ALABAMA DEPARTMENT OF TRANSPORTATION

1409 Coliseum Boulevard, Montgomery, Alabama 36110

Bureau of Materials and Tests

3700 Fairground Road, Montgomery, Alabama 36110
Phone (334)206-2200 FAX (334)264-6263

Kay Ivey
Governor

John R. Cooper
Transportation Director

July 31, 2018

Memo

To: **Mr. Matt Ericksen, P.E.**
MRB & Bayway Project Director

From: Ms. Kaye Chancellor Davis, P.E. AKCD
State Geotechnical Engineer

Re: **I-10 Mobile River Bridge- US-98 Interchange**
Subsurface Data Report
Project No.: **DPI-0030 (005)**
I-10 Mobile River Bridge
Mobile County

The Materials & Tests Bureau, Geotechnical Division, has reviewed the Subsurface Data Report. This office agrees with the information held within this report. Please contact this office if there any question or concerns.

AKCD/rld

Attachments

C: Project File
File

REPORT OF GEOTECHNICAL CONSULTING SERVICES

GEOTECHNICAL SUBSURFACE DATA REPORT

I-10 Mobile River Bridge – US-98 Interchange

Baldwin County, Alabama

ALDOT PE Project No.: DPI-0030(005)

Thompson Engineering Project No.: 17-1101-0145

July 31, 2018

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July 31, 2018

Mr. Scott W. George, P.E.
Materials and Test Engineer
Alabama Department of Transportation
Bureau of Materials and Test
3700 Fairgrounds Road
Montgomery, Alabama 36130

Attention: **Kaye Chancellor Davis, P.E.**
ALDOT Geotechnical Engineer

Subject: **Report of Geotechnical Consulting Services**
Subsurface Data Report
I-10 Mobile River Bridge – US-98 Interchange
ALDOT PE Project No.: DPI-0030(005)
Spanish Fort, Baldwin County, Alabama
Thompson Project No. 17-1101-0145

Dear Ms. Davis:

Thompson Engineering is pleased to transmit this geotechnical subsurface data report for the project referenced above. This submittal summarizes the field exploration and laboratory testing results for the referenced design build operate and maintain project. Our services were performed in general accordance with the Thompson Fee provided in an email dated May 9, 2018.

We appreciate the opportunity to assist the Alabama Department of Transportation with project-related geotechnical matters. Please do not hesitate to contact our office with any questions concerning this submittal.

Respectfully submitted,

THOMPSON ENGINEERING, INC.

Michael Davis, Jr., P.E.
Geotechnical Project Engineer

Cameron L. Crigler, P.E.
Geotechnical Team Leader

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Mobile, AL 36606
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- Unconsolidated Undrained (U.U.) Triaxial Shear Tests
- Direct Shear Test
- One Dimensional Consolidation Tests

Appendix D – Drill Rig Hammer Energy Efficiency Report

1.0 SCOPE OF SERVICES

Thompson Engineering (Thompson) has completed the field exploration and laboratory testing for the US-98 Interchange in support of the overall Mobile River Bridge (MRB) located in Mobile and Baldwin Counties, Alabama. This scope of work was performed in general accordance with the contracted scope of services between the Alabama Department of Transportation (ALDOT) and Thompson, dated July 20, 2017 and in an email dated May 9, 2018. Our services were authorized in the ALDOT Work Order #71,002 on Contract ID #2096.

2.0 PROJECT DESCRIPTION

The US-98 Interchange is located along interstate I-10 in Spanish Fort, Baldwin County, Alabama. This portion of the project begins on the southern side of the bridge at approximate station 17+00 and proceeds north to approximate station 27+00 along the US-98 Mainline. The scope of services included landside subsurface exploration and associated laboratory testing for the I-10 modifications in support of the design build or design build operate and maintain (DBFOM) delivery method. The overall intent was to provide subsurface information to the prospective teams in an effort to reduce the risk and unknowns associated with the subsurface conditions. **Figure 1** below depicts the project location and immediate surrounding areas.

***Figure 1**: Project location and immediate surrounding area.*

3.0 SUBSURFACE EXPLORATION PROGRAM

Thompson geotechnical drilling crews performed soil test borings and sampling operations at the approximate locations shown on the appended Boring Location Plan in **Appendix A**. A Diedrich D-50 track-mounted drilling rig, equipped with an automatic standard penetration test hammer, was utilized to advance the borings using mud rotary drilling techniques. Drilling and field operations took place between May 23, 2017 and June 6, 2017. The hammer energy report for the automatic SPT hammer on the drill rig is attached in **Appendix D** of this report.

Borings were drilled to depths of 150 feet below the existing ground surface as shown on the attached Record of Test Borings in **Appendix B.** Boring locations were surveyed by Thompson Survey crews upon completion.

Brief descriptions of the testing protocols are presented below.

3.1 Standard Penetration Test (SPT) Borings

The SPT borings were performed in general accordance with AASHTO T-206 guidelines. Recovered samples were examined and visually classified in the field or in the geotechnical laboratory by a geologist or engineer. Samples were returned to Thompson's geotechnical laboratory for additional testing. The results of the classification and stratification are shown on the appended Record of Test Borings.

3.2 Undisturbed Soil Sampling

Undisturbed soil specimens were recovered utilizing thin-wall "Shelby" tube sampling equipment at select depths within soft to firm cohesive soil zones. Undisturbed samples were collected in general accordance AASHTO T-207. The recovered soil samples were sealed and transported to Thompson's geotechnical laboratory.

3.3 Cone Penetration Tests

The cone penetration tests were carried out using an integrated electronic piezocone (CPTU). The cone reaction system consisted of a S4 track-mounted rig. The cone was advanced to termination depths at a rate of 2 cm/s. Tip resistance (qc), sleeve friction (fs), and dynamic pore pressure measurements (u2) were recorded every 5 centimeters (2 inches). Pore pressure dissipation data was also obtained at two locations during the cone penetration tests. Testing was performed in general accordance with the methods and procedures described in ASTM Specification D5778-07. Samples are not recovered with cone penetration tests.

The results of the soundings are shown on the CPT logs, presented in **Appendix B**. The corrected tip resistance (Qt) is the recorded tip resistance (Qc) which has been corrected to account for the pore water pressures acting on unequal tip areas of the cone.

4.0 LABORATORY TESTING

Samples selected for laboratory testing were assigned by Thompson. **Table 1** provides a quantitative summary of the lab tests performed.

Table 1: Laboratory Testing Summary

Test Type	Quantity
Atterberg Limits	88
Full Sieve Analysis	88
Consolidation	1
Unconsolidated Undrained (U.U.) Triaxial Shear Tests	3
Consolidated Undrained (C.U.) Triaxial Shear Tests	4
Direct Shear Tests	1

A laboratory test summary table, BMT-5 sheets, and individual test results are included in **Appendix C**.

5.0 SUBSURFACE FINDINGS

While establishment of generalized subsurface conditions is useful for the geotechnical engineering evaluation process, such generalizations should be reviewed with caution as they promote extrapolation of recovered data between soil test boring locations. The stratifications shown on the Soil Test Borings represent the conditions only at the actual boring locations. The actual transition between soil types may be more gradual than those depicted.

5.1 Groundwater Conditions

Groundwater depth measurements are provided in **Table 2**. Delayed measurements were whenever possible. Fluctuations in groundwater depth measurements can be attributed to elevations and/or drilling techniques used in the field. Groundwated depths depicted on the appended CPT logs were calculated using pore pressure readings obtained in clean sands.

Table 2: Groundwater Depth Measurements

Boring	Completion of Boring (ft.)	Day 1 (ft.)	Day 2 (ft.)	June 6, 2018 (ft.)	July 10, 2018 (ft.)	Date of Boring Completion
TH-28	Not Obtained	42.5	41.8	41.0	--	June 1
TH-29	Not Obtained	5.6	5.2	4.5	--	June 4
TH-30	18.0	Not Obtained	Not Obtained	18.0	16.1	June 7
TH-31	Not Obtained	16.9	Not Obtained	16.9	--	May 31
TH-32	Not Obtained	32.0	32.6	32.6	--	May 24

Fluctuations of the groundwater level on this project may be expected to occur seasonally as a result of rainfall, surface runoff, tidal issues, and immediate area construction activities.

6.0 REPORT LIMITATIONS

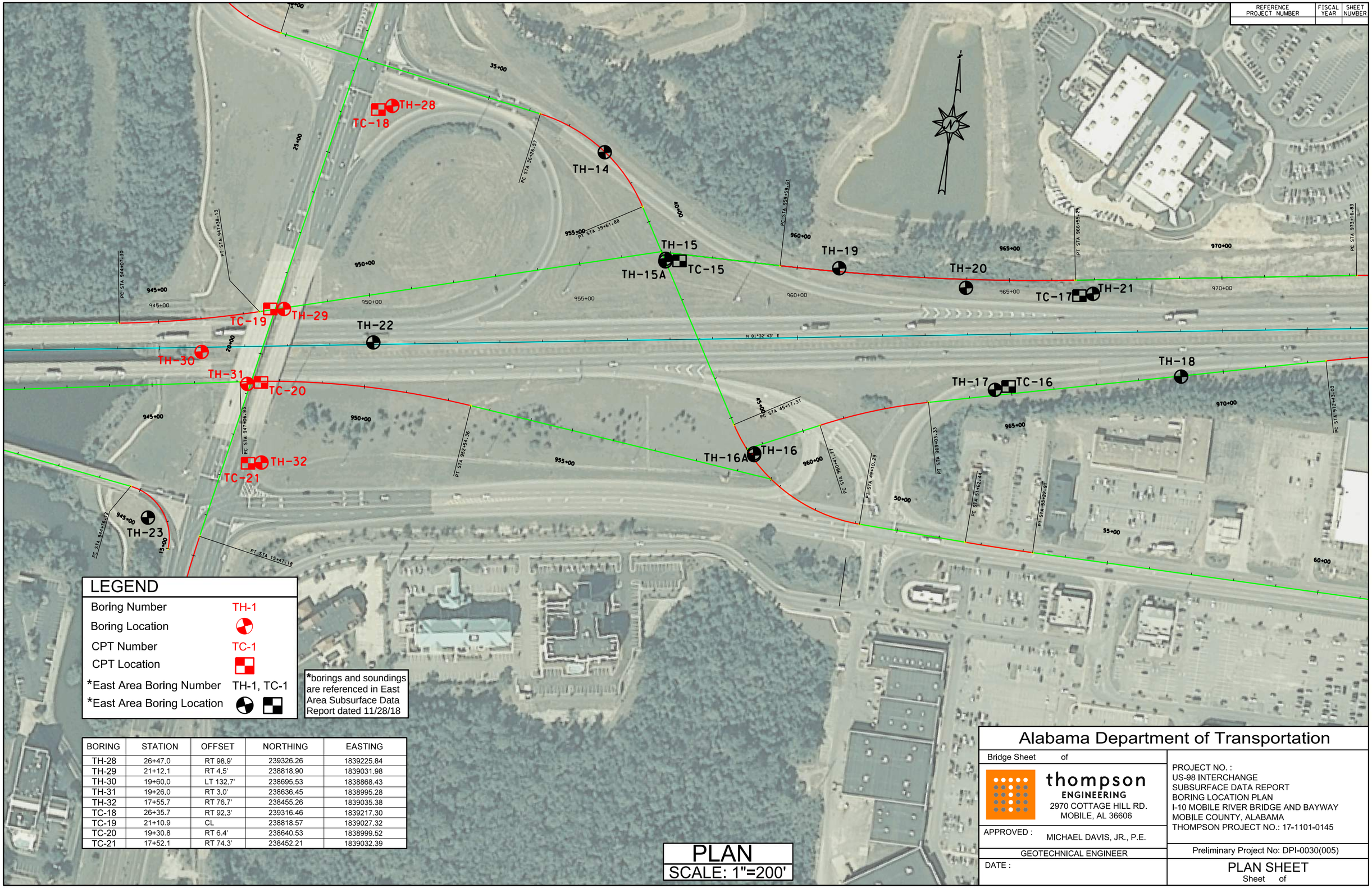
This Geotechnical Subsurface Data Report has been prepared for the exlusive use of ALDOT for the specific project discussed herein. This Geotechnical Subsurface Data Report has been prepared in accordance with generally accepted local geotechnical engineering practices; no other warranty is expressed or implied. The recovered samples were not examined, either visually or analytically, for chemical composition or environmental hazards.

The observations from field sample recovery, laboratory examination of samples and testing, and computed data analysis, which are presented in this data report, should be considered preliminary investigation and are subject to change upon the acquisition of additional data during the final investigation for the final design. Additional subsurface exploration including borings and laboratory testing for the purposes of evaluating cut slopes, embankment slopes, embankment settlements, retaining walls and bridge foundation types and capacities will be required for final design and applicable to the specific final design layout. The Geotechnical Engineer of Record for the project must review the data submitted in this report and develop their own interpretation of the testing results as they apply to design.

APPENDIX A

- **Boring Location Plan**

REFERENCE PROJECT NUMBER	FISCAL YEAR	SHEET NUMBER



LEGEND

Boring Number	TH-1
Boring Location	
CPT Number	TC-1
CPT Location	
*East Area Boring Number	TH-1, TC-1
*East Area Boring Location	

*borings and soundings are referenced in East Area Subsurface Data Report dated 11/28/18

BORING	STATION	OFFSET	NORTHING	EASTING
TH-28	26+47.0	RT 98.9'	239326.26	1839225.84
TH-29	21+12.1	RT 4.5'	238818.90	1839031.98
TH-30	19+60.0	LT 132.7'	238695.53	1838868.43
TH-31	19+26.0	RT 3.0'	238636.45	1838995.28
TH-32	17+55.7	RT 76.7'	238455.26	1839035.38
TC-18	26+35.7	RT 92.3'	239316.46	1839217.30
TC-19	21+10.9	CL	238818.57	1839027.32
TC-20	19+30.8	RT 6.4'	238640.53	1838999.52
TC-21	17+52.1	RT 74.3'	238452.21	1839032.39

PLAN
SCALE: 1"=200'

Alabama Department of Transportation

Bridge Sheet of

thompson ENGINEERING
2970 COTTAGE HILL RD.
MOBILE, AL 36606

APPROVED : MICHAEL DAVIS, JR., P.E.

GEOTECHNICAL ENGINEER

DATE :

PROJECT NO. :
US-98 INTERCHANGE
SUBSURFACE DATA REPORT
BORING LOCATION PLAN
I-10 MOBILE RIVER BRIDGE AND BAYWAY
MOBILE COUNTY, ALABAMA
THOMPSON PROJECT NO.: 17-1101-0145

Preliminary Project No: DPI-0030(005)

PLAN SHEET
Sheet of

APPENDIX B

- **Records of Test Borings**
- **CPT Soundings**
- **Legend**

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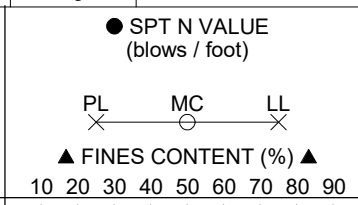
RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-28	**Boring Location:**	26+47.0	**Offset:**	RT 98.9	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	63.1 ft.	**Northing:**	239326.26	**Easting:**	1839225.84	**Date Started:**	5/31/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/1/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	42.5 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)
0.0		Approximately 6 inches of topsoil.		0.0					
	60.0	Loose, dry, brown and red, fine grained, SILTY SAND (SM, A-2-4(0)), FILL, LL=NP PL=NP PI=NP NMC=12.2 %#200=22.3		1.5	SS-1	3	5	5	10
					SS-2	4	6	10	16
		Very stiff, dry, tan and red, SANDY LEAN CLAY (CL, A-6(8)), FILL, LL=35 PL=13 PI=22 NMC=17.9 %#200=55.0		3.0	SS-3	4	5	5	10
5.0		Stiff, moist, tan and brown, fine to medium grained, with trace gravel, CLAYEY SAND (SC, A-4(0)), FILL, LL=22 PL=12 PI=10 NMC=23.5 %#200=36.1		4.5	SS-4	1	1	5	6
	55.0	Loose, wet, reddish yellow, fine grained, with trace gravel, CLAYEY SAND (SC, A-6(6)), FILL, LL=36 PL=13 PI=23 NMC=38.0 %#200=45.4		6.0	SS-5	3	6	8	14
10.0		Stiff, moist, red, SANDY LEAN CLAY (CL), FILL Undisturbed sample obtained from 8.0 to 10.0 feet. Approximately 18 inches of recovery.		8.0	T-1				
		Firm, moist, red, with trace gravel, SANDY LEAN CLAY (CL, A-7-6(10)), FILL, LL=44 PL=20 PI=24 NMC=21.1 %#200=54.1							
	50.0								
		Medium dense, moist, red and tan, fine grained, SILTY SAND (SM)		13.5	SS-6	8	15	14	29
15.0									
	45.0								
		Dense, dry, tan and yellow, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=24.2 %#200=30.0		18.5	SS-7	12	20	21	41
20.0									
	40.0								
25.0									
		Dense, moist, reddish yellow		25.5	SS-8	7	19	29	48
	35.0								
		Dense		28.5	SS-9	10	15	16	31
30.0									



LEGEND

SAMPLER TYPE

SS - Split Spoon
T - Shelby Tube
DCP - Dynamic Cone Penetrometer
AC - Auger Cuttings
GB - Grab Bag
NQ - Rock Core

DRILLING METHOD

HSA - Hollow Stem Augers
SSA - Solid Stem Augers
HA - Hand Auger
MR - Mud Rotary Wash
RC - Rock Coring

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-28	**Boring Location:**	26+47.0	**Offset:**	RT 98.9	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	63.1 ft.	**Northing:**	239326.26	**Easting:**	1839225.84	**Date Started:**	5/31/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/1/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**		AASHTO T206 & T207			
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	42.5 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)
30.0								
35.0	30.0	Very dense, moist, tan, reddish yellow, fine grained, POORLY GRADED SAND with SILT (SP-SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=25.4 %#200=11.1	33.5	SS-10	27	38	48	86
40.0	25.0	Very dense, moist, reddish yellow, fine to medium grained, SILTY SAND (SM)	38.5	SS-11	17	25	29	54
45.0	20.0	Dense, moist, reddish yellow, fine to medium grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=22.6 %#200=12.6	43.5	SS-12	10	12	25	37
50.0	15.0	Loose, moist, reddish yellow, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=24.4 %#200=31.7	48.5	SS-13	6	5	5	10
55.0	10.0	Loose, brown	53.5	SS-14	3	3	3	6
60.0	5.0	Loose, moist, brown, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=35.2	58.5	SS-15	3	2	3	5

● SPT N VALUE (blows / foot)

PL MC LL

▲ FINES CONTENT (%) ▲

10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE

SS - Split Spoon
T - Shelby Tube
DCP - Dynamic Cone Penetrometer
AC - Auger Cuttings
GB - Grab Bag
NQ - Rock Core

DRILLING METHOD

HSA - Hollow Stem Augers
SSA - Solid Stem Augers
HA - Hand Auger
MR - Mud Rotary Wash
RC - Rock Coring

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-28	**Boring Location:**	26+47.0	**Offset:**	RT 98.9	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	63.1 ft.	**Northing:**	239326.26	**Easting:**	1839225.84	**Date Started:**	5/31/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/1/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**		AASHTO T206 & T207			
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	42.5 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	SPT N VALUE (blows / foot) PL MC LL ▲ FINES CONTENT (%) ▲ 10 20 30 40 50 60 70 80 90
60.0										
	0.0	%#200=29.8								
65.0		Loose		63.5	SS-16	4	3	6	9	●
	-5.0			68.5	SS-17	7	9	22	31	●
70.0		Dense, red, tan, gray, and reddish yellow								
	-10.0			73.5	SS-18	7	5	6	11	▲● ○
75.0		Medium dense, moist, red, tan, and reddish yellow, fine grained, POORLY GRADED SAND with SILT (SP-SM, A-3(0)), LL=NP PL=NP PI=NP NMC=26.8 %#200=6.9								
	-15.0			78.5	SS-19	4	3	5	8	●
80.0		Loose, gray								
	-20.0			83.5	SS-20	3	3	3	6	● ⊠ ▲
85.0		Loose, moist, gray, fine grained, CLAYEY SAND (SC, A-4(1)), LL=26 PL=18 PI=8 NMC=26.2 %#200=43.6								
	-25.0			88.5	SS-21	4	3	4	7	●
90.0		Loose								

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

thompson ENGINEERING

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Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
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ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	63.1 ft.	**Northing:**	239326.26	**Easting:**	1839225.84	**Date Started:**	5/31/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/1/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	42.5 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	SPT N VALUE (blows / foot) / PL MC LL / FINES CONTENT (%) 10 20 30 40 50 60 70 80 90
90.0										
	-30.0	Loose		93.5	SS-22	4	4	6	10	●
95.0										
	-35.0	Loose, moist, gray, fine grained, CLAYEY SAND (SC, A-6(2)), LL=28 PL=17 PI=11 NMC=22.1 %#200=48.8		98.5	SS-23	2	4	5	9	● ⊗ ▲
100.0										
	-40.0	Loose		103.5	SS-24	4	4	5	9	●
105.0										
	-45.0	Loose		108.5	SS-25	3	4	6	10	●
110.0										
	-50.0	Loose		113.5	SS-26	2	2	3	5	●
115.0										
	-55.0	Very stiff, moist, bluish green, LEAN CLAY with SAND (CL, A-6(10)), LL=35 PL=21 PI=14 NMC=25.4		118.5	SS-27	6	9	11	20	● ⊗ ▲
120.0										

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

thompson ENGINEERING

RECORD OF TEST BORING

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Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	42.5 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	SPT N VALUE (blows / foot) PL MC LL ▲ FINES CONTENT (%) ▲ 10 20 30 40 50 60 70 80 90
120.0		%#200=80.2								
	-60.0									
125.0		Medium dense, moist, gray and bluish green, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=28.1 %#200=35.2		123.5	SS-28	3	4	7	11	
	-65.0									
130.0		Medium dense		128.5	SS-29	4	6	5	11	
	-70.0									
135.0		Very stiff, moist, bluish green, SANDY LEAN CLAY (CL, A-6(9)), LL=35 PL=18 PI=17 NMC=23.6 %#200=64.1		133.5	SS-30	7	8	9	17	
	-75.0									
140.0		Medium dense, moist, gray and bluish green, fine grained, SILTY SAND (SM)		138.5	SS-31	10	9	9	18	
	-80.0									
145.0		Medium dense, moist, gray and bluish green, fine grained, SILTY SAND (SM, A-4(0)), LL=NP PL=NP PI=NP NMC=25.6 %#200=46.1		143.5	SS-32	8	7	14	21	
	-85.0									
150.0		Medium dense		148.5	SS-33	12	14	15	29	

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-28	**Boring Location:**	26+47.0	**Offset:**	RT 98.9	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	63.1 ft.	**Northing:**	239326.26	**Easting:**	1839225.84	**Date Started:**	5/31/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/1/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	42.5 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	● SPT N VALUE (blows / foot) PL MC LL ▲ FINES CONTENT (%) ▲ 10 20 30 40 50 60 70 80 90
		Boring Terminated at 150.0 feet.								

LEGEND

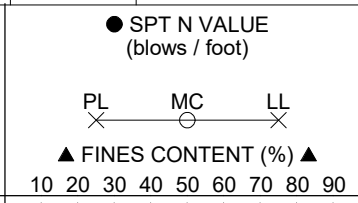
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-29	**Boring Location:**	21+12.1	**Offset:**	RT 4.5	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	20.0 ft.	**Northing:**	238818.9	**Easting:**	1839031.98	**Date Started:**	6/3/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/4/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**		AASHTO T206 & T207			
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	5.6 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)
0.0	20.0	Approximately 4 inches of topsoil. Medium dense, dry, brown and red, fine to medium grained, with trace gravel and organics, CLAYEY SAND (SC), FILL		0.0	SS-1	7	8	9	17
				1.5	SS-2	6	5	8	13
		Medium dense, moist, red, fine to medium grained, CLAYEY SAND (SC, A-2-4(0)), FILL, LL=21 PL=12 PI=9 NMC=13.5 %#200=25.6		3.0	SS-3	3	2	3	5
5.0	15.0	Firm, moist, tan and brown, with trace gravel, FAT CLAY with SAND (CH, A-7-6(32)), FILL, LL=55 PL=17 PI=38 NMC=28.6 %#200=81.8		4.5	SS-4	2	1	2	3
				6.0	SS-5	2	1	3	4
		Very loose, wet, reddish brown, fine grained, CLAYEY SAND with GRAVEL (SC, A-6(3)), FILL, LL=37 PL=13 PI=24 NMC=45.9 %#200=36.5		8.5	T-1				
10.0	10.0	Firm, moist, tan and brown, with few sand, LEAN CLAY (CL), FILL Undisturbed sample obtained from 8.5 to 10.0 feet. Approximately 24 inches of recovery. Moist, pale brown, with few sand, LEAN CLAY (CL, A-7-6(25)), FILL, LL=44 PL=16 PI=28 NMC=37.8 %#200=87.8		13.5	SS-6	4	4	4	8
15.0	5.0	Loose, moist, yellow, fine grained, POORLY GRADED SAND with SILT (SP-SM)		18.5	SS-7	6	5	6	11
20.0	0.0	Medium dense, moist, yellow, fine grained, POORLY GRADED SAND with SILT (SP-SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=26.4 %#200=10.7							
25.0	-5.0	Very loose		23.5	SS-8	5	2	2	4
30.0		Very loose, moist, yellow, fine grained, SILTY, CLAYEY SAND (SC-SM, A-2-4(0)), LL=25 PL=18		28.5	SS-9	2	2	2	4



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-29	**Boring Location:**	21+12.1	**Offset:**	RT 4.5	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	20.0 ft.	**Northing:**	238818.9	**Easting:**	1839031.98	**Date Started:**	6/3/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/4/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	5.6 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	SPT N VALUE (blows / foot) PL MC LL ▲ FINES CONTENT (%) ▲ 10 20 30 40 50 60 70 80 90
30.0	-10.0	PI=7 NMC=27.6 %#200=33.2								
		Very loose, gray		33.5	SS-10	1	1	2	3	●
35.0	-15.0									
		Firm, moist, gray, LEAN CLAY with SAND (CL, A-7-6(17)), LL=43 PL=16 PI=27 NMC=28.4 %#200=70.7		38.5	SS-11	3	3	5	8	● ×—○—× ▲
40.0	-20.0									
		Stiff		43.5	SS-12	3	4	5	9	●
45.0	-25.0									
		Very loose, moist, gray, fine grained, CLAYEY SAND (SC, A-6(2)), LL=29 PL=16 PI=13 NMC=26.5 %#200=43.1		48.5	SS-13	2	2	2	4	● ×—○— ▲
50.0	-30.0									
		Loose		53.5	SS-14	3	3	4	7	●
55.0	-35.0									
		Loose, moist, gray, fine grained, CLAYEY SAND (SC, A-6(4)), LL=32 PL=14 PI=18 NMC=26.3 %#200=44.5		58.5	SS-15	3	3	3	6	● ×—○—× ▲
60.0										

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-29	**Boring Location:**	21+12.1	**Offset:**	RT 4.5	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	20.0 ft.	**Northing:**	238818.9	**Easting:**	1839031.98	**Date Started:**	6/3/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/4/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**		AASHTO T206 & T207			
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	5.6 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	● SPT N VALUE (blows / foot); PL MC LL; ▲ FINES CONTENT (%) ▲ 10 20 30 40 50 60 70 80 90
60.0	-40.0									
65.0	-45.0	Medium dense		63.5	SS-16	5	5	7	12	●
70.0	-50.0	Medium dense, moist, gray, fine grained, CLAYEY SAND (SC, A-6(2)), LL=31 PL=16 PI=15 NMC=23.0 %#200=40.7		68.5	SS-17	4	5	7	12	● × ○ × ▲
75.0	-55.0	Medium dense, moist, gray, fine grained, SILTY, CLAYEY SAND (SC-SM)		73.5	SS-18	4	7	7	14	●
80.0	-60.0	Medium dense, moist, gray, fine grained, SILTY, CLAYEY SAND (SC-SM, A-2-4(0)), LL=26 PL=19 PI=7 NMC=24.9 %#200=29.2		78.5	SS-19	5	6	7	13	● × ⊗ ▲
85.0	-65.0	Medium dense		83.5	SS-20	4	6	8	14	●
90.0		Medium dense, moist, gray, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP		88.5	SS-21	10	12	11	23 ×	● ◭

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

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RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-29	**Boring Location:**	21+12.1	**Offset:**	RT 4.5	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	20.0 ft.	**Northing:**	238818.9	**Easting:**	1839031.98	**Date Started:**	6/3/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/4/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	5.6 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	SPT N VALUE (blows / foot) PL MC LL ▲ FINES CONTENT (%) ▲ 10 20 30 40 50 60 70 80 90
90.0	-70.0	NMC=32.2 %#200=31.7								
95.0	-75.0	Very stiff, moist, gray, SANDY LEAN CLAY (CL)		93.5	SS-22	6	9	9	18	
100.0	-80.0	Stiff, moist, gray, SANDY LEAN CLAY (CL, A-6(6)), LL=32 PL=14 PI=18 NMC=27.4 %#200=54.0		98.5	SS-23	6	6	9	15	
105.0	-85.0	Very stiff		103.5	SS-24	7	10	8	18	
110.0	-90.0	Medium dense, moist, gray, fine grained, SILTY, CLAYEY SAND (SC-SM)		108.5	SS-25	8	9	11	20	
115.0	-95.0	Medium dense, moist, gray, fine grained, SILTY, CLAYEY SAND (SC-SM, A-2-4(0)), LL=25 PL=18 PI=7 NMC=26.6 %#200=33.1		113.5	SS-26	6	6	6	12	
120.0		Medium dense, moist, gray, fine grained, SILTY, CLAYEY SAND (SC-SM, A-4(1)), LL=26 PL=19 PI=7		118.5	SS-27	7	8	10	18	

LEGEND

SAMPLER TYPE

SS - Split Spoon
T - Shelby Tube
DCP - Dynamic Cone Penetrometer
AC - Auger Cuttings
GB - Grab Bag
NQ - Rock Core

DRILLING METHOD

HSA - Hollow Stem Augers
SSA - Solid Stem Augers
HA - Hand Auger
MR - Mud Rotary Wash
RC - Rock Coring

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RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-29	**Boring Location:**	21+12.1	**Offset:**	RT 4.5	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	20.0 ft.	**Northing:**	238818.9	**Easting:**	1839031.98	**Date Started:**	6/3/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/4/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**		AASHTO T206 & T207			
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	5.6 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	SPT N VALUE (blows / foot) PL MC LL ▲ FINES CONTENT (%) ▲ 10 20 30 40 50 60 70 80 90
120.0	-100.0	NMC=25.5 %#200=49.6								
		Stiff, moist, gray, SANDY LEAN CLAY (CL)		123.5	SS-28	4	4	9	13	
125.0	-105.0									
		Very stiff		128.5	SS-29	7	7	10	17	
130.0	-110.0									
		Hard, moist, gray and bluish green, SANDY LEAN CLAY (CL, A-6(11)), LL=40 PL=21 PI=19 NMC=24.3 %#200=65.9		133.5	SS-30	10	14	40	54	
135.0	-115.0									
		Hard		138.5	SS-31	14	16	19	35	
140.0	-120.0									
		Hard		143.5	SS-32	21	23	22	45	
145.0	-125.0									
		Dense, moist, gray and bluish gray, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP		148.5	SS-33	16	25	25	50	
150.0										

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

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RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-29	**Boring Location:**	21+12.1	**Offset:**	RT 4.5	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	20.0 ft.	**Northing:**	238818.9	**Easting:**	1839031.98	**Date Started:**	6/3/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/4/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	5.6 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	● SPT N VALUE (blows / foot) PL MC LL ▲ FINES CONTENT (%) ▲ 10 20 30 40 50 60 70 80 90
		NMC=26.8 %#200=25.3 Boring Terminated at 150.0 feet.								

LEGEND

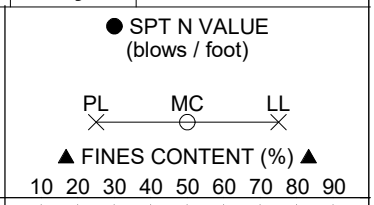
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-30	**Boring Location:**	19+60.0	**Offset:**	LT 132.7	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	22.5 ft.	**Northing:**	238695.53	**Easting:**	1838868.43	**Date Started:**	6/6/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/7/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** 18.0 ft.	**Delayed:**	16.1 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)
0.0	22.5	Approximately 12 inches of topsoil. Loose, moist, brown, fine grained, with trace organics, SILTY SAND (SM, A-2-4(0)), FILL, LL=NP PL=NP PI=NP NMC=14.2 %#200=29.7		0.0	SS-1	2	2	3	5
	20.0	Loose, moist, red, fine to medium grained, with trace gravel and trace organics, CLAYEY SAND (SC, A-2-4(0)), FILL, LL=21 PL=11 PI=10 NMC=10.2 %#200=31.5		1.5	SS-2	3	3	5	8
5.0		Very loose, moist, red, fine grained, CLAYEY SAND (SC, A-6(3)), FILL, LL=26 PL=12 PI=14 NMC=21.5 %#200=49.6		3.0	SS-3	2	1	1	2
	15.0	Very soft, wet, red, brown and tan, with trace gravel, SANDY LEAN CLAY (CL, A-6(4)), FILL, LL=28 PL=13 PI=15 NMC=27.4 %#200=51.2		4.5	SS-4	1	1	1	2
		Very soft, moist, reddish brown		6.0	SS-5	6	1	1	2
10.0		Firm, moist, red, brown and tan, LEAN CLAY with SAND (CL, A-7-6(26)), FILL, LL=46 PL=14 PI=32 NMC=29.0 %#200=82.8		8.5	SS-6	2	2	3	5
	10.0								
		Undisturbed sample obtained from 13.5 to 15.5 feet. Approximately 24 inches of recovery. Wet, brown and gray, with few sand, FAT CLAY (CH, A-7-6(36)), LL=57 PL=19 PI=38 NMC=55.5 %#200=87.7		13.5	T-1				
15.0									
	5.0			18.5	SS-7	10	9	11	20
20.0		Medium dense, moist, yellow, fine to medium grained, POORLY GRADED SAND with SILT (SP-SM, A-3(0)), LL=NP PL=NP PI=NP NMC=19.9 %#200=5.9							
	0.0			23.5	SS-8	10	8	8	16
25.0		Medium dense, moist, yellow, fine to medium grained, SILTY, CLAYEY SAND (SC-SM, A-2-4(0)), LL=20 PL=15 PI=5 NMC=24.9 %#200=17.1							
	-5.0			28.5	SS-9	3	3	3	6
30.0		Loose, moist, yellow, tan, and red, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP							



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-30	**Boring Location:**	19+60.0	**Offset:**	LT 132.7	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	22.5 ft.	**Northing:**	238695.53	**Easting:**	1838868.43	**Date Started:**	6/6/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/7/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**		AASHTO T206 & T207			
Drill Machine:	D50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** 18.0 ft.	**Delayed:**	16.1 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	SPT N VALUE (blows / foot) / PL MC LL / FINES CONTENT (%) 10 20 30 40 50 60 70 80 90
30.0		NMC=25.7 %#200=28.6								
	-10.0									
35.0		Undisturbed sample obtained from 33.5 to 35.5 feet. Approximately 14 inches of recovery. Loose, wet, brown and gray, fine grained, SILTY, CLAYEY SAND (SC-SM, A-2-4(0)), LL=25 PL=21 PI=4 NMC=29.1 %#200=33.0		33.5	T-2					
	-15.0									
40.0		Firm, moist, gray and tan, SANDY FAT CLAY (CH, A-7-6(21)), LL=51 PL=17 PI=34 NMC=26.9 %#200=67.7		38.5	SS-10	2	2	5	7	
	-20.0									
45.0		Firm, moist, gray, SANDY LEAN CLAY (CL, A-6(4)), LL=33 PL=21 PI=12 NMC=27.4 %#200=53.3		43.5	SS-11	3	3	4	7	
	-25.0									
50.0		Firm, moist, gray, SANDY LEAN CLAY (CL, A-6(4)), LL=31 PL=20 PI=11 NMC=27.3 %#200=59.8		48.5	SS-12	3	3	4	7	
	-30.0									
55.0		Stiff		53.5	SS-13	4	4	5	9	
	-35.0									
60.0		Firm, moist, gray, SANDY LEAN CLAY (CL, A-6(4)), LL=30 PL=16 PI=14 NMC=23.7 %#200=50.9		58.5	SS-14	3	3	5	8	

LEGEND

SAMPLER TYPE

- SS - Split Spoon
- T - Shelby Tube
- DCP - Dynamic Cone Penetrometer
- AC - Auger Cuttings
- GB - Grab Bag
- NQ - Rock Core

DRILLING METHOD

- HSA - Hollow Stem Augers
- SSA - Solid Stem Augers
- HA - Hand Auger
- MR - Mud Rotary Wash
- RC - Rock Coring

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-30	**Boring Location:**	19+60.0	**Offset:**	LT 132.7	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	22.5 ft.	**Northing:**	238695.53	**Easting:**	1838868.43	**Date Started:**	6/6/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/7/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** 18.0 ft.	**Delayed:**	16.1 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	● SPT N VALUE (blows / foot); PL MC LL; ▲ FINES CONTENT (%) 10 20 30 40 50 60 70 80 90
60.0										
	-40.0									
65.0		Stiff		63.5	SS-15	4	5	6	11	●
	-45.0									
70.0		Very stiff		68.5	SS-16	7	8	9	17	●
	-50.0									
75.0		Stiff, moist, gray, SANDY LEAN CLAY (CL, A-6(5)), LL=34 PL=22 PI=12 NMC=28.8 %#200=57.7		73.5	SS-17	5	6	9	15	● ×○× ▲
	-55.0									
80.0		Medium dense, moist, gray, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=31.1 %#200=23.0		78.5	SS-18	6	4	7	11 ×	● ▲ ○
	-60.0									
85.0		Medium dense		83.5	SS-19	5	4	6	10	●
	-65.0									
90.0		Dense, moist, gray, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=23.0		88.5	SS-20	6	16	15	31 ×	▲ ○ ●

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

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RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-30	**Boring Location:**	19+60.0	**Offset:**	LT 132.7	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	22.5 ft.	**Northing:**	238695.53	**Easting:**	1838868.43	**Date Started:**	6/6/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/7/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** 18.0 ft.	**Delayed:**	16.1 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	SPT N VALUE (blows / foot) / PL MC LL / FINES CONTENT (%) 10 20 30 40 50 60 70 80 90
90.0		%#200=16.7								
	-70.0									
		Very dense		93.5	SS-21	20	30	27	57	●
95.0										
	-75.0									
		Medium dense		98.5	SS-22	8	10	14	24	●
100.0										
	-80.0									
		Medium dense, moist, gray, fine grained, SILTY SAND (SM, A-4(0)), LL=NP PL=NP PI=NP NMC=22.9 %#200=42.6		103.5	SS-23	7	12	16	28	○● ▲
105.0										
	-85.0									
		Medium dense		108.5	SS-24	10	11	11	22	●
110.0										
	-90.0									
		Medium dense, moist, gray, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=28.2 %#200=24.6		113.5	SS-25	7	7	7	14	● ▲○
115.0										
	-95.0									
		Medium dense		118.5	SS-26	7	6	10	16	●
120.0										

LEGEND

SAMPLER TYPE

SS - Split Spoon
T - Shelby Tube
DCP - Dynamic Cone Penetrometer
AC - Auger Cuttings
GB - Grab Bag
NQ - Rock Core

DRILLING METHOD

HSA - Hollow Stem Augers
SSA - Solid Stem Augers
HA - Hand Auger
MR - Mud Rotary Wash
RC - Rock Coring

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-30	**Boring Location:**	19+60.0	**Offset:**	LT 132.7	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	22.5 ft.	**Northing:**	238695.53	**Easting:**	1838868.43	**Date Started:**	6/6/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/7/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** 18.0 ft.	**Delayed:**	16.1 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	SPT N VALUE (blows / foot) PL MC LL ▲ FINES CONTENT (%) ▲ 10 20 30 40 50 60 70 80 90
120.0										
125.0	-100.0	Medium dense, moist, gray, fine grained, SILTY SAND (SM, A-4(0)), LL=27 PL=22 PI=5 NMC=37.9 %#200=48.5		123.5	SS-27	7	6	7	13	
130.0	-105.0	Hard, moist, gray and bluish green, with few sand, LEAN CLAY (CL)		128.5	SS-28	14	14	21	35	
135.0	-110.0	Very stiff, moist, bluish green, with few sand, LEAN CLAY (CL, A-6(11)), LL=34 PL=23 PI=11 NMC=29.7 %#200=93.8		133.5	SS-29	10	13	16	29	
140.0	-115.0	Very dense, moist, gray, fine grained, SILTY SAND (SM)		138.5	SS-30	28	37	38	75	
145.0	-120.0	Hard, moist, gray and bluish green, LEAN CLAY with SAND (CL, A-6(9)), LL=35 PL=20 PI=15 NMC=26.6 %#200=70.3		143.5	SS-31	12	14	21	35	
150.0	-125.0	Hard		148.5	SS-32	12	16	31	47	

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

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RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-30	**Boring Location:**	19+60.0	**Offset:**	LT 132.7	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	22.5 ft.	**Northing:**	238695.53	**Easting:**	1838868.43	**Date Started:**	6/6/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	6/7/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** 18.0 ft.	**Delayed:**	16.1 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	● SPT N VALUE (blows / foot) PL MC LL ▲ FINES CONTENT (%) ▲ 10 20 30 40 50 60 70 80 90
		Boring Terminated at 150.0 feet.								

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

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RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-31	**Boring Location:**	19+26.0	**Offset:**	RT 3.0	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	18.9 ft.	**Northing:**	238636.45	**Easting:**	1838995.28	**Date Started:**	5/29/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	5/31/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	16.9 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)
0.0		Approximately 4 inches of topsoil. Very loose, dry, brown, gray, fine to medium grained, CLAYEY SAND with GRAVEL (SC, A-2-6(1)), FILL, LL=29 PL=13 PI=16 NMC=9.5 %#200=25.9		0.0	SS-1	25	2	2	4
				1.5	SS-2	3	8	14	22
	15.0	Medium dense, moist, red and brown, fine to medium grained, with trace gravel, SILTY SAND (SM), FILL		3.0	SS-3	4	8	11	19
5.0		Medium dense, moist, reddish yellow, fine to medium grained, SILTY SAND (SM, A-2-4(0)), FILL, LL=NP PL=NP PI=NP NMC=17.6 %#200=15.0		4.5	SS-4	2	6	11	17
		Medium dense, FILL		6.0	SS-5	2	2	5	7
	10.0	Firm, moist, reddish yellow, with trace sand, FAT CLAY (CH), FILL							
10.0		Undisturbed sample obtained from 8.5 to 10.5 feet. Approximately 24 inches of recovery. Firm, wet, yellowish brown and gray, with trace sand, FAT CLAY (CH, A-7-6(45)), FILL, LL=59 PL=17 PI=42 NMC=26.1 %#200=97.1		8.5	T-1				
	5.0	Soft, moist, reddish yellow, with few sand, LEAN CLAY (CL, A-6(14)), FILL, LL=31 PL=13 PI=18 NMC=34.7 %#200=89.2		13.5	SS-6	2	2	2	4
15.0									
	0.0	Soft		18.5	SS-7	2	2	2	4
20.0									
	-5.0	Undisturbed sample obtained from 23.5 to 25.5 feet. Approximately 24 inches of recovery. Loose, moist, gray, fine grained, SILTY SAND (SM, A-4(0)), LL=NP PL=NP PI=NP NMC=35.5 %#200=42.4		23.5	T-2				
25.0									
	-10.0	Loose		28.5	SS-8	2	3	3	6
30.0									

SPT N VALUE (blows / foot)

PL MC LL

▲ FINES CONTENT (%) ▲

10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE

SS - Split Spoon
T - Shelby Tube
DCP - Dynamic Cone Penetrometer
AC - Auger Cuttings
GB - Grab Bag
NQ - Rock Core

DRILLING METHOD

HSA - Hollow Stem Augers
SSA - Solid Stem Augers
HA - Hand Auger
MR - Mud Rotary Wash
RC - Rock Coring

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RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-31	**Boring Location:**	19+26.0	**Offset:**	RT 3.0	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	18.9 ft.	**Northing:**	238636.45	**Easting:**	1838995.28	**Date Started:**	5/29/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	5/31/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	16.9 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	● SPT N VALUE (blows / foot) PL MC LL ▲ FINES CONTENT (%) ▲ 10 20 30 40 50 60 70 80 90
30.0										
35.0	-15.0	Loose, moist, gray, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=28.5 %#200=29.7		33.5	SS-9	3	4	3	7	
40.0	-20.0	Undisturbed sample obtained from 28.0 to 30.0 feet. Approximately 24 inches of recovery. Medium dense, moist, bluish green and brown, fine grained, SILTY SAND (SM, A-4(0)), LL=NP PL=NP PI=NP NMC=21.6 %#200=49.6		38.0	T-3					
45.0	-25.0	Loose, moist, gray, fine grained, CLAYEY SAND (SC)		43.5	SS-10	3	3	5	8	
50.0	-30.0	Loose, moist, gray, fine grained, CLAYEY SAND (SC, A-4(0)), LL=28 PL=19 PI=9 NMC=27.6 %#200=38.8		48.5	SS-11	3	3	4	7	
55.0	-35.0	Loose		53.5	SS-12	3	4	6	10	
60.0	-40.0	Loose		58.5	SS-13	3	3	5	8	

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-31	**Boring Location:**	19+26.0	**Offset:**	RT 3.0	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	18.9 ft.	**Northing:**	238636.45	**Easting:**	1838995.28	**Date Started:**	5/29/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	5/31/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	16.9 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	SPT N VALUE (blows / foot) PL MC LL ▲ FINES CONTENT (%) ▲ 10 20 30 40 50 60 70 80 90
60.0										
65.0	-45.0	Loose		63.5	SS-14	3	3	4	7	●
70.0	-50.0	Medium dense, moist, gray, fine grained, SILTY SAND (SM, A-4(0)), LL=NP PL=NP PI=NP NMC=24.6 %#200=40.6		68.5	SS-15	5	7	8	15	● ○ ▲
75.0	-55.0	Medium dense		73.5	SS-16	6	8	9	17	●
80.0	-60.0	Medium dense		78.5	SS-17	5	6	6	12	●
85.0	-65.0	Very stiff, moist, gray, LEAN CLAY with SAND (CL, A-6(10)), LL=32 PL=18 PI=14 NMC=29.1 %#200=81.9		83.5	SS-18	7	9	10	19	● ○ ▲
90.0	-70.0	Medium dense, moist, gray, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP		88.5	SS-19	10	14	15	29	▲ ●

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-31	**Boring Location:**	19+26.0	**Offset:**	RT 3.0	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	18.9 ft.	**Northing:**	238636.45	**Easting:**	1838995.28	**Date Started:**	5/29/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	5/31/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	16.9 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)
90.0		NMC=29.9 %#200=16.7							
	-75.0	Medium dense, gray and bluish green		93.5	SS-20	8	9	12	21
95.0									
	-80.0	Very stiff, moist, bluish green, LEAN CLAY with SAND (CL, A-6(14)), LL=37 PL=15 PI=22 NMC=22.5 %#200=73.9		98.5	SS-21	6	8	11	19
100.0									
	-85.0	Dense, moist, bluish green, fine grained, SILTY SAND (SM)		103.5	SS-22	12	15	19	34
105.0									
	-90.0	Medium dense, moist, bluish green, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=23.5 %#200=36.8		108.5	SS-23	9	11	14	25
110.0									
	-95.0	Very stiff, moist, gray and bluish green, LEAN CLAY with SAND (CL)		113.5	SS-24	6	7	9	16
115.0									
	-100.0	Very stiff		118.5	SS-25	6	8	12	20
120.0									

● SPT N VALUE (blows / foot)

PL MC LL

▲ FINES CONTENT (%) ▲

10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

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RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-31	**Boring Location:**	19+26.0	**Offset:**	RT 3.0	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	18.9 ft.	**Northing:**	238636.45	**Easting:**	1838995.28	**Date Started:**	5/29/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	5/31/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	16.9 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	SPT N VALUE (blows / foot) PL MC LL ▲ FINES CONTENT (%) ▲ 10 20 30 40 50 60 70 80 90
120.0										
125.0	-105.0	Very stiff		123.5	SS-26	6	8	14	22	
130.0	-110.0	Very stiff, moist, gray and bluish green, LEAN CLAY (CL, A-6(12)), LL=37 PL=24 PI=13 NMC=31.0 %#200=89.4		128.5	SS-27	9	12	17	29	
135.0	-115.0	Very dense, moist, gray, fine grained, SILTY SAND (SM)		133.5	SS-28	9	18	34	52	
140.0	-120.0	Hard, moist, gray, LEAN CLAY with SAND (CL)		138.5	SS-29	11	14	17	31	
145.0	-125.0	Very dense, moist, gray, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=26.1 %#200=31.8		143.5	SS-30	19	28	39	67	
150.0	-130.0	Very dense		148.5	SS-31	10	23	32	55	

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-31	**Boring Location:**	19+26.0	**Offset:**	RT 3.0	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	18.9 ft.	**Northing:**	238636.45	**Easting:**	1838995.28	**Date Started:**	5/29/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	5/31/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	16.9 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	● SPT N VALUE (blows / foot) PL MC LL ▲ FINES CONTENT (%) ▲ 10 20 30 40 50 60 70 80 90
		Boring Terminated at 150.0 feet.								

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-32	**Boring Location:**	17+55.7	**Offset:**	RT 76.7	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	33.8 ft.	**Northing:**	238455.26	**Easting:**	1839035.38	**Date Started:**	5/23/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	5/24/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	32.0 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)
0.0	33.8	Approximately 4 inches of topsoil. Loose, moist, reddish brown, fine grained, CLAYEY SAND (SC, A-4(1)), FILL, LL=25 PL=15 PI=10 NMC=5.8 %#200=40.0	0.0	SS-1	12	5	4	9
		Medium dense, with trace gravel, FILL	1.5	SS-2	4	6	24	30
	30.0	Stiff, moist, reddish and yellowish brown, SANDY LEAN CLAY (CL, A-7-6(18)), FILL, LL=48 PL=14 PI=34 NMC=24.1 %#200=62.3	3.0	SS-3	3	5	8	13
5.0		Stiff, moist, reddish brown and gray, SANDY LEAN CLAY (CL, A-6(13)), FILL, LL=37 PL=12 PI=25 NMC=48.6 %#200=66.2	4.5	SS-4	2	3	7	10
		Very stiff, wet, reddish brown and gray, SANDY LEAN CLAY (CL, A-6(3)), FILL, LL=26 PL=15 PI=11 NMC=21.2 %#200=57.2	6.0	SS-5	4	5	14	19
	25.0	Very stiff, brown and gray, FILL	8.5	SS-6	5	9	12	21
10.0								
	20.0	Firm, moist, dark gray, FILL	13.5	SS-7	4	3	5	8
15.0								
	15.0	Very loose, moist, gray, fine grained, SILTY SAND (SM, A-4(0)), LL=NP PL=NP PI=NP NMC=15.2 %#200=45.8	18.5	SS-8	2	1	1	2
20.0								
	10.0	Undisturbed sample obtained from 23.0 to 25.0 feet. Approximately 24 inches of recovery. Medium dense, moist, reddish yellow and gray, fine to medium grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=14.0 %#200=27.4	23.0	T-1				
25.0								
	5.0	Medium dense, moist, fine to medium grained, POORLY GRADED SAND with SILT (SP-SM, A-3(0)),	28.5	SS-9	14	11	15	26
30.0								

SPT N VALUE (blows / foot)

PL MC LL

▲ FINES CONTENT (%) ▲

10 20 30 40 50 60 70 80 90

LEGEND

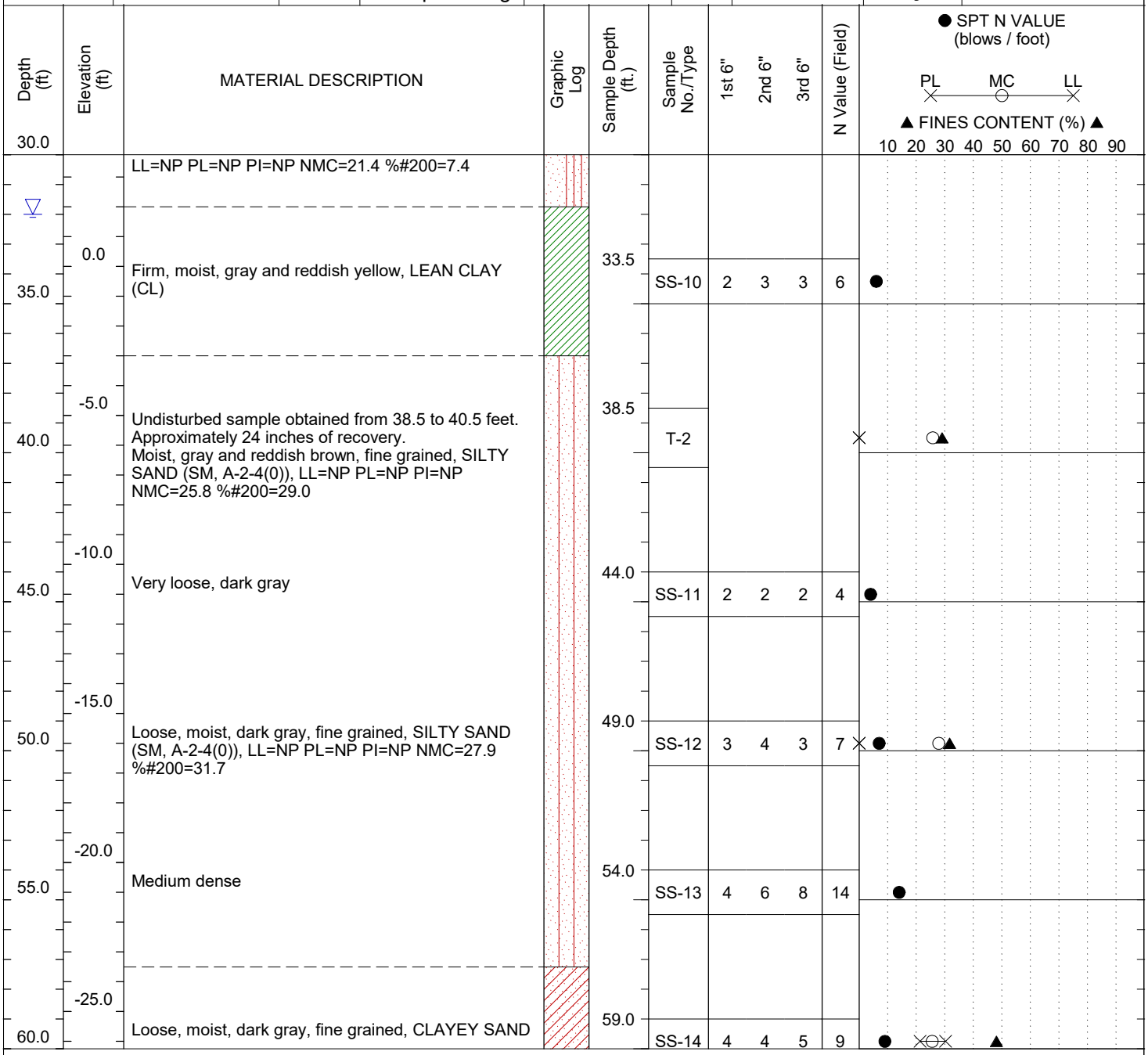
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-32	**Boring Location:**	17+55.7	**Offset:**	RT 76.7	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	33.8 ft.	**Northing:**	238455.26	**Easting:**	1839035.38	**Date Started:**	5/23/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	5/24/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	32.0 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)
30.0		LL=NP PL=NP PI=NP NMC=21.4 %#200=7.4						
35.0	0.0	Firm, moist, gray and reddish yellow, LEAN CLAY (CL)	33.5	SS-10	2	3	3	6
40.0	-5.0	Undisturbed sample obtained from 38.5 to 40.5 feet. Approximately 24 inches of recovery. Moist, gray and reddish brown, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=25.8 %#200=29.0	38.5	T-2				
45.0	-10.0	Very loose, dark gray	44.0	SS-11	2	2	2	4
50.0	-15.0	Loose, moist, dark gray, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=27.9 %#200=31.7	49.0	SS-12	3	4	3	7
55.0	-20.0	Medium dense	54.0	SS-13	4	6	8	14
60.0	-25.0	Loose, moist, dark gray, fine grained, CLAYEY SAND	59.0	SS-14	4	4	5	9



LEGEND

SAMPLER TYPE

SS - Split Spoon
T - Shelby Tube
DCP - Dynamic Cone Penetrometer
AC - Auger Cuttings
GB - Grab Bag
NQ - Rock Core

DRILLING METHOD

HSA - Hollow Stem Augers
SSA - Solid Stem Augers
HA - Hand Auger
MR - Mud Rotary Wash
RC - Rock Coring

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-32	**Boring Location:**	17+55.7	**Offset:**	RT 76.7	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	33.8 ft.	**Northing:**	238455.26	**Easting:**	1839035.38	**Date Started:**	5/23/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	5/24/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	32.0 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	● SPT N VALUE (blows / foot) PL MC LL ▲ FINES CONTENT (%) ▲ 10 20 30 40 50 60 70 80 90
60.0		(SC, A-4(2)), LL=30 PL=21 PI=9 NMC=25.6 %#200=48.1								
	-30.0			64.0						
65.0		Loose			SS-15	4	4	5	9	●
	-35.0	Loose		68.0	SS-16	5	5	5	10	●
70.0										
	-40.0	Loose		73.0	SS-17	3	4	6	10	●
75.0										
	-45.0	Medium dense, moist, dark gray, fine grained, SILTY SAND (SM, A-4(0)), LL=NP PL=NP PI=NP NMC=24.1 %#200=43.1		78.0	SS-18	6	7	9	16	● ○ ▲
80.0										
	-50.0	Medium dense, moist, bluish green, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=22.8 %#200=34.5		83.0	SS-19	6	6	10	16	● ○ ▲
85.0										
	-55.0	Medium dense, gray		88.0	SS-20	6	6	6	12	●
90.0										

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

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RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-32	**Boring Location:**	17+55.7	**Offset:**	RT 76.7	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	33.8 ft.	**Northing:**	238455.26	**Easting:**	1839035.38	**Date Started:**	5/23/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	5/24/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	32.0 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)
90.0									
	-60.0	Loose, moist, gray, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=31.0 %#200=23.1		93.0	SS-21	5	4	5	9
95.0									
	-65.0	Dense		98.0	SS-22	6	17	25	42
100.0									
	-70.0	Medium dense		103.0	SS-23	9	8	18	26
105.0									
	-75.0	Very stiff, moist, gray, SANDY LEAN CLAY (CL, A-6(6)), LL=34 PL=17 PI=17 NMC=25.0 %#200=55.2		108.0	SS-24	8	11	16	27
110.0									
	-80.0	Very stiff, bluish green and gray		113.0	SS-25	5	8	10	18
115.0									
	-85.0	Medium dense, moist, gray, fine grained, SILTY SAND (SM)		118.0	SS-26	8	12	12	24
120.0									

● SPT N VALUE (blows / foot)

PL MC LL

▲ FINES CONTENT (%) ▲

10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE

SS - Split Spoon
T - Shelby Tube
DCP - Dynamic Cone Penetrometer
AC - Auger Cuttings
GB - Grab Bag
NQ - Rock Core

DRILLING METHOD

HSA - Hollow Stem Augers
SSA - Solid Stem Augers
HA - Hand Auger
MR - Mud Rotary Wash
RC - Rock Coring

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-32	**Boring Location:**	17+55.7	**Offset:**	RT 76.7	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	33.8 ft.	**Northing:**	238455.26	**Easting:**	1839035.38	**Date Started:**	5/23/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	5/24/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	32.0 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)
120.0									
	-90.0	Medium dense, moist, gray, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=28.1 %#200=26.7		123.0	SS-27	7	7	7	14
125.0									
	-95.0	Medium dense, dark gray		128.0	SS-28	7	5	6	11
130.0									
	-100.0	Medium dense, moist, gray, fine grained, CLAYEY SAND (SC, A-4(1)), LL=30 PL=21 PI=9 NMC=25.8 %#200=46.6		133.0	SS-29	4	6	8	14
135.0									
	-105.0	Medium dense, bluish green and gray		138.0	SS-30	7	10	14	24
140.0									
	-110.0	Very dense		143.0	SS-31	22	26	30	56
145.0									
	-115.0	Hard, moist, bluish green and gray, LEAN CLAY with SAND (CL, A-7-6(18)), LL=41 PL=19 PI=22 NMC=34.0 %#200=82.4		148.0	SS-32	7	15	19	34
150.0									

● SPT N VALUE (blows / foot)

PL MC LL

▲ FINES CONTENT (%) ▲

10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE

SS - Split Spoon
T - Shelby Tube
DCP - Dynamic Cone Penetrometer
AC - Auger Cuttings
GB - Grab Bag
NQ - Rock Core

DRILLING METHOD

HSA - Hollow Stem Augers
SSA - Solid Stem Augers
HA - Hand Auger
MR - Mud Rotary Wash
RC - Rock Coring

thompson ENGINEERING

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway					**County:**	Mobile
Boring No.:	TH-32	**Boring Location:**	17+55.7	**Offset:**	RT 76.7	**Alignment:**	US-98
ALDOT PE No.:	DPI-0030(005)	**TE Project No.:**	15-1101-0228			**Eng./Geo.:**	P.McKissick
Elev.:	33.8 ft.	**Northing:**	238455.26	**Easting:**	1839035.38	**Date Started:**	5/23/2018
Total Depth:	150.0 ft.	**Soil Depth:**	150.0 ft.	**Core Depth:**	0.0 ft.	**Date Completed:**	5/24/2018
Bore Hole Diameter (in):	4-inch	**AASHTO / ASTM Sampling Methods:**	AASHTO T206 & T207				
Drill Machine:	D-50	**Drill Method:**	MR	**Hammer Type:**	Automatic	**Energy Ratio:**	94%
Core Size:	N/A	**Driller:**	Thompson Eng	**Groundwater:**	**TOB** N.O.	**Delayed:**	32.0 ft.

Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	● SPT N VALUE (blows / foot) PL MC LL ▲ FINES CONTENT (%) ▲ 10 20 30 40 50 60 70 80 90
		Boring Terminated at 150.0 feet.								

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
T - Shelby Tube	GB - Grab Bag	SSA - Solid Stem Augers	RC - Rock Coring
DCP - Dynamic Cone Penetrometer	NQ - Rock Core	HA - Hand Auger	

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MRB-Hwy 98 Additional CPT
Daphne, AL

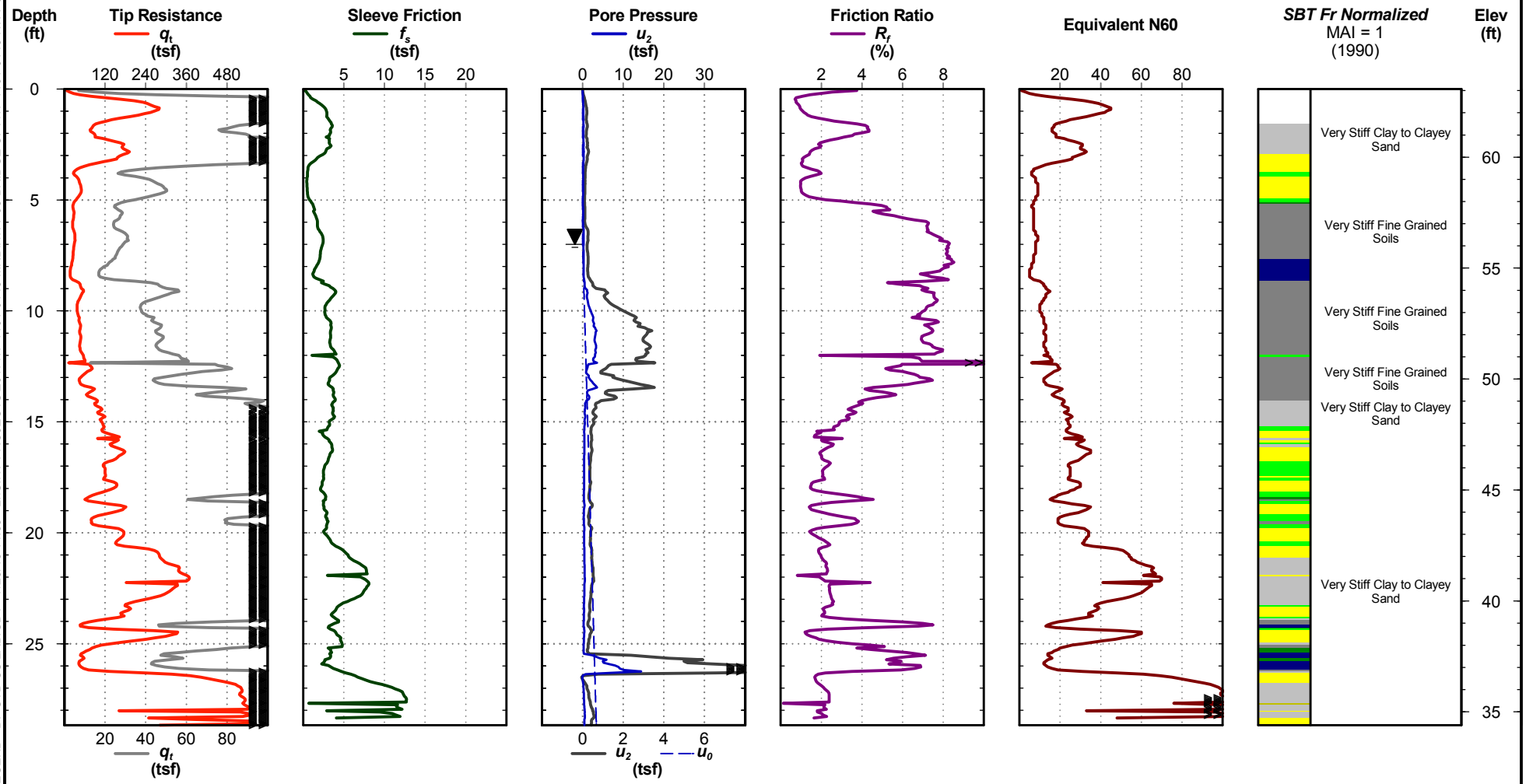
Cone Penetration Test

TC-18

Project #: 15-1101-0228
Date: Jul. 17, 2018

Northing: 239316.5
Easting: 1839217.3

Elevation: 63.07
Filename: CPT-1.cpt



1 - Sensitive, Fine Grained Soils
2 - Organic Soils, Peats
3 - Clays-Clay to Silty Clay
4 - Silt Mixtures-Clay Silt to Silty Clay
5 - Sand Mixtures-Silty Sand to Sandy Silt
6 - Sands-Clean Sand to Silty Sand
7 - Gravelly Sand to Sand
8 - Very Stiff Clay to Clayey Sand
9 - Very Stiff Fine Grained Soils

TC-18

thompson ENGINEERING

MRB-Hwy 98 Additional CPT
Daphne, AL

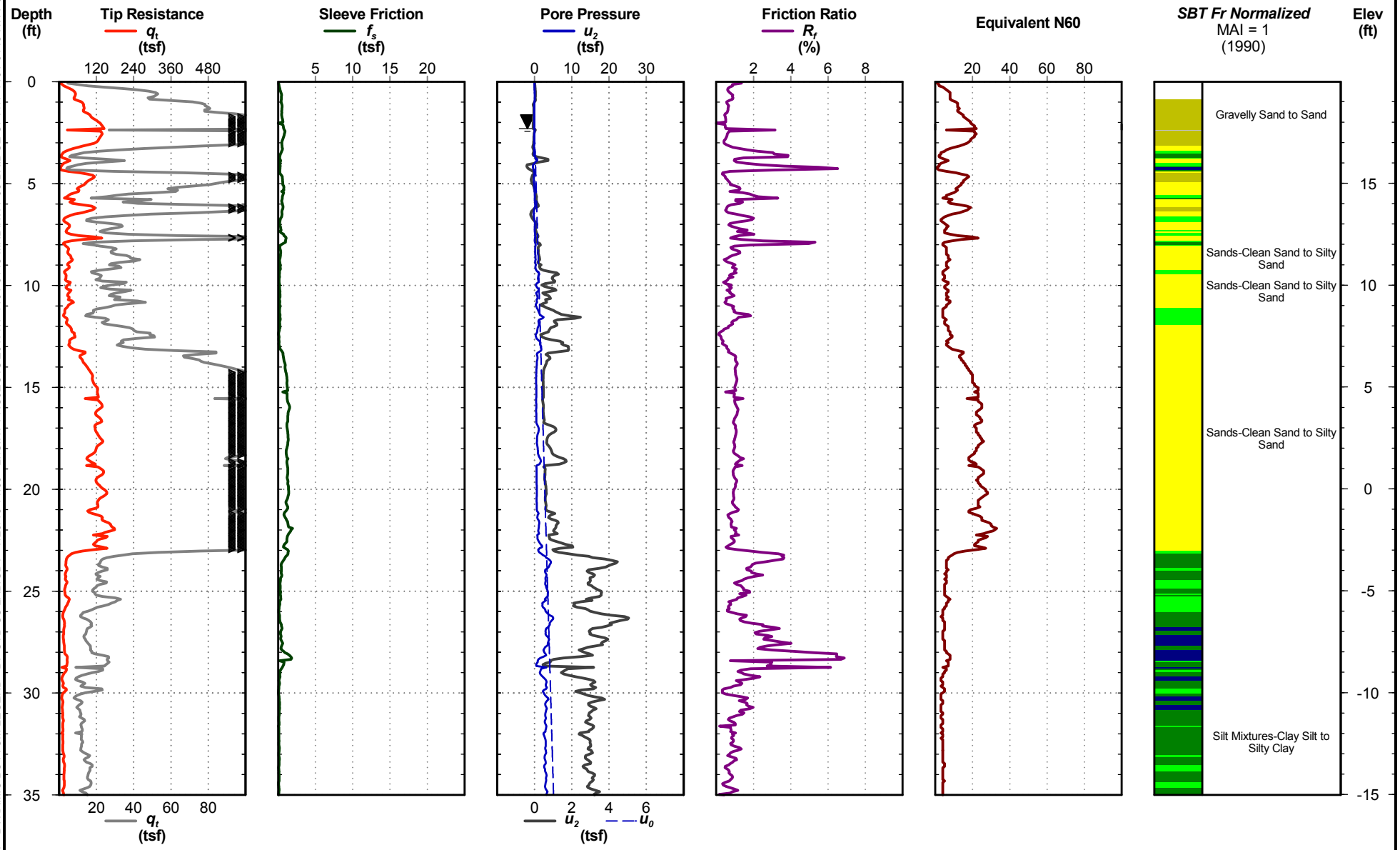
Cone Penetration Test

TC-19

Project #: 15-1101-0228
Date: Jul. 17, 2018

Northing: 238818.6
Easting: 1839027.3

Elevation: 19.98
Filename: CPT-2.cpt



1 - Sensitive, Fine Grained Soils
2 - Organic Soils, Peats
3 - Clays-Clay to Silty Clay
4 - Silt Mixtures-Clay Silt to Silty Clay
5 - Sand Mixtures-Silty Sand to Sandy Silt
6 - Sands-Clean Sand to Silty Sand
7 - Gravelly Sand to Sand
8 - Very Stiff Clay to Clayey Sand
9 - Very Stiff Fine Grained Soils

TC-19

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MRB-Hwy 98 Additional CPT
Daphne, AL

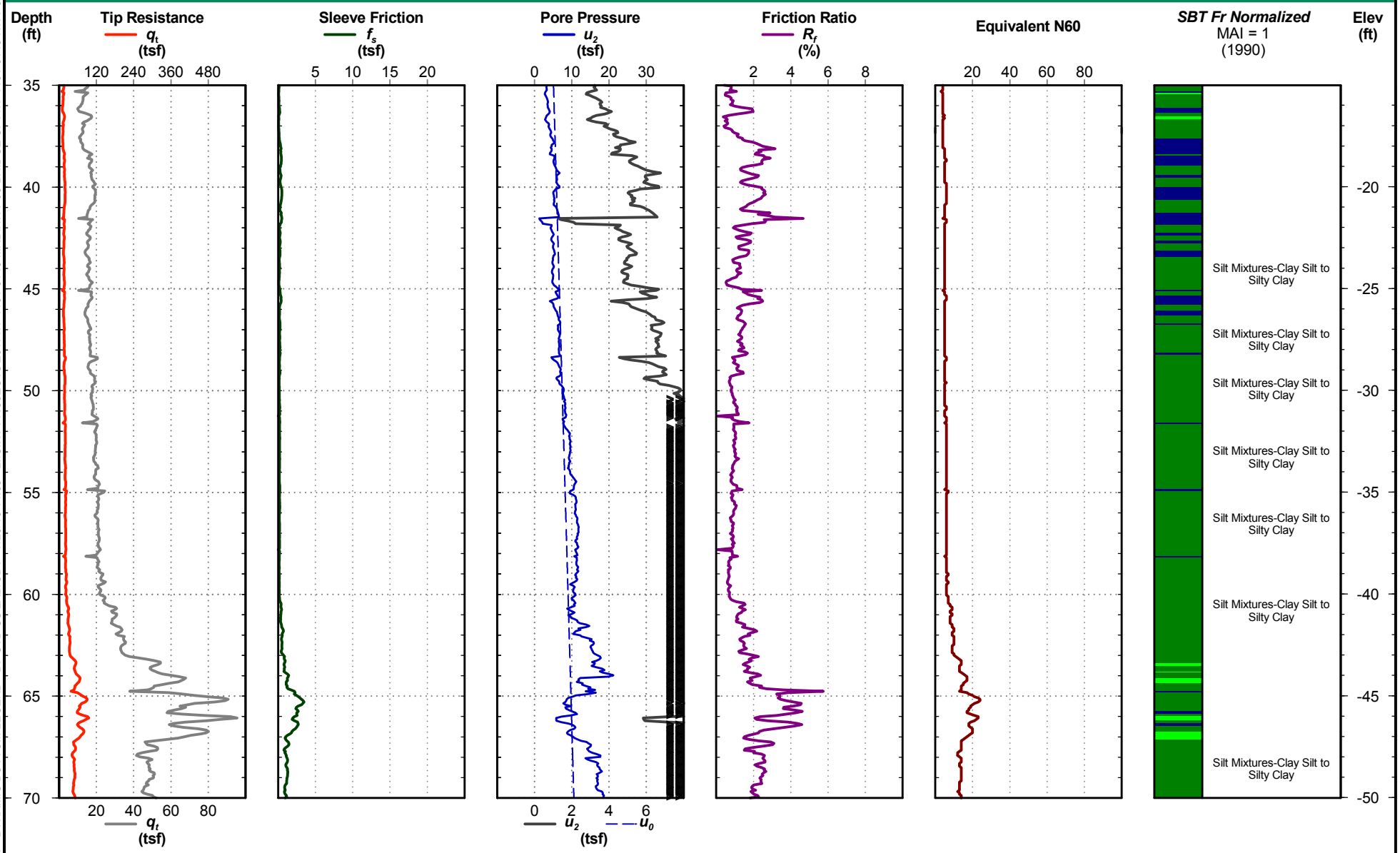
Cone Penetration Test

TC-19

Project #: 15-1101-0228
Date: Jul. 17, 2018

Northing: 238818.6
Easting: 1839027.3

Elevation: 19.98
Filename: CPT-2.cpt



TC-19

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MRB-Hwy 98 Additional CPT
Daphne, AL

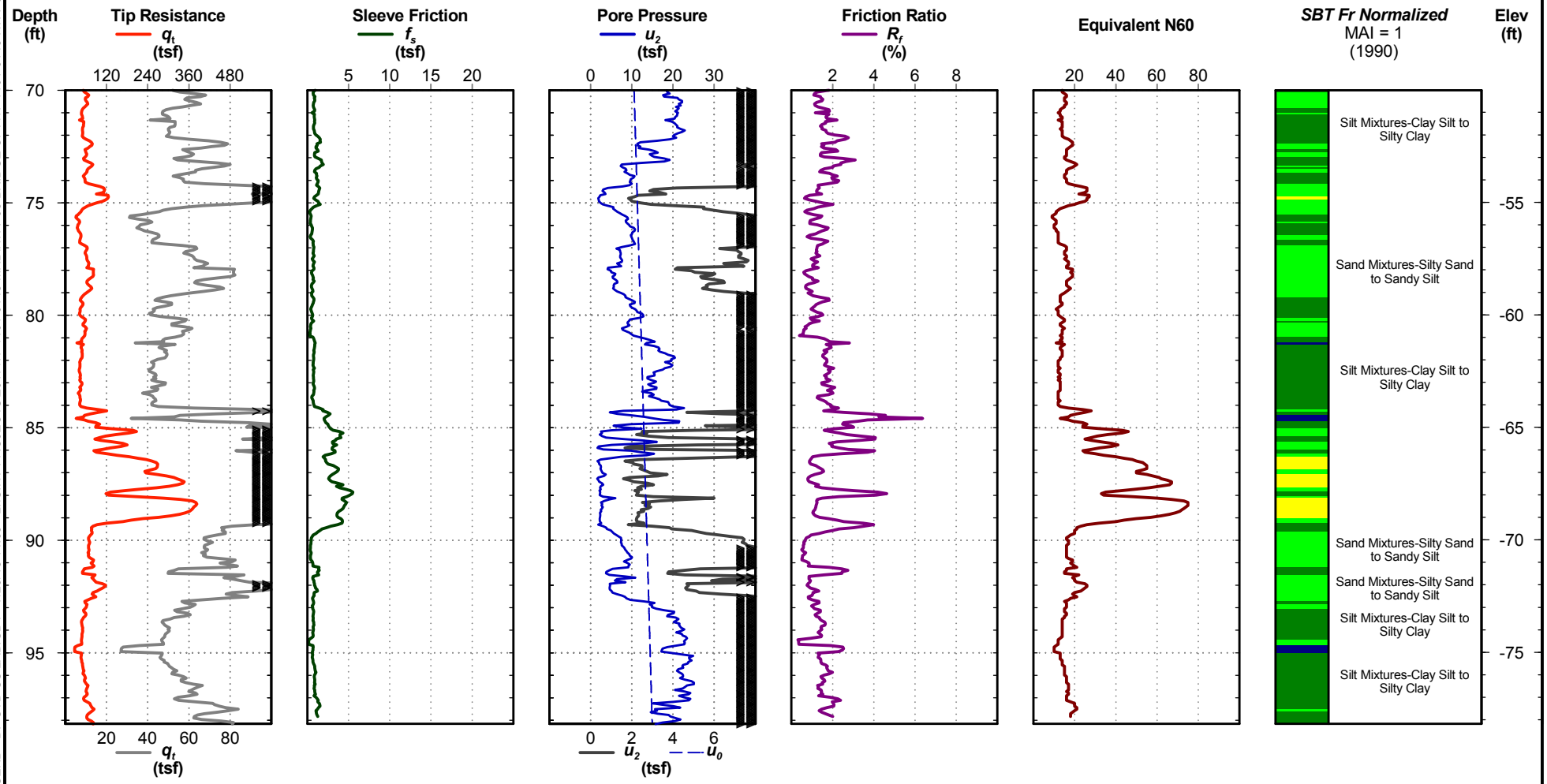
Cone Penetration Test

TC-19

Project #: 15-1101-0228
Date: Jul. 17, 2018

Northing: 238818.6
Easting: 1839027.3

Elevation: 19.98
Filename: CPT-2.cpt



1 - Sensitive, Fine Grained Soils
2 - Organic Soils, Peats
3 - Clays-Clay to Silty Clay
4 - Silt Mixtures-Clay Silt to Silty Clay
5 - Sand Mixtures-Silty Sand to Sandy Silt
6 - Sands-Clean Sand to Silty Sand
7 - Gravelly Sand to Sand
8 - Very Stiff Clay to Clayey Sand
9 - Very Stiff Fine Grained Soils

TC-19

thompson ENGINEERING

MRB-Hwy 98 Additional CPT
Daphne, AL

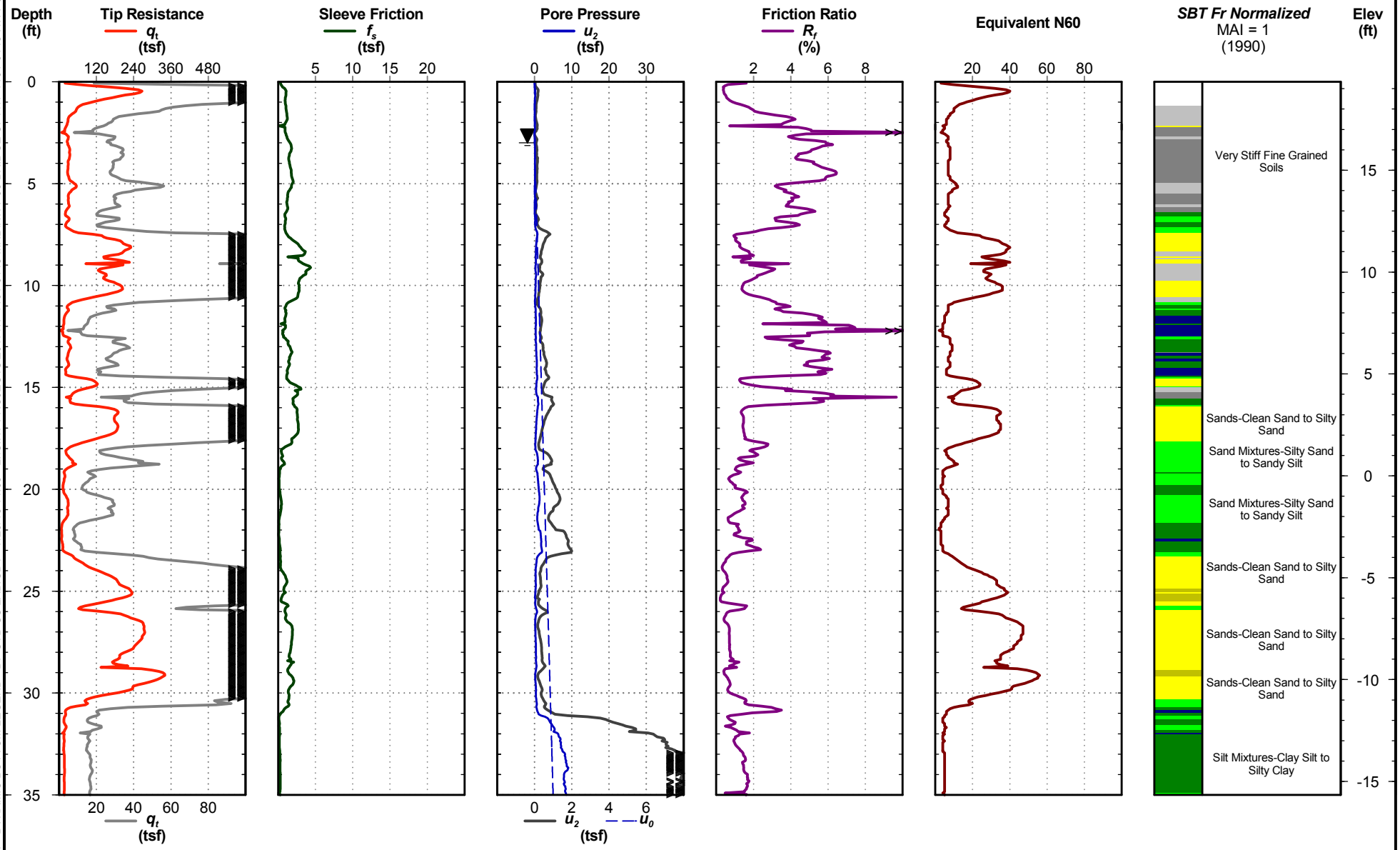
Cone Penetration Test

TC-20

Project #: 15-1101-0228
Date: Jul. 16, 2018

Northing: 238640.5
Easting: 1838999.5

Elevation: 19.34
Filename: CPT-3.cpt



1 - Sensitive, Fine Grained Soils
2 - Organic Soils, Peats
3 - Clays-Clay to Silty Clay
4 - Silt Mixtures-Clay Silt to Silty Clay
5 - Sand Mixtures-Silty Sand to Sandy Silt
6 - Sands-Clean Sand to Silty Sand
7 - Gravelly Sand to Sand
8 - Very Stiff Clay to Clayey Sand
9 - Very Stiff Fine Grained Soils

TC-20

thompson ENGINEERING

MRB-Hwy 98 Additional CPT
Daphne, AL

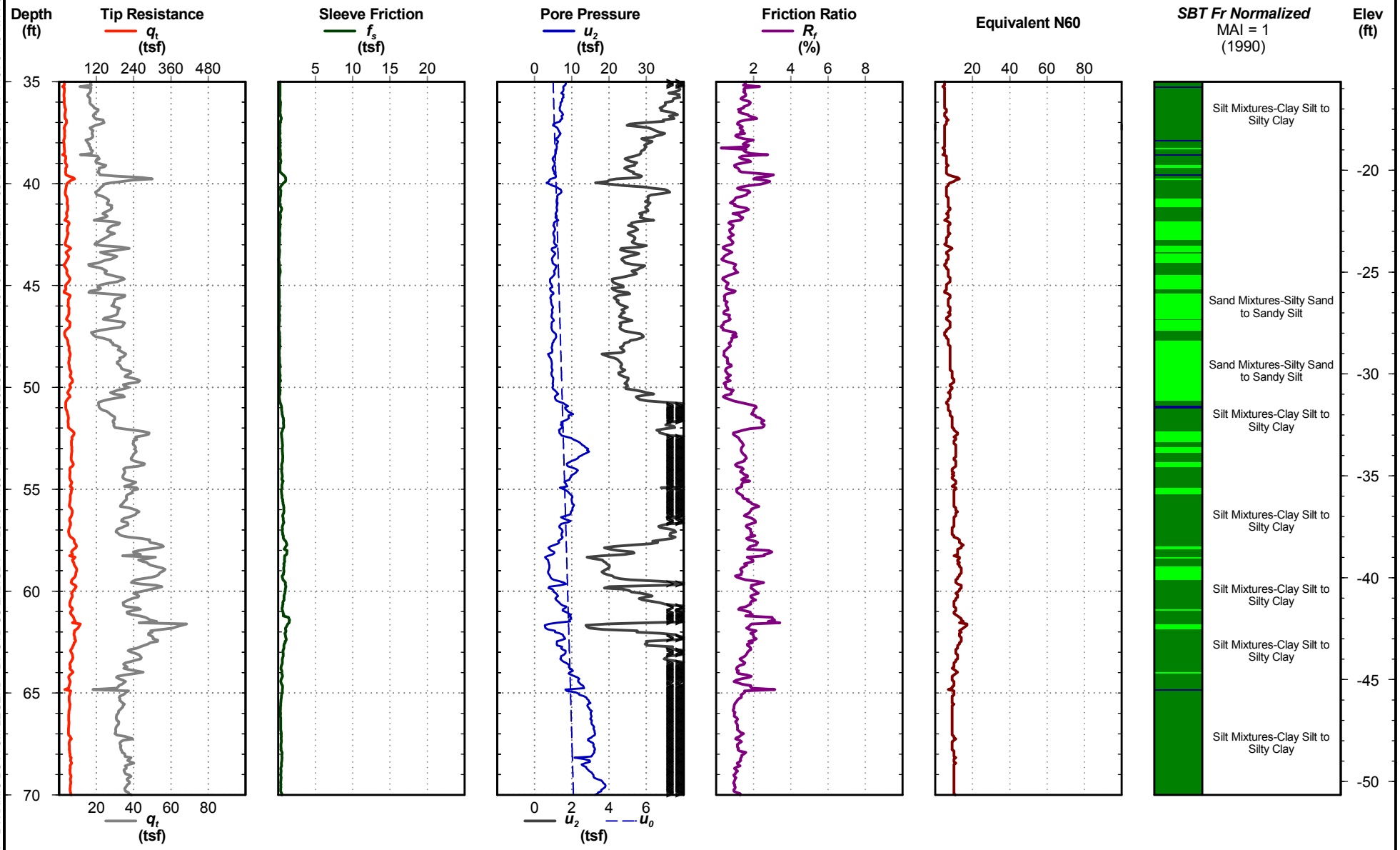
Cone Penetration Test

TC-20

Project #: 15-1101-0228
Date: Jul. 16, 2018

Northing: 238640.5
Easting: 1838999.5

Elevation: 19.34
Filename: CPT-3.cpt



1 - Sensitive, Fine Grained Soils
2 - Organic Soils, Peats
3 - Clays-Clay to Silty Clay
4 - Silt Mixtures-Clay Silt to Silty Clay
5 - Sand Mixtures-Silty Sand to Sandy Silt
6 - Sands-Clean Sand to Silty Sand
7 - Gravelly Sand to Sand
8 - Very Stiff Clay to Clayey Sand
9 - Very Stiff Fine Grained Soils

TC-20

thompson ENGINEERING

MRB-Hwy 98 Additional CPT
Daphne, AL

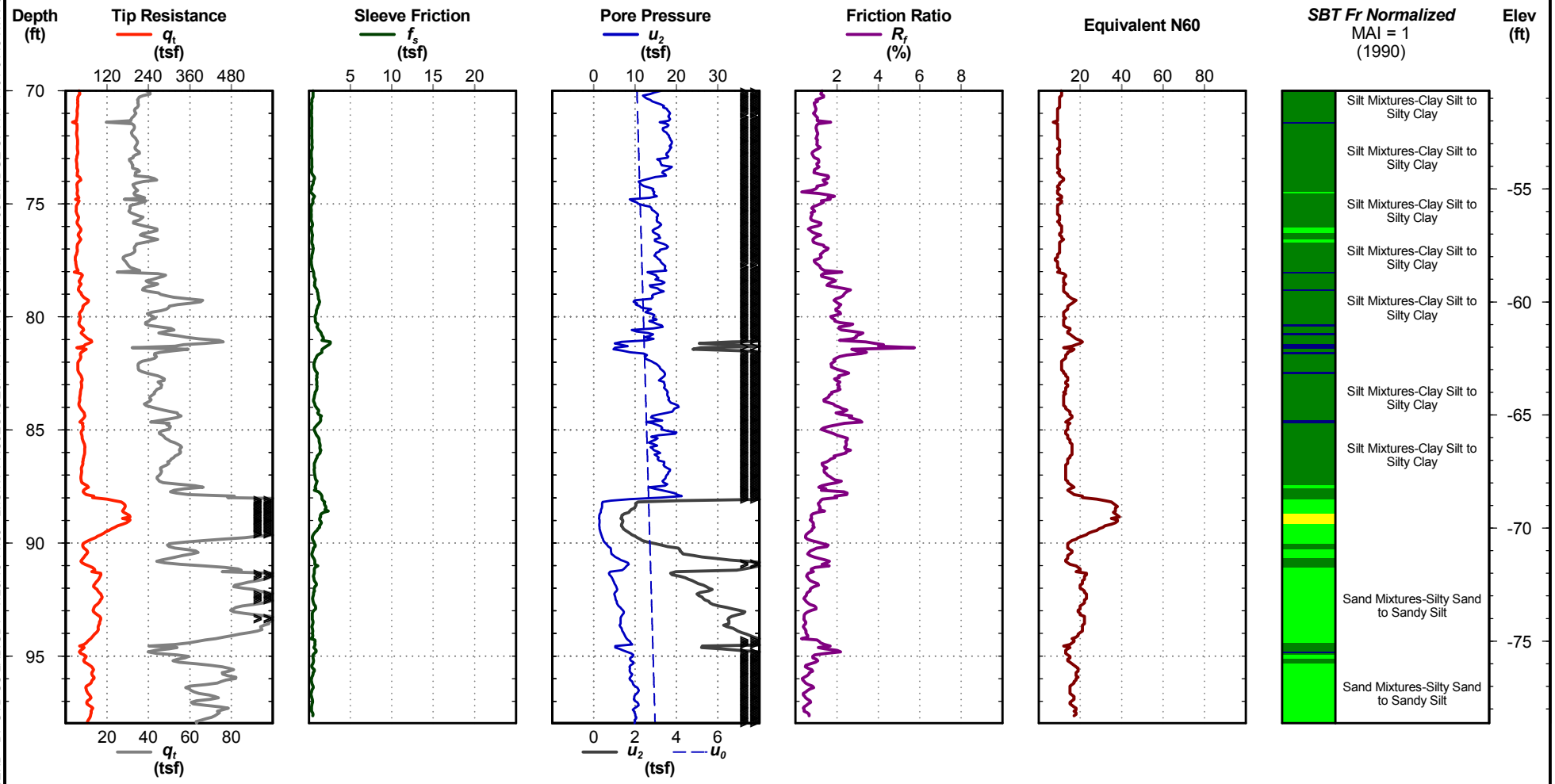
Cone Penetration Test

TC-20

Project #: 15-1101-0228
Date: Jul. 16, 2018

Northing: 238640.5
Easting: 1838999.5

Elevation: 19.34
Filename: CPT-3.cpt



1 - Sensitive, Fine Grained Soils
2 - Organic Soils, Peats
3 - Clays-Clay to Silty Clay
4 - Silt Mixtures-Clay Silt to Silty Clay
5 - Sand Mixtures-Silty Sand to Sandy Silt
6 - Sands-Clean Sand to Silty Sand
7 - Gravelly Sand to Sand
8 - Very Stiff Clay to Clayey Sand
9 - Very Stiff Fine Grained Soils

TC-20

thompson ENGINEERING

MRB-Hwy 98 Additional CPT
Daphne, AL

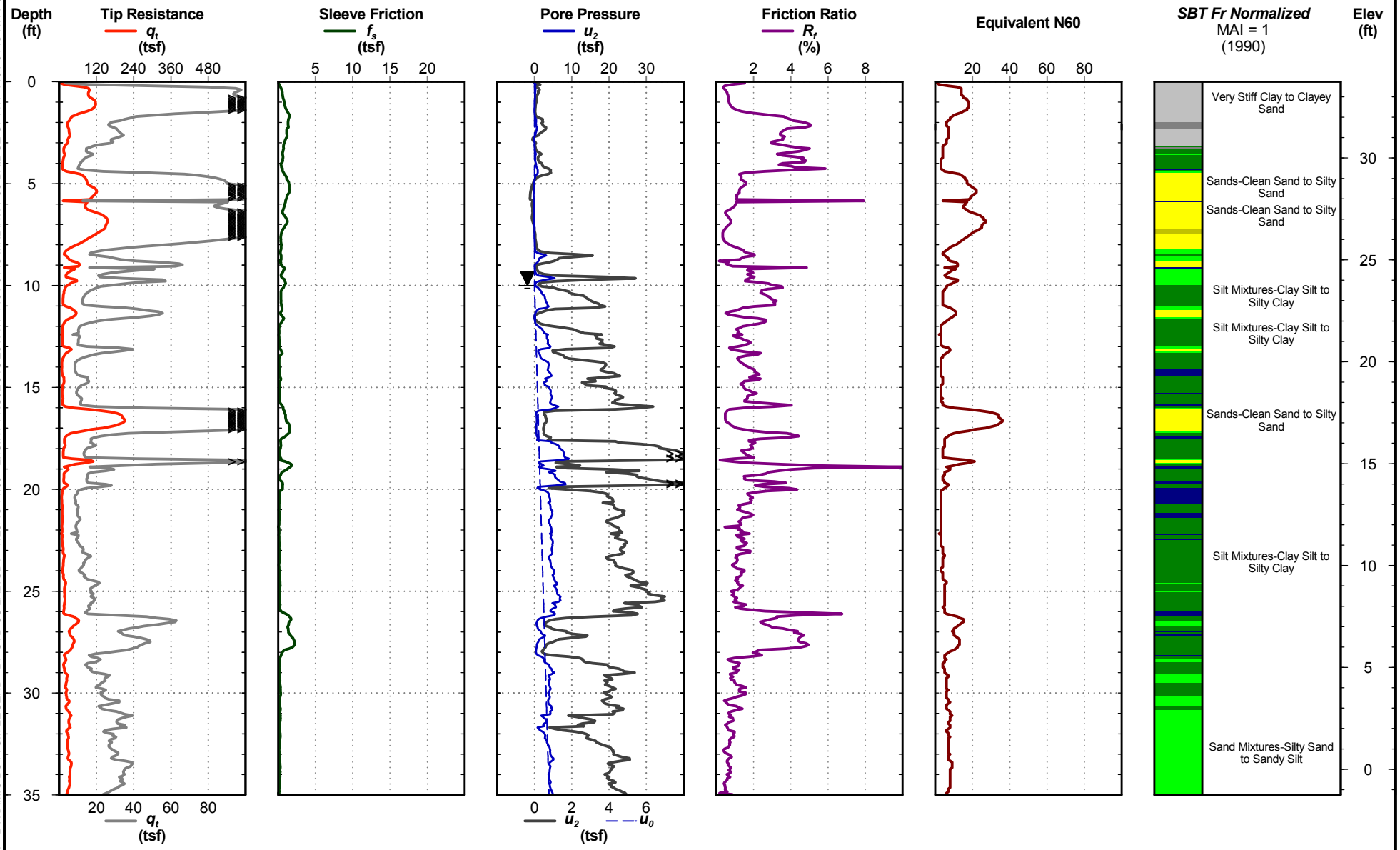
Cone Penetration Test

TC-21

Project #: 15-1101-0228
Date: Jul. 16, 2018

Northing: 238452.2
Easting: 1839032.4

Elevation: 33.74
Filename: CPT-4.cpt



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2 - Organic Soils, Peats
3 - Clays-Clay to Silty Clay
4 - Silt Mixtures-Clay Silt to Silty Clay
5 - Sand Mixtures-Silty Sand to Sandy Silt
6 - Sands-Clean Sand to Silty Sand
7 - Gravelly Sand to Sand
8 - Very Stiff Clay to Clayey Sand
9 - Very Stiff Fine Grained Soils

TC-21

thompson ENGINEERING

MRB-Hwy 98 Additional CPT
Daphne, AL

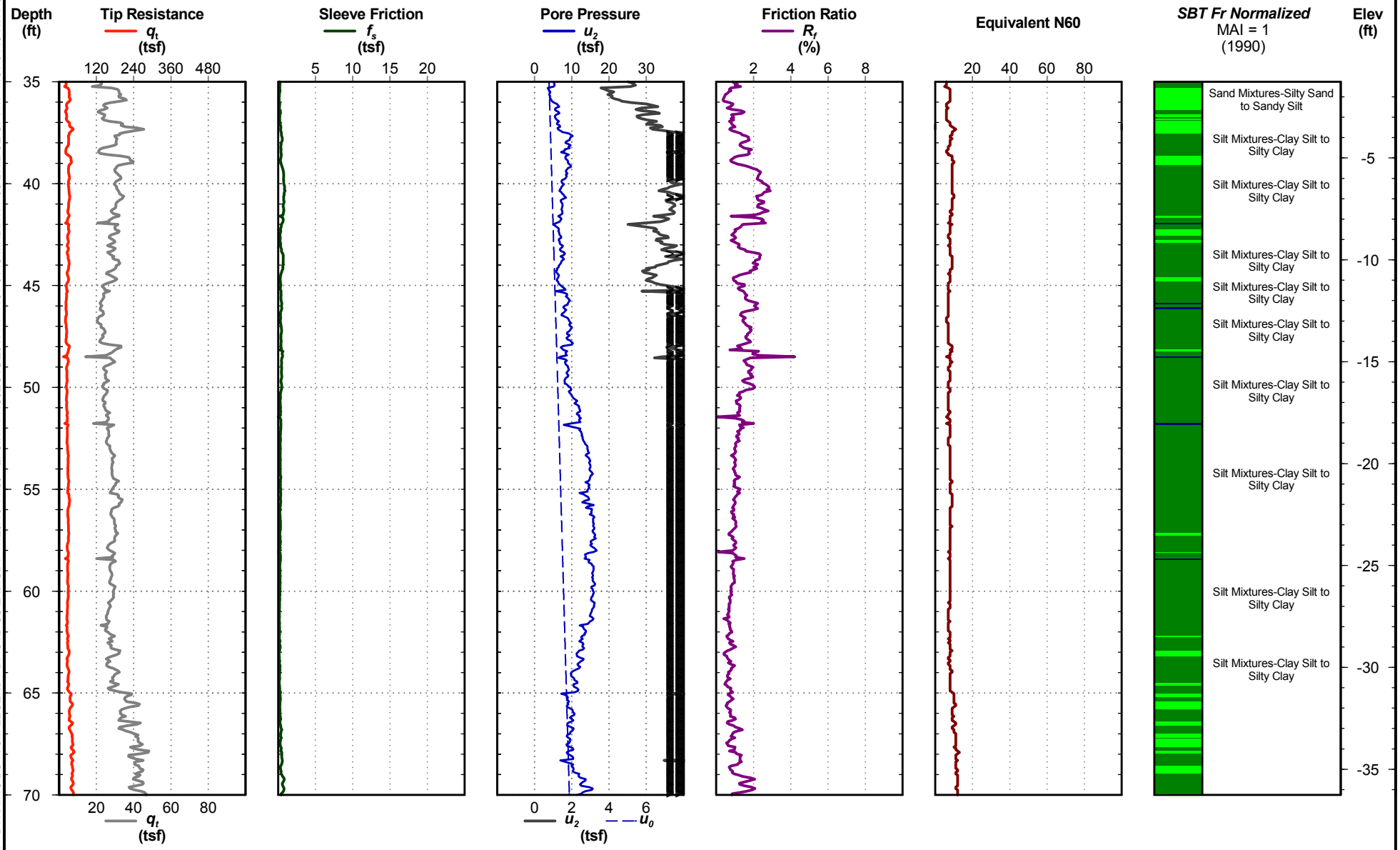
Cone Penetration Test

TC-21

Project #: 15-1101-0228
Date: Jul. 16, 2018

Northing: 238452.2
Easting: 1839032.4

Elevation: 33.74
Filename: CPT-4.cpt



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2 - Organic Soils, Peats
3 - Clays-Clay to Silty Clay
4 - Silt Mixtures-Clay Silt to Silty Clay
5 - Sand Mixtures-Silty Sand to Sandy Silt
6 - Sands-Clean Sand to Silty Sand
7 - Gravelly Sand to Sand
8 - Very Stiff Clay to Clayey Sand
9 - Very Stiff Fine Grained Soils

TC-21

thompson ENGINEERING

MRB-Hwy 98 Additional CPT
Daphne, AL

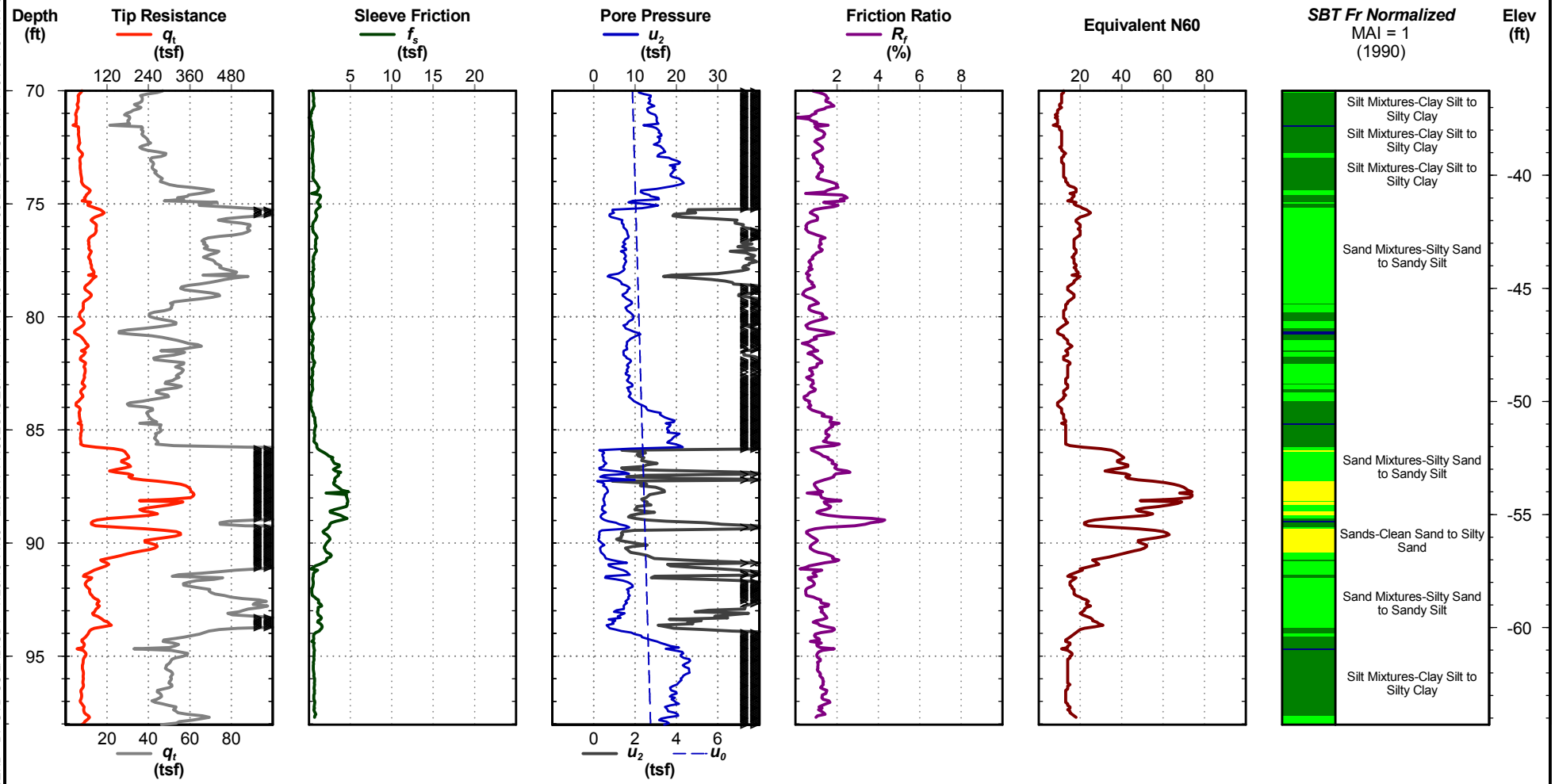
Cone Penetration Test

TC-21

Project #: 15-1101-0228
Date: Jul. 16, 2018

Northing: 238452.2
Easting: 1839032.4

Elevation: 33.74
Filename: CPT-4.cpt



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6 - Sands-Clean Sand to Silty Sand
7 - Gravelly Sand to Sand
8 - Very Stiff Clay to Clayey Sand
9 - Very Stiff Fine Grained Soils

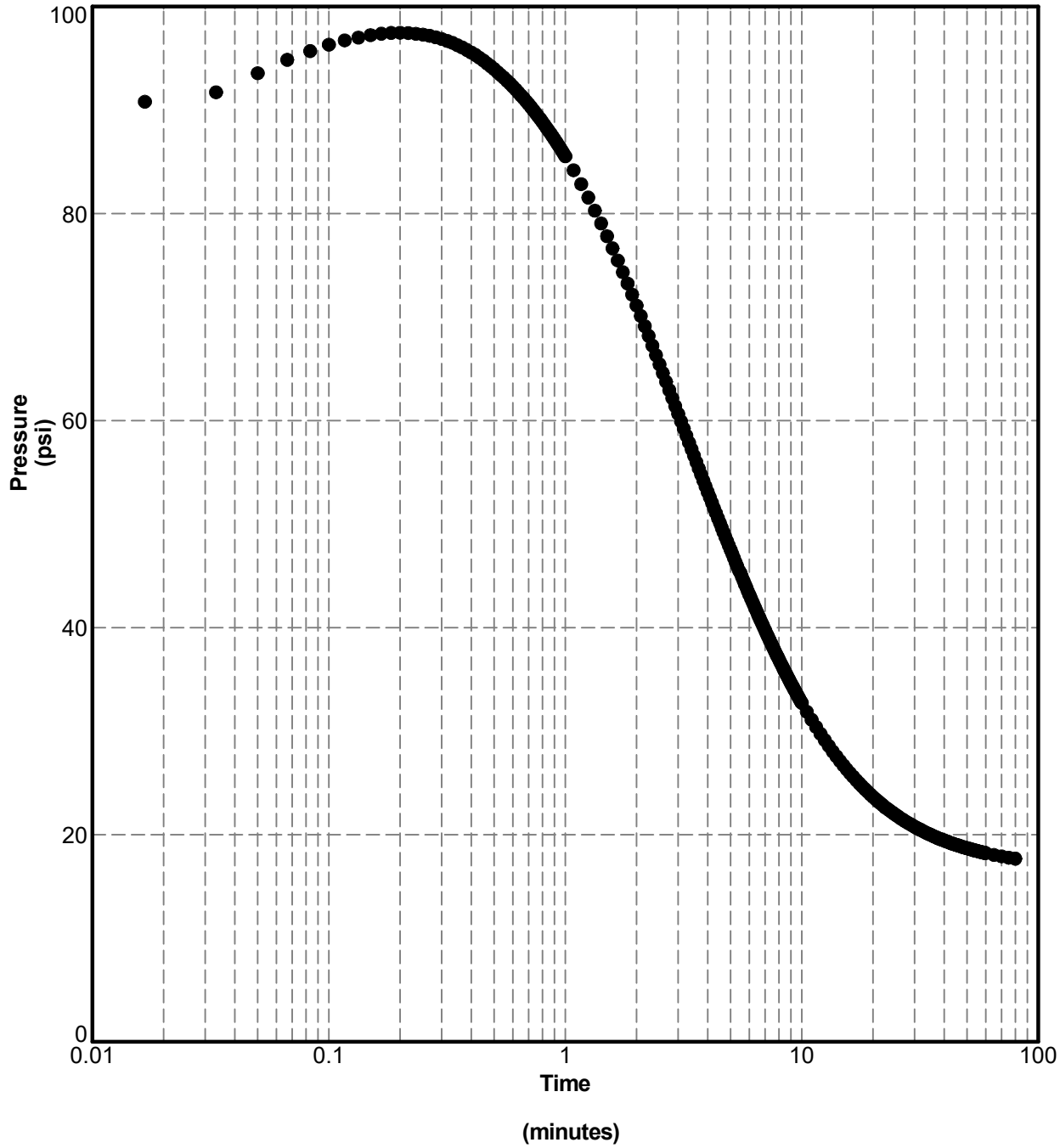
TC-21

thompson ENGINEERING

MRB-Hwy 98 Additional CPT
Daphne, AL
Project Number :15-1101-0228

Pore Pressure Dissipation

Date:	Jul. 17, 2018	**Northing:**	238818.6	**Total Depth:**	98.2 ft
Estimated Water Depth:	2.3 ft	**Easting:**	1839027.3	**Termination Criteria:**	
Rig/Operator:	Chris Rea	**Elevation:**	20.0	**Test Depth:**	41.5 ft



TC-19

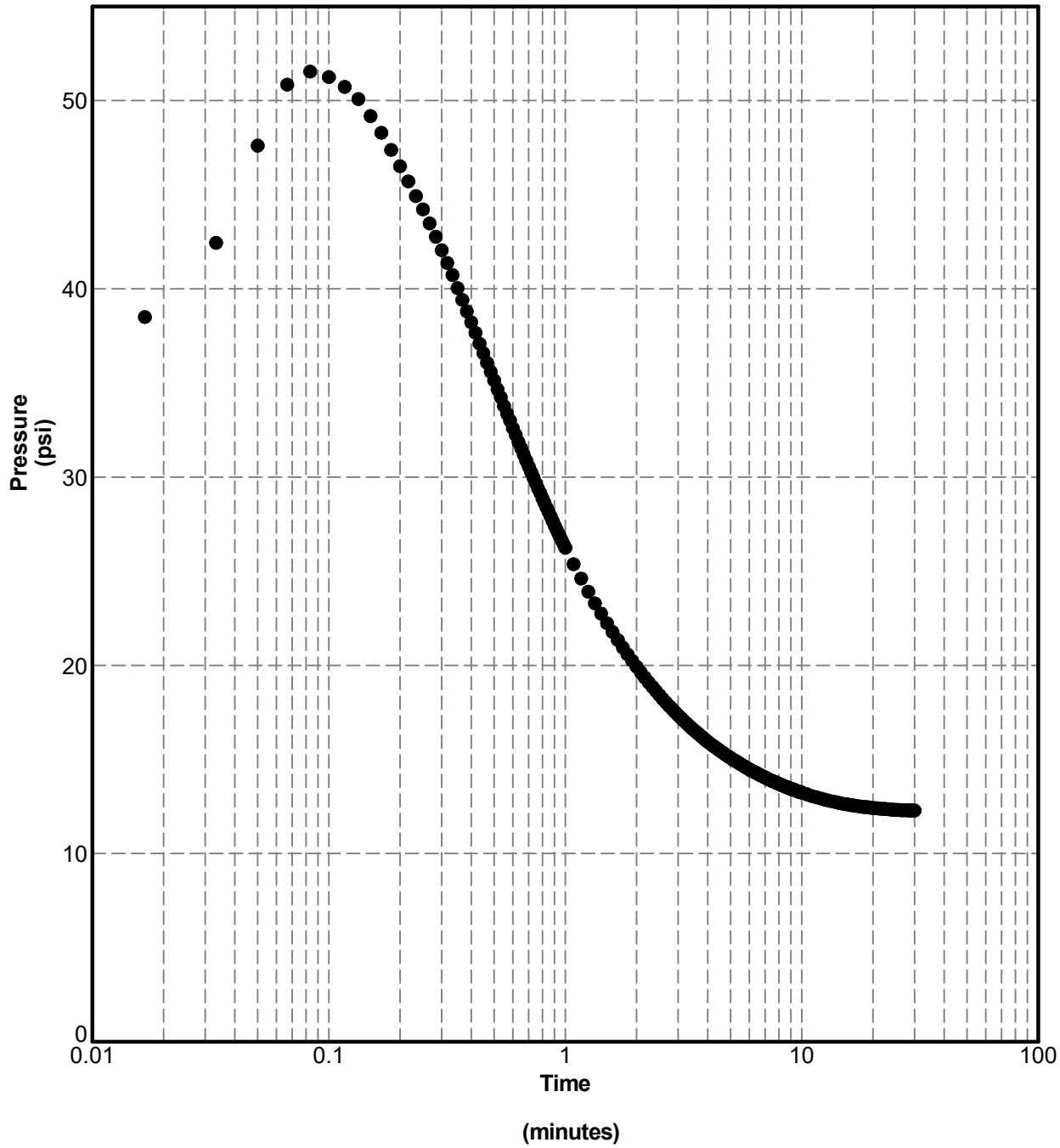
Electronic File Name: CPT-2.dis

thompson ENGINEERING

MRB-Hwy 98 Additional CPT
Daphne, AL
Project Number :15-1101-0228

Pore Pressure Dissipation

Date:	Jul. 16, 2018	**Northing:**	238452.2	**Total Depth:**	98.0 ft
Estimated Water Depth:	10 ft	**Easting:**	1839032.4	**Termination Criteria:**	
Rig/Operator:	Chris Rea	**Elevation:**	33.7	**Test Depth:**	31.6 ft



TC-21

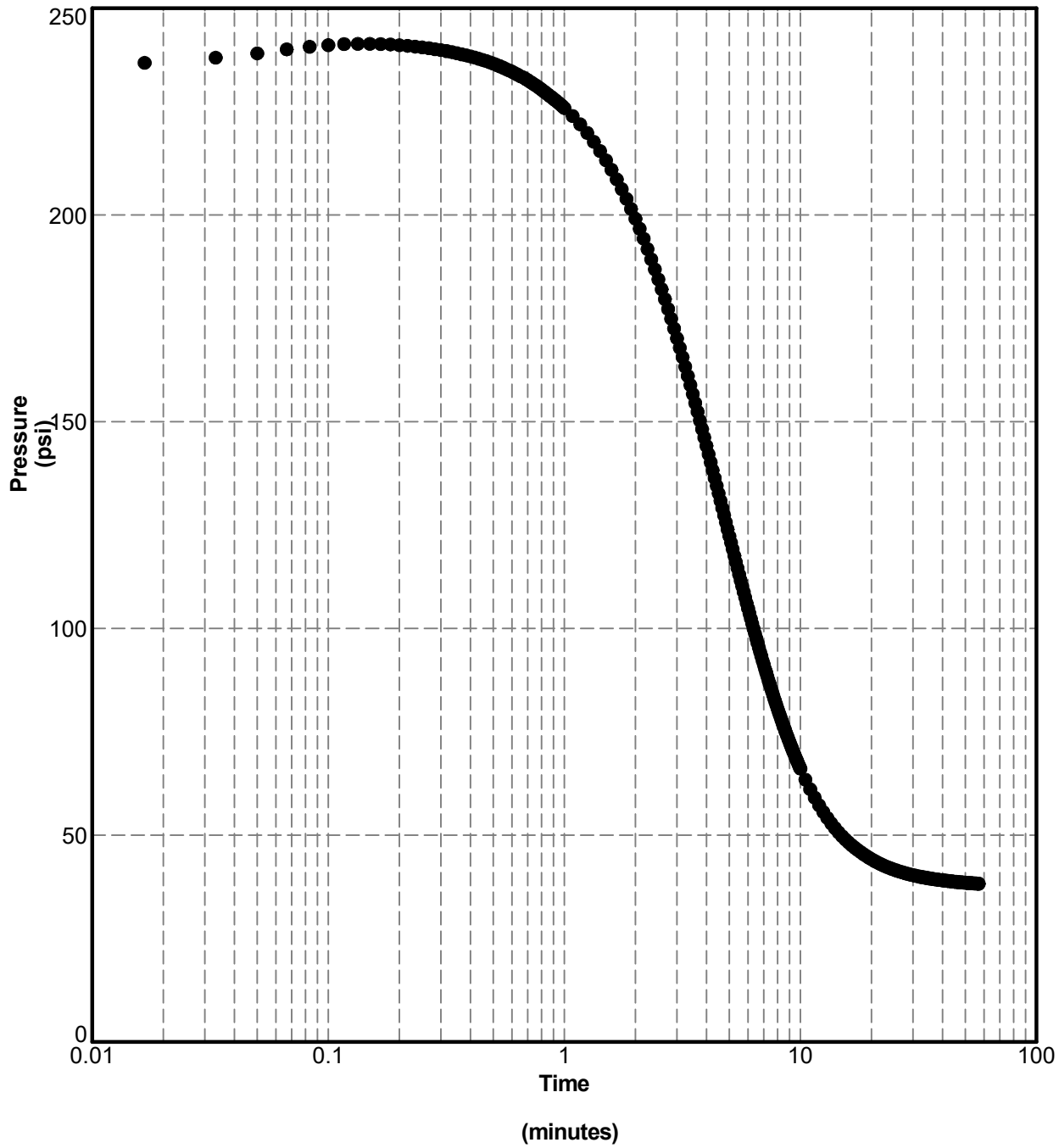
Electronic File Name: CPT-4.dis

thompson ENGINEERING

MRB-Hwy 98 Additional CPT
Daphne, AL
Project Number :15-1101-0228

Pore Pressure Dissipation

Date:	Jul. 16, 2018	**Northing:**	238452.2	**Total Depth:**	98.0 ft
Estimated Water Depth:	10 ft	**Easting:**	1839032.4	**Termination Criteria:**	
Rig/Operator:	Chris Rea	**Elevation:**	33.7	**Test Depth:**	98.0 ft



TC-21

Electronic File Name: CPT-4.dis

KEY TO SYMBOLS

Thompson Engineering, Inc

PROJECT NAME I-10 Mobile River Bridge and Bayway **CLIENT** ALDOT

ALDOT PROJECT NO: DPI-0030(005) **TE PROJECT NO:** 15-1101-0228 **PROJECT LOCATION** Baldwin, Baldwin

LITHOLOGIC SYMBOLS


ASPHALT: Asphalt


AUGER


CH: USCS High Plasticity Clay


CL: USCS Low Plasticity Clay


CL-ML: USCS Low Plasticity Silty Clay


CONCRETE: Concrete


GM: USCS Silty Gravel


GP: USCS Poorly-graded Gravel


GP-GM: USCS Poorly-graded Gravel with Silt


GW: USCS Well-graded Gravel


MH: USCS Elastic Silt


ML: USCS Silt


SC: USCS Clayey Sand


SC-SM: USCS Clayey Sand


SM: USCS Silty Sand


SP: USCS Poorly-graded Sand

SAMPLER TYPE

SS - Split Spoon

T - Shelby Tube

DCP - Dynamic Cone Penetrometer

AC - Auger Cuttings

GB - Grab Bag

NQ - Rock Core

GROUNDWATER LEGEND

▽ Delayed Groundwater Level

▼ Groundwater Level at TOB (Time of Boring). Water levels at the time of boring may have not been obtained due to mud rotary drilling techniques.

N.E. - Not Encountered

N.O. - Not Obtained

ABBREVIATIONS

LL	- LIQUID LIMIT (%)
PL	- PLASTIC LIMIT (%)
PI	- PLASTIC INDEX (%)
NMC	- MOISTURE CONTENT (%)
DD	- DRY DENSITY (PCF)
NP	- NON PLASTIC
%#200	- PERCENT PASSING NO. 200 SIEVE
PP	- POCKET PENETROMETER (TSF)
TV	- TORVANE
UC	- UNCONFINED COMPRESSION

APPENDIX C

- **Laboratory Summary**
- **BMT-5's**
- **Consolidated Undrained (C.U.) Triaxial Shear Tests**
- **Unconsolidated Undrained (U.U.) Triaxial Shear Test Results**
- **Direct Shear Test Results**
- **One Dimensional Consolidation Tests**

Station & Offset	Boring No.	Sample ID	Depth (ft)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Gravel	% Sand	% Pass 200		D50 (mm)	USCS	AASHTO
										% Silt	% Clay			
26+47.0 RT 98.9	TH-28	SS-1	0.0	12.2	NP	NP	NP	0.0	77.7	22.3		0.2002	SM	A-2-4(0)
26+47.0 RT 98.9	TH-28	SS-2	1.5	17.9	35	13	22	0.0	45.0	55.0			CL	A-6(8)
26+47.0 RT 98.9	TH-28	SS-3	3.0	23.5	22	12	10	2.3	61.6	36.1		0.1612	SC	A-4(0)
26+47.0 RT 98.9	TH-28	SS-4	4.5	38.0	36	13	23	3.2	51.4	45.4		0.0971	SC	A-6(6)
26+47.0 RT 98.9	TH-28	T-1	8.0	21.1	44	20	24	4.5	41.4	22.7	31.4	0.0523	CL	A-7-6(10)
26+47.0 RT 98.9	TH-28	SS-7	18.5	24.2	NP	NP	NP	0.2	69.8	30.0		0.1001	SM	A-2-4(0)
26+47.0 RT 98.9	TH-28	SS-10	33.5	25.4	NP	NP	NP	0.0	88.9	11.1		0.1654	SP-SM	A-2-4(0)
26+47.0 RT 98.9	TH-28	SS-12	43.5	22.6	NP	NP	NP	0.0	87.4	12.6		0.2412	SM	A-2-4(0)
26+47.0 RT 98.9	TH-28	SS-13	48.5	24.4	NP	NP	NP	0.0	68.3	31.7		0.0978	SM	A-2-4(0)
26+47.0 RT 98.9	TH-28	SS-15	58.5	35.2	NP	NP	NP	0.0	70.2	29.8		0.1146	SM	A-2-4(0)
26+47.0 RT 98.9	TH-28	SS-18	73.5	26.8	NP	NP	NP	0.0	93.1	6.9		0.2238	SP-SM	A-3(0)
26+47.0 RT 98.9	TH-28	SS-20	83.5	26.2	26	18	8	0.0	56.4	43.6		0.0817	SC	A-4(1)
26+47.0 RT 98.9	TH-28	SS-23	98.5	22.1	28	17	11	0.0	51.2	48.8		0.0768	SC	A-6(2)
26+47.0 RT 98.9	TH-28	SS-27	118.5	25.4	35	21	14	0.0	19.8	80.2			CL	A-6(10)
26+47.0 RT 98.9	TH-28	SS-28	123.5	28.1	NP	NP	NP	0.0	64.8	35.2		0.1005	SM	A-2-4(0)
26+47.0 RT 98.9	TH-28	SS-30	133.5	23.6	35	18	17	0.0	35.9	64.1			CL	A-6(9)
26+47.0 RT 98.9	TH-28	SS-32	143.5	25.6	NP	NP	NP	0.0	53.9	46.1		0.0803	SM	A-4(0)
21+12.1 RT 4.5	TH-29	SS-2	1.5	13.5	21	12	9	0.0	74.4	25.6		0.2121	SC	A-2-4(0)
21+12.1 RT 4.5	TH-29	SS-3	3.0	28.6	55	17	38	1.9	16.3	81.8			CH	A-7-6(32)
21+12.1 RT 4.5	TH-29	SS-4	4.5	45.9	37	13	24	28.6	34.9	36.5		0.2182	SC	A-6(3)
21+12.1 RT 4.5	TH-29	T-1	8.5	37.8	44	16	28	1.9	10.3	51.1	36.7	0.0197	CL	A-7-6(25)
21+12.1 RT 4.5	TH-29	SS-7	18.5	26.4	NP	NP	NP	0.0	89.3	10.7		0.1801	SP-SM	A-2-4(0)
21+12.1 RT 4.5	TH-29	SS-9	28.5	27.6	25	18	7	0.0	66.8	33.2		0.0951	SC-SM	A-2-4(0)
21+12.1 RT 4.5	TH-29	SS-11	38.5	28.4	43	16	27	0.0	29.3	70.7			CL	A-7-6(17)
21+12.1 RT 4.5	TH-29	SS-13	48.5	26.5	29	16	13	0.0	56.9	43.1		0.0841	SC	A-6(2)
21+12.1 RT 4.5	TH-29	SS-15	58.5	26.3	32	14	18	0.0	55.5	44.5		0.0837	SC	A-6(4)
21+12.1 RT 4.5	TH-29	SS-17	68.5	23.0	31	16	15	0.0	59.3	40.7		0.0918	SC	A-6(2)
21+12.1 RT 4.5	TH-29	SS-19	78.5	24.9	26	19	7	0.0	70.8	29.2		0.1099	SC-SM	A-2-4(0)
21+12.1 RT 4.5	TH-29	SS-21	88.5	32.2	NP	NP	NP	0.0	68.3	31.7		0.1483	SM	A-2-4(0)
21+12.1 RT 4.5	TH-29	SS-23	98.5	27.4	32	14	18	0.0	46.0	54.0			CL	A-6(6)

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Soil Classification Summary

Alabama Department of Transportation
ALDOT Project No.: DPI-0030(005)
Project Name: I-10 Mobile River Bridge and Bayway
Location: Mobile, Alabama

Station & Offset	Boring No.	Sample ID	Depth (ft)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Gravel	% Sand	% Pass 200		D50 (mm)	USCS	AASHTO
										% Silt	% Clay			
21+12.1 RT 4.5	TH-29	SS-26	113.5	26.6	25	18	7	0.0	66.9	33.1		0.1061	SC-SM	A-2-4(0)
21+12.1 RT 4.5	TH-29	SS-27	118.5	25.5	26	19	7	0.0	50.4	49.6		0.0755	SC-SM	A-4(1)
21+12.1 RT 4.5	TH-29	SS-30	133.5	24.3	40	21	19	0.0	34.1	65.9			CL	A-6(11)
21+12.1 RT 4.5	TH-29	SS-33	148.5	26.8	NP	NP	NP	0.0	74.7	25.3		0.1060	SM	A-2-4(0)
19+60.0 LT 132.7	TH-30	SS-1	0.0	14.2	NP	NP	NP	0.3	70.0	29.7		0.1736	SM	A-2-4(0)
19+60.0 LT 132.7	TH-30	SS-2	1.5	10.2	21	11	10	6.2	62.3	31.5		0.1974	SC	A-2-4(0)
19+60.0 LT 132.7	TH-30	SS-3	3.0	21.5	26	12	14	0.0	50.4	49.6		0.0767	SC	A-6(3)
19+60.0 LT 132.7	TH-30	SS-4	4.5	27.4	28	13	15	1.8	47.1	51.2			CL	A-6(4)
19+60.0 LT 132.7	TH-30	SS-6	8.5	29.0	46	14	32	0.0	17.2	82.8			CL	A-7-6(26)
19+60.0 LT 132.7	TH-30	T-1	13.5	55.5	57	19	38	0.0	12.3	43.8	43.9	0.0080	CH	A-7-6(36)
19+60.0 LT 132.7	TH-30	SS-7	18.5	19.9	NP	NP	NP	0.0	94.1	5.9		0.2657	SP-SM	A-3(0)
19+60.0 LT 132.7	TH-30	SS-8	23.5	24.9	20	15	5	0.3	82.6	17.1		0.2041	SC-SM	A-2-4(0)
19+60.0 LT 132.7	TH-30	SS-9	28.5	25.7	NP	NP	NP	0.0	71.4	28.6		0.0984	SM	A-2-4(0)
19+60.0 LT 132.7	TH-30	T-2	33.5	29.1	25	21	4	0.0	67.0	19.8	13.3	0.0913	SC-SM	A-2-4(0)
19+60.0 LT 132.7	TH-30	SS-10	38.5	26.9	51	17	34	0.0	32.3	67.7			CH	A-7-6(21)
19+60.0 LT 132.7	TH-30	SS-11	43.5	27.4	33	21	12	0.0	46.7	53.3			CL	A-6(4)
19+60.0 LT 132.7	TH-30	SS-12	48.5	27.3	31	20	11	0.0	40.2	59.8			CL	A-6(4)
19+60.0 LT 132.7	TH-30	SS-14	58.5	23.7	30	16	14	0.0	49.1	50.9			CL	A-6(4)
19+60.0 LT 132.7	TH-30	SS-17	73.5	28.8	34	22	12	0.0	42.3	57.7			CL	A-6(5)
19+60.0 LT 132.7	TH-30	SS-18	78.5	31.1	NP	NP	NP	0.0	77.0	23.0		0.1180	SM	A-2-4(0)
19+60.0 LT 132.7	TH-30	SS-20	88.5	23.0	NP	NP	NP	0.0	83.3	16.7		0.2132	SM	A-2-4(0)
19+60.0 LT 132.7	TH-30	SS-23	103.5	22.9	NP	NP	NP	0.0	57.4	42.6		0.0843	SM	A-4(0)
19+60.0 LT 132.7	TH-30	SS-25	113.5	28.2	NP	NP	NP	0.0	75.4	24.6		0.1179	SM	A-2-4(0)
19+60.0 LT 132.7	TH-30	SS-27	123.5	37.9	27	22	5	0.0	51.5	48.5		0.0796	SM	A-4(0)
19+60.0 LT 132.7	TH-30	SS-29	133.5	29.7	34	23	11	0.0	6.2	93.8			CL	A-6(11)
19+60.0 LT 132.7	TH-30	SS-31	143.5	26.6	35	20	15	0.0	29.7	70.3			CL	A-6(9)
19+26.0 RT 3.0	TH-31	SS-1	0.0	9.5	29	13	16	23.8	50.4	25.9		0.2919	SC	A-2-6(1)
19+26.0 RT 3.0	TH-31	SS-3	3.0	17.6	NP	NP	NP	0.4	84.6	15.0		0.3076	SM	A-2-4(0)
19+26.0 RT 3.0	TH-31	T-1	8.5	26.1	59	17	42	0.0	2.9	42.3	54.8	0.0036	CH	A-7-6(45)
19+26.0 RT 3.0	TH-31	SS-6	13.5	34.7	31	13	18	0.0	10.8	89.2			CL	A-6(14)

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Soil Classification Summary

Alabama Department of Transportation
ALDOT Project No.: DPI-0030(005)
Project Name: I-10 Mobile River Bridge and Bayway
Location: Mobile, Alabama

Station & Offset	Boring No.	Sample ID	Depth (ft)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Gravel	% Sand	% Pass 200		D50 (mm)	USCS	AASHTO
										% Silt	% Clay			
19+26.0 RT 3.0	TH-31	T-2	23.5	35.5	NP	NP	NP	0.0	57.6	28.5	13.8	0.0834	SM	A-4(0)
19+26.0 RT 3.0	TH-31	SS-9	33.5	28.5	NP	NP	NP	0.0	70.3	29.7		0.0940	SM	A-2-4(0)
19+26.0 RT 3.0	TH-31	T-3	38.0	21.6	NP	NP	NP	0.0	50.4	35.6	14.0	0.0755	SM	A-4(0)
19+26.0 RT 3.0	TH-31	SS-11	48.5	27.6	28	19	9	0.0	61.2	38.8		0.0916	SC	A-4(0)
19+26.0 RT 3.0	TH-31	SS-15	68.5	24.6	NP	NP	NP	0.0	59.4	40.6		0.0912	SM	A-4(0)
19+26.0 RT 3.0	TH-31	SS-18	83.5	29.1	32	18	14	0.0	18.1	81.9			CL	A-6(10)
19+26.0 RT 3.0	TH-31	SS-19	88.5	29.9	NP	NP	NP	0.0	83.3	16.7		0.1829	SM	A-2-4(0)
19+26.0 RT 3.0	TH-31	SS-21	98.5	22.5	37	15	22	0.0	26.1	73.9			CL	A-6(14)
19+26.0 RT 3.0	TH-31	SS-23	108.5	23.5	NP	NP	NP	0.0	63.2	36.8		0.0958	SM	A-4(0)
19+26.0 RT 3.0	TH-31	SS-27	128.5	31.0	37	24	13	0.0	10.6	89.4			CL	A-6(12)
19+26.0 RT 3.0	TH-31	SS-30	143.5	26.1	NP	NP	NP	0.0	68.2	31.8		0.0943	SM	A-2-4(0)
17+55.7 RT 76.7	TH-32	SS-1	0.0	5.8	25	15	10	0.8	59.2	40.0		0.1201	SC	A-4(1)
17+55.7 RT 76.7	TH-32	SS-3	3.0	24.1	48	14	34	1.3	36.5	62.3			CL	A-7-6(18)
17+55.7 RT 76.7	TH-32	SS-4	4.5	48.6	37	12	25	2.4	31.4	66.2			CL	A-6(13)
17+55.7 RT 76.7	TH-32	SS-5	6.0	21.2	26	15	11	0.1	42.7	57.2			CL	A-6(3)
17+55.7 RT 76.7	TH-32	SS-8	18.5	15.2	NP	NP	NP	0.2	53.9	45.8		0.0934	SM	A-4(0)
17+55.7 RT 76.7	TH-32	T-1	23.0	14.0	NP	NP	NP	0.7	71.9	19.1	8.3	0.2118	SM	A-2-4(0)
17+55.7 RT 76.7	TH-32	SS-9	28.5	21.4	NP	NP	NP	0.2	92.4	7.4		0.3393	SP-SM	A-3(0)
17+55.7 RT 76.7	TH-32	T-2	38.5	25.8	NP	NP	NP	0.0	71.0	12.2	16.8	0.0992	SM	A-2-4(0)
17+55.7 RT 76.7	TH-32	SS-12	49.0	27.9	NP	NP	NP	0.0	68.3	31.7		0.0935	SM	A-2-4(0)
17+55.7 RT 76.7	TH-32	SS-14	59.0	25.6	30	21	9	0.0	51.9	48.1		0.0771	SC	A-4(2)
17+55.7 RT 76.7	TH-32	SS-18	78.0	24.1	NP	NP	NP	0.0	56.9	43.1		0.0886	SM	A-4(0)
17+55.7 RT 76.7	TH-32	SS-19	83.0	22.8	NP	NP	NP	0.0	65.5	34.5		0.1036	SM	A-2-4(0)
17+55.7 RT 76.7	TH-32	SS-21	93.0	31.0	NP	NP	NP	0.0	76.9	23.1		0.1123	SM	A-2-4(0)
17+55.7 RT 76.7	TH-32	SS-24	108.0	25.0	34	17	17	0.0	44.8	55.2			CL	A-6(6)
17+55.7 RT 76.7	TH-32	SS-27	123.0	28.1	NP	NP	NP	0.0	73.3	26.7		0.1146	SM	A-2-4(0)
17+55.7 RT 76.7	TH-32	SS-29	133.0	25.8	30	21	9	0.0	53.4	46.6		0.0810	SC	A-4(1)
17+55.7 RT 76.7	TH-32	SS-32	148.0	34.0	41	19	22	0.0	17.6	82.4			CL	A-7-6(18)

thompson
ENGINEERING

Soil Classification Summary

Alabama Department of Transportation
ALDOT Project No.: DPI-0030(005)
Project Name: I-10 Mobile River Bridge and Bayway
Location: Mobile, Alabama

BMT-5

Client: ALDOT
Project: I-10 Mobile River Bridge and Bayway
ALDOT Project No.:15-1101-0228

Project No.: 15-1101-0228
Region: Southwest Region
Date: 07/20/2018

ALABAMA DEPARTMENT OF TRANSPORTATION
SOILS AND BASE COARSE ANALYSIS

Boring No.	TH-28	TH-28	TH-28	TH-28	TH-28	TH-28
Station	26+47.0	26+47.0	26+47.0	26+47.0	26+47.0	26+47.0
Offset	RT 98.9	RT 98.9	RT 98.9	RT 98.9	RT 98.9	RT 98.9
Sample ID	SS-1	SS-2	SS-3	SS-4	T-1	SS-7
Depth (ft)	0.0	1.5	3.0	4.5	8.0	18.5
TOTAL PASSING (%)						
3" SIEVE (75mm)	100.0	100.0	100.0	100.0	100.0	100.0
2 1/2" SIEVE (63mm)	100.0	100.0	100.0	100.0	100.0	100.0
2" SIEVE (50mm)	100.0	100.0	100.0	100.0	100.0	100.0
1 1/2" SIEVE (37.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
1" SIEVE (25mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/4" SIEVE (19mm)	100.0	100.0	100.0	100.0	100.0	100.0
1/2" SIEVE (12.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/8" SIEVE (9.5mm)	100.0	100.0	100.0	100.0	96.8	100.0
#4 SIEVE (4.75mm)	100.0	100.0	97.7	96.8	95.5	99.8
#10 SIEVE (2.00mm)	99.7	99.4	94.8	94.4	91.9	99.7
#20 SIEVE (0.85mm)	98.7	98.5	90.6	91.8	89.0	99.5
#40" SIEVE (425um)	89.4	94.7	80.6	85.5	85.5	99.3
#60 SIEVE (250um)	62.8	81.9	63.3	72.9	77.6	99.0
#100 SIEVE (150um)	33.3	68.6	47.8	57.7	69.5	92.3
#140 SIEVE (106um)	26.2	62.4	41.8	51.6	62.2	54.0
#200 SIEVE (75um)	22.3	55.0	36.1	45.4	54.1	30.0
Clay					31.4	
Silt					22.7	
Total Sand	77.7	45.0	61.6	51.4	41.4	69.8
Total Gravel	0.0	0.0	2.3	3.2	4.5	0.2
ATTERBERG LIMITS						
Liquid Limit	NP	35	22	36	44	NP
Plastic Limit	NP	13	12	13	20	NP
Plasticity Index	NP	22	10	23	24	NP
USCS	SM	CL	SC	SC	CL	SM
AASHTO	A-2-4(0)	A-6(8)	A-4(0)	A-6(6)	A-7-6(10)	A-2-4(0)

BMT-5

Client: ALDOT
Project: I-10 Mobile River Bridge and Bayway
ALDOT Project No.:15-1101-0228

Project No.: 15-1101-0228
Region: Southwest Region
Date: 07/20/2018

ALABAMA DEPARTMENT OF TRANSPORTATION
SOILS AND BASE COARSE ANALYSIS

Boring No.	TH-28	TH-28	TH-28	TH-28	TH-28	TH-28
Station	26+47.0	26+47.0	26+47.0	26+47.0	26+47.0	26+47.0
Offset	RT 98.9	RT 98.9	RT 98.9	RT 98.9	RT 98.9	RT 98.9
Sample ID	SS-10	SS-12	SS-13	SS-15	SS-18	SS-20
Depth (ft)	33.5	43.5	48.5	58.5	73.5	83.5
TOTAL PASSING (%)						
3" SIEVE (75mm)	100.0	100.0	100.0	100.0	100.0	100.0
2 1/2" SIEVE (63mm)	100.0	100.0	100.0	100.0	100.0	100.0
2" SIEVE (50mm)	100.0	100.0	100.0	100.0	100.0	100.0
1 1/2" SIEVE (37.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
1" SIEVE (25mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/4" SIEVE (19mm)	100.0	100.0	100.0	100.0	100.0	100.0
1/2" SIEVE (12.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/8" SIEVE (9.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
#4 SIEVE (4.75mm)	100.0	100.0	100.0	100.0	100.0	100.0
#10 SIEVE (2.00mm)	100.0	99.7	100.0	99.2	100.0	100.0
#20 SIEVE (0.85mm)	99.9	97.9	100.0	97.1	99.9	100.0
#40" SIEVE (425um)	97.5	85.0	99.8	94.9	99.4	99.9
#60 SIEVE (250um)	85.4	52.2	94.2	91.9	60.7	99.2
#100 SIEVE (150um)	41.6	20.6	83.6	68.6	11.4	91.6
#140 SIEVE (106um)	18.1	15.6	55.6	44.6	8.1	69.4
#200 SIEVE (75um)	11.1	12.6	31.7	29.8	6.9	43.6
Clay						
Silt						
Total Sand	88.9	87.4	68.3	70.2	93.1	56.4
Total Gravel	0.0	0.0	0.0	0.0	0.0	0.0
ATTERBERG LIMITS						
Liquid Limit	NP	NP	NP	NP	NP	26
Plastic Limit	NP	NP	NP	NP	NP	18
Plasticity Index	NP	NP	NP	NP	NP	8
USCS	SP-SM	SM	SM	SM	SP-SM	SC
AASHTO	A-2-4(0)	A-2-4(0)	A-2-4(0)	A-2-4(0)	A-3(0)	A-4(1)

BMT-5

Client: ALDOT
Project: I-10 Mobile River Bridge and Bayway
ALDOT Project No.:15-1101-0228

Project No.: 15-1101-0228
Region: Southwest Region
Date: 07/20/2018

ALABAMA DEPARTMENT OF TRANSPORTATION
SOILS AND BASE COARSE ANALYSIS

Boring No.	TH-28	TH-28	TH-28	TH-28	TH-28	TH-29
Station	26+47.0	26+47.0	26+47.0	26+47.0	26+47.0	21+12.1
Offset	RT 98.9	RT 98.9	RT 98.9	RT 98.9	RT 98.9	RT 4.5
Sample ID	SS-23	SS-27	SS-28	SS-30	SS-32	SS-2
Depth (ft)	98.5	118.5	123.5	133.5	143.5	1.5
TOTAL PASSING (%)						
3" SIEVE (75mm)	100.0	100.0	100.0	100.0	100.0	100.0
2 1/2" SIEVE (63mm)	100.0	100.0	100.0	100.0	100.0	100.0
2" SIEVE (50mm)	100.0	100.0	100.0	100.0	100.0	100.0
1 1/2" SIEVE (37.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
1" SIEVE (25mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/4" SIEVE (19mm)	100.0	100.0	100.0	100.0	100.0	100.0
1/2" SIEVE (12.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/8" SIEVE (9.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
#4 SIEVE (4.75mm)	100.0	100.0	100.0	100.0	100.0	100.0
#10 SIEVE (2.00mm)	100.0	100.0	100.0	100.0	100.0	99.8
#20 SIEVE (0.85mm)	99.9	100.0	99.5	99.3	99.9	98.2
#40" SIEVE (425um)	99.7	99.8	98.7	98.2	98.9	84.6
#60 SIEVE (250um)	98.3	99.3	95.3	96.2	95.3	57.0
#100 SIEVE (150um)	86.3	96.5	75.4	88.6	82.4	35.1
#140 SIEVE (106um)	65.6	90.9	52.7	78.7	66.0	28.9
#200 SIEVE (75um)	48.8	80.2	35.2	64.1	46.1	25.6
Clay						
Silt						
Total Sand	51.2	19.8	64.8	35.9	53.9	74.4
Total Gravel	0.0	0.0	0.0	0.0	0.0	0.0
ATTERBERG LIMITS						
Liquid Limit	28	35	NP	35	NP	21
Plastic Limit	17	21	NP	18	NP	12
Plasticity Index	11	14	NP	17	NP	9
USCS	SC	CL	SM	CL	SM	SC
AASHTO	A-6(2)	A-6(10)	A-2-4(0)	A-6(9)	A-4(0)	A-2-4(0)

BMT-5

Client: ALDOT
Project: I-10 Mobile River Bridge and Bayway
ALDOT Project No.:15-1101-0228

Project No.: 15-1101-0228
Region: Southwest Region
Date: 07/20/2018

ALABAMA DEPARTMENT OF TRANSPORTATION
SOILS AND BASE COARSE ANALYSIS

Boring No.	TH-29	TH-29	TH-29	TH-29	TH-29	TH-29
Station	21+12.1	21+12.1	21+12.1	21+12.1	21+12.1	21+12.1
Offset	RT 4.5	RT 4.5	RT 4.5	RT 4.5	RT 4.5	RT 4.5
Sample ID	SS-3	SS-4	T-1	SS-7	SS-9	SS-11
Depth (ft)	3.0	4.5	8.5	18.5	28.5	38.5
TOTAL PASSING (%)						
3" SIEVE (75mm)	100.0	100.0	100.0	100.0	100.0	100.0
2 1/2" SIEVE (63mm)	100.0	100.0	100.0	100.0	100.0	100.0
2" SIEVE (50mm)	100.0	100.0	100.0	100.0	100.0	100.0
1 1/2" SIEVE (37.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
1" SIEVE (25mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/4" SIEVE (19mm)	100.0	100.0	100.0	100.0	100.0	100.0
1/2" SIEVE (12.5mm)	100.0	92.3	100.0	100.0	100.0	100.0
3/8" SIEVE (9.5mm)	100.0	84.1	98.5	100.0	100.0	100.0
#4 SIEVE (4.75mm)	98.1	71.4	98.1	100.0	100.0	100.0
#10 SIEVE (2.00mm)	97.3	68.8	97.7	99.9	99.6	100.0
#20 SIEVE (0.85mm)	96.7	67.6	96.8	99.8	99.3	100.0
#40" SIEVE (425um)	95.3	62.7	96.3	99.7	99.0	99.9
#60 SIEVE (250um)	91.8	52.5	95.9	94.2	95.8	99.2
#100 SIEVE (150um)	88.4	43.0	95.2	25.4	83.0	95.2
#140 SIEVE (106um)	86.6	39.6	94.5	14.6	57.7	85.9
#200 SIEVE (75um)	81.8	36.5	87.8	10.7	33.2	70.7
Clay			36.7			
Silt			51.1			
Total Sand	16.3	34.9	10.3	89.3	66.8	29.3
Total Gravel	1.9	28.6	1.9	0.0	0.0	0.0
ATTERBERG LIMITS						
Liquid Limit	55	37	44	NP	25	43
Plastic Limit	17	13	16	NP	18	16
Plasticity Index	38	24	28	NP	7	27
USCS	CH	SC	CL	SP-SM	SC-SM	CL
AASHTO	A-7-6(32)	A-6(3)	A-7-6(25)	A-2-4(0)	A-2-4(0)	A-7-6(17)

BMT-5

Client: ALDOT
Project: I-10 Mobile River Bridge and Bayway
ALDOT Project No.:15-1101-0228

Project No.: 15-1101-0228
Region: Southwest Region
Date: 07/20/2018

ALABAMA DEPARTMENT OF TRANSPORTATION
SOILS AND BASE COARSE ANALYSIS

Boring No.	TH-29	TH-29	TH-29	TH-29	TH-29	TH-29
Station	21+12.1	21+12.1	21+12.1	21+12.1	21+12.1	21+12.1
Offset	RT 4.5	RT 4.5	RT 4.5	RT 4.5	RT 4.5	RT 4.5
Sample ID	SS-13	SS-15	SS-17	SS-19	SS-21	SS-23
Depth (ft)	48.5	58.5	68.5	78.5	88.5	98.5
TOTAL PASSING (%)						
3" SIEVE (75mm)	100.0	100.0	100.0	100.0	100.0	100.0
2 1/2" SIEVE (63mm)	100.0	100.0	100.0	100.0	100.0	100.0
2" SIEVE (50mm)	100.0	100.0	100.0	100.0	100.0	100.0
1 1/2" SIEVE (37.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
1" SIEVE (25mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/4" SIEVE (19mm)	100.0	100.0	100.0	100.0	100.0	100.0
1/2" SIEVE (12.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/8" SIEVE (9.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
#4 SIEVE (4.75mm)	100.0	100.0	100.0	100.0	100.0	100.0
#10 SIEVE (2.00mm)	100.0	100.0	100.0	100.0	100.0	100.0
#20 SIEVE (0.85mm)	100.0	100.0	100.0	100.0	99.9	99.8
#40" SIEVE (425um)	99.9	99.9	99.9	99.8	92.4	98.8
#60 SIEVE (250um)	98.6	98.2	98.2	97.3	76.4	96.1
#100 SIEVE (150um)	87.5	85.6	82.9	79.4	50.4	86.6
#140 SIEVE (106um)	63.9	61.8	56.6	46.6	36.9	72.2
#200 SIEVE (75um)	43.1	44.5	40.7	29.2	31.7	54.0
Clay						
Silt						
Total Sand	56.9	55.5	59.3	70.8	68.3	46.0
Total Gravel	0.0	0.0	0.0	0.0	0.0	0.0
ATTERBERG LIMITS						
Liquid Limit	29	32	31	26	NP	32
Plastic Limit	16	14	16	19	NP	14
Plasticity Index	13	18	15	7	NP	18
USCS	SC	SC	SC	SC-SM	SM	CL
AASHTO	A-6(2)	A-6(4)	A-6(2)	A-2-4(0)	A-2-4(0)	A-6(6)

BMT-5

Client: ALDOT
Project: I-10 Mobile River Bridge and Bayway
ALDOT Project No.:15-1101-0228

Project No.: 15-1101-0228
Region: Southwest Region
Date: 07/20/2018

ALABAMA DEPARTMENT OF TRANSPORTATION
SOILS AND BASE COARSE ANALYSIS

Boring No.	TH-29	TH-29	TH-29	TH-29	TH-30	TH-30
Station	21+12.1	21+12.1	21+12.1	21+12.1	19+60.0	19+60.0
Offset	RT 4.5	RT 4.5	RT 4.5	RT 4.5	LT 132.7	LT 132.7
Sample ID	SS-26	SS-27	SS-30	SS-33	SS-1	SS-2
Depth (ft)	113.5	118.5	133.5	148.5	0.0	1.5
TOTAL PASSING (%)						
3" SIEVE (75mm)	100.0	100.0	100.0	100.0	100.0	100.0
2 1/2" SIEVE (63mm)	100.0	100.0	100.0	100.0	100.0	100.0
2" SIEVE (50mm)	100.0	100.0	100.0	100.0	100.0	100.0
1 1/2" SIEVE (37.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
1" SIEVE (25mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/4" SIEVE (19mm)	100.0	100.0	100.0	100.0	100.0	100.0
1/2" SIEVE (12.5mm)	100.0	100.0	100.0	100.0	100.0	95.3
3/8" SIEVE (9.5mm)	100.0	100.0	100.0	100.0	100.0	95.3
#4 SIEVE (4.75mm)	100.0	100.0	100.0	100.0	99.7	93.8
#10 SIEVE (2.00mm)	100.0	100.0	100.0	100.0	98.4	92.1
#20 SIEVE (0.85mm)	99.9	100.0	99.7	99.9	96.6	89.4
#40" SIEVE (425um)	98.7	98.0	95.5	99.3	87.1	76.6
#60 SIEVE (250um)	94.4	94.6	94.1	98.7	65.4	57.0
#100 SIEVE (150um)	73.7	83.7	90.7	86.9	43.8	41.9
#140 SIEVE (106um)	49.9	67.0	74.9	50.0	35.2	36.0
#200 SIEVE (75um)	33.1	49.6	65.9	25.3	29.7	31.5
Clay						
Silt						
Total Sand	66.9	50.4	34.1	74.7	70.0	62.3
Total Gravel	0.0	0.0	0.0	0.0	0.3	6.2
ATTERBERG LIMITS						
Liquid Limit	25	26	40	NP	NP	21
Plastic Limit	18	19	21	NP	NP	11
Plasticity Index	7	7	19	NP	NP	10
USCS	SC-SM	SC-SM	CL	SM	SM	SC
AASHTO	A-2-4(0)	A-4(1)	A-6(11)	A-2-4(0)	A-2-4(0)	A-2-4(0)

BMT-5

Client: ALDOT
Project: I-10 Mobile River Bridge and Bayway
ALDOT Project No.:15-1101-0228

Project No.: 15-1101-0228
Region: Southwest Region
Date: 07/20/2018

ALABAMA DEPARTMENT OF TRANSPORTATION
SOILS AND BASE COARSE ANALYSIS

Boring No.	TH-30	TH-30	TH-30	TH-30	TH-30	TH-30
Station	19+60.0	19+60.0	19+60.0	19+60.0	19+60.0	19+60.0
Offset	LT 132.7	LT 132.7	LT 132.7	LT 132.7	LT 132.7	LT 132.7
Sample ID	SS-3	SS-4	SS-6	T-1	SS-7	SS-8
Depth (ft)	3.0	4.5	8.5	13.5	18.5	23.5
TOTAL PASSING (%)						
3" SIEVE (75mm)	100.0	100.0	100.0	100.0	100.0	100.0
2 1/2" SIEVE (63mm)	100.0	100.0	100.0	100.0	100.0	100.0
2" SIEVE (50mm)	100.0	100.0	100.0	100.0	100.0	100.0
1 1/2" SIEVE (37.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
1" SIEVE (25mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/4" SIEVE (19mm)	100.0	100.0	100.0	100.0	100.0	100.0
1/2" SIEVE (12.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/8" SIEVE (9.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
#4 SIEVE (4.75mm)	100.0	98.2	100.0	100.0	100.0	99.7
#10 SIEVE (2.00mm)	99.2	96.3	100.0	100.0	99.7	99.2
#20 SIEVE (0.85mm)	97.5	94.4	100.0	99.3	97.8	97.1
#40" SIEVE (425um)	89.9	87.0	99.9	97.4	75.9	84.8
#60 SIEVE (250um)	75.5	73.4	99.6	95.1	46.6	64.4
#100 SIEVE (150um)	62.0	62.0	98.0	93.3	14.8	28.1
#140 SIEVE (106um)	55.4	56.5	93.0	91.4	7.9	20.4
#200 SIEVE (75um)	49.6	51.2	82.8	87.7	5.9	17.1
Clay				43.9		
Silt				43.8		
Total Sand	50.4	47.1	17.2	12.3	94.1	82.6
Total Gravel	0.0	1.8	0.0	0.0	0.0	0.3
ATTERBERG LIMITS						
Liquid Limit	26	28	46	57	NP	20
Plastic Limit	12	13	14	19	NP	15
Plasticity Index	14	15	32	38	NP	5
USCS	SC	CL	CL	CH	SP-SM	SC-SM
AASHTO	A-6(3)	A-6(4)	A-7-6(26)	A-7-6(36)	A-3(0)	A-2-4(0)

BMT-5

Client: ALDOT
Project: I-10 Mobile River Bridge and Bayway
ALDOT Project No.:15-1101-0228

Project No.: 15-1101-0228
Region: Southwest Region
Date: 07/20/2018

ALABAMA DEPARTMENT OF TRANSPORTATION
SOILS AND BASE COARSE ANALYSIS

Boring No.	TH-30	TH-30	TH-30	TH-30	TH-30	TH-30
Station	19+60.0	19+60.0	19+60.0	19+60.0	19+60.0	19+60.0
Offset	LT 132.7	LT 132.7	LT 132.7	LT 132.7	LT 132.7	LT 132.7
Sample ID	SS-9	T-2	SS-10	SS-11	SS-12	SS-14
Depth (ft)	28.5	33.5	38.5	43.5	48.5	58.5
TOTAL PASSING (%)						
3" SIEVE (75mm)	100.0	100.0	100.0	100.0	100.0	100.0
2 1/2" SIEVE (63mm)	100.0	100.0	100.0	100.0	100.0	100.0
2" SIEVE (50mm)	100.0	100.0	100.0	100.0	100.0	100.0
1 1/2" SIEVE (37.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
1" SIEVE (25mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/4" SIEVE (19mm)	100.0	100.0	100.0	100.0	100.0	100.0
1/2" SIEVE (12.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/8" SIEVE (9.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
#4 SIEVE (4.75mm)	100.0	100.0	100.0	100.0	100.0	100.0
#10 SIEVE (2.00mm)	100.0	100.0	100.0	99.9	100.0	99.9
#20 SIEVE (0.85mm)	100.0	100.0	99.9	99.8	100.0	99.6
#40" SIEVE (425um)	99.9	99.7	99.8	99.5	100.0	99.2
#60 SIEVE (250um)	98.4	98.6	99.2	98.7	99.2	97.4
#100 SIEVE (150um)	85.0	86.8	94.3	92.6	92.3	85.7
#140 SIEVE (106um)	55.9	62.9	83.1	73.9	76.6	64.8
#200 SIEVE (75um)	28.6	33.0	67.7	53.3	59.8	50.9
Clay		13.3				
Silt		19.8				
Total Sand	71.4	67.0	32.3	46.7	40.2	49.1
Total Gravel	0.0	0.0	0.0	0.0	0.0	0.0
ATTERBERG LIMITS						
Liquid Limit	NP	25	51	33	31	30
Plastic Limit	NP	21	17	21	20	16
Plasticity Index	NP	4	34	12	11	14
USCS	SM	SC-SM	CH	CL	CL	CL
AASHTO	A-2-4(0)	A-2-4(0)	A-7-6(21)	A-6(4)	A-6(4)	A-6(4)

BMT-5

Client: ALDOT
Project: I-10 Mobile River Bridge and Bayway
ALDOT Project No.:15-1101-0228

Project No.: 15-1101-0228
Region: Southwest Region
Date: 07/20/2018

ALABAMA DEPARTMENT OF TRANSPORTATION
SOILS AND BASE COARSE ANALYSIS

Boring No.	TH-30	TH-30	TH-30	TH-30	TH-30	TH-30
Station	19+60.0	19+60.0	19+60.0	19+60.0	19+60.0	19+60.0
Offset	LT 132.7	LT 132.7	LT 132.7	LT 132.7	LT 132.7	LT 132.7
Sample ID	SS-17	SS-18	SS-20	SS-23	SS-25	SS-27
Depth (ft)	73.5	78.5	88.5	103.5	113.5	123.5
TOTAL PASSING (%)						
3" SIEVE (75mm)	100.0	100.0	100.0	100.0	100.0	100.0
2 1/2" SIEVE (63mm)	100.0	100.0	100.0	100.0	100.0	100.0
2" SIEVE (50mm)	100.0	100.0	100.0	100.0	100.0	100.0
1 1/2" SIEVE (37.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
1" SIEVE (25mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/4" SIEVE (19mm)	100.0	100.0	100.0	100.0	100.0	100.0
1/2" SIEVE (12.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/8" SIEVE (9.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
#4 SIEVE (4.75mm)	100.0	100.0	100.0	100.0	100.0	100.0
#10 SIEVE (2.00mm)	100.0	99.9	99.9	100.0	100.0	100.0
#20 SIEVE (0.85mm)	99.3	99.8	99.8	99.9	99.8	97.0
#40" SIEVE (425um)	92.2	99.1	94.3	99.3	98.2	83.0
#60 SIEVE (250um)	88.6	94.5	61.3	96.4	92.8	78.1
#100 SIEVE (150um)	80.2	73.7	25.0	83.6	68.9	68.5
#140 SIEVE (106um)	67.5	39.4	19.0	64.4	41.7	57.0
#200 SIEVE (75um)	57.7	23.0	16.7	42.6	24.6	48.5
Clay						
Silt						
Total Sand	42.3	77.0	83.3	57.4	75.4	51.5
Total Gravel	0.0	0.0	0.0	0.0	0.0	0.0
ATTERBERG LIMITS						
Liquid Limit	34	NP	NP	NP	NP	27
Plastic Limit	22	NP	NP	NP	NP	22
Plasticity Index	12	NP	NP	NP	NP	5
USCS	CL	SM	SM	SM	SM	SM
AASHTO	A-6(5)	A-2-4(0)	A-2-4(0)	A-4(0)	A-2-4(0)	A-4(0)

BMT-5

Client: ALDOT
Project: I-10 Mobile River Bridge and Bayway
ALDOT Project No.:15-1101-0228

Project No.: 15-1101-0228
Region: Southwest Region
Date: 07/20/2018

ALABAMA DEPARTMENT OF TRANSPORTATION
SOILS AND BASE COARSE ANALYSIS

Boring No.	TH-30	TH-30	TH-31	TH-31	TH-31	TH-31
Station	19+60.0	19+60.0	19+26.0	19+26.0	19+26.0	19+26.0
Offset	LT 132.7	LT 132.7	RT 3.0	RT 3.0	RT 3.0	RT 3.0
Sample ID	SS-29	SS-31	SS-1	SS-3	T-1	SS-6
Depth (ft)	133.5	143.5	0.0	3.0	8.5	13.5
TOTAL PASSING (%)						
3" SIEVE (75mm)	100.0	100.0	100.0	100.0	100.0	100.0
2 1/2" SIEVE (63mm)	100.0	100.0	100.0	100.0	100.0	100.0
2" SIEVE (50mm)	100.0	100.0	100.0	100.0	100.0	100.0
1 1/2" SIEVE (37.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
1" SIEVE (25mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/4" SIEVE (19mm)	100.0	100.0	83.8	100.0	100.0	100.0
1/2" SIEVE (12.5mm)	100.0	100.0	83.8	100.0	100.0	100.0
3/8" SIEVE (9.5mm)	100.0	100.0	82.7	100.0	100.0	100.0
#4 SIEVE (4.75mm)	100.0	100.0	76.2	99.6	100.0	100.0
#10 SIEVE (2.00mm)	99.9	99.9	72.6	99.0	100.0	100.0
#20 SIEVE (0.85mm)	98.8	98.2	68.7	95.7	99.4	99.8
#40" SIEVE (425um)	97.5	97.3	59.1	69.5	99.0	99.7
#60 SIEVE (250um)	96.9	96.7	46.2	37.5	98.7	99.6
#100 SIEVE (150um)	96.3	94.7	34.9	21.6	98.3	98.2
#140 SIEVE (106um)	95.6	87.3	29.9	17.5	97.8	94.3
#200 SIEVE (75um)	93.8	70.3	25.9	15.0	97.1	89.2
Clay					54.8	
Silt					42.3	
Total Sand	6.2	29.7	50.4	84.6	2.9	10.8
Total Gravel	0.0	0.0	23.8	0.4	0.0	0.0
ATTERBERG LIMITS						
Liquid Limit	34	35	29	NP	59	31
Plastic Limit	23	20	13	NP	17	13
Plasticity Index	11	15	16	NP	42	18
USCS	CL	CL	SC	SM	CH	CL
AASHTO	A-6(11)	A-6(9)	A-2-6(1)	A-2-4(0)	A-7-6(45)	A-6(14)

BMT-5

Client: ALDOT
Project: I-10 Mobile River Bridge and Bayway
ALDOT Project No.:15-1101-0228

Project No.: 15-1101-0228
Region: Southwest Region
Date: 07/20/2018

ALABAMA DEPARTMENT OF TRANSPORTATION
SOILS AND BASE COARSE ANALYSIS

Boring No.	TH-31	TH-31	TH-31	TH-31	TH-31	TH-31
Station	19+26.0	19+26.0	19+26.0	19+26.0	19+26.0	19+26.0
Offset	RT 3.0	RT 3.0	RT 3.0	RT 3.0	RT 3.0	RT 3.0
Sample ID	T-2	SS-9	T-3	SS-11	SS-15	SS-18
Depth (ft)	23.5	33.5	38.0	48.5	68.5	83.5
TOTAL PASSING (%)						
3" SIEVE (75mm)	100.0	100.0	100.0	100.0	100.0	100.0
2 1/2" SIEVE (63mm)	100.0	100.0	100.0	100.0	100.0	100.0
2" SIEVE (50mm)	100.0	100.0	100.0	100.0	100.0	100.0
1 1/2" SIEVE (37.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
1" SIEVE (25mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/4" SIEVE (19mm)	100.0	100.0	100.0	100.0	100.0	100.0
1/2" SIEVE (12.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/8" SIEVE (9.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
#4 SIEVE (4.75mm)	100.0	100.0	100.0	100.0	100.0	100.0
#10 SIEVE (2.00mm)	100.0	100.0	100.0	100.0	100.0	99.9
#20 SIEVE (0.85mm)	99.1	100.0	100.0	99.9	99.8	99.6
#40" SIEVE (425um)	98.4	99.9	99.9	99.3	99.5	98.6
#60 SIEVE (250um)	96.6	98.8	99.3	97.6	97.2	97.7
#100 SIEVE (150um)	87.1	86.5	91.3	85.2	81.8	93.9
#140 SIEVE (106um)	67.3	60.7	72.5	58.1	57.3	88.4
#200 SIEVE (75um)	42.4	29.7	49.6	38.8	40.6	81.9
Clay	13.8		14.0			
Silt	28.5		35.6			
Total Sand	57.6	70.3	50.4	61.2	59.4	18.1
Total Gravel	0.0	0.0	0.0	0.0	0.0	0.0
ATTERBERG LIMITS						
Liquid Limit	NP	NP	NP	28	NP	32
Plastic Limit	NP	NP	NP	19	NP	18
Plasticity Index	NP	NP	NP	9	NP	14
USCS	SM	SM	SM	SC	SM	CL
AASHTO	A-4(0)	A-2-4(0)	A-4(0)	A-4(0)	A-4(0)	A-6(10)

BMT-5

Client: ALDOT
Project: I-10 Mobile River Bridge and Bayway
ALDOT Project No.:15-1101-0228

Project No.: 15-1101-0228
Region: Southwest Region
Date: 07/20/2018

ALABAMA DEPARTMENT OF TRANSPORTATION
SOILS AND BASE COARSE ANALYSIS

Boring No.	TH-31	TH-31	TH-31	TH-31	TH-31	TH-32
Station	19+26.0	19+26.0	19+26.0	19+26.0	19+26.0	17+55.7
Offset	RT 3.0	RT 3.0	RT 3.0	RT 3.0	RT 3.0	RT 76.7
Sample ID	SS-19	SS-21	SS-23	SS-27	SS-30	SS-1
Depth (ft)	88.5	98.5	108.5	128.5	143.5	0.0
TOTAL PASSING (%)						
3" SIEVE (75mm)	100.0	100.0	100.0	100.0	100.0	100.0
2 1/2" SIEVE (63mm)	100.0	100.0	100.0	100.0	100.0	100.0
2" SIEVE (50mm)	100.0	100.0	100.0	100.0	100.0	100.0
1 1/2" SIEVE (37.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
1" SIEVE (25mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/4" SIEVE (19mm)	100.0	100.0	100.0	100.0	100.0	100.0
1/2" SIEVE (12.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/8" SIEVE (9.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
#4 SIEVE (4.75mm)	100.0	100.0	100.0	100.0	100.0	99.2
#10 SIEVE (2.00mm)	94.9	100.0	100.0	100.0	99.9	98.0
#20 SIEVE (0.85mm)	92.9	99.9	99.9	99.9	99.7	96.4
#40" SIEVE (425um)	89.1	98.0	98.1	97.9	98.8	90.5
#60 SIEVE (250um)	72.0	96.4	92.9	96.8	97.8	76.9
#100 SIEVE (150um)	36.0	91.3	75.4	95.4	90.3	57.3
#140 SIEVE (106um)	21.7	84.3	55.5	93.9	59.3	45.9
#200 SIEVE (75um)	16.7	73.9	36.8	89.4	31.8	40.0
Clay						
Silt						
Total Sand	83.3	26.1	63.2	10.6	68.2	59.2
Total Gravel	0.0	0.0	0.0	0.0	0.0	0.8
ATTERBERG LIMITS						
Liquid Limit	NP	37	NP	37	NP	25
Plastic Limit	NP	15	NP	24	NP	15
Plasticity Index	NP	22	NP	13	NP	10
USCS	SM	CL	SM	CL	SM	SC
AASHTO	A-2-4(0)	A-6(14)	A-4(0)	A-6(12)	A-2-4(0)	A-4(1)

BMT-5

Client: ALDOT
Project: I-10 Mobile River Bridge and Bayway
ALDOT Project No.:15-1101-0228

Project No.: 15-1101-0228
Region: Southwest Region
Date: 07/20/2018

ALABAMA DEPARTMENT OF TRANSPORTATION
SOILS AND BASE COARSE ANALYSIS

Boring No.	TH-32	TH-32	TH-32	TH-32	TH-32	TH-32
Station	17+55.7	17+55.7	17+55.7	17+55.7	17+55.7	17+55.7
Offset	RT 76.7	RT 76.7	RT 76.7	RT 76.7	RT 76.7	RT 76.7
Sample ID	SS-3	SS-4	SS-5	SS-8	T-1	SS-9
Depth (ft)	3.0	4.5	6.0	18.5	23.0	28.5
TOTAL PASSING (%)						
3" SIEVE (75mm)	100.0	100.0	100.0	100.0	100.0	100.0
2 1/2" SIEVE (63mm)	100.0	100.0	100.0	100.0	100.0	100.0
2" SIEVE (50mm)	100.0	100.0	100.0	100.0	100.0	100.0
1 1/2" SIEVE (37.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
1" SIEVE (25mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/4" SIEVE (19mm)	100.0	100.0	100.0	100.0	100.0	100.0
1/2" SIEVE (12.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/8" SIEVE (9.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
#4 SIEVE (4.75mm)	98.7	97.6	99.9	99.8	99.3	99.8
#10 SIEVE (2.00mm)	97.1	96.0	99.2	98.6	99.2	99.4
#20 SIEVE (0.85mm)	94.7	94.3	98.2	97.0	97.2	96.8
#40" SIEVE (425um)	88.9	90.1	94.8	91.9	84.0	69.0
#60 SIEVE (250um)	79.6	83.5	86.1	79.3	56.0	24.3
#100 SIEVE (150um)	72.7	76.6	71.5	60.7	37.5	10.8
#140 SIEVE (106um)	67.5	71.4	64.4	52.4	31.5	8.5
#200 SIEVE (75um)	62.3	66.2	57.2	45.8	27.4	7.4
Clay					8.3	
Silt					19.1	
Total Sand	36.5	31.4	42.7	53.9	71.9	92.4
Total Gravel	1.3	2.4	0.1	0.2	0.7	0.2
ATTERBERG LIMITS						
Liquid Limit	48	37	26	NP	NP	NP
Plastic Limit	14	12	15	NP	NP	NP
Plasticity Index	34	25	11	NP	NP	NP
USCS	CL	CL	CL	SM	SM	SP-SM
AASHTO	A-7-6(18)	A-6(13)	A-6(3)	A-4(0)	A-2-4(0)	A-3(0)

BMT-5

Client: ALDOT
Project: I-10 Mobile River Bridge and Bayway
ALDOT Project No.:15-1101-0228

Project No.: 15-1101-0228
Region: Southwest Region
Date: 07/20/2018

ALABAMA DEPARTMENT OF TRANSPORTATION
SOILS AND BASE COARSE ANALYSIS

Boring No.	TH-32	TH-32	TH-32	TH-32	TH-32	TH-32
Station	17+55.7	17+55.7	17+55.7	17+55.7	17+55.7	17+55.7
Offset	RT 76.7	RT 76.7	RT 76.7	RT 76.7	RT 76.7	RT 76.7
Sample ID	T-2	SS-12	SS-14	SS-18	SS-19	SS-21
Depth (ft)	38.5	49.0	59.0	78.0	83.0	93.0
TOTAL PASSING (%)						
3" SIEVE (75mm)	100.0	100.0	100.0	100.0	100.0	100.0
2 1/2" SIEVE (63mm)	100.0	100.0	100.0	100.0	100.0	100.0
2" SIEVE (50mm)	100.0	100.0	100.0	100.0	100.0	100.0
1 1/2" SIEVE (37.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
1" SIEVE (25mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/4" SIEVE (19mm)	100.0	100.0	100.0	100.0	100.0	100.0
1/2" SIEVE (12.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
3/8" SIEVE (9.5mm)	100.0	100.0	100.0	100.0	100.0	100.0
#4 SIEVE (4.75mm)	100.0	100.0	100.0	100.0	100.0	100.0
#10 SIEVE (2.00mm)	100.0	99.9	100.0	100.0	100.0	100.0
#20 SIEVE (0.85mm)	100.0	99.8	99.9	100.0	99.9	100.0
#40" SIEVE (425um)	99.9	99.6	99.3	99.3	98.6	99.7
#60 SIEVE (250um)	98.6	98.1	98.4	95.3	95.6	97.1
#100 SIEVE (150um)	84.4	85.9	92.4	78.5	78.2	80.4
#140 SIEVE (106um)	55.0	60.4	71.7	57.4	51.1	43.9
#200 SIEVE (75um)	29.0	31.7	48.1	43.1	34.5	23.1
Clay	16.8					
Silt	12.2					
Total Sand	71.0	68.3	51.9	56.9	65.5	76.9
Total Gravel	0.0	0.0	0.0	0.0	0.0	0.0
ATTERBERG LIMITS						
Liquid Limit	NP	NP	30	NP	NP	NP
Plastic Limit	NP	NP	21	NP	NP	NP
Plasticity Index	NP	NP	9	NP	NP	NP
USCS	SM	SM	SC	SM	SM	SM
AASHTO	A-2-4(0)	A-2-4(0)	A-4(2)	A-4(0)	A-2-4(0)	A-2-4(0)

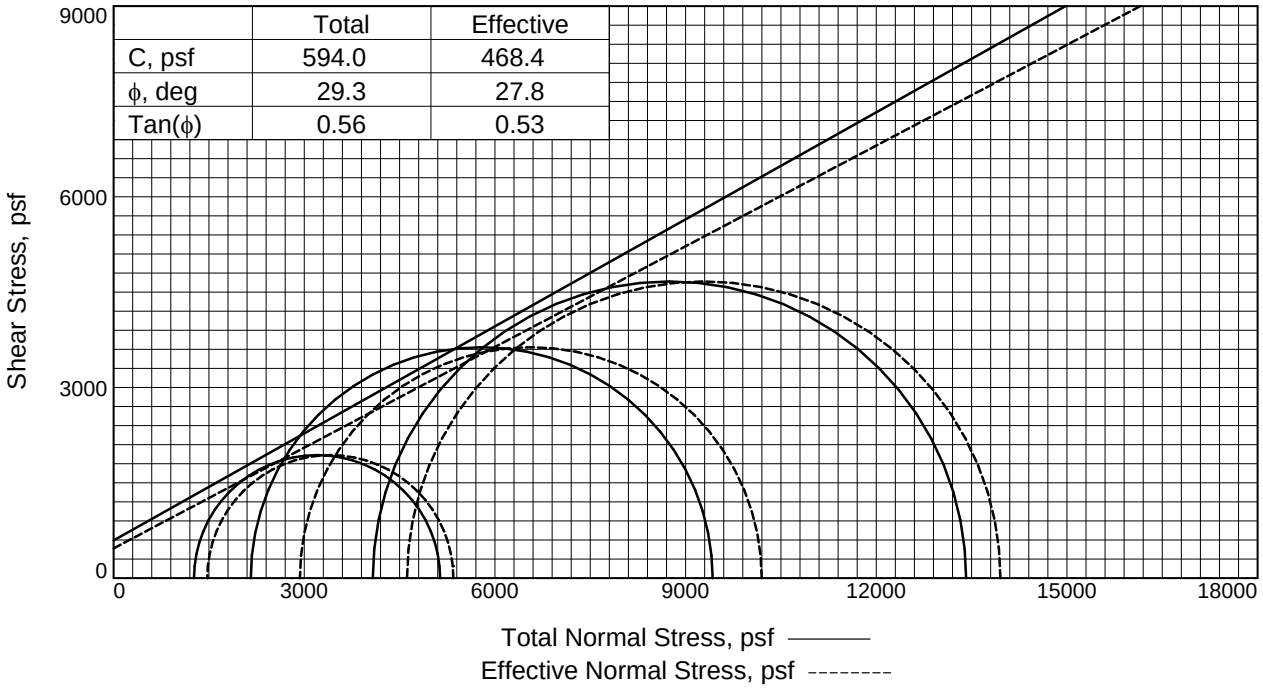
BMT-5

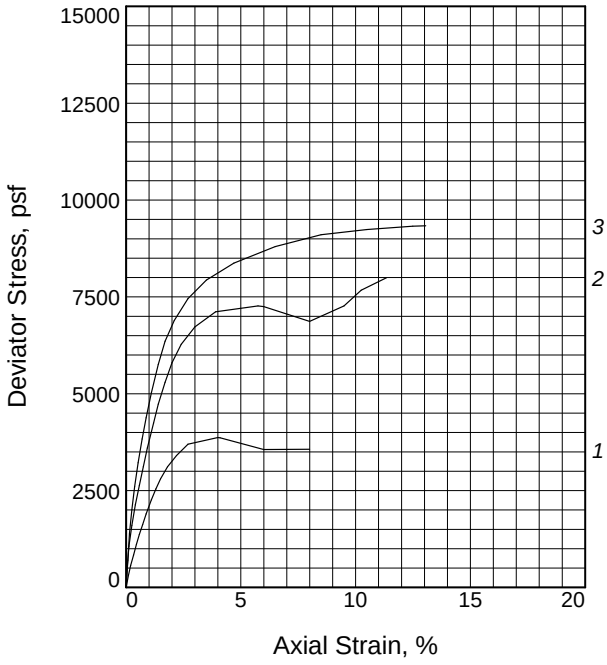
Client: ALDOT
Project: I-10 Mobile River Bridge and Bayway
ALDOT Project No.:15-1101-0228

Project No.: 15-1101-0228
Region: Southwest Region
Date: 07/20/2018

ALABAMA DEPARTMENT OF TRANSPORTATION
SOILS AND BASE COARSE ANALYSIS

Boring No.	TH-32	TH-32	TH-32	TH-32
Station	17+55.7	17+55.7	17+55.7	17+55.7
Offset	RT 76.7	RT 76.7	RT 76.7	RT 76.7
Sample ID	SS-24	SS-27	SS-29	SS-32
Depth (ft)	108.0	123.0	133.0	148.0
TOTAL PASSING (%)				
3" SIEVE (75mm)	100.0	100.0	100.0	100.0
2 1/2" SIEVE (63mm)	100.0	100.0	100.0	100.0
2" SIEVE (50mm)	100.0	100.0	100.0	100.0
1 1/2" SIEVE (37.5mm)	100.0	100.0	100.0	100.0
1" SIEVE (25mm)	100.0	100.0	100.0	100.0
3/4" SIEVE (19mm)	100.0	100.0	100.0	100.0
1/2" SIEVE (12.5mm)	100.0	100.0	100.0	100.0
3/8" SIEVE (9.5mm)	100.0	100.0	100.0	100.0
#4 SIEVE (4.75mm)	100.0	100.0	100.0	100.0
#10 SIEVE (2.00mm)	100.0	100.0	100.0	100.0
#20 SIEVE (0.85mm)	99.6	99.9	99.9	100.0
#40" SIEVE (425um)	97.5	98.4	99.3	98.0
#60 SIEVE (250um)	94.5	92.9	97.4	97.0
#100 SIEVE (150um)	82.1	67.8	80.4	95.5
#140 SIEVE (106um)	70.1	44.8	61.9	92.7
#200 SIEVE (75um)	55.2	26.7	46.6	82.4
Clay				
Silt				
Total Sand	44.8	73.3	53.4	17.6
Total Gravel	0.0	0.0	0.0	0.0
ATTERBERG LIMITS				
Liquid Limit	34	NP	30	41
Plastic Limit	17	NP	21	19
Plasticity Index	17	NP	9	22
USCS	CL	SM	SC	CL
AASHTO	A-6(6)	A-2-4(0)	A-4(1)	A-7-6(18)





Specimen No.		1	2	3
Initial	Water Content, %	15.8	16.6	16.7
	Dry Density, pcf	111.4	113.9	114.8
	Saturation, %	85.4	96.7	99.7
	Void Ratio	0.4909	0.4578	0.4460
	Diameter, in.	1.447	1.427	1.417
	Height, in.	2.790	2.780	2.780
At Test	Water Content, %	19.7	19.0	18.0
	Dry Density, pcf	111.4	113.9	114.8
	Saturation, %	106.9	110.1	107.2
	Void Ratio	0.4909	0.4578	0.4460
	Diameter, in.	1.447	1.427	1.417
	Height, in.	2.790	2.780	2.780
Strain at peak, %		4.0	5.7	13.1
Eff. Cell Pressure, psf		1265.8	2158.6	4078.1
Fail. Stress, psf		3871.0	7266.0	9335.7
Excess Pore Pr., psf		-208.4	-772.6	-538.7
Strain, %		4.0	5.7	13.1
Ult. Stress, psf		3871.0	7266.0	9335.7
Excess Pore Pr., psf		-208.4	-772.6	-538.7
Strain, %		4.0	5.7	13.1
$\bar{\sigma}_1$ Failure, psf		5345.2	10197.2	13952.5
$\bar{\sigma}_3$ Failure, psf		1474.2	2931.2	4616.8

Type of Test:
CU with Pore Pressures

Sample Type: 3-in. Shelby Tube

Description: SANDY LEAN CLAY (CL, A-7-6(10))

Specific Gravity= 2.66

Remarks: Compression Failure Mode: Asymmetrical Shear Plane

Figure _____

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: Lab #8203 **Depth:** 8.5'-10.0'

Sample Number: TH-28 T-1

Proj. No.: 1511010228 **Date Sampled:**

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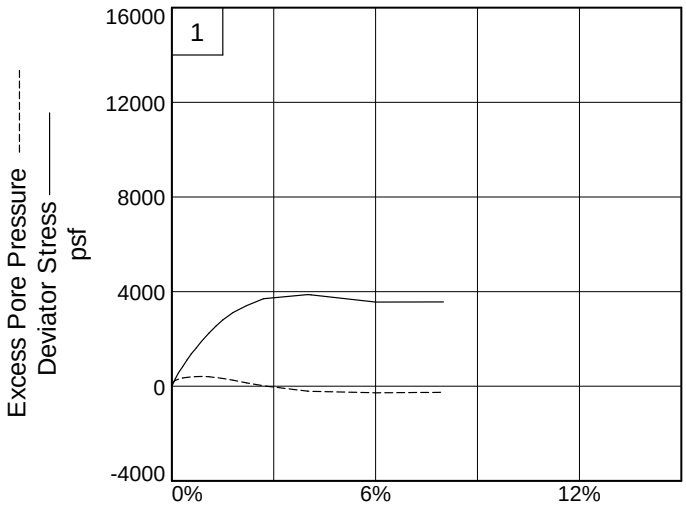
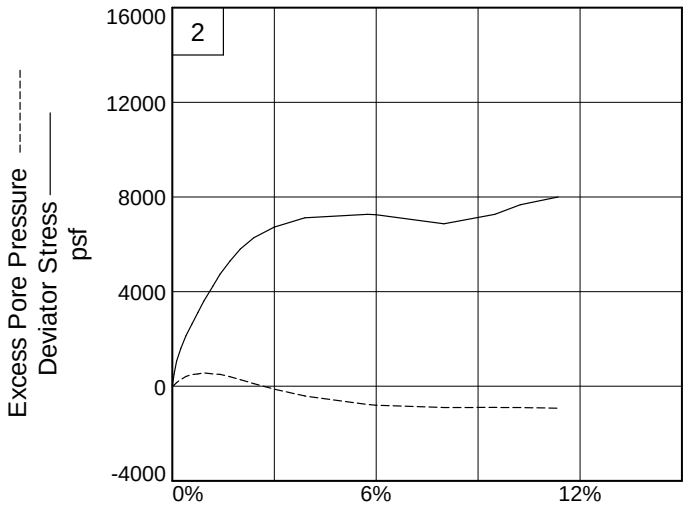
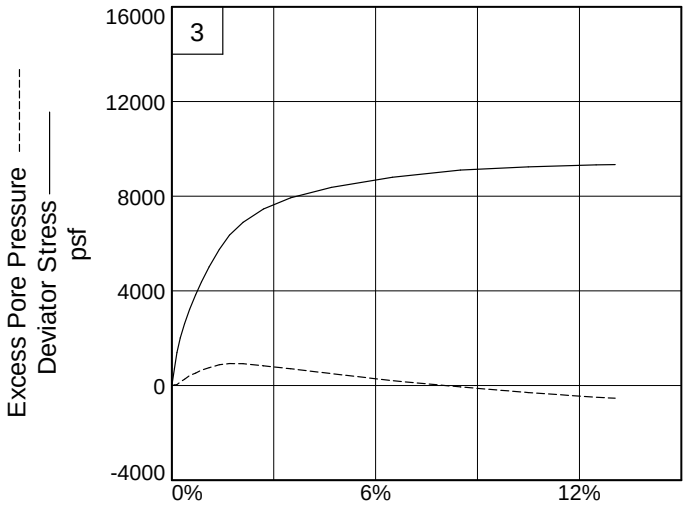
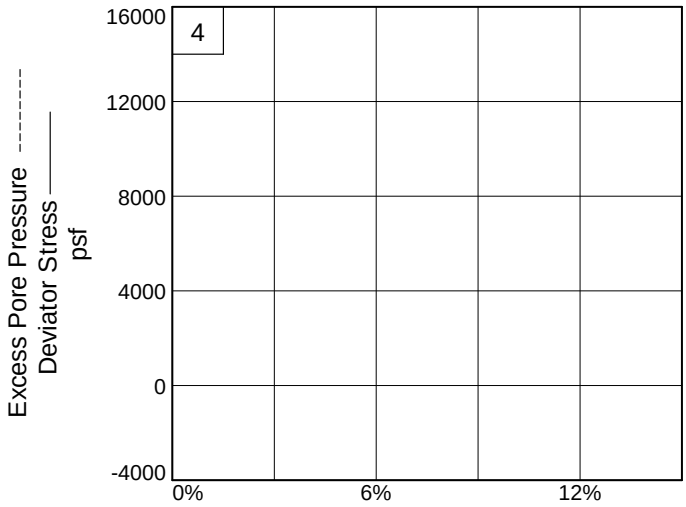
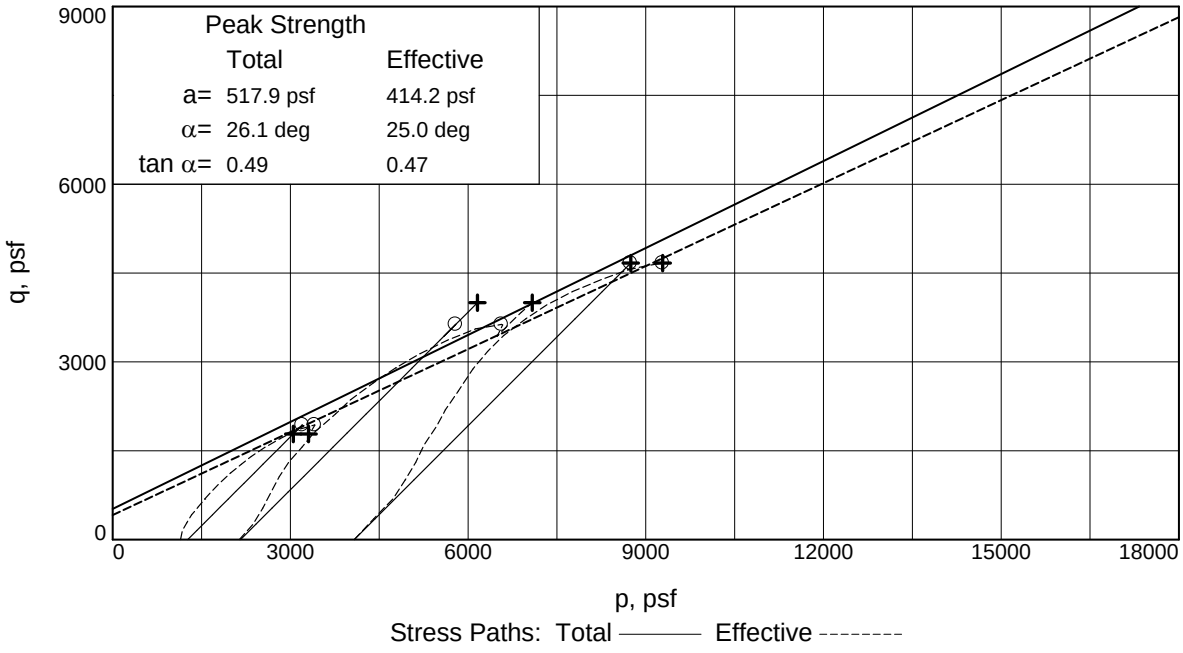
Thompson Engineering
Mobile, Alabama











Client: ALDOT

Project: Mobile River Bridge

Source of Sample: Lab #8203 **Depth:** 8.5'-10.0' **Sample Number:** TH-28 T-1

Project No.: 1511010228 **Figure** _____

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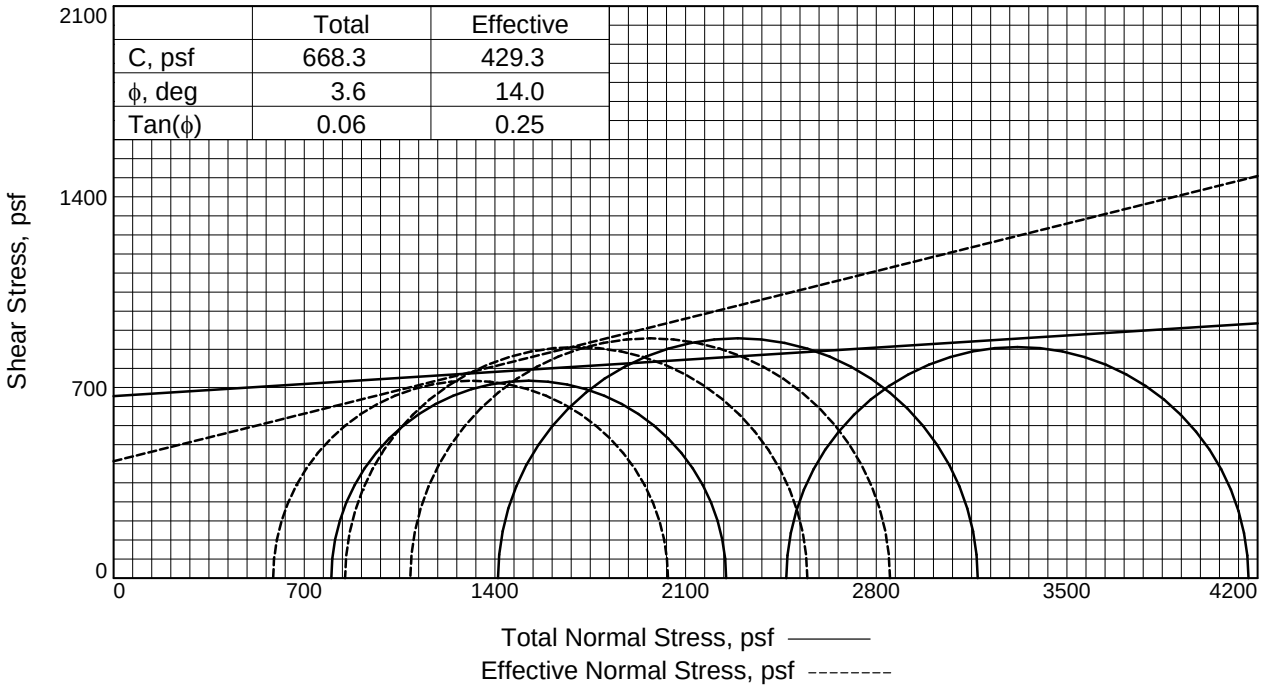
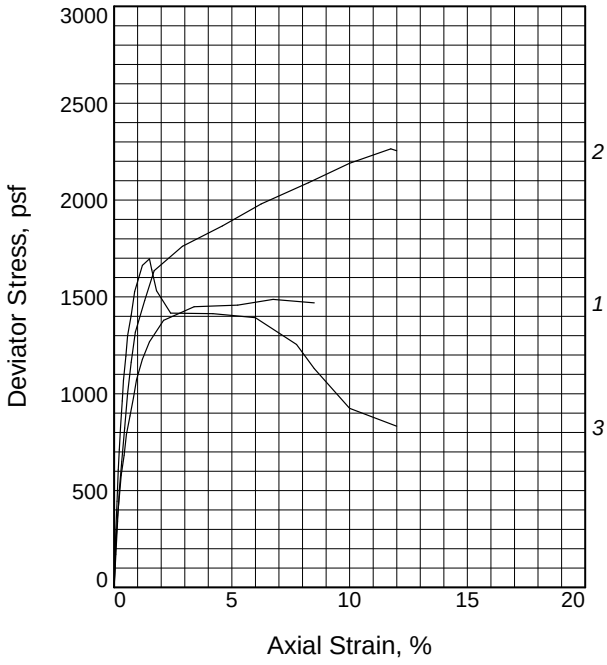
	Total	Effective
C, psf	668.3	429.3
ϕ, deg	3.6	14.0
Tan(ϕ)	0.06	0.25





Specimen No.		1	2	3
Initial	Water Content, %	29.6	29.4	25.3
	Dry Density, pcf	93.6	94.2	100.1
	Saturation, %	101.7	102.7	102.3
	Void Ratio	0.7733	0.7621	0.6588
	Diameter, in.	1.416	1.422	1.414
	Height, in.	2.790	2.790	2.790
At Test	Water Content, %	2.0	29.9	25.6
	Dry Density, pcf	93.6	94.2	100.1
	Saturation, %	6.8	104.2	103.4
	Void Ratio	0.7733	0.7621	0.6588
	Diameter, in.	1.416	1.422	1.414
	Height, in.	2.790	2.790	2.790
Strain at peak, %		3.4	2.9	1.5
Eff. Cell Pressure, psf		799.2	1411.2	2469.6
Fail. Stress, psf		1449.5	1761.0	1696.7
Excess Pore Pr., psf		213.6	322.0	1619.7
Strain, %		3.4	2.9	1.5
Ult. Stress, psf		1449.5	1761.0	
Excess Pore Pr., psf		213.6	322.0	
Strain, %		3.4	2.9	
$\bar{\sigma}_1$ Failure, psf		2035.0	2850.2	2546.6
$\bar{\sigma}_3$ Failure, psf		585.6	1089.2	849.9

Type of Test:
CU with Pore Pressures

Sample Type: 3-in. Shelby Tube

Description: LEAN CLAY (CL, A-7-6(25))

Specific Gravity= 2.66

Remarks: Compression Failure Mode: Symmetrical Bulge

Figure _____

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: Lab #8210 **Depth:** 8.5'-10.0'

Sample Number: TH-29 T-1

Proj. No.: 1511010228 **Date Sampled:**

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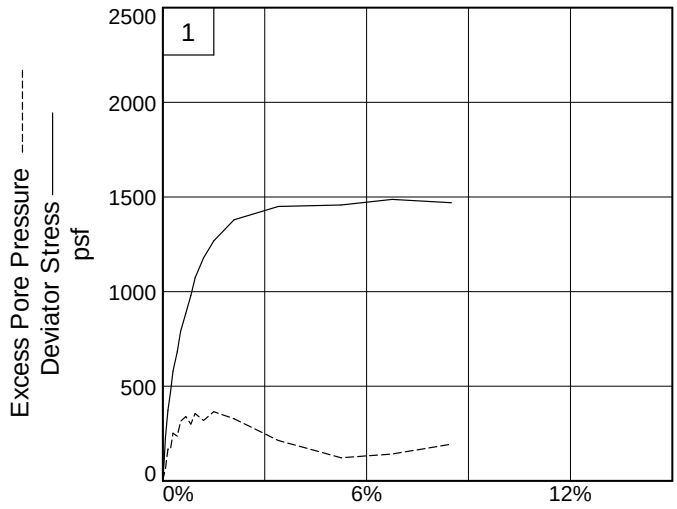

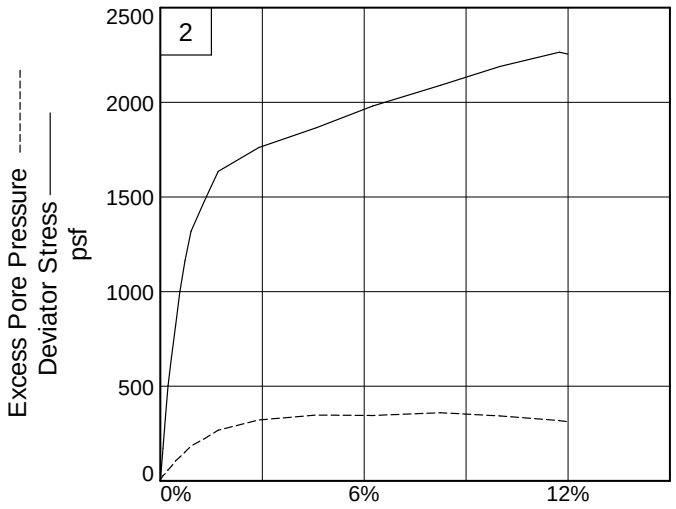

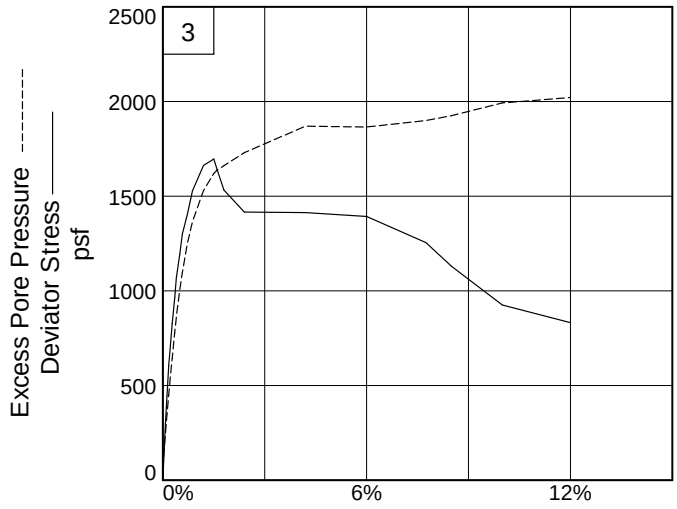

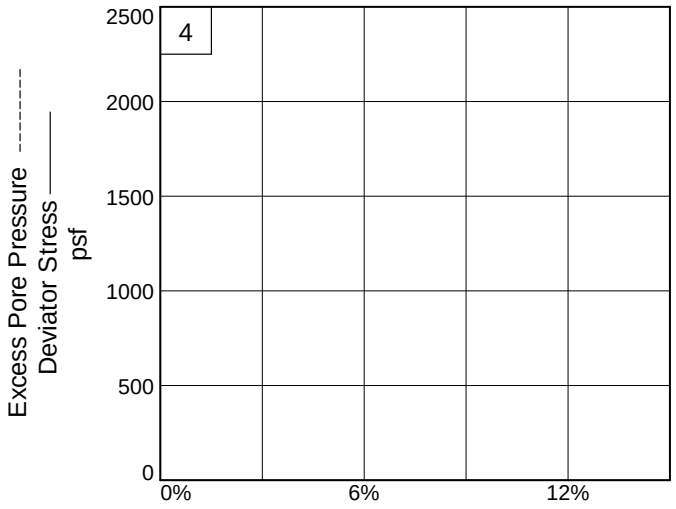

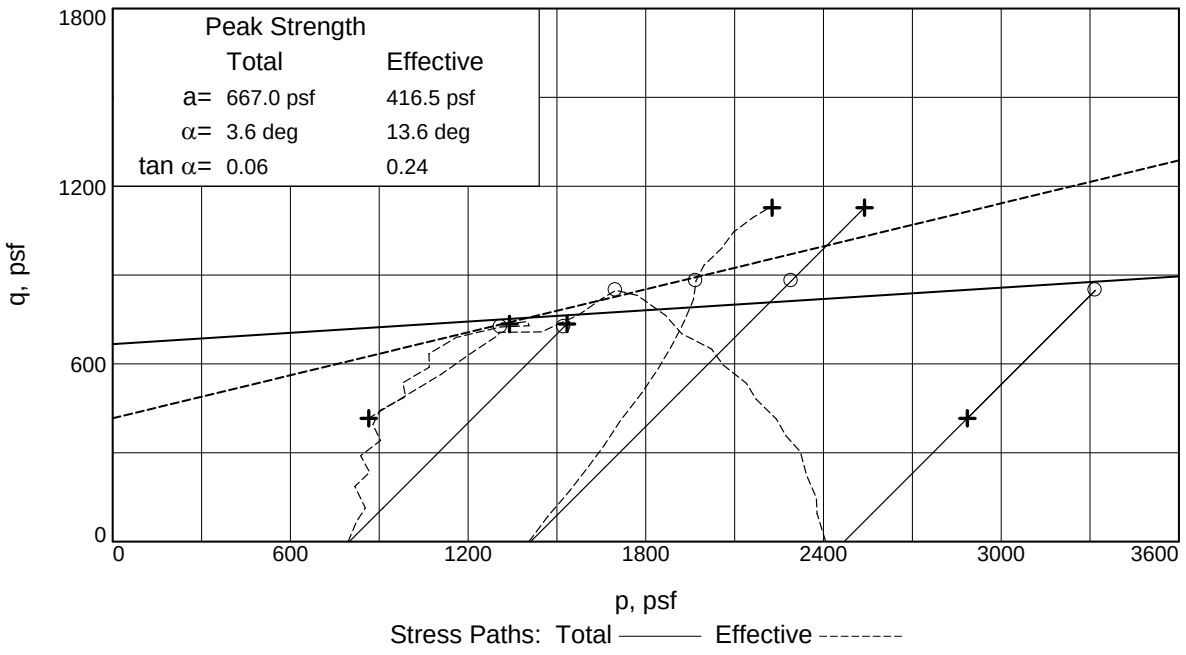

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: Lab #8210 **Depth:** 8.5'-10.0' **Sample Number:** TH-29 T-1

Project No.: 1511010228 **Figure** _____

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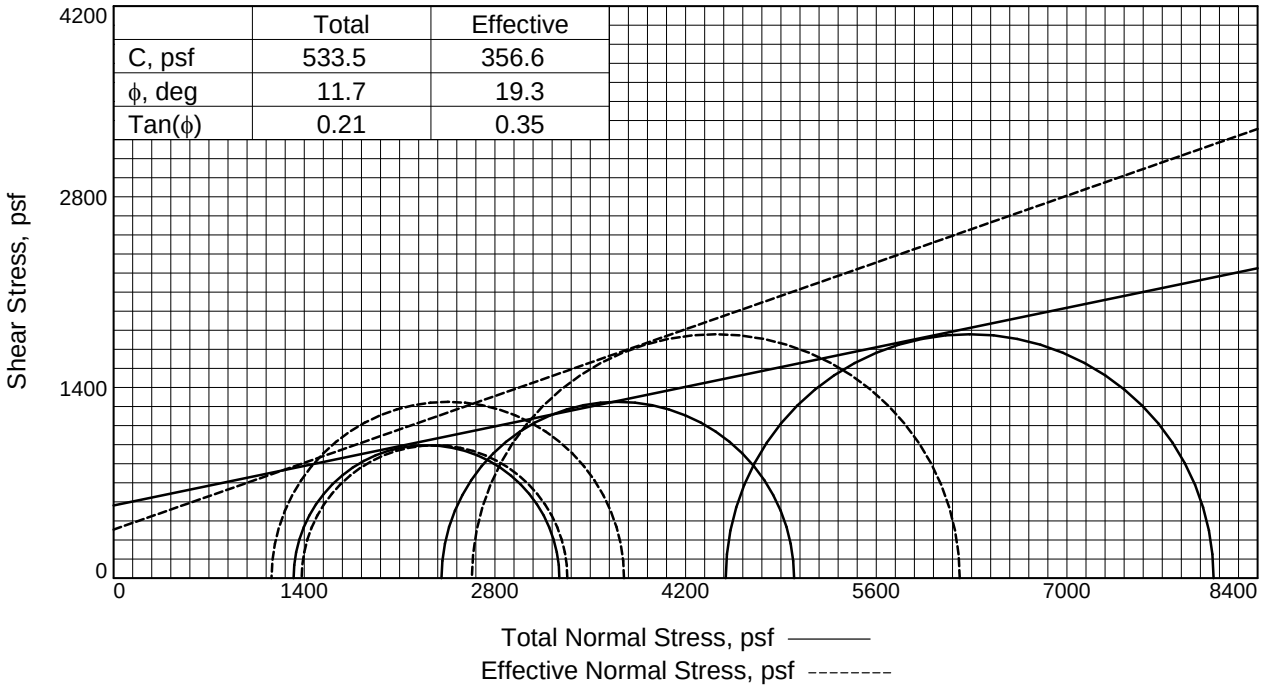

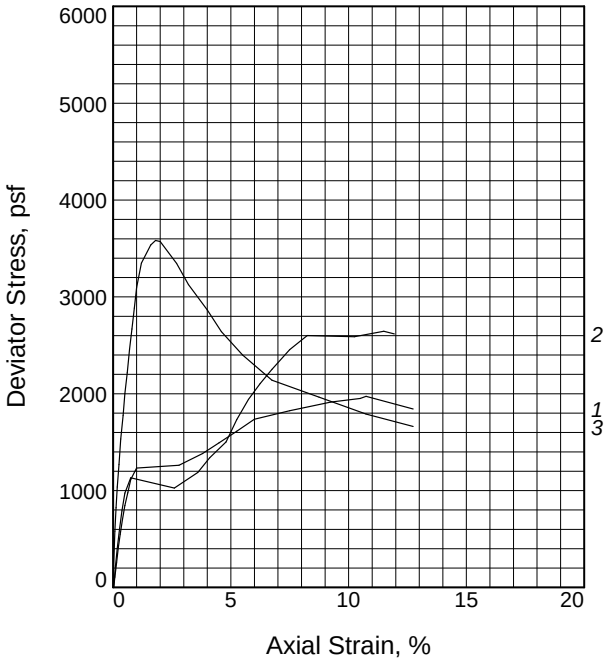

Specimen No.		1	2	3
Initial	Water Content, %	22.5	23.1	21.1
	Dry Density, pcf	104.9	102.6	106.9
	Saturation, %	102.8	99.4	101.5
	Void Ratio	0.5824	0.6190	0.5536
	Diameter, in.	1.420	1.424	1.417
	Height, in.	2.780	2.780	2.780
At Test	Water Content, %	23.5	24.5	22.3
	Dry Density, pcf	104.9	102.6	106.9
	Saturation, %	107.5	105.3	107.0
	Void Ratio	0.5824	0.6190	0.5536
	Diameter, in.	1.420	1.424	1.417
	Height, in.	2.780	2.780	2.780
Strain at peak, %		10.5	10.2	1.8
Eff. Cell Pressure, psf		1321.9	2407.7	4494.2
Fail. Stress, psf		1951.1	2588.6	3582.2
Excess Pore Pr., psf		-58.8	1248.3	1863.6
Strain, %		10.5	10.2	1.8
Ult. Stress, psf		1951.1	2588.6	3582.2
Excess Pore Pr., psf		-58.8	1248.3	1863.6
Strain, %		10.5	10.2	1.8
$\bar{\sigma}_1$ Failure, psf		3331.9	3747.9	6212.8
$\bar{\sigma}_3$ Failure, psf		1380.7	1159.4	2630.6

Type of Test:
CU with Pore Pressures

Sample Type: 3-in. Shelby Tube

Description: FAT CLAY (CH, A-7-6(45))Speciman was very soft and wanted to sluff off during setup.

Specific Gravity= 2.66

Remarks: Compression Failure Mode: Asymmetrical Shear Plane

Figure _____

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: Lab #8203 **Depth:** 8.5'-10.5'

Sample Number: TH-31 T-1

Proj. No.: 1511010228 **Date Sampled:**

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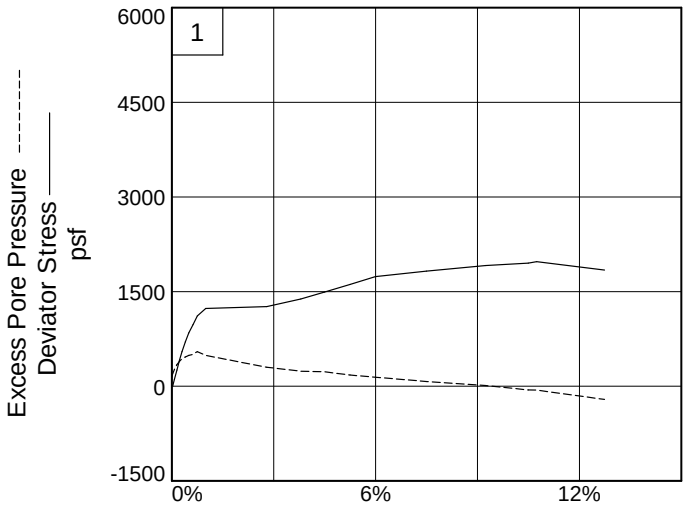

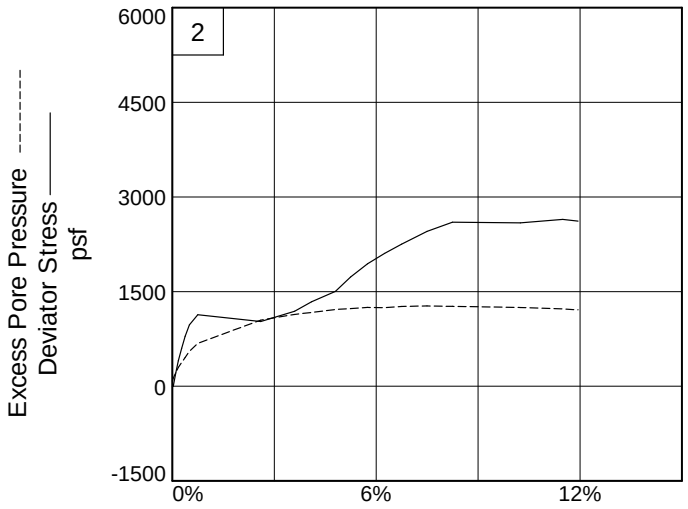

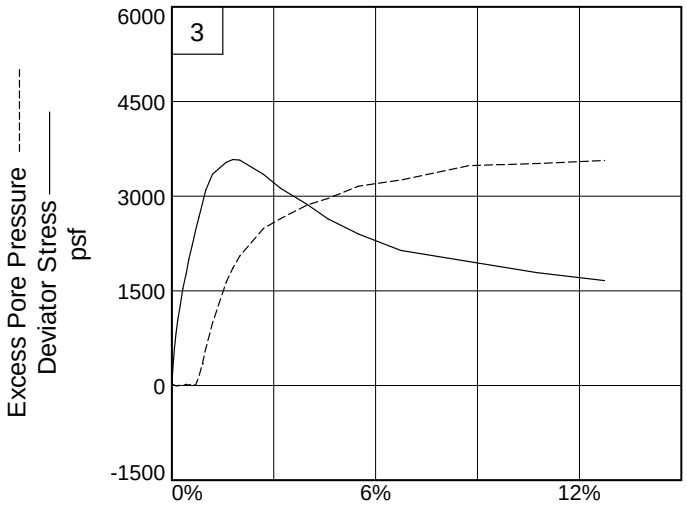

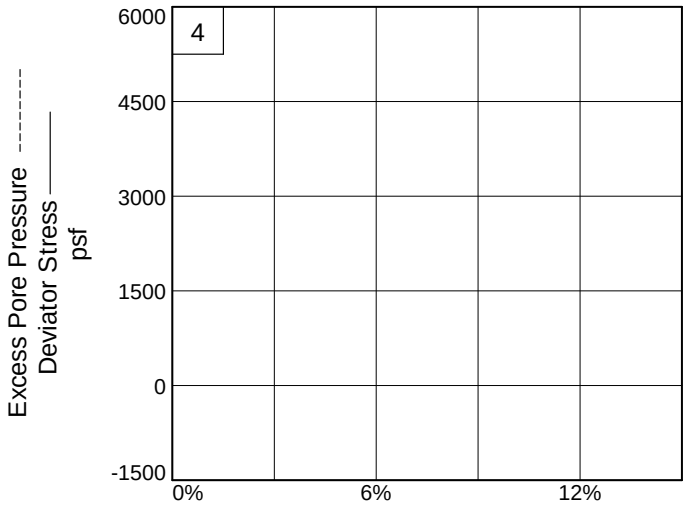

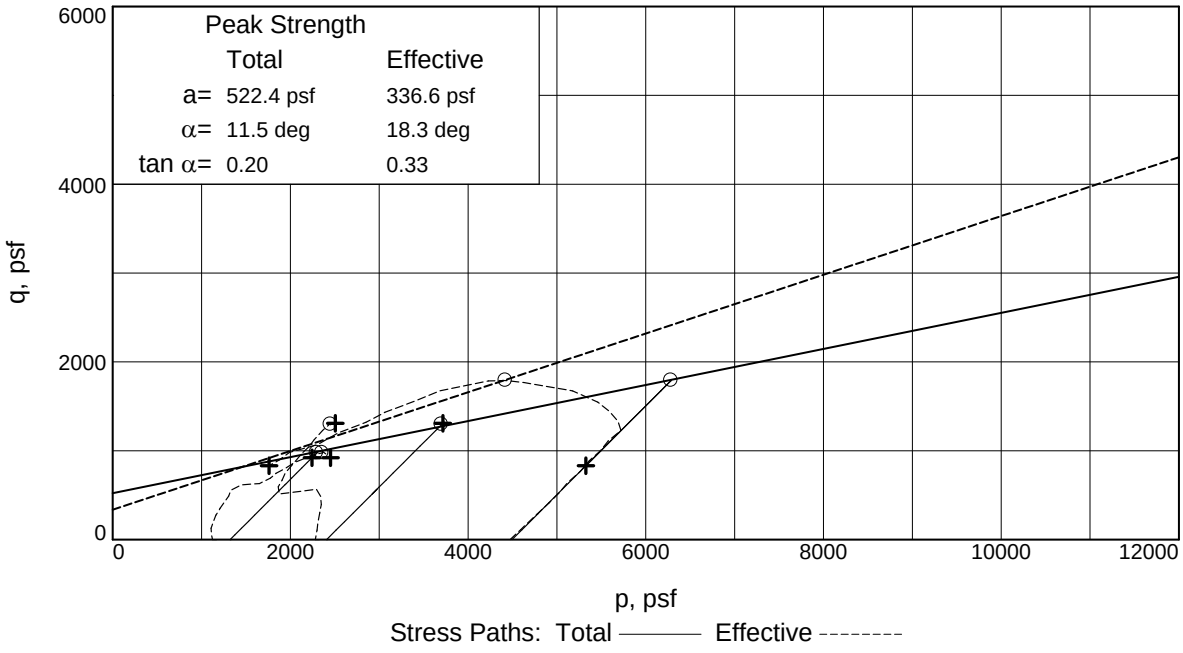

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: Lab #8203 **Depth:** 8.5'-10.5' **Sample Number:** TH-31 T-1

Project No.: 1511010228 **Figure** _____

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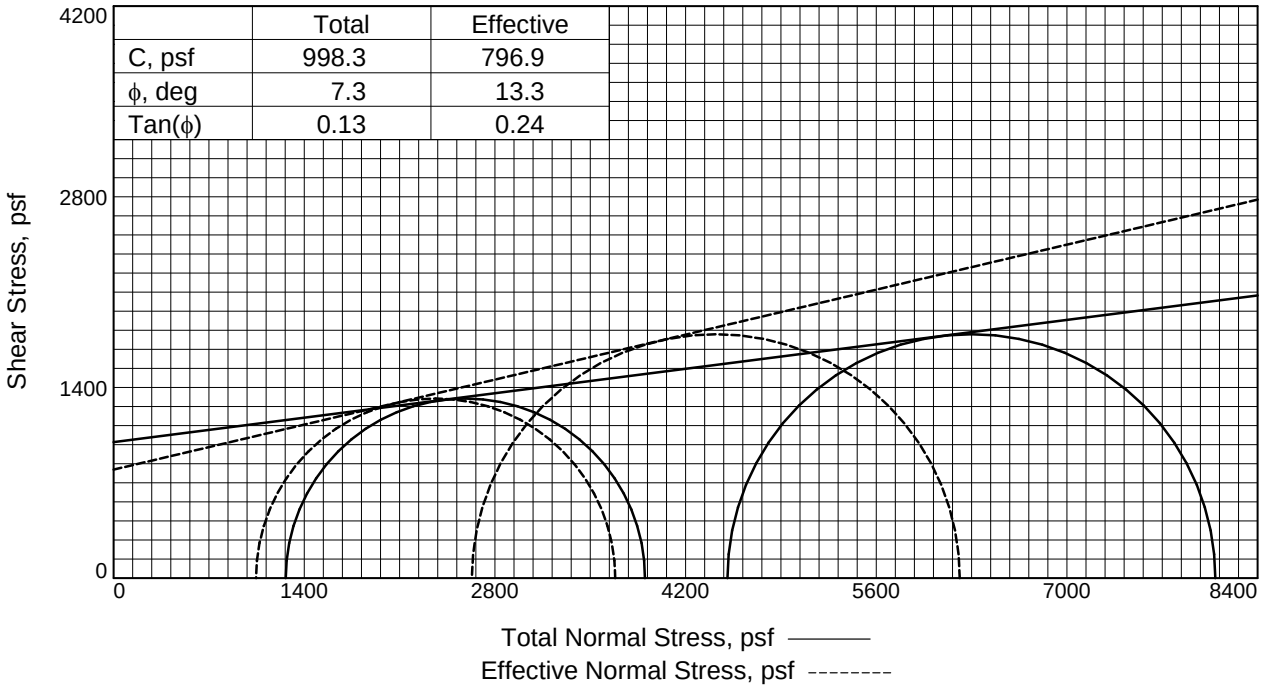

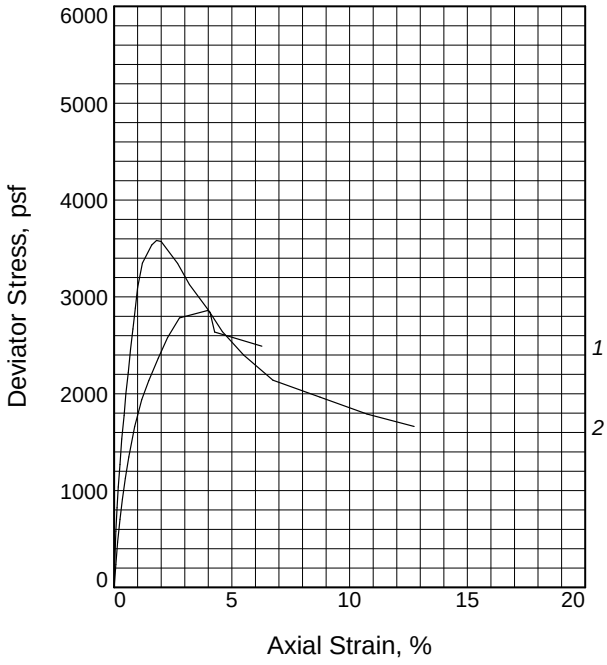

Specimen No.		1	2
Initial	Water Content, %	31.6	23.0
	Dry Density, pcf	85.4	97.7
	Saturation, %	88.9	87.4
	Void Ratio	0.9442	0.6988
	Diameter, in.	1.427	1.417
	Height, in.	2.780	2.780
At Test	Water Content, %	36.9	26.8
	Dry Density, pcf	85.4	97.7
	Saturation, %	104.1	102.1
	Void Ratio	0.9442	0.6988
	Diameter, in.	1.427	1.417
	Height, in.	2.780	2.780
Strain at peak, %		4.3	1.8
Eff. Cell Pressure, psf		1264.3	4507.2
Fail. Stress, psf		2637.3	3582.2
Excess Pore Pr., psf		218.3	1876.6
Strain, %		4.3	1.8
Ult. Stress, psf		2637.3	3582.2
Excess Pore Pr., psf		218.3	1876.6
Strain, %		4.3	1.8
$\bar{\sigma}_1$ Failure, psf		3683.4	6212.8
$\bar{\sigma}_3$ Failure, psf		1046.0	2630.6

Type of Test:
CU with Pore Pressures

Sample Type: 3-in. Shelby Tube

Description: SILTY SAND (SM, A-4(0))
Sample was sandy compared to other CU test specimens, only able to test 2 points.

Specific Gravity= 2.66

Remarks: Compression Failure Mode: Asymmetrical Shear Plane

Figure _____

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: Lab #8203 **Depth:** 23.5'-25.5'

Sample Number: TH-31 T-2

Proj. No.: 1511010228 **Date Sampled:**

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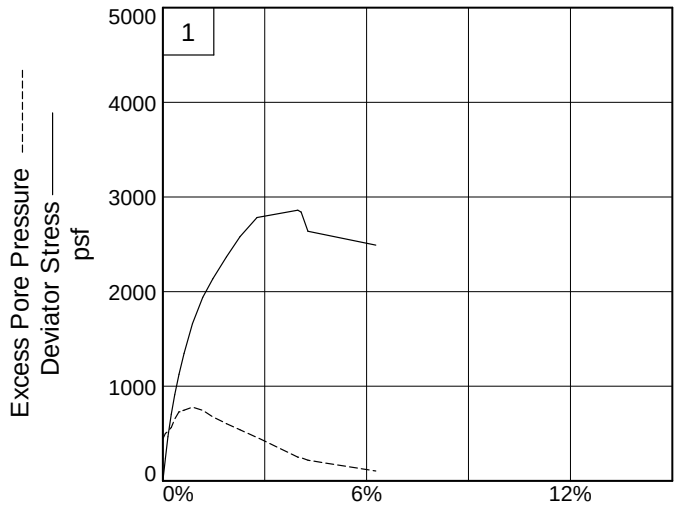
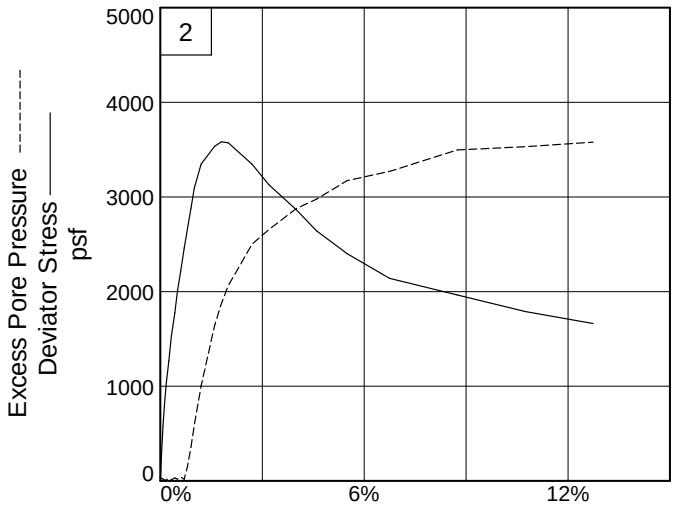
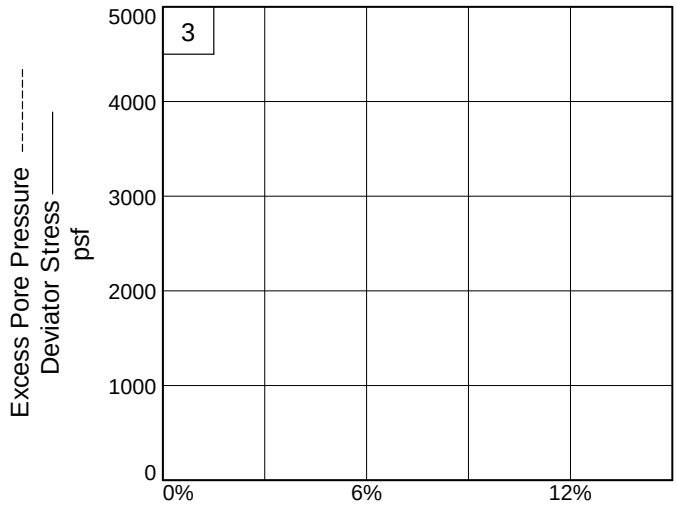
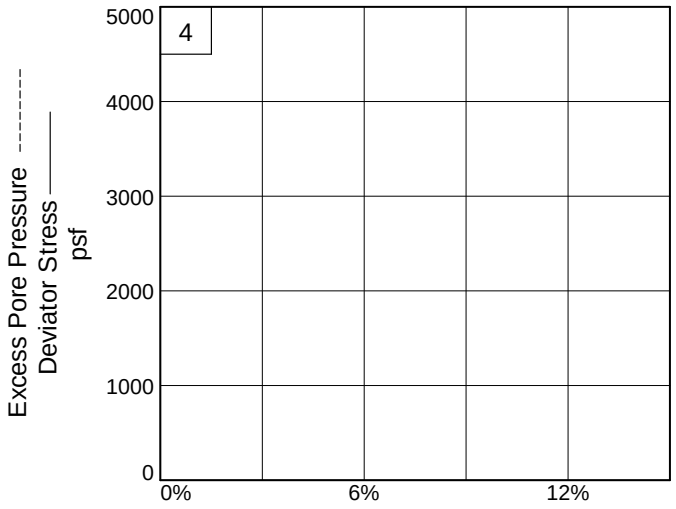
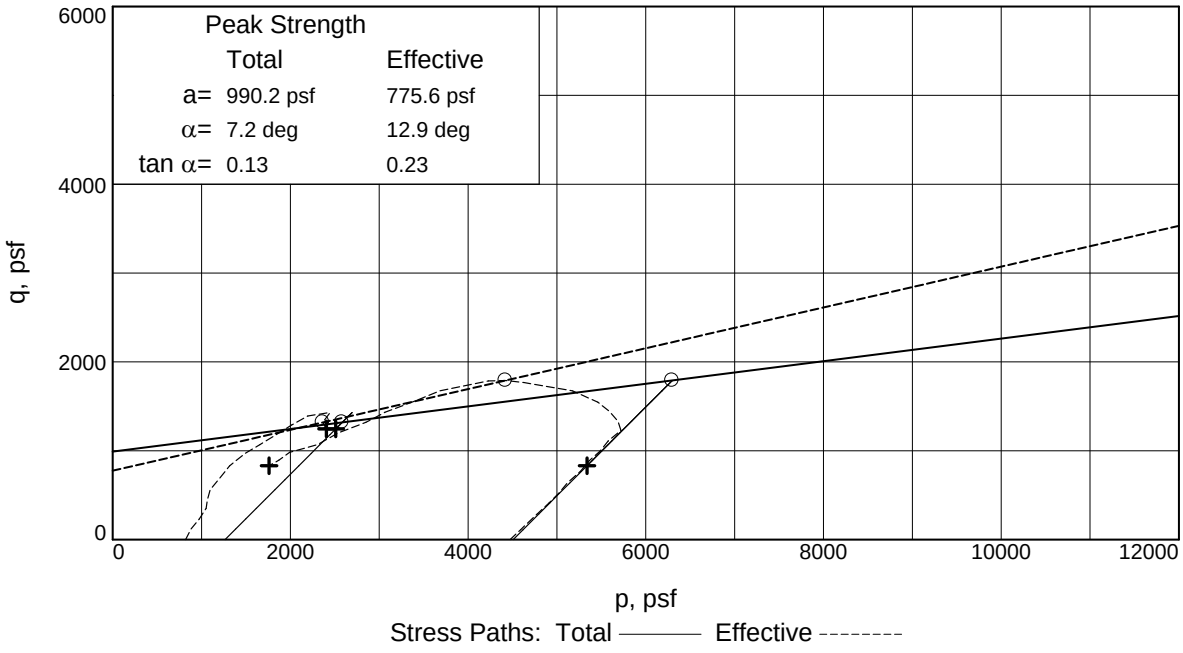
Mobile, Alabama











Client: ALDOT

Project: Mobile River Bridge

Source of Sample: Lab #8203 **Depth:** 23.5'-25.5' **Sample Number:** TH-31 T-2

Project No.: 1511010228 **Figure** _____

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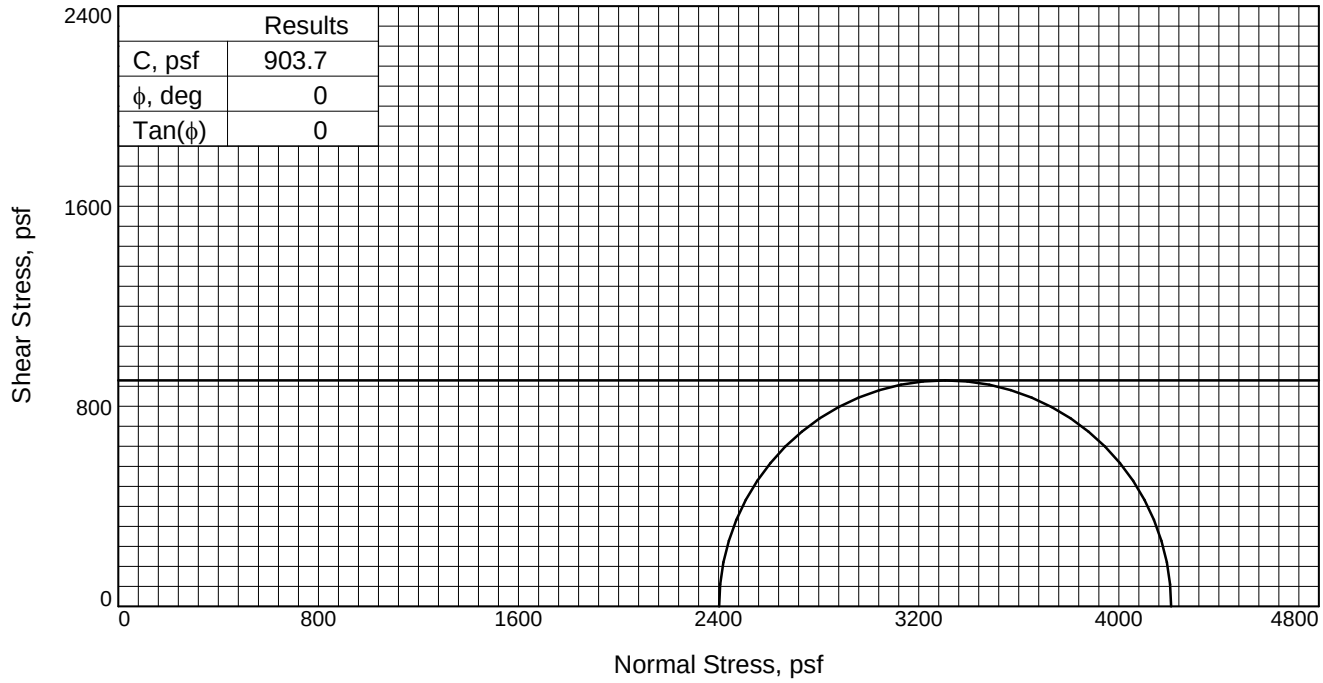

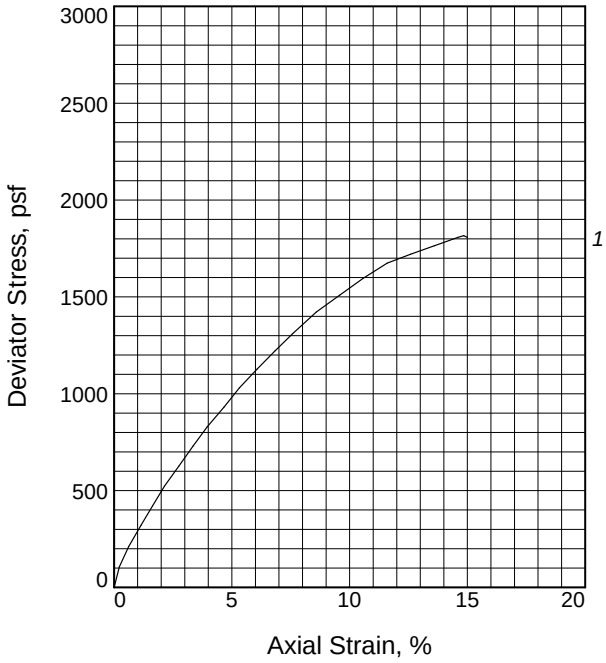

Specimen No.		1
Initial	Water Content, %	27.7
	Dry Density, pcf	99.1
	Saturation, %	109.0
	Void Ratio	0.6756
	Diameter, in.	2.824
	Height, in.	5.497
At Test	Water Content, %	26.4
	Dry Density, pcf	99.1
	Saturation, %	104.1
	Void Ratio	0.6756
	Diameter, in.	2.824
	Height, in.	5.497
Strain at peak, %		15.0
Back Pressure, psf		0.0
Cell Pressure, psf		2401.9
Fail. Stress, psf		1807.5
Strain, %		15.0
Ult. Stress, psf		1807.5
Strain, %		15.0
σ_1 Failure, psf		4209.4
σ_3 Failure, psf		2401.9

Type of Test:
Unconsolidated Undrained

Sample Type: 3-in. Shelby Tube

Description: SILTY, CLAYEY SAND (SC-SM, A-2-4(0))

Specific Gravity= 2.66

Remarks: Compression Failure Mode: Symmetrical Bulge

Figure _____

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: Lab #8210 **Depth:** 33.5'-35.5'

Sample Number: TH-30 T-2

Proj. No.: 1511010228 **Date Sampled:**

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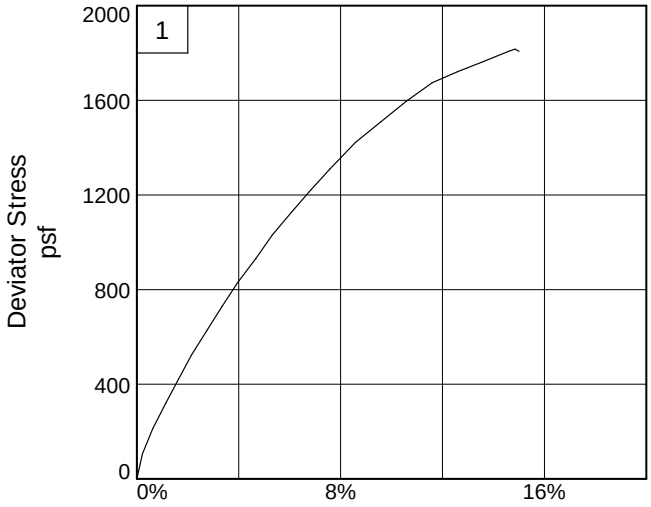

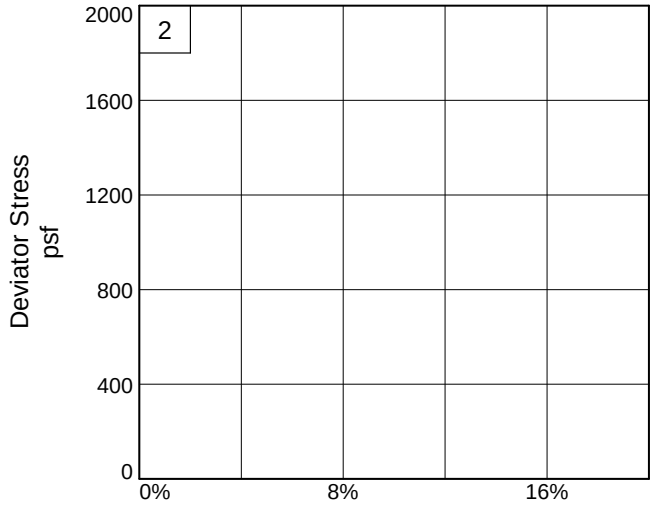

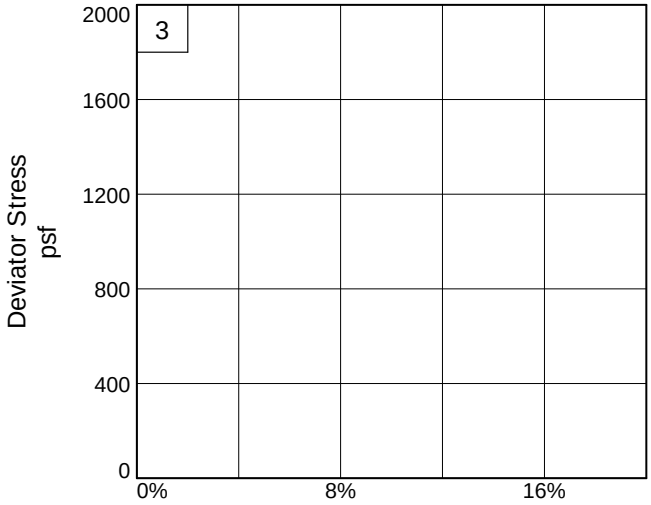

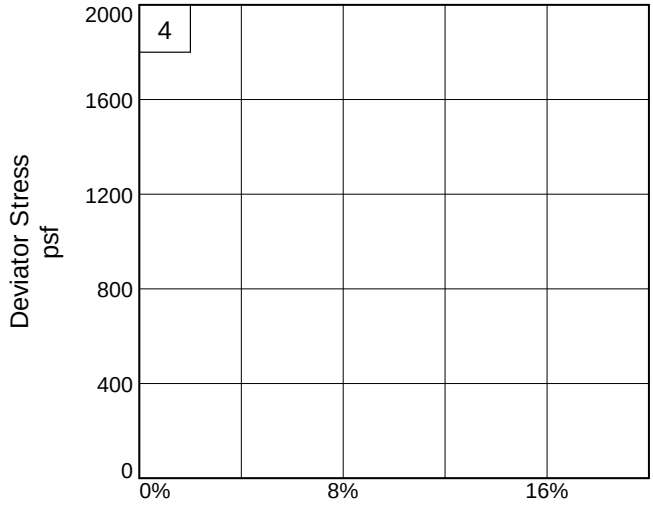

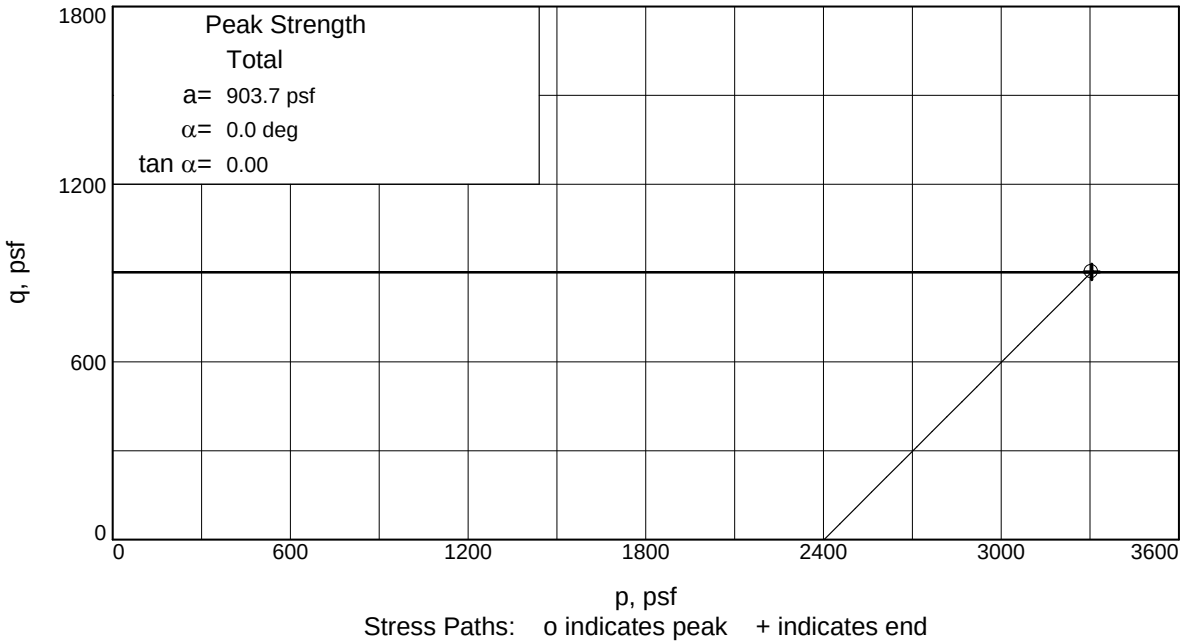

Stress Paths: o indicates peak + indicates end

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: Lab #8210 **Depth:** 33.5'-35.5' **Sample Number:** TH-30 T-2

Project No.: 1511010228 **Figure** _____

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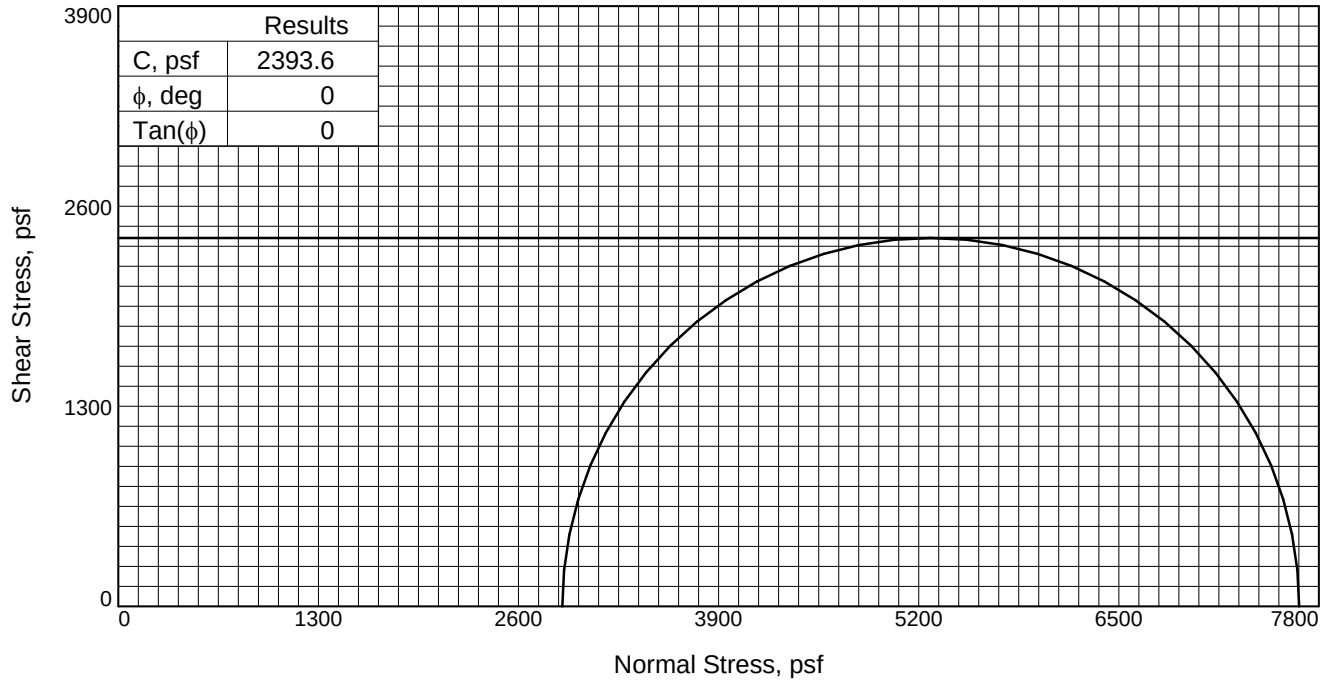
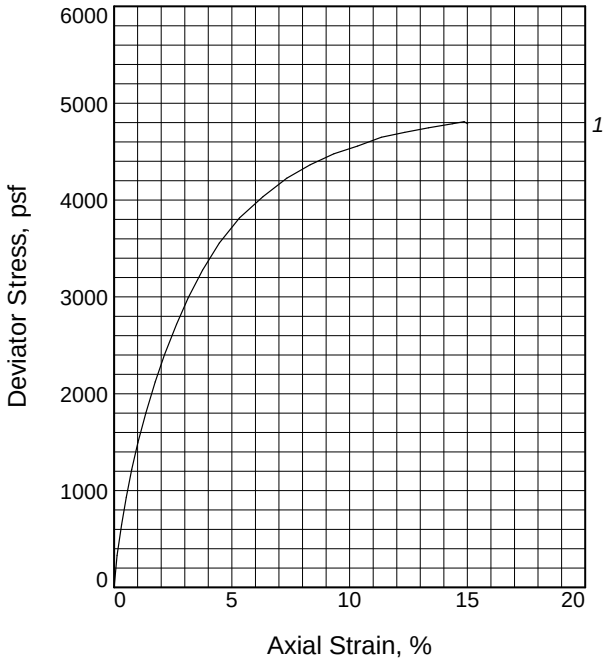




Specimen No.		1
Initial	Water Content, %	21.5
	Dry Density, pcf	103.9
	Saturation, %	95.4
	Void Ratio	0.5990
	Diameter, in.	2.869
	Height, in.	5.766
At Test	Water Content, %	23.0
	Dry Density, pcf	103.9
	Saturation, %	102.0
	Void Ratio	0.5990
	Diameter, in.	2.869
	Height, in.	5.766
Strain at peak, %		15.0
Back Pressure, psf		0.0
Cell Pressure, psf		2884.3
Fail. Stress, psf		4787.1
Strain, %		15.0
Ult. Stress, psf		4787.1
Strain, %		15.0
σ_1 Failure, psf		7671.4
σ_3 Failure, psf		2884.3

Type of Test:
Unconsolidated Undrained

Sample Type: 3-in. Shelby Tube

Description: SILTY SAND (SM, A-4(0))

Specific Gravity= 2.66

Remarks: Compression Failure Mode: Symmetrical Bulge

Figure _____

Client: ALDOT

Project: Mobile River Bridge

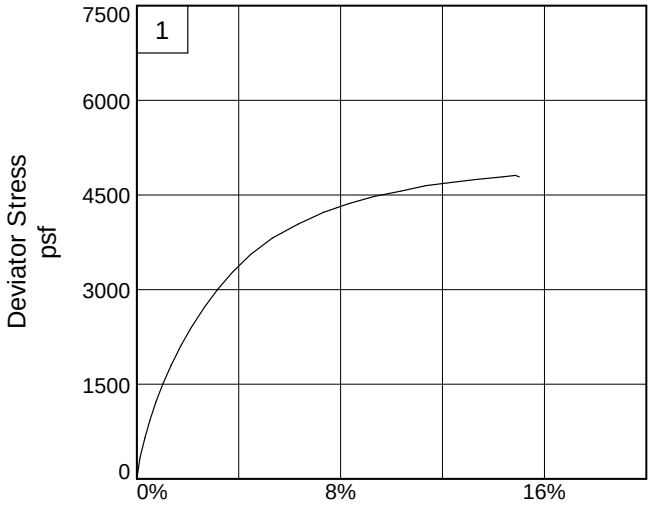
Source of Sample: Lab #8203 **Depth:** 38.0'-40.0'

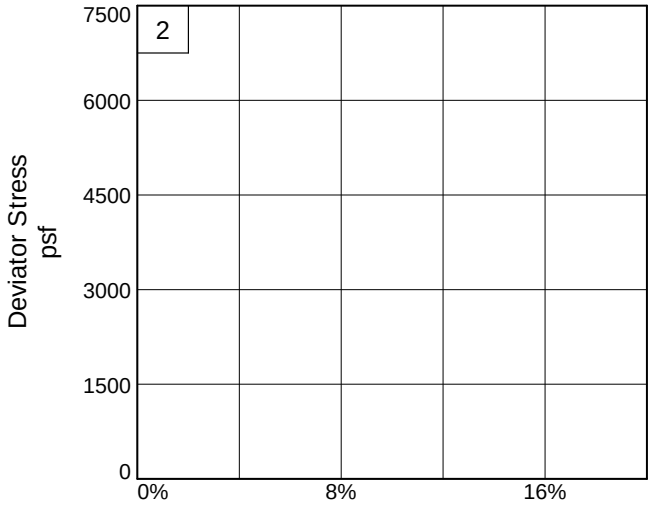
Sample Number: TH-31 T-3

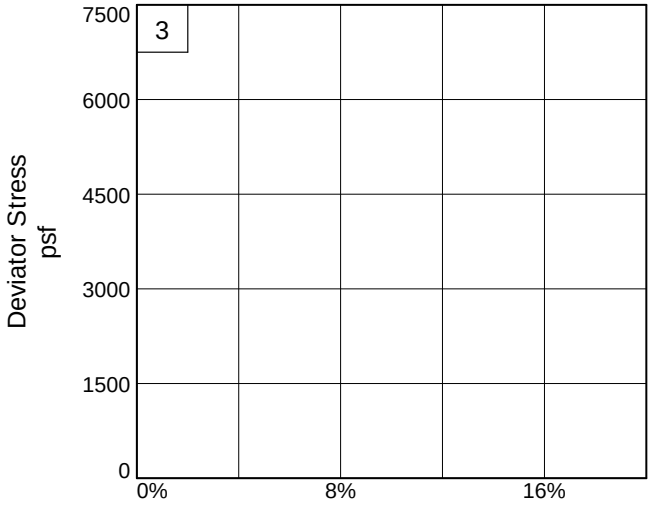
Proj. No.: 1511010228 **Date Sampled:**

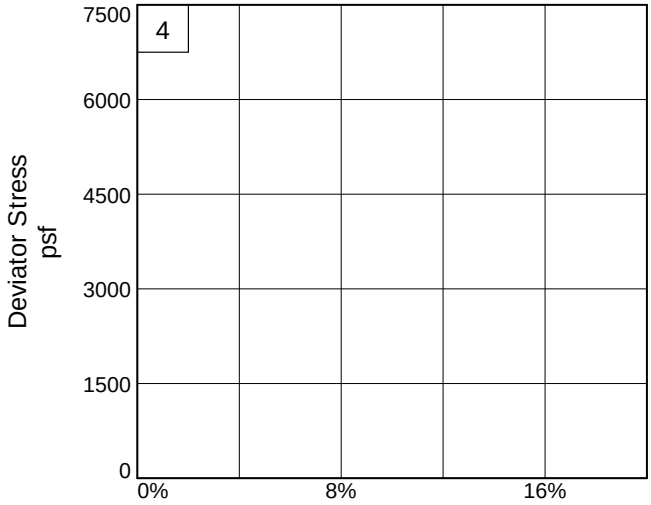
TRIAXIAL SHEAR TEST REPORT

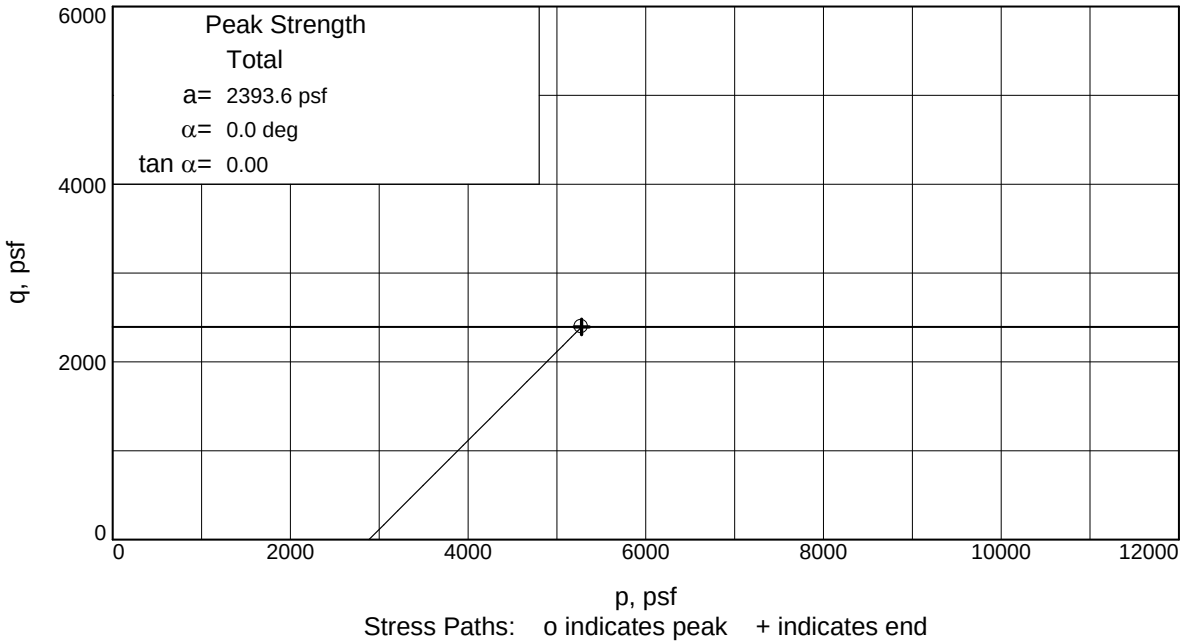
Thompson Engineering
Mobile, Alabama











Stress Paths: o indicates peak + indicates end

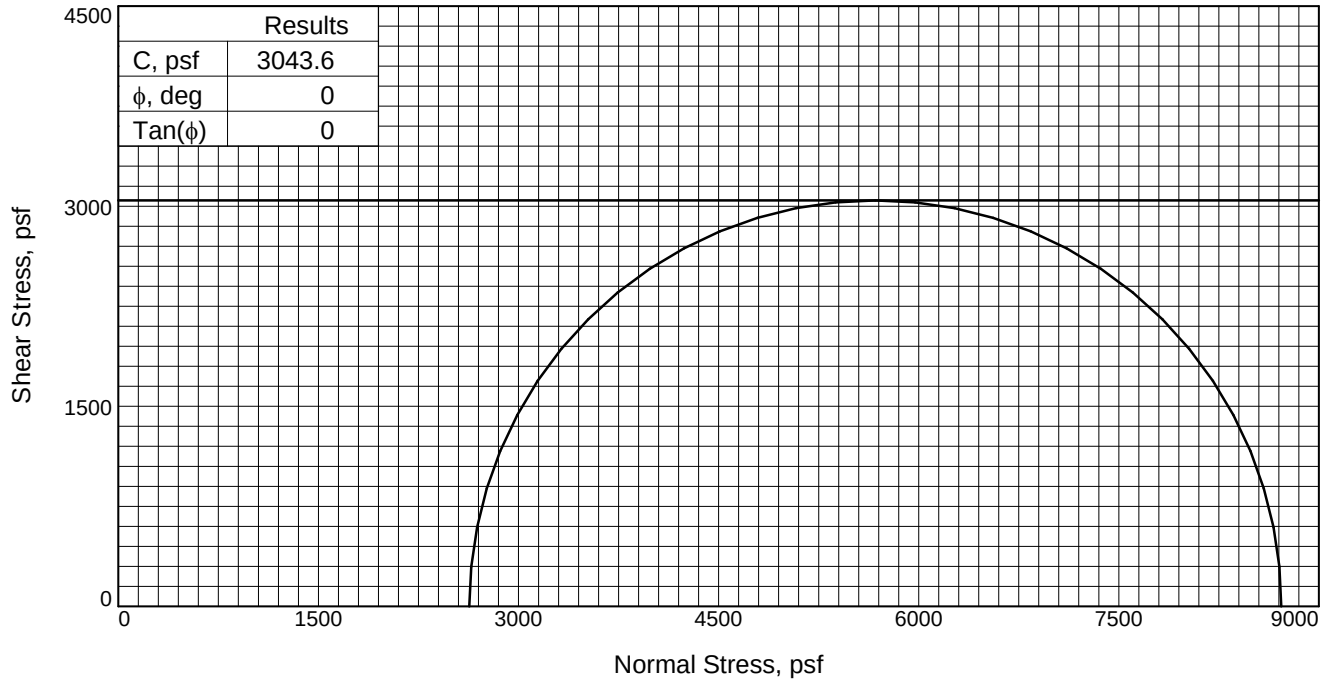
Client: ALDOT

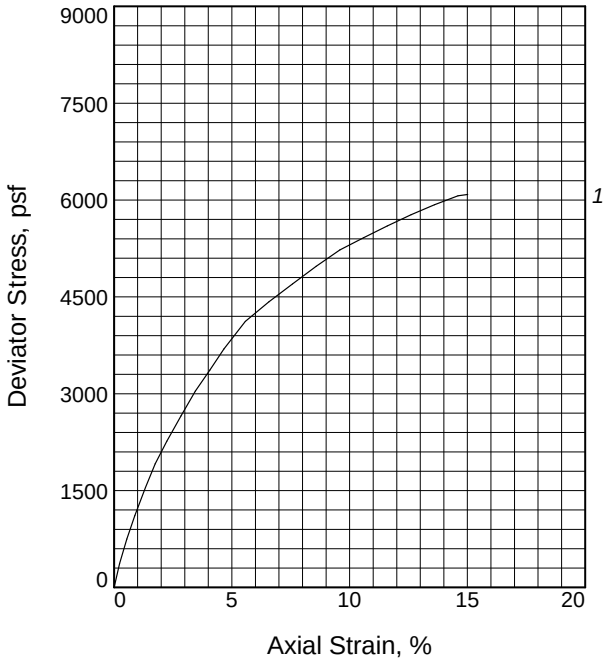
Project: Mobile River Bridge

Source of Sample: Lab #8203 **Depth:** 38.0'-40.0' **Sample Number:** TH-31 T-3

Project No.: 1511010228 **Figure** _____

Thompson Engineering





Specimen No.		1
Initial	Water Content, %	13.2
	Dry Density, pcf	124.5
	Saturation, %	104.9
	Void Ratio	0.3335
	Diameter, in.	2.855
	Height, in.	5.556
At Test	Water Content, %	13.0
	Dry Density, pcf	124.5
	Saturation, %	103.8
	Void Ratio	0.3335
	Diameter, in.	2.855
	Height, in.	5.556
Strain at peak, %		15.0
Back Pressure, psf		0.0
Cell Pressure, psf		2630.9
Fail. Stress, psf		6087.3
Strain, %		15.0
Ult. Stress, psf		
Strain, %		
σ_1 Failure, psf		8718.2
σ_3 Failure, psf		2630.9

Type of Test:
Unconsolidated Undrained

Sample Type: 3-in. Shelby Tube

Description: SILTY SAND (SM, A-2-4(0))

Specific Gravity= 2.66

Remarks: Compression Failure Mode: Symmetrical Bulge

Figure _____

Client: ALDOT

Project: Mobile River Bridge

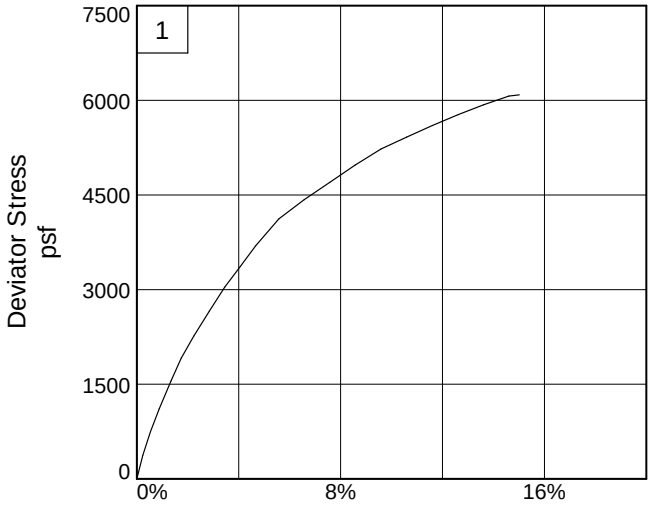
Source of Sample: Lab #8203 **Depth:** 23.0'-25.0'

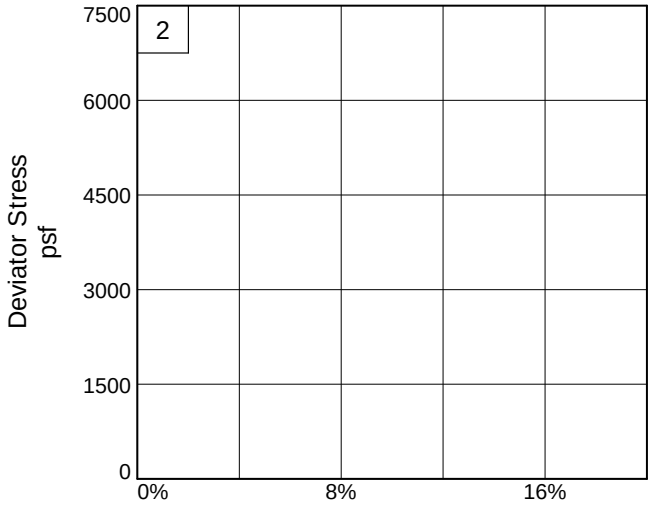
Sample Number: TH-32 T-1

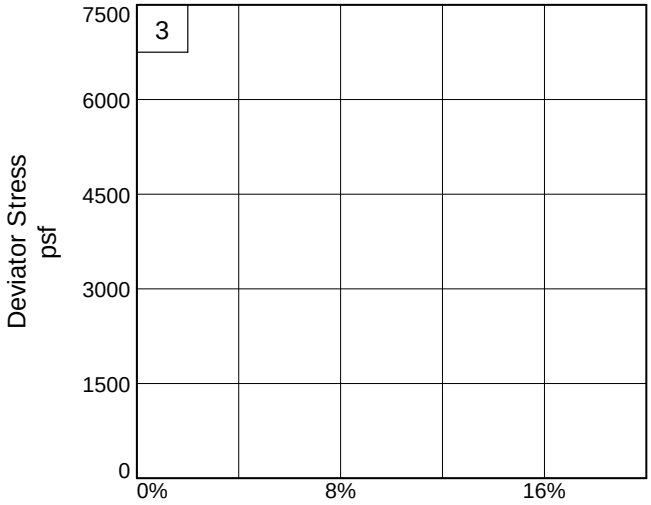
Proj. No.: 1511010228 **Date Sampled:**

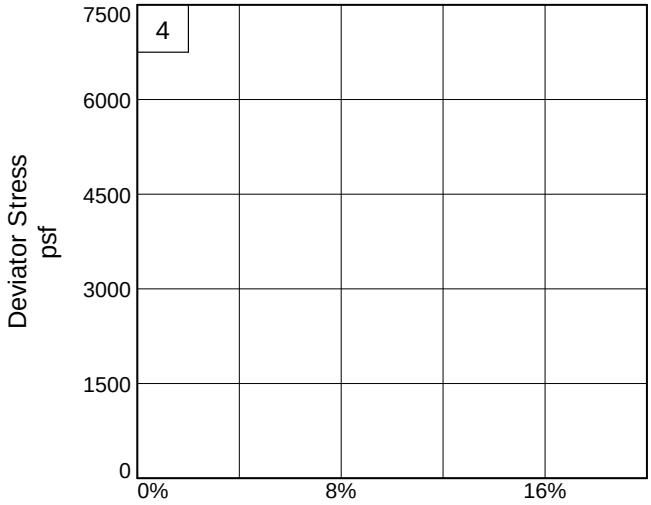
TRIAXIAL SHEAR TEST REPORT

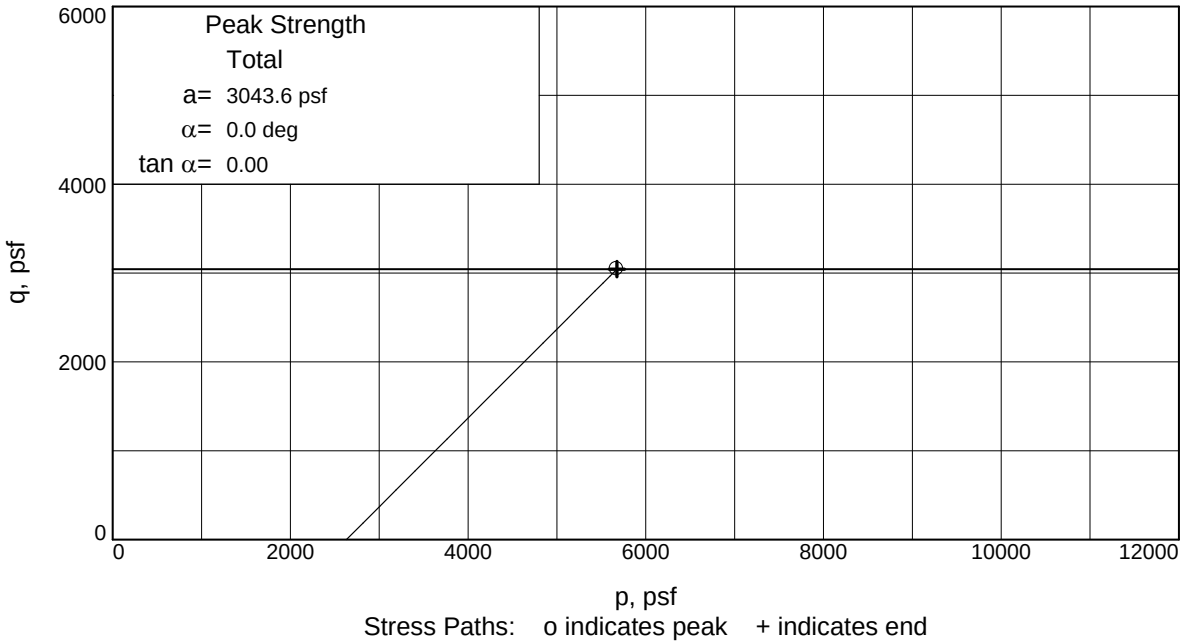
Thompson Engineering
Mobile, Alabama











Stress Paths: o indicates peak + indicates end

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: Lab #8203 **Depth:** 23.0'-25.0' **Sample Number:** TH-32 T-1

Project No.: 1511010228 **Figure** _____

Thompson Engineering

Thompson Engineering

Direct Shear Test (ASTM D3080)

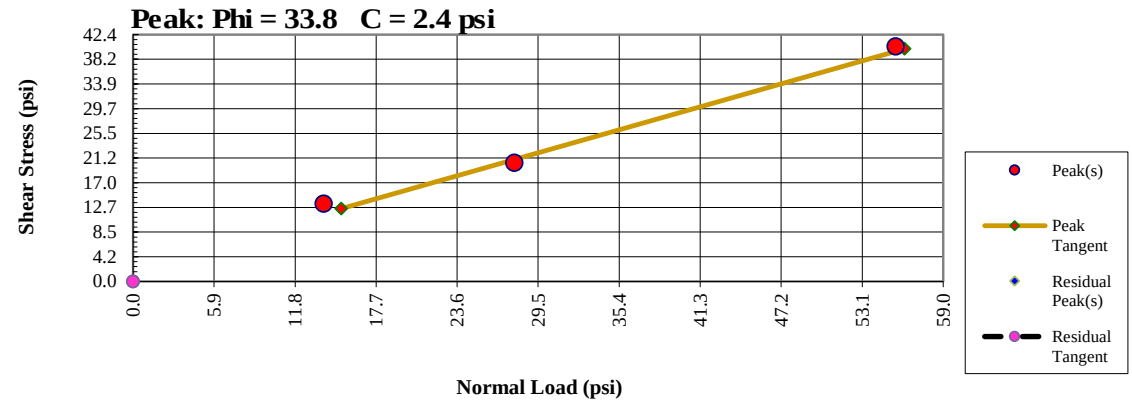
Date

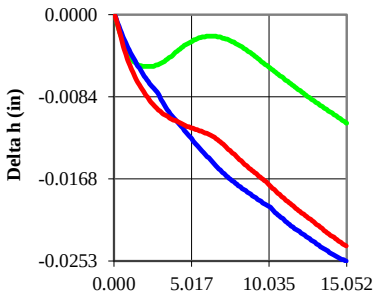
Checked By

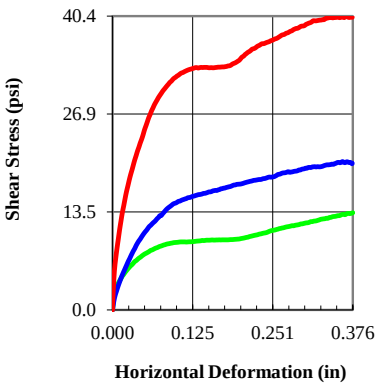
Date

Date

Tested By







Initial	Specimen A	B	C	D
Moisture (%)	32.91	29.99	29.46	
Density (pcf)	91.61	85.47	92.73	
Void Ratio	0.772	0.899	0.750	
Saturation (%)	100.00	86.73	100.00	
Diameter (in)	2.500	2.500	2.500	
Height (in)	1.000	1.000	1.000	

Final	A	B	C	D
Moisture (%)	27.79	33.30	25.03	
Density (pcf)	98.69	87.44	97.64	
Void Ratio	0.645	0.856	0.662	
Saturation (%)	100.00	100.00	100.00	
Diameter (in)	2.500	2.500	2.500	
Height (in)	0.962	0.941	0.932	
Normal Stress (psi)	13.9	27.8	55.6	
Peak Stress (psi)	13.4	20.4	40.4	
Residual Stress (psi)				
Strain (%)	15.052	15.017	14.590	
Rate (in/min)	0.00901	0.00835	0.00892	

Project Date	
Date	6/19/18

Project:	Mobile River Bridge
Location:	Soils Lab
Project Number:	8203
Boring Number	TH-32
Sample Number:	T-2
Depth:	38.5-40.5 ft.
Sample Type:	Undisturbed
Description:	SILTY SAND (SM, A-2-4(0))
Test Type:	Direct Shear
Remarks:	

Failure Photographs

Thompson Engineering

Direct Shear Test (ASTM D3080)

Date

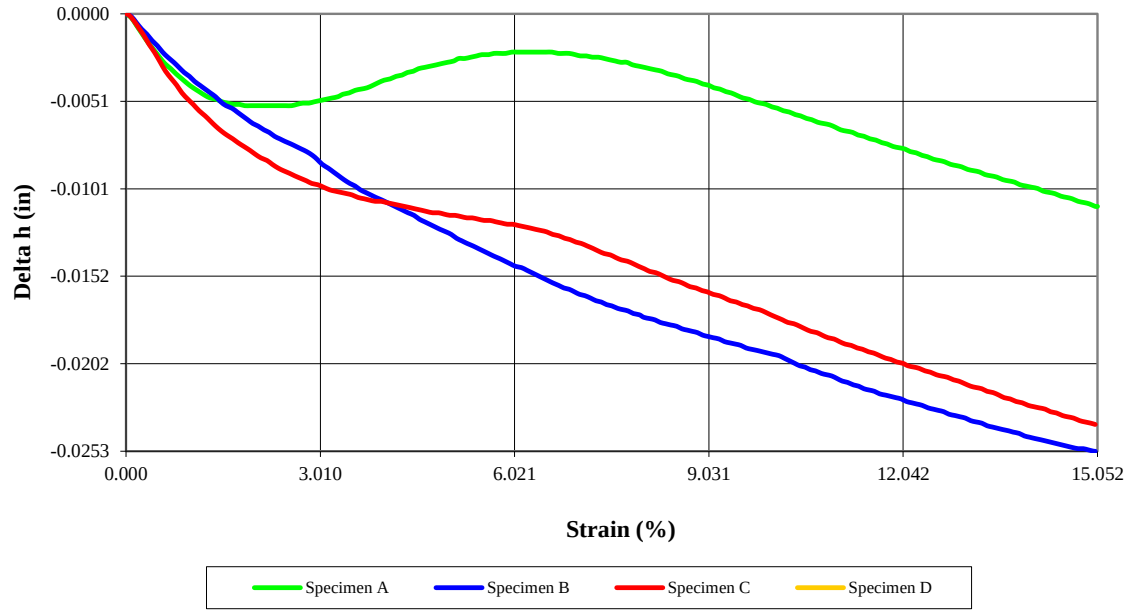
Checked By

Date

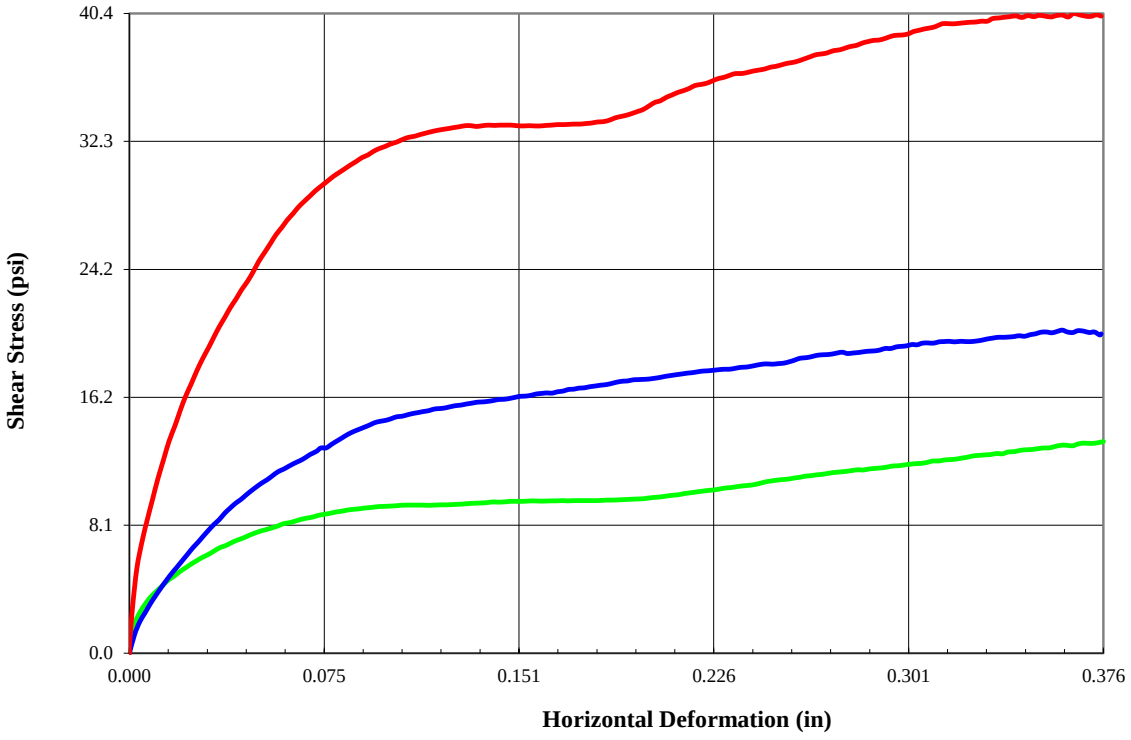
Date

Tested By

Delta h



Stress-Deformation



Thompson Engineering

Direct Shear Test

Date

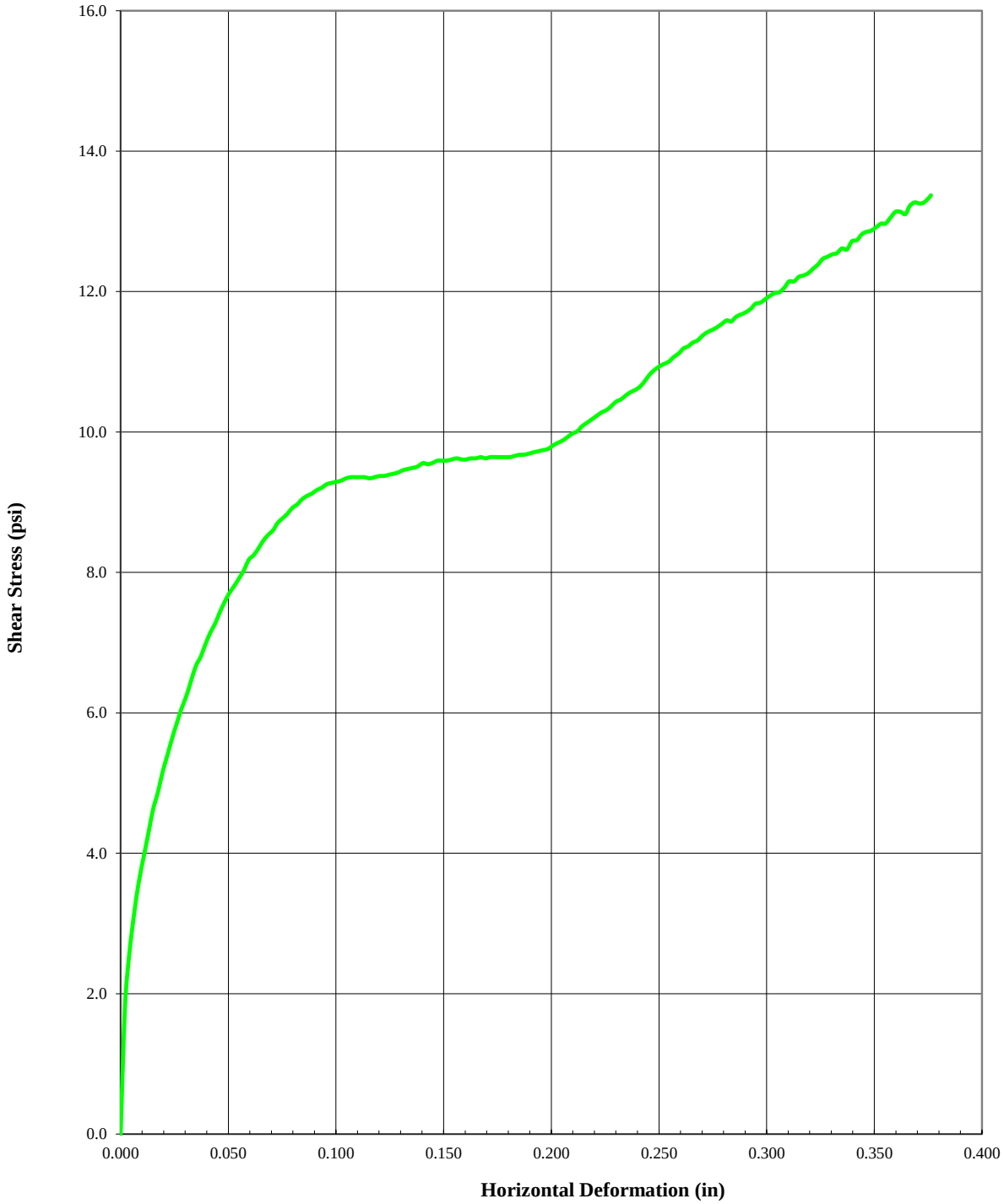
Checked By

Date

Date

Tested By

Specimen A Stress-Deformation



Thompson Engineering

Direct Shear Test

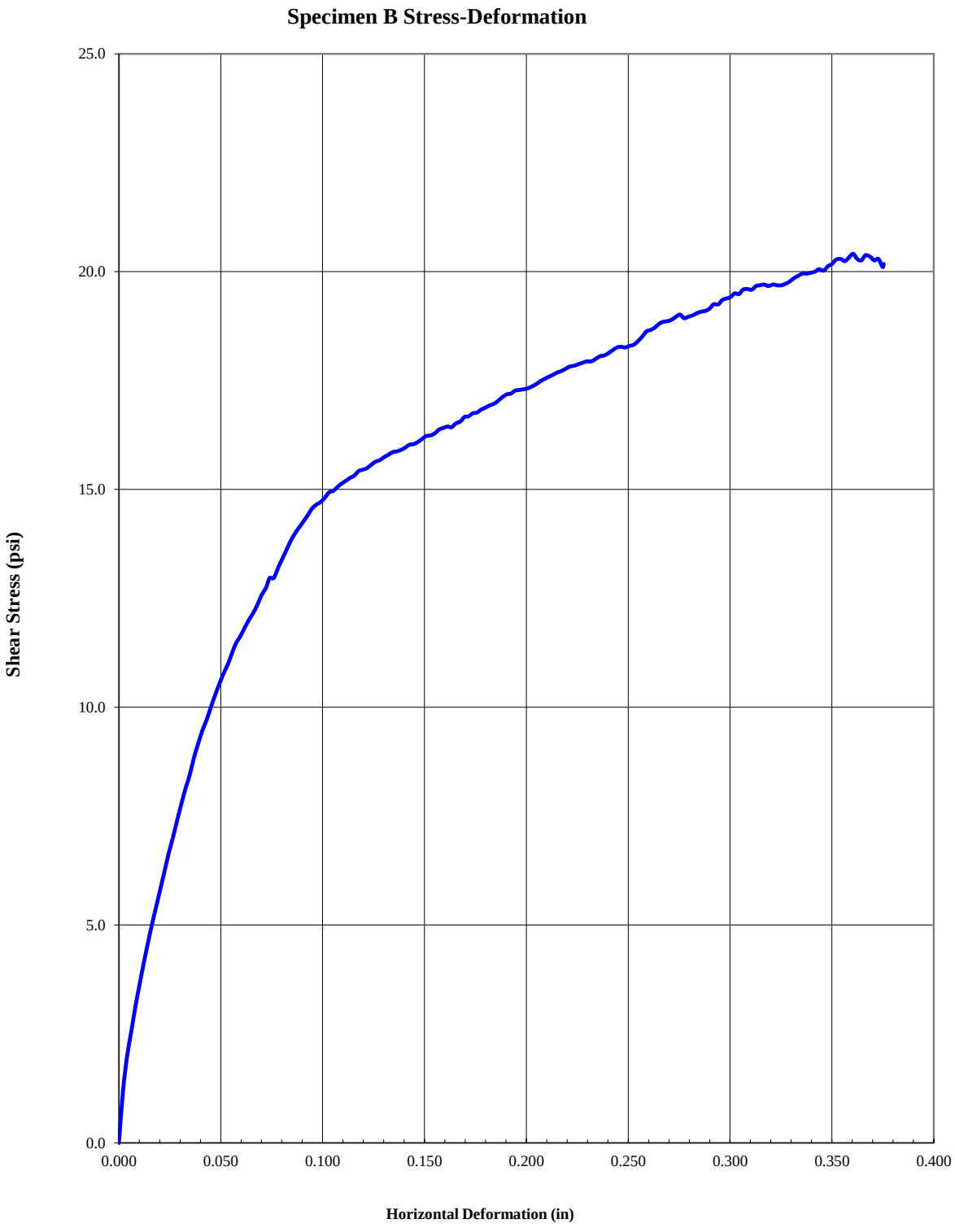
Date

Checked By

Date

Date

Tested By



DS 17-1101-0145 SB-5 T-2.HSD

Thompson Engineering

Direct Shear Test

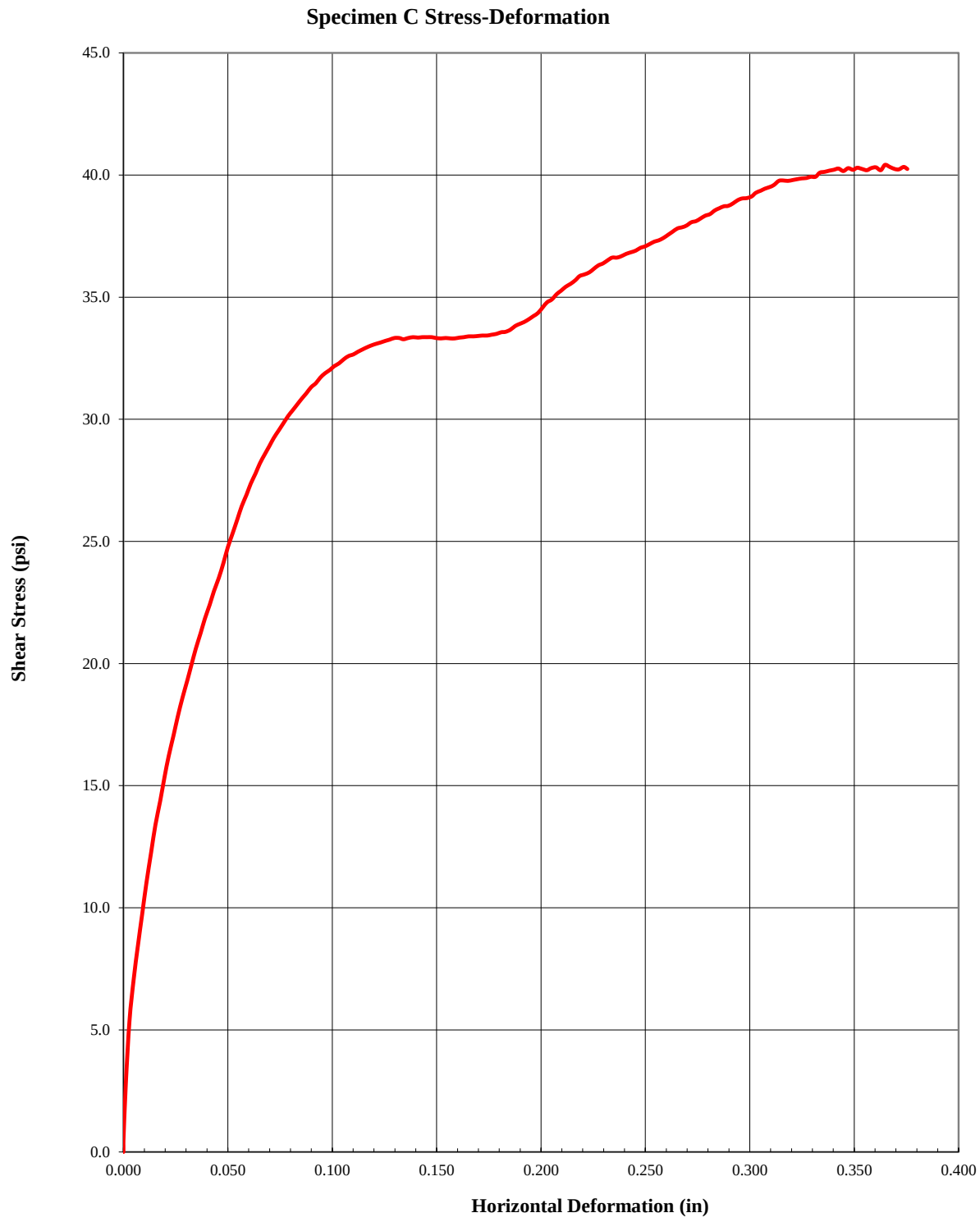
Date

Checked By

Date

Date

Tested By



DS 17-1101-0145 SB-5 T-2.HSD

Specimen Information Direct Shear Test	Thompson Engineering

Project Information

Project: Mobile River Bridge
Location: Soils Lab
Project Number: 8203
Client: ALDOT
Sample Location: Soils Lab
Sample Number: TH-32
Boring Number: SB-5

Tested By: B. Hak
Reduced By: B. Hak
Checked By: C. Dugger

Sample Description/Remarks	
Specimen A Description	SILTY SAND (SM, A-2-4(0))
Remarks	
Specimen B Description	SILTY SAND (SM, A-2-4(0))
Remarks	
Specimen C Description	SILTY SAND (SM, A-2-4(0))
Remarks	
Specimen D Description	
Remarks	

Moisture Density Data

	Specimen A		Specimen B		Specimen C		Specimen D	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Height (in)	1.000	0.962	1.000	0.941	1.000	0.932		
Diameter (in)	2.500	2.500	2.500	2.500	2.500	2.500		
Total Wet Weight of Ring & Soil (g)	1196.97	1202.58	1182.16	1189.19	1194.94	1197.57		
Weight of Ring (g)	1040.08	1040.08	1039.00	1039.00	1040.26	1040.26		
Wet Weight of Soil (g)	156.89	162.50	143.16	150.19	154.68	157.31		
Wt of Wet Soil & Dish (g)	-	208.04	-	222.02	-	201.38		
Wt of Dry Soil & Dish (g)	-	190.65	-	198.72	-	185.75		
Wt. Of Dish (g)	-	128.07	-	128.74	-	123.31		

Consolidation Calculations

	Specimen A	Specimen B	Specimen C	Specimen D
Initial Ref. Height (in)	0.393	0.397	0.389	
Final Ref. Height (in)	0.355	0.338	0.321	
Height after Consol (in)	0.962	0.941	0.932	

Calculations

	Specimen A		Specimen B		Specimen C		Specimen D	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Specific Gravity	2.600	2.600	2.600	2.600	2.600	2.600		
Area (in2)	4.909	4.909	4.909	4.909	4.909	4.909		
Volume (in3)	4.9	4.9	4.9	4.9	4.9	4.9		
Moisture Content (%)	32.910	27.788	29.986	33.295	29.459	25.032		
Wet Density (pcf)	121.757	126.111	111.102	116.558	120.042	122.083		
Dry Density (pcf)	91.609	98.687	85.472	87.443	92.726	97.642		
Saturation (%)	100.000	100.000	86.725	100.000	100.000	100.000		
Void Ratio	0.772	0.645	0.899	0.856	0.750	0.662		
Porosity (%)	43.559	36.821	47.340	42.754	42.871	35.441		

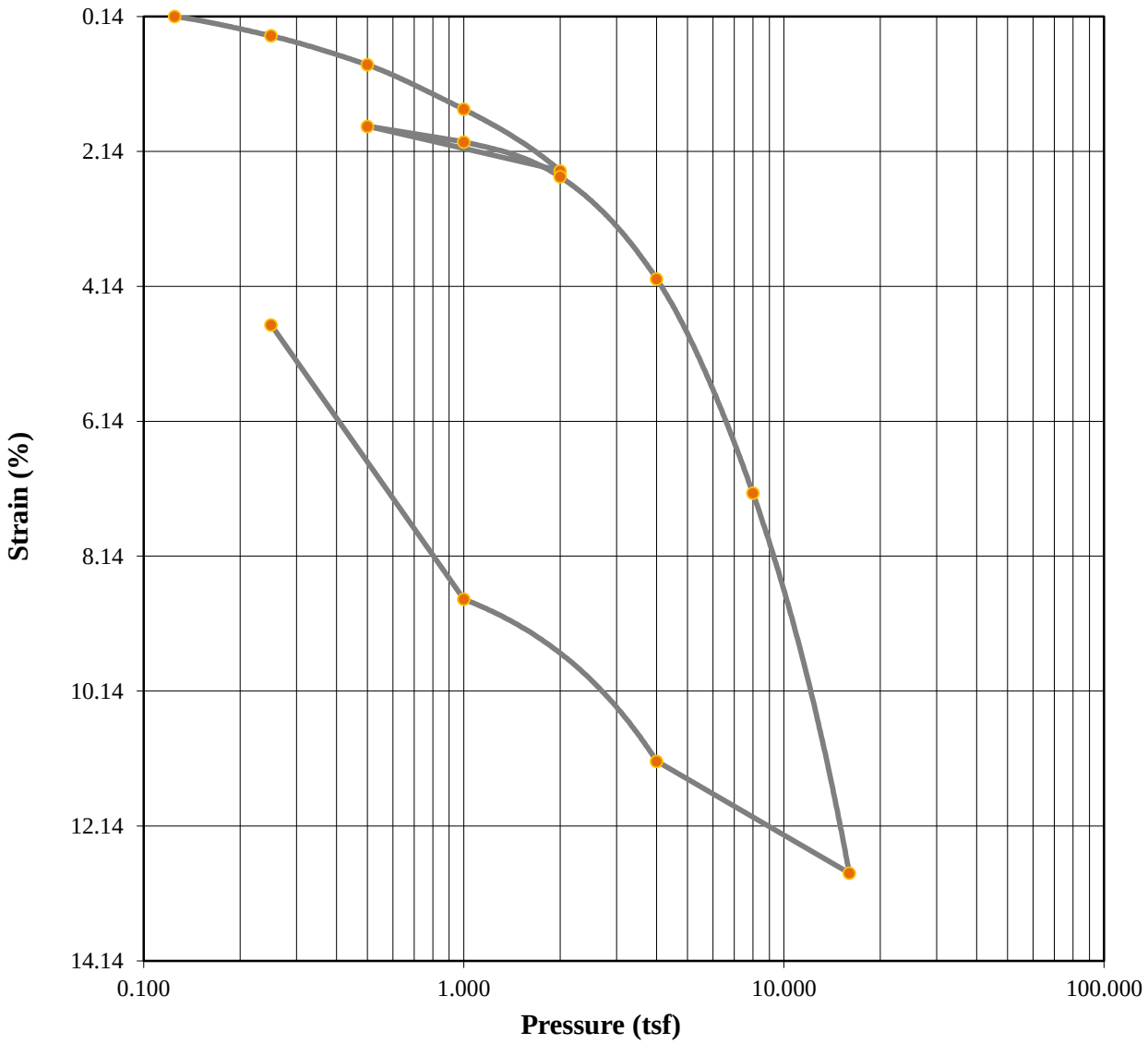
Specimen A Shear Data **Direct Shear Test**	**Thompson Engineering**

File Location
DS 17-1101-0145 SB-5 T-2.HSD

Last Shear Pass

Reading Number	Time	Shear Force (lbs)	Horizontal Deformation (in)	Vertical Deformation (in)	Axial Strain (%)	Stress (psi)
0	00:00:00	0.0	0.000	0.0000	0.000	0.0
1	00:00:15	8.9	0.002	-0.0002	0.081	1.8
2	00:00:30	12.6	0.004	-0.0007	0.162	2.6
3	00:00:45	15.5	0.006	-0.0012	0.254	3.2
4	00:01:00	17.6	0.008	-0.0016	0.335	3.6
5	00:01:15	19.4	0.011	-0.0021	0.428	3.9
6	00:01:30	21.1	0.013	-0.0025	0.520	4.3
7	00:01:45	22.7	0.015	-0.0029	0.601	4.6
8	00:02:00	23.9	0.017	-0.0032	0.694	4.9
9	00:02:15	25.2	0.019	-0.0035	0.775	5.1
10	00:02:30	26.5	0.022	-0.0038	0.867	5.4
11	00:02:45	27.7	0.024	-0.0040	0.960	5.6
12	00:03:00	28.7	0.026	-0.0043	1.040	5.8
13	00:03:15	29.8	0.028	-0.0045	1.133	6.1
14	00:03:30	30.7	0.031	-0.0047	1.225	6.2
15	00:03:45	31.7	0.033	-0.0049	1.306	6.5
16	00:04:00	32.7	0.035	-0.0049	1.399	6.7
17	00:04:15	33.4	0.037	-0.0051	1.491	6.8
18	00:04:30	34.2	0.039	-0.0052	1.572	7.0
19	00:04:45	35.0	0.042	-0.0052	1.665	7.1
20	00:05:00	35.7	0.044	-0.0052	1.757	7.3
21	00:05:15	36.4	0.046	-0.0053	1.838	7.4
22	00:05:30	37.2	0.048	-0.0053	1.931	7.6
23	00:05:45	37.8	0.051	-0.0053	2.023	7.7
24	00:06:00	38.3	0.053	-0.0053	2.116	7.8
25	00:06:15	38.8	0.055	-0.0053	2.197	7.9
26	00:06:30	39.4	0.057	-0.0053	2.289	8.0
27	00:06:45	40.2	0.060	-0.0053	2.382	8.2
28	00:07:00	40.5	0.062	-0.0053	2.474	8.2
29	00:07:15	41.0	0.064	-0.0053	2.566	8.3
30	00:07:30	41.5	0.066	-0.0052	2.647	8.4
31	00:07:45	41.9	0.068	-0.0052	2.740	8.5
32	00:08:00	42.2	0.071	-0.0052	2.832	8.6
33	00:08:15	42.7	0.073	-0.0051	2.913	8.7
34	00:08:30	43.0	0.075	-0.0050	3.006	8.8
35	00:08:45	43.4	0.077	-0.0049	3.098	8.8
36	00:09:00	43.8	0.080	-0.0049	3.191	8.9
37	00:09:15	44.0	0.082	-0.0048	3.283	9.0
38	00:09:30	44.4	0.084	-0.0046	3.364	9.0
39	00:09:45	44.6	0.086	-0.0046	3.457	9.1
40	00:10:00	44.8	0.089	-0.0044	3.549	9.1
41	00:10:15	45.0	0.091	-0.0043	3.642	9.2
42	00:10:30	45.2	0.093	-0.0043	3.734	9.2
43	00:10:45	45.4	0.096	-0.0041	3.827	9.3
44	00:11:00	45.5	0.098	-0.0040	3.908	9.3
45	00:11:15	45.6	0.100	-0.0038	4.000	9.3

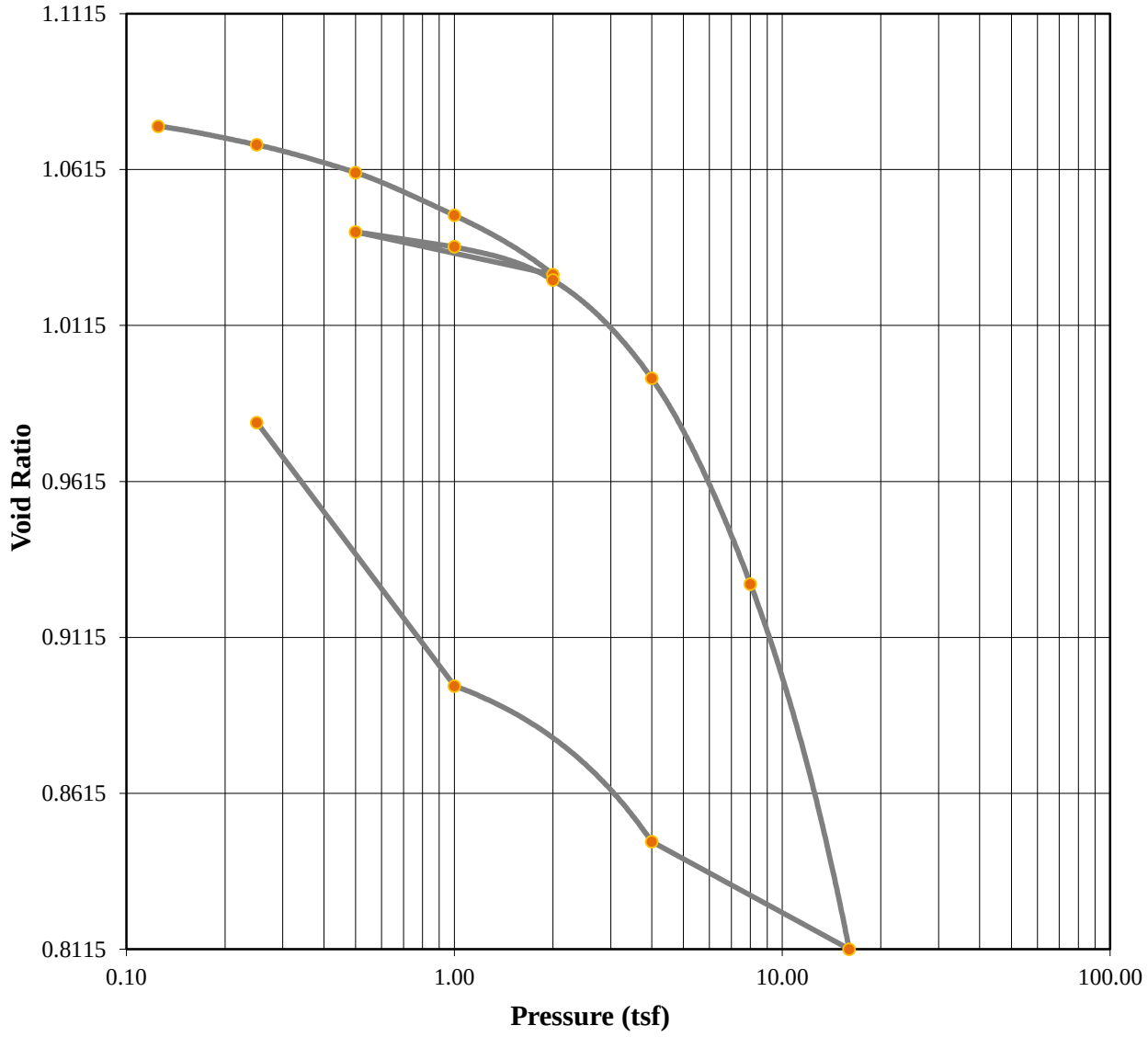
Consolidation Test
Test Results



	Before	After				
Moisture (%):	35.96	35.47	**Liquid Limits:**	0	**Test Date:**	6/5/18
Dry Density (pcf):	79.76	83.06	**Plastic Limits:**	0		
Saturation (%):	88.40	94.43	**Plasticity Index (%):**	0		
Void Ratio:	1.0779	0.9799	**Specific Gravity:**	2.660	Assumed	

Sample Description:	SILTY SAND (SM, A-4(0))			
Project Number:	8203	**Depth:**	23.5-25.5 ft.	**Remarks:**
Sample Number:	T-2	**Boring Number:**	TH-31	
Project:	Mobile River Bridge			
Client:	ALDOT			
Location:	Soils Lab			

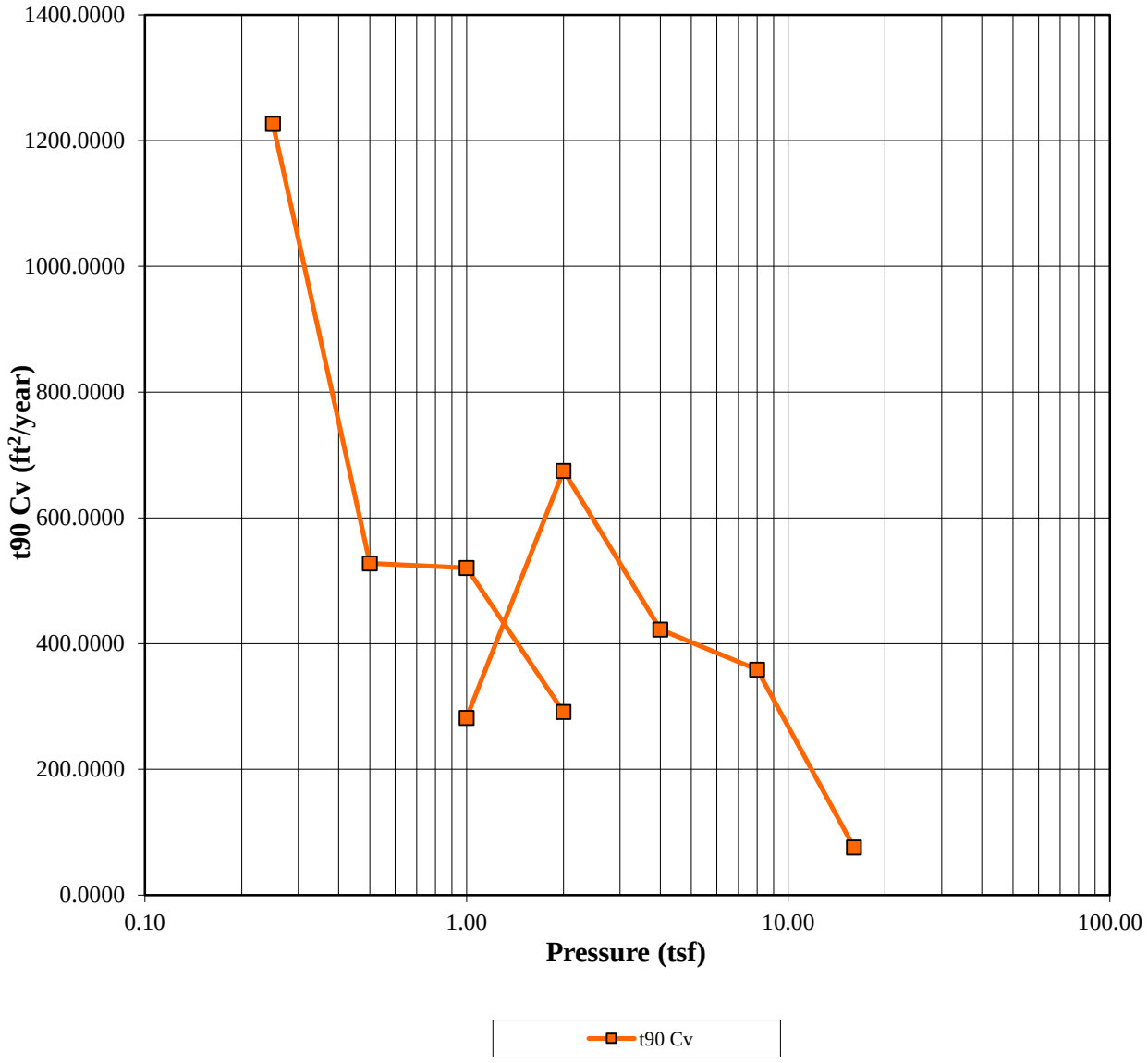
Consolidation Test
Test Results



	Before	After				
Moisture (%):	35.96	35.47	**Liquid Limits:**	0	**Test Date:**	6/5/18
Dry Density (pcf):	79.76	83.06	**Plastic Limits:**	0		
Saturation (%):	88.40	94.43	**Plasticity Index (%):**	0		
Void Ratio:	1.0779	0.9799				
			Specific Gravity:	2.660	Assumed	

Soil Description:	SILTY SAND (SM, A-4(0))			
Project Number:	8203	**Depth:**	23.5-25.5 ft.	**Remarks:**
Sample Number:	T-2	**Boring Number:**	TH-31	
Project:	Mobile River Bridge			
Client:	ALDOT			
Location:	Soils Lab			

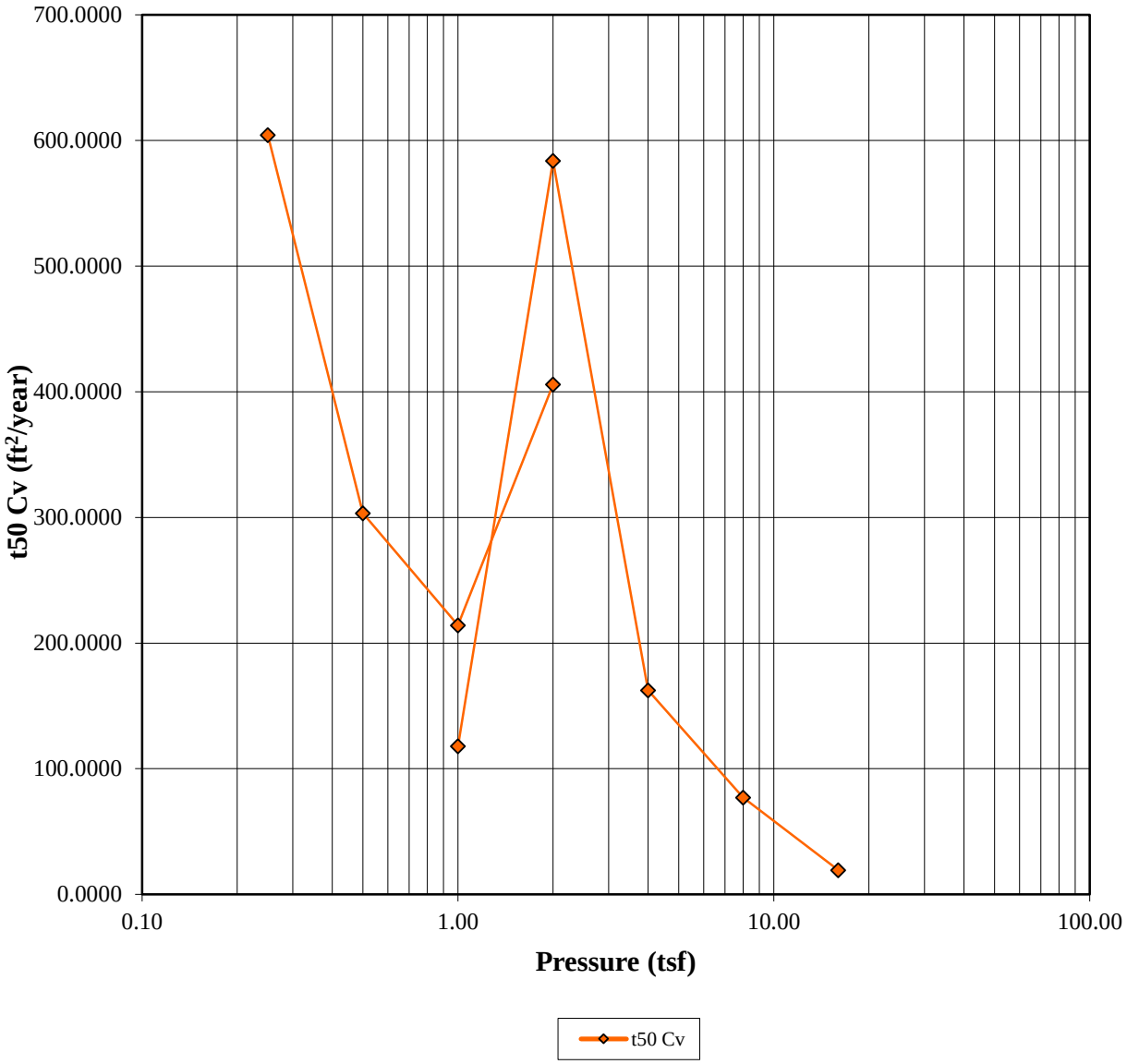
Consolidation Test
Test Results



	Before	After				
Moisture (%):	35.96	35.47	**Liquid Limits:**	0	**Test Date:**	6/5/18
Dry Density (pcf):	79.76	83.06	**Plastic Limits:**	0		
Saturation (%):	88.40	94.43	**Plasticity Index (%):**	0		
Void Ratio:	1.0779	0.9799	**Specific Gravity:**	2.660	Assumed	

Soil Description:	SILTY SAND (SM, A-4(0))			
Project Number:	8203	**Depth:**	23.5-25.5 ft.	**Remarks:**
Sample Number:	T-2	**Boring Number:**	TH-31	
Project:	Mobile River Bridge			
Client:	ALDOT			
Location:	Soils Lab			

Consolidation Test
Test Results



	Before	After				
Moisture (%):	35.96	35.47	**Liquid Limits:**	0	**Test Date:**	6/5/18
Dry Density (pcf):	79.76	83.06	**Plastic Limits:**	0		
Saturation (%):	88.40	94.43	**Plasticity Index (%):**	0		
Void Ratio:	1.0779	0.9799	**Specific Gravity:**	2.660	Assumed	

Soil Description: SILTY SAND (SM, A-4(0))

Project Number: 8203 **Depth:** 23.5-25.5 ft. **Remarks:**

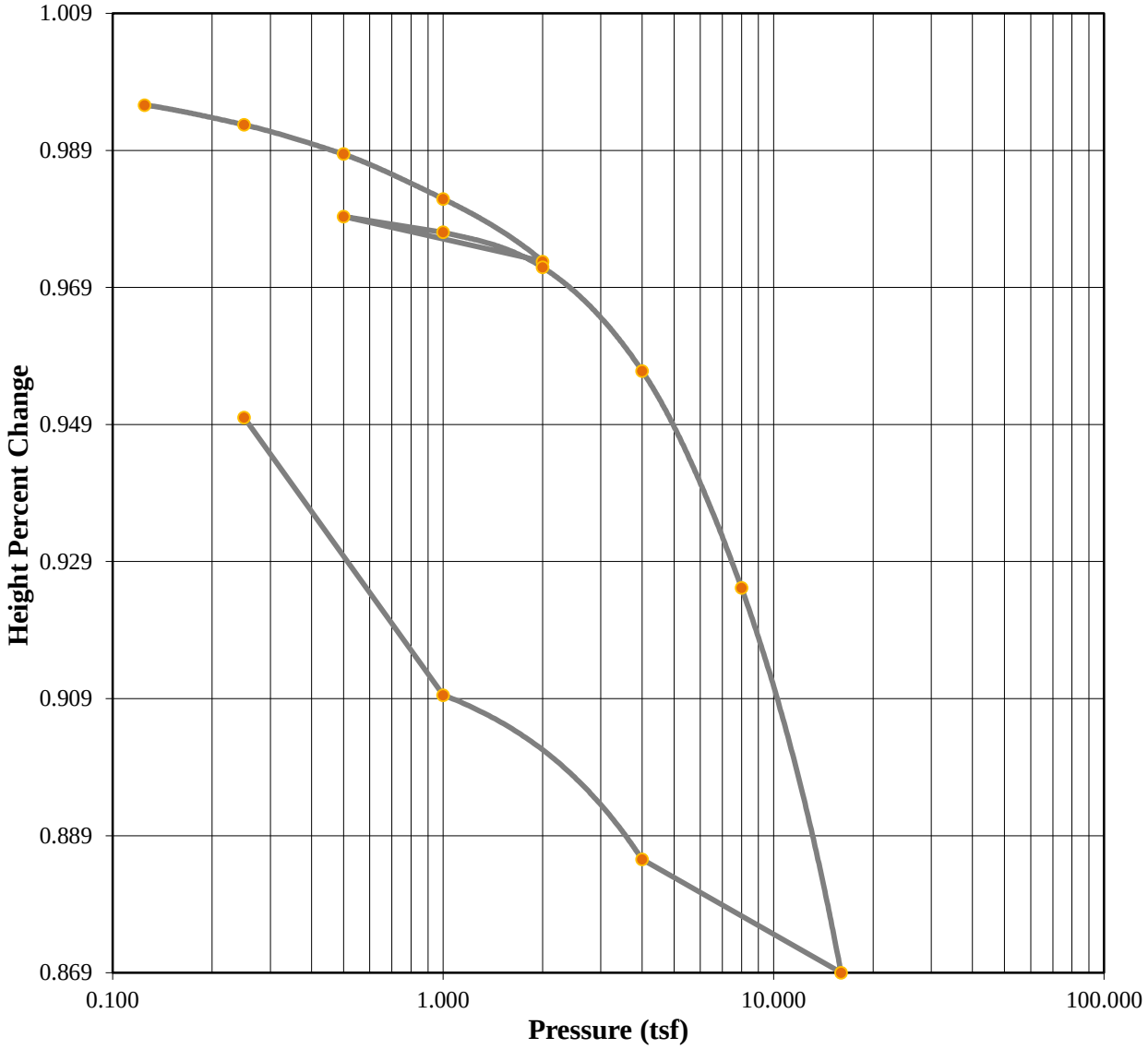
Sample Number: T-2 **Boring Number:** TH-31

Project: Mobile River Bridge

Client: ALDOT

Location: Soils Lab

Consolidation Test
Test Results



	Before	After				
Moisture (%):	35.96	35.47	**Liquid Limits:**	0	**Test Date:**	6/5/18
Dry Density (pcf):	79.76	83.06	**Plastic Limits:**	0		
Saturation (%):	88.40	94.43	**Plasticity Index (%):**	0		
Void Ratio:	1.0779	0.9799	**Specific Gravity:**	2.660	Assumed	

Soil Description: SILTY SAND (SM, A-4(0))

Project Number: 8203 **Depth:** 23.5-25.5 ft. **Remarks:**

Sample Number: T-2 **Boring Number:** TH-31

Project: Mobile River Bridge

Client: ALDOT

Location: Soils Lab

Consolidation Test Results
Summary

Project: Mobile River Bridge
Location: Soils Lab
Job Number: 17-1101-0145

Project Number: 8203

Sample Number: T-2
Boring Number: TH-31
Depth: 23.5-25.5 ft.
Sample Type: Undisturbed

Sample Description: SILTY SAND (SM, A-4(0))
Remarks:

Test Number:
Test Date: 6/5/18

Index	Load Sequence (tsf)	Cummulative Change in Height (in)	Specimen Height (in)	Height of Void (in)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (ft2/year)	t50 Cv (ft2/year)
0	0.000	0.0000	0.9970	0.5173	0.00	1.0783	0.000	0.000	0.000	0.000
1	0.125	0.0014	0.9956	0.5159	0.14	1.0754	0.000	0.000	0.000	0.000
2	0.250	0.0043	0.9927	0.5130	0.43	1.0694	0.622	0.293	1226.894	604.287
3	0.500	0.0086	0.9884	0.5087	0.86	1.0605	1.433	0.579	527.635	303.221
4	1.000	0.0151	0.9819	0.5022	1.52	1.0468	1.433	0.809	520.457	214.213
5	2.000	0.0242	0.9728	0.4931	2.43	1.0278	2.513	0.419	291.433	405.771
6	0.500	0.0177	0.9793	0.4996	1.77	1.0415	0.000	0.000	0.000	0.000
7	1.000	0.0200	0.9770	0.4973	2.00	1.0367	2.619	* 1.4549	282.072	117.948
8	2.000	0.0251	0.9719	0.4922	2.52	1.0260	1.083	0.291	675.007	583.842
9	4.000	0.0402	0.9568	0.4771	4.03	0.9945	1.678	1.014	422.154	162.359
10	8.000	0.0719	0.9251	0.4454	7.21	0.9286	1.847	1.999	358.604	76.986
11	16.000	0.1280	0.8690	0.3893	12.84	0.8115	7.671	7.028	76.176	19.313
12	4.000	0.1115	0.8855	0.4058	11.18	0.8459	0.000	0.000	0.000	0.000
13	1.000	0.0875	0.9095	0.4298	8.78	0.8959	0.000	0.000	0.000	0.000
14	0.250	0.0470	0.9500	0.4703	4.71	0.9804	0.000	0.000	0.000	0.000

Predicted value indicated with *

Tested By: B. Hak

Checked By: C. Dugger

thompson
ENGINEERING

Consolidation Test
Consolidation Specimen Information

Project: Mobile River Bridge **Project Number:** 8203
Location: Soils Lab
Job Number: 17-1101-0145 **Test Date:** 6/5/18

Sample Number: T-2 **Sample Description:**
Boring Number: TH-31 SILTY SAND (SM, A-4(0))
Depth: 23.5-25.5 ft. **Remarks:**
Sample Type: Undisturbed

Test Number:
Liquid Limit: 0.0000 **Initial Void Ratio:** 1.0779 **Initial Height (in):** 0.9970
Plastic Limit: 0.0000 **Plasticity Index (%):** 0.0000 **Initial Diameter (in):** 2.4960
Specific Gravity: 2.6600 Assumed **Weight of Ring (g):** 110.7200

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	117.46	265.95
Dry Soil + Container (g)	94.98	230.09
Weight of Container (g)	32.47	129.00
Moisture Content (%)	35.96	35.47
Void Ratio	1.0779	0.9799
Saturation (%)	88.40	94.43
Dry Density (pcf)	79.76	83.06

Tested By: B. Hak **Checked By:** C. Dugger

Consolidation Test Results
(Sequence 1) Load 0.125 tsf

Project: Mobile River Bridge
Location: Soils Lab
Job Number: 17-1101-0145

Project Number: 8203
Test Date: 6/5/18
Test Number:

Sample Number: T-2
Boring Number: SB-4
Depth: 23.5-25.5 ft.
Sample Type: Undisturbed

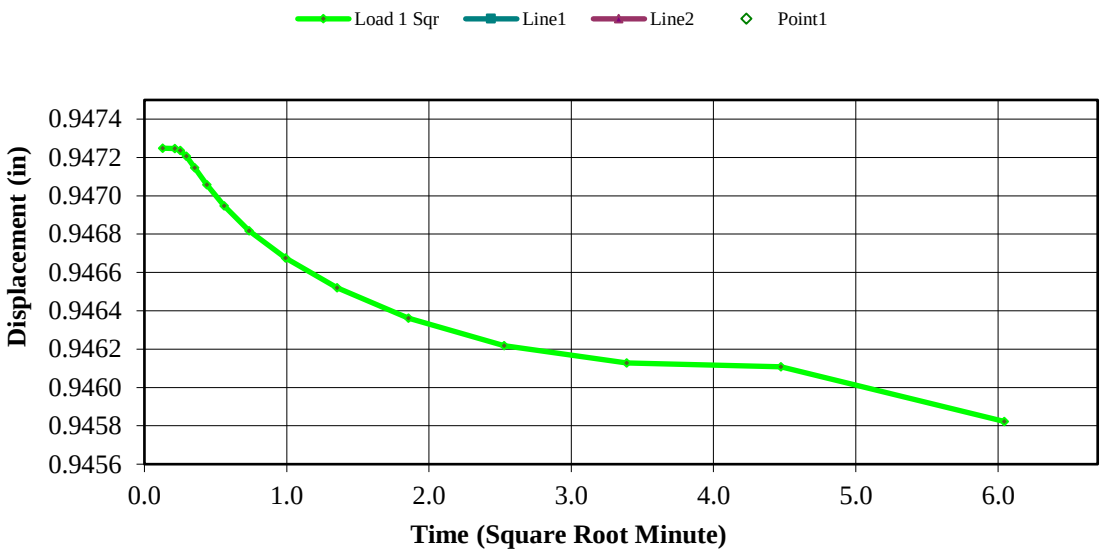
Soil Description: Gray Sandy Clay
Remarks:

Index	Time	Displacement (in)	Settlement (in)	Axial Strain (%)	Void Ratio
0	00:00:00	0.9472	0.0000	0.0000	1.0779
1	00:00:01	0.9472	0.0000	0.0000	1.0779
2	00:00:02	0.9472	0.0000	0.0000	1.0779
3	00:00:03	0.9472	0.0000	0.0000	1.0779
4	00:00:04	0.9472	0.0000	0.0000	1.0779
5	00:00:05	0.9472	0.0000	0.0000	1.0779
6	00:00:06	0.9472	0.0000	0.0000	1.0779
7	00:00:12	0.9470	0.0003	0.0286	1.0773
8	00:00:15	0.9470	0.0003	0.0286	1.0773
9	00:00:30	0.9467	0.0006	0.0572	1.0767
10	00:01:00	0.9467	0.0006	0.0572	1.0767
11	00:02:00	0.9464	0.0009	0.0858	1.0761
12	00:05:01	0.9461	0.0011	0.1144	1.0755
13	00:10:01	0.9461	0.0011	0.1144	1.0755
14	00:20:01	0.9461	0.0011	0.1144	1.0755
15	00:36:32	0.9458	0.0014	0.1430	1.0749

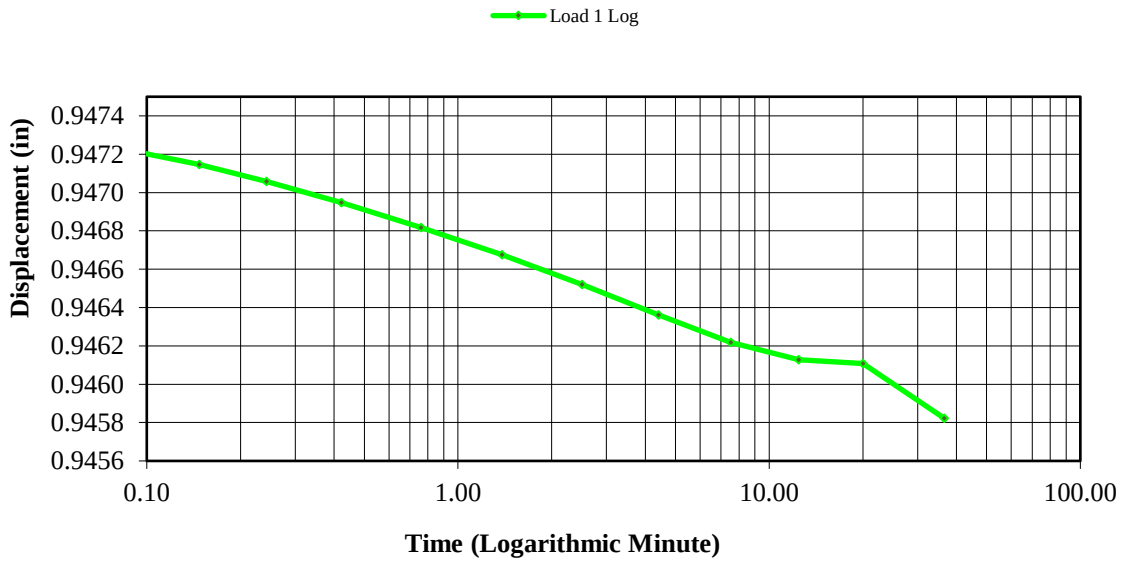
Tested By: **Checked By:**

Consolidation Test Results
(Sequence 1) Load 0.125 tsf

Consolidation Graph (Squareroot Time)

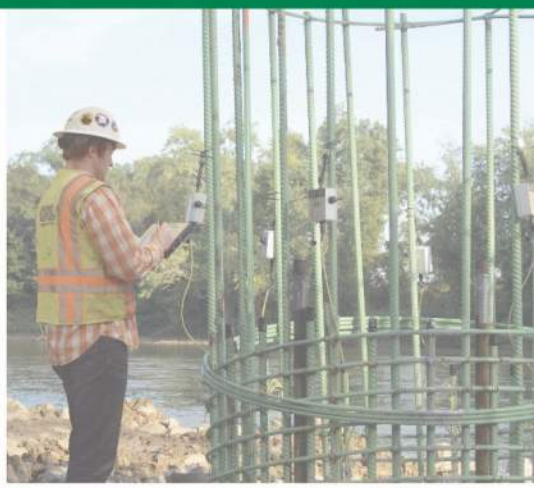
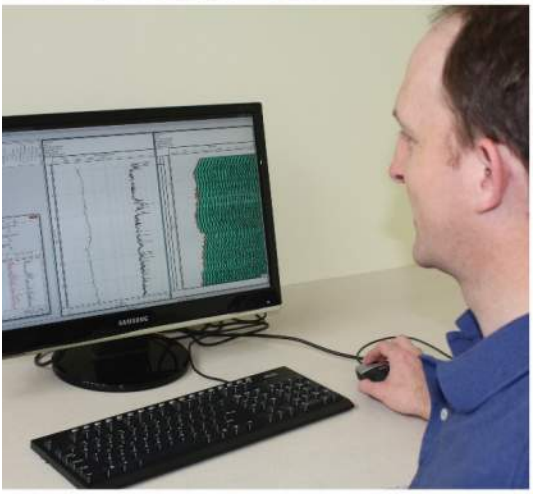


Consolidation Graph (Logarithmic Time)



APPENDIX D

- **Drill Rig Hammer Energy Report**



GRL engineers, inc.
Dynamic Measurements and Analyses

Job No. 179034-1

Report on: Standard Penetration Test Energy Measurements
Chattanooga, TN

Prepared for Thompson Engineering
By Thomas G. Hyatt and Joel S. Webster, E.I.

June 28, 2017

June 28, 2017

Blake Ellis
Thompson Engineering
3707 Cottage Hill Road
Mobile, AL 36609

Re: Standard Penetration Test Energy Measurements
Chattanooga, TN
GRL Job No. 179034-1

Dear Mr. Ellis,

This report presents results of energy measurements obtained on June 21, 2017 during Standard Penetration Tests (SPT) sampling. One automatic hammer mounted a Diedrich D-50 drill rig that was tested generally following ASTM D4633-10 standards. All dynamic tests were performed on NWJ drill rods. GRL Engineers, Inc. obtained the dynamic measurements with an instrumented NWJ subsection and a Model 8G Pile Driving Analyzer®. This report describes the testing procedures and summarizes the test results. Appendix A describes our measurement and analysis methods, Appendix B contains calibration information for the gages and equipment used, and Appendix C is a summary of the field data.

PURPOSE AND SCOPE OF WORK

At the request of Thompson Engineering, GRL conducted SPT energy measurements in Chattanooga, TN generally following the ASTM D4633-10 recommendations. Specifically, we recorded SPT energy measurements at five-foot sample intervals between 13.5 and 40.0 feet below the existing ground surface. SPT samples were taken every five feet from the ground surface until a boring depth of about 40.0 feet was reached. All SPT samples were driven for a total of 3 six-inch increments, or 1.5 feet.

EQUIPMENT

Drilling and SPT Hammer Equipment

Diedrich D-50 (Serial # 310)

SPT energy measurements were made on an automatic hammer mounted on a Diedrich D-50 drill rig. The drilling method used to advance the boring was hollow stem auger. Energy measurements for this drill rig were collected at a borehole located in Chattanooga, TN. SPT energy measurements were performed at 5-foot sampling intervals between 13.5 and 40.0 feet. A total of six energy measurement events were performed for this drill rig.

Instrumentation

A Model 8G Pile Driving Analyzer (PDA) data acquisition system (SN# 4613LE) was used to collect and process the dynamic measurements of force and velocity. The data was collected using a two foot long section of NWJ rod subsection (SN# 231NWJ) with a cross sectional area of 1.46 square inches and instrumented with two full bridge foil resistance strain gages and two piezoresistive accelerometers mounted in the midpoint location of the instrumented rod.

Analog signals from the strain gages and accelerometers were conditioned, digitized, stored and processed with the PDA. The sampling frequency used during the SPT testing was 50 kHz. Selected output from the PDA for each recorded impact included the energy transfer ratio (ETR), maximum rod top velocity (VMX), maximum energy transfer (EFV), maximum rod top force (FMX), and the hammer operating rate (BPM).

MEASUREMENTS AND CALCULATIONS

FV Method (EFV)

Energy transfer to the PDA gage location, EFV, was computed by the PDA using force, F(t), and velocity, v(t), records as follows:

$$EFV = \int_a^b F(t) \cdot v(t) dt$$

The time "a" corresponds to the start of the record when the energy transfer begins, and "b" is the time at which energy transferred to the rod reaches a maximum value. The FV Method is currently recognized in ASTM D4633-10, and is the theoretically correct result; therefore, no other energy calculation methods are reported.

Corrected SPT number (N_{60})

While the primary purpose of SPT energy testing is to calculate the maximum transferred energy (ETR) of each hammer blow, the overall average EFV value can be used to calculate the corrected SPT number (N_{60}). To adjust the SPT N-values for hammer performance, the following correction as suggested by Seed for N-value adjustment to 60% transfer efficiency (e.g. 210 ft-pounds) was used:

$$N_{60} = \left(\frac{E_m}{210} \right) N_m$$

Where:

N_{60} = Corrected N-value
E_m = overall average measured energy transfer (EFV)
N_m =number of blows for last 12 inches of sampler penetration

A general introduction to dynamic SPT testing methods is included in this report as Appendix A. References for more detailed descriptions of our testing and analysis methods are available upon request.

Any cross-sectional area difference between the GRL rod subsection and the drill rods, any loose connections or changes in area at section joints, or any cross-sectional area differences between the individual drill rod sections will result in stress wave reflections that can potentially influence the energy transfer. The EFV transferred energy calculation method, utilizing both force and velocity records, is theoretically correct and gives energy transfer results that are not adversely affected by cross-sectional area changes or loose connectors. The EFV results are included in Appendix C for all records collected and accepted after checking them for consistency.

RESULTS

Upon return to the office, the records collected by the PDA were checked for consistency and accuracy. For example, records from very weak startup or final impacts were not included in average results. Appendix C contains a representative plot of force and normalized velocity versus time, as well as tables of PDA results for all hammer blows at each dynamically monitored sampling depth. The results include the EFV (transferred energy by the FV method, as recommended by ASTM D4633-10), ETR (energy transfer efficiency for the EFV method), BPM (hammer operating rate), FMX (maximum rod top force) and VMX (maximum rod top velocity). The tables show statistical summaries for the final two 6 inch increments over which the SPT N value is calculated. At the end of each table is a statistical evaluation of these results which include the average and standard deviation.

The table below and the summary tables in Appendix C summarize the average transferred energy values calculated by the EFV method. The records consist of averaged hammer blows from the last 12 inches (i.e. N value) at each dynamically monitored sampling depth. The “energy transfer ratio” (ETR) is defined as the ratio of maximum transferred energy EFV divided by the theoretical hammer potential energy of 350 ft-lbs (i.e., computed per the 140 lb SPT hammer and the standard 30 inch drop as specified by ASTM D1586-08). The average hammer operating rate is reported in blows per minute (BPM). A summary of the dynamic measurements of the energy transfer to the drill rods using the EFV equation is provided in the table below.

Drill Rig	Avg. EFV (ft-lbs)	Avg ETR (%)	Range of EFV (ft-lbs)	Range of ETR (%)
Diedrich D-50 SN 310	329	94	299 – 357	86 – 102

CONCLUSIONS

Based upon the dynamic test data obtained, the following conclusions are presented:

1. Loose connections in the drill string were sometimes observed in the force and velocity records. However, energy transfer values calculated using the EFV equation are not adversely affected by the connectors and therefore are considered a better indication of transferred energy.

2. Dynamic measurements of the transferred energy to the drill rods using the EFV equation ranged from 299 to 357 ft-lbs for the Diedrich D-50, SN 310 drill rig. This corresponds to a transfer efficiency ranging from 86 to 102% of the SPT hammer energy of 350 ft-lbs.

3. The average transferred energy (EFV) and energy transfer ratio (ETR) for the Diedrich D-50 drill rig tested was as follows:

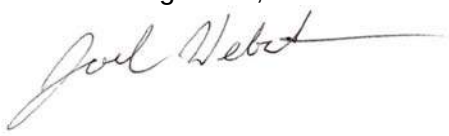
   Diedrich D-50, SN 310: Average EFV = 329 ft-lbs; Average ETR = 94%

Please review both ASTM D4633-10 and ASTM D1586-08 prior to applying these test results. The energy calibrations reported herein are valid for the same hammer/drill rig, with the same drill operator, same anvil dimensions, and same drilling methods.

We appreciate the opportunity to be of assistance to you on this project. Please contact our office should you have any questions regarding this submittal, require additional information, or if we may be of further service.

Sincerely,

GRL Engineers, Inc.



Joel S. Webster, E.I.

Thomas G. Hyatt

TGH:JSW:dms

Appendix A

An Introduction into SPT Dynamic Pile Testing

APPENDIX A
AN INTRODUCTION INTO SPT DYNAMIC PILE TESTING

1. BACKGROUND

The Standard Penetration Test is frequently conducted as an in-situ assessment of soil strength. This test requires that a 140 lb weight is dropped 30 inches onto a drive rod at whose bottom a sampler is usually installed. The sampler is driven for 18 inches; the number of blows required for the last 12 inches of driving is the so-called N-value. The N-value may be used as a strength indicator for foundation design or as a means of assessing the liquefaction potential of soils.

Obviously, the SPT hammer efficiency is an important consideration when using the N-values for design purposes. Measurements have indicated that the energy in the drive rod is sometimes only 30% and and may reach 90% of the potential or rated energy of the SPT hammer (E-rated = 0.35 kip-ft or 0.475 kJ). The type of hammer used to drive the rod is the main reason for these variations. On the average, the energy in the drive rod is 60% of the standard rated energy.

Because of the variability of energy, methods based on N-values are considered unreliable. However, measurements during SPT testing using the Case Method can be done on a routine basis and these measurements yield the transferred energy values. With measured energy, EMX, known, an adjustment of the measured N-value, N_m, can be made as follows.

$$N_{60} = N_m [E_m / (0.6E_r)] \quad (1)$$

Thus, if the measured energy value is equal to the normally expected transferred energy of 60% of E-rated then the adjusted and measured N-values are identical. On the other hand, if the measured energy is only 30% then the adjusted blow count will be reduced by 50%.

2. DYNAMIC TESTING AND ANALYSIS METHODS APPLIED TO SPT

The Case Method of dynamic pile testing, named after the Case Institute of Technology where it was developed between 1964 and 1975, requires that a substantial ram mass (e.g. a pile driving hammer) impacts the pile top such that the pile undergoes at least a small permanent set. Thus, the method is also referred to as a “High Strain Method”. The Case Method requires dynamic measurements on the pile or shaft under the ram impact and then a calculation of various quantities. Conveniently, for SPT applications, the measurements and analyses are done by a single piece of equipment: the SPT Analyzer. The Pile Driving Analyzer® (PDA) is also suitable to perform these measurements and data processing.

A related analysis method is the “Wave Equation Analysis” which calculates a relationship between bearing capacity, pile stresses, transferred energy and field blow count. The GRLWEAP™ program performs this analysis and provides a complete set of helpful information and input data. This program can be used very effectively to simulate the SPT driving process.

3. MEASUREMENTS

GRL uses equipment manufactured by Pile Dynamics, Inc. The system includes either an SPT-Analyzer™ (SPTA) or a Pile Driving Analyzer® (PDA), an instrumented rod section and two accelerometers. SPT energy testing is very closely related to and borrows procedures from dynamic pile testing. Those interested in the basis of the SPT energy testing method may obtain extensive literature on dynamic pile testing from GRL Engineers, Inc.

3.1 SPT Analyzer or Pile Driving Analyzer

The basis for the results calculated by the SPTA or PDA are strain and acceleration measured in an instrumented rod section. These signals are converted to rod top force, F(t), and rod top velocity, v(t). The SPTA or PDA conditions, calibrates and displays these signals and immediately computes average pile force and velocity thereby eliminating bending effects. The product of these two

measurements is then integrated over time which yields the energy transferred to the instrumented section as a function of time (see Section 4.1).

For convenience and accuracy, strain measurements are usually taken on an instrumented section of SPT drive rod. Ideally, the section properties of the instrumented rod and those of the drive rod are the same, however, using subs, other sections can also be utilized.

For the instrumented section, PDI provides a force calibration in such a way that the output of the instrumented rod is directly calculated without the need for an accurate elastic modulus or cross sectional area of the rod section.

The acceleration measurements are often demanding in the SPT environment, because of high frequency and high acceleration motion components. An experienced measurement engineer, therefore, has to evaluate the quality of this data before final conclusions are drawn from the numerical results calculated by SPTA or PDA.

SPTA or PDA records are taken while the standard N-value is acquired in the conventional manner. This then allows a direct correlation between N-value and average transferred energy.

3.2 HPA

The SPT hammer's ram velocity may be directly obtained using radar technology in the Hammer Performance Analyzer™. The impact velocity results can be automatically processed with a PC or recorded on a strip chart. HPA measurements yield a hammer kinetic energy, but not the energy transferred to the drive rod.

4 RECORD EVALUATION BY SPTA OR PDA

4.1 HAMMER PERFORMANCE

The PDA calculates the energy transferred to the pile top from:

$$E(t) = {}_0\int^t F(\tau)v(\tau)\, d\tau \qquad (2)$$

The maximum of the E(t) curve is often called **ENTHRU or EMX;** it is the most important quantity for an overall evaluation of the performance of a hammer and driving system. **EMX** allows for a classification of the hammer's performance when presented as, e_T, the rated transfer efficiency, also called energy transfer ratio (**ETR**) or global efficiency.

$$e_T = EMX/E_R \qquad (3)$$

where E_R is the hammer manufacturer's rated energy value or 0.35 kip-ft (0.475 kJ) in the case of the SPT hammer.

Often in the SPT literature one finds also reference to the EF2 energy. This evaluation is based on assumed proportionality between force and velocity (see also Section 5):

$$v(t) = F(t) / Z \qquad (4)$$

where Z = EA/c is the pile impedance, E is the elastic modulus, A is the cross sectional area and c is the speed of the stress wave in the pile material..

Combining equations 2 and 4 leads to

$$EF(t) = {}_0\int^t F(\tau)^2 / Z\, d\tau \qquad (5)$$

The EF2 transferred energy value is the EF-value at the time t = 2L/c, where L is the drive rod length and c is the stress wave speed in steel (16,800 ft/s or 5,124 m/s). Since the force is easier to measure than both force and velocity, Equation 5 is preferred by some test engineers. However, the EF method is fraught with errors and certain correction factors have to be applied to make it approximately correct. Among the error sources are the following:

- Proportionality is often violated prior to time 2L/c. The proportionality between force and velocity in a downward traveling wave only holds if the wave does not encounter a disturbance prior to reflecting off the pile toe. Such disturbances include a change in cross sectional area, an open or loose splice or joint, or resistance along the shaft.

- Using only one force measurement precludes a data quality check based on the proportionality between force and velocity. Thus, a force measurement that is for some reason in error may not be detectable, which will lead to errors in the EF2 value. Data quality checks will be discussed further in Section 5.

The use if EF2 is therefore not recommended but it is often included in result presentations for the sake of completeness.

4.2 STRESSES

During SPT monitoring, it is also of interest to monitor compressive stresses at both the top of the drive rod and at its bottom.

At the pile top (location of sensors) the maximum compression stress averaged over the rod's cross section, **CSX**, is directly obtained from the measurements. Note that this stress value refers to the instrumented section. If the rod has a different cross sectional area then the stress in the rod will be different from CSX.

The SPTA or PDA can also calculate, in an approximate manner, the force at the rod bottom, **CFB**. To obtain the corresponding stress, this force value should be divided by the appropriate cross sectional area, e.g. by the rod area just above the sampler or by the sampler area itself. Of course, non-uniform stress components as they might occur at the sampler tip due to a sloping rock are not considered in this calculation.

5. DATA QUALITY CHECKS

Quality data is the first and foremost requirement for accurate dynamic testing results. It is therefore important that the measurement engineer performing SPTA or PDA tests has the experience necessary to recognize measurement problems and take appropriate corrective action should problems develop. Fortunately, dynamic pile testing allows for certain data quality checks because two independent measurements are taken that have to conform to the so-called proportionality relationship.

As long as there is only a wave traveling in one direction, as is the case during impact when only a downward traveling wave exists in the rod, force and velocity measured at its top are proportional

$$F = v\,Z \qquad (5)$$

where Z is again the pile impedance, Z = EA/c. This relationship can also be expressed in terms of stress

$$\sigma = F/A = v\,(E/c) \qquad (6)$$

or strain

$$\epsilon = \sigma/E = v / c \qquad (7)$$

This means that the early portion of strain times wave speed must be equal to the velocity unless the proportionality is affected by high friction near the pile top or by a pile cross sectional change not far below the sensors. Checking the proportionality is an excellent means of assuring meaningful measurements but is only truly meaningful for perfectly uniform rods. Open or loose splices, for example, will lead to a non-proportionality. For SPT rods it is fortunate that usually no soil resistance acts along the shaft and for that reason, proportionality can exist until the stress wave returns from sampler top or rod bottom unless connectors are not sufficiently tightened or have a significant mass.

Velocity data quality can also be checked by looking at the final displacement, DFN, which is calculated from the acceleration by double integration. If the calculated final displacement is much higher or lower than indicated by the N-value, the accelerometer attachment may be loose or the sensor may be faulty. If major drift in the velocity is observed, the EMX value may be in error, even though proportionality from impact to time 2L/c exists. In this case, it may be useful to evaluate the energy transferred to the drill rod at time 2L/c, which is calculated by the PDA or SPTA as the E2E quantity.

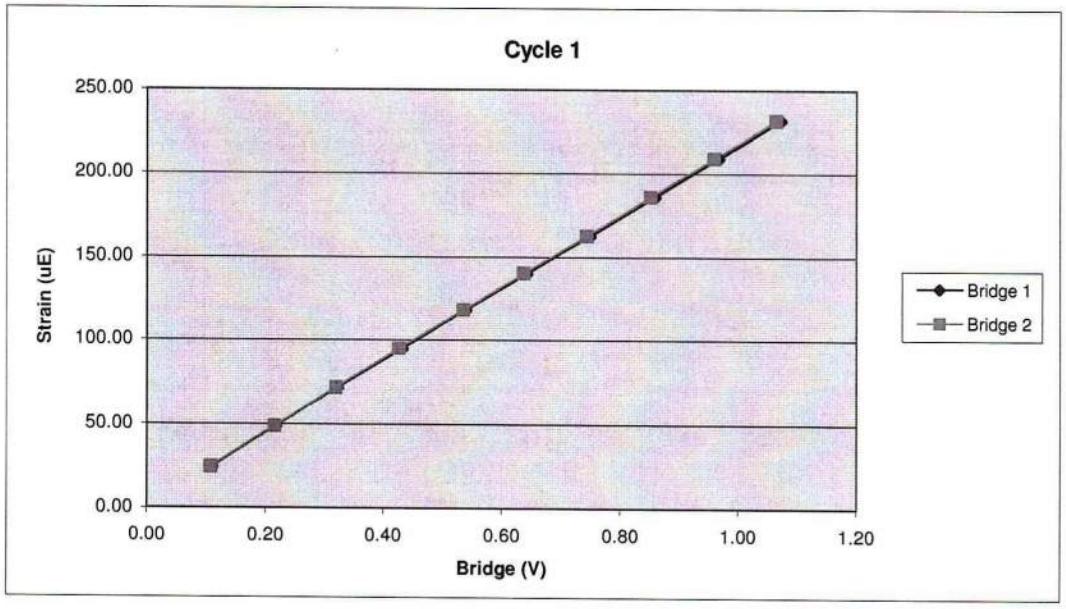
APPENDIX B

Instrumentation Calibration Information

231NWJ		Cycle 1		
Sample	**Force (lb)**	**Strain (µE)**	**Bridge 1 (V)**	**Bridge 2 (V)**
1	0.00	0.00	0.00	0.00
2	1012.13	24.71	0.11	0.11
3	2008.29	48.73	0.22	0.22
4	2984.34	71.57	0.32	0.32
5	3989.18	95.13	0.43	0.43
6	4994.80	117.95	0.54	0.54
7	5955.87	139.98	0.64	0.64
8	6944.74	162.72	0.75	0.74
9	7955.89	186.14	0.86	0.85
10	8962.89	209.00	0.97	0.96
11	9948.41	231.79	1.07	1.06

Bridge 1		**Bridge 2**	
Force Calibration (lb/V)	**9283.84**	**Force Calibration (lb/V)**	**9345.66**
Offset	-6.70	Offset	-0.19
Correlation	0.999999	Correlation	0.999999
Strain Calibration (µE/V)	**214.44**	**Strain Calibration (µE/V)**	**215.86**
Offset	2.14	Offset	2.29
Correlation	0.999981	Correlation	0.999982

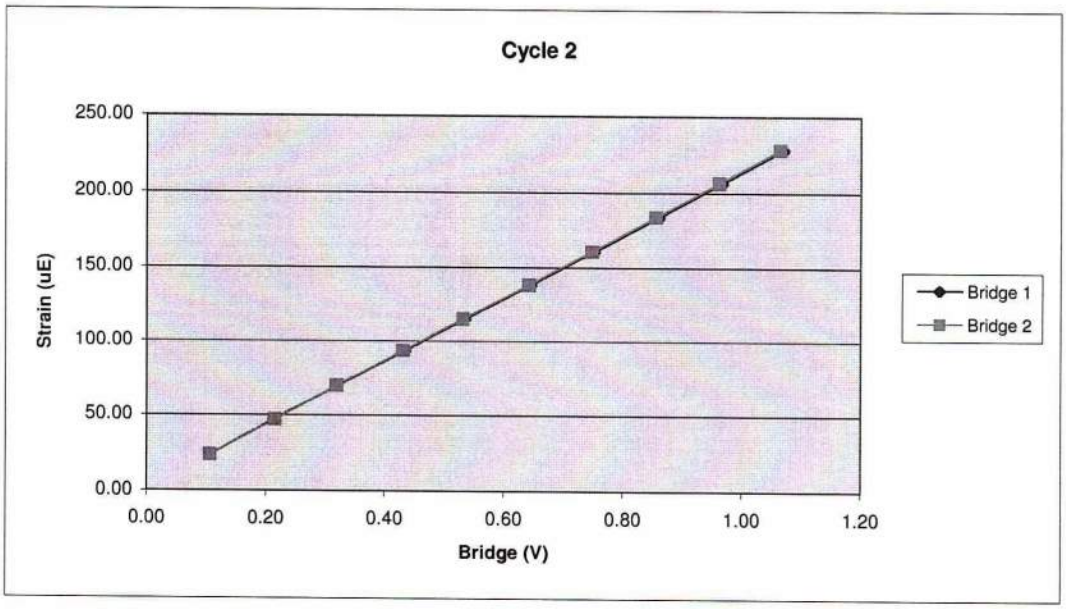
Force Strain Calibration	
EA (Kips)	**43292.53**
Offset	-99.16
Correlation	0.999979



231NWJ		Cycle 2		
Sample	**Force (lb)**	**Strain (µE)**	**Bridge 1 (V)**	**Bridge 2 (V)**
1	0.00	0.00	0.00	0.00
2	976.64	23.62	0.11	0.11
3	1976.95	47.01	0.21	0.22
4	2948.66	69.69	0.32	0.32
5	3992.73	93.38	0.43	0.43
6	4928.56	115.08	0.53	0.53
7	5953.31	138.50	0.64	0.64
8	6923.84	160.74	0.75	0.75
9	7942.09	183.61	0.86	0.85
10	8927.21	206.62	0.97	0.96
11	9887.09	228.02	1.07	1.06

Bridge 1		**Bridge 2**	
Force Calibration (lb/V)	**9250.68**	**Force Calibration (lb/V)**	**9301.08**
Offset	**-9.91**	Offset	**-18.55**
Correlation	**0.999998**	Correlation	**0.999998**
Strain Calibration (µE/V)	**212.11**	**Strain Calibration (µE/V)**	**213.27**
Offset	**1.53**	Offset	**1.33**
Correlation	**0.999994**	Correlation	**0.999994**

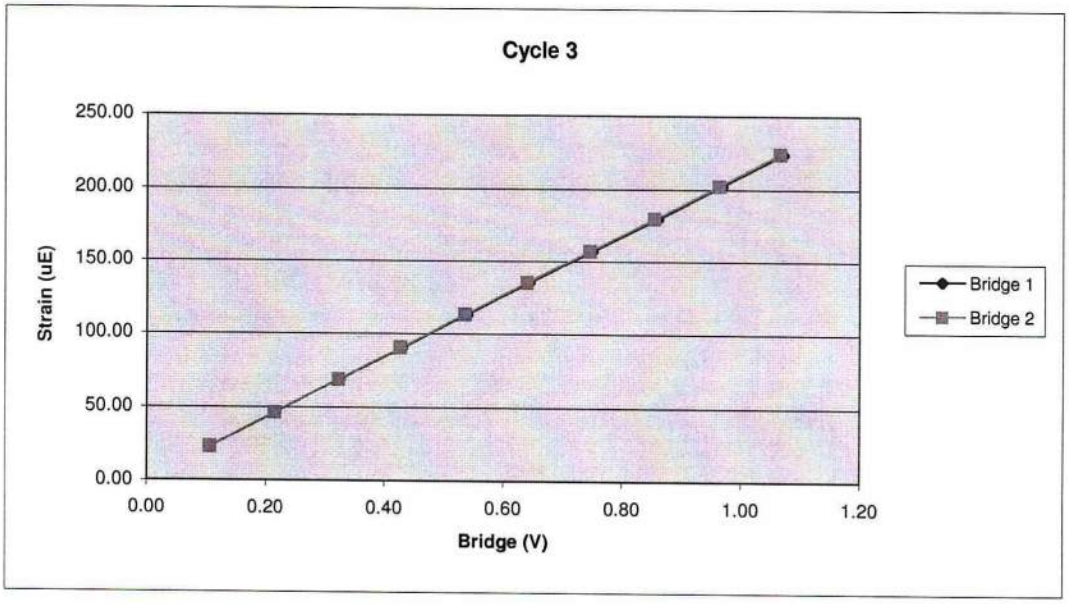
Force Strain Calibration	
EA (Kips)	**43611.25**
Offset	**-76.62**
Correlation	**0.999990**



231NWJ		Cycle 3		
Sample	**Force (lb)**	**Strain (µE)**	**Bridge 1 (V)**	**Bridge 2 (V)**
1	0.00	0.00	0.00	0.00
2	976.05	22.97	0.11	0.11
3	1980.69	46.32	0.21	0.21
4	2977.64	68.91	0.32	0.32
5	3954.48	90.43	0.43	0.43
6	4961.09	113.14	0.54	0.54
7	5931.03	135.05	0.64	0.64
8	6916.55	156.82	0.75	0.74
9	7928.09	179.47	0.86	0.85
10	8932.14	202.49	0.97	0.96
11	9894.98	224.03	1.07	1.07

Bridge 1		**Bridge 2**	
Force Calibration (lb/V)	**9251.71**	**Force Calibration (lb/V)**	**9303.81**
Offset	**-8.61**	Offset	**-17.09**
Correlation	**0.999998**	Correlation	**0.999998**
Strain Calibration (µE/V)	**208.00**	**Strain Calibration (µE/V)**	**209.17**
Offset	**1.35**	Offset	**1.16**
Correlation	**0.999992**	Correlation	**0.999996**

Force Strain Calibration	
EA (Kips)	**44479.19**
Offset	**-68.49**
Correlation	**0.999991**



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

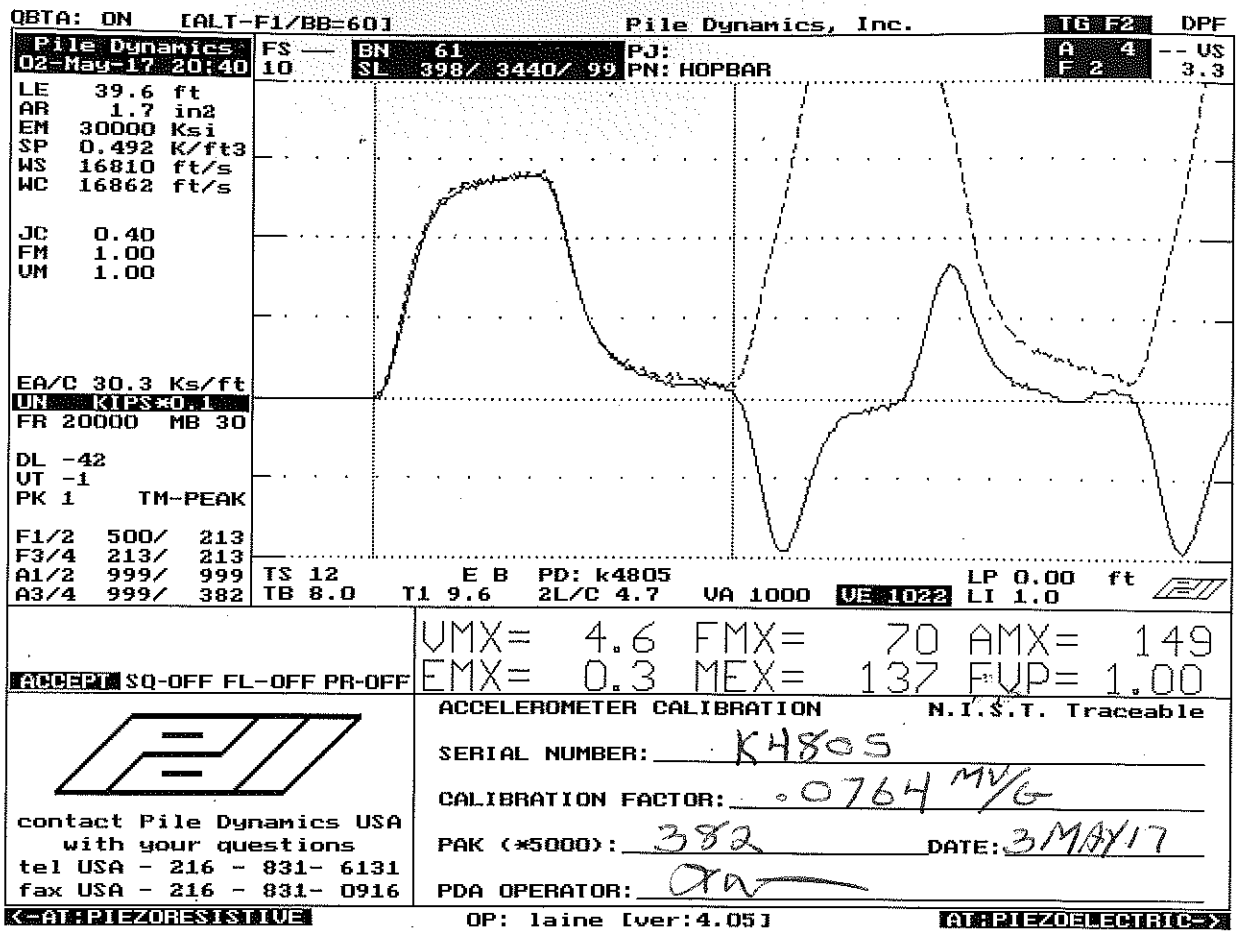
Calibration Factors	231NWJ		
Bridge 1 (µE/V)	211.52	Bridge 2 (µE/V)	212.77
EA Factor (Kips)	43794.32	Area (in^2)	1.46

Calibrated by: David Beck

Calibrated Date: 9/28/2015

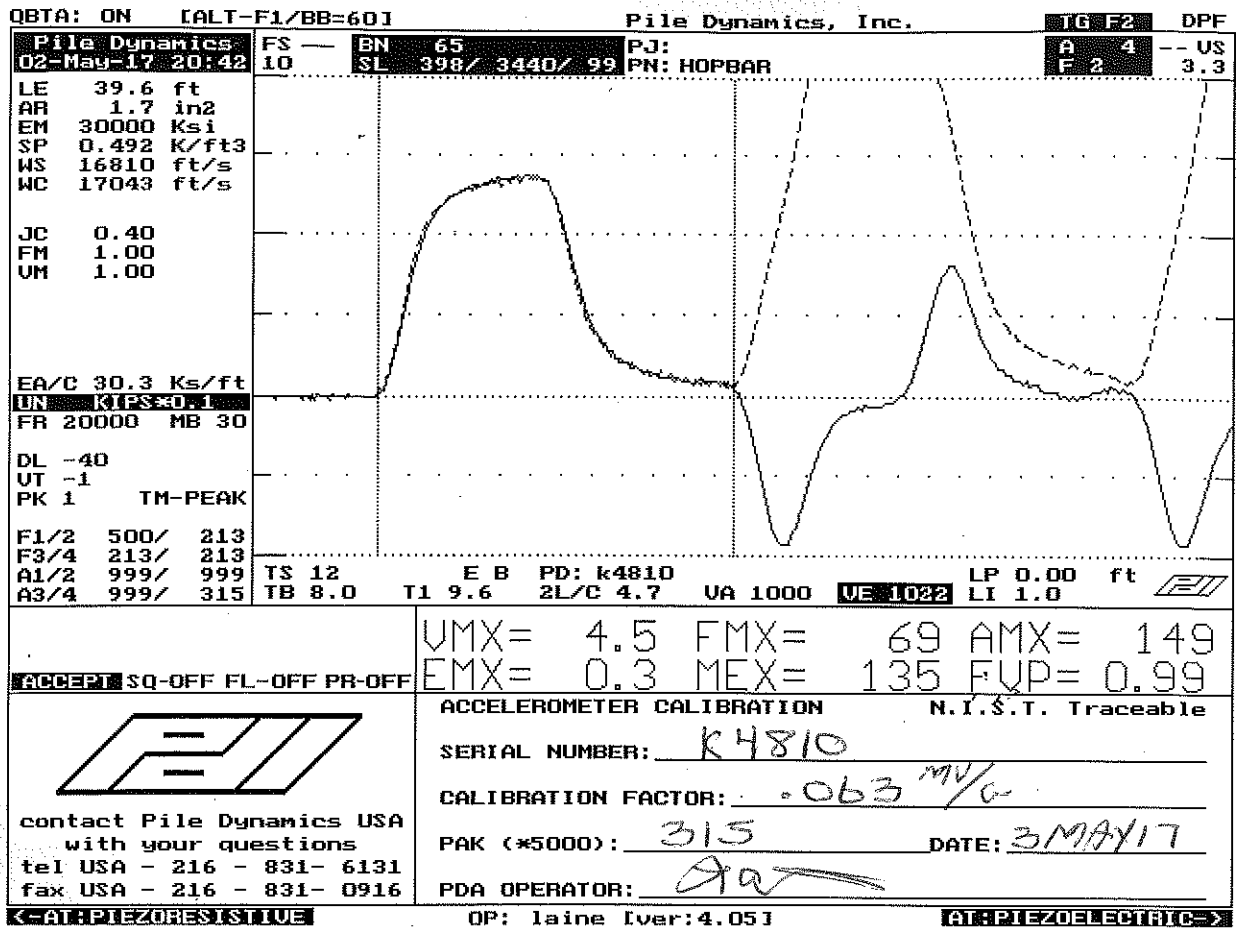
Pile Dynamics Inc
30725 Aurora Rd
Solon, OH 44139

Traceable to N.I.S.T.



Smart Sensor

Smart Chip Programmed By A.M.W **on** 3MAY17 **CRC Value** BC78


QBTA: ON [ALT-F1/BB=60]
Pile Dynamics, Inc.
TG F2
DPF
Pile Dynamics
02-May-17 20:42
FS —
10
BN 65
SL 398/ 3440/ 99
PJ:
PN: HOPBAR
A 4
F 2
-- VS
3.3
LE 39.6 ft
AR 1.7 in2
EM 30000 Ksi
SP 0.492 K/ft3
WS 16810 ft/s
WC 17043 ft/s
JC 0.40
FM 1.00
VM 1.00
EA/C 30.3 Ks/ft
UN KIPS*0.1
FR 20000 MB 30
DL -40
VT -1
PK 1 TM-PEAK
F1/2 500/ 213
F3/4 213/ 213
A1/2 999/ 999
A3/4 999/ 315
TS 12 E B PD: k4810
TB 8.0 T1 9.6 2L/C 4.7 VA 1000 VE 1022
LP 0.00 ft
LI 1.0
VMX= 4.5 FMX= 69 AMX= 149
EMX= 0.3 MEX= 135 FVP= 0.99
ACCEPT SQ-OFF FL-OFF PR-OFF
contact Pile Dynamics USA
with your questions
tel USA - 216 - 831- 6131
fax USA - 216 - 831- 0916
ACCELEROMETER CALIBRATION
N.I.S.T. Traceable
SERIAL NUMBER: K4810
CALIBRATION FACTOR: .063 mV/g
PAK (*5000): 315
DATE: 3MAY17
PDA OPERATOR:
<-AT:PIEZORESISTIVE
OP: laine [ver:4.05]
AT:PIEZOELECTRIC->
Smart Sensor
Smart Chip Programmed By T.M.W. on 3MAY17 CRC Value 9E7B

Certificate of Calibration

Pile Dynamics, Inc. certifies that the

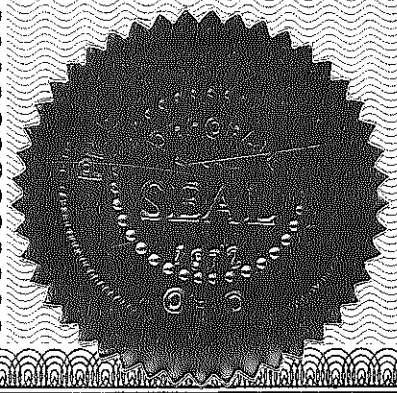
Pile Driving Analyzer®, Model 8G

Serial Number: 4613 LE

was calibrated on 4 May 2017

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

Appendix C

SPT Calibration Results

GRL Engineers, Inc.
SPT Analyzer Results

PDA-S Ver. 2017.18 - Printed: 6/23/2017

Summary of SPT Test Results

Project: Diedrich D-50 SN310, Test Date: 6/21/2017

FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute
EFV: Maximum Energy

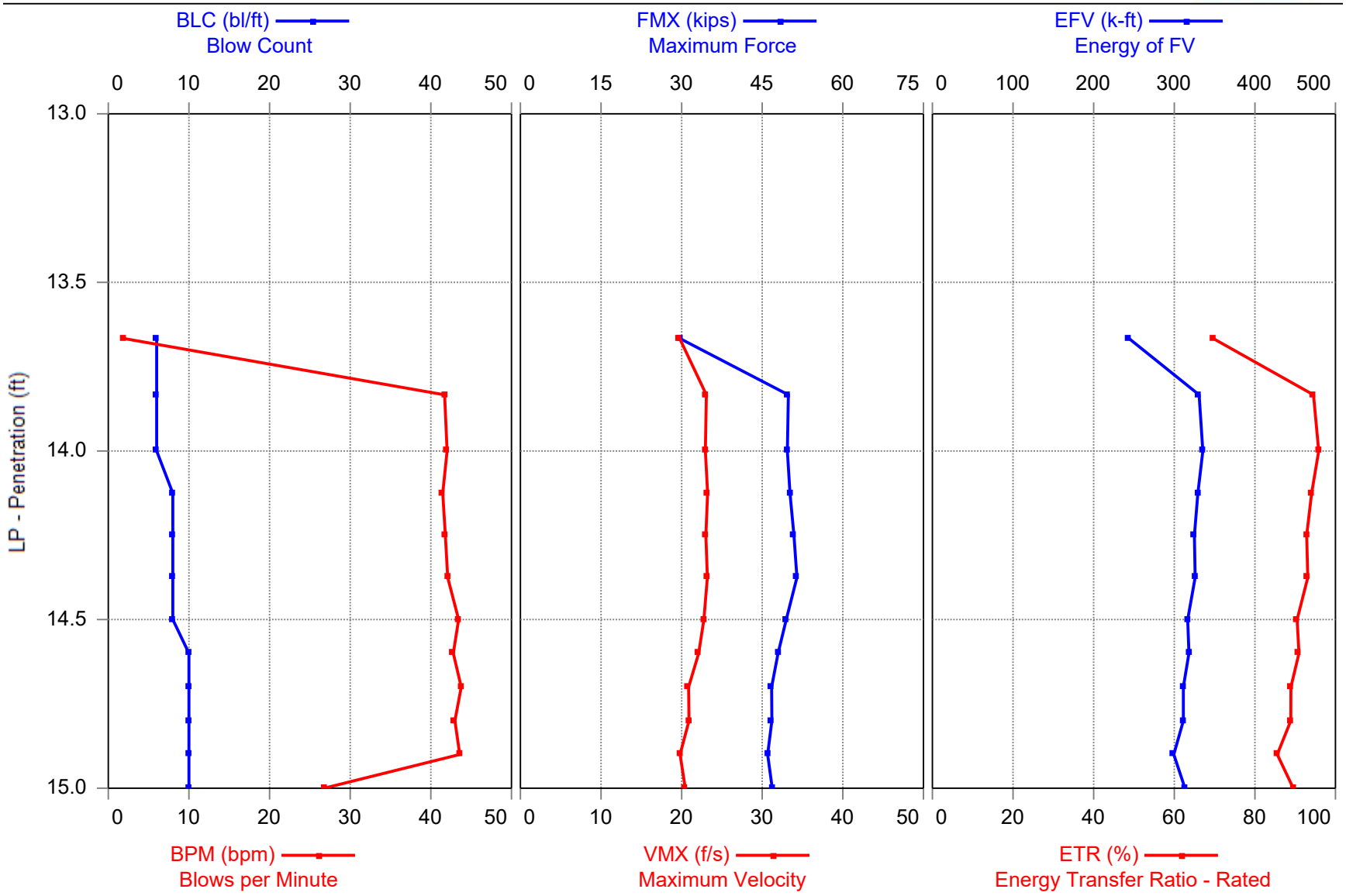
ETR: Energy Transfer Ratio - Rated
DFN: Final Displacement
FVP: Force/Velocity Proportionality

Instr. Length ft	Blows Applied /6"	Start Depth ft	Final Depth ft	**N Value**	**N60 Value**	Average FMX kips	Average VMX ft/s	Average BPM bpm	Average EFV ft-lb	Average ETR (%)	Average DFN in	Average FVP []
19.00	**3-4-5**	13.50	15.00	**9**	**14**	48	21.8	41.0	317	90.5	1.33	0.9
24.00	**3-6-8**	18.50	20.00	**14**	**21**	50	19.4	44.4	326	93.0	0.86	0.9
29.00	**4-8-11**	23.50	25.00	**19**	**29**	50	19.0	44.5	340	97.1	0.63	0.9
34.00	**5-6-9**	28.50	30.00	**15**	**23**	48	17.0	44.8	323	92.4	0.80	1.0
39.00	**7-10-15**	33.50	35.00	**25**	**39**	49	17.5	44.6	325	92.8	0.47	1.1
46.00	**4-4-6**	38.50	40.00	**10**	**15**	46	17.9	44.2	340	97.0	1.20	0.9
				Overall Average Values:		49	18.5	44.2	329	93.9	0.78	1.0
				Standard Deviation:		2	1.6	1.9	12	3.5	0.32	0.1
				Overall Maximum Value:		52	23.2	45.4	357	102.1	1.50	1.1
				Overall Minimum Value:		44	15.9	26.8	299	85.5	0.39	0.8

GRL Engineers, Inc. - PDIPLOT2 Ver 2016.2.57.6 - Case Method & iCAP® Results

Printed: 23-June-2017 Test started: 21-June-2017

Diedrich D-50 SN310 - SS 13.5-15



Diedrich D-50 SN310 - SS 13.5-15 B2-4
OP: JW Date: 21-June-2017

AR: 1.46 in² SP: 0.492 k/ft³
LE: 19.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.90 []

BPM: Blows per Minute
FMX: Maximum Force
VMX: Maximum Velocity
EFV: Energy of FV
ETR: Energy Transfer Ratio - Rated
CSX: Max Measured Compr. Stress
DMX: Maximum Displacement
DFN: Final Displacement
FVP: Force/Velocity proportionality

BL#	Depth ft	BLC bl/ft	TYPE	BPM bpm	FMX kips	VMX f/s	EFV k-ft	ETR (%)	CSX ksi	DMX in	DFN in	FVP []
3	14.0	6	AV3	29	43	21.9	303	87	29.5	2.39	2.00	0.90
7	14.5	8	AV4	42	50	23.0	324	93	34.6	2.09	1.50	0.88
12	15.0	10	AV5	40	47	20.8	311	89	32.1	1.30	1.20	0.89
			Average	38	47	21.8	313	90	32.3	1.83	1.50	0.89

Total number of blows analyzed: 12

Sensors

Blows: 1-12

Sensor	Type	Serial Nr.	Calibration	Replay Factor
F2	Strain	231NWJ1	211.5	1.00
F4	Strain	231NWJ2	212.8	1.00
A1	PR Accel	K4810	315.0	1.00
A3	PR Accel	K4805	382.0	1.00

Time Summary

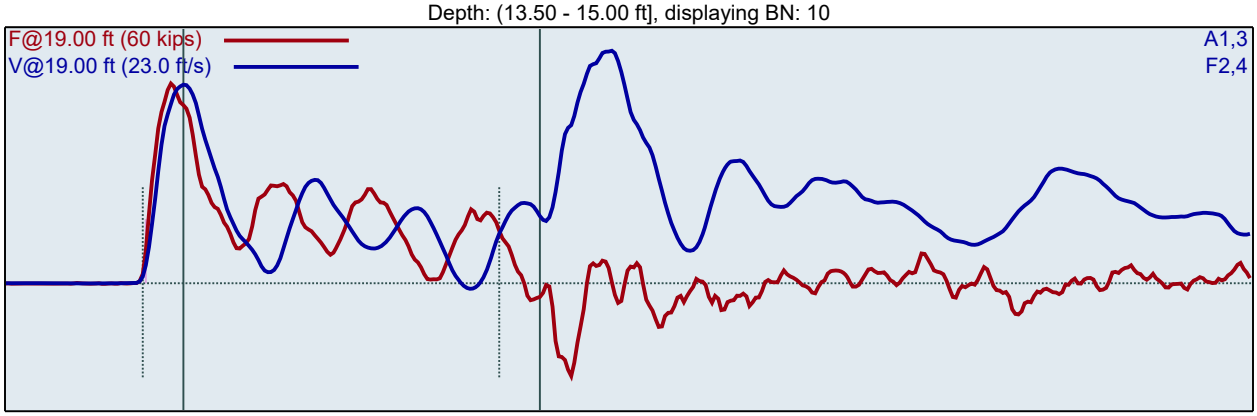
Drive 16 seconds 9:00 AM - 9:00 AM BN 1 - 12

GRL Engineers, Inc.
SPT Analyzer Results

PDA-S Ver. 2017.18 - Printed: 6/23/2017

Diedrich D-50 SN310 — SS 13.5-15
JW — Test date: 6/21/2017
AR: 1.46 in^2 — SP: 0.492 k/ft3
LE: 19.00 ft — EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (13.50 - 15.00 ft], displaying BN: 10



FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute
EFV: Maximum Energy

ETR: Energy Transfer Ratio - Rated
DFN: Final Displacement
FVP: Force/Velocity Proportionality

BL#	BC /6"	LP ft	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR (%)	DFN in	FVP []
1	3	13.67	30	19.8	1.9	244	69.7	2.00	0.9
2	3	13.83	50	23.1	41.7	331	94.5	2.00	0.9
3	3	14.00	50	22.9	42.0	335	95.8	2.00	0.9
4	4	14.13	50	23.2	41.5	329	94.1	1.50	0.9
5	4	14.25	51	23.0	41.8	325	92.9	1.50	0.9
6	4	14.38	51	23.2	42.1	326	93.1	1.50	0.9
7	4	14.50	49	22.8	43.4	317	90.5	1.50	0.9
8	5	14.60	48	22.1	42.8	318	90.9	1.20	0.9
9	5	14.70	47	20.9	43.8	311	88.9	1.20	0.9
10	5	14.80	47	20.9	43.0	311	88.9	1.20	0.9
11	5	14.90	46	19.8	43.6	299	85.5	1.20	0.9
12	5	15.00	47	20.4	26.8	313	89.5	1.20	0.9
		Average	48	21.8	41.0	317	90.5	1.33	0.9
		Std Dev	2	1.2	5.1	9	2.5	0.15	0.0
		Maximum	51	23.2	43.8	329	94.1	1.50	0.9
		Minimum	46	19.8	26.8	299	85.5	1.20	0.9
				N-value: 9					

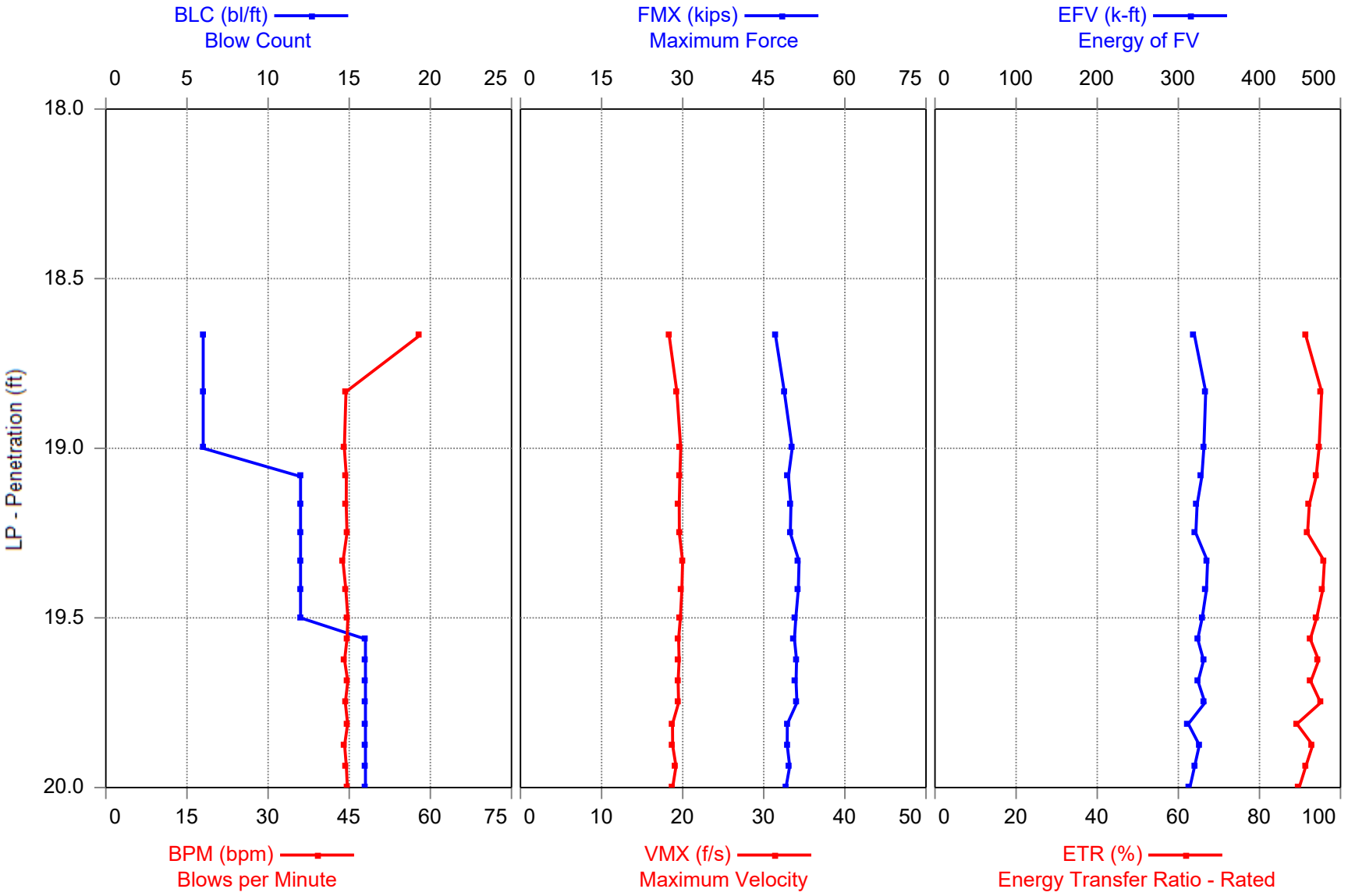
Sample Interval Time: 16.33 seconds.

GRL Engineers, Inc. - PDIPLOT2 Ver 2016.2.57.6 - Case Method & iCAP® Results

Printed: 23-June-2017

Test started: 21-June-2017

Diedrich D-50 SN310 - SS 18.5-20



Diedrich D-50 SN310 - SS 18.5-20 B2-4
OP: JW Date: 21-June-2017

AR: 1.46 in² SP: 0.492 k/ft³
LE: 24.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.90 []

BPM: Blows per Minute
FMX: Maximum Force
VMX: Maximum Velocity
EFV: Energy of FV
ETR: Energy Transfer Ratio - Rated
CSX: Max Measured Compr. Stress
DMX: Maximum Displacement
DFN: Final Displacement
FVP: Force/Velocity proportionality

BL#	Depth ft	BLC bl/ft	TYPE	BPM bpm	FMX kips	VMX f/s	EFV k-ft	ETR (%)	CSX ksi	DMX in	DFN in	FVP []
3	19.0	6	AV3	49	49	19.1	328	94	33.4	2.41	2.00	0.86
9	19.5	12	AV6	44	51	19.7	329	94	34.6	1.38	1.00	0.85
17	20.0	16	AV8	44	50	19.2	323	92	34.4	1.08	0.75	0.87
			Average	45	50	19.4	326	93	34.3	1.42	1.06	0.86

Total number of blows analyzed: 17

Sensors

Blows: 1-17

Sensor	Type	Serial Nr.	Calibration	Replay Factor
F2	Strain	231NWJ1	211.5	1.00
F4	Strain	231NWJ2	212.8	1.00
A1	PR Accel	K4810	315.0	1.00
A3	PR Accel	K4805	382.0	1.00

Time Summary

Drive 21 seconds 9:09 AM - 9:09 AM BN 1 - 17

GRL Engineers, Inc.
SPT Analyzer Results

PDA-S Ver. 2017.18 - Printed: 6/23/2017

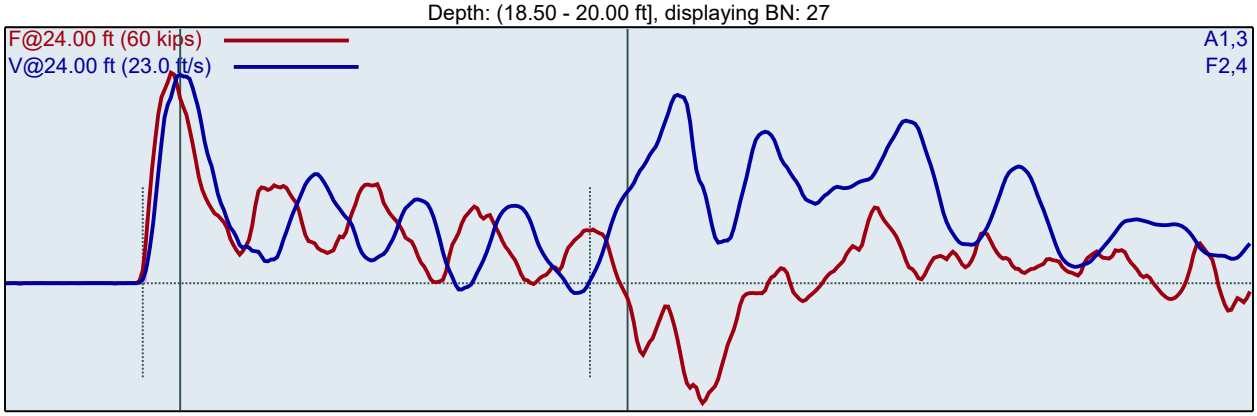
Diedrich D-50 SN310
JW

SS 13.5-15
Test date: 6/21/2017

AR: 1.46 in^2
LE: 24.00 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (18.50 - 20.00 ft], displaying BN: 27



BL#	BC /6"	LP ft	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR (%)	DFN in	FVP []
13	3	18.67	47	18.3	58.1	320	91.4	2.00	0.9
14	3	18.83	49	19.3	44.4	334	95.3	2.00	0.9
15	3	19.00	50	19.8	44.1	331	94.7	2.00	0.8
16	6	19.08	50	19.7	44.5	329	94.0	1.00	0.9
17	6	19.17	50	19.6	44.4	323	92.3	1.00	0.8
18	6	19.25	50	19.6	44.6	322	91.9	1.00	0.9
19	6	19.33	52	20.0	43.8	336	96.0	1.00	0.8
20	6	19.42	51	19.9	44.4	335	95.6	1.00	0.8
21	6	19.50	51	19.7	44.7	329	94.1	1.00	0.9
22	8	19.56	51	19.5	44.6	324	92.5	0.75	0.8
23	8	19.63	51	19.6	44.2	331	94.6	0.75	0.9
24	8	19.69	51	19.4	44.7	324	92.7	0.75	0.9
25	8	19.75	51	19.5	44.3	333	95.1	0.75	0.9
26	8	19.81	49	18.7	44.7	312	89.2	0.75	0.9
27	8	19.88	49	18.8	44.2	326	93.1	0.75	0.9
28	8	19.94	50	19.2	44.5	320	91.4	0.75	0.9
29	8	20.00	49	18.8	44.7	314	89.8	0.75	0.9
		Average	50	19.4	44.4	326	93.0	0.86	0.9
		Std Dev	1	0.4	0.3	7	2.0	0.12	0.0
		Maximum	52	20.0	44.7	336	96.0	1.00	0.9
		Minimum	49	18.7	43.8	312	89.2	0.75	0.8
				N-value: 14					

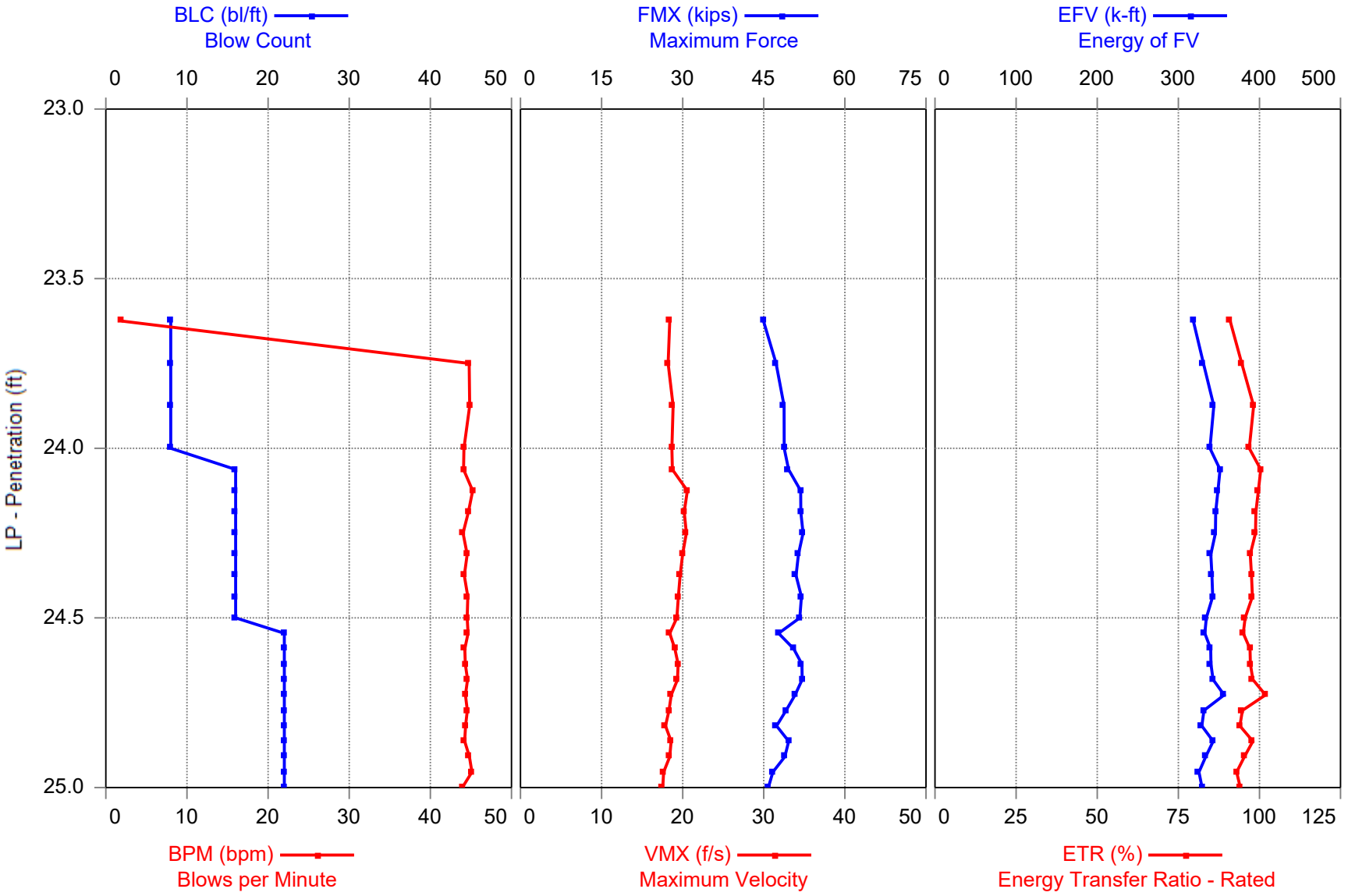
Sample Interval Time: 21.59 seconds.

GRL Engineers, Inc. - PDIPLOT2 Ver 2016.2.57.6 - Case Method & iCAP® Results

Printed: 23-June-2017

Test started: 21-June-2017

Diedrich D-50 SN310 - SS 23.5-25



Diedrich D-50 SN310 - SS 23.5-25 B2-4
OP: JW Date: 21-June-2017

AR: 1.46 in² SP: 0.492 k/ft³
LE: 29.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.90 []

BPM: Blows per Minute
FMX: Maximum Force
VMX: Maximum Velocity
EFV: Energy of FV
ETR: Energy Transfer Ratio - Rated
CSX: Max Measured Compr. Stress
DMX: Maximum Displacement
DFN: Final Displacement
FVP: Force/Velocity proportionality

BL#	Depth ft	BLC bl/ft	TYPE	BPM bpm	FMX kips	VMX f/s	EFV k-ft	ETR (%)	CSX ksi	DMX in	DFN in	FVP []
4	24.0	8	AV4	34	47	18.5	333	95	32.5	1.86	1.50	0.93
12	24.5	16	AV8	44	51	19.8	344	98	35.2	1.26	0.75	0.90
23	25.0	22	AV11	44	49	18.5	337	96	33.7	1.01	0.55	0.88
			Average	43	50	18.9	339	97	34.0	1.24	0.78	0.89

Total number of blows analyzed: 23

Sensors

Blows: 1-23

Sensor	Type	Serial Nr.	Calibration	Replay Factor
F2	Strain	231NWJ1	211.5	1.00
F4	Strain	231NWJ2	212.8	1.00
A1	PR Accel	K4810	315.0	1.00
A3	PR Accel	K4805	382.0	1.00

Time Summary

Drive 29 seconds 9:18 AM - 9:19 AM BN 1 - 23

GRL Engineers, Inc.
SPT Analyzer Results

PDA-S Ver. 2017.18 - Printed: 6/23/2017

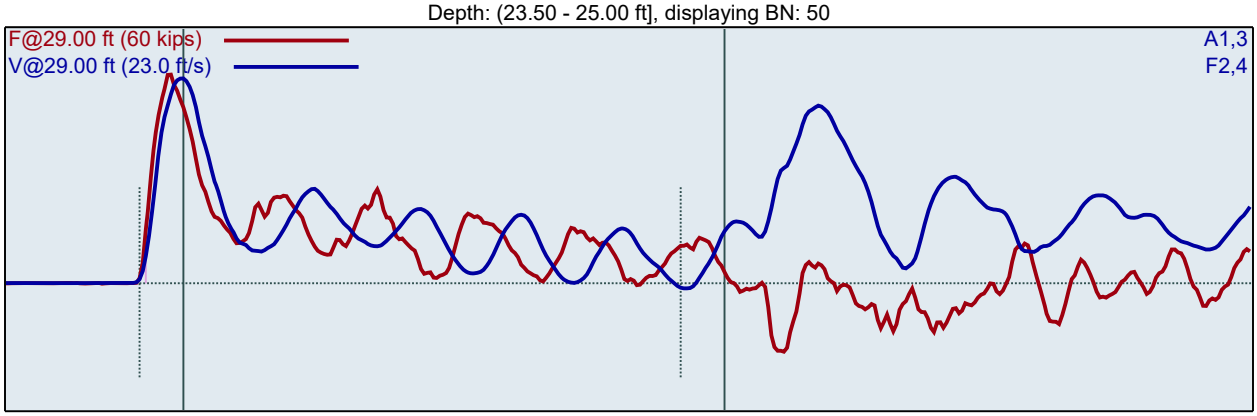
Diedrich D-50 SN310
JW

SS 13.5-15
Test date: 6/21/2017

AR: 1.46 in^2
LE: 29.00 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (23.50 - 25.00 ft], displaying BN: 50



BL#	BC /6"	LP ft	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR (%)	DFN in	FVP []
30	4	23.63	45	18.4	1.9	318	91.0	1.50	0.9
31	4	23.75	47	18.2	44.8	331	94.6	1.50	0.9
32	4	23.88	49	18.8	44.8	344	98.2	1.50	0.9
33	4	24.00	49	18.7	44.1	339	96.8	1.50	0.9
34	8	24.06	50	18.7	44.1	351	100.4	0.75	0.9
35	8	24.13	52	20.6	45.2	349	99.7	0.75	0.9
36	8	24.19	52	20.2	44.7	346	98.9	0.75	0.9
37	8	24.25	52	20.5	44.0	346	98.8	0.75	0.9
38	8	24.31	51	20.0	44.5	340	97.2	0.75	0.9
39	8	24.38	51	19.7	44.2	341	97.6	0.75	0.9
40	8	24.44	52	19.5	44.6	342	97.8	0.75	0.9
41	8	24.50	52	19.3	44.5	335	95.6	0.75	0.9
42	11	24.55	48	18.4	44.6	333	95.0	0.54	0.9
43	11	24.59	51	19.0	44.2	340	97.1	0.55	0.9
44	11	24.64	52	19.4	44.3	340	97.2	0.55	0.8
45	11	24.68	52	19.4	44.6	343	98.0	0.55	0.8
46	11	24.73	51	18.6	44.3	356	101.9	0.55	0.9
47	11	24.77	49	18.3	44.6	332	94.8	0.54	0.9
48	11	24.82	47	17.9	44.3	329	94.0	0.54	0.9
49	11	24.86	50	18.6	44.2	343	98.0	0.55	0.9
50	11	24.91	49	18.4	44.8	334	95.4	0.54	0.9
51	11	24.95	47	17.7	45.1	325	93.0	0.55	0.9
52	11	25.00	46	17.5	43.9	329	94.1	0.55	0.9
		Average	50	19.0	44.5	340	97.1	0.63	0.9
		Std Dev	2	0.9	0.3	8	2.3	0.10	0.0
		Maximum	52	20.6	45.2	356	101.9	0.75	0.9
		Minimum	46	17.5	43.9	325	93.0	0.54	0.8
				N-value: 19					

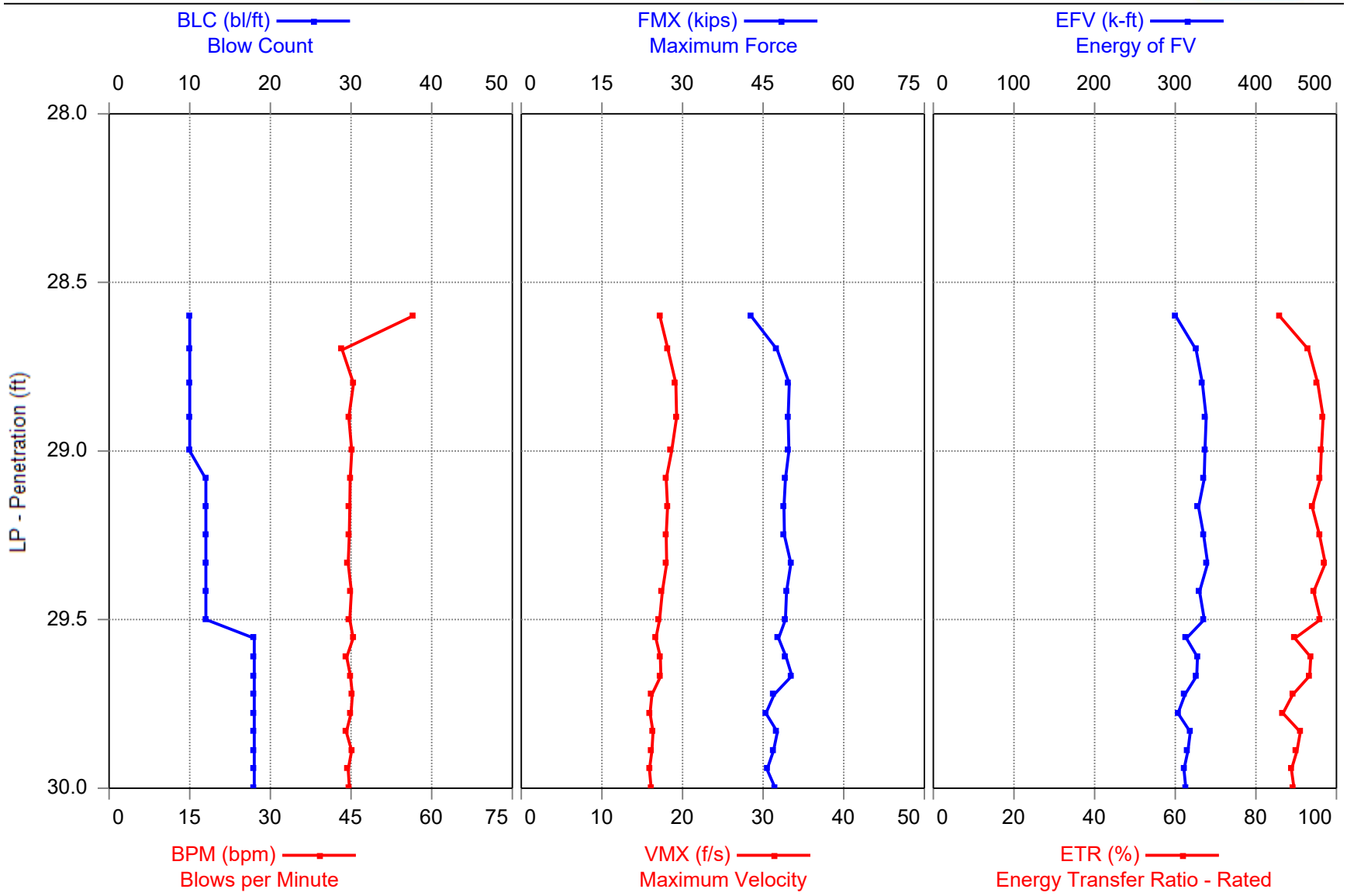
Sample Interval Time: 29.69 seconds.

GRL Engineers, Inc. - PDIPLOT2 Ver 2016.2.57.6 - Case Method & iCAP® Results

Printed: 23-June-2017

Test started: 21-June-2017

Diedrich D-50 SN310 - SS 28.5-30



Diedrich D-50 SN310 - SS 28.5-30 B2-4
OP: JW Date: 21-June-2017

AR: 1.46 in² SP: 0.492 k/ft³
LE: 34.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.90 []

BPM: Blows per Minute
FMX: Maximum Force
VMX: Maximum Velocity
EFV: Energy of FV
ETR: Energy Transfer Ratio - Rated
CSX: Max Measured Compr. Stress
DMX: Maximum Displacement
DFN: Final Displacement
FVP: Force/Velocity proportionality

BL#	Depth ft	BLC bl/ft	TYPE	BPM bpm	FMX kips	VMX f/s	EFV k-ft	ETR (%)	CSX ksi	DMX in	DFN in	FVP []
5	29.0	10	AV5	47	48	18.5	327	93	32.8	1.40	1.19	1.00
11	29.5	12	AV6	45	49	17.8	334	96	33.8	1.01	1.00	1.04
20	30.0	18	AV9	45	48	16.4	316	90	32.5	0.74	0.66	1.05
			Average	45	48	17.4	324	93	33.0	0.99	0.90	1.04

Total number of blows analyzed: 20

Sensors

Blows: 1-20

Sensor	Type	Serial Nr.	Calibration	Replay Factor
F2	Strain	231NWJ1	211.5	1.00
F4	Strain	231NWJ2	212.8	1.00
A1	PR Accel	K4810	315.0	1.00
A3	PR Accel	K4805	382.0	1.00

Time Summary

Drive 25 seconds 9:28 AM - 9:28 AM BN 1 - 20

GRL Engineers, Inc.
SPT Analyzer Results

PDA-S Ver. 2017.18 - Printed: 6/23/2017

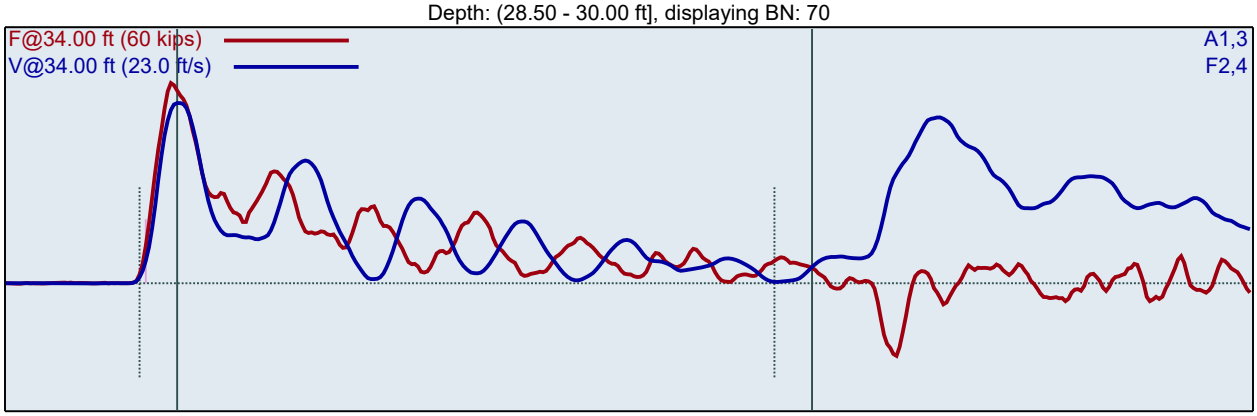
Diedrich D-50 SN310
JW

SS 13.5-15
Test date: 6/21/2017

AR: 1.46 in^2
LE: 34.00 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (28.50 - 30.00 ft], displaying BN: 70



BL#	BC /6"	LP ft	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR (%)	DFN in	FVP []
53	5	28.60	43	17.2	56.5	301	85.9	1.20	0.9
54	5	28.70	48	18.2	43.4	326	93.1	1.19	1.0
55	5	28.80	50	19.2	45.5	334	95.4	1.19	1.0
56	5	28.90	50	19.3	44.6	338	96.7	1.19	1.0
57	5	29.00	50	18.7	45.1	337	96.2	1.20	1.0
58	6	29.08	49	18.0	44.8	336	96.0	1.00	1.0
59	6	29.17	49	18.1	44.8	329	94.0	1.00	1.1
60	6	29.25	49	18.0	44.7	335	95.8	1.00	1.0
61	6	29.33	50	18.0	44.5	340	97.2	1.00	1.0
62	6	29.42	49	17.5	45.1	330	94.4	1.00	1.0
63	6	29.50	49	17.2	44.8	336	96.0	1.00	1.1
64	9	29.56	48	16.7	45.4	314	89.7	0.66	1.1
65	9	29.61	49	17.2	44.2	328	93.6	0.66	1.0
66	9	29.67	50	17.3	44.9	327	93.3	0.66	1.0
67	9	29.72	47	16.2	45.2	312	89.2	0.66	1.1
68	9	29.78	46	16.0	45.0	304	86.7	0.66	1.0
69	9	29.83	48	16.4	44.1	319	91.0	0.66	1.1
70	9	29.89	47	16.2	45.1	316	90.2	0.66	1.1
71	9	29.94	46	15.9	44.5	311	88.8	0.66	1.1
72	9	30.00	47	16.1	44.7	313	89.4	0.66	1.1
		Average	48	17.0	44.8	323	92.4	0.80	1.0
		Std Dev	1	0.8	0.4	11	3.1	0.16	0.0
		Maximum	50	18.1	45.4	340	97.2	1.00	1.1
		Minimum	46	15.9	44.1	304	86.7	0.66	1.0
				N-value: 15					

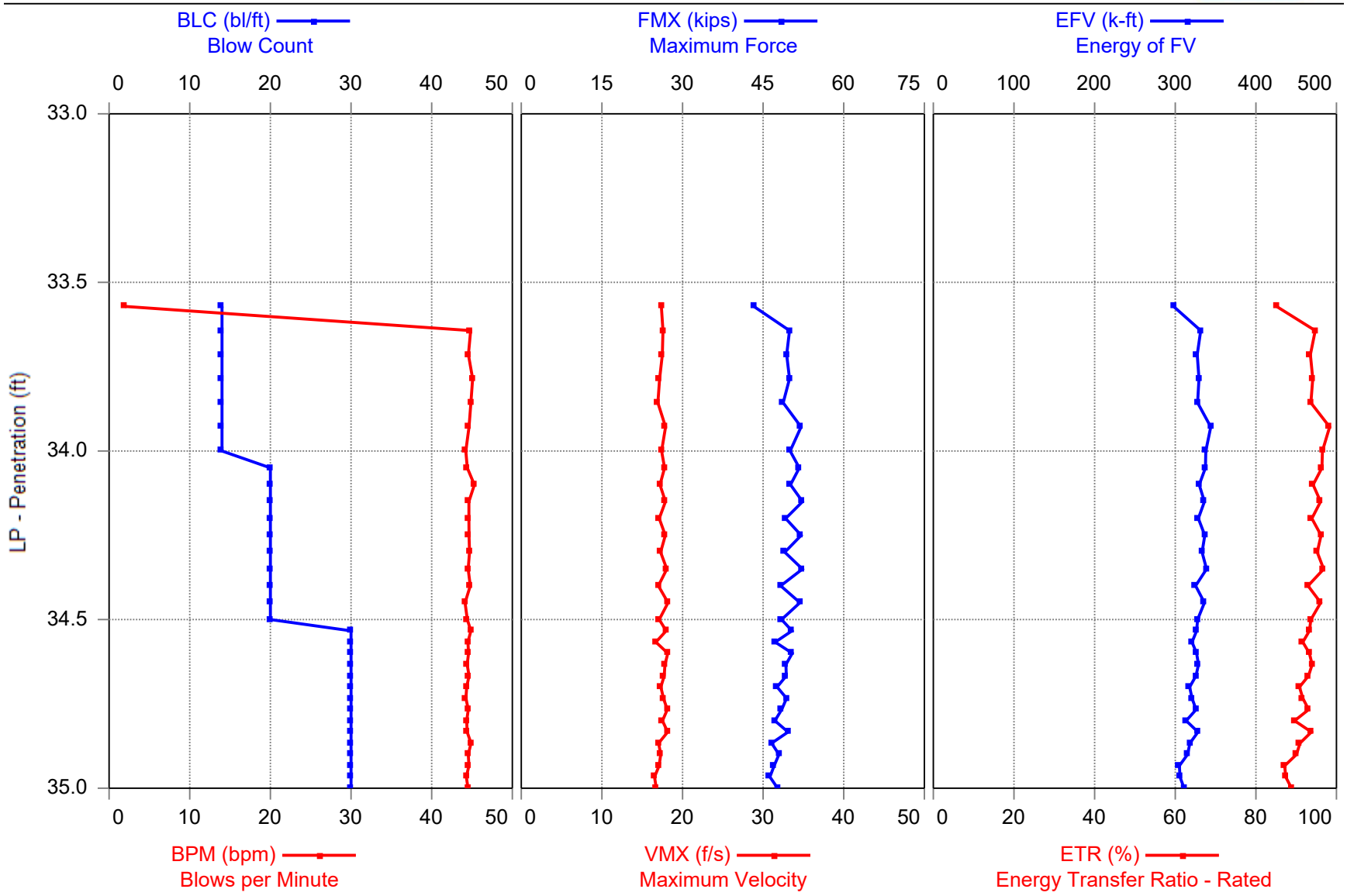
Sample Interval Time: 25.44 seconds.

GRL Engineers, Inc. - PDIPLOT2 Ver 2016.2.57.6 - Case Method & iCAP® Results

Printed: 23-June-2017

Test started: 21-June-2017

Diedrich D-50 SN310 - SS 33.5-35



Diedrich D-50 SN310 - SS 33.5-35 B2-4
OP: JW Date: 21-June-2017

AR: 1.46 in² SP: 0.492 k/ft³
LE: 39.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.90 []

BPM: Blows per Minute
FMX: Maximum Force
VMX: Maximum Velocity
EFV: Energy of FV
ETR: Energy Transfer Ratio - Rated
CSX: Max Measured Compr. Stress
DMX: Maximum Displacement
DFN: Final Displacement
FVP: Force/Velocity proportionality

BL#	Depth ft	BLC bl/ft	TYPE	BPM bpm	FMX kips	VMX f/s	EFV k-ft	ETR (%)	CSX ksi	DMX in	DFN in	FVP []
7	34.0	14	AV7	39	49	17.4	328	94	33.6	0.93	0.85	1.05
17	34.5	20	AV10	45	51	17.6	333	95	34.6	0.63	0.59	1.09
32	35.0	30	AV15	45	48	17.5	319	91	33.1	0.47	0.40	1.05
			Average	43	49	17.5	325	93	33.7	0.62	0.56	1.06

Total number of blows analyzed: 32

Sensors

Blows: 1-32

Sensor	Type	Serial Nr.	Calibration	Replay Factor
F2	Strain	231NWJ1	211.5	1.00
F4	Strain	231NWJ2	212.8	1.00
A1	PR Accel	K4810	315.0	1.00
A3	PR Accel	K4805	382.0	1.00

Time Summary

Drive 41 seconds 9:38 AM - 9:39 AM BN 1 - 32

GRL Engineers, Inc.
SPT Analyzer Results

PDA-S Ver. 2017.18 - Printed: 6/23/2017

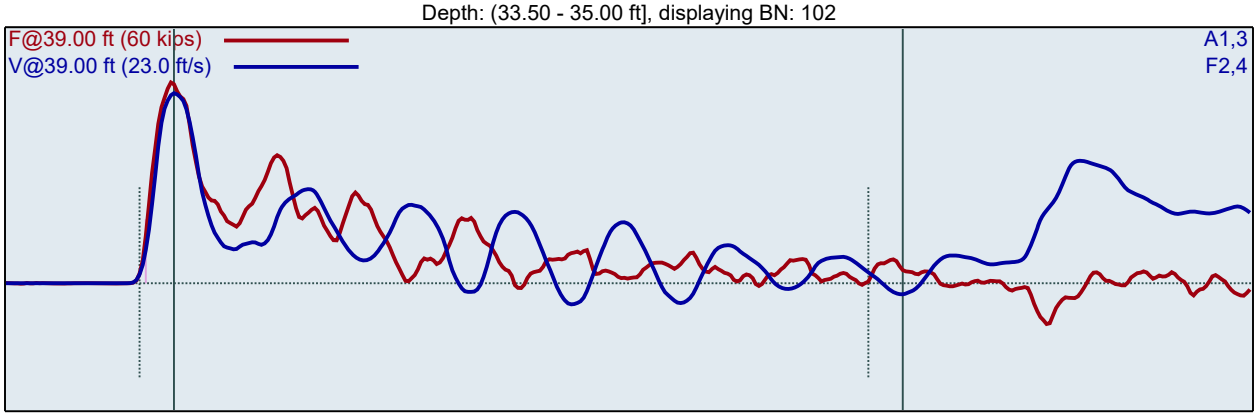
Diedrich D-50 SN310
JW

SS 13.5-15
Test date: 6/21/2017

AR: 1.46 in^2
LE: 39.00 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (33.50 - 35.00 ft], displaying BN: 102



BL#	BC /6"	LP ft	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR (%)	DFN in	FVP []
73	7	33.57	43	17.4	1.9	298	85.1	0.84	1.0
74	7	33.64	50	17.6	44.8	332	94.7	0.85	1.1
75	7	33.71	49	17.5	44.6	327	93.5	0.85	1.0
76	7	33.79	50	17.2	45.1	329	94.1	0.85	1.1
77	7	33.86	49	16.9	44.9	328	93.6	0.85	1.1
78	7	33.93	52	17.9	44.6	344	98.3	0.85	1.1
79	7	34.00	50	17.4	44.2	338	96.5	0.85	1.1
80	10	34.05	52	17.8	44.4	337	96.4	0.59	1.1
81	10	34.10	50	17.2	45.3	330	94.2	0.59	1.1
82	10	34.15	52	17.9	44.6	336	96.1	0.59	1.1
83	10	34.20	49	17.1	44.6	329	93.9	0.59	1.1
84	10	34.25	52	17.9	44.6	337	96.2	0.59	1.1
85	10	34.30	49	17.3	44.7	333	95.2	0.60	1.1
86	10	34.35	52	18.1	44.5	339	96.8	0.60	1.1
87	10	34.40	48	17.0	44.8	325	92.9	0.59	1.1
88	10	34.45	52	18.2	44.1	336	96.1	0.60	1.1
89	10	34.50	48	17.1	44.4	328	93.6	0.59	1.1
90	15	34.53	50	18.0	44.9	326	93.3	0.40	1.0
91	15	34.57	47	16.7	44.5	321	91.7	0.40	1.1
92	15	34.60	50	18.2	44.6	326	93.3	0.40	1.1
93	15	34.63	49	17.8	44.4	329	93.9	0.40	1.1
94	15	34.67	49	17.7	44.6	326	93.1	0.40	1.0
95	15	34.70	48	17.3	44.3	318	90.8	0.40	1.0
96	15	34.73	49	17.6	44.2	321	91.7	0.39	1.1
97	15	34.77	48	18.1	44.5	326	93.1	0.39	1.0
98	15	34.80	47	17.5	44.3	314	89.6	0.39	1.0
99	15	34.83	50	18.2	44.4	328	93.8	0.39	1.0
100	15	34.87	47	17.0	44.9	318	90.9	0.40	1.0
101	15	34.90	48	17.3	44.5	315	90.1	0.40	1.0
102	15	34.93	47	17.1	44.6	305	87.2	0.40	1.0
103	15	34.97	46	16.5	44.3	306	87.4	0.40	1.1
104	15	35.00	48	16.7	44.5	311	88.8	0.40	1.1

Average	49	17.5	44.6	325	92.8	0.47	1.1
Std Dev	2	0.5	0.2	9	2.7	0.10	0.0
Maximum	52	18.2	45.3	339	96.8	0.60	1.1
Minimum	46	16.5	44.1	305	87.2	0.39	1.0

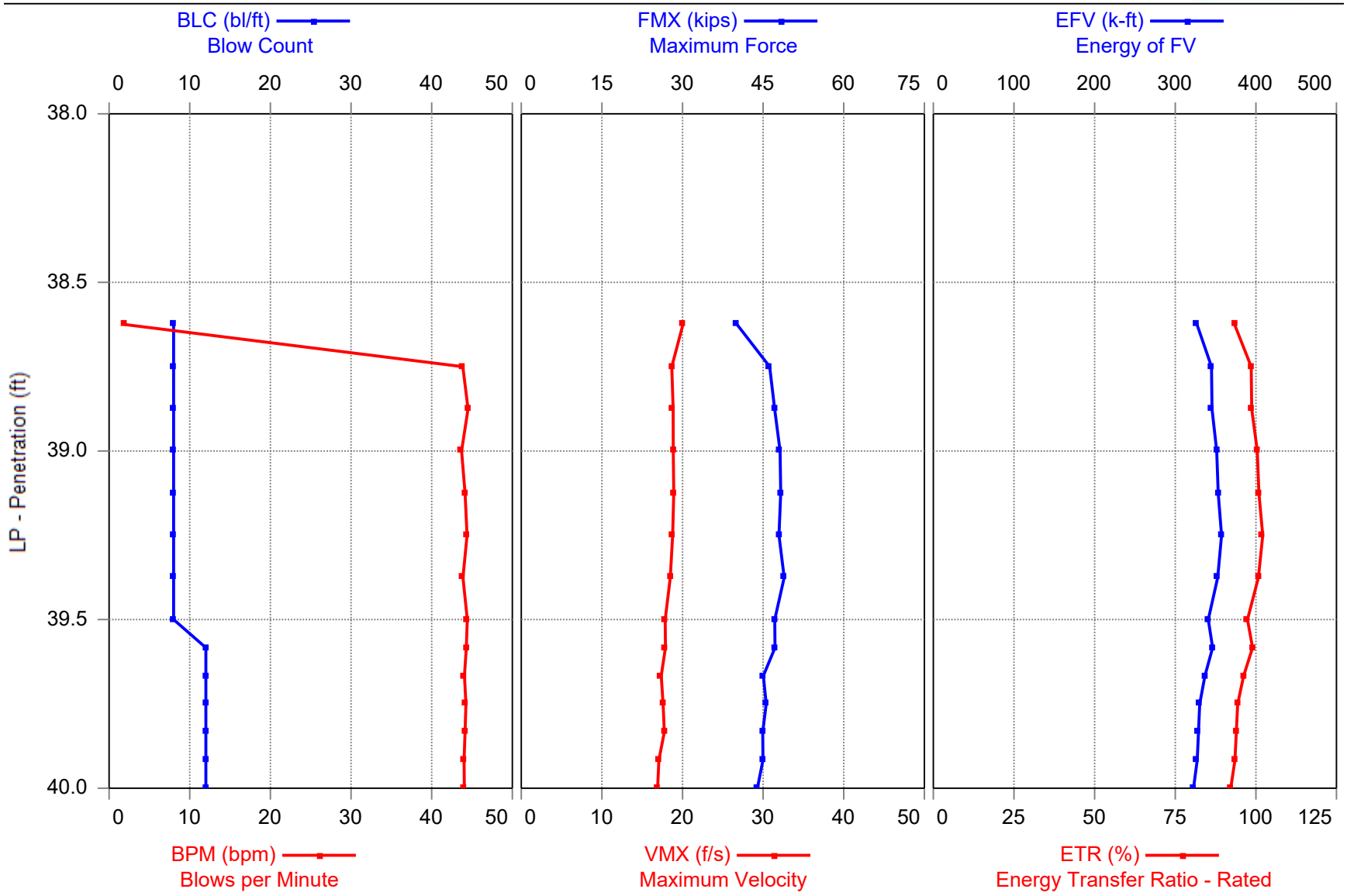
N-value: 25

Sample Interval Time: 41.75 seconds.

GRL Engineers, Inc. - PDIPLOT2 Ver 2016.2.57.6 - Case Method & iCAP® Results

Printed: 23-June-2017 Test started: 21-June-2017

Diedrich D-50 SN310 - SS 38.5-40



Diedrich D-50 SN310 - SS 38.5-40 B2-4
OP: JW Date: 21-June-2017

AR: 1.46 in² SP: 0.492 k/ft³
LE: 46.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.90 []

BPM: Blows per Minute
FMX: Maximum Force
VMX: Maximum Velocity
EFV: Energy of FV
ETR: Energy Transfer Ratio - Rated
CSX: Max Measured Compr. Stress
DMX: Maximum Displacement
DFN: Final Displacement
FVP: Force/Velocity proportionality

BL#	Depth ft	BLC bl/ft	TYPE	BPM bpm	FMX kips	VMX f/s	EFV k-ft	ETR (%)	CSX ksi	DMX in	DFN in	FVP []
4	39.0	8	AV4	34	45	19.1	342	98	31.1	1.83	1.50	0.87
8	39.5	8	AV4	44	48	18.5	351	100	32.9	1.81	1.50	0.94
14	40.0	12	AV6	44	45	17.4	332	95	31.0	1.52	1.00	0.95
			Average	41	46	18.2	340	97	31.6	1.69	1.29	0.92

Total number of blows analyzed: 14

Sensors

Blows: 1-14

Sensor	Type	Serial Nr.	Calibration	Replay Factor
F2	Strain	231NWJ1	211.5	1.00
F4	Strain	231NWJ2	212.8	1.00
A1	PR Accel	K4810	315.0	1.00
A3	PR Accel	K4805	382.0	1.00

Time Summary

Drive 17 seconds 9:51 AM - 9:51 AM BN 1 - 14

GRL Engineers, Inc.
SPT Analyzer Results

PDA-S Ver. 2017.18 - Printed: 6/27/2017

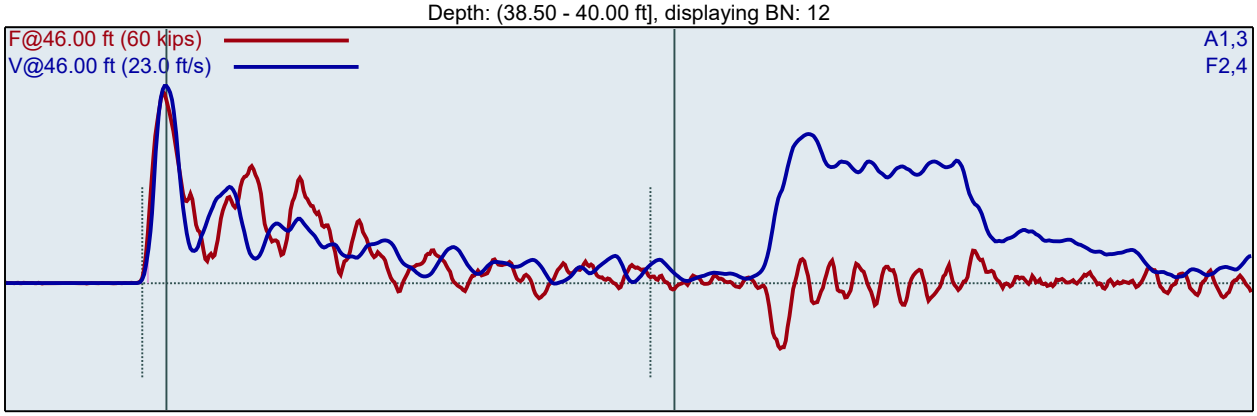
Diedrich D-50 SN310
JW

SS 38.5-40
Test date: 6/21/2017

AR: 1.46 in^2
LE: 46.00 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (38.50 - 40.00 ft], displaying BN: 12



FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute
EFV: Maximum Energy

ETR: Energy Transfer Ratio - Rated
DFN: Final Displacement
FVP: Force/Velocity Proportionality

BL#	BC /6"	LP ft	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR (%)	DFN in	FVP []
1	4	38.63	40	20.1	1.9	327	93.4	1.50	0.8
2	4	38.75	46	18.7	43.9	345	98.6	1.50	0.9
3	4	38.88	47	18.8	44.5	346	98.7	1.50	0.9
4	4	39.00	48	18.9	43.7	352	100.4	1.50	0.9
5	4	39.13	48	18.9	44.1	353	101.0	1.50	0.9
6	4	39.25	48	18.8	44.4	357	102.1	1.50	0.9
7	4	39.38	49	18.5	43.9	353	100.8	1.50	1.0
8	4	39.50	47	17.8	44.4	341	97.4	1.50	0.9
9	6	39.58	47	17.9	44.3	346	99.0	1.00	0.9
10	6	39.67	45	17.4	44.1	337	96.2	1.00	1.0
11	6	39.75	46	17.6	44.2	330	94.4	1.00	1.0
12	6	39.83	45	17.7	44.1	329	93.9	1.00	0.9
13	6	39.92	45	17.1	44.0	327	93.5	1.00	1.0
14	6	40.00	44	16.9	44.1	323	92.2	1.00	1.0
		Average	46	17.9	44.2	340	97.0	1.20	0.9
		Std Dev	2	0.6	0.2	12	3.4	0.24	0.0
		Maximum	49	18.9	44.4	357	102.1	1.50	1.0
		Minimum	44	16.9	43.9	323	92.2	1.00	0.9
				N-value: 10					

Sample Interval Time: 17.69 seconds.