

REVISED

GEOTECHNICAL BASE LINE REPORT

Route S-1-96 Replacement Bridge over Shanklin Creek
Abbeville County, South Carolina



PREPARED FOR

SCDOT

955 Park Street

Columbia, South Carolina 29201

PREPARED BY

F&ME Consultants, Inc.

1825 Blanding Street

Columbia, South Carolina 29201

SCDOT Project ID: P038299

F&ME Project #: G6100.05.02

October 23, 2019

October 23, 2019

Trapp Harris, P.E.
Design-Build Group Geotechnical Engineer
South Carolina Department of Transportation
955 Park Street
Columbia, South Carolina 29201

Re: Closed and Load-Restricted Bridge Package 2020-1
REVISED Geotechnical Base Line Report
Route S-1-96 Bridge over Shanklin Creek
Abbeville County, South Carolina
SCDOT Project ID: P038299
F&ME Project No.: G6100.050.02

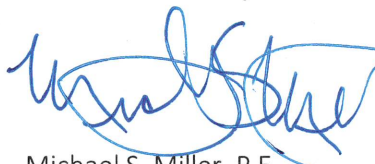
Dear Mr. Harris:

Submitted herein is F&ME Consultants, Inc. (FME) revised Geotechnical Base Line Report (GBLR) for the Route S-1-96 Replacement Bridge over Shanklin Creek. Revisions to our previously submitted report include the corrosion series laboratory test results. This report contains findings from our subsurface field exploration, results from the laboratory testing program, and conceptual geotechnical assessment of approach embankments and bridge foundation systems.

It has been a pleasure working 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 may be of further assistance.

Sincerely,

F&ME Consultants, Inc.

A handwritten signature in blue ink, appearing to read 'Michael S. Miller', is written over the printed name and title.

Michael S. Miller, P.E.
Senior Geotechnical Engineer



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1.0 INTRODUCTION

FME performed geotechnical soil test borings and laboratory testing for the Route S-1-96 Replacement Bridge over Shanklin Creek located in Abbeville County, South Carolina. A Site Location Plan is presented as Figure 1 in Section 1 in the Appendix of this report. The South Carolina Department of Transportation (SCDOT) Scope of Services Work Request for the geotechnical subsurface exploration and laboratory testing was issued on March 1, 2019.

The field investigation consisted of performing soil test borings (STB's) with associated Standard Penetration Testing (SPT) and rock core sampling. Laboratory testing was performed on selected soil and rock core samples collected from the test borings. The 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, and the SCDOT Geotechnical Design Manual (GDM). This Geotechnical Base Line Report was prepared in general accordance with the 2019 SCDOT Geotechnical Design Manual (GDM), Version 2.0. along with PCDM-11 Supplemental Design Criteria for Low Volume Bridge Replacement Projects.

2.0 FIELD EXPLORATION SUMMARY

On June 17 and 18, 2019, F&ME performed two (2) soil test borings (STB's). The test boring locations were performed in proximity to the existing bridge end bent locations. The intent of the subsurface investigation was to provide a broad indication of the subsurface conditions at the site.

The STB's were advanced using a CME 45B trailer mounted drill rig with an automatic standard penetration test (SPT) hammer system. Rotary wash drilling techniques were used during drilling to maintain a stable borehole. Standard split-spoon sampling was performed continuously over the first ten (10) feet of the boring depth and at five (5) foot intervals thereafter. Soil test borings were advanced to a drilling refusal condition and subsequently advanced into rock using NQ rock coring techniques. Details of each STB are included on the individual Soil Test Boring Logs in Section 4 in the Appendix of this report.

2.1 Soil Test Borings (STB's)

The following table is a summary of the STB designations, exploration depths, locations, and ground surface elevations of the test boring locations.

Table 1 – Soil Test Boring Summary Table

SOIL TEST BORINGS (STB)							
Test Hole No.	Surface Condition	Soil Depth (ft.)	Rock Core Depth (ft.)	Total Boring Depth (ft.)	Latitude	Longitude	Elev. (ft.-MSL)
B-801	Paved Roadway	36.8	10.0	46.8	34.234842	-82.552393	574.0
B-802	Paved Roadway	30.8	10.2	41.0	34.234856	-82.552112	572.6
Totals	-	67.6	20.2	87.8			

2.2 Groundwater

Groundwater depths were recorded at the time of boring (TOB) for soil test borings B-801 and B-802, with the recorded measurements noted on the individual Soil Test Boring Logs in Section 4 of the Appendix to this report. In test boring B-801 groundwater measurements were made twenty-four (24) hours following boring completion. Soil test boring B-802 was backfilled following TOB groundwater measurements. The following table is a summary of the groundwater measurements for the soil test borings at time of boring and at twenty-four (24) hours following boring, where recorded.

Table 2 – Groundwater Depth Summary Table

GROUNDWATER DEPTH			
Boring No.	Date of TOB Groundwater Measurement	TOB Groundwater Depth (ft.)	24-hr. Groundwater Depth (ft.)
B-801	6/17/2019	9.7	9.5
B-802	6/18/2019	9.9	Backfilled

3.0 LABORATORY TESTING

Following completion of F&ME's field investigation, select split-spoon samples were tested in FME's AASHTO accredited laboratory to determine applicable physical and engineering properties. Four (4) rock core specimens were sent to Geotechnical Testing Services, Inc. and tested for unconfined compressive strength testing and Young's Modulus determinations. One (1) split-spoon sample was sent to an off-site AASHTO accredited laboratory for corrosion series testing. All laboratory testing was performed in general accordance with procedures set forth in the most current AASHTO and ASTM standards.

The laboratory testing performed for the split-spoon samples and rock cores are detailed in the table below. Data sheets containing the results of the laboratory testing program are provided in Section 7 of the Appendix.

Table 3 – Laboratory Soil Testing Summary Table

LABORATORY SOIL AND ROCK TESTING		
Type of Test	Quantity	Procedure
Grain Size Analysis with Hydrometer	6	AASHTO T88
Grain Size Analyses with Wash 200	2	AASHTO T11
Atterberg Limits	4	AASHTO T89/T90
Natural Moisture Content	6	ASTM D2216
pH	1	AASHTO T289
Resistivity	1	AASHTO T288
Chloride Content	1	AASHTO T291
Sulfate Content	1	AASHTO T290
Rock Core Compressive Strength and Young's Modulus	4	ASTM D7012 Methods C and D

4.0 SUBSURFACE STRATIGRAPHY

The following table summarizes the soil and rock stratigraphy based on conditions as encountered in the soil test borings performed during this geotechnical subsurface investigation.

Table 4 – Stratigraphy Summary Table

SOIL AND ROCK STRATIGRAPHY					
Strata	Elevation of Top Layer (ft-MSL)	Depth to Top of Layer (ft.)	USCS Soil Type	Avg. SPT N Value (bpf)	Comments
Fill	573	0	SM, ML, CL	7	-
Alluvium	566	7	SM	3	-
Residuum	558	8	SM	38	-
PWR	554	19	SM	+100	-
Bed Rock	539	34	N/A	N/A	Gneissic Granite

5.0 CONCEPTUAL GEOTECHNICAL ASSESSMENT

Relative to the SCDOT's Supplemental Design Criteria for Low Volume Bridge Replacement Projects, the soil subgrade below the new embankment areas are anticipated to be adequate for embankment construction.

We anticipate that pile foundations will be preferred for support of the bridge abutments. At bridge abutment associated with boring B-802, the Strength Case axial loadings will likely govern the geotechnical driven pile design. We anticipate that the soil thickness above weathered rock and bedrock is sufficient to resist the assumed lateral loading conditions, and drilled piles will not be likely. We anticipate that the piles will be driven to a practical refusal driving condition on weathered rock or sound bedrock. To avoid excessive pile driving stresses, we anticipate that pile driving termination criteria will be based on encountering a pile driving practical refusal condition. Shallow foundation concepts are likely not feasible due to the estimated bearing depth and the presence of groundwater at that depth.

At bridge abutment associated with boring B-801, PWR was encountered at a depth of about fourteen and one-half (14.5) feet below present ground surface. Depending on bottom of new cap elevation, the soil thickness above weathered rock and bedrock may be insufficient to resist the assumed lateral loading conditions, and drilled pile may be preferred.

If a multi-span concept is pursued, the selection of the interior bent foundation type will be predicated on the scour depth relative to the bent location(s). For an assumed scour depth and channel geometry, FME anticipates that driven pile concepts will not be feasible based on an insufficient soil thickness above rock to resist the lateral loads. As such, we anticipate that drilled shafts will be utilized at the interior bent(s). The drilled shafts will consist of construction casing and rock sockets below the casing tip elevation. We expect the Strength Case axial loadings will govern the drilled shaft design. Based on the performed borings, the typical rock strengths range on the order from about 8,600 psi to 14,400 psi. We would note that the indicated relatively low rock strength of 1,300 psi of one of the rock cores tested may be the result of a relatively weak rock foliation plane. This rock test result may not be indicative of typical in-situ rock compressive strength.

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SECTION 1	SITE LOCATION PLAN
SECTION 2	BORING LOCATION PLAN
SECTION 3	DRILL RIG PHOTOS
SECTION 4	TEST BORING LOGS
SECTION 5	GENERALIZED SUBSURFACE PROFILE
SECTION 6	ROCK CORE PHOTOS
SECTION 7	LABORATORY TEST RESULTS

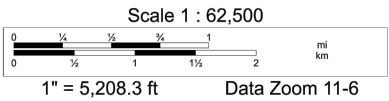
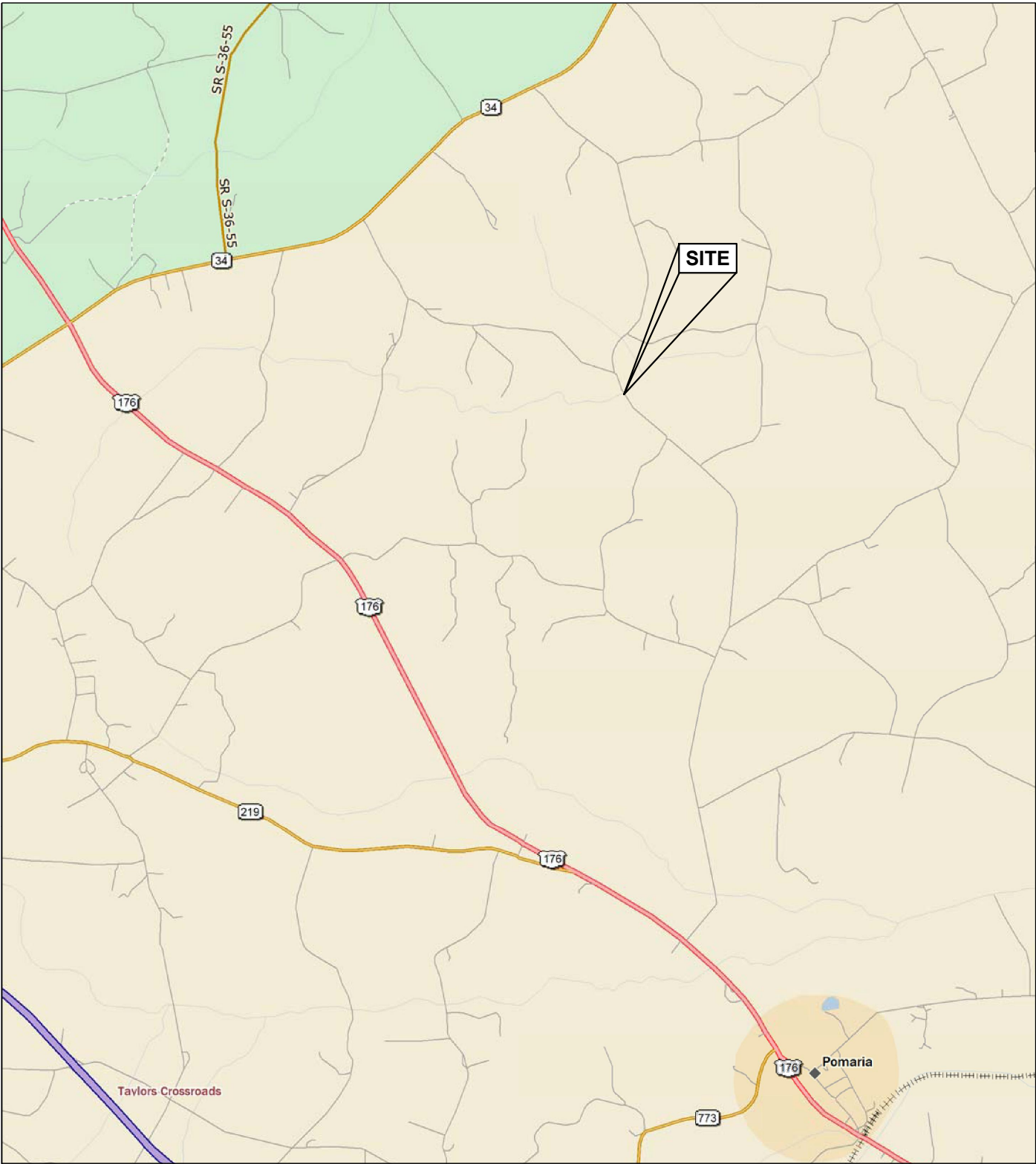
S-1-96 Replacement Bridge over Shanklin Creek

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SECTION 1 SITE LOCATION PLAN

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	ABBEVILLE	P038299	S-1-96	



F&ME CONSULTANTS, INC.
COLUMBIA, SC

4			
3			
2			
1			
REV.	BY	DATE	DESCRIPTION OF REVISION
TOPO.		DATE	
DWG.	CTC	DATE 6.3.19	GROUP - -
R/W		DATE	

SECOND CREEK
NEWBERRY COUNTY, SOUTH CAROLINA

SITE LOCATION PLAN

F&ME JOB NO. G6100.050

SCALE: AS NOTED

FIGURE 1

S-1-96 Replacement Bridge over Shanklin Creek

Geotechnical Base Line Report

APPENDIX

SECTION 2 BORING LOCATION PLAN

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	SC	ABBEVILLE	P038299	S-1-96	



LEGEND:

SOIL TEST BORING LOCATION

4			
3			
2			
1			
REV.	BY	DATE	DESCRIPTION OF REVISION
TOPO.		DATE	
DWG.	CTC	DATE 6.3.19	GROUP -- --
R/W		DATE	

F&ME CONSULTANTS, INC.

COLUMBIA, SC

SHANKLIN CREEK ABBEVILLE COUNTY, SOUTH CAROLINA	
BORING LOCATION PLAN	
F&ME JOB NO. G6100.050	
SCALE: 1"=30'	FIGURE 2

S-1-96 Replacement Bridge over Shanklin Creek

Geotechnical Base Line Report

APPENDIX

SECTION 3 DRILL RIG PHOTOS

Drill Rig Setup Photographs

B-801



Drill Rig Setup Photographs

B-802



S-1-96 Replacement Bridge over Shanklin Creek

Geotechnical Base Line Report

APPENDIX

SECTION 4 TEST BORING 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	Spft
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

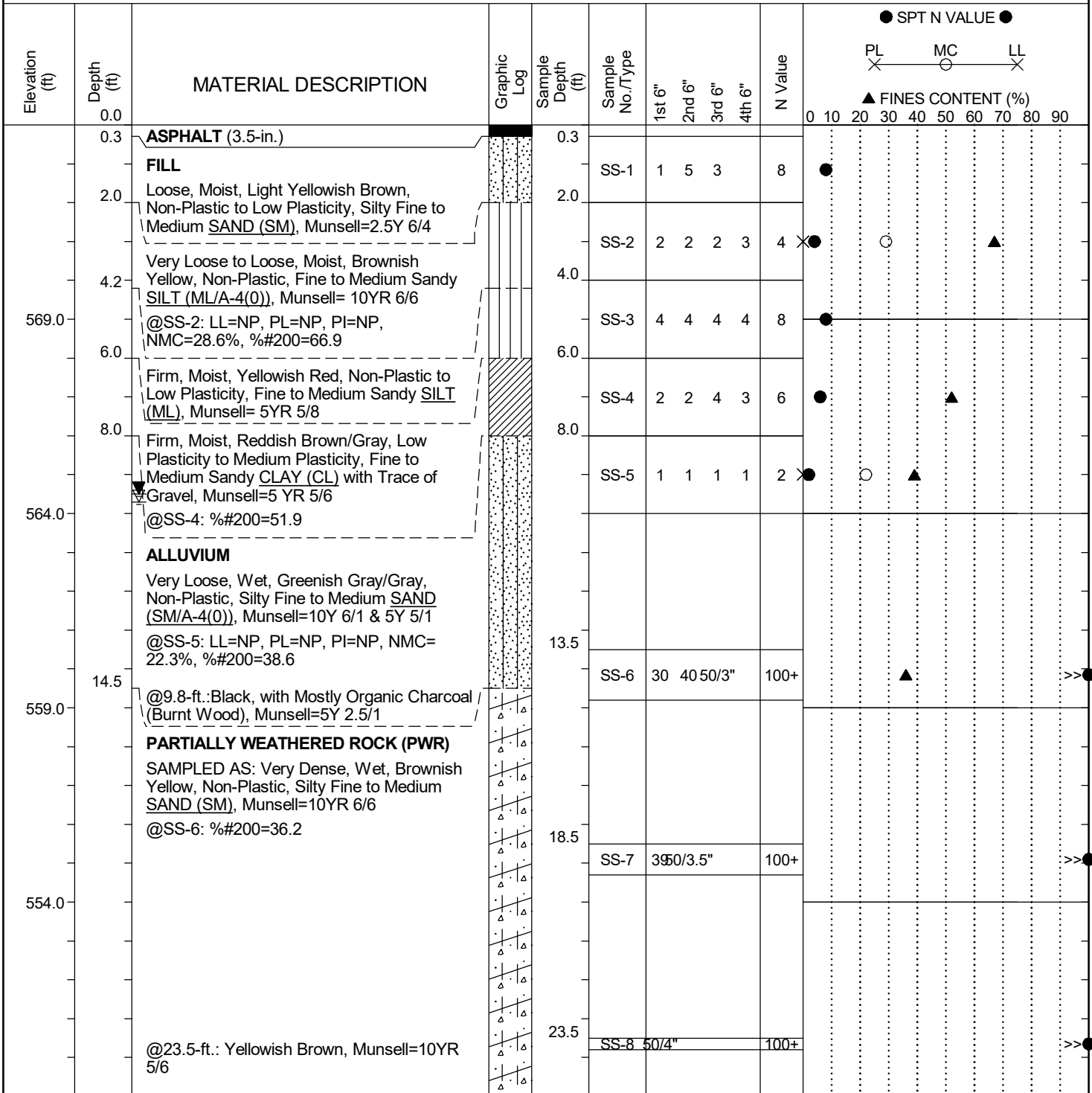
MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL -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

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS



SCDOT Soil Test Log

Project ID:	P038299	County:	Abbeville	Boring No.:	B-801
Site Description:	S-1-96 Replacment Bridge over Shanklin Creek			Route:	S-1-96
Eng./Geo.:	C.Piercy	Boring Location:	N/A	Offset:	N/A
Elev.:	574.0 ft	Latitude:	34.234842	Longitude:	-82.552393
Date Started:	6/17/2019				
Total Depth:	46.8 ft	Soil Depth:	36.8 ft	Core Depth:	10 ft
Date Completed:	6/17/2019				
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)	Drill Machine:	CME 45B	Drill Method:	RW/RC
Hammer Type:	Automatic	Energy Ratio:	92%	Core Size:	NQ
Driller:	L. Guempel	Groundwater:	TOB	9.7 ft	24HR
					9.5 ft



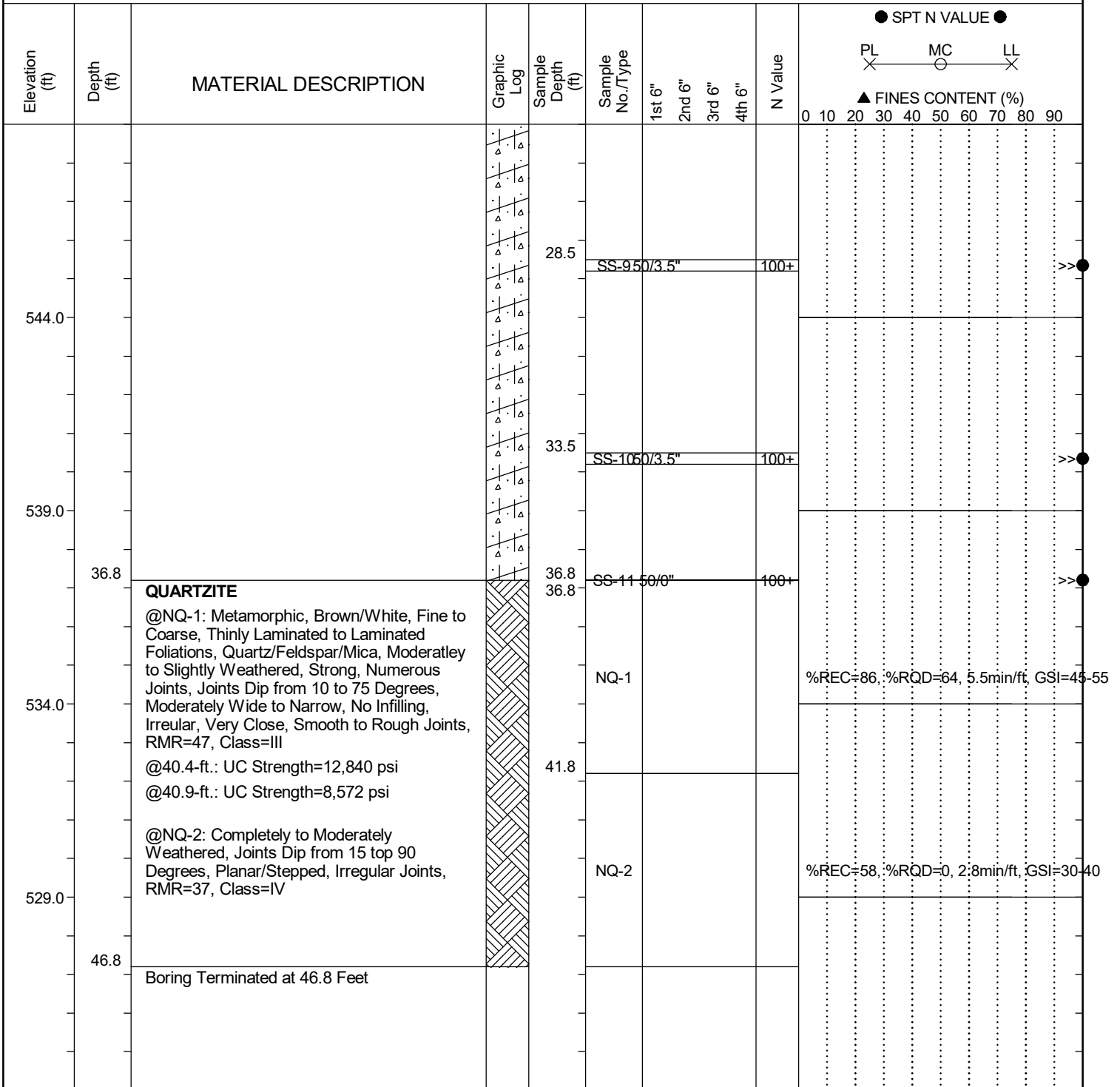
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving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

SCDOT Soil Test Log

Project ID:	P038299	County:	Abbeville	Boring No.:	B-801
Site Description:	S-1-96 Replacment Bridge over Shanklin Creek			Route:	S-1-96
Eng./Geo.:	C.Piercy	Boring Location:	N/A	Offset:	N/A
Elev.:	574.0 ft	Latitude:	34.234842	Longitude:	-82.552393
Date Started:	6/17/2019				
Total Depth:	46.8 ft	Soil Depth:	36.8 ft	Core Depth:	10 ft
Date Completed:	6/17/2019				
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)	Drill Machine:	CME 45B	Drill Method:	RW/RC
Hammer Type:	Automatic	Energy Ratio:	92%	Core Size:	NQ
Driller:	L. Guempel	Groundwater:	TOB	9.7 ft	24HR
					9.5 ft



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	

Project ID: P038299				County: Abbeville		Boring No.: B-802	
Site Description:		S-1-96 Replacment Bridge over Shanklin Creek					Route: S-1-96
Eng./Geo.: C.Piercy		Boring Location: N/A		Offset: N/A		Alignment: Existing	
Elev.:	572.6 ft	Latitude:	34.234856	Longitude:	-82.552112	Date Started:	6/18/2019
Total Depth:	41 ft	Soil Depth:	30.8 ft	Core Depth:	10.2 ft	Date Completed:	6/18/2019
Bore Hole Diameter (in): 4		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)	
Drill Machine: CME 45B		Drill Method: RW/RC		Hammer Type: Automatic		Energy Ratio: 92%	
Core Size: NQ		Driller: L. Guempel		Groundwater: TOB 9.9 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	SPT N VALUE
											<div style="text-align: center;"> PL X MC O LL X ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90 </div>
	0.3	ASPHALT (3.5-in) -----		0.3							
		FILL Loose, Moist, Light Brownish Gray, Non-Plastic to Low Plasticity, Silty Fine to Medium <u>SAND (SM)</u> , Munsell=10YR 6/2		2.0	SS-1	4	4	4		8	●
	2.3	@2-ft.: Brownish Yellow/Reddish Yellow, with Trace of Gravel, Munsell=10YR 6/8 & 5YR 6/8		4.0	SS-2	4	4	4	4	8	● ○ ▲
567.6	5.0	Firm, Moist, Red, Non-Plastic to Low Plasticity, Fine to Medium Sandy <u>SILT (ML)</u> , Munsell=2.5YR 5/8 @SS-2: NMC=24.0, % #200=53.6		6.0	SS-3	1	2	3	3	5	●
		ALLUVIUM Loose to Very Loose, Moist, Gray, Non-Plastic, Silty Fine to Medium <u>SAND (SM/A-4(0))</u> , Munsell=5Y 5/1 @SS-4: LL=NP, PL=NP, PI=NP, NMC=17.0, % #200=39.5		8.0	SS-4	1	2	1	1	3	X ● ○ ▲
562.6	8.7	@6-ft.: Light Gray, Fine to Coarse Sands, Munsell= 2.5Y 7/2 @8-ft.: Light Greenish Gray, Fine to Medium Sands, Munsell=10Y 7/1			SS-5	WOH	2	1	3	3	X ● ○ ▲
		RESIDUUM Very Loose, Moist, Very Pale Brown, Non-Plastic, Silty Fine to Coarse <u>SAND (SM/A-2-4)</u> , with Trace of Gravel, Munsell=10YR 7/4 @SS-5: LL=NP, PL=NP, PI=NP, NMC=15.2, % #200=25.4		13.5	SS-6	9	16	16		32	○ ● ▲
557.6		@13.5-ft.: Dense to Very Dense, Yellowish Brown, Wet, Fine to Medium Sands, Munsell=10YR 5/8 @SS-6: NMC=19.0, % #200=42.4		18.5	SS-7	11	16	27		43	●
552.6				23.5							

LEGEND

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SAMPLER TYPE	
SS - Split Spoon	NQ - Rock Core, 1-7/8"
UD - Undisturbed Sample	CU - Cuttings
AWG - Rock Core, 1-1/8"	CT - Continuous Tube

DRILLING METHOD	
HSA - Hollow Stem Auger	RW - Rotary Wash
CFA - Continuous Flight Augers	RC - Rock Core
DC - Driving Casing	

SCDOT Soil Test Log

Project ID:	P038299	County:	Abbeville	Boring No.:	B-802
Site Description:	S-1-96 Replacment Bridge over Shanklin Creek			Route:	S-1-96
Eng./Geo.:	C.Piercy	Boring Location:	N/A	Offset:	N/A
Elev.:	572.6 ft	Latitude:	34.234856	Longitude:	-82.552112
Date Started:	6/18/2019				
Total Depth:	41 ft	Soil Depth:	30.8 ft	Core Depth:	10.2 ft
Date Completed:	6/18/2019				
Bore Hole Diameter (in):	4	Sampler Configuration		Liner Required:	Y (N)
Liner Used:	Y (N)	Drill Machine:	CME 45B	Drill Method:	RW/RC
Hammer Type:	Automatic	Energy Ratio:	92%	Core Size:	NQ
Driller:	L. Guempel	Groundwater:	TOB	9.9 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	<div> <div>● SPT N VALUE ●</div> <div> <div>PL</div> <div>MC</div> <div>LL</div> </div> <div>▲ FINES CONTENT (%)</div> </div>
547.6	24.0	PARTIALLY WEATHERED ROCK (PWR) SAMPLED AS: Very Dense, Wet, Brownish Yellow, Non-Plastic to Low Plasticity, Silty Fine to Coarse SAND (SM) with Trace of Gravel, Munsell=10YR 6/6			SS-8	38	50	5"		100+	>>
542.6	28.5				SS-9	47	50	2"		100+	>>
537.6	30.8	GNEISSIC GRANITE @NQ-1: Metamorphic, Brown/Gray, Fine to Coarse Grained, Thinly Laminated to Laminated Foliations, Quartz/Feldspar/Mica, Highly to Moderately Weathered, Numerous Joints, Joints Dip from 15 to 75 Degrees, Moderately Wide to Very Narrow, Surface Stain/Filled, Iron Oxide/Gypsum/Tale, Planar/Irregular, Very Close, Smooth to Rough Joints, RMR=41, Class III @33.2 - 33.5ft.: UC Strength= 14,395psi @NQ-2: Completely to Moderately Weathered, Joints Dip from 10 to 80 Degrees, Quartz Vein, Slightly Rough to Rough, RMR=47, Class III @36.8-ft.: UC Strength= 1,262 psi		30.7 30.8	SS-10	50	50	0"		100+	>>
532.6	36.0				NQ-1						%REC=91,%RQD=54, 2.5min/ft, GSI=35-45
	41.0	Boring Terminated at 41.0 Feet			NQ-2						%REC=98,%RQD=25, 2.2min/ft, GSI=40-50
527.6											

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	

S-1-96 Replacement Bridge over Shanklin Creek

Geotechnical Base Line Report

















APPENDIX

SECTION 5 GENERALIZED SUBSURFACE PROFILE

KEY TO SYMBOLS

PROJECT NAME	Closed and Load-Restricted Bridge Package 2020-1 (S-1-96 Bridge Replacement over Shanklin Creek)
PROJECT COUNTY	Abbeville

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)



	ASPHALT
	GABC (Graded Aggregate Base Course)
	PWR: Partially Weathered Rock
	BEDROCK: Bedrock
	CH: USCS High Plasticity Clay
	CL: USCS Low Plasticity Clay
	CL-ML: USCS Low Plasticity Silty Clay
	MH: USCS Elastic Silt
	ML: USCS Silt
	SP: USCS Poorly Graded Sand
	SM: USCS Silty Sand
	SC: USCS Clayey Sand
	SP-SM: USCS Poorly Graded Sand w/ Silt
	SC-SM: USCS Silty, Clayey Sand
	SP-SC: USCS Poorly Graded Sand w/ Clay
	No Recovery

SOIL TEST ID'S

B-# SOIL TEST BORING

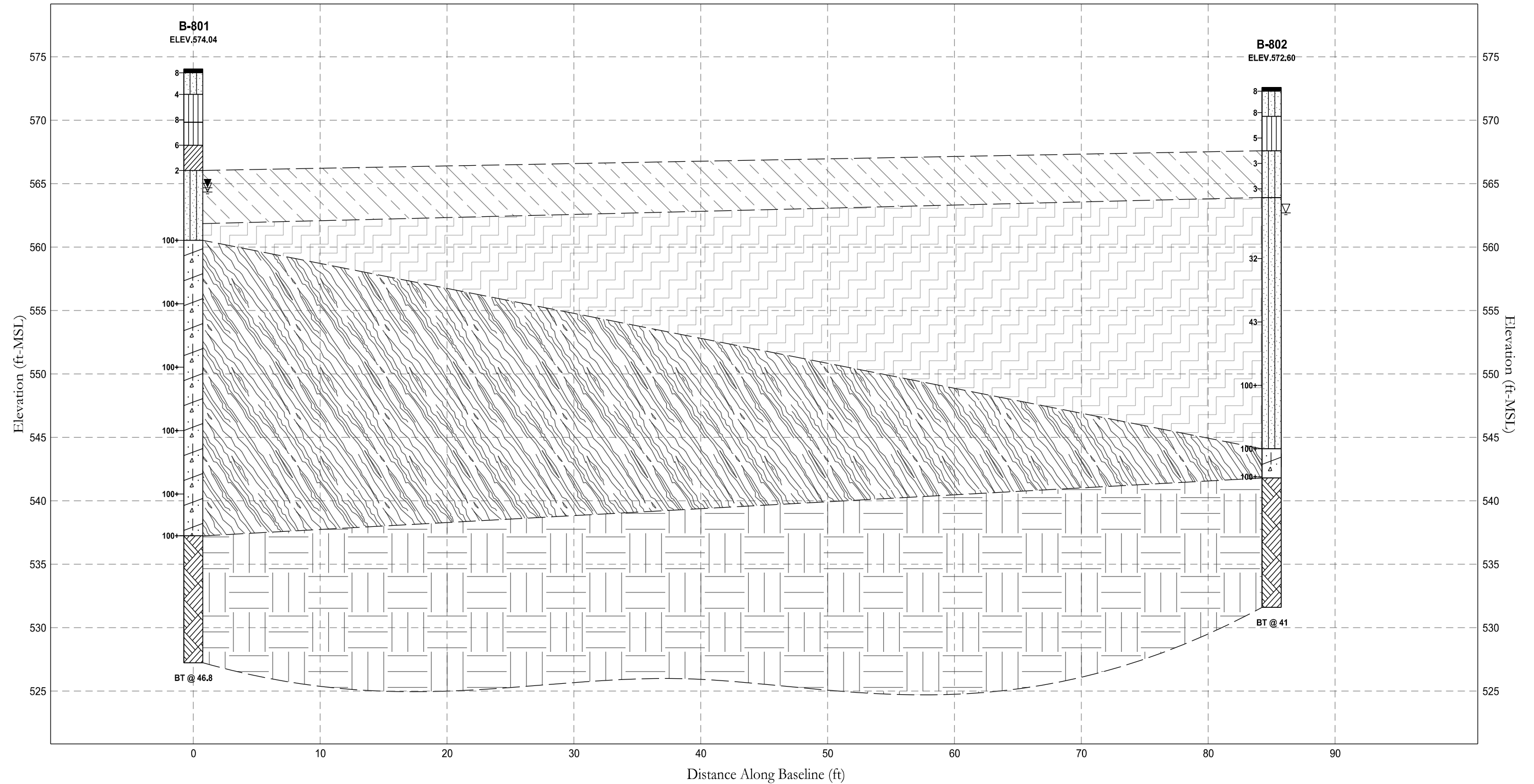
ABBREVIATIONS

- LL - LIQUID LIMIT (%)
- PL - PLASTIC LIMIT (%)
- PI - PLASTIC INDEX (%)
- NMC - MOISTURE CONTENT (%)
- NP - NON PLASTIC
- %#200 - PERCENT PASSING NO. 200 SIEVE

-  Water Level at Time Drilling, or as Shown
-  Water Level at End of Drilling, or as Shown


NOTES

- THE GENERALIZED SUBSURFACE PROFILES ARE PROVIDED ONLY FOR ILLUSTRATIVE PURPOSES. THE INTENT OF THESE DRAWINGS IS TO PROVIDE THE READER WITH VERY GENERAL INFORMATION ON SUBSURFACE CONDITIONS AT THE TIME OF THE INVESTIGATION. VARIATIONS IN THE INDICATED SUBSURFACE CONDITIONS WILL BECOME EVIDENT ONCE ADDITIONAL BORINGS ARE PERFORMED. THE INDICATED STRATIGRAPHY BETWEEN TESTING LOCATIONS WAS GENERATED USING STRAIGHT-LINE LINEAR INTERPOLATION, AND DOES NOT REPRESENT THE TRUE STRATIGRAPHY.



The generalized subsurface profile is provided for illustrative purposes. The intent of this drawing is to provide the reader with very general information on soil stratigraphy at the bridge site. Variations in the indicated subsurface conditions will become evident once additional borings are performed.

4			
3			
2			
1			
REV. NO.	BY	DATE	DESCRIPTION OF REVISION
TOPO.		DATE	
DWG.	JFH	DATE 8.27.19	GROUP - -
R/W		DATE	



**S-1-96 BRIDGE REPLACEMENT
OVER SHANKLIN CREEK**

GENERALIZED SUBSURFACE PROFILE

HRZ SCALE = NTS	
VRT SCALE = NTS	

S-1-96 Replacement Bridge over Shanklin Creek

Geotechnical Base Line Report

APPENDIX

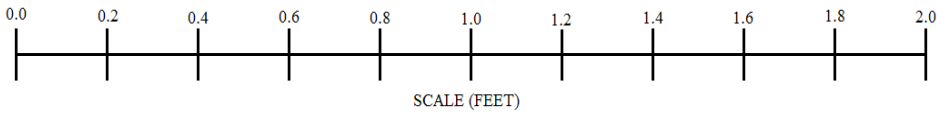
SECTION 6 ROCK CORE PHOTOS

S-1-96 RBO Shanklin Creek
Boring B-801

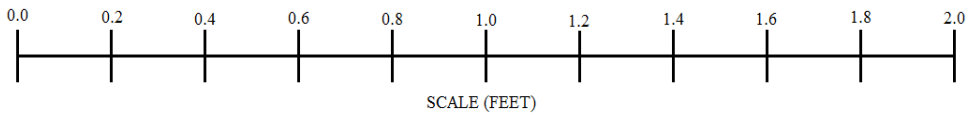


S-1-96 RBO Shanklin Creek
Boring B-802

Begin Run 1
30.8 feet



Begin Run 2
36.0 feet



S-1-96 Replacement Bridge over Shanklin Creek

Geotechnical Base Line Report

APPENDIX

SECTION 7 LABORATORY TEST RESULTS



SUMMARY OF LABORATORY RESULTS

PAGE 1 OF 1

PROJECT ID P038299

PROJECT NAME S-1-96 Replacment Bridge over Shanklin Creek

PROJECT COUNTY Abbeville

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-801	4.0	NP	NP	NP	19	67	ML	28.6			
B-801	8.0				4.76	52					
B-801	10.0	NP	NP	NP	4.76	39	SM	22.3			
B-801	15.0				4.76	36					
B-802	4.0				19	54		24.0			
B-802	8.0	NP	NP	NP	4.76	40	SM	17.0			
B-802	10.0	NP	NP	NP	4.76	25	SM	15.2			
B-802	15.0				4.76	42		19.0			



Rock Coring Summary

Project ID: P038299

Project Name: S-1-96 RBO Shanklin Creek

Project County: Abbeville

Borehole	Core Run Number	Core Run Top Depth (ft)	REC (%)	RQD (%)	q _u (psi)	Poisson's Ratio	Elastic Modulus (ksi)	Unit Weight (pcf)	RMR
									GSI
B-801	NQ-1	36.8	86	64	12,840	0.30	1.70E+03	161	47
					8,572	0.33	1.80E+03	161	45-55
	NQ-2	41.8	58	0	N/A	N/A	N/A	N/A	37
									30-40
B-802	NQ-1	30.8	91	54	14,395	0.30	1.00E+04	162	41
									34-45
	NQ-2	36.0	98	25	1,262	0.11	1.80E+03	160	47
									40-50

F&ME CONSULTANTS
3112 Devine Street
Columbia, South Carolina 29205

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	<u>S-1-96 Replacment Bridge over Shanklin Creek</u>	PROJECT NO.:	<u>P038299</u>
SAMPLE NUMBER:	<u>19-1695</u>	DATE SAMPLE RECEIVED:	<u>7/5/2019</u>
DESCRIPTION OF SOIL:	<u>VARIOUS</u>		
TESTED BY:	<u>AMC</u>	DATE OF TESTING:	<u>8/9/2019</u>
WEIGHED BY:	<u>AMC</u>	DATE OF WEIGHING:	<u>8/10/2019</u>

BORING NO.	B-801	B-601			
SAMPLE NO.	SS-2	SS-5			
SAMPLE DEPTH	2.-4'	8-10'			
WATER CONTENT, W%	28.6	22.3			

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%					

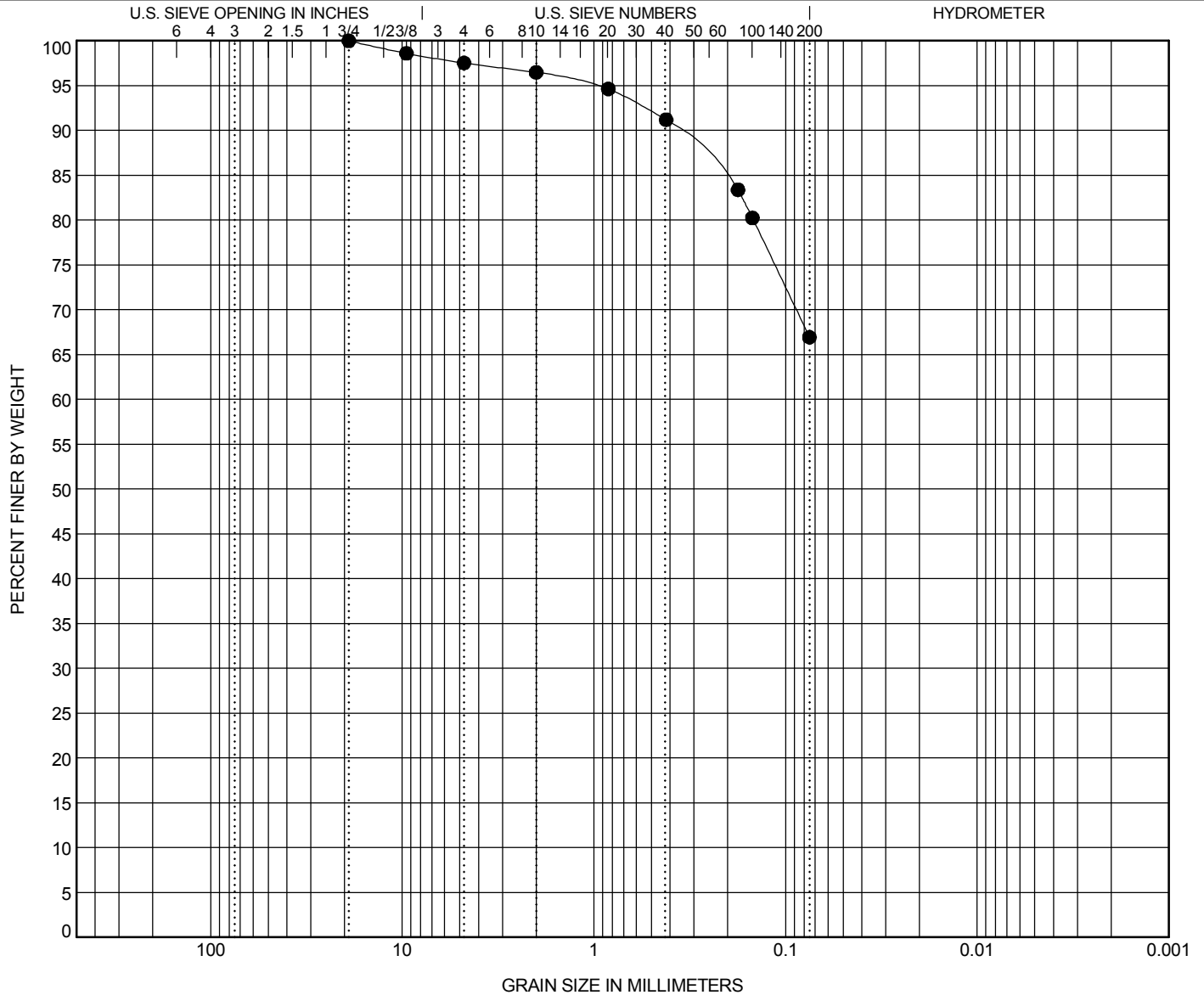


GRAIN SIZE DISTRIBUTION

PROJECT ID P038299

PROJECT NAME S-1-96 Replacement Bridge over Shanklin Creek

PROJECT COUNTY Abbeville



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● B-801	4.0	Sandy SILT (ML/A-4(0))					NP	NP	NP		
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt		%Clay	
● B-801	4.0	19	0.997			2.5	30.6	66.9			

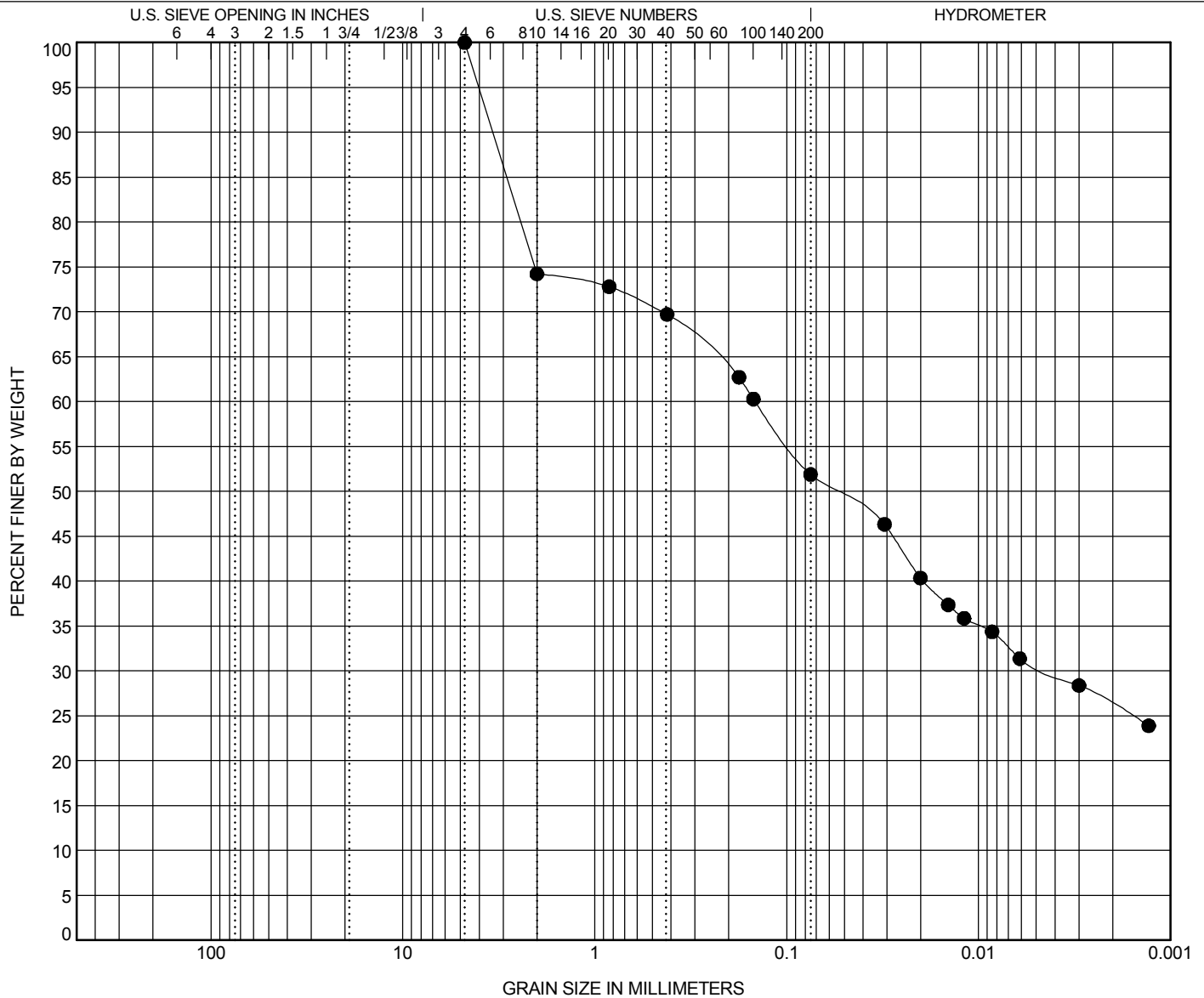


GRAIN SIZE DISTRIBUTION

PROJECT ID P038299

PROJECT NAME S-1-96 Replacement Bridge over Shanklin Creek

PROJECT COUNTY Abbeville



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

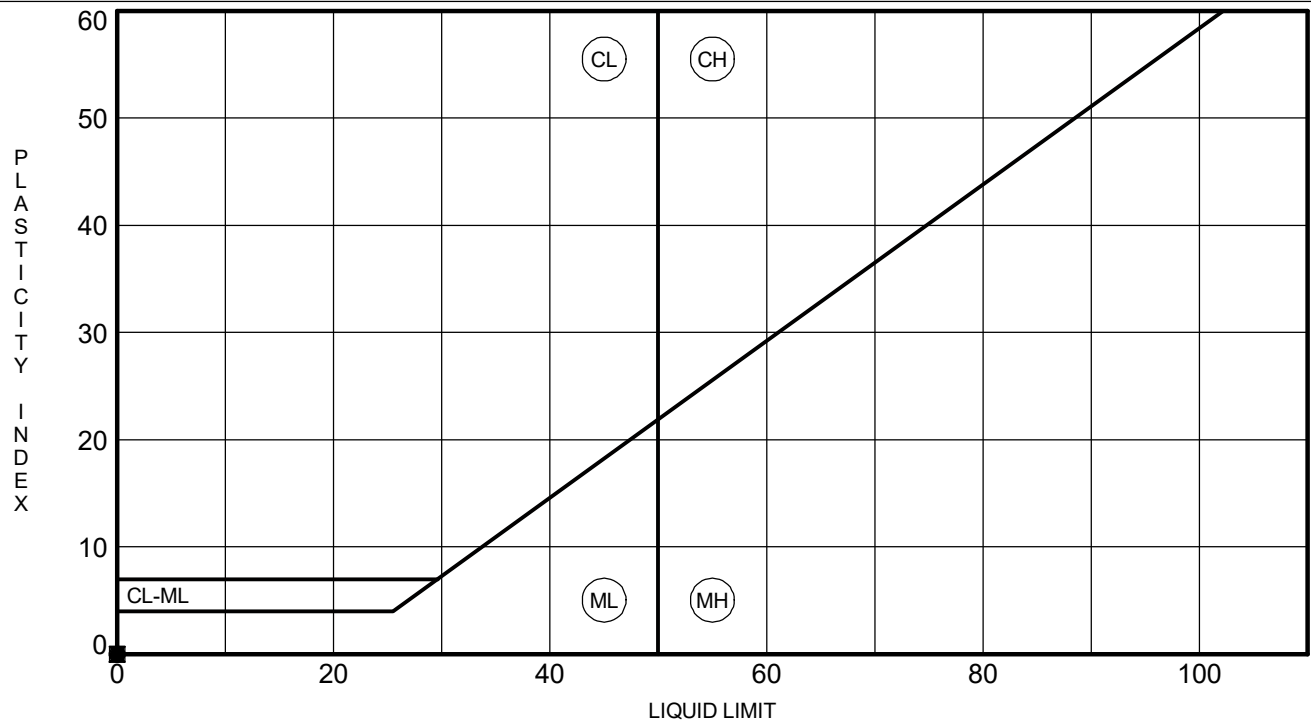
BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● B-801	8.0	Sandy CLAY (CL)									
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay		
● B-801	8.0	4.76	4.023	0.055		0.1	48.0	21.4	30.5		



PROJECT ID P038299

PROJECT NAME S-1-96 Replacment Bridge over Shanklin Creek

PROJECT COUNTY Abbeville

[illegible]

Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression
ASTM D7012-14e1 (D) / D4543-08e1

Client F&ME Consultants
 Client Project G6100.050 - Load Restricted Bridge Projects
 Project Number 42140

Boring G6100.050.00002 - Shanklin Creek
 Depth 40.4' - 40.7'
 Sample RC-801.2
 Lab ID number 42140005

Method of Calculating Young's Modulus from Axial Stress-Strain Curve

Average Modulus - Linear Portion of Axial Stress Strain Curve

Manually selected by lab at 25% and 50% of the total Compressive strength (psi) - other values possible

Description: Pink Granite
 As-Received Condition: Useable L/D > 2
 Sample Preparation: Diamond saw blade cut, surface ground flat

Axial Strain	Diametric Strain	Axial Stress psi
4.45E-03	-9.09E-04	6394
2.61E-03	-3.59E-04	3223

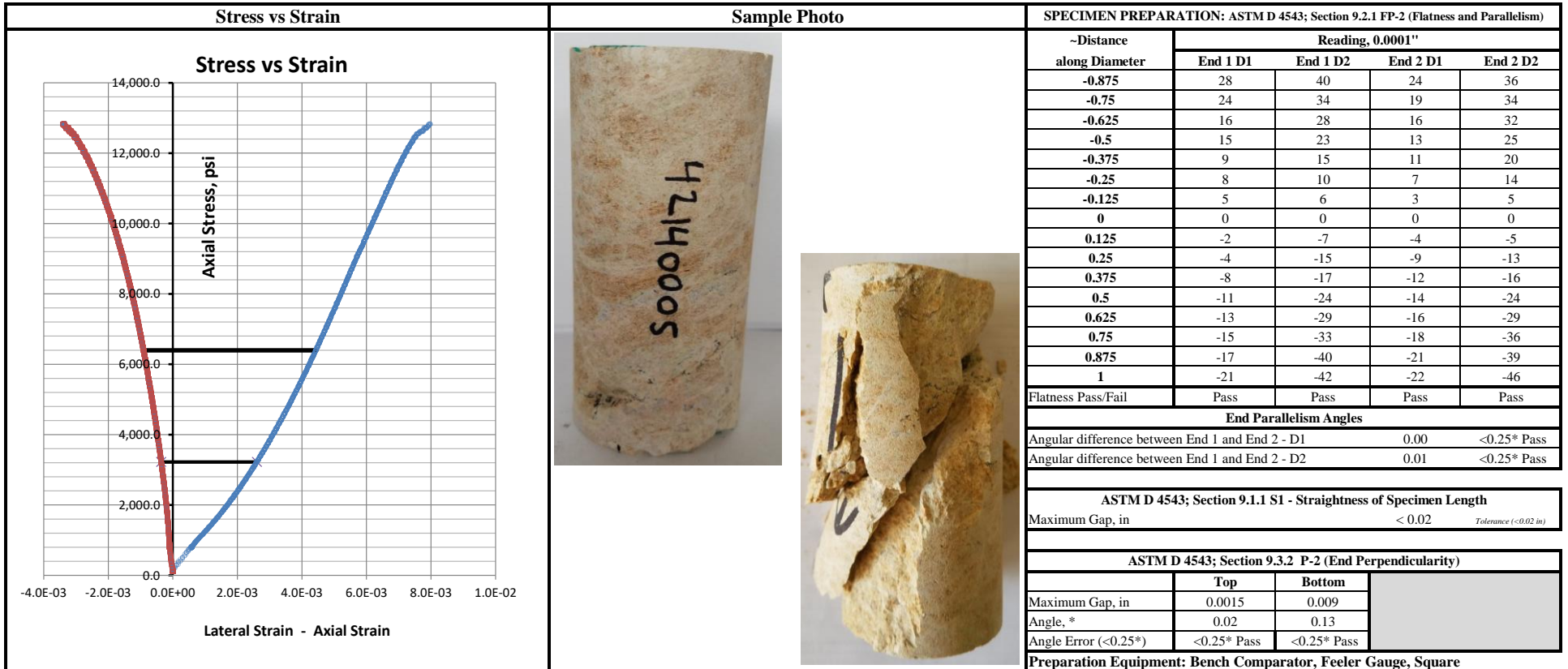
ASTM D 4543; Section 4.2 & 5.6	
Length, in	4.111
Mid Height Diameter #1, in	1.867
Mid Height Diameter #2, in	1.865
Average Mid. Height Diameter, in.	1.87
Sample Area, in ²	2.73
L/D Ratio (2.0-2.5)	2.20

Test Parameters		
Test Temperature	Room	
Moisture Condition	As-Received	
Sample Weight, gms	475.11	
Sample Volume, cc	184	
Wet Density, pcf	161	

Test Results	
Overall Loading Rate, psi/sec	40
Peak Load, lbs	35115
Unconfined Compressive Strength, psi	12,840
Youngs Modulus, E psi	1.7 E+06
Slope of Lateral Curve, psi	-5.8 E+06
Poisson's Ratio	0.30

Load Application in Relation to Lithology:

Unable to Determine



Performed By: MAK

Input Validation: MAK

Reviewed By: ALO

Date Tested: 7/25/2019

Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression
ASTM D7012-14e1 (D) / D4543-08e1

Client F&ME Consultants
 Client Project G6100.050 - Load Restricted Bridge Projects
 Project Number 42140
 Description: Pink Granite
 As-Received Condition: Useable L/D > 2
 Sample Preparation: Diamond saw blade cut, surface ground flat

Boring G6100.050.00002 - Shanklin Creek
 Depth 40.9' - 41.2'
 Sample RC-801.5
 Lab ID number 42140008

Method of Calculating Young's Modulus from Axial Stress-Strain Curve
Average Modulus - Linear Portion of Axial Stress Strain Curve
 Manually selected by lab at 25% and 50% of the total Compressive strength (psi) - other values possible

Axial Strain	Diametric Strain	Axial Stress psi
1.93E-03	-6.45E-04	4300
6.92E-04	-2.38E-04	2133

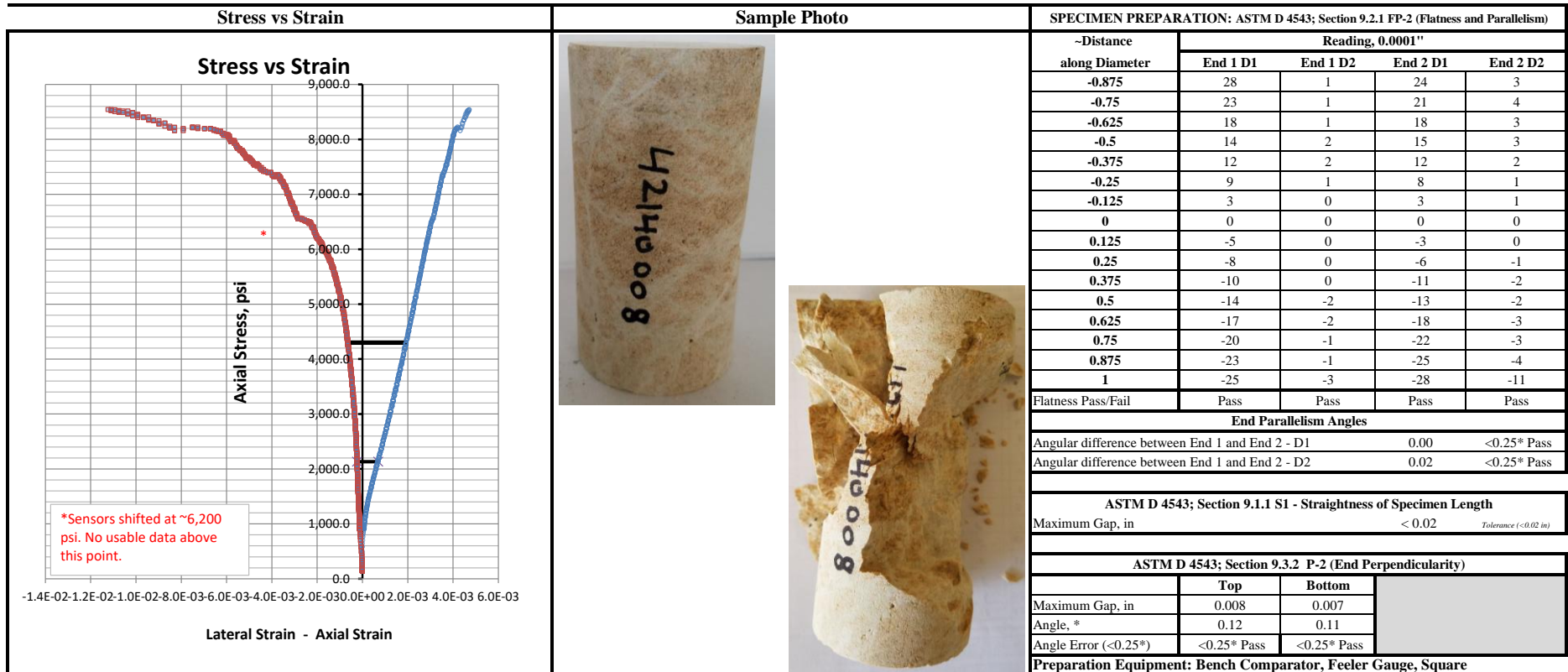
ASTM D 4543; Section 4.2 & 5.6	
Length, in	3.786
Mid Height Diameter #1, in	1.861
Mid Height Diameter #2, in	1.866
Average Mid. Height Diameter, in.	1.86
Sample Area, in^2	2.73
L/D Ratio (2.0-2.5)	2.03

Test Parameters		
Test Temperature	Room	
Moisture Condition	As-Received	
Sample Weight, gms	436.97	
Sample Volume, cc	169	
Wet Density, pcf	161	

Test Results	
Overall Loading Rate, psi/sec	40
Peak Load, lbs	23379
Unconfined Compressive Strength, psi	8,572
Youngs Modulus, E psi	1.8 E+06
Slope of Lateral Curve, psi	-5.3 E+06
Poisson's Ratio	0.33

Load Application in Relation to Lithology:

Unable to Determine



Performed By: MAK

Input Validation: MAK

Reviewed By:

Date Tested:

7/25/2019

F&ME CONSULTANTS
3112 Devine Street
Columbia, South Carolina 29205

MOISTURE CONTENT DETERMINATION
(AASHTO T265)

PROJECT:	<u>S-1-96 Replacment Bridge over Shanklin Creek</u>	PROJECT NO.:	<u>P038299</u>
SAMPLE NUMBER:	<u>19-1697</u>	DATE SAMPLE RECEIVED:	<u>7/5/2019</u>
DESCRIPTION OF SOIL:	<u>VARIOUS</u>		
TESTED BY:	<u>AMC</u>	DATE OF TESTING:	<u>8/9/2019</u>
WEIGHED BY:	<u>AMC</u>	DATE OF WEIGHING:	<u>8/10/2019</u>

BORING NO.	B-802	B-802	B-802	B-802	
SAMPLE NO.	SS-2	SS-4	SS-5	SS-6	
SAMPLE DEPTH	2.-4'	6-8'	8-10'	13.5-15'	
WATER CONTENT, W%	24.0	17.0	15.2	19.0	

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%					

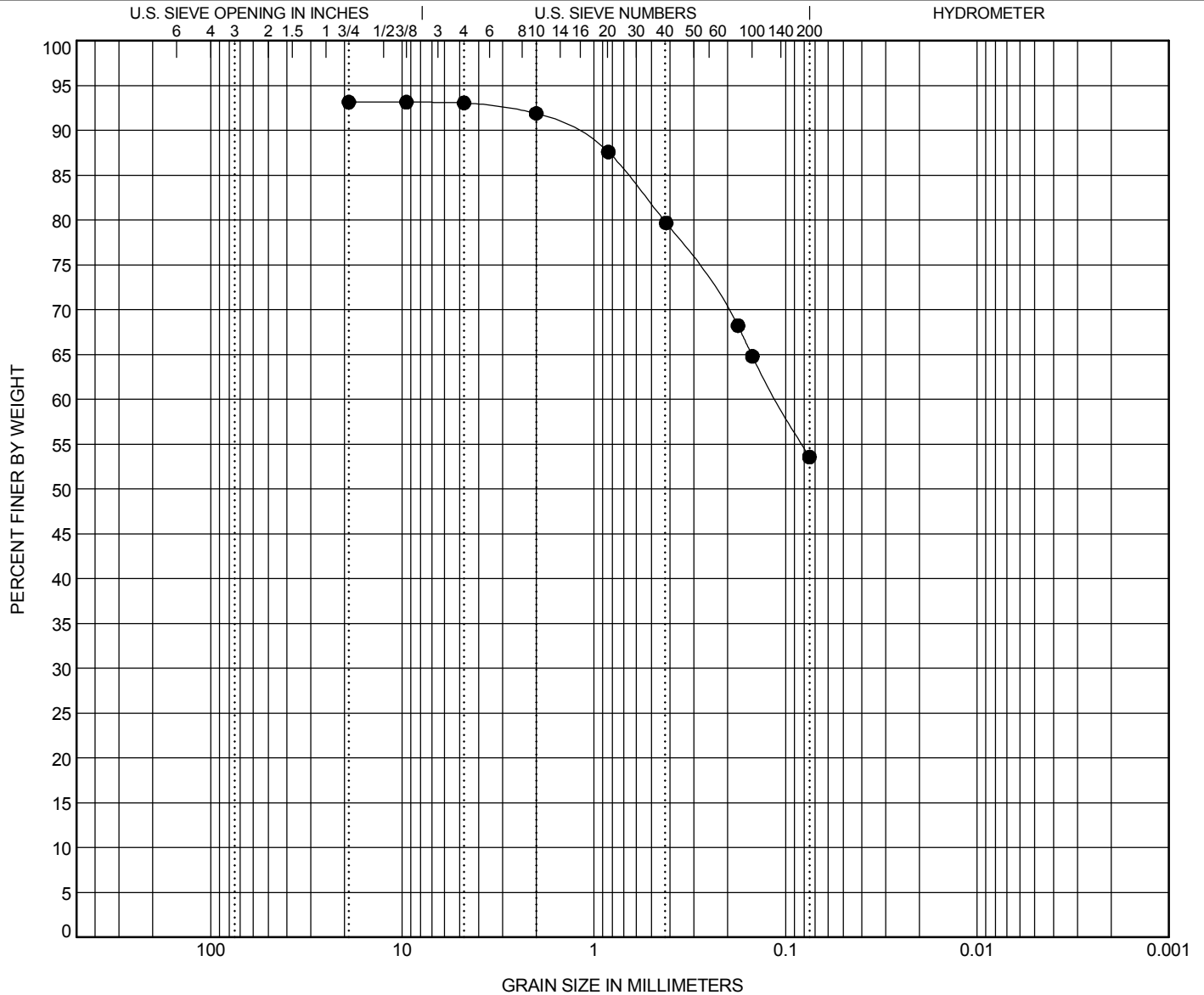


GRAIN SIZE DISTRIBUTION

PROJECT ID P038299

PROJECT NAME S-1-96 Replacement Bridge over Shanklin Creek

PROJECT COUNTY Abbeville



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● B-802	4.0	Sandy SILT (ML)									
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt		%Clay	
● B-802	4.0	19				0.1	39.5	53.6			

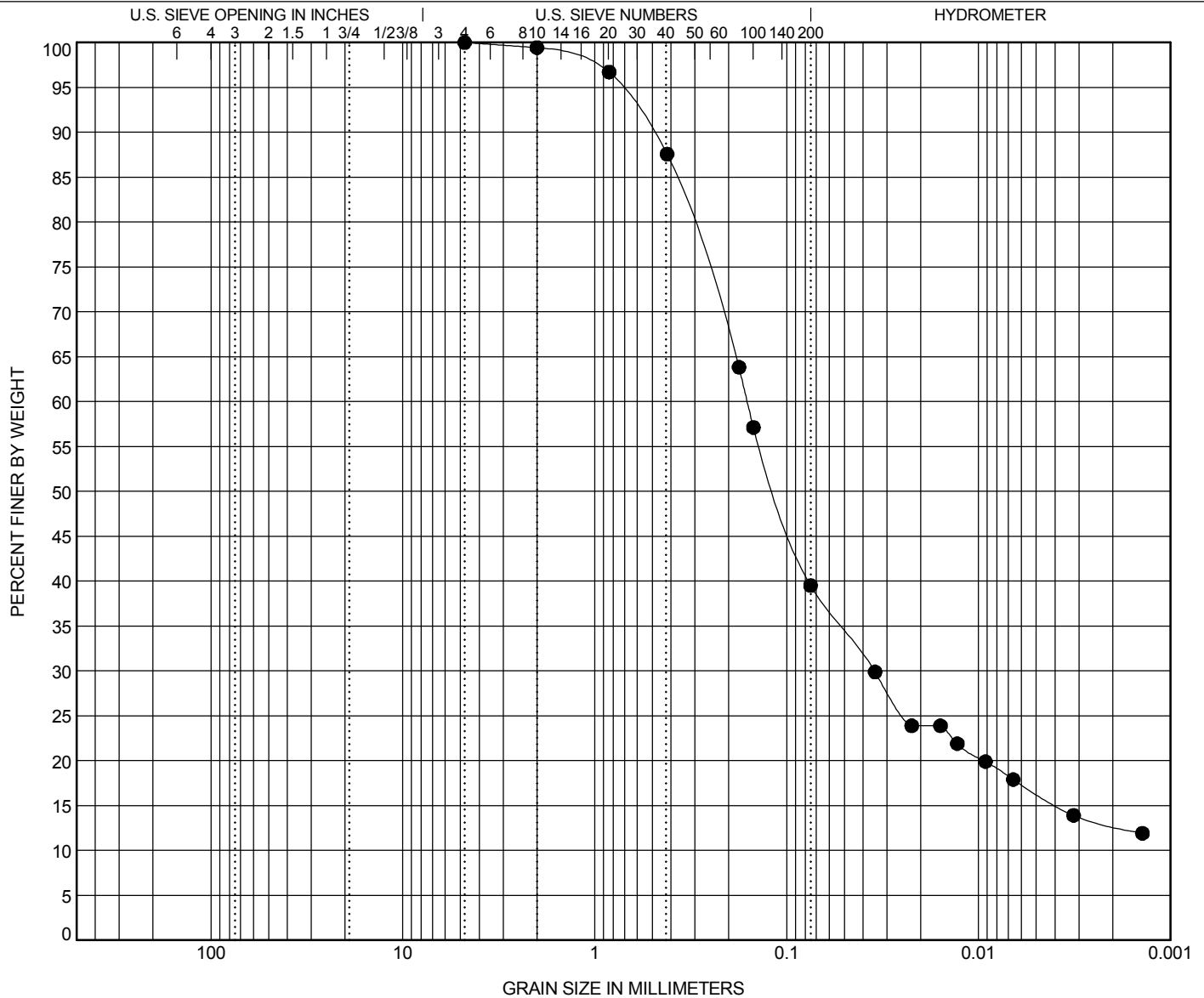


GRAIN SIZE DISTRIBUTION

PROJECT ID P038299

PROJECT NAME S-1-96 Replacement Bridge over Shanklin Creek

PROJECT COUNTY Abbeville



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● B-802	8.0	Silty SAND (SM/A-4(0))					NP	NP	NP		
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt		%Clay	
● B-802	8.0	4.76	0.738	0.113		0.0	60.5	23.1		16.4	

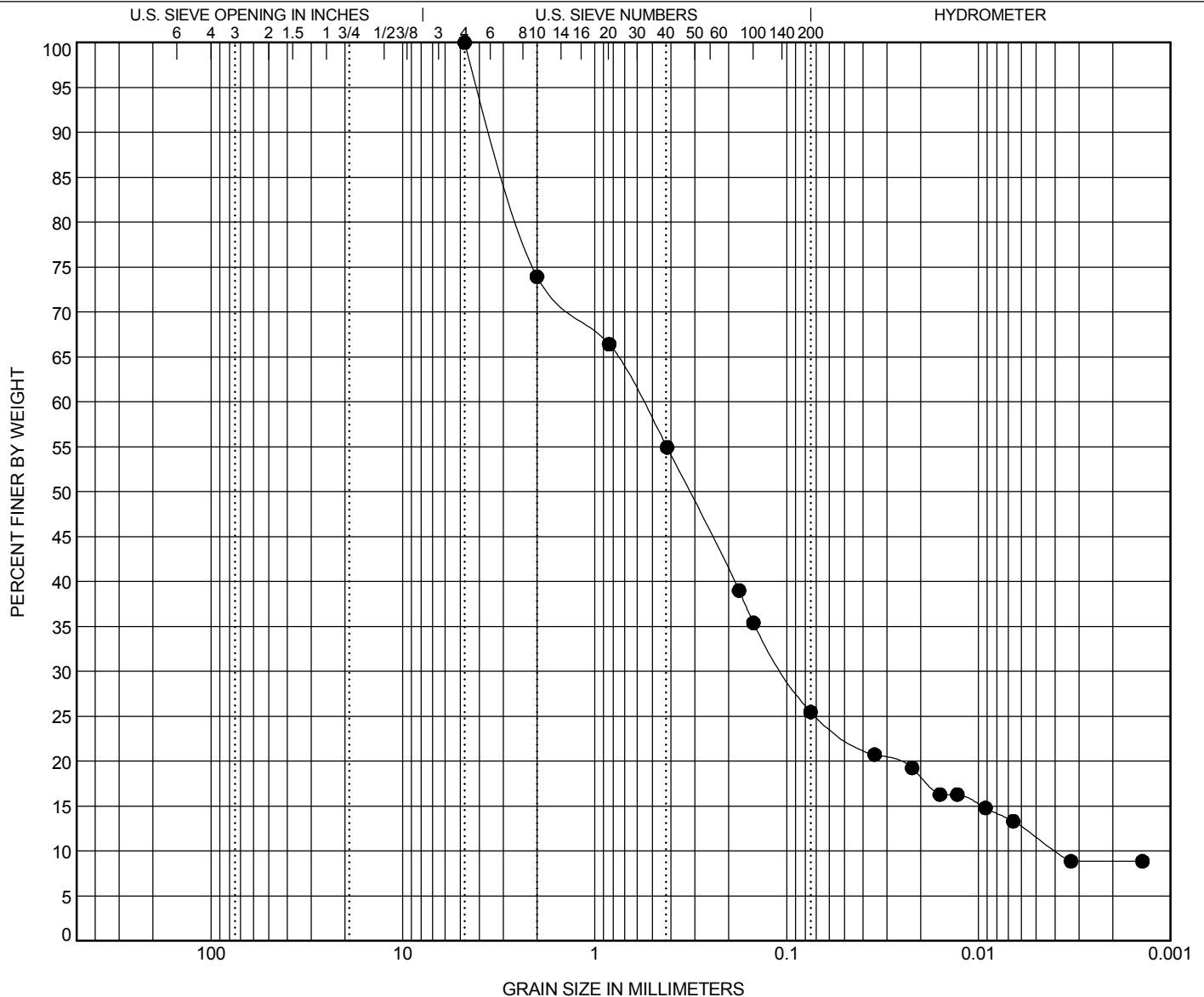


GRAIN SIZE DISTRIBUTION

PROJECT ID P038299

PROJECT NAME S-1-96 Replacement Bridge over Shanklin Creek

PROJECT COUNTY Abbeville



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● B-802	10.0	Silty SAND (SM/A-2-4)					NP	NP	NP	4.68	144.82
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt		%Clay	
● B-802	10.0	4.76	4.03	0.321	0.004	0.1	74.5	13.9		11.5	

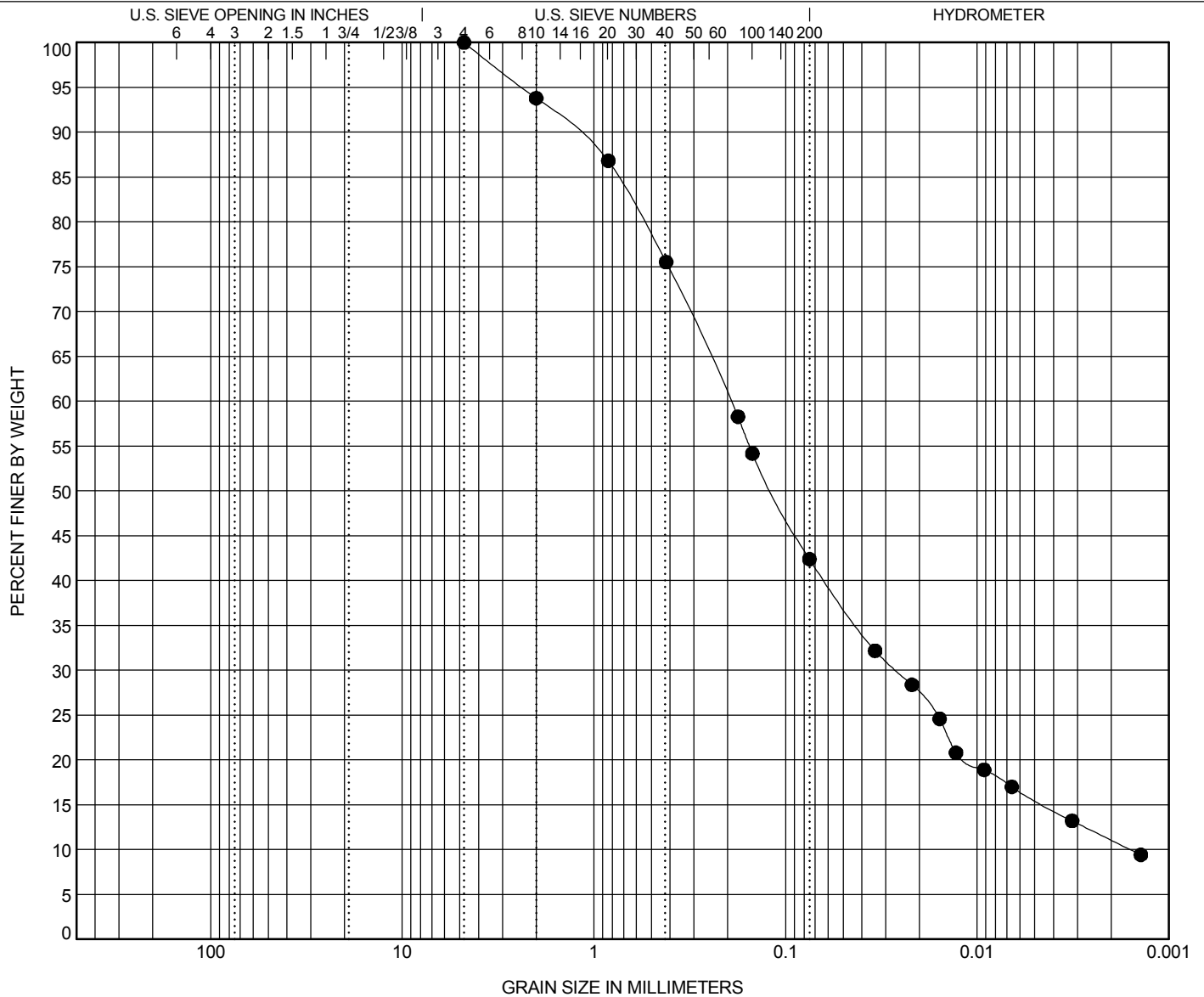


GRAIN SIZE DISTRIBUTION

PROJECT ID P038299

PROJECT NAME S-1-96 Replacement Bridge over Shanklin Creek

PROJECT COUNTY Abbeville



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

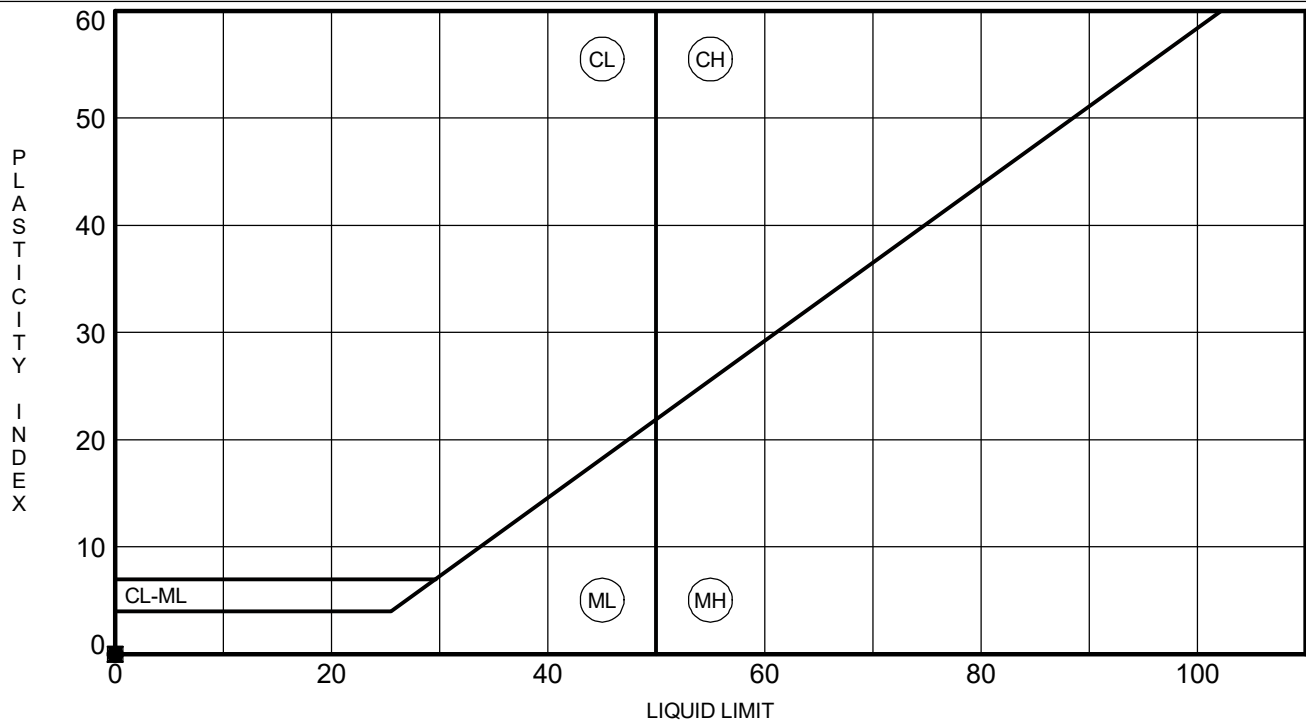
BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● B-802	15.0	Silty SAND (SM)								2.28	121.56
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay		
● B-802	15.0	4.76	2.366	0.117	0.002	0.0	57.6	26.8	15.6		

ATTERBERG LIMITS' RESULTS

PROJECT ID P038299

PROJECT NAME S-1-96 Replacment Bridge over Shanklin Creek

PROJECT COUNTY Abbeville

[illegible]

Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression
ASTM D7012-14e1 (D) / D4543-08e1

Client F&ME Consultants
 Client Project G6100.050 - Load Restricted Bridge Projects
 Project Number 42140
 Description: Tan Granite
 As-Received Condition: Useable L/D > 2
 Sample Preparation: Diamond saw blade cut, surface ground flat

Boring G6100.050.00002 - Shanklin Creek
 Depth 33.2' - 33.5'
 Sample RC-802.3
 Lab ID number 42140006

Method of Calculating Young's Modulus from Axial Stress-Strain Curve

Average Modulus - Linear Portion of Axial Stress Strain Curve

Manually selected by lab at 25% and 50% of the total Compressive strength (psi) - other values possible

Axial Strain	Diametric Strain	Axial Stress psi
4.95E-04	-1.95E-04	7117
1.40E-04	-8.68E-05	3577

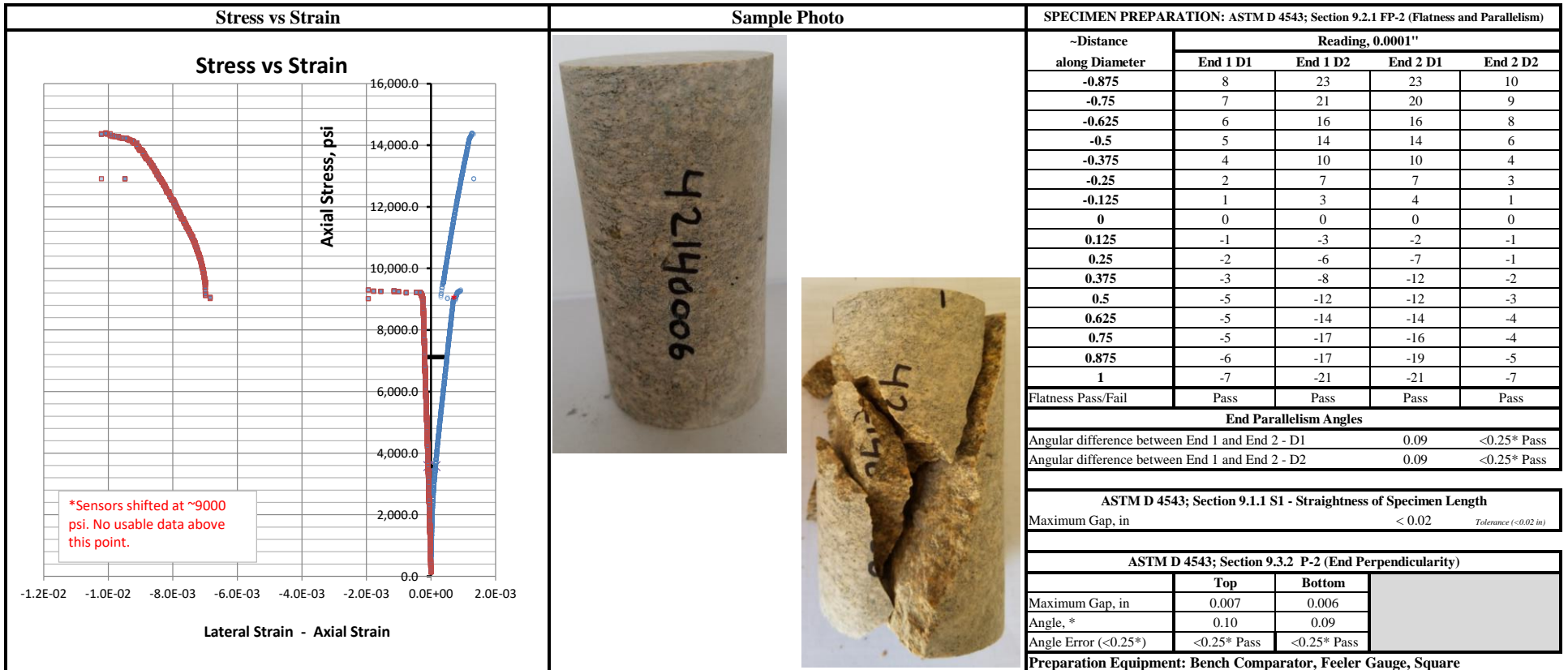
ASTM D 4543; Section 4.2 & 5.6	
Length, in	3.872
Mid Height Diameter #1, in	1.878
Mid Height Diameter #2, in	1.864
Average Mid. Height Diameter, in.	1.87
Sample Area, in ²	2.75
L/D Ratio (2.0-2.5)	2.07

Test Parameters		
Test Temperature	Room	
Moisture Condition	As-Received	
Sample Weight, gms	451.54	
Sample Volume, cc	174	
Wet Density, pcf	162	

Test Results	
Overall Loading Rate, psi/sec	40
Peak Load, lbs	39577
Unconfined Compressive Strength, psi	14,395
Youngs Modulus, E psi	10.0 E+06
Slope of Lateral Curve, psi	-32.9 E+06
Poisson's Ratio	0.30

Load Application in Relation to Lithology:

Unable to Determine



Performed By: MAK

Input Validation: MAK

Reviewed By: ALO

Date Tested: 7/25/2019

Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression
ASTM D7012-14e1 (D) / D4543-08e1

Client F&ME Consultants
 Client Project G6100.050 - Load Restricted Bridge Projects
 Project Number 42140

Boring G6100.050.00002 - Shanklin Creek
 Depth 36.8' - 37.1'
 Sample RC-802.4
 Lab ID number 42140007

Method of Calculating Young's Modulus from Axial Stress-Strain Curve

Average Modulus - Linear Portion of Axial Stress Strain Curve

Manually selected by lab at 50% and 75% of the total Compressive strength (psi) - other values possible

Description: Tan Granite with Dendrites
 As-Received Condition: Useable L/D > 2
 Sample Preparation: Diamond saw blade cut, surface ground flat

Axial Strain	Diametric Strain	Axial Stress psi
8.44E-05	-3.78E-05	604
2.89E-04	-6.07E-05	971

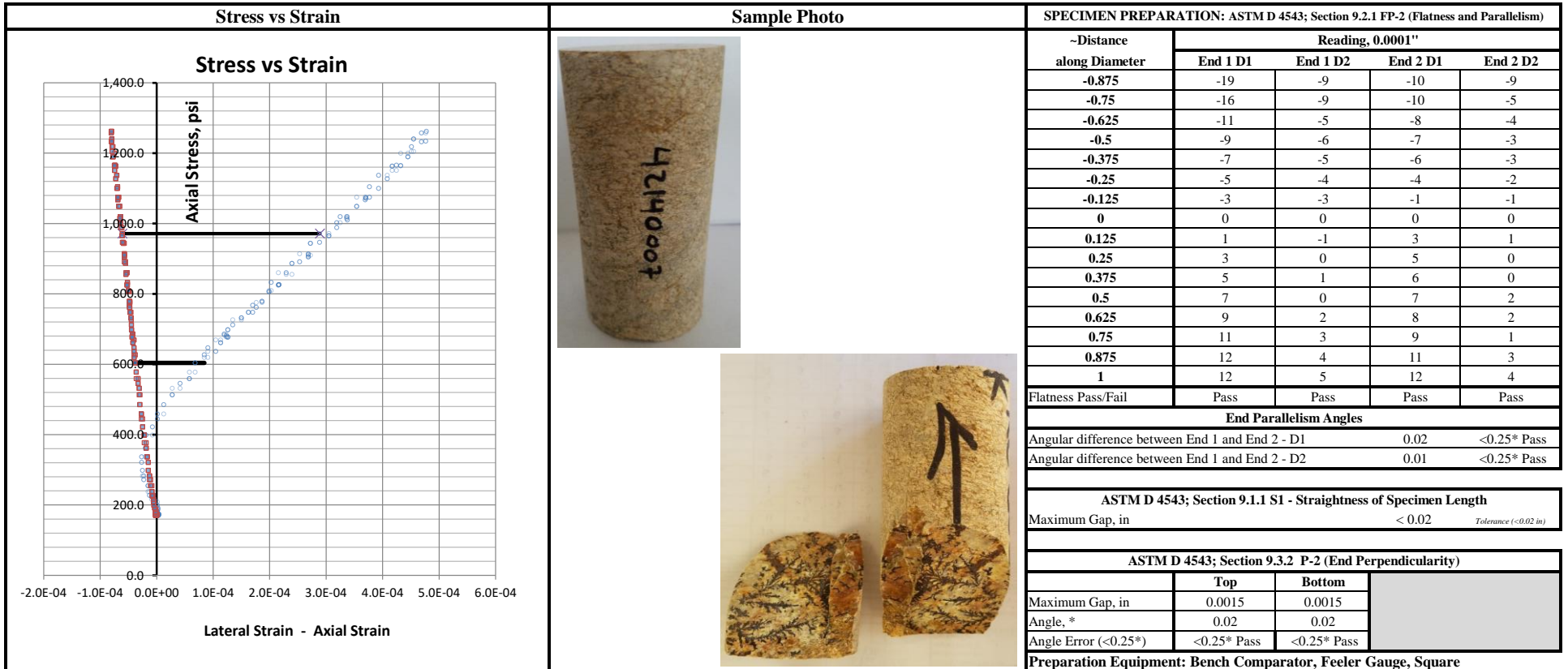
ASTM D 4543; Section 4.2 & 5.6	
Length, in	4.086
Mid Height Diameter #1, in	1.868
Mid Height Diameter #2, in	1.87
Average Mid. Height Diameter, in.	1.87
Sample Area, in ²	2.74
L/D Ratio (2.0-2.5)	2.19

Test Parameters		
Test Temperature	Room	
Moisture Condition	As-Received	
Sample Weight, gms	470.94	
Sample Volume, cc	184	
Wet Density, pcf	160	

Test Results	
Overall Loading Rate, psi/sec	40
Peak Load, lbs	3462
Unconfined Compressive Strength, psi	1,262
Youngs Modulus, E psi	1.8 E+06
Slope of Lateral Curve, psi	-16.0 E+06
Poisson's Ratio	0.11

Load Application in Relation to Lithology:

Unable to Determine



Performed By: MAK

Input Validation: MAK

Reviewed By: ALO

Date Tested: 7/25/2019

Corrosivity Testing

Client F&ME Consultants
 Client Project G6100.050 Load Restricted Bridge Package 2020-1
 Project No. 42301

Lab Sample ID	Boring	Depth	Sample	Matrix	pH AASHTO T289			Chloride AASHTO T291 (Method B)			Sulfate AASHTO T290 (Method B)			Min. Soil Resistivity AASHTO T288		
					Result	Date Tested	Tested By	Result mg/kg (ppm)	Date Tested	Tested By	Result mg/kg (ppm)	Date Tested	Tested By	Result, Ohm-cm	Date Tested	Tested By
42301013	G6100.050.00001	B-901	0.0' - 10.0'	Soil	5.3	8/27/2019	AMP	75	8/29/2019	AMP	<30	8/28/2019	AMP	16,500	8/27/2019	AMP
42301014	G6100.050.00002	B-802	0.0' - 10.0'	Soil	5.4	8/27/2019	AMP	47	8/29/2019	AMP	<30	8/28/2019	AMP	9,850	8/27/2019	AMP
42301015	G6100.050.00003	B-1001	0.0' - 10.0'	Soil	5.7	8/27/2019	AMP	<10	8/29/2019	AMP	<30	8/28/2019	AMP	16,500	8/27/2019	AMP
42301016	G6100.050.00004	B-602	0.0' - 10.0'	Soil	5.6	8/27/2019	AMP	<10	8/29/2019	AMP	<30	8/28/2019	AMP	15,500	8/27/2019	AMP
42301017	G6100.050.00005	B-501	0.0' - 10.0'	Soil	6.0	8/27/2019	AMP	75	8/29/2019	AMP	<30	8/28/2019	AMP	4,900	8/27/2019	AMP
42301018	G6100.050.00006	B-701	0.0' - 10.0'	Soil	5.2	8/27/2019	AMP	<10	8/29/2019	AMP	<30	8/28/2019	AMP	18,000	8/27/2019	AMP
42301019	G6100.050.00007	B-1202	0.0' - 10.0'	Soil	5.5	8/27/2019	AMP	38	8/29/2019	AMP	88	8/28/2019	AMP	1,700	8/27/2019	AMP
42301020	G6100.050.00008	B-1602	0.0' - 10.0'	Soil	6.1	8/27/2019	AMP	136	8/29/2019	AMP	<30	8/28/2019	AMP	3,500	8/27/2019	AMP
42301021	G6100.050.00009	B-402	0.0' - 10.0'	Soil	5.9	8/27/2019	AMP	<10	8/29/2019	AMP	<30	8/28/2019	AMP	10,500	8/29/2019	AMP
42301022	G6100.050.00010	B-301	0.0' - 10.0'	Soil	7.5	8/27/2019	AMP	40	8/29/2019	AMP	28	8/28/2019	AMP	2,200	8/29/2019	AMP
42301023	G6100.050.00011	B-202	0.0' - 10.0'	Soil	5.9	8/27/2019	AMP	<10	8/29/2019	AMP	36	8/28/2019	AMP	7,200	8/29/2019	AMP
42301024	G6100.050.00012	B-101	0.0' - 10.0'	Soil	6.2	8/27/2019	AMP	<10	8/29/2019	AMP	<30	8/28/2019	AMP	6,000	8/29/2019	AMP
42301025	G6100.050.00013	B-1302	0.0' - 10.0'	Soil	4.9	8/27/2019	AMP	40	8/29/2019	AMP	<30	8/28/2019	AMP	8,500	8/28/2019	AMP
42301026	G6100.050.00014	B-1402	0.0' - 10.0'	Soil	5.2	8/27/2019	AMP	<10	8/29/2019	AMP	<30	8/28/2019	AMP	11,000	8/28/2019	AMP
42301027	G6100.050.00015	B-1501	0.0' - 10.0'	Soil	5.8	8/27/2019	AMP	<10	8/29/2019	AMP	<30	8/28/2019	AMP	11,000	8/28/2019	AMP
42301028	G6100.050.00016	B-1102	0.0' - 10.0'	Soil	5.7	8/27/2019	AMP	78	8/29/2019	AMP	<30	8/28/2019	AMP	5,200	8/28/2019	AMP

Input Validation: AMP

Reviewed By: ALO