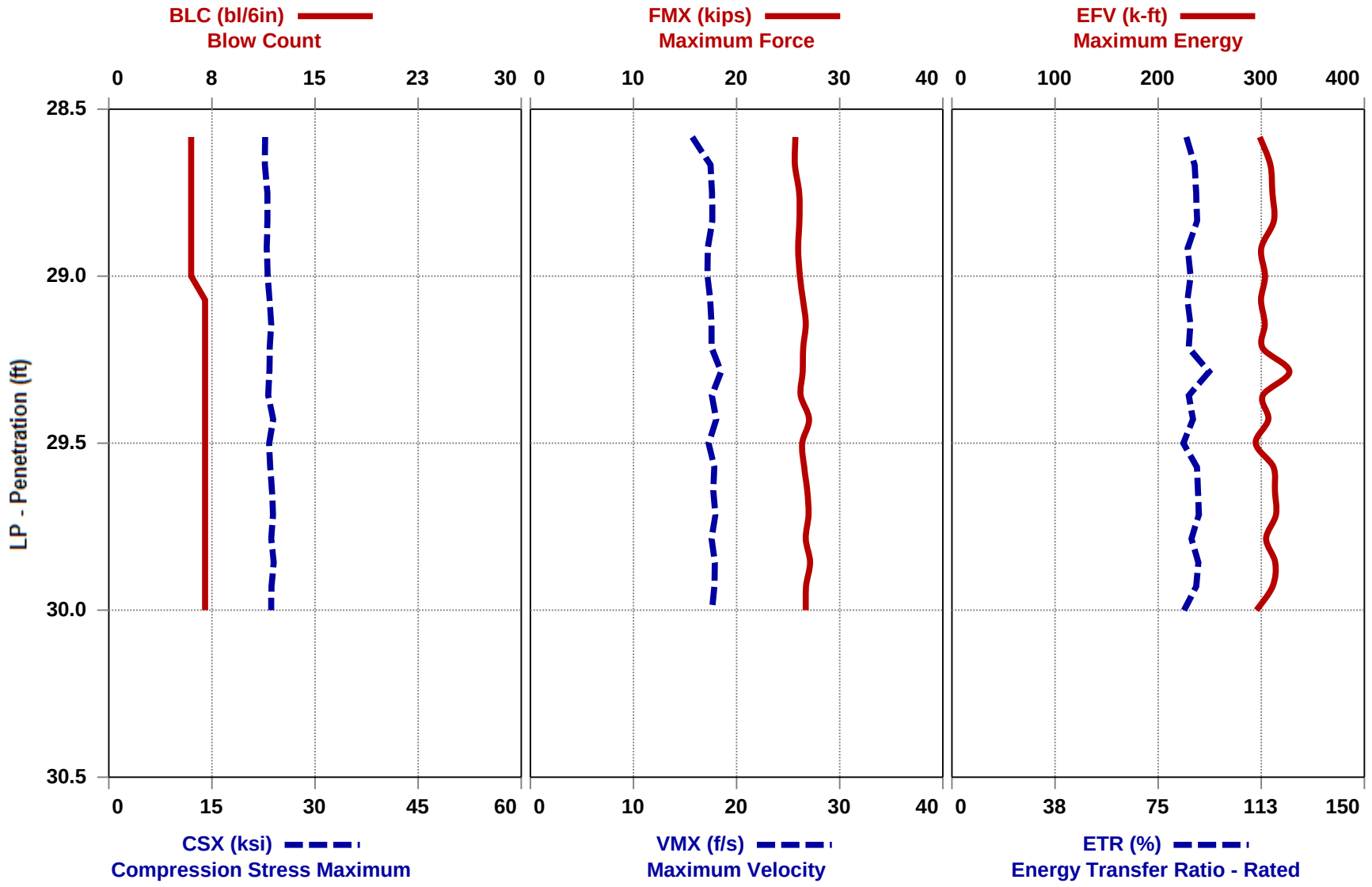
GRL Engineers, Inc. - PDIPLOT2 Ver 2021.1.61.0 - Case Method & iCAP® Results

Printed: 11-April-2024

Test started: 09-April-2024

MOBILE B-29 (SN 2019022) - 28.5 TO 30.0

B-1



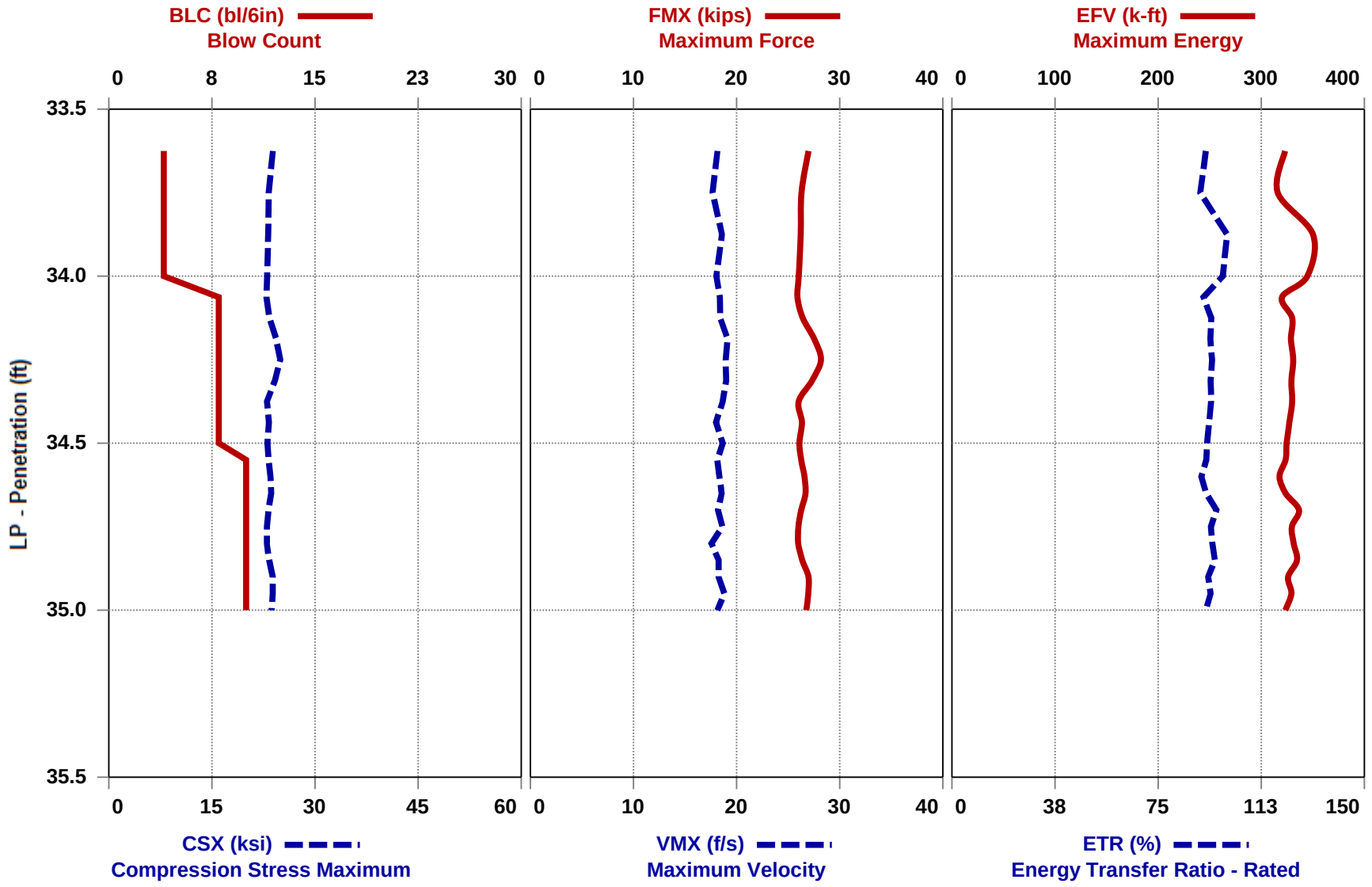
GRL Engineers, Inc. - PDIPLOT2 Ver 2021.1.61.0 - Case Method & iCAP® Results

Printed: 11-April-2024

Test started: 09-April-2024

MOBILE B-29 (SN 2019022) - 33.5 TO 35.0

B-1



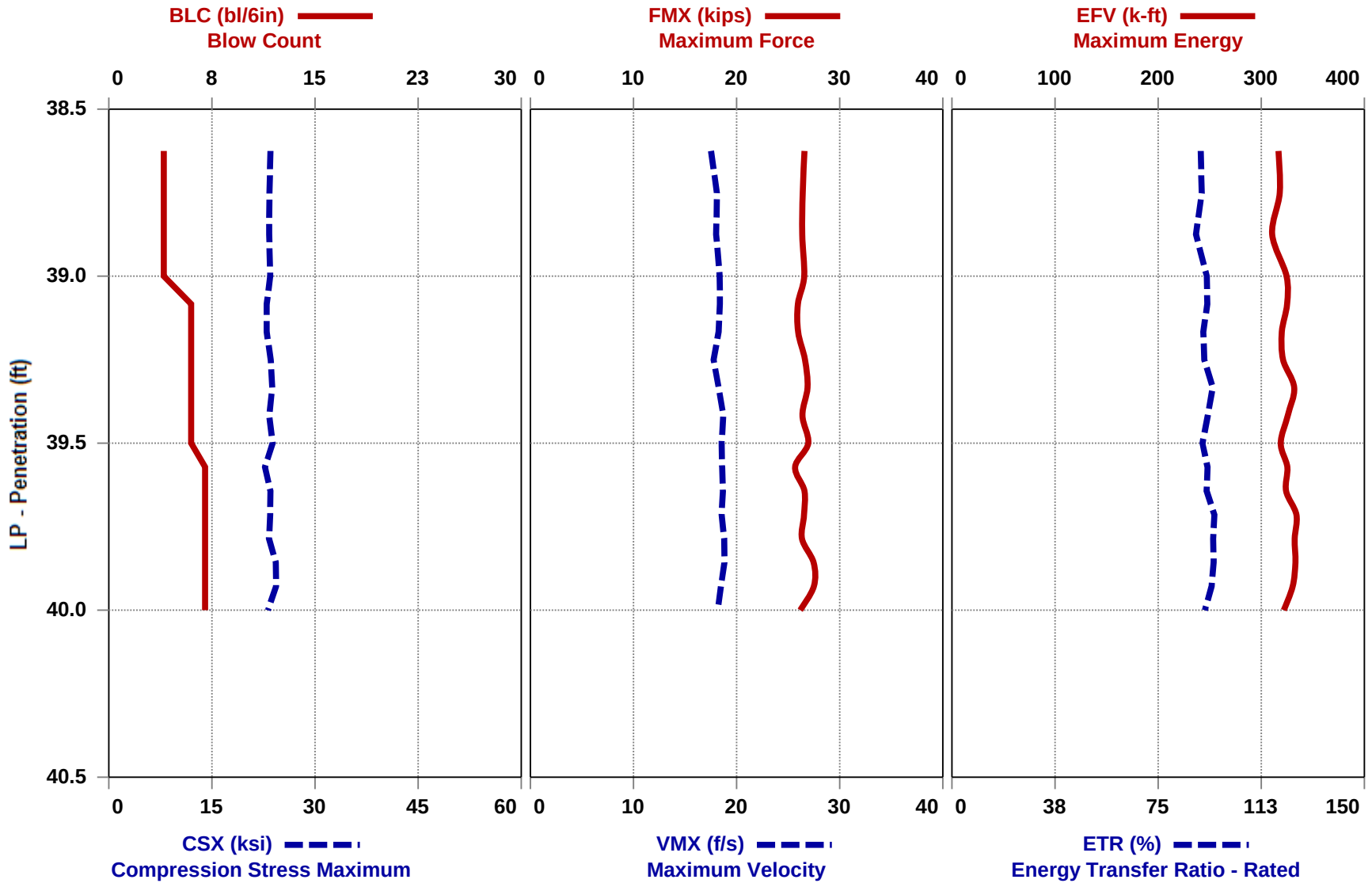
GRL Engineers, Inc. - PDIPLOT2 Ver 2021.1.61.0 - Case Method & iCAP® Results

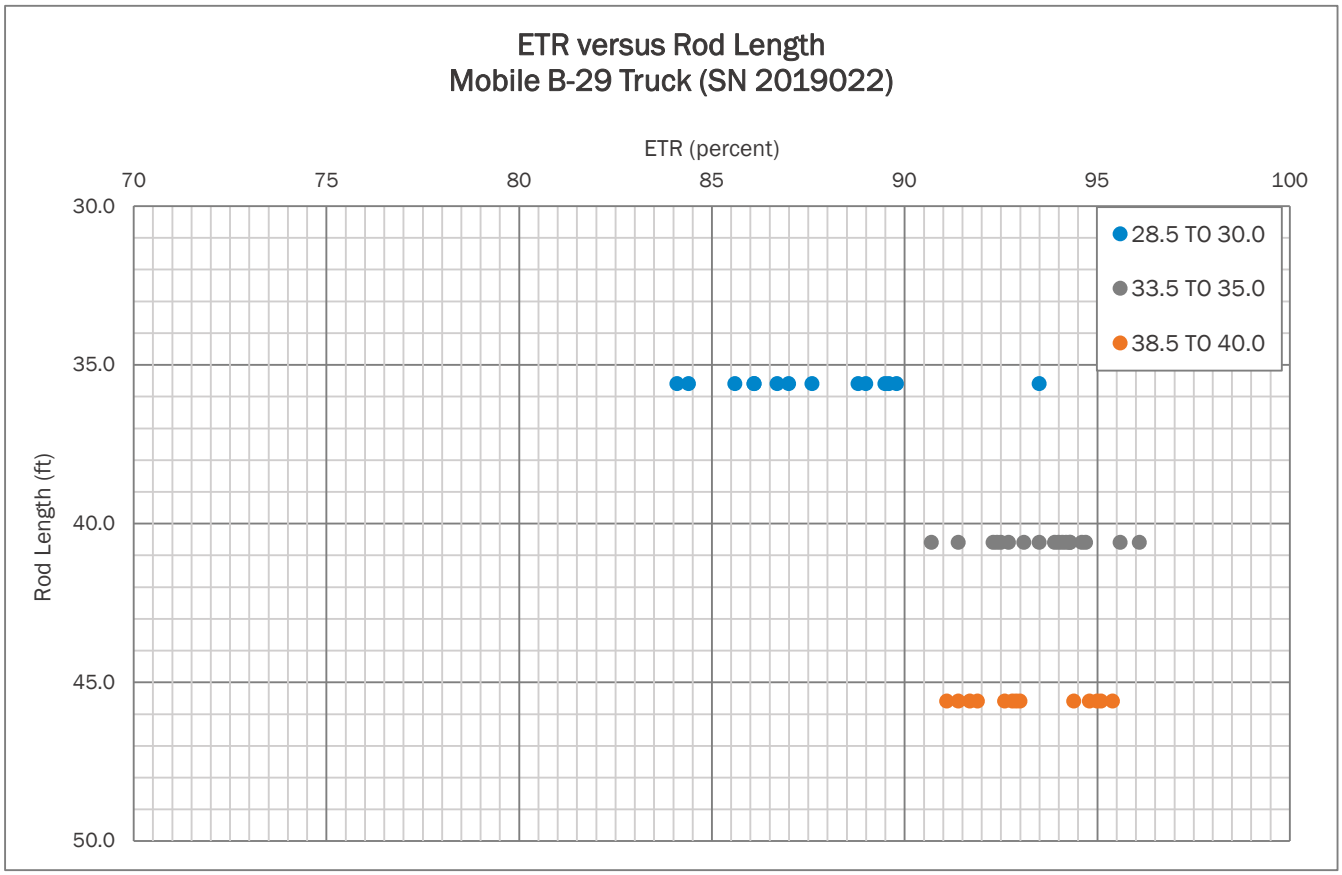
Printed: 11-April-2024

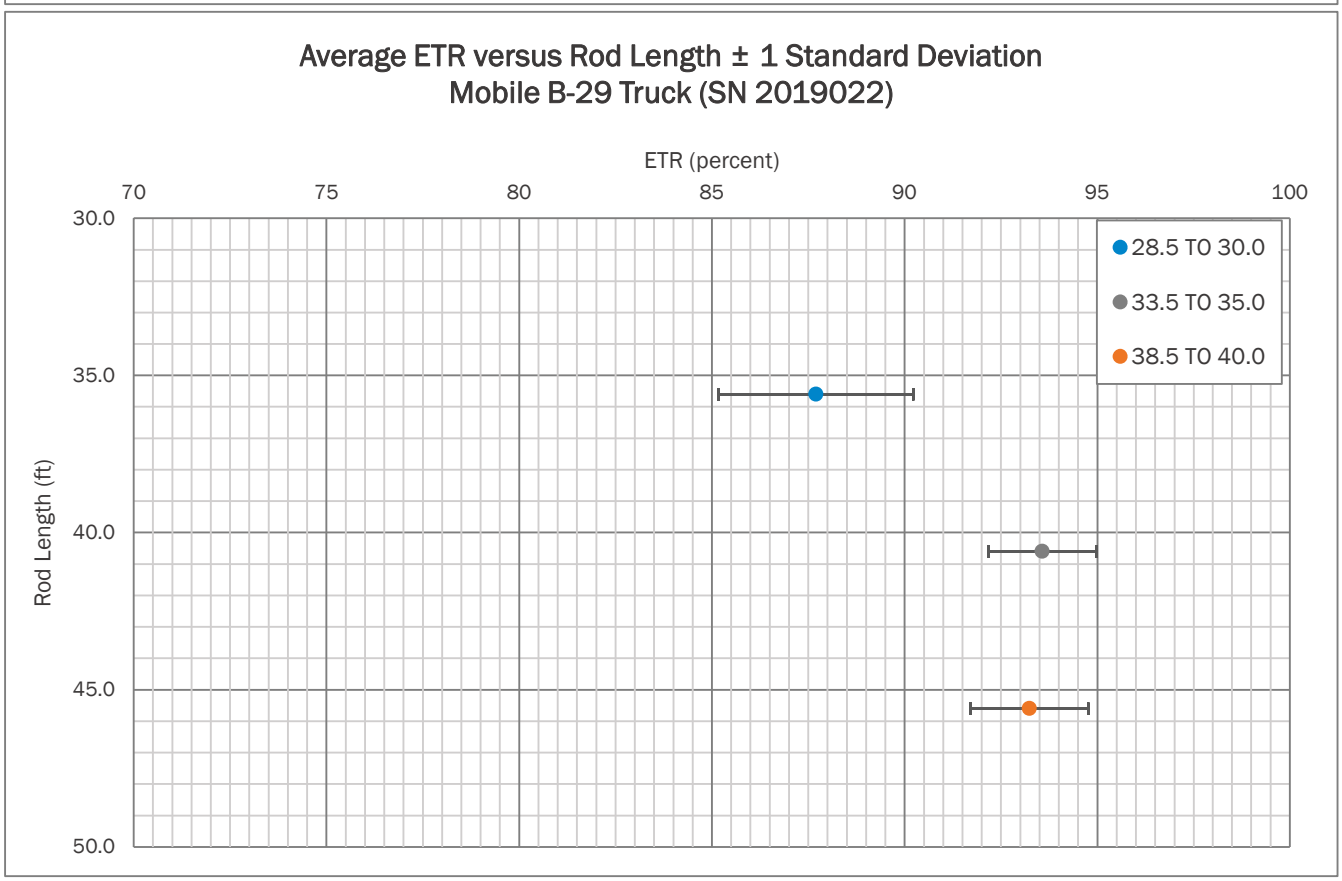
Test started: 09-April-2024

MOBILE B-29 (SN 2019022) - 38.5 TO 40.0

B-1




ETR versus Rod Length
Mobile B-29 Truck (SN 2019022)
ETR (percent)
70
75
80
85
90
95
100
30.0
35.0
40.0
45.0
50.0
Rod Length (ft)
28.5 TO 30.0
33.5 TO 35.0
38.5 TO 40.0


Average ETR versus Rod Length ± 1 Standard Deviation
Mobile B-29 Truck (SN 2019022)
ETR (percent)
70
75
80
85
90
95
100
30.0
35.0
40.0
45.0
50.0
Rod Length (ft)
28.5 TO 30.0
33.5 TO 35.0
38.5 TO 40.0

APPENDIX II

SPT Hammer Energy Field Form

Project:	SPT HAMMER ENERGY	**Date:**	4/9/2024
Project No.:	240019024	**Weather:**	60's CLOUDY
Boring No.:	B-1	**Drill Rod Type:**	AWJ

On-site Personnel

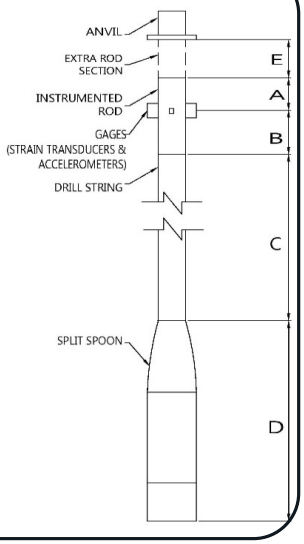
Drilling Company:	CG2 EXPLORATION, LLC
Rig Operator:	M. BREWER
Engr/Geologist:	N/A
Client Rep.:	N/A
Analyzer Oper.:	R. KRAL

Rig/Hammer Info

Drill Rig Make/Model:	MOBILE B29
Carrier Type:	TRUCK
Rig Serial No.:	2019022
Hammer Type/Model:	MOBILE
Hammer Serial No.:	N/A
Hammer Drop System:	AUTO
Lubrication Condition:	PER MANUFACTURER
Manufacturer Recommended Operation Rate (bpm):	45
Drop Height (in.):	30
Hammer Weight (lbs):	140
Anvil Dimension (in.):	6.5
Drilling Method:	2.25" HSA

Rod Info

(A + E) Impact Surface to Gages Length:	1.36	ft
(B) Instr. Rod Length below Gages:	0.70	ft
(A) + (B) Instr. Rod Length:	2.00	ft
(D) Spoon Length:	2.85	ft
(E) Rod Length Above Instr. Rod (if applicable):	0.06	ft
Instr. Rod S/N:	728AWJ	
Instr. Rod Outside Dia.:	1.75	in.
Instr. Rod Area:	1.13	in^2
PDA Make/Model:	SPT	
PDA Serial No.:	4553 TB	
Calib. Pulse Test (y/n):	Y	



Gage Info

Gage		Serial No.	Calibration No.
Accel.	A3	K10959	413.83
	A4	K10960	419.89
Strain	F3	728AWJ-1	224.65
	F4	728AWJ-2	224.14

Date of Test	Test Depth Increment (ft to ft)	Test Time Start / Stop (military)	Length of Drill String (ft) ***(C)***	(LE) Length below Gages (ft) ***(B) + (C) + (D)***	Avg. Meas. Hammer Rate (BPM)	SPT Blow Counts 6"	12"	18"	N-Value	Drop Height in Tolerance (y/n)	Soil Class.
9-Apr	28.5 TO 30.0	1515/1515	32	35.6	53	6	7	7	14	Y	SI
9-Apr	33.5 TO 35.0	1522/1523	37	40.6	53	4	8	10	18	Y	SI
9-Apr	38.5 TO 40.0	1530/1531	42	45.6	53	4	6	7	13	Y	SI

Notes:
TESTING PERFORMED AT 1550 WALL STREET IN STATESVILLE, NORTH CAROLINA 28677 (IREDELL COUNTY). THE APPROXIMATE COORDINATES ARE 35.7604171, -80.8633185.

NOTE: (1) Note any unusual hammer operating conditions that affect the hammer performance, or changes in operating conditions (e.g. veritcality, weather, or lubrication between trials). (2) Note any changes in rod diameter along drill string and record locations of short rod sections.

Prepared By (print/signature)

4/9/2024
Date

Figure No. 1: Rear View of Drill Rig

Figure No. 2: Side View of Drill Rig

Figure No. 3: Serial Number Plate

Figure No. 4: Automatic Hammer

APPENDIX III

Certificate of Calibration

Pile Dynamics, Inc. certifies that the

Pile Driving Analyzer®, Model SPT

Serial Number: 4553 TB

was calibrated on 18 December 2023

using a PDA Calibration Box whose output was calibrated with test equipment traceable to NIST.

This certificate is valid for 2 years from above date.

PILE DYNAMICS, INC. CORPORATE SEAL 1972 OHIO

Tested by

Pile Dynamics, Inc
30725 Aurora Road
Cleveland, Ohio 44139 USA

Certificate of Calibration

Pile Dynamics, Inc. certifies that the

Pile Driving Analyzer®, Model SPT

Serial Number: 4549 TB

was calibrated on 14 July 2022

using a PDA Calibration Box whose output was calibrated with test equipment traceable to NIST.

This certificate is valid for 2 years from above date.

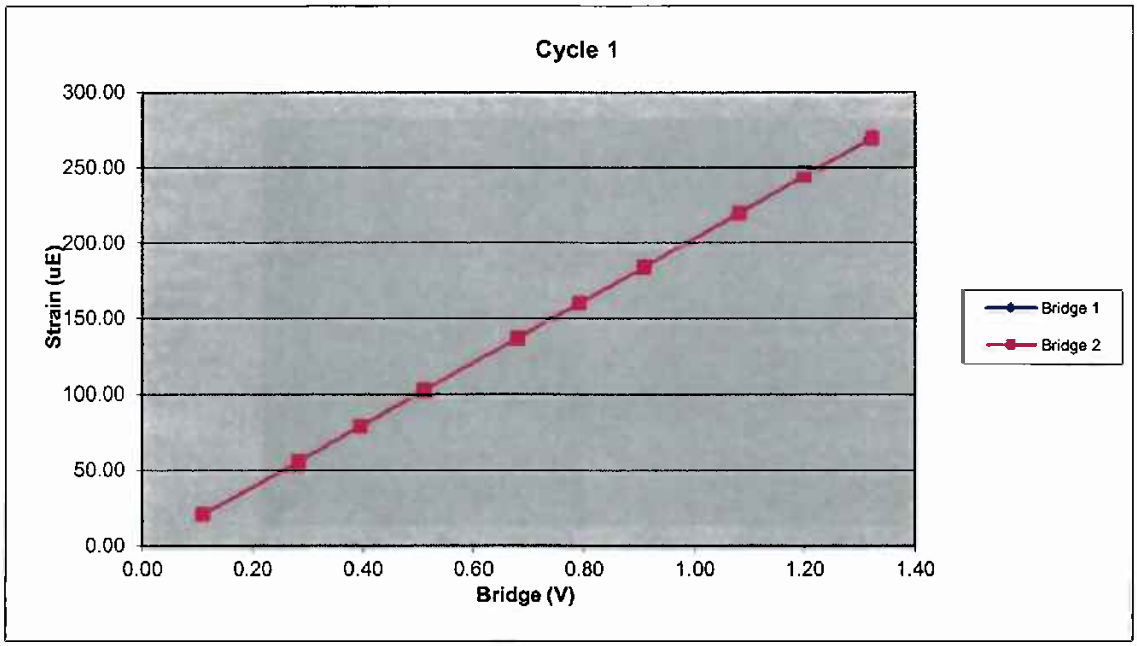
Tested by

Pile Dynamics, Inc.
30725 Aurora Road
Cleveland, Ohio 44139 USA

528AWJ		Cycle 1		
Sample	**Force (lb)**	**Strain (µE)**	**Bridge 1 (V)**	**Bridge 2 (V)**
1	0.00	0.00	0.00	0.00
2	803.20	21.15	0.11	0.11
3	2080.73	56.33	0.28	0.28
4	2904.01	79.79	0.39	0.39
5	3765.89	103.49	0.51	0.51
6	5005.11	138.03	0.68	0.68
7	5828.59	161.56	0.79	0.79
8	6692.71	185.68	0.91	0.91
9	7962.93	221.03	1.08	1.08
10	8831.54	245.89	1.20	1.20
11	9736.80	270.68	1.32	1.32

Bridge 1		**Bridge 2**	
Force Calibration (lb/V)	**7358.13**	**Force Calibration (lb/V)**	**7351.82**
Offset	3.52	Offset	6.26
Correlation	0.999999	Correlation	0.999999
Strain Calibration (µE/V)	**205.90**	**Strain Calibration (µE/V)**	**205.73**
Offset	-1.56	Offset	-1.48
Correlation	0.999995	Correlation	0.999996

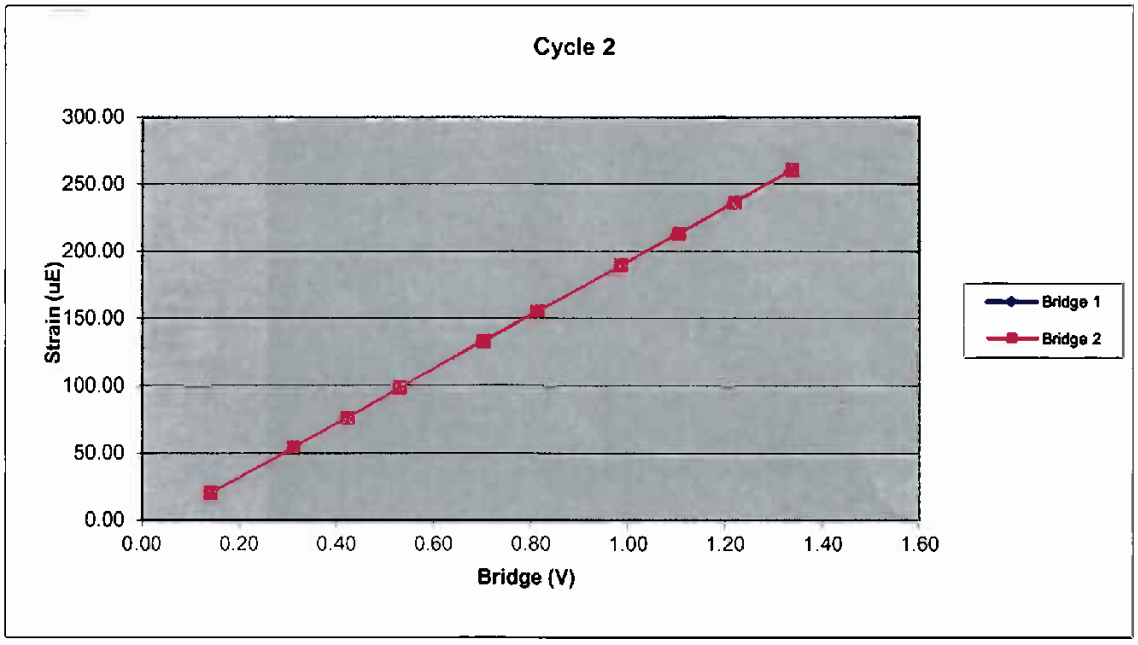
Force Strain Calibration	
EA (Kips)	**35735.87**
Offset	59.29
Correlation	0.999995



528AWJ		Cycle 2		
Sample	**Force (lb)**	**Strain (μE)**	**Bridge 1 (V)**	**Bridge 2 (V)**
1	0.00	0.00	0.00	0.00
2	1038.71	19.60	0.14	0.14
3	2288.25	53.30	0.31	0.31
4	3093.11	75.49	0.42	0.42
5	3893.00	97.84	0.53	0.53
6	5167.50	132.26	0.70	0.70
7	5988.25	154.39	0.81	0.81
8	7248.72	188.87	0.98	0.98
9	8125.71	212.29	1.10	1.10
10	8976.19	235.45	1.22	1.22
11	9854.85	259.50	1.33	1.34

Bridge 1		**Bridge 2**	
Force Calibration (lb/V)	**7381.92**	**Force Calibration (lb/V)**	**7365.94**
Offset	**-0.76**	Offset	**4.69**
Correlation	**0.999998**	Correlation	**0.999999**
Strain Calibration (μE/V)	**200.83**	**Strain Calibration (μE/V)**	**200.40**
Offset	**-8.59**	Offset	**-8.44**
Correlation	**0.999997**	Correlation	**0.999996**

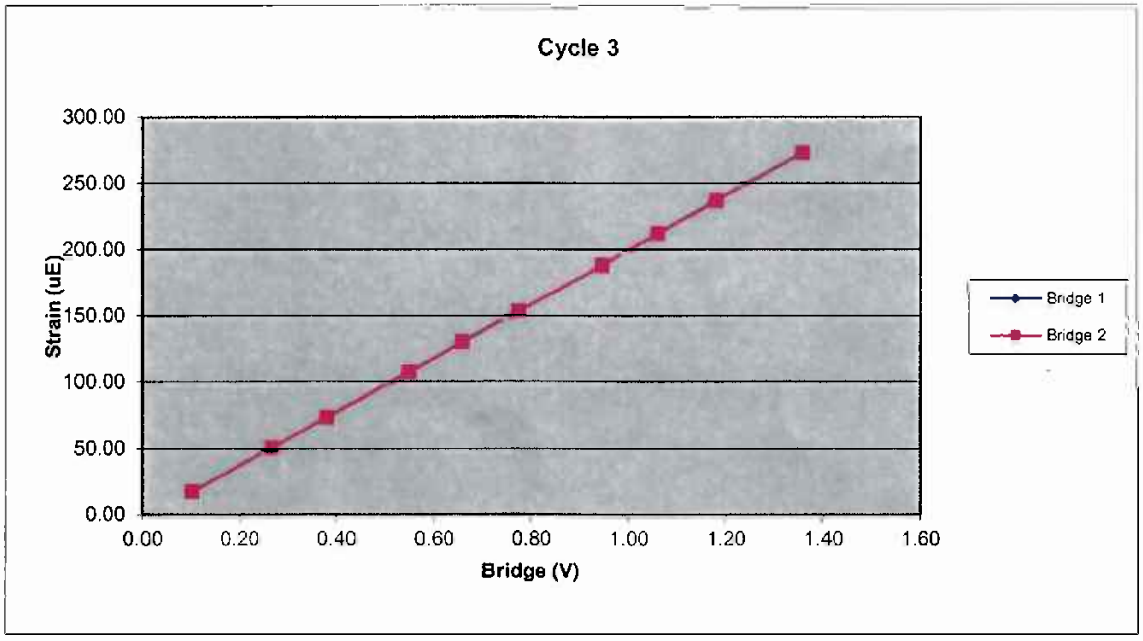
Force Strain Calibration	
EA (Kips)	**36756.34**
Offset	**315.07**
Correlation	**0.999995**



528AWJ		Cycle 3		
Sample	**Force (lb)**	**Strain (µE)**	**Bridge 1 (V)**	**Bridge 2 (V)**
1	0.00	0.00	0.00	0.00
2	734.68	18.74	0.10	0.10
3	1943.58	51.94	0.26	0.26
4	2781.29	75.07	0.38	0.38
5	4027.81	108.88	0.55	0.55
6	4829.55	131.78	0.66	0.66
7	5689.29	155.36	0.77	0.77
8	6956.49	190.12	0.95	0.95
9	7799.46	214.09	1.06	1.06
10	8693.90	238.78	1.18	1.18
11	10007.88	275.06	1.36	1.36

Bridge 1		**Bridge 2**	
Force Calibration (lb/V)	**7366.71**	**Force Calibration (lb/V)**	**7364.49**
Offset	**-6.17**	Offset	**-9.40**
Correlation	**0.999998**	Correlation	**0.999999**
Strain Calibration (µE/V)	**203.78**	**Strain Calibration (µE/V)**	**203.72**
Offset	**-2.08**	Offset	**-2.17**
Correlation	**0.999989**	Correlation	**0.999993**

Force Strain Calibration	
EA (Kips)	**36149.33**
Offset	**69.26**
Correlation	**0.999994**



Bridge Excitation (V) 5
Shunt Resitor (ohm) 60.4k

Calibration Factors	528AWJ		
Bridge 1 (µE/V)	203.51	Bridge 2 (µE/V)	203.28
EA Factor (Kips)	36213.85	Area (in^2)	1.21

Calibrated by: _____
Calibrated Date: 7/18/2022

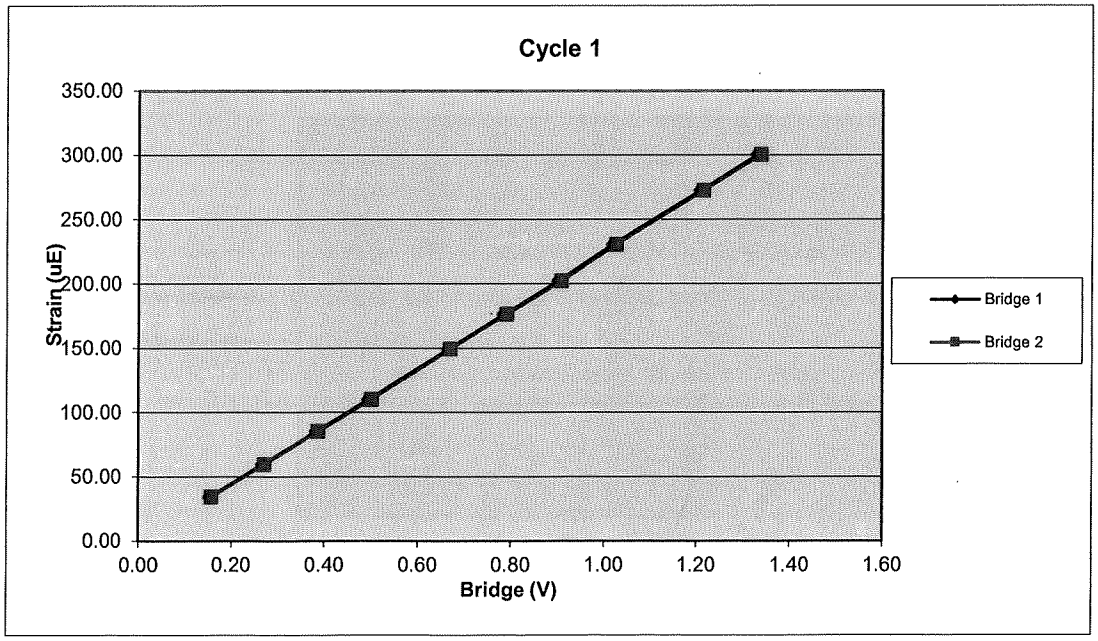
Pile Dynamics Inc
30725 Aurora Rd
Solon, OH 44139

Traceable to N.I.S.T.

728AWJ		Cycle 1		
Sample	**Force (lb)**	**Strain (μE)**	**Bridge 1 (V)**	**Bridge 2 (V)**
1	0.00	0.00	0.00	0.00
2	1199.06	34.33	0.16	0.16
3	2052.76	59.72	0.27	0.27
4	2924.20	85.27	0.38	0.39
5	3782.68	110.02	0.50	0.50
6	5074.34	149.22	0.67	0.67
7	5985.06	176.19	0.79	0.79
8	6869.47	202.19	0.90	0.91
9	7768.10	230.48	1.02	1.03
10	9202.28	272.31	1.21	1.22
11	10126.06	300.27	1.33	1.34

Bridge 1		**Bridge 2**	
Force Calibration (lb/V)	**7583.03**	**Force Calibration (lb/V)**	**7557.58**
Offset	20.67	Offset	0.95
Correlation	1.000000	Correlation	0.999999
Strain Calibration (μE/V)	**226.02**	**Strain Calibration (μE/V)**	**225.27**
Offset	-1.27	Offset	-1.86
Correlation	0.999984	Correlation	0.999979

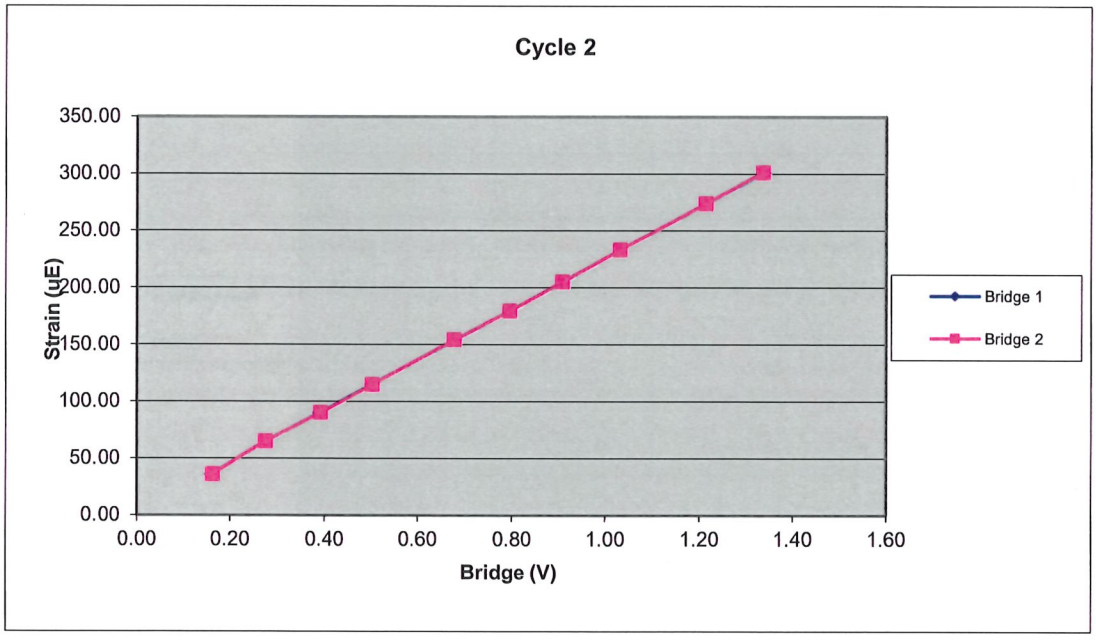
Force Strain Calibration	
EA (Kips)	**33548.47**
Offset	63.54
Correlation	0.999983



728AWJ		Cycle 2		
Sample	**Force (lb)**	**Strain (µE)**	**Bridge 1 (V)**	**Bridge 2 (V)**
1	0.00	0.00	0.00	0.00
2	1236.98	35.69	0.16	0.16
3	2108.61	64.71	0.28	0.28
4	2976.64	89.52	0.39	0.39
5	3811.14	114.45	0.50	0.50
6	5141.89	153.54	0.68	0.68
7	6032.24	178.92	0.80	0.80
8	6903.48	204.54	0.91	0.91
9	7825.42	232.64	1.03	1.03
10	9217.58	273.43	1.22	1.22
11	10151.02	300.79	1.34	1.34

Bridge 1		**Bridge 2**	
Force Calibration (lb/V)	**7561.16**	**Force Calibration (lb/V)**	**7576.28**
Offset	**14.33**	Offset	**4.68**
Correlation	**0.999997**	Correlation	**0.999995**
Strain Calibration (µE/V)	**223.39**	**Strain Calibration (µE/V)**	**223.84**
Offset	**1.55**	Offset	**1.27**
Correlation	**0.999945**	Correlation	**0.999943**

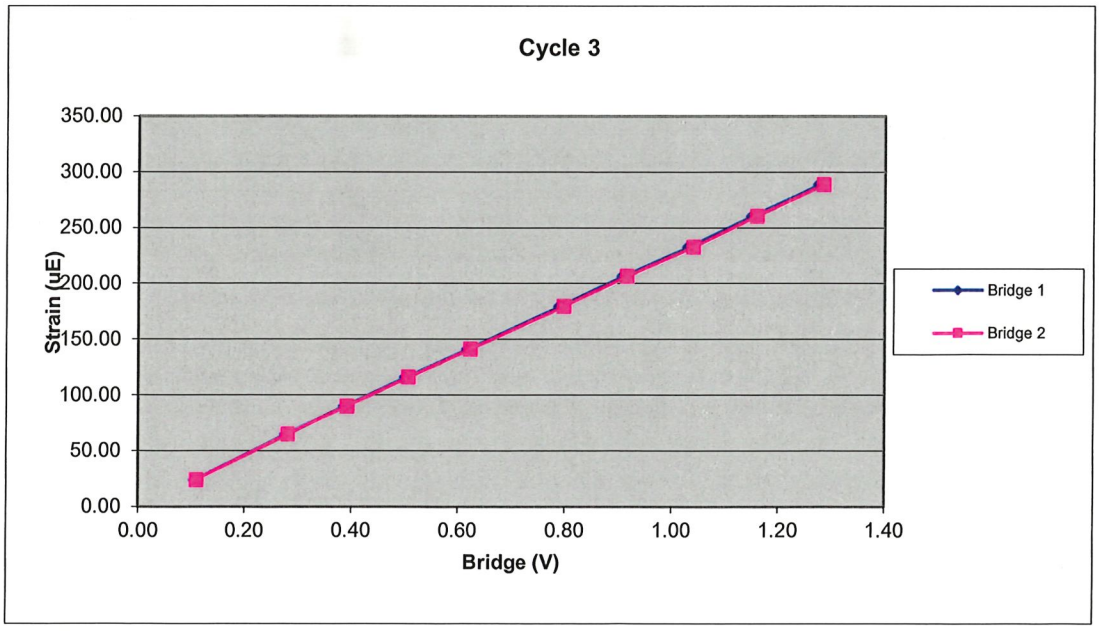
Force Strain Calibration	
EA (Kips)	**33843.24**
Offset	**-37.68**
Correlation	**0.999950**



728AWJ		Cycle 3		
Sample	**Force (lb)**	**Strain (µE)**	**Bridge 1 (V)**	**Bridge 2 (V)**
1	0.00	0.00	0.00	0.00
2	822.90	24.10	0.11	0.11
3	2132.69	64.89	0.28	0.28
4	2972.74	89.98	0.39	0.39
5	3841.65	115.75	0.50	0.51
6	4741.16	141.06	0.62	0.62
7	6043.35	179.33	0.79	0.80
8	6961.58	206.39	0.91	0.92
9	7901.94	232.60	1.03	1.04
10	8816.85	260.36	1.15	1.16
11	9759.65	288.75	1.28	1.29

Bridge 1		**Bridge 2**	
Force Calibration (lb/V)	**7644.24**	**Force Calibration (lb/V)**	**7602.69**
Offset	**-5.25**	Offset	**-12.15**
Correlation	**0.999999**	Correlation	**0.999997**
Strain Calibration (µE/V)	**224.53**	**Strain Calibration (µE/V)**	**223.31**
Offset	**1.57**	Offset	**1.37**
Correlation	**0.999950**	Correlation	**0.999942**

Force Strain Calibration	
EA (Kips)	**34041.33**
Offset	**-58.11**
Correlation	**0.999945**



Bridge Excitation (V) 5
Shunt Resitor (ohm) 60.4k

Calibration Factors	728AWJ		
Bridge 1 (µE/V)	224.65	Bridge 2 (µE/V)	224.14
EA Factor (Kips)	33811.01	Area (in^2)	1.13

Calibrated by: Sean Bonner
Calibrated Date: 2/6/2024

Pile Dynamics Inc
30725 Aurora Rd
Solon, OH 44139

Traceable to N.I.S.T.

Accelerometer Calibration Certificate
Pile Dynamics, Inc.

Calibrated by Pile Dynamics, Inc.
Calibration performed on 14Jun2022

Serial No:	K10959	**Temperature:**	79.0 °F
Model:	PR	**Humidity:**	50%
Calibrated on:	Channel 3 on 8G 5161 LE		

Ref Acc 1:	72517! 1049 g's/volt	**Cal on:**	24Mar2022
Ref Acc 2:	72505! 1035 g's/volt	**Cal on:**	24Mar2022

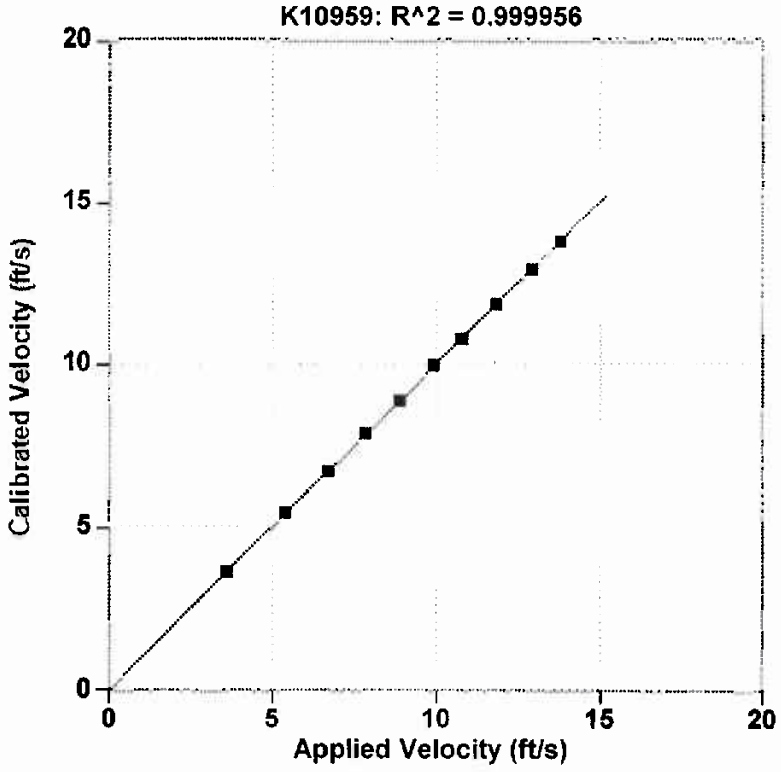
Reference accelerometer calibrations are traceable to the United States National Institute of Standards and Technology (NIST).

PDA CALIBRATION FACTOR

413.8 mv/5000g
(82.8 µv/g)
R^2: 0.999956 [Chip programmed]

Operator: William Johnson

Signed



Reference Velocity	S/N K10959 Velocity
ft/s	ft/s
3.605	3.589
5.397	5.412
6.705	6.699
7.841	7.862
8.877	8.913
9.904	9.929
10.746	10.721
11.807	11.815
12.910	12.889
13.783	13.762

Maximum Acceleration: 935 g's

Accelerometer Calibration Certificate
Pile Dynamics, Inc.

Calibrated by Pile Dynamics, Inc.
Calibration performed on 14Jun2022

Serial No:	K10960	**Temperature:**	79.0 °F
Model:	PR	**Humidity:**	50%
Calibrated on:	Channel 3 on 8G 5161 LE		

Ref Acc 1:	72517! 1049 g's/volt	**Cal on:**	24Mar2022
Ref Acc 2:	72505! 1035 g's/volt	**Cal on:**	24Mar2022

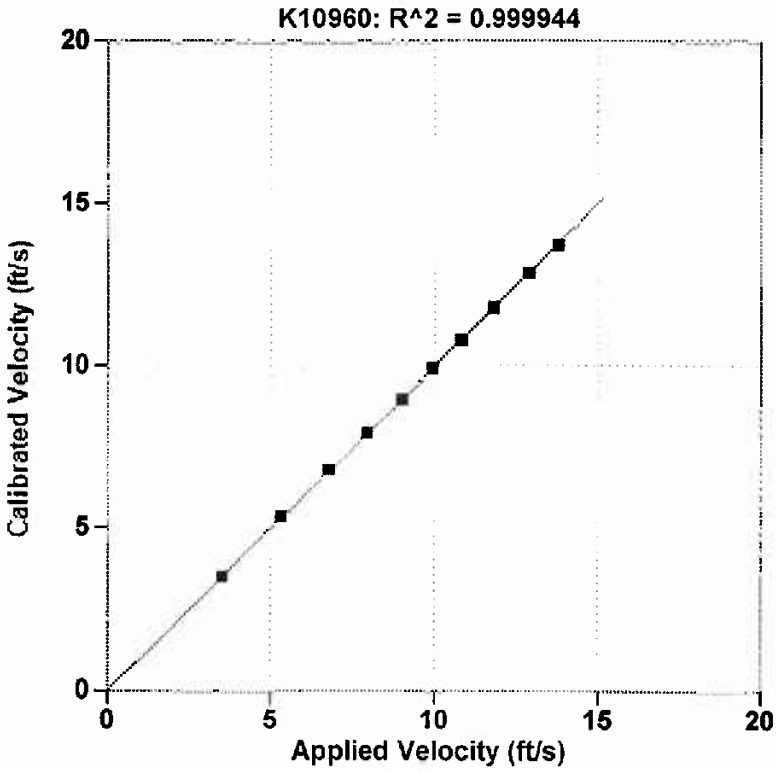
Reference accelerometer calibrations are traceable to the United States National Institute of Standards and Technology (NIST).

PDA CALIBRATION FACTOR

419.9 mv/5000g
(84.0 µv/g)
R^2: 0.999944 [Chip programmed]

Operator: William Johnson

Signed



Reference Velocity	S/N K10960 Velocity
ft/s	ft/s
3.513	3.540
5.322	5.345
6.769	6.796
7.933	7.937
8.998	9.037
9.912	9.923
10.788	10.775
11.781	11.779
12.877	12.863
13.771	13.732

Maximum Acceleration: 934 g's

Accelerometer Calibration Certificate
Pile Dynamics, Inc.

Calibrated by Pile Dynamics, Inc.
Calibration performed on 14Jun2022

Serial No:	K11957	**Temperature:**	79.0 °F
Model:	PR	**Humidity:**	50%
Calibrated on:	Channel 3 on 8G 5161 LE		

Ref Acc 1:	72517! 1049 g's/volt	**Cal on:**	24Mar2022
Ref Acc 2:	72505! 1035 g's/volt	**Cal on:**	24Mar2022

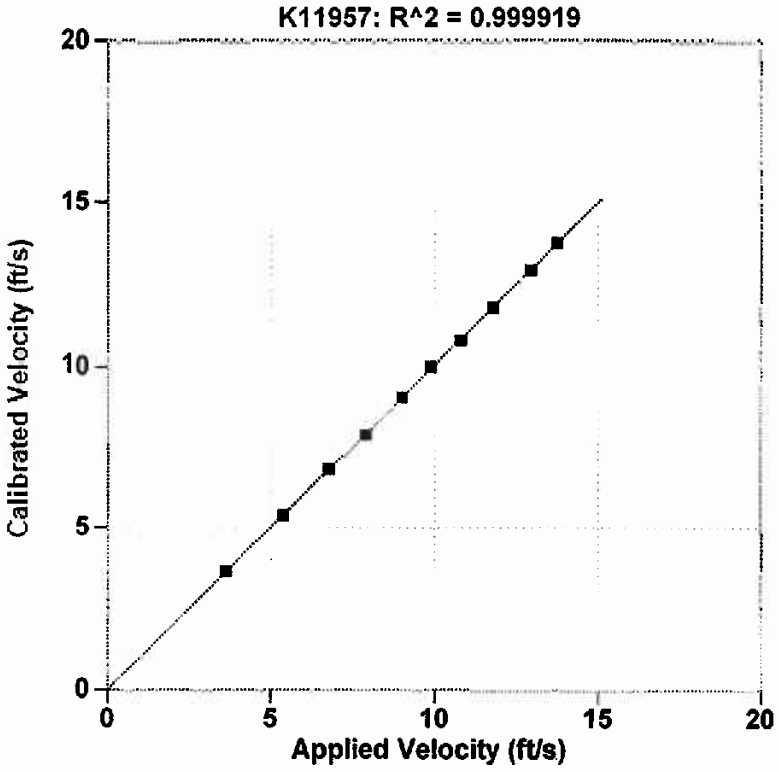
Reference accelerometer calibrations are traceable to the United States National Institute of Standards and Technology (NIST).

PDA CALIBRATION FACTOR

409.6 mv/5000g
(81.9 µv/g)
R^2: 0.999919 [Chip programmed]

Operator: William Johnson

Signed



Reference Velocity ft/s	S/N K11957 Velocity ft/s
3.643	3.661
5.377	5.363
6.761	6.783
7.895	7.905
8.973	8.989
9.864	9.918
10.780	10.730
11.763	11.749
12.920	12.894
13.735	13.746

Maximum Acceleration: 931 g's

APPENDIX IV

PDCA
PILE DRIVING CONTRACTORS ASSOCIATION

Pile Dynamics, Inc.

This documents that

Robert E. Kral
Carolinas Geotechnical Group

has on May 20, 2016 achieved the rank of

ADVANCED

on the **Dynamic Measurement and Analysis Proficiency Test.**

The individual identified on this document demonstrated to the degree granted above an understanding of theory, data quality evaluation, interpretation and signal matching for high strain dynamic testing of deep foundations. ***It is recommended*** **that Individuals at the Advanced level seek Master or Expert levels through additional study within six years of the date of this document.**

The ability of the individual named to provide appropriate knowledge and advice on a specific project is not implied or warranted by the Pile Driving Contractors Association or Pile Dynamics, Inc. **This certificate can be verified at www.PDAproficiencytest.com.** The Pile Driving Contractors Association or Pile Dynamics, Inc. assumes no liability for foundation testing and analysis work performed by the bearer of this certificate.

Steven A. Hall, Executive Director
Pile Driving Contractors Association

Garland Likins, Senior Partner
Pile Dynamics, Inc.

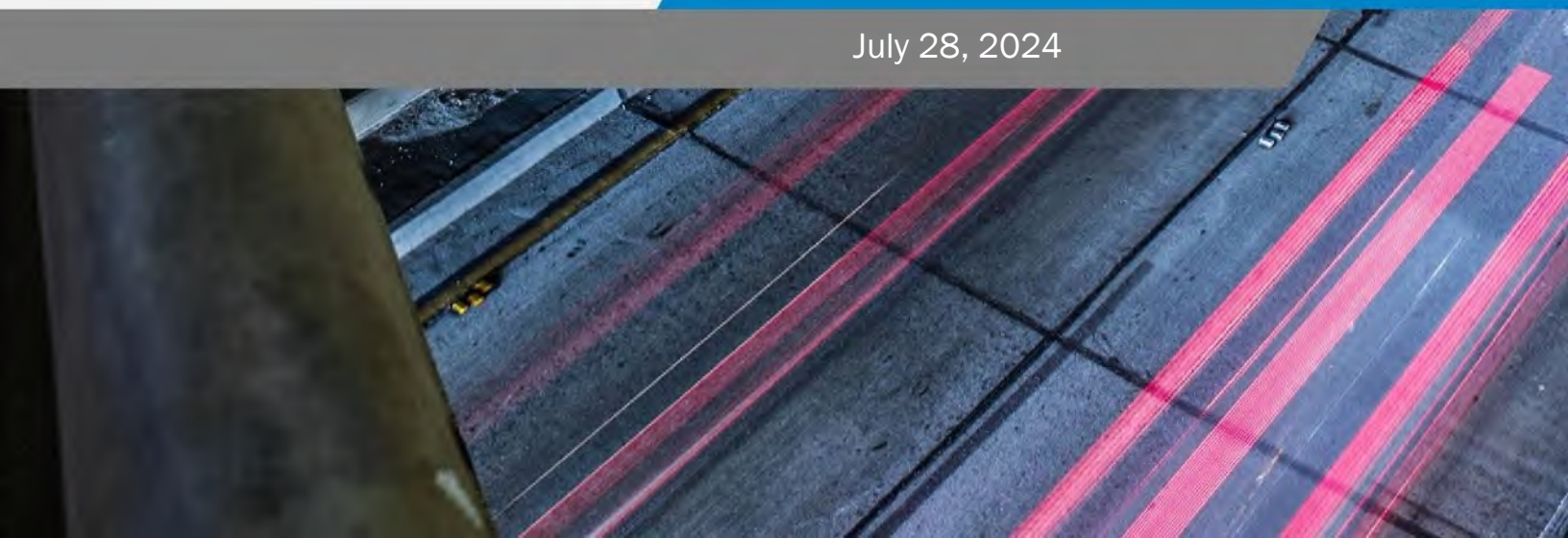
No. 2072

CAROLINAS GEOTECHNICAL GROUP

Report of SPT Hammer Energy

Prepared for:
Geologic Exploration, Inc.
176 Commerce Blvd.
Statesville, North Carolina 28625

July 28, 2024



CAROLINAS GEOTECHNICAL GROUP

N.C. Firm License: P-1904

2400 Crownpoint Executive Drive
Suite 800
Charlotte, NC 28227

(980) 339-8684
contact@carolinasgeotech.com
www.carolinasgeotech.com

July 28, 2024

Mr. Jason Mantak
Geologic Exploration, Inc.
176 Commerce Blvd.
Statesville, North Carolina

SUBJECT: **Report of SPT Hammer Energy**
Geologic Diedrich D-50 Track Rig (SN 366)
Charlotte, North Carolina
CG2 Project No.: 240019025

Dear Mr. Mantak:

Carolinas Geotechnical Group, PLLC (CG2) has completed the Standard Penetration Test (SPT) energy measurements on the automatic hammer mounted on a Geologic Exploration, Inc. (Geologic) Diedrich D-50 track-mounted drill rig with a serial number of 366, see attached Drill Rig Photo Log. This service was performed by Mr. Robert E. Kral, PE on July 26, 2024. SPT energy testing was performed in general accordance with ASTM D4633 and the most recent revision of the North Carolina Department of Transportation (NCDOT), Geotechnical Engineering Unit's requirements. The testing procedures, equipment used during testing, and detailed results are presented in this report.

CG2 recommends Geologic submit this Report of SPT Hammer Energy and data to the NCDOT Geotechnical Engineering Unit for review and approval no later than August 23, 2024.

DYNAMIC TESTING METHODOLOGY

Testing was performed using a model SPT (Serial No. 4549 TB) Pile Driving Analyzer™ (PDA) manufactured by Pile Dynamics, Inc. The PDA was used to record and interpret data from two piezoresistive accelerometers (Serial Nos. K10959 and K10960) bolted to a 2-foot long AWJ drill rod (SN 728AWJ) internally instrumented with two strain transducers. The instrumented AWJ drill rod has a cross-sectional area of 1.13 square inches, an outside diameter of approximately 1.75 inches, and an estimated inside diameter of 1.25 inches at the gauge location. The accelerometers and strain gauges, which are mounted on opposing axis near the middle of the instrumented rod, monitor acceleration and strain for each hammer blow. The analyzer converts the data to velocities and forces and computes the maximum transferred hammer energies with the "EFV" method described in ASTM D4633. Preliminary results are recorded and displayed in real-time for each blow. Calibration sheets for the PDA, accelerometers, and the instrumented rod are included in Appendix III.

TESTING AND OBSERVATIONS

CG2 personnel was on site July 26, 2024 to observe and perform high-strain dynamic testing during SPT sampling on the Diedrich D-50 track-mounted drill rig rented and operated by C. Odom of CG2 Exploration, LLC. The measurements were taken during drilling operations at a test site located at 327 Old Hebron Road in Charlotte, North Carolina (Mecklenburg County). The approximate coordinates (not professionally surveyed) for the test location are 35.1310233, -80.8858186. No Soil Test Boring Log was provided. SPT energy measurements were recorded during three intervals at depths of approximately 28½, 33½, and 38½ feet below the existing ground surface. Drop height of the weight could not be observed due to lack of observations windows in the steel hammer case. The information presented in the table below summarizes the equipment tested and tooling used during the SPT energy measurements.

Table 1: SPT Field Data

Drill Rig Information	
Manufacturer	Diedrich
Model	D-50
Serial Number	366
Operator	C. Odom of CG2 Exploration, LLC
Carrier	Track
Hammer Information	
Model / Type	Diedrich / Auto
Serial Number	N/A
Anvil Height (inches)	30
Anvil Diameter (inches)	2.5
Drop Height (inches)	30
Ram Weight (pounds)	140
Ram Serial Number	N/A
Drilling and Instrumented Rod Information	
Drill Rod Type	AWJ
OD (inches)	1.75
ID (inches)	1.25
Cross-Sectional Area (in^2)	1.13
Typical Lengths (feet)	5
Instrumented Rod Type	AWJ (SN 728)
OD (inches)	1.75
ID (inches)	1.25
Cross-Sectional Area (in^2)	1.13
Total Instrumented Rod Length (feet)	2.00
Length Below Gages (feet)	0.70
Split-Spoon Length (feet)	2.85

DYNAMIC TESTING RESULTS

The total rod length from the instrumentation to the tip of the split-spoon sampler was determined by adding 3.6 feet to the required drill rod length at each sample depth. Based on the test data, the automatic hammer on the Diedrich D-50 track-mounted drill rig operated at a rate of about 48.6 to 49.5 blows per minute (BPM) during dynamic testing. The measured transferred hammer energy (EFV) ranged from 314.3 to 356.7 foot-pounds, which corresponds to Energy Transfer Ratio (ETR) values of 89.8 to 101.9%, respectively. These data ranges are based on the overall minimum and maximum values for the last 12 inches of each sample interval.

The SPT Energy Measurement Data Summary tables in Appendix I present the test data from every hammer blow at each sampling interval along with representative force and velocity traces for each test interval. The reported blow counts, obtained by the drill rig personnel, a summary of the test data, and average computed BPM, EFV, and ETR values are provided in Table 2. The BPM, EFV, and ETR values presented in Table 2 were computed by averaging data from the last 12 inches of each sample interval. Plots and tables of the following are also included in Appendix I and present the test data with depth for each test interval:

- Penetration vs. BLC
- Penetration vs. FMX
- Penetration vs. EFV
- Penetration vs. CSX
- Penetration vs. VMX
- Penetration vs. ETR
- Average ETR vs. Rod Length
- ETR vs. Rod Length

Table 2: Summary of Dynamic Testing Results

Data Set ID	Sample Depth (ft)	Drill Rod Length (ft)	Instrumentation to Sampler Tip Length (ft)	Blows per 6" Increment / N-value	Soil Sample Description (Piedmont Residual)	Avg. BPM	Avg. EFV (ft-lbs)	Avg. ETR (%)
1	28½ - 30	30	33.6	3-4-5 / 9	SA SILT	49.1	326.3	93.2
2	35½ - 35	35	38.6	4-4-6 / 10	SA SILT	48.9	338.3	96.7
3	38½ - 40	40	43.6	5-7-9 / 16	SA SILT	49.0	336.1	96.0
					Overall Average	**49.0**	**334.2**	**95.5**

The average hammer rate, transferred energy, and transfer ratio were calculated for each depth interval. Per ASTM D4633, only the blows from the final foot of each sample interval (i.e., the blows that determine the N-value) were included when computing the average values shown in Table 2. The overall average transferred hammer energy for the automatic hammer on the Diedrich D-50 track-mounted drill rig (for all the depth intervals tested in Table 2) was 334.2 foot-pounds, with an average ETR of 95.5%.

LIMITATIONS OF REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The information contained in this report were based on the applicable standards of our profession in this geographic area at the time this report was prepared. No other warranty, express or implied, is made.

CLOSING

CG2 is pleased to have the opportunity to provide these services to you. If you have questions concerning the content of this report, or if CG2 can be of further service, please contact CG2 at (980) 339-8684.

Sincerely,
Carolinas Geotechnical Group, PLLC

DocuSigned by:
Robert E. Kral
8AD703B2A8484F4...

Robert E. Kral, PE
Geotechnical Design Manager
NC Registration No. 042642

Appendices:

- Appendix I - Diedrich D-50 Track Rig (SN 366) SPT Energy Measurements Summary Plots and Tables
- Appendix II - SPT Hammer Energy Field Form (Field Log) and Drill Rig Photo Log
- Appendix III - Instrumented Rod and Accelerometer Calibration Sheets
- Appendix IV - Certificate of Proficiency

APPENDIX I

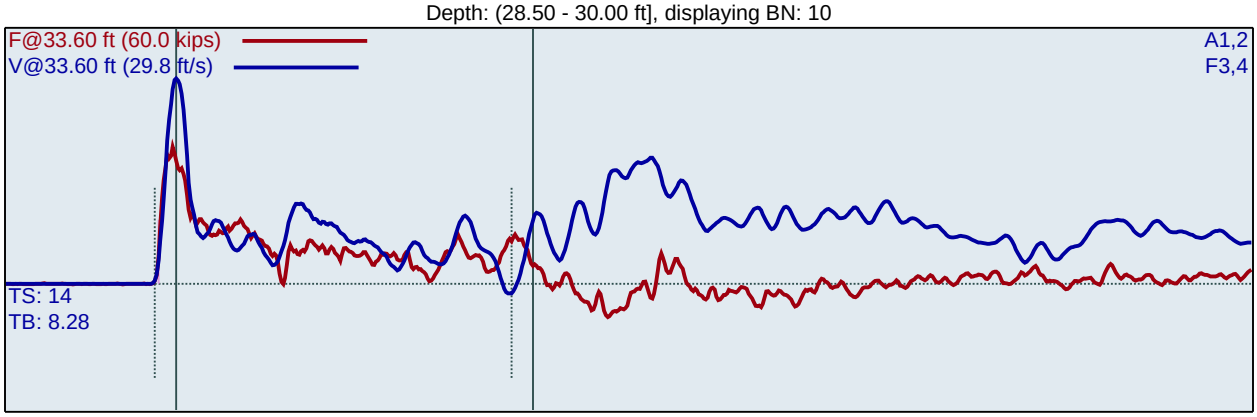
DIEDRICH D-50 (SN 366)
REK
B-18

B-18
Interval start: 7/26/2024

AR: 1.13 in^2
LE: 33.60 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (28.50 - 30.00 ft], displaying BN: 10



F3 : [728AWJ1] 224.649 PDICAL (1) FF1
F4 : [728AWJ2] 224.139 PDICAL (1) FF1

A1 (PR): [K10959] 420.036 mv/6.4v/5000g (1) VF1
A2 (PR): [K10960] 416.342 mv/6.4v/5000g (1) VF1

BPM: Blows/Minute
FMX: Maximum Force
VMX: Maximum Velocity
DMX: Maximum Displacement

CSX: Compression Stress Maximum
DFN: Final Displacement
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

LP	BL#	BC	BPM	FMX	VMX	DMX	CSX	DFN	EFV	ETR
ft		/6"	bpm	kips	ft/s	in	ksi	in	ft-lb	%
28.67	1	3	10.5	34.2	23.8	2.4	30.3	2.0	318.4	91.0
28.83	2	3	48.5	34.5	24.3	2.3	30.5	2.0	327.6	93.6
29.00	3	3	49.4	34.3	24.7	2.3	30.3	2.0	331.8	94.8
29.13	4	4	49.5	33.8	24.9	2.0	29.9	1.5	332.4	95.0
29.25	5	4	48.9	33.5	25.0	1.7	29.7	1.5	329.0	94.0
29.38	6	4	48.8	33.0	24.8	1.6	29.2	1.5	327.2	93.5
29.50	7	4	48.9	33.3	25.5	1.5	29.5	1.5	329.7	94.2
29.60	8	5	49.0	33.3	25.0	1.5	29.5	1.2	325.6	93.0
29.70	9	5	49.3	32.5	24.8	1.5	28.8	1.2	323.3	92.4
29.80	10	5	49.0	32.1	23.9	1.5	28.4	1.2	325.2	92.9
29.90	11	5	49.1	31.9	24.2	1.3	28.3	1.2	325.4	93.0
30.00	12	5	49.5	31.2	24.2	1.2	27.6	1.2	319.1	91.2
		Average	49.1	32.7	24.7	1.5	29.0	1.3	326.3	93.2
		Std Dev	0.2	0.8	0.5	0.2	0.7	0.1	3.6	1.0
		Maximum	49.5	33.8	25.5	2.0	29.9	1.5	332.4	95.0
		Minimum	48.8	31.2	23.9	1.2	27.6	1.2	319.1	91.2

N-value: 9

Sample Interval Time: 13.44 seconds.

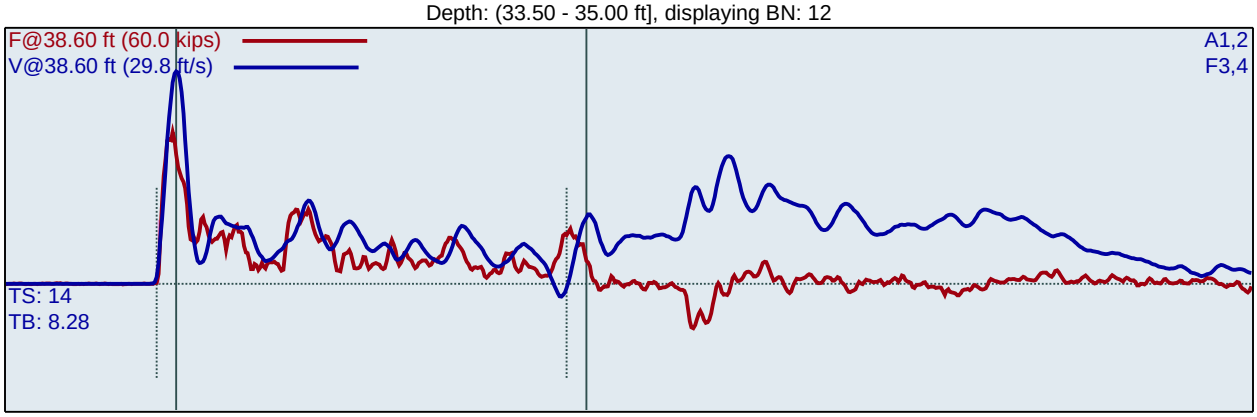
DIEDRICH D-50 (SN 366)
REK
B-18

B-18
Interval start: 7/26/2024

AR: 1.13 in^2
LE: 38.60 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (33.50 - 35.00 ft], displaying BN: 12



F3 : [728AWJ1] 224.649 PDICAL (1) FF1
F4 : [728AWJ2] 224.139 PDICAL (1) FF1

A1 (PR): [K10959] 420.036 mv/6.4v/5000g (1) VF1
A2 (PR): [K10960] 416.342 mv/6.4v/5000g (1) VF1

LP	BL#	BC	BPM	FMX	VMX	DMX	CSX	DFN	EFV	ETR
ft		/6"	bpm	kips	ft/s	in	ksi	in	ft-lb	%
33.63	1	4	49.1	35.1	25.1	2.2	31.0	1.5	340.7	97.3
33.75	2	4	48.9	35.2	25.1	2.1	31.1	1.5	358.9	102.5
33.88	3	4	48.9	34.8	24.8	1.9	30.8	1.5	340.1	97.2
34.00	4	4	48.5	34.6	25.5	1.8	30.6	1.5	351.8	100.5
34.13	5	4	49.1	35.0	25.2	1.7	31.0	1.5	338.3	96.7
34.25	6	4	49.0	34.4	25.2	1.6	30.4	1.5	340.3	97.2
34.38	7	4	48.6	34.9	24.8	1.6	30.8	1.5	337.1	96.3
34.50	8	4	49.1	34.6	25.0	1.5	30.6	1.5	339.8	97.1
34.58	9	6	48.9	35.4	25.0	1.3	31.3	1.0	339.4	97.0
34.67	10	6	48.9	34.7	24.8	1.4	30.7	1.0	334.8	95.7
34.75	11	6	48.9	35.5	24.6	1.2	31.5	1.0	339.7	97.1
34.83	12	6	48.8	35.6	24.7	1.4	31.5	1.0	339.2	96.9
34.92	13	6	48.9	34.6	24.4	1.3	30.7	1.0	338.9	96.8
35.00	14	6	48.6	35.3	24.5	1.3	31.3	1.0	335.5	95.9
		Average	48.9	35.0	24.8	1.4	31.0	1.2	338.3	96.7
		Std Dev	0.2	0.4	0.3	0.2	0.4	0.2	1.8	0.5
		Maximum	49.1	35.6	25.2	1.7	31.5	1.5	340.3	97.2
		Minimum	48.6	34.4	24.4	1.2	30.4	1.0	334.8	95.7

N-value: 10

Sample Interval Time: 15.97 seconds.

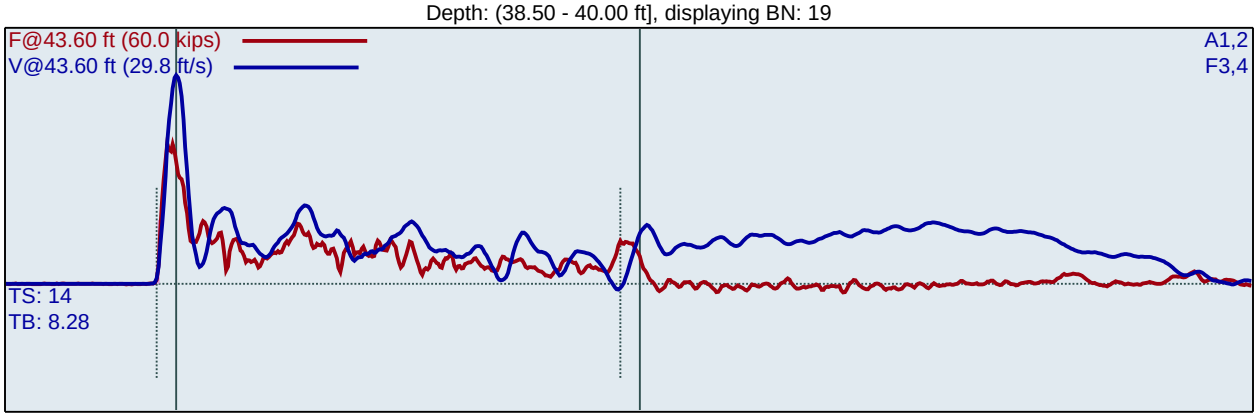
DIEDRICH D-50 (SN 366)
REK
B-18

B-18
Interval start: 7/26/2024

AR: 1.13 in^2
LE: 43.60 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (38.50 - 40.00 ft], displaying BN: 19



F3 : [728AWJ1] 224.649 PDICAL (1) FF1
F4 : [728AWJ2] 224.139 PDICAL (1) FF1

A1 (PR): [K10959] 420.036 mv/6.4v/5000g (1) VF1
A2 (PR): [K10960] 416.342 mv/6.4v/5000g (1) VF1

LP ft	BL#	BC /6"	BPM bpm	FMX kips	VMX ft/s	DMX in	CSX ksi	DFN in	EFV ft-lb	ETR %
38.60	1	5	49.1	33.5	25.4	1.5	29.6	1.2	346.0	98.8
38.70	2	5	48.7	33.1	25.4	1.4	29.3	1.2	347.1	99.2
38.80	3	5	49.2	34.2	25.9	1.5	30.2	1.2	349.7	99.9
38.90	4	5	48.9	34.0	26.0	1.5	30.1	1.2	358.1	102.3
39.00	5	5	49.3	33.5	25.7	1.5	29.7	1.2	346.9	99.1
39.07	6	7	48.8	34.2	26.0	1.4	30.2	0.9	352.2	100.6
39.14	7	7	49.3	33.9	25.7	1.4	30.0	0.9	343.6	98.2
39.21	8	7	48.9	33.1	25.3	1.3	29.3	0.9	347.4	99.3
39.29	9	7	48.7	34.3	26.0	1.3	30.4	0.9	352.5	100.7
39.36	10	7	48.7	34.5	26.0	1.4	30.5	0.9	356.7	101.9
39.43	11	7	49.2	32.7	25.0	1.3	28.9	0.9	336.4	96.1
39.50	12	7	48.8	33.1	25.1	1.3	29.3	0.9	340.6	97.3
39.56	13	9	48.9	34.1	25.6	1.2	30.2	0.7	334.4	95.5
39.61	14	9	49.2	34.3	25.5	1.3	30.3	0.7	341.6	97.6
39.67	15	9	49.1	33.6	25.4	1.2	29.8	0.7	338.5	96.7
39.72	16	9	49.2	32.4	24.6	1.1	28.7	0.7	323.9	92.5
39.78	17	9	49.0	32.8	24.8	1.1	29.0	0.7	331.7	94.8
39.83	18	9	49.0	32.8	24.4	1.1	29.1	0.7	322.1	92.0
39.89	19	9	49.3	32.9	24.3	1.0	29.1	0.7	319.1	91.2
39.94	20	9	48.7	32.3	24.0	1.0	28.6	0.7	321.9	92.0
40.00	21	9	49.1	32.6	24.1	1.0	28.9	0.7	314.3	89.8
		Average	49.0	33.4	25.1	1.2	29.5	0.7	336.1	96.0
		Std Dev	0.2	0.7	0.7	0.1	0.7	0.1	12.6	3.6
		Maximum	49.3	34.5	26.0	1.4	30.5	0.9	356.7	101.9
		Minimum	48.7	32.3	24.0	1.0	28.6	0.7	314.3	89.8
					N-value: 16					

Sample Interval Time: 24.53 seconds.

Summary of SPT Test Results

Project: DIEDRICH D-50 (SN 366), Test Date: 7/26/2024

BPM: Blows/Minute
FMX: Maximum Force
VMX: Maximum Velocity
DMX: Maximum Displacement
CSX: Compression Stress Maximum
DFN: Final Displacement
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

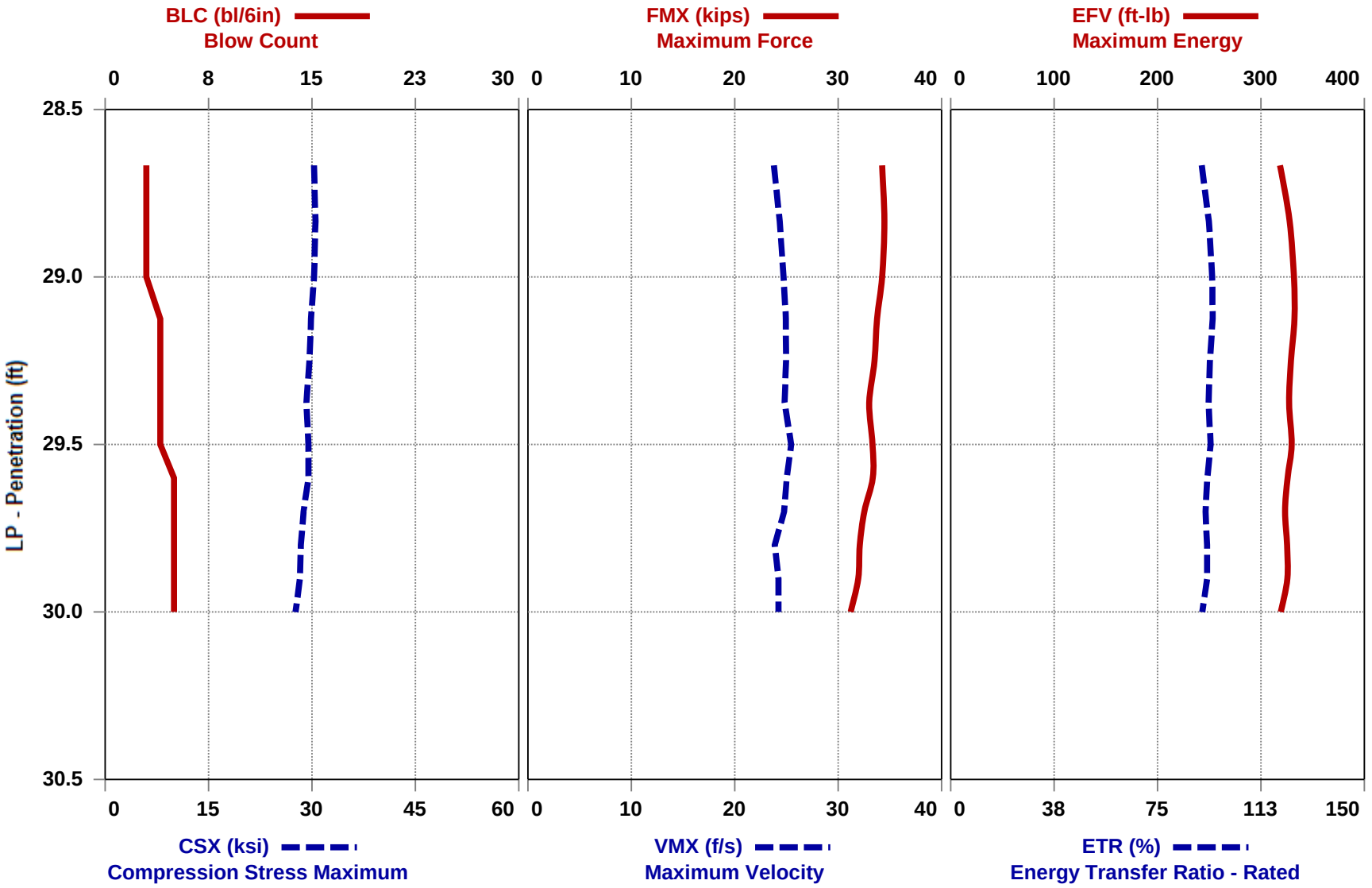
Instr. Length ft	Start Depth ft	Final Depth ft	Blows Applied /6"	**N Value**	**N60 Value**	Average BPM bpm	Average FMX kips	Average VMX ft/s	Average DMX in	Average CSX ksi	Average DFN in	Average EFV ft-lb	Average ETR %
33.60	28.50	30.00	**3-4-5**	**9**	**14**	49.1	32.7	24.7	1.5	29.0	1.3	326.3	93.2
38.60	33.50	35.00	**4-4-6**	**10**	**15**	48.9	35.0	24.8	1.4	31.0	1.2	338.3	96.7
43.60	38.50	40.00	**5-7-9**	**16**	**25**	49.0	33.4	25.1	1.2	29.5	0.7	336.1	96.0
				Overall Average Values:		49.0	33.7	24.9	1.4	29.8	1.0	334.2	95.5
				Standard Deviation:		0.2	1.1	0.6	0.2	1.0	0.3	10.0	2.8
				Overall Maximum Value:		49.5	35.6	26.0	2.0	31.5	1.5	356.7	101.9
				Overall Minimum Value:		48.6	31.2	23.9	1.0	27.6	0.7	314.3	89.8

GRL Engineers, Inc. - PDIPLOT2 Ver 2021.1.61.0 - Case Method & iCAP® Results

Printed: 28-July-2024 Test started: 26-July-2024

DIEDRICH D-50 (SN 366) - 28.5 TO 30.0

B-18

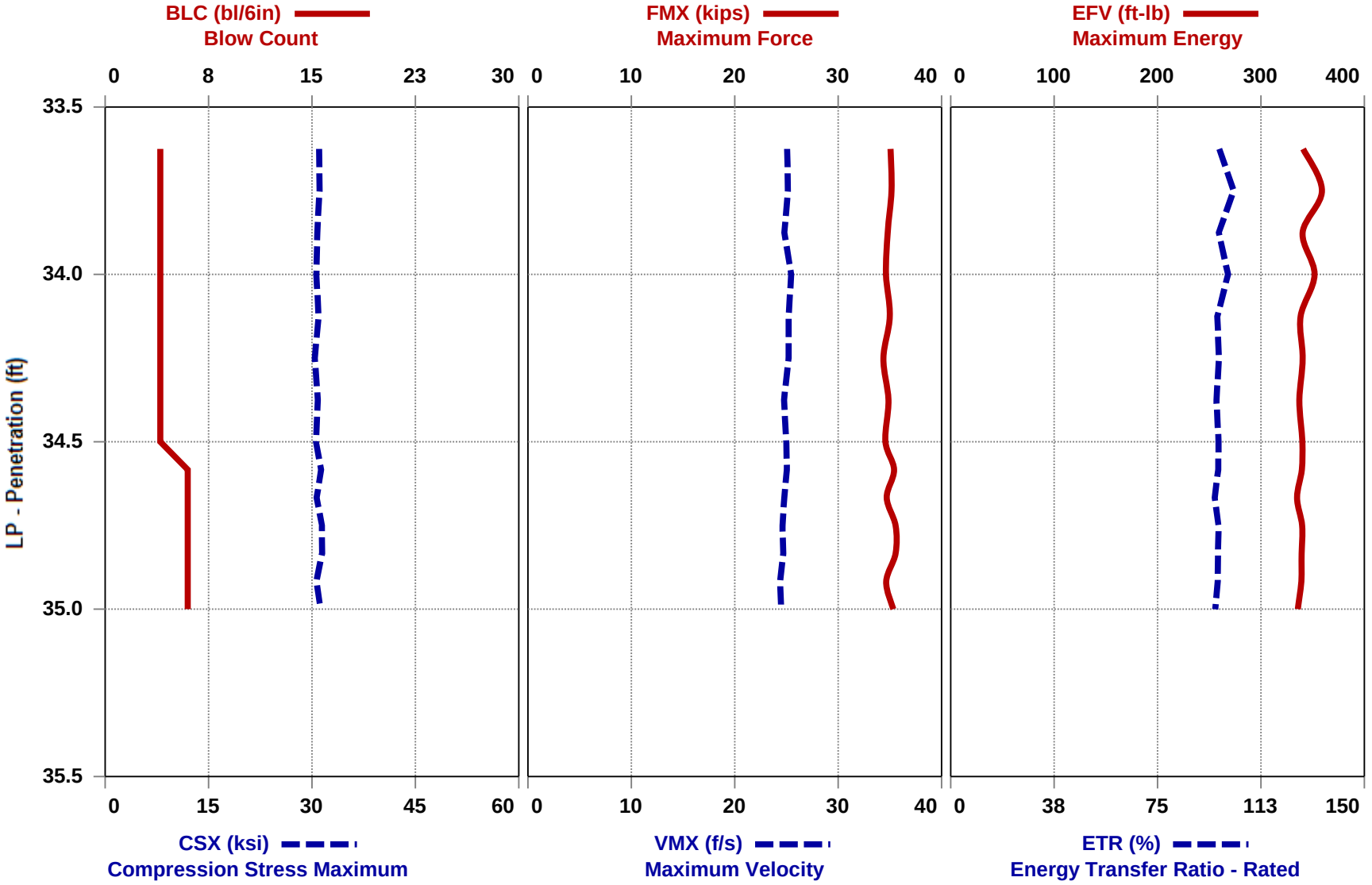


GRL Engineers, Inc. - PDIPLOT2 Ver 2021.1.61.0 - Case Method & iCAP® Results

Printed: 28-July-2024 Test started: 26-July-2024

DIEDRICH D-50 (SN 366) - 33.5 TO 35.0

B-18

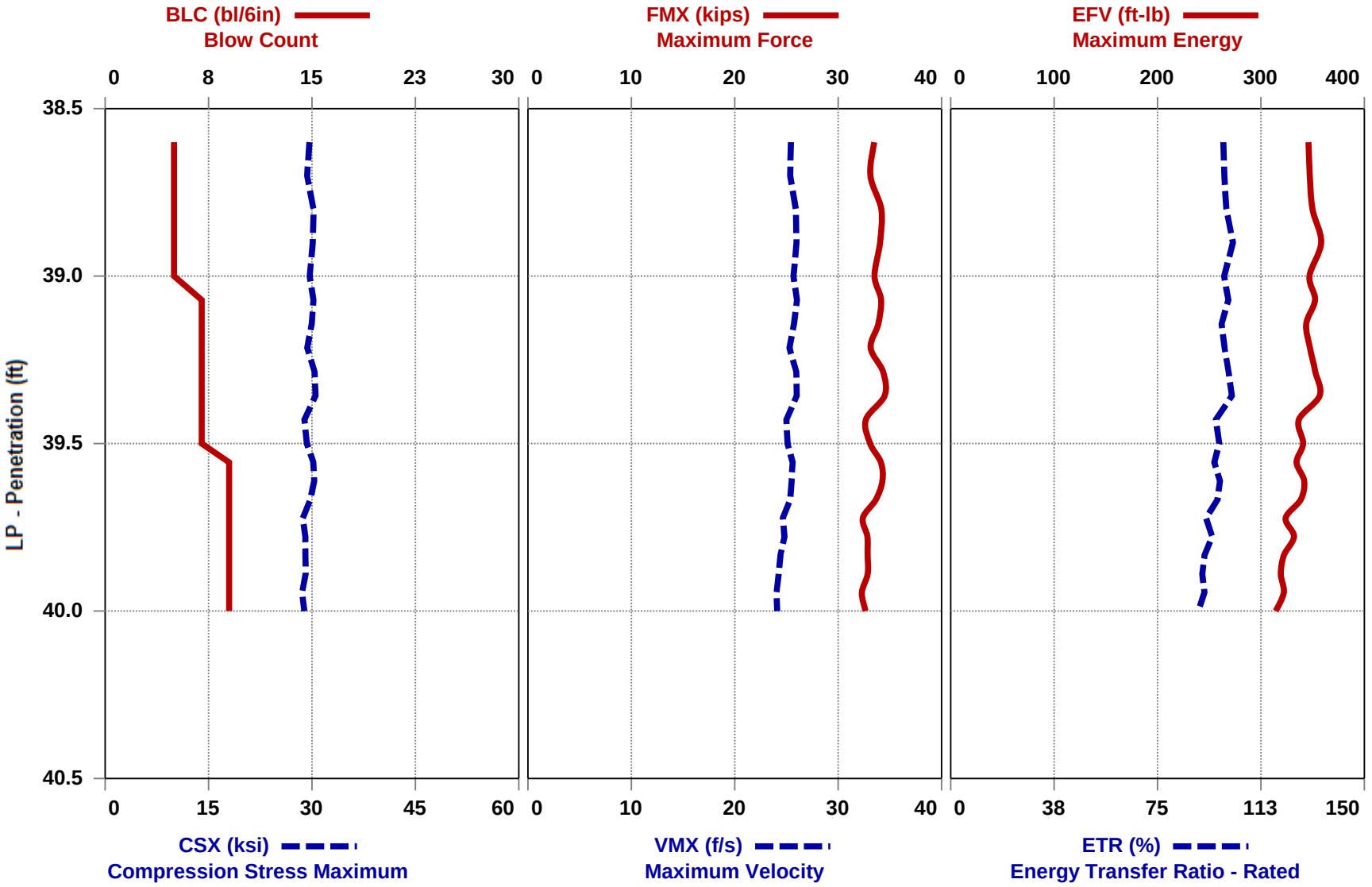


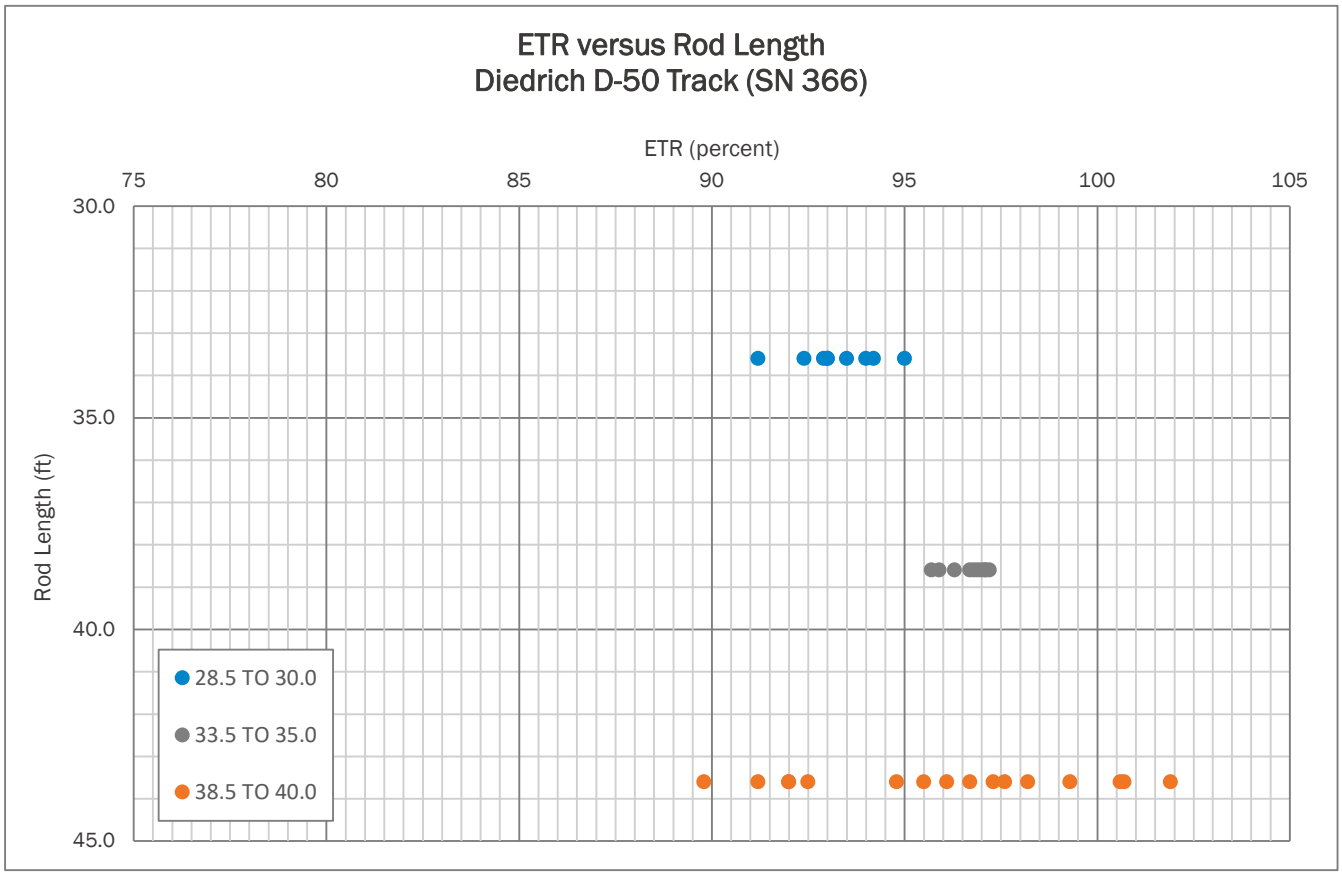
GRL Engineers, Inc. - PDIPLOT2 Ver 2021.1.61.0 - Case Method & iCAP® Results

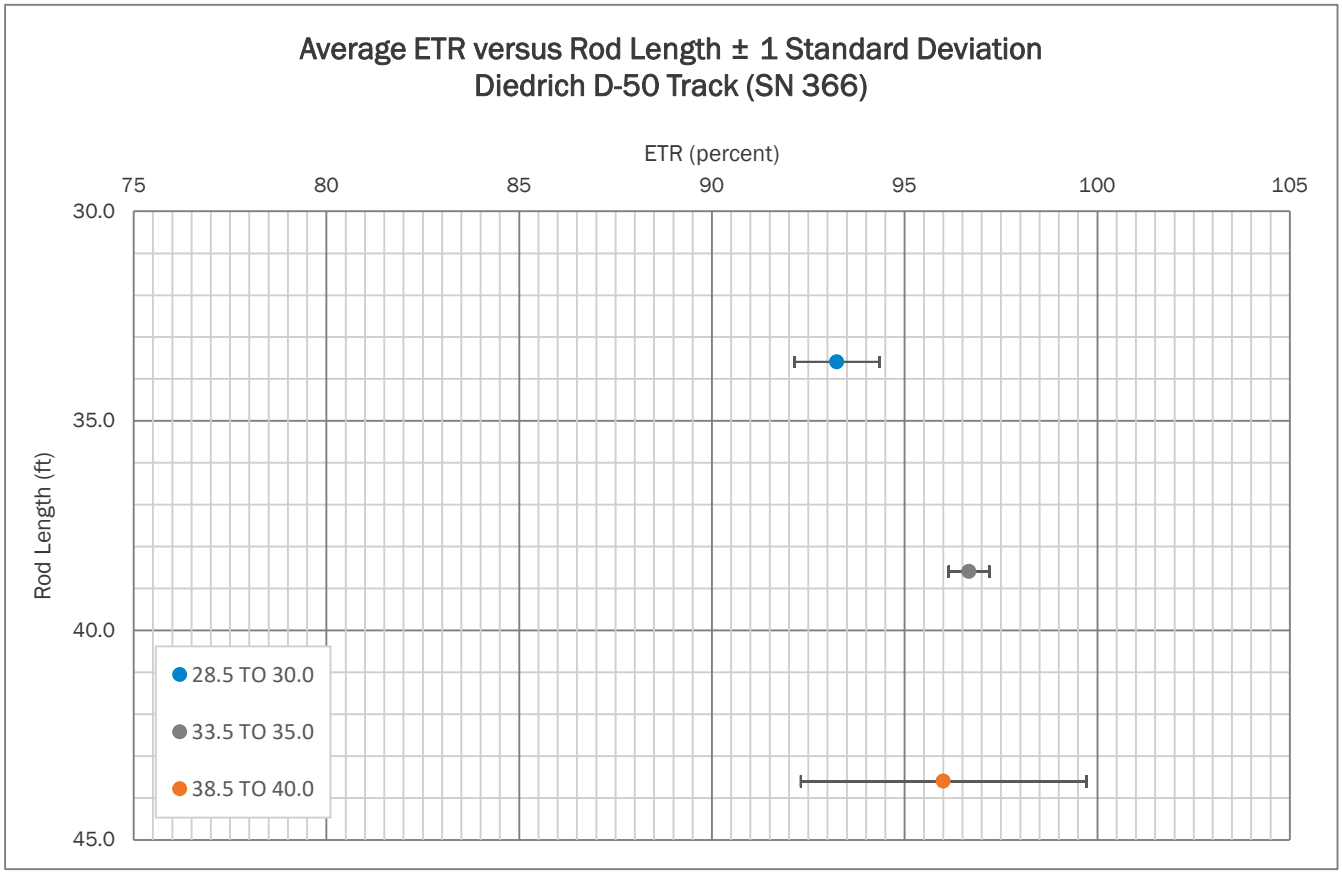
Printed: 28-July-2024 Test started: 26-July-2024

DIEDRICH D-50 (SN 366) - 38.5 TO 40.0

B-18




ETR versus Rod Length
Diedrich D-50 Track (SN 366)
ETR (percent)
75
80
85
90
95
100
105
30.0
35.0
40.0
45.0
Rod Length (ft)
28.5 TO 30.0
33.5 TO 35.0
38.5 TO 40.0


Average ETR versus Rod Length ± 1 Standard Deviation
Diedrich D-50 Track (SN 366)
ETR (percent)
75
80
85
90
95
100
105
30.0
35.0
40.0
45.0
Rod Length (ft)
28.5 TO 30.0
33.5 TO 35.0
38.5 TO 40.0

APPENDIX II

SPT Hammer Energy Field Form

Project:	SPT HAMMER ENERGY	**Date:**	7/26/2024
Project No.:	240019025 (2024 TESTING)	**Weather:**	70's / CLEAR
Boring No.:	B-18	**Drill Rod Type:**	AWJ

On-site Personnel

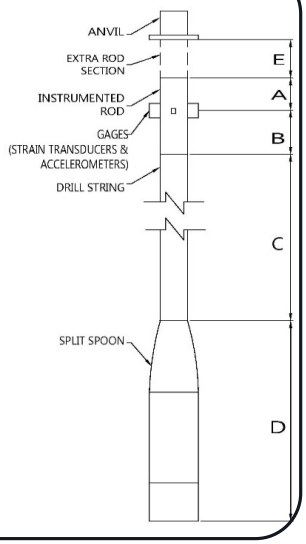
Drilling Company:	RENTED TO CG2 EXPLORATION, LLC
Rig Operator:	C. ODOM
Engr/Geologist:	N/A
Client Rep.:	N/A
Analyzer Oper.:	R. KRAL

Rig/Hammer Info

Drill Rig Make/Model:	DIEDRICH D-50
Carrier Type:	TRACK
Rig Serial No.:	366
Hammer Type/Model:	DIEDRICH
Hammer Serial No.:	N/A
Hammer Drop System:	AUTO
Lubrication Condition:	PER MANUFACTURER
Manufacturer Recommended Operation Rate (bpm):	45
Drop Height (in.):	30
Hammer Weight (lbs):	140
Anvil Dimension (in.):	30
Drilling Method:	2.25 HOLLOW-STEM AUGERS

Rod Info

(A + E) Impact Surface to Gages Length:	1.71	ft
(B) Instr. Rod Length below Gages:	0.70	ft
(A) + (B) Instr. Rod Length:	2.00	ft
(D) Spoon Length:	2.85	ft
(E) Rod Length Above Instr. Rod (if applicable):	0.41	ft
Instr. Rod S/N:	728AWJ	
Instr. Rod Outside Dia.:	1.75	in.
Instr. Rod Area:	1.13	in^2
PDA Make/Model:	SPT	
PDA Serial No.:	4549 TB	
Calib. Pulse Test (y/n):	Y	



Gage Info

Gage		Serial No.	Calibration No.
Accel.	A3	K10959	420.00
	A4	K10960	416.30
Strain	F3	728AWJ-1	224.65
	F4	728AWJ-2	224.14

Date of Test	Test Depth Increment (ft to ft)	Test Time Start / Stop (military)	Length of Drill String (ft) ***(C)***	(LE) Length below Gages (ft) ***(B) + (C) + (D)***	Avg. Meas. Hammer Rate (BPM)	SPT Blow Counts 6"	12"	18"	N-Value	Drop Height in Tolerance (y/n)	Soil Class.
26-Jul	28.5 TO 30.0	1054/1054	30	33.6	48	3	4	5	9	Unknown	SA SI
26-Jul	33.5 TO 35.0	1102/1102	35	38.6	48	4	4	6	10	Unknown	SA SI
26-Jul	38.5 TO 40.0	1110/1110	40	43.6	49	5	7	9	16	Unknown	SA SI

Notes:
TESTING PERFORMED AT A SITE LOCATED AT 327 OLD HEBRON ROAD IN, CHARLOTTE, NORTH CAROLINA (MECKLENBURG COUNTY). APPROXIMATE COORDINATES OF THE TESTING SITE ARE 35.1310233, -80.8858186.

NOTE: (1) Note any unusual hammer operating conditions that affect the hammer performance, or changes in operating conditions (e.g. veritcality, weather, or lubrication between trials). (2) Note any changes in rod diameter along drill string and record locations of short rod sections.

Prepared By (print/signature)

7/26/2024
Date

Figure No. 1: Rear View of Drill Rig

Figure No. 2: Side View of Drill Rig

Figure No. 3: Serial Number Plate

Figure No. 4: Automatic Hammer

APPENDIX III

Certificate of Calibration

Pile Dynamics, Inc. certifies that the

Pile Driving Analyzer®, Model SPT

Serial Number: 4549 TB

was calibrated on 17 MAY 2024

using a PDA Calibration Box whose output was calibrated with test equipment traceable to NIST.

This certificate is valid for 2 years from above date.

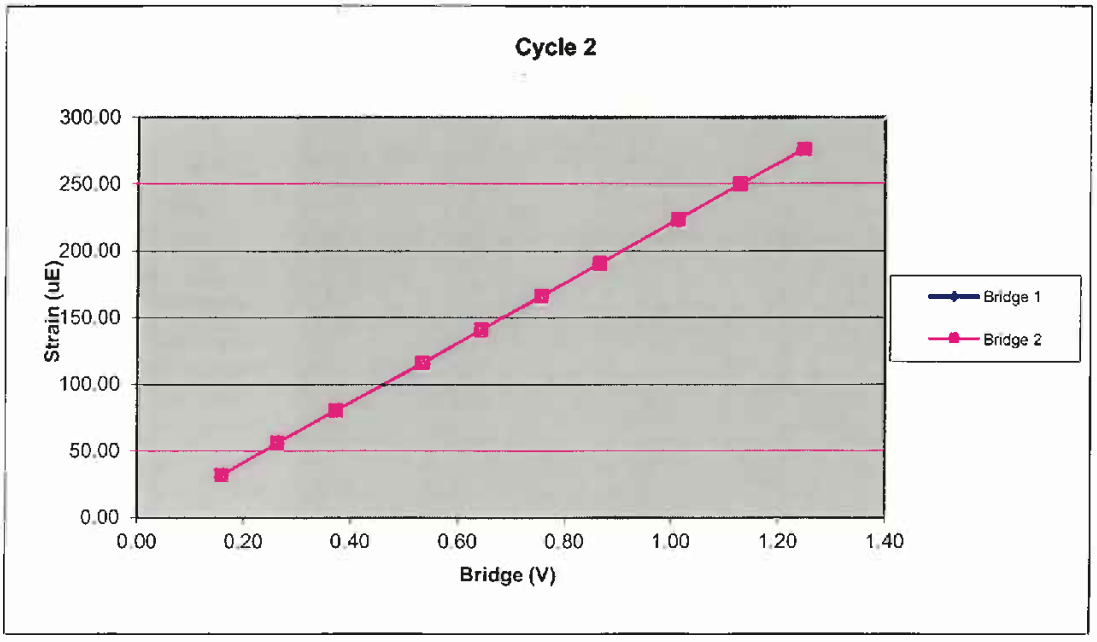
Tested by: MG

Pile Dynamics, Inc.
30725 Aurora Road
Cleveland, Ohio 44139 USA

528AWJ		Cycle 2		
Sample	**Force (lb)**	**Strain (µE)**	**Bridge 1 (V)**	**Bridge 2 (V)**
1	0.00	0.00	0.00	0.00
2	1275.09	30.72	0.16	0.16
3	2117.68	54.81	0.26	0.26
4	3006.08	79.31	0.37	0.37
5	4307.49	114.86	0.54	0.53
6	5174.25	139.41	0.64	0.64
7	6086.83	164.67	0.76	0.76
8	6980.20	189.06	0.87	0.87
9	8159.37	222.00	1.01	1.01
10	9091.83	248.52	1.13	1.13
11	10060.07	274.72	1.25	1.25

Bridge 1		**Bridge 2**	
Force Calibration (lb/V)	**8074.08**	**Force Calibration (lb/V)**	**8058.01**
Offset	**-15.56**	Offset	**-1.74**
Correlation	**0.999996**	Correlation	**0.999999**
Strain Calibration (µE/V)	**224.12**	**Strain Calibration (µE/V)**	**223.67**
Offset	**-4.79**	Offset	**-4.40**
Correlation	**0.999991**	Correlation	**0.999992**

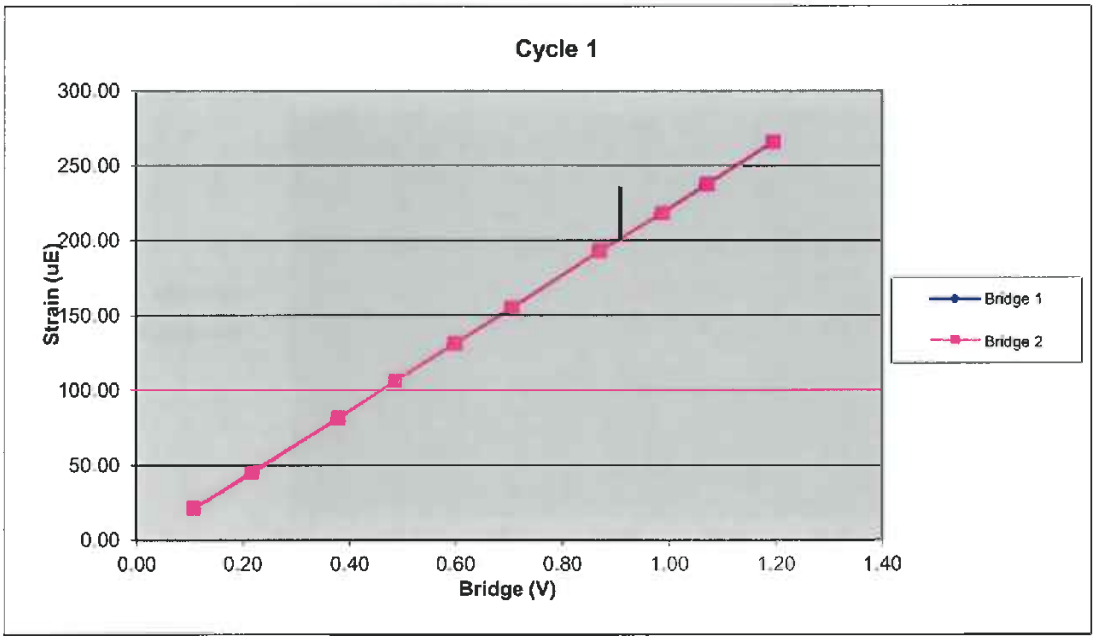
Force Strain Calibration	
EA (Kips)	**36025.06**
Offset	**156.98**
Correlation	**0.999993**



528AWJ		Cycle 1		
Sample	**Force (lb)**	**Strain (µE)**	**Bridge 1 (V)**	**Bridge 2 (V)**
1	0.00	0.00	0.00	0.00
2	884.31	20.98	0.11	0.11
3	1783.92	45.13	0.22	0.22
4	3073.53	80.67	0.38	0.38
5	3932.89	105.36	0.49	0.49
6	4836.79	130.28	0.60	0.60
7	5716.12	154.14	0.70	0.71
8	7053.40	191.99	0.87	0.87
9	7971.93	217.29	0.99	0.99
10	8671.71	236.63	1.07	1.07
11	9674.35	264.84	1.20	1.20

Bridge 1		**Bridge 2**	
Force Calibration (lb/V)	**8081.78**	**Force Calibration (lb/V)**	**8061.53**
Offset	10.48	Offset	19.76
Correlation	0.999997	Correlation	0.999997
Strain Calibration (µE/V)	**224.52**	**Strain Calibration (µE/V)**	**223.96**
Offset	-3.88	Offset	-3.62
Correlation	0.999994	Correlation	0.999991

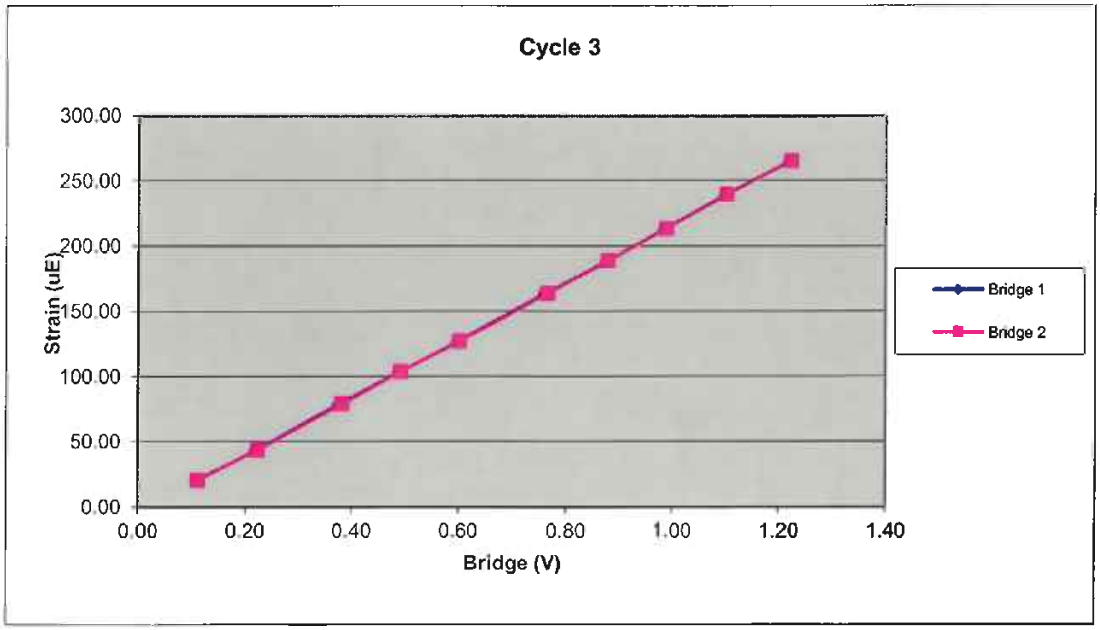
Force Strain Calibration	
EA (Kips)	**35995.56**
Offset	150.23
Correlation	0.999991



528AWJ		Cycle 3		
Sample	Force (lb)	Strain (µE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	901.56	19.94	0.11	0.11
3	1793.96	43.13	0.22	0.22
4	3064.57	78.60	0.38	0.38
5	3959.40	103.11	0.49	0.49
6	4851.51	126.42	0.60	0.60
7	6166.76	162.91	0.76	0.77
8	7098.54	187.86	0.88	0.88
9	7986.55	212.63	0.99	0.99
10	8919.01	238.54	1.10	1.10
11	9888.22	264.36	1.22	1.23

Bridge 1		Bridge 2	
Force Calibration (lb/V)	8075.82	Force Calibration (lb/V)	8080.86
Offset	7.47	Offset	-14.23
Correlation	0.999999	Correlation	0.999998
Strain Calibration (µE/V)	220.19	Strain Calibration (µE/V)	220.33
Offset	-5.00	Offset	-5.59
Correlation	0.999981	Correlation	0.999982

Force Strain Calibration	
EA (Kips)	36675.33
Offset	190.88
Correlation	0.999985



Bridge Excitation (V)	5
Shunt Resitor (ohm)	60.4k

Calibration Factors	528AWJ		
Bridge 1 (µE/V)	222.94	Bridge 2 (µE/V)	222.65
EA Factor (Kips)	36231.98	Area (in^2)	1.21

Calibrated by: 
Calibrated Date: 6/17/2024

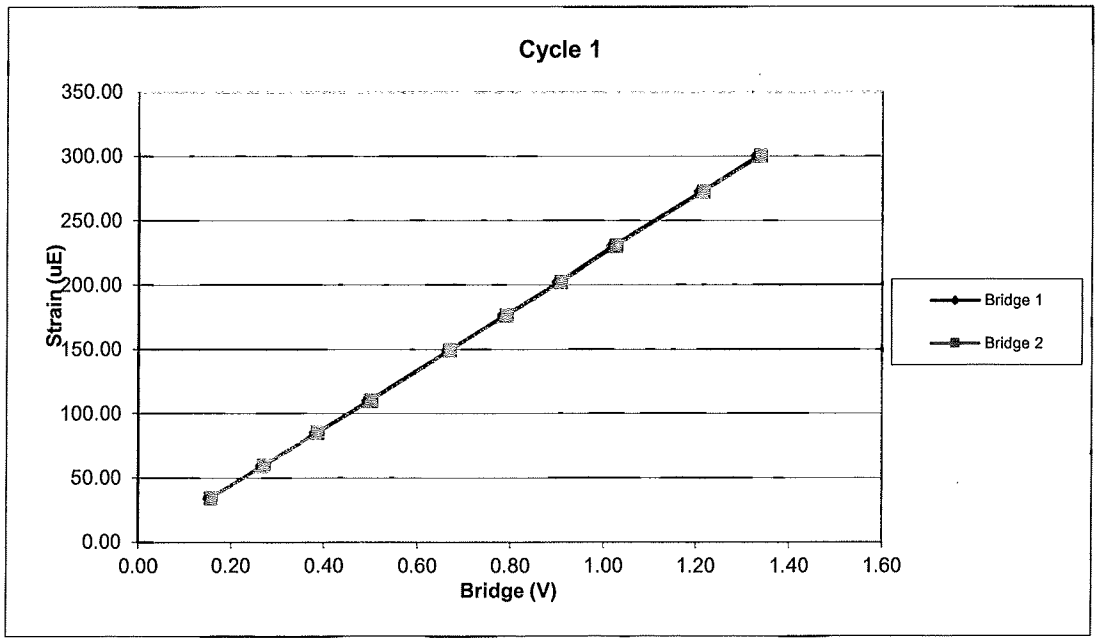
Pile Dynamics Inc
30725 Aurora Rd
Solon, OH 44139

Traceable to N.I.S.T.

728AWJ		Cycle 1		
Sample	**Force (lb)**	**Strain (μE)**	**Bridge 1 (V)**	**Bridge 2 (V)**
1	0.00	0.00	0.00	0.00
2	1199.06	34.33	0.16	0.16
3	2052.76	59.72	0.27	0.27
4	2924.20	85.27	0.38	0.39
5	3782.68	110.02	0.50	0.50
6	5074.34	149.22	0.67	0.67
7	5985.06	176.19	0.79	0.79
8	6869.47	202.19	0.90	0.91
9	7768.10	230.48	1.02	1.03
10	9202.28	272.31	1.21	1.22
11	10126.06	300.27	1.33	1.34

Bridge 1		**Bridge 2**	
Force Calibration (lb/V)	**7583.03**	**Force Calibration (lb/V)**	**7557.58**
Offset	20.67	Offset	0.95
Correlation	1.000000	Correlation	0.999999
Strain Calibration (μE/V)	**226.02**	**Strain Calibration (μE/V)**	**225.27**
Offset	-1.27	Offset	-1.86
Correlation	0.999984	Correlation	0.999979

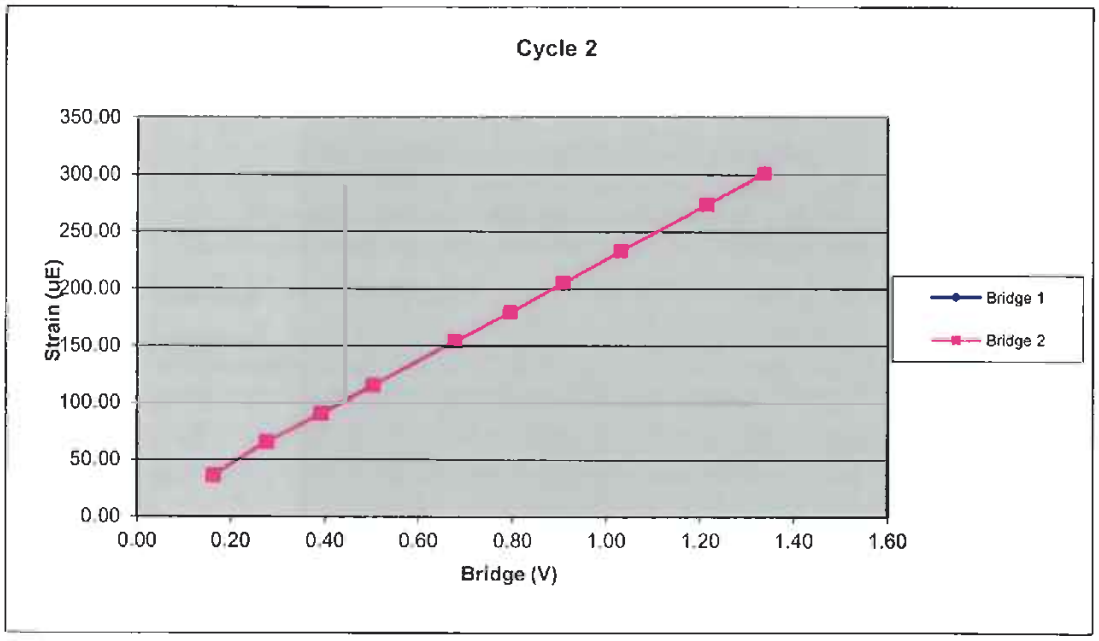
Force Strain Calibration	
EA (Kips)	**33548.47**
Offset	63.54
Correlation	0.999983



728AWJ		Cycle 2		
Sample	**Force (lb)**	**Strain (µE)**	**Bridge 1 (V)**	**Bridge 2 (V)**
1	0.00	0.00	0.00	0.00
2	1236.98	35.69	0.16	0.16
3	2108.61	64.71	0.28	0.28
4	2976.64	89.52	0.39	0.39
5	3811.14	114.45	0.50	0.50
6	5141.89	153.54	0.68	0.68
7	6032.24	178.92	0.80	0.80
8	6903.48	204.54	0.91	0.91
9	7825.42	232.64	1.03	1.03
10	9217.58	273.43	1.22	1.22
11	10151.02	300.79	1.34	1.34

Bridge 1		**Bridge 2**	
Force Calibration (lb/V)	**7561.16**	**Force Calibration (lb/V)**	**7576.28**
Offset	**14.33**	Offset	**4.68**
Correlation	**0.999997**	Correlation	**0.999995**
Strain Calibration (µE/V)	**223.39**	**Strain Calibration (µE/V)**	**223.84**
Offset	**1.55**	Offset	**1.27**
Correlation	**0.999945**	Correlation	**0.999943**

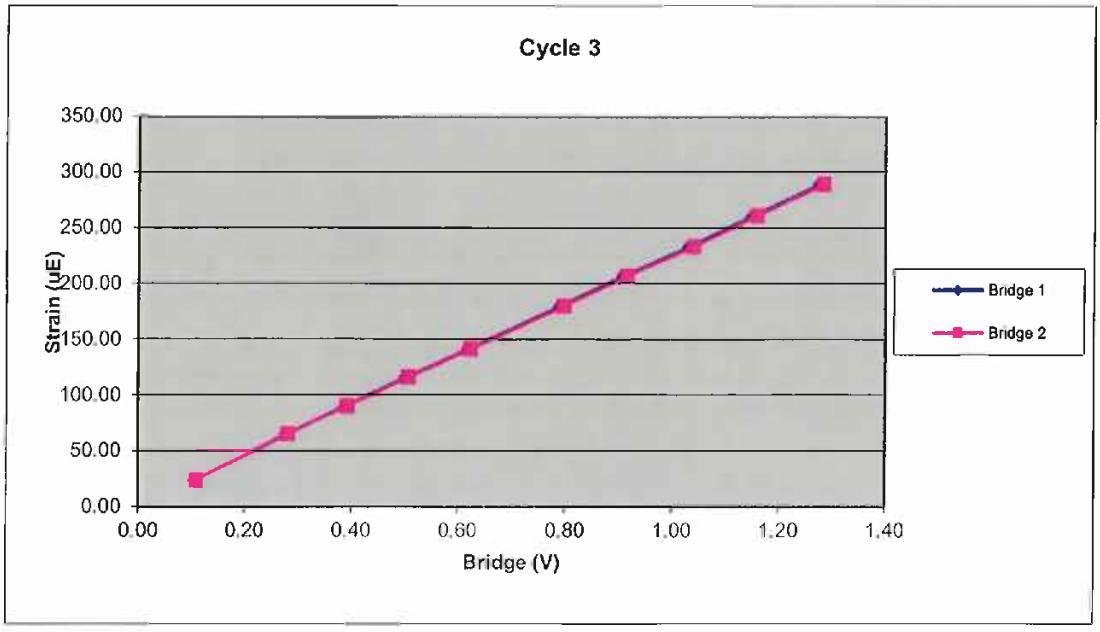
Force Strain Calibration	
EA (Kips)	**33843.24**
Offset	**-37.68**
Correlation	**0.999950**



728AWJ		Cycle 3		
Sample	Force (lb)	Strain (µE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	822.90	24.10	0.11	0.11
3	2132.69	64.89	0.28	0.28
4	2972.74	89.98	0.39	0.39
5	3841.65	115.75	0.50	0.51
6	4741.16	141.06	0.62	0.62
7	6043.35	179.33	0.79	0.80
8	6961.58	206.39	0.91	0.92
9	7901.94	232.60	1.03	1.04
10	8816.85	260.36	1.15	1.16
11	9759.65	288.75	1.28	1.29

Bridge 1		Bridge 2	
Force Calibration (lb/V)	7644.24	Force Calibration (lb/V)	7602.69
Offset	-5.25	Offset	-12.15
Correlation	0.999999	Correlation	0.999997
Strain Calibration (µE/V)	224.53	Strain Calibration (µE/V)	223.31
Offset	1.57	Offset	1.37
Correlation	0.999950	Correlation	0.999942

Force Strain Calibration	
EA (Kips)	34041.33
Offset	-58.11
Correlation	0.999945



Bridge Excitation (V) 5
Shunt Resitor (ohm) 60.4k

Calibration Factors	728AWJ		
Bridge 1 (µE/V)	224.65	Bridge 2 (µE/V)	224.14
EA Factor (Kips)	33811.01	Area (in^2)	1.13

Calibrated by: Sean Bonner
Calibrated Date: 2/6/2024

Pile Dynamics Inc
30725 Aurora Rd
Solon, OH 44139

Traceable to N.I.S.T.

Accelerometer Calibration Certificate
Pile Dynamics, Inc.

Calibrated by Pile Dynamics, Inc.
Calibration performed on 11Jul2024

Serial No:	K11957	**Temperature:**	24.9 °C
Model:	PR	**Humidity:**	54%
Calibrated on:	Channel 4 on 8G 5161 LE		

Ref Acc 1:	78270! 971 g's/volt	**Cal on:**	11Jan2024
Ref Acc 2:	78268! 986 g's/volt	**Cal on:**	11Jan2024

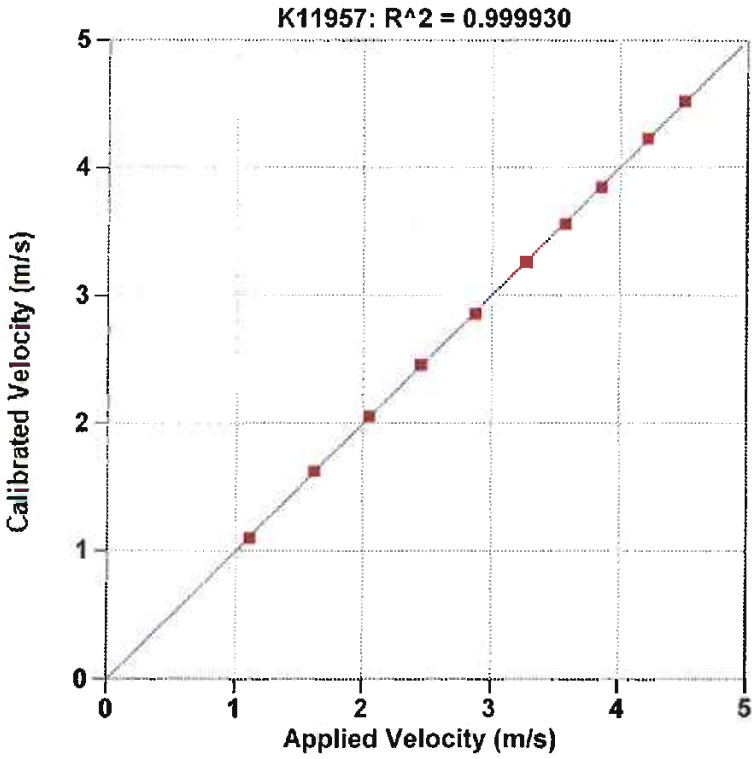
Reference accelerometer calibrations are traceable to the United States National Institute of Standards and Technology (NIST).

PDA CALIBRATION FACTOR

412.3 mv/5000g
(82.5 µv/g)
R^2: 0.999930 [Chip programmed]

Operator: William Johnson

Signed



Reference Velocity	S/N K11957 Velocity
m/s	m/s
1.113	1.104
1.621	1.626
2.052	2.057
2.451	2.459
2.874	2.861
3.272	3.266
3.574	3.565
3.858	3.850
4.220	4.230
4.510	4.521

Maximum Acceleration: 975 g's

Accelerometer Calibration Certificate
Pile Dynamics, Inc.

Calibrated by Pile Dynamics, Inc.
Calibration performed on 11Jul2024

Serial No:	K10959	**Temperature:**	24.9 °C
Model:	PR	**Humidity:**	55%
Calibrated on:	Channel 4 on 8G 5161 LE		

Ref Acc 1:	78270! 971 g's/volt	**Cal on:**	11Jan2024
Ref Acc 2:	78268! 986 g's/volt	**Cal on:**	11Jan2024

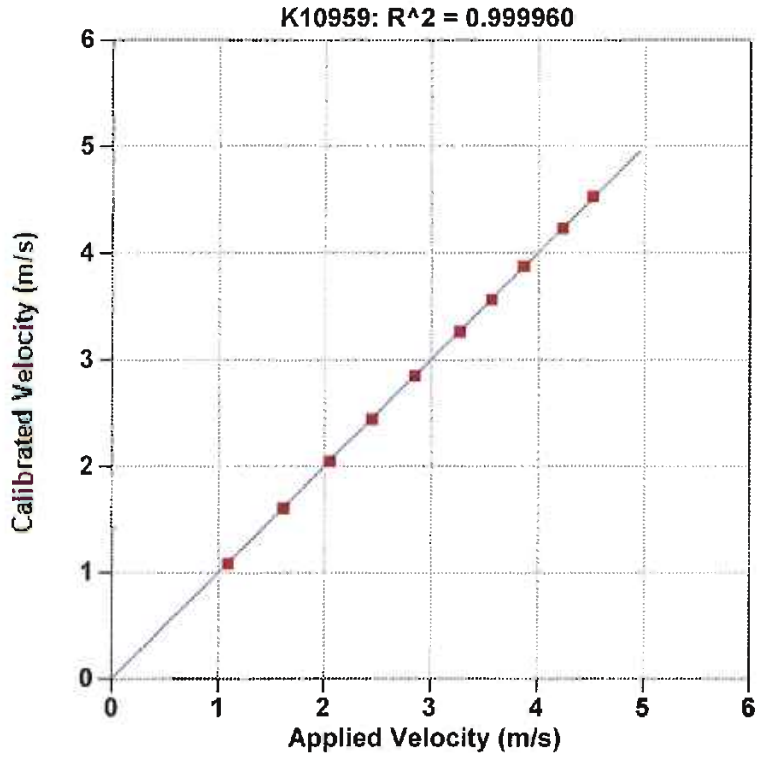
Reference accelerometer calibrations are traceable to the United States National Institute of Standards and Technology (NIST).

PDA CALIBRATION FACTOR

420.0 mv/5000g
(84.0 µv/g)
R^2: 0.999960 [Chip programmed]

Operator: William Johnson

Signed



Reference Velocity	S/N K10959 Velocity
m/s	m/s
1.091	1.084
1.611	1.607
2.051	2.046
2.449	2.442
2.851	2.852
3.271	3.264
3.571	3.564
3.872	3.878
4.232	4.232
4.516	4.531

Maximum Acceleration: 976 g's

Accelerometer Calibration Certificate
Pile Dynamics, Inc.

Calibrated by Pile Dynamics, Inc.
Calibration performed on 11Jul2024

Serial No:	K10960	**Temperature:**	24.9 °C
Model:	PR	**Humidity:**	55%
Calibrated on:	Channel 3 on 8G 5161 LE		

Ref Acc 1:	78270! 971 g's/volt	**Cal on:**	11Jan2024
Ref Acc 2:	78268! 986 g's/volt	**Cal on:**	11Jan2024

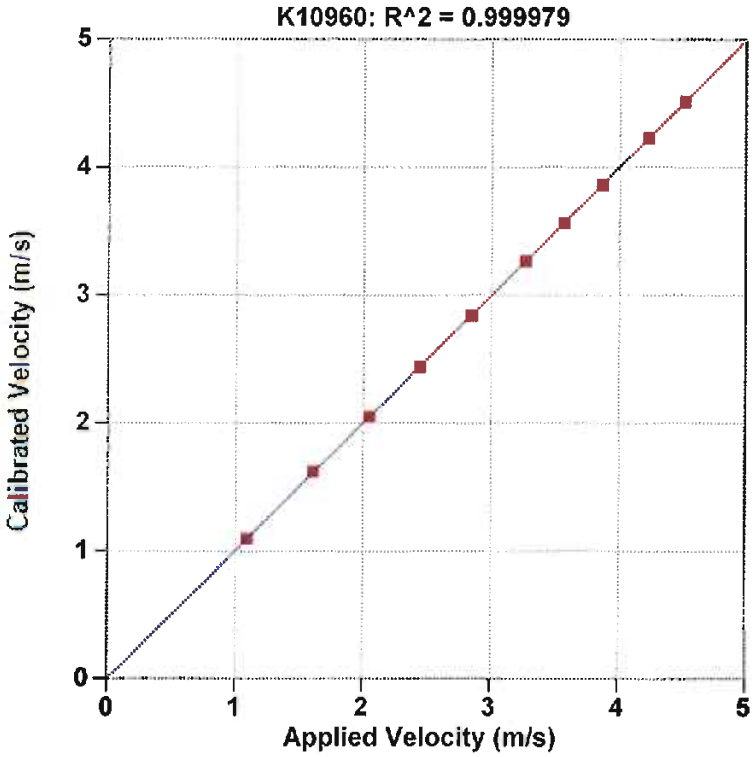
Reference accelerometer calibrations are traceable to the United States National Institute of Standards and Technology (NIST).

PDA CALIBRATION FACTOR

416.3 mv/5000g
(83.3 µv/g)
R^2: 0.999979 [Chip programmed]

Operator: William Johnson

Signed



Reference Velocity	S/N K10960 Velocity
m/s	m/s
1.091	1.095
1.611	1.622
2.051	2.053
2.449	2.443
2.851	2.847
3.271	3.271
3.571	3.571
3.872	3.866
4.232	4.237
4.516	4.517

Maximum Acceleration: 976 g's

APPENDIX IV

PDCA
PILE DRIVING CONTRACTORS ASSOCIATION

Pile Dynamics, Inc.

This documents that

Robert E. Kral
Carolinas Geotechnical Group

has on May 20, 2016 achieved the rank of

ADVANCED

on the **Dynamic Measurement and Analysis Proficiency Test**.

The individual identified on this document demonstrated to the degree granted above an understanding of theory, data quality evaluation, interpretation and signal matching for high strain dynamic testing of deep foundations. ***It is recommended*** **that Individuals at the Advanced level seek Master or Expert levels through additional study within six years of the date of this document.**

The ability of the individual named to provide appropriate knowledge and advice on a specific project is not implied or warranted by the Pile Driving Contractors Association or Pile Dynamics, Inc. **This certificate can be verified at www.PDAproficiencytest.com.** The Pile Driving Contractors Association or Pile Dynamics, Inc. assumes no liability for foundation testing and analysis work performed by the bearer of this certificate.

Steven A. Hall, Executive Director
Pile Driving Contractors Association

Garland Likins, Senior Partner
Pile Dynamics, Inc.

No. 2072

APPENDIX

SECTION 10 GEOSCOPING FORM

GeoScoping Form

PROJECT INFORMATION	
Project ID: P043969	Date of Trip: 10/16/2024 - 10/20/2024
County: Oconee	Location: US 76
Rd/Route: US 76	Local Name: Long Creek Highway
Attendees: Craig Piercy	

EXISTING BRIDGE INFORMATION	
Bridge Length: 250.7 feet	Bridge Width: 33.5
Superstructure Type: Precast Slab/Concrete Girders	Substructure Type: Driven Timber End Bents/Interior Concrete piers in Shallow Foundation in Rock
Begin Bridge Sta.:	End Bridge Sta.:
Begin Bridge Embankment Sta.[1]:	End Bridge Embankment Sta.[1]:
Structure Number: 04624	Posted Weight Limit:
Crossing: Chauga River	Skew:
Latitude:	Longitude:
Existing Fill Height: East ~ 25-ft, West ~10-ft	Approximate Existing Slope Angle: East: 70°-80°, West 60°-70°

[1]Begin and End Bridge Embankment 100 feet down station or up station from bridge, respectively

EXISTING ROADWAY EMBANKMENT INFORMATION		
Begin Project Sta.: East Side	Begin Bridge Embankment Sta.[1]:	
Accessibility Issues: Bridge Partially Collapsed East Approach Near End Bent		
Ground Cover: Vegetation(Grass/Shrubs, Small Trees & Bare Soil where Undercut		
Existing Fill Height: ~25-FT.	Approximate Existing Slope Angle:	
Local Development (undeveloped, developed residential, developed commercial, developed industrial, etc.): developed residential		
Topography (level, flat, rolling, steep, hillside, valley, swamp, gully, etc.): Residential		
Traffic Control Necessary (Y/N): (No)		
Surface Soil: Silty SAND	Muck (Y/N): No	
Exposed Rock (Y/N): Yes	In Stream Bed (Y/N): Yes	In Banks (Y/N): No
Wetlands On-Site (Y/N): Yes - River	Wetlands Adjacent (Y/N): No	
Depth FG to Water: at B-3, 48.1-ft.	Water Depth: 1.3-ft.	
Depth to Existing Ground: 49.5-ft. to Mud Line		
Scour Condition at EB: End Bent Undercut	Scour Condition at IB: N/A	
End Bridge Embankment Sta.[1]: West Side	End Project Sta.:	
Accessibility Issues: None		
Ground Cover: Grass, Shrubs, Trees, Bare DIrst Below Bridge Near the Top		
Existing Fill Height: ~10-ft. at EB But is Cut Slope	Approximate Existing Slope Angle: 60°-70°	
Local Development (undeveloped, developed residential, developed commercial, developed industrial, etc.): Undeveloped		
Topography (level, flat, rolling, steep, hillside, valley, swamp, gully, etc.): Steep Hill Side		
Traffic Control Necessary (Y/N): No - Bridge Closed		
Surface Soil: Silty SAND	Muck (Y/N): No	
Exposed Rock (Y/N): Yes	In Stream Bed (Y/N): Yes	In Banks (Y/N): Yes
Wetlands On-Site (Y/N): Yes - River	Wetlands Adjacent (Y/N): No	
Depth FG to Water: 49.8-ft.	Water Depth: 1.8-ft.	
Depth to Existing Ground: 51.3-ft.		
Scour Condition at EB: N/A	Scour Condition at IB: N/A	

GeoScoping Form

UTILITIES INFORMATION
Attached:
Above Ground/ Overhead: Overhead power lines on South Side of Bridge
Underground: Water Line (Surfcae - over Old Bridge to the South); Underground Communication Lines on South Side

COMMENTS
Wood Dammed up at the North Side (Upstream) of the bridge

Instructions:

1. Attach boring location plan for bridge and roadway.
2. Attach all photographs taken, photographs to be labeled as to direction looking in and what is being depicted.
3. Fill out GeoScoping Form as completely as possible, using additional sheets as necessary to describe site conditions.
4. If representative of GEC on site during GeoScoping, include GEC representative's name and contact number in Attendees block.

Geo-Scoping Form

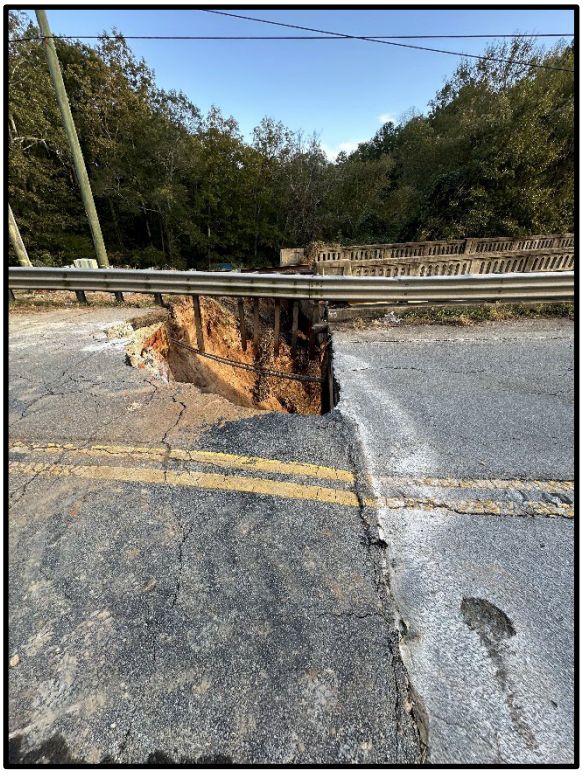
South Side of Bridge – Facing East

South Side of Bridge – Facing East

Geo-Scoping Form

Debris Accumulation (North Side)

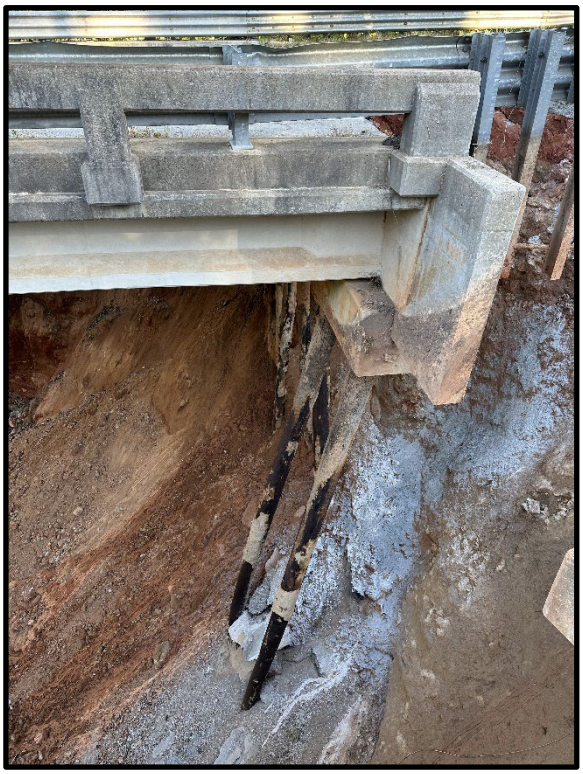
East Side of Bridge Facing West



Eastbound Lane Damage

Eastbound Lane Damage

Geo-Scoping Form



South Side of Bridge – Underneath (Southeastern Corner)

South Side of Bridge – Underneath (Southeastern Corner)