



Geotechnical Data Report
Fripp Island Bridge Retrofit
Beaufort County, South Carolina
S&ME Project No. 1413-17-079

PREPARED FOR:

Johnson, Mirmiran, & Thompson, Inc.
952 Houston Northcutt Blvd, Suite100
Mount Pleasant, South Carolina 29464

PREPARED BY:

S&ME, Inc.
620 Wando Park Boulevard
Mount Pleasant, SC 29464

November 14, 2017



November 14, 2017

Johnson, Mirmiran, & Thompson, Inc.
952 Houston Northcutt Blvd, Suite100
Mount Pleasant, South Carolina 29464

Attention: Mr. Thai Trinh, P.E.

Reference: **Geotechnical Data Report**
Fripp Island Bridge Retrofit
Beaufort County, South Carolina
S&ME Project No. 1413-17-079

Dear Mr. Trinh:

We have completed our geotechnical exploration of the Fripp Island Bridge Retrofit project in Beaufort County, South Carolina. Our services were performed pursuant to S&ME Proposal No. 14-1600662R dated August 2, 2017. The purpose of our services was to explore the surface conditions along the bridge and provide geotechnical consultation and design recommendations to support JMT's bridge retrofit plans. This data report presents our understanding of the project, our field exploration procedures, and our findings.

◆ Project Information

We understand the existing bridge from Hunting Island to Fripp Island will be retrofitted to address on-going scour concerns and extend the lifespan of the structure. The 49-span bridge is supported by pre-stressed concrete piles, and Bents 5 through 17 have been previously retrofitted. It is anticipated that new piles will be needed as part of the retrofit at the other bents along the length of the bridge.

General project information was developed through email and telephone conversation between Ms. Shannon Boyd, P.E. and Mr. Thai Trinh, P.E. of JMT and Mr. Greg Canivan, P.E. of S&ME, Inc. between June 20 and August 1, 2017. Additional project information was communicated through email and telephone conversations between Mr. Trinh and Mr. Levi Ekstrom of S&ME, Inc. on September 26, 2017.

◆ Field Exploration

Our field exploration consisted of four soil test borings performed along the Fripp Island Bridge extended to depths ranging from approximately 80 to 120 ft. The borings were performed by first coring through the approximately 7 in thick bridge deck and then setting casing into the river bottom. The borings were advanced using mud-rotary techniques, and split-spoon sampling with standard penetration testing (N values) were performed at 5-ft intervals in general accordance with ASTM D 1586. Upon completion, the core holes were patched with grout.



Borings B-1, B-3, and B-4 were advanced to their planned depths of 120 ft. Boring B-2 was suspended at a depth of 80 ft when the drilling process became unsafe at the bridge deck. The mudline was encountered at a depth of 69 ft below the bridge deck, and the casing was oscillating wildly under the fast current. This manifested at the bridge deck in the drilling equipment as strong shaking and vibration, continued drilling was considered unsafe, and the drilling was stopped.

A Test Location Plan (Figure 1) showing the test locations, boring logs presenting detailed information at specific locations, and the Field Exploration procedures are presented in the Appendix. The elevations shown on the logs were interpolated from the provided information and are approximate.

◆ Laboratory Testing

Laboratory testing was performed on selected samples obtained during the subsurface exploration. The samples were subjected to laboratory grain size distribution, natural moisture content, and Atterberg limits testing in general conformance with applicable ASTM standards by S&ME, Inc. in our Mount Pleasant Laboratory. Individual data sheets are presented in the Appendix.

◆ Site and Subsurface Conditions

Site Conditions

The Fripp Island Bridge is located on Sea Island Parkway between Hunting Island and Fripp Island in Beaufort County, South Carolina. The two-lane bridge is generally oriented north to south, with Hunting Island on the north and Fripp Island on the south. The structure is generally composed of a concrete deck supported on concrete beams, pile bents, and concrete piles.

Subsurface Conditions

Details of the subsurface conditions encountered by the borings are shown on the logs in the Appendix. These logs represent our interpretation of the subsurface conditions based upon field and laboratory data. Stratification lines on the boring logs represent approximate boundaries between soil types; however, the actual transition may be gradual. The general subsurface conditions and their pertinent characteristics are discussed in the following paragraphs. A generalized subsurface profile (Figure 2) is presented in the Appendix. This profile contains the 2017 exploration by S&ME, Inc., the 2002 exploration by Wilbur Smith and Associates (WSA), and the original explorations performed in the 1960's.

The exploration encountered Coastal Plain alluvial soils consisting of soft to firm clay/silt and loose to medium dense sand to a depth of approximately 95 to 98 ft below the bridge deck. Underlying the alluvial soils in Borings B-3 and B-4, the exploration encountered the Hawthorne Marl which extended to the deepest explored depth of 120 ft below the bridge deck. Boring B-1 did not encounter the marl but encountered stiff clay/silt and medium dense to very dense sand to the deepest explored depth of 120 feet below the bridge deck.

Although the mudline level has changed, the subsurface conditions presented in the 2002 WSA boring logs and 1960's boring logs are generally consistent with our 2017 borings.



◆ 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 is based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, either express or implied, is made.

We relied on project information given to us to develop our conclusions and recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be notified of the changes so that we can modify our recommendations based on this additional information if necessary.

The provided information is based on data from widely spaced test locations. Subsurface conditions can vary widely between explored areas. Some variations may not become evident until construction. If conditions are encountered which appear different than those described in our report, we should be notified. This report should not be construed to represent subsurface conditions for the entire site.

Unless specifically noted otherwise, our field exploration program did not include an assessment of regulatory compliance, environmental conditions or pollutants or presence of any biological materials (mold, fungi, bacteria, etc.). If there is a concern about these items, other studies should be performed. S&ME can provide a proposal and perform these services if requested.

◆ Closure

S&ME appreciates the opportunity to be of service on this project. If you have any questions concerning this report, please call.

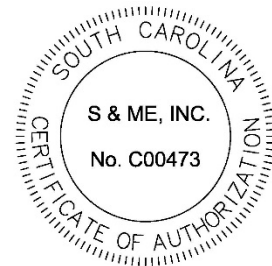
Sincerely,

S&ME, Inc.

Levi T. Ekstrom, E.I.T.
Geotechnical Project Professional



Michael S. Ulmer, P.E.
Vice President



Appendix

Test Location Plan (Figure 1)

Generalized Subsurface Profile (Figure 2)

Boring Logs

Legend to Soil Classification and Symbols

Laboratory Data Sheets



REFERENCE:
Google Earth 2017

◆ - 2017 S&ME Exploration

● - 2002 WSA Exploration

■ - 1960's Original Exploration



Test Location Plan

Fripp Island Bridge Retrofit
Sea Island Parkway
Fripp Island, South Carolina

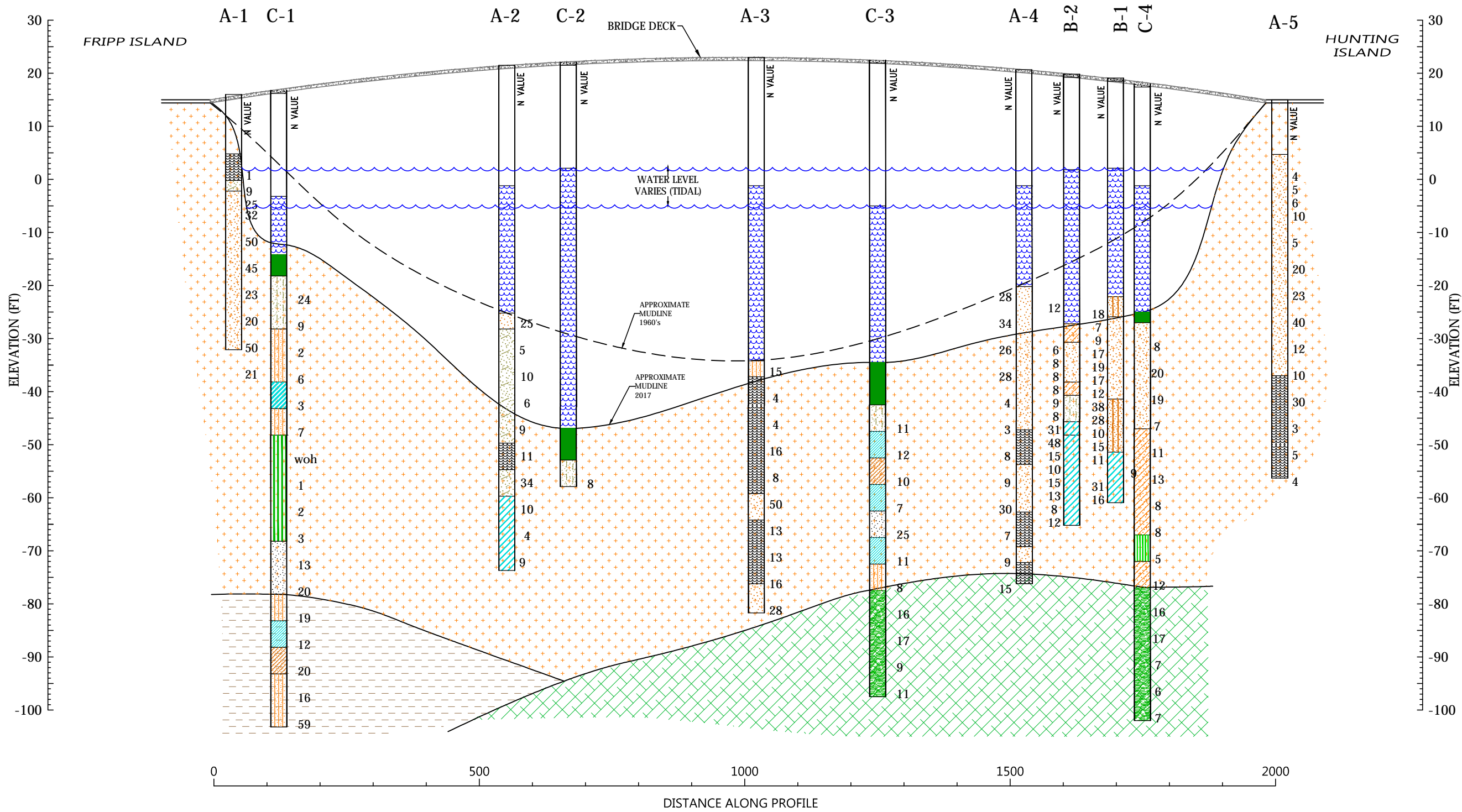
SCALE:
NTS

DATE:
11-8-17

PROJECT NUMBER
1413-17-079

FIGURE NO.

1



LEGEND

	COASTAL PLAINS SOILS: SOFT TO FIRM SILTS/CLAYS AND LOOSE TO MEDIUM DENSE SANDS
	COASTAL PLAINS SOILS: STIFF CLAY AND MEDIUM DENSE TO VERY DENSE SANDS
	HAWTHORNE MARL

NOTES:

BORINGS A-1 THROUGH A-5 PERFORMED DURING ORIGINAL EXPLORATION IN 1960's.
 BORINGS B-1 AND B-2 PERFORMED DURING 2002 WSA EXPLORATION.
 BORINGS C-1 THROUGH C-4 PERFORMED DURING 2017 S&ME EXPLORATION.

GENERALIZED SUBSURFACE PROFILE

GEOTECHNICAL EXPLORATION
 BRIDGE RETROFIT
 FRIPP ISLAND, SOUTH CAROLINA

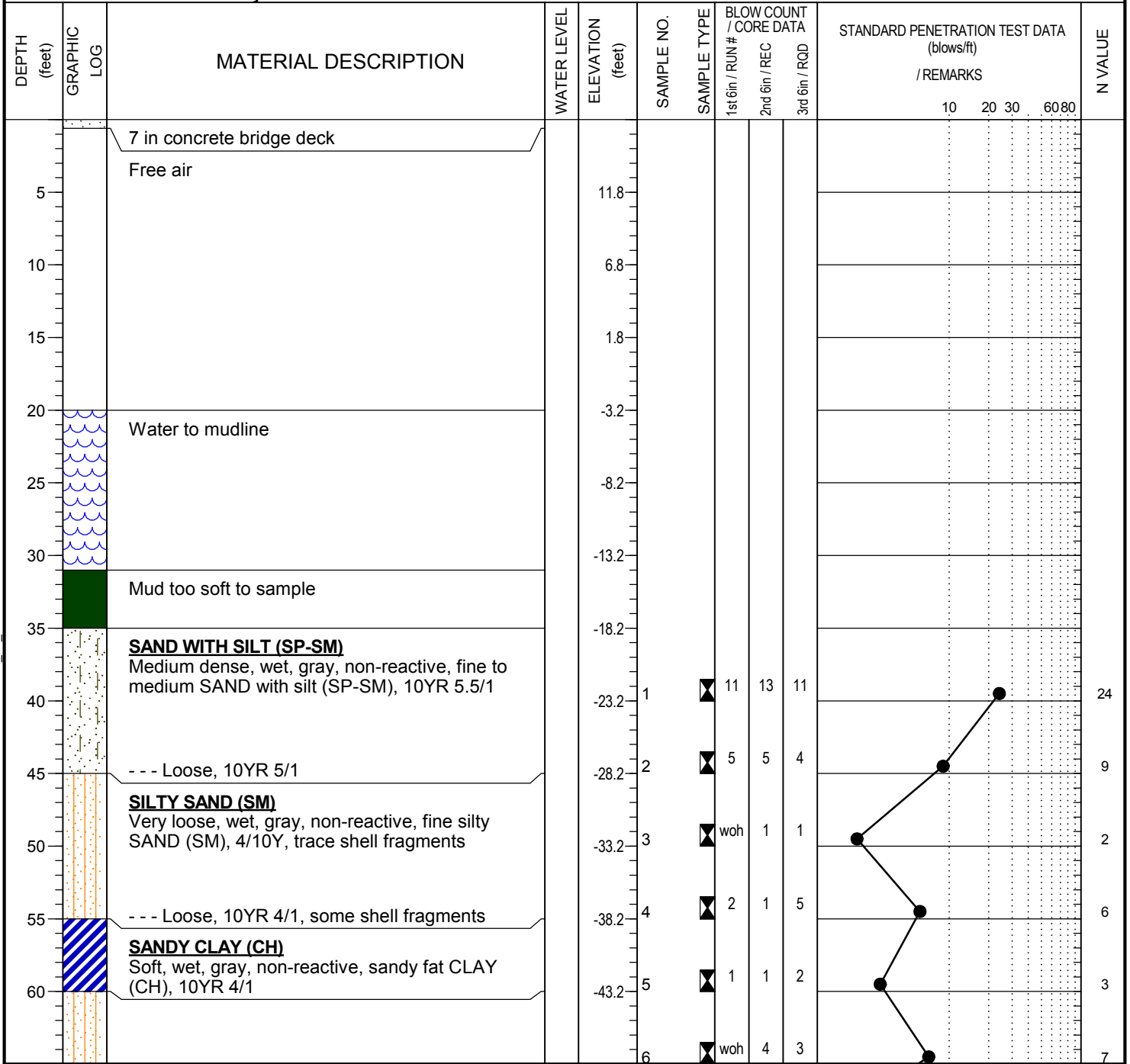
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DATE:	11-17-2017
PROJECT NUMBER	1413-17-079
FIGURE NO.	

Drawing path: Q:\drawings\1413\2017\079 Fripp\1413-17-079 pro_C.dwg

DATE DRILLED: 10/11/17	ELEVATION: 16.8 ft	NOTES: Station: 51+20 Near Bent 4 Casing driven to 95 ft
DRILL RIG: Diedrich D-50	BORING DEPTH: 120.0 ft	
DRILLER: Justin/Shane	WATER LEVEL:	
HAMMER TYPE: Automatic	LOGGED BY: L. Ekstrom	

SAMPLING METHOD: Split spoon	NORTHING: 184015.903	EASTING: 2165258.802
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DRILLING METHOD: Mud Rotary



S&ME BORING LOG 1413-17-079 SPT LOGS.GPJ LIBRARY 2011_06_28.GDT 11/13/17

NOTES:

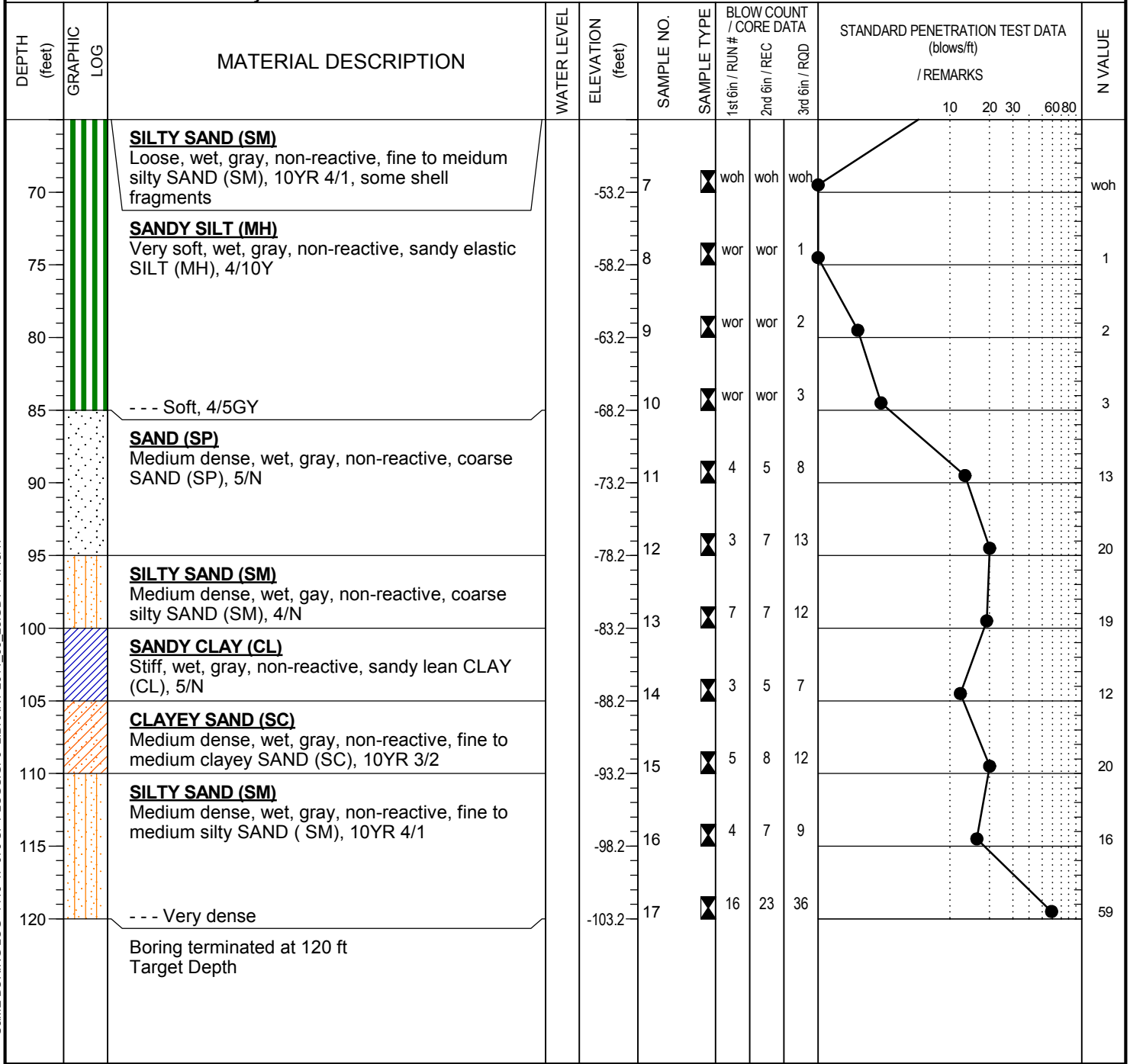
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2. BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.
3. STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.
4. WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.



DATE DRILLED: 10/11/17	ELEVATION: 16.8 ft	NOTES: Station: 51+20 Near Bent 4 Casing driven to 95 ft
DRILL RIG: Diedrich D-50	BORING DEPTH: 120.0 ft	
DRILLER: Justin/Shane	WATER LEVEL:	
HAMMER TYPE: Automatic	LOGGED BY: L. Ekstrom	

SAMPLING METHOD: Split spoon NORTHING: 184015.903 EASTING: 2165258.802

DRILLING METHOD: Mud Rotary



S&ME BORING LOG - 1413-17-079 SPT LOGS.GPJ LIBRARY 2011_06_28.GDT 11/13/17

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DATE DRILLED: 10/17/17	ELEVATION: 22.1 ft	NOTES: Station: 56+80 Near Bent 18 Outer casing driven to 69 ft Inner casing driven to 80 ft Boring terminated at 80 due to Safety Issues
DRILL RIG: Diedrich D-50	BORING DEPTH: 80.0 ft	
DRILLER: Justin/Shane	WATER LEVEL:	
HAMMER TYPE: Automatic	LOGGED BY: L. Ekstrom	

SAMPLING METHOD: Split spoon	NORTHING: 185108.541	EASTING: 2165610.527
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DRILLING METHOD: **Mud Rotary**

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA			STANDARD PENETRATION TEST DATA (blows/ft) /REMARKS				N VALUE	
							1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	10	20	30	60		80
5		7 in concrete bridge deck		17.1											
10		Free air		12.1											
15				7.1											
20		Water to mudline		2.1											
25	~			-2.9											
30	~			-7.9											
35	~			-12.9											
40	~			-17.9											
45	~			-22.9											
50	~			-27.9											
55	~			-32.9											
60	~			-37.9											

S&ME BORING LOG - 1413-17-079 SPT LOGS.GPJ LIBRARY 2011_06_28.GDT 11/13/17

NOTES:

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PROJECT:		Fripp Island Bridge Retrofit Fripp Island, SC S&ME Project No. 1413-17-079			BORING LOG C-2										
DATE DRILLED: 10/17/17		ELEVATION: 22.1 ft			NOTES: Station: 56+80 Near Bent 18 Outer casing driven to 69 ft Inner casing driven to 80 ft Boring terminated at 80 due to Safety Issues										
DRILL RIG: Diedrich D-50		BORING DEPTH: 80.0 ft													
DRILLER: Justin/Shane		WATER LEVEL:													
HAMMER TYPE: Automatic		LOGGED BY: L. Ekstrom													
SAMPLING METHOD: Split spoon					NORTHING: 185108.541		EASTING: 2165610.527								
DRILLING METHOD: Mud Rotary															
DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA			STANDARD PENETRATION TEST DATA (blows/ft)				N VALUE	
							1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	/ REMARKS					
										10	20	30	60	80	
		Water to mudline (continued)													
70		Mud too soft to sample		-47.9											
75		SAND WITH SILT (SP-SM) Loose, wet, gray, non-reactive, fine to medium SAND with silt (SP-SM), 4/10Y		-52.9											
80		Boring terminated at 80 ft Safety Issues		-57.9	1	2	3	5							8

S&ME BORING LOG - 1413-17-079 SPT LOGS.GPJ LIBRARY 2011_06_28.GDT 11/13/17

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DATE DRILLED: 10/10/17	ELEVATION: 22.5 ft	NOTES: Station: 62+70 Near Bent 32 Outer casing driven to 62 ft Inner casing driven to 93 ft
DRILL RIG: Diedrich D-50	BORING DEPTH: 120.0 ft	
DRILLER: Justin/Shane	WATER LEVEL:	
HAMMER TYPE: Automatic	LOGGED BY: L. Ekstrom	

SAMPLING METHOD: Split spoon	NORTHING: 184550.203	EASTING: 2165432.413
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DRILLING METHOD: **Mud Rotary**

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA			STANDARD PENETRATION TEST DATA (blows/ft) /REMARKS				N VALUE	
							1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	10	20	30	60		80
5		7 in concrete bridge deck Free air		17.5											
10				12.5											
15				7.5											
20				2.5											
25				-2.5											
30	Water to mudline			-7.5											
35				-12.5											
40				-17.5											
45				-22.5											
50				-27.5											
55				-32.5											
60	Mud too soft to sample			-37.5											

S&ME BORING LOG - 1413-17-079 SPT LOGS.GPJ LIBRARY 2011_06_28.GDT 11/13/17

NOTES:

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PROJECT:		Fripp Island Bridge Retrofit Fripp Island, SC S&ME Project No. 1413-17-079			BORING LOG C-3									
DATE DRILLED: 10/10/17		ELEVATION: 22.5 ft			NOTES: Station: 62+70 Near Bent 32 Outer casing driven to 62 ft Inner casing driven to 93 ft									
DRILL RIG: Diedrich D-50		BORING DEPTH: 120.0 ft												
DRILLER: Justin/Shane		WATER LEVEL:												
HAMMER TYPE: Automatic		LOGGED BY: L. Ekstrom												
SAMPLING METHOD: Split spoon					NORTHING: 184550.203		EASTING: 2165432.413							
DRILLING METHOD: Mud Rotary														
DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA			STANDARD PENETRATION TEST DATA (blows/ft)				N VALUE
							1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	/ REMARKS				
										10	20	30	6080	
70		SAND WITH SILT (SP-SM) Loose, wet, gray, non-reactive, fine to medium SAND with silt (SP-SM), 10YR 5/1		-47.5	1	▲	5	6	5					11
75		SANDY CLAY (CL) Stiff, wet, dark gray, non-reactive, sandy lean CLAY (CL), 4/N		-52.5	2	▲	3	6	6					12
80		CLAYEY SAND (SC) Firm, wet, dark gray, non-reactive, fine to medium clayey SAND (SC), 4/10Y		-57.5	3	▲	5	4	6					10
85		SANDY CLAY (CL) Firm, wet, gray, non-reactive, sandy lean CLAY (CL), 5/5GY		-62.5	4	▲	1	2	5					7
90		SAND (SP) Dense, wet, gray, non-reactive, medium to coarse SAND (SP), 10YR 4/1		-67.5	5	▲	5	9	16					25
95		SANDY CLAY (CL) Firm, wet, olive, weakly reactive, sandy lean CLAY (CL), 10YR 4/3		-72.5	6	▲	3	5	6					11
100		SILTY SAND (SM) Loose, wet, yellowish brown, weakly reactive, silty SAND (SM), 10YR 5/4, with some cementation		-77.5	7	▲	6	7	1					8
105		MARL: SILTY SAND (SM) Medium dense, wet, very pale gray, strongly reactive, silty SAND (SM), 5Y 8/1		-82.5	8	▲	8	8	8					16
110		--- Loose		-87.5	9	▲	9	9	8					17
115		--- Loose		-92.5	10	▲	4	5	4					9
120		Boring terminated at 120 ft Target Depth		-97.5	11	▲	7	6	5					11

S&ME BORING LOG - 1413-17-079 SPT LOGS.GPJ LIBRARY 2011_06_28.GDT 11/13/17

NOTES:

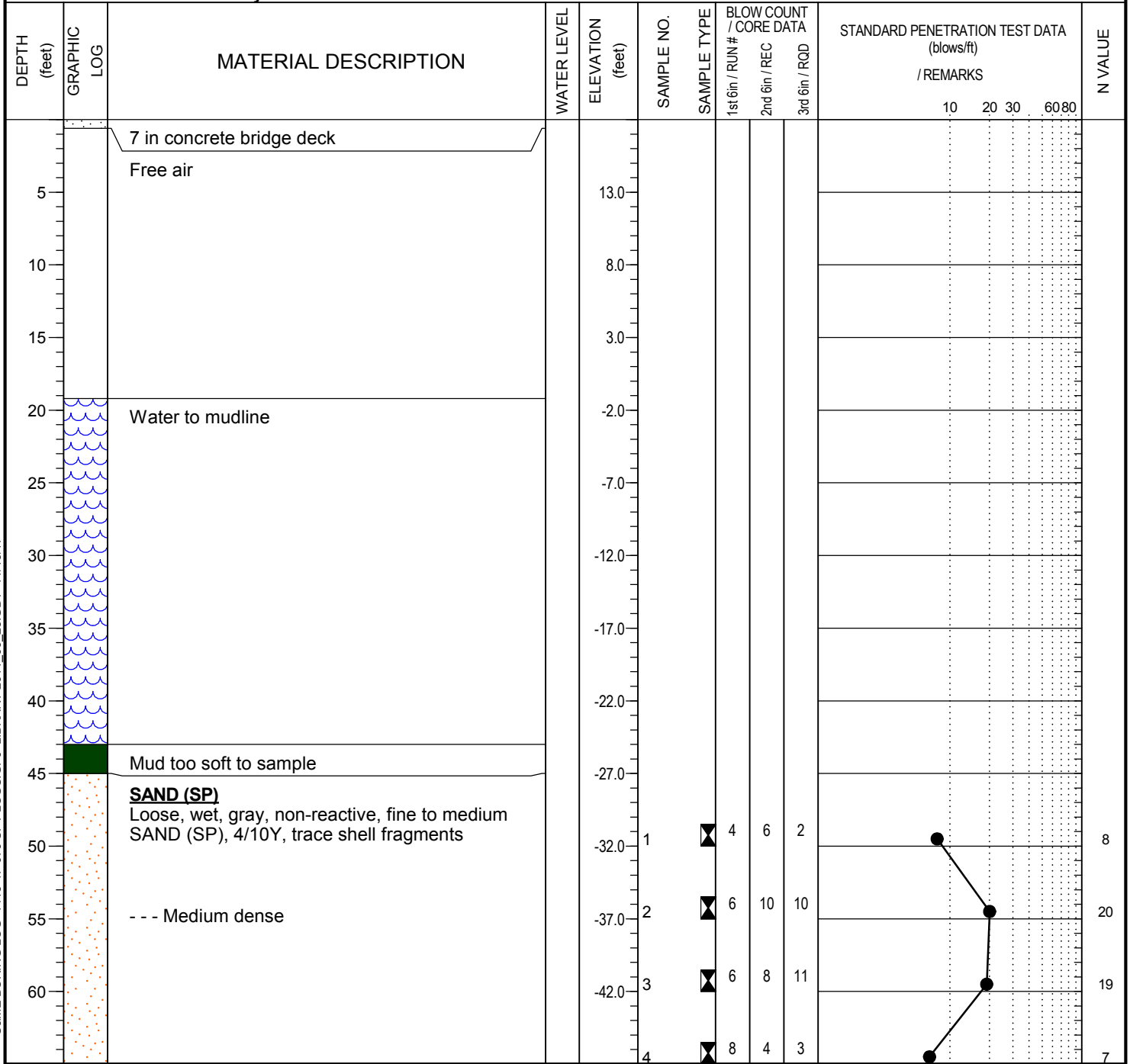
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4. WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.



DATE DRILLED: 10/10/17	ELEVATION: 18.0 ft	NOTES: Station: 67+50 Near Bent 44 Casing driven to 40 ft
DRILL RIG: Diedrich D-50	BORING DEPTH: 120.0 ft	
DRILLER: Justin/Shane	WATER LEVEL:	
HAMMER TYPE: Automatic	LOGGED BY: A. Syms	

SAMPLING METHOD: Split spoon	NORTHING: 185566.645	EASTING: 2165754.561
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DRILLING METHOD: **Mud Rotary**



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DRILL RIG: Diedrich D-50	BORING DEPTH: 120.0 ft	
DRILLER: Justin/Shane	WATER LEVEL:	
HAMMER TYPE: Automatic	LOGGED BY: A. Syms	

SAMPLING METHOD: Split spoon	NORTHING: 185566.645	EASTING: 2165754.561
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DRILLING METHOD: **Mud Rotary**

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA			STANDARD PENETRATION TEST DATA (blows/ft) /REMARKS				N VALUE	
							1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	10	20	30	60/80		
70		--- Loose, 4/5GY CLAYEY SAND (SC) Medium dense, wet, gray, non-reactive, fine clayey SAND (SC), 4/5GY, trace shell fragments		-52.0	5	▲	4	4	7						11
75		--- 3/10Y		-57.0	6	▲	10	6	7						13
80		--- Loose, 4/5GY		-62.0	7	▲	6	4	4						8
85		--- 2.5YR 4/3		-67.0	8	▲	5	4	4						8
90		SANDY SILT (ML) Firm, moist, olive, non-reactive, sandy lean SILT (ML), 2.5Y 4/3		-72.0	9	▲	woh	2	3						5
95		CLAYEY SAND (SC) Medium dense, moist, dark brown, non-reactive, fine to coarse clayey SAND (SC), 10YR 3/1		-77.0	10	▲	21	8	4						12
100		MARL: SANDY SILT (ML) Very stiff, moist, very light gray, strongly reactive, sandy lean SILT (ML), 8/10Y, with shell hash		-82.0	11	▲	6	7	9						16
105		--- Firm		-87.0	12	▲	11	9	8						17
110				-92.0	13	▲	5	4	3						7
115				-97.0	14	▲	4	3	3						6
120		Boring terminated at 120 ft Target Depth		-102.0	15	▲	4	5	2						7

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FIELD TESTING PROCEDURES

Standard Penetration Test (SPT) Boring (ASTM D-1586)

All boring and sampling operations were performed by either mechanically augering or wash boring through the soils. Where necessary, a heavy drilling fluid was used below the water table to stabilize the side and bottom of the drill hole. At regular intervals, soil samples were obtained with a standard 1.4-inch I.D., 2-inch O.D., split-spoon sampler. The sampler was first seated 6 inches to penetrate any loose cuttings and then driven an additional foot with blows of a 150 pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is designated the "Standard Penetration Resistance." The penetration resistance, when properly evaluated, is an index to the soil strength.

Soil Classifications

Soil classifications provide a general guide to the engineering properties of various soil types and enable the engineer to apply his past experience to current problems. In our exploration, samples obtained during drilling operations are examined and visually classified based on the Unified Soil Classification System (USCS) according to color, texture, and relative density or consistency (based on standard penetration resistance). The consistency and relative density designations are as follows:

<u>SANDS</u>		<u>SILTS AND CLAYS</u>	
N (SPT)	Relative Density	N (SPT)	Consistency
0 - 4	Very Loose	0 - 2	Very Soft
5 - 10	Loose	3 - 4	Soft
11 - 30	Medium Dense	5 - 8	Firm
		9 - 15	Stiff
31 - 50	Dense	16 - 30	Very Stiff
50+	Very Dense	31 - 50	Hard
		50+	Very Hard

LEGEND TO SOIL CLASSIFICATION AND SYMBOLS

SOIL TYPES

(Shown in Graphic Log)



Fill



Asphalt



Concrete



Topsoil



Gravel



Sand



Silt



Clay



Organic



Silty Sand



Clayey Sand



Sandy Silt



Clayey Silt



Sandy Clay



Silty Clay



Partially Weathered Rock



Cored Rock



Cooper Marl

WATER LEVELS

(Shown in Water Level Column)

▽ = Water Level At Termination of Boring

▼ = Water Level Taken After 24 Hours

◀ = Loss of Drilling Water

HC = Hole Cave

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY

Very Soft
Soft
Firm
Stiff
Very Stiff
Hard
Very Hard

STD. PENETRATION RESISTANCE BLOWS/FOOT

0 to 2
3 to 4
5 to 8
9 to 15
16 to 30
31 to 50
Over 50

RELATIVE DENSITY OF COHESIONLESS SOILS

RELATIVE DENSITY

Very Loose
Loose
Medium Dense
Dense
Very Dense

STD. PENETRATION RESISTANCE BLOWS/FOOT

0 to 4
5 to 10
11 to 30
31 to 50
Over 50

SAMPLER TYPES

(Shown in Samples Column)

Shelby Tube

⊠ Split Spoon

▮ Rock Core

⋯ No Recovery

TERMS

Standard Penetration Resistance - The Number of Blows of 140 lb. Hammer Falling 30 in. Required to Drive 1.4 in. I.D. Split Spoon Sampler 1 Foot. As Specified in ASTM D-1586.

REC - Total Length of Rock Recovered in the Core Barrel Divided by the Total Length of the Core Run Times 100%.

RQD - Total Length of Sound Rock Segments Recovered that are Longer Than or Equal to 4" (mechanical breaks excluded) Divided by the Total Length of the Core Run Times 100%.



Sieve Analysis of Soils



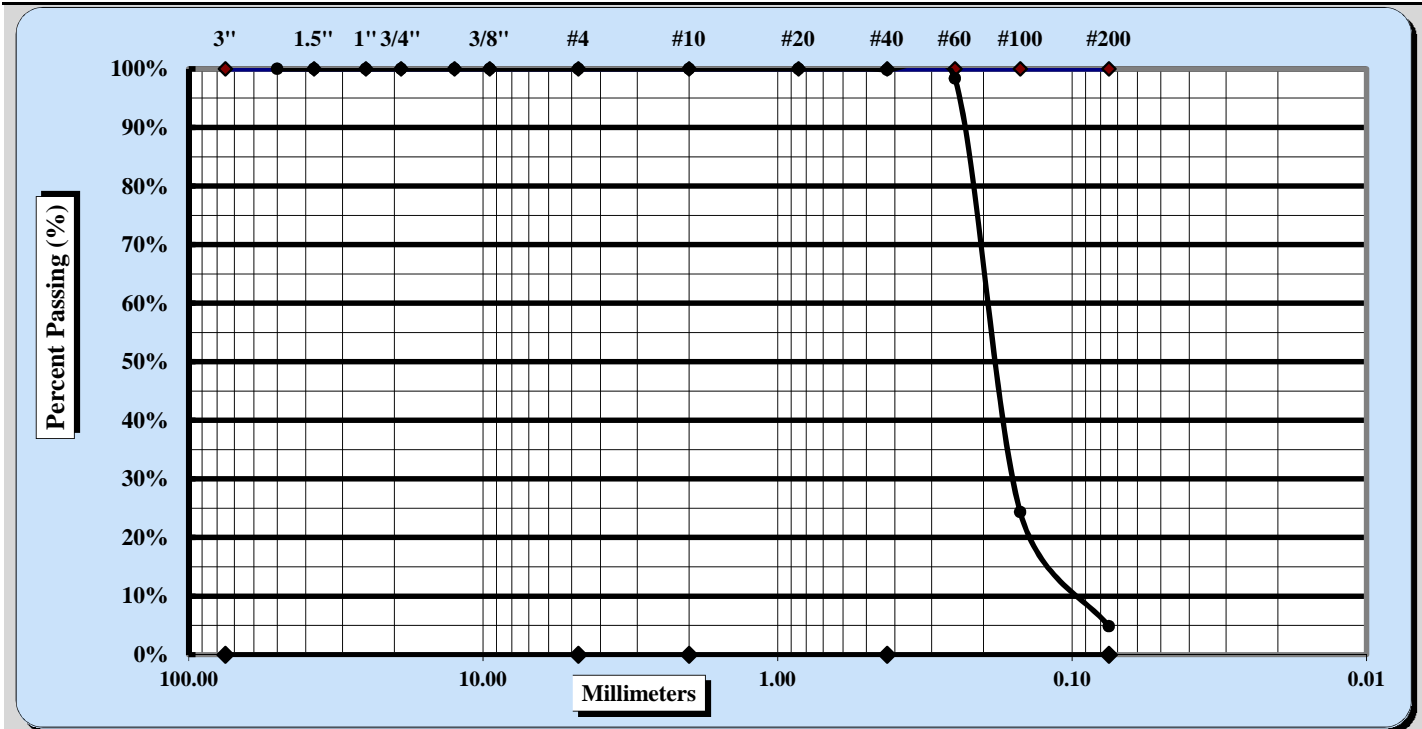
ASTM D 422

Quality Assurance

S&ME, Inc. - 620 Wando Park Blvd., Mt. Pleasant, SC 29464

Project #:	1413-17079	Report Date:	10-29-17
Project Name:	Fripp Island Bridgr Retrofit	Test Date(s):	10-25-17
Client Name:	Johnson, Mirmiran, and Thompson, Inc.		
Client Address:	952 Houston Northcutt Blvd, Suite 100: Mt, Pleasant, SC 29464		
Sample Id.	C-1	Type:	Sample Date:
Location:	Sample:	#1	Depth
			38.5 to 40 ft

Sample Description: Gray SAND with silt (SP-SM)



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Maximum Particle Size	#20	Coarse Sand	0.0%	Fine Sand	95.0%
Gravel	0.0%	Medium Sand	0.2%	Silt & Clay	4.8%
Liquid Limit	NP	Plastic Limit	NP	Plastic Index	NP
Specific Gravity				Moisture Content	25.1%
Coarse Sand	0.0%	Medium Sand	0.2%	Fine Sand	95.0%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

Notes / Deviations / References:

Telford Wood
Technical Responsibility

Telford Wood
Signature

Group Leader
Position

10/29/2017
Date

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Sieve Analysis of Soils



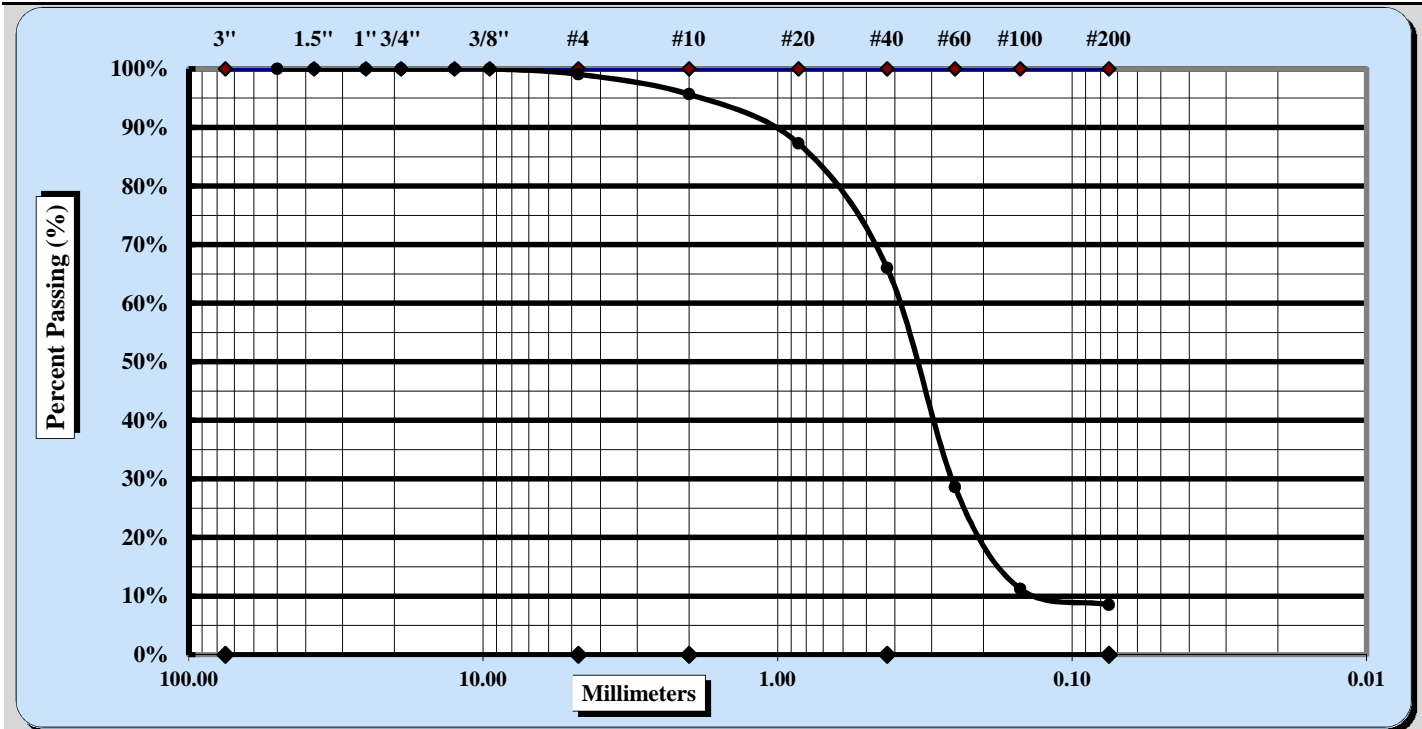
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Client Name:	Johnson, Mirmiran, and Thompson, Inc.		
Client Address:	952 Houston Northcutt Blvd, Suite 100: Mt, Pleasant, SC 29464		
Sample Id.	C-2	Type:	Sample Date:
Location:	Sample:	#1	Depth
			78.5 to 80 ft

Sample Description: **Gray SAND with silt (SP-SM)**



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Maximum Particle Size	3/8"	Coarse Sand	3.4%	Fine Sand	57.5%
Gravel	0.9%	Medium Sand	29.6%	Silt & Clay	8.5%
Liquid Limit	NP	Plastic Limit	NP	Plastic Index	NP
Specific Gravity				Moisture Content	22.0%
Coarse Sand	3.4%	Medium Sand	29.6%	Fine Sand	57.5%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

Notes / Deviations / References:

Telford Wood
Technical Responsibility

Signature

Group Leader
Position

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Sieve Analysis of Soils



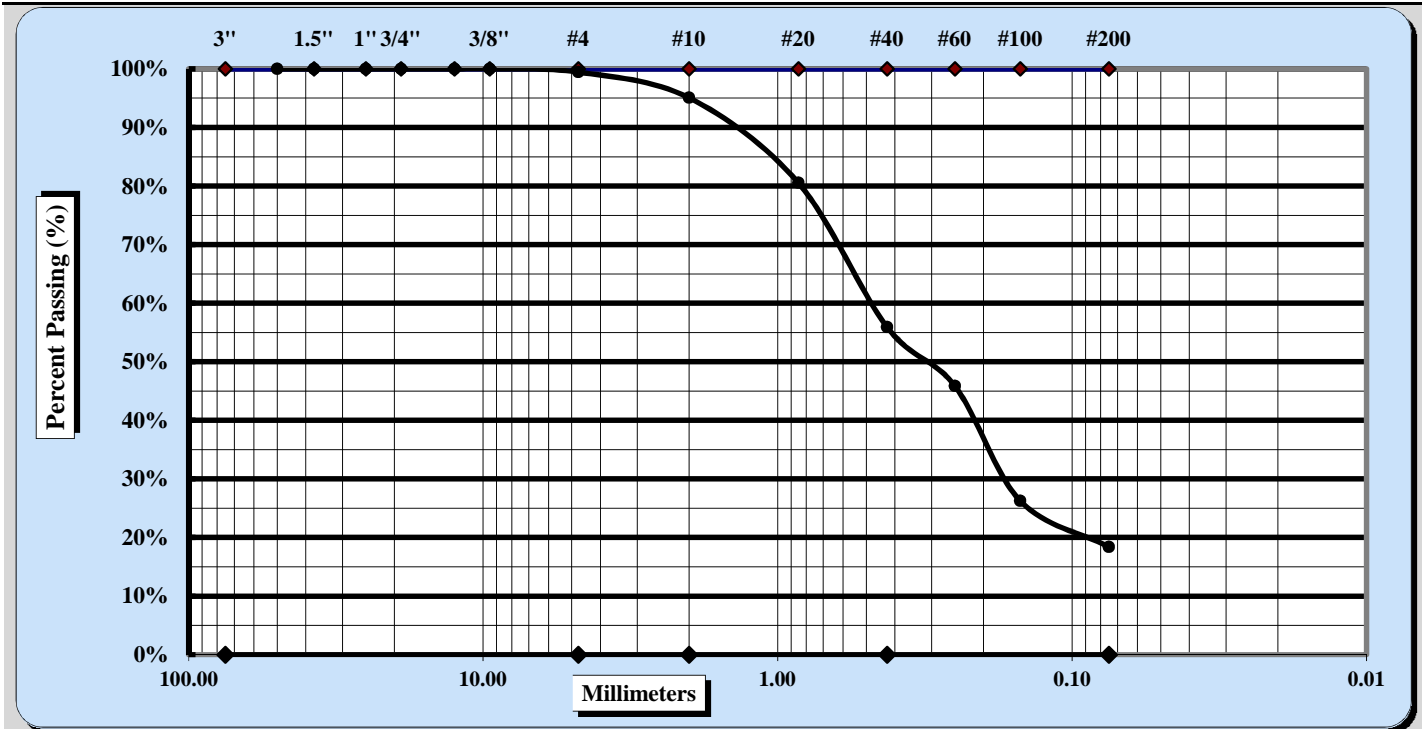
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Quality Assurance

S&ME, Inc. - 620 Wando Park Blvd., Mt. Pleasant, SC 29464

Project #:	1413-17079	Report Date:	10-29-17
Project Name:	Fripp Island Bridgr Retrofit	Test Date(s):	10-25-17
Client Name:	Johnson, Mirmiran, and Thompson, Inc.		
Client Address:	952 Houston Northcutt Blvd, Suite 100: Mt, Pleasant, SC 29464		
Sample Id.	C-3	Type:	Sample Date:
Location:	Sample:	#1	Depth
			68.5 to 70 ft

Sample Description: Gray SAND with silt (SP-SM)



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Maximum Particle Size	3/8"	Coarse Sand	4.4%	Fine Sand	37.5%
Gravel	0.6%	Medium Sand	39.1%	Silt & Clay	18.4%
Liquid Limit	NP	Plastic Limit	NP	Plastic Index	NP
Specific Gravity				Moisture Content	22.3%

Coarse Sand	4.4%	Medium Sand	39.1%	Fine Sand	37.5%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

Notes / Deviations / References:

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Sieve Analysis of Soils



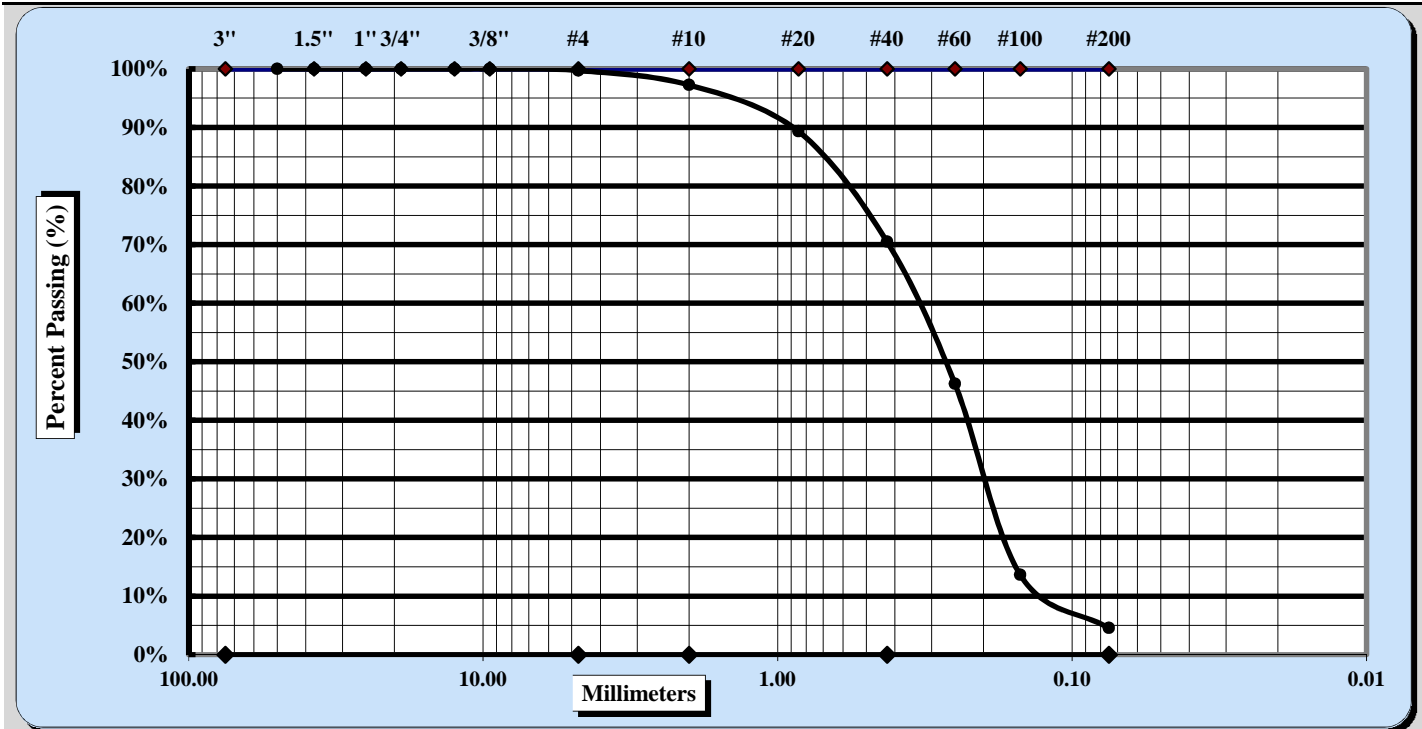
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Project #:	1413-17079	Report Date:	10-29-17
Project Name:	Fripp Island Bridgr Retrofit	Test Date(s):	10-25-17
Client Name:	Johnson, Mirmiran, and Thompson, Inc.		
Client Address:	952 Houston Northcutt Blvd, Suite 100: Mt, Pleasant, SC 29464		
Sample Id.	C-4	Type:	Sample Date:
Location:	Sample:	#1	Depth
			48.5 to 50

Sample Description: Gray SAND (SP)



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Maximum Particle Size	3/8"	Coarse Sand	2.5%	Fine Sand	65.9%
Gravel	0.3%	Medium Sand	26.8%	Silt & Clay	4.5%
Liquid Limit	NP	Plastic Limit	NP	Plastic Index	NP
Specific Gravity				Moisture Content	25.4%

Coarse Sand	2.5%	Medium Sand	26.8%	Fine Sand	65.9%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

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