

REPORT OF GEOTECHNICAL CONSULTING SERVICES

GEOTECHNICAL SUBSURFACE DATA REPORT

I-10 Mobile River Bridge – Main Bridge Span Unit

Mobile County, Alabama

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

Thompson Engineering Project No.: 17-1101-0145

November 2, 2017



knowledge - ideas - impact



November 2, 2017

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 – Main Bridge Span Unit
ALDOT PE Project No.: DPI-0030(005)
Mobile, Mobile 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 accordance with the Thompson Fee Proposals dated September 9, 2015, April 5, 2016 and February 16, 2017.

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. E.I.
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1.0 SCOPE OF SERVICES

Thompson Engineering (Thompson) has completed the field exploration and laboratory testing for the Main Bridge Span Unit 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 September 9, 2015, April 5, 2016 and February 16, 2017.

2.0 PROJECT DESCRIPTION

The project is located along interstate I-10 in Mobile County, Alabama. The scope of services included borings for the Main Bridge Span Unit's eastern and western main tower 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.

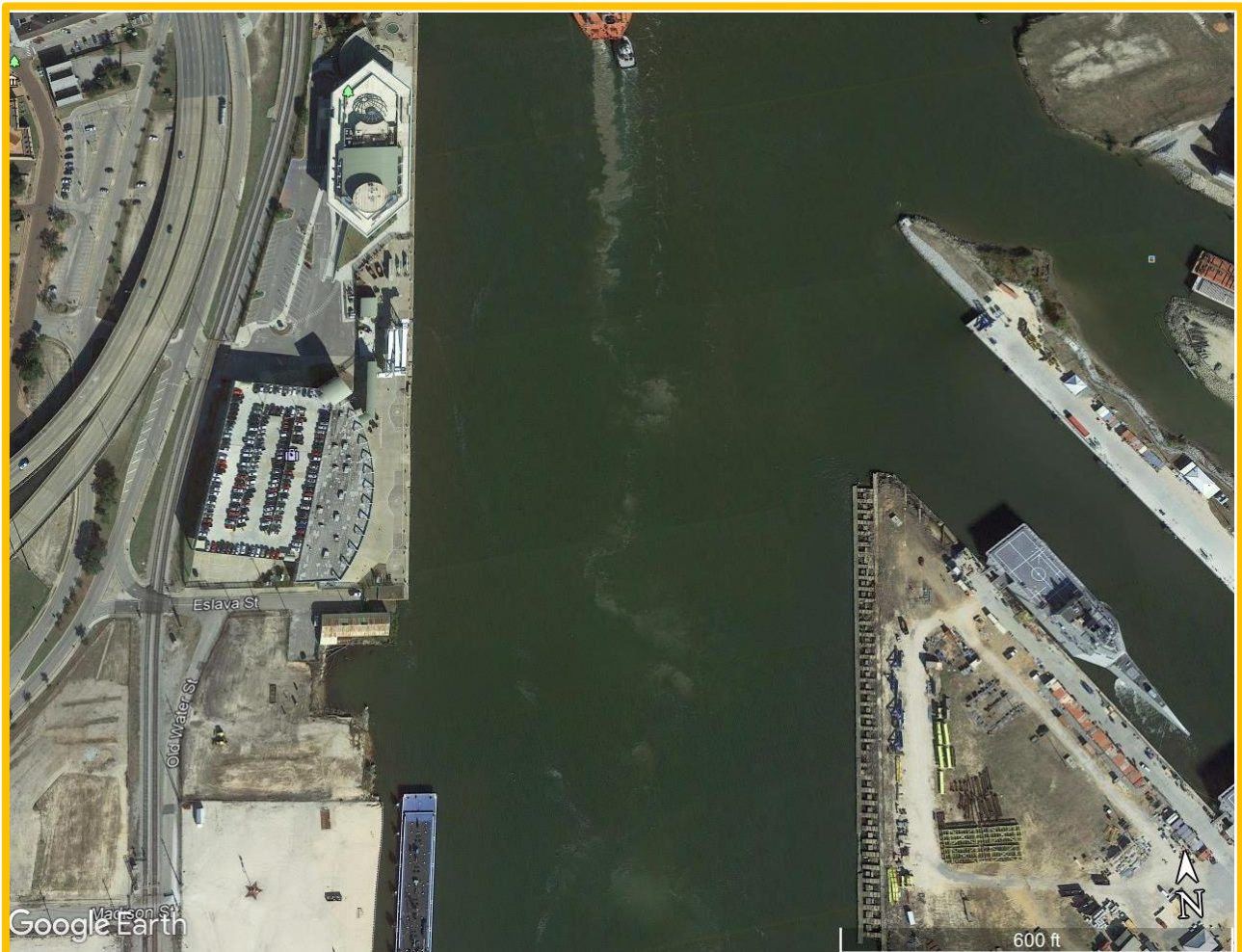


Figure 1: Project location and immediate surrounding area.

Thompson's Scope of Services for this work included subsurface exploration and associated laboratory testing for the Main Bridge Span Unit's eastern and western tower locations.

The initial field work included boring MB-2 which was drilled and completed prior to the dredge operation for the Austal Navy Outfit Yard. Following the dredge operation, the shoreline was lined with rip rap.

Subsequent to our initial field work and bridge meetings on July 28, 2016, a corrosion study for the west high level approaches and the western tower was requested (boring MB-1). In addition, the proposed foundation for the eastern tower was shifted approximately 100 feet to the east following preliminary design concepts and update meetings with ALDOT. An additional boring was requested by ALDOT SW Region for the new location and further corrosion testing following the meeting on January 19, 2017 (boring MB-2A).

3.0 SUBSURFACE EXPLORATION PROGRAM

Thompson geotechnical drilling crews performed soil test borings and sampling operations at the Main Bridge Span Unit's east and west tower locations. Borings MB-1 and MB-2 were performed to a depth of 300 feet below the existing ground surface. The additional boring, MB-2A, was performed to a depth of 320 feet below the existing mudline.

The actual test locations are provided on the appended Boring Location Plan and Record of Test Borings in **Appendix A** and **Appendix B**, respectively. Boring MB-1 and MB-2 were surveyed by Thompson Survey crews. MB-2A was located by using a Garmin Marine GPS unit installed in the cabin of the drilling support vessel. The antenna was placed at the back of the drill rig, directly above where the boring would be drilled and then positioning the drill rig near the proposed boring coordinates. The GPS unit measured decimal degrees to five (5) decimal places making the degree of accuracy up to 1.1 meter, or 3.6 feet. The crew would attempt to stay within a maximum distance of 20 to 30 feet of the proposed boring location. The final GPS coordinates were recorded once the barge had spudded and anchored down to begin setup.

The seafloor elevation for MB-2A was obtained using two (2) methods. First, an electronic sonar depth finder on Thompson Engineering's drilling support vessel gave an estimate of the seafloor elevation. Second, elevations were taken prior, during and after the termination of a boring using a weighted open wheel tape with the date and time noted for each measurement. Each elevation obtained was measured to a tenth of a foot for all data to ensure a degree of accuracy. Taking the elevations throughout the day helped to accumulate data for the accuracy of the tide and depth of boring. The data is then correlated with NOAA Station 8736897 Coast Guard Section MLLW datum time and tide gauges based on NAVD88 elevations. Once all elevations had been correlated for a single boring, the mean value of the elevations for that particular boring is calculated and established as the seafloor elevation.

CME 550X All-Terrain Vehicle (ATV) drilling rigs, equipped with automatic penetration test hammers, were utilized to advance the borings using mud rotary techniques. The hammer energy report for the automatic SPT hammers on the rigs are attached in **Appendix D** of this report. Drilling and field operations took place between September 8, 2015 and April 27, 2016. The subsequent drilling and field operation which included the corrosion testing occurred between June 20 and July 24, 2017.

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 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.

Samples obtained for corrosion tests were immediately placed in sealed containers and placed on ice for transport to the testing facility.

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 per AASHTO T-207. The recovered soil samples were sealed and transported to Thompson's geotechnical laboratory.

3.3 Cone Penetration Tests

The cone penetration test was carried out using an integrated electronic piezocone (CPTU). The cone reaction system consisted of a 20-ton tracked-rig. The cone was advanced to termination depths at a rate of 2 cm/s. Tip resistance (q_c), sleeve friction (f_s), and dynamic pore pressure measurements (u_2) were recorded every 5 centimeters (2 inches). Testing was performed in general accordance with the methods and procedures described in ASTM Specification D5778-07. Samples are not recovered with the cone penetration test.

The results of the soundings are shown on the CPT log, presented in **Appendix B**. The corrected tip resistance (Q_t) is the recorded tip resistance (Q_c) 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 Dan Brown and Associates (DBA) and Thompson. **Table 1** provides a quantitative summary of the lab tests performed.

Table 1: Laboratory Testing Summary	
Test Type	Quantity
Atterberg Limits	76
Full Sieve Analysis	76
Hydrometer Analysis	19
Consolidation	8
Unconsolidated Undrained (U.U.) Triaxial Shear Tests	12
Consolidated Undrained (C.U.) Triaxial Shear Tests	2
Direct Shear Test	1
pH	20
Resistivity	18
Total Sulfates	20
Total Chlorides	20

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

4.1 Electrochemical Testing Summary

Electrochemical series soil tests (total chlorides, total sulfates, resistivity and pH) were performed on select samples obtained from borings MB-1 and MB-02A. The following soil limit conditions for corrosive environments for steel piles have been provided by ALDOT and FHWA.

ALDOT:

- Resistivity less than 3,000 ohm-cm
- pH less than 5 or greater than 10
- Chlorides greater than 50 ppm
- Sulfates greater than 100 ppm

FHWA (*Publication NHI-16-009*):

- Resistivity less than 2,000 ohm-cm
- pH less than 4.5
- Resistivity is between 2,000 and 5,000 ohms-cm and chlorides are greater than 100 ppm or sulfate greater than 200 ppm

The electrochemical test results are summarized in **Table 2** below.

Table 2: Summary of Electrochemical Test Results							
Boring No.	Sample No./ Depth(ft.)	pH	Chlorides (ppm) ⁽²⁾	Sulfates (ppm) ⁽³⁾	Resistivity (ohms-cm)	ALDOT Classification	FHWA Classification
MB-1	S-1A / 3.0-5.0	7.1 ⁽¹⁾	<24	<24	2,500 ⁽⁵⁾	Aggressive	Non-Aggressive
	S-1B / 5.0-7.0	7.3 ⁽¹⁾	<27	<27	3,000 ⁽⁵⁾	Aggressive	Non-Aggressive
	S-2A / 8.0-10.0	7.2 ⁽¹⁾	<30	<30	1,500 ⁽⁵⁾	Aggressive	Aggressive
	S-2B / 10.0-12.0	7.2 ⁽¹⁾	<32	<32	1,500 ⁽⁵⁾	Aggressive	Aggressive
	S-3A / 18.0-20.0	8.3 ⁽¹⁾	<26	<26	6,775 ⁽⁵⁾⁽⁷⁾	Non-Aggressive	Non-Aggressive
	S-3B / 20.0-22.0	7.4 ⁽¹⁾	<26	28		Non-Aggressive	Non-Aggressive
	S-4A / 28.0-30.0	8.1 ⁽¹⁾	<24	<24	8,950 ⁽⁵⁾⁽⁷⁾	Non-Aggressive	Non-Aggressive
	S-4B / 30.0-32.0	8.6 ⁽¹⁾	<25	30		Non-Aggressive	Non-Aggressive
MB-02A	C-1 / 15.0-16.5	7.8 ⁽⁶⁾	1100	<25	430 ⁽⁵⁾	Aggressive	Aggressive
	C-2 / 25.0-26.5	7.8 ⁽⁶⁾	450	34	2,250 ⁽⁵⁾	Aggressive	Aggressive
	C-3 / 35.0-37.0	7.5 ⁽⁶⁾	3100	370	220 ⁽⁵⁾	Aggressive	Aggressive
	C-4 / 45.0-47.0	6.8 ⁽⁶⁾	2700	330	199 ⁽⁵⁾	Aggressive	Aggressive
	C-5 / 55.0-57.0	7.7 ⁽⁶⁾	440	59	470 ⁽⁵⁾	Aggressive	Aggressive
	C-6 / 64.5-65.5	7.2 ⁽⁶⁾	1300	180	240 ⁽⁵⁾	Aggressive	Aggressive
	C-7 / 74.5-75.5	7.3 ⁽⁶⁾	560	59	278 ⁽⁵⁾	Aggressive	Aggressive
	C-8 / 84.5-85.5	7.2 ⁽⁶⁾	3700	380	215 ⁽⁵⁾	Aggressive	Aggressive
	C-9 / 94.5-95.5	7.9 ⁽⁶⁾	370	<24	2,100 ⁽⁵⁾	Aggressive	Aggressive
	C-10 / 105.0-105.5	7.8 ⁽⁶⁾	140	30	2,150 ⁽⁵⁾	Aggressive	Aggressive
	C-11 / 130.0-130.5	7.5 ⁽⁶⁾	130	<26	725 ⁽⁵⁾	Aggressive	Aggressive
	C-12 / 155.0-155.5	7.2 ⁽⁶⁾	89	30	6,490 ⁽⁵⁾	Non-Aggressive	Non-Aggressive
Mobile River Water Samples	MB-WS1	7.8 ⁽¹⁾	1100	190	<200,000 ⁽⁴⁾	Aggressive	Aggressive
	MB-WS2	7.8 ⁽¹⁾	1200	190	<200,000 ⁽⁴⁾	Aggressive	Aggressive

Note: (1) EPA Method 150.1(pH) performed.
 (2) EPA Method 325.2 (chloride) performed.
 (3) Standard Methods for the Examination of Water and Waste Water Method 4500-SO4E (sulfate) performed equivalent to EPA Method 375.4.
 (4) EPA Method 9050A (Specific Conductance/Resistance) performed.
 (5) AASHTO T288 Method (Resistivity) performed.
 (6) AASHTO T289 Method (pH) performed.
 (7) Samples were combined for resistivity testing.

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.

Where laboratory tests were not available, the approximate AASHTO classifications correlation to the USCS was used based upon **Table 3** of the FHWA Publication FHWA ED-88-053, "Checklist and Guidelines for Review of Geotechnical Reports and Preliminary Plans and Specifications."

6.0 REPORT LIMITATIONS

This Geotechnical Subsurface Data Report has been prepared for the exclusive 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.

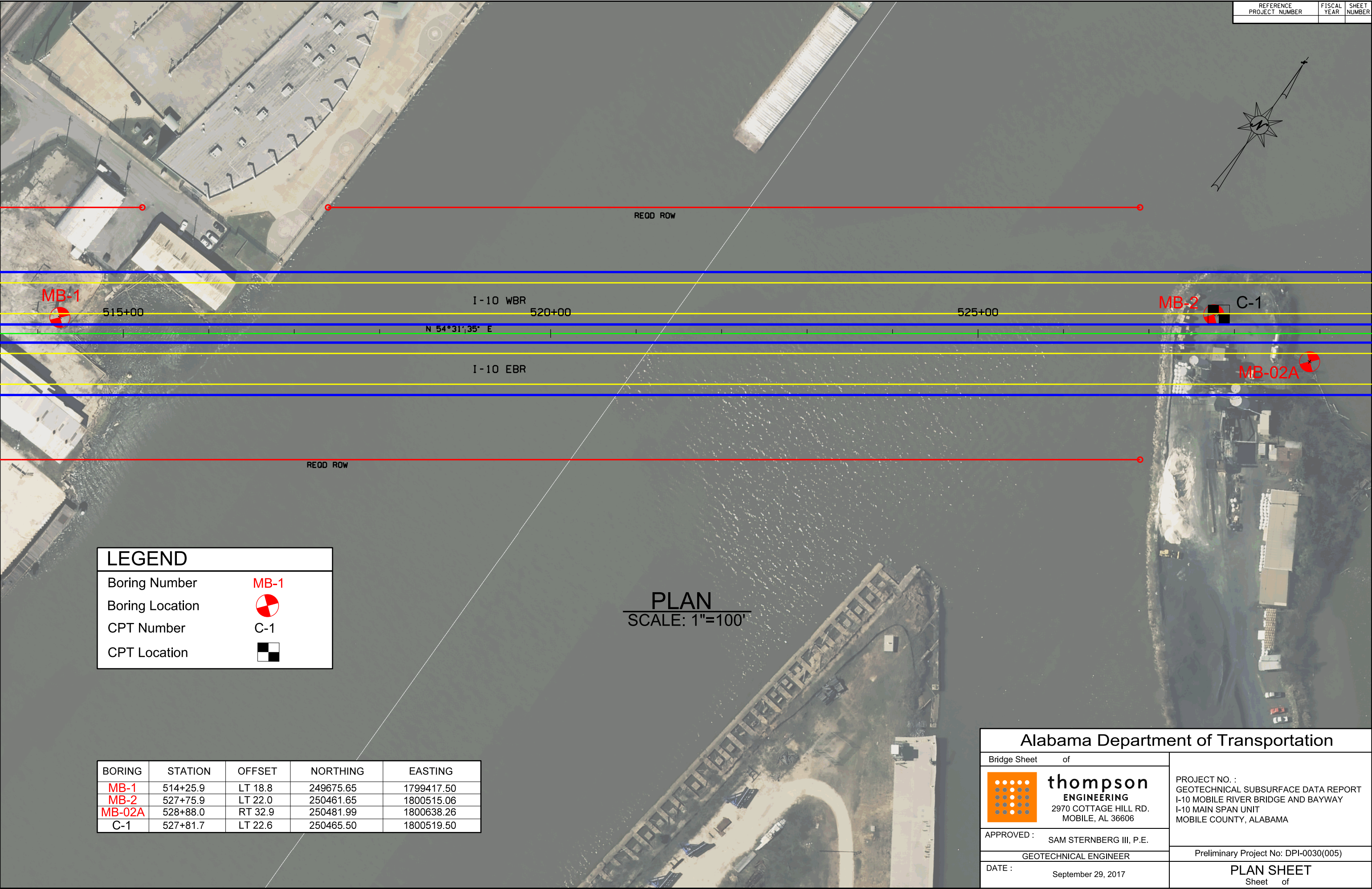
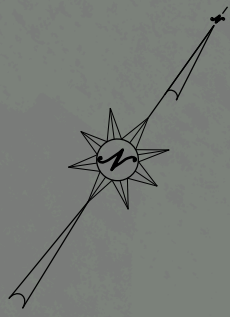
The observations from field sample recovery, laboratory examination of samples and testing, and computed data analysis, which are presented in this data report, should be considered preliminary investigation and are subject to change upon the acquisition of additional data during the final investigation 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.

7.0 REFERENCES

Hannigan, P.J., Rausche, F., Likins, G., Robinson, B.R., and Becker, M. (2016).
Geotechnical Engineering Circular No. 12 – Vol. 1: Design and Construction of Driven Pile
Foundations. FHWA-NHI-16-009. National Highway Institute, Federal Highway
Administration, Washington, D.C.

APPENDIX A

- **Boring Location Plan**



LEGEND	
Boring Number	MB-1
Boring Location	
CPT Number	C-1
CPT Location	

PLAN
SCALE: 1"=100'

BORING	STATION	OFFSET	NORTHING	EASTING
MB-1	514+25.9	LT 18.8	249675.65	1799417.50
MB-2	527+75.9	LT 22.0	250461.65	1800515.06
MB-02A	528+88.0	RT 32.9	250481.99	1800638.26
C-1	527+81.7	LT 22.6	250465.50	1800519.50

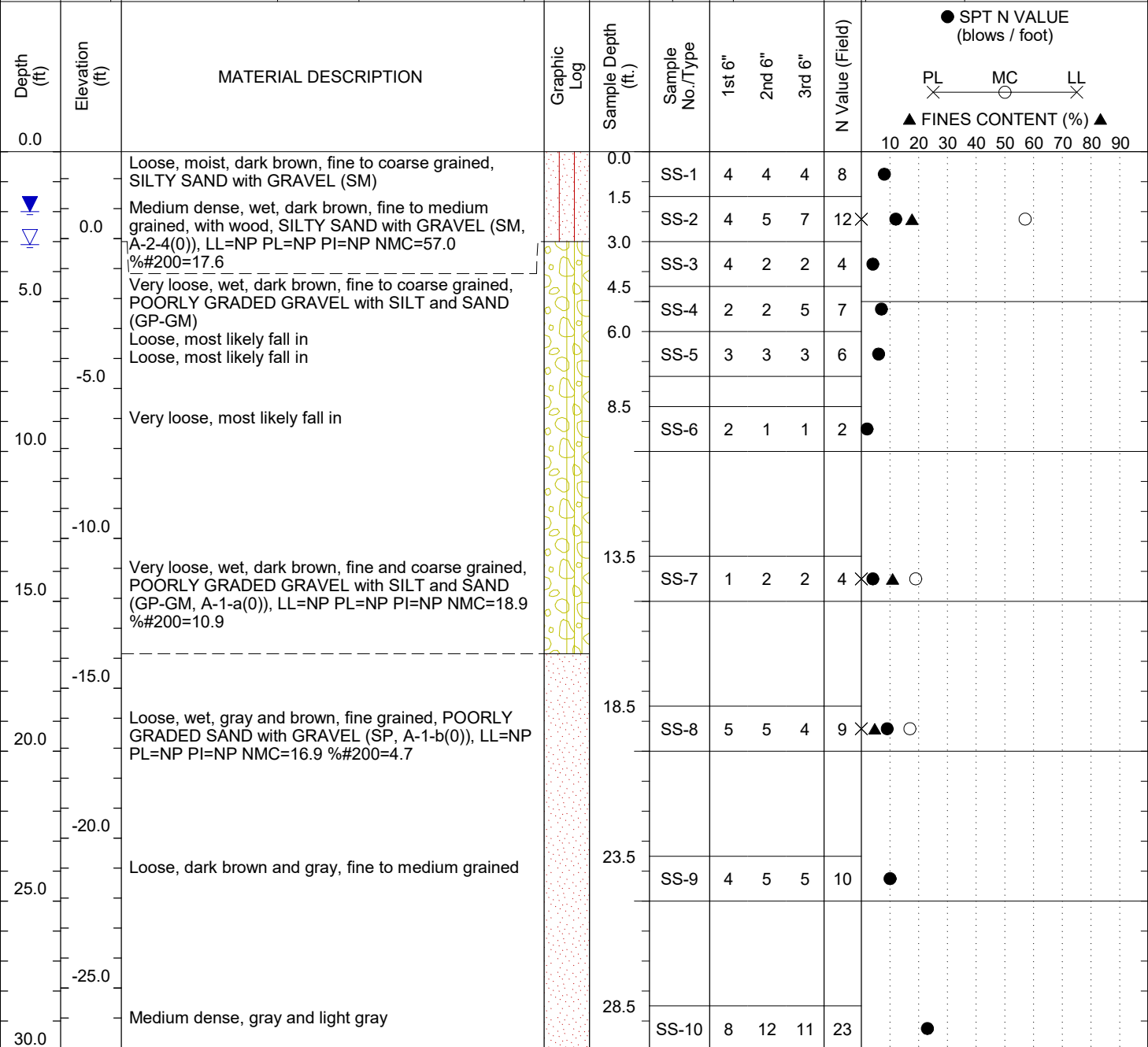
Alabama Department of Transportation	
Bridge Sheet	of
 thompson ENGINEERING 2970 COTTAGE HILL RD. MOBILE, AL 36606	PROJECT NO. : GEOTECHNICAL SUBSURFACE DATA REPORT I-10 MOBILE RIVER BRIDGE AND BAYWAY I-10 MAIN SPAN UNIT MOBILE COUNTY, ALABAMA
APPROVED :	SAM STERNBERG III, P.E.
	GEOTECHNICAL ENGINEER
DATE :	September 29, 2017
Preliminary Project No: DPI-0030(005)	
PLAN SHEET	
Sheet of	

APPENDIX B

- **Records of Test Borings**
- **CPT Sounding**

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway				County:	Mobile	
Boring No.:	MB-01	Boring Location:	514+25.9	Offset:	LT 18.8	Alignment:	I-10 Main Span
ALDOT PE No.:	DPI-0030(005)	TE Project No.:	15-1101-0228	Eng./Geo.:	B.Ellis/C.Tisher		
Elev.:	2.9 ft.	Northing:	249675.65	Easting:	1799417.497	Date Started:	4/20/2016
Total Depth:	300.0 ft.	Soil Depth:	300.0 ft.	Core Depth:	0.0 ft.	Date Completed:	4/27/2016
Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207			
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	88%
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB 2.0 ft.	Delayed:	3.1 ft.

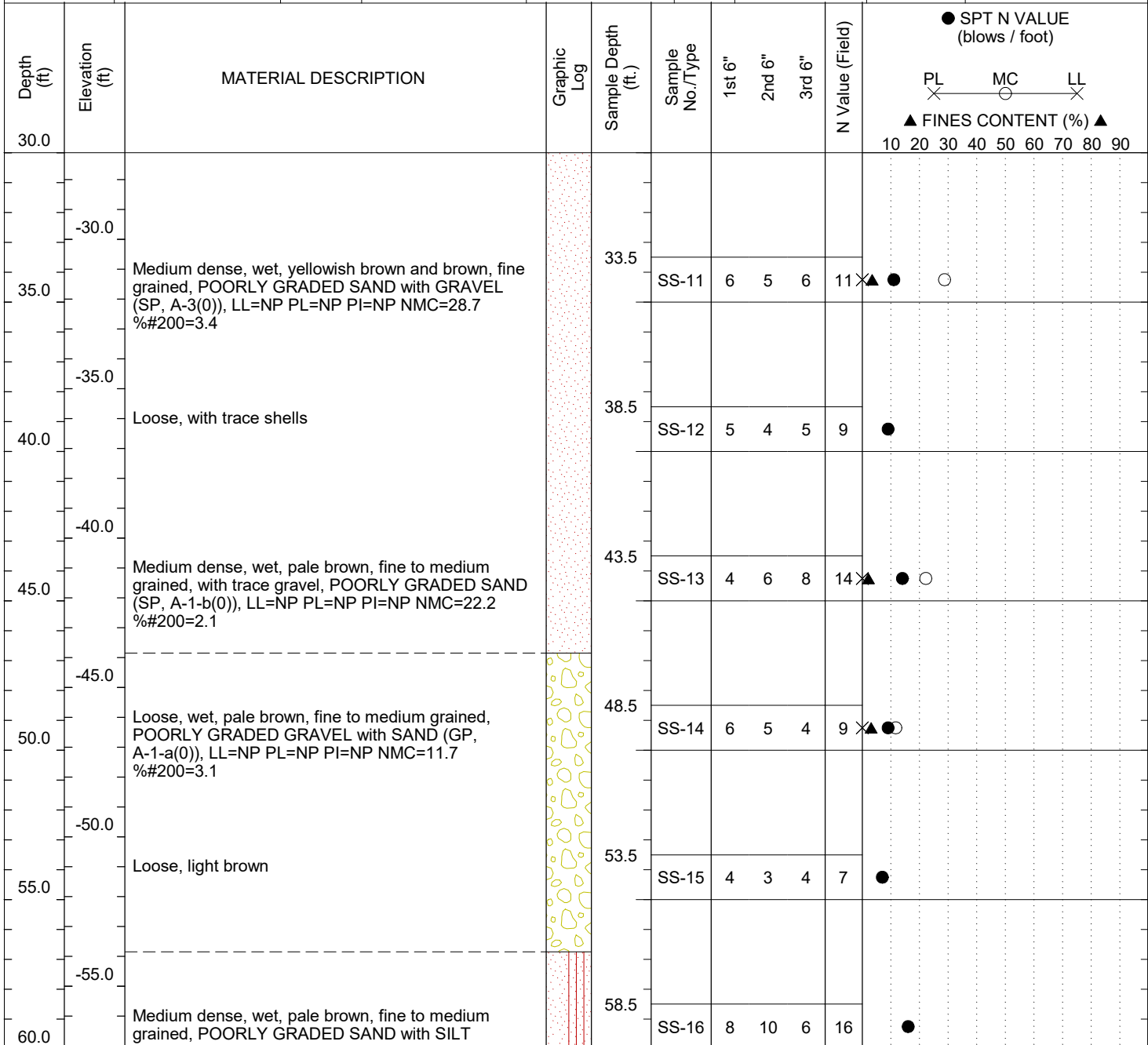


LEGEND

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	

RECORD OF TEST BORING

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Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	88%
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB 2.0 ft.	Delayed:	3.1 ft.

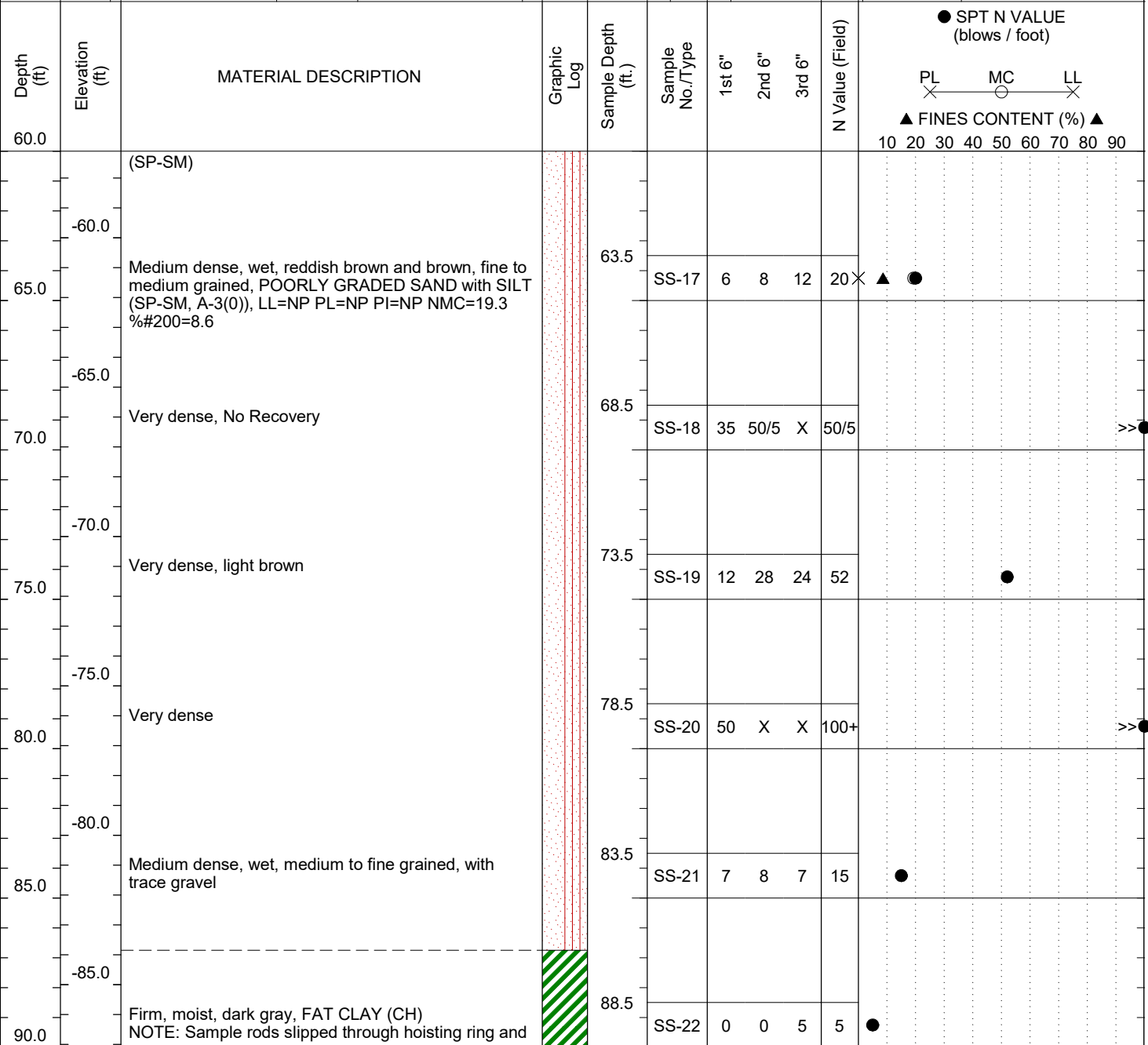


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Bore Hole Diameter (in): 4-inch		AASHTO / ASTM Sampling Methods: AASHTO T206 & T207			
Drill Machine: CME 550X		Drill Method: MR		Hammer Type: Automatic	
Core Size: N/A		Driller: Thompson Eng		Groundwater: TOB 2.0 ft.	
				Energy Ratio: 88%	
				Delayed: 3.1 ft.	

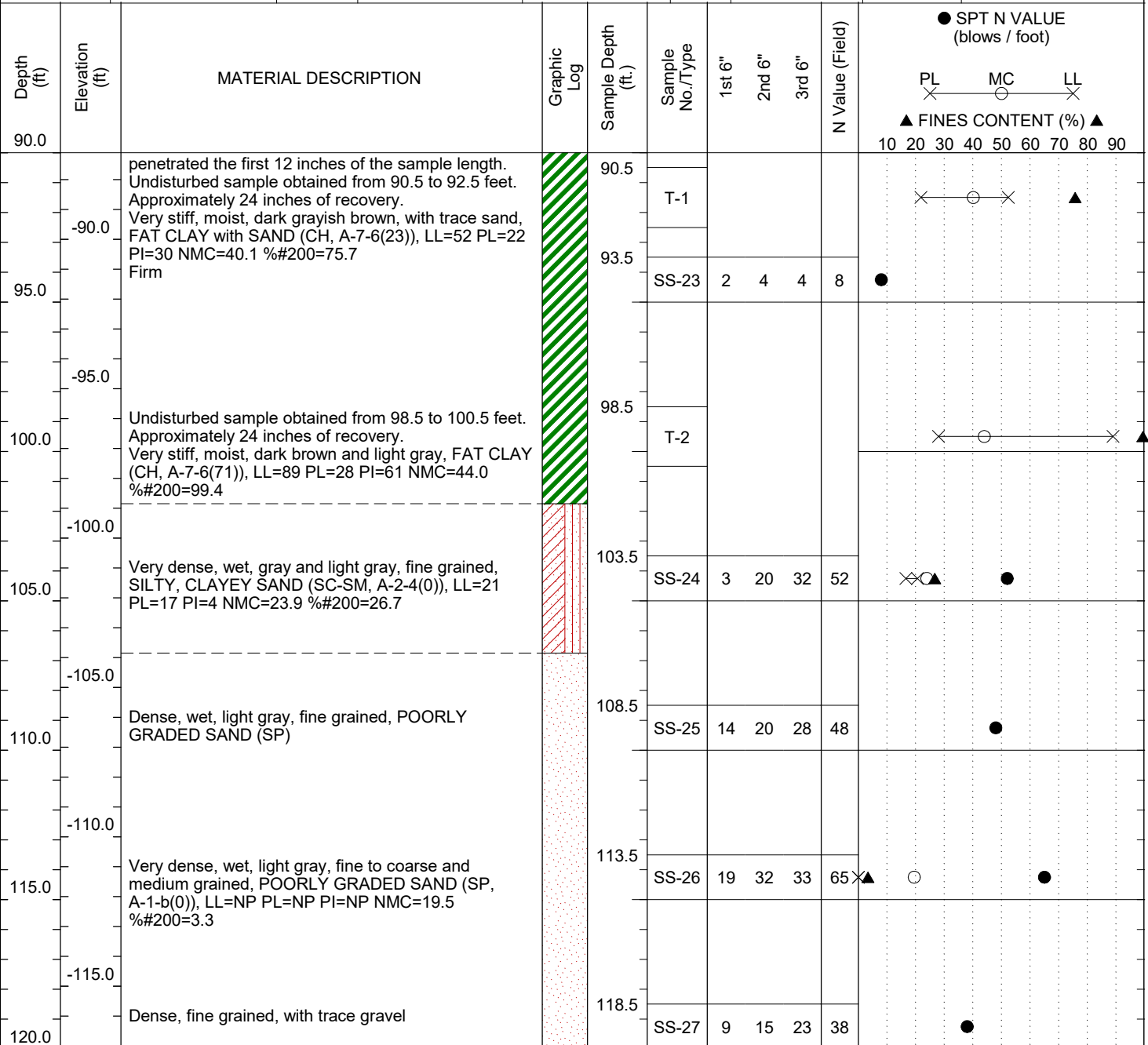


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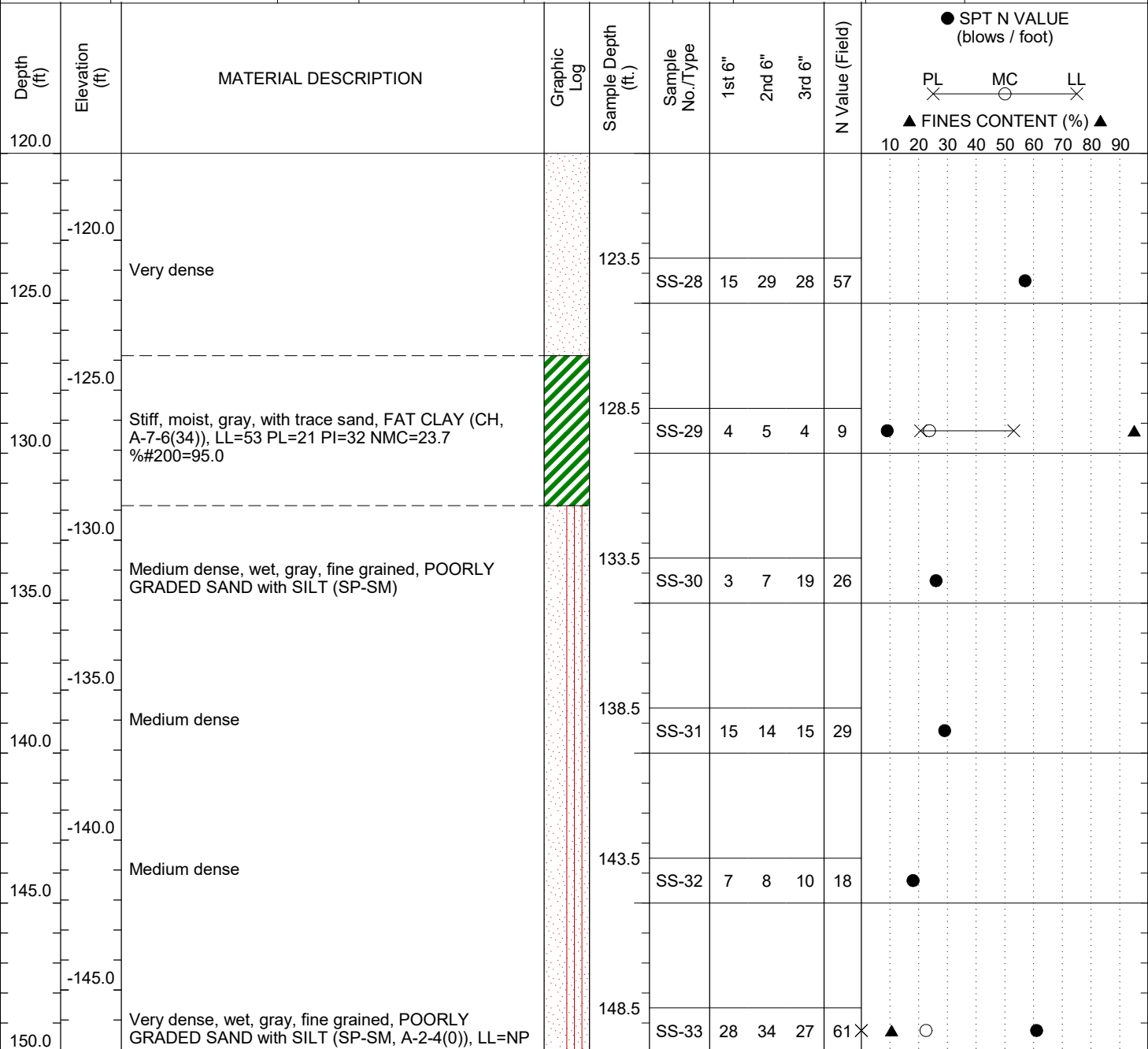


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Bore Hole Diameter (in): 4-inch		AASHTO / ASTM Sampling Methods: AASHTO T206 & T207			
Drill Machine: CME 550X		Drill Method: MR		Hammer Type: Automatic	
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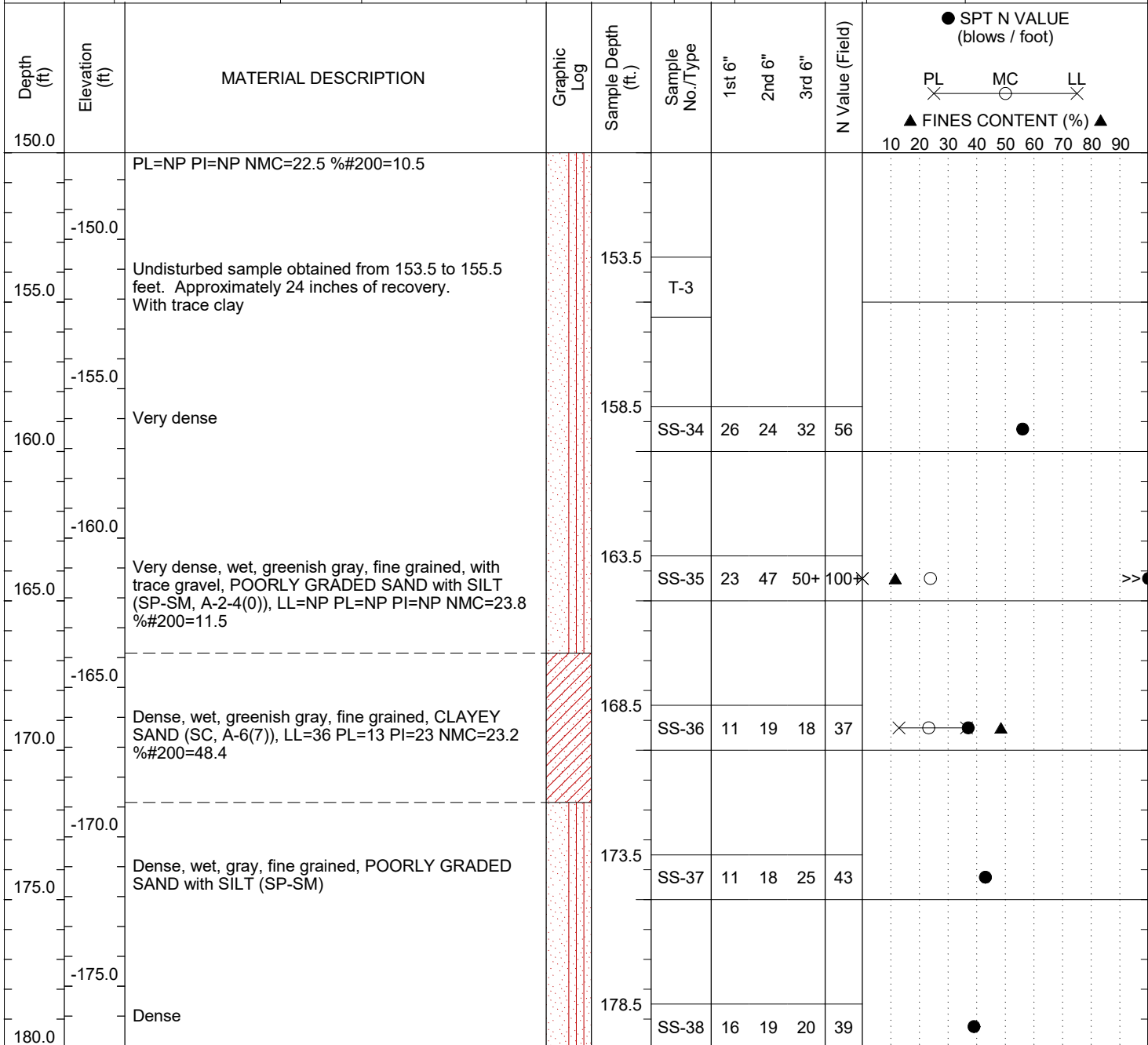


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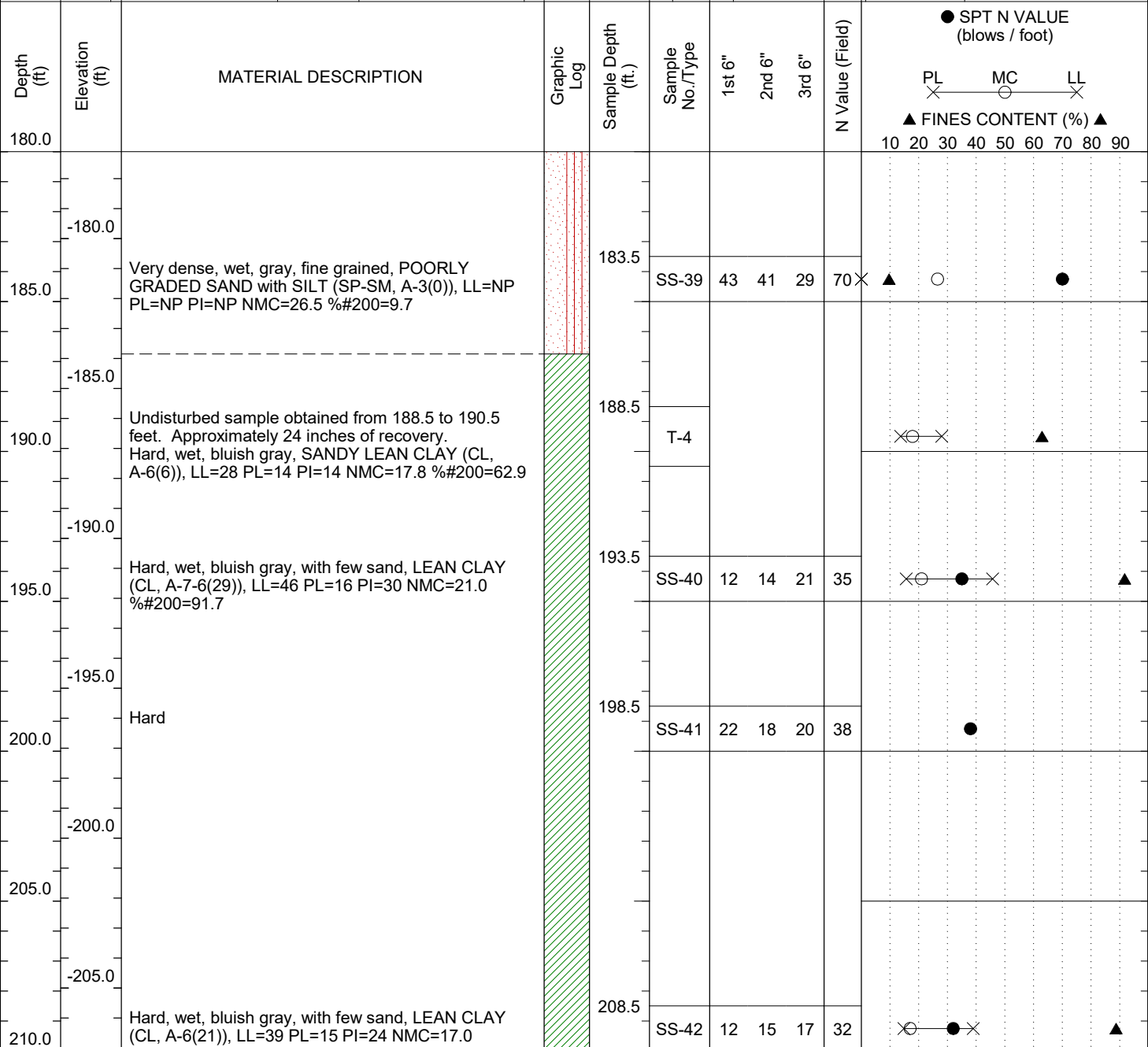


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Bore Hole Diameter (in): 4-inch		AASHTO / ASTM Sampling Methods: AASHTO T206 & T207		Date Started: 4/20/2016	
Drill Machine: CME 550X		Drill Method: MR		Hammer Type: Automatic	
Core Size: N/A		Driller: Thompson Eng		Groundwater: TOB 2.0 ft.	
				Energy Ratio: 88%	
				Delayed: 3.1 ft.	

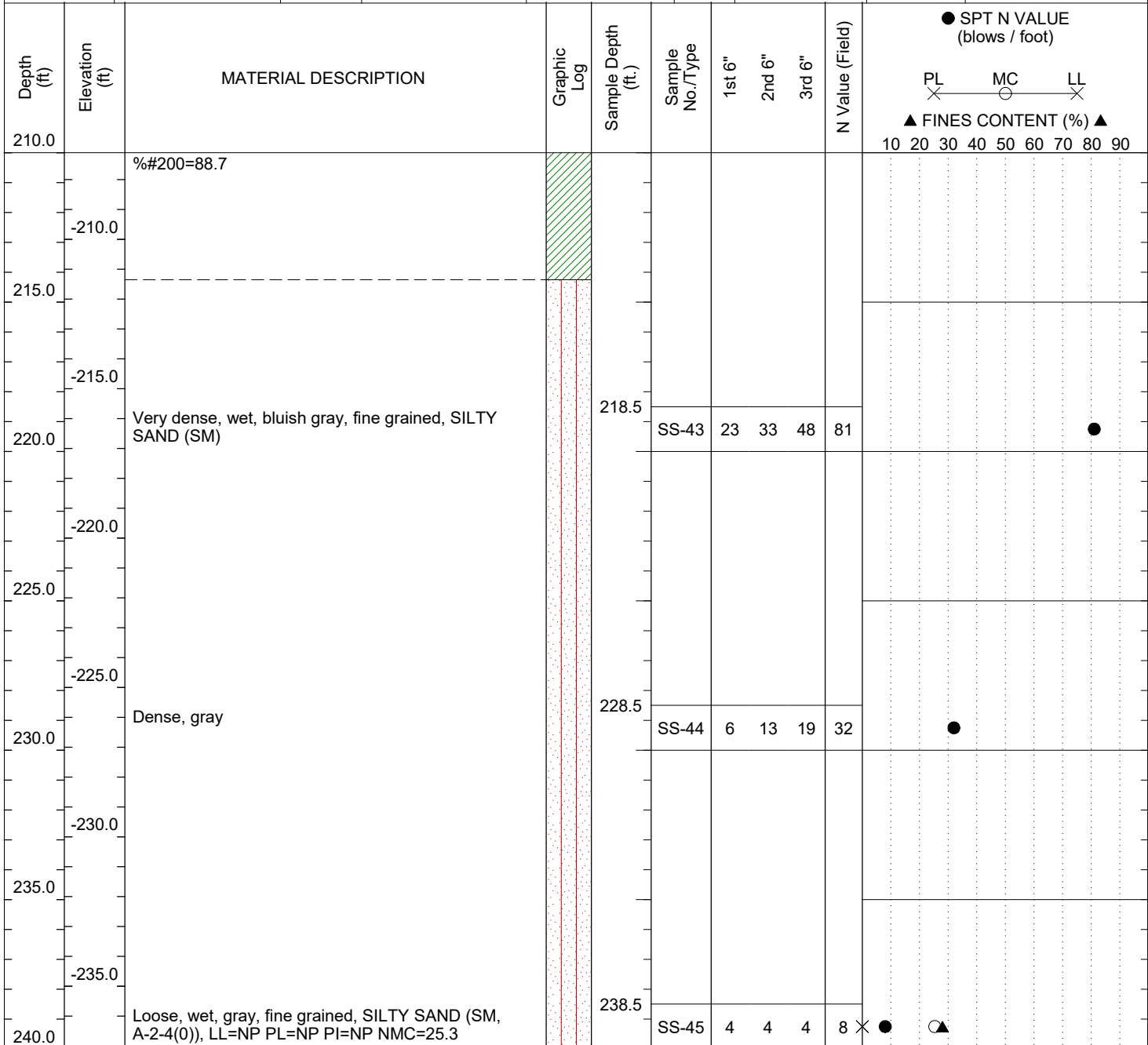


LEGEND

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	

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway				County:	Mobile	
Boring No.:	MB-01	Boring Location:	514+25.9	Offset:	LT 18.8	Alignment:	I-10 Main Span
ALDOT PE No.:	DPI-0030(005)	TE Project No.:	15-1101-0228	Eng./Geo.:	B.Ellis/C.Tisher		
Elev.:	2.9 ft.	Northing:	249675.65	Easting:	1799417.497	Date Started:	4/20/2016
Total Depth:	300.0 ft.	Soil Depth:	300.0 ft.	Core Depth:	0.0 ft.	Date Completed:	4/27/2016
Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207			
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	88%
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB 2.0 ft.	Delayed:	3.1 ft.



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

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway				County:	Mobile	
Boring No.:	MB-01	Boring Location:	514+25.9	Offset:	LT 18.8	Alignment:	I-10 Main Span
ALDOT PE No.:	DPI-0030(005)	TE Project No.:	15-1101-0228	Eng./Geo.:	B.Ellis/C.Tisher		
Elev.:	2.9 ft.	Northing:	249675.65	Easting:	1799417.497	Date Started:	4/20/2016
Total Depth:	300.0 ft.	Soil Depth:	300.0 ft.	Core Depth:	0.0 ft.	Date Completed:	4/27/2016
Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207			
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	88%
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB 2.0 ft.	Delayed:	3.1 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
240.0										
	-240.0	%#200=28.0								
245.0										
	-245.0									
250.0		Medium dense		248.5	SS-46	5	10	11	21	●
	-250.0									
255.0										
	-255.0									
260.0		Very dense, wet, gray, fine grained, POORLY GRADED SAND with SILT (SP-SM)		258.5	SS-47	30	50/0	X	50/0	● >>
	-260.0									
265.0										
	-265.0									
270.0		Very dense, with trace gravel		268.5	SS-48	43	50	X	50/6	● >>

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

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway				County:	Mobile	
Boring No.:	MB-01	Boring Location:	514+25.9	Offset:	LT 18.8	Alignment:	I-10 Main Span
ALDOT PE No.:	DPI-0030(005)	TE Project No.:	15-1101-0228		Eng./Geo.:	B.Ellis/C.Tisher	
Elev.:	2.9 ft.	Northing:	249675.65	Easting:	1799417.497	Date Started:	4/20/2016
Total Depth:	300.0 ft.	Soil Depth:	300.0 ft.	Core Depth:	0.0 ft.	Date Completed:	4/27/2016
Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207			
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	88%
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB 2.0 ft.	Delayed:	3.1 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)		FINES CONTENT (%) ▲	
										PL	MC	LL	10
270.0													
-270.0													
275.0													
-275.0													
280.0		Very dense		278.5	SS-49	24	50/4	X	50/4				>>●
-280.0													
285.0													
-285.0													
290.0		Very dense, wet, light gray, fine grained, with trace gravel, POORLY GRADED SAND with SILT (SP-SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=21.1 % _{#200} =10.9		288.5	SS-50	43	41	49	90	X	▲	○	●
-290.0													
295.0													
-295.0													
300.0		Very dense, gray, with trace clay		298.5	SS-51	25	50	X	50/6				>>●

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

RECORD OF TEST BORING

Site Description: I-10 Mobile River Bridge and Bayway				County: Mobile	
Boring No.: MB-02		Boring Location: 527+75.9		Offset: LT 22.0	
ALDOT PE No.: DPI-0030(005)		TE Project No.: 15-1101-0228		Eng./Geo.: Chris L/Charles T	
Elev.: 7.4 ft.		Northing: 250461.65		Easting: 1800515.058	
Total Depth: 300.0 ft.		Soil Depth: 300.0 ft.		Core Depth: 0.0 ft.	
Bore Hole Diameter (in): 4-inch		AASHTO / ASTM Sampling Methods: AASHTO T206 & T207			
Drill Machine: CME 550X		Drill Method: MR		Hammer Type: Automatic	
Core Size: N/A		Driller: Thompson Eng		Groundwater: TOB N.O.	
				Energy Ratio: 88%	
				Delayed: 4.7 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 X MC ○ LL X ▲ FINES CONTENT (%) ▲
0.0				0.0	SS-1	3	4	5	9	●
5.0		Loose, dry, dark brown gray and light brown, fine to medium grained, with Mobile Abrasives particles, POORLY GRADED SAND (SP), FILL		3.0	SS-2	5	3	5	8	●
5.0		Loose, brown and black, fine to coarse grained, with Mobile Abrasives particles, FILL		6.0	SS-3	3	4	5	9	X ● ○
0.0		Loose, moist, brown and black, fine to medium grained, with Mobile Abrasive particles and trace gravel, POORLY GRADED SAND (SP, A-3(0)), FILL, LL=NP PL=NP PI=NP NMC=18.7 % #200=3.8		9.0	SS-4	4	3	3	6	●
10.0		Loose, FILL		13.5	SS-5	2	2	2	4	●
-5.0		Very loose, moist to wet, light brown, fine to medium grained		18.5	SS-6	2	1	1	2	●
15.0		Very loose, wet, greenish gray and brown, fine grained		23.5	SS-7	1	1	1	2	●
-10.0		Very loose		28.5	SS-8	2	1	1	2	X ● ▲ ○
20.0		Very loose, wet, greenish gray and brown, fine to medium grained, POORLY GRADED SAND with SILT								

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	

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway				County:	Mobile		
Boring No.:	MB-02	Boring Location:	527+75.9	Offset:	LT 22.0	Alignment:	I-10 Main Span	
ALDOT PE No.:	DPI-0030(005)	TE Project No.:	15-1101-0228	Eng./Geo.:	Chris L/Charles T			
Elev.:	7.4 ft.	Northing:	250461.65	Easting:	1800515.058	Date Started:	9/8/2015	
Total Depth:	300.0 ft.	Soil Depth:	300.0 ft.	Core Depth:	0.0 ft.	Date Completed:	9/15/2015	
Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207				
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	88%	
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB	N.O.	Delayed:	4.7 ft.

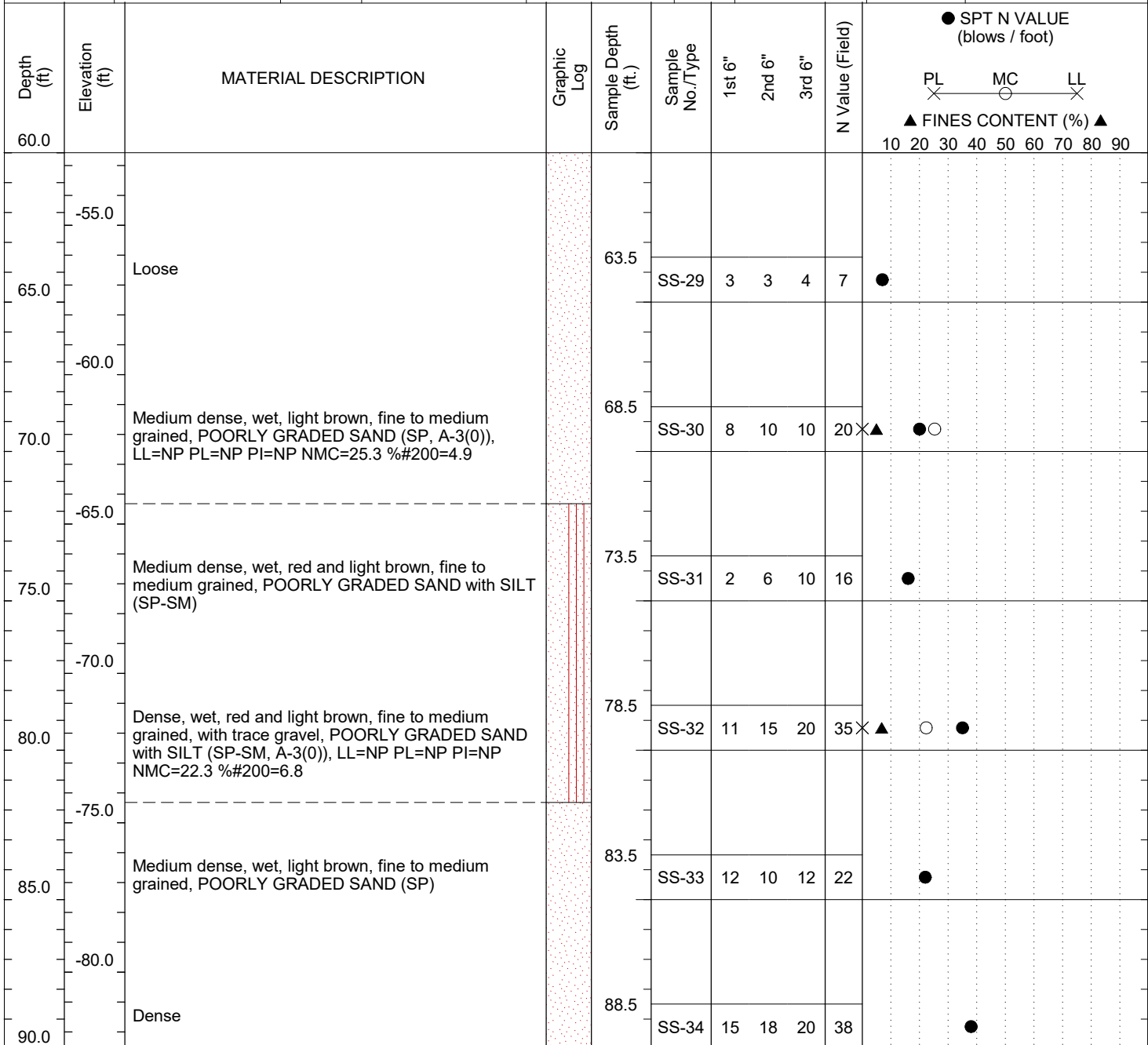
Depth (ft)	Elevation (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft.)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value (Field)	SPT N VALUE (blows / foot)		FINES CONTENT (%) ▲					
										PL	MC	LL	10	20	30	40	50
30.0		(SP-SM, A-3(0)), LL=NP PL=NP PI=NP NMC=22.7 %#200=7.6 Very loose, fine grained, with trace Mobile Abrasive particles		30.0	SS-9	1	1	1	2	●							
	-25.0	Very loose		31.5	SS-10	1	1	1	2	●							
		Very loose, brown and black, with trace Mobile Abrasive particles		33.0	SS-11	2	1	1	2	●							
35.0		Very loose, greenish gray and brown		34.5	SS-12	1	1	1	2	●							
	-30.0	Very loose, No Recovery		36.0	SS-13	1	1	1	2	●							
		Very loose, wet, grayish brown, fine to medium grained, POORLY GRADED SAND with SILT (SP-SM, A-3(0)), LL=NP PL=NP PI=NP NMC=28.4 %#200=10.1		37.5	SS-14	2	1	2	3	●▲	○						
40.0		Loose, light brown to brown		39.0	SS-15	2	2	3	5	●							
	-35.0	Loose, fine to medium grained		40.5	SS-16	1	2	3	5	●							
		Very loose, light brown, medium grained		42.0	SS-17	0	1	2	3	●							
		Loose, brown, fine grained, with trace gravel		43.5	SS-18	3	3	3	6	●							
45.0		Loose, light brown, fine to medium grained, with trace gravel		45.0	SS-19	1	1	2	3	●							
	-40.0	Loose, with trace gravel		46.5	SS-20	2	2	3	5	●							
		Loose		48.0	SS-21	3	2	3	5	●							
50.0		Loose, wet, light brown, fine to medium grained, with few gravel, POORLY GRADED SAND with SILT (SP-SM, A-3(0)), LL=NP PL=NP PI=NP NMC=23.2 %#200=6.0		49.5	SS-22	1	2	3	5	●	○						
	-45.0	Loose, fine grained		51.0	SS-23	3	3	2	5	●							
		Very loose		52.5	SS-24	2	2	2	4	●							
		Loose		54.0	SS-25	2	1	4	5	●							
55.0		Loose, wet, light brown, fine to medium grained, POORLY GRADED SAND (SP, A-3(0)), LL=NP PL=NP PI=NP NMC=29.4 %#200=3.8		55.5	SS-26	3	3	5	8	●▲	○						
	-50.0	Loose		57.0	SS-27	3	4	3	7	●							
		Loose, fine to medium grained		58.5	SS-28	2	2	4	6	●							

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	

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway				County:	Mobile		
Boring No.:	MB-02	Boring Location:	527+75.9	Offset:	LT 22.0	Alignment:	I-10 Main Span	
ALDOT PE No.:	DPI-0030(005)	TE Project No.:	15-1101-0228	Eng./Geo.:	Chris L/Charles T			
Elev.:	7.4 ft.	Northing:	250461.65	Easting:	1800515.058	Date Started:	9/8/2015	
Total Depth:	300.0 ft.	Soil Depth:	300.0 ft.	Core Depth:	0.0 ft.	Date Completed:	9/15/2015	
Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207				
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	88%	
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB	N.O.	Delayed:	4.7 ft.

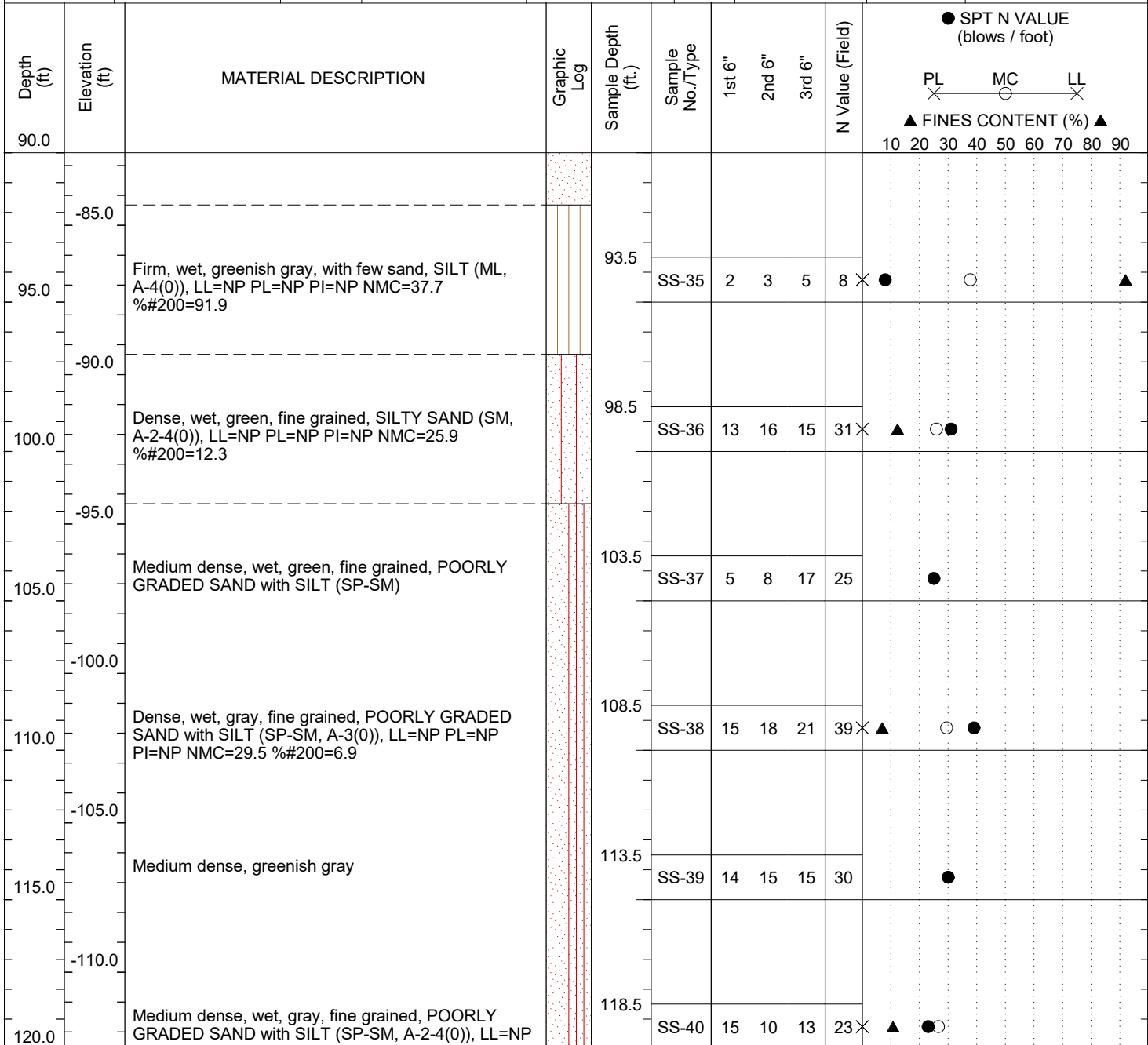


LEGEND

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
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RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway				County:	Mobile	
Boring No.:	MB-02	Boring Location:	527+75.9	Offset:	LT 22.0	Alignment:	I-10 Main Span
ALDOT PE No.:	DPI-0030(005)	TE Project No.:	15-1101-0228	Eng./Geo.:	Chris L/Charles T		
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Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207			
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	88%
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB N.O.	Delayed:	4.7 ft.

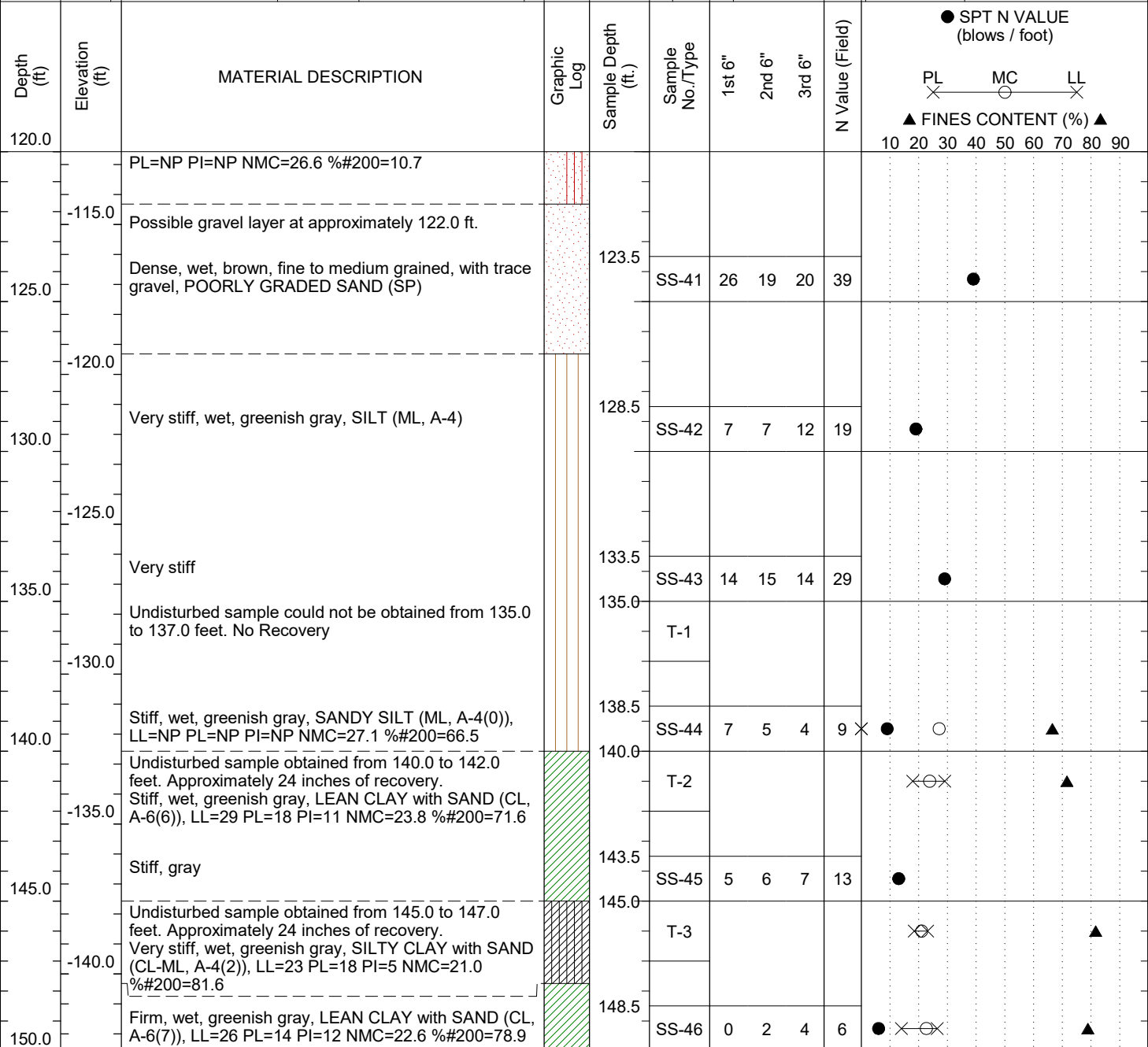


LEGEND

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
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RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway				County:	Mobile		
Boring No.:	MB-02	Boring Location:	527+75.9	Offset:	LT 22.0	Alignment:	I-10 Main Span	
ALDOT PE No.:	DPI-0030(005)	TE Project No.:	15-1101-0228	Eng./Geo.:	Chris L/Charles T			
Elev.:	7.4 ft.	Northing:	250461.65	Easting:	1800515.058	Date Started:	9/8/2015	
Total Depth:	300.0 ft.	Soil Depth:	300.0 ft.	Core Depth:	0.0 ft.	Date Completed:	9/15/2015	
Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207				
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	88%	
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB	N.O.	Delayed:	4.7 ft.

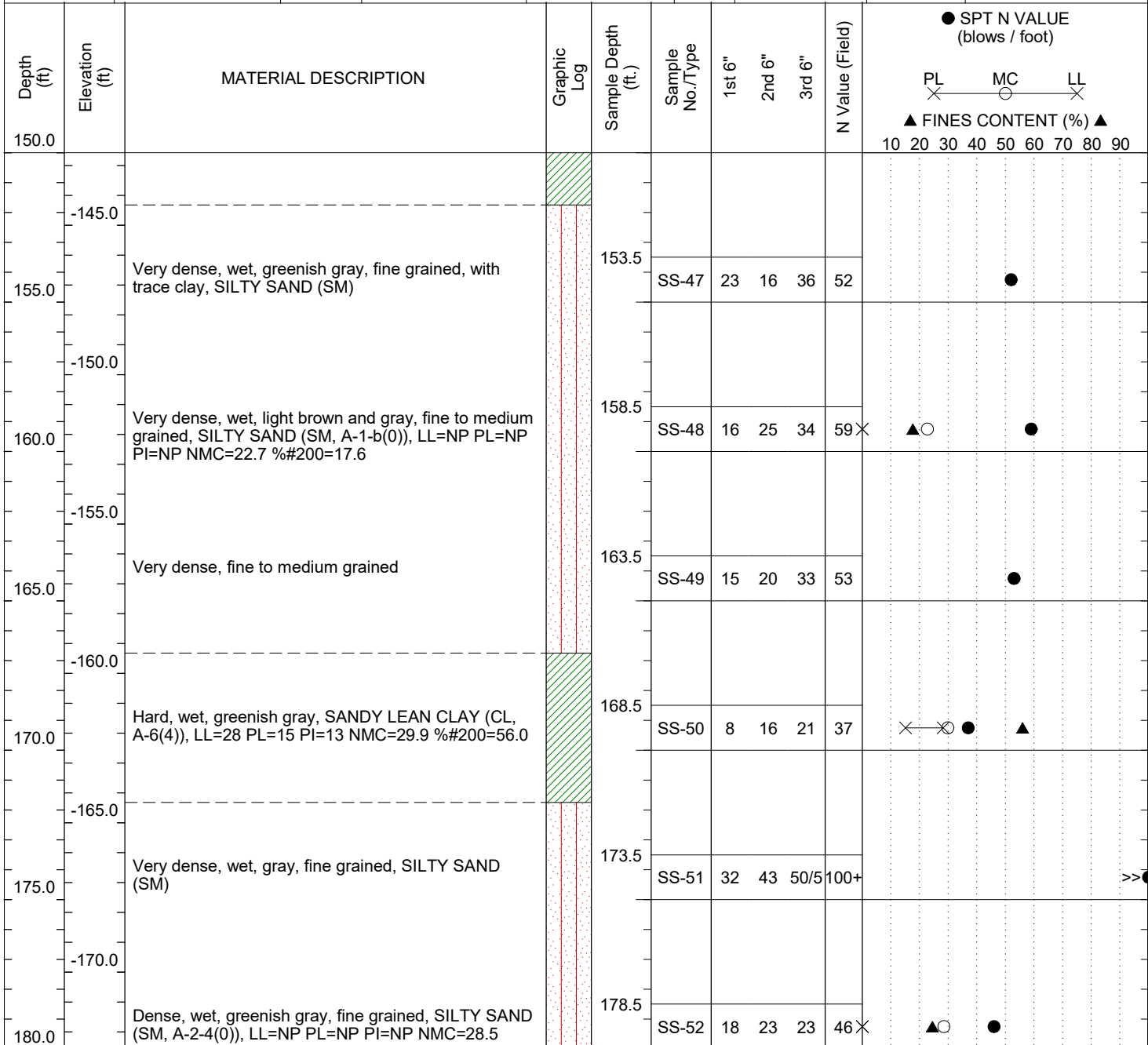


LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
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RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway				County:	Mobile	
Boring No.:	MB-02	Boring Location:	527+75.9	Offset:	LT 22.0	Alignment:	I-10 Main Span
ALDOT PE No.:	DPI-0030(005)	TE Project No.:	15-1101-0228	Eng./Geo.:	Chris L/Charles T		
Elev.:	7.4 ft.	Northing:	250461.65	Easting:	1800515.058	Date Started:	9/8/2015
Total Depth:	300.0 ft.	Soil Depth:	300.0 ft.	Core Depth:	0.0 ft.	Date Completed:	9/15/2015
Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207			
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	88%
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB N.O.	Delayed:	4.7 ft.

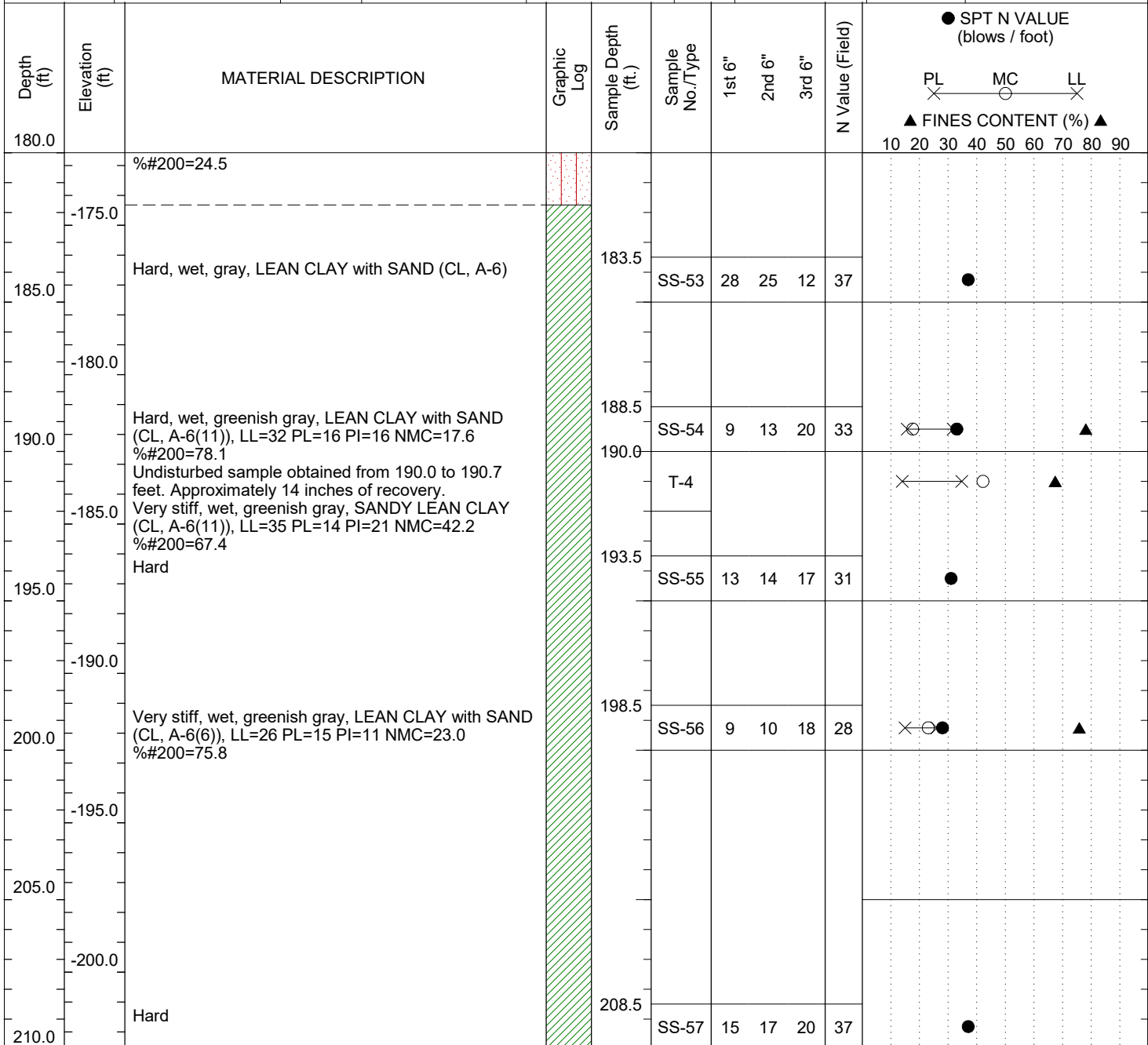


LEGEND

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	

RECORD OF TEST BORING

Site Description: I-10 Mobile River Bridge and Bayway				County: Mobile	
Boring No.: MB-02		Boring Location: 527+75.9		Offset: LT 22.0	
ALDOT PE No.: DPI-0030(005)		TE Project No.: 15-1101-0228		Eng./Geo.: Chris L/Charles T	
Elev.: 7.4 ft.		Northing: 250461.65		Easting: 1800515.058	
Total Depth: 300.0 ft.		Soil Depth: 300.0 ft.		Core Depth: 0.0 ft.	
Bore Hole Diameter (in): 4-inch		AASHTO / ASTM Sampling Methods: AASHTO T206 & T207		Date Started: 9/8/2015	
Drill Machine: CME 550X		Drill Method: MR		Hammer Type: Automatic	
Core Size: N/A		Driller: Thompson Eng		Groundwater: TOB N.O.	
				Energy Ratio: 88%	
				Delayed: 4.7 ft.	



LEGEND

SAMPLER TYPE

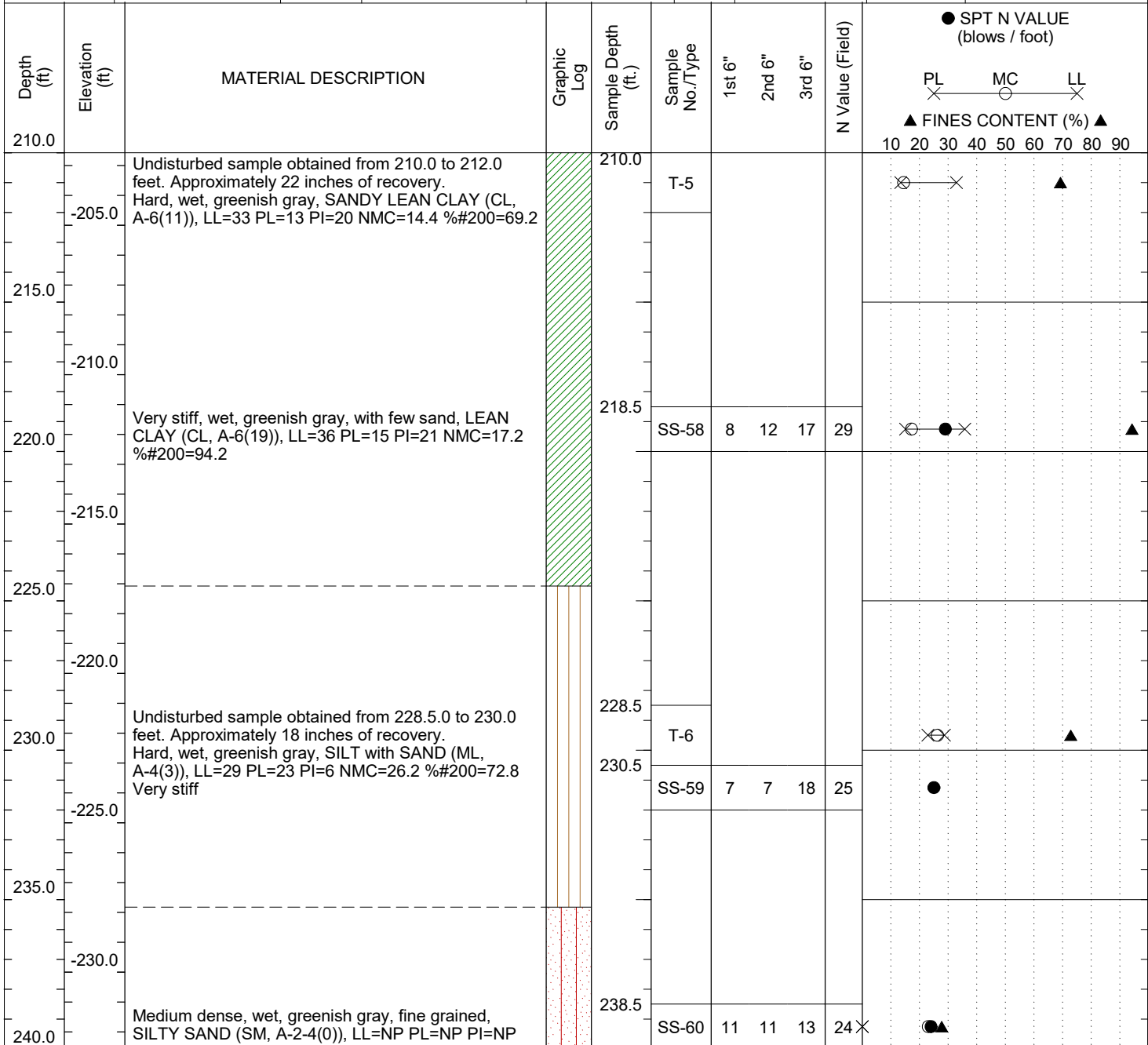
SS - Split Spoon
 T - Shelby Tube
 DCP - Dynamic Cone Penetrometer
 AC - Auger Cuttings
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 NQ - Rock Core

DRILLING METHOD

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

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway				County:	Mobile		
Boring No.:	MB-02	Boring Location:	527+75.9	Offset:	LT 22.0	Alignment:	I-10 Main Span	
ALDOT PE No.:	DPI-0030(005)	TE Project No.:	15-1101-0228	Eng./Geo.:	Chris L/Charles T			
Elev.:	7.4 ft.	Northing:	250461.65	Easting:	1800515.058	Date Started:	9/8/2015	
Total Depth:	300.0 ft.	Soil Depth:	300.0 ft.	Core Depth:	0.0 ft.	Date Completed:	9/15/2015	
Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207				
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	88%	
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB	N.O.	Delayed:	4.7 ft.



LEGEND

SAMPLER TYPE

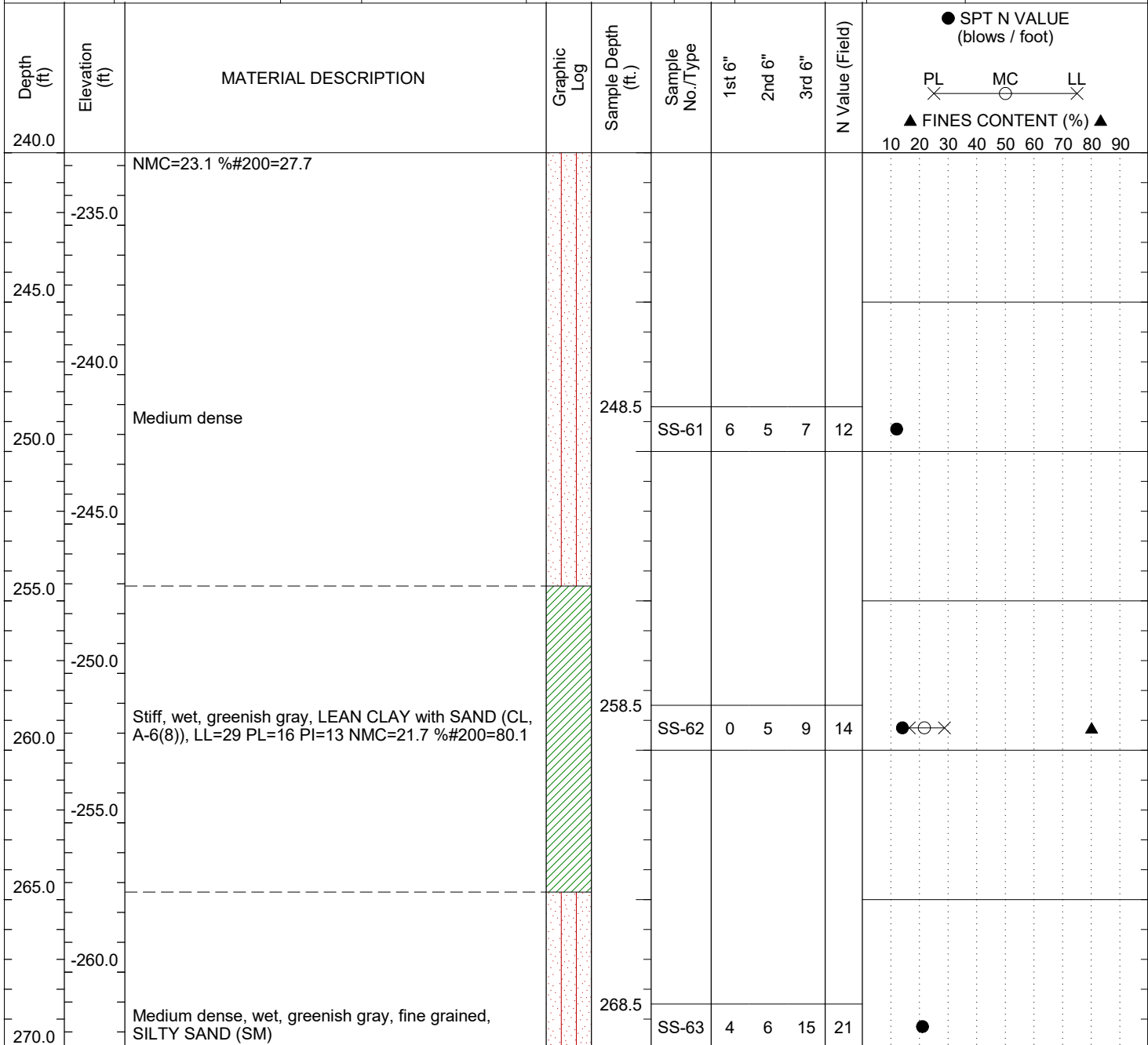
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DRILLING METHOD

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RECORD OF TEST BORING

Site Description: I-10 Mobile River Bridge and Bayway				County: Mobile	
Boring No.: MB-02		Boring Location: 527+75.9		Offset: LT 22.0	
ALDOT PE No.: DPI-0030(005)		TE Project No.: 15-1101-0228		Eng./Geo.: Chris L/Charles T	
Elev.: 7.4 ft.		Northing: 250461.65		Easting: 1800515.058	
Total Depth: 300.0 ft.		Soil Depth: 300.0 ft.		Core Depth: 0.0 ft.	
Bore Hole Diameter (in): 4-inch		AASHTO / ASTM Sampling Methods: AASHTO T206 & T207			
Drill Machine: CME 550X		Drill Method: MR		Hammer Type: Automatic	
Core Size: N/A		Driller: Thompson Eng		Groundwater: TOB N.O.	
				Energy Ratio: 88%	
				Delayed: 4.7 ft.	



LEGEND

SAMPLER TYPE

SS - Split Spoon
 T - Shelby Tube
 DCP - Dynamic Cone Penetrometer
 AC - Auger Cuttings
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DRILLING METHOD

HSA - Hollow Stem Augers
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RECORD OF TEST BORING

Site Description: I-10 Mobile River Bridge and Bayway				County: Mobile	
Boring No.: MB-02		Boring Location: 527+75.9		Offset: LT 22.0	
Alignment: I-10 Main Span		ALDOT PE No.: DPI-0030(005)		TE Project No.: 15-1101-0228	
Eng./Geo.: Chris L/Charles T		Elev.: 7.4 ft.		Northing: 250461.65	
Easting: 1800515.058		Date Started: 9/8/2015		Total Depth: 300.0 ft.	
Soil Depth: 300.0 ft.		Core Depth: 0.0 ft.		Date Completed: 9/15/2015	
Bore Hole Diameter (in): 4-inch		AASHTO / ASTM Sampling Methods: AASHTO T206 & T207			
Drill Machine: CME 550X		Drill Method: MR		Hammer Type: Automatic	
Energy Ratio: 88%		Core Size: N/A		Driller: Thompson Eng	
Groundwater: TOB		N.O.		Delayed: 4.7 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 (%)
270.0														
	-265.0	Undisturbed sample obtained from 270.0 to 272.0 feet. Approximately 8 inches of recovery. Medium dense, wet, greenish gray, fine grained, SILTY SAND (SM, A-4(0)), LL=NP PL=NP PI=NP NMC=19.6 % #200=45.6		270.0	T-7				X					
	-270.0													
	-280.0	Very dense, wet, light greenish gray, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP NMC=25.3 % #200=16.5		278.5	SS-64	27	50/4	X	50/4X					
	-275.0													
	-285.0													
	-280.0													
	-290.0	Very dense, with trace wood		288.5	SS-65	24	29	36	65					
	-285.0													
	-295.0													
	-290.0													
	-300.0	Very dense, wet, pale brown, fine grained, SILTY SAND (SM, A-2-4(0)), LL=NP PL=NP PI=NP		298.5	SS-66	48	38	50/4	100X					

LEGEND

SAMPLER TYPE

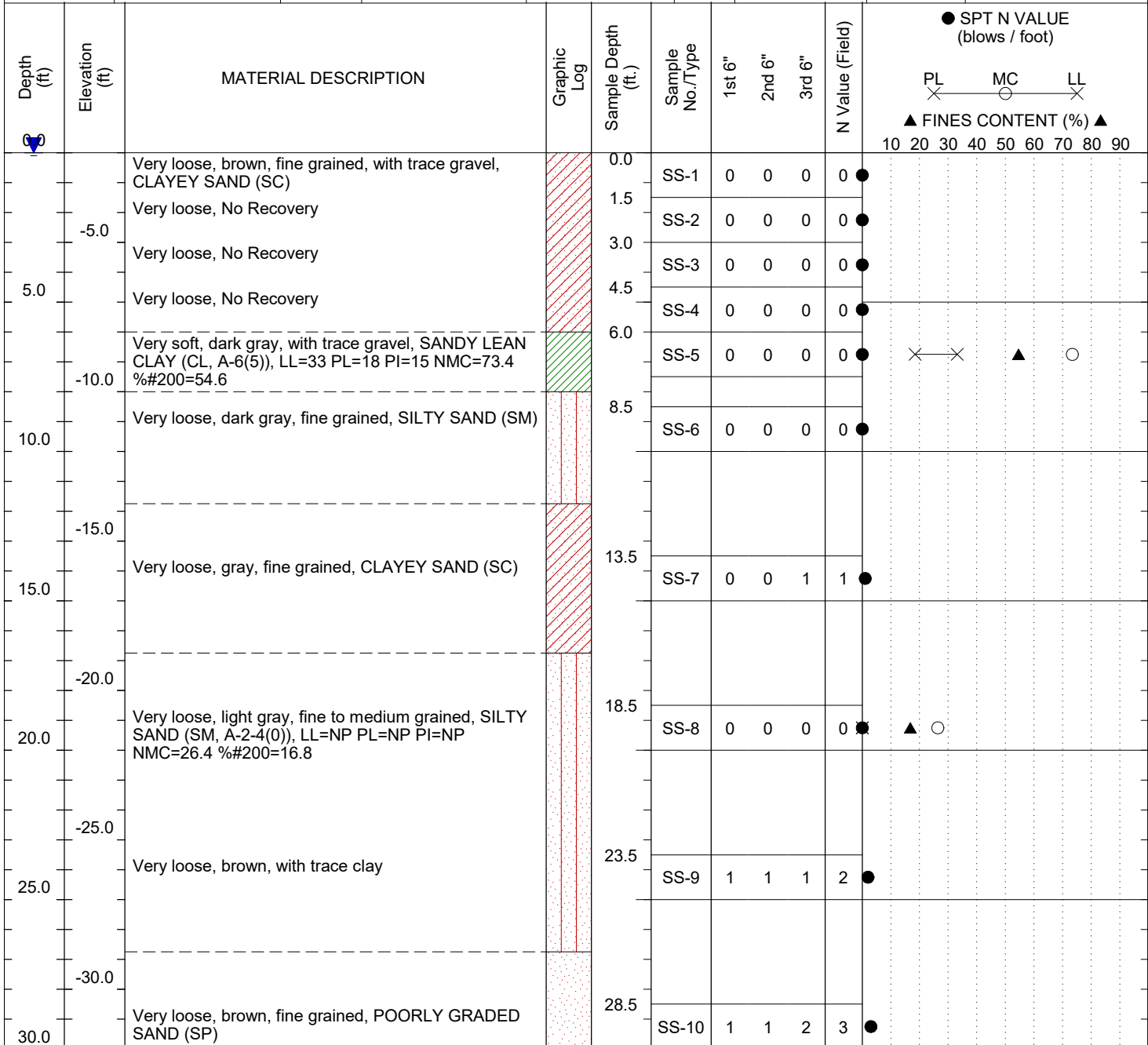
SS - Split Spoon
 T - Shelby Tube
 DCP - Dynamic Cone Penetrometer
 AC - Auger Cuttings
 GB - Grab Bag
 NQ - Rock Core

DRILLING METHOD

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

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway				County:	Mobile		
Boring No.:	MB-02A	Boring Location:	528+88.0	Offset:	RT 32.9	Alignment:	I-10 Main Span	
ALDOT PE No.:	DPI-0030(005)	TE Project No.:	15-1101-0228	Eng./Geo.:	Chris L/Charles T			
Elev.:	-2.0 ft.	Northing:	250481.989	Easting:	1800638.256	Date Started:	6/20/2017	
Total Depth:	320.0 ft.	Soil Depth:	320.0 ft.	Core Depth:	0.0 ft.	Date Completed:	7/24/2017	
Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207				
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	90%	
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB	0.0 ft.	Delayed:	0.0 ft.



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
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RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway				County:	Mobile	
Boring No.:	MB-02A	Boring Location:	528+88.0	Offset:	RT 32.9	Alignment:	I-10 Main Span
ALDOT PE No.:	DPI-0030(005)	TE Project No.:	15-1101-0228	Eng./Geo.:	Chris L/Charles T		
Elev.:	-2.0 ft.	Northing:	250481.989	Easting:	1800638.256	Date Started:	6/20/2017
Total Depth:	320.0 ft.	Soil Depth:	320.0 ft.	Core Depth:	0.0 ft.	Date Completed:	7/24/2017
Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207			
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	90%
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB 0.0 ft.	Delayed:	0.0 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 (%)
30.0														
	-35.0	Very loose, white	[Graphic Log: Dotted pattern]	33.5	SS-11	1	2	2	4	●				
35.0														
	-40.0	Very loose, tan, fine to medium grained, with trace gravel		38.5	SS-12	2	2	2	4	●				
40.0														
	-45.0	Loose, fine grained		43.5	SS-13	3	4	5	9	●				
45.0														
	-50.0	Medium dense, tan, medium to fine grained, with trace gravel, POORLY GRADED SAND (SP, A-1-b(0)), LL=NP PL=NP PI=NP NMC=21.7 % #200=1.5	48.5	SS-14	4	6	9	15	▲ ● ○					
50.0														
	-55.0	Medium dense	53.5	SS-15	6	8	9	17	●					
55.0														
	-60.0	Medium dense, wet	58.5	SS-16	6	6	10	16	●					
60.0														

LEGEND

SAMPLER TYPE

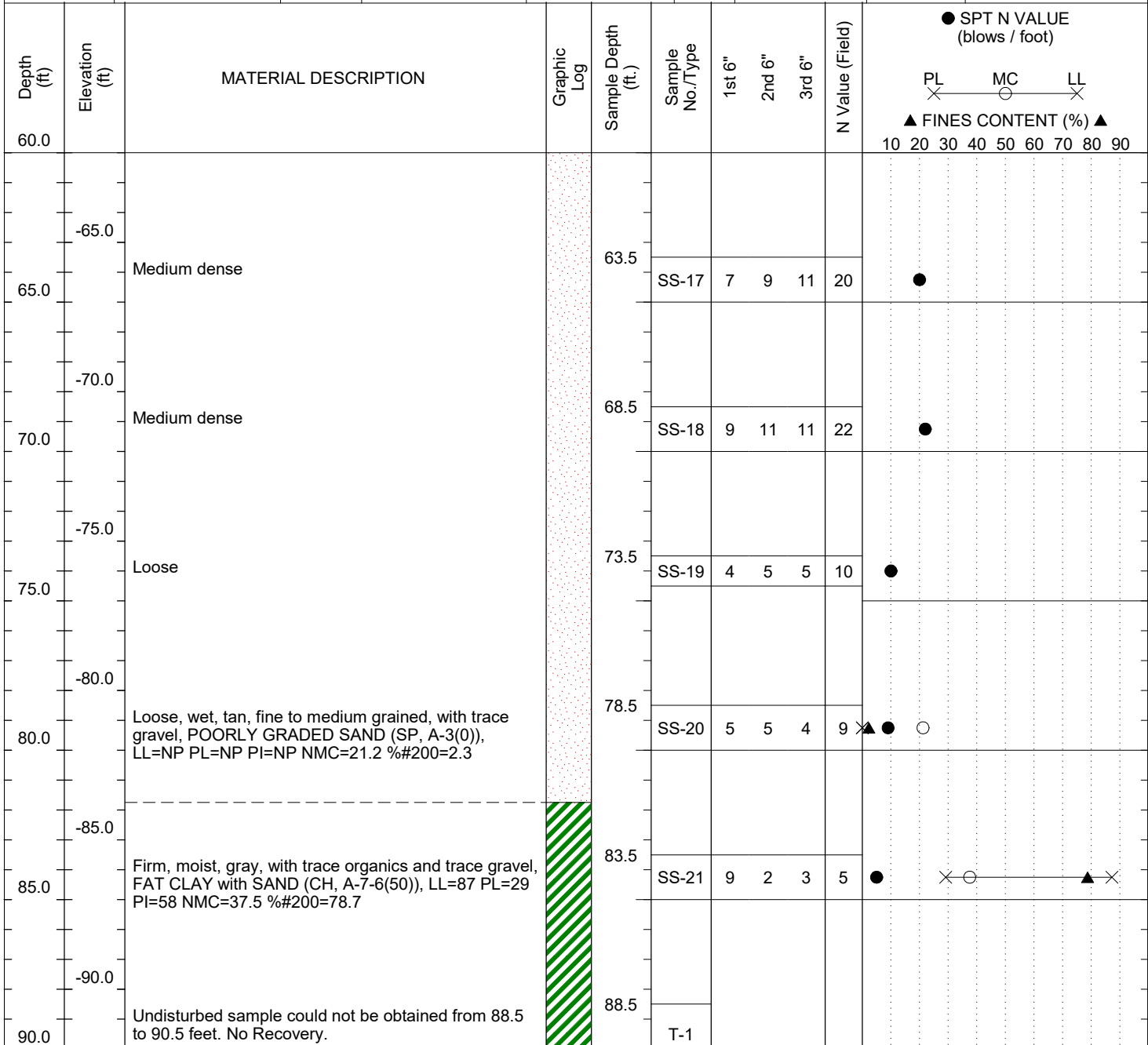
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 AC - Auger Cuttings
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DRILLING METHOD

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RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway				County:	Mobile	
Boring No.:	MB-02A	Boring Location:	528+88.0	Offset:	RT 32.9	Alignment:	I-10 Main Span
ALDOT PE No.:	DPI-0030(005)	TE Project No.:	15-1101-0228	Eng./Geo.:	Chris L/Charles T		
Elev.:	-2.0 ft.	Northing:	250481.989	Easting:	1800638.256	Date Started:	6/20/2017
Total Depth:	320.0 ft.	Soil Depth:	320.0 ft.	Core Depth:	0.0 ft.	Date Completed:	7/24/2017
Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207			
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	90%
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB 0.0 ft.	Delayed:	0.0 ft.



LEGEND

SAMPLER TYPE

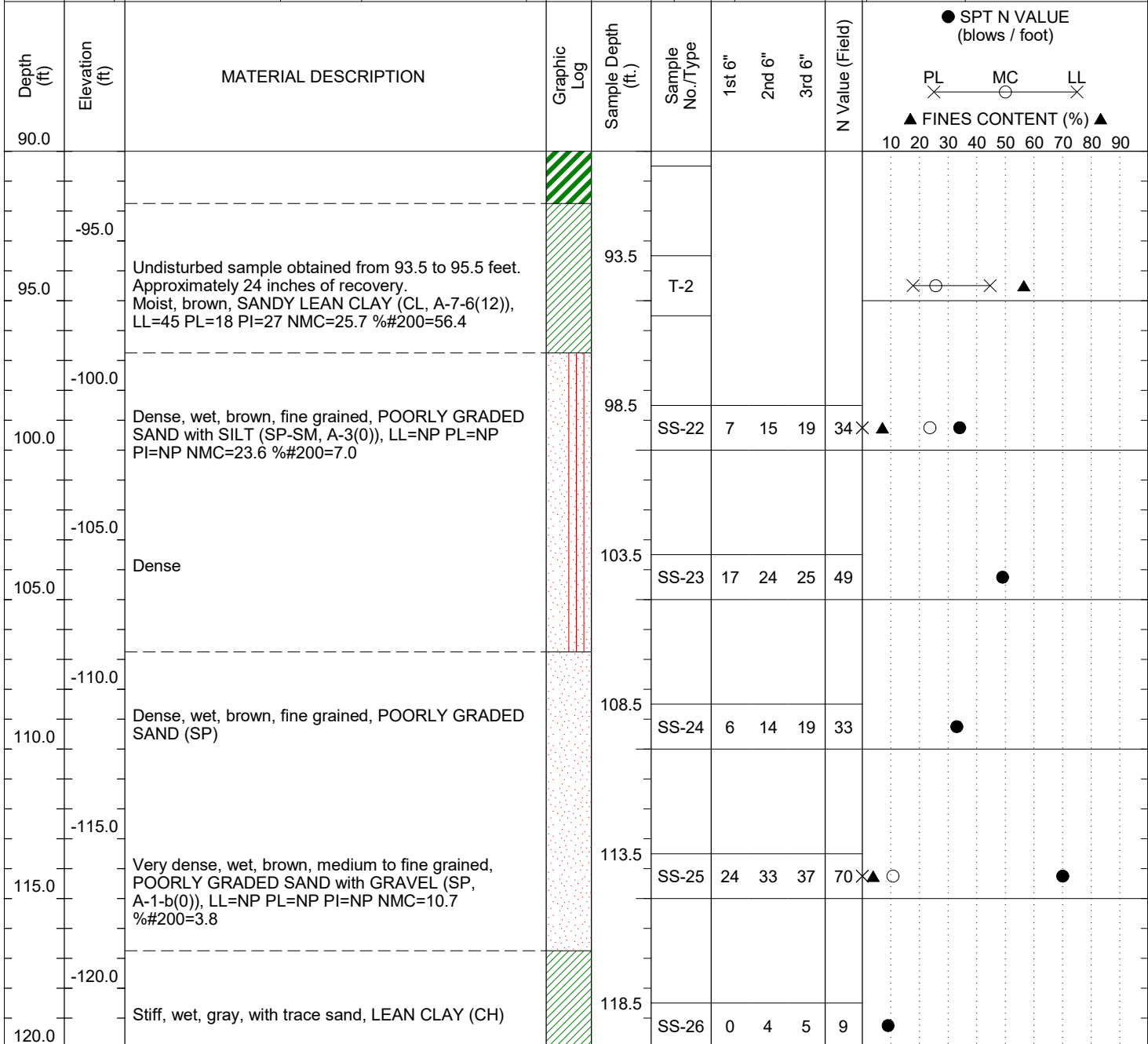
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DRILLING METHOD

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

RECORD OF TEST BORING

Site Description: I-10 Mobile River Bridge and Bayway				County: Mobile	
Boring No.: MB-02A		Boring Location: 528+88.0		Offset: RT 32.9	
ALDOT PE No.: DPI-0030(005)		TE Project No.: 15-1101-0228		Eng./Geo.: Chris L/Charles T	
Elev.: -2.0 ft.		Northing: 250481.989		Easting: 1800638.256	
Total Depth: 320.0 ft.		Soil Depth: 320.0 ft.		Core Depth: 0.0 ft.	
Bore Hole Diameter (in): 4-inch		AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207	
Drill Machine: CME 550X		Drill Method: MR		Hammer Type: Automatic	
Core Size: N/A		Driller: Thompson Eng		Groundwater: TOB 0.0 ft.	
				Energy Ratio: 90%	
				Delayed: 0.0 ft.	

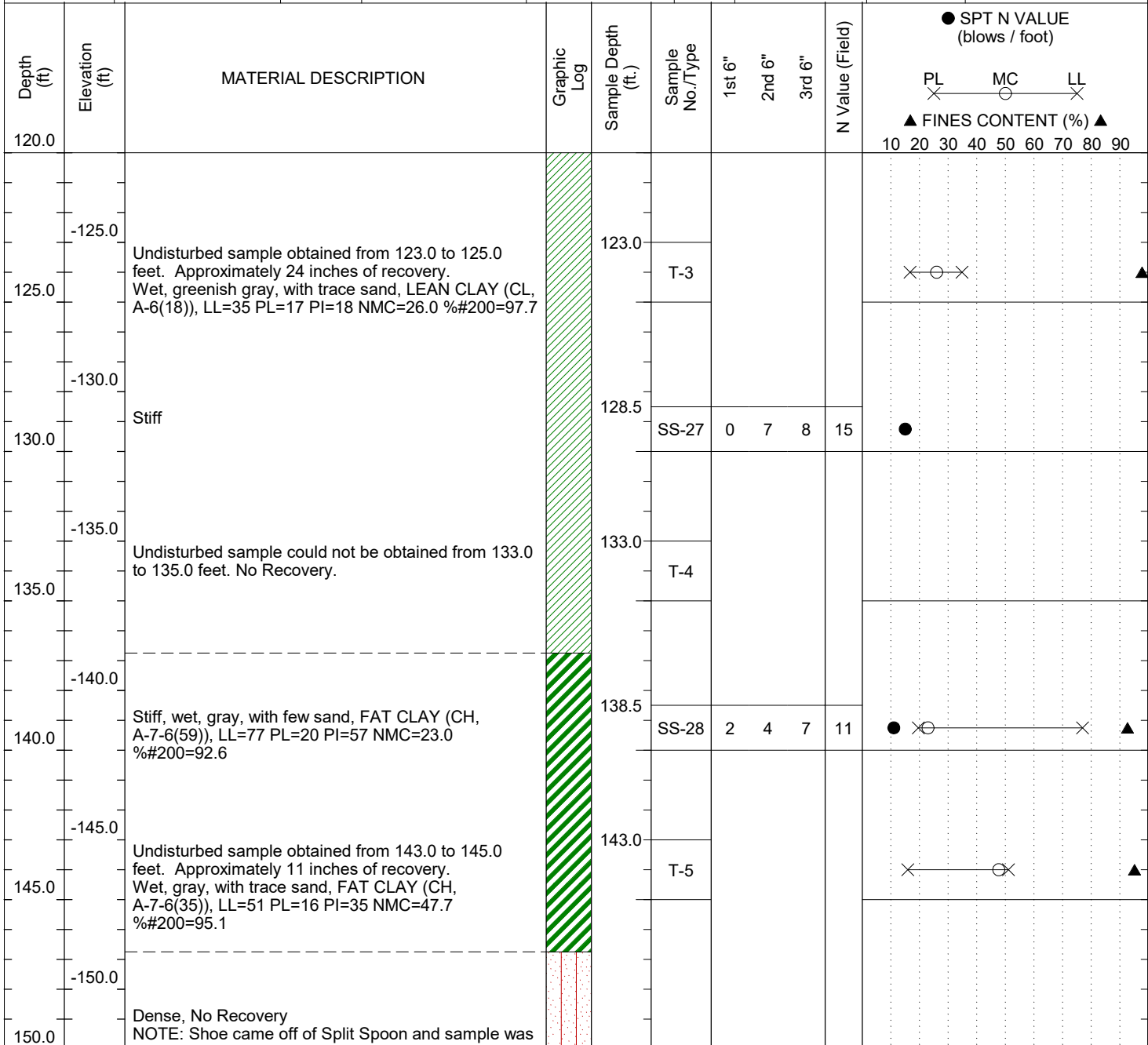


LEGEND

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	

RECORD OF TEST BORING

Site Description:	I-10 Mobile River Bridge and Bayway				County:	Mobile	
Boring No.:	MB-02A	Boring Location:	528+88.0	Offset:	RT 32.9	Alignment:	I-10 Main Span
ALDOT PE No.:	DPI-0030(005)	TE Project No.:	15-1101-0228	Eng./Geo.:	Chris L/Charles T		
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Total Depth:	320.0 ft.	Soil Depth:	320.0 ft.	Core Depth:	0.0 ft.	Date Completed:	7/24/2017
Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207			
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	90%
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB 0.0 ft.	Delayed:	0.0 ft.

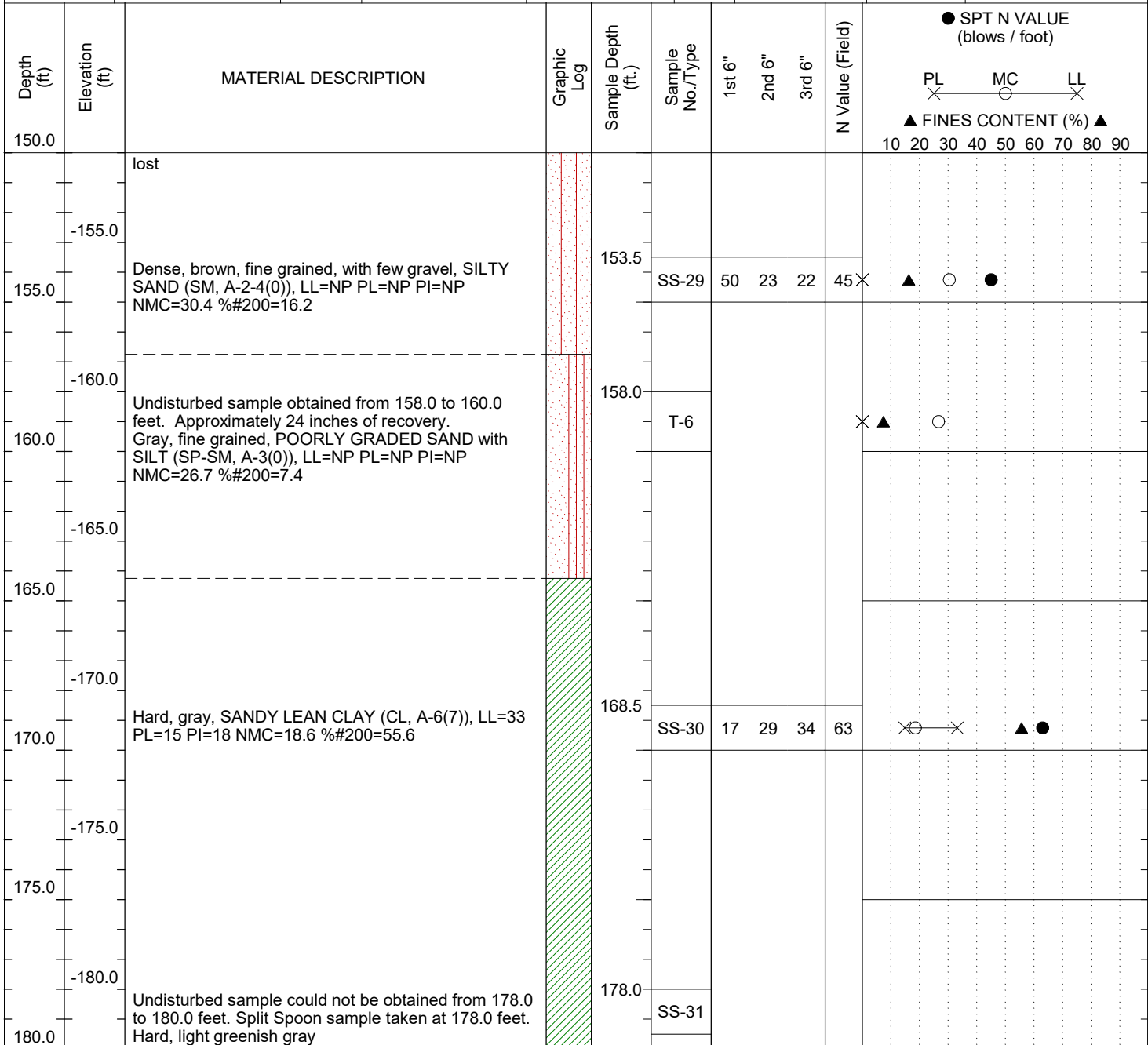


LEGEND

SAMPLER TYPE		DRILLING METHOD	
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Total Depth:	320.0 ft.	Soil Depth:	320.0 ft.	Core Depth:	0.0 ft.	Date Completed:	7/24/2017
Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207			
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	90%
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB 0.0 ft.	Delayed:	0.0 ft.

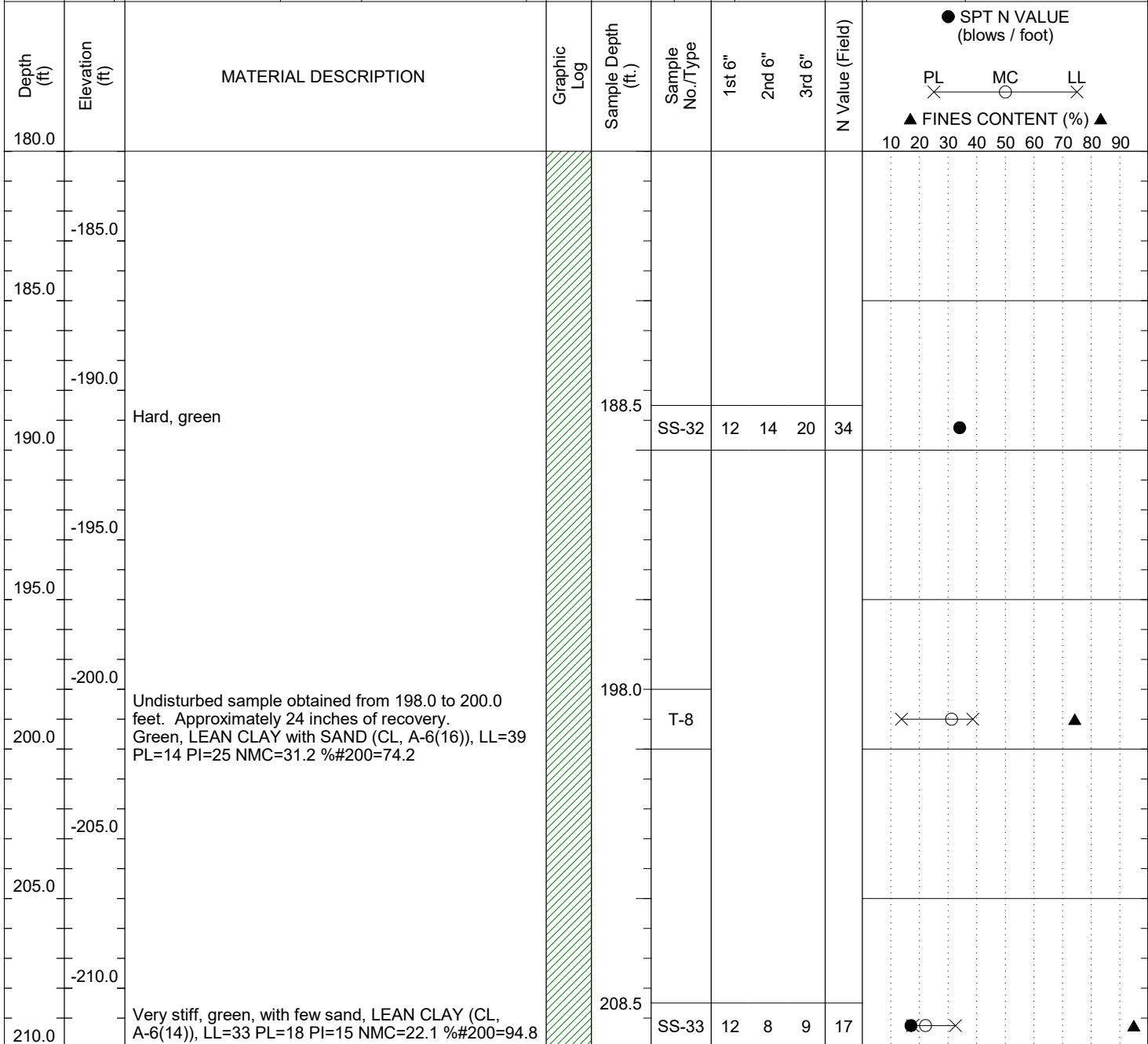


LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
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Total Depth:	320.0 ft.	Soil Depth:	320.0 ft.	Core Depth:	0.0 ft.	Date Completed:	7/24/2017
Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207			
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	90%
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB 0.0 ft.	Delayed:	0.0 ft.



LEGEND

SAMPLER TYPE

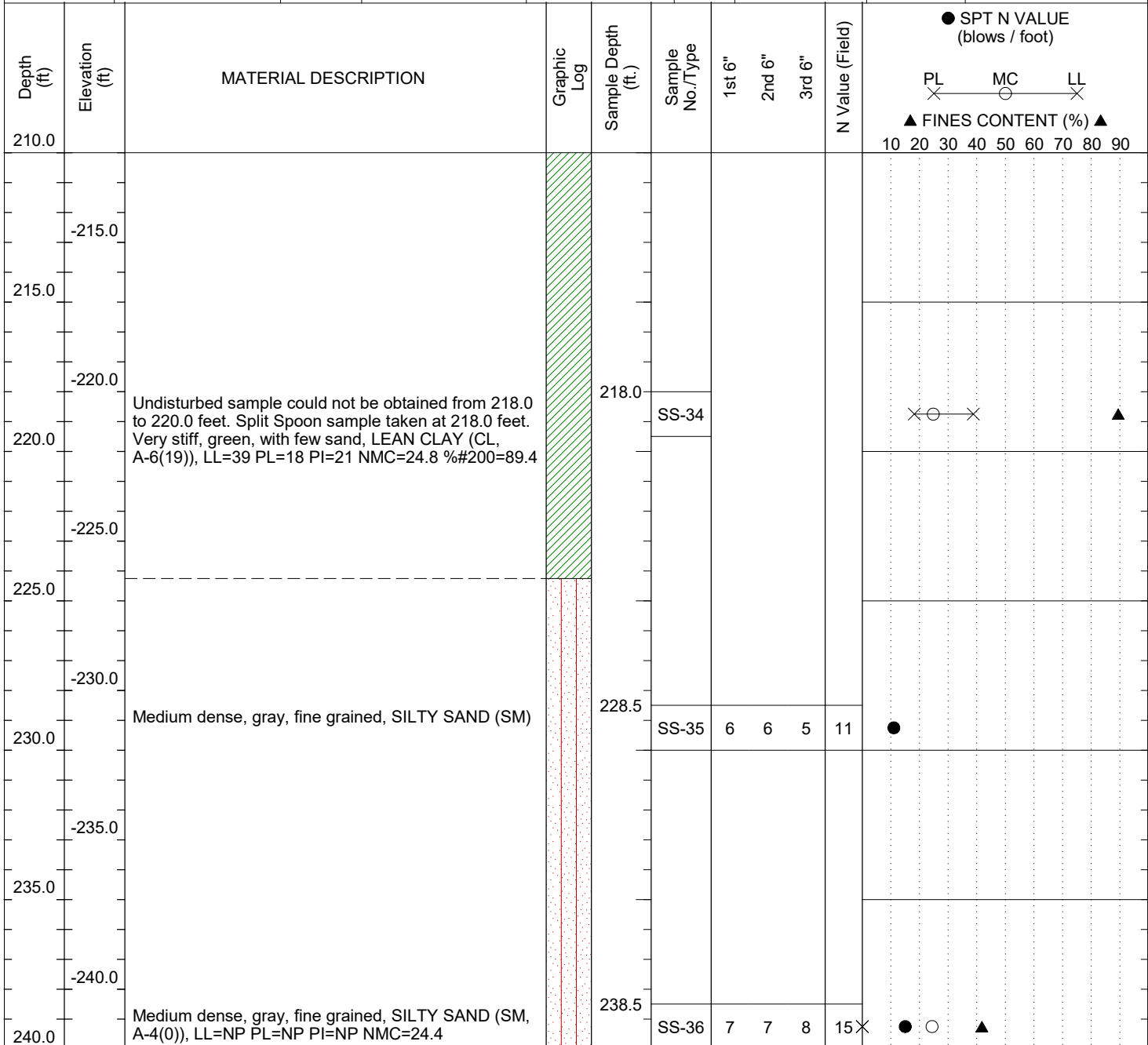
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Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB 0.0 ft.	Delayed:	0.0 ft.



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SAMPLER TYPE

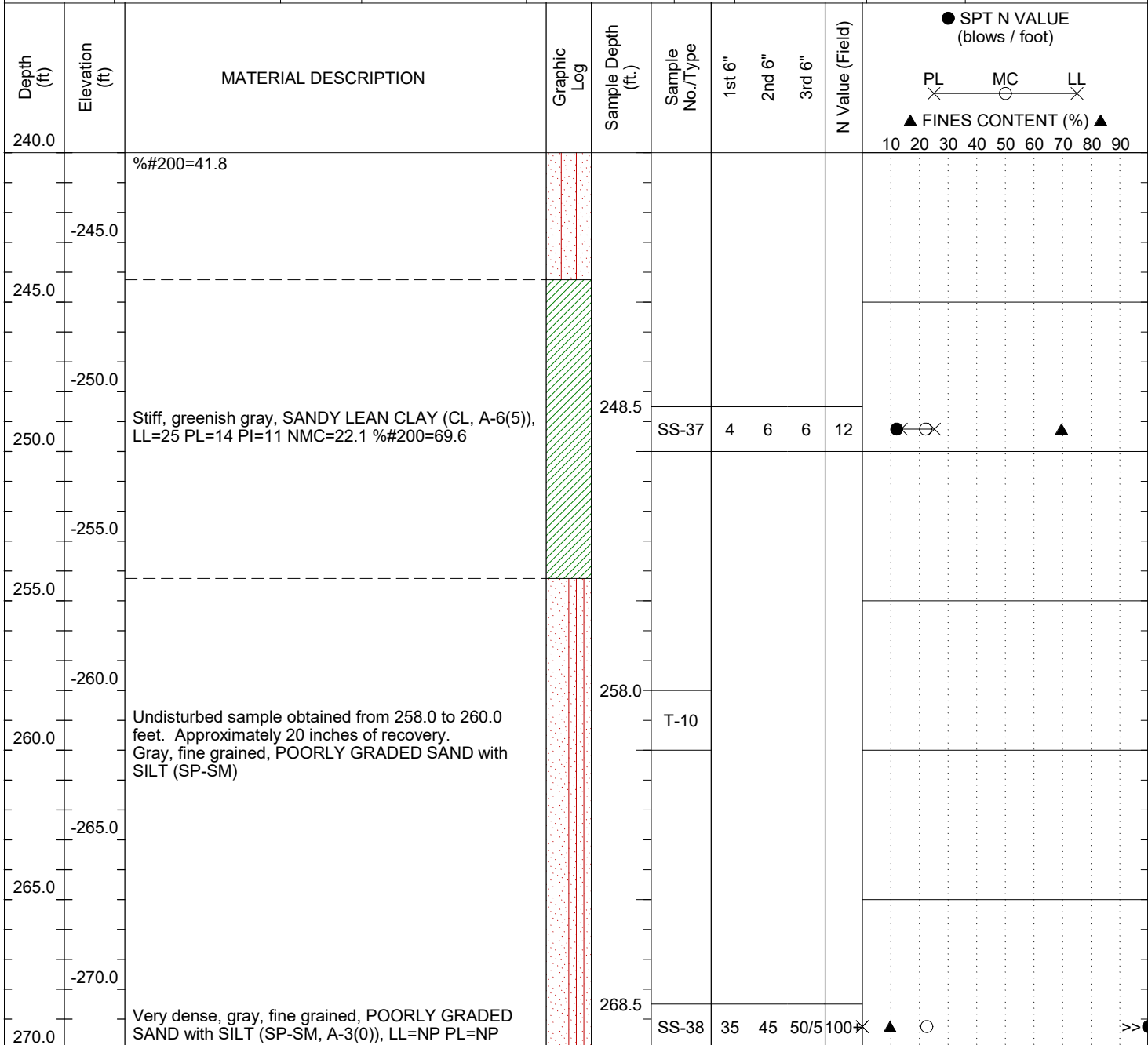
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Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	90%
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB 0.0 ft.	Delayed:	0.0 ft.



LEGEND

SAMPLER TYPE

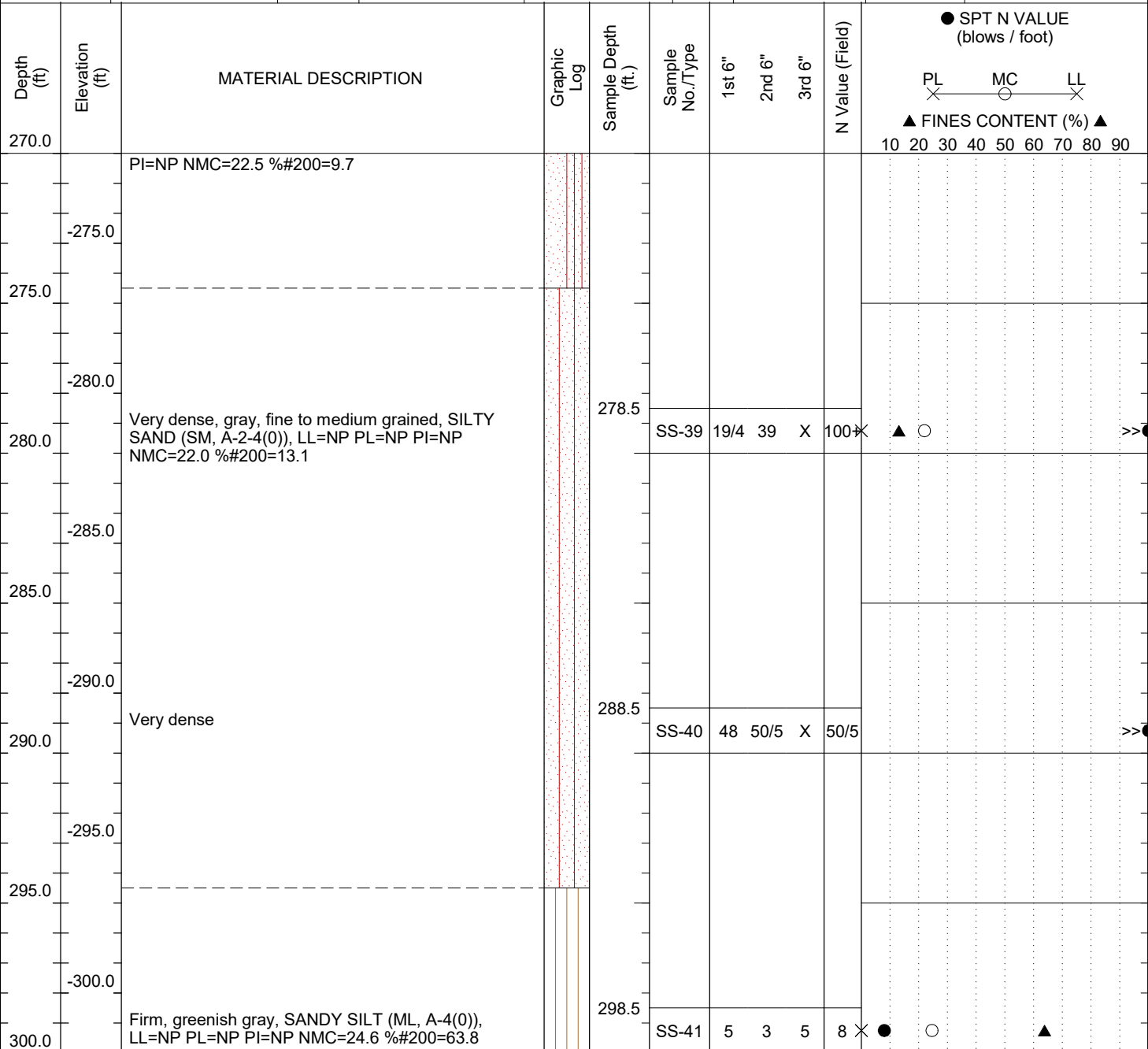
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Total Depth:	320.0 ft.	Soil Depth:	320.0 ft.	Core Depth:	0.0 ft.	Date Completed:	7/24/2017
Bore Hole Diameter (in):	4-inch	AASHTO / ASTM Sampling Methods:		AASHTO T206 & T207			
Drill Machine:	CME 550X	Drill Method:	MR	Hammer Type:	Automatic	Energy Ratio:	90%
Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB 0.0 ft.	Delayed:	0.0 ft.



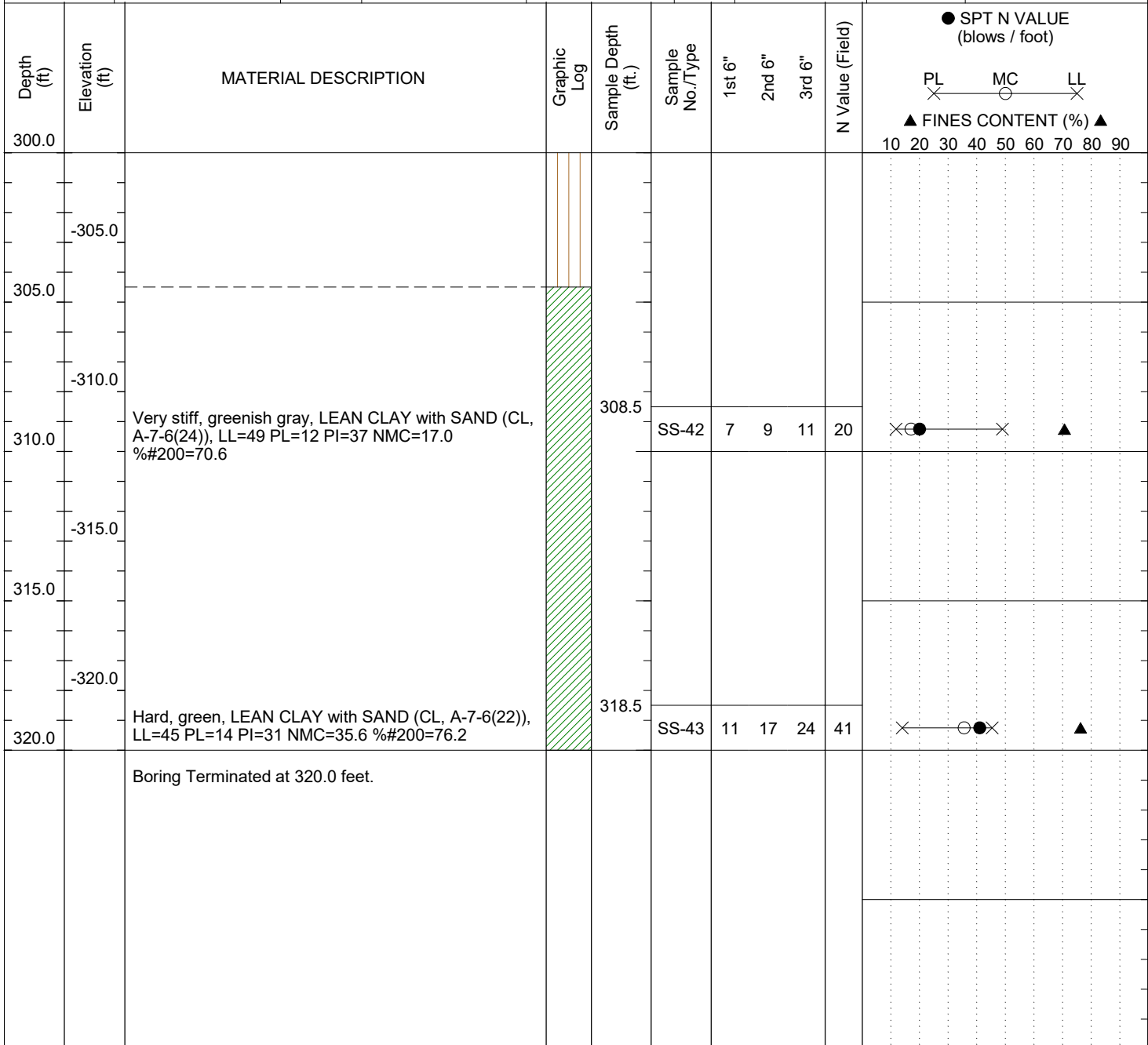
LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	AC - Auger Cuttings	HSA - Hollow Stem Augers	MR - Mud Rotary Wash
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Core Size:	N/A	Driller:	Thompson Eng	Groundwater:	TOB 0.0 ft.	Delayed:	0.0 ft.



LEGEND

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CPT REPORT - DYNAMIC BOTTOM LEGEND - DF STD US LAB GDT - 1/3/17 13:41 - \TCO\SHAREDFILES\DIVISIONS\OPERATIONS\LABS\GINT_PROJECTS\2015\15-1101-0228 ALDOT MRB INITIAL GEOTEC



Mobile River Bridge CPT Investigation
Mobile, Alabama

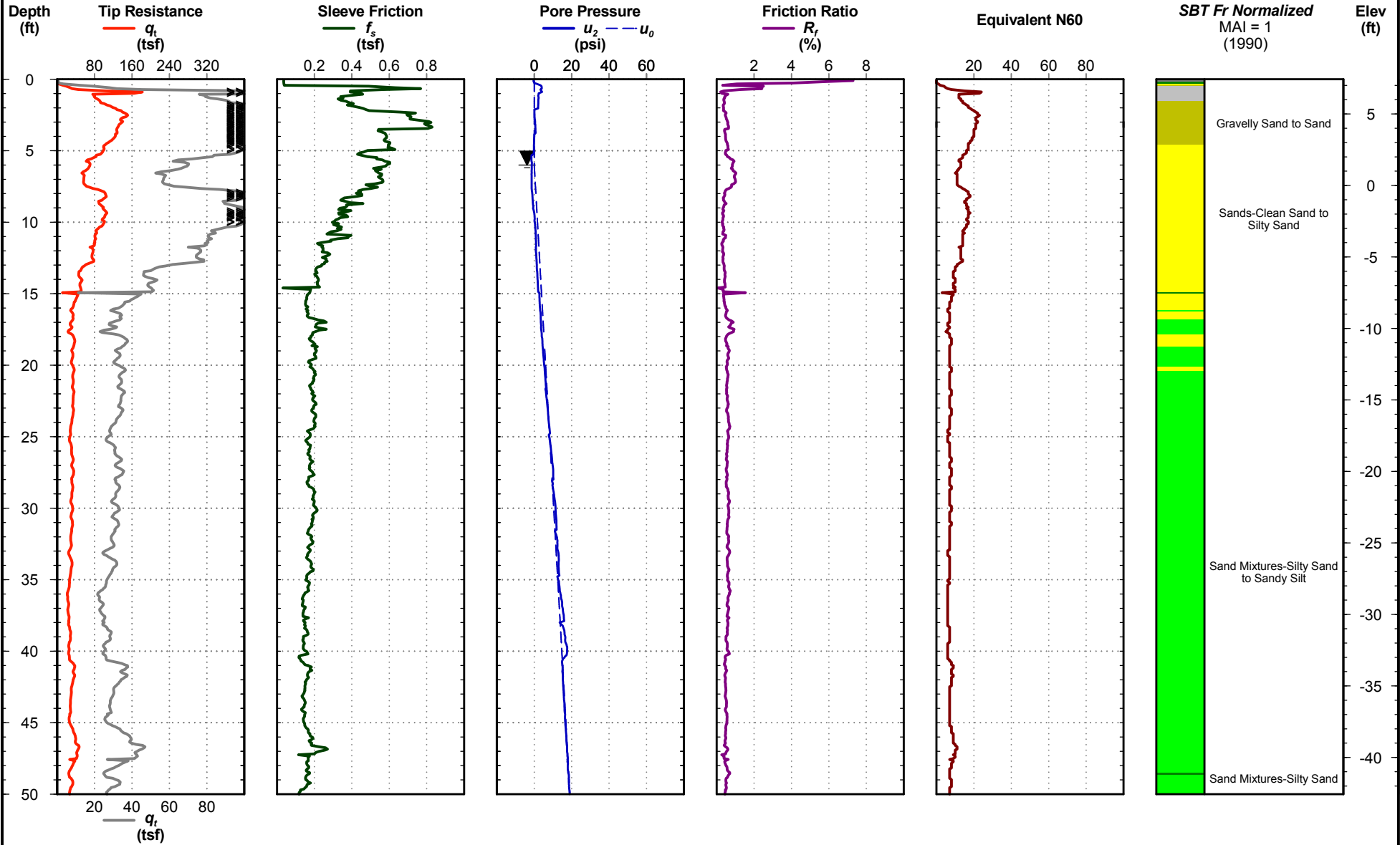
Cone Penetration Test

C-1

Project #: 15-1101-0228
Date: Sep. 26, 2015

Northing: 250465.5
Easting: 1800519.5

Elevation: 7.429
Filename: CPT-C1.cpt



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

C-1

CPT REPORT - DYNAMIC BOTTOM LEGEND - DF STD US LAB.GDT - 1/3/17 13:41 - \VTCO\SHAREDFILES\DIVISIONS\OPERATIONS\LABS\GINT_PROJECTS\15-1101-0228 ALDOT MRB INITIAL GEOTEC



**Mobile River Bridge CPT Investigation
Mobile, Alabama**

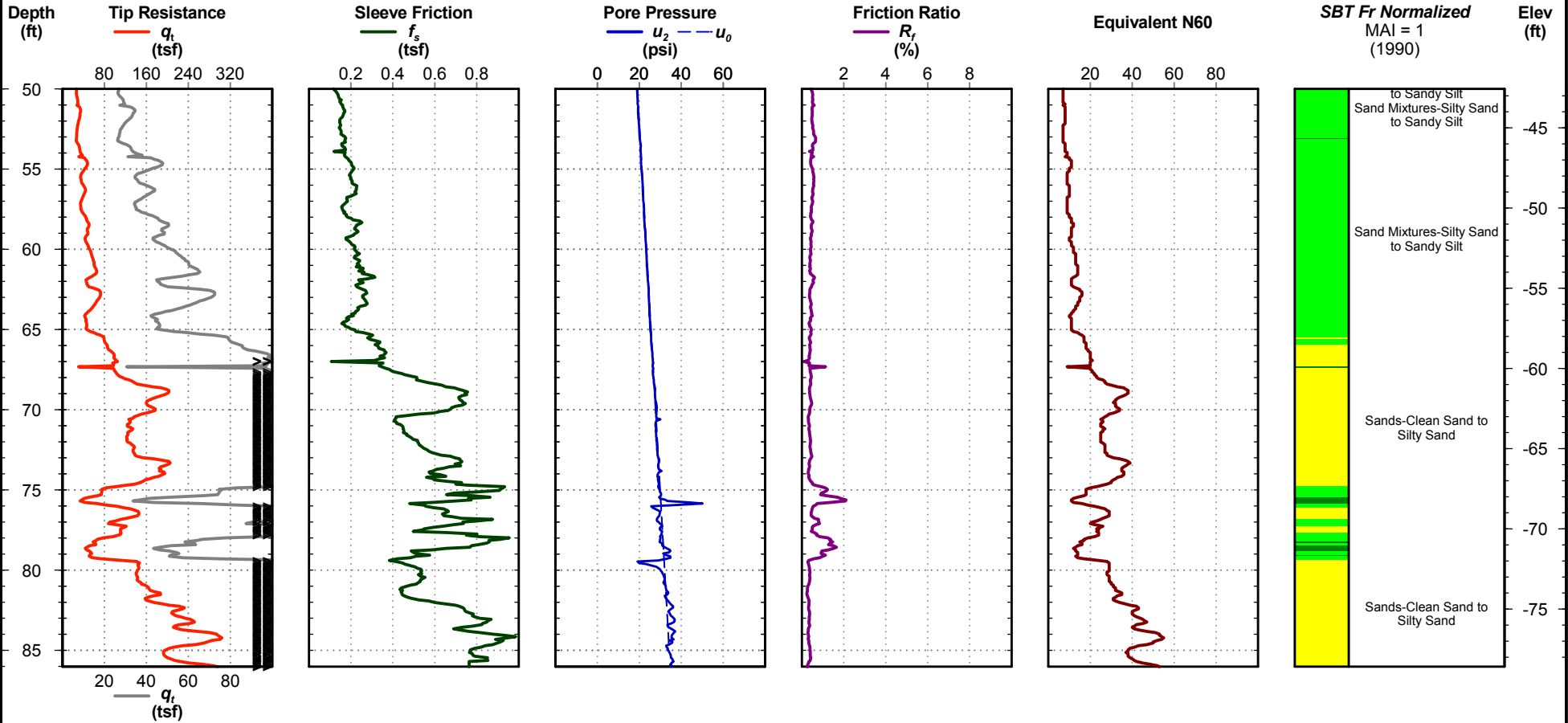
Cone Penetration Test

C-1

Project #: 15-1101-0228
Date: Sep. 26, 2015

Northing: 250465.5
Easting: 1800519.5

Elevation: 7.429
Filename: CPT-C1.cpt



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

C-1



Thompson Engineering
 2970 Cottage Hill RD
 Mobile AL 36606
 Telephone: 251-666-2443

KEY TO SYMBOLS

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 Mobile, Mobile

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

ALDOT MRB LEGEND - GINT STD US LAB.GDT - 11/15/17 16:17 - L:\GINT PROJECTS\2015\15-1101-0228 ALDOT MRB INITIAL GEOTECHNICAL\15-1101-0228 ALDOT MRB INITIAL GEOTECHNICAL.GPJ


APPENDIX C

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


Station & Offset	Boring No.	Sample ID	Depth (ft)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Gravel	% Sand	% Pass 200 (if hydrometer data available)		D50 (mm)	USCS	AASHTO Classification
										% Silt	% Clay			
514+25.9 LT 18.8	MB-1	SS-2	1.5	57.0	NP	NP	NP	19.9	62.6	11.3	6.2	0.2928	SM	A-2-4(0)
514+25.9 LT 18.8	MB-1	SS-7	13.5	18.9	NP	NP	NP	50.1	39.0	8.4	2.5	4.7614	GP-GM	A-1-a(0)
514+25.9 LT 18.8	MB-1	SS-8	18.5	16.9	NP	NP	NP	38.4	56.9	3.2	1.5	0.5977	SP	A-1-b(0)
514+25.9 LT 18.8	MB-1	SS-11	33.5	28.7	NP	NP	NP	16.6	80.0	3.4		0.3261	SP	A-3(0)
514+25.9 LT 18.8	MB-1	SS-13	43.5	22.2	NP	NP	NP	3.9	94.0	2.1		0.4741	SP	A-1-b(0)
514+25.9 LT 18.8	MB-1	SS-14	48.5	11.7	NP	NP	NP	55.6	41.3	3.1		6.0176	GP	A-1-a(0)
514+25.9 LT 18.8	MB-1	SS-17	63.5	19.3	NP	NP	NP	9.7	81.7	8.6		0.4055	SP-SM	A-3(0)
514+25.9 LT 18.8	MB-1	T-1	90.5	40.1	52	22	30	0.0	24.3	39.4	36.3	0.0185	CH	A-7-6(23)
514+25.9 LT 18.8	MB-1	T-2	98.5	44.0	89	28	61	0.0	0.7	20.0	79.3	---	CH	A-7-6(71)
514+25.9 LT 18.8	MB-1	SS-24	103.5	23.9	21	17	4	0.0	73.3	26.7		0.1545	SC-SM	A-2-4(0)
514+25.9 LT 18.8	MB-1	SS-26	113.5	19.5	NP	NP	NP	8.9	87.8	3.3		0.7445	SP	A-1-b(0)
514+25.9 LT 18.8	MB-1	SS-29	128.5	23.7	53	21	32	0.2	4.8	95.0		---	CH	A-7-6(34)
514+25.9 LT 18.8	MB-1	SS-33	148.5	22.5	NP	NP	NP	0.0	89.5	10.5		0.1997	SP-SM	A-2-4(0)
514+25.9 LT 18.8	MB-1	SS-35	163.5	23.8	NP	NP	NP	3.6	84.9	11.5		0.1583	SP-SM	A-2-4(0)
514+25.9 LT 18.8	MB-1	SS-36	168.5	23.2	36	13	23	0.0	51.6	48.4		0.0895	SC	A-6(7)
514+25.9 LT 18.8	MB-1	SS-39	183.5	26.5	NP	NP	NP	0.0	90.3	9.7		0.1758	SP-SM	A-3(0)
514+25.9 LT 18.8	MB-1	T-4	188.5	17.8	28	14	14	0.0	37.1	62.9		---	CL	A-6(6)
514+25.9 LT 18.8	MB-1	SS-40	193.5	21.0	46	16	30	0.0	8.3	91.7		---	CL	A-7-6(29)
514+25.9 LT 18.8	MB-1	SS-42	208.5	17.0	39	15	24	0.0	11.3	88.7		---	CL	A-6(21)
514+25.9 LT 18.8	MB-1	SS-45	238.5	25.3	NP	NP	NP	0.0	72.0	28.0		0.1152	SM	A-2-4(0)
514+25.9 LT 18.8	MB-1	SS-50	288.5	21.1	NP	NP	NP	2.4	86.7	10.9		0.2976	SP-SM	A-2-4(0)
527+75.9 LT 22.0	MB-2	SS-3	6.0	18.7	NP	NP	NP	2.1	94.1	3.8		0.4165	SP	A-3(0)
527+75.9 LT 22.0	MB-2	SS-8	28.5	22.7	NP	NP	NP	0.1	92.3	7.6		0.289	SP-SM	A-3(0)
527+75.9 LT 22.0	MB-2	SS-14	37.5	28.4	NP	NP	NP	0.0	89.9	10.1		0.274	SP-SM	A-3(0)
527+75.9 LT 22.0	MB-2	SS-22	49.5	23.2	NP	NP	NP	5.3	88.7	6.0		0.3947	SP-SM	A-3(0)
527+75.9 LT 22.0	MB-2	SS-26	55.5	29.4	NP	NP	NP	0.3	95.9	3.8		0.3456	SP	A-3(0)
527+75.9 LT 22.0	MB-2	SS-30	68.5	25.3	NP	NP	NP	0.0	95.1	4.9		0.3281	SP	A-3(0)

 <p>thompson ENGINEERING</p>	Soil Classification Summary	
	Alabama Department of Transportation	
	ALDOT PE Project No.: DPI-0030(005)	
	Project Name: Mobile River Bridge - Main Span Unit Thompson Project No.: 17-1101-0145 Mobile, Mobile County, Alabama	

Station & Offset	Boring No.	Sample ID	Depth (ft)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Gravel	% Sand	% Pass 200 (if hydrometer data available)		D50 (mm)	USCS	AASHTO Classification
										% Silt	% Clay			
527+75.9 LT 22.0	MB-2	SS-32	78.5	22.3	NP	NP	NP	1.4	91.8	6.8		0.3907	SP-SM	A-3(0)
527+75.9 LT 22.0	MB-2	SS-35	93.5	37.7	NP	NP	NP	0.0	8.1	29.1	62.8	0.0011	ML	A-4(0)
527+75.9 LT 22.0	MB-2	SS-36	98.5	25.9	NP	NP	NP	0.0	87.7	12.3		0.2101	SM	A-2-4(0)
527+75.9 LT 22.0	MB-2	SS-38	108.5	29.5	NP	NP	NP	0.0	93.1	6.9		0.2576	SP-SM	A-3(0)
527+75.9 LT 22.0	MB-2	SS-40	118.5	26.6	NP	NP	NP	0.0	89.3	10.7		0.1889	SP-SM	A-2-4(0)
527+75.9 LT 22.0	MB-2	SS-44	138.5	27.1	NP	NP	NP	0.0	33.5	50.8	15.7	0.0533	ML	A-4(0)
527+75.9 LT 22.0	MB-2	T-2	140.0	23.8	29	18	11	0.0	28.4	52.2	19.4	0.0416	CL	A-6(6)
527+75.9 LT 22.0	MB-2	T-3	145.0	21.0	23	18	5	0.0	18.3	57.8	23.9	0.0371	CL-ML	A-4(2)
527+75.9 LT 22.0	MB-2	SS-46	148.5	22.6	26	14	12	0.0	21.1	52.6	26.3	0.0251	CL	A-6(7)
527+75.9 LT 22.0	MB-2	SS-48	158.5	22.7	NP	NP	NP	0.0	82.4	17.6		0.4834	SM	A-1-b(0)
527+75.9 LT 22.0	MB-2	SS-50	168.5	29.9	28	15	13	0.0	44.1	38.3	17.6	0.0613	CL	A-6(4)
527+75.9 LT 22.0	MB-2	SS-52	178.5	28.5	NP	NP	NP	0.6	74.9	24.5		0.1107	SM	A-2-4(0)
527+75.9 LT 22.0	MB-2	SS-54	188.5	17.6	32	16	16	0.0	21.9	58.4	19.7	0.0296	CL	A-6(11)
527+75.9 LT 22.0	MB-2	T-4	190.0	42.2	35	14	21	0.0	32.6	39.8	27.6	0.0413	CL	A-6(11)
527+75.9 LT 22.0	MB-2	SS-56	198.5	23.0	26	15	11	0.0	24.2	56.6	19.2	0.0396	CL	A-6(6)
527+75.9 LT 22.0	MB-2	T-5	210.0	14.4	33	13	20	0.0	30.8	30.1	39.1	0.0167	CL	A-6(11)
527+75.9 LT 22.0	MB-2	SS-58	218.5	17.2	36	15	21	0.0	5.9	53.0	41.1	0.0099	CL	A-6(19)
527+75.9 LT 22.0	MB-2	ST-6	228.5	26.2	29	23	6	0.0	27.2	61.5	11.3	0.0529	ML	A-4(3)
527+75.9 LT 22.0	MB-2	SS-60	238.5	23.1	NP	NP	NP	0.0	72.3	27.7		0.1176	SM	A-2-4(0)
527+75.9 LT 22.0	MB-2	SS-62	258.5	21.7	29	16	13	0.0	19.8	60.0	20.2	0.0341	CL	A-6(8)
527+75.9 LT 22.0	MB-2	T-7	270.0	19.6	NP	NP	NP	0.0	54.4	34.3	11.3	0.0865	SM	A-4(0)
527+75.9 LT 22.0	MB-2	SS-64	278.5	25.3	NP	NP	NP	0.0	83.5	16.5		0.2302	SM	A-2-4(0)
527+75.9 LT 22.0	MB-2	SS-66	298.5	23.4	NP	NP	NP	0.0	77.8	22.2		0.2083	SM	A-2-4(0)
528+88.0 RT 32.9	MB-2A	SS-5	6.0	73.4	33	18	15	3.0	42.4	54.6		---	CL	A-6(5)
528+88.0 RT 32.9	MB-2A	SS-8	18.5	26.4	NP	NP	NP	0.0	83.2	16.8		0.2754	SM	A-2-4(0)
528+88.0 RT 32.9	MB-2A	SS-14	48.5	21.7	NP	NP	NP	1.4	97.1	1.5		0.5527	SP	A-1-b(0)
528+88.0 RT 32.9	MB-2A	SS-20	78.5	21.2	NP	NP	NP	1.0	96.7	2.3		0.3799	SP	A-3(0)

	Soil Classification Summary
	Alabama Department of Transportation
	ALDOT PE Project No.: DPI-0030(005) Project Name: Mobile River Bridge - Main Span Unit Thompson Project No.: 17-1101-0145
	Mobile, Mobile County, 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 Classification
										% Silt	% Clay (if hydrometer data available)			
528+88.0 RT 32.9	MB-2A	SS-21	83.5	37.5	87	29	58	1.2	20.1	78.7	---	CH	A-7-6(50)	
528+88.0 RT 32.9	MB-2A	T-2	93.5	25.7	45	18	27	0.0	43.6	56.4	---	CL	A-7-6(12)	
528+88.0 RT 32.9	MB-2A	SS-22	98.5	23.6	NP	NP	NP	0.0	93.0	7.0	0.2772	SP-SM	A-3(0)	
528+88.0 RT 32.9	MB-2A	SS-25	113.5	10.7	NP	NP	NP	35.9	60.3	3.8	1.5827	SP	A-1-b(0)	
528+88.0 RT 32.9	MB-2A	T-3	123.0	26.0	35	17	18	0.0	2.3	97.7	---	CL	A-6(18)	
528+88.0 RT 32.9	MB-2A	SS-28	138.5	23.0	77	20	57	0.3	7.1	92.6	---	CH	A-7-6(59)	
528+88.0 RT 32.9	MB-2A	T-5	143.0	47.7	51	16	35	0.0	4.9	95.1	---	CH	A-7-6(35)	
528+88.0 RT 32.9	MB-2A	SS-29	153.5	30.4	NP	NP	NP	6.6	77.2	16.2	0.1764	SM	A-2-4(0)	
528+88.0 RT 32.9	MB-2A	T-6	158.0	26.7	NP	NP	NP	0.6	92.0	7.4	0.1564	SP-SM	A-3(0)	
528+88.0 RT 32.9	MB-2A	SS-30	168.5	18.6	33	15	18	0.0	44.4	55.6	---	CL	A-6(7)	
528+88.0 RT 32.9	MB-2A	T-8	198.0	31.2	39	14	25	0.0	25.8	74.2	---	CL	A-6(16)	
528+88.0 RT 32.9	MB-2A	SS-33	208.5	22.1	33	18	15	0.0	5.2	94.8	---	CL	A-6(14)	
528+88.0 RT 32.9	MB-2A	SS-34	218.0	24.8	39	18	21	0.0	10.6	89.4	---	CL	A-6(19)	
528+88.0 RT 32.9	MB-2A	SS-36	238.5	24.4	NP	NP	NP	0.0	58.2	41.8	0.0873	SM	A-4(0)	
528+88.0 RT 32.9	MB-2A	SS-37	248.5	22.1	25	14	11	0.2	30.2	69.6	---	CL	A-6(5)	
528+88.0 RT 32.9	MB-2A	SS-38	268.5	22.5	NP	NP	NP	0.0	90.3	9.7	0.184	SP-SM	A-3(0)	
528+88.0 RT 32.9	MB-2A	SS-39	278.5	22.0	NP	NP	NP	0.0	86.9	13.1	0.2985	SM	A-2-4(0)	
528+88.0 RT 32.9	MB-2A	SS-41	298.5	24.6	NP	NP	NP	0.0	36.2	63.8	---	ML	A-4(0)	
528+88.0 RT 32.9	MB-2A	SS-42	308.5	17.0	49	12	37	0.0	29.4	70.6	---	CL	A-7-6(24)	
528+88.0 RT 32.9	MB-2A	SS-43	318.5	35.6	45	14	31	0.0	23.8	76.2	---	CL	A-7-6(22)	

	Soil Classification Summary
	Alabama Department of Transportation
	ALDOT PE Project No.: DPI-0030(005) Project Name: Mobile River Bridge - Main Span Unit Thompson Project No.: 17-1101-0145 Mobile, Mobile County, Alabama



BMT-5

Client: Alabama Department of Transportation
 Project: Mobile River Bridge - Main Span Unit
 ALDOT PE Project No.: DPI-0030(005)

Project No.: 17-1101-0145
 Region: Southwest Region
 Date: 9/29/2017

**ALABAMA DEPARTMENT OF TRANSPORTATION
 SOILS AND BASE COURSE ANALYSIS**

Boring No.		MB-1	MB-1	MB-1	MB-1	MB-1	MB-1
Station		514+25.9	514+25.9	514+25.9	514+25.9	514+25.9	514+25.9
Offset		LT 18.8	LT 18.8	LT 18.8	LT 18.8	LT 18.8	LT 18.8
Sample ID		SS-2	SS-7	SS-8	SS-11	SS-13	SS-14
Depth (ft)		1.5	13.5	18.5	33.5	43.5	48.5
TOTAL PASSING (%)							
3"	SIEVE (75mm)	---	---	---	---	---	---
2 1/2"	" (63mm)	---	---	---	---	---	---
2"	" (50mm)	---	---	---	---	---	---
1 1/2"	" (37.5mm)	---	---	---	---	---	---
1"	" (25mm)	---	---	100.0	---	---	---
3/4"	" (19mm)	100.0	100.0	89.2	100.0	---	100.0
1/2"	" (12.5mm)	92.3	89.8	78.8	90.6	100.0	79.9
3/8"	" (9.5mm)	87.9	78.6	69.3	86.2	98.1	60.8
#4	" (4.75mm)	80.1	49.9	61.6	83.4	96.1	44.4
#10	" (2.00mm)	71.6	33.2	55.8	81.9	95.2	36.0
#20	" (0.85mm)	66.3	28.4	51.3	80.2	90.0	30.5
#40	" (425um)	59.5	25.0	48.8	73.9	42.5	19.2
#60	" (250um)	46.0	20.4	25.2	26.0	7.3	8.5
#100	" (150um)	28.4	14.9	9.1	5.8	3.0	4.2
#140	" (106um)	21.7	12.6	6.3	4.2	2.5	3.5
#200	" (75um)	17.6	10.9	4.7	3.4	2.1	3.1
Clay		6.2	2.5	1.5	3.4	2.1	3.1
Silt		11.3	8.4	3.2			
Total Sand		62.6	39.0	56.9	80.0	94.0	41.3
Total Gravel		19.9	50.1	38.4	16.6	3.9	55.6
ATTERBERG LIMITS							
Liquid Limit		NP	NP	NP	NP	NP	NP
Plastic Limit		NP	NP	NP	NP	NP	NP
Plasticity Index		NP	NP	NP	NP	NP	NP
USCS		SM	GP-GM	SP	SP	SP	GP
AASHTO		A-2-4(0)	A-1-a(0)	A-1-b(0)	A-3(0)	A-1-b(0)	A-1-a(0)



BMT-5

Client: Alabama Department of Transportation
 Project: Mobile River Bridge - Main Span Unit
 ALDOT PE Project No.: DPI-0030(005)

Project No.: 17-1101-0145
 Region: Southwest Region
 Date: 9/29/2017

**ALABAMA DEPARTMENT OF TRANSPORTATION
 SOILS AND BASE COURSE ANALYSIS**

Boring No.		MB-1	MB-1	MB-1	MB-1	MB-1	MB-1
Station		514+25.9	514+25.9	514+25.9	514+25.9	514+25.9	514+25.9
Offset		LT 18.8	LT 18.8	LT 18.8	LT 18.8	LT 18.8	LT 18.8
Sample ID		SS-17	T-1	T-2	SS-24	SS-26	SS-29
Depth (ft)		63.5	90.5	98.5	103.5	113.5	128.5
TOTAL PASSING (%)							
3"	SIEVE (75mm)	---	---	---	---	---	---
2 1/2"	" (63mm)	---	---	---	---	---	---
2"	" (50mm)	---	---	---	---	---	---
1 1/2"	" (37.5mm)	---	---	---	---	---	---
1"	" (25mm)	---	---	---	---	---	---
3/4"	" (19mm)	---	---	---	---	---	---
1/2"	" (12.5mm)	100.0	---	---	---	100.0	---
3/8"	" (9.5mm)	98.9	---	---	---	95.0	100.0
#4	" (4.75mm)	90.3	---	---	100.0	91.1	99.8
#10	" (2.00mm)	85.3	---	100.0	99.7	63.5	99.3
#20	" (0.85mm)	77.1	100.0	100.0	98.5	53.9	98.9
#40	" (425um)	53.1	99.9	99.9	91.5	33.7	98.6
#60	" (250um)	18.0	98.5	99.7	77.2	10.8	98.3
#100	" (150um)	9.9	83.3	99.5	48.3	4.4	97.9
#140	" (106um)	9.1	79.6	99.4	33.8	3.6	97.3
#200	" (75um)	8.6	75.7	99.4	26.7	3.3	95.0
Clay		8.6	36.3	79.3	26.7	3.3	95.0
Silt			39.4	20.0			
Total Sand		81.7	24.3	0.7	73.3	87.8	4.8
Total Gravel		9.7	0.0	0.0	0.0	8.9	0.2
ATTERBERG LIMITS							
Liquid Limit		NP	52	89	21	NP	53
Plastic Limit		NP	22	28	17	NP	21
Plasticity Index		NP	30	61	4	NP	32
USCS		SP-SM	CH	CH	SC-SM	SP	CH
AASHTO		A-3(0)	A-7-6(23)	A-7-6(71)	A-2-4(0)	A-1-b(0)	A-7-6(34)



BMT-5

Client: Alabama Department of Transportation
 Project: Mobile River Bridge - Main Span Unit
 ALDOT PE Project No.: DPI-0030(005)

Project No.: 17-1101-0145
 Region: Southwest Region
 Date: 9/29/2017

**ALABAMA DEPARTMENT OF TRANSPORTATION
 SOILS AND BASE COURSE ANALYSIS**

Boring No.		MB-1	MB-1	MB-1	MB-1	MB-1	MB-1
Station		514+25.9	514+25.9	514+25.9	514+25.9	514+25.9	514+25.9
Offset		LT 18.8	LT 18.8	LT 18.8	LT 18.8	LT 18.8	LT 18.8
Sample ID		SS-33	SS-35	SS-36	SS-39	T-4	SS-40
Depth (ft)		148.5	163.5	168.5	183.5	188.5	193.5
TOTAL PASSING (%)							
3"	SIEVE (75mm)	---	---	---	---	---	---
2 1/2"	" (63mm)	---	---	---	---	---	---
2"	" (50mm)	---	---	---	---	---	---
1 1/2"	" (37.5mm)	---	---	---	---	---	---
1"	" (25mm)	---	---	---	---	---	---
3/4"	" (19mm)	---	100.0	---	---	---	---
1/2"	" (12.5mm)	---	96.4	---	---	---	---
3/8"	" (9.5mm)	---	96.4	---	---	---	---
#4	" (4.75mm)	---	96.4	100.0	100.0	---	---
#10	" (2.00mm)	100.0	96.2	99.5	100.0	100.0	100.0
#20	" (0.85mm)	99.9	96.0	98.3	99.8	99.8	99.9
#40	" (425um)	96.4	95.4	92.9	98.2	99.4	99.5
#60	" (250um)	68.4	80.4	77.4	85.5	96.5	98.5
#100	" (150um)	26.6	46.4	57.9	34.0	89.1	96.7
#140	" (106um)	15.7	22.0	51.5	16.6	78.1	94.3
#200	" (75um)	10.5	11.5	48.4	9.7	62.9	91.7
Clay		10.5	11.5	48.4	9.7	62.9	91.7
Silt							
Total Sand		89.5	84.9	51.6	90.3	37.1	8.3
Total Gravel		0.0	3.6	0.0	0.0	0.0	0.0
ATTERBERG LIMITS							
Liquid Limit		NP	NP	36	NP	28	46
Plastic Limit		NP	NP	13	NP	14	16
Plasticity Index		NP	NP	23	NP	14	30
USCS		SP-SM	SP-SM	SC	SP-SM	CL	CL
AASHTO		A-2-4(0)	A-2-4(0)	A-6(7)	A-3(0)	A-6(6)	A-7-6(29)



BMT-5

Client: Alabama Department of Transportation
 Project: Mobile River Bridge - Main Span Unit
 ALDOT PE Project No.: DPI-0030(005)

Project No.: 17-1101-0145
 Region: Southwest Region
 Date: 9/29/2017

**ALABAMA DEPARTMENT OF TRANSPORTATION
 SOILS AND BASE COURSE ANALYSIS**

Boring No.		MB-1	MB-1	MB-1	MB-2	MB-2	MB-2
Station		514+25.9	514+25.9	514+25.9	527+75.9	527+75.9	527+75.9
Offset		LT 18.8	LT 18.8	LT 18.8	LT 22.0	LT 22.0	LT 22.0
Sample ID		SS-42	SS-45	SS-50	SS-3	SS-8	SS-14
Depth (ft)		208.5	238.5	288.5	6.0	28.5	37.5
TOTAL PASSING (%)							
3"	SIEVE (75mm)	---	---	---	---	---	---
2 1/2"	" (63mm)	---	---	---	---	---	---
2"	" (50mm)	---	---	---	---	---	---
1 1/2"	" (37.5mm)	---	---	---	---	---	---
1"	" (25mm)	---	---	---	---	---	---
3/4"	" (19mm)	---	---	---	---	---	---
1/2"	" (12.5mm)	---	---	---	---	---	---
3/8"	" (9.5mm)	---	---	100.0	100.0	100.0	---
#4	" (4.75mm)	100.0	---	97.6	97.9	99.9	100.0
#10	" (2.00mm)	100.0	100.0	97.6	89.5	99.2	99.8
#20	" (0.85mm)	99.9	99.9	97.1	76.8	95.5	97.9
#40	" (425um)	99.5	99.0	89.6	51.4	77.9	85.1
#60	" (250um)	98.6	90.5	30.6	15.7	39.5	42.7
#100	" (150um)	97.5	65.2	17.6	5.2	11.4	16.9
#140	" (106um)	95.1	45.2	13.6	4.2	8.6	12.3
#200	" (75um)	88.7	28.0	10.9	3.8	7.6	10.1
Clay		88.7	28.0	10.9	3.8	7.6	10.1
Silt							
Total Sand		11.3	72.0	86.7	94.1	92.3	89.9
Total Gravel		0.0	0.0	2.4	2.1	0.1	0.0
ATTERBERG LIMITS							
Liquid Limit		39	NP	NP	NP	NP	NP
Plastic Limit		15	NP	NP	NP	NP	NP
Plasticity Index		24	NP	NP	NP	NP	NP
USCS		CL	SM	SP-SM	SP	SP-SM	SP-SM
AASHTO		A-6(21)	A-2-4(0)	A-2-4(0)	A-3(0)	A-3(0)	A-3(0)



BMT-5

Client: Alabama Department of Transportation
 Project: Mobile River Bridge - Main Span Unit
 ALDOT PE Project No.: DPI-0030(005)

Project No.: 17-1101-0145
 Region: Southwest Region
 Date: 9/29/2017

**ALABAMA DEPARTMENT OF TRANSPORTATION
 SOILS AND BASE COURSE ANALYSIS**

Boring No.		MB-2	MB-2	MB-2	MB-2	MB-2	MB-2
Station		527+75.9	527+75.9	527+75.9	527+75.9	527+75.9	527+75.9
Offset		LT 22.0	LT 22.0	LT 22.0	LT 22.0	LT 22.0	LT 22.0
Sample ID		SS-22	SS-26	SS-30	SS-32	SS-35	SS-36
Depth (ft)		49.5	55.5	68.5	78.5	93.5	98.5
TOTAL PASSING (%)							
3"	SIEVE (75mm)	---	---	---	---	---	---
2 1/2"	" (63mm)	---	---	---	---	---	---
2"	" (50mm)	---	---	---	---	---	---
1 1/2"	" (37.5mm)	---	---	---	---	---	---
1"	" (25mm)	---	---	---	---	---	---
3/4"	" (19mm)	---	---	---	---	---	---
1/2"	" (12.5mm)	100.0	---	---	---	---	---
3/8"	" (9.5mm)	98.9	100.0	---	100.0	---	---
#4	" (4.75mm)	94.7	99.7	100.0	98.6	---	100.0
#10	" (2.00mm)	90.6	99.5	100.0	95.9	100.0	99.9
#20	" (0.85mm)	85.8	98.4	98.7	89.9	98.0	99.7
#40	" (425um)	55.5	83.4	82.7	56.4	97.1	98.5
#60	" (250um)	16.1		15.6	15.9	95.7	63.8
#100	" (150um)	7.3	5.7	6.4	9.2	93.6	23.2
#140	" (106um)	6.5	4.3	5.5	7.8	92.4	16.5
#200	" (75um)	6.0	3.8	4.9	6.8	91.9	12.3
Clay		6.0	3.8	4.9	6.8	62.8	12.3
Silt						29.1	
Total Sand		88.7	95.9	95.1	91.8	8.1	87.7
Total Gravel		5.3	0.3	0.0	1.4	0.0	0.0
ATTERBERG LIMITS							
Liquid Limit		NP	NP	NP	NP	NP	NP
Plastic Limit		NP	NP	NP	NP	NP	NP
Plasticity Index		NP	NP	NP	NP	NP	NP
USCS		SP-SM	SP	SP	SP-SM	ML	SM
AASHTO		A-3(0)	A-3(0)	A-3(0)	A-3(0)	A-4(0)	A-2-4(0)



BMT-5

Client: Alabama Department of Transportation
 Project: Mobile River Bridge - Main Span Unit
 ALDOT PE Project No.: DPI-0030(005)

Project No.: 17-1101-0145
 Region: Southwest Region
 Date: 9/29/2017

**ALABAMA DEPARTMENT OF TRANSPORTATION
 SOILS AND BASE COURSE ANALYSIS**

Boring No.		MB-2	MB-2	MB-2	MB-2	MB-2	MB-2
Station		527+75.9	527+75.9	527+75.9	527+75.9	527+75.9	527+75.9
Offset		LT 22.0	LT 22.0	LT 22.0	LT 22.0	LT 22.0	LT 22.0
Sample ID		SS-38	SS-40	SS-44	T-2	T-3	SS-46
Depth (ft)		108.5	118.5	138.5	140.0	145.0	148.5
TOTAL PASSING (%)							
3"	SIEVE (75mm)	---	---	---	---	---	---
2 1/2"	" (63mm)	---	---	---	---	---	---
2"	" (50mm)	---	---	---	---	---	---
1 1/2"	" (37.5mm)	---	---	---	---	---	---
1"	" (25mm)	---	---	---	---	---	---
3/4"	" (19mm)	---	---	---	---	---	---
1/2"	" (12.5mm)	---	---	---	---	---	---
3/8"	" (9.5mm)	---	---	---	---	---	---
#4	" (4.75mm)	---	---	---	---	---	---
#10	" (2.00mm)	100.0	100.0	---	100.0	100.0	100.0
#20	" (0.85mm)	99.9	99.8	100.0	99.7	99.8	100.0
#40	" (425um)	98.0	98.4	99.7	98.5	99.8	99.8
#60	" (250um)	47.1	75.3	99.2	95.3	99.7	99.5
#100	" (150um)	16.5	29.2	98.3	91.2	97.0	95.7
#140	" (106um)	9.4	16.7	89.5	84.8	89.9	87.3
#200	" (75um)	6.9	10.7	66.5	71.6	81.6	78.9
Clay		6.9	10.7	15.7	19.4	23.9	26.3
Silt				50.8	52.2	57.8	52.6
Total Sand		93.1	89.3	33.5	28.4	18.3	21.1
Total Gravel		0.0	0.0	0.0	0.0	0.0	0.0
ATTERBERG LIMITS							
Liquid Limit		NP	NP	NP	29	23	26
Plastic Limit		NP	NP	NP	18	18	14
Plasticity Index		NP	NP	NP	11	5	12
USCS		SP-SM	SP-SM	ML	CL	CL-ML	CL
AASHTO		A-3(0)	A-2-4(0)	A-4(0)	A-6(6)	A-4(2)	A-6(7)



BMT-5

Client: Alabama Department of Transportation
 Project: Mobile River Bridge - Main Span Unit
 ALDOT PE Project No.: DPI-0030(005)

Project No.: 17-1101-0145
 Region: Southwest Region
 Date: 9/29/2017

**ALABAMA DEPARTMENT OF TRANSPORTATION
 SOILS AND BASE COURSE ANALYSIS**

Boring No.		MB-2	MB-2	MB-2	MB-2	MB-2	MB-2
Station		527+75.9	527+75.9	527+75.9	527+75.9	527+75.9	527+75.9
Offset		LT 22.0	LT 22.0	LT 22.0	LT 22.0	LT 22.0	LT 22.0
Sample ID		SS-48	SS-50	SS-52	SS-54	T-4	SS-56
Depth (ft)		158.5	168.5	178.5	188.5	190.0	198.5
TOTAL PASSING (%)							
3"	SIEVE (75mm)	---	---	---	---	---	---
2 1/2"	" (63mm)	---	---	---	---	---	---
2"	" (50mm)	---	---	---	---	---	---
1 1/2"	" (37.5mm)	---	---	---	---	---	---
1"	" (25mm)	---	---	---	---	---	---
3/4"	" (19mm)	---	---	---	---	---	---
1/2"	" (12.5mm)	---	---	---	---	---	---
3/8"	" (9.5mm)	---	---	100.0	---	---	---
#4	" (4.75mm)	100.0	---	99.4	---	---	---
#10	" (2.00mm)	99.8	100.0	99.3	100.0	100.0	100.0
#20	" (0.85mm)	99.5	99.8	99.1	99.7	98.7	100.0
#40	" (425um)	38.7	99.6	98.9	97.2	93.3	99.7
#60	" (250um)	18.5	99.2	98.2	94.0	86.8	97.0
#100	" (150um)	18.0	92.0	84.7	91.0	80.9	92.2
#140	" (106um)	17.8	72.9	45.0	85.6	74.4	84.8
#200	" (75um)	17.6	56.0	24.5	78.1	67.4	75.8
Clay		17.6	17.6	24.5	19.7	27.6	19.2
Silt			38.3		58.4	39.8	56.6
Total Sand		82.4	44.1	74.9	21.9	32.6	24.2
Total Gravel		0.0	0.0	0.6	0.0	0.0	0.0
ATTERBERG LIMITS							
Liquid Limit		NP	28	NP	32	35	26
Plastic Limit		NP	15	NP	16	14	15
Plasticity Index		NP	13	NP	16	21	11
USCS		SM	CL	SM	CL	CL	CL
AASHTO		A-1-b(0)	A-6(4)	A-2-4(0)	A-6(11)	A-6(11)	A-6(6)



BMT-5

Client: Alabama Department of Transportation
 Project: Mobile River Bridge - Main Span Unit
 ALDOT PE Project No.: DPI-0030(005)

Project No.: 17-1101-0145
 Region: Southwest Region
 Date: 9/29/2017

**ALABAMA DEPARTMENT OF TRANSPORTATION
 SOILS AND BASE COURSE ANALYSIS**

Boring No.		MB-2	MB-2	MB-2	MB-2	MB-2	MB-2
Station		527+75.9	527+75.9	527+75.9	527+75.9	527+75.9	527+75.9
Offset		LT 22.0	LT 22.0	LT 22.0	LT 22.0	LT 22.0	LT 22.0
Sample ID		T-5	SS-58	T-6	SS-60	SS-62	T-7
Depth (ft)		210.0	218.5	228.5	238.5	258.5	270.0
TOTAL PASSING (%)							
3"	SIEVE (75mm)	---	---	---	---	---	---
2 1/2"	" (63mm)	---	---	---	---	---	---
2"	" (50mm)	---	---	---	---	---	---
1 1/2"	" (37.5mm)	---	---	---	---	---	---
1"	" (25mm)	---	---	---	---	---	---
3/4"	" (19mm)	---	---	---	---	---	---
1/2"	" (12.5mm)	---	---	---	---	---	---
3/8"	" (9.5mm)	---	---	---	---	---	---
#4	" (4.75mm)	---	---	---	---	---	---
#10	" (2.00mm)	100.0	100.0	100.0	100.0	100.0	---
#20	" (0.85mm)	95.9	99.6	99.3	99.9	99.1	100.0
#40	" (425um)	94.1	99.2	99.1	99.2	98.0	98.9
#60	" (250um)	91.4	98.6	96.6	90.9	92.6	80.9
#100	" (150um)	82.9	96.8	88.7	65.1	89.2	64.3
#140	" (106um)	75.3	95.8	82.3	43.5	85.8	56.3
#200	" (75um)	69.2	94.2	72.8	27.7	80.1	45.6
Clay		39.1	41.1	11.3	27.7	20.2	11.3
Silt		30.1	53.0	61.5		60.0	34.3
Total Sand		30.8	5.9	27.2	72.3	19.8	54.4
Total Gravel		0.0	0.0	0.0	0.0	0.0	0.0
ATTERBERG LIMITS							
Liquid Limit		33	36	29	NP	29	NP
Plastic Limit		13	15	23	NP	16	NP
Plasticity Index		20	21	6	NP	13	NP
USCS		CL	CL	ML	SM	CL	SM
AASHTO		A-6(11)	A-6(19)	A-4(3)	A-2-4(0)	A-6(8)	A-4(0)



BMT-5

Client: Alabama Department of Transportation
 Project: Mobile River Bridge - Main Span Unit
 ALDOT PE Project No.: DPI-0030(005)

Project No.: 17-1101-0145
 Region: Southwest Region
 Date: 9/29/2017

**ALABAMA DEPARTMENT OF TRANSPORTATION
 SOILS AND BASE COURSE ANALYSIS**

Boring No.		MB-2	MB-2	MB-2A	MB-2A	MB-2A	MB-2A
Station		527+75.9	527+75.9	528+88.0	528+88.0	528+88.0	528+88.0
Offset		LT 22.0	LT 22.0	RT 32.9	RT 32.9	RT 32.9	RT 32.9
Sample ID		SS-64	SS-66	SS-5	SS-8	SS-14	SS-20
Depth (ft)		278.5	298.5	6.0	18.5	48.5	78.5
TOTAL PASSING (%)							
3"	SIEVE (75mm)	---	---	---	---	---	---
2 1/2"	" (63mm)	---	---	---	---	---	---
2"	" (50mm)	---	---	---	---	---	---
1 1/2"	" (37.5mm)	---	---	---	---	---	---
1"	" (25mm)	---	---	---	---	---	---
3/4"	" (19mm)	---	---	---	---	---	---
1/2"	" (12.5mm)	---	---	100.0	---	---	---
3/8"	" (9.5mm)	---	---	99.4	---	100.0	100.0
#4	" (4.75mm)	---	100.0	97.0	100.0	98.6	99.0
#10	" (2.00mm)	100.0	99.8	93.8	98.7	97.9	96.2
#20	" (0.85mm)	99.9	98.9	91.9	95.1	93.3	87.7
#40	" (425um)	98.9	92.9	87.1	79.2	23.6	59.9
#60	" (250um)	55.5	60.2	73.7	43.5	4.7	12.9
#100	" (150um)	21.2	31.6	61.6	19.0	2.2	3.6
#140	" (106um)	18.1	26.1	57.9	17.3	1.8	2.7
#200	" (75um)	16.5	22.2	54.6	16.8	1.5	2.3
Clay		16.5	22.2	54.6	16.8	1.5	2.3
Silt							
Total Sand		83.5	77.8	42.4	83.2	97.1	96.7
Total Gravel		0.0	0.0	3.0	0.0	1.4	1.0
ATTERBERG LIMITS							
Liquid Limit		NP	NP	33	NP	NP	NP
Plastic Limit		NP	NP	18	NP	NP	NP
Plasticity Index		NP	NP	15	NP	NP	NP
USCS		SM	SM	CL	SM	SP	SP
AASHTO		A-2-4(0)	A-2-4(0)	A-6(5)	A-2-4(0)	A-1-b(0)	A-3(0)



BMT-5

Client: Alabama Department of Transportation
 Project: Mobile River Bridge - Main Span Unit
 ALDOT PE Project No.: DPI-0030(005)

Project No.: 17-1101-0145
 Region: Southwest Region
 Date: 9/29/2017

**ALABAMA DEPARTMENT OF TRANSPORTATION
 SOILS AND BASE COURSE ANALYSIS**

Boring No.		MB-2A	MB-2A	MB-2A	MB-2A	MB-2A	MB-2A
Station		528+88.0	528+88.0	528+88.0	528+88.0	528+88.0	528+88.0
Offset		RT 32.9	RT 32.9	RT 32.9	RT 32.9	RT 32.9	RT 32.9
Sample ID		SS-21	T-2	SS-22	SS-25	T-3	SS-28
Depth (ft)		83.5	93.5	98.5	113.5	123.0	138.5
TOTAL PASSING (%)							
3"	SIEVE (75mm)	---	---	---	---	---	---
2 1/2"	" (63mm)	---	---	---	---	---	---
2"	" (50mm)	---	---	---	---	---	---
1 1/2"	" (37.5mm)	---	---	---	---	---	---
1"	" (25mm)	---	---	---	---	---	---
3/4"	" (19mm)	---	---	---	100.0	---	---
1/2"	" (12.5mm)	---	---	---	91.9	---	---
3/8"	" (9.5mm)	100.0	---	---	87.3	---	100.0
#4	" (4.75mm)	98.8	100.0	100.0	64.1	100.0	99.7
#10	" (2.00mm)	97.6	97.5	99.8	53.3	99.8	99.7
#20	" (0.85mm)	94.3	91.1	98.9	41.1	99.7	99.3
#40	" (425um)	86.2	73.5	95.0	23.3	99.7	98.8
#60	" (250um)	80.8	61.9	39.2	10.3	99.6	98.0
#100	" (150um)	79.4	58.3	10.6	5.9	99.5	94.9
#140	" (106um)	79.1	57.3	8.0	4.7	99.3	93.7
#200	" (75um)	78.7	56.4	7.0	3.8	97.7	92.6
Clay		78.7	56.4	7.0	3.8	97.7	92.6
Silt							
Total Sand		20.1	43.6	93.0	60.3	2.3	7.1
Total Gravel		1.2	0.0	0.0	35.9	0.0	0.3
ATTERBERG LIMITS							
Liquid Limit		87	45	NP	NP	35	77
Plastic Limit		29	18	NP	NP	17	20
Plasticity Index		58	27	NP	NP	18	57
USCS		CH	CL	SP-SM	SP	CL	CH
AASHTO		A-7-6(50)	A-7-6(12)	A-3(0)	A-1-b(0)	A-6(18)	A-7-6(59)



BMT-5

Client: Alabama Department of Transportation
 Project: Mobile River Bridge - Main Span Unit
 ALDOT PE Project No.: DPI-0030(005)

Project No.: 17-1101-0145
 Region: Southwest Region
 Date: 9/29/2017

**ALABAMA DEPARTMENT OF TRANSPORTATION
 SOILS AND BASE COURSE ANALYSIS**

Boring No.		MB-2A	MB-2A	MB-2A	MB-2A	MB-2A	MB-2A
Station		528+88.0	528+88.0	528+88.0	528+88.0	528+88.0	528+88.0
Offset		RT 32.9	RT 32.9	RT 32.9	RT 32.9	RT 32.9	RT 32.9
Sample ID		T-5	SS-29	T-6	SS-30	T-8	SS-33
Depth (ft)		143.0	153.5	158.0	168.5	198.0	208.5
TOTAL PASSING (%)							
3"	SIEVE (75mm)	---	---	---	---	---	---
2 1/2"	" (63mm)	---	---	---	---	---	---
2"	" (50mm)	---	---	---	---	---	---
1 1/2"	" (37.5mm)	---	---	---	---	---	---
1"	" (25mm)	---	---	---	---	---	---
3/4"	" (19mm)	---	100.0	---	---	---	---
1/2"	" (12.5mm)	---	95.3	---	---	---	---
3/8"	" (9.5mm)	---	95.3	100.0	---	---	---
#4	" (4.75mm)	---	93.4	99.4	100.0	100.0	100.0
#10	" (2.00mm)	100.0	92.9	99.3	100.0	99.7	99.9
#20	" (0.85mm)	99.8	91.7	99.2	99.7	99.4	99.6
#40	" (425um)	99.3	89.4	98.9	99.4	98.1	99.4
#60	" (250um)	98.9	83.5	97.1	98.4	96.6	99.1
#100	" (150um)	98.5	34.4	45.8	90.0	89.9	98.3
#140	" (106um)	97.7	22.6	14.0	72.5	81.1	97.2
#200	" (75um)	95.1	16.2	7.4	55.6	74.2	94.8
Clay		95.1	16.2	7.4	55.6	74.2	94.8
Silt							
Total Sand		4.9	77.2	92.0	44.4	25.8	5.2
Total Gravel		0.0	6.6	0.6	0.0	0.0	0.0
ATTERBERG LIMITS							
Liquid Limit		51	NP	NP	33	39	33
Plastic Limit		16	NP	NP	15	14	18
Plasticity Index		35	NP	NP	18	25	15
USCS		CH	SM	SP-SM	CL	CL	CL
AASHTO		A-7-6(35)	A-2-4(0)	A-3(0)	A-6(7)	A-6(16)	A-6(14)



BMT-5

Client: Alabama Department of Transportation
 Project: Mobile River Bridge - Main Span Unit
 ALDOT PE Project No.: DPI-0030(005)

Project No.: 17-1101-0145
 Region: Southwest Region
 Date: 9/29/2017

**ALABAMA DEPARTMENT OF TRANSPORTATION
 SOILS AND BASE COURSE ANALYSIS**

Boring No.		MB-2A	MB-2A	MB-2A	MB-2A	MB-2A	MB-2A
Station		528+88.0	528+88.0	528+88.0	528+88.0	528+88.0	528+88.0
Offset		RT 32.9	RT 32.9	RT 32.9	RT 32.9	RT 32.9	RT 32.9
Sample ID		SS-34	SS-36	SS-37	SS-38	SS-39	SS-41
Depth (ft)		218.0	238.5	248.5	268.5	278.5	298.5
TOTAL PASSING (%)							
3"	SIEVE (75mm)	---	---	---	---	---	---
2 1/2"	" (63mm)	---	---	---	---	---	---
2"	" (50mm)	---	---	---	---	---	---
1 1/2"	" (37.5mm)	---	---	---	---	---	---
1"	" (25mm)	---	---	---	---	---	---
3/4"	" (19mm)	---	---	---	---	---	---
1/2"	" (12.5mm)	---	---	---	---	---	---
3/8"	" (9.5mm)	---	---	100.0	---	---	---
#4	" (4.75mm)	100.0	100.0	99.8	100.0	100.0	100.0
#10	" (2.00mm)	99.9	99.9	99.4	99.9	99.8	100.0
#20	" (0.85mm)	99.9	99.9	99.2	99.8	97.2	99.9
#40	" (425um)	99.8	99.4	98.7	99.6	76.2	99.7
#60	" (250um)	99.5	93.6	94.6	93.8	36.9	97.9
#100	" (150um)	98.4	77.4	86.4	20.7	18.0	91.8
#140	" (106um)	96.4	60.6	79.1	13.1	15.0	82.9
#200	" (75um)	89.4	41.8	69.6	9.7	13.1	63.8
Clay		89.4	41.8	69.6	9.7	13.1	63.8
Silt							
Total Sand		10.6	58.2	30.2	90.3	86.9	36.2
Total Gravel		0.0	0.0	0.2	0.0	0.0	0.0
ATTERBERG LIMITS							
Liquid Limit		39	NP	25	NP	NP	NP
Plastic Limit		18	NP	14	NP	NP	NP
Plasticity Index		21	NP	11	NP	NP	NP
USCS		CL	SM	CL	SP-SM	SM	ML
AASHTO		A-6(19)	A-4(0)	A-6(5)	A-3(0)	A-2-4(0)	A-4(0)



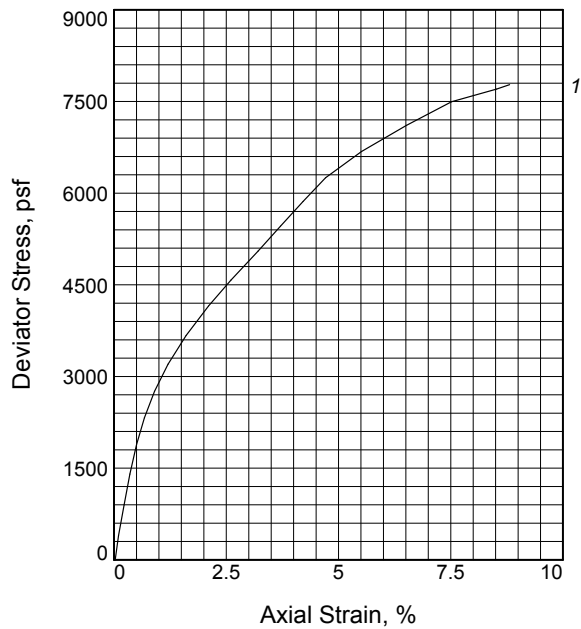
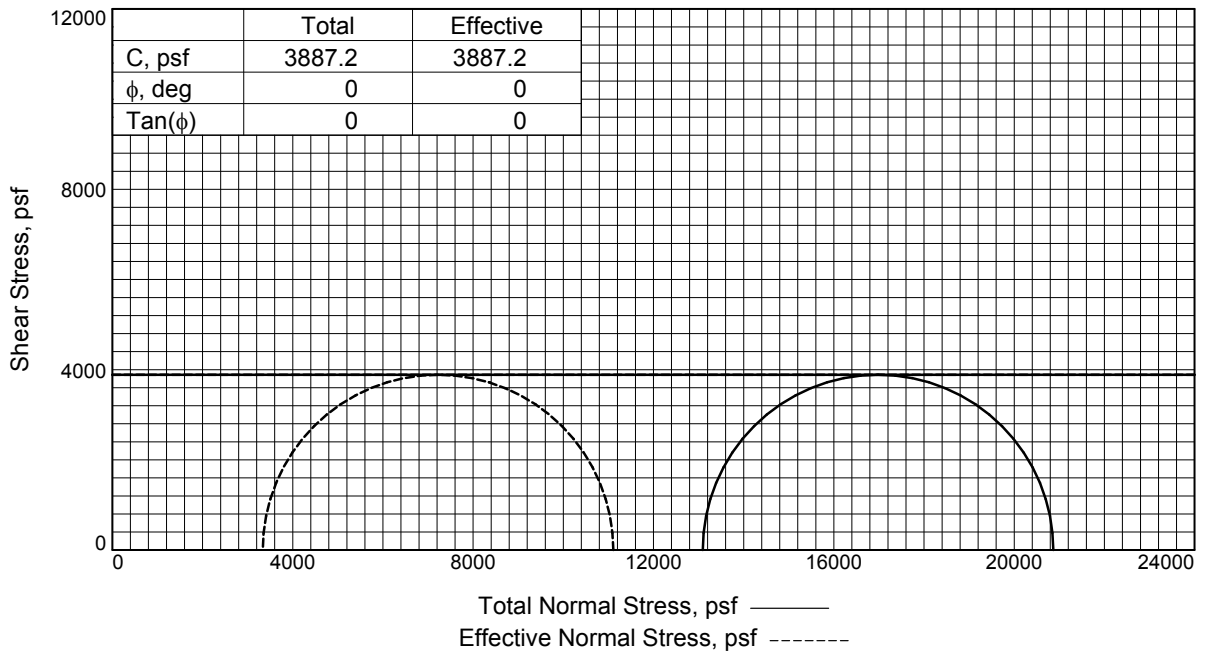
BMT-5

Client: Alabama Department of Transportation
 Project: Mobile River Bridge - Main Span Unit
 ALDOT PE Project No.: DPI-0030(005)

Project No.: 17-1101-0145
 Region: Southwest Region
 Date: 9/29/2017

**ALABAMA DEPARTMENT OF TRANSPORTATION
 SOILS AND BASE COURSE ANALYSIS**

Boring No.		MB-2A	MB-2A
Station		528+88.0	528+88.0
Offset		RT 32.9	RT 32.9
Sample ID		SS-42	SS-43
Depth (ft)		308.5	318.5
TOTAL PASSING (%)			
3"	SIEVE (75mm)	---	---
2 1/2"	" (63mm)	---	---
2"	" (50mm)	---	---
1 1/2"	" (37.5mm)	---	---
1"	" (25mm)	---	---
3/4"	" (19mm)	---	---
1/2"	" (12.5mm)	---	---
3/8"	" (9.5mm)	---	---
#4	" (4.75mm)	---	100.0
#10	" (2.00mm)	100.0	100.0
#20	" (0.85mm)	99.8	99.9
#40	" (425um)	99.3	99.6
#60	" (250um)	97.4	98.8
#100	" (150um)	91.2	94.8
#140	" (106um)	81.7	87.2
#200	" (75um)	70.6	76.2
Clay		70.6	76.2
Silt			
Total Sand		29.4	23.8
Total Gravel		0.0	0.0
ATTERBERG LIMITS			
Liquid Limit		49	45
Plastic Limit		12	14
Plasticity Index		37	31
USCS		CL	CL
AASHTO		A-7-6(24)	A-7-6(22)



Specimen No.	1	
Initial	Water Content, %	20.4
	Dry Density, pcf	109.4
	Saturation, %	105.0
	Void Ratio	0.5174
	Diameter, in.	2.838
At Test	Height, in.	5.460
	Water Content, %	19.5
	Dry Density, pcf	109.4
	Saturation, %	100.0
	Void Ratio	0.5174
Strain at peak, %		8.8
	Eff. Cell Pressure, psf	13092.5
Fail. Stress, psf		7774.5
	Excess Pore Pr., psf	9758.0
Strain, %		8.8
	Ult. Stress, psf	7774.5
Excess Pore Pr., psf		9758.0
	Strain, %	8.8
$\bar{\sigma}_1$ Failure, psf		11108.9
$\bar{\sigma}_3$ Failure, psf		3334.5

Type of Test:

CU with Pore Pressures

Sample Type: 3-in. Shelby Tube

Description: SANDY LEAN CLAY (CL,A-6(11))

Specific Gravity= 2.66

Remarks: Compression Failure Mode: Symmetrical
Bulge

Figure _____

Client: ALDOT

Project: Mobile River Bridge

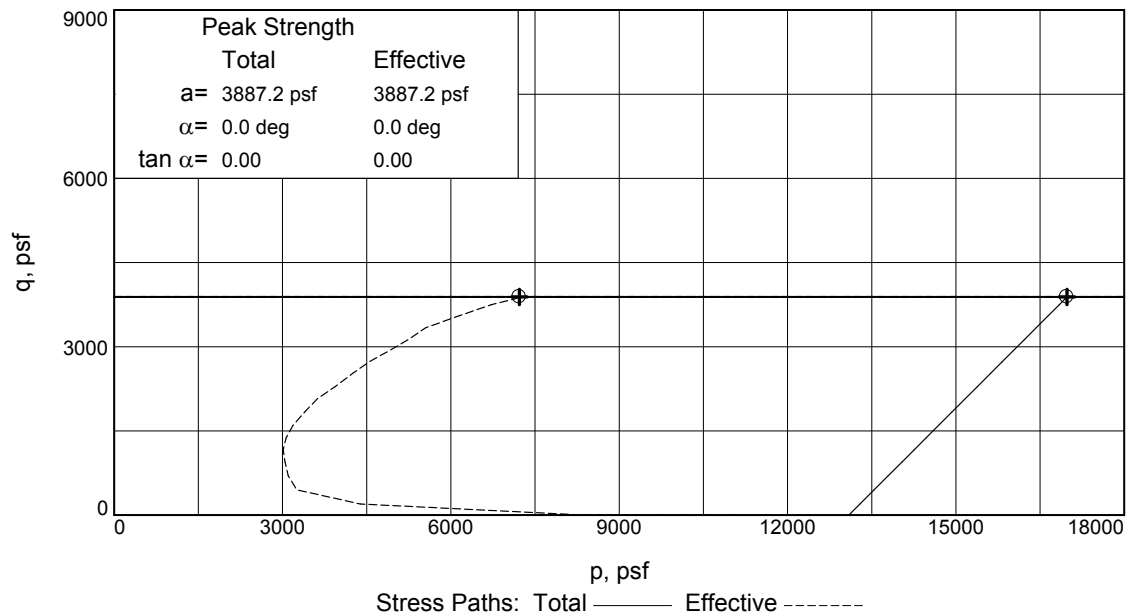
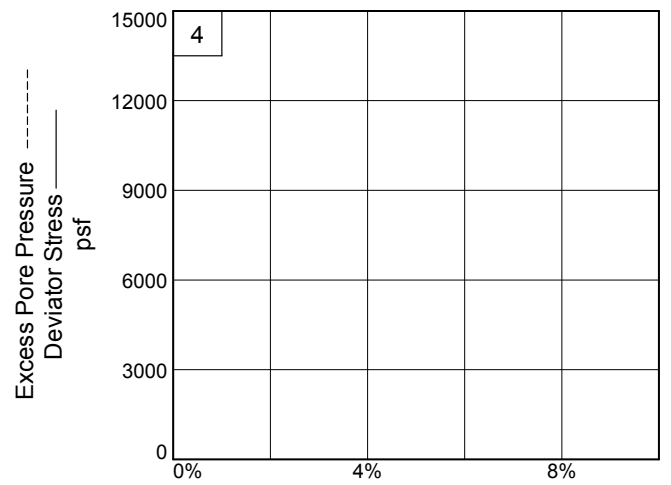
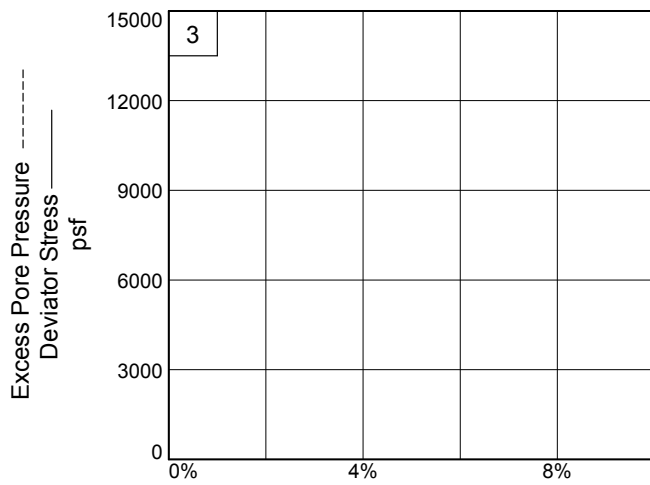
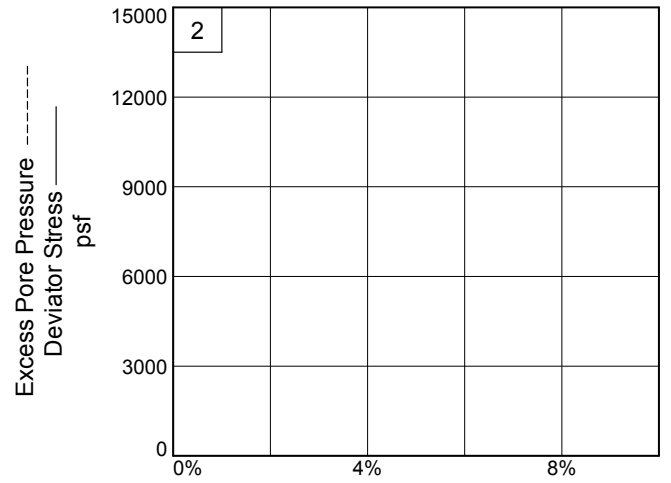
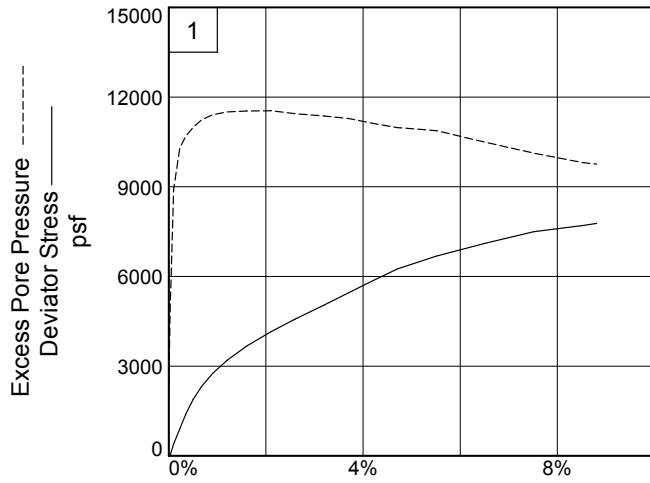
Source of Sample: MB-2 **Depth:** 190.0-192.00

Sample Number: T-4

Proj. No.: 1511010228

Date Sampled:

TRIAXIAL SHEAR TEST REPORT
 Thompson Engineering
 Mobile, Alabama



Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2

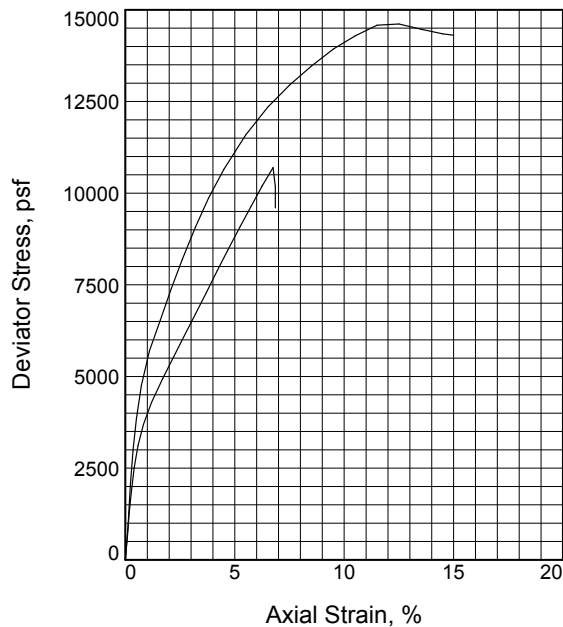
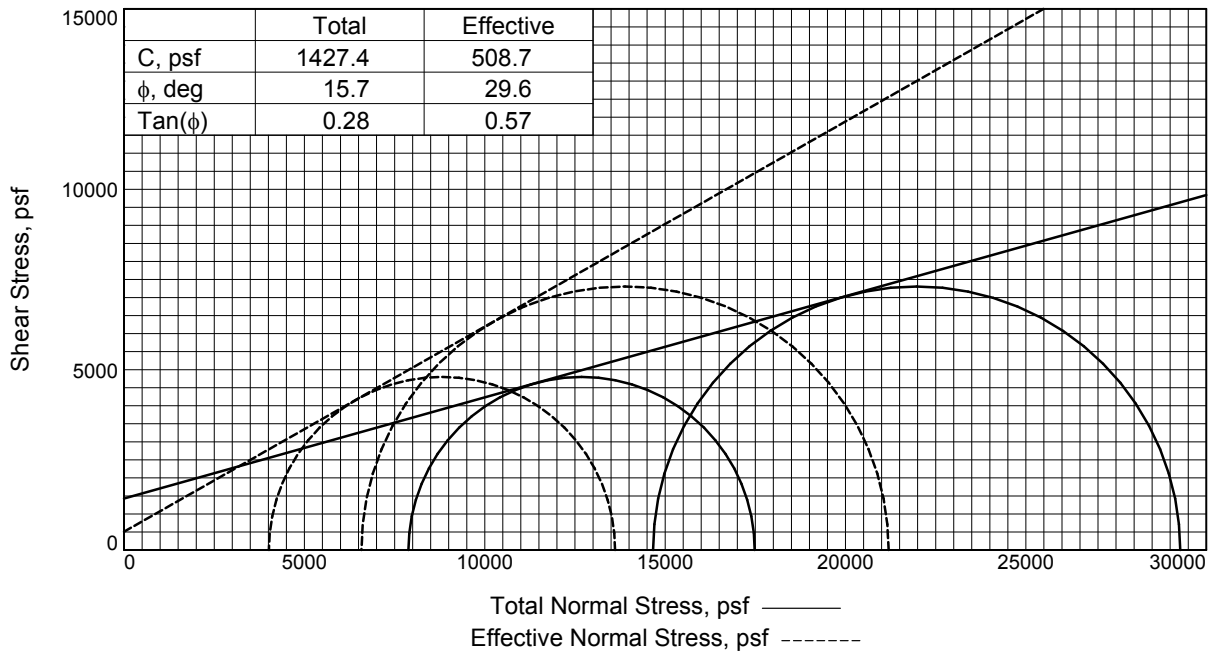
Depth: 190.0-192.00

Sample Number: T-4

Project No.: 1511010228

Figure _____

Thompson Engineering



	1	2	
Specimen No.	1	2	
Initial	Water Content, %	22.9	23.5
	Dry Density, pcf	104.5	101.9
	Saturation, %	103.4	101.6
	Void Ratio	0.5897	0.6050
	Diameter, in.	2.830	2.800
At Test	Height, in.	5.490	5.400
	Water Content, %	22.2	23.1
	Dry Density, pcf	104.5	101.9
	Saturation, %	100.0	100.0
	Void Ratio	0.5897	0.6050
Diameter, in.	2.830	2.800	
Height, in.	5.490	5.400	
Strain at peak, %	12.5	6.9	
Eff. Cell Pressure, psf	14665.0	7884.0	
Fail. Stress, psf	14613.3	9597.3	
Excess Pore Pr., psf	8083.4	3868.6	
Strain, %	12.5	6.9	
Ult. Stress, psf	14613.3		
Excess Pore Pr., psf	8083.4		
Strain, %	12.5		
$\bar{\sigma}_1$ Failure, psf	21194.9	13612.7	
$\bar{\sigma}_3$ Failure, psf	6581.6	4015.4	

Type of Test:

CU with Pore Pressures

Sample Type: 3-in. Shelby Tube

Description: SILT with SAND (ML,A-4(3))

Specific Gravity= 2.66

Remarks: Compression Failure Mode: Symmetrical
Bulge

Figure _____

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2

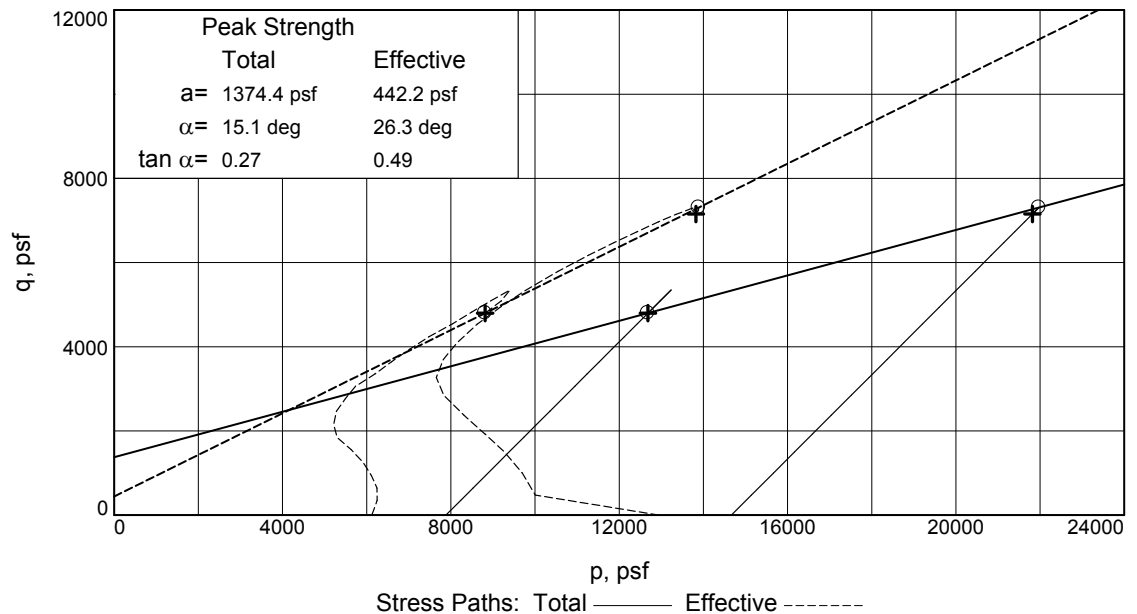
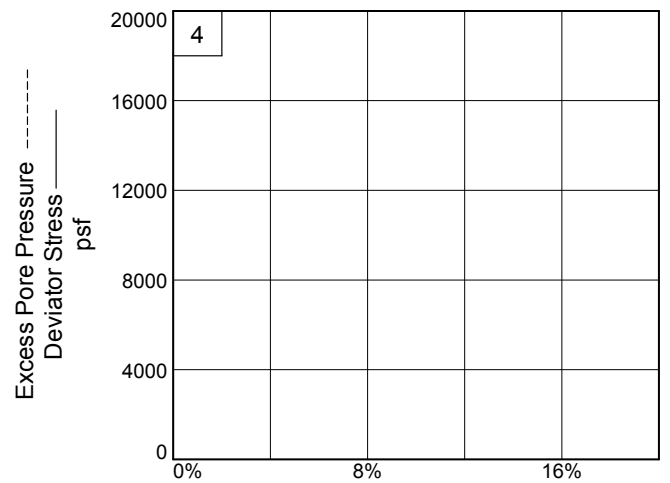
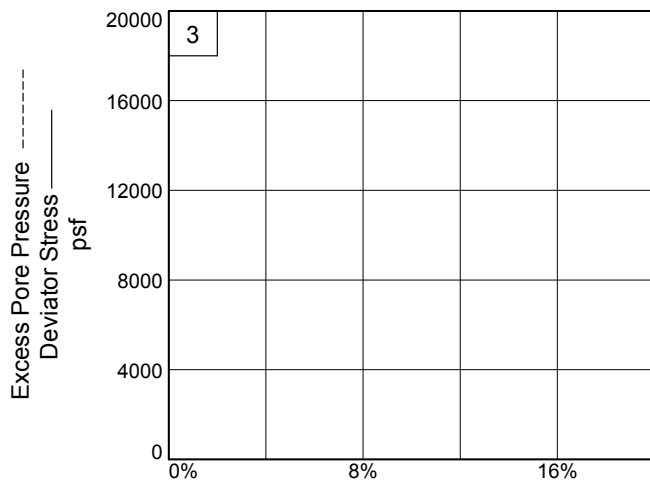
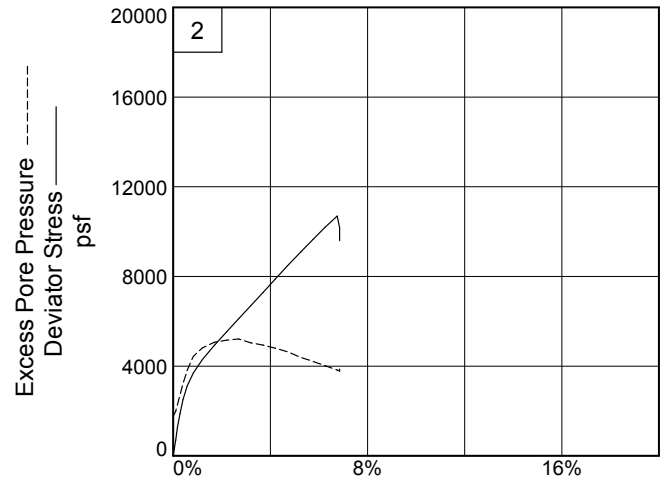
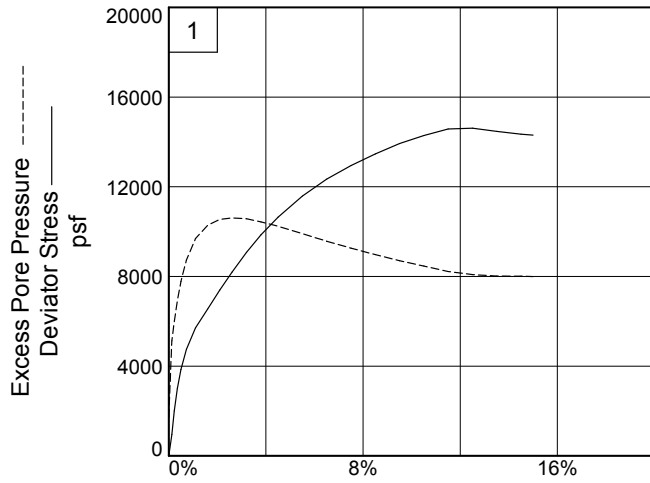
Depth: 228.5'-230.0'

Sample Number: T-6

Proj. No.: 1511010228

Date Sampled:

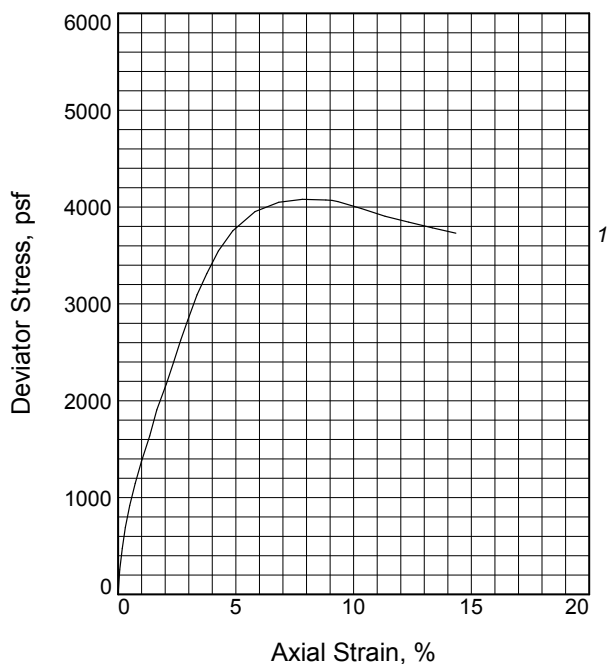
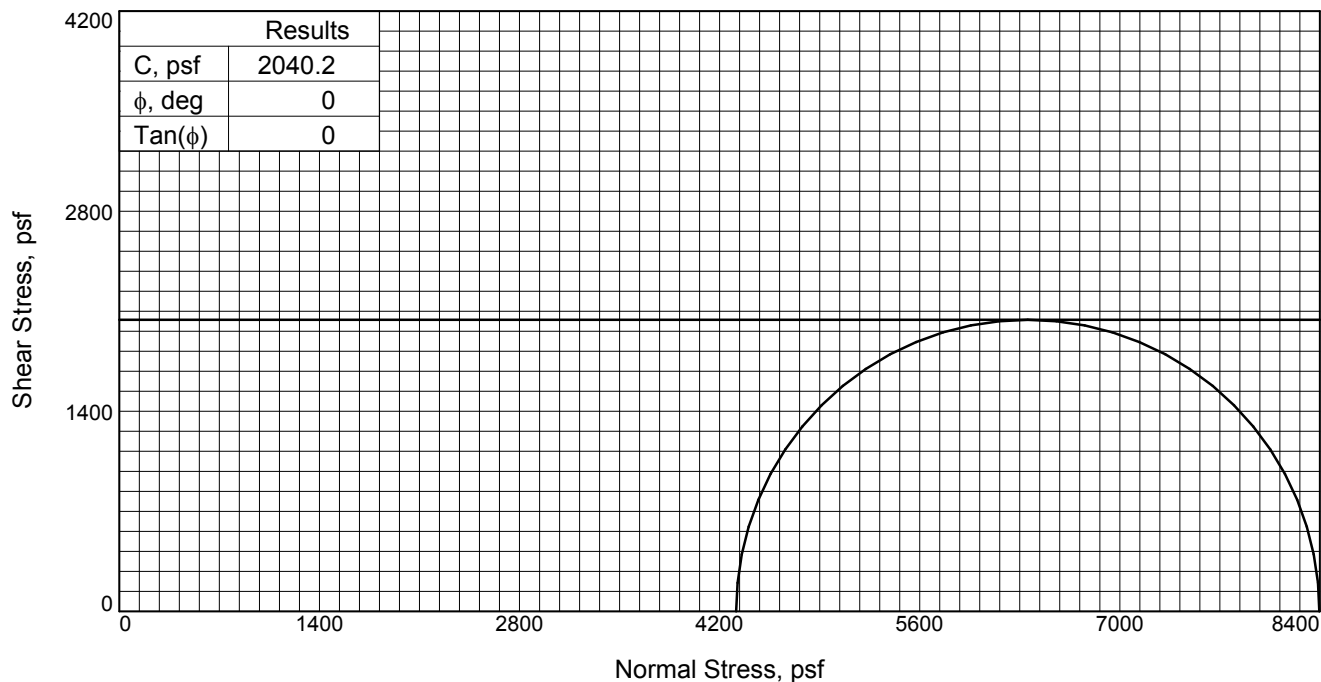
TRIAXIAL SHEAR TEST REPORT
 Thompson Engineering
 Mobile, Alabama



Client: ALDOT
Project: Mobile River Bridge
Source of Sample: MB-2
Project No.: 1511010228

Depth: 228.5'-230.0'
Sample Number: T-6
Figure _____

Thompson Engineering



Specimen No.		1
Initial	Water Content, %	29.6
	Dry Density, pcf	89.6
	Saturation, %	96.1
	Void Ratio	0.7945
	Diameter, in.	2.860
At Test	Height, in.	5.071
	Water Content, %	37.7
	Dry Density, pcf	89.6
	Saturation, %	122.2
	Void Ratio	0.7945
	Diameter, in.	2.860
	Height, in.	5.071
	Strain at peak, %	7.8
	Back Pressure, psf	0.0
	Cell Pressure, psf	4315.7
Fail. Stress, psf		4080.5
	Strain, %	7.8
Ult. Stress, psf		4080.5
	Strain, %	7.8
σ_1 Failure, psf		8396.2
σ_3 Failure, psf		4315.7

Type of Test:

Unconsolidated Undrained

Sample Type: 3-in. Shelby Tube

Description: FAT CLAY (CH, A-7-6(29))

Specific Gravity= 2.577

Remarks: Compression Failure Mode: Symmetrical
Bulge

Figure _____

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-1

Depth: 90.5'-92.5'

Sample Number: T-1

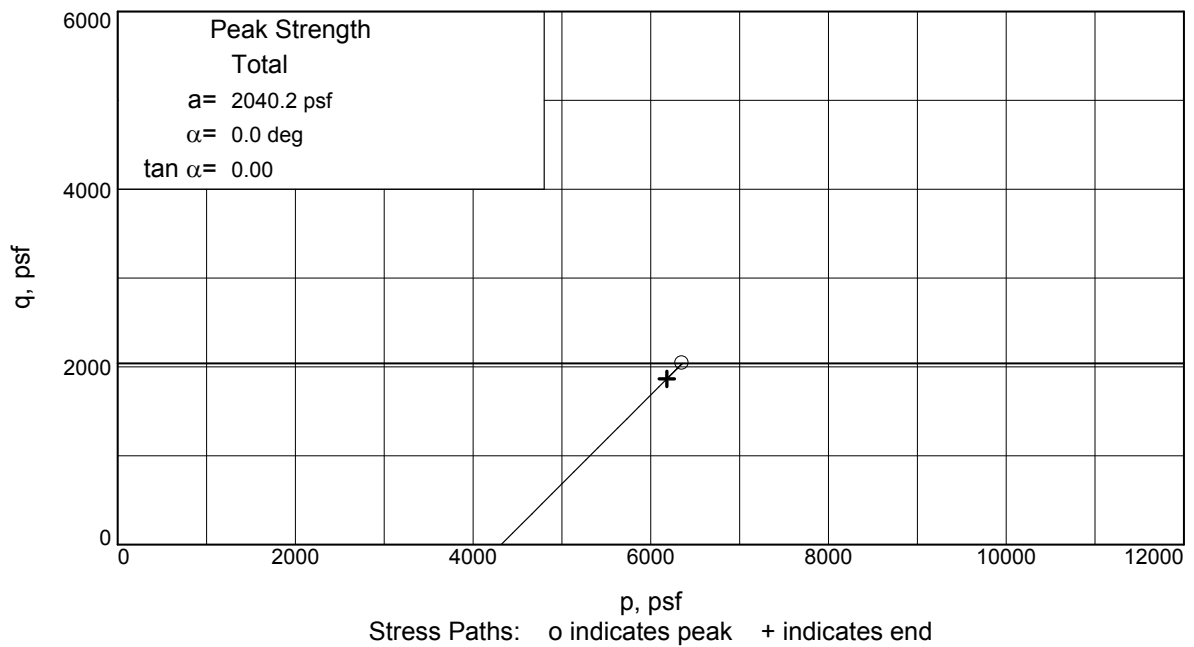
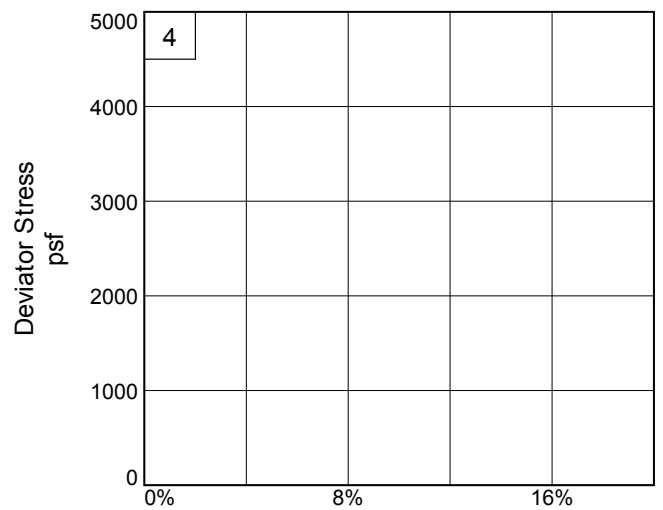
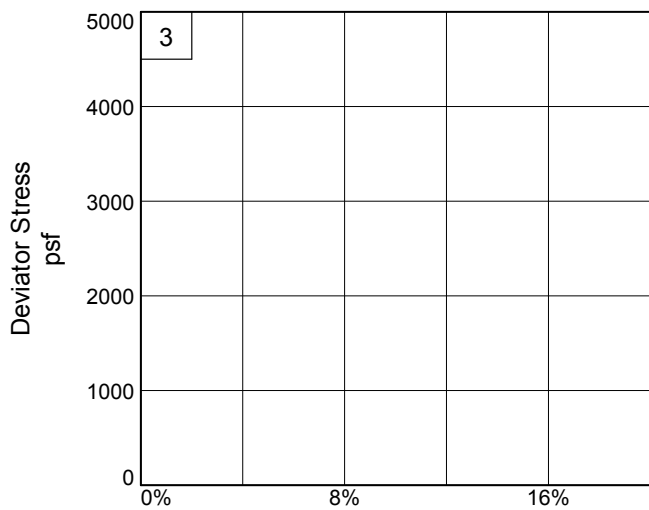
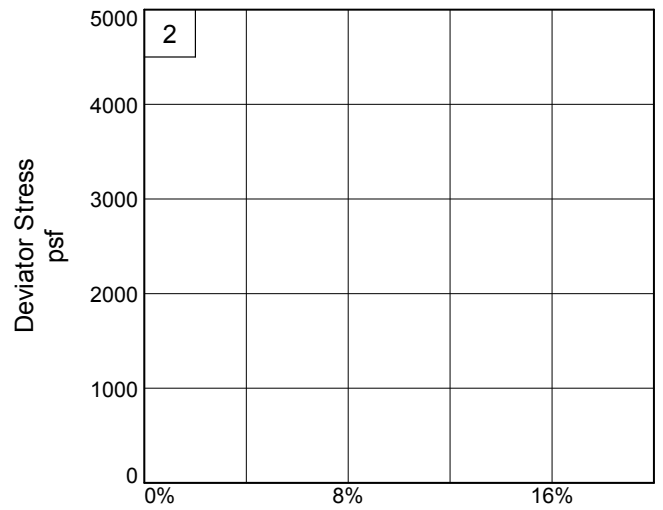
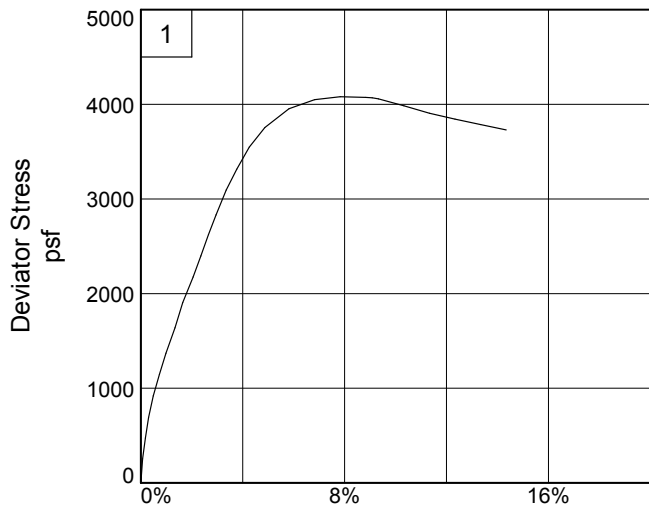
Proj. No.: 1511010228

Date Sampled:

TRIAxIAL SHEAR TEST REPORT

Thompson Engineering

Mobile, Alabama



Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-1

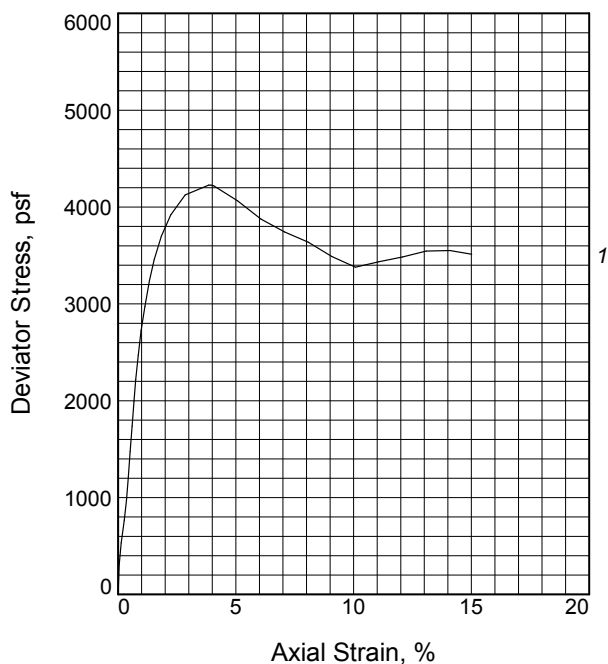
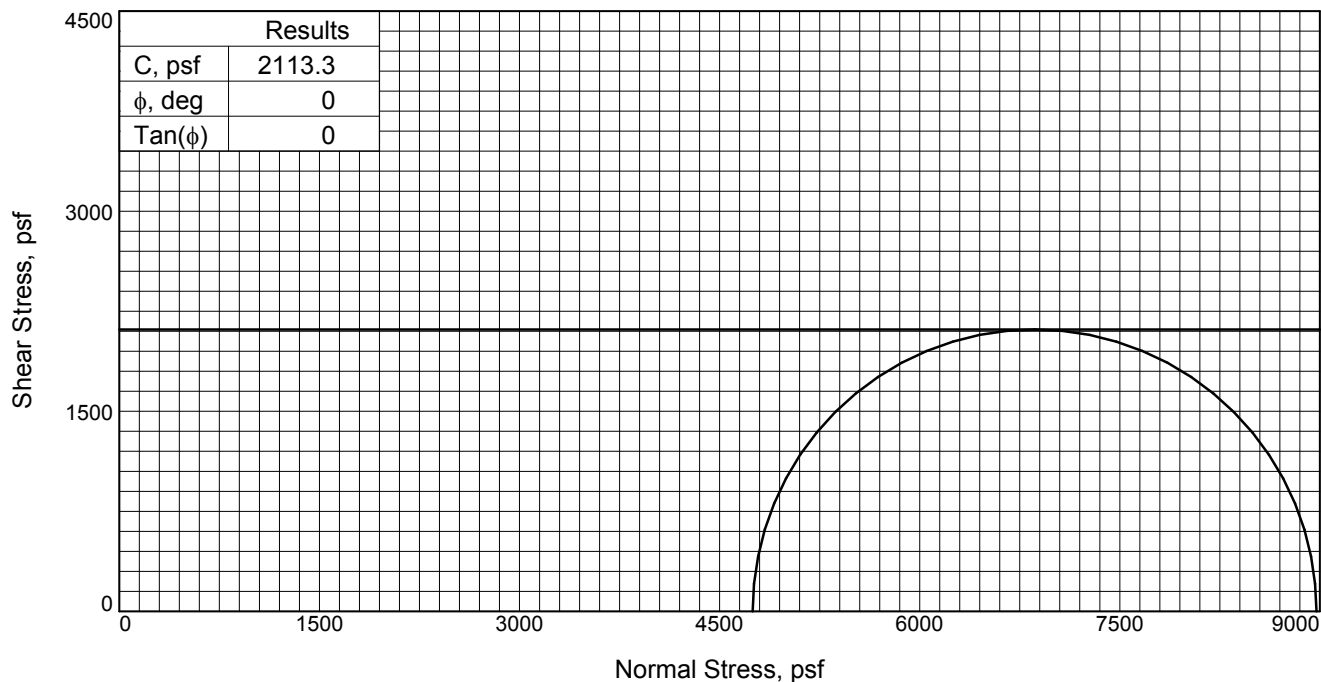
Depth: 90.5'-92.5'

Sample Number: T-1

Project No.: 1511010228

Figure _____

Thompson Engineering



Specimen No.		1
Initial	Water Content, %	36.6
	Dry Density, pcf	86.5
	Saturation, %	141.2
	Void Ratio	0.5620
	Diameter, in.	2.826
At Test	Height, in.	5.512
	Water Content, %	35.4
	Dry Density, pcf	86.5
	Saturation, %	136.5
	Void Ratio	0.5620
	Diameter, in.	2.826
	Height, in.	5.512
	Strain at peak, %	3.8
	Back Pressure, psf	0.0
	Cell Pressure, psf	4747.7
Fail. Stress, psf		4226.6
	Strain, %	3.8
Ult. Stress, psf		4226.6
	Strain, %	3.8
σ_1 Failure, psf		8974.3
σ_3 Failure, psf		4747.7

Type of Test:

Unconsolidated Undrained

Sample Type: 3-in. Shelby Tube

Description: FAT CLAY (CH, A-7-6(71))

Specific Gravity= 2.165

Remarks: Compression Failure Mode: Asymmetrical Shear Plane

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-1

Depth: 98.5'-100.5'

Sample Number: T-2

Proj. No.: 1511010228

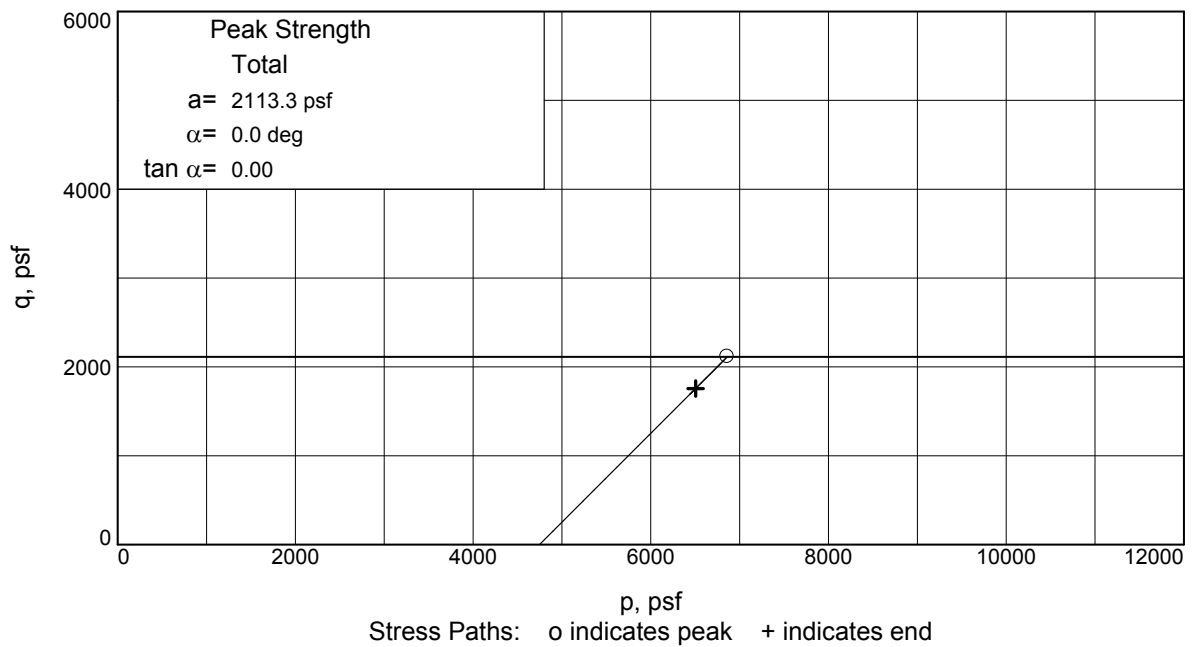
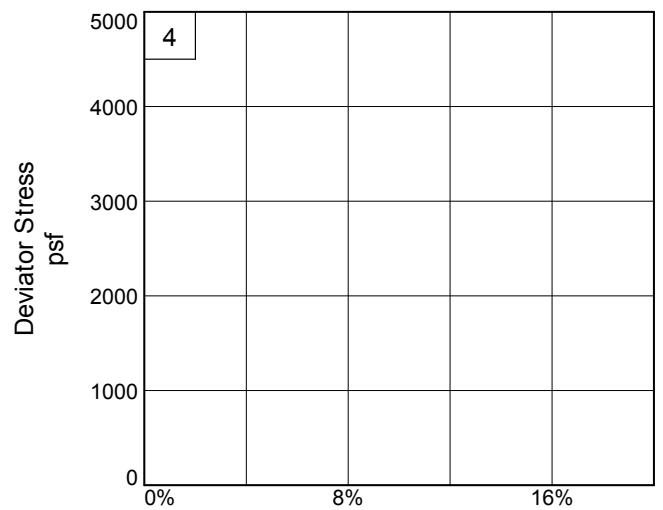
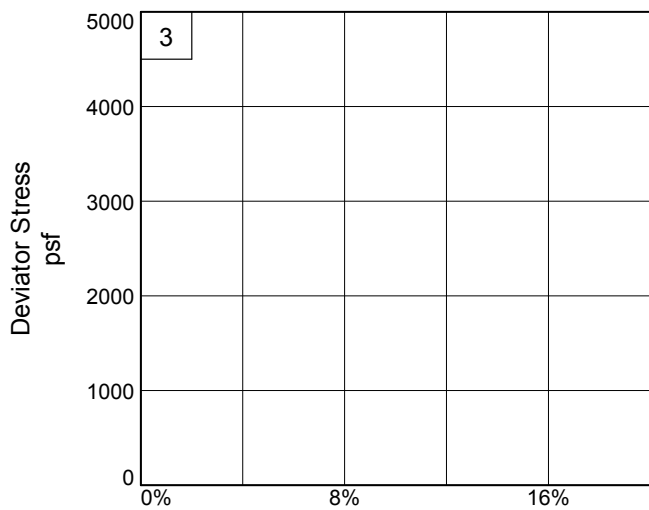
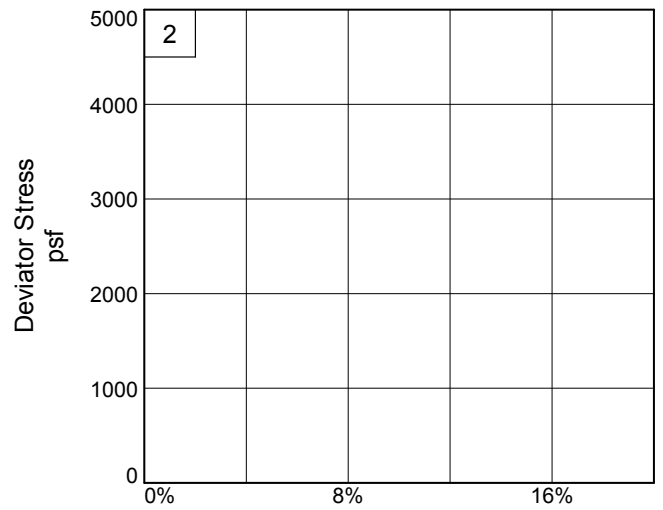
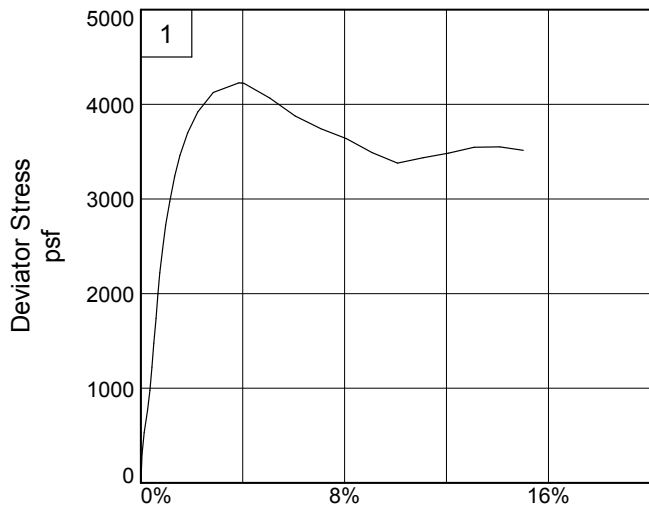
Date Sampled:

TRIAxIAL SHEAR TEST REPORT

Thompson Engineering

Mobile, Alabama

Figure _____



Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-1

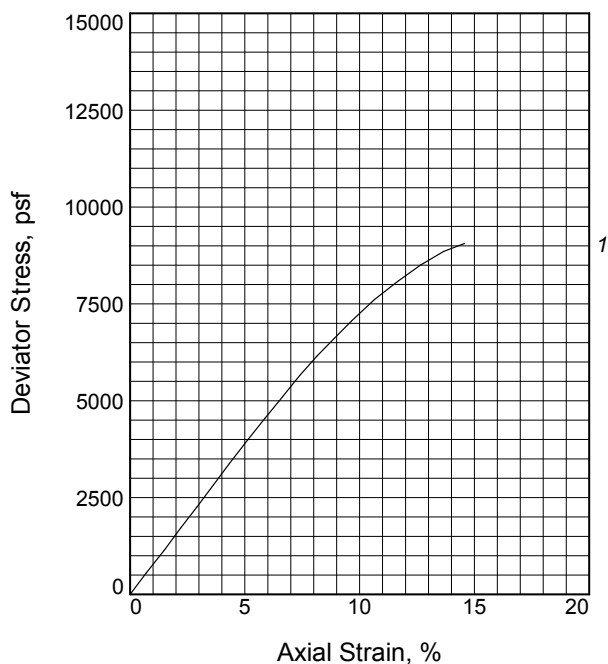
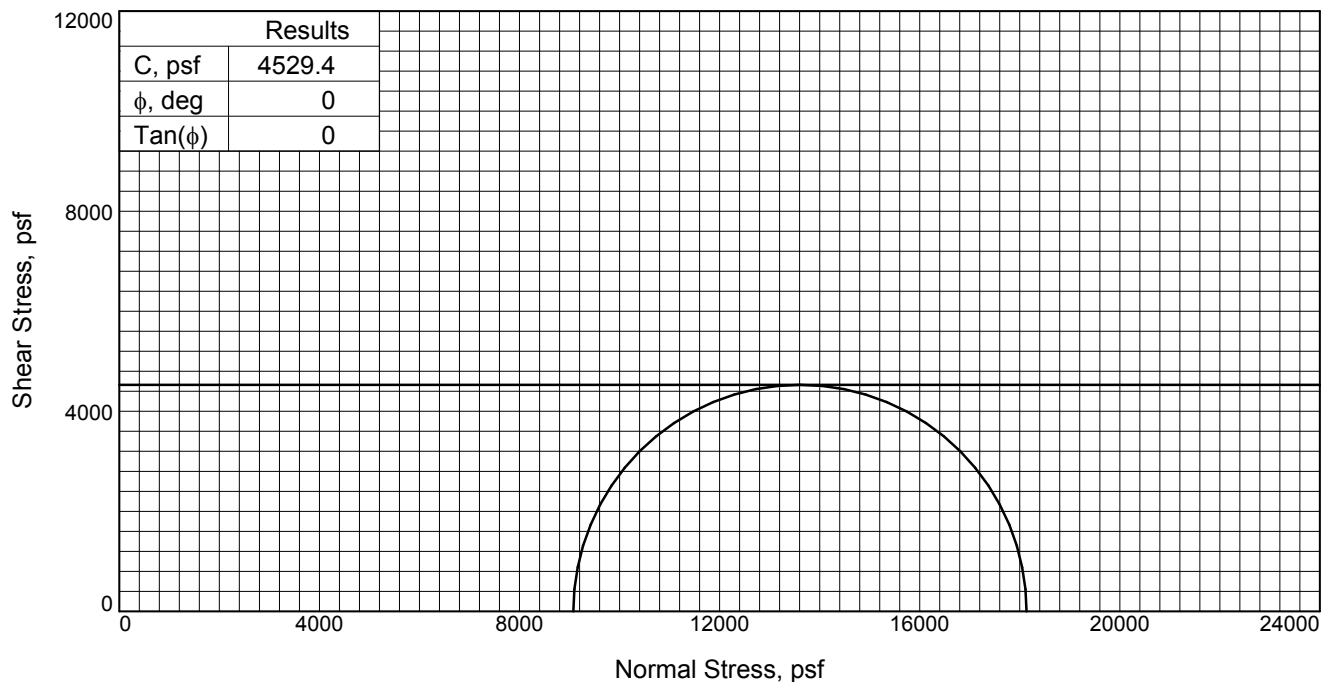
Depth: 98.5'-100.5'

Sample Number: T-2

Project No.: 1511010228

Figure _____

Thompson Engineering



Specimen No.		1
Initial	Water Content, %	18.6
	Dry Density, pcf	114.8
	Saturation, %	111.1
	Void Ratio	0.4461
	Diameter, in.	2.848
At Test	Height, in.	5.635
	Water Content, %	18.4
	Dry Density, pcf	114.8
	Saturation, %	109.8
	Void Ratio	0.4461
	Diameter, in.	2.848
	Height, in.	5.635
	Strain at peak, %	14.6
	Back Pressure, psf	0.0
	Cell Pressure, psf	9076.3
Fail. Stress, psf		9058.9
	Strain, %	14.6
Ult. Stress, psf		9058.9
	Strain, %	14.6
σ_1 Failure, psf		18135.2
σ_3 Failure, psf		9076.3

Type of Test:

Unconsolidated Undrained

Sample Type: 3-in. Shelby Tube

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

Specific Gravity= 2.66

Remarks: Compression Failure Mode: Symmetrical
Bulge

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-1

Depth: 188.5'-190.5'

Sample Number: T-4

Proj. No.: 1511010228

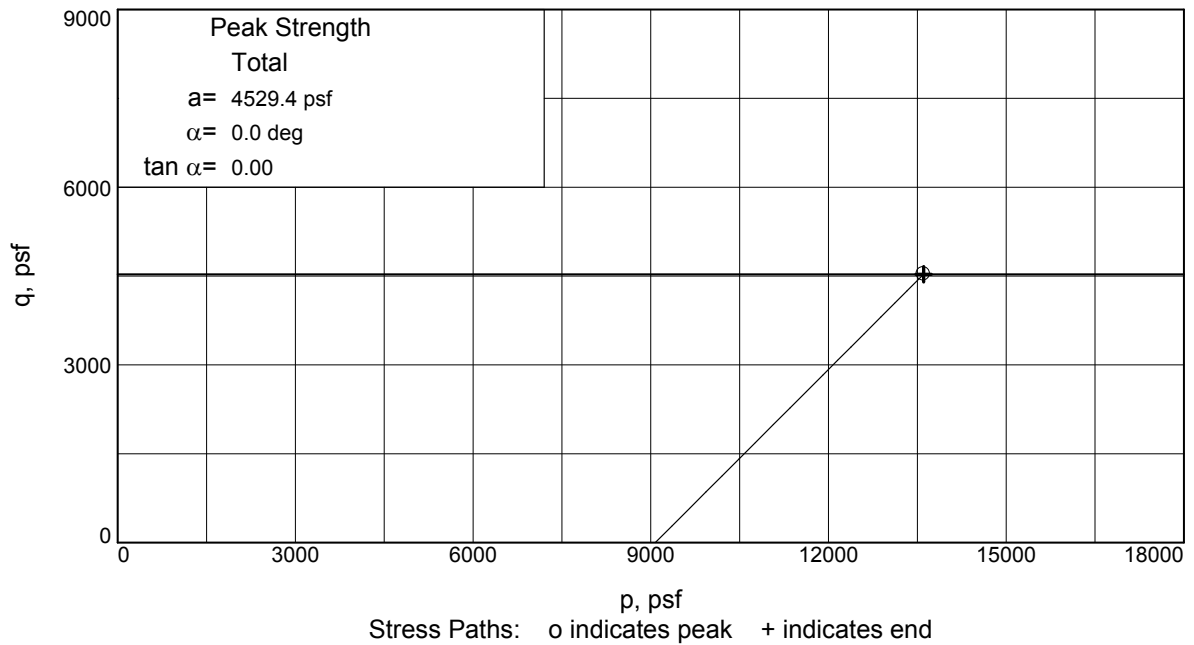
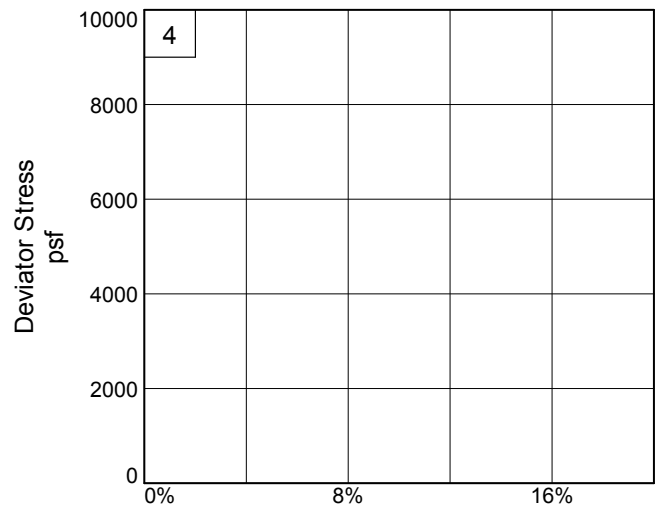
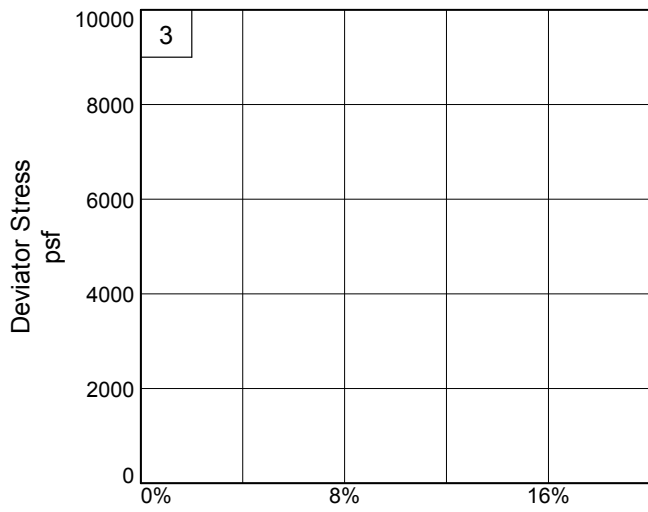
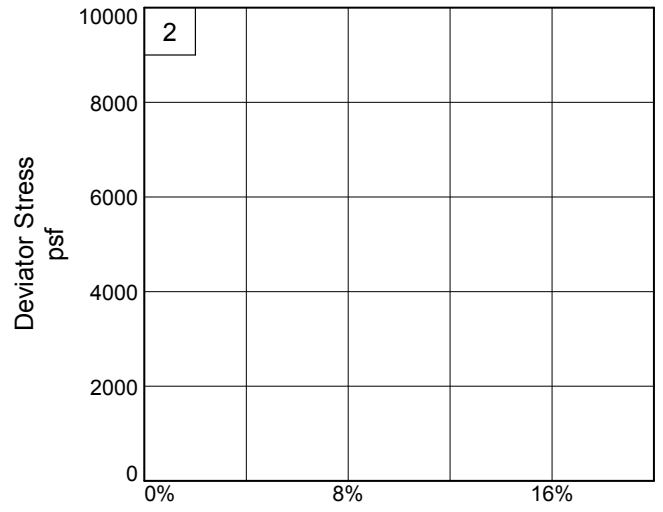
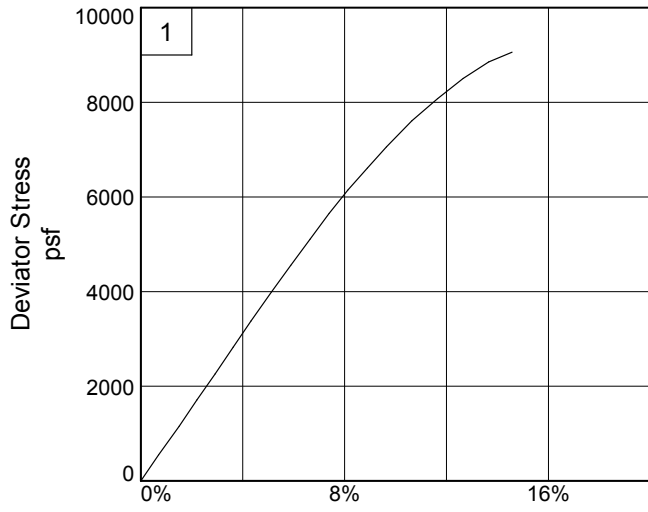
Date Sampled:

TRIAxIAL SHEAR TEST REPORT

Thompson Engineering

Mobile, Alabama

Figure _____



Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-1

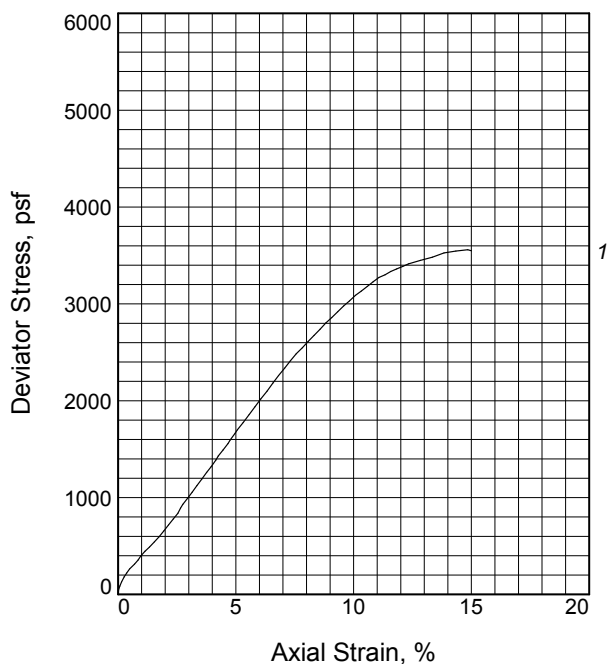
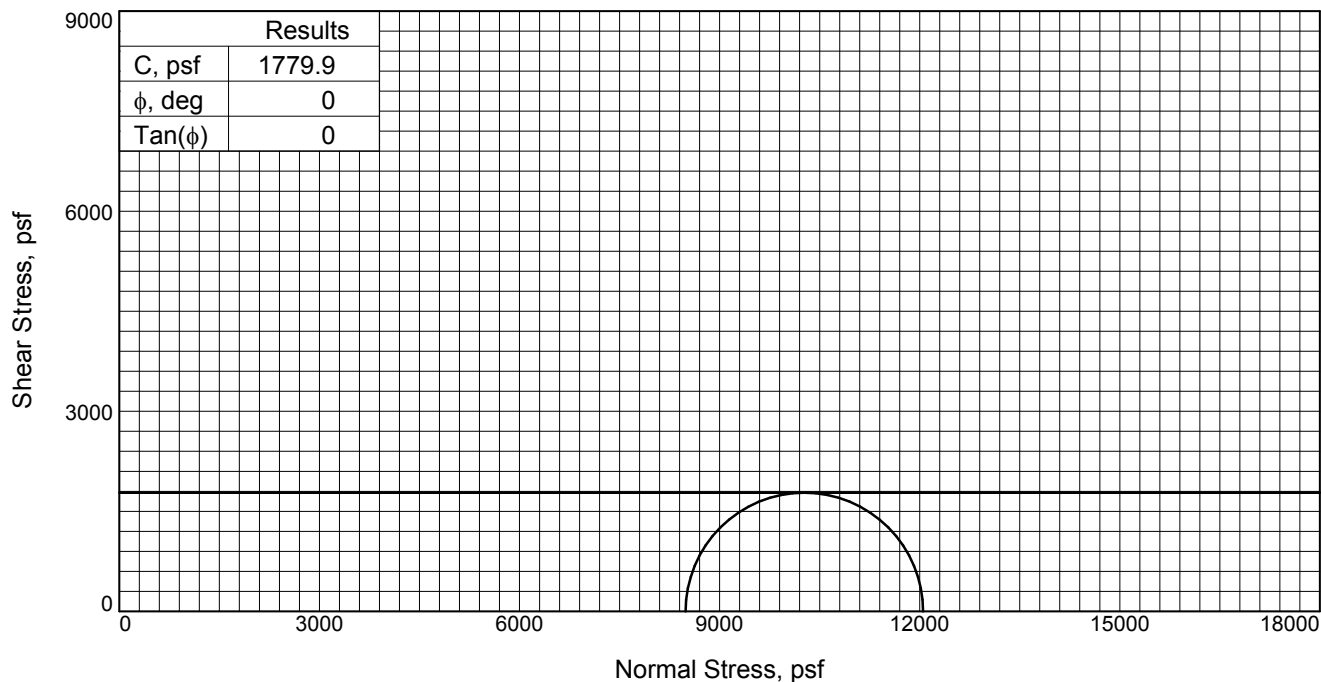
Depth: 188.5'-190.5'

Sample Number: T-4

Project No.: 1511010228

Figure _____

Thompson Engineering



Specimen No.		1
Initial	Water Content, %	21.6
	Dry Density, pcf	107.6
	Saturation, %	105.5
	Void Ratio	0.5435
	Diameter, in.	2.835
At Test	Height, in.	5.367
	Water Content, %	21.8
	Dry Density, pcf	107.6
	Saturation, %	106.8
	Void Ratio	0.5435
	Diameter, in.	2.835
	Height, in.	5.367
	Strain at peak, %	14.8
	Back Pressure, psf	0.0
	Cell Pressure, psf	8490.2
Fail. Stress, psf		3559.7
	Strain, %	14.8
Ult. Stress, psf		3559.7
	Strain, %	14.8
σ_1 Failure, psf		12050.0
σ_3 Failure, psf		8490.2

Type of Test:

Unconsolidated Undrained

Sample Type: 3-in. Shelby Tube

Description: SNADY LEAN CLAY (CL,A-6(11))

Assumed Specific Gravity= 2.66

Remarks: Compression Failure Mode: Symmetrical
Bulge

Figure _____

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2

Depth: 140.0-141.5'

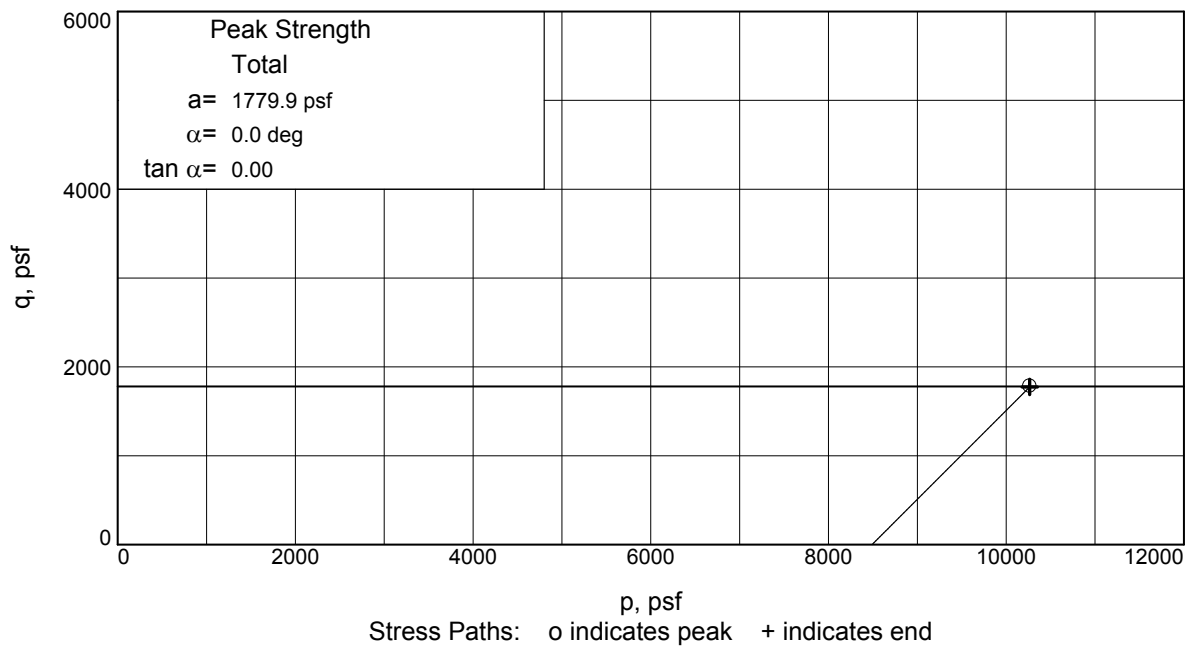
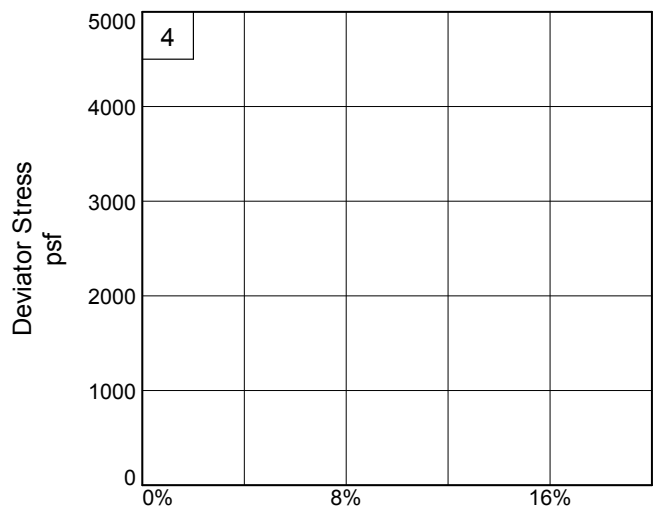
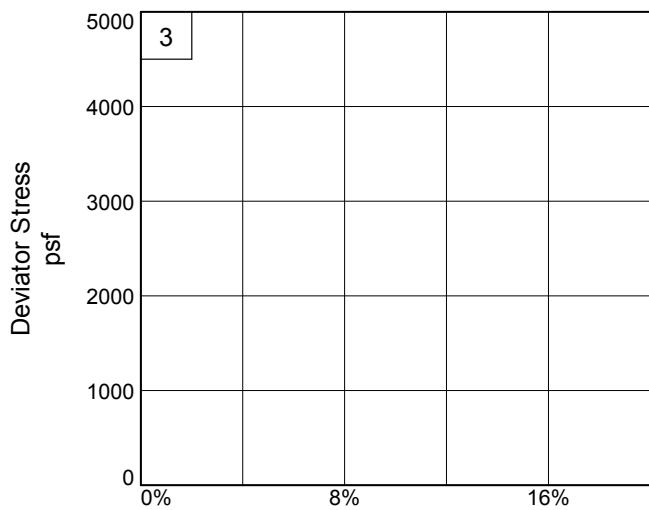
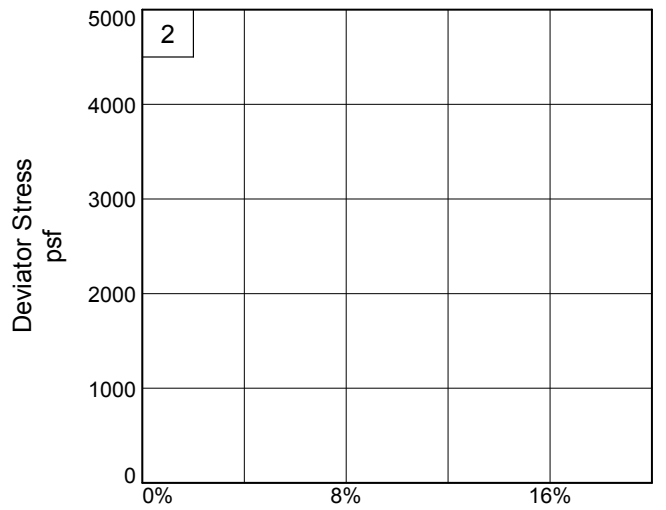
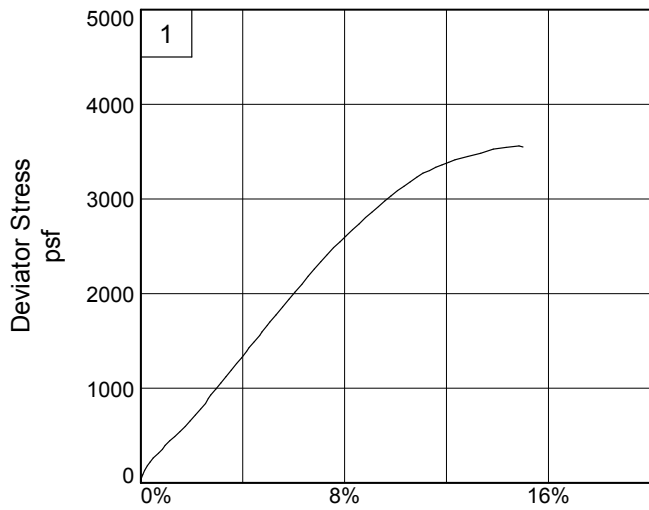
Sample Number: T-2

Proj. No.: 1511010228

Date Sampled:

TRIAXIAL SHEAR TEST REPORT

Thompson Engineering
Mobile, Alabama



Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2

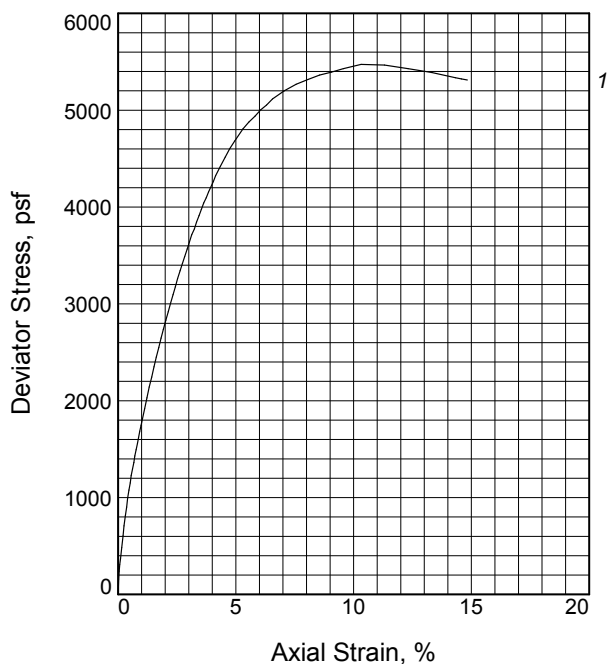
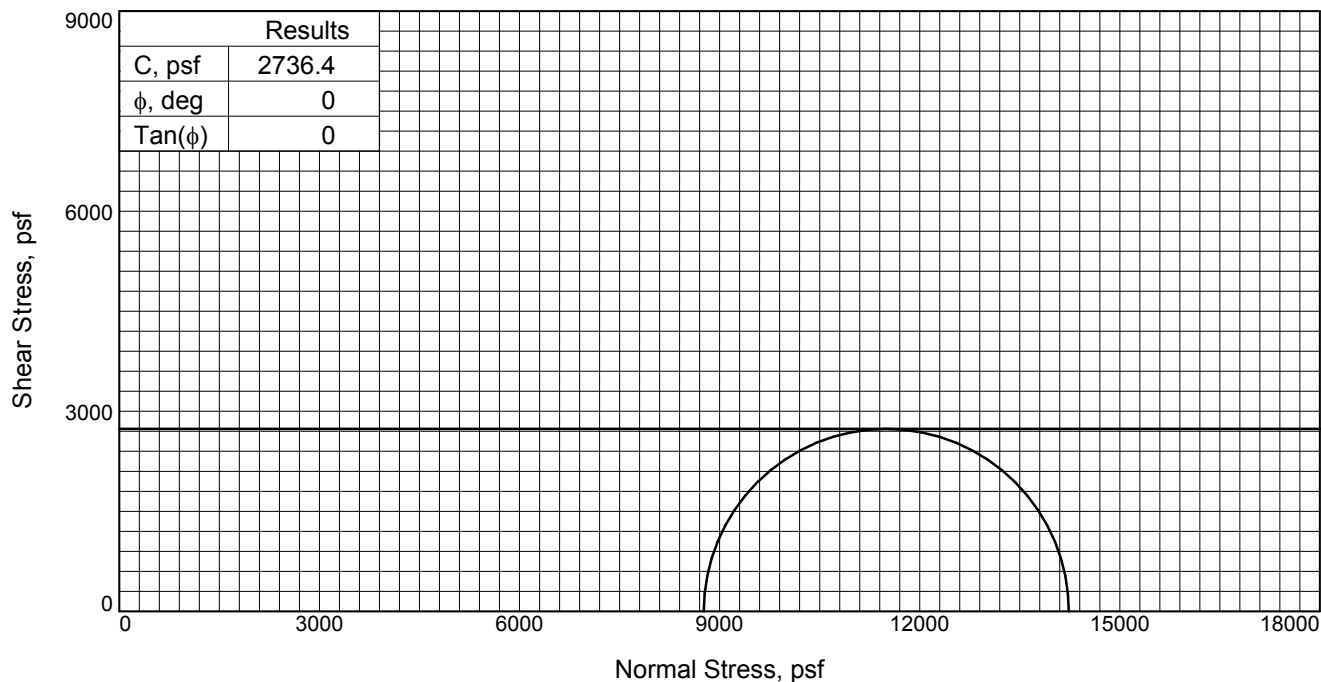
Depth: 140.0-141.5'

Sample Number: T-2

Project No.: 1511010228

Figure _____

Thompson Engineering



Specimen No.		1
Initial	Water Content, %	19.2
	Dry Density, pcf	108.5
	Saturation, %	96.3
	Void Ratio	0.5308
	Diameter, in.	2.850
At Test	Height, in.	5.552
	Water Content, %	22.2
	Dry Density, pcf	108.5
	Saturation, %	111.4
	Void Ratio	0.5308
	Diameter, in.	2.850
	Height, in.	5.552
	Strain at peak, %	10.3
	Back Pressure, psf	0.0
	Cell Pressure, psf	8762.4
Fail. Stress, psf		5472.8
	Strain, %	10.3
Ult. Stress, psf		5472.8
	Strain, %	10.3
σ_1 Failure, psf		14235.2
σ_3 Failure, psf		8762.4

Type of Test:

Unconsolidated Undrained

Sample Type: 3-in. Shelby Tube

Description: SILTY CLAY, with SAND (CL-ML,A-4(2))

Assumed Specific Gravity= 2.66

Remarks: Compression Failure Mode: Symmetrical Bulge

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2

Depth: 145.0-147.0'

Sample Number: T-3

Proj. No.: 1511010228

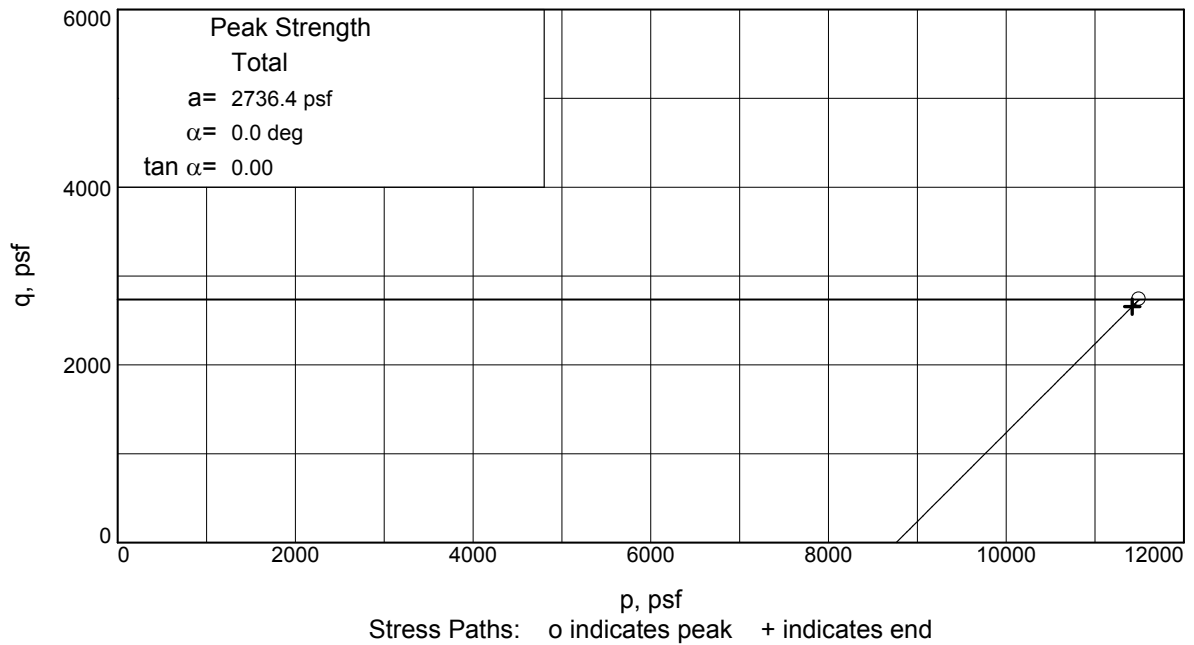
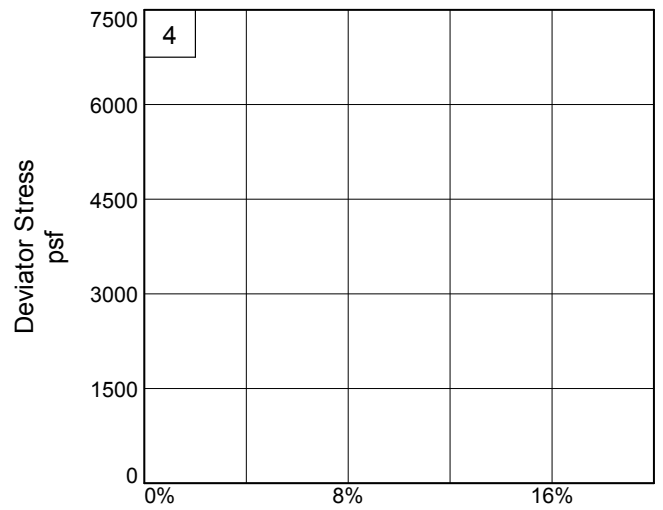
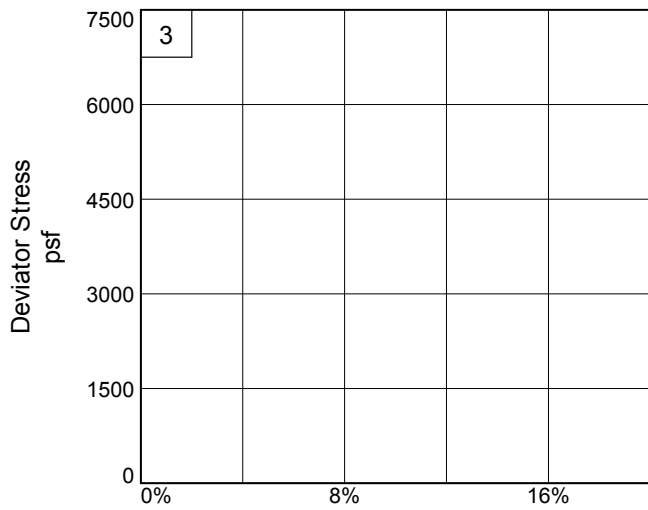
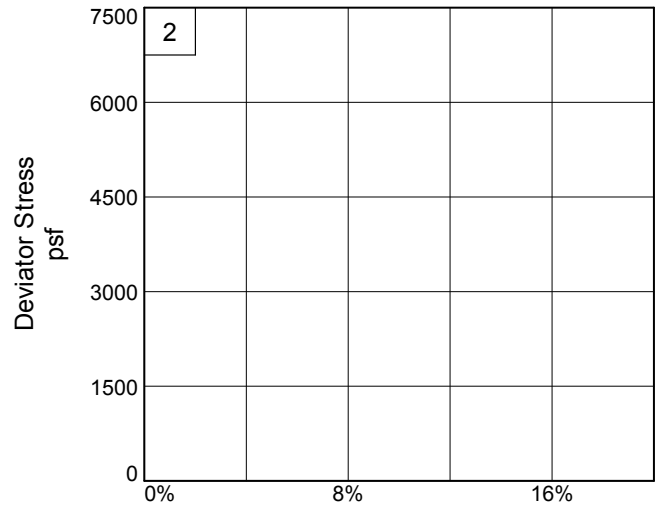
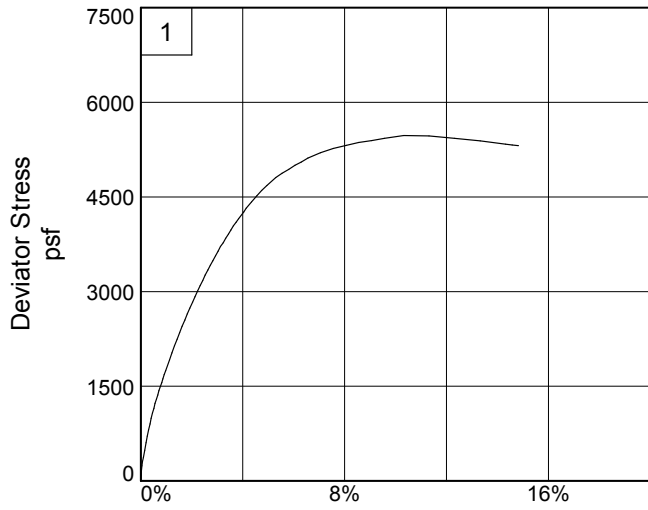
Date Sampled:

TRIAXIAL SHEAR TEST REPORT

Thompson Engineering

Mobile, Alabama

Figure _____



Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2

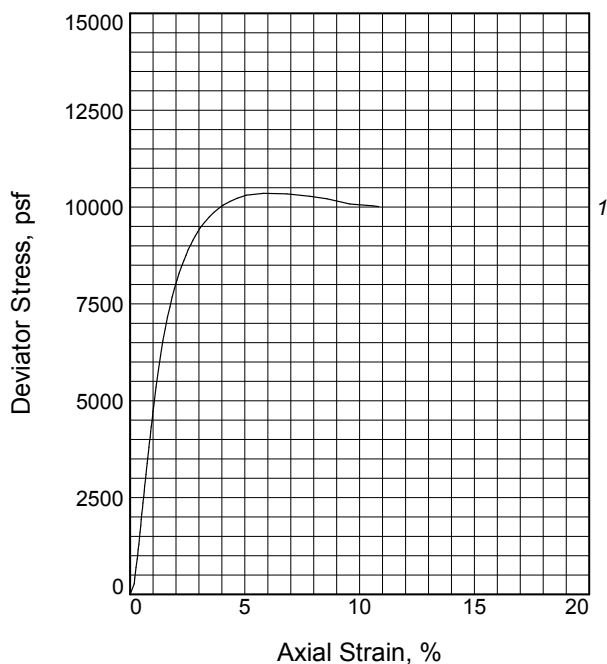
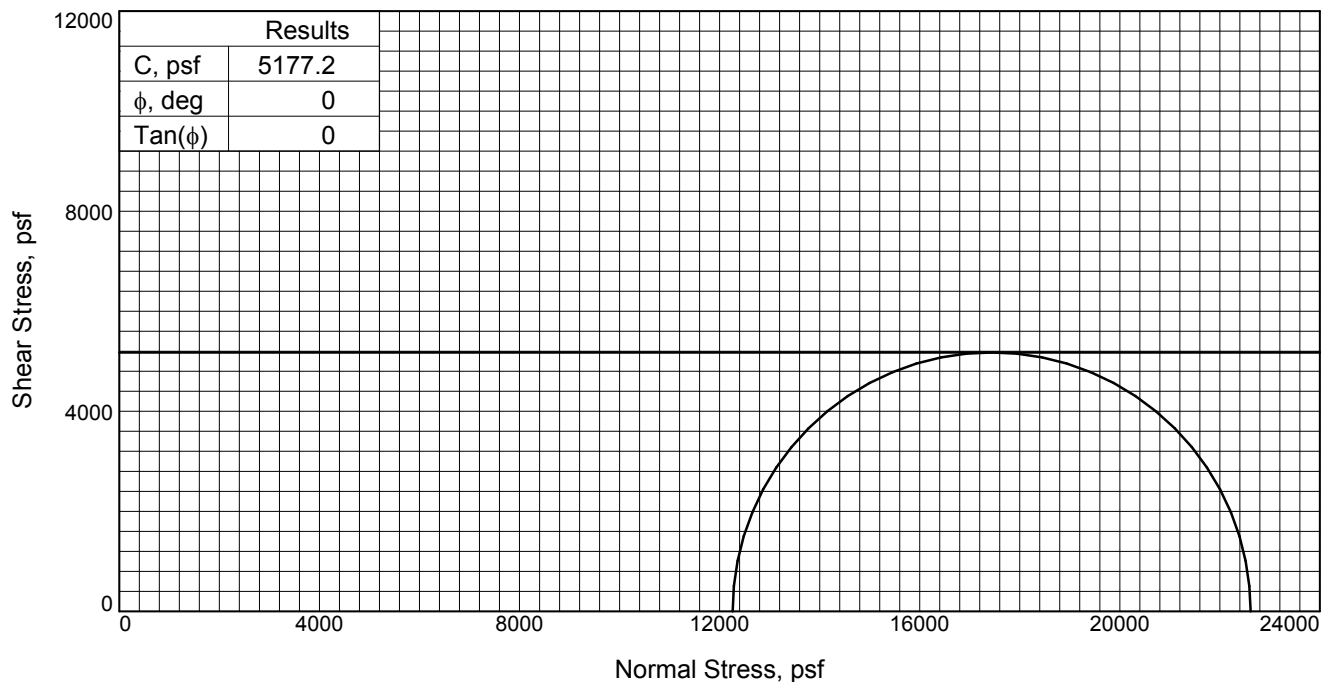
Depth: 145.0-147.0'

Sample Number: T-3

Project No.: 1511010228

Figure _____

Thompson Engineering



Specimen No.		1
Initial	Water Content, %	15.2
	Dry Density, pcf	119.1
	Saturation, %	102.3
	Void Ratio	0.3944
	Diameter, in.	2.856
At Test	Height, in.	5.532
	Water Content, %	15.7
	Dry Density, pcf	119.1
	Saturation, %	105.6
	Void Ratio	0.3944
	Diameter, in.	2.856
	Height, in.	5.532
	Strain at peak, %	5.8
	Back Pressure, psf	0.0
	Cell Pressure, psf	12260.2
	Fail. Stress, psf	10354.4
	Strain, %	5.8
	Ult. Stress, psf	10354.4
	Strain, %	5.8
	σ_1 Failure, psf	22614.6
σ_3 Failure, psf	12260.2	

Type of Test:

Unconsolidated Undrained

Sample Type: 3-in. Shelby Tube

Description: SANDY LEAN CLAY (CL,A-6(11))

Assumed Specific Gravity= 2.66

Remarks: Compression Failure Mode: Asymmetrical Shear Plane

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2

Depth: 210.0-212.0'

Sample Number: T-5

Proj. No.: 1511010228

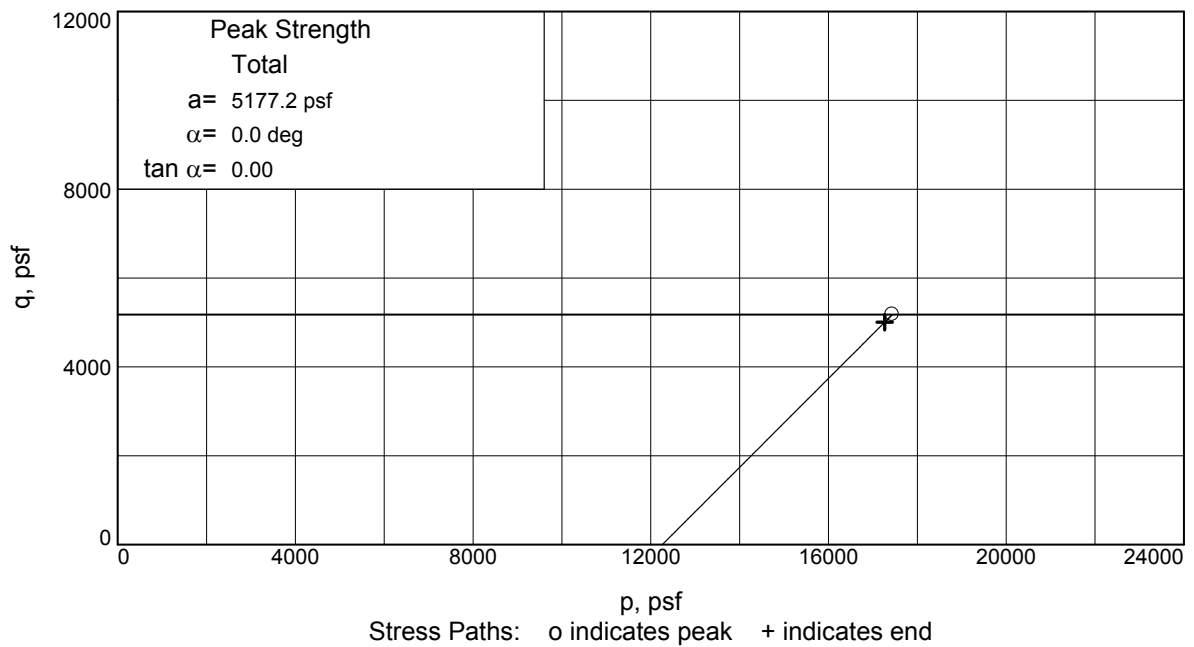
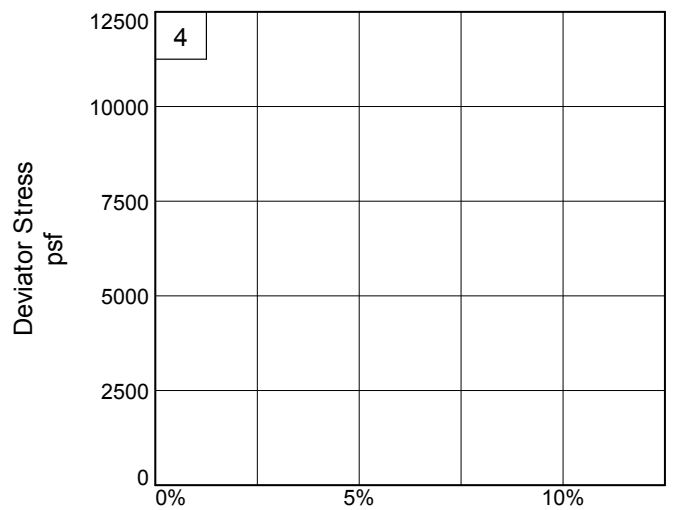
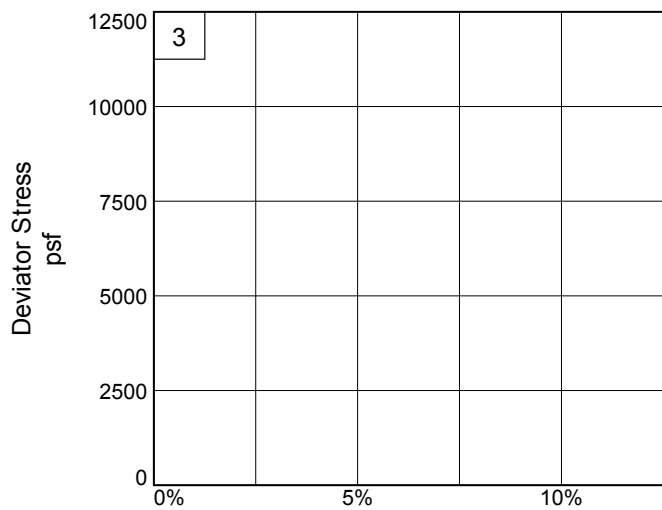
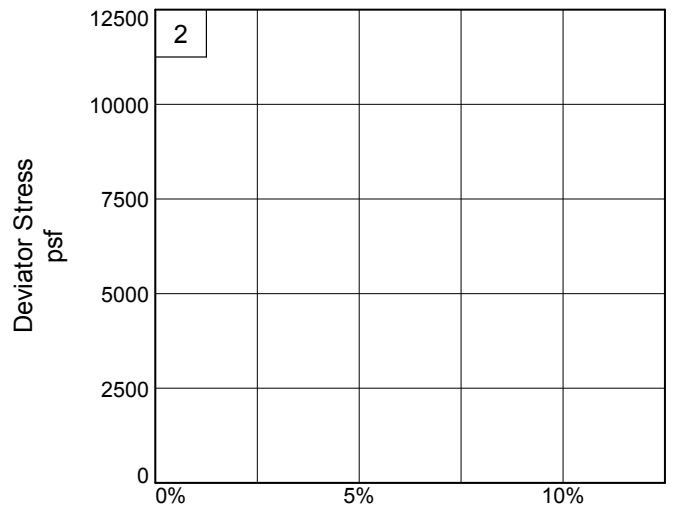
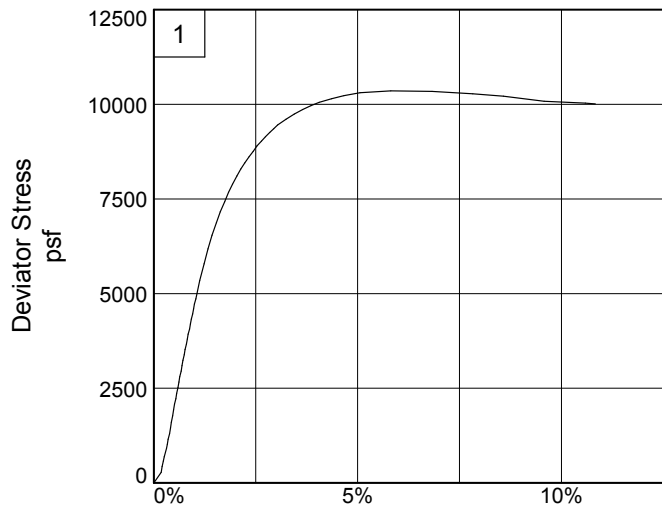
Date Sampled:

TRIAxIAL SHEAR TEST REPORT

Thompson Engineering

Mobile, Alabama

Figure _____



Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2

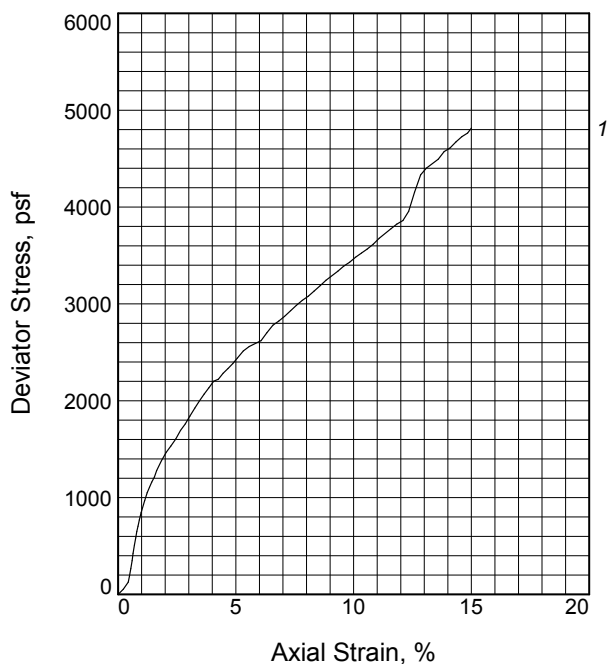
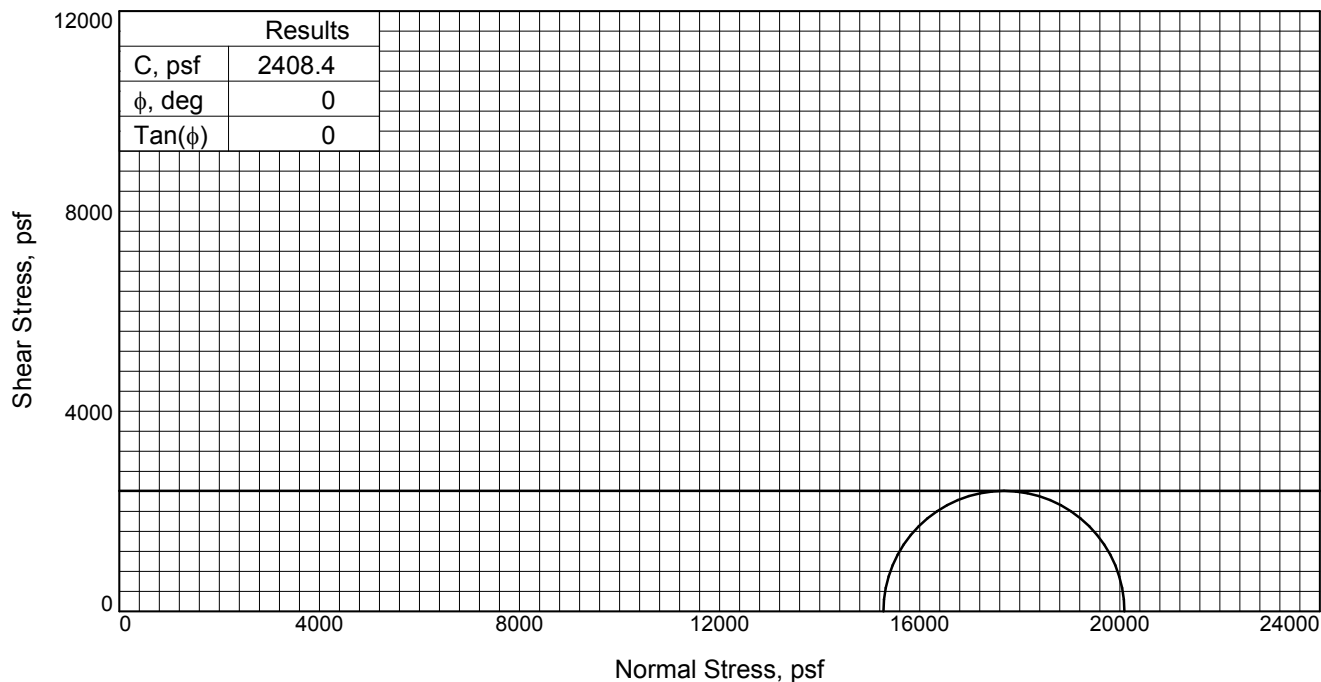
Depth: 210.0-212.0'

Sample Number: T-5

Project No.: 1511010228

Figure _____

Thompson Engineering



Specimen No.		1
Initial	Water Content, %	21.3
	Dry Density, pcf	105.4
	Saturation, %	98.6
	Void Ratio	0.5750
	Diameter, in.	2.809
At Test	Height, in.	5.171
	Water Content, %	20.1
	Dry Density, pcf	105.4
	Saturation, %	93.2
	Void Ratio	0.5750
	Diameter, in.	2.809
	Height, in.	5.171
	Strain at peak, %	15.0
	Back Pressure, psf	0.0
	Cell Pressure, psf	15275.5
Fail. Stress, psf		4816.9
	Strain, %	15.0
Ult. Stress, psf		4816.9
	Strain, %	15.0
σ_1 Failure, psf		20092.4
σ_3 Failure, psf		15275.5

Type of Test:

Unconsolidated Undrained

Sample Type: 3-in. Shelby Tube

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

Assumed Specific Gravity= 2.66

Remarks: Compression Failure Mode: Symmetrical
Bulge

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2

Depth: 270.0-272.0'

Sample Number: T-7

Proj. No.: 1511010228

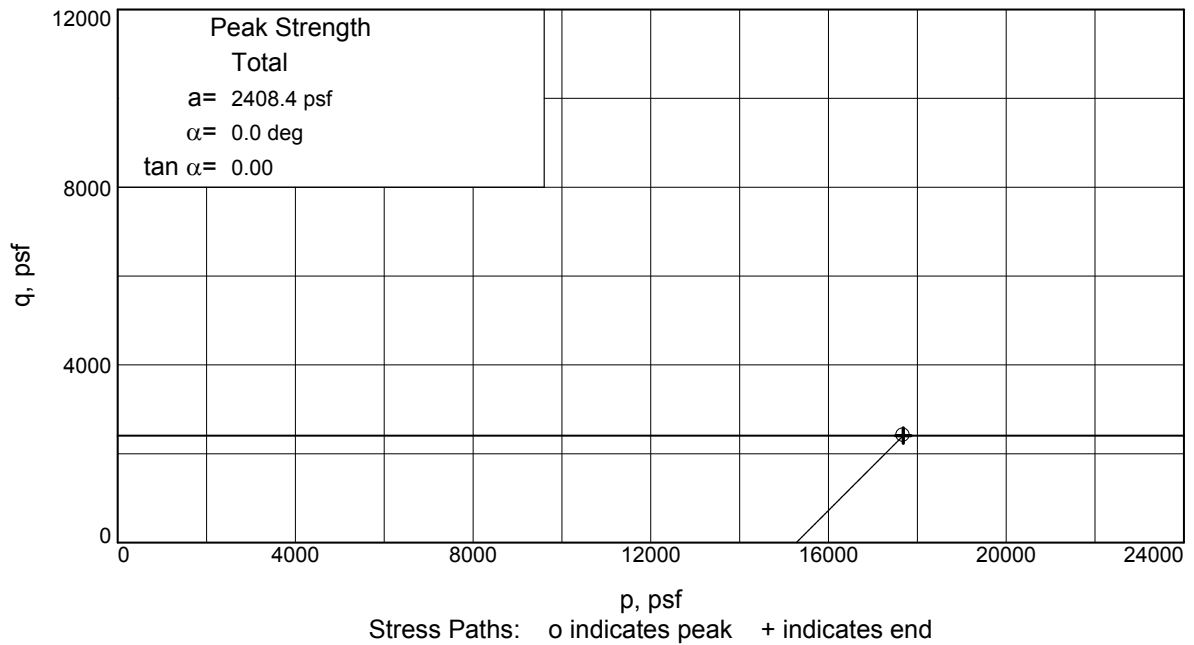
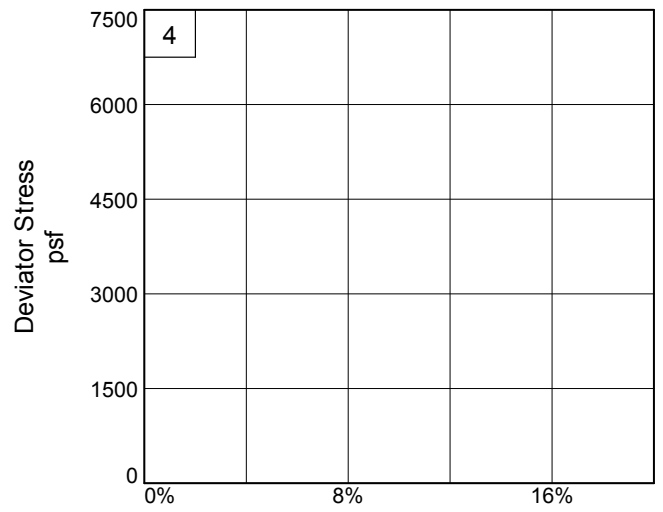
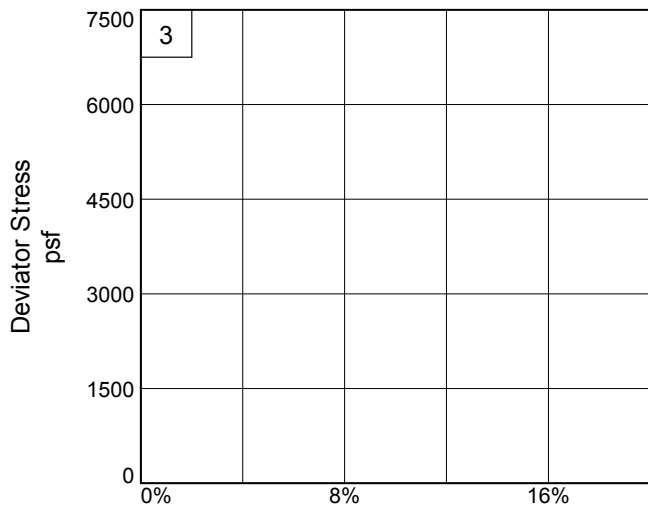
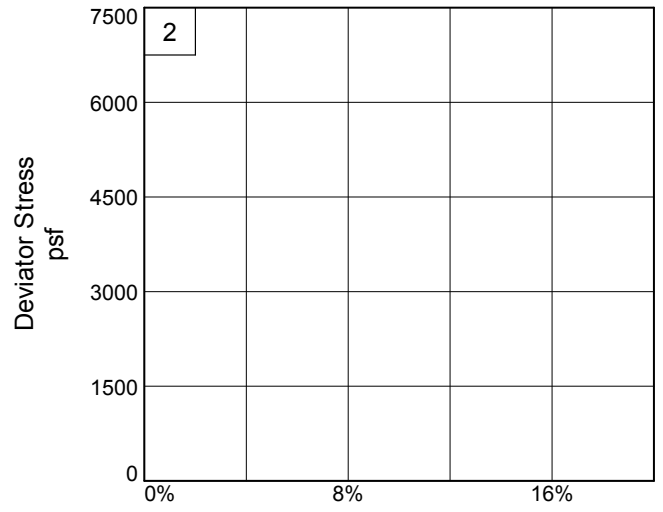
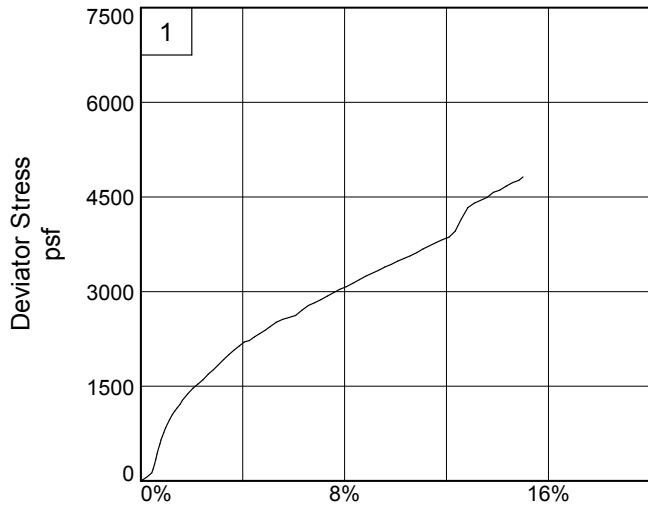
Date Sampled:

TRIAXIAL SHEAR TEST REPORT

Thompson Engineering

Mobile, Alabama

Figure _____



Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2

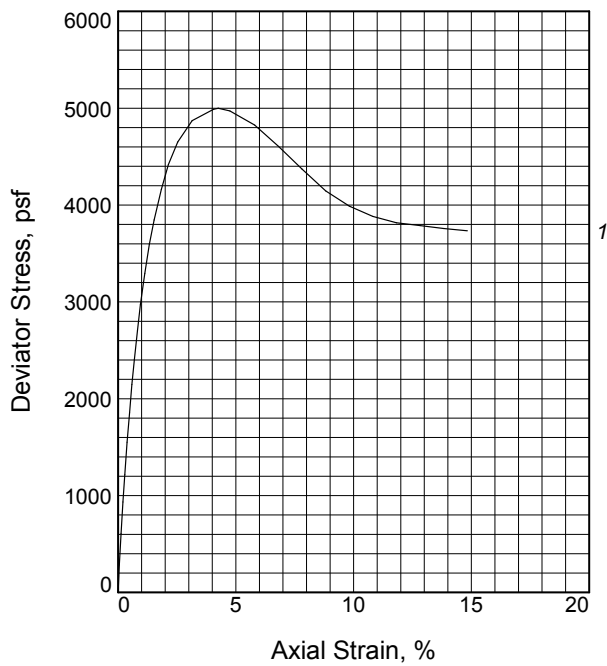
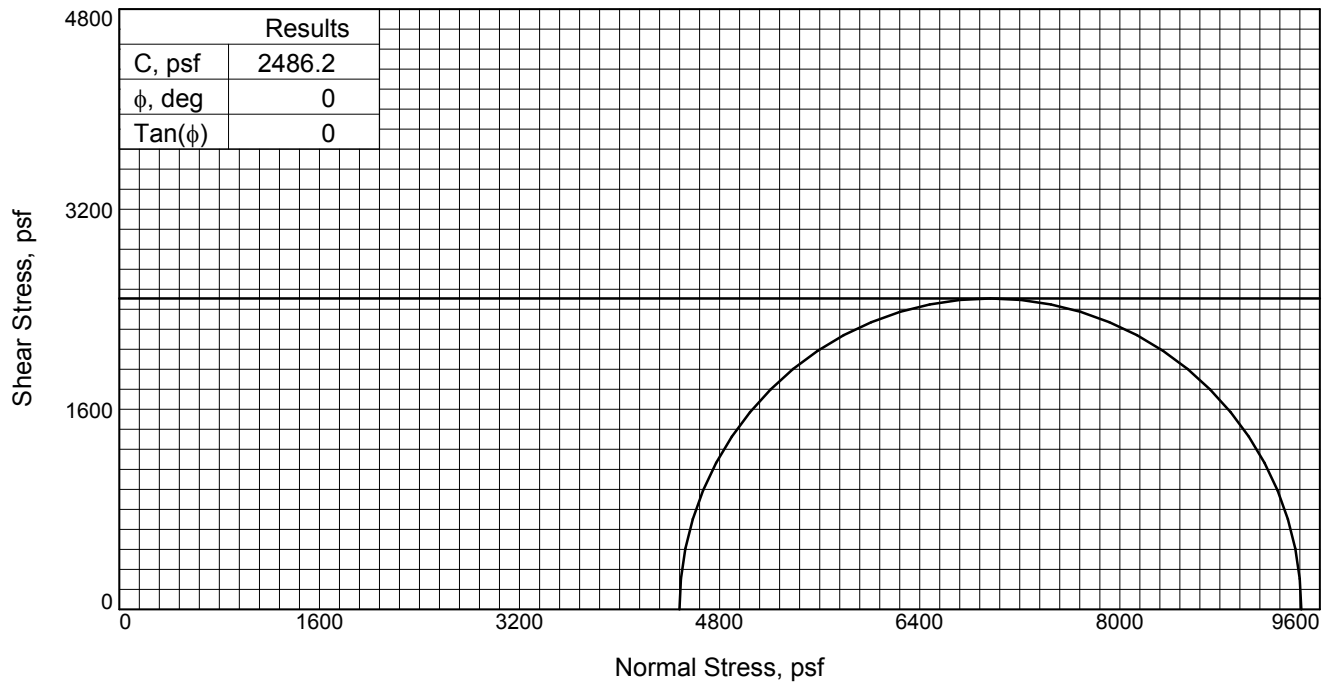
Depth: 270.0-272.0'

Sample Number: T-7

Project No.: 1511010228

Figure _____

Thompson Engineering



Specimen No.		1
Initial	Water Content, %	26.4
	Dry Density, pcf	100.2
	Saturation, %	106.7
	Void Ratio	0.6578
	Diameter, in.	2.860
	Height, in.	5.661
At Test	Water Content, %	27.5
	Dry Density, pcf	100.2
	Saturation, %	111.1
	Void Ratio	0.6578
	Diameter, in.	2.860
	Height, in.	5.661
Strain at peak, %	4.7	
Back Pressure, psf	0.0	
Cell Pressure, psf	4478.4	
Fail. Stress, psf	4972.5	
Strain, %	4.7	
Ult. Stress, psf	4972.5	
Strain, %	4.7	
σ_1 Failure, psf	9450.9	
σ_3 Failure, psf	4478.4	

Type of Test:

Unconsolidated Undrained

Sample Type: 3-in. Shelby Tube

Description: SANDY LEAN CLAY (CL,A-7-6(12))

Specific Gravity= 2.66

Remarks: Compression Failure Mode: Asymmetrical Shear Plane

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2A

Depth: 93.5'-95.5'

Sample Number: T-2

Proj. No.: 1511010228

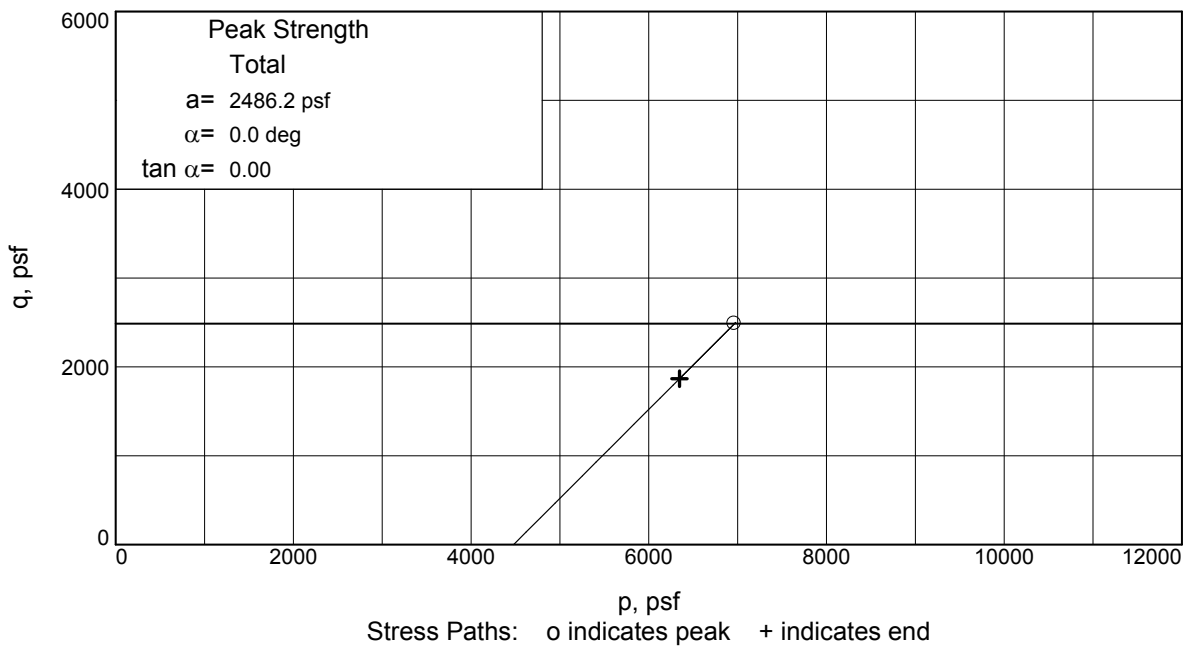
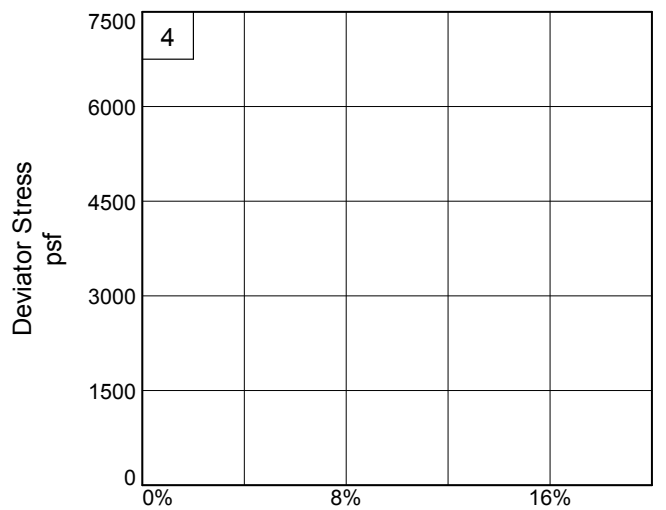
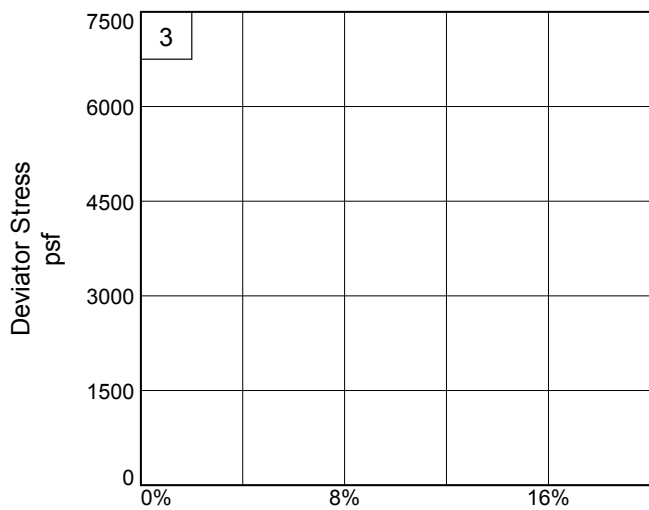
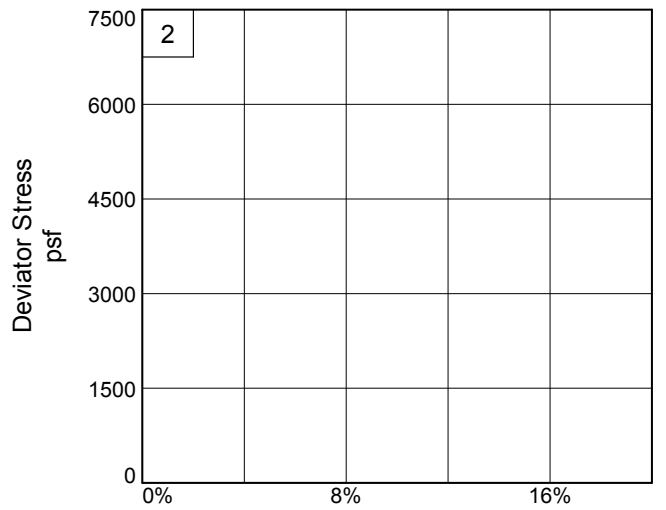
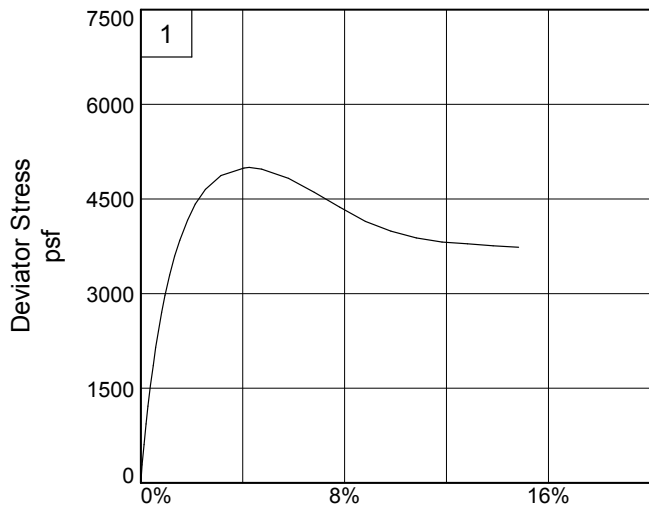
Date Sampled:

TRIAxIAL SHEAR TEST REPORT

Thompson Engineering

Mobile, Alabama

Figure _____



Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2A

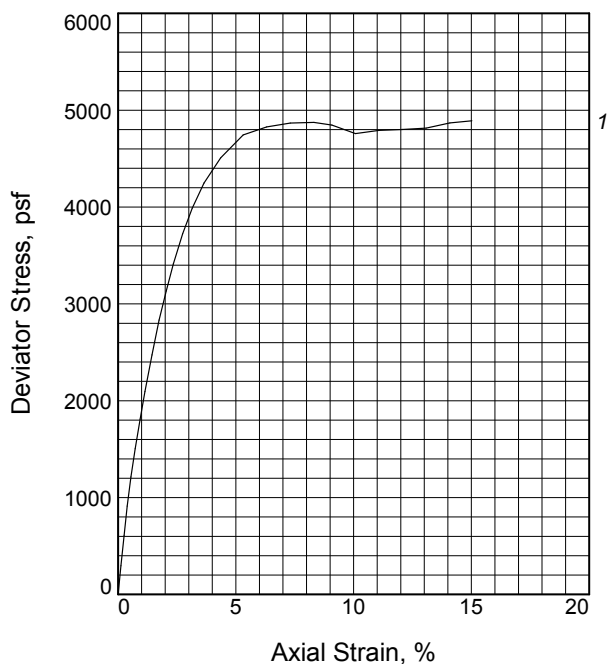
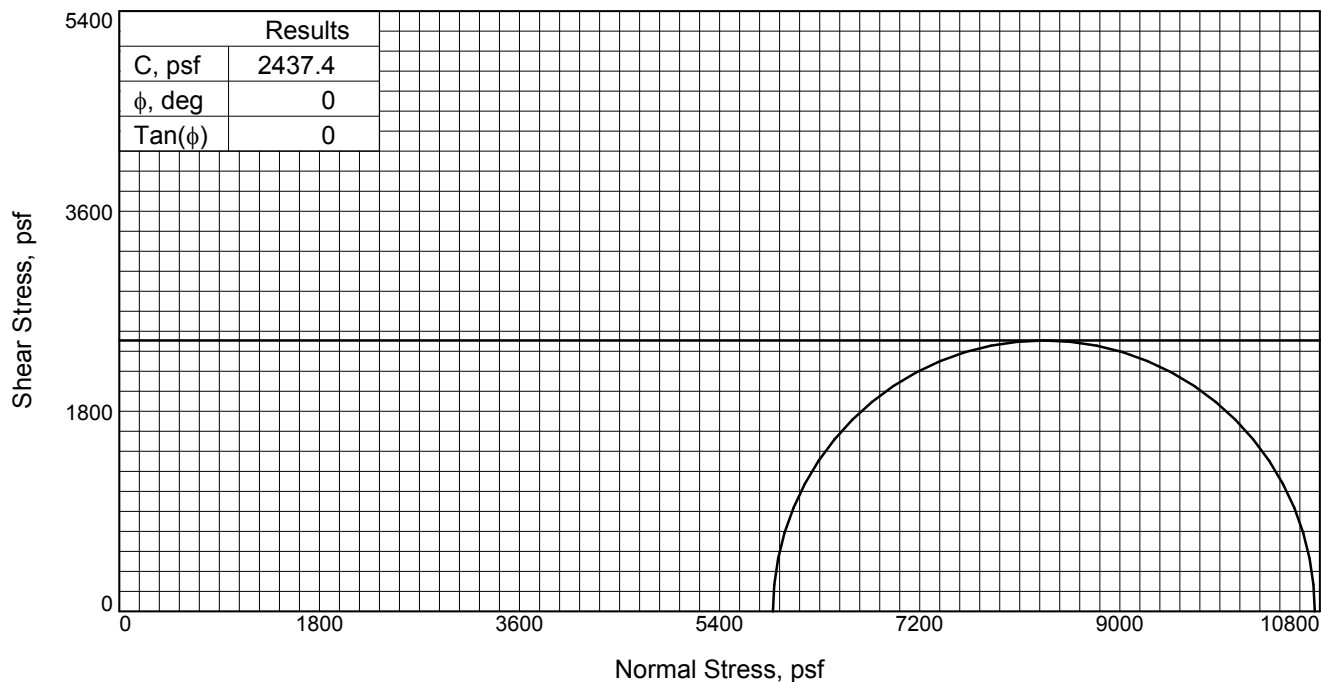
Depth: 93.5'-95.5'

Sample Number: T-2

Project No.: 1511010228

Figure _____

Thompson Engineering



Specimen No.		1
Initial	Water Content, %	20.6
	Dry Density, pcf	106.7
	Saturation, %	98.4
	Void Ratio	0.5570
	Diameter, in.	2.844
At Test	Height, in.	5.657
	Water Content, %	24.3
	Dry Density, pcf	106.7
	Saturation, %	116.2
	Void Ratio	0.5570
	Diameter, in.	2.844
	Height, in.	5.657
	Strain at peak, %	8.3
	Back Pressure, psf	0.0
	Cell Pressure, psf	5879.5
Fail. Stress, psf		4874.8
	Strain, %	8.3
	Ult. Stress, psf	4874.8
Strain, %		8.3
	σ_1 Failure, psf	10754.3
	σ_3 Failure, psf	5879.5

Type of Test:

Unconsolidated Undrained

Sample Type: 3-in. Shelby Tube

Description: LEAN CLAY (CL,A-6(18))

Specific Gravity= 2.66

Remarks: Compression Failure Mode: Asymmetrical Shear Plane

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2A

Depth: 123'-125'

Sample Number: T-3

Proj. No.: 1511010228

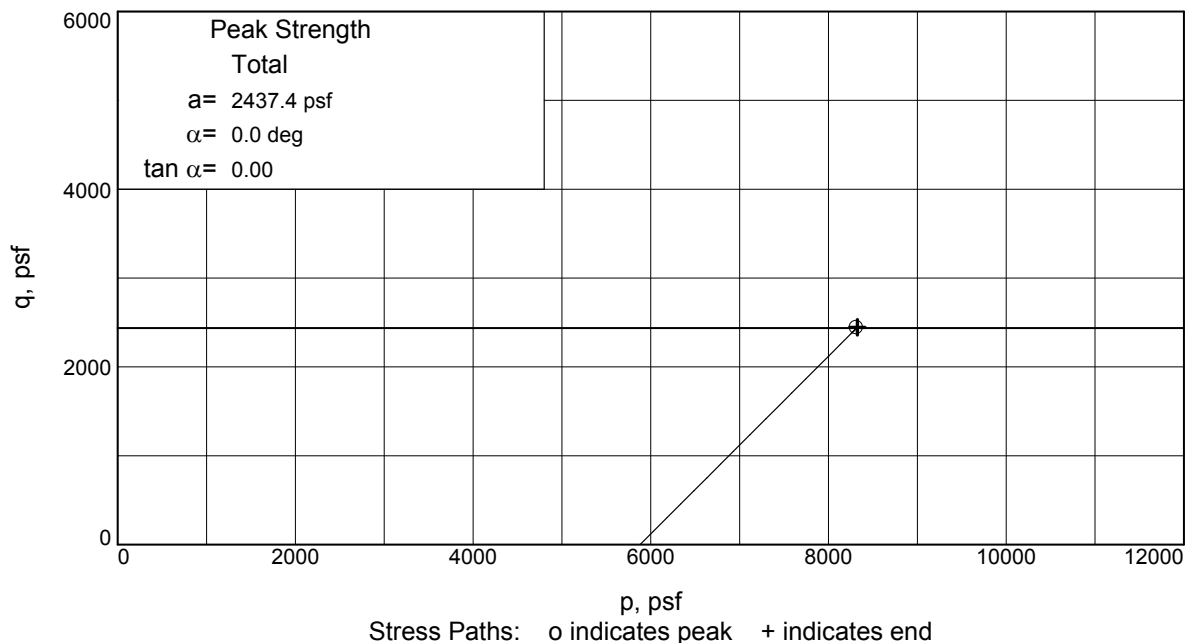
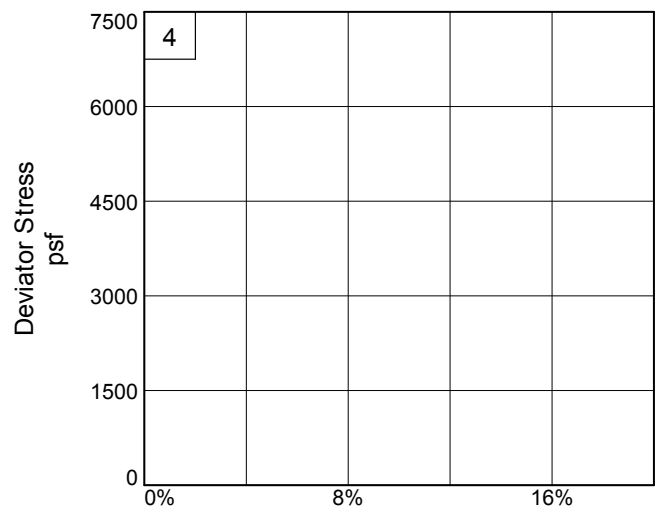
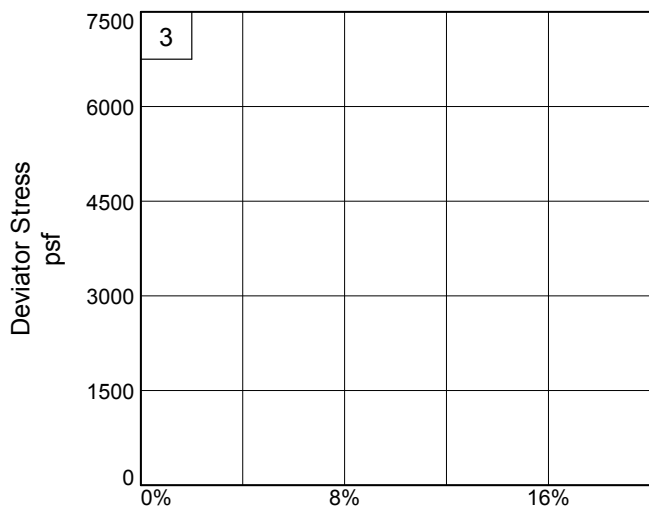
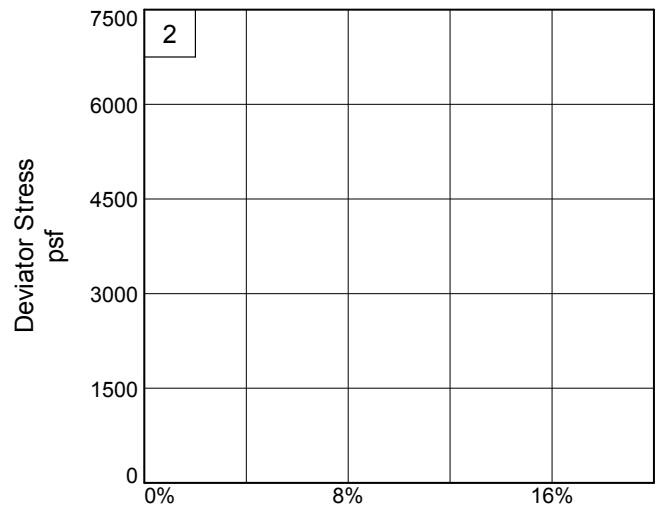
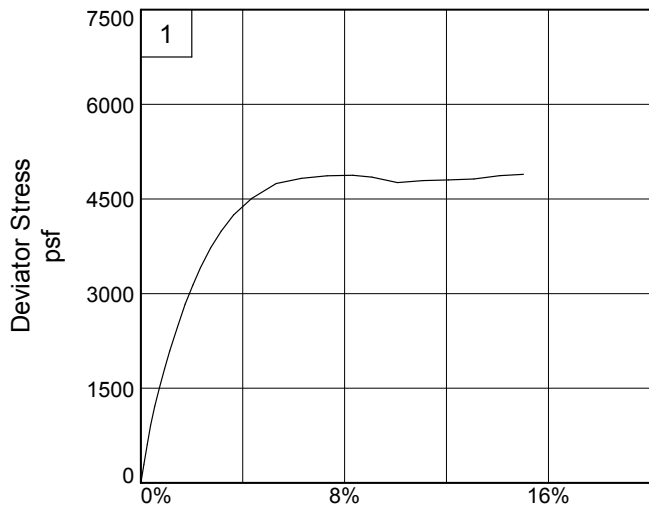
Date Sampled:

TRIAXIAL SHEAR TEST REPORT

Thompson Engineering

Mobile, Alabama

Figure _____



Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2A

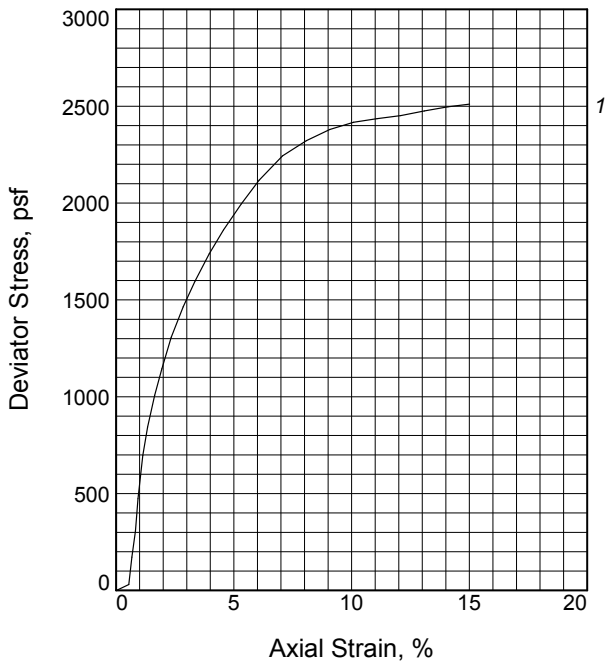
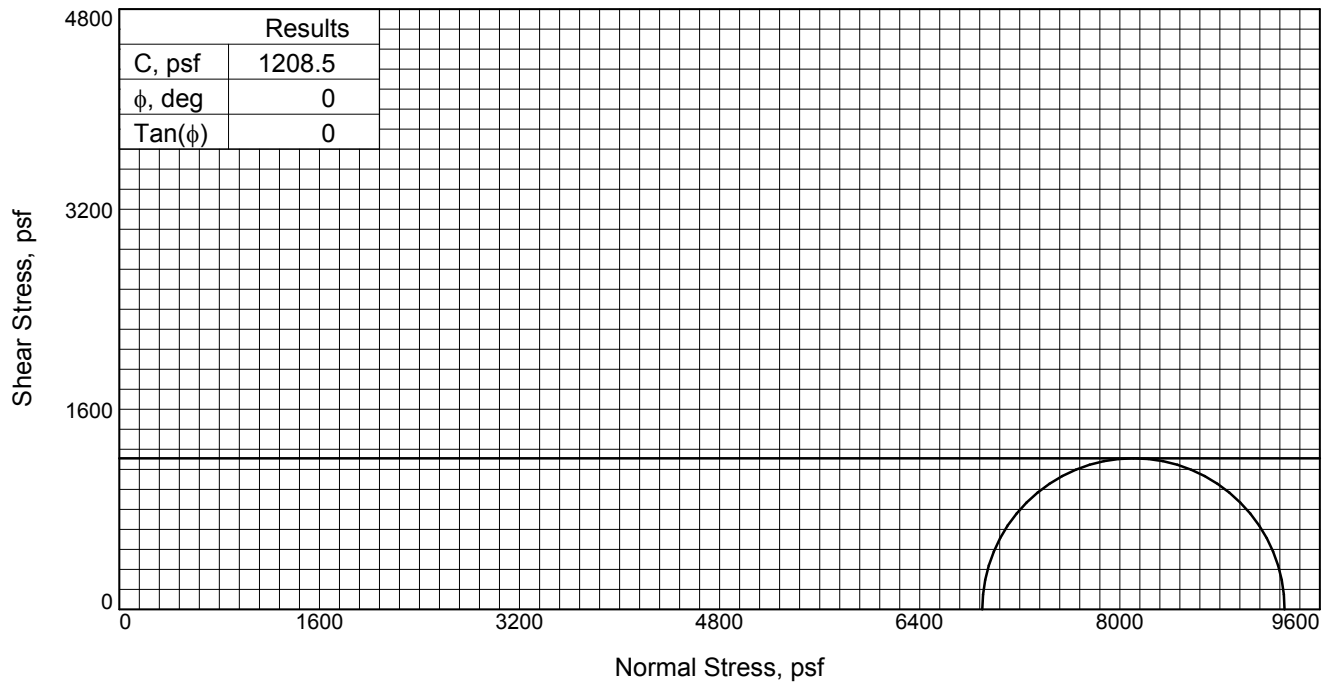
Depth: 123'-125'

Sample Number: T-3

Project No.: 1511010228

Figure _____

Thompson Engineering



Specimen No.		1
Initial	Water Content, %	12.6
	Dry Density, pcf	110.3
	Saturation, %	66.6
	Void Ratio	0.5050
	Diameter, in.	2.741
At Test	Height, in.	5.038
	Water Content, %	27.6
	Dry Density, pcf	110.3
	Saturation, %	145.2
	Void Ratio	0.5050
	Diameter, in.	2.741
	Height, in.	5.038
	Strain at peak, %	10.1
	Back Pressure, psf	0.0
	Cell Pressure, psf	6900.5
Fail. Stress, psf		2417.0
	Strain, %	10.1
Ult. Stress, psf		2417.0
	Strain, %	10.1
σ_1 Failure, psf		9317.5
σ_3 Failure, psf		6900.5

Type of Test:

Unconsolidated Undrained

Sample Type: 3-in. Shelby Tube

Description: Gray, CLAY, with sand lense

Specific Gravity= 2.66

Remarks: Compression Failure Mode: Asymmetrical Shear Plane

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2A

Depth: 143'-145'

Sample Number: T-5

Proj. No.: 1511010228

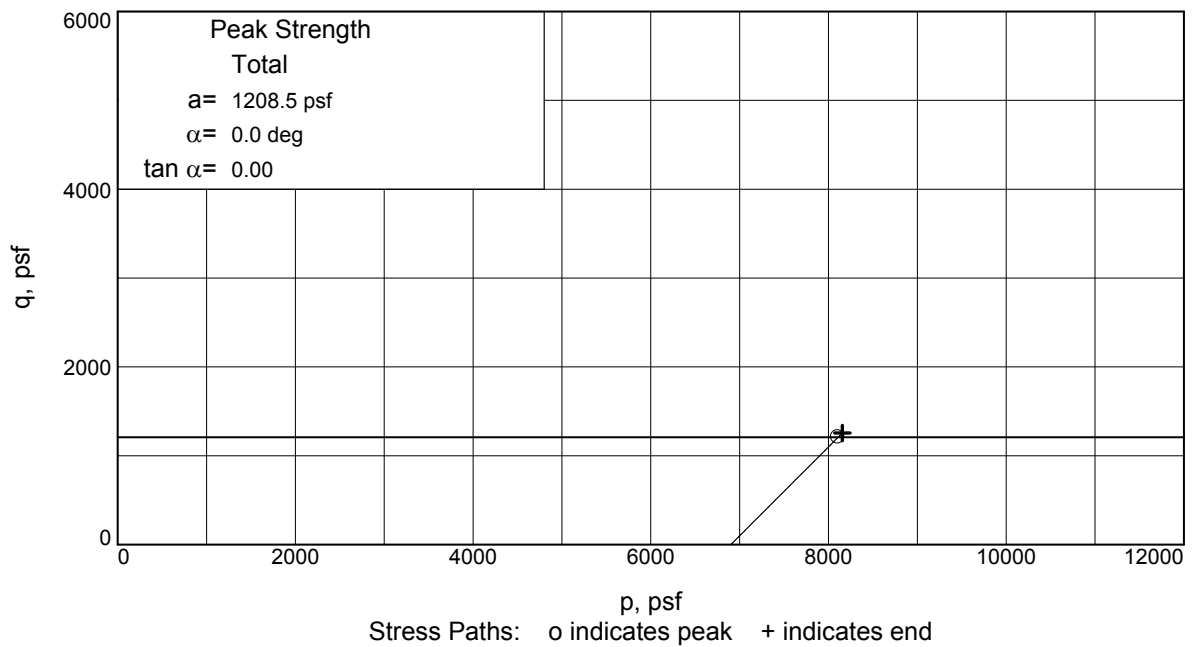
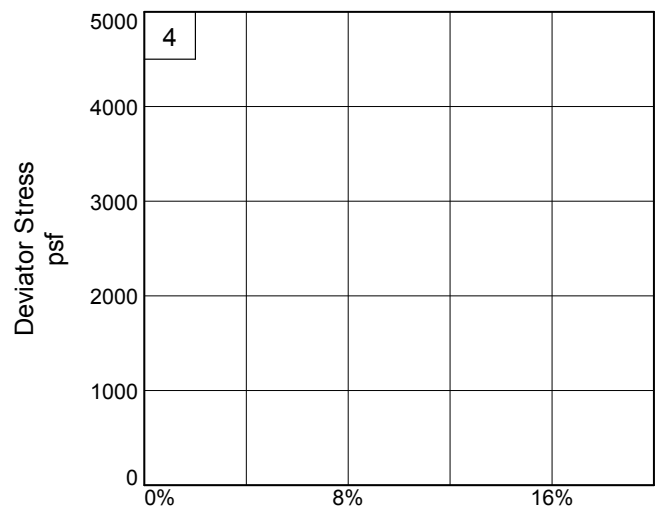
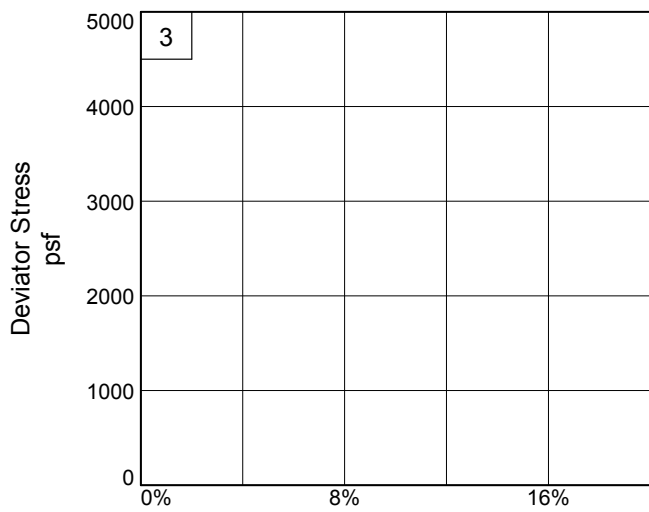
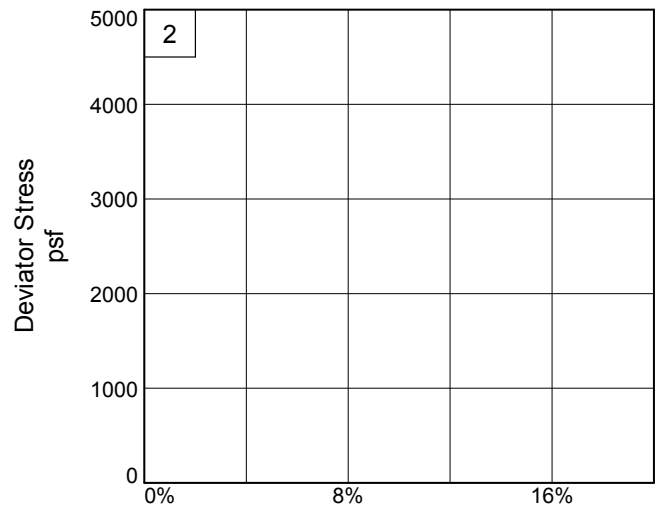
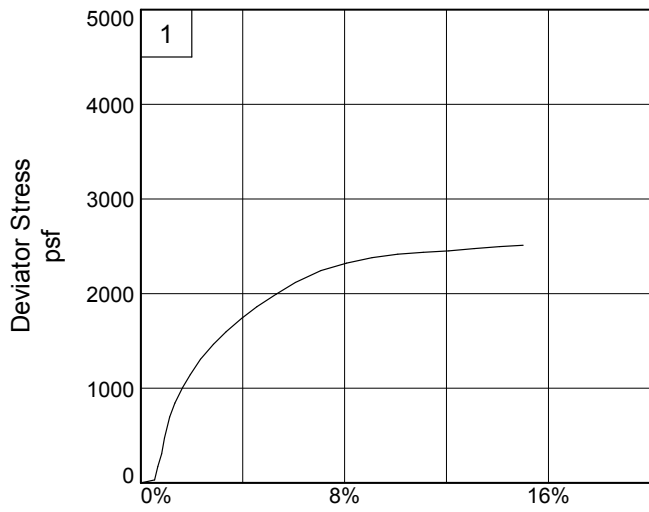
Date Sampled:

TRIAxIAL SHEAR TEST REPORT

Thompson Engineering

Mobile, Alabama

Figure _____



Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2A

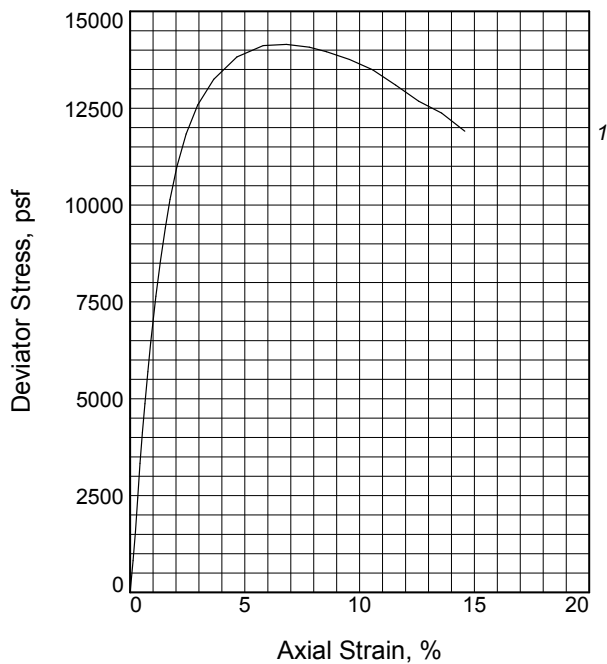
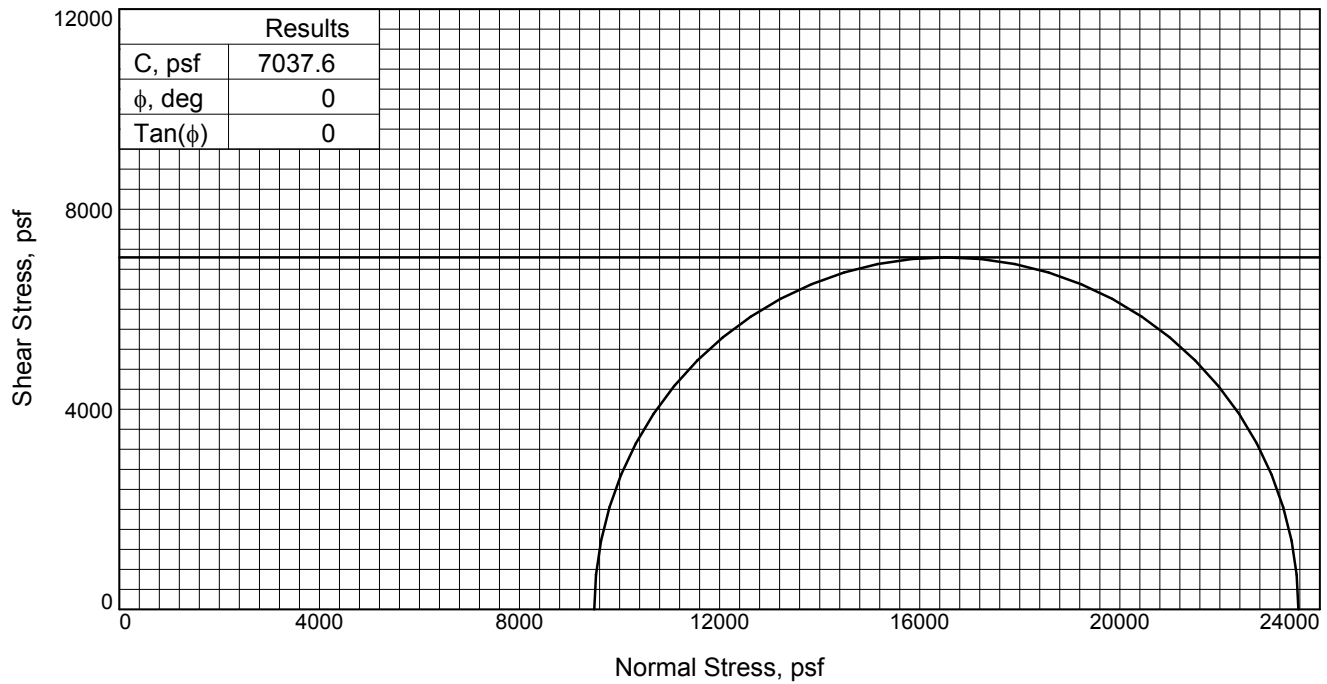
Depth: 143'-145'

Sample Number: T-5

Project No.: 1511010228

Figure _____

Thompson Engineering



Specimen No.		1
Initial	Water Content, %	17.7
	Dry Density, pcf	114.4
	Saturation, %	104.0
	Void Ratio	0.4522
	Diameter, in.	2.739
At Test	Height, in.	5.506
	Water Content, %	16.8
	Dry Density, pcf	114.4
	Saturation, %	98.8
	Void Ratio	0.4522
	Diameter, in.	2.739
	Height, in.	5.506
	Strain at peak, %	7.8
	Back Pressure, psf	0.0
	Cell Pressure, psf	9493.9
Fail. Stress, psf		14075.3
	Strain, %	7.8
Ult. Stress, psf		14075.3
	Strain, %	7.8
σ_1 Failure, psf		23569.2
σ_3 Failure, psf		9493.9

Type of Test:

Unconsolidated Undrained

Sample Type: 3-in. Shelby Tube

Description: LEAN CLAY with SAND (CL,A-6(16))

Specific Gravity= 2.66

Remarks: Compression Failure Mode: Asymmetrical Shear Plane

Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2A

Depth: 198'-200'

Sample Number: T-8

Proj. No.: 1511010228

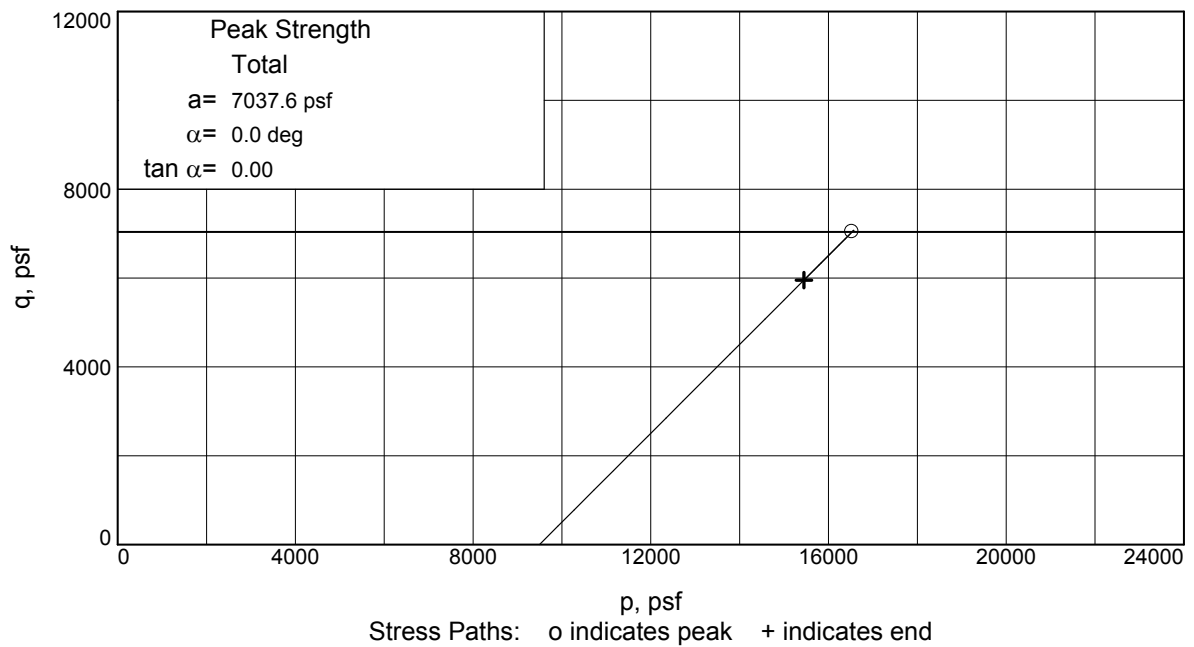
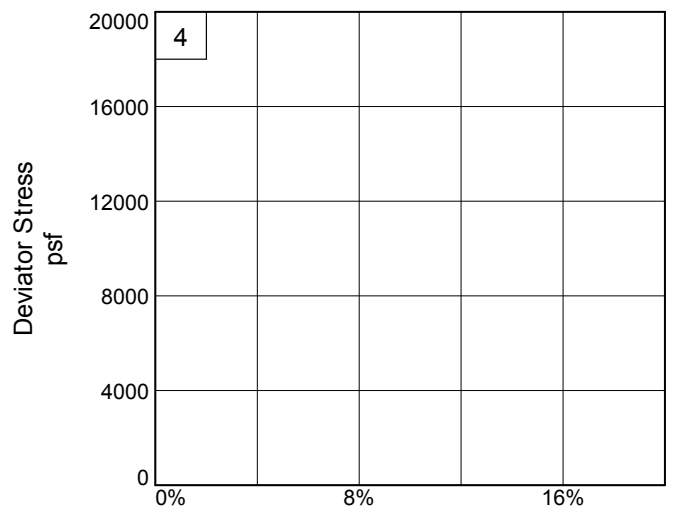
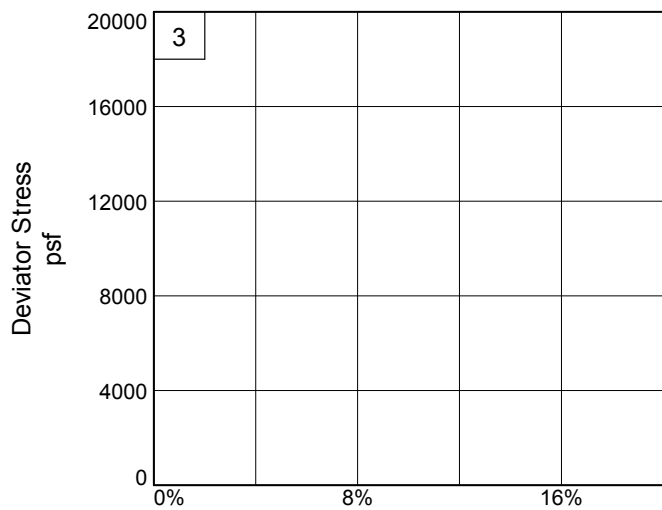
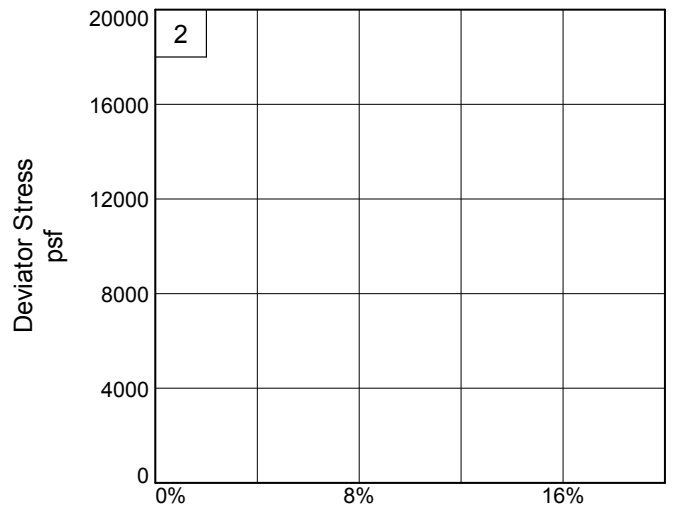
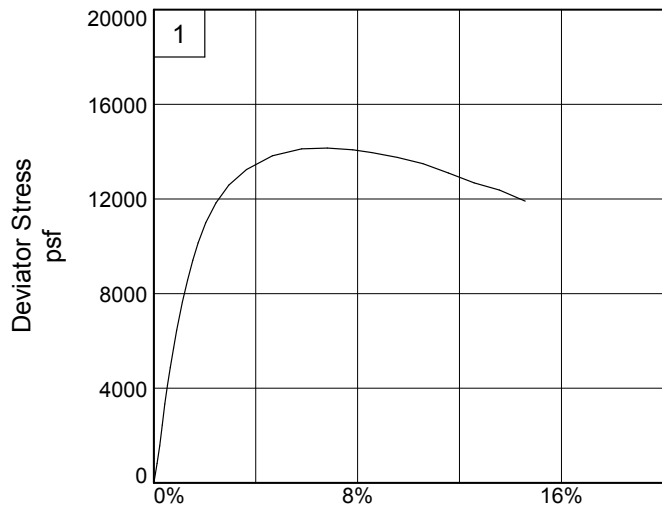
Date Sampled:

TRIAxIAL SHEAR TEST REPORT

Thompson Engineering

Mobile, Alabama

Figure _____



Client: ALDOT

Project: Mobile River Bridge

Source of Sample: MB-2A

Depth: 198'-200'

Sample Number: T-8

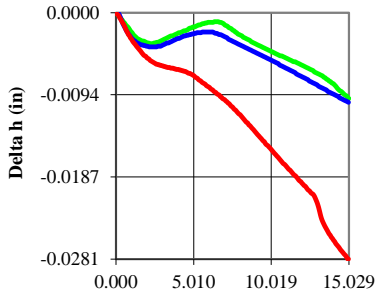
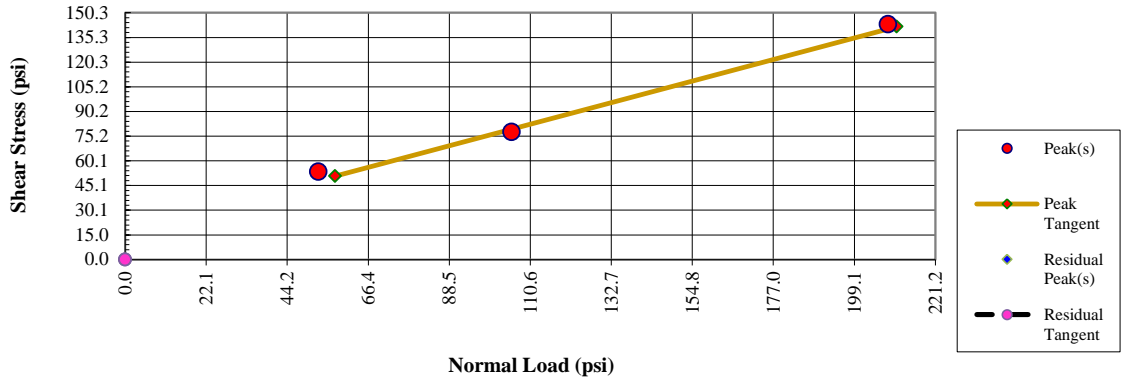
Project No.: 1511010228

Figure _____

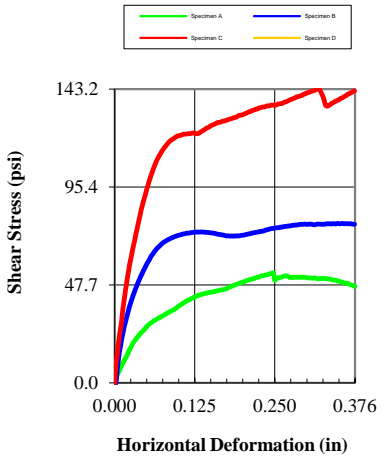
Thompson Engineering

Thompson Engineering
Direct Shear Test (ASTM D3080)

Peak: $\Phi = 30.7$ $C = 16.9$



	Specimen			
Initial	A	B	C	D
Moisture (%)	25.75	27.09	27.09	
Density (pcf)	94.08	94.76	95.09	
Void Ratio	0.725	0.713	0.707	
Saturation (%)	92.32	98.80	99.63	
Diameter (in)	2.500	2.500	2.500	
Height (in)	1.000	1.000	1.000	



Final	A	B	C	D
Moisture (%)	31.09	30.53	29.72	
Density (pcf)	94.59	96.41	97.51	
Void Ratio	0.716	0.684	0.664	
Saturation (%)	100.00	100.00	100.00	
Diameter (in)	2.500	2.500	2.500	
Height (in)	0.965	0.954	0.947	
Normal Stress (psi)	52.8	105.6	208.3	
Peak Stress (psi)	53.5	77.7	143.2	
Residual Stress (psi)				
Strain (%)	15.029	15.006	15.006	
Rate (in/min)	0.00857	0.00848	0.00716	

Project Date	
Date	8/24/17

Project:	Mobile River Bridge
Location:	Soils Lab
Project Number:	8013
Boring Number:	MB-02A
Sample Number:	T-6
Depth:	158.0-160.0 ft.
Sample Type:	Undisturbed
Description:	POORLY GRADED SAND with SILT (SP-SM A-3(0))
Test Type:	Direct Shear
Remarks:	



Failure Photographs

Date

Checked By

Date

Date

Tested By

Thompson Engineering
Direct Shear Test (ASTM D3080)

Date

Checked By

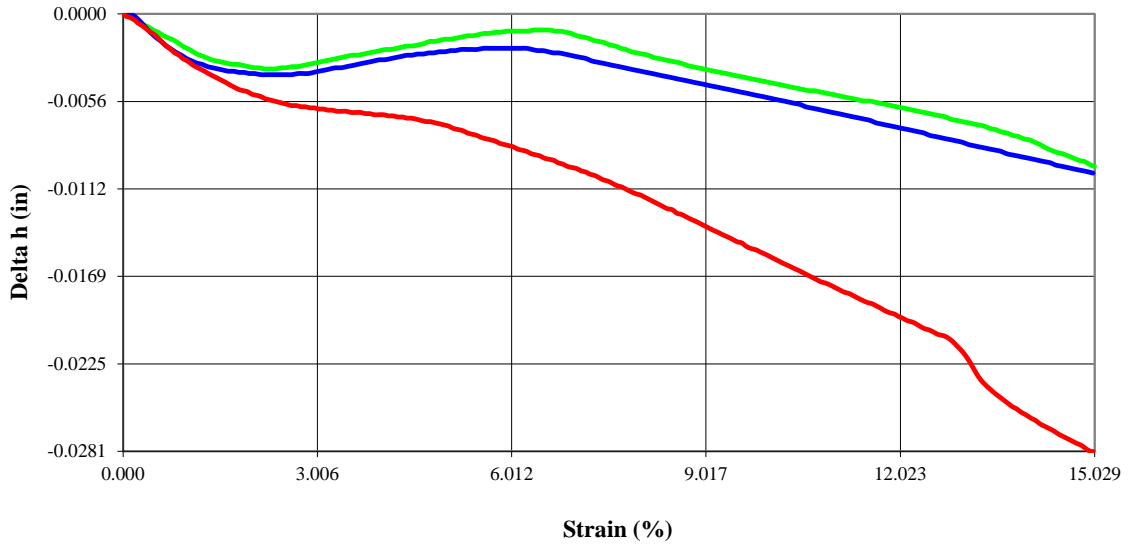
Date

Date

Date

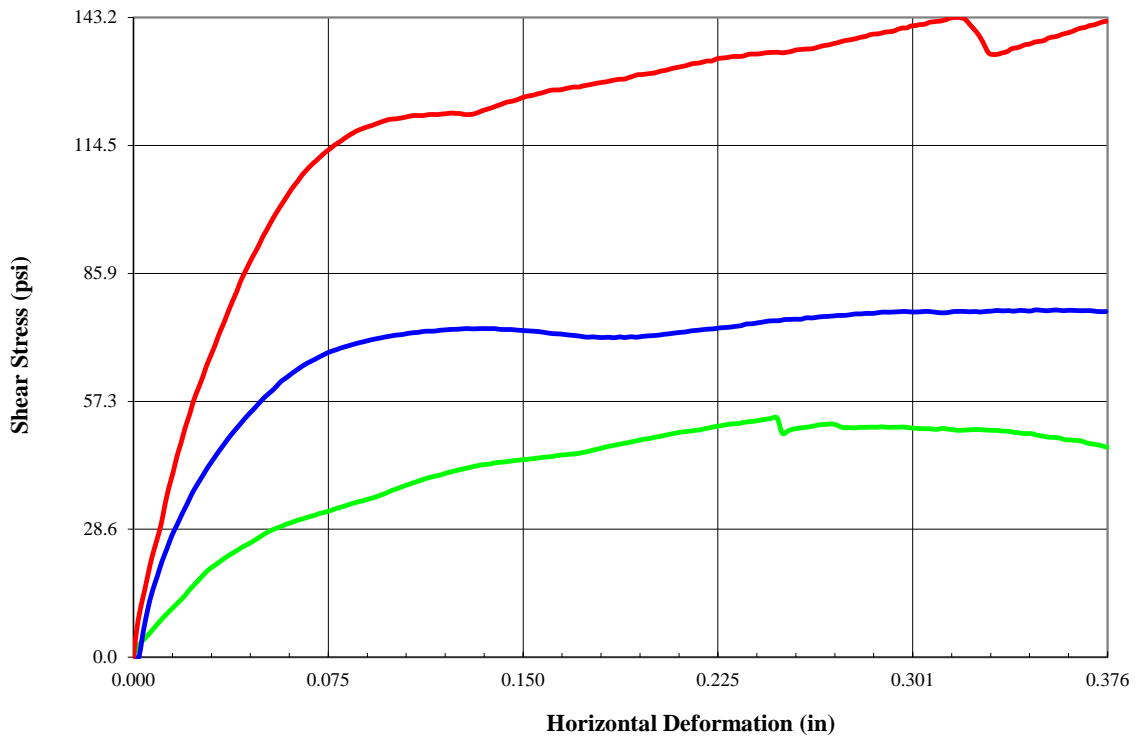
Tested By

Delta h

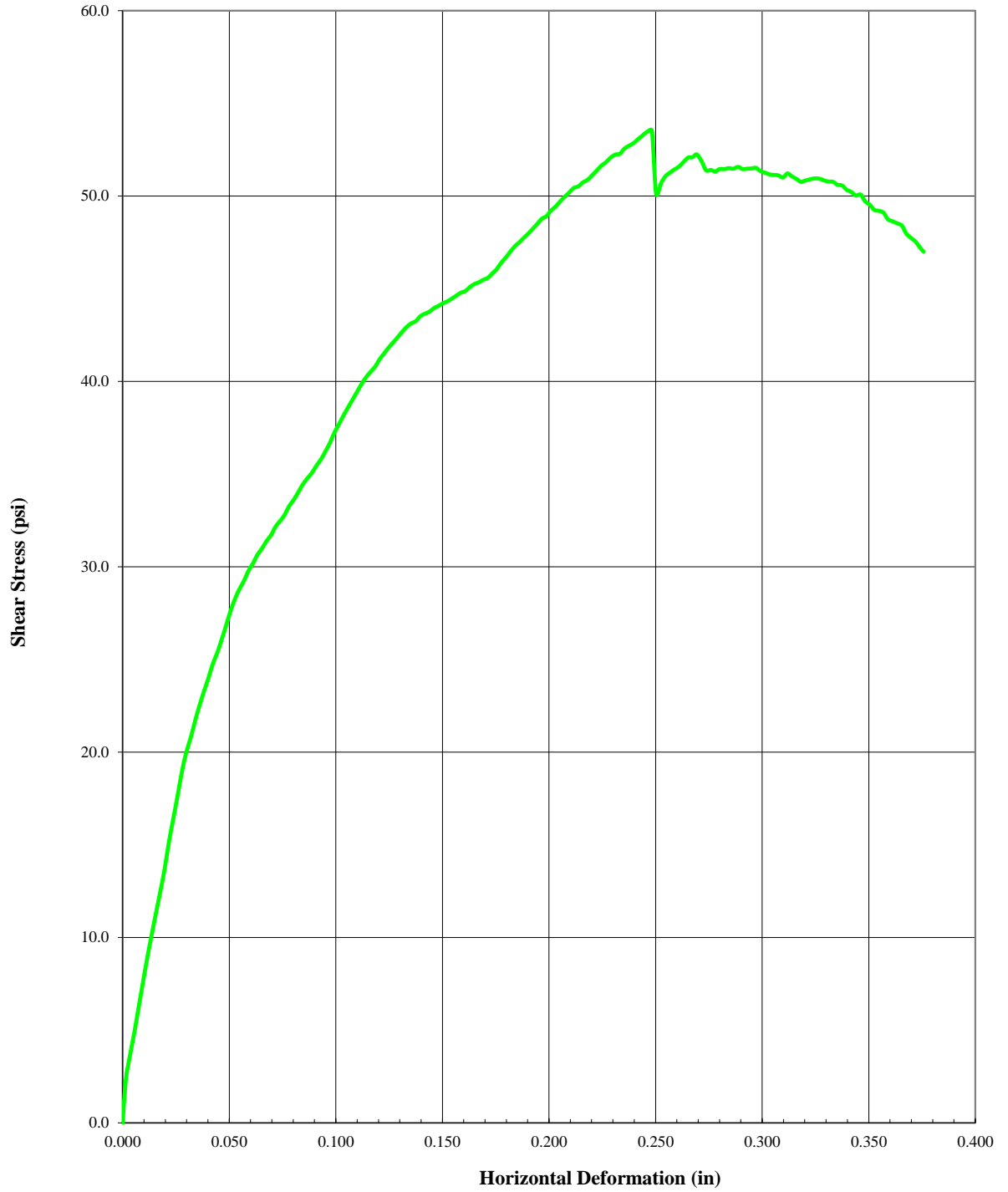


Specimen A Specimen B Specimen C Specimen D

Stress-Deformation



Specimen A Stress-Deformation



Date

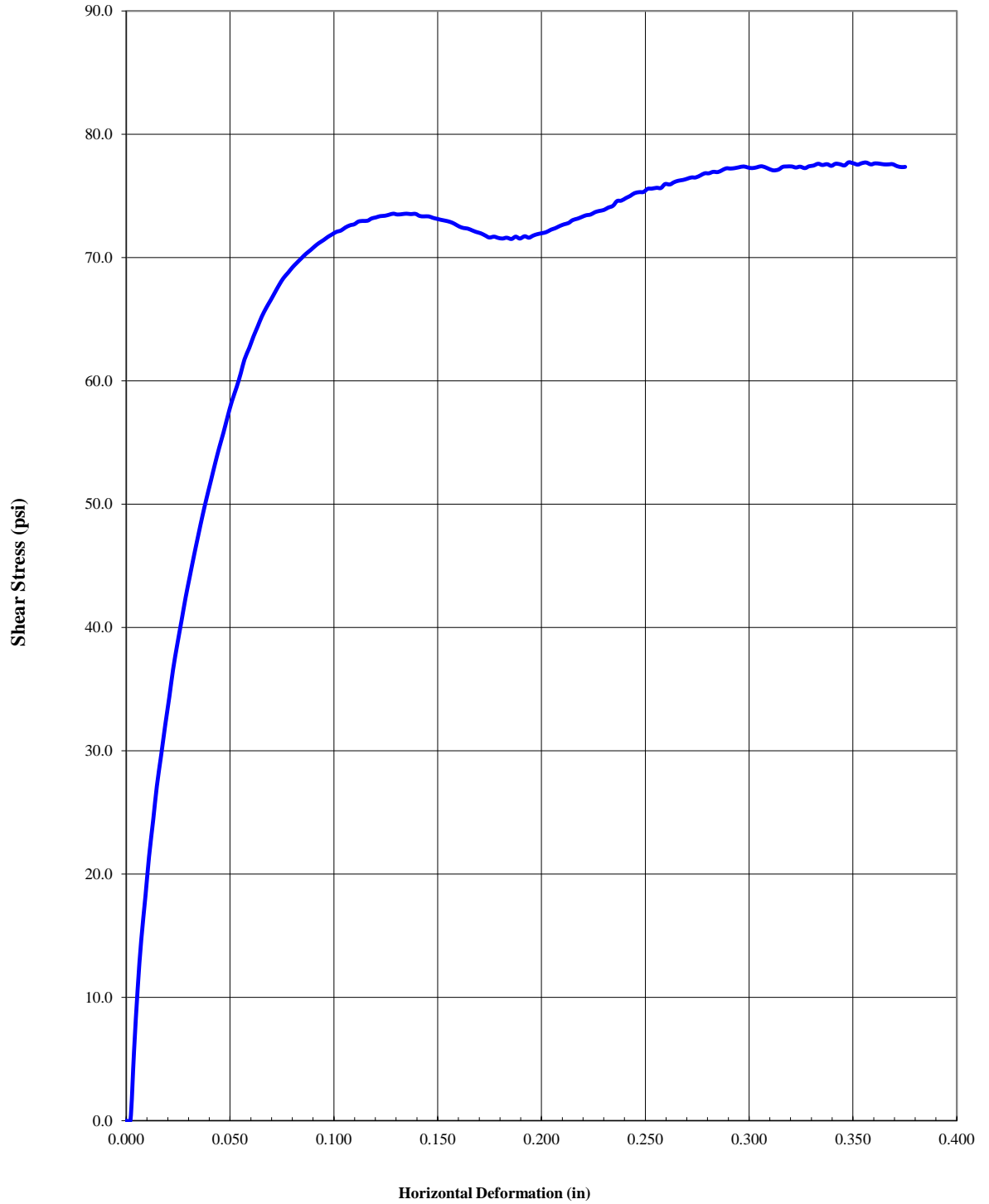
Checked By

Date

Date

Tested By

Specimen B Stress-Deformation



Date

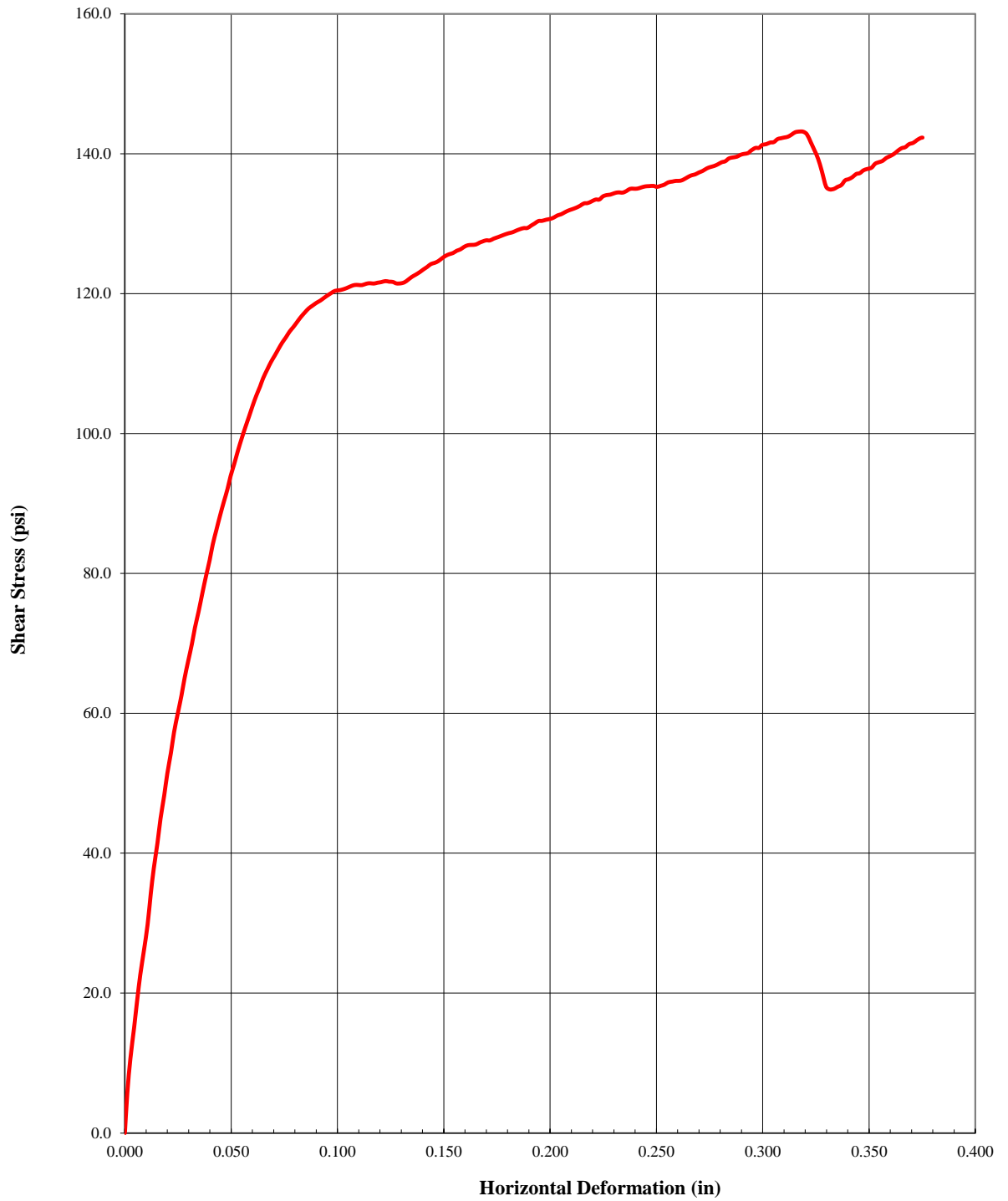
Checked By

Date

Date

Tested By

Specimen C Stress-Deformation



Date

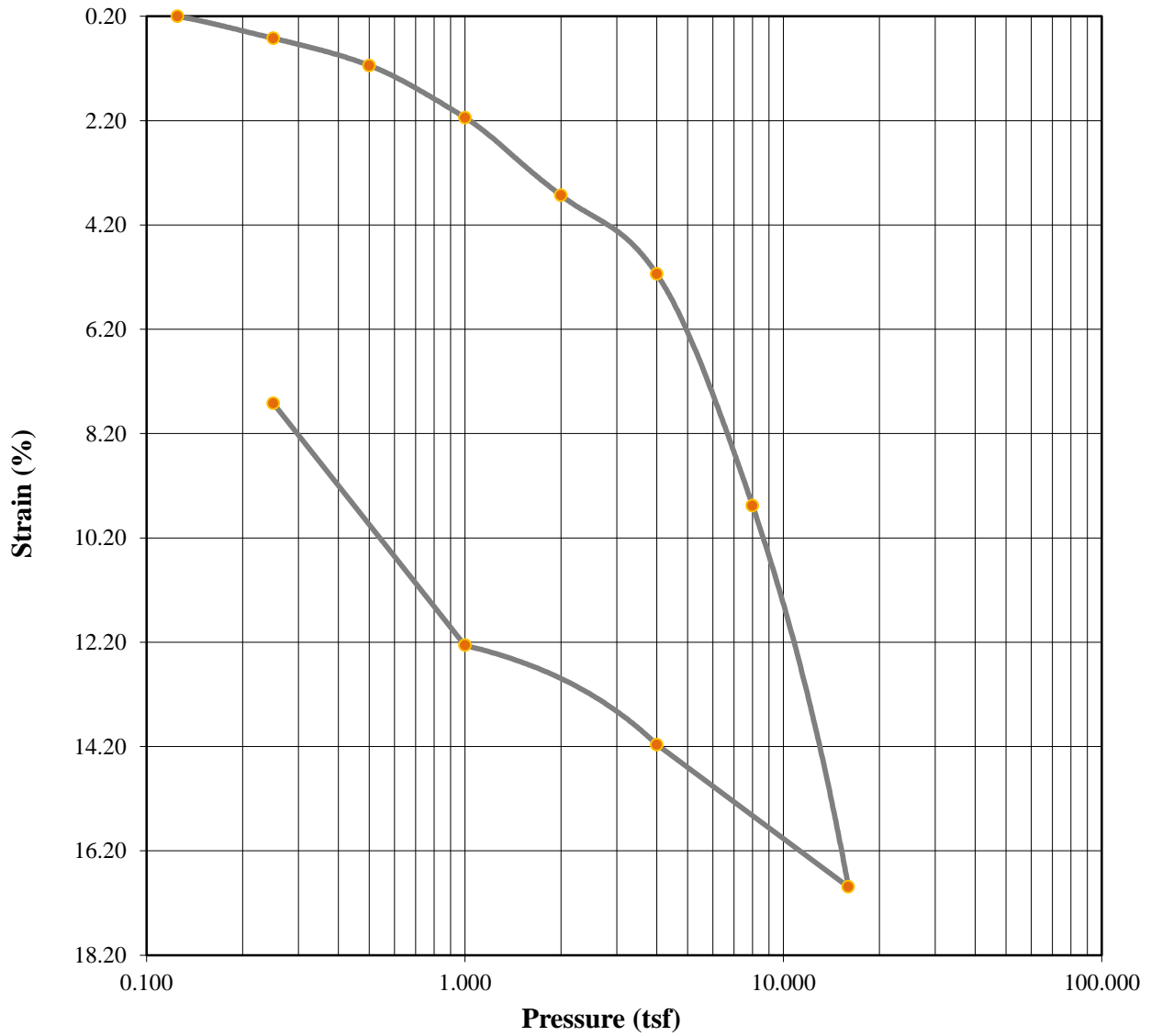
Checked By

Date

Date

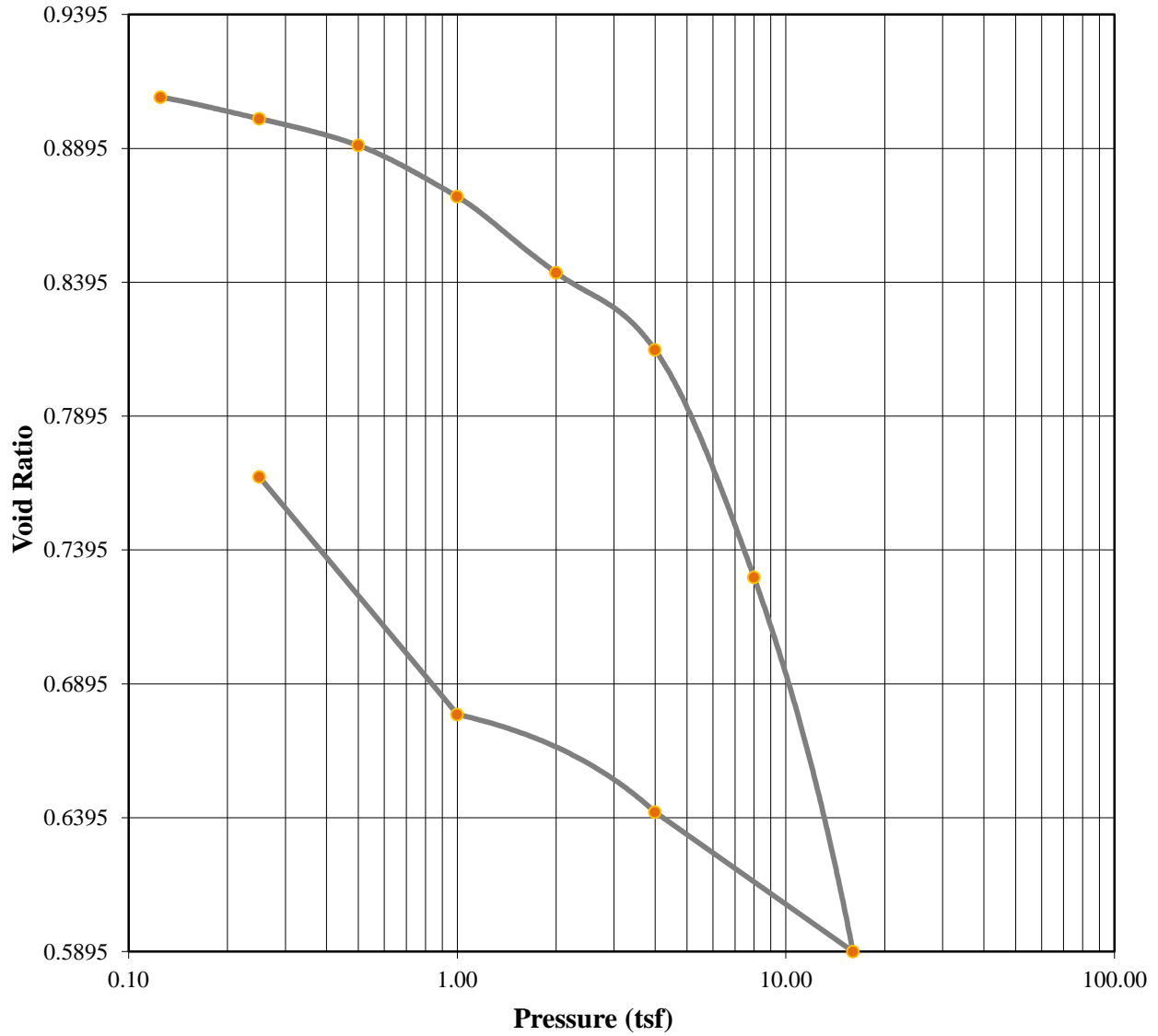
Tested By

Consolidation Test Test Results



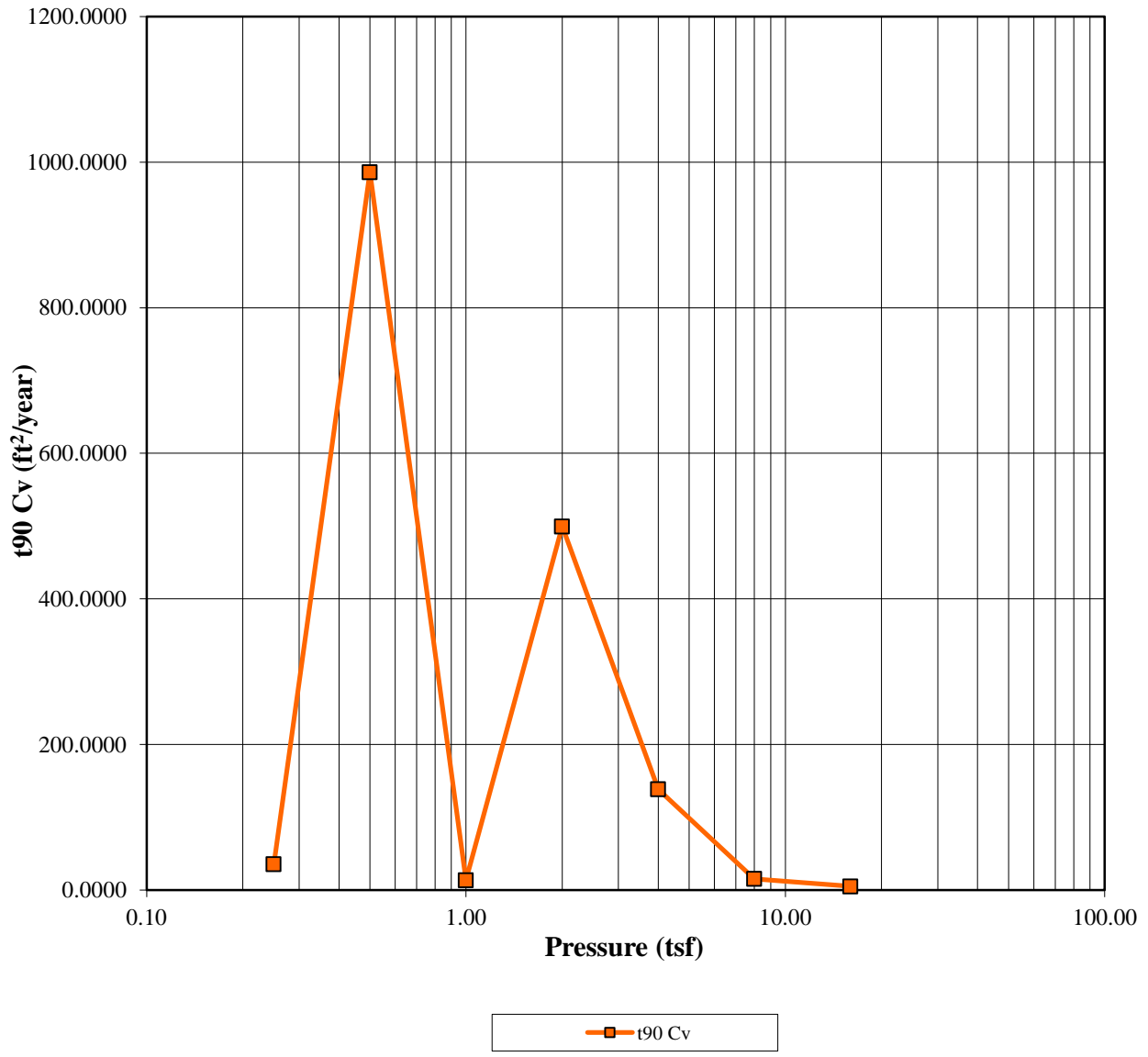
	Before	After	Liquid Limits:	52	Test Date:	5/14/16
Moisture (%):	34.65	33.88	Plastic Limits:	22		
Dry Density (pcf):	83.97	88.16	Plasticity Index (%):	30		
Saturation (%):	97.50	105.85				
Void Ratio:	0.9166	0.7707	Specific Gravity:	2.577	Measured	
Sample Description:	FAT CLAY with SAND (CH A-7-6(23))					
Project Number:	7716		Depth:	90.5-92.5 ft.		Remarks:
Sample Number:	T-1		Boring Number:	MB-1		
Project:	Mobile River Bridge					
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



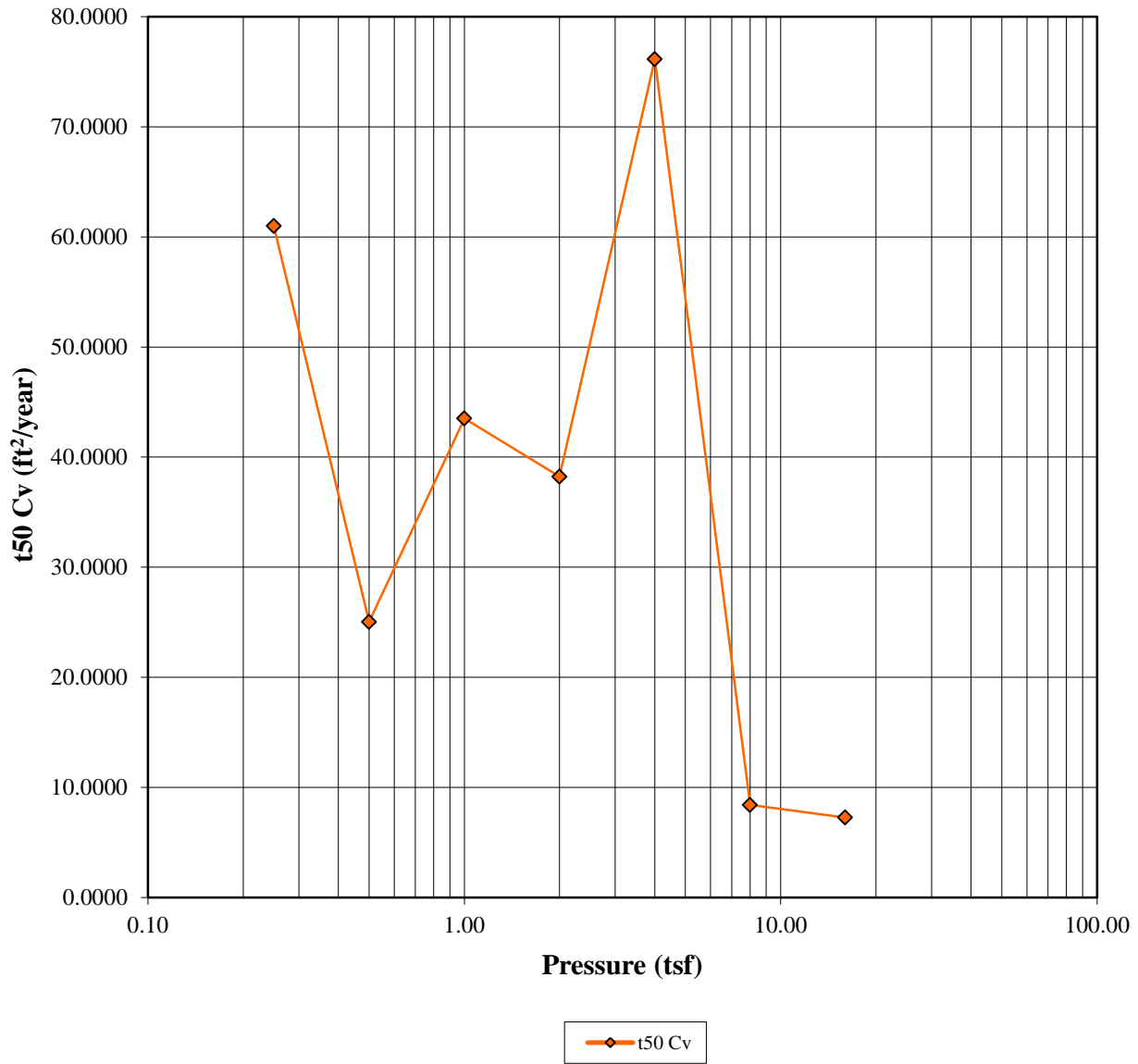
	Before	After	Liquid Limits:	52	Test Date:	5/14/16
Moisture (%):	34.65	33.88	Plastic Limits:	22		
Dry Density (pcf):	83.97	88.16	Plasticity Index (%):	30		
Saturation (%):	97.50	105.85				
Void Ratio:	0.9166	0.7707	Specific Gravity:	2.577	Measured	
Soil Description:	FAT CLAY with SAND (CH A-7-6(23))					
Project Number:	7716		Depth:	90.5-92.5 ft.		Remarks:
Sample Number:	T-1		Boring Number:	MB-1		
Project:	Mobile River Bridge					
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



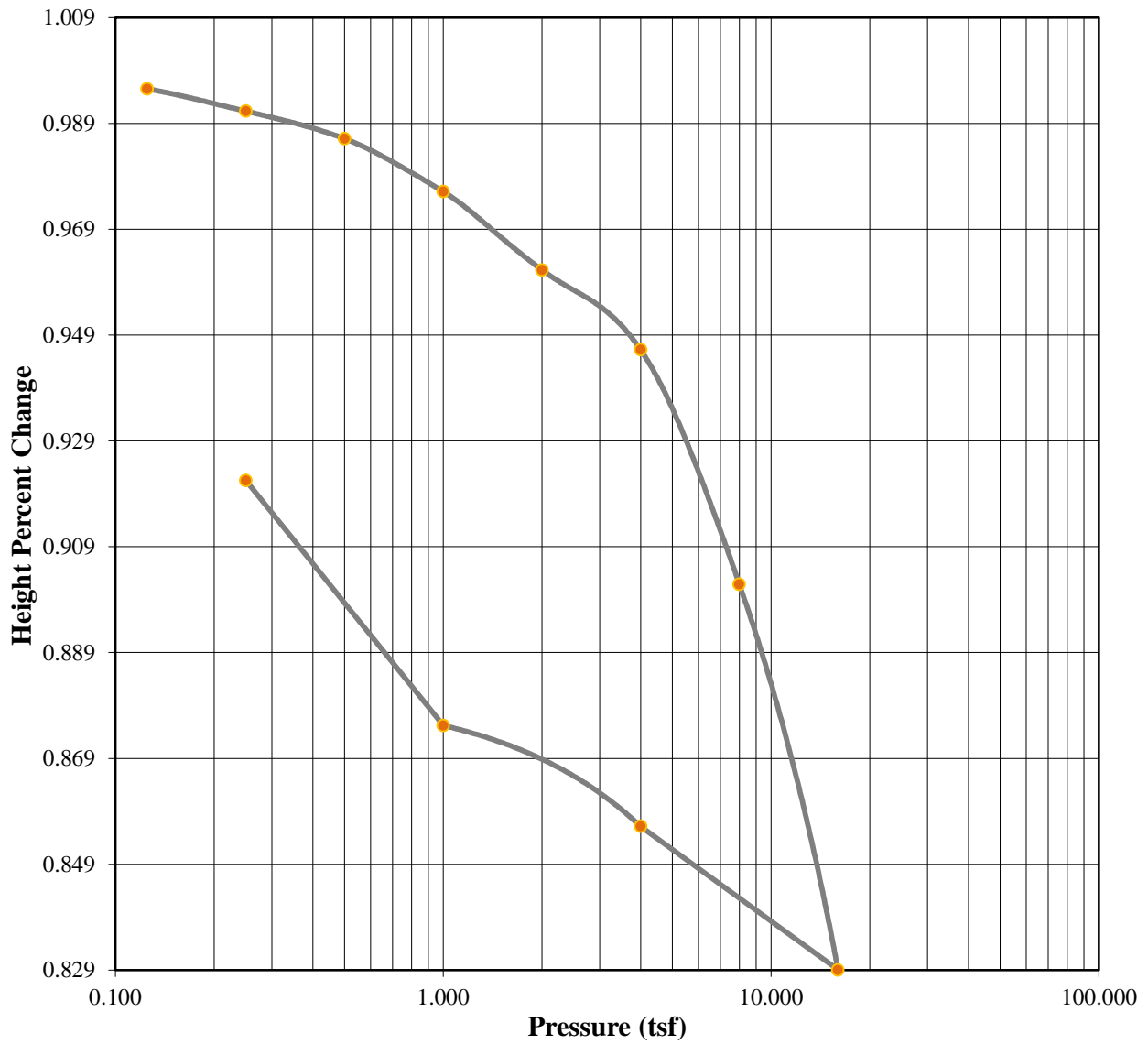
	Before	After	Liquid Limits:	52	Test Date:	5/14/16
Moisture (%):	34.65	33.88	Plastic Limits:	22		
Dry Density (pcf):	83.97	88.16	Plasticity Index (%):	30		
Saturation (%):	97.50	105.85	Specific Gravity:	2.577	Measured	
Void Ratio:	0.9166	0.7707				
Soil Description:	FAT CLAY with SAND (CH A-7-6(23))					
Project Number:	7716		Depth:	90.5-92.5 ft.		Remarks:
Sample Number:	T-1		Boring Number:	MB-1		
Project:	Mobile River Bridge					
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	52	Test Date:	5/14/16
Moisture (%):	34.65	33.88	Plastic Limits:	22		
Dry Density (pcf):	83.97	88.16	Plasticity Index (%):	30		
Saturation (%):	97.50	105.85				
Void Ratio:	0.9166	0.7707	Specific Gravity:	2.577	Measured	
Soil Description:	FAT CLAY with SAND (CH A-7-6(23))					
Project Number:	7716		Depth:	90.5-92.5 ft.		Remarks:
Sample Number:	T-1		Boring Number:	MB-1		
Project:	Mobile River Bridge					
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	52	Test Date:	5/14/16
Moisture (%):	34.65	33.88	Plastic Limits:	22		
Dry Density (pcf):	83.97	88.16	Plasticity Index (%):	30		
Saturation (%):	97.50	105.85				
Void Ratio:	0.9166	0.7707	Specific Gravity:	2.577	Measured	
Soil Description:	FAT CLAY with SAND (CH A-7-6(23))					
Project Number:	7716		Depth:	90.5-92.5 ft.		Remarks:
Sample Number:	T-1		Boring Number:	MB-1		
Project:	Mobile River Bridge					
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Results Summary

Project: Mobile River Bridge
Location: Soils Lab
Job Number: 16-1101-0110

Project Number: 7716

Sample Number: T-1
Boring Number: MB-1
Depth: 90.5-92.5 ft.
Sample Type: Undisturbed

Sample Description: FAT CLAY with SAND (CH A-7-6(23))
Remarks:

Test Number:
Test Date: 5/14/16

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 (ft ² /year)	t50 Cv (ft ² /year)
0	0.000	0.0000	0.9980	0.4762	0.00	0.9124	0.000	0.000	0.000	0.000
1	0.125	0.0020	0.9960	0.4742	0.20	0.9086	0.000	0.000	0.000	0.000
2	0.250	0.0062	0.9918	0.4700	0.62	0.9006	21.386	2.900	35.594	60.981
3	0.500	0.0114	0.9866	0.4648	1.14	0.8906	0.764	6.987	986.125	25.043
4	1.000	0.0214	0.9766	0.4548	2.14	0.8715	53.823	3.941	13.713	43.512
5	2.000	0.0362	0.9618	0.4400	3.63	0.8431	1.433	4.350	499.639	38.231
6	4.000	0.0513	0.9467	0.4249	5.14	0.8142	5.006	2.117	138.564	76.127
7	8.000	0.0956	0.9024	0.3806	9.58	0.7293	40.610	17.356	15.517	8.435
8	16.000	0.1685	0.8295	0.3076	16.89	0.5895	100.033	16.990	5.322	7.280
9	4.000	0.1414	0.8566	0.3348	14.16	0.6416	0.000	0.000	0.000	0.000
10	1.000	0.1223	0.8757	0.3538	12.26	0.6781	0.000	0.000	0.000	0.000
11	0.250	0.0760	0.9220	0.4002	7.62	0.7668	0.000	0.000	0.000	0.000

Predicted value indicated with *

Tested By: B. Hak

Checked By: C. Dugger

Consolidation Test

Consolidation Specimen Information

Project: Mobile River Bridge **Project Number:** 7716
Location: Soils Lab
Job Number: 16-1101-0110 **Test Date:** 5/14/16

Sample Number: T-1 **Sample Description:**
Boring Number: MB-1 FAT CLAY with SAND (CH A-7-6(23))
Depth: 90.5-92.5 ft. **Remarks:**
Sample Type: Undisturbed

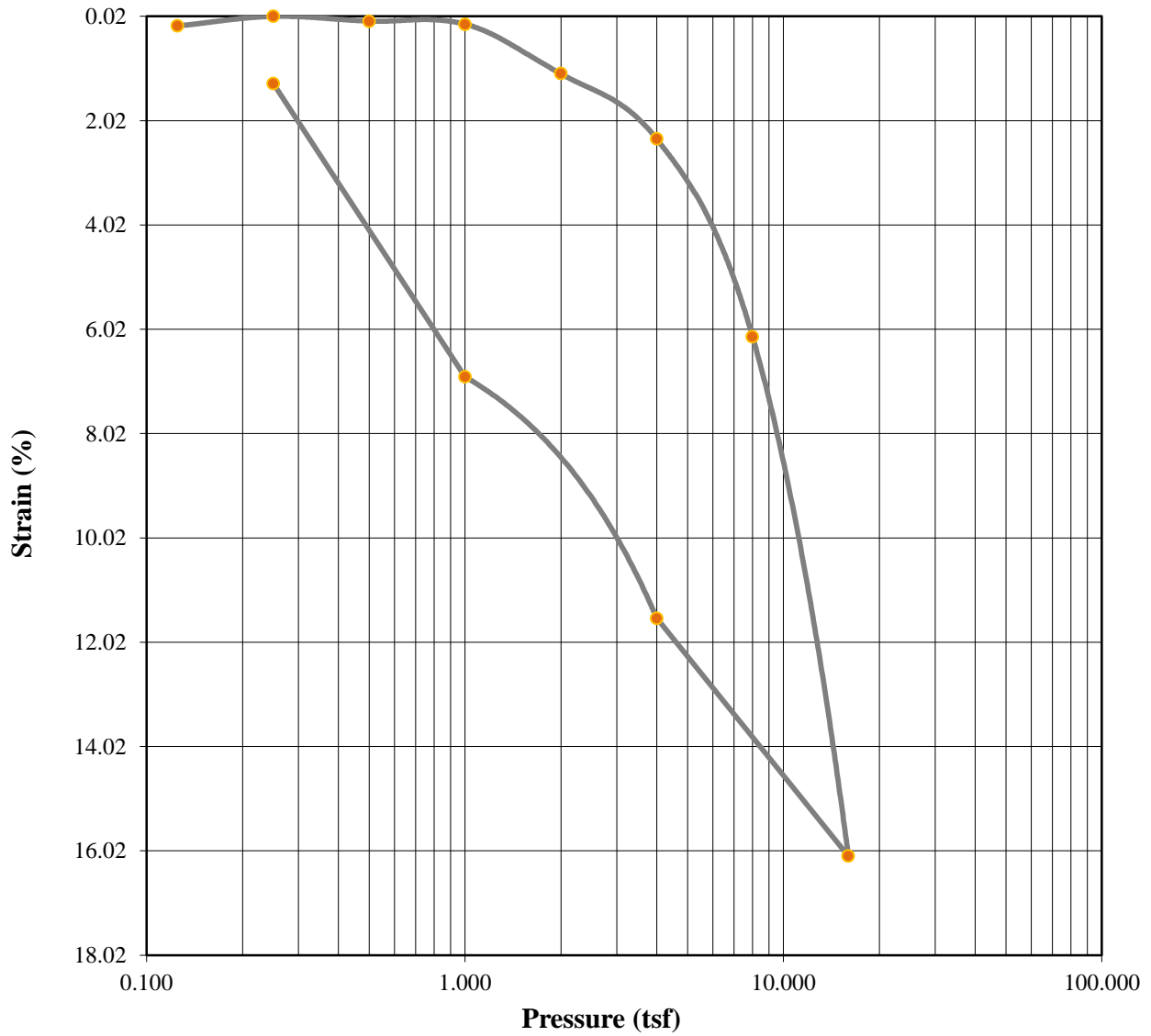
Test Number:
Liquid Limit: 52.0000 **Initial Void Ratio:** 0.9166 **Initial Height (in):** 0.9980
Plastic Limit: 22.0000 **Plasticity Index (%):** 30.0000 **Initial Diameter (in):** 2.4970
Specific Gravity: 2.5770 **Weight of Ring (g):** 110.7800
Measured

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	87.11	264.62
Dry Soil + Container (g)	72.82	229.35
Weight of Container (g)	31.58	125.26
Moisture Content (%)	34.65	33.88
Void Ratio	0.9166	0.7707
Saturation (%)	97.50	105.85
Dry Density (pcf)	83.97	88.16

Tested By: B. Hak

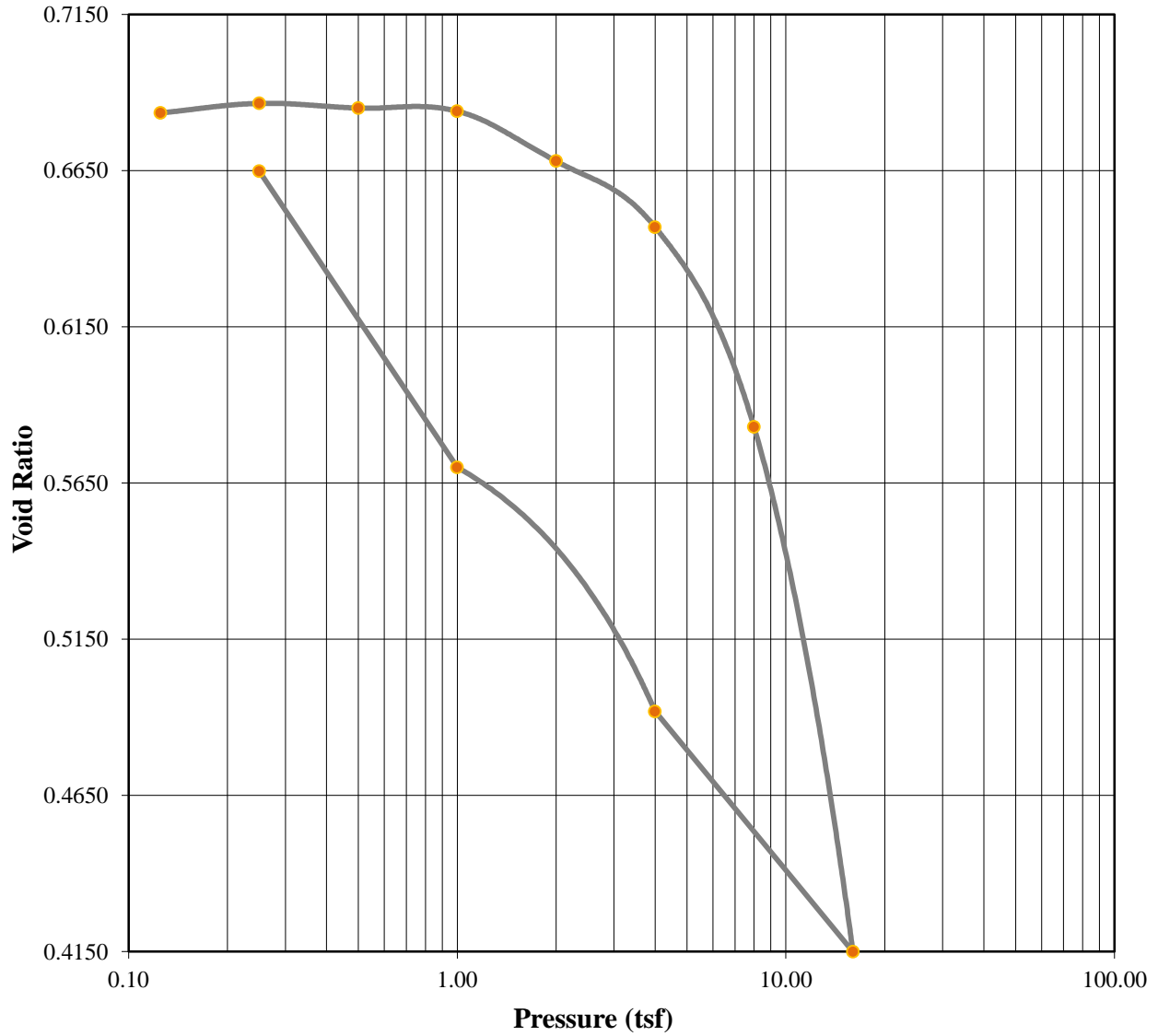
Checked By: C. Dugger

Consolidation Test Test Results



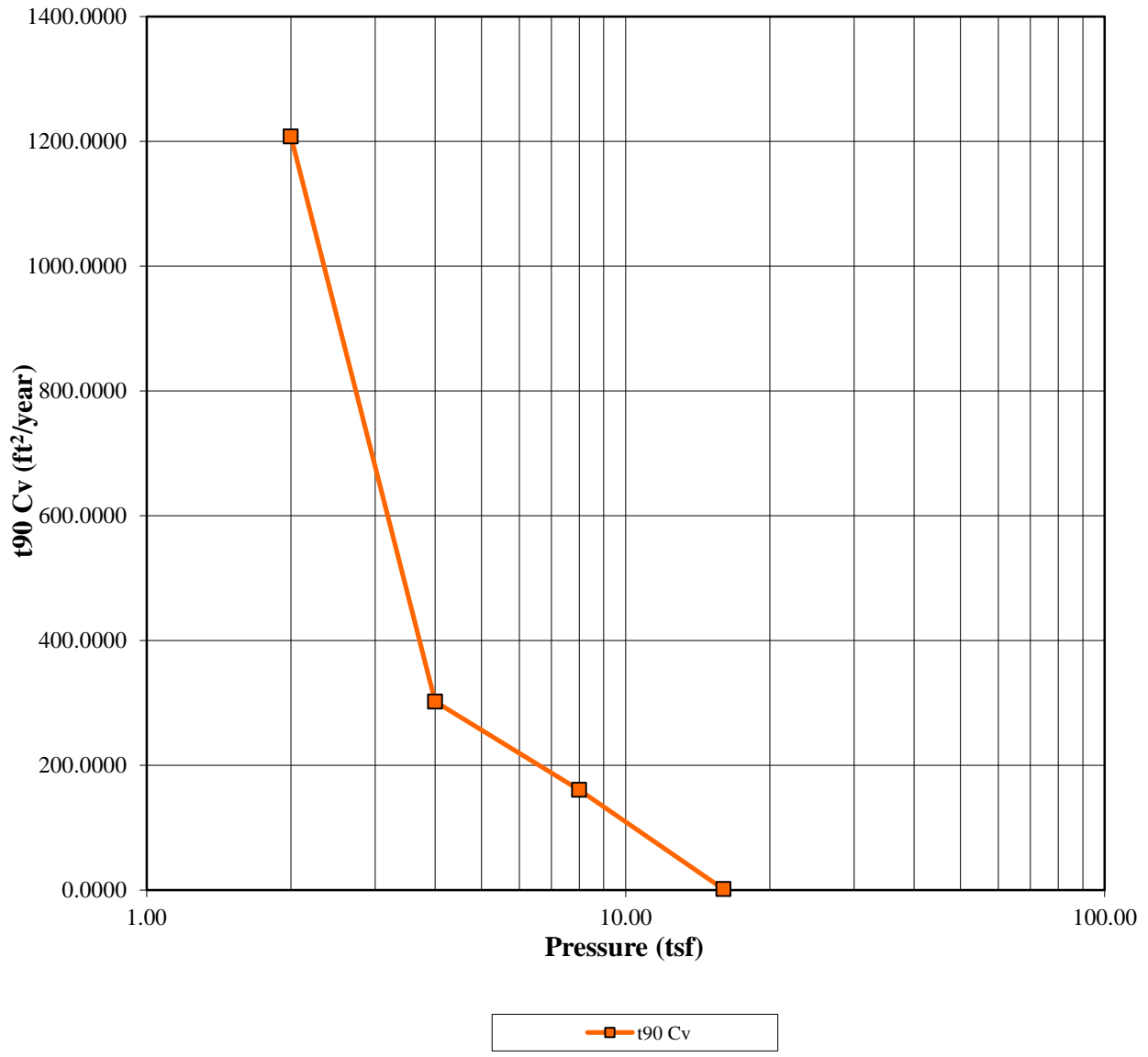
	Before	After	Liquid Limits:	89	Test Date:	5/18/16
Moisture (%):	41.43	40.62	Plastic Limits:	28		
Dry Density (pcf):	79.98	80.91	Plasticity Index (%):	61		
Saturation (%):	130.00	131.18				
Void Ratio:	0.6918	0.6697	Specific Gravity:	2.165	Measured	
Sample Description: FAT CLAY (CH A-7-6(71))						
Project Number:	7716		Depth:	98.5-100.5 ft.		Remarks:
Sample Number:	T-2		Boring Number:	MB-1		
Project:	Mobile River Bridge					
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



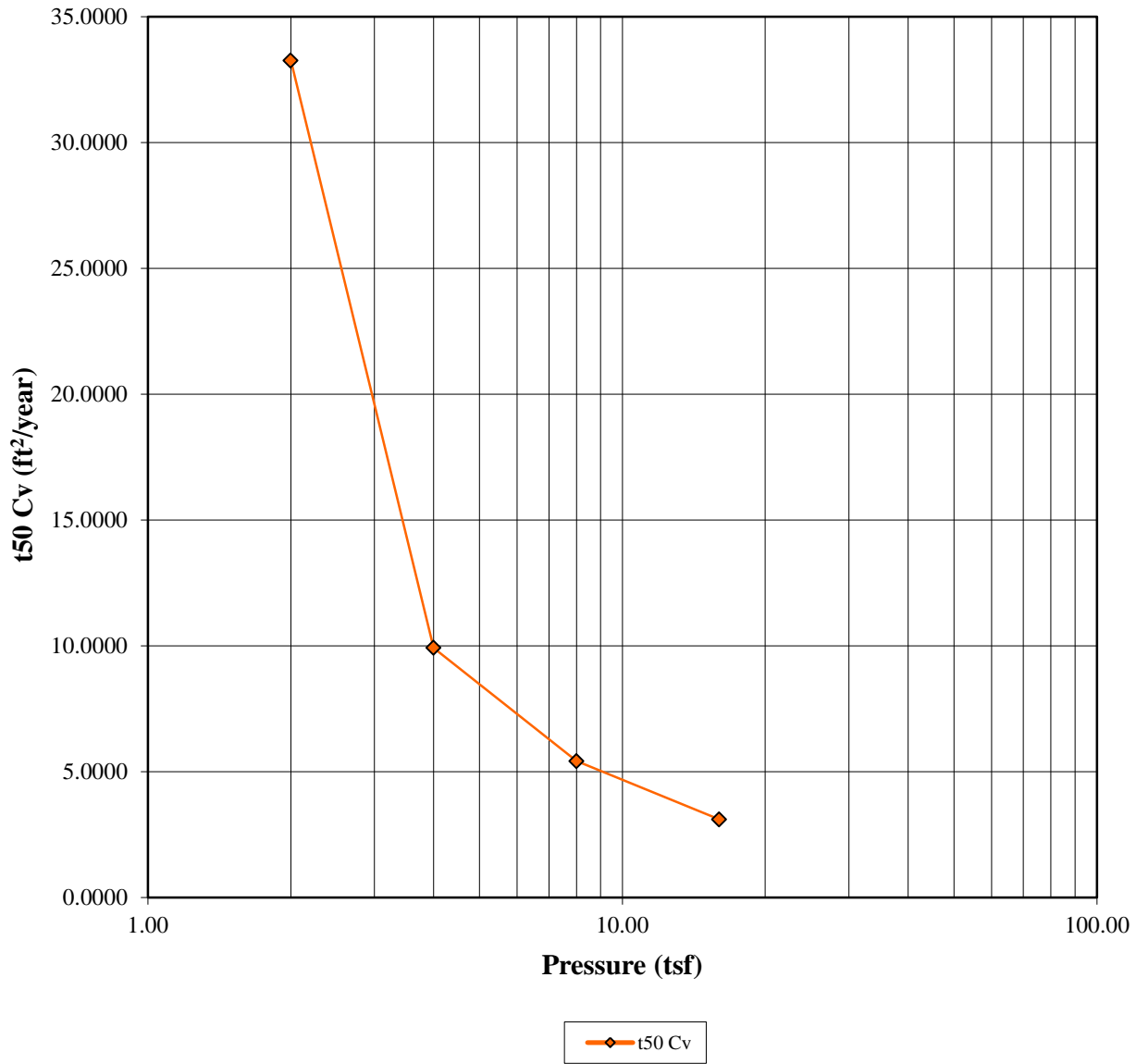
	Before	After	Liquid Limits:	89	Test Date:	5/18/16
Moisture (%):	41.43	40.62	Plastic Limits:	28		
Dry Density (pcf):	79.98	80.91	Plasticity Index (%):	61		
Saturation (%):	130.00	131.18	Specific Gravity:	2.165	Measured	
Void Ratio:	0.6918	0.6697				
Soil Description: FAT CLAY (CH A-7-6(71))						
Project Number:	7716		Depth:	98.5-100.5 ft.		Remarks:
Sample Number:	T-2		Boring Number:	MB-1		
Project:	Mobile River Bridge					
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



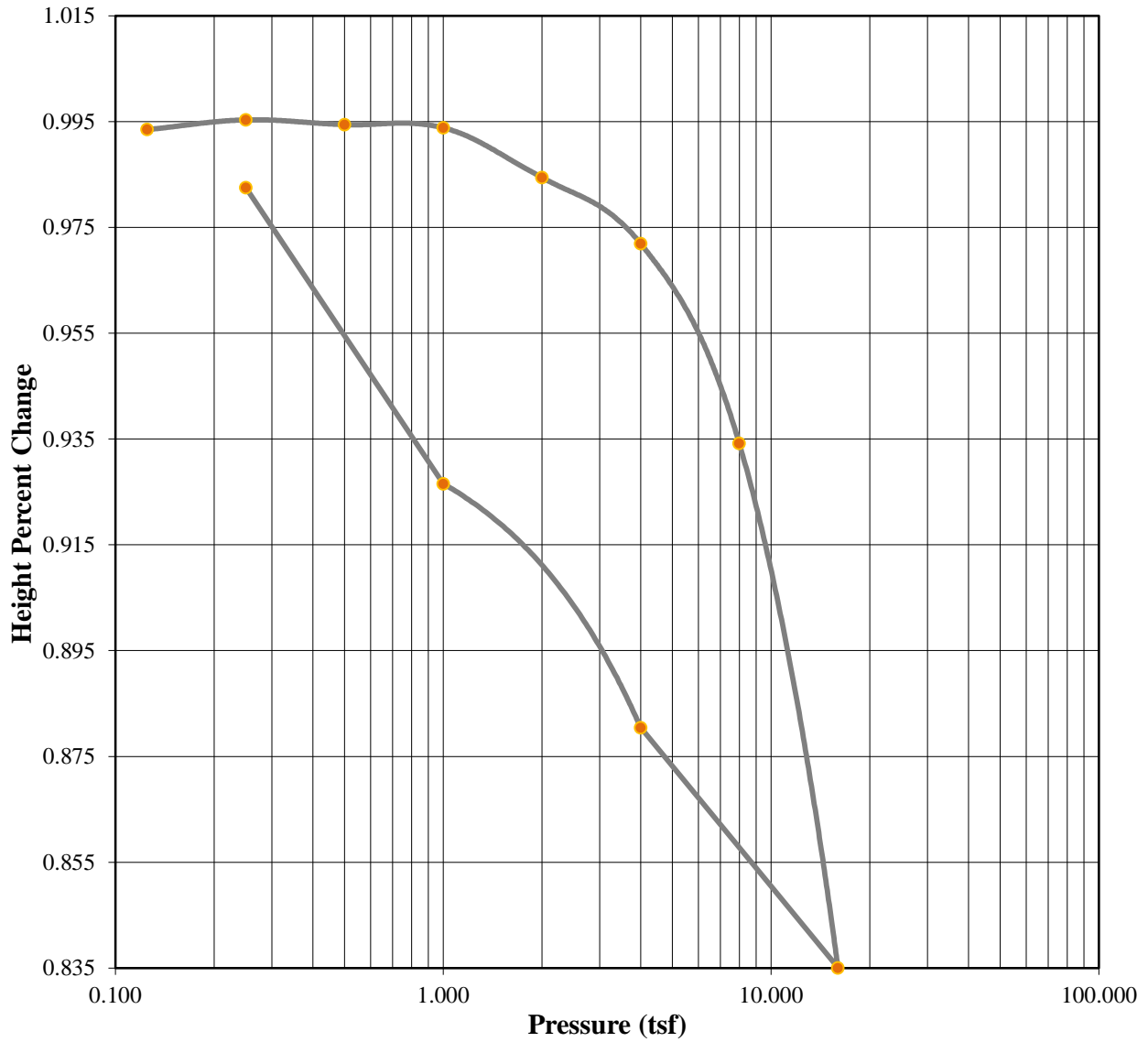
	Before	After	Liquid Limits:	89	Test Date:	5/18/16
Moisture (%):	41.43	40.62	Plastic Limits:	28		
Dry Density (pcf):	79.98	80.91	Plasticity Index (%):	61		
Saturation (%):	130.00	131.18	Specific Gravity:	2.165	Measured	
Void Ratio:	0.6918	0.6697				
Soil Description:	FAT CLAY (CH A-7-6(71))					
Project Number:	7716		Depth:	98.5-100.5 ft		
Sample Number:	T-2		Boring Number:	MB-1		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	89	Test Date:	5/18/16
Moisture (%):	41.43	40.62	Plastic Limits:	28		
Dry Density (pcf):	79.98	80.91	Plasticity Index (%):	61		
Saturation (%):	130.00	131.18	Specific Gravity:	2.165	Measured	
Void Ratio:	0.6918	0.6697				
Soil Description:	FAT CLAY (CH A-7-6(71))					
Project Number:	7716		Depth:	98.5-100.5 ft		
Sample Number:	T-2		Boring Number:	MB-1		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	89	Test Date:	5/18/16
Moisture (%):	41.43	40.62	Plastic Limits:	28		
Dry Density (pcf):	79.98	80.91	Plasticity Index (%):	61		
Saturation (%):	130.00	131.18	Specific Gravity:	2.165	Measured	
Void Ratio:	0.6918	0.6697				
Soil Description:	FAT CLAY (CH A-7-6(71))					
Project Number:	7716		Depth:	98.5-100.5 ft.		Remarks:
Sample Number:	T-2		Boring Number:	MB-1		
Project:	Mobile River Bridge					
Client:	ALDOT					
Location:	Soils Lab					



Consolidation Test Results Summary

Project: Mobile River Bridge
Location: Soils Lab
Job Number: 16-1101-0110

Project Number: 7716

Sample Number: T-2
Boring Number: MB-1
Depth: 98.5-100.5 ft.
Sample Type: Undisturbed

Sample Description:
 FAT CLAY (CH A-7-6(71))
Remarks:

Test Number:
Test Date: 5/18/16

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 (ft ² /year)	t50 Cv (ft ² /year)
0	0.000	0.0000	0.9960	0.4056	0.00	0.6870	0.000	0.000	0.000	0.000
1	0.125	0.0020	0.9940	0.4036	0.20	0.6836	0.000	0.000	0.000	0.000
2	0.250	0.0002	0.9958	0.4054	0.02	0.6866	0.000	0.000	0.000	0.000
3	0.500	0.0011	0.9949	0.4045	0.11	0.6851	0.000	0.000	0.000	0.000
4	1.000	0.0017	0.9943	0.4039	0.17	0.6841	0.000	0.000	0.000	0.000
5	2.000	0.0111	0.9849	0.3945	1.12	0.6681	0.622	5.244	1207.744	33.250
6	4.000	0.0236	0.9724	0.3820	2.37	0.6470	2.419	17.128	302.463	9.924
7	8.000	0.0614	0.9346	0.3442	6.16	0.5830	4.202	28.962	160.856	5.422
8	16.000	0.1605	0.8355	0.2450	16.12	0.4150	303.739	40.325	1.778	3.112
9	4.000	0.1151	0.8809	0.2905	11.56	0.4920	0.000	0.000	0.000	0.000
10	1.000	0.0690	0.9270	0.3366	6.93	0.5701	0.000	0.000	0.000	0.000
11	0.250	0.0130	0.9830	0.3926	1.31	0.6649	0.000	0.000	0.000	0.000

Predicted value indicated with *

Tested By: B. Hak

Checked By: C. Dugger

Consolidation Test

Consolidation Specimen Information

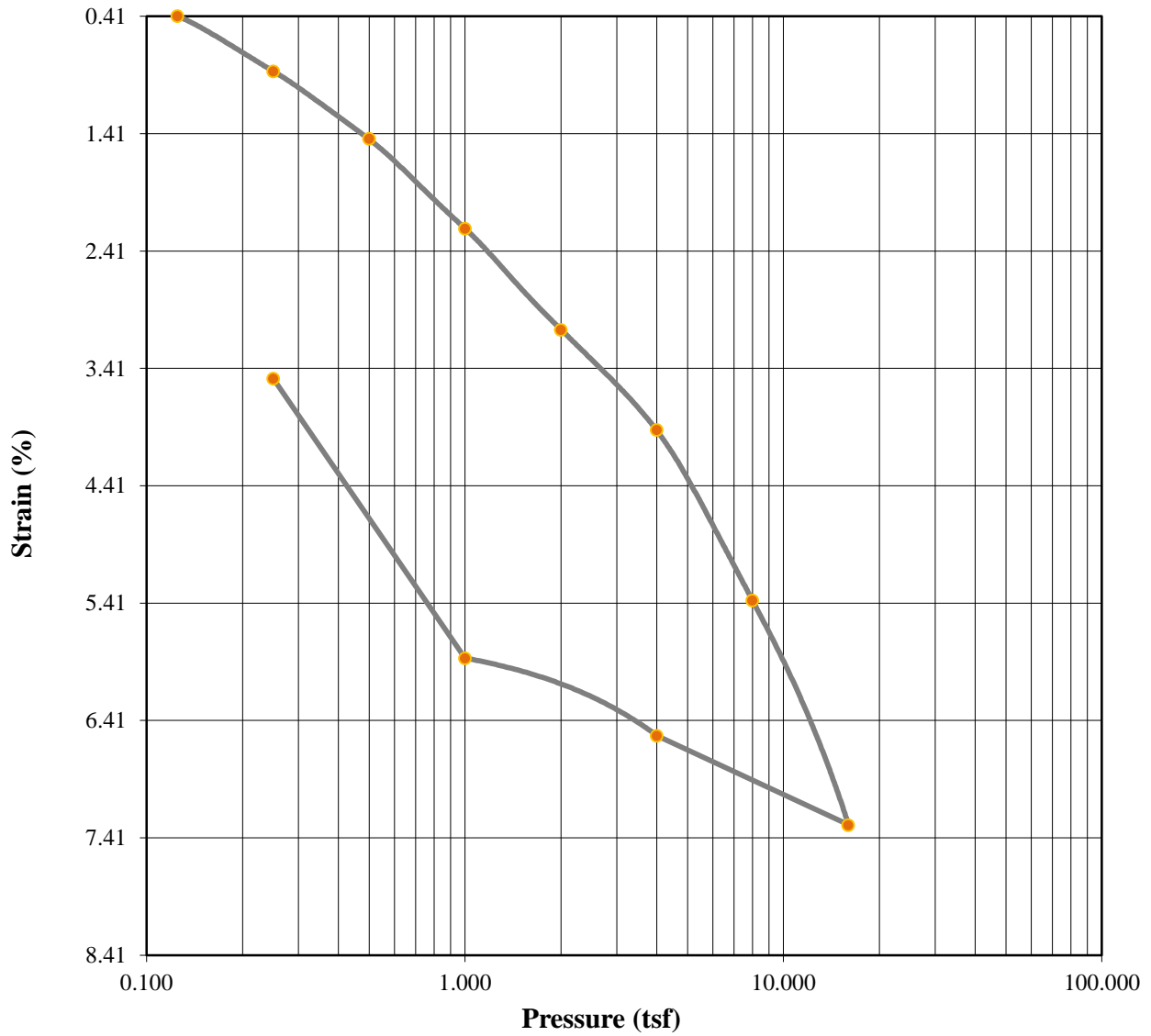
Project: Mobile River Bridge		Project Number: 7716
Location: Soils Lab		
Job Number: 16-1101-0110		Test Date: 5/18/16
Sample Number: T-2	Sample Description:	
Boring Number: MB-1	FAT CLAY (CH A-7-6(71))	
Depth: 98.5-100.5 ft.	Remarks:	
Sample Type: Undisturbed		
Test Number:		
Liquid Limit: 89.0000	Initial Void Ratio: 0.6918	Initial Height (in): 0.9960
Plastic Limit: 28.0000	Plasticity Index (%): 61.0000	Initial Diameter (in): 2.4950
Specific Gravity: 2.1650	Weight of Ring (g): 110.8000	
Measured		

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	101.13	268.27
Dry Soil + Container (g)	80.66	227.00
Weight of Container (g)	31.25	125.39
Moisture Content (%)	41.43	40.62
Void Ratio	0.6918	0.6697
Saturation (%)	130.00	131.18
Dry Density (pcf)	79.98	80.91

Tested By: B. Hak

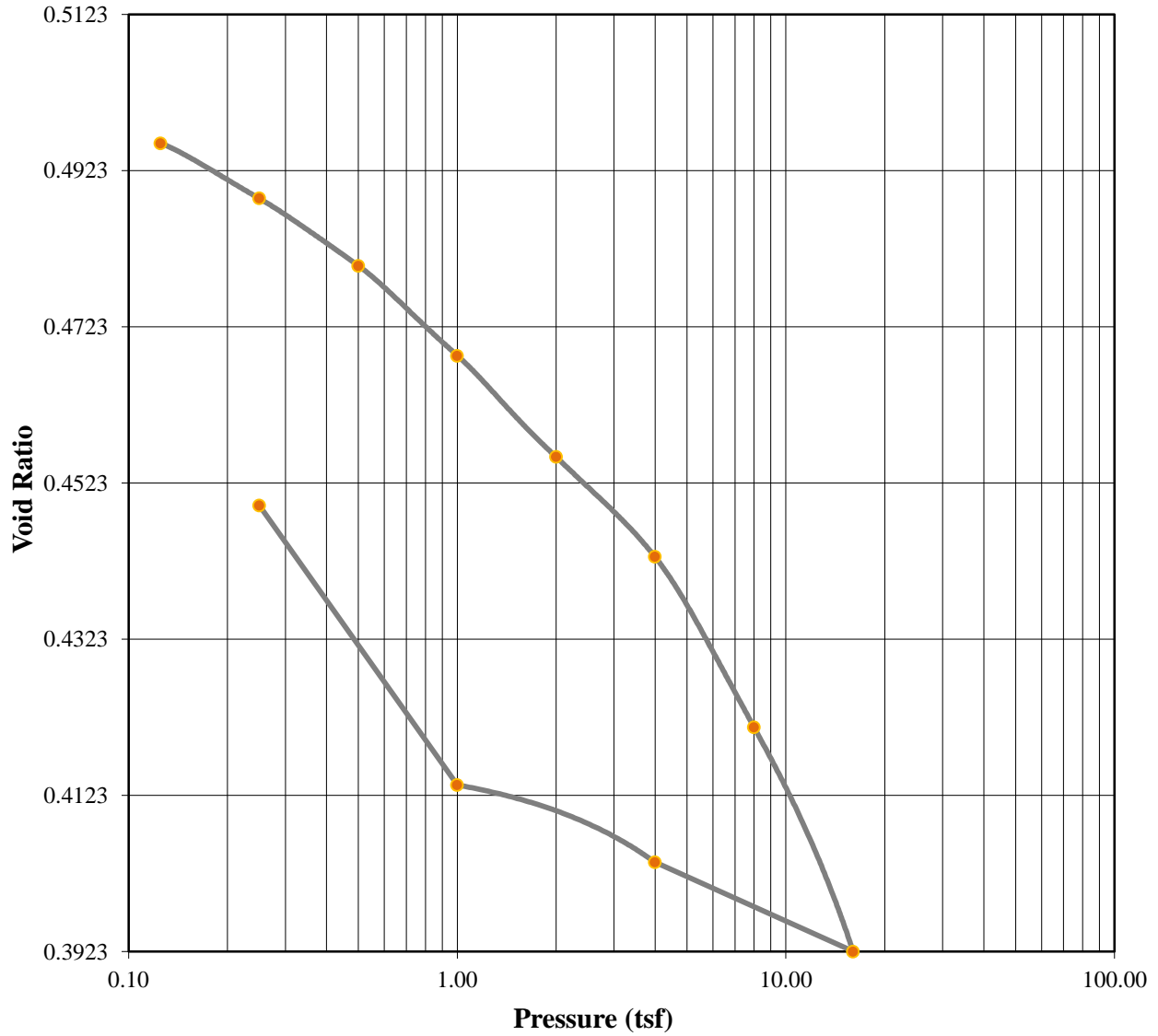
Checked By: C. Dugger

Consolidation Test Test Results



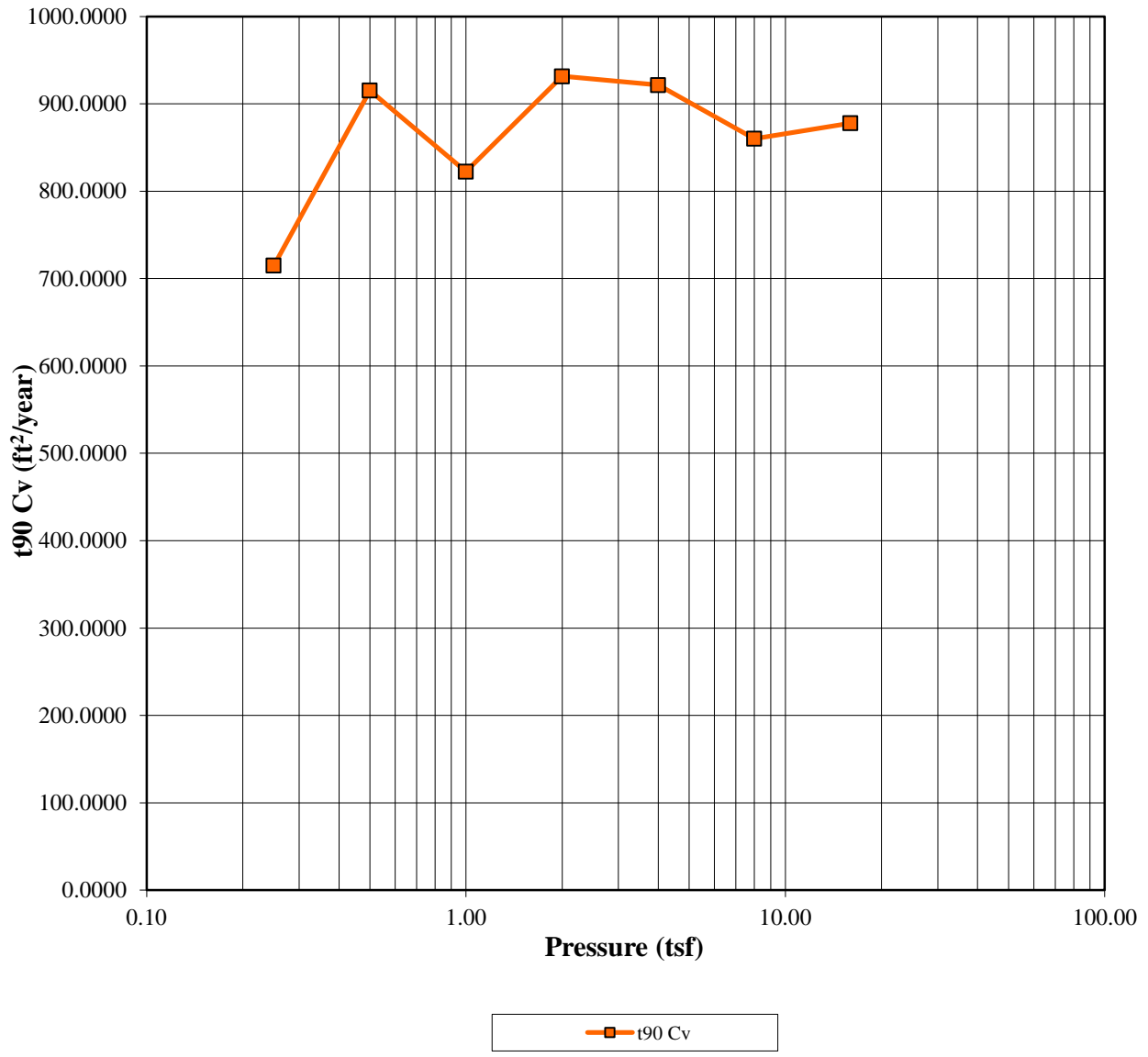
	Before	After	Liquid Limits:	28	Test Date:	5/21/16
Moisture (%):	18.28	18.14	Plastic Limits:	14		
Dry Density (pcf):	110.49	114.19	Plasticity Index (%):	14		
Saturation (%):	96.46	105.97				
Void Ratio:	0.5019	0.4494	Specific Gravity:	2.663	Measured	
Sample Description:	SANDY LEAN CLAY (CL A-6(6))					
Project Number:	7716		Depth:	188.5-190.5 ft		
Sample Number:	T-4		Boring Number:	MB-1		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



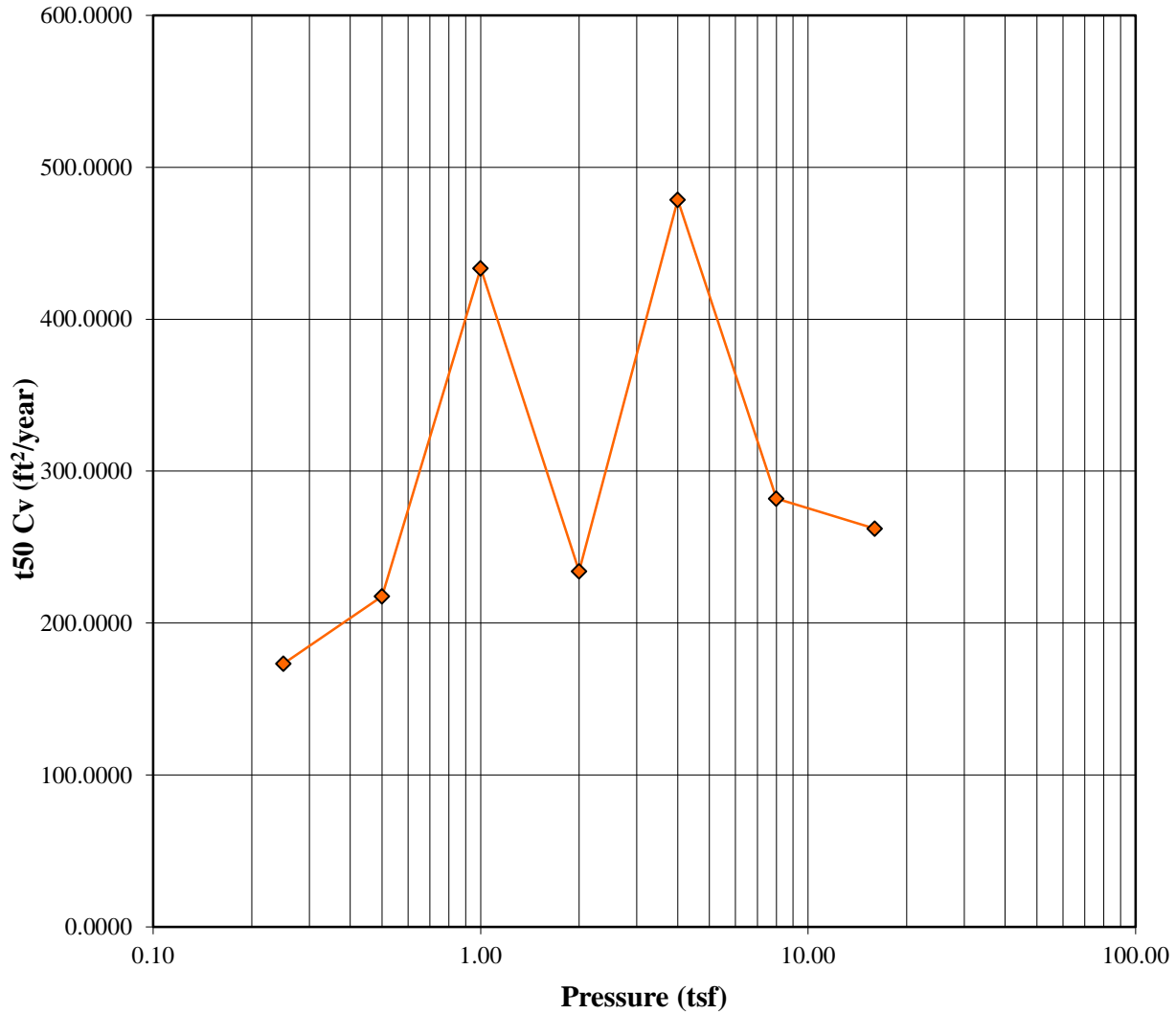
	Before	After	Liquid Limits:	28	Test Date:	5/21/16
Moisture (%):	18.28	18.14	Plastic Limits:	14		
Dry Density (pcf):	110.49	114.19	Plasticity Index (%):	14		
Saturation (%):	96.46	105.97	Specific Gravity:	2.663	Measured	
Void Ratio:	0.5019	0.4494				
Soil Description:	SANDY LEAN CLAY (CL A-6(6))					
Project Number:	7716		Depth:	188.5-190.5 ft		
Sample Number:	T-4	Boring Number:	MB-1			
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	28	Test Date:	5/21/16
Moisture (%):	18.28	18.14	Plastic Limits:	14		
Dry Density (pcf):	110.49	114.19	Plasticity Index (%):	14		
Saturation (%):	96.46	105.97	Specific Gravity:	2.663	Measured	
Void Ratio:	0.5019	0.4494				
Soil Description:	SANDY LEAN CLAY (CL A-6(6))					
Project Number:	7716		Depth:	188.5-190.5 ft		
Sample Number:	T-4		Boring Number:	MB-1		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

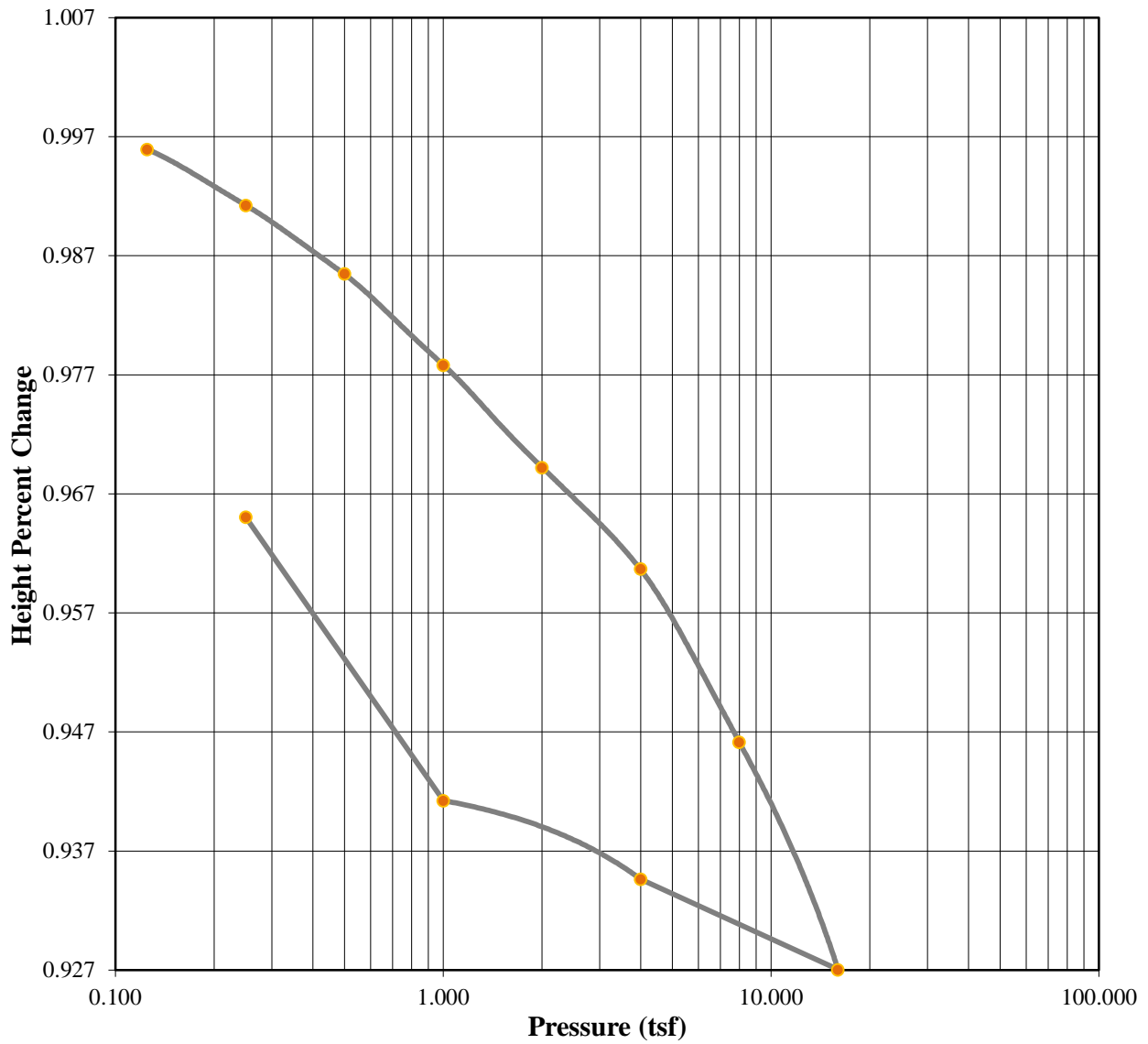
Consolidation Test Test Results



—◆— t50 Cv

	Before	After	Liquid Limits:	28	Test Date:	5/21/16
Moisture (%):	18.28	18.14	Plastic Limits:	14		
Dry Density (pcf):	110.49	114.19	Plasticity Index (%):	14		
Saturation (%):	96.46	105.97				
Void Ratio:	0.5019	0.4494	Specific Gravity:	2.663	Measured	
Soil Description:	SANDY LEAN CLAY (CL A-6(6))					
Project Number:	7716		Depth:	188.5-190.5 ft		
Sample Number:	T-4		Boring Number:	MB-1		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	28	Test Date:	5/21/16
Moisture (%):	18.28	18.14	Plastic Limits:	14		
Dry Density (pcf):	110.49	114.19	Plasticity Index (%):	14		
Saturation (%):	96.46	105.97				
Void Ratio:	0.5019	0.4494	Specific Gravity:	2.663	Measured	
Soil Description:	SANDY LEAN CLAY (CL A-6(6))					
Project Number:	7716		Depth:	188.5-190.5 ft		
Sample Number:	T-4		Boring Number:	MB-1		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					



Consolidation Test Results Summary

Project: Mobile River Bridge
Location: Soils Lab
Job Number: 16-1101-0110

Project Number: 7716

Sample Number: T-4
Boring Number: MB-1
Depth: 188.5-190.5 ft.
Sample Type: Undisturbed

Sample Description:
 SANDY LEAN CLAY (CL A-6(6))
Remarks:

Test Number:
Test Date: 5/21/16

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 (ft ² /year)	t50 Cv (ft ² /year)
0	0.000	0.0000	1.0000	0.3342	0.00	0.5020	0.000	0.000	0.000	0.000
1	0.125	0.0041	0.9959	0.3301	0.41	0.4958	0.000	0.000	0.000	0.000
2	0.250	0.0088	0.9912	0.3254	0.88	0.4887	1.064	1.019	714.820	173.308
3	0.500	0.0146	0.9854	0.3196	1.46	0.4801	0.821	0.802	915.264	217.601
4	1.000	0.0222	0.9778	0.3120	2.22	0.4686	0.900	0.396	822.402	433.509
5	2.000	0.0308	0.9692	0.3034	3.08	0.4556	0.780	0.721	931.487	234.107
6	4.000	0.0394	0.9606	0.2948	3.94	0.4428	0.775	0.347	921.449	478.457
7	8.000	0.0539	0.9461	0.2803	5.39	0.4210	0.805	0.571	860.124	281.914
8	16.000	0.0730	0.9270	0.2612	7.30	0.3923	0.758	0.589	877.717	262.212
9	4.000	0.0654	0.9346	0.2688	6.54	0.4037	0.000	0.000	0.000	0.000
10	1.000	0.0588	0.9412	0.2754	5.88	0.4136	0.000	0.000	0.000	0.000
11	0.250	0.0350	0.9650	0.2992	3.50	0.4494	0.000	0.000	0.000	0.000

Predicted value indicated with *

Tested By: B. Hak

Checked By: C. Dugger

Consolidation Test

Consolidation Specimen Information

Project: Mobile River Bridge **Project Number:** 7716
Location: Soils Lab
Job Number: 16-1101-0110 **Test Date:** 5/21/16

Sample Number: T-4 **Sample Description:**
Boring Number: MB-1 SANDY LEAN CLAY (CL A-6(6))
Depth: 188.5-190.5 ft. **Remarks:**
Sample Type: Undisturbed

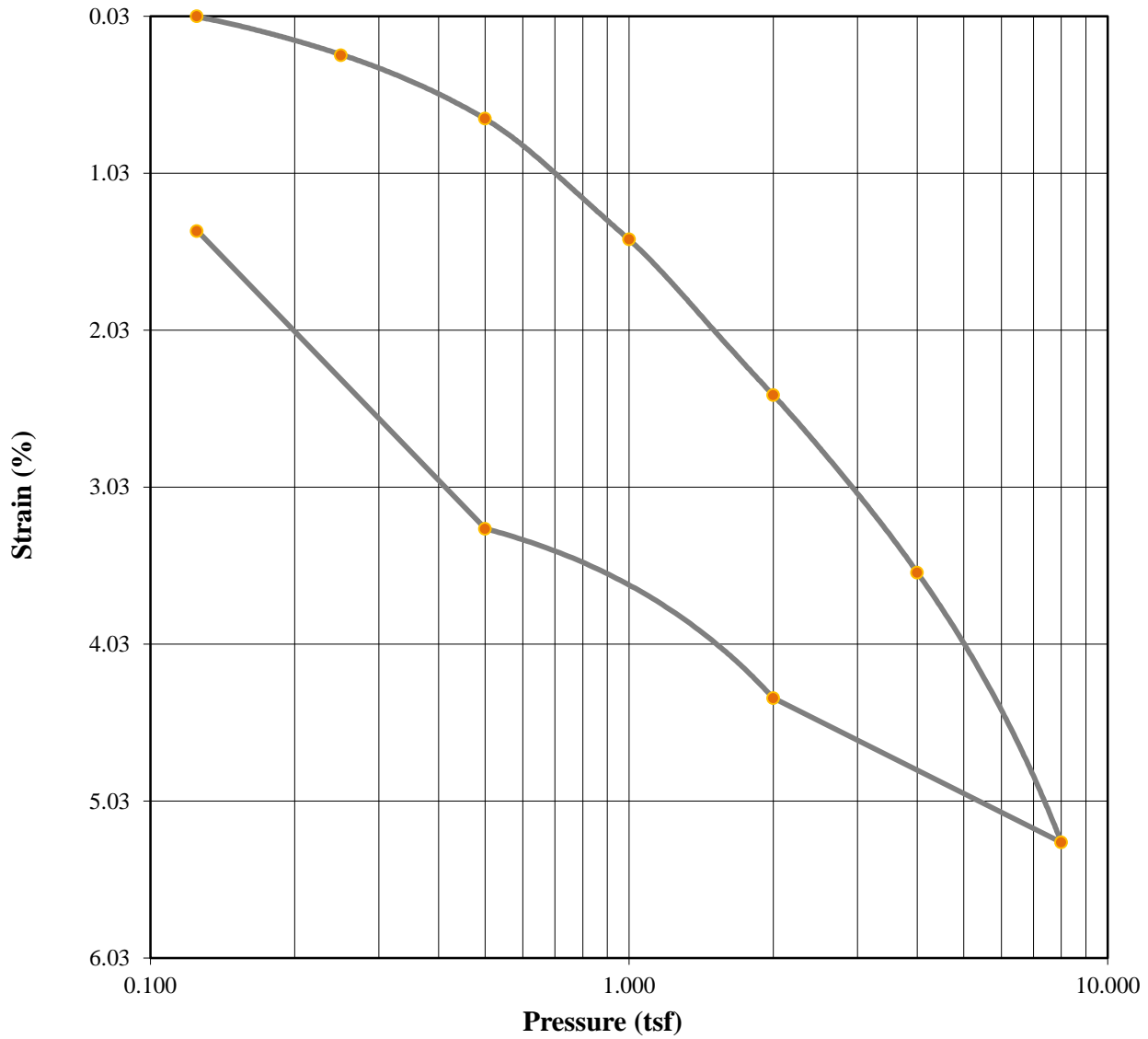
Test Number:
Liquid Limit: 28.0000 **Initial Void Ratio:** 0.5019 **Initial Height (in):** 1.0000
Plastic Limit: 14.0000 **Plasticity Index (%):** 14.0000 **Initial Diameter (in):** 2.5020
Specific Gravity: 2.6630 **Weight of Ring (g):** 98.6700
Measured

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	128.40	297.32
Dry Soil + Container (g)	113.55	271.53
Weight of Container (g)	32.33	129.33
Moisture Content (%)	18.28	18.14
Void Ratio	0.5019	0.4494
Saturation (%)	96.46	105.97
Dry Density (pcf)	110.49	114.19

Tested By: B. Hak

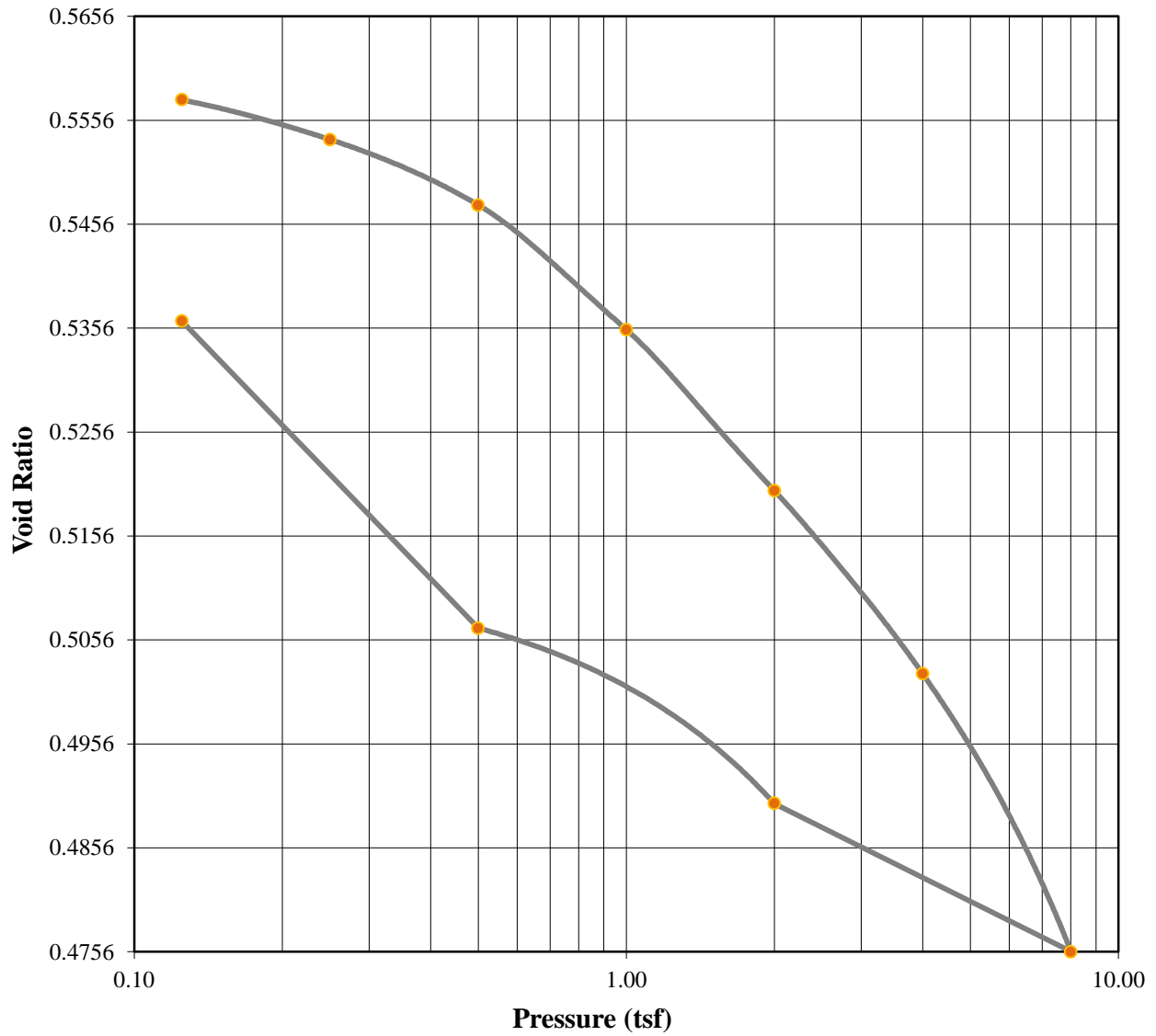
Checked By: C. Dugger

Consolidation Test Test Results



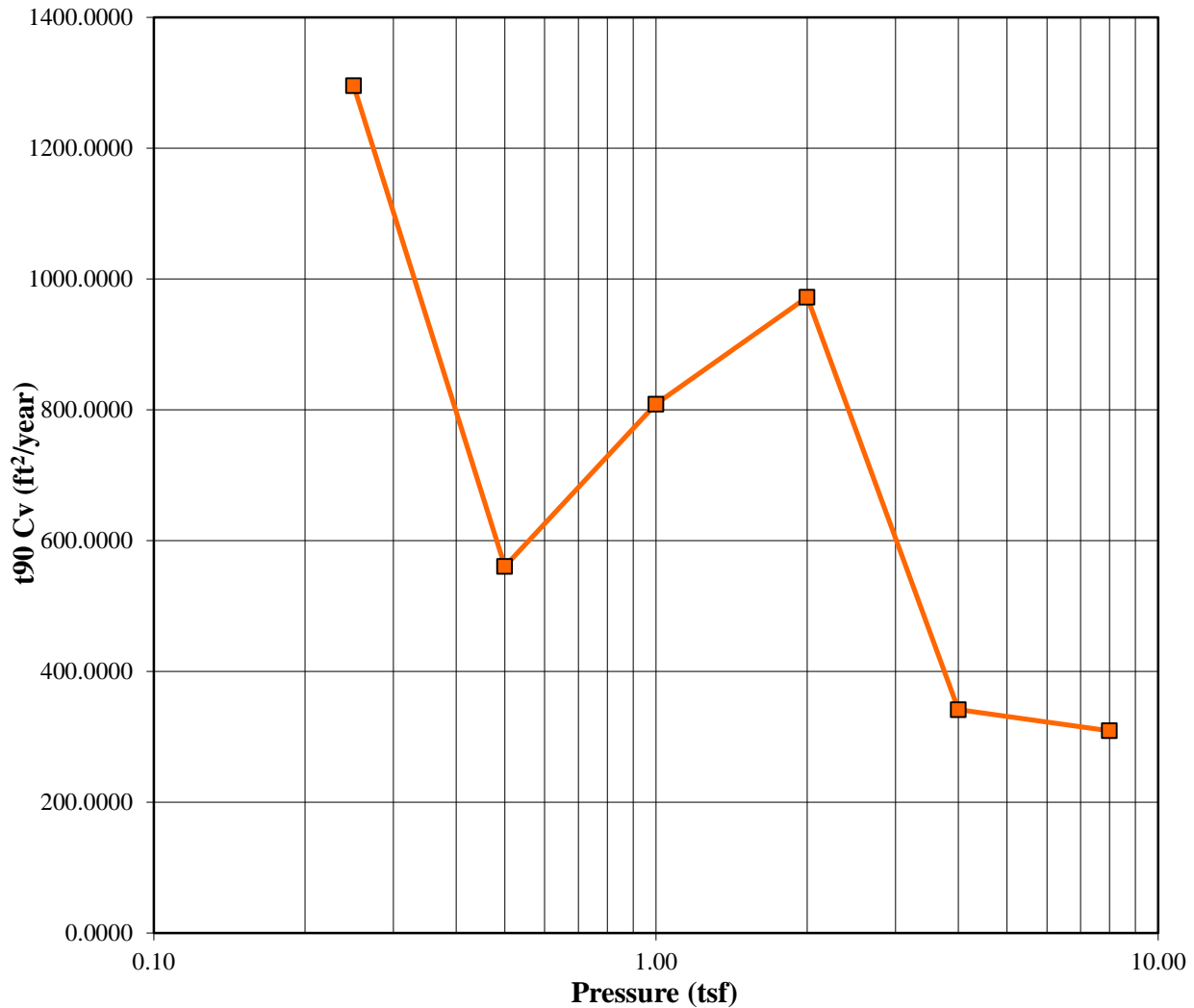
	Before	After	Liquid Limits:	0	Test Date:	9/29/15
Moisture (%):	21.17	21.68	Plastic Limits:	0		
Dry Density (pcf):	104.00	105.16	Plasticity Index (%):	0		
Saturation (%):	98.16	103.72	Specific Gravity:	2.600	Assumed	
Void Ratio:	0.5597	0.5379				
Sample Description:	SILTY CLAY with SAND (CL-ML A-4(2))					
Project Number:	7559		Depth:	145.0 - 147.0		
Sample Number:	T-3		Boring Number:	MB-2		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	0	Test Date:	9/29/15
Moisture (%):	21.17	21.68	Plastic Limits:	0		
Dry Density (pcf):	104.00	105.16	Plasticity Index (%):	0		
Saturation (%):	98.16	103.72	Specific Gravity:	2.600	Assumed	
Void Ratio:	0.5597	0.5379				
Soil Description:	SILTY CLAY with SAND (CL-ML A-4(2))					
Project Number:	7559		Depth:	145.0 - 147.0		
Sample Number:	T-3		Boring Number:	MB-2		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

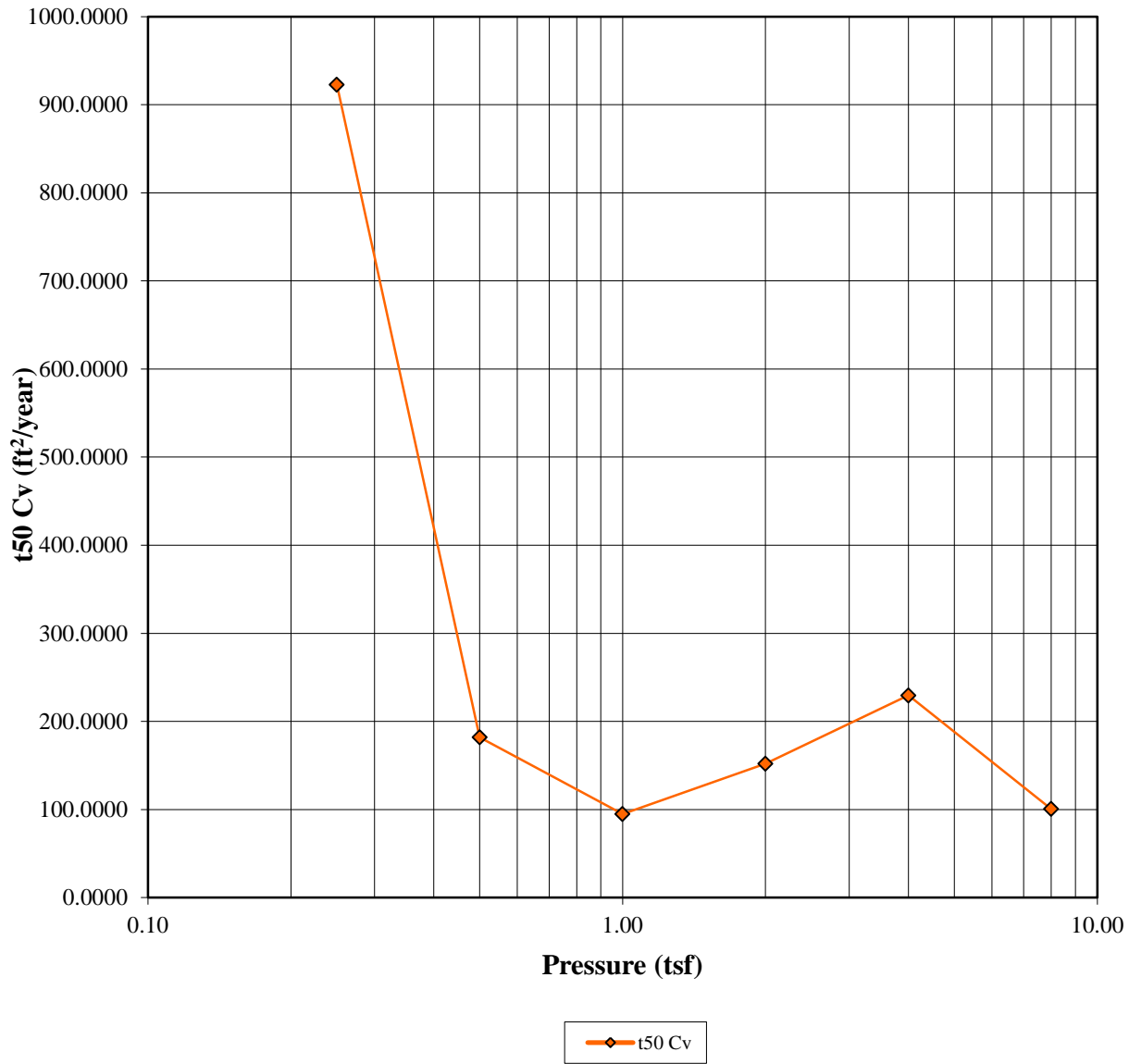
Consolidation Test Test Results



—■— t90 Cv

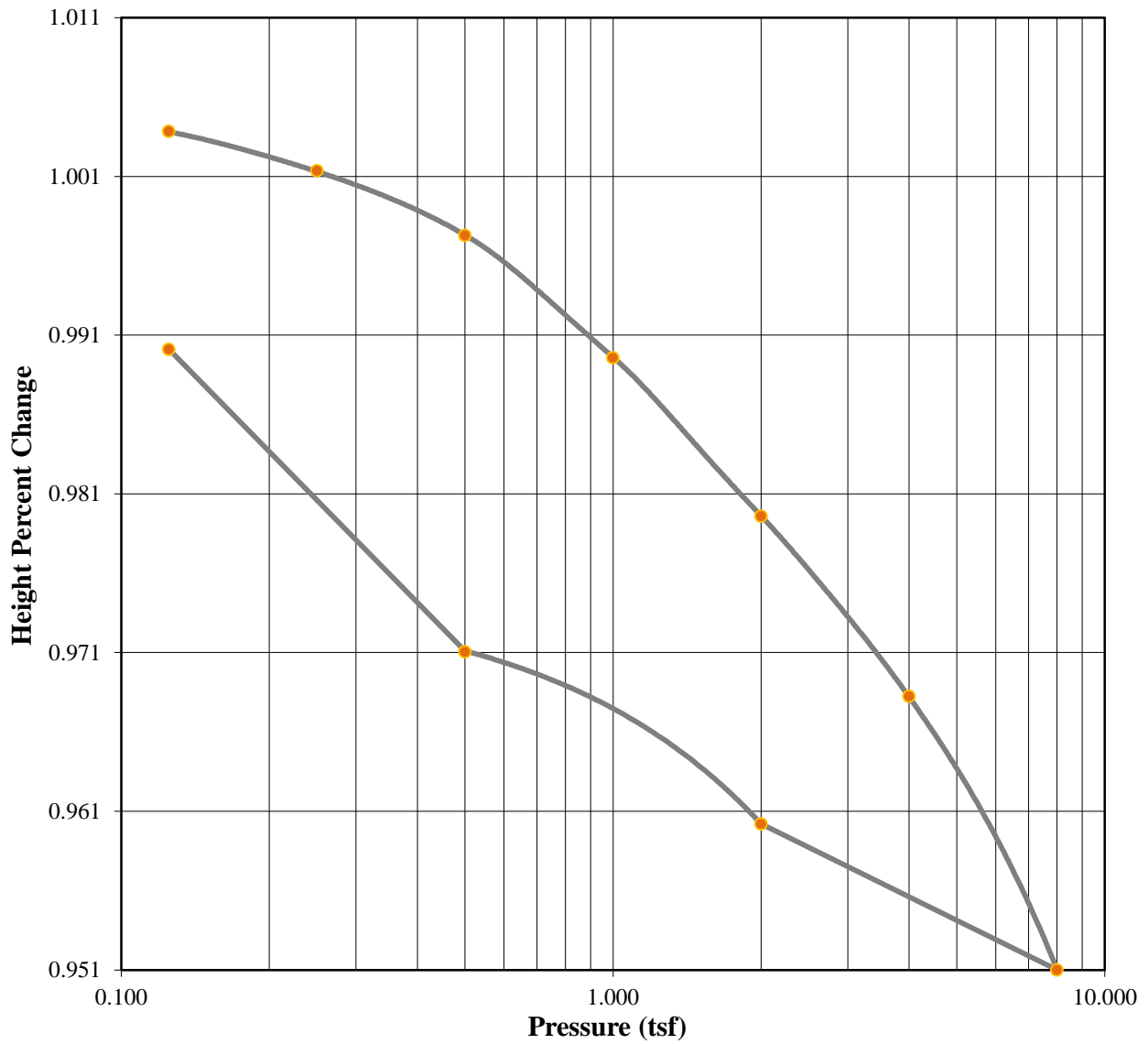
	Before	After	Liquid Limits:	0	Test Date:	9/29/15
Moisture (%):	21.17	21.68	Plastic Limits:	0		
Dry Density (pcf):	104.00	105.16	Plasticity Index (%):	0		
Saturation (%):	98.16	103.72	Specific Gravity:	2.600	Assumed	
Void Ratio:	0.5597	0.5379				
Soil Description:	SILTY CLAY with SAND (CL-ML A-4(2))					
Project Number:	7559		Depth:	145.0 - 147.0		
Sample Number:	T-3		Boring Number:	MB-2		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	0	Test Date:	9/29/15
Moisture (%):	21.17	21.68	Plastic Limits:	0		
Dry Density (pcf):	104.00	105.16	Plasticity Index (%):	0		
Saturation (%):	98.16	103.72	Specific Gravity:	2.600	Assumed	
Void Ratio:	0.5597	0.5379				
Soil Description:	SILTY CLAY with SAND (CL-ML A-4(2))					
Project Number:	7559		Depth:	145.0 - 147.0		
Sample Number:	T-3		Boring Number:	MB-2		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	0	Test Date:	9/29/15
Moisture (%):	21.17	21.68	Plastic Limits:	0		
Dry Density (pcf):	104.00	105.16	Plasticity Index (%):	0		
Saturation (%):	98.16	103.72				
Void Ratio:	0.5597	0.5379	Specific Gravity:	2.600	Assumed	
Soil Description:	SILTY CLAY with SAND (CL-ML A-4(2))					
Project Number:	7559		Depth:	145.0 - 147.0		Remarks:
Sample Number:	T-3		Boring Number:	MB-2		
Project:	Mobile River Bridge					
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Results Summary

Project: Mobile River Bridge
Location: Soils Lab
Job Number: 15-1101-0228

Project Number: 7559

Sample Number: T-3
Boring Number: MB-2
Depth: 145.0 - 147.0 ft.
Sample Type: Undisturbed

Sample Description: SILTY CLAY with SAND (CL-ML A-4(2))
Remarks:

Test Number:
Test Date: 9/29/15

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	1.0040	0.3596	0.00	0.5580	0.000	0.000	0.000	0.000
1	0.125	0.0003	1.0037	0.3593	0.03	0.5575	0.000	0.000	0.000	0.000
2	0.250	0.0028	1.0012	0.3568	0.27	0.5537	0.599	0.195	1295.381	922.560
3	0.500	0.0068	0.9972	0.3528	0.68	0.5474	1.372	0.982	560.685	182.015
4	1.000	0.0145	0.9895	0.3450	1.45	0.5354	0.937	1.856	808.716	94.854
5	2.000	0.0245	0.9795	0.3351	2.44	0.5199	0.764	1.133	971.913	152.185
6	4.000	0.0359	0.9681	0.3237	3.57	0.5023	2.123	0.734	341.569	229.584
7	8.000	0.0531	0.9509	0.3065	5.29	0.4756	2.262	1.613	309.308	100.774
8	2.000	0.0439	0.9601	0.3157	4.37	0.4898	0.000	0.000	0.000	0.000
9	0.500	0.0330	0.9710	0.3265	3.29	0.5067	0.000	0.000	0.000	0.000
10	0.125	0.0140	0.9900	0.3456	1.39	0.5362	0.000	0.000	0.000	0.000

Predicted value indicated with *

Tested By:

Checked By:

Consolidation Test
Consolidation Specimen Information

Project: Mobile River Bridge **Project Number:** 7559
Location: Soils Lab
Job Number: 15-1101-0228 **Test Date:** 9/29/15

Sample Number: T-3 **Sample Description:**
Boring Number: MB-2 SILTY CLAY with SAND (CL-ML A-4(2))
Depth: 145.0 - 147.0 ft. **Remarks:**
Sample Type: Undisturbed

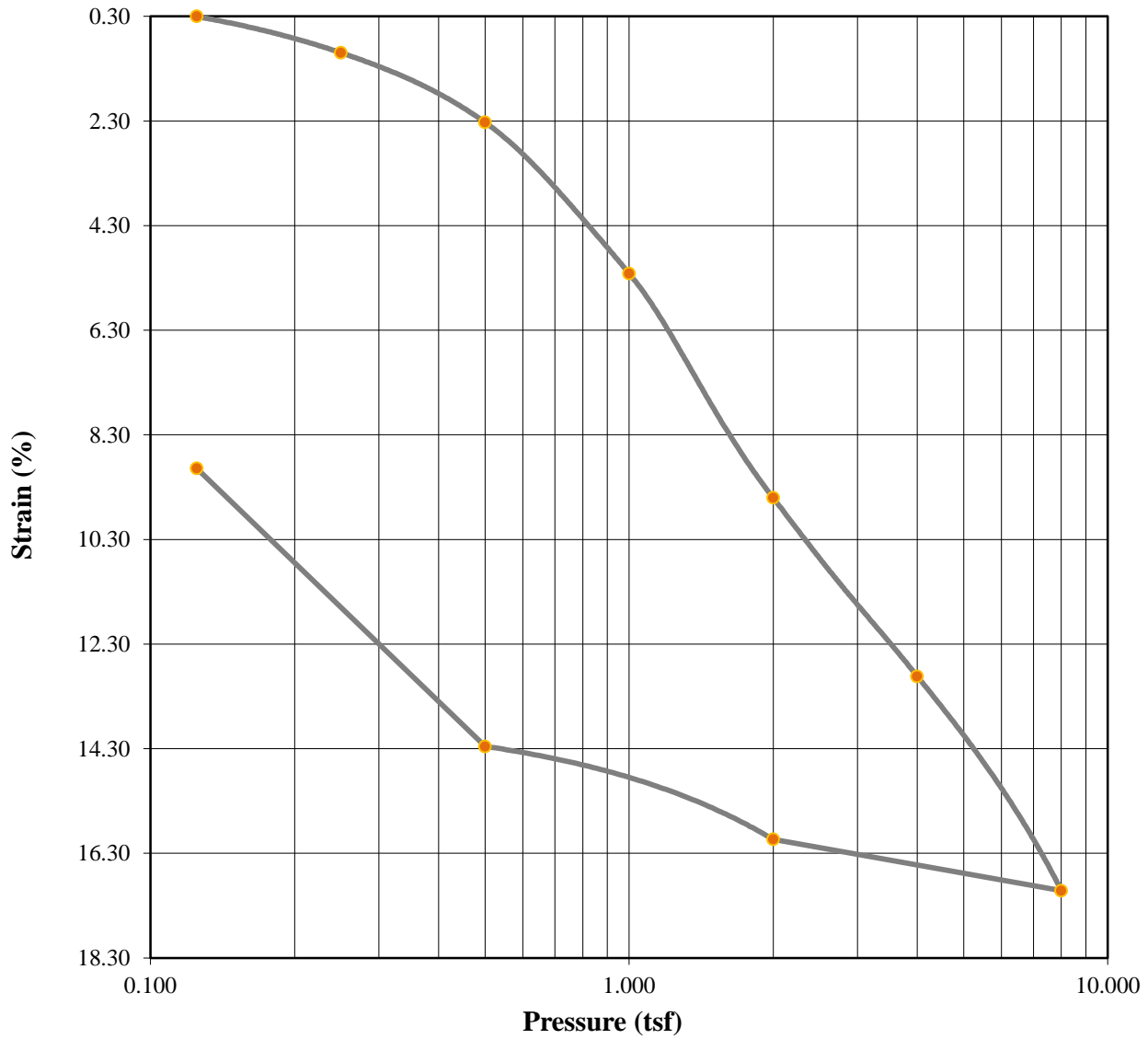
Test Number:
Liquid Limit: 0.0000 **Initial Void Ratio:** 0.5597 **Initial Height (in):** 1.0040
Plastic Limit: 0.0000 **Plasticity Index (%):** 0.0000 **Initial Diameter (in):** 2.5020
Specific Gravity: 2.6000 **Weight of Ring (g):** 110.8400
Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	140.49	291.58
Dry Soil + Container (g)	121.61	262.52
Weight of Container (g)	32.42	128.49
Moisture Content (%)	21.17	21.68
Void Ratio	0.5597	0.5379
Saturation (%)	98.16	103.72
Dry Density (pcf)	104.00	105.16

Tested By:

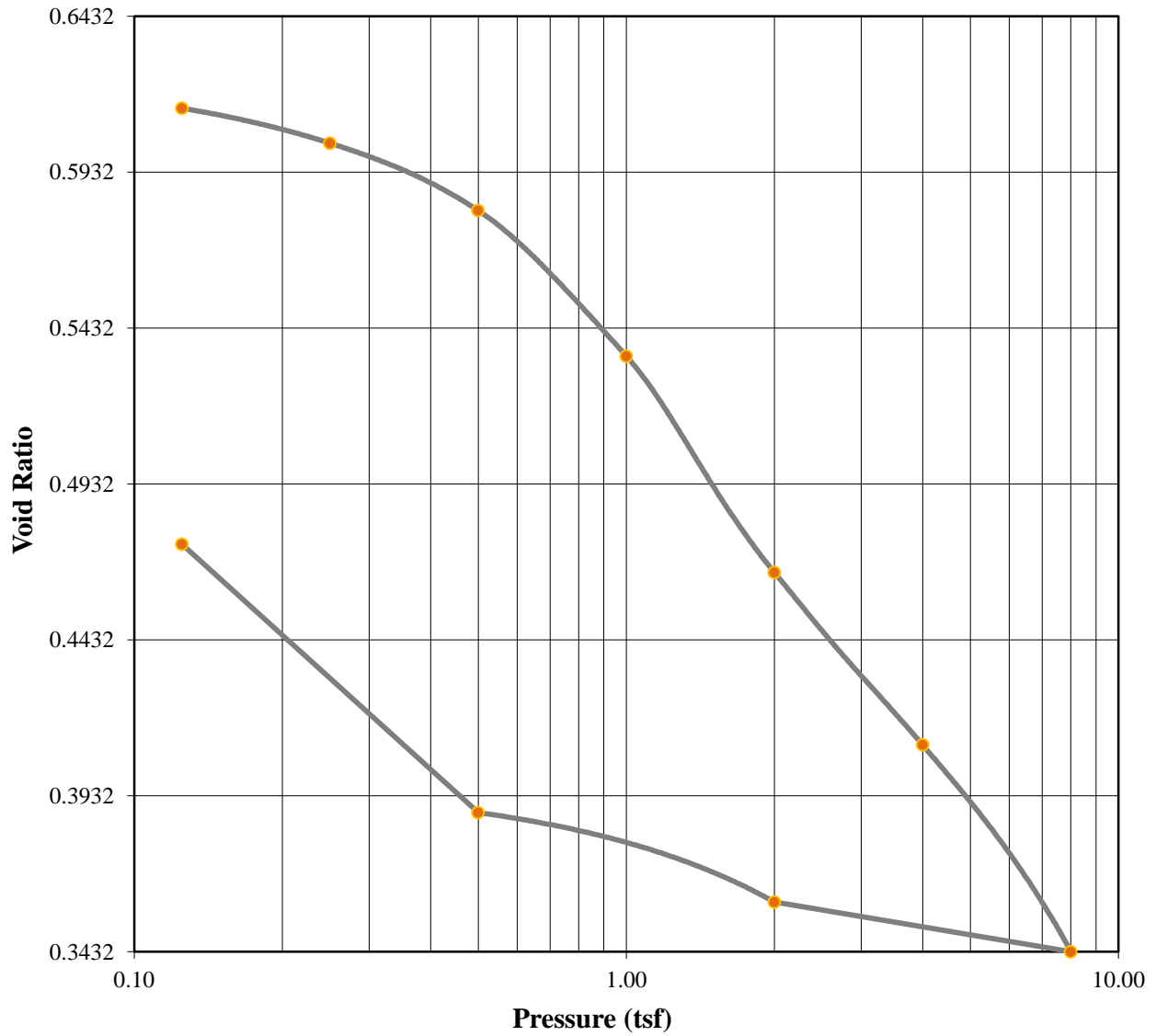
Checked By:

Consolidation Test Test Results



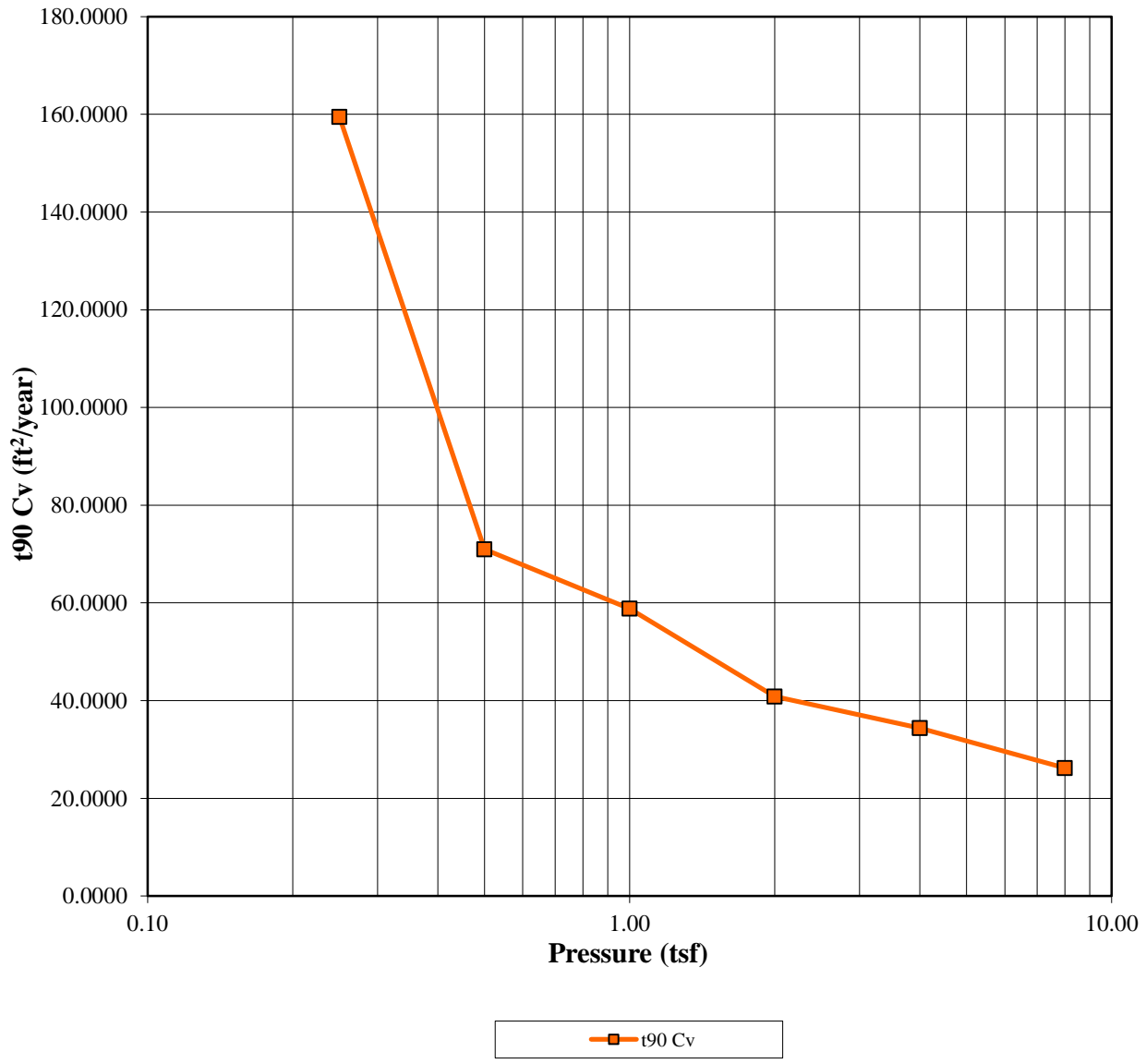
	Before	After	Liquid Limits:	0	Test Date:	9/29/15
Moisture (%):	23.86	21.04	Plastic Limits:	0		
Dry Density (pcf):	100.11	109.07	Plasticity Index (%):	0		
Saturation (%):	99.83	112.05	Specific Gravity:	2.600	Assumed	
Void Ratio:	0.6175	0.4730				
Sample Description: SANDY LEAN CLAY (CL A-6(11))						
Project Number:	7559		Depth:	190.0-190.33		
Sample Number:	T-4	Boring Number:	MB-2			
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



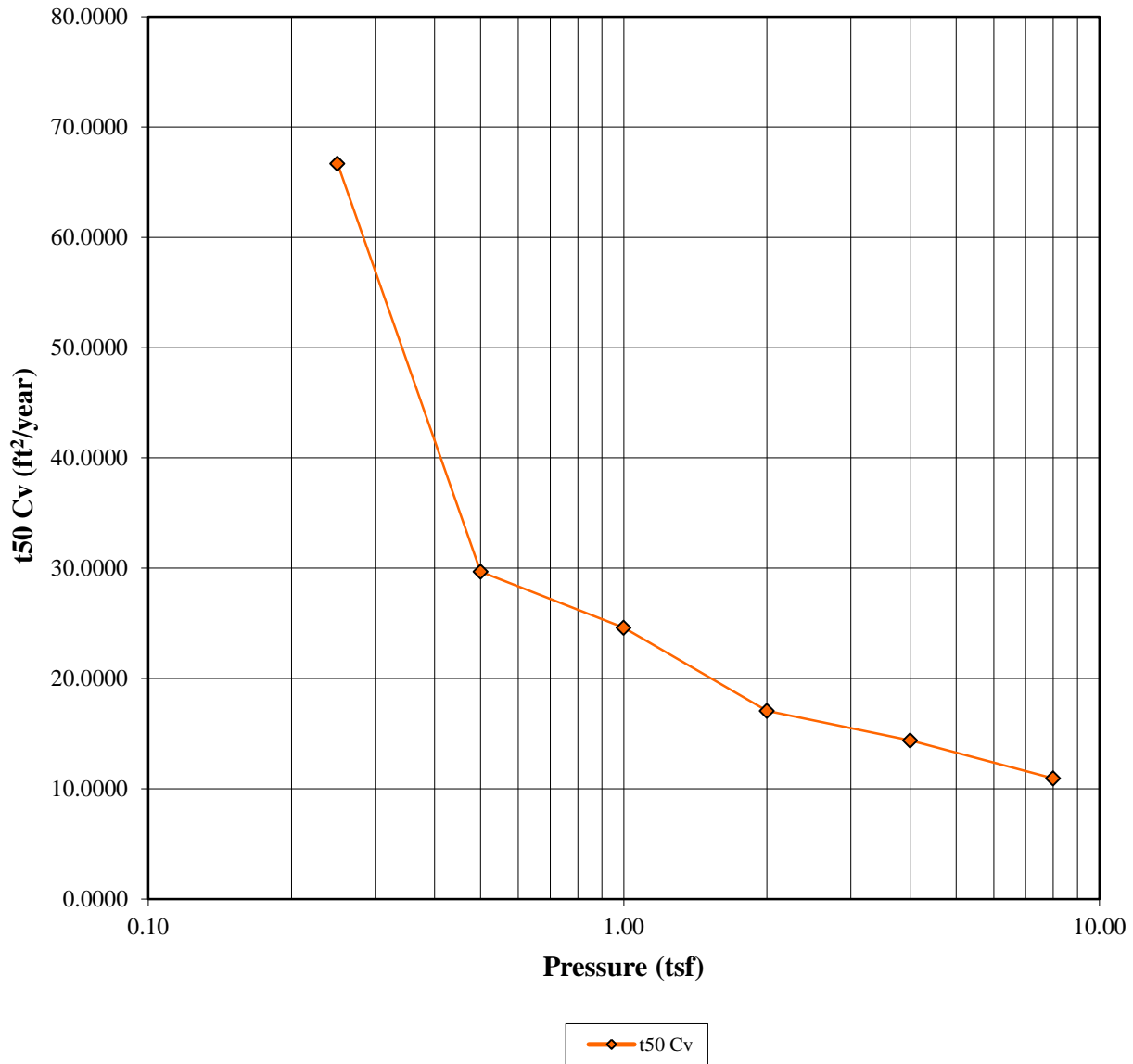
	Before	After	Liquid Limits:	0	Test Date:	9/29/15
Moisture (%):	23.86	21.04	Plastic Limits:	0		
Dry Density (pcf):	100.11	109.07	Plasticity Index (%):	0		
Saturation (%):	99.83	112.05	Specific Gravity:	2.600	Assumed	
Void Ratio:	0.6175	0.4730				
Soil Description: SANDY LEAN CLAY (CL A-6(11))						
Project Number:	7559		Depth:	190.0-190.33		Remarks:
Sample Number:	T-4	Boring Number:	MB-2			
Project:	Mobile River Bridge					
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



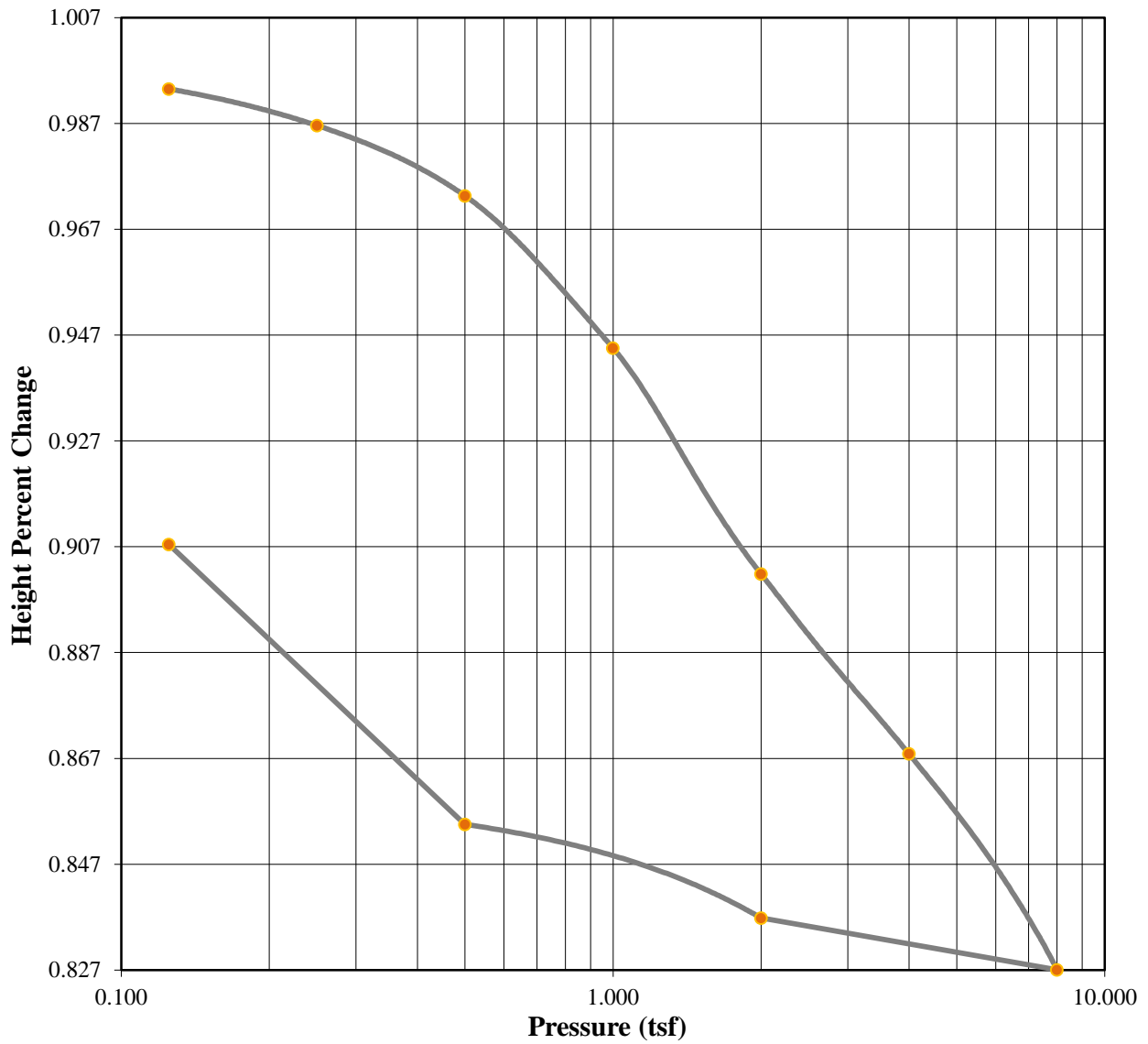
	Before	After	Liquid Limits:	0	Test Date:	9/29/15
Moisture (%):	23.86	21.04	Plastic Limits:	0		
Dry Density (pcf):	100.11	109.07	Plasticity Index (%):	0		
Saturation (%):	99.83	112.05	Specific Gravity:	2.600	Assumed	
Void Ratio:	0.6175	0.4730				
Soil Description:	SANDY LEAN CLAY (CL A-6(11))					
Project Number:	7559		Depth:	190.0-190.33		
Sample Number:	T-4		Boring Number:	MB-2		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	0	Test Date:	9/29/15
Moisture (%):	23.86	21.04	Plastic Limits:	0		
Dry Density (pcf):	100.11	109.07	Plasticity Index (%):	0		
Saturation (%):	99.83	112.05				
Void Ratio:	0.6175	0.4730	Specific Gravity:	2.600	Assumed	
Soil Description:	SANDY LEAN CLAY (CL A-6(11))					
Project Number:	7559		Depth:	190.0-190.33		
Sample Number:	T-4		Boring Number:	MB-2		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	0	Test Date:	9/29/15
Moisture (%):	23.86	21.04	Plastic Limits:	0		
Dry Density (pcf):	100.11	109.07	Plasticity Index (%):	0		
Saturation (%):	99.83	112.05	Specific Gravity:	2.600	Assumed	
Void Ratio:	0.6175	0.4730				
Soil Description:	SANDY LEAN CLAY (CL A-6(11))					
Project Number:	7559		Depth:	190.0-190.33		
Sample Number:	T-4		Boring Number:	MB-2		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Results Summary

Project: Mobile River Bridge
Location: Soils Lab
Job Number: 15-1101-0228

Project Number: 7559

Sample Number: T-4
Boring Number: MB-2
Depth: 190.0-190.33 ft.
Sample Type: Undisturbed

Sample Description:
 SANDY LEAN CLAY (CL A-6(11))

Remarks:

Test Number:
Test Date: 9/29/15

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 (ft ² /year)	t50 Cv (ft ² /year)
0	0.000	0.0000	0.9960	0.3806	0.00	0.6185	0.000	0.000	0.000	0.000
1	0.125	0.0029	0.9931	0.3777	0.30	0.6137	0.000	0.000	0.000	0.000
2	0.250	0.0098	0.9862	0.3708	0.99	0.6025	* 4.7192	2.622	159.461	66.681
3	0.500	0.0231	0.9729	0.3575	2.32	0.5809	* 10.3175	5.732	70.988	29.684
4	1.000	0.0519	0.9441	0.3287	5.21	0.5342	* 11.7213	6.512	58.842	24.606
5	2.000	0.0946	0.9014	0.2860	9.50	0.4648	* 15.3923	8.551	40.847	17.081
6	4.000	0.1286	0.8674	0.2520	12.91	0.4095	* 16.9259	9.403	34.397	14.383
7	8.000	0.1694	0.8266	0.2112	17.01	0.3432	* 20.1672	11.204	26.215	10.962
8	2.000	0.1596	0.8364	0.2210	16.03	0.3591	0.000	0.000	0.000	0.000
9	0.500	0.1419	0.8541	0.2387	14.25	0.3878	0.000	0.000	0.000	0.000
10	0.125	0.0890	0.9070	0.2916	8.94	0.4739	0.000	0.000	0.000	0.000

Predicted value indicated with *

Tested By:

Checked By:

Consolidation Test
Consolidation Specimen Information

Project: Mobile River Bridge **Project Number:** 7559
Location: Soils Lab
Job Number: 15-1101-0228 **Test Date:** 9/29/15

Sample Number: T-4 **Sample Description:**
Boring Number: MB-2 SANDY LEAN CLAY (CL A-6(11))
Depth: 190.0-190.33 ft. **Remarks:**
Sample Type: Undisturbed

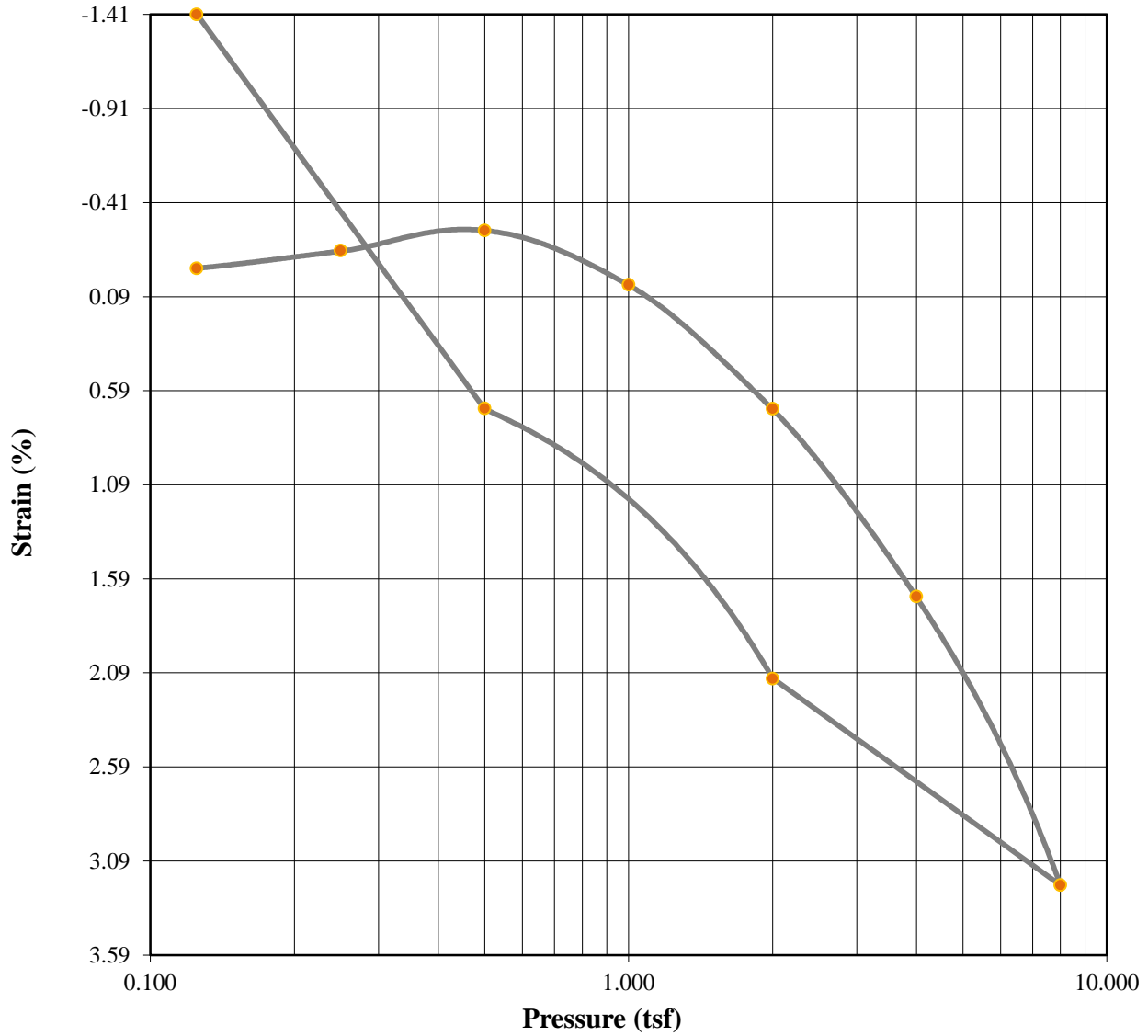
Test Number:
Liquid Limit: 0.0000 **Initial Void Ratio:** 0.6175 **Initial Height (in):** 0.9960
Plastic Limit: 0.0000 **Plasticity Index (%):** 0.0000 **Initial Diameter (in):** 2.4990
Specific Gravity: 2.6000 **Weight of Ring (g):** 98.6900
Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	128.16	278.80
Dry Soil + Container (g)	109.65	252.03
Weight of Container (g)	32.08	124.77
Moisture Content (%)	23.86	21.04
Void Ratio	0.6175	0.4730
Saturation (%)	99.83	112.05
Dry Density (pcf)	100.11	109.07

Tested By:

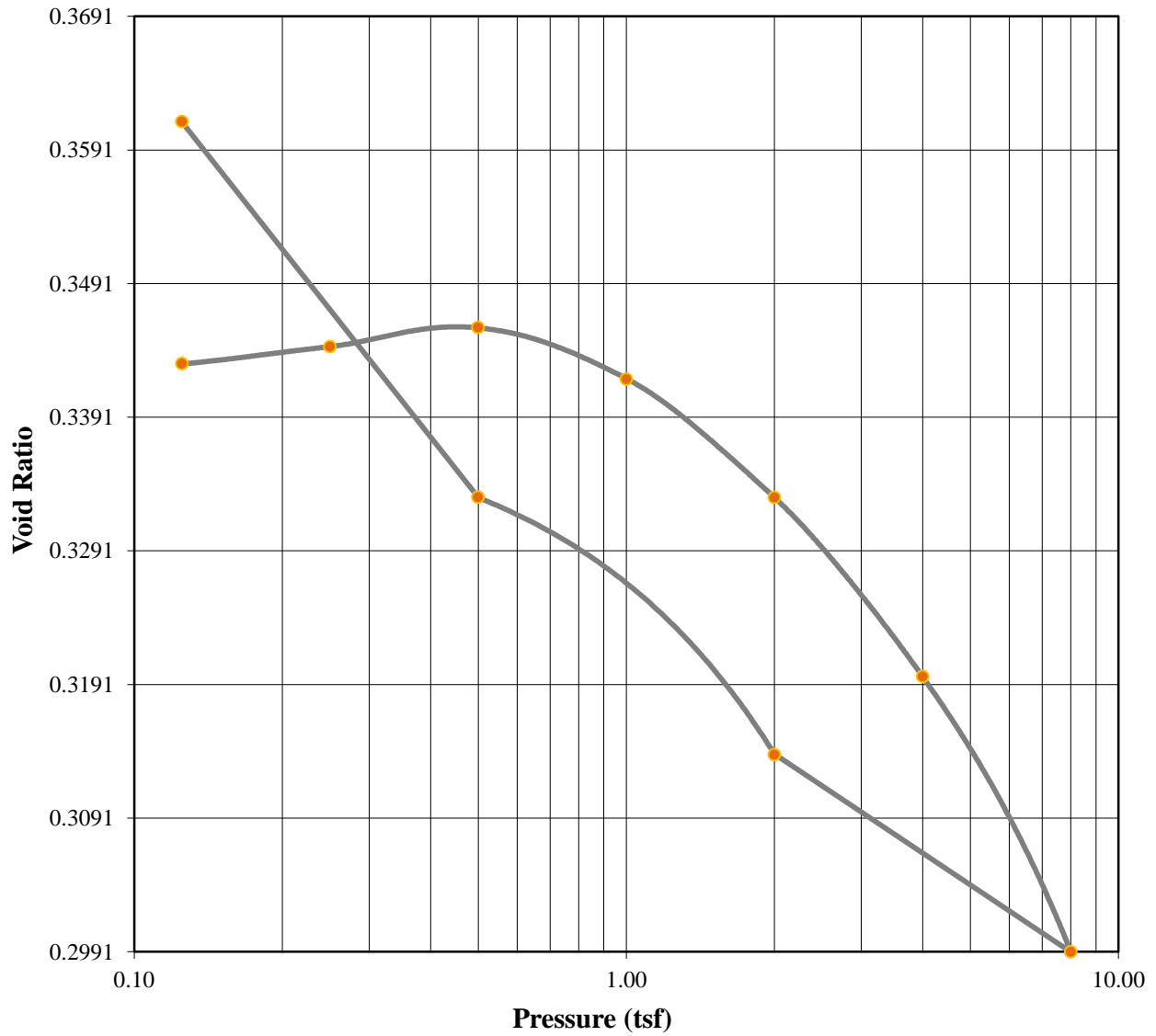
Checked By:

Consolidation Test Test Results



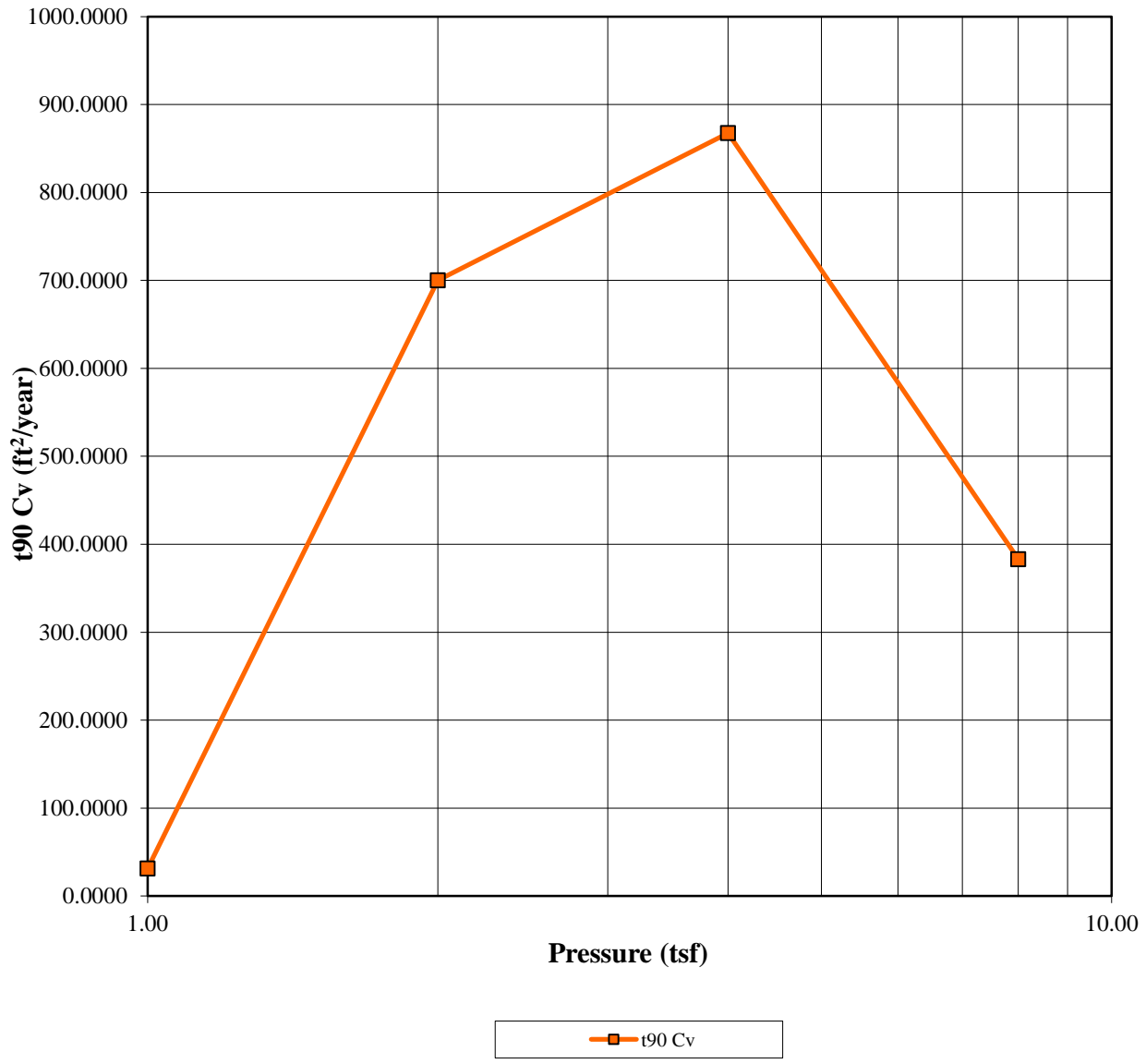
	Before	After	Liquid Limits:	0	Test Date:	9/30/15
Moisture (%):	14.35	16.42	Plastic Limits:	0		
Dry Density (pcf):	120.70	118.78	Plasticity Index (%):	0		
Saturation (%):	108.23	116.47	Specific Gravity:	2.600	Assumed	
Void Ratio:	0.3431	0.3242				
Sample Description:	SANDY LEAN CLAY (CL A-6(11))					
Project Number:	7559	Depth:	210.0-212.0 ft	Remarks:		
Sample Number:	T-5	Boring Number:	MB-2			
Project:	Mobile River Bridge					
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



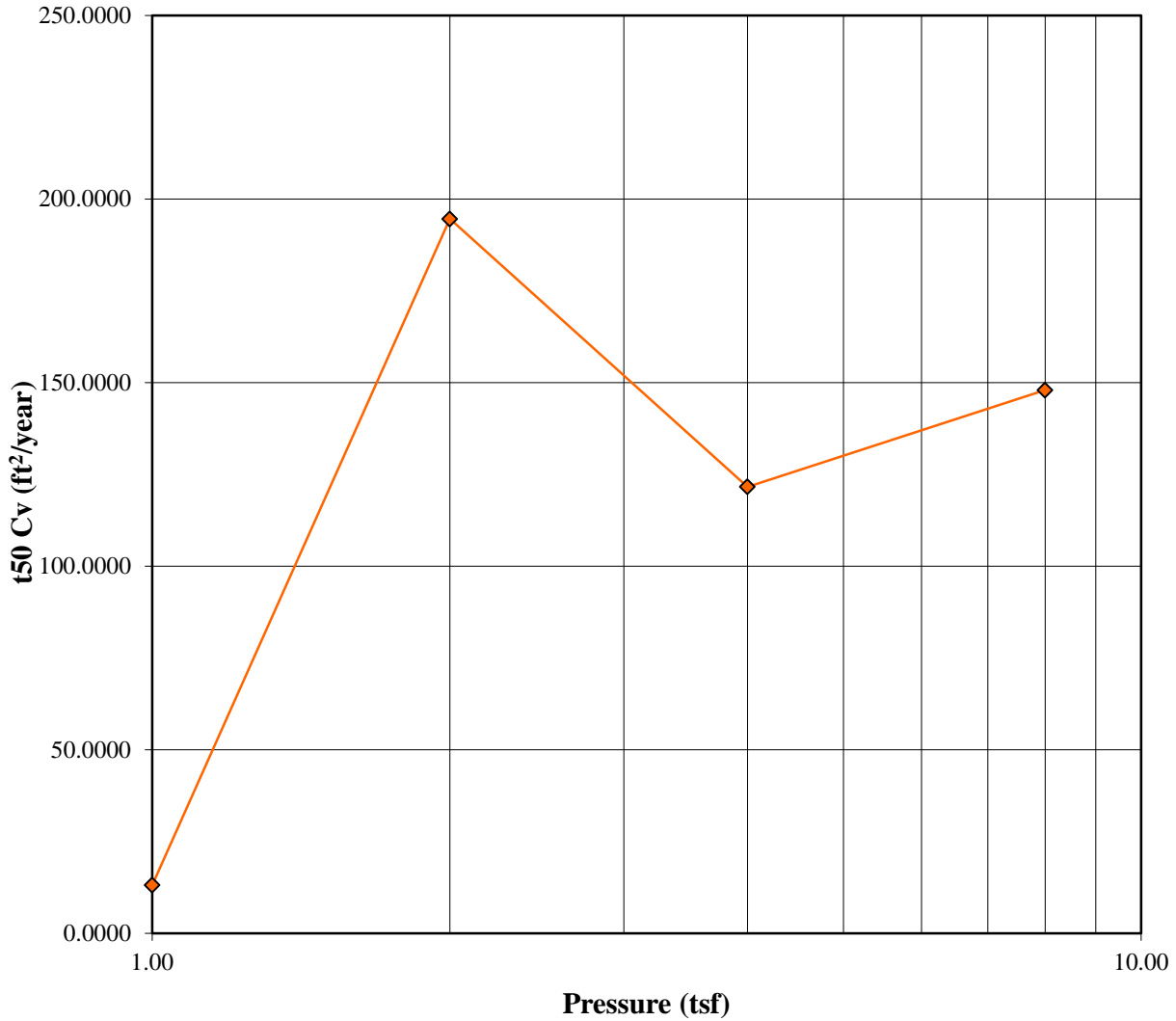
	Before	After	Liquid Limits:	0	Test Date:	9/30/15
Moisture (%):	14.35	16.42	Plastic Limits:	0		
Dry Density (pcf):	120.70	118.78	Plasticity Index (%):	0		
Saturation (%):	108.23	116.47				
Void Ratio:	0.3431	0.3242	Specific Gravity:	2.600	Assumed	
Soil Description:	SANDY LEAN CLAY (CL A-6(11))					
Project Number:	7559		Depth:	210.0-212.0 ft		Remarks:
Sample Number:	T-5		Boring Number:	MB-2		
Project:	Mobile River Bridge					
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	0	Test Date:	9/30/15
Moisture (%):	14.35	16.42	Plastic Limits:	0		
Dry Density (pcf):	120.70	118.78	Plasticity Index (%):	0		
Saturation (%):	108.23	116.47	Specific Gravity:	2.600	Assumed	
Void Ratio:	0.3431	0.3242				
Soil Description: SANDY LEAN CLAY (CL A-6(11))						
Project Number:	7559		Depth:	210.0-212.0 ft		Remarks:
Sample Number:	T-5		Boring Number:	MB-2		
Project:	Mobile River Bridge					
Client:	ALDOT					
Location:	Soils Lab					

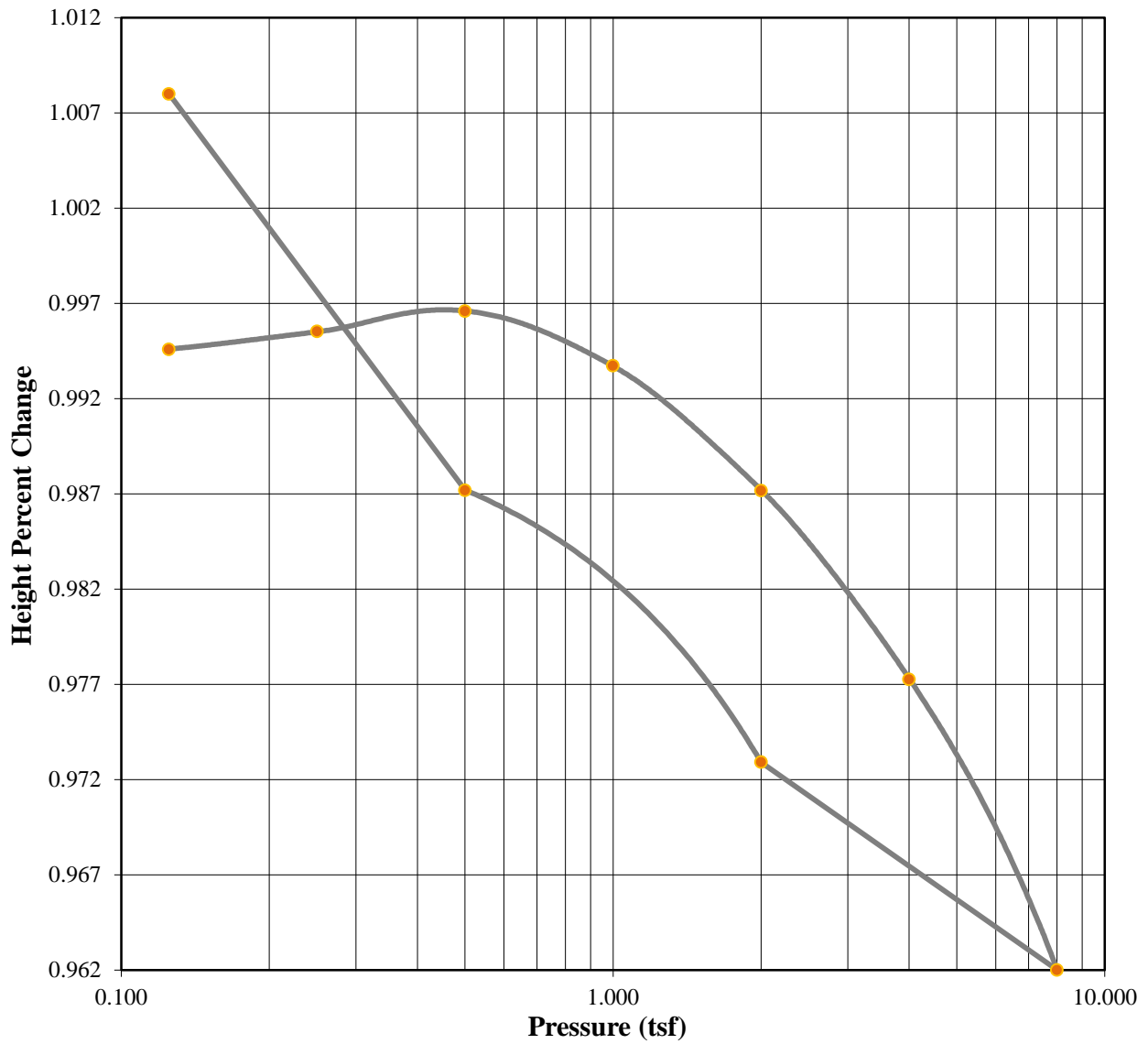
Consolidation Test Test Results



◆ t50 Cv

	Before	After	Liquid Limits:	0	Test Date:	9/30/15
Moisture (%):	14.35	16.42	Plastic Limits:	0		
Dry Density (pcf):	120.70	118.78	Plasticity Index (%):	0		
Saturation (%):	108.23	116.47	Specific Gravity:	2.600	Assumed	
Void Ratio:	0.3431	0.3242				
Soil Description: SANDY LEAN CLAY (CL A-6(11))						
Project Number:	7559		Depth:	210.0-212.0 ft		Remarks:
Sample Number:	T-5	Boring Number:	MB-2			
Project:	Mobile River Bridge					
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	0	Test Date:	9/30/15
Moisture (%):	14.35	16.42	Plastic Limits:	0		
Dry Density (pcf):	120.70	118.78	Plasticity Index (%):	0		
Saturation (%):	108.23	116.47				
Void Ratio:	0.3431	0.3242	Specific Gravity:	2.600	Assumed	
Soil Description:	SANDY LEAN CLAY (CL A-6(11))					
Project Number:	7559		Depth:	210.0-212.0 ft		
Sample Number:	T-5	Boring Number:	MB-2			
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Results Summary

Project: Mobile River Bridge
Location: Soils Lab
Job Number: 15-1101-0228

Project Number: 7559

Sample Number: T-5
Boring Number: MB-2
Depth: 210.0-212.0 ft.
Sample Type: Undisturbed

Sample Description: SANDY LEAN CLAY (CL A-6(11))
Remarks:

Test Number:
Test Date: 9/30/15

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	0.9940	0.2535	0.00	0.3423	0.000	0.000	0.000	0.000
1	0.125	-0.0006	0.9946	0.2541	-0.06	0.3431	0.000	0.000	0.000	0.000
2	0.250	-0.0015	0.9955	0.2550	-0.15	0.3444	0.000	0.000	0.000	0.000
3	0.500	-0.0026	0.9966	0.2561	-0.26	0.3458	0.000	0.000	0.000	0.000
4	1.000	0.0003	0.9937	0.2532	0.03	0.3420	24.262	* 13.4786	31.495	13.170
5	2.000	0.0068	0.9872	0.2467	0.69	0.3331	1.077	0.900	700.093	194.558
6	4.000	0.0167	0.9773	0.2368	1.69	0.3197	0.852	1.412	867.566	121.620
7	8.000	0.0320	0.9620	0.2215	3.22	0.2991	1.869	1.124	383.100	147.965
8	2.000	0.0211	0.9729	0.2324	2.12	0.3139	0.000	0.000	0.000	0.000
9	0.500	0.0068	0.9872	0.2467	0.69	0.3331	0.000	0.000	0.000	0.000
10	0.125	-0.0140	1.0080	0.2675	-1.41	0.3612	0.000	0.000	0.000	0.000

Predicted value indicated with *

Tested By:

Checked By:

Consolidation Test
Consolidation Specimen Information

Project: Mobile River Bridge **Project Number:** 7559
Location: Soils Lab
Job Number: 15-1101-0228 **Test Date:** 9/30/15

Sample Number: T-5 **Sample Description:**
Boring Number: MB-2 SANDY LEAN CLAY (CL A-6(11))
Depth: 210.0-212.0 ft. **Remarks:**
Sample Type: Undisturbed

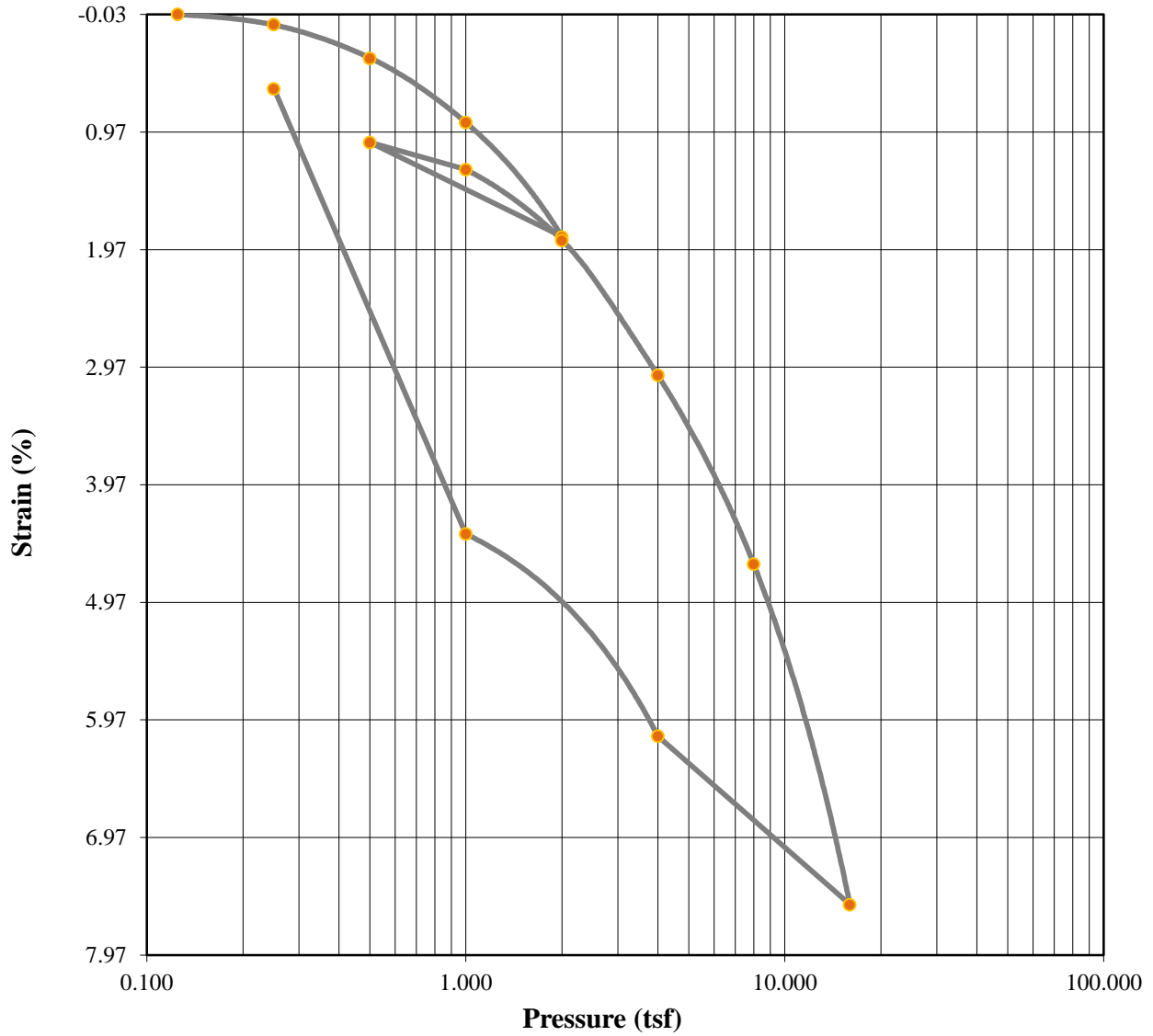
Test Number:
Liquid Limit: 0.0000 **Initial Void Ratio:** 0.3431 **Initial Height (in):** 0.9940
Plastic Limit: 0.0000 **Plasticity Index (%):** 0.0000 **Initial Diameter (in):** 2.5000
Specific Gravity: 2.6000 **Weight of Ring (g):** 98.7000
Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	125.59	303.85
Dry Soil + Container (g)	113.88	278.59
Weight of Container (g)	32.26	124.80
Moisture Content (%)	14.35	16.42
Void Ratio	0.3431	0.3242
Saturation (%)	108.23	116.47
Dry Density (pcf)	120.70	118.78

Tested By:

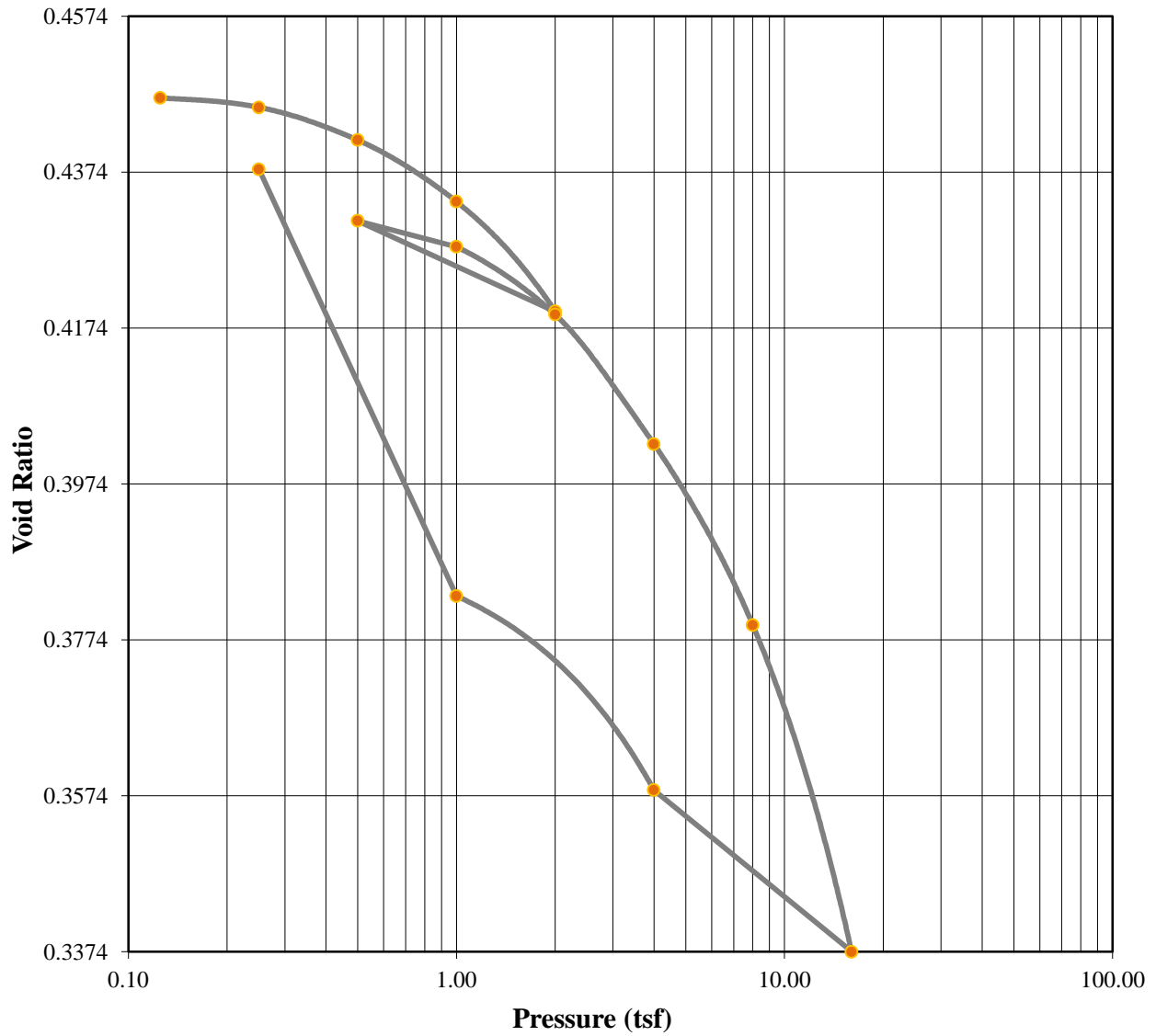
Checked By:

Consolidation Test Test Results



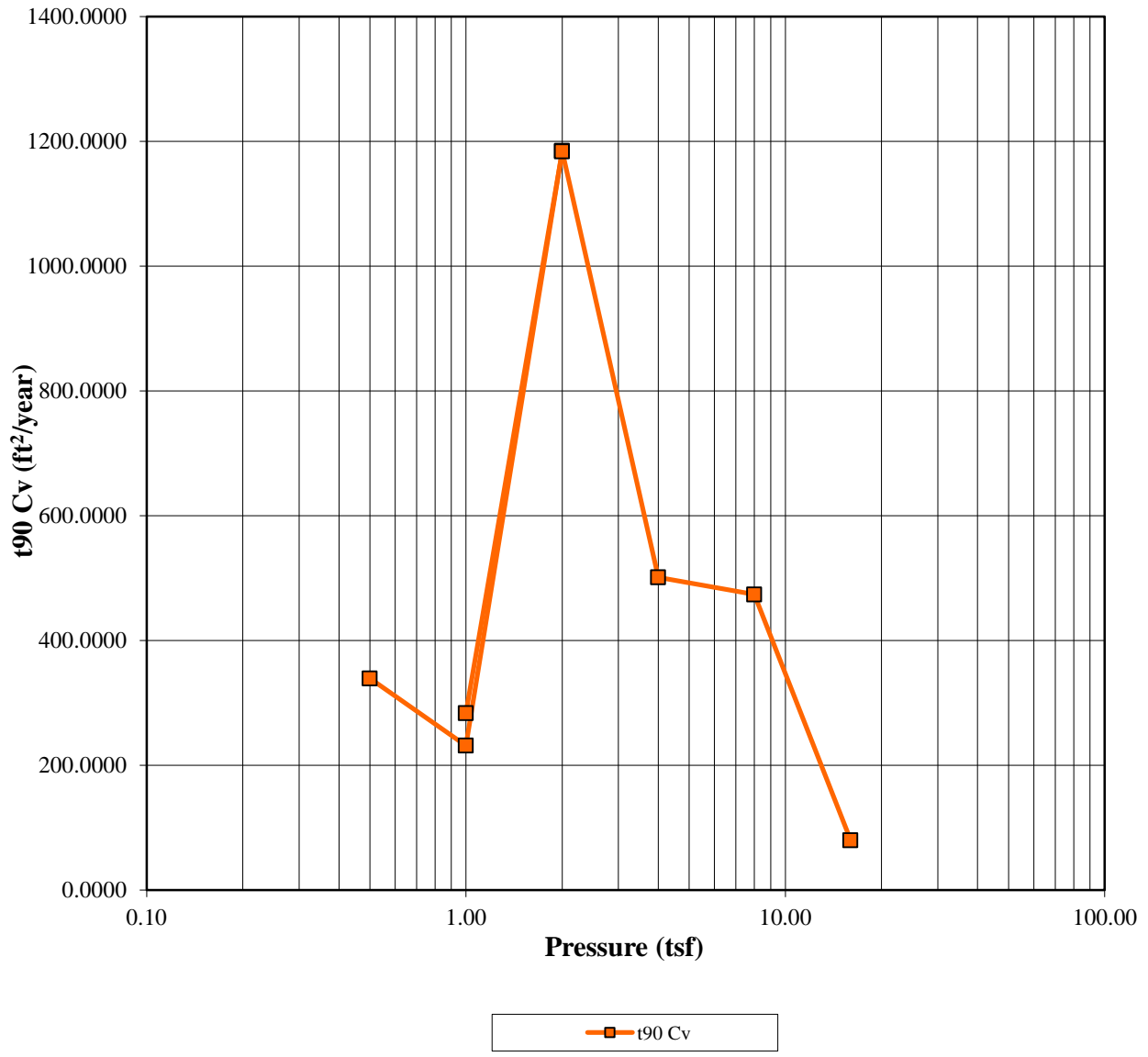
	Before	After	Liquid Limits:	35	Test Date:	8/23/17
Moisture (%):	23.29	24.06	Plastic Limits:	17		
Dry Density (pcf):	102.71	103.07	Plasticity Index (%):	0		
Saturation (%):	123.64	129.22	Specific Gravity:	2.384	Measured	
Void Ratio:	0.4438	0.4351				
Sample Description:	LEAN CLAY (CL A-6(18))					
Project Number:	8013		Depth:	123.0-125.0 ft		Remarks:
Sample Number:	T-3		Boring Number:	MB-02A		
Project:	Mobile River Bridge					
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



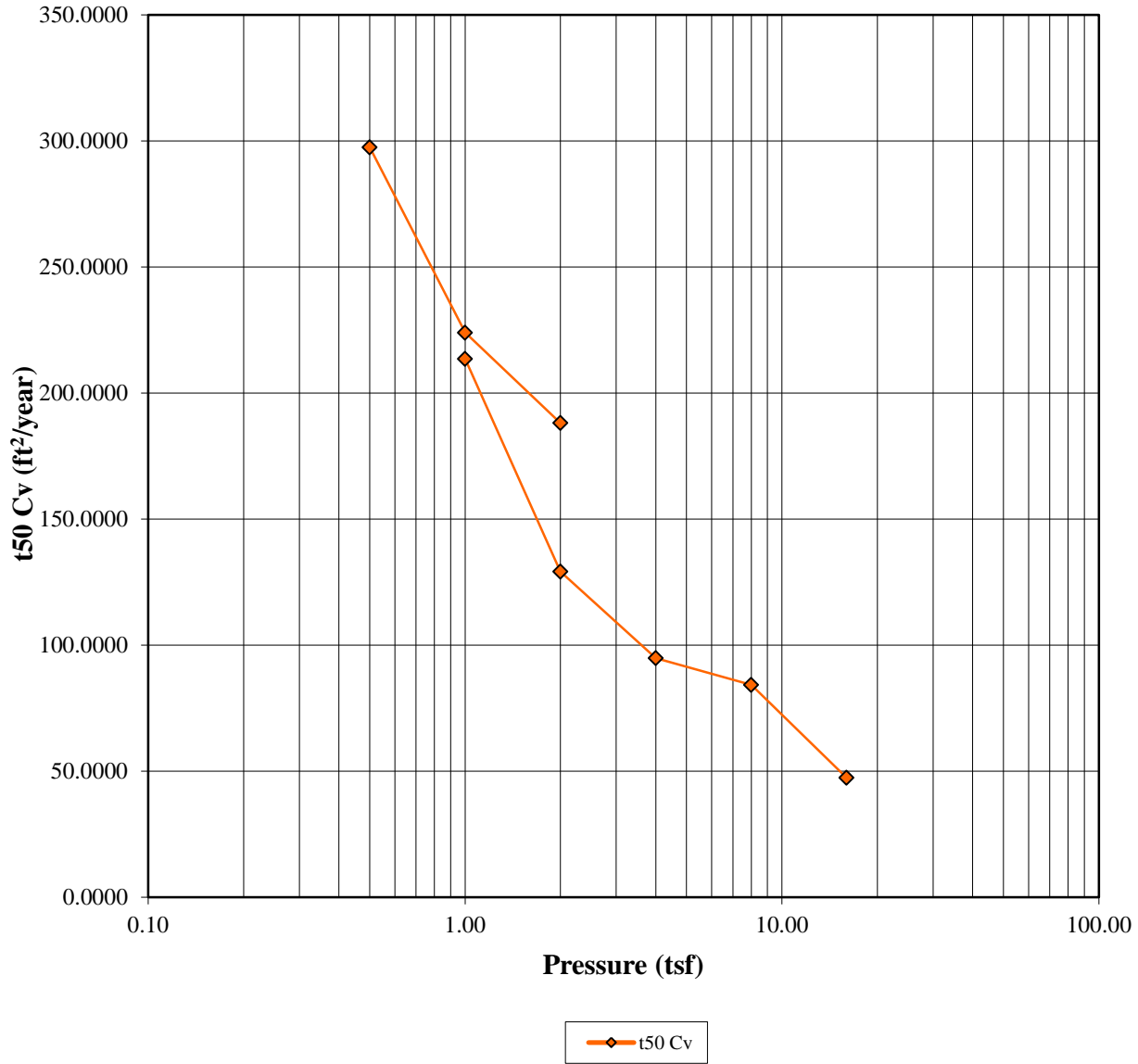
	Before	After	Liquid Limits:	35	Test Date:	8/23/17
Moisture (%):	23.29	24.06	Plastic Limits:	17		
Dry Density (pcf):	102.71	103.07	Plasticity Index (%):	0		
Saturation (%):	123.64	129.22	Specific Gravity:	2.384	Measured	
Void Ratio:	0.4438	0.4351				
Soil Description:	LEAN CLAY (CL A-6(18))					
Project Number:	8013		Depth:	123.0-125.0 ft		Remarks:
Sample Number:	T-3		Boring Number:	MB-02A		
Project:	Mobile River Bridge					
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



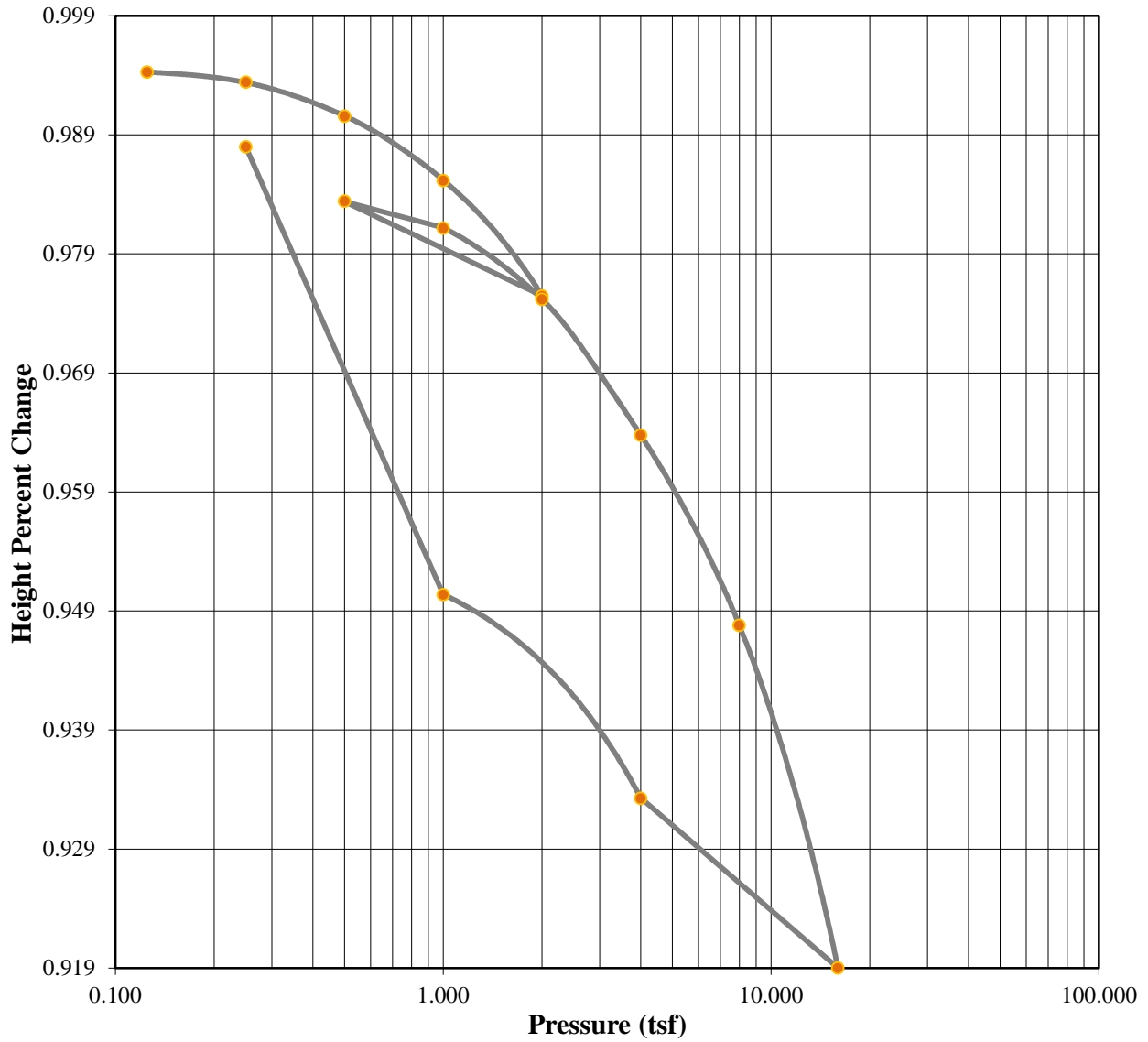
	Before	After	Liquid Limits:	35	Test Date:	8/23/17
Moisture (%):	23.29	24.06	Plastic Limits:	17		
Dry Density (pcf):	102.71	103.07	Plasticity Index (%):	0		
Saturation (%):	123.64	129.22	Specific Gravity:	2.384	Measured	
Void Ratio:	0.4438	0.4351				
Soil Description:	LEAN CLAY (CL A-6(18))					
Project Number:	8013		Depth:	123.0-125.0 ft		
Sample Number:	T-3		Boring Number:	MB-02A		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	35	Test Date:	8/23/17
Moisture (%):	23.29	24.06	Plastic Limits:	17		
Dry Density (pcf):	102.71	103.07	Plasticity Index (%):	0		
Saturation (%):	123.64	129.22	Specific Gravity:	2.384	Measured	
Void Ratio:	0.4438	0.4351				
Soil Description:	LEAN CLAY (CL A-6(18))					
Project Number:	8013		Depth:	123.0-125.0 ft		
Sample Number:	T-3		Boring Number:	MB-02A		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	35	Test Date:	8/23/17
Moisture (%):	23.29	24.06	Plastic Limits:	17		
Dry Density (pcf):	102.71	103.07	Plasticity Index (%):	0		
Saturation (%):	123.64	129.22				
Void Ratio:	0.4438	0.4351	Specific Gravity:	2.384	Measured	
Soil Description:	LEAN CLAY (CL A-6(18))					
Project Number:	8013		Depth:	123.0-125.0 ft		
Sample Number:	T-3		Boring Number:	MB-02A		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Results Summary

Project: Mobile River Bridge
Location: Soils Lab
Job Number: 17-1101-0067

Project Number: 8013

Sample Number: T-3
Boring Number: MB-02A
Depth: 123.0-125.0 ft.
Sample Type: Undisturbed

Sample Description: LEAN CLAY (CL A-6(18))
Remarks:

Test Number:
Test Date: 8/23/17

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 (ft ² /year)	t50 Cv (ft ² /year)
0	0.000	0.0000	0.9940	0.3068	0.00	0.4465	0.000	0.000	0.000	0.000
1	0.125	-0.0003	0.9943	0.3071	-0.03	0.4469	0.000	0.000	0.000	0.000
2	0.250	0.0006	0.9934	0.3063	0.06	0.4457	0.000	0.000	0.000	0.000
3	0.500	0.0034	0.9906	0.3034	0.34	0.4415	2.238	0.593	339.260	297.489
4	1.000	0.0088	0.9852	0.2980	0.89	0.4336	3.242	0.779	231.680	223.953
5	2.000	0.0185	0.9755	0.2883	1.86	0.4195	0.622	0.909	1184.685	188.094
6	0.500	0.0106	0.9834	0.2963	1.06	0.4311	0.000	0.000	0.000	0.000
7	1.000	0.0128	0.9812	0.2940	1.29	0.4278	2.625	0.810	283.829	213.569
8	2.000	0.0188	0.9752	0.2880	1.89	0.4191	0.622	1.323	1183.913	129.219
9	4.000	0.0302	0.9638	0.2766	3.04	0.4025	1.433	1.760	501.466	94.878
10	8.000	0.0462	0.9478	0.2606	4.65	0.3793	1.466	1.916	474.053	84.287
11	16.000	0.0750	0.9190	0.2318	7.54	0.3374	8.165	3.203	80.045	47.406
12	4.000	0.0607	0.9333	0.2461	6.11	0.3581	0.000	0.000	0.000	0.000
13	1.000	0.0436	0.9504	0.2632	4.39	0.3830	0.000	0.000	0.000	0.000
14	0.250	0.0060	0.9880	0.3008	0.60	0.4378	0.000	0.000	0.000	0.000

Predicted value indicated with *

Tested By: B. Hak

Checked By: C. Dugger

Consolidation Test

Consolidation Specimen Information

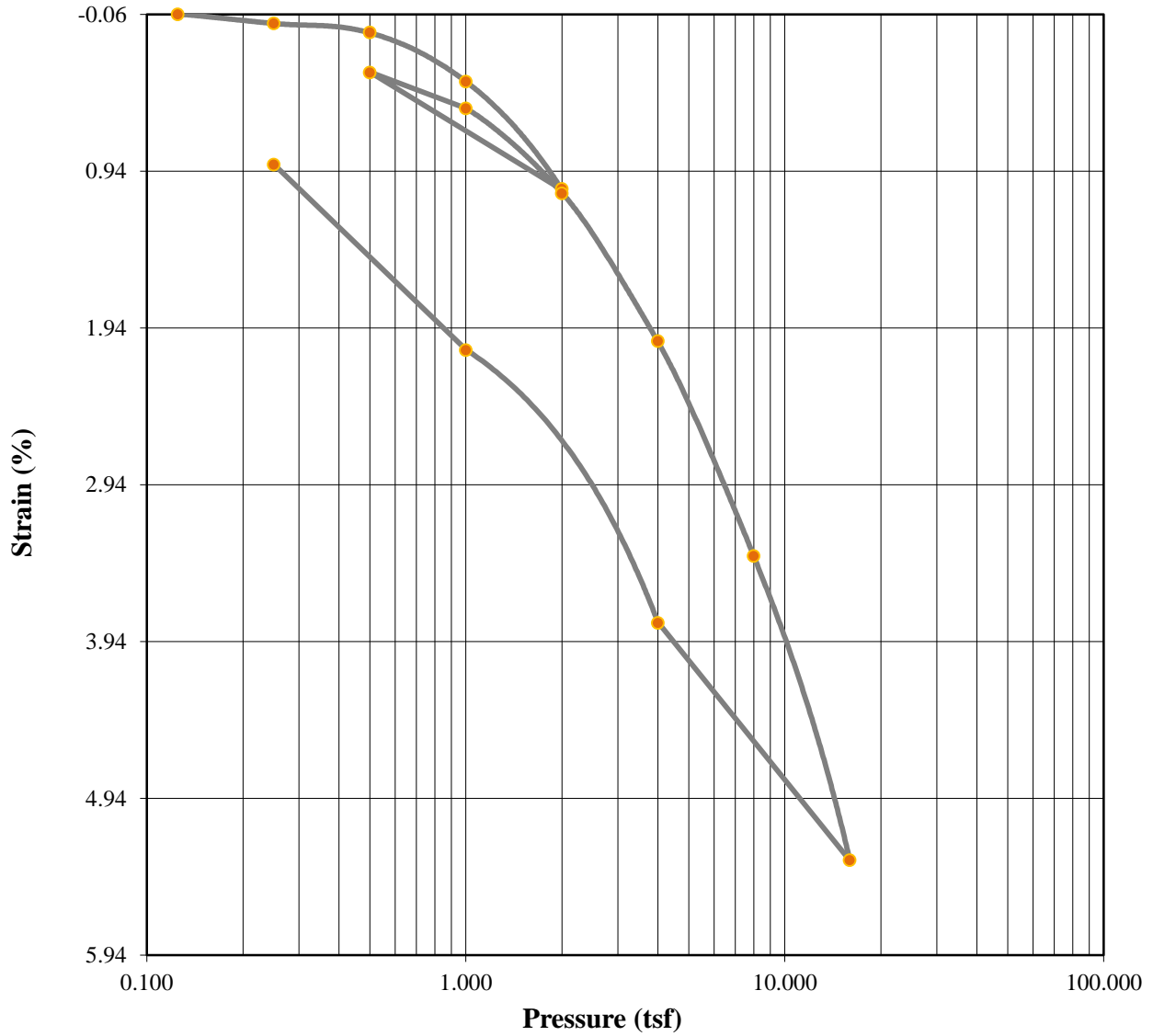
Project: Mobile River Bridge		Project Number: 8013
Location: Soils Lab		
Job Number: 17-1101-0067		Test Date: 8/23/17
Sample Number: T-3	Sample Description:	
Boring Number: MB-02A	LEAN CLAY (CL A-6(18))	
Depth: 123.0-125.0 ft.	Remarks:	
Sample Type: Undisturbed		
Test Number:		
Liquid Limit: 35.0000	Initial Void Ratio: 0.4438	Initial Height (in): 0.9940
Plastic Limit: 17.0000	Plasticity Index (%): 0.0000	Initial Diameter (in): 2.5010
Specific Gravity: 2.3840	Weight of Ring (g): 98.6500	
Measured		

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	118.54	291.67
Dry Soil + Container (g)	102.19	260.21
Weight of Container (g)	32.00	129.44
Moisture Content (%)	23.29	24.06
Void Ratio	0.4438	0.4351
Saturation (%)	123.64	129.22
Dry Density (pcf)	102.71	103.07

Tested By: B. Hak

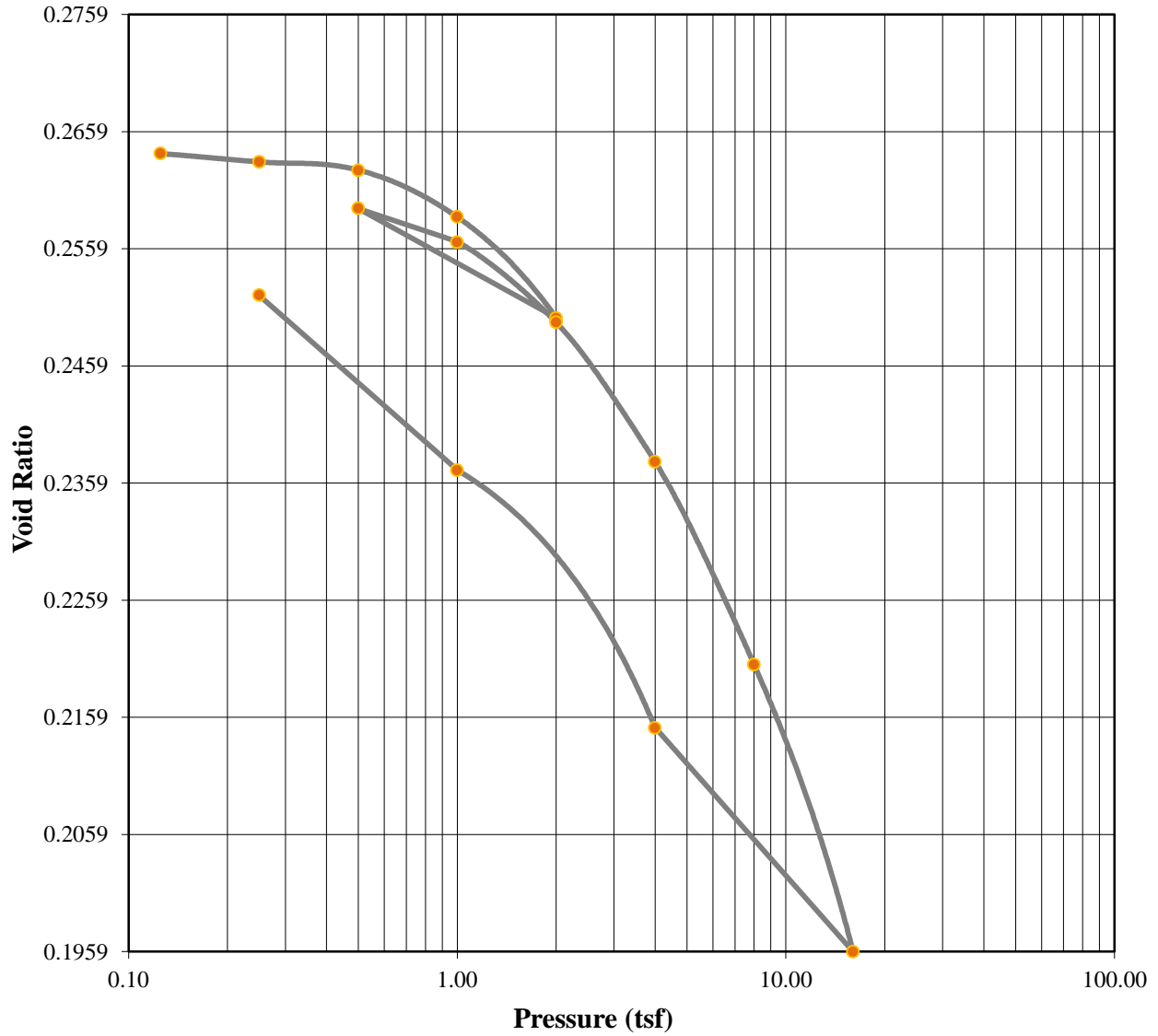
Checked By: C. Dugger

Consolidation Test Test Results



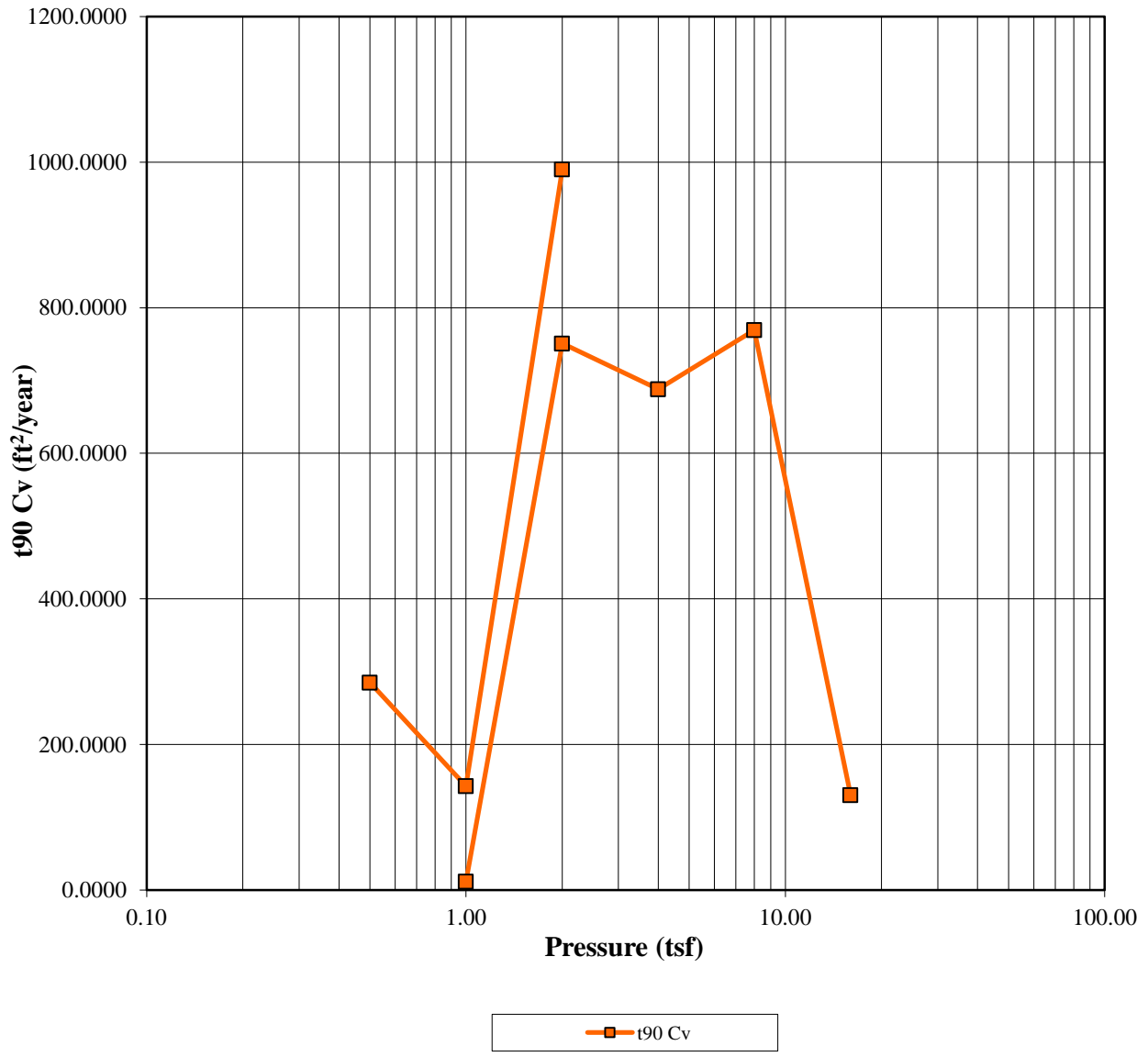
	Before	After	Liquid Limits:	39	Test Date:	8/25/17
Moisture (%):	16.73	18.16	Plastic Limits:	14		
Dry Density (pcf):	115.48	116.03	Plasticity Index (%):	0		
Saturation (%):	147.48	163.80				
Void Ratio:	0.2621	0.2508	Specific Gravity:	2.341	Measured	
Sample Description:	LEAN CLAY with SAND (CL A-6(16))					
Project Number:	8013		Depth:	198.0-200.0 ft		
Sample Number:	T-8		Boring Number:	MB-02A		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



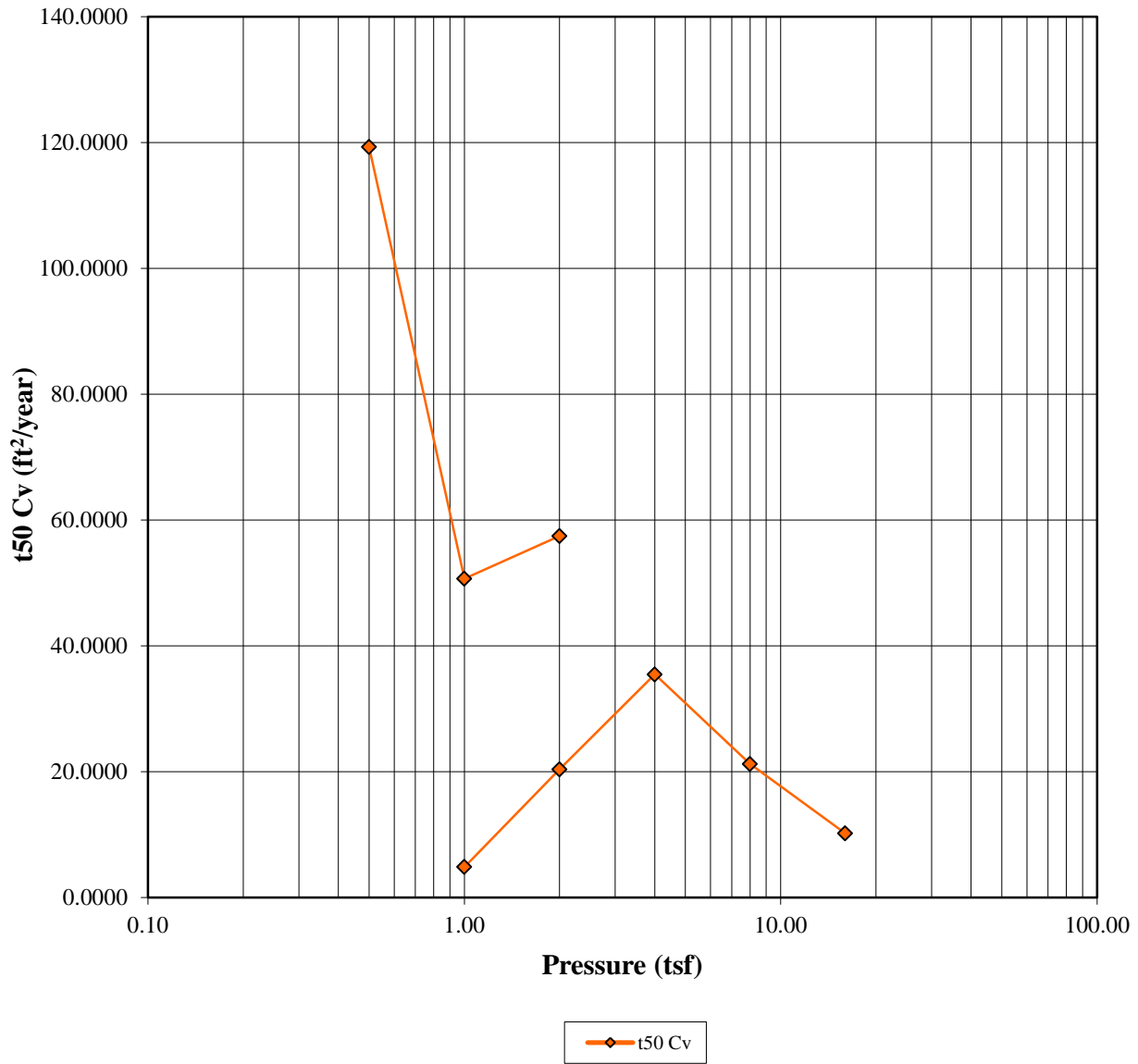
	Before	After	Liquid Limits:	39	Test Date:	8/25/17
Moisture (%):	16.73	18.16	Plastic Limits:	14		
Dry Density (pcf):	115.48	116.03	Plasticity Index (%):	0		
Saturation (%):	147.48	163.80	Specific Gravity:	2.341	Measured	
Void Ratio:	0.2621	0.2508				
Soil Description:	LEAN CLAY with SAND (CL A-6(16))					
Project Number:	8013		Depth:	198.0-200.0 ft		
Sample Number:	T-8		Boring Number:	MB-02A		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



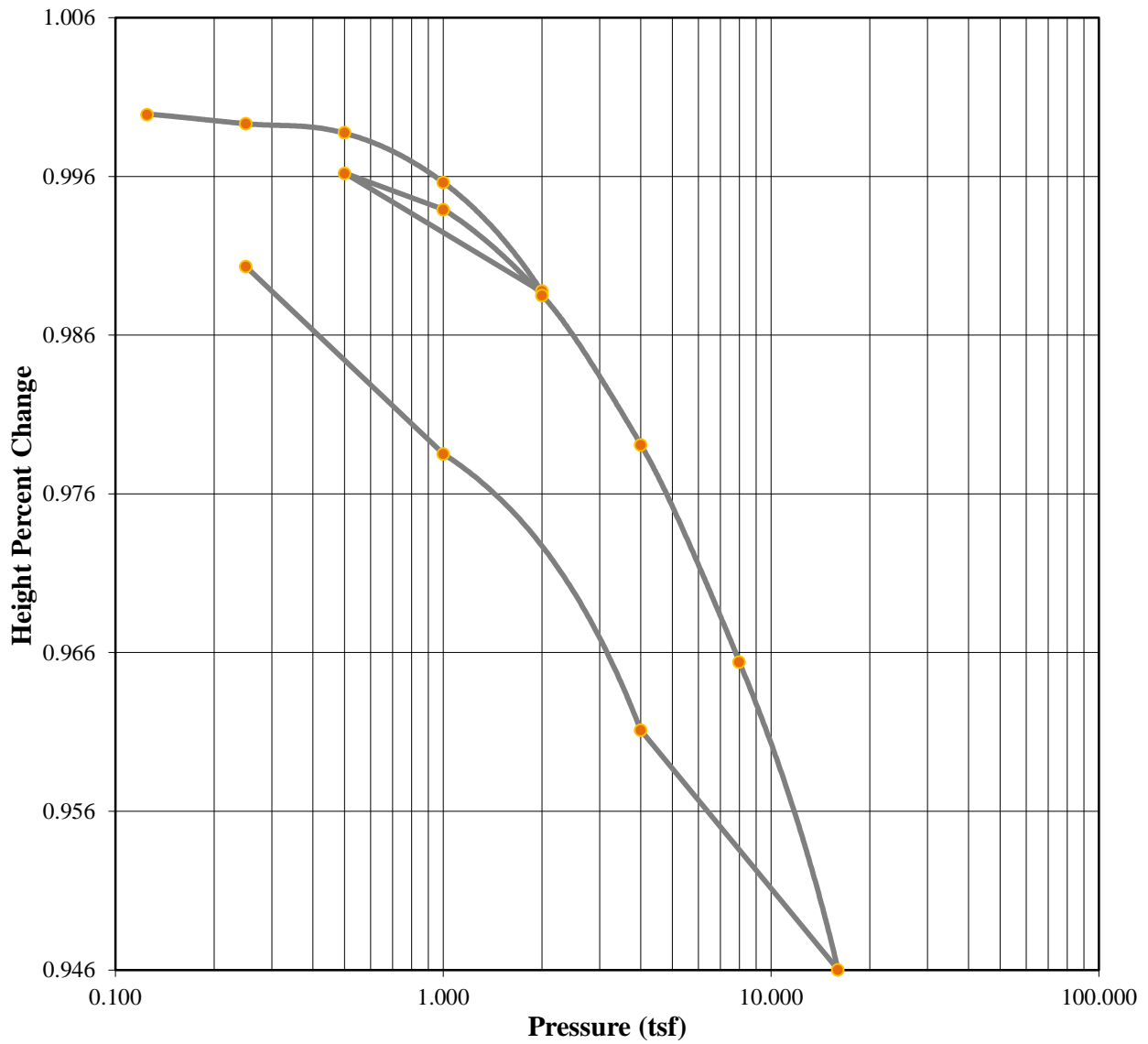
	Before	After	Liquid Limits:	39	Test Date:	8/25/17
Moisture (%):	16.73	18.16	Plastic Limits:	14		
Dry Density (pcf):	115.48	116.03	Plasticity Index (%):	0		
Saturation (%):	147.48	163.80	Specific Gravity:	2.341	Measured	
Void Ratio:	0.2621	0.2508				
Soil Description:	LEAN CLAY with SAND (CL A-6(16))					
Project Number:	8013		Depth:	198.0-200.0 ft		
Sample Number:	T-8		Boring Number:	MB-02A		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	39	Test Date:	8/25/17
Moisture (%):	16.73	18.16	Plastic Limits:	14		
Dry Density (pcf):	115.48	116.03	Plasticity Index (%):	0		
Saturation (%):	147.48	163.80	Specific Gravity:	2.341	Measured	
Void Ratio:	0.2621	0.2508				
Soil Description:	LEAN CLAY with SAND (CL A-6(16))					
Project Number:	8013		Depth:	198.0-200.0 ft		
Sample Number:	T-8		Boring Number:	MB-02A		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					

Consolidation Test Test Results



	Before	After	Liquid Limits:	39	Test Date:	8/25/17
Moisture (%):	16.73	18.16	Plastic Limits:	14		
Dry Density (pcf):	115.48	116.03	Plasticity Index (%):	0		
Saturation (%):	147.48	163.80				
Void Ratio:	0.2621	0.2508	Specific Gravity:	2.341	Measured	
Soil Description:	LEAN CLAY with SAND (CL A-6(16))					
Project Number:	8013		Depth:	198.0-200.0 ft		
Sample Number:	T-8		Boring Number:	MB-02A		
Project:	Mobile River Bridge					Remarks:
Client:	ALDOT					
Location:	Soils Lab					



Consolidation Test Results Summary

Project: Mobile River Bridge
Location: Soils Lab
Job Number: 17-1101-0067

Project Number: 8013

Sample Number: T-8
Boring Number: MB-02A
Depth: 198.0-200.0 ft.
Sample Type: Undisturbed

Sample Description: LEAN CLAY with SAND (CL A-6(16))
Remarks:

Test Number:
Test Date: 8/25/17

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 (ft ² /year)	t50 Cv (ft ² /year)
0	0.000	0.0000	0.9990	0.2082	0.00	0.2633	0.000	0.000	0.000	0.000
1	0.125	-0.0006	0.9996	0.2088	-0.06	0.2640	0.000	0.000	0.000	0.000
2	0.250	0.0000	0.9990	0.2082	0.00	0.2633	0.000	0.000	0.000	0.000
3	0.500	0.0006	0.9984	0.2077	0.06	0.2626	2.704	* 1.5024	285.227	119.275
4	1.000	0.0037	0.9953	0.2045	0.37	0.2586	5.361	3.514	142.985	50.683
5	2.000	0.0106	0.9884	0.1977	1.06	0.2500	0.764	3.057	989.773	57.448
6	0.500	0.0031	0.9959	0.2051	0.31	0.2593	0.000	0.000	0.000	0.000
7	1.000	0.0054	0.9936	0.2028	0.54	0.2565	65.513	* 36.3964	11.660	4.876
8	2.000	0.0108	0.9882	0.1974	1.08	0.2496	1.006	8.612	750.830	20.382
9	4.000	0.0202	0.9788	0.1880	2.03	0.2377	1.077	4.852	688.207	35.490
10	8.000	0.0339	0.9651	0.1743	3.40	0.2204	0.937	7.881	769.166	21.243
11	16.000	0.0533	0.9457	0.1549	5.34	0.1959	5.303	15.697	130.499	10.241
12	4.000	0.0382	0.9608	0.1700	3.82	0.2150	0.000	0.000	0.000	0.000
13	1.000	0.0208	0.9782	0.1874	2.08	0.2370	0.000	0.000	0.000	0.000
14	0.250	0.0090	0.9900	0.1992	0.90	0.2519	0.000	0.000	0.000	0.000

Predicted value indicated with *

Tested By: B. Hak

Checked By: C. Dugger

Consolidation Test

Consolidation Specimen Information

Project: Mobile River Bridge **Project Number:** 8013
Location: Soils Lab
Job Number: 17-1101-0067 **Test Date:** 8/25/17

Sample Number: T-8 **Sample Description:**
Boring Number: MB-02A LEAN CLAY with SAND (CL A-6(16))
Depth: 198.0-200.0 ft. **Remarks:**
Sample Type: Undisturbed

Test Number:
Liquid Limit: 39.0000 **Initial Void Ratio:** 0.2621 **Initial Height (in):** 0.9990
Plastic Limit: 14.0000 **Plasticity Index (%):** 0.0000 **Initial Diameter (in):** 2.5040
Specific Gravity: 2.3410 **Weight of Ring (g):** 111.0800
Measured

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	110.01	304.45
Dry Soil + Container (g)	98.87	277.59
Weight of Container (g)	32.27	129.65
Moisture Content (%)	16.73	18.16
Void Ratio	0.2621	0.2508
Saturation (%)	147.48	163.80
Dry Density (pcf)	115.48	116.03

Tested By: B. Hak

Checked By: C. Dugger

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Pensacola

3355 McLemore Drive

Pensacola, FL 32514

Tel: (850)474-1001

TestAmerica Job ID: 400-126048-1

Client Project/Site: ALDOT MRB West Pier

For:

Thompson Engineering Inc

2970 Cottage Hill Rd.

Suite 190

Mobile, Alabama 36606

Attn: Mr. Steve O'Hearn



Authorized for release by:

8/31/2016 12:21:49 PM

Mike Nance, Service Center Manager

(251)706-3210

mike.nance@testamericainc.com

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Job ID: 400-126048-1

Laboratory: TestAmerica Pensacola

Narrative

**Job Narrative
400-126048-1**

Comments

No additional comments.

Receipt

The samples were received on 8/18/2016 1:25 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.5° C.

Receipt Exceptions

MRB West Pier MB-1 (400-126048-1), MRB West Pier MHLA-3 (400-126048-2), MRB West Pier MHLA-3 S-1A (400-126048-3), MRB West Pier MHLA-3 S-1B (400-126048-4), MRB West Pier MHLA-3 S-2A (400-126048-5), MRB West Pier MHLA-3 S-2B (400-126048-6), MRB West Pier MHLA-3 S-3A (400-126048-7), MRB West Pier MHLA-3 S-3B (400-126048-8), MRB West Pier MHLA-3 S-4A (400-126048-9), MRB West Pier MHLA-3 S-4B (400-126048-10), MRB West Pier MB-1 S-1A (400-126048-11), MRB West Pier MB-1 S-1B (400-126048-12), MRB West Pier MB-1 S-2A (400-126048-13), MRB West Pier MB-1 S-2B (400-126048-14), MRB West Pier MB-1 S-3A (400-126048-15), MRB West Pier MB-1 S-3B (400-126048-16), MRB West Pier MB-1 S-4A (400-126048-17) and MRB West Pier MB-1 S-4B (400-126048-18)
No sample collection time list on COC/container labels.

HPLC/IC

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

Method(s) 9050A: The procedure for Resistivity by Method 9050A is applicable to liquid samples and has been modified to provide the enclosed results on the soil matrix. The modification involves a DI leach of the soil followed by electrometric measurement of the leachate. The values provided are a measure of the leachable components resistance for a given mass to volume of water, rather than the resistivity of the soil itself.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Lab Admin

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1

Lab Sample ID: 400-126048-1

Date Collected: 08/17/16 00:00

Matrix: Water

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.1	HF			SU			08/23/16 09:31	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	9.5		2.0		mg/L			08/24/16 08:00	1
Specific Conductance	730		5.0		umhos/cm			08/28/16 13:13	1
Resistivity	<2000		2000		ohm-m			08/28/16 13:13	1
Sulfate	<5.0		5.0		mg/L			08/24/16 13:01	1

Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3

Lab Sample ID: 400-126048-2

Date Collected: 08/18/16 00:00

Matrix: Water

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.2	HF			SU			08/23/16 09:31	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	26		2.0		mg/L			08/24/16 08:05	1
Specific Conductance	1000		5.0		umhos/cm			08/28/16 13:13	1
Resistivity	<2000		2000		ohm-m			08/28/16 13:13	1
Sulfate	44		25		mg/L			08/24/16 14:19	5

Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-1A

Lab Sample ID: 400-126048-3

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	20.2		0.1		%			08/23/16 14:00	1

General Chemistry - Soluble

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.2	HF			SU			08/23/16 10:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	250		100		umhos/cm			08/29/16 09:50	1
Resistivity	16000		20		ohm-m			08/29/16 09:50	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-1A

Lab Sample ID: 400-126048-3

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 79.8

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<25		25		mg/Kg	☼		08/30/16 02:40	1
Sulfate	<25		25		mg/Kg	☼		08/30/16 02:40	1



Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-1B

Lab Sample ID: 400-126048-4

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	13.3		0.1		%			08/23/16 14:00	1

General Chemistry - Soluble

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.1	HF			SU			08/23/16 10:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	630		100		umhos/cm			08/29/16 09:50	1
Resistivity	6400		20		ohm-m			08/29/16 09:50	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-1B

Lab Sample ID: 400-126048-4

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 86.7

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<23		23		mg/Kg	☼		08/30/16 03:49	1
Sulfate	<23		23		mg/Kg	☼		08/30/16 03:49	1

Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-2A

Lab Sample ID: 400-126048-5

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	19.6		0.1		%			08/23/16 14:00	1

General Chemistry - Soluble

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.7	HF			SU			08/23/16 10:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	550		100		umhos/cm			08/29/16 09:50	1
Resistivity	7300		20		ohm-m			08/29/16 09:50	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-2A

Lab Sample ID: 400-126048-5

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 80.4

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<24		24		mg/Kg	☼		08/30/16 04:12	1
Sulfate	<24		24		mg/Kg	☼		08/30/16 04:12	1

Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-2B

Lab Sample ID: 400-126048-6

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	20.5		0.1		%			08/23/16 14:00	1

General Chemistry - Soluble

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.8	HF			SU			08/23/16 10:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	330		100		umhos/cm			08/29/16 09:50	1
Resistivity	12000		20		ohm-m			08/29/16 09:50	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-2B

Lab Sample ID: 400-126048-6

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 79.5

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<25		25		mg/Kg	☼		08/30/16 05:20	1
Sulfate	<25		25		mg/Kg	☼		08/30/16 05:20	1

Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-3A

Lab Sample ID: 400-126048-7

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	19.9		0.1		%			08/23/16 14:00	1

General Chemistry - Soluble

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.2	HF			SU			08/23/16 10:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	150		100		umhos/cm			08/29/16 09:50	1
Resistivity	27000		20		ohm-m			08/29/16 09:50	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-3A

Lab Sample ID: 400-126048-7

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 80.1

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<24		24		mg/Kg	☼		08/30/16 05:43	1
Sulfate	<24		24		mg/Kg	☼		08/30/16 05:43	1



Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-3B

Lab Sample ID: 400-126048-8

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	17.7		0.1		%			08/23/16 14:00	1

General Chemistry - Soluble

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.2	HF			SU			08/23/16 10:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	200		100		umhos/cm			08/29/16 09:50	1
Resistivity	20000		20		ohm-m			08/29/16 09:50	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-3B

Lab Sample ID: 400-126048-8

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 82.3

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<24		24		mg/Kg	☼		08/30/16 06:06	1
Sulfate	31		24		mg/Kg	☼		08/30/16 06:06	1

Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-4A

Lab Sample ID: 400-126048-9

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	18.6		0.1		%			08/23/16 14:00	1

General Chemistry - Soluble

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.2	HF			SU			08/23/16 10:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	260		100		umhos/cm			08/29/16 09:50	1
Resistivity	15000		20		ohm-m			08/29/16 09:50	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-4A

Lab Sample ID: 400-126048-9

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 81.4

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<24		24		mg/Kg	☼		08/30/16 06:28	1
Sulfate	42		24		mg/Kg	☼		08/30/16 06:28	1

Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-4B

Lab Sample ID: 400-126048-10

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	15.5		0.1		%			08/23/16 14:00	1

General Chemistry - Soluble

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.3	HF			SU			08/23/16 10:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	240		100		umhos/cm			08/29/16 09:50	1
Resistivity	17000		20		ohm-m			08/29/16 09:50	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-4B

Lab Sample ID: 400-126048-10

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 84.5

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<23		23		mg/Kg	☼		08/30/16 06:51	1
Sulfate	33		23		mg/Kg	☼		08/30/16 06:51	1

Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-1A

Lab Sample ID: 400-126048-11

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	19.4		0.1		%			08/23/16 14:00	1

General Chemistry - Soluble

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.1	HF			SU			08/23/16 10:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	1400		100		umhos/cm			08/29/16 09:50	1
Resistivity	2900		20		ohm-m			08/29/16 09:50	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-1A

Lab Sample ID: 400-126048-11

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 80.6

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<24		24		mg/Kg	✘		08/30/16 07:14	1
Sulfate	<24		24		mg/Kg	✘		08/30/16 07:14	1

Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-1B

Lab Sample ID: 400-126048-12

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	25.4		0.1		%			08/23/16 14:00	1

General Chemistry - Soluble

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.3	HF			SU			08/23/16 10:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	930		100		umhos/cm			08/29/16 09:50	1
Resistivity	4300		20		ohm-m			08/29/16 09:50	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-1B

Lab Sample ID: 400-126048-12

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 74.6

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<27		27		mg/Kg	☼		08/30/16 07:37	1
Sulfate	<27		27		mg/Kg	☼		08/30/16 07:37	1

Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-2A

Lab Sample ID: 400-126048-13

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	32.7		0.1		%			08/23/16 15:11	1

General Chemistry - Soluble

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.2	HF			SU			08/23/16 10:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	760		100		umhos/cm			08/29/16 09:50	1
Resistivity	5200		20		ohm-m			08/29/16 09:50	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-2A

Lab Sample ID: 400-126048-13

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 67.4

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<30		30		mg/Kg	✘		08/30/16 08:00	1
Sulfate	<30		30		mg/Kg	✘		08/30/16 08:00	1

Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-2B

Lab Sample ID: 400-126048-14

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	38.6		0.1		%			08/23/16 15:11	1

General Chemistry - Soluble

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.2	HF			SU			08/23/16 10:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	680		100		umhos/cm			08/29/16 09:50	1
Resistivity	5800		20		ohm-m			08/29/16 09:50	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-2B

Lab Sample ID: 400-126048-14

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 61.4

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<32		32		mg/Kg	✱		08/30/16 08:45	1
Sulfate	<32		32		mg/Kg	✱		08/30/16 08:45	1

Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-3A

Lab Sample ID: 400-126048-15

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	20.3		0.1		%			08/23/16 15:11	1

General Chemistry - Soluble

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.3	HF			SU			08/23/16 10:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	150		100		umhos/cm			08/29/16 09:50	1
Resistivity	27000		20		ohm-m			08/29/16 09:50	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-3A

Lab Sample ID: 400-126048-15

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 79.7

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<26		26		mg/Kg	☼		08/30/16 09:54	1
Sulfate	<26		26		mg/Kg	☼		08/30/16 09:54	1

Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-3B

Lab Sample ID: 400-126048-16

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	21.8		0.1		%			08/23/16 15:11	1

General Chemistry - Soluble

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.4	HF			SU			08/23/16 10:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	380		100		umhos/cm			08/29/16 09:50	1
Resistivity	11000		20		ohm-m			08/29/16 09:50	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-3B

Lab Sample ID: 400-126048-16

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 78.2

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<26		26		mg/Kg	☼		08/30/16 10:17	1
Sulfate	28		26		mg/Kg	☼		08/30/16 10:17	1

Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-4A

Lab Sample ID: 400-126048-17

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	18.7		0.1		%			08/23/16 15:11	1

General Chemistry - Soluble

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.1	HF			SU			08/23/16 10:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	260		100		umhos/cm			08/29/16 09:50	1
Resistivity	16000		20		ohm-m			08/29/16 09:50	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-4A

Lab Sample ID: 400-126048-17

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 81.4

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<24		24		mg/Kg	☼		08/30/16 10:39	1
Sulfate	<24		24		mg/Kg	☼		08/30/16 10:39	1

Client Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-4B

Lab Sample ID: 400-126048-18

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	19.4		0.1		%			08/23/16 15:11	1

General Chemistry - Soluble

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.6	HF			SU			08/23/16 10:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	360		100		umhos/cm			08/29/16 09:50	1
Resistivity	11000		20		ohm-m			08/29/16 09:50	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-4B

Lab Sample ID: 400-126048-18

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 80.6

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<25		25		mg/Kg	☼		08/30/16 11:02	1
Sulfate	30		25		mg/Kg	☼		08/30/16 11:02	1

QC Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Method: 9056 - Anions, Ion Chromatography

Lab Sample ID: MB 400-320657/1-A
Matrix: Solid
Analysis Batch: 320720

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<20		20		mg/Kg			08/30/16 01:32	1
Sulfate	<20		20		mg/Kg			08/30/16 01:32	1

Lab Sample ID: LCS 400-320657/2-A
Matrix: Solid
Analysis Batch: 320720

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	100	101		mg/Kg		101	80 - 120
Sulfate	100	101		mg/Kg		101	80 - 120

Lab Sample ID: LCSD 400-320657/3-A
Matrix: Solid
Analysis Batch: 320720

Client Sample ID: Lab Control Sample Dup
Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	100	103		mg/Kg		103	80 - 120	2	15
Sulfate	100	109		mg/Kg		109	80 - 120	7	15

Lab Sample ID: 400-126048-3 MS
Matrix: Solid
Analysis Batch: 320720

Client Sample ID: MRB West Pier MHLA-3 S-1A
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	<25		126	134		mg/Kg	☼	100	80 - 120
Sulfate	<25		126	159		mg/Kg	☼	109	80 - 120

Lab Sample ID: 400-126048-3 MSD
Matrix: Solid
Analysis Batch: 320720

Client Sample ID: MRB West Pier MHLA-3 S-1A
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	<25		126	136		mg/Kg	☼	102	80 - 120	1	15
Sulfate	<25		126	163		mg/Kg	☼	113	80 - 120	3	15

Lab Sample ID: 400-126048-13 MS
Matrix: Solid
Analysis Batch: 320720

Client Sample ID: MRB West Pier MB-1 S-2A
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	<30		146	159		mg/Kg	☼	100	80 - 120
Sulfate	<30		146	157		mg/Kg	☼	97	80 - 120

QC Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Method: 325.2 - Chloride

Lab Sample ID: MB 400-319860/6
Matrix: Water
Analysis Batch: 319860

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<2.0		2.0		mg/L			08/24/16 07:42	1

Lab Sample ID: LCS 400-319860/7
Matrix: Water
Analysis Batch: 319860

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	30.0	30.9		mg/L		103	90 - 110

Lab Sample ID: MRL 400-319860/3
Matrix: Water
Analysis Batch: 319860

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	2.00	<2.0		mg/L		81	50 - 150

Method: 9045C - pH

Lab Sample ID: 400-126048-8 DU
Matrix: Solid
Analysis Batch: 319708

Client Sample ID: MRB West Pier MHLA-3 S-3B
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.2	HF	7.2		SU		0	5

Method: 9050A - Specific Conductance

Lab Sample ID: MB 400-320589/1
Matrix: Water
Analysis Batch: 320589

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	<5.0		5.0		umhos/cm			08/28/16 13:13	1
Resistivity	NA		2000		Mohm-cm			08/28/16 13:13	1

Lab Sample ID: LCS 400-320589/2
Matrix: Water
Analysis Batch: 320589

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	10.0	10.0		umhos/cm		100	98 - 102

Lab Sample ID: LCS 400-320608/20
Matrix: Solid
Analysis Batch: 320608

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	10.0	10.1		umhos/cm		101	98 - 102

TestAmerica Pensacola

QC Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Method: 9050A - Specific Conductance (Continued)

Lab Sample ID: MB 400-320598/1-A
Matrix: Solid
Analysis Batch: 320608

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	<100		100		umhos/cm			08/29/16 09:50	1
Resistivity	NA		20		Mohm-cm			08/29/16 09:50	1

Lab Sample ID: 400-126048-13 DU
Matrix: Solid
Analysis Batch: 320608

Client Sample ID: MRB West Pier MB-1 S-2A
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Specific Conductance	760		766		umhos/cm		0.4	2
Resistivity	5200		5220		ohm-m		NC	2

Method: SM 4500 SO4 E - Sulfate, Total

Lab Sample ID: MB 400-319996/6
Matrix: Water
Analysis Batch: 319996

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<5.0		5.0		mg/L			08/24/16 12:03	1

Lab Sample ID: LCS 400-319996/7
Matrix: Water
Analysis Batch: 319996

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	15.0	15.5		mg/L		103	90 - 110

Lab Sample ID: MRL 400-319996/3
Matrix: Water
Analysis Batch: 319996

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	5.00	<5.0		mg/L		83	50 - 150

Lab Chronicle

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1

Lab Sample ID: 400-126048-1

Date Collected: 08/17/16 00:00

Matrix: Water

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	150.1		1			319682	08/23/16 09:31	LSS	TAL PEN
Total/NA	Analysis	325.2		1	10 mL	10 mL	319860	08/24/16 08:00	LSS	TAL PEN
Total/NA	Analysis	9050A		1			320589	08/28/16 13:13	CAC	TAL PEN
Total/NA	Analysis	SM 4500 SO4 E		1	10 mL	10 mL	319996	08/24/16 13:01	LSS	TAL PEN

Client Sample ID: MRB West Pier MHLA-3

Lab Sample ID: 400-126048-2

Date Collected: 08/18/16 00:00

Matrix: Water

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	150.1		1			319682	08/23/16 09:31	LSS	TAL PEN
Total/NA	Analysis	325.2		1	10 mL	10 mL	319860	08/24/16 08:05	LSS	TAL PEN
Total/NA	Analysis	9050A		1			320589	08/28/16 13:13	CAC	TAL PEN
Total/NA	Analysis	SM 4500 SO4 E		5	10 mL	10 mL	319996	08/24/16 14:19	LSS	TAL PEN

Client Sample ID: MRB West Pier MHLA-3 S-1A

Lab Sample ID: 400-126048-3

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN
Total/NA	Analysis	Moisture		1			319780	08/23/16 14:00	JLB	TAL PEN

Client Sample ID: MRB West Pier MHLA-3 S-1A

Lab Sample ID: 400-126048-3

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 79.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.51 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 02:40	KH1	TAL PEN

Client Sample ID: MRB West Pier MHLA-3 S-1B

Lab Sample ID: 400-126048-4

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN

TestAmerica Pensacola

Lab Chronicle

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-1B

Lab Sample ID: 400-126048-4

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN
Total/NA	Analysis	Moisture		1			319780	08/23/16 14:00	JLB	TAL PEN

Client Sample ID: MRB West Pier MHLA-3 S-1B

Lab Sample ID: 400-126048-4

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 86.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.46 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 03:49	KH1	TAL PEN

Client Sample ID: MRB West Pier MHLA-3 S-2A

Lab Sample ID: 400-126048-5

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN
Total/NA	Analysis	Moisture		1			319780	08/23/16 14:00	JLB	TAL PEN

Client Sample ID: MRB West Pier MHLA-3 S-2A

Lab Sample ID: 400-126048-5

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 80.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.55 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 04:12	KH1	TAL PEN

Client Sample ID: MRB West Pier MHLA-3 S-2B

Lab Sample ID: 400-126048-6

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN
Total/NA	Analysis	Moisture		1			319780	08/23/16 14:00	JLB	TAL PEN

TestAmerica Pensacola

Lab Chronicle

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-2B

Lab Sample ID: 400-126048-6

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 79.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.51 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 05:20	KH1	TAL PEN

Client Sample ID: MRB West Pier MHLA-3 S-3A

Lab Sample ID: 400-126048-7

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN
Total/NA	Analysis	Moisture		1			319780	08/23/16 14:00	JLB	TAL PEN

Client Sample ID: MRB West Pier MHLA-3 S-3A

Lab Sample ID: 400-126048-7

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 80.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.56 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 05:43	KH1	TAL PEN

Client Sample ID: MRB West Pier MHLA-3 S-3B

Lab Sample ID: 400-126048-8

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN
Total/NA	Analysis	Moisture		1			319780	08/23/16 14:00	JLB	TAL PEN

Client Sample ID: MRB West Pier MHLA-3 S-3B

Lab Sample ID: 400-126048-8

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 82.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.49 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 06:06	KH1	TAL PEN

TestAmerica Pensacola

Lab Chronicle

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MHLA-3 S-4A

Lab Sample ID: 400-126048-9

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN
Total/NA	Analysis	Moisture		1			319780	08/23/16 14:00	JLB	TAL PEN

Client Sample ID: MRB West Pier MHLA-3 S-4A

Lab Sample ID: 400-126048-9

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 81.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.57 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 06:28	KH1	TAL PEN

Client Sample ID: MRB West Pier MHLA-3 S-4B

Lab Sample ID: 400-126048-10

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN
Total/NA	Analysis	Moisture		1			319780	08/23/16 14:00	JLB	TAL PEN

Client Sample ID: MRB West Pier MHLA-3 S-4B

Lab Sample ID: 400-126048-10

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 84.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.52 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 06:51	KH1	TAL PEN

Client Sample ID: MRB West Pier MB-1 S-1A

Lab Sample ID: 400-126048-11

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN
Total/NA	Analysis	Moisture		1			319780	08/23/16 14:00	JLB	TAL PEN

TestAmerica Pensacola

Lab Chronicle

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-1A

Lab Sample ID: 400-126048-11

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 80.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.54 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 07:14	KH1	TAL PEN

Client Sample ID: MRB West Pier MB-1 S-1B

Lab Sample ID: 400-126048-12

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN
Total/NA	Analysis	Moisture		1			319780	08/23/16 14:00	JLB	TAL PEN

Client Sample ID: MRB West Pier MB-1 S-1B

Lab Sample ID: 400-126048-12

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 74.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.51 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 07:37	KH1	TAL PEN

Client Sample ID: MRB West Pier MB-1 S-2A

Lab Sample ID: 400-126048-13

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN
Total/NA	Analysis	Moisture		1			319780	08/23/16 15:11	JLB	TAL PEN

Client Sample ID: MRB West Pier MB-1 S-2A

Lab Sample ID: 400-126048-13

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 67.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.49 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 08:00	KH1	TAL PEN

TestAmerica Pensacola

Lab Chronicle

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-2B

Lab Sample ID: 400-126048-14

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN
Total/NA	Analysis	Moisture		1			319780	08/23/16 15:11	JLB	TAL PEN

Client Sample ID: MRB West Pier MB-1 S-2B

Lab Sample ID: 400-126048-14

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 61.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.56 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 08:45	KH1	TAL PEN

Client Sample ID: MRB West Pier MB-1 S-3A

Lab Sample ID: 400-126048-15

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN
Total/NA	Analysis	Moisture		1			319780	08/23/16 15:11	JLB	TAL PEN

Client Sample ID: MRB West Pier MB-1 S-3A

Lab Sample ID: 400-126048-15

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 79.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.46 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 09:54	KH1	TAL PEN

Client Sample ID: MRB West Pier MB-1 S-3B

Lab Sample ID: 400-126048-16

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN
Total/NA	Analysis	Moisture		1			319780	08/23/16 15:11	JLB	TAL PEN

TestAmerica Pensacola

Lab Chronicle

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: MRB West Pier MB-1 S-3B

Lab Sample ID: 400-126048-16

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 78.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.49 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 10:17	KH1	TAL PEN

Client Sample ID: MRB West Pier MB-1 S-4A

Lab Sample ID: 400-126048-17

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN
Total/NA	Analysis	Moisture		1			319780	08/23/16 15:11	JLB	TAL PEN

Client Sample ID: MRB West Pier MB-1 S-4A

Lab Sample ID: 400-126048-17

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 81.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.54 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 10:39	KH1	TAL PEN

Client Sample ID: MRB West Pier MB-1 S-4B

Lab Sample ID: 400-126048-18

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN
Total/NA	Analysis	Moisture		1			319780	08/23/16 15:11	JLB	TAL PEN

Client Sample ID: MRB West Pier MB-1 S-4B

Lab Sample ID: 400-126048-18

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 80.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.51 g	50 mL	320657	08/29/16 14:44	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 11:02	KH1	TAL PEN

TestAmerica Pensacola

Lab Chronicle

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: Method Blank

Date Collected: N/A

Date Received: N/A

Lab Sample ID: MB 400-319860/6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	325.2		1	10 mL	10 mL	319860	08/24/16 07:42	LSS	TAL PEN

Client Sample ID: Method Blank

Date Collected: N/A

Date Received: N/A

Lab Sample ID: MB 400-319996/6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 4500 SO4 E		1	10 mL	10 mL	319996	08/24/16 12:03	LSS	TAL PEN

Client Sample ID: Method Blank

Date Collected: N/A

Date Received: N/A

Lab Sample ID: MB 400-320589/1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9050A		1			320589	08/28/16 13:13	CAC	TAL PEN

Client Sample ID: Method Blank

Date Collected: N/A

Date Received: N/A

Lab Sample ID: MB 400-320598/1-A

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5 g	100 mL	320598	08/28/16 12:10	CAC	TAL PEN
Soluble	Analysis	9050A		1			320608	08/29/16 09:50	CAC	TAL PEN

Client Sample ID: Method Blank

Date Collected: N/A

Date Received: N/A

Lab Sample ID: MB 400-320657/1-A

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.52 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 01:32	KH1	TAL PEN

Client Sample ID: Lab Control Sample

Date Collected: N/A

Date Received: N/A

Lab Sample ID: LCS 400-319682/4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	150.1		1			319682	08/23/16 09:31	LSS	TAL PEN

TestAmerica Pensacola

Lab Chronicle

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 400-319685/1-A

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			20 g	20 mL	319685	08/23/16 09:38	LSS	TAL PEN
Soluble	Analysis	9045C		1			319708	08/23/16 10:33	LSS	TAL PEN

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 400-319860/7

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	325.2		1	10 mL	10 mL	319860	08/24/16 07:42	LSS	TAL PEN

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 400-319996/7

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 4500 SO4 E		1	10 mL	10 mL	319996	08/24/16 12:03	LSS	TAL PEN

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 400-320589/2

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9050A		1			320589	08/28/16 13:13	CAC	TAL PEN

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 400-320608/20

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9050A		1			320608	08/29/16 09:51	CAC	TAL PEN

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 400-320657/2-A

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.50 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 01:55	KH1	TAL PEN

TestAmerica Pensacola

Lab Chronicle

Client: Thompson Engineering Inc
Project/Site: ALDOT MRB West Pier

TestAmerica Job ID: 400-126048-1

Client Sample ID: Lab Control Sample Dup

Lab Sample ID: LCSD 400-320657/3-A

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.49 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 02:17	KH1	TAL PEN

Client Sample ID: Lab Control Sample

Lab Sample ID: MRL 400-319860/3

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	325.2		1	10 mL	10 mL	319860	08/24/16 07:42	LSS	TAL PEN

Client Sample ID: Lab Control Sample

Lab Sample ID: MRL 400-319996/3

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 4500 SO4 E		1	10 mL	10 mL	319996	08/24/16 12:03	LSS	TAL PEN

Client Sample ID: MRB West Pier MHLA-3 S-1A

Lab Sample ID: 400-126048-3 MS

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 79.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.48 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 03:03	KH1	TAL PEN

Client Sample ID: MRB West Pier MHLA-3 S-1A

Lab Sample ID: 400-126048-3 MSD

Date Collected: 08/18/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 79.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.49 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 03:26	KH1	TAL PEN

Client Sample ID: MRB West Pier MB-1 S-2A

Lab Sample ID: 400-126048-13 MS

Date Collected: 08/17/16 00:00

Matrix: Solid

Date Received: 08/18/16 13:25

Percent Solids: 67.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.55 g	50 mL	320657	08/29/16 14:39	KH1	TAL PEN
Soluble	Analysis	9056		1			320720	08/30/16 08:23	KH1	TAL PEN

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

TestAmerica Pensacola

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Tel: (850)474-1001

TestAmerica Job ID: 400-139760-1
Client Project/Site: Mobile River Bridge East Tower

For:
Thompson Engineering Inc
2970 Cottage Hill Rd.
Suite 190
Mobile, Alabama 36606

Attn: Chris Dugger



Authorized for release by:
7/6/2017 4:23:45 PM

Mike Nance, Service Center Manager
(251)706-3210
mike.nance@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Job ID: 400-139760-1

Laboratory: TestAmerica Pensacola

Narrative

**Job Narrative
400-139760-1**

Comments

No additional comments.

Receipt

The samples were received on 6/26/2017 1:17 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 23.8° C.

HPLC/IC

Method(s) 9056: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 400-359039 and analytical batch 400-359196 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits. The native concentration was greater than 4x the matrix spike

Method(s) 9056: The following samples was diluted to bring the concentration of target analytes within the calibration range: MB- 02A C-3 (400-139760-3), MB- 02A C-4 (400-139760-4), MB- 02A C-6 (400-139760-6) and MB- 02A C-8 (400-139760-8). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Lab Admin

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-1

Lab Sample ID: 400-139760-1

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	81.0		0.01		%			06/27/17 10:35	1
Percent Moisture	19.0		0.01		%			06/27/17 10:35	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-1

Lab Sample ID: 400-139760-1

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Percent Solids: 81.0

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1100		25		mg/Kg	☼		07/01/17 14:51	1
Sulfate	<25		25		mg/Kg	☼		07/01/17 14:51	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-2

Lab Sample ID: 400-139760-2

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	71.5		0.01		%			06/27/17 10:35	1
Percent Moisture	28.5		0.01		%			06/27/17 10:35	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-2

Lab Sample ID: 400-139760-2

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Percent Solids: 71.5

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	450		28		mg/Kg	☼		07/01/17 16:46	1
Sulfate	34		28		mg/Kg	☼		07/01/17 16:46	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-3

Lab Sample ID: 400-139760-3

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	80.1		0.01		%			06/27/17 11:14	1
Percent Moisture	19.9		0.01		%			06/27/17 11:14	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-3

Lab Sample ID: 400-139760-3

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Percent Solids: 80.1

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3100		120		mg/Kg	✘		07/03/17 12:08	5
Sulfate	370		25		mg/Kg	✘		07/01/17 17:08	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-4

Lab Sample ID: 400-139760-4

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	82.3		0.01		%			06/27/17 11:14	1
Percent Moisture	17.7		0.01		%			06/27/17 11:14	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-4

Lab Sample ID: 400-139760-4

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Percent Solids: 82.3

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2700		130		mg/Kg	✘		07/03/17 12:31	5
Sulfate	330		25		mg/Kg	✘		07/01/17 17:31	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-5

Lab Sample ID: 400-139760-5

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	85.7		0.01		%			06/27/17 11:14	1
Percent Moisture	14.3		0.01		%			06/27/17 11:14	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-5

Lab Sample ID: 400-139760-5

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Percent Solids: 85.7

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	440		24		mg/Kg	✘		07/01/17 17:54	1
Sulfate	59		24		mg/Kg	✘		07/01/17 17:54	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-6

Lab Sample ID: 400-139760-6

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	87.8		0.01		%			06/27/17 11:14	1
Percent Moisture	12.2		0.01		%			06/27/17 11:14	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-6

Lab Sample ID: 400-139760-6

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Percent Solids: 87.8

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1300		110		mg/Kg	✘		07/03/17 12:54	5
Sulfate	180		22		mg/Kg	✘		07/01/17 18:17	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-7

Lab Sample ID: 400-139760-7

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	83.7		0.01		%			06/27/17 11:14	1
Percent Moisture	16.4		0.01		%			06/27/17 11:14	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-7

Lab Sample ID: 400-139760-7

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Percent Solids: 83.6

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	560		24		mg/Kg	☼		07/01/17 18:40	1
Sulfate	59		24		mg/Kg	☼		07/01/17 18:40	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-8

Lab Sample ID: 400-139760-8

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	69.8		0.01		%			06/27/17 11:14	1
Percent Moisture	30.2		0.01		%			06/27/17 11:14	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-8

Lab Sample ID: 400-139760-8

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Percent Solids: 69.8

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3700		150		mg/Kg	✘		07/03/17 13:17	5
Sulfate	380		29		mg/Kg	✘		07/01/17 19:03	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-9

Lab Sample ID: 400-139760-9

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	86.1		0.01		%			06/27/17 11:14	1
Percent Moisture	13.9		0.01		%			06/27/17 11:14	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-9

Lab Sample ID: 400-139760-9

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Percent Solids: 86.1

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	370		24		mg/Kg	✘		07/01/17 19:25	1
Sulfate	<24		24		mg/Kg	✘		07/01/17 19:25	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-10

Lab Sample ID: 400-139760-10

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	84.5		0.01		%			06/27/17 11:14	1
Percent Moisture	15.5		0.01		%			06/27/17 11:14	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-10

Lab Sample ID: 400-139760-10

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Percent Solids: 84.5

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	140		24		mg/Kg	✘		07/01/17 20:34	1
Sulfate	30		24		mg/Kg	✘		07/01/17 20:34	1

QC Sample Results

Client: Thompson Engineering Inc
 Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Method: 9056 - Anions, Ion Chromatography

Lab Sample ID: MB 400-359039/1-A
Matrix: Solid
Analysis Batch: 359196

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<20		20		mg/Kg			07/01/17 13:17	1
Sulfate	<20		20		mg/Kg			07/01/17 13:17	1

Lab Sample ID: LCS 400-359039/2-A
Matrix: Solid
Analysis Batch: 359196

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	100	99.1		mg/Kg		99	80 - 120
Sulfate	100	107		mg/Kg		107	80 - 120

Lab Sample ID: LCSD 400-359039/3-A
Matrix: Solid
Analysis Batch: 359196

Client Sample ID: Lab Control Sample Dup
Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	100	97.4		mg/Kg		97	80 - 120	2	15
Sulfate	100	104		mg/Kg		104	80 - 120	3	15

Lab Sample ID: 400-139760-1 MS
Matrix: Solid
Analysis Batch: 359196

Client Sample ID: MB- 02A C-1
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	1100		123	1190	4	mg/Kg	☼	33	80 - 120
Sulfate	<25		123	133		mg/Kg	☼	98	80 - 120

Lab Sample ID: 400-139760-1 MSD
Matrix: Solid
Analysis Batch: 359196

Client Sample ID: MB- 02A C-1
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	1100		125	1080	4	mg/Kg	☼	-54	80 - 120	10	15
Sulfate	<25		125	137		mg/Kg	☼	100	80 - 120	3	15

Lab Chronicle

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-1
Date Collected: 06/26/17 09:00
Date Received: 06/26/17 13:17

Lab Sample ID: 400-139760-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			358504	06/27/17 10:35	RSE	TAL PEN

Client Sample ID: MB- 02A C-1
Date Collected: 06/26/17 09:00
Date Received: 06/26/17 13:17

Lab Sample ID: 400-139760-1
Matrix: Solid
Percent Solids: 81.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.43 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		1			359196	07/01/17 14:51	TAJ	TAL PEN

Client Sample ID: MB- 02A C-2
Date Collected: 06/26/17 09:00
Date Received: 06/26/17 13:17

Lab Sample ID: 400-139760-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			358504	06/27/17 10:35	RSE	TAL PEN

Client Sample ID: MB- 02A C-2
Date Collected: 06/26/17 09:00
Date Received: 06/26/17 13:17

Lab Sample ID: 400-139760-2
Matrix: Solid
Percent Solids: 71.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.50 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		1			359196	07/01/17 16:46	TAJ	TAL PEN

Client Sample ID: MB- 02A C-3
Date Collected: 06/26/17 09:00
Date Received: 06/26/17 13:17

Lab Sample ID: 400-139760-3
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			358504	06/27/17 11:14	RSE	TAL PEN

Client Sample ID: MB- 02A C-3
Date Collected: 06/26/17 09:00
Date Received: 06/26/17 13:17

Lab Sample ID: 400-139760-3
Matrix: Solid
Percent Solids: 80.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.50 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		1			359196	07/01/17 17:08	TAJ	TAL PEN
Soluble	Leach	DI Leach			2.50 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		5			359242	07/03/17 12:08	TAJ	TAL PEN

TestAmerica Pensacola

Lab Chronicle

Client: Thompson Engineering Inc
 Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-4

Lab Sample ID: 400-139760-4

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			358504	06/27/17 11:14	RSE	TAL PEN

Client Sample ID: MB- 02A C-4

Lab Sample ID: 400-139760-4

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Percent Solids: 82.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.42 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		1			359196	07/01/17 17:31	TAJ	TAL PEN
Soluble	Leach	DI Leach			2.42 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		5			359242	07/03/17 12:31	TAJ	TAL PEN

Client Sample ID: MB- 02A C-5

Lab Sample ID: 400-139760-5

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			358504	06/27/17 11:14	RSE	TAL PEN

Client Sample ID: MB- 02A C-5

Lab Sample ID: 400-139760-5

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Percent Solids: 85.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.47 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		1			359196	07/01/17 17:54	TAJ	TAL PEN

Client Sample ID: MB- 02A C-6

Lab Sample ID: 400-139760-6

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			358504	06/27/17 11:14	RSE	TAL PEN

Client Sample ID: MB- 02A C-6

Lab Sample ID: 400-139760-6

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Percent Solids: 87.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.56 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		1			359196	07/01/17 18:17	TAJ	TAL PEN
Soluble	Leach	DI Leach			2.56 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN

TestAmerica Pensacola

Lab Chronicle

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-6

Date Collected: 06/26/17 09:00

Date Received: 06/26/17 13:17

Lab Sample ID: 400-139760-6

Matrix: Solid

Percent Solids: 87.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Analysis	9056		5			359242	07/03/17 12:54	TAJ	TAL PEN

Client Sample ID: MB- 02A C-7

Date Collected: 06/26/17 09:00

Date Received: 06/26/17 13:17

Lab Sample ID: 400-139760-7

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			358504	06/27/17 11:14	RSE	TAL PEN

Client Sample ID: MB- 02A C-7

Date Collected: 06/26/17 09:00

Date Received: 06/26/17 13:17

Lab Sample ID: 400-139760-7

Matrix: Solid

Percent Solids: 83.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.45 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		1			359196	07/01/17 18:40	TAJ	TAL PEN

Client Sample ID: MB- 02A C-8

Date Collected: 06/26/17 09:00

Date Received: 06/26/17 13:17

Lab Sample ID: 400-139760-8

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			358504	06/27/17 11:14	RSE	TAL PEN

Client Sample ID: MB- 02A C-8

Date Collected: 06/26/17 09:00

Date Received: 06/26/17 13:17

Lab Sample ID: 400-139760-8

Matrix: Solid

Percent Solids: 69.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.46 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		1			359196	07/01/17 19:03	TAJ	TAL PEN
Soluble	Leach	DI Leach			2.46 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		5			359242	07/03/17 13:17	TAJ	TAL PEN

Client Sample ID: MB- 02A C-9

Date Collected: 06/26/17 09:00

Date Received: 06/26/17 13:17

Lab Sample ID: 400-139760-9

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			358504	06/27/17 11:14	RSE	TAL PEN

TestAmerica Pensacola

Lab Chronicle

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-9

Lab Sample ID: 400-139760-9

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Percent Solids: 86.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.47 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		1			359196	07/01/17 19:25	TAJ	TAL PEN

Client Sample ID: MB- 02A C-10

Lab Sample ID: 400-139760-10

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			358504	06/27/17 11:14	RSE	TAL PEN

Client Sample ID: MB- 02A C-10

Lab Sample ID: 400-139760-10

Date Collected: 06/26/17 09:00

Matrix: Solid

Date Received: 06/26/17 13:17

Percent Solids: 84.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.44 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		1			359196	07/01/17 20:34	TAJ	TAL PEN

Client Sample ID: Method Blank

Lab Sample ID: MB 400-359039/1-A

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.5 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		1			359196	07/01/17 13:17	TAJ	TAL PEN

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 400-359039/2-A

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.5 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		1			359196	07/01/17 14:04	TAJ	TAL PEN

Client Sample ID: Lab Control Sample Dup

Lab Sample ID: LCSD 400-359039/3-A

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.5 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		1			359196	07/01/17 14:29	TAJ	TAL PEN

TestAmerica Pensacola

Lab Chronicle

Client: Thompson Engineering Inc
Project/Site: Mobile River Bridge East Tower

TestAmerica Job ID: 400-139760-1

Client Sample ID: MB- 02A C-1

Date Collected: 06/26/17 09:00

Date Received: 06/26/17 13:17

Lab Sample ID: 400-139760-1 MS

Matrix: Solid

Percent Solids: 81.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.52 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		1			359196	07/01/17 16:00	TAJ	TAL PEN

Client Sample ID: MB- 02A C-1

Date Collected: 06/26/17 09:00

Date Received: 06/26/17 13:17

Lab Sample ID: 400-139760-1 MSD

Matrix: Solid

Percent Solids: 81.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.47 g	50 mL	359039	06/30/17 14:15	TAJ	TAL PEN
Soluble	Analysis	9056		1			359196	07/01/17 16:23	TAJ	TAL PEN

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Pensacola

3355 McLemore Drive

Pensacola, FL 32514

Tel: (850)474-1001

TestAmerica Job ID: 400-140869-1

Client Project/Site: ALDOT Mobile River Bridge

For:

Thompson Engineering Inc

2970 Cottage Hill Rd.

Suite 190

Mobile, Alabama 36606

Attn: Chris Dugger



Authorized for release by:

8/3/2017 4:34:02 PM

Mike Nance, Service Center Manager

(251)706-3210

mike.nance@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

1

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Definitions/Glossary

Client: Thompson Engineering Inc
Project/Site: ALDOT Mobile River Bridge

TestAmerica Job ID: 400-140869-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Thompson Engineering Inc
Project/Site: ALDOT Mobile River Bridge

TestAmerica Job ID: 400-140869-1

Job ID: 400-140869-1

Laboratory: TestAmerica Pensacola

Narrative

**Job Narrative
400-140869-1**

Comments

No additional comments.

Receipt

The samples were received on 7/21/2017 11:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 21.4° C.

HPLC/IC

Method(s) 9056: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 400-362371 and analytical batch 400-362477 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Lab Admin

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT Mobile River Bridge

TestAmerica Job ID: 400-140869-1

Client Sample ID: MB-02A C-11

Lab Sample ID: 400-140869-1

Date Collected: 07/20/17 16:30

Matrix: Solid

Date Received: 07/21/17 11:20

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	79.6		0.01		%			07/24/17 16:51	1
Percent Moisture	20.4		0.01		%			07/24/17 16:51	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT Mobile River Bridge

TestAmerica Job ID: 400-140869-1

Client Sample ID: MB-02A C-11

Lab Sample ID: 400-140869-1

Date Collected: 07/20/17 16:30

Matrix: Solid

Date Received: 07/21/17 11:20

Percent Solids: 79.6

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	130	F1	26		mg/Kg	☼		07/31/17 16:57	1
Sulfate	<26	F1	26		mg/Kg	☼		07/31/17 16:57	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT Mobile River Bridge

TestAmerica Job ID: 400-140869-1

Client Sample ID: MB-02A C-12

Lab Sample ID: 400-140869-2

Date Collected: 07/20/17 16:30

Matrix: Solid

Date Received: 07/21/17 11:20

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	83.3		0.01		%			07/24/17 16:51	1
Percent Moisture	16.8		0.01		%			07/24/17 16:51	1

Client Sample Results

Client: Thompson Engineering Inc
Project/Site: ALDOT Mobile River Bridge

TestAmerica Job ID: 400-140869-1

Client Sample ID: MB-02A C-12

Lab Sample ID: 400-140869-2

Date Collected: 07/20/17 16:30

Matrix: Solid

Date Received: 07/21/17 11:20

Percent Solids: 83.2

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	89		23		mg/Kg	☼		07/31/17 18:05	1
Sulfate	30		23		mg/Kg	☼		07/31/17 18:05	1

QC Sample Results

Client: Thompson Engineering Inc
 Project/Site: ALDOT Mobile River Bridge

TestAmerica Job ID: 400-140869-1

Method: 9056 - Anions, Ion Chromatography

Lab Sample ID: MB 400-362371/1-A
Matrix: Solid
Analysis Batch: 362477

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<20		20		mg/Kg			07/31/17 15:48	1
Sulfate	<20		20		mg/Kg			07/31/17 15:48	1

Lab Sample ID: LCS 400-362371/2-A
Matrix: Solid
Analysis Batch: 362477

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	100	98.1		mg/Kg		98	80 - 120
Sulfate	100	102		mg/Kg		102	80 - 120

Lab Sample ID: LCSD 400-362371/3-A
Matrix: Solid
Analysis Batch: 362477

Client Sample ID: Lab Control Sample Dup
Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	100	97.7		mg/Kg		98	80 - 120	0	15
Sulfate	100	102		mg/Kg		102	80 - 120	0	15

Lab Sample ID: 400-140869-1 MS
Matrix: Solid
Analysis Batch: 362477

Client Sample ID: MB-02A C-11
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	130	F1	126	234		mg/Kg	☼	86	80 - 120
Sulfate	<26	F1	126	97.0	F1	mg/Kg	☼	70	80 - 120

Lab Sample ID: 400-140869-1 MSD
Matrix: Solid
Analysis Batch: 362477

Client Sample ID: MB-02A C-11
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	130	F1	126	223	F1	mg/Kg	☼	77	80 - 120	5	15
Sulfate	<26	F1	126	83.6	F1	mg/Kg	☼	59	80 - 120	15	15

Lab Chronicle

Client: Thompson Engineering Inc
Project/Site: ALDOT Mobile River Bridge

TestAmerica Job ID: 400-140869-1

Client Sample ID: MB-02A C-11

Date Collected: 07/20/17 16:30

Date Received: 07/21/17 11:20

Lab Sample ID: 400-140869-1

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			361447	07/24/17 16:51	TMO	TAL PEN

Client Sample ID: MB-02A C-11

Date Collected: 07/20/17 16:30

Date Received: 07/21/17 11:20

Lab Sample ID: 400-140869-1

Matrix: Solid

Percent Solids: 79.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.42 g	50 mL	362371	07/31/17 12:38	TAJ	TAL PEN
Soluble	Analysis	9056		1			362477	07/31/17 16:57	TAJ	TAL PEN

Client Sample ID: MB-02A C-12

Date Collected: 07/20/17 16:30

Date Received: 07/21/17 11:20

Lab Sample ID: 400-140869-2

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			361447	07/24/17 16:51	TMO	TAL PEN

Client Sample ID: MB-02A C-12

Date Collected: 07/20/17 16:30

Date Received: 07/21/17 11:20

Lab Sample ID: 400-140869-2

Matrix: Solid

Percent Solids: 83.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.58 g	50 mL	362371	07/31/17 12:38	TAJ	TAL PEN
Soluble	Analysis	9056		1			362477	07/31/17 18:05	TAJ	TAL PEN

Client Sample ID: Method Blank

Date Collected: N/A

Date Received: N/A

Lab Sample ID: MB 400-362371/1-A

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.5 g	50 mL	362371	07/31/17 12:38	TAJ	TAL PEN
Soluble	Analysis	9056		1			362477	07/31/17 15:48	TAJ	TAL PEN

Client Sample ID: Lab Control Sample

Date Collected: N/A

Date Received: N/A

Lab Sample ID: LCS 400-362371/2-A

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.5 g	50 mL	362371	07/31/17 12:38	TAJ	TAL PEN
Soluble	Analysis	9056		1			362477	07/31/17 16:11	TAJ	TAL PEN

TestAmerica Pensacola

Lab Chronicle

Client: Thompson Engineering Inc
Project/Site: ALDOT Mobile River Bridge

TestAmerica Job ID: 400-140869-1

Client Sample ID: Lab Control Sample Dup

Lab Sample ID: LCSD 400-362371/3-A

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.5 g	50 mL	362371	07/31/17 12:38	TAJ	TAL PEN
Soluble	Analysis	9056		1			362477	07/31/17 16:34	TAJ	TAL PEN

Client Sample ID: MB-02A C-11

Lab Sample ID: 400-140869-1 MS

Date Collected: 07/20/17 16:30

Matrix: Solid

Date Received: 07/21/17 11:20

Percent Solids: 79.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.49 g	50 mL	362371	07/31/17 12:38	TAJ	TAL PEN
Soluble	Analysis	9056		1			362477	07/31/17 17:20	TAJ	TAL PEN

Client Sample ID: MB-02A C-11

Lab Sample ID: 400-140869-1 MSD

Date Collected: 07/20/17 16:30

Matrix: Solid

Date Received: 07/21/17 11:20

Percent Solids: 79.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.50 g	50 mL	362371	07/31/17 12:38	TAJ	TAL PEN
Soluble	Analysis	9056		1			362477	07/31/17 17:43	TAJ	TAL PEN

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001



September 28, 2017

PROJECT: Mobile River Bridge - Main Span Unit
 CLIENT: Alabama Department of Transportation

JOB #: 17-1101-0145
 LAB #: 7971
 Technician: B. Hak

REPORT OF: Measurement of Soil Resistivity AASHTO T288

Location	Depth (ft)	Date Tested	Resisivity (Ohms-cm)
MB-1 - S-1A	3.0-5.0	9/17-9/21/2017	2,500
MB-1 - S-1B	5.0-7.0	9/17-9/21/2018	3,000
MB-1 - S-2A	8.0-10.0	9/17-9/21/2018	1,500
MB-1 - S-2B	10.0-12.0	9/17-9/21/2019	1,500
MB-1 - S-3A	18.0-22.0	9/17-9/21/2018	6,775
MB-1 - S-3B			
MB-1 - S-4A	28.0-32.0	9/17-9/21/2020	8,950
MB-1 - S-4B			
MB-2A - C-1	15.0-16.5	6/23/17	430
MB-2A - C-2	25.0-26.5	6/23/17	2,250
MB-2A - C-3	35.0-37.0	6/23/17	220
MB-2A - C-4	45.0-47.0	6/23/17	199
MB-2A - C-5	55.0-57.0	6/23/17	470
MB-2A - C-6	64.5-65.5	6/23/17	240
MB-2A - C-7	74.5-75.5	6/23/17	278
MB-2A - C-8	84.5-85.5	6/23/17	215
MB-2A - C-9	94.5-95.5	6/23/17	2,100
MB-2A - C-10	105.0-105.5	6/23/17	2,150
MB-2A - C-11	130.0-130.5	7/1/17	725
MB-2A - C-12	155.0-155.5	7/1/17	6,490

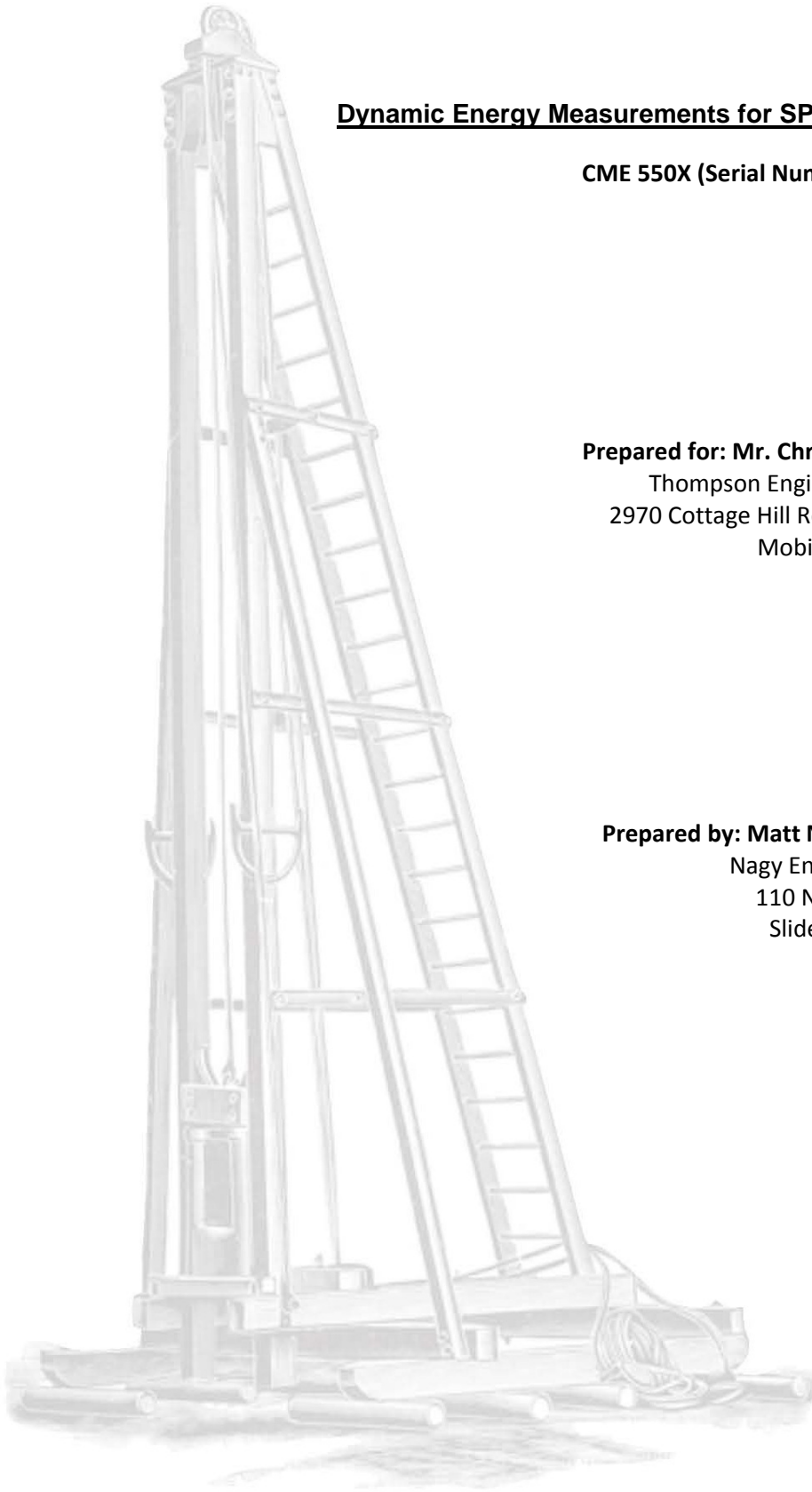
MATERIALS ENGINEERING LABORATORY

3707 Cottage Hill Road
 Mobile, AL. 36609
 251-666-2443 ph / 251-665-5491 fax
 www.thompsonengineering.com

APPENDIX D

- **Hammer Energy Reports**

Nagy Engineers, Inc.



Dynamic Energy Measurements for SPT Hammer

CME 550X (Serial Number 327443)

Prepared for: Mr. Chris Dugger of
Thompson Engineering, Inc.
2970 Cottage Hill Rd., Suite 190
Mobile, AL 36606

Prepared by: Matt Nagy, P.E. of
Nagy Engineers, Inc.
110 N Queens Dr.
Slidell, LA 70458



October 5, 2016

Mr. Chris Dugger
Thompson Engineering, Inc.
2970 Cottage Hill Road, Suite 190
Mobile, AL 36606

Re: SPT Hammer Calibration using Dynamic Energy Measurements
Thompson Engineering Drill Rig – CME 550X (S/N 327443)
Nagy Engineers Job No. 161037-1

Dear Mr. Dugger:

This report summarizes the results from SPT Energy Measurement Testing performed at the Mobile River Bridge project on September 28, 2016. The testing was conducted to calibrate a CME 550X automatic SPT hammer. The hammer reportedly had a 140 lb drop weight and a 2.5 ft drop height. Appendix A gives a summary of the field dynamic test data and results while Appendix B contains the equipment calibration sheets. An overall summary of the test results is presented in Table 1.

OBJECTIVES

The objective of the testing was to perform SPT Energy Measurements according to ASTM D4633-10. These objectives were met using our Pile Driving Analyzer®, Model PAX – SPT Software, which acquired the SPT hammer's transfer energies using an instrumented NWJ rod section and two piezoresistive accelerometers.

TESTING AND EQUIPMENT

Drilling and SPT Hammer Equipment

SPT energy measurements were collected for a CME 550X automatic SPT hammer. The serial number on the rig was s/n 327443. Energy records were collected at various increments between the depths of 68.5 ft and 100 ft. The drilling method was mud rotary. Appendix A contains a photo of the CME 550X rig that was tested.

Instrumentation

A Model PAX Pile Driving Analyzer® (PDA) data acquisition system was used to collect and process the dynamic measurements of force and velocity. The PAX is a digital system having a low pass filter cutoff frequency of 5 kHz. The sampling frequency was therefore set to 10 times the low pass filter, or 50 kHz. A two foot long section of NWJ rod subsection was instrumented with one full bridge foil resistance strain

gage and two piezoresistive accelerometers mounted at the midpoint location of the instrumented subsection. Strain and acceleration signals were conditioned, digitized, stored and processed using the PDA. Selected output from the PDA for each recorded impact included the maximum calculated rod top force (FMX), maximum rod top velocity (VMX), maximum average compressive stress (CSX), maximum energy transfer (EMX), energy transfer ratio (ETR) and the hammer operating rate (BPM).

MEASUREMENTS AND CALCULATIONS

FV Method (EMX)

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

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

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.

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 the results. Appendix A contains a representative plot of force and normalized velocity versus time and PDILOT results for all hammer blows at each dynamically monitored sampling depth. The PDA results include the EMX (transferred energy by the EMX method, as recommended by ASTM D4633-10), ETR (energy transfer ratio), BPM (hammer operating rate), FMX (maximum rod top force), CSX (maximum compressive stress), and VMX (maximum rod top velocity). The plots show each calculated PDA result versus sampling spoon penetration while the tables show statistical summaries for each 6 inch increment. At the end of each table, on the next page, is a statistical evaluation of the results which only include the blows that correspond to the N-Value for that sample.

Table 1 summarizes the average transfer energy values calculated by the EMX method. The records averaged consist only of the hammer blows at each dynamically monitored sampling depth that correspond to the N-Values (i.e. the blows in the initial 6 inches of split spoon driving were not considered as part of the average). The "energy transfer ratio" (ETR) is defined as the ratio of maximum transferred

energy EMX divided by the theoretical hammer potential energy of 350 ft-lbs. The average hammer operating rate is reported in blows per minute (BPM).

CONCLUSIONS

RIG: CME 550X (s/n: 327443) - 140 lbs Hammer – 2.5 ft Drop Height

The average maximum energy transfer (EMX) to the NWJ SPT rod using the 140 lbs drop weight was 307 ft-lbs which is approximately 88% of the 350 ft-lbs potential energy of the hammer. The standard deviation of the transfer efficiency was 1% over the seven samples that were collected. The average hammer operation rate during the time of testing was 49.2 blows/min.

We have appreciated this opportunity to be of assistance to you on this project, please contact our office if you have any questions regarding this report, or if we may be of further service.

Very truly yours,
Nagy Engineers, Inc.



Matthew Nagy, P.E. AL # 33853
Project Engineer

Firm COA Number: 4718

enclosed: Appendices A and B

TABLE 1: Summary of SPT Energy Measurements
CME 550X Automatic SPT Hammer (S/N 327443)

Rod Length Below Gages <i>LE</i>	Depth Below Top of Ground	Reported SPT Blow Counts	Maximum Transfer Force <i>FMX</i>	Maximum Compressive Stress <i>CSX</i>	Average Hammer Blow Rate <i>BPM</i>	Average Energy Transfer <i>EMX</i>	Average Transfer Efficiency <i>ETR</i>
ft	ft	blows/6"	kips	ksi	blows/min	ft-lbs	%
86.0	68.5 to 70.0	5,6,10	42	29.2	47.2	305	87%
91.0	73.5 to 75.0	6,11,15	42	29.4	49.5	310	88%
96.0	78.5 to 80.0	8,18,20	41	29.0	49.4	312	89%
101.0	83.5 to 85.0	11,14,18	41	29.2	49.5	308	88%
106.0	88.5 to 90.0	11,13,16	39	27.2	49.4	304	87%
111.0	93.5 to 95.0	12,14,19	40	28.4	50.0	302	86%
116.0	98.5 to 100.0	12,12,8	38	27.0	49.6	308	88%
Overall Average					49.2	307	88%
Standard Deviation					0.9	4	1%

Notes

- LE* - Length from the bottom of the spoon to the PDA gage location.
- FMX* - Maximum Force Measured at PDA gage location.
- CSX* - Maximum Average Compressive Stress at PDA gage location.
- BPM* - Hammer operation rate (blows/minute)
- EMX* - Computed, from $\int F_v dt$, maximum energy transferred to PDA gage location.
- ETR* - Computed, from EMX/PE , maximum energy transfer efficiency

Appendix A

Results from SPT Dynamic Energy Measurements

Thompson Engineering SPT Rig Calibration

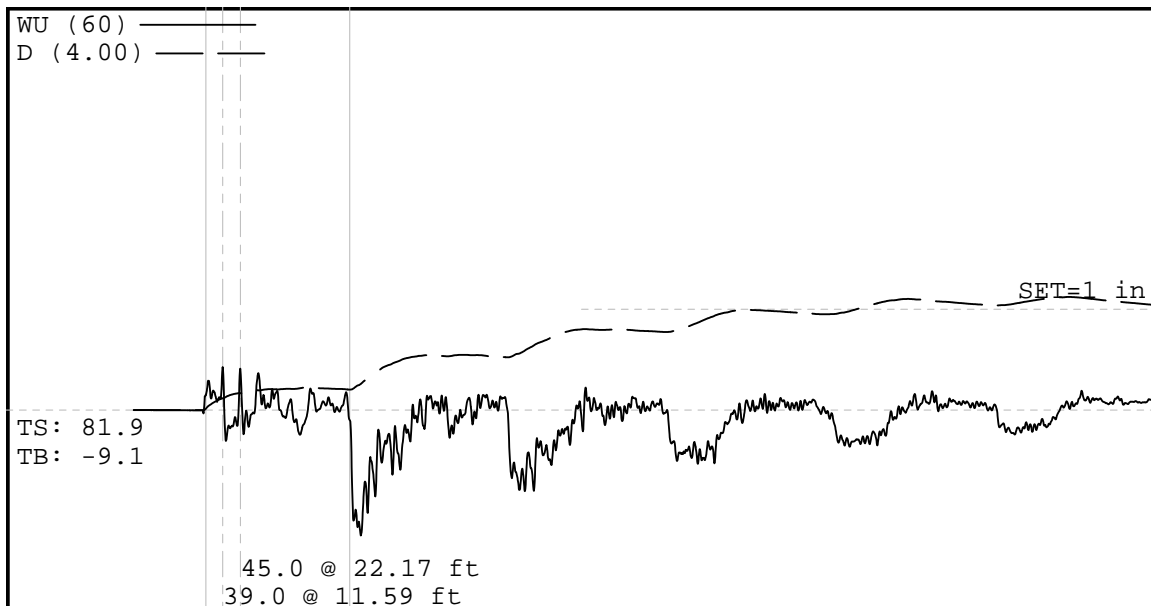
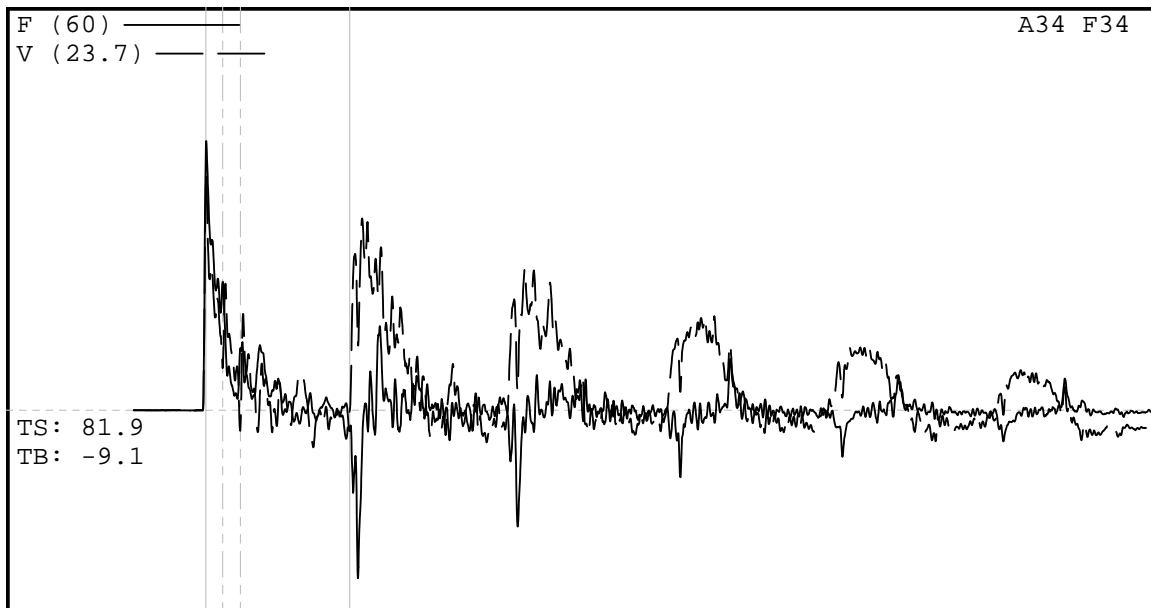
CME 550X

S/N 327443

(NWJ Rod – Mud Rotary)



Thompson Engineering's CME 550X (S/N 327443)



Project Information

PROJECT: Thompson Engineering SPT CalibraticCSX 28.23 ksi
 PILE NAME: CME 550X (SN 327443) - 68.5 to 70.0 ft
 DESCR: NWJ Rod - Mud Rotary
 OPERATOR: MBP
 FILE: CME 550X (SN 327443) - 68.5 to 70.0 ft
 9/28/2016 9:26:10 AM
 Blow Number 1

Quantity Results

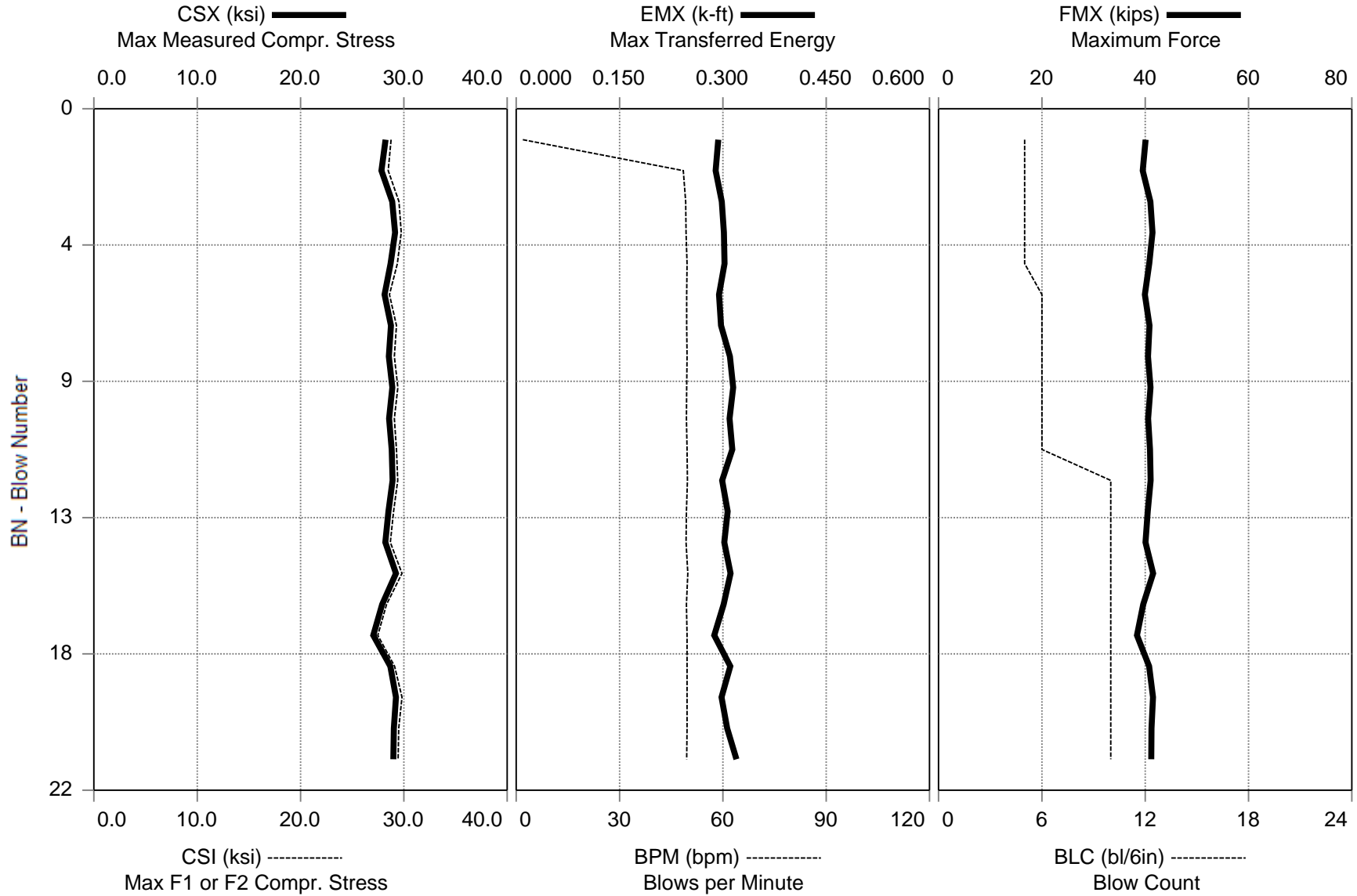
EMX 0.3 k-ft
 ETR 86.1 (%)
 BPM 1.9 bpm
 FMX 40 kips
 VMX 13.9 f/s
 QNV 0.00 []
 QNV 0.00 []

Pile Properties

LE 86.00 ft
 AR 1.42 in^2
 EM 30000 ksi
 SP 0.492 k/ft3
 WS 16807.9 f/s
 EA/C 2.5 ksec/ft
 2L/C 10.24 ms
 JC []
 LP 68.60 ft

Sensors

F3: [413 NWJ-2] 213.94 (1)
 F4: [413 NWJ-1] 212.28 (1)
 A3: [K4676] 390 mv/5000g's (1)
 A4: [K4120] 388 mv/5000g's (1)
 CLIP: OK



Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 68.5 to 70.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

AR: 1.42 in² SP: 0.492 k/ft³
LE: 86.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress FMX: Maximum Force
CSI: Max F1 or F2 Compr. Stress ETR: Energy Transfer Ratio
EMX: Max Transferred Energy VMX: Maximum Velocity
BPM: Blows per Minute

BL#	Depth ft	BLC bl/6in	TYPE	CSX ksi	CSI ksi	EMX k-ft	BPM bpm	FMX kips	ETR (%)	VMX f/s
5	69.00	5	AV5	28.6	29.2	0.297	39.7	41	84.9	14.1
			MAX	29.2	29.7	0.302	49.6	41	86.4	14.3
11	69.50	6	AV6	28.6	29.1	0.307	49.5	41	87.6	14.3
			MAX	28.9	29.4	0.315	49.6	41	90.0	14.4
21	70.00	10	AV10	28.6	29.1	0.304	49.6	41	86.9	14.4
			MAX	29.2	29.8	0.320	49.8	42	91.4	14.7
Average				28.6	29.1	0.303	47.2	41	86.6	14.3
Maximum				29.2	29.8	0.320	49.8	42	91.4	14.7

Total number of blows analyzed: 21

BL# Sensors

1-21 F3: [413 NWJ-2] 213.9 (1.00); F4: [413 NWJ-1] 212.3 (1.00); A3: [K4676] 390.0 (1.00);
A4: [K4120] 388.0 (1.00)

Time Summary

Drive 24 seconds 9:26 AM - 9:26 AM BN 1 - 21

Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 68.5 to 70.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

AR: 1.42 in² SP: 0.492 k/ft³
LE: 86.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
6	69.08	6	28.1	28.6	0.294	84.1	49.5	40	13.9
7	69.17	6	28.7	29.3	0.297	84.9	49.5	41	14.3
8	69.25	6	28.5	29.1	0.310	88.6	49.6	41	14.3
9	69.33	6	28.9	29.4	0.315	90.0	49.5	41	14.4
10	69.42	6	28.6	29.1	0.310	88.5	49.4	41	14.3
11	69.50	6	28.8	29.3	0.314	89.6	49.6	41	14.4
12	69.55	10	28.9	29.4	0.299	85.4	49.7	41	14.5
13	69.60	10	28.5	29.0	0.307	87.7	49.4	40	14.3
14	69.65	10	28.2	28.7	0.302	86.3	49.3	40	14.3
15	69.70	10	29.2	29.8	0.311	88.9	49.8	42	14.7
16	69.75	10	27.9	28.3	0.301	86.0	49.4	40	13.9
17	69.80	10	27.0	27.5	0.287	82.1	49.6	38	13.6
18	69.85	10	28.7	29.1	0.311	88.8	49.6	41	14.3
19	69.90	10	29.2	29.8	0.298	85.1	49.6	42	14.7
20	69.95	10	29.0	29.5	0.306	87.5	49.6	41	14.7
21	70.00	10	29.0	29.4	0.320	91.4	49.5	41	14.6
Average			28.6	29.1	0.305	87.2	49.5	41	14.3
Maximum			29.2	29.8	0.320	91.4	49.8	42	14.7

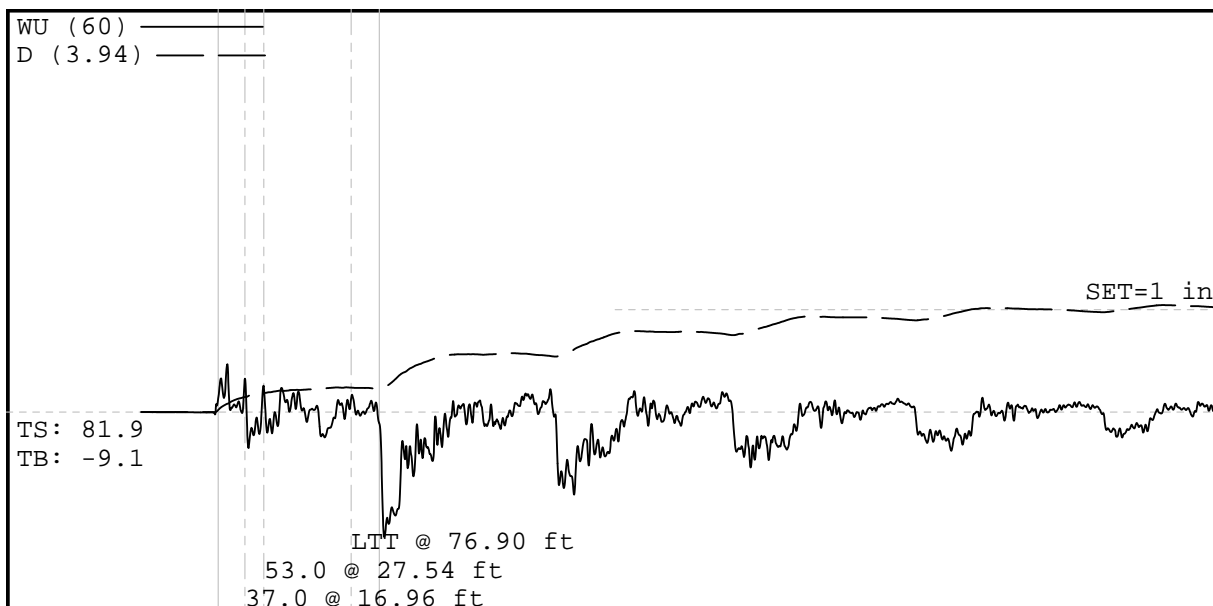
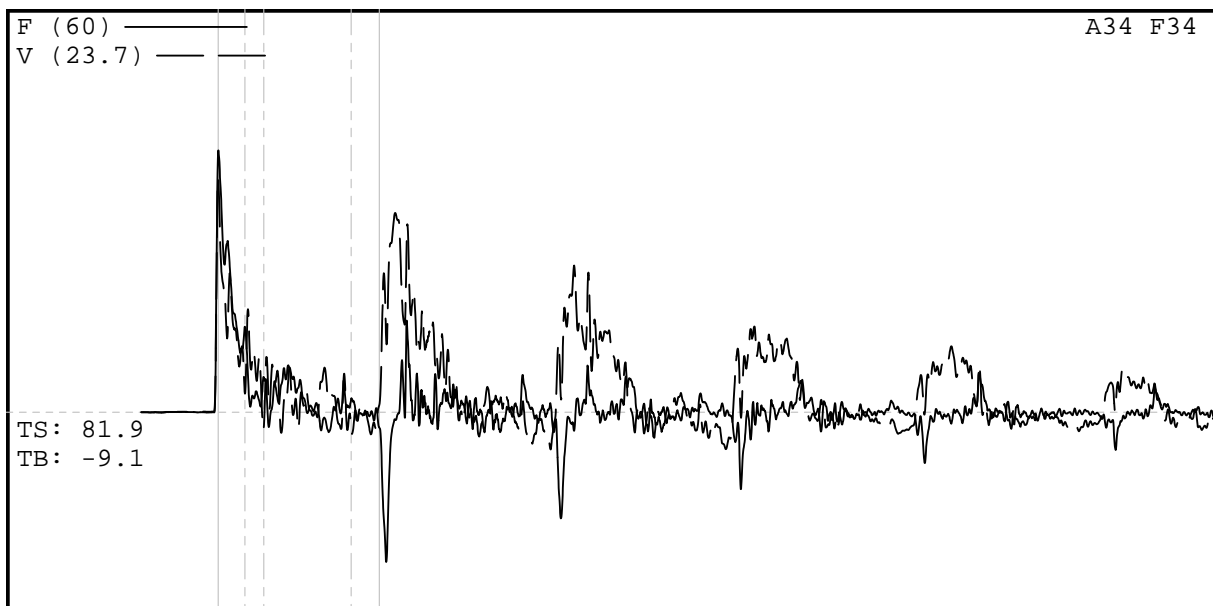
Total number of blows analyzed: 16

BL# Sensors

6-21 F3: [413 NWJ-2] 213.9 (1.00); F4: [413 NWJ-1] 212.3 (1.00); A3: [K4676] 390.0 (1.00);
A4: [K4120] 388.0 (1.00)

Time Summary

Drive 24 seconds 9:26 AM - 9:26 AM BN 1 - 21



Project Information

PROJECT: Thompson Engineering SPT CalibraticCSX 27.44 ksi
 PILE NAME: CME 550X (SN 327443) - 73.5 to 7CSI f27.98 ksi
 DESCR: NWJ Rod - Mud Rotary
 OPERATOR: MBP
 FILE: CME 550X (SN 327443) - 73.5 to 75.0 ft
 9/28/2016 9:46:38 AM
 Blow Number 1

Quantity Results

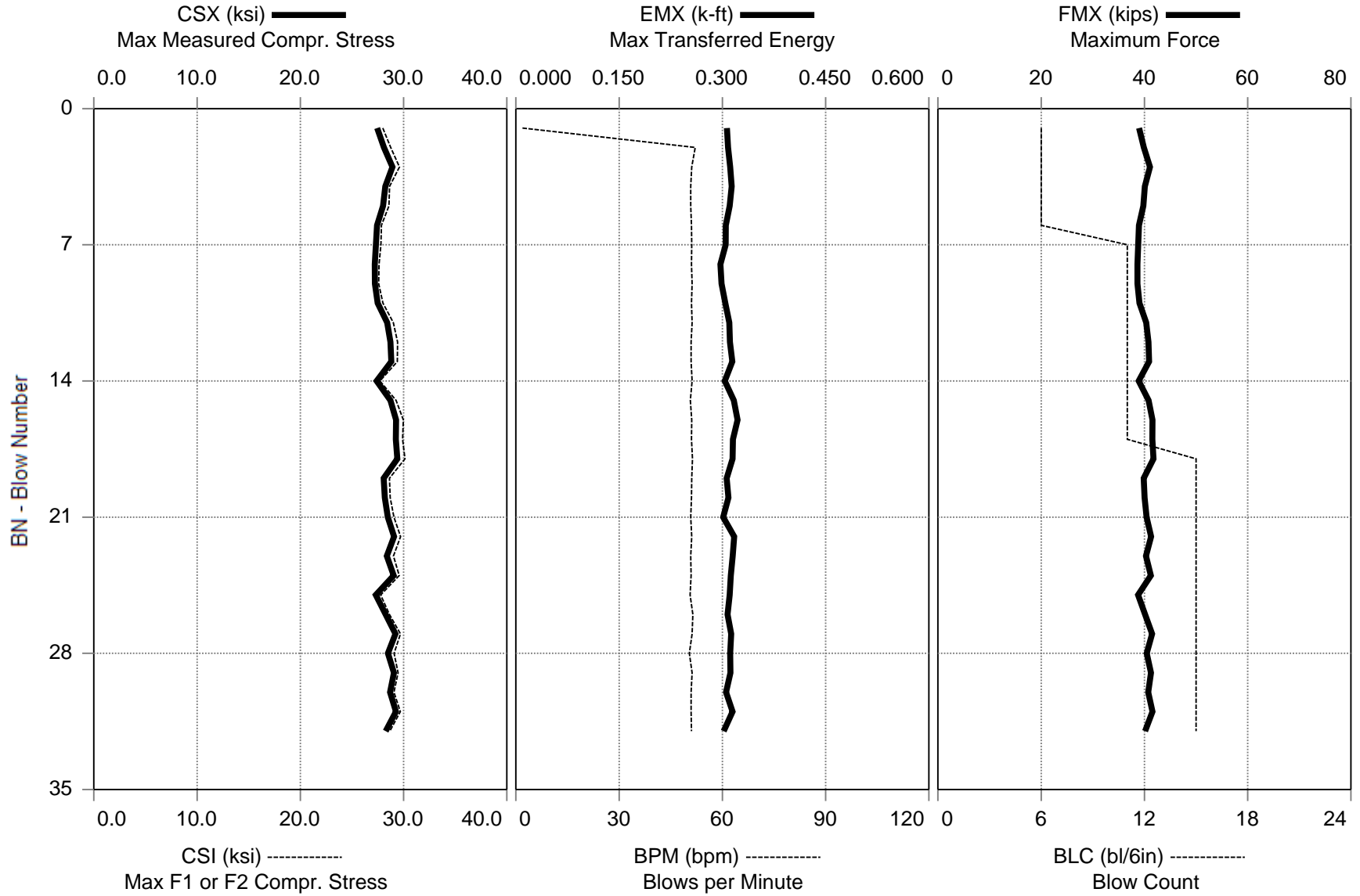
EMX 0.3 k-ft
 ETR 87.6 (%)
 BPM 1.9 bpm
 FMX 39 kips
 VMX 13.8 f/s
 QNV 0.00 []
 QNV 0.00 []

Pile Properties

LE 91.00 ft
 AR 1.42 in^2
 EM 30000 ksi
 SP 0.492 k/ft3
 WS 16807.9 f/s
 EA/C 2.5 ksec/ft
 2L/C 10.84 ms
 JC []
 LP 73.58 ft

Sensors

F3: [413 NWJ-2] 213.94 (1)
 F4: [413 NWJ-1] 212.28 (1)
 A3: [K4676] 390 mv/5000g's (1)
 A4: [K4120] 388 mv/5000g's (1)
 CLIP: OK



Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 73.5 to 75.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

AR: 1.42 in² SP: 0.492 k/ft³
LE: 91.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	TYPE	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
6	74.00	6	AV6	28.0	28.6	0.309	88.3	43.0	40	14.2
			MAX	28.9	29.6	0.313	89.6	52.1	41	14.8
17	74.50	11	AV11	28.2	28.7	0.309	88.3	51.0	40	14.3
			MAX	29.3	30.0	0.322	92.0	51.2	42	15.0
32	75.00	15	AV15	28.6	29.1	0.310	88.6	51.0	41	14.8
			MAX	29.4	30.1	0.317	90.6	51.4	42	15.1
Average				28.3	28.9	0.309	88.4	49.5	40	14.5
Maximum				29.4	30.1	0.322	92.0	52.1	42	15.1

Total number of blows analyzed: 32

BL# Sensors

1-32 F3: [413 NWJ-2] 213.9 (1.00); F4: [413 NWJ-1] 212.3 (1.00); A3: [K4676] 390.0 (1.00);
A4: [K4120] 388.0 (1.00)

Time Summary

Drive 36 seconds 9:46 AM - 9:47 AM BN 1 - 32

Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 73.5 to 75.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

AR: 1.42 in² SP: 0.492 k/ft³
LE: 91.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

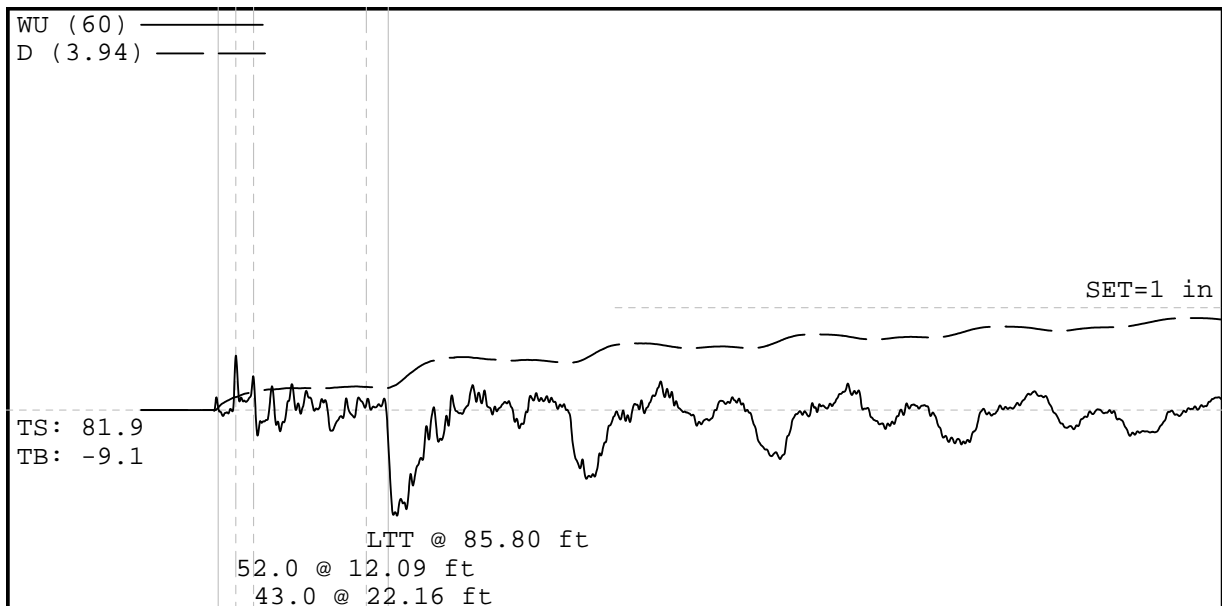
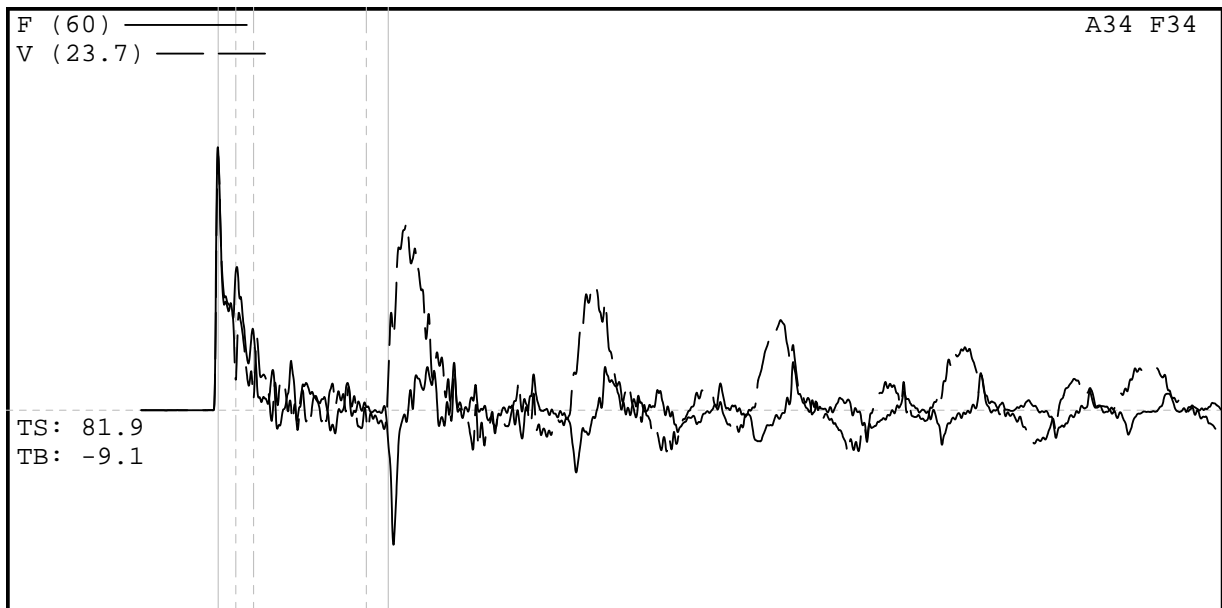
BL#	Depth ft	BLC bl/6in	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
7	74.05	11	27.3	27.8	0.305	87.1	51.1	39	13.8
8	74.09	11	27.2	27.6	0.297	84.9	51.0	39	13.4
9	74.14	11	27.2	27.6	0.299	85.3	51.2	39	13.6
10	74.18	11	27.5	28.0	0.304	86.9	51.0	39	14.0
11	74.23	11	28.4	29.0	0.310	88.6	51.2	40	14.7
12	74.27	11	28.7	29.4	0.311	88.8	50.9	41	14.7
13	74.32	11	28.8	29.4	0.314	89.8	50.9	41	14.8
14	74.36	11	27.4	27.7	0.304	86.7	51.2	39	13.7
15	74.41	11	28.7	29.3	0.317	90.5	50.7	41	14.9
16	74.45	11	29.3	30.0	0.322	92.0	51.1	42	15.0
17	74.50	11	29.2	29.9	0.315	90.1	51.0	42	15.0
18	74.53	15	29.4	30.1	0.315	90.0	51.3	42	15.1
19	74.57	15	28.1	28.6	0.306	87.5	51.1	40	14.4
20	74.60	15	28.2	28.7	0.309	88.2	51.0	40	14.8
21	74.63	15	28.5	29.1	0.301	86.0	50.8	40	14.7
22	74.67	15	29.1	29.7	0.317	90.6	51.1	41	15.0
23	74.70	15	28.4	29.0	0.315	90.0	50.8	40	14.7
24	74.73	15	29.0	29.6	0.312	89.2	50.9	41	15.0
25	74.77	15	27.3	27.8	0.311	88.7	50.6	39	14.0
26	74.80	15	28.3	28.6	0.307	87.8	51.4	40	14.7
27	74.83	15	29.2	29.7	0.313	89.4	51.2	41	15.0
28	74.87	15	28.5	29.1	0.311	88.9	50.4	40	14.7
29	74.90	15	29.1	29.5	0.312	89.0	51.2	41	15.1
30	74.93	15	28.7	29.1	0.305	87.2	50.9	41	14.8
31	74.97	15	29.3	29.7	0.315	89.9	50.9	42	15.0
32	75.00	15	28.3	28.7	0.302	86.3	51.0	40	14.6
	Average		28.4	28.9	0.310	88.4	51.0	40	14.6
	Maximum		29.4	30.1	0.322	92.0	51.4	42	15.1
Total number of blows analyzed: 26									

BL# Sensors

7-32 F3: [413 NWJ-2] 213.9 (1.00); F4: [413 NWJ-1] 212.3 (1.00); A3: [K4676] 390.0 (1.00);
A4: [K4120] 388.0 (1.00)

Time Summary

Drive 36 seconds 9:46 AM - 9:47 AM BN 1 - 32



Project Information

PROJECT: Thompson Engineering SPT CalibraticCSX 27.57 ksi
 PILE NAME: CME 550X (SN 327443) - 78.5 to 80.0 ft
 DESCR: NWJ Rod - Mud Rotary
 OPERATOR: MBP
 FILE: CME 550X (SN 327443) - 78.5 to 80.0 ft
 9/28/2016 10:08:12 AM
 Blow Number 1

Quantity Results

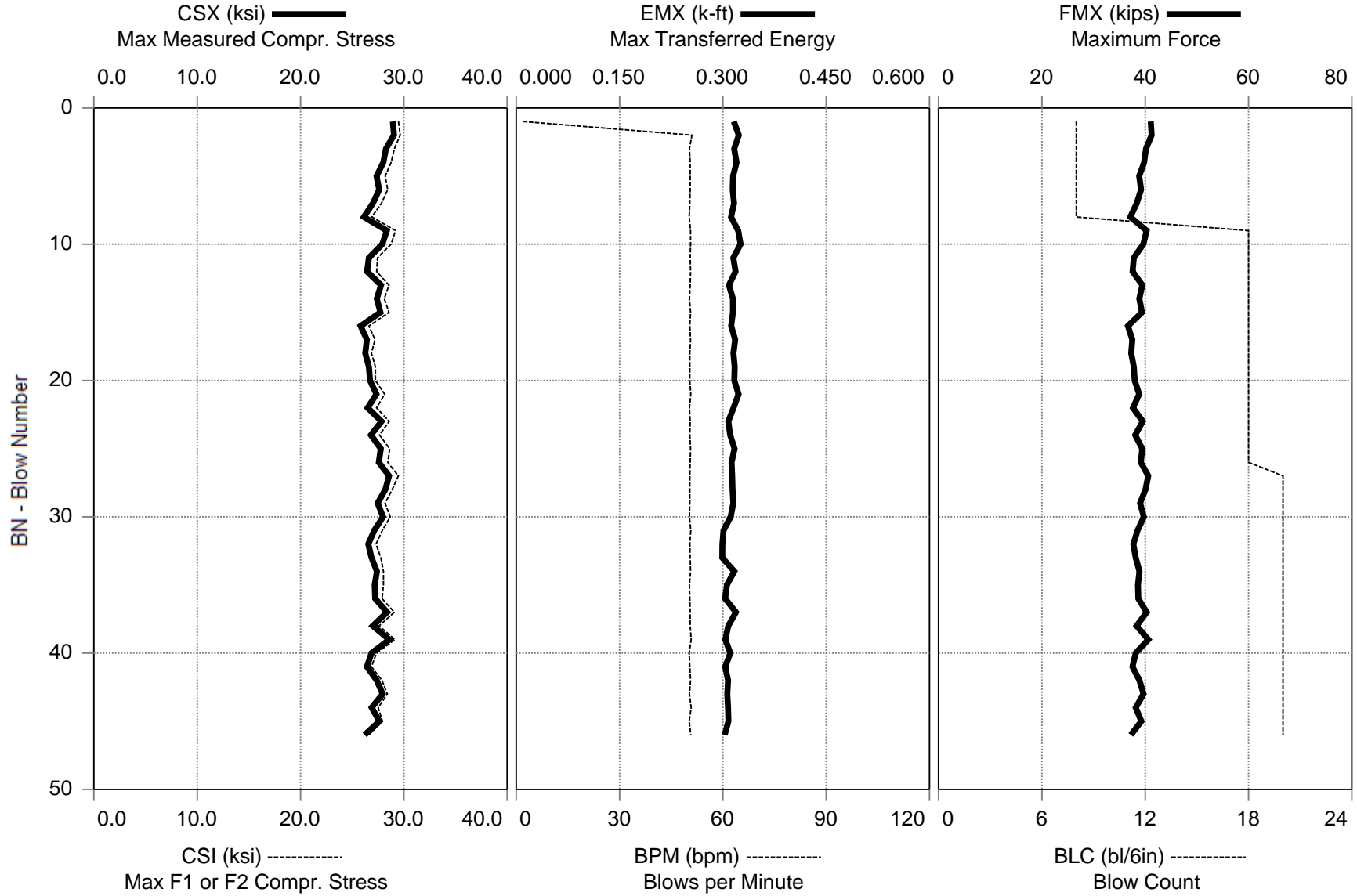
EMX 0.3 k-ft
 ETR 89.0 (%)
 BPM 1.9 bpm
 FMX 39 kips
 VMX 14.9 f/s
 QNV 0.00 []
 QNV 0.00 []

Pile Properties

LE 96.00 ft
 AR 1.42 in²
 EM 30000 ksi
 SP 0.492 k/ft3
 WS 16807.9 f/s
 EA/C 2.5 ksec/ft
 2L/C 11.44 ms
 JC []
 LP 78.56 ft

Sensors

F3: [413 NWJ-2] 213.94 (1)
 F4: [413 NWJ-1] 212.28 (1)
 A3: [K4676] 390 mv/5000g's (1)
 A4: [K4120] 388 mv/5000g's (1)
 CLIP: OK



Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 78.5 to 80.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

AR: 1.42 in² SP: 0.492 k/ft³
LE: 96.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	TYPE	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
8	79.00	8	AV8	27.8	28.5	0.317	90.4	44.4	39	15.6
			MAX	29.0	29.7	0.323	92.3	51.0	41	15.9
26	79.50	18	AV18	27.1	27.9	0.316	90.2	50.5	38	16.1
			MAX	28.4	29.2	0.326	93.1	50.7	40	16.6
46	80.00	20	AV20	27.4	28.0	0.308	87.9	50.5	39	15.9
			MAX	28.6	29.5	0.319	91.1	50.8	41	17.0
Average				27.3	28.1	0.312	89.3	49.4	39	15.9
Maximum				29.0	29.7	0.326	93.1	51.0	41	17.0

Total number of blows analyzed: 46

BL# Sensors

1-46 F3: [413 NWJ-2] 213.9 (1.00); F4: [413 NWJ-1] 212.3 (1.00); A3: [K4676] 390.0 (1.00);
A4: [K4120] 388.0 (1.00)

Time Summary

Drive 53 seconds 10:08 AM - 10:09 AM BN 1 - 46

Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 78.5 to 80.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

AR: 1.42 in² SP: 0.492 k/ft³
LE: 96.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
9	79.03	18	28.4	29.2	0.322	92.0	50.6	40	16.0
10	79.06	18	27.9	28.8	0.326	93.1	50.6	40	16.5
11	79.08	18	26.6	27.4	0.315	90.1	50.5	38	15.8
12	79.11	18	26.4	27.4	0.318	91.0	50.6	38	16.5
13	79.14	18	27.8	28.6	0.309	88.2	50.5	39	16.3
14	79.17	18	27.4	28.1	0.315	89.9	50.3	39	15.1
15	79.19	18	27.7	28.5	0.315	89.9	50.6	39	16.5
16	79.22	18	25.8	26.6	0.312	89.2	50.4	37	15.2
17	79.25	18	26.4	27.2	0.318	90.8	50.6	38	16.1
18	79.28	18	26.3	26.9	0.315	90.1	50.4	37	16.0
19	79.31	18	26.6	27.2	0.317	90.6	50.4	38	16.4
20	79.33	18	26.7	27.2	0.317	90.5	50.4	38	16.1
21	79.36	18	27.3	28.1	0.323	92.2	50.7	39	16.6
22	79.39	18	26.5	27.4	0.315	90.1	50.3	38	16.5
23	79.42	18	27.8	28.6	0.308	87.9	50.5	40	16.4
24	79.44	18	26.8	27.6	0.311	88.7	50.4	38	15.3
25	79.47	18	27.8	28.6	0.317	90.5	50.6	39	16.1
26	79.50	18	27.6	28.4	0.313	89.3	50.5	39	16.2
27	79.53	20	28.6	29.5	0.313	89.5	50.4	41	16.2
28	79.55	20	28.2	28.9	0.314	89.7	50.4	40	16.5
29	79.58	20	27.5	28.2	0.315	90.0	50.4	39	16.1
30	79.60	20	28.0	28.7	0.311	88.9	50.3	40	16.9
31	79.63	20	27.1	27.9	0.301	86.0	50.7	39	16.5
32	79.65	20	26.6	27.3	0.299	85.5	50.4	38	17.0
33	79.68	20	26.9	27.8	0.299	85.5	50.5	38	16.6
34	79.70	20	27.4	28.0	0.317	90.4	50.6	39	15.9
35	79.73	20	27.2	28.0	0.306	87.4	50.3	39	16.5
36	79.75	20	27.2	27.9	0.303	86.7	50.4	39	16.5
37	79.78	20	28.4	29.1	0.319	91.1	50.5	40	16.3
38	79.80	20	27.0	27.6	0.308	87.9	50.5	38	15.8
39	79.83	20	28.6	29.1	0.303	86.7	50.8	41	15.5
40	79.85	20	26.9	27.4	0.311	88.8	50.2	38	15.2
41	79.88	20	26.4	26.9	0.303	86.7	50.4	38	14.5
42	79.90	20	27.4	27.9	0.308	87.9	50.6	39	14.9
43	79.93	20	27.9	28.4	0.306	87.5	50.3	40	15.2
44	79.95	20	26.9	27.5	0.308	87.9	50.8	38	15.7
45	79.98	20	27.6	27.9	0.308	88.0	50.2	39	15.1
46	80.00	20	26.2	26.6	0.303	86.4	50.7	37	14.4
	Average		27.3	28.0	0.312	89.0	50.5	39	16.0
	Maximum		28.6	29.5	0.326	93.1	50.8	41	17.0

Total number of blows analyzed: 38

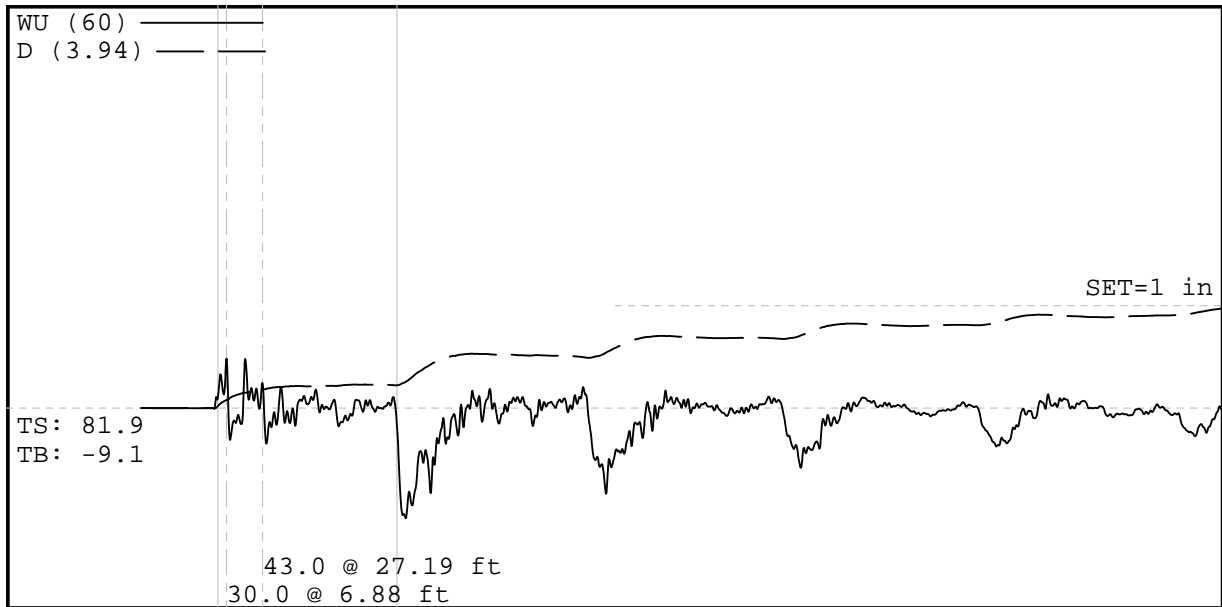
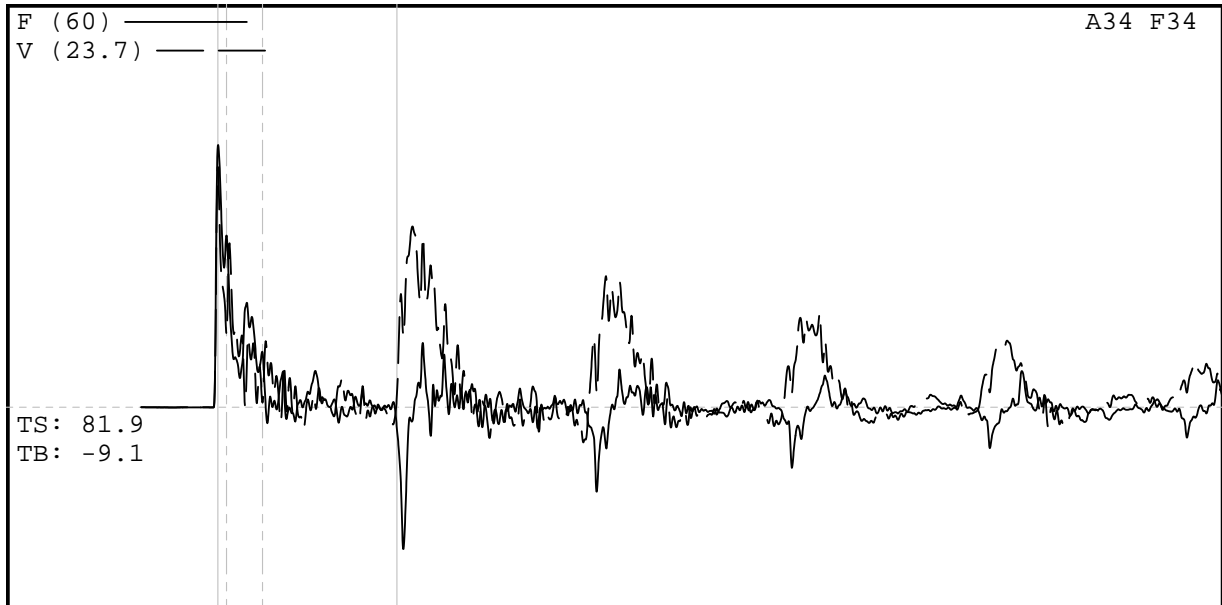
BL# Sensors

9-46 F3: [413 NWJ-2] 213.9 (1.00); F4: [413 NWJ-1] 212.3 (1.00); A3: [K4676] 390.0 (1.00);
A4: [K4120] 388.0 (1.00)

Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 78.5 to 80.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

Time Summary

Drive 53 seconds 10:08 AM - 10:09 AM BN 1 - 46



Project Information

PROJECT: Thompson Engineering SPT CalibraticCSX 27.50 ksi
 PILE NAME: CME 550X (SN 327443) - 83.5 to 85.0 ft
 DESCR: NWJ Rod - Mud Rotary
 OPERATOR: MBP
 FILE: CME 550X (SN 327443) - 83.5 to 85.0 ft
 9/28/2016 10:33:36 AM
 Blow Number 1

Quantity Results

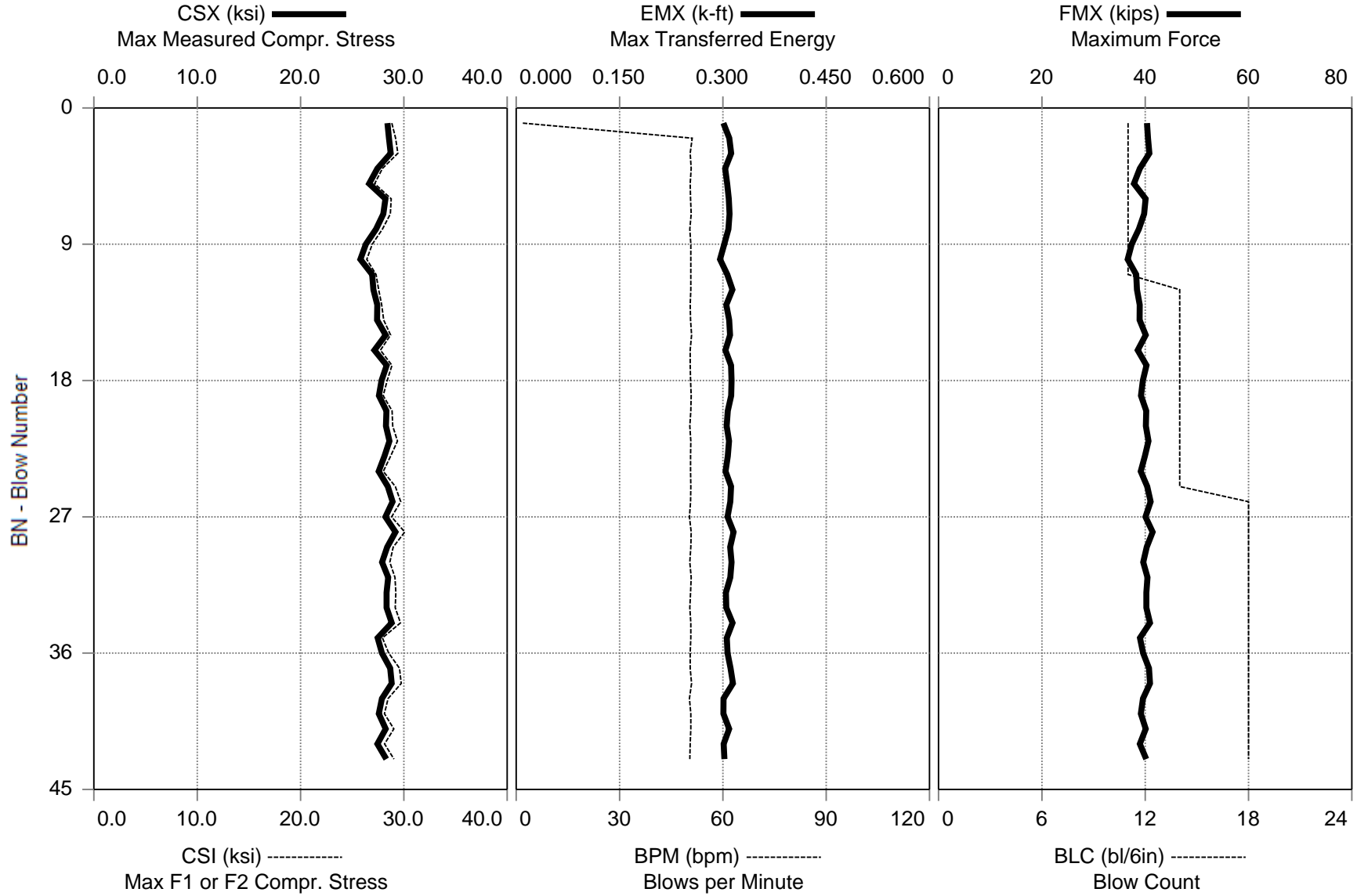
EMX 0.3 k-ft
 ETR 85.0 (%)
 BPM 1.9 bpm
 FMX 39 kips
 VMX 14.1 f/s
 QNV 0.00 []
 QNV 0.00 []

Pile Properties

LE 101.00 ft
 AR 1.42 in^2
 EM 30000 ksi
 SP 0.492 k/ft3
 WS 16807.9 f/s
 EA/C 2.5 ksec/ft
 2L/C 12.04 ms
 JC []
 LP 83.55 ft

Sensors

F3: [413 NWJ-2] 213.94 (1)
 F4: [413 NWJ-1] 212.28 (1)
 A3: [K4676] 390 mv/5000g's (1)
 A4: [K4120] 388 mv/5000g's (1)
 CLIP: OK



Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 83.5 to 85.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

AR: 1.42 in² SP: 0.492 k/ft³
LE: 101.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	TYPE	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
11	84.00	11	AV11	27.5	28.1	0.306	87.3	46.2	39	14.2
			MAX	28.7	29.4	0.312	89.1	51.1	41	15.0
25	84.50	14	AV14	27.9	28.4	0.309	88.2	50.6	40	14.7
			MAX	28.6	29.4	0.314	89.7	50.9	41	15.1
43	85.00	18	AV18	28.3	29.0	0.308	88.0	50.6	40	15.0
			MAX	29.2	30.1	0.316	90.2	50.9	41	15.7
Average				27.9	28.6	0.308	87.9	49.5	40	14.7
Maximum				29.2	30.1	0.316	90.2	51.1	41	15.7

Total number of blows analyzed: 43

BL# Sensors

1-43 F3: [413 NWJ-2] 213.9 (1.00); F4: [413 NWJ-1] 212.3 (1.00); A3: [K4676] 390.0 (1.00);
A4: [K4120] 388.0 (1.00)

Time Summary

Drive 49 seconds 10:33 AM - 10:34 AM BN 1 - 43

Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 83.5 to 85.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

AR: 1.42 in² SP: 0.492 k/ft³
LE: 101.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
12	84.04	14	27.0	27.6	0.314	89.7	50.7	38	14.0
13	84.07	14	27.4	27.9	0.305	87.1	50.5	39	14.4
14	84.11	14	27.4	28.0	0.309	88.3	50.6	39	14.3
15	84.14	14	28.2	28.7	0.310	88.7	50.9	40	14.8
16	84.18	14	27.2	27.7	0.304	86.8	50.5	39	14.6
17	84.21	14	28.3	28.8	0.312	89.1	50.5	40	14.7
18	84.25	14	27.8	28.4	0.312	89.3	50.6	40	14.9
19	84.29	14	27.6	28.0	0.312	89.2	50.8	39	14.4
20	84.32	14	28.3	28.9	0.307	87.7	50.7	40	14.7
21	84.36	14	28.3	28.9	0.305	87.3	50.4	40	14.8
22	84.39	14	28.6	29.4	0.309	88.3	50.7	41	15.1
23	84.43	14	28.1	28.7	0.307	87.7	50.6	40	15.1
24	84.46	14	27.6	28.0	0.304	86.8	50.6	39	14.4
25	84.50	14	28.4	29.2	0.312	89.1	50.7	40	15.0
26	84.53	18	28.9	29.7	0.311	88.8	50.6	41	15.1
27	84.56	18	28.2	28.8	0.307	87.7	50.3	40	15.0
28	84.58	18	29.2	30.1	0.316	90.2	50.8	41	15.3
29	84.61	18	28.4	29.0	0.311	88.7	50.7	40	14.7
30	84.64	18	27.9	28.6	0.313	89.3	50.4	40	14.7
31	84.67	18	28.5	29.1	0.311	88.8	50.8	40	15.0
32	84.69	18	28.3	29.2	0.304	87.0	50.6	40	15.0
33	84.72	18	28.3	29.2	0.305	87.1	50.4	40	15.0
34	84.75	18	28.8	29.7	0.314	89.7	50.7	41	15.2
35	84.78	18	27.5	27.9	0.306	87.3	50.7	39	14.1
36	84.81	18	27.9	28.5	0.307	87.7	50.5	40	14.6
37	84.83	18	28.7	29.6	0.311	88.9	50.5	41	15.2
38	84.86	18	28.8	29.7	0.315	89.9	50.9	41	15.2
39	84.89	18	27.9	28.5	0.301	86.0	50.3	40	15.1
40	84.92	18	27.6	28.1	0.301	85.9	50.7	39	14.3
41	84.94	18	28.2	29.0	0.309	88.3	50.7	40	15.7
42	84.97	18	27.4	28.1	0.301	86.0	50.5	39	15.1
43	85.00	18	28.3	29.0	0.302	86.3	50.4	40	15.4
	Average		28.1	28.8	0.308	88.1	50.6	40	14.8
	Maximum		29.2	30.1	0.316	90.2	50.9	41	15.7

Total number of blows analyzed: 32

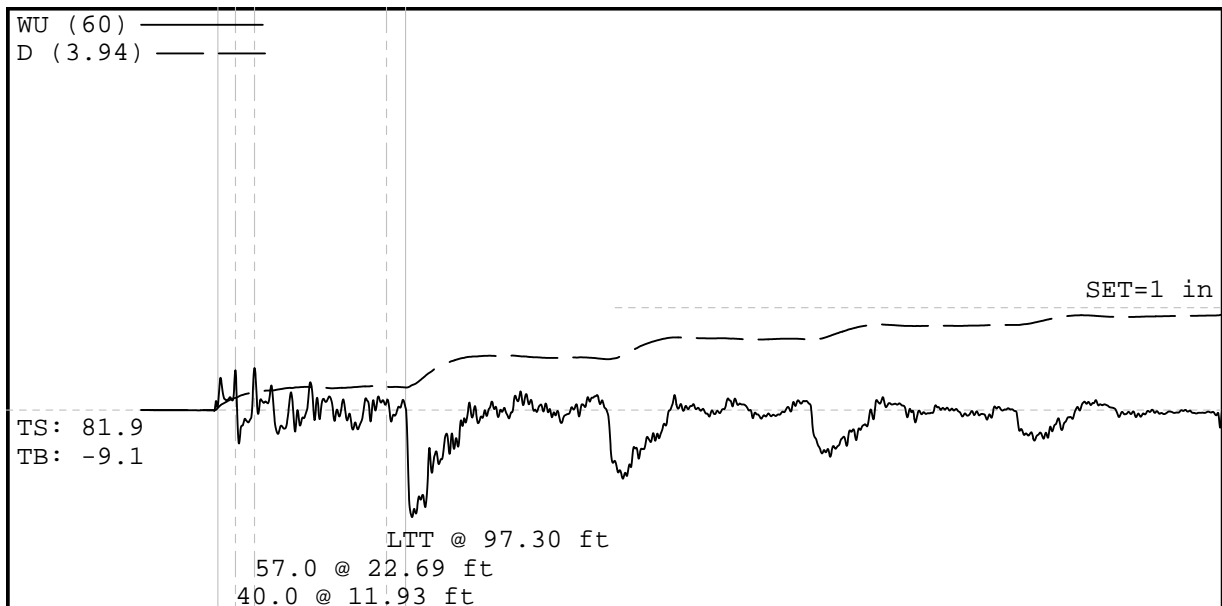
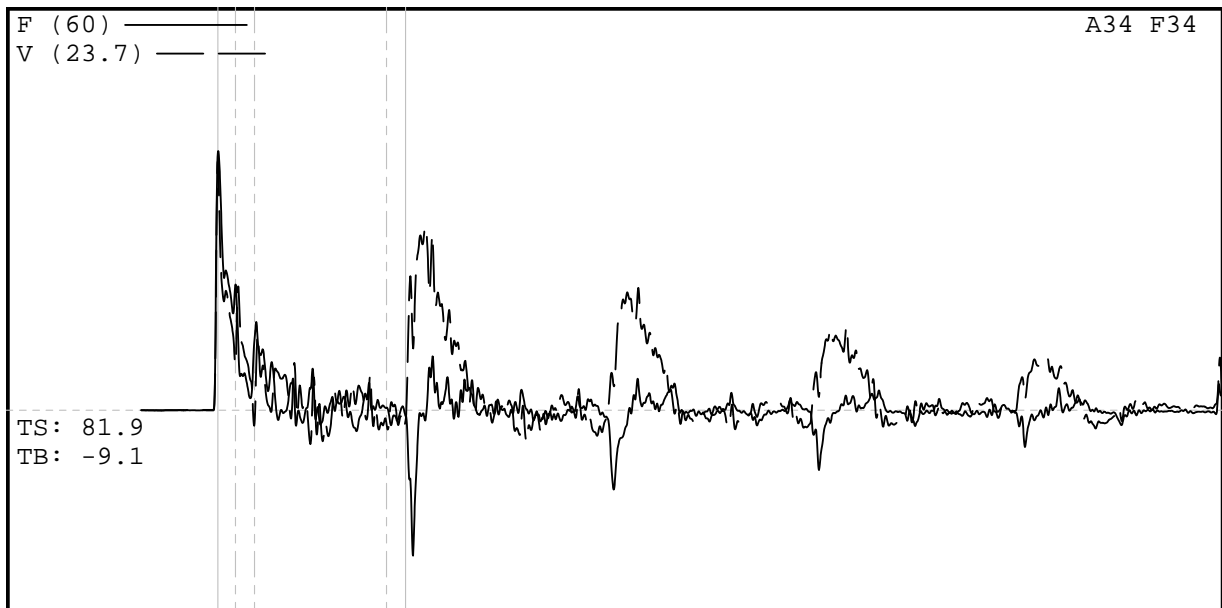
BL# Sensors

12-43 F3: [413 NWJ-2] 213.9 (1.00); F4: [413 NWJ-1] 212.3 (1.00); A3: [K4676] 390.0 (1.00);
A4: [K4120] 388.0 (1.00)

Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 83.5 to 85.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

Time Summary

Drive 49 seconds 10:33 AM - 10:34 AM BN 1 - 43



Project Information

PROJECT: Thompson Engineering SPT CalibraticCSX 27.17 ksi
 PILE NAME: CME 550X (SN 327443) - 88.5 to 90.0 ft
 DESCR: NWJ Rod - Mud Rotary
 OPERATOR: MBP
 FILE: CME 550X (SN 327443) - 88.5 to 90.0 ft
 9/28/2016 10:51:53 AM
 Blow Number 1

Quantity Results

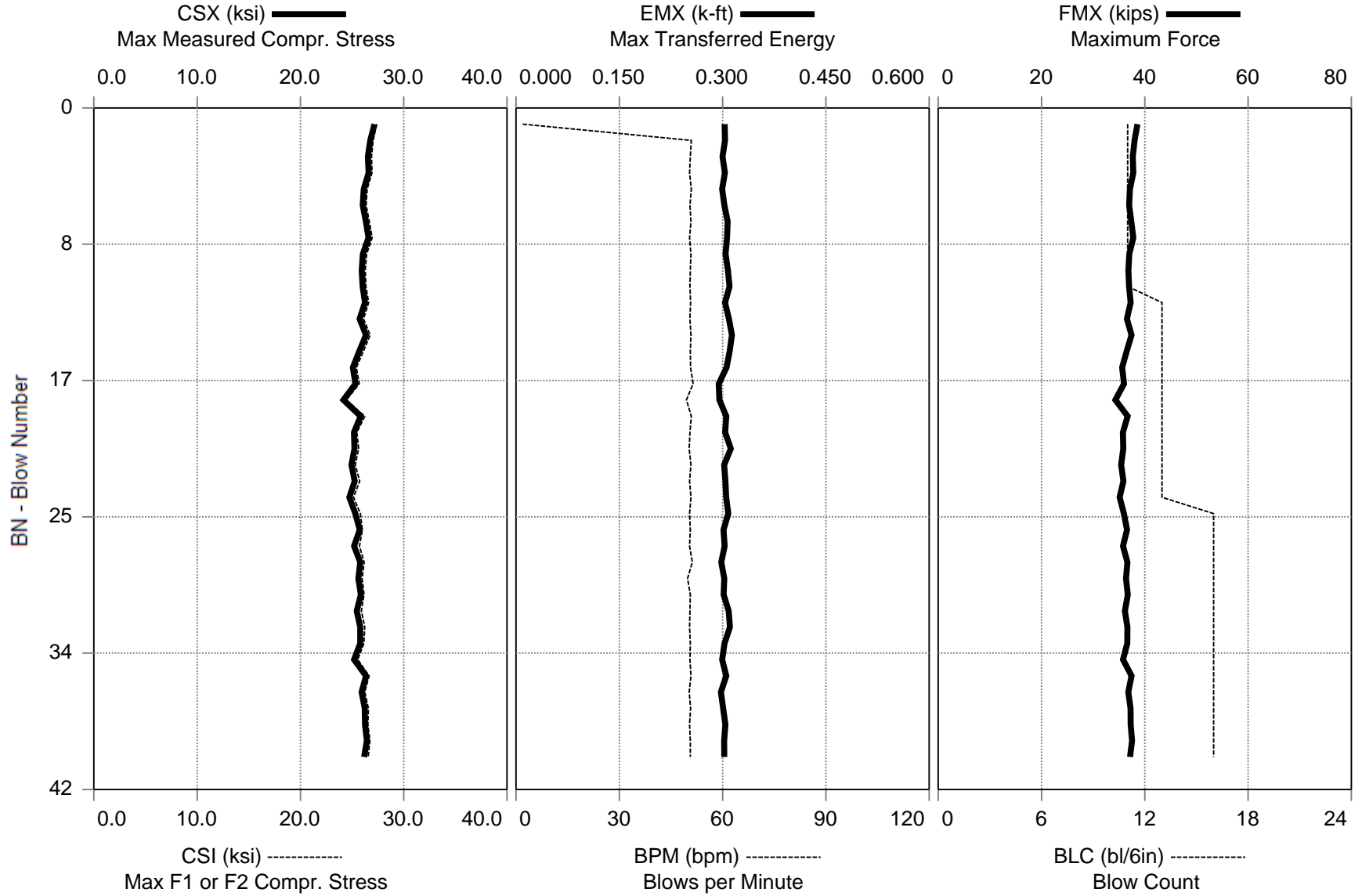
EMX 0.3 k-ft
 ETR 86.6 (%)
 BPM 1.9 bpm
 FMX 39 kips
 VMX 14.6 f/s
 QNV 0.00 []
 QNV 0.00 []

Pile Properties

LE 106.00 ft
 AR 1.42 in²
 EM 30000 ksi
 SP 0.492 k/ft³
 WS 16807.9 f/s
 EA/C 2.5 ksec/ft
 2L/C 12.62 ms
 JC []
 LP 88.55 ft

Sensors

F3: [413 NWJ-2] 213.94 (1)
 F4: [413 NWJ-1] 212.28 (1)
 A3: [K4676] 390 mv/5000g's (1)
 A4: [K4120] 388 mv/5000g's (1)
 CLIP: OK



Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 88.5 to 90.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

AR: 1.42 in² SP: 0.492 k/ft³
LE: 106.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	TYPE	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
11	89.00	11	AV11	26.4	26.7	0.304	86.9	46.2	37	15.3
			MAX	27.2	27.4	0.310	88.6	50.9	39	16.1
24	89.50	13	AV13	25.4	25.7	0.305	87.1	50.6	36	15.6
			MAX	26.4	26.7	0.313	89.6	51.4	37	16.4
40	90.00	16	AV16	25.8	26.2	0.303	86.6	50.5	37	15.5
			MAX	26.4	26.7	0.311	88.8	51.2	38	16.5
Average				25.8	26.2	0.304	86.8	49.4	37	15.5
Maximum				27.2	27.4	0.313	89.6	51.4	39	16.5

Total number of blows analyzed: 40

BL# Sensors

1-40 F3: [413 NWJ-2] 213.9 (1.00); F4: [413 NWJ-1] 212.3 (1.00); A3: [K4676] 390.0 (1.00);
A4: [K4120] 388.0 (1.00)

Time Summary

Drive 46 seconds 10:51 AM - 10:52 AM BN 1 - 40

Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 88.5 to 90.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

AR: 1.42 in² SP: 0.492 k/ft³
LE: 106.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
12	89.04	13	26.2	26.6	0.303	86.7	50.7	37	15.8
13	89.08	13	25.7	26.1	0.309	88.3	50.5	37	16.4
14	89.12	13	26.4	26.7	0.313	89.6	50.8	37	16.2
15	89.15	13	25.7	26.1	0.310	88.6	50.6	36	15.8
16	89.19	13	25.1	25.4	0.306	87.4	50.7	36	15.7
17	89.23	13	25.3	25.7	0.294	84.1	51.4	36	15.6
18	89.27	13	24.2	24.5	0.295	84.4	49.5	34	14.6
19	89.31	13	25.8	26.2	0.305	87.2	50.9	37	16.0
20	89.35	13	25.2	25.5	0.304	86.8	50.5	36	15.3
21	89.38	13	25.2	25.6	0.312	89.1	50.3	36	15.9
22	89.42	13	24.9	25.3	0.302	86.3	50.8	35	14.0
23	89.46	13	25.3	25.7	0.304	86.9	50.4	36	16.4
24	89.50	13	24.7	25.1	0.305	87.2	50.8	35	15.1
25	89.53	16	25.3	25.8	0.308	88.1	50.4	36	16.5
26	89.56	16	25.7	26.0	0.301	86.1	50.6	37	14.6
27	89.59	16	25.2	25.7	0.303	86.6	50.4	36	15.7
28	89.63	16	25.8	26.2	0.298	85.2	51.2	37	15.0
29	89.66	16	25.6	26.0	0.302	86.4	49.8	36	15.8
30	89.69	16	25.8	26.2	0.301	86.1	50.6	37	15.2
31	89.72	16	25.5	25.9	0.309	88.2	50.5	36	16.1
32	89.75	16	25.8	26.2	0.311	88.8	50.4	37	15.9
33	89.78	16	25.8	26.1	0.303	86.5	50.6	37	15.8
34	89.81	16	25.2	25.5	0.299	85.5	50.5	36	15.8
35	89.84	16	26.4	26.6	0.305	87.2	50.8	37	14.9
36	89.88	16	25.9	26.2	0.297	85.0	50.3	37	15.0
37	89.91	16	26.2	26.6	0.301	85.9	50.7	37	15.3
38	89.94	16	26.2	26.5	0.304	86.9	50.4	37	15.4
39	89.97	16	26.4	26.7	0.302	86.3	50.6	38	15.2
40	90.00	16	26.2	26.6	0.302	86.4	50.6	37	15.2
		Average	25.6	26.0	0.304	86.8	50.6	36	15.5
		Maximum	26.4	26.7	0.313	89.6	51.4	38	16.5

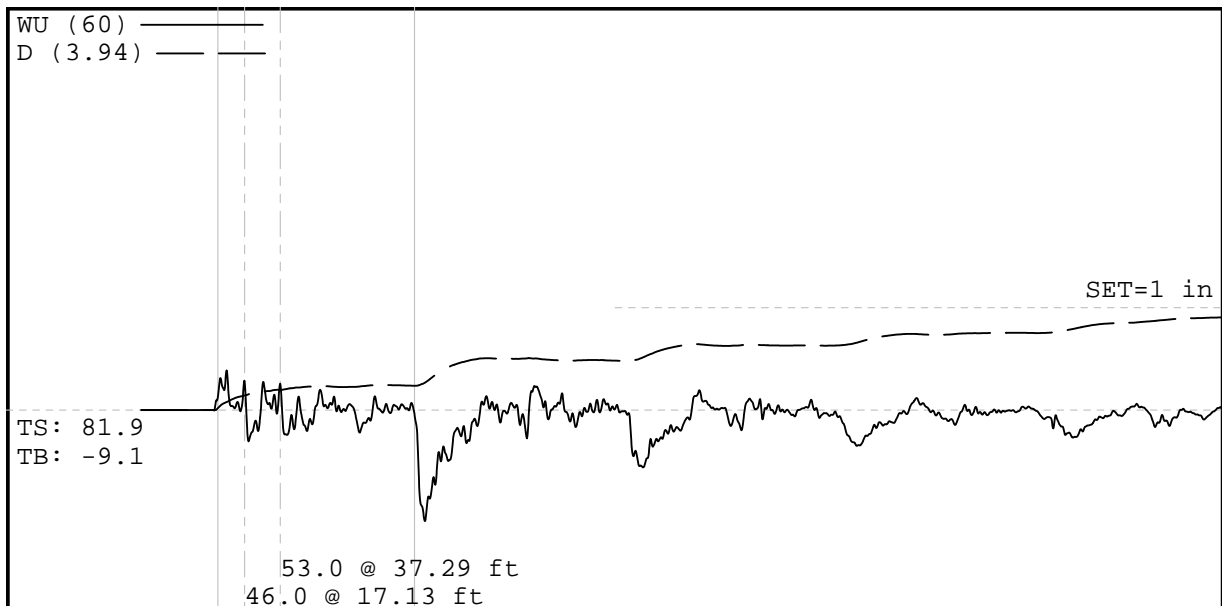
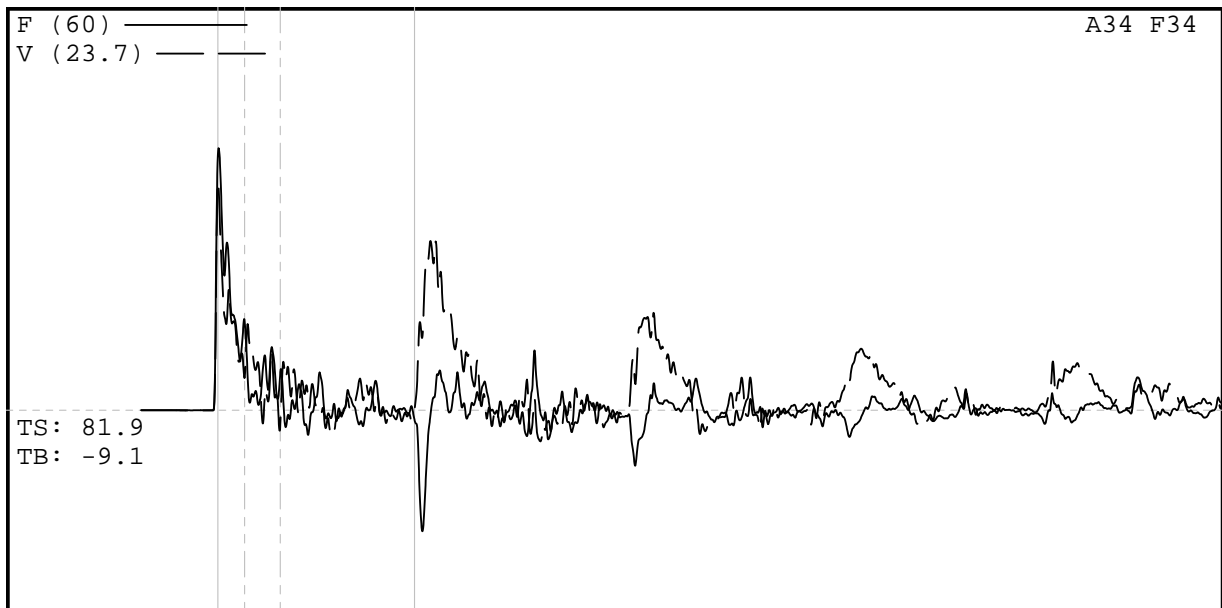
Total number of blows analyzed: 29

BL# Sensors

12-40 F3: [413 NWJ-2] 213.9 (1.00); F4: [413 NWJ-1] 212.3 (1.00); A3: [K4676] 390.0 (1.00);
A4: [K4120] 388.0 (1.00)

Time Summary

Drive 46 seconds 10:51 AM - 10:52 AM BN 1 - 40



Project Information

PROJECT: Thompson Engineering SPT CalibraticCSX 27.47 ksi
 PILE NAME: CME 550X (SN 327443) - 93.5 to 9CSI f27.80 ksi
 DESCR: NWJ Rod - Mud Rotary
 OPERATOR: MBP
 FILE: CME 550X (SN 327443) - 93.5 to 95.0 ft
 9/28/2016 11:26:27 AM
 Blow Number 1

Quantity Results

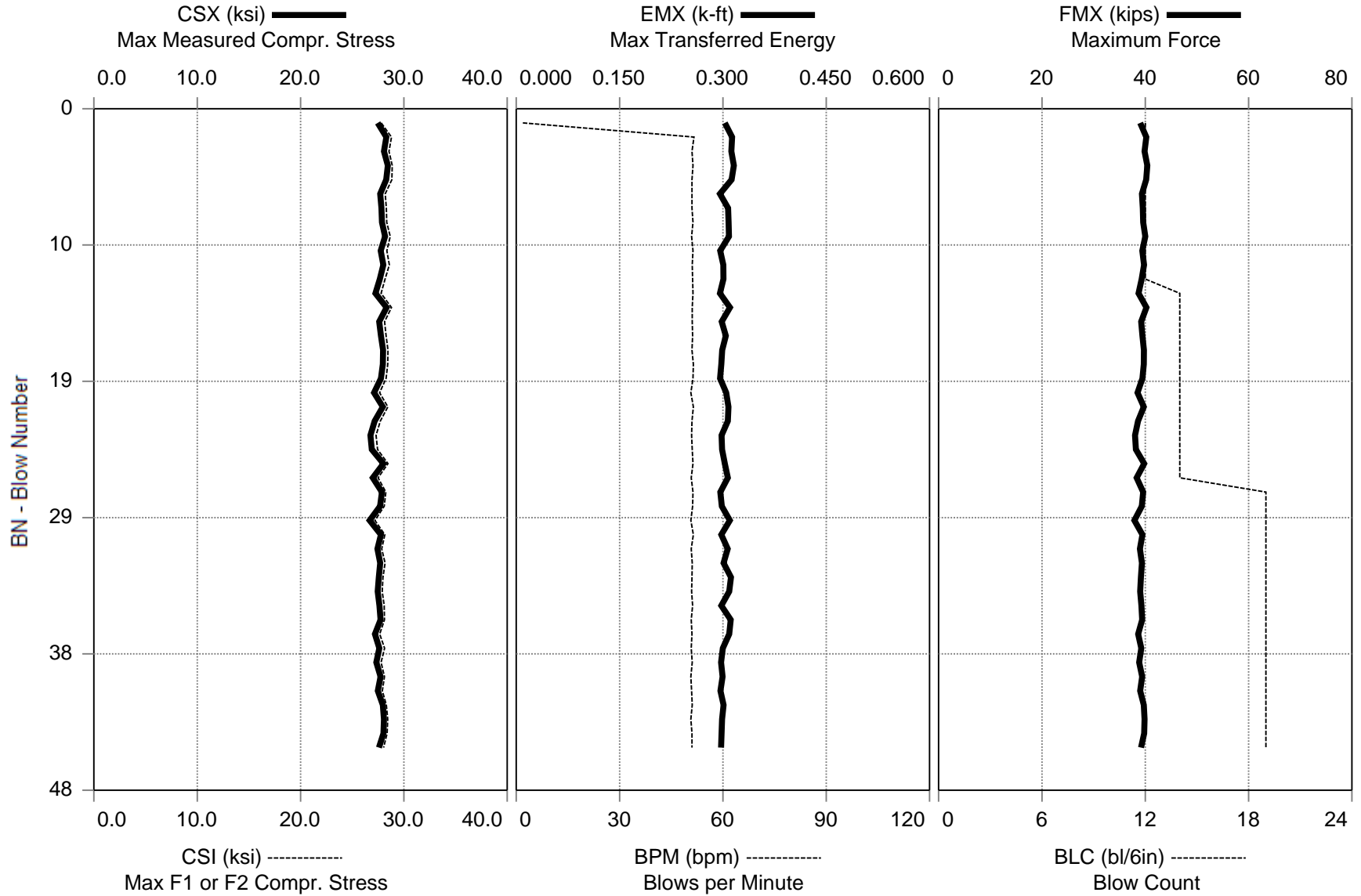
EMX 0.3 k-ft
 ETR 86.5 (%)
 BPM 1.9 bpm
 FMX 39 kips
 VMX 13.5 f/s
 QNV 0.00 []
 QNV 0.00 []

Pile Properties

LE 111.00 ft
 AR 1.42 in^2
 EM 30000 ksi
 SP 0.492 k/ft3
 WS 16807.9 f/s
 EA/C 2.5 ksec/ft
 2L/C 13.22 ms
 JC []
 LP 93.54 ft

Sensors

F3: [413 NWJ-2] 213.94 (1)
 F4: [413 NWJ-1] 212.28 (1)
 A3: [K4676] 390 mv/5000g's (1)
 A4: [K4120] 388 mv/5000g's (1)
 CLIP: OK



Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 93.5 to 95.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

AR: 1.42 in² SP: 0.492 k/ft³
LE: 111.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	TYPE	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
12	94.00	12	AV12	28.0	28.5	0.306	87.5	47.1	40	14.4
			MAX	28.4	28.9	0.316	90.3	51.6	40	15.0
26	94.50	14	AV14	27.5	28.0	0.302	86.3	51.1	39	14.1
			MAX	28.3	28.8	0.310	88.6	51.4	40	14.8
45	95.00	19	AV19	27.6	28.0	0.302	86.3	51.0	39	14.3
			MAX	28.1	28.4	0.312	89.0	51.4	40	14.7
Average				27.7	28.1	0.303	86.6	50.0	39	14.3
Maximum				28.4	28.9	0.316	90.3	51.6	40	15.0

Total number of blows analyzed: 45

BL# Sensors

1-45 F3: [413 NWJ-2] 213.9 (1.00); F4: [413 NWJ-1] 212.3 (1.00); A3: [K4676] 390.0 (1.00);
A4: [K4120] 388.0 (1.00)

Time Summary

Drive 51 seconds 11:26 AM - 11:27 AM BN 1 - 45

Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 93.5 to 95.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

AR: 1.42 in² SP: 0.492 k/ft³
LE: 111.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
13	94.04	14	27.2	27.8	0.296	84.5	51.3	39	13.8
14	94.07	14	28.3	28.8	0.310	88.6	51.1	40	14.7
15	94.11	14	27.6	28.1	0.298	85.2	51.1	39	14.0
16	94.14	14	27.8	28.3	0.304	86.9	51.2	39	14.0
17	94.18	14	28.0	28.5	0.299	85.4	51.0	40	14.8
18	94.21	14	28.0	28.4	0.298	85.0	51.4	40	14.6
19	94.25	14	27.8	28.3	0.296	84.5	51.3	39	14.7
20	94.29	14	27.1	27.6	0.305	87.1	50.7	38	13.5
21	94.32	14	28.0	28.4	0.308	88.0	51.4	40	14.8
22	94.36	14	27.2	27.7	0.307	87.7	51.0	39	13.8
23	94.39	14	26.8	27.3	0.298	85.1	50.9	38	13.3
24	94.43	14	26.9	27.5	0.299	85.4	51.1	38	13.4
25	94.46	14	28.0	28.5	0.303	86.5	51.3	40	14.6
26	94.50	14	27.0	27.5	0.307	87.7	50.8	38	14.0
27	94.53	19	27.9	28.2	0.296	84.6	51.3	40	14.6
28	94.55	19	27.7	28.1	0.298	85.3	51.2	39	14.5
29	94.58	19	26.7	27.2	0.310	88.6	50.7	38	13.3
30	94.61	19	27.8	28.2	0.298	85.0	51.4	39	14.5
31	94.63	19	27.4	27.8	0.307	87.7	50.8	39	14.4
32	94.66	19	27.7	28.2	0.301	86.0	51.1	39	14.5
33	94.68	19	27.6	28.0	0.312	89.0	51.0	39	14.5
34	94.71	19	27.5	27.9	0.309	88.3	50.9	39	14.3
35	94.74	19	27.6	28.1	0.298	85.1	51.2	39	14.4
36	94.76	19	27.7	28.1	0.311	88.9	50.8	39	14.5
37	94.79	19	27.2	27.7	0.309	88.3	51.0	39	14.0
38	94.82	19	27.6	28.1	0.300	85.7	50.8	39	14.4
39	94.84	19	27.3	27.8	0.297	84.9	51.1	39	14.1
40	94.87	19	27.7	28.1	0.299	85.5	50.7	39	14.5
41	94.89	19	27.5	27.9	0.296	84.7	50.9	39	14.3
42	94.92	19	28.0	28.3	0.301	86.0	51.1	40	14.7
43	94.95	19	28.1	28.4	0.299	85.3	50.7	40	14.6
44	94.97	19	28.0	28.4	0.298	85.2	51.0	40	14.6
45	95.00	19	27.6	28.0	0.297	84.9	51.0	39	14.0
	Average		27.6	28.0	0.302	86.3	51.0	39	14.3
	Maximum		28.3	28.8	0.312	89.0	51.4	40	14.8

Total number of blows analyzed: 33

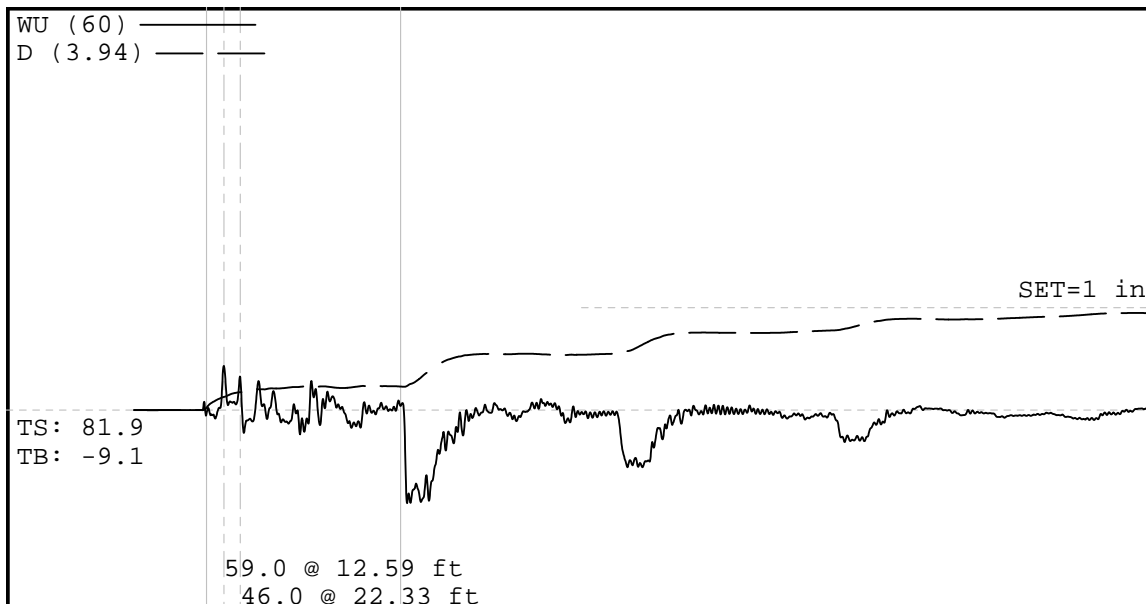
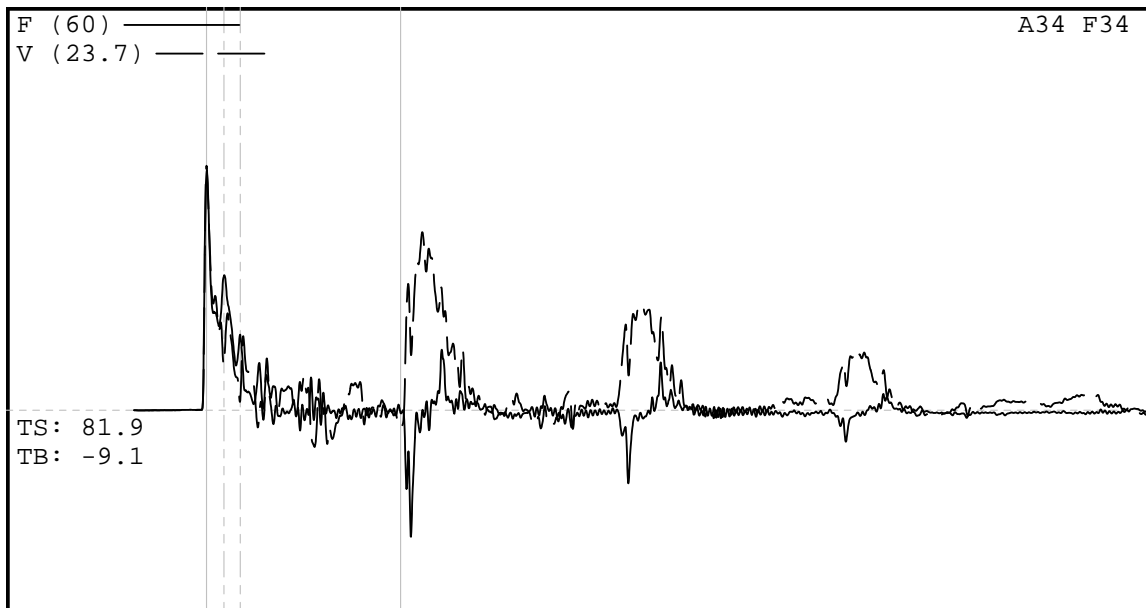
BL# Sensors

13-45 F3: [413 NWJ-2] 213.9 (1.00); F4: [413 NWJ-1] 212.3 (1.00); A3: [K4676] 390.0 (1.00);
A4: [K4120] 388.0 (1.00)

Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 93.5 to 95.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

Time Summary

Drive 51 seconds 11:26 AM - 11:27 AM BN 1 - 45



Project Information

PROJECT: Thompson Engineering SPT CalibraticCSX 25.12 ksi
 PILE NAME: CME 550X (SN 327443) - 98.5 to 100.0 ft
 DESCR: NWJ Rod - Mud Rotary
 OPERATOR: MBP
 FILE: CME 550X (SN 327443) - 98.5 to 100.0 ft
 9/28/2016 11:50:26 AM
 Blow Number 32

Quantity Results

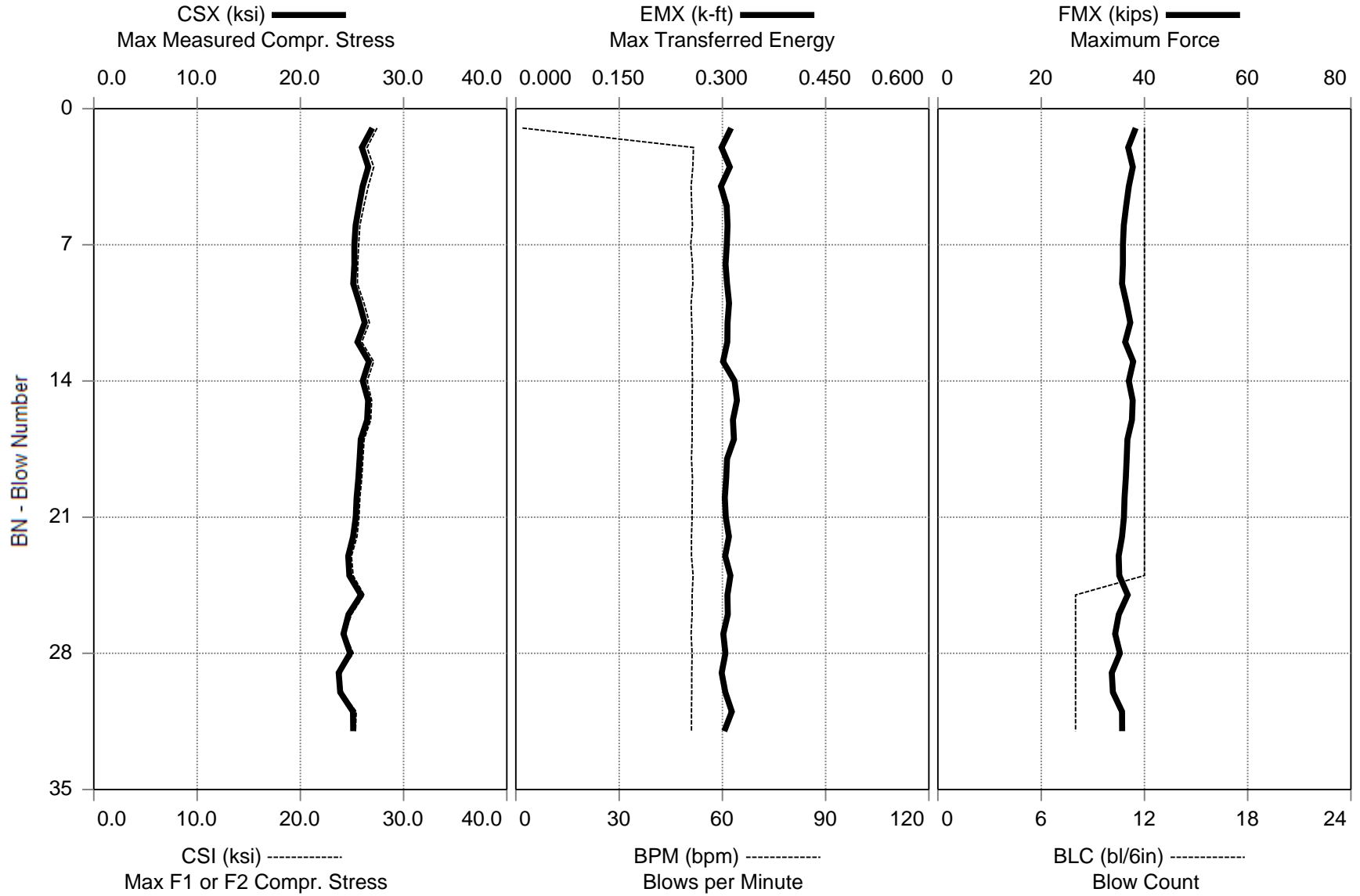
EMX 0.3 k-ft
 ETR 86.5 (%)
 fBPM 51.0 bpm
 FMX 36 kips
 VMX 14.4 f/s
 QNV 0.00 []
 QNV 0.00 []

Pile Properties

LE 116.00 ft
 AR 1.42 in²
 EM 30000 ksi
 SP 0.492 k/ft3
 WS 16807.9 f/s
 EA/C 2.5 ksec/ft
 2L/C 13.82 ms
 JC []
 LP 100.00 ft

Sensors

F3: [413 NWJ-2] 213.94 (1)
 F4: [413 NWJ-1] 212.28 (1)
 A3: [K4676] 390 mv/5000g's (1)
 A4: [K4120] 388 mv/5000g's (1)
 CLIP: OK



Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 98.5 to 100.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

AR: 1.42 in² SP: 0.492 k/ft³
LE: 116.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	TYPE	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
12	99.00	12	AV12	25.8	26.2	0.306	87.5	47.1	37	15.5
			MAX	27.0	27.4	0.313	89.3	51.6	38	16.0
24	99.50	12	AV12	25.7	26.0	0.310	88.5	51.2	36	16.2
			MAX	26.6	27.1	0.321	91.7	51.5	38	17.1
32	100.00	8	AV8	24.7	24.9	0.305	87.1	51.1	35	15.9
			MAX	25.9	26.2	0.314	89.6	51.2	37	16.8
Average				25.5	25.8	0.307	87.8	49.6	36	15.9
Maximum				27.0	27.4	0.321	91.7	51.6	38	17.1

Total number of blows analyzed: 32

BL# Sensors

1-32 F3: [413 NWJ-2] 213.9 (1.00); F4: [413 NWJ-1] 212.3 (1.00); A3: [K4676] 390.0 (1.00);
A4: [K4120] 388.0 (1.00)

Time Summary

Drive 36 seconds 11:49 AM - 11:50 AM BN 1 - 32

Thompson Engineering SPT Calibration - CME 550X (SN 327443) - 98.5 to 100.0 ft NWJ Rod - Mud Rotary
OP: MBP Date: 28-September-2016

AR: 1.42 in² SP: 0.492 k/ft³
LE: 116.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
13	99.04	12	26.6	27.1	0.301	86.0	51.2	38	15.5
14	99.08	12	26.0	26.5	0.318	90.8	51.3	37	16.2
15	99.13	12	26.6	26.9	0.321	91.7	51.2	38	16.0
16	99.17	12	26.5	26.8	0.315	90.1	51.2	38	16.0
17	99.21	12	25.9	26.2	0.317	90.5	51.2	37	16.4
18	99.25	12	25.7	26.1	0.307	87.6	51.0	37	15.9
19	99.29	12	25.6	25.9	0.306	87.3	51.3	36	16.0
20	99.33	12	25.5	25.8	0.304	86.7	51.2	36	15.9
21	99.38	12	25.4	25.7	0.305	87.1	51.2	36	16.0
22	99.42	12	25.1	25.5	0.309	88.4	51.0	36	16.6
23	99.46	12	24.6	24.9	0.304	86.8	51.0	35	16.7
24	99.50	12	24.7	25.1	0.312	89.1	51.5	35	17.1
25	99.56	8	25.9	26.2	0.307	87.8	51.2	37	15.9
26	99.63	8	24.7	25.0	0.308	88.0	51.2	35	16.8
27	99.69	8	24.2	24.3	0.301	86.1	50.9	34	15.2
28	99.75	8	24.8	25.1	0.304	87.0	51.2	35	16.7
29	99.81	8	23.7	23.8	0.299	85.4	51.1	34	15.4
30	99.88	8	23.9	24.0	0.304	86.9	51.1	34	15.9
31	99.94	8	25.1	25.4	0.314	89.6	51.0	36	16.8
32	100.00	8	25.1	25.3	0.303	86.5	51.0	36	14.4
Average			25.3	25.6	0.308	88.0	51.2	36	16.1
Maximum			26.6	27.1	0.321	91.7	51.5	38	17.1
Total number of blows analyzed: 20									

BL# Sensors

13-32 F3: [413 NWJ-2] 213.9 (1.00); F4: [413 NWJ-1] 212.3 (1.00); A3: [K4676] 390.0 (1.00);
A4: [K4120] 388.0 (1.00)

Time Summary

Drive 36 seconds 11:49 AM - 11:50 AM BN 1 - 32

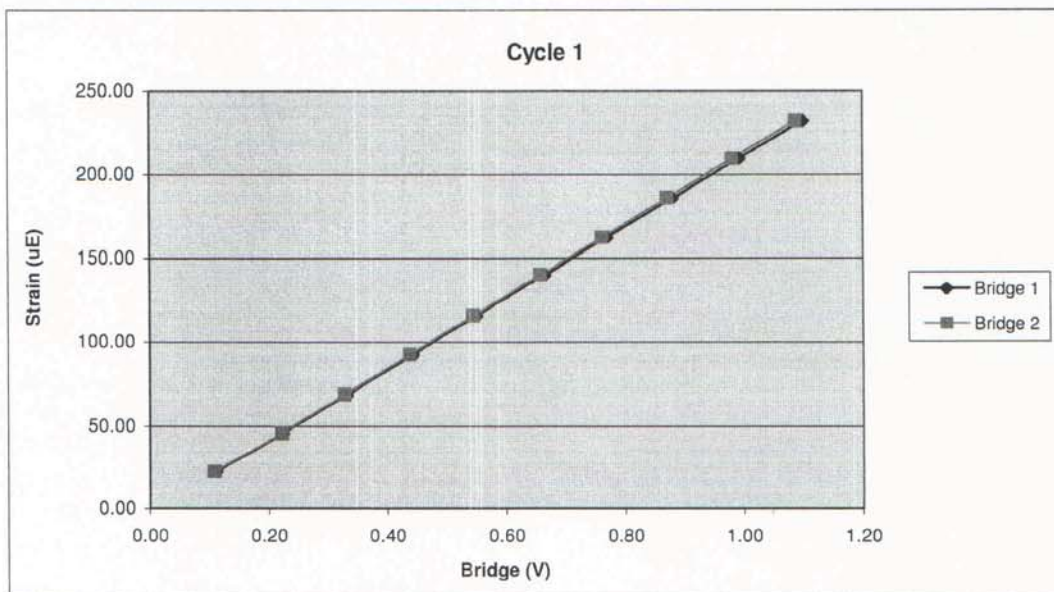
Appendix B

Dynamic Measurement Calibration Sheets

413NWJ		Cycle 1		
Sample	Force (lb)	Strain (μ E)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	990.99	22.25	0.11	0.11
3	2002.63	46.15	0.22	0.22
4	2988.10	69.17	0.33	0.33
5	3994.04	92.72	0.44	0.44
6	4963.98	115.99	0.55	0.54
7	5994.11	140.04	0.66	0.66
8	6930.41	162.12	0.77	0.76
9	7939.49	185.78	0.88	0.87
10	8950.34	209.60	0.99	0.98
11	9926.18	232.15	1.10	1.09

Bridge 1		Bridge 2	
Force Calibration (lb/V)	9036.37	Force Calibration (lb/V)	9125.33
Offset	-9.46	Offset	-2.08
Correlation	1.000000	Correlation	0.999997
Strain Calibration (μ E/V)	212.51	Strain Calibration (μ E/V)	214.61
Offset	-1.22	Offset	-1.05
Correlation	0.999996	Correlation	0.999998

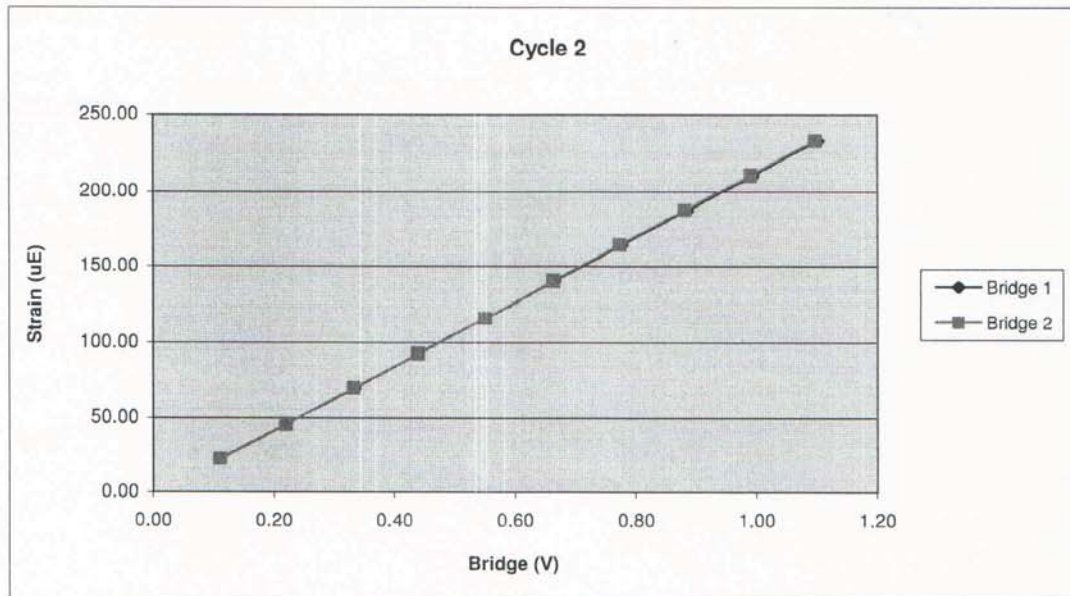
Force Strain Calibration	
EA (Kips)	42521.15
Offset	42.49
Correlation	0.999997



413NWJ		Cycle 2		
Sample	Force (lb)	Strain (μE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	987.05	22.73	0.11	0.11
3	1966.04	45.88	0.22	0.22
4	2986.33	69.92	0.33	0.33
5	3951.35	92.68	0.44	0.44
6	4949.03	116.49	0.55	0.55
7	5960.47	140.42	0.66	0.66
8	6953.03	163.97	0.78	0.77
9	7934.77	187.50	0.88	0.88
10	8928.90	210.76	0.99	0.99
11	9905.13	233.34	1.10	1.10

Bridge 1		Bridge 2	
Force Calibration (lb/V)	8992.65	Force Calibration (lb/V)	9034.81
Offset	-7.95	Offset	-19.15
Correlation	0.999996	Correlation	0.999998
Strain Calibration ($\mu\text{E}/\text{V}$)	212.81	Strain Calibration ($\mu\text{E}/\text{V}$)	213.81
Offset	-0.84	Offset	-1.11
Correlation	0.999997	Correlation	0.999996

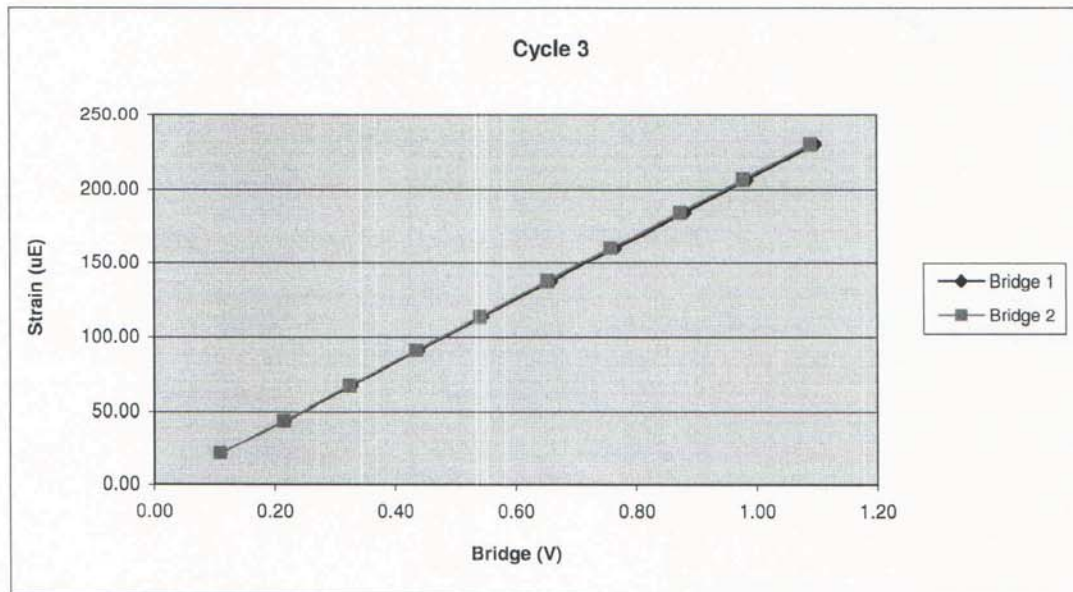
Force Strain Calibration	
EA (Kips)	42256.93
Offset	27.76
Correlation	0.999996



413NWJ		Cycle 3		
Sample	Force (lb)	Strain (μE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	978.00	21.53	0.11	0.11
3	1923.94	43.44	0.22	0.21
4	2938.53	67.46	0.33	0.32
5	3944.67	91.22	0.44	0.44
6	4898.87	113.58	0.54	0.54
7	5921.72	137.82	0.66	0.65
8	6874.74	160.10	0.77	0.76
9	7926.90	184.40	0.88	0.87
10	8859.86	206.60	0.98	0.98
11	9889.59	230.60	1.10	1.09

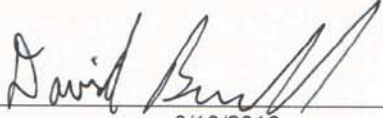
Bridge 1		Bridge 2	
Force Calibration (lb/V)	9008.15	Force Calibration (lb/V)	9088.85
Offset	-7.86	Offset	-13.21
Correlation	0.999998	Correlation	0.999998
Strain Calibration ($\mu\text{E}/\text{V}$)	211.51	Strain Calibration ($\mu\text{E}/\text{V}$)	213.41
Offset	-1.67	Offset	-1.80
Correlation	0.999995	Correlation	0.999993

Force Strain Calibration	
EA (Kips)	42588.80
Offset	63.31
Correlation	0.999997



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

Calibration Factors	413NWJ		
Bridge 1 ($\mu\text{E}/\text{V}$)	212.28	Bridge 2 ($\mu\text{E}/\text{V}$)	213.94
EA Factor (Kips)	42455.63	Area (in^2)	1.42

Calibrated by: 
Calibrated Date: 6/10/2016

Pile Dynamics Inc
30725 Aurora Rd
Solon, OH 44139

Traceable to N.I.S.T.

QBTA: ON [ALT-F1/BB=60]

Pile Dynamics, Inc.

Pile Dynamics
09-Sep-16 01:54

FS — BN1492 3881 2389
10 SL 1816/ 3440/ 2

PJ:
PN: HOPBAR

TG F2 DPF
A 4 -- US
F 2 3.3

LE 39.6 ft
AR 1.7 in2
EM 30000 Ksi
SP 0.492 K/ft3
WS 16810 ft/s
WC 16862 ft/s

JC 0.40
FM 1.00
UM 1.00

EA/C 30.3 Ks/ft
UN KIPS*0.1
FR 20000 MB 30

DL -43
UT -1
PK 1 TM-PEAK

F1/2 500/ 213
F3/4 213/ 213
A1/2 999/ 999
A3/4 999/ 388

TS 12 E B PD: k4120 LP 1.00 ft
TB 8.0 T1 9.6 2L/C 4.7 UA 1000 UE 1022 LI 1.0

VMX= 4.6 FMX= 70 AMX= 149
EMX= 0.3 MEX= 137 FUP= 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: K4120

CALIBRATION FACTOR: .0776 mV/g

PAK (*5000): 388 DATE: 13SEPT16

PDA OPERATOR: [Signature]

<-AT:PIEZORESISTIVE

OP: laine [ver:4.05]

AT:PIEZOELECTRIC->

Smart Sensor

Smart Chip Programmed By J.M.W. on 13SEPT16 CRC Value 2F02

QBTA: ON [ALT-F1/BB-60]

File Dynamics, Inc.

TG F2 DPF

File Dynamics 09-Sep-16 02:00	FS — 10	BNI497 3886 2389 SL 1820/ 3440/ 99	PJ: PN: HOPBAR	A 4 -- US F 2 3.3			
LE 39.6 ft AR 1.7 in2 EM 30000 Ksi SP 0.492 K/ft3 WS 16810 ft/s WC 16862 ft/s							
JC 0.40 FM 1.00 UM 1.00							
EA/C 30.3 Ks/ft UN KIPS*0.1 FR 20000 MB 30							
DL -42 UT -1 PK 1 TM-PEAK							
F1/2 500/ 213 F3/4 213/ 213 A1/2 999/ 999 A3/4 999/ 390							
TS 12 TB 8.0					E B PD: k4676 T1 9.6 2L/C 4.7	UA 1000 UE 1022	LP 1.00 ft LI 1.0

ACCEPT SQ-OFF FL-OFF PR-OFF	VMX= 4.5 FMX= 69 AMX= 139
	EMX= 0.3 MEX= 135 FVP= 0.99
<p>contact File Dynamics USA with your questions tel USA - 216 - 831- 6131 fax USA - 216 - 831- 0916</p>	ACCELEROMETER CALIBRATION N.I.S.T. Traceable
	SERIAL NUMBER: <u>K4676</u>
	CALIBRATION FACTOR: <u>.078 MV/G</u>
	PAK (*5000): <u>390</u> DATE: <u>13SEPT16</u>
PDA OPERATOR: <u>[Signature]</u>	
←-AT:PIEZORESISTIVE	OP: laine [ver:4.05] AT:PIEZOELECTRIC→

Smart Sensor

Smart Chip Programmed By R.M.W. on 13SEPT16 CRC Value C6ED

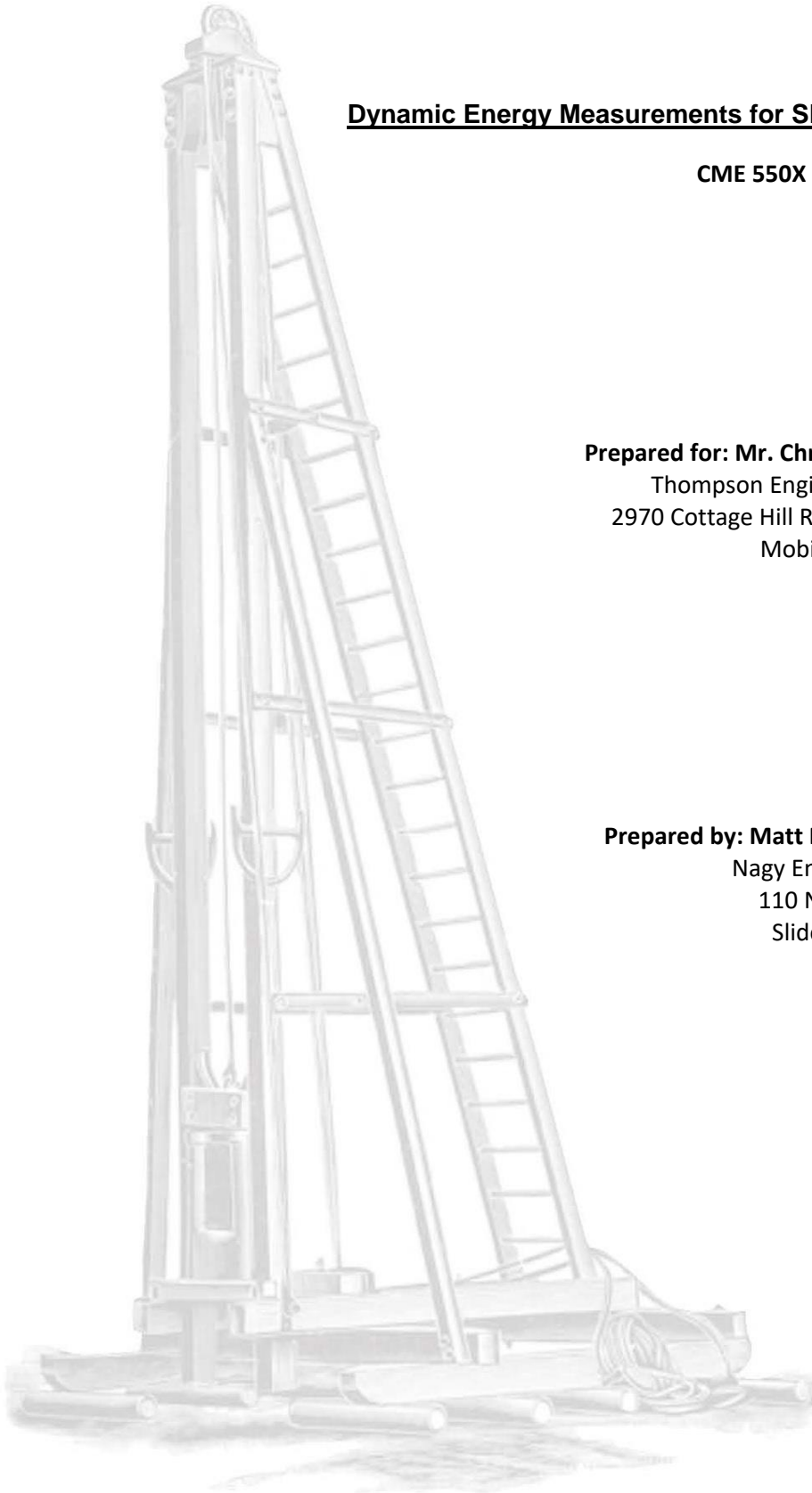
Nagy Engineers, Inc.

Dynamic Energy Measurements for SPT Hammer

CME 550X (S/N 355273)

Prepared for: Mr. Chris Dugger of
Thompson Engineering, Inc.
2970 Cottage Hill Rd., Suite 190
Mobile, AL 36606

Prepared by: Matt Nagy, P.E. of
Nagy Engineers, Inc.
110 N Queens Dr.
Slidell, LA 70458





Nagy Engineers, Inc.

- Deep Foundation Specialty Testing -

September 13, 2017

Mr. Chris Dugger
Thompson Engineering, Inc.
2970 Cottage Hill Road, Suite 190
Mobile, AL 36606

Re: SPT Hammer Calibration using Dynamic Energy Measurements
Thompson Engineering Drill Rig – CME 550X (S/N 355273)
Nagy Engineers Job No. 171044-1

Dear Mr. Dugger:

This report summarizes the results from SPT Energy Measurement Testing performed in Mobile, Alabama near the intersection of Interstate 10 and Old Spanish Trail on September 11, 2017. The testing was conducted to calibrate a CME 550X automatic SPT hammer. The hammer reportedly had a 140 lb drop weight and a 2.5 ft drop height. Appendix A gives a summary of the field dynamic test data and results while Appendix B contains the equipment calibration sheets. An overall summary of the test results is presented in Table 1.

OBJECTIVES

The objective of the testing was to perform SPT Energy Measurements according to ASTM D4633-10. These objectives were met using our Pile Driving Analyzer®, Model PAX – SPT Software, which acquired the SPT hammer's transfer energies using an instrumented NWJ rod section and two piezoresistive accelerometers.

TESTING AND EQUIPMENT

Drilling and SPT Hammer Equipment

SPT energy measurements were collected for a CME 550X automatic SPT hammer. The serial number on the rig was s/n 355273. Energy records were collected at various increments between the depths of 13.5 ft and 35.0 ft. The drilling method was mud rotary. Appendix A contains a photo of the CME 550X rig that was tested.

Instrumentation

A Model PAX Pile Driving Analyzer® (PDA) data acquisition system was used to collect and process the dynamic measurements of force and velocity. The PAX is a digital system having a low pass filter cutoff frequency of 5 kHz. The sampling frequency was therefore set to 10 times the low pass filter, or 50 kHz. A

two foot long section of NWJ rod subsection was instrumented with one full bridge foil resistance strain gage and two piezoresistive accelerometers mounted at the midpoint location of the instrumented subsection. Strain and acceleration signals were conditioned, digitized, stored and processed using the PDA. Selected output from the PDA for each recorded impact included the maximum calculated rod top force (FMX), maximum rod top velocity (VMX), maximum average compressive stress (CSX), maximum energy transfer (EMX), energy transfer ratio (ETR) and the hammer operating rate (BPM).

MEASUREMENTS AND CALCULATIONS

FV Method (EMX)

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

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

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.

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 the results. Appendix A contains a representative plot of force and normalized velocity versus time and PDILOT results for all hammer blows at each dynamically monitored sampling depth. The PDA results include the EMX (transferred energy by the EMX method, as recommended by ASTM D4633-10), ETR (energy transfer ratio), BPM (hammer operating rate), FMX (maximum rod top force), CSX (maximum compressive stress), and VMX (maximum rod top velocity). The plots show each calculated PDA result versus sampling spoon penetration while the tables show statistical summaries for each 6 inch increment. At the end of each table, on the next page, is a statistical evaluation of the results which only include the blows that correspond to the N-Value for that sample.

Table 1 summarizes the average transfer energy values calculated by the EMX method. The records averaged consist only of the hammer blows at each dynamically monitored sampling depth that correspond to the N-Values (i.e. the blows in the initial 6 inches of split spoon driving were not considered

as part of the average). The “energy transfer ratio” (ETR) is defined as the ratio of maximum transferred energy EMX divided by the theoretical hammer potential energy of 350 ft-lbs. The average hammer operating rate is reported in blows per minute (BPM).

CONCLUSIONS

RIG: CME 550X (s/n: 355273) - 140 lbs Hammer – 2.5 ft Drop Height

The average maximum energy transfer (EMX) to the NWJ SPT rod using the 140 lbs drop weight was 314 ft-lbs which is 90% of the 350 ft-lbs potential energy of the hammer. The standard deviation of the transfer efficiency was 3% over the eight samples that were collected. The average hammer operation rate during the time of testing was 51.5 blows/min.

We have appreciated this opportunity to be of assistance to you on this project, please contact our office if you have any questions regarding this report, or if we may be of further service.

Very truly yours,
Nagy Engineers, Inc.

Matthew Nagy, P.E. AL # 33853

Firm COA Number: 4718

Enclosed: Appendices A and B

TABLE 1: Summary of SPT Energy Measurements
CME 550X Automatic SPT Hammer (S/N 355273)

Rod Length Below Gages <i>LE</i>	Depth Below Top of Ground	Reported SPT Blow Counts	Maximum Transfer Force <i>FMX</i>	Maximum Compressive Stress <i>CSX</i>	Average Hammer Blow Rate <i>BPM</i>	Average Energy Transfer <i>EMX</i>	Average Transfer Efficiency <i>ETR</i>
ft	ft	blows/6"	kips	ksi	blows/min	ft-lbs	%
19.0	13.5 to 15.0	3,7,11	42	29.5	43.7	290	83%
24.0	18.5 to 20.0	2,3,8	43	30.6	54.4	310	89%
27.0	21.0 to 22.5	13,23,21	43	30.3	56.6	313	89%
29.0	23.5 to 25.0	8,8,5	43	30.0	50.5	314	90%
32.0	26.0 to 27.5	7,5,5	44	30.7	55.5	327	93%
34.0	28.5 to 30.0	5,9,15	43	30.0	50.4	327	93%
37.0	31.0 to 32.5	6,4,8	43	30.0	50.4	314	90%
39.0	33.5 to 35.0	9,12,12	43	30.5	50.5	318	91%
Overall Average					51.5	314	90%
Standard Deviation					4.1	12	3%

Notes

- LE* - Length from the bottom of the spoon to the PDA gage location.
- FMX* - Maximum Force Measured at PDA gage location.
- CSX* - Maximum Average Compressive Stress at PDA gage location.
- BPM* - Hammer operation rate (blows/minute)
- EMX* - Computed, from $\int F_v dt$, maximum energy transferred to PDA gage location.
- ETR* - Computed, from EMX/PE , maximum energy transfer efficiency

Appendix A

Results from SPT Dynamic Energy Measurements

Thompson Engineering SPT Rig Calibration

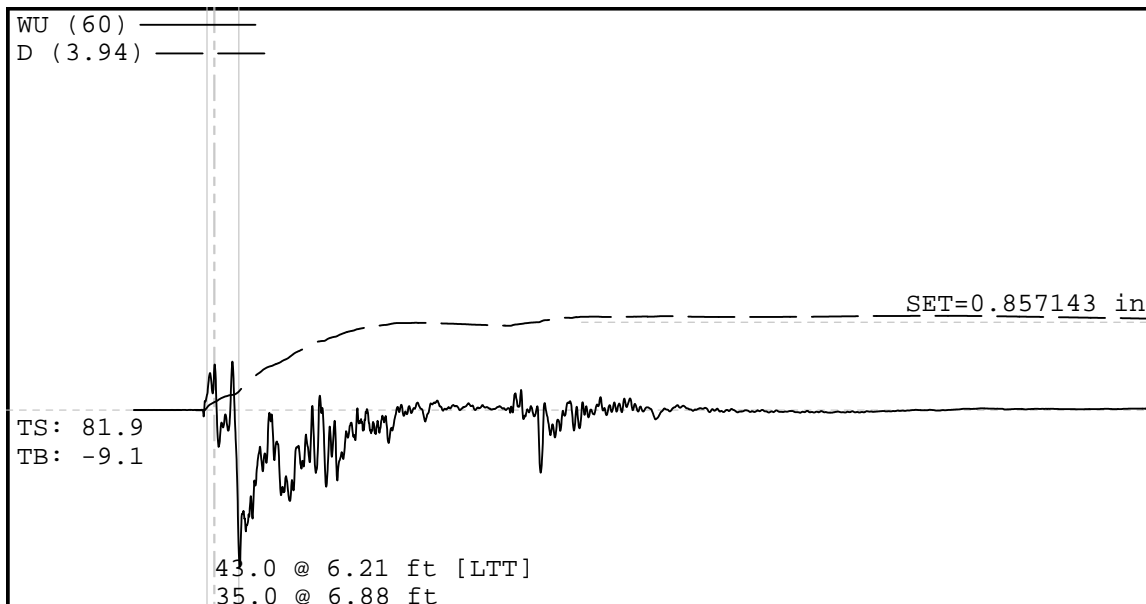
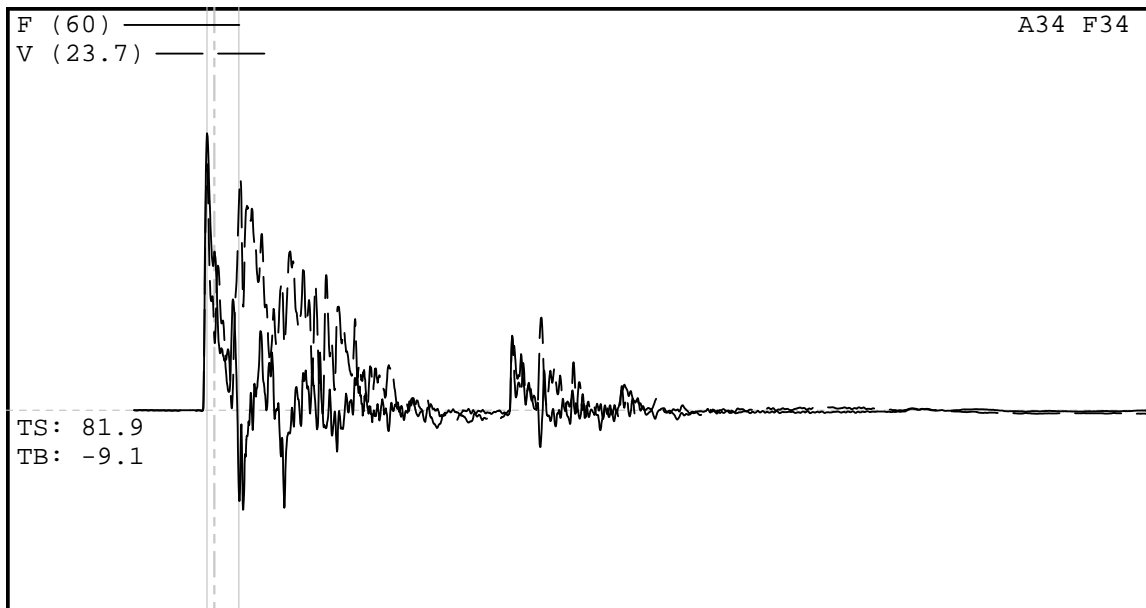
CMX 550X

S/N 355273

(NWJ Rod –Mud Rotary)



Thompson Engineering's CME 550X (S/N 355273)



Project Information

PROJECT: Thompson Engineering SPT CalibraticCSX 29.03 ksi
 PILE NAME: CME 550X (SN 355273) - 13.5 to 15.0 ft
 DESCR: NWJ Rod - Mud Rotary
 OPERATOR: MJN
 FILE: CME 550X (SN 355273)
 9/11/2017 1:11:19 PM
 Blow Number 7

Quantity Results

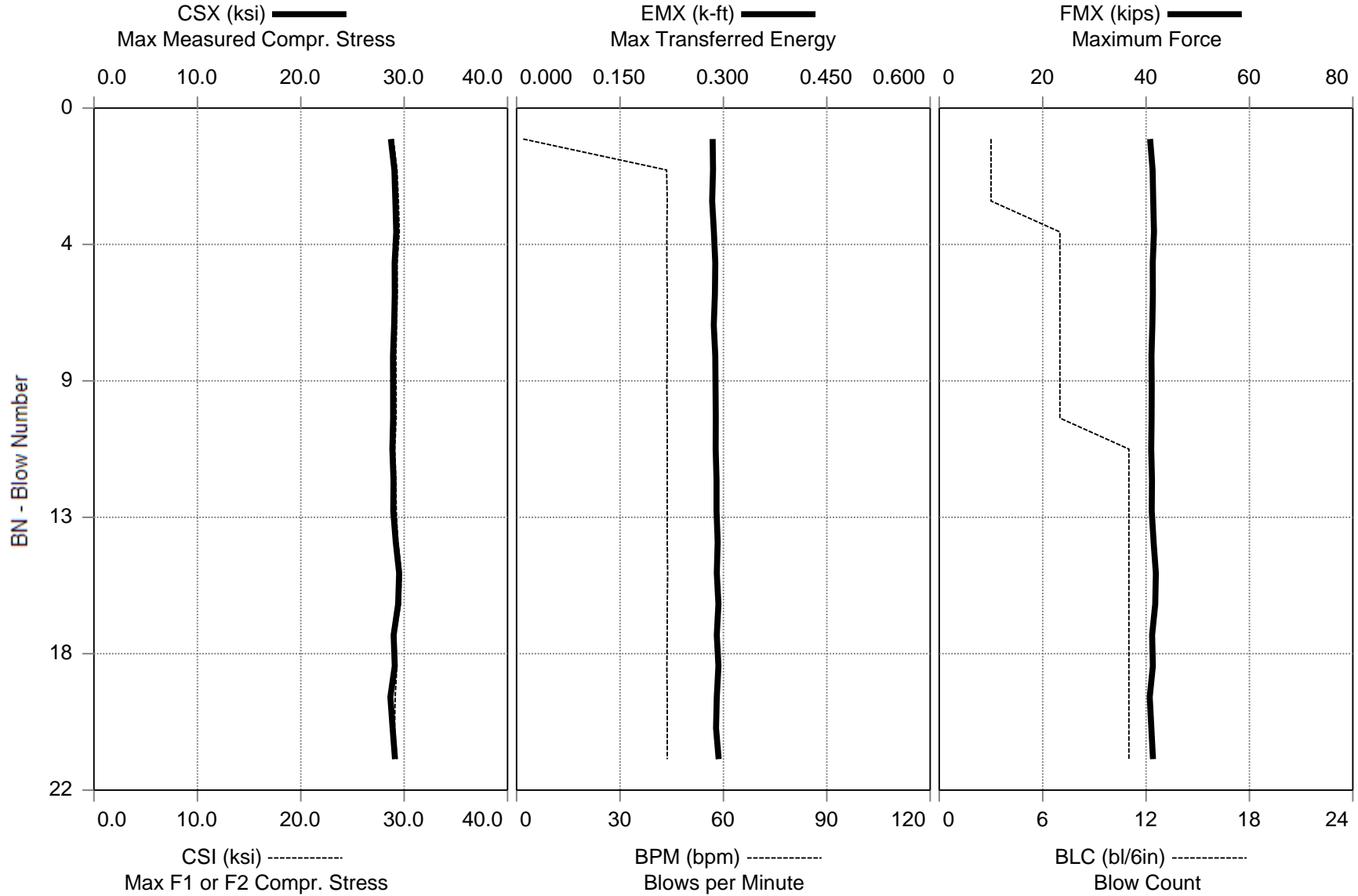
EMX 0.286 k-ft
 ETR 81.7 (%)
 BPM 43.7 bpm
 FMX 41 kips
 VMX 14.5 f/s
 QNV 0.00 []
 QNV 0.00 []

Pile Properties

LE 19.00 ft
 AR 1.42 in²
 EM 30000 ksi
 SP 0.492 k/ft³
 WS 16807.9 f/s
 EA/C 2.5 ksec/ft
 2L/C 2.26 ms
 JC []
 LP 14.29 ft

Sensors

F3: [413 NWJ-1] 212.28 (1)
 F4: [413 NWJ-2] 213.94 (1)
 A3: [K3773] 380 mv/5000g's (1)
 A4: [K4822] 355 mv/5000g's (1)
 CLIP: OK



Thompson Engineering SPT Calibration - CME 550X (SN 355273) - 13.5 to 15.0 ft NWJ Rod - Mud Rotary
OP: MJN Date: 11-September-2017

AR: 1.42 in² SP: 0.492 k/ft³
LE: 19.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	TYPE	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
3	14.00	3	AV3	29.0	29.2	0.284	81.2	29.7	41	14.5
			MAX	29.2	29.4	0.285	81.4	43.7	41	14.8
10	14.50	7	AV7	29.0	29.3	0.288	82.2	43.7	41	14.5
			MAX	29.2	29.5	0.289	82.6	43.7	42	14.6
21	15.00	11	AV11	29.1	29.3	0.291	83.1	43.7	41	14.6
			MAX	29.5	29.7	0.293	83.7	43.8	42	14.7
Average				29.0	29.3	0.289	82.5	41.7	41	14.6
Maximum				29.5	29.7	0.293	83.7	43.8	42	14.8

Total number of blows analyzed: 21

BL# Sensors

1-21 F3: [413 NWJ-1] 212.3 (1.00); F4: [413 NWJ-2] 213.9 (1.00); A3: [K3773] 380.0 (1.00);
A4: [K4822] 355.0 (1.00)

Time Summary

Drive 27 seconds 1:11 PM - 1:11 PM BN 1 - 21

Thompson Engineering SPT Calibration - CME 550X (SN 355273) - 13.5 to 15.0 ft NWJ Rod - Mud Rotary
OP: MJN Date: 11-September-2017

AR: 1.42 in² SP: 0.492 k/ft³
LE: 19.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
4	14.07	7	29.2	29.5	0.286	81.7	43.6	42	14.3
5	14.14	7	29.1	29.3	0.288	82.4	43.6	41	14.4
6	14.21	7	29.1	29.3	0.288	82.2	43.7	41	14.5
7	14.29	7	29.0	29.3	0.286	81.7	43.7	41	14.5
8	14.36	7	28.9	29.2	0.288	82.4	43.7	41	14.6
9	14.43	7	28.9	29.2	0.289	82.4	43.6	41	14.6
10	14.50	7	28.9	29.2	0.289	82.6	43.7	41	14.6
11	14.55	11	28.9	29.1	0.289	82.5	43.7	41	14.5
12	14.59	11	29.0	29.2	0.290	82.9	43.7	41	14.6
13	14.64	11	28.9	29.2	0.290	82.9	43.7	41	14.6
14	14.68	11	29.2	29.4	0.292	83.3	43.7	41	14.6
15	14.73	11	29.5	29.7	0.290	82.9	43.8	42	14.7
16	14.77	11	29.4	29.6	0.293	83.6	43.7	42	14.6
17	14.82	11	29.0	29.2	0.290	83.0	43.7	41	14.6
18	14.86	11	29.1	29.3	0.293	83.7	43.6	41	14.7
19	14.91	11	28.7	29.1	0.290	83.0	43.7	41	14.5
20	14.95	11	28.9	29.1	0.289	82.6	43.7	41	14.6
21	15.00	11	29.1	29.3	0.293	83.7	43.7	41	14.7
	Average		29.0	29.3	0.290	82.7	43.7	41	14.6
	Maximum		29.5	29.7	0.293	83.7	43.8	42	14.7

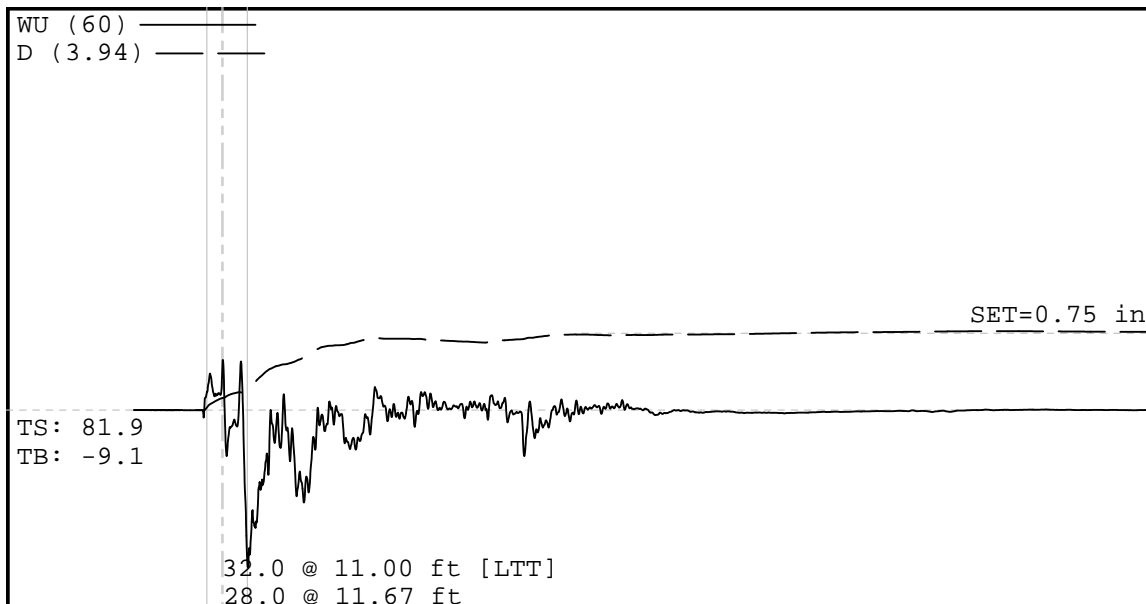
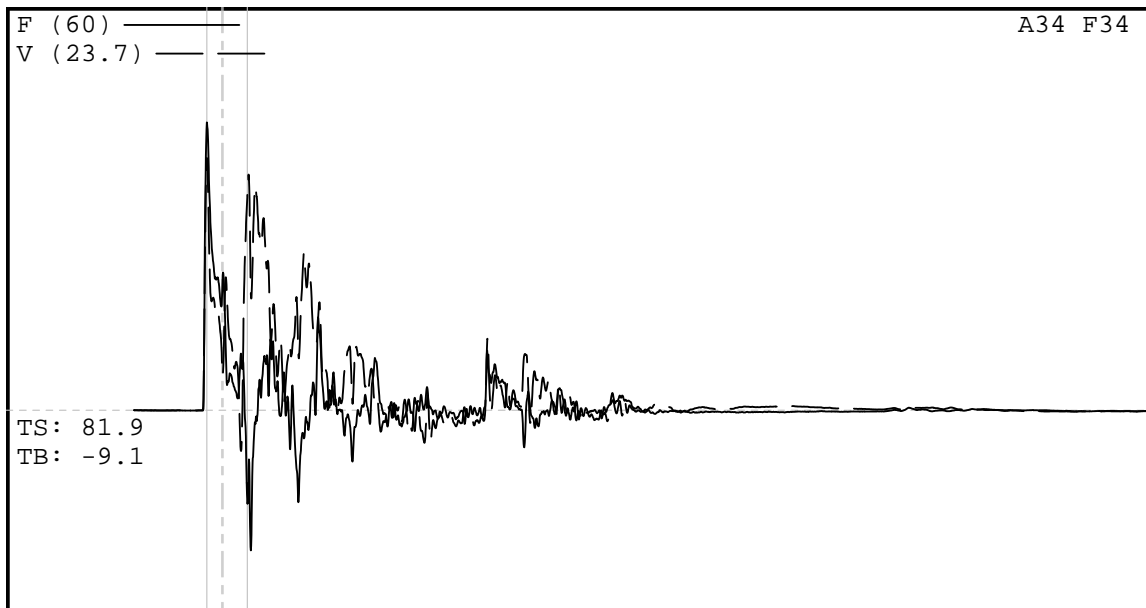
Total number of blows analyzed: 18

BL# Sensors

4-21 F3: [413 NWJ-1] 212.3 (1.00); F4: [413 NWJ-2] 213.9 (1.00); A3: [K3773] 380.0 (1.00);
A4: [K4822] 355.0 (1.00)

Time Summary

Drive 27 seconds 1:11 PM - 1:11 PM BN 1 - 21



Project Information

PROJECT: Thompson Engineering SPT CalibraticCSX 30.17 ksi
 PILE NAME: CME 550X (SN 355273) - 18.5 to 20.0 ft
 DESCR: NWJ Rod - Mud Rotary
 OPERATOR: MJN
 FILE: CME 550X (SN 355273)_1
 9/11/2017 1:23:52 PM
 Blow Number 8

Quantity Results

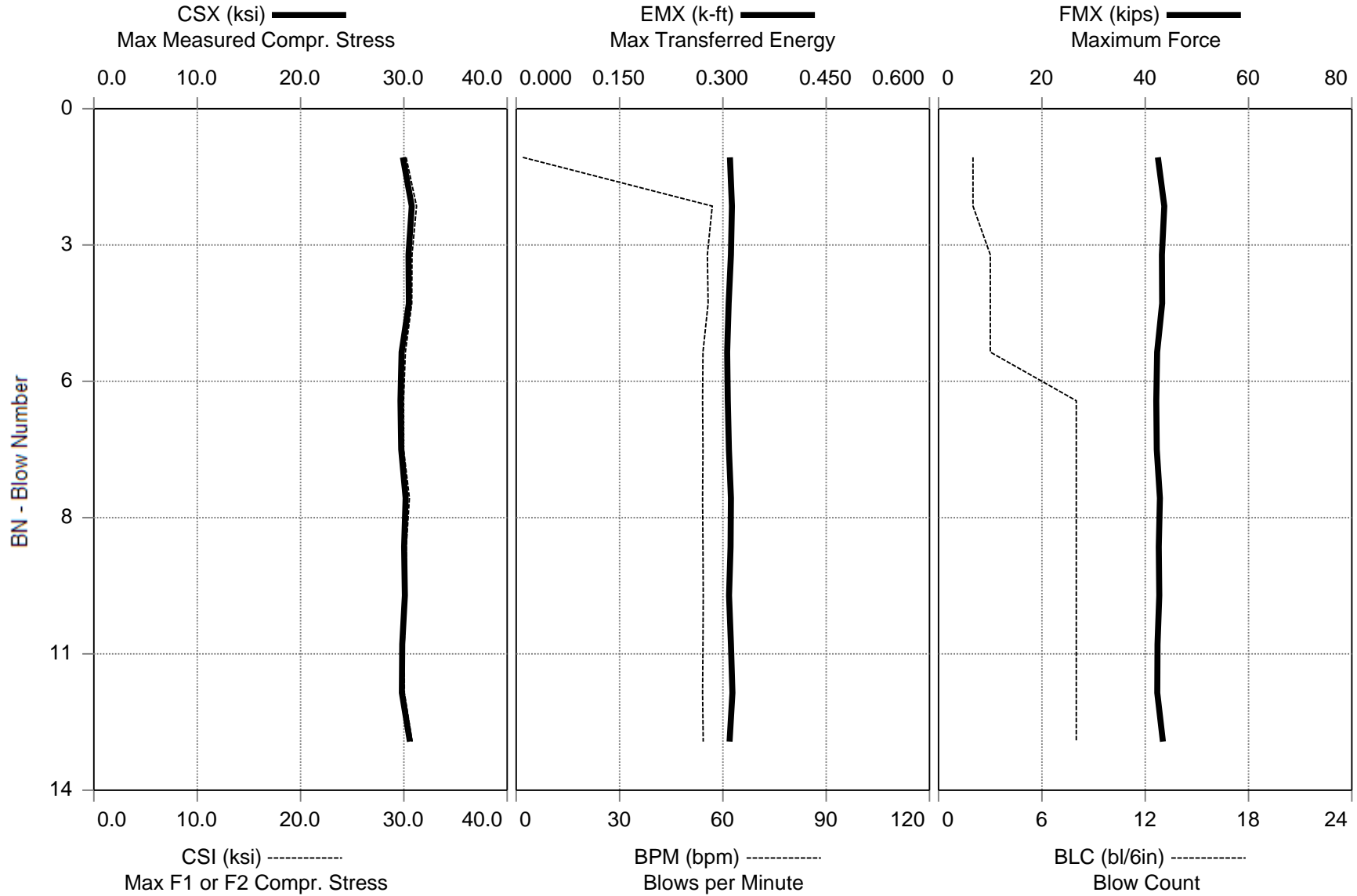
EMX 0.312 k-ft
 ETR 89.0 (%)
 BPM 54.1 bpm
 FMX 43 kips
 VMX 14.8 f/s
 QNV 0.00 []
 QNV 0.00 []

Pile Properties

LE 24.00 ft
 AR 1.42 in²
 EM 30000 ksi
 SP 0.492 k/ft3
 WS 16807.9 f/s
 EA/C 2.5 ksec/ft
 2L/C 2.88 ms
 JC []
 LP 19.69 ft

Sensors

F3: [413 NWJ-1] 212.28 (1)
 F4: [413 NWJ-2] 213.94 (1)
 A3: [K3773] 380 mv/5000g's (1)
 A4: [K4822] 355 mv/5000g's (1)
 CLIP: OK



Thompson Engineering SPT Calibration - CME 550X (SN 355273) - 18.5 to 20.0 ft NWJ Rod - Mud Rotary
OP: MJN Date: 11-September-2017

AR: 1.42 in² SP: 0.492 k/ft³
LE: 24.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	TYPE	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
2	19.00	2	AV2	30.3	30.7	0.312	89.0	29.4	43	16.4
			MAX	30.8	31.2	0.313	89.4	56.9	44	16.4
5	19.50	3	AV3	30.2	30.6	0.309	88.2	55.1	43	15.8
			MAX	30.5	30.8	0.312	89.1	55.7	43	16.2
13	20.00	8	AV8	30.0	30.2	0.310	88.7	54.2	43	14.8
			MAX	30.6	30.8	0.314	89.6	54.3	43	15.0
Average				30.1	30.4	0.310	88.6	50.6	43	15.3
Maximum				30.8	31.2	0.314	89.6	56.9	44	16.4

Total number of blows analyzed: 13

BL# Sensors

1-13 F3: [413 NWJ-1] 212.3 (1.00); F4: [413 NWJ-2] 213.9 (1.00); A3: [K3773] 380.0 (1.00);
A4: [K4822] 355.0 (1.00)

Time Summary

Drive 13 seconds 1:23 PM - 1:23 PM BN 1 - 13

Thompson Engineering SPT Calibration - CME 550X (SN 355273) - 18.5 to 20.0 ft NWJ Rod - Mud Rotary
OP: MJN Date: 11-September-2017

AR: 1.42 in² SP: 0.492 k/ft³
LE: 24.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
3	19.17	3	30.4	30.8	0.312	89.1	55.5	43	15.8
4	19.33	3	30.5	30.8	0.308	88.1	55.7	43	16.2
5	19.50	3	29.8	30.1	0.306	87.5	54.2	42	15.5
6	19.56	8	29.7	30.0	0.307	87.8	54.1	42	14.9
7	19.63	8	29.7	30.0	0.309	88.2	54.2	42	14.6
8	19.69	8	30.2	30.5	0.312	89.0	54.1	43	14.8
9	19.75	8	30.0	30.2	0.311	88.9	54.2	43	14.8
10	19.81	8	30.1	30.2	0.309	88.3	54.3	43	14.8
11	19.88	8	29.8	30.0	0.312	89.0	54.2	42	14.8
12	19.94	8	29.8	30.0	0.314	89.6	54.1	42	14.9
13	20.00	8	30.6	30.8	0.310	88.5	54.3	43	15.0
	Average		30.1	30.3	0.310	88.5	54.4	43	15.1
	Maximum		30.6	30.8	0.314	89.6	55.7	43	16.2

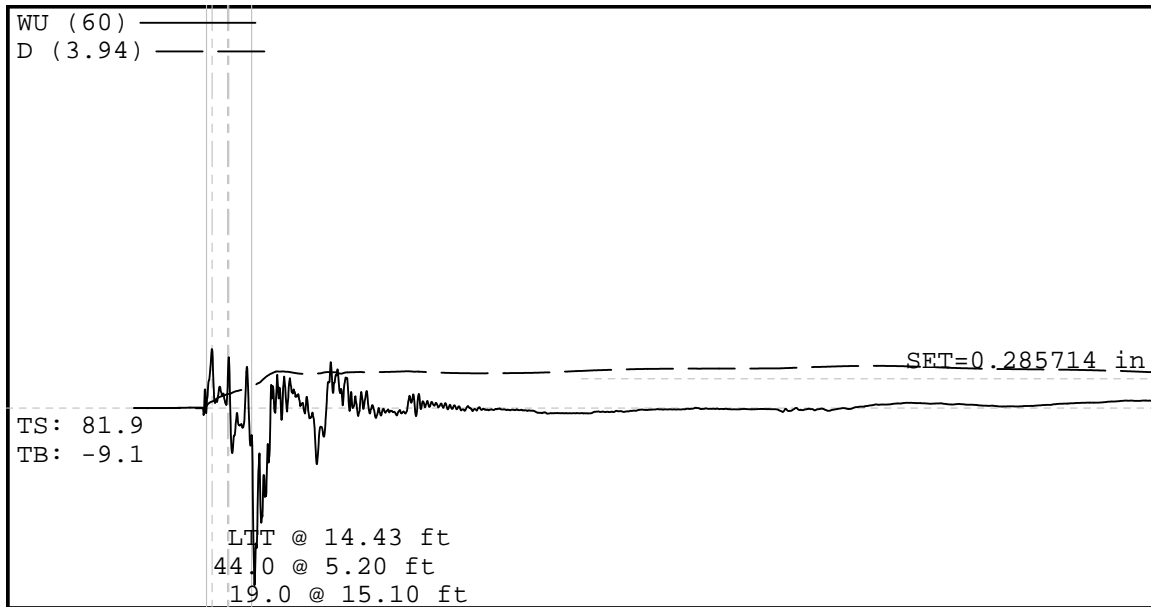
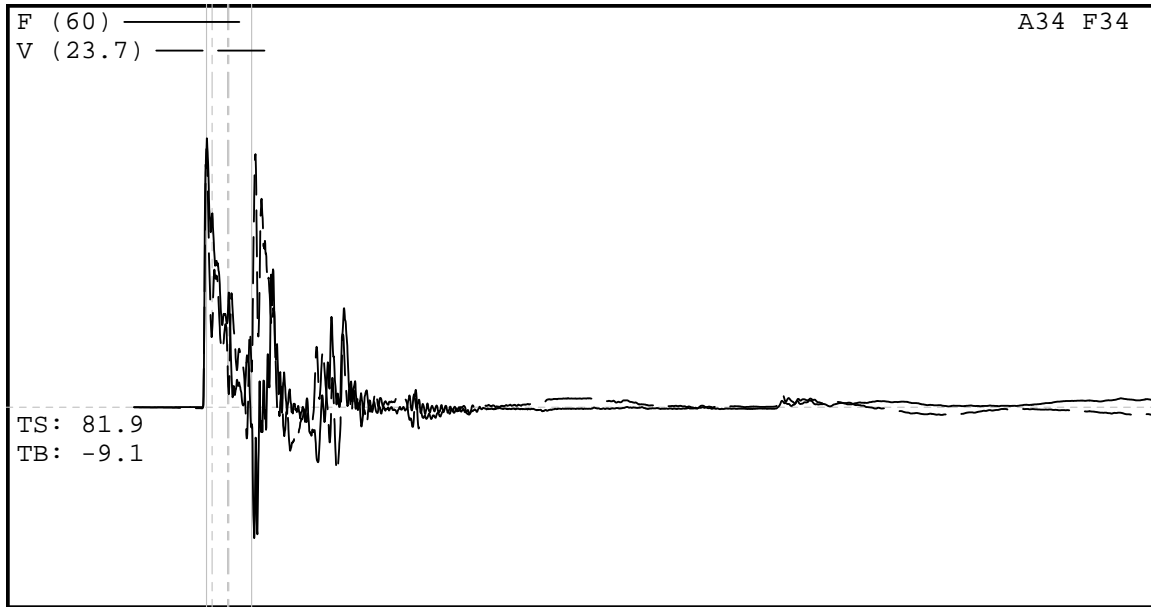
Total number of blows analyzed: 11

BL# Sensors

3-13 F3: [413 NWJ-1] 212.3 (1.00); F4: [413 NWJ-2] 213.9 (1.00); A3: [K3773] 380.0 (1.00);
A4: [K4822] 355.0 (1.00)

Time Summary

Drive 13 seconds 1:23 PM - 1:23 PM BN 1 - 13



Project Information

PROJECT: Thompson Engineering SPT Calibratic
 PILE NAME: CME 550X (SN 355273) - 21.0 to 22.5 ft
 DESCR: NWJ Rod - Mud Rotary
 OPERATOR: MJN
 FILE: CME 550X (SN 355273)_2
 9/11/2017 1:35:14 PM
 Blow Number 37

Quantity Results

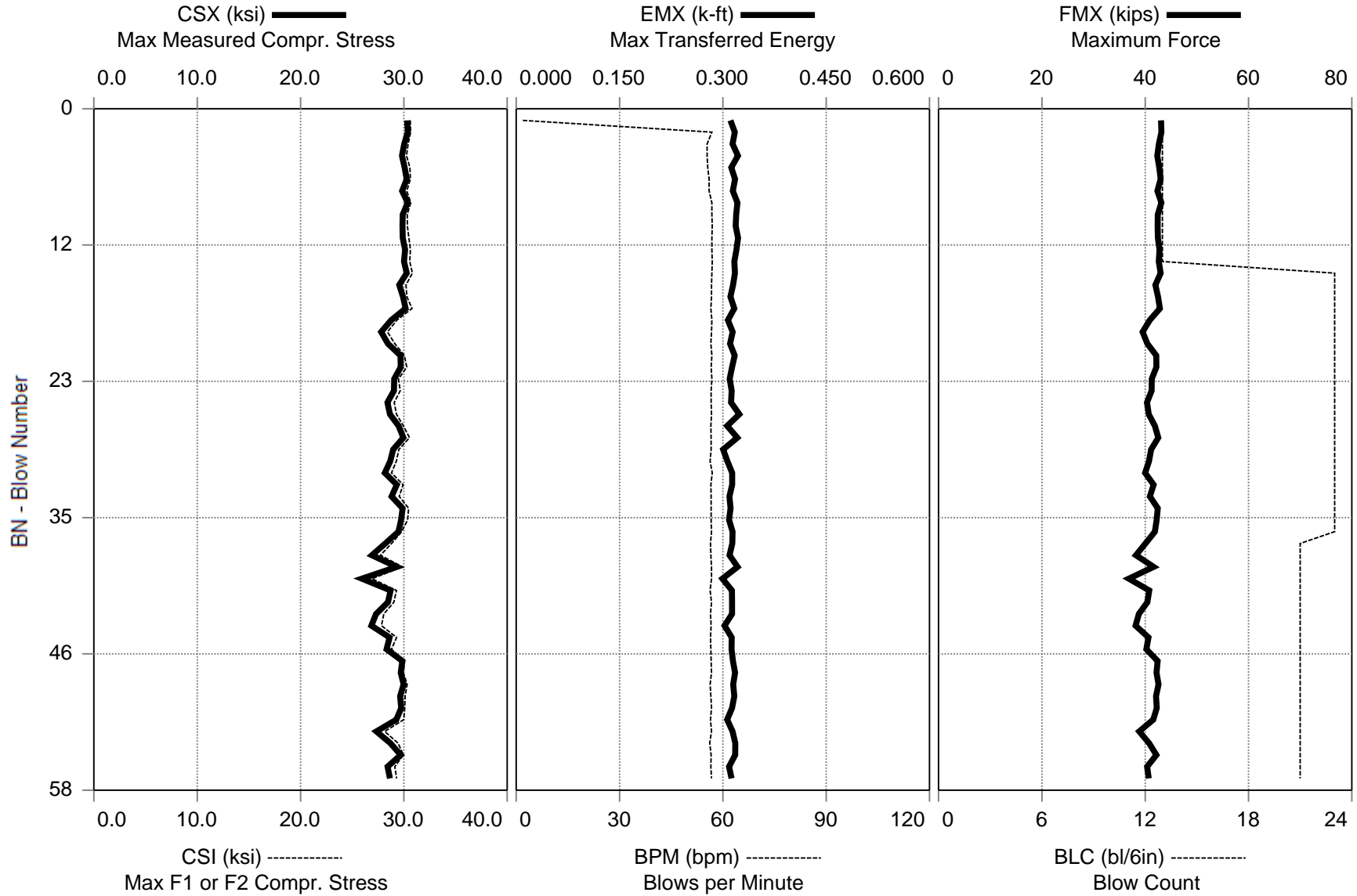
CSX 28.20 ksi
 CSI f28.81 ksi
 EMX 0.314 k-ft
 ETR 89.6 (%)
 BPM 56.4 bpm
 FMX 40 kips
 VMX 15.2 f/s
 QNV 0.00 []
 QNV 0.00 []

Pile Properties

LE 27.00 ft
 AR 1.42 in^2
 EM 30000 ksi
 SP 0.492 k/ft3
 WS 16807.9 f/s
 EA/C 2.5 ksec/ft
 2L/C 3.22 ms
 JC []
 LP 22.02 ft

Sensors

F3: [413 NWJ-1] 212.28 (1)
 F4: [413 NWJ-2] 213.94 (1)
 A3: [K3773] 380 mv/5000g's (1)
 A4: [K4822] 355 mv/5000g's (1)
 CLIP: OK



Thompson Engineering SPT Calibration - CME 550X (SN 355273) - 21.0 to 22.5 ft NWJ Rod - Mud Rotary
OP: MJN Date: 11-September-2017

AR: 1.42 in² SP: 0.492 k/ft³
LE: 27.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	TYPE	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
13	21.50	13	AV13	30.1	30.5	0.317	90.7	52.2	43	15.0
			MAX	30.4	30.7	0.322	92.0	56.9	43	15.2
36	22.00	23	AV23	29.2	29.8	0.312	89.3	56.6	41	15.0
			MAX	30.3	30.8	0.324	92.5	56.9	43	15.5
57	22.50	21	AV21	28.6	29.1	0.313	89.3	56.5	41	15.6
			MAX	30.0	30.3	0.321	91.8	56.7	43	16.2
Average				29.2	29.7	0.314	89.6	55.6	41	15.2
Maximum				30.4	30.8	0.324	92.5	56.9	43	16.2

Total number of blows analyzed: 57

BL# Sensors

1-57 F3: [413 NWJ-1] 212.3 (1.00); F4: [413 NWJ-2] 213.9 (1.00); A3: [K3773] 380.0 (1.00);
A4: [K4822] 355.0 (1.00)

Time Summary

Drive 59 seconds 1:34 PM - 1:35 PM BN 1 - 57

Thompson Engineering SPT Calibration - CME 550X (SN 355273) - 21.0 to 22.5 ft NWJ Rod - Mud Rotary
OP: MJN Date: 11-September-2017

AR: 1.42 in² SP: 0.492 k/ft³
LE: 27.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
14	21.52	23	30.3	30.8	0.317	90.7	56.8	43	15.3
15	21.54	23	29.6	30.2	0.315	89.9	56.7	42	15.0
16	21.57	23	29.9	30.3	0.311	88.8	56.7	42	15.2
17	21.59	23	30.2	30.8	0.317	90.5	56.5	43	14.9
18	21.61	23	28.8	29.3	0.307	87.8	56.8	41	15.2
19	21.63	23	27.8	28.4	0.314	89.8	56.7	39	15.4
20	21.65	23	28.5	29.1	0.310	88.7	56.5	40	15.2
21	21.67	23	29.7	30.0	0.317	90.6	56.8	42	14.9
22	21.70	23	29.7	30.3	0.313	89.5	56.6	42	14.8
23	21.72	23	29.1	29.5	0.310	88.5	56.8	41	15.1
25	21.76	23	28.4	29.1	0.312	89.1	56.6	40	15.3
27	21.80	23	29.5	30.0	0.306	87.5	56.5	42	15.2
29	21.85	23	29.0	29.5	0.300	85.8	56.6	41	14.5
31	21.89	23	28.2	28.8	0.314	89.6	56.9	40	15.1
33	21.93	23	28.8	29.6	0.309	88.4	56.6	41	15.0
35	21.98	23	29.7	30.4	0.309	88.3	56.6	42	14.4
37	22.02	21	28.2	28.8	0.314	89.6	56.4	40	15.2
39	22.07	21	29.3	29.9	0.321	91.8	56.7	42	15.2
41	22.12	21	28.7	29.3	0.313	89.5	56.3	41	15.2
43	22.17	21	27.3	28.1	0.313	89.5	56.4	39	15.6
45	22.21	21	28.6	29.3	0.313	89.4	56.4	41	15.5
47	22.26	21	29.9	30.1	0.315	89.9	56.6	42	15.3
49	22.31	21	30.0	30.3	0.315	90.0	56.3	43	15.2
51	22.36	21	29.7	30.1	0.313	89.5	56.7	42	15.6
53	22.40	21	27.3	28.1	0.314	89.7	56.7	39	16.2
55	22.45	21	29.7	29.9	0.318	90.8	56.6	42	15.8
57	22.50	21	28.7	29.3	0.313	89.3	56.7	41	15.9
	Average		28.9	29.5	0.313	89.3	56.6	41	15.3
	Maximum		30.3	30.8	0.324	92.5	56.9	43	16.2

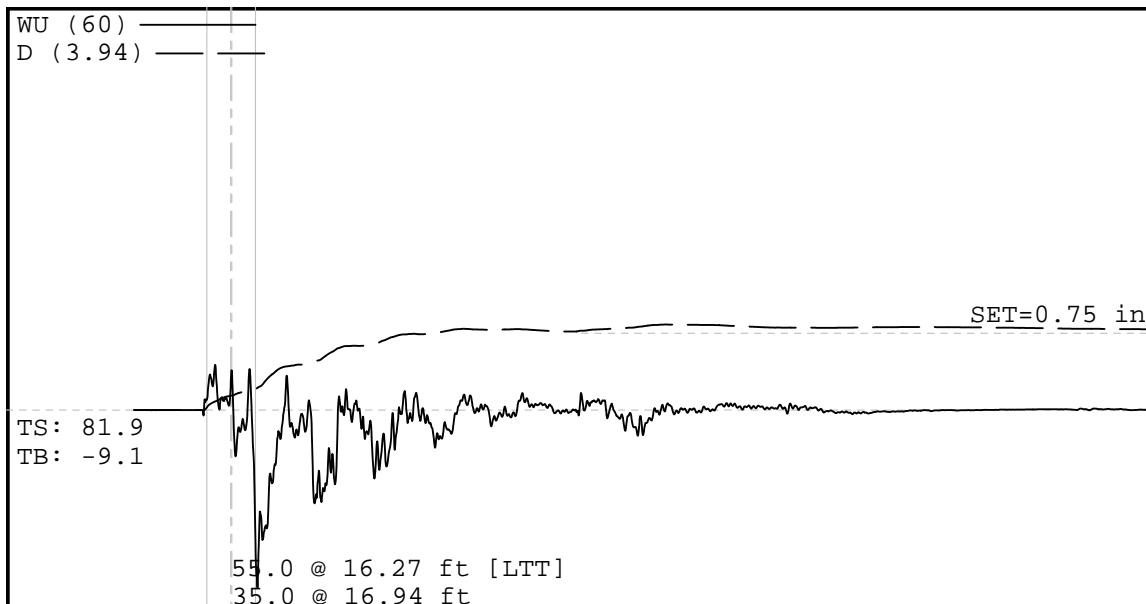
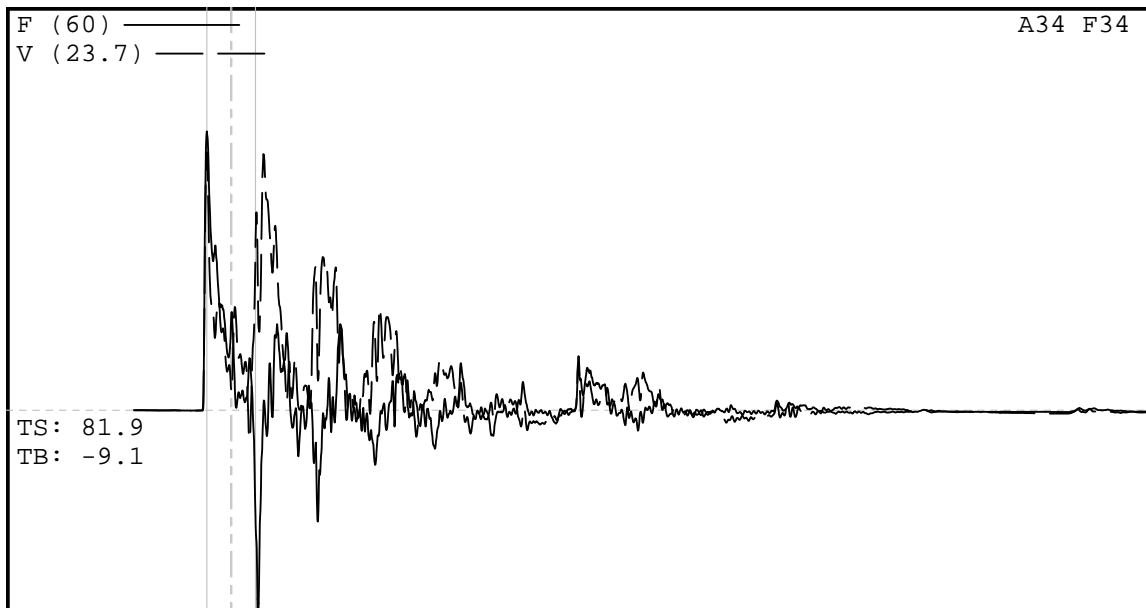
Total number of blows analyzed: 44

BL# Sensors

14-57 F3: [413 NWJ-1] 212.3 (1.00); F4: [413 NWJ-2] 213.9 (1.00); A3: [K3773] 380.0 (1.00);
A4: [K4822] 355.0 (1.00)

Time Summary

Drive 59 seconds 1:34 PM - 1:35 PM BN 1 - 57



Project Information

PROJECT: Thompson Engineering SPT CalibraticCSX 29.23 ksi
 PILE NAME: CME 550X (SN 355273) - 23.5 to 25.0 ft
 DESCR: NWJ Rod - Mud Rotary
 OPERATOR: MJN
 FILE: CME 550X (SN 355273)_3
 9/11/2017 1:45:51 PM
 Blow Number 10

Quantity Results

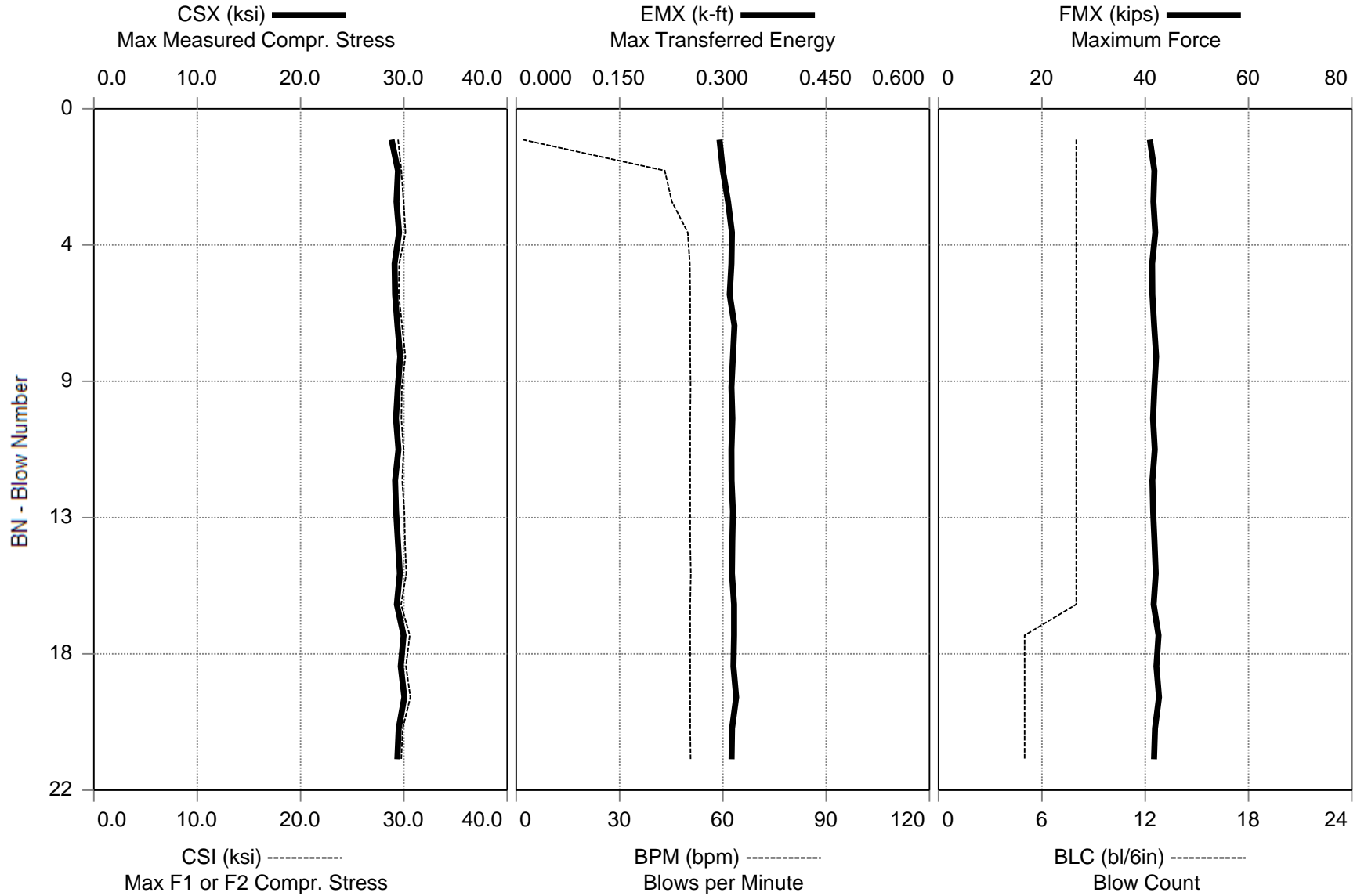
EMX 0.314 k-ft
 ETR 89.7 (%)
 BPM 50.5 bpm
 FMX 42 kips
 VMX 15.2 f/s
 QNV 0.00 []
 QNV 0.00 []

Pile Properties

LE 29.00 ft
 AR 1.42 in²
 EM 30000 ksi
 SP 0.492 k/ft3
 WS 16807.9 f/s
 EA/C 2.5 ksec/ft
 2L/C 3.46 ms
 JC []
 LP 24.13 ft

Sensors

F3: [413 NWJ-1] 212.28 (1)
 F4: [413 NWJ-2] 213.94 (1)
 A3: [K3773] 380 mv/5000g's (1)
 A4: [K4822] 355 mv/5000g's (1)
 CLIP: OK



Thompson Engineering SPT Calibration - CME 550X (SN 355273) - 23.5 to 25.0 ft NWJ Rod - Mud Rotary
OP: MJN Date: 11-September-2017

AR: 1.42 in² SP: 0.492 k/ft³
LE: 29.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	TYPE	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
8	24.00	8	AV8	29.3	29.8	0.309	88.2	42.7	42	15.4
			MAX	29.6	30.2	0.317	90.5	50.5	42	16.1
16	24.50	8	AV8	29.4	29.9	0.314	89.6	50.5	42	15.2
			MAX	29.6	30.2	0.316	90.4	50.7	42	15.4
21	25.00	5	AV5	29.7	30.2	0.315	90.1	50.5	42	16.3
			MAX	30.0	30.6	0.319	91.2	50.6	43	17.1
Average				29.4	29.9	0.312	89.2	47.6	42	15.6
Maximum				30.0	30.6	0.319	91.2	50.7	43	17.1

Total number of blows analyzed: 21

BL# Sensors

1-21 F3: [413 NWJ-1] 212.3 (1.00); F4: [413 NWJ-2] 213.9 (1.00); A3: [K3773] 380.0 (1.00);
A4: [K4822] 355.0 (1.00)

Time Summary

Drive 24 seconds 1:45 PM - 1:46 PM BN 1 - 21

Thompson Engineering SPT Calibration - CME 550X (SN 355273) - 23.5 to 25.0 ft NWJ Rod - Mud Rotary
OP: MJN Date: 11-September-2017

AR: 1.42 in² SP: 0.492 k/ft³
LE: 29.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
9	24.06	8	29.4	29.8	0.312	89.3	50.6	42	15.1
10	24.13	8	29.2	29.8	0.314	89.7	50.5	42	15.2
11	24.19	8	29.5	30.0	0.312	89.2	50.5	42	15.2
12	24.25	8	29.1	29.8	0.313	89.3	50.5	41	15.1
13	24.31	8	29.2	30.0	0.315	89.9	50.5	42	15.3
14	24.38	8	29.4	30.1	0.314	89.6	50.5	42	15.2
15	24.44	8	29.6	30.2	0.313	89.5	50.7	42	15.4
16	24.50	8	29.3	29.7	0.316	90.4	50.5	42	15.2
17	24.60	5	30.0	30.6	0.316	90.4	50.5	43	15.5
18	24.70	5	29.7	30.2	0.315	90.1	50.5	42	15.9
19	24.80	5	30.0	30.6	0.319	91.2	50.5	43	16.3
20	24.90	5	29.5	29.9	0.313	89.5	50.5	42	17.1
21	25.00	5	29.4	29.7	0.313	89.3	50.6	42	16.9
Average			29.5	30.0	0.314	89.8	50.5	42	15.6
Maximum			30.0	30.6	0.319	91.2	50.7	43	17.1

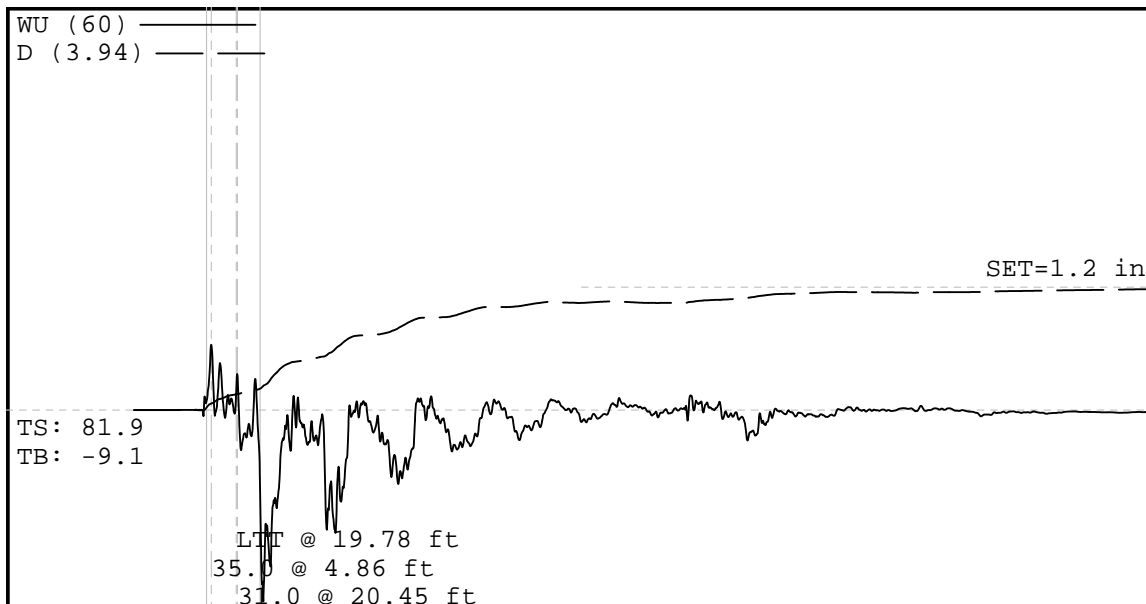
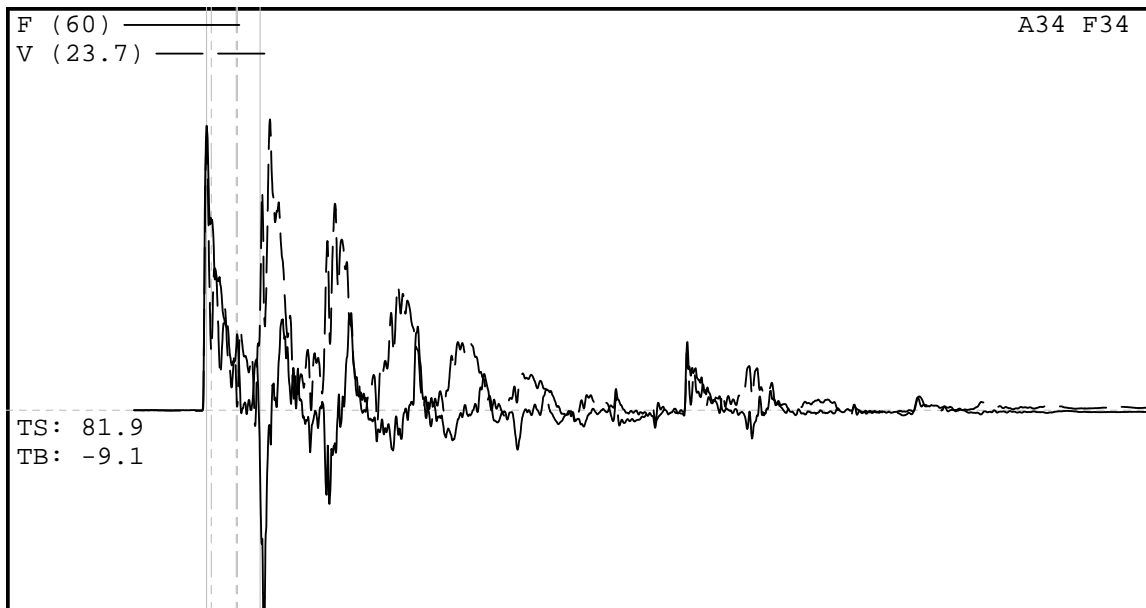
Total number of blows analyzed: 13

BL# Sensors

9-21 F3: [413 NWJ-1] 212.3 (1.00); F4: [413 NWJ-2] 213.9 (1.00); A3: [K3773] 380.0 (1.00);
A4: [K4822] 355.0 (1.00)

Time Summary

Drive 24 seconds 1:45 PM - 1:46 PM BN 1 - 21



Project Information

PROJECT: Thompson Engineering SPT CalibraticCSX 29.81 ksi
 PILE NAME: CME 550X (SN 355273) - 26.0 to 2CSI f30.00 ksi
 DESCR: NWJ Rod - Mud Rotary
 OPERATOR: MJN
 FILE: CME 550X (SN 355273)_4
 9/11/2017 1:53:32 PM
 Blow Number 8

Quantity Results

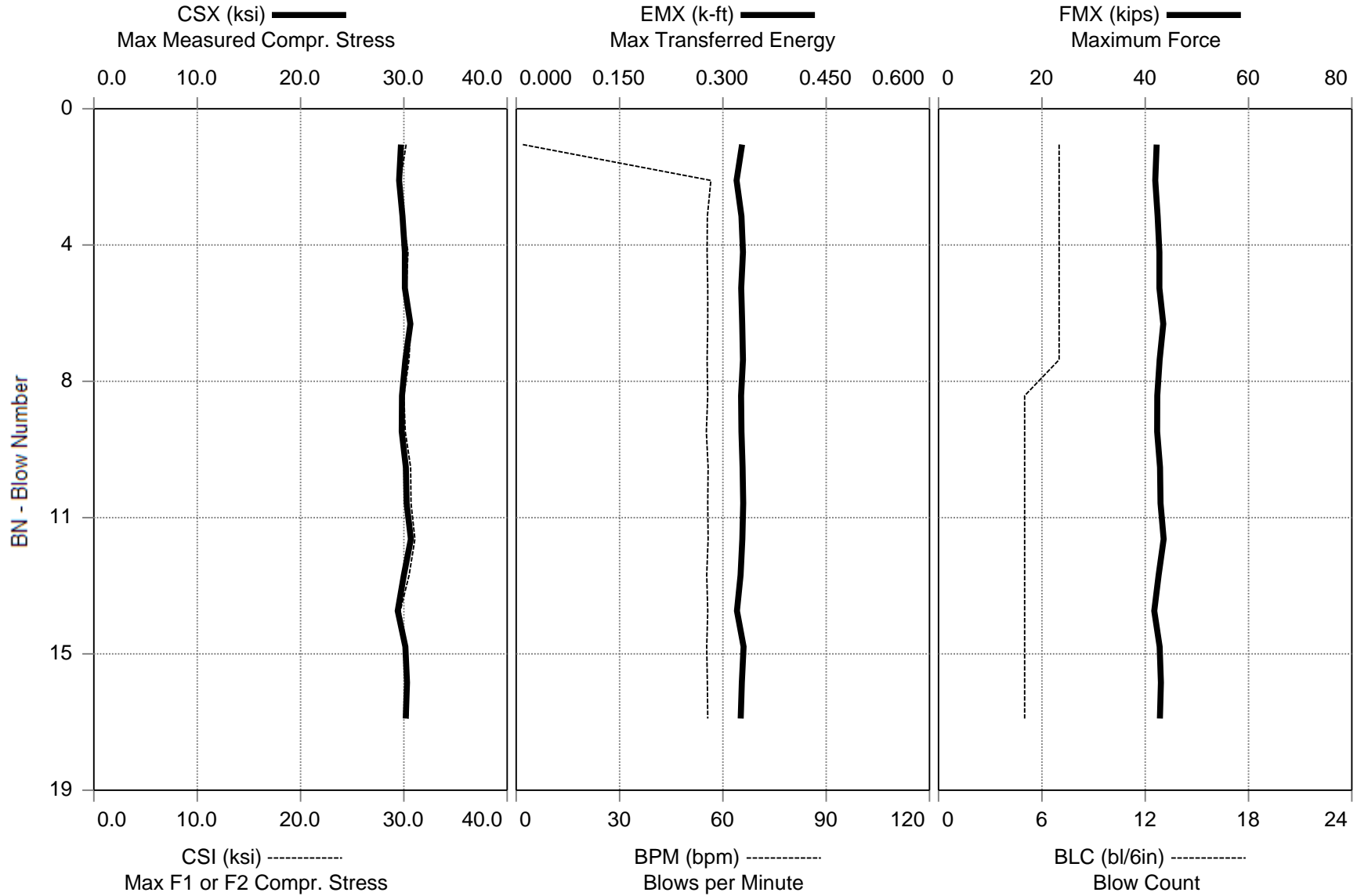
EMX 0.326 k-ft
 ETR 93.2 (%)
 BPM 55.6 bpm
 FMX 42 kips
 VMX 17.1 f/s
 QNV 0.00 []
 QNV 0.00 []

Pile Properties

LE 32.00 ft
 AR 1.42 in^2
 EM 30000 ksi
 SP 0.492 k/ft3
 WS 16807.9 f/s
 EA/C 2.5 ksec/ft
 2L/C 3.82 ms
 JC []
 LP 26.60 ft

Sensors

F3: [413 NWJ-1] 212.28 (1)
 F4: [413 NWJ-2] 213.94 (1)
 A3: [K3773] 380 mv/5000g's (1)
 A4: [K4822] 355 mv/5000g's (1)
 CLIP: OK



Thompson Engineering SPT Calibration - CME 550X (SN 355273) - 26.0 to 27.5 ft NWJ Rod - Mud Rotary
OP: MJN Date: 11-September-2017

AR: 1.42 in² SP: 0.492 k/ft³
LE: 32.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	TYPE	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
7	26.50	7	AV7	30.0	30.2	0.327	93.4	48.0	43	17.3
			MAX	30.6	30.7	0.329	94.0	56.5	44	18.2
12	27.00	5	AV5	30.1	30.5	0.328	93.7	55.6	43	17.8
			MAX	30.7	31.1	0.330	94.2	55.7	44	18.4
17	27.50	5	AV5	30.0	30.2	0.326	93.1	55.5	43	17.9
			MAX	30.3	30.5	0.330	94.3	55.6	43	18.1
Average				30.0	30.3	0.327	93.4	52.4	43	17.6
Maximum				30.7	31.1	0.330	94.3	56.5	44	18.4

Total number of blows analyzed: 17

BL# Sensors

1-17 F3: [413 NWJ-1] 212.3 (1.00); F4: [413 NWJ-2] 213.9 (1.00); A3: [K3773] 380.0 (1.00);
A4: [K4822] 355.0 (1.00)

Time Summary

Drive 18 seconds 1:53 PM - 1:53 PM BN 1 - 18

Thompson Engineering SPT Calibration - CME 550X (SN 355273) - 26.0 to 27.5 ft NWJ Rod - Mud Rotary
OP: MJN Date: 11-September-2017

AR: 1.42 in² SP: 0.492 k/ft³
LE: 32.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
8	26.60	5	29.8	30.0	0.326	93.2	55.6	42	17.1
9	26.70	5	29.8	30.1	0.327	93.4	55.2	42	17.7
10	26.80	5	30.2	30.7	0.329	93.9	55.7	43	17.8
11	26.90	5	30.3	30.7	0.330	94.2	55.6	43	18.4
12	27.00	5	30.7	31.1	0.328	93.8	55.7	44	18.1
13	27.10	5	30.0	30.5	0.326	93.1	55.3	43	18.1
14	27.20	5	29.4	29.7	0.320	91.5	55.6	42	18.1
15	27.30	5	30.1	30.2	0.330	94.3	55.3	43	18.0
16	27.40	5	30.3	30.4	0.327	93.6	55.5	43	17.6
17	27.50	5	30.2	30.4	0.326	93.1	55.6	43	17.8
	Average		30.1	30.4	0.327	93.4	55.5	43	17.9
	Maximum		30.7	31.1	0.330	94.3	55.7	44	18.4

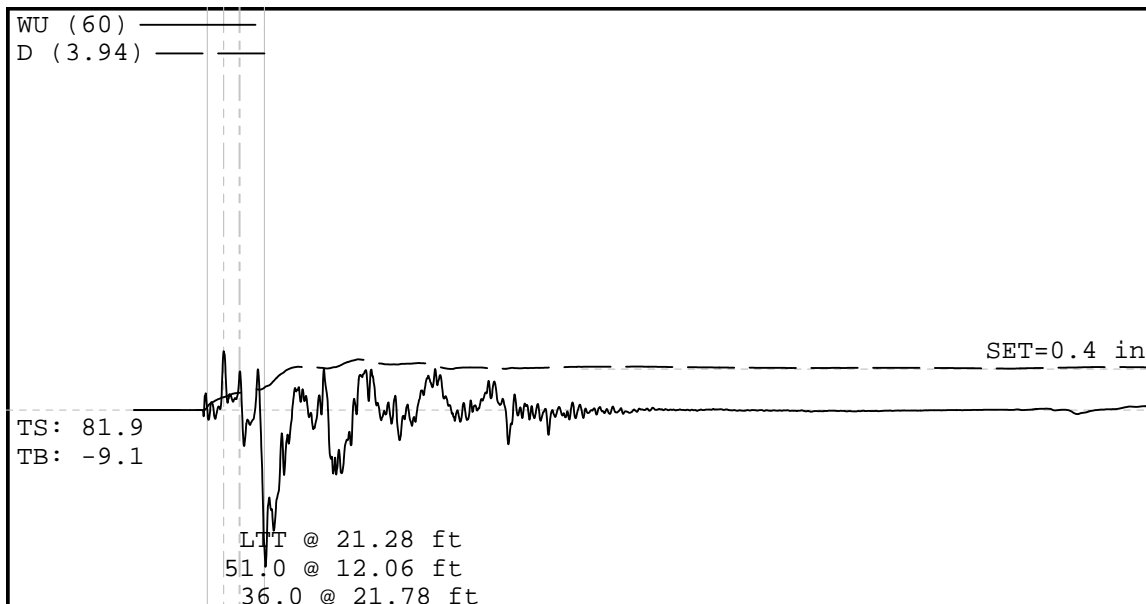
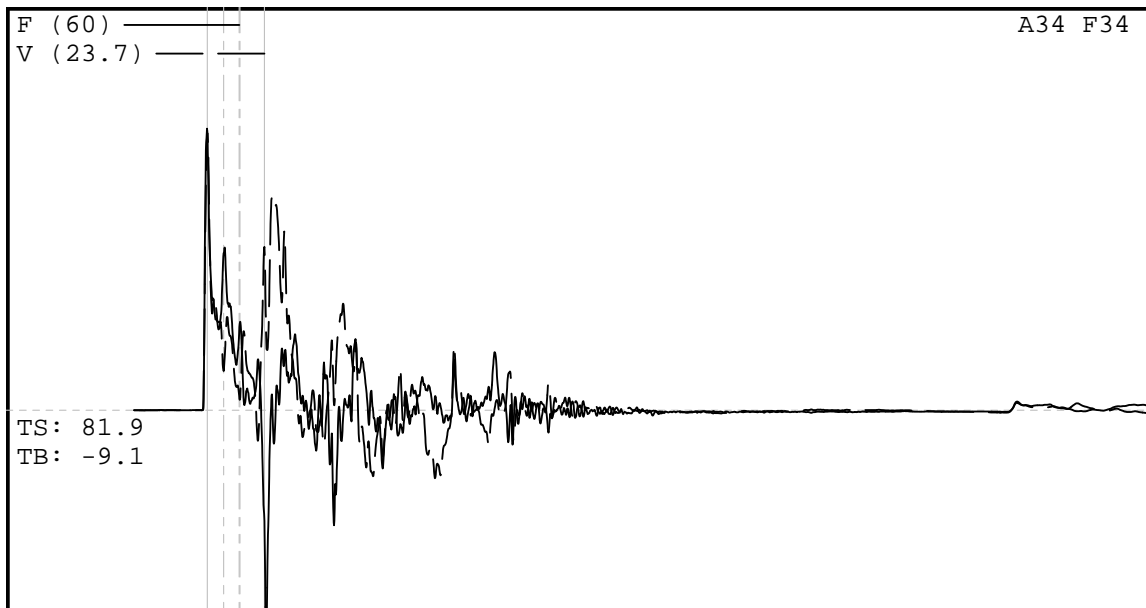
Total number of blows analyzed: 10

BL# Sensors

8-17 F3: [413 NWJ-1] 212.3 (1.00); F4: [413 NWJ-2] 213.9 (1.00); A3: [K3773] 380.0 (1.00);
A4: [K4822] 355.0 (1.00)

Time Summary

Drive 18 seconds 1:53 PM - 1:53 PM BN 1 - 18



Project Information

PROJECT: Thompson Engineering SPT CalibraticCSX 29.53 ksi
 PILE NAME: CME 550X (SN 355273) - 28.5 to 30.0 ft
 DESCR: NWJ Rod - Mud Rotary
 OPERATOR: MJN
 FILE: CME 550X (SN 355273)_5
 9/11/2017 2:03:38 PM
 Blow Number 18

Quantity Results

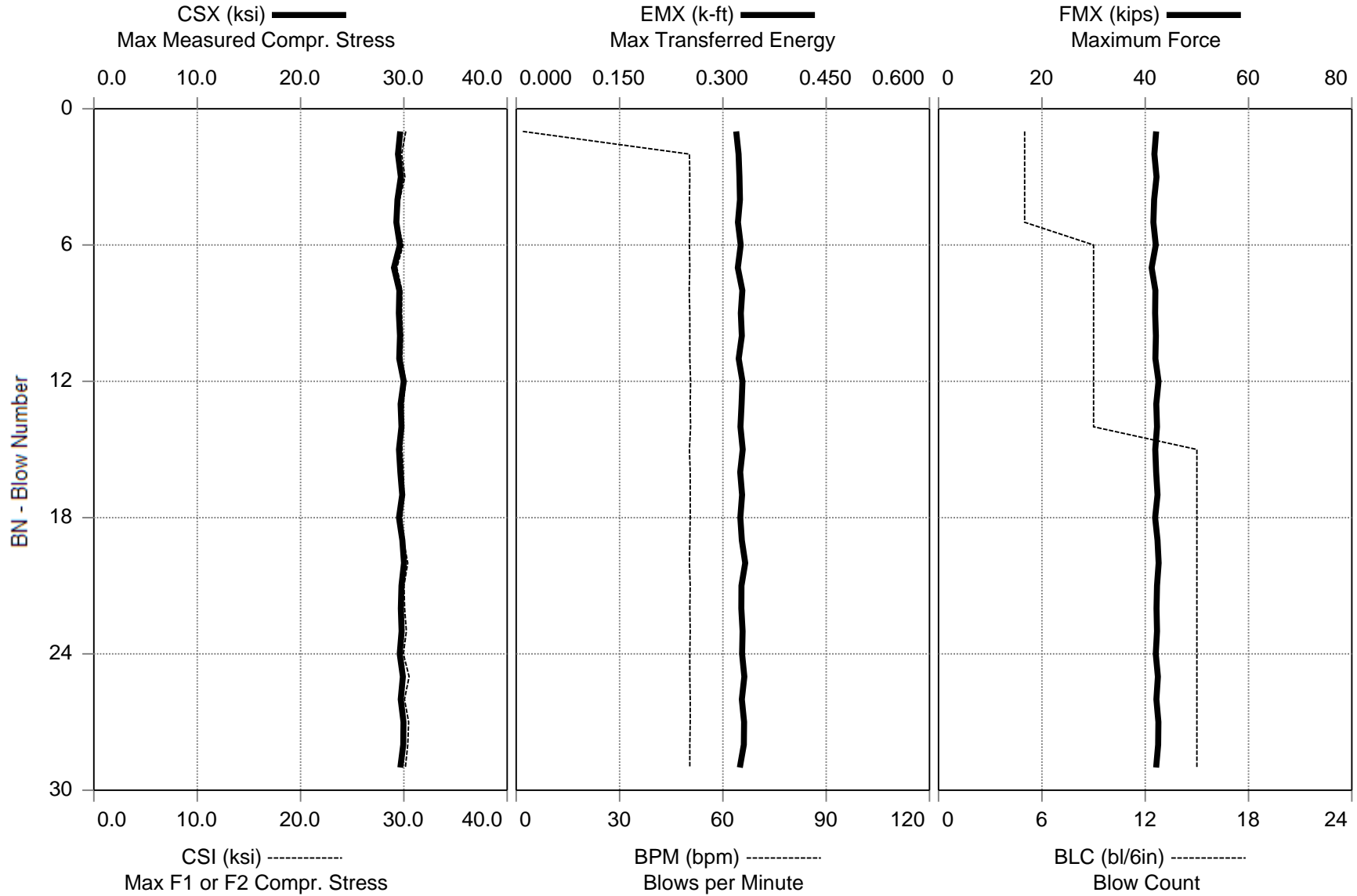
EMX 0.325 k-ft
 ETR 92.9 (%)
 BPM 50.5 bpm
 FMX 42 kips
 VMX 16.3 f/s
 QNV 0.00 []
 QNV 0.00 []

Pile Properties

LE 34.00 ft
 AR 1.42 in²
 EM 30000 ksi
 SP 0.492 k/ft3
 WS 16807.9 f/s
 EA/C 2.5 ksec/ft
 2L/C 4.06 ms
 JC []
 LP 29.63 ft

Sensors

F3: [413 NWJ-1] 212.28 (1)
 F4: [413 NWJ-2] 213.94 (1)
 A3: [K3773] 380 mv/5000g's (1)
 A4: [K4822] 355 mv/5000g's (1)
 CLIP: OK



Thompson Engineering SPT Calibration - CME 550X (SN 355273) - 28.5 to 30.0 ft NWJ Rod - Mud Rotary
OP: MJN Date: 11-September-2017

AR: 1.42 in² SP: 0.492 k/ft³
LE: 34.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	TYPE	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
5	29.00	5	AV5	29.5	29.8	0.323	92.2	40.7	42	16.2
			MAX	29.7	30.2	0.325	92.8	50.4	42	16.3
14	29.50	9	AV9	29.6	29.8	0.326	93.1	50.4	42	16.3
			MAX	30.0	30.2	0.328	93.9	50.6	43	16.5
29	30.00	15	AV15	29.8	30.1	0.328	93.7	50.4	42	16.4
			MAX	30.0	30.5	0.332	95.0	50.5	43	16.6
Average				29.7	30.0	0.326	93.3	48.7	42	16.4
Maximum				30.0	30.5	0.332	95.0	50.6	43	16.6

Total number of blows analyzed: 29

BL# Sensors

1-29 F3: [413 NWJ-1] 212.3 (1.00); F4: [413 NWJ-2] 213.9 (1.00); A3: [K3773] 380.0 (1.00);
A4: [K4822] 355.0 (1.00)

Time Summary

Drive 33 seconds 2:03 PM - 2:03 PM BN 1 - 29

Thompson Engineering SPT Calibration - CME 550X (SN 355273) - 28.5 to 30.0 ft NWJ Rod - Mud Rotary
OP: MJN Date: 11-September-2017

AR: 1.42 in² SP: 0.492 k/ft³
LE: 34.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
6	29.06	9	29.6	29.9	0.326	93.1	50.3	42	16.3
7	29.11	9	29.0	29.3	0.322	91.9	50.4	41	16.1
8	29.17	9	29.6	29.8	0.328	93.8	50.2	42	16.4
9	29.22	9	29.5	29.8	0.326	93.2	50.4	42	16.3
10	29.28	9	29.6	29.9	0.327	93.6	50.4	42	16.3
11	29.33	9	29.5	29.8	0.323	92.3	50.4	42	16.3
12	29.39	9	30.0	30.2	0.328	93.9	50.6	43	16.5
13	29.44	9	29.7	30.0	0.327	93.5	50.5	42	16.3
14	29.50	9	29.8	29.8	0.326	93.0	50.6	42	16.3
15	29.53	15	29.5	29.8	0.329	94.0	50.3	42	16.3
16	29.57	15	29.7	29.9	0.325	92.9	50.5	42	16.3
17	29.60	15	29.8	30.0	0.328	93.7	50.5	42	16.4
18	29.63	15	29.5	29.8	0.325	92.9	50.5	42	16.3
19	29.67	15	29.8	30.0	0.327	93.5	50.4	42	16.4
20	29.70	15	30.0	30.4	0.332	95.0	50.3	43	16.6
21	29.73	15	29.8	30.0	0.327	93.4	50.5	42	16.4
22	29.77	15	29.7	30.1	0.327	93.4	50.4	42	16.4
23	29.80	15	29.8	30.2	0.329	93.9	50.5	42	16.5
24	29.83	15	29.6	29.9	0.328	93.7	50.4	42	16.3
25	29.87	15	29.9	30.5	0.331	94.6	50.4	42	16.6
26	29.90	15	29.7	30.1	0.327	93.6	50.5	42	16.4
27	29.93	15	30.0	30.5	0.331	94.5	50.5	43	16.6
28	29.97	15	29.9	30.4	0.330	94.4	50.4	43	16.6
29	30.00	15	29.7	30.1	0.325	92.7	50.4	42	16.4
	Average		29.7	30.0	0.327	93.5	50.4	42	16.4
	Maximum		30.0	30.5	0.332	95.0	50.6	43	16.6

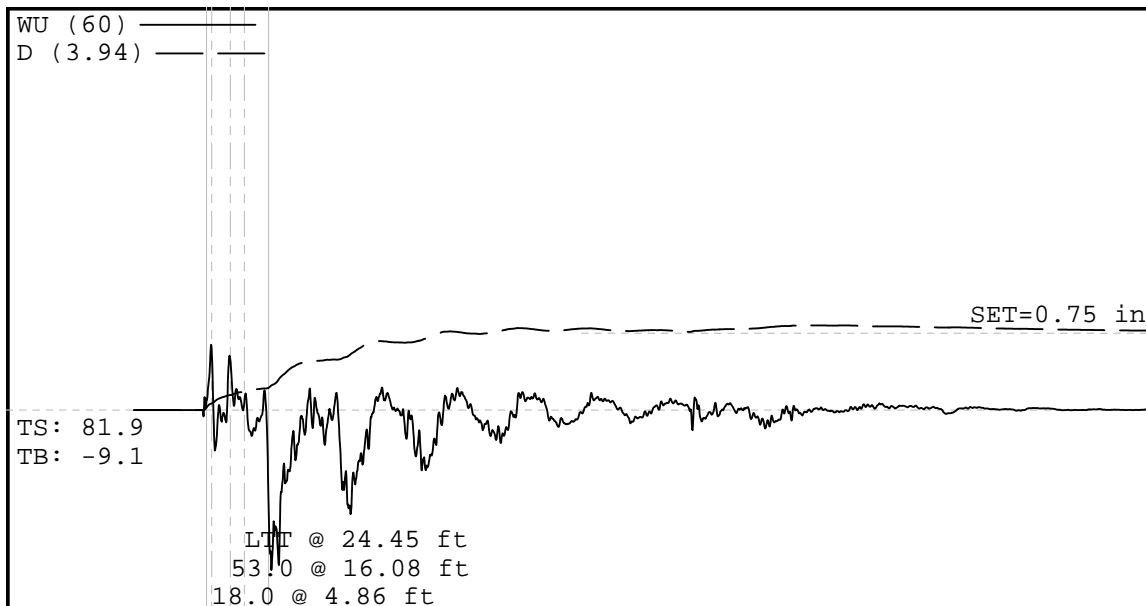
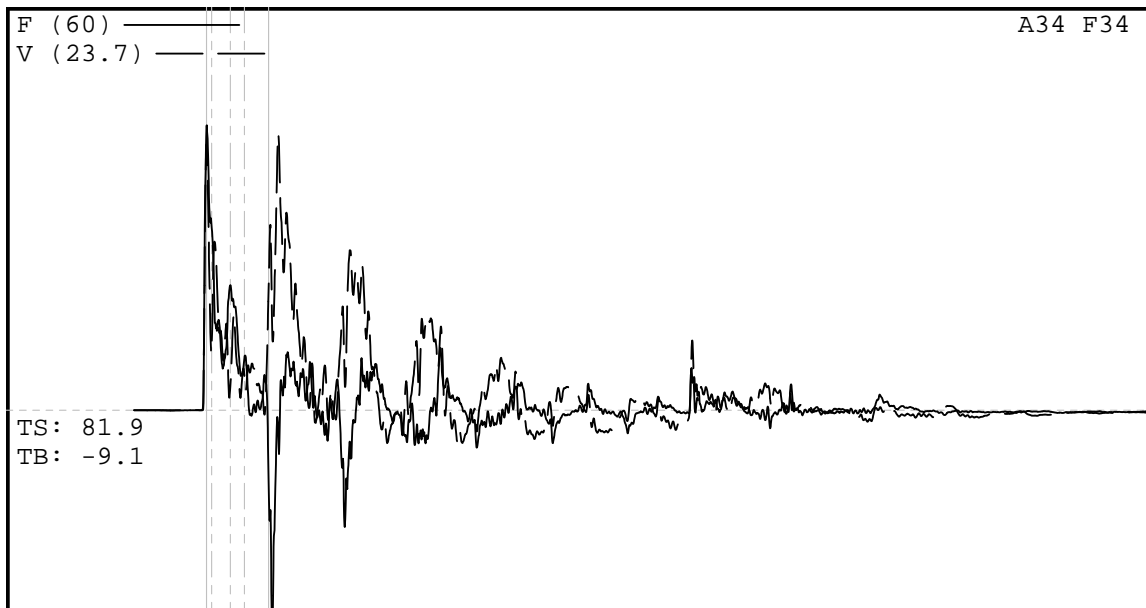
Total number of blows analyzed: 24

BL# Sensors

6-29 F3: [413 NWJ-1] 212.3 (1.00); F4: [413 NWJ-2] 213.9 (1.00); A3: [K3773] 380.0 (1.00);
A4: [K4822] 355.0 (1.00)

Time Summary

Drive 33 seconds 2:03 PM - 2:03 PM BN 1 - 29



Project Information

PROJECT: Thompson Engineering SPT CalibraticCSX 29.87 ksi
 PILE NAME: CME 550X (SN 355273) - 31.0 to 3CSI f30.48 ksi
 DESCR: NWJ Rod - Mud Rotary
 OPERATOR: MJN
 FILE: CME 550X (SN 355273)_6
 9/11/2017 2:13:12 PM
 Blow Number 12

Quantity Results

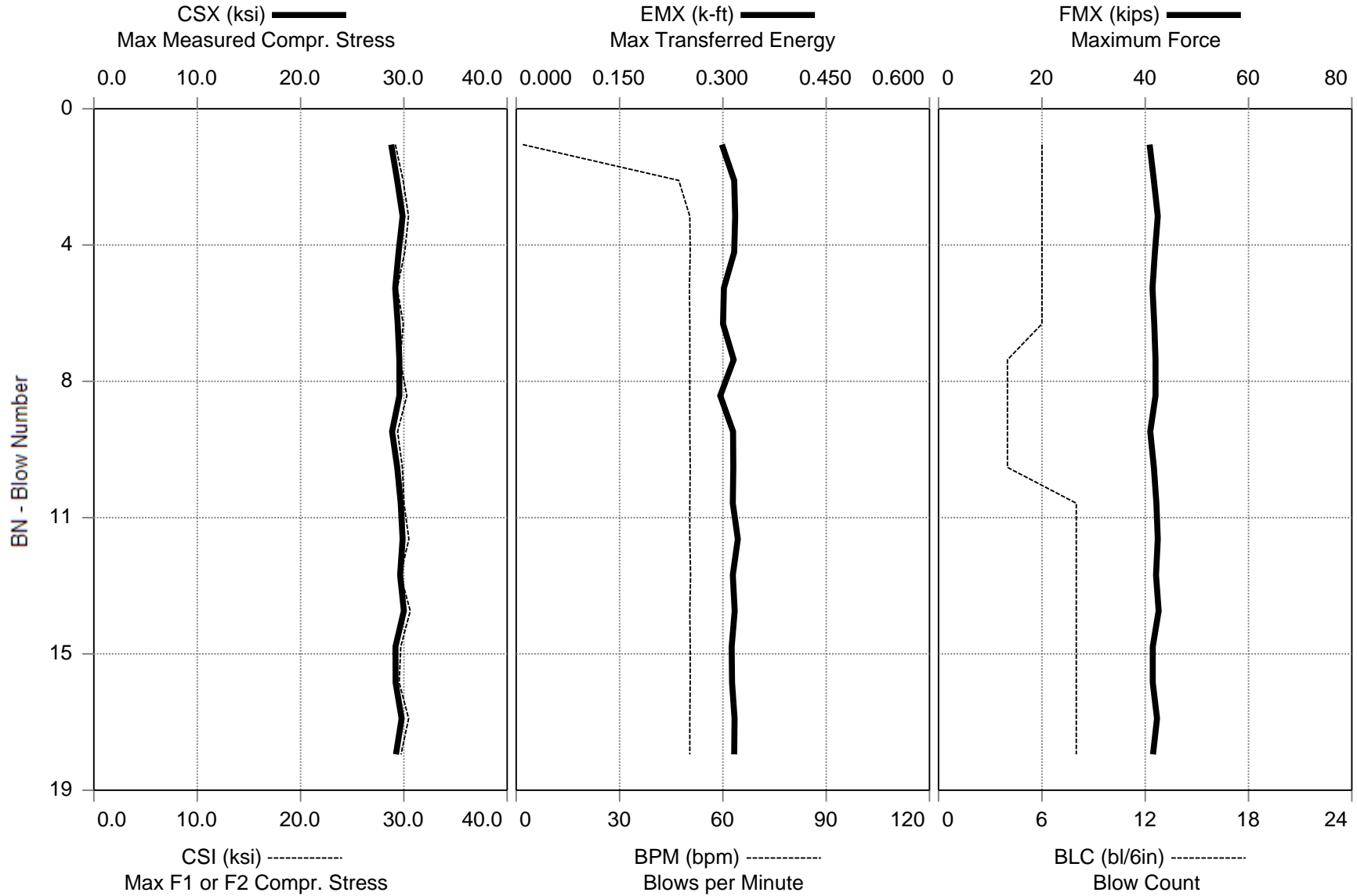
EMX 0.322 k-ft
 ETR 91.9 (%)
 BPM 50.4 bpm
 FMX 42 kips
 VMX 16.2 f/s
 QNV 0.00 []
 QNV 0.00 []

Pile Properties

LE 37.00 ft
 AR 1.42 in^2
 EM 30000 ksi
 SP 0.492 k/ft3
 WS 16807.9 f/s
 EA/C 2.5 ksec/ft
 2L/C 4.42 ms
 JC []
 LP 32.13 ft

Sensors

F3: [413 NWJ-1] 212.28 (1)
 F4: [413 NWJ-2] 213.94 (1)
 A3: [K3773] 380 mv/5000g's (1)
 A4: [K4822] 355 mv/5000g's (1)
 CLIP: OK



Thompson Engineering SPT Calibration - CME 550X (SN 355273) - 31.0 to 32.5 ft NWJ Rod - Mud Rotary
OP: MJN Date: 11-September-2017

AR: 1.42 in² SP: 0.492 k/ft³
LE: 37.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	TYPE	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
6	31.50	6	AV6	29.3	29.8	0.308	88.1	41.8	42	15.2
			MAX	29.9	30.4	0.318	90.8	50.5	42	15.5
10	32.00	4	AV4	29.3	29.8	0.310	88.7	50.4	42	16.0
			MAX	29.6	30.3	0.316	90.2	50.5	42	16.4
18	32.50	8	AV8	29.6	30.0	0.316	90.3	50.5	42	15.6
			MAX	30.0	30.6	0.322	91.9	50.6	43	16.2
Average				29.4	29.9	0.312	89.2	47.6	42	15.5
Maximum				30.0	30.6	0.322	91.9	50.6	43	16.4

Total number of blows analyzed: 18

BL# Sensors

1-18 F3: [413 NWJ-1] 212.3 (1.00); F4: [413 NWJ-2] 213.9 (1.00); A3: [K3773] 380.0 (1.00);
A4: [K4822] 355.0 (1.00)

Time Summary

Drive 20 seconds 2:12 PM - 2:13 PM BN 1 - 18

Thompson Engineering SPT Calibration - CME 550X (SN 355273) - 31.0 to 32.5 ft NWJ Rod - Mud Rotary
OP: MJN Date: 11-September-2017

AR: 1.42 in² SP: 0.492 k/ft³
LE: 37.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
7	31.63	4	29.6	29.6	0.316	90.2	50.4	42	16.1
8	31.75	4	29.6	30.3	0.296	84.6	50.4	42	15.8
9	31.88	4	28.9	29.4	0.315	89.9	50.4	41	15.5
10	32.00	4	29.4	29.9	0.315	90.0	50.5	42	16.4
11	32.06	8	29.7	30.0	0.314	89.8	50.4	42	15.4
12	32.13	8	29.9	30.5	0.322	91.9	50.4	42	16.2
13	32.19	8	29.6	29.7	0.314	89.8	50.6	42	15.9
14	32.25	8	30.0	30.6	0.317	90.6	50.4	43	15.9
15	32.31	8	29.2	29.7	0.313	89.3	50.5	41	15.2
16	32.38	8	29.2	29.6	0.313	89.5	50.5	41	15.3
17	32.44	8	29.8	30.5	0.317	90.6	50.4	42	15.6
18	32.50	8	29.2	29.7	0.316	90.4	50.4	42	15.2
	Average		29.5	29.9	0.314	89.7	50.4	42	15.7
	Maximum		30.0	30.6	0.322	91.9	50.6	43	16.4

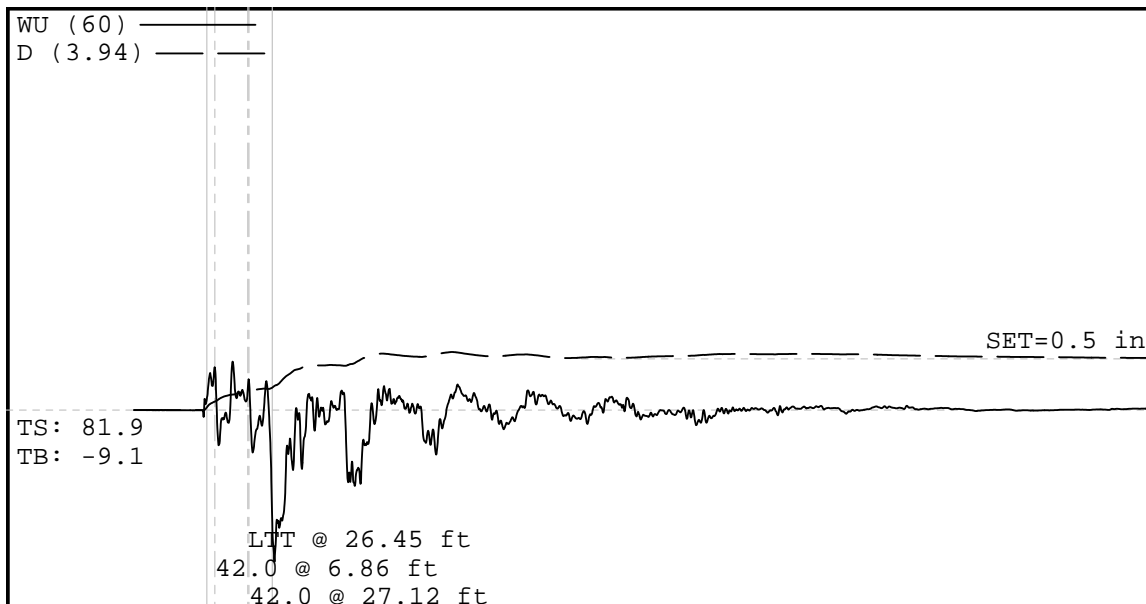
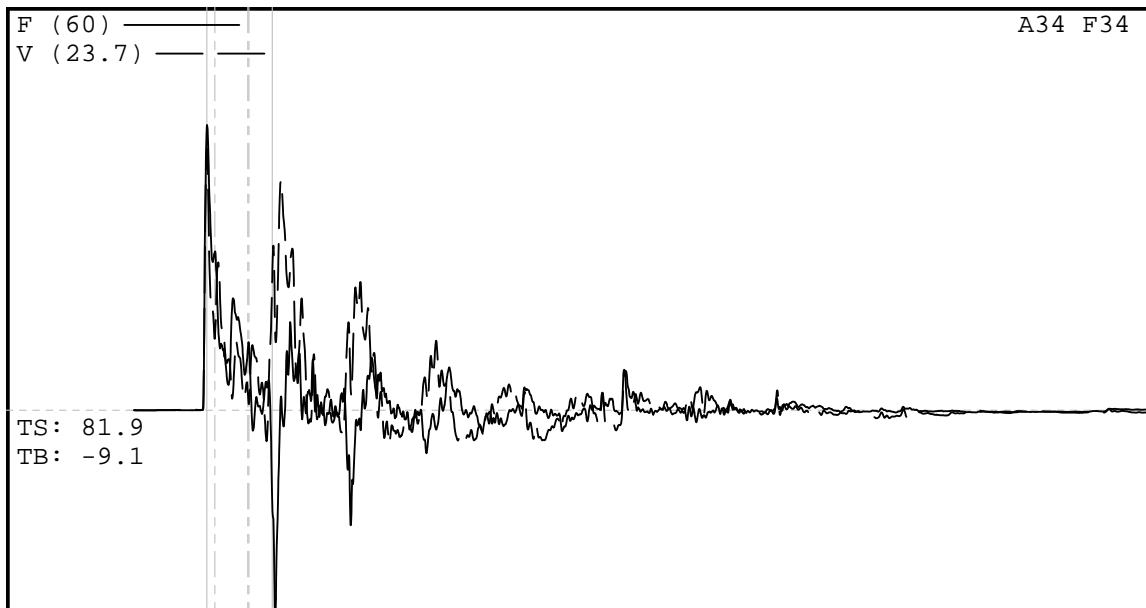
Total number of blows analyzed: 12

BL# Sensors

7-18 F3: [413 NWJ-1] 212.3 (1.00); F4: [413 NWJ-2] 213.9 (1.00); A3: [K3773] 380.0 (1.00);
A4: [K4822] 355.0 (1.00)

Time Summary

Drive 20 seconds 2:12 PM - 2:13 PM BN 1 - 18



Project Information

PROJECT: Thompson Engineering SPT CalibraticCSX 29.91 ksi
 PILE NAME: CME 550X (SN 355273) - 33.5 to 3CSI f30.50 ksi
 DESCR: NWJ Rod - Mud Rotary
 OPERATOR: MJN
 FILE: CME 550X (SN 355273)_7
 9/11/2017 2:22:47 PM
 Blow Number 22

Quantity Results

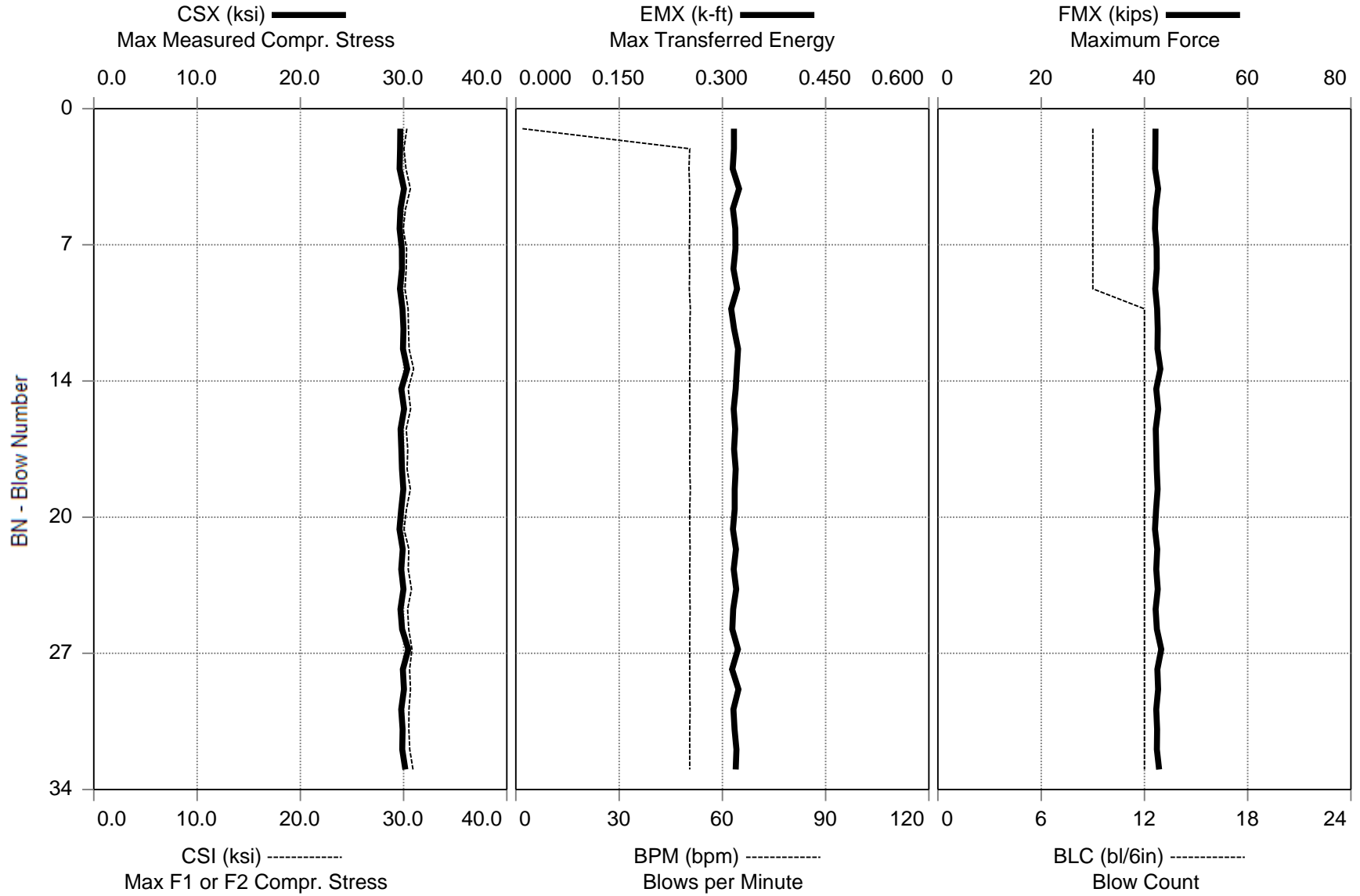
EMX 0.320 k-ft
 ETR 91.3 (%)
 BPM 50.6 bpm
 FMX 42 kips
 VMX 15.4 f/s
 QNV 0.00 []
 QNV 0.00 []

Pile Properties

LE 39.00 ft
 AR 1.42 in^2
 EM 30000 ksi
 SP 0.492 k/ft3
 WS 16807.9 f/s
 EA/C 2.5 ksec/ft
 2L/C 4.66 ms
 JC []
 LP 34.54 ft

Sensors

F3: [413 NWJ-1] 212.28 (1)
 F4: [413 NWJ-2] 213.94 (1)
 A3: [K3773] 380 mv/5000g's (1)
 A4: [K4822] 355 mv/5000g's (1)
 CLIP: OK



Thompson Engineering SPT Calibration - CME 550X (SN 355273) - 33.5 to 35.0 ft NWJ Rod - Mud Rotary
OP: MJN Date: 11-September-2017

AR: 1.42 in² SP: 0.492 k/ft³
LE: 39.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	TYPE	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
9	34.00	9	AV9	29.7	30.2	0.318	90.9	45.1	42	15.2
			MAX	30.0	30.6	0.324	92.6	50.5	43	15.5
21	34.50	12	AV12	29.9	30.5	0.318	90.8	50.6	42	15.3
			MAX	30.3	31.0	0.323	92.2	50.7	43	15.6
33	35.00	12	AV12	29.9	30.6	0.318	90.9	50.5	43	15.4
			MAX	30.5	30.9	0.323	92.4	50.6	43	15.7
Average				29.9	30.4	0.318	90.9	49.0	42	15.3
Maximum				30.5	31.0	0.324	92.6	50.7	43	15.7

Total number of blows analyzed: 33

BL# Sensors

1-33 F3: [413 NWJ-1] 212.3 (1.00); F4: [413 NWJ-2] 213.9 (1.00); A3: [K3773] 380.0 (1.00);
A4: [K4822] 355.0 (1.00)

Time Summary

Drive 37 seconds 2:22 PM - 2:23 PM BN 1 - 33

Thompson Engineering SPT Calibration - CME 550X (SN 355273) - 33.5 to 35.0 ft NWJ Rod - Mud Rotary
OP: MJN Date: 11-September-2017

AR: 1.42 in² SP: 0.492 k/ft³
LE: 39.00 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 0.00 []

CSX: Max Measured Compr. Stress BPM: Blows per Minute
CSI: Max F1 or F2 Compr. Stress FMX: Maximum Force
EMX: Max Transferred Energy VMX: Maximum Velocity
ETR: Energy Transfer Ratio

BL#	Depth ft	BLC bl/6in	CSX ksi	CSI ksi	EMX k-ft	ETR (%)	BPM bpm	FMX kips	VMX f/s
10	34.04	12	29.9	30.4	0.313	89.3	50.7	42	15.3
11	34.08	12	30.0	30.5	0.317	90.5	50.5	43	15.4
12	34.13	12	29.9	30.5	0.323	92.2	50.6	43	15.4
13	34.17	12	30.3	31.0	0.321	91.7	50.5	43	15.6
14	34.21	12	29.8	30.4	0.319	91.2	50.5	42	15.3
15	34.25	12	30.0	30.7	0.316	90.4	50.5	43	15.4
16	34.29	12	29.7	30.2	0.319	91.0	50.6	42	15.2
17	34.33	12	29.8	30.4	0.317	90.6	50.5	42	15.3
18	34.38	12	29.8	30.3	0.319	91.2	50.5	42	15.2
19	34.42	12	30.0	30.6	0.318	90.8	50.7	43	15.4
20	34.46	12	29.8	30.3	0.318	90.8	50.5	42	15.3
21	34.50	12	29.6	30.1	0.315	90.1	50.5	42	15.1
22	34.54	12	29.9	30.5	0.320	91.3	50.6	42	15.4
23	34.58	12	29.8	30.4	0.316	90.4	50.5	42	15.3
24	34.63	12	30.0	30.8	0.320	91.4	50.5	43	15.4
25	34.67	12	29.7	30.4	0.316	90.2	50.6	42	15.2
26	34.71	12	29.9	30.5	0.314	89.8	50.5	42	15.3
27	34.75	12	30.5	30.8	0.323	92.2	50.5	43	15.7
28	34.79	12	29.9	30.6	0.314	89.7	50.5	42	15.3
29	34.83	12	30.0	30.7	0.323	92.4	50.5	43	15.4
30	34.88	12	29.8	30.5	0.316	90.3	50.6	42	15.3
31	34.92	12	29.9	30.5	0.318	90.8	50.5	42	15.3
32	34.96	12	29.9	30.6	0.320	91.5	50.5	42	15.4
33	35.00	12	30.2	30.9	0.319	91.2	50.5	43	15.4
		Average	29.9	30.5	0.318	90.9	50.5	42	15.3
		Maximum	30.5	31.0	0.323	92.4	50.7	43	15.7

Total number of blows analyzed: 24

BL# Sensors

10-33 F3: [413 NWJ-1] 212.3 (1.00); F4: [413 NWJ-2] 213.9 (1.00); A3: [K3773] 380.0 (1.00);
A4: [K4822] 355.0 (1.00)

Time Summary

Drive 37 seconds 2:22 PM - 2:23 PM BN 1 - 33

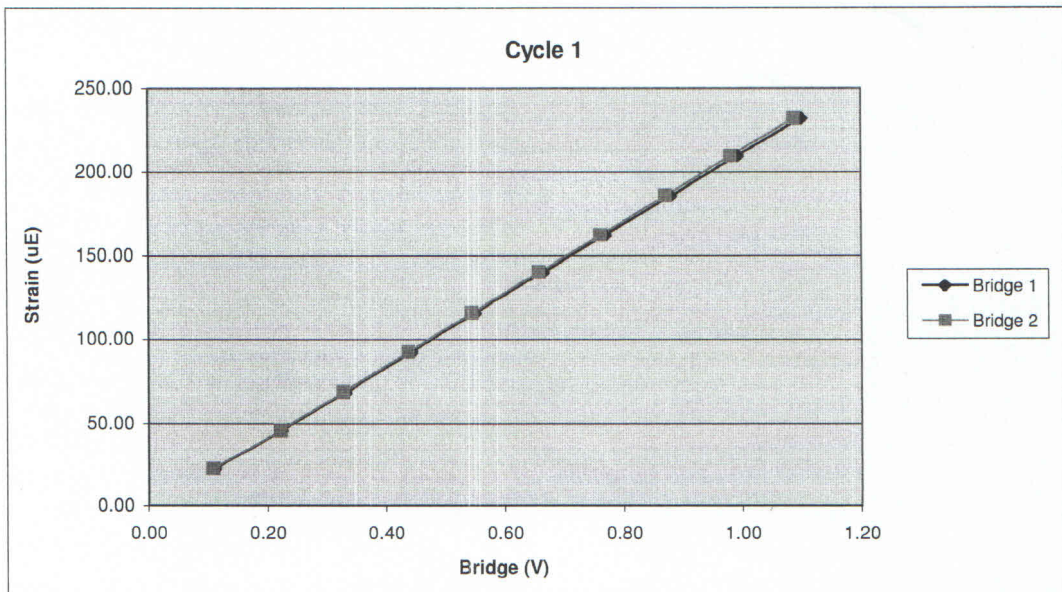
Appendix B

Dynamic Measurement Calibration Sheets

413NWJ		Cycle 1		
Sample	Force (lb)	Strain (μE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	990.99	22.25	0.11	0.11
3	2002.63	46.15	0.22	0.22
4	2988.10	69.17	0.33	0.33
5	3994.04	92.72	0.44	0.44
6	4963.98	115.99	0.55	0.54
7	5994.11	140.04	0.66	0.66
8	6930.41	162.12	0.77	0.76
9	7939.49	185.78	0.88	0.87
10	8950.34	209.60	0.99	0.98
11	9926.18	232.15	1.10	1.09

Bridge 1		Bridge 2	
Force Calibration (lb/V)	9036.37	Force Calibration (lb/V)	9125.33
Offset	-9.46	Offset	-2.08
Correlation	1.000000	Correlation	0.999997
Strain Calibration ($\mu E/V$)	212.51	Strain Calibration ($\mu E/V$)	214.61
Offset	-1.22	Offset	-1.05
Correlation	0.999996	Correlation	0.999998

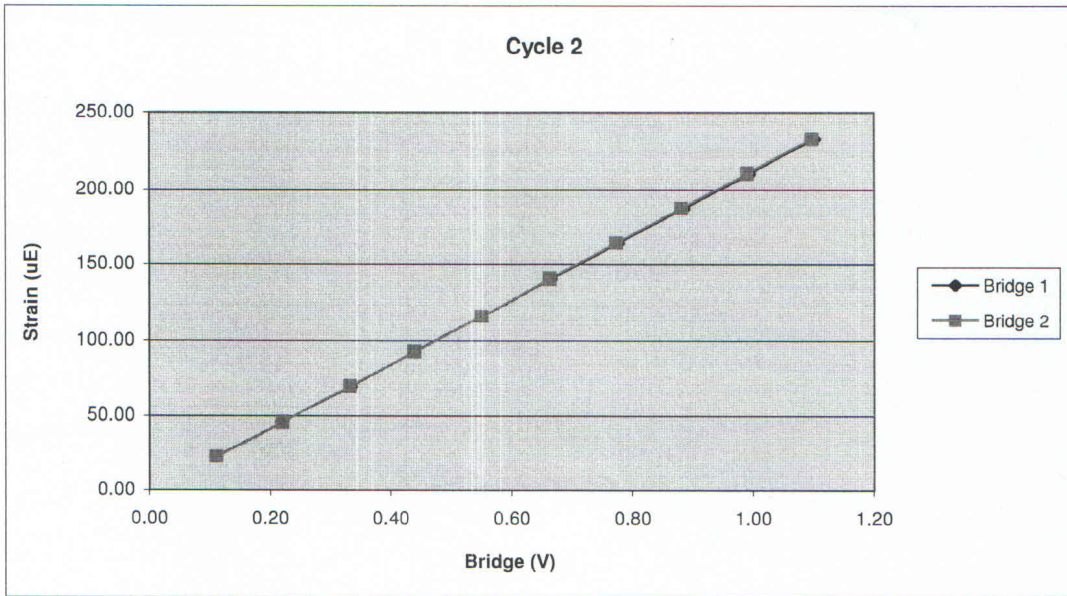
Force Strain Calibration	
EA (Kips)	42521.15
Offset	42.49
Correlation	0.999997



413NWJ		Cycle 2		
Sample	Force (lb)	Strain (μE)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	987.05	22.73	0.11	0.11
3	1966.04	45.88	0.22	0.22
4	2986.33	69.92	0.33	0.33
5	3951.35	92.68	0.44	0.44
6	4949.03	116.49	0.55	0.55
7	5960.47	140.42	0.66	0.66
8	6953.03	163.97	0.78	0.77
9	7934.77	187.50	0.88	0.88
10	8928.90	210.76	0.99	0.99
11	9905.13	233.34	1.10	1.10

Bridge 1		Bridge 2	
Force Calibration (lb/V)	8992.65	Force Calibration (lb/V)	9034.81
Offset	-7.95	Offset	-19.15
Correlation	0.999996	Correlation	0.999998
Strain Calibration ($\mu E/V$)	212.81	Strain Calibration ($\mu E/V$)	213.81
Offset	-0.84	Offset	-1.11
Correlation	0.999997	Correlation	0.999996

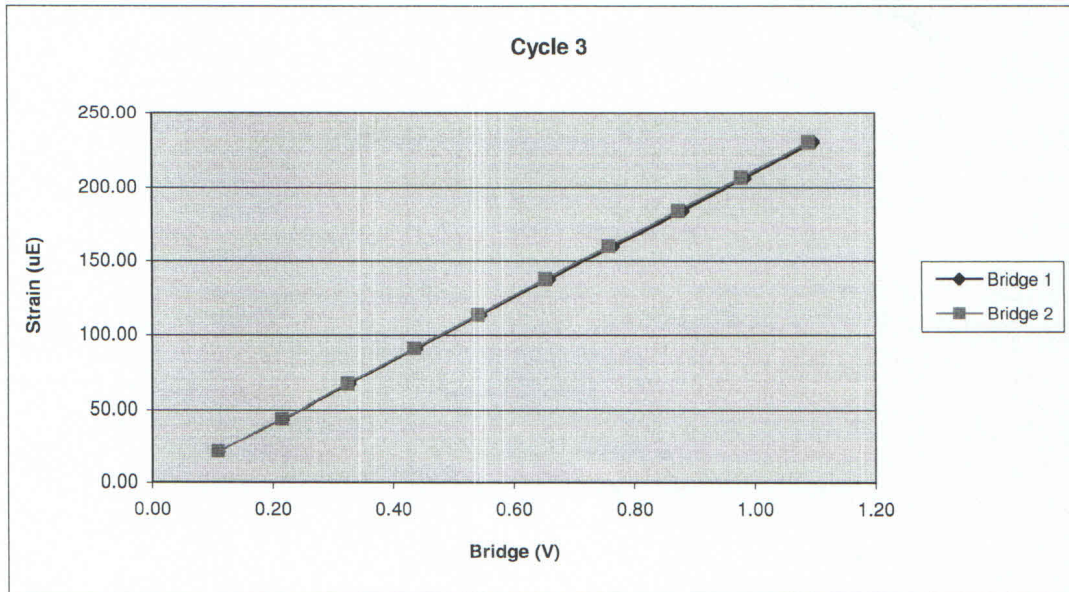
Force Strain Calibration	
EA (Kips)	42256.93
Offset	27.76
Correlation	0.999996



413NWJ		Cycle 3		
Sample	Force (lb)	Strain (μ E)	Bridge 1 (V)	Bridge 2 (V)
1	0.00	0.00	0.00	0.00
2	978.00	21.53	0.11	0.11
3	1923.94	43.44	0.22	0.21
4	2938.53	67.46	0.33	0.32
5	3944.67	91.22	0.44	0.44
6	4898.87	113.58	0.54	0.54
7	5921.72	137.82	0.66	0.65
8	6874.74	160.10	0.77	0.76
9	7926.90	184.40	0.88	0.87
10	8859.86	206.60	0.98	0.98
11	9889.59	230.60	1.10	1.09

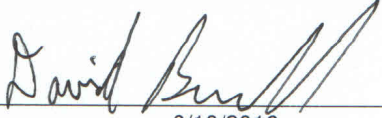
Bridge 1		Bridge 2	
Force Calibration (lb/V)	9008.15	Force Calibration (lb/V)	9088.85
Offset	-7.86	Offset	-13.21
Correlation	0.999998	Correlation	0.999998
Strain Calibration (μ E/V)	211.51	Strain Calibration (μ E/V)	213.41
Offset	-1.67	Offset	-1.80
Correlation	0.999995	Correlation	0.999993

Force Strain Calibration	
EA (Kips)	42588.80
Offset	63.31
Correlation	0.999997



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

Calibration Factors	413NWJ		
Bridge 1 ($\mu\text{E}/\text{V}$)	212.28	Bridge 2 ($\mu\text{E}/\text{V}$)	213.94
EA Factor (Kips)	42455.63	Area (in²)	1.42

Calibrated by: 
Calibrated Date: 6/10/2016

Pile Dynamics Inc
30725 Aurora Rd
Solon, OH 44139

Traceable to N.I.S.T.

QBTA: ON [ALT-F1/BB=60]

Pile Dynamics, Inc.

TG F2 DPF

Pile Dynamics
19-Jan-17 00:48

FS 10

BN 303
SL 485/ 3440/ 2

PJ:
PN: HOPBAR

A 4 -- US
F 2 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
UM 1.00

EA/C 30.3 Ks/ft
UN KIPS±0.1
FR 20000 MB 30

DL -43
UT -1
PK 1 TM-PEAK

F1/2 500/ 213
F3/4 213/ 213
A1/2 999/ 999
A3/4 999/ 355

TS 12 E B PD: k4822 LP 0.00 ft
TB 8.0 T1 9.6 2L/C 4.7 VA 1000 UE 1022 LI 1.0



ACCEPT SQ-OFF FL-OFF PR-OFF

VMX= 4.5 FMX= 69 AMX= 149
EMX= 0.3 MEX= 135 FVP= 0.99



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: K4822

CALIBRATION FACTOR: .071 MV/G

PAK (*5000): 355 DATE: 19JAN17

PDA OPERATOR: [Signature]

<-AT:PIEZORESISTIVE

OP: laine [ver:4.05]

AT:PIEZOELECTRIC->

Smart Sensor

Smart Chip Programmed By R.M.W. on 19JAN17 CRC Value 5839

QBTA: ON [ALT-F1/BB=60]

Pile Dynamics, Inc.

TG F2 DPF

File Dynamics 09-Jan-16 06:32 LE 39.6 ft AR 1.7 in2 EM 30000 Ksi SP 0.492 K/ft3 WS 16810 ft/s WC 16862 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 -42 UT -1 PK 1 TM-PEAK F1/2 500/ 213 F3/4 213/ 213 A1/2 999/ 999 A3/4 999/ 380	FS — BN 4094 10 SL 1818/ 3440/ 99 PJ: PN: HOPBAR TS 12 TB 8.0	E B PD: k3773 T1 9.6 2L/C 4.7 VA 1000 VE 1022	A 4 -- US F 2 3.3 LP 0.00 ft LI 1.0
--	--	---	--

UMX= 4.7 FMX= 73 AMX= 149
 EMX= 0.3 MEX= 143 FVP= 1.00

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: K3773
 CALIBRATION FACTOR: .076 mV/g
 PAK (*5000): 380 DATE: 14JAN16
 PDA OPERATOR: [Signature]

<-AT:PIEZORESISTIVE

OP: laine [ver:4.05]

AT:PIEZOELECTRIC->

Smart Sensor

Smart Chip Programmed By J.M.W. on 14JAN16 CRC Value 317C